# TIBCO Spotfire® 4.0.2 - User's Manual

## Important Information

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# 1 Introduction

## 1.1 Introduction

Welcome to TIBCO Spotfire®!

TIBCO Spotfire makes it easy for you to access, analyze and create dynamic reports on your data. It delivers immediate value whether you are a market researcher, a sales representative, a scientist or a process engineer by letting you quickly identify trends and patterns in your critical business data.

Spotfire can access data in a number of places such as on your desktop or in a network file system. It can even access your data if it is located in remote databases, without you having to involve your IT department each time you wish to ask a new question.

Spotfire lets you filter your data interactively, and gives you answers instantly. It also lets you rapidly create clear and concise, yet sleek and colorful visualizations in the form of bar charts, cross tables, scatter plots and many more valuable tools that will help you respond to events that affect your business.

And finally, Spotfire lets you share your results. Static reports can be limiting to good business in this fast-paced world of data, and Spotfire allows you to create dynamic reports that help you to ask new questions, as well as be able to quickly turn your reports into instant presentations to show to your colleagues and customers.

**Note:** This user's manual contains information about all functionality that can be used within the Spotfire end user environment. If you do not have access to all licenses, some tools described in this help will be unavailable. For more information on how to get access to the full range of functionality, please visit the website http://spotfire.tibco.com/support.

## 1.2 The User Interface

The image below shows some of the main parts of the TIBCO Spotfire® user interface.
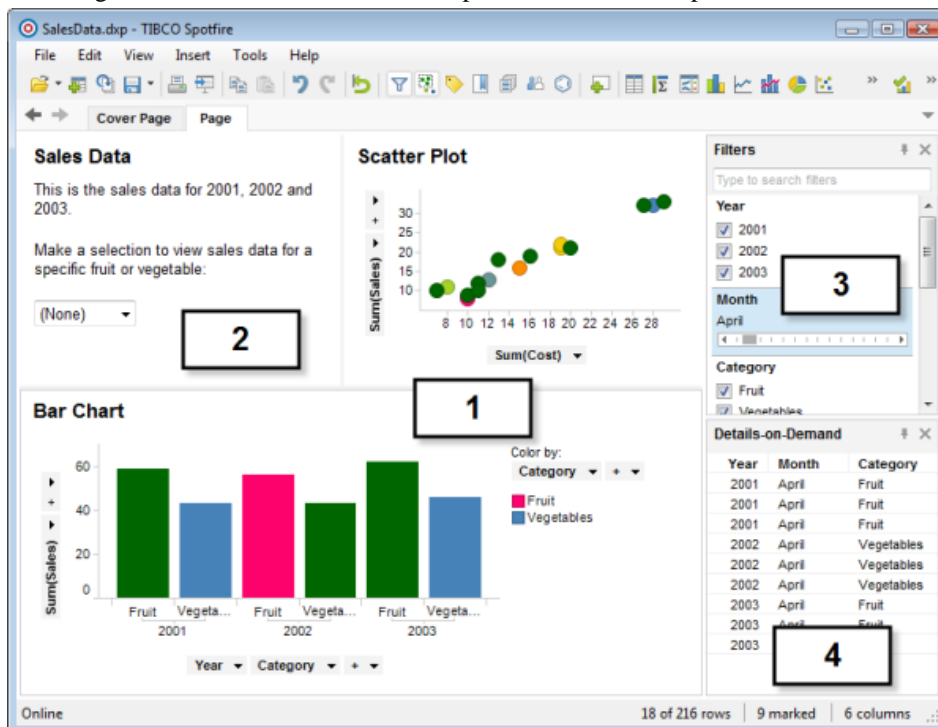
### 1. Visualizations

Visualizations are the key to analyzing data in Spotfire. A variety of visualization types can be used to provide the best view of the data:

- Tables
- Cross Tables
- Graphical Tables
- Bar Charts
- Line Charts
- Combination Charts
- Pie Charts
- Scatter Plots
- 3D Scatter Plots
- Map Charts
- Treemaps
- Heat Maps
- Parallel Coordinate Plots
- Summary Tables
- Box Plots

Different types of visualizations can be shown simultaneously. They can be linked to each other, and may or may not be updated dynamically when the corresponding filters on the page are manipulated (see below).

Visualizations can be made to reflect many dimensions of data by letting values control visual attributes such as size, color, shape, etc.

### 2. Text areas

You can type text in text areas, explaining what is seen in the different visualizations. This can be particularly useful if you are creating analytic applications for other users. Text areas can also include several different types of controls, allowing you to filter, perform actions or make selections to view particular types of data, etc.

### 3. Filters

By adjusting filters, you can reduce the data seen in the visualizations to "drill down" to the things that interest you. Filters are powerful tools that quickly let you see various aspects of your data and make discoveries.

Filters appear in several forms, and you can select the type of filter device that best suits your needs (for example, check boxes, sliders, etc). When you manipulate a filter by moving a slider or by selecting a check box, all linked visualizations are immediately updated to reflect the new selection of data. By default, all new visualizations on a page will be limited by the filtering scheme used on the page. However, the filtering scheme can be changed for each visualization separately.

### 4. Details-on-Demand

The Details-on-Demand window can be used to show the exact values of a row or a group of rows. By clicking an item in a visualization, or marking several items by clicking and dragging with the mouse around them, you can see the numerical values and textual data they represent directly in the Details-on-Demand window.

## 1.3 Logging In

When you start TIBCO Spotfire a login dialog appears. Enter your Username and Password, and click on the **Login** button to start Spotfire. If you select the **Save my login information**

check box, you will automatically be logged in when you start Spotfire in the future. Logging into Spotfire will let you access the joint library and other collaboration features.

If the Save my login information check box has been selected, but you later want to reach this dialog again, you can force it to be shown by using the **TIBCO Spotfire (show login dialog)** option, reached via the Start menu > All Programs > TIBCO.



If you are working on a large company with multiple TIBCO Spotfire Servers, you may occasionally also need to change the server you are connecting to via the drop-down list. New servers can be added to the list by clicking on the Manage Servers... link.

## Connecting via Proxy Server

If you are connecting via a proxy server, you may need to change your security settings in Internet Explorer prior to logging into Spotfire. See the Microsoft Internet Explorer help for more information. Prior to logging into Spotfire, make sure that the Spotfire Server start page can be accessed by browsing to http://<hostname>/spotfire/.

## Downloading Updates

Spotfire will automatically check for updates on your Spotfire Server that apply to you. If you have a network connection to the Spotfire Server, and there are updates available, you will be notified of this and can select whether to install them right away or at a later time.

You can get a look at the contents of the available updates by clicking on the **View updates** link in the notification dialog.

## Working Offline

If you are on a plane or just happen to not be connected to the network where your Spotfire Server is located, you can work with Spotfire offline. Almost all of the functionality of Spotfire works fine without a connection to the server. Library access, however, does not, nor can you access information links to databases. To work offline, simply click the **Work Offline** button in the login dialog. With some licenses of Spotfire, you do need to connect to your Spotfire Server at least once a month to be able to continue to work offline.

## Updates and Working Offline

If you have more than one server, and one of them has provided you with updates, this server must be selected in the login screen for those updates to be available, even if you choose to work offline.

# 1.4　Logging In Details

## 1.4.1　Details on Manage Servers

**► To reach the Manage Servers dialog:**

1. In the Login dialog of TIBCO Spotfire, click on the **Manage Servers...** link.
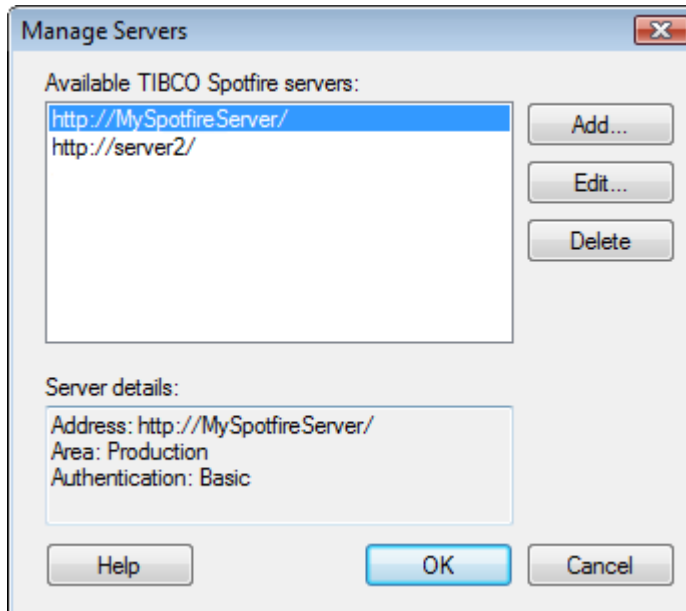


| Option | Description |
| --- | --- |
| **Available TIBCO Spotfire servers** | Lists all previously added Spotfire servers, which you can select to log into. |
| **Add...** | Opens the Add Server dialog, where you can add new Spotfire servers to the list. |
| **Edit...** | Opens the Edit Server dialog, where you can edit the address and area of the selected Spotfire server. |
| **Delete** | Deletes the selected server from the list of Available TIBCO Spotfire servers. |
| **Server details** | Lists information about the selected Spotfire server, such as its address, area and authentication type. |

## 1.4.2　Details on Add/Edit Server

**► To reach the Add Server dialog:**

1. In the Login dialog of TIBCO Spotfire, click on the **Manage Servers...** link.
2. In the Manage Servers dialog, click **Add...**.
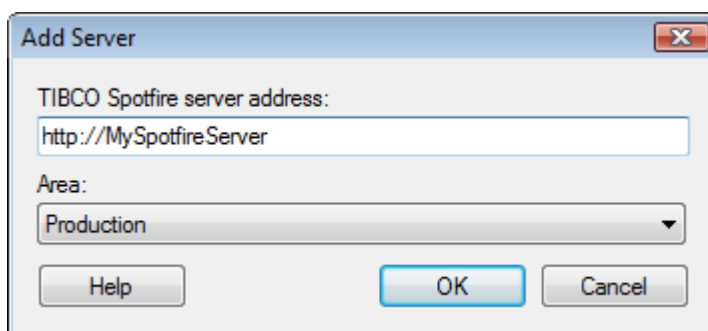
### ► To reach the Edit Server dialog:

1. In the Login dialog of TIBCO Spotfire, click on the **Manage Servers...** link.
2. In the Manage Servers dialog, click to select a server, then click **Edit...**.
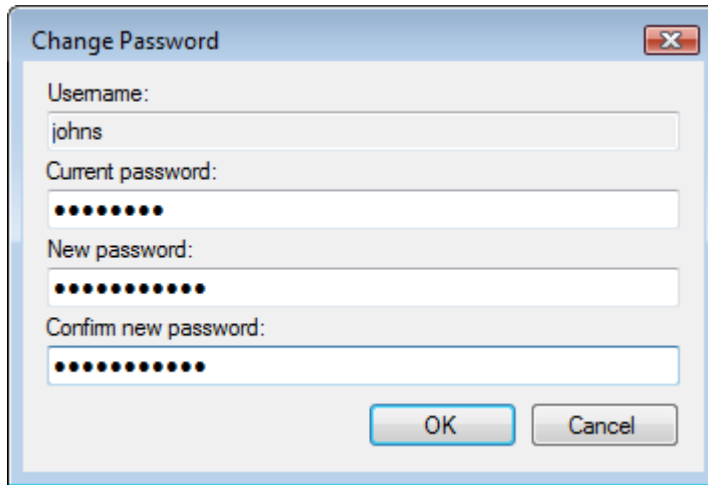


| Option | Description |
| --- | --- |
| **TIBCO Spotfire server address** | This is where the web address to the new server should be specified. Contact your TIBCO Spotfire Administrator for this type of information. |
| **Area** | Specifies whether the connection should be made to the **Production** area or to the **Test** area on the specified server. The Production area is normally the preferred option for all common users. The Test area is basically reserved for developers and test pilots of new deployments. |

## 1.4.3    Details on Change Password

This dialog is available when your server has been set up to use Spotfire Database authentication only. It is not available in offline mode. If your Spotfire Server has been set up to use any other authentication mechanism this dialog will not be available at all.

### ► To reach the Change Password dialog:

1. Select **Tools > Change Password...**.

| Option | Description |
| --- | --- |
| **Username** | Shows the name of the currently logged in user. |
| **Current password** | Type the current password for the logged in user. |
| **New password** | Type the new password for the logged in user. |
| **Confirm new password** | Retype the password to ensure it is correct. |

# 2    Loading Data

## 2.1    Loading Data Overview

You can load data into TIBCO Spotfire from a number of different sources: by pasting from the clipboard, by opening simple text files, Microsoft Excel files, SAS files, a database or an information link (a predefined connection to a shared data source). You may also have access to additional file sources if such have been set up by your company.

You reach the different ways to load data via the **File** menu.

If more than one data table is needed in your analysis, you can add them using Add Data Tables or Add On-Demand Data Table.

### Limiting What Data to Load

When the data source contains large amounts of data, it may take a long time to retrieve all data and the application could also be perceived as less responsive to different actions. You may also want to restrict some data from certain users. When you are working with information links it is possible to limit what data to open in different analyses in a number of different ways (combinations are also possible):

| Method | Use when? | Define where? |
|---|---|---|
| **Add On-Demand Data Table** | When you want the data in your analysis to dynamically change with some predefined condition. For example, when setting up a details visualization dependent on the marking or filtering in another data table.<br><br>Another example is when you want one information link to return different data for different analysis files, in which case you could use the on-demand data table as the only data table in the analysis (with a document property as input). | On-demand data tables are added to your analysis in TIBCO Spotfire by selecting File > Add On-Demand Data Table and specifying the input conditions that should control loading.<br><br>See On-Demand Overview for more information.<br><br>**Note:** You can only specify a single fixed value as input to on-demand loading, so if you need to retrieve multiple values from a certain column you will have to make sure that the information link is set up to use a multiple selection prompt rather than using it as an on-demand data table. |
| **Prompted Information Links** | When the source data amount is huge, but the end users of the information link are allowed to determine what data to bring in for analysis themselves.<br><br>Can in some cases be replaced by an on-demand data table. | Prompts are defined in Information Designer, Information Link tab, Prompts section. |
| **Personalized Information Links** | When you want the data source to return only information applicable for a certain user name (via a lookup table) or for a specified group. | Personalized information links are set up on a filter or column element in Information Designer using the %CURRENT_USER% or %CURRENT_GROUPS% syntax. See Personalized Information Links |

| | | for more information. |
|---|---|---|
| **Parameterized Information Links** | When you want the data source to return only information applicable for a certain user or group in a more flexible way than with personalized information links. | Parameters are created in Information Designer (for example, as a part of an expression set on a column or filter) but their properties and definitions are defined using the API.<br><br>By using a parameterized information link and a configuration block, it is possible to create an analysis with different input parameters (e.g., to be used by an On-Demand data table) for different groups of users. See Parameterized Information Links for more information. |

## 2.2      Open File

### 2.2.1      Opening an Analysis File

If a colleague has created an analysis file (a DXP file) and either sent it to you in an email, or, given you a link to the Library where the file is located, **double-clicking** on the file will open it. To open a file from within TIBCO Spotfire, see below.

#### ► **To open an analysis file:**

1. Click on the Open button on the toolbar, or select **File > Open...**.
2. Browse to the analysis file of interest and click **Open**.
   **Note:** SFS files created with TIBCO Spotfire DecisionSite, opened in TIBCO Spotfire will not retain any visualizations created in DecisionSite, and the file will be opened as if it was a standard Spotfire Text Data Format file. Note that SFS files cannot be opened from the Library.

### 2.2.2      Opening a Text File

This option is used when delimited text files, such as CSV or TXT files, are opened in Spotfire.

#### ► **To open a text file:**

1. Click on the Open button on the toolbar, or select **File > Open...**.
2. Browse to the text file of interest and click **Open**.
3. Look at the **Data preview** and make sure that the format of your data looks OK.
4. If necessary, change any settings required to obtain the desired result.
   Comment: For detailed information about the various settings, see Import Settings or Import Settings - Advanced.
5. Click on **Refresh**.
   Response: The Data preview field is updated to show how data will be imported with the current settings.
6. When you are satisfied, click **OK**.
   Comment: For information about adding more data tables to the analysis, see How to Insert Multiple Data Tables to the Analysis.

**Note:** If a delimited text file is *pasted* into Spotfire, the Import Settings dialog will *not* be displayed. The default settings will be used during import.

**Note:** SFS files created with Spotfire DecisionSite, opened in Spotfire will not retain any visualizations created in DecisionSite, and the file will be opened as if it was a standard Spotfire Text Data Format file. Note that SFS files cannot be opened from the Library.

## 2.2.3    Opening an Excel File

Microsoft Excel files (XLSX or XLS) stored using Microsoft Office Excel 2000 or later can be opened in Spotfire.

### ► **To open an Excel file:**

1. Click on the Open button on the toolbar, or select **File > Open...**.
2. Browse to the Excel file of interest and click **Open**.
3. Select the **Worksheet** to import.

   Comment: If you cannot see all worksheets available in the file at this step, try saving and closing the file in Excel before you open it in Spotfire.
4. Look at the **Data preview** and make sure that the format of your data looks OK.
5. If necessary, change any settings required to obtain the desired result.

   Comment: For detailed information about the various settings, see Excel Import.
6. Click on **Refresh**.

   Response: The Data preview field is updated.
7. When you are satisfied, click **OK**.

   Comment: For information about adding more data tables to the analysis, see How to Insert Multiple Data Tables to the Analysis.

## 2.2.4    Opening a SAS File

**Note:** To be able to open SAS data files (*.sas7bdat, *.sd2) directly into TIBCO Spotfire, the SAS Providers for OLE DB 9.1.3 or later must first be installed on the client machine (see http://spotfire.tibco.com/sr for more information). *.sd7 files can also be opened provided that they first are renamed to *.sas7bdat.

### ► **To open a SAS file:**

1. Click on the Open button on the toolbar, or select **File > Open...**.
2. Browse to the SAS file of interest and click **Open**.
3. Select the columns to import by clicking on them in the Available columns list and then click **Add >**.
4. Comment: To select all columns click Add All. For multiple selection, press Ctrl and click on the desired columns.
5. Select whether you want to **Map data to TIBCO Spotfire compatible types** or not.
6. Select whether you want to **Use Description as column name** once imported into TIBCO Spotfire.

   Comment: For detailed information about the various settings, see SAS Data Import.
7. Click **OK**.

   Comment: For information about adding more data tables to the analysis, see How to Insert Multiple Data Tables to the Analysis.

## 2.2.5 Details

### 2.2.5.1 Details on Excel Import

**► To reach the Excel Import dialog:**
1. Select **File > Open...**.
2. Browse to a Microsoft Excel file and click **Open**.



| Option | Description |
|---|---|
| **Worksheet** | Select the worksheet containing the data you wish to import. **Note:** If you cannot see all worksheets available in the file, try saving and closing the file in Excel before you open it in Spotfire. |
| **Refresh** | Updates the Data preview field to reflect any changes made to the settings. |
| **Ignore empty rows** | Select the check box to skip empty rows during import. |
| **Data preview** | Shows how the file will be interpreted, given the specified settings. |
| **Name** | Double-click on a column name to edit the name. |
| **Type** | Change the type for a column by clicking on the arrow and selecting the new type from the drop-down menu. The available data types are: String, Integer, Real, Currency, Date, Time, DateTime, TimeSpan, LongInteger, SingleReal and Boolean. If an inapplicable data type is selected, the data in the preview will be displayed in italics once you have clicked on the Refresh button. |
| **Included** | Clear the check box to ignore a specific column upon import. |

The drop-down list available on each row contains the following options:

| Option | Description |
|---|---|
| **Name row** | Select this option on the row or rows that will be used to specify the column names in the imported data. |
| **Type row** | Select this option on the row that will be used to specify the data types. |
| **Data row** | Select this option for all data rows that you wish to import. |
| **Ignore** | Select this option for rows that should be ignored during import. |

## 2.2.5.2 Details on Import Settings

► **To reach the Import Settings dialog:**

1.  Select **File > Open...**.
2.  Browse to a delimited text file and click **Open**.



| Option | Description |
|---|---|
| **Separator character** | Allows you to specify which character to interpret as separator character.

Individual fields (column names, type strings, and values) are delimited by separator characters—usually commas, semicolons or tabs. Spotfire automatically makes a guess to determine the separator character, but you can change to a different separator character if necessary. |
| **Culture** | Allows you to change the culture (the language-related regional settings for formatting information, such as time, currency, or dates) |

| | |
|---|---|
| | from which the data originates. |
| **Encoding** | Allows you to change the encoding used to interpret the data. |
| **Advanced...** | Opens the Import Settings - Advanced dialog, where additional settings can be changed. |
| **Refresh** | Updates the Data preview field to reflect any changes made to the settings in this dialog or the Import Settings - Advanced dialog. |
| **Data preview** | Shows how the file will be interpreted, given the specified settings. |
| **Name** | Double-click on a column name to edit the name. |
| **Type** | Change the type for a column by clicking on the arrow and selecting the new type from the drop-down menu. The available data types are: String, Integer, Real, Currency, Date, Time, DateTime, TimeSpan, LongInteger, SingleReal and Boolean.  If an inapplicable data type is selected, the data in the preview will be displayed in italics once you have clicked on the Refresh button. |
| **Included** | Clear the check box to ignore a specific column upon import. |

The drop-down list available on each row contains the following options:

| Option | Description |
|---|---|
| **Name row** | Select this option on the row or rows that will be used to specify the column names in the imported data. |
| **Type row** | Select this option on the row that will be used to specify the data types. |
| **Data row** | Select this option for all data rows that you wish to import. |
| **Ignore** | Select this option for rows that should be ignored during import. |

## 2.2.5.3 Details on Import Settings - Advanced

**► To reach the Import Settings - Advanced dialog:**

1. Select **File > Open...**.
2. Browse to a delimited text file and click **Open**.
3. In the Import Settings dialog, click **Advanced...**.



| Option | Description |
|---|---|
| **Comment row beginning** | Allows you to ignore all rows beginning with a specific character sequence. For example, if "#" is used as in the example above, all rows beginning with # will be set as Comment rows and will be ignored during import. |
| **Set number of columns** | Allows you to specify a fixed number of columns to import. This could be smaller or greater than the number of columns available in the beginning of the text file. For example, in a data table where 50 columns are present for the first 100 rows and 60 columns for the following rows, it could be useful to set this option to 60 and, hence, import all available data. |
| **Minimum number of columns allowed** | Ignores rows where the number of available values is less than the specified number. If the data table contains comments or texts in the middle of the data, this option can be set to, for example, 5, and only rows with values in at least five columns will be imported. |
| **Interpret as null (missing value)** | Allows you to specify a string that should be interpreted as null (a missing data value). |
| **Start reading data from row** | Allows you to leave out a specified number of rows. For example, if your data contains a header of ten rows which should be ignored during import, this option should be set to 11. |

| | |
|---|---|
| **Name for columns with no name rows** | Specifies the default naming of columns for data tables without any specified name rows. The suffix "{0}" will automatically be added if you do not type it yourself and it means that all columns will receive a number after the specified name. For example, "Column {0}" will result in the columns "Column 1", "Column 2", "Column 3", etc. |
| **Concatenate multiple name rows** | Specifies how multiple name rows will be concatenated. For example, the default value for three name rows, "{0}, {1}, {2}", will separate the name parts of the different name rows with a comma and a space. If the commas are removed, "{0} {1} {2}", only a space will separate the name parts. |
| **Replace missing name fields** | Allows you to replace a missing name (or a part of a name if multiple name rows are used) by one of the following methods: **None** - leaves a name part blank. If no other name rows contribute to the name, the "Name for columns with no name rows" specified above will be used for that particular column. **From left** - takes the name or name part from the column on the left and uses it as a name or name part. **By string** - replaces missing names or name parts with the specified string. |
| **Has quote character** | Specifies whether or not the data table contains quote characters. |
| **Quote character** | Specifies the quote character. |
| **Quote escape** | Specifies how quote characters should be escaped. |
| **Allow newline characters in quoted fields** | Specifies whether or not newline characters will be allowed within a quoted field. |
| **Default** | Returns all settings in the Import Settings - Advanced dialog to the default values. |

## 2.2.5.4    Details on SAS Data Import

► **To reach the SAS Data Import dialog:**

1. Select **File > Open...**.
2. Browse to a SAS data file (*.sas7bdat or *.sd2) and click **Open**.



| Option | Description |
|---|---|
| **Available columns** | Lists all columns available in the SAS file. |
| | Click a column name in the list to select it. To select more than one column, press **Ctrl** and click the column names in the list. Then click **Add >** to send the selected column to the Selected columns field. |
| **Selected columns** | Lists all columns that will be imported into Spotfire. |
| **Add >** | Sends the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list and sends them back to the Available columns list. |
| **Add All** | Adds all available columns to the Selected columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Map data to TIBCO Spotfire compatible types** | Select this option to map the data to data types available in TIBCO Spotfire. If this check box is cleared, the SAS formatting will be unchanged. |
| **Use Description as column name (if available)** | Select this option to specify whether to use the SAS description as the column name once imported into TIBCO Spotfire. If this check box is cleared, the column name used in the SAS file will be kept after import. |

# 2.3    Open from Library

## 2.3.1    Opening Files from the Library

The library provides publishing capabilities for all of your analysis materials, so you can share data with your colleagues. The library can be used directly from Spotfire by anyone who has at least read privileges.

### ► To open a file from the library:

1. Select **File > Open From > Library...**.

   Comment: You can also add data from the library using either of the Add Data Table tools, or the Replace Data Table tool.

2. Navigate through the folders, and select the analysis file you want to open.

   Response: Information about the selected analysis file is displayed to the right of the list of folders and files.

   Comment: Which library folders you have access to is controlled by group privileges. Contact your Spotfire administrator if you cannot reach all the necessary data.

   Comment: SFS files created with Spotfire DecisionSite cannot be opened in Spotfire from the library. However, local SFS files can be opened using File > Open..., but in that case no visualizations or settings from the SFS file are retained.

   Comment: To limit the amount of items shown in the list, you can select **Analysis File** from the **Show items of type** drop-down.

3. Click **Open**.

   **Note:** You can also search for a file in the library by entering a file name, or part of a file name in the search field in the upper right corner in the dialog, and then pressing Enter. All the files and folders matching your search string will then be listed. See Searching the Library for more information about search expressions.

Files published in the library can also be accessed directly by users of Spotfire Web Player by clicking on a link to the analysis in an email or on a website.

**Tip:** Right-click in the library tree to display a pop-up menu where you can delete or edit the properties of previously added files and folders. You can also copy the URL to an analysis and open the analysis in the Web Player or send the link to a colleague.

## 2.3.2    Opening an Information Link

Information links are predefined database queries, specifying the columns to be loaded, and any filters needed to reduce the size of the data table prior to visualization. They are organized into different folders in the library. Which folders in the library are available to you depends on how your permissions have been set by the administrator. Information links are defined using **Tools > Information Designer**.

### ► To open an information link:

1. Select **File > Open From > Library...**.

2. Navigate through the folders, and select the information link you want to open.

   Response: Information about the information link is displayed to the right of the list of folders and files.

   Comment: Which Library folders you have access to is controlled by group privileges. Contact your Spotfire administrator if you cannot reach all the necessary data.

   Comment: To limit the amount of items shown in the list, you can select **Information Link** from the **Show items of type** drop-down.

3. Click **Open**.

   Response: The information link is opened into Spotfire. If the information link contains prompted steps, you have to respond to these first.

**Note:** You can also search for an item in the library by entering its name, or part of the name in the search field in the upper right corner in the dialog, and then pressing enter. All the files, information links and folders matching your search string will then be listed. See Searching the Library for detailed information about library search.

## 2.3.3  Searching the Library

You can search for library items in the Open from Library dialog, in the Library Administration tool and in Information Designer.

Searching for a text string will by default look for matching text in the **title** and **keywords** of the items in the library. You can use wildcards and boolean operators to search for parts and combinations of words. For a listing of the basic search syntax, see Searching in TIBCO Spotfire.

### Library specific search:

| Keyword | Example | Function |
| --- | --- | --- |
| **title:**<word in title> | title:sales | Locates library items with the specified word (or part of word) somewhere in the title. |
| **created_by:** <username> | created_by:admin<br><br>created_by::admin | Locates library items created by a certain user.<br>In the first example, all items modified by any users beginning with admin will be found. In the second example, only items modified by the user 'admin' will be found. |
| **modified_by:** <username> | modified_by:admin | Locates library items modified by a certain user. |
| **item_type:**<type> or **type:**<type> | item_type:datasource | Locates items of a specific type. The available types are: column, filter, join, procedure, query (=information link) folder, dxp (= TIBCO Spotfire analysis file), datasource, datafunction and colorscheme. |
| **item_id::**<GUID> or **id::**<GUID> | item_id::dac3cd8c-47ec-454a-a8f2-691c60ece052 | Locates a specific library item based on its unique identifier. |
| **depends_on** (<expression>) | depends_on(item_id::538bcde4-7212-475f-a348-5bb41ba39c41)<br><br>depends_on(Sales) | Locates all items that depend on a specific element. |
| **required_by** (<expression>) | required_by(item_id::6f6dc7e0-57bd-11d7-5ac0-0010ac110132) | Locates all items that are required by another item. If the GUID in the example to the left belongs to an information link, the search will find all columns, filters, etc. that are included in that information link. |

| modified | modified:"2 days ago"<br>modified:"a week ago"<br>modified:>"an hour ago"<br>modified:today<br>modified:<"this month" | It is possible to search for items that have been modified during a specified time span, relative to today. There are two different ways of describing relative dates and times:<br><br>1) State the number of time parts ago in a string surrounded by quotes. The available time parts are seconds, minutes, hours, days, weeks, months and years. For example, search for modified:<"6 months ago". The given number of time units will be subtracted from the current time in the search.<br><br>2) State the time period to look back at using either of the keywords; today, yesterday, "this week", "this month", "this year". Note that you need quotes around all keywords consisting of more than one word. In this type of search, the last part of the date or time is "reset" (the time gets set to zero, the day of the month gets set to 1 etc.). The start day of a week is dependent on your server locale. For a en-US |
|---|---|---|
| | modified::>created | locale the first day of the week would be Sunday.<br><br>Modified, created and accessed can also be used in comparisons with each other. The  example to the left locates all items that have been modified after their creation. |
| | modified:"2009-02-01T18:27:55CEST" | Modified can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items modified at a specific time. |
| created | created:>"this week"<br>created:<"2 weeks ago" | It is possible to search for items that have been created during a specified time span, relative to today. See details regarding the allowed time spans under "modified" above.<br><br>Modified, created and accessed can be used in comparisons with each other. |
| | created:>"2009-02-01T18:27:55CEST" | Created can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items created at a certain time. |
| accessed | accessed:>"this month"<br>accessed:<"2 weeks ago" | It is possible to search for items that have been accessed during a specified time span, relative to today. See details regarding the allowed time spans under "modified" above. |

| | | Modified, created and accessed can be used in comparisons with each other. |
|---|---|---|
| | | Accessed can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items accessed at a certain time. |
| | accessed:null | The example accessed:null finds all items that have never been accessed. |
| | accessed:>"2009-02-01T18:27:55CEST" | The last example finds all items that have been accessed after the first of February 2009. |
| **::>** | modified::>created | Used to finds items strictly greater than the expression following the operator. For example, finds all items that have been modified after their creation. |
| **::<** | accessed::<modified | Used to finds items strictly less than the expression following the operator. For example, finds all items that have been modified after they were last accessed. |
| **parent_id::** <folder GUID> | parent_id::538bcde4-7212-475f-a348-5bb41ba39c41 | Locates all items located in the specified folder. |
| **format_version:** <string or null> | format_version:null | Locates all items of a specified format version. For example, all items which have no format version specified can be found. |
| **content_size:** <byte> | content_size:>10000 content_size:>500KB content_size:<2MB | Locates all items of a specific byte size. In the first example, all items larger than 10000 bytes are found. If nothing else is specified, the number is interpreted as bytes, but you can specify content sizes in KB, MB or GB as well. |

### Analysis files:

When searching for analysis files, there are a number of search parameters that may help you locating a specific group of analyses. If you want to locate analysis files only, add type:dxp to the search expression.

| Keyword | Example | Function |
|---|---|---|
| **description** | description:sales type:dxp description:sales | Locates all items containing the specified word in their description. |

| | | Locates all analysis files containing the specified word in their description. |
|---|---|---|
| **keywords** | keywords:sales | Locates all items containing the specified keyword. |
| | type:dxp keywords:sales | Locates all analysis files containing the specified keyword. |
| **AllowWebPlayerResume:** <true or false> | AllowWebPlayerResume:true | If true, locates all analysis files that allow personalized views for all web player users. |
| **EmbedAllSourceData:** <true or false> | EmbedAllSourceData:true | If true, locates all analysis files that embed all source data. (Override and embed all data check box selected.) |
| **OnDemandInformationLinks:** <GUID> | OnDemandInformationLinks:* | The first example locates all analyses that use on-demand data tables. |
| | OnDemandInformationLinks:c45618c3-b7ac-43aa-bafe-e14f39fd4bb7 | You can also specify a GUID to locate all analyses that use a specific information link as an on-demand data table. |
| **AllTablesEmbedded:** <true or false> | AllTablesEmbedded:true | If true, locates all analysis files that only have embedded data tables. |

## Information Model elements:

If you want to locate information model elements of a specific type only, add type:column (or filter, join, procedure, query, folder or datasource) to the search expression.

| Keyword | Example | Function |
|---|---|---|
| **description** | description:sales | Locates all items containing the specified word in their description. |
| | type:query description:sales | Locates all information links containing the specified word in their description. |
| **column** | column:Sales | Locates all items referring to a source column with the specified name. |
| | column::Sales | The source column could be referred to in the conditions or groupings of a column element, a filter condition, a join condition or the join condition of a procedure. |
| **table** | table:SalesandCost | Locates all items referring to a source table or stored procedure with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **schema** | schema:dbo | Locates all items referring to a source schema with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **catalog** | catalog:Sales | Locates all elements referring to a source catalog with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **datatype** | datatype:integer | Locates all columns of the specified data type (integer, real, string, date, time, datetime, clob or blob). |
| **parameter** | parameter:MinSales parameter:* | Locates information links using the specified parameter. |
| <property_name>: | "my.prop":* | Custom properties in any information |

| <property_value> | model element are searchable using the same syntax.<br><br>However, note that the property name must by quoted if it contains a '.' delimiter. |
|---|---|

## Combinations of keywords:

You can combine many of the keywords described above to create more advanced search expressions. For example:

**type:query depends_on(type:column salary)** - searches for information links that contains a column named salary

**type:query depends_on(column:salary)** - searches for information links that contains an element that refers to a data source column named salary

**required_by(type::query InformationLinkName)** - shows the elements used by the information link with the name InformationLinkName.

**(not (required_by(type:dxp))) and type:query** - searches for information links that are not used by any analysis file in the library.

### ► To search for items in the Open from Library dialog:

Depending on where you are searching, you may get different search results. Analyses and information links are shown when searching in the Open from Library dialog, not any information model elements or data sources, etc.

1. Navigate to the top folder of the structure you want to perform the search in. If you want to search the entire library, navigate to the library root.
2. Type the text you want to search for in the search field at the top right corner of the dialog.
3. Click on the search button with a magnifying glass.
   Response: The dialog will switch to a Search Results view.
4. The items matching your search criteria will be displayed in the list. To return to the normal folder view, click the **Back to folder** link.

### ► To search for items in the Library Administration tool:

1. Navigate to the top folder of the structure you want to perform the search in. If you want to search the entire library, navigate to the library root.
2. Type the text you want to search for in the search field at the top right corner of the Library Administration tool.
3. Click on the **Search** button.
   Response: The Library Administration tool will switch to a Search Result view. **Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.
4. The items matching your search criteria will be displayed in the list. To return to the normal folder view, click the **Back to folder** link.

### ► To search for items in Information Designer:

Depending on where you are searching, you may get different search results. Information model elements, information links and data sources are shown when searching in Information Designer, not any analyses, etc.

1. Type the text you want to search for in the search field at the top of the Elements tree.
2. Click on the search button with a magnifying glass, .

Response: The search results are displayed. **Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.

3. The items matching the search result are shown in the list. To return to the normal folder view, click the **Clear Search...** link.

## ► **To use search expressions in custom RSS feeds:**

You can create a customized RSS feed showing the latest changes to the library items you are interested in by appending a library search expression to a URL.

Use the following syntax to create your own feed:

http://<server>/spotfire/library[/path/to/something/interesting]?rss[&search=<search_expression>]

The **path and search** parameters are optional. If you only specify http://myspotfireserver/spotfire/library?rss, the feed will return the 20 most recently modified files in the library. You can also add a **max-results** section if you want to limit the number of results shown, see example below.

Examples:

http://myspotfireserver/spotfire/library?rss&search=content_size:>500KB

http://myspotfireserver/spotfire/library?rss&search=created_by::admin

http://myspotfireserver/spotfire/library?rss&max-results=10&search=title:sales

## ► **To use search expressions in tibcospotfire links:**

You can incorporate a search expression in a tibcospotfire link in order to directly populate the Open from Library dialog with some suitable analyses or information links. See Links to Analyses in the Library for more information about links. The links are a list of keys and value pairs. The key and value are separated using colon, :, and each key and value pair are also separated with colons:

tibcospotfire:<key1>:<value1>:<key2>:<value2>...<keyN>:<valueN>

The following keys and values are allowed:

Search: <search expression> with optional parameters.

OrderBy : Title | Modified | Created | Accessed | ContentSize | Description

MaxResult: <positive integer>

SortDirection: Ascending | Descending

The values should be encoded using the following pattern:

| Value | Encoded to: |
|-------|-------------|
| : | \: |
| " | \' |
| \ | \\ |

Examples:

tibcospotfire:search:*:OrderBy:Modified:SortDirection:Descending:MaxResult:20

tibcospotfire:search:modified\:<\'3 days ago'\:OrderBy:Modified:SortDirection:Descending

## 2.3.4　　Edit Properties

### 2.3.4.1　　Details on Edit Properties - General

This dialog is used to edit the properties for an item in the library. It can be reached by right-clicking on the item of interest in any view representing the library structure and selecting **Edit Properties...** from the pop-up menu. In the Library Administration tool, it is reached when clicking on the **Edit...** link for the **Selected Item**.



To edit the properties of an item you must have Browse + Access + Modify permissions to the folder it is placed in.

| Option | Description |
| --- | --- |
| **Name** | The name of the library item. The following characters are not accepted in titles:<br>\ / : * ? " < > \| $ & + = @ # % ; , { [ ] } ^ ' ~ ´ |
| **Description** | A description of the library item. |
| **Keywords** | Allows you to add keywords which can be used for finding the item in the library. Keywords are separated by a semicolon. |

## 2.3.4.2    Details on Edit Properties - Document



| Option | Description |
|---|---|
| **Remember personalized view for each Web Player user** | Select this check box if you want to allow users to continue where they left off from one time to another when working on the analysis in the Web Player. For example, a user can open the analysis in the Web Player, change the view (by filtering out some data, for instance), close the analysis, and then open the analysis again with the same filter settings.<br>**Note:** To make sure this works completely, it is necessary to define key columns for all the data tables in the analysis even if they are embedded. |
| **Allow users to add new bookmarks** | The ability to add and modify bookmarks can be restricted on two levels: the user licenses and the property settings on an analysis level. This check box determines the analysis level settings based on the users' library folder permissions.<br>Clear the check box if you do not want anyone to be able to add bookmarks to the analysis.<br>Select the check box to allow some or all users to add bookmarks and specify the permitted level using the drop-down list: |

| | |
|---|---|
| | **Private bookmarks only (all users)** – allows all users to add private bookmarks but no public bookmarks are allowed. |
| | **Private (all users), public (write permissions needed)** – allows all users to add private bookmarks but only users with Modify folder permissions or higher will be able to make bookmarks public. |
| | **Private and public bookmarks (write permissions needed)** – allows only users with Modify folder permissions or higher to add any bookmarks. |
| | **Private and public bookmarks (all users)** – allows all users to add both private and public bookmarks. |
| **Select preview image** | Select whether or not to show a preview image for this analysis when browsing for analyses in the library. |
| | **Automatically** - sets the preview image to a snapshot of the active page when saving the analysis to the library. |
| | **Manually** - allows you to manually select a previously saved image. |
| | **(No preview)** - use this option to prevent any preview image from being shown in the library. |
| **Browse...** | When Select preview image has been set to Manually you can browse for an image to use in the preview. |
| **Current preview image** | Displays the currently selected preview image. If Select preview image has been set to Automatically and the analysis has not yet been saved to the library, then no preview will be visible. However, once saved to the library the active page when saving will be used as a preview image. |

# 2.4 Open Database

## 2.4.1 Open from Database Overview

By default, Spotfire can connect to several external data source types using the following drivers: ODBC, OLE DB, OracleClient and SQLClient. OLE DB UDL files can also be opened directly using **File > Open...**. Other external data sources may also be available depending on your installed data providers.

► **General data connection recommendations:**

1. Preferably, use Information Services and create an information link to retrieve your data.
2. If you need to use SqlServer, use the SqlClient Data Provider.
3. If you need to use Oracle, install the Oracle Data Provider for .NET (ODP.NET) on all machines that need to reach the database. It is faster and better than the default data provider for Oracle.
4. It is not recommended to use the OracleClient Data Provider because is at least twice as slow at retrieving data (compared to the other options) and even slower at retrieving metadata.
5. Use OleDb rather than ODBC, since ODBC only refers to a local registry connection string (one on each machine), which means it will be hard to administer. For OleDb the connection string is saved within the file. One advantage with ODBC is that you can change the connection string in a single place for one computer.

## 2.4.2 Opening Data from a Database

See Open from Database Overview for some tips on what connections to use.

### ► To open data using SQLClient:

1. Select **File > Open From > Database...**.
   Response: The Open Database dialog is displayed.
2. Click to select **SqlClient Data Provider** as **Data source type**.
3. Click **Configure...**.
   Response: The Configure Data Source Connection dialog is displayed.
4. Enter the **SQL server name**.
5. Specify whether to **Use Windows Authentication** or **Use SQL Server Authentication**.
6. If you are using SQL Server Authentication, type a **Username** and **Password** in the fields provided.
7. If you want to connect to a remote database, **Select or enter a database name**.
   Comment: Select a database from the drop-down list or type the name in the field.
8. If you instead have a local database file you want to connect to, select **Attach to database file**, and **Browse** for the local file. Type a logical name to associate with the database file.
9. Click **OK**.
   Response: The Specify Tables and Columns dialog is displayed.
10. Select the **Tables, views and columns** you wish to import.
    Comment: If desired you can edit the **SQL statement** directly, or load a previously saved SQL file with a more complex SQL statement.
11. Click **OK**.
    Response: Data is loaded into Spotfire.

### ► To open data using OLE DB:

**Note:** UDL files can be opened directly using **File > Open...**.

1. Select **File > Open From > Database...**.
   Response: The Open Database dialog is displayed.
2. Click to select **OleDb Data Provider** as **Data source type**.
3. Click **Configure...**.
   Response: The Configure Data Source Connection dialog is displayed.
4. Type or paste a connection line.
   Comment: This should normally be provided by your database administrator.
5. Click **OK**.
   Response: The Connection string field in the Open Database dialog is updated with the information entered in the previous step.
6. Click **OK**.
   Response: The Specify Tables and Columns dialog is displayed.
7. Select the **Tables, views and columns** you wish to import.
   Comment: If desired you can edit the **SQL statement** directly, or load a previously saved SQL file with a more complex SQL statement.
8. Click **OK**.
   Response: Data is loaded into Spotfire.

### ► **To open data using ODBC:**

**Note:** To learn how to set up a data source, please refer to the database vendor's documentation and the Windows documentation on ODBC. It might be necessary to install ODBC driver software particular to the database used before being able to utilize the ODBC option.

1. Select **File > Open From > Database...**.

   Response: The Open Database dialog is displayed.

2. Click to select **Odbc Data Provider** as **Data source type**.

3. Click **Configure...**.

   Response: The Configure Data Source Connection dialog is displayed.

4. Select a **System or user data source name** from the drop-down list.

   Comment: The data sources available here are the ones previously defined in Windows ODBC Data Source Administrator, found under Control Panel > Administrative Tools > Data Sources (ODBC). Contact your database administrator if you are missing any information.

5. If the data source is password protected, type a **Username** and **Password** in the fields provided.

6. Click **OK**.

   Response: The Connection string field in the Open Database dialog is updated with the information entered in the previous step.

7. Click **OK**.

   Response: The Specify Tables and Columns dialog is displayed.

8. Select the **Tables, views and columns** you wish to import.

   Comment: If desired you can edit the **SQL statement** directly, or load a previously saved SQL file with a more complex SQL statement.

9. Click **OK**.

   Response: Data is loaded into Spotfire.

### ► **To open data using OracleClient:**

**Note:** To be able to use the OracleClient data provider, you need to have Oracle Client installed on your computer.

1. Select **File > Open From > Database...**.

   Response: The Open Database dialog is displayed.

2. Click to select **OracleClient Data Provider** as **Data source type**.

3. Click **Configure...**.

   Response: The Configure Data Source Connection dialog is displayed.

4. Type or paste the **Oracle server name**.

5. If the data source is password protected, type a **Username** and **Password** in the fields provided.

6. Click **OK**.

   Response: The Connection string field in the Open Database dialog is updated with the information entered in the previous step.

7. Click **OK**.

   Response: The Specify Tables and Columns dialog is displayed.

8. Select the **Tables, views and columns** you wish to import.

   Comment: If desired you can edit the **SQL statement** directly, or load a previously saved SQL file with a more complex SQL statement.

9. Click **OK**.

   Response: Data is loaded into Spotfire.

## 2.4.3       Details

### 2.4.3.1       Details on Open Database

► **To reach the Open Database dialog:**

1.  Select **File > Open From > Database...**.
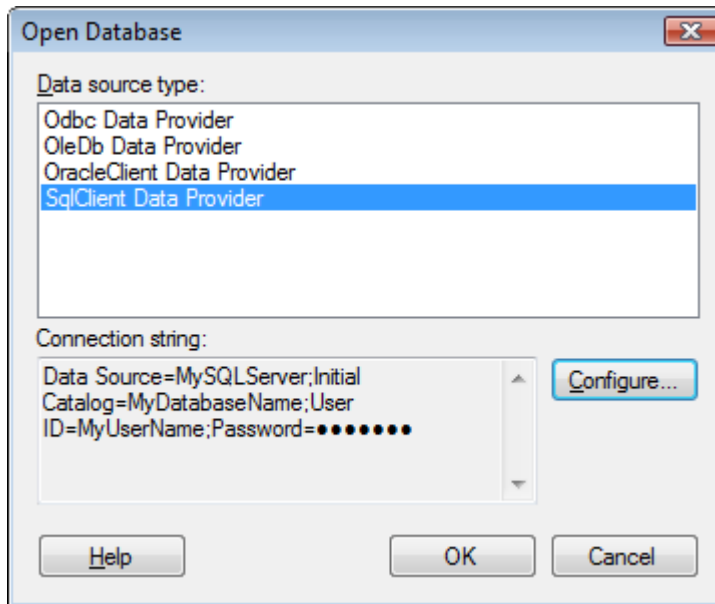


| Option | Description |
| --- | --- |
| **Data source type** | Lists the available data source types. |
| **Connection string** | Shows the connection string specified for the selected data source type. If no connection has been defined yet you can do that by clicking Configure.... |
| **Configure...** | Opens the Configure Data Source Connection dialog for the respective data source type: ODBC, OLE DB, OracleClient, SQLClient or a custom provider. |

### 2.4.3.2       Configure Data Source Connection - SQLClient

► **To reach the Configure Data Source Connection dialog:**

1.  Select **File > Open From > Database...**.
2.  In the Open Database dialog, click to select the **SqlClient Data Provider**.
3.  Click **Configure...**.

| Option | Description |
| --- | --- |
| **SQL server name** | The name of the SQL server where your data is located. |
| **Refresh** | Refreshes the list of available SQL servers to include a recently added SQL server name. |
| **Use Windows Authentication** | Select this option if you can use your normal Windows username and password to log into the SQL Server. |
| **Use SQL Server Authentication** | Select this option if the SQL server requires you to log in using a different username and password. |
| **Username** | The username you wish to use when logging into the SQL server. |
| **Password** | The password for the specified username. |
| **Allow saving credentials** | Select this option to allow saving of your credentials. |
| **Select or enter a database name** | The name of the database where your data is located. |
| **Attach to a database file** | Select this option if you have a local database file you want to connect to. |

| | |
|---|---|
| **Browse** | Browse for the database file. |
| **Logical name** | Specify a logical name to be associated with the database file. |

## 2.4.3.3   Configure Data Source Connection - OLE DB

An OLE DB data provider allows native access to data, such as an SQL Server or an Oracle database. Using an OLE DB data provider, Spotfire can retrieve data from a wide variety of data sources, not just relational databases. The connection string provided should specify the OLE DB driver that is designed to work with your data.

The following providers are included with the Microsoft data access components:

Microsoft Jet 3.51 OLE DB Provider

OLE DB Provider for Oracle

OLE DB Provider for SQL Server

OLE DB Provider for ODBC Drivers

**Note:** For more information about OLE DB providers, see the OLE DB Programmer's Reference. This documentation is available in the Microsoft Data Access SDK. For more information about advanced initialization properties, see the documentation provided with your OLE DB provider.

### ► To reach the Configure Data Source Connection dialog:

1. Select **File > Open From > Database...**.
2. In the Open Database dialog, click to select the **OleDb Data Provider**.
3. Click **Configure...**.
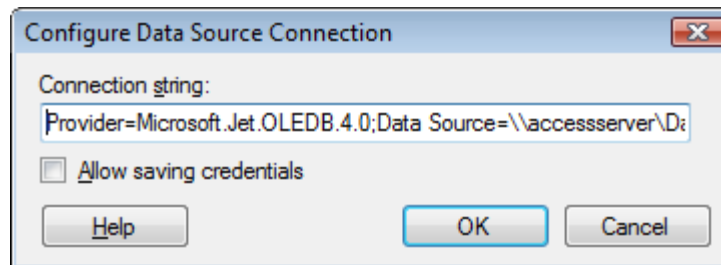


| Option | Description |
|---|---|
| **Connection string** | Should provide information about which OLE DB driver to use, which data source to connect to, etc. The connection string would normally be acquired from your database administrator. |
| **Allow saving credentials** | Select this option to allow saving of your credentials. |

## 2.4.3.4   Configure Data Source Connection - ODBC

ODBC (Open Database Connectivity) allows you to import data from virtually any kind of database commercially available.

To learn how to set up an ODBC data source, please refer to the database vendor's documentation and the Windows documentation on ODBC. It might be necessary to install ODBC driver software particular to the database used before being able to utilize the ODBC option.

### ► To reach the Configure Data Source Connection dialog:

1. Select **File > Open From > Database...**.

2. In the Open Database dialog, click to select the **Odbc Data Provider**.

3. Click **Configure...**.



| Option | Description |
| --- | --- |
| **System or user data source name** | Select this option to connect to a system or user data source.<br><br>The data sources available here are the ones previously defined in Windows ODBC Data Source Administrator, found under Control Panel > Administrative Tools > Data Sources (ODBC). Contact your database administrator if you are missing any information. |
| **Refresh** | Refreshes the list of defined data sources to include a currently added system or user data source name. |
| **File data source** | Select this option to connect to a file data source. |
| **Browse...** | Opens a dialog where you can browse to locate the DSN file of interest. |
| **Username** | The username you wish to use when logging into the selected data source. |
| **Password** | The password for the specified username. |
| **Allow saving credentials** | Select this option to allow saving of your credentials. |

## 2.4.3.5 Configure Data Source Connection - OracleClient

► **To reach the Configure Data Source Connection dialog:**

1. Select **File > Open From > Database...**.

2. In the Open Database dialog, click to select the **OracleClient Data Provider**.

3. Click **Configure...**.

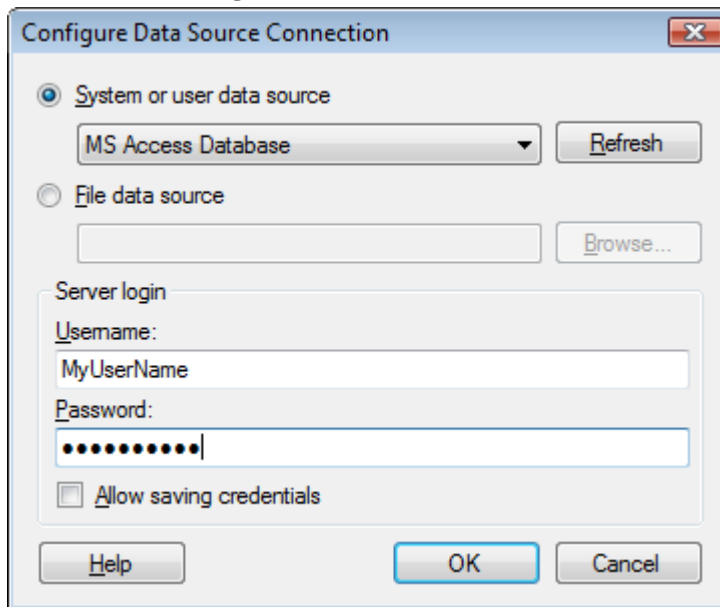| Option | Description |
| --- | --- |
| **Oracle server name** | The net service name for the Oracle instance where your data are located. The net service name can be found either in the local tnsnames.ora file, on an Oracle Names server, or, it can depend on your configuration of the Oracle Native Naming Adapters for your system. |
| **Username** | The username you wish to use when logging into the Oracle server. |
| **Password** | The password for the specified username. |
| **Allow saving credentials** | Select this option to allow saving of your credentials. |

## 2.4.3.6 Configure Data Source Connection - Custom .NET Provider

You can also open other types of databases if other .NET providers are installed on your system. How these connections are configured is highly depending on the provider, and these examples might not look like the ones installed on your system.

► **To reach the Configure Data Source Connection dialog:**

1. Select **File > Open From > Database...**.
2. In the Open Database dialog, click to select the Data Provider of interest.
3. Click **Configure...**.

| Option | Description |
|---|---|
| **Misc** | Lists properties for your connection. (What properties are visible depends on the provider you are using.) Edit the properties by typing in the right-hand column. |
| **Connection string** | Displays the connection string that is the result of what you have entered in the various fields above. |
| **Allow saving credentials** | Select this option to allow saving of your credentials. |

Note that what properties are shown is dependent on your connection provider. Some provider might for instance have no visible properties at all, and instead present a login window when you open the data source:
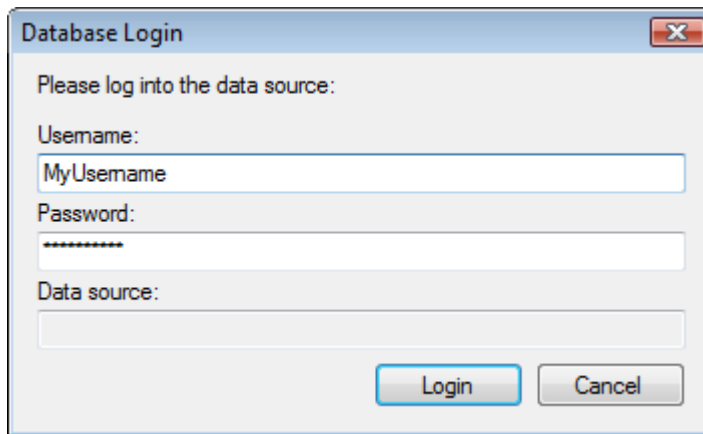
# 2.5 Replace Data

## 2.5.1 Replacing Data

In Spotfire it is possible to reuse the visualizations, calculations and setup from a previously created document with new data, as long as the new data is reasonably similar to the old data. This is useful when creating an analysis for, say, sales figures for a certain month. You create a full analysis using the data from January, set up visualizations, calculations, etc., and save the file. When the sales figures for February are available, you can open the same file again, and replace the data from January with the data from February, and the visualizations will be updated. This of course requires that the data table for February is structured in the same way as for January, using the same column names and format.

### ► To replace data in a document:

1. Select **File > Replace Data Table...**.
   Response: The Replace Data Table - Select Data Table dialog is displayed.
2. Select the data table you wish to replace.
3. Determine whether to replace it with a **New data table** or a **New data table loaded on demand**.
   Comment: You can replace data with new data from a file, from an information link, from a database, from the clipboard or from an existing data table in the analysis. Only information links can be loaded on demand.
4. Click **OK**.
5. Select the source type for the new data table.
6. If the selected data type is anything other than the clipboard, click **Browse...** to specify the source.
   Response: Depending on which option you have selected, you are provided with some means to choose what data to open. See Opening a Text File, Opening an Excel File, Opening a SAS File, Opening an Information Link, or Opening Data from a Database for more information about each alternative.
   Apply transformations (optional).
7. Click **OK**.
8. If the new data table contains columns that match the columns in the old data table completely, the document is immediately updated to use the new data. However, if not all columns used in the document could be replaced automatically by columns in the new data table, you will be presented with the Replace Data - Match Columns dialog. Here, you are able to match columns from the current data table with columns from the new data table. If there are missing columns remaining after you have matched columns, the Replace Data - Missing Columns dialog is shown. The dialog will state

all mismatches that still occur. Make a note of these and click **Close**. The data are replaced, but there may be a need for you to make some manual fixes to make sure all visualizations are displayed as you intended.

9. If necessary, update any visualizations, calculations or hierarchies that were broken when the data was replaced.

## 2.5.2 Details on Replace Data Table - Select Data Table
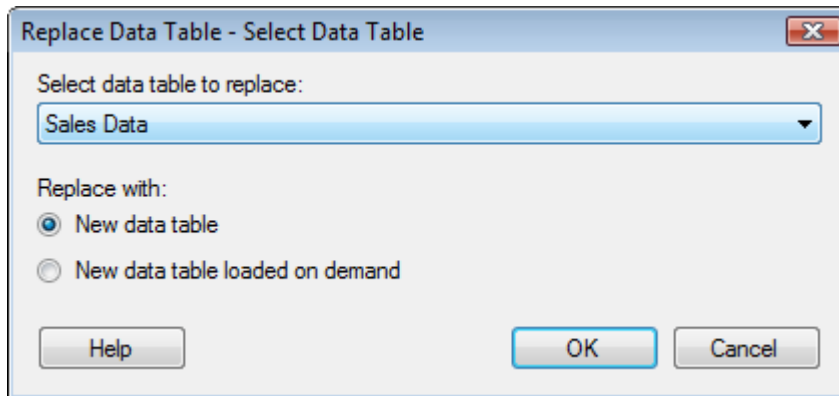


| Option | Description |
|---|---|
| **Select data table to replace** | Specifies which data table to replace. |
| **Replace with** | |
| **New data table** | Allows you to select a file, an information link, a database, the clipboard or an existing data table in your analysis as the source for your new data table. |
| **New data table loaded on demand** | Allows you to replace your data table with an information link which is loaded on demand. See Loading Data on Demand for more information. |

## 2.5.3 Details on Replace Data Table - Select Source

| Option | Description |
|---|---|
| **Select source type** | |
| **File** | Allows you to add a data table from a file. |
| **Information Link** | Allows you to add a data table from an information link. |
| **Database** | Allows you to add a data table from any supported database. |
| **Clipboard** | Allows you to add a data table from the clipboard. |
| **Existing data table in my analysis** | Allows you to add a data table from the current analysis. |
| **Location** | Shows the path and file name of the selected file. |
| **Browse...** | Opens a dialog where you can select which file, information link, database, etc., to open. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the data table you want to add. For more information, see the Show transformations dialog. |

## 2.5.4 Details on Replace Data - Match Columns

This dialog is displayed when data have been replaced in your current document, but all columns used in the document could not be replaced automatically by columns in the new data table. It allows you to match columns from the current data table with columns from the new data table.
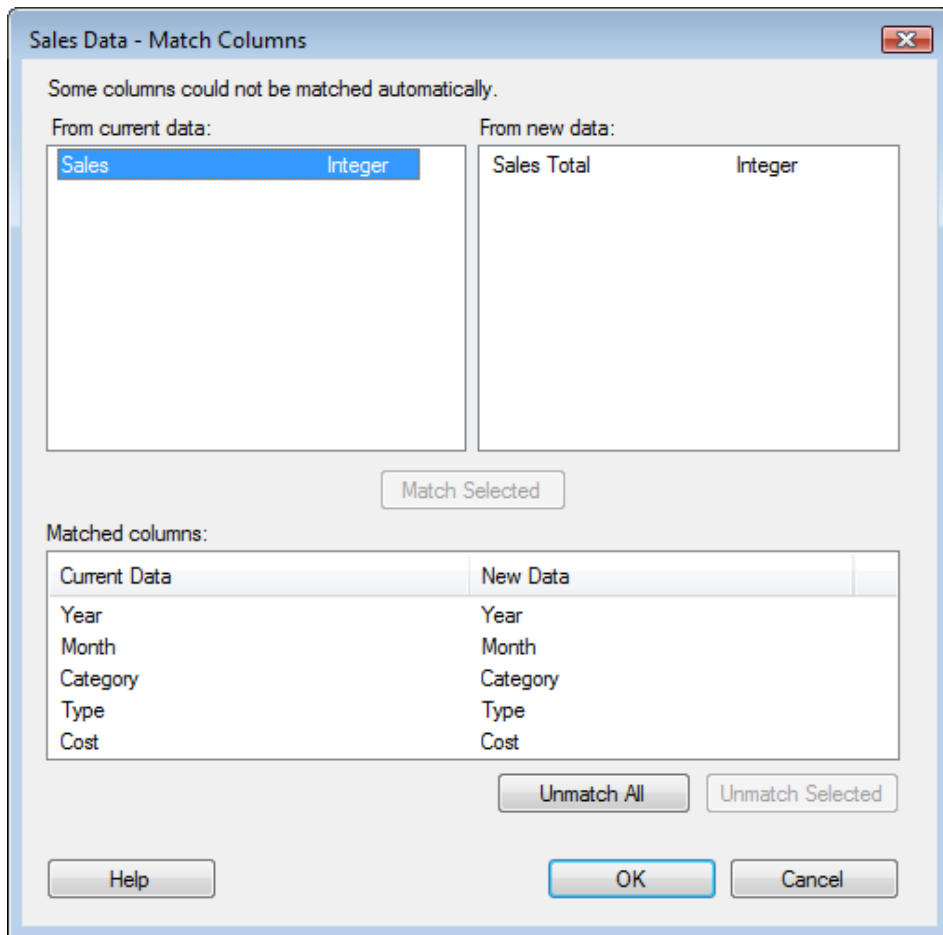
| Option | Description |
|---|---|
| **From current data** | Lists the columns in the current data table that could not be replaced automatically. Click here to select the column you wish to match with a column from the new data, then click Match Selected. |
| **From new data** | Lists the columns in the new data table that has not been matched to columns from the current data table. Click here to select the column you wish to match with a column from the current data, then click Match Selected. |
| **Match Selected** | Matches the selected columns from the current data table and the new data table. |
| **Matched columns** | Lists all column pairs that have been selected for matching. |
| **Unmatch All** | Unmatches all the matched columns, including the automatically matched columns. |
| **Unmatch Selected** | Unmatches selected columns from the Matched columns list. |
| **Cancel** | Cancels the replace data table operation. |

## 2.5.5 Details on Replace Data - Missing Columns

This dialog is displayed when you have replaced or reloaded the data in your current document, but some columns are missing in the new data table. The data is still replaced, but some visualizations and hierarchies in the document may need to be manually adjusted.



| Option | Description |
|---|---|
| **Missing columns** | Lists columns that were available in the old data table, but are missing in the new data table. |
| **Invalid calculated columns (manual updates required)** | Lists columns that were calculated using a column that was available in the old data table, but is missing in the new data table. This means that the calculation of the column fails. |
| | You can edit the calculated column in Spotfire by selecting **Edit > Column Properties**; then click to select the column in the Columns and hierarchies list and click **Edit...** in the lower part of the General tab. Or, you can simply remove the erroneous column from the document (Delete in Column Properties). |
| **Invalid hierarchies (manual updates required)** | Lists any hierarchies that were created using a column that was available in the old data table, but is missing in the new data table. This means that the hierarchy can no longer be used, until it is manually updated to use a different column. Hierarchies can be edited by right-clicking on the filter and selecting **Edit Hierarchy...**. |

# 2.6    Transform Data

## 2.6.1    Transforming Data

Sometimes the data you want to analyze in Spotfire is not in the most appropriate format and may contain errors. It may therefore be necessary to perform modifications on the data before importing it in order to get the best results from the analysis.

There are several methods that can be used to transform your data before importing it into the analysis file.

Calculate and replace column allows you to replace a column in the data table with a calculated column.

Calculate new column allows you to add a calculated column to the data table.

Change column names allows you to change the name of one or more of the columns in the data table.

Change data types allows you to change the data type for one or more of the columns in the data table.

Data function allows you to use a previously registered data function as a transformation step.

Exclude columns allows you to exclude one or more of the columns from the data table.

Normalization allows you to normalize the data prior to addition of the data table.

Pivot allows you to pivot the data - to change the data table from a tall/skinny to a short/wide format.

Unpivot allows you to unpivot the data - to change the data table from a short/wide to a tall/skinny format.

**Note:** Additional transformations may be available to you if these have been added locally.

### ► To transform data

1.  Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...**.
    If you already have an analysis open, you can also choose:
    **File > Replace Data Table...**
    **Insert > Columns from External Data...**
    **Insert > Rows from External Data...**
2.  Select source type.
3.  Browse for the file if needed.
4.  Click **Show transformations.**
5.  Add the transformations you want to perform on your data.
6.  Click **OK** to import the transformed data to the analysis.

## 2.6.2    Pivoting Data

A pivot transformation is one way to transform data from a tall/skinny format to a short/wide format. The data is distributed into columns usually aggregating the values. This means that multiple values from the original data end up in the same place in the new data table.

### Example:

The example below shows a pivot transformation on a very simple data set. In the original data table, there are three columns and four rows. Each row contains one of two department stores, A or B; a product, TV or DVD; and a numerical value for the number of sales. The data table might look like this if a new row is added after each day.

However, perhaps we are more interested in knowing how many units of each product are sold in each store on an average day.

After pivoting the data table, using the aggregation method "average" on the numerical values for the two products, we get a new data table. This data table has just two rows, one for each store. The layout of the table has gone from tall/skinny to short/wide. Had there been more products in the data table the difference would be even more pronounced. In the new data table, it is easy to see the number of products being sold in each store on an average day. The first row tells us that on any given day in department store A, 3 TVs are sold, but no DVDs. In department store B, however, an average day might see 6 TVs and 8 DVDs sold.

| Store | Product | Sales |
|-------|---------|-------|
| A | TV | 2 |
| A | TV | 4 |
| B | TV | 6 |
| B | DVD | 8 |

| Store | Avg(Sales) for TV | Avg(Sales) for DVD |
|-------|-------------------|--------------------|
| A | 3 | (Empty) |
| B | 6 | 8 |

## Example:

In this example, we have a larger data set, with data from an imagined company that produces small machinery parts. These parts have measurements for width, height and thickness. The parts have three different holes in them. There are also measurements for the diameter of these holes, and a measurement for a possible small offset from where they are supposed to be.

In the original data table, which contains measurements for samples of all parts, we can see which of the company's three factories—A, B or C—have produced the parts, and we can see on which date the parts were shipped, which batch they belong to as well as all the measurements for the parts.

| Site | Date | Batch | Measure | Value |
|------|------|-------|---------|-------|
| A | 1/13/2006 | 1 | Width | 6.04 |
| A | 1/13/2006 | 1 | Height | 3.33 |
| A | 1/13/2006 | 1 | Thickness | 1.21 |
| A | 1/13/2006 | 1 | Weight | 3.97 |
| A | 1/13/2006 | 1 | Offset1 | 1.27 |
| A | 1/13/2006 | 1 | Offset2 | 2.43 |
| A | 1/13/2006 | 1 | Offset3 | 3.14 |
| A | 1/13/2006 | 1 | Diameter1 | 0.71 |
| A | 1/13/2006 | 1 | Diameter2 | 0.29 |
| A | 1/13/2006 | 1 | Diameter3 | 0.10 |
| B | 1/13/2006 | 1 | Width | 6.03 |
| B | 1/13/2006 | 1 | Height | 3.47 |
| B | 1/13/2006 | 1 | Thickness | 1.12 |
| B | 1/13/2006 | 1 | Weight | 4.11 |
| B | 1/13/2006 | 1 | Offset1 | 1.23 |
| B | 1/13/2006 | 1 | Offset2 | 2.43 |
| B | 1/13/2006 | 1 | Offset3 | 3.20 |
| B | 1/13/2006 | 1 | Diameter1 | 0.71 |
| B | 1/13/2006 | 1 | Diameter2 | 0.31 |
| B | 1/13/2006 | 1 | Diameter3 | 0.10 |
| C | 1/13/2006 | 1 | Width | 6.36 |
| C | 1/13/2006 | 1 | Height | 3.07 |
| C | 1/13/2006 | 1 | Thickness | 1.17 |
| C | 1/13/2006 | 1 | Weight | 4.14 |
| C | 1/13/2006 | 1 | Offset1 | 1.25 |
| C | 1/13/2006 | 1 | Offset2 | 2.30 |
| C | 1/13/2006 | 1 | Offset3 | 3.05 |
| C | 1/13/2006 | 1 | Diameter1 | 0.67 |
| C | 1/13/2006 | 1 | Diameter2 | 0.30 |
| C | 1/13/2006 | 1 | Diameter3 | 0.09 |
| A | 1/13/2006 | 2 | Width | 6.08 |

What we are really interested in knowing is how good the three different factories are at producing these parts. If we deliver the parts to different customers who have different demands for the accuracy of the holes in the part, we want to know which factory should supply which customer with parts. We then pivot the data to get one row for each factory, and to get minimum, maximum and average values for the different measurements of the parts.

After importing the data to Spotfire, we can start analyzing it. By filtering the data, we can set the minimum and maximum allowed measurements for the diameter and offset of the holes in the part.
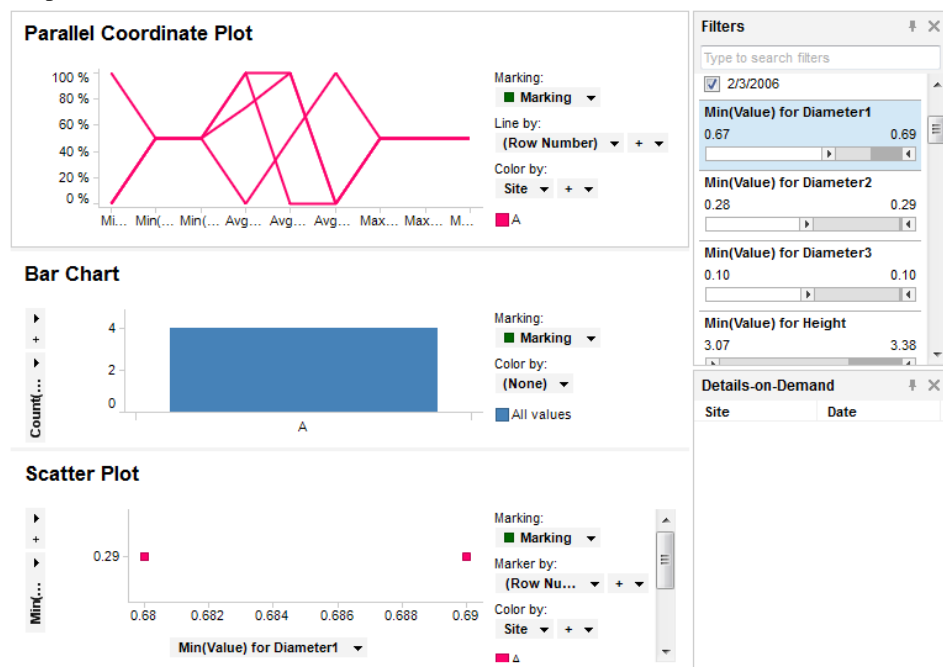


In the analysis, we can see that if the most important criterion is that the diameter is not too small, A is the factory that should supply parts to the most demanding customers.

## 2.6.3     Unpivoting Data

An unpivot transformation is one way to transform data from a short/wide to a tall/skinny format. When the data types of source columns differ, the varying data is converted to a common data type so the source data can be part of one single column in the new data set.
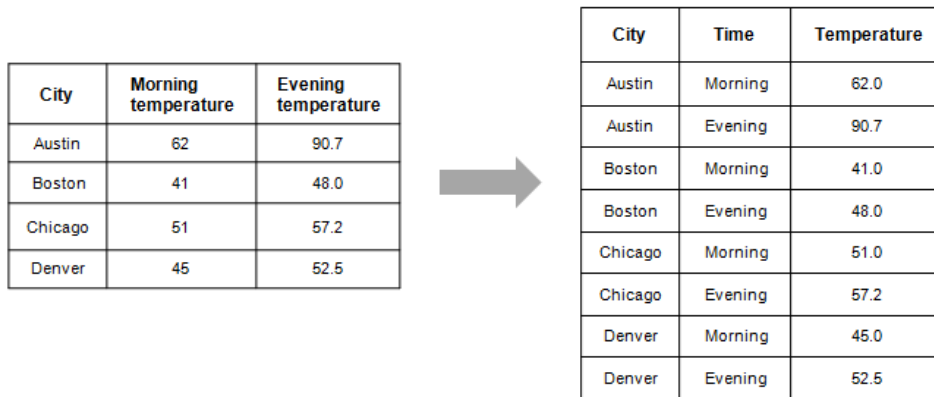
### Example:

The example below shows an unpivot transformation on a very simple data set. In the original data table, there are three columns and four rows. Each row contains a city, a morning temperature and an evening temperature for each city.

While this is certainly useful, we want to determine the average temperature of all the cities for all times of day.

After unpivoting the data, we have one row for each measurement and can easily get an average value for the Temperature column in the analysis after the data has been imported.

**Note:** Observe that the morning temperatures were given as integers and the evening temperatures as real numbers. In the unpivoted data table, these values must have the same data type to be used in the same column. Integers are therefore changed to real numbers (changing the real number temperatures to integers, while still somewhat compatible in this case, would have resulted in a loss of information).

| City | Morning temperature | Evening temperature |
|------|---------------------|---------------------|
| Austin | 62 | 90.7 |
| Boston | 41 | 48.0 |
| Chicago | 51 | 57.2 |
| Denver | 45 | 52.5 |

| City | Time | Temperature |
|------|------|-------------|
| Austin | Morning | 62.0 |
| Austin | Evening | 90.7 |
| Boston | Morning | 41.0 |
| Boston | Evening | 48.0 |
| Chicago | Morning | 51.0 |
| Chicago | Evening | 57.2 |
| Denver | Morning | 45.0 |
| Denver | Evening | 52.5 |

### Example:

In this example, we have a larger data set containing data on the sales of entrance tickets for a museum. The original data table shows data for each of the five ticket counters (desks) and the number of tickets they have sold to adults, children and senior citizens each day.

| Category | Date | Desk1 | Desk2 | Desk3 | Desk4 | Desk5 |
|----------|------|-------|-------|-------|-------|-------|
| Adult | 5/1/2007 | 62 | 19 | 26 | 111 | 34 |
| Child | 5/1/2007 | 20 | 6 | 5 | 11 | 8 |
| Senior | 5/1/2007 | 102 | 47 | 42 | 6 | 49 |
| Adult | 5/2/2007 | 74 | 35 | 37 | 4 | 65 |
| Child | 5/2/2007 | 17 | 8 | 8 | 0 | 10 |
| Senior | 5/2/2007 | 122 | 39 | 47 | 3 | 50 |
| Adult | 5/3/2007 | 91 | 43 | 24 | 1 | 24 |
| Child | 5/3/2007 | 16 | 8 | 5 | 6 | 1 |
| Senior | 5/3/2007 | 99 | 35 | 34 | 40 | 55 |
| Adult | 5/4/2007 | 51 | 21 | 13 | 49 | 104 |
| Child | 5/4/2007 | 16 | 4 | 7 | 5 | 15 |
| Senior | 5/4/2007 | 64 | 29 | 29 | 51 | 80 |
| Adult | 5/5/2007 | 135 | 55 | 51 | 37 | 21 |
| Child | 5/5/2007 | 15 | 6 | 4 | 6 | 21 |
| Senior | 5/5/2007 | 71 | 26 | 23 | 85 | 64 |
| Adult | 5/6/2007 | 95 | 39 | 38 | 3 | 131 |
| Child | 5/6/2007 | 23 | 10 | 9 | 13 | 1 |
| Senior | 5/6/2007 | 58 | 18 | 22 | 92 | 87 |
| Adult | 5/7/2007 | 90 | 40 | 24 | 20 | 134 |
| Child | 5/7/2007 | 23 | 7 | 6 | 19 | 3 |
| Senior | 5/7/2007 | 117 | 38 | 32 | 48 | 15 |
| Adult | 5/8/2007 | 104 | 43 | 38 | 46 | 51 |
| Child | 5/8/2007 | 18 | 7 | 5 | 6 | 14 |
| Senior | 5/8/2007 | 113 | 32 | 44 | 48 | 45 |
| Adult | 5/9/2007 | 103 | 26 | 46 | 1 | 51 |
| Child | 5/9/2007 | 13 | 4 | 4 | 10 | 14 |
| Senior | 5/9/2007 | 89 | 43 | 41 | 53 | 60 |
| Adult | 5/10/2007 | 55 | 23 | 26 | 90 | 22 |
| Child | 5/10/2007 | 20 | 8 | 8 | 0 | 7 |

However, at this point, rather than needing to know which counter sold how many tickets to whom, we are more interested in analyzing our ticket sales in general. Therefore, we unpivot the data, combining the Desk columns into one, which we name "Desk" and merging all ticket sales to another column, which we name "Tickets".

After importing the data into Spotfire, we can start analyzing it.
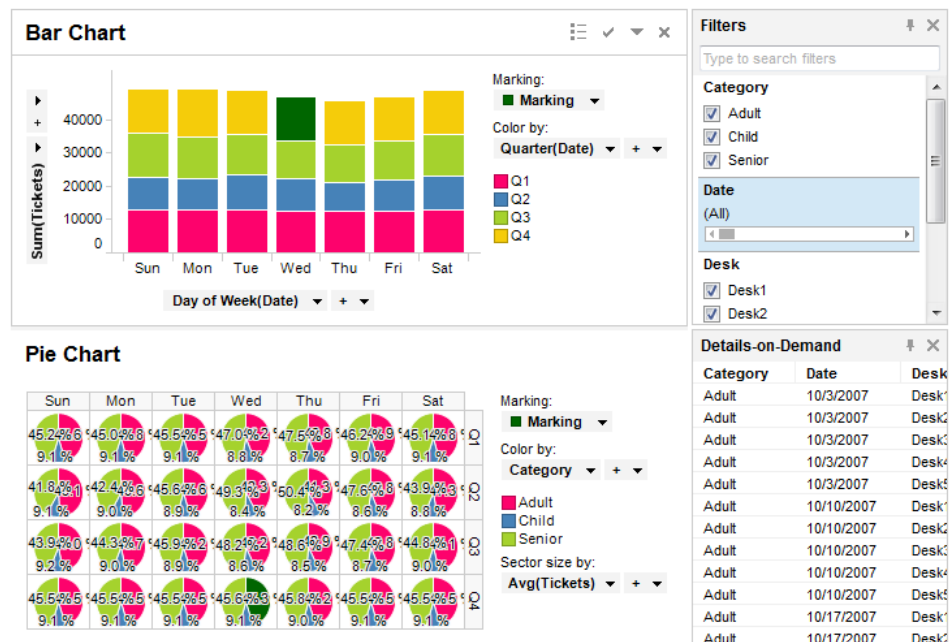
Looking at the analysis, we can now see that Thursdays are the days when we sell the least amount of tickets, and that the second and third quarters is the time of year when the museum sells the least amount of tickets.

# 2.6.4     Normalizing Data

## 2.6.4.1     Normalizing Columns

A number of normalization methods can be written as expressions or used as a transformation step when adding data tables. See the links at the end of this topic for a description of the theory behind each method.

In the expression examples below, the following values are used:

Columns: E and A, where E is the column to normalize and A is a baseline column.

Percentile value: P

### Normalize by mean
[E] / Avg([E])
[E] * Avg([A]) / Avg([E])

### Normalize by trimmed mean
[E] / TrimmedMean([E], P)
[E] * TrimmedMean([A], P) / TrimmedMean([E], P)

### Normalize by percentile
[E] / Percentile([E], P)
[E] * Percentile([A], P) / Percentile([E], P)

### Scale between 0 and 1
If( Max([E]) = Min([E]), 0.5, ([E] – Min([E]) / (Max([E]) – Min([E])) )

### Subtract the mean
[E] – Avg([E])

### Subtract the median
[E] – Median([E])

### Normalization by signed ratio
If( [E] > [A], [E] / [A], -[A] / [E])

### Normalization by log ratio
Log10( [E] / [A] )

### Normalization by log ratio in standard deviation units
Log10( [E] / [A] ) / StdDev(Log10( [E] / [A] ))

### Z-score calculation
([E] – Avg([E])) / StdDev([E])

### Normalize by standard deviation
[E] / StdDev([E])

## 2.6.4.2 Details

### 2.6.4.2.1 Normalization by Mean

Assume that there are $n$ rows with seven variables (columns), A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

#### Without rescaling (Baseline variable = None)

The normalized value of $e_i$ for variable E in the $i^{th}$ row is calculated as:

$$Normalized\ (e_i) = \frac{e_i}{\frac{1}{p}\ \Sigma_{j=1}^{p} e_j}$$

where

$p$ = the number of records used to calculate the mean

#### Rescaling by a baseline variable

If we select variable A as baseline variable, the normalized value of $e_i$ for variable E in the $i^{th}$ row is calculated as:

$$Normalized\ (e_i) = \frac{e_i\ \frac{1}{p}\ \Sigma_{j=1}^{p} a_j}{\frac{1}{p}\ \Sigma_{j=1}^{p} e_j}$$

where

$p$ = the number of rows used to calculate the mean

$a_j$ = the value for variable A in the $j^{th}$ record

### 2.6.4.2.2 Normalization by Trimmed Mean

The trimmed mean for a variable is based on all values except a certain percentage of the lowest and highest values for that variable. This removes the effect of outliers during the normalization. If the trim value is set to 10% then the highest 5% of the values and the lowest 5% of the values are excluded from the calculated mean.

Assume that there are $n$ rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

#### Without rescaling (Baseline variable = None)

The normalized value of $e_i$ for variable E in the $i^{th}$ row is calculated as:

$$Normalized\ (e_i) = \frac{e_i}{\frac{1}{p}\Sigma_{j\in T} e_j}$$

where

$T$ = the set of rows left after trimming

$p$ = the number of rows in T.

#### Rescaling by a baseline variable

If we select variable A as baseline variable, the normalized value of $e_i$ for variable E in the $i^{th}$ row is calculated as:

$$Normalized\ (e_i) = \frac{e_i \frac{1}{p}\sum_{j\in T} a_j}{\frac{1}{p}\sum_{j\in T} e_j}$$

where

$T$ = the set of rows left after trimming

$p$ = the number of rows in T

$a_j$ = the value for variable A in the jth row.

## 2.6.4.2.3    Normalization by Percentile

Assume that there are $n$ rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

### Without rescaling (Baseline variable = None)

The normalized value of $e_i$ for variable E in the ith record is calculated as:

$$Normalized\ (e_i) = \frac{e_i}{q_{E,P\%}}$$

where

$q_{E,P\%}$ = the value that P% of the values for variable E—among the selected rows—are less than or equal to

$P$ = the percentile value that you specify when you normalize the data.

### Rescaling by a baseline variable

If we select variable A as baseline variable, the normalized value of $e_i$ for variable E in the ith row is calculated as:

$$Normalized\ (e_i) = \frac{e_i \cdot q_{A,P\%}}{q_{E,P\%}}$$

where

$q_{A,P\%}$ = the value that P % of the values for variable A—among the selected rows—are less than or equal to

$q_{E,P\%}$ = the value that P % of the values for variable E—among the selected rows—are less than or equal to

$P$ = the percentile value that you specify when you normalize the data.

## 2.6.4.2.4    Normalization by Scaling Between 0 and 1

Assume that there are $n$ rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

The normalized value of $e_i$ for variable E in the ith row is calculated as:

$$Normalized\ (e_i) = \frac{e_i - E_{min}}{E_{max} - E_{min}}$$

where

$E_{min}$ = the minimum value for variable E

$E_{max}$ = the maximum value for variable E

If $E_{max}$ is equal to $E_{min}$ then *Normalized* $(e_i)$ is set to 0.5.

### 2.6.4.2.5 Normalization by Subtracting the Mean

Assume that there are *n* rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

The normalized value of $e_i$ for variable E in the i$^{th}$ row is calculated as:

$$Normalized\ (e_i) = e_i - \frac{1}{n} \sum_{j=1}^{n} e_j$$

where

*n* = the total number of rows in the data.

### 2.6.4.2.6 Normalization by Subtracting the Median

Assume that there are *n* rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. The remaining variables in the rows are normalized in the same way.

The normalized value of $e_i$ for variable E in the i$^{th}$ row is calculated as:

$$Normalized\ (e_i) = e_i - E_{median}$$

where

$E_{median}$ = the median of variable E.

The median of a set of values is the middle value when the values are sorted from lowest to highest. If the number of values is even, the median is the average of the two middle values.

### 2.6.4.2.7 Normalization by Signed Ratio

Assume that there are *n* rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. All target variables are normalized in the same way.

If we select A as baseline variable, the normalized value of $e_i$ for variable E in the i$^{th}$ record is calculated as:

$$Normalized\ (e_i) = \frac{e_i}{a_i} \qquad\qquad \text{if } e_i > a_i$$

$$Normalized\ (e_i) = -\frac{a_i}{e_i} \qquad\qquad \text{if } e_i < a_i$$

where

$a_i$ = the value for variable A in the i$^{th}$ row.

### 2.6.4.2.8 Normalization by Log Ratio

Assume that there are *n* rows with seven variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. All target variables are normalized in the same way.

If we select A as baseline variable the normalized value of $e_i$ for variable E in the i$^{th}$ row is calculated as:

$$Normalized\ (e_i) = \log_{10} \frac{e_i}{a_i}$$

where

$a_i$ = the value for variable A in the i$^{th}$ row.

### 2.6.4.2.9 Normalization by Log Ratio in Standard Deviation Units

Assume that there are $n$ rows with $k$ variables, A, B, C, D, E, F and G, in the data. We use variable E as an example in the calculations below. All target variables are normalized in the same way.

If we select A as baseline variable the normalized value of $e_i$ for variable E in the $i^{th}$ row is calculated as:

$$Normalized\ (e_i) = \frac{\log_{10} \frac{e_i}{a_i}}{std\left(\log_{10} \frac{e_i}{a_i}\right)}$$

where

$std$ = the standard deviation

$a_i$ = the value for variable A in the $i^{th}$ row.

### 2.6.4.2.10 Normalization by Z-score

Assume that there are five rows with the IDs A, B, C, D and E, each row containing $n$ different variables (columns). We use record E as an example in the calculations below. The remaining rows are normalized in the same way.

The normalized value of $e_i$ for row E in the $i^{th}$ column is calculated as:

$$Normalized\ (e_i) = \frac{e_i - \bar{E}}{std(E)}$$

where

$$std(E) = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^{n} (e_i - \bar{E})^2}$$

$$\bar{E} = \frac{1}{n} \sum_{i=1}^{n} e_i$$

If all values for row E are identical—so the standard deviation of E (std(E)) is equal to zero—then all values for row E are set to zero.

### 2.6.4.2.11 Normalization by Standard Deviation

Assume that there are five rows with the IDs A, B, C, D and E, each row containing $n$ different variables (columns). We use record E as an example in the calculations below. The remaining rows are normalized in the same way.

The normalized value of $e_i$ for row E in the $i^{th}$ column is calculated as:

$$Normalized\ (e_i) = \frac{e_i}{std(E)}$$

where

$$std(E) = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^{n} (e_i - \bar{E})^2}$$

$$\bar{E} = \frac{1}{n} \sum_{i=1}^{n} e_i$$

If all values for row E are identical—so the standard deviation of E (std(E)) is equal to zero—then all values for row E are set to zero.

## 2.6.5 Details

### 2.6.5.1 Details on Show Transformations

Transformations can be applied in dialogs that add data, such as in the Add Data Tables dialog, the Add On-Demand Data Table dialog, or, in the Insert columns or rows from external data tools. Click on Show transformations to display the controls described below.



| Option | Description |
|---|---|
| **Hide transformations** | Hides the transformation part of the dialog. Can be shown again by clicking the "Show transformations" button displayed when the lower part of the dialog is hidden. |
| **Transformations** | Lists the available transformations. Select one by clicking on it in the list. |
| **Add...** | Opens a new dialog for the chosen transformation where you specify all settings needed for the transformation before it is performed. When the transformation has been completed, it will appear in the list on the left-hand side. |
| **Preview** | Opens a new dialog with a preview of the data with the added transformations. |
| **Edit...** | Opens a new dialog that allows you to edit the settings for the latest transformation added. **Note:** If an earlier transformation is marked in the list, this button is grayed out. |
| **Remove** | Removes the latest transformation added. **Note:** If an earlier transformation is marked in the list, this button is grayed out. |

## 2.6.5.2 Details on Preview



| Option | Description |
|---|---|
| **Preview after step** | Lists the transformations you have added so far. Select one of these steps in the transformation chain, or the original data table to see in the preview how your data has changed with each transformation. |
| **Data Table tab** | Shows the Data Table preview tab. This tab shows how the data table looks after each transformation. |
| **Data Table Properties tab** | Shows the Data Table Properties preview tab. This tab shows a list of all data table properties that have been defined for the data table after each transformation, and the values of these data table properties. There are two columns in the list, one with all properties and one with the corresponding values. |
| **Column Properties tab** | Shows the Column Properties preview tab. This tab shows a list of the values of all column properties for all columns in the data table after each transformation. In the list, there is a column for each property, and all columns in the data table are represented by a row. |

## 2.6.5.3 Details on Pivot Data

Pivot Data can be used to transform data from a tall/skinny to a short/wide format when adding or replacing data tables. **Tip:** You can replace a data table with a transformed version of itself.

► **To reach the Pivot Data dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
   If you already have an analysis open, you can also choose:
   **File > Replace Data Table...**
   **Insert > Columns from External Data...**
   or **Insert > Rows from External Data...**
2. Click **Show transformations.**
3. Select **Pivot** from the drop-down list and click **Add.....**

| Option | Description |
|---|---|
| **Row identifiers** | Each unique value in the chosen identity column or hierarchy produces a row in the generated table. |
| | If you choose more than one column, the new table will have a separate row for each unique combination of values in the chosen columns. |
| **Column titles (%C)** | Each unique value in the chosen category column or hierarchy produces a new column for each aggregation method in the generated data table. |
| | Selecting more than one column means that the new data table will have a separate column for each unique combination of values in the chosen columns. |
| | The column titles are used in the column naming pattern, see below. |
| **Values (%V) and aggregation methods (%M)** | The column from which the data values are calculated. The values in the generated data table are computed according to the method selected under Aggregation in the column selector menu (for example, Average). A list of aggregation methods can be found on the Statistical Functions page. |
| | **Note:** Except for the methods found on the statistical functions page, the method Count() can be used. It includes all values, including empty values, and therefore returns the total number of rows in the column. |
| | **Note:** If you are certain that each combination of Identity and Category has a unique value, then you can select the Aggregation: **None** which will not apply any aggregation of the data. However, the pivot will fail if you select **None**, and each combination of Identify and Category is *not* unique. |

| | |
|---|---|
| **Column naming pattern** | You can select how the pivoted columns should be named. By default the predefined option is:<br>Method(Value) for Column<br>You can also create a custom naming scheme for your pivoted columns.<br>By clicking the drop down list, you can choose from the recently used names. |
| **Transfer columns (%T) and aggregation methods (%A)** | This option allows you to include an overall average, or any other aggregation method listed on the Statistical Functions page, of a particular measurement, for each row in the generated table.<br>**Note:** Except for the methods found on the statistical functions page, the method Count() can be used. It includes all values, including empty values, and therefore returns the total number of rows in the column. |
| **Transfer column naming pattern** | You can select how the transfer columns should be named. By default the predefined option is:<br>Aggregation(TransferValue)<br>By clicking the drop down list, you can choose from the recently used names. |
| **Sample** | Gives you a sample of what the resulting data table will look like.<br>**Note:** Uses the first 100 rows from the data table, so there might be some differences between the sample and the resulting data table. |

## 2.6.5.4    Details on Unpivot Data

Unpivot Data can be used to transform data from a short/wide to a tall/skinny format when adding or replacing data tables. **Tip:** You can replace a data table with a transformed version of itself.

#### ► **To reach the Unpivot Data dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
   If you already have an analysis open, you can also choose:
   **File > Replace Data Table...**
   **Insert > Columns from External Data...**
   or **Insert > Rows from External Data...**
2. Click **Show transformations.**
3. Select **Unpivot** from the drop-down list and click **Add.....**

| Option | Description |
|---|---|
| **Available columns** | The columns available for use in the unpivot operation. |
| | Click a column name in the list to select it. To select more than one column, press Ctrl and click the column names in the list. Use one of the Add > buttons to send the selected column to either the Columns to transform or Columns to pass through field, see below. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. |
| **Add >** | Moves the selected columns from the Available columns field to the field next to the button. |
| **< Remove** | Removes a column and brings it back to the Available columns field. |
| **Remove All** | Removes all columns from the selected columns fields. |
| **Columns to pass through** | The selected columns containing information that should be transferred to the unpivoted data set without any transformation. This could be ID columns, categorical information such as Region, Priority etc. |

| | |
|---|---|
| **Columns to transform** | The selected columns containing the values that you wish to combine into a single column. The column names of these columns will be used as category values in the resulting new category column. Typically, this might be a number of columns containing the same type of data, such as sales figures for different years. |
| **Category column name (contains transformed column names)** | Type a column name that summarizes the information provided in the columns that you have selected to transform. For instance, "Year" could be used when sales figures for several different years are to be combined to a single column. |
| **Data type** | Allows you to set the data type of the category column name, if several are possible. |
| **Value column name** | Type a column name that shows what type of information is included in the new value column. For instance, "Sales" would be a good name for a column containing sales figures for several different years. |
| **Data type** | Allows you to set the data type of the value column name, if several are possible. |
| **Include empty values** | Select this check box to transfer empty values to the unpivoted data view. If the check box is cleared, all records containing empty values will be discarded. |
| **Sample** | Gives you a preview of what the resulting data table will look like. **Note:** Uses the first 100 rows from the data table, so there might be some differences between the sample and the resulting data table. |

## 2.6.5.5    Details on Calculate and Replace Column

This dialog is used to calculate a new column and replace a column in a data table with the new, calculated column. It is reached as a transformation step when adding or replacing data tables.
**Tip:** You can replace a data table with a transformed version of itself.

### ► **To reach the Calculate and Replace Column dialog:**

1.  Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
    If you already have an analysis open, you can also choose:
    **File > Replace Data Table...**
    **Insert > Columns from External Data...**
    or **Insert > Rows from External Data...**
2.  Click **Show transformations.**
3.  Select **Calculate and replace column** from the drop-down list and click **Add.....**

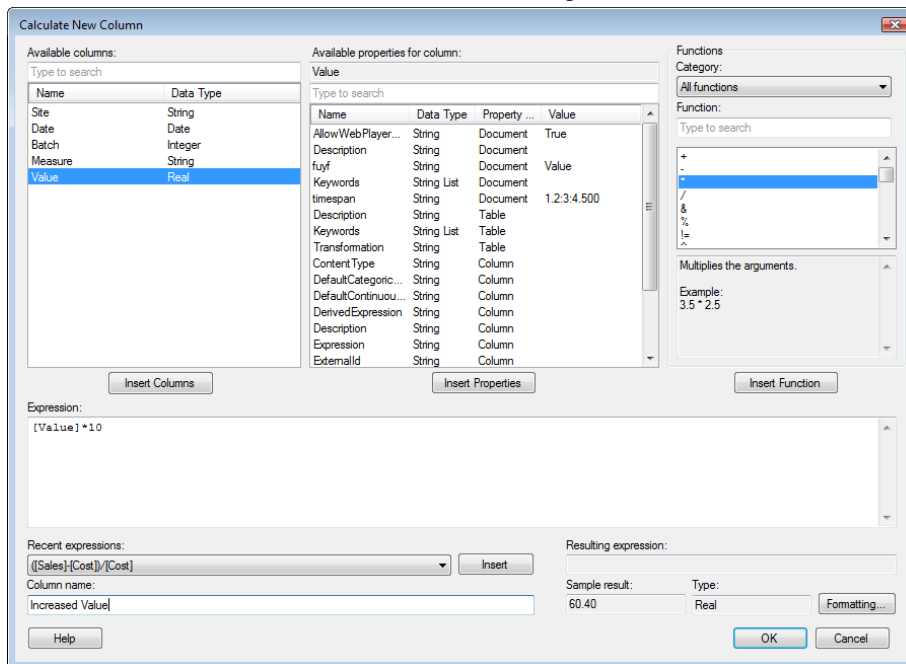| Option | Description |
|---|---|
| **Column to replace** | Lists all available columns in the selected data table. Select the column you want to replace by clicking on it. |
| **Available columns** | Shows all available columns. Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column to send it to the Expression field. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Press Ctrl or Shift to select multiple columns. |
| **Insert Columns** | Inserts the selected columns in the Expression field. |
| **Available properties for column** | Shows all properties that you can use in the calculation of a new column. The column properties are specific to the column selected in the Available columns list to the left. |
| | Select a property by clicking on it in the list and then click on the Insert Properties button, or double-click on the property to send it to the Expression field. The property will automatically be inserted as a value in this context. |
| | See Properties in Expressions for more information. |
| | You can narrow down the list of available properties by using the search field. |
| **Insert Properties** | Inserts the properties selected in the Available properties for column list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list: All functions |

| | Binning functions |
| | Conversion functions |
| | Date and Time functions |
| | Logical functions |
| | Math functions |
| | Operators |
| | Property functions |
| | Ranking functions |
| | Spatial functions |
| | Statistical functions |
| | Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button, or double-click on the function to send it to the Expression field. You can narrow down the list by typing a part of a name in the field where it says "Type to search". |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Functions chapter. |
| **Insert Function** | Inserts the selected function in the Expression field. |
| **Expression** | This is the text field in which you build your expression. You can insert columns and functions from the lists or enter text as in any standard text editor. |
| **Recent expressions** | Displays the ten expressions you have most recently created. You can select one of these and click the Insert button to insert the expression into the Expression field. |
| **Insert** | Inserts the selected Recent expression into the Expression field. This will replace the entire content of the Expression field. |
| **Resulting expression** | Of interest when preprocessor functions (such as ${PropertyName}) are used in the expression only. Displays the expression after all occurrences of the property have been replaced with its current value or values. |
| **Column name** | Type a name for the calculated column. |
| **Sample result** | Displays the result of applying the current expression to the first row of the data table. Note that if aggregating functions (such as, "Count") are used in the expression, only the first 100 rows will be used in the sample calculation. |
| | If this field shows an error there is a problem with the expression. Moving the mouse pointer over the red exclamation mark next to the Expression field will display an explanation of what is wrong. |
| **Type** | Shows the data type of the calculated column. |
| **Formatting...** | Opens the Formatting dialog, where you can change the formatting of the calculated column. |

## 2.6.5.6    Details on Calculate New Column

This dialog is used to calculate a new column in a transformation step when adding or replacing data tables.

► **To reach the Calculate New Column dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
2. Click **Show transformations.**
3. Select **Calculate new column** from the drop-down list and click **Add.....**.



| Option | Description |
|---|---|
| **Available columns** | Shows all available columns. Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column, to send it to the Expression field. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Press Ctrl or Shift to select multiple columns. |
| **Insert Columns** | Inserts the selected columns in the Expression field. |
| **Available properties for column** | Shows all properties that you can use in the calculation of a new column. The column properties are specific to the column selected in the Available columns list to the left. |
| | Select a property by clicking on it in the list and then click on the Insert Properties button, or double-click on the property to send it to the Expression field. The property will automatically be inserted as a value in this context. |
| | See Properties in Expressions for more information. |
| | You can narrow down the list of available properties by using the search field. |

| | |
|---|---|
| **Insert Properties** | Inserts the properties selected in the Available properties for column list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list:<br>All functions<br>Binning functions<br>Conversion functions<br>Date and Time functions<br>Logical functions<br>Math functions<br>Operators<br>Property functions<br>Ranking functions<br>Spatial functions<br>Statistical functions<br>Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button, or double-click on the function to send it to the Expression field. You can narrow down the list by typing a part of a name in the field where it says "Type to search". |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Functions chapter. |
| **Insert Function** | Inserts the selected function in the Expression field. |
| **Expression** | This is the text field in which you build your expression. You can insert columns and functions from the lists or enter text as in any standard text editor. |
| **Recent expressions** | Displays the ten expressions you have most recently created. You can select one of these and click the Insert button to insert the expression into the Expression field. |
| **Insert** | Inserts the selected Recent expression into the Expression field. This will replace the entire content of the Expression field. |
| **Resulting expression** | Of interest when preprocessor functions (such as ${PropertyName}) are used in the expression only. Displays the expression after all occurrences of the property have been replaced with its current value or values. |
| **Column name** | Type a name for the calculated column you want to add. |
| **Sample result** | Displays the result of applying the current expression to the first row of the data table. Note that if aggregating functions (such as, "Count") are used in the expression, only the first 100 rows will be used in the sample calculation.<br>If this field shows an error there is a problem with the expression. Moving the mouse pointer over the red exclamation mark next to the Expression field will display an explanation of what is wrong. |
| **Type** | Shows the data type of the new calculated column. |

| | |
|---|---|
| **Formatting...** | Opens the Formatting dialog where you can change the formatting of the new, calculated column. |

## 2.6.5.7 Details on Data Function - Transformation

This dialog is used to select which function in the library to use as a transformation. Only those data functions that use a data table as input and output parameters will be available for selection.

► **To reach the Data Function - Transformation dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
2. Click **Show transformations.**
3. Select **Data function** from the drop-down list and click **Add.....**.
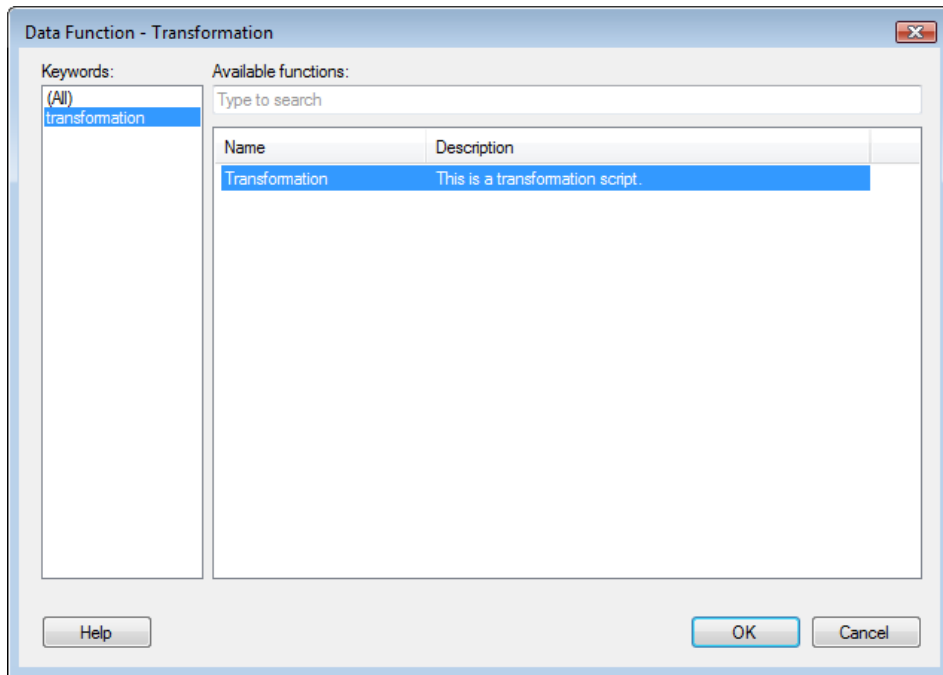


Click to select a keyword in the Keywords list that matches the type of data function you are looking for. You can further limit the number of data functions shown by typing some text in the search field. This limits the data functions visible to the ones matching the current search expression. For more information about valid search expressions, see Searching in TIBCO Spotfire.

## 2.6.5.8 Details on Normalization

Normalization can be used as a transformation step when adding or replacing data tables. **Tip:** You can replace a data table with a transformed version of itself.

► **To reach the Normalization dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
   If you already have an analysis open, you can also choose:
   **File > Replace Data Table...**
   **Insert > Columns from External Data...**
   or **Insert > Rows from External Data...**
2. Click **Show transformations.**

3. Select **Normalization** from the drop-down list and click **Add...**.



| Option | Description |
|---|---|
| **Result options** | |
| **Add columns** | Click this radio button to add new normalized columns to the resulting data table. The old columns will also be kept. |
| **Replace selected columns** | Click this radio button to replace the old columns with the new, normalized ones. |
| **Available columns** | Lists the columns available in the selected data source. |
| **Add >** | Moves the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list. |
| **Remove All** | Removes all columns form the Selected columns list. |
| **Move Up** | Moves the selected column in the Selected columns list up one step. |
| **Move Down** | Moves the selected column in the Selected columns list down one step. |
| **Selected columns** | Lists the columns that are selected to be normalized. |
| **Method** | Specifies the normalization method to use. See Normalizing Columns and the theory section for each method for further information about the various methods. |

| | |
|---|---|
| **Baseline column** | Specifies the baseline column to use (in some normalization methods only). |
| **Percentage** | Specifies the percentage value (P) to use when normalizing by percentile or by trimmed mean. |
| **Description** | Shows a brief description of the currently selected normalization method. |
| **Column names setting** | Specifies how the naming of the normalized columns should be handled. You can either add the word "Normalized:" to the column name of the original columns or use the expression (normalization equation) as a column name.<br><br>If you have selected to replace columns you will also get a third option where you can keep the current column names. |

## 2.6.5.9    Details on Exclude Columns

This dialog is reached as a transformation step when adding or replacing data tables.

### ► **To reach the Exclude Columns dialog:**

1.  Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
2.  Click **Show transformations.**
3.  Select **Exclude columns** from the drop-down list and click **Add....**.
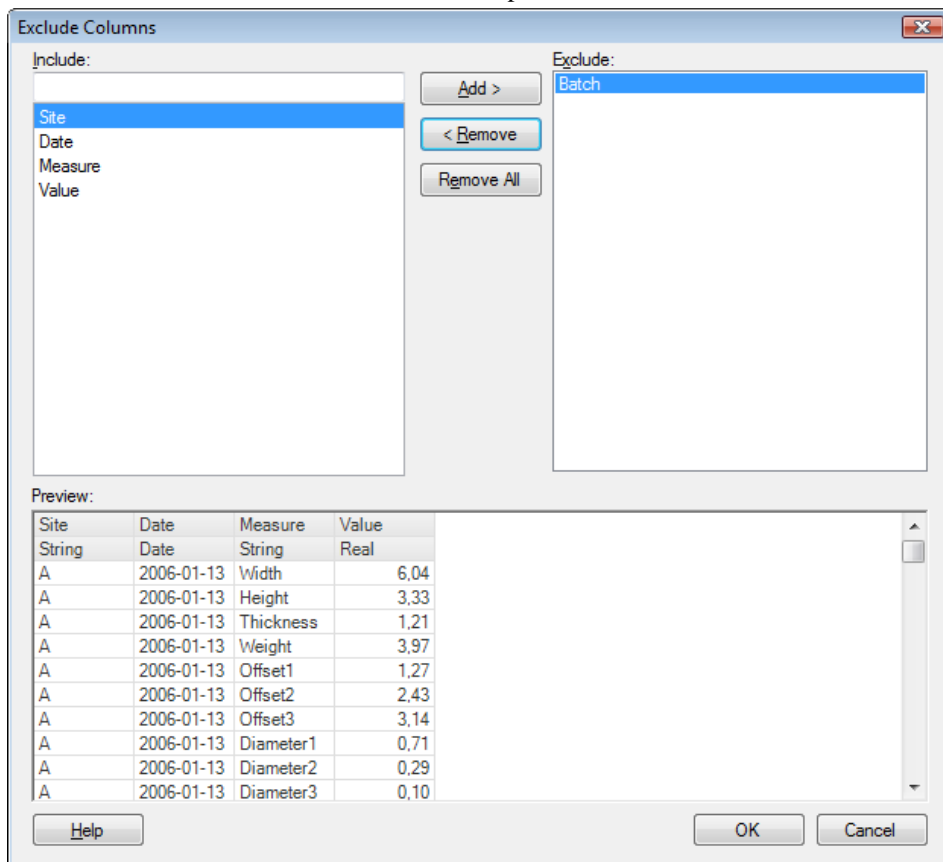
| Option | Description |
|---|---|
| **Include** | Shows all included columns. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Press Ctrl or Shift to select multiple columns. |
| **Add >** | Adds the selected columns to the Exclude list. |
| **< Remove** | Removes the selected columns from the Exclude list. |
| **Remove All** | Removes all columns from the Exclude list. |
| **Exclude** | Lists all columns you have chosen to exclude. |
| **Preview** | Shows how many columns you have chosen to include and gives you a preview of what the data will look like after the completion of this transformation. |

## 2.6.5.10    Details on Change Column Names

Change Column Names can be used as a transformation step when adding or replacing data tables. **Tip:** You can replace a data table with a transformed version of itself.

### ► **To reach the Change Column Names dialog:**

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
   If you already have an analysis open, you can also choose:
   **File > Replace Data Table...**
   **Insert > Columns from External Data...**
   or **Insert > Rows from External Data...**
2. Click **Show transformations.**
3. Select **Change column names** from the drop-down list and click **Add.....**

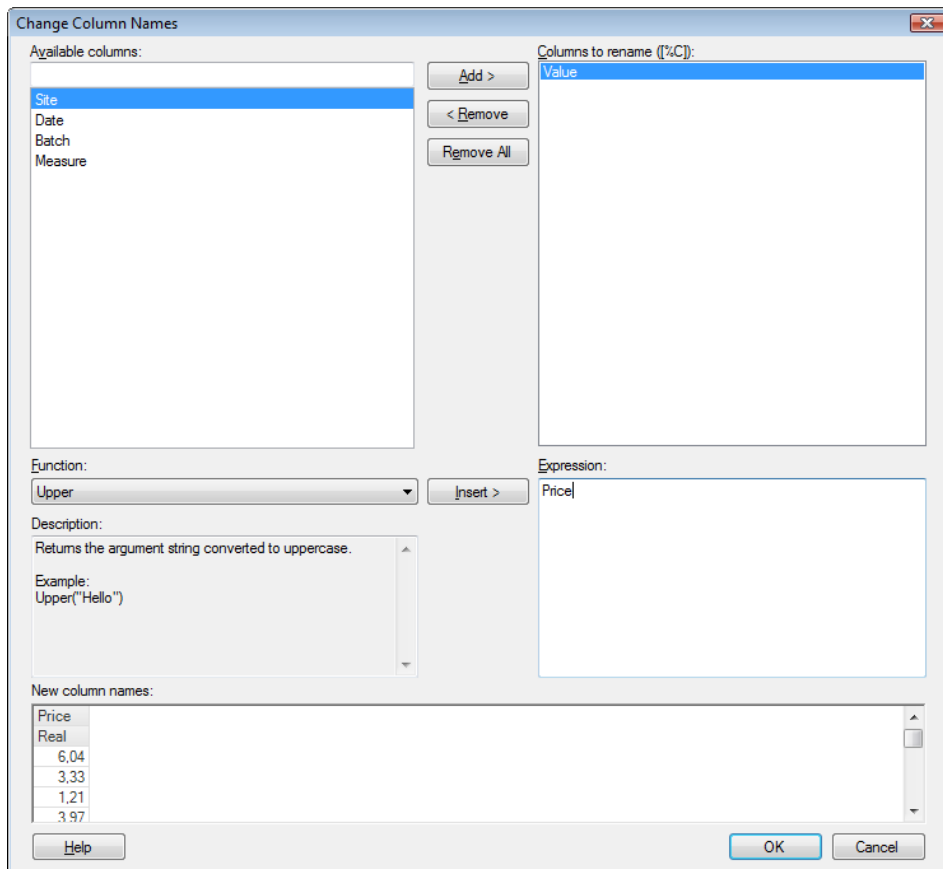| Option | Description |
|---|---|
| **Available columns** | Shows all available columns. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Press Ctrl or Shift to select multiple columns. |
| **Add >** | Adds the selected columns to the Columns to rename list. |
| **< Remove** | Removes the selected columns from the Columns to rename list. |
| **Remove All** | Removes all columns from the Columns to rename list. |
| **Columns to rename** | Lists the columns you have selected to rename and shows you the name ([%C]) that can be used to apply the same function on all columns in the Expression field. |
| **Function** | Select a function by clicking on it in the list and then click on the Insert button, or double-click on the function to send it to the Expression field. |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Text functions page. |
| **Insert >** | Inserts the selected function in the Expression field. |

| Expression | This is the text field in which you build your expression on how to rename columns. You can insert functions from the lists or enter text as in any standard text editor. Many of the functions require you to type either the name of the column you want to rename or the common name given by the Columns to rename list. |
|---|---|
| New column names | Shows the renamed columns. |

## 2.6.5.11 Details on Change Data Types

Change Data Types can be used as a transformation step when adding or replacing data tables.
**Tip:** You can replace a data table with a transformed version of itself.

### ► To reach the Change Data Types dialog:

1. Select **File > Add Data Tables...** or **File > Add On-Demand Data Table...** and add the data of interest.
   If you already have an analysis open, you can also choose:
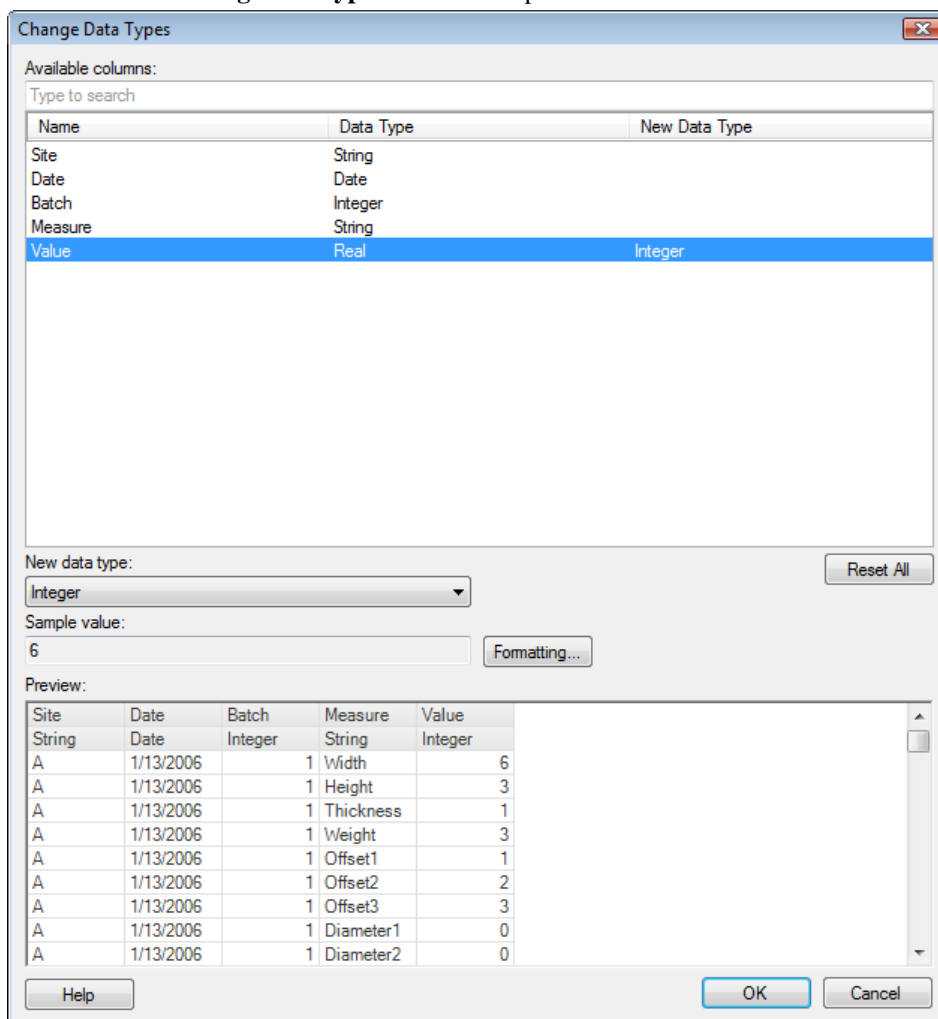   **File > Replace Data Table...**
   **Insert > Columns from External Data...**
   or **Insert > Rows from External Data...**
2. Click **Show transformations.**
3. Select **Change data types** from the drop-down list and click **Add.....**
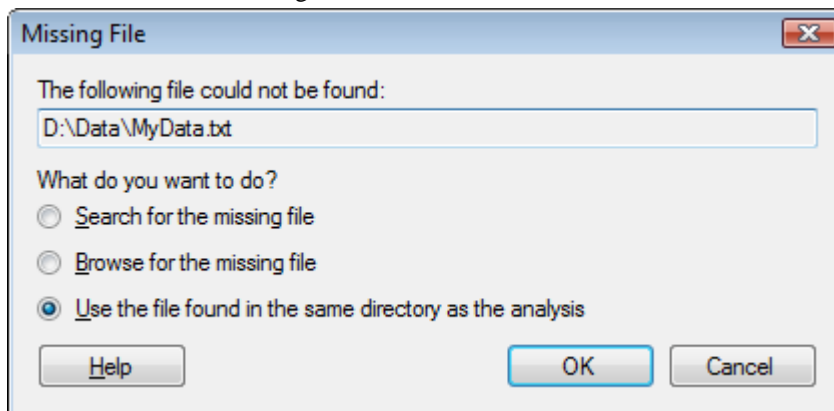
| Option | Description |
|---|---|
| **Available columns** | Shows all available columns. If the data type has been changed for a column, the new data type will appear under "New Data Type". If not, that field will be empty for that column. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Press Ctrl or Shift to select multiple columns. |
| **New data type** | Allows you to choose which data type you want a selected column to have. |
| **Sample value** | Shows one sample value from the chosen column with the new data type applied. |
| **Formatting** | Opens the Formatting dialog where you can change the formatting of the column with the new data type. |
| **Reset All** | Resets the data types of all columns. |
| **Preview** | Shows a preview of what the data will look like after the completion of this transformation. |

# 2.7 Missing File

## 2.7.1 Details on Missing File

This dialog is shown when you open a linked analysis file in which the file path to one or more of the source files is no longer correct.



| Option | Description |
|---|---|
| **The following file could not be found** | Shows the name and path to the file that the linked analysis file is trying to open. |
| **What do you want to do?** | |
| **Search for the missing file** | Select this option to open the Search for Missing File dialog and automatically search for the file on your local computer or on the network. |

| | |
|---|---|
| **Browse for the missing file** | Select this option to manually browse for the missing file. Use this option if the source file used by the linked analysis file has been renamed. |
| **Use the file found in the same directory as the analysis** | Spotfire has found a file in the same directory as the analysis file with the same name as the linked source file. Use this option if you know that this is the file. |

## 2.7.2 Details on Search for Missing File
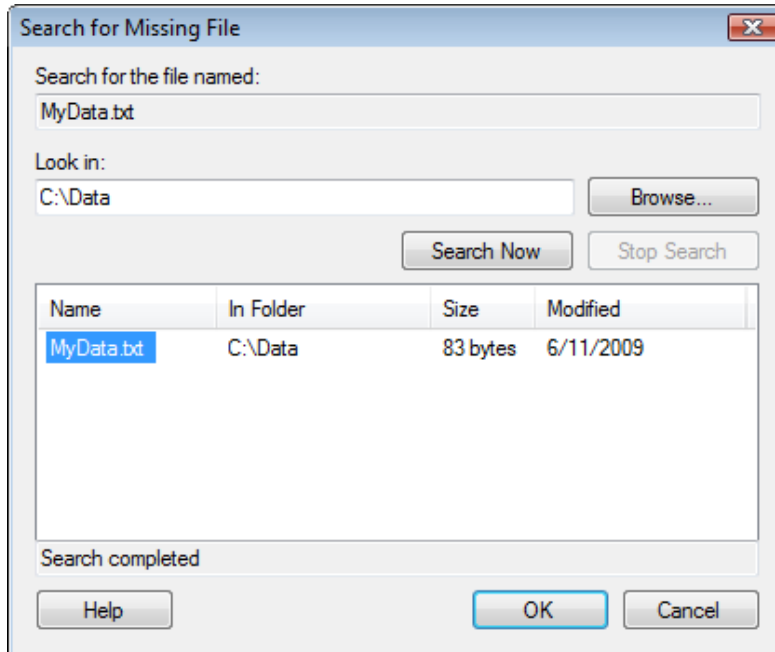


| Option | Description |
|---|---|
| **Search for the file named** | Shows the file name of the missing file. This cannot be changed, hence, you cannot specify to use a file that has been renamed, or has changed file type. |
| **Look in** | Displays the path to the folder in which the search will be performed. |
| **Browse...** | Opens the Browse for Folder dialog, where you can select a different folder, on your local computer or on a network, in which to perform the search. |
| **Search Now** | Starts the search, in the specified folder. |
| **Stop Search** | Stops a search. |
| **Name** | Lists the name of all files that match the search. This is always the same as the file name at the top of the dialog. |
| **In Folder** | Lists the path to the file. |
| **Size** | Lists the size of the file. |
| **Modified** | Lists the date when the file was last modified. |

# 2.8      Column Properties

## 2.8.1      How to Edit Column Properties

Column properties are any type of metadata available for the columns (and, in some cases, also for hierarchies) in your data table. For example, this could be the name or number of decimals of a column, the data type, an optional description of the column content, or, a customized sort order for a string column. All properties can be viewed, and some can be edited, by selecting **Edit > Column Properties**.

### ► To change a column name:

1. Select **Edit > Column Properties**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Locate the column of interest by scrolling in the list or by typing a search expression in the field provided.
4. Click to select the column.
5. On the **General** tab, type a new name in the **Name** field.
6. Click **OK**.

### ► To change the formatting of a column:

1. Select **Edit > Column Properties**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Locate the column of interest by scrolling in the list or by typing a search expression in the field provided.
4. Click to select the column.
5. On the **Formatting** tab, click to select a **Category**.
6. Make any changes desired. See Column Properties - Formatting for more information about the various options.

   Comment: For example, to change the number of decimals displayed for a Real column, click **Number**. Then change the **Decimal places** to the desired number.
7. Click **OK**.

### ► To create a custom sort order for a string column:

1. Select **Edit > Column Properties**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Locate the string column of interest by scrolling in the list or by typing a search expression in the field provided.
4. Click to select the column.
5. On the **Sort Order** tab, click to select **Custom sort order**.
6. Click **Configure...**.

   Response: The Custom Sort Order dialog is displayed.
7. Move the values up or down in the Value order list, to create the desired sort order.
8. Click **OK** to close the Custom Sort Order dialog.
9. Click **OK**.

### ► To delete a column from the data table:

1. Select **Edit > Column Properties**.

2. If you have more than one data table in the document, select the **Data table** to work on.

3. Locate the column of interest by scrolling in the list or by typing a search expression in the field provided.

4. Click to select the column.

5. Click **Delete**.

Comment: You can hide columns from separate visualizations using the appropriate page in the Visualization Properties dialog without actually deleting the column. Likewise, you can hide filters that you do not wish to use in the Organize Filters dialog.

### ► To edit the link template for hyperlinks in tables:

It is possible to display the text in a table as clickable hyperlinks by setting the renderer for a column to Link Renderer. Setting a template in Column Properties provides a default suggestion for the Link Renderer. The default template is "http://{$}/", where {$} represents the value from the table cell.

1. Select **Edit > Column Properties**.

2. If you have more than one data table in the document, select the **Data table** to work on.

3. Locate the column of interest by scrolling in the list or by typing a search expression in the field provided.

4. Click to select the column.

5. On the **Column Properties** tab, scroll down to locate the **Link Template** property and click to select it.

6. Click **Edit Value...**.

Response: The Edit Value dialog is displayed.

7. Type a new template for the format of the links.

Comment: For example, "http://www.{$}.com".

8. Click **OK** to close the Edit Value dialog.

9. Click **OK**.

### ► To create a hierarchy:

If two or more columns are hierarchically related to each other, you can create a hierarchy that can be used instead of the separate columns when filtering or using the categories on axes or to specify other properties.

1. Select **Edit > Column Properties**.

2. Click **Insert > Hierarchy...**.

3. If you have more than one data table in the document, select the **Data table** to work on.

Comment: Hierarchies can only be created with columns from the same data table.

4. Select the columns that should be a part of the hierarchy from the **Available columns** list.

5. Click **Add >**.

6. Make sure that the columns are listed in the Hierarchy list from the least granular to the most granular category. For example, Continent - Country - City.

7. Type a **Hierarchy name**.

8. Click **OK** to close the Insert Hierarchy dialog.

9. Click **OK**.

## 2.8.2      Details on Column Properties - General

Metadata about the columns and hierarchies is handled in the Column Properties dialog. Here, it is possible to view information about the origin of columns, descriptions on columns, min and max values within a column, etc. See Column Properties Descriptions for more information about the default properties. All columns in the data view have the same set of column properties, but a property may have undefined values for some columns.

### ► To reach the Column Properties dialog:

1. Select **Edit > Column Properties**.
2. Click on the **General** tab.



### Top part of dialog

| Option | Description |
| --- | --- |
| **Data table** | Only available when more than one data table is available in the analysis. Specifies the data table that you are currently viewing column properties for. |
| **Columns and hierarchies** | Lists all columns and hierarchies available in the data table. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. |
| **Insert** | |
| **Calculated Column** | Opens the Insert Calculated Column dialog, where you can create a new column from an expression. |

| | |
|---|---|
| **Binned Column** | Opens the Insert Binned Column dialog, where you can group the values of a column into a smaller number of bins (groups). |
| **Hierarchy** | Opens the Insert Hierarchy dialog, where you can create a hierarchy (an ordered structure) by combining columns with each other. |
| **Delete** | Removes the selected column or hierarchy from the data table. |

### General tab

| Option | Description |
|---|---|
| **Name** | The name of the column or hierarchy used in the application. |
| **Description** | An optional description of the column. |
| **Data type** | The data type of the column. |
| **Column Information** | Displays additional information about the column or hierarchy, such as how it was created. |
| **Edit...** | Available for calculated columns, binned columns or hierarchies only. Opens the dialog where the column was created, so that the expression can be modified. |
| **Freeze Column** | Locks the column so that it cannot be edited anymore, and any replace data operations will not attempt to recalculate this column. |

## 2.8.3    Details on Column Properties - Formatting

This dialog lets you format values on column level. If you change settings for a specific column or hierarchy in this dialog the new settings will be used for that specific column or hierarchy everywhere in the analysis from then on.

For general information about formatting, see Formatting Overview.

### ► To reach the Column Properties dialog:

1.  Select **Edit** > **Column Properties**.
2.  Click on the **Formatting** tab.

## Top part of dialog

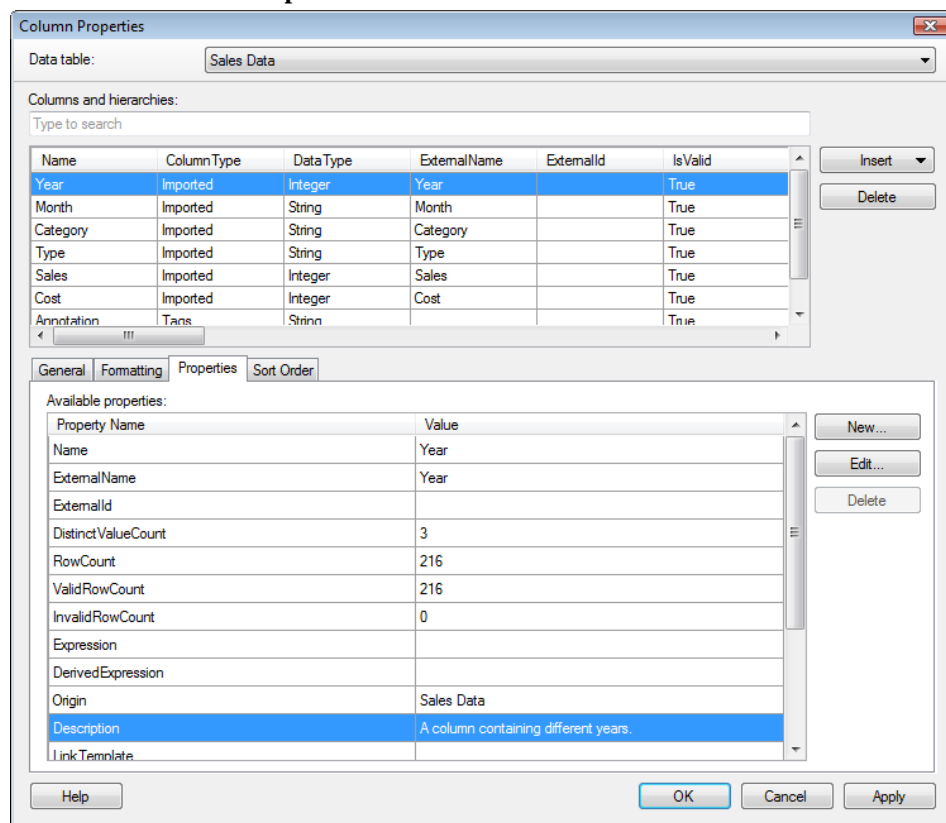| Option | Description |
|---|---|
| **Data table** | Only available when more than one data table is available in the analysis. Specifies the data table that you are currently viewing column properties for. |
| **Columns and hierarchies** | Lists all columns and hierarchies available in the data table. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. Click on the column or hierarchy to format it. Formatting options can be set for more than one column or hierarchy at a time, provided that all columns are of the same type. |
| **Insert** | |
| **Calculated Column** | Opens the Insert Calculated Column dialog, where you can create a new column from an expression. |
| **Binned Column** | Opens the Insert Binned Column dialog, where you can group the values of a column into a smaller number of bins (groups). |
| **Hierarchy** | Opens the Insert Hierarchy dialog, where you can create a hierarchy (an ordered structure) by combining columns with each other. |
| **Delete** | Removes the selected column or hierarchy from the data table. |

**Formatting tab**

| Option | Description |
|---|---|
| Category | Lists the available categories for the selected column or hierarchy. Each category in this list has separate settings. What categories are available depends on the data type of the selected column. See Formatting Settings for a full description of all possible options. |
| Apply formatting from column | |
| Data table | Specifies the data table containing the column from which you want to apply formatting. |
| Column | Lists all columns of the same type as the selected column, from which it is possible to reuse the formatting. |
| Apply Formatting | Applies the formatting from the column selected in the drop-down list. |

## 2.8.4    Details on Column Properties - Properties

► **To reach the Column Properties dialog:**

1. Select **Edit > Column Properties**.
2. Click on the **Properties** tab.

## Top part of dialog

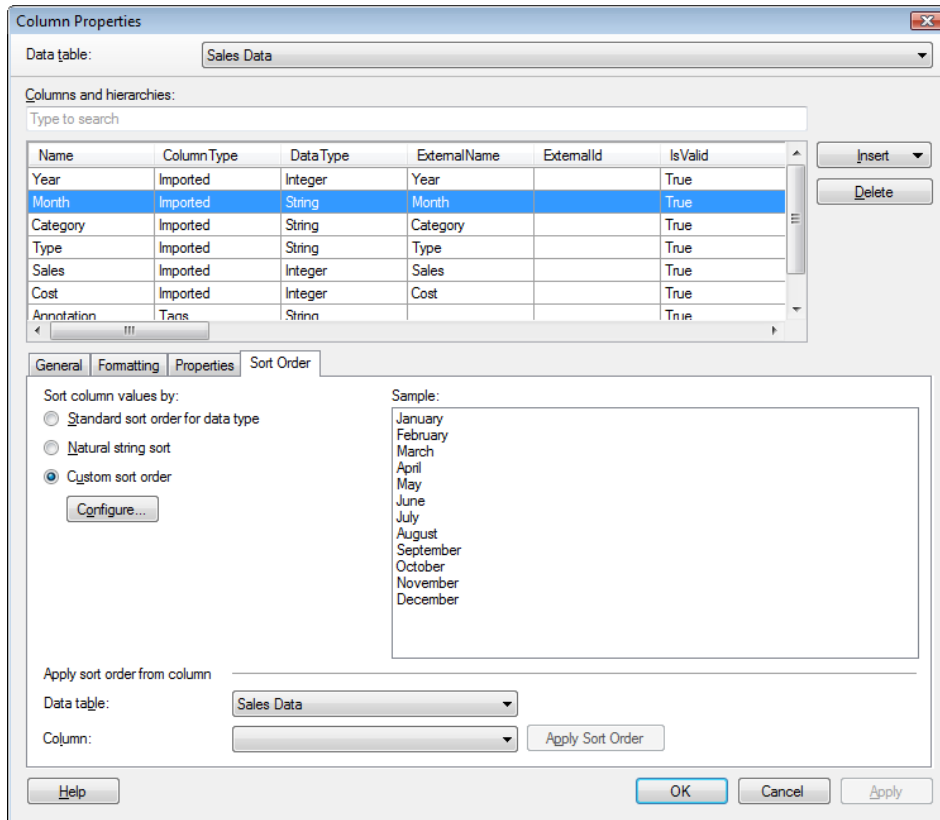| Option | Description |
|---|---|
| Data table | Only available when more than one data table is available in the analysis. Specifies the data table that you are currently viewing column properties for. |
| Columns and hierarchies | Lists all columns and hierarchies available in the data table. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. |
| Insert | |
|    Calculated Column | Opens the Insert Calculated Column dialog, where you can create a new column from an expression. |
|    Binned Column | Opens the Insert Binned Column dialog, where you can group the values of a column into a smaller number of bins (groups). |
|    Hierarchy | Opens the Insert Hierarchy dialog, where you can create a hierarchy (an ordered structure) by combining columns with each other. |
| Delete | Removes the selected column or hierarchy from the data table. |

## Properties tab

| Option | Description |
|---|---|
| Property Name | Lists all properties currently available for the selected column. If you have defined custom properties for the column, these properties are also listed here. |
| Value | Lists the value of each property for the selected column (when applicable). |
| New... | Opens the New Property dialog, where custom column properties can be defined. Custom column properties are added to all columns in the analysis, including those in other data tables. |
| Edit... | Opens the Edit Property dialog, where the value and the default value of a custom column property can be edited. **Note:** If other settings than the value or the default value are wrong, you need to delete the custom property and create a new one instead. |
| Delete | Deletes the selected custom property. The custom column property is deleted from all columns in the analysis. |

## 2.8.5      Details on Column Properties - Sort Order

► **To reach the Column Properties dialog:**

1. Select **Edit** > **Column Properties**.
2. Click on the **Sort Order** tab.



## Top part of dialog

| Option | Description |
|---|---|
| **Data table** | Only available when more than one data table is available in the analysis. Specifies the data table that you are currently viewing column properties for. |
| **Columns and hierarchies** | Lists all columns and hierarchies available in the data table. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field, using the rules described on the Searching in TIBCO Spotfire page. |
| **Insert** | |
| **Calculated Column** | Opens the Insert Calculated Column dialog, where you can create a new column from an expression. |
| **Binned Column** | Opens the Insert Binned Column dialog, where you can group the values of a column into a smaller number of bins (groups). |
| **Hierarchy** | Opens the Insert Hierarchy dialog, where you can create a |

| | hierarchy (an ordered structure) by combining columns with each other. |
|---|---|
| Delete | Removes the selected column or hierarchy from the data table. |

## Sort Order tab

| Option | Description |
|---|---|
| Standard sort order for data type | Use this option to apply the standard sort order for the data type of the selected column. For example, this means that a string column will be sorted alphabetically. Below is an example of how strings containing digits and non-alphanumeric characters will be sorted:<br><br>a#<br>a1<br>a20<br>a3<br>b1 |
| Natural string sort | Use this option to apply natural string sort order to the selected column. This means that a string column will be sorted alphabetically. Below is an example of how strings containing digits and non-alphanumeric characters will be sorted:<br><br>a1<br>a3<br>a20<br>a#<br>b1 |
| Custom sort order | Use this option to specify a different sort order. For example, a column containing months could be sorted by the actual order of months as in the example in the image above. |
| Configure... | Opens the Custom Sort Order dialog, where the desired sort order can be specified. |
| Sample | Displays a sample of how the column will be sorted using the current settings. |
| Apply sort order from column | To be able to apply a sort order from another column, there must be some matching values in the two columns. If the column with the sort order you want to apply for example contains months, the column you want to sort must contain some of the months. This means that you cannot use a column with months sorted alphabetically to sort a column with names alphabetically. |
| Data table | Specifies the data table containing the column from which you wish to copy a sort order. |
| Column | Select a column from the drop-down list to copy a sort order from another column. |
| Apply Sort Order | Applies the sort order from the chosen column to the currently |

selected column.

## 2.8.6    Column Properties Descriptions

The following column properties are available by default:

| Option | Description |
| --- | --- |
| **Name** | [Persistent, user visible, user editable, searchable.] The name is a trimmed and unique identifier for the column. It is used as the display name for the column in the UI. |
| **DataType** | [Persistent, user visible, searchable.] The type of the values in the column. The API type of this property is Spotfire.Data.DataType, but the name of the type is displayed in the UI. |
| **ExternalName** | [Persistent, user visible, searchable.] The name of the column in the original data source. The purpose of this property is to allow column matching for linked data and add/replace data operations. This property always has a non-null value, even if the name and the external name are identical. |
| **ExternalId** | [Persistent, user visible, searchable.] The globally unique id of the column, if available from the data source. Available for many columns imported via information links, but not all. The property is invalid if the column has no external id. |
| **ColumnType** | [Persistent, user visible, searchable.] The type of column. The API type of this property is an enum, but it is displayed by name in the UI. The following are the mutually exclusive column types: <br>• Static - physical data retrieved from a data source. <br>• Calculated - a column created using the Insert Calculated Column tool. <br>• Binned - a column created using the Insert Binned Column tool. <br>• Annotation - an annotation column containing tags. <br>• Result - output result from a calculation such as clustering. <br>• Frozen - a Calculated/Binned/Annotation/Result column that has been frozen and behaves like a static column. <br>This property is user-editable in the sense that non-static columns can be frozen. |
| **IsValid** | [Persistent, user visible, searchable.] True if the column expression is valid. The property itself is valid only for calculated and binned columns, and the property value is false if there is a dangling reference in the column expression. |

| | |
|---|---|
| **IsIndexed** | [Persistent, user visible, searchable.] |
| | True if the column is indexed, i.e., if the distinct values have been identified and sorted. |
| **DistinctValueCount** | [Calculated, user visible, searchable.] |
| | The number of distinct valid values in the column. The property is valid only if the column is indexed. |
| **RowCount** | [Calculated, user visible.] |
| | The number of rows in the column (equal value for all columns in a data view). |
| **ValidRowCount** | [Calculated, user visible, searchable.] |
| | The number of valid rows in the column. The property is valid for all columns, even if not indexed. |
| **InvalidRowCount** | [Calculated, user visible, searchable.] |
| | The number of invalid rows in the column. The property is valid for all columns, even if not indexed. |
| **MinValue** | [Calculated, user visible, searchable.] |
| | The smallest value in the column, as defined by the comparer. The property is valid for all columns that have at least one valid value, even if the column is not indexed. |
| **MaxValue** | [Calculated, user visible, searchable.] |
| | The largest value in the column, as defined by the comparer. The property is valid for all columns that have at least one valid value, even if the column is not indexed. |
| **MinNumericValue** | [Calculated, user visible, searchable.] |
| | The smallest numeric value in a column. (All column values have a numeric representation.) The property is valid even for a non-indexed column, as long as there is at least one valid value. |
| **MaxNumericValue** | [Calculated, user visible, searchable.] |
| | The largest numeric value in a column. The property is valid even for a non-indexed column, as long as there is at least one valid value. |
| **Expression** | [Calculated, user visible.] |
| | For calculated columns only. Displays the expression used to calculate the column. |
| **DerivedExpression** | [Calculated, user visible.] |
| | For calculated columns only. Displays the expression used to calculate the column after the pre-processor values have been evaluated. |
| **Origin** | [Persistent, user visible, searchable.] |
| | A text string that describes where the column comes from. Typically set by a data source, or by a tool for a |

| | |
|---|---|
| | result column. |
| **Description** | [Persistent, user visible, user editable, searchable.] |
| | A description of the column entered by the user as an annotation. |
| **LinkTemplate** | A link template used to create links to a website from the values in a table. For example, the link template can be "http://www.{$}.com", where "{$}" represents the data value from the column. |
| **DefaultContinuousColorScheme** | The name of the default continuous color scheme that will be used when continuous coloring is applied to this column. If no color scheme is specified, or if the specified color scheme is not available, the Spotfire Continuous color scheme will be used. |
| **DefaultCategoricalColorScheme** | The name of the default categorical color scheme that will be used when categorical coloring is applied to this column. If no color scheme is specified, or the specified color scheme is not available, the Spotfire Categorical color scheme will be used. |
| **ContentType** | Each column may have a specified content type. Renderers use this property as input to know what to display. Use the form toplevel/subtype, for example, text/plain or image/jpg. |
| | For Geometry columns the content type should be set to application/x-wkb if you want to show the geometry information as images. |
| | If you are using TIBCO Spotfire Lead Discovery to display chemical structures from an SDFile then the content type should be set to chemical/x-mdl-molfile for the molfile column. |
| | **Note:** Do not use a space when specifying the content type. |
| **Keywords** | [Persistent, user visible, searchable.] |
| | Keywords defined on the column element can be used when searching for columns with the following syntax: Keywords:<desired keyword>. For example, Keywords:Sales. |

Note that column properties that are being calculated from the values in the column should not be used directly in any subsequent calculations. For example, they should not be used as input parameters for data functions, property controls or action controls in the text area, nor as On-Demand loading parameters. Instead, it is recommended that the corresponding values are being calculated using expressions:

| Column Property | Corresponding Expression |
|---|---|
| DistinctValueCount | UniqueCount(...) |
| RowCount | Count() |
| ValidRowCount | Count(...) |
| InvalidRowCount | Count() - Count(...) |

| | |
|---|---|
| MinValue | Min(...) |
| MaxValue | Max(...) |
| MinNumericValue | Real(Min(...)) |
| MaxNumericValue | Real(Max(...)) |

# 2.8.7 Details

## 2.8.7.1 Details on Insert Hierarchy

Predefined hierarchies can be set up when two or more columns are somehow related to each other. For example, a hierarchy can add structure to columns containing Country, State and City. The predefined hierarchies allow you to quickly change the level of detail in a visualization by using the hierarchy sliders, or, when you wish to combine two or more filters to a more structured hierarchy filter.

**Note:** The number of allowed nodes in a hierarchy with more than one level is limited to 100 000. If you try to create a hierarchy with more nodes, you will simply receive a hierarchy with one value, (All). If this should happen, edit the hierarchy and remove the column with too many unique values from the hierarchy.

### ► To reach the Insert Hierarchy dialog:

1. Select **Edit > Column Properties**.
2. Click on the **Insert** button and select **Hierarchy...** from the menu.
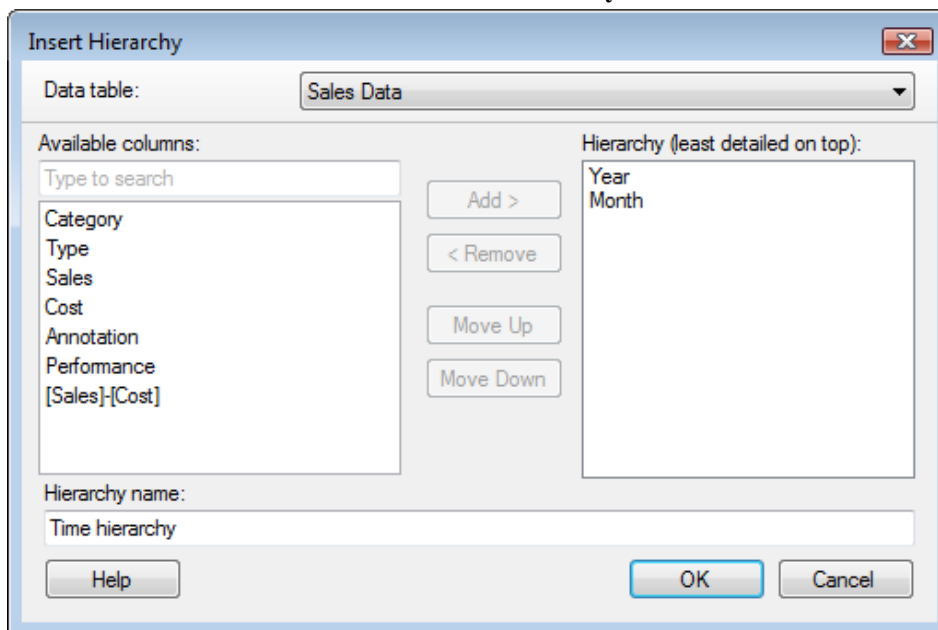


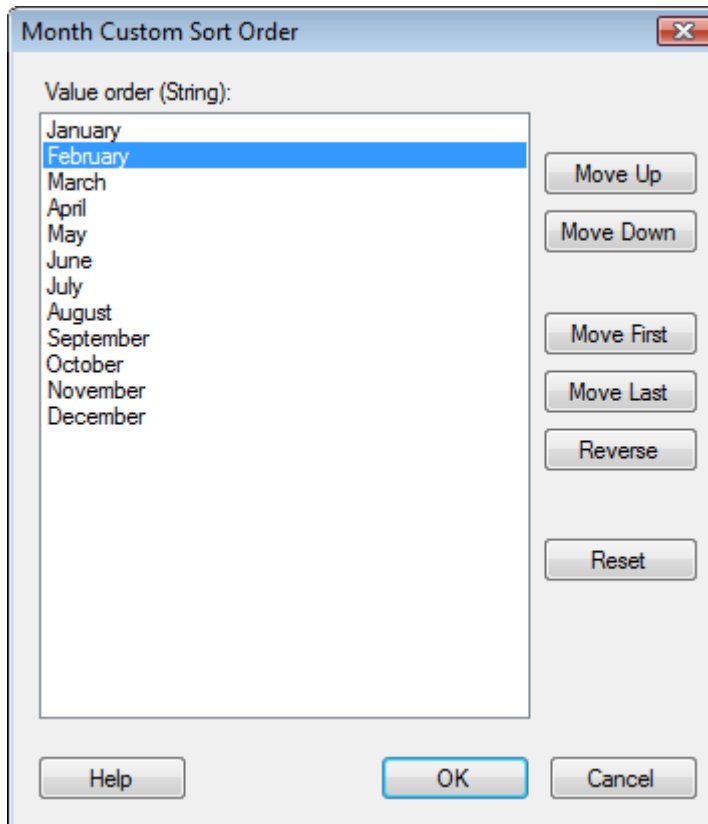| Option | Description |
|---|---|
| **Data table** | Only available when more than one data table is present in the analysis and the dialog has been opened via the main menu. Specifies the data table where the hierarchy will be inserted. |
| **Available columns** | Lists all columns that can be used to create a hierarchy. |
| **Add >** | Adds the column selected in the Available columns list to the Hierarchy. |

| | |
|---|---|
| **< Remove** | Removes the selected column from the Hierarchy and sends it back to the Available Columns list. |
| **Move Up** | Moves the selected column up in the Hierarchy. |
| **Move Down** | Moves the selected column down in the Hierarchy. |
| **Hierarchy (least detailed on top)** | Lists the columns that will be part of the new hierarchy. Start with the least granular category and continue to add more and more granular categories to the list. |
| **Hierarchy name** | Type a name to define the new hierarchy. |

## 2.8.7.2    Details on Custom Sort Order

### ► To reach the Custom Sort Order dialog:

1. Select **Edit > Column Properties**.
2. Click to select the column you wish to modify the sort order for in the **Columns and hierarchies** list.
3. Go to the **Sort Order** tab.
4. Click on the **Custom sort order** radio button and click **Configure...**.

**Note:** Custom sort order is only available for string columns.



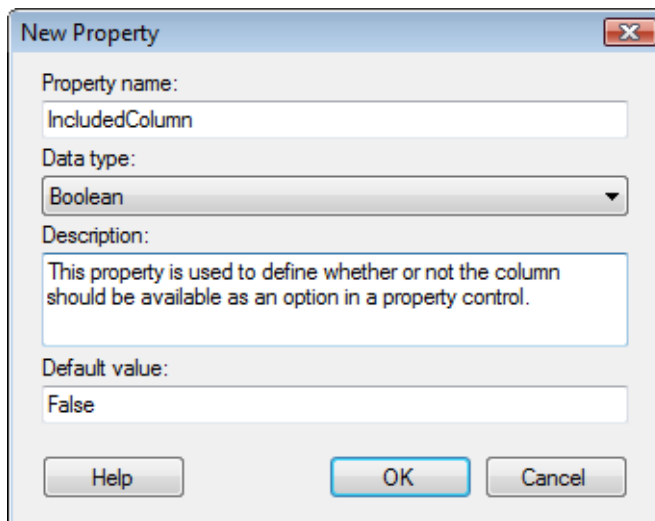| Option | Description |
|---|---|
| **Value order** | Lists the available values in the current sort order. Move values up and down in the list to rearrange the sort order. |

| | |
|---|---|
| **Move Up** | Click on a value and then click Move Up to move the value up in the list. |
| **Move Down** | Click on a value and then click Move Down to move the value down in the list. |
| **Move First** | Click on a value and then click Move First to move the selected value to the top of the list. |
| **Move Last** | Click on a value and then click Move Last to move the selected value to the bottom of the list. |
| **Reverse** | Reverses the current sort order. |
| **Reset** | Reverts to the default sort order (alphabetically sorted strings or string valued date parts). |

## 2.8.7.3 Details on New/Edit Column Property

It is possible to add custom column properties to the columns in the analysis. These can be used when you create reference lines in visualizations, or be a part of an expression. See Using Properties in the Analysis for some examples.

### ► To reach the New Property dialog:
1. Select **Edit > Column Properties**.
2. Click on the **Properties** tab.
3. Click **New...**.



| Option | Description |
|---|---|
| **Property name** | Specifies the name of the custom column property. |
| **Data type** | Specifies the data type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Default value** | Shows the default value of the property. If the value is cleared (set to empty) for a specific column then that column property will automatically revert to use the default value. |

**Note:** The only thing you can change using Edit Property is the value of the selected column, the default value and the description. If other settings are wrong, you need to delete the custom property and create a new one instead.



| Option | Description |
|---|---|
| **Property name** | Specifies the name of the column property. |
| **Data type** | Specifies the data type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Default value** | Shows the default value of the property.<br>**Note:** Changing the default value will change both the value for all new columns as well as for those columns that are currently using the old default value. |
| **Edit...** | Opens the Edit Value dialog, where the description and the default value can be changed. |
| **Value** | Shows the value of the property. |

## 2.8.7.4 Details on Edit Value

This dialog is shown when editing the default values for a property in the Edit Property dialog. For example, this could be the default value and the description of a column property.

If the Edit Value dialog is opened from the Document Properties dialog, then only the description field will be available.

| Option | Description |
|---|---|
| **Property value** | [Only available for column properties and data table properties.] Allows you to specify a value for the selected property. |
| **Description** | Allows you to edit the description of the property. |

## 2.8.7.5 Details on Select Visible Properties

### ► To reach the Select Visible Properties dialog:

1. Select **Edit > Column Properties**.
2. Right-click in the Columns and hierarchies list in the top part of the Column Properties dialog.
3. Select **More...**.
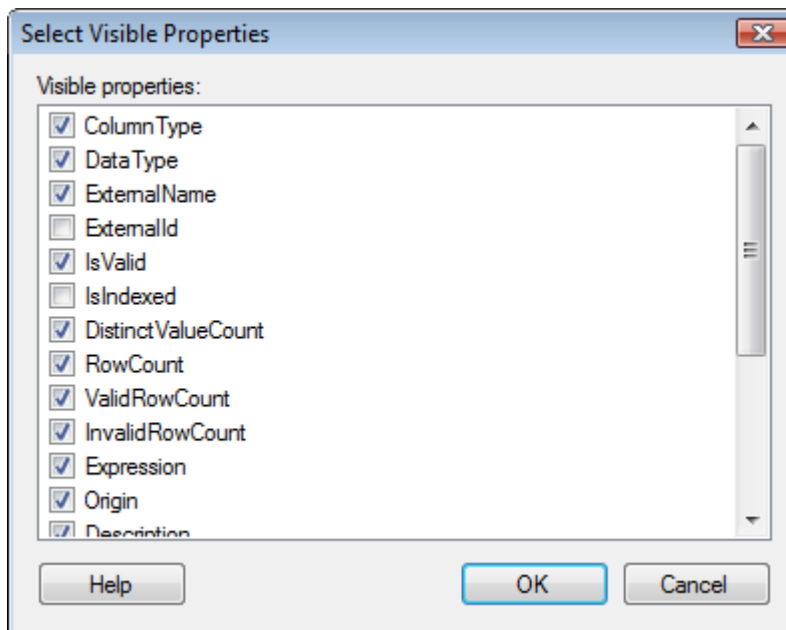


| Option | Description |
|---|---|
| **Visible properties** | Lists all properties available for the columns in this data table. Select the check box of a property to show it in the Columns and hierarchies list. Clear the check box to hide the property from the list. |

# 2.9 Data Table Properties

## 2.9.1 How to Edit Data Table Properties

The dialog found under **Edit > Data Table Properties** contains settings that apply to the data tables used in the analysis. For example, you can define which data table to use as default when creating new visualizations, set up sharing routines, or define how data should be stored when saving the analysis. To learn more about using multiple data tables, see Data Tables Overview.

► **To change the default data table to use when creating new visualizations:**

1. Select **Edit > Data Table Properties**.
2. Click on the data table to use in the **Data tables** list.
   Comment: New data tables are added by selecting File > Add Data Tables... or File > Add On-Demand Data Table....
3. Click on the **Set as Default** button to the right of the Data tables list.
4. Click **OK**.
   Response: All new visualizations created from here on will use the specified data table.
   Comment: To change the data table used in an already-created visualization, right-click on the visualization and select Properties from the pop-up menu, then go to the Data page.

► **To define a new relation between two data tables:**

1. See To define a new relation.

► **To add a new data table property:**

1. Select **Edit > Data Table Properties**.
2. Go to the **Properties** tab.
3. Click on the **New...** button.
   Response: The New Property dialog is opened.
4. Enter a name for the new property.
5. Select a data type for the new property.
6. Enter a value to use as default value for the property.
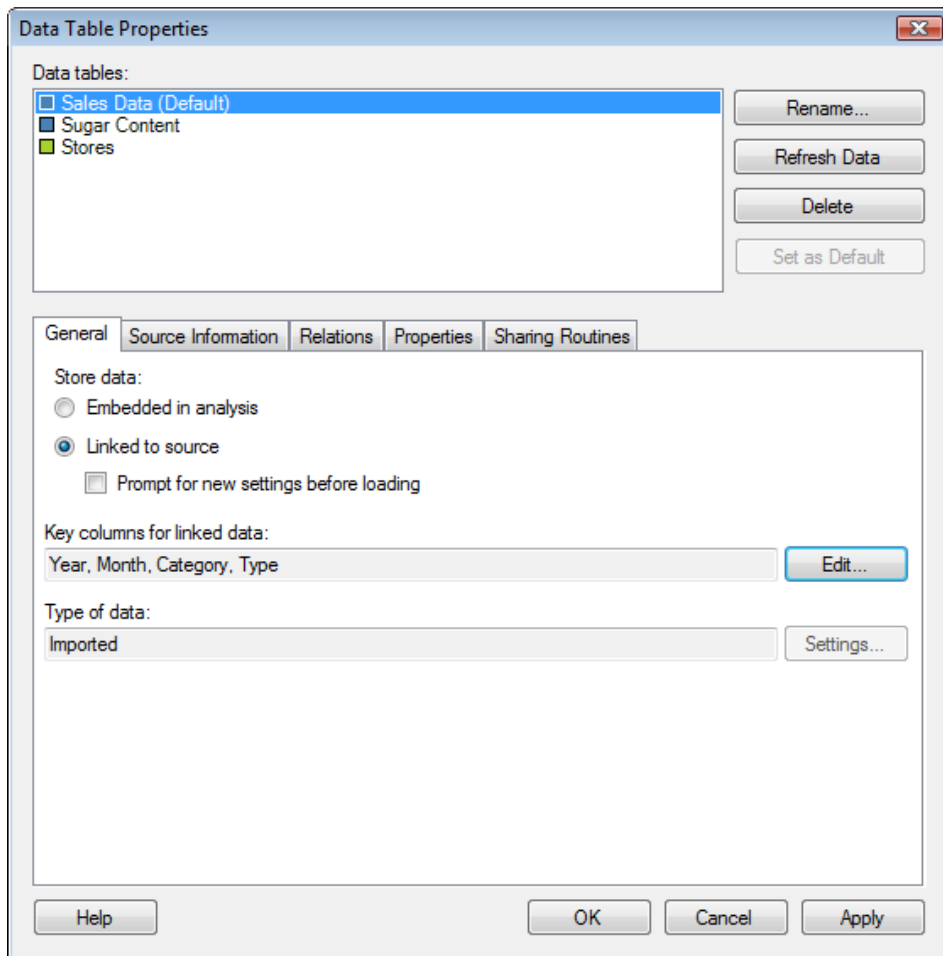7. Click **OK**.
   Response: The new property is added to the list of available properties.
   Comment: New properties can also be created on most places where you can use them. For example, by right-clicking in the Available properties for column list in the expression dialogs.

## 2.9.2 Details on Data Table Properties - General

► **To reach the Data Table Properties dialog:**

1. Select **Edit > Data Table Properties**.
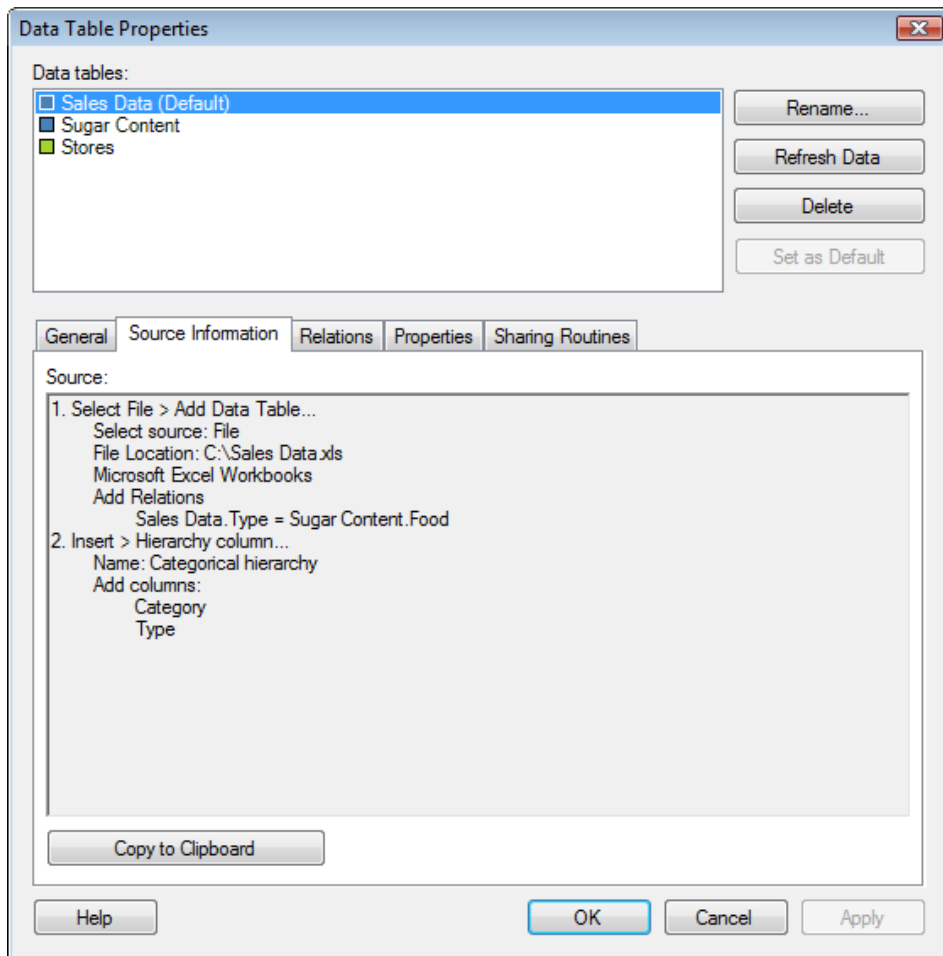2. Click on the **General** tab.

| Option | Description |
|---|---|
| **Data tables** | Lists the data tables available within the document. The names of the data tables in this list are the names that will be shown in the data table selectors, in the legends of visualizations, etc.<br><br>You cannot have two data tables with identical names in the same analysis. |
| **Rename...** | Allows you to change the display name of the selected data table. |
| **Refresh Data** | Reloads the data from the source. This is a way to refresh the data while analyzing, without having to reload the entire file.<br><br>**Tip:** If you want to reload multiple data tables simultaneously, you can instead select File > Reload Data on the main menu.<br><br>**Note:** If a data table is loaded on demand or calculated using a data function you need to click OK in the Data Table Properties dialog to actually start the data refresh. |
| **Delete** | Removes the selected data table from the analysis. Any visualizations that use the deleted data table will become invalid. |
| **Set as Default** | Sets the selected data table to be the default data table. This means that the selected data table will be used when new visualizations are created. |

| | |
|---|---|
| | You can always change the data table to use in a specific visualization from the Data page in Visualization Properties or from the Data table selector in the legend. |
| **Store Data** | Defines how you want data from the selected data table to be stored when saving the analysis. |
| **Embedded in analysis** | Use this option to embed the data from the selected data table in the analysis. By embedding all data in the analysis file it will be self-contained with data. This allows you to share the analysis with others who do not have access to the same databases you do, or who need to use their laptops offline while traveling. |
| **Linked to source** | Use this option to link the data from the selected data table to the original data sources. This is useful when data is updated or changed from time to time. For example, if you create an analysis file that gets its data from a database that is updated each night, then the linked option allows you to open the analysis file and have it automatically show the latest numbers. It will still use the visualizations and settings you already set up, but base them on the updated data. Also, data might take up lots of space so you might not want to embed a copy of a large data table if you can access it from another data source. |
| | **Note:** Make sure that all people who are going to use the analysis also have permissions to access the linked data. If you use this option to create an analysis file which is linked to a source file on your local computer, other people might not be able to open the file. |
| **Prompt for new settings before loading** | Select this check box if you want to see the import settings or any available prompt steps for the selected data table when you open the analysis. If the check box is cleared, the last used settings will be applied. |
| **Key columns for linked data** | If specified, lists the columns that have been specified to define an identifier for all rows in the selected data table. |
| | Key columns are used to uniquely identify rows when markings, tags or bookmarks are saved with a linked data source. |
| **Edit...** | Opens the Select Key Columns dialog where you can specify the columns to use to create a unique identifier for all rows in the selected data table. |
| **Type of data** | Displays the type of data source. |
| **Settings...** | If applicable, opens a dialog where the data source settings can be modified. If the data table is the result of a calculation (for example, a data relationships calculation), then the dialog for calculating the data table is opened again. For information links that are loaded on demand, the load method settings can be changed. |

## 2.9.3 Details on Data Table Properties - Source Information

► **To reach the Data Table Properties dialog:**
1. Select **Edit > Data Table Properties**.
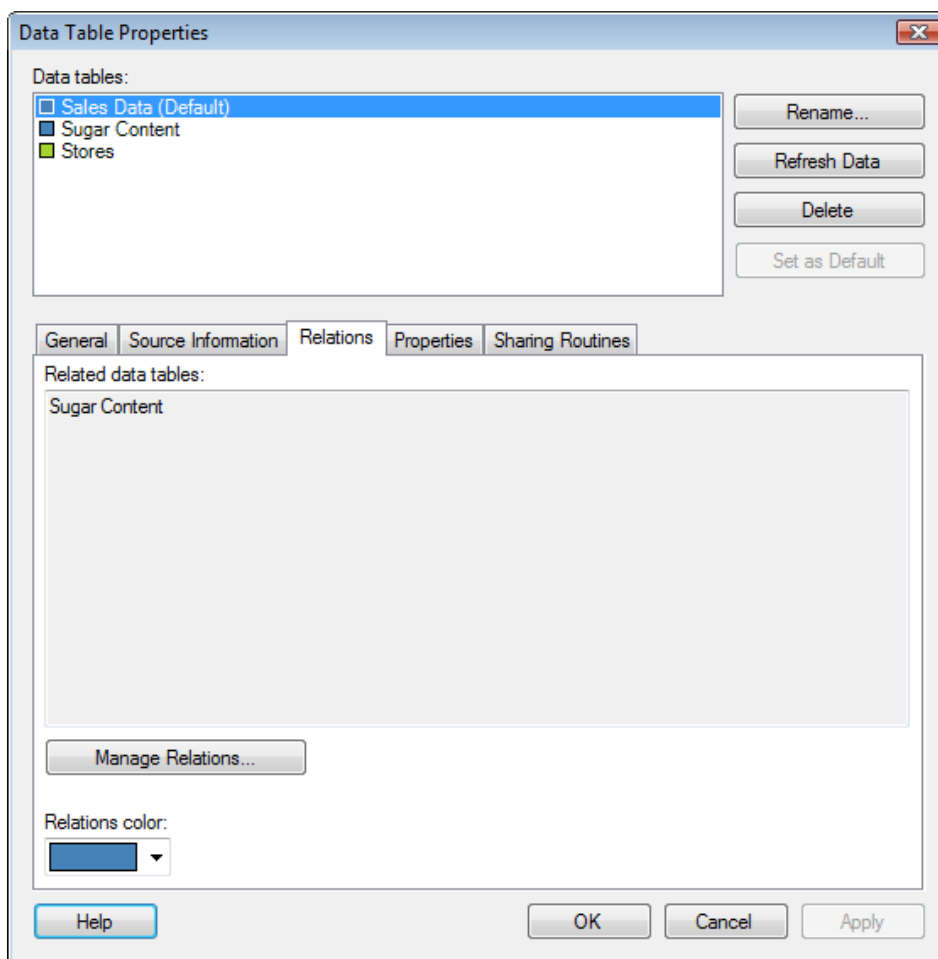2. Click on the **Source Information** tab.

| Option | Description |
|---|---|
| **Data tables** | Lists the data tables available within the document. The names of the data tables in this list are the names that will be shown in the data table selectors, in the legends of visualizations, etc.<br><br>You cannot have two data tables with identical names in the same analysis. |
| **Rename...** | Allows you to change the display name of the selected data table. |
| **Refresh Data** | Reloads the data from the source. This is a way to refresh the data while analyzing, without having to reload the entire file.<br><br>**Tip:** If you want to reload multiple data tables simultaneously, you can instead select File > Reload Data on the main menu.<br><br>**Note:** If a data table is loaded on demand or calculated using a data function you need to click OK in the Data Table Properties dialog to actually start the data refresh. |
| **Delete** | Removes the selected data table from the analysis. Any visualizations that use the deleted data table will become invalid. |
| **Set as Default** | Sets the selected data table to be the default data table. This means that the selected data table will be used when new visualizations are created. |

You can always change the data table to use in a specific visualization from the Data page in Visualization Properties or from the Data table selector in the legend.

| | |
|---|---|
| **Source** | Displays information about the origin of the data table together with any transformations or other modifications that have been applied to the original source data. |
| | If the source is a file, then the file name and path are shown. For an information link, the source origin shown is the name of the information link, and for a database, it is the data source name given when adding the data table. |
| Copy to Clipboard | Copies the information under Source so that you can paste it in another application. |

## 2.9.4    Details on Data Table Properties - Relations

► **To reach the Data Table Properties dialog:**
1.   Select **Edit > Data Table Properties**.
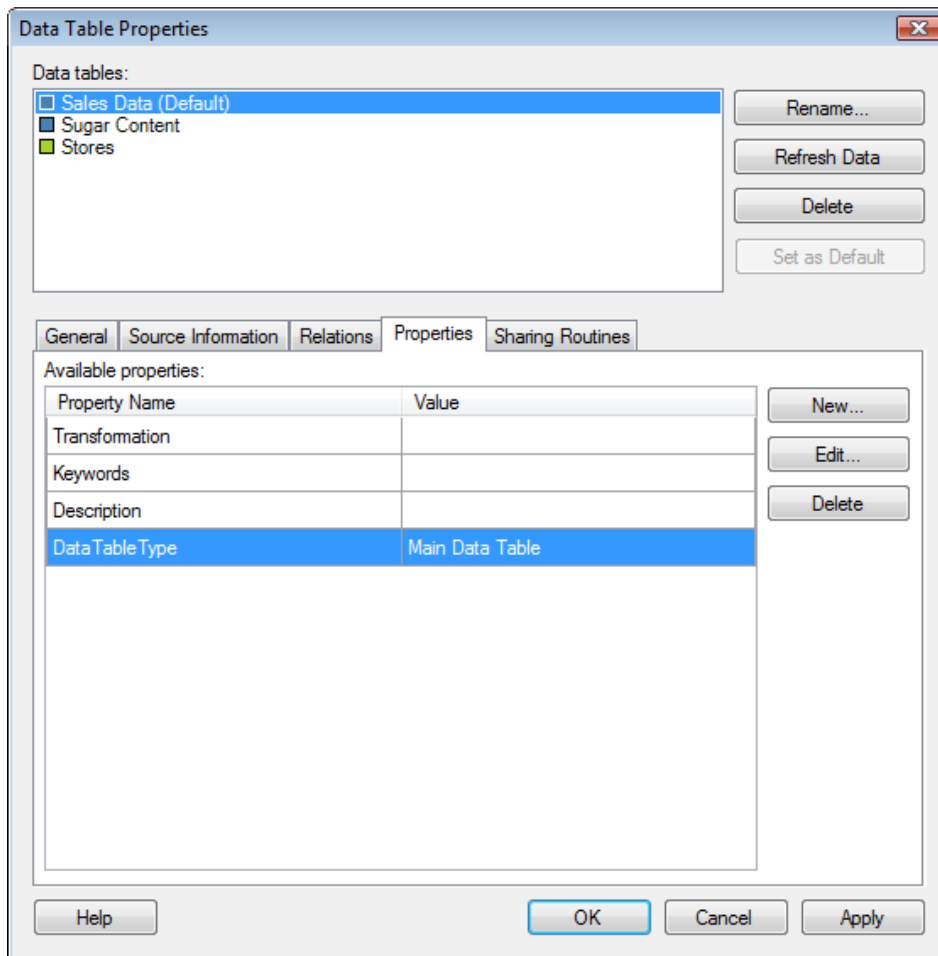2.   Click on the **Relations** tab.

| Option | Description |
|---|---|
| **Data tables** | Lists the data tables available within the document. The names of the data tables in this list are the names that will be shown in the data table selectors, in the legends of visualizations, etc.<br><br>You cannot have two data tables with identical names in the same analysis. |
| **Rename...** | Allows you to change the display name of the selected data table. |
| **Refresh Data** | Reloads the data from the source. This is a way to refresh the data while analyzing, without having to reload the entire file.<br><br>**Tip:** If you want to reload multiple data tables simultaneously, you can instead select File > Reload Data on the main menu.<br><br>**Note:** If a data table is loaded on demand or calculated using a data function you need to click OK in the Data Table Properties dialog to actually start the data refresh. |
| **Delete** | Removes the selected data table from the analysis. Any visualizations that use the deleted data table will become invalid. |
| **Set as Default** | Sets the selected data table to be the default data table. This means that the selected data table will be used when new visualizations are created.<br><br>You can always change the data table to use in a specific visualization from the Data page in Visualization Properties or from the Data table selector in the legend. |
| **Related data tables** | Lists all other data tables which have been specified to have a relation to the selected data table. |
| **Manage Relations...** | Opens the Manage Relations dialog where you can add, edit or remove relations between data tables. |
| **Relations color** | Displays the color used to distinguish the data tables related to this data table from other, unrelated data tables. |

## 2.9.5 Details on Data Table Properties - Properties

On the Properties tab it is possible to specify custom data table properties which are applicable throughout the document. The data table properties can be used inside expressions using Insert Column from Expression or Custom Expressions.

► **To reach the Data Table Properties dialog:**
  1. Select **Edit > Data Table Properties**.
  2. Click on the **Properties** tab.

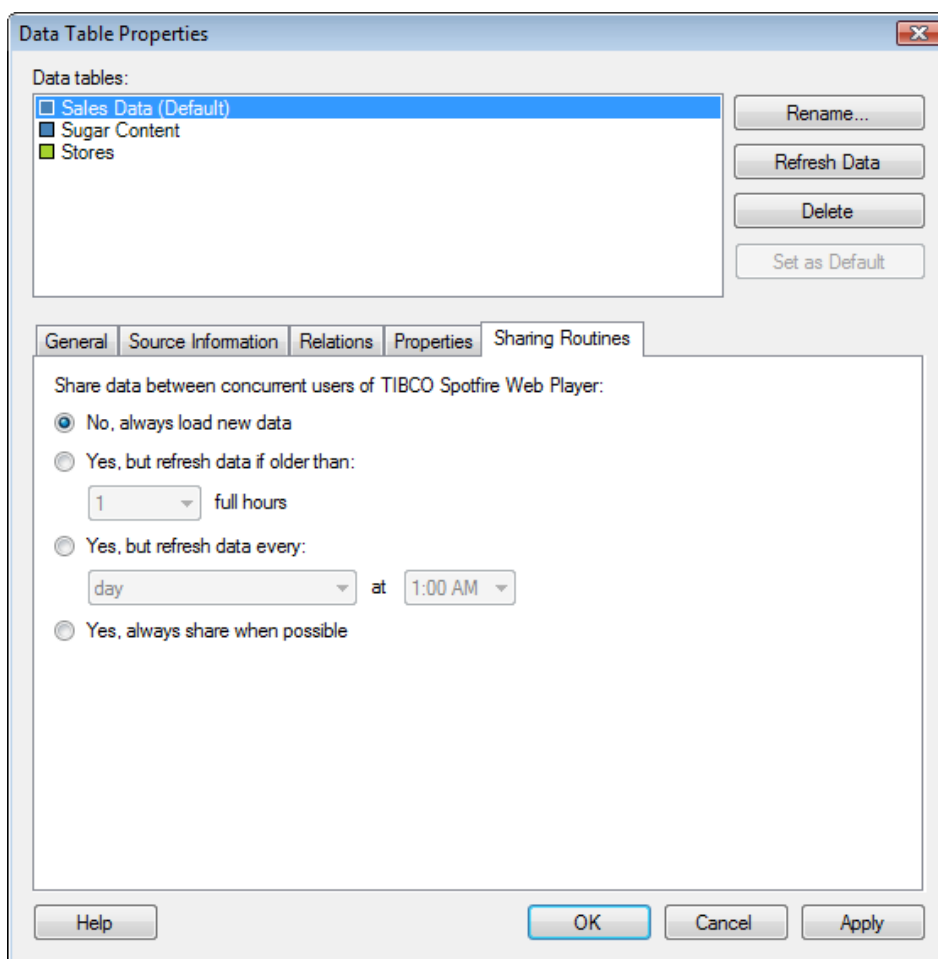| Option | Description |
|---|---|
| **Data tables** | Lists the data tables available within the document. The names of the data tables in this list are the names that will be shown in the data table selectors, in the legends of visualizations, etc.<br><br>You cannot have two data tables with identical names in the same analysis. |
| **Rename...** | Allows you to change the display name of the selected data table. |
| **Refresh Data** | Reloads the data from the source. This is a way to refresh the data while analyzing, without having to reload the entire file.<br><br>**Tip:** If you want to reload multiple data tables simultaneously, you can instead select File > Reload Data on the main menu.<br><br>**Note:** If a data table is loaded on demand or calculated using a data function you need to click OK in the Data Table Properties dialog to actually start the data refresh. |
| **Delete** | Removes the selected data table from the analysis. Any visualizations that use the deleted data table will become invalid. |
| **Set as Default** | Sets the selected data table to be the default data table. This means that the selected data table will be used when new visualizations are created. |

|  |  |
|---|---|
|  | You can always change the data table to use in a specific visualization from the Data page in Visualization Properties or from the Data table selector in the legend. |
| **Available properties** | Lists all properties currently available for the selected data table. For example, any transformations applied when adding the data table will be visible here. When data tables have been added using information links, the Keywords and Description defined in Information Designer will also be displayed. |
|  | If you have defined custom properties for the data table, then these properties are also listed here. |
| **New...** | Opens a dialog where you can add new data table properties to the document. |
| **Edit...** | Opens a dialog where you can edit the selected data table property. |
| **Delete** | Deletes the selected property. |

## 2.9.6 Details on Data Table Properties - Sharing Routines

When you publish analyses to the TIBCO Spotfire Library, many persons may access the same analysis file simultaneously and, hence, access the same data source by using TIBCO Spotfire Web Player. If desired, the loaded data can be shared between concurrent users from the TIBCO Spotfire Web Player server cache. Sharing data reduces the need for the server to reload the same data and can improve the performance of the server. Since TIBCO Spotfire cannot know when the original data sources have been updated and need to be reloaded, the settings on the Sharing Routines tab allows you to specify an update schedule that can match the actual times when your databases or network files are updated.

► **To reach the Data Table Properties dialog:**
1. Select **Edit > Data Table Properties**.
2. Click on the **Sharing Routines** tab.

| Option | Description |
|---|---|
| **Data tables** | Lists the data tables available within the document. The names of the data tables in this list are the names that will be shown in the data table selectors, in the legends of visualizations, etc. |
| | You cannot have two data tables with identical names in the same analysis. |
| **Rename...** | Allows you to change the display name of the selected data table. |
| **Refresh Data** | Reloads the data from the source. This is a way to refresh the data while analyzing, without having to reload the entire file. |
| | **Tip:** If you want to reload multiple data tables simultaneously, you can instead select File > Reload Data on the main menu. |
| | **Note:** If a data table is loaded on demand or calculated using a data function you need to click OK in the Data Table Properties dialog to actually start the data refresh. |
| **Delete** | Removes the data table from the analysis. Any visualizations that use the deleted data table will become invalid. |
| **Set as Default** | Sets the selected data table to be the default data table. This means that the selected data table will be used when new visualizations are created. |

|  | You can always change the data table to use in a specific visualization from the Data page in Visualization Properties or from the Data table selector in the legend. |
|---|---|
| **Share data between concurrent users of TIBCO Spotfire Web Player** | |
| **No, always load new data** | Use this option to always load new data. Note that this can put a very high load on the server, if many end users are accessing files from the Library simultaneously. |
| **Yes, but refresh data if older than X full hours** | Use this option to share data and only refresh if the data are older than the specified number of hours. <br><br> When someone accesses linked data for a certain data table, the update schedule is checked and the data pool is investigated to see if any data with the same timestamp are available. For example, if the time is 09.35 am when the person accesses the analysis file and the update schedule has been set to refresh data every hour, then the timestamp will be set to 09.00. If any other person has loaded the data between 09.00 and 09.35, then there will be cached data available which will be shared with the new person. If not, then new data are loaded. |
| **Yes, but refresh data every** [day or day of the week] **at** [time] | Use this option to share data and only refresh once every day or on a specified day every week, at the specified time. <br><br> See above for information about how data are loaded. |
| **Yes, always share when possible** | Use this option to always attempt to share data. <br><br> In this case, the data are presumed never to be changed. |

**Note:** This tab is only relevant if a Web Player server has been installed.
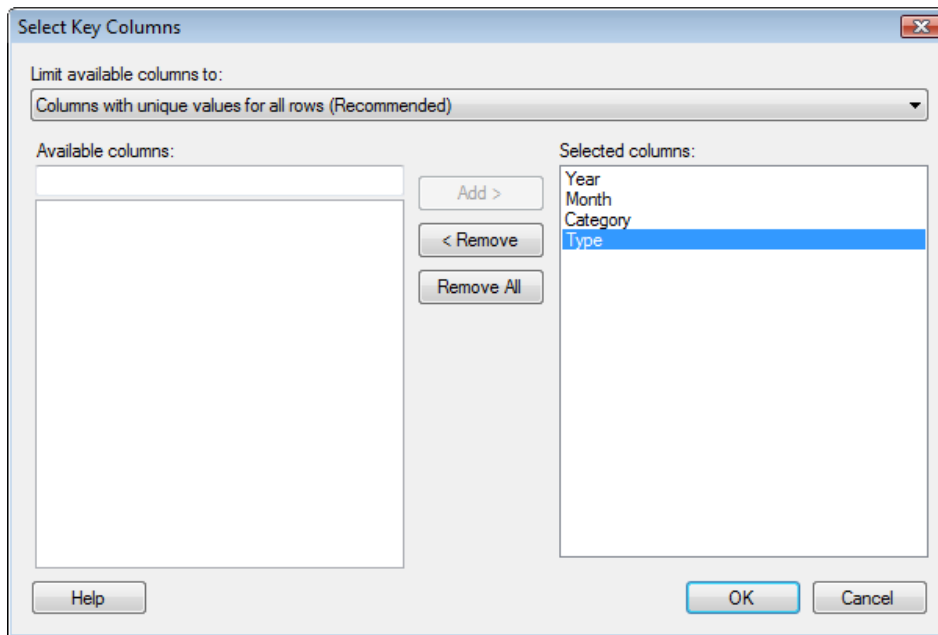
## 2.9.7    Details

### 2.9.7.1    Details on Select Key Columns

This dialog is used to define key columns for a data table in an analysis. The key columns are used to uniquely identify all rows in the data table. You should specify key columns if you want to be able to see the markings that were active when saving the file, or if you want any specified tags or bookmarks to be able to be reapplied when reopening the analysis file.

#### ► To reach the Select Key Columns dialog:
1. Select **Edit > Data Table Properties**.
   Comment: You can also reach the Data Table Properties dialog from the third step of the Save as Library Item wizard by clicking on the Edit... button.
2. On the **General** tab, click to select the data table of interest.
3. Click on the **Edit...** button next to the **Key columns for linked data** field.

| Option | Description |
|---|---|
| **Limit available columns to** | From this drop-down list you can limit the available columns to choose from. Options are: |
| | **Columns with unique values for all rows (Recommended)** |
| | Since these columns have unique values for all rows, it is likely that they are good choices for determining a unique identifier for each tagged row. |
| | **Columns of appropriate data types** |
| | This option only shows columns with INTEGER or STRING data types, since these are more likely to provide unique identifiers. |
| | **All columns** |
| | This option shows all columns. |
| **Available columns** | Select which columns to use when identifying keys for the tagged or marked rows. |
| | Each tagged or marked row must be determined by a unique combination of values in the specified columns. For each row with a tag or a marking in your current analysis, the values for the specified columns are noted in the saved analysis file, and when the analysis file is opened again rows matching those criteria will be tagged or marked again. |
| | This means that if a new row has been added to the data table that also matches a criterion for a tag or a marking, the tag or marking is not unique and therefore invalid. Neither the new row nor the original row that was tagged, will receive any tag. |
| **Selected columns** | These are the columns that will be used when identifying keys for the tagged rows. |
| **Add >** | Select a column from the Available columns list and click **Add >** to move it to the Selected columns list. |
| **< Remove** | Select a column from the Selected columns list and click **< Remove** to |

move it to the Available columns list.

| | |
|---|---|
| **Remove All** | Removes all columns from the Selected columns list. |

## 2.9.7.2    Details on Load Method

This dialog is reached by clicking on the **Settings...** button in the Data Table Properties dialog for a data table that originates from an information link which has been specified to load data on demand.

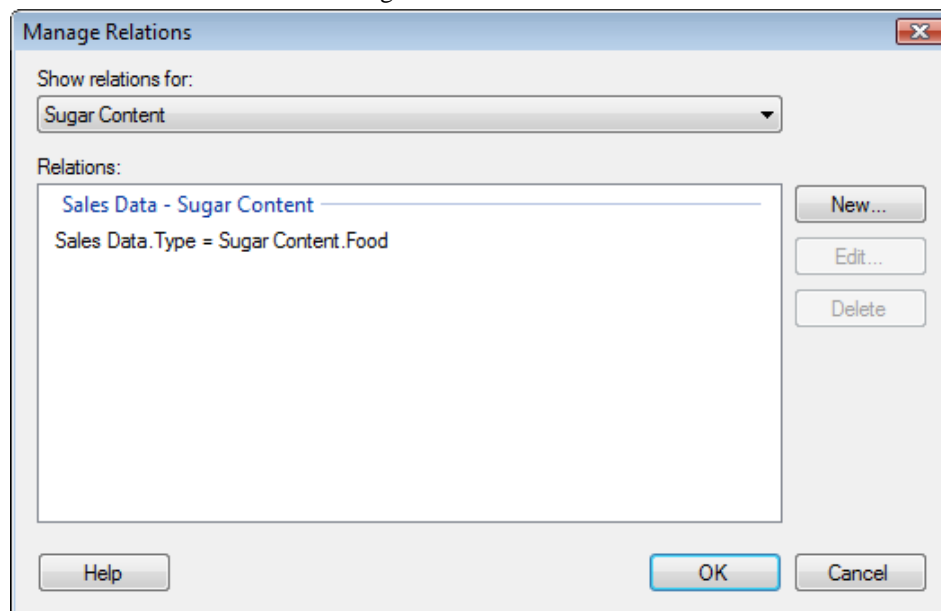| Option | Description |
|---|---|
| **All data at once** | Click this radio button to load all data immediately. |
| **Data on demand** | Click this radio button to load data on demand only. If this option is selected you need to specify what parameters will be used to control the on-demand loading. |
| **Define input for parameters that should control loading** | This is where you select what will affect the loading of data from the perspective of the information link. All columns and parameters available in the selected information link are listed. Click to select the parameter in the list and click Define Input... to specify a condition that must be fulfilled for any data to be loaded. |
| | Any required prompts or parameters that were specified upon the creation of the information link will be listed as Required parameters in this field. This means that you must specify input handling of these parameters to be able to load any on-demand data at all. |
| **Define Input...** | Opens the Define Input dialog where you can specify how the selected parameter will be connected to the on-demand data. |
| **Clear Input** | Removes the previously added input from the selected parameter. |

| Load automatically | Select this check box if the on-demand data should be loaded automatically each time the specified input conditions are changed. If the check box is cleared the visualization can be manually updated using the refresh icon, , in the visualization title bar.

A data table set to load automatically will switch to manual update if cyclic dependencies are detected in the analysis. |
|---|---|
| Allow caching | Select this check box to allow caching of data. This may speed up the process when loading new subsets of data. However, if the underlying information link data are updated during the current TIBCO Spotfire session you may end up with different results for a specific set of input values depending on whether or not the current selection is stored in the cache. You should always clear the check box if you know that the underlying data may be updated during your current session. |

## 2.9.7.3 Details on Manage Relations

This dialog is used to manage relations between both new and previously added data tables in your analysis.

► **To reach the Manage Relations dialog:**
1. Select **Edit > Data Table Properties**.
2. Go to the **Relations** tab.
3. Click on **Manage Relations...**.
4. Comment: You can also reach the Manage Relations dialog from the Data page of the Map Chart Visualization Properties, or from the Add Data Tables or the Add On-Demand Data Table dialogs.



| Option | Description |
|---|---|
| **Show relations for** | Select the data table whose relations you wish to view, or select All data tables to view all relations in the document. |
| **Relations** | Lists all relations for the selected data table or all relations in the |

document, depending on your selection above.

**Note:** If one or more relations have become invalid, these will appear in red.

| | |
|---|---|
| **New...** | Opens the New Relation dialog where you can define a new relation between two data tables. |
| **Edit...** | Opens the Edit Relation dialog where you can edit the relation selected in the Relations list. |
| **Delete** | Removes the selected relation from the Relations list. |

## 2.9.7.4 Details on New/Edit Data Table Property

It is possible to add data table properties to the data tables in the analysis. These can be used as parts of an expression and can help you classify different types of data tables.

### ► To reach the New Property dialog:

1. Select **Edit > Data Table Properties**.

   Comment: The New Property dialog is also available by right-clicking in the Available properties list in the Insert Calculated Column and Custom Expression dialogs, as well as from the dialogs used when adding property controls to a text area.

2. Click on the **Properties** tab.

3. Click **New...**.



| Option | Description |
|---|---|
| **Property name** | Specifies the name of the data table property. |
| **Data type** | Specifies the data type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Default value** | Shows the default value of the property. Data table and Column properties have default values. If the value is cleared (set to empty) for a specific data table then that data table property will automatically revert to use the default value.<br><br>To change the value for a specific data table, click to select it in the list and then click Edit.... |

### ► To reach the Edit Property dialog:

1. Select **Edit > Data Table Properties**.

   Comment: The Edit Property dialog is also available by right-clicking in the Available properties list in the Insert Calculated Column and Custom Expression dialogs, as well as from the dialogs used when adding property controls to a text area.

2. Click on the **Properties** tab.

3. Click to select the property you wish to edit in the list of available properties.

4. Click **Edit...**.

| Option | Description |
|---|---|
| **Property name** | Specifies the name of the data table property. |
| **Data type** | Specifies the data type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Default value** | Displays the default value of the property. **Note:** If you change the default value, it will be set as the default value for both new data tables and already created data tables. |
| **Edit...** | Opens the Edit Value dialog where the default value and description can be specified. |
| **Value** | Shows the value of the property. |

# 3  Adding Data

## 3.1  Insert Calculated Column

### 3.1.1  What is a Calculated Column?

Occasionally, the columns included in a data table do not allow you to perform all necessary operations, or to create the visualizations needed to fully explore the data table. However, in many cases the necessary information can be computed from existing columns by using the mathematical and logical expressions provided by the Insert Calculated Column tool.

**Note:** A calculated column is treated like any other column and its contents are static during all further analysis. If you want to use expressions that change during filtering of your data table, you should instead use custom expressions that are defined where you need them (for example, select **Custom Expression...** from the right-click menu on the axis selector).

### 3.1.2  How to Insert a Calculated Column

TIBCO Spotfire supports two different types of expressions: Insert Calculated Column, which creates a new column in the data table, and Custom Expression, which is used to dynamically modify the expression used on an axis or to define a setting. Both types of expressions are created with a similar user interface.

► **To insert a calculated column in the data table:**

Select **Insert > Calculated Column...**.

1. If you have more than one data table in the document, select the **Data table** to work on.
2. Specify a suitable expression by either typing it directly into the **Expression** text field, or by selecting columns, properties and functions from the list.
   An example of an expression could be: [Exports m$]/[Population].

   Comment: You can always modify the expression by editing the text in the Expression field, using cut-and-paste, or by typing text. For a detailed description of the expression language, see General Syntax and other topics under Expression Language. For details on the syntax to use when adding properties, see Properties in Expressions.
3. Verify that the result seems reasonable by looking at the **Sample result** field.

   Comment: If an error message is shown, there is a problem with the expression. Go back and modify the expression until the desired result is achieved.
4. If desired, you can change the **Formatting** of the new column.
5. Type a **Column name** for the new column.
6. Click **OK**.

   Response: The expression is now evaluated for each row in the data table and a new column is created. A filter will appear with the name of the new column you created.

**Tip:** If you have previously created a suitable expression, you may select it from the Recent expressions list and click the Insert button.

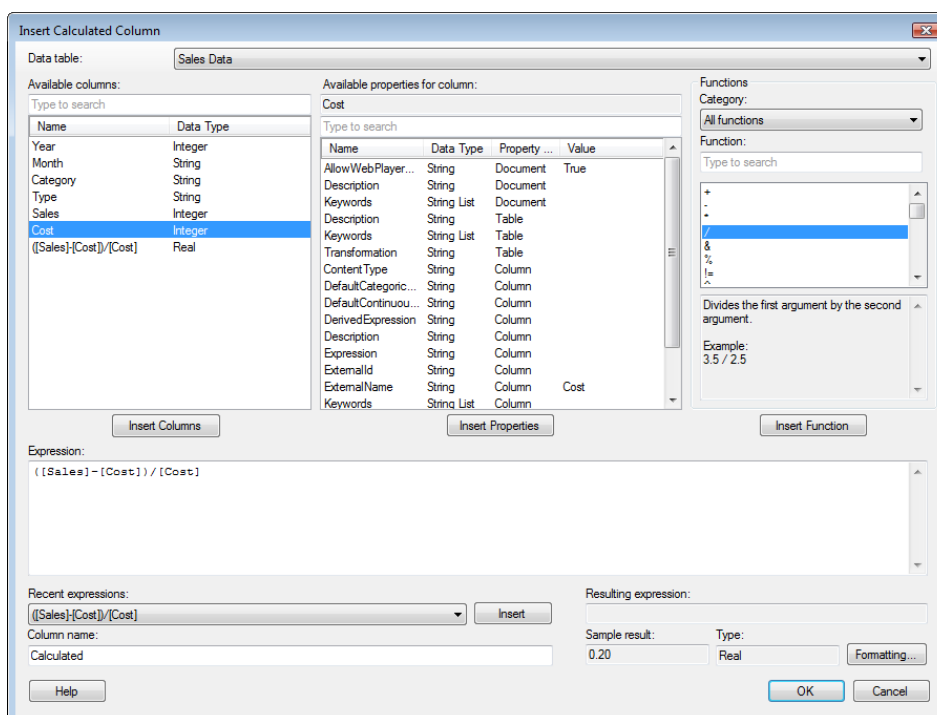► **To reach the Custom Expression dialog:**

1. Right-click on a column selector on an axis, in a Visualization Properties dialog, or in the Legend, to display the menu.
2. Select **Custom Expression...**.

   Comment: See How to Insert a Custom Expression for more information.

# 3.1.3    Details on Insert Calculated Column

TIBCO Spotfire supports two different types of expressions: Insert Calculated Column, which creates a new column in the data table, and Custom Expression, which is used to dynamically modify the expression used on an axis or to define a setting. Both types of expressions are created with a similar user interface.

### ► To reach the Insert Calculated Column dialog:

Select **Insert > Calculated Column...**.



| Option | Description |
|---|---|
| **Data table** | Only available when more than one data table is present in the analysis and the dialog has been opened via the main menu. |
| | Specifies the data table where the calculated column will be inserted. |
| **Available columns** | Shows all columns that you can use in the calculation of a new column. |
| | Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column to send it to the Expression field. Press Ctrl or Shift to select multiple columns. |
| | You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field using the rules described on the Searching in TIBCO Spotfire page. |
| **Insert Columns** | Inserts the columns selected in the Available columns list at the current cursor position in the Expression field. |
| **Available properties for column** | Shows all properties that you can use in the calculation of a new column. You can narrow down the list of available properties by |

using the search field. The column properties shown are specific to the column selected in the Available columns list to the left.

Select a property by clicking on it in the list and then click on the Insert Properties button; or double-click on the property to send it to the Expression field. The property will automatically be inserted as text. However, there may be occasions where you need to insert the property as a function to receive the desired result. See Properties in Expressions for more information. Use the pop-up menu in this field to select how to insert the property or type the correct syntax manually.

If you want to define a new property to use in the expression, right-click in the Available properties field and select **New > [Property Type] Property...** from the pop-up menu. You can also edit or delete custom properties by using the pop-up menu.

| | |
|---|---|
| **Insert Properties** | Inserts the properties selected in the Available properties for column list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list: <br><br> All functions <br> Binning functions <br> Conversion functions <br> Date and Time functions <br> Logical functions <br> Math functions <br> Operators <br> Property functions <br> Ranking functions <br> Spatial functions <br> Statistical functions <br> Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button, or double-click on the function to send it to the Expression field. <br><br> Type a search string in the text field to limit the number of items in the Functions list. <br><br> You can also click on any function and type the first letter of the desired function name to jump to a specific location in the list. |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Expression Language chapter. |
| **Insert Function** | Inserts the selected function at the current cursor position in the Expression field. |
| **Expression** | This is the text field in which you build your expression. You can insert columns and functions from the lists, or enter text as in any standard text editor. <br><br> Cut/Copy/Paste works in the field using standard Ctrl+X/Ctrl+C/Ctrl+V. <br><br> Also, it is possible to undo/redo the last action by pressing Ctrl+Z. |

| | |
|---|---|
| **Recent expressions** | Displays the ten expressions you have most recently created. You can select one of these and click the Insert button to insert the expression into the Expression field. |
| **Insert** | Inserts the selected Recent expression into the Expression field. This will replace the entire content of the Expression field. |
| **Resulting expression** | Of interest when preprocessor functions (such as ${PropertyName}) are used in the expression only. Displays the expression after all occurrences of the property have been replaced with its current value or values. |
| **Column name** | The name of the new calculated column. |
| **Sample result** | Displays the result of applying the current expression to the first row of the data table. Note that if aggregating functions (such as, "Count") are used in the expression, only the first 100 rows will be used in the sample calculation. |
| | If this field shows an error there is a problem with the expression. Moving the mouse pointer over the red exclamation mark next to the Expression field will display an explanation of what is wrong. |
| **Type** | The type of the new calculated column. |
| **Formatting...** | Opens the Formatting dialog, where you can change the formatting of the new calculated column. |

# 3.1.4    Expression Language

## 3.1.4.1    General Syntax

### Column references

Accessing columns is done by enclosing the column name in "[" and "]" characters (square brackets). The brackets are needed when the column name contains characters other than letters, digits or _ (underscore). They are also required when the column name is the same as a function name, or when the column name begins with a digit. If a column name contains any square brackets then they must be escaped. Escaping of brackets is performed by adding extra brackets before and after the bracket: "[" and "]]". For example, if the column name is [Name], it would be written as [[Name]]] in an expression.

If the column name has no special character or whitespace, or is not also a function name, it can be entered without brackets.

**Examples:**

Column1
[Column1]
[Binned Column1]
[1]
[!@#$%^&*()[\]]\\]

Constants are converted to columns, so even if a method says that the argument has to be a column, it is acceptable to use a constant.

### Case sensitivity

- Variables, functions and keywords are case insensitive: SUM(C1) = Sum(C1) = sum(C1)
- Column name references are case sensitive.

- Method call names are case insensitive. All methods which are defined in the add-in framework can be used. See later sections for information about the different methods supported.

## Expression results

An expression describes how a new column should be calculated. The newly created column will have the same number of rows as all the other columns in the data table. The default null handling behavior is that operations on null return null. This means that if a new column is calculated as [Column A]*2 and there are empty values on some rows in Column A, then the new column will have empty values on those rows as well.

Multiple columns are normally separated with a comma. If multiple expressions are used the AS keyword can be used to rename the expressions in the custom expression dialog. See examples below.

## Categorical expressions, NEST and CROSS

In custom expressions, categorical and hierarchical columns and expressions are written between angles, "<>". When more than one category is available within the expression, which combinations of categories to show must also be specified. This is done using the keywords NEST (which shows all actual combinations of values in the data) or CROSS (which will show all possible combinations of the values, including combinations that currently hold no data). All columns in the expression must be separated by "nest" or "cross" instead of a comma, and mixing the two combination options is not permitted.

For example, if we have a data table containing some sales data for each month during two years, but the data for February is missing for one year, the different options will give the following results:

**Nest:**
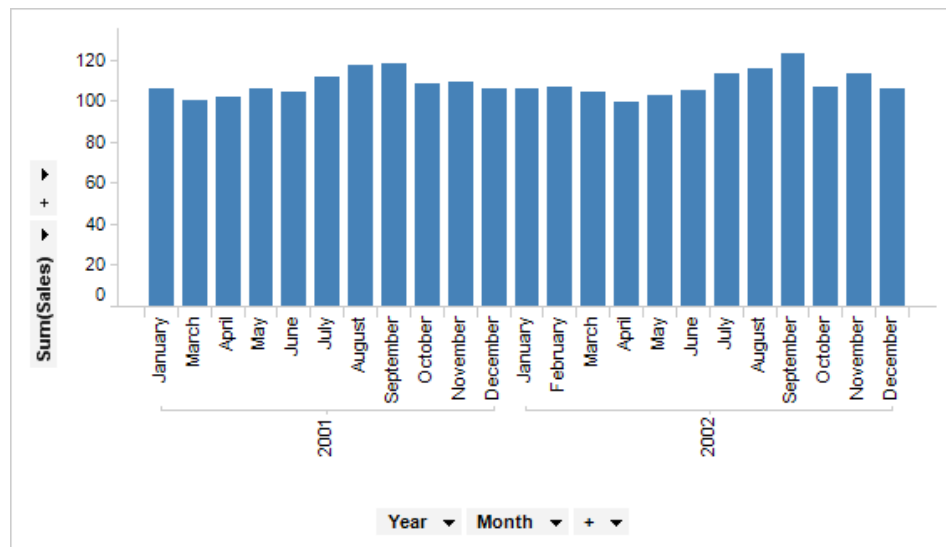


Since there are no data available for February 2001, there will not be a bar (nor a placeholder for a bar) there. This visualization is set up using the **All values in data (nest)** option in the Advanced Settings dialog, reached from the category axis property page for the visualization. It corresponds to the custom expression: <[Year] NEST [Month]>

**Cross:**
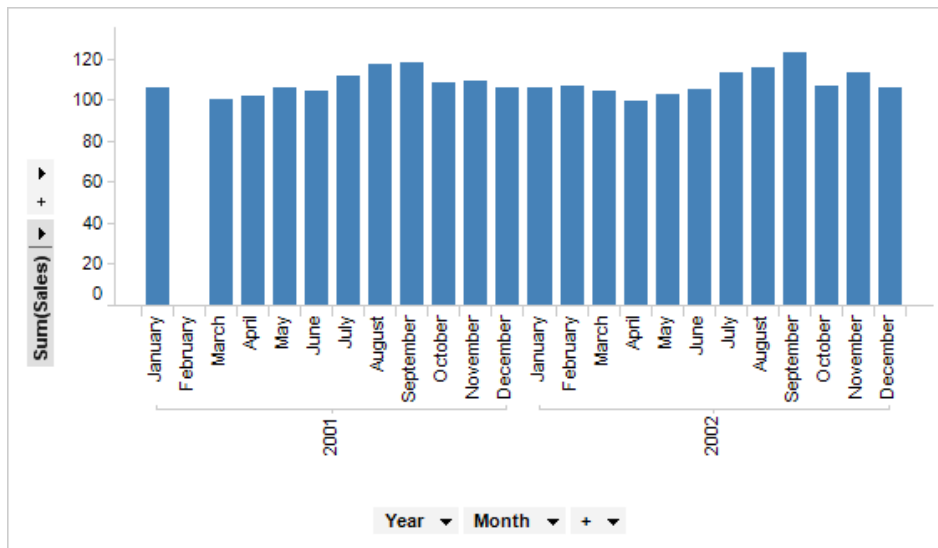
When the CROSS option is selected, all possible combinations of the categories are displayed. This means that there will be a placeholder for the February column for 2001, even though there is no data available for February. The **All possible values (cross)** option has been selected in the Advanced Settings dialog and the corresponding custom expression would be: <CROSS [Year] CROSS [Month]>

(The first CROSS is optional.)

## Examples of expressions:

[Column1]

[Column1], [Column2]

[Column1] AS [My first column], [Column2] AS [My second column]

<[Category column 1]>

<[Category column 1] nest [Category column 2]>

<[Category column 1] cross [Category column 2] cross [Category column 3]>

123.23

39+12*3

-(1-2)

cast (power(2,2) as integer)

null

case Column1 when 10 then 'ten' else 'not ten' end

case when 1 < 3 or 3 < 2 then 10 else 32 end

case when Column1 is not error then Column1 else Column2 end

## 3.1.4.2    Operators

### 3.1.4.2.1    Data Types

The available data types are:

- Integer
- LongInteger
- Real
- SingleReal
- Currency
- Date

- DateTime
- Time
- TimeSpan
- Boolean
- String
- Binary

All data formats except Currency (Decimal) use a binary floating-point number representation of the values. This means that some calculations which *should* result in an even number may be displayed as a number which needs to be rounded off, due to the nature of the base-two calculation. When more calculations are performed after one another, errors can accumulate and may become a problem.

| Data Type | Description |
|---|---|
| **Integer** | Integer values are written as a sequence of digits, possibly prefixed by a + or - sign. The integer values that can be specified range from -2147483648 to 2147483647. If used where a decimal value was expected, the integer values are automatically converted to decimal values.<br><br>**Note:** Hexadecimal values can be used in custom expressions and in calculated columns. They cannot be used when opening data. Hexadecimal-formatted values have a size limitation of 8 characters.<br><br>**Examples:**<br>0<br>101<br>-32768<br>+55<br>0xff      = 255<br>0x7fffffff     = 2147483647<br>0x80000000   = -2147483648 |
| **LongInteger** | LongInteger can be used if the range for the standard Integer is not enough for your needs. It ranges from -9223372036854775808<br>to 9223372036854775807. LongInteger cannot be converted to Real without precision loss, but it can be converted to Currency without precision loss.<br><br>**Note:** Hexadecimal values can be used in custom expressions and in calculated columns. They cannot be used when opening data.<br><br>**Examples:**<br>2147483648<br>0x7FFFFFFFFFFFFFFF = -9223372036854775808<br>0x8000000000000000 = 9223372036854775807 |
| **Real** | Real values are written as standard floating point numbers with a period for a decimal point and no thousands separator. The real values that can be specified range from -8.98846567431157E+307 to 8.98846567431157E+307.<br><br>The number of significant digits that can be shown is limited to 15, even though 16 can be used in calculations.<br><br>Math operations on real values which produce results that cannot be represented by the real data type generate numeric errors. In the resulting data table, these special cases will be filtered out and replaced by null.<br><br>**Examples:**<br>0.0<br>0.1 |

|  | 10000.0<br>-1.23e-22<br>+1.23e+22<br>1E6 |
|---|---|
| **SingleReal** | SingleReal values are written as standard floating point numbers with lower precision and range than Real. SingleReal occupies 50% less memory than Real. The SingleReal values that can be specified range from -1.7014117E+38 to 1.7014117E+38.<br><br>The number of significant digits that can be shown is limited to 7, even though 8 can be used in calculations.<br><br>SingleReal can be converted to Real with minor precision loss. |
| **Currency** | Currency constants are written as integer or real constants with an 'm' suffix.<br><br>The data format behind the currency type is decimal. The decimal data format uses the base 10 in its calculations, which means that the round-off errors that may occur when doing binary calculations can be avoided with this format. However, this also means that heavy calculations take a longer time.<br><br>The number of significant digits that can be shown for a currency value is 28 (29 can be used in calculations). Currency values that can be specified range from -3961408125713216879677197 to 3961408125713216879677197.<br><br>Currency columns cannot be used in data functions. |
| **Date** | A date and time format depending on the locale on your computer. Dates from January 1, 1583 and forward are supported.<br>**Examples:**<br>6/12/2006<br>June 12<br>June, 2006<br>Note that the Date format is not directly supported by Spotfire Statistics Services. See also How to Use Data Functions. |
| **DateTime** | A date and time format depending on the locale on your computer. Dates from January 1, 1583 and forward are supported.<br>**Examples:**<br>6/12/2006<br>Monday, June 12, 2006 1:05 PM<br>6/12/2006 10:14:35 AM |
| **Time** | A date and time format depending on the locale on your computer.<br>**Examples:**<br>2006-06-12 10:14:35<br>10:14<br>10:14:35<br>Note that the Time format is not directly supported by Spotfire Statistics Services. See also How to Use Data Functions. |
| **TimeSpan** | TimeSpan is a value describing the difference between two dates.<br>It has 5 possible fields:<br>Days<br>1. Min: -10675199<br>2. Max: 10675199<br>Hours |

|  |  |
|---|---|
|  | 1. Min: 0 |
|  | 2. Max: 23 |
|  | Minutes |
|  | 1. Min: 0 |
|  | 2. Max: 59 |
|  | Seconds |
|  | 1. Min: 0 |
|  | 2. Max: 59 |
|  | Fractions (decimals of seconds) |
|  | 1. Up to three decimals, i.e., the precision is 1 ms. |
|  | TimeSpan values can be displayed on a compact form: [-]d.h:m:s.f ([-]days.hours:minutes:seconds.fractions) or written out with words or abbreviations for each available field. Some of the descriptive forms can be localized. |
|  | Total min: -10675199.02:48:05.477 |
|  | Total max: 10675199.02:48:05.477 |
| **Boolean** | True and false. Booleans are used to represent true and false values returned by comparison operators and logical functions. |
|  | The display values can be localized. |
|  | **Examples:** |
|  | true |
|  | false |
|  | 1 < 5 |
| **String** | String values are surrounded by double quotes or single quotes. Escaping is performed by entering the delimiter symbol twice in a row (i.e., '' or ""). A string value can contain any sequence of UNICODE characters. A double quote cannot be used within the string unless it is escaped. Backslash is used to escape special characters, so it too must be escaped. |
|  | The basic escaping rules are that only the characters defined below can be used after a \; everything else will generate an error. |
|  | **Examples:** |
|  | "Hello world" |
|  | "25""23" |
|  | "1\n2\n" |
|  | "C:\\TEMP\\image.png" |
| **Binary** | May contain any type of data, encoded in binary form. |
|  | **Examples:** |
|  | Images |
|  | Chemical structure information |

| Escape sequence | Result |
|---|---|
| \uHHHH | Any Unicode character expressed as four hexadecimal characters, 0-F. |
| \DDD | A character in the range 0-255 expressed as three octal digits, 0-7. |
| \b | \u0008: backspace (BS) |
| \t | \u0009: horizontal tab (HT) |

| | |
|---|---|
| \n | \u000a: linefeed (LF) |
| \f | \u000c: form feed (FF) |
| \r | \u000d: carriage return (CR) |
| \\ | \u005c: backslash \ |

## Conversion to other data types

The data types supported in expressions are the same types as are supported in the data model. Converting a value from one data type to another is called casting.

Implicit casting to real is performed when integer columns are used in calculations and the result is a non-integer. If the result is an integer but larger than the limit for the Integer data type, it will be implicitly cast to a LongInteger. Integers can also be implicitly cast to a Currency. For example, if an Integer and a Currency column are added, then the result will be a Currency column.

You may also end up with a Currency when the result from a LongInteger exceeds the LongInteger limit. This is because a LongInteger cannot be cast to Real without the risk of losing precision. All operations using TimeSpan (except a simple TimeSpan casting) will return a DateTime. For any other conversions, you need to use the Conversion Functions to calculate new columns or use in custom expressions. Binary objects cannot be cast to any other data types.

Conversion of the data types for several columns simultaneously can be done using the Change Data Types transformation tool. Transformations can be done on existing data tables via the Add Data Tables dialog or the Replace Data Table dialog.

## 3.1.4.2.2  Operators

| Operator | Description |
|---|---|
| - Arg1 | Negates the argument. The argument and the result are of type real. |
| Arg1 + Arg2 | Adds the two arguments. See operator & for string concatenation. |
| Arg1 – Arg2 | Subtracts *Arg2* from *Arg1*. |
| Arg1 * Arg2 | Multiplies the two arguments. The arguments and the result are of type real or decimal. |
| Arg1 / Arg2 | Divides *Arg1* by *Arg2*. The arguments and the result are of type real or decimal. Division by zero results in an error.<br><br>Examples:<br>7/2   -> 3.5<br>0/0   -> #NA<br>-1/0  -> #NA |
| Arg1 & Arg2 | Appends *Arg2* to the end of *Arg1*. The arguments can be of any type, but are converted to strings. The result is of type string. See also function Concatenate.<br><br>Examples:<br>"April " & (20+1) & "st"   -> "April 21st"<br>null & "Ape"                -> #Error |
| Arg1 % Arg2 | Returns the remainder of the division of *Arg1* by *Arg2*. The arguments and the result are of type real or decimal. Null and error are propagated |

to the result column.

Example:
3.5 % 2.5 -> 1.00

| | |
|---|---|
| Arg1^Arg2 | Returns *Arg1* raised to the *Arg2* power. |

Example:
2.5^3
[Value Column]^2

| | |
|---|---|
| Arg1 < Arg2 | Operator which can be a part of an IF or a CASE statement. Returns true if *Arg1* is less than *Arg2*. The arguments can be of any type, but must both be of the same type. The result is of type boolean. If any argument is null, the result is null. The function is defined for comparing normal numbers to each other. Other combinations result in errors or null. |

Examples:
If( 1 < 2, "true", "false" )          -> true
Case when 2 < 1 then "true" else "false" end  -> false
If(1<null, "true", "false")          -> (Empty)
If(1 < 1/0, "true", "false")         -> #NA
If(1/0 < 1/0, "true", "false")     -> #NA
If(-1/0 < 1/0, "true", "false")   -> #NA
If(1< 0/0, "true", "false")          -> #NA

| | |
|---|---|
| Arg1 > Arg2 | Operator which can be a part of an IF or a CASE statement. Returns true if *Arg1* is greater than *Arg2*. The arguments are of type real and the result is of type boolean. See operator < for the definition of valid arguments. |
| Arg1 <= Arg2 | Operator which can be a part of an IF or a CASE statement. Returns true if *Arg1* is less than or equal to *Arg2*. The arguments are of type real and the result is of type boolean. See operator < for the definition of valid arguments. |
| Arg1 >= Arg2 | Operator which can be a part of an IF or a CASE statement. Returns true if *Arg1* is greater than or equal to *Arg2*. The arguments are of type real and the result is of type boolean. See operator < for the definition of valid arguments. |
| Arg1 = Arg2 | Operator which can be a part of an IF or a CASE statement. Returns true if *Arg1* is equal to *Arg2*. The arguments can be of any type, but must both be of the same type. The result is of type boolean. If any argument is null, the result is null. For arguments of type real, see operator < for the definition of valid arguments. |

Examples:
If(1 = 2, "true", "false" )                                   -> false
Case when 2 = 2 then "true" else "false" end      -> true
If("Hello" = "hello", "true", "false" )        -> false
If("" = null, "true", "false" )                     -> (Empty)
If(null = null, "true", "false" )                -> (Empty)

| | |
|---|---|
| Arg1 <> Arg2 | Operator which can be part of an 'IF' or a 'CASE' statement. Returns |

| | |
|---|---|
| | true if *Arg1* is not equal to *Arg2*. The arguments can be of any type, but must both be of the same type. The result is of type boolean. If any argument is null, the result is null. For arguments of type real, see operator < for the definition of valid arguments. |
| Arg1 ~= Arg2 | Operator which can be part of an 'IF' or a 'CASE' statement. The arguments can be of any type, but will be treated as string columns. Returns true if the Arg2 regular expression string matches the Arg1 string. |
| | Some characters, like for instance the backslash character "\", need to be escaped to work when using calculated columns. See literature about regular expression language elements, e.g., on MSDN, for more information. |
| | Examples:<br>If( "aab" ~= "a+" , "true", "false" )          -> true<br>Case when "aba" ~= ".a+$" then "true" else "false" end   -> true |
| And(Arg1, ...) | Operator which can be part of an 'If' or 'Case' statement. It has two boolean expressions as arguments and returns true if both expressions are true. |
| | Examples:<br>If( 1 < 2 and 2 < 3, "true", "false" )<br>Case when false and true then "true" else "false" end |
| Not(Arg1) | Operator which can be part of an 'If' or 'Case' statement. It negates the boolean expression given as argument. |
| | Examples:<br>If( not 1 < 2, "true", "false" )<br>Case when not true then "true" else "false" end |
| Or(Arg1, ...) | Operator which can be part of an 'If' or 'Case' statement. It has two boolean expressions as arguments and returns true if one of the expressions is true. |
| | Examples:<br>If( 1 < 2 or 2 < 3, "true", "false" )<br>Case when false or true then "true" else "false" end |

### 3.1.4.2.3    Operator Precedence

Below is a table showing the hierarchy of operators with the highest precedence operator shown first.

Expressions inside parentheses are evaluated first; nested parentheses are evaluated from the innermost parentheses to the outer.

Operators in the same row in the chart have equal precedence

| Operators | Type | Order of Evaluation |
|---|---|---|
| ( ) | Parentheses | left to right |
| - + | Unary minus and plus | right to left |

| | | |
|---|---|---|
| * / % | Multiplicative | left to right |
| + - | Additive | left to right |
| & | Concatenation | left to right |
| < > <= >= | Relational | left to right |
| = <> | Equality | left to right |

## 3.1.4.3 Functions

### 3.1.4.3.1 Functions Overview

Select which types of Functions you are interested in:
Binning functions
Conversion functions
Date and Time functions
Logical functions
Math functions
OVER functions
Property functions
Ranking functions
Spatial functions
Statistical functions
Text functions

### 3.1.4.3.2 Binning Functions

| Function | Description |
|---|---|
| BinByDateTime | Creates a binned column based on a natural date, datetime or time hierarchy. |
| | The first argument is the Date, Time or DateTime column to bin. The second argument is the definition of the levels in the hierarchy. The hierarchy levels should be written in the form of a string containing the desired date parts, separated by dots, for example "Year.Quarter.Month". The third argument is the pruning level which specifies the level of the hierarchy to display. |
| | If you write a custom expression based on a BinByDateTime expression you will see a column selector with all levels of the specified hierarchy available, but with the hierarchy slider handle positioned at the specified pruning level. |
| | Valid arguments for *Arg2* are combinations of: |
| | 'year' or 'yy' - The year. |
| | 'quarter' or 'qq' - The quarter. |
| | 'month' or 'mm' - The month. |
| | 'day of year' or 'dy' - The day of year. |
| | 'day' or 'dd' - The day. |
| | 'week' or 'wk' - The week. |
| | 'day of week' or 'dw' - The weekday. |

'hour' or 'hh' - The hour.

'minute' or 'mi' - The minute.

'second' or 'ss' - The second.

'millisecond' or 'ms' - The millisecond.

Example:

BinByDateTime([Column],"Year.Quarter.Month.Day",2)

For a date column called Order Date, the expression above would result in the column selector and hierarchy slider shown below:



Order Date (Month)
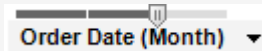
Pruning level 0 would set the slider handle to the year position, 1 would mean the quarter, 2 the month, and 3 the day.

| | |
|---|---|
| BinByEvenDistribution | Creates a binned column where each bin has the same number of unique values as the others. The last bin may have more unique values than the others. The first argument is the column to bin and the second argument is the number of bins. Null values will have a null bin value and error values will have an error bin value.<br><br>Example:<br>BinByEvenDistribution([Column], 5)<br>BinByEvenDistribution(Rank([Column])*Count() + RowId(), 3) |
| BinByEvenIntervals | Creates a binned column where the value range is divided into equal intervals. The first argument is the column to bin and the second argument is the number of bins.<br><br>Example:<br>BinByEvenIntervals([Column], 5) |
| BinBySpecificLimits | Creates a binned column with specific limits for the bins. The first argument is the column to bin and the following arguments are the limits for the bins. All rows which have values larger than the largest limit will have the same bin value. Null values will have a null bin value, error values will have an error bin value.<br><br>Example:<br>BinBySpecificLimits([Column], 1, 2, 3, 10) |
| BinByStdDev | Creates a binned column where the values are divided into bins depending on the values distance from the mean, measured in standard deviations. The first argument is the column to bin and the following arguments are the number of standard deviations to show from the mean. The standard deviation arguments should be given in ascending order and all values should be positive.<br><br>Example:<br>BinByStdDev([Column], 0.5, 1)<br>This will create a binning for:<br><= -1 standard deviation |

|  |  |
|---|---|
|  | -1 standard deviation |
|  | -0.5 standard deviation |
|  | 0.5 standard deviation |
|  | 1 standard deviation |
|  | > 1 standard deviation |
| BinBySubstring | Creates a binned column based on beginning or end of value. The first argument is the string column to bin and the following is the number of characters in the substring. If the second argument is negative the substring starts from the end of the value. |
|  | Examples: |
|  | BinBySubstring([Column], -4) |
|  | BinBySubstring(String([Integer Column]), 1) |

### 3.1.4.3.3 Conversion Functions

| Function | Description |
|---|---|
| Cast(Arg1 as type) | Casts any expression to any type (except Null/Undefined). |
|  | Null values and error values are propagated. Casting performed for different types of input and output types results in different outputs. See Cast Method for more information. |
|  | Example: |
|  | Cast([IntegerColumn] as Currency) |
| Boolean(Arg1) | Converts the column or value to a Boolean. |
|  | Example: |
|  | Boolean([Column]) |
| Currency(Arg1) | Converts the column or value to a Currency. |
|  | Example: |
|  | Currency([Column]) |
| Date(Arg1, ..., Arg3) | Converts the column or values to a Date. If a single argument is used, *Arg1* can be of type String or DateTime. If a String is specified, the date must be written in a format that Spotfire can recognize. Additionally, all parts of the date (year, month and day) must be present. See examples below. If a DateTime is specified, the time part is removed. |
|  | If three integer arguments are given, then the first argument is the year, the second is the month and the third is the day of the month. |
|  | See also Date and Time functions. |
|  | Examples: |
|  | Date("2003-03-21")            -> 3/21/2003 |
|  | Date("3/21/03")               -> 3/21/2003 |
|  | Date("10")                     -> (Empty) |
|  | Date(null)                     -> (Empty) |
|  | Date("2003-03-21 11:37:00")    -> 3/21/2003 |

| | |
|---|---|
| | Date(2003,03, 21)           -> 3/21/2003 |
| | (The output formats available are dependent on your current locale.) |
| DateTime(Arg1, Arg2,..., Arg7) | Converts the column or values to a DateTime. If a single argument is used, *Arg1* can be of type String or Date. If a String is specified, the date must be written in a format that Spotfire can recognize. Additionally, at least all parts of the date (year, month and day) must be present. If a Date is specified, the time part is set to 00:00:00 (12:00:00 AM). |
| | If seven integer arguments are given, then the first argument is the year, the second is the month, the third is the day of the month, the fourth is the hour, the fifth is the minute, the sixth is the second and the seventh argument is the millisecond. |
| | See also Date and Time functions. |
| | Examples:<br>DateTime("2003-03-21 11:37:00")   -> 3/21/2003 11:37:00 AM<br>DateTime("10")                   -> (Empty)<br>DateTime(null)                  -> (Empty)<br>DateTime("2003-03-21")        -> 2003-03-21 00:00:00<br>DateTime(2003, 03, 21, 11, 37, 00)  -> 2003-03-21 11:37:00 |
| | (The output formats available depend on your current locale.) |
| Integer(Arg1) | Converts the column or value to an integer number. If the conversion fails, an error is returned. *Arg1* can be of type integer, real or string, and the result is of type integer. Real numbers are truncated, i.e., only the integer part is used. |
| | Examples:<br>Integer("-123")     -> -123<br>Integer(-2.99)      -> -2<br>Integer("0%")       -> (Empty)<br>Integer(1e20)       -> (Empty)<br>Integer(null)        -> (Empty) |
| LongInteger(Arg1) | Converts the column or value to a LongInteger. |
| | Example:<br>LongInteger([Column]) |
| Real(Arg1) | Converts the column or value to a real number. If the conversion fails, an error is returned. *Arg1* can be of type integer, real or string, and the result is of type real. |
| | Examples:<br>Real(1.23)    -> 1.23<br>Real(2)       -> 2<br>Real("0%")    -> (Empty)<br>Real(null)    -> (Empty) |
| SE(Arg1, Arg2) | Substitutes errors. Returns *Arg1* if it is not an error, *Arg2* otherwise. *Arg1* and *Arg2* can be of any type, but both must be of the same type or null. The result is of the same type as the arguments. |
| | A common usage is to substitute errors in a column. If *Arg1* is a column, *Arg2* can be either a value of the same type as the contents |

|  |  |
|---|---|
|  | of the column or a column with the same content type. If *Arg2* is also a column, the error in *Arg1* will be replaced with the value from the same row in *Arg2*.<br><br>Examples:<br>SE(1, 2)        -> 1<br>SE(null, 2)    -> (Empty)<br>SE(0/0, 2)     -> 2<br>SE([Column], 1) -> 1 (if error in column)<br>SE([Column1], [Column2]) -> (value from Column2 if error in Column1) |
| SingleReal(Arg1) | Converts the column or value to a SingleReal.<br><br>Example:<br>SingleReal([Column]) |
| SN(Arg1, Arg2) | Substitutes null values. Returns *Arg1* if it is not null, *Arg2* otherwise. *Arg1* and *Arg2* can be of any type, but both must be of the same type or null. The result is of the same type as the arguments.<br><br>A common usage is to substitute null values in a column. If *Arg1* is a column, *Arg2* can be either a value of the same type as the contents of the column or a column with the same content type. If *Arg2* is also a column, the error in *Arg1* will be replaced with the value from the same row in *Arg2*.<br><br>Examples:<br>SN(1, 2)       -> 1<br>SN(null, 2)   -> 2<br>SN(0/0, 2)    -> #NA<br>SN([Column], 1) -> 1 (if null value in column)<br>SN([Column1], [Column2]) -> (value from Column2 if null value in Column1) |
| String(Arg1) | Converts the column or value to a string. This conversion never fails except if *Arg1* is null. *Arg1* can be of any type and the result is of type string.<br><br>Examples:<br>String(1.23)   -> "1.23"<br>String(null)    -> (Empty) |
| Time(Arg1, Arg2,..., Arg4) | Converts the column or values to a time. If the conversion fails, an error is returned. If a single argument is used, *Arg1* can be of type String or DateTime.  If a String is specified, the time must be written in a format that Spotfire can recognize. Additionally, both the hour and the minute must be specified. See examples below. If a DateTime is specified, the date part is removed.<br>If four integer arguments are given, then the first argument is the hour, the second is the minute, the third is the second and the fourth is the millisecond.<br>See also Date and Time functions. |

| | Examples: | |
|---|---|---|
| | Time("11:37:00") | -> 11:37:00 |
| | Time("10") | -> (Empty) |
| | Time (null) | -> (Empty) |
| | Time(11, 30, 20, 4) | ->11:30:20 |

(The output formats available depend on your current locale.)

| TimeSpan(Arg1, Arg2,...Arg5)) | Creates a TimeSpan from a column or values. If a single argument is given, the input column can be of type String or TimeSpan. If a String is specified, TimeSpan must be written in the format "[-]d.h:m:s.ms". |
|---|---|

If five arguments are given, then the first argument is the days, the second is the hours, the third is the minutes, the fourth is the seconds and the fifth is the milliseconds. The first four arguments are integers, the last is a real number.

Examples:

TimeSpan([Column])

TimeSpan("247.5:17:11.5002")

TimeSpan(247, 05, 17, 11, 500.2)

### 3.1.4.3.4 Cast Method

This is an overview of what will happen when a column is cast from one data type to another.

| Input | Output | | | | | |
|---|---|---|---|---|---|---|
| | **Integer** | **Real** | **Decimal** | **Date/DateTime/Time** | **String** | **Binary** |
| **Integer** | Same value. | Value cast to real. | Value converted to decimal if it fits in the limit. Null otherwise. | Date* value is created using the integer value as ticks. | Formatted using input formatter. | Null. |
| **Real** | Integer part of real value is it fits in the limit. Null otherwise. | Same value. | Value converted to decimal if it fits in the limit. Null otherwise. | Date* value is created using the integer part of the value as ticks. | Formatted using input formatter. | Null. |
| **Decimal** | Integer part of decimal value is it fits in the limit. Null otherwise. | Decimal value rounded to Real if it fits, null otherwise. | Same value. | Date* value is created using the integer part of the value as ticks. | Formatted using input formatter. | Null. |
| **Date/DateTime/Time** | Number of ticks if | Number of ticks | Number of ticks | Same value. | Formatted using | Null. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | it fits in the limit. Null otherwise. | converted to real. | converted decimal if it fins in the limit. Null otherwise. | | input formatter. | |
| **String** | Try to parse using output formatter. Null if it failed to parse. | Try to parse using output formatter. Null if it failed to parse. | Try to parse using output formatter. Null if it failed to parse. | Try to parse using output formatter. Null if it failed to parse. | Same value. | Null. |
| **Binary** | Null. | Null. | Null. | Null. | Null. | Same value. |

\* Date, DateTime or Time.

## 3.1.4.3.5    Date and Time Functions

| Function | Description |
|---|---|
| DateAdd(Arg1, Arg2, (Arg3)) | Adds an interval to a Date, Time or a DateTime. The method can add either a TimeSpan or an integer representing a specified date or time part (e.g., a number of days).<br><br>If a TimeSpan is to be added, two arguments are needed: a DateTime column and a TimeSpan column.<br><br>If an integer value is to be added to a date or time part, three arguments are used: *Arg1* is a string describing which part to add. *Arg2* is a number which contains the number of parts to add. *Arg3* is the Date, Time or DateTime column.<br><br>Valid arguments for *Arg1* are:<br>'year' or 'yy' - The year.<br>'quarter' or 'qq' - The quarter.<br>'month' or 'mm' - The month.<br>'day' or 'dd' - The day.<br>'week' or 'wk' - The week.<br>'hour' or 'hh' - The hour.<br>'minute' or 'mi' - The minute.<br>'second' or 'ss' - The second.<br>'millisecond' or 'ms' - The millisecond.<br><br>Examples:<br>DateAdd([Date Column], [TimeSpan Column])<br>DateAdd('year', 2, [Date Column])<br>DateAdd('month', 1, [Date Column]) |

| | |
|---|---|
| DateDiff(Arg1, Arg2, (Arg3)) | Calculates the difference between two Date, Time or DateTime columns. The result is presented either as a TimeSpan or as a real value representing a specified time part (e.g., number of days). |
| | If two arguments are used (a start date column and a stop date column) the result will be a TimeSpan value displaying the total difference. |
| | If three arguments are used, the first argument should be the part to compare. The second argument is the start date column and the third argument is the stop date column. The result of the operation is a real value. |
| | Valid arguments for *Arg1* are: <br> 'year' or 'yy' - The year. <br> 'quarter' or 'qq' - The quarter. <br> 'month' or 'mm' - The month. <br> 'day' or 'dd' - The day. <br> 'week' or 'wk' - The week. <br> 'hour' or 'hh' - The hour. <br> 'minute' or 'mi' - The minute. <br> 'second' or 'ss' - The second. <br> 'millisecond' or 'ms' - The millisecond. |
| | Example: <br> DateDiff([Order Date], [Delivery Date]) <br> DateDiff('day', [Order Date], [Delivery Date]) |
| DatePart(Arg1, Arg2) | Returns a specified part of a Date, Time or DateTime. *Arg1* is a string describing which part of the date to get and *Arg2* is the Date, Time or DateTime column. |
| | Valid arguments for *Arg1* are: <br> 'year' or 'yy' - The year. <br> 'quarter' or 'qq' - The quarter. <br> 'month' or 'mm' - The month. <br> 'day of year' or 'dy' - The day of year. <br> 'day' or 'dd' - The day. <br> 'year and week' or 'yywk' - The year and week. <br> 'week' or 'wk' - The week. <br> 'day of week' or 'dw' - The weekday. <br> 'hour' or 'hh' - The hour. <br> 'minute' or 'mi' - The minute. <br> 'second' or 'ss' - The second. <br> 'millisecond' or 'ms' - The millisecond. |
| | Example: <br> DatePart('year', [Date Column]) |

| | |
|---|---|
| DateTimeNow() | Returns the current system time. |
| | Example:<br>DateTimeNow() |
| Day(Arg1) | Extracts the day of month from a Date or DateTime column. The result is an integer between 1 and 31. |
| | Example:<br>Day([Date Column]) |
| DayOfMonth(Arg1) | Extracts the day of month from a Date or DateTime column. The result is an integer between 1 and 31. |
| | Example:<br>DayOfMonth([Date Column]) |
| DayOfWeek(Arg1) | Extracts the day of week from a Date or DateTime column. The underlying data of the new column is an integer between 0 and 6, but regional settings determine the start of week as well as the formatted output. |
| | Example:<br>DayOfWeek([Date Column]) |
| DayOfYear(Arg1) | Extracts the day of year for a Date or DateTime column. Returns an integer between 1 and 366. |
| | Example:<br>DayOfYear([Date Column]) |
| Days(Arg1) | Returns the number of days for a TimeSpan as an integer between -10675199 and 10675199. |
| | Example:<br>Days([TimeSpan Column]) |
| Hour(Arg1) | Extracts the hour from a DateTime or Time column. Returns an integer between 0 and 23. |
| | Example:<br>Hour([Time Column]) |
| Hours(Arg1) | Returns the number of hours for a TimeSpan as an integer between 0 and 23. |
| | Example:<br>Hours([TimeSpan Column]) |
| Millisecond(Arg1) | Extracts the millisecond from a DateTime or Time column. Returns an integer between 0 and 999. |
| | Example:<br>Millisecond([Time Column]) |

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|---|---|
| Milliseconds(Arg1) | Returns the number of milliseconds for a TimeSpan as a real value between 0.0 and 999.0. |
| Minute(Arg1) | Extracts the minute from a DateTime or Time column. Returns an integer between 0 and 59.<br><br>Example:<br>Minute([Time Column]) |
| Minutes(Arg1) | Returns the number of minutes for a TimeSpan as an integer between 0 and 59.<br><br>Example:<br>Minutes([TimeSpan Column]) |
| Month(Arg1) | Extracts the month from a Date or DateTime column. The underlying data of the new column is an integer between 1 and 12, but regional settings determine the formatted output.<br><br>Example:<br>Month([Date Column]) |
| Quarter(Arg1) | Extracts the quarter from a Date or DateTime column. The underlying data of the new column is an integer between 1 and 4, but regional settings determine the formatted output.<br><br>Example:<br>Quarter([Date Column]) |
| Second(Arg1) | Extracts the second from a DateTime or Time column. Returns an integer between 0 and 59.<br><br>Example:<br>Second([Time Column]) |
| Seconds(Arg1) | Returns the number of seconds for a TimeSpan as an integer between 0 and 59.<br><br>Example:<br>Seconds([TimeSpan Column]) |
| TotalDays(Arg1) | Returns the number of days for a TimeSpan as a real value expressed in whole days and fractional days.<br><br>Example:<br>TotalDays([TimeSpan Column]) |
| TotalHours(Arg1) | Returns the number of hours for a TimeSpan as a real value expressed in whole and fractional hours.<br><br>Example:<br>TotalHours([TimeSpan Column]) |
| TotalMilliseconds(Arg1) | Returns the number of milliseconds for a TimeSpan as a real value expressed in whole and fractional milliseconds. |

| | |
|---|---|
| | Example: TotalMilliseconds([TimeSpan Column]) |
| TotalMinutes(Arg1) | Returns the number of minutes for a TimeSpan as a real value expressed in whole and fractional minutes. |
| | Example: TotalMinutes([TimeSpan Column]) |
| TotalSeconds() | Returns the number of seconds for a TimeSpan as a real value expressed in whole and fractional seconds. |
| | Example: TotalSeconds([TimeSpan Column]) |
| Week(Arg1) | Extracts the week from a Date or DateTime column as an integer between 1 and 54, where the first week of year is dependent on the regional settings. |
| | Example: Week([Date Column]) |
| Year(Arg1) | Extracts the year from a Date or DateTime column. The result is of type Integer. |
| | Example: Year([Date Column]) |
| YearAndWeek(Arg1) | Extracts the year and week from a Date or DateTime column. Returns an integer (Year*100 + Week number), for example, the date 2005-10-13 will return 200541. |
| | Example: YearAndWeek([Date Column]) |

### 3.1.4.3.6 Logical Functions

| Function | Description |
|---|---|
| Case | The case statement has two different forms. |
| | Simple: case *Arg1* when *Arg2* then *Arg3* else *Arg4* end The *Arg1* expression is evaluated and when *Arg1* is equal to *Arg2* then *Arg3* is returned. Multiple when/then expressions can be entered and are evaluated in left to right order. |
| | Searched: case when *Arg1* then *Arg2* else *Arg3* end Returns *Arg2* if *Arg1*=true, and *Arg3* if *Arg1*=false. Multiple when/then expressions can be entered and are evaluated in left to right order. |

| | |
|---|---|
| | Example: |
| | case when 1 < 2 then "a" when 1 < 3 then "b" else "c" end |
| | case [Column] when 3 then "a" when 2 then "b" else "c" end |
| If(Arg1,Arg2,Arg3) | Returns *Arg2* if *Arg1*=true, and *Arg3* if *Arg1*=false. *Arg1* is of type boolean, usually the result of a comparison. *Arg2* and *Arg3* can be of any type, but must both be of the same type or null. |
| | Examples: |
| | If([Count] > 3, "many", "few") |
| | If(true, null, null)           -> (Empty) |
| | If(true, 1, null)              -> 1 |
| | If(false, null, 2)             -> 2 |
| | If(null, 1, 2)                 -> #Error |
| | If(1 < 2, "Small", "Big")      -> Small |
| | If([Column] Is Null,"0","has value") |
| | If([Column] Is Error,"error","has value") |
| Is Error | Used within an If- or Case- statement, to determine whether or not an expression yields an error. |
| | Example: |
| | If([Column] Is Error, "value was error", "value was not error") |
| | If an expression contains errors, you can use the SE function to substitute the error with the specified value. |
| Is Not Error | Used within an If- or Case- statement, to determine whether or not an expression yields an error. |
| | Example: |
| | If([Column] Is Not Error, "r;value was not error", "r;value was error") |
| | If an expression contains errors, you can use the SE function to substitute the error with the specified value. |
| Is Not Null | Used within an If- or Case- statement, to determine whether or not an expression yields an empty value (null value). |
| | Example: |
| | If([Column] Is Not Null, "value was not null", "value was null") |
| | If an expression contains empty values (null values), you can use the SN function to substitute the null values with the specified value. |
| Is Null | Used within an If- or Case- statement, to determine whether or not an expression yields an empty value (null value). |
| | Example: |
| | If([Column] Is Null, "value was null", "value was not null") |
| | If an expression contains empty values (null values), you can use the SN function to substitute the null values with the specified value. |

## 3.1.4.3.7      Math Functions

| Function | Description |
|---|---|
| Abs(Arg1) | Returns the absolute value of *Arg1*. The argument and the result are of type real. |
| ACos(Arg1) | Returns the arccosine of *Arg1* as an angle expressed in radians in the interval $[0, \pi]$. *Arg1* must be in the interval [-1.0, 1.0], otherwise #NA is returned. The argument and the result are of type real. |
| ASin(Arg1) | Returns the arcsine of *Arg1* as an angle expressed in radians in the interval $[-\pi/2, \pi/2]$. *Arg1* must be in the interval [-1.0, 1.0], otherwise #NA is returned. The argument and the result are of type real. |
| ATan(Arg1) | Returns the arctangent of *Arg1* as an angle expressed in radians in the interval $[-\pi/2, \pi/2]$. The argument and the result are of type real. |
| Ceiling(Arg1) | Rounds *Arg1* up to the nearest natural number. The argument and the result are of type real.<br><br>Examples:<br>Ceiling(1.01)    -> 2.0<br>Ceiling(-1.99)   -> -1.0 |
| Cos(Arg1) | Returns the cosine of *Arg1* where *Arg1* is an angle expressed in radians. The argument and the result are of type real. |
| Exp(Arg1) | Returns e (2.718281...) raised to the *Arg1* power. The argument and the result are of type real. |
| Floor(Arg1) | Rounds *Arg1* down to the nearest natural number. The argument and the result are of type real.<br><br>Examples:<br>Floor(1.99)     -> 1.0<br>Floor(-1.01)    -> -2.0 |
| Ln(Arg1) | Returns the natural logarithm of *Arg1*. The arguments and the result are of type real. If *Arg1* is negative, the result is a #NA error. If *Arg1* is zero, the result is also #NA. |
| Log(Arg1, Arg2) | Returns the logarithm of *Arg1* expressed in the base specified by *Arg2*. Equivalent to Ln(*Arg1*)/Ln(*Arg2*). The arguments and the result are of type real. See function Ln for the definition of valid arguments. |
| Log10(Arg1) | Returns the 10-based logarithm of *Arg1*. Equivalent to Ln(*Arg1*)/Ln(10). The arguments and the result are of type real. See function Ln for the definition of valid arguments. |
| Mod(Arg1, Arg2) | Returns the reminder of the division of *Arg1* by *Arg2*, The arguments and the result are of type real. If *Arg2* is 0, the result is a #NA error.<br>Mod(*Arg1*, *Arg2*) is defined as:<br>Arg1 – Arg2*Floor(Arg1/Arg2) |

| | |
|---|---|
| PI() | Returns the numerical constant $\pi$ .<br>The result is of type real. |
| Power(Arg1, Arg2) | Returns *Arg1* raised to the *Arg2* power. The arguments and the result are of type real.<br><br>Examples:<br>Power(10, 3)   -> 1000<br>Power(10, -3)  -> 0.001<br>Power(0, 0)     -> 1 |
| Rand(Arg1) | Returns a random real number between 0.0 and 1.0.<br>The integer argument is a constant seed value that is used to initialize the random number generator. It also assures that the same values are generated if the column is recalculated.<br>The seed value cannot be a column reference.<br><br>Example:<br>Rand(147) |
| RandBetween(Arg1, Arg2, Arg3) | Returns a random integer number within the specified range.<br>The first and the second arguments set the range for the random numbers. These arguments can be constant values or integer column references.<br>The third argument is a constant seed value that is used to initialize the random number generator. It also assures that the same values are generated if the column is recalculated.<br>The seed value cannot be a column reference.<br>Example:<br>RandBetween(100, -100, 147)<br>RandBetween(0, [Column 1], 147)<br>RandBetween([Column 1], [Column 2], 37) |
| Product(Arg1, ...) | Product is available under Statistical Functions.<br>Returns the product of the arguments. The arguments and the result are of type real. Null arguments are ignored and do not contribute to the product.<br><br>Examples:<br>Product(-1)           -> -1<br>Product(1.5, -2, 3)   -> -9<br>Product(1, null, 3)   -> 3<br>Product(null)        -> (Empty) |
| Round(Arg1, Arg2) | Rounds *Arg1* to the number of decimal places specified by *Arg2*. The arguments and the result are of type real, but for *Arg2*, only the integer part is used. Note that *Arg2* can be negative to round to even 10s, 100s, etc. 0.5 is rounded upwards to a number with higher magnitude (ignoring the sign).<br><br>Examples:<br>Round(PI(), 3)   -> 3.142<br>Round(-0.5, 0)   -> -1<br>Round(25, -1)   -> 30 |

| | |
|---|---|
| Sin(Arg1) | Returns the sine of *Arg1* where *Arg1* is an angle expressed in radians. The argument and the result are of type real. |
| Sqrt(Arg1) | Returns the square root of *Arg1*. The argument and the result are of type real. If *Arg1* is negative, the result is a #NA error. |
| Sum(Arg1, ...) | Sum is available under Statistical Functions. Returns the sum of the arguments. Null arguments are ignored and do not contribute to the sum. Examples: Sum(-1)          -> -1 Sum (1.5, -2, 3)   -> 2.5 Sum (1, null, 3)   -> 4 Sum (null)        -> (Empty) |
| Tan(Arg1) | Returns the tangent of *Arg1* where *Arg1* is an angle expressed in radians. The argument and the result are of type real. |

## 3.1.4.3.8    OVER Functions

The OVER functions are used to determine how data should be sliced, for example, relative to time periods. For more information, see OVER in Custom Expressions and Advanced Custom Expressions.

| Option | Description |
|---|---|
| All | Uses all the nodes in the referenced hierarchy. This can be useful when intersecting the current node with more than one hierarchy. For example, you can show the relative sales of different product categories for each month. Examples: Sum([Sales]) / Sum([Sales]) OVER (Intersect(All([Axis.Color]), [Axis.X])) Sum([Sales]) / Sum([Sales]) OVER (All([Axis.X])) * 100 |
| AllNext | Uses all nodes, including the current, to the end of the level. Example: Sum([Sales]) OVER (AllNext([Axis.X])) |
| AllPrevious | Uses all nodes, including the current, from the start of the level. This can be used to calculate the cumulative sum. Examples: Sum([Sales]) OVER (AllPrevious([Axis.X])) Sum([Sales]) OVER (Intersect(Parent([Axis.X]), AllPrevious([Axis.X]))) |
| Intersect | Returns the intersected rows from nodes in different hierarchies. See also AllPrevious and All. Example: Intersect(Parent([Axis.X]), All([Axis.Color]), Parent([Axis.Rows]), ...) |

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|---|---|
| LastPeriods | Includes the current node and the n - 1 previous nodes. This can be used to calculate moving averages. Example: Sum([Sales]) OVER (LastPeriods(3, [Axis.X]))/3 |
| Next | Compares the current node with the next node on the same level in the hierarchy. If there is no next node, that is, if the current node is the last node for the current level, the resulting subset will not contain any rows. Example: Sum([Sales]) - Sum([Sales]) OVER (Next([Axis.X])) |
| NextPeriod | Uses the next node which has the next value on the same level as the current node. If there is no next node, that is, if the current node is the last node for the current level, the resulting subset will not contain any rows. Example: Sum([Sales]) OVER (NextPeriod([Axis.X])) |
| ParallelPeriod | Uses the previous parallel node with the same value on the same level as the current node. For example, this can be used to compare sales results for each month with the corresponding months the previous year. Example: Sum([Sales])-Sum([Sales]) OVER (ParallelPeriod([Axis.X])) |
| Parent | Uses the parent subset of the current node. If the node does not have a parent, all rows are used as the subset. Examples: Sum([Sales]) / Sum([Sales]) OVER (Parent([Axis.Color])) Sum([Sales]) / Sum([Sales]) OVER (Parent([Axis.X])) * 100 |
| Previous | Uses the previous node on the same level as the current node to compare the result of the current node with the previous one. If there is no previous node, that is, if the current node is the first node for the current level, the resulting subset will not contain any rows. Example: Sum([Sales]) - Sum([Sales]) OVER (Previous([Axis.X])) |
| PreviousPeriod | Uses the previous node which has the previous value on the same level as the current node. If there is no previous node, that is, if the current node is the first node for the current level, the resulting subset will not contain any rows. Example: Sum([Sales]) OVER (PreviousPeriod([Axis.X])) |

### 3.1.4.3.9 Property Functions

| Function | Description |
|---|---|
| $csearch | Selects a number of columns from a data table using a limiting search expression. The first argument is a data table and the second argument is a string that contains the search expression determining which column names should be returned. The function returns a list of the (unescaped) column names from the data table that match the search expression. |
| | Examples: |
| | $csearch([Data Table],"*") |
| | -> Returns a list of all values in the data table called Data Table. |
| | $csearch([Data Table], "Col*") |
| | -> Returns a list of all values in the data table Data Table beginning with "Col", e.g., Column 1, Column 2, etc. |
| $esc | Replaces "]" in column names with "]]" and encloses the escaped column names in "[" and "]". The argument is a property value or a property function that starts with a dollar sign ($). See Properties in Expressions for more information. |
| | Examples: |
| | $esc(${PropertyName}) |
| | -> Returns the property value as a column name (within [ and ]). |
| | $esc($csearch([Data Table], "Col*")) |
| | -> Returns a list of all columns in the data table Data Table beginning with "Col", e.g., [Column 1], [Column 2], etc. |
| $map | Maps a list-valued property to a single string. The first argument is a template to use for each value in the list and the second argument is a specification of how the list values should be connected in the resulting expression. See Properties in Expressions for more information. |
| | Examples: |
| | $map("sum([${PropertyName}])", ",") |
| | -> Returns a comma separated list of the sum of the columns included in the list-valued property, e.g., sum([Column 1]),sum([Column 2]) |
| | <$map("[${PropertyName}]", " NEST")> |
| | -> Returns a nested categorical hierarchy using the columns included in the list-valued property, e.g., <[Column 1] NEST[Column 2]> |
| BaseRowID | Returns a unique identifier for each calculated row in the visualization. This identifier is selected from identifiers calculated on the Data Table. This value may change when filtering or marking is performed. |
| | Example: |
| | BaseRowId() |
| ColumnProperty | The first argument is a column and the second argument is the column property name, presented as a string. Returns the value of the named column property from the column. The column property value cannot be a list and the column property has to exist before |

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|---|---|
| | creating the expression. |
| | Custom column properties can be specified using Edit > Column Properties, Properties tab, New-button. |
| | Example: |
| | ColumnProperty([Column], "Description") |
| DataTableProperty | Returns the value of the data table property. The argument to the method is the name of the data table property, presented as a string. |
| | Example: |
| | DataTableProperty("Table.CreationDate") |
| DocumentProperty | Returns the value of the document property. Custom document properties can be specified under Edit > Document Properties, Properties tab. Document properties can be used throughout the entire document. |
| | The argument to the method is the name of the document property, presented as a string. |
| | Example: |
| | DocumentProperty("Extension.NumberOfBins") |
| RowID | Returns a unique identifier for each calculated row in the visualization. This identifier will not change when filtering or marking is performed. |
| | Example: |
| | RowId() |

### 3.1.4.3.10    Ranking Functions

| Function | Description |
|---|---|
| DenseRank(Arg1, Arg2, Arg3...) | Returns an integer value ranking of the values in the selected column. The first argument is the column to be ranked. |
| | An optional argument is a string determining whether to use an ascending (default) or a descending ranking. For the highest value to retrieve rank 1, use the argument "desc", for the lowest value to retrieve rank 1, use "asc". |
| | Ties are given the same rank value and the highest ranking number equals the number of unique values in the column. |
| | Additional column arguments (optional) can be used when the column should be split into separately ranked categories. |
| | Examples: |
| | DenseRank([Sales]) |
| | DenseRank([Sales], "desc", [Region]) |
| Rank(Arg1, Arg2, Arg3...) | Returns an integer value ranking of the values in the selected column. The first argument is the column to be ranked. |
| | An optional argument is a string determining whether to use an ascending (default) or a descending ranking. For the highest value to retrieve rank 1, use the argument "desc", for the lowest value to retrieve rank 1, use "asc". |
| | Ties are given rank values depending on optional argument values: |
| | "ties.method=minimum" (default), |

"ties.method=maximum", or

"ties.method=first".

See More about ranking ties below for more information about the available arguments.

Additional column arguments (optional) can be used when the column should be split into separately ranked categories.

Examples:

Rank([Sales])

Rank([Sales], "desc", [Region])

Rank([Sales], "ties.method=first")

| RankReal(Arg1, Arg2, Arg3...) | Returns a real value ranking of the values in the selected column. The first argument is the column to be ranked. |
|---|---|
| | An optional argument is a string determining whether to use an ascending (default) or a descending ranking. For the highest value to retrieve rank 1, use the argument "desc", for the lowest value to retrieve rank 1, use "asc". |
| | Ties are given rank values depending on optional argument values: |
| | "ties.method=minimum" (default), |
| | "ties.method=maximum", |
| | "ties.method=first", or |
| | "ties.method=average". |
| | See More about ranking ties below for more information about the available arguments. The average ties method is used when calculating data relationships using Spearman R. |
| | Additional column arguments (optional) can be used when the column should be split into separately ranked categories. |
| | Examples: |
| | RankReal([Sales]) |
| | RankReal([Sales], "desc", [Region]) |
| | RankReal([Sales], "ties.method=average") |

## More about ranking ties:

With the functions Rank and RankReal, you can add an optional ties method argument depending how you want equal values to be ranked:

| Argument | Description |
|---|---|
| "ties.method=minimum" | Gives all ties the smallest rank value of the tie values. |
| "ties.method=maximum" | Gives all ties the largest rank value of the tie values. |
| "ties.method=first" | Gives the first found tie value the lowest rank value, and continues with the following rank value for the next tie. |
| "ties.method=average" | Gives all ties the average of the rank values for all ties. |

**Example:**

When a list is to be ranked, its values are first of all sorted. Then, the sorted values are assigned a rank value depending on the order in the sorted list. What rank is given to a tie value depends on the ties method. Empty values are left empty and do not receive any rank.

| List of values | Rank with "ties.method=minimum" | Rank with "ties.method=maximum" | Rank with "ties.method=first" | Rank with "ties.method=average" |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 3 | 2 | 2.5 |
| 3 | 4 | 4 | 4 | 4 |
| 2 | 2 | 3 | 3 | 2.5 |
| (Empty) | (Empty) | (Empty) | (Empty) | (Empty) |
| 5 | 5 | 5 | 5 | 5 |

If DenseRank was used, the resulting rank values in the example would be 1 2 3 4.

### 3.1.4.3.11    Spatial Functions

The spatial functions are used to transform data so that it can be used to set up map charts in TIBCO Spotfire. If the map information is included in a Shape file, none of this is necessary. However, if you have geographic information in some other type of BLOB column containing WKB (Well-Known Binary) data, then this information needs to be extracted into seven different columns: Geometry, XMax, XMin, YMax, YMin, XCenter and YCenter. The Geometry column is the original, binary column.

The bounding box for a geometry is called the envelope. It is specified by the four coordinates XMax, XMin, YMax and YMin. XCenter and YCenter specifies the center of the geometry. These coordinate columns can be calculated from the binary WKB column using the spatial functions with the binary WKB column as an argument. In order for the map chart to identify these columns they must also have the required property values (same as the column names listed above) set on the mapchart.columntypeid property. This is automatically done when the spatial functions below are applied.

See also Configuration of Geographical Data for Map Charts.

| Function | Description |
|---|---|
| WKBEnvelopeXCenter(Arg1) | Calculates the X center of the geometry envelope and sets the XCenter value on the mapchart.columntypeid property. The argument is a binary WKB column.<br><br>Example:<br>WKBEnvelopeXCenter([WKB]) |
| WKBEnvelopeXMin(Arg1) | Calculates the X min of the geometry envelope and sets the XMin value on the mapchart.columntypeid property. The argument is a binary WKB column.<br><br>Example:<br>WKBEnvelopeXMin([WKB]) |
| WKBEnvelopeXMax(Arg1) | Calculates the X max of the geometry envelope and sets the XMax value on the mapchart.columntypeid property. The argument is a binary WKB column.<br><br>Example:<br>WKBEnvelopeXMax([WKB]) |
| WKBEnvelopeYCenter(Arg1) | Calculates the Y center of the geometry envelope and sets |

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|---|---|
| | the YCenter value on the mapchart.columntypeid property. The argument is a binary WKB column. |
| | Example:<br>WKBEnvelopeYCenter([WKB]) |
| WKBEnvelopeYMin(Arg1) | Calculates the Y min of the geometry envelope and sets the YMin value on the mapchart.columntypeid property. The argument is a binary WKB column. |
| | Example:<br>WKBEnvelopeYMin([WKB]) |
| WKBEnvelopeYMax(Arg1) | Calculates the Y max of the geometry envelope and sets the YMax value on the mapchart.columntypeid property. The argument is a binary WKB column. |
| | Example:<br>WKBEnvelopeYMax([WKB]) |

### 3.1.4.3.12   Statistical Functions

| Function | Description |
|---|---|
| Avg(Arg1, ...) | Returns the average (arithmetic mean) of the arguments. The arguments and the result are of type real. If one argument is given, then the result is the average of all rows. If more than one argument is given, then the result is the average for each row. Null arguments are ignored and do not contribute to the average.<br>Examples:<br>Avg([Column])<br>Avg(2,-3,4)           -> 1<br>Avg(-1)                 -> -1<br>Avg(1.5, -2, 3.5)   -> 1<br>Avg(1, null, 3)       -> 2<br>Avg(null)              -> (Empty) |
| ChiDist(Arg1) | Returns the (upper tail) chi-square p-value of the argument.<br>Example:<br>ChiDist(x, deg_freedom)<br>ChiDist(7.377759, 2) =0.025 |
| ChiInv(Arg1) | Returns the (upper tail) chi-square quantile value of the argument.<br>Example:<br>ChiInv(p, deg_freedom)<br>ChiInv(0.025, 2) =7.377759 |
| Count(Arg1) | Calculates the number of non-empty values in the argument column, or, if no argument is specified, the total number of rows.<br>Example:<br>Count([Column]) |

| | |
|---|---|
| Covariance(Arg1, Arg2) | Calculates the covariance of two columns given as arguments.<br>Example:<br>Covariance([Column1], [Column2]) |
| FDist(Arg1) | Returns the upper tail F p-value of the argument.<br>Example:<br>FDist(x, deg_freedom1, deg_freedom2)<br>FDist(6.936728, 1, 10) =0.025 |
| FInv(Arg1) | Returns the upper tail F quantile value of the argument.<br>Example:<br>FInv(p, deg_freedom1, deg_freedom2)<br>FInv(0.025, 1, 10) =6.936728 |
| First(Arg1) | Returns the first valid value based on the physical order of the rows of data in the argument column.<br>Example:<br>First([Column]) |
| GeometricMean() | Calculates the geometric mean value. If any input value is negative then the result will be "Empty". If any input value is equal to zero then the result will be zero.<br>Example:<br>GeometricMean([Sales]) |
| IQR(Arg1) | Calculates the value difference Q3-Q1, or, the 75th percentile minus the 25th percentile. IQR is also referred to as the H-spread.<br>Example:<br>IQR([Column]) |
| L95(Arg1) | Calculates the lower endpoint of the 95% confidence interval.<br>Example:<br>L95([Column]) |
| Last(Arg1) | Returns the last valid value based on the physical order of the rows of data in the argument column.<br>Example:<br>Last([Column]) |
| LAV(Arg1) | Calculates the lower adjacent value.<br>Example:<br>LAV([Column]) |
| LIF(Arg1) | Calculates the lower inner fence. This is the threshold located at Q1 – (1.5*IQR).<br>Example:<br>LIF([Column]) |
| LOF(Arg1) | Calculates the lower outer fence. This is the threshold located at Q1 – (3*IQR).<br>Example:<br>LOF([Column]) |

| | |
|---|---|
| Max(Arg1, ...) | Calculates the maximum value. If one argument is given, then the result is the maximum for the entire column. If more than one argument is given, then the result is the maximum for each row. The argument and the result are of type real. Null arguments are ignored.<br><br>Examples:<br><br>Max([Column])<br><br>Max(-1) -> -1<br>Max (1.5, -2, 3) -> 3<br>Max (1, null, 3) -> 3<br>Max (null) -> (Empty) |
| MeanDeviation(Arg1, ...) | Calculates the mean deviation value (average absolute deviation, AAD). If one argument is given, then the result is the mean deviation of all rows. If more than one argument is given, then the result is the mean deviation for each row.<br><br>Examples:<br><br>MeanDeviation([Column])<br><br>MeanDeviation(2,-3,4) -> 2.67 |
| Median(Arg1) | Calculates the median of the argument. If one argument is given, then the result is the median of all rows. If more than one argument is given, then the result is the median for each row.<br><br>Examples:<br><br>Median([Column])<br><br>Median(2,-3,4) |
| MedianAbsoluteDeviation(Arg1, ...) | Calculates the median absolute deviation value (MAD). If one argument is given, then the result is the median absolute deviation of all rows. If more than one argument is given, then the result is the median absolute deviation for each row.<br><br>Examples:<br><br>MedianAbsoluteDeviation([Sales])<br><br>MedianAbsoluteDeviation(2,-3,4) |
| Min(Arg1, ...) | Calculates the minimum value. If one argument is given, then the result is the minimum for the entire column. If more than one argument is given, then the result is the minimum for each row. The argument and the result are of type real. Null arguments are ignored.<br><br>Examples:<br><br>Min([Column])<br><br>Min(-1) -> -1<br>Min (1.5, -2, 3) -> -2<br>Min (1, null, 3) -> 1<br>Min (null) -> (Empty) |
| NormDist(Arg1) | Returns the (upper tail) normal p-value of the argument. If you do not specify them yourself, the default is mean=0 and standard deviation=1.<br><br>Example:<br><br>NormDist(x, mean, standard_dev)<br><br>NormDist(1.96) =0.025 |

| | |
|---|---|
| NormInv(Arg1) | Returns the (upper tail) normal quantile value of the argument. If you do not specify them yourself, the default is mean=0 and standard deviation=1.<br>Example:<br>NormInv(p, mean, standard_dev)<br>NormInv(0.025) =1.96 |
| Outliers(Arg1) | Outer value count. Calculates the count of values that are greater than the upper adjacent value or lower than the lower adjacent value.<br>Example:<br>Outliers([Column]) |
| P10(Arg1) | The 10th percentile is the value at which 10 percent of the data values are equal to or lower than the value.<br>Example:<br>P10([Column]) |
| P90(Arg1) | The 90th percentile is the value at which 90 percent of the data values are equal to or lower than the value.<br>Example:<br>P90([Column]) |
| PctOutliers(Arg1) | Outer value percentile. Calculates the percent of values that are greater than the upper adjacent value or lower than the lower adjacent value.<br>Example:<br>PctOutliers([Column]) |
| Percentile(Arg1, Arg2) | The percentile is the value at which a certain percent of the data values are equal to or lower than the value. The first argument is the column to analyze and the second argument is the percent.<br>Example:<br>Percentile([Column], 15.0) |
| Product(Arg1, ...) | Calculates the product of the values. If one argument is given, then the result is the product of the entire column. If more than one column is given, then the result is the product of each row.<br>Example:<br>Product([Column])<br>Product(1,2,3) |
| Q1(Arg1) | Calculates the first quartile.<br>Example:<br>Q1([Column]) |
| Q3(Arg1) | Calculates the third quartile.<br>Example:<br>Q3([Column]) |
| Range(Arg1) | The range between the largest and the smallest value in the column.<br>The result will be presented as a real or a timespan, depending on the data type of the argument. |

| | |
|---|---|
| | Example:<br>Range([Column]) |
| StdDev(Arg1) | Calculates the standard deviation.<br>Example:<br>StdDev([Column]) |
| StdErr(Arg1) | Calculates the standard error.<br>Example:<br>StdErr([Column]) |
| Sum(Arg1, ...) | Calculates the sum of the values. If one argument is given, then the result is the sum of the entire column. If more than one column is given, then the result is the sum of each row.<br>Examples:<br>Sum(-1)         -> -1<br>Sum (1.5, -2, 3)  -> 2.5<br>Sum (1, null, 3)  -> 4<br>Sum (null)      -> (Empty) |
| TDist(Arg1) | Returns the (upper tail) t p-value of the argument.<br>Example:<br>TDist(x, deg_freedom)<br>TDist(4.302653, 2) =0.025 |
| TInv(Arg1) | Returns the (upper tail) t quantile value of the argument.<br>Example:<br>TInv(p, deg_freedom)<br>TInv(0.025, 2) =4.302653 |
| TrimmedMean(Arg1, Arg2) | Calculates the trimmed mean value (trimmed average). The first argument is the column to analyze and the second argument is, in percent, how many values to exclude from the calculation. If the trim value is set to 10%, then the highest 5% and the lowest 5% of the values are excluded from the calculated mean.<br>Example:<br>TrimmedMean([Sales], 10) |
| U95(Arg1) | Calculates the upper endpoint of the 95% confidence interval.<br>Example:<br>U95([Column]) |
| UAV(Arg1) | Calculates the upper adjacent value.<br>Example:<br>UAV([Column]) |
| UIF(Arg1) | Calculates the upper, inner fence. This is the threshold located at $Q3 + (1.5*IQR)$.<br>Example:<br>UIF([Column]) |
| UniqueCount(Arg1) | Calculates the number of unique, non-empty values in the argument column.<br>Example:<br>UniqueCount([Column]) |

| | |
|---|---|
| UOF(Arg1) | Calculates the upper, outer fence. This is the threshold located at Q3 + (3*IQR). <br> Example: <br> UOF([Column]) |
| ValueForMax(Arg1, Arg2) | Returns the value of column 2 for the maximum value of column 1. <br> Example: <br> ValueForMax([Column 1], [Column 2]) |
| ValueForMin(Arg1, Arg2) | Returns the value of column 2 for the minimum value of column 1. <br> Example: <br> ValueForMin([Column 1], [Column 2]) |
| Var(Arg1) | Calculates the variance. <br> Example: <br> Var([Column]) |
| WeightedAverage(Arg1, Arg2) | Calculates the weighted average of two columns. Arg1 is the weight column and Arg2 is the value column. <br> Example: <br> WeightedAverage([Column1],[Column2]) |

### 3.1.4.3.13 Text Functions

| Function | Description |
|---|---|
| ~= | Can be part of an 'If' or 'Case' statement. Returns true if the *Arg2* regular expression string matches the *Arg1* string. <br><br> Examples: <br> If( "aab" ~= "a+" , "true", "false" ) <br> Case when "aba" ~= ".a+$" then "true" else "false" end |
| Concatenate(Arg1, ...) | Concatenates (appends) all the arguments into a string. If one argument is given, then the result is the concatenation of all rows. If more than one argument is given, then each row is concatenated. The arguments can be of any type, but are converted to strings. The result is of type string. Null arguments are ignored. <br><br> Examples: <br> Concatenate("April ", 20+1, "st")   -> "April 21st" <br> Concatenate(null, "Ape")        -> "Ape" <br> Concatenate (null, null)       -> (Empty) |
| Find(Arg1, Arg2) | Returns the 1-based index of the first occurrence of the string *Arg1* in *Arg2*. If not found, 0 is returned. The search is case-sensitive. The arguments are of type string and the result is of type integer. If *Arg1* is the empty string, 0 is returned. |

| | |
|---|---|
| | Examples:<br>Find("lo", "Hello")  -> 4<br>Find("a", "Hello")  -> 0<br>Find("", "Hello")  -> 0<br>Find("", null)  -> (Empty)<br>If(Find("Pri 1", [Col1])>0, "Important", "Not important") |
| Left(Arg1, Arg2) | Returns the first *Arg2* characters of the string *Arg1*. *Arg1* and the result are of type string. *Arg2* is of type real, but only the integer part is used. If *Arg2* > the length of *Arg1*, the whole string is returned. If *Arg2* is negative, an error is returned.<br><br>Examples:<br>Left("Daddy", 3.99)  -> "Dad"<br>Left("Daddy", 386)  -> "Daddy"<br>Left("Daddy", -1)  -> (Empty) |
| Len(Arg1) | Returns the length of *Arg1*. *Arg1* is of type string and the result is of type integer.<br><br>Examples:<br>Len("Hello")  -> 5<br>Len(null)  -> (Empty) |
| Lower(Arg1) | Returns *Arg1* converted to lowercase. *Arg1* and the result are of type string. |
| Mid(Arg1, Arg2, Arg3) | Returns the substring of *Arg1* starting at index *Arg2* with a length of *Arg3* characters. *Arg1* and the result are of type string. *Arg2* and *Arg3* are of type real, but only the integer part is used. If *Arg2* > Len(*Arg1*), an empty string is returned. Else, if *Arg2*+*Arg3* > Len(*Arg1*), *Arg3* is adjusted to 1+Len(*Arg1*)-*Arg2*. If either of *Arg2* or *Arg3* is negative or if *Arg2* is zero, an error is returned.<br><br>Examples:<br>Mid("Daddy", 2, 3)  -> "add"<br>Mid("Daddy", 386, 4)  -> ""<br>Mid("Daddy", 4, 386)  -> "dy"<br>Mid("Daddy", -1, 2)  -> (Empty)<br>Mid("Daddy", 2, -1)  -> (Empty) |
| MostCommon(Arg1) | Returns the most common value of the specified column. If several values are equally common, the first one will be used.<br><br>Example:<br>MostCommon([Column]) |
| NameDecode(Arg1) | Replaces all substring codes with decoded characters.<br>Column names in TIBCO Spotfire are stored as UTF-16 encoded strings, while variable names in TIBCO Spotfire Statistics Services are built from 8-bit ASCII characters matching [.0-9a-zA-Z] or ASCII strings enclosed in grave accents. Thus, the column names that are sent to TIBCO Spotfire Statistics Services must be encoded. Column names received from TIBCO Spotfire Statistics Services are automatically decoded by the built-in data functions output handlers. This function can be used to decode |

|  | results that have not been automatically decoded. |
|---|---|
|  | Example:<br>NameDecode("Column %02D") |
| NameEncode(Arg1) | Encodes characters in the string so that the string only contains characters matching the regular expression [.0-9a-zA-Z]. |
|  | Column names in TIBCO Spotfire are stored as UTF-16 encoded strings, while variable names in TIBCO Spotfire Statistics Services are built from 8-bit ASCII characters matching [.0-9a-zA-Z]. Thus, the column names that are sent to TIBCO Spotfire Statistics Services must be encoded. This is done automatically when sending data to TIBCO Spotfire Statistics Services via the built-in data functions input handlers. If you need to provide column name input by some other means (e.g., via a document property) you may need to use this function to encode the column names before applying the data function. |
|  | Example:<br>NameEncode("Column £") |
| Repeat | Repeats a string a specified number of times. |
|  | Example:<br>Repeat("Hello", 2)　　-> "HelloHello" |
| Right(Arg1, Arg2) | Returns the last *Arg2* characters of the string *Arg1*. *Arg1* and the result are of type string. *Arg2* is of type real, but only the integer part is used. If *Arg2* > the length of *Arg1*, the whole string is returned. If *Arg2* is negative, an error is returned. |
|  | Examples:<br>Right("Daddy", 3.99)　　-> "ddy"<br>Right("Daddy", 386)　　-> "Daddy"<br>Right("Daddy", -1)　　　-> (Empty) |
| RXReplace(Arg1, Arg2, Arg3, Arg4) | Replaces a substring according to a regular expression. Search for the *Arg2* regular expression in *Arg1* and replace it with *Arg3*. *Arg4* specifies the options for the replacement:<br><br>"g" specifies that if *Arg2* matches more than once then all matches should be substituted.<br>"i" specifies that the comparison should be case insensitive.<br>"s", for single-line mode, specifies that the dot (.) matches every character (instead of every character except newline). |
|  | Some characters, like for instance the backslash character "\", need to be escaped to work when using calculated columns. See literature about regular expression language elements, e.g., on MSDN, for more information. |
|  | Example:<br>RXReplace("Hello", "L+", "LL", "i")　　　-> "HeLLo"<br>RXReplace("3 Minor", "(\\d).*", "$1", "")　-> 3 |

| | |
|---|---|
| | RXReplace("change\\slashdirection","\\\\","/","")  -> change/slashdirection<br><br>(In the last example, the backslash needs to be escaped twice; once for the Spotfire string and once for the regular expression.) |
| Substitute(Arg1, Arg2, Arg3) | Replaces all occurrences of *Arg2* in *Arg1* with *Arg3*. The search is case sensitive.<br><br>Example:<br>Substitute("Test","t","ting")  -> "Testing" |
| Trim(Arg1) | Removes whitespace characters from the beginning and end of a string.<br><br>Example:<br>Trim(" Example ")  ->"Example" |
| UniqueConcatenate(Arg1) | Concatenates the unique values converted to strings. The values are ordered according the comparator.<br><br>Example:<br>UniqueConcatenate([Column]) |
| Upper(Arg1) | Returns *Arg1* converted to uppercase. *Arg1* and the result are of type string.<br><br>Example:<br>Upper("hello")  ->"HELLO" |

## 3.1.4.4    Errors and Empty Values

An expression is considered valid if it is syntactically correct and all function, operator and column references can be resolved. If an expression is not valid, it cannot be evaluated. This will be indicated in the Sample result field as "#Error", or similar.

When evaluating an expression, some operations produce errors or null values. Each function and operator can choose how to handle arguments that are errors or null. The default behavior is to propagate the first error or null value that is encountered. So, if a function takes two arguments and the first is null and the second is an error, the default behavior is to return null. Functions that handle errors and null in other ways are explained in their Descriptions.

### Errors

For operations on arguments of type real, the result is sometimes not defined. This produces a **#NA** (Not Applicable) error. For example, this could happen if the result of an operation is greater than the maximum real number.

If the argument for a function (or operator) is invalid, an error is also produced. For example, functions expecting an index might produce an error because the index is negative and conversion functions produce an error if the argument cannot be converted.

The **SE**(*Arg1*, *Arg2*) function can be used to substitute errors with a certain value, for example null or 0.

When generating a result data table from the expression, errors are converted to null. Wrap the expression with a call to the **SN**(*Arg1*, *Arg2*) function to override this behavior.

| Error | Example | Description |
|---|---|---|
| NA | 0/0<br>sqrt(-1) | NA, Not Applicable, means that the result is undefined. |
| Negative Argument | Left("Hello", -1)<br>Mid("Hello", 0, 1) | Invalid argument. In this case because length must be positive and position cannot be zero. |
| (Empty) | Real("Hello") | Conversion failed. |

### (Empty)

Empty values are usually only generated when a column value from the data table is missing or by explicitly writing **null** in the expression. Results that are null, are displayed as "(Empty)".

The **SN**(*Arg1*, *Arg2*) function can be used to substitute null with a certain value, for example, 0.

## 3.1.4.5    Details on Formatting

This dialog lets you format values on column level. If you change settings for a specific column or hierarchy in this dialog the new settings will be used for that specific column or hierarchy everywhere in the analysis from then on.

For general information about formatting, see Formatting Overview.

### ► To reach the Formatting dialog:

1.  Right-click on a filter in the filters panel and select **Format Values...** from the pop-up menu, or, in the Insert Calculated Column dialog, click on the **Formatting** button.

    Comment: The same functionality is also available in the Formatting tab of the Column Properties dialog (Edit  > Column Properties).



| Option | Description |
|---|---|
| **Category** | Lists the available formatting categories for the selected column or hierarchy. Each category in this list has separate settings. What |

| | |
|---|---|
| | categories are available depends on the data type of the selected column. See Formatting Settings for a full description of all possible options. |
| **Apply formatting from column** | |
| **Data table** | Specifies the data table containing the column from which you want to apply formatting. |
| **Column** | Lists all columns of the same type as the selected column, from which it is possible to reuse the formatting. |
| **Apply Formatting** | Applies the formatting from the column selected in the drop-down list. |

## 3.1.4.6     Format String

If the format you want to use cannot be created with the given settings, the custom format string allows you to create your own formats using a code explained in the examples below.

The special characters allow you to multiply, divide, separate numbers, etc. Other characters are printed out in the resulting data.

### Custom Numeric Format Strings

**Special characters:**

| Character | Description |
|---|---|
| **0** | Always returns a value for the position it is written in. If there is no number in its place in the data, 0 (zero) will be used. |
| **#** | Returns values if there are numbers in its place in the data. |
| | If used to the left of the decimal point, all digits are returned even if there is one # in the format string and three digits in the data. |
| | If used to the right of the decimal point, the same number of digits are returned as there are # to the right of the decimal point, and the number gets rounded up or down. |
| | See example below. |
| **,** | If used before a decimal point, divide the number in the data by 1000. |
| | **Note:** A difference from Excel is that Excel allows for "," as divider after the decimal point as well. |
| **%** | Multiplies the number by 100 and inserts a "%" in the number in the location it is written in the format string. |
| **.** | Decimal point. |
| | **Note:** If no decimal point is used and there are decimals in the value you apply the format string on, the value gets rounded up or down. |
| **;** | Used to divide a format string if different formats are to be used for positive numbers, negative numbers and 0 (zero). |
| | If no semicolon is used, the format string is used for all numbers. |

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| | If one semicolon is used, it divides the format string like this: String for positive numbers and zero;String for negative numbers |
| | If two semicolons are used, they divide the format string like this: String for positive numbers;String for negative numbers;String for zero |
| \ | If a "\" is added before a special character that character will not modify the number, the character will only be added to the value. |

**Examples:**

**Note:** All these examples use the number 12345.67 as the value from the data.

| Format string | Result |
|---|---|
| # #### | 1 2346 |
| #.# | 12345.7 |
| #.000 | 12345.670 |
| #,.# | 12.3 |
| #,,.## | .01 |
| #% | 1234567% |
| #\% | 12345.67% |
| $# | $12346 |
| #.##E+0 | 1.23E+4 |
| #.#;(#.#) | 12345.7<br>**Note:** Had the number been negative, the result would be: (12345.7) |
| 23 | 23 |

See literature about custom numeric format strings, for example, on MSDN, for more information.

## Custom DateTime Format Strings

Below are some examples of custom format strings for datetime formats. See literature about custom datetime format strings, such as that on MSDN, for more information.

| Character | Description |
|---|---|
| yy | Returns the year, measured as a number between 0 and 99. |
| yyyy | Returns the year as a four-digit number. |
| M | Returns the month, measured as a number between 1 and 12, with one or two digits depending on the value. |
| MM | Returns the month with two digits, measured as a number between 1 and 12. This means that June will be written as '06', when this format |

| | |
|---|---|
| | string is applied. |
| **MMM** | Returns the abbreviated name of the month. For example, 'Jun'. |
| **MMMM** | Returns the full name of the month. For example, 'June'. |
| **d** | Returns the day of the month, measured as a number between 1 and 31, with one or two digits depending on the value. |
| **dd** | Returns the day of the month with two digits, measured as a number between 1 and 31. This means that the 6th of a month will be written as '06', when this format string is applied. |
| **ddd** | Returns the abbreviated name of the day of the week. For example, 'Fri'. |
| **dddd** | Returns the full name of the day of the week. For example, 'Friday'. |
| **h** | Returns the hour using a 12-hour clock, with one or two digits depending on the value. |
| **hh** | Returns the hour using a 12-hour clock, with two digits. This means that 6 o'clock will be written as '06', when this format string is applied. |
| **H** | Returns the hour using a 24-hour clock, with one or two digits depending on the value. |
| **HH** | Returns the hour using a 24-hour clock, with two digits. This means that 6 o'clock in the morning will be written as '06' and 6 o'clock in the evening will be written as '18', when this format string is applied. |
| **m** | Returns the minute with one or two digits, depending on the value. |
| **mm** | Returns the minute with two digits. This means that six minutes will be written as '06', when this format string is applied. |
| **s** | Returns the second with one or two digits, depending on the value. |
| **ss** | Returns the second with two digits. This means that six seconds will be written as '06', when this format string is applied. |
| **f** | Returns the tenths of a second. |
| **ff** | Returns the hundredths of a second. |
| **fff** | Returns the milliseconds. |
| **tt** | Returns the AM/PM designator. |
| **:** | Returns the time separator. |
| **/** | Returns the date separator. |

You can also add any custom string value, but if any of the specifier characters are included in the string, they need to be escaped by a backslash (\).

**Examples:**

**Note:** All the examples below use the following value from the data: Friday, October 16, 2009, at 25 minutes past three in the afternoon.

| Format string | Result |
|---|---|
| **dd\t\h o\f MMMM yyyy** | 16th of October 2009 |
| **MMM d yyyy, HH:mm** | Oct 16 2009, 15:25 |
| **\year: YY, \mon\t\h: MM, \da\y: dd** | year: 09, month: 10, day: 16 |
| **hh:mm tt** | 03:25 PM |
| **m \minu\te\s pa\s\t h, MMM d** | 25 minutes past 3, Oct 16 |

## Custom TimeSpan Format Strings

There are five different data values included in the TimeSpan format: day, hour, minute, second and fractions of seconds. These can be combined to a suitable format using a format string built by the following specifier characters:

| Character | Description |
|---|---|
| **d** | Returns the number of days. |
| **h** | Returns the number of hours with one or two digits, depending on the value. |
| **hh** | Returns the number of hours with two digits. This means that six hours will be written as '06', when this format string is applied. |
| **m** | Returns the number of minutes with one or two digits, depending on the value. |
| **mm** | Returns the number of minutes with two digits. This means that six minutes will be written as '06', when this format string is applied. |
| **s** | Returns the number of seconds with one or two digits, depending on the value. |
| **ss** | Returns the number of seconds with two digits. This means that six seconds will be written as '06', when this format string is applied. |
| **f** | Returns the fractions of seconds. You can also add a number between 1 and 3 after the 'f', defining how many decimals will be shown. If no number has been specified, three numbers will be shown, if available. |

Between each specifier character, you need to supply some kind of separator. This could be a custom string value, but if any of the specifier characters are included in the string, they need to be escaped by a backslash (\). You can also include an initial and a conclusive string.

**Examples:**

**Note:** All the examples below use the following value from the data:  -5 days, 7 hours, 11 minutes 3.1234 seconds.

| Format string | Result |
|---|---|
| **d.h:m:s.f** | -5.7:11:3.123 |
| **d.hh:mm:ss.f2** | 5.07:11:03.12 |
| **Ti\me\span i\s d \day\s** | Timespan is -5 days |
| **d \day\s h \hour\s m \minute\s s \secon\d\s** | -5 days 7 hours 11 minutes 3 seconds |
| **f s m h d** | 123 3 11 7 -5 |

# 3.1.4.7    Properties

## 3.1.4.7.1    Properties in Expressions

There are three types of properties available in TIBCO Spotfire: document properties, data table properties and column properties. All of these can be used in expressions that control one or many settings. The properties can be interpreted in two different ways, either as actual values or as text values that can be used instead of column names or measures.

### Insert as Text

When you want to use a string property in an expression where it should be interpreted as a column name or a measure you must use a specific syntax. The name of the property should be enclosed in the following: "${" and "}". So, for a document property this could look something like: ${MyProperty}. For a data table property, the first part should be the data table name within the symbols specified above, followed by a period and the property name also within curly brackets: ${My Data Table}.{MyProperty}. For a column property, the column name is also required: ${My Data Table}.{Column Name}.{MyProperty}.

| Property call in expression | Description |
|---|---|
| **${MyProperty}** | Denotes the document property named MyProperty. |
| **${My Data Table}.{MyProperty}** | Denotes the data table property named MyProperty defined for the data table "My Data Table". |
| **${My Data Table}.{Column Name}.{MyProperty}** | Denotes the column property named MyProperty defined for the column "Column Name" in the data table "My Data Table". |
| **$map("template", "concatenation string")** | The $map() function is used to map list-valued properties to a single string. The first argument is a template to use for each value in the list and the second argument is a specification of how the list values should be connected in the resulting expression.<br>See List-Valued Properties (Multiple Select) below for more information.<br>Examples:<br>$map("sum([${PropertyName}])", ",") |

| | |
|---|---|
| | <$map("[${PropertyName}]", " NEST")> |
| **$esc(expression)** | Replaces "]" in column names with "]]" and encloses the escaped column names in "[" and "]". The argument is an expression which could be a property value or a property function that starts with a dollar sign ($).<br><br>Examples:<br>$esc(${MyProperty})<br>$esc("$csearch([Data Table], "Col*")") |
| **$csearch([Data Table], "search string")** | The $csearch() function is used to select a number of columns from a data table using a limiting search expression. The first argument is a data table and the second argument is a string that contains the search expression determining which column names should be returned. The function returns a list of the (unescaped) column names from the data table that match the search expression.<br><br>Examples:<br>$csearch([Data Table],"*")<br>$csearch([Data Table], "Col*") |

When the $ sign is encountered in an expression, the property will be replaced by its corresponding value before the actual expression is evaluated (a preprocessing step). This means that if you type an expression like: sum(${Property1}) -${Property1}-${Property2}, and the value of Property1 is the column name Column1, and the value of Property2 is Column2, then the resulting expression will be: sum([Column1]) -[Column1]-[Column2].

If you do not want the property value to be interpreted as a column name but as a literal string value, you should put the property call within quotation marks. For example, if you have a property called "MyProperty" with the value "MyValue", the expression ${MyProperty} would return the resulting expression MyValue, where a column called "MyValue" is retrieved. However, the expression "${MyProperty}" would return the text string "MyValue" instead. If the string value consists of several words (e.g., "My Value"), then you should use $esc() or put brackets around the property expression in order to return a column: [${MyProperty}]. See General Syntax for more information about column names.

Note that it is very important to use the correct syntax for the expression at all times. Otherwise you may end up with a different result than you expected. If a property is inserted as a column where the expression expected a string, the first value of the specified column will be retrieved. For string columns, the result may be a valid expression, but for a column of another data type, you may receive an error.

If a property is inserted using the Insert Properties button in the Insert Calculated Column dialog or in the Custom Expression dialog, the property will automatically be added using the text (preprocessor) syntax.
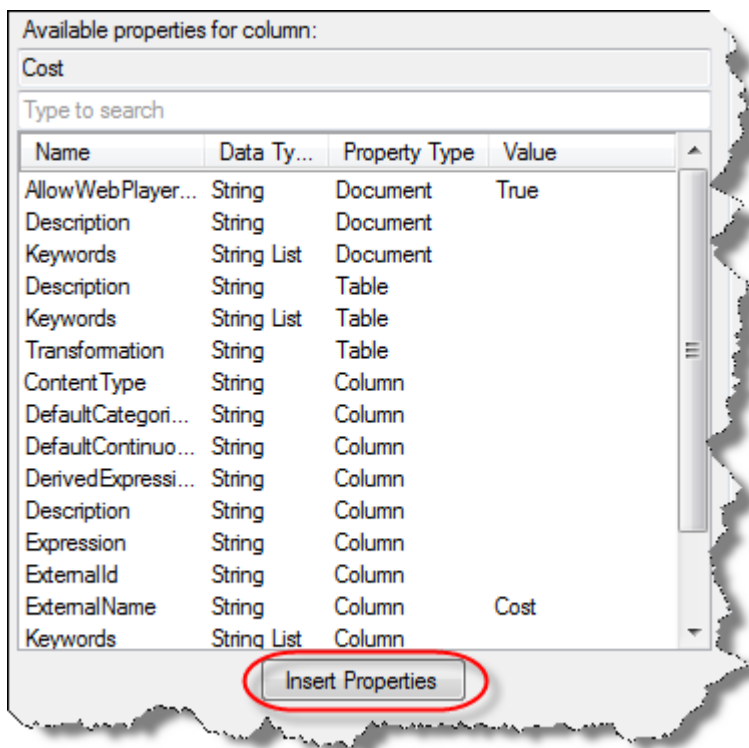
You can also right-click on the property in the Available properties for column field and select **Insert as Text** from the pop-up menu.

If a property containing a column name is to be used on an axis, there is a shortcut called Set from Property available from the pop-up menu on the column selectors. If any changes to the automatically added syntax are required, you must use the Custom Expression dialog to modify the expression. Right-click on the column selector and select Remove All if you want to remove the property expression from the axis.

A property can also be used to specify an aggregation measure. For example, you can define a property called MyMeasure with the default value "sum". If such a property is to be used in an expression you need to manually add parentheses and arguments for the measure in the expression where it is used. You can then create a property selector in a text area displaying a list of fixed aggregation measures that you want to be available in an axis expression and let web player users change the axis expression using the property selector.

Since string properties inserted as text in most cases will be interpreted as column names, you may encounter situations where you do not achieve the expected result when creating a custom expression. If the string property is to be interpreted as a value (e.g., in conditional expressions) it needs to be surrounded by quotation marks. For example, if you want to replace the string "ProductA" used in an axis expression condition such as Sum(if((([Product])=("ProductA"),[Quantity],null)) with a document property, then the document property needs to be surrounded by quotation marks in order to make the expression work:

Sum(if ( [Product] = "${MyProduct}",[Quantity],null))

You can also insert the property as a function rather than as text in order to retrieve the same results (see also Insert as Value below):

Sum(if ( [Product] = DocumentProperty("MyProduct"),[Quantity],null))

## Insert as Value

When the *value* of a property is to be part of an expression, the recommendation is to use the standard property functions: ColumnProperty(), DataTableProperty() and DocumentProperty() to encapsulate the property name. For example, use this syntax to write an expression with a

document property holding an exchange rate times a value column expressed in some currency to be converted:

DocumentProperty("ExchangeRate")*[Value Column]

Note that the property name should always be written within quotation marks when property functions are applied. If you want a property to be interpreted as a value, you should right-click on the property in the Available properties for column field and select **Insert as Value** from the pop-up menu.
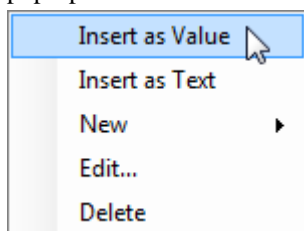


You can of course also manually edit the syntax for the property.

## List-Valued Properties (Multiple Select)

Multiple-select properties, or list-valued properties, are based on a list of values instead of a single value. They can be created when defining a list box (multiple select) property control. A list-valued property cannot be used in all places where a regular single-valued property can be applied, but it is an effective way to specify multiple columns on an axis.



List-valued properties often require some additional manual work when used in expressions. However, you will in most cases get a hint of what the expression should look like in the current context when inserting the property using the Insert Properties button.

When a list-valued property is added as text to a custom expression (for example, on a continuous axis like the Y-axis in a Line Chart or the value axis in a Bar Chart) the syntax will be something like $map("sum([${PropertyName}])", ","). In this example, the default aggregation is set to "sum", so if you want to use a different aggregation you need to manually edit the expression. The concatenation string is set to a comma, which means that each list value should be interpreted as a separate column. If the PropertyName property contains a list with three columns: "ColumnA", "ColumnB" and "ColumnC", the resulting expression after expansion is sum([ColumnA]),sum([ColumnB]),sum([ColumnC]). If the concatenation string is changed to a "+", then the axis would show the sum of the values from all columns included in the list: sum([ColumnA])+sum([ColumnB])+sum([ColumnC]).

For a categorical axis, such as the X-axis in a Line Chart or the category axis in a Bar Chart, you want to display a hierarchy rather than some calculated values. The map expression must

then use angle brackets, "<>", and either NEST or CROSS to define what combinations to show. For example:

<$map("[${PropertyName}]", " NEST")>

See General Syntax for more information about the NEST and CROSS alternatives.

**Note:** As always when setting up expressions with multiple columns, you need to make sure that the columns you use are of the same type and that they match the rest of the expression. For example, you cannot mix categorical and continuous columns on some axes, nor can you use categorical columns in an expression using any type of aggregation.

## More Expression Examples

If nothing else is stated, the expression examples below assume that you have a data table called Data Table containing three integer columns called "Column 1", "Column 2", and "Sales".

| Requested result | Expression example | Resulting expression |
|---|---|---|
| Sum all integer columns in the data table called Data Table. | $map("sum([$csearch([Data Table],"datatype:int")])","+") | sum([Column 1])+sum([Column 2])+sum([Sales]) |
| Return a list of all columns in the data table called Data Table. | $csearch([Data Table],"*") | Column1,Column 2,Sales |
| Return an escaped column name from a property (MyProperty) with the value "Column name with bracket (])". | $esc(${MyProperty}) | [Column name with bracket (]])] |
| Use a list-valued property expression as input to a data function. In the example, the property MyListProperty contains three column names: Column 1, Column 2, and Sales. | $map("[Data Table].[${MyListProperty}]", ",") | [Data Table].[Column 1],[Data Table].[Column 2],[Data Table].[Sales] |
| Use multiple columns on an axis where one of the columns is retrieved via a property control. In the examples, the property MyProperty has the value Column | [Column 1],[${MyProperty}]<br>or<br><[Column 1] NEST [${MyProperty}]><br>or<br>Sum([Column 1]),<br>Sum(${MyProperty}])<br>etc. | [Column 1],[Column 2]<br>or<br><[Column 1] NEST [Sales]><br>or<br>Sum([Column 1]),<br>Sum(Column 2])<br>etc. |

| 2. | | | |
|---|---|---|---|
| Change the display name of multiple columns on an axis using a list-valued property. | $map("Sum([${MyListProperty}]) as [${MyListProperty}]", ",") | | Sum([Column 1]) as [Column 1],Sum([Column 2]) as [Column 2],Sum([Sales]) as [Sales] |
| In the example, the property MyListProperty contains three column names: Column 1, Column 2 and Sales. | All list-valued properties in the expression must be of the same size. | | |

### 3.1.4.7.2   Troubleshooting Property Expressions

Since properties can be inserted and interpreted in two different ways, there may be occasions where a seemingly correct expression does not work as expected. The following messages may be encountered when inserting properties in the Expression field of the Custom Expression dialog or the Insert Calculated Column dialog.

Some of the problems may also occur if you add a property to an axis using Set from Property and the expression does not match the axis. In that case, you need to right-click and go to the Custom Expression dialog to manually change your expression. Try to identify your problem using the table below.

| Error text for the expression field | Expression example | Possible errors | Solution |
|---|---|---|---|
| The expression is not complete.<br><br>or<br><br>The expression is empty.<br><br>or<br><br>The expression cannot be evaluated. | **${MyProperty}** | When a property is inserted to an expression using double-click or by clicking on the Insert Properties button, it is inserted as text.<br>With this syntax, Spotfire will try to interpret a string property value as a column name or a part of an expression rather than as a value. | If you want to use the value of the string property, put quotation marks around the expression:<br>**"${MyProperty}"**<br>You can also right-click on the property in the Available properties for column list and select Insert as Value from the pop-up menu instead :<br>**DocumentProperty("MyProperty")**<br><br>If the property is supposed to hold a column name, but the column name contains space characters, you need to put "[" and "]" characters around the property expression. You can also use the $esc() function that both escapes any "]" characters and converts the property string to a column:<br>**$esc(${MyProperty})**<br>If the property is added using Set from Property, you will automatically get the escaped version of the expression. |

| | | | |
|---|---|---|---|
| The expression is not complete. | **Concatenate("My first string", ${EmptyProperty})** | If a string property inserted as text is empty then it cannot be interpreted as a column and Spotfire will not see that the second argument in this example is there at all. | If you want to use the value of the string property, put quotation marks around the expression: **Concatenate("My first string", "${EmptyProperty}")** You can also right-click on the property in the Available properties for column list and select Insert as Value from the pop-up menu instead : **Concatenate("My first string", DocumentProperty("EmptyProperty"))** If you want to use the content of a column in the concatenation, you should put '[' and ']' characters around the property to make sure the property is interpreted as a column (or use $esc() as described above). **Concatenate("My first string", [${EmptyProperty}])** |
| Invalid type for function call 'DocumentProperty' | **DocumentProperty(MyProperty)** | The property name should always be written within quotation marks when property functions are applied. Quotation marks are automatically added if you use the Insert as Value shortcut from the pop-up menu. | Put quotation marks around the property name: **DocumentProperty("MyProperty")** |
| Expected 'End of expression' but found ',' on line 1 character 12 or The expression is not valid | **$map("sum([${MyListProperty}])", ",")** | When list-valued properties are used on an axis you need to map the list-valued properties to a single string. The expression must contain a template to use for each value in the list (e.g., an aggregation measure) and also a specification of how the list values should be connected in the resulting expression. The default expression obtained when first inserting the property is suitable for continuous axes where a simple listing of the columns included in the list-valued property is desired. In all other cases it must be manually modified. | Depending on what you want to display you need to modify the default expression somewhat differently. If a simple listing of column names is desired (e.g., if you want to show multiple columns on a bar chart value axis), then the expression in the example works fine. If you want to use an aggregation measure other than "sum" simply replace "sum" in the expression. If the list of columns is to be shown on a categorical axis, you need to modify the default expression to something like this: **<$map("[${MyListProperty}]", "NEST")>** Categorical expressions must be surrounded by angle brackets, "<>", and you must also specify how different combinations of categories should be handled. Also, the current selection of columns |

in the list-valued property may be a mixture of continuous and categorical columns. Make sure that only columns of the same type are included in the property list.

There are also more cases where the expression needs to be modified. See the section List-Valued Properties (Multiple Select) under Properties in Expressions for more information.

| Expected ':' but found '3' on line 1 character 5 | **${TimeSpanProperty}** | If you try to use a TimeSpan, Date, Time or DateTime property in an expression, the expression language will not be able to interpret it correctly without some manual editing. | Put quotation marks around the property name and use the corresponding conversion function: **TimeSpan("${TimeSpanProperty}")** |
| | | First, it needs quotation marks around the property name. This will interpret the property as a string and you will be able to get rid of the error. Second, you need to use one of the conversion functions in order to actually interpret the value as a TimeSpan, Date, Time or DateTime. | You can also right-click on the property in the Available properties for column list and select Insert as Value from the pop-up menu instead : **TimeSpan(DocumentProperty("TimeSpanProperty"))** |
| {Table is undefined in ${{Table} | **${{Table}}.{MyProperty}** | If a name contains right curly bracket (}) it needs to be escaped by a backslash character (\). | To access the data table property MyProperty in a data table that is named "{Table}" one must write **${{Table\}}.{MyProperty}.** |

## More about $esc and $csearch:

**$esc(expression)**

The $esc() function is used to escape "]" which normally denotes the end of a column from column names and adds "[" and "]" to the column name. The brackets are required for column names containing space characters to be interpreted as columns. $esc() can be used together with the $csearch() function. The argument is an expression which could be a property value or a property function that starts with a dollar sign ($).

For example, let the data table "A Data Table" have three columns called "Column 1","Column 2[example]", and "Sales".  The expression $esc($csearch([A Data Table], "Col*")) returns a list with two elements—the strings "[Column 1]" and "[Column 2[example]]]".

**$csearch([Data Table], "search string")**

The $csearch() function is used to produce a "filtered" list of column names. It allows you to select a number of columns from a data table using a limiting search expression. This function is likely to be used together with the $map() function. The first argument is a data table and the second argument is a string that contains the search expression to be used to determine what column names should be returned. The function returns a list of (unescaped) column names contained in the data table that fulfills the search expression.

For example, let the data table "A Data Table" have three columns called "Column 1", "Column 2", and "Sales". The expression $csearch([A Data Table], "Col*") returns a list with two

elements—the strings "Column 1" and "Column 2". If the property MyTable contains the string [A Data Table] and the property MyA contains the string "Col*" then $csearch(${MyTable}, "${MyA}") will return the same result.

$csearch together with $map() and $esc() can produce column lists or calculations based on columns from list-valued properties. For example, $map("sum($esc($csearch(${MyTable}, "*")))", "+") is expanded to sum([Column 1])+sum([Column 2])+sum([Sales]) since the search expression * will return all columns in the table. The $esc() function is necessary if you want the strings in the list to be interpreted as columns and the column names contain space characters.

**Note:** $csearch() is primarily intended to be used in visualization axis expressions or included in data function argument expressions. While $csearch() is looking at all columns in a data table, including any calculated columns, it is less suitable for use in calculated columns. If used in a calculated column, cyclic dependencies may occur.

# 3.2　Insert Binned Column

## 3.2.1　What is Binning?

Binning is a way to group a number of more or less continuous values into a smaller number of "bins". For example, if you have data about a group of people, you might want to arrange their ages into a smaller number of age intervals. Numeric columns can also be temporarily grouped by right-clicking on a column selector and clicking Auto-bin Column.

### Example:

The data table contains information about a number of persons.
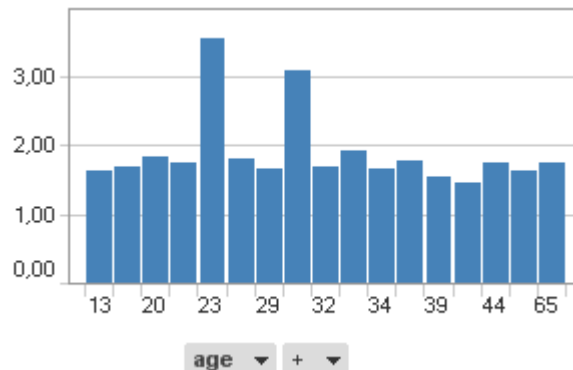


By binning the age of the people into a new column, data can be visualized for the different age groups instead of for each individual.
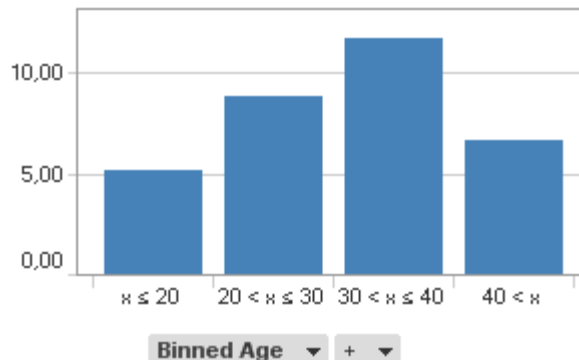
## 3.2.2 How to Use Binning

► **To use the binning tool:**

1. Select **Insert > Binned Column...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Select a **Column** to bin.
4. Select a **Bin method**:

   **Specific Limits**

   Allows you to explicitly enter values, separated by semicolons, of the limits to use for each bin.

   **Even Intervals**

   Allows you to specify the desired number of bins and divides the value range into equal intervals.

   **Even Distribution of Unique Values**

   Allows you to specify the desired number of bins and divides the bins so that each one contains an equal number of unique values.

   **Based on Standard Deviation**

   Allows you to divide the range into sections as described by the selected standard deviation multipliers.

   **Substring**

   Allows you to group the values by the first or last characters in the column to be binned.

5. Type a **New column name** for the binned column.
6. Click **OK**.

## 3.2.3 Details on Insert Binned Column

► **To reach the Insert Binned Column dialog:**

Select **Insert > Binned Column...**.

| Option | Description |
|---|---|
| **Data table** | Only available when more than one data table is present in the analysis and the dialog has been opened via the main menu.<br>Specifies the data table where the binned column will be inserted. |
| **Column** | Displays the available columns on which you can perform binning. It is possible to search for columns by typing in the field provided when the drop-down list is expanded. The values from the selected column will be sorted into several bins or categories based on your selections. |
| **Specific limits** | Allows you to explicitly enter the values of the limits to use for each bin.<br><br>Enter the values you wish to use for the limits of your bins and separate them with a semicolon. For example, typing "20;30;40" will result in the  following bins:<br>x<=20<br>20<x<=30<br>30<x<=40<br>40<x |
| **Even intervals** | Allows you to specify the desired number of bins and divides the value |

| | |
|---|---|
| | range into equal intervals.<br><br>This method works for all data types except string. The current data range is divided up into the specified number of bins. Empty values will be empty in the new column, and when loading data tables from external sources (linked data), new values will be placed inside one of the available bins. |
| **Even distribution of unique values** | Allows you to specify the desired number of bins and divides the bins so that each one contains an equal number of unique values.<br><br>The suggested division works for all data types and is made so that the bins each contain an equal number of unique values. Extra values are placed in the final bins, so if you have four values and you want three bins with one value in each bin, your final value will be placed in the third bin. Empty values will be empty in the new column, and when loading data tables from external sources (linked data) the bin ranges will be modified to fit the new data range. |
| **Based on standard deviation** | Divides the range into sections as described by the selected standard deviation multipliers.<br><br>This method works for numeric columns only. The range is divided into sections as described by the selected standard deviation multipliers. Bins are created using any of the standard deviations +/- 0.5, 1, 2, 3, 6. In the example below, the range is divided into the following six subsections ($\mu$ denoting the average value for the column and s the corresponding standard deviation):<br>lower limit -> ($\mu$-3s)<br>($\mu$-3s) -> ($\mu$-s)<br>($\mu$-s) -> $\mu$<br>$\mu$ -> ($\mu$+s)<br>($\mu$+s) -> ($\mu$+3s)<br>($\mu$+3s) -> upper limit<br>Empty values will be empty in the new column, and when loading data tables from external sources (linked data) the standard deviation will be recalculated. |
| **Substring** | Groups the rows by the first or last characters of the values in the column to be binned. The exact number of characters to take into account must be supplied.<br>Example:<br>Suppose the column to be binned contains family names, beginning with Adams and ending with Winter. To bin the rows according to the first letter in the name, use the Substring option considering one character from the beginning. Bin names are generated from the substring, and if **Ignore case** is used, the bin names are all formatted as upper case.<br><br>Empty values will be empty in the new column, and when loading data tables from external sources (linked data) the new values will be placed in suitable bins, taking the substrings into consideration. |
| **New column name** | The name of the new, binned column. |

## 3.2.4 The Binning Slider

When using a numeric column for the X-axis in a visualization (the category axis in a bar chart), you sometimes may want to bin the values to compare segments of the data to each other. One very handy tool to help you dynamically do this is the binning slider.

The bar chart below shows the average purchases of a customer group, where each bar represents the age of the customers.
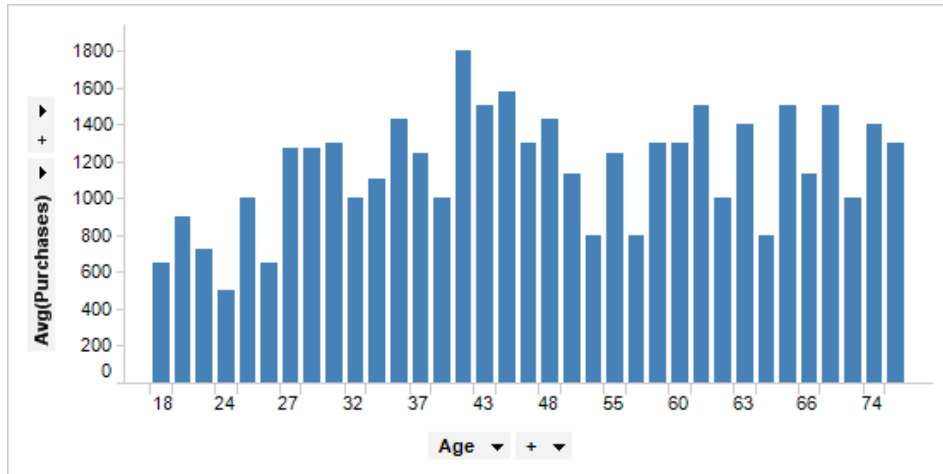


By **right-clicking** on the category axis selector, and selecting **Auto-bin Column**, the bars are automatically binned. In the example below there are five bins, which means all customers between 0 to 29 are gathered in the first bar, customers between 30 to 41 in the second bar, and so on.
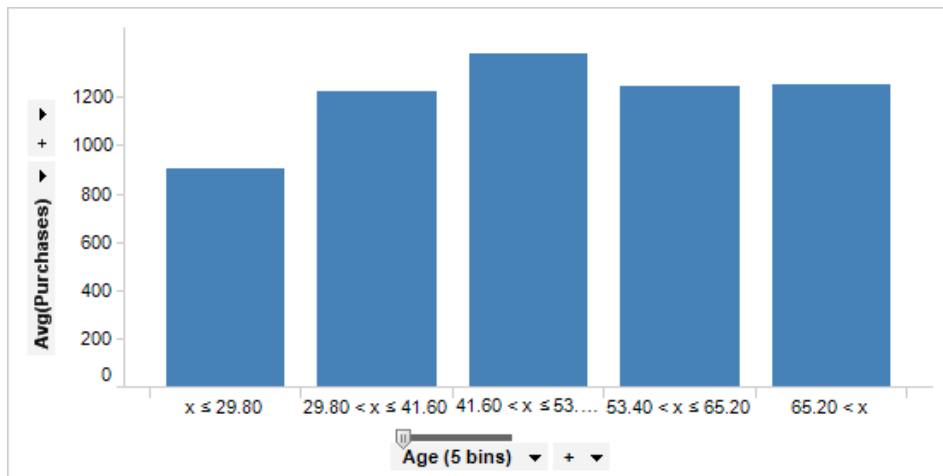


As you see there is a small slider with a handle just above the axis selector. This is the binning slider. By dragging this horizontally, you can alter the number of bins dynamically. In the example below, the slider has been set to show 20 bins.
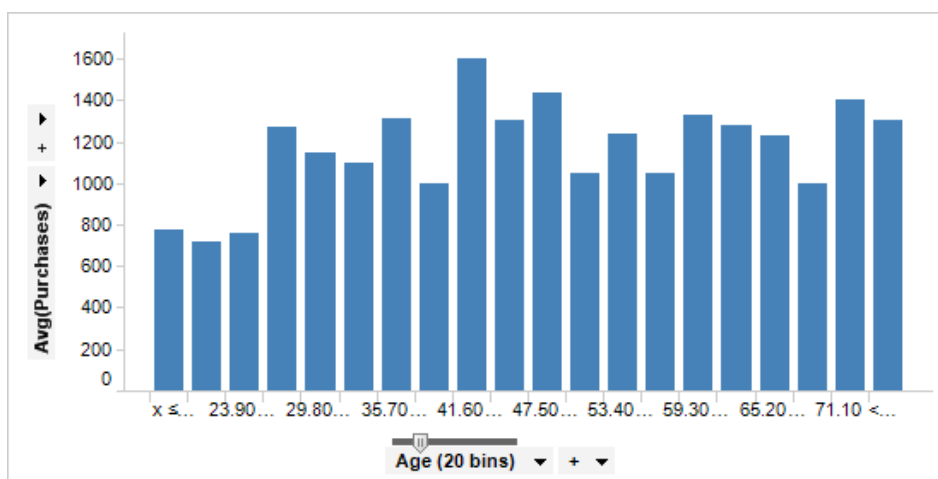
# 3.3 Insert Columns from External Data

## 3.3.1 How to Insert Columns from External Data

### ► To insert columns from external file:

1. Select **Insert > Columns from External Data...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Click the **File** radio button.
4. Type a **Location** or click on **Browse...** to locate the file with additional data.

   Response: If the selected file is a text file, the Import Settings dialog is displayed. If the selected file is an Excel file, the Excel Import dialog is displayed.

   Apply transformations (optional).
5. Click **Next >**.

   Comment: If you want the columns to be matched automatically, go straight to step 11.

   Response: The second dialog of the wizard is displayed.
6. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.
7. Click **Next >**.

   Response: The third dialog of the wizard is displayed.
8. Select the check boxes for all columns that you wish to add from the new data.
9. Select a **Join method** to determine which rows to keep from both data tables.

   Comment: Note that selecting an inner join may result in that no data remains in TIBCO Spotfire, if no matching rows are found.
10. Click **Finish**.

    Response: The selected columns are added to your data table.

### ► To insert columns from an information link:

1. Select **Insert > Columns from External Data...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Click the **Information Link** radio button.

4. Click on **Browse...** to locate the information link with additional data.

   Response: The Open Information Link dialog is displayed.

5. In the tree structure to the left, click to select the information link of interest and then click **Open**.

6. Apply transformations (optional).

7. Click **Next >**.

   Comment: If you want the columns to be matched automatically, go straight to step 12.

   Response: The second dialog of the wizard is displayed.

8. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.

9. Click **Next >**.

   Response: The third dialog of the wizard is displayed.

10. Select the check boxes for all columns that you wish to add from the new data.

11. Select a **Join method** to determine which rows to keep from both data tables.

    Comment: Note that selecting an inner join may result in that no data remains in TIBCO Spotfire, if no matching rows are found.

12. Click **Finish**.

    Response: The selected columns are added to your data table.

## ► **To insert columns from a database:**

1. Select **Insert > Columns from External Data...**.

2. If you have more than one data table in the document, select the **Data table** to work on.

3. Click the **Database** radio button.

4. Click on **Browse...** to locate the database with additional data.

   Response: The Open Database dialog is displayed.

5. Follow the instructions for the desired data source type under Opening Data from a Database.

6. Apply transformations (optional).

7. Click **Next >**.

   Comment: If you want the columns to be matched automatically, go straight to step 12.

   Response: The second dialog of the wizard is displayed.

8. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.

9. Click **Next >**.

   Response: The third dialog of the wizard is displayed.

10. Select the check boxes for all columns that you wish to add from the new data.

11. Select a **Join method** to determine which rows to keep from both data tables.

    Comment: Note that selecting an inner join may result in that no data remains in TIBCO Spotfire, if no matching rows are found.

12. Click **Finish**.

    Response: The selected columns are added to your data table.

## 3.3.2 Details on Insert Columns from External Data - Select Destination

This step is only visible if you have more than one data table open in the document.
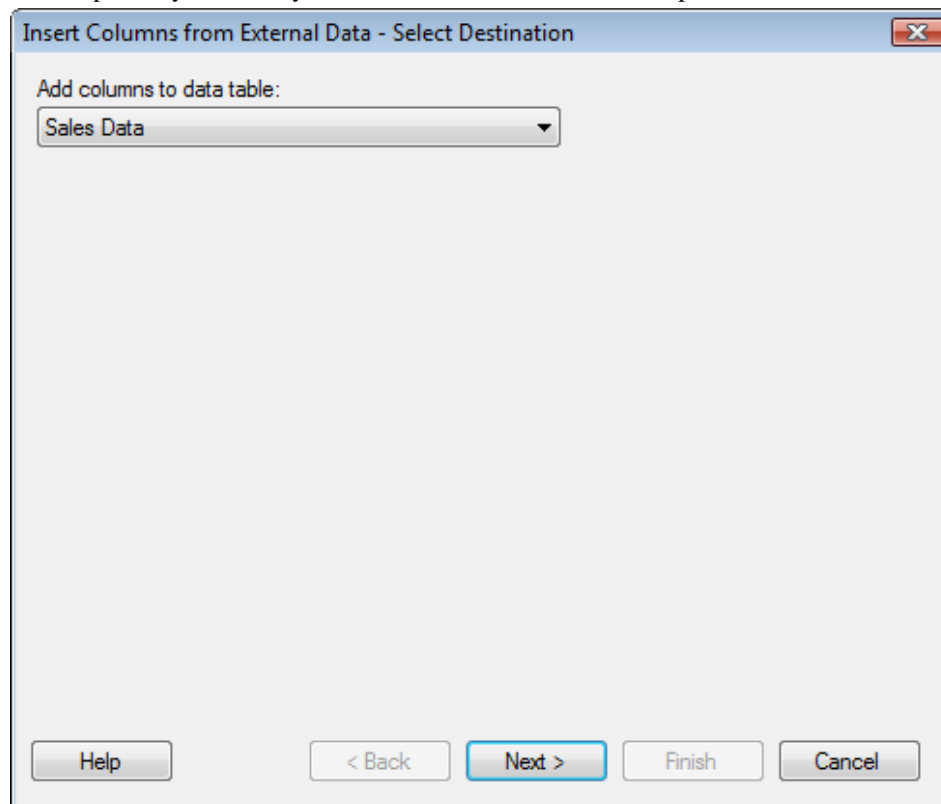


| Option | Description |
|---|---|
| **Add columns to data table** | Specifies which data table to add columns to. |
| **Next >** | Continues to the next step of the wizard where the data source to add data from is selected. |

### 3.3.3 Details on Insert Columns from External Data - Select Source



| Option | Description |
|---|---|
| **Add columns from** | |
| **File** | Allows you to add columns from files. |
| **Information Link** | Allows you to add columns from information links. |
| **Database** | Allows you to add columns from any supported database. |
| **Clipboard** | Allows you to add columns from the clipboard. |
| **Existing data table in my analysis** | Allows you to add columns from the current analysis. |
| **Location** | Shows the path and file name of the selected file. |
| **Browse...** | Opens a dialog where you can select which file, information link, or database to open. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the columns you want to add. For more information, see the Show transformations dialog. |
| **Next >** | Continues to the next step of the wizard where the matching columns are selected. |
| **Finish** | Automatically matches all columns with the same external ID or, of subordinate importance, the same name. The columns that were not used in the matching are also added to the data table. |
| | **Note:** If you have columns with identical names that do not contain the same identifiers, this option might result in that no data is added. In that case, it is probably better to use the **Next >** button (see above), and match on columns that contain correct identifiers. |

## 3.3.4     Details on Insert Columns from External Data - Match Columns



| Option | Description |
|---|---|
| **From current data** | Lists all columns in the current data. Click here to select the column you wish to match against a column from the new data, then click Match Selected. |
| **From new data** | Lists all columns in the new data. Click here to select the column you wish to match against a column from the current data, then click Match Selected. |
| **Match Selected** | Sends the selected column pair (From current data and From new data) to the Matched columns list. |
| **Match All Possible** | Sends all column pairs that have the same external ID or, of subordinate importance, columns with the same name to the Matched columns list. |
| **Matched columns** | Lists all column pairs that have been selected for matching. |
| **Unmatch Selected** | Removes the selected column pair from the Matched columns list. |
| **Unmatch All** | Removes all column pairs from the Matched columns list. |
| **Next >** | Continues to the next step of the wizard where the columns to add and the join method are selected. |

| | |
|---|---|
| **Finish** | Adds all available columns that were not used in the matching to the data table using a left outer join. |

## 3.3.5 Details on Insert Columns from External Data - Import
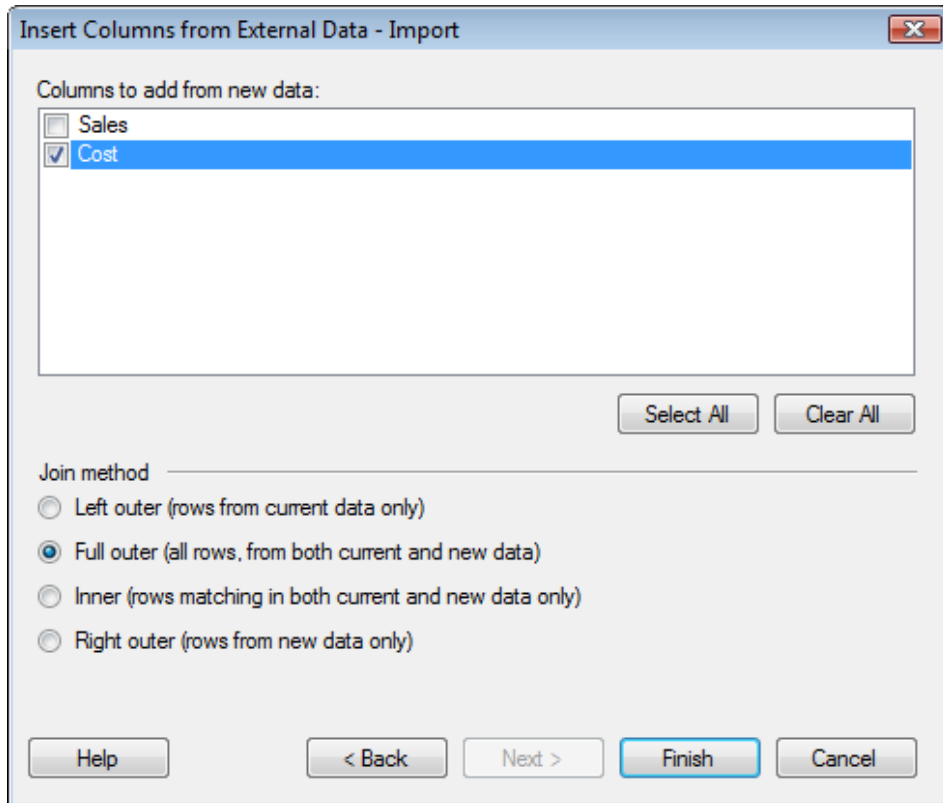


| Option | Description |
|---|---|
| **Columns to add from new data** | Lists all columns in the new data that can be added to the current data table. Only columns that have not been used in a matching in the previous step are available. Select the check box for all columns you wish to add. |
| **Select All** | Selects the check boxes for all available columns. |
| **Clear All** | Clears the check boxes for all available columns. |
| **Join method** | |
| **Left outer** | Data will be kept (and columns added) only for rows that are available in the current data table. If additional rows exist in the new data, they will not be added to the current data table. |
| **Full outer** | Data will be kept (and columns added) for all rows available in any of the data tables. If additional rows exist in the new data, they will be added to the current data table. |
| **Inner** | Data will be kept (and columns added) only for rows that are available |

| | |
|---|---|
| | in both the current and the new data. If the new data contains fewer rows than the current data table, rows will be removed from the current data table after this operation. |
| **Right outer** | Data will be kept (and columns added) only for rows that are available in the new data. If the new data contains fewer rows than the current data table, rows will be removed from the current data table after this operation. |
| **Finish** | Adds the selected columns to the selected data table in Spotfire. |

# 3.4 Insert Rows from External Data

## 3.4.1 How to Insert Rows from External Data

► **To insert rows from external file:**

1. Select **Insert > Rows from External Data...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Click the **File** radio button.
4. Type a **Location** or click on **Browse...** to locate the file with additional data.

   Response: If the selected file is a text file, the Import Settings dialog is displayed. If the selected file is an Excel file, the Excel Import dialog is displayed.

   Apply transformations (optional).
5. Click **Next >**.

   Comment: If you want the rows to be matched automatically, go straight to step 11.

   Response: The second dialog of the wizard is displayed.
6. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.
7. Click **Next >**.

   Response: The third dialog of the wizard is displayed.
8. If the new data contains more columns than the original data table, you may add the new columns by selecting their check boxes.
9. If desired, you can add information about the origin of new rows to a specified column.

   Comment: Update existing column is only relevant when rows have been previously added to the document.
10. Click **Finish**.

    Response: The selected columns are added to your data table.

► **To insert rows from information link:**

1. Select **Insert > Rows from External Data...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Click the **Information Link** radio button.
4. Click on **Browse...** to locate the information link with additional data.

   Response: The Open Information Link dialog is displayed.
5. In the tree structure to the left, click to select the information link of interest and then click **Open**.

6. Apply transformations (optional).
7. Click **Next >**.

   Comment: If you want the rows to be matched automatically, go straight to step 12.

   Response: The second dialog of the wizard is displayed.
8. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.
9. Click **Next >**.

   Response: The third dialog of the wizard is displayed.
10. If the new data contains more columns than the original data table, you may add the new columns by selecting their check boxes.
11. If desired, you can add information about the origin of new rows to a specified column.

    Comment: Update existing column is only relevant when rows have been previously added to the document.
12. Click **Finish**.

    Response: The selected columns are added to your data table.

### ► To insert rows from a database:

1. Select **Insert > Rows from External Data...**.
2. If you have more than one data table in the document, select the **Data table** to work on.
3. Click the **Database** radio button.
4. Click on **Browse...** to locate the database with additional data.

   Response: The Open Database dialog is displayed.
5. Follow the instructions for the desired data source type under Opening Data from a Database.
6. Apply transformations (optional).
7. Click **Next >**.

   Comment: If you want the rows to be matched automatically, go straight to step 12.

   Response: The second dialog of the wizard is displayed.
8. Click on the **Match All Possible** button, or manually select one column from current data and one from new data and click **Match Selected**. Repeat if necessary.

   Comment: The columns used for matching should together create a unique identifier for all rows.
9. Click **Next >**.

   Response: The third dialog of the wizard is displayed.
10. If the new data contains more columns than the original data table, you may add the new columns by selecting their check boxes.
11. If desired, you can add information about the origin of new rows to a specified column.

    Comment: Update existing column is only relevant when rows have been previously added to the document.
12. Click **Finish**.

    Response: The selected columns are added to your data table.

## 3.4.2 Details on Insert Rows from External Data - Select Destination

This step is only visible if you have more than one data table open in the document.
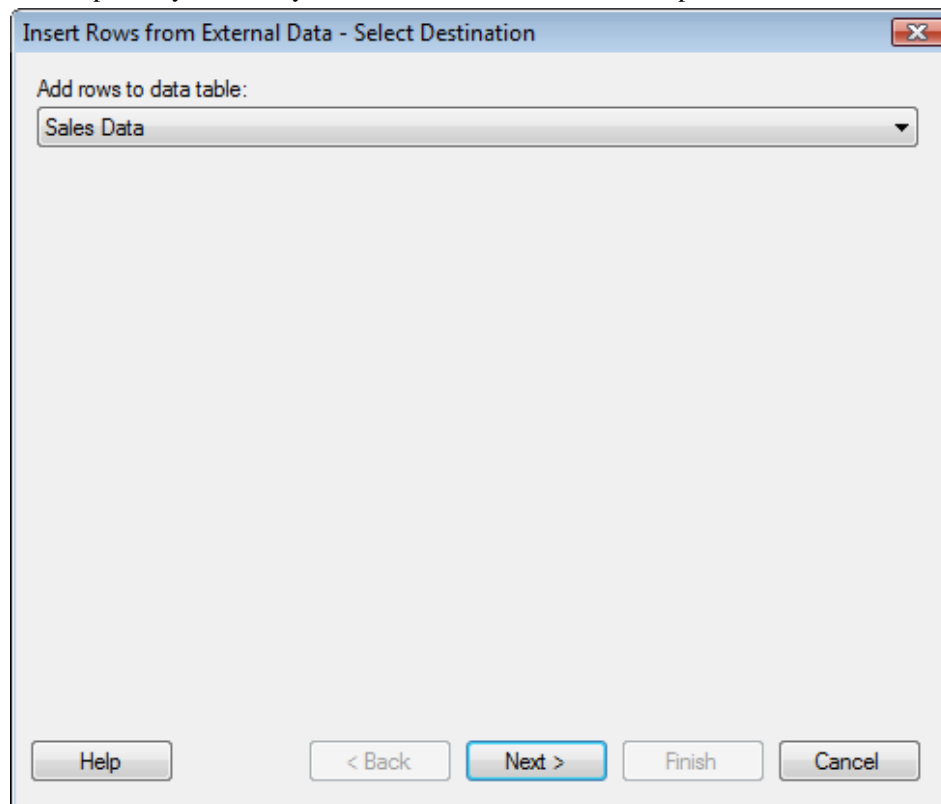


| Option | Description |
| --- | --- |
| **Add rows to data table** | Specifies which data table to add rows to. |
| **Next >** | Continues to the next step of the wizard where the data source to add data from is selected. |

### 3.4.3 Details on Insert Rows from External Data - Select Source



| Option | Description |
|---|---|
| **Add rows from** | |
| **File** | Allows you to add rows from files. |
| **Information Link** | Allows you to add rows from information links. |
| **Database** | Allows you to add rows from any supported database. |
| **Clipboard** | Allows you to add rows from the clipboard. |
| **Existing data table in my analysis** | Allows you to add rows from the current analysis. |
| **Location** | Shows the path and file name of the selected file. |
| **Browse...** | Opens a dialog where you can select which file, information link, or database to open. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the rows you want to add. For more information, see the Show transformations dialog. |
| **Next >** | Continues to the next step of the wizard where the matching columns are selected. |
| **Finish** | Automatically matches all columns with the same external ID or, of subordinate importance, the same name. The columns that were not used in the matching are also added to the data table. **Note:** If you have columns with identical names that do not contain the same identifiers, this option might result in that no data is added. In that case, it is probably better to use the **Next >** button (see above), and match on columns that contain correct identifiers. |

## 3.4.4    Details on Insert Rows from External Data - Match Columns



| Option | Description |
|---|---|
| **From current data** | Lists all columns in the current data. Click here to select the column you wish to match against a column from the new data, then click Match Selected. |
| **From new data** | Lists all columns in the new data. Click here to select the column you wish to match against a column from the current data, then click Match Selected. |
| **Match Selected** | Sends the selected column pair (From current data and From new data) to the Matched columns list. |
| **Match All Possible** | Sends all column pairs that have the same external ID or, of subordinate importance, columns with the same name to the Matched columns list. |
| **Matched columns** | Lists all column pairs that have been selected for matching. |
| **Unmatch Selected** | Removes the selected column pair from the Matched columns list. |
| **Unmatch All** | Removes all column pairs from the Matched columns list. |
| **Next >** | Continues to the next step of the wizard where it is possible to determine if additional columns should be included and whether or not to use a column to identify the origin of new rows. |

| | |
|---|---|
| **Finish** | Adds all available new rows and includes data from any new columns that were not used in the matching. |

## 3.4.5 Details on Insert Rows from External Data - Additional Settings



| Option | Description |
|---|---|
| **Include additional columns from the new data** | Lists all columns in the new data that can be added to the current data table. Only columns that have not been used in a matching in the previous step are available. Select the check box for all columns you wish to add. |
| **Select All** | Selects the check boxes for all available columns. |
| **Clear All** | Clears the check boxes for all available columns. |
| **Identify origin of new rows** | Select the check box if you want to use a column with information about the origin of the new (and the original) rows. |
| **Create new column** | Use this option if you have not previously added any rows and created a "column of origin". |
| **Update existing column** | Use this option when you add rows from many different sources and want to update a previously added "column of origin". |
| **Column name** | The column name of the "column of origin". |

| | |
|---|---|
| **Value for new rows** | The value you want to tag all new rows with. |
| **Value for original rows** | The value you want to tag all original rows with. This option is only available when you create a new column. Once a "column of origin" has been created, all previously added values will be kept when the column is updated. |
| **Finish** | Adds the selected rows and (optionally) columns to the specified data table in Spotfire. |

# 3.5 Add Data Tables

## 3.5.1 How to Insert Multiple Data Tables into the Analysis

Data can be added to the analysis in several different ways: as new columns, as new rows or as new data tables. Adding data as separate data tables is useful if the new data are unrelated to the previously opened data table or if the new data are in a different format (pivoted vs. unpivoted).

If you have a visualization made from a particular data table which has filtering and marking that you would like to apply to visualizations made from another data table, then you must define a relation between the two tables. For a relation to be useful, you need to have one or more key columns (identifier columns) available in both data tables, and use these to define which rows in the first data table will correspond to rows in the second data table. If you need more than one key column to set up a unique identifier, you must add one relation for each identifier column.

**Note:** The map chart is the only visualization where you can use different data tables in the same visualization. If you need to bring data from different data sources together in any other single visualization, use the Insert Columns from External Data or Insert Rows from External Data tool instead.

### ► To add new data tables to the analysis:

1. Select **File > Add Data Tables...**.

   Response: The Add Data Tables dialog is displayed.

2. Click **Add** and select the type of data to add from the drop-down list.

   Comment: You can add data tables from files, information links, databases, the clipboard, data functions or from current data tables within your analysis. You may also have access to other sources if they have been set up by your administrators.

   Response: Depending on your selection you will be presented with a dialog where you can specify which file, information link, etc., to add. If you need more information on specific data sources, see Opening a Text File, Opening an Excel File, Opening a SAS File, Opening an Information Link or Opening Data from a Database.

3. Select the source data and specify any required settings.

4. If desired, type a new **Data table name**.

5. Apply transformations (optional).

6. If you want to add more data tables, repeat steps 2-5 for each data table.

7. Determine whether or not the new data tables will be related to each other or to previously added data tables. If a relation is necessary, click **Manage Relations...** and specify the relation.

   Comment: See To define a new relation below for more information. Remember that you need to define a relation if the new data table is to be used to create details visualizations for the previously added data tables.

8. Click **OK**.

Response: The new data tables are incorporated into the analysis and are ready to be used.

**Note:** If you want to add a new data table that is loaded on demand you should instead use the **File > Add On-Demand Data Table** option. See Loading Data on Demand for more information.

### ► To define a new relation:

1. In the Add Data Tables dialog, click **Manage Relations...**.

   Response: The Manage Relations dialog is displayed.

2. Click on **New...**.

   Response: The New Relation dialog is displayed.

3. Select the two data tables you want to connect from the **Left data table** and **Right data table** drop-down lists.

4. Select the columns containing the identifiers from the **Left column** and **Right column** drop-down lists.

5. If desired, you can apply a **Left method** or **Right method** to modify the values of one or both columns.

   Comment: For example, if the identifiers are written in uppercase letters in one of the data tables and in lowercase letters in the other, you can use the Lower method on the uppercase column and change the letters to lowercase.

   Response: The result of the method application is shown in the Sample field.

6. Click **OK**.

**Tip:** You can always go back and edit relations as well as create new ones using the Data Table Properties dialog.

## 3.5.2    Details

### 3.5.2.1    Details on Add Data Tables

Use this dialog to add one or more data tables to your analysis. You can also apply one or more transformation steps before adding the new data table.
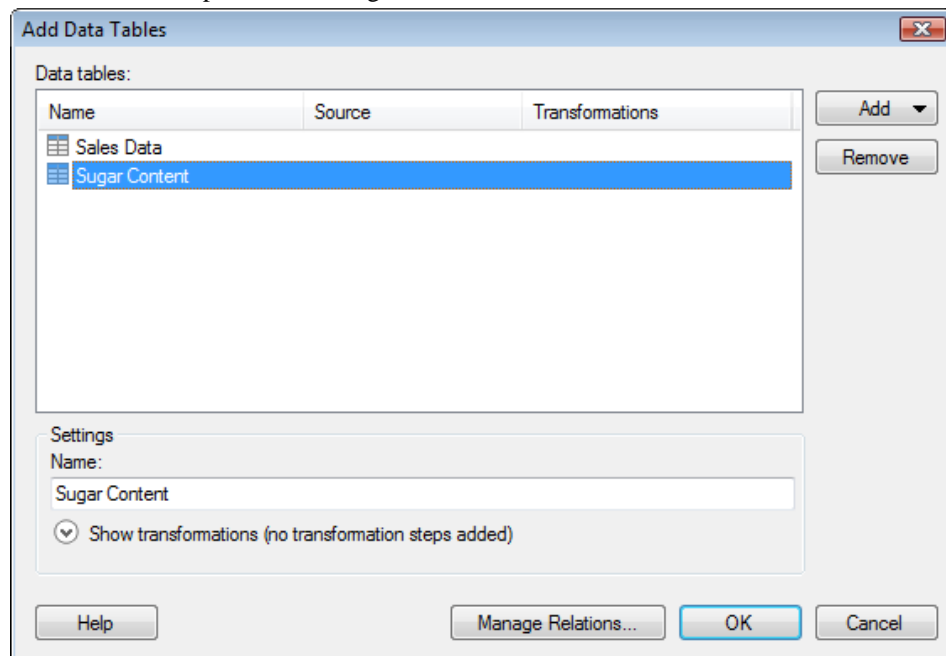
| Option | Description |
|---|---|
| **Data tables** | Lists all data tables that you have selected to add to the analysis, along with information about their origin and any transformations. |
| **Add** | |
| **Files...** | Allows you to add a data table from a file. |
| **Information Link...** | Allows you to add a data table from an information link. |
| **Database...** | Allows you to add a data table from any supported database. |
| **Clipboard** | Allows you to add a data table from the clipboard. |
| **Data Function...** | Allows you to add a data table from a data function. |
| **From Analysis** | Allows you to add a data table from the current analysis. For example, you may want to pivot or otherwise transform the data in an already existing data table, but you also want to keep the original data in the analysis. |
| **Remove** | Removes the selected data table from the list. |
| **Name** | Allows you to change the name of the selected data table. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the data table you want to add. For more information, see Details on Show Transformations. |
| **Manage Relations...** | Opens the Manage Relations dialog where you can specify how the new data tables are related to each other or any previously loaded data tables in your analysis. |

## 3.5.2.2    Details on Manage Relations

This dialog is used to manage relations between both new and previously added data tables in your analysis.

► **To reach the Manage Relations dialog:**

1.  Select **Edit > Data Table Properties**.
2.  Go to the **Relations** tab.
3.  Click on **Manage Relations...**.
4.  Comment: You can also reach the Manage Relations dialog from the Data page of the Map Chart Visualization Properties, or from the Add Data Tables or the Add On-Demand Data Table dialogs.

| Option | Description |
|---|---|
| **Show relations for** | Select the data table whose relations you wish to view, or select All data tables to view all relations in the document. |
| **Relations** | Lists all relations for the selected data table or all relations in the document, depending on your selection above.<br>**Note:** If one or more relations have become invalid, these will appear in red. |
| **New...** | Opens the New Relation dialog where you can define a new relation between two data tables. |
| **Edit...** | Opens the Edit Relation dialog where you can edit the relation selected in the Relations list. |
| **Delete** | Removes the selected relation from the Relations list. |

## 3.5.2.3 Details on New/Edit Relation

This dialog is used to define a relation between two data tables.

| Option | Description |
|---|---|
| **Left data table** | Lists all data tables currently available in the analysis. Select one of the data tables for which you wish to define a relation. |
| **Right data table** | Lists all data tables currently available in the analysis. Select the data table you wish to relate to the previously selected left data table. If you reached this dialog via an add data table procedure, then the new data tables will be the only ones available here. |
| **Left column** | Lists all columns available in the left data table. Select the column to be used in the matching of rows. |
| **Right column** | Lists all columns available in the right data table. Select the column to be used in the matching of rows. |
| **Left method** | If desired, modifies the content of the selected left column according to the selected method. What methods are available depends on the data type of the selected column. For example, for a string column it is possible to use the methods "Lower" or "Upper" to convert the strings to lowercase or uppercase, respectively. |
| **Right method** | If desired, modifies the content of the selected right column according to the selected method. What methods are available depends on the data type of the selected column. For example, for a string column it is possible to use the methods "Lower" or "Upper" to convert the strings to lowercase or uppercase, respectively. |
| **Sample value** | Displays the resulting first value of the selected left or right column after any specified methods have been applied. |

## 3.5.2.4    Details on Browse for Data Table

This dialog is shown when you have selected to add a data table or additional columns or rows from an existing data table, and you have more than one data table available in the analysis.
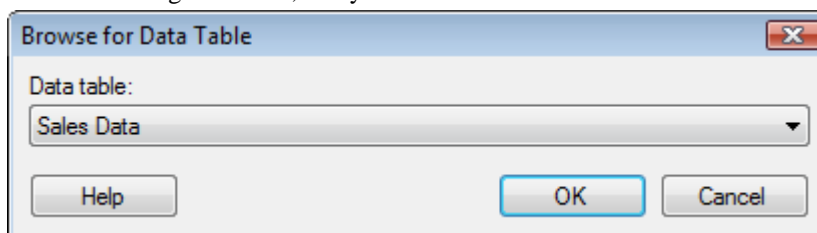


Select the data table from which you wish to add or replace data using the drop-down list.

## 3.5.2.5    Details on Data Function - Select Input

This dialog allows you to define how the input parameters of the selected data function should be handled when adding data tables. It is necessary to specify a mapping of all required parameters to Spotfire in order to use the data function.

### ► To reach the Data Function - Select Input dialog:

1.   Select **File > Add Data Tables...**.

Response: The Add Data Tables dialog is displayed.

2.   Select **Add > Data Functions...**.

Response: The Data Functions - Select Function dialog is displayed.

3. Click to select the function of interest from the list, then click **OK**.

Comment: If no previously added data are available in your document, you will only be able to select data functions with values as input.



| Option | Description |
|---|---|
| **Refresh function automatically** | Select this check box to update the results from the data function automatically each time the input settings are changed. If the check box is cleared, a manual refresh is needed in order for any updates to take effect. A data function set to load automatically will switch to manual update if cyclic dependencies are detected in the analysis. |
| **Input parameters** | Lists all input parameters that have been defined for the selected data function. Select an input parameter in this list to edit its settings. |
| **Input handler** | Lists all possible input handlers for the selected input parameter. Depending on which input handler you select in this list, a different set of settings is available to the lower right in the dialog. |
| [Input handler settings] | See the table below. |
| **OK** | Adds the selected data function to the Add Data Tables dialog. |

## Input Handler Settings

Note that which input handlers are available depends on the type of input parameter that is selected (Value, Column or Table). You will not be able to select from all of the input handlers described below when specifying the input for a selected parameter.

| Option | Description |
|---|---|
| **Column** | |
| **Data table** | Allows you to select the data table from which to retrieve the |

input column.

| | |
|---|---|
| **Column** | Allows you to specify which column to use as input from the selected data table. |
| **Limit by** | Use a combination of filtering and markings to limit the calculations to rows matching the specified settings only. If more than one option is selected, then calculations will be performed for rows matching the intersection of the selected filtering and markings only.<br><br>Leave both the Filtered rows and the Marked rows check boxes blank to base calculations on all rows. |
| **Filtered rows** | Select this check box to limit the calculations to rows remaining after filtering with the specified filtering scheme. |
| **Marked rows** | Select this check box to limit the calculations to rows marked by the selected markings.<br><br>If more than one marking is available in your analysis, you need to determine which marking or markings to control the calculation. If more than one marking is selected, then calculations will be performed for rows matching the intersection of the markings. |

**Columns**

| | |
|---|---|
| **Data table** | Allows you to select the data table from which to retrieve the input columns. |
| **Columns** | Lists the selected input columns. Click Select Columns... to change columns. |
| **Select Columns...** | Opens a dialog where you can specify which columns to include as input to the function. |
| **Limit by** | See a description of the options under Column above. |

**Expression**

| | |
|---|---|
| **Data table** | Allows you to select the data table to evaluate the expression against. |
| **Expression** | Displays the expression. |
| **Edit...** | Opens the Edit Expression dialog where you can specify an expression. |
| **Limit by** | See a description of the options under Column above. |

**Value**

| | |
|---|---|
| **Value** | Allows you to type an input value in the text box. |

**Document property**

| | |
|---|---|
| **Property** | Allows you to select a document property to use as input. Use the search field to help locate your property. |

| | |
|---|---|
| **New...** | Opens the New Property dialog where you can define a new document property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **Data table property** | |
| **Data table** | Allows you to select the data table to work with. |
| **Property** | Allows you to select a data table property to use as input. Use the search field to help locate your property. |
| **New...** | Opens the New Property dialog where you can define a new data table property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **Column property** | |
| **Data table** | Allows you to select the data table to work with. |
| **Column** | Allows you to select which column to work with. |
| **Property** | Allows you to select the column property you wish to use as input. |
| **New...** | Opens the New Property dialog where you can define a new column property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **None** | No input handler has been selected. This can be used for optional input parameters. If the input parameter is required, you must specify a different input handler to be able to continue. |

# 3.6     Add On-Demand Data Table

## 3.6.1     On-Demand Overview

When an information link is to be added to the analysis as a new data table, you have the option to either load all data at once, or to load data on demand only. Your analysis can benefit from on-demand loading when you have access to massive amounts of data, but you only need to work with some parts of the data at a time. When setting up an on-demand data table you can specify conditions based on one or more other data tables to control what to load. You can also start by letting an on-demand data table be the first (or only) data table in the analysis if its input is defined by a document property.
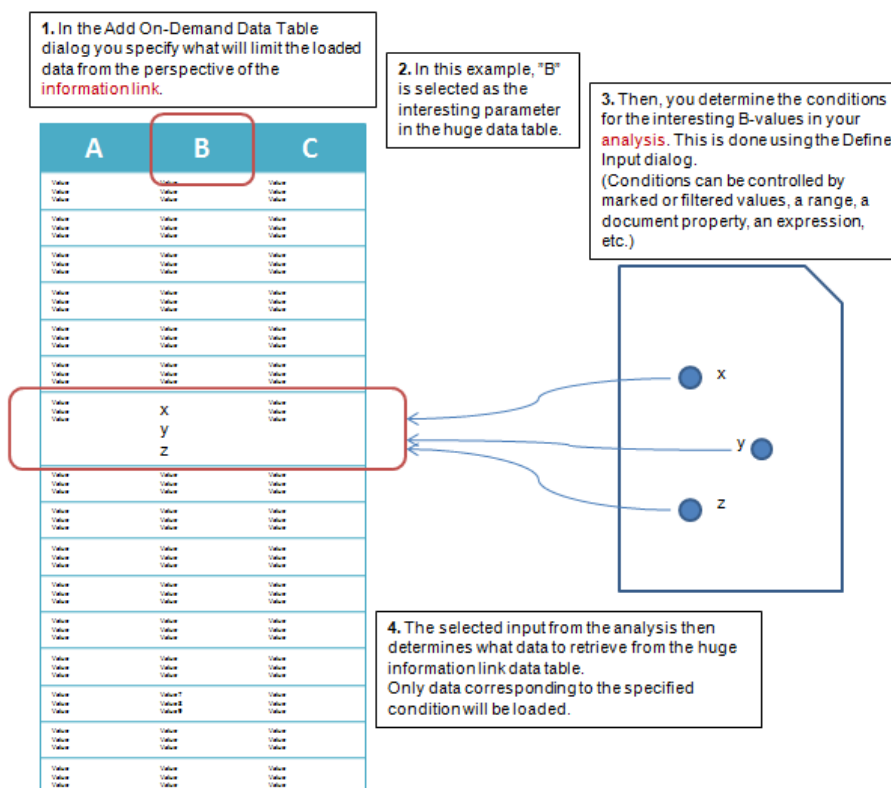


## 3.6.2     Loading Data on Demand

Select **File > Add On-Demand Data Table...** to load data on demand.

The on-demand loading of information links can be controlled by specifying one or more conditions that need to be met for data to be loaded. See Example of Marking Controlled On-Demand Details Visualization and Example of Property Controlled On-Demand Data for examples of how to configure the on-demand loading in those cases.

Conditions can be set in a number of different ways. For example, they could be determined by the value of a property or an expression, or by the values of the filtered or marked rows in a column from another data table. If the selected information link has been set up with required prompts or parameters, then these will automatically be required parameters for the on-demand loading and you must specify a condition using the Define Input button for each required parameter.

If desired, you can apply a transformation to the data prior to loading. While the transformation will be performed on the data corresponding to the condition only, you may gain some performance by doing the transformation here rather than conditioning the entire information link directly.

**Examples of Conditions**

| What to control on-demand loading | How to set it up |
|---|---|
| Marking in another data table. | 1. Click to select the column of interest from the **Define input for parameters that should control loading** list.<br>2. In the Define Input dialog, set Input for the selected parameter to **Values from column.**<br>3. Select the **Data table** from the analysis where you want to mark data.<br>4. Select the **Column** from the selected data table to match against the column in the information link.<br>5. Select to Limit by **Marked rows** by selecting the check box. |
| Filtering in another data table. | 1. Click to select the column of interest from the **Define input for parameters that should control loading** list.<br>2. In the Define Input dialog, set Input for the selected parameter to **Values from column.**<br>3. Select the **Data table** from the analysis where you want to mark data.<br>4. Select the **Column** from the selected data table to match against the column in the information link.<br>5. Select to Limit by **Filtered rows** by selecting the check box. |
| A range of values defined by the min and max values from the current marking or filtering, for a selected column. | 1. Click to select the column of interest from the **Define input for parameters that should control loading** list.<br>2. In the Define Input dialog, set Input for the selected parameter to **Range from column.**<br>3. Select the **Data table** from the analysis where you want to mark data.<br>4. Select the **Column** from the selected data table to match against the column in the information link.<br>5. Select to Limit by **Marked rows** or **Filtered rows** by selecting the corresponding check box. |
| A document property value. | 1. Click to select the column/parameter of interest from the **Define input for parameters that should control loading** list.<br>2. In the Define Input dialog, set Input for the selected parameter to **Values (fixed/properties/expression).**<br>3. Click the **Property** radio button.<br>4. Click **Select...** and specify which document property to use in the dialog that opens. |
| An expression. | 1. Click to select the column/parameter of interest from the **Define input for parameters that should control loading** list.<br>2. In the Define Input dialog, set Input for the selected parameter to **Values (fixed/properties/expression).**<br>3. Click the **Expression** radio button.<br>4. Click **Edit...** and specify your custom expression. |

| All values over (or under) a certain limit, e.g., Sales > 1000. | 1. Click to select the column/parameter of interest from the **Define input for parameters that should control loading** list. |
| --- | --- |
| | 2. In the Define Input dialog, set Input for the selected parameter to **Range (fixed/properties/expression).** |
| | 3. In the field of interest (e.g., Min) click the **Fixed value** radio button. |
| | 4. Type the value of interest in the field or click **Select...** to pick a value from the available values in the column. |

The data retrieved for the on-demand data table can be based on a combination of all of the examples above.

**Note:** Special attention is needed when setting up an on-demand data table dependent on nothing but a parameter defined within a configuration block (a text file which configures the initial state of an analysis, see Spotfire Technology Network). An on-demand data table must always have at least one input defined for the parameter in the Add On-Demand Data Table dialog. Since configuration block parameters will automatically be assigned to document properties (if they exist and have the appropriate data type), a document property may act as a bridge between a configuration block parameter and a parameter in an information link. If another input is defined, such as a column filter, no such bridge is required and the parameter from the configuration block will be used automatically.

## 3.6.3 Example of Marking Controlled On-Demand Details Visualization

If you have selected to load data on demand, and specified a marking that should control what data to be loaded you will end up with the following scenario:

When you mark items in a visualization that uses the specified marking, the data for the on-demand data table is updated. The update can either be done automatically each time you change the marking, or manually by clicking on the refresh button displayed when the marking is changed.

This way, you can create a master visualization in which to specify the item of interest and a details visualization where more information about the marked item is loaded from the database only when requested.

### ► To set up a marking controlled on-demand data table:

When one identifier column in the first data table is matched by an identifier column in the on-demand data table, the on-demand data table should be set up using the following steps:

1. Select **File > Add On-Demand Data Table...**.

   Response: The Select Information Link dialog is displayed.
2. Browse to the information link holding the desired data and select it in the list.
3. Click **OK**.

   Response: The Add On-Demand Data Table dialog is displayed.
4. If desired, change the **Data table name** for the new on-demand data table.
5. In the **Define input for parameters that should control loading** list, click to select the column in the information link that contains the identifiers.
6. Click **Define Input...**.

   Response: The Define Input dialog is displayed.
7. In the **Input for the selected parameter** list, select **Values from column**.
8. Select the **Data table** used by the master visualization.
9. Select the **Column** containing identifiers in the master data table.
10. Make sure that the **Marked rows** check box is selected and that only the check box for the marking used in the main visualization is selected.

Comment: You might also want to add a relation between the two data tables, so the marked rows from the master data table also become marked in the on-demand data table visualizations. This can be done directly in the Add On-Demand Data Table or later in the Data Table Properties dialog. See Data Table Properties - Relations for more information.

11. Click **OK** to close the Define Input dialog.

12. Use the Load automatically check box to determine whether to reload data as soon as the input conditions change or using a manual update only.

Comment: This setting can be changed later on in the Data Table Properties dialog.

13. Click **OK**.

Response: The on-demand data table is loaded and a default visualization is created. The data shown in any visualization based on the on-demand data table will depend on what is marked in the master visualization.

## Example of on-demand-loaded data table with manual update:

Click on an item in the master visualization:
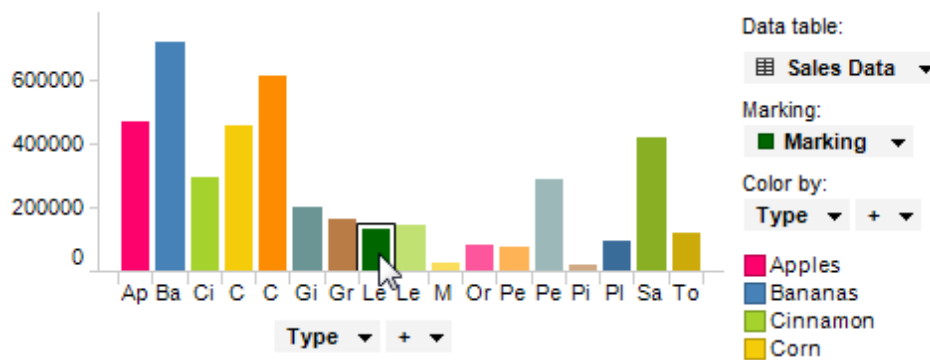


The refresh button of the visualization based on the on-demand-loaded data table appears in the title bar. (If nothing was marked from the beginning, the on-demand visualization will be empty until the first refresh.) Click on refresh.
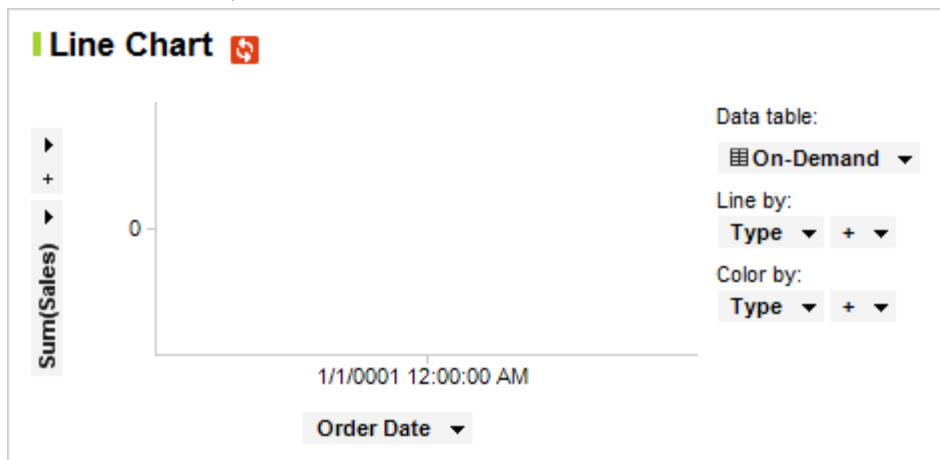


The visualization is updated to show details about the marked item:
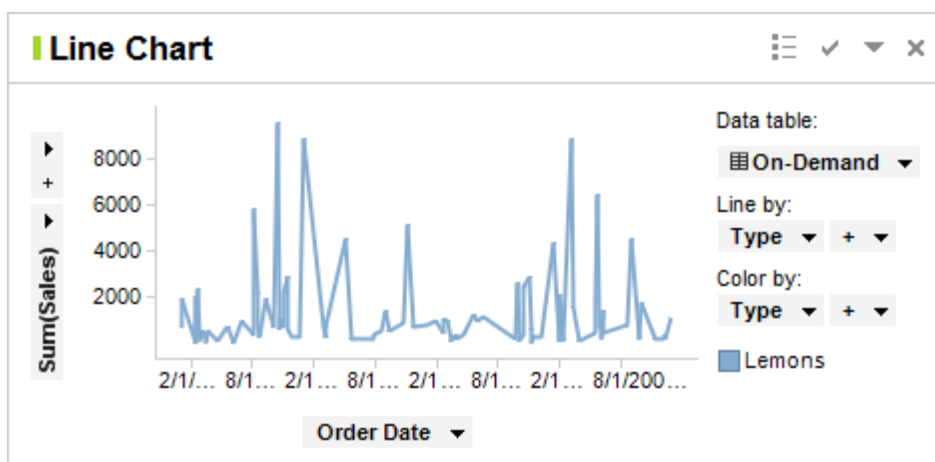
Clicking on a different item in the master visualization once again displays the refresh button.
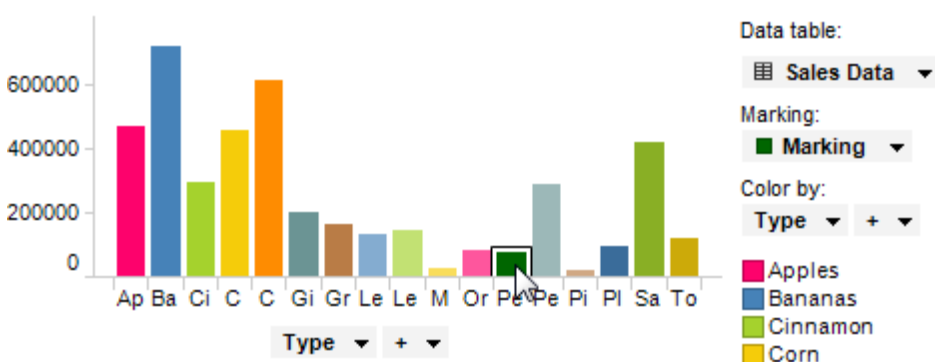


Click refresh to update the on-demand visualization to use the new marking:
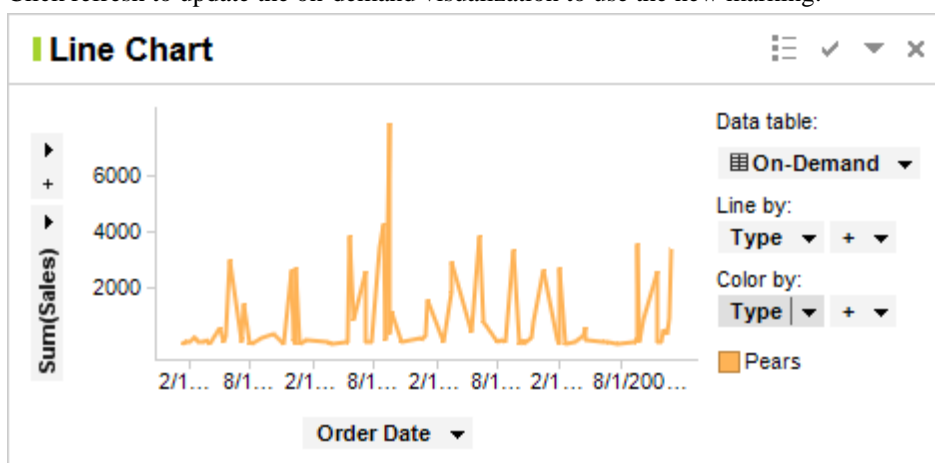


## 3.6.4    Example of Property Controlled On-Demand Data

The data that is to be loaded on demand can be controlled in a number of ways. See Loading Data on Demand for more information. The example below uses a property control in a text area to select which data to display in a bar chart based on an on-demand data table.

In this example, we first assume that we have a data table containing a string column called "Type" which lists a number of different product types loaded in the analysis. We also assume that there is an information link with some additional data available, which also contains a "Type" column. See Creating an Information Link if you need information about how to set up information links.

**► To add an on-demand data table using input from a document property value:**

1. Select **File > Add On-Demand Data Table....**

   Response: The Select Information Link dialog is displayed.

2. Browse to the information link holding the desired data and select it in the list.

3. Click **OK**.

   Response: The Add On-Demand Data Table dialog is displayed.

4. If desired, change the **Data table name** for the new on-demand data table.

5. In the **Define input for parameters that should control loading** list, click to select the column containing the product types.

6. Click **Define Input....**

   Response: The Define Input dialog is displayed.

7. In the **Input for the selected parameter** list, select **Values (fixed/properties/expression)**.

8. Click on the **Property** radio button.

9. Click **Select....**

   Response: The Select Property dialog is displayed.

10. If no suitable property is available, click **New...** in the Document Properties tab.

    Response: The New Property dialog is displayed.

11. Define a string property using one of the available product types as default value. For example, create a string property called "Type" with the value "Apples".

12. Click **OK** in all dialogs.

    Response: The on-demand data table is loaded using the limiting default value and a visualization is displayed. In the example below, the visualization shown is a bar chart displaying the sum of sales for Apples in four different regions.
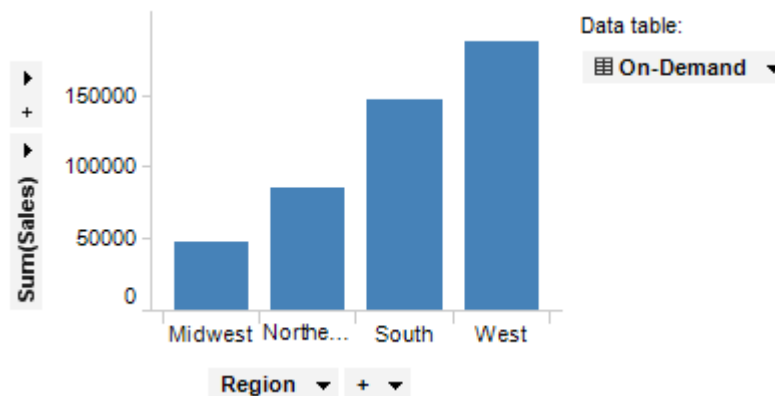


**► To add a property control for changing the document property to a text area:**

1. Create or activate a text area.

2. Click on the Toggle Edit Mode button, , in the title bar of the text area.

3. Type some descriptive text to help other users understand what the control will do.

4. Click on the Insert Property Control button, , and select which type of control to add. In this example we will add a drop-down list.

   Response: The Property Control dialog is displayed.

5. Select the previously specified document property.

6. Select **Set property value through: Unique values in column**.

7. Select the **Data table** to be the first data table in the analysis (not the on-demand data table).
8. Select the "Type" **Column**.
9. If desired, limit the values to be displayed in the drop-down list using a search expression.

   Comment: Only those values matching the search expression will be shown in the control. See Searching in TIBCO Spotfire for more information about valid search expressions.
10. Click **OK.**

    Response: The property control is added to the text area.
11. Click on the Toggle Edit Mode button again to exit the edit mode.

You can now use the property control to change which product type to look at in the visualization. If Load automatically has been selected in the on-demand settings, the visualization will be updated each time the property is changed via the control. If Load automatically has not been selected, a refresh button will be displayed in the title bar of the visualization each time the input is changed.

## Text Area

Use the drop-down list to change which product type to view in the Bar Chart below:

Bananas ▼

## ▍Bar Chart

Data table:

▦ On-Demand ▼

Sum(Sales)

250000

200000

150000

100000

50000

0

Midwest   Northe...   South   West

Region ▼ + ▼
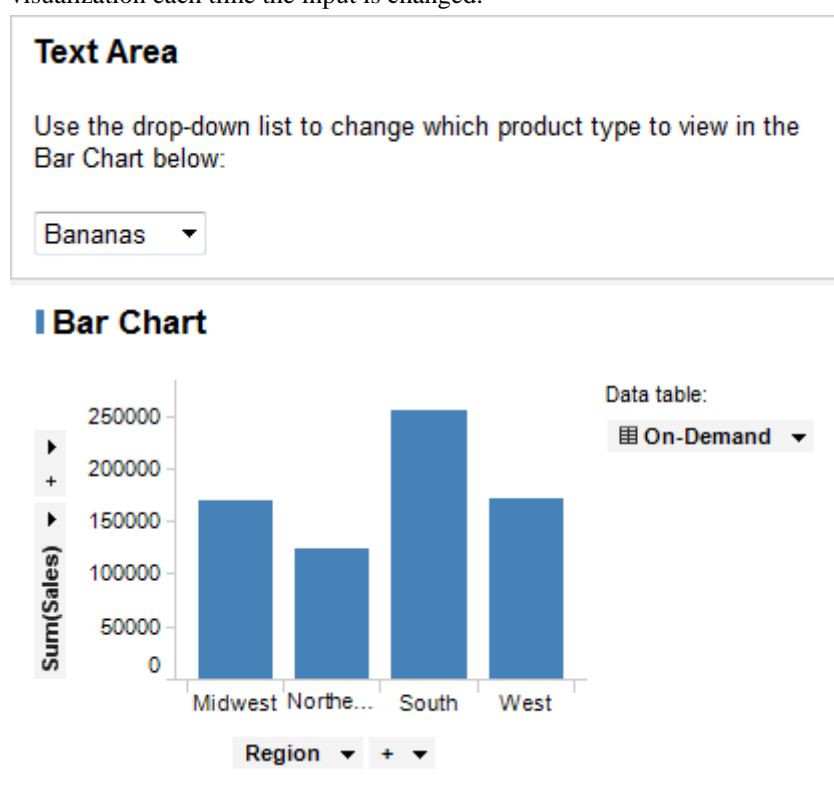
# 3.6.5    Details

## 3.6.5.1    Details on Add On-Demand Data Table

This dialog is used when you want to add a data table where data are loaded only when requested. You can specify what input to control the loading in a number of different ways.

### ► To reach the Add On-Demand Data Table dialog:

1. Select **File > Add On-Demand Data Table...**.
2. Browse to the information link holding the desired data and select it in the list.
3. Click **OK**.

| Option | Description |
|---|---|
| **Source** | Lists the path and name of the selected information link. |
| **Browse...** | Allows you to select a different information link. |
| **Data table name** | Allows you to specify a name for the new on-demand data table. |
| **Define input for parameters that should control loading** | This is where you select what will affect the loading of data from the perspective of the information link. All columns and parameters available in the selected information link are listed. Click to select the parameter in the list and click Define Input... to specify a condition that must be fulfilled for any data to be loaded. |
| | For example, this is where you specify that the marking based on a certain column from one data table will limit what is shown in the on-demand data table. If you would like to retrieve only data for a certain Region as shown in the picture above, you would select Region in this list and click Define Input to specify that only those rows corresponding to the set condition (e.g., marked rows in the data table "Sales Data") should be retrieved. |
| | Any required prompts or parameters that were specified upon the creation of the information link will be listed as Required parameters in this field. This means that you must specify input handling of these parameters to be able to load any on-demand data at all. |
| **Define Input...** | Opens the Define Input dialog where you can tie the selected parameter to a value or a range. |
| **Clear Input** | Removes the previously added input definition from the selected column or parameter. |
| **Load automatically** | Select this check box if the on-demand data should be loaded automatically each time the specified input conditions are changed. If |

|  | the check box is cleared the visualization can be manually updated using the refresh icon, , in the visualization title bar. A data table set to load automatically will switch to manual update if cyclic dependencies are detected in the analysis. |
| --- | --- |
| **Allow caching** | Select this check box to allow caching of data. This may speed up the process when loading new subsets of data. However, if the underlying information link data are updated during the current TIBCO Spotfire session you may end up with different results for a specific set of input values depending on whether or not the current selection is stored in the cache. You should always clear the check box if you know that the underlying data may be updated during your current session. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the data table you want to add. For more information, see the Show transformations topic. |
| **Manage Relations...** | Opens the Manage Relations dialog where you can define how the on-demand data table should be related to other data tables in your analysis. If you want marked rows in one data table to also show up as marked in the other data table, then adding a relation is necessary. |

## 3.6.5.2    Details on Define Input

This dialog is used to tie the selected parameter to a specified value or a range from the perspective of the analysis.

### ► To reach the Define Input dialog:

1. Select **File > Add On-Demand Data Table...**.
2. Browse to the information link holding the desired data and select it in the list.
3. Click **OK**.
4. Select the parameter for which you want to create a condition and click **Define Input...**.

| Option | Description |
|---|---|
| **Selected parameter** | Shows the name of the parameter that was selected in the Add On-Demand Data Table dialog in a previous step. |
| **Input for the selected parameter** | Allows you to select whether to retrieve the input for the parameter from values or a range. See a description of the various options below. |
| **Values from column** | Use this option to set the conditions for the parameter from the values in a column already in the analysis. The data retrieved for the on-demand data table can be based on filtered or marked rows, or a combination of both. See below for details. |

| Range from column | Use this option to set the conditions for the parameter from the range of a column already in the analysis. The resulting range will be the min and the max values from the selected column. |
|---|---|
| **Values (fixed/properties/expression)** | Use this option if you want to specify fixed values or connect the parameter to a property. You can also calculate the values with an expression. |
| **Range (fixed/properties/expression)** | Use this option if you want to specify a fixed range or connect the parameter range to properties. You can also calculate the values with an expression.<br><br>**Note:** This option can also be used to set a single limit for a range, either an upper or a lower limit, such as loading only "Sales < 100". |

## Values from column/Range from column settings



| Option | Description |
|---|---|
| **Data table** | Select the data table where the column of interest is located. |
| **Column** | Select the column from which the input values should be picked. |
| **Limit by** | Use a combination of filtering and markings to limit the loaded data to rows matching the specified settings only. If more than one option is |

|  | selected then data will be retrieved for rows matching the intersection of the selected filtering and markings only. |
|  | Leave both the Filtered rows and the Marked rows check boxes blank to retrieve data for all rows. |
| **Filtered rows** | Select this check box to retrieve data for values remaining after filtering with the specified filtering scheme. |
| **Marked rows** | Select this check box to retrieve data for values marked by the selected markings. |
|  | If more than one marking is available in your analysis you need to determine which marking or markings to control the loading. If more than one marking is selected, then data will be retrieved for rows matching the intersection of the markings. |
| **Number of identifiers to limit data loading to** | Available for the Values from column option only. |
|  | Use this check box to determine whether the on-demand data should be loaded regardless of how many identifiers have been marked or whether there should be a limit to how many identifiers one can retrieve data for. |
|  | The purpose of this option is to be able to limit the amount of data loaded from the server. If more identifiers than the specified number are marked and this check box has been selected, the data table will be empty. |

## Values (fixed/properties/expression) settings



| Option | Description |
|---|---|
| **Fixed value** | Select this option to type a value to use as input for the parameter. |
| **Select...** | Opens the Select Value dialog where you can pick a value available in the selected column element to use as a fixed value. This may be helpful when you are uncertain of which values are valid for the specified information link.<br>The button will not be available if your information link is parameterized.<br>If the selected parameter is a date or a datetime column, you will be able to select a date by clicking on the calendar icon instead, ▦. |
| **Property** | Select this option to tie the parameter value to a property value. Property values can easily be changed if you add a property control to a text area. See Using Properties in the Analysis for more information. |
| **Select...** | Opens the Select Property dialog where you can specify a property to tie to the selected parameter. |
| **Expression** | Select this option if you need to perform some calculation to obtain the desired input parameter value. For example, if the input is to be affected by multiple columns and properties, these can be defined in an expression. |

| | |
|---|---|
| **Edit...** | Opens the Edit Expression dialog where you can specify the expression to control the input parameter. |
| **Limit by** | Use a combination of filtering and markings to limit the loaded data to rows matching the specified settings only. If more than one option is selected then data will be retrieved for rows matching the intersection of the selected filtering and markings only. |
| | Leave both the Filtered rows and the Marked rows check boxes blank to retrieve data for all rows. |
| **Filtered rows** | Select this check box to retrieve data for values remaining after filtering with the specified filtering scheme. |
| **Marked rows** | Select this check box to retrieve data for values marked by the selected markings. |
| | If more than one marking is available in your analysis you need to determine which marking or markings to control the loading. If more than one marking is selected, then data will be retrieved for rows matching the intersection of the markings. |
| **Number of identifiers to limit data loading to** | Use this check box to determine whether the on-demand data should be loaded regardless of how many identifiers have been marked or whether there should be a limit to how many identifiers one can retrieve data for. |
| | The purpose of this option is to be able to limit the amount of data loaded from the server. If more identifiers than the specified number are marked and this check box has been selected, the visualization will be empty. |
| **Include empty values** | Select this check box to also include rows that do not contain any data for the specified column. |

## Range (fixed/properties/expression) settings



| Option | Description |
|---|---|
| **Fixed value** | Select this option to type a value to use as input for the parameter. |
| **Select...** | Opens the Select Value dialog where you can pick a value available in the selected column element to use as a fixed value. This may be helpful when you are uncertain of which values are valid for the specified information link.<br>The button will not be available if your information link is parameterized.<br>If the selected parameter is a date or a datetime column, you will be able to select a date by clicking on the calendar icon instead, ▦. |
| **Property** | Select this option to tie the parameter value to a property value. Property values can easily be changed if you add a property control to a text area. See Using Properties in the Analysis for more information. |
| **Select...** | Opens the Select Property dialog where you can specify a property to tie to the selected parameter. |
| **Expression** | Select this option if you need to perform some calculation to obtain the desired input parameter value. For example, if the input is to be affected by multiple columns and properties, these can be defined in an |

expression.

| | |
|---|---|
| **Edit...** | Opens the Edit Expression dialog where you can specify the expression to control the input parameter. |
| **Base on** | Displays whether the calculations will be based on All values, Filtered values or Marked values. |
| **Settings...** | Select this option to define whether to base the calculations on All values, Filtered values or Marked values. |
| **Include empty values** | Select this check box to also include rows that do not contain any data for the specified column. |

It is not necessary to specify both a min and a max input value for a range, one is sufficient.

## 3.6.5.3 Details on Select Value

This dialog is used to select a fixed value to control the input of an on-demand loaded data table.
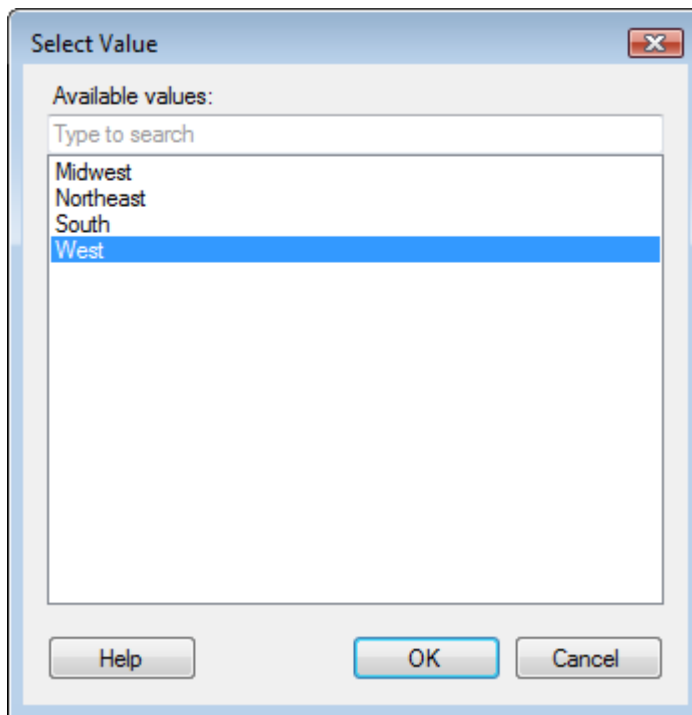


The Available values list shows all unique values in the selected information link column element. Click to select the value to use. Use the search field to limit the values shown to one matching the search expression. See Searching in TIBCO Spotfire for more information.

## 3.6.5.4    Details on Select Property

This dialog is used to specify a property that will contain a parameter value for an action control or an on-demand information link parameter.

### Document Properties



| Option | Description |
|---|---|
| **Select property** | Select the property you want to tie to the parameter value from the list. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new document property. |
| **Edit...** | Opens a dialog where you can edit the selected document property. |
| **Delete** | Deletes the selected document property. |

## Data Table Properties



| Option | Description |
|---|---|
| **Data table** | Allows you to select the data table to work with. |
| **Select property** | From the list, select the property you want to tie to the parameter value. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new data table property. |
| **Edit...** | Opens a dialog where you can edit the selected data table property. |
| **Delete** | Deletes the selected data table property. |

## Column Properties



| Option | Description |
|---|---|
| **Data table** | Allows you to select the data table to work with. |
| **Column** | Allows you to select the column to add a new property to. |
| **Select property** | From the list, select the property you want to tie to the parameter value. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new column property. |
| **Edit...** | Opens a dialog where you can edit the selected column property. |
| **Delete** | Deletes the selected column property. |

## 3.6.5.5 Details on Settings



| Option | Description |
|---|---|
| **Limit by** | Use a combination of filtering and markings to limit the loaded data to rows matching the specified settings only. If more than one option is selected then data will be retrieved for rows matching the intersection of the selected filtering and markings only. |
| | Leave both the Filtered rows and the Marked rows check boxes blank to retrieve data for all rows. |
| **Filtered rows** | Select this check box to retrieve data for values remaining after filtering with the specified filtering scheme. |
| **Marked rows** | Select this check box to retrieve data for values marked by the selected markings. |
| | If more than one marking is available in your analysis you need to determine which marking or markings to control the loading. If more than one marking is selected, then data will be retrieved for rows matching the intersection of the markings. |

## 3.6.5.6    Details on Select Information Link

This dialog is used to specify which information link to load when adding a data table to the analysis.
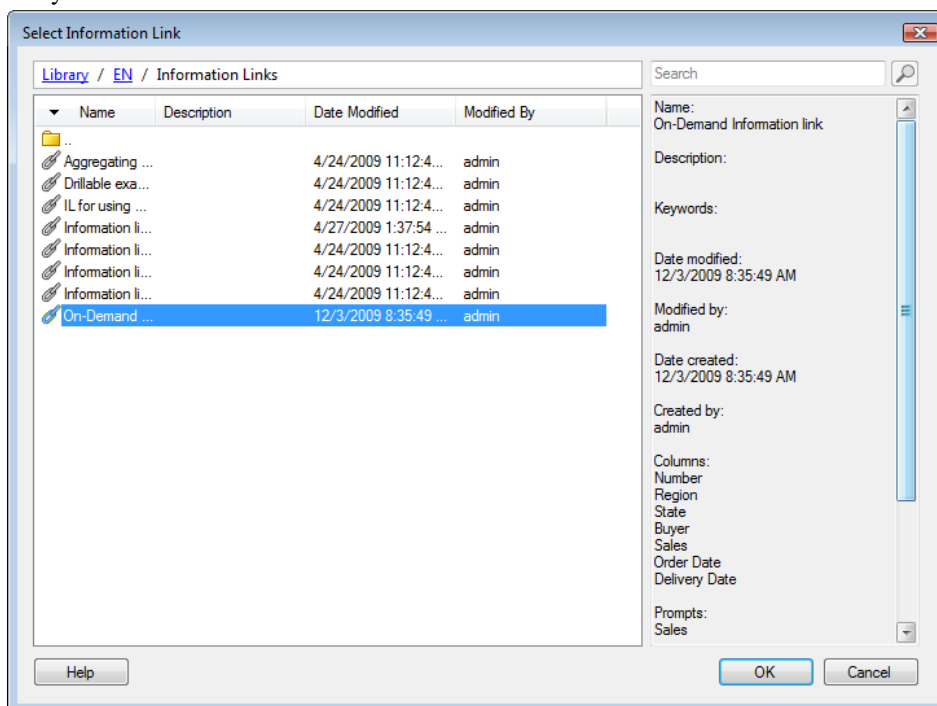


Navigate through the folders, and select the information link you want to use. Information about the selected information link is displayed to the right of the list of folders and information links. Which library folders you have access to is controlled by group privileges. Contact your Spotfire administrator if you cannot reach all the necessary information links.

You can search for an information link in the library by entering a name, or part of a name in the search field in the upper right corner in the dialog, and then pressing Enter. All information links and folders matching your search string will then be listed. See Searching the Library for more information about search expressions.

# 4    Visualizations

## 4.1    Table

### 4.1.1    What is a Table?

The table in TIBCO Spotfire works much like any other table you might be familiar with. It presents the data as a table of rows and columns, and is used to see details and compare values.

By clicking on a row you mark it, and by dragging the mouse pointer over several rows you can mark more than one row.

You can sort the rows in the table according to different columns by clicking on the column headers, or filter out unwanted rows by using the filters.

**Table**

| Continent | Country | City | Sales | Date of Sale |
|---|---|---|---|---|
| Asia | China | Beijing | 1422 | 10/22/2002 |
| Europe | Germany | Frankfurt | 414 | 11/11/2002 |
| Asia | China | Hong Kong | 1556 | 11/25/2002 |
| Asia | China | Beijing | 6312 | 1/5/2003 |
| Africa | Marocco | Casablanca | 3556 | 5/17/2003 |
| Africa | Marocco | Casablanca | 6822 | 6/22/2003 |
| Asia | Japan | Tokyo | 288 | 11/1/2003 |
| Europe | Germany | Berlin | 2866 | 11/19/2003 |
| Africa | Egypt | Alexandria | 2673 | 12/24/2003 |
| Africa | Marocco | Tangier | 4231 | 2/29/2004 |
| Asia | Japan | Yokohama | 993 | 2/8/2004 |
| Africa | Egypt | Cairo | 3516 | 4/16/2004 |
| Africa | Egypt | Alexandria | 2323 | 5/5/2004 |

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

### 4.1.2    How to Use the Table

► **To change column order:**

1. Click on a column header and drag that column to the desired position.

   Comment: You can also right-click on a column header and select **Move First** or **Move Last** from the pop-up menu.
   Comment: You can also go to the **Columns** page in the **Properties** dialog and click on a column in the Selected columns list and then click Move Up or Move Down to change the order of the columns.

► **To change the column width:**

1. Place the mouse pointer at the right edge of the column header you want to resize (indicated by a thin line). The cursor changes into a cross with arrows.
2. Adjust the width by holding down the mouse button and moving the mouse horizontally.

   Comment: You can also right-click on the column heading and select Column Width... from the menu that appears. Enter the width in number of pixels and click **OK.**

### ► **To remove columns:**

1. Right-click on a column header and select **Remove**.

### ► **To add columns:**

1. Right-click on the table and select **Properties**.
2. Select the **Columns** page in the dialog.
3. Select the columns you want to insert from the Available columns list.
4. Click **Add >**.

   Response: The column is inserted to the right of all previously added columns.

   Comment: Click on a column in the Selected columns list and then click Move Up or Move Down to change the order of the columns.
5. Click **Close**.

### ► **To apply coloring:**

See Coloring in Tables to learn how to set up coloring for tables specifically. See Coloring Overview if you want to learn more about coloring in general.

### ► **To freeze certain columns when scrolling horizontally:**

In a table with many columns you often need to scroll horizontally. However, there may be certain columns you want to see regardless of scrolling. This is achieved by freezing one or more columns.

1. Move the columns you want to freeze to the left side of the table.
2. Right-click on a column heading and select **Properties**.
3. Select the **Appearance** page of the dialog.
4. Specify the **Number of frozen columns** you want, counting from the left-hand side of the table.
5. Click **Close**.

### ► **To show text as hyperlinks:**

1. It is possible to show the contents of a column as clickable links. To do this, right-click on the table visualization and select **Properties**.
2. Select the **Columns** tab.
3. Select the column you want to contain links.
4. Select **Link** from the **Renderer** drop down list.
5. Click **Settings...**
6. Specify the settings in the Link Renderer Settings dialog and click **OK**.
7. Click **Close**.

### ► **To sort the rows:**

1. Click on the header of the first column you wish to sort the data by.

   Comment: Click once again on the column header to toggle between Ascending and Descending row order.
2. Press Shift and click on another column header to make a subsequent sort according to the values in that column.
3. Repeat step 2 on other columns as many times as you like.

   Comment: You can also right-click in the table and open the **Properties** dialog. On the **Sort Order** tab, you can specify up to three columns to sort by.

### ► **To mark rows:**

**To mark a single row:**

Either click on the row with the mouse, or use the up/down arrow keys on your keyboard.

**To mark several separate rows:**

Hold the Ctrl key and click on each row you want to add to the marked selection. You can also hold the Ctrl key and use the up/down arrow keys on your keyboard to highlight other rows and then press space to mark them as well.

**To mark a range of rows:**

Press the mouse button and drag the pointer over the table to mark all the rows under the selection. You can also mark the first row of your intended selection, hold the Shift key, and use the up/down arrow keys on the keyboard to expand the selection of marked rows.

**To change the marked rows' color:**

Select **Edit > Document Properties**, and then change the marked items' color.

### ► **To change row height:**

1. Right-click on the table visualization.
2. Select **Row Height** and a number from the list.
   Comment: Specifying the number 2 will make the row twice as high as the standard height, and so on.
   OR
3. Select **Other...**
4. Enter a number in the Properties page.
5. Click **Close**.
   Response: All rows in the table visualization change height.
   **Note:** This can also be done in the Details-on-Demand.

### ► **To copy a cell:**

1. Right-click in the cell with the content you want to copy.
2. Depending on the content of the cell, different things can be copied. For example a text column lets you copy the text from the cell by selecting **Value** and for a column with links you can choose to copy either the displayed text or the actual link.
   **Note:** This can also be done in the Details-on-Demand.

### ► **To create a new table:**

1. Click on the New Table button on the toolbar, .
   Comment: You can also select **Insert > New Visualization > Table** from the menu.
   Response: A table showing all available columns is created.
2. Adjust the table to display the columns and sort order of your choice.

# 4.1.3 Images in Tables

It is possible to show images in the cells of a table visualization. A Spotfire analysis or information link can contain a data table with images that will be shown in the column in the table visualization.

| Continent | Country | Flag | Sales | Date of Sale |
|-----------|---------|------|-------|--------------|
| Asia | China | | 1422 | 10/22/2002 |
| Europe | Germany | | 414 | 11/11/2002 |
| Asia | China | | 1556 | 11/25/2002 |
| Asia | Japan | | 288 | 11/1/2003 |
| Europe | Germany | | 2866 | 11/19/2003 |
| Africa | Egypt | | 2673 | 12/24/2003 |

If the column values are on the form of a URL you can also retrieve images from another location. Use **Image from URL** as the selected Renderer to display linked images.

Another way of including pictures in the table visualization is if the column is a virtual column, collecting the images from a remote data source. For more information on virtual columns, see the Virtual Columns page.

## Renderer

The images must be drawn using a renderer. All columns can be shown as an image depending on the renderer, but the most common data type for images is binary data. If a binary column containing images has been set to use the wrong renderer, "[...]" will be shown in the cells of the column. It is then possible to change the renderer manually.

### ► To change renderer for a specific column in a table visualization:

1. Right-click on the table visualization and select **Properties**.
2. Select the **Columns** tab.
3. Select the column containing the images.
4. Select **Image** from the **Renderer** drop down list.
5. Click **Close**.

It is also possible to change the default renderer for different content types from the **Tools > Options** menu. This will affect all future table visualizations, and can be useful if you know that you always want a certain column with a specific content type to be rendered the same way. For more information, see the Renderer Settings dialog.

## Row height

By default, the height of the rows in the table visualization may not be suited for showing images. It is therefore possible to manually change the height of the rows.

### ► To change row height:

1. Right-click on the table visualization.
2. Select **Row Height** and a number from the list.
   Comment: Specifying the number 2 will make the row twice as high as the standard height, and so on.
   OR
3. Select **More...**.

4.  Enter a number in the Properties page.
5.  Click **Close**.
    Response: All rows in the table visualization change height.

### Copy the image

It is possible to copy the images from the table. To do this, right-click on the cell with the image and select **Copy Cell > Image**.

**Note:** If the table contains images, these will not be exported if the table is exported to a text file or a Microsoft Excel file.

# 4.1.4    Virtual Columns

It is possible to include data in a table visualization (or in labels and tooltips of some other visualizations) that is not part of the original data table. A virtual column connects to a remote data source and collects data from there. This can be useful if, for example, a large quantity of data is stored in a database and the Spotfire analysis file would be too large if the data was included. The virtual columns can contain plain text but a more common use might be if the collected data were to consist of images or other large files.

**Note:** A virtual column type needs to be registered programmatically. Virtual columns are not available by default.

### Differences between virtual columns and regular columns

In the context of the table visualization, there are no major differences except that you cannot sort by the virtual column. However, the virtual column is only part of the table visualization and not part of the data table. This means that:

*   No filter will be created for the virtual column.
*   No export of the underlying data table will include the virtual column. To export the data, the visualization, and not the data table, must be chosen. Copy will wait until the value has been collected in the virtual column and then copy the value.
*   Settings, such as changing the column's name, are not managed from **Edit > Column Properties**, but from the Virtual Columns tab in the properties page for the table visualization.
*   The virtual column will not be available for selection on axes in the other visualization types.

The virtual column may take some time to load, especially if the column contains images. However, the column will not be loaded all at once. It is possible to start working with the column and the contents will be loaded as you scroll down in the table.

**Note:** The remote data source from where the virtual column is retrieved may require you to enter a username and password.

# 4.1.5    Table Properties

## 4.1.5.1    Table Properties

The Table Properties dialog consists of several pages:

*   General
*   Data
*   Appearance
*   Fonts
*   Columns
*   Virtual Columns

- Colors
- Sorting
- Legend

► **To reach the Table Properties dialog:**

1. Right-click on the table visualization.
2. Select **Properties** from the pop-up menu.
3. Comment: You can also click on the table visualization to make it active and then select **Edit > Visualization Properties**.

## 4.1.5.2 Table Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.1.5.3      Table Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br><br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br><br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br><br>This can be used if you have two visualizations with different |

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|---|---|
|  | markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
|  | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
|  | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
|  | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
|  | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.1.5.4 Table Properties - Appearance



| Option | Description |
|---|---|
| **Header row height (number of lines)** | Specifies the height of the header row in number of lines. |
| **Data row height (number of lines)** | Specifies the height of all data rows in number of lines. |
| **Number of frozen columns** | Specifies how many columns on the left-hand side will be frozen, that is, not scroll out of sight when the scroll bar is moved to the right. |
| **Show cell borders** | Specifies whether or not cell borders should be visible between the cells in the table. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the table. |

## 4.1.5.5    Table Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.1.5.6     Table Properties - Columns



| Option | Description |
|---|---|
| **Available columns** | Lists all columns in the data table available for selection. |
| [Type to search] | Type a search string to limit the number of items in the Available columns list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Selected columns** | Lists the columns selected to be displayed in the table. |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list and sends them back to the Available columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the columns in the table. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the columns in the table. |
| **Renderer** | Lists the available renderers for the chosen column. Which renderers are available is determined by the content type of the column. |
| **Add new columns automatically** | Select the check box to make sure that any new columns added to the selected data table are also automatically added to the table |

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| | visualization. |
| | New columns can appear when refreshing an information link, calculating new columns, etc. |
| **Settings...** | Opens the settings dialog for the chosen renderer. |

## 4.1.5.7    Table Properties - Virtual Columns



| Option | Description |
|---|---|
| **Available virtual columns** | Lists the available virtual columns. |
| **Add** | Lets you add virtual columns. |
| **Edit...** | Opens the edit dialog for the chosen virtual column. |
| **Remove** | Removes the chosen virtual column. |
| **Display name** | Type the name to be displayed for the chosen virtual column. |

## 4.1.5.8      Table Properties - Colors



| Option | Description |
|---|---|
| **Color scheme groupings** | Lists all the currently added color scheme groupings. In table visualizations, a color scheme is always applied to a color scheme grouping, which can contain one or more columns. Click on a grouping in the list to select it and see its defined color scheme in the lower part of the dialog. By default, no coloring is applied when you create a new table. This means that the list is empty, and no color scheme is shown in the lower part of the dialog. To apply coloring, you must add one or more color scheme groupings and define color schemes for them. To learn more about color scheme groupings and coloring in tables, see Coloring in Tables. |
| **Add** | Opens a menu which lets you add a new color scheme grouping. The menu option Color Scheme Grouping... opens the Add Color Scheme Grouping dialog, in which you can select which columns to include in the new grouping. You can also give the grouping a descriptive name. The menu also lists each of the columns in the table. Select a column from the list to create a grouping containing only that column. |
| | **Note:** A grouping can only contain columns with values of the same data type. The exception being the five numeric data types Integer, LongInteger, Real, SingleReal, and Currency which can be added to the same grouping. |
| **Edit...** | Opens the Edit Color Scheme Grouping dialog which lets you modify the selected grouping. |
| **Remove** | Removes the selected color scheme grouping from the list. |

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|---|---|
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depend on the columns in the selected color scheme grouping. For groupings containing continuous columns, you can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. For categorical columns, you can select either Unique values or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale for each column in the color scheme grouping, or if one common scale should apply to all the columns. |
| ⬚▾ <br><br> [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the current color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes applicable to the columns in the current color scheme grouping will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes applicable to the columns in the current color scheme grouping will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Only available for color scheme groupings containing continuous columns. For a full description of the predefined color schemes, see Predefined Color Schemes.<br><br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br><br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br><br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br><br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.<br><br>**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be |

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|---|---|
|  | added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used for the selected color scheme grouping. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the columns in the color scheme grouping, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the columns in the color scheme grouping. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the selected color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.1.5.9 Table Properties - Sorting
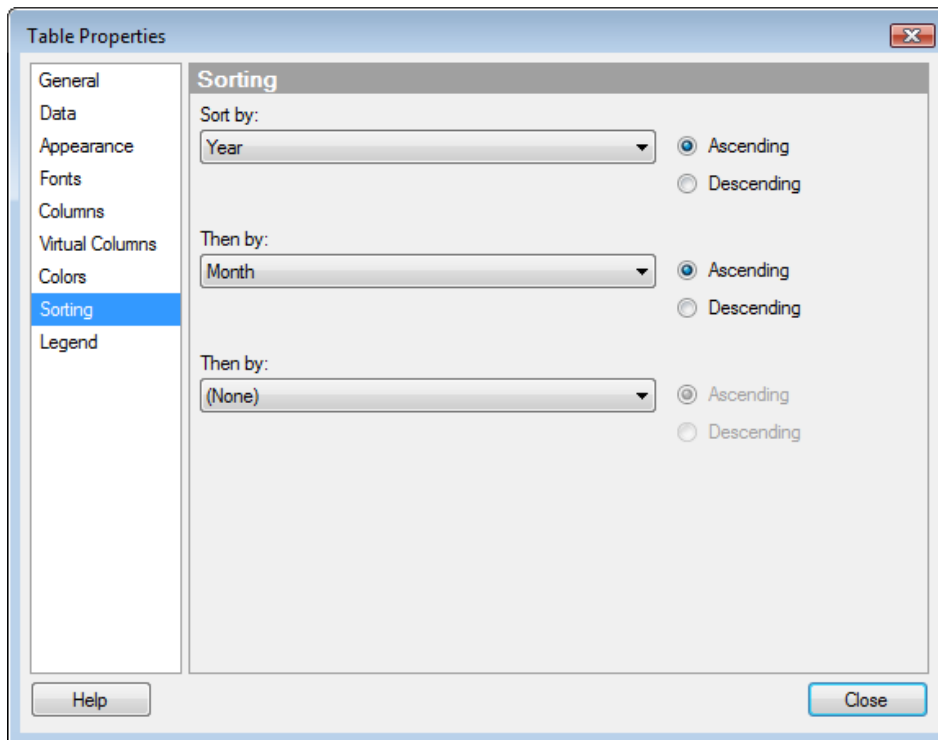


| Option | Description |
|---|---|
| **Sort by** | Specifies the primary column you wish to sort the rows by. |
| **Then by** | Specifies the secondary and tertiary columns you wish to sort the rows by. |
| **Ascending** | Sorts the rows from the lowest to the highest value in the selected column. |
| **Descending** | Sorts the rows from the highest to the lowest value in the selected column. |

**Note:** You cannot sort by a virtual column.

## 4.1.5.10 Table Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.1.5.11    Details on Column Width

**► To reach the Column Width dialog:**

1. In a table visualization, right-click on the column header that you wish to change.
2. Select **Column Width...** from the pop-up menu.
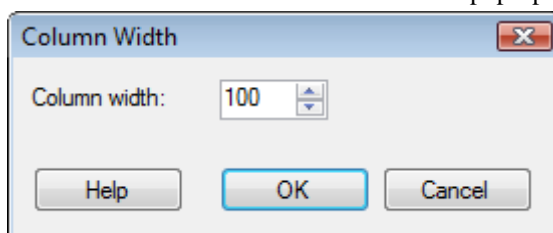


| Option | Description |
|---|---|
| **Column width** | Specifies the width of the selected column in number of pixels.<br>**Tip:** You can also drag the column headers to change the width of columns. |

# 4.2    Cross Table

## 4.2.1    What is a Cross Table?

A cross table is a two-way table consisting of columns and rows. It is also known as a pivot table or a multi-dimensional table. Its greatest strength is its ability to structure, summarize and display large amounts of data. Cross tables can also be used to determine whether there is a relation between the row variable and the column variable or not.

Optionally, the cross table can display grand totals for columns, rows, or for the whole measure. It can also display subtotals for columns,

**Example:**

Below is a cross table showing sales figures for different types of fruits and vegetables.

| Category | Type | 2001 | 2002 | 2003 | Grand total |
|---|---|---|---|---|---|
| Fruit | Apples | 150 | 153 | 162 | 465 |
| | Bananas | 332 | 336 | 344 | 1012 |
| | Pears | 267 | 266 | 279 | 812 |
| | Subtotal | 749 | 755 | 785 | 2289 |
| Vegetables | Cucumber | 140 | 141 | 152 | 433 |
| | Lettuce | 246 | 245 | 258 | 749 |
| | Tomatoes | 156 | 161 | 168 | 485 |
| | Subtotal | 542 | 547 | 578 | 1667 |
| Grand total | | 1291 | 1302 | 1363 | 3956 |

The same data displayed in a regular table takes up far more space and it is much more difficult to get an overview:

| Year | Month | Category | Type | Sales | Cost |
|---|---|---|---|---|---|
| 2001 | January | Fruit | Apples | 12 | 10 |
| 2001 | January | Fruit | Pears | 21 | 13 |
| 2001 | January | Fruit | Bananas | 29 | 26 |
| 2001 | January | Vegetables | Cucumber | 9 | 6 |
| 2001 | January | Vegetables | Tomatoes | 13 | 11 |
| 2001 | January | Vegetables | Lettuce | 22 | 20 |
| 2001 | February | Fruit | Apples | 11 | 9 |
| 2001 | February | Fruit | Pears | 21 | 14 |
| 2001 | February | Fruit | Bananas | 31 | 27 |
| 2001 | February | Vegetables | Cucumber | 8 | 6 |
| 2001 | February | Vegetables | Tomatoes | 12 | 10 |
| 2001 | February | Vegetables | Lettuce | 20 | 19 |
| 2001 | March | Fruit | Apples | 9 | 10 |
| 2001 | March | Fruit | Pears | 19 | 13 |
| 2001 | March | Fruit | Bananas | 32 | 27 |
| 2001 | March | Vegetables | Cucumber | 8 | 6 |
| 2001 | March | Vegetables | Tomatoes | 11 | 11 |
| 2001 | March | Vegetables | Lettuce | 21 | 19 |
| 2001 | April | Fruit | Apples | 9 | 10 |
| 2001 | April | Fruit | Pears | 18 | 13 |
| 2001 | April | Fruit | Bananas | 32 | 27 |
| 2001 | April | Vegetables | Cucumber | 10 | 7 |
| 2001 | April | Vegetables | Tomatoes | 12 | 11 |
| 2001 | April | Vegetables | Lettuce | 21 | 19 |
| 2001 | May | Fruit | Apples | 10 | 9 |
| 2001 | May | Fruit | Pears | 20 | 13 |
| 2001 | May | Fruit | Bananas | 31 | 27 |
| 2001 | May | Vegetables | Cucumber | 11 | 7 |
| 2001 | May | Vegetables | Tomatoes | 13 | 11 |
| 2001 | May | Vegetables | Lettuce | 21 | 19 |
| 2001 | June | Fruit | Apples | 9 | 9 |
| 2001 | June | Fruit | Pears | 18 | 14 |
| 2001 | June | Fruit | Bananas | 28 | 26 |
| 2001 | June | Vegetables | Cucumber | 13 | 8 |
| 2001 | June | Vegetables | Tomatoes | 14 | 10 |
| 2001 | June | Vegetables | Lettuce | 22 | 19 |
| 2001 | July | Fruit | Apples | 10 | 10 |

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

# 4.2.2    How to Use the Cross Table

► **To set up the cross table:**

1. Select a filter that represents the column you want to add to your cross table.
2. Drag that filter into the cross table.
   Response: Three drop-targets appear.

   

3. Drop the filter onto the drop-target you want. The first will place the column on the vertical axis, the second will place the column on the horizontal axis, and the third will

use the column as the actual numeric values inside the cross-table.

**Note:** You can also drag-and-drop the filters to the column selectors. This way you can set up hierarchies, which is a very powerful feature in a cross table.

## ► To display grand totals for rows or columns:

1. Right-click in the cross table to display the pop-up menu.
2. Select **Grand Total for Columns** or **Grand Total for Rows**.

   Response: The selected grand total is displayed in the cross table.

   Comment: You can also make these selections from the Appearance page of the Cross Table Properties.

## ► To display subtotals for columns:

To display subtotals in the cross table, the vertical axis must be set up as a hierarchy with at least two levels.

1. Right-click in the cross table to open the pop-up menu.
2. Select **Subtotals for Columns**.

   Response: A submenu is opened. It lists the columns and/or hierarchies currently on the vertical axis of the cross table. The options All and None are also available.
3. Select a column (or level in a hierarchy) for which you want to show subtotals. Select **All** to display subtotals for all the columns (or hierarchical levels) on the vertical axis of the cross table.

   Response: The selected subtotals are displayed in the cross table.

   Comment: You can also make these selections from the Column Subtotals page of the Cross Table Properties.

## ► To apply coloring:

See Coloring in Cross Tables and Heat Maps to learn how to set up coloring for cross tables specifically. See Coloring Overview if you want to learn more about coloring in general.

## ► To change the column width:

1. Place the mouse pointer at the right edge of the column header you want to resize. The cursor changes into a cross with arrows.
2. Adjust the width by holding down the mouse button and moving the mouse horizontally.

   Comment: All value columns will be set to the new size. They cannot be specified separately.

   **Note:** You can also right-click on the cross table, and select **Resize Cells to Fit** from the pop-up menu. This will set the value columns to the smallest width possible, where all values are still visible.

## ► To sort the cross table:

1. Click on the column title or row title by which you wish to sort the cross table.
2. Click again to sort in descending order and a third time to return to the default sort order.

   Comment: When you are sorting a cross table, you always work within the last category of a hierarchy. See Cross Table Properties - Sorting for an example.

## ► To mark the cells in an entire cross table category:

1. Press **Alt** on the keyboard and click on the category title of interest.

   Comment: Clicking on the first category in a hierarchy will mark all rows or columns within this category. Clicking on the last category will only mark the rows or columns in that particular category.

### ► To create a new cross table:

1.  Click on the New Cross Table button on the toolbar, ⃞Σ .

    Comment: You can also select **Insert > New Visualization > Cross Table** from the menu.

    Response: A first attempt to set up a suitable cross table is made by the application.
2.  Adjust the cross table to display the categories and measures of your choice.

## 4.2.3      Formatting in the Cross Table

It is possible to format the values in the cross table on any of the axes. You can format the values either by opening the Formatting page of the Properties dialog, or by right-clicking directly in the cross table. The example below illustrates how formatting can be applied to a cross table.

### Example:

The cross table below shows the sum of sales (Sum(Sales)) for fruits and vegetables for the years 2001, 2002, and 2003. The horizontal axis has the two columns Category and Type. The column Category contains the two axis values Fruit and Vegetables, and the column Type contains the values Apples, Bananas, Pears, Cucumber, Lettuce, and Tomatoes.

| Year | Fruit | | | Vegetables | | |
|------|--------|---------|--------|----------|---------|----------|
|      | Apples | Bananas | Pears  | Cucumber | Lettuce | Tomatoes |
| 2001 | 150.00 | 332.00  | 267.00 | 140.00   | 246.00  | 156.00   |
| 2002 | 153.00 | 336.00  | 266.00 | 141.00   | 245.00  | 161.00   |
| 2003 | 162.00 | 344.00  | 279.00 | 152.00   | 258.00  | 168.00   |

To format all the values for 2001 as currency, right-click on the row header 2001, choose Formatting and then select currency from the pop-up menu. The values in that row will be updated instantly with the new setting. To format the row containing the values for 2003, go through the same steps. The resulting cross table is shown below.

| Year | Fruit | | | Vegetables | | |
|------|----------|----------|----------|----------|----------|----------|
|      | Apples   | Bananas  | Pears    | Cucumber | Lettuce  | Tomatoes |
| 2001 | $150.00  | $332.00  | $267.00  | $140.00  | $246.00  | $156.00  |
| 2002 | 153.00   | 336.00   | 266.00   | 141.00   | 245.00   | 161.00   |
| 2003 | $162.00  | $344.00  | $279.00  | $152.00  | $258.00  | $168.00  |

**Note:** To select another currency than $ you must open the properties dialog.

You can go through the same steps again to format the values for 2002. However, if you format the values for the Apples column instead, all the previous formatting settings will be reset, as seen in the cross table below.

| Year | Fruit | | | Vegetables | | |
|------|----------|---------|--------|----------|---------|----------|
|      | Apples   | Bananas | Pears  | Cucumber | Lettuce | Tomatoes |
| 2001 | $150.00  | 332.00  | 267.00 | 140.00   | 246.00  | 156.00   |
| 2002 | $153.00  | 336.00  | 266.00 | 141.00   | 245.00  | 161.00   |
| 2003 | $162.00  | 344.00  | 279.00 | 152.00   | 258.00  | 168.00   |

Only the values in the column Apples are now formatted as currency, because you can only format values in one direction and at one level at a time. This means that if you format the values for Vegetables, then the values in Apples will be reset, as seen in the cross table below.

| Year | Fruit | | | Vegetables | | |
|------|--------|---------|--------|----------|----------|----------|
|      | Apples | Bananas | Pears  | Cucumber | Lettuce  | Tomatoes |
| 2001 | 150.00 | 332.00  | 267.00 | $140.00  | $246.00  | $156.00  |
| 2002 | 153.00 | 336.00  | 266.00 | $141.00  | $245.00  | $161.00  |
| 2003 | 162.00 | 344.00  | 279.00 | $152.00  | $258.00  | $168.00  |

You can move a measure from one axis to another without losing the formatting settings you have defined. This means that if you were to move the column Category from the horizontal axis to the vertical axis, all the values for the Vegetables would still be formatted as currency.

If you right-click on any of the cells that are not row or column headers in the cross table and select a formatter, all the values in the cross table will get the new formatting settings.

However, if you add another column to the cell values axis it will only be possible to format on cell values. In the cross table below, Sum(Cost) was added to the cell values axis, and the column Type was removed.

| Year | Fruit | | Vegetables | |
|------|------------|------------|------------|------------|
| | Sum(Sales) | Sum(Cost) | Sum(Sales) | Sum(Cost) |
| 2001 | 749.00 | 563.00 | 542.00 | 446.00 |
| 2002 | 755.00 | 584.00 | 547.00 | 476.00 |
| 2003 | 785.00 | 624.00 | 578.00 | 501.00 |

It is no longer possible to format only the values for an individual year, nor the values only for Fruit or Vegetables. If you right-click on any of those header cells in the cross table, the pop-up menu will not provide any formatting options to choose from. However, you can still format the values on Sum(Sales) and Sum(Cost). If you right-click on one of the two header cells for Sum(Cost) and set formatting to currency, the cross table will look like the one below.

| Year | Fruit | | Vegetables | |
|------|------------|------------|------------|------------|
| | Sum(Sales) | Sum(Cost) | Sum(Sales) | Sum(Cost) |
| 2001 | 749.00 | $563.00 | 542.00 | $446.00 |
| 2002 | 755.00 | $584.00 | 547.00 | $476.00 |
| 2003 | 785.00 | $624.00 | 578.00 | $501.00 |

To learn more about additional formatting options for the cross table see Cross Table Properties - Formatting. For general information about formatting, see Formatting Overview.

# 4.2.4 Cross Table Properties

## 4.2.4.1 Cross Table Properties

The Cross Table Properties dialog consists of several pages:

- General
- Data
- Appearance
- Column Subtotals
- Formatting
- Fonts
- Axes
- Colors
- Sorting
- Legend

### ► To reach the Cross Table Properties dialog:

1. Right-click on the cross table visualization.
2. Select **Properties** from the pop-up menu.
3. Comment: You can also click on the cross table visualization to make it active and then select **Edit > Visualization Properties**.

## 4.2.4.2    Cross Table Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.2.4.3    Cross Table Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations. |
| | If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. |
| | The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |

|  | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| --- | --- |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
|  | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
|  | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
|  | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
|  | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.2.4.4 Cross Table Properties - Appearance



| Option | Description |
|---|---|
| **Show cell borders** | Specifies whether or not cell borders should be visible between the cells in the cross table. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the cross table. |
| **Grand total for columns** | Specifies whether or not the selected aggregation measure (for example, the sum) of all values in a column should be displayed without consideration for the categories creating the rows of the cells. See note below for details on the calculation. |
| **Grand total for rows** | Specifies whether or not the selected aggregation measure (for example, the sum) of all values in a row should be displayed without consideration for the different column categories. See note below for details on the calculation. |

**Note:** The aggregated value for grand totals is not calculated on the values shown in the cross table, but on the underlying row values. For example, if "Average" is used as aggregation measure, the grand total average of a column is calculated on the rows the column is based on and not on the values shown in the cross table.

## 4.2.4.5 Cross Table Properties - Column Subtotals



| Option | Description |
|---|---|
| **Show subtotals for** | Lists the columns and/or hierarchies on the vertical axis of the cross table. Select the ones you wish to display subtotals for. |
| | A subtotal is a partial summarization of the values in a column and can be displayed if the vertical axis is set up as a hierarchy with at least two levels. The aggregated subtotal value is calculated using the selected aggregation measure, and is displayed for each category and at each hierarchy level. |
| | **Note:** The aggregated value for subtotals is not calculated on the values shown in the cross table, but on the underlying row values. For example, if "Average" is used as aggregation measure, the subtotal average of a column is calculated on the rows the column is based on and not on the values shown in the cross table. |
| | **Note:** Custom expressions with OVER statements should be used carefully in cross tables with subtotals. The subtotals depend on the statement the same way the cell values do, and some OVER statements may therefore result in subtotal values that seem unexpected at first glance. See OVER in Custom Expressions to learn more about using the OVER statement. |
| **All** | Selects all the columns in the list. Subtotals will be displayed for all the columns and/or hierarchical levels on the vertical axis of the cross table. |
| **None** | Deselects all the columns in the list. No subtotals will be displayed in the cross table. |

| Display subtotals | |
|---|---|
| **Before values** | Places the subtotal values before the cell values on each level in the hierarchy of the vertical axis. |
| **After values** | Places the subtotal values after the cell values on each level in the hierarchy of the vertical axis. |

## 4.2.4.6  Cross Table Properties - Formatting



| Option | Description |
|---|---|
| **Format by** | Lists the alternatives by which it is possible to format the values in the cross table. The drop-down list contains the columns that are visible on the horizontal and vertical axes of the cross table. It also contains the alternative **(Cell Values)** which lets you format the values for each measure. Select the alternative you wish to format by to see the axis values available for that alternative. When you change from one alternative to another in the drop-down list, all the previous formatting settings in the cross table will be reset. |
| **Axis values** | Lists the values on the selected axis, as well as the current formatting category used for each value. Click on the alternative that you want to format. You can select more than one value if you want to apply the same formatting to them. Only the cell values in the selected columns or rows will be affected. If you select **(Cell Values)**, the **Axis values** list will contain all columns and aggregation methods used on the cell values axis. If the cell values axis contains more than one column, formatting will always be applied to cell values and **Format by** will be grayed out, as seen below: |

The cell values axis contains both Sum(Sales) and Sum(Cost), and the **Format by** drop-down list is grayed out.

| | |
|---|---|
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis value. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis value. See Formatting Settings for a full description of all possible options. |

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview. See also Formatting in the Cross Table to learn more about how you can change formatting settings in the cross table.

## 4.2.4.7    Cross Table Properties - Fonts
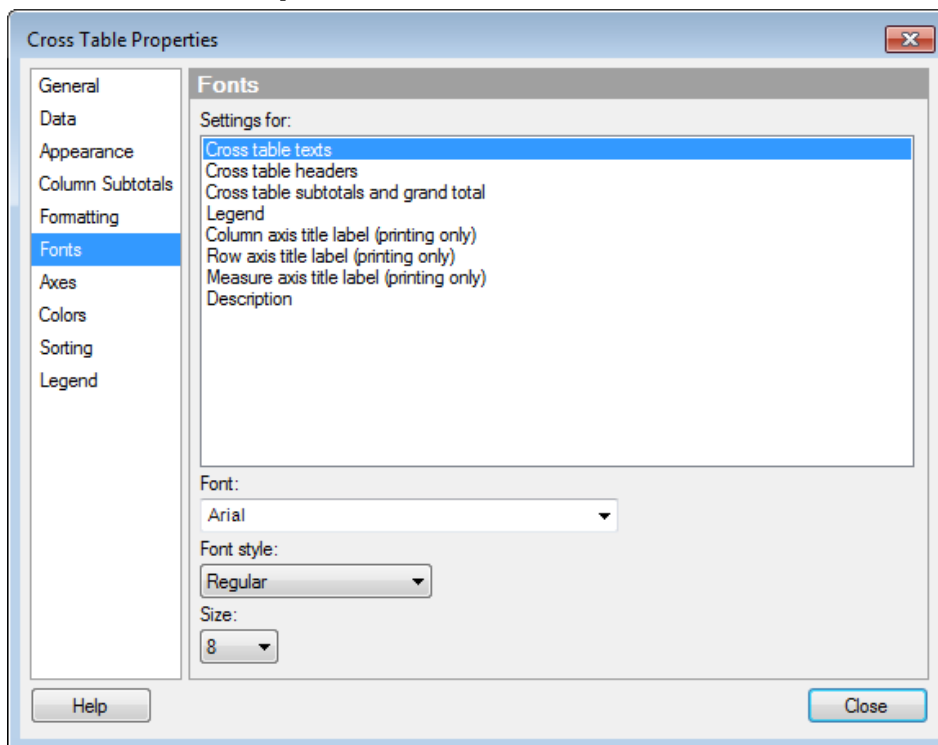


| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |

| | |
|---|---|
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.2.4.8    Cross Table Properties - Axes



| Option | Description |
|---|---|
| **Horizontal** | Specifies the column or hierarchy that should be used to define the column titles in the cross table. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the category mode to determine which combinations of categories to show. (In a cross table, the axes are always categorical and the scale mode cannot be changed.)<br>**Note:** If All values in data (nest) or All possible values (cross) are selected, all available categories, even empty ones, will be shown in the cross table regardless of filtering. |
| **Vertical** | Specifies the column or hierarchy that should be used to define the row titles in the cross table. |
| **Settings...** | See above. |
| **Cell values** | Specifies the column or hierarchy that should be used to define the actual values in the cross table. |

### 4.2.4.9 Cross Table Properties - Colors



| Option | Description |
|---|---|
| **Color by** | Lists the alternatives by which it is possible to color the cross table. The drop-down list contains the columns that are visible on the horizontal and vertical axes of the cross table. It also contains the alternative (Cell Values) which lets you color the cross table by the column on the cell values axis. Select the alternative you wish to color by to set up a color scheme and see the available color scheme groupings for that alternative. If the cell values axis contains more than one column, you can only color by (Cell values) and the Color by drop-down list will be grayed out. |
| **Color scheme groupings** | Lists the currently available color scheme groupings for the selected column. In cross tables, a color scheme is always applied to a color scheme grouping. A default color scheme grouping named Numeric is always available for each of the columns in the cross table. Before any new color scheme groupings have been added, the default grouping contains all the values in the selected column. Click on a grouping in the list to select it and see its defined color scheme in the lower part of the dialog. To learn more about color scheme groupings and coloring in cross tables, see Coloring in Cross Tables and Heat Maps. |
| **Add** | Opens a menu which lets you add a new color scheme grouping. The menu option Color Scheme Grouping... opens the Add Color Scheme Grouping dialog, in which you can select values in the selected column to include in the new grouping. You can also give the grouping a descriptive name. The menu also lists all the values in the selected column as separate menu options. If you select one of these values from the menu, a grouping containing only that value will be added. |

| | |
|---|---|
| **Edit...** | Opens the Edit Color Scheme Grouping dialog which lets you modify an existing grouping. You cannot edit the default grouping named Numeric. |
| **Remove (Remove)** | Removes the selected color scheme grouping from the list. You cannot remove the default grouping named Numeric. |
| **Color mode (Color mode)** | Specifies in which color mode to set up the color scheme. You can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. To learn more about the color modes, see Color Modes Overview. |
| **One scale per (One scale per)** | Specifies whether there should be one separate scale for each axis value in the selected color scheme grouping, or if one single scale should apply to the entire grouping. |
| [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the current color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes applicable to the current color scheme grouping will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes applicable to the current color scheme grouping will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. For a full description of the predefined color schemes, see Predefined Color Schemes. **Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme. **Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse. **File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse. **Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed. |

|  | **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
|---|---|
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used for the selected color scheme grouping. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the color scheme grouping, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Adds a new anchor point to the color scheme. |
| **Delete Point** | Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the color scheme grouping. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the selected color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.2.4.10    Cross Table Properties - Sorting

**Tip:** Sorting is easily done by clicking directly on a column title or row title in the cross table visualization.

When you are sorting a cross table, you always work on the last node of a hierarchy. For example, if the cross table shows sales figures for different types of fruits and vegetables, as in the example under What is a Cross Table?, and you click on the Apples leaf node, only the cell values within the Fruit >> Apples hierarchy will affect the sorting. You cannot sort on the entire Fruit category while subcategories are being displayed.
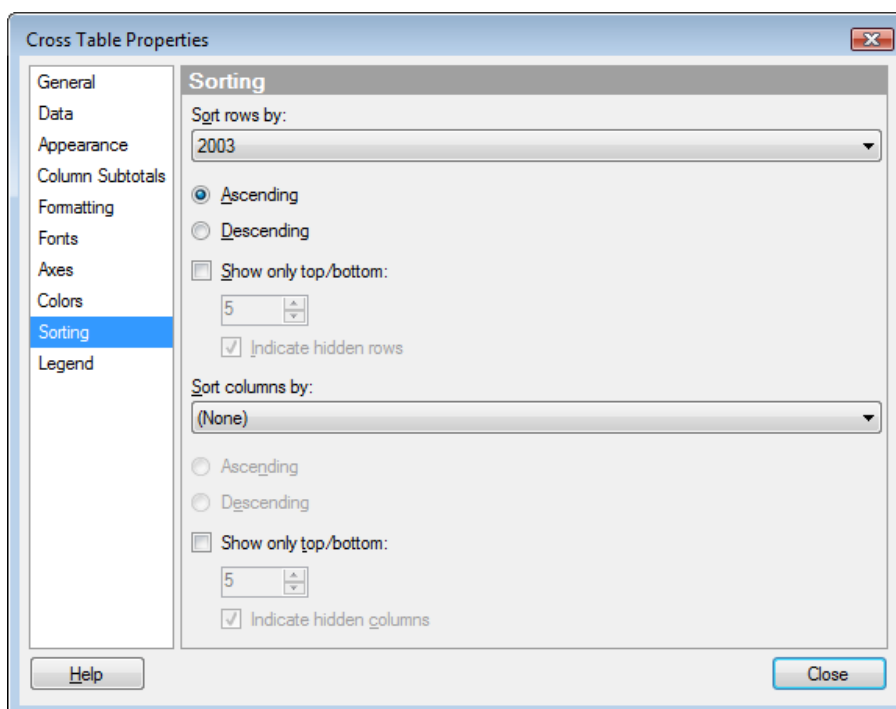
| Option | Description |
|---|---|
| **Sort rows by** | Select the cross table column title by which you wish to sort. |
| **Ascending** | Sorts the cross table by the selected column title in ascending order. |
| **Descending** | Sorts the cross table by the selected column title in descending order. |
| **Show only top/bottom** | Select this check box if you want to display a limited number of rows per category in the cross table. If you select ascending sort order, the rows with the bottom values will be shown. If you select descending sort order, the rows with the top values will be shown. |
| **Indicate hidden rows** | Select this check box if you want to get an indication that some rows in the cross table are not displayed when the Show only top/bottom check box has been selected. A row with three dots in each cell will be added to indicate this. |
| **Sort columns by** | Select the row title you wish to sort the columns by in the cross table. |
| **Ascending** | Sorts the cross table by the selected row in ascending order. |
| **Descending** | Sorts the cross table by the selected row in descending order. |
| **Show only top/bottom** | Select this check box if you want to display a limited number of columns per category in the cross table. If you select ascending sort order, the columns with the bottom values will be shown. If you select descending sort order, the columns with the top values will be shown. |
| **Indicate hidden columns** | Select this check box if you want to get an indication that some columns in the cross table are not displayed when the Show only top/bottom check box has been selected. A column with three dots in each cell will be added to indicate this. |

## 4.2.4.11    Cross Table Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

# 4.3 Graphical Table
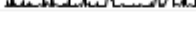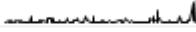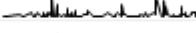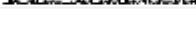
## 4.3.1 What is a Graphical Table?

A graphical table is a summarizing visualization designed to provide a lot of information at one glance. It can be set up to show columns with dynamic items such as sparklines, calculated values or conditional icons. One value is shown for each row as specified on the Rows axis.



You can add any number of dynamic items to a graphical table. Each dynamic item column uses its own axis expression and it can also be filtered and limited by markings separately. This way, you can show both the total values for some calculated value and the currently filtered values simultaneously. See Limiting What is Shown in Visualizations for more information.

When a hierarchical structure is used on the Rows axis, the graphical table is grouped into sections and sorting can be performed within each section by clicking on a column header.

| State | Trend | Sum of Sales ▲ |
|---|---|---|
| **Midwest** | | |
| Ohio | | 78797 |
| Missouri | | 104687 |
| Indiana | | 167109 |
| Illinois | | 192793 |
| Michigan | | 233725 |
| **Northeast** | | |
| Pennsylvania | | 132888 |
| Massachusetts | | 154704 |
| New York | | 280734 |
| New Jersey | | 281457 |
| **South** | | |
| Georgia | | 92489 |
| North Carolina | | 96892 |
| Tennessee | | 139768 |
| Virginia | | 238334 |
| Florida | | 347926 |
| Texas | | 563265 |
| **West** | | |
| Washington | | 101744 |
| Arizona | | 230382 |
| Colorado | | 305083 |
| California | | 566056 |

## 4.3.2    How to Use the Graphical Table

**► To add columns to a graphical table:**

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Axes** page.
4. Click on **Add** and select the type of item of interest from the drop-down menu.
   Response: A Settings dialog for the new item is displayed and a new column is shown in the graphical table.
   Comment: Note that each item added to a graphical table has its own settings.
5. Make the necessary changes to the settings dialog so that the new column shows the information you want.
6. When you are done, click **Close**.

### ► To change column order:

Click on a column header and drag that column to the desired position.

Comment: The row header column cannot be moved.

### ► To change the column width:

1. Place the mouse pointer at the right edge of the column header you want to resize (indicated by a thin line).

   Response: The cursor changes into a double-arrow.
2. Adjust the width by holding down the mouse button and moving the mouse horizontally.

### ► To remove a column:

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Axes** page.
4. In the **Columns** list, click to select the item you want to remove.
5. Click **Remove**.
6. When you are done, click **Close**.

### ► To create a new graphical table:

1. Click on the New Graphical Table button on the toolbar, 

   Comment: You can also select **Insert > New Visualization > Graphical Table** from the menu.

   Response: A table showing one column is created. You can change which item type to be used as default under Tools > Options > Graphical Table.
2. Adjust the table to display the items of your choice.

### ► To sort the rows:

1. Click on the header of the column you wish to sort the data by. You can sort by columns containing calculated values and icons (based on the underlying calculation).

   Comment: Click again on the column header to sort descending. Click once again to return to the original sort order.

   Comment: If a hierarchy is used on the row axis, then sorting will be performed within each category only.

### ► To change row height:

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Appearance** page.
4. Increase the **Additional row spacing (in pixels)**.

   Comment: The row heights are automatically increased if the font size is increased. The Additional row spacing setting only needs adjustment if you want to add a few more pixels between the rows.
5. Click **Close**.

### ► To copy marked rows:

1. Mark the rows of interest in the graphical table.
2. Right-click and select **Copy** from the pop-up menu.

   Response: Information about the marked rows is copied to the clipboard. For sparklines, the start point and end point Y-axis values are copied. For calculated values

the actual values are copied. For icons, any applied rules are displayed on the form of the shape and the specified HTML color code.

## 4.3.3 Graphical Table Properties

### 4.3.3.1 Graphical Table Properties

The Graphical Table Properties dialog consists of several pages:

> General
> Data
> Appearance
> Fonts
> Axes
> Legend

#### ► To reach the Graphical Table Properties dialog:

1. Click on the graphical table visualization to make it active and then select **Edit > Visualization Properties**.

### 4.3.3.2 Graphical Table Properties - General



| Option | Description |
| --- | --- |
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be |

shown in the legend and/or in the visualization.

| | |
|---|---|
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.3.3.3 Graphical Table Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br><br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br><br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected |

markings.

| | |
|---|---|
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.3.3.4　Graphical Table Properties - Appearance



| Option | Description |
|---|---|
| **Show** | |
| **Header row** | Specifies whether or not the column headers at the top of the graphical table should be visible.<br>**Tip:** If you want to show or hide a specific column header, instead of the entire row of headers, open the Settings dialog for the column of interest, go to the General page and then select or clear the check box Show name in header. |
| **Row header name** | Specifies whether or not the row header name should be visible.<br>This is the left-most header in the header row, displayed above the column containing the row headers in the graphical table. By default, the row header name is the name of the column on the row axis. If the row axis has a hierarchy of columns, then the row header name is the column at the lowest level in the hierarchy. |
| **Cell borders** | Specifies whether or not cell borders should be visible in the graphical table. |
| **Only the first n rows** | Select this check box if you want to display a limited number of rows in the graphical table. Note that the sort order in the graphical table affects which rows are shown. |
| **Indicate hidden rows** | Select this check box if you want to get an indication that some rows in the graphical table are not displayed when the Only the first n rows check box has been selected. A row with three dots in each cell will be added to indicate this. |

| Additional row spacing (in pixels) | Specifies how many extra pixels should be added to each row. **Note:** The row heights are automatically increased if the font size is increased. The Additional row spacing setting only needs adjustment if you want to add a few more pixels between the rows. |

## 4.3.3.5    Graphical Table Properties - Fonts
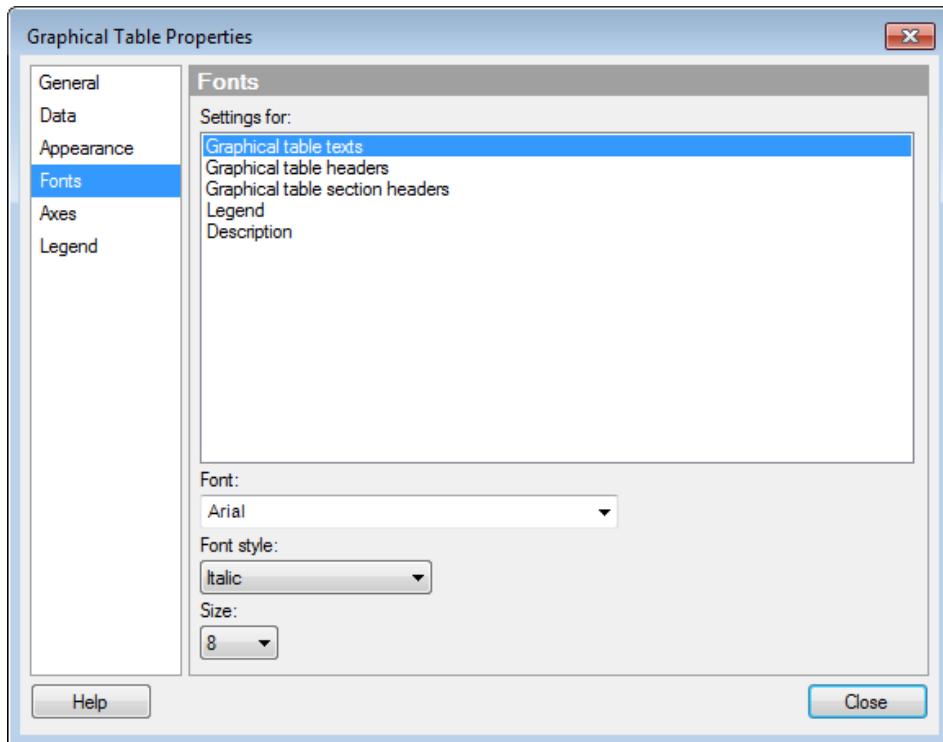


| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.3.3.6 Graphical Table Properties - Axes
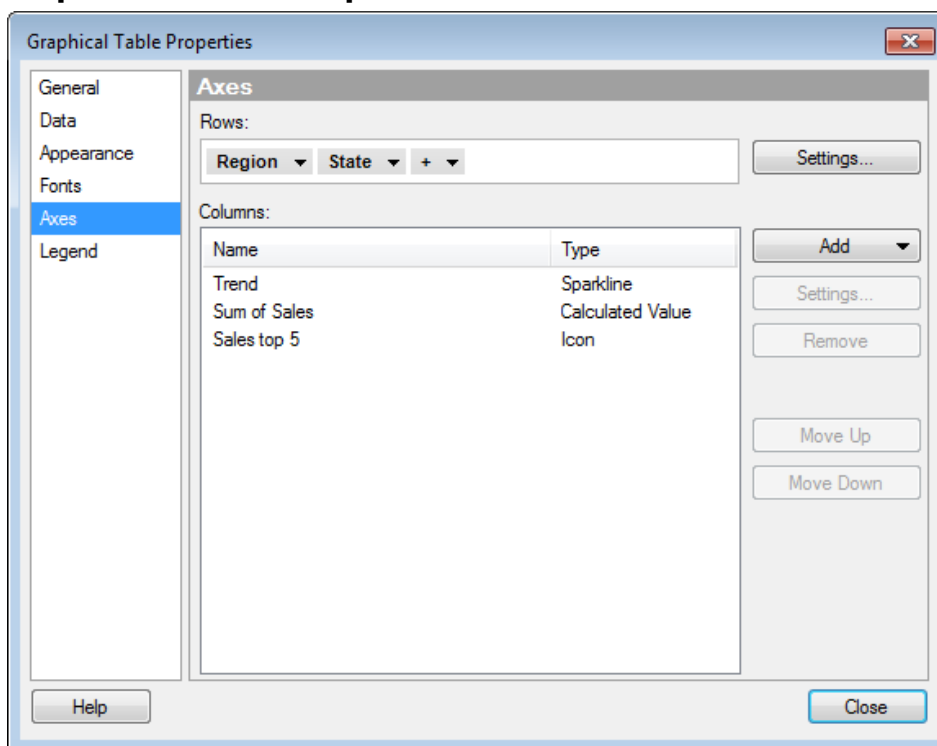


| Option | Description |
|---|---|
| **Rows** | Specifies the column or hierarchy that should be used to define the rows in the graphical table. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the category mode to determine which combinations of categories to show. |
| **Columns** | Lists the columns currently shown in the graphical table. |
| **Add** | Displays a menu where you can select which dynamic item to add to the graphical table. Once you make your selection, the selected item will be added to the Columns list, and a dialog where you can specify settings to use for that column will open. |
| **Settings...** | Opens the Settings dialog for the selected column. |
| **Remove** | Removes the selected column from the graphical table. |
| **Move up** | Moves the selected column up in the Columns list. The order of the columns in this list determines the order of the columns in the graphical table. |
| **Move down** | Moves the selected column down in the Columns list. The order of the columns in this list determines the order of the columns in the graphical table. |

## 4.3.3.7 Graphical Table Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend. By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.3.3.8    Sparkline

### 4.3.3.8.1    What are Sparklines?

Sparklines are small, simple line graphs traditionally used for displaying trends or variations of some variable:



They can be displayed in the context of a graphical table or, separately, in a text area. The general idea of sparklines is that they can be included directly where they are needed, in tables or text, in order to provide context to a value. Sparklines can be set up to change with filtering like any traditional Spotfire visualization or they can be locked to show fixed values, using the Data page in the Sparkline Settings dialog.

### 4.3.3.8.2    How to Use Sparklines

Sparklines can be shown both separately in a text area or be included as a column in a graphical table. The behavior of the sparkline is quite similar in both places, but some differences exist. Therefore, this list of step instructions has been split into three different sections: General information applicable to both instances, Graphical table specific information and Text area specific information.

#### General information

► **To add actions to be performed when clicking on the sparkline:**

1. Open the Sparkline Settings dialog and go to the **Actions** page.
2. Select the **Perform action on click** check box.
3. Click on **Settings...**.
   Response: The Action Settings dialog is displayed.
4. Type a good **Description** explaining what will happen when clicking on the sparkline.
   Comment: The description can be shown in the tooltip for the sparkline.
5. Add the desired actions and click **OK**.

#### Graphical table specific information

When sparklines are included in a graphical table, the settings for the sparkline column normally control a number of separate sparkline graphs, one for each value in the graphical table row axis.

► **To lock the sparkline column so it does not react to filtering:**

1. Open the Sparkline Settings dialog and go to the **Data** page.
2. Make sure that the **Specify separate data limiting** radio button is selected.
3. Clear all check boxes under **Limit data using filterings**.
   Comment: You can also select one specific filtering scheme and keep from modifying any of the filters in it.

4. Click **Close** or **OK**.

   Response: The sparkline shows all data, regardless of any filtering.

## ► To add a sparkline column to a graphical table:

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Axes** page.
4. Click on **Add** and select **Sparkline** from the drop-down menu.

   Response: A Sparkline Settings dialog is displayed and a new sparkline column is shown in the graphical table.

   Comment: Note that each sparkline column added to a graphical table has its own settings.
5. On the **Axes** page of the Sparkline Settings dialog, select the column, hierarchy or expression to define the **X-axis** and **Y-axis** of the sparkline.
6. On the **General** page, change the **Name** to be shown in the graphical table.

   Comment: You can hide the name form the graphical table by clearing the Show name in header check box. (The entire header row of the graphical table can also be hidden from the Appearance tab of the Graphical Table Properties.)
7. If desired, make other changes to the default sparkline settings, such as changing the filtering scheme on the Data page, adding an action or displaying start point and end point Y-axis values.
8. When you are done, click **Close**.

## ► To change the column header for a sparkline column:

1. Open the Sparkline Settings dialog and go to the **General** page.
2. Type a new **Name** for the column.
3. Make sure that the **Show name in header** check box is selected.
4. Click **Close**.

## ► To hide the column name from a graphical table:

Open the Sparkline Settings dialog and go to the **General** page.
1. Clear the **Show name in header** check box.

   Comment: The entire header row of the graphical table can be hidden from the Appearance tab of the Graphical Table Properties.
2. Click **Close**.

## ► To change the scale for a sparkline column in a graphical table:

1. Open the Sparkline Settings dialog and go to the **Axes** page.
2. Click to select whether to use **One scale for all sparklines** or **Multiple scales**.

   Comment: Use One scale for all sparklines if you want to show the Y-axis values for all sparklines in this column presented using the same scale. Use Multiple scales to maximize the Y-axis variation within each sparkline.
3. Click **Close**.

## ► To display Y-axis start point/end point values for the sparkline:

1. Open the Sparkline Settings dialog and go to the **Values** page.
2. Select the **Start point** and/or **End point** check box.

   Response: The values are shown in the visualization.
3. If desired, change how much space to use for the values by modifying the **Y-axis values width**.

Comment: This setting does not change the total width of the column. To increase the total column width, place the mouse pointer at the right edge of the column header you want to resize and adjust the width by holding down the mouse button and moving the mouse horizontally.

## Text area specific information

When a sparkline is used in a text area it behaves slightly different from when it is included in a graphical table. For example, you will not get instant feedback to your setting changes since the sparkline does not show up until you leave the edit mode. However, the placement of the edit box tells you where in the text area the sparkline will show up.

### ► To lock the sparkline so it does not react to filtering:

1. Open the Sparkline Settings dialog and go to the **Data** page.
2. Clear all check boxes under **Limit data using filterings**.

   Comment: You can also select one specific filtering scheme and keep from modifying any of the filters in it.
3. Click **Close** or **OK**.

   Response: The sparkline shows all data, regardless of any filtering.

### ► To add a sparkline to a text area:

1. Create a text area where you want the sparkline to reside.
2. Click on the Toggle Edit Mode button, ✐, in the text area title bar to make sure that the text area is in edit mode.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
3. Type some descriptive text in the text area regarding what the sparkline will show.
4. Click on the **Insert Dynamic Item** button, 🔼▾, and select the **Sparkline** option.

   Response: The Sparkline Settings dialog is displayed.
5. On the **Axes** page, select the column, hierarchy or expression to define the **X-axis** and **Y-axis** of the sparkline.

   Comment: If desired, make other changes to the default sparkline settings, such as changing the filtering scheme on the Data page, adding an action or displaying start point and end point Y-axis values.
6. Click **OK**.

### ► To resize the sparkline in a text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar to make sure that the text area is in edit mode.

   Response: The outline of the sparkline is shown as a gray box.
2. Click on the gray edit box to select it and drag either of the corners to resize the box.
3. Click on the Toggle Edit Mode button, ✐, in the text area title bar again, or click outside the text area in any other visualization to leave the Edit mode.

   Response: The final result is shown in the text area.

   Comment: You can always reset the size of the sparkline to the original size if you change your mind. Just open the Format Control dialog by right-clicking on the gray box, click on the Reset button and then OK, and the size will be reset.

### ► To display Y-axis start point/end point values for the sparkline:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar to make sure that the text area is in edit mode.
2. Open the Sparkline Settings dialog and go to the **Appearance** page.

3. Select the **Start point** and/or **End point** check box.

4. Click **OK**.

5. Click on the Toggle Edit Mode button, ✐, in the text area title bar again, or click outside the text area in any other visualization to leave the Edit mode.

   Response: The values are shown next to the sparkline.

   Comment: The values are not visible in edit mode. The gray edit box only indicates the size of the actual sparkline.

### 4.3.3.8.3    Sparkline Settings

The Sparkline Settings dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Axes
- Actions
- Tooltip

#### ► To reach the Sparkline Settings dialog from a graphical table:

1. Right-click on the sparkline column in a graphical table visualization.

2. Select **Properties** from the pop-up menu.

3. If the Sparkline Settings dialog is not opened directly, go to the **Axes** page in the Graphical Table Properties dialog, select the Sparkline column you want to modify and click **Settings...**.

#### ► To reach the Sparkline Settings dialog from a text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar, to make sure that the text area is in Edit Mode.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.

2. Double-click on the gray edit box representing the desired sparkline in the text area.

### 4.3.3.8.4 Sparkline Settings - General



| Option | Description |
|---|---|
| **Name** | The name of the sparkline. If the sparkline is included in a graphical table, then this name is the column header which can be shown or hidden using the check box below. Otherwise, the name is simply used to identify this particular sparkline column on the Axes page of the graphical table or in Edit-mode in a text area. |
| **Show name in header** | [Only applicable when the sparkline is part of a graphical table.] Shows or hides the column header. |

| 4.3.3.8.5 | **Sparkline Settings - Data** |
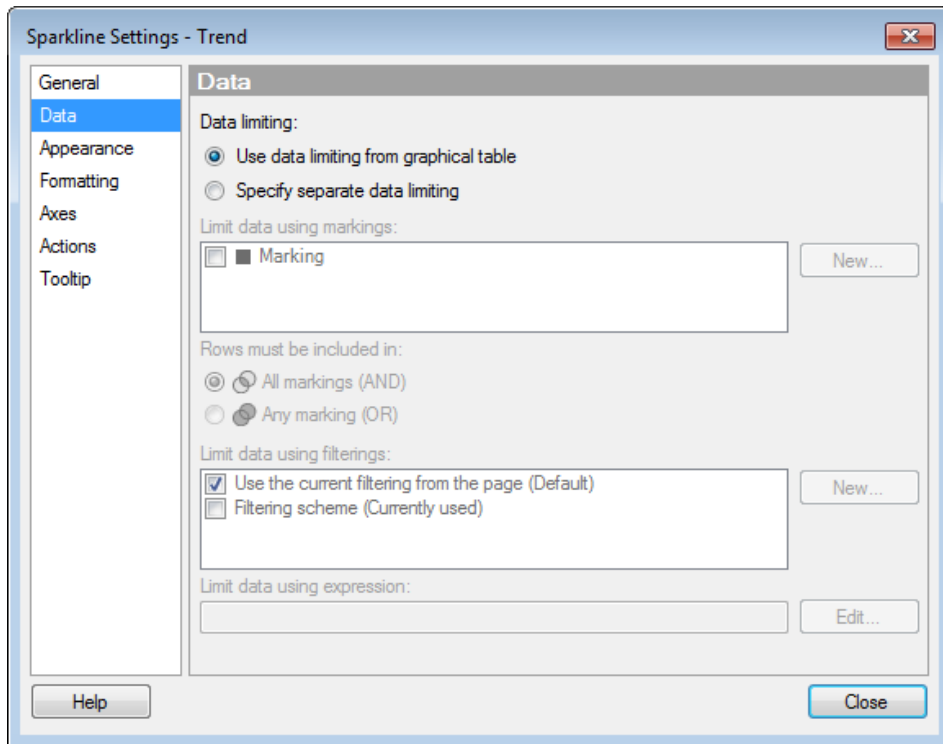


## Sparkline in Graphical Table

When the sparkline is used in a graphical table the selection of data table and marking is already done in the Graphical Table Properties - Data page, so these options are not available here. Instead you will get the choice to inherit the data limiting settings or to use separate data limiting:

| Option | Description |
|---|---|
| **Data limiting** | |
| **Use data limiting from graphical table** | Use this option to inherit the data limiting settings from the graphical table. |
| **Specify separate data limiting** | Use this option if you want to specify other limitations for the sparkline column than you have set up for the graphical table. |

## Sparkline in Text Area

When a sparkline is used in a text area you must specify the data table to work on.

| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | [Not applicable for sparklines in text area.] |

**All Sparklines**

| Option | Description |
|---|---|
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this dynamic item. This means that the dynamic item only displays data that has been marked in other visualizations. <br><br> If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. <br><br> The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this dynamic item to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This dynamic item will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this dynamic item to show the union of the markings selected in Limit data using markings. <br><br> This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This dynamic item will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this dynamic item. <br><br> Select **Use the current filtering from the page** if you want the dynamic item to always utilize the filtering scheme that is used on the page where the dynamic item is located. If you move the dynamic item to a new page, then the dynamic item will automatically start reacting on the filtering scheme that is used on the new page. <br><br> Select a specific filtering scheme from the list if you want the dynamic item to always use that filtering scheme. Moving the dynamic item to another page with a different filtering scheme will not affect this setting. <br><br> If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the dynamic item will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. <br><br> The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain dynamic item using an expression. If you have defined a limiting expression, |

it will be displayed here.

**Edit...**  Opens the Limit Data Using Expression dialog where you can
define an expression to use for limiting the data in this dynamic
item.

## 4.3.3.8.6   Sparkline Settings - Appearance
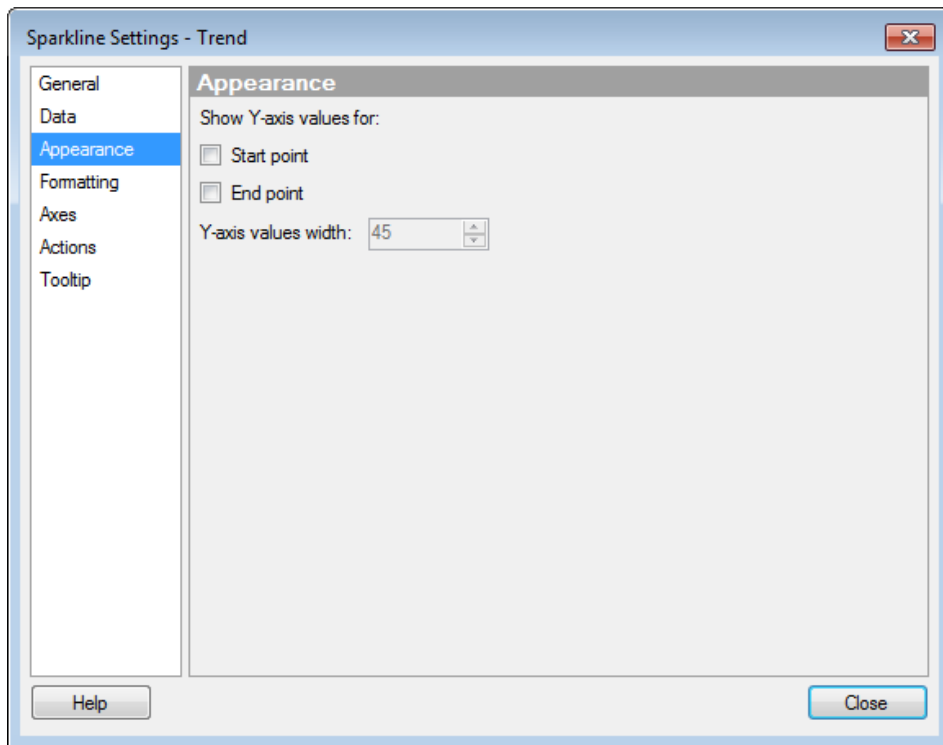


| Option | Description |
|---|---|
| **Show Y-axis values for** | |
| **Start point** | Select this check box to display the first Y-axis value for a sparkline. |
| **End point** | Select this check box to display the last Y-axis value for a sparkline. |
| **Y-axis values width** | [Only available when the sparkline is used in a graphical table.] Allows you to specify how many pixels of the total sparkline width to use for the start point or end point values. The total sparkline width can be controlled by dragging the column header edges with the mouse. |

#### 4.3.3.8.7 Sparkline Settings - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays how the Y-axis start point and end point values is formatted. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**4.3.3.8.8** **Sparkline Settings - Axes**



| Option | Description |
|---|---|
| **X-axis** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the scale mode from categorical to continuous, and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Y-axis** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Y-axis scale** | [Only applicable when the sparkline is part of a graphical table.] |
| **One scale for all sparklines** | Use this option if you want to show the Y-axis values for all sparklines in the graphical table presented using the same scale. |
| **Multiple scales** | Use this option to show the Y-axis values for all sparklines using different scales. For example, use it if the data for several categories are of very different magnitudes, and you are interested in seeing the trends for each category rather than how the curves behave relative to each other. |

### 4.3.3.8.9 Sparkline Settings - Actions



| Option | Description |
|---|---|
| **Perform action on click** | Select the check box to specify an action that should happen when clicking on the sparkline. Actions include operations like going to another page, applying a bookmark, a data function or executing a script. |
| **Settings...** | Opens the Action Settings dialog where you can specify what should happen when clicking on this sparkline.<br><br>In the graphical table, the action is specified for the whole item column. However, if the action is based on a script, then you may obtain different results depending on which cell you click on. See Action Script Examples for more information. |

## 4.3.3.8.10 Sparkline Settings - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.3.3.9          Calculated Value

### 4.3.3.9.1       What are Calculated Values?

Calculated values are values derived from some kind of aggregated expression, similar to the data shown in cross tables. They can be displayed in the context of a graphical table or, separately, in a text area.

**Text Area**

Status value (red if below the limit): 4310391

The general idea of calculated values is that they can be included directly where they are needed, in tables or text, in order to provide information at a glance. Calculated values can be set up to change with filtering like any traditional Spotfire visualization or they can be locked to show  fixed values, using the Data page in the Calculated Value Settings dialog.

By adding rules that control the color and font style you can make sure that a value stands out when it falls outside the specified limits:

**Text Area**

Status value (red if below the limit): 2486977

### 4.3.3.9.2       How to Use Calculated Values

Calculated Values can be shown both separately in a text area or be included as a column in a graphical table. The behavior of the calculated value is quite similar in both places, but some differences exist. Therefore, this list of step instructions has been split into three different sections: General information applicable to both instances, Graphical table specific information and Text area specific information.

### General information

#### ► To add actions performed when clicking on the calculated value:
1.  Open the Calculated Value Settings dialog and go to the **Actions** page.
2.  Select the **Perform action on click** check box.
3.  Click on **Settings...**.
    Response: The Action Settings dialog is displayed.
4.  Type a good **Description** explaining what will happen when clicking on the calculated value.
    Comment: The description can be shown in the tooltip for the calculated value.
5.  Add the desired actions and click **OK**.

#### ► To add a rule for the color or font style:
Calculated values do not require any rules at all, but they can be used to emphasize a certain value using a color or a different font style.
1.  Open the Calculated Value Settings dialog and go to the **Values** page.
2.  Click **Add Rule...**.
    Response: The Add Rule dialog is displayed.
3.  Define the **Rule type** to apply.
4.  Set the **Value** for the rule.
5.  Specify the **Color** and **Font style** to use when the rule is applied.
6.  Click **OK**.

Comment: You can add more than one rule. If you add many rules, the rules are prioritized from top to bottom, for each row. None of the rules further down in the list will be considered once a rule higher up in the list has been applied. You can click and drag a rule in the Rules list to change the order.

### ► To change the formatting:

1. Open the Calculated Value Settings dialog and go to the **Formatting** page.
2. Click to select the **Category** of your choice. For example, "Number".
   Response: The settings for the selected category are shown.
3. Make the desired changes. For example, change the number of decimals shown.
4. Click **Close** or **OK**.

## Graphical table specific information

When calculated values are included in a graphical table, the settings for the calculated value item normally control a number of separate calculated values, one for each value in the graphical table row axis.

### ► To lock the calculated value so it does not react to filtering:

1. Open the Calculated Value Settings dialog and go to the **Data** page.
2. Make sure that the **Specify separate data limiting** radio button is selected.
3. Clear all check boxes under **Limit data using filterings**.
   Comment: You can also select one specific filtering scheme and keep from modifying any of the filters in it.
4. Click **Close** or **OK**.

### ► To add a calculated values column to a graphical table:

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Axes** page.
4. Click on **Add** and select **Calculated Value** from the drop-down menu.
   Response: A Calculated Value Settings dialog is displayed and a new calculated value item is shown in the graphical table.
   Comment: Note that each calculated value column added to a graphical table has its own settings.
5. On the **Values** page, select a column, hierarchy or expression in the **Calculate values using** field.
6. On the **General** page, change the **Name** of the new column.
   Comment: You can hide the name form the graphical table by clearing the Show name in header check box. (The entire header row of the graphical table can also be hidden from the Appearance tab of the Graphical Table Properties.)
7. If desired, make other changes to the default settings, such as changing the filtering scheme on the Data page, adding an action or setting up a rule, see above.
8. When you are done, click **Close**.

### ► To change the column header for a calculated values column:

1. Open the Calculated Value Settings dialog and go to the **General** page.
2. Type a new **Name** for the column.
3. Make sure that the **Show name in header** check box is selected.
4. Click **Close**.

**► To hide the column name from a graphical table:**

Open the Calculated Value Settings dialog and go to the **General** page.

1. Clear the **Show name in header** check box.

   Comment: The entire header row of the graphical table can be hidden from the Appearance tab of the Graphical Table Properties.

2. Click **Close**.

## Text area specific information

Using calculated values in a text area works slightly different from when it is included in a graphical table. Below are some useful tips for working with calculated values in the text area.

**► To add a calculated value to a text area:**

1. Create a text area where you want the calculated value to reside.

2. Click on the Toggle Edit Mode button, ✎, in the text area title bar to make sure that the text area is in edit mode.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.

3. Type some descriptive text in the text area regarding what the calculated value will show.

4. Click on the **Insert Dynamic Item** button, �² , and select the **Calculated Value** option.

   Response: The Calculated Value Settings dialog is displayed.

5. On the **Values** page, select a column, hierarchy or expression in the **Calculate values using** field.

   Comment: If desired, make other changes to the default settings, such as changing the filtering scheme on the Data page, adding an action or setting up a rule, see above.

6. Click **OK**.

   Response: The calculated value is now added to the text area.

**► To lock the calculated value so it does not react to filtering:**

1. Open the Calculated Value Settings dialog and go to the **Data** page.

2. Clear all check boxes under **Limit data using filterings**.

   Comment: You can also select one specific filtering scheme and keep from modifying any of the filters in it.

3. Click **Close** or **OK**.

**► To change the font, style and size of calculated values in the text area:**

1. Click on the Toggle Edit Mode button, ✎, in the text area title bar.

2. Right-click on the calculated value and select **Format Control...** from the pop-up menu.

   Response: The Format Control dialog is opened.

3. Adjust the font settings in the dialog to change the appearance of the calculated value to your liking.

4. Click **OK**.

   Response: The new font settings are applied to the calculated value.

5. Click on the Toggle Edit Mode button, ✎, in the text area title bar again.

   Response: The Edit mode is closed and you see the final result.

**Note:** The text color cannot be set using the Format Control dialog. Text color is instead defined by rules. See "To add a rule for the color or font style" above for more information.

**Note:** When working with calculated values, make sure you do not unintentionally override any font style settings that have been defined in a rule. If you apply a font style (Bold and Italic) from the Format Control dialog, it will be added to the calculated value on top of any font style included in a rule for the calculated value. For example, if you select the check box for Bold in the Format Control dialog, then the calculated value will always be displayed as bold. A rule stating that the value should be displayed in bold only if the value is greater than a certain value will have no effect, since the calculated value is already displayed in bold.

## 4.3.3.9.3     Calculated Value Settings

The Calculated Value Settings dialog consists of several pages:

- General
- Data
- Formatting
- Values
- Actions
- Tooltip

### ► To reach the Calculated Value Settings dialog from a graphical table:

1. Right-click on the calculated value column in a graphical table visualization.
2. Select **Properties** from the pop-up menu.
3. If the Calculated Value Settings dialog is not opened directly, go to the **Axes** page in the Graphical Table Properties dialog, select the Calculated Value column you want to modify and click **Settings...**.

### ► To reach the Calculated Value Settings dialog from a text area:

1. Click on the Toggle Edit Mode button, ✐ , in the text area title bar, to make sure that the text area is in Edit Mode.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
2. Double-click on the gray edit box representing the desired calculated value in the text area.

## 4.3.3.9.4    Calculated Value Settings - General



| Option | Description |
|---|---|
| **Name** | The name of the calculated value. If the calculated value is included in a graphical table, then this name is the column header which can be shown or hidden using the check box below. Otherwise, the name is simply used to identify this particular calculated value column on the Axes page of the graphical table or in Edit-mode in a text area. |
| **Show name in header** | [Only applicable when the calculated value is part of a graphical table.] Shows or hides the column header. |

## 4.3.3.9.5     Calculated Value Settings - Data
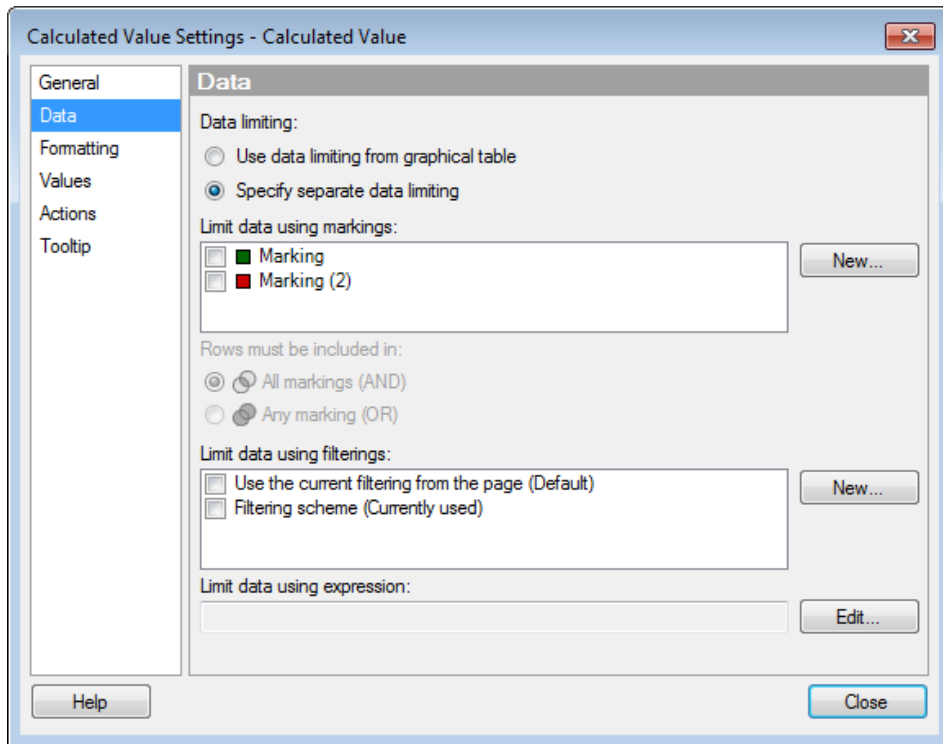


### Calculated Value in Graphical Table

When the calculated value is used in a graphical table the selection of data table and marking is already done in the Graphical Table Properties - Data page, so these options are not available here. Instead you will get the choice to inherit the data limiting settings or to use separate data limiting:

| Option | Description |
| --- | --- |
| **Data limiting** | |
| **Use data limiting from graphical table** | Use this option to inherit the data limiting settings from the graphical table. |
| **Specify separate data limiting** | Use this option if you want to specify other limitations for the calculated value column than you have set up for the graphical table. |

### Calculated Value in Text Area

When a calculated value is used in a text area you must specify the data table to work on.

| Option | Description |
| --- | --- |
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | [Not applicable for calculated values in text area.] |

### All Calculated Values

| Option | Description |
|---|---|
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this dynamic item. This means that the dynamic item only displays data that has been marked in other visualizations.<br><br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br><br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this dynamic item to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This dynamic item will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this dynamic item to show the union of the markings selected in Limit data using markings.<br><br>This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This dynamic item will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this dynamic item.<br><br>Select **Use the current filtering from the page** if you want the dynamic item to always utilize the filtering scheme that is used on the page where the dynamic item is located. If you move the dynamic item to a new page, then the dynamic item will automatically start reacting on the filtering scheme that is used on the new page.<br><br>Select a specific filtering scheme from the list if you want the dynamic item to always use that filtering scheme. Moving the dynamic item to another page with a different filtering scheme will not affect this setting.<br><br>If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the dynamic item will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme.<br><br>The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain dynamic item using an expression. If you have defined a limiting expression, |

|  | it will be displayed here. |
|---|---|
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define an expression to use for limiting the data in this dynamic item. |

## 4.3.3.9.6    Calculated Value Settings - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays how the calculated value is formatted. |
| **Reset** | Resets the formatting for the calculated value according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis (value). Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**4.3.3.9.7      Calculated Value Settings - Values**



| Option | Description |
|---|---|
| **Calculate values using** | Select the column and aggregation method to base your calculated value on. |
| **Rules** | Lists all defined rules.<br>If you add many rules, the rules are prioritized from top to bottom. None of the rules further down in the list will be considered once a rule higher up in the list has been applied. You can click and drag a rule in the Rules list to change the order. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule to control the color and font style for a calculated value. For example, you can define one rule to give the top five items in your data a particular color and another rule to provide a different color for all other rows. See Details on Add/Edit Rule for full descriptions of the rule types. |

### 4.3.3.9.8 Calculated Value Settings - Actions



| Option | Description |
|---|---|
| **Perform action on click** | Select the check box to specify an action that should happen when clicking on the calculated value. Actions include operations like going to another page, applying a bookmark, a data function or executing a script. |
| **Settings...** | Opens the Action Settings dialog where you can specify what should happen when clicking on this calculated value.<br><br>In the graphical table, the action is specified for the whole item column. However, if the action is based on a script, then you may obtain different results depending on which cell you click on. See Action Script Examples for more information. |

## 4.3.3.9.9     Calculated Value Settings - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
|   **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
|   **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

### 4.3.3.9.10    Details on Add/Edit Rule

Use these dialogs to define or edit a color rule for a calculated value. This will make sure certain values stand out with a specific color or formatting.

#### ► To reach the Add/Edit Rule dialog:

1.  In the Calculated Value Settings dialog, go to the **Values** page.
2.  Click on the **Add Rule...** button to add a rule. To edit an existing rule, double-click on the rule of interest in the list.



| Option | Description |
|---|---|
| **Rule type** | Specifies which rule type to add. See below for descriptions of all available rule types. |
| **Value** | Defines the value or values the rule should apply to. The available options depend on the rule type selected. See Details on Point/Value Menu for descriptions of all the options in this menu. |
| **Color** | Specifies the color to use for the rule. |
| **Font style** | Specifies the font style to use for the rule. You can show calculated values using Regular, Bold or Italic font style. |

#### Available rule types:

| Rule Type | Description |
|---|---|
| **Top** | Sets the top number of items to the selected appearance. Specify the number of items to affect in the Value field. |
| | **Note:** In some cases more than the defined number of items may be affected by a rule. For example, if the rule states that the top three items should be yellow, and four items represent the highest value, then all four of these items will become yellow. |
| **Bottom** | Sets the bottom number of items to the selected appearance. Specify the number of items to affect in the Value field. |
| | **Note:** In some cases more than the defined number of items may be |

| | |
|---|---|
| | affected by a rule. For example, if the rule states that the bottom three items should be yellow, and four items represent the lowest value, then all four of these items will become yellow. |
| **Between** | Sets all the items representing values between the two specified values to the selected appearance. Specify the values in the two Value fields. |
| **Equal to** | Sets all the items representing values that are equal to the specified value to the selected appearance. |
| **Not equal to** | Sets all the items representing values that are not equal to the specified value to the selected appearance. |
| **Greater than** | Sets all the items representing values greater than the specified value to the selected appearance. |
| **Greater than or equal to** | Sets all the items representing values greater than or equal to the specified value to the selected appearance. |
| **Less than** | Sets all the items representing values less than the specified value to the selected appearance. |
| **Less than or equal to** | Sets all the items representing values less than or equal to the specified value to the selected appearance. |
| **Boolean expression** | Lets you define a boolean expression. All the items for which the expression is true will get the specified appearance. See To add a boolean expression as a rule for a description. To learn more about custom expressions in general, see Custom Expressions Introduction. |

# 4.3.3.10 Icon

## 4.3.3.10.1 What are Icons?

Icons are small, simple images traditionally used for displaying trends or variations of some variable. They can be displayed in the context of a graphical table or, separately, in a text area. In the example below, the icons are used in a graphical table to show the top, bottom and intermediate sales region of some fictive product:

| Region | Icon ▼ |
|--------|--------|
| East | ✚ |
| West | ● |
| Central | ▬ |

The general idea of icons is that they can be included directly where they are needed, in tables or text, in order to provide information at a glance. Icons can be set up to change with filtering like any traditional Spotfire visualization or they can be locked to show fixed values, using the Data page in the Icon Settings dialog.

## 4.3.3.10.2 How to Use Icons

Icons can be shown both separately in a text area or be included as a column in a graphical table. The behavior of the icon is quite similar in both places, but some differences exist. Therefore, this list of step instructions has been split into three different sections: General information applicable to both instances, Graphical table specific information and Text area specific information.

### General information

#### ► To add actions performed when clicking on the icon:

1. Open the Icon Settings dialog and go to the **Actions** page.
2. Select the **Perform action on click** check box.
3. Click on **Settings...**.
   Response: The Action Settings dialog is displayed.
4. Type a good **Description** explaining what will happen when clicking on the icon.
   Comment: The description can be shown in the tooltip for the icon.
5. Add the desired actions and click **OK**.

#### ► To add a rule defining the color and shape:

Icons need at least one defined rule for anything to be visible. It is the rules that determine what to display and when.

1. Open the Icon Settings dialog and go to the **Icons** page.
2. Click **Add Rule...**.
   Response: The Add Rule dialog is displayed.
3. Define the **Rule type** to apply.
4. Set the **Value** for the rule.
5. Specify the **Color** and **Shape** to use when the rule is applied.
6. Click **OK**.
   Comment: You can add more than one rule. If you add many rules, the rules are prioritized from top to bottom. You can click and drag a rule in the Rules list to change the order.

## Graphical table specific information

When icons are included in a graphical table, the settings for the icon column normally control a number of separate icons, potentially one for each value in the graphical table row axis.

### ► To lock the icon column so it does not react to filtering:

1. Open the Icon Settings dialog and go to the **Data** page.
2. Make sure that the **Specify separate data limiting** radio button is selected.
3. Clear all check boxes under **Limit data using filterings**.

   Comment: You can also select one filtering scheme and keep from modifying any of the filters in it.
4. Click **Close** or **OK**.

### ► To add an icons column to a graphical table:

1. Right-click on the graphical table to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Axes** page.
4. Click on **Add** and select **Icon** from the drop-down menu.

   Response: An Icon Settings dialog is displayed and a new icon column is shown in the graphical table.

   Comment: Note that each icon column added to a graphical table has its own settings.
5. On the **Icons** page, select a column, hierarchy or expression in the **Calculate icons using** field.
6. Define one or more rules (see above) to control what icons to show and when.
7. On the **General** page, change the **Name** of the new column.

   Comment: You can hide the name form the graphical table by clearing the Show name in header check box. (The entire header row of the graphical table can also be hidden from the Appearance tab of the Graphical Table Properties.)
8. If desired, make other changes to the default settings, such as changing the filtering scheme on the Data page, adding an action, etc.
9. When you are done, click **Close**.

### ► To change the column header for an icon column:

1. Open the Icon Settings dialog and go to the **General** page.
2. Type a new **Name** for the column.
3. Make sure that the **Show name in header** check box is selected.
4. Click **Close**.

### ► To hide the column name from a graphical table:

Open the Icon Settings dialog and go to the **General** page.

1. Clear the **Show name in header** check box.

   Comment: The entire header row of the graphical table can be hidden from the Appearance tab of the Graphical Table Properties.
2. Click **Close**.

## Text area specific information

When a icon is used in a text area it behaves slightly different from when it is included in a graphical table. For example, you will not get instant feedback to your changes since the icon does not show up until you leave the edit mode. However, the placement of the edit box tells you where in the text area the icon will show up.

### ► **To lock the icon so it does not react to filtering:**

1.  Open the Icon Settings dialog and go to the **Data** page.
2.  Clear all check boxes under **Limit data using filterings**.
    Comment: You can also select one filtering scheme and keep from modifying any of the filters in it.
3.  Click **Close** or **OK**.

### ► **To add an icon to a text area:**

1.  Create a text area where you want the icon to reside.
2.  Click on the Toggle Edit Mode button, ✐, in the text area title bar to make sure that the text area is in edit mode.
    Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
3.  Type some descriptive text in the text area regarding what the icon will show.
4.  Click on the **Insert Dynamic Item** button, ⬚▾, and select the **Icon** option.
    Response: The Icon Settings dialog is displayed.
5.  On the **Icons** page, select a column, hierarchy or expression in the **Calculate icons using** field.
6.  Define one or more rules (see above) to control what icons to show and when.
    Comment: If desired, make other changes to the default settings, such as changing the filtering scheme on the Data page, adding an action, etc.
7.  Click **OK**.

### ► **To change the size of the icon in a text area:**

1.  Click on the Toggle Edit Mode button, ✐, in the text area title bar to make sure that the text area is in edit mode.
    Response: The outline of the icon is shown as a gray box.
2.  Click on the gray edit box to select it and drag either of the corners to resize the box.
    Comment: The size slider within the Icons page of the Icon Settings dialog can only resize the icon within the current edit box. If the slider is set to Max, then the edit box limit will be the limit of the icon. If the slider is set to Min, then the icon will be small, even if the edit box is made larger. Hence, it is recommended that the slider in the Settings dialog is used only for fine tuning the size of really small icons.
3.  Click on the Toggle Edit Mode button, ✐, in the text area title bar again.
    Response: The Edit mode is closed and you see the final result.
    Comment: You can always reset the size of the icon to the original size if you change your mind. Just open the Format Control dialog by right-clicking on the gray box, click on the Reset button and then OK, and the size will be reset.

## 4.3.3.10.3    Icon Settings

The Icon Settings dialog consists of several pages:

*   General
*   Data
*   Icons
*   Actions
*   Tooltip

### ► **To reach the Icon Settings dialog from a graphical table:**

1.  Right-click on the icon column in a graphical table visualization.
2.  Select **Properties** from the pop-up menu.

3. If the Icon Settings dialog is not opened directly, go to the **Axes** page in the Graphical Table Properties dialog, select the Icon column you want to modify and click **Settings...**.

► **To reach the Icon Settings dialog from a text area:**

1. Click on the Toggle Edit Mode button, ✎ , in the text area title bar, to make sure that the text area is in Edit Mode.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.

2. Double-click on the gray edit box representing the desired icon in the text area.

## 4.3.3.10.4    Icon Settings - General



| Option | Description |
|---|---|
| **Name** | The name of the icon. If the icon is included in a graphical table, then this name is the column header which can be shown or hidden using the check box below. Otherwise, the name is simply used to identify this particular icon column on the Axes page of the graphical table or in Edit-mode in a text area. |
| **Show name in header** | [Only applicable when the icon is part of a graphical table.] Shows or hides the column header. |

### 4.3.3.10.5  Icon Settings - Data
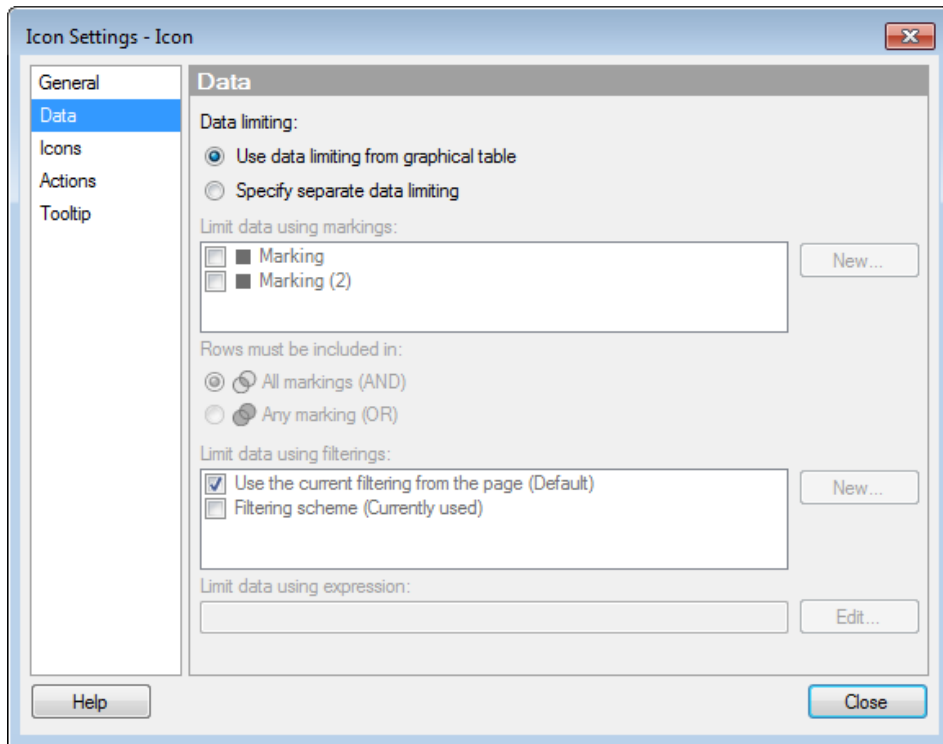


## Icon in Graphical Table

When the icon is used in a graphical table the selection of data table and marking is already done in the Graphical Table Properties - Data page, so these options are not available here. Instead you will get the choice to inherit the data limiting settings or to use separate data limiting:

| Option | Description |
|---|---|
| **Data limiting** | |
| **Use data limiting from graphical table** | Use this option to inherit the data limiting settings from the graphical table. |
| **Specify separate data limiting** | Use this option if you want to specify other limitations for the icon column than you have set up for the graphical table. |

## Icon in Text Area

When an icon is used in a text area you must specify the data table to work on.

| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | [Not applicable for icons in text area.] |

**All Icons**

| Option | Description |
|---|---|
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this dynamic item. This means that the dynamic item only displays data that has been marked in other visualizations. |
| | If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. |
| | The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this dynamic item to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This dynamic item will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this dynamic item to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This dynamic item will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this dynamic item. |
| | Select **Use the current filtering from the page** if you want the dynamic item to always utilize the filtering scheme that is used on the page where the dynamic item is located. If you move the dynamic item to a new page, then the dynamic item will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the dynamic item to always use that filtering scheme. Moving the dynamic item to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the dynamic item will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain dynamic item using an expression. If you have defined a limiting |

expression, it will be displayed here.

| | |
|---|---|
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define an expression to use for limiting the data in this dynamic item. |

## 4.3.3.10.6    Icon Settings - Icons



| Option | Description |
|---|---|
| **Calculate icons using** | Select the column and aggregation method to base your icon calculations on. |
| **Rules** | Lists all defined rules. <br><br> If you add many rules, the rules are prioritized from top to bottom. None of the rules further down in the list will be considered once a rule higher up in the list has been applied. You can click and drag a rule in the Rules list to change the order. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule to control when a row should display a certain icon. For example, you can define one rule to give the top five items in your data a particular icon and another rule to provide a different icon for all other rows. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Icon size** | Controls the size of the icon within the current boundaries. If icons are used within a graphical table, then the max size is limited by the row height of the graphical table. If an icon is added to a text area, then the max size is limited by the size of the gray edit box. That size can be modified by dragging the edit box of the icon when in edit mode. |
| **Alignment** | [Only applicable when icons are used in a graphical table.] |

Aligns the icon header and the icons to the Left, Right or Center in the graphical table column.

## 4.3.3.10.7 Icon Settings - Actions



| Option | Description |
|---|---|
| **Perform action on click** | Select the check box to specify an action that should happen when clicking on the icon. Actions include operations like going to another page, applying a bookmark, a data function or executing a script. |
| **Settings...** | Opens the Action Settings dialog where you can specify what should happen when clicking on this icon.<br><br>In the graphical table, the action is specified for the whole item column. However, if the action is based on a script, then you may obtain different results depending on which cell you click on. See Action Script Examples for more information. |

### 4.3.3.10.8 Icon Settings - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

### 4.3.3.10.9 Details on Add/Edit Rule

Use these dialogs to define or edit an icon rule.

#### ► To reach the Add/Edit Rule dialog:

1. In the Icon Settings dialog, go to the **Icons** page.
2. Click on the **Add Rule...** button to add a rule. To edit an existing rule, double-click on the rule of interest in the list.



| Option | Description |
|---|---|
| **Rule type** | Specifies which rule type to add. See below for descriptions of all available rule types. |
| **Value** | Defines the value or values the rule should apply to. The available options depend on the rule type selected. See Details on Point/Value Menu for descriptions of all the options in this menu. |
| **Color** | Specifies the color of the icon. |
| **Shape** | Specifies the shape of the icon. |

#### Available rule types:

| Rule Type | Description |
|---|---|
| **Top** | Adds an icon of the selected appearance to the rows of the top number of items. Specify the number of items to affect in the Value field.<br>**Note:** In some cases more than the defined number of items may be affected. For example, if the rule states that the top three items should be indicated using a yellow star, and four items represent the highest value, then all four of these items will get the yellow star. |
| **Bottom** | Adds an icon of the selected appearance to the rows of the bottom number of items. Specify the number of items to affect in the Value field.<br>**Note:** In some cases more than the defined number of items may be affected. For example, if the rule states that the bottom three items |

| | should be indicated using a red star, and four items represent the lowest value, then all four of these items will get the red star. |
|---|---|
| **Between** | Adds an icon of the selected appearance to all the items representing values between the two specified values. Specify the values in the two Value fields. |
| **Equal to** | Adds an icon of the selected appearance to all the items representing values that are equal to the specified value. |
| **Not equal to** | Adds an icon of the selected appearance to all the items representing values that are not equal to the specified value. |
| **Greater than** | Adds an icon of the selected appearance to all the items representing values greater than the specified value. |
| **Greater than or equal to** | Adds an icon of the selected appearance to all the items representing values greater than or equal to the specified value. |
| **Less than** | Adds an icon of the selected appearance to all the items representing values less than the specified value. |
| **Less than or equal to** | Adds an icon of the selected appearance to all the items representing values less than or equal to the specified value. |
| **Boolean expression** | Lets you define a boolean expression. All the items for which the expression is true will get the an icon of the selected appearance. See To add a boolean expression as a rule for a description. To learn more about custom expressions in general, see Custom Expressions Introduction. |

# 4.4    Bar Chart

## 4.4.1    What is a Bar Chart?

A bar chart is a way of summarizing a set of categorical data (continuous data can be made categorical by auto-binning). The bar chart displays data using a number of bars, each representing a particular category. The height of each bar is proportional to a specific aggregation (for example the sum of the values in the category it represents). The categories could be something like an age group or a geographical location. It is also possible to color or split each bar into another categorical column in the data, which enables you to see the contribution from different categories to each bar or group of bars in the bar chart.

### Example:

The bar chart below shows the total sum of sales for fruits and vegetables over three years.
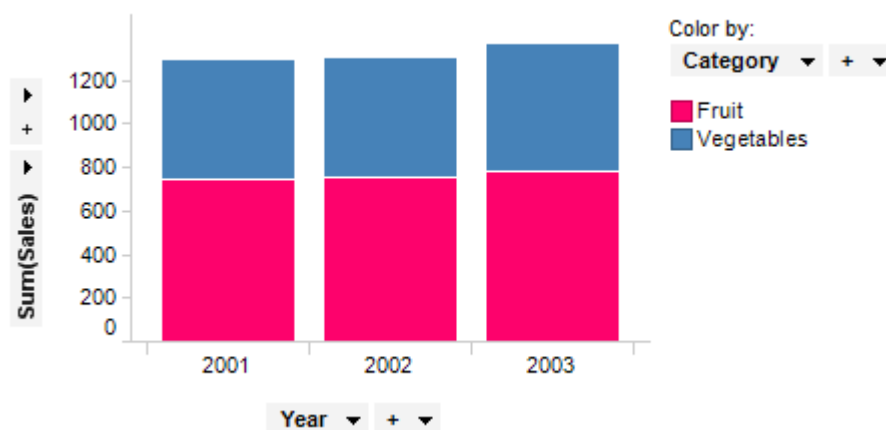


The bars are colored by the Category column, which contains two values: Fruit and Vegetables. You can also view these color categories side-by-side as in the bar chart below. Right-click in the visualization and select Side-by-Side Bars from the pop-up menu to get this appearance.
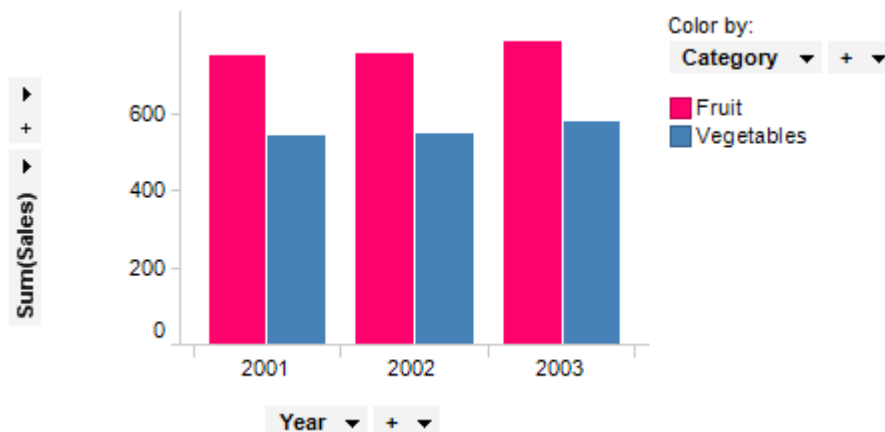


Another way to get a similar appearance is to add the column Category to the category axis to create a hierarchy on that axis. See Hierarchies to learn more about multiple columns on an axis.

If you prefer the bars to be displayed horizontally, right-click in the visualization and select Horizontal Bars from the pop-up menu.
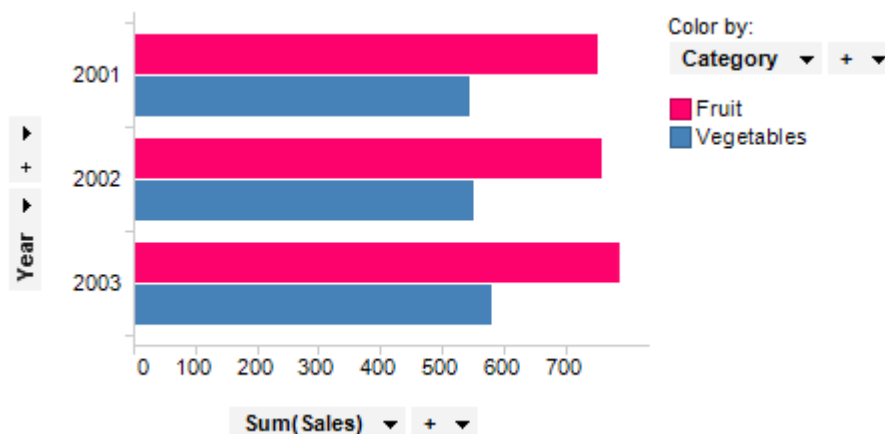
Note that in some cases the category axis is referred to as X-axis, and the value axis is referred to as Y-axis. This is the case in some lines and curves, for example, as well as in OVER statements in custom expressions.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

# 4.4.2 How to Use the Bar Chart

## ► To apply coloring:

1. In the **Filters** panel, click and hold the left mouse button on the filter representing the column you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under Edit > Document Properties.

2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Color target.

   Response: The bars are colored with one color for each category in the selected column.

   Comment: To learn more about coloring in Spotfire, see Coloring Overview.

## ► To sort the bar chart:

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Appearance** page.
4. Select the **Sort bars by value** check box.

   Response: The bars are sorted according to the summarized value for each bar.

   Comment: Go to the Category Axis page in the Visualization Properties dialog and select Reverse scale if you want the reversed order of the bars.

## ► To change orientation of the bars:

1. Right-click in the bar chart to display the pop-up menu.
2. Select **Vertical Bars** or **Horizontal Bars** depending on the current orientation of the bars.

   Response: The orientation of the bars is now changed according to your selection.

### ► To change the aggregation type:

1.  Click on the axis selector on the value axis. This is where it says Sum([Column Name]), Count(...), or similarly.

    Response: A drop-down menu appears.

2.  Select **Aggregation >** and a new aggregation measure from the submenu.

    Comment: You can also right-click on the axis selector and select Custom Expression... from the menu to create your own expression.

    Response: The bar chart is updated to show the new information.

### ► To auto-bin a continuous category axis:

If you have a column containing values that can be interpreted as continuous values, such as an "Age" column, but you want to display bars for a number of age groups instead, you can use the auto-binning function.

1.  Put the desired continuous column on the category axis.

2.  Right-click on the column selector and select **Auto-bin Column** from the pop-up menu.

    Response: Spotfire automatically creates a number of bins in which the values are placed.

3.  If desired, use the binning slider to change the number of bins used in the visualization.

    Comment: You can also right-click on the column selector and select **Number of Bins...** to enter an exact number of bins on the category axis.

### ► To use multiple columns on the value axis:

This is an example of how to use two columns on the value axis. Each column will be represented by a bar.

1.  Click on the arrow next to the plus sign on the value axis.

2.  Select a new column from the menu.

    Comment: A column can also be dragged and dropped from the filters panel.

3.  Select **(Column Names)** in the category axis column selector.

    Response: The two bars appear on the category axis.

    Comment: For more information on (Column Names), see the Non-Column Selections page.

### ► To split stacked bars:

This is an example of how you can split the bars in a visualization to display side-by-side bars instead of stacked bars.

1.  Create a bar chart with one numerical column on the value axis (e.g., Sales), one categorical column on the category axis (e.g., Year), and one categorical column to color by (e.g., Category).

    Response: A stacked bar chart with the sum of the numerical column (Sales) per category axis category (Year) is displayed.

2.  Right-click and select **Side-by-Side Bars** from the pop-up menu.

3.  Response: Each color category is now presented as a separate bar.

    Comment: You could also have kept the Stacked bars option and added the color category column to the category axis instead, in order to produce a similar result.

### ► To show each bar segment as a percentage of the total bar:

This is an example of how you can present all stacked bars as 100% high and show the segments in each bar as a percentage of the entire bar.

1.  Create a bar chart with one numerical column on the value axis (e.g., Sales), one categorical column on the category axis (e.g., Year), and one categorical column to color by (e.g., Category).

Response: A stacked bar chart with the sum of the numerical column (Sales) per category axis category (Year) is displayed.

2. Right-click and select **100% Stacked Bars** from the pop-up menu.

Response: All bars are now 100% and the percentage of each segment can be shown in a tooltip by hovering with the mouse pointer over the segment.
Comment: You can also display the segment values or percentage by adjusting the Labels settings in the Visualization Properties dialog.

### ► To mark bars or bar segments:

- Click on a bar or bar segment to mark it.
  Comment: Press **Ctrl** and click to add more bars or bar segments.
- Click and drag with the mouse to draw a rectangle over interesting items.
  Response: All bars or bar segments touched by the rectangle will be marked.
- Place the mouse pointer in the area of the scale labels and then click and drag with the mouse along the axis.
  Response: A rectangle is drawn across the visualization so that you can mark all bars whose heights are between two specified axis values.
  Comment: Only those bars with the top part of the bar included within the axis-marking rectangle will be marked. This allows you to select bars with heights within a specific span. You cannot mark bar segments using axis-marking.
  To learn more about marking, see Marking in Visualizations.

### ► To add a reference line to the bar chart:

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Lines & Curves** page.
4. Select the check box for any of the default lines or click on **Add** to define a new horizontal or vertical line.
   Comment: You can only add lines to the category axis when it is in continuous mode. Right-click on the scale labels and select Continuous Scale from the pop-up menu.

### ► To add a curve fit to the bar chart:

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Lines & Curves** page.
4. Click on **Add** and select a suitable curve fit from the drop-down menu.
   Comment: You can select from a number of predefined curve fits, or define your own curve using Curve Draw. See Curve Fit Models for more information about the different options.
5. Once the curve has been created, you can change its settings on the Lines & Curves page. Some of the curve settings are also available from the pop-up menu in the visualization.

### ► To add multiple scales:

1. Right-click on the value axis and select **Multiple Scales** from the pop-up menu.
   Comment: By default, you will get one scale for each color that is defined under Color By.
2. You can also go to the Value Axis page in the Visualization Properties dialog and click the Multiple scales radio button. This is also where you can change the settings for the different scales as well as define which side of the bar chart a certain scale should be located.

Comment: If you are using values from different columns on the various scales, you can also use drag and drop to move columns from one side to another.

### ► To add error bars to the bar chart:

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Error Bars** page.
4. In the Visible error bars list, select the column or measure to use, and select the check box next to it.

   Response: The settings for the selected column or measure will be displayed in the lower part of the dialog.

   Comment: Only columns and measures with numerical values are listed.
5. To define an upper error, choose a column or measure in the Upper error column selector. To define a lower error, choose a column or measure in the Lower error column selector.

   Response: The defined error bars appear in the visualization. See the Error Bars page in the Bar Chart Properties for more information about the settings. To learn more about error bars in general, see Error Bars.

   **Note:** Error bars cannot be added to bar charts with percentage scaling. Therefore, stacked bar charts and bar charts where all bars have maximum height cannot be combined with error bars.

### ► To create a new bar chart:

1. Click on the New Bar Chart button on the toolbar, ![icon].

   Comment: You can also select **Insert > New Visualization > Bar Chart** from the menu.

   Response: A first attempt to set up a suitable bar chart is made by the application.
2. Adjust the bar chart to display the categories and measures of your choice.

   Comment: For more information about how to change what to show on the two axes, see Column Selectors.

## 4.4.3 Bar Chart Properties

### 4.4.3.1 Bar Chart Properties

The Bar Chart Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- Category Axis
- Value Axis
- Colors
- Labels
- Tooltip
- Legend
- Trellis
- Lines & Curves
- Error Bars

► **To reach the Bar Chart Properties dialog:**

1. Right-click on the bar chart visualization.
2. Select **Properties** from the pop-up menu.
3. Comment: You can also click on the bar chart visualization to make it active and then select **Edit > Visualization Properties**.

## 4.4.3.2    Bar Chart Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

### 4.4.3.3 Bar Chart Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br>This can be used if you have two visualizations with different markings |

| | |
|---|---|
| | and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.4.3.4 Bar Chart Properties - Appearance



| Option | Description |
|---|---|
| **Orientation** | |
| **Vertical bars** | Use this option to display the bars in the visualization vertically. |
| **Horizontal bars** | Use this option to display the bars in the visualization horizontally. |
| **Layout** | |
| **Side-by-side bars** | Use this option to place bars from the color category side-by-side instead of stacked on top of each other. The effect is similar to what you get if you add the color category column to the category axis together with the current category axis column. |
| **Stacked bars** | Use this option to keep color categories stacked on top of each other. |
| **100% stacked bars** | Use this option to set the heights of all bars to 100%. The size of the bar segments represents how much of the percentage of the total sum for the group is constituted of the sums of the values in the category. The exact percentage of each category can be seen in the tooltip displayed when hovering with the mouse pointer over a bar segment. |
| **Bar width** | Drag the slider to modify the width of the bars. |
| **Show shadows indicating the unfiltered data** | Shows a gray shadow behind all visible bars, indicating the height of the bar if all filters are reset and all data is available. |
| **Sort bars by value** | Sorts all bars from the highest to the lowest bar. The bars are resorted when filtering is applied. |

**Time series**

| | |
|---|---|
| **Compensate for missing values** | Select this check box if you are using a Date, Time or DateTime column somewhere in the visualization and you need to perform some calculation where a required time period is missing. For example, if you have created a visualization showing cumulative sums and there are missing data for some categories, selecting this check box will produce a bar of the same size as the previous bar instead of showing no bar at all. See Working With Time Hierarchies for more information. |
| | Enabling this setting will temporarily add new rows with empty values for the missing periods so that they can be used in the calculation. |

## 4.4.3.5 Bar Chart Properties - Formatting
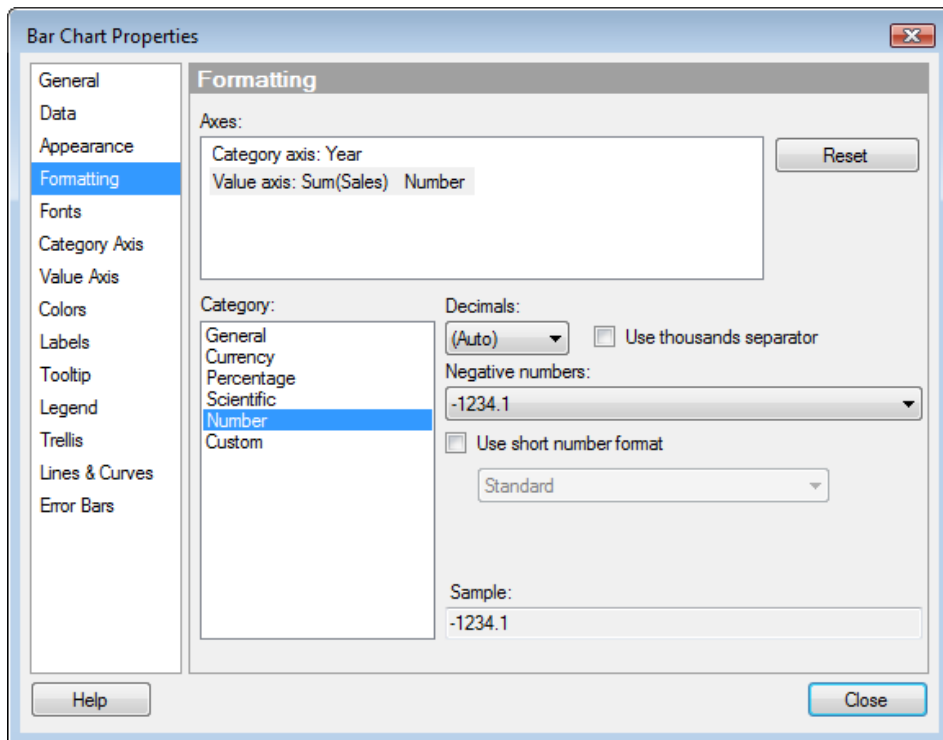


| Option | Description |
|---|---|
| **Axes** | Displays which column and category are currently being used on each of the two axes in the bar chart. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for both axes at the same time. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting |

Settings for a full description of all possible options.

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.4.3.6    Bar Chart Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.4.3.7    Bar Chart Properties - Category Axis
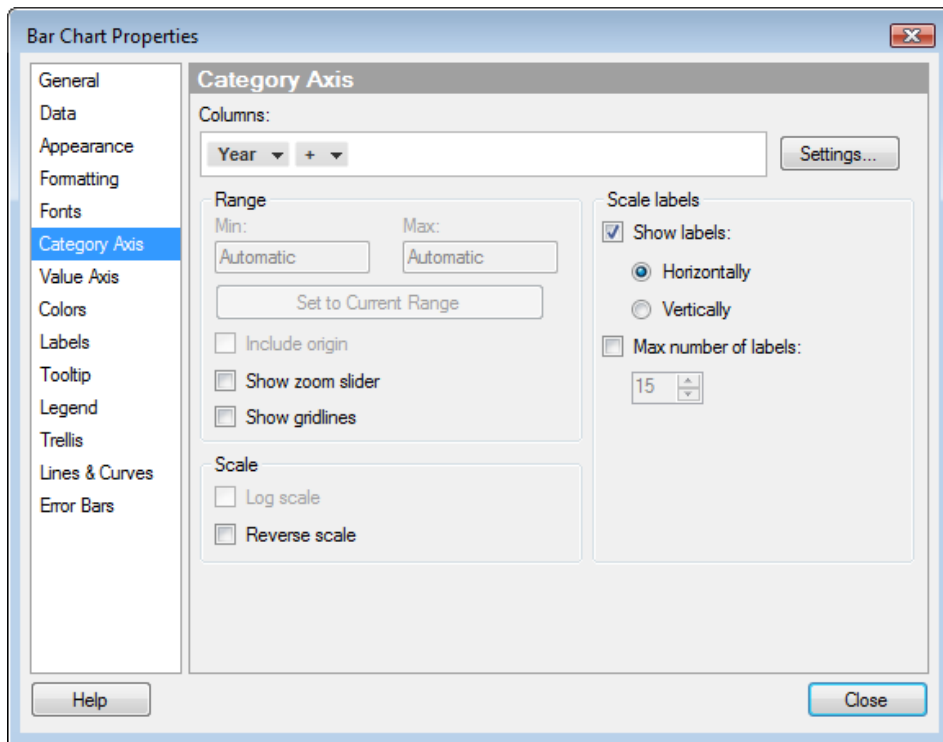


| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the category axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the scale mode from categorical to continuous, and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting bars in the bar chart. |
| **Show gridlines** | Specifies whether or not gridlines should be visible. Comment: This refers to vertical gridlines in a vertical bar chart, and |

|  |  |
|---|---|
|  | horizontal gridlines in a horizontal bar chart. |
| **Scale labels** |  |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** |  |
| **Log scale** | Available for continuous axes only. Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.4.3.8    Bar Chart Properties - Value Axis

### One value axis with a single scale



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the value axis. |
| **Settings...** | [Not available in this visualization.] |

| | |
|---|---|
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the value axis, or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two value axes (left and right) with two or more different scales. For example, use it if you want to display two columns of very different magnitudes in the same visualization. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the bar chart. |
| **Show gridlines** | Specifies whether or not gridlines should be visible.<br><br>Comment: This refers to vertical gridlines in a horizontal bar chart, and horizontal gridlines in a vertical bar chart. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** | |
| **Reverse scale** | Reverses the current sort order on the scale. |

### Multiple scales



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the value axis. |
| **Settings...** | [Not available in this visualization.] |
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the value axis, or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two value axes (left and right) with two or more different scales. For example, use it if you want to display two columns of very different magnitudes in the same visualization. |
| **Individual scaling** | |
| **For each color** | Use this option to display one scale for each category used to color the markers by. For example, if you put two different columns on the value axis (for example, Oil Production and BNP), you can use the "(Column Names)" option to color by and click this radio button to display one scale for Oil Production and one for BNP.<br><br>Do not use this option if you need to color by a large number of different categories.<br><br>Note that you should apply true categorical coloring before using this option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

| | |
|---|---|
| **For each trellis panel** | Use this option to display one scale for each trellis panel. |
| **Zoom** | |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the bar chart. |
| **Show gridlines** | Specifies whether or not gridlines should be visible. Comment: This refers to vertical gridlines in a horizontal bar chart, and horizontal gridlines in a vertical bar chart. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. **Note:** Only available for individual scaling for each trellis panel. |
| **Vertically** | Shows scale labels vertically. **Note:** Only available for individual scaling for each trellis panel. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Individual scale settings** | |
| [Drop-down list] | Select the scale for which you wish to change the settings. Select All scales to change settings for all scales simultaneously. |
| **Scale Range...** | Opens the Scale Range dialog where you can specify the range of the selected scale, and also determine whether or not to include the origin (0,0). |
| **Position** | Specifies which side of the visualization the scales should be positioned. The available alternatives vary depending on whether the bars are displayed vertically or horizontally. |
| **Left value axis** | Select this option to place the selected scale on the left-hand side of the visualization in a vertical bar chart. |
| **Right value axis** | Select this option to place the selected scale on the right-hand side of the visualization in a vertical bar chart. |
| **Bottom value axis** | Select this option to place the selected scale at the bottom of the visualization in a horizontal bar chart. |
| **Top value axis** | Select this option to place the selected scale on top of the visualization in a horizontal bar chart. |
| **Reverse scale** | Reverses the current sort order on the scale. |

## 4.4.3.9    Bar Chart Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, or Fixed. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised bar charts, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
|  [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |

| Document Color Schemes | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
|---|---|
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes. **Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| Open from Library... | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| Open from File... | Opens a dialog where you can select a previously saved color scheme. |
| Save As | Lets you save a color scheme as a library item, a local file or a document color scheme. **Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse. **File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse. **Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| Apply to Visualizations... | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed. **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| Add Point | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| Delete Point | Available for continuous columns only. Deletes the selected anchor point. |

| Add Rule... | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
|---|---|
| Reset | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.4.3.10 Bar Chart Properties - Labels



| Option | Description |
|---|---|
| Show labels for | Determines whether to show labels on all bars (**All**), bars containing marked rows only (**Marked rows**), or not to show any labels at all (**None**). |
| Types of labels | Determines whether to show labels on the **Complete bar** and/or on **Bar segments** only. For bar segments you can also specify whether you want the value of the bar segment or the bar segments' percentage of the total value to be shown. |
| | Note that bar segment labels are only drawn if they fit within the bar segment. If no labels are shown, try increasing the bar width, using a |

smaller font for the label, or removing some bar percentage decimals.

| | |
|---|---|
| **Label orientation** | Determines whether to display the labels horizontally or vertically. |
| **Max number of labels on complete bars** | Specifies the maximum number of labels to be shown. If the number is smaller than the available number of bars, the labels will be equally distributed along the category axis. |
| **Bar percentage decimals** | Specifies the number of decimals to show when 100% bars are used.<br>**Note:** Bar percentage is only visible when you have selected the option **All bars should have maximum height** on the Appearance page, and it gives relevant information only when the bars are colored by a column or hierarchy. The number specified here will also affect the number of decimals shown for bar segments in the tooltip. |

## 4.4.3.11    Bar Chart Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |

| Move Up | Moves the selected value up in the list and, hence, up in the tooltip. |
|---|---|
| Move Down | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| Value names and values | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| Visualization properties and values | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, Category axis: 2003, Color: Cucumber, etc. |

## 4.4.3.12 Bar Chart Properties - Legend



| Option | Description |
|---|---|
| Show legend | Specifies whether or not the docked legend should be shown in the visualization. |
| Position | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| Display the following legend items | Specifies what will be shown in the legend. By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| Settings | Defines how the selected legend item should be displayed. The |

available options vary between legend items.

**Show title**   Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:



**Show axis selector**   Select this option to show or hide the axis selector for the selected item.



## 4.4.3.13     Bar Chart Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |

| | | |
|---|---|---|
| **Columns** | | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way. |
| | | The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
| **Split by** | | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | | Opens the Advanced Settings dialog, where you can change the category mode to determine which combinations to show. |

## 4.4.3.14　Bar Chart Properties - Lines & Curves



### First part of the dialog

| Option | Description |
|---|---|
| **Visible lines and curves** | Lists the currently added lines and curves. If a checkmark is shown in the check box, then that reference line is shown in the visualization. Clear the check box to hide a line or curve.<br><br>New lines and curves can be added to this list by clicking on the Add button; see below. |
| **Add** | Displays a menu where you can select which type of line or curve to add to the list of available lines and curves, and in some cases, opens a dialog where you can specify settings to use for that line or curve.<br><br>For more information about the different curve types, see Curve Fit Models. |
| **Edit...** | Opens a dialog where you can change the settings for the selected line or curve (when applicable). |
| **Remove** | Removes the selected line or curve from the list of available lines and curves. |
| **More** | |
| **Duplicate** | Duplicates the currently selected line or curve. This can be particularly useful if you want to add one static curve that is calculated on the whole data set (select the Update curve manually check box) and another one that is changed upon filtering (default). |

| | |
|---|---|
| **Export Curve Fit Result...** | Opens a dialog where you can choose to export the curve fit result for the selected curve to a text file or to Microsoft® Excel®. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file, which contains a bit more information about the columns (types, etc.). The Excel file can be either an XLS file or an XLSX file. |

## Settings

| Option | Description |
|---|---|
| **Appearance** | Determines the color, style and width of lines and curves, as well as the color, style and size of points. |
| **Place in** | Select whether to place the line, curve or point in the Foreground or Background of the visualization. |
| **Transparency** | Determines the transparency of the selected line, curve or point. That is, the degree to which the markers can be seen through it. The transparency is strongly connected to the color. |
| **Label and Tooltip** | Opens a dialog where you can determine what information to show in the label and/or tooltip for the selected line, curve or point. |
| **Included in axis range** | Sets the automatic zooming so that the line, curve or point is always shown, even if it lies far from the currently filtered values. |
| **Update manually** | Select the check box to "freeze" the line or curve so that it is not automatically recalculated upon filtering. You can update the line or curve by clicking the Update button below or by right-clicking in the visualization and selecting Update Lines and Curves and clicking on the one you want to update.<br>**Note:** Not applicable for points. |
| **Update** | When a line or curve has been specified to be manually updated, use this button to perform the update. |
| **One per** | Determines whether to show one line or curve per Color and/or Trellis panel.<br>**Note:** Not applicable for points.<br>Note that you should apply true categorical coloring before using the color option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

**Note:** Whenever there is a reference to X or Y in lines or curves for a bar chart, X always refers to the category axis while Y refers to the value axis.

## 4.4.3.15    Bar Chart Properties - Error Bars



| Option | Description |
|---|---|
| **Visible error bars** | Lists the numerical columns and measures that you can define error bars for in the visualization. If a check mark is shown in the check box, then error bars for that column or measure are visible in the visualization. Clear the check box to hide the error bars for a column or measure.<br>**Note:** No error bars will be visible in the visualization until an upper or lower error has been defined. |
| **Settings** | Shows the settings for the selected column or measure. |
| **Upper error** | Specifies the column and aggregation method, or custom expression to use for the upper error bars.<br>**Note:** The chosen column or measure must have numerical values. |
| **Lower error** | Specifies the column and aggregation method, or custom expression to use for the lower error bars.<br>**Note:** The chosen column or measure must have numerical values. |
| **Color** | |
| **Same as bar** | Choose this option if you want an error bar to have the same color as the bar.<br>**Note:** For positive bars, the lower error bar will be invisible if this option is selected, and for negative bars, the upper error bar will be invisible. |
| **Custom** | Choose this option if you want to use a custom color for the error bars. Click on the drop-down list to show the palette and select a different color. |

| | |
|---|---|
| **Show end caps** | Specifies whether or not orthogonal lines should be displayed at the end of the error bars. |
| **Include error bars in axis range** | Sets the automatic zooming so that the error bars are always visible. |

**Note:** The upper and lower errors refer to the underlying data. This means that if you use reversed scales in a visualization, the error bars will also be reversed. For example, for a vertical bar chart with reversed value axis, the upper error bar will be displayed below the bar. It also means that when the bars are displayed horizontally, an upper error will be displayed to the right of the bar.

# 4.5    Line Chart

## 4.5.1    What is a Line Chart?

Line charts are ideal for showing trends over time. A standard example would be how the stock value for a certain company develops over time on the stock market. However, it does not necessarily need to be time along the X-axis. Any data that behaves like a function with respect to the variable on the X-axis can be plotted. Line charts emphasize time flow and rate of change rather than the amount of change.

You can select parts of a line by clicking and dragging with the mouse. If one node in the line is included when you drag, that node will be marked. If two or more adjacent nodes are included, the line between the nodes will also be marked, but if there are nodes in between which are not included, only the separate nodes will be marked. You can select several nodes in different parts of the line by pressing **Ctrl** and click and drag with the mouse. By pressing **Alt**, the entire line is marked if you click and drag, just as it is if you simply click once anywhere on the line.

### Example:

Below is a line chart showing the sum of sales for two different product categories over several years. The line chart has one color (one line) per product category.
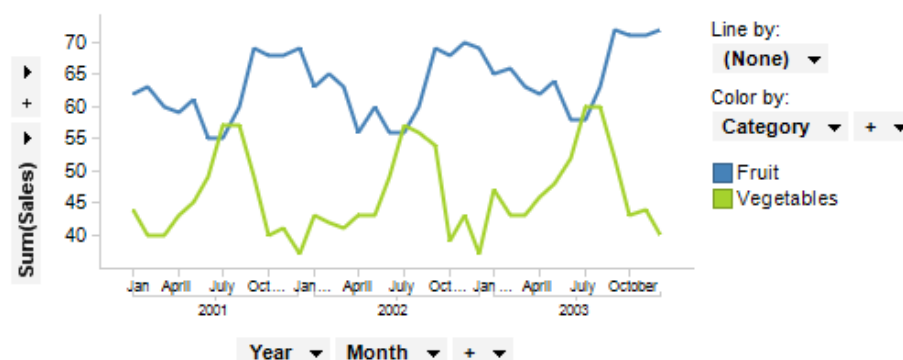


When several different years are available it may also be useful to trellis the data by year to display the variation during the years separately:
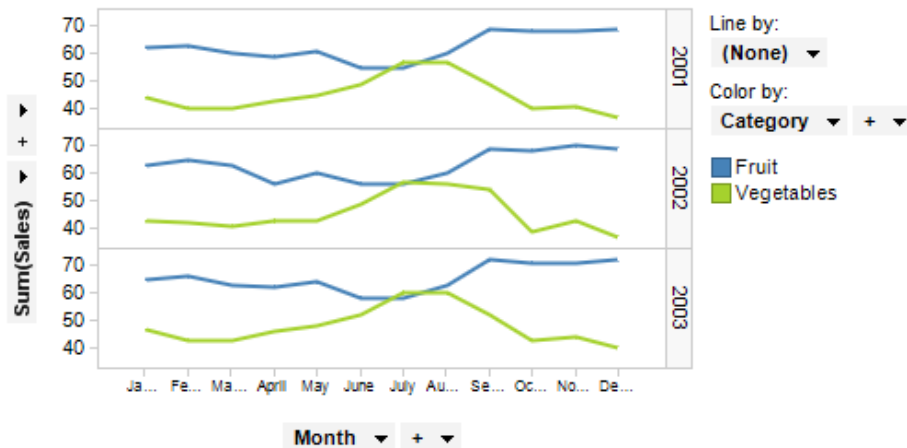
Multiple scales can also be used on the Y-axis, when you want to compare several lines with significantly different value ranges.

## Step lines

The line chart can also be used as a step chart, where the lines are drawn in incremental steps rather than as straight lines between each value.

Step charts are especially useful when changes occur at certain times but the values remain more or less stable between changes.
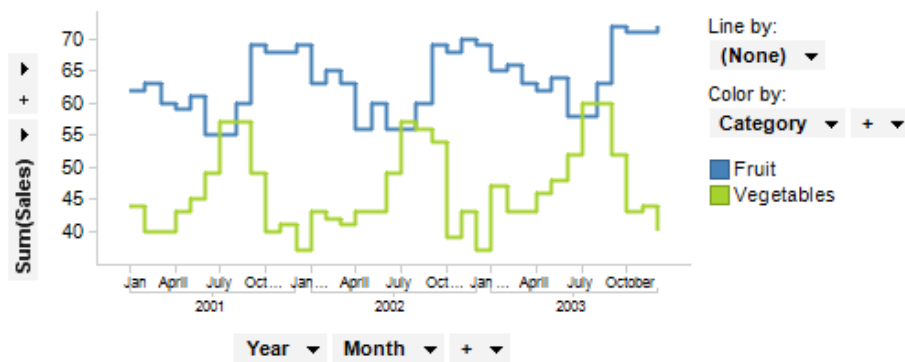


Changing into step mode is done by selecting the **Draw as step lines** check box on the Appearance page of the Line Chart Properties dialog.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.5.2 How to Use the Line Chart

### ► To apply coloring (split in categories):

1. In the filters panel, click and hold down the left mouse button on the filter representing the column that you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under Edit > Document Properties.

2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Color target.

Response: The lines are colored with one color for each category in the selected column. If the lines have not been previously split by adding a Line By column, the lines will be split according to the color categories.

Comment: To learn more about coloring in Spotfire, see Coloring Overview.

## ► To mark parts of the line:

1. Click and drag with the mouse around the part of the line you want to mark.

   Response: If one node in the line is included when you drag, that node will be marked. If two or more adjacent nodes are included, the line between the nodes will also be marked, but if there are nodes in between which are not included, only the separate nodes will be marked.

   Comment: You can select several nodes in different parts of the line by pressing **Ctrl** and click and drag with the mouse.

## ► To mark the entire line:

1. Click once anywhere on the line.
   OR
2. Press **Shift** and click and drag with the mouse over the line.

## ► To use multiple columns on one axis:

This is an example of how to use two columns on the Y-axis. Each column will be represented by a colored line.

1. Click on the arrow next to the plus sign on the axis of your choice.
2. Select a new column from the menu.
   Comment: A column can also be dragged and dropped from the filters panel.
3. Select **(Column Names)** in the Color By drop down list.
   Response: The lines are colored with one color for each column.
   Comment: For more information on (Column Names), see the Non-Column Selections page.

## ► To split lines without coloring:

1. In the filters panel, click and hold down the left mouse button on the filter representing the column that you want to split by.
   Comment: The Line By setting is also available in the Properties dialog.
2. Drag the filter to the center of the visualization.
   Response: Drop targets appear in the middle of the visualization.
3. Release the mouse button on the Line By target.
   Response: The lines are split into one line for each category in the selected column, unless coloring has already split the lines in a more granular way.
   Comment: It is also possible to combine a Line By action with a Color By, so that the lines are split by one category and colored by another.

## ► To add a reference line to the line chart:

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Lines & Curves** page.
4. Select the check box for any of the default lines or click on **Add** to define a new horizontal or vertical line.
   Comment: You can only add lines to the X-axis when it is in continuous mode. Right-click on the scale labels and select Continuous Scale from the pop-up menu.

### ► **To add multiple scales:**

1. Right-click on the Y-axis and select **Multiple Scales** from the pop-up menu.

   Comment: By default, you will get one scale for each color that is defined under Color By.

2. You can also go to the Y-axis page in the Visualization Properties dialog and click the Multiple scales radio button. This is also where you change the settings for the different scales and determine whether a certain scale should be located on the left or the right Y-axis.

   Comment: If you are using values from different columns on the various scales, you can also use drag and drop to move columns from one side to another.

### ► **To add a curve fit to the line chart:**

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Lines & Curves** page.
4. Click on **Add** and select a suitable curve fit from the drop-down menu..

   Comment: You can select from a number of predefined curve fits, or define your own curve using Curve Draw. See Curve Fit Models for more information about the different options.

5. Once the curve has been created, you can change its settings on the Lines & Curves page. Some of the curve settings are also available from the pop-up menu in the visualization.

### ► **To add error bars to the line chart:**

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Error Bars** page.
4. In the Visible error bars list, select the column or measure to use, and select the check box next to it.

   Response: The settings for the selected column or measure will be displayed in the lower part of the dialog.

   Comment: Only columns and measures with numerical values are listed.

5. To define an upper error, choose a column or measure in the Upper error column selector. To define a lower error, choose a column or measure in the Lower error column selector.

   Response: The defined error bars appear in the visualization.

   Comment: Error bars can only be used on numerical values.

   **Note:** Error bars cannot be added to line charts with percentage scaling. Therefore, line charts using individual scaling for each line cannot be combined with error bars.

### ► **To create a new line chart:**

1. Click on the New Line Chart button on the toolbar, .

   Comment: You can also select **Insert > New Visualization > Line Chart** from the menu.

   Response: A first attempt to set up a suitable line chart is made by the application.

2. Adjust the line chart to display the categories and measures of your choice.

   Comment: For more information about how to change what to show on the two axes, see Column Selectors.

## 4.5.3        Line Chart Properties

### 4.5.3.1        Line Chart Properties

The Line Chart Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- X-axis
- Y-axis
- Line By
- Colors
- Labels
- Tooltip
- Legend
- Trellis
- Lines & Curves
- Error Bars

### ► To reach the Line Chart Properties dialog:

1. Right-click on the line chart visualization.
2. Select **Properties** from the pop-up menu.
3. Comment: You can also click on the line chart visualization to make it active and then select **Edit > Visualization Properties**.

## 4.5.3.2      Line Chart Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.5.3.3    Line Chart Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations. |
| | If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. |
| | The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings |

|  | and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
|---|---|
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
|  | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
|  | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
|  | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
|  | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.5.3.4 Line Chart Properties - Appearance



| Option | Description |
|---|---|
| **Line width** | Specifies the width of the lines in the line chart. |
| **Show markers** | Determines whether or not markers should be displayed for the axis values. |
| **Marker size** | Use the slider to increase or decrease the size of the markers. |
| **Draw as step lines** | Select this check box if you want the lines to be drawn in incremental steps rather than as straight lines directly between each value. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data used to create the line. |
| **Time series** | |
| **Compensate for missing values** | Select this check box if you are using a Date, Time or DateTime column somewhere in the visualization and you need to perform some calculation where a required time period is missing. For example, if you have created a visualization showing cumulative sums and there are missing data for some categories, selecting this check box will produce a value of the same size as the previous value instead of interpolating between the values. See Working With Time Hierarchies for more information. |
| | Enabling this setting will temporarily add new rows with empty values for the missing periods so that they can be used in the calculation. |

## 4.5.3.5 Line Chart Properties - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays which column and category are currently being used on each of the two axes in the line chart. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for both axes at the same time. If you use multiple scales in the visualization, each of the different scales on the Y-axis will appear in the list, and you can apply formatting to them individually. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.5.3.6    Line Chart Properties - Fonts



| Option | Description |
| --- | --- |
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.5.3.7      Line Chart Properties - X-axis



| Option | Description |
| --- | --- |
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the scale mode from categorical to continuous, and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting parts of the line chart. |
| **Show gridlines** | Specifies whether or not vertical gridlines should be visible. |

| | |
|---|---|
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** | |
| **Log scale** | Available for continuous axes only. Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.5.3.8 Line Chart Properties - Y-axis

### One Y-axis with a single scale



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | [Not available in this visualization.] |
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the Y-axis, or if you have multiple columns that can be presented using the same scale. |

| | |
|---|---|
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns of very different magnitudes in the same visualization. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the line chart. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** | |
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [$\log 10\ (x)$]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## Multiple scales



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | [Not available in this visualization.] |
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the Y-axis, or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns with values of very different magnitudes in the same visualization. |
| **Individual scaling** | |
| **For each color** | Use this option to display one scale for each category used to color the markers by. For example, if you put two different columns on the Y-axis (like Oil Production and BNP), you can use the "(Column Names)" option to color by and click this radio button to display one scale for Oil Production and one for BNP. |
| | Do not use this option if you need to color by a large number of different categories. |
| | Note that you should apply true categorical coloring before using this option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

| | |
|---|---|
| **For each trellis panel** | Use this option to display one scale for each trellis panel. |
| **For each line** | Use this option to display individual scales for each line defined by the "Line by" and/or the "Color by" settings. <br><br> The lines will be normalized so that all lines are shown on a scale with the actual value expressed as a percentage of the maximum value for each line. |
| **Zoom** | |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the line chart. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. The scale labels are always displayed horizontally when multiple scales are shown. |
| **Horizontally** | Shows scale labels horizontally. <br> **Note:** Only available for individual scaling for each trellis panel. |
| **Vertically** | Shows scale labels vertically. <br> **Note:** Only available for individual scaling for each trellis panel. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Individual scale settings** | |
| [Drop-down list] | Select the scale for which you wish to change the settings. Select All scales to change settings for all scales simultaneously. |
| **Scale Range...** | Opens the Scale Range dialog where you can specify the range of the selected scale, and also determine whether or not to include the origin (0,0). |
| **Position** | Specifies which side of the visualization the scales should be positioned. |
| **Left Y-axis** | Select this option to place the selected scale on the left-hand side of the visualization. |
| **Right Y-axis** | Select this option to place the selected scale on the right-hand side of the visualization. |
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.5.3.9    Line Chart Properties - Line By



| Option | Description |
|---|---|
| **Show one line for each** | Specifies the column or hierarchy by which the lines should be split. **Note:** If the lines are being colored by a column or hierarchy with more categories than the one selected here, there will be no visible effect from this operation, since the coloring has already split the lines more granularly. |
| **Currently also split by the following properties** | Displays information about what other properties currently contribute to a splitting of the lines. |

## 4.5.3.10 Line Chart Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, or Fixed. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised line charts, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
| [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |

| | |
|---|---|
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes.<br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.<br>**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has |

higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types.

**Reset**    Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog.

## 4.5.3.11    Line Chart Properties - Labels



| Option | Description |
| --- | --- |
| **Show in labels** | |
| **Line identifier** | Displays labels showing the categories used to create each line (by coloring or line by). |
| **Individual values** | Displays labels showing the values for all points used to create the line. |
| **Show labels for** | Determines whether to show labels with on all lines (**All**), lines containing marked rows only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. |

## 4.5.3.12 Line Chart Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format  where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.5.3.13    Line Chart Properties - Legend



| Option | Description |
|--------|-------------|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.5.3.14 Line Chart Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not |

|  | control the number of shown rows or columns in any way. The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.5.3.15    Line Chart Properties - Lines & Curves

**First part of the dialog**

| Option | Description |
|---|---|
| **Visible lines and curves** | Lists the currently added lines and curves. If a checkmark is shown in the check box, then the reference line is shown in the visualization. Clear the check box to hide a line or curve.<br><br>New lines and curves can be added to this list by clicking on the Add button; see below. |
| **Add** | Displays a menu where you can select which type of line or curve to add to the list of available lines and curves, and in some cases, opens a dialog where you can specify settings to use for that line or curve.<br><br>For more information about the different curve types, see Curve Fit Models. |
| **Edit...** | Opens a dialog where you can change the settings for the selected line or curve (when applicable). |
| **Remove** | Removes the selected line or curve from the list of available lines and curves. |
| **More** | |
| **Duplicate** | Duplicates the currently selected line or curve. This can be particularly useful if you want to add one static curve that is calculated on the whole data set (select the Update curve manually check box) and another one that is changed upon filtering (default). |
| **Export Curve Fit Result...** | Opens a dialog where you can choose to export the curve fit result for the selected curve to a text file or to Microsoft® Excel®. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file, which contains a bit more information about the columns (types, etc.). The Excel file can be either an XLS file or an XLSX file. |

**Settings**

| Option | Description |
|---|---|
| **Appearance** | Determines the color, style and width of lines and curves, and the color, style and size of points. |
| **Place in** | Select whether to place the line, curve or point in the Foreground or Background of the visualization. |
| **Transparency** | Determines the transparency of the selected line, curve or point. That is, the degree to which the markers can be seen through it. The transparency is strongly connected to the color. |
| **Label and Tooltip** | Opens a dialog where you can determine what information to show in the label and/or tooltip for the selected line, curve or point. |
| **Included in axis range** | Sets the automatic zooming so that the line, curve or point is always shown, even if it lies far from the currently filtered values. |
| **Update manually** | Select the check box to "freeze" the line or curve so that it is not automatically recalculated upon filtering. You can update the line or |

curve by clicking the Update button below or by right-clicking in the visualization and selecting Update Lines and Curves and clicking on the one you want to update.

**Note:** Not applicable for points.

**Update**

When a line or curve has been specified to be manually updated, use this button to perform the update.

**One per**

Determines whether to show one line or curve per Color, Trellis panel and/or line.

**Note:** Not applicable for points.

Note that you should apply true categorical coloring before using the color option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight.

## 4.5.3.16　Line Chart Properties - Error Bars



| Option | Description |
| --- | --- |
| **Visible error bars** | Lists the numerical columns and measures that you can define error bars for in the visualization. If a check mark is shown in the check box, then error bars for that column or measure are visible in the visualization. Clear the check box to hide the error bars for a column or measure.<br>**Note:** No error bars will be visible in the visualization until an upper or lower error has been defined. |
| **Settings** | Shows the settings for the selected column or measure.<br>**Note:** If you use multiple Y-axes in the line chart you can define different error bars for the axes. However, all the defined vertical error |

| | bars will share the same settings for Color, Show end caps, and Include error bars in axis range. For example, you cannot set one vertical error bar to be blue, and another vertical error bar to be yellow in the same line chart. This also applies to using multiple measures on a Y-axis with a single scale. |
|---|---|
| **Upper error** | Specifies the column and aggregation method, or custom expression to use for the upper error bars.<br>**Note:** The chosen column or measure must have numerical values. |
| **Lower error** | Specifies the column and aggregation method, or custom expression to use for the lower error bars.<br>**Note:** The chosen column or measure must have numerical values. |
| **Color** | |
| **Same as line** | Choose this option if you want an error bar to have the same color as the line. |
| **Custom** | Choose this option if you want to use a custom color for the error bars. Click on the drop-down list to show the palette and select a different color. |
| **Show end caps** | Specifies whether or not orthogonal lines should be displayed at the end of the error bars. |
| **Include error bars in axis range** | Sets the automatic zooming so that the error bars are always visible. |

**Note:** The upper and lower errors refer to the underlying data. This means that if you use reversed scales in a visualization, the error bars will also be reversed. For example, for a line chart with reversed Y-axis, the upper error bar will be displayed below the line.

# 4.6 Combination Chart

## 4.6.1 What is a Combination Chart?

The combination chart is a visualization that combines the features of the bar chart and the line chart. The combination chart displays the data using a number of bars and/or lines, each of which represent a particular category. A combination of bars and lines in the same visualization can be useful when comparing values in different categories, since the combination gives a clear view of which category is higher or lower. An example of this can be seen when using the combination chart to compare the projected sales with the actual sales for different time periods.

### Series

Similarly to the function of Color by in other visualizations, Series by in the combination chart is a way to divide the data into slices. The difference is that the slices in the combination chart, called series, can be defined as bars or lines as well as being colored separately. That is, each series in the combination chart will be represented by a line or a set of bars in the visualization.

### Example:

The example below contains two series: the bars represent the projected sales for each month in a year and the line represents the actual sales for the same months. Series by is set to **(Column Names)** since both series should be shown on the Y-axis. For more information on (Column Names), see the Non-Column Selections page.
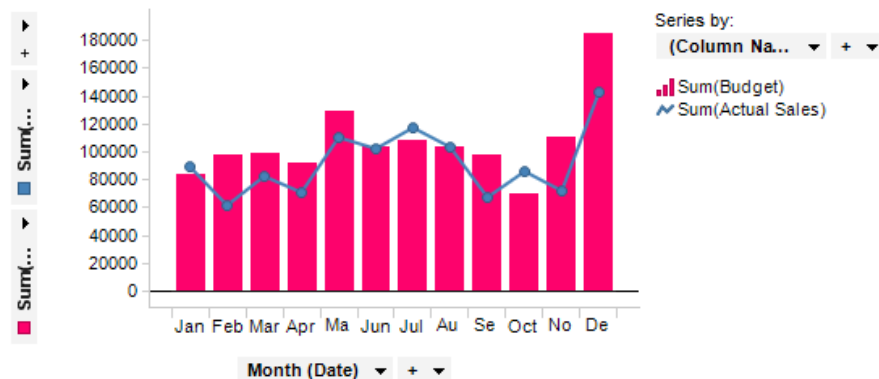


Multiple scales can also be used on the Y-axis when you want to compare several lines and bars with significantly different value ranges.
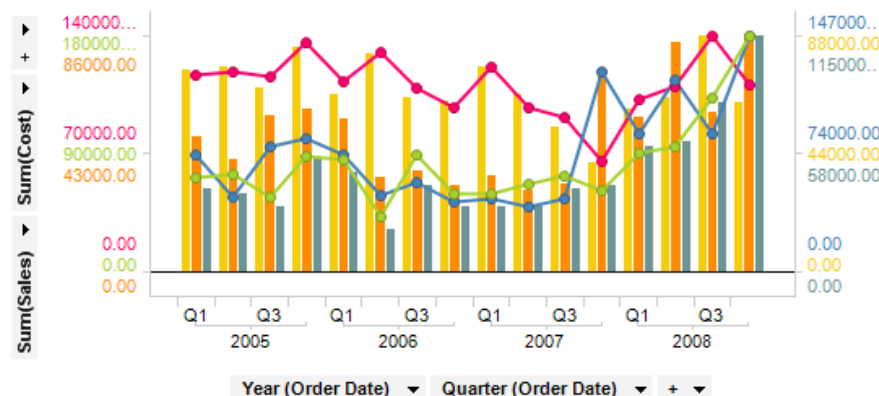


All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.6.2     How to Use the Combination Chart

### ► To apply series (split in categories):

1. In the **Filters** panel, click and hold down the left mouse button on the filter representing the column that you want to split by series.

   Comment: Series by is also available in the Visualization Properties dialog.
2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.
3. Release the mouse button on the Series target.

   Comment: If you want to use multiple columns on the Y-axis, and set each of these as a series, you should select to series by **(Column Names)** in the legend or the Visualization Properties dialog.

### ► To switch between bars and lines:

1. Click on the bar or line symbol next to the series in the legend and select **Show as Bars** or **Show as Line**.

   OR
2. Right-click on the visualization and select **Properties** from the pop-up menu.
3. Go to the **Series** page, select a series and define it as bars or a line.

   Comment: It is also possible to right-click on the visualization and select **Show All as Bars** or **Show All as Lines** to set all series to bars or lines.

### ► To mark bars or lines:

1. Click once on a line or a bar to mark the line or bar.

   Comment: If you have stacked bars, only the bar segment will be marked.

   OR
2. Click and drag with the mouse to mark all bar segments, bars and parts of lines included in the selection.

   Comment: You can select items in different parts of the visualization by pressing **Ctrl** and clicking and dragging with the mouse.

### ► To sort the combination chart:

1. Right-click on the visualization and select **Properties** from the pop-up menu.
2. Go to the **Appearance** page.
3. Select a series to sort the X-axis by.

### ► To change the aggregation type:

1. Click on the axis selector on the Y-axis. This is where it says Sum([Column Name]), Count(...), or similar.

   Response: A drop-down menu is displayed.
2. Select **Aggregation >** and a new aggregation measure from the submenu.

   Comment: You can also select Custom Expression... from the menu and create your own expression.

   Response: The combination chart is updated to show the new information.

### ► To use multiple columns on one axis:

This is an example of how to use two columns on the Y-axis. The columns will be represented by a line or a set of bars.

1.   Click on the arrow next to the plus sign on the axis of your choice.
2.   Select a new column from the menu.

     Comment: A column can also be dragged and dropped from the filters panel.
3.   Select **(Column Names)** in the Series by column selector.

     Comment: For more information on (Column Names), see the Non-Column Selections page.

     Response: The columns are represented by a line or a set of bars in the combination chart.

### ► To add multiple scales:

1.   Right-click on the Y-axis and select **Multiple Scales** from the pop-up menu.

     Comment: By default, you will get one scale for each color that is defined under Series by.
2.   You can also go to the Y-axis page in the Visualization Properties dialog and click the Multiple scales radio button. This is also where you change the settings for the different scales and determine whether a certain scale should be located on the left or the right Y-axis.

     Comment: If you are using values from different columns on the various scales, you can also use drag and drop to move columns from one side to another.

### ► To add a reference line to the combination chart:

1.   Right-click on the visualization and select **Properties** from the pop-up menu.
2.   Go to the **Lines & Curves** page.
3.   Select the check box for any of the default lines or click on **Add** to define a new line.

     Comment: You can only add lines to the X-axis when it is in continuous mode. Right-click on the scale labels and select Continuous Scale from the pop-up menu.

### ► To add a curve fit to the combination chart:

1.   Right-click on the visualization and select **Properties** from the pop-up menu.
2.   Go to the **Lines & Curves** page.
3.   Click on **Add** and select a suitable curve fit from the drop-down menu.

     Comment: You can select from a number of predefined curve fits, or define your own curve using Curve Draw. See Curve Fit Models for more information about the different options.
4.   Once the curve has been created, you can change its settings on the Lines & Curves page. Some of the curve settings are also available from the pop-up menu in the visualization.

### ► To create a new combination chart:

1.   Click on the New Combination Chart button on the toolbar, .

     Comment: You can also select **Insert > New Visualization > Combination Chart** from the menu.

     Response: A first attempt to set up a suitable combination chart is made by the application.
2.   Adjust the combination chart to display the categories and measures of your choice.

     Comment: For more information about how to change what to show on the two axes, see Column Selectors.

# 4.6.3 Combination Chart Properties

## 4.6.3.1 Combination Chart Properties

The Combination Chart Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- X-axis
- Y-axis
- Series
- Labels
- Tooltip
- Legend
- Trellis
- Lines & Curves

### ► To reach the Combination Chart Properties dialog:

1. Right-click on the combination chart visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the combination chart visualization to make it active and then select **Edit > Visualization Properties**.

## 4.6.3.2 Combination Chart Properties - General

| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.6.3.3　Combination Chart Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the |

|  | Document Properties dialog. |
|---|---|
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br><br>This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization.<br><br>Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page.<br><br>Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting.<br><br>If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme.<br><br>The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.6.3.4 Combination Chart Properties - Appearance



| Option | Description |
| --- | --- |
| **Sort x-axis by** | Selecting (**None**) sorts the contents of the visualization by the natural sort order of the column chosen on the X-axis. However, you can also sort the visualization by any of the Series you have created in the combination chart. |
| **Bars** | |
| **Layout** | |
| **Side-by-side bars** | Use this option to place bars from the series category side-by-side next to each other instead of stacked on top of each other. |
| **Stacked bars** | Use this option to keep series categories stacked on top of each other. |
| **Bar width** | Drag the slider to modify the width of the bars. |
| **Lines** | |
| **Line width** | Specifies the width of the lines in the combination chart. |
| **Show line markers** | Determines whether or not markers should be displayed for the axis values. The slider can be used to increase or decrease the size of the markers. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data that was used to create the line. |

**Time series**

| | |
|---|---|
| **Compensate for missing values** | Select this check box if you are using a Date, Time or DateTime column somewhere in the visualization and you need to perform some calculation where a required time period is missing. For example, if you have created a visualization showing cumulative sums and there are missing data for some categories, selecting this check box will produce a bar or line value of the same size as the previous bar or line value instead of showing no value at all. See Working With Time Hierarchies for more information. |
| | Enabling this setting will temporarily add new rows with empty values for the missing periods so that they can be used in the calculation. |

## 4.6.3.5 Combination Chart Properties - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays the column and category currently being used on each of the two axes in the combination chart. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for both axes at the same time. If you use multiple scales in the visualization, each of the different scales on the Y-axis will appear in the list and you can apply formatting to them individually. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |

| Category | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |
|---|---|

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.6.3.6    Combination Chart Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.6.3.7     Combination Chart Properties - X-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the lowest value currently in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the highest value currently in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only those parts of the combination chart you are interested in. |
| **Show gridlines** | Specifies whether or not vertical gridlines should be visible. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |

**Scale**

| | |
|---|---|
| **Log scale** | Available for continuous axes only. Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.6.3.8 Combination Chart Properties - Y-axis

### One Y-axis with a single scale



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | [Not available in this visualization.] |

| | |
|---|---|
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the Y-axis, or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns of very different magnitudes in the same visualization. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the lowest value currently in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the highest value currently in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only those parts of the combination chart you are interested in. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** | |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

### Multiple scales



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | [Not available in this visualization.] |
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the Y-axis, or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns with values of very different magnitudes in the same visualization. |
| **Individual scaling** | |
| **For each color** | Use this option to display one scale for each category used to color the markers by. For example, if you put two different columns on the Y-axis (like Oil Production and BNP), you can use the (Column Names) option to color by and click this radio button to display one scale for Oil Production and one for BNP. |
| | Do not use this option if you need to color by a large number of different categories. |
| | Note that you should apply true categorical coloring before using this option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

| | |
|---|---|
| **For each trellis panel** | Use this option to display one scale for each trellis panel. |
| **Zoom** | |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only those parts of the combination chart you are interested in. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. The scale labels are always displayed horizontally when multiple scales are shown. |
| **Horizontally** | Shows scale labels horizontally. <br> **Note:** Only available for individual scaling for each trellis panel. |
| **Vertically** | Shows scale labels vertically. <br> **Note:** Only available for individual scaling for each trellis panel. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Individual scale settings** | |
| **[Drop-down list]** | Select the scale for which you wish to change the settings. Select All scales to change settings for all scales simultaneously. |
| **Scale Range...** | Opens the Scale Range dialog where you can specify the range of the selected scale, and also determine whether or not to include the origin (0, 0). |
| **Position** | Specifies which side of the visualization the scales should be positioned. |
| **Left Y-axis** | Select this option to place the selected scale on the left-hand side of the visualization. |
| **Right Y-axis** | Select this option to place the selected scale on the right-hand side of the visualization. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed at the top of the scale. |

## 4.6.3.9    Combination Chart Properties - Series
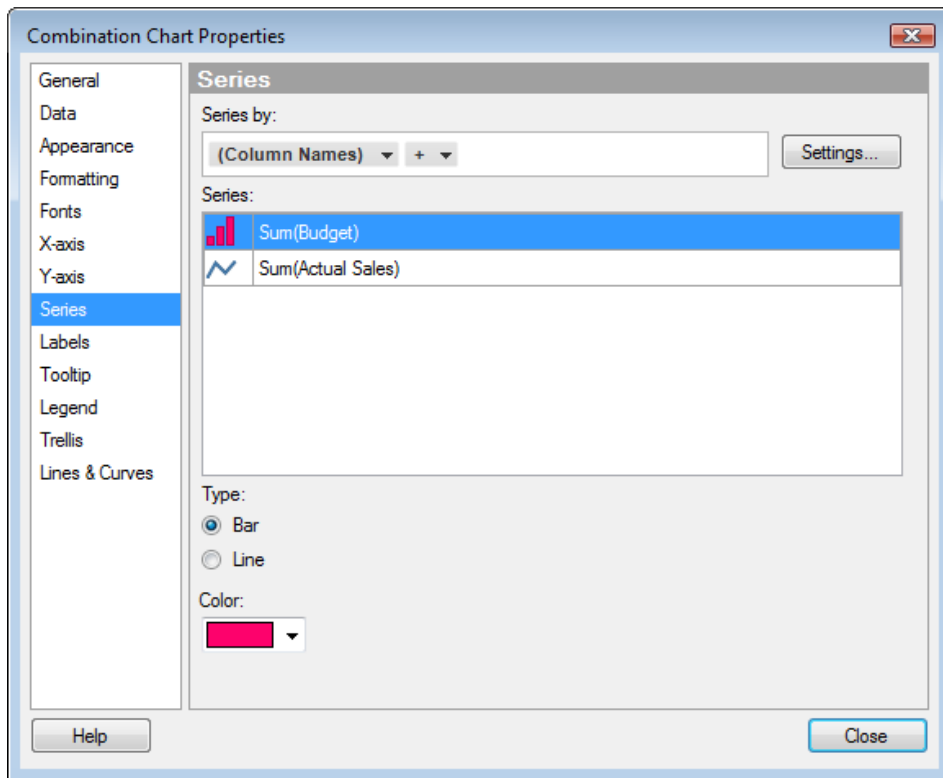


| Option | Description |
|---|---|
| **Series by** | Select the column to set series by.<br>**Note:** If you have more than one column on the Y-axis, you need to series by (Column Names) to be able to display all columns in the same visualization. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Series** | Lists the series in the combination chart. Select a series to be able to apply changes to it. |
| **Type** | Select whether the series should be displayed as bars or as a line. |
| **Color** | Specify a color for the selected series. |

## 4.6.3.10    Combination Chart Properties - Labels
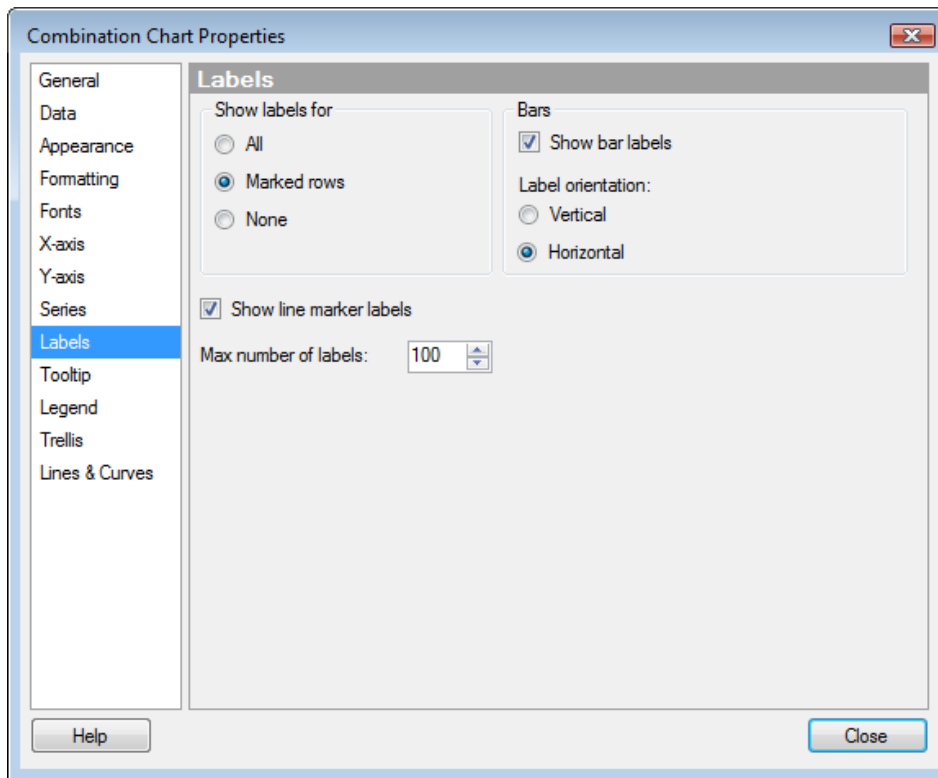


| Option | Description |
|---|---|
| **Show labels for** | Determines whether to show labels on all bars and lines (**All**), bars and lines containing marked rows only (**Marked rows**), or not to show any labels at all (**None**). |
| **Bars** | |
| **Show bar labels** | Determines whether or not to show labels for the bars in the visualization. |
| **Label orientation** | Determines whether to display the labels horizontally or vertically. |
| **Show line marker labels** | Determines whether or not to show labels for the line markers in the visualization. |
| **Max number of labels** | Specifies the maximum number of labels to be shown. |

## 4.6.3.11 Combination Chart Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.6.3.12 Combination Chart Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br><br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br><br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.6.3.13    Combination Chart Properties - Trellis



| Option | Description |
| --- | --- |
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the |

number of actual values in the column to split by does not control the number of shown rows or columns in any way.

The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below.

| | |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.6.3.14 Combination Chart Properties - Lines & Curves

### First part of the dialog

| Option | Description |
| --- | --- |
| **Visible lines and curves** | Lists the currently added lines and curves. If a checkmark is shown in the check box, then the reference line is shown in the visualization. Clear the check box to hide a line or curve.<br><br>New lines and curves can be added to this list by clicking on the Add button; see below. |
| **Add** | Displays a menu where you can select which type of line or curve to add to the list of available lines and curves, and in some cases, opens a dialog where you can specify settings to use for that line or curve.<br><br>For more information about the different curve types, see Curve Fit Models. |
| **Edit...** | Opens a dialog where you can change the settings for the selected line or curve (when applicable). |
| **Remove** | Removes the selected line or curve from the list of available lines and curves. |
| **More** | |
| **Duplicate** | Duplicates the currently selected line or curve. This can be particularly useful if you want to add one static curve that is calculated on the whole data set (select the Update curve manually check box) and another one that is changed upon filtering (default). |
| **Export Curve Fit Result...** | Opens a dialog where you can choose to export the curve fit result for the selected curve to a text file or to Microsoft® Excel®. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file, which contains a bit more information about the columns (types, etc.). The Excel file can be either an XLS file or an XLSX file. |

### Settings

| Option | Description |
| --- | --- |
| **Appearance** | Determines the color, style and width of lines and curves, and the color, style and size of points. |
| **Place in** | Select whether to place the line, curve or point in the Foreground or Background of the visualization. |
| **Transparency** | Determines the transparency of the selected line, curve or point. That is, the degree to which the markers can be seen through it. The transparency is strongly connected to the color. |
| **Label and Tooltip** | Opens a dialog where you can determine what information to show in the label and/or tooltip for the selected line, curve or point. |
| **Included in axis range** | Sets the automatic zooming so that the line, curve or point is always shown, even if it lies far from the currently filtered values. |
| **Update manually** | Select the check box to "freeze" the line or curve so that it is not automatically recalculated upon filtering. You can update the line or |

curve by clicking the Update button below or by right-clicking in the visualization and selecting Update Lines and Curves and clicking on the one you want to update.

**Note:** Not applicable for points.

**Update**

When a line or curve has been specified to be manually updated, use this button to perform the update.

**One per**

Determines whether to show one line or curve per Color and/or Trellis panel.

**Note:** Not applicable for points.

Note that you should apply true categorical coloring before using the color option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight.

# 4.7 Pie Chart

## 4.7.1 What is a Pie Chart?

Pie charts are circle graphs divided into sectors, each pie sector displaying the size of some related piece of information. Pie charts are used to show the relative sizes of the parts of a whole.

**Example:**
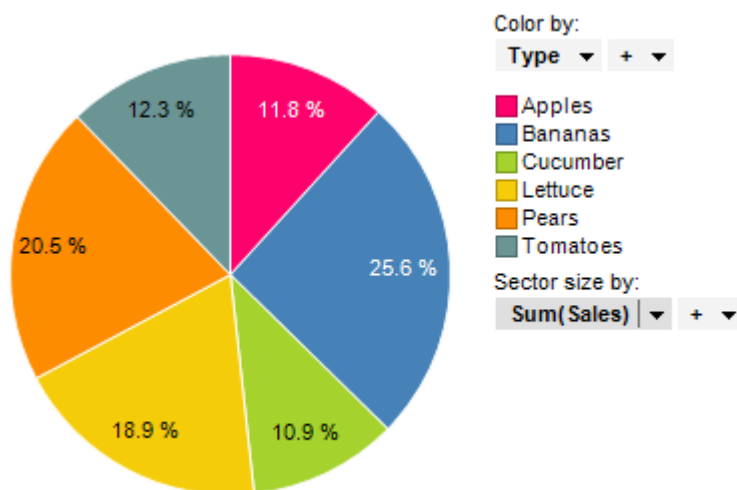


All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.7.2 How to Use the Pie Chart

► **To set which column represents the size of the sectors:**

In the **Filters** panel, click and hold down the left mouse button on the filter representing the column you want to represent the size of the sectors.

1. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

2. Release the mouse button on the sector size drop target.

   Response: The sectors are adjusted so that the size is according the corresponding values of the column.

   From the Legend, click on the Sector Size by button, and select Aggregation.

   Select whether you want each sector size to be the sum or average (or other type of aggregation) of the selected column.

► **To sort the sectors of the pie chart:**

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Appearance** page.
4. Select the **Sort sectors by size** check box.

► **To create a new pie chart:**

1. Click on the New Pie Chart button on the toolbar, .

   Comment: You can also select **Insert > New Visualization > Pie Chart** from the menu.

   Response: A first attempt to set up a suitable pie chart is made by the application.

2. Adjust the pie chart to display the data of your choice.

## 4.7.3 Pie Chart Properties

### 4.7.3.1 Pie Chart Properties

The Pie Chart Properties dialog consists of several pages:

- General
- Data
- Appearance
- Fonts
- Colors
- Size
- Labels
- Tooltip
- Legend
- Trellis

► **To reach the Pie Chart Properties dialog:**

1. Right-click on the pie chart visualization.

2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the pie chart visualization to make it active and then select **Edit > Visualization Properties**.

### 4.7.3.2 Pie Chart Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization. **Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

### 4.7.3.3 Pie Chart Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br>This can be used if you have two visualizations with different markings |

and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings.

| | |
|---|---|
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.7.3.4 Pie Chart Properties - Appearance



| Option | Description |
|---|---|
| **Sort sectors by size** | This option sorts the sectors of the pie chart, so that the largest sector is placed next to the second largest sector, and so forth. |

## 4.7.3.5　　　Pie Chart Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.7.3.6    Pie Chart Properties - Colors
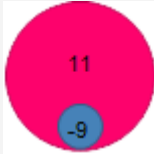


| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. Pie charts can only be colored by categories, therefore continuous columns will be auto-binned. See What is Binning? to learn more about binned columns. |
| **Settings** | Opens the Advanced Settings dialog. The upper part of the dialog is grayed out, because it concerns scale mode, which cannot be changed for pie charts. In the lower part you can change the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. You can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Not applicable to pie charts. Available for continuous columns only. |
| **[Color Schemes menu]** | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |

| Open from Library... | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
|---|---|
| Open from File... | Opens a dialog where you can select a previously saved color scheme. |
| Save As | Lets you save a color scheme as a library item, a local file or a document color scheme. |
| | **Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse. |
| | **File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse. |
| | **Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| Apply to Visualizations... | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed. |
| | **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| Add Point | Not applicable to pie charts. Available for continuous columns only. |
| Delete Point | Not applicable to pie charts. Available for continuous columns only. |
| Add Rule... | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
| Reset | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.7.3.7 Pie Chart Properties - Size



| Option | Description |
|--------|-------------|
| **Sector size by** | Specifies a column or hierarchy whose categories will determine the size of the pie sectors. This is always an aggregated measure. |
| **Pie size** | Specifies the absolute pie size within the visualization area. |
| **Pie size by** | Sizes the pies according to the values in the specified column. Only relevant when there are more than one pie available (via trellising). |
| **Scale** | Determines what scale to use for the size of the pie. Only relevant when there are more than one pie available (via trellising). |
| **From min to max** | Assigns the maximum pie size to the highest value, and the minimum pie size to the lowest value. For instance, if the minimum and maximum data values are -9 and 11 the pie sizes could be like the following:  This mode is useful when you want to visualize differences. |
| **Min limit:** **Max limit:** | The minimum and maximum limits that should be mapped to the pie size. By default, they are set to "Automatic". This means that the pie size will adapt during filtering. If the scale is set to "From min to max", the current minimum value will have the minimum pie size, and the current maximum value will have the maximum pie size. It is |

comparable to automatic zooming on the X- or Y-axis.

It is possible to lock max limit and/or min limit to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that are lower than the minimum value or higher than the maximum value will not get a size and are not drawn. By setting the lower value to 0, negative values can be removed. By specifying both a high and low value, the auto-scaling behavior is turned off.

| **From 0 to max absolute value** | This mode is useful when you want to compare the magnitude of measures. By letting the value 0 map to pie size 0, and the maximum value to the maximum pie size, it is possible to compare the diameter of pie and say "a" is twice as big as "b". So with this scale the values 50 and 100 would be rendered like this:<br><br><br><br>**Note:** The size is scaled symmetrically around 0 with absolute numbers. That is, if your highest value is 10 and your lowest is -20, the size of the pie at 10 will be 50 percent of the maximum pie size. |
| --- | --- |
| **Max:** | The absolute limit that should be mapped to the pie size. By default, it is set to "Automatic". This means that the marker size will adapt during filtering. The value 0 will have the minimum pie size and the highest absolute value in the visualization will have the maximum pie size.<br><br>It is possible to lock this to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that have a larger absolute value than the set value will get the same size as the maximum value. |
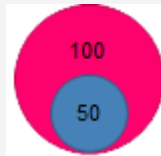
## 4.7.3.8 Pie Chart Properties - Labels
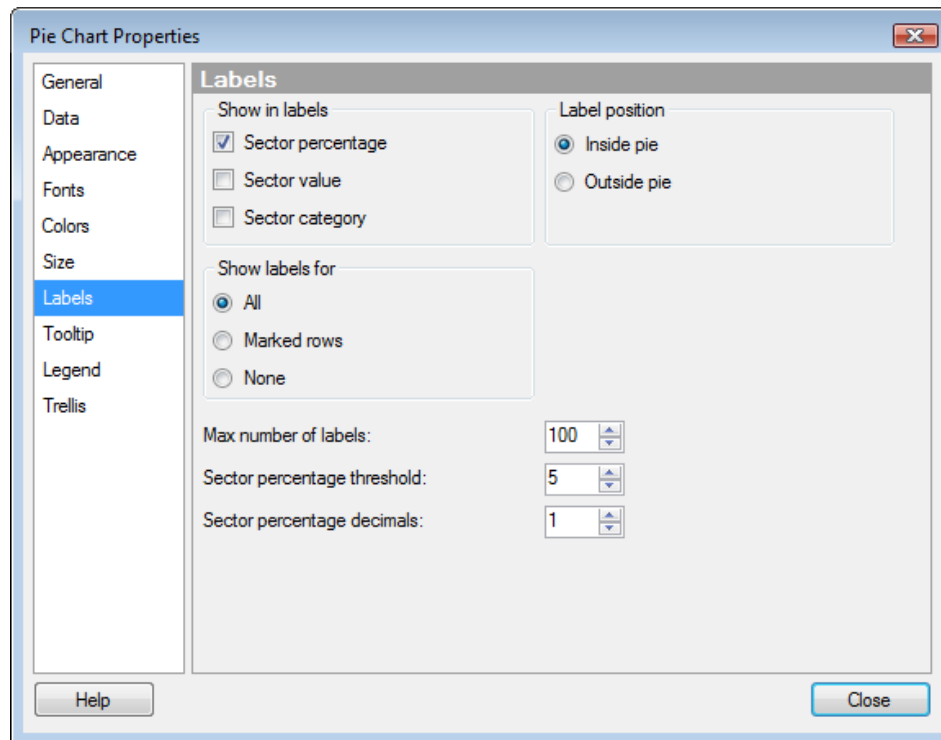


| Option | Description |
|---|---|
| **Show in labels** | Specifies what information to show in the labels for the pie sectors. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Sector value** | Displays the value of the sector. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Label position** | Specifies whether the labels should be placed **Inside pie** or **Outside pie**. |
| **Show labels for** | Determines whether to show labels for all pie sectors (**All**), pie sectors containing marked rows only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. |
| **Sector percentage threshold** | Excludes the labels for the sectors whose percentage falls below the specified threshold value. |
| **Sector percentage decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |

### 4.7.3.9 Pie Chart Properties - Tooltip



| Option | Description |
| --- | --- |
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.7.3.10 Pie Chart Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend. By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.7.3.11    Pie Chart Properties - Trellis



| Option | Description |
| --- | --- |
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not |

|  |  |
|---|---|
|  | control the number of shown rows or columns in any way. The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

# 4.8      Scatter Plot

## 4.8.1      What is a Scatter Plot?

Scatter plots are used to plot data points on a horizontal and a vertical axis in the attempt to show how much one variable is affected by another. Each row in the data table is represented by a marker whose position depends on its values in the columns set on the X and Y axes.

A third variable can be set to correspond to the color or size of the markers, thus adding yet another dimension to the plot.

The relationship between two variables is called their correlation. If the markers are close to making a straight line in the scatter plot, the two variables have a high correlation. If the markers are equally distributed in the scatter plot, the correlation is low, or zero. However, even though a correlation may seem to be present, this might not always be the case. Both variables could be related to some third variable, thus explaining their variation, or, pure coincidence might cause an apparent correlation.

**Example:**

In the scatter plot below, sales is plotted against cost for a number of different products (colored by product), to display a low positive correlation.
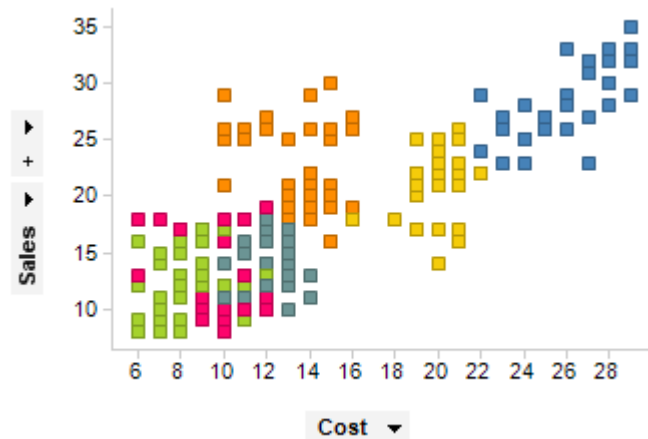


Each product can be shown separately using trellising:
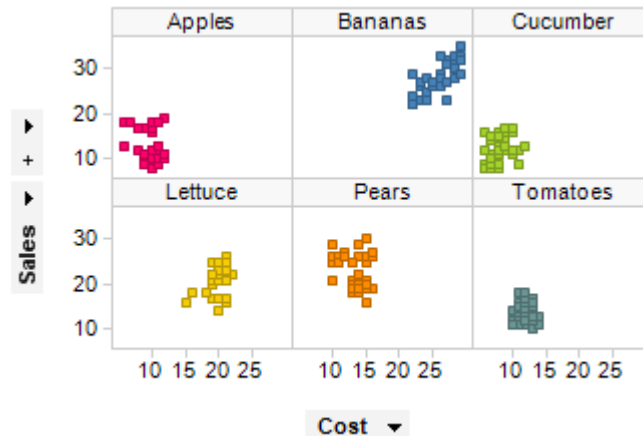


The scatter plot can also be used together with aggregation (for example, Sum or Average) by using the setting Marker By. In this case, the values for a certain category are bundled together to display a single marker for each category. The aggregated markers can also be sized by the count of items within each category, or by any other column.

## Example:

The markers now show the Sum of Sales for each product, as you can see on the axis selector for the Y-axis.
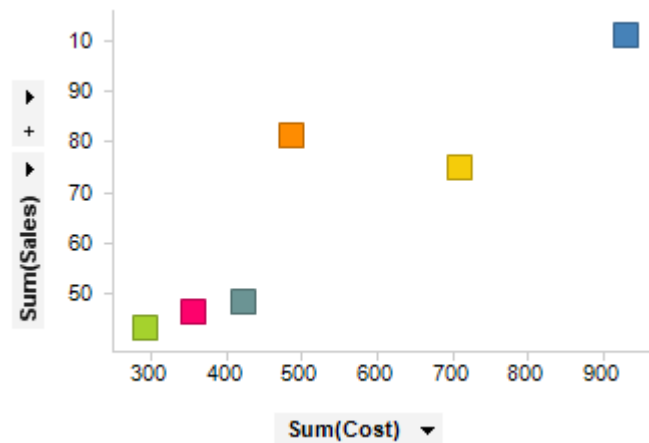


Multiple scales can also be used on the Y-axis, when you want to compare several markers with significantly different value ranges.

Labels can be used in visualizations to identify and describe markers and the data associated with them.

## Example:

In the scatter plot below, labels show which category each of the marked markers belongs to.
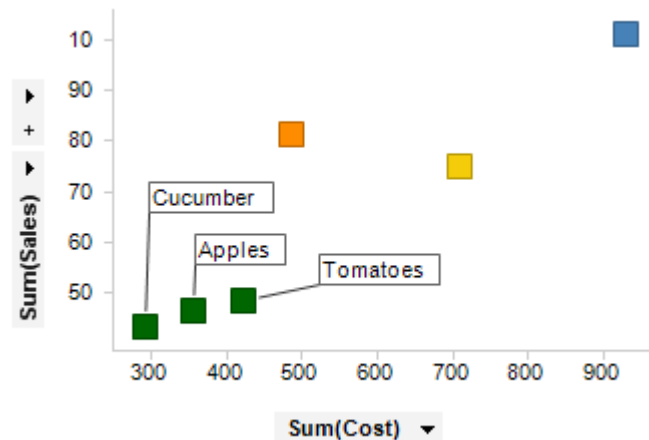


In a scatter plot, you can interact with the labels and move them using drag-and-drop operations. Click on a label to mark the corresponding marker, and mouseover a label to highlight both the label and the marker. If you move a label, it will stay in the new position until you reset the label positions from the right-click menu in the visualization. If you select to show labels for all markers, the labels will be visible for all markers at all times. You can also select to show labels for marked markers only. Labels will then appear every time you mark one or many markers. To add labels and/or change label settings, open the Labels page of the Scatter Plot Properties dialog.

You can change the shapes of the markers to add another dimension to the visualization, or to get a view that better suits your data. For example, you can have the marker shapes correspond to the different values in a column, or display the markers as pie charts. Another option is to use tiled markers. This means that all the markers will have the same size, and be displayed in a grid-like layout as seen in the example below.

**Example:**
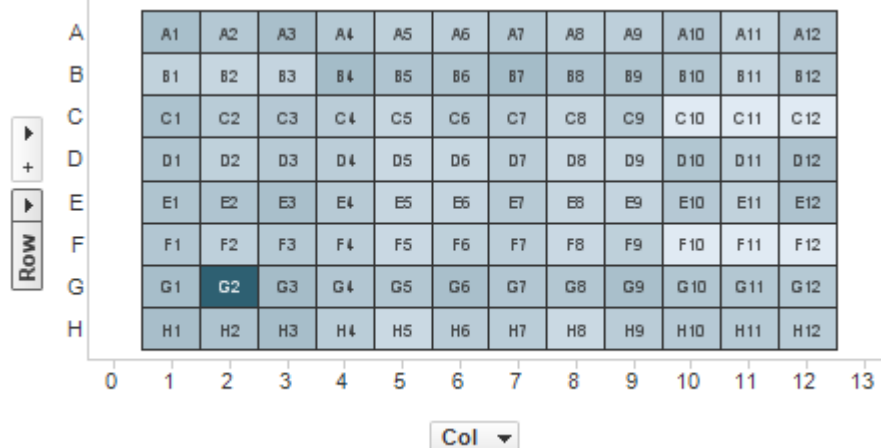


This example shows the results of an experiment conducted on an assay plate consisting of 96 wells. Each marker in the scatter plot represents a well on the assay plate, and the markers' colors represent the results of the experiment for each of the wells on the plate. Using this setup to copy the actual layout of the assay plate is a way to enhance the readability of the data. It becomes easy to notice that the well represented by the marker G2 stands out compared to the other wells. Labels are always centered and displayed directly on tiled markers. Therefore, they cannot be moved around as is otherwise possible in a scatter plot.

**Note:** If you use tiled markers, and the axes' scales have a large number of values, then the markers may become too small to be seen. The reason for this is that the grid layout makes it necessary for each value on the scales to have a unique position, even if no marker is located at each of these allocated positions. Therefore, with a large number of values on the scale, the markers must become very small to fit in the grid.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.8.2 How to Use the Scatter Plot

### ► To apply coloring:

1. In the filters panel, click and hold down the left mouse button on the filter representing the column that you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under **Edit > Document Properties**.

2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Color target.

   Response: The markers are colored with one color for each category in the selected column.

   Comment: To learn more about coloring in Spotfire, see Coloring Overview.

### ► To shape markers by a column:

1. In the filters panel, click and hold down the left mouse button on the filter representing the column that you want to shape by.

   Comment: Shape is also available in the Properties dialog.

2. Drag the filter to the center of the visualization.

   Comment: Drop targets appear in the middle of the visualization.

3.  Release the mouse button on the Shape by target.

    Response: The markers are shaped with one shape for each category in the selected column.

    Comment: In the Shape page of the Properties dialog you can also change the fixed shape, or select pies as shape. To use pies, you must first aggregate the markers, as described below.

### ► To aggregate markers:

1.  Right-click in the scatter plot to display the pop-up menu.
2.  Select **Properties**.

    Comment: If the Legend is visible, the Marker by property may also be changed there.
3.  Click to display the **Marker By** page.
4.  Select a column to group the markers by under **Show one marker for each**. You can also select Remove to get the option (None) on the Marker By selector. If (None) is selected then the number of markers shown will depend on other properties only, such as which columns are selected on the axes or used to color by. None is often a good alternative if you intend to use pies as shape.

    Response: The markers are grouped so that a single marker is shown for each category in the selected column.

    Comment: Select (Row Number) to remove the aggregation and show one marker for each row.

### ► To use multiple columns on one axis:

This is an example of how to use two columns on the Y-axis. Each column will be represented by a set of colored markers.

1.  Click on the arrow next to the plus sign on the axis of your choice.
2.  Select a new column from the menu.

    Comment: A column can also be dragged and dropped from the filters panel.
3.  Select **(Column Names)** in the Color By drop down list.

    Response: The markers are colored with one color for each column.

    Comment: For more information on (Column Names), see the Non-Column Selections page.

### ► To add multiple scales:

1.  Right-click on the Y-axis and select **Multiple Scales** from the pop-up menu.

    Comment: By default, you will get one scale for each color that is defined under Color By.
2.  You can also go to the Y-axis page in the Visualization Properties dialog and click the Multiple scales radio button. This is also where you change the settings for the different scales and determine whether a certain scale should be located on the left or the right Y-axis.

    Comment: If you are using values from different columns on the various scales, you can also use drag and drop to move columns from one side to another.

### ► To add a reference line to the scatter plot:

1.  Right-click on the visualization to display the pop-up menu.
2.  Select **Properties**.
3.  Go to the **Lines & Curves** page.
4.  Select the check box for any of the default lines or click on **Add** to define a new horizontal or vertical line.

    Comment: You can only add lines to the axes when they are in continuous mode. Right-click on the scale labels and select Continuous Scale from the pop-up menu.

### ► To add a curve fit to the scatter plot:

1. Right-click on the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Lines & Curves** page.
4. Click on **Add** and select a suitable curve fit from the drop-down menu.

   Comment: You can select from a number of predefined curve fits, or define your own curve using Curve Draw. See Curve Fit Models for more information about the different options.
5. Once the curve has been created, you can change its settings on the Lines & Curves page. Some of the curve settings are also available from the pop-up menu in the visualization.

### ► To add error bars to the scatter plot:

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Error Bars** page.
4. In the Visible error bars list, select the column or measure to use, and select the check box next to it.

   Response: The settings for the selected column or measure will be displayed in the lower part of the dialog.

   Comment: Only columns and measures with numerical values are listed.
5. To define an upper error, choose a column or measure in the Upper error column selector. To define a lower error, choose a column or measure in the Lower error column selector.

   Response: The defined error bars appear in the visualization.

   Comment: Error bars can only be used on numerical values.

### ► To display images in labels:

This is an example of how you can use a binary column containing image information to label the markers in a scatter plot. You can of course use regular text labels or a number of other settings instead. See the Scatter Plot Properties - Labels page for more information about your available labeling options.

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Labels** page.
4. Select the column containing images under **Label by**.

   Comment: This example assumes that you have the images available as a binary column in your current data table. If you intend to retrieve images via an information link you need to select an identifier column instead, and then use a suitable transform to map the ID to the requested image.
5. Determine whether to **Show labels for** All rows, Marked rows or None.
6. If desired, modify the **Max number of labels** to limit the amount of shown labels further.
7. (If required, select a **Transform** to convert the selected column values to another form of output. See the comment on step 4.)
8. Make sure that **Show as** is set to **Image** (or whatever the type of output is that you wish to display).

   Comment: If you are running TIBCO Spotfire Lead Discovery and select a Structure Column as the transform then you would typically select a structure renderer here instead.
9. If desired, change the **Size** of the labels by dragging the slider.

### ► To display images in tooltips:

This is an example of how you can use a binary column containing image information in the tooltip shown when hovering with the mouse pointer over the markers in a scatter plot. You can of course use regular text tooltips instead. See the Scatter Plot Properties - Tooltip page for more information about your available tooltip options.

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Tooltip** page.
4. Click **Add...**.

   Response: The Add Tooltip dialog is displayed.

5. Select the **Column** containing images.

   Comment: This example assumes that you have the images available as a binary column in your current data table. If you intend to retrieve images via an information link you need to select an identifier column instead, and then use a suitable transform to map the ID to the requested image.

6. If desired, change the display **Name**.
7. (If required, select a **Transform** to convert the selected column values to another form of output. See the comment on step 5.)
8. Make sure that **Show as** is set to **Image** (or whatever the type of output is that you wish to display).

   Comment: If you are running TIBCO Spotfire Lead Discovery and select a Structure Column as the transform then you would typically select a structure renderer here instead.

9. If desired, change the **Size** of the labels by dragging the slider.
10. Select whether or not to **Include value name in tooltip**.
11. Click **OK**.

### ► To create a new scatter plot:

1. Click on the New Scatter Plot button on the toolbar, ▨.

   Comment: You can also select **Insert > New Visualization > Scatter Plot** from the menu.

   Response: A first attempt to set up a suitable scatter plot is made by the application.

2. Adjust the scatter plot to display the measures of your choice.

   Comment: For more information about how to change what to show on the two axes, see Column Selectors.

## 4.8.3    Scatter Plot Properties

### 4.8.3.1    Scatter Plot Properties

The Scatter Plot Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- X-axis
- Y-axis
- Colors
- Size

- Shape
- Labels
- Tooltip
- Legend
- Trellis
- Line Connection
- Marker By
- Lines & Curves
- Error Bars

### ► **To reach the Scatter Plot Properties dialog:**

1. Right-click on the scatter plot visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the scatter plot visualization to make it active and then select **Edit > Visualization Properties**.

## 4.8.3.2    Scatter Plot Properties - General



| Option | Description |
| --- | --- |
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |

| | |
|---|---|
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.8.3.3     Scatter Plot Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |

| | |
|---|---|
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.8.3.4 Scatter Plot Properties - Appearance



| Option | Description |
| --- | --- |
| **Jittering** | Jittering is an option that displaces the visualization items randomly in the display window, thereby making overlapping markers visible. |
| **X** | Specifies the amount of jittering to use in the horizontal direction. |
| **Y** | Specifies the amount of jittering to use in the vertical direction. |
| **Use the same amount of jittering for both X and Y** | Select this check box to connect the jittering sliders in both directions to each other. |

## 4.8.3.5    Scatter Plot Properties - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays which column and category are currently being used on each of the two axes in the scatter plot. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for both axes at the same time. If you use multiple scales in the visualization, each of the different scales on the Y-axis will appear in the list, and you can apply formatting to them individually. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.8.3.6 Scatter Plot Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.8.3.7 Scatter Plot Properties - X-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting markers in the scatter plot. |
| **Show gridlines** | Specifies whether or not vertical gridlines should be visible. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |

**Scale**

| | |
|---|---|
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.8.3.8 Scatter Plot Properties - Y-axis

### One Y-axis with a single scale



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |

| One axis with a single scale | Use this option if you want to show the values from a single column on the Y-axis or if you have multiple columns that can be presented using the same scale. |
|---|---|
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns of very different magnitudes in the same visualization. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the scatter plot. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Scale** | |
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed at the top of the scale. |

## Multiple scales



| Option | Description |
|--------|-------------|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **One axis with a single scale** | Use this option if you want to show the values from a single column on the Y-axis or if you have multiple columns that can be presented using the same scale. |
| **Multiple scales** | Use this option to show two Y-axes (left and right) with two or more different scales. For example, use it if you want to display two columns with values of very different magnitudes in the same visualization. |
| **Individual scaling** | |
| **For each color** | Use this option to display one scale for each category used to color the markers by. For example, if you put two different columns on the Y-axis (for example, Oil Production and BNP), you can use the "(Column Names)" option to color by and click this radio button to display one scale for Oil Production and one for BNP. |
| | Do not use this option if you need to color by a large number of different categories. |
| | Note that you should apply true categorical coloring before using this option. If you use a continuous column on the color axis, you may end |

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|---|---|
| | up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |
| **For each trellis panel** | Use this option to display one scale for each trellis panel. |
| **Zoom** | |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the scatter plot. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. The scale labels are always displayed horizontally when multiple scales are shown. |
| **Horizontally** | Shows scale labels horizontally.<br>**Note:** Only available for individual scaling for each trellis panel. |
| **Vertically** | Shows scale labels vertically.<br>**Note:** Only available for individual scaling for each trellis panel. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Individual scale settings** | |
| [Drop-down list] | Select the scale for which you wish to change the settings. Select All scales to change settings for all scales simultaneously. |
| **Scale Range...** | Opens the Scale Range dialog where you can specify the range of the selected scale, and also determine whether or not to include the origin (0, 0). |
| **Position** | Specifies which side of the visualization the scales should be positioned. |
| **Left Y-axis** | Select this option to place the selected scale on the left-hand side of the visualization. |
| **Right Y-axis** | Select this option to place the selected scale on the right-hand side of the visualization. |
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.8.3.9 Scatter Plot Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, or Fixed. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised scatter plots, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
| **[Color Schemes menu]** | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |

| | |
|---|---|
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes.<br><br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br><br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br><br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br><br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.<br><br>**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has |

higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types.

**Reset** — Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog.

## 4.8.3.10 Scatter Plot Properties - Size
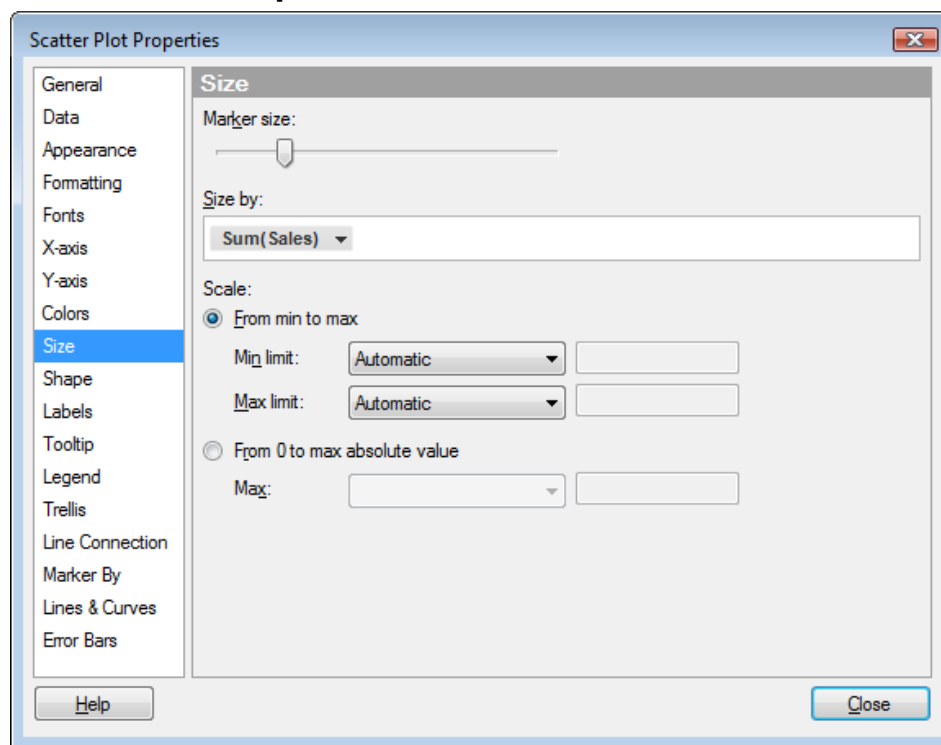


**Note:** The settings on this page are not available when the scatter plot is set up with tiled markers. There are no size settings to apply to tiled markers since they have the same size by definition. Go to the Shape page to change marker shapes.

| Option | Description |
| --- | --- |
| **Marker size** | Increases or decreases the overall size of all markers. |
| **Size by** | Specifies a column or hierarchy whose categories will determine the size of the markers.<br><br>The aggregation options on the drop-down menu are only available if the markers in the scatter plot have been aggregated by setting the Marker By option to something other than (Row Number). |

| | |
|---|---|
| **Scale** | Determines what scale to use for the size of the markers. |
| **From min to max** | Assigns the maximum marker size to the highest value, and the minimum marker size to the lowest value. For instance, if the minimum and maximum data values are -9 and 11 the marker sizes could be like the following: |



This mode is useful when you want to visualize differences.

| | |
|---|---|
| **Min limit:** **Max limit:** | The minimum and maximum limits that should be mapped to the marker size. By default, they are set to "Automatic". This means that the marker size will adapt during filtering. If the scale is set to "From min to max", the current minimum value will have the minimum marker size, and the current maximum value will have the maximum marker size. It is comparable to automatic zooming on the X or Y axes. |

It is possible to lock the max limit and/or min limit to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that are lower than the minimum value or higher than the maximum value will get the same size as the minimum and maximum value respectively. By specifying both a high and low value, the auto-scaling behavior is turned off.

| | |
|---|---|
| **From 0 to max absolute value** | This mode is useful when you want to compare the magnitude of measures. By letting the value 0 map to marker size 0, and the maximum value to the maximum marker size, it is possible to compare the diameter of markers and say "a" is twice as big as "b". With this scale the values 50 and 100 would be rendered like this: |



**Note:** The size is scaled symmetrically around 0 with absolute numbers. That is, if your highest value is 10 and your lowest is -20, the size of the marker at 10 will be 50 percent of the maximum marker size.

| | |
|---|---|
| **Max:** | The absolute limit that should be mapped to the marker size. By default, it is set to "Automatic". This means that the marker size will adapt during filtering. The value 0 will have the minimum marker size and the highest absolute value in the visualization will have the maximum marker size. |

It is possible to lock this to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that have a larger absolute value than the set value will get the same size as the maximum value.

## 4.8.3.11    Scatter Plot Properties - Shape



| Option | Description |
|--------|-------------|
| **Fixed shape** | Select this option to use the same, fixed shape on all markers. Select which shape to use from the Shape drop-down list under Shape definition. |
| **Shape** | Defines which shape to use for all markers. |
| **Shape by column values** | Select this option to use different shapes for the categories in a specified column or hierarchy. Which column or hierarchy to use, as well as which shape should represent which category, is specified under Shape definition. **Note:** A default set of shapes is used when automatically assigning shapes to categories. When there are more categories than available shapes in the default set, shapes will be recycled. |
| **Columns** | Specifies the column or hierarchy containing the categories you wish to present using different shapes. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |
| **Shape scheme** | Lists the categories in the selected column or hierarchy, and the shapes that have been assigned to each of these categories. **Note:** The set of shapes that is used by default in the scheme does not include all the available shapes. You can, however, always change to the shapes of your choice manually. Click on a shape in the scheme to display all the available shapes and make your selection. |

| | |
|---|---|
| **Tiled markers** | Select this option to display the markers as tiles. The markers will be rectangularly shaped, have the same size, and be displayed in a grid-like layout.<br>**Note:** When you use tiled markers the settings in the Size page will be disabled since the markers have the same size. |
| **Pies** | Select this option to use pies instead of markers.<br>**Note:** The Pies option is only available when the scatter plot is aggregated. Scatter plots are not aggregated by default. To enable the Pies alternative you need either to set Marker By to (None) or to use the column by which you want to aggregate on the Marker By selector. |
| **Sector size by** | Determines the numeric column that should provide the sizes of the pie sectors.<br>**Note:** Which categories the pie sectors should represent is defined in the Colors page. |
| **Show in labels** | Specifies what information to show in the labels for the pie sectors. |
| **Sector value** | Displays the value of the sector. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Threshold** | Excludes the labels for the sectors whose percentage falls below the specified threshold value. |
| **Decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |
| **Label position** | Specifies whether the labels will be located Inside or Outside the pie sectors. |
| **Sort sectors by size** | Sorts the pie sectors by size. |

## 4.8.3.12 Scatter Plot Properties - Labels



| Option | Description |
|---|---|
| **Label by** | Specifies the column or hierarchy whose values should be presented as labels in the visualization. |
| **Show labels for** | Determines whether to show labels on all markers (**All**), marked markers only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. If the number is smaller than the available number of markers, the labels will be equally distributed. <br> **Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Center labels on items** | Places the label right on top of the marker instead of drawing a line from the marker to the label, which is the default behavior. This can be a way to use your own images as markers. <br> **Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Show empty labels** | Shows labels that have no content. <br> **Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Display options** | These settings are used when you choose to display anything other than plain text in your labels. For example, the labels could contain web links or images. |
| **Get content from** | [Only visible if at least one virtual column producer is available.] <br> Your company may have set up some type of virtual column producers |

that can take the values from the selected column and transform them in one way or another to produce a desired output. For example, if you have access to TIBCO Spotfire Lead Discovery you can select Structure Column here, in order to show molecular structures from an information link in the labels.

For embedded images in the current data table, or when fetching data via a URL, you should leave this setting at (Selected column).

| | |
|---|---|
| **Settings...** | If the selected source has some settings available, you can reach those by clicking on the Settings button. For example, this is where you would specify which information link to retrieve structures from when using TIBCO Spotfire Lead Discovery. |
| **Show as** | Allows you to decide how the data in the selected column should be interpreted. |

For example, use **Text** for plain text labels. Use **Image** if there are binary images in your data that you want to use as labels. Use **Link** if the text should be interpreted as a web link. Use **Image from URL** if the image is picked from a web resource location. You may need to change the Link or Image from URL Renderer Settings by clicking on the Settings... button and modifying the link syntax so that it fits your current data. Once the URL to the image has been correctly specified you can see images in the labels.



Use **Geometry** if your data is a shape file and you want to show the geometrical shapes in the labels.

If a TIBCO Spotfire Lead Discovery structure column is used to label by, then you would select a renderer for displaying structure images here.

| | |
|---|---|
| **Settings...** | If the selected Show as method has some settings available that can be modified, you can reach them by clicking on the Settings button. For example, this could be Link Renderer Settings or Image from URL Renderer Settings for a web link, Geometry Renderer Settings or some structure renderer settings. |
| **Size** | Available if the selected label output is some kind of image. Increases or decreases the size of the labels. |

## 4.8.3.13 Scatter Plot Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.8.3.14　　Scatter Plot Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend. |
| | By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar: |
| |  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.8.3.15    Scatter Plot Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not |

|  | control the number of shown rows or columns in any way. The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.8.3.16   Scatter Plot Properties - Line Connection



| Option | Description |
|---|---|
| **Draw a separate line per value in** | Specifies the column or hierarchy containing the categories to use for line connection. Markers of the same category will be connected with each other to form a separate line. If no column or hierarchy is specified here, all markers will be connected with each other. |

| Order each line by | Specifies the order in which markers are connected. If no column or hierarchy is specified here, the markers will be ordered by row index (the order of the rows in the original data table). |
|---|---|
| **Color** | Specifies how colors will be assigned to the lines. |
| **Same as marker** | Choose this option if you want the lines to have the same color as the markers they are a connection between. If a line connects markers with different colors, the color of the line will be a fusion of the two colors. For example, when a blue marker is connected with a yellow marker the line between them will be green. |
| **Custom** | Choose this option if you want to use a single custom color for the lines. Click on the drop-down list to show the color selector where you can choose a different color. |
| **Width** | Specifies the width of the lines. |
| **Place in** | Select whether the lines should be placed in the foreground or background of the markers they are connecting. |
| **Show arrows to indicate order** | Specifies whether or not there should be arrows along the lines to indicate the order. |

## 4.8.3.17    Scatter Plot Properties - Marker By



| Option | Description |
|---|---|
| **Show one marker for each** | If you select (Row Number) here, then each row in the data table will be displayed as a separate marker in the visualization, even if several markers have identical values for the X-axis and Y-axis, and therefore are located at the exact same coordinates. These markers will be drawn on |

top of each other.

You can, however, select to combine markers (known as aggregation) so that each marker shows for example the sum of all rows that have something in common.

For example, if you have Continent on the X-axis and Sales on the Y-axis, then each individual sales number for each continent would be displayed as a marker (below).
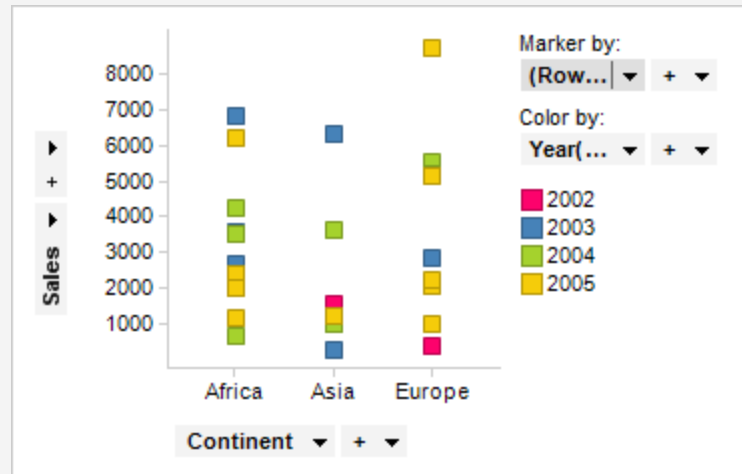


However, if you set Marker by = Year, then the sum of sales for each year will be displayed as a marker for each continent.
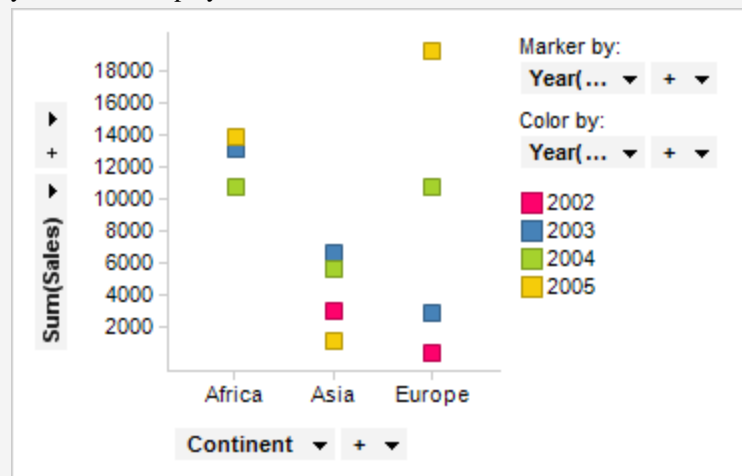


| **Currently also split by the following properties** | Displays information about what other properties currently contribute to a splitting of the markers. |
| --- | --- |

## 4.8.3.18    Scatter Plot Properties - Lines & Curves



**First part of the dialog**

| Option | Description |
|---|---|
| **Visible lines and curves** | Lists the currently added lines and curves. If a check mark is shown in the check box, then the line or curve is shown in the visualization. Clear the check box to hide a line or curve.<br><br>New lines or curves can be added to this list by clicking on the Add button; see below. |
| **Add** | Displays a menu where you can select which type of line or curve to add to the list of available lines and curves, and in some cases, opens a dialog where you can specify settings to use for that line or curve.<br><br>For more information about the different curve types, see Curve Fit Models. |
| **Edit...** | Opens a dialog where you can change the settings for the selected line or curve (when applicable). |
| **Remove** | Removes the selected line or curve from the list of available lines and curves. |
| **More** | |
| **Duplicate** | Duplicates the currently selected line or curve. This can be particularly useful if you want to add one static curve that is calculated on the whole data set (select the Update curve manually check box) and |

|  |  |
|---|---|
|  | another one that is changed upon filtering (default). |
| **Export Curve Fit Result...** | Opens a dialog where you can choose to export the curve fit result for the selected curve to a text file or to Microsoft® Excel®. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file, which contains a bit more information about the columns (types, etc.). The Excel file can be either an XLS file or an XLSX file. |

## Settings

| Option | Description |
|---|---|
| **Appearance** | Determines the color, style and width of lines and curves, and the color, style and size of points. |
| **Place in** | Select whether to place the line, curve or point in the Foreground or Background of the visualization. |
| **Transparency** | Determines the transparency of the selected line, curve or point. That is, the degree to which the markers can be seen through it. The transparency is strongly connected to the color. |
| **Label and Tooltip** | Opens a dialog where you can determine what information to show in the label and/or tooltip for the selected line, curve or point. |
| **Included in axis range** | Sets the automatic zooming so that the line, curve or point is always shown, even if it lies far from the currently filtered values. |
| **Update manually** | Select the check box to "freeze" the line or curve so that it is not automatically recalculated upon filtering. You can update the line or curve by clicking the Update button below or by right-clicking in the visualization and selecting Update Lines and Curves and clicking on the one you want to update. <br> **Note:** Not applicable for points. |
| **Update** | When a line or curve has been specified to be manually updated, use this button to perform the update. |
| **One per** | Determines whether to show one line or curve per Color, Trellis panel, and/or Shape. <br> **Note:** Not applicable for points. <br> Note that you should apply true categorical coloring before using the color option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

## 4.8.3.19 Scatter Plot Properties - Error Bars



| Option | Description |
|---|---|
| **Visible error bars** | Lists the numerical columns and measures that you can define error bars for in the visualization. If a check mark is shown in the check box, then error bars for that column or measure are visible in the visualization. Clear the check box to hide the error bars for a column or measure.<br>**Note:** No error bars will be visible in the visualization until an upper or lower error has been defined. |
| **Settings** | Shows the settings for the selected column or measure.<br>**Note:** If you use multiple Y-axes in the scatter plot you can define different error bars for the axes. However, all the defined vertical error bars will share the same settings for Color, Show end caps, and Include error bars in axis range. For example, you cannot set one vertical error bar to be blue, and another vertical error bar to be yellow in the same scatter plot. This also applies to using multiple measures on a Y-axis with a single scale. |
| **Upper error** | Specifies the column and aggregation method, or custom expression to use for the upper error bars in the visualization.<br>**Note:** The chosen column or measure must have numerical values.<br>**Note:** For horizontal error bars in a scatter plot with non-reversed scales, the upper error refers to the error bar on the right hand side of the marker. |
| **Lower error** | Specifies the column and aggregation method, or custom expression to use for the lower error bars in the visualization.<br>**Note:** The chosen column or measure must have numerical values. |

| | Note: For horizontal error bars in a scatter plot with non-reversed scales, the lower error refers to the error bar on the left-hand side of the marker. |
|---|---|
| **Color** | |
| **Same as marker** | Choose this option if you want an error bar to have the same color as the marker. |
| **Custom** | Choose this option if you want to use a custom color for the error bars. Click on the drop-down list to show the palette and select a different color. |
| **Show end caps** | Specifies whether or not orthogonal lines should be displayed at the end of the error bars. |
| **Include error bars in axis range** | Sets the automatic zooming so that the error bars are always visible. |

**Note:** The upper and lower errors refer to the underlying data. This means that if you use reversed scales in a visualization, the error bars will also be reversed. For example, for a scatter plot with reversed Y-axis, the upper error bar will be displayed below the marker. With reversed X-axis in the scatter plot, the upper error will be displayed on the left-hand side.

# 4.9 3D Scatter Plot

## 4.9.1 What is a 3D Scatter Plot?

3D scatter plots are used to plot data points on three axes in the attempt to show the relationship between three variables. Each row in the data table is represented by a marker whose position depends on its values in the columns set on the X, Y, and Z axes.

A fourth variable can be set to correspond to the color or size of the markers, thus adding yet another dimension to the plot.

The relationship between different variables is called correlation. If the markers are close to making a straight line in any direction in the three-dimensional space of the 3D scatter plot, the correlation between the corresponding variables is high. If the markers are equally distributed in the 3D scatter plot, the correlation is low, or zero. However, even though a correlation may seem to be present, this might not always be the case. The variables could be related to some fourth variable, thus explaining their variation, or pure coincidence might cause an apparent correlation.

You can change how the 3D scatter plot is viewed by zooming in and out as well as rotating it by using the navigation controls located in the top right part of the visualization.

**Note:** The 3D scatter plot is not supported in TIBCO Spotfire Web Player. It is still possible to open an analysis with a 3D scatter plot in the web player, but the 3D scatter plot will not be shown.

### Example:

In the 3D scatter plot below, sales, cost, and year are plotted against each other for a number of different products (colored by product).
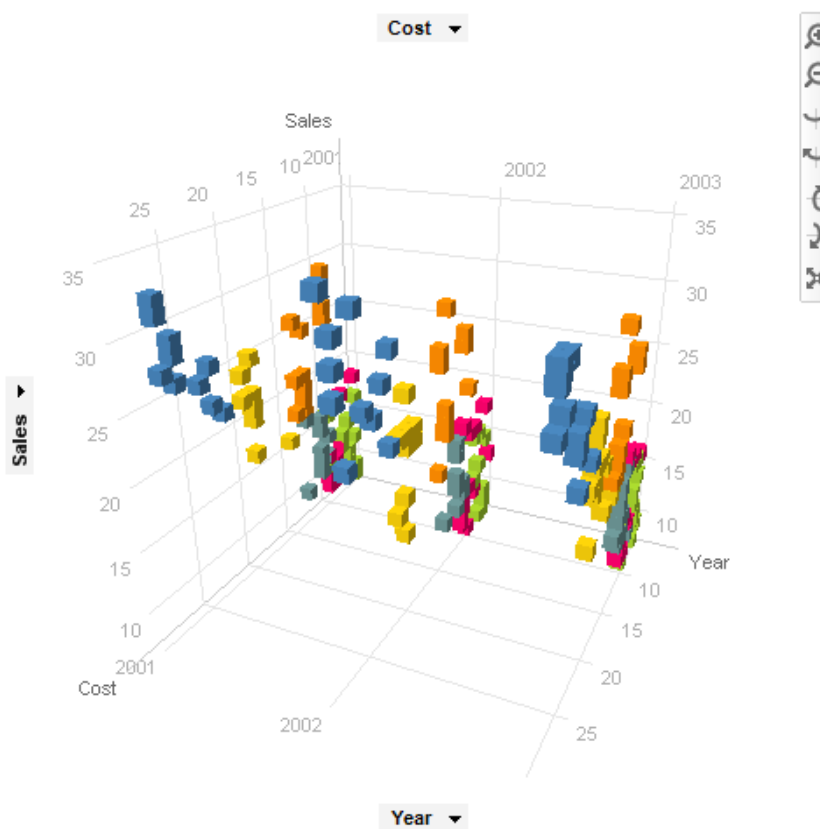


Each category can be shown separately using trellising. In the example below, the markers are colored by product, and trellised by category:
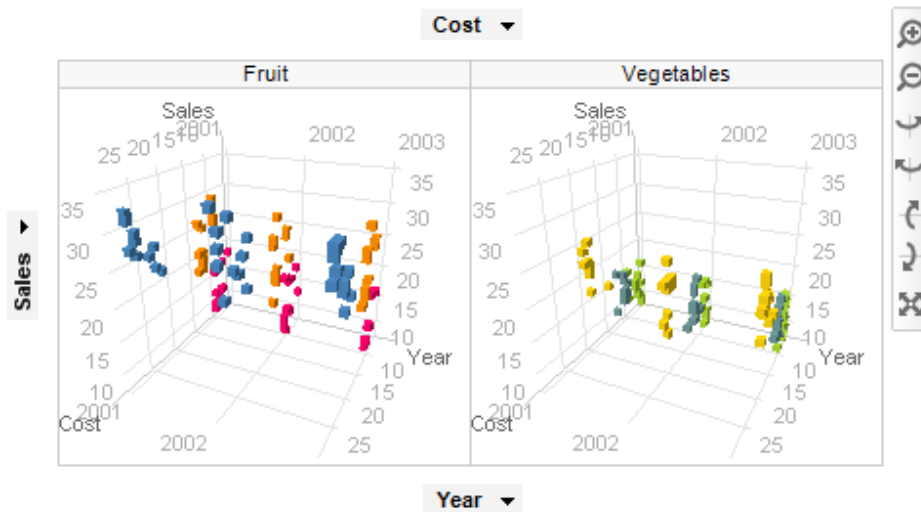
The 3D scatter plot can also be used together with aggregation (for example, Sum or Average) by using the setting Marker By. In this case, the values for a certain category are bundled together to display a single marker for each category as seen in the example below. The aggregated markers can also be sized by the count of items within each category, or by any other column.
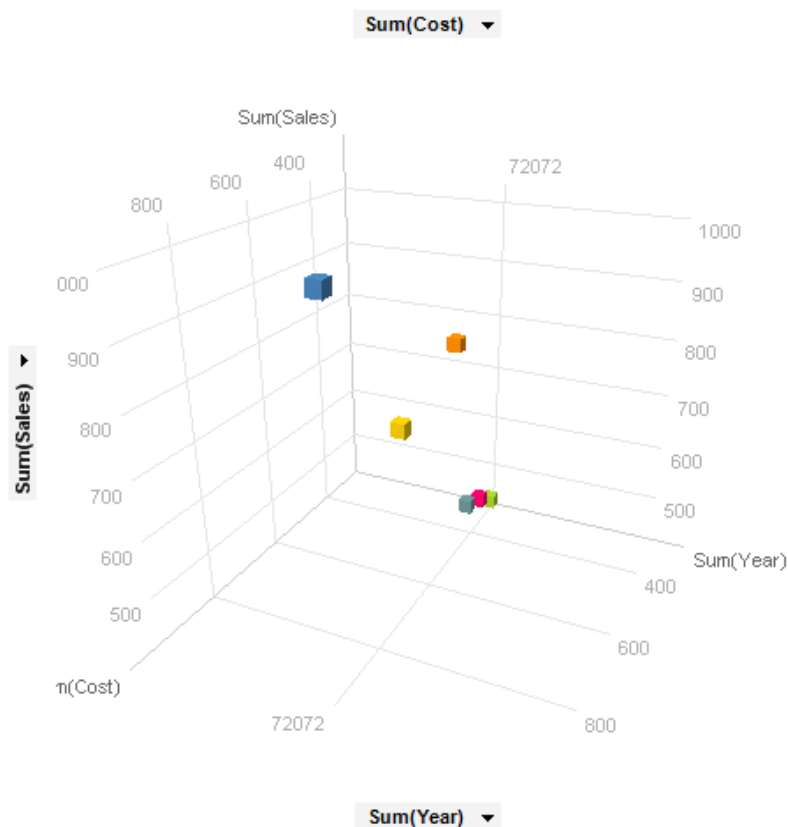
## Example:



Labels can be used in visualizations to identify and describe markers and the data associated with them.

**Example:**

In the 3D scatter plot below, labels show which category each of the marked markers belongs to.
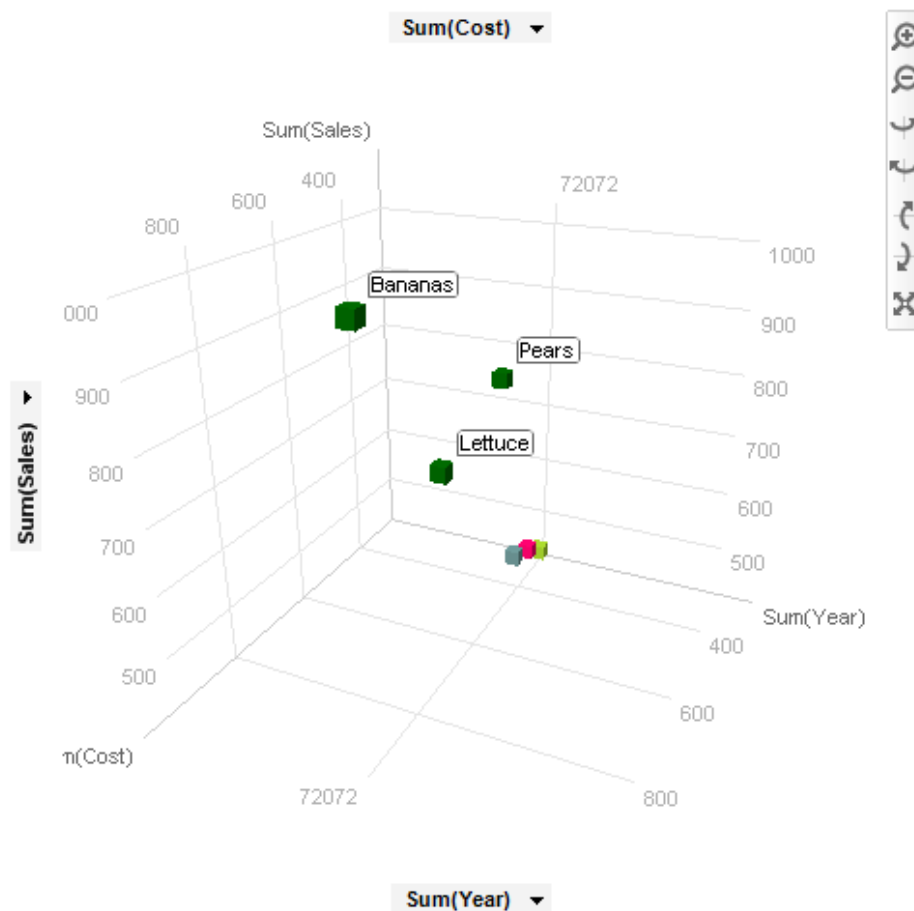


All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.9.2 How to Use the 3D Scatter Plot

► **To apply coloring:**

1. In the **Filters** panel, click and hold down the left mouse button on the filter representing the column that you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under **Edit > Document Properties**.

2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Color target.

   Response: The markers are colored with one color for each category in the selected column.

   Comment: To learn more about coloring in Spotfire, see Coloring Overview.

### ► To shape markers by a column:

1. In the filters panel, click and hold down the left mouse button on the filter representing the column that you want to shape by.

    Comment: Shape is also available in the Properties dialog.

2. Drag the filter to the center of the visualization.

    Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Shape by target.

    Response: The markers are shaped with one shape for each category in the selected column.

    Comment: In the Shape page of the Properties dialog you can change the shape you want to use for each category.

### ► To aggregate markers:

1. Right-click in the 3D scatter plot to display the pop-up menu.

2. Select **Properties**.

3. Click to display the **Marker By** page.

4. Select a column to group the markers by under **Show one marker for each**.

    Response: The markers are grouped so that a single marker is shown for each category in the selected column.

    Comment: If the Legend is visible, the Marker By property may also be changed there.

### ► To create a new 3D scatter plot:

1. Click on the New 3D Scatter Plot button on the toolbar, .

    Comment: You can also select **Insert > New Visualization > 3D Scatter Plot** from the menu.

    Response: A first attempt to set up a suitable 3D scatter plot is made by the application.

2. Adjust the 3D scatter plot to display the measures of your choice.

    Comment: For more information about how to change what to show on the three axes, see Column Selectors.

### Zooming and navigating in the 3D scatter plot:

Located at the top right of the visualization are a number of buttons that you can use to zoom and navigate in the visualization.

| Button | Shortcut | Description |
|---|---|---|
| ⊕ | Press and hold the **Shift** key and the **right mouse button** simultaneously while moving the mouse up. | Zoom in. |
| ⊖ | Press and hold the **Shift** key and the **right mouse button** simultaneously while moving the mouse down. | Zoom out. |
| ↴ | Press and hold the **Ctrl** key and the **right mouse button** simultaneously while moving the mouse to the right. | Rotate right. |
| ↵ | Press and hold the **Ctrl** key and the **right mouse button** simultaneously while moving the mouse to the left. | Rotate left. |

| | | |
|---|---|---|
| ( | Press and hold the **Ctrl** key and the **right mouse button** simultaneously while moving the mouse up. | Rotate up. |
| ) | Press and hold the **Ctrl** key and the **right mouse button** simultaneously while moving the mouse down. | Rotate down. |
| ⤬ | | Reset navigation. |

You can also use the mouse wheel to zoom in or out. To reset zoom and navigation to the default values, click on the Reset Navigation button, or right-click in the visualization and select **Reset Navigation**.

### Resizing markers in the 3D scatter plot:

You can use keyboard shortcuts to resize markers in the 3D scatter plot:

| Shortcut | Description |
|---|---|
| Press and hold down the **Ctrl** key and the plus (+) key simultaneously until the markers have the desired size. | Increase size of markers. |
| Press and release the plus key repeatedly while pressing the **Ctrl** key. | Increase size of markers. |
| Press and hold the **Ctrl** key and the minus (-) key simultaneously. | Decrease size of markers. |
| Press and release the minus key repeatedly while pressing the **Ctrl** key. | Decrease size of markers. |
| Press and hold down the **Ctrl** key while rotating the mouse wheel. | Resize markers. |

Yet another way to resize the markers is to open the Size page of the Properties dialog and use the slider control.

## 4.9.3    3D Scatter Plot Properties

### 4.9.3.1    3D Scatter Plot Properties

The 3D Scatter Plot Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- X-axis
- Y-axis
- Z-axis
- Colors
- Size
- Shape
- Labels

- Tooltip
- Legend
- Trellis
- Marker By

### ► To reach the 3D Scatter Plot Properties dialog:

1. Right-click on the 3D scatter plot visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the 3D scatter plot visualization to make it active and then select **Edit > Visualization Properties**.

## 4.9.3.2    3D Scatter Plot Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

**Note:** You can open an analysis containing a 3D scatter plot in the web player, but you will be informed that the visualization cannot be shown in the web player.

## 4.9.3.3      3D Scatter Plot Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br>This can be used if you have two visualizations with different markings |

and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings.

| | |
|---|---|
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.9.3.4 3D Scatter Plot Properties - Appearance



| Option | Description |
|---|---|
| **Show navigation controls** | Specifies whether or not to show the navigation controls in the visualization. |
| **Jittering** | Jittering is an option that displaces the visualization items randomly in the display window, thereby making overlapping markers visible. |
| **X** | Specifies the amount of jittering to use in the X direction. |
| **Y** | Specifies the amount of jittering to use in the Y direction. |
| **Z** | Specifies the amount of jittering to use in the Z direction. |
| **Use the same amount of jittering for X, Y and Z** | Select this check box to connect the jittering sliders in both directions to each other. |

### 4.9.3.5 3D Scatter Plot Properties - Formatting



| Option | Description |
| --- | --- |
| **Axes** | Displays which column and category are currently being used on each of the three axes in the 3D scatter plot. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for two or all of the axes at the same time. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.9.3.6    3D Scatter Plot Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.9.3.7 3D Scatter Plot Properties - X-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting markers in the 3D scatter plot. |
| **Show gridlines** | Specifies whether or not gridlines should be visible on the X-axis. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Specifies that scale labels are shown horizontally.<br>**Note:** In the 3D scatter plot you cannot change this setting. |
| **Vertically** | This alternative is inactive, since it is not possible to change this setting in the 3D scatter plot. |

**Scale**

| | |
|---|---|
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.9.3.8  3D Scatter Plot Properties - Y-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |

**Range**

| | |
|---|---|
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the 3D scatter plot. |
| **Show gridlines** | Specifies whether or not gridlines should be visible on the Y-axis. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Specifies that scale labels are shown horizontally. **Note:** In the 3D scatter plot you cannot change this setting. |
| **Vertically** | This alternative is inactive, since it is not possible to change this setting in the 3D scatter plot. |

**Scale**

| | |
|---|---|
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed at the top of the scale. |

## 4.9.3.9 3D Scatter Plot Properties - Z-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Z-axis. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the 3D scatter plot. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |

| Scale labels | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Specifies that scale labels are shown horizontally. **Note:** In the 3D scatter plot you cannot change this setting. |
| **Vertically** | This alternative is inactive, since it is not possible to change this setting in the 3D scatter plot. |
| **Scale** | |
| **Log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed at the top of the scale. |

## 4.9.3.10    3D Scatter Plot Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can |

| | select one of the following color modes: Gradient, Segments, or Fixed. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
|---|---|
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised 3D scatter plots, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
| [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes.<br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.<br>**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |

| | |
|---|---|
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.9.3.11   3D Scatter Plot Properties - Size



| Option | Description |
|---|---|
| **Marker size** | Increases or decreases the overall size of all markers. |
| **Size by** | Specifies a column or hierarchy whose categories will determine the size of the markers.<br><br>The aggregation options on the drop-down menu are only available if the markers in the 3D scatter plot have been aggregated by setting the Marker By option to something other than (Row Number). |
| **Scale** | Determines what scale to use for the size of the markers. |
| **From min to max** | Assigns the maximum marker size to the highest value and the minimum marker size to the lowest value. For instance, if the minimum and maximum data values are -9 and 11 the marker sizes might look as follows:<br><br><br><br>This mode is useful when you want to visualize differences. |
| **Min limit:**<br>**Max limit:** | The minimum and maximum limits that should be mapped to the marker size. By default, they are set to "Automatic". This means that the marker size will adapt during filtering. If the scale is set to "From min to max", the current minimum value will have the minimum marker size, and the current maximum value will have the maximum marker size. It is comparable to automatic zooming on the axes.<br><br>It is possible to lock the max limit and/or min limit to a specific value |

by selecting "Value" in the drop-down list and entering a value. Data values that are lower than the minimum value or higher than the maximum value will get the same size as the minimum and maximum value respectively. By specifying both a high and low value, the auto-scaling behavior is turned off.

**From 0 to max absolute value**

This mode is useful when you want to compare the magnitude of measures. By letting the value 0 map to marker size 0, and the maximum value to the maximum marker size, it is possible to compare the diameter of markers and say "a" is twice as big as "b". With this scale the values 50 and 100 would be rendered like this:



**Note:** The size is scaled symmetrically around 0 with absolute numbers. That is, if your highest value is 10 and your lowest is -20, the size of the marker at 10 will be 50 percent of the maximum marker size.

**Max:**

The absolute limit that should be mapped to the marker size. By default it is set to "Automatic". This means that the marker size will adapt during filtering. The value 0 will have the minimum marker size and the highest absolute value in the visualization will have the maximum marker size.

It is possible to lock this to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that have a larger absolute value than the set value will get the same size as the maximum value.

## 4.9.3.12    3D Scatter Plot Properties - Shape
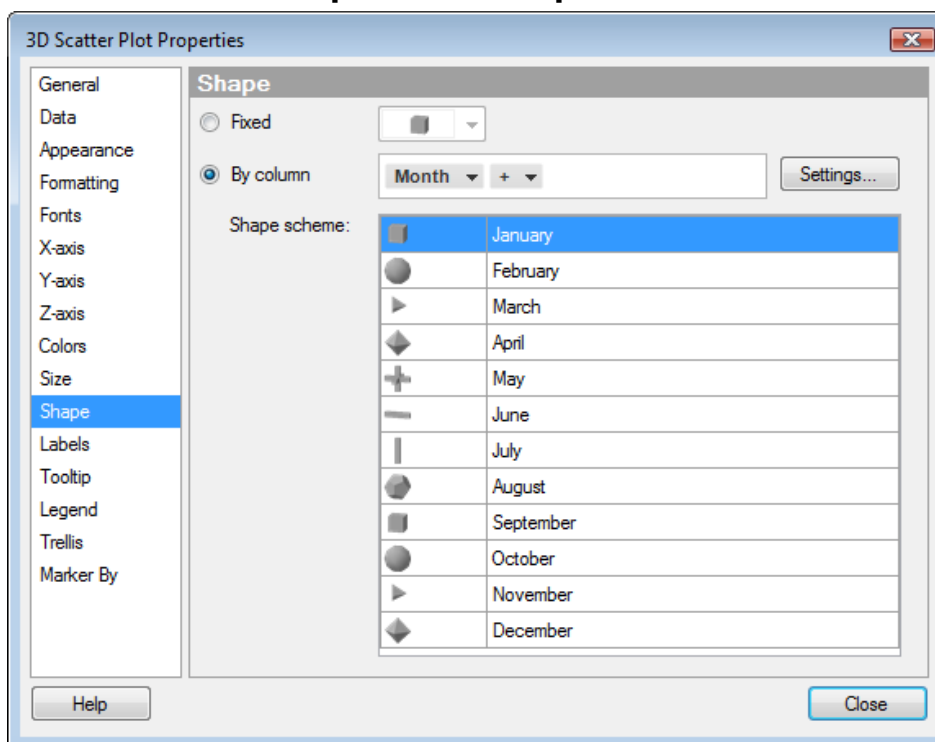


| Option | Description |
|---|---|
| **Fixed** | Select this option to use the same, fixed shape on all markers. The shape is selected from the drop-down list. |
| **By column** | Select this option to use different shapes for the categories in a specified column or hierarchy. When there are more categories than available shapes, shapes will be recycled. Select which column to shape the markers by in the drop-down list. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |
| **Shape scheme** | Click on a shape to change it to a different one. |

### 4.9.3.13　　3D Scatter Plot Properties - Labels
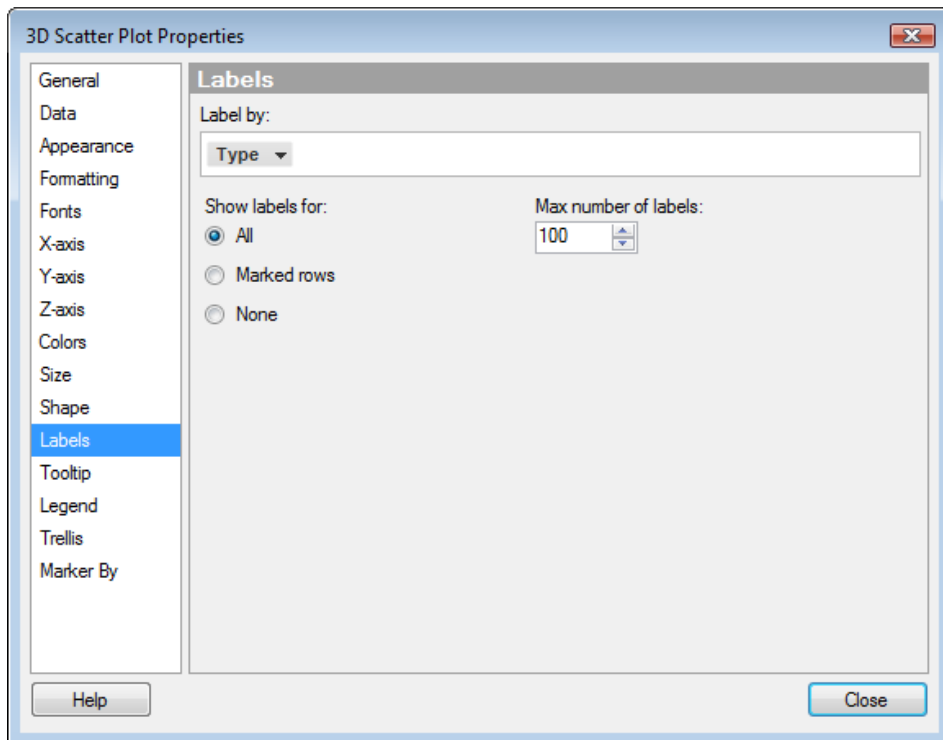


| Option | Description |
| --- | --- |
| **Label by** | Specifies the column or hierarchy whose values you want presented as labels in the visualization. |
| **Show labels for** | Determines whether to show labels on all markers (**All**), marked markers only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. If the number is smaller than the available number of markers, the labels will be equally distributed. |

## 4.9.3.14 3D Scatter Plot Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.9.3.15    3D Scatter Plot Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.9.3.16    3D Scatter Plot Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way. |

|  |  |
|---|---|
|  | The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.9.3.17　3D Scatter Plot Properties - Marker By



| Option | Description |
|---|---|
| **Show one marker for each** | If you select (Row Number) here, then each row in the data table will be displayed as a separate marker in the visualization even if several markers have identical values for the X-axis, Y-axis, and Z-axis and are located at the exact same coordinates. These markers will be drawn on top of each other.<br><br>You can, however, select to combine markers (known as aggregating) so that each marker shows the sum of all rows that have something in |

common.

For example, if you have Continent on the X-axis, Year on the Y-axis and Sales on the Z-axis, then each individual sales number for each continent, and each individual year would be displayed as a marker (below).



However, if you set Marker By = Year, then the sum of sales for each year will be displayed as a marker for each continent.
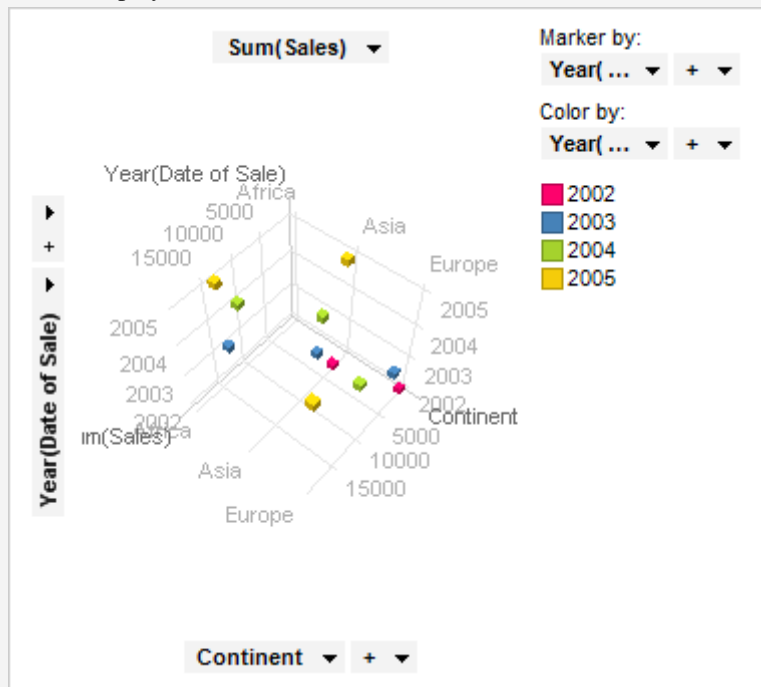


| **Currently also split by the following properties** | Displays information about what other properties currently contribute to a splitting of the markers. |

# 4.10    Map Chart

## 4.10.1    What is a Map Chart?

There are three kinds of map charts in TIBCO Spotfire: maps with interactive shapes, maps with markers or pies, and image backgrounds with markers or pies.

Below is an example of a map chart with interactive shapes, where each shape represents a state in the United States. Each shape in the map is a separate item, and you can interact with those items the same way you do with items in any other visualization.
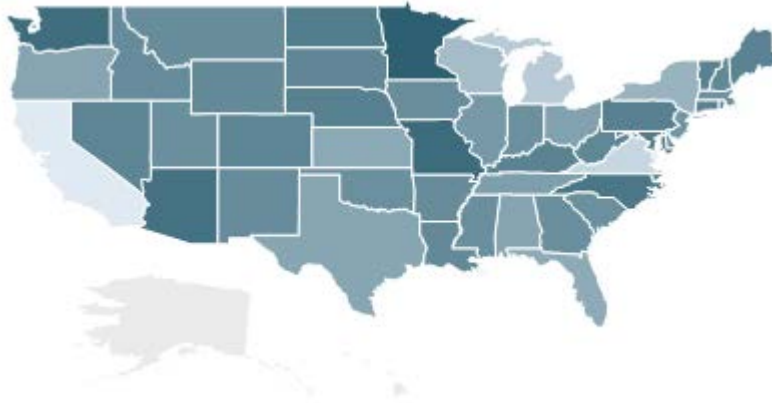
The interactive shapes can be one of three geometry types: polygons, lines, or points. When polygons are used, as in the example above, the shapes constitute different areas in the map, and these areas will be filled with color. How to color the shapes is defined in the Colors page of the visualization properties, or in the legend. When lines or points are used, the interactive shapes are the actual lines or points. The color you define in the Colors page will be the color of the lines or points. Examples of when maps with lines as interactive shapes could be useful are maps showing highways or a street grid. Below is an example of a map chart with interactive shapes, where each shape represents a highway.

Which geometry type is used in a map is defined in the map data before you load it into your analysis, and this cannot be changed in Spotfire. If the map data comes from an ESRI shape file, you can open the Properties tab of the Data Table Properties dialog to see which geometry type a map has if you are uncertain.

In a map with markers or pies, the map areas are not interactive. Instead, markers or pies are positioned in the different areas. In the example below, the map shows the same geographical area as in the first example, and is also divided into states. But instead of the states being interactive, a marker is placed in each of the states, and you can interact with the markers just as you do with markers in other visualizations.
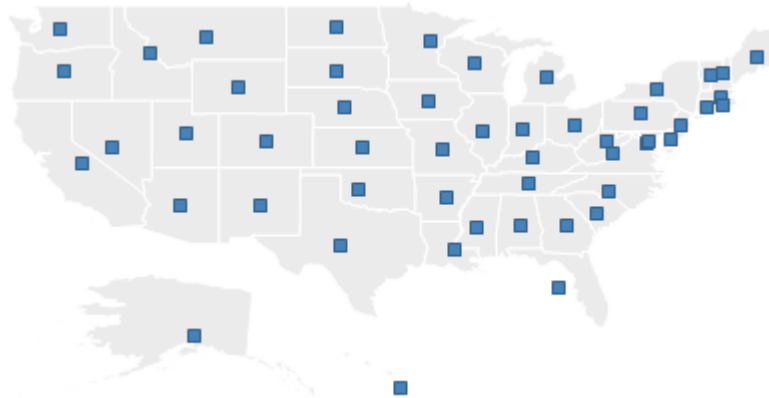
To set up a map with interactive shapes, or a map with markers or pies, you need a data table containing map data, such as from an ESRI shape file. You can use other types of sources than shape files, but that requires some manual configuration. To learn how to use a non-shape file, or to set up information links with map information, see Configuration of Geographical Data for Map Charts.

If you want the shapes in a map with interactive shapes to be colored by a data table other than the map data table, the two data tables must contain columns that can be matched to each other; State or City, for example. When you have set up a relation between the two data tables using these columns, you can color the shapes by a column in the other data table.

Similarly, if you want the markers in a map with markers or pies to be colored by another data table than the map data table, you must set up a relation between the two data tables. Or, if the data table for markers or pies has columns containing coordinates, you can use these to position the markers or pies in their correct locations on the map.

A third way to set up a map chart is to use a background image and then position markers or pies on top of that image. This works similarly to the map with markers or pies, but with the difference that you do not need to have map data in a data table in order to set it up. However, for the markers to be placed correctly in geographical positions, the data table must contain X and Y coordinates. Below is an example of a map chart where the background is a map image of a part of North America. On top of the background image are markers pointing out cities in the United States.



You can zoom and pan in a map using the navigation controls to the right of the map. Click on the small arrow icon on the map chart title bar (shown on mouse over) to show or hide the navigation controls. The example below shows the same map chart as in the first example, but it has been zoomed in to show only some of the states. To learn more, see Zooming and navigating in the map chart.
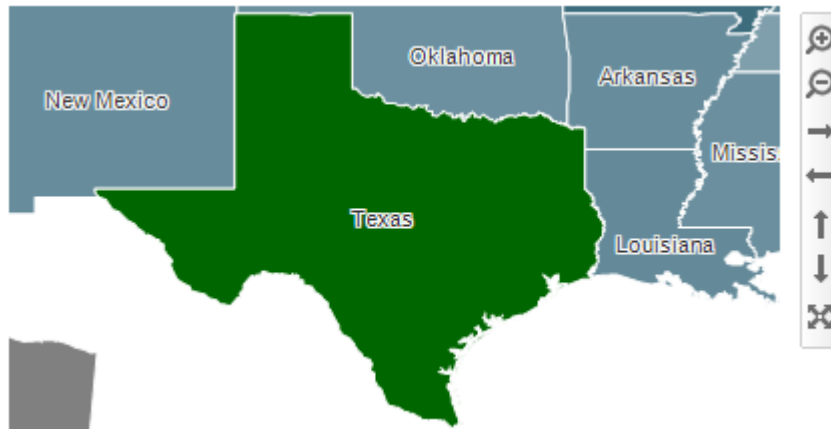
Labels can be used in the map chart to identify and describe markers or interactive shapes. In the example above, labels with the state names have been added to the map. Open the Labels page of the Map Chart Properties if you want to modify the labels settings. You can also move the labels to other positions in the map using drag and drop. To learn more about labels in different map types, see How to Use the Map Chart.

A map chart can be used to show other than geographical data. The example below displays different types of failures on a wafer, a semi-conductor material used to manufacture microchips.
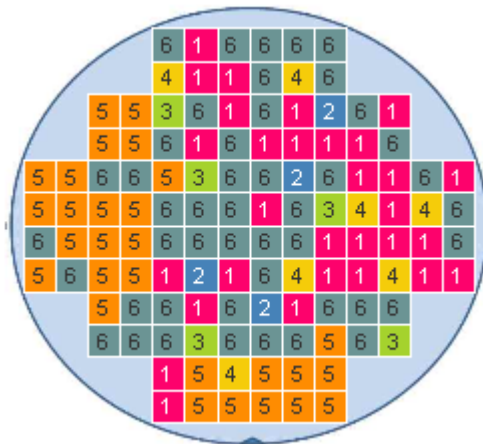


The background is an image representing the wafer. The markers in the visualization represent the chips on the wafer, and are placed on the background the same way they are placed on the actual wafer. The colors and labels indicate the six different types of manufacturing failures that have occurred on this wafer. Copying the actual layout of the wafer is a way to enhance the readability of the data. To be able to view the data this way, you need to use tiled markers. This means that all the markers have the same size, and are displayed in a grid-like layout. Go to the Shape page in the Map Chart Properties to change to tiled markers.

**Note:** If you use tiled markers, and the axes' scales have a large number of values, then the markers may become too small to be seen. The reason for this is that the grid layout makes it necessary for each value on the scales to have a unique position, even if no marker is located at each of these allocated positions. Therefore, with a large number of values on the scale, the markers must become very small to fit in the grid.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

# 4.10.2    How to Use the Map Chart

### ► To create a new map chart:

1.  Click on the New Map Chart button on the toolbar, 🌐.
    Comment: You can also select **Insert > New Visualization > Map Chart** from the menu.
    Response: A visualization area is created for the map chart.
2.  Right-click in the visualization to display the pop-up menu and select **Properties**.
    Response: The Properties dialog is displayed.
3.  Go to the Data page to select map type and to set up the map chart.
    Comment: See the appropriate section below to learn how to set up the different map types.

### ► To set up a map with interactive shapes:

1.  Create a map chart.
2.  Right-click in the visualization to display the pop-up menu and select **Properties**.
    Response: The Properties dialog is displayed.
3.  Go to the Data page.
4.  Select **Map with interactive shapes** from the Map type drop-down list.
5.  Select a data table containing map data.
    Comment: If a map data table has not already been added, click **Add...** to open the Add Data Table dialog where you can browse for a data table to use, such as an ESRI shape file. If you are not using a shape file, some manual configuration is needed. To learn how to do this, see Configuration of Geographical Data for Map Charts.
    Response: The map is displayed in the visualization area.
6.  Under Related data table for coloring, select a data table of interest.
    Comment: To be able to color by another data table than the map data table, the other data table must be related to the map data table.
7.  If a relation has already been defined, the colored map is now displayed in the visualization. If no relation is defined, or if you want to edit an existing relation, continue to step 8.
8.  Click the **Manage Relations...** button.
    Response: The Manage Relations dialog is opened.
9.  To create a new relation, click on the **New...** button to open the New Relation dialog. To edit an existing relation, click on the **Edit...** button to open the Edit Relation dialog.
10. In the Left data table drop-down list, select the same data table that you selected under Related data table for coloring.
11. In the Right data table drop-down list, select the map data table.
12. In the Left column and the Right column drop-down lists, select columns that make up a valid relation between the two data tables. For instance, columns in both data tables describing the same regions, such as state or country names.
13. Click **OK**.
14. Click **OK** in the Manage Relations dialog.
    Response: The map is colored by a column in the related data table. To change which column to color the map by, go to the Colors page.
15. Comment: To learn more about coloring in Spotfire, see Coloring Overview.
16. To change the appearance of the map, go to the Appearance page.

### ► To set up a map with markers or pies:

1. Create a map chart.
2. Right-click in the visualization to display the pop-up menu and select **Properties**.
   Response: The Properties dialog is displayed.
3. Go to the Data page.
4. Select **Map with markers or pies** from the Map type drop-down list.
5. Select a data table containing map data.
   Comment: If a map data table has not already been added, click **Add...** to open the Add Data Table dialog where you can browse for a data table to use, such as an ESRI shape file.
   Response: The map is displayed in the visualization area.
6. Under Data table for markers or pies, select a data table of interest.
7. Under Draw markers or pies using, select whether to use **Relation** or **Coordinate columns** to match the map data table to the data table for markers or pies.
   Comment: If you want to use a relation, you must set up a relation to make the **Relation** option available.
8. To set up a relation, or to edit an existing relation, go through steps 9 to 15. To use an existing relation, go to step 16. To use coordinate columns, go through steps 17 to 19.
9. Click the **Manage Relations...** button.
   Response: The Manage Relations dialog is opened.
10. To create a new relation, click on the **New...** button to open the New Relation dialog. To edit an existing relation, click on the **Edit...** button to open the Edit Relation dialog.
11. In the Left data table drop-down list, select the same data table that you selected under Related data table for coloring.
12. In the Right data table drop-down list, select the map data table.
13. In the Left column and the Right column drop-down lists, select columns that make up a valid relation between the two data tables. For instance, columns in both data tables describing the same regions, such as state or country names.
14. Click **OK**.
15. Click **OK** in the Manage Relations dialog.
16. Select the **Relation** radio button.
    Response: Markers or pies are displayed in the map according to the positions given in the specified relation.
17. Select the **Coordinate columns** radio button.
18. In the X column drop-down list, select the X coordinate column.
19. In the Y column drop-down list, select the Y coordinate column.
    Response: Markers or pies are displayed in the map according to the positions given in the coordinate columns.
20. To change from markers to pies, or vice versa, go to the Shape page. To change the appearance of the map, go to the Appearance page.

### ► To set up a map using a background image with markers or pies:

1. Create a map chart.
2. Right-click in the visualization to display the pop-up menu and select **Properties**.
   Response: The Properties dialog is displayed.
3. Go to the Data page.
4. Select **Background image with markers or pies** from the Map type drop-down list.
5. Click on **Browse...** to locate the interesting image file.

Comment: You can use a vector file (EMF, WMF) or an image file (BMP, GIF, TIFF, JPG, PNG, etc.).

Response: The image is shown in the visualization area.

6. Under Data table for markers or pies, select a data table.
7. Select X column and Y column from the drop-down lists.
8. Click on the **Position Settings...** button to open the Position Settings dialog where you can adjust the image position relative to the data in the X and Y columns.

    Comment: If you do not have the exact coordinates of the map limits, you can locate a few known landmarks in the map and adjust the X and Y High and Low values until the corresponding markers are positioned on the correct landmarks.

9. When done, click **OK**.
10. To change from markers to pies, or vice versa, go to the Shape page.

## Zooming and navigating in the map chart:

Located at the top right of the visualization are a number of buttons that you can use to zoom and navigate in the visualization.

| Button | Shortcut | Description |
|---|---|---|
| ⊕ | Press and hold the **Shift** key and the **right mouse button** simultaneously while moving the mouse up. | Zoom in. |
| ⊖ | Press and hold the **Shift** key and the **right mouse button** simultaneously while moving the mouse down. | Zoom out. |
| | Press and hold the **Shift** + **Ctrl** + **Alt** keys and the left mouse button simultaneously, while drawing a rectangle with the mouse pointer. | Zoom in on a rectangular area of a map. |
| → | Press and hold the **Ctrl** key and the **right mouse button** simultaneously to grab the map and move it in any direction. | Pan right. |
| ← | -"- | Pan left. |
| ↑ | -"- | Pan up. |
| ↓ | -"- | Pan down. |
| ✕ | | Reset navigation. |

You can also use the mouse wheel to zoom in or out. To reset navigation to the default values, click on the Reset Navigation button or right-click in the visualization and select **Reset Navigation**.

## Resizing markers and pies in the map chart:

You can use keyboard shortcuts to resize markers and pies in a map chart:

| Shortcut | Description |
|---|---|
| Press and hold down the **Ctrl** key and the plus (+) key simultaneously until the markers or pies have the desired size. | Increase size of markers or pies. |

| | |
|---|---|
| Press and release the plus key repeatedly while pressing the **Ctrl** key. | Increase size of markers or pies. |
| Press and hold the **Ctrl** key and the minus (**-**) key simultaneously. | Decrease size of markers or pies. |
| Press and release the minus key repeatedly while pressing the **Ctrl** key. | Decrease size of markers or pies. |
| Press and hold down the **Ctrl** key while rotating the mouse wheel. | Resize markers or pies. |

You can also go into the Size page of the Properties dialog and use the slider control.

## Labels in different map types

Labels can be used in any map type to identify and describe the markers, pies, or interactive shapes. Most settings related to labels are defined in the Labels page of the Map Chart Properties. In maps with markers or pies, you can click on a label to mark the corresponding marker, and mouseover a label to highlight both the label and the marker. In a map with a large amount of labels it can sometimes be useful to move the labels to other positions to make sure as many of the labels as possible are visible. This is done using drag and drop, and works slightly differently depending on the map type, as described below. In maps with interactive shapes, you can hover with the mouse pointer over a map shape to view its corresponding label if the label is hidden due to lack of space.

### ► To add labels to a map chart:

1. Right-click in the visualization to display the pop-up menu and select **Properties**.
   Response: The Properties dialog is displayed.
2. Go to the **Labels** page.
3. Select the column to **Label by**.
   Response: Labels are displayed in the map.
   Comment: When a map with interactive shapes is used, the column to label by must always come from the same data table as the column to color by. The data table used for coloring is specified on the Data page.
4. Specify whether to **Show labels for** All, Marked rows or None.
   Comment: If the map chart uses markers or pies you can change the **Max number of labels**, or select one or more of the check boxes to **Center labels on items** or **Show empty labels**. You can also specify **Display options** and get content from an image column, another source or apply some kind of transformation (if any transformations are available).

### ► To move labels in a map chart with interactive shapes:

1. Right-click in the visualization to display the pop-up menu and select **Edit Label Positions**.
   Response: The label editing is enabled.
2. Click on the label you wish to move and drag it to its new position.
3. When you are done, right-click on the visualization and select **Edit Label Positions** again to leave the label editing mode.
   Comment: You can get all original label positions back by right-clicking and selecting Reset Label Positions.

### ► To move labels in a map with markers or pies:

1. Click on the label you wish to move and drag it to a new position.
2. Response: The label is moved to the new position.

Comment: You can get all original label positions back by right-clicking and selecting Reset Label Positions.

Comment: When tiled markers are used, labels cannot be moved to other positions since they are always centered and displayed directly on the markers.

## 4.10.3     Map Chart Properties

### 4.10.3.1     Map Chart Properties

The Map Chart Properties dialog consists of several pages:

- General
- Data
- Appearance
- Fonts
- Colors
- Size
- Shape
- Labels
- Tooltip
- Legend
- Trellis
- Line Connection
- Marker By

### ► To reach the Map Chart Properties dialog:

1. Right-click on the map chart visualization.
2. Select **Properties** from the pop-up menu.
3. Comment: You can also click on the map chart visualization to make it active and then select **Edit > Visualization Properties**.

## 4.10.3.2 Map Chart Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.10.3.3    Map Chart Properties - Data

There are three types of maps in Spotfire and depending on the map you choose, the settings you need to define will be different.

### Map with interactive shapes



| Option | Description |
|---|---|
| **Map type** | Decides what kind of map to use. Depending on which map type you choose, the available map settings will be different. |
| **Map settings** | The available settings for the chosen map type. |
| **Map data table** | Specifies the data table to draw the map from. |
| **Add...** | Opens a dialog where you can select the data table of interest. For example, an ESRI shape file (.SHP). |
| **Auto-zoom** | If the check box is selected, the visualization is automatically zoomed in on the filtered shapes.<br>**Note:** To be able to zoom and pan using the navigation controls or keyboard shortcuts, **Auto-zoom** must be deselected. |
| **Related data table for coloring** | Specifies the data table that the coloring of the map should be based on. This is also the data table from which information will be shown in the Details-on-Demand window when shapes are marked in the map.<br>**Note:** You can use the map data table to color by, but to color by another data table, a valid relation must exist between the two data tables. |

| | |
|---|---|
| **Manage Relations...** | Opens the Manage Relations dialog where you can add, edit or remove relations between data tables. |
| **Marking Settings** | |
| **Marking** | Specifies the marking (the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. The color of a previously created marking is edited in the Document Properties dialog. |
| **Limit data shown in visualization using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations. If more than one marking is selected, the resulting visualization shows the intersection of the markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. Create a third visualization and set the data to be limited by both markings to see the common markers. |

**Note:** To set up a map chart using a non-shape file, see Configuration of Geographical Data for Map Charts.

## Map with markers or pies



| Option | Description |
|---|---|
| **Map type** | Decides what kind of map to use. Depending on which map type you choose, the available map settings will be different. |
| **Map settings** | The available settings for the chosen map type. |
| **Map data table** | Specifies the data table to draw the map background from. |
| **Add...** | Opens a dialog where you can select the data table of interest. |
| **Data table for markers or pies** | Specifies the data table that the markers or pies in the map chart should be based on. This is also the data table from which information will be shown in the Details-on-Demand window when the markers or pies are marked in the map. |
| **Manage relations...** | Opens the Manage Relations dialog where you can add, edit or remove relations between data tables. |
| **Draw markers or pies using** | Decides whether the markers or pies in the map chart should be drawn by using a relation between columns in two data tables or by specifying coordinate columns. |

| | |
|---|---|
| **Relation** | Select this option to use an already defined relation between columns in the map data table and the data table for markers or pies. |
| **Coordinate columns** | Use this option to specify columns in the data table that should be used on the X-axis and the Y-axis of the visualization. |
| **Auto-zoom** | If the check box is selected, the visualization is automatically zoomed in on the filtered values.<br>**Note:** To be able to zoom and pan using the navigation controls or keyboard shortcuts, **Auto-zoom** must be deselected. |

**Marking Settings**

| | |
|---|---|
| **Marking** | Specifies the marking (the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color of a previously created marking is edited in the Document Properties dialog. |
| **Limit data shown in visualization using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, the resulting visualization shows the intersection of the markings.<br>This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. Create a third visualization and set the data to be limited by both markings to see the common markers. |

## Background image with markers or pies



| Option | Description |
|---|---|
| **Map type** | Decides what kind of map to use. Depending on which map type you choose, the available map settings will be different. |
| **Map settings** | The available settings for the chosen map type. |
| **Background image file** | Specifies the image to use as a background. Both vector files (EMF, WMF) and image files (BMP, GIF, PNG, etc.) can be used. |
| **Browse...** | Opens a dialog where you can select the file of interest. |
| **Position settings** | Opens a dialog where you can specify the location of the markers or pies relative to the position of the background image. |
| **Data table for markers or pies** | Specifies the data table that the markers or pies in the map chart should be based on. This is also the data table from which information will be shown in the Details-on-Demand window when the markers or pies are marked in the map. |
| **X column** | Use this option to specify a column in the data table that should be used on the X-axis of the visualization. |
| **Y column** | Use this option to specify a column in the data table that should be |

used on the Y-axis of the visualization.

| | |
|---|---|
| **Auto-zoom** | If the check box is selected, the visualization is automatically zoomed in on the filtered values.<br><br>**Note:** To be able to zoom and pan using the navigation controls or keyboard shortcuts, **Auto-zoom** must be deselected. |

**Marking Settings**

| | |
|---|---|
| **Marking** | Specifies the marking (the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br><br>The color of a previously created marking is edited in the Document Properties dialog. |
| **Limit data shown in visualization using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br><br>If more than one marking is selected, the resulting visualization shows the intersection of the markings.<br><br>This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. Create a third visualization and set the data to be limited by both markings to see the common markers. |

## 4.10.3.4    Map Chart Properties - Appearance

| Option | Description |
|---|---|
| **Show navigation controls** | Specifies whether or not the navigation controls should be visible in the visualization. |
| **Map** | Settings to apply to the map.<br>**Note:** These settings are disabled for map charts using a background image with markers or pies. |
| **Fill color** | Defines which color to fill the different areas of the map with. This is only available for maps with markers or pies with polygon shapes. |
| **Border color** | Defines the color to use for the border surrounding the areas in the map. This is available for maps with interactive shapes, and maps with markers or pies.<br>**Note:** In a map with markers or pies where the map consists of lines or points rather than areas, the color to apply to them is decided by the border color as well. |
| **Border weight** | Defines the thickness of the borders of the areas in the map. If the map consists of lines rather than areas, the border weight decides the line thickness. If the map consists of points, the border weight decides their sizes. Border weight is available for maps with interactive shapes, and maps with markers or pies. |
| **Markers or pies** | Settings to apply to markers or pies in the visualization.<br>**Note:** These settings are disabled for maps with interactive shapes, since no markers or pies are available in those maps. |
| **Jittering** | Jittering is an option that displaces the visualization items randomly in the display window, thereby making overlapping records visible. |
| **X** | Specifies the amount of jittering to use in the horizontal direction. |
| **Y** | Specifies the amount of jittering to use in the vertical direction. |
| **Use the same amount of jittering for both X and Y** | Select this check box to connect the jittering sliders in both directions to each other. |

## 4.10.3.5 Map Chart Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.10.3.6    Map Chart Properties - Colors
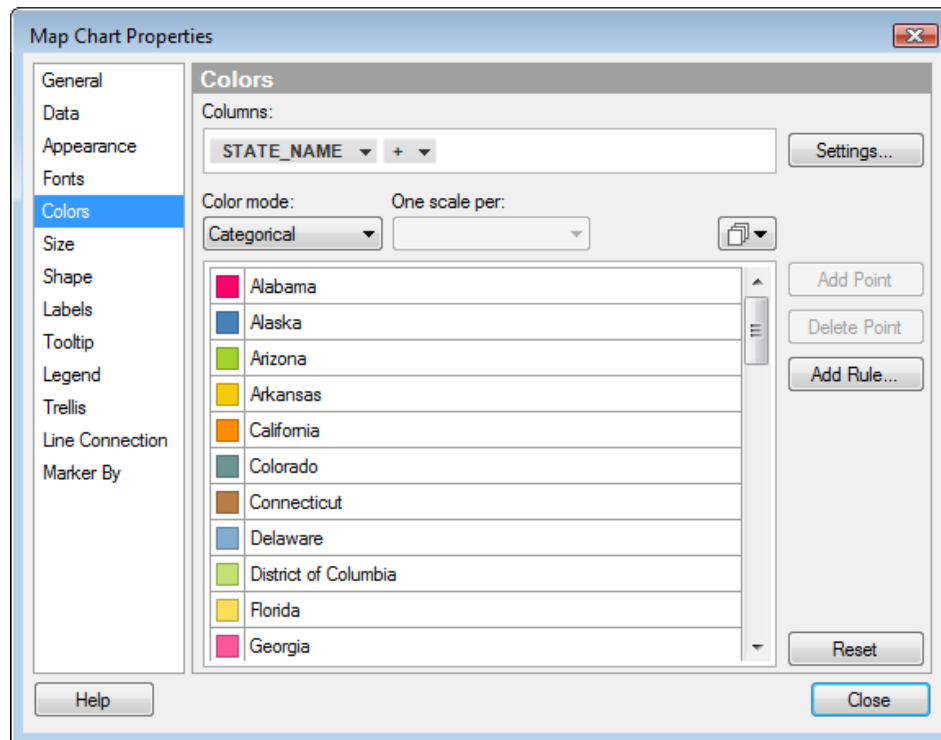


**Note:** The settings on this page concern the related data table for coloring when you use a map with interactive shapes. When you use a map or image background with markers or pies, the settings on this page concern the data table for markers or pies.

| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised map charts, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
| ▣ ▾  [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color |

| | |
|---|---|
| | scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes. <br><br> **Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme. <br><br> **Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse. <br><br> **File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse. <br><br> **Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed. <br><br> **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |

| | |
|---|---|
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.10.3.7    Map Chart Properties - Size
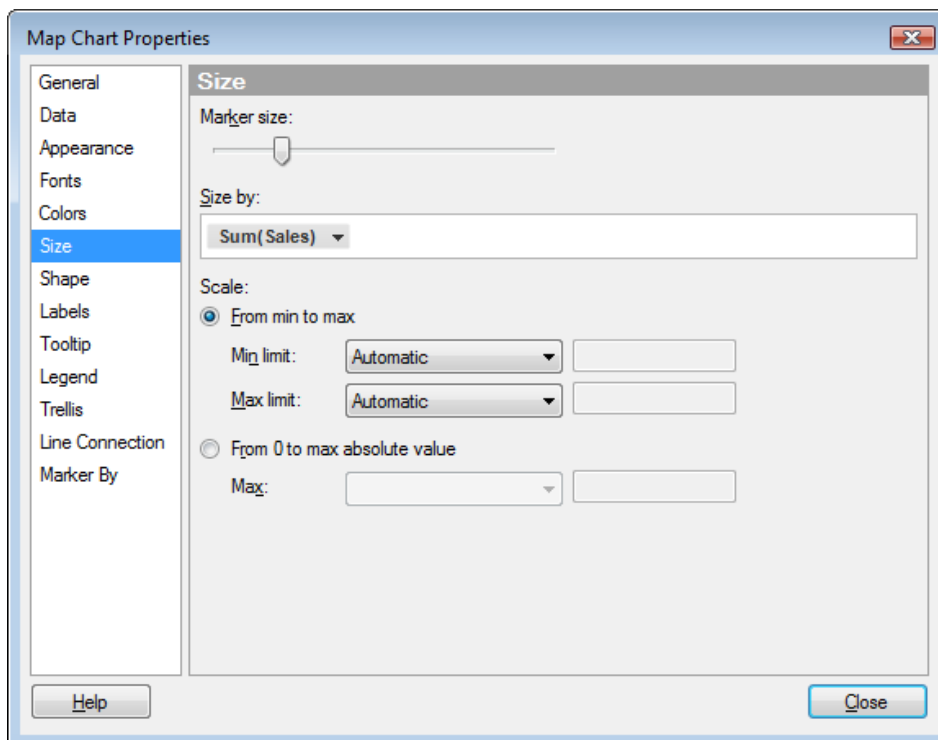


**Note:** The settings on this page are not available for maps with interactive shapes, or when the map chart is set up with tiled markers. Maps with interactive shapes do not have any markers to apply any size settings to, and tiled markers have the same size by definition. To change map type, go to the Data page. To change marker shapes, go to the Shape page.

| Option | Description |
|---|---|
| **Marker size** | Increases or decreases the overall size of all markers. |
| **Size by** | Specifies a column or hierarchy whose categories will determine the size of the markers. |
| | The aggregation options on the drop-down menu are only available if the markers in the map chart have been aggregated by setting the Marker By option to something other than (Row Number). |

| | |
|---|---|
| **Scale** | Determines the scale to use for the size of the markers. |
| **From min to max** | Assigns the maximum marker size to the highest value, and the minimum marker size to the lowest value. For instance, if the minimum and maximum data values are -9 and 11 respectively, the marker sizes could be like the following: |



This mode is useful when you want to visualize differences.

| | |
|---|---|
| **Min limit:** **Max limit:** | The minimum and maximum limits that should be mapped to the marker size. By default, they are set to "Automatic". This means that the marker size will adapt during filtering. If the scale is set to "From min to max", the current minimum value will have the minimum marker size, and the current maximum value will have the maximum marker size. It is comparable to automatic zooming on the X or Y axes. |

It is possible to lock the max limit and/or min limit to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that are lower than the minimum value or higher than the maximum value will get the same size as the minimum and maximum value respectively. By specifying both a high and low value, the auto-scaling behavior is turned off.

| | |
|---|---|
| **From 0 to max** **absolute value** | This mode is useful when you want to compare the magnitude of measures. By letting the value 0 map to marker size 0, and the maximum value to the maximum marker size, it is possible to compare the diameter of markers and say "a" is twice as big as "b". With this scale the values 50 and 100 would be rendered like this: |



**Note:** The size is scaled symmetrically around 0 with absolute numbers. That is, if your highest value is 10 and your lowest is -20, the size of the marker at 10 will be 50 percent of the maximum marker size.

| | |
|---|---|
| **Max:** | The absolute limit that should be mapped to the marker size. By default, it is set to "Automatic". This means that the marker size will adapt during filtering. The value 0 will have the minimum marker size and the highest absolute value in the visualization will have the maximum marker size. |

It is possible to lock this to a specific value by selecting "Value" in the drop-down list and entering a value. Data values that have a larger absolute value than the set value will get the same size as the maximum value.

## 4.10.3.8 Map Chart Properties - Shape
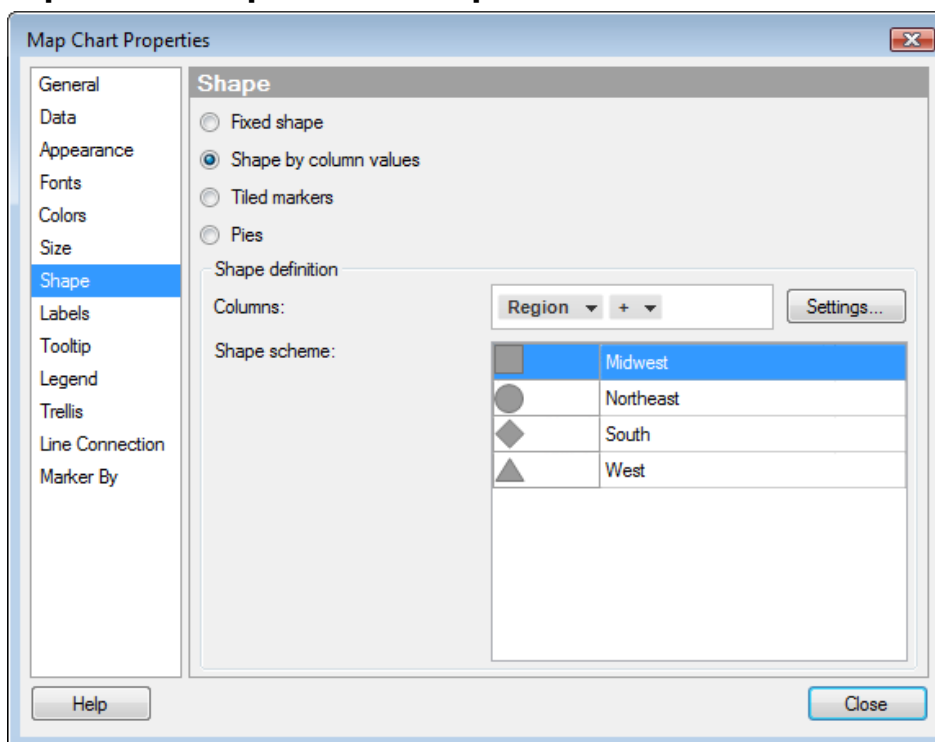


**Note:** The settings on this page are not available for maps with interactive shapes, since those maps do not have any markers to apply any shape settings to.

| Option | Description |
|---|---|
| **Fixed shape** | Select this option to use the same, fixed shape on all markers. Select which shape to use from the Shape drop-down list under Shape definition. |
| **Shape** | Defines which shape to use for all markers. |
| **Shape by column values** | Select this option to use different shapes for the categories in a specified column or hierarchy. Which column or hierarchy to use, as well as which shape should represent which category, is specified under Shape definition.<br>**Note:** A default set of shapes is used when automatically assigning shapes to categories. When there are more categories than available shapes in the default set, shapes will be recycled. |
| **Columns** | Specifies the column or hierarchy containing the categories you wish to present using different shapes. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |
| **Shape scheme** | Lists the categories in the selected column or hierarchy, and the shapes that have been assigned to each of these categories.<br>**Note:** The set of shapes that is used by default in the scheme does not include all the available shapes. You can, however, always change to the shapes of your choice manually. Click on a shape in the scheme to display all the available shapes and make your |

|  |  |
|---|---|
|  | selection. |
| **Tiled markers** | Select this option to display the markers as tiles. The markers will be rectangular, have the same size, and be displayed in a grid-like layout.<br>**Note:** When you use tiled markers the settings in the Size page will be disabled since the markers have the same size. |
| **Pies** | Select this option to use pies instead of markers. |
| **Sector size by** | Determines the numeric column that should provide the sizes of the pie sectors.<br>**Note:** Remember to specify an aggregation method (for example, sum) for this column if you want each category selected under Colors to be summarized. |
| **Show in labels** | Specifies what information to show in the labels for the pie sectors. |
| **Sector value** | Displays the value of the sector. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Threshold** | Excludes the labels for the sectors whose percentage falls below the specified threshold value. |
| **Decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |
| **Label position** | Specifies whether the labels will be located Inside or Outside the pie sectors. |
| **Sort sectors by size** | Sorts the pie sectors by size. |

## 4.10.3.9　Map Chart Properties - Labels



| Option | Description |
|---|---|
| **Label by** | Specifies the column or hierarchy whose values should be presented as labels in the visualization.<br><br>When a map with interactive shapes is used, the column to label by must always come from the same data table as the column to color by. The data table used for coloring is specified on the Data page. |
| **Show labels for** | Determines whether to show labels on all markers (**All**), marked markers only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. If the number is smaller than the available number of markers, the labels will be equally distributed.<br><br>**Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Center labels on items** | Places the label right on top of the marker instead of drawing a line from the marker to the label, which is the default behavior. This can be a way to use your own images as markers.<br><br>**Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Show empty labels** | Shows labels that have no content.<br><br>**Note:** This setting is not available when the markers are tiled. Go to the Shape page if you want to change marker shapes. |
| **Display options** | [Available when the Map type is set to Background image with markers or pies or Map with markers and pies only.]<br><br>These settings are used when you choose to display anything other |

| | |
|---|---|
| | than plain text in your labels. For example, the labels could contain web links or images. |
| **Get content from** | [Only visible if at least one virtual column producer is available.] |
| | Your company may have set up some type of virtual column producers that can take the values from the selected column and transform them in one way or another to produce a desired output. For example, if you have access to TIBCO Spotfire Lead Discovery you can select Structure Column here, in order to show molecular structures from an information link in the labels. |
| | For embedded images in the current data table, or when fetching data via a URL, you should leave this setting at (Selected column). |
| **Settings...** | If the selected source has some settings available, you can reach them by clicking on the Settings button. For example, this is where you would specify which information link to retrieve structures from when using TIBCO Spotfire Lead Discovery. |
| **Show as** | Allows you to decide how the data in the selected column should be interpreted. |
| | For example, use **Text** for plain text labels. Use **Image** if there are binary images in your data that you want to use as labels. Use **Link** if the text should be interpreted as a web link. Use **Image from URL** if the image is picked from a web resource location. You may need to change the Link or Image from URL Renderer Settings by clicking on the Settings... button and modifying the link syntax so that it fits your current data. |
| | Use **Geometry** if your data is a shape file and you want to show the geometrical shapes in the labels. |
| | If a TIBCO Spotfire Lead Discovery structure column is used to label by, then you would select a renderer for displaying structure images here. |
| **Settings...** | If the selected Show as method has some settings available that can be modified, you can reach them by clicking on the Settings button. For example, this could be Link Renderer Settings or Image from URL Renderer Settings for a web link, Geometry Renderer Settings or some structure renderer settings. |
| **Size** | Available if the selected label output is some kind of image. Increases or decreases the size of the labels. |

## 4.10.3.10 Map Chart Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.10.3.11   Map Chart Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.10.3.12 Map Chart Properties - Trellis



| Option | Description |
| --- | --- |
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not |

| | control the number of shown rows or columns in any way. The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.10.3.13 Map Chart Properties - Line Connection
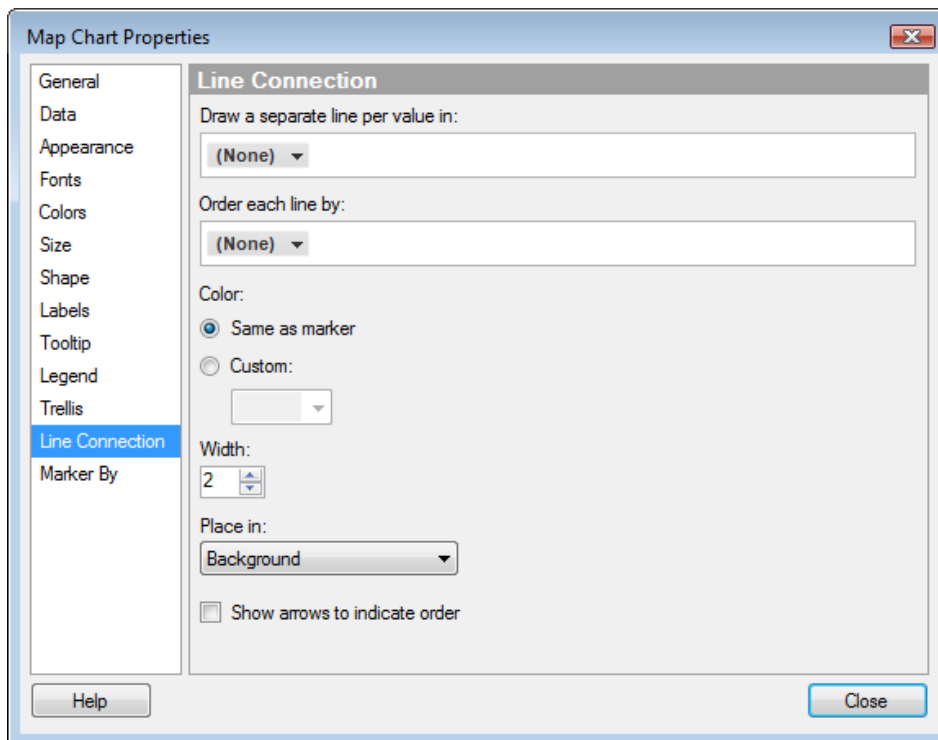


**Note:** The settings on this page are not available for maps with interactive shapes, since those maps do not have any markers to apply line connection settings for.

| Option | Description |
|---|---|
| **Draw a separate line per value in** | Specifies the column or hierarchy containing the categories to use for line connection. Markers of the same category will be connected with |

| | each other to form a separate line. If no column or hierarchy is specified here, all markers will be connected with each other. |
|---|---|
| **Order each line by** | Specifies the order in which markers are connected. If no column or hierarchy is specified here, the markers will be ordered by row index (the order of the rows in the original data table). |
| **Color** | Specifies how colors will be assigned to the lines. |
| **Same as marker** | Choose this option if you want the lines to have the same color as the markers they are a connection between. If a line connects markers with different colors, the color of the line will be a fusion of the two colors. For example, when a blue marker is connected with a yellow marker the line between them will be green. |
| **Custom** | Choose this option if you want to use a single custom color for the lines. Click on the drop-down list to show the color selector where you can choose a different color. |
| **Width** | Specifies the width of the lines. |
| **Place in** | Select whether the lines should be placed in the foreground or background of the markers they are connecting. <br> **Tip:** Change the transparency of the markers on the Appearance page if you want to be able to see the lines through the markers when the lines are placed in the background. |
| **Show arrows to indicate order** | Specifies whether or not there should be arrows along the lines to indicate the order. |

## 4.10.3.14   Map Chart Properties - Marker By
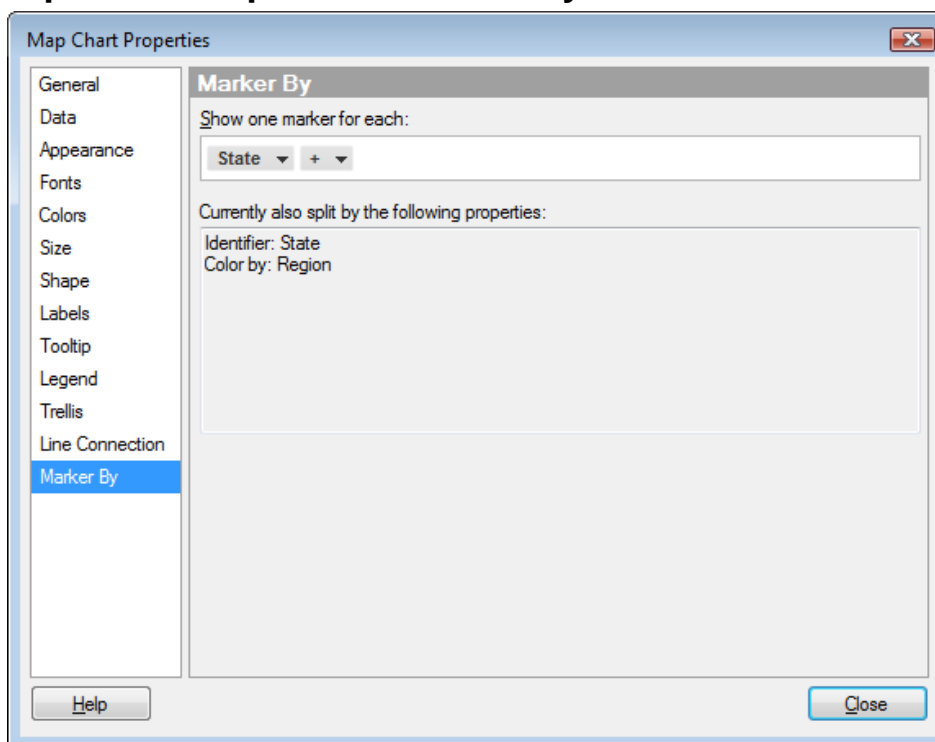
**Note:** The settings on this page are not available for maps with interactive shapes, since those maps do not have any markers.

| Option | Description |
|---|---|
| **Show one marker for each** | Specifies the column or hierarchy containing the categories by which the markers should be split. |
| **Currently also split by the following properties** | Displays information about what other properties currently contribute to a splitting of the markers. |

## 4.10.3.15 Details on Add Data Table

This dialog is used to add map data to a map chart visualization.

### ► To reach the Add Data Table dialog:

1. Create a map chart.
2. Right-click in the visualization to display the pop-up menu and select **Properties**.
   Response: The Properties dialog is displayed.
3. Go to the **Data** page.
4. Select **Map with interactive shapes** from the Map type drop-down list.
5. Click **Add...**.
   Comment: If you are not using a shape file, some manual configuration of the data will be needed before you can use it as a map. To learn how to do this, see Configuration of Geographical Data for Map Charts.



| Option | Description |
|---|---|
| **Select source type** | |
| **File** | Allows you to add a data table from a file. |

| | |
|---|---|
| **Information Link** | Allows you to add a data table from an information link. |
| **Database** | Allows you to add a data table from any supported database. |
| **Clipboard** | Allows you to add a data table from the clipboard. |
| **Existing data table in my analysis** | Allows you to add a data table from the current analysis. |
| **Location** | Shows the path and filename of the selected file. |
| **Browse...** | Opens a dialog where you can select which file, information link, database, etc., to open. |
| **Data table name** | Allows you to type a suitable name for the new data table. |
| **Show transformations** | Expands the dialog and allows you to apply transformations on the data table you want to add. For more information, see the Show transformations topic. |
| **Manage Relations...** | Opens the Manage Relations dialog where you can specify how the new data table is related to any previously loaded data tables in your analysis. |

## 4.10.3.16 Details on Position Settings

► **To reach the Position Settings dialog:**

1. In the Visualization Properties dialog of the Map Chart, go to the **Data** page.
2. Select **Background image with markers or pies** as map type.
3. Select a background image.
4. Click **Position Settings...**.
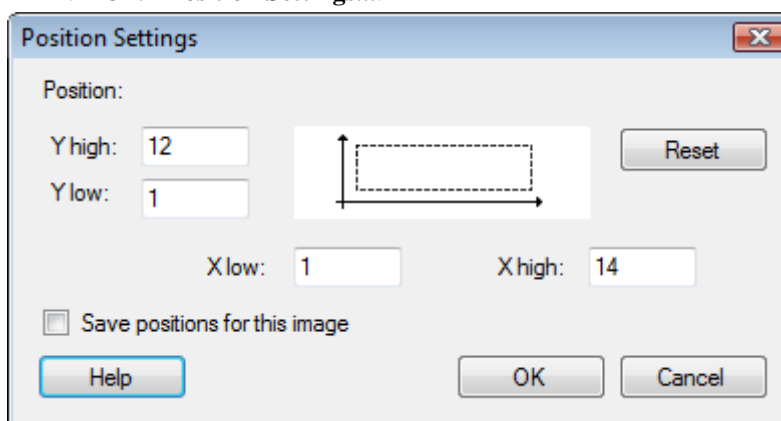


| Option | Description |
|---|---|
| **Position** | Specifies the location of the markers relative to the position of the map image. Type different values for Y High, Y Low, X High and X Low to move the markers so that they are placed on their correct positions on the map. |
| **Reset** | Returns to the default position, which is specified by the max and min values of the selected coordinate columns. |

| Save positions for this image | Select this check box if you want the application to remember the positions you have defined for the current background image. The positions will be kept when you change data table, X and Y columns, or shape type of the markers as long as the background image is not changed. |
|---|---|

# 4.10.4 Configuration of Geographical Data for Map Charts

When Shape files are opened in TIBCO Spotfire they are automatically configured so that maps with interactive shapes can be displayed. However, there may be times when some manual work is needed before the data can be used in a map with interactive shapes. The binary geometry data needs to be extracted to six coordinate columns and the columns also need to be assigned the proper value on the mapchart.columntypeid property: Geometry, XMax, XMin, YMax, YMin, XCenter and YCenter.

### ► To set up non-shape file WKB data:

When the geographical data is located in a Well-Known Binary (WKB) column, but not originating from a Shape file, you can manually create the required coordinate columns using the Spatial functions in the Insert Calculated Column tool.

1. Click **Insert > Calculated Column...**.
2. In the **Functions** section, select the **Spatial functions** category.
3. Select the first spatial function, WKBEnvelopeXCenter and click **Insert Function**.
4. Select the WKB column from the Available columns list and click **Insert Columns**.
5. Type a suitable column name (e.g., XCenter) and click **OK**.
   Response: The XCenter column is created and the correct property value is set on the mapchart.columntypeid property.
6. Repeat steps 3 to 5 with the other five functions.
7. Now, create a Map Chart and use the data table with the newly created columns as the Map data table in the Data page of the Visualization Properties dialog.

### ► To set up an information link with map information:

When the geographical data is located in a database and an information link is used to retrieve the data, you need to perform the following steps at the creation of the column elements if you want the end users of the information link to be able to create map charts without further configuration:

1. If you only have a binary WKB column, you can use TIBCO Spotfire to create the necessary coordinate columns. Placing the coordinate columns in the server database from the beginning makes it a lot easier to use the geographical data later on. The Geometry column should be of type BLOB and the coordinate columns should be of type Real.
2. Properties are specified at the creation of the column elements in Information Designer, on the Column Element tab. For each column element, expand the Properties field, click Add... and create the property mapchart.columntypeid. In the Value field, type Geometry, XMax, XMin, YMax, YMin, XCenter or YCenter, depending on which column you are defining.
3. Save the column elements.

If you want to be able to view the Geometry column as images in a Table visualization, the ContentType column property needs to be set to application/x-wkb. For a table visualization created before you added the ContentType property to display the shapes from the Geometry column, click Edit > Visualization Properties and go to the Columns page to change the renderer.

# 4.11     Treemap

## 4.11.1     What is a Treemap?

Treemaps are ideal for displaying large amounts of hierarchically structured (tree-structured) data. The space in the visualization is split up into rectangles that are sized and ordered by a quantitative variable.

The levels in the hierarchy of the treemap are visualized as rectangles containing other rectangles. Each set of rectangles on the same level in the hierarchy represents a column or an expression in a data table. Each individual rectangle on a level in the hierarchy represents a category in a column. For example, a rectangle representing a continent may contain several rectangles representing countries in that continent. Each rectangle representing a country may in turn contain rectangles representing cities in these countries. You can create a treemap hierarchy directly in the visualization, or use an already defined hierarchy. To learn more, see the section To Create a Treemap Hierarchy.

A number of different algorithms can be used to determine how the rectangles in a treemap should be sized and ordered. The treemap in Spotfire uses a squarified algorithm.

The rectangles in the treemap range in size from the top left corner of the visualization to the bottom right corner, with the largest rectangle positioned in the top left corner and the smallest rectangle in the bottom right corner. For hierarchies, that is, when the rectangles are nested, the same ordering of the rectangles is repeated for each rectangle in the treemap. This means that the size, and thereby also position, of a rectangle that contains other rectangles is decided by the sum of the areas of the contained rectangles.

### Example:

Below is a treemap where the rectangles represent cities and are sized and colored by the column Sales. In this case, the aggregation method Sum was selected for the Sales column. This treemap only contains data on one level.
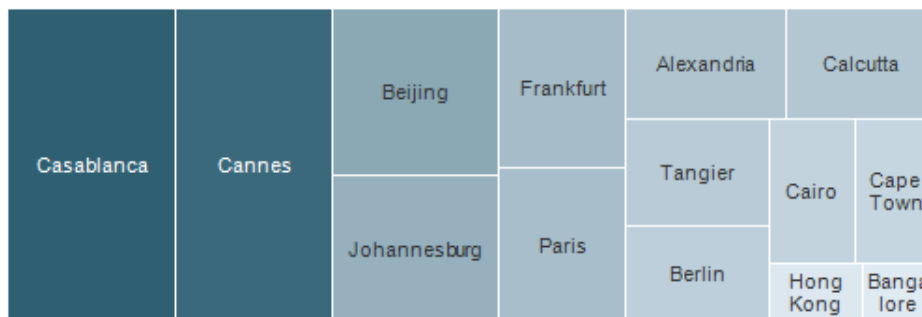


The sizes and positions of the rectangles, as well as the coloring, indicate that Casablanca and Cannes have the highest total sum of sales, while Hong Kong and Bangalore have the lowest.

To compare sum of sales for entire countries or continents, you can add other levels to the treemap hierarchy without losing the information about the individual cities. In the treemap below, the columns Country and Continent were added to the treemap hierarchy.
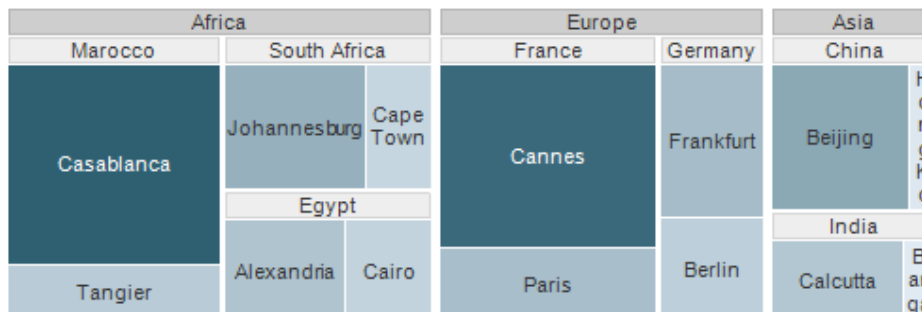
The rectangles are now nested. Each rectangle that represents a continent consists of rectangles representing countries within that continent. Each rectangle that represents a country consists of rectangles representing cities in that country. It is still possible to see which individual cities has the highest sum of sales, but it is now also easy to see that Africa is the continent with the highest total sum of sales, and that Asia is the continent with the lowest total sum of sales. Since the rectangles are now nested, the rectangles are not in the same positions anymore. However, each level of the hierarchy is still organized according to the squarified algorithm. For example, the size of the rectangle representing India is decided by the sum of the areas of the two rectangles representing Calcutta and Bangalore. The size of the rectangle representing Asia is in turn decided by the sum of the areas of the rectangles representing China and India.

To take a closer look at a certain part of the treemap, you can navigate from a higher hierarchy level to a lower one. Click on the hierarchy header of the level you want to navigate to. In the example below, the treemap is shown as it appears when you navigate down to the country level India.
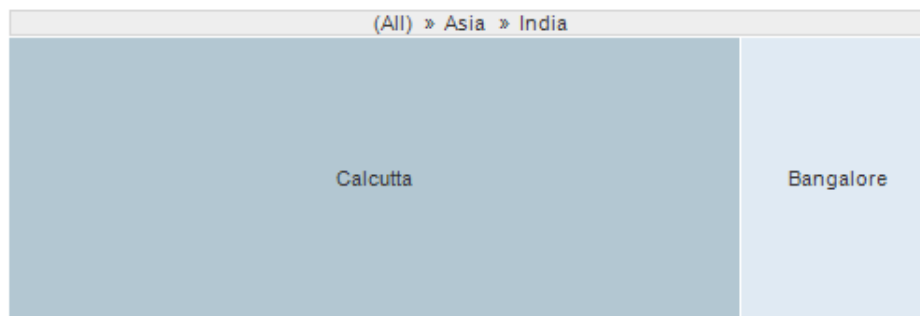


The uppermost hierarchy header now displays the hierarchy levels from the top level to the level you are currently viewing. To navigate upwards in the hierarchy, click on the level you want to navigate to.

You can hide both the hierarchy headers and the labels in the treemap at any time from the right-click menu of the visualization.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.11.2 How to Use the Treemap

### ► To apply coloring:

1. In the **Filters** panel, click and hold the left mouse button on the filter representing the column you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under **Edit > Document Properties**.

2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.

3. Release the mouse button on the Color target.

   Response: The rectangles in the treemap will be colored according to the chosen column.

   Comment: To learn more about coloring in Spotfire, see Coloring Overview.

### ► To create a treemap hierarchy:

1. In the legend, click on the column selector for **Hierarchy** to open the menu.

   Comment: The hierarchy settings can also be defined on the Hierarchy page of the Visualization Properties dialog.

2. Select the column you want to use as the top level of the treemap hierarchy.

Response: The treemap will instantly be divided into rectangles representing the categories in the chosen column.

3. Click on the column selector with a plus sign next to the previously used column selector.

4. From the menu, select the column that you want to use as the next level in the treemap hierarchy.

   Response: Rectangles representing the categories in the chosen column will be added inside the rectangles of the level immediately above in the treemap hierarchy.

5. Repeat steps 3 and 4 for every level that you want to add to the treemap hierarchy.

   Comment: You can add columns to the treemap hierarchy and change the order of the hierarchy levels by using drag-and-drop in the legend. To learn more, see Drag-and-Drop.

   **Note:** You can also use a preconfigured hierarchy as a treemap hierarchy by creating a hierarchy in the Column Properties dialog, or by creating a hierarchy from the filters panel. For more information about creating hierarchies in TIBCO Spotfire, see How to Edit Column Properties and Creating a Hierarchy Filter.

### ► **To navigate to different levels in a treemap:**

1. Right-click in the treemap to display the pop-up menu.
2. From the pop-up menu, select **Navigate To**.
3. Select the hierarchy level you want to navigate to.

   Comment: If the hierarchy headers are visible, you can also click on a hierarchy header to navigate to that level.

   **Note:** You can navigate upwards in a hierarchy by clicking on a category from the path of levels in the uppermost header of the treemap. To go to the top level, click (All).

### ► **To create a new treemap:**

1. Click on the New Treemap button on the toolbar, .

   Comment: You can also select **Insert > New Visualization > Treemap** from the menu.

   Response: A first attempt to set up a suitable treemap is made by the application.

2. Adjust the treemap to display the data of your choice.

## 4.11.3    Treemap Properties

### 4.11.3.1    Treemap Properties

The Treemap Properties dialog consists of several pages:

- General
- Data
- Fonts
- Colors
- Size
- Hierarchy
- Labels
- Tooltip
- Legend
- Trellis

► **To reach the Treemap Properties dialog:**

1. Right-click on the treemap visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the treemap visualization to make it active and then select **Edit > Visualization Properties**.

## 4.11.3.2   Treemap Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization. **Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.11.3.3    Treemap Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br>This can be used if you have two visualizations with different markings |

and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings.

| | |
|---|---|
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.11.3.4    Treemap Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.11.3.5    Treemap Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Color mode** | Specifies in which color mode to set up the color scheme. You can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised treemaps, or if one scale should apply to the entire visualization. |
| [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. For a full description of the predefined color schemes, see Predefined Color Schemes.<br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |

| | |
|---|---|
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme. |
| | **Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse. |
| | **File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse. |
| | **Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed. |
| | **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Adds a new anchor point to the color scheme. |
| **Delete Point** | Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.11.3.6      Treemap Properties - Size
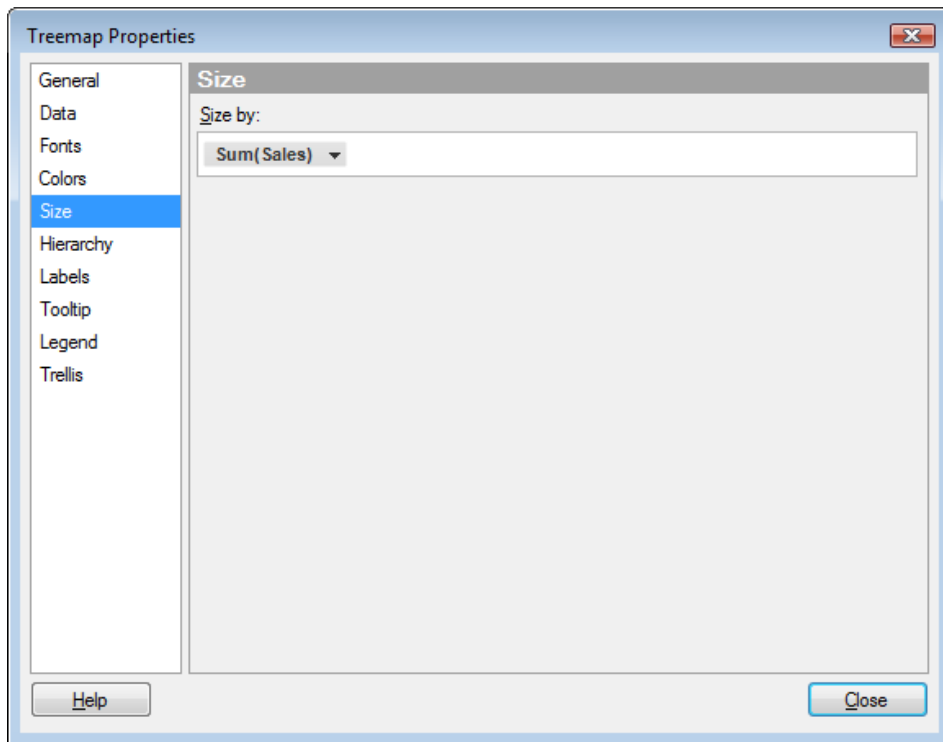
| Option | Description |
|--------|-------------|
| **Size by** | Specifies a column whose categories will determine the size of the rectangles in the treemap. <br> **Note:** Since items with negative values have no size and cannot be shown, it is not advisable to size by a column that could contain negative values. |

## 4.11.3.7      Treemap Properties - Hierarchy



| Option | Description |
|---|---|
| **Hierarchy** | Specifies which columns to use in the treemap hierarchy. The order specified here determines the order of the levels in the treemap hierarchy. |
| | For example, Continent - Country - City, where Continent will be the highest level, and City the lowest. |
| | **Tip:** Instead of adding separate columns to set up a treemap hierarchy, you can use a previously defined hierarchy. To learn more about creating hierarchies, see How to Edit Column Properties and Creating a Hierarchy Filter. |

## 4.11.3.8    Treemap Properties - Labels
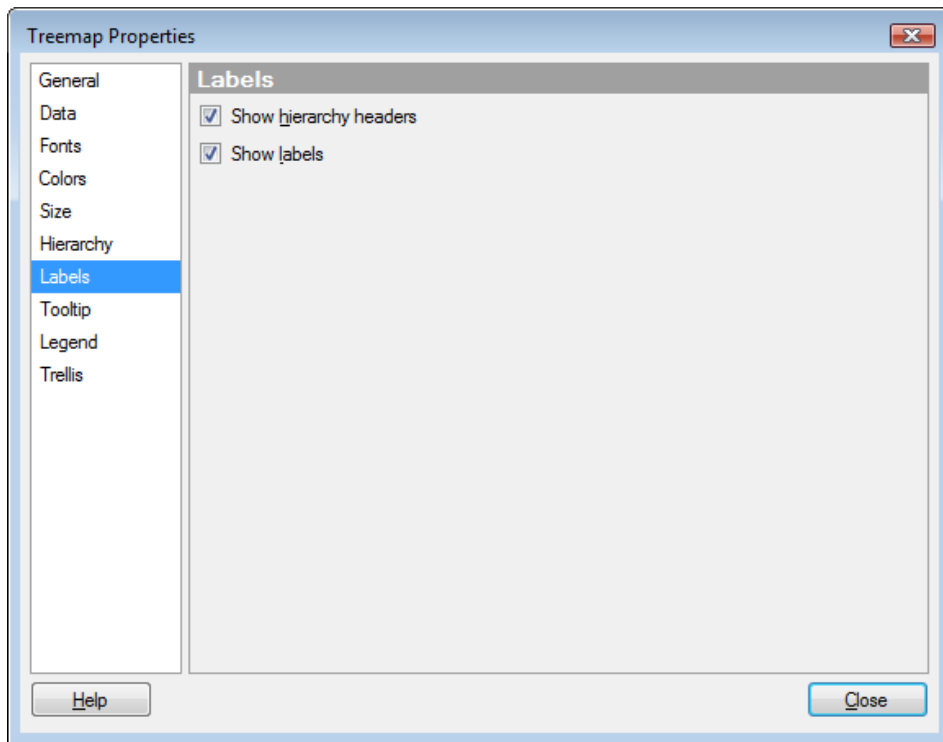


| Option | Description |
|---|---|
| **Show hierarchy headers** | Specifies whether or not to show hierarchy headers in the treemap. That is, if the column name for each level in the hierarchy should be visible as headers in the treemap. |
| **Show labels** | Specifies whether or not to show labels in the rectangles at the lowest level of the treemap hierarchy. |

## 4.11.3.9 Treemap Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.11.3.10    Treemap Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br> |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.11.3.11    Treemap Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way. |

| | The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

# 4.12  Heat Map

## 4.12.1  What is a Heat Map?

The easiest way to understand a heat map is to think of a table or spreadsheet which contains colors instead of numbers. The default color gradient sets the lowest value in the heat map to dark blue, the highest value to a bright red, and mid-range values to light gray, with a corresponding transition (or gradient) between these extremes. Heat maps are well-suited for visualizing large amounts of multi-dimensional data and can be used to identify clusters of rows with similar values, as these are displayed as areas of similar color.

### Example:

The example below illustrates how the values in the table are displayed as color gradients in the heat map cells.

| Test | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| Test A | 2.02 | 3.21 | 5.57 |
| Test B | 2.92 | 4.37 | 6.02 |
| Test C | 2.64 | 5.02 | 7.19 |
| Test D | 2.37 | 3.48 | 8.21 |
| Test E | 2.21 | 3.12 | 5.38 |
| Test F | 2.43 | 3.84 | 6.47 |

Avg(Time 1)  Avg(Time 2)  Avg(Time 3)

Test A
Test B
Test C
Test D
Test E
Test F
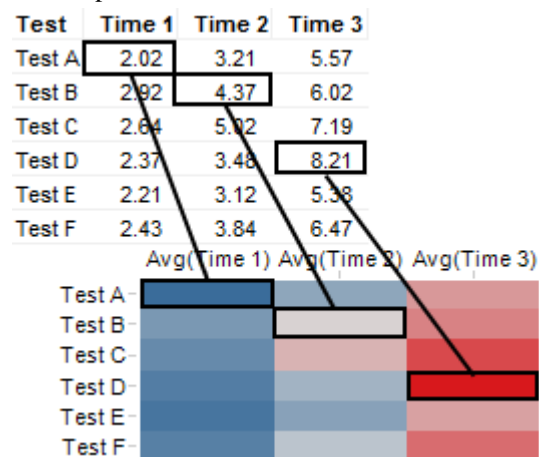
### Data in short/wide format:

Like in other visualizations, highlighting and marking in the heat map are applied to one or more rows in the underlying data table. In the example below, the data is in short/wide format, and each row in the data table corresponds to a row in the heat map.
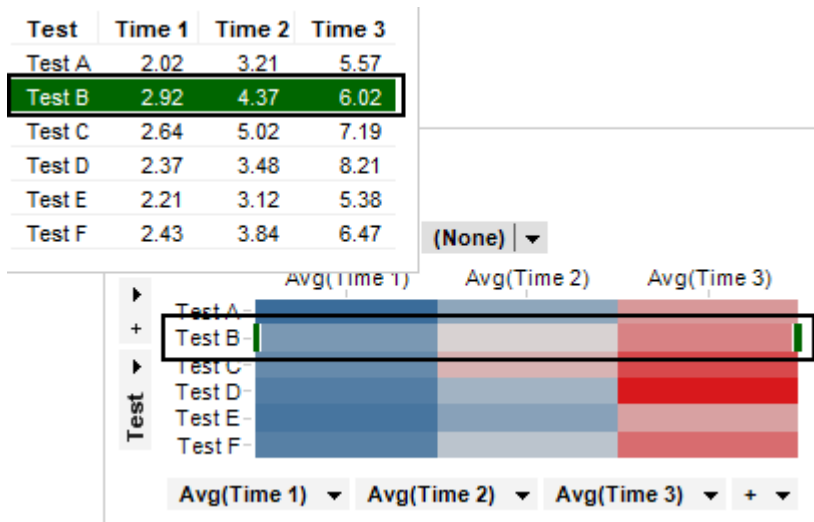
The Y-axis in this heat map is set up with the column Test, while the X-axis is set to (None). For the individual cell values in the heat map, the columns Time 1, Time 2, and Time 3 are selected. Cell value columns are always aggregated unless the Y-axis is set to (Row Number). This is because the data table may contain many rows with the same name, and the values in these rows must then be aggregated to one single value to be displayed in the heat map. Average is the default aggregation. With data in short/wide format, this is a common way to set up a heat map.

## Data in tall/skinny format:

If the data is in tall/skinny format instead, each data table row will correspond to a single cell in the heat map, as seen in the example below.
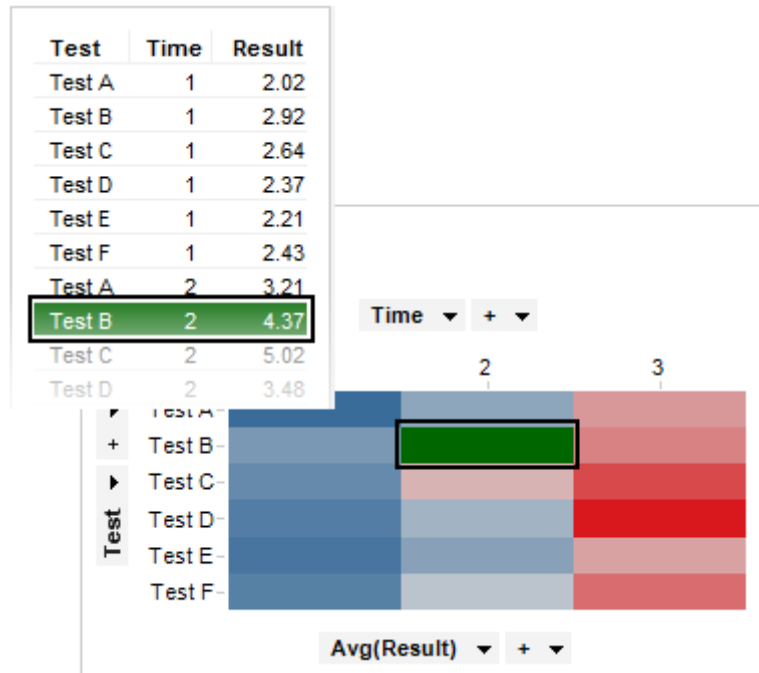


As in the previous example, the column Test is selected on the Y-axis. But in this case, the column Time is selected on the X-axis, and the cell values are set to the single column Result. The content of the data is the same as in the example with data in short/wide format, but the format of the data makes it necessary to set up the heat map in a different way.

### Dendrograms

It is often useful to combine heat maps with hierarchical clustering, which is a way of arranging items in a hierarchy based on the distance or similarity between them. The result of a clustering calculation is presented either as the distance or the similarity between the clustered items depending on the selected distance measure. See Distance Measures Overview and the detailed description for each measure for further information. To learn more about hierarchical clustering in general, see Overview of Hierarchical Clustering Theory. You can cluster both rows and columns in the heat map. The result of a hierarchical clustering calculation is displayed in a heat map as a dendrogram, which is a tree-structure of the hierarchy. Row dendrograms show the distance (or similarity) between rows and which nodes each row belongs to as a result of the clustering calculation. Column dendrograms show the distance (or similarity) between the variables (the selected cell value columns). The example below shows a heat map with a row dendrogram where the distance between the rows were calculated.
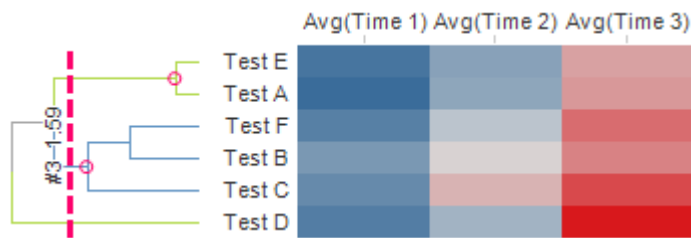


As a result of the clustering calculation, the rows in the heat map have been reordered to correspond to the cluster calculation. Test A and Test E are placed in the same cluster. Test F and Test B are placed together in another cluster, and this cluster forms another cluster together with Test C. Test D is not included in any of those clusters. This indicates that Test A and Test E are closer to each other than what they are to Test F, Test B, Test C, or Test D. It also indicates that Test D is the one that is the most distant to any of the other rows. See Dendrograms and Clustering to learn more about this.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.12.2    How to Use the Heat Map

### ► To add a dendrogram:

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Dendrograms** page.
4. Select dendrogram type in the Settings for drop-down list.
5. Select the **Show row dendrogram** or **Show column dendrogram** check box depending on the dendrogram type you selected in the previous step.

   Response: The settings for the selected dendrogram become available in the bottom part of the dialog.
6. Click the **Calculated hierarchical clustering** radio button.

   Comment: To use an already existing dendrogram instead, click the **Imported** radio button, select which dendrogram to use from the data table selector, and continue to step 12.
7. Click the **Settings...** button.

   Response: The Edit Clustering Settings dialog is opened.
8. Select the **Clustering method**, **Distance measure**, and **Ordering weight** from the drop-down lists.

Comment: To learn more about the possible clustering settings, see Clustering Methods Overview, Distance Measures Overview, and Ordering Weight.

9. Select how to replace empty values from the **Empty value replacement Method** drop-down list.

    Comment: For descriptions of the available replacement methods, see Details on Edit Clustering Settings.

10. If you want to normalize the values in the heat map, select a **Normalization Method** from the drop-down list.

    Comment: To learn more about normalization methods, see Normalizing Columns.

11. When done, click **OK** to close the dialog.

12. For the dendrogram to show the correct clustering data, you must update it. Click the **Automatically** radio button if you want updates to appear automatically every time a setting is changed. If you want to control when the dendrogram is updated, click the **Manually** radio button, and then the **Update** button.

    Response: The dendrogram is displayed in the visualization.

    Comment: You can change the placement of the dendrogram under **Position**.

### ► **To apply coloring:**

See Coloring in Cross Tables and Heat Maps to learn how to set up coloring for heat maps specifically. See Coloring Overview if you want to learn more about coloring in general.

### ► **To create a new heat map:**

1. Click on the New Heat Map button on the toolbar, .

    Comment: You can also select **Insert > New Visualization > Heat Map** from the menu.

    Response: A first attempt to set up a suitable heat map is made by the application.

2. Adjust the heat map to display the data of your choice.

## 4.12.3    Dendrograms and Clustering

A dendrogram is a tree-structured graph used in heat maps to visualize the result of a hierarchical clustering calculation. The result of a clustering is presented either as the distance or the similarity between the clustered rows or columns depending on the selected distance measure. See Distance Measures Overview and the detailed description for each measure for further information about the available distance measures. You can perform hierarchical clustering on an existing heat map by opening the Dendrograms page of the Visualization Properties. You can also use the Hierarchical Clustering tool to cluster with a data table as the input. To learn more about hierarchical clustering and heat maps, see Overview of Hierarchical Clustering Theory and What is a Heat Map? respectively. Note that only numeric columns will be included when clustering.

### Row Dendrograms

The row dendrogram shows the distance or similarity between rows and which nodes each row belongs to, as a result of clustering. An example of a row dendrogram is shown below.
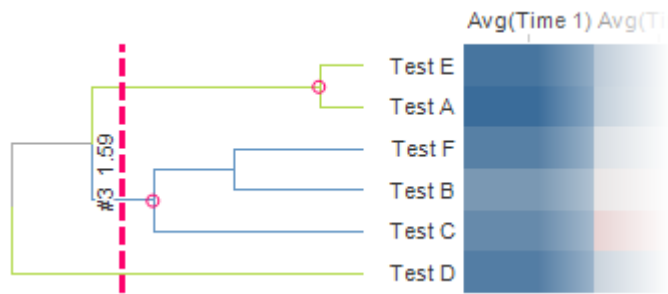
The individual rows in the clustered data are represented by the right-most nodes, the leaf nodes, in the row dendrogram. Each node in the dendrogram represents a cluster of all rows that lie to the right of it in the dendrogram. The left-most node in the dendrogram is therefore a cluster that contains all rows. The vertical dotted line is the pruning line, which can be dragged sideways in the dendrogram. The values next to the pruning line indicate the number of clusters starting from the current position of the line, as well as the calculated distance or similarity at that position. In the example above, the calculated distance is 1.59, and there are three clusters starting at the position of the pruning line. The upper two, indicated by pink circles, contain two or more rows, while the lower cluster contains only one individual row.

## Column Dendrograms

The column dendrogram is drawn in the same way as the row dendrogram, but shows the distance or similarity between the variables (the cell value columns).
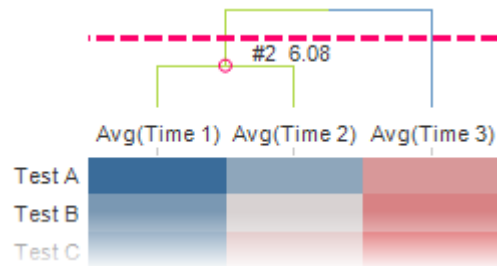


At the position of the pruning line in the above example, there are two clusters. The left-most cluster contains two columns, while the right-most cluster contains only one individual column. The calculated distance is 6.08.

## Interacting with the dendrogram

The dendrogram makes it easy to highlight and mark in the heat map. You can mouseover the dendrogram to highlight clusters and their corresponding cells in the heat map. You can click to mark a cluster. This will also mark the corresponding cells in the heat map, as in the example below. The tooltip displays information about the cluster.
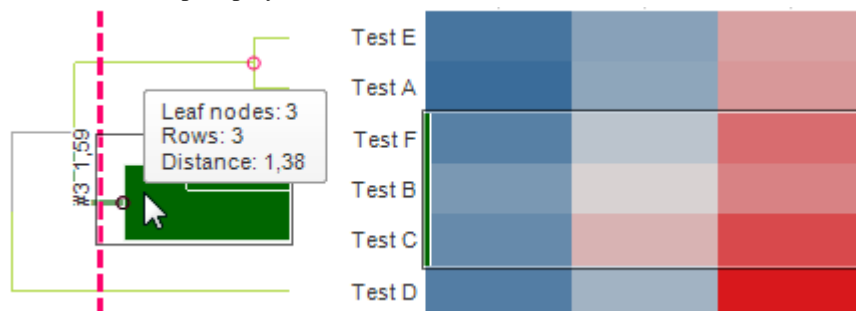


## Clustering

As mentioned, a dendrogram is added to the heat map when clustering is performed. A new column is also added to the data table, and made available in the filters panel. The cluster

column is dynamic, and the position of the pruning line decides its content. The example below shows what the cluster column and cluster filter would look like for the row dendrogram above.



The cluster column contains unique identifiers for the cluster nodes corresponding to the position of the pruning line. In the example above, two cluster nodes are identified. Test B, Test C, and Test F belong to the cluster node with identifier 3, while Test A and Test E belong to the cluster node with identifier 5. The third identifier, *6, is a leaf node, containing Test D. The cluster column makes it possible to filter out entire clusters at a time. You can also use it to color or trellis other visualizations by.

**Note:** If you add a column dendrogram to a heat map that is set up with multiple cell value columns, then the cluster column cannot show any cluster IDs. This means that the cluster column cannot be used for filtering, or to color or trellis other visualizations by. Also, the column dendrogram will not be fully interactive. For instance, it may not be possible to use the dendrogram to highlight or mark in the heat map. However, you can still move the pruning line to see the calculated distance or similarity, as well as the number of clusters.

# 4.12.4    Importing/Exporting Dendrograms

All dendrograms in TIBCO Spotfire can be represented by a data table. This makes it possible to use various clustering methods and statistical calculations, other than those included in the Edit Clustering Settings dialog. For example, you can use TIBCO Spotfire Statistics Services to execute a custom made S-PLUS or R script, which performs a clustering with a method of your choice. More specifically, you can make use of any calculation that can order leaves in a hierarchical fashion. The result from such a procedure would be a data table, which you can add to the analysis, and then import to the heat map and use for displaying a dendrogram.

You can also export a dendrogram from a heat map, view the resulting data table, make modifications, and import it back to the heat map - in effect modifying the dendrogram.

Another reason for exporting a dendrogram to a data table, and later importing it again, is performance. If you have a really large data set, and perform a clustering method on it, the calculations could take some time. If you have run a clustering method once, which is used in a dendrogram, you can export it and later import it without having to run the clustering again.

The data table representation of a dendrogram used in TIBCO Spotfire must adhere to a certain format. This format is described below.

► **To export a dendrogram:**
1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Dendrograms** page.
4. Under Source, click the **Export** button.
   Response: The Export Dendrogram dialog is opened.
5. Enter a name for the exported dendrogram data table.
   Comment: Each data table must have a unique name. If a data table with the same name already exists, a number in parenthesis will be added at the end of the name. For example "My Row Dendrogram (2)".
6. Click **OK**.
   Response: A data table is added to the analysis.

   If you want to export this data table to use outside of TIBCO Spotfire, use the **File > Export > Data...** function, and select to export the data table you just created.

## ► To import a dendrogram:

1.  Select **File > Add Data Tables...** to add the dendrogram data table to the analysis.
2.  Right-click in the heat map visualization to display the pop-up menu.
3.  Select **Properties**.
4.  Go to the **Dendrograms** page.
5.  Under Source, select the **Imported** radio button.
6.  Use the column selector to pick the data table you want to use for the dendrogram.

    Comment: The data table must be formatted according to the correct specifications (see below).

    Response: The imported data table is used to draw the dendrogram.

## Dendrogram Data Table Format

As stated above, a dendrogram can be imported and used in the heat map via a data table. This data table must follow a certain format. Most importantly, the column headers must be named exactly as seen below, and have the appropriate type:

*   **NodeID** *(integer)*
*   **ParentID** *(integer)*
*   **PruningLevel** *(integer)*
*   **Height** *(numeric)*
*   **LeafOrder** *(integer)*
*   + one or more Leaf Identifier Columns

| NodeID | ParentID | PruningLevel | Height | LeafOrder | Type |
|---|---|---|---|---|---|
| 0 | 7 | 5 | 0.00 | 0 | Cucumber |
| 1 | 6 | 5 | 0.00 | 1 | Apples |
| 2 | 6 | 5 | 0.00 | 2 | Tomatoes |
| 3 | 8 | 5 | 0.00 | 3 | Pears |
| 4 | 8 | 5 | 0.00 | 4 | Lettuce |
| 5 | 9 | 5 | 0.00 | 5 | Bananas |
| 6 | 7 | 4 | 69.92 | | |
| 7 | 10 | 3 | 106.25 | | |
| 8 | 9 | 2 | 230.77 | | |
| 9 | 10 | 1 | 414.79 | | |
| 10 | -1 | 0 | 541.79 | | |

In this table, each row corresponds to a node in the dendrogram and its associated attributes. In the dendrogram below, the NodeID of each node has been indicated by a number.
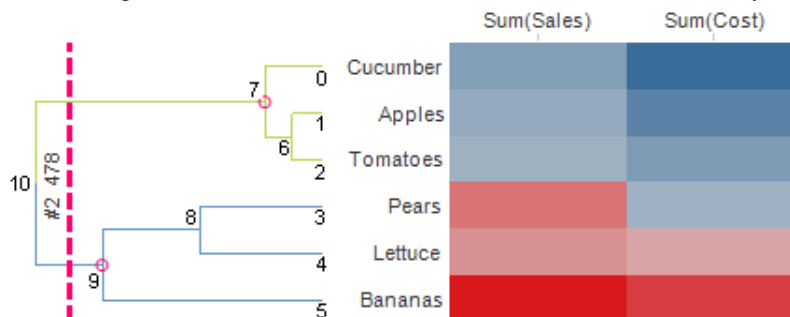


**NodeID**

The NodeID provides a unique number for each node in the dendrogram.

**ParentID**

Combined with the NodeID, the ParentID determines the hierarchy of the dendrogram. For each NodeID, the corresponding ParentID states which node is its parent. For example, node 2 has the parent 6, which in turn has parent 7, which in turn has parent 10, which in turn has parent -1. Since -1 is not present in the NodeID column, that means -1 is a root node. Note that there can be several root nodes. Every unique ParentID that does not match a NodeID will be interpreted as a root node.

### PruningLevel

The PruningLevel is additional information, needed to interpret prunings as cluster columns. From a PruningLevel, the system finds the associated closest node in a pruning perspective as follows: Think of all rows as branches. Prune all branches < PruningLevel. Then you will have a set of remaining nodes. Then remove all nodes whose parent is among the remaining nodes.

In the example above, this means:

- Prune at level 0  ->  One node (10) will be found.
- Prune at level 1  ->  Two nodes (7, 9) will be found.
- Prune at level 2  ->  Four nodes (0, 5, 6, 8) will be found.
- Prune at level 3  ->  Six nodes (0, 1, 2, 3, 4, 5) will be found, all leaves.

### Height

The Height determines the position of the node. For a row dendrogram as in the example above, this means the horizontal position relative the edge of the heat map. In the example, all leaves have height 0, thus they begin closest to the heat map. Each parent must have an increasing value, as they come closer to the root of the dendrogram.

At first glance, the height of each node might not mean much. But there are ways of making this attribute take on more meaning. For example, by using TIBCO Spotfire Statistics Services to calculate a dendrogram, you can assign values to the height of each node, that indicates how well each node correlates to its cluster. For example, a short height could indicate that the node correlates well, whereas a longer height could indicate that the node is an outlier.
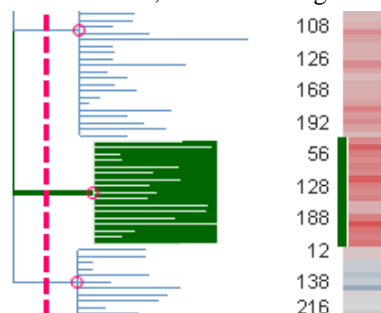


### LeafOrder

Each row that is a leaf, must have a LeafOrder number. These numbers state the order of the leaves. Nodes that are not leaves have an empty value.

### Additional leaf identifier column(s)

Additional columns in the dendrogram data table are leaf identifier columns. In the example above, there is only one identifier column, but it is quite possible to have several. The leaf identifier columns are used to match and sort the heat map.

### Concerning R:

R is available under separate open source software license terms and is not part of TIBCO Spotfire.  As such, R is not within the scope of your license for TIBCO Spotfire. R is not supported, maintained, or warranted in any way by TIBCO Software Inc.  Download and use of R is solely at your own discretion and subject to the free open source license terms applicable to R.

# 4.12.5     Heat Map Properties

## 4.12.5.1     Heat Map Properties

The Heat Map Properties dialog consists of several pages:

- General
- Data
- Fonts
- Cell Values
- X-axis
- Y-axis
- Colors
- Sorting
- Tooltip
- Legend
- Trellis
- Dendrograms

### ► To reach the Heat Map Properties dialog:

1. Right-click on the heat map visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the heat map visualization to make it active and then select **Edit > Visualization Properties**.

## 4.12.5.2     Heat Map Properties - General

| Option | Description |
|---|---|
| Title | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| Show title bar | Specifies whether or not to show the visualization title. |
| Description | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| Show description in visualization | Specifies whether or not to show the description in the visualization. |

## 4.12.5.3 Heat Map Properties - Data



| Option | Description |
|---|---|
| Data table | Specifies the data table on which the visualization will work. |
| Marking | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| Limit data using markings | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| New... | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the |

| | Document Properties dialog. |
|---|---|
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.12.5.4    Heat Map Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.12.5.5    Heat Map Properties - Cell Values
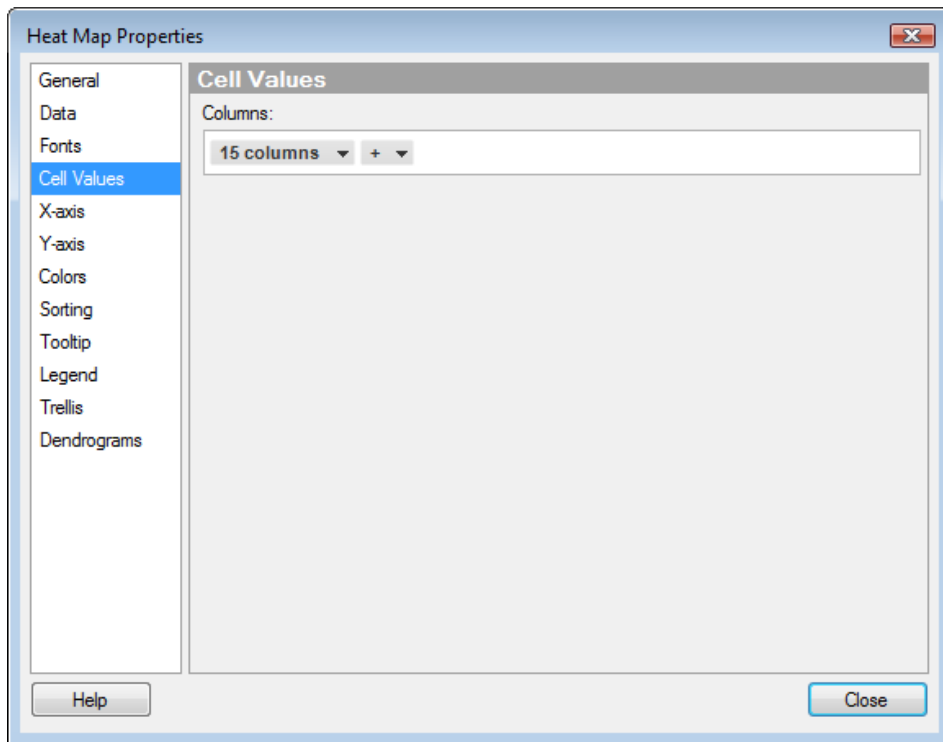


| Option | Description |
|--------|-------------|
| **Columns** | Specifies the columns that should be used to define the actual values in the individual cells of the heat map. |

## 4.12.5.6    Heat Map Properties - X-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Range** | |
| **Min** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Max** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Set to current range** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Include origin** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Show zoom slider** | Shows a zoom slider which you can manually manipulate to view only those cells in the heat map you are interested in. |
| **Show gridlines** | Specifies whether or not vertical gridlines should be visible. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed on the right-hand side of the scale. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Position** | |
| **Top** | Select this option to place the X-axis scale labels on top of the heat map. |
| **Bottom** | Select this option to place the X-axis scale labels at the bottom of the heat map. |

## 4.12.5.7    Heat Map Properties - Y-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode from categorical to continuous and vice versa, as well as changing the category mode to determine which combinations to show. |

**Range**

| | |
|---|---|
| **Min** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Max** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Set to current range** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Include origin** | Not applicable to heat map visualizations. Available for continuous axes only. |
| **Show zoom slider** | Shows a zoom slider which you can manually manipulate to view only those cells in the heat map you are interested in. |
| **Show gridlines** | Specifies whether or not horizontal gridlines should be visible. |
| **Reverse scale** | Reverses the current sort order so that the lowest value is displayed at the top of the scale. |

**Scale labels**

| | |
|---|---|
| **Show labels** | Specifies whether or not scale labels should be visible. |
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |
| **Position** | |
| **Left** | Select this option to place the Y-axis scale labels on the left-hand side of the heat map. |
| **Right** | Select this option to place the Y-axis scale labels on the right-hand side of the heat map. |

### 4.12.5.8　　　Heat Map Properties - Colors



| Option | Description |
|---|---|
| **Color by** | Lists the alternatives by which it is possible to color the heat map. The drop-down list contains the columns that are visible on the horizontal and vertical axes of the heat map. It also contains the alternative (Cell Values) which lets you color the heat map by the column on the cell values axis. Select the alternative you wish to color by to set up a color scheme and see the available color scheme groupings for that alternative. If the cell values axis contains more than one column, you can only color by (Cell values) and Color by drop-down list will be grayed out. |
| **Color scheme groupings** | Lists the currently available color scheme groupings for the selected column. In heat maps, a color scheme is always applied to a color scheme grouping. A default color scheme grouping named Numeric is always available for each of the columns in the heat map. Before any new color scheme groupings have been added, the default grouping contains all the values in the selected column. Click on a grouping in the list to select it and see its defined color scheme in the lower part of the dialog. To learn more about color scheme groupings and coloring in heat maps, see Coloring in Cross Tables and Heat Maps. |
| **Add** | Opens a menu which lets you add a new color scheme grouping. The menu option Color Scheme Grouping... opens the Add Color Scheme Grouping dialog, in which you can select values in the selected column to include in the new grouping. You can also give the grouping a descriptive name. The menu also lists all the values in the selected column as separate menu options. If you select one of these values from the menu, a grouping containing only that value will be added. |

| | |
|---|---|
| **Edit...** | Opens the Edit Color Scheme Grouping dialog which lets you modify an existing grouping. You cannot edit the default grouping named Numeric. |
| **Remove** | Removes the selected color scheme grouping from the list. You cannot remove the default grouping named Numeric. |
| **Color mode** | Specifies in which color mode to set up the color scheme. You can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale for each axis value, or if one scale should apply to the entire color scheme grouping. You can also select to use one scale for each trellis panel for trellised heat maps, as well as one scale for each trellis panel and each axis value in the trellis panel. |
| ⬚▾<br><br>[Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes applicable to the current color scheme grouping will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes applicable to the current color scheme grouping will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. For a full description of the predefined color schemes, see Predefined Color Schemes.<br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current |

color scheme to. Only visualizations with compatible color schemes are listed.

**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog.

| | |
|---|---|
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used for the selected color scheme grouping. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the color scheme grouping, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |
| **Add Point** | Adds a new anchor point to the color scheme. |
| **Delete Point** | Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the color scheme grouping. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.12.5.9     Heat Map Properties - Sorting
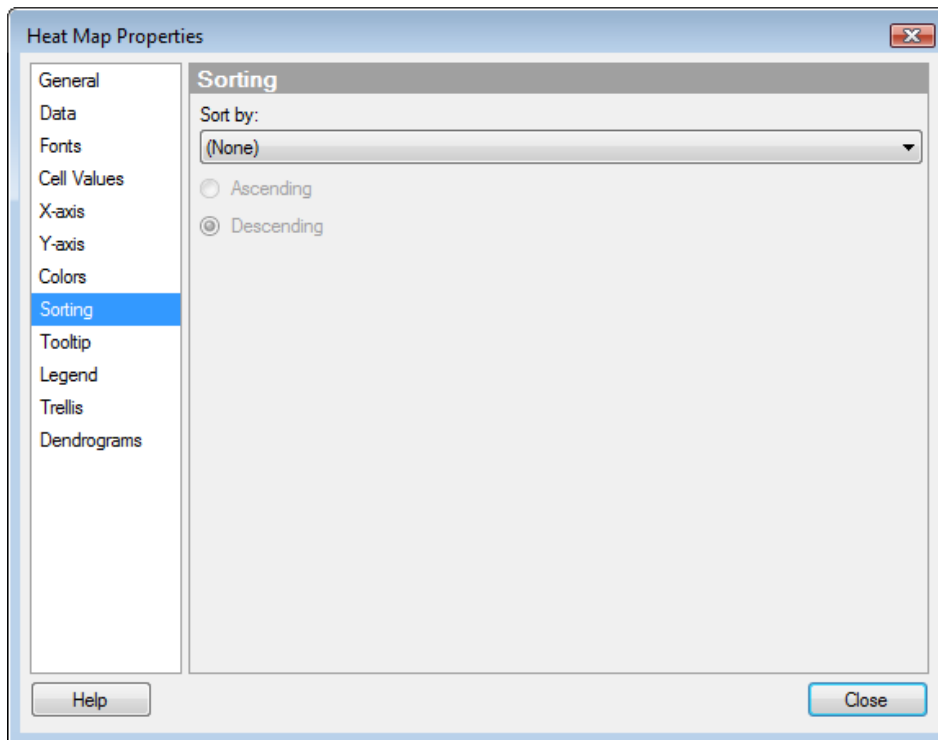


| Option | Description |
|---|---|
| **Sort by** | Specifies which column to sort the heat map by. |
| **Ascending** | Sorts the heat map by the selected column title in ascending order. |
| **Descending** | Sorts the heat map by the selected column title in descending order. |

## 4.12.5.10    Heat Map Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the expression or the name to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list as well as up in the tooltip. |
| **Move Down** | Moves the selected value down in the list as well as down in the tooltip. |
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.12.5.11 Heat Map Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend. By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.12.5.12    Heat Map Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way. |

|  | The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
|---|---|
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.12.5.13 Heat Map Properties - Dendrograms

| Option | Description |
| --- | --- |
| **Settings for** | Select whether to define settings for a row dendrogram or a column dendrogram. The controls in the rest of the dialog are adapted to the dendrogram type you choose. |
| **Update** | Click this button to update the dendrogram. |
| **Show row/column dendrogram** | Select this check box to make the dendrogram visible in the visualization. When this check box is selected the controls in the lower part of the dialog are available. **Note:** To make the dendrogram visible the first time, it must be updated. Click the Update button, or choose automatic updates. |
| **Source** | |
| **Calculated hierarchical clustering** | Choose this option if you want the dendrogram to be drawn based on a hierarchical clustering calculation. |
| **Settings...** | Opens the Edit Clustering Settings dialog where you can define which distance measure, clustering method, and ordering weight to use for the clustering calculation. You can also define a normalization method and a method to use for replacing empty values. Note: If you change the settings and have chosen to update the dendrogram manually, you will need to do so afterwards. To learn more about hierarchical clustering, see Overview of Hierarchical Clustering Theory. To learn more about normalization, see Normalizing Columns. |
| **Export...** | Opens the Export Dendrogram dialog where you can specify a name for the exported dendrogram. |
| **Imported** | Choose this option if you want to use a dendrogram from a previously performed clustering. |
| **Update dendrogram** | |
| **Manually** | Use this option if you want to control when the dendrogram is updated. You must update each time you have changed any clustering settings. Otherwise the dendrogram will not be valid. |
| **Automatically** | Use this option if you want the dendrogram to be updated automatically when you change any clustering settings. |
| **Position** | Defines on which side of the heat map the dendrogram should be placed. |
| **Top** | Places the dendrogram above the heat map. Available for column dendrograms. |
| **Bottom** | Places the dendrogram below the heat map. Available for column dendrograms. |
| **Left** | Places the dendrogram to the left of the heat map. Available for row dendrograms. |

| | |
|---|---|
| **Right** | Places the dendrogram to the right of the heat map, Available for row dendrograms. |
| **Appearance** | |
| **Use log scale** | Changes the scale from a linear scale to a logarithmic base 10 scale [log10 (x)]. |
| **Show pruning line** | Specifies whether or not to show a pruning line in the dendrogram. |
| **Pruning line color** | Specifies the color to use for the pruning line in the dendrogram. |
| **First alternating cluster color** | Specifies the first color to use for the clusters when pruning in the dendrogram. |
| **Second alternating cluster color** | Specifies the second color to use for the clusters when pruning in the dendrogram. |

## 4.12.5.14 Details on Edit Clustering Settings

► **To reach the Edit Clustering Settings dialog from the Heat Map Properties dialog:**

1. In the Visualization Properties dialog of the heat map, go to the **Dendrograms** page.
2. Under Settings for, select either **Row dendrogram** or **Column Dendrogram** from the drop-down list.
3. Select the check box **Show row dendrogram** or **Show column dendrogram** depending on the kind of dendrogram you selected in the drop-down list.
   Response: The settings for the selected dendrogram become active in the bottom part of the dialog.
4. Under Source, click the **Calculated hierarchical clustering** radio button.
5. Click **Settings...**.

► **To reach the Edit Clustering Settings dialog from the Hierarchical Clustering dialog:**

1. From the **Tools** menu, select **Hierarchical Clustering...**.
   Response: The Hierarchical Clustering dialog is opened.
2. Select the check box **Cluster rows** or **Cluster columns** depending on the kind of dendrogram you want to create.
3. Click the corresponding **Settings...** button.

| Option | Description |
|---|---|
| **Clustering method** | Specifies the clustering method to use for calculating the similarity between clusters. |
| **Distance measure** | Specifies which distance measure to use for the clustering calculation. |
| **Ordering weight** | Specifies the ordering weight to use for the clustering calculation. |
| **Empty value replacement** | |
| **Method** | Defines how empty values in the data set should be replaced in the clustering calculation. <br> **Constant value** – replaces the value by a constant number. <br> **Column average** – returns the average of the corresponding column values. If the column contains only empty values, they will be replaced by 0, since it is not possible to calculate an average. <br> **Row average** – replaces the value by the average value of the entire row. If the row contains only empty values, they will be replaced by 0, since it is not possible to calculate an average. <br> **Row interpolation** – sets the missing value to the interpolated value between the two neighboring values in the row. |
| **Replace with** | Specifies the constant value to replace all empty values by when using the Constant value replacement method. |

| Normalization | |
|---|---|
| **Method** | Specifies the normalization method to use. See Normalizing Columns and the detailed description for each method for further information about the various methods. |
| **Percentage** | Specifies the percentage value to use when normalizing by percentile or by trimmed mean. |

**Note:** If you select Ward's method as the clustering method, the distance measure will automatically be set to Half square Euclidean distance. No other distance measure can be used with Ward's method.

## 4.12.5.15   Details on Export Dendrogram

### ► To reach the Export Dendrogram dialog:

1. In the Visualization Properties dialog of the heat map, go to the **Dendrograms** page.
2. Under Settings for, select either **Row dendrogram** or **Column Dendrogram** from the drop-down list.
3. Select the check box **Show row dendrogram** or **Show column dendrogram** depending on the kind of dendrogram you selected in the drop-down list.

   Response: The settings for the selected dendrogram become active in the bottom part of the dialog.

   Under Source, click the **Calculated hierarchical clustering** radio button.

   Click the **Export...** button.
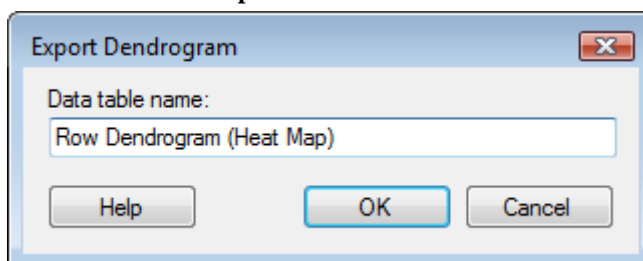


| Option | Description |
|---|---|
| **Data table name** | Type a name for the exported dendrogram. |

# 4.13     Parallel Coordinate Plot

## 4.13.1      What is a Parallel Coordinate Plot?

A parallel coordinate plot maps each row in the data table as a line, or profile. Each attribute of a row is represented by a point on the line. This makes parallel coordinate plots similar in appearance to line charts, but the way data is translated into a plot is substantially different.

Consider, for example, a data table where a laboratory has measured the amount of various carbohydrates contained in various fruit and vegetables.

| Food | Glucose | Fructose | Maltose | Saccharose |
|------|---------|----------|---------|------------|
| Apples | 2.10 | 4.50 | 0.00 | 1.30 |
| Bananas | 4.40 | 2.70 | 0.00 | 6.40 |
| Corn | 0.60 | 0.20 | 0.30 | 2.30 |
| Cucumber | 0.70 | 0.70 | 0.00 | 0.00 |
| Lettuce | 1.30 | 0.90 | 0.00 | 0.00 |
| Tomatoes | 1.30 | 2.00 | 0.00 | 0.00 |

For each food type, it is now possible to plot a profile of how the carbohydrates are distributed. The technicians in the laboratory can now see which food types are similar to each other in carbohydrate distribution, by comparing the profiles to each other. This is where the parallel coordinate plot is really useful, to compare profiles in order to find similarities.
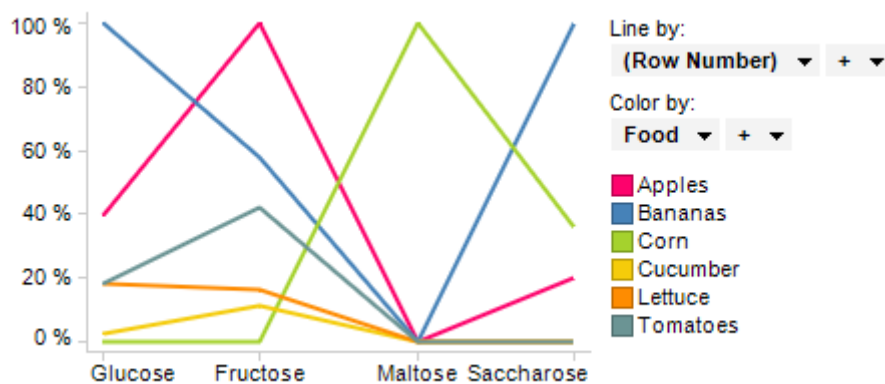


The values in a parallel coordinate plot are always normalized. This means that for each point along the X-axis, the lowest value in the corresponding column is set to 0% and the highest value in that column is set to 100% along the Y-axis. The scale of the various columns is totally separate, so do not compare the height of the curve in one column to the height of the curve in another column.

This becomes more apparent when looking at another example. This data table contains information about some models of computer monitors. As you see, the data in the various columns are of completely different types and totally incomparable to each other. They are however, perfect for a parallel coordinate plot, which normalizes the data in each column and simply plots the lowest value as 0% and the highest as 100%.

| Monitor Model | Screen Size | Type | # Year Warranty | Cost |
|---------------|-------------|------|-----------------|------|
| Costronic M22 | 19" | CRT | 1 | $150.00 |
| Sazozi 12p | 17" | TFT | 2 | $295.00 |
| Sazozi 14p | 19" | TFT | 2 | $345.00 |
| Optex Magma 4 | 20" | CRT | 3 | $299.00 |

This gives us a profile for each computer monitor, which we can compare to the other profiles, and try to spot a monitor that fits our needs.
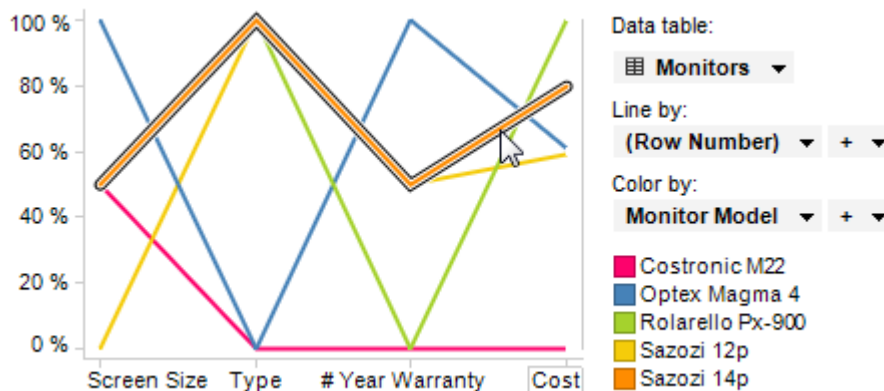
Perhaps we think that the Sazozi 14p monitor (the orange marked profile) is a good buy, since it has a medium sized screen, it is a new flat screen, it has an average warranty period, and seems to cost a bit but not in the very highest price range.

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.13.2    How to Use the Parallel Coordinate Plot

### ► To set up a new parallel coordinate plot:

1.  Click on the New Parallel Coordinate Plot button on the toolbar, ⬚.

    Comment: You can also select **Insert > New Visualization > Parallel Coordinate Plot** from the menu.

    Response: A first attempt to set up a suitable parallel coordinate plot is made by the application.

2.  Adjust the parallel coordinate plot to display the columns of your choice, by right-clicking in the visualization and selecting **Properties**.

3.  Select **Columns**.

4.  **Add/Remove** the columns you want to appear on the X-axis.

5.  Click **Close**.

### ► To apply coloring:

1.  In the **Filters** panel, click and hold down the left mouse button on the filter representing the column that you want to color by.

    Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under Edit > Document Properties.

2.  Drag the filter to the center of the visualization.

    Response: Drop targets appear in the middle of the visualization.

3.  Release the mouse button on the Color target.

    Response: The lines are colored with one color for each category in the selected column. If the lines have not been previously split by adding a Line By column, the lines will be split according to the color categories.

    Comment: To learn more about coloring in Spotfire, see Coloring Overview.

# 4.13.3 Parallel Coordinate Plot Properties

## 4.13.3.1 Parallel Coordinate Plot Properties

The Parallel Coordinate Plot Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting
- Fonts
- Scale Labels
- Columns
- Colors
- Labels
- Tooltip
- Legend
- Trellis
- Line By

► **To reach the Parallel Coordinate Plot Properties dialog:**

1. Right-click on the Parallel Coordinate Plot Properties visualization.
2. Select **Properties** from the pop-up menu.
   Comment: You can also click on the parallel coordinate plot visualization to make it active and then select **Edit > Visualization Properties**.

## 4.13.3.2 Parallel Coordinate Plot Properties - General

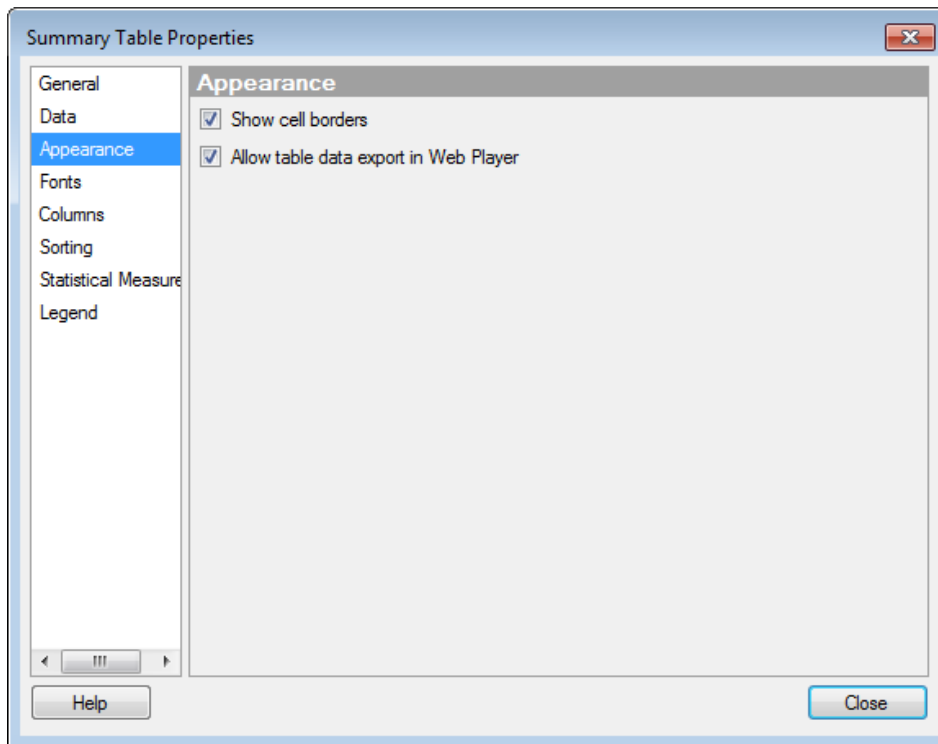| Option | Description |
|---|---|
| Title | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| Show title bar | Specifies whether or not to show the visualization title. |
| Description | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| Show description in visualization | Specifies whether or not to show the description in the visualization. |

### 4.13.3.3 Parallel Coordinate Plot Properties - Data



| Option | Description |
|---|---|
| Data table | Specifies the data table on which the visualization will work. |
| Marking | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| Limit data using markings | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| New... | Opens the New Marking dialog where you can specify a new marking.<br>The color and name of a previously created marking is edited in the |

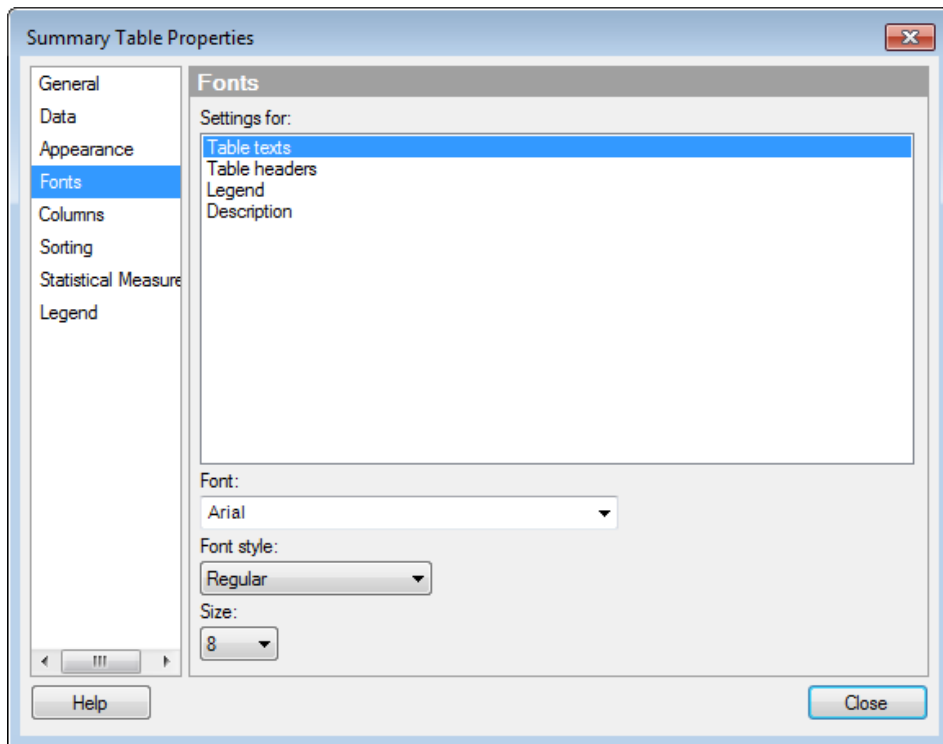| | Document Properties dialog. |
|---|---|
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.13.3.4    Parallel Coordinate Plot Properties - Appearance
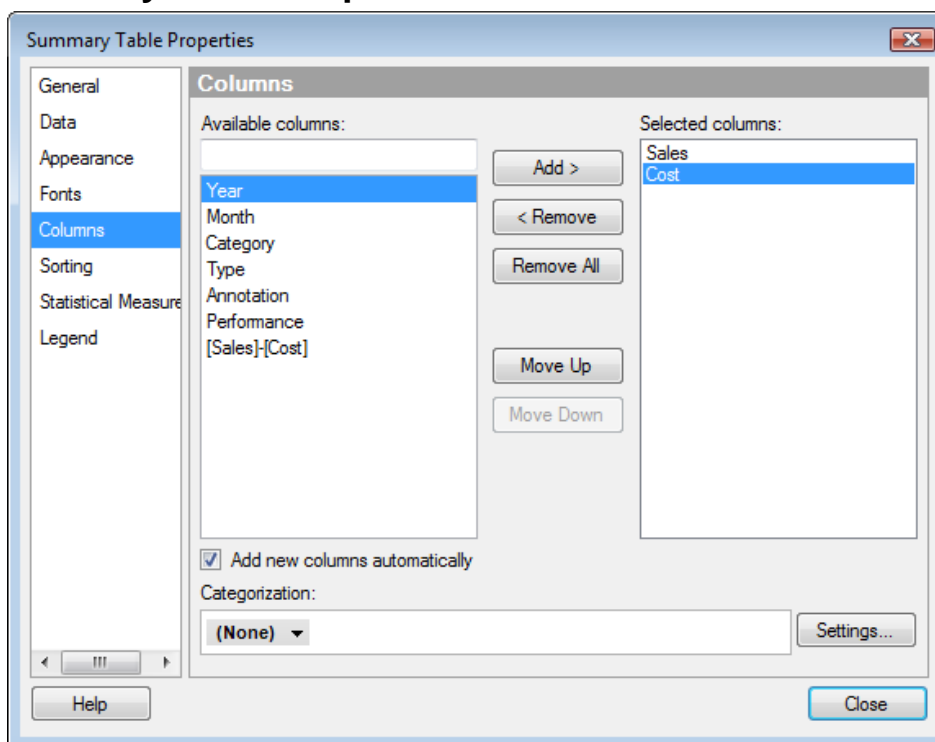


| Option | Description |
|---|---|
| **Line width** | Specifies the width of the lines in the parallel coordinate plot. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data used to create the line. |
| **Show column zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting columns in the parallel coordinate plot. |

## 4.13.3.5        Parallel Coordinate Plot Properties - Formatting



| Option | Description |
|---|---|
| **Selected columns** | Lists the columns visible in the parallel coordinate plot as well as the formatting category currently being used on each of the columns. Click on the one you want to change the settings for. If the columns on the axes are of the same type, you can set formatting for both axes at the same time. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected column. Each category in this list has separate settings. Which categories are available depends on the data type of the selected column. See Formatting Settings for a full description of all possible options. |

**Note:** You can only see formatting for the column that is currently visible on the scale.

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.13.3.6    Parallel Coordinate Plot Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.13.3.7 Parallel Coordinate Plot Properties - Scale Labels



| Option | Description |
|---|---|
| **Left scale (percentage)** | Defines the properties of the scale labels on the left Y-axis. |
| **Right scale (selected column)** | Defines the properties of the scale labels on the right Y-axis. This axis shows the values of the column that has been selected by clicking on its column name on the X-axis in the visualization. |
| **Columns** | Defines the properties of the scale labels displaying the names of the columns included in the visualization. |
| [For each scale above] | |
| **Show labels** | Specifies whether or not scale labels should be displayed on this axis. Click the radio button to display the labels **Horizontally** or **Vertically**. |
| **Max number of labels** | Specifies the maximum number of scale labels to be shown on this axis.<br>Select the check box that is available for the right scale settings if you want to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on an axis scale with many values. |
| **Show gridlines** | Specifies whether or not gridlines should be shown for this axis. |

## 4.13.3.8　　Parallel Coordinate Plot Properties - Columns
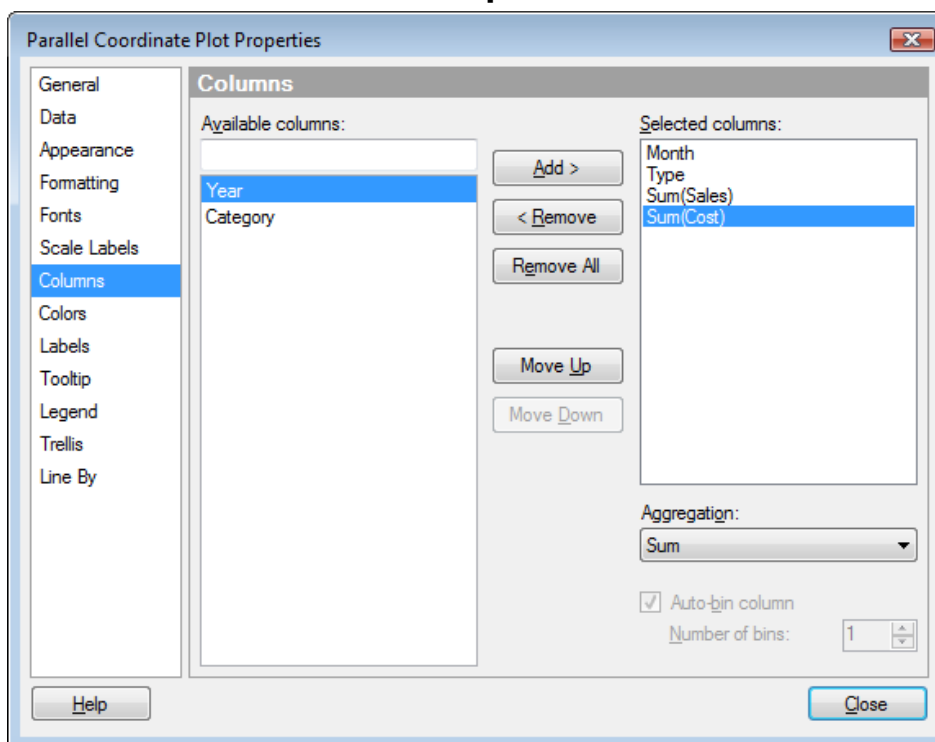


| Option | Description |
|---|---|
| **Available columns** | Lists all columns in the data table which are available for selection. |
| **Selected columns** | Lists the columns selected to be displayed in the parallel coordinate plot, as well as the selected aggregation method used on each column (if any aggregation has been specified). |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list and sends them back to the Available columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the Y-axes in the parallel coordinate plot. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the Y-axes in the parallel coordinate plot. |
| **Aggregation** | Click on one or more columns in the Selected columns list to make this option available. Specifies the aggregation method to use for the selected column. |
| **Auto-bin column** | Click on one or more columns in the Selected columns list to make this option available. Select the check box to temporarily group the values of a numeric column into a specified number of categorical bins. |

|  | **Note:** To create a new column with binned values, see How to Use Binning instead. |
|---|---|
| **Number of bins** | Click on one or more columns in the Selected columns list to make this option available. Specifies the number of bins into which the values of a numeric column should be grouped. |

## 4.13.3.9 Parallel Coordinate Plot Properties - Colors



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to color by. |
| **Settings** | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| **Color mode** | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised parallel coordinate plots, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |

| | |
|---|---|
| [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes.<br><br>**Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.<br><br>**Library Item** – Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.<br><br>**File** – Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.<br><br>**Document Color Scheme** – Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.<br><br>**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively. |

| | |
|---|---|
| **Add Point** | Available for continuous columns only. Adds a new anchor point to the color scheme. |
| **Delete Point** | Available for continuous columns only. Deletes the selected anchor point. |
| **Add Rule...** | Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types. |
| **Reset** | Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog. |

## 4.13.3.10 Parallel Coordinate Plot Properties - Labels



| Option | Description |
|---|---|
| **Show in labels** | |
| Line identifier | Displays labels showing the categories used to create each line (by coloring or line by). |

| | |
|---|---|
| **Individual values** | Displays labels showing the values for all points used to create the line. |
| **Show labels for** | Determines whether to show labels on all lines (**All**), lines containing marked rows only (**Marked rows**), or not to show any labels at all (**None**). |
| **Max number of labels** | Specifies the maximum number of labels to be shown. |

## 4.13.3.11 Parallel Coordinate Plot Properties - Tooltip



| Option | Description |
|---|---|
| **Display the following values** | Specifies what will be shown in the tooltip. |
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |

| | |
|---|---|
| **Tooltip format** | |
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.13.3.12    Parallel Coordinate Plot Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar: |

| | |
|---|---|
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |



## 4.13.3.13 Parallel Coordinate Plot Properties - Trellis



| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |

| | |
|---|---|
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way.<br><br>The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.13.3.14    Parallel Coordinate Plot Properties - Line By

| Option | Description |
|---|---|
| **Show one line for each** | Specifies the column or hierarchy by which the lines should be split. **Note:** If the lines are being colored by a column or hierarchy with more categories than the one selected here, there will be no visible effect from this operation, since the coloring has already split the lines more granularly. |
| **Currently also split by the following properties** | Displays information about what other properties currently contribute to a splitting of the lines. |

# 4.14 Summary Table

## 4.14.1 What is a Summary Table?

The summary table is a visualization that summarizes statistical information about data in table form. The information is based on one data table in TIBCO Spotfire. You can, at any time, choose which measures you want to see (such as mean, median, etc.), as well as the columns on which to base these measures. As you change the set of filtered rows, the Summary Table automatically updates the values displayed to reflect the current selection.

| Column | Sum | Avg | Min | Max | Median | StdDev |
|--------|-----|-----|-----|-----|--------|--------|
| Sales | 3956 | 18 | 8 | 35 | 18 | 7 |
| Cost | 3194 | 15 | 6 | 29 | 13 | 6 |

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.14.2 How to Use the Summary Table

► **To set up the summary table:**

1. Select the filters that represent the columns you want to add to your summary table.
2. Drag that filters into the summary table.
   Response: Two drop-targets are displayed.

3. Drop the filters onto the leftmost drop-target, . This will show measures for all of the selected columns in the summary table.
4. Optionally, if you want separate statistics for different subsets of data, select the desired categorical column from the filters panel and drop it onto the categorization drop-target, . This column should not contain a large number of unique values, since it will be used to split the selected columns into categories.
   Comment: You can also use the Columns page of the Visualization Properties dialog to set up the summary table.
   **Note:** If a calculated column is added in Spotfire, it will automatically be included in the summary table.

► **To sort the summary table:**

1. Click on the header for the measure by which you wish to sort the summary table.
   Response: The columns are sorted in an ascending order by that measure. If categorization is applied, the values for the different categories are sorted within each column.
   Comment: Click again to sort in a descending order, and click once more to return to the original sort order.

► **To change the order of the measures in the summary table:**

1. Right-click on a measure header and select **Properties**.
2. Select the **Statistical measures** page in the dialog.

3. Select the measure you wish to move and click **Move Up** or **Move Down**. Repeat for other measures until you obtain the desired order.

Comment: You can also right-click on a column header and select **Move First** or **Move Last** from the pop-up menu.

► **To remove measures:**

1. Right-click on a measure header and select **Remove**.

Response: The measure is removed from the table.

► **To add measures:**

1. Right-click on the summary table and select **Properties**.
2. Select the **Statistical measures** page in the dialog.
3. Select the measures you want to insert from the Available measures list.
4. Click **Add >**.

Response: The measure is inserted to the right of all previously added measures.

Comment: Click on a measure in the Selected measures list and then click Move Up or Move Down to change the order of the measures.

5. Click **Close**.

► **To change the measure column width:**

1. Place the mouse pointer at the right edge of the measure header you want to resize. The cursor changes into a cross with arrows.
2. Adjust the width by holding down the mouse button and moving the mouse horizontally.

Comment: You can also right-click on the desired header and select Column Width... from the pop-up menu, if you want to specify a column width in number of pixels.

► **To create a new summary table:**

1. Click on the New Summary Table button on the toolbar, 

Comment: You can also select **Insert > New Visualization > Summary Table** from the menu.

Response: A first attempt to set up a suitable summary table is made by the application.

2. Adjust the summary table to display the columns and measures of your choice.

## 4.14.3    Summary Table Properties

### 4.14.3.1    Summary Table Properties

The Summary Table Properties dialog consists of several pages:

- General
- Data
- Appearance
- Fonts
- Columns
- Sorting
- Statistical Measures
- Legend

► **To reach the Summary Table Properties dialog:**

1. Right-click on the summary table visualization.
2. Select **Properties** from the pop-up menu.
   Comment: You can also click on the summary table visualization to make it active and then select **Edit > Visualization Properties**.

## 4.14.3.2    Summary Table Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.14.3.3    Summary Table Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations.<br><br>If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking.<br><br>The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings.<br><br>This can be used if you have two visualizations with different markings |

and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings.

| | |
|---|---|
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.14.3.4 Summary Table Properties - Appearance



| Option | Description |
|---|---|
| **Show cell borders** | Specifies whether or not cell borders should be visible between the cells in the summary table. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the summary table. |

## 4.14.3.5 Summary Table Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 4.14.3.6    Summary Table Properties - Columns



| Option | Description |
|---|---|
| **Available columns** | Lists all columns in the data table available for selection. |
| [Type to search] | Type a search string to limit the number of items in the Available columns list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Selected columns** | Lists the columns selected to be displayed in the summary table. **Note:** If a calculated column is added in Spotfire, it will automatically be included in the Selected columns list. |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list and sends them back to the Available columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the columns in the table. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the columns in the table. |
| **Add new columns automatically** | Select the check box to make sure that any new columns added to the selected data table are also automatically added to the summary table visualization. |

|  |  |
|---|---|
|  | New columns can appear when refreshing an information link, calculating new columns, etc. |
| **Categorization** | If selected, specifies a categorical column by which each column should be split in the summary table. For example, a column called Sales might be interesting to split by the different product categories to view Sum of sales for fruits and vegetables separately. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the category mode to determine which combinations to show.<br>**Note:** If All values in data (nest) or All possible values (cross) are selected, all possible combinations, even empty ones, will be shown regardless of filtering. |

## 4.14.3.7    Summary Table Properties - Sorting
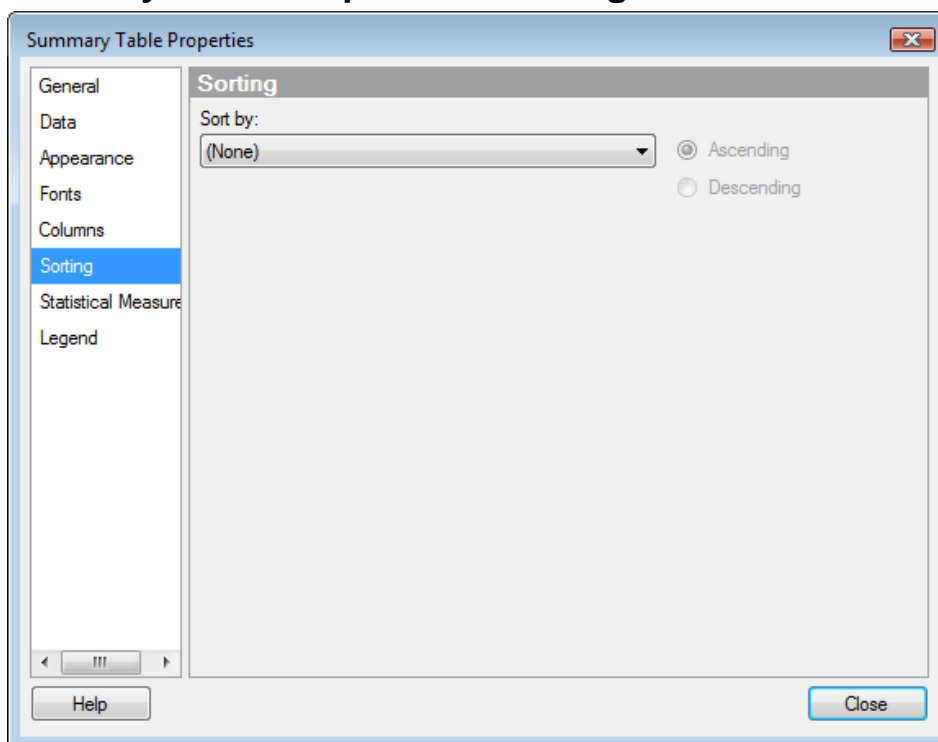


| Option | Description |
|---|---|
| **Sort by** | Specifies the measure you wish to sort the rows by. |
| **Ascending** | Sorts the rows from the lowest to the highest value. If categorization is applied, the values for the different categories are sorted within each column. |
| **Descending** | Sorts the rows from the highest to the lowest value. If categorization is applied, the values for the different categories are sorted within each column. |

## 4.14.3.8    Summary Table Properties - Statistical Measures
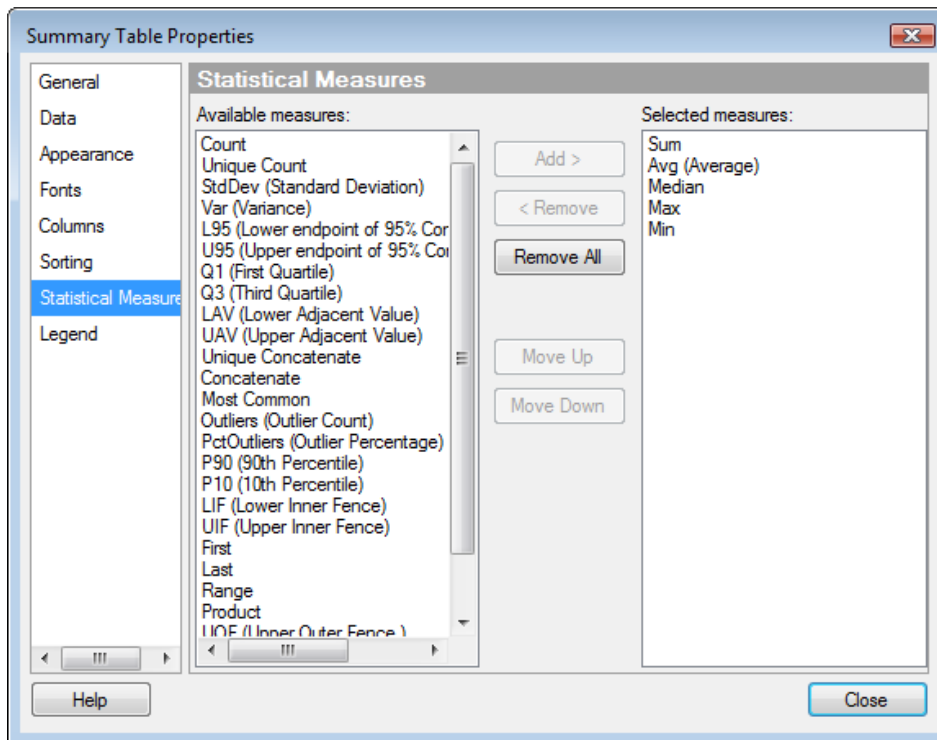


| Option | Description |
|---|---|
| **Available measures** | Lists all measures available for selection. |
| **Selected measures** | Lists the measures selected to be displayed in the table. |
| **Add >** | Adds the measures selected in the Available measures list to the Selected measures list. |
| **< Remove** | Removes the selected measures from the Selected measures list and sends them back to the Available measures list. |
| **Remove All** | Removes all measures from the Selected measures list. |
| **Move Up** | Moves the selected measures up in the Selected measures list. The order of the measures in this list determines the order of the measures in the table. |
| **Move Down** | Moves the selected measures down in the Selected measures list. The order of the measures in this list determines the order of the measures in the table. |

## 4.14.3.9 Summary Table Properties - Legend



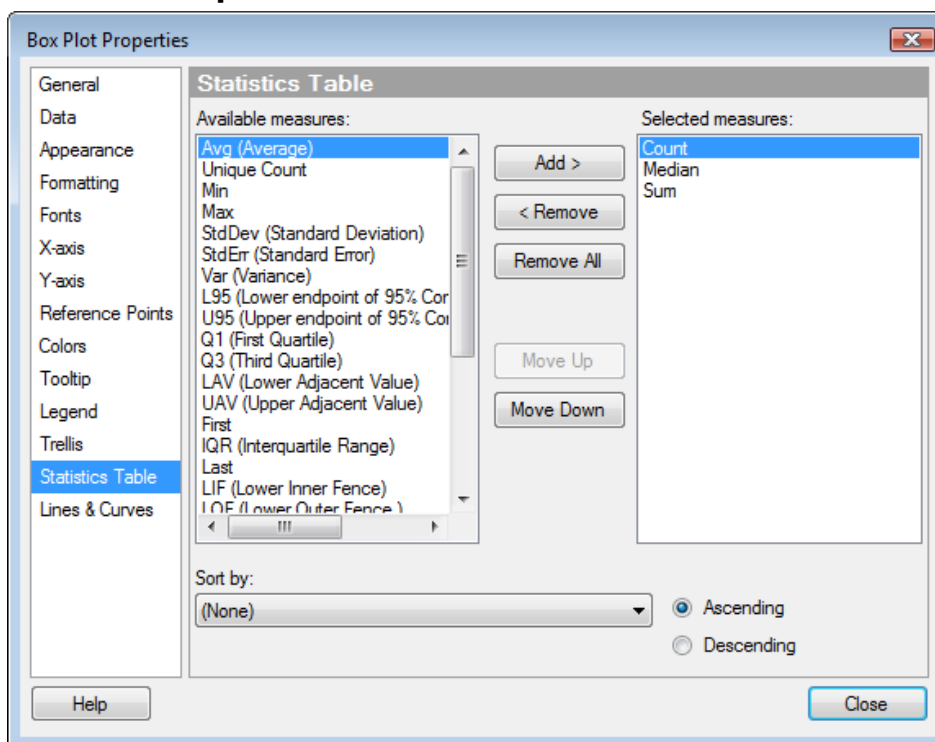| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:  |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item. |

## 4.14.4　Statistical Measures Overview

TIBCO Spotfire contains several visualizations and tools which calculate various measures. For a description of each measure, see the corresponding section.

**Note:** For measures where a large statistical selection is needed, the result from a calculation may vary with the number of available values.

# 4.15    Box Plot

## 4.15.1    What is a Box Plot?

Box plots are graphical tools to visualize key statistical measures, such as median, mean and quartiles.

A single box plot can be used to represent all the data. It is also possible to visualize separate statistics for subsets by selecting a column for the X-axis.

The individual box plot is a visual aid to examining key statistical properties of a variable. The diagram below shows how the shape of a box plot encodes these properties. The range of the vertical scale is from the minimum to the maximum value of the selected column, or, to the highest or lowest of the displayed reference points.
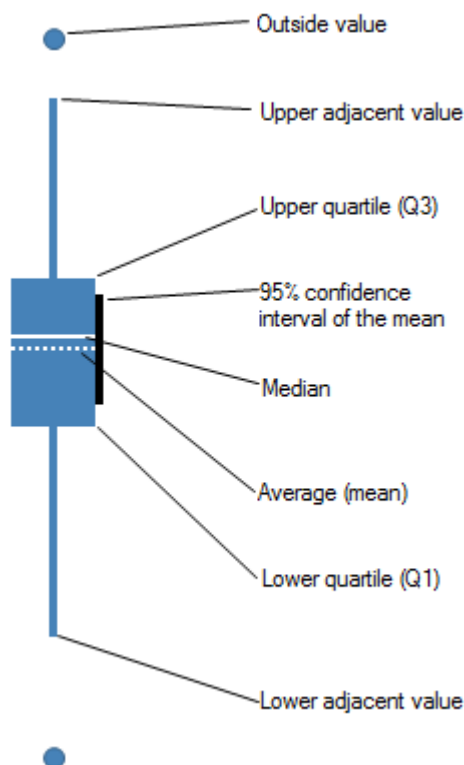


Which reference points should be shown in the box plot is selected in the Properties dialog. There, it is also possible to change the shape and color of each reference point. The shape of outside values cannot be changed. For details of each measure, see Statistical measures.

The axis selectors control which column is mapped to which axis. See Column Selectors for more information about how they work.

The Y-axis should be set to the column or columns on which the statistical measures should be based.

The X-axis can be set to any column. However, since a separate plot will be drawn for each unique value, the column or hierarchy should not contain too many unique values. To summarize the data in a single plot, select (None) on the X-axis. If multiple columns are used on the Y-axis, '(Column Names)' must be used either on the X-axis or in one of the trellis options.
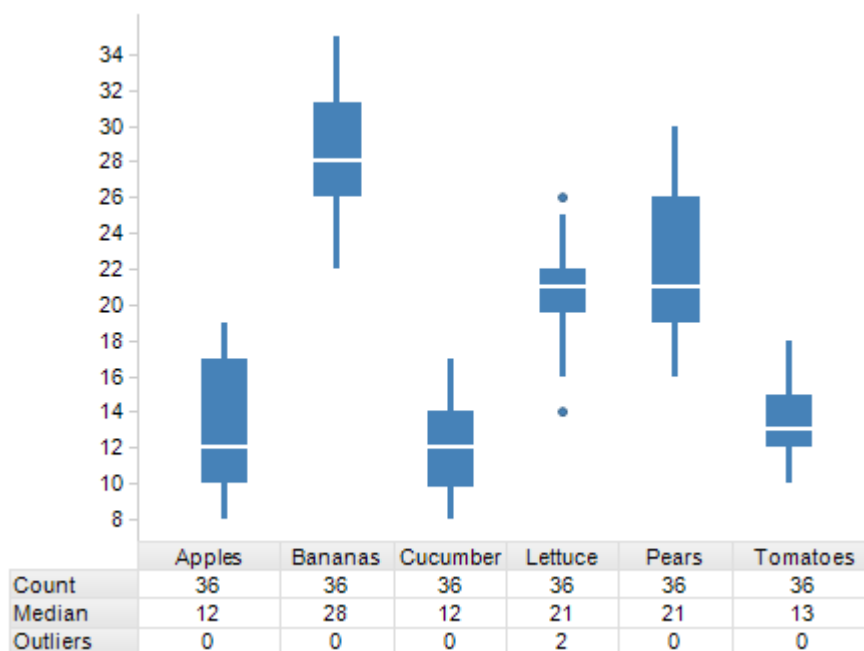
| | Apples | Bananas | Cucumber | Lettuce | Pears | Tomatoes |
|---|---|---|---|---|---|---|
| Count | 36 | 36 | 36 | 36 | 36 | 36 |
| Median | 12 | 28 | 12 | 21 | 21 | 13 |
| Outliers | 0 | 0 | 0 | 2 | 0 | 0 |

All visualizations except the map chart can be set up to show data limited by one or more markings in other visualizations only (details visualizations). They can also be limited by one or more filterings. Another alternative is to set up a visualization without any filtering at all. See Limiting What is Shown in Visualizations for more information.

## 4.15.2    How to Use the Box Plot

► **To add a distribution histogram:**

1. Right-click on the box plot visualization and select **Properties** from the pop-up menu.
2. Go to the **Appearance** page.
3. Select the **Show distribution** check box.

   Response: A histogram displaying the distribution is shown for each box.

► **To apply coloring:**

1. In the **Filters** panel, click and hold the left mouse button on the filter representing the column that you want to color by.

   Comment: Coloring is also available in the Visualization Properties dialog. The color of marked items is changed under Edit > Document Properties.
2. Drag the filter to the center of the visualization.

   Response: Drop targets appear in the middle of the visualization.
3. Release the mouse button on the X-axis target, or on either of the trellis targets.

   Comment: To color by a column you need to use the same column to split the boxes either on the X-axis or by trellising.
4. Drag the same filter to the Color target.

   Response: The boxes are colored with one color for each category in the selected column.

   Comment: To learn more about coloring in Spotfire, see Coloring Overview.

► **To add or remove reference points:**

1. Right-click on the box plot visualization and select **Properties** from the pop-up menu.

2. Go to the **Reference Points** page.

3. To add more reference points, select the check boxes for the interesting features.

4. To remove a reference point, clear its check box.

### ► To change the appearance of reference points:

1. Right-click on the box plot visualization and select **Properties** from the pop-up menu.

2. Go to the **Reference Points** page.

3. Click on the reference point of interest to select it.

   Comment: Clicking twice on the same reference point will select or clear its check box; hence, it will change whether the reference point will be shown in the visualization or not.

4. Change the **Color** or **Shape** for the selected reference point.

### ► To add a reference line to the box plot:

1. Right-click on the visualization to display the pop-up menu.

2. Select **Properties**.

3. Go to the **Lines & Curves** page.

4. Select the check box for any of the default lines or click on **Add** to define a new horizontal or vertical line.

### ► To add a curve fit to the box plot:

1. Right-click on the visualization to display the pop-up menu.

2. Select **Properties**.

3. Go to the **Lines & Curves** page.

4. Click on **Add** and select a suitable curve fit from the drop-down menu..

   Comment: You can select from a number of predefined curve fits or define your own curve using Curve Draw. See Curve Fit Models for more information about the different options.

5. Once the curve has been created, you can change its settings on the Lines & Curves page. Some of the curve settings are also available from the pop-up menu in the visualization.

### ► To show comparison circles:

1. Right-click on the visualization to display the pop-up menu.

2. Select **Properties**.

3. Go to the **Appearance** page.

4. Select the **Show comparison circles** check box.

### ► To create a new box plot:

1. Click on the New Box Plot button on the toolbar, .

   Comment: You can also select **Insert > New Visualization > Box Plot** from the menu.

   Response: A first attempt to set up a suitable box plot is made by the application.

2. Adjust the box plot to display the categories and measures of your choice.

   Comment: For more information about how to change what to show on the two axes, see Column Selectors.

## 4.15.3    What are Comparison Circles?

The drawing of comparison circles is a way to display whether or not the mean values for various categories (boxes in the box plot) are significantly different from each other. The circles are drawn with their centers at the mean value for the box to which it corresponds.

If the circles for different groups do not overlap, the means of the two groups are generally significantly different. If the circles have a large overlap, the means are not significantly different.
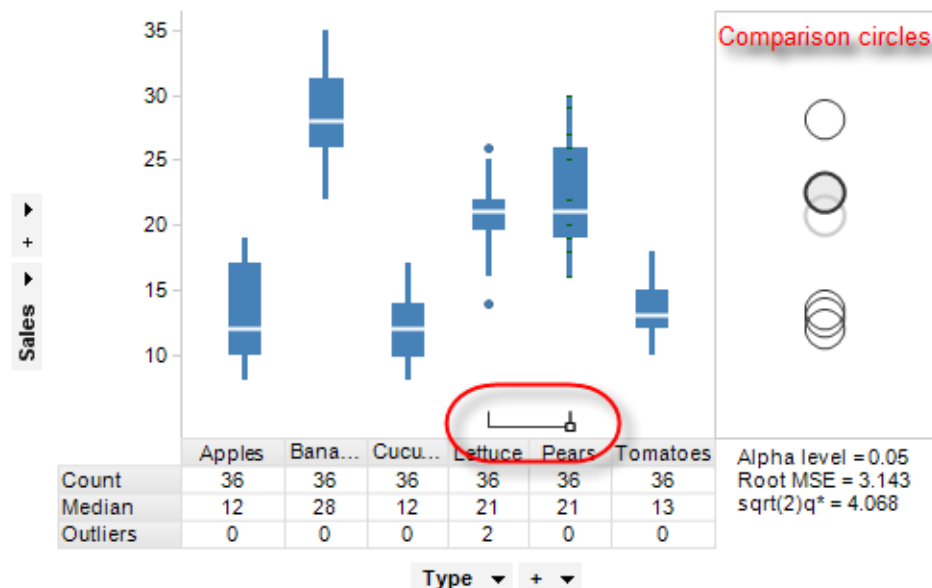


In the example above, the sum of sales is shown for a number of different fruits and vegetables. The box for Pears has been marked, which is also indicated in the corresponding comparison circle. The marked comparison circle is shown with a darker border and a transparent fill. By looking at the comparison circles or the little relation indicator at the bottom of the visualization area (circled in red on the image), one can see that the sum of sales for Lettuce does not display a significantly different group mean, whereas the group means for all other fruits and vegetables are significantly different from that of Pears. The square in the relation indicator indicates the marked box and the lines in the relation indicator extend to any boxes that are not significantly different from the marked one.

You can also highlight a comparison circle by highlighting its box plot or vice versa. The highlighted comparison circle is drawn with a double lined border:



**Tip:** You can resize the area containing the comparison circles by placing the mouse pointer over the vertical line separating the circles from the box plots and dragging the handle to the desired position.

# 4.15.4 Box Plot Properties

## 4.15.4.1 Box Plot Properties

The Box Plot Properties dialog consists of several pages:

- General
- Data
- Appearance
- Formatting

- Fonts
- X-axis
- Y-axis
- Reference Points
- Colors
- Tooltip
- Legend
- Trellis
- Statistics Table
- Lines & Curves

### ► To reach the Box Plot Properties dialog:

1. Right-click on the box plot visualization.
2. Select **Properties** from the pop-up menu.

   Comment: You can also click on the box plot visualization to make it active and then select **Edit > Visualization Properties**.

## 4.15.4.2    Box Plot Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the visualization.<br>**Tip:** Double-click on the title bar of the visualization for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the visualization title. |
| **Description** | A description of the visualization. This description can optionally be shown in the legend and/or in the visualization. |

| | |
|---|---|
| **Show description in visualization** | Specifies whether or not to show the description in the visualization. |

## 4.15.4.3 Box Plot Properties - Data



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the visualization will work. |
| **Marking** | Specifies the marking (that is, the color and relationships to other marked items) that will be used to mark items in this visualization. |
| **Limit data using markings** | Lists the available markings that can be used to limit what is shown in this visualization. This means that the visualization only displays data that has been marked in other visualizations. |
| | If more than one marking is selected, you can choose how the data in the markings should be combined. |
| **New...** | Opens the New Marking dialog where you can specify a new marking. |
| | The color and name of a previously created marking is edited in the Document Properties dialog. |
| **Rows must be included in** | Specifies how the data in the markings should be combined if you have selected to limit the data by more than one marking. |
| **All markings (AND)** | Use this option if you want this visualization to show the intersection of the markings selected in Limit data using markings. This can be used if you have two visualizations with different markings and want to see which markers are present in both markings. This visualization will then show only the data that has been marked using both of the selected markings. |

| | |
|---|---|
| **Any marking (OR)** | Use this option if you want this visualization to show the union of the markings selected in Limit data using markings. |
| | This can be used if you have two visualizations with different markings and want to see which markers are present in either of the two markings. This visualization will then show data that has been marked using either of the selected markings. |
| **Limit data using filterings** | Defines how different filtering schemes in the analysis should affect this visualization. |
| | Select **Use the current filtering from the page** if you want the visualization to always utilize the filtering scheme that is used on the page where the visualization is located. If you move the visualization to a new page, then the visualization will automatically start reacting on the filtering scheme that is used on the new page. |
| | Select a specific filtering scheme from the list if you want the visualization to always use that filtering scheme. Moving the visualization to another page with a different filtering scheme will not affect this setting. |
| | If you select to limit data using more than one filtering scheme, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes. |
| **New...** | Opens the New Filtering Scheme dialog where you can specify a new filtering scheme. |
| | The color and name of a previously created filtering scheme is edited in the Document Properties dialog. |
| **Limit data using expression** | You can limit what data should be available for a certain visualization using an expression. If you have defined a limiting expression, it will be displayed here. |
| **Edit...** | Opens the Limit Data Using Expression dialog where you can define a boolean expression to use for limiting the data in this visualization. |

## 4.15.4.4 Box Plot Properties - Appearance



| Option | Description |
|---|---|
| **Box width** | Specifies the width of all box plots. |
| **Jittering outer values** | Displaces outside values and far out values to reveal overlapping. Move the slider to change the level of jittering. |
| **Marker size** | Specifies the size of all outer values. |
| **Show distribution** | Specifies whether or not the distribution of values should be shown as a histogram:<br> |
| **Show 95% confidence interval of the mean** | Select the check box to display the confidence interval in the box plot as a black line next to the box. |
| **Show comparison circles** | Select the check box to display comparison circles in the box plot visualization. See What are Comparison Circles? for more information. |
| **Alpha level** | The level at which the difference between groups would be significant. |

| **Use relative scale** | Sets the max and the min for all box plots to 100% and 0%, respectively. |
| **Show cell borders in statistics table** | Specifies whether or not cell borders should be visible in the statistics table. |

## 4.15.4.5    Box Plot Properties - Formatting



| Option | Description |
|---|---|
| **Axes** | Displays which column and category are currently being used on the Y-axis in the box plot. |
| **Reset** | Resets the formatting for the selected axis values according to the settings defined on column level. If no column formatting has been set, axis formatting settings defined in the Options dialog will be used. If no settings have been specified in the Options dialog, the default settings for the visualization type will be used. |
| **Category** | Lists the available formatting categories for the selected axis. Each category in this list has separate settings. Which categories are available depends on the data type of the selected axis. See Formatting Settings for a full description of all possible options. |

**Note:** These settings affect only the current visualization. For general information about formatting, see Formatting Overview.

## 4.15.4.6 Box Plot Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

### 4.15.4.7 Box Plot Properties - X-axis



| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the X-axis. |
| **Settings...** | Opens the Advanced Settings dialog, where you can change the category mode to determine which combinations to show. In a box plot, the X-axis is always categorical. <br><br> **Note:** If All values in data (nest) or All possible values (cross) are selected, all boxes, even empty ones, will be shown regardless of filtering. The All possible values (cross) option may result in combinations that are practically impossible and will always remain empty. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting boxes in the box plot. |
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.15.4.8    Box Plot Properties - Y-axis
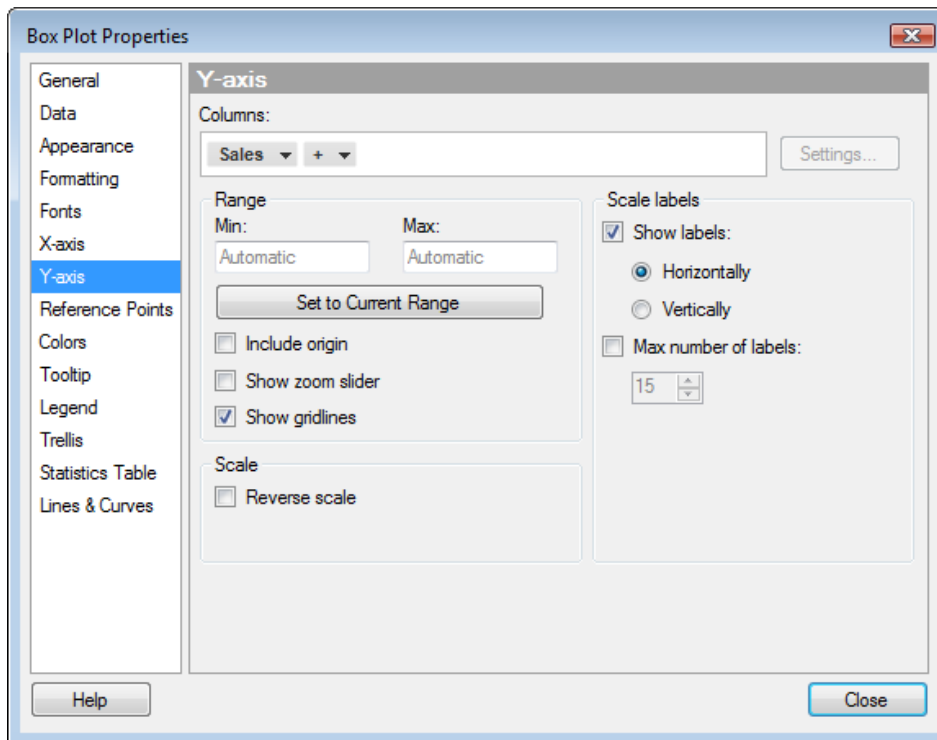


| Option | Description |
|---|---|
| **Columns** | Specifies the column or hierarchy to be displayed on the Y-axis. |
| **Settings...** | [Not available on this axis, since it is always continuous.] |
| **Range** | |
| **Min** | Determines the lower value of the axis range. Leave the field blank to automatically adjust the range to the currently lowest value in the filtered data. |
| **Max** | Determines the upper value of the axis range. Leave the field blank to automatically adjust the range to the currently highest value in the filtered data. |
| **Set to Current Range** | Allows you to set the axis range to the currently filtered values. |
| **Include origin** | Available for continuous axes only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |
| **Show zoom slider** | Shows a zoom slider that you can manually manipulate to view only the interesting segments of the box plot. |
| **Show gridlines** | Specifies whether or not vertical gridlines should be visible. |
| **Scale labels** | |
| **Show labels** | Specifies whether or not scale labels should be visible. |

| | |
|---|---|
| **Horizontally** | Shows scale labels horizontally. |
| **Vertically** | Shows scale labels vertically. |
| **Max number of labels** | Select the check box to specify a maximum number of scale labels to be shown. Limiting the number of labels can improve readability on axis scales with many values. |

**Scale**

| | |
|---|---|
| **Reverse scale** | Reverses the current sort order, so that the lowest value is displayed at the top of the scale. |

## 4.15.4.9  Box Plot Properties - Reference Points



| Option | Description |
|---|---|
| **Show real data points in box plot** | |
| Color | Specifies the color of the selected reference point (the reference point on which you have clicked in the Show real data points in box plots list). |
| Shape | Specifies the shape of the selected reference point (the reference point on which you have clicked in the Show real data points in box plots list). |

| Show abstraction of data ranges in box plot | |
|---|---|
| Color | Specifies the color of the selected reference point (the reference point on which you have clicked in the Show abstraction of data ranges in box plots list). All lines are white by default, and inverted to blue (or the selected box plot color) when outside the box. |
| Shape | Specifies the shape of the selected reference point (the reference point on which you have clicked in the Show abstraction of data ranges in box plots list). |

## 4.15.4.10    Box Plot Properties - Colors



| Option | Description |
|---|---|
| Columns | Specifies the column or hierarchy to color by. |
| Settings | Opens the Advanced Settings dialog where you can change the scale mode for the selected column or hierarchy from continuous to categorical and vice versa, as well as changing the category mode to determine which combinations to show. |
| Color mode | Specifies in which color mode to set up the color scheme. Which modes are available depends on whether the scale is in categorical or continuous mode. For columns in continuous scale mode, you can select one of the following color modes: Gradient, Segments, Fixed, or Unique values. For columns in categorical scale mode, you can select either Categorical or Fixed color mode. To learn more about the color modes, see Color Modes Overview. |

| | |
|---|---|
| **One scale per** | Specifies whether there should be one separate scale per trellis panel for trellised box plots, or if one scale should apply to the entire visualization. Only applicable to columns in continuous scale mode. |
| ▢▾  [Color Schemes menu] | Opens a menu where you can select an already existing color scheme and apply it to the visualization, or apply the currently open color scheme to another visualization in the analysis. |
| **From Visualization** | Lets you select a color scheme from another visualization in the analysis. Only color schemes that are applicable to the current color scheme will be listed. |
| **Document Color Schemes** | Lets you select a color scheme that has previously been saved within the analysis. Only color schemes that are applicable to the current color scheme will be listed. This menu option is only available if one or more document color schemes already exist. |
| [Predefined color schemes] | Lists a number of predefined color schemes. Available for columns in continuous scale mode only. For a full description of the predefined color schemes, see Predefined Color Schemes.  **Tip:** To facilitate setting up a new color scheme, you can open a predefined color scheme with a similar appearance, and then adjust it to suit your needs. |
| **Open from Library...** | Opens the Open from Library dialog where you can select a color scheme that has previously been saved to the library. |
| **Open from File...** | Opens a dialog where you can select a previously saved color scheme. |
| **Save As** | Lets you save a color scheme as a library item, a local file or a document color scheme.  **Library Item** –- Opens the Save as Library Item dialog, where you can specify a location in the library and a file name to save the currently open color scheme for later reuse.  **File** –- Opens a dialog where you can specify a location and a file name to save your currently open color scheme locally on your computer for later reuse.  **Document Color Scheme** –- Opens the Save as Document Color Scheme dialog, where you can specify a name and save the currently open color scheme for later reuse within the analysis. |
| **Apply to Visualizations...** | Opens the Apply to Visualizations dialog where you can select other visualizations (within the analysis) that you want to apply the current color scheme to. Only visualizations with compatible color schemes are listed.  **Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog. |
| [Color scheme area] | The area in the lower part of the dialog shows the current color scheme. That is, the colors and values currently used in the visualization. You can modify color schemes in numerous ways to give the visualization the appearance you prefer. The color scheme area will look different, and have different available settings, |

depending on the characteristics of the column used to color the visualization by, as well as the selected color mode. To learn more about color schemes and color modes, see Color Schemes Overview and Color Modes Overview respectively.

**Add Point**   Available for continuous columns only. Adds a new anchor point to the color scheme.

**Delete Point**   Available for continuous columns only. Deletes the selected anchor point.

**Add Rule...**   Opens the Add Rule dialog where you can define a rule that functions as an exception to the rest of the defined color scheme. A rule has higher priority than the rest of the color scheme. For example, you can define a rule to give the top five items in your data a different color than the rest of the items. If you add many rules to a color scheme, the rules are prioritized from top to bottom. Which rule types are available depends on the characteristics of the column or hierarchy used to color the visualization by. See Details on Add/Edit Rule for full descriptions of the rule types.

**Reset**   Resets the color scheme to the one that was in effect when the visualization was created. Any added rules will be removed. Which color scheme should be used by default when you create a new visualization is defined in the Visualization page of the Options dialog.

## 4.15.4.11   Box Plot Properties - Tooltip
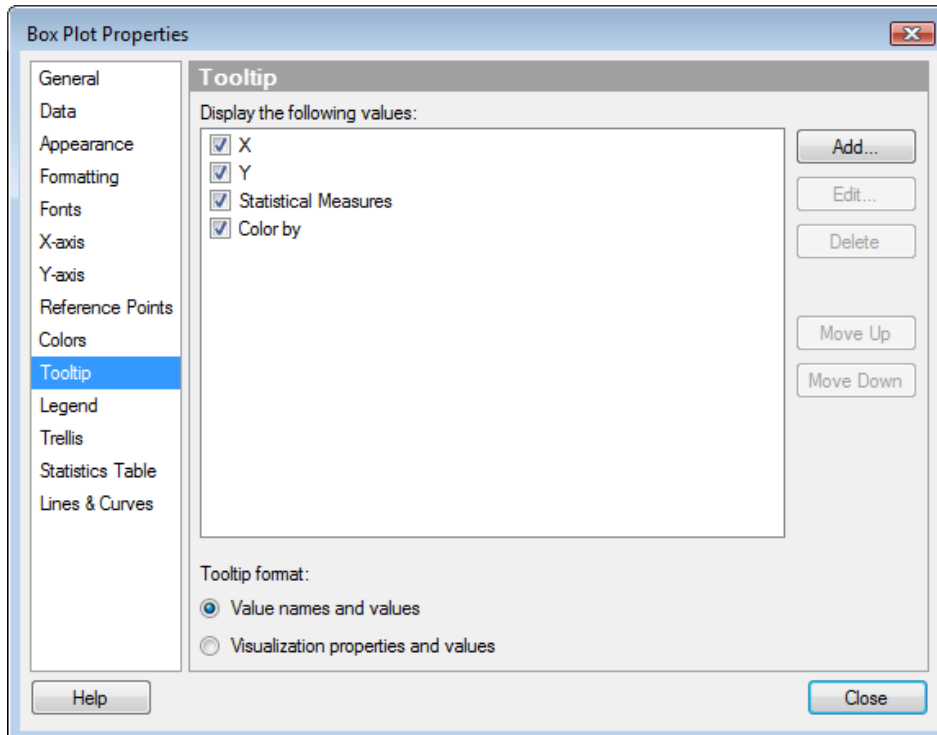


| Option | Description |
|---|---|
| **Display the** | Specifies what will be shown in the tooltip. |

**following values**

| | |
|---|---|
| **Add...** | Opens the Add Tooltip Value dialog, where you can add the content from another column, hierarchy, or any custom expression to be shown in the tooltip. You can also use images in tooltips. See Highlighting in Visualizations for more information. |
| **Edit...** | Opens the Edit Tooltip Value dialog, where you can change the information to be shown in the tooltip. |
| **Delete** | Deletes the selected value from the list. |
| **Move Up** | Moves the selected value up in the list and, hence, up in the tooltip. |
| **Move Down** | Moves the selected value down in the list and, hence, down in the tooltip. |

**Tooltip format**

| | |
|---|---|
| **Value names and values** | Shows the tooltip content in a format where the selected column name, hierarchy or custom expression is displayed. For example, Year: 2003, Type: Cucumber, etc. |
| **Visualization properties and values** | Shows the tooltip content in a format where the visualization property for each value is displayed. For example, X: 2003, Color: Cucumber, etc. |

## 4.15.4.12    Box Plot Properties - Legend



| Option | Description |
|---|---|
| **Show legend** | Specifies whether or not the docked legend should be shown in the visualization. |

| | |
|---|---|
| **Position** | Specifies which side of the visualization the legend should be positioned: the right-hand side or the left-hand side. |
| **Display the following legend items** | Specifies what will be shown in the legend.<br><br>By clearing a check box you will completely hide that item from the legend. You can also select to show or hide parts of the legend information using the check boxes under Settings for the selected item in the list, see below. |
| **Settings** | Defines how the selected legend item should be displayed. The available options vary between legend items. |
| **Show title** | Use this option to show or hide the title for the selected item. The title is typically what is displayed above an axis selector or similar:<br><br>Color by:<br>Category<br>■ Fruit<br>■ Spices<br>■ Vegetables |
| **Show axis selector** | Select this option to show or hide the axis selector for the selected item.<br><br>Color by:<br>Category<br>■ Fruit<br>■ Spices<br>■ Vegetables |

## 4.15.4.13  Box Plot Properties - Trellis

| Option | Description |
|---|---|
| **Rows and columns** | Splits the visualization into different panels for all categories in the selected column or hierarchy. The number of values in the specified column or hierarchy controls the number of panels to be displayed in each row, column, or page, respectively. |
| **Rows** | A row with trellis panels will be created for each value in the selected column or hierarchy. |
| **Columns** | A column with trellis panels will be created for each value in the selected column or hierarchy. |
| **Pages** | A new page with trellis panels will be created for each value in the selected column or hierarchy. Scroll down in the visualization to see the next page. |
| **Panels** | Splits the visualization into different panels for all categories in the selected column or hierarchy, without binding any dimensions to either rows or columns. This means that the number of actual values in the column to split by does not control the number of shown rows or columns in any way.<br><br>The number of panels that should be visible on each page is instead specified using the Max number of rows and Max number of columns controls below. |
| **Split by** | Specifies the column or hierarchy to define the categories by which the visualization should be split. |
| **Manual layout** | Select the check box to manually specify the number of rows and columns that should be visible without scrolling. If the check box is cleared, the application will automatically specify the number of rows and columns. |
| **Max number of rows** | Specifies the maximum number of panels that should be visible on each page. |
| **Max number of columns** | Specifies the maximum number of panels that should be visible on each page. |
| **Settings...** | Opens the Advanced Settings dialog where you can change the category mode to determine which combinations to show. |

## 4.15.4.14    Box Plot Properties - Statistics Table



| Option | Description |
|---|---|
| **Available measures** | Lists all statistical measures which can be shown in the statistics table. |
| **Selected measures** | Lists the statistical measures selected to be displayed in the statistics table. |
| **Add >** | Adds the measures selected in the Available measures list to the Selected measures list. |
| **< Remove** | Removes the selected statistical measures from the Selected measures list and sends them back to the Available measures list. |
| **Remove All** | Removes all statistical measures from the Selected measures list. |
| **Move Up** | Moves the selected measures up in the Selected measures list. The order of the measures in this list determines the order of the measures in the statistics table. |
| **Move Down** | Moves the selected measures down in the Selected measures list. The order of the measures in this list determines the order of the measures in the statistics table. |
| **Sort by** | Specifies the measure by which you wish to sort the rows. **Note:** If trellising is applied, then this setting is ignored, since it is not possible to sort the measures for trellised categories. |
| **Ascending** | Sorts the measures from the lowest to the highest value. |

| | |
|---|---|
| **Descending** | Sorts the measures from the highest to the lowest value. |

## 4.15.4.15    Box Plot Properties - Lines & Curves



### First part of the dialog

| Option | Description |
|---|---|
| **Visible lines and curves** | Lists the currently added lines and curves. If a checkmark is shown in the check box, then the reference line is shown in the visualization. Clear the check box to hide a line or curve.<br><br>New lines and curves can be added to this list by clicking on the Add button; see below. |
| **Add** | Displays a menu where you can select which type of line or curve to add to the list of available lines and curves, and in some cases, opens a dialog where you can specify settings to use for that line or curve.<br><br>For more information about the different curve types, see Curve Fit Models. |
| **Edit...** | Opens a dialog where you can change the settings for the selected line or curve (when applicable). |
| **Remove** | Removes the selected line or curve from the list of available lines and curves. |

| | |
|---|---|
| **More** | |
| Duplicate | Duplicates the currently selected line or curve. This can be particularly useful if you want to add one static curve that is calculated on the whole data set (select the Update curve manually check box) and another one that is changed upon filtering (default). |
| Export Curve Fit Result... | Opens a dialog where you can choose to export the curve fit result for the selected curve to a text file or to Microsoft® Excel®. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file, which contains a bit more information about the columns (types, etc.). The Excel file can be either an XLS file or an XLSX file. |

**Settings**

| Option | Description |
|---|---|
| Appearance | Determines the color, style and width of lines and curves, and the color, style and size of points. |
| Place in | Select whether to place the line, curve or point in the Foreground or Background of the visualization. |
| Transparency | Determines the transparency of the selected line, curve or point. That is, the degree to which the markers can be seen through it. The transparency is strongly connected to the color. |
| Label and Tooltip | Opens a dialog where you can determine what information to show in the label and/or tooltip for the selected line, curve or point. |
| Included in axis range | Sets the automatic zooming so that the line, curve or point is always shown, even if it lies far from the currently filtered values. |
| Update manually | Select the check box to "freeze" the line or curve so that it is not automatically recalculated upon filtering. You can update the line or curve by clicking the Update button below or by right-clicking in the visualization and selecting Update Lines and Curves and clicking on the one you want to update.<br>**Note:** Not applicable for points. |
| Update | When a line or curve has been specified to be manually updated, use this button to perform the update. |
| One per | Determines whether to show one line or curve per Color and/or Trellis panel.<br>**Note:** Not applicable for points.<br>Note that you should apply true categorical coloring before using the color option. If you use a continuous column on the color axis, you may end up with a different result than the expected. This applies even if the continuous color mode looks "categorical" at first sight. |

## 4.15.4.16  Details on Alpha Level

This dialog is shown when you have selected to specify a different alpha level for the comparison circles, other than the predefined options.
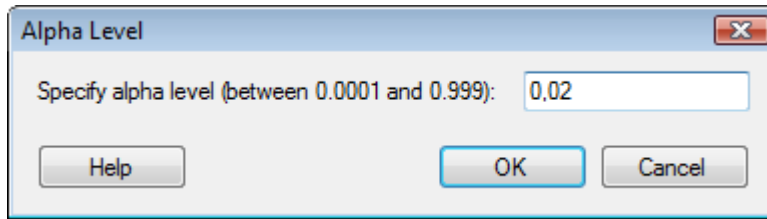
| Option | Description |
|--------|-------------|
| **Specify alpha level (between 0,0001 and 0,999)** | The level at which the difference between groups would be significant. See Comparison Circles Algorithm for more information. |

## 4.15.5 Statistical Measures Overview

TIBCO Spotfire contains several visualizations and tools which calculate various measures. For a description of each measure, see the corresponding section.

**Note:** For measures where a large statistical selection is needed, the result from a calculation may vary with the number of available values.

## 4.15.6 Comparison Circles Algorithm

The drawing of comparison circles is a way to display whether or not the group means for all pairs are significantly different from each other. The Tukey-Kramer method is used for the calculation. Each group (each box plot) gets a circle where the center of the circle is aligned with the group mean value. The radius of the circle, $r_i$, is calculated as follows:

$$r_i = \left| \frac{q}{\sqrt{2}} \right| \sqrt{\frac{MSE}{n_i}}$$

where

- MSE is the mean standard error (the pooled sample variance) for each box:

$$MSE = \frac{1}{v} \sum_{j=1}^{K} (std)^2 (n_j - 1)$$

- v is the degrees of freedom:

$$v = \sum_{j=1}^{K} (n_j - 1)$$

- $n_j$ is the number of records in the group (count)
- K is the number of groups
- $q = \sqrt{2} |q *|_{\alpha, K, v}$ where q* is the critical value and q is the upper alpha quantile of the Studentized range distribution with K groups and v degrees of freedom. The alpha level is specified in the Visualization Properties dialog. For details on how the quantile is calculated, see Statistical Measures Overview. The value of q is calculated and updated each time the filtering of the axis is changed.

If the circles for different groups do not overlap (or that the external angle of intersection is less than 90 degrees) the means of the two groups are generally significantly different. If the circles have a large overlap, the means are not significantly different.

The explanation to why the overlap defines whether or not group means are significant can be deduced with the Pythagorean Theorem.

| Comparison circles | Mathematical expression | Interpretation |
|---|---|---|
|  | $$\lvert \bar{x}_1 - \bar{x}_2 \rvert > \sqrt{r_1^2 + r_2^2}$$ | The groups are significantly different. |
|  | $$\lvert \bar{x}_1 - \bar{x}_2 \rvert = \sqrt{r_1^2 + r_2^2}$$ | Borderline significantly different. |
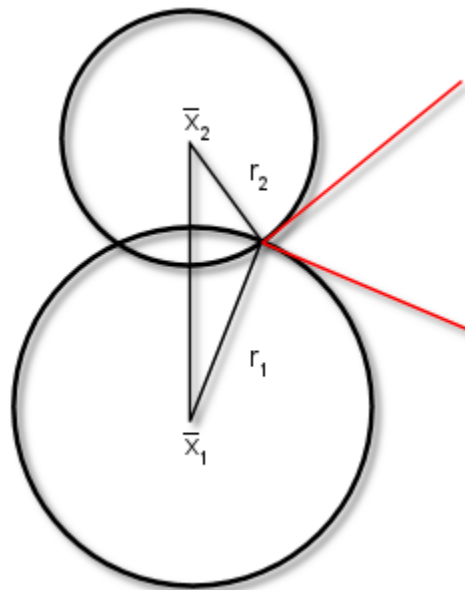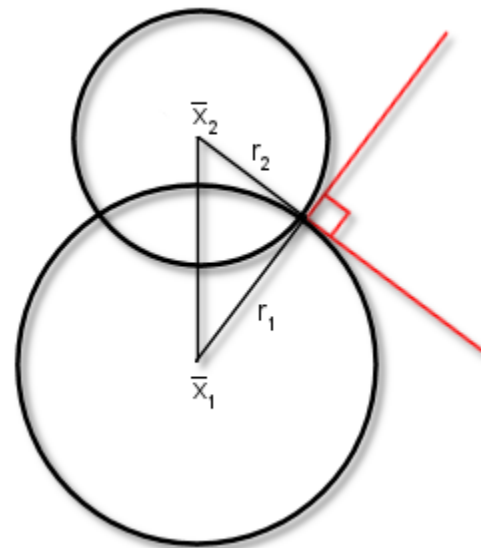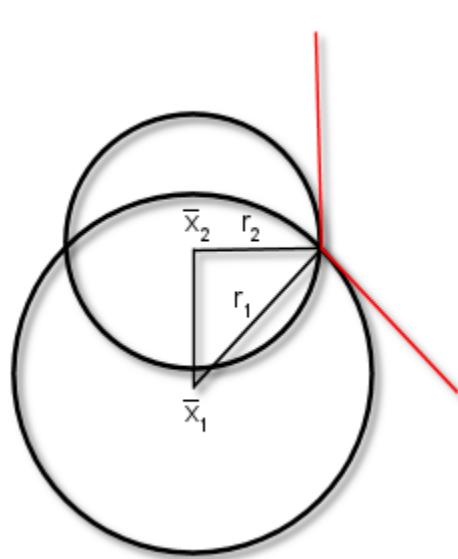
$$|\bar{x}_1 - \bar{x}_2| < \sqrt{r_1^2 + r_2^2}$$

The groups are not significantly different.

## References

http://lib.stat.cmu.edu/general/qprob

Sall, J. (1992), "Graphical Comparison of Means" Statistical Computing and Statistical Graphics Newsletter, 3, pages 27-32.

# 4.16    Text Area

## 4.16.1    How to Use the Text Area

The text area is not a visualization as such, but it can be placed within a page just like a bar chart or scatter plot. The text area is where you can provide text, images and links or buttons that you think are helpful for other users opening your analysis. You can provide information on the purpose of a page, or maybe state the observations you have made so that other people can verify or comment on your findings. See Visualization Layout for more information on how to position the text area in a page.

There are several different types of content you can add to a text area:

- **Text** - text can be formatted to your liking, by changing the font, color, alignment, etc. You can also add links leading to an external web page.

- **Images** - images can be inserted into the text area in GIF, BMP, PNG or JPG format. Regular images are added using Insert Image, but you can also add images that behave like action controls when clicking on them, see below.

- **Action controls** - you can add links, buttons or images that perform a certain action or series of actions to the text area. For example, an action link can switch to a different page or apply a bookmark. It can also refresh a data function calculation or run a script. This could be very handy if you intend to share your analysis with other people. You could, for example, write instructions in a text area, and include links to any operations you want them to perform, such as: "...and when you are done filtering, refresh the calculation." And clicking on the link would launch a predefined data function calculation.

- **Property controls** - you can add a number of different items that control the values of selected properties. This could be drop-down lists, list boxes or sliders with predefined values. You can also add manual input fields where anything can be entered, or you could simply add a label displaying the value of a specified property.

- **Filters** - if you only want to display a few filters in your analysis, you can add those filters to a text area and save screen estate by closing the filters panel. Filters in the text area can also be set up to use a different filtering scheme than the one used on the rest of the page. This could be useful if you have selected to limit one or more visualizations on a page by some other filtering scheme than the one used on the page.

- **Dynamic items** - dynamic items are small "visualizations" that can live within a text area or in a graphical table. When included in a text area they represent an aggregated view of some data. For example, this could be a calculated value displaying the total sum of sales. The dynamic items can be set up to respond to the page filtering, some other filtering or no filtering. They can also be limited by markings in other visualizations, similar to details visualizations. Currently, the available dynamic items are sparklines, calculated values and icons.

► **To insert a text area on a page:**

1.    Click on the New Text Area button on the toolbar, ▣.
      Comment: You can also select **Insert > New Text Area** from the menu.
      Response: A blank text area is created.

► **To edit the text area:**

1.    Click on the Toggle Edit Mode button, ✎, in the text area title bar.
      Comment: You can also right-click in the text area and select **Edit Text Area** from the pop-up menu.
      Response: The Text Area edit mode is toggled on and off.

2. You can now type text directly in the text area, or add any type of dynamic controls by clicking on the corresponding button in the text area toolbar.

Comment: See Text Area Edit Mode for more information about the available tools. Double-clicking on a control while the text area is in edit mode opens the corresponding dialog for editing.

3. To edit the title and set whether or not to show the title bar, right-click and select **Properties** from the pop-up menu.

4. Click on the toggle edit mode button again when you are finished.

### ► To add an image to the text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.

2. Click on the Insert Image button, ▣.

Response: A dialog is opened where you can browse to the image of your choice.

3. Select an image and click **Open**.

Comment: You can also copy and paste an image from another application.

**Note:** If you want to use the image as an action control you should follow the steps below instead.

### ► To add a property control to the text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.

2. Click on the Insert Property Control button, ▣▾, and select which type of control to add.

Comment: You can choose from a number of different controls.

Response: The Property Control dialog is displayed. There you can select which property to work on and determine which options will be available for selection.

3. Now you can use the property in the analysis, such as on a visualization axis, for example. Each time the property control is changed, all visualizations that use the property will be updated.

**Note:** Make sure that you type some information explaining what the property control will actually do if the analysis is going to be opened by other users (for example, in TIBCO Spotfire Web Player).

See Using Properties in the Analysis for examples of how you can use property controls.

### ► To add a web link to the text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.

2. Click on the Insert Web Link button, ▨.

Response: The Insert Web Link dialog is displayed.

3. Type a **Text to display**.

Comment: If you had previously selected a text, then this text is already present in the dialog.

4. Type or paste a web address in the **Address** field.

Comment: This could be either an ordinary web address, a mailto link opening an empty email for a specified person or a tibcospotfire link to a related analysis.

5. Click **OK**.

### ► To add a bookmark button, link or image action control to the text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.

2. Click on the Insert Action Control button, .

   Response: The Action Control dialog is displayed.

3. Click on **Actions** in the left-hand panel.

   Comment: On this page, you can add multiple actions to a single control, but you can also choose to add a single action, such as a bookmark or a page shift.

4. Type a **Display text** to be shown in the text area.

5. Select a **Control type**: Button, Link or Image.

6. In the Available actions list, click on the plus sign to expand the **Bookmarks** group.

7. Click to select the bookmark you wish to add, then click on **Add**.

   Comment: You can also double-click on the bookmark to add it to the Selected actions list.

   Comment: If you wish to add more items to the action control, select them in the Available actions list and click Add.

8. Click **OK**.

► **To add a page-switch button, link or image action control to the text area:**

1. Click on the Toggle Edit Mode button, ✏, in the text area title bar.

2. Click on the Insert Action Control button, .

   Response: The Action Control dialog is displayed.

3. Click on **Actions** in the left-hand panel.

   Comment: On this page, you can add multiple actions to a single control, but you can also choose to add a single action, such as a bookmark or a page shift.

4. Type a **Display text** to be shown in the text area.

5. Select a **Control type**: Button, Link or Image.

6. In the Available actions list, click on the plus sign to expand the **Pages and Visualizations** group.

7. Click to select the page to which you wish to switch, then click on **Add**.

   Comment: If you wish to add more items to the action control, select them in the Available actions list and click Add.

8. Click **OK**.

► **To add a multiple actions button, link or image action control to the text area:**

You can add multiple actions from the Actions page to a single button or link. However, it is not possible to mix actions from different pages (actions, scripts and data functions) in one action control.

1. Click on the Toggle Edit Mode button, ✏, in the text area title bar.

2. Click on the Insert Action Control button, .

   Response: The Action Control dialog is displayed.

3. Click on **Actions** in the left-hand panel.

4. Type a **Display text** to be shown in the text area.

5. Select a **Control type**: Button, Link or Image.

6. In the Available actions list, click on the plus sign to expand the group of interest.

7. Click to select the action you wish to add, then click on **Add**.

8. Repeat steps six and seven to add more actions.

Comment: The actions will be performed in the order from top to bottom of the Selected actions list. It is possible to rearrange the actions in the list by clicking on them and selecting Move Up or Move Down.

9. Click **OK**.

### ► To add a script button, link or image action control to the text area:

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.

2. Click on the Insert Action Control button, 🔲.

   Response: The Action Control dialog is displayed.

3. Click on **Script** in the left-hand panel.

4. Type a **Display text** to be shown in the text area.

5. Select a **Control type**: Button, Link or Image.

6. In the **Available scripts** list, click on the script of interest.

   Comment: To define a new script, click **New...**. For more information regarding scripts, see Using Scripts in the Text Area.

7. Click on each parameter (if there are any) in the **Necessary input for the selected script field** and specify the **Input for the selected parameter**.

   Comment: If the script needs some kind of input values, then these must be specified before the script can be executed. Examples of input could be a text value or a specification of a visualization or a page to work with.

8. When all script parameters have been defined, click **OK**.

   Response: The action control is added to the text area.

9. Click on the Toggle Edit Mode button, ✐, in the text area title bar, to turn off the Edit mode.

### ► To add a data function button, link or image action control to the text area:

Once executed in the document, data functions can also be refreshed by an action link or button in a text area. This can be a way to make it easier for other users of the analysis to find and use the data function. For example, if the data function has been set up to work with filtered rows, many people can access the analysis, filter to their special area of interest and click on a button to receive calculation results relevant for them.

1. Create an analysis where the data function can be used and run the data function from the Insert menu as described in How to Use Data Functions.

   Comment: This is done in order to make the current document aware of the data function.

2. Create a text area and enter edit mode by clicking on the Toggle Edit Mode button, ✐.

3. Click on the Insert Action Control button, 🔲.

   Response: The Action Control dialog is displayed.

4. Click on **Data Function** in the left-hand pane.

5. Type a **Display text** to use on the button or link.

6. Select the **Control type** to use: Button, Link or Image.

7. Click to select the data function of interest from the **Available data functions** list.

   Comment: Only data functions that have been executed from within the current document and do not use automatic refresh will be available.

8. Click **OK**.

   Response: The button or link is added to the text area.

### ► To add a filter to the text area:

1. Click on the Toggle Edit Mode button, ⬦, in the text area title bar.

2. Click on the Insert Filter button, ▽.
   Response: The Insert Filter dialog is displayed.

3. Select the filtering scheme to use from the **Filtering scheme** drop-down list.

4. Select which filter to insert by clicking on it in the **Filter** list.

5. Click **OK**.

6. Click on the Toggle Edit Mode button, ⬦, in the text area title bar, to turn off the Edit mode.
   Response: The filter is added to the text area.

### ► To add a sparkline, a calculated value or an icon to the text area:

1. Click on the Toggle Edit Mode button, ⬦, in the text area title bar.

2. Click on the Insert Dynamic Item button, ⬦▾, and select which item to add.
   Response: The Settings dialog for the selected item is displayed and the dynamic item is added to the text area. For sparklines and icons, a gray edit box representing the placement and size of the dynamic item is shown in the text area. The name and type of the dynamic item is displayed in the edit box to help identifying those items.

3. Make the necessary changes to set up the dynamic item the way you want it.
   Comment: See How to Use Sparklines, How to Use Calculated Values or How to Use Icons for more details.

4. Click **OK**.
   Response: The settings dialog is closed.

5. Click on the Toggle Edit Mode button, ⬦, in the text area title bar, to turn off the Edit mode.
   Response: The item is shown in the text area.

### ► To change the font, style and size of text in the text area:

To change the appearance of text that is typed directly in the text area and web links, use the text area toolbar. Other texts, such as the texts included in property controls, action controls, or dynamic items are modified from the Format Control dialog. Which settings are available in the dialog depends on the type of control or item. Note that text in filters and sliders cannot be edited.

1. Click on the Toggle Edit Mode button, ⬦, in the text area title bar.

2. Right-click on the control or item of interest, and select **Format Control...** from the pop-up menu.
   Response: The Format Control dialog is opened.

3. Adjust the settings in the dialog to your liking.

4. Click **OK**.
   Response: The new settings are applied to the selected control or item.

5. Click on the Toggle Edit Mode button, ⬦, in the text area title bar, to turn off the Edit mode.
   Response: The Edit mode is closed and you see the final result.
   **Note:** When working with calculated values, make sure you do not unintentionally override any font style settings that have been defined in a rule.

### ► To change the size of a sparkline or an icon in the text area:

1. Click on the Toggle Edit Mode button, ⟋, in the text area title bar.

   Response: The outline of the sparkline or icon is shown as a gray box.

2. Click on the gray edit box to select it and drag either of the corners to resize the box.

   Comment: The size slider within the Icons page of the Icon Settings dialog can only resize the icon within the current edit box.

3. Click on the Toggle Edit Mode button, ⟋, in the text area title bar again.

   Response: The Edit mode is closed and you see the final result.

   Comment: You can always reset the size of the sparkline or icon to the original size if you change your mind. Just open the Format Control dialog by right-clicking on the gray box, click on the Reset button and then OK, and the size will be reset.

### ► To change the size of filters and controls in the text area:

1. Click on the Toggle Edit Mode button, ⟋, in the text area title bar.

2. Click on the control (if it is a filter, click on the gray edit box representing the filter) to select it and drag either of the corners to resize the box.

   Comment: Filters cannot be resized in the vertical direction, only the width will be changed.

3. Click on the Toggle Edit Mode button, ⟋, in the text area title bar again.

   Response: The Edit mode is closed and you see the final result.

   Comment: You can always reset the size of the filter or control to the original size if you change your mind. Just open the Format Control dialog by right-clicking on the filter or control, click on the Reset button and then OK, and the size will be reset.

### ► To change the default font, style and size for the text area:

The default font is used in the property controls and on action buttons.

1. Select **Tools > Options**.

   Response: The Options dialog is displayed.

2. Click on **Fonts.**

3. Under **Settings for**, click to select **Text area content**.

4. Select a **Font**.

5. Select a **Size**.

6. Click **OK**.

   Response: Property controls and action buttons in all new text areas will use the new default font. Note that previously created text areas in your document will not be affected by this change.

   Comment: To apply the font settings to already existing texts, you can click on the Apply to Document... button to open the Apply Font Settings to Document dialog. The dialog allows you to update the text styles in all visualizations on one or more pages at the same time. Using this dialog to adjust the fonts in the analysis will override any settings you may have made directly in a visualization.

### ► To use the 3.0 text area:

In TIBCO Spotfire 3.1, a new version of the text area was created in order to allow the use of property controls and script actions in the text area. However, the function links to tools previously available in the text area can no longer be added to a version 3.1 text area. If you need that type of functionality, for example, to use some of the tools of the TIBCO Spotfire Connector for Pipeline Pilot, you can revert to using 3.0 text areas in your document.

1. Select **Tools > Options**.

   Response: The Options dialog is displayed.

2. Click on **Compatibility.**

3. Select the **Use 3.0 text area** check box.

   Comment: Note that while this check box is selected you cannot add script action controls and property controls in new text areas. See the 3.0 Text Area help section for an explanation of the available functionality.

4. Click **OK**.

   Response: All new text areas created in the document will be of the 3.0 version. Note that previously created text areas in your document will not be affected by this change. This means that you can create documents where some text areas use the old style and some use the new style.

### ► To migrate content between different text area versions:

If you use an analysis file created before version 3.1, then the text area will be of the old 3.0 style. You cannot convert a text area from one text area version to another directly, but it is possible to use the check box described above to switch between the versions when creating new text areas. This way, you can create a new text area, copy the text and images used in the first version and paste it in a text area of the other version.

## 4.16.2    Text Area Edit Mode

The text area can only be edited when the Toggle Edit Mode button, $\diagup$, in the visualization title bar has been clicked, or, when **Edit Text Area** has been selected from the pop-up menu.

When in edit mode, you will see a toolbar at the top of the text area where a number of options are available:

| Option | Description |
| --- | --- |
| ✂ | Cuts the selected object from the current position, to be pasted somewhere else. |
| 🖺 | Copies the selected object. |
| 📋 | Pastes the selected object in the text area. |
| **Font** | Specifies the font of the text. |
| **Size** | Specifies the font size of the text. |
| **B** | Sets the selected text to boldface. |
| *I* | Sets the selected text to italics. |
| U | Underlines the selected text. |
| 🎨 | Opens the Color dialog where you can specify the text color. |
| ≡ | Aligns the selected paragraph to the left of the text area. |
| ≡ | Aligns the selected paragraph to the center of the text area. |
| ≡ | Align the selected paragraph to the right of the text area. |

| | |
|---|---|
| | Creates a numbered list of the selected paragraph. |
| | Creates a bulleted list of the selected paragraph. |
| | Removes the indent characters from the selected text. |
| | Indents the text of the selected paragraph. |
| | Opens a dialog where you can browse to locate an image to insert. Including images can be very costly to memory, so it is recommended to keep images small. |
| | Opens the Insert Web Link dialog where you can type or paste the link to any website which might be of interest for the analysis. You can also use this button to add a mailto link opening a new message in your standard email client, or a tibcospotfire link which links to a different analysis.<br><br>Examples:<br>http://www.tibco.com<br>mailto:person@example.com?subject=Test<br>tibcospotfire:server:http\://myspotfireserver/:analysis:/Data/My Analysis |
| | Removes the web link but leaves the text intact. |
| | Opens the Insert Filter dialog where you can select a filter to add to the text area. |
| | Opens the Action Control dialog where you can insert an action link or button which applies a bookmark, switches page or runs a script, etc. |
| | Opens the Property Control dialog where you can insert input fields, drop-down lists, list boxes, etc., which can easily change the values of custom properties. |
| | Allows you to insert a dynamic item (a sparkline, a calculated value or an icon) into the text area. |

To change the name of the Text Area, or to show or hide the title bar, right-click on the text area and select Properties.

## 4.16.3    Using Properties in the Analysis

Properties can control one or many settings by being applied in custom expressions. For example, a document property can be used to specify a column name. This property can then be used to define what is shown on one or more visualization axes, either directly or as a part of a custom expression. By using a property instead of simply placing the column name directly on the axes, you only need to change a single value (the property value) in order to change all axes where the property is used. Adding a property control that can change the property value further simplifies the update process.

Since the property controls are available in Spotfire Web Player, this also gives the Web Player users a possibility to change the axes of visualizations. Property expressions can also be used to define a line or a curve. If a property used in expressions is updated, the property will be updated in all currently used locations.

► **To use a document property to control column selection on an axis:**

1. Create one or more visualizations.
2. Right-click on the axis selector for the axis of interest and select **Set from Property...** from the pop-up menu.

   Response: The Set from Property dialog is displayed.
3. In the **Select the property to use** list, click to select the property of interest.

   Comment: If you have not previously created a property, click New... to define a new property. Note that this type of property can only be of the data type **String**.
4. Click **OK**.

   Response: The visualization axis uses the default value of the property.

► **To use a document property as a part of a multiple columns custom expression:**

When properties are added to a custom expression using the Insert Properties button they are by default inserted as text. However, you may need to manually edit the expression syntax. For more information about the different syntaxes see Properties in Expressions.

1. Create one or more visualizations.
2. Right-click on the axis selector for the axis of interest and select **Custom Expression...** from the pop-up menu.

   Response: The Custom Expression dialog is displayed.
3. In the list of **Available properties**, right-click on the property of interest.

   Comment: If you have not previously created a property, you can right-click in the Available properties list and select New > Document Property... to define a new property. Note that the data type of this type of property must be **String**.

   Response: A pop-up menu is displayed.
4. Select **Insert as Text** from the pop-up menu.

   Response: The property is added to the expression using the text syntax. For example, ${MyProperty}.
5. You can add more properties to the expression by repeating the steps above. To interpret each property as one column, you also need to separate the properties with a comma:

   ${MyProperty}, ${MyProperty2}, ${MyProperty3}
6. If desired, you can edit the expression for more complex calculations. For just a simple property-controlled multiple columns axis, click **OK**.

   Response: The visualization axis uses the default value of the properties.

► **To add a drop-down list that changes a property holding a column name:**

1. Create a text area where you want the control to reside.
2. Click on the Toggle Edit Mode button, ✎ , in the text area title bar.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
3. Type some descriptive text in the text area regarding what the control will do.

   Comment: This can be important to help other users of the analysis file understand what will happen when they change the selection of the control.
4. Click on the Insert Property Control button, 🔲▾, and select the **Drop-down list** option.

   Response: The Property Control dialog is displayed.
5. Click to select the property of interest in the **Select property** list.

Comment: Use the search field if you cannot find your property. You can also specify a new property by clicking New....

6. Select **Set property value through: Column selection**.

Comment: This will create a drop-down list control where you can choose from a number of columns in the data table.

Response: The Settings part of the dialog will show the settings needed for the Column selection option.

7. If more than one data table is available in the analysis, select the **Data table** to work on.

Response: The columns from the selected data table are shown in the Selectable columns list.

8. If you do not want all columns to be available in your drop-down list, type a search expression that displays only the columns of interest.

Comment: For example, use "datatype:integer" to show integer columns only, use "datatype:real" to show real columns only, use "A or B" to show columns beginning with the letters A or B only, etc. You can also search for a particular column property. The Select Columns dialog is a shortcut to creating column properties and selecting columns based on these properties. For example, use "included.column:true" if you have added a custom column property called included.column with the default value false and the value true for those columns you want to be available. See also Searching in TIBCO Spotfire for more information about valid search expressions.

Response: Only the columns matching the search expression will be visible in the Property Control dialog, and, therefore, only those columns will be available in the resulting drop-down list.

9. Click **OK**.

Response: The drop-down list is added to the text area.

*Column selection* allows you to choose from a list of columns. There are also several other definitions available: *Unique values in column* allows you to choose from the unique values available in a specified column. *Expressions* can be any type of custom expression. *Fixed values* uses a list of predefined values. *Numerical range* is used to set a range of numbers from min to max, each step increased by a specified interval.

## ► **To use a property expression to define a curve:**

A property can either be a string expression in itself, or it can be used as a variable in a custom expression. This step instruction assumes that the property contains a string which is an expression.

1. In the visualization where you want to add the curve, right-click and select **Properties**.

Response: The Visualization Properties dialog is displayed.

2. Click **Lines & Curves**.

3. Click **Add** and select **Curve Draw**.

Comment: Properties can also be used when defining straight lines or in the expressions for curves from data table.

Response: The Curve Draw dialog is displayed.

4. Call the property containing the expression in the Curve expression field using the Text syntax: For example, ${CurveExpression} .

Comment: The document property curve.expression could in this example hold a value such as "2+3*x". The expression could also contain other properties. For example, "2+DocumentProperty("ExpressionConstant")*x". Note that the syntax for calling a property differs when calling it to retrieve the value of the property. See Properties in Expressions for more information regarding the different syntaxes.

5. Click **OK**.

Response: The curve is shown in the visualization.

#### ► To add an input field which updates a document property:

1. Create a text area where you want the input field to reside.

2. Click on the Toggle Edit Mode button, ⌀, in the text area title bar.

   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.

   Response: The text area becomes possible to edit.

3. Type some descriptive text in the text area regarding what the control will do.

   Comment: This can be important to help other users of the analysis file understand what will happen when they change the text in the input field.

4. Click on the Insert Property Control button, 🔲▼, and select the **Input field** option.

   Response: The Property Control dialog is displayed.

5. Click to select the property of interest in the **Select property** list.

   Comment: Use the search field if you cannot find your property. You can also specify a new property by clicking New....

6. Click **OK**.

   Response: The input field is added to the text area.

   Comment: You need to exit the edit mode to use the input field.

   Comment: This type of input field works well together with a button or a link that performs some type of action. For example, a button that updates a visualization title as described in Using Scripts in the Text Area.

## 4.16.4 Using Scripts in the Text Area

You can define your own scripts in TIBCO Spotfire by adding action controls in a text area. The scripts are written in IronPython and they allow you to incorporate simple actions or tools into your analysis without having to deploy complete AddIns to the server. The scripts have full access to the Spotfire API.

To be able to create analyses containing IronPython scripts, you need to belong to the group "Script Author" and have the license function "Author Scripts" under "TIBCO Spotfire Extensions" enabled. Select **Tools > Administration Manager** to make the necessary changes, or contact your Spotfire Administrator to do it for you.

#### ► To add a script action link or button to the text area:

1. Click on the Toggle Edit Mode button, ⌀, in the Text Area title bar.

2. Click on the Insert Action Control button, 🔲.

   Response: The Action Control dialog is displayed.

3. Click on **Script** in the left-hand panel.

4. Type a **Display text** to be shown in the text area.

5. Select a **Control type**: Link or Button.

6. In the **Available scripts** list, click on the script of interest.

   Comment: To define a new script, see Example scripts below.

7. Click on each parameter (if there are any) in the **Necessary input for the selected script field** and specify the **Input for the selected parameter**.

   Comment: If the script needs some kind of input values, then these must be specified before the script can be executed. Examples of input could be a text value or a specification of a visualization or a page to work with.

8. When all script parameters have been defined, click **OK**.

   Response: The action control is added to the text area.

9. Click on the Toggle Edit Mode button, ⌀, in the text area title bar to turn off the Edit mode.

### Example scripts:

Below are more details about how to create and use a few example scripts in TIBCO Spotfire. These steps can also serve as instructions for how you should work when creating your own scripts.

► **To create the "Change visualization title" script:**

1.  In a text area in Edit mode, click on the Insert Action Control button, .

    Response: The Action Control dialog is displayed.
2.  Click on **Script** in the left-hand panel.
3.  Click **New...**.

    Response: The New Script dialog is displayed.
4.  Type the **Script name: Change visualization title**.
5.  In the **Script** field, type or paste your script:

```
visual.Title = title
```

6.  Click **Add...**.

    Comment: You need to specify the type of the parameters used in the script.

    Response: The Add Script Parameter dialog is displayed.
7.  In the **Name** field, type **title**.

    Comment: This is the string parameter containing the visualization title.
8.  From the **Type** drop-down list, select **String**.

    Comment: The title must be a string which can be defined either by a simple text value, a string property or an expression.
9.  If desired, add a **Debug value** which can be used for testing the script.
10. Click **OK**.

    Response: The "title" parameter is added to the Script parameters list.
11. Click **Add...** again, to define the second parameter.

    Response: The Add Script Parameter dialog is displayed.
12. In the **Name** field, type **visual** and select **Visualization** as the **Type**.

    Comment: This parameter is used to point out which visualization to change the title on.

    Select a **Debug value** visualization to use when testing the script.
13. Click **OK**.

    Response: The "visual" parameter is added to the Script parameters list.
14. If desired, test the script by clicking **Run Script**.

    Response: The selected visualization title is updated with the Debug value provided in the Add Script Parameter dialog. Click Undo in the New Script dialog to revert to the old title.
15. Click **OK** to close the New Script dialog.

    Response: The script is added to the Available scripts list in the Action Control dialog and the defined parameters are shown in the Necessary input for the selected script list (as long as the script is selected in the Available scripts list).
16. Continue with To use the "Change visualization title" script below.

**Tip:** To change the title of the active visualization, use the following script:

```
Document.ActiveVisualReference.Title = title
```

### ► To use the "Change visualization title" script:

1. Define a display text and a control type as described in "To add a script action link or button to the text area".

2. Make sure that the "Change visualization title" script is selected.

3. Click on the first parameter, **title**, in the Necessary input for the selected script list.

   Response: The Input for the selected parameter settings for title become available.

4. Determine whether to define the title using a predefined **Value**, a **Property** or an **Expression**.

   Comment: In this example, we will assume that the title is specified using a **Property**.

5. Click **Select Property...**.

   Response: The Select Property dialog is displayed.

6. On the Document Property tab, click **New...**.

   Comment: If a suitable property is already available, you can select it in the list and go to step 10.

   Response: The New Property dialog is displayed.

7. Type a suitable **Property name**, for example, **visualization.title**.

8. From the **Data type** drop-down list, select **String**.

   Comment: The title must be a string.

9. Type a **Value** to be the first (default) value of the property. For example, My Visualization Title.

10. Click **OK**.

    Response: The new property is selected in the Select Property dialog.

11. Click **OK**.

    Response: The Property field in the Action Control dialog is updated to show the expression syntax for the property you just defined.

12. Click **OK**.

    Response: The action control is added to the text area.

13. Click on the Toggle Edit Mode button, ✐, in the text area title bar, to turn off the Edit mode.

14. Test the action control by clicking on it in the text area.

The property controlling the visualization title could in turn be modified using a property control (for example, an input field) in the text area. See Using Properties in the Analysis for examples of how you can add property controls.

My Visualization Title

Change Title

### ► **To create the "Change filtering scheme" script:**

1. In a text area, click on the Insert Action Control button.

   Response: The Action Control dialog is displayed.

2. Click on **Script** in the left-hand panel.

3. Click **New...**.

   Response: The New Script dialog is displayed.

4. Type the **Script name: Change filtering scheme**.

5. In the **Script** field, type or paste your script:

```
from Spotfire.Dxp.Application.Filters import FilterPanel

# Get hold of the filters panel for the current page.
panels = Document.ActivePageReference.Panels
# The return value and out parameters are returned as a tuple
# in IronPython and can be bound with pattern matching.
(found, filterPanel) = panels.TryGetPanel[FilterPanel]()

# Find the filtering selection named "Filters2"
# and set it as current.
for filteringScheme in Document.FilteringSchemes:
    filteringSelection = filteringScheme.FilteringSelectionReference
    if filteringSelection.Name == "Filters2":
        filterPanel.FilteringSchemeReference = filteringScheme
```

   Comment: The included example script expects to find a filtering scheme called "Filters2" and changes the filtering scheme of the active page to the Filters2 filtering scheme.

6. Click **OK** to close the New Script dialog.

   Response: The script is added to the Available scripts list in the Action Control dialog.

7. Continue with To use the "Change filtering scheme" script below.

### ► **To use the "Change filtering scheme" script:**

1. Define a display text and a control type as described in To add a script action link or button to the text area above.

2. Make sure that the Change filtering scheme script is selected.
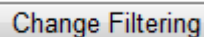
3. Click **OK**.

   Response: The action control is added to the text area.

   Comment: This script requires no input from the end users, but if there is no "Filters2" filtering scheme in the analysis, then nothing will happen when the action control is clicked.

4. Click on the Toggle Edit Mode button, ✎ , in the Text Area title bar, to turn off the Edit mode.

5. Test the action control by clicking on it in the text area.

   Change Filtering

# 4.16.5 IronPython Example Scripts

This topic lists a number of example scripts that can be executed by clicking on action links or buttons in the text area. See Using Scripts in the Text Area for more examples and detailed instructions on how to add scripts to a text area.

## Refresh of calculations, on-demand data and data functions:

```
# Example script that refreshes a table driven by
# a calculation, a data function
# or an information link loaded on demand.
# The script takes a parameter "table" of type DataTable

if table.IsRefreshable and table.NeedsRefresh:
    table.Refresh()
```

## Add columns from an SBDF file to a data table in the current document:

```
# This script adds columns from an sbdf file to a data table
# in the current document.
#
# Four arguments are expected:
#    table - The data table in the current document
#            that columns will be added to.
#    path - The path to the sbdf file with columns to add.
#    ColumnNameInTable - A column in the data table.
#    ColumnNameInFile - A matching column in the sbdf file.
# The columns are used to join new data to the current data.

from Spotfire.Dxp.Data.Import import SbdfFileDataSource
from Spotfire.Dxp.Data import AddColumnsSettings, JoinType,
DataColumnSignature, DataType

# Create the join condition map. The column with the name
# specified in ColumnNameInTable from the current data table
# will be joined with ColumnNameInFile in the sbdf file.

columnInTable = DataColumnSignature(table.Columns[ColumnNameInTable])
columnInFile = DataColumnSignature(ColumnNameInFile, DataType.String)
joinConditionMap = {columnInTable : columnInFile}

ignoredCols = [ ]
settings = AddColumnsSettings( joinConditionMap, JoinType.InnerJoin,
ignoredCols)
ds = SbdfFileDataSource(path)
table.AddColumns(ds, settings)
```

## Use a specific visualization ("Visual") as input and then change the X-axis of the visualization:

```
# Sets the value of the XAxis Expression of a visual.
# This script expects two arguments:
#    visual - The visual to the set the X-axis expression on.
#    expression - The expression to set.

from Spotfire.Dxp.Application.Visuals import VisualContent

# Get the content of the visual. Use the most general type
# so that the script works for all VisualContent classes that
# have an X-axis property.
vc = visual.As[VisualContent]()

vc.XAxis.Expression = expression
```

**Tip:** If the expression parameter is tied to a string property value, you can use a property control (e.g., a drop-down list) with a number of predefined expression alternatives to create an analysis where complex expressions can be assigned to visualization axes in an easy way.

# 4.16.6    Action Script Examples

Actions can be defined on all dynamic items in a graphical table or in a text area. Below is an example of what you can do by setting up an IronPython script action on two dynamic items of the type calculated value in a graphical table.

## Configure Details Visualization Example

This example uses a fictive data table containing sales and cost for a number of products in the different states of USA. The graphical table has been set up to show all states on the Rows axis and two dynamic items of the type calculated value have been added, displaying the sum of sales and the sum of cost, respectively:



Another visualization, a line chart, has been set up to show either the sum of sales or the sum of cost for the marked state in the graphical table over the time, thus displaying the details behind the total sum for each state. In contrast to a standard details visualization controlled by the marking, this visualization will display different data depending on which cell you click on; clicking in the Sales column will show the sales for that state and clicking in the cost column will show the cost.

This is done using an action script on the columns in the graphical table which sets what to show on the Y-axis and automatically limits the line chart by a boolean expression set to display data for the state of the clicked row in the graphical table only. The title of the details visualization is also updated by the script:
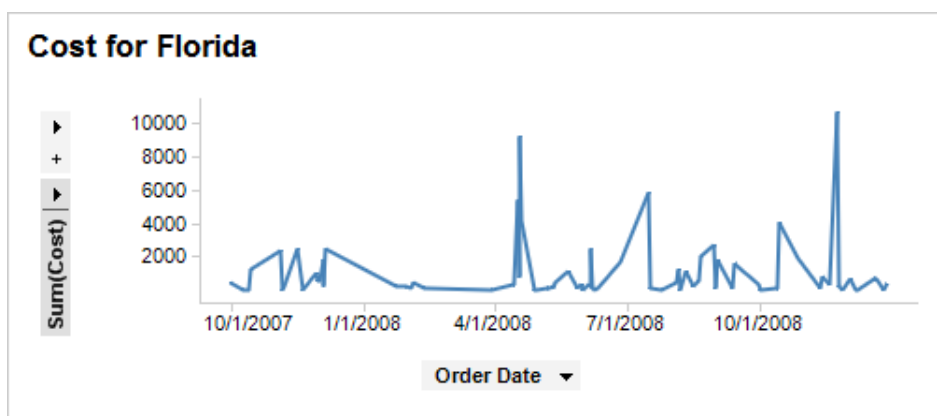
### ► To add the action to the graphical table columns:

1. Open the Calculated Value Settings dialog for the first column and go to the **Actions** page.
2. Select the **Perform action on click** check box.
3. Click on **Settings...**.

   Response: The Action Settings dialog is displayed, providing you with the same options as when inserting action controls in the text area.
4. Go to the **Script** page.
5. Click **New...**.
6. Type a **Script name** (for example, "Configure Details Visualization").
7. Type a **Description** (for example, "Configures a visualization to show details of a graphical table cell.")
8. Copy the script below and paste it into the **Script** field.

   Comment: Note that the example script assumes that a column called "State" is available in the data table.
9. Click **Add...**.
10. Type the **Name** detailsVis, as expected by the script.
11. Let the **Type** be a **Visualization** and select the line chart to use as the details visualization from the list.
12. Click **OK** in all dialogs to close them.
13. Add the defined script to the other column as well, to be able to show either Sales or Cost details in the line chart.

**Script:**

```
# This script is intended to be run as an action on a
# Calculated Value miniature visualization in a graphical
# table.
#
# It expects one Visualization argument, detailsVis, and
# it configures the specified visualization to show details
# for the clicked cell.
#
# When executed as an action in a graphical table,
# the variable Context is bound to an instance of
# MiniatureVisualizationActionContext (see API documentation).

from Spotfire.Dxp.Application.Visuals import VisualContent

# This script assumes that the row axis of the Graphical Table
# is configured with one column: State.
#
# Get the miniature visualization and the value of the row
```

```
# axis hierarchy (the state column) for the clicked cell:

clickedMiniVis = Context.Visualization
state = Context.HierarchyPathValues[0]

# Get the content of the visual that shall be configured to
# show details. Use the most general type so that the script
# works for all VisualContent classes that have a Y-axis
# property. This works well for a Line Chart, for instance.

vc = detailsVis.As[VisualContent]()

# Configure the Title and YAxis of the details visualization:

vc.YAxis.Expression = clickedMiniVis.ValueAxis.Expression
detailsVis.Title = clickedMiniVis.Title + " for " + state

# Limit the data of the details visualization to only use
# data for the selected state:

vc.Data.WhereClauseExpression = "State = \"" + state + "\""
```

# 4.16.7    Details

## 4.16.7.1    Details on Action Control

This dialog is used for adding or editing action links or buttons in a text area. The action controls can open TIBCO Spotfire tools that work on the range of filtered or marked data, apply bookmarks, or navigate to a certain page or visualization in the analysis. Multiple actions can be performed in just one click. It is also possible to add your own custom actions using the IronPython scripting functionality, or to refresh data function calculations.

### ► To reach the Action Control dialog:

1. Click on the Toggle Edit Mode button, ✎, in the text area title bar.
   Comment: You can also right-click in the text area and select **Edit Text Area** from the pop-up menu.
2. In the **Text Area toolbar**, click on the Insert Action Control button.

### Actions

Select this option to insert an action which includes displaying or hiding panels, performing various operations on marked rows, applies bookmarks or switches pages.

| Option | Description |
|---|---|
| **Display text** | The text that will be displayed for the link or on the button. |
| **Control type** | Specifies whether to use a button, link or an image to execute the action. |
| **Image** | Enabled if the control type selected above is an image. Displays the path to the selected image. |
| **Browse...** | Opens a dialog where you can browse to an image to use as the action control. Clicking on the image in the text area will execute the specified actions. |
| **Available actions** | Lists all actions that can be included in a multiple action link, grouped by type. Click on the plus sign to expand a group. Click on an action (a function, a bookmark or a page) to select it. |
| | **Comments about bookmarks:** |
| | For bookmark components, the active visualization always takes precedence over the active page. |
| | The filter settings of the active filtering scheme are changed, including the setting determining how related data tables are affected by each other's filtering. |
| | The markings component of a bookmark takes the analysis back to the state all markings had when the bookmark part was captured. If a marking has been removed, that marking is simply ignored. |
| | **Comments about marked rows:** |
| | The marking applied when adding any of the Marked Rows functions is the one used by the active data table. The active data table is the one |

| | |
|---|---|
| | used by the visualization that was active before clicking on the text area. If the marking for the active visualization is set to (None), nothing will happen when clicking on the link. |
| **Add** | Adds the selected action to the Selected actions list. |
| **Remove** | Removes the selected action from the Selected actions list. |
| **Selected actions (applied in top-bottom order)** | Lists the added actions in the order that they will be performed. |
| **Settings...** | Opens the Settings dialog for the action selected in the Selected actions list (when applicable). |
| **Move Up** | Moves the selected action up in the list. |
| **Move Down** | Moves the selected action down in the list. |

## Script

Select this option to insert a link or a button that executes a script when clicked.



| Option | Description |
|---|---|
| **Display text** | The text that will be displayed for the link or on the button. |
| **Control type** | Specifies whether to use a button, link or an image to execute the action. |
| **Image** | Enabled if the control type selected above is an image. Displays the path to the selected image. |

| | |
|---|---|
| **Browse...** | Opens a dialog where you can browse to an image to use as the action control. Clicking on the image in the text area will execute the specified actions. |
| **Available scripts** | Lists all currently defined scripts. |
| | The Remark field can contain information about whether a script is trusted or not. All scripts that you have created yourself will be trusted. As are all scripts that are included in analyses that have been published to and opened from the library. However, if you should receive an analysis file containing a script directly from another person, the script will be listed as "Not trusted". This does not mean that the script necessarily contains any unsafe material, but you should determine whether you trust the script or not by inspecting it in the Edit Script dialog. By clicking OK in the Edit Script dialog, the script will be regarded as created by you and it will therefore be trusted. |
| **New...** | Opens the New Script dialog where you can define a new script. |
| **Import...** | Opens a dialog where you can select an analysis file from which to import all available scripts. |
| **Edit...** | Opens the Edit Script dialog where you can edit the selected script or its parameters. |
| **Delete** | Deletes the selected script. |
| **Necessary input for the selected script** | Lists all parameters that have been defined for the selected script. Click on a parameter to modify the input. Different parameter types have different input settings. |
| **Value** | Click this radio button if you want to type a value to use as input for the selected parameter. |
| **Property** | Click this radio button to associate the selected parameter with a property. |
| **Select Property...** | Opens the Select Property dialog where you can specify which property to get the input to the script from. |
| **Expression** | Click this radio button to calculate the value for the selected parameter via an expression. |
| **Edit Expression...** | Opens the Edit Expression dialog where you can specify an expression using columns, properties and functions. |
| **Select visualization** | Select the visualization in the current analysis that you want to associate with the selected script parameter. |
| **Select page** | Select the page in the current analysis that you want to associate with the selected script parameter. |
| **Select data table** | Select the data table in the current analysis that you want to associate with the selected script parameter. |

## Data Function

Select this option to insert a link or button that refreshes a previously executed data function when clicked.



| Option | Description |
|---|---|
| **Display text** | The text that will be displayed for the link or on the button. |
| **Control type** | Specifies whether to use a button, link or an image to execute the action. |
| **Image** | Enabled if the control type selected above is an image. Displays the path to the selected image. |
| **Browse...** | Opens a dialog where you can browse to an image to use as the action control. Clicking on the image in the text area will execute the specified actions. |
| **Available data functions** | Lists all data functions that have been executed within the current analysis and that do not use the Refresh function automatically feature. |

## 4.16.7.2     Details on Bookmark Filter Settings

► **To reach the Bookmark Filter Settings dialog:**

1.  Right-click in a text area and select **Edit Text Area** from the pop-up menu.

2.  Click on the Insert Action Control button, .

3.  In the Action Control dialog, click on **Actions** in the left-hand panel.

4.  On the Actions page, add one or more Filter settings actions from the Bookmarks part of the Available actions list to the Selected actions list.

5.  Select a Filter settings action in the Selected actions list and then click on **Settings...**.
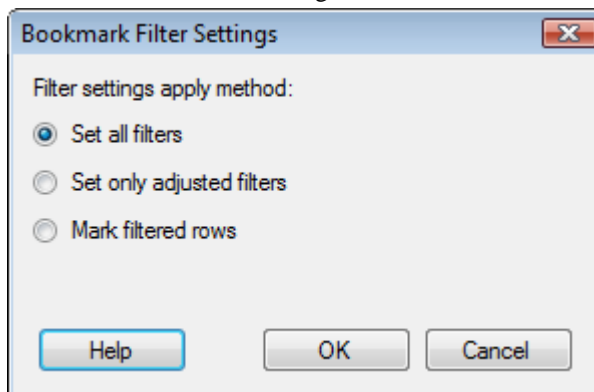


| Option | Description |
| --- | --- |
| **Filter settings apply method** | |
| **Set all filters** | Applies the exact filter settings for the active filtering scheme, as stored in the bookmark. |
| **Set only adjusted filters** | Keeps everything as it is in the filters panel except for those filters that were changed in the bookmark, which are updated. |
| **Mark filtered rows** | Uses the filter condition from the bookmark to mark rows in the analysis, but leaves the filtering exactly as it was before applying the bookmark. |

## 4.16.7.3     Details on Panel Visibility Settings

► **To reach the Panel Visibility Settings dialog:**

1.  Right-click in a text area and select **Edit Text Area** from the pop-up menu.

2.  Click on the Insert Action Control button, .

3.  In the Action Control dialog, click on **Actions** in the left-hand panel.

4.  On the Actions page, add one or more Functions from the View folder to the Selected actions list.

5.  Select one of the newly added functions in the Selected actions list and then click on **Settings...**.
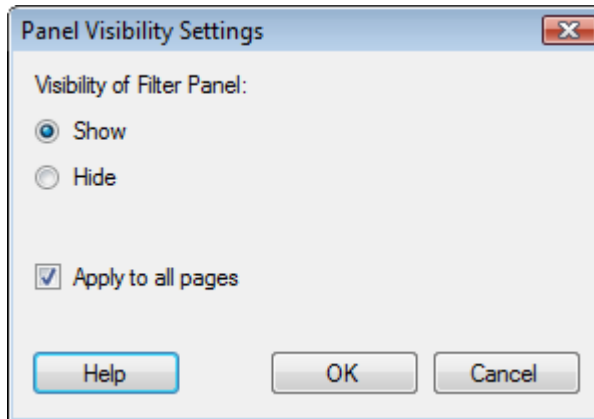
| Option | Description |
|---|---|
| **Visibility of [Panel Name]** | |
| **Show** | The selected panel is shown when clicking on the action link or button. |
| **Hide** | The selected panel is hidden when clicking on the action link or button. |
| **Apply to all pages** | Select the check box to apply the change to all pages. Clear the check box to only change the visibility on the active page. |

## 4.16.7.4    Details on New/Edit Script

It is possible to add your own custom actions using IronPython scripts. The resulting action control is launched from a text area. See Using Scripts in the Text Area and IronPython Example Scripts for more information.

### ► To reach the New Script dialog:

1. Click on the Toggle Edit Mode button, ✐, in the Text Area title bar.
   Comment: You can also right-click in the text area and select **Edit** from the pop-up menu.

2. In the **Text Area toolbar**, click on the Insert Action Control button, 🔲.
3. Click on **Script** in the left-hand panel.
4. Click **New...**.

| Option | Description |
|---|---|
| **Script name** | The name of the script as you want it to be displayed in the Available scripts list of the Action Control dialog. |
| **Description** | An optional description of what the script does. |
| **Script** | The field for typing the script in IronPython.<br>The font settings for the script field can be changed using Tools > Options, Fonts page and selecting Expression and script editor. |
| **Script parameters** | Lists any defined parameters to be used by the script. |
| **Add...** | Opens the Add Script Parameter dialog where you can define new parameters to use with the script. |
| **Edit...** | Opens the Edit Script Parameter dialog where you can edit the selected parameter. |

| | |
|---|---|
| **Remove** | Removes the selected parameter. |
| **Run Script** | Allows you to test the script by running it in the document, without your having to close this dialog. Any objects marked by print in the script definition will be shown in the Output list below. |
| **Undo** | Undoes the Run Script operation so that any results are removed from the document. |
| **Output** | Lists all objects marked up with "print" in the script definition. <br><br>For example, if you have a script parameter called "title", you can display its debug value by typing "print title" in the Script field. |
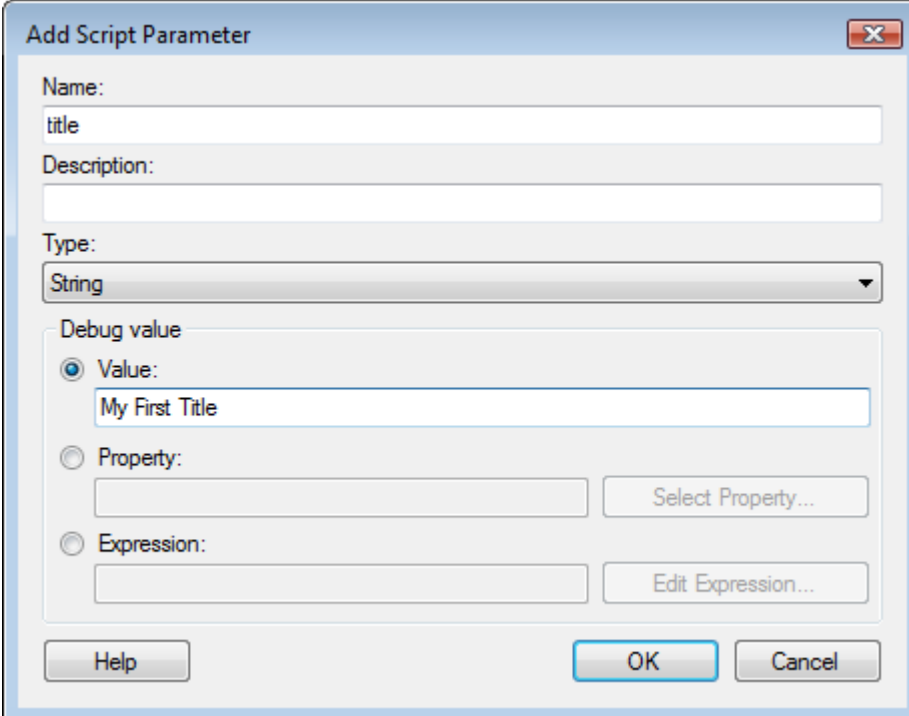
## 4.16.7.5  Details on Add/Edit Script Parameter

This dialog is used to define script parameters for scripts in action controls.

### ► To reach the Add Script Parameter dialog:

1. Click on the Toggle Edit Mode button, ✎, in the Text Area title bar.
   Comment: You can also right-click in the text area and select **Edit** from the pop-up menu.
2. In the **Text Area toolbar**, click on the Insert Action Control button.
3. Click on **Script** in the left-hand panel.
4. Click **New...**or select an existing script and click **Edit...**.
   Response: The New Script or Edit Script dialog is displayed.
5. Click **Add...**.



| Option | Description |
|---|---|
| **Name** | Type the name of the parameter as it is defined in the script. |

| Description | An optional description of what this parameter is used for. |
|---|---|
| **Type** | Select the type of parameter. The type can be a simple data type such as a text string, an integer, etc., or it can be a visualization, page or data table in the current analysis. |
| **Debug value** | The debug value settings vary with the type of input parameter. When a visualization is selected, you specify a visualization from your current analysis to use as debug value. When a page is selected, you specify a page as debug value. When a data table is selected, you specify a data table.<br><br>For the options available when selecting any of the standard data types, see below. |
| **Value** | Use this option to specify a value of the selected type to use when debugging the script. |
| **Property** | Use this option to specify a property of the selected type to use when debugging the script. |
| **Select Property...** | Opens the Select Property dialog where you can select a property to tie to the script parameter. |
| **Expression** | Use this option to calculate the debug value for the parameter via an expression. |
| **Edit Expression...** | Opens the Edit Expression dialog where you can specify an expression using columns, properties and functions. |

## 4.16.7.6    Details on Action Settings

This dialog is used for adding or editing actions to be performed when clicking on a dynamic item in a graphical table or a text area. The actions can open TIBCO Spotfire tools that work on the range of filtered or marked data, apply bookmarks, or navigate to a certain page or visualization in the analysis, the same things that are available for Action Controls. Multiple actions can be performed in just one click. It is also possible to add your own custom actions using the IronPython scripting functionality, or to refresh data function calculations.

### ► To reach the Action Settings dialog from a graphical table:

1. Right-click on the dynamic item column for which to add or edit an action in a graphical table visualization.
2. Select **Properties** from the pop-up menu.
3. If the Settings dialog for your selected dynamic item is not opened directly, go to the **Axes** page in the Graphical Table Properties dialog, select the column you want to modify and click **Settings...**.
4. Go to the **Actions** page and click **Settings...**.

### ► To reach the Action Settings dialog from a text area:

1. Click on the Toggle Edit Mode button, ✎, in the text area title bar, to make sure that the text area is in Edit Mode.
   Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
2. Right-click on the gray edit box representing the desired dynamic item in the text area.
3. Select **Edit Control...** from the pop-up menu.
4. Go to the **Actions** page and click **Settings...**.

## Actions

Select this option to insert an action which includes displaying or hiding panels, performing various operations on marked rows, applies bookmarks or switches pages.



| Option | Description |
|---|---|
| **Description** | A text that can be shown in the tooltip when hovering with the mouse pointer over the item connected to the action.<br><br>By typing a good description you can help other users of the analysis understand what will happen when clicking on the item. |
| **Available actions** | Lists all actions that can be included in a multiple action link, grouped by type. Click on the plus sign to expand a group. Click on an action (a function, a bookmark or a page) to select it.<br><br>**Comments about bookmarks:**<br><br>For bookmark components, the active visualization always takes precedence over the active page.<br><br>The filter settings of the active filtering scheme are changed, including the setting determining how related data tables are affected by each other's filtering.<br><br>The markings component of a bookmark takes the analysis back to the state all markings had when the bookmark part was captured. If a marking has been removed, that marking is simply ignored.<br><br>**Comments about marked rows:**<br><br>The marking applied when adding any of the Marked Rows functions is the one used by the active data table. The active data table is the one used by the visualization that was active before clicking on the text area. If the marking for the active visualization is set to (None), nothing will happen when clicking on the link. |

| | |
|---|---|
| **Add** | Adds the selected action to the Selected actions list. |
| **Remove** | Removes the selected action from the Selected actions list. |
| **Selected actions (applied in top-bottom order)** | Lists the added actions in the order that they will be performed. |
| **Settings...** | Opens the Settings dialog for the action selected in the Selected actions list (when applicable). |
| **Move Up** | Moves the selected action up in the list. |
| **Move Down** | Moves the selected action down in the list. |

## Script

Select this option to insert an action that executes a script when clicked. For script examples, see IronPython Example Scripts or  Action Script Examples.



| Option | Description |
|---|---|
| **Description** | A text that can be shown in the tooltip when hovering with the mouse pointer over the item connected to the action. |
| | By typing a good description you can help other users of the analysis understand what will happen when clicking on the item. |
| **Available scripts** | Lists all currently defined scripts. |
| | The Remark field can contain information about whether a script is trusted or not. All scripts that you have created yourself will be |

trusted. As are all scripts that are included in analyses that have been published to and opened from the library. However, if you should receive an analysis file containing a script directly from another person, the script will be listed as "Not trusted". This does not mean that the script necessarily contains any unsafe material, but you should determine whether you trust the script or not by inspecting it in the Edit Script dialog. By clicking OK in the Edit Script dialog, the script will be regarded as created by you and it will therefore be trusted.

| | |
|---|---|
| **New...** | Opens the New Script dialog where you can define a new script. |
| **Import...** | Opens a dialog where you can select an analysis file from which to import all available scripts. |
| **Edit...** | Opens the Edit Script dialog where you can edit the selected script or its parameters. |
| **Delete** | Deletes the selected script. |
| **Necessary input for the selected script** | Lists all parameters that have been defined for the selected script. Click on a parameter to modify the input. Different parameter types have different input settings. |
| **Value** | Click this radio button if you want to type a value to use as input for the selected parameter. |
| **Property** | Click this radio button to associate the selected parameter with a property. |
| **Select Property...** | Opens the Select Property dialog where you can specify which property to get the input to the script from. |
| **Expression** | Click this radio button to calculate the value for the selected parameter via an expression. |
| **Edit Expression...** | Opens the Edit Expression dialog where you can specify an expression using columns, properties and functions. |
| **Select visualization** | Select the visualization in the current analysis that you want to associate with the selected script parameter. |
| **Select page** | Select the page in the current analysis that you want to associate with the selected script parameter. |
| **Select data table** | Select the data table in the current analysis that you want to associate with the selected script parameter. |

## Data Function

Select this option to insert an action that refreshes a previously executed data function when clicked.



| Option | Description |
|---|---|
| **Description** | A text that can be shown in the tooltip when hovering with the mouse pointer over the item connected to the action. |
| | By typing a good description you can help other users of the analysis understand what will happen when clicking on the item. |
| **Available data functions** | Lists all data functions that have been executed within the current analysis and that do not use the Refresh function automatically feature. |

## 4.16.7.7    Details on Select Property

This dialog is used to specify a property that will contain a parameter value for an action control or an on-demand information link parameter.

### Document Properties



| Option | Description |
|---|---|
| **Select property** | Select the property you want to tie to the parameter value from the list. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new document property. |
| **Edit...** | Opens a dialog where you can edit the selected document property. |
| **Delete** | Deletes the selected document property. |

### Data Table Properties



| Option | Description |
|---|---|
| **Data table** | Allows you to select the data table to work with. |
| **Select property** | From the list, select the property you want to tie to the parameter value. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new data table property. |
| **Edit...** | Opens a dialog where you can edit the selected data table property. |
| **Delete** | Deletes the selected data table property. |

### Column Properties



| Option | Description |
|---|---|
| **Data table** | Allows you to select the data table to work with. |
| **Column** | Allows you to select the column to add a new property to. |
| **Select property** | From the list, select the property you want to tie to the parameter value. You can type an expression in the search field to limit the number of displayed properties. If no suitable properties are available, you can create a new one by clicking New.... |
| **New...** | Opens a dialog where you can specify a new column property. |
| **Edit...** | Opens a dialog where you can edit the selected column property. |
| **Delete** | Deletes the selected column property. |

## 4.16.7.8 Details on Property Control

This dialog is used to define a control device in the text area that can change the content of a property in an easy way. See Using Properties in the Analysis for examples of possible areas of application. For more information about how to set the options to be shown in a control, see the description for each control below. For a general description of search expressions, see Searching in TIBCO Spotfire.

You cannot display more than 1000 values in a property control. However, you should try keep down the number of available values as much as possible in order to make the control easier to use.

► **To reach the Property Control dialog:**

1. Click on the Toggle Edit Mode button, ✐, in the text area title bar.
   Comment: You can also right-click in the text area and select **Edit Text Area** from the pop-up menu.

2. In the **Text Area toolbar**, click on the Insert Property Control button and select which type of control to add.



| Option | Description |
|---|---|
| **Control type** | Displays the type of property control that you have selected to add. You can choose from:<br>**Label** - shows the current value of the selected property in the text area:<br>Sales<br>The label can also be used with binary properties. This means that you can use it to display images as well as text. |

**Input field** - adds a text box where you can type a new value for the property:

Sales
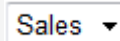
**Input field (multiple lines)** - adds a text box where you can type new values for a string property with multiple lines:

Sales
Cost
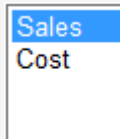
The Input field (multiple select) control can only be used with string properties.
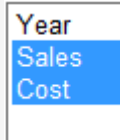
**Drop-down list** - adds a drop-down list, where the property value can be changed by selecting among predefined options:

Sales ▼

**List box** - adds a list box, where the property value can be changed by selecting among predefined options:

Sales
Cost

**List box (multiple select)** - adds a list box, where the property value can be changed by selecting several predefined options:

Year
Sales
Cost

The List box (multiple select) control can only be used with multiple line string properties.

**Slider** - adds a slider where the property values can be changed by moving the slider:

2
◄ | ❚❚ | | | | | | | | | ►
1                                          10

The current property value is displayed in a label above the slider.

**Document Properties**

| | |
|---|---|
| **Select property** | Click to select which property that the property control should change. |
| **New...** | Opens the New Property dialog where you can define a new property which the property control should change. |
| **Edit...** | Allows you to edit the first (default) value to use on the selected property. |
| **Delete** | Deletes the selected document property. |

**Data Table Properties**

| | |
|---|---|
| **Data table** | Select the data table of interest. |
| **Select property** | Click to select which property that the property control should change. |

| | |
|---|---|
| **New...** | Opens the New Property dialog where you can define a new property which the property control should change. |
| **Edit...** | Allows you to edit the first (default) value to use on the selected property. |
| **Delete** | Deletes the selected data table property. |
| **Column Properties** | |
| **Data table** | Select the data table of interest. |
| **Column** | Select the column of interest. |
| **Select property** | Click to select which property that the property control should change. |
| **New...** | Opens the New Property dialog where you can define a new property which the property control should change. |
| **Edit...** | Allows you to edit the first (default) value to use on the selected property. |
| **Delete** | Deletes the selected column property. |
| **Set property value through** | Allows you to specify how the property value should be selected: **Column selection** - displays a list of columns to select from. **Unique values in column** - displays a list of values picked from a column. **Expressions** - displays a list of values obtained via more or less complex calculations. **Fixed values** - displays a list of values that you define yourself. **Numerical range** - displays a range of values from min to max using a specified value interval. |
| **Settings** | See the settings for each method below. |

## Column selection

Displays a list of columns from which you can select a column. The columns shown can be either all columns in the data table or a specified selection of columns.



| Option | Description |
|---|---|
| **Data table** | Select the data table from which to pick columns. |
| **Selectable columns** | Lists all columns that will be available for selection in the property control. If not all columns in the data table should be available, you can type an expression to limit which columns to show. Expressions can limit the available columns to ones of a certain data type, like "DataType:Integer" or simple conditions using the column names or the beginning of the names to show, e.g., only columns beginning with A: "A". For more information about possible search expressions, see Searching in TIBCO Spotfire. |
| **Include (None) alternative** | Adds the alternative (None) to the list of available options. |
| **Constraints...** | [Available for multiple select list boxes only.] Opens the Selection Constraints dialog where you can determine whether or not there should be a min or a max number of selections possible in the list box. |
| **Select Columns...** | Opens the Select Columns dialog where you can hand-pick the columns you want to show in the control. The selected columns will receive the same boolean column property value and a search expression matching this value will automatically be added to the Selectable columns field above. |

## Unique values in column

Displays a list of the unique values available in a column. See Example of Property Controlled On-Demand Data for an example using this type of property control.



| Option | Description |
|---|---|
| **Data table** | Select the data table from which to pick columns. |
| **Column** | Select the column containing the values that should be available for selection. |
| **Selectable values** | Lists all values that will be available for selection in the property control. If not all values in the column should be available, you can type an expression to limit which values to show. Expressions can limit the available values to show, e.g., only values beginning with A: "A". For more information about possible search expressions, see Searching in TIBCO Spotfire. |
| **Include (None) alternative** | Adds the alternative (None) to the list of available options. |
| **Constraints...** | [Available for multiple select list boxes only.] <br><br> Opens the Selection Constraints dialog where you can determine whether or not there should be a min or a max number of selections possible in the list box. |

## Expressions

Available for string properties only. Displays a list of values obtained via more or less complex calculations. The expressions option provides a list of strings that can be used as expressions on an axis, or to define curves, etc. It is a special case of the fixed values option, and can only be used with string properties.



In the example above, each option has been tied to another (numerical) property which in turn can be changed using other property controls.

It is possible to copy and paste items in the list using the pop-up menu or Ctrl+C and Ctrl+V.

| Option | Description |
|---|---|
| **Display name** | Lists a display name for each option that the end users of the control should see. |
| **Expression** | Lists the expressions that define each option. |
| **Add...** | Opens the Custom Expression dialog where you can define an expression to calculate the value. The name you select for your expression will be the Display name that the end users of the property control will see. |
| **Edit...** | Opens the Custom Expression dialog so you can edit the expression of the selected option. |
| **Remove** | Removes the selected option. |
| **Move Up** | Moves the selected option up one step. |
| **Move Down** | Moves the selected option down one step. |
| **Include (None) alternative** | Adds the alternative (None) to the list of available options. |
| **Constraints...** | [Available for multiple select list boxes only.] Opens the Selection Constraints dialog where you can determine whether or not there should be a min or a max number of selections possible in the list box. |

## Fixed values

Displays a list of values that you define yourself. The display name used in the control can be different from the actual value of the alternative.



It is possible to copy and paste items in the list using the pop-up menu or Ctrl+C and Ctrl+V.

| Option | Description |
|---|---|
| **Display name** | Type a display name for each option that the end users of the control should see. |
| **Value** | Type a value for each option. |
| **Add** | Adds a new row where you can type a new option. |
| **Remove** | Removes the selected option. |
| **Move Up** | Moves the selected option up one step. |
| **Move Down** | Moves the selected option down one step. |
| **Include (None) alternative** | Adds the alternative (None) to the list of available options. |
| **Constraints...** | [Available for multiple select list boxes only.] <br> Opens the Selection Constraints dialog where you can determine whether or not there should be a min or a max number of selections possible in the list box. |

## Numerical range

Displays a range of values from min to max using a specified value interval. Can be used with numerical properties only.



| Option | Description |
| --- | --- |
| **Min** | Allows you to specify the min value of the numerical range. |
| **Max** | Allows you to specify the max value of the numerical range. |
| **Value interval** | Allows you to specify the interval between the tick marks in the slider. For example, with a range from 1-10 and an interval of 1, you will be able to change the slider in steps of one: |
| |  |
| | If the value interval is increased to 3, the number of tick marks will be fewer and the property will increase its value by three for each step. |
| |  |
| | If the max number and the interval steps do not break even, there will be a shorter interval between the last available values. |
| **Show min and max labels** | Clear the check box to remove the labels for the max and min values of the control and just keep the current property value above the control. |

## 4.16.7.9      Details on Select Columns

This dialog is used when you cannot limit the available columns for a property control using a simple enough search expression. It allows you to hand-pick the columns you want to show and it stores the selection as a boolean column property. All of the selected columns will receive the value "True" on this property and the remaining columns will receive the value "False".
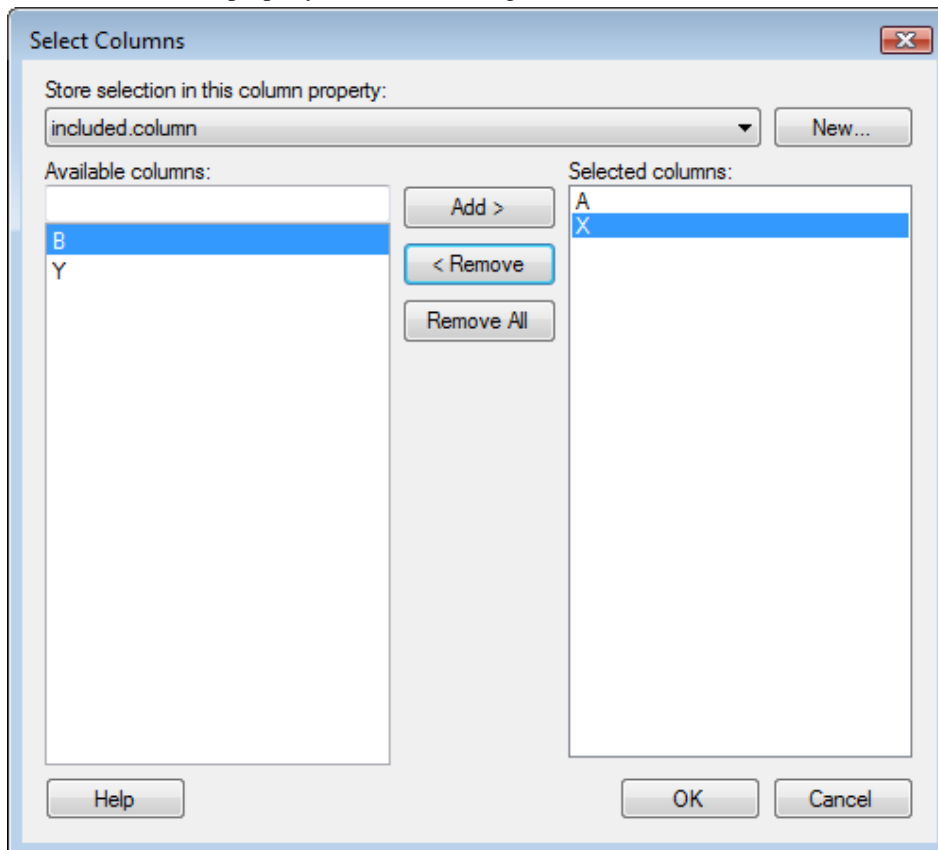


| Option | Description |
|---|---|
| **Store selection in this column property** | Allows you to select a boolean column property where the selection can be stored. |
| **New...** | Opens the New Property dialog where you can define a new column property in which to store the selection. |
| **Available columns** | Lists all columns in the specified data table that have not yet been selected. |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Selected columns** | Lists all columns that have currently been selected. These columns will receive the value "True" on the specified column property. |

## 4.16.7.10    Details on Selection Constraints

This dialog is available from the Property Control dialog when you have selected to add a List box (multiple select) control.
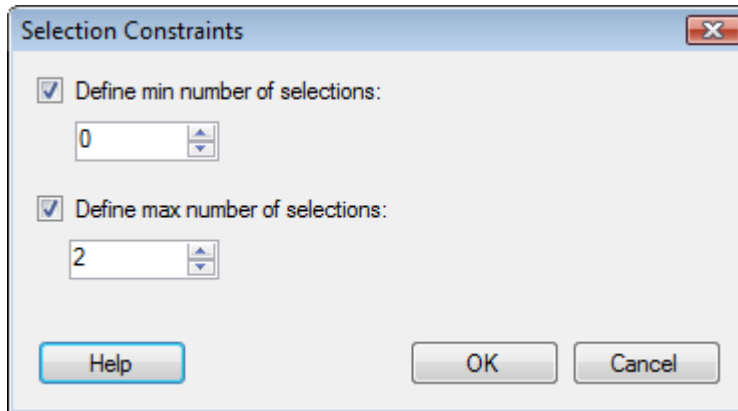


| Option | Description |
|---|---|
| **Define min number of selections** | Allows you to specify a minimum number of selections that are required in the List box (multiple select) control. This means that if you set the min number of selections to 1, there must always be at least one item selected in the list box control. |
| **Define max number of selections** | Allows you to specify a maximum number of selections allowed in the list box control. It will not be possible to select more than the specified max number of selections. |

## 4.16.7.11 Details on Insert Filter

This dialog is used to add a filter to a text area.
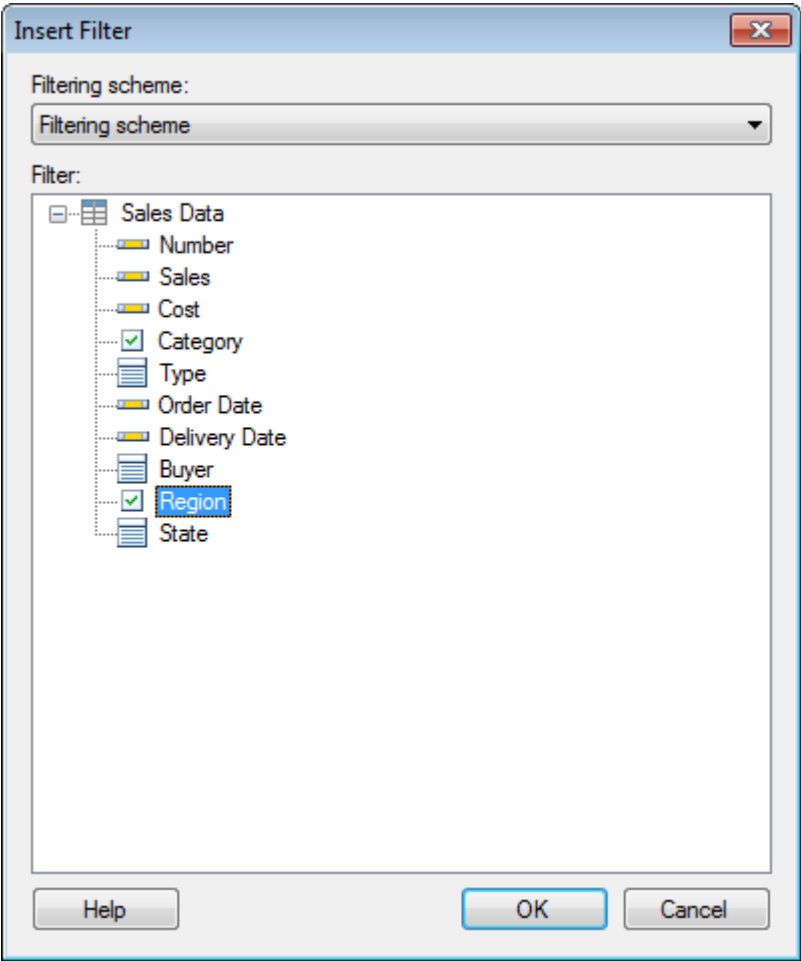


| Option | Description |
|---|---|
| **Filtering scheme** | [Only available if more than one filtering scheme have been defined in the document.] |
| | Allows you to select the filtering scheme to affect with the filter. |
| **Filter** | Allows you to select which filter to insert into the text area. Click to select the filter to insert. |

## 4.16.7.12 Details on Format Control

Use this dialog to change the font settings for, or reset the size of, filters, controls or items in the text area. Which settings are available in the dialog depends on the type of selected control or item.

► **To reach the Format Control dialog:**

1.  Click on the Toggle Edit Mode button, ✐, in the text area title bar.
    Comment: You can also right-click and select **Edit Text Area** from the pop-up menu.
    Right-click on the control or item you want to format.

Select **Format Control...** from the pop-up menu.
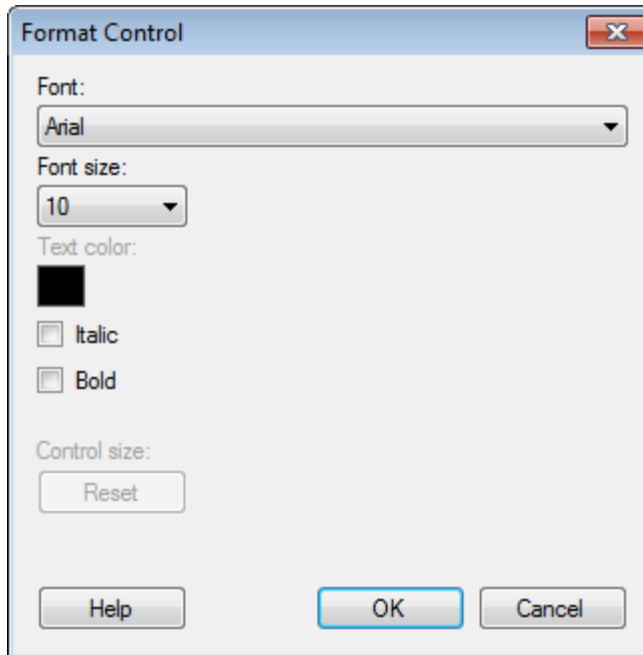


| Option | Description |
|---|---|
| **Font** | Specifies the font to use for the selected control or item. |
| **Font size** | Specifies the font size to use for the selected control or item. |
| **Text color** | Specifies the color to use for the text in the selected control or item. |
| **Italic** | Specifies whether or not the text in the selected control or item should be in italic font style. |
| **Bold** | Specifies whether or not the text in the selected control or item should be in bold font style. |
| **Control size** | Resets the size of the selected control or item to its original size. |

## 4.16.7.13    Text Area Properties - General



| Option | Description |
|---|---|
| **Title** | The title of the text area.<br>**Tip:** Double-click on the title bar of the text area for a shortcut to this field. |
| **Show title bar** | Specifies whether or not to show the title bar. |
| **Include configuration in bookmark** | Specifies whether or not the current configuration of this particular text area should be included when capturing bookmarks. For example, if you are currently creating a guided analysis for other people and you are adding bookmarks to be used as action links in the text area, you probably do not want to capture the current content in your text area while this is under construction. If that is the case, this check box should be cleared.<br>On the other hand, if you want to create an action link which actually alters the information in the text area, then the check box should be selected when capturing the bookmark. |

## 4.16.7.14    Text Area Pop-up Menus

Right-clicking in the text area, when not in edit mode, displays the following menu:

| Option | Description |
|---|---|
| **Edit Text Area** | Toggles the edit mode for the text area on and off. |
| **Copy** | Available if anything is selected only. Copies the selected object. |
| **Select All** | Selects all content in the text area. |

| | |
|---|---|
| **Duplicate Visualization** | Duplicates the active text area including any text, images, links and controls. |
| **Close** | Closes the text area. |
| **Properties** | Opens the Text Area Properties dialog where you can change the title of the text area and show or hide the title bar. |

When the text area is in edit mode, some more alternatives are shown:

| Option | Description |
|---|---|
| **Edit Text Area** | Toggles the edit mode for the text area on and off. |
| **Cut** | Cuts the selected object from the current position, to be pasted somewhere else. |
| **Copy** | Copies the selected object. |
| **Paste** | Pastes the selected object in the text area. |
| **Delete** | Deletes the selected object. |
| **Select All** | Selects all text, images and links in the text area. |
| **Edit Control...** | Available when right-clicking on a control only. Allows you to edit the action control or property control you right-clicked on. |
| **Duplicate Visualization** | Duplicates the active text area including any text, images, links and controls. |
| **Close** | Closes the text area. |
| **Properties** | Opens the Text Area Properties dialog where you can change the title of the text area and show or hide the title bar. |

## 4.16.8   3.0 Text Area

### 4.16.8.1   How to Use the 3.0 Text Area

In TIBCO Spotfire 3.1, a new version of the text area was created in order to allow the use of property controls and script actions in the text area. See How to Use the Text Area for information about the new text area. However, for compatibility reasons, you can go back to use the 3.0 version of the text area instead.

**► To use the 3.0 text area:**

1. Select **Tools > Options**.
2. Go to the **Compatibility** page.
3. Select the **Use 3.0 text area** check box.

    Response: All new text areas created in the document will be of the 3.0 version. Note that previously created text areas in your document will not be affected by this change.

The text area is not a visualization as such, but it can be placed within a page just like a bar chart or scatter plot. The text area is where you can provide text, images and links that you think are helpful for people opening your analysis. You can provide information on the purpose of a page, or maybe state the insights you have made so that other people can verify or comment on

your findings. See Visualization Layout for more information on how to position the text area in a page.

There are three types of content you can add to a text area:

- **Text** - text can be formatted to your liking, by changing the font, color, alignment, etc..
- **Images** - images can be imported into the text area in GIF, BMP, PNG or JPG format.
- **Links** - you can add links to the text area. These come in some different forms - links can lead to an external web page or be "function links" or "action links" within TIBCO Spotfire. A function link is a link that when clicked launches a tool or feature of TIBCO Spotfire. These are very handy if you intend to share your analysis with other people. You can then write instructions in a text area, and include links to any operations you want them to perform, for example, "...and when you are done filtering, Export your results to PowerPoint." which would launch the Export to PowerPoint tool. Action links can perform simple actions, like switching to a different page or applying a bookmark, but they can also contain a whole series of actions.

### ► To insert a 3.0 text area on a page:

1. Click on the New Text Area button on the toolbar, ![icon].
   Comment: You can also select **Insert > New Text Area** from the menu.
   Response: A blank text area is created.

### ► To edit the 3.0 text area:

1. Right-click in the text area and select **Edit Text Area** from the pop-up menu.
   Comment: When the text area is active you can also select Edit > Visualization Properties.
   Response: The Edit Text Area dialog is displayed.
2. Edit the **Title** and type whatever you want in the text field.
   Comment: See Edit Text Area (3.0) for more information about the available tools.
3. Click **OK**.

### ► To add a function link to the 3.0 text area:

1. Right-click on the text area and select **Edit Text Area** from the pop-up menu.
2. Click on the Insert/Edit Link button, ![icon].
   Response: The Insert Link dialog is displayed.
3. Click on **Function** in the left-hand panel.
   Comment: On this page, you can add links that open tools, exports data or images. Only one function per link is allowed. To add a link that applies a bookmark or changes page, see below.
4. Type a **Display text** to be shown in the text area.
5. Click on the function in the list which you wish to be performed when clicking on the link.
   Comment: Click on the plus sign to expand the tree. Only the leaf nodes in the tree can be selected as a function.
   **Note:** Clicking the link in the Edit Text Area page opens the Edit Link dialog. To be able to follow the link, you have to click the link from the actual text area.
6. Click **OK**.

### ► To add a web link to the 3.0 text area:

1. Right-click in the text area and select **Edit Text Area** from the pop-up menu.
2. Click on the Insert/Edit Link button, ![icon].
   Response: The Insert Link dialog is displayed.

3. Click on **Web Page** in the left-hand panel.

   Comment: On this page, you can add links to external web pages which open in a separate web browser. To add a link that applies a bookmark or changes page, see below.

4. Type a **Display text** to be shown in the text area.

5. Type or paste a web address in the **Web page** field.
   **Note:** If you leave the Display text field empty, the actual web address you type into the Web page field will be the displayed text.
   **Note:** Clicking the link in the Edit Text Area page opens the Edit Link dialog. To be able to follow the link, you have to click the link from the actual text area.

6. Click **OK**.

### ► To add a bookmark link to the 3.0 text area:

1. Right-click in the text area and select **Edit Text Area** from the pop-up menu.

2. Click on the Insert/Edit Link button, 🔗.

   Response: The Insert Link dialog is displayed.

3. Click on **Actions** in the left-hand panel.

   Comment: On this page, you can add multiple actions to a single link, but you can also choose to add a single action, such as a bookmark or a page shift.

4. Type a **Display text** to be shown in the text area.

5. In the Available actions list, click on the plus sign to expand the Bookmarks group.

6. Click to select the bookmark you wish to add, then click on **Add**.

   Comment: You can also double-click on the bookmark to add it to the Selected actions list.

   Comment: If you wish to add more items to the action link, select them in the Available actions list and click Add.

   **Note:** Clicking the link in the Edit Text Area page opens the Edit Link dialog. To be able to follow the link, you have to click the link from the actual text area.

7. Click **OK**.

### ► To add a page-switch link to the 3.0 text area:

1. Right-click in the text area and select **Edit Text Area** from the pop-up menu.

2. Click on the Insert/Edit Link button, 🔗.

   Response: The Insert Link dialog is displayed.

3. Click on **Actions** in the left-hand panel.

   Comment: On this page, you can add multiple actions to a single link, but you can also choose to add a single action, such as a bookmark or a page shift.

4. Type a **Display text** to be shown in the text area.

5. In the Available actions list, click on the plus sign to expand the Pages and Visualizations group.

6. Click to select the page to which you wish to switch, then click on **Add**.

   Comment: If you wish to add more items to the action link, select them in the Available actions list and click Add.

   **Note:** Clicking the link in the Edit Text Area page opens the Edit Link dialog. To be able to follow the link, you have to click the link from the actual text area.

7. Click **OK**.

### ► To add a multiple actions link to the 3.0 text area:

1. Right-click in the text area and select **Edit Text Area** from the pop-up menu.

2. Click on the Insert/Edit Link button, 🔗.

Response: The Insert Link dialog is displayed.

3. Click on **Actions** in the left-hand panel.
4. Type a **Display text** to be shown in the text area.
5. In the Available actions list, click on the plus sign to expand the group of interest.
6. Click to select the action you wish to add, then click on **Add**.
7. Repeat steps five and six to add more actions.

   Comment: The actions will be performed in the order from top to bottom of the Selected actions list. It is possible to rearrange the actions in the list by clicking on them and selecting Move Up or Move Down.

   **Note:** Clicking the link in the Edit Text Area page opens the Edit Link dialog. To be able to follow the link, you have to click the link from the actual text area.
8. Click **OK**.

## 4.16.8.2    Edit Text Area (3.0)



| Option | Description |
|---|---|
| **Title** | Specifies the title of the text area. |
| **Show title bar** | Specifies whether or not to show the title. |
|  | Opens the Insert Link dialog where you can insert a function link, a link to a web page or a bookmark, etc. |
|  | Removes the selected link but leaves the text intact. |
|  | Opens the Insert Image dialog where you can browse locate an image to insert. Images are restricted to 1024x1024 pixels at the most. Including images can be very costly to memory, so it is recommended to keep images small. |
|  | Cuts the selected object from the current position, to be pasted somewhere else. |
|  | Copies the selected object. |

| | |
|---|---|
| 📋 | Pastes the selected object in the text area. |
| **B** | Sets the selected text to boldface. |
| *I* | Sets the selected text to italics. |
| ■ ▾ | Opens the Color dialog where you can specify the text color. |
| **Font** | Specifies the font of the text. |
| **Font Size** | Specifies the font size of the text. |
| ≔ | Creates a bulleted list of the selected paragraph. |
| ≔ | Creates a numbered list of the selected paragraph. |
| ≡ | Aligns the selected paragraph to the left of the text area. |
| ≡ | Aligns the selected paragraph to the center of the text area. |
| ≡ | Align the selected paragraph to the right of the text area. |
| ⇥ | Indents the text of the selected paragraph. |
| ⇤ | Removes the indent characters from the selected text. |

## 4.16.8.3    3.0 Edit Text Area Pop-up Menu

Right-clicking in the Edit Text Area dialog displays the following menu:

| Option | Description |
|---|---|
| **Cut** | Cuts the selected object from the current position, to be pasted somewhere else. |
| **Copy** | Copies the selected object. |
| **Paste** | Pastes the selected object in the text area. |
| **Delete** | Deletes the selected object. |
| **Select All** | Selects all text, images and links in the text area. |
| **Insert Link** | Opens the Insert Link dialog where you can insert a function link, a link to a web page or a bookmark, etc. |
| **Edit Link** | Available when right-clicking on a link only. Opens the Insert Link dialog with the link properties available for editing. |
| **Select Link** | Available when right-clicking on a link only. Selects the link. |
| **Copy Link** | Available when right-clicking on a link only. Copies the link. |
| **Remove Link** | Available when right-clicking on a link only. Removes the link but leaves the text intact. |

## 4.16.8.4   Details on Insert Image (3.0 Text Area)
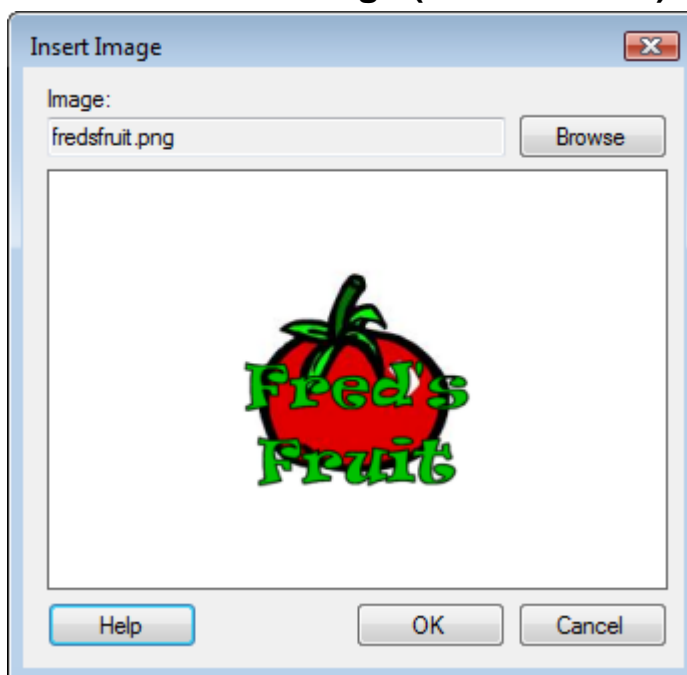


| Option | Description |
|--------|-------------|
| **Image** | The name of the image file is displayed here. |
| | Images are restricted to 1024x1024 pixels at the most. Including images can be very costly to memory, so it is recommended to keep images small. |
| **Browse** | Click this button to browse for an image file. You can import images in GIF, BMP, PNG or JPG format. |

## 4.16.8.5   Details on Insert Link (3.0 Text Area)

This dialog is used for adding links to a text area, or editing existing links in a text area. The links can be either web links to an external web page, or function links that open various TIBCO Spotfire tools, that work on the range of filtered or marked data, that applies bookmarks or switches page in the analysis. It is also possible to insert multiple action links, which perform several different actions in just one click.

### ► To reach the Insert Link dialog:

1.   Right-click in the text area and select **Edit Text Area** from the pop-up menu.

2.   In the **Edit Text Area** dialog, click on the Insert/Edit Link button, 🔗.

### Actions

Select this option to insert a multiple action link, or to apply a bookmark or a switch page operation.

**Note:** Functions are not available in TIBCO Spotfire Web Player and function links will be indicated as broken to those users.

| Option | Description |
|---|---|
| **Display text** | The text that will be displayed for the link. |
| **Available actions** | Lists all actions that can be included in a multiple action link, grouped by type. Click on the plus sign to expand a group. Click on an action (a function, a bookmark or a page) to select it. |
| | **Comments about bookmarks:** |
| | For bookmark components, the active visualization always takes precedence over the active page. |
| | The filter settings of the active filtering scheme are changed, including the setting determining how related data tables are affected by each other's filtering. |
| | The markings component of a bookmark takes the analysis back to the state all markings had when the bookmark part was captured. If a marking has been removed, that marking is simply ignored. |
| | **Comments about marked rows:** |
| | The marking applied when adding any of the Marked Rows functions is the one used by the active data table. The active data table is the one used by the visualization that was active before clicking on the text area. If the marking for the active visualization is set to (None), nothing will happen when clicking on the link. |
| **Add** | Adds the selected action to the Selected actions list. |
| **Remove** | Removes the selected action from the Selected actions list. |
| **Selected actions** | Lists the added actions in the order that they will be performed. |

| | |
|---|---|
| **Settings...** | Opens the Settings dialog for the action selected in the Selected actions list (when applicable). |
| **Move Up** | Moves the selected action up in the list. |
| **Move Down** | Moves the selected action down in the list. |

## Function

Select this option to insert a function link. A function link is a link that when clicked launches a tool or feature of TIBCO Spotfire. Examples of available functions are different save and export alternatives, handling of marked or filtered rows, the launching of statistical tools, such as K-means clustering, etc. For applying a bookmark or switching page, you need to go to the Actions page.

**Note:** Functions are not available in TIBCO Spotfire Web Player and function links will be indicated as broken to those users.



| Option | Description |
|---|---|
| **Display text** | The text that will be displayed for the link. |
| **Function** | Select the function of TIBCO Spotfire that you want the link to perform in the list. <br><br> **Note:** For applying a bookmark or switching page, you need to go to the Actions page, even if you just want to add that single action to the link. |

## Web Page

Select this option to insert a link to a web page. The web page will be opened in an external web browser.
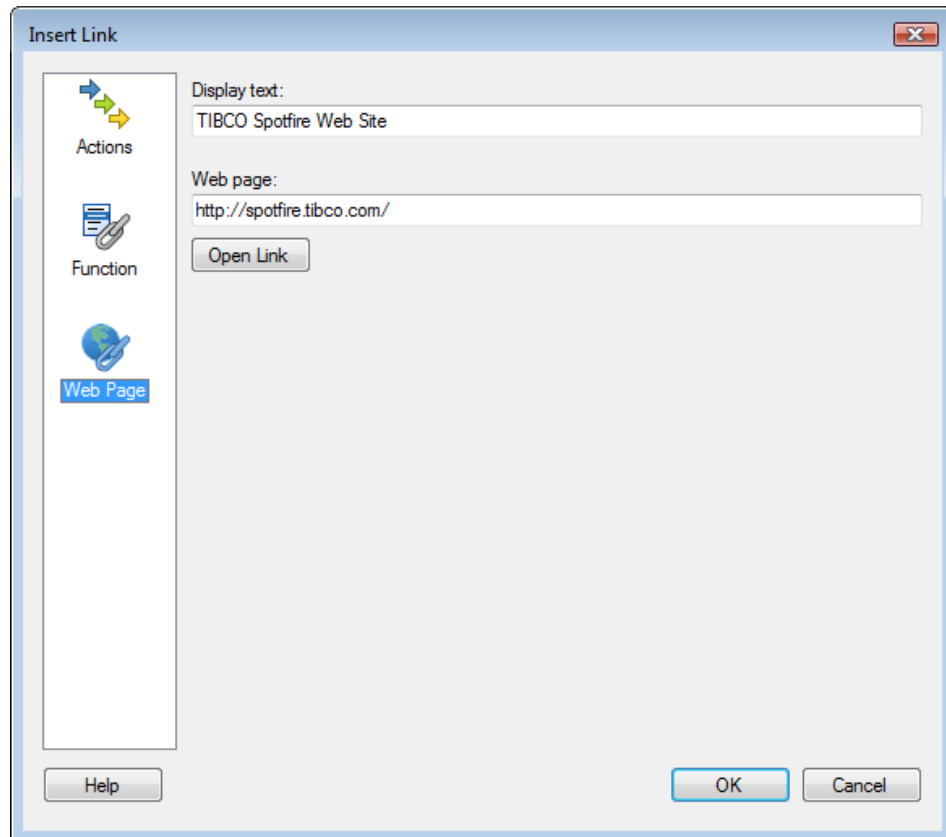


| Option | Description |
| --- | --- |
| **Display text** | The text that will be displayed for the link. |
| **Web page** | Enter the URL to the web page. |
| **Open Link** | Allows you to test the web link by opening the URL in a web browser window. |

# 4.17 Details on General Dialogs

## 4.17.1 Details on Add/Edit Tooltip Value

Use these dialogs to choose additional values to be displayed in the tooltips for the active visualization.

### ► To reach the Add/Edit Tooltip Value dialog:

1. In the Visualization Properties dialog, go to the **Tooltip** page.
2. Click on the **Add...** button to add a tooltip value. To edit a tooltip value, select the value of interest from the list, then click on **Edit....** Only the tooltip values that you have added to the list yourself can be edited or deleted.

   **Note:** Adding/editing tooltip values is not applicable to table visualizations.

| Option | Description |
|---|---|
| **Column** | Select the column or expression you wish to be visible in the tooltip. |
| **Name** | Type a name to be presented with the value in the tooltip. The column or expression selected above will be used as a default name if nothing else is entered. (To exclude the name completely from the tooltip, clear the **Include value name in tooltip** check box below instead.) |
| **Get content from** | [Only visible if at least one virtual column producer is available.] |
| | Your company may have set up some type of virtual column producers that can take the values from the selected column and transform them in one way or another to produce a desired output. For example, if you have access to TIBCO Spotfire Lead Discovery you can select Structure Column here, in order to show molecular structures from an information link in the labels. |
| | For embedded images in the current data table, or when fetching data via a URL, you should leave this setting at (Selected column). |
| **Settings...** | If the selected source has some settings available, you can reach those by clicking on the Settings button. |
| | For example, this is where you would specify which information link to retrieve structures from when using TIBCO Spotfire Lead Discovery. |
| **Show as** | Allows you to select how the data in the selected column should be interpreted. |
| | For example, use **Text** for plain text labels. Use **Image** if there are binary images in your data that you want to use as labels. Use **Link** if the text should be interpreted as a web link. Use **Image from URL** if the image is picked from a web resource location. You may need to change the Link or Image from URL Renderer Settings by clicking on |

|  | the Settings... button and modifying the link syntax so that it fits your current data. |
|--|--|
|  | Use **Geometry** if your data is a shape file and you want to show the geometrical shapes in the labels. |
|  | If a TIBCO Spotfire Lead Discovery structure column is used to label by, then you would select a renderer for displaying structure images here. |
| **Settings...** | If the selected Show as method has some settings available that can be modified, you can reach them by clicking on the Settings button. For example, this could be Link Renderer Settings or Image from URL Renderer Settings for a web link, Geometry Renderer Settings or some structure renderer settings. |
| **Size** | Available if the selected tooltip value is some kind of image. Increases or decreases the size of the image. |
| **Include value name in tooltip** | Select this check box if you do want to include the name of the selected value along with the value itself. Clear the check box to show the resulting value only (for example, an image). |

## 4.17.2    Details on Advanced Settings

► **To reach the Advanced Settings dialog:**

1. In the Visualization Properties dialog, go to the page of interest (for example, X-axis, Y-axis, Trellis...).
2. Click on the **Settings...** button next to the column selector of the property of interest.
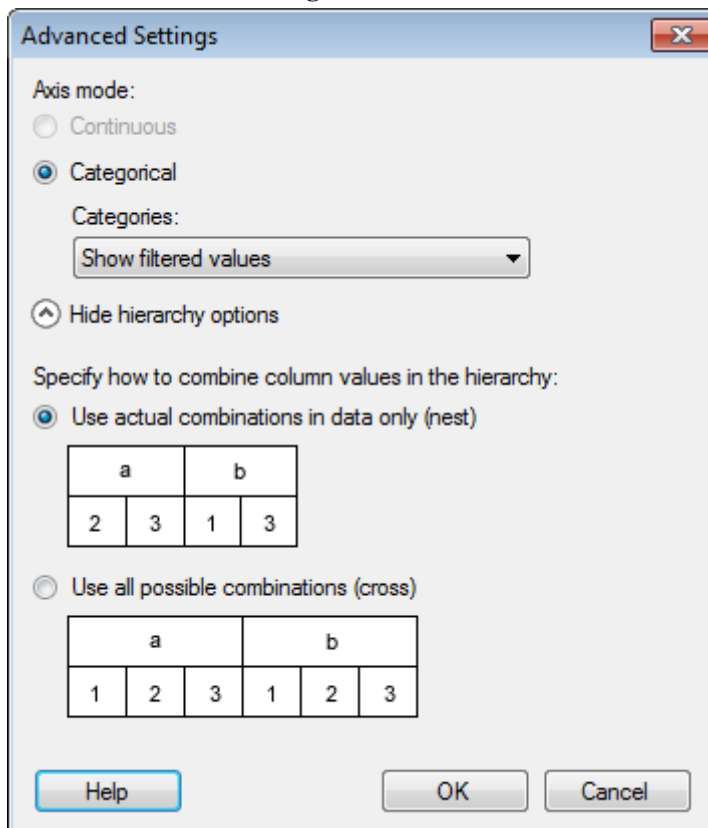
| Option | Description |
|---|---|
| **Axis mode** | Specifies whether the column or hierarchy should be treated as continuous or categorical. |
| **Continuous** | Select this option for numerical columns when you want the values to be treated as continuous, numerical values.<br><br>This option is not available for properties that are always categorical (like string columns). |
| **Categorical** | Select this option when you want the values to be seen as categories rather than numerical values.<br><br>For example, if you have the years 2001, 2002 and 2003 in a column, you would probably like to treat the different values as categories rather than numbers. |
| **Categories** | Determines how to display the categories. |
| **Show filtered values** | Select this option to display values currently available after any filtering operations only. This means that those categories that are visible will change when filtering and that categories currently without any values will be hidden from the visualization. |
| **Show filtered range** | Select this option to hide empty categories on both ends of the currently visible range. This means that those categories that are visible will change when filtering, and that empty categories within the currently visible range will remain visible. |
| **Show all values** | Select this option to keep all categories visible even if data for some categories have been filtered out. |
| **Show/Hide hierarchy options** | For hierarchical categories only, but not available for Date, Time or DateTime hierarchies.<br><br>Shows or hides the options used to specify how hierarchies should be built, that is, which combinations of the different categories should be available. |
| **Specify how to combine column values in the hierarchy** | Specifies how many categories will be available, e.g., on an axis or in a list of colors in the legend. |
| **Use actual combinations in data only (nest)** | Use this option to display all combinations available in the data. For more information about the nest and cross alternatives, see General Syntax. |
| **Use all possible combinations (cross)** | Use this option to display all possible combinations, even showing categories that are currently not included in the data. |

## 4.17.3     Details on Scale Range

This dialog is available for visualizations with multiple scales and allows you to specify the range that you want to show for the specified scale.

### ► To reach the Scale Range dialog:

1. In the Visualization Properties dialog, go to the axis page that displays the multiple scales settings.
2. From the drop-down list under Individual scale settings, select which scale to define scale range for. You can also select All scales to set the same range for all the scales.
3. Click on **Scale Range...** to the right of the drop-down list.
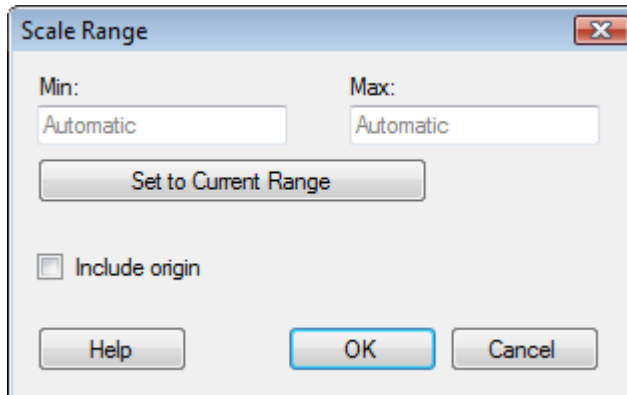


| Option | Description |
|---|---|
| **Min** | Leave the field blank (**Automatic**) to let the application automatically adjust the scale range after the currently lowest value used on the axis. |
| **Max** | Leave the field blank (**Automatic**) to let the application automatically adjust the scale range after the currently highest value used on the axis. |
| **Set to Current Range** | Allows you to set the scale range to the currently filtered values. |
| **Include origin** | Available for continuous columns only. Always includes the coordinates (0, 0) in the visualization, regardless of filtering. |

If a range has been specified, further filtering will not affect the range of the selected scale. However, when all values belonging to a certain scale have been filtered out, the scale will become hidden.

## 4.17.4     Details on Select Columns

Use this dialog when you need to select more than a few columns simultaneously from a column selector, either on an axis of a visualization, in the legend, or in a dialog.

### ► To reach the Select Columns dialog:

1. Click on the column selector of interest to open the drop-down list.
2. Click on **Select Columns...**.
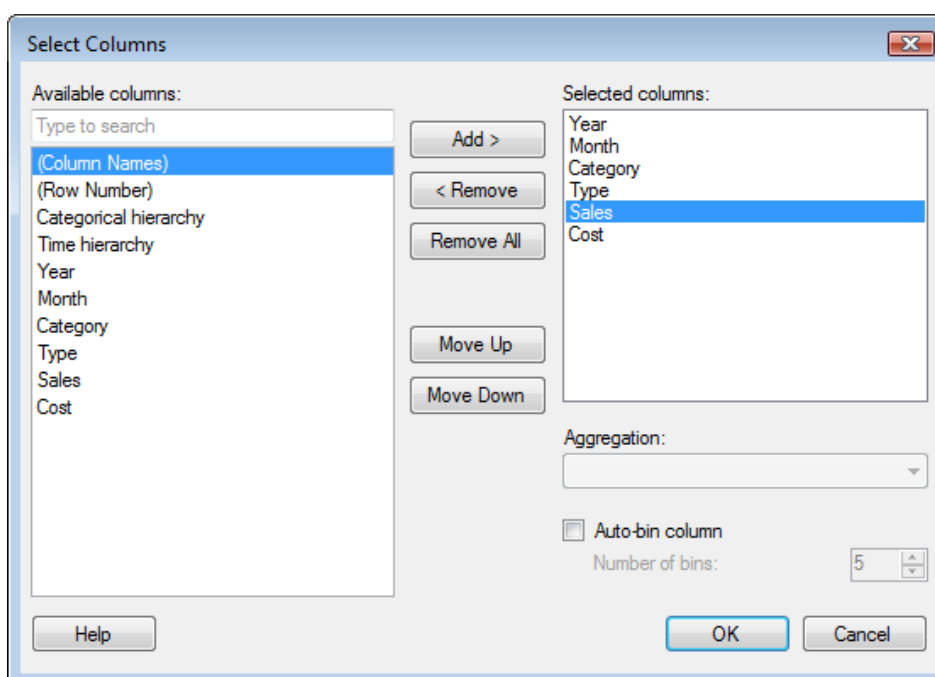
(In places where you are only allowed to specify a single column the Add > button will be replaced by a Set > button and no Move Up/Move Down buttons will be available.)

| Option | Description |
|---|---|
| **Available columns** | Lists all columns and hierarchies available for selection. |
| [Type to search] | Type a search string to limit the number of items in the Available columns list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Selected columns** | Lists the columns selected to be used in this particular location, as well as the selected aggregation method used on each column (if any aggregation has been specified) . Click on a column in this list to display additional settings for that column. |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the hierarchy. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the hierarchy. |
| **Aggregation** | Click on one or more columns in the Selected columns list to make this option available. Specifies the aggregation method to use for the selected column. |
| **Auto-bin column** | Click on one or more columns in the Selected columns list to make this option available. Select this check box to temporarily bin a continuous column and create an Auto-bin slider. |

|  | **Note:** To create a new column with binned values, see How to Use Binning instead. |
|---|---|
| **Number of bins** | Specifies the starting number of bins to use in the binning. This number can be changed by dragging the auto-bin slider in the visualization (if the column selectors of all included columns fits in the window). |
| **Level** | Level : Year |

Click on a hierarchy in the Selected columns list to make this option available. Specifies which level of the hierarchy to use.

## 4.17.5 Details on Limit Data Using Expression

You can limit what data should be available for a certain visualization using an expression. This way, you can set a "hard filter" on a visualization to make sure that certain values are never included in the calculations behind the visualization, regardless of any filtering in the Filters panel. For example, you can make sure that one visualization only shows data for a certain state by adding the expression similar to [State]="Nevada". See also Limiting What is Shown in Visualizations.

► **To reach the Limit Data Using Expression dialog:**
1. Click on the visualization for which you want to limit the data using an expression to make it active.
2. Select **Edit > Visualization Properties**.
3. Go to the Data page.
4. At the bottom of the page, next to Limit data using expression, click on **Edit...**.

| Option | Description |
|---|---|
| **Available columns** | Shows all columns that you can use in the calculation of a new column. |
| | Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column to send it to the Expression field. Press Ctrl or Shift to select multiple columns. |
| | You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field using the rules described on the Searching in TIBCO Spotfire page. |
| **Insert Columns** | Inserts the columns selected in the Available columns list at the current cursor position in the Expression field. |
| **Available properties for column** | Shows all properties that you can use in the calculation of a new column. You can narrow down the list of available properties by using the search field. The column properties shown are specific to the column selected in the Available columns list to the left. |
| | Select a property by clicking on it in the list and then click on the Insert Properties button; or double-click on the property to send it to the Expression field. The property will automatically be inserted as text. However, there may be occasions where you need to insert the property as a function to receive the desired result. See Properties in Expressions for more information. Use the pop-up menu in this field to select how to insert the property or type the correct syntax manually. |
| | If you want to define a new property to use in the expression, right-click in the Available properties field and select **New > [Property Type] Property...** from the pop-up menu. You can also edit or delete custom properties by using the pop-up menu. |
| **Insert Properties** | Inserts the properties selected in the Available properties for column list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list: |
| | All functions |
| | Binning functions |
| | Conversion functions |
| | Date and Time functions |
| | Logical functions |
| | Math functions |
| | Operators |
| | Property functions |
| | Ranking functions |
| | Spatial functions |
| | Statistical functions |
| | Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button, or double-click on the function to send it to the Expression field. |
| | Type a search string in the text field to limit the number of items in |

|  |  |
|---|---|
|  | the Functions list.<br><br>You can also click on any function and type the first letter of the desired function name to jump to a specific location in the list. |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Expression Language chapter. |
| **Insert Function** | Inserts the selected function at the current cursor position in the Expression field. |
| **Expression** | This is the text field in which you build your expression. You can insert columns and functions from the lists, or enter text as in any standard text editor. In this context, the expression must be of type "Boolean", since it will be used as a filter.<br><br>Cut/Copy/Paste works in the field using standard Ctrl+X/Ctrl+C/Ctrl+V.<br><br>Also, it is possible to undo/redo the last action by pressing Ctrl+Z. |
| **Recent expressions** | Displays the ten expressions you have most recently created. You can select one of these and click the Insert button to insert the expression into the Expression field. |
| **Insert** | Inserts the selected Recent expression into the Expression field. This will replace the entire content of the Expression field. |
| **Resulting expression** | Of interest when preprocessor functions (such as ${PropertyName}) are used in the expression only. Displays the expression after all occurrences of the property have been replaced with its current value or values. |

## 4.17.6    Details on Link Renderer Settings

### ► To reach the Link Renderer Settings dialog:

In the Table Properties Columns page, click to select a column that uses the Link Renderer, then click **Settings...** .

**OR**

Click **Settings...** in the Scatter Plot Properties or Map Chart Properties Labels page, or in the Add Tooltip dialog, when Show as: Link has been chosen.

**OR**

Click **Settings...** in the Add/Edit Default Renderer dialog when the Link Renderer has been chosen.

**Note:** If you apply renderer settings from the visualization properties, the settings are applied to that visualization only. If you apply renderer settings from the Add/Edit Default Renderer dialog, the settings are applied to all new visualizations.
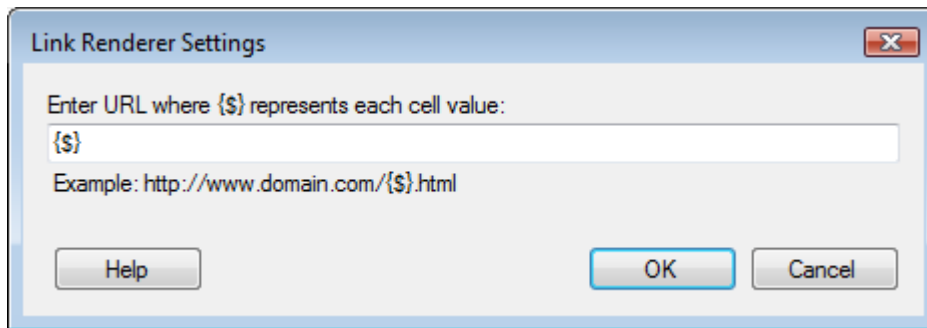
### Example:

If the link is entered as the example in the dialog, http://www.domain.com/{$}.html the result would be:

| Cell value | URL |
|---|---|
| a | http://www.domain.com/a.html |
| b | http://www.domain.com/b.html |
| c | http://www.domain.com/c.html |
| d | http://www.domain.com/d.html |
| e | http://www.domain.com/e.html |

## 4.17.7    Details on Image from URL Renderer Settings

### ► To reach the Image from URL Renderer Settings dialog:

In the Table Properties Columns page, click to select a column that uses the Image from URL Renderer, then click **Settings...** .

**OR**

Click **Settings...** in the Scatter Plot Properties or Map Chart Properties Labels page, or in the Add Tooltip dialog, when Show as: Image from URL has been chosen.

**OR**

Click **Settings...** in the Add/Edit Default Renderer dialog when the Image from URL Renderer has been chosen.

**Note:** If you apply renderer settings from the visualization properties, the settings are applied to that visualization only. If you apply renderer settings from the Add/Edit Default Renderer dialog, the settings are applied to all new visualizations.
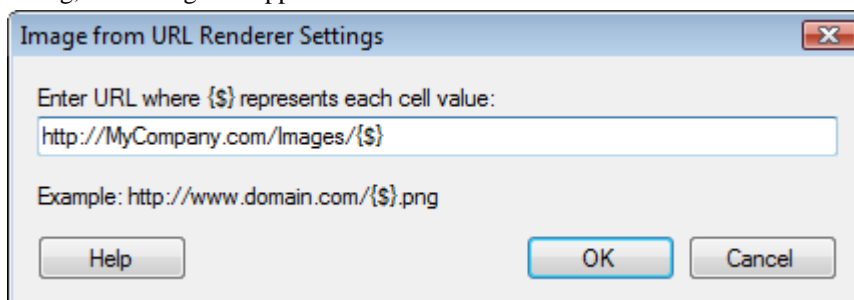
### Examples:

If the images are available on the internet and the link is entered as the example in the dialog, http://www.domain.com/{$}.png the result would be:

| Cell value | URL |
|---|---|
| **a** | http://www.domain.com/a.png |
| **b** | http://www.domain.com/b.png |
| **c** | http://www.domain.com/c.png |
| **d** | http://www.domain.com/d.png |
| **e** | http://www.domain.com/e.png |

If the requested images reside on a company network location you could also specify the path to the folder:

Q:\MyCompany\Images\{$}

**Note:** Since local network paths may be unavailable to other users, the recommended procedure is to use a URL rather than a local network path when publishing analyses to the library.

### Width and Height

If the website allows, you can also specify the width and height of the rendered image (in pixels): http://MyCompany.com/Images/{$}/image?width={$width}&height={$height}

If $width and $height are included in the link template, the image will be rendered using the width and height specified by your current table row height/column width, or, in the case of labels or tooltips, by the size set using the size slider. If not included, the default size will be rendered and changing the size will simply enlarge or shrink the default image.

## 4.17.8 Details on Geometry Renderer Settings

#### ► To reach the Geometry Renderer Settings dialog:

In the Table Properties Columns page, click to select a column that uses the Geometry Renderer, then click **Settings...** .

**OR**

Click **Settings...** in the Scatter Plot Properties or Map Chart Properties Labels page, or in the Add Tooltip dialog, when Show as: Geometry has been chosen.

**OR**

Click **Settings...** in the Add/Edit Default Renderer dialog when the Geometry Renderer has been chosen.

**Note:** If you apply renderer settings from the visualization properties, the settings are applied to that visualization only. If you apply renderer settings from the Add/Edit Default Renderer dialog, the settings are applied to all new visualizations.
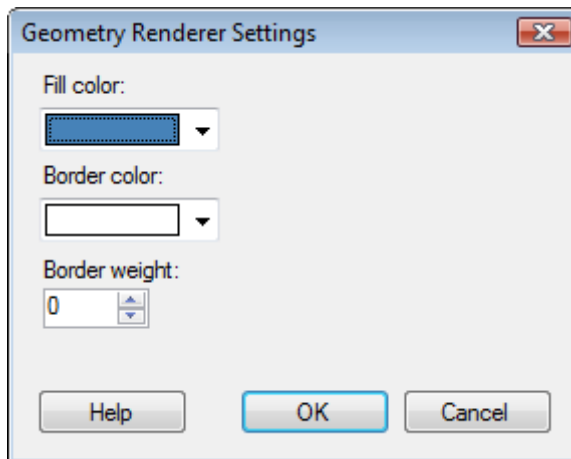
| Option | Description |
|---|---|
| **Fill color** | Defines which color to fill the different geometries with. |
| **Border color** | Defines the color to use for the border surrounding the geometries. |
| **Border weight** | Defines the thickness of the borders of the geometries. |

# 5 Using Visualizations

## 5.1 Interacting with Visualizations

### 5.1.1 Marking in Visualizations

The purpose of marking items (for example, a bar segment, a pie sector, a line, or a marker) or rows in a visualization may be to view details for the item, or to distinguish rows in order to tag, copy, delete, or in other ways manipulate them. Marked rows are given an identifying color in all visualizations. However, if the analysis contains multiple markings (see below), only visualizations using the same marking as the one you modify will be affected.

**Note:** If markings are to be reapplied after reloading linked data, you need to specify key columns that can be used to uniquely identify the rows in each data table. See Details on Select Key Columns for more information.

#### ► To mark a single item:

1. Click on the item.

   Response: The marked item is given a different color. Related visualizations are also updated so that items where the marked item is included are set to the marked color.
   **Note:** Marking a pie or a bar is equivalent to marking all the rows that are included in that pie or bar.

#### ► To mark one or more items in a visualization:

1. Click and drag with the mouse to draw a rectangle enclosing the interesting items.

   Comment: You can also mark a section on an axis to include all items within that section, see below.

   Comment: If you want to mark several items that are spread out in the visualization so that they cannot be enclosed by a rectangular shape, you can use lasso marking instead. Press and hold down the **Alt** key and draw a shape of any form to enclose the items of interest.

   **Note:** Lasso marking cannot be applied to table visualizations.

#### ► To mark one or more items using axis-marking:

1. In a visualization with axes, you can mark items by placing the mouse pointer in the area of the scale labels and then click and drag with the mouse along the axis.

   Response: A rectangle is drawn across the visualization so that you can mark all values between two specified axis values.

   Comment: Marking along the value axis in the bar chart is slightly different than normal rectangle marking; Only those bars with the top part of the bar included within the axis-marking rectangle will be marked. This allows you to select bars with heights within a specific span.

#### ► To add more items to the marked set:

1. Press and hold **Ctrl**.
2. Click on items you want to add, one by one. Alternatively, click and drag with the mouse around several items (while still pressing **Ctrl**).

   Comment: To add more items using the lasso marking technique, press and hold both **Ctrl** and **Alt** when you draw a shape to enclose the items you want to add to the marked set.

#### ► To change the color for marked items:

1. Select **Edit > Document Properties**.
2. Click on the **Markings** tab.
3. Click on the marking of interest and then click on **Edit....**.
4. Change the color and click **OK**.
5. Click **OK** to close the Document Properties dialog.

   Comment: If multiple markings are used within the analysis, you can switch between these in the legend or visualization properties of all visualizations.

#### ► Unmarking:

- Unmark all data by selecting **Edit > Marked Rows > Unmark**. Alternatively, you can unmark everything by clicking on an empty area of any visualization, except the tables.
- Re-marking any marked items while **Ctrl** is pressed will unmark them.
- Click to mark a new item. If **Ctrl** is not pressed, only the new item will be marked.

#### ► To display labels for marked items:

1. Open the **Properties** dialog for the visualization.

   Comment: This is done by right-clicking on the visualization and selecting Properties from the pop-up menu.
2. Click on the **Labels** page in the list on the left.

   Response: The Labels page is displayed. Note that not all visualizations support labels.
3. Select a column to **Label By**.
4. Click the **Show labels for: Marked rows** radio button.
5. Click **Close**.

   Comment: If you want to use an image in the label you may need to apply some other settings as well. See the Labels property page for your specific visualization for more information. For example, Scatter Plot Properties - Labels.

#### ► To filter to marked rows:

You can use marked items in a visualization to filter to data.

1. Make sure you have marked the items you want to filter to in the analysis.
2. Right-click in the visualization and select **Marked Rows > Filter To**.

   Response: Only the marked items remain visible, all other items are filtered out. A new column called "Filtered to at..." with the two values Yes and No is also created in the data table, as well as a corresponding check box filter.

   Comment: The new column and filter make it easy to toggle between viewing all items or only the marked items. There is always just one column for filtered to items in the same data table. If you mark items and select Filter To again, the existing column will be updated with the new selection.

#### ► To filter out marked rows:

You can use marked items in a visualization to filter out data.

1. Make sure you have marked the items you want to filter out in the analysis.
2. Right-click in the visualization and select **Marked Rows > Filter Out**.

   Response: The marked items are filtered out in the visualization. A new column called "Filtered out at..." with the two values Yes and No is also created in the data table, as well as a corresponding check box filter.

   Comment: The new column and filter make it easy to toggle between viewing all items or only the unmarked items. There is always just one column for filtered out items in the same data table. If you mark additional items and select Filter Out again, the

additional filtered out items will be added to the previously created column. You cannot remove items from the created column.

## Using the Keyboard and Mouse to Mark Rows

Using combinations of keyboard and mouse interaction, you can perform more advanced marking. The most common keyboard interaction is to hold down the **Ctrl** key while clicking and dragging the mouse over a set of items to add these to an already existing marking. You can also "step" between items using the arrow keys on the keyboard.

Below is a list of all the keyboard and mouse interaction you can use to mark items.

| Action | Description |
|---|---|
| **Mouseover item** | Highlight item. |
| **Click on item** | Mark clicked item and unmark all other items. |
| **Ctrl + click on item** | Toggle mark for clicked item. Leave other items as is. |
| **Shift + click** | Useful in table visualizations, where you mark all items between the previously marked item and the clicked item. All other items are unmarked. |
| **Ctrl + Shift + click** | Useful in table visualizations, where you mark all items between the clicked item and the previously marked item. Other items are left as is. |
| **Alt + click** | Press Alt and click on a column header or row header in the cross table to mark the entire column or row. |
| **Click and drag** | Mark items within the drawn rectangle and unmark all other items. When you start to drag, a transparent rectangle is shown indicating the area to be marked. |
| **Alt + click and drag** | Mark items within the drawn area of any shape and unmark all other items. When you press Alt and start to drag, a transparent shape is shown indicating the area to be marked. This marking technique, lasso marking, is useful when the items you want to mark cannot be enclosed within a rectangle because of the way they are spread out in the visualization. <br> **Note:** Lasso marking is not applicable to table visualizations. |
| **Ctrl + click and drag** | If none of the items in the drawn rectangle are marked, they are added to the marked items. <br> If all items in the rectangle are marked, they are unmarked. <br> If some items in the rectangle are marked and some not, the behavior differs between table visualizations and other visualizations. In tables and cross tables, marked items are unmarked, and unmarked items are marked. For all other visualizations the marked items will stay marked and the unmarked items will be added to the marked items. |
| **Ctrl + Alt + click and drag** | If none of the items in the drawn area are marked, they are added to the marked items. <br> If all items in the area are marked, they are unmarked. <br> If some items in the area are marked and some not, the marked items will stay marked and the unmarked items will be added to the marked items. |

| | |
|---|---|
| | **Note:** Lasso marking is not applicable to table visualizations. |
| **Shift + click and drag** | Marks the entire line in a line chart if the drawn rectangle contains parts of the line. |
| **Up/Down/Left/Right Arrow key** | Mark the first item above/below/left/right of the previously marked item and unmark all other items. |
| **Shift + Up/Down/Left/Right Arrow key** | Extend the set of marked items up/down/left/right, unless the next item is already marked. If the item is already marked, unmark the previously marked item. |
| **Ctrl + Up/Down/Left/Right** | Move highlight up/down/left/right. |
| **Space** | Mark the highlighted item. Unmark other items. |
| **Ctrl + Space** | Toggle mark for highlighted item. Keep other items as is. |

### Multiple markings

A marking is what identifies marked rows in the data tables of an analysis. If you have multiple data tables in your analysis, you may want to use different markings for the different data tables. For example, if two data tables are completely unrelated to each other it may be a good idea to use different markings with different marking colors for those two data tables. This would lessen the risk of interpreting the marked data in the two data tables as being related to each other.

If the data tables are related, the marked rows can be propagated using the specified key relation between the data tables, provided that the same marking is used. Setting a marking in one data table does not affect the marking of unrelated data tables. Each analysis can hold multiple markings and each marking has its own marking color. One or more markings can be used to limit what data is displayed in a visualization.

► **To define a new marking:**

1. Select **Edit > Document Properties**.

   Comment: You can also define new markings from the Data page of any Visualization Properties dialog.

   Go to the **Markings** tab.
2. Click on the **New...** button next to the Available Markings list.
3. Specify a **Color** for the new marking.
4. Specify a **Name**.
5. Click **OK**.

► **To change what marking to use for a specific visualization:**

1. Right-click on the visualization and select **Properties** from the pop-up menu.
2. Go to the **Data** page.
3. Use the drop-down list to select a different **Marking**.

   Comment: The Marking selector may also be shown in the legend.

## 5.1.2    Highlighting in Visualizations

When you move the mouse pointer over an item (for example, a bar segment, a pie sector, a line, or a marker) in a visualization, a tooltip appears displaying details about the highlighted item. The tooltip displays a few items by default, but it can also be configured to show information from additional columns or expressions.

### ► **To highlight an item:**

1. Point to the item of interest.

   Response: A tooltip will appear with information about the selected item. For example, in a stacked bar chart you will get information about the category that the segment represents as well as the height of that specific segment.

### ► **To change what is displayed in the tooltip:**

1. Open the **Properties** dialog for the visualization.

   Comment: This is done by right-clicking on the visualization and selecting Properties from the pop-up menu.

2. Click on the **Tooltip** page in the list on the left.

   Response: The Tooltip page is displayed.

3. Select the check boxes for the values you want to show in the tooltip, and clear the check boxes for values you do not want to show.

4. If desired, click on the **Add...** button to create expressions or add other columns whose values you want to show in the tooltip.

   Response: The Add Tooltip Value dialog is displayed.

   Comment: See "To display images in the tooltip" below for more information about using images in tooltips.

5. Select the column or expression of interest.

6. Type a **Name** to display.

   Comment: This is the text that will be shown together with the expression value in the tooltip, and also what will be shown in the list of available tooltip values.

7. Click **OK**.

   Response: The Add Tooltip Value dialog is closed and the newly added value is shown in the Tooltip property page.

8. Click **Close**.

   Response: The Properties dialog is closed.

**Note:** In a map chart, the columns available for selection will be limited to those in the selected Data table for markers or pies or the Related data table for coloring, as specified on the Data page. You cannot use the Map data table if this is another data table than those mentioned above.

### ► **To display images in the tooltip:**

Most visualizations can display images from a binary image column, a shape file, or—if you have access to TIBCO Spotfire Lead Discovery—chemical structures in tooltips.

1. Open the **Properties** dialog for the visualization.

   Comment: This is done by right-clicking on the visualization and selecting Properties from the pop-up menu.

2. Click on the **Tooltip** page in the list on the left.

   Response: The Tooltip page is displayed.

3. Click on the **Add...** button.

   Response: The Add Tooltip Value dialog is displayed.

4. Select the **Column** of interest. In some cases, like when you are going to display linked structures, you will select an ID column here, which at a later step is mapped against the desired output.

5. Type a **Name** to display.

   Comment: This is the text that will be shown together with the expression value in the tooltip, and also what will be shown in the list of available tooltip values.

6. If you are a TIBCO Spotfire Lead Discovery user and have selected an ID column to be mapped against structure data in an information link, you need to select **Get**

**content from: Structure Column** in order to display chemical structures in the tooltip.

Comment: Most people will not need to specify anything under Get content from, but your company may have set up other types of custom virtual column producers that can be selected here.

If you have selected something other than (Selected column) under Get content from, you may need to click on **Settings...** and make some changes in the dialog. For example, this is where you would specify which information link to connect to when displaying linked structures in a tooltip.

7. Select **Show as:** [your current structure renderer, e.g., Symyx® Draw (MDL)] or one of the options Image, Image from URL or Geometry. This specifies the type of image to be rendered.

8. If desired, change the **Size** of the tooltip image by moving the slider,

9. Clear the **Include value name in tooltip** check box if you only want to display the image in the tooltip and not the name.

10. Click **OK**.

Response: The Add Tooltip Value dialog is closed and the newly added value is shown in the Tooltip property page.

11. Click **Close**.

### ► **To copy tooltips for marked items:**

1. Mark the interesting visualization items (bar segments, lines, markers, etc.).

2. Right-click on the visualization.

Response: A pop-up menu is shown.

3. Select **Copy** from the menu.

Response:  The tooltips for the currently marked visualization items are copied to the clipboard.

## 5.1.3    Drag-and-Drop

TIBCO Spotfire contains rich possibilities of using drag-and-drop operations for setting up the visualizations. You can drag filters from the filters panel to the axes, or filters or column selectors to drop targets in the middle of the visualizations. These drop targets control coloring, trellising, size or shape, etc. All operations are undoable, so that you can try different layouts without being afraid of destroying anything.

### Column Selectors

Dropping a column (a filter or a column selector) directly on a column selector will change that axis to use the new column instead. Dropping it next to the previous column selector will add another column to the axis.

### Drop Targets

You can drag a filter from the filters panel and move it over the center of a visualization. As you do so, drop targets will appear as shown in the table below. By dropping the filter on, for example, the Color By icon, the visualization will be colored according to the column the filter represents. Other drop targets can be used to set different properties, such as X-axis or Trellis. If you want to assign several columns to one property, you can use **Shift** + **Click** or **Ctrl** + **Click** to select several filters at once.

You can also drag a column selector from, for example, the legend or an axis and drop that on a drop target. The behavior is identical to that of dragging a filter except that the original column selector will be removed unless you hold down **Ctrl** while dragging. This behavior is the same if you drag the columns directly to a column selector.

| Drop Target | Visualization | Description |
|---|---|---|
| | Bar chart ,scatter plot, 3D scatter plot, line chart, parallel coordinate plot, box plot, combination chart | Changes column on the horizontal axis. In most cases this means the X-axis in a visualization, but in a bar chart it depends on the orientation of the bars. In a vertical bar chart, this refers to the category axis; in a horizontal bar chart it refers to the value axis. |
| | Bar chart, scatter plot, 3D scatter plot, line chart, box plot, combination chart | Changes column on the vertical axis. In most cases this means the Y-axis of a visualization, but in a bar chart it depends on the orientation of the bars. In a vertical bar chart, this refers to the value axis; in a horizontal bar chart it refers to the category axis. |
| | 3D scatter plot | Changes column on the Z-axis in the 3D scatter plot. |
| | Bar chart, line chart, parallel coordinate plot, pie chart, scatter plot, 3D scatter plot, map chart, box plot, treemap | Colors the visualization items by the provided column. |
| | Scatter plot, 3D scatter plot, map chart | Changes the markers' shapes according to the values in the provided column. |
| | Scatter plot, 3D scatter plot, map chart | Sizes the markers by the provided column. |
| | Line chart | Splits the lines according to the values in the provided column, unless they have already been split by a more detailed coloring option. |
| | Pie chart | Defines the column or hierarchy whose values will set the size of the pie sectors. |
| | Treemap | Changes the treemap hierarchy to the provided column or hierarchy. |
| | Treemap | Sizes and orders the rectangles in the treemap by the provided column. |
| | Cross table | Changes the cell values of the cross table to the provided column. |

| | Cross table, heat map | Changes the vertical values (Y-axis) to the provided column. |
|---|---|---|
| | Cross table, heat map | Changes the horizontal values (X-axis) to the provided column. |
| | Heat map | Changes the cell values of the heat map to the provided column. |
| | Heat map | Adds the provided column to the cell values of the heat map. |
| | Table, graphical table, summary table | Shows the selected columns in the table (and removes all other columns from the table). |
| | Table | Adds the selected columns to the table. |
| | Summary table | Splits the summary table into different categories. |
| | Bar chart, line chart, parallel coordinate plot, pie chart, scatter plot, 3D scatter plot, map chart, box plot, treemap, combination chart, heat map | Splits (trellises) the visualization into several rows, where the number of panels equals the number of categories in the column provided. |
| | Bar chart, line chart, parallel coordinate plot, pie chart, scatter plot, 3D scatter plot, map chart, box plot, treemap, combination chart, heat map | Splits (trellises) the visualization into several columns, where the number of panels equals the number of categories in the column provided. |
| | Bar chart, line chart, parallel coordinate plot, pie chart, scatter plot, 3D scatter plot, map chart, box plot, treemap, combination chart, heat map | Splits (trellises) the visualization into several panels, where the number of panels equals the number of categories in the column provided. |
| | Bar chart, line chart, parallel | (Only available when a column selector within a visualization is being dragged.) |

| | | |
|---|---|---|
| | coordinate plot, pie chart, scatter plot, 3D scatter plot, map chart, box plot, treemap, combination chart, heat map | Removes a previously applied condition from the visualization. For example, if you have dragged a filter to the "Color by" drop target of a visualization, but later want to remove the coloring, you can drag the color selector from the legend to this drop target. |
| | Combination chart | Splits the visualization according to the values in the column provided. |
| | All visualizations | Attaches the selected tag to the marked rows. |

## 5.1.4 Zoom Sliders

By clicking on the small arrow icon in the title bar of a visualization you can turn on or off zoom sliders for the axes in a visualization. (The icons in the title bar are only shown when hovering with the mouse pointer over the title bar area.)
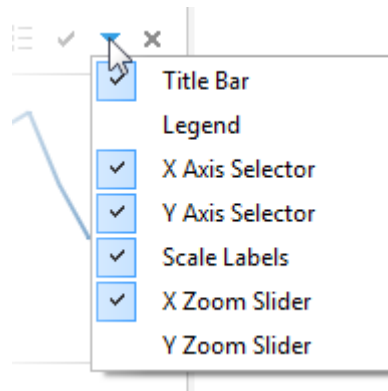


Zoom sliders are used to get a closer look at details in your visualization. The line chart below shows the stock price for a certain stock, from January 2002 to December 2003. Below the chart is a zoom slider with its handles in the end position showing the entire span of the X-axis.
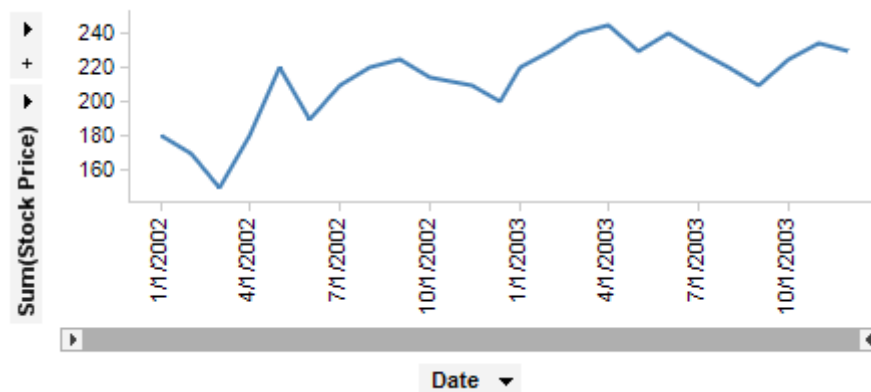


Perhaps you are curious as to what happened to the stock in a narrower span of time, say from November 2002 to May 2003. By adjusting the handles of the zoom slider, the visualization is updated and zooms in on the selected span.
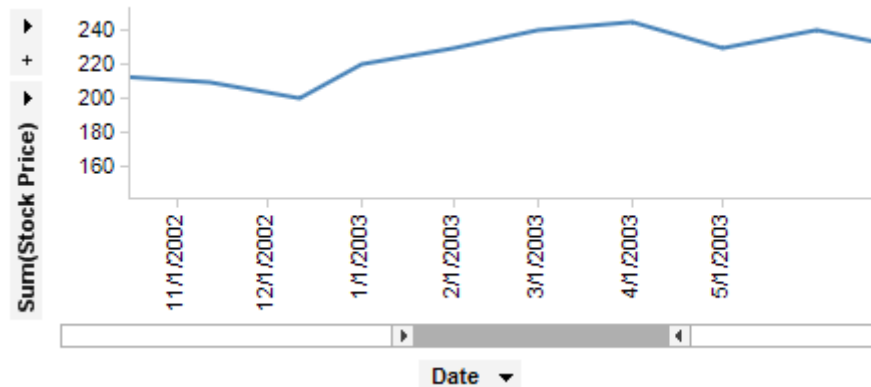
You can now grab the gray part of the zoom slider and drag it to the left or right to pan horizontally. If you like you can also turn on a zoom slider for the Y-axis.

### Zoom to selection

When the zoom sliders are shown, it is also possible to press the **Ctrl+Alt+Shift** buttons on the keyboard and click and drag with the mouse around several items. This will automatically zoom to the selected items, without marking them.

# 5.2 Column Selectors

## 5.2.1 Column Selectors

When you open data in TIBCO Spotfire and create a visualization, you can select which data columns should be used to determine how the visualization looks using column selectors. These are found in three different places:

On the axes of a visualization,

In the legend of a visualization,

In dialogs.

For the most part, column selectors behave in the same way regardless of where they are found in the application. Clicking on the selector brings up a list of all available columns. It is also possible to search for columns in a search field, or to add multiple columns by selecting Select Columns... For information on the syntax for searches, see the Searching in TIBCO Spotfire page.

There are however, some differences between the column selectors found on the axes and the ones found in the legend. See Axis Selectors and Legend Selectors below to learn more.

As mentioned, column selectors are also accessible from dialogs throughout the application. In the properties dialog of a visualization you can always make all the settings that you can make from any axis or legend selectors. From a properties dialog you can also configure more details than in the visualization itself.

### Axis Selectors

Most visualizations in TIBCO Spotfire include some type of axis selectors, where you can change what will be shown on each axis in the visualization.



The axis selectors are the same type of column selectors which are used in almost all places where you can select one or more columns or hierarchies to specify a property. This includes the Visualization Properties dialogs. Clicking on a column selector will display the columns you can select, together with any aggregation measures. See Non-Column Selections to learn about

menu alternatives which are not columns. Right-clicking on the column selector will display a different menu, where additional advanced options can be changed.

### ► To switch column on an axis:

1. Click on the arrow next to the name of the previously used column.
   Comment: In the example above, the arrow next to Year.
2. Select a new column from the menu.
   Comment: All columns that are allowed on the specific axis will be shown.
   Response: The visualization is updated to use the new column.

### ► To switch column on an axis using drag and drop:

1. Select a filter in the filters panel that corresponds to the column you want to use on the axis.
2. Drag that filter from the filters panel to the axis selector area.
   Response: A visual indication is shown depending on where you position the dragged filter.
3. Drop the filter straight onto the axis selector.
   Response: The visualization is updated to use the new column.

On most of the axes, you can select to display more than one column simultaneously. This will create a hierarchical structure on the axis, as seen below:

Year ▾ Category ▾ + ▾

### ► To add a column to an axis:

1. Click on the arrow next to the plus sign on the axis of your choice.
2. Select a new column from the menu.
   Response: The visualization is updated to show data from the new column as well as from the old one.
3. If desired, you can rearrange the order of the current axis columns using a drag-and-drop operation.
   Comment: See "Hierarchies" for more information.

### ► To add a column to an axis using drag and drop:

1. Select a filter in the filters panel that corresponds to the column you want to add to the axis.
2. Drag that filter from the filters panel to the axis selector area.
   Response: A visual indication is shown depending on where you position the dragged filter.
3. Drop the filter next to the axis selector where a thick black line appears.
4. If desired, rearrange the order of the current axis columns using a drag-and-drop operation.
   Comment: See "Hierarchies" for more information.

### ► To remove a column from an axis:

1. Click on the arrow next to the name of the column you wish to remove.
2. Select **Remove** from the menu.
   Response: The column is removed from the axis and from the visualization.

### ► To use a custom expression on an axis:

1. Right-click on the axis of your choice.
2. Select **Custom Expression...** from the menu.

Comment: See How to Insert a Custom Expression for more information.

► **To change the display name on a column selector:**
1. Right-click on the column selector you want to modify.
2. Select **Custom Expression...** from the menu.
3. Under **Display name**, enter the name you want to display on the column selector.
4. Click **OK**.

   Response: The text you entered is now displayed on the column selector.

   Comment: If the axis is set up with more than one column, you need to change the expression itself to modify the name. See below to learn how.

► **To change display name on a column selector with multiple columns:**

If you want to change the display name on an axis that is set up with more than one column, you need to modify the actual expression behind the axis. For example, you may have a line chart where the Y-axis shows one line for sum of sales, and another line for sum of gross profit. The column selectors would then appear as seen below:

**Sum(Sales Total)** ▼ **Sum(Gross Profit)** ▼ + ▼

 You may want to shorten the names on the column selectors to say just Sales and Profit respectively. To do that, follow the steps below:
1. Right-click on the column selector you want to modify.
2. Select **Custom Expression...** from the menu.
3. Under Expression, you will see this text string: **Sum([Sales Total]), Sum([Gross Profit])**.
4. Now modify the text string to say this instead: **Sum([Sales Total]) AS Sales, Sum([Gross Profit]) AS Profit**.
5. Click **OK**.

   Response: The display names on the two column selectors will now be Sales and Profit:

   **Sales** ▼ **Profit** ▼ + ▼

   Comment: If the lines have different colors, you may have to readjust the coloring manually after you have changed the display names on the column selectors.
   Comment: If you only want to change one or some of the names on an axis, just leave the other ones as they are.

► **To dynamically change the column used on an axis by marking in another visualization:**
1. Right-click on the axis of your choice.
2. Select **Column from Marked...** from the menu.

   Comment: See What is Column from Marked? and Details on Column from Marked for more information.

► **To use a property on an axis:**
1. Right-click on the axis of your choice.
2. Select **Set from Property...** from the menu.

   Comment: See Using Properties in the Analysis and Details on Set from Property for more information.
   **Note:** This is a shortcut to set a property on the axis. You can do more advanced settings in the Custom Expression dialog.

## Legend Selectors

In the legend of a visualization, there are different types of column selectors, depending on what kind of visualization you are currently viewing. These selectors provide dimensions to your visualization beyond what axis selectors can do. Right-click anywhere in the legend to open a menu where you can select which column selectors are to be visible in the legend. For more information, see Legend.

Data table:
田 Sugar Content ▼

Marking:
■ Marking 1 ▼

Marker by:
(Row Number) ▼ + ▼

Color by:
Food ▼ + ▼

■ Apples
■ Bananas
■ Corn
■ Cucumber
■ Lettuce
■ Tomatoes

Shape by:
(None) ▼

■ All values

Size by:
(None) ▼

Line connection
Connect by:

(None) ▼

Order by:

(None) ▼

Each of these options are explained in detail in the properties descriptions for each type of visualization.

Note that the column selector **Marker by** may potentially affect how other column selectors can be configured. If you choose to have markers represent the contents of a column, as opposed to column names or row number, and the data in this column is possible to aggregate, the option Aggregation will activate on the appropriate column selectors. TIBCO Spotfire will also try to set the axis selectors to the most meaningful aggregation. See Aggregation for more information.

You can select either (None) or Remove from a column selector to reset it. For example, setting the Size by option in a scatter plot to (None) will make all markers be the same size instead of having the size depend on a certain column.

# 5.2.2    Non-Column Selections

For many visualizations, there are three special options available on the column selector menu: (Column Names), (Row Number), and (Row Count). The use of these options is best described with examples.

## Column Names

The data table below contains sales data for a company's total business during a year, all the sales of fruit and vegetables for 2001.

It has two separate columns stating the sales and cost of each transaction, and we now want to compare the total sum of sales to the total sum of cost.

| Year | Month | Category | Type | Sales | Cost |
|------|-------|----------|------|-------|------|
| 2001 | January | Fruit | Apples | 12 | 10 |
| 2001 | January | Fruit | Pears | 21 | 13 |
| 2001 | January | Fruit | Bananas | 29 | 26 |
| 2001 | January | Vegetables | Cucumber | 9 | 6 |
| 2001 | January | Vegetables | Tomatoes | 13 | 11 |
| 2001 | January | Vegetables | Lettuce | 22 | 20 |

In the image below, we have set up a bar chart where the value axis shows sum of sales, and also sum of cost. The problem now is to decide what to show on the category axis. Normally, we would select a column from the column selector, and each unique value in that column would correspond to a bar. However, this will not help us achieve the bar chart we want now, as seen below.
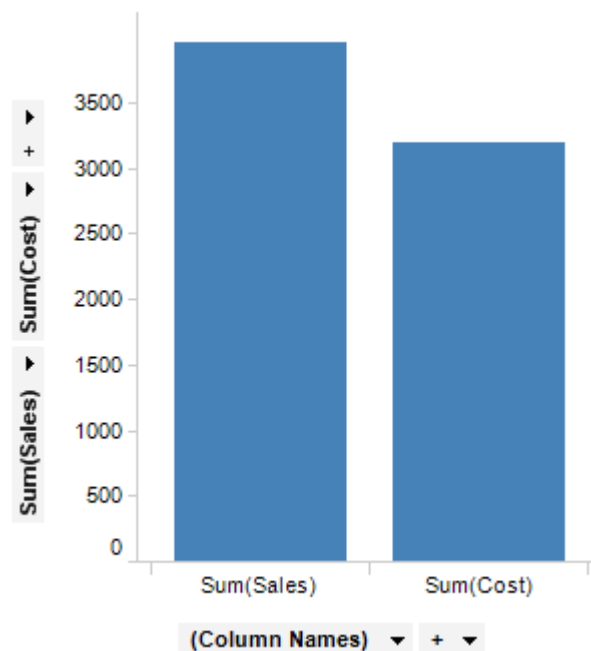


Instead, we select the (Column Names) option from the category axis selector. This means that we take the value column names used on the value axis, and create a bar for each of these names. Since the scale is the same, we can easily plot the two columns as bars beside each other.

In another example where the data table contains several years, we use a line chart to see the trends of the sum of sales and the sum of cost over the years. Again, the Y-axis shows sum of sales and sum of cost, but we want the X-axis to show the years. We therefore have to set (Column Names) on another visualization property in order to see the two different lines. By

setting Color by to (Column Names) we get two lines with different colors, one for each column on the Y-axis.
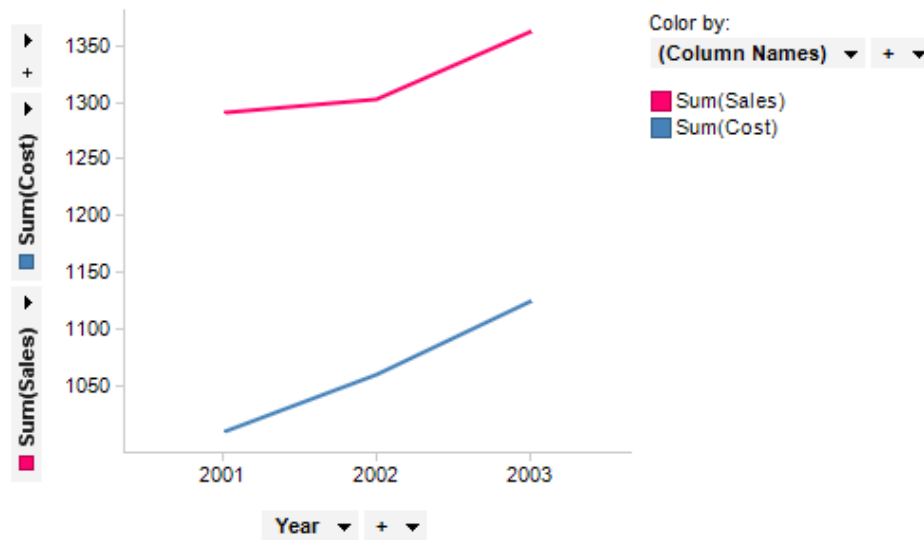


## Row Number

The second special option for the column selectors is called (Row Number). This will plot a bar for each row in the data table (when used on the category axis of a bar chart). As mentioned before, we would normally select a column from the column selector, and each unique value in that column would correspond to a bar. If several rows have the same identical value, these will be aggregated and displayed as the same bar, showing the sum or average of the included values.

Selecting (Row Number) on the category axis selector will let you see each individual transaction (row) as an individual bar, which can be useful for spotting extreme values.
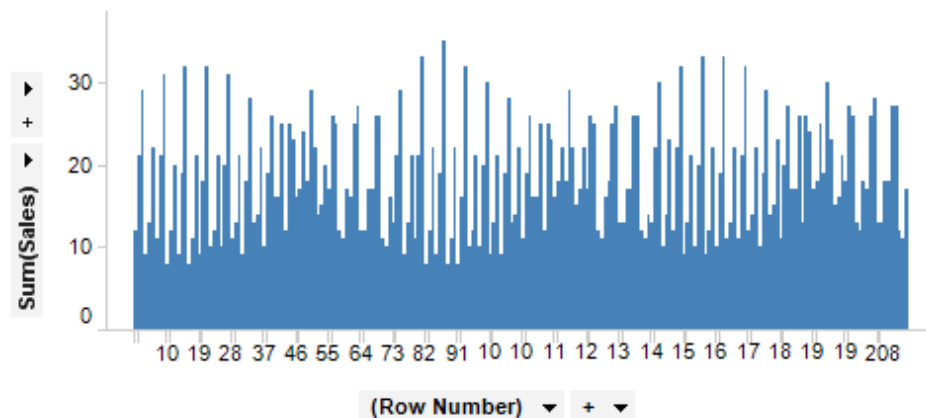


## Row Count

The third special option is called (Row Count), and is used when you want a visualization to display the number of rows in your data table. If you select (Row Count) on the value axis of a bar chart, the height of each bar will show the number of rows that correspond to the selected column on the category axis. The bar chart below shows sales data by order date for each month of a year. (Row Count) was selected on the value axis, which means that the height of each bar shows the number of orders for each month.
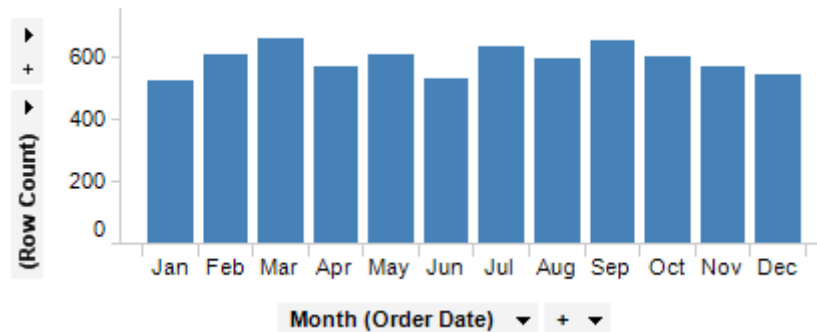
In the example below, a cross table shows the number of sales transactions for fruit, spices, and vegetables in four different sales regions. Each cell in the cross table displays the total number of sales transactions, and in this example the rows have also been colored by (Row Count) to further highlight the cell values.



## 5.2.3      What is Column from Marked?

The Column from Marked function is a way to look up which column to assign to a column selector by fetching the cell value in a data table. The cell would then contain the name of the column you want to assign to a property in a visualization, such as what to use on the X-axis or what to color by.

Use the Column from Marked function when you want to update the visualization iteratively and quickly set another column for the property. Once Column from Marked has been configured, pointing to a new cell by marking a row updates the property. If you only want to configure a visualization to use a certain column, you should not use the Column from Marked function.

### Example:

The Data Relationships tool uses the Column from Marked function to display the results from the calculation. The purpose of the Data Relationships tool is to calculate the correlation between the columns in a table, and then find and display highly correlated columns to see what they look like, one plotted against the other. See What is the Data Relationships Tool? for information about how to perform such a calculation.

The result from the Data Relationships tool is a new data table where each row shows the correlation between two columns from the original data table. The row includes the names of the two compared columns, and values for how well they correlate.

## ▌Data Relationships (Linear Regression) ▦

| Y (numerical) | X (numerical) | p-value ▲ | F Stat | RSq ▾ | R | Df |
|---|---|---|---|---|---|---|
| Height (m) | Weight (kg) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Height (m) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Age | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Age | Weight (kg) | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Height (m) | Age | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |
| Age | Height (m) | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |

## ▌Data Relationships (Details)
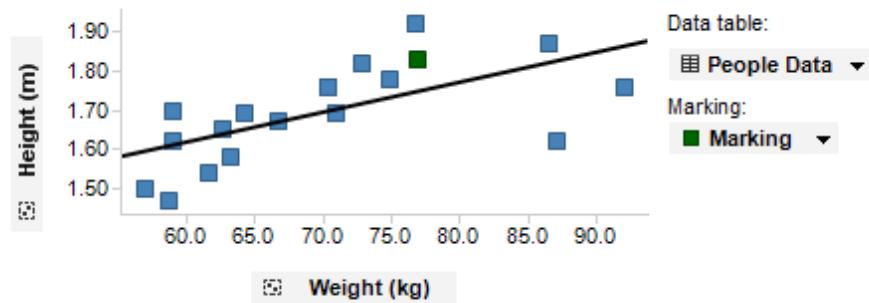


The tool creates two visualizations, one table visualization that displays the new correlation data table, and, in the linear regression case, one scatter plot that shows one column plotted against the other from the original data table. As you mark a row in the new correlation data table, the scatter plot is updated to display the two compared columns from that row. In this configuration, the X- and Y-axes of the scatter plot are configured using Column from Marked. That is, the names of which columns to display are fetched from the marked row in the new correlation data table. You change the marking by clicking on a row in the table visualization.

**Data Relationships (Linear Regression)**

| Y (numerical) | X (numerical) | p-value ▲ | F Stat | RSq ▼ | R | Df |
|---|---|---|---|---|---|---|
| Height (m) | Weight (kg) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Height (m) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Age | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Age | Weight (kg) | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Height (m) | Age | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |
| Age | Height (m) | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |

**Data Relationships (Details)**



The way this is set up, you can quickly browse the correlation between columns by stepping through the rows in the table visualization. To update the scatter plot manually by interacting with the column selectors of the X- and Y-axes would take a much longer time.

## 5.2.4    Details on Column from Marked

The Column from Marked functionality allows you to create a visualization which changes what column is used on an axis depending on what you mark in a different visualization. This makes it possible to create a visualization that is connected to, say, a table visualization for example, in such a way that when you click on the table, the axes of the new visualization will change to show the values of a specified cell in the table. The cell should contain a column name available in the current data table. For an example of how it works, see the automatically created visualizations from a Data Relationships calculation.

► **To reach the Column from Marked dialog:**
  1.  Right-click on the axis selector of the axis of interest.
  2.  Select **Column from Marked...** from the pop-up menu.

**Note:** Once the Column from Marked functionality has been switched on, it will be used to continuously update the visualization until it is switched off. This means that any other configuration that you try to apply to the visualization will be lost each time the marking changes.

| Option | Description |
|---|---|
| **Data table** | Lists the available data tables. This is where you select the data table containing the column with all column names. |
| **Column** | Lists the available columns in the selected data table. Select the column containing all column names that should appear on this axis upon marking. |
| **Row from marking** | Lists the available markings. Select the marking that should define what is shown on this axis. If more than one item is marked, the first item will be used to define the value to use on the axis. |
| **Expression** | |
| **Default as specified above** | The expression is by default set to the plain cell value as specified by the input fields at the top of the dialog. |
| | A suitable aggregation method is automatically selected depending on the type of axis in the visualization. The text "Sales 2004" can, thus, be interpreted as "[Sales 2004]"  on the Y-axis of a scatter plot, as "Sum([Sales 2004])" on the value axis of a bar chart and as "<[Sales 2004]>" on a categorical category axis of a bar chart. |
| **Advanced** | The {0} variable refers to the value defined by the three input fields in the dialog (the plain cell value) and the cell value is automatically escaped to a column expression by the addition of straight brackets. |
| | It is possible to extend this expression and include additional columns and/or apply aggregation methods. |
| | The expression is extended using the same syntax as custom expressions. |

If additional columns are specified, these will appear as individual column selectors for the visualization property once the Column from Marked function has been applied.

Examples:

The expression "{0}, [Sales 2005]" applied on a continuous column containing the column names "Sales YearX" could result in "[Sales 2004], [Sales 2005]" , "[Sales 2003], [Sales 2005]", etc., on the axis, depending on what year was marked.

The expression "Sum({0})" would result in the expression "Sum([Sales 2004])", hence, an aggregated, continuous column on the axis.

The expression "Sum({0}) over AllPrevious([Axis.X])" would result in the expression "Sum([Sales 2004]) over AllPrevious([Axis.X]", hence, a cumulative sum on the axis.

The expression "<{0}>" with a categorical column containing genders would result in the expression "<[Male]>" or "<[Female]>" on the axis, depending on what was marked.

The expression "<{0} nest [Product]>" with a categorical column containing genders would result in the categorical hierarchy "<[Male] nest [Product]>" or "<[Female] nest [Product]>" on the axis, depending on what was marked.

**Sample**       Displays a sample of the currently used expression.

## 5.2.5      Details on Set from Property

This dialog is used to specify that the axis value should be picked from a string document property containing a column or an expression value. See Using Properties in the Analysis for more information.

► **To reach the Set from Property dialog:**

1.   Create a visualization.
2.   Right-click on the column selector where you want to use a property.
3.   Select **Set from Property...** from the pop-up menu.

| Option | Description |
|---|---|
| **Select the property to use** | Click to select a property to use on the axis. Note that only string properties can be used on axes. |
| | The string value of the property will be interpreted as a column name or an expression containing column names. See Properties in Expressions for more information about the syntax for property expressions. |
| **New...** | Opens the New Property dialog where you can define a new property to define the axis. |
| | Note that you can only use string properties on axes. The property should contain a value that can be interpreted as a column or a column expression. |
| **Edit...** | Allows you to edit the first (default) value to use on the selected property. |
| **Delete** | Deletes the selected document property. |

## 5.2.6    Aggregation

Aggregation is the grouping of data using statistical measures. For example, you could select to show the Sum of all Sales for a year or the Average Sale for each month.

To use aggregation, your visualization must meet the following requirements:

The underlying data table must contain at least one numeric column. For example, an Integer, Real, or Currency column.

The visualization type must support aggregation. Some visualizations, like Tables, do not support any aggregation. Others can use aggregation on the coloring axis or some other axis only.

In visualizations which support aggregation  you can aggregate the data using one or more column selectors, for example, the axis selectors or the color selector.

Click on an axis selector and select Aggregation to show a list of common statistical measures to use for aggregation. A submenu with more options is opened if you select More. You may also choose (None), which will remove aggregation from this axis.
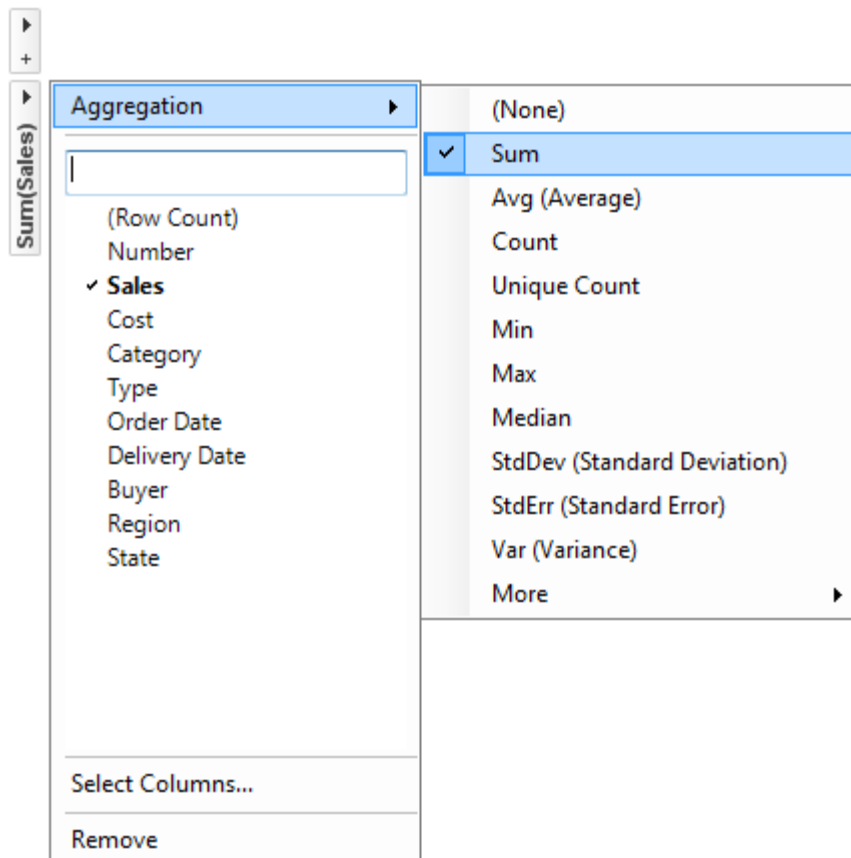


The different options available are statistical measures that may be used to aggregate the data column. For a complete list of what Statistical Measures are available in TIBCO Spotfire, see Statistical Measures Overview. Not all statistical measures will be available at all locations.

### Missing Aggregation Menu?

Some visualizations, for example scatter plots, are not aggregated by default. Instead, they display one item per row (Marker By is set to (Row Number)) and the Aggregation menu is not available in the axis selector. To display the Aggregation menu you need either to set Marker By to (None) or to use the column by which you want to aggregate on the Marker By selector. An axis needs to be aggregated if you, for example, intend to display scatter plot markers as pies.

# 5.3     Legend

The legend can be displayed either as a temporary popover which is visible until you click somewhere outside it, or as a docked part of the visualization. It can be docked either to the left or to the right in a visualization. If the legend is hidden you can click on the Legend button in the visualization features menu to show it (the icons in the title bar are only shown when hovering with the mouse pointer over the title bar area.):
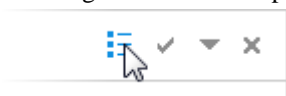
Use the popover when you need to use as much as possible of the screen estate for the visualizations themselves:
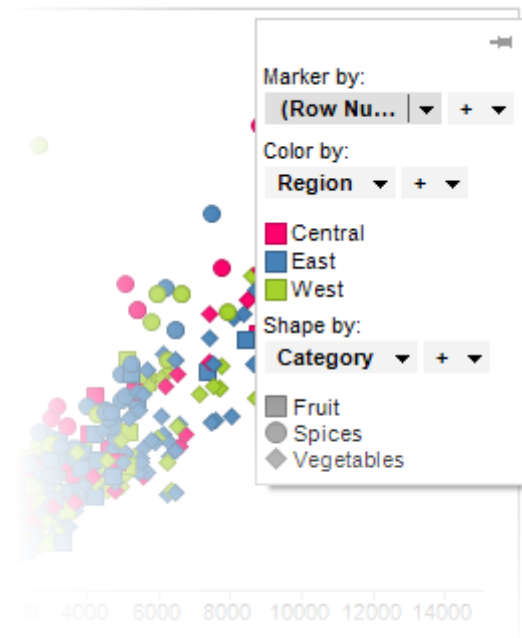


The popover can be turned into a docked legend by clicking on the Dock ikon, ⊢ , at the top right of the popover.

Use the docked legend when the information within it is necessary  for interpreting the visualization at all times, or when the visualization is to be exported to another media, such as a PowerPoint presentation, where the popover is unavailable:
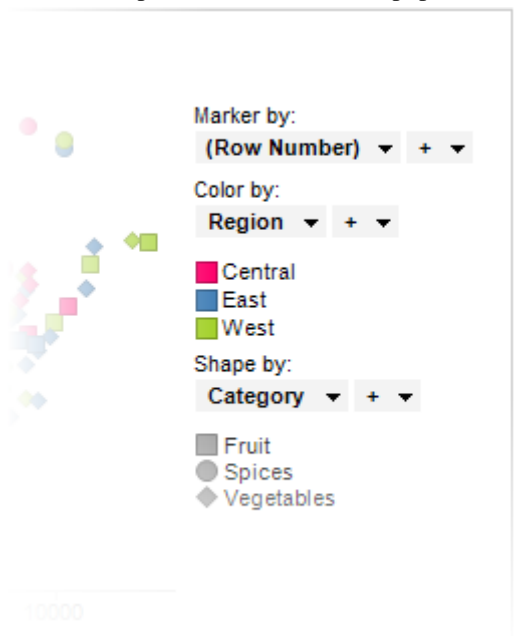


The docked legend will be turned into a popover if you click on the Legend button in the title bar.

By clicking on the small arrow icon in the title bar of a visualization you can show or hide the docked version of the legend:
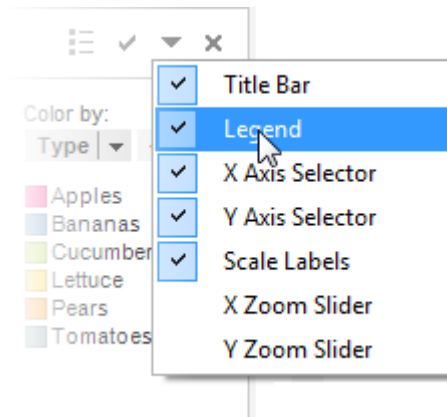
You can also show or hide the docked legend by right-clicking on the visualization and selecting **Visualization Features > Legend** from the pop-up menu, or by using the Legend page in the Visualization Properties dialog.

**Note:** If the visualization becomes too small in either direction, controls such as the legend, zoom sliders, axis selectors, etc., are hidden and cannot be viewed until the size of the visualization is increased.

The legend can present things like what parameter in the visualization is represented by each color. Just like for any other column selector, you can click on the column selectors in the legend and pick another column. In the case of coloring, you can also select multiple columns to color by. This means that each unique combination of the values in the columns you pick will get a unique color. You can change the colors used in the visualization directly from the legend. Click on the color box in the legend to open a color palette where you can select another color. Clicking on the shape icon under Shape by similarly allows you to switch shape.
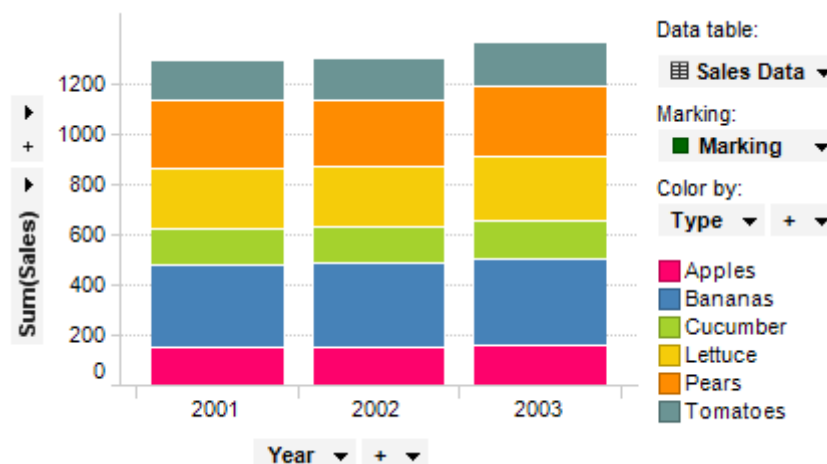


What information is available in the legend by default varies with the visualization type. For example, the legend of a pie chart will show which column determines the size of the pie sectors, and the legend of a scatter plot will state if a column is set to represent marker size or marker shape, etc. You can edit all such parameters, by clicking on the respective column selectors in the legend. When multiple data tables are available in the analysis, the legend for all new visualizations will automatically display a data table selector.

► **To specify what will be visible in the legend:**

1. In the visualization, right-click to display the pop-up menu.
2. Select **Properties**.
3. Click to display the **Legend** page.
4. Select the check boxes for the items you wish to show, and clear the check boxes for items that should be removed from the legend.

5. By clicking on a legend item in the list on the Legend page the **Settings** group box becomes enabled (where applicable). Here you can select whether or not to **Show title** and **Show axis selector** for the selected item.

Comment: Only legend items that can show both title and axis selector will have the setting available. See the description of the Visualization Properties Legend page for more information.

### ► To change the position of the docked legend:

1. In the visualization, right-click to display the pop-up menu.
2. Select **Properties**.
3. Click to display the **Legend** page.
4. Select the **Left** or **Right** radio button..

# 5.4     Shortcuts

### ► To switch to a different visualization:

If you have set up a good layout of visualizations, but then want to change one of the visualizations to a different type, you can right-click on the visualization and select **Switch Visualization To >** [desired visualization].

### ► To change the title of a visualization:

1. Double-click on the visualization title bar.
2. Type a new **Title**.
3. Click **Close**.

### ► To hide the title bar of a visualization:

1. Hover with the mouse pointer over the title bar of a visualization and click on the small arrow to the right.



2. Select **Title Bar**.

### ► To show the title bar of a visualization:

1. Right-click on the visualization.
2. Select **Visualization Features > Title Bar** from the pop-up menu.

   Comment: You can also show the title bar from the General page of the Visualization Properties dialog.

### ► To show the legend for a visualization:

1. If the title bar is displayed, click on the legend icon, ▤.

   Comment: You can also right-click on the visualization and select  **Visualization Features > Legend** from the pop-up menu.

2. If the legend is shown as a popover and you want to lock it to the visualization, click on the Dock button.

### ► To show or hide the scale labels:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on one of the scale labels.
2. Select **Show Labels** on the pop-up menu.

### ► To change the orientation of the scale labels:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on one of the scale labels.
2. Select either **Horizontal Labels** or **Vertical Labels** from the pop-up menu.

### ► To show or hide axis selectors:

1. Hover with the mouse pointer over the title bar of a visualization and click on the small arrow to the right.



2. Select **X Axis Selector** or **Y Axis Selector** from the drop-down menu.

### ► To show or hide gridlines:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on one of the scale labels.
2. Select **Show Gridlines** on the pop-up menu.

### ► To change an axis from continuous to categorical scale:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on one of the scale labels.
2. Select **Categorical Scale** on the pop-up menu.

   Comment: Click Continuous Scale to return.

### ► To change the formatting of an axis:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on one of the scale labels.
2. Select **Formatting** and the desired format from the pop-up menu.

### ► To hide empty values from a categorical time-series axis:

This is applicable to visualizations with traditional axes only, such as scatter plots, line charts, bar charts, etc.

1. Right-click on the scale labels for the categorical axis.
2. Select **Categories > Show Filtered Values** from the pop-up menu.

   Comment: Show Filtered Values will only display those categories where values are present, and hide all categories without values. Show Filtered Range will only remove empty values from outside of the current range where values are present.

# 5.5    Hierarchies

## 5.5.1    Hierarchies

By adding more than one column to the axis selectors, you can create a hierarchy in the visualization. In the example below the column Year and the column Category have been added to the category axis. The bar chart automatically displays a bar for each combination in the hierarchy - in this case the sale of fruit and vegetables per year.
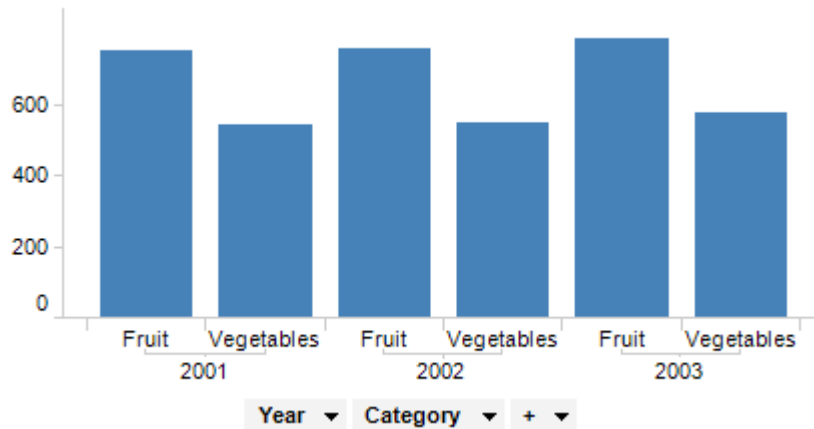
You can change the hierarchy order, if you prefer to see the bars in another way. Drag the Category axis selector and drop it to the left of the Year axis selector.



This causes the bar chart to change the order of the bars. As you can see below, the bars concerning fruit sales are now placed next to each other. Note how the hierarchy displayed in the labels below the bar chart corresponds to the order of the axis selectors.
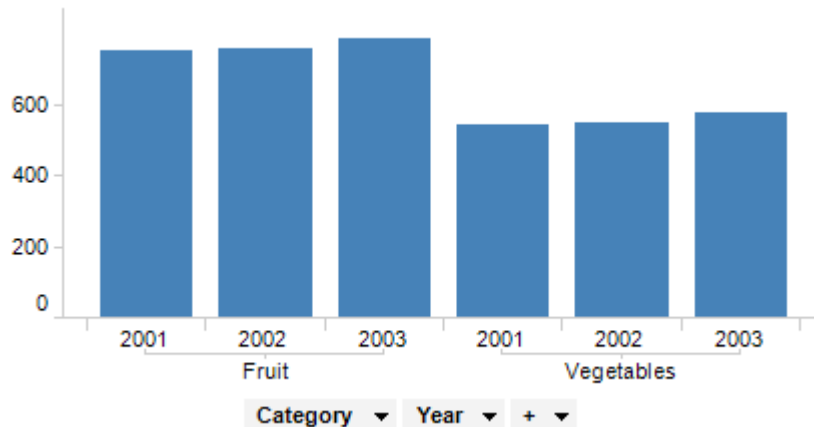


The order of columns can also be changed in the Visualization Properties dialog, either by drag-and-drop, or, by right-clicking on a column selector and selecting Move Up/Move Down or Move Left/Move Right from the pop-up menu.

Using predefined hierarchies, you can create even more powerful axis hierarchies and get access to the hierarchy slider - a tool that helps you change the level of detail in a visualization fast and easily. Predefined hierarchies are also necessary if you want to set up hierarchy filters.

## 5.5.2     Hierarchy Slider

As explained in the Hierarchies chapter, adding multiple columns to the column selectors creates a hierarchy in the visualization. However, you can also add "predefined" hierarchies to your column selectors. A predefined hierarchy is a hierarchy that has been set up while working with the data itself, or while creating a hierarchy filter in the filters panel. These hierarchies are even more powerful, and provide an additional feature in the visualization - the hierarchy slider.

### Example of the Hierarchy Slider

Suppose you have a hierarchy filter called Date of Sale, which consists of a hierarchy of Year/Quarter/Month.

Drag this filter and drop it onto the axis selector of the category axis of a bar chart. This is the result:
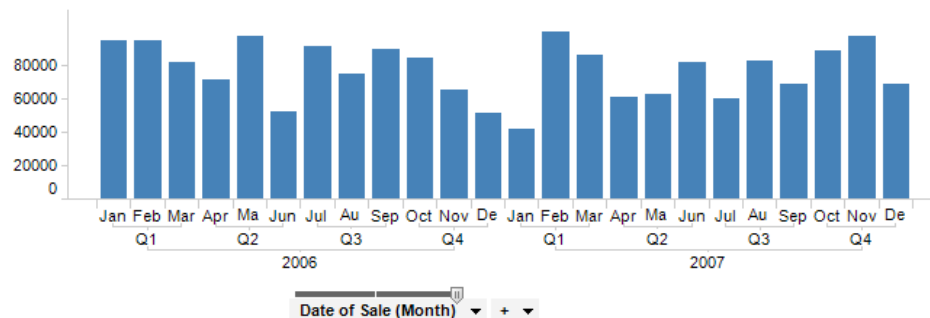


Since the filter was a hierarchy filter, the labels underneath the bar chart states which bars represent the sales for each month, but they also show which months are part of a quarter, and which quarters are part of a certain year.

You will note that there is only one axis selector, unlike in the example using many columns on the axes to build a hierarchy, where there were several axis selectors. You will also note that there is a slider on top of the axis selector. This is the hierarchy slider, a tool that lets you change the level of detail of the visualization. If you were to drag the handle of the hierarchy slider one step to the left, this is what would happen to the bar chart:



The bars are now automatically updated to show the total sales for each quarter, instead of for each month. Dragging the handle yet another step would update the bar chart to show the total sales for each year.

The hierarchy slider will appear for all predefined hierarchies. These can be geographical trees showing continent/country/city, or product categories and the products therein, etc.

## Time Hierarchies

When you are working with time-series data (Date, Time or DateTime columns) you have the choice to either use a part of the time or date, or to set up a hierarchical structure directly. The hierarchical model allows you to quickly change the time resolution in your visualization. You simply go to the time-series column using the column selector menu, see the lower part of the menu and select the hierarchical structure of your choice. The hierarchy slider will be shown immediately.
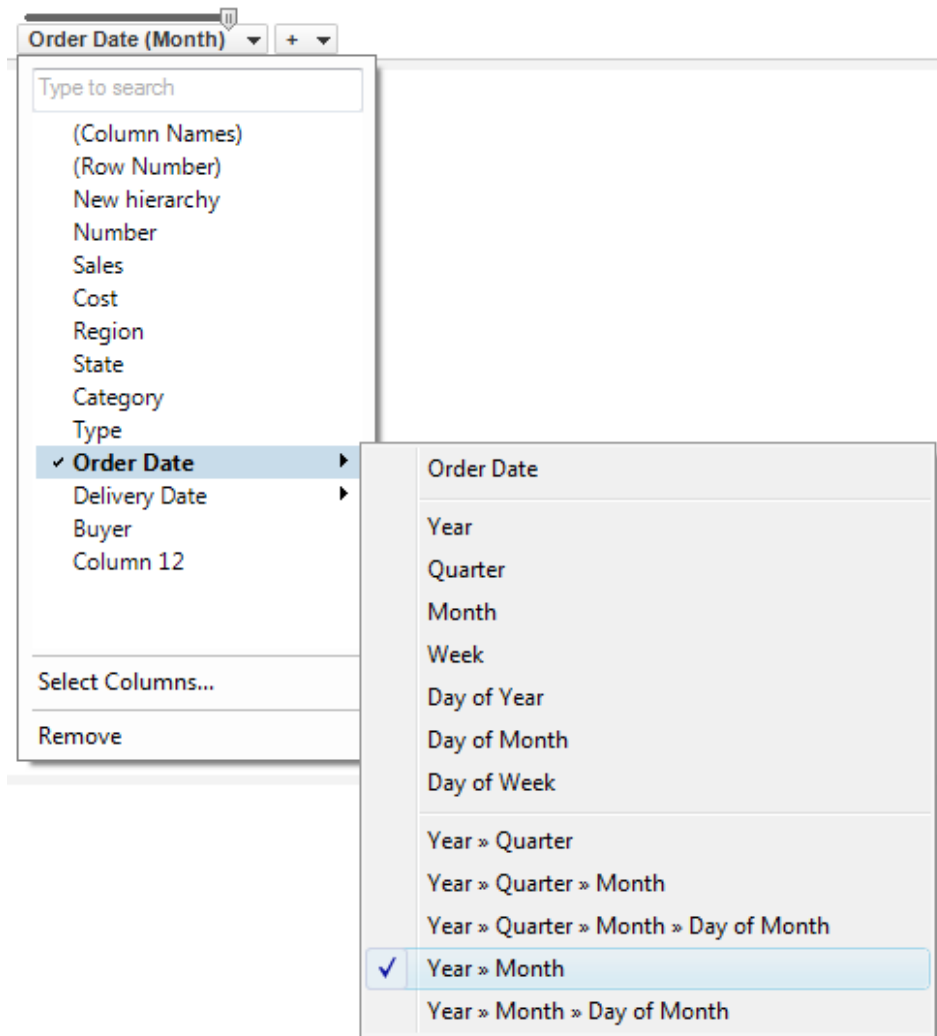
Set the level of detail to show in the visualization by using the hierarchy slider as discussed above. See Working with Time Hierarchies for more details about how time-series data can be handled.

If you instead select a single time part you will not have the hierarchy slider available in the visualization and the only time part available will be the one you selected:



## 5.5.3      **Working with Time Hierarchies**

Sometimes you may work with data where some category values are missing. If the visualizations make use of a Date, Time or DateTime column and you like to present the data in an aggregated form, missing data may have strange effects on your calculations. For example, below is a cumulative sum of sales for a few years, where data for three quarters are missing:
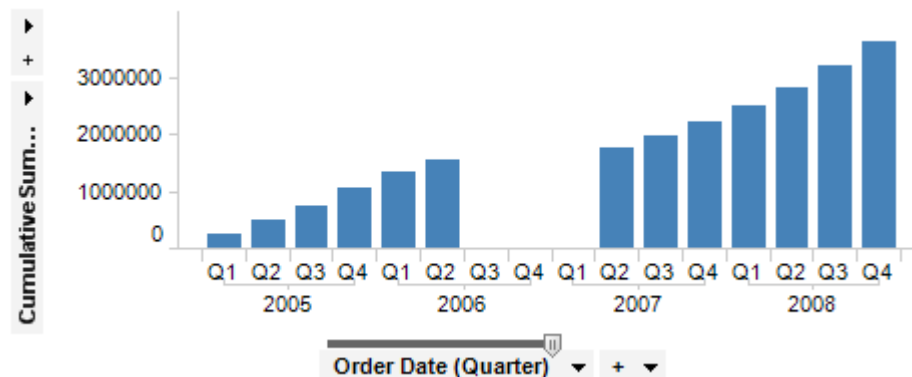


In this example, you might want the bars for the missing quarters to be of the same size as the last available bar rather than completely missing. This can be accomplished by using **Compensate for missing values** via the **Appearance** page of the visualization. Compensate for missing values is available in the bar chart, line chart and combination chart. It introduces a gap-filling mechanism where empty values can be temporarily inserted for the missing rows. This way, the cumulative sum can instead show the same value as the last available bar for the bars with missing data:



**Note:** Compensate for missing values only works with true Date, Time or DateTime columns. The check box will have no effect on a hierarchy made by putting together string values from different columns (such as Year, Month and Day).

Data values in general can be valid values (non-null and non-error), invalid values (errors, such as a value of a different data type than the rest), or empty values (where the row identifier is there, but there is no value in the value column). There may also be completely missing categories. For most kinds of data, this may be difficult to handle, but time-series can be filled out with the missing data points, since it is always possible to calculate which time points

should have been available. TIBCO Spotfire can temporarily add the missing rows and fill them with empty values so they can be used in calculations.

When Compensate for missing values is used, the max and min values in the time column are determined. Then all missing steps, depending on the time hierarchy level, are added.

Multiple date/time parts on different axes can be combined in a visualization as long as the same date/time column is used.

## Categories

When categorical time values are used in a visualization, you can control what to show using the **Categories** setting on the axis. If you want to completely hide those categories where no data is available (either due to filtering or to missing data) this can be done by selecting the Show Filtered Values setting:



In the first image on this topic, there is an example of a visualization with missing values where no compensation for missing values has been made and the Show Filtered Range setting has been selected. This option will only hide empty categories on each side of the range, but not in the middle. There is also an option to Show All Values where the currently filtered-out values on the sides also remain visible.

Change the setting in the Advanced Settings dialog or by right-clicking on the visualization axis and selecting Categories and one of the options from the pop-up menu. Use zoom sliders to work with continuous time axes.

## Mixed Hierarchies

Mixed hierarchies with both date and/or time parts (from the same datetime column) and other categories are supported by treating the categories as part of the group by hierarchy. The combinations to show are specified in the Advanced Settings dialog or using a custom expression.

## Max Number of Added Rows

If the range of the date/time column is significantly larger than the step size, a huge number of rows may be needed when compensating for missing values. For example, this will be the case when the step size is millisecond and you have dates spanning several years. For performance reasons a property limit is defined, determining the max number of rows that can be inserted. The **MaxMissingTimeParts** property can be changed under Edit > Document Properties, Properties tab. An administrator can also change this preference by going to Tools > Administration Manager, Preferences tab, and then clicking on DataOptimizationPreferences under DataOptimization and editing the MaxMissingTimeParts preference.

Note that the limit for max number of rows to add is based on the size of the span and not on the actual missing values. This means that if the preference value is set too low, you may encounter this limit even though not that many time parts were missing in the current setup. If the message "Could not compensate for missing values. The document property value for MaxMissingTimeParts has been exceeded." is encountered, you might want to increase the property value, but the solution may also be to clear the Compensate for missing values check

box or simply to try to reduce the granularity on the time series axis by using a hierarchy slider (if one is available).

### Marking Temporarily Added Rows

When a visualization item based on temporarily added rows is marked it will look like a regular marking in the visualization. However, since no real rows are marked, this marking will not be propagated to any other visualizations nor to the Details-on-Demand.

### BinByDateTime

A time hierarchy is actually built using the BinByDateTime function. This function uses three arguments: 1) The Date, Time or DateTime column, 2) the hierarchy definition as a string of the date parts separated by dots, and 3) the pruning level (meaning which level to start the hierarchy slider position on). For example, BinByDateTime([Column],"Year.Quarter.Month.Day",2)

## 5.6     Trellis Visualizations

Trellised visualizations enable you to quickly recognize similarities or differences between different categories in the data. Each individual panel in a trellis visualization displays a subset of the original data table, where the subsets are defined by the categories available in a column or hierarchy.

For example, if you choose to trellis a visualization based on the two variables "Gender" and "Political affiliation", this will result in four separate panels representing the combinations Female-Republican, Female-Democrat, Male-Republican, and Male-Democrat. If the "Gender" variable is used in conjunction with another variable that has five different values, this will yield ten panels. From this follows that variables with a continuous distribution and a wide range of values (for example, Real values) should be binned before they are used to form a trellis visualization. Otherwise the number of panels quickly becomes unmanageable.

### Example:

This is a standard non-trellised scatter plot:
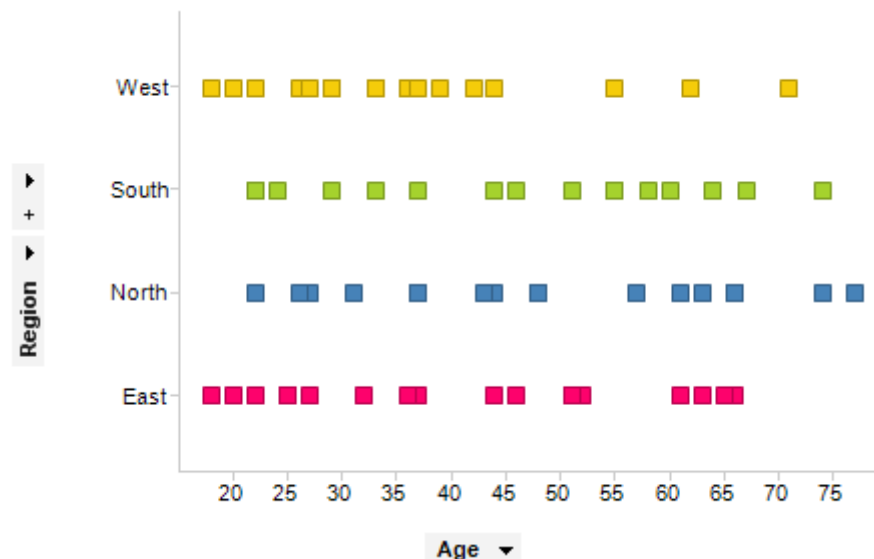


By trellising this visualization based on Gender and Political affiliation, it will look like this:
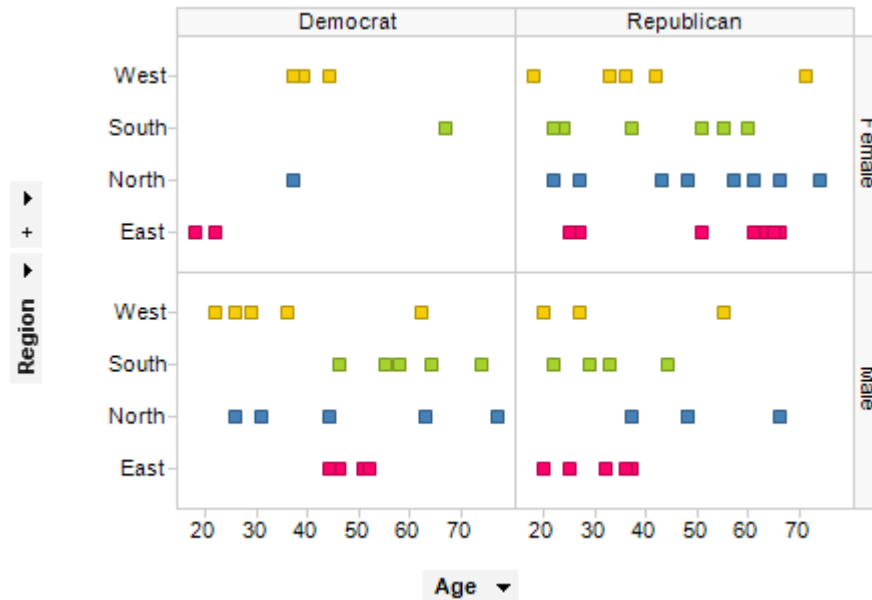
### ► To trellis a visualization:

1. Select the visualization you want to trellis.
2. Right-click on the visualization and select **Properties**.
3. Select **Trellis**.
4. Select the **Rows and Columns** you want to trellis by.
5. Specify additional trellis parameters, and click **Close**.

# 5.7 Information and Warnings

### Information Icons in Visualizations

If there are items in a visualization that cannot be shown or might be misinterpreted because of some settings, an icon will appear in the title bar of that visualization. If something cannot be shown, a notification icon, 🛈, will appear. If there is a risk that something might be misinterpreted due to lack of data to calculate a curve or similar, a warning icon, ⚠, will appear. On mouseover, a tooltip will appear, and if you click the icon a longer description will appear.

### Details Link

If you are currently running some heavy calculations, or, if there is some trouble with the loaded data or a calculation in the analysis, you will see a Details... link in the lower left corner of the TIBCO Spotfire window.
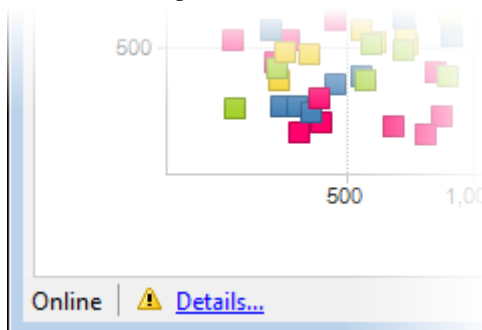
Click on the link to display progress information or notifications about current issues. You can copy alerts to the clipboard and use the information when communicating with others during troubleshooting of an analysis.

# 5.8 Statistical Measures

## 5.8.1 Statistical Measures Overview

TIBCO Spotfire contains several visualizations and tools which calculate various measures. For a description of each measure, see the corresponding section.

**Note:** For measures where a large statistical selection is needed, the result from a calculation may vary with the number of available values.

## 5.8.2 Sum and Product

### Sum

The sum of all values in the subset. If no categorization has been applied, then the sum will show the total sum of all values in each column: $Sum = x_1+x_2+x_3....$

### Product

The product of all values in the subset. If no categorization has been applied, then the product will show the total product of all values in each column: $Product = x_1*x_2*x_3....$

## 5.8.3 Average

The mean, or average, is calculated as the sum of all values in the distribution divided by the number of values.

The arithmetic mean value, $\bar{x}$, is calculated as:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

## 5.8.4 Count

The *Count* measure gives the number of values in a column, not counting empty values. In the table below, Column A has a *Count* of 3, while Column B has a *Count* of 4.

| Column A | Column B |
|---|---|
| 1 | 4 |
|  | 7 |
| 8 | 3 |
| 9 | 6 |

# 5.8.5     Unique Count

The *Unique Count* measure gives the number of unique (distinct) values in a column. Empty values are not counted. In the table below, column A has a unique count of two and column B has a unique count of three.

| Column A | Column B |
| --- | --- |
| 1 | 4 |
|   | 4 |
| 1 | 3 |
| 9 | 6 |

# 5.8.6     Min and Max
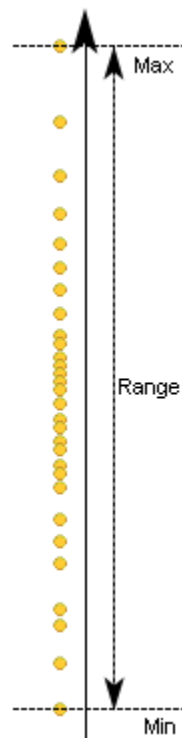


Max is the maximum (highest) value of the selected subset.
Min is the minimum (lowest) value of the selected subset.
Range = Max-Min.

# 5.8.7     Median

The median of a distribution is the value which, when the distribution is sorted, appears in the middle of the list. If the number of values is even, the median is computed by taking the average of the two middle values.

The median is sometimes called the **location** of the distribution.

# 5.8.8     Standard Deviation

The standard deviation (StdDev), *s*, is an indication of how dispersed the probability distribution is about its center. It is computed as follows:

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

where

- $\bar{x}$ is the average value of the group
- $n$ is the number of values in the group (Count)

If the number of values (n) is one, an error is returned.

## 5.8.9 Standard Error

The standard error (StdErr) is the standard deviation of the calculated mean. It is calculated as the estimated standard deviation divided by the square root of the size of the sample.

## 5.8.10 Variance

The sample variance, $s^2$, is an indication of how dispersed the probability distribution is about its center. It is calculated as follows:

$$s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

where

- $\bar{x}$ is the average value of the group
- $n$ is the number of values in the group (Count)

If the number of values (n) is one, an error is returned.

## 5.8.11 Confidence Intervals

Confidence intervals are calculated as:

$$\bar{x} \pm \frac{1.959964 \times s}{\sqrt{n}}$$

where

- $\bar{x}$ is the average value of the group
- $s$ is the sample standard deviation
- $n$ is the number of values in the group (Count)

The L95 value is the lower endpoint of the confidence interval.

The U95 value is the upper endpoint of the confidence interval.

## 5.8.12 Percentiles and Quartiles

### Percentiles

A percentile is a measure at which that percentage of the total values are the same as or below that measure. For example, 90% of the data values lie below the 90th percentile, whereas 10% of the data values lie below the 10th percentile.

### Quartiles

Quartiles are values that divide a (part of a) data table into four groups containing an approximately equal number of observations. The total of 100% is split into four equal parts: 25%, 50%, 75% and 100%.

The *first quartile* (or lower quartile), Q1, is defined as the value that has an f-value equal to 0.25. This is the same thing as the twenty-fifth percentile. The *third quartile* (or upper quartile), Q3, has an f-value equal to 0.75. The interquartile range, IQR, is defined as Q3-Q1.

### ► The percentiles and quartiles are computed as follows:

1. The f-value of each value in the data table is computed:

$$f_i = \frac{i-1}{n-1}$$

   where $i$ is the index of the value, and $n$ the number of values.

2. The first quartile is computed by interpolating between the f-values immediately below and above 0.25, to arrive at the value corresponding to the f-value 0.25.

3. The third quartile is computed by interpolating between the f-values immediately below and above 0.75, to arrive at the value corresponding to the f-value 0.75.

4. Any other percentile is similarly calculated by interpolating between the appropriate values.

### Example:

| Value | f-value |
|-------|---------|
| 4 | 0 |
| 8 | 0.2 |
| 9 | 0.4 |
| 11 | 0.6 |
| 16 | 0.8 |
| 17 | 1.0 |

Interpolation at f-value=0.75 yields Q3=14.75.
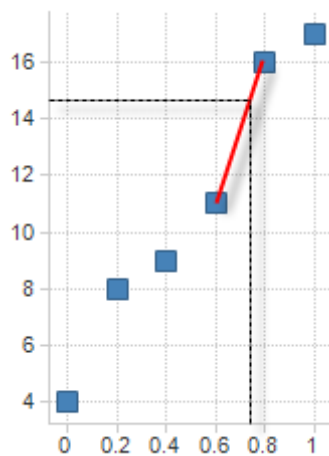
## 5.8.13    Adjacent Values and Outliers
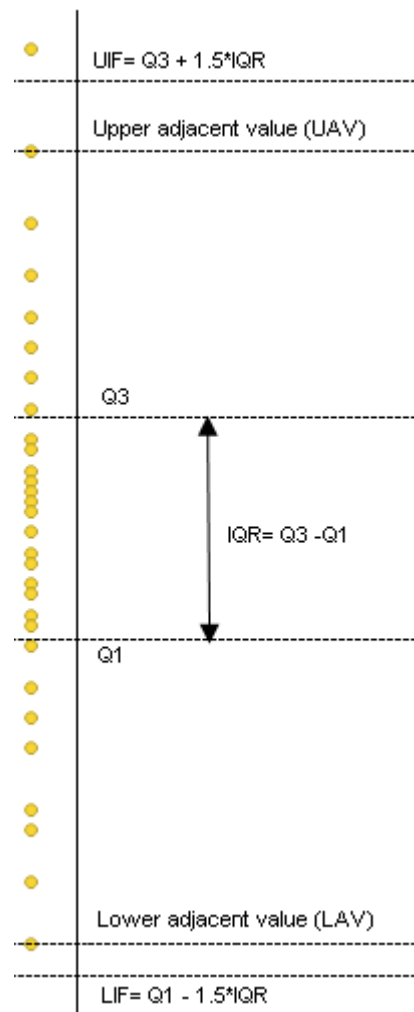


### Adjacent values

Let IQR be the interquartile range.

The upper adjacent value (UAV) is the largest observation that is less than or equal to the upper inner fence (UIF), which is the third quartile plus 1.5*IQR.

The lower adjacent value (LAV) is the smallest observation that is greater than or equal to the lower inner fence (LIF), which is the first quartile minus 1.5*IQR.

**Note:** If, by the above definition, the UAV is such that it is smaller than Q3, then it is set equal to Q3. Similarly, the LAV is never allowed to be greater than Q1.

### Outliers

Outliers are all values that fall outside either of the fences. Outside values are values that fall in between the inner and outer fences. Far out values are outside the outer fence.

The upper outer fence (UOF) is defined as the threshold located at Q3 + (3*IQR). The lower outer fence (LOF )is defined as the threshold located at Q1 – (3*IQR).

The outlier percentage is the count of outliers divided by the total count for each category.

## 5.8.14    Concatenate and Unique Concatenate

The Concatenate measure appends all values in the subset into a string.

The Unique Concatenate measure appends all unique values in the subset into a string. This means that each value will only be included in the string once.

### Example:

| Column A | Column B | Column C |
|----------|----------|----------|
| 1 | 1 | 1 |
| 1 |   | 3 |
| 1 | 3 | 3 |

With the columns from the table above, the following result would be given:

| Column | Concatenate | Unique Concatenate |
|--------|-------------|--------------------|
| A | 1, 1, 1 | 1 |
| B | 1, 3 | 1, 3 |
| C | 1, 3, 3 | 1, 3 |

## 5.8.15    First and Last

First returns the first valid value based on the physical order of the rows of data in the selected column.

Last returns the last valid value based on the physical order of the rows of data in the selected column.

## 5.8.16    Geometric Mean

The geometric mean is the $n^{th}$ root of the product of all values in a distribution, where n is the number of values. It is generally preferred over the arithmetic mean when working with normalized values, percentages or exponential values. It is not suitable for calculations including any negative values or zeros.

The geometric mean value, G, is calculated as:

$$G = \sqrt[n]{x_1 x_2 \ldots x_n}$$

## 5.8.17    Mean Deviation

The mean deviation (average absolute deviation, AAD) is calculated as the mean of the absolute difference between a value and the mean value of the group:

$$Mean\ Deviation = \frac{1}{n}\sum_{i=1}^{n}|x_i - \bar{x}|$$

where

- $\bar{x}$ is the average value of the group
- $n$ is the number of values in the group (Count)

## 5.8.18    Median Absolute Deviation

The median absolute deviation (MAD) is calculated as the median of the absolute value of each value, $x_i$ minus the median of x:

$$MAD = median(|x_i - \tilde{x}|)$$

where

- $\tilde{x}$ is the median value of the group

The median absolute deviation is used instead of the mean deviation when the deviation value needs to be less affected by extreme values in the tail. This is due to the fact that the median is less affected by the tail values than the mean is.

## 5.8.19    Most Common

Returns the most common value of the selected column. If several values are equally common, the first one will be used.

# 6 Enhancing Visualizations

## 6.1 Coloring

### 6.1.1 Coloring Overview

By coloring the items in a visualization you can add an extra dimension to your data. For instance, you can use colors to identify outliers in the data, or to distinguish different categories. In TIBCO Spotfire there are many ways to customize the coloring in your visualizations. Most of the coloring settings can be found on the Colors page of the Visualization Properties for each visualization type. Configuration of the coloring settings works in a similar way for most of the visualization types. However, for the table, cross table, and heat map it works in a slightly different way. Coloring for those visualizations is therefore described separately.

To learn more about coloring in Spotfire, see the following sections:

Color Schemes Overview

Color Modes Overview

Color Rules Overview

Coloring in Tables, Cross Tables and Heat Maps

### 6.1.2 Color Schemes

#### 6.1.2.1 Color Schemes Overview

The entire setup of colors for a visualization is referred to as its color scheme. Which colors and threshold values you choose, as well as the color mode you select, are all part of a visualization's color scheme. The current color scheme of a visualization can be viewed in the legend, and on the Colors page of the Visualization Properties. This is also where you edit a color scheme. In the example below two scatter plots are shown. Their respective color schemes are displayed in the legend.
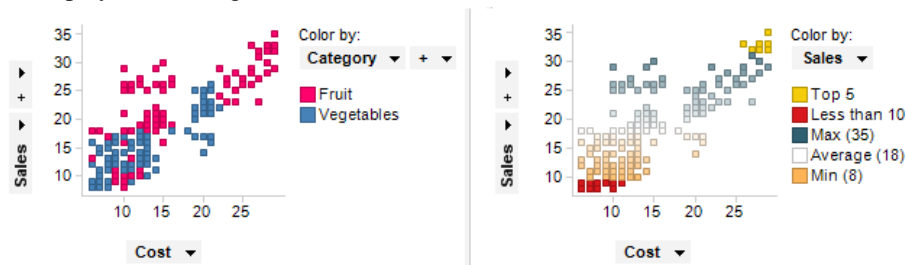


The visualization on the left has a color scheme with only two colors, each representing a category, while the visualization on the right has a color scheme with a somewhat more complex configuration. While the left color scheme can be defined directly in the legend, the right visualization's configuration requires that you open the Visualization Properties dialog. The two color schemes above are in different scale modes. The one on the left is a categorical color scheme, which means that it is colored by a categorical column. In this case, the column Category contains string values. The color scheme on the right is continuous. It is colored by the continuous column Sales, which contains Integer values. Different scale modes also create different possibilities. When setting up a color scheme for a visualization, the color mode you choose is essential. Since the available settings differ between different color modes, each mode is described separately. See Color Modes Overview to learn more about how to set up color schemes in each of the color modes.

Once you have configured a color scheme, you can save and reuse it in a number of ways. For example, you can apply a color scheme to another visualization in the same analysis. You can also save a color scheme to disk for later use, or in the library to share it with other users. When you are about to set up a new color scheme, you can make use of one of the predefined color schemes as a starting point, and then modify it to your liking.

The following sections describe how you can use and reuse color schemes in a number of ways:

Opening a Color Scheme

Predefined Color Schemes

Applying a Color Scheme to Another Visualization

Saving a Color Scheme

## 6.1.2.2    Opening a Color Scheme

You can open a color scheme that has previously been saved to disk or to the library. You can also apply a color scheme from another visualization in the analysis, or open a document color scheme. The color scheme must be in the same scale mode as the visualization in which you want to use it.

### ► To open a color scheme from file:

1.  Open the **Visualization Properties** dialog, and go to the **Colors** page.

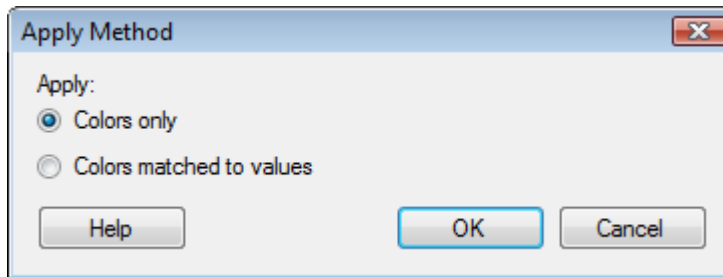2.  Click on the Color Schemes menu icon, .

3.  Select **Open from File...**.

    Response: A dialog where you can browse for a previously saved color scheme is opened.

4.  Browse to the color scheme of interest and click **Open**.

    Response: If it is a gradient color scheme, the selected color scheme is applied to the visualization. Otherwise, the Apply Method dialog is opened, continue to step 5.

5.  Click the **Colors only** radio button to apply only the colors in the color scheme to the visualization. Click **Colors matched to values** if you want to match the colors in the color scheme to the values in the visualization.

    Comment: See Details on Apply Method for an example of how the two options work.

6.  Click **OK**.

    Response: The selected color scheme is applied to the visualization.

### ► To open a color scheme from the library:

1.  Open the **Visualization Properties** dialog, and go to the **Colors** page.

2.  Click on the Color Schemes menu icon, .

3.  Select **Open from Library...**.

    Comment: The menu option Open from Library is not available if you are working offline (without a connection to a server).

    Response: The Open from Library dialog is opened.

4.  From the **Available color schemes** list, select the color scheme you want to open.

    Comment: To limit the amount of items shown in the list, you can click on a keyword in the panel to the left. You can also search for a color scheme by entering a file name, or part of a file name in the search field.

5.  Click **OK**.

    Response: If it is a gradient color scheme, the selected color scheme is applied to the visualization. Otherwise, the Apply Method dialog is opened, continue to step 6.

6.  Click the **Colors only** radio button to apply only the colors in the color scheme to the visualization. Click **Colors matched to values** if you want to match the colors in the color scheme to the values in the visualization.

    Comment: See Details on Apply Method for an example of how the two options work.

7.  Click **OK**.

    Response: The selected color scheme is applied to the visualization.

### ► To apply a color scheme from a visualization:

1.  Open the **Visualization Properties** dialog, and go to the **Colors** page.

2.  Click on the Color Schemes menu icon, .

    Response: The Color Schemes menu is opened.

3.  Select **From Visualization** to open the submenu.

    Response: The submenu lists all the existing pages in the analysis.

4.  Select the page of interest to open the submenu.

    Response: The submenu lists all the color schemes used in other visualizations on that page.

5.  Select the color scheme you want to use.

    Response: If it is a gradient color scheme, the selected color scheme is applied to the visualization. Otherwise, the Apply Method dialog is opened, continue to step 6.

6.  Click the **Colors only** radio button to apply only the colors in the color scheme to the visualization. Click **Colors matched to values** if you want to match the colors in the color scheme to the values in the visualization.

    Comment: See Details on Apply Method for an example of how the two options work.

7.  Click **OK**.

    Response: The selected color scheme is applied to the visualization.

### ► To open a document color scheme:

1.  Open the **Visualization Properties** dialog, and go to the **Colors** page.

2.  Click on the Color Schemes menu icon, .

3.  Select **Document Color Schemes** to open the submenu.

    Response: The submenu lists all the previously saved document color schemes in the analysis.

4.  Select the color scheme you want to use.

    Response: If it is a gradient color scheme, the selected color scheme is applied to the visualization. Otherwise, the Apply Method dialog is opened, continue to step 5.

5.  Click the **Colors only** radio button to apply only the colors in the color scheme to the visualization. Click **Colors matched to values** if you want to match the colors in the color scheme to the values in the visualization.

    Comment: See Details on Apply Method for an example of how the two options work.

6.  Click **OK**.

    Response: The selected color scheme is applied to the visualization.

    **Note:** The menu option From Visualization is only available if other visualizations exist in the analysis.

    **Note:** The menu option Document Color Schemes is only available if one or more document color schemes have previously been saved in the analysis. See Saving a Color Scheme to learn more.

## 6.1.2.3  Predefined Color Schemes

To facilitate setting up color schemes you can open one of the predefined ones and then adjust it according to your preferences. Predefined color schemes are only available for color schemes based on a column in continuous scale mode. Which predefined schemes are available differs slightly depending on the data type of the column.

### ► To reach the predefined color schemes:

1. Open the Visualization Properties dialog, and go to the Colors page.

2. Click on the Color Schemes menu icon, .

   Response: The Color Schemes menu is opened. The predefined color schemes are located in the middle of the menu, as seen below.
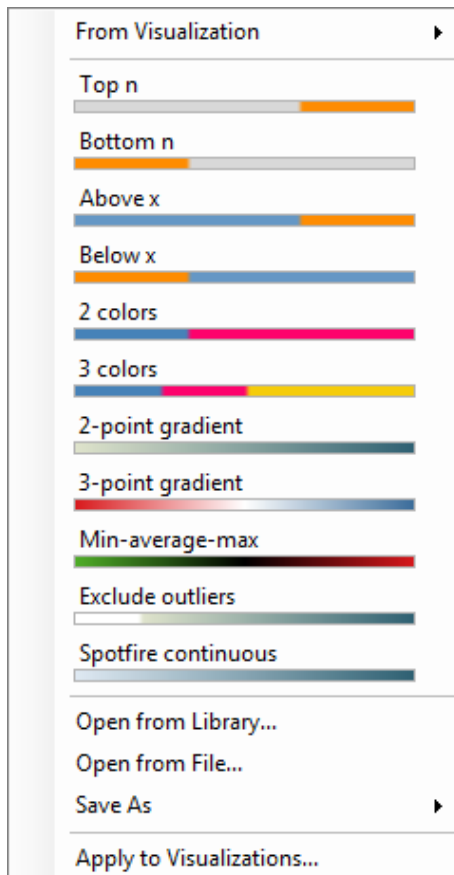


| Option | Description |
|---|---|
| **Top n** | A color scheme in Segments color mode. Items representing values from Min to Max get a single fixed gray color, and a rule states that the ten items with the highest values in the data get an orange color. |
| **Bottom n** | A color scheme in Segments color mode. Items representing values from Min to Max get a single fixed gray color, and a rule states that the ten items with the lowest values in the data get an orange color. |
| **Above x** | A color scheme in Segments color mode. Items representing values from Min to Max get a single fixed blue color, and a rule states that the items representing values above average get an orange color. |

| | |
|---|---|
| **Below x** | A color scheme in Segments color mode. Items representing values from Min to Max get a single fixed blue color, and a rule states that the items representing values below average get an orange color. |
| **2 colors** | A color scheme in Segments color mode. Items representing values from Min to Average get a blue color, and items representing values from average to Max get a pink color. |
| **3 colors** | A color scheme in Segments color mode. Items representing values from Min to Q1 get a blue color, items representing values from Q1 to Q3 get a pink color, and items representing values from Q3 to Max get a yellow color. To learn more about quartiles, see Percentiles and Quartiles. |
| **2-point gradient** | A color scheme in Gradient color mode with a gradient transition from light green to dark green between Min and Max. |
| **3-point gradient** | A color scheme in Gradient color mode. Items representing values from Min to 0.00 are colored with a gradient transition from red to white. Items representing values from 0.00 to Max are colored in a gradient transition from white to blue. The Min and Max points are defined with custom expressions to ensure that items representing positive values are always colored in a blue nuance, and negative values are always colored in a red nuance. |
| **Min-average-max** | A color scheme in Gradient color mode. Items representing values from Min to average are colored with a gradient transition from green to black. Items representing values from average to Max are colored in a gradient transition from black to red. |
| **Exclude outliers** | A color scheme in Gradient color mode. Items representing values from LIF to UIF are colored with a gradient transition from light green to dark green. One rule states that items representing values greater than UIF should be white. A second rule states that items representing a lower value than LIF should also be white. To learn more about outliers, see Adjacent Values and Outliers. |
| **Spotfire categorical** | The default color scheme for categorical columns. |
| **Spotfire continuous** | The default color scheme for continuous columns. |

## 6.1.2.4    Applying a Color Scheme to Another Visualization

When you have set up a color scheme for a visualization, you can apply it to another visualization, provided that the two visualizations are colored by a column in the same scale mode.

► **To apply a color scheme to a visualization:**

1.  Open the Visualization Properties dialog, and go to the Colors page.

2.  Click on the Color Schemes menu icon, ⬚▾.

3.  Select **Apply to Visualizations...**.
    Response: The Apply to Visualizations dialog is opened.

4. From the **Available visualizations** list, select a visualization that you want to apply the current color scheme to, and click **Add >**.

Comment: You can select and add an entire page if you want to apply the color scheme to all visualizations on that page.

Response: The selected visualization or page is added to the **Selected visualizations** list (and removed from the Available visualizations list).

Repeat step 4 until all the visualizations you want to apply the color scheme to have been added to the list.

5. If the color scheme you are about to apply is categorical you need to select an **Apply** method. Click the **Colors only** radio button to apply only the colors in the color scheme to the visualization. Click **Colors matched to values** if you want to match the colors in the color scheme to the values in the visualization.

Comment: See Details on Apply Method for an example of how the two options work.

Click **OK**.

Response: The current color scheme is applied to the selected visualizations.

**Note:** If you apply a color scheme to a table, cross table, or heat map, the coloring will not take effect immediately. The color scheme will be added as an empty color scheme grouping, and you must select which columns or axis values to include in the grouping by opening the Edit Color Scheme Grouping dialog.

## 6.1.2.5     Saving a Color Scheme

You can save a color scheme for later reuse or to share it with others. If you save the color scheme to disk or in the library, you can use it in other analyses. If you save it as a document color scheme, you can use it again within the analysis. A document color scheme can be selected for a specific visualization in the analysis from the Colors page of the visualization properties. You can also select it as the default color scheme to use for a specific column as well as for new visualizations in the analysis. See Column Properties – Properties, Column Properties Descriptions, and Options – Visualization to learn more about using default color schemes.

### ► To save a color scheme as a file:

1. Open the Visualization Properties dialog, and go to the Colors page.

2. Click on the Color Schemes menu icon, ⬚▾.

3. Select **Save As > File...**.

   Response: The Save Color Scheme dialog is displayed.

4. Specify a file name and a location for the color scheme.

5. Click **Save**.

### ► To save a color scheme as a library item:

1. Open the Visualization Properties dialog, and go to the Colors page.

2. Click on the Color Schemes menu icon, ⬚▾.

3. Select **Save As > Library Item...**.

   Comment: The menu option Library Item... is not available if you are working offline (without a connection to a server).

   Response: The Save as Library Item dialog is displayed.

   Comment: The path in the upper part of the dialog shows your current location in the folder structure of the library.

4. Navigate to the folder where you want to save the color scheme.

   Comment: Double-click on a folder to open it. Double-click on the folder with two dots, "..", to move up in the folder hierarchy. Click on the New Folder button to create

a new folder to save your color scheme in. To modify folder permissions, click on the **Folder Permissions...** button. To learn more about permissions, see Permissions.

5. Specify a name for the color scheme.

6. Optionally, type one or more **Keywords** describing the color scheme. Other users can then browse color schemes using keywords when opening from the library.

   Comment: Keywords are separated by a semicolon, i.e., if you write "corporate colors; categorical" this will be two keywords, "corporate colors" and "categorical".

7. Click **Save**.

### ► To save a color scheme as a document color scheme:

1. Open the Visualization Properties dialog, and go to the Colors page.

2. Click on the Color Schemes menu icon, .

3. Select **Save As > Document Color Scheme...**.

   Response: The Save Document Color Scheme dialog is displayed.

4. Click the **New color scheme** radio button and enter a name in the text field to save as a new document color scheme. Select the **Replace existing color scheme** radio button to overwrite a previously saved document color scheme. Select the color scheme to overwrite from the drop-down list.

5. Click **OK**.

   Response: The saved document color scheme is now available in the Color Schemes menu.

## 6.1.2.6    Details

### 6.1.2.6.1    Details on Open from Library

Use this dialog to select which color scheme to apply to the current visualization.

### ► To reach the Open from Library dialog:

1. In the Visualization Properties dialog, go to the **Colors** page.

2. Click on the **Color Schemes** menu icon, .

3. Select **Open from Library...**.

   Comment: The menu option Open from Library is not available if you are working offline (without a connection to a server).
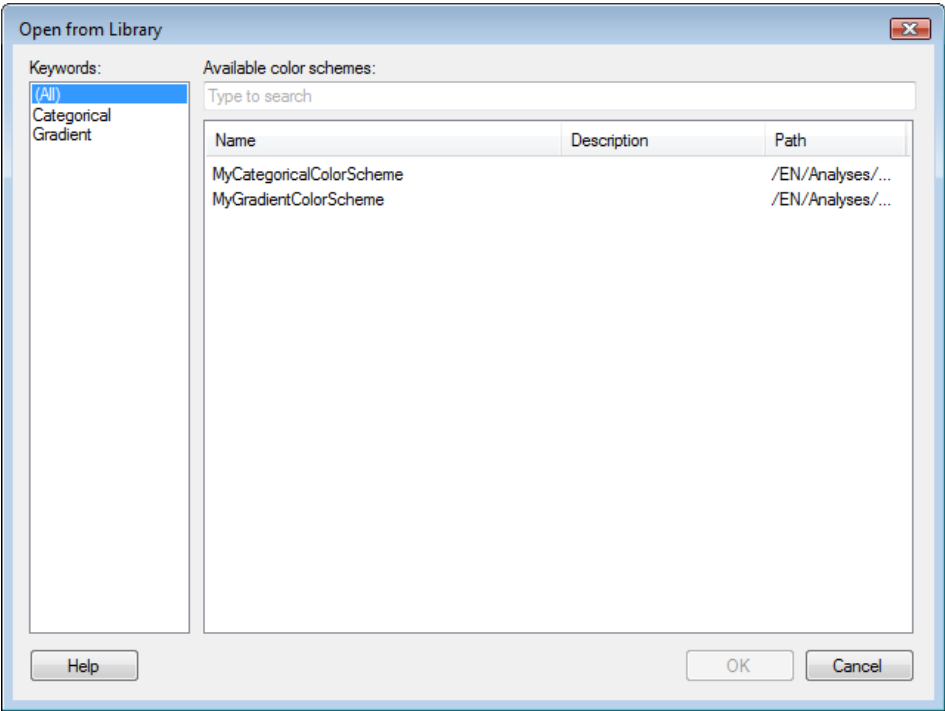
| Option | Description |
|---|---|
| **Keywords** | Select (All) to see all the available color schemes in the library. Select a keyword from the list to see only color schemes with that particular keyword. |
| [Type to search] | Type a search string to limit the number of items in the Available color schemes list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Available color schemes** | Lists the color schemes that apply to the selected keyword and/or search string. |

## 6.1.2.6.2　Details on Edit Document Color Schemes

This dialog is used to rename or delete previously added document color schemes.
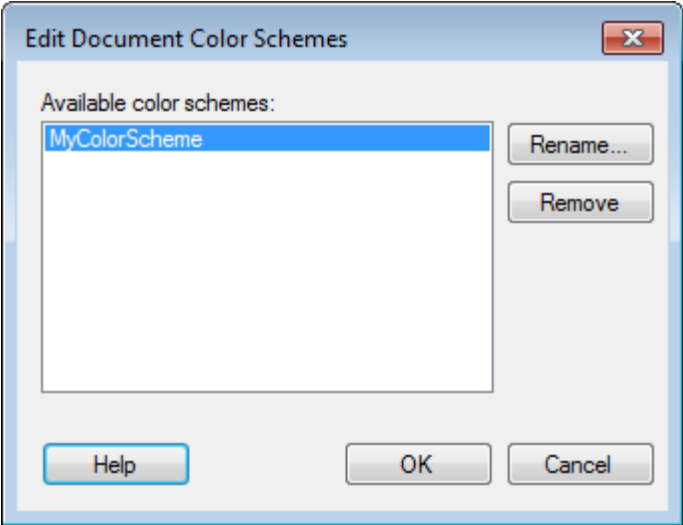
| Option | Description |
|--------|-------------|
| **Available color schemes** | Lists all previously created document color schemes. |
| **Rename...** | Allows you to rename the selected document color scheme. |
| **Remove** | Deletes the selected document color scheme. |

### 6.1.2.6.3 Details on Apply to Visualizations

#### ► To reach the Apply to Visualizations dialog:

1. In the Visualization Properties dialog, go to the **Colors** page.

2. Click on the **Color Schemes** menu icon, ⬚▾.

3. Select **Apply to Visualizations...**.
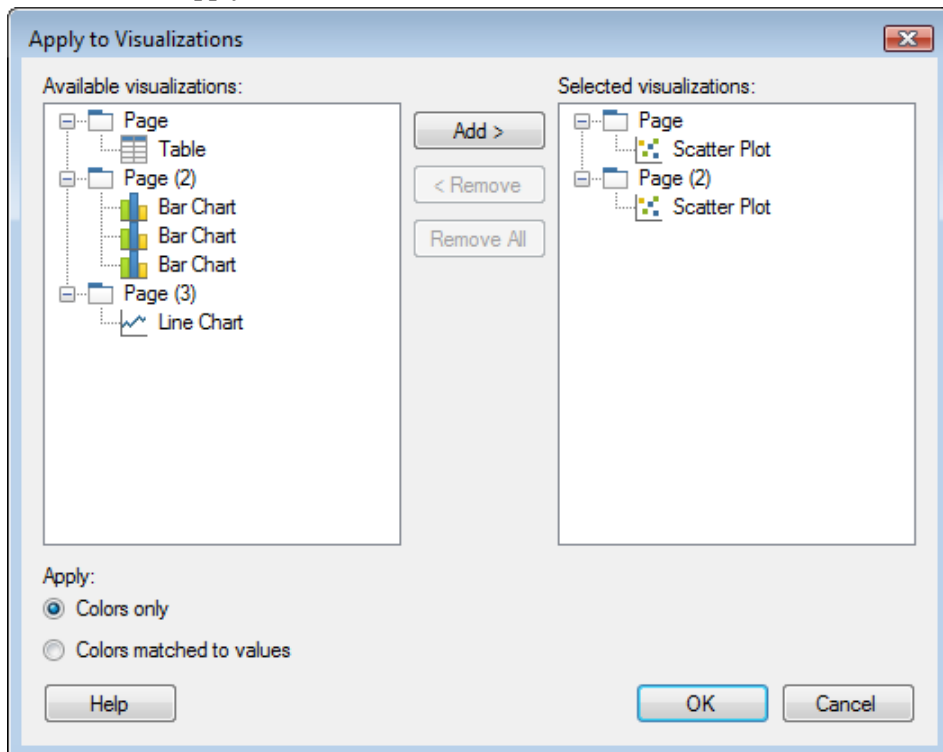


| Option | Description |
|--------|-------------|
| **Available visualizations** | Lists all the visualizations available for selection. |
| **Selected visualizations** | Lists the visualizations that have been selected, and to which the color scheme will be applied. |
| **Add >** | Adds the selected visualizations to the Selected visualizations list. |
| **< Remove** | Removes the selected visualizations from the Selected visualizations list. |

| | |
|---|---|
| **Remove All** | Removes all visualizations from the Selected visualizations list. |
| **Apply** | |
| **Colors only** | Select this option if you want only the colors in the color scheme to be applied to the visualization.<br>**Note:** If the color scheme contains any rules, they will not be included. |
| **Colors matched to values** | Select this option if you want to keep the colors matched to the values in the visualization, when matches exist. |

**Note:** See Details on Apply Method for an example of how the two **Apply** options work

### 6.1.2.6.4 Details on Apply Method

This dialog is shown when you apply a categorical color scheme to a visualization. It lets you choose how you want the colors to be matched to the values in the visualization. This is illustrated with an example below.



| Option | Description |
|---|---|
| **Apply** | |
| **Colors only** | Select this option if you want only the colors in the color scheme to be applied to the visualization.<br>**Note:** If the color scheme contains any rules, they will not be included. |
| **Colors matched to values** | Select this option if you want to keep the colors matched to the values in the visualization, when matches exist. |

### Example:

When you open a categorical color scheme, or apply a categorical color scheme to a visualization, you can apply the colors in two different ways. Either you apply only the colors to the visualization, or you match the colors to the values in the visualization. The scatter plot below is colored by the column Type, which contains a number of different fruits, vegetables, and spices. These all have their own color in the color scheme.
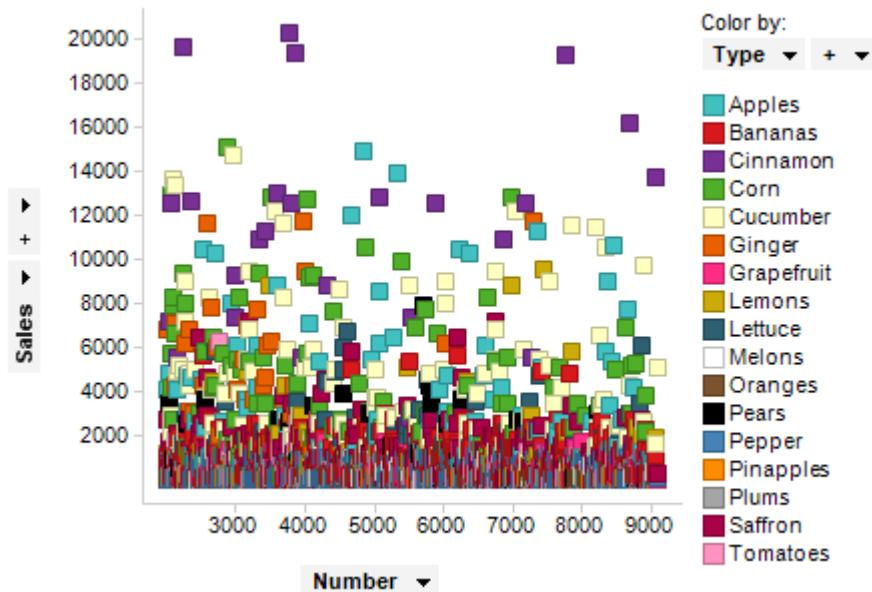
The color scheme from the scatter plot above has been applied to the two visualizations below, but using different application methods.

## Colors only
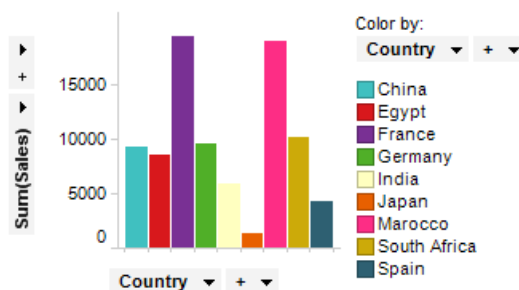


## Colors matched to values
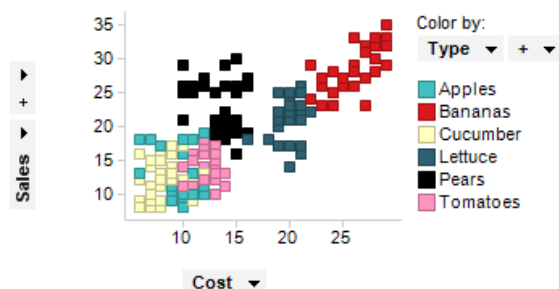


The visualization on the left is colored by a column containing completely different values than the scatter plot, in this case countries. Therefore the option **Apply > Colors only** was selected when applying the colors to the visualization. The visualization on the right is colored by a column that contains some of the same values from the upper scatter plot. Therefore, the option **Apply > Colors matched to values** was selected for this visualization. This ensures that those values the visualization has in common with the color scheme get the same colors. If the visualization contains values that do not exist in the color scheme, then colors from the default color palette will be used for those values.

**Note:** If the color scheme contains any rules, they will only be included if you select Colors matched to values.

## 6.1.2.6.5    Details on Save as Document Color Scheme

You can save a color scheme as a document color scheme if you want to use it again within an analysis. See Saving a Color Scheme for more information about document color schemes.

► **To reach the Save as Document Color Scheme dialog:**

1.  In the Visualization Properties dialog, go to the **Colors** page.

2.  Click on the Color Schemes menu icon, .

3.  Select **Save As > Document Color Scheme...**.
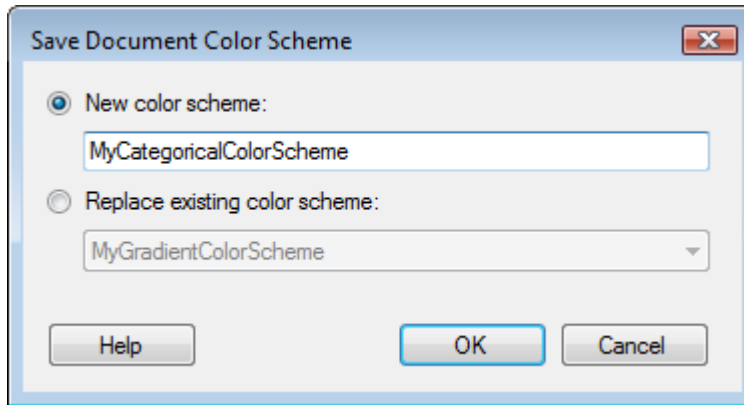
| Option | Description |
|---|---|
| **New color scheme** | Use this option to save a new color scheme. Type a name in the text field. |
| **Replace existing color scheme** | Use this option to replace a previously saved color scheme with a new one. Select the color scheme to overwrite from the drop-down list. |

## 6.1.3 Color Modes

### 6.1.3.1 Color Modes Overview

A color mode can be described as the way the colors in a color scheme are assigned to the values in the data. For example, you can determine whether you want the items in your visualization to get distinct colors representing different categories, or if you want to see a gradient color transition between two or more anchor points in a range of values.

The following color modes are available in TIBCO Spotfire:

Fixed

Categorical

Gradient

Segments

Unique values

Which color modes are available depends on the characteristics of the column or hierarchy you have selected to color the visualization by. For a column in categorical scale mode you can select Categorical or Fixed color mode. For a column in continuous scale mode you can choose one of the following color modes: Gradient, Segments, Fixed, or Unique values. The data type in the selected column decides which scale mode the column will be set to by default, as well as if it is possible to change the scale mode.

**Note:** In tables, cross tables, and heat maps coloring is always continuous. This means that the color mode Categorical is not applicable. However, you can use the color mode Unique values to get a categorical appearance in those visualizations. To learn more about coloring in these visualization types, see Coloring in Tables, Cross Tables and Heat Maps.

### 6.1.3.2 Fixed Color Mode

Fixed color mode is available as an option for columns in both categorical scale mode and continuous scale mode. In fixed mode, all items in the visualization will get a single, fixed color as seen in the example below.
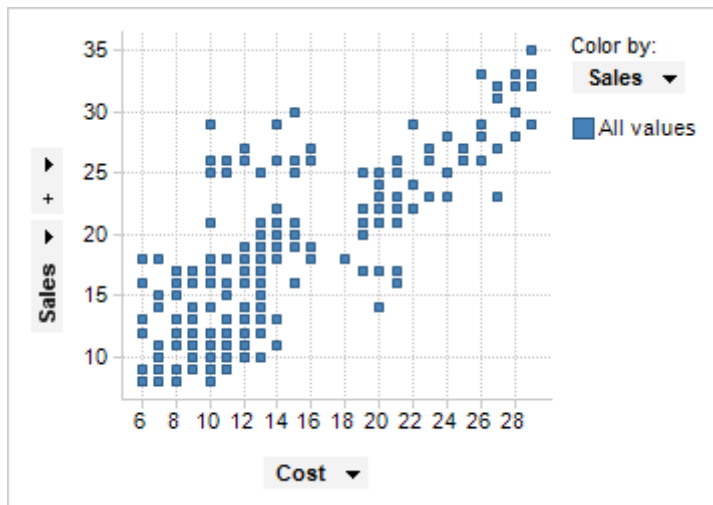
Note that Fixed color mode is not the same as not selecting a column to color by. If no column is selected, most of the settings for the color scheme will be grayed out. The only setting you can change is the color of the values. In Fixed color mode, you can still add rules to the color scheme, and the rules will be applied to the column you have selected. In the example above, the scatter plot is colored by the column Sales. At this point, no rules have been added, which means that it looks like a scatter plot without any coloring applied to it. The example below shows the Colors page of the Visualization Properties for Fixed color mode.
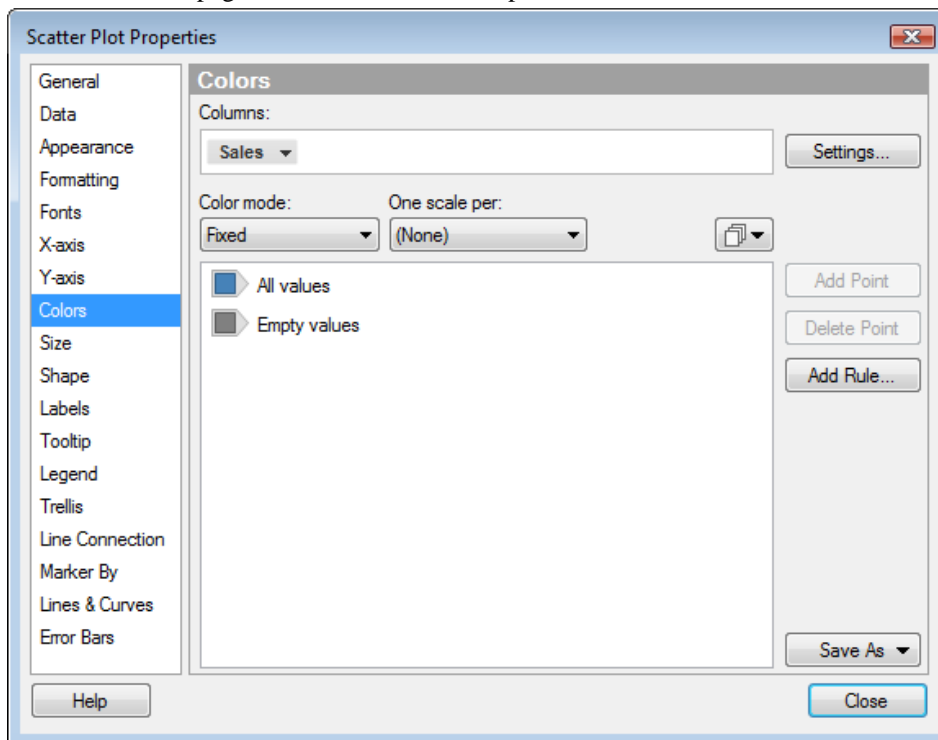


## Changing the color for values

To change the color of the items in the visualization, click on the color box to the left of All values or Empty values in the color scheme. This will open a color selector where you can select a different color.

### Adding rules to the color scheme

You cannot add points to the color scheme in Fixed mode. The Add Point and Delete Point buttons are therefore grayed out. However, as mentioned, you can add rules. A rule functions as an exception to the rest of the color scheme. To add a rule, click on the Add Rule... button to the right of the color scheme area. This will open a dialog where you can define the rule. The rule will be added on top of the color scheme, as seen in the example below, where a rule stating that all values below 15 should be yellow.



If the color scheme includes more than one rule, the rules are prioritized from top to bottom. You can change the order of the rules by using drag-and-drop. To learn more about rules in color schemes, see Color Rules Overview.

### Deleting rules

To delete a rule, click on the x to the right of the rule, or right-click on the rule and select Delete Rule from the menu.

### Resetting the color scheme

To reset the color scheme to its initial state, right-click in the color scheme area to open the menu, and select Reset Color Scheme. The color scheme will be reset to the default state for the selected column. Any added rules will be removed.

For a description of the rest of the Colors page in the Visualization Properties dialog, see the corresponding help section for each visualization type.

## 6.1.3.3    Categorical Color Mode

Categorical color mode is available for columns in categorical scale mode, and gives each value in the column a separate color, as seen in the example below.
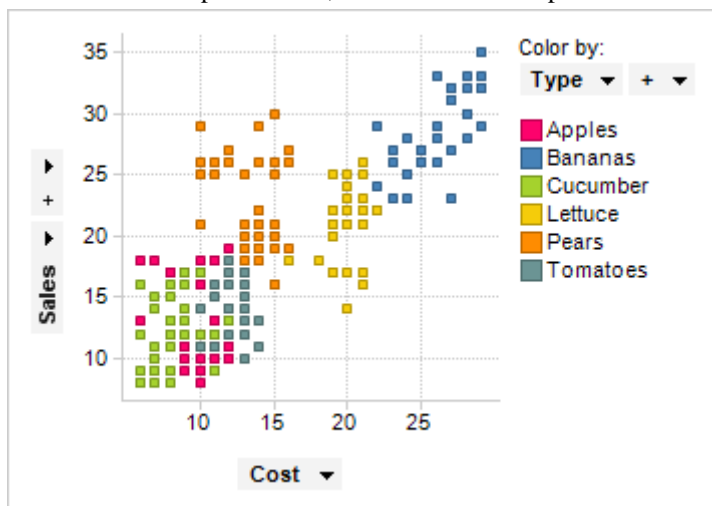


In the example, the scatter plot is colored by the column Type, which is a column containing string values representing different types of fruits and vegetables. Each of the six different types has its own color. The example below shows the Colors page of the Visualization Properties for Categorical color mode.
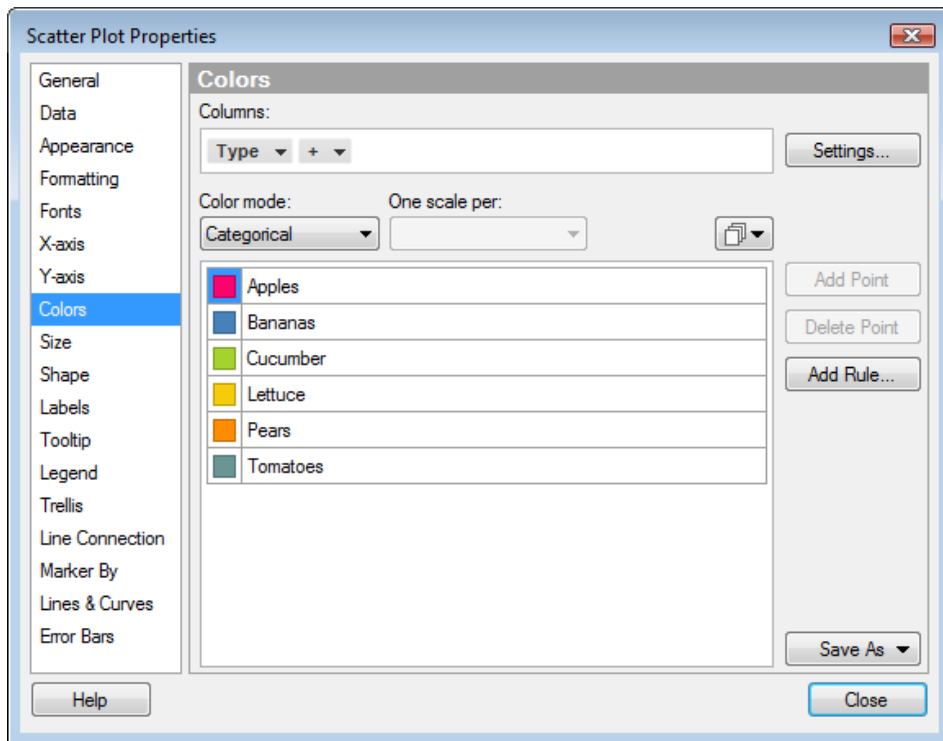
## Changing the color for values

To change the color of any of the values in the color scheme, click on the color box to the left of a value. A color selector will appear, and you can select a different color.

## Adding rules to the color scheme

You cannot add points to the color scheme in Categorical mode. The Add Point and Delete Point buttons are therefore grayed out. However, as mentioned, you can add rules. A rule functions as an exception to the rest of the color scheme. The rules available in categorical mode are all of the kind that requires the output to be either true or false. For example, you can add a rule saying that all values starting with a certain letter should have a different color. To add a rule, click on the Add Rule... button to the right of the color scheme area. This will open a dialog where you can define the rule. The rule will be added at the top of the color scheme, as seen in the example below, where a rule states that all values starting with the letters "Ba" should be brown.



Since the rule functions as an exception to the rest of the color scheme, the markers for "Bananas" (and any other values starting with "Ba") will become brown in the visualization. If the color scheme includes more than one rule, the rules are prioritized from top to bottom. You can change the order of the rules by using drag-and-drop. To learn more about rules in color schemes, see Color Rules Overview.

## Deleting rules

To delete a rule, click on the x to the right of the rule, or right-click on the rule and select Delete Rule from the menu.

### Resetting the color scheme

To reset the color scheme to its initial state, right-click in the color scheme area to open the menu, and select Reset Color Scheme. The color scheme will be reset to the default state for the selected column. Any added rules will be removed.

For a description of the rest of the Colors page in the Visualization Properties dialog, see the corresponding help section for each visualization type.

## 6.1.3.4    Gradient Color Mode

Gradient color mode is available for columns in continuous scale mode. In this mode the items will show a color gradient between two or more anchor points as seen in the example below.
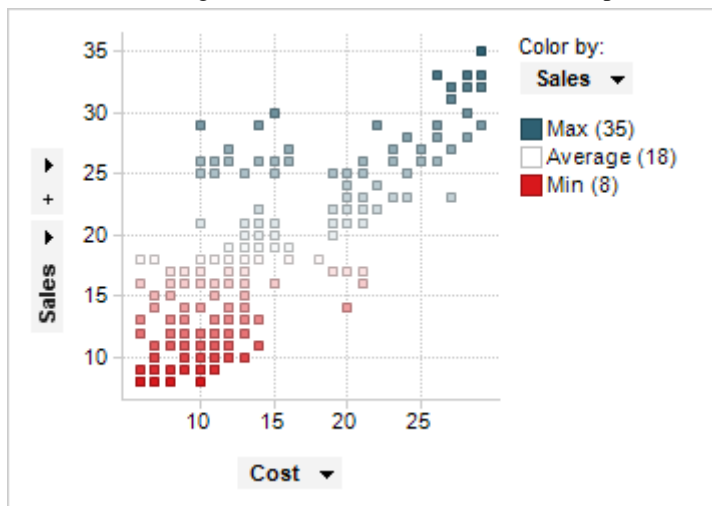


In the example, the scatter plot is colored by the column Sales, which is a column containing integer values. The color scheme has three anchor points: Min, Average, and Max. The colors at these points are set to red, white, and blue respectively, which means that the color gradient shifts from red to white to blue. The example below shows the Colors page of the Visualization Properties for Gradient color mode.
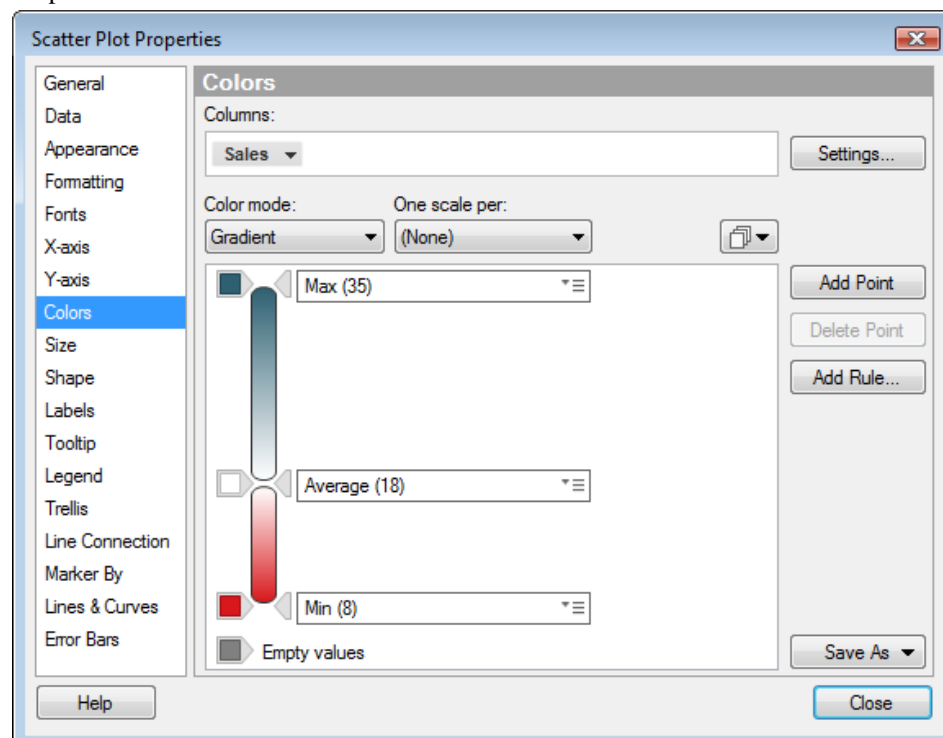
## Changing the color of anchor points

To change the color of an anchor point, click on the color box to the left of the point. A color selector will appear, and you can select a different color. The coloring will be updated immediately in the visualization.

## Adding anchor points to the color scheme

To add a point where you want the gradient to switch to another color, you can either click on the Add Point button, or double-click in the color scheme area. To specify the exact placement of the added point, select one of the options in the menu beside the anchor point. The example below shows the available options in the menu. See Details on Point/Value Menu for descriptions of all the options in this menu.



Most of the options in the menu will add an anchor point that is relative to the current color scale. For example, if you select Average, the position of the anchor point will be adjusted automatically when you filter the data, so that it stays at average for the new range of values.

If you select Value, you can enter an absolute value for the anchor point in the field. Keep in mind that this means that the value can end up outside the range of values if you filter out data or select another column to color by. When you have selected Value from the menu, you can also adjust the position of a point by dragging it vertically.

Select the last menu option to open the Custom Expression dialog, where you can define a custom expression to set the anchor point. See Custom Expressions for Coloring to learn more about this. To get a basic understanding of custom expressions, see Custom Expressions Introduction.

## Adding rules to the color scheme

You can also add rules to the color scheme in gradient mode. A rule functions as an exception to the rest of the color scheme. To add a rule, click on the Add Rule... button to the right of the color scheme area. This will open a dialog where you can define the rule. The rule will be added at the top of the color scheme, as seen in the example below, where a rule states that all values below 15 should be yellow.



If the color scheme includes more than one rule, the rules are prioritized from top to bottom. You can change the order of the rules by using drag-and-drop. To learn more about rules in color schemes, see Color Rules Overview.

## Deleting points and rules

To delete a point, select it in the color scheme and click the Delete Point button. You can also right-click on the point and select Delete Point from the menu.

To delete a rule, click on the x to the right of the rule, or right-click on the rule and select Delete Rule from the menu.

### Resetting the color scheme

To reset the color scheme to its initial state, right-click in the color scheme area to open the menu, and select Reset Color Scheme. The color scheme will be reset to the default state for the selected column. Any added rules will be removed.

For a description of the rest of the Colors page in the Visualization Properties dialog, see the corresponding help section for each visualization type.

## 6.1.3.5    Segments Color Mode

Segments color mode is available for columns in continuous scale mode. This will color the items representing values between two or more anchor points in fixed colors, as seen in the example below.
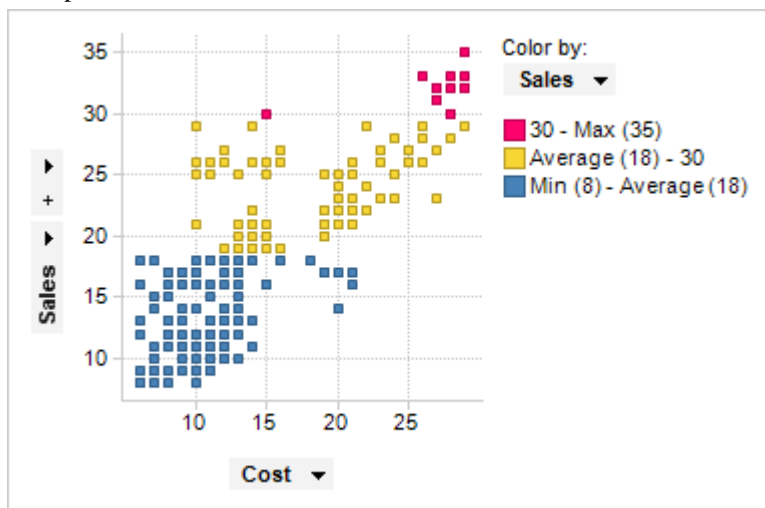


In the example, the scatter plot is colored by the column Sales, which is a column containing integer values. The color scheme has four anchor points: Min, Average, 30, and Max. The colors between these points are set to blue, yellow, and red respectively. This means that items representing values between the Min value (8) and the average value (18) are colored blue, items representing values between average and 30 are colored yellow, and items representing values greater than 30 are colored red.

**Note:** An anchor point will get its color from the segment below it on the scale. In the example above, this means that an item representing the value 30 will be yellow.

The example below shows the Colors page of the Visualization Properties for the color mode Segments.
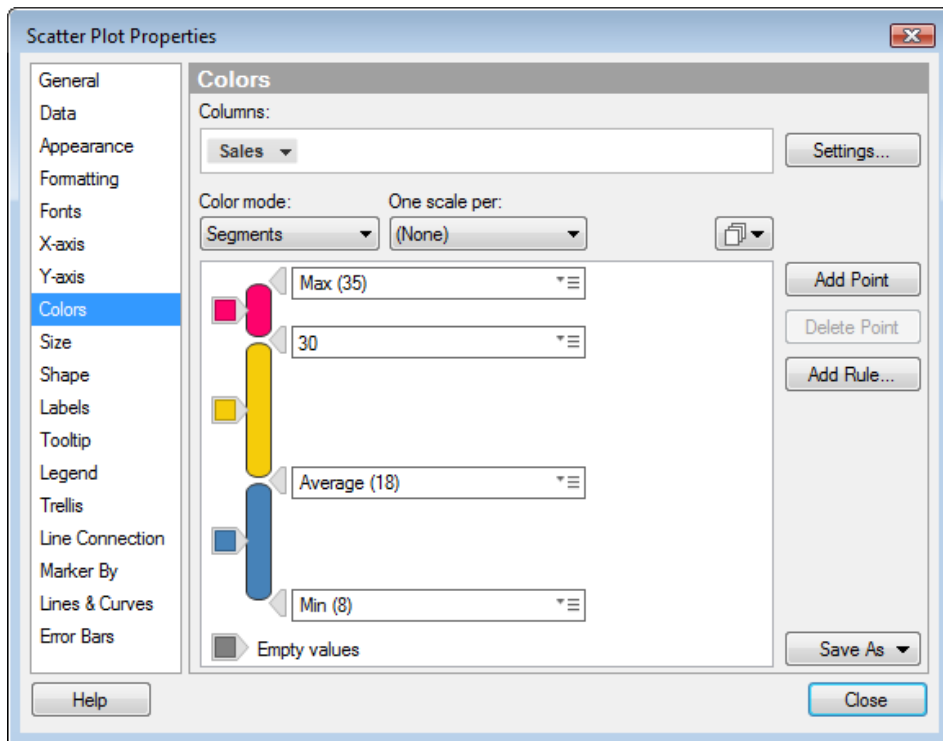
## Changing the color of segments

To change the color of a segment, click on the color box to the left of that segment. A color selector will appear, and you can select a different color.

## Adding anchor points to the color scheme

To add an anchor point where you want a boundary between two segments, you can either click on the Add Point button, or double-click in the color scheme area. To specify the exact placement of the added point, select one of the options in the menu beside the anchor point. The example below shows the available options in the menu. See Details on Point/Value Menu for descriptions of all the options in this menu.



Most of the options in the menu will add an anchor point that is relative to the current color scale. For example, if you select Average, the position of the anchor point will be adjusted automatically when you filter the data, so that it stays at average for the new range of values.

If you select Value, you can enter an absolute value for the anchor point in the field. Keep in mind that this means that the value can end up outside the range of values if you filter out data or select another column to color by. When you have selected Value from the menu, you can also adjust the position of a point by dragging it vertically.

Select the last menu option to open the Custom Expression dialog, where you can define a custom expression to set the anchor point. See Custom Expressions for Coloring to learn more about this. To get a basic understanding of custom expressions, see Custom Expressions Introduction.

### Adding rules to the color scheme

You can also add rules to the color scheme in Segments mode. A rule functions as an exception to the rest of the color scheme. To add a rule, click on the Add Rule... button to the right of the color scheme area. This will open a dialog where you can define the rule. The rule will be added at the top of the color scheme, as seen in the example below, where a rule stating that all values below 15 should be green.



If the color scheme includes more than one rule, the rules are prioritized from top to bottom. You can change the order of the rules by using drag-and-drop. To learn more about rules in color schemes, see Color Rules Overview.

### Deleting points and rules

To delete a point, select it in the color scheme and click the Delete Point button. You can also right-click on the point and select Delete Point from the menu.

To delete a rule, click on the x to the right of the rule, or right-click on the rule and select Delete Rule from the menu.

### Resetting the color scheme

To reset the color scheme to its initial state, right-click in the color scheme area to open the menu, and select Reset Color Scheme. The color scheme will be reset to the default state for the selected column. Any added rules will be removed.

**Note:** A color scheme in Segments color mode may appear as if the coloring is categorical. However, because the column used to color by is in continuous scale mode, the coloring is also considered continuous. This means that if you are using multiple scales, it is not possible to set individual scaling per color. For lines and curves, this means that you cannot set them to one line or curve per color.

For a description of the rest of the Colors page in the Visualization Properties dialog, see the corresponding help section for each visualization type.

## 6.1.3.6    Unique Values Color Mode

Unique values color mode is available for columns in continuous scale mode. It is similar to the Categorical color mode, and gives each unique value in the column a separate color, as seen in the example below.
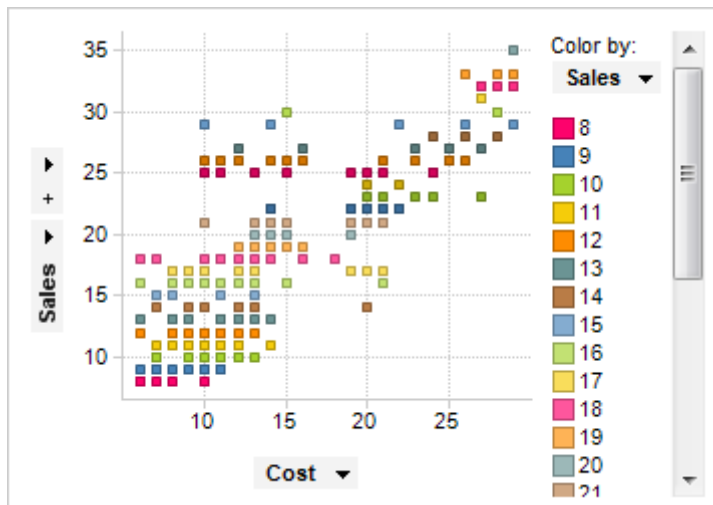
In the example, the scatter plot is colored by the column Sales, which is a column containing integer values. Each unique value in the column has its own color. The example below shows the Colors page of the Visualization Properties for Unique values color mode.
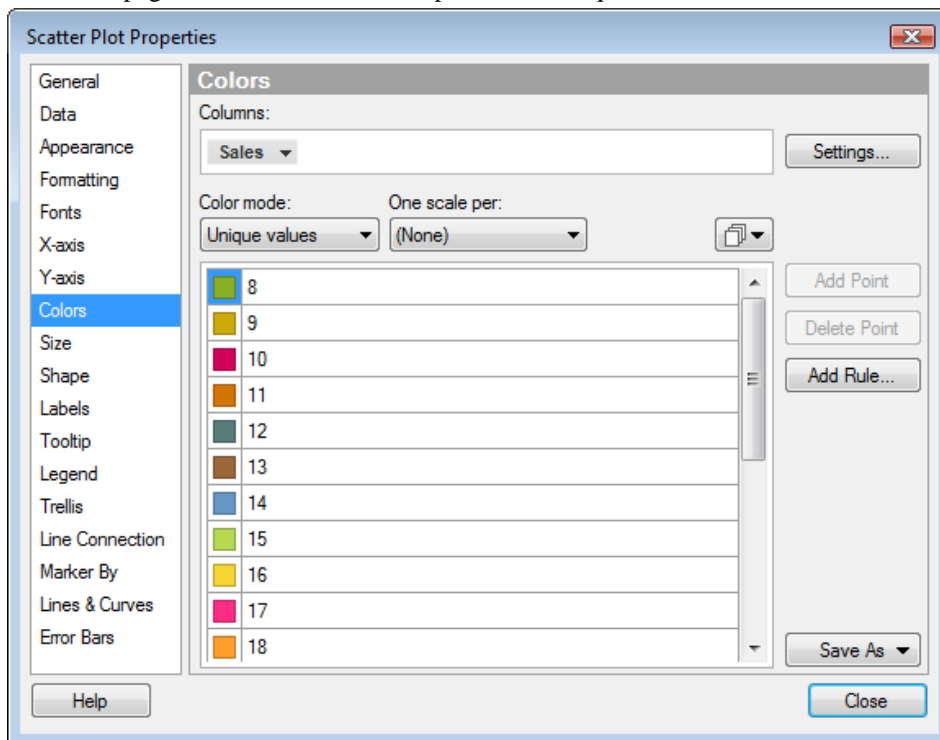


## Changing the color for values

To change the color of any of the values in the color scheme, click on the color box to the left of a value. A color selector will appear, and you can select a different color.

## Adding rules to the color scheme

You cannot add points to the color scheme in Unique values mode, but you can add rules. A rule functions as an exception to the rest of the color scheme. For example, you can add a rule stating that the bottom three values should be yellow. In the example above, this would mean that the values 8, 9, and 10 would all be yellow. To add a rule, click on the Add Rule... button to the right of the color scheme area. This will open a dialog where you can define the rule. The rule will be added at the top of the color scheme as seen below.

If the color scheme includes more than one rule, the rules are prioritized from top to bottom. You can change the order of the rules by using drag-and-drop. To learn more about rules in color schemes, see Color Rules Overview.

### Deleting rules

To delete a rule, click on the x to the right of the rule, or right-click on the rule and select Delete Rule from the menu.

### Resetting the color scheme

To reset the color scheme to its initial state, right-click in the color scheme area to open the menu, and select Reset Color Scheme. The color scheme will be reset to the default state for the selected column. Any added rules will be removed.

**Note:** A color scheme in Unique values color mode may appear as if the coloring is categorical. However, because the column used to color by is in continuous scale mode, the coloring is also considered continuous. This means that if you are using multiple scales, it is not possible to set individual scaling per color. For lines and curves, this means that you cannot set them to one line or curve per color.

For a description of the rest of the Colors page in the Visualization Properties dialog, see the corresponding help section for each visualization type.

## 6.1.3.7    Details on Point/Value Menu

This menu is available for points in the color scheme area in the two color modes Segments and Gradient, as seen below. It is also available in the Add/Edit Rule dialog.
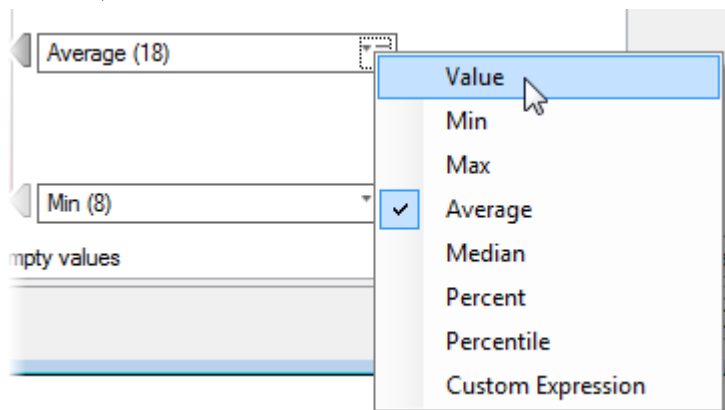


**Note:** Most of the options in the menu will add an anchor point that is relative to the current color scale. For example, if you select Average, the position of the anchor point will be adjusted automatically when you filter the data, so that it stays at average for the new range of values.

| Option | Description |
|---|---|
| **Value** | Select this option to specify an absolute value. Type the value of your choice in the field and press Enter. |
| | For dates, you can also click on the calendar icon, , to set a date. |

| | |
|---|---|
| | **Note:** Because the value is absolute, it can end up outside the range of values if you filter out data or select another column to color by. |
| **Min** | Sets the value to the minimum value in the data. |
| **Max** | Sets the value to the maximum value in the data. |
| **Average** | Sets the value to the average value in the data. |
| **Median** | Sets the value to the median value in the data. |
| **Percent** | Sets the value to a percentage value. |
| **Percentile** | Sets the value to a percentile value. |
| **Custom Expression** | Select this option to define the value with a custom expression. See To add a custom expression as an anchor point and To add a custom expression as a value in a rule to learn more. To get a basic understanding of custom expressions, see Custom Expressions Introduction. |

# 6.1.4    Rules in Color Schemes

## 6.1.4.1    Color Rules Overview

Rules can be very useful when you are setting up color schemes for your visualizations. Rules function as exceptions to the rest of the color scheme. You can use them in all kinds of visualizations, and in any color mode. The collection of available rules is different for categorical columns than for continuous columns. For instance, for categorical color schemes you can add a rule saying that all values starting with a certain letter should have a specific color. For continuous color schemes, you can, among many other things, define a rule stating that all items representing values below a certain value should have a certain color. Or, if you use a date column to color by, you can set up a rule stating that items representing values between two specific dates should get a certain color. See Details on Add/Edit Rule for descriptions of all the rule types.

### Example:

When you add a rule, it is placed at the top of the color scheme in the legend and on the Colors page of the Visualization Properties. It always has higher priority than the rest of the color scheme. If you add more than one rule, the rules will be prioritized from top to bottom. The example below shows a scatter plot that is colored by the column Sales, and the color scheme is set up in Fixed color mode.
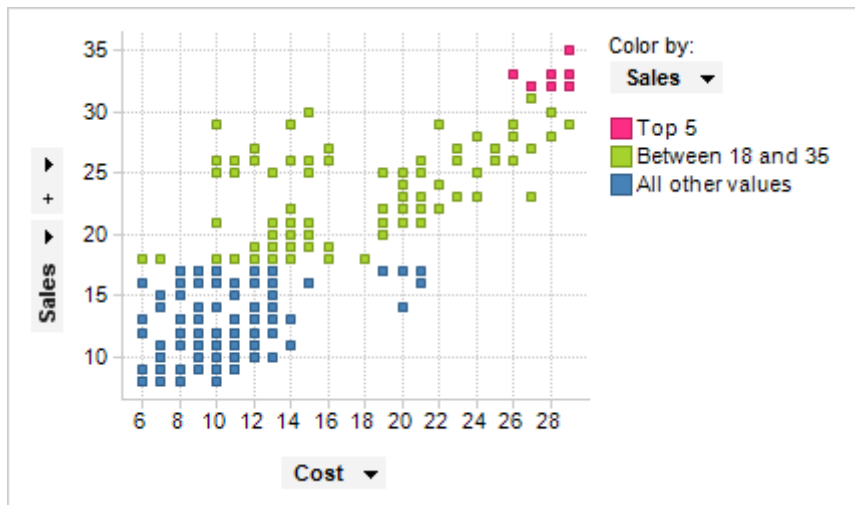
The example below shows the color scheme area for the scatter plot above.
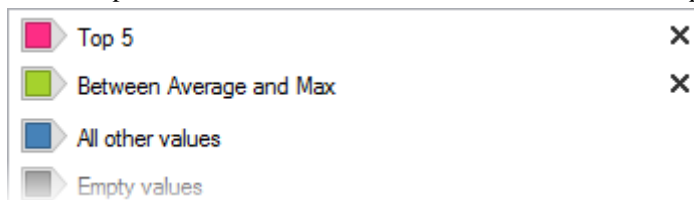


Two rules have been added to the scheme. The first rule states that the items representing the five highest values should get a pink color. The second rule states that all values between average and max should get a green color. The order in which these rules are placed is essential. If the order had been reversed, then the Top 5 rule would not have had any effect since the other rule would include the items representing the five highest values as well. You can change the order of the rules by using drag-and-drop. You can add as many rules as you like to a color scheme, but a rule that does not have any effect on the visualization is not shown in the legend. For example, if you have filtered out all the data that was originally included in the rule, or if another rule overrides it, that rule will no longer be shown in the legend.

► **To add a rule to a color scheme:**

1. Open the Visualization Properties dialog, and go to the Colors page.
2. Click on the **Add Rule...** button to the right of the color scheme area.
   Response: The Add rule dialog is opened.
3. Select which rule to use from the **Rule type** drop-down list.
4. In the **Value** field, click on the icon, ▾≡, to open the menu.
5. Select which kind of value to use in the rule. If you select the menu option **Value**, you also need to provide a value in the field.
   **Note:** Which options are available in the menu depends on the selected rule type. See Details on Point/Value Menu to learn more.
6. Open the **Color** selector and select a color to use for the rule.
7. Click OK.
   Response: The rule is added at the top of the color scheme.

► **To edit a rule:**

1. Go to the Colors page of the Visualization Properties dialog.
2. Locate the rule of interest in the color schemes area.
3. Right-click on the rule, and select **Edit Rule...**.
4. Response: The Edit Rule dialog is opened.

**Note:** You can also double-click on the rule to open the dialog.

#### ► To delete a rule:
1. Go to the Colors page of the Visualization Properties dialog.
2. Locate the rule of interest in the color schemes area.
3. Right-click on the rule, and select **Delete Rule**.
4. Response: The rule is deleted.
   **Note:** You can also click on the x to the right of the rule to delete it.

## 6.1.4.2    Details on Add/Edit Rule

Use these dialogs to define or edit a color rule. See also Color Rules Overview to get an introduction to rules in color schemes. Note that the set of rule types available in these dialogs is different depending on whether the color scheme is categorical or continuous. Both sets of rules are described below.

#### ► To reach the Add/Edit Rule dialog:
1. In the Visualization Properties dialog, go to the **Colors** page.
2. Click on the **Add Rule...** button to add a rule. To edit an existing rule, double-click on the rule of interest in the list.

| Option | Description |
|---|---|
| **Rule type** | Specifies which rule type to add. Which types are available depends on the data type of the column, or hierarchy that the rule is applied to. See below for descriptions of all available rule types. |
| **Value** | Defines the value or values the rule should apply to. The available |

| | |
|---|---|
| | options depend on the rule type selected. See Details on Point/Value Menu for descriptions of all the options in this menu. |
| **Color** | Specifies the color to use for the rule. |

## Available rule types for continuous coloring:

| Rule Type | Description |
|---|---|
| **Top** | Colors the top number of items in the selected color. Specify the number of items to color in the Value field. **Note:** In some cases more than the defined number of items may be colored. For example, if the rule states that the top three items should be yellow, and four items represent the highest value, then all four of these items will become yellow. |
| **Bottom** | Colors the bottom number of items in the selected color. Specify the number of items to color in the Value field. **Note:** In some cases more than the defined number of items may be colored. For example, if the rule states that the bottom three items should be yellow, and four items represent the lowest value, then all four of these items will become yellow. |
| **Between** | Colors all the items representing values between the two specified values in the selected color. Specify the values in the two Value fields. |
| **Equal to** | Colors all the items representing values that are equal to the specified value in the selected color. |
| **Not equal to** | Colors all the items representing values that are not equal to the specified value in the selected color. |
| **Greater than** | Colors all the items representing values greater than the specified value in the selected color. |
| **Greater than or equal to** | Colors all the items representing values greater than or equal to the specified value in the selected color. |
| **Less than** | Colors all the items representing values less than the specified value in the selected color. |
| **Less than or equal to** | Colors all the items representing values less than or equal to the specified value in the selected color. |
| **Boolean expression** | Lets you define a boolean expression. All the items for which the expression is true will get the specified color. See To add a boolean expression as a rule for a description. To learn more about custom expressions in general, see Custom Expressions Introduction. |

## Available rule types for categorical coloring:

**Note:** Rules are case sensitive. This means that "Equal to Bananas" is not the same as "Equal to bananas". Note also that in rules you should not use quotation marks around strings. If you define a custom expression containing a string value, however, then quotation marks are necessary.

| Rule Type | Description |
|---|---|
| **Equal to** | Colors all the items that correspond exactly to the specified string value in the selected color. |
| **Not equal to** | Colors all the items that do not correspond exactly to the specified string value in the selected color. |
| **Contains** | Colors all the items that contain the specified string value in the selected color. |
| **Starts with** | Colors all the items that start with the specified string value in the selected color. |
| **Ends with** | Colors all the items that end with the specified string value in the selected color. |
| **Boolean expression** | Lets you define a boolean expression. All the items for which the expression is true will get the specified color. See To add a boolean expression as a rule for a description. To learn more about custom expressions in general, see Custom Expressions Introduction. |

## 6.1.5 Coloring in Tables, Cross Tables and Heat Maps

### 6.1.5.1 Coloring in Tables, Cross Tables and Heat Maps

Coloring is applied to tables, cross tables, and heat maps in a different way than other visualizations. The following two sections describe how to apply coloring to these visualizations.

### 6.1.5.2 Coloring in Tables

For a table visualization, a color scheme is always applied to a color scheme grouping. A color scheme grouping functions as a container for one or more columns on which you want to apply the same color scheme. You can add many color schemes to the same table. In fact, you can add as many as one color scheme per column. When you create a new table it has no coloring applied to it. You must add color scheme groupings with the columns you want to color, and set up color schemes for each of the groupings. To learn more about color schemes and how to set them up in different color modes, see Color Schemes Overview and Color Modes Overview respectively.

**Example:**

The image below shows a table with two different color schemes applied to it.

The color schemes are separated by a horizontal line in the legend. They are described separately below.

The upper color scheme in the legend contains the two columns Category and Type, both containing string values. The color scheme grouping for this color scheme is called Category and Type, as seen below where a part of the Colors page of the Table Properties dialog is shown.
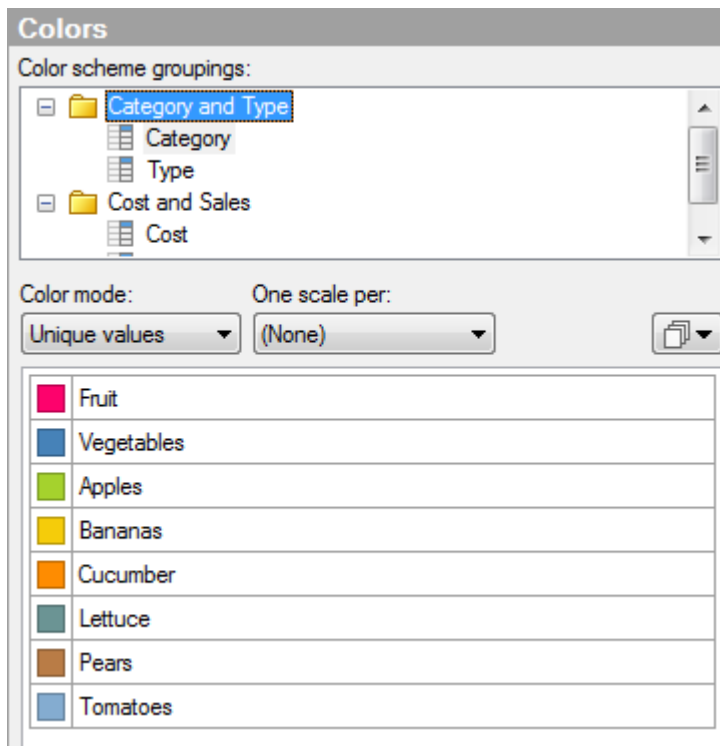


In the upper part of the dialog, the color scheme grouping Category and Type is selected, and in the lower part of the dialog, its corresponding color scheme is displayed. The color scheme is in Unique values color mode, and each of the values in the two columns has its own color.

The color scheme shown in the lower part of the legend contains the two columns Cost and Sales, which both contain integer values. The color scheme grouping for this color scheme is

called Cost and Sales, as seen below where a part of the Colors page of the Table Properties dialog is shown.
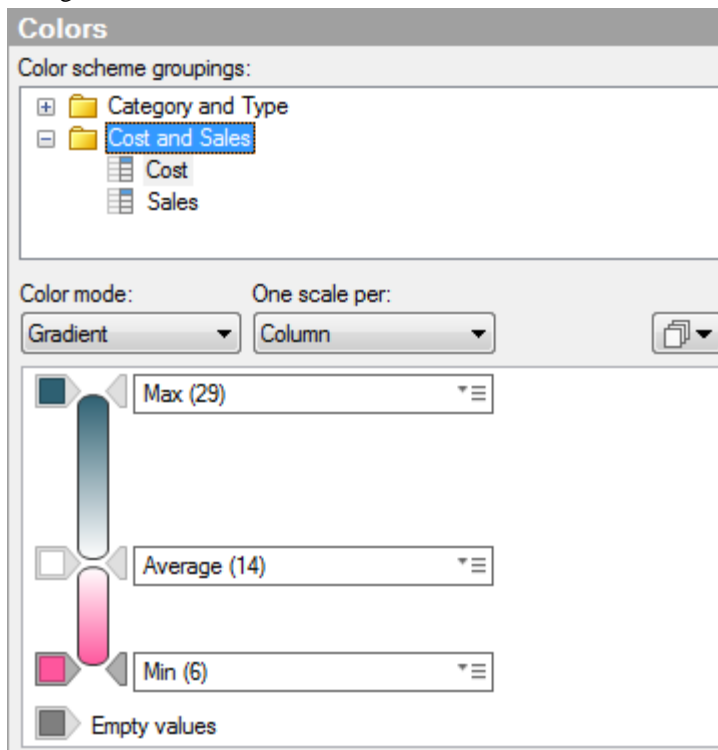


In the upper part of the dialog, the color scheme grouping Cost and Sales is selected, and in the lower part of the dialog, its corresponding color scheme is displayed. The color scheme is in Gradient color mode. The two columns share the same color scheme, but the scaling is separate for them. This means that the three color points Min, Average, and Max are calculated per column. If you want to use a common scale for the columns in the grouping, select the alternative (None) in the One scale per drop-down list. To see the scale for a column in the color scheme grouping, select it in the Color scheme groupings list. If the grouping itself is selected, as in the example, then the scale for the first column in the grouping is displayed.

### ► To add a color scheme grouping:

1. Open the Visualization Properties dialog, and go to the Colors page.
2. Open the **Add** menu and select **Color Scheme Grouping...**.

   Response: The Add Color Scheme Grouping dialog is opened.
3. In the **Name** field, type a name to use for the new grouping.
4. In the **Available columns** list, select the columns you want to include.

   Comment: A grouping can only contain columns with values of the same data type. The exception being the five numeric data types: Integer, LongInteger, Real, SingleReal, and Currency, which can be added to the same grouping. The "data type" in this case is called Numeric, but is a collection of these five data types rather than an actual data type.
5. Click **Add >**.

   Response: The selected columns are added to the **Selected columns** list.
6. Click **OK**.

   Response: The new color scheme grouping is added to the **Color scheme groupings** list.

   Comment: A column can only be included in one grouping at a time. If you add a column that is already included in an another color scheme grouping, the column will automatically be removed from the other grouping.

## 6.1.5.3     Coloring in Cross Tables and Heat Maps

For cross tables and heat maps, a color scheme is always applied to a color scheme grouping. A color scheme grouping functions as a container for one or more axis values on which you want to apply the same color scheme. You can add many color schemes to the same cross table or heat map, and it is possible to color by the columns on any of the axes. However, you can only color a cross table and a heat map by one column at a time, and if the cell values axis contains more than one column, you can only color by the cell values axis. To learn more about color schemes and how to set them up in different color modes, see Color Schemes Overview and Color Modes Overview respectively. The examples below illustrate how coloring can be applied to cross tables and heat maps.

### Example:

The cross table below shows the sum of sales (Sum(Sales)) for fruits and vegetables for the years 2001, 2002, and 2003. The horizontal axis has the two columns Category and Type. The column Category contains the two axis values Fruit and Vegetables, and the column Type contains the values Apples, Bananas, Pears, Cucumber, Lettuce, and Tomatoes. The cross table is colored by the column Category.



When you create a new cross table, one color scheme grouping (named Numeric) is created for each column represented on an axis in the cross table. The default grouping contains all the axis values in that column. Select a column in the Color by drop-down list to see its default color scheme grouping. In the example below, a part of the Colors page of the Cross Table Properties dialog is shown. The column Category was selected in the Color by drop-down list and its default color scheme grouping is displayed, as well as its two axis values Fruit and Vegetables.
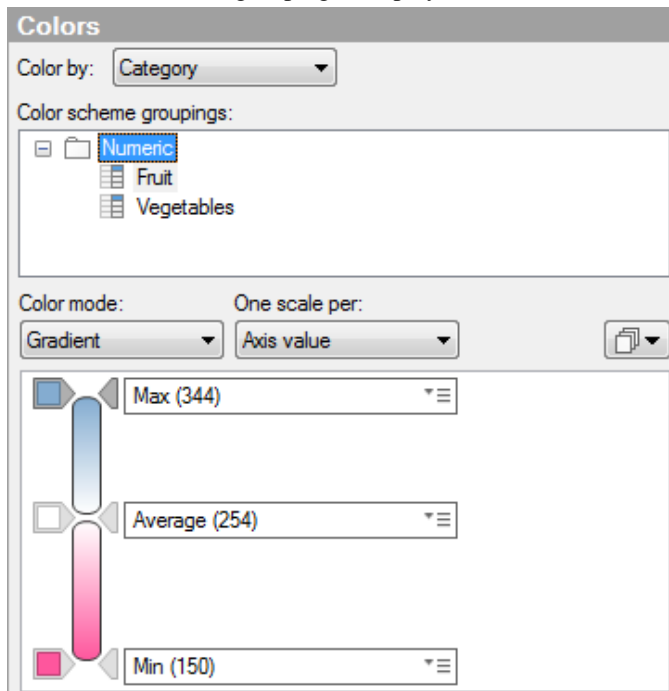
In the lower part of the dialog, the color scheme for the Numeric color scheme grouping is displayed. The color scheme is in Gradient color mode. The two axis values Fruit and Vegetables share the same color scheme, but the scaling is separate for them. This means that the three color points, Min, Average, and Max, are calculated per axis value. If you want to use a common scale for the axis values in the grouping, select the alternative (None) in the One scale per drop-down list. To see the scale for a column in the color scheme grouping, select it in the Color scheme groupings list. If the grouping itself is selected, as in the example, then the scale for the first column in the grouping is displayed.

## Example:

The example below shows a cross table with the same setup as in the example above except for the coloring. This cross table is colored by the column Type, and has two different color schemes applied to it.



The color schemes are separated by a horizontal line in the legend. Below is a part of the Colors page of the Cross Table Properties dialog for this cross table.



As can be seen in the upper part of the dialog, two color scheme groupings have been added. The first grouping is named Fruits, and the three axis values, Apples, Bananas, and Pears, have been added to that grouping. This is also the color scheme displayed first in the legend above. The second grouping is named Vegetables, and it contains the axis values Cucumber, Lettuce, and Tomatoes. The Numeric color scheme grouping is empty because all the axis values in the

column Type have been added to either of the two new groupings. The default grouping cannot be deleted from the list of groupings. If you delete a grouping that you have added, then the axis values in that grouping will automatically be moved to the default grouping instead. Any added groupings will be shown in the list even if you change to another column to color by. The example below shows the Color scheme groupings list when the Color by column is set to Year.
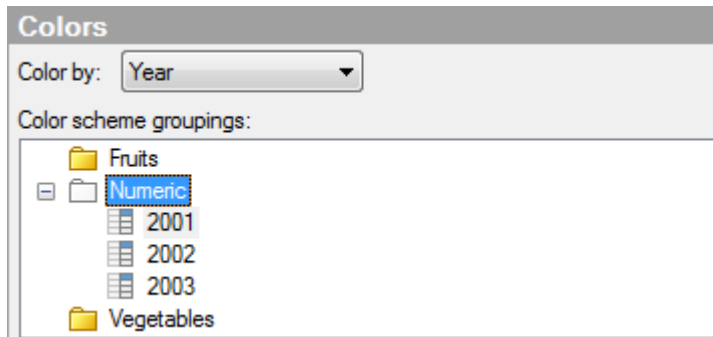


The two groupings Fruits and Vegetables are still visible, but you cannot expand them unless you change Color by back to the column Type.

## Example:

Coloring in heat maps works the same way as in cross tables. The example below shows a heat map where the Y-axis is set to the column Test, while the X-axis is set to (None). The individual cell values show the average of the three columns, Time 1, Time 2, and Time 3.
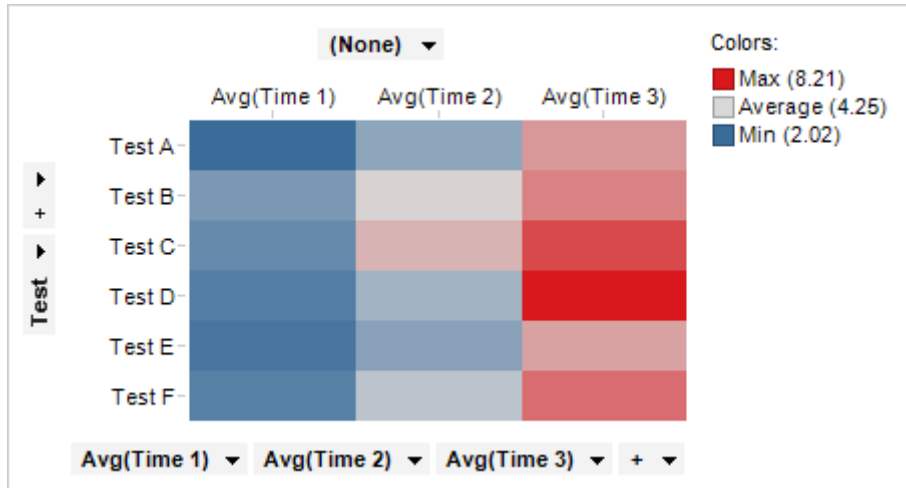


Below is a part of the Colors page of the Heat Map Properties dialog for the heat map above. The heat map is colored by (Cell Values), which is the only available option when the cell values axis contains more than one column.
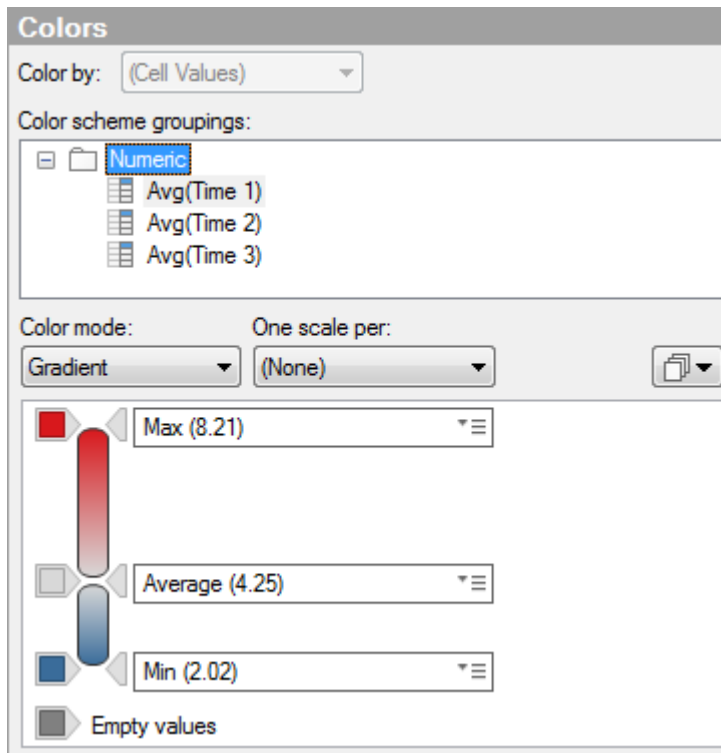
### ► To add a color scheme grouping:

1. Open the Visualization Properties dialog, and go to the Colors page.
2. Open the **Add** menu and select **Color Scheme Grouping...**.
   Response: The Add Color Scheme Grouping dialog is opened.
3. In the **Name** field, type a name to use for the new grouping.
4. In the **Available axis values** list, select the columns you want to include.
5. Click **Add >**.
   Response: The selected columns are added to the **Selected axis values** list.
6. Click **OK**.
   Response: The new color scheme grouping is added to the Color scheme groupings list.

   Comment: An axis value can only be included in one grouping at a time. If you add an axis value that is already included in another color scheme grouping, the axis value will automatically be removed from the other grouping.

## 6.1.5.4    Details on Add/Edit Color Scheme Grouping

Use these dialogs when you want to add a new color scheme grouping or edit an existing one.

### ► To reach the Add/Edit Color Scheme Grouping dialog:

1. In the Visualization Properties dialog for a table, a cross table, or a heat map, go to the **Colors** page.
2. To add a new grouping, open the **Add** menu and select **Color Scheme Grouping...**. To edit an existing grouping, select the grouping of interest from the list, then click on **Edit...**. Only groupings that you have added to the list can be edited or deleted.

**Note:** If this dialog is opened from a heat map or cross table, the labels will read "Available axis values" and "Selected axis values" instead. This means that in the descriptions below, each reference to a "column" should be replaced by "axis value".

| Option | Description |
|---|---|
| **Name** | Type a name to use for the color scheme grouping. |
| **Available columns** | Lists all columns and hierarchies available for selection. |
| **Selected columns** | Lists the columns selected to be used in this color scheme grouping. |
| **Add >** | Adds the selected columns to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |

**Note:** You cannot combine columns containing different data types in the same color scheme grouping. The exception being the five numeric data types: Integer, LongInteger, Real, SingleReal, and Currency, which can be added to the same grouping. The "data type" in this case is called Numeric, but is a collection of these five data types rather than an actual data type.

# 6.1.6        Custom Expressions for Coloring

You can use custom expressions in color schemes in a few different ways and some examples are described below. You can define an anchor point with a custom expression, or you can use expressions in rules. To get a basic understanding of custom expressions, see Custom Expressions Introduction. To learn more about using rules in color schemes, see Color Rules Overview.

### ► To add a custom expression as an anchor point:

Anchor points are available when coloring continuous columns in a gradient or segments color mode. A custom expression can be used to determine where the breakpoint should be.

1.   Open the menu for the anchor point by clicking on the icon, ⁼≡.
2.   Select **Custom Expression**.
     Response: The Custom Expression dialog is opened.
3.   In the **Available columns** list, select **Axis.Color**, and click **Insert Columns** to add it to the expression.
     Comment: Axis.Color represents the column you have selected to color by and it is most of the times the only "column" in the Available columns list. In table visualizations you will have access to all columns.
4.   Specify the custom expression of your choice.
     **Note:** The output from the custom expression must be an aggregated value.
5.   Click **OK** to close the dialog.

     Response: The custom expression is added as the anchor point. An icon, ✎, indicating that the anchor point is a custom expression, is shown in the field.

### ► To add a boolean expression as a rule:

A rule functions as an exception to the rest of the color scheme and can be specified using a boolean custom expression.

1.   Go to the **Colors** page of the **Visualization Properties** dialog.
2.   Click on the **Add Rule...** button to the right of the color scheme.
     Response: The Add Rule dialog is opened.
3.   In the **Rule Type** drop-down list, select **Boolean expression**.
4.   Click on the custom expression icon, ✎, in the **Value** field.
     Response: The Custom Expression dialog is opened.
5.   Specify the custom expression of your choice. For example, use "[Axis.Color]=true" to color all rows with the boolean value "true" with a specified color.
     Comment: Axis.Color represents the column you have selected to color by. In table visualizations you will also have access to the columns themselves and you can make direct column comparisons, e.g., [Col1]>[Col2], in the expression.
     **Note:** The output from the custom expression must be a boolean value.
6.   Click **OK** to close the dialog.
7.   Select a **Color** to represent the rule.
8.   Click **OK**.
     Response: The rule is added to the color scheme.

### ► To add a custom expression as a value in a rule:

The custom expression can specify a certain value at which the exception rule should take over.

1. Go to the **Colors** page of the **Visualization Properties** dialog.

2. Click on the **Add Rule...** button to the right of the color scheme.

   Response: The Add Rule dialog is opened.

3. From the **Rule type** drop-down list, select the rule type you want to use.

   Comment: For example, the rule type could be "Greater than or equal to" a value defined by the custom expression. There are a number of different rule types to choose from.

4. In the **Value** field, click on the icon, $^\blacktriangledown\equiv$, to open the menu.

5. Select **Custom Expression**.

   Response: The Custom Expression dialog is opened.

6. Specify the custom expression of your choice.

   Comment: Axis.Color represents the column you have selected to color by. For example, if the rule type is "Greater than or equal to", then the expression "Avg([Axis.Color])+2*StdDev([Axis.Color])" would color all rows where the value of the selected color column is greater than or equal to the average value plus two standard deviations with the rule color.

   **Note:** The output from the custom expression must be an aggregated value.

7. Click **OK** to close the dialog.

8. Select a **Color** to represent the rule.

9. Click **OK**.

   Response: The rule is added to the color scheme.

   **Note:** When you are setting up a custom expression with a string comparison included, you need to put quotation marks around the string (for example, [Axis.Color]="Bananas"). If you define a rule containing a string comparison, however, you should not use quotation marks.

## 6.2    Limiting What is Shown in Visualizations

When a new visualization is created, the default limitation setting is that the visualization is affected by the current filtering on the page where it resides. However, there are many alternatives for you to set up the visualization available on the Data page of the Visualization Properties dialog.

### ► To limit a visualization by the union of two markings:

The default when limiting data by more than one marking is that data must be available in all markings (intersection) to be shown in the limited visualization. However, you can change Rows must be included in to Any marking on the Data page.

### ► To set up a visualization to use a different filtering scheme than the one on the page:

1. Right-click in the visualization to display the pop-up menu.

2. Select **Properties**.

3. Go to the **Data** page.

4. Under **Limit data using filterings**, clear the **Use the current filtering scheme from the page** check box and select a different filtering scheme instead.

   Comment: The difference between selecting the Use the current filtering scheme from the page option and the filtering scheme annotated with (Currently used) is that in the first case, the filtering scheme of the visualization will change when the filtering scheme of the page is changed. In the latter case, it will not.

Comment: It is possible to limit a visualization by more than one filtering scheme. In this case, the intersection of the filterings will be used. This means that the visualization will show only the data that is made visible by all of the filtering schemes.

### ► To create an unfiltered visualization:

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Data** page.
4. Clear all check boxes under **Limit data using filterings**.

### ► To limit a visualization by an expression:

If you want to display data for a special category only, you can set up a "hard filter" on the visualization using a boolean expression.

1. Right-click in the visualization to display the pop-up menu.
2. Select **Properties**.
3. Go to the **Data** page.
4. Next to **Limit data using expression**, click **Edit...**.
5. Type a boolean expression in the dialog and click **OK**.

**Note:** If you use more than one type of limiting on the Data page, then the different types of limiting will be combined so that the result will be Marking limiting AND Filtering limiting AND Expression limiting.

# 6.3    Details Visualizations

## 6.3.1    What is a Details Visualization?

A details visualization is a special case of a limited visualization, slightly related to the Details-on-Demand. This means that the information shown in a details visualization depends on what is marked in one or more other visualizations. Details visualizations can be used to set up analyses where you can drill down into your data in multiple steps. The marking you perform in one visualization (the master visualization), determines what you will see in the next visualization, and so on. If nothing is marked, the details visualization will not contain any data at all.

In contrast to the Details-on-Demand, which is always a table, the details visualization can be any type of visualization and it can be placed anywhere within the page, just like any other visualization.

### ► To create a details visualization:

1. Load data for the master visualization and, if other data, for the details visualization.
   Comment: Note that all data tables you wish to use must be loaded, and a relation must have been set up between the data tables, before you create the details visualization. See How to Insert Multiple Data Tables into the Analysis for more information about how to add more data tables and define relations between them.
2. Create the master visualization that you want to use to control the details visualization.
   Comment: This should be the visualization in which you want to be able to mark items and retrieve details about these items in the details visualization.
3. Right-click in the visualization and select **Create Details Visualization** and the type of visualization to use as details visualization from the pop-up menu.

4. If there are more than one related data table available in your analysis, the Create Details Visualization dialog will appear. Select which data table to use from the **Related data table for new visualization** drop-down list.

   Comment: If no related data tables are available, the details visualization will automatically use the same data table as the master visualization.

5. Click **OK** in the Create Details Visualization dialog.

   Response: The new details visualization appears in the analysis.

6. Set up the new details visualization to the desired view.

The Data page in the Visualization Properties dialog controls which markings will be used to limit the data shown in a visualization. Normally, no marking is selected here, but when you create a details visualization, the marking used by the master visualization is automatically selected to be limiting, and a new marking is created to enable marking in the details visualization.

**Tip:** An already created visualization can also be converted to a details visualization by changing the limiting markings on the Data page. In that case, you should also make sure that the visualization in itself does not use the same marking as is used to limit the data shown.

## Example:

Imagine having a master visualization showing the sales of different fruits and vegetables during a couple of years. The master visualization in this example is a line chart with each line representing a fruit or a vegetable:
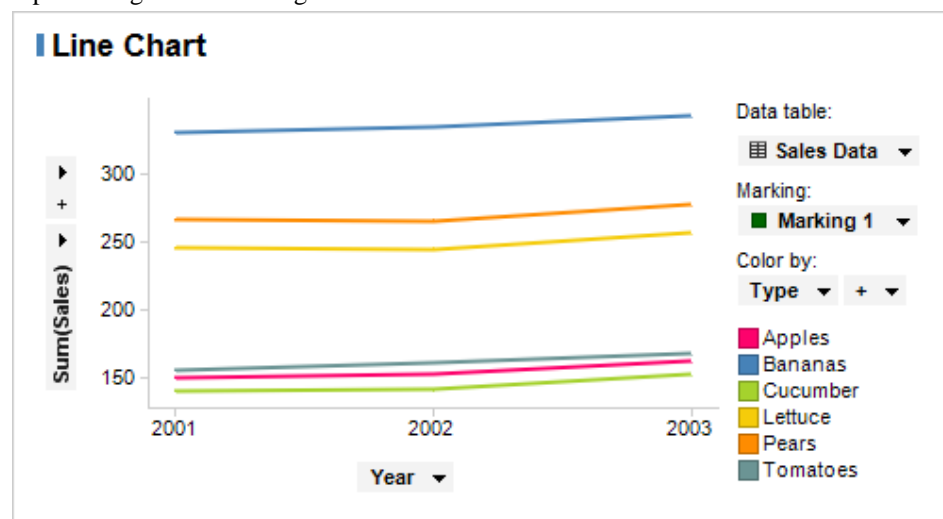


Then, we want to investigate the carbohydrate content of the different fruits and vegetables in a details visualization where only the data for the type that we clicked on is shown.

Right-click on the master visualization and select **Create Details Visualization > Bar Chart...**. In this example, the details data comes from a different data table than the one used in the master visualization, but it could also be the same data table.

This details visualization is set up to show the content of Glucose, Fructose, Maltose and Saccharose on the value axis and (Column Names) on the category axis. If nothing is marked in the master visualization, then no data is shown in the details visualization:

When a line is marked in the master visualization, the bar chart is updated to show data about that fruit or vegetable. In this example, we mark Apples, the second line from the bottom:
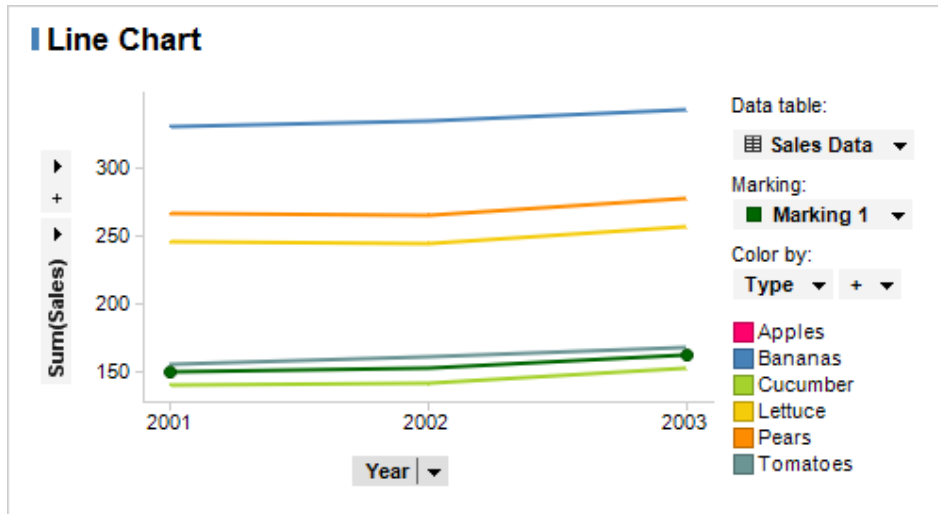


The details visualization shows the carbohydrate content of apples:
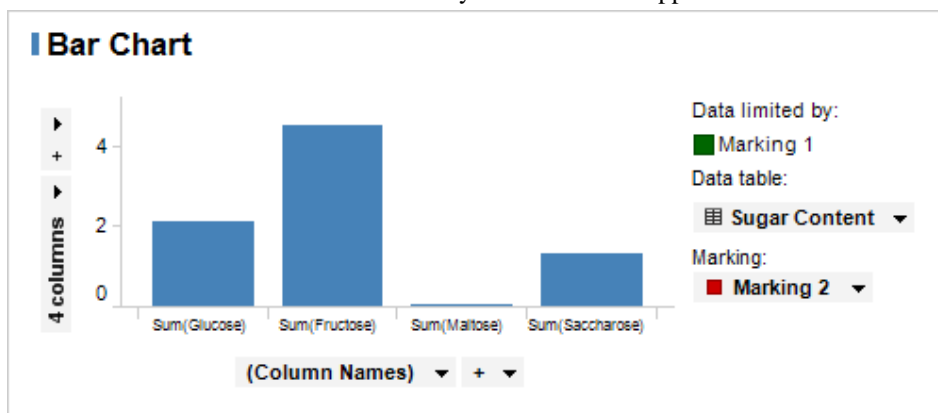


Clicking on the Bananas line will show the carbohydrate content of bananas, etc.

A details visualization can, in turn, be used as a master visualization for another details visualization, so that you can drill down deeper and deeper into your data, by marking elements in a series of visualizations.

## 6.3.2     Details on Create Details Visualization

Details visualizations are limited to showing data marked in another visualization (the master visualization) only. See What is a Details Visualization? to learn more. The Create Details Visualization dialog is shown if the master visualization is based on a data table that is related to one or more other data tables in the analysis. You must then select which data table the details visualization should be based on.

### ► To reach the Create Details Visualization dialog:

1. Create a master visualization.

   Comment: This is the visualization that you want to use to control the details visualization.

2. Right-click in the master visualization to display the pop-up menu.

3. Select **Create Details Visualization** and determine which type of visualization you want to use.

   Response: The Create Details Visualization is displayed. Note that it will only appear if there are related data tables in the analysis.
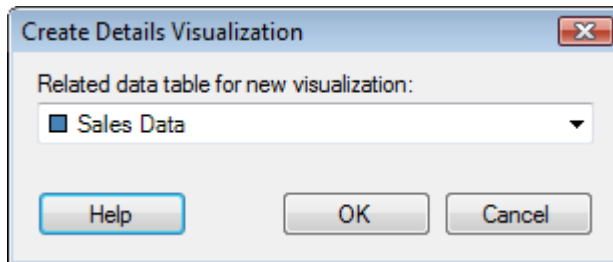


| Option | Description |
|---|---|
| **Related data table for new visualization** | Select the data table to use for the details visualization. You can only select from data tables that are related to the one used in the master visualization.<br><br>New data tables are added via **File > Add Data Tables...** or **File > Add On-Demand Data Table...**. |

# 6.4     Custom Expressions

## 6.4.1     Custom Expressions Introduction

The ability to create custom expressions is a powerful and advanced tool in TIBCO Spotfire. Custom expressions allow you to create your own aggregation methods for the visualizations.

The custom expression functionality is accessed by right-clicking on the column selector in the visualization and selecting the Custom Expression… option from the pop-up menu.
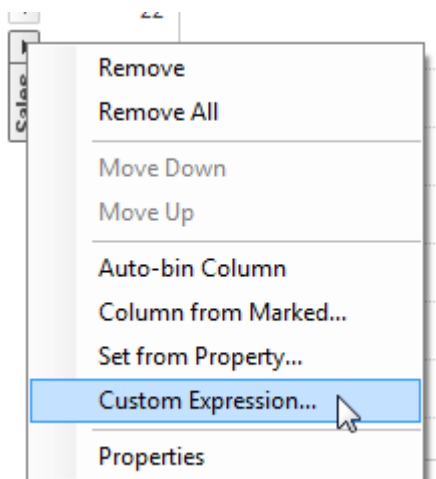
This section of the help contains the following information on how to create custom expressions:

- An overview explaining what custom expressions are
- Basic custom expressions
- Information about the OVER keyword in custom expressions
- Advanced custom expressions
- How to insert a custom expression
- Details on the Custom Expression dialog

## 6.4.2 Custom Expressions Overview

As mentioned, custom expressions are powerful and useful, but also advanced. The purpose of this overview is to introduce you to some basic concepts regarding custom expressions. What they are, how they can be used, and why they affect the visualizations the way they do. This overview includes some examples of how to use custom expressions, and more examples can be found in the following help sections: Basic Custom Expressions, OVER in Custom Expressions, and Advanced Custom Expressions.

### What are markers?

Before creating custom expressions, it is vital to know what the markers in a visualization represent, since it makes it easier to understand why custom expressions behave the way they do. Particularly affected are custom expressions containing the OVER statement. See OVER in Custom Expressions to learn more.

Markers are, quite simply, a representation of how you have divided your data into different slices. A marker can represent everything from all rows in your data to a single row, depending on how you have set up your visualization. These slices can, of course, be represented by not only markers in a scatter plot, but also segments of a bar chart or a pie chart and so on.

In the example below, the marker contains all rows in the data. It shows the sum of all sales of all products for all time periods.
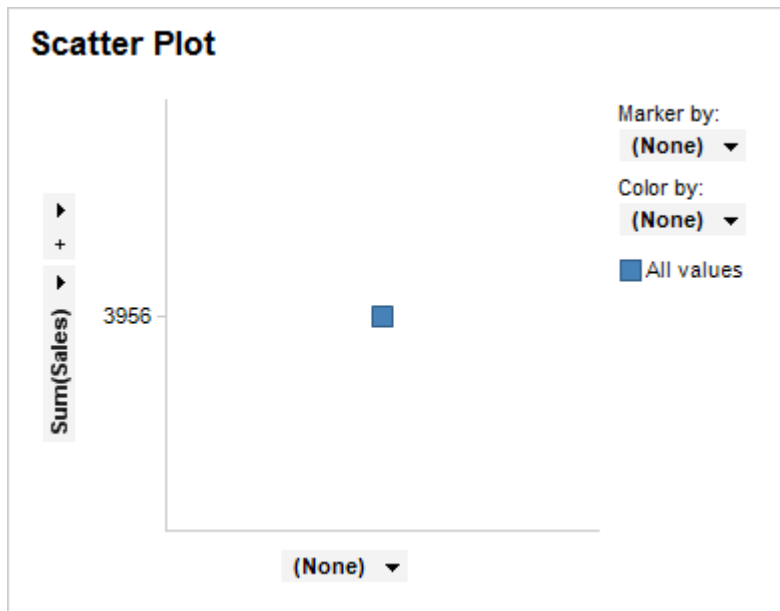
If you start slicing the data into smaller parts, the result could look like the example below, where each marker represents the sum of the sales for each product for each year.
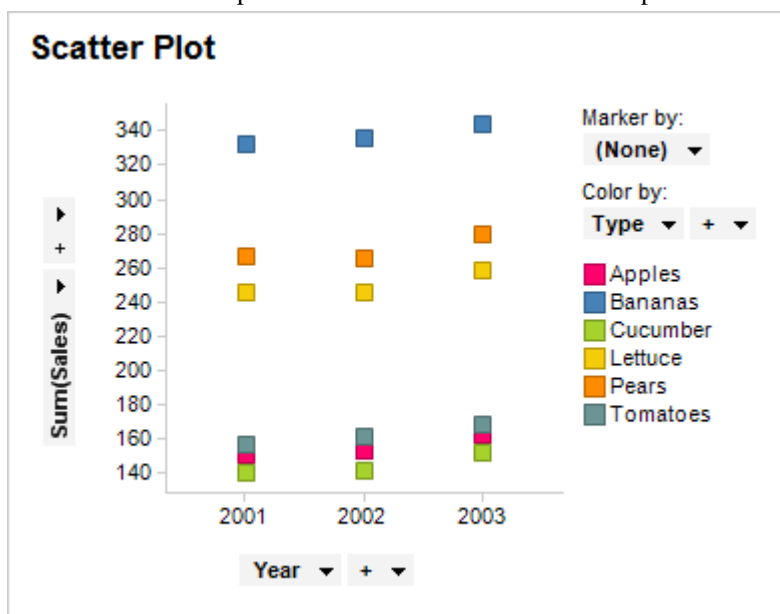


## Setting up a visualization

Setting up a visualization is basically deciding how the data is to be divided and how the data is to be aggregated over the slices. In the examples above, the aggregation method is **Sum()**, which in this case means that the total value of all sales for each product and year are summed up in one marker.

The aggregation method **Sum()** can actually be seen as a custom expression, the only difference is that it is provided in the aggregation menu. When you want to use an aggregation method that is not listed, you can create your own using custom expressions.

When you change the visualization, for example using the filters, the markers and scales will automatically update. The aggregation will automatically be revaluated based on the contents of each marker. This works the same way for the provided aggregation methods as well as for the basic custom expressions.

**Note:** If you apply <> around an expression, it becomes categorical. Similarly, you can right-click on the axis and select Categorical Scale from the pop-up menu. If an aggregated value is made categorical, it will not change value when data are being filtered.

## Example

Just to show that custom expressions and the predefined aggregations really are the same thing, consider the aggregation **Avg(Cost)**, an aggregation that shows you the average cost for each product each year.
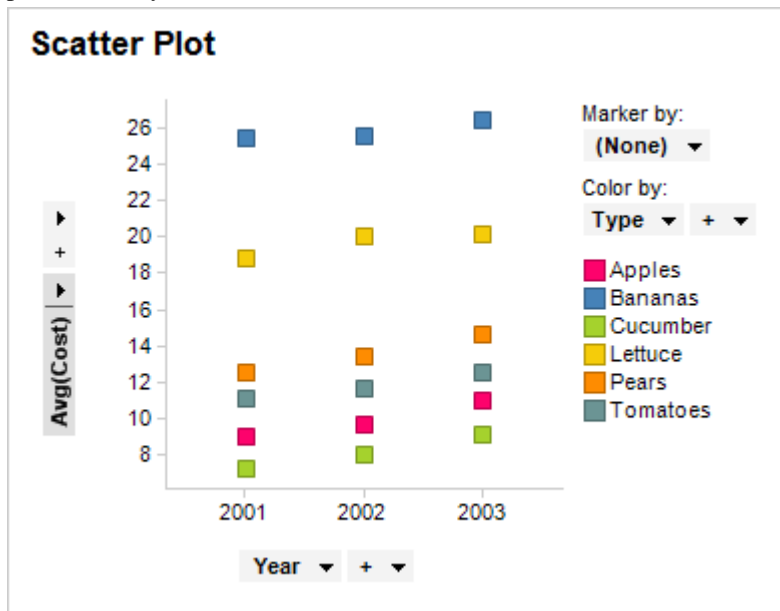


The same visualization can be created using custom expressions. Start by right-clicking on the axis selector for the Y-axis and select **Custom Expression...**
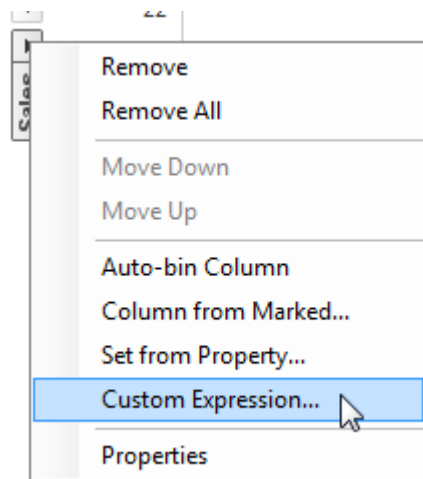


In the Custom Expression dialog, enter the expression **Sum([Cost])/Count([Cost])**, either by typing it directly in the Expression field or by inserting columns and functions from the lists, and click **OK**.
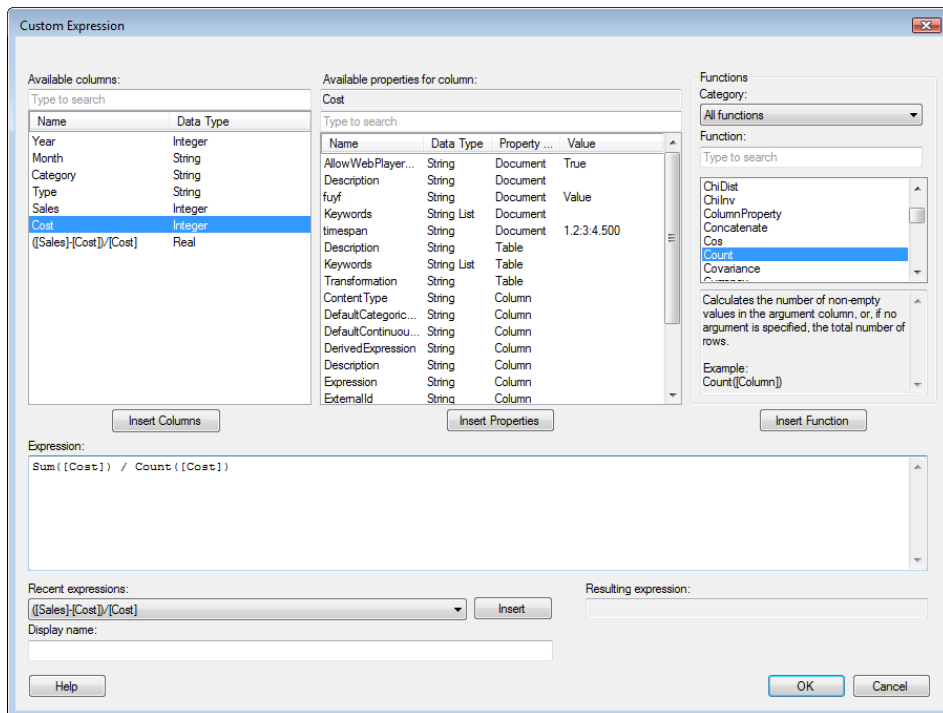
As you can see, the resulting visualization is the same as when you chose the aggregation **Avg(Cost)**, but you have now done it yourself by creating a simple custom expression.

**Note:** This is just an example to show that custom expressions work the same way as the predefined aggregation methods. The main purpose with the custom expressions is to create aggregations that are not listed, rather than to recreate the predefined ones.
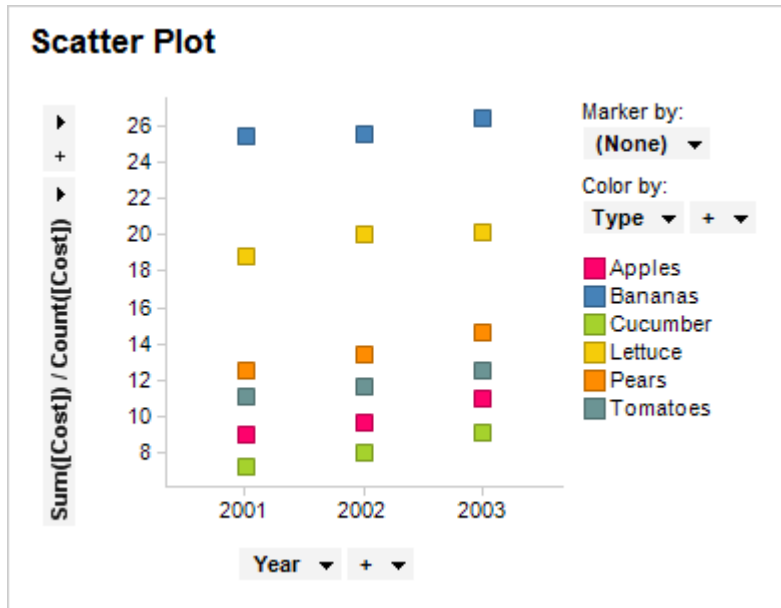


For more examples of custom expressions, continue to the Basic Custom Expressions page.

## 6.4.3 Basic Custom Expressions

Now that you know what custom expressions are, it is time to look at some basic examples of how they can be used.

### Example

Let us start with a simple custom expression. Consider again the visualization from the overview page that shows the sales of fruits and vegetables.

This trellised bar chart shows the sum of the sales per Year and Category.
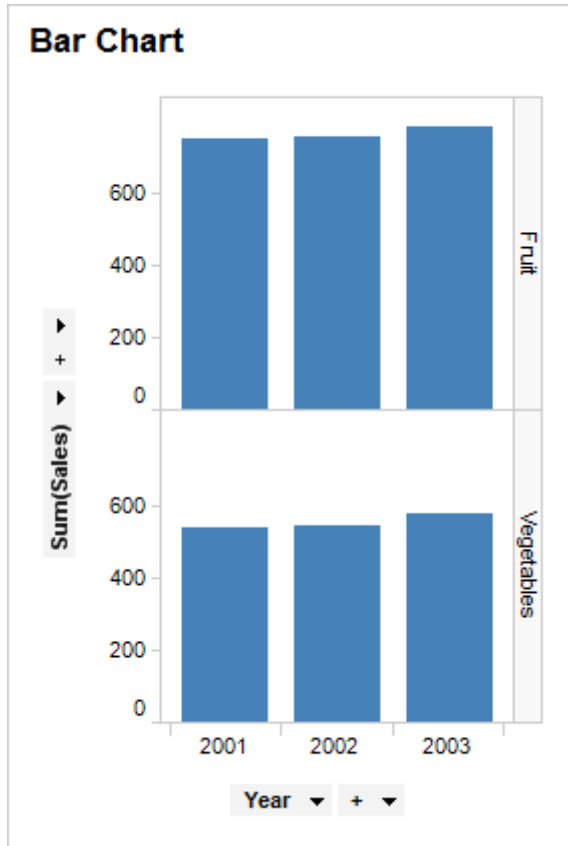


It shows that the sum of the sales of all vegetables and all fruits has increased each year.

Using a simple custom expression, **Sum([Sales])/Sum([Cost])**, you can see the ratio of how much higher the sales are compared to the cost for each category and year.
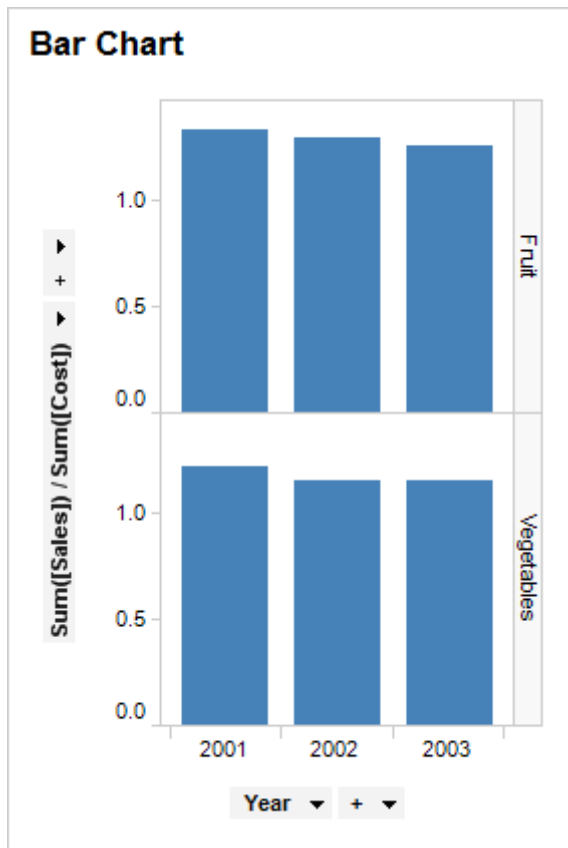
It is now possible to see that even though the generated sales have increased each year, the sum of the sales compared to the sum of the cost has mostly decreased.

## Example

The previous example showed that the sum of the sales had decreased relative to the sum of the cost. If you want to see the amount of money earned for each product and year, simply subtract the sum of the cost from the sum of the sales using the custom expression **Sum([Sales])-Sum([Cost])**.
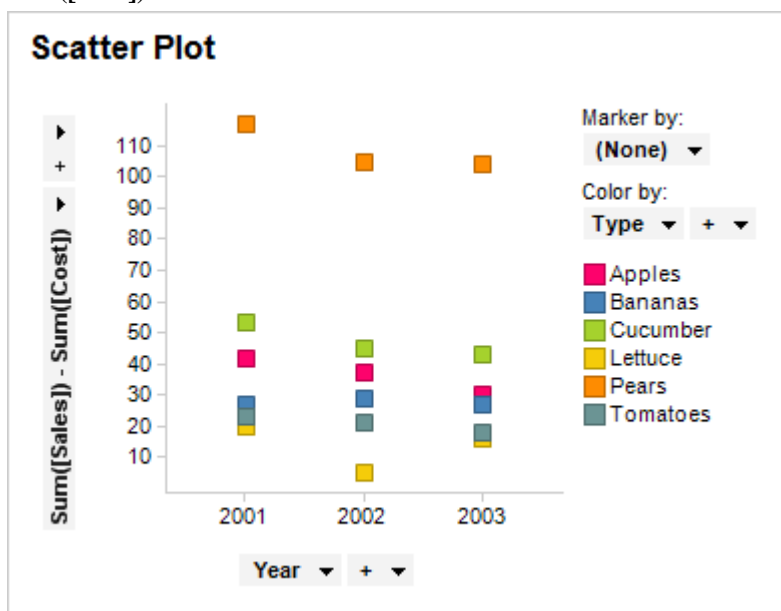
Now, assume that tax has not been subtracted from the sales price, and that five percent of the money received from customers cannot be counted as a profit. Simply change the custom expression to **(Sum([Sales])\*0.95)-Sum([Cost])** and you have the actual profit for each product each year.



## Example

Consider another data set with sales data for a number of stores. In this data set, each row represents a specific purchase made by a customer. If you want to know how much money an average customer spends on different product types, this bar chart does not give you the correct answer.
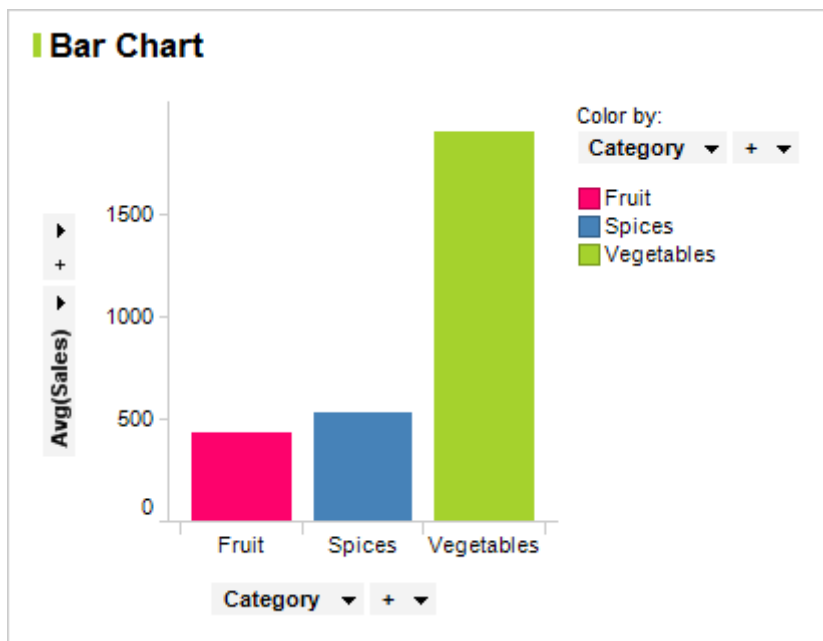
This is because the aggregation **Avg()** returns the average sales figure for each row, which means this is an average of the money spent on a single purchase. However, since each customer can make several purchases, you have to use a simple custom expression.

Since each row in the data also contains information on which customer has made the purchase (and in this case all customers have unique names), the custom expression to use is: **Sum([Sales])/UniqueCount([Buyer])** which gives you the visualization below.
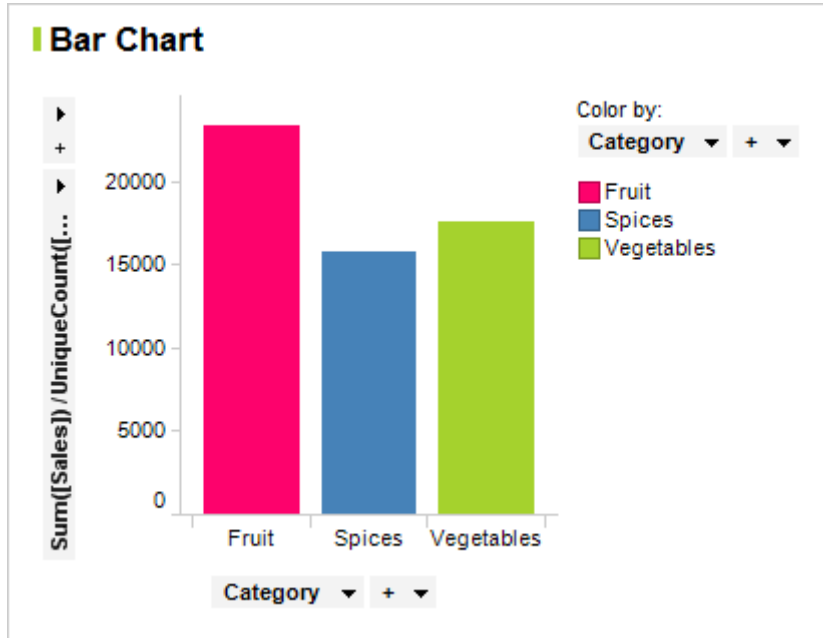


Note how much smaller the bar representing vegetables is compared to bar in the first visualization. These two charts show that people spend more money on vegetables than they do on fruit or spices each time they make a purchase of either category. But overall, the average customer spends about the same amount of money on spices that they do on vegetables, and much more on fruit, meaning they must make many more individual purchases of vegetables.

## Example

This data set is a record of orders and deliveries of Cable TV and Broadband Internet installations for customers in different cities. The fist image shows the number of installations that have been performed in the different cities. The visualization is colored according to which installation has been performed.
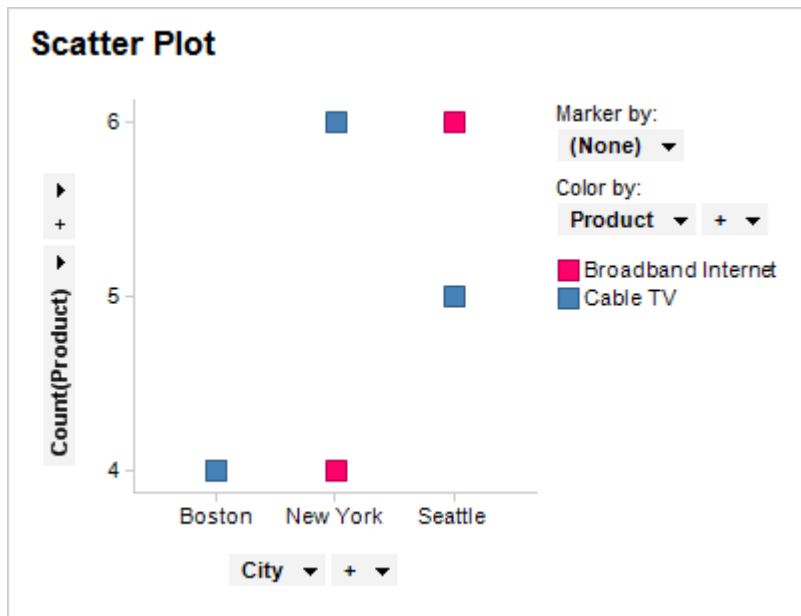
If you are interested in analyzing the number of days it takes for the cable TV and broadband Internet to be delivered and installed from the day it was ordered, this can be done with a bit more advanced custom expression. For this, we will use the **DateDiff()** function, found under Date and Time functions in the Custom Expression dialog. This function returns the difference between two date columns, in this case the columns Order Date and Delivery Date. You must also specify which part of the date you want to compare, and in this case it is the number of days we are interested in. Therefore, the base of the custom expression is:
**DateDiff("day",[Order Date],[Delivery Date])**. This returns the number of days from order to delivery for each order. The complete custom expression looks like this:
**Avg(DateDiff("day",[Order Date],[Delivery Date]))**, and shows the average delivery time for both products in each city.
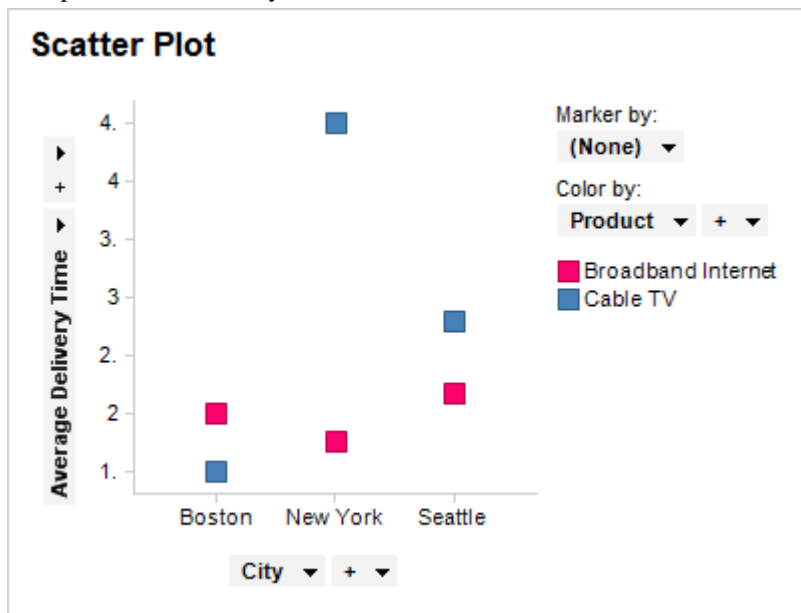


From this, it is possible to see that the average delivery time for cable TV in New York is much higher than in the other cities.

For more advanced custom expressions, the OVER statement is often used. It is described in the OVER in Custom Expressions topic.

### Hierarchies

If you are using a predefined hierarchy (in the example called MyHierarchy) on an axis and select Custom Expression you will see the expression <PruneHierarchy([Hierarchy.MyHierarchy],0)>. This syntax must always be used when a hierarchy is included in an expression. It specifies that this part of the expression is a hierarchy and it determines which level of the hierarchy slider to set. 0 is the leftmost level on the hierarchy slider, and the number of levels in the hierarchy determines how high a value you can specify. If the hierarchy expression is to be used together with another categorical column or hierarchy, each subset must be separated with NEST or CROSS, as for all categorical expressions. For example, <PruneHierarchy([Hierarchy.MyHierarchy],0) NEST [Another category column]>.

### Column Names

If the Column Names option is used on the axis, the underlying expression will be <[Axis.Default.Names]>. If the Column Names expression is to be used together with another categorical column or hierarchy, each subset must be separated with NEST or CROSS. For example, <[Axis.Default.Names] NEST [Another category column]>.

## 6.4.4 OVER in Custom Expressions

The OVER statement is used in many of the more advanced custom expressions. To understand how it works, consider again how markers represent slices of your data, and that the visualization properties, such as color or aggregations, determine how the data is sliced. Custom expressions work on each of the already defined slices in the visualization.

**Note:** This is the fundamental difference between OVER in custom expressions and in calculated columns. When you add a calculated column with OVER, OVER defines how the data is to be sliced. Since custom expressions work on the individual slices, OVER in custom expressions actually does quite the opposite. When used in Custom Expressions the OVER method is telling the visualization to ignore specific slices that are already built into the visualization .

### Example

To demonstrate what OVER does in custom expressions, consider the data set used in the overview and the first basic expressions.

This visualization shows the sum of sales for the two categories fruits and vegetables for each year.
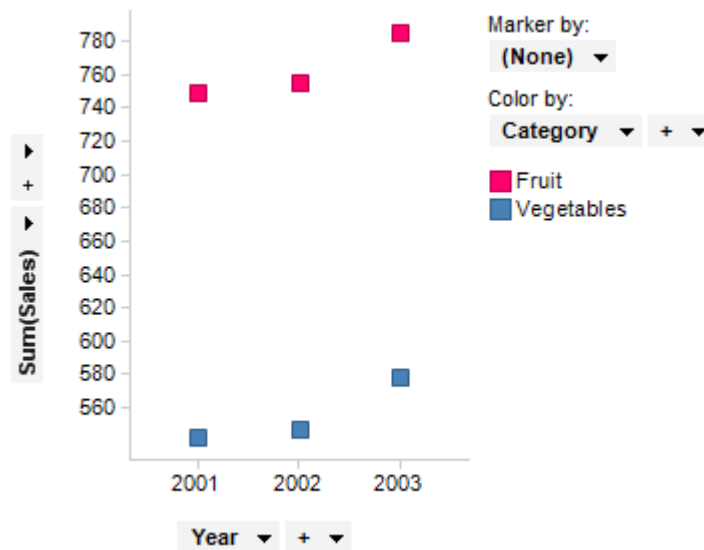
Change **Sum(Sales)** on the Y-axis to the custom expression **Sum([Sales]) OVER (All([Axis.X]))**. Note that the X-axis must be categorical when OVER expressions are used to reference it. The expression might seem a bit confusing, but the terminology used will be explained shortly. Now look at the resulting visualization. It has the same number of markers as before, but the sum of the sales is equal for all of the markers of a certain category.
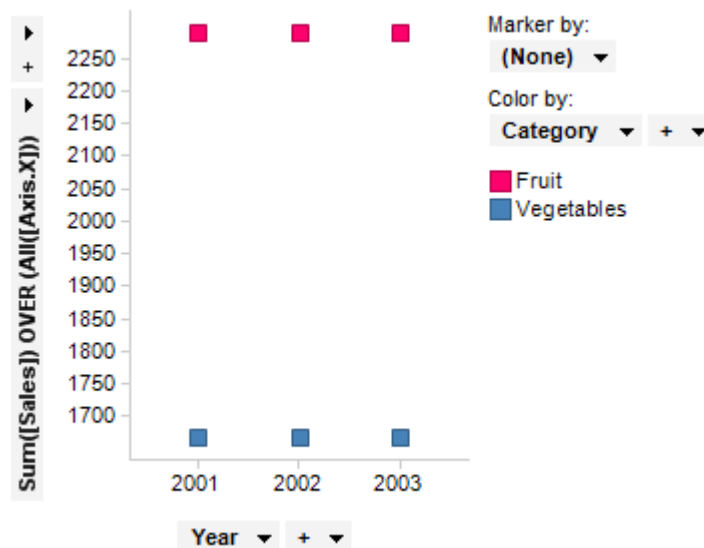


The sum of sales is the same because you told the aggregation to look outside of the individual slices. In the first visualization the sum of the sales was calculated for each year, but the OVER statement told the aggregation to ignore the slicing on the X-axis. This means that the method **Sum([Sales])** simply calculated the sum of the sales for all three years. But since you defined the X-axis to be divided by year, the number of markers remains the same, but the value for the Y-axis has changed. More information on the **All Method** used can be found on the Advanced Custom Expressions page.

It is important to note that the term used is **[Axis.X]** instead of the name of the column (in this case, Year). When using the OVER statement, you cannot refer to explicit column names, but you should instead use **[Axis.X]** or **[Axis.Color]**, for example, to refer to the column on the X-axis and the Color by, respectively. Since the custom expressions work on the actual slices in the data (in this case, markers in the visualization), allowing them to refer to columns that are not defined as visualization properties (for example, X-axis or Color by), would demand further

slicing. Therefore, the custom expressions using the OVER statement can only be defined for columns used as visualization properties, and refer to the properties instead of the names. This also allows for changing the properties on the axes or the Color by, without making the custom expression invalid. See Axes in Expressions for a list of what to refer to in different visualizations.

### Nodes

Another way to explain the OVER statement is this tree hierarchy.
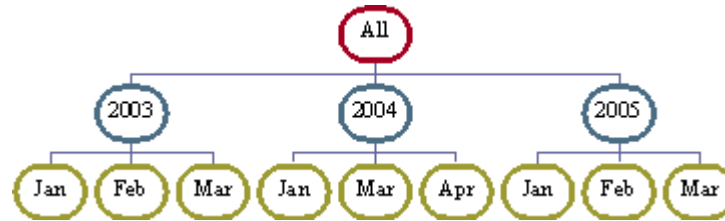


A marker or slice can include all data, for instance the data for 2003, or the data for January of 2003. Each of the slices in this hierarchy is called a node. Using the OVER statement, you can compare data from one node with the data of other nodes. For instance, you can compare January 2003 with February 2003, you can compare March 2005 with March 2004, or you can compare data from a single month with the data from that entire year. For more examples of expressions using the OVER statement, see the Advanced Custom Expressions topic.

### What to refer to in different visualization types

An axis in a visualization can be used as a part of an OVER expression, provided that the axis is **categorical** (this can be specified in the Advanced Settings dialog). See Axes in Expressions for a table defining what terms to use to specify a calculation on a property. The syntax when referring to axes in an expression is [Axis.*Axis Name*]. For example, if the Axis Name is "X", the expression should refer to **[Axis.X]**. Note that the actual names to use may be different in two similar looking visualizations. For example, in the cross table you would refer to Axis.Columns whereas in a heat map you would use Axis.X for similarly set up visualizations.

### Limitations

- It is not allowed to refer to the Color axis in the size expression in a pie chart.

### Syntax

The syntax for the OVER statement is the same for custom expressions and calculated columns:

```
<method>(<method arguments>) over (<over methods>)
```

All OVER methods can be used with dot notation or as a normal function call, for example, **[Axis.Color].Parent** or **Parent([Axis.Color])**. If nothing else is specified, the calculations are always based on the current node.

## 6.4.5     Axes in Expressions

When creating custom expressions, you may need to refer to an axis from the visualization in the expression. Below is a list of the available axes for different visualization types. Some of the axes can be useful in OVER expressions, whereas others are only used when defining rules or reference lines.

The term *axis,* in this context, does not only refer to the X and Y axes, but is a general term for the mapping of data to a dimension represented in the visualization: coloring is controlled by the Color axis, marker shape by the Shape axis and so on.

The syntax when referring to axes in an expression is [Axis.*Axis Name*]. For example, if the Axis Name is "X", the expression should refer to **[Axis.X]**. Note that the actual names to use may be different in two similar looking visualizations. For example, in the cross table you

would refer to Axis.Columns whereas in a heat map you would use Axis.X for similarly set up visualizations.

It does not make any sense to include the axis you are creating the expression for in an OVER expression. Instead, you would probably want to use the categorization on the X-axis or the Color axis when defining an OVER expression on the Y-axis.

## Axes to use in OVER expressions and other expressions:

| Visualization | Axis (Property) | Axis Name Used in Expression |
|---|---|---|
| Cross Table | Columns | Columns |
| | Rows | Rows |
| Sparkline | Rows | Rows* |
| | X-axis | X |
| Calculated Value | Rows | Rows* |
| Icon | Rows | Rows* |
| Bar Chart | Category axis | X |
| | Color by | Color |
| Line Chart | X-axis | X |
| | Color by | Color |
| | Line by | Line |
| | Line by + Color by | Feature |
| Combination Chart | X-axis | X |
| | Color | Color |
| Pie Chart | Color by | Color |
| Scatter Plot | X-axis | X |
| | Y-axis | Y |
| | Color by | Color |
| | Marker by | Marker |
| | Shape by | Shape |
| | Label by | Label |
| | Line by | Line |
| 3D Scatter Plot | X-axis | X |
| | Y-axis | Y |
| | Z-axis | Z |
| | Color by | Color |
| | Marker by | Marker |
| | Shape by | Shape |
| | Label by | Label |
| Map Chart | X-axis | X |
| | Y-axis | Y |
| | Color by | Color |
| | Marker by | Marker |
| | Shape by | Shape |
| | Label by | Label |

| | | |
|---|---|---|
| | Line by | Line |
| | Identifier | Identifier |
| Treemap | Hierarchy | Hierarchy |
| Heat Map | X-axis | X |
| | Y-axis | Y |
| Parallel Coordinate Plot | Line by | Line |
| | Color by | Color |
| Trellis | Columns | Columns |
| | Rows | Rows |
| | Pages | Pages |
| | Panels | Panels |

\* The Rows axis in a graphical table can be used in OVER expressions in dynamic item columns included in that graphical table.

Example:

Sum([Sales]) OVER (AllPrevious([Axis.X]))

See OVER in Custom Expressions and Advanced Custom Expressions for more information about OVER expressions.

### Axes to use in rules and reference lines only:

When defining rules (for example, for coloring, icons or calculated values) or when setting up a reference line in a visualization, you will define an expression directly using the value on that very axis. (The way to refer to the axes is slightly different in those two contexts.)

| Visualization | Axis (Property) | Axis Name Used in Expression |
|---|---|---|
| Sparkline | Y-axis | Y |
| Calculated Value | Value | Value |
| Icon | Icon | Icon |
| Bar Chart | Value axis | Y |
| Line Chart | Y-axis | Y |
| Combination Chart | Y-axis | Y |

Examples in rules:

[Axis.Color]="West"

[Axis.Value]> 10000

Example in reference line:

Avg([Y])*10

## 6.4.6    Advanced Custom Expressions

The OVER statement is used in many of the more advanced custom expressions. In this section, several node and time period methods are explained.
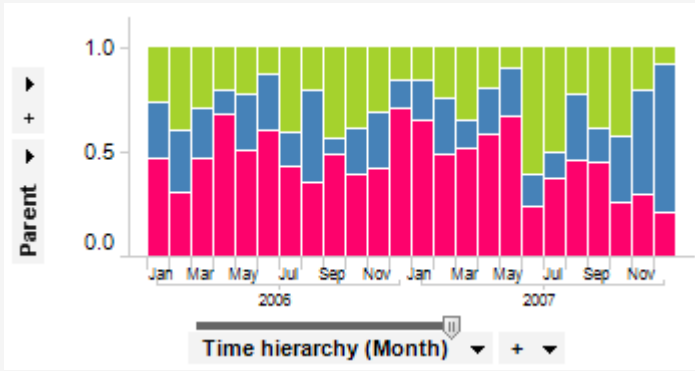
In the examples below, a bar chart with a Year/Month hierarchy on the category axis is used, and in most cases it is colored by Product.
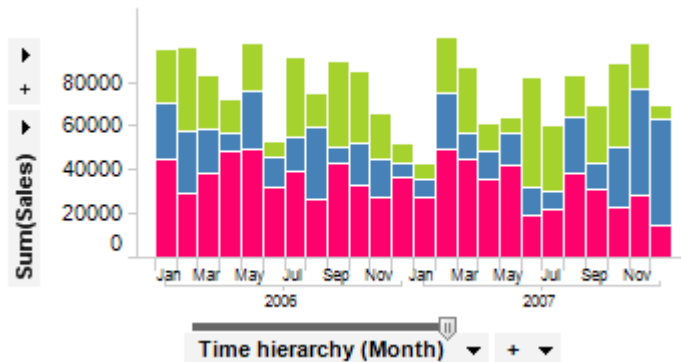
For some of the methods, there is more than one example and many have a more general illustration of how they work.

## Node methods

Node methods can refer to other nodes relative to the current node based on the position in the hierarchy.

| Method | Description |
|---|---|
| **Parent Method** | Uses the parent subset of the current node to perform the calculation. If the node does not have a parent, all rows are used as the subset.<br><br>It can be used to show how much of the total sales each product category represent each month.<br><br>Sum([Sales]) / Sum([Sales]) OVER (Parent([Axis.Color]))<br><br><br><br>**Note:** In this example, Parent refers to what the color is set to, which is Product.<br><br>As an additional example, if you wish to see the percentage of all sales for each month of each year, regardless of product category, you can create the following custom expression.<br><br>Sum([Sales]) / Sum([Sales]) OVER (Parent([Axis.X])) * 100 |
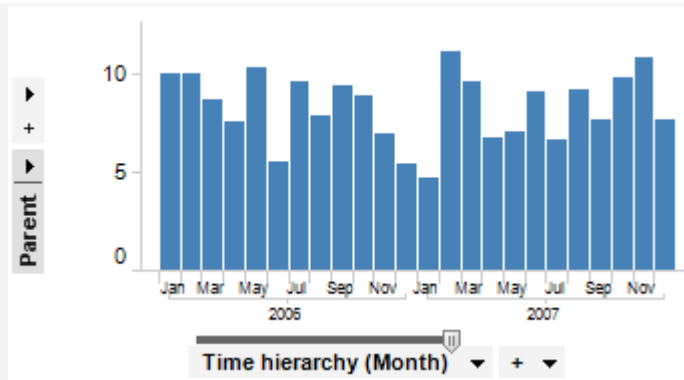
**Next Method**    Compares the current node with the next node on the same level in the hierarchy.
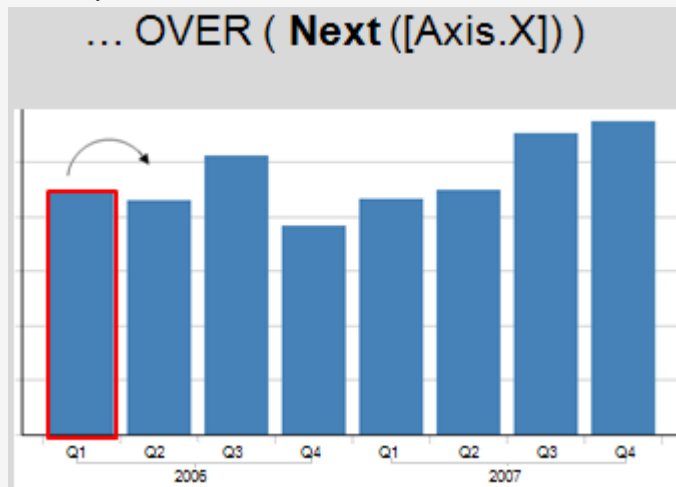


If there is no next node, that is, if the current node is the last node for the current level, the resulting subset will not contain any rows.

Sum([Sales]) - Sum([Sales]) OVER (Next([Axis.X]))
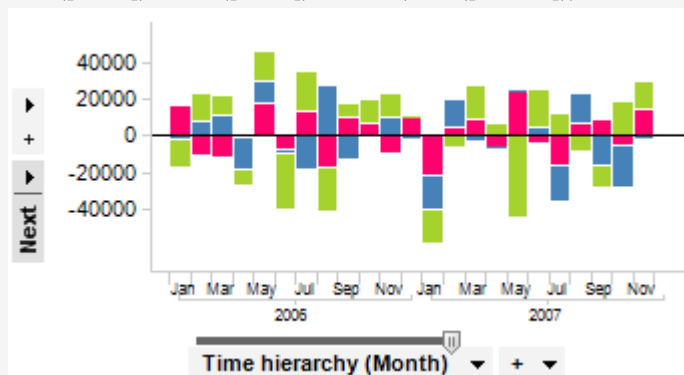


If the current node is 2004.Jan, in the figure at the top of the page, 'next' in this case will refer to 2004.March, since 2004.February is missing in the data. See Next Period method for value based reference.

| | |
|---|---|
| **Previous Method** | Uses the previous node on the same level as the current node to compare the result of the current node with the previous one. |



... OVER ( **Previous** ([Axis.X]) )
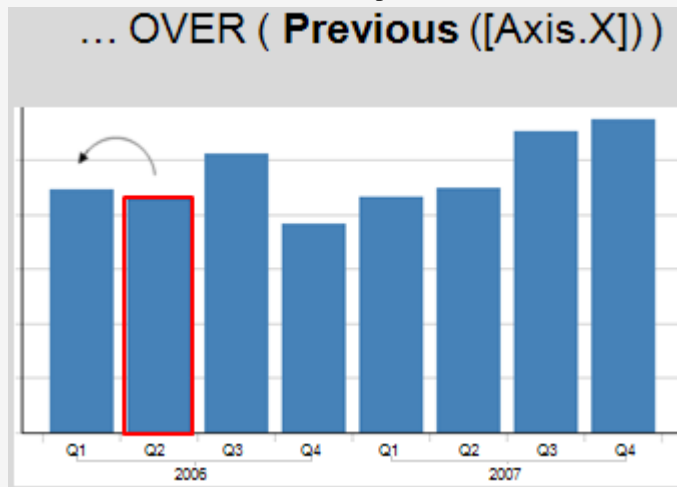
If there is no previous node, that is, if the current node is the first node for the current level, the resulting subset will not contain any rows.

Sum([Sales]) - Sum([Sales]) OVER (Previous([Axis.X]))
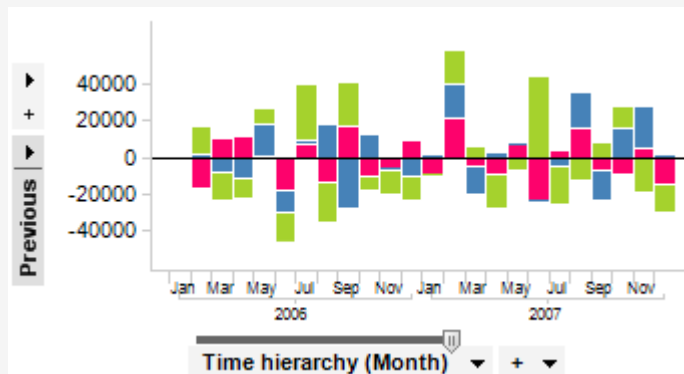


| | |
|---|---|
| **All Method** | The All method uses all the nodes in the referenced hierarchy: |



... OVER ( **All** ([Axis.X]) )
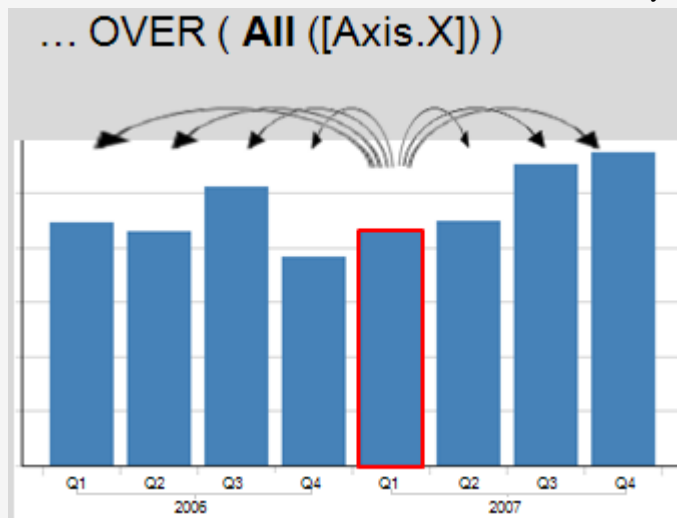
This can be useful when intersecting the current node with more than one hierarchy.

In this example, the bar chart shows the relative sales of the different product categories for each month.

Sum([Sales]) / Sum([Sales]) OVER (Intersect(All([Axis.Color]), [Axis.X]))
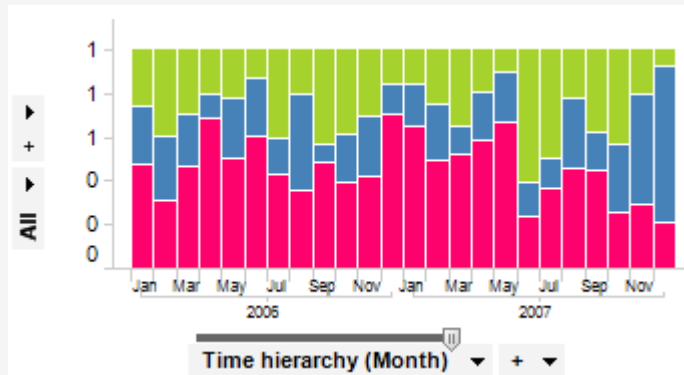


**Note:** See the Intersect Method for information on that method.

Another example is if you want to see the percentage of all sales for each month over the years. Regardless of product category.

Sum([Sales]) / Sum([Sales]) OVER (All([Axis.X])) * 100
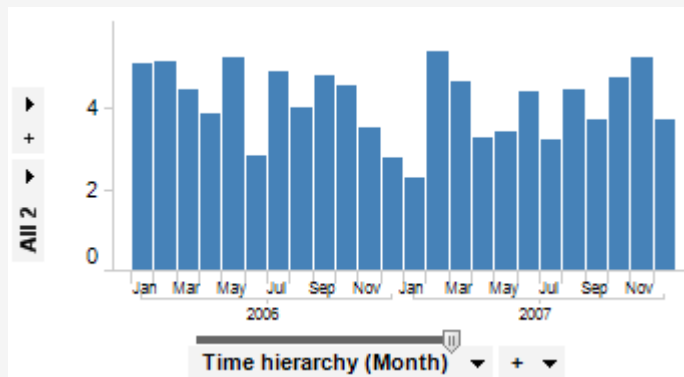


| | |
|---|---|
| **All Previous Method** | Uses all nodes, including the current, from the start of the level. |
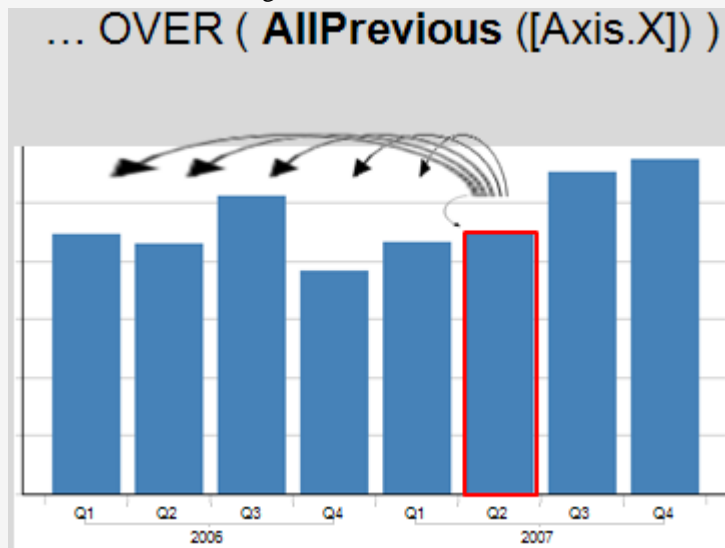


This can be used to calculate the cumulative sum.

Sum([Sales]) OVER (AllPrevious([Axis.X]))
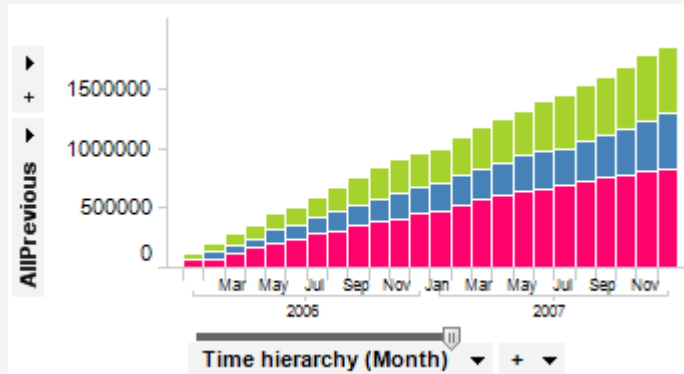


**Tip:** A basic Cumulative Sum expression can easily be created using the shortcut in the Aggregation menu on the axis selector.

If you want to limit the cumulative sum for current year you can combine the All Previous Method with the Intersect Method:

Sum([Sales]) OVER (Intersect(Parent([Axis.X]), AllPrevious([Axis.X])))
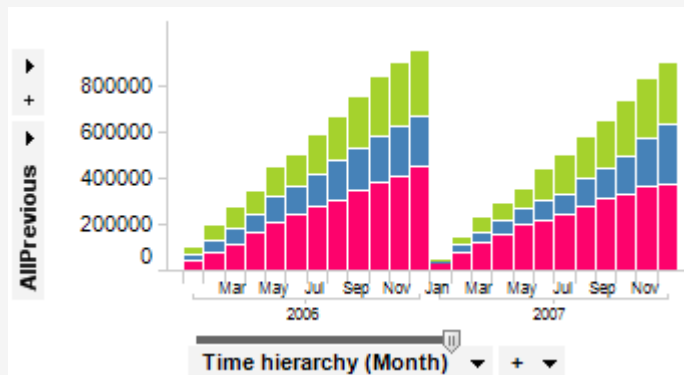


**Note:** See the Intersect Method for information on that method.

| | |
|---|---|
| **All Next Method** | Uses all nodes, including the current, to the end of the level. |



| | |
|---|---|
| **Intersect Method** | Returns the intersected rows from nodes in different hierarchies. |
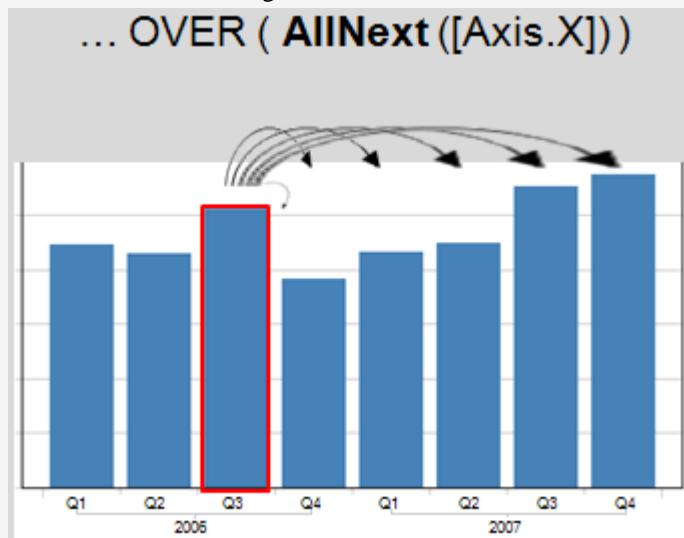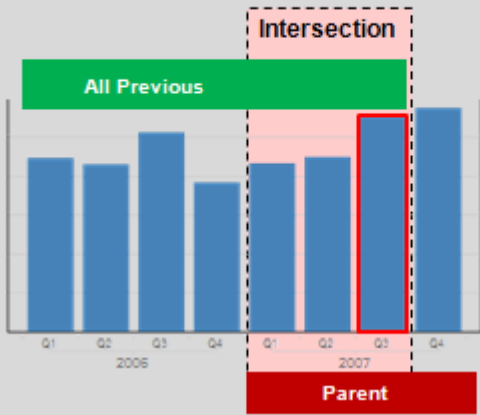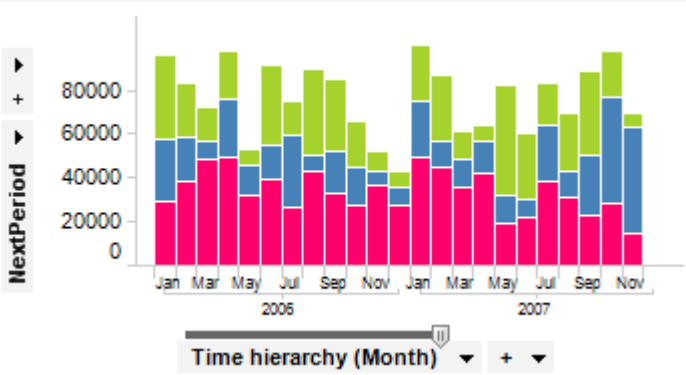
See also the All Previous Method and the All Method for examples of how it works.
Intersect(Parent([Axis.X]), All([Axis.Color]), Parent([Axis.Rows]), ...)

## Time period methods

Time period methods can refer to other nodes relative to the current node based on the value in the current node and the other relative nodes.

| Method | Description |
|---|---|
| **Next Period Method** | Uses the next node which has the next value (defined as the next value index) on the same level as the current node to perform the calculation. If there is no next node, that is, if the current node is the last node for the current level, the resulting subset will not contain any rows. |
| | Sum([Sales]) OVER (NextPeriod([Axis.X])) |
| |  |
| | If the current node is 2004.Jan, in the figure at the top of the page, NextPeriod will return an empty subset, since February is missing. |
| **Previous Period Method** | Uses the previous node which has the previous value (defined as the previous value index) on the same level as the current node to perform the calculation. If there is no previous node, that is, if the current node is the first node for the current level, the resulting subset will not contain any rows. |
| | Sum([Sales]) OVER (PreviousPeriod([Axis.X])) |

| **Parallel Period Method** | Uses the previous parallel node with the same value (defined as having the same value index) on the same level as the current node. |
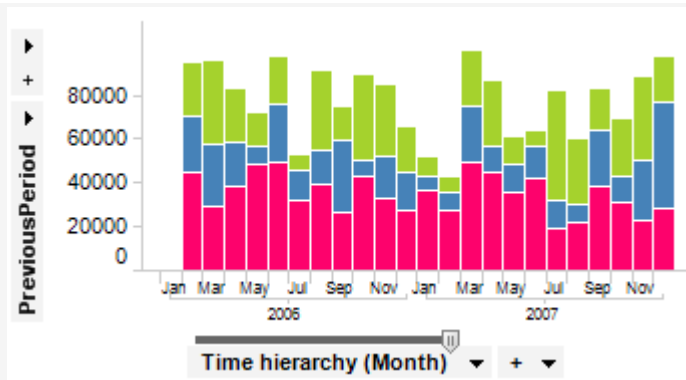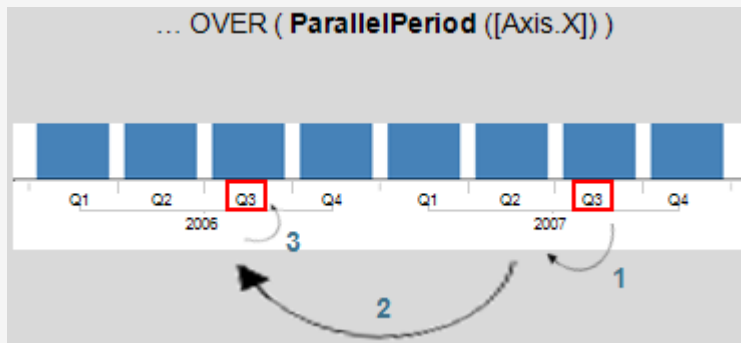


**Note:** The method only looks for a node with the same value as the current node in the children to the previous parent node. That means that it only looks one level above the current node. Therefore, a hierarchy with year as the parent node and quarter OR month as nodes on the lower level will work since the nodes under each year will have the same values. However, a hierarchy with all three levels would not work for this method since the months under Q2 and Q3, for example, do not have the same values.

This can be used to compare sales results for each month with the corresponding months the previous year.

Sum([Sales])-Sum([Sales]) OVER (ParallelPeriod([Axis.X]))
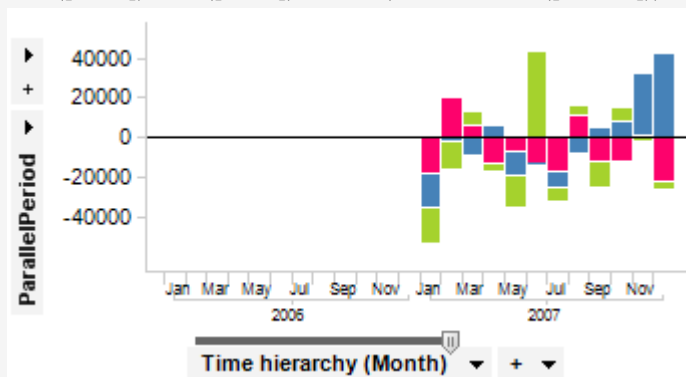


| **Last Periods Method** | Includes the current node and the n - 1 previous nodes (as defined by the each node value index). |

This can be used to calculate moving averages.

Sum([Sales]) OVER (LastPeriods(3, [Axis.X]))/3
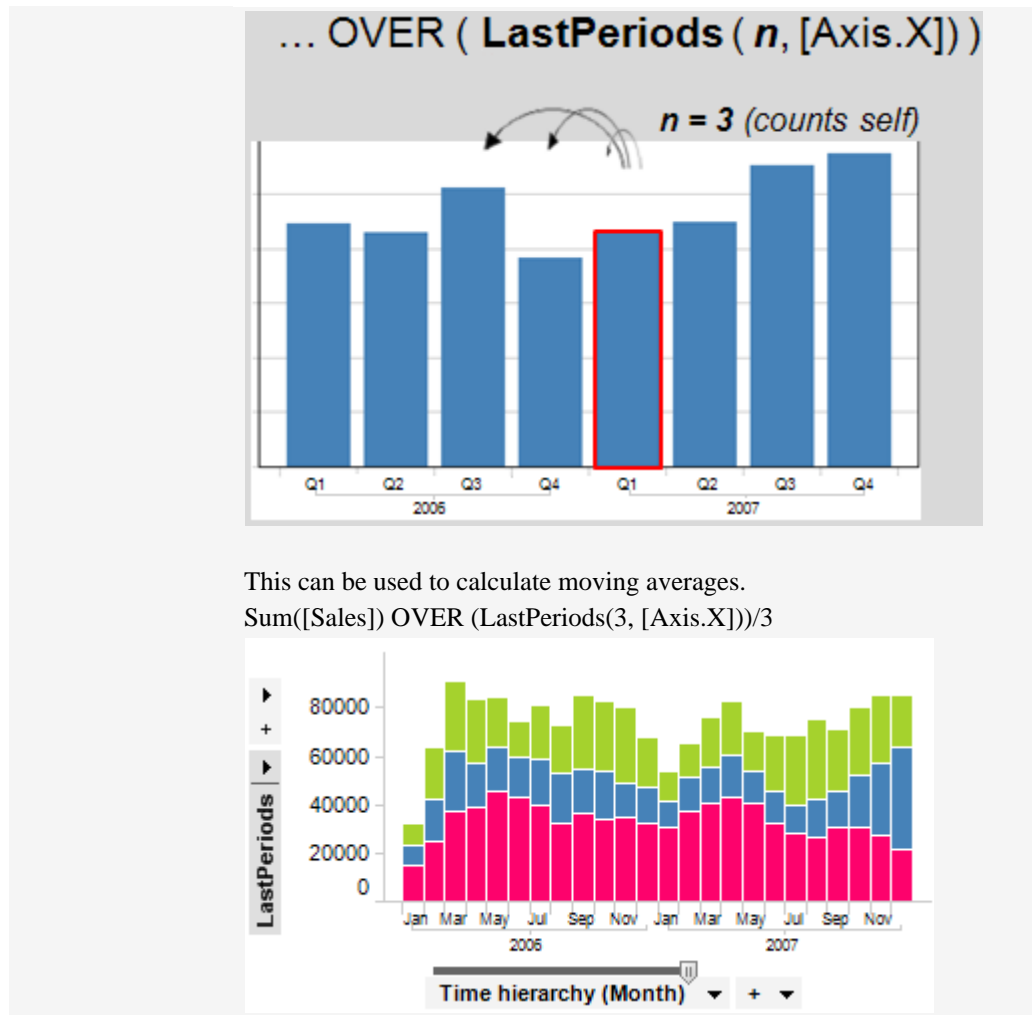


**Note:** All time period methods return the resulting visualization item subset, so the use of aggregation methods like average might not produce the expected result. See also Working with Time Hierarchies for more information about missing values in time series.

## 6.4.7 How to Insert a Custom Expression

TIBCO Spotfire supports two different types of expressions: Insert Calculated Column, which creates a new column in the data table, and Custom Expression, which is used to dynamically modify the expression used on an axis or to define a setting. Both types of expressions are created with a similar user interface.

### ► To create a custom expression:

1. Right-click on a column selector on an axis, in a Visualization Properties dialog, or in the Legend, to display the pop-up menu.
   Comment: You can also create custom expressions for rules and reference lines. See Custom Expressions for Coloring, Details on Horizontal/Vertical Line, Details on Curve Draw, or Details on Curve from Data Table for more information.

2. Select **Custom Expression...**.

3. Specify a suitable expression by either typing it directly into the **Expression** text field, or by selecting columns, properties and functions from the list.
   An example of an expression could be: [Exports m$]/[Population].

Comment: You can always modify the expression by editing the text in the Expression field using cut-and-paste, or by typing text. For a detailed description of the expression language, see General Syntax and other topics under Expression Language in the Insert Calculated Column chapter. For details on the syntax to use when adding properties, see Properties in Expressions.

4.  Type a **Display name** for the expression.

5.  Click **OK**.

   Comment: If an error message is shown, there is a problem with the expression. Go back and modify the expression until the desired result is achieved.

   Response: The expression is used on the specified axis or setting.

**Tip:** If you have previously created a suitable expression, you may select it from the Recent expressions list and click the Insert button.

### ► To reach the Insert Calculated Column dialog:

1.  Select **Insert > Calculated Column...**.

   Comment: See How to Insert a Calculated Column for more information.

## 6.4.8    Details on Custom Expression

TIBCO Spotfire supports two different types of expressions: Insert Calculated Column, which creates a new column in the data table, and Custom Expression, which is used to dynamically modify the expression used on an axis or to define a setting. Both types of expressions are created with a similar user interface.

### ► To reach the Custom Expression dialog:

1.  Right-click on a column selector on an axis, in a Visualization Properties dialog, or in the Legend, to display the pop-up menu.

2.  Select **Custom Expression...**.

| Option | Description |
|---|---|
| **Available columns** | Shows all columns that you can use in the calculation of your custom expression. |
| | Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column to send it to the Expression field. Press Ctrl or Shift to select multiple columns. |
| | You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. You can also enter an expression in the field using the rules described on the Searching in TIBCO Spotfire page. |
| **Insert Columns** | Inserts the columns selected in the Available columns list at the current cursor position in the Expression field. |
| **Available properties for column** | Shows all properties that you can use in the calculation of a custom expression. You can narrow down the list of available properties by using the search field. The column properties shown are specific to the column selected in the Available columns list to the left. |
| | Select a property by clicking on it in the list and then click on the Insert Properties button; or double-click on the property to send it to the Expression field. The property will automatically be inserted as text. However, there may be occasions where you need to insert the property as a function to receive the desired result. See Properties in Expressions for more information. Use the pop-up menu in this field to select how to insert the property or type the correct syntax manually. |
| | If you want to define a new property to use in the expression, right-click in the Available properties field and select **New > [Property Type] Property...** from the pop-up menu. You can also edit or delete custom properties by using the pop-up menu. |
| **Insert Properties** | Inserts the properties selected in the Available properties for column list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list: |
| | All functions |
| | Binning functions |
| | Conversion functions |
| | Date and Time functions |
| | Logical functions |
| | Math functions |
| | Operators |
| | Property functions |
| | Ranking functions |
| | Spatial functions |
| | Statistical functions |
| | Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button, or double-click on the function to send it to the Expression field. |
| | Type a search string in the text field to limit the number of items in |

|  |  |
|---|---|
|  | the Functions list.<br><br>You can also click on any function and type the first letter of the desired function name to jump to a specific location in the list. |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Functions chapter. |
| **Insert Function** | Inserts the selected function at the current cursor position in the Expression field. |
| **Expression** | This is the text field in which you build your expression. You can insert columns and functions from the lists, or enter text as in any standard text editor.<br><br>Cut/Copy/Paste works in the field using standard Ctrl+X/Ctrl+C/Ctrl+V.<br><br>Also, it is possible to undo/redo the last action by pressing Ctrl+Z. |
| **Recent expressions** | Displays the ten expressions you have most recently created. You can select one of these and click the Insert button to insert the expression into the Expression field. |
| **Insert** | Inserts the selected Recent expression into the Expression field. This will replace the entire content of the Expression field. |
| **Resulting expression** | Of interest when preprocessor functions (such as ${PropertyName}) are used in the expression only. Displays the expression after all occurrences of the property have been replaced with its current value or values. |
| **Display name** | The name of the new expression. |

# 6.5    Lines & Curves

## 6.5.1    Lines and Curves

Some of the visualization types can display additional information in reference lines or several different types of curves. This is set up in the properties dialog of each appropriate visualization type. Here, the Lines and Curves page of the scatter plot properties is shown:
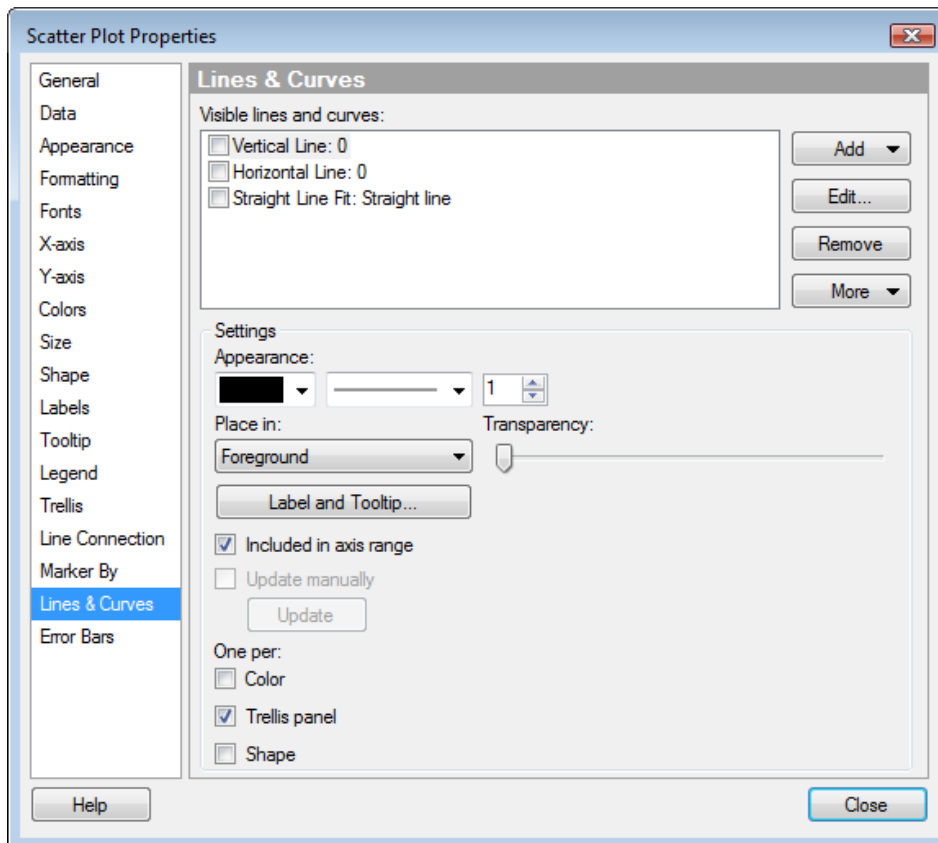
For example, you may want to show how well your data points adapt to a certain polynomial curve fit or to a logistic regression curve fit.

Curve fit (regression analysis) allows you to summarize a collection of sample data points by fitting them to a model that will describe the data and display a curve or a straight line on top of a visualization. The curve is normally not a fixed curve, but rather a line that can be changed upon changing the input data during filtering. However, you can always select to "freeze" the updating of a curve and only allow it to be updated manually.

Curve fitting can be used either to determine the parameter values of a known regression model or to find a model that fits the data better than other models. TIBCO Spotfire allows you to define your own curves, either directly from an expression or from an expression which is linked to a data table containing curve parameters. Note that whenever there is a reference to X or Y in lines or curves for a bar chart, X always refers to the category axis while Y refers to the value axis.

## Transformations

The X- and Y-values used in the curve fitting are the plotted values, hence, they are affected by scaling. This means that if you use log scale you may want to apply a different curve fitting model than you would otherwise. For example, if you want to do logistic regression and have either log10-values or log10-scaled values on the X-axis, you should make sure to apply the setting "Assume that X is log10-transformed" in the Edit Curve dialog in order to obtain the expected results.

## Limitations on data

Not all types of input data can be used to calculate curves using all different types of models. All models require:

- more than one data point to use in the calculation
- that not all data points have the same X- and Y-values (lie on top of each other)

- that not all data points have the same X-value

In addition, the logarithmic model, the power model and the logistic regression model require that all data points have positive X-values. The power model and the exponential model also require that all Y-values have the same sign (positive or negative).

The logistic regression requires that not all data points have the same Y-value. If any of the above limitations occur, no curve will be drawn and a notification will be displayed in the title bar of the visualization.
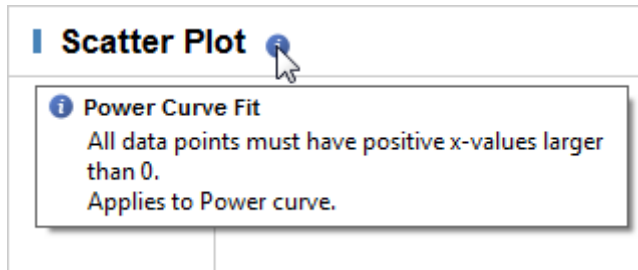


If you choose to export your calculation, any error message shown in this tooltip will also appear in the column "Notes" of the resulting export file. Note that this column always exists in the export file. If there are no errors, it will be empty.

For more information about exporting Lines and Curves, see Lines & Curves properties of the appropriate visualizations.

## 6.5.2    Curve Fit Models

There are several different models available for curve fitting. See Lines and Curves for information about how to apply the various curves.

### Straight Line

The straight line fit is calculated by choosing the line that minimizes the least square sum of the vertical distance **d**, of all the selected markers (see picture below) by using the following equation:

$$y = a + bx$$

where a is the intercept and b is the slope.

For example, you could plot days along the X-axis and have one marker for each day. The distance between the markers along the X-axis is the same, thus making straight line fit appropriate.
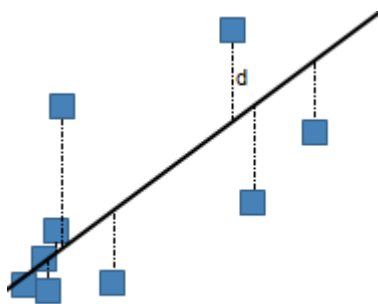


### Logarithmic

The logarithmic fit calculates the least squares fit through points by using the following equation:

$$y = a + b \ln x$$

where a and b are constants and ln is the natural logarithm function. This model requires that x>0 for all data points.  Spotfire uses a nonlinear regression method for this calculation. This will result in better accuracy of the calculation compared to using linear regression on transformed values only.

## Exponential

The exponential fit calculates the least squares fit through points by using the following equation:

$$y = ae^{bx}$$

where a and b are constants, and e is the base of the natural logarithm.

Exponential models are commonly used in biological applications, for example, for exponential growth of bacteria. Spotfire uses a nonlinear regression method for this calculation. This will result in better accuracy of the calculation compared to using linear regression on transformed values only.

## Power

The Power fit calculates the least squares fit through points by using the following equation:

$$y = ax^b$$

where a and b are constants. This model requires that x>0 for all data points, and either that all y>0 or all y<0. Spotfire uses a nonlinear regression method for this calculation. This will result in better accuracy of the calculation compared to using linear regression on transformed values only.

## Logistic Regression

The logistic regression fit is a dose response ("IC50") model, also known as sigmoidal dose response. The four parameter logistic model is the most important one.

Dose-response curves describe the relationship between response to drug treatment and drug dose or concentration. These types of curves are often semi-logarithmic, with log (drug concentration) on the X-axis. On the Y-axis one can show measurements of enzyme activity, accumulation of an intracellular second messenger or measurements of heart rate or muscle contraction.

**Note:** The logistic regression model of Spotfire is implemented with a setting where you can select whether or not to assume that X is log10-transformed. The default setting is a selected check box, which means that if your input data is not logarithmic, you should make sure to clear the check box in the Edit Curve dialog. You might also want to select the Log scale check box on the X-axis page in the Visualization Properties dialog, to show the values on a logarithmic scale.

**Log10-transformed X-values:**

The logistic regression on logged X-values fit uses the following equation:

$$y = min + \frac{max - min}{1 + 10^{(Hill(Log10(X50)-x))}}$$

The LoggedX50 value is interpreted as the Log10(X50). For example, if the H30+ concentration at IC50 has a pH of 3, then the LoggedX50 = -3.

**Note:** With this model, it is the logged X50 values that are estimated and not the actual X50.

**Non-logarithmic X-values:**

The logistic regression fit when not assuming logged X-values uses the following equation:

$$y = min + \frac{max - min}{1 + \left(\frac{X50}{x}\right)^{Hill}}$$

where min and max are the lower and upper asymptotes of the curve, Hill is the slope of the curve at its midpoint and X50 is the x-coordinate of the inflection point (x, y). This model requires that x>0 for all data points and that you use at least four records to calculate the curve.
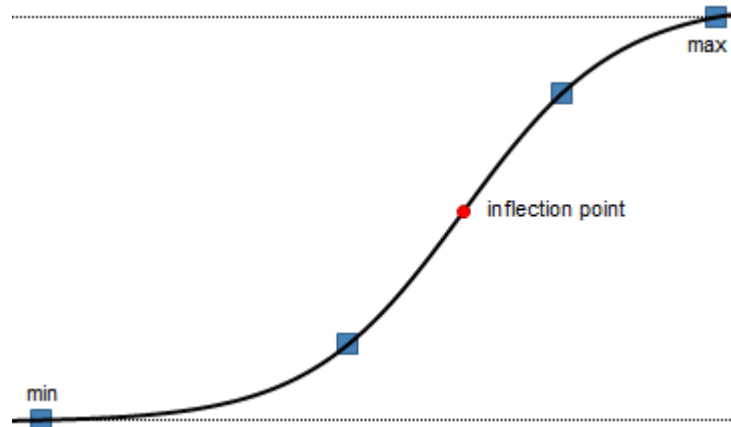


### Polynomial

The polynomial curve fit calculates the least squares fit through points by using the following equation:

$$y = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4 + a_5 x^5$$

where $a_0$, $a_1$, $a_2$, etc., are constants. The default order is a 2nd order polynomial, but you can change the degree in the Edit Curve dialog. This model requires that you use at least three markers to calculate the curve for a 2nd order polynomial model, and four markers for a 3rd order polynomial, etc.

If you have a low number of unique x-values, a polynomial curve can be calculated in an unlimited number of ways. This means that you may end up with a curve that does not look as expected. If this should happen, you probably should not apply this model to your data.

Some of the models have been partially solved by using the LAPACK software package, see References.

### Gaussian

The Gaussian curve fit calculates a bell curve suitable to describe normal distributions using the following equation:

$$y = A \cdot e^{-\left(\frac{x-E}{G}\right)^2}$$

where A is the amplitude of the curve, E is the position of the center of the curve and G is the width.

In TIBCO Spotfire, you have the possibility to let the application calculate values on the parameters A, E and G automatically from the available data. You can also specify one or more of the parameters yourself.

## 6.5.3     Curve Fit Theory

Generally, curve fit algorithms determine the best-fit parameters by minimizing a chosen merit function. In order to optimize the merit function, it is necessary to select a set of initial parameter estimates and then iteratively refine the merit parameters until the merit function does not change significantly between iterations. The Levenberg-Marquardt algorithm has been used for nonlinear least squares calculations in the current implementation.

The goodness of fit is shown as an R2-value. A value of R2=1.0 indicates a perfect fit, whereas R2=0.0 indicates that the regression model might be unsuitable for this type of data.

### R2

The R2-value measures how much of the variation in the data points can be explained by the selected regression model:

$$R2 = \frac{SSR}{SST} = 1.0 - \frac{SSE}{SST} \qquad 0 \leq R2 \leq 1$$

where

$$SSR = \sum_{i=1}^{n} (\hat{Y}_i - \bar{Y})^2$$

(the regression sum of squares)

$$SSE = \sum_{i=1}^{n} (Y_i - \hat{Y}_i)^2$$

(the residual or error sum of squares)

$$SST = \sum_{i=1}^{n} (Y_i - \bar{Y})^2$$

(the total sum of squares, SST= SSE+SSR)

and $\hat{Y}_i$ represents the ith fitted value (calculated using the selected model) of the dependent variable Y.

### Limitations to curve fitting

Since the calculation of the curve is an iterative process, the calculation must stop somewhere. In some cases, the maximum number of iterations might be reached before the best possible curve has been calculated. In that case, a message in the title bar of the visualization will inform you of this. In some cases, for example if the data is widely scattered or too few data points are available, the iterative process might also result in a curve that converges on a false minimum.

When a model is applied during data analysis, it is important not only to look at the R2-value and how well the curve fits the current markers in the scatter plot, but also to consider what the curve would look like for more extreme values and determine whether the model is reasonable in a scientific or statistical context. The number of unique x-values must be larger than, or equal to, the number of degrees of freedom in order to obtain a unique curve. If the curve can be solved in an infinite number of ways, it is not certain that the presented curve will be relevant to your data.

### References

Heath, M.T., (2002), Scientific Computing: An Introductory Survey, 2nd ed., McGraw-Hill, New York.

Anderson, E., Bai, Z., Bischof, C., Blackford, S., Demmel, J., Dongarra, J., Du Croz, J., Greenbaum, A., Hammarling, S., McKenney, A., Sorensen, D., (1999), LAPACK Users' Guide, 3rd ed., Society for Industrial and Applied Mathematics, Philadelphia, PA, ISBN = 0-89871-447-8

## 6.5.4    Details

## 6.5.4.1    Details on Horizontal/Vertical Line

Lines can currently be shown in the bar chart, line chart, combination chart, scatter plot and box plot visualizations.

### ► **To reach the Horizontal Line or Vertical Line dialog:**

1. In the Visualization Properties dialog of any of the above mentioned visualizations, go to the Lines & Curves page.
2. Click on **Add** and select to add either a horizontal or vertical line.

   Comment: Selecting a previously added horizontal or vertical line and clicking on **Edit...** also opens this dialog.



| Option | Description |
|---|---|
| **Line position** | Specifies the type of line that you wish to add. |
| **Fixed value** | Adds a straight line at the defined value for the selected axis. |
| **Aggregated value** | Adds a straight line at the selected aggregation of values for the selected values. |
| **Column property value** | Adds a straight line at the specified column property value. All numerical column properties, both predefined and custom properties, are available for selection. |
| **Custom expression** | Adds a line at the specified custom expression. |
| **Edit...** | Opens the Custom Expression dialog, where you can select between columns and functions to define your expression. |
| **Use axis transform in line calculation** | Select this check box to apply the same axis transform, i.e., a log scale, to the reference line as has been previously specified on the page for the axis. A reversion of the axis is always applied. |

| | |
|---|---|
| **Line name** | Specifies whether an **Automatic** line name should be created, or whether you instead wish to type a **Custom** line name. |

**Note:** If you change the orientation of the bars in a bar chart, any added lines will automatically switch orientation as well. For example, if you have added a horizontal line to a vertical bar chart and then switch to horizontal bars, the line will automatically become a vertical line.

## 6.5.4.2    Details on Naming Curve

This dialog is shown when you add or edit a Straight Line Fit, a Power Curve Fit, a Logarithmic Curve Fit or an Exponential Curve Fit from the Lines & Curves page of the Visualization Properties dialog.

This dialog allows you to name your curve automatically or to set a custom name. The other Lines and Curves have additional settings.
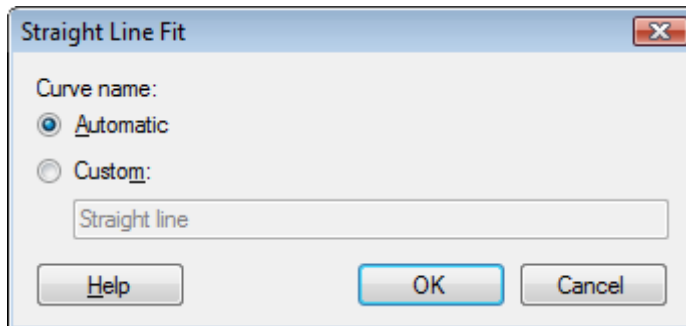


| Option | Description |
|---|---|
| **Curve name** | Specifies whether an **Automatic** line name should be created, or whether you instead wish to type a **Custom** line name. |

## 6.5.4.3    Details on Logistic Regression Curve Fit

This dialog is shown when you add or edit a Logistic Regression curve fit from the Lines & Curves page of the Visualization Properties dialog (only available for some visualization types).
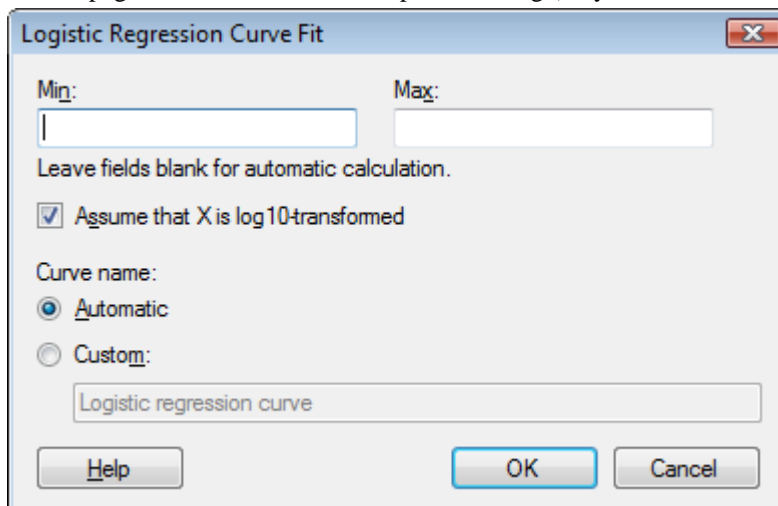
| Option | Description |
|---|---|
| **Min** | Allows you to specify a minimum value to be used in the calculation. |
| **Max** | Allows you to specify a maximum value to be used in the calculation. |
| **Assume that X is log10-transformed** | Select this check box if the X-axis values are log10-transformed. Clear the check box if the values are non-logarithmic. |
| **Curve name** | Specifies whether an **Automatic** curve name should be created, or whether you instead wish to type a **Custom** curve name. |

Leaving the fields blank will let the application automatically create min and max values based on the currently available data used for calculation.

## 6.5.4.4    Details on Polynomial Curve Fit

This dialog is shown when you add or edit a polynomial curve fit from the Lines & Curves page of the Visualization Properties dialog (only available for some visualization types).
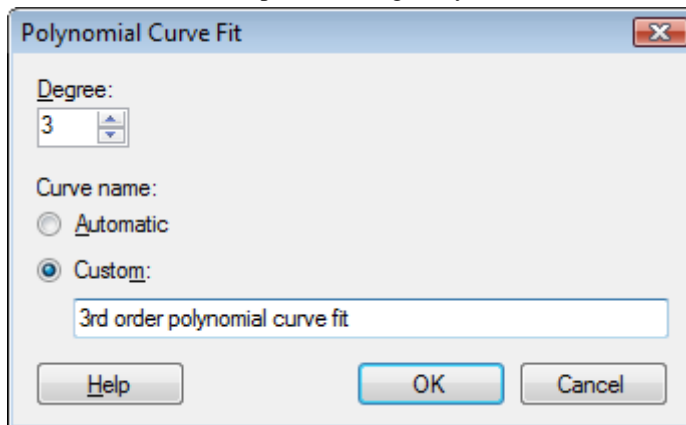


| Option | Description |
|---|---|
| **Degree** | Specifies the order of the polynomial to use in the curve fit. |
| **Curve name** | Specifies whether an **Automatic** line name should be created, or whether you instead wish to type a **Custom** line name. |

### 6.5.4.5 Details on Curve Draw
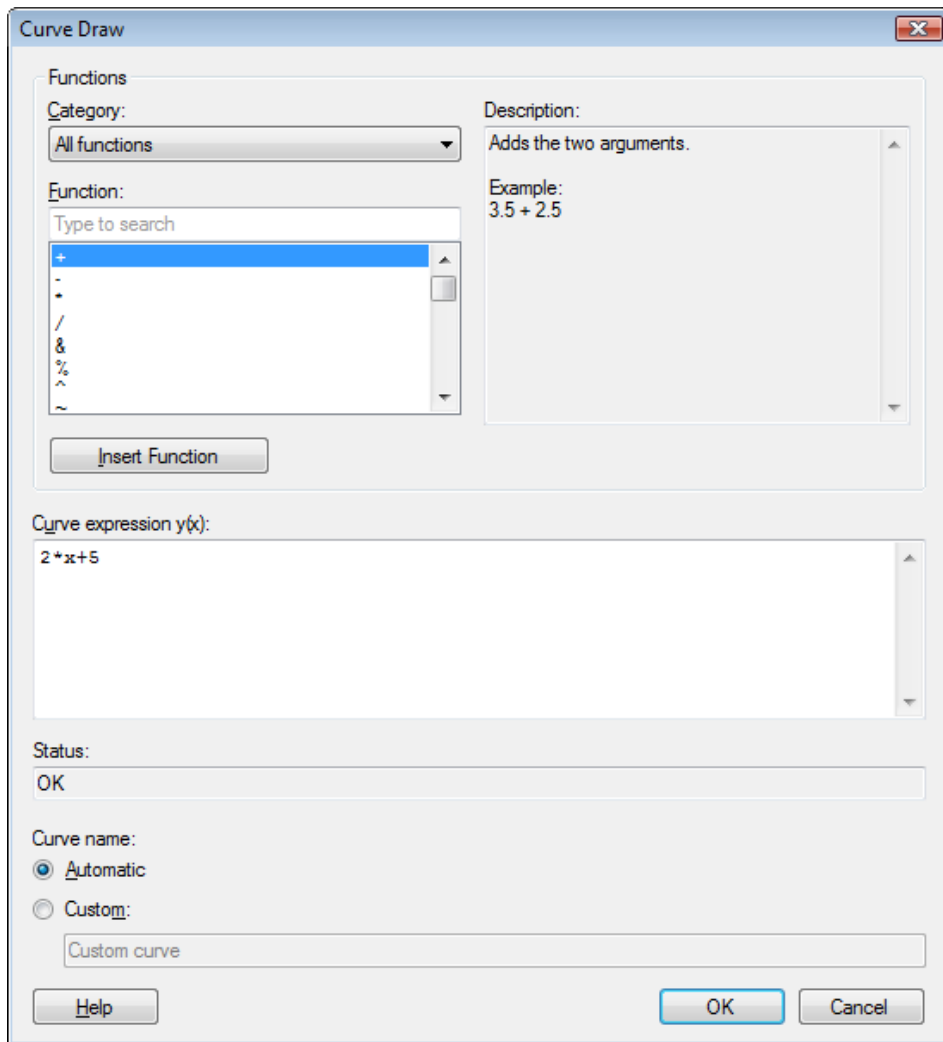


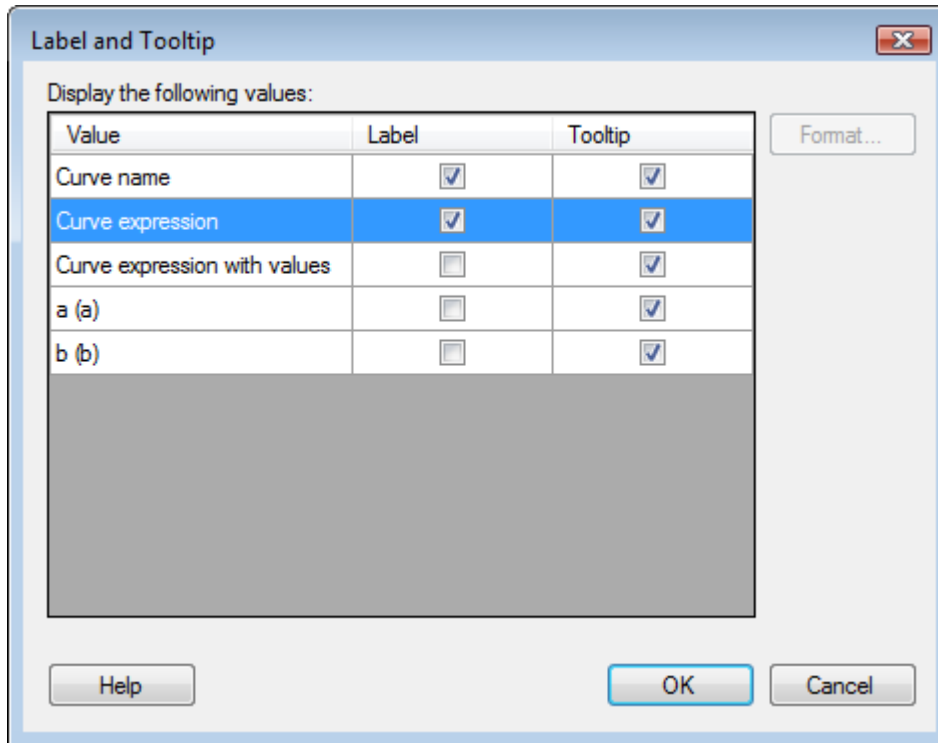| Option | Description |
|---|---|
| **Category** | Select a category of functions to limit the choices in the Function list: Binning functions Conversion functions Date and Time functions Logical functions Math functions Operators Property functions Ranking functions Statistical functions Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button to send it to the Curve expression field. Type a search string in the text field to limit the number of items in the Functions list. |

|  | You can also click on any function and type the first letter of the desired function name to jump to a specific location in the list. |
|---|---|
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Functions chapter. |
| **Insert Function** | Inserts the selected function at the current cursor position in the Curve expression field. |
| **Curve expression y(x):** | This is the text field in which you build your expression. You can insert functions from the lists, or enter text as in any standard text editor.<br>Cut/Copy/Paste works in the field using standard Ctrl+X/Ctrl+C/Ctrl+V.<br>It is also possible to undo/redo the last action by pressing Ctrl+Z. |
| **Status** | Displays the status of the current expression. If this field shows an error, there is a problem with the expression. |
| **Curve name** | Specifies whether an **Automatic** curve name should be created, or whether you instead wish to type a **Custom** curve name. |

## 6.5.4.6 Details on Curve from Data Table

This dialog is shown when you add or edit a curve from data table from the Lines & Curves page of the Visualization Properties dialog (only available for some visualization types). It allows you to specify a custom curve expression which makes use of parameters available in a specified data table.
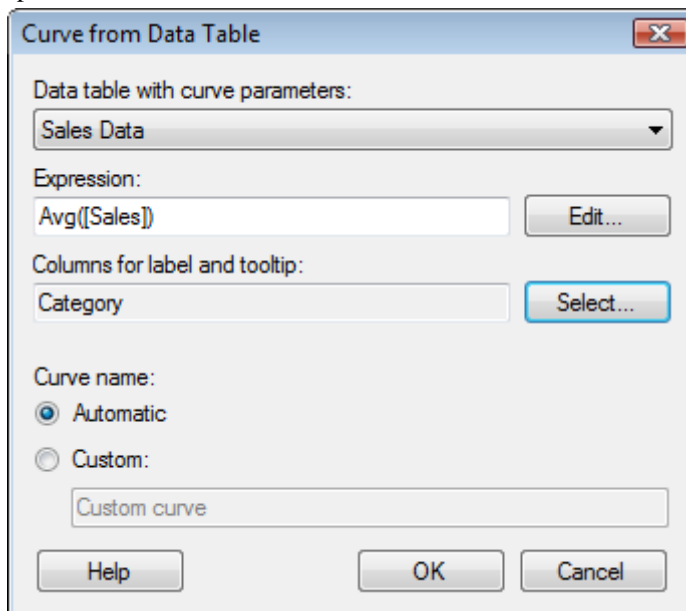


| Option | Description |
|---|---|
| **Data table with curve parameters** | Lists the available data tables in the analysis. Select the data table that contains the curve parameters you wish to use in the definition of the curve. |

| | |
|---|---|
| **Expression** | Type the curve expression containing the independent variable (normally x) and any other parameters that are defined in the selected data table. |
| | All variables in the expression, except for the independent variable, must have corresponding columns in the parameter table. |
| | **Note:** The columns that are used for relations between the data table and the parameter table cannot be used as variables in the expression or as result variables. |
| **Edit...** | Opens the Edit Expression dialog where you can select between columns and functions to define your expression. |
| **Columns for label and tooltip** | Lists the columns from the data table selected above that also should be used in the label and/or tooltip for the curve. You can change whether to display the contents from the column in the label, in the tooltip or in both using the Label and Tooltip dialog. |
| **Select...** | Opens the Select Columns dialog where you can select the columns that should be possible to use in the label and/or tooltip for a curve. |
| **Curve name** | Specifies whether an **Automatic** line name should be created, or whether you instead wish to type a **Custom** line name. |
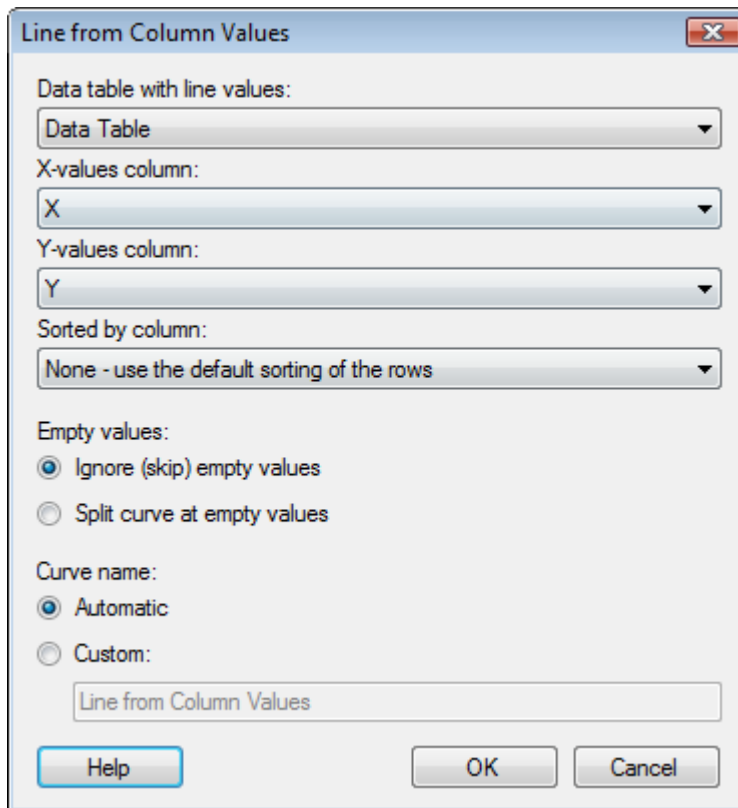
## 6.5.4.7 Details on Line from Column Values

Use this alternative if you want to display lines based on X and Y coordinates that already exist in two columns of your analysis. For example, coordinate values could be calculated from the input data using a statistical calculation in a data function and the output result could be presented as coordinate values for a curve.

When the line is drawn from column values it is also possible to show predictive values, if these are available:
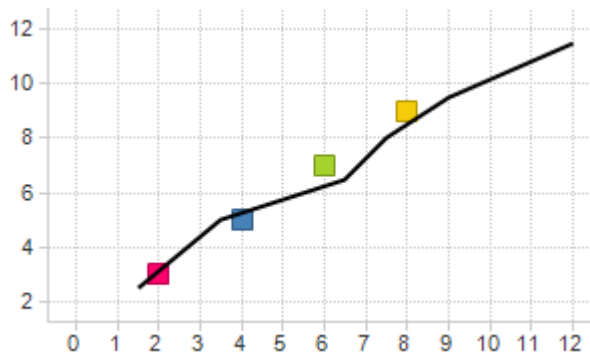


Note that lines cannot be drawn when categorical scales are used on the axes.

| Option | Description |
|---|---|
| **Data table with line values** | Lists the available data tables in the analysis. Select the data table with the coordinate values. |
| **X-values column** | Select the column in the data table that holds the X-axis coordinate values.<br>(In a bar chart, this refers to the category axis coordinate values.) |
| **Y-values column** | Select the column in the data table that holds the Y-axis coordinate values.<br>(In a bar chart, this refers to the value axis coordinate values.) |
| **Sorted by column** | If desired, select a column to sort the values by. If none is selected, the line is drawn in the order of appearance of all values. |
| **Empty values** | |
| **Ignore (skip) empty values** | Click this radio button to ignore any missing values and continue the line using the next coordinate pair. |
| **Split curve at empty values** | Click this radio button to split the curve once an empty value is encountered. |
| **Curve name** | |
| **Automatic** | Sets an automatic name for the line. |
| **Custom** | Allows you to set a custom name for the line by typing a name in the text field. |
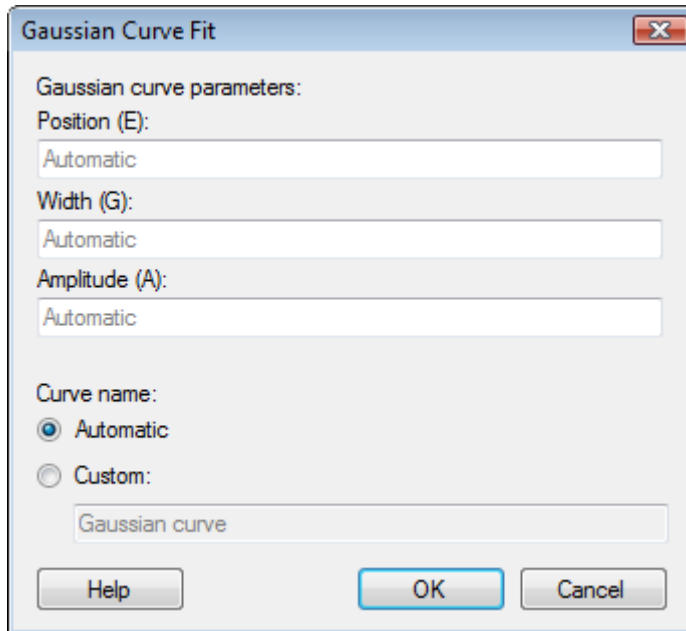
## 6.5.4.8    Details on Line from Data Table

Use this alternative if you want to add lines to a visualization based on an existing data table in your analysis. A simple example is if you have a data table with number of sales for two different products on different dates, you can also have a data table with the minimum acceptable number of sales on any given day for the different products. If the data with number of sales is set as a visualization, you can add lines from the minimum number of sales data table. This gives you an easy way of seeing whether any products have fewer sales than you expect.



| Option | Description |
|---|---|
| **Data table with line positions** | Lists the available data tables in the analysis. |
| **Column** | Select the column in the data table from which you want to create your reference line. |
| **Columns for label and tooltip** | Lists the columns from the data table selected above that should also be used in the label and/or tooltip for the line. You can change whether to display the contents from the column in the label, in the tooltip or in both using the Label and Tooltip dialog. |
| **Select...** | Opens the Select Columns dialog where you can select the columns that should be possible to use in a line's label and/or tooltip. |
| **Curve name** | |
| **Automatic** | Sets an automatic name for the line. |
| **Custom** | Allows you to set a custom name for the line by typing a name in the text field. |

## 6.5.4.9 Details on Gaussian Curve Fit

This dialog is shown when you add or edit a Gaussian curve fit from the Lines & Curves page of the Visualization Properties dialog (only available for some visualization types).



| Option | Description |
|---|---|
| **Gaussian curve parameters** | |
| **Position (E)** | Allows you to specify the position of the center point for the Gaussian distribution curve. |
| **Width (G)** | Allows you to specify the width of the Gaussian distribution curve. |
| **Amplitude (A)** | Allows you to specify the altitude (height) of the Gaussian distribution curve. |
| **Curve name** | Specifies whether an Automatic curve name should be created, or whether you instead wish to type a Custom curve name. |

Leaving the curve parameter fields blank will let the application automatically create curve parameter values based on the currently used data.

Note that if you specify curve parameters that are very far away from the data values, no curve will be drawn.

## 6.5.4.10    Details on Edit Expression

This dialog is shown when you add or edit a curve from data table from the Lines & Curves page of the Visualization Properties dialog (only available for some visualization types) and you click Edit... in the Curve from Data Table dialog.



| Option | Description |
|---|---|
| **Available variables** | Shows all variables found in the data table that you can use in the calculation of the curve.<br><br>Select a column by clicking on it in the list and then click on the Insert Columns button, or double-click on the column to send it to the Expression field. Press Ctrl or Shift to select multiple columns. |
| **Insert Variable** | Inserts the variables selected in the Available variables list at the current cursor position in the Expression field. |
| **Category** | Select a category of functions to limit the choices in the Function list:<br>Binning functions<br>Conversion functions<br>Date and Time functions<br>Logical functions<br>Math functions<br>Operators<br>Property functions |

|  | Ranking functions |
|  | Statistical functions |
|  | Text functions |
| **Function** | Select a function by clicking on it in the list and then click on the Insert Function button to send it to the Curve expression field. |
|  | Type a search string in the text field to limit the number of items in the Functions list. |
|  | You can also click on any function and type the first letter of the desired function name to jump to a specific location in the list. |
| **Description** | Shows a brief description of the selected function. For more detailed descriptions, see the Functions chapter. |
| **Insert Function** | Inserts the selected function at the current cursor position in the Curve expression field. |
| **Curve expression y(x):** | This is the text field in which you build your expression. You can insert functions from the lists, or enter text as in any standard text editor. |
|  | Cut/Copy/Paste works in the field using standard Ctrl+X/Ctrl+C/Ctrl+V. |
|  | Also, it is possible to undo/redo the last action by pressing Ctrl+Z. |
| **Status** | Displays the status of the current expression. If this field shows an error, there is a problem with the expression. |

## 6.5.4.11 Details on Label and Tooltip

This dialog handles what should be shown in the label and/or tooltip of a selected line, curve or point.

### ► To reach the Label and Tooltip dialog:

1. In the Visualization Properties dialog of a visualization that supports lines and curves, go to the **Lines & Curves** page.
2. Click to select the line or curve of interest in the Visible lines and curves list.
3. Click on the **Label and Tooltip...** button under Settings.

| Option | Description |
|---|---|
| **Display the following values** | Lists the available values that can be selected to be displayed in the label, tooltip or both. |
| | For Line from Data Table and Curve from Data Table you can make columns from the additional data table available here while setting up the line or curve using the Columns for label and tooltip field. |
| | Select the corresponding check box to include a value in the label or tooltip. |
| **Format...** | Opens the Formatting dialog where you can change the value formatting of the values in the curve expression. |

# 6.6 Formatting

## 6.6.1 Formatting Overview

Formatting is giving a value meaning by adding units of measurements, thousands and decimal separators, and other information. Locale settings, determined by Windows Regional Settings, are used to determine formatting, but you can also make certain changes yourself, such as whether to show thousands separators or how many decimals to show.

Formatting does not include visual properties, such as color, font, or size.

Example: If you have Windows Regional Settings set to Swedish and select to show thousands separators and the numbers are in US currency, you will get formatted values such as $1.000.000,00. If you change your locale settings to US English, the value will be re-formatted into $1,000,000.00.

Which formatting options are available depends on the data type of the value. Text cannot be formatted at all, while an integer has several different possibilities. An integer can, among other things, be formatted as a number, currency and as percentage. You can set the number of decimals to be displayed, as well as whether or not to use a thousands separator. Another

possibility is to use short number format, which is a way to shorten values to take up less space by replacing powers of tens with symbols. See Short Number Format to learn more. You can apply formatting to your data on different levels and you can access the settings in different ways as described below.

## Default axis formatting

In the Options dialog you can set default formatting for data types on the visualization axes. For example, if you set the data type integer to be formatted as US currency ($) with two decimals, then each time you create a new visualization in Spotfire, values on an axis with integers will be displayed as US currency with two decimals. Note that these default formatting settings do not affect the columns or the data tables in any way, only the axes in the visualizations.

To reach the default settings, open the **Tools** menu, select **Options** and go to the Axis Formatting page in the dialog.

## Column formatting

If you want a specific column in a data table to be formatted in a certain way throughout the analysis, you can format values on a column level. For example, if you format a column called "Cost" as US currency ($) with two decimals, the values in the column "Cost" will be displayed as US currency with two decimals every time that column is used. These settings affect all the places where the column is used in the analysis, including axes in visualizations, filters, tooltips, etc., and changes take effect immediately. Column formatting overrides formatting on default axis formatting level.

To change formatting settings on column level, open the **Edit** menu, select **Column Properties** and go to the Formatting tab. You can also right-click on a filter in the filters panel, and then select Format Values... from the menu to format on column level.

## Formatting in visualizations

You can format values in individual visualizations. For example, if you format the values on the X-axis of a scatter plot as Number with no decimals, the values on the X-axis in that scatter plot will be instantly updated with the new formatting settings. The Y-axis in the scatter plot will not be affected by the new settings, and no other visualizations in the analysis will adopt the changes. Formatting on this level overrides settings on both the default axis level and on the column level. You can define formatting settings on the axes in many of the visualizations, but not all. Formatting on visualization level is similar in all kinds of visualizations, but the cross table differs slightly and is described in Formatting in the Cross Table.

To change formatting settings on the visualization level, right-click in the visualization, select **Properties** from the pop-up menu, and then open the **Formatting** page. You can also right-click directly on the scale labels of a visualization to open a pop-up menu, then select **Formatting** and the formatter you want to use for the axis.

If you use multiple scales in a visualization, you can format each of the scales individually the same way you format an axis in a visualization. However, if there is more than one scale on the same side of an axis in a visualization, you cannot format the scales on that side separately by right-clicking directly on the scale. This will instead change the settings for all scales. However, you can still format the scales separately from the Formatting page in the properties dialog.

No matter on which level you format, the options are the same. See Formatting Settings to get a full description of all the options.

## 6.6.2 Formatting Settings
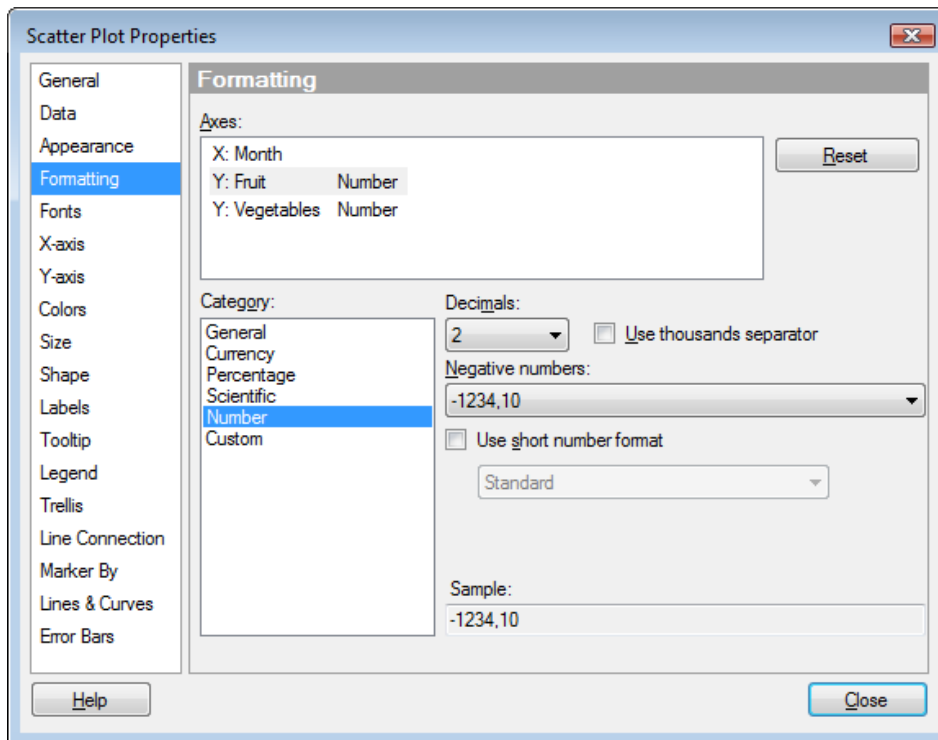


The image above shows the Formatting page of a Scatter Plot Properties dialog. The lower part of the dialog contains the formatting settings and is the same for all the dialogs where you can change formatting settings. The Category list displays the available categories for the selected axis, column or data type depending on whether you are changing formatting settings on visualization level, column level, or default settings level respectively. Each category in this list has separate settings, as shown below. What categories are available depends on the data type of the selected column. For general information about formatting, see Formatting Overview.

| Option | Description |
|--------|-------------|
| General | A general, non-configurable format, with a variable number of decimals and no thousands separator. The number is converted to the most compact of either fixed-point or scientific notation. A minus sign is always used for negative values.<br>Examples:<br>1<br>12345<br>1.23456E-6<br>-12345 |
| Currency | A number format for currencies. A currency culture may be other than the current culture. In this case number formatting is according to current culture, but currency symbol and pattern is defined by the specified currency culture.<br>Examples:<br>$ 1234.45<br>¥1,234<br>-1,234.45 kr<br>($ 1,234.45) |

| | |
|---|---|
| **Decimals** | Specifies the number of decimals (0-15) to display. An additional alternative (Auto) is also available. If you select (Auto), the number of decimals will be different from one number to another since trailing zeros will not be included.<br>Examples:<br>1,234.560700 (Six decimals)<br>1,234.560 (Three decimals)<br>1,234.56 (Two decimals)<br>1,234.5607 (Auto) |
| **Use thousands separator** | Specifies whether to use a thousands separator (digit grouping symbol in Windows Regional Settings) or not. The grouping symbol cannot be explicitly specified (only through Windows Regional Settings). |
| **Currency** | Specifies the currency type (kr, £, $, etc.) and placement. |
| **Negative numbers** | Specifies the pattern used for displaying negative numbers [-1.23 or (1.23)]. **Note:** The negative number format setting in Windows Regional Settings is ignored. |
| **Use short number format** | Use this option if you want to shorten numerical values to take up less space. For example, 1,000 can be formatted to 1k. Select which symbol set to use from the drop-down list. To learn more, see Short Number Format. |
| **Percentage** | A percentage number format, where percentage symbol and format pattern is culture specific. The converted number is multiplied by 100 in order to be presented as percentage. A minus sign is always used for negative values.<br>Examples:<br>100.00 %<br>- 99 % |
| **Decimals** | Specifies the number of decimals (0-15) to display. An additional alternative (Auto) is also available. If you select (Auto), the number of decimals will be different from one number to another since trailing zeros will not be included.<br>Examples:<br>1,234.560700 (Six decimals)<br>1,234.560 (Three decimals)<br>1,234.56 (Two decimals)<br>1,234.5607 (Auto) |
| **Use thousands separator** | Specifies whether to use a thousands separator (digit grouping symbol in Windows Regional Settings) or not. The grouping symbol cannot be explicitly specified (only through Windows Regional Settings). |
| **Scientific** | A number format for scientific notation with a fixed number of decimals. A minus sign is always used for negative values.<br>Examples:<br>1.00000E+099<br>5.6E-001 |

| | |
|---|---|
| | -5.6E-001 |
| **Decimals** | Specifies the number of decimals to display (0-15). |
| **Number** | A configurable number format.<br>Examples:<br>1234.45<br>1,234.45<br>-1,234.45<br>(1,234.45) |
| **Decimals** | Specifies the number of decimals (0-15) to display. An additional alternative (Auto) is also available. If you select (Auto), the number of decimals will be different from one number to another since trailing zeros will not be included.<br>Examples:<br>1,234.560700 (Six decimals)<br>1,234.560 (Three decimals)<br>1,234.56 (Two decimals)<br>1,234.5607 (Auto) |
| **Use thousands separator** | Specifies whether to use a thousands separator (digit grouping symbol in Windows Regional Settings) or not. The grouping symbol cannot be explicitly specified (only through Windows Regional Settings). |
| **Negative numbers** | Specifies the pattern used for displaying negative numbers [-1.23 or (1.23)]. **Note:** The negative number format setting in Windows Regional Settings is ignored. |
| **Use short number format** | Use this option if you want to shorten numerical values to take up less space. For example, 1,000 can be formatted to 1k. Select which symbol set to use from the drop-down list. To learn more, see Short Number Format. |
| **Custom** | A highly configurable number format, which supports custom format specifiers (similar to Excel).<br>Examples:<br>(1.234E+099)<br>999,999.00 Dollars |
| **Format string** | Allows you to specify a custom format string. For details on how you can write these strings, see the Format String page. |
| **Text** | A text format used for strings. It cannot be configured. |
| **DateTime** | A format which can be used to display dates, times or both dates and times. |
| **Type** | Allows you to select the form on which the date and/or time should be displayed from a predefined list (what you will see in the list is dependent on the locale).<br>Examples:<br>• Short date: 10/16/2009<br>• Long date: Friday, October 16, 2009 |

| | | |
|---|---|---|
| | | • Short time: 3:25 PM |
| | | • Long time: 3:25:55 PM |
| | | • Short date/short time: 10/16/2009 3:25 PM |
| | | • Short date/long time: 10/16/2009 3:25:55 PM |
| | | • Long date/short time: Friday, October 16, 2009 3:25 PM |
| | | • Long date/long time: Friday, October 16, 2009 3:25:55 PM |
| | | • Month day: October 16 |
| | | • RFC1123 : Fri, 16 Oct 2009 15:25:55 GMT |
| | | • Sortable (ISO 8601): 2009-10-16T15:25:55 |
| | | • Year month: October, 2009 |
| | **Custom** | Allows you to specify a custom format string. For details on how you can write these strings, see the Format String page. |
| | | Examples: |
| | | "d" Short date pattern |
| | | "T" Long time pattern |
| | | "G" General date/time pattern |
| **Date** | | A format which can be used to display dates. |
| | **Type** | Allows you to select the form on which the date should be displayed from a predefined list (what you will see in the list is dependent on the locale). |
| | | Examples: |
| | | • 10/16/2009 |
| | | • Friday, October 16, 2009 |
| | | • October 16 |
| | | • October, 2009 |
| | | • 16/Oct/09 |
| | | • 16/Oct/2009 |
| | | • 16-Oct-09 |
| | | • 16-Oct-2009 |
| | **Custom** | Allows you to specify a custom format string. For details on how you can write these strings, see the Format String page. |
| **Time** | | A format which can be used to display times. |
| | **Type** | Allows you to select the form on which the time should be displayed from a predefined list (what you will see in the list is dependent on the locale). |
| | | Examples: |
| | | • Short time: 8:32 AM |
| | | • Long time: 8:32:24 AM |
| | **Custom** | Allows you to specify a custom Time format string. For details on how you can write these strings, see the Format String page. |
| **TimeSpan** | | A format which can be used to display time spans. |
| | **Type** | Allows you to select the form on which the time span should be displayed from a predefined list. |
| | | Examples: |

|  |  |
|---|---|
|  | • 25 d |
|  | • 25 d 09 h 03 m 07 s 015 ms |
|  | • 25 days 09 hours 03 minutes 07 seconds 015 milliseconds |
|  | • 25.9:3:7:015 |
|  | • 09:03:07.015 |
| **Custom** | Allows you to specify a custom TimeSpan format string. For details on how you can write these strings, see the Format String page. |
| **Boolean** | A format used to display boolean data. |
| **Type** | Allows you to select the form on which the boolean values should be displayed.<br>Examples:<br>• True / False<br>• 1 / 0 |
| **Sample** | Displays a sample of what a value in the column would look like with the current settings applied. |

## 6.6.3    Format String

If the format you want to use cannot be created with the given settings, the custom format string allows you to create your own formats using a code explained in the examples below.

The special characters allow you to multiply, divide, separate numbers, etc. Other characters are printed out in the resulting data.

### Custom Numeric Format Strings

**Special characters:**

| Character | Description |
|---|---|
| **0** | Always returns a value for the position it is written in. If there is no number in its place in the data, 0 (zero) will be used. |
| **#** | Returns values if there are numbers in its place in the data.<br>If used to the left of the decimal point, all digits are returned even if there is one # in the format string and three digits in the data.<br>If used to the right of the decimal point, the same number of digits are returned as there are # to the right of the decimal point, and the number gets rounded up or down.<br>See example below. |
| **,** | If used before a decimal point, divide the number in the data by 1000.<br>**Note:** A difference from Excel is that Excel allows for "," as divider after the decimal point as well. |
| **%** | Multiplies the number by 100 and inserts a "%" in the number in the location it is written in the format string. |
| **.** | Decimal point.<br>**Note:** If no decimal point is used and there are decimals in the value you apply the format string on, the value gets rounded up or down. |

| ; | Used to divide a format string if different formats are to be used for positive numbers, negative numbers and 0 (zero). |
| | If no semicolon is used, the format string is used for all numbers. |
| | If one semicolon is used, it divides the format string like this: String for positive numbers and zero;String for negative numbers |
| | If two semicolons are used, they divide the format string like this: String for positive numbers;String for negative numbers;String for zero |
| \ | If a "\" is added before a special character that character will not modify the number, the character will only be added to the value. |

**Examples:**

**Note:** All these examples use the number 12345.67 as the value from the data.

| Format string | Result |
| --- | --- |
| # #### | 1 2346 |
| #.# | 12345.7 |
| #.000 | 12345.670 |
| #,.# | 12.3 |
| #,,,.## | .01 |
| #% | 1234567% |
| #\% | 12345.67% |
| $# | $12346 |
| #.##E+0 | 1.23E+4 |
| #.#;(#.#) | 12345.7<br>**Note:** Had the number been negative, the result would be: (12345.7) |
| 23 | 23 |

See literature about custom numeric format strings, for example, on MSDN, for more information.

## Custom DateTime Format Strings

Below are some examples of custom format strings for datetime formats. See literature about custom datetime format strings, such as that on MSDN, for more information.

| Character | Description |
| --- | --- |
| yy | Returns the year, measured as a number between 0 and 99. |
| yyyy | Returns the year as a four-digit number. |

| | |
|---|---|
| **M** | Returns the month, measured as a number between 1 and 12, with one or two digits depending on the value. |
| **MM** | Returns the month with two digits, measured as a number between 1 and 12. This means that June will be written as '06', when this format string is applied. |
| **MMM** | Returns the abbreviated name of the month. For example, 'Jun'. |
| **MMMM** | Returns the full name of the month. For example, 'June'. |
| **d** | Returns the day of the month, measured as a number between 1 and 31, with one or two digits depending on the value. |
| **dd** | Returns the day of the month with two digits, measured as a number between 1 and 31. This means that the 6th of a month will be written as '06', when this format string is applied. |
| **ddd** | Returns the abbreviated name of the day of the week. For example, 'Fri'. |
| **dddd** | Returns the full name of the day of the week. For example, 'Friday'. |
| **h** | Returns the hour using a 12-hour clock, with one or two digits depending on the value. |
| **hh** | Returns the hour using a 12-hour clock, with two digits. This means that 6 o'clock will be written as '06', when this format string is applied. |
| **H** | Returns the hour using a 24-hour clock, with one or two digits depending on the value. |
| **HH** | Returns the hour using a 24-hour clock, with two digits. This means that 6 o'clock in the morning will be written as '06' and 6 o'clock in the evening will be written as '18', when this format string is applied. |
| **m** | Returns the minute with one or two digits, depending on the value. |
| **mm** | Returns the minute with two digits. This means that six minutes will be written as '06', when this format string is applied. |
| **s** | Returns the second with one or two digits, depending on the value. |
| **ss** | Returns the second with two digits. This means that six seconds will be written as '06', when this format string is applied. |
| **f** | Returns the tenths of a second. |
| **ff** | Returns the hundredths of a second. |
| **fff** | Returns the milliseconds. |
| **tt** | Returns the AM/PM designator. |
| **:** | Returns the time separator. |
| **/** | Returns the date separator. |

You can also add any custom string value, but if any of the specifier characters are included in the string, they need to be escaped by a backslash (\\).

**Examples:**

**Note:** All the examples below use the following value from the data: Friday, October 16, 2009, at 25 minutes past three in the afternoon.

| Format string | Result |
|---|---|
| **dd\t\h o\f MMMM yyyy** | 16th of October 2009 |
| **MMM d yyyy, HH:mm** | Oct 16 2009, 15:25 |
| **\year: YY, \mon\t\h: MM, \da\y: dd** | year: 09, month: 10, day: 16 |
| **hh:mm tt** | 03:25 PM |
| **m \minu\te\s pa\s\t h, MMM d** | 25 minutes past 3, Oct 16 |

## Custom TimeSpan Format Strings

There are five different data values included in the TimeSpan format: day, hour, minute, second and fractions of seconds. These can be combined to a suitable format using a format string built by the following specifier characters:

| Character | Description |
|---|---|
| **d** | Returns the number of days. |
| **h** | Returns the number of hours with one or two digits, depending on the value. |
| **hh** | Returns the number of hours with two digits. This means that six hours will be written as '06', when this format string is applied. |
| **m** | Returns the number of minutes with one or two digits, depending on the value. |
| **mm** | Returns the number of minutes with two digits. This means that six minutes will be written as '06', when this format string is applied. |
| **s** | Returns the number of seconds with one or two digits, depending on the value. |
| **ss** | Returns the number of seconds with two digits. This means that six seconds will be written as '06', when this format string is applied. |
| **f** | Returns the fractions of seconds. You can also add a number between 1 and 3 after the 'f', defining how many decimals will be shown. If no number has been specified, three numbers will be shown, if available. |

Between each specifier character, you need to supply some kind of separator. This could be a custom string value, but if any of the specifier characters are included in the string, they need to be escaped by a backslash (\). You can also include an initial and a conclusive string.

**Examples:**

**Note:** All the examples below use the following value from the data: -5 days, 7 hours, 11 minutes 3.1234 seconds.

| Format string | Result |
|---|---|
| **d.h:m:s.f** | -5.7:11:3.123 |
| **d.hh:mm:ss.f2** | 5.07:11:03.12 |
| **Ti\me\span i\s d \day\s** | Timespan is -5 days |
| **d \day\s h \hour\s m \minute\s s \secon\d\s** | -5 days 7 hours 11 minutes 3 seconds |
| **f s m h d** | 123 3 11 7 -5 |

## 6.6.4    Short Number Format

If the values on an axis or a column are numerical, you can choose to display them in short number format. This means that values with many digits can be shortened to take up less space. For example, by using short number format you can set the number 1,000 to be displayed as 1k.

A standard symbol set is already defined and available to use. The defined symbols in the standard symbol set are M for 10^6, and k for 10^3. You cannot delete or change the standard symbol set. However, you can add your own symbol sets and define symbols of your choice.

As with other formatting settings, you can apply short number formatting in different ways and on different levels. For general information about formatting, see Formatting Overview.

### ► To add a symbol set

1. Open the **Axis Formatting** page in the **Tools > Options** dialog.
2. Click on the **Edit Symbol Sets...** button.
3. Click on the **Add...** button in the upper part of the dialog.
4. Type a name to use for the symbol set in the text field and click **OK**.
   Response: The new symbol set is added to the drop-down list.
5. Click on the **Add...** button next to the **Defined symbols** list to add symbols to the symbol set.
6. Enter an exponent and a symbol to replace it with.
   Response: The new Symbol is added to the list of **Defined symbols**.

# 6.7    Error Bars

Error bars are used to indicate the estimated error in a measurement. In other words, an error bar indicates the uncertainty in a value.

In Spotfire, you can use error bars in bar charts, line charts, and scatter plots. Bar charts and line charts can display vertical errors. Scatter plots can display both vertical and horizontal errors. The image below shows all four possible error bars on a scatter plot marker. However, upper and lower errors refer to the underlying data. This means that if you use reversed scales in a visualization, or change orientation of the bars in a bar chart, the error bars will also be reversed or change orientation respectively. For example, for a scatter plot with a reversed Y-axis, an upper vertical error will be displayed below the marker instead of above the marker. For a bar chart with horizontal bars and non-reversed scale, an upper horizontal error will be displayed to the right of the bar.
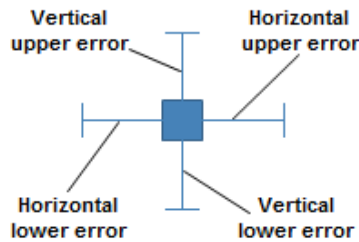
You can choose to show only one of the error bars, or any combination of them.

The length of an error bar indicates the uncertainty of the value. For example, for an average value, a long error bar means that the concentration of the values the average was calculated on is low, and thus that the average value is uncertain. Conversely, a short error bar means that the concentration of values is high, and thus, that the average value is more certain.

There are two different ways to set up error bars in Spotfire. For aggregated values, you can use one of the existing measures, such as standard error or standard deviation. The length of the error bars will then be calculated in Spotfire. In the example below, a bar chart shows the average sales for each month during one year. The statistical measure standard error was used to calculate the length of the upper error bars. No lower error bars were defined in this graph.
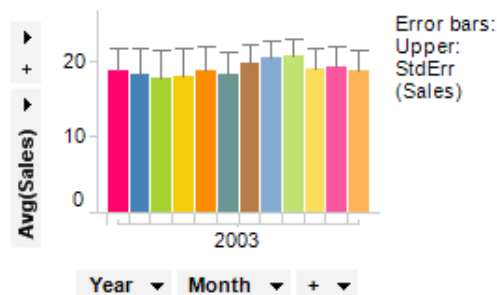


The other way to define error bars is to use the values in existing data table columns. You may, for example, have a data table where average values and error values have already been calculated, as in the table below. You can then use these columns to set up the error bars. In the scatter plot below, the Y-axis represents the column Average, and the upper and lower errors represent the two columns Upper Error and Lower Error respectively.

| Average | Upper Error | Lower Error |
|---------|-------------|-------------|
| 36      | 4           | 2           |
| 28      | 2           | 3           |
| 33      | 2           | 1           |
| 34      | 3           | 2           |
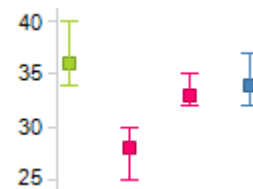


By default, error bars are drawn relative to the marker position in the visualization, but for some measures this may not be what you want to display. Custom expressions could be helpful in those cases.

For example, if a marker represents an aggregated value such as sales average, you may want to display the maximum and minimum values as error bars. However, if you select the measure Min for the lower error, and the measure Max for the upper error, the error bars will not show the minimum and maximum values, since the bars are shown relative to the marker position. Instead, the upper error shows the average plus the maximum value, and the lower error shows the average minus the minimum value. To display the absolute minimum and maximum values, you need to use a custom expression. In this case the custom expression for the upper error should be Max([Sales])-Avg([Sales]), and for the lower error Avg([Sales])- Min([Sales]).

To learn more about using custom expressions, see Custom Expressions Introduction.

See one of the following sections to learn how to set up error bars for different visualization types: To add error bars to the bar chart, To add error bars to the line chart, or To add error bars to the scatter plot.

# 7 Pages and Layout

## 7.1 Visualization Layout

You can insert several visualizations on a page. Each new visualization will be inserted at the top of the page.

Often you will want to adjust the layout of the visualizations, as you might want some to be larger than others, or some visualization to be placed beside another instead of above it.

### ► To resize visualizations:

1. Position the mouse pointer between the visualizations you want to resize.

2. Response: The mouse pointer changes appearance to ✛.

3. Click and drag the mouse to resize the visualizations.

**Note:** If the visualization becomes too small in either direction, controls such as the legend, zoom sliders, axis selectors, etc., are hidden and cannot be viewed until the size of the visualization is increased.

### Moving visualizations

You can also change the layout of the visualizations using a drag-and-drop operation. Click on a visualization title and drag the mouse over another visualization. A shaded box will appear over a part of that visualization, and when you release the mouse the layout will be updated as shown below.

### ► To place a visualization beside another:

Click on the **title** of the bar chart and drag it onto the scatter plot. Drag it to the **right side** of the scatter plot and a shaded area will indicate that by dropping the bar chart, it will be placed to the right of the scatter plot. Release the mouse, and the bar chart will be placed to the right of the scatter plot. All the visualizations will automatically adjust to fill the entire window.
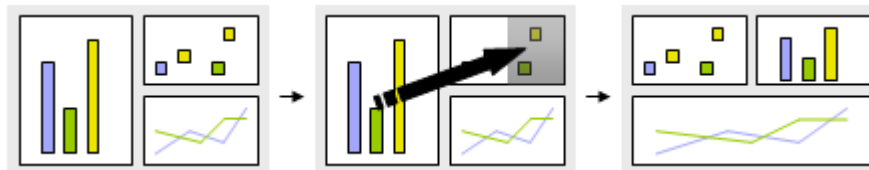


### ► To place a visualization below another:

Click on the **title** of the scatter plot and drag it onto the bar chart. Drag it to the **bottom part** of the bar chart and a shaded area will indicate that by dropping the scatter plot, it will be placed below the bar chart. Release the mouse, and the scatter plot will be placed below the bar chart. All the visualizations will automatically adjust to fill the entire window.
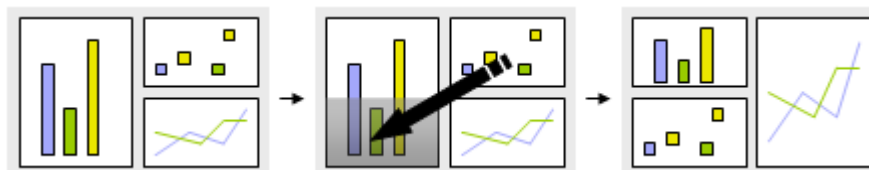


### ► To switch places between two visualizations:

Click on the **title** of the bar chart and drag it onto the line chart. Drag it to the **center** of the line chart and a shaded area will cover the entire line chart, indicating that by dropping the bar chart, the visualizations will switch places. Release the mouse, and the visualizations will switch

places. The window layout will stay the same since the switched visualizations take each other's size and position.
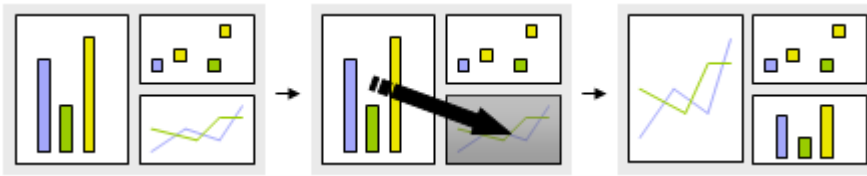


**Tip:** If the title bar of a visualization has been hidden, it can be shown by right-clicking on the visualization and selecting Properties. On the General page, select the **Show title bar** check box.

# 7.2 Arranging Visualizations

Apart from positioning the visualizations on a page using a drag-and-drop operation, there are some shortcuts to apply a basic layout.

### ► To arrange visualizations:

Select **View > Arrange Visualizations > ...** or click on one of the corresponding buttons on the toolbar.

|  | **Arrange Evenly** | Arranges the visualizations as evenly as possible. |
|---|---|---|
|  | **Arrange Side-by-side** | Arranges the visualizations side by side. |
|  | **Arrange Stacked** | Arranges the visualizations stacked on top of each other. |
|  | **Maximize Active** | Makes the active visualization as large as possible, and minimizes all other visualizations which are placed as thumbnails at the bottom of the page. |

**Tip:** Use **Maximize Active** and drag to switch visualizations in order to view one visualization at a time.

# 7.3 Pages

You can work with several pages in your analysis if you want to keep information about different topics separated, or if you simply need more space. Navigation between pages can be done using three different modes; titled tabs, step-by-step, or history arrows, as described below.

### ► To add a new page to the document:

1. Click on the New Page button on the toolbar, .

   Comment: You can also select **Insert > New Page** from the menu.

   **Note:** New pages can only be added in tab mode.

   Comment: When a new page is added, the filtering scheme and organize filters settings are inherited from the active page.

### Titled Tabs

In tab mode, pages are indicated by tabs at the top of the screen, and clicking on these tabs switches page. You can also click on the small arrow icon to the right of the tabs to open a drop-down list where you can switch between all pages in the analysis. Tab mode is useful when you want to see the titles of each page and choose in what order to look at the pages.
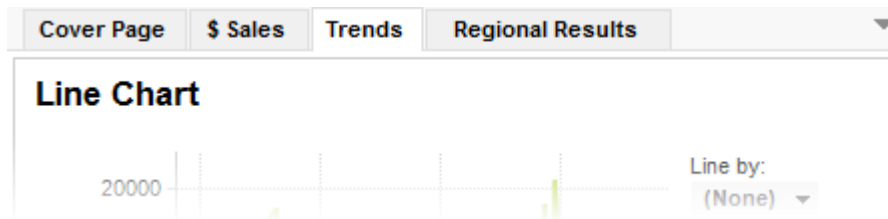
On each page, you can insert one or many visualizations, and arrange these as you like. Perhaps you want to see both a table and a bar chart next to each other on one page to compare details, and then be able to switch pages to see a pie chart. When in tab mode, you can change the order of your pages using drag-and-drop.

► **To change page title:**

1. Right-click on a page tab.
2. Select **Rename Page...** from the pop-up menu.
3. Type a new name for the page.
4. Click **OK**.

## Step-by-Step

You can also select to show the pages as numeric links instead of tabs. This is called Step-by-Step mode. Step-by-Step mode is useful when the order of the pages is important and you want to present your analysis as a guided flow.
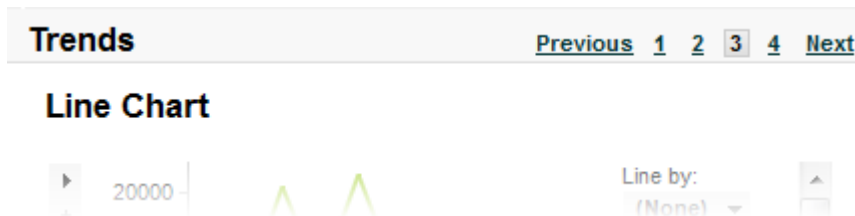


The pages are now reached by clicking on the numbered links or the Previous/Next links. This is useful if you want to create a guided analysis and share it with other colleagues, and you intend for your colleagues to go through the analysis in a certain order.

## History arrows

If you want to set up your own navigation in the analysis you can select Page Navigation > History Arrows. This will give you a similar look as in the step-by-step case, but all links will be hidden.
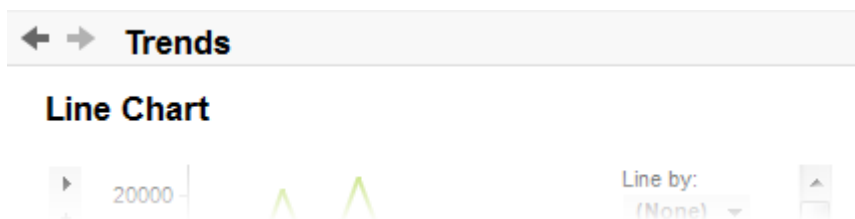


When this option is selected you can keep pages in the analysis that are not shown to Web Player users at all. All connections between the available pages must then be separately specified using actions in the text area or on dynamic items in graphical tables. The page history arrows to the left of the page name makes it possible to return to a previously visited page.

► **To change the page navigation mode:**

1. Right-click in the area containing the tabs or links.
2. Select **Page Navigation > Step-by-Step** or **Titled Tabs** or **History Arrows** from the pop-up menu.

### Filtering in different pages

You can specify whether or not filtering on one page will affect the visualizations on a different page by using the same or different filtering schemes on the pages. You can also specify which filters will be visible on each page using the Organize Filters dialog. The filtering scheme of new pages is inherited from the active page, but it can be changed by displaying the filtering scheme menu in the Filters panel.

### Showing and hiding panels

The visibility of all panels such as the filters panel, and the bookmarks panel is controlled per page. For each page, you can switch on or off the panels of interest by clicking on their corresponding toolbar button (and clicking Dock if the panel is in popover mode) or by selecting it from the **View** menu. The panel visibility of new pages is inherited from the active page.

# 7.4 Cover Page

## 7.4.1 Cover Page

The cover page is a page meant to serve as an introduction to your analysis. It contains a text area in which you can enter information about the purpose of your analysis as well as other useful information, before you share your analysis with your colleagues. If desired, it can be automatically created each time you make a new document, see below. If you are creating a guided analysis in step-by-step mode, and have selected to use a cover page, this should be the first page in the sequence of links.



► **To change whether or not to create a cover page in new documents:**

1. Select **Tools > Options...**.
2. Go to the **Document** page.
3. Clear or select the **Create cover page for new analysis** check box.

► **To edit text in the cover page:**

1. Right-click in the cover page.
2. Select **Edit** from the pop-up menu.
3. Type text in the text area.
4. Right-click and select **Edit** again, to leave the edit mode.

► **To change the cover page name:**

1. Right-click on the Cover Page tab.
2. Select **Rename Page...** from the pop-up menu.
3. Type a new name for the cover page.
4. Click **OK**.

## 7.4.2 Text Area Edit Mode

The text area can only be edited when the Toggle Edit Mode button, ✎, in the visualization title bar has been clicked, or, when **Edit Text Area** has been selected from the pop-up menu.

When in edit mode, you will see a toolbar at the top of the text area where a number of options are available:

| Option | Description |
|--------|-------------|
| ✂ | Cuts the selected object from the current position, to be pasted somewhere else. |
| 🗐 | Copies the selected object. |
| 📋 | Pastes the selected object in the text area. |
| **Font** | Specifies the font of the text. |
| **Size** | Specifies the font size of the text. |
| **B** | Sets the selected text to boldface. |
| *I* | Sets the selected text to italics. |
| U | Underlines the selected text. |
| 🎨 | Opens the Color dialog where you can specify the text color. |
| ▤ | Aligns the selected paragraph to the left of the text area. |
| ▤ | Aligns the selected paragraph to the center of the text area. |
| ▤ | Align the selected paragraph to the right of the text area. |
| ▤ | Creates a numbered list of the selected paragraph. |
| ▤ | Creates a bulleted list of the selected paragraph. |
| ▤ | Removes the indent characters from the selected text. |
| ▤ | Indents the text of the selected paragraph. |
| ▣ | Opens a dialog where you can browse to locate an image to insert. Including images can be very costly to memory, so it is recommended to keep images small. |
| 🖊 | Opens the Insert Web Link dialog where you can type or paste the link to any website which might be of interest for the analysis. You can also use this button to add a mailto link opening a new message in your standard email client, or a tibcospotfire link which links to a different analysis. |

| | |
|---|---|
| | Examples:<br>http://www.tibco.com<br>mailto:person@example.com?subject=Test<br>tibcospotfire:server:http\://myspotfireserver/:analysis:/Data/My Analysis |
| | Removes the web link but leaves the text intact. |
| | Opens the Insert Filter dialog where you can select a filter to add to the text area. |
| | Opens the Action Control dialog where you can insert an action link or button which applies a bookmark, switches page or runs a script, etc. |
| | Opens the Property Control dialog where you can insert input fields, drop-down lists, list boxes, etc., which can easily change the values of custom properties. |
| | Allows you to insert a dynamic item (a sparkline, a calculated value or an icon) into the text area. |

To change the name of the Text Area, or to show or hide the title bar, right-click on the text area and select Properties.

# 7.5  Details-on-Demand

## 7.5.1  What is the Details-on-Demand?

The Details-on-Demand display the actual values of marked items in the active visualization. If you mark a bar in a bar chart, all the rows of data included in that bar are presented. Marking a record in a scatter plot might only display information about a single row of data.

You can view and manage Details-on-Demand in a popover, in a docked panel, or as a floating window. Click on the Details-on-Demand button, , on the toolbar, or select **View > Details-on-Demand** to open Details-on-Demand. They will open in the mode they were opened last time you had them open. The image below shows the Bookmarks popover with three added bookmarks.

The Details-on-Demand works just like any other table—you can click on column headings to sort the presented details, drag and drop column headings to change the order, and change the width of the columns by moving the mouse over the column separator line and dragging.
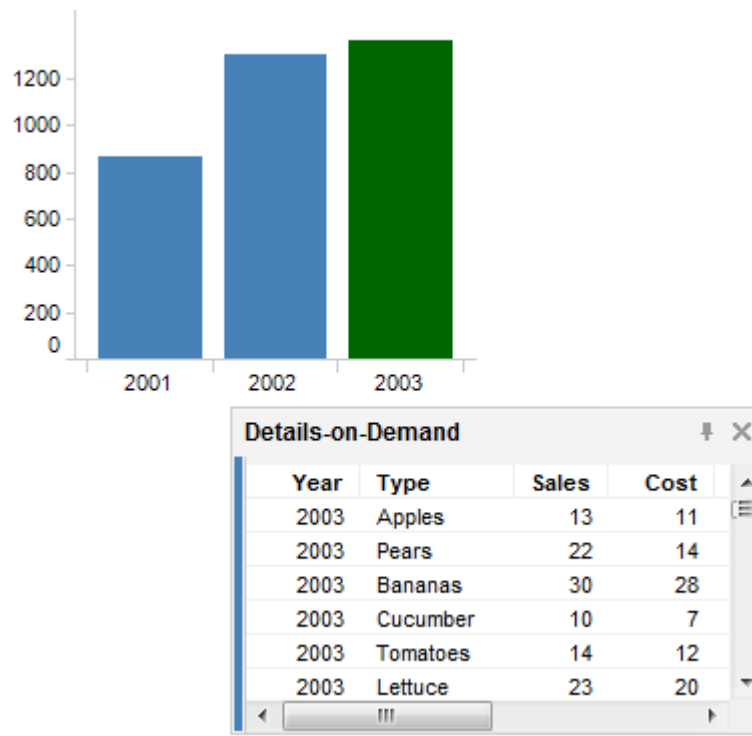
If more than one data table is available within the analysis, a color stripe showing the relations color for the active data table is shown on the right hand side of the Details-on-Demand.

**Note:** For analyses with multiple data tables, settings for the Details-on-Demand must be defined in the Details-on-Demand properties dialog for each data table.

# 7.5.2     Details-on-Demand Properties

## 7.5.2.1     Details-on-Demand Properties

The Details-on-Demand Properties dialog consists of several pages:

- Appearance
- Fonts
- Columns
- Virtual Columns
- Sorting

### ► To reach the Details-on-Demand Properties dialog:

1. Right-click on the Details-on-Demand.
2. Select **Properties** from the pop-up menu.

**Note:** For analyses with multiple data tables, settings for the Details-on-Demand must be defined in the Details-on-Demand properties dialog for each data table.

## 7.5.2.2    Details-on-Demand Properties - Appearance



| Option | Description |
|---|---|
| **Header row height (number of lines)** | Specifies the height of the header row in number of lines. |
| **Data row height (number of lines)** | Specifies the height of all data rows in number of lines. |
| **Number of frozen columns** | Specifies how many columns on the left-hand side will be frozen, that is, not scroll out of sight when the scroll bar is moved to the right. |
| **Show cell borders** | Specifies whether or not cell borders should be visible between the cells in the table. |
| **Allow table data export in Web Player** | Specifies whether or not Web Player users should be able to export data from the Details-on-Demand table. If you do not have the appropriate license you cannot change this setting. Contact your Spotfire administrator if you have questions regarding licenses. |
| **Column orientation** | Specifies whether the columns should be displayed side-by-side (Vertical) in the Details-on-Demand or stacked (Horizontal), so that each column forms a row in the Details-on-Demand. The Automatic option will display the result vertically ("stacked") if a single row is marked, otherwise the columns are oriented side-by-side. |

## 7.5.2.3 Details-on-Demand Properties - Fonts



| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the font settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |

## 7.5.2.4      Details-on-Demand Properties - Columns



| Option | Description |
|---|---|
| **Available columns** | Lists all columns in the data table available for selection. |
| [Type to search] | Type a search string to limit the number of items in the Available columns list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Selected columns** | Lists the columns selected to be displayed in the table, as well as the selected aggregation method used on each column (if any aggregation has been specified). |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list and sends them back to the Available columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the Y-axes in the table. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the Y-axes in the table. |
| **Renderer** | Lists the available renderers for the chosen column. |
| **Settings...** | Opens the settings dialog for the chosen renderer. |

| Add new columns automatically | Select the check box to make sure that any new columns added to the selected data table are also automatically added to the Details-on-Demand table.<br>New columns can appear when refreshing an information link, calculating new columns, etc. |

## 7.5.2.5 Details-on-Demand Properties - Virtual Columns



| Option | Description |
| --- | --- |
| **Available virtual columns** | Lists the available virtual columns. |
| **Add** | Lets you add virtual columns. |
| **Edit...** | Opens the edit dialog for the chosen virtual column. |
| **Remove** | Removes the chosen virtual column. |
| **Display name** | Type the name to be displayed for the chosen virtual column. |

## 7.5.2.6     Details-on-Demand Properties - Sorting
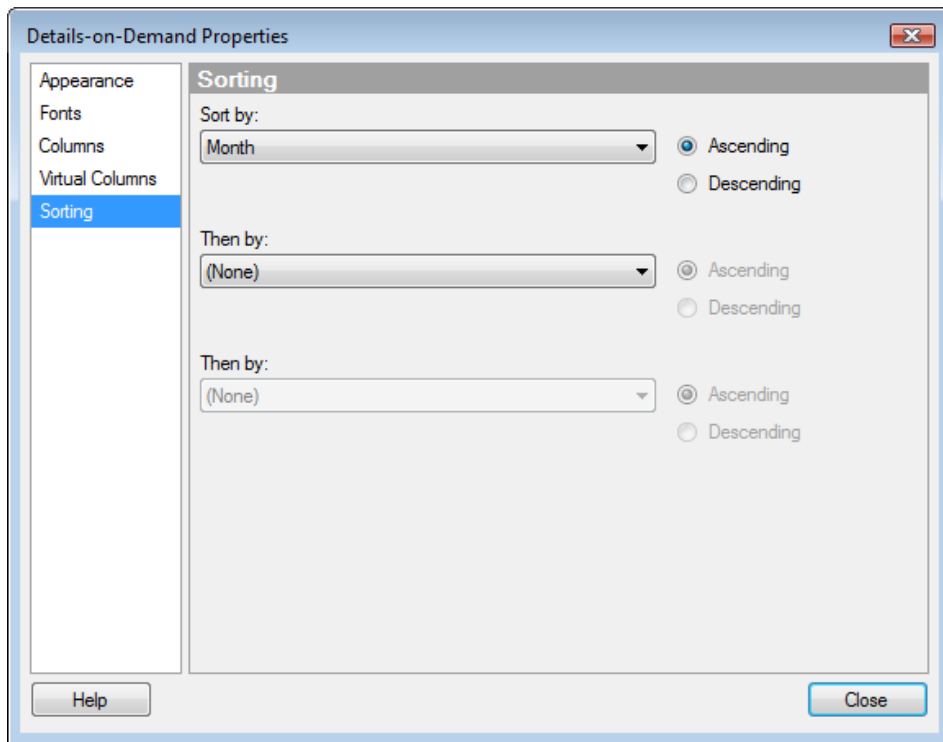


| Option | Description |
|---|---|
| **Sort by** | Specifies the primary column you wish to sort the rows by. |
| **Then by** | Specifies the secondary and tertiary columns you wish to sort the rows by. |
| **Ascending** | Sorts the rows from the lowest to the highest value in the selected column. |
| **Descending** | Sorts the rows from the highest to the lowest value in the selected column. |

**Note:** You cannot sort by a virtual column.

# 7.6     Document Properties

## 7.6.1     How to Edit Document Properties

The dialog found under **Edit > Document Properties** contains settings that apply to the entire document. However, settings that affect the visualizations are found in the Properties dialog for a specific visualization. These dialogs are reached by clicking on the visualization of interest to make it active, and then selecting **Edit > Visualization Properties**.

The Document Properties dialog is divided into a number of different tabs. A number of common procedures are listed for each tab below.

**General**

### ► To update the description or keywords for an analysis:
1. Select **Edit > Document Properties**.
2. On the **General** tab, make the desired changes in the **Description** or **Keywords** field.

   Comment: Keywords can be used to used to enhance organization and search capabilities in the library. Multiple keywords are separated by semicolons.
3. Click **OK**.

### ► To change the page navigation:
1. Select **Edit > Document Properties**.
2. On the **General** tab, select whether to use **Titled tabs** or **Step-by-step** navigation, or to remove the page navigation controls by selecting **None**.

   Comment: Titled tabs will show all pages as separate tabs, which can be dragged and dropped to change the order of pages. Step-by-step will show pages as numbered links to support a specific flow throughout the analysis. Use None if you want to define your own page navigation using actions in text areas.
3. Click **OK**.

   Response: The layout is updated.

### ► To specify a particular visualization area size:
If you are preparing an analysis for a different platform than the one you are currently using, you may want to lock the visualization area to a specific size.
1. Select **Edit > Document Properties**.
2. On the **General** tab, select the desired size under **Visualization area size**.

   Comment: If the desired size is not available, use the **Custom size...** option to specify an exact size in pixels. To find out the current visualization area size for a device, see below. An administrator can store specific sizes in the preferences to have them show up like any other presets in the Visualization area size drop-down list, see below.
3. Click **OK**.

### ► To find out the currently available visualization area size in TIBCO Spotfire:
If you know that you are going to present an analysis using a particular equipment (for example, a large screen in a conference room) you can look up the current visualization area size on that device and then design your analysis so that it is optimized for that particular screen size.
1. On the device to use, open the analysis in TIBCO Spotfire.
2. Select **Help > Support Diagnostics and Logging**.
3. Go to the **Diagnostic Information** tab
4. Look at the **Visualization Area Size**.

### ► To find out the currently available visualization area size in Web Player:
You can optimize the analysis for usage in TIBCO Spotfire Web Player. For example, you may be designing a Web Player based dashboard to be viewed by end users with identical tablet devices (and identically configured web browsers).
1. On the device to use, open the analysis in TIBCO Spotfire Web Player.
2. Click on the arrow at the top right corner of the application, ▼.

   Response: The Web Player menu is displayed.
3. Select **Other Tools > Current Visualization Area Size**.

Comment: Note that the current visualization area size is dependant on what browser and which toolbars and items are shown in the browser, so make sure that you are using the same settings as will be used in the presentation.

4. Click **Close**.

### ► To store a fixed size configuration in the preferences:

If you have administrative rights you can store a specific size in the preferences to have it show up like any other presets in the Visualization area size drop-down list of the Document Properties dialog.

1. Select **Tools > Administration Manager**.
2. Go to the **Preferences** tab.
3. In the **Selected group** list, click on the group for which to set the preferences.
4. In the Preferences list to the right, click on the plus sign next to **Application** to expand the group.
5. Click on **ApplicationPreferences**.
6. Click **Edit**.
7. Click Fixed Visualization Area Sizes.

    Response: A small button is displayed to the right of the preference.
8. Click on the button.

    Response: The String Collector Editor is displayed.
9. Enter the desired fixed size configurations and click **OK**.

### Library

### ► To view the URL for an analysis in the library:

1. Select **Edit > Document Properties**.
2. Go to the **Library** tab.
3. Look at the **Library URL** or **Web Player URL** field.
4. Click **OK**.

### ► To determine who gets to add bookmarks for an analysis:

The creator of an analysis can specify the folder permissions required to add bookmarks in the Document Properties dialog.

1. Select **Edit > Document Properties**.
2. Go to the **Library** tab.
3. Select an option in the **Allow users to add new bookmarks** drop-down list, or clear the check box to disable bookmarks for the analysis.

    Comment: See Details on Document Properties - Library for more information about the various options.
4. Click **OK**.

### ► To manually specify a preview image for an analysis:

1. Select **Edit > Document Properties**.
2. Go to the **Library** tab.
3. Under **Select preview image**, select **Manually**.
4. Click **Browse...**.
5. Locate the image to use and click **Open**.

    Comment: Switching back to Automatically will change the preview image to a snapshot of the active page when saving to the library. Select (No preview) if you do not want to show a preview.
6. Click **OK**.

### Markings

#### ► To change the color of marked items:
1. Select **Edit > Document Properties**.
2. Go to the **Markings** tab.
3. Click to select the marking color you wish to change under Available markings.
4. Click **Edit...**.
5. Change color using the drop-down list.
6. Click **OK** twice.

   Response: The color of marked items is updated in all visualizations that use the selected marking.

   Comment: See Marking in Visualizations for more information about how you can use several different markings in your analysis.

#### ► To add a new marking:
Sometimes, you want to be able to mark items in one visualization without changing the marking in the other visualizations. This is especially useful when you have more than one data table in the document, or, when you create details visualizations. See Marking in Visualizations for more information.

1. Select **Edit > Document Properties**.

   Comment: You can also define new markings from the Data page of any Visualization Properties dialog.

   Go to the **Markings** tab.
2. Click on the **New...** button next to the Available markings list.
3. Specify a **Color** for the new marking.
4. Specify a **Name**.
5. Click **OK** twice.

#### ► To change the default marking:
1. Select **Edit > Document Properties**.
2. Go to the **Markings** tab.
3. Click on the marking that you want to use as default.
4. Click on the **Set as Default** button below the Available markings list.
5. Click **OK**.

### Filtering Schemes

#### ► To show the filtering scheme menu in Filters panel:
Sometimes, you want to be able to filter items in one visualization without changing the filtering in the other visualizations. By showing the filtering scheme menu in the Filters panel you can easily change which filtering scheme to modify. See Filtering Schemes for more information.

1. Select **Edit > Document Properties**.
2. Go to the **Filtering Schemes** tab.
3. Select the **Show filtering scheme menu in Filters panel** check box.

#### ► To create a new filtering scheme:
Sometimes, you want to be able to filter items in one visualization without changing the filtering in the other visualizations. Then it may be useful to add more than one filtering scheme to the analysis. See Filtering Schemes for more information.

1. Select **Edit > Document Properties**.

2. Go to the **Filtering Schemes** tab.
3. Click **New...**.
4. Type a name and click **OK**.

### ► To change the filtering scheme to use on a page:

If you want to use different filtering schemes on different pages, an easy way to switch filtering schemes is to show the filtering scheme menu in the filters panel, as described below. If you want one or two visualizations to use a different filtering scheme only, then this can be specified on the Data page of the Visualization Properties dialog.

1. Make sure that the filtering scheme menu is visible at the top of the filters panel.

   Comment: If the filtering scheme menu has been hidden, it can be shown by selecting Edit > Document Properties > Filtering Schemes tab and the check box **Show filtering scheme menu in Filters panel**.
2. Click on the filtering scheme menu.
3. Select the desired filtering scheme.

### ► To rename a filtering scheme:

1. Select **Edit > Document Properties**.
2. Go to the **Filtering Schemes** tab.
3. Click to select the filtering scheme to rename in the list.
4. Click **Rename...**.
5. Type a name and click **OK**.

## Data Functions

### ► To refresh a data function:

If you have inserted a data function in your analysis and the underlying data has been changed you can update the calculation without needing to insert the data function again.

1. Select **Edit > Document Properties**.
2. Go to the **Data Function** tab.
3. Click on the data function of interest.
4. Click **Refresh**.
5. Click **OK**.

### ► To sync a data function with the library:

If a newer version of the data function in the document is available in the library you can click sync to update the data function.

1. Select **Edit > Document Properties**.
2. Go to the **Data Function** tab.
3. Click on the data function of interest.
4. Click **Sync**.
5. Click **OK**.

## Properties

### ► To create a new document property:

Document properties can be used inside expressions controlling the visualizations. See Using Properties in the Analysis for more information.

1. Select **Edit > Document Properties**.
2. Go to the **Data Function** tab.

3.   Click on the data function of interest.
4.   Click **Refresh**.
5.   Click **OK**.

## 7.6.2    Details on Document Properties - General

The General tab of the Document Properties dialog is where you can add a description of the analysis and keywords to describe the content of the analysis. You can also specify what kind of page navigation to use in the analysis.

► **To reach the Document Properties dialog:**

1.   Select **Edit > Document Properties**.
2.   Click on the **General** tab.

**General Tab**



| Option | Description |
|---|---|
| **Description** | An optional description of the analysis. The description could contain detailed information about the analysis enabling quick overviews. |
| **Keywords (separated by semicolons)** | Keywords specific to the content of the analysis. Keywords are separated by semicolons. This means that if you write "sales representatives; cost" it will be interpreted as two keywords, "sales representatives" and "cost". |

| | |
|---|---|
| | Keywords are used to enhance organization and search capabilities. |
| **Page navigation** | Determines which type of page navigation to use in the analysis. See Pages to learn more about the different navigation modes. You can change the default page navigation for all new analyses on the Document page in the Tools > Options dialog. |
| **Titled tabs** | Shows all pages as separate tabs, which can be dragged and dropped to change the order of the pages. |
| **Step-by-step** | Shows all pages as numbered links to support a specific flow throughout the analysis. |
| **History arrows** | Hides the page navigation, except for the page history arrows. Use this mode if you want to create your own flow throughout the analysis, by adding actions directly on the pages. |
| **Visualization area size** | Determines the size of the area where visualizations are shown. Use **Fit to window** to automatically resize the visualization area after the current size of the Spotfire window. |
| | If you are preparing an analysis for a different platform than the one you are currently using, you may want to lock the visualization area to a specific size. For example, use **iPad Landscape** or **iPad Portrait** to reduce the available visualization area size for each page and optimize the analysis for that platform. |
| | An administrator can Preferences > [Group] > Application > ApplicationPreferences > Fixed Visualization Area Sizes. |
| | **Tip:** When Custom size... is selected the current visualization area size is shown by default, if no other custom sizes have been used previously. |
| | **Tip:** The visualization area size is persisted in bookmarks so a set of bookmarks with different layouts can be used to switch between different area sizes. |
| **Show tooltips as black text on light background** | Select the check box if you want to display tooltips as black text on a light background rather than the default white text on black background. |
| **Auto-hide scroll bars in table visualizations** | Select the check box if you want scroll bars in tabular visualizations to be displayed only on mouse-over. If you clear the check box, then scroll bars will always be shown in tabular visualizations where some of the content does not fit on screen. |

## 7.6.3    Details on Document Properties - Library

The Library tab of the Document Properties dialog is where you handle settings for how the document should behave in the library. This is also where you can copy links to the analysis to be used in other analyses, or to be provided to other people using e-mails or

► **To reach the Document Properties dialog:**
1. Select **Edit > Document Properties**.
2. Click on the **Library** tab.

**Library Tab**



| Option | Description |
|---|---|
| **Library URL** | If the analysis has been saved in the library, this URL allows you to open the file in TIBCO Spotfire. Copy the URL to send the link to a colleague. |
| **Web Player URL** | If the analysis has been saved in the library and Spotfire Web Player has been set up, this URL allows you to open the analysis in the Web Player. Copy the URL to send the link to a colleague. |
| **Remember personalized view for each Web Player user** | Select this check box if you want to allow users to continue where they left off from one time to another when working on the analysis in the Web Player. For example, a user can open the analysis in the Web Player, change the view (by filtering out some data, for instance), close the analysis, and then open the analysis again with the same filter settings. <br><br>**Note:** To make sure this works completely, it is necessary to define key columns for all the data tables in the analysis even if they are embedded. |
| **Allow users to add new bookmarks** | The ability to add and modify bookmarks can be restricted on two levels: the user licenses and the property settings on an analysis level. |

| | This check box determines the analysis level settings based on the users' library folder permissions. |
|---|---|
| | Clear the check box if you do not want anyone to be able to add bookmarks to the analysis. |
| | Select the check box to allow some or all users to add bookmarks and specify the permitted level using the drop-down list: |
| | **Private bookmarks only (all users)** – allows all users to add private bookmarks but no public bookmarks are allowed. |
| | **Private (all users), public (write permissions needed)** – allows all users to add private bookmarks but only users with Modify folder permissions or higher will be able to make bookmarks public. |
| | **Private and public bookmarks (write permissions needed)** – allows only users with Modify folder permissions or higher to add any bookmarks. |
| | **Private and public bookmarks (all users)** – allows all users to add both private and public bookmarks. |
| **Select preview image** | Select whether or not to show a preview image for this analysis when browsing for analyses in the library. |
| | **Automatically** - sets the preview image to a snapshot of the active page when saving the analysis to the library. |
| | **Manually** - allows you to manually select a previously saved image. |
| | **(No preview)** - use this option to prevent any preview image from being shown in the library. |
| **Browse...** | When Select preview image has been set to Manually you can browse for an image to use in the preview. |
| **Current preview image** | Displays the currently selected preview image. If Select preview image has been set to Automatically and the analysis has not yet been saved to the library, then no preview will be visible. However, once saved to the library the active page when saving will be used as a preview image. |

## 7.6.4      Details on Document Properties - Markings

The Markings tab of the Document Properties dialog is where you specify which data table and marking to use as default when new visualizations are created. You can also add, edit or remove markings.

### ► To reach the Document Properties dialog:

1. Select **Edit > Document Properties**.
2. Click on the **Markings** tab.

**Markings Tab**
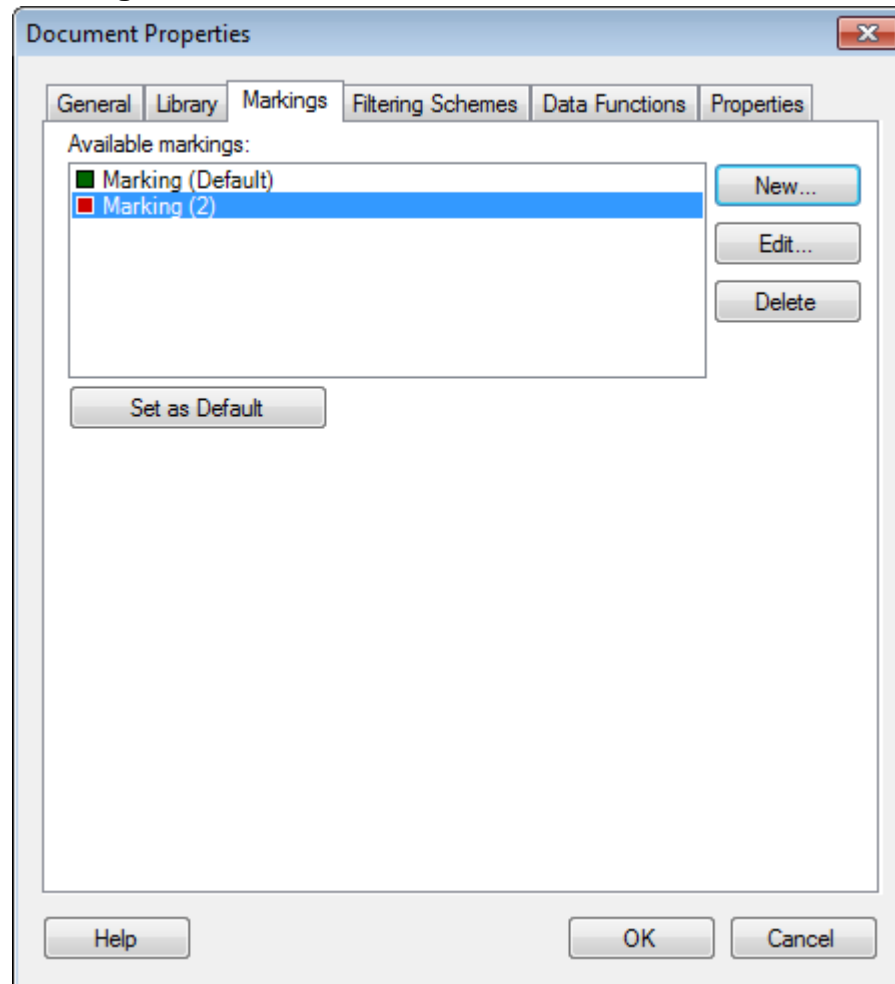


| Option | Description |
|---|---|
| **Available markings** | Lists all markings available in the document. A marking is what specifies the color of marked items from one or more data tables. |
| **New...** | Opens a dialog where you can specify the name and color of the new marking. |
| **Edit...** | Opens a dialog where you can change the name and color of the selected marking. |
| **Delete** | Deletes the selected marking. If any visualizations use the deleted marking, they will be set to not allow marking. This can be changed on the Data page of the Visualization Properties dialog for each visualization concerned. |
| **Set as Default** | Sets the selected marking to be the default marking, that is, the marking that is used when new visualizations are created. |

## 7.6.5    Details on Document Properties - Filtering Schemes

► **To reach the Document Properties dialog:**

1.  Select **Edit** > **Document Properties**.
2.  Click on the **Filtering Schemes** tab.



| Option | Description |
|---|---|
| **Show filtering scheme menu in Filters panel** | Select this check box to show the filtering scheme menu in the filters panel. You need to display this menu if you are to change the filtering scheme used on a page. However, when sending the finished document to a coworker for further analysis, you may want to hide the menu in order to save space in the filters panel and to reduce the risk of changing the filtering schemes by mistake. |
| **Available filtering schemes** | Lists all filtering schemes that have been defined in the document. |
| **New...** | Opens a dialog where you can add a new filtering scheme. |
| **Rename...** | Allows you to change the name of the selected filtering scheme. |
| **Delete** | Deletes the selected filtering scheme. |

**Note:** You can create multiple different filtering schemes in the document. The filtering scheme can be specified per page or per visualization and it can be the same or different for different pages and visualizations. See Filtering Schemes for more information.

# 7.6.6     Details on Document Properties - Data Functions

Once a data function has been executed in an analysis it will be available for editing in the Data Functions tab of the Document Properties dialog. This is where you can change the input and output handlers, or refresh the calculation if anything has changed.

► **To reach the Document Properties dialog:**

1. Select **Edit > Document Properties**.
2. Click on the **Data Functions** tab.
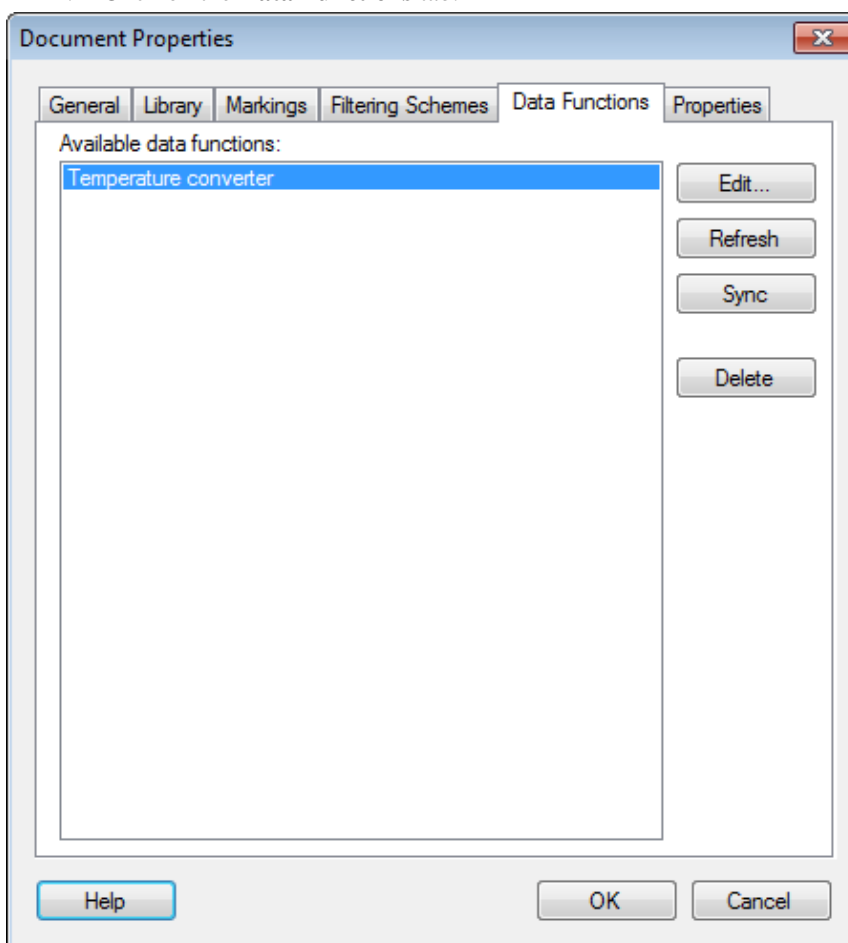


| Option | Description |
|---|---|
| **Available data functions** | Lists all data functions that have been used in the current analysis. <br><br> Note that if a previously used data function has been replaced by a subsequent data function and all outputs from the first data function has been removed, then the first data function will no longer remain in this list. |
| **Edit...** | Opens a dialog where you can edit the input parameters of the selected data function. The output cannot be changed here. Execute the data function again if you need to change some output parameter settings. |

| | |
|---|---|
| **Refresh** | Refreshes the data function calculation, so that any changes to the input values are reflected in the output results. |
| | **Note:** You need to click OK in the Document Properties dialog to actually start the data refresh. |
| **Sync** | Makes the document use an updated version of the function definition if a newer version is available in the library. |
| | Note that synchronizing is only possible for data functions that have been saved to the library and executed via Insert > Data Functions. The Sync button will be unavailable for data functions run from the Register Data Functions Dialog. If the analysis is expected to have a long life span, it is recommended to only keep saved data functions in the analysis, so that they can be updated. |
| **Delete** | Deletes the selected data function. |

## 7.6.7    Details on Document Properties - Properties

On the Properties tab it is possible to specify document properties, which are applicable throughout the document. For example, this could be a currency rate which can be used in calculations on several different columns. The document properties can be used inside expressions, using Insert Calculated Column or Custom Expressions, or, in reference lines in visualizations. You can also add property controls to a text area for an easy way of changing the property value. See Using Properties in the Analysis for more information.

### ► To reach the Document Properties dialog:
1.    Select **Edit > Document Properties**.
2.    Click on the **Properties** tab.

| Option | Description |
|---|---|
| **Property Name** | Lists all properties that are currently available in the document.<br><br>**MaxMissingTimeParts** – Allows you to specify the maximum number of missing time parts that should be allowed to be replaced using the Compensate for missing values setting, available on the Appearance tab of some visualizations. See Working with Time Hierarchies for more information.<br><br>If you have defined custom properties for the document, these properties are also listed here. |
| **Value** | Lists the values of the defined document properties. |
| **New...** | Opens a dialog where you can add new document properties to the document. |
| **Edit...** | Opens a dialog where you can edit the selected document property. |
| **Delete** | Deletes the selected property. |

## 7.6.8 Details on New/Edit Document Property

Custom document properties can be used throughout the analysis. For example, this could be a currency exchange rate which can be used in calculations on several different columns.

Document properties can be used inside expressions, using Insert Calculated Column or Custom Expressions, or, in reference lines in visualizations. You can also add property controls to a text area, for an easy way of changing the property value. See Using Properties in the Analysis for more information.

### ► To reach the New Property dialog:

1. Select **Edit > Document Properties**.

   Comment: The New Property dialog is also available by right-clicking in the Available properties list in the Insert Calculated Column and Custom Expression dialogs, as well as from the dialogs used when adding property controls to a text area.

2. Click on the **Properties** tab.
3. Click **New...**.



| Option | Description |
| --- | --- |
| **Property name** | Specifies the name of the custom document property. |
| **Data type** | Specifies the type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Value** | Specifies the value of the property. |

### ► To reach the Edit Property dialog:

1. Select **Edit > Document Properties**.

   Comment: The Edit Property dialog is also available by right-clicking in the Available properties list in the Insert Calculated Column and Custom Expression dialogs, as well as from the dialogs used when adding property controls to a text area.

2. Click on the **Properties** tab.
3. Click to select the property you wish to edit in the list of available properties.
4. Click **Edit...**.

| Option | Description |
|---|---|
| **Property name** | Specifies the name of the custom document property. |
| **Data type** | Specifies the type of the property. |
| **Description** | Optional. A description of the intended use of the property. |
| **Edit...** | Opens the Edit Value dialog where you can edit the description of the property. |
| **Value** | Specifies the value of the property. |

**Note:** The only thing you can change using Edit Property is the description and the value of the selected property. If other settings are wrong, you need to delete the custom property and create a new one instead.

# 7.7    Setting Defaults

## 7.7.1    How to Specify Default Values

Sometimes, you may want to reuse settings from one time to another. For example, you may want to specify that the marked items color should always be red when you start TIBCO Spotfire, or that the default visualization should be a table. This is done in the Options dialog. The default values you set are also saved for your profile on the server, so your default settings will be available even if you are using a different computer.

An administrator can also configure which settings should be default for certain user groups on the server. If you are a member of such a group, these defaults will take effect for you, unless you have made an active choice and set your own default value in the Options dialog.

► **To reach the Options dialog:**

1.    Select **Tools > Options...**.

# 7.7.2 Options

## 7.7.2.1 Options - Application



| Option | Description |
|---|---|
| **Show welcome screen when no file is loaded** | Select this option to display the welcome screen when starting TIBCO Spotfire without a file loaded. |
| **Number of recent files in File menu** | Specifies how many of the most recently used files that should be shown in the File menu. |
| **Toolbars** | Select which toolbars should be visible when TIBCO Spotfire is started. Changes here take effect the next time TIBCO Spotfire is started. |
| **Language** | Select which language should be used for TIBCO Spotfire when it is started. This setting affects the language used in the application, but not in the data itself. Language settings for the data are controlled by the Column Properties. Changes here take effect the next time TIBCO Spotfire is started. |
| **Renderer Settings...** | Opens the Renderer Settings dialog that sets the default renderer for different content types. This is applicable when displaying links, images, geometries, etc. in table visualizations or as labels or tooltips. |
| **Animations** | Select this check box to enable smooth animations in the visualizations when data are filtered and visualizations are modified. Clear the check box if you experience performance problems when modifying the visualizations, to get a slight performance boost. This setting takes |

| | effect immediately. |
|---|---|
| **Hardware acceleration** | Select this option to enable hardware graphics acceleration. You should only disable the option if you experience odd problems relating to graphics in TIBCO Spotfire. If disabling this option alleviates the problem, you may have some problems with your graphics card or its software drivers. Try updating these and see if you can enable hardware acceleration again, as this greatly improves performance of TIBCO Spotfire. This setting takes effect immediately. |
| **Anti-aliased lines and markers** | Only available when Hardware acceleration has been switched off. Select this check box to render smooth lines and markers using anti-aliasing. Clearing the check box may increase the performance of the visualization rendering. |
| **Set as Default Spotfire Version** | Click on this button to make sure that Spotfire analysis files are opened using the current version of TIBCO Spotfire when double-clicked in your Windows environment or opened via links to the library. Registering a default version is only necessary if you are running several different versions of TIBCO Spotfire on your computer (e.g., a gold version and a beta version). |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.2 Options - Fonts

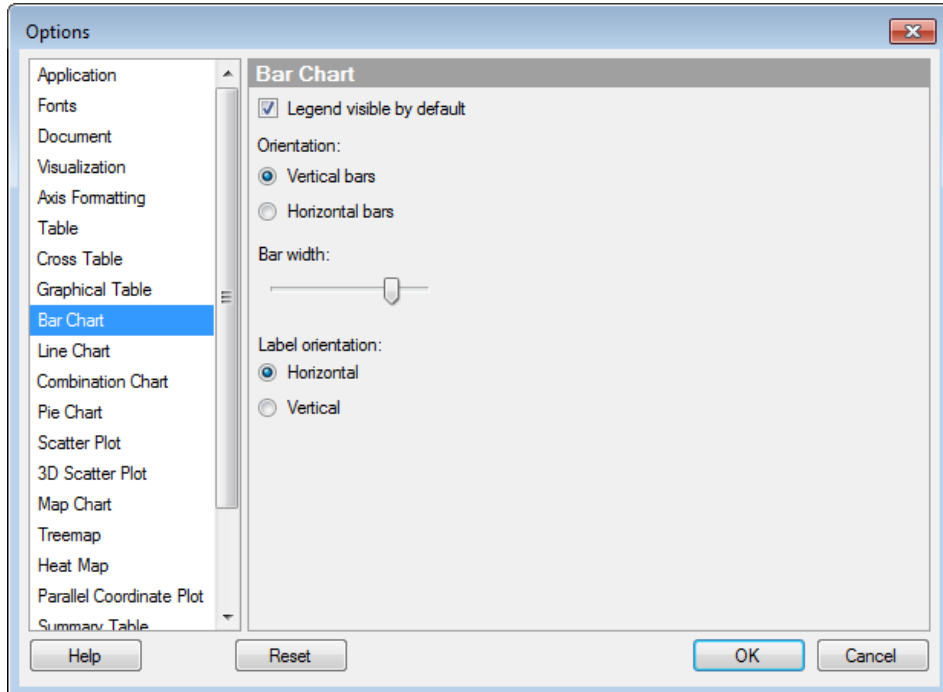| Option | Description |
|---|---|
| **Settings for** | Lists all items for which you can change the font settings. Click to select an item in the list to change the settings for that text in the visualization. Press **Ctrl** and click on more items to change the settings for multiple items simultaneously. |
| **Font** | Specifies the font to use for the selected items. |
| **Font style** | Specifies the font style to use for the selected items. |
| **Size** | Specifies the font size to use for the selected items. |
| **Apply to Document...** | Opens the Apply Font Settings to Document dialog which allows you to update the text styles for the selected items in all visualizations on one or more pages at the same time. Note that this will override any font settings you may have made directly in a visualization. |
| **Reset** | Resets all properties on this page to the default values. Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.3 Options - Document

These settings generally take effect when you open new data and create a new document in TIBCO Spotfire.

| Option | Description |
|---|---|
| **Initial visualization when loading data** | Select which visualization should be the default visualization to appear when loading new data. <br> **Note:** When you load map data into Spotfire, the initial visualization is always a map chart. |
| **Create cover page for new analysis** | Select whether or not a cover page should be created by default when creating a new analysis. |
| **Filters panel open by default** | Select whether or not the filters panel should be open when creating a new analysis. |
| **Details-on-Demand open by default** | Select whether or not the Details-on-Demand should be open when creating a new analysis. |
| **List box filter size (number of rows shown)** | Type or click to the number of rows you want to display in the list box filter. |
| **Show tooltips as black text on light background** | Select the check box if you want to display tooltips as black text on a light background rather than the default white text on black background. |
| **Auto-hide scroll bars in table visualizations** | Select the check box if you want scroll bars in tabular visualizations to be displayed only on mouse-over. If you clear the check box, then scroll bars will always be shown in tabular visualizations where some of the content does not fit on screen. |
| **Page navigation** | Select whether to use Titled tabs, Step-by-step mode or no page navigation as default when creating a new analysis. SeePages and What is a Guided Analysis? to learn more about working with the different navigation modes. |
|    **Titled tabs** | Shows all pages as separate tabs, which can be dragged and dropped to change the order of the pages. |
|    **Step-by-step** | Shows all pages as numbered links to support a specific flow throughout the analysis. |
|    **History arrows** | Hides the page navigation, except for the page history arrows. Use this mode if you want to create your own flow throughout the analysis, by adding actions directly on the pages. |
| **Default marking color** | Select which color should be used for marked items as default. |
| **Reset** | Resets all properties on this page to the default values. <br> Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.4      Options - Visualization
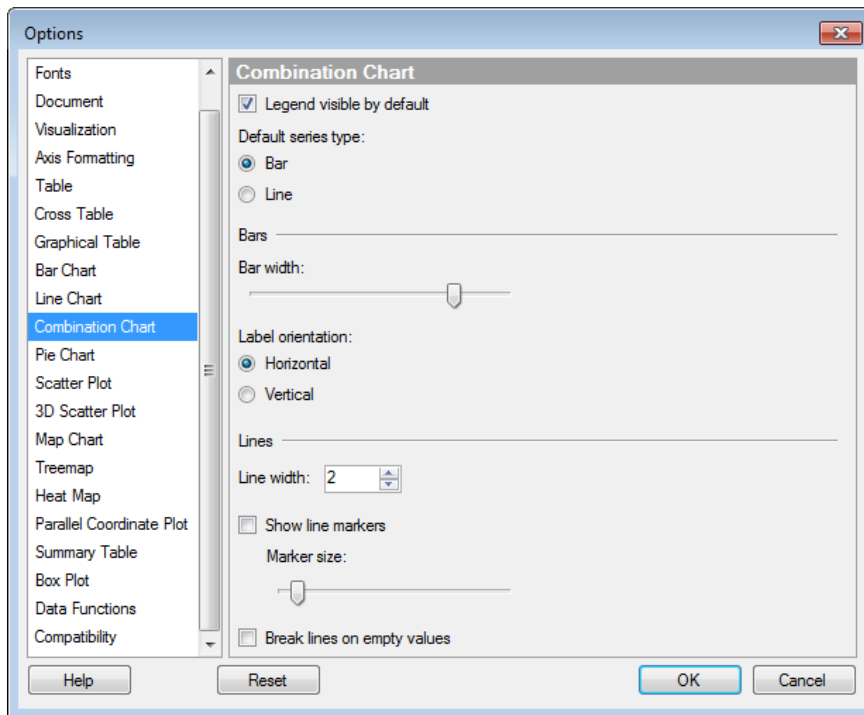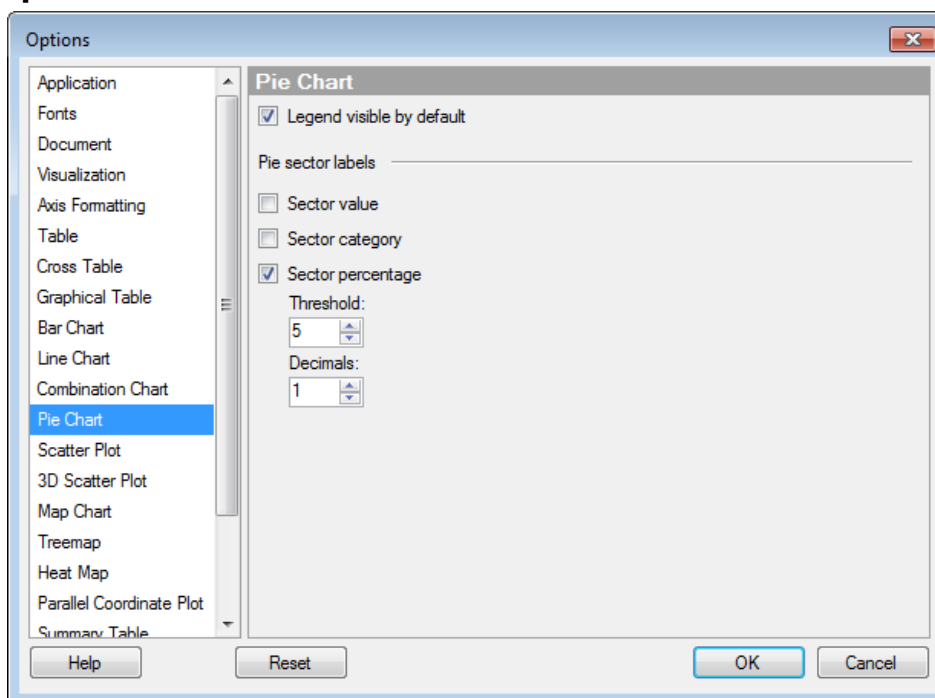
These settings take effect when creating a new visualization.



| Option | Description |
| --- | --- |
| **Visualization title visible by default** | Select whether or not the title bar for new visualizations should be visible by default. |
| **Visualization description visible by default** | Select whether or not the description for new visualizations should be visible by default. |
| **Gridlines visible by default** | Select whether or not gridlines should be visible in new visualizations (where applicable) by default. |
| **Zoom for axes** | Select whether zooming should be automatic or require the use of manual zoom sliders, when creating a new visualization. |
| **Tooltip format** | Select whether the tooltip should show "Value names and values" or "Visualization properties and values". Generally speaking, the first option means that the tooltip will show the column names and corresponding values for the highlighted row. The second option means that the tooltip will show the name of the properties (rather than the corresponding columns) and the values. **Example "Value names and values":** Product: Bananas Month: March Sales: 3300 **Example "Visualization properties and values":** Color: Bananas |

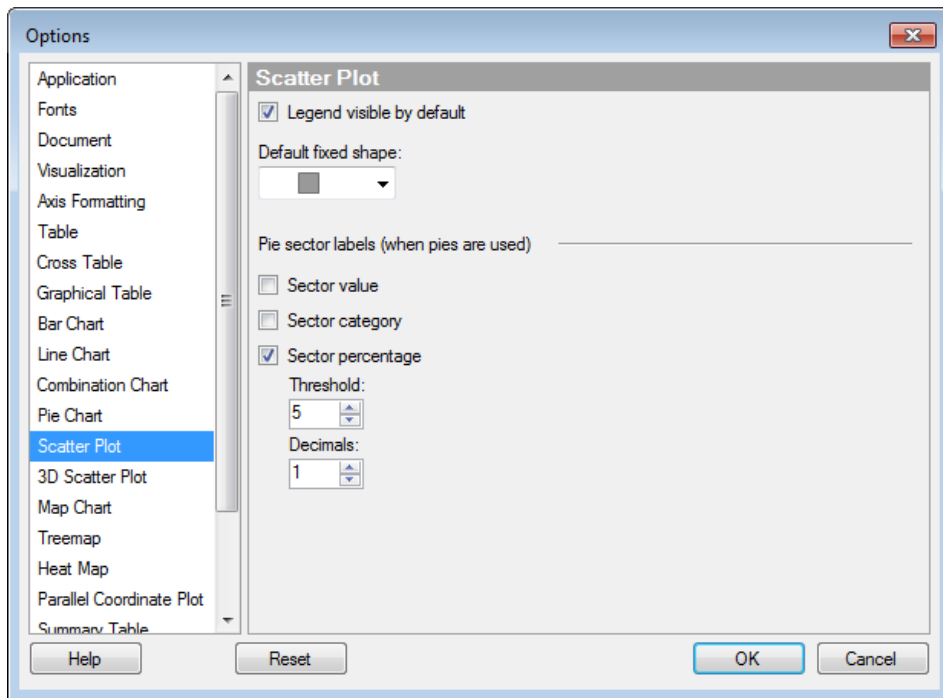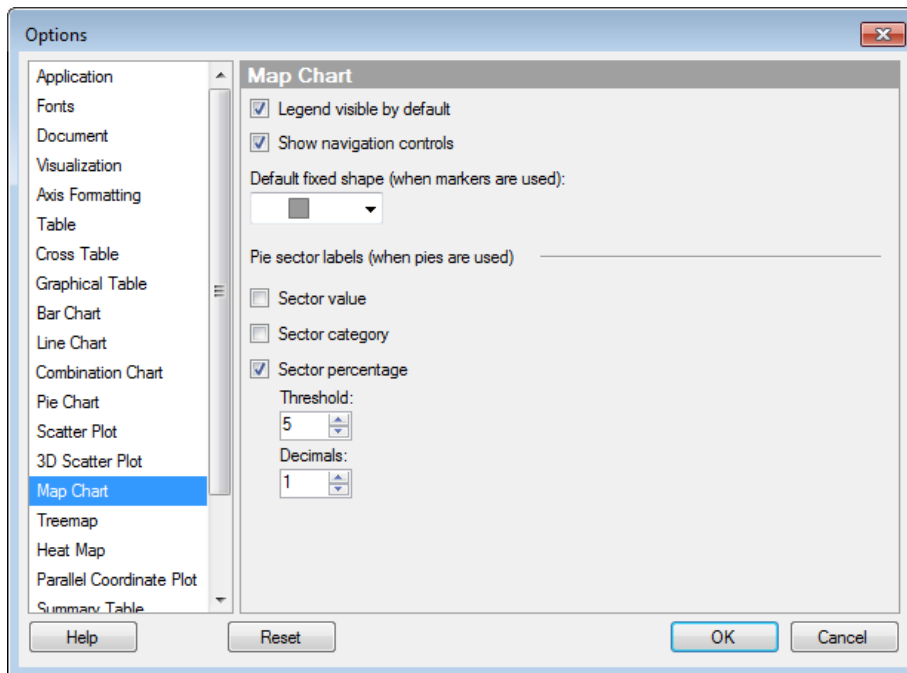| | X: March |
| | Y: 3300 |
| **Default fixed color** | Select which color should be used as the fixed color in all visualizations. |
| **Default categorical color scheme** | Select which scheme should be the default categorical color scheme for all visualizations. If the color scheme is categorical, only the colors from the color scheme will be used in the visualizations. No values will be matched between the color scheme and the visualizations. And if the selected color scheme contains any rules, they will not be included. |
| | **Note:** Changing the default color scheme will not affect any already existing visualizations. The new default scheme will only be used in visualizations created after the change. |
| **Default continuous color scheme** | Select which scheme should be the default continuous color scheme for all visualizations. If the color scheme is categorical, only the colors from the color scheme will be used in the visualizations. No values will be matched between the color scheme and the visualizations. And if the selected color scheme contains any rules, they will not be included. |
| | **Note:** Changing the default color scheme will not affect any already existing visualizations. The new default scheme will only be used in visualizations created after the change. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.5    Options - Axis Formatting

These settings take effect when creating a new visualization and affect only the axes in visualizations. For general information about formatting, see Formatting Overview.

| Option | Description |
|---|---|
| **Default axis formatting** | Defines the default settings that should be used for the axes.<br>**Note:** Settings are applied to visualizations created after the settings are made. Already existing visualizations will not be affected. |
| **Data type** | Defines which data type the formatting should be applied to. |
| **Category** | Lists the available categories for the selected data type. Each category in this list has separate settings. What categories are available depends on the data type. See Formatting Settings for a full description of all possible options. |
| **Short number format** | Short number format lets you format values with many digits to take up less space on the axis. For example, by using short number format you can set 1,000 to be displayed as 1k. You can define your own sets of symbols to use as short number format, but a standard symbol set is already defined. To learn more, see Short Number Format. |
| **Edit Symbol Sets...** | Opens a dialog where you can edit or add symbol sets to use when you apply short number format.<br>**Note:** It is not possible to edit or delete the Standard symbol set. |
| **Reset** | Resets all properties, except added symbol sets, on this page to the default values. Symbol sets must be deleted manually by opening the Edit Symbol Sets dialog. |

## 7.7.2.6 Options - Table



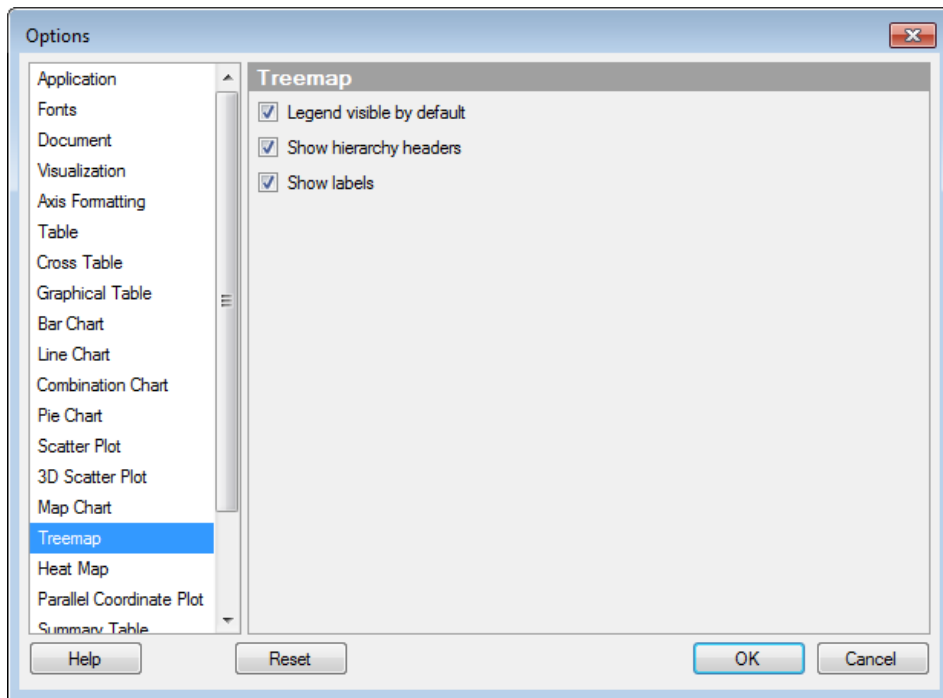| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new table. |
| **Header row height** | Specifies the height of the header row in number of lines. |
| **Data rows height** | Specifies the height of all data rows in number of lines. |
| **Number of frozen columns** | Specifies the number of columns on the left-hand side to be frozen, that is, they will not scroll out of sight when the scroll bar is moved to the right. |
| **Show cell borders** | Specifies whether or not cell borders should be visible in the table. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the table. |
| **Add new columns automatically** | Select the check box to change the default setting so that any new columns in a data table are also automatically added to table visualizations using that data table. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.7 Options - Cross Table



| Option | Description |
|--------|-------------|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new cross table. |
| **Show cell borders** | Specifies whether or not cell borders should be visible in the cross table. |
| **Grand total for columns** | Specifies whether or not the sum of all values in a column should be displayed. |
| **Grand total for rows** | Specifies whether or not the sum of all values in a row should be displayed. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the cross table. |
| **Display subtotals** | |
| **Before values** | Places the subtotal values before the cell values on each level in the hierarchy of the vertical axis. |
| **After values** | Places the subtotal values after the cell values on each level in the hierarchy of the vertical axis. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

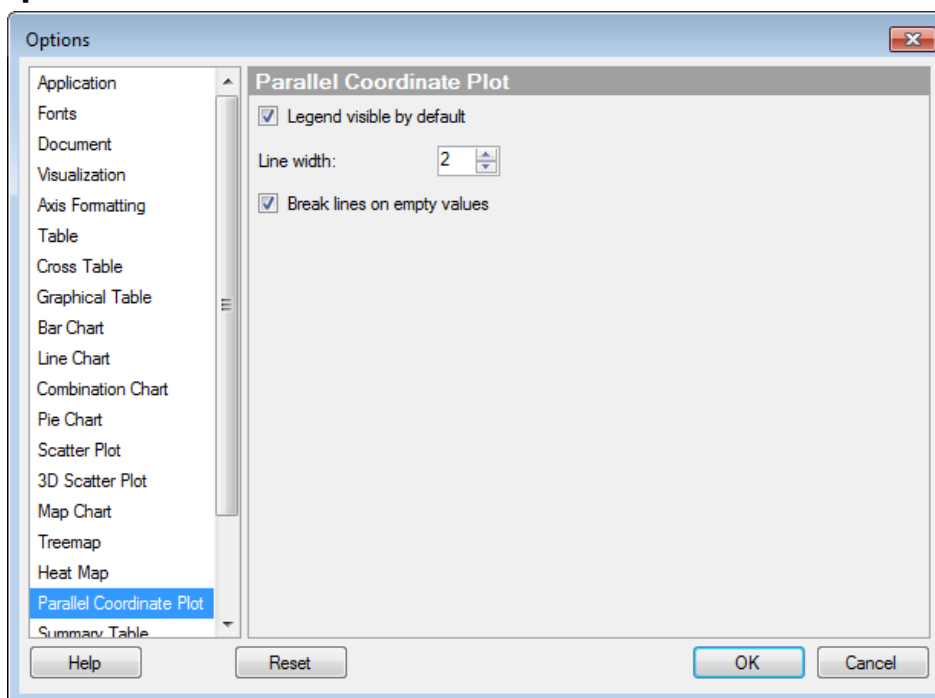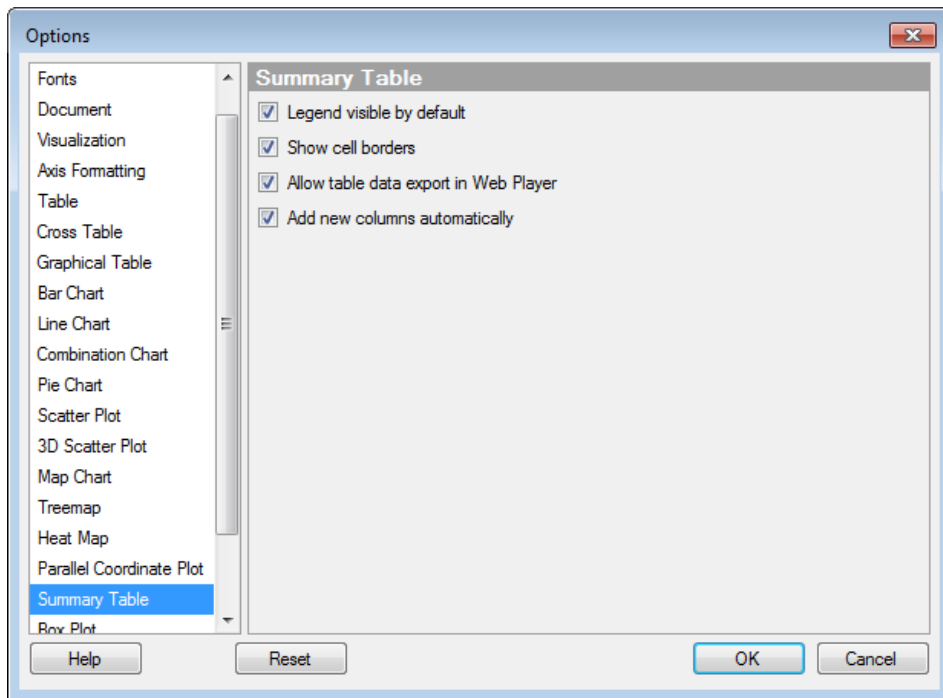## 7.7.2.8 Options - Graphical Table



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new bar chart. |
| **Initial column when inserting new graphical table** | Specifies the default column type to show up initially when inserting a new graphical table visualization. |
| **Show** | |
| **Header row** | Specifies whether or not the column headers at the top of the graphical table should be visible. |
| | **Tip:** If you want to show or hide a specific column header, instead of the entire row of headers, open the Settings dialog for the column of interest, go to the General page and then select or clear the check box Show name in header. |
| **Row header name** | Specifies whether or not the row header name should be visible. |
| | This is the left-most header in the header row, displayed above the column containing the row headers in the graphical table. By default, the row header name is the name of the column on the row axis. If the row axis has a hierarchy of columns, then the row header name is the column at the lowest level in the hierarchy. |
| **Cell borders** | Specifies whether or not cell borders should be visible in the graphical table. |
| **Only the n first rows** | Select this check box if you want to display a limited number of rows in the graphical table. Note that the sort order in the graphical table affects which rows are shown. |

| **Additional row spacing (in pixels)** | Specifies how much extra space should be added to the cells for each row. |
| --- | --- |
| **Reset** | Resets all properties on this page to the default values.<br><br>Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.9 Options - Bar Chart



| **Option** | **Description** |
| --- | --- |
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new bar chart. |
| **Orientation** | Specifies whether the bars should be displayed horizontally or vertically by default. |
| **Bar width** | Drag the slider to modify the width of the bars. |
| **Label orientation** | Specifies whether labels should be displayed horizontally or vertically by default. |
| **Reset** | Resets all properties on this page to the default values.<br><br>Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.10 Options - Line Chart



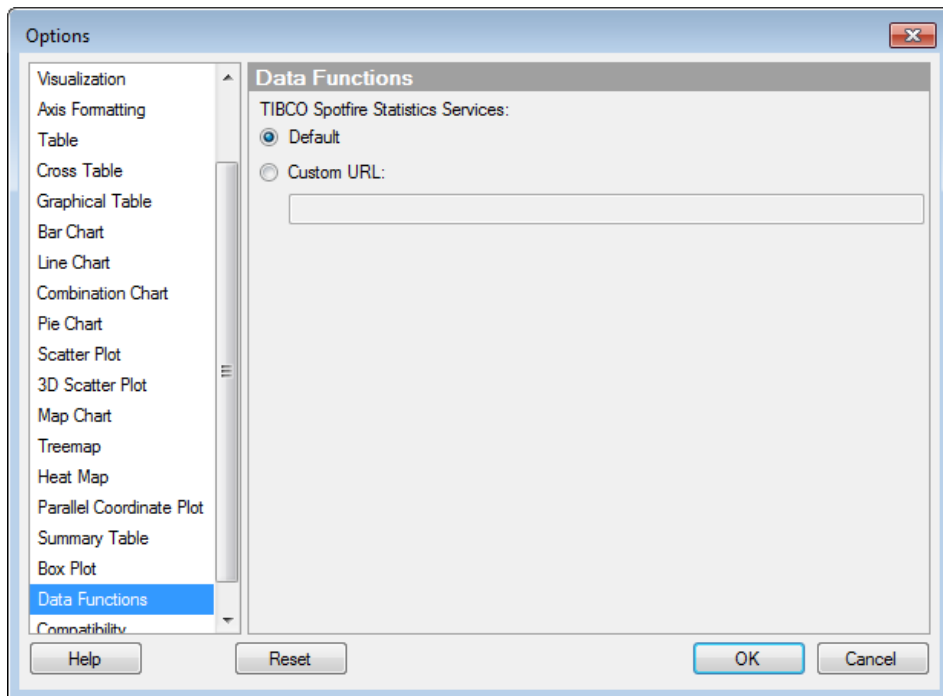| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new line chart. |
| **Line width** | Specifies the width of the lines in the line chart. |
| **Show markers** | Determines whether or not markers should be displayed for the axis values. |
| **Marker size** | Increases or decreases the overall size of the markers. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data used to create the line. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.11      Options - Combination Chart



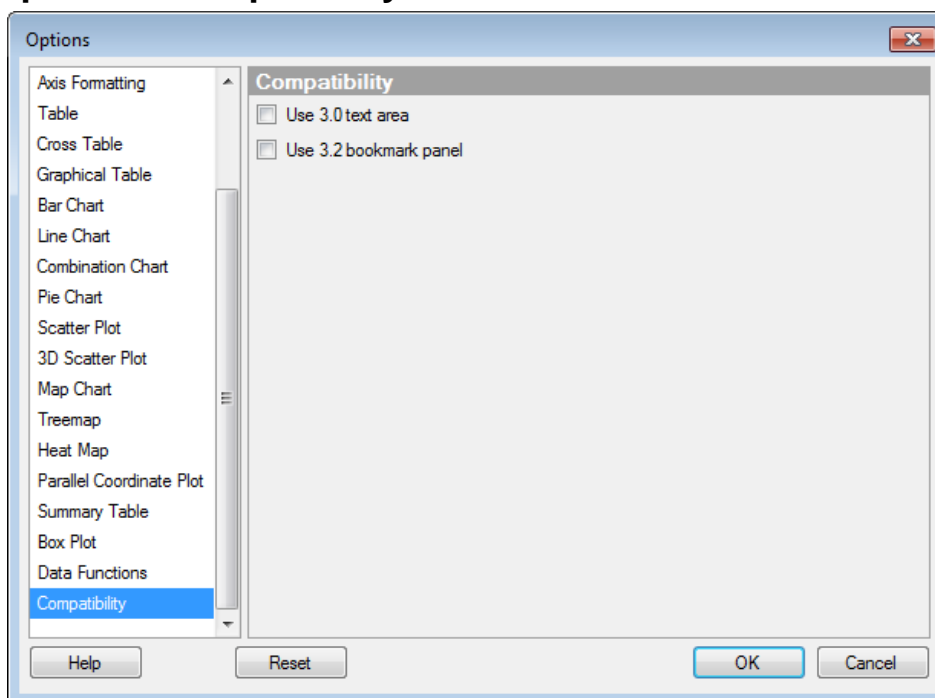| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new combination chart. |
| **Default series type** | Specifies whether the default type of new series should be bars or lines. |
| **Bars** | |
| **Bar width** | Drag the slider to modify the width of the bars. |
| **Label orientation** | Specifies whether labels should be displayed horizontally or vertically by default. |
| **Lines** | |
| **Line width** | Specifies the width of the lines in the combination chart. |
| **Show line markers** | Determines whether or not markers should be displayed on the lines for the axis values. |
| **Marker size** | Drag the slider to modify the overall size of the markers. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data that was used to create the line. |
| **Reset** | Resets all properties on this page to the default values. <br><br> Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.12 Options - Pie Chart



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new pie chart. |
| **Sector value** | Displays the value of the sector as a label. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector as a label. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Threshold** | Excludes labels whose percentage falls below a given threshold. |
| **Decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.13    Options - Scatter Plot



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new scatter plot. |
| **Default fixed shape** | Defines which shape to use for all markers as default. |
| **Sector value** | Displays the value of the sector as a label. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector as a label. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Threshold** | Excludes labels whose percentage falls below a given threshold. |
| **Decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.14 Options - 3D Scatter Plot
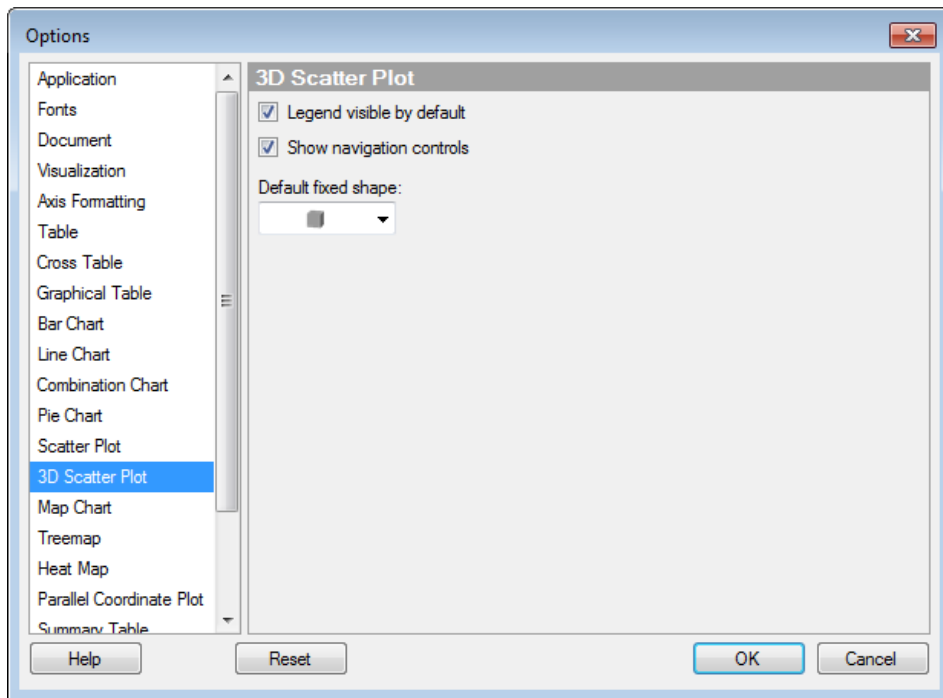


| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new 3D scatter plot. |
| **Show navigation controls** | Specifies whether or not the navigation controls should be visible when a new 3D scatter plot is created. |
| **Default fixed shape** | Defines which shape to use for all markers as default. |

## 7.7.2.15        Options - Map Chart



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new map chart. |
| **Show navigation controls** | Specifies whether or not the navigation controls should be visible when creating a new map chart. |
| **Default fixed shape (when markers are used)** | Defines which shape to use for all markers as default. |
| **Sector value** | Displays the value of the sector as a label. For example, sum of sales for apples, if the sector size is defined by sum of sales and the color is defined by fruit or vegetable type. |
| **Sector category** | Displays the category defining the sector as a label. For example, "apples", if the sector color is defined by fruit or vegetable type. |
| **Sector percentage** | Displays labels showing the percentage of the total that each sector represents. |
| **Threshold** | Excludes labels whose percentage falls below a given threshold. |
| **Decimals** | Specifies the number of decimals to display for the percentage value. The number specified here will also affect the number of decimals shown for pie sectors in the tooltip. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.16    Options - Treemap



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new treemap. |
| **Show hierarchy headers** | Specifies whether or not the hierarchy headers should be shown when creating a new treemap. |
| **Show labels** | Specifies whether or not labels should be displayed when a new treemap is created. |
| **Reset** | Resets all properties on this page to the default values.<br><br>Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.17    Options - Heat Map



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new heat map. |
| **One color scale per axis value** | Specifies whether or not there should be one separate color scale for each axis value, or if one scale should apply to the entire visualization when creating a new heat map. |
| **Dendrogram colors** | |
| **Pruning line color** | Specifies the color to use for the pruning line in the dendrogram. |
| **First alternating cluster color** | Specifies the first color to use for the clusters when pruning in the dendrogram. |
| **Second alternating cluster color** | Specifies the second color to use for the clusters when pruning in the dendrogram. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.18    Options - Parallel Coordinate Plot



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new parallel coordinate plot. |
| **Line width** | Specifies the width of the lines in the parallel coordinate plot. |
| **Break lines on empty values** | Determines whether lines should be broken or remain connected when an empty value is found in the data used to create the line. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.19 Options - Summary Table



| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new summary table. |
| **Show cell borders** | Specifies whether or not cell borders should be visible in the summary table. |
| **Allow table data export in Web Player** | Specifies whether or not a Web Player user is allowed to export the data from the summary table. |
| **Add new columns automatically** | Select the check box to change the default setting so that any new columns in a data table are also automatically added to summary table visualizations using that data table. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of such a group, the options on this page will be set to these defaults when you press the Reset button. |

## 7.7.2.20    Options - Box Plot
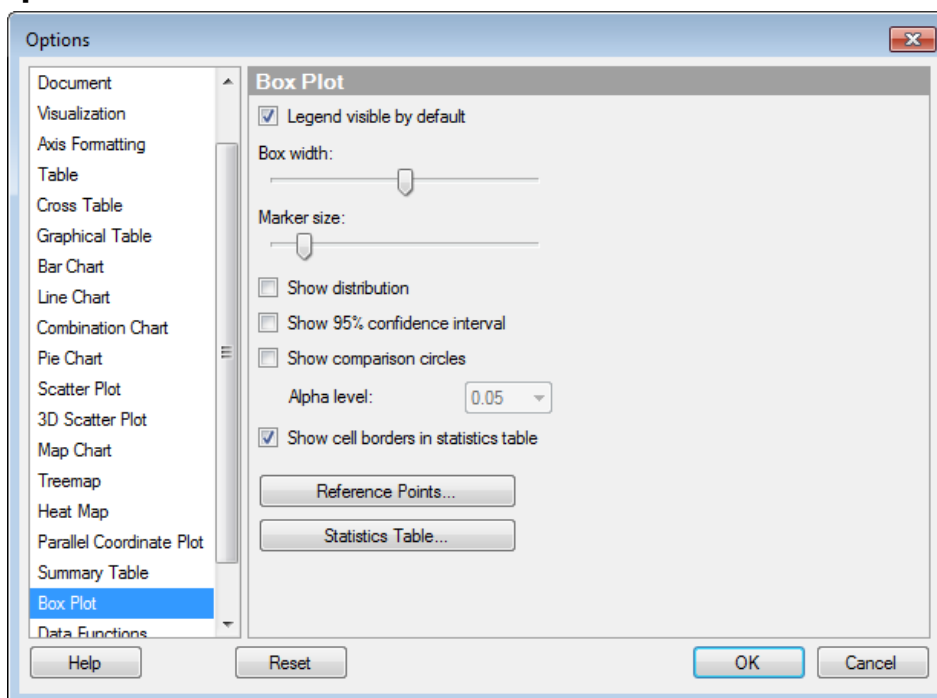


| Option | Description |
|---|---|
| **Legend visible by default** | Specifies whether or not the legend should be open when creating a new box plot. |
| **Box width** | Specifies the width of all box plots. |
| **Marker size** | Specifies the size of all outer values. |
| **Show distribution** | Specifies whether or not the distribution of values should be shown as a histogram. |
| **Show 95% confidence interval** | Select the check box to display the confidence interval in the box plot as a black line next to the box. |
| **Show comparison circles** | Select the check box to display comparison circles in the box plot visualization. See What are Comparison Circles? for more information. |
| **Alpha level** | The level at which the difference between groups would be significant. |
| **Show cell borders in statistics table** | Specifies whether or not cell borders should be visible in the statistics table of the box plot. |
| **Reference Points...** | Opens a dialog where you can specify the shape and color of the reference points to show by default in the box plot. |
| **Statistics Table...** | Opens a dialog where you can specify what measures to show in the statistics table (if any), as well as the sorting to apply. |
| **Reset** | Resets all properties on this page to the default values. |
| | Note that an administrator can configure which settings should be default for certain user groups on the server. If you are a member of |

such a group, the options on this page will be set to these defaults when you press the Reset button.

## 7.7.2.21    Options - Data Functions



| Option | Description |
|---|---|
| **TIBCO Spotfire Statistics Services** | |
| **Default** | Use this option to connect to the default Spotfire Statistics Services server set up by the administrator. |
| **Custom URL** | Use this option to run data functions using an alternative instance of Spotfire Statistics Services. For example, while you are developing new data functions you can use Spotfire Statistics Services Local Adapter to test your scripts. |

## 7.7.2.22    Options - Compatibility



| Option | Description |
|---|---|
| **Use 3.0 text area** | In TIBCO Spotfire 3.1, the text area was changed from its old behavior in order to be able to add property controls and script action controls. However, the function links to tools previously available in the text area could no longer be added to a text area. |
| | Select this option if you want to be able to create text areas which behave as they did in TIBCO Spotfire 3.0 and older. All new text areas within the document will then use the 3.0 style and functionality. |
| | Note that while this check box is selected you cannot add script action controls and property controls in new text areas. Clear the check box to create new text areas that include the 3.1 functionality. |
| | No text areas previously created within the document will be affected by the change, only the newly created ones. This means that you can create documents where some text areas use the old style and some use the new style. See also How to Use the Text Area. |
| **Use 3.2 bookmark panel** | In TIBCO Spotfire 3.3, a new version of the bookmarks functionality was created in order to allow the capturing of visualization properties along with the previously available settings for page, filtering, marking, etc. (See What are Bookmarks? for information about the new bookmarks.) However, for compatibility reasons, you can go back to using the 3.2 version of the bookmarks instead. |
| | Select this option if you want to use the bookmarks panel that was available in TIBCO Spotfire 3.2 and older. |

## 7.7.2.23     Details

### 7.7.2.23.1     Details on Renderer Settings

The Renderer Settings dialog is used to set default values to use when displaying links, images, geometries, etc. in table visualizations or as labels or tooltips.

**► To reach the Renderer Settings dialog:**

1. Click **Tools > Options...**.
2. Select the **Application** tab.
3. Click **Renderer Settings...**.
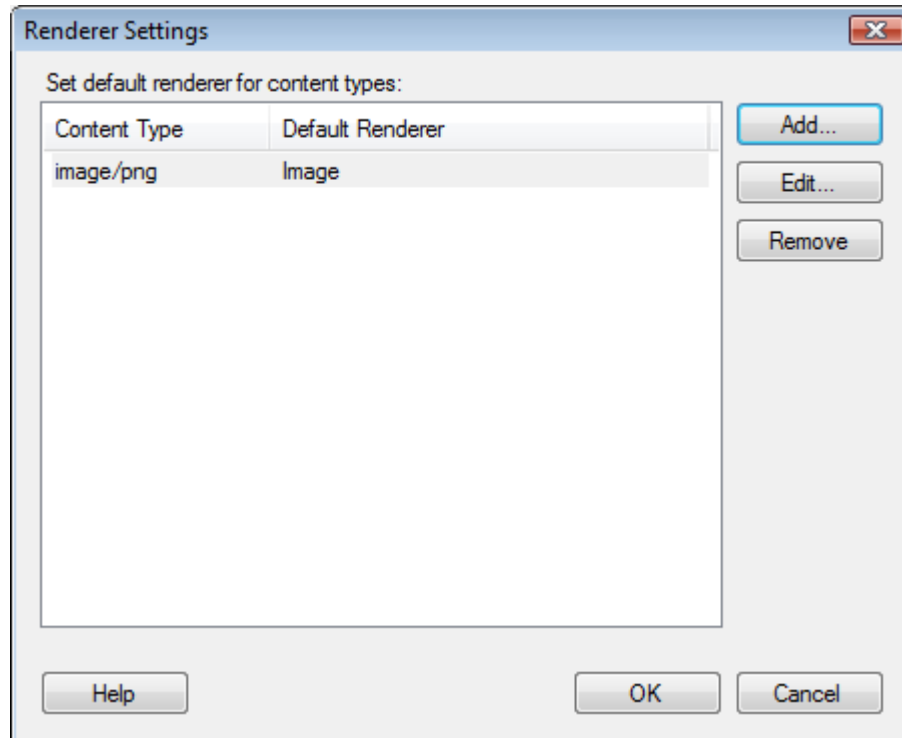


| Option | Description |
|---|---|
| **Content Type** | Lists the content types with a specified default renderer. |
| **Default Renderer** | Lists the default renderers associated with the different content types. |
| **Add...** | Opens the Add/Edit Default Renderer dialog, which lets you add a new default renderer for a content type. |
| **Edit...** | Opens the Add/Edit Default Renderer dialog, which lets you edit the default renderer for the selected content type. |
| **Remove** | Removes the selected default renderer. |

### 7.7.2.23.2     Details on Add/Edit Default Renderer

This dialog allows you to specify a default renderer for a particular content type.

**► To reach the Add/Edit Default Renderer dialog:**

1. Click **Tools > Options...**.

2. Select the **Application** tab.
3. Click **Renderer Settings...**.
4. Click **Add...** (or click **Edit...** if an existing renderer is selected).



| Option | Description |
|---|---|
| **Content type** | Enter the content type for which you want to add a default renderer. |
| | Use the form toplevel/subtype, for example, text/html or image/jpg. |
| | For Geometry columns the content type should be set to application/x-wkb if you want to show the geometry information as images. |
| | If you are using TIBCO Spotfire Lead Discovery to display chemical structures from an SDFile then the content type should be set to chemical/x-mdl-molfile for the molfile column. |
| | **Note:** Do not use a space when specifying the content type. |
| **Default renderer** | Select a default renderer from the list. |
| **Settings...** | If applicable, opens the Settings dialog for the selected renderer: Link Renderer Settings |
| | Image from URL Renderer Settings |
| | Geometry Renderer Settings |

### 7.7.2.23.3 Details on Apply Font Settings to Document

This dialog allows you to update multiple text styles in all visualizations on one or more pages at the same time. Using this dialog to adjust the fonts in the analysis will override any settings you may have made directly in a visualization.

#### ► To reach the Apply Font Settings to Document dialog:

1. Select **Tools > Options...**.
2. Go to the **Fonts** page.
3. In the Settings for list, select the items for which you want to change the font settings.
4. Adjust the **Font**, **Font style** and **Size** settings to your liking.
5. Click on **Apply to Document...**.
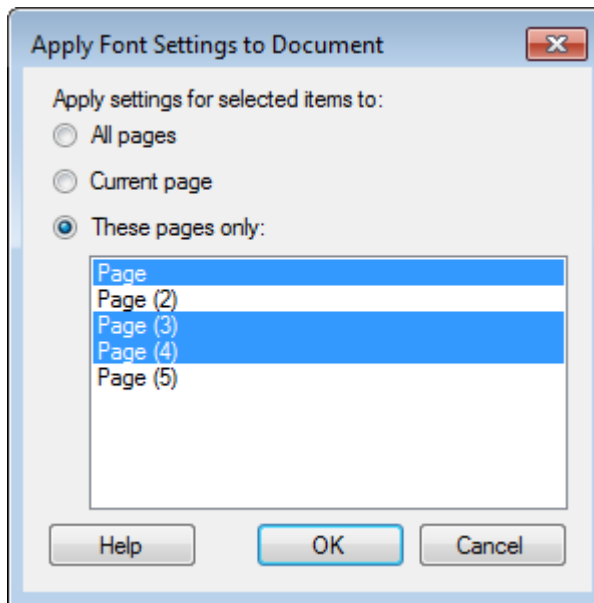
| Option | Description |
|---|---|
| **Apply settings for selected items to** | |
| **All pages** | Use this option to apply the new font settings on all the pages in the analysis. |
| **Current page** | Use this option to apply the new font settings to the current page in the analysis only. |
| **These pages only** | Use this option to apply the new font settings to selected pages in the analysis. Press **Ctrl** and click to select more that one page. |

### 7.7.2.23.4    Details on Edit Symbol Sets

This dialog is used to define a new symbol set to use as a short number format.

► **To reach the Edit Symbol Sets dialog:**

1.  Select **Tools > Options...**.
2.  Go to the **Axis Formatting** page.
3.  Click on **Edit Symbol Sets...**.
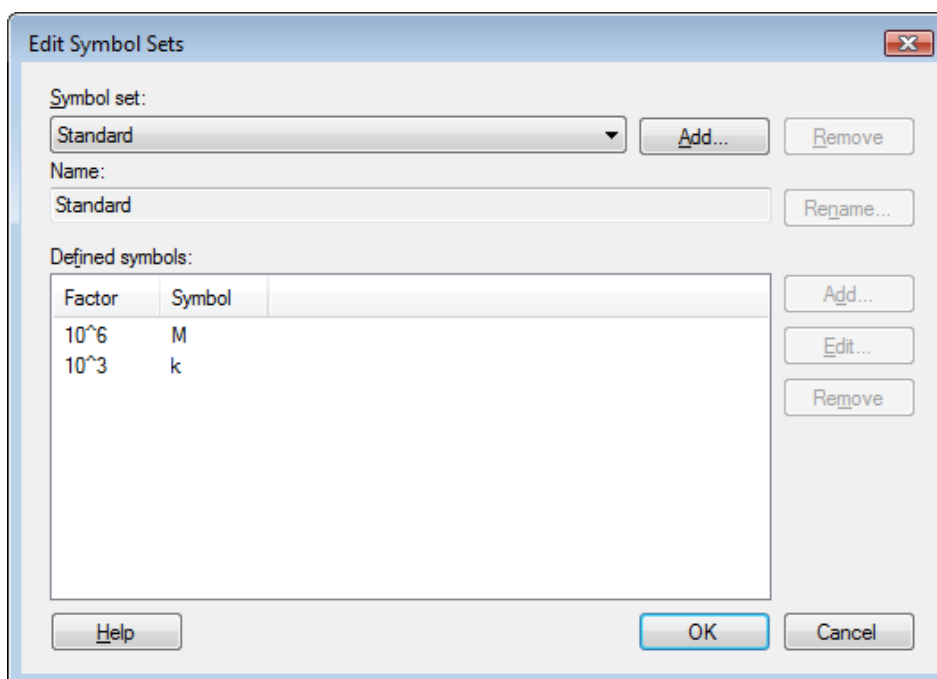
| Option | Description |
|---|---|
| **Symbol set** | Specifies which symbol set to edit. |
| **Add...** | Opens a dialog where you can enter a name to use for the new symbol set. |
| **Remove** | Removes the selected symbol set.<br>**Note:** The symbol set Standard cannot be removed. |
| **Name** | Displays the name of the selected symbol set. |
| **Rename...** | Opens a dialog where you can enter a new name to use for the symbol set. |
| **Defined symbols** | Lists all the symbols, and their corresponding factors, that are defined for the selected symbol set. The symbols are sorted by factor. |
| **Add...** | Opens a dialog where you can define a new symbol. |
| **Edit...** | Opens a dialog where you can edit a symbol. Click on a symbol to select and edit it. |
| **Remove** | Removes the selected symbol from the list. |

### 7.7.2.23.5  Details on Add/Rename Symbol Set

This dialog is used when naming a new symbol set or renaming an already existing symbol set.

► **To reach the Add Symbol Set/Rename Symbol Set dialogs:**
1. Select **Tools > Options...**.
2. Go to the **Axis Formatting** page.
3. Click on **Edit Symbol Sets...**.

4. Click on **Add...** next to the drop-down list to add a new symbol set. To rename an existing symbol set, select the symbol set you wish to rename from the drop-down list, then click on **Rename...**.
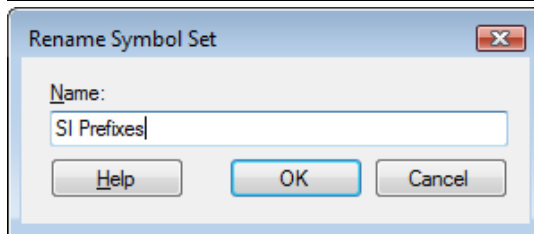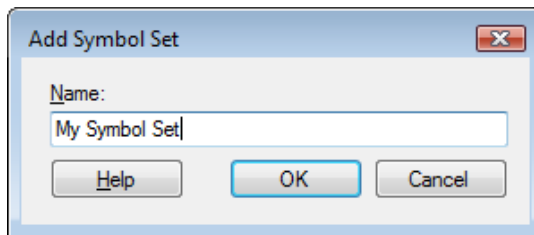




| Option | Description |
|--------|-------------|
| **Name** | Type a name to use for the symbol set. |

## 7.7.2.23.6 Details on Add/Edit Symbol

These dialogs are used to define a new symbol or edit an existing symbol, to use as a short number format.

### ► To reach the Add/Edit Symbol dialog:

1. Select **Tools > Options...**.
2. Go to the **Axis Formatting** page.
3. Click on **Edit Symbol Sets...**.
   Response: The Edit Symbol Sets dialog is opened.
4. In the **Symbol set** drop-down list, select the symbol set of interest.
   Response: The current symbols in the selected symbol set are displayed in the Defined symbols list.
   Comment: You cannot add symbols to or edit symbols in the Standard symbol set.
5. To add a new symbol to the selected symbol set, click on **Add...** to the right of the Defined symbols list. To edit an existing symbol, select the symbol you wish to edit in the Defined symbols list, then click on **Edit...**.
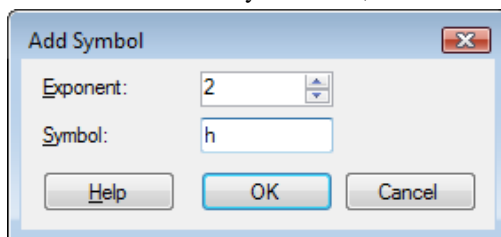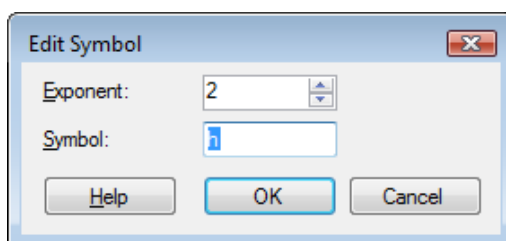
| Option | Description |
|---|---|
| **Exponent** | Defines the power of 10 you want to replace with a symbol when using the short number formats. To replace 10^3 (1,000) with the symbol k, enter 3 in the field. The number 1,000 will then be displayed as 1k, and the number 1,250 will be displayed as 1.25k. |
| **Symbol** | Defines which symbol to replace the exponent with.<br>**Note:** You cannot use any numerical values as symbols. |

### 7.7.2.23.7    Details on Reference Points

This dialog is used to specify default settings for the reference points shown in new box plots.

► **To reach the Reference Points dialog:**
1. Select **Tools > Options...**.
2. Go to the **Box Plot** page.
3. Click on **Reference Points...**.

| Option | Description |
|---|---|
| **Show real data points in box plot** | |
| **Color** | Specifies the color of the selected reference point (the reference point on which you have clicked in the Show real data points in box plots list). |
| **Shape** | Specifies the shape of the selected reference point (the reference point on which you have clicked in the Show real data points in box plots list). |
| **Show abstraction of data ranges in box plot** | |
| **Color** | Specifies the color of the selected reference point (the reference point on which you have clicked in the Show abstraction of data ranges in box plots list). |
| **Shape** | Specifies the shape of the selected reference point (the reference point on which you have clicked in the Show abstraction of data ranges in box plots list). |

### 7.7.2.23.8    Details on Statistics Table

This dialog is used to specify default settings for the statistics table shown in new box plots.

► **To reach the Statistics Table dialog:**

1. Select **Tools > Options...**.
2. Go to the **Box Plot** page.
3. Click on **Statistics Table...**.

| Option | Description |
|---|---|
| **Available measures** | Lists all statistical measures which can be shown in the statistics table. |
| **Selected measures** | Lists the statistical measures selected to be displayed in the statistics table. |
| **Add >** | Adds the measures selected in the Available measures list to the Selected measures list. |
| **< Remove** | Removes the selected statistical measures from the Selected measures list and sends them back to the Available measures  list. |
| **Remove All** | Removes all statistical measures from the Selected measures list. |
| **Move Up** | Moves the selected measures up in the Selected measures list. The order of the measures in this list determines the order of the measures in the statistics table. |
| **Move Down** | Moves the selected measures down in the Selected measures list. The order of the measures in this list determines the order of the measures in the statistics table. |
| **Sort by** | Specifies the measure by which you wish to sort the rows. |
| **Ascending** | Sorts the measures from the lowest to the highest value. |
| **Descending** | Sorts the measures from the highest to the lowest value. |

# 7.8      Panels and Popovers

In TIBCO Spotfire, some functionality can be reached through panels that can be shown either at all times or on demand only. The state of a panel is remembered per page, so you can use one state on one page and another on the next page.

By default, the Filters panel and Details-on-Demand are shown as docked panels to the right and the Tags panel, the Lists panel and the Collaboration panel will be shown to the left in the main window, if displayed. Bookmarks are shown in a popover by default. However, all panels can be shown in three different states: as docked panels, as popovers or as floating windows. The legend of all visualizations is a special case which can be shown in a docked state or as a popover only; it cannot be unattached to a floating window like the other panels and popovers. See Legend for more information.

No matter what state is used to display the panel, the content will always be remembered.

## Docked Panels

Docked panels may be preferred when you interact with the content of the panel often, or, when you need to see the content at all times. For example, if you need to view the current state of the filters in the filters panel. Docked panels can be moved to the left, right or bottom part of the Spotfire window using drag-and-drop.

### ► To move docked panels inside the TIBCO Spotfire main window:

1. Click on the title bar of the panel you want to move.
2. Drag the panel to its new position.

If no other panels are displayed where you want to place your panel, simply drag it to the edge of the main window and a shaded area will show you where the panel will be displayed. If there is no shaded area you will not be able to drop the panel in that position.

If one or more panels are already displayed where you want to place your panel, the shaded area will help you decide the order of the panels.

## Popovers

Popovers are useful when the screen estate is limited and you only need a short interaction with the controls within the panel. For example, if you want to apply a bookmark and then continue with your analysis.

You can never display more than one popover at a time.

### ► To undock a panel into a popover:

Click the Undock icon, ![undock icon], in the top right corner of the panel. The panel will change into a popover, located below its corresponding button in the toolbar.

You can click on the title of the popover and drag it to another position, temporarily. The popover will remain open on this position as long as you work within it. However, the next time the popover is opened it will be located below its corresponding toolbar button again.

### ► To turn a popover into a docked panel:

Click the Dock icon, ![dock icon], in the top right corner of the popover. You can also double-click on the header of the popover to dock it.

## Floating Windows

Floating windows can be used if you want to move that particular panel outside of the main Spotfire window. For example, if you want to keep the Collaboration panel open on a different screen.

### ► To undock a panel into a floating window:

Double-click the title bar of the panel you want to undock.

Once undocked you can move the floating window by clicking the title bar and drag it to where you want it displayed.

### ► To reposition floating windows:

Double-click on the title bar of the floating window to return it to the same position in the TIBCO Spotfire main window it was previously undocked from.

**Note:** Clicking the cross in the title bar will close the floating window. To bring back a hidden window, select **View >** and the name of the panel, or click the corresponding button on the toolbar.

| | |
|---|---|
| | **Filters** |
| | **Details-on-Demand** |
| | **Tags** |
| | **Bookmarks** |
| | **Lists** |
| | **Collaboration** |

# 8     Filters

## 8.1     What is a Filter?

Filters are used to narrow down the selection of data shown in the visualizations. For example, a filter could be adjusted so that data is only shown for a certain range of dates or for a certain number of food products. When you manipulate a filter, you can instantly see how the current setting affects the visible data in the visualizations.

When you load data into Spotfire, each column in the data table is automatically represented by a filter. The initial type of filter depends on the type of data in the column, but you can right-click on any filter and change the type if you like.

You can view and manage filters in a popover, in a docked panel, or as a floating window. See Panels and Popovers for more information. Click on the Filters button on the toolbar, , or select **View > Filters** to show or hide Filters. The Filters panel or popover will open in the mode it was opened the last time you had it open. The visibility of Filters is controlled per page, and the Filters visibility of new pages is inherited from the active page. The image below shows Filters as a docked panel with the different filter types.

| Number | Filter Type |
|--------|-------------|
| **1** | Range Filter |
| **2** | Item Filter |
| **3** | Radio Button Filter |
| **4** | Check Box Filter |
| **5** | Text Filter |
| **6** | List Box Filter |
| **7** | Hierarchy Filter |

**Note:** Binary columns are not represented by filters.

When more than one data table is available in the analysis, data table headers are automatically displayed above the filters. The active data table is indicated by bold typeface and a color stripe. Related data tables are indicated by stripes of the same color to the left of the filters, as seen in the image below.
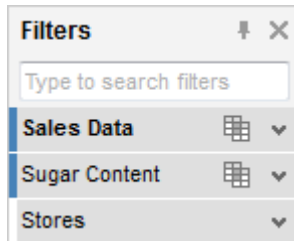


Visualizations also get a color stripe in the title bar, indicating which data table the visualization is based on, when more than one data table is available in the analysis. The image below shows a bar chart title bar with a blue color stripe indicating that the bar chart is based on the same data table as the filters in the image above.



Once a filter has been manipulated, you can right-click on it and select **Reset Filter** to return the filter to its original state (all values selected). Selecting **Reset All Filters**, either from the pop-up menu in the filters panel, on the toolbar, or from the Edit menu, returns all filters in the active filtering scheme to their original state. Note that resetting filters will only affect modifications related to filtering of the data. For example, if you have cleared any check boxes in a check box filter, or narrowed down the range of values in a range filter. Other changes, such as renaming a filter, changing the filter type or scale, will not be affected.

When Filters are in a popover or a docked panel, you can get a quick overview of which filters have been modified by hovering over the Filters heading:
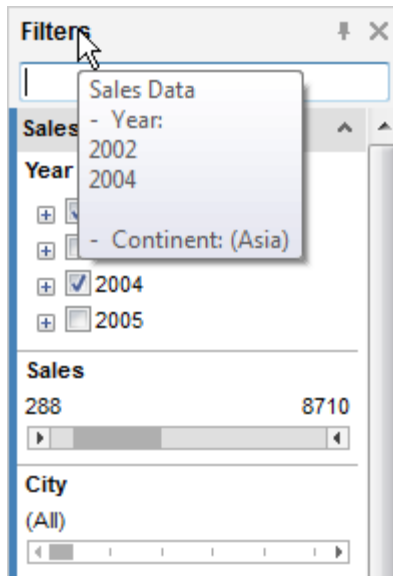


The filters currently modified are shown together with their settings in a tooltip.

# 8.2 Filter Types

## 8.2.1 Range Filter

The range filter lets you narrow down the data shown to a range of values.
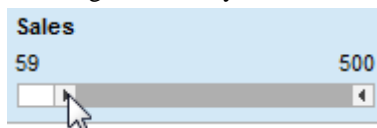


### ► Interacting with the range filter:

Use the left and right handles on the range filter to change the lower and upper limit of the range. Click and drag a handle to set it to the desired upper or lower limit. Only rows with values within the range will remain visible in the visualization.

You can also use the keyboard to adjust the range when the filter device is active. The left and right arrow keys will move the lower limit, and up and down arrow keys will move the upper limit.

Labels above the slider display the exact current range. Double-click on a label, enter a value in the field, and press Enter, if you want to set the range to a specific value:



Click and drag the middle part of the slider to move the range sideways.
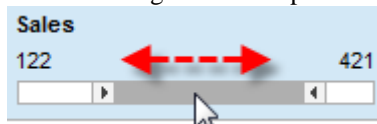


This provides a powerful way of sweeping over different "slices" of a data table. Observing the reactions of the other filters to such a sweep can give some interesting clues to correlation between parameters in the data table.

If the range filter shows dates, you can click on the calendar icon, ▦, to set a date for the slider.

An important feature of the range filter is that the values are distributed on a linear scale according to the values of the data. Thus, if values are unevenly distributed, this will be reflected in the range filter.

**Note:** This is not the case with item filters, where values are distributed at even intervals along the range of the slider, regardless of the actual numeric values.

### ► Narrowing the range filter span to the currently filtered data:

1. A lighter shade at either end of the slider indicates that currently there is no data visible in that part of the range because other filters in the analysis have filtered out those rows:



Double-click on the center of the range filter.

Response: The range filter is now adjusted, showing only the effective range:

## ► Filtering the data range:

Sometimes you might wish to filter the data in a column using a smaller range than the full range of the column. If so, you can set a range filter to encompass only a smaller range.

1. The original range filter span is 1 to 500.
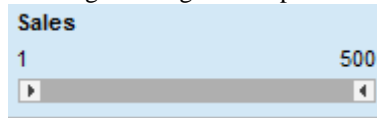
   

2. Move the drag box to narrow down the selection.

   

3. Right-click on the range filter to bring up the pop-up menu.

4. Select **Filtering Scheme Properties**.

   Response: The Filtering Scheme Properties dialog is opened.

5. Under Filter settings, select **Data range: Specific**.

6. Click on the **Range from Filtered** button.

7. Click **OK**.

   Response: The range filter expands to its full width, but with the range 296 to 500. Three dots are displayed to indicate that the range is not the original full range.
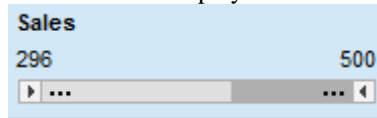
   

## ► Setting the data range without filtering:

You can also set the data range in the Filtering Scheme Properties dialog without filtering out any data beforehand.

1. Right-click on the range filter to bring up the pop-up menu.

2. Select **Filtering Scheme Properties**.

   Response: The Filtering Scheme Properties dialog is opened.

3. Under Filter settings, select **Data range: Specific**.

4. Enter **Min** and **Max** values in the provided fields.

5. Click **OK**.

   Response: The range filter is displayed at its full width, but ranging between the values you provided in the Min and Max fields. Three dots are displayed to indicate that the range is not the original full range.

## ► Changing the scale:

If the values of a column are unevenly distributed, you may want to change the scale used on the range slider to get better granularity when moving the slider handles. A column with many low values but only a few high values can benefit from using a Log10 scale. The scale setting does not alter the data in any way, just how the values are distributed along the slider.

1. Right-click on the range filter to bring up the pop-up menu.

2. Select **Filtering Scheme Properties**.

   Response: The Filtering Scheme Properties dialog is opened.

3. Under Filter settings, select **Scale: Log10**.

4. Click **OK**.

   Response: See example below.

   **Example:** A column with many low values but only a few high values.
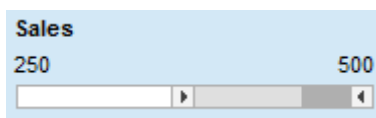
The image above shows the filter with Original scale – the middle of the slider represents the value 250.
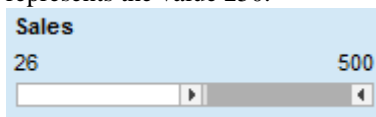


The image above shows the filter with Log10 Scale – the middle of the slider represents the value 26. It is now easy to set the left handle to specific low values.

**Note:** Resetting a range filter by selecting Reset Filter from the right-click menu only affects the range of values in the filter. This means that if the scale has been set to Log10, it will not be changed back to Original.

## 8.2.2 Item Filter

The item filter is used to select a single item at a time, and lets you easily step between nearby items.



Drag the slider to a new position, or click on the arrows at the edges of the slider, to step through the values. The item filter can also be adjusted with the arrow keys when the filter is active: the left and right arrow keys move the slider one step in either direction, the Home key sets it to show (All), and the End key sets it to show (None). By double-clicking on the label above the slider you can type in a value to set, and the slider will snap to that value when you press Enter.
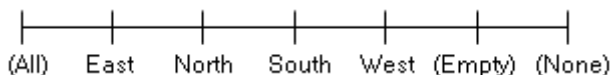


The example above shows the values of an item filter and the special cases at the edges. When the slider is set to the very first position to the left (All), it does not filter anything, thus, all items are shown. When the slider is set to (None) everything is filtered out, showing nothing. If the data table contains empty values, the (Empty) position will select these.

## 8.2.3 Radio Buttons

In a radio button filter, each value is represented by a radio button.
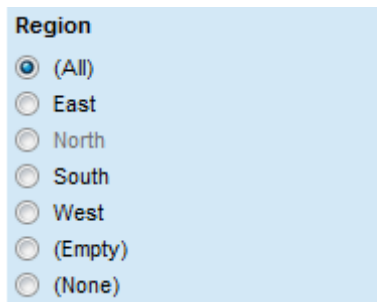


The radio buttons are mutually exclusive, that is, only one of the alternatives in the filter can be set at a time. However, an (All) option is always present, letting you select all values. A (None) option is also available, letting you filter out all the values, showing nothing. If there are empty values present, a radio button named (Empty) will be available. Selecting this radio button will filter to the empty values.

Values that have been filtered out by other filters are indicated with grey text. If you select a radio button that is grayed out, nothing will be shown in the visualizations since that value has been filtered out already.

When the filter is active, you can use the arrow keys on the keyboard to change the selected radio button.

For columns containing more than 500 values, radio buttons cannot be used as the filter type.

## 8.2.4    Check Boxes

In a check box filter, each unique value in the column is represented by a check box. One or several check boxes may be selected or cleared to determine which values are to appear in the visualizations.



If there are empty values present, a check box called "Empty" will be available, letting you filter to those values.

Values that have been filtered out by other filters are indicated with gray text.

When the filter is active, you can use the arrow buttons and the spacebar on the keyboard to select and clear check boxes.

For quick selecting or clearing of all the values, right-click on the filter, and select **Reset Filter** to select all the check boxes, or **Deselect All Values** from the pop-up menu.

For columns containing more than 500 values, check boxes cannot be used as the filter type.

## 8.2.5    Text Filter

The text filter lets you type a string of text, and any values that do not match the entered string are filtered out. As you type the string, the visualization is continuously updated with the values that begin with the current substring.
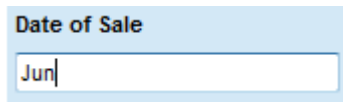


For example, consider a column with all the months of the year, January, February, March, ... , December.

| Typed in Text Filter | Filtered rows |
|---|---|
| j | January, June, July |
| ju | June, July |
| jun | June |
| june | June |

- The text filter is not case-sensitive.
- A **blank space** between two search words will result in rows containing both words.
- Search for **june OR may** to find rows containing either of those months.
- Use **\*son** to search for rows ending in "son" (Anderson, Jamesson, etc.), and use **\*sun\*** to search for rows containing the letters "sun" somewhere (Sunday, Asunder, etc.).
- Use quotation marks **"sample batch alpha"** to search for exact phrases.

- Searching **Date**, **Time** and **DateTime**: Date and time can be formatted and displayed in a multitude of ways. When searching for date or time, always search using the same syntax as displayed in the document. The separators between year, month, day will be treated as word separators.
  For example, suppose dates are displayed in a table visualization in the YYYY-MM-DD notation.
  Searching for 05 would match dates such as:  2005-05-27 or 1998-12-05.
  Searching for *05 would match dates such as: 2005-12-30 or 1997-05-22 or 1879-10-05.
  Searching for 04-2 would match dates such as: 1998-04-21 or 2005-04-29.
  Time can sometimes be displayed using a notation with colon, for example: 11:45pm or 23:45.
  The colon is a protected keyword, which means that to search for such a time you need to enclose the time within quotation marks:  "23:45".  Just searching for 23:45 without the quotation marks will not provide any matches.
- Searching **Currency**: Depending on how a column of currency values is presented, it can have various symbols before or after the digits. When searching, do not enter these symbols, just search for the value. For example, a searching for 550 would find $550, £550 or 500kr.

For a listing of more search alternatives, see Searching in TIBCO Spotfire.

## 8.2.6 List Box Filter

The list box filter is used to select a few values from a very long list of values present in the column.
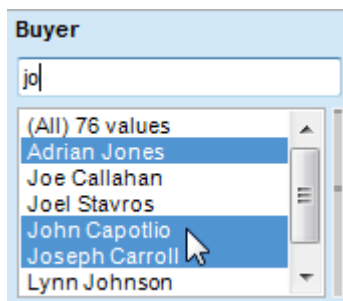


Select items in the list to filter to those items. Press Ctrl or Shift and click to select multiple values. If you click on the first alternative in the list, (All), no filter is applied, and all values are shown.

You can narrow down the list of values by typing a string of text in the search field above the list. The values that do not match the string are removed from the list. As you type the string, the list is continuously updated with the values that match the current substring. For list box filters in the text area, you need to press enter to search. By narrowing down the list, you can more easily find the values of interest, but this does not affect the applied filtering in any way. To apply filtering you must select values from the list. You can also enter an expression in the field to narrow down the list, using the rules described in Searching in TIBCO Spotfire. Remove the text string from the search field to make all the values reappear in the list.

The grey indicator on the right hand side of the filter shows where your selected values are located in the whole list. On mouseover, a tooltip appears, showing how many values have been selected in the list. If fewer than six values are selected, you also see those values in the tooltip.

# 8.2.7    Hierarchy Filter

## 8.2.7.1    What is a Hierarchy Filter?

A hierarchy filter is a filter type that shows hierarchical data in an expandable tree view. Good examples of data that can be used in a hierarchy filter are date and time information, or geographical data such as continents/countries/cities. The examples below illustrate those two uses of hierarchy filters.

### Hierarchy filter from a date column

In this example, a column with various dates is shown as a check box filter. This column is used to create a hierarchy filter, grouping the dates into Year/Quarter/Month, instantly providing a better overview.
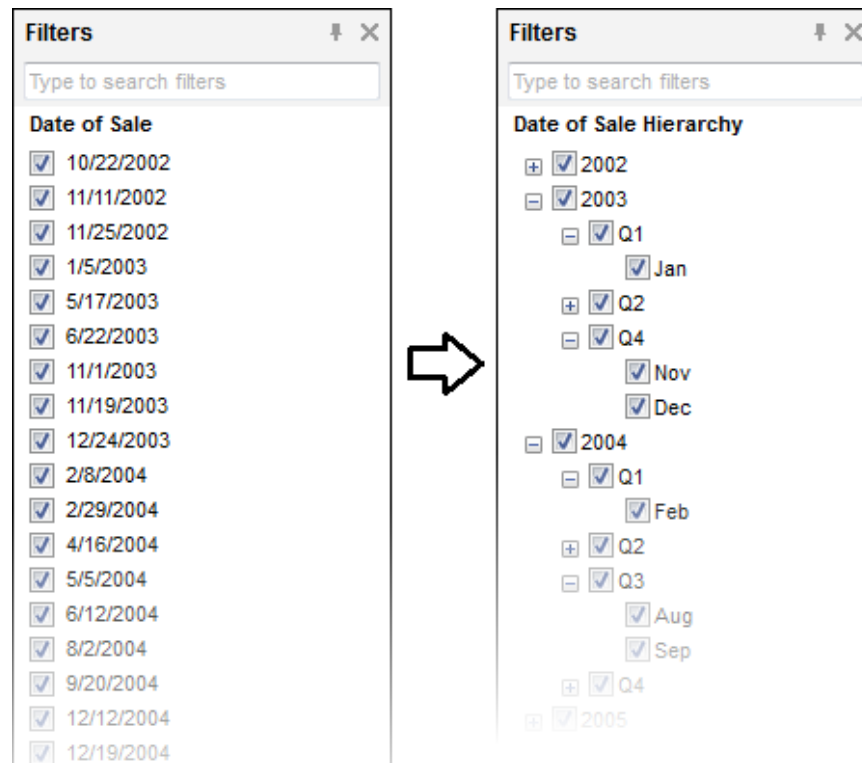


In this case, you go from a linear series of dates that you can only manipulate on the most granular level, to a view that groups the dates from the column into a hierarchy you decide. You can select to show the dates as Year/Quarter/Month or Year/Month/Day or Year/Month/Week/Day or any other configuration you want.

### Hierarchy filter from different but related columns

With date information, you often only need the data from one single column to create the hierarchy filter. However, for other data it might not be so easy for Spotfire to instantly understand they have a hierarchical order. In this case you can set up a new hierarchy filter by combining several related columns into a hierarchy. Such data can be geographical data as mentioned above, or perhaps product information such as Market Category/Product Category/Product.
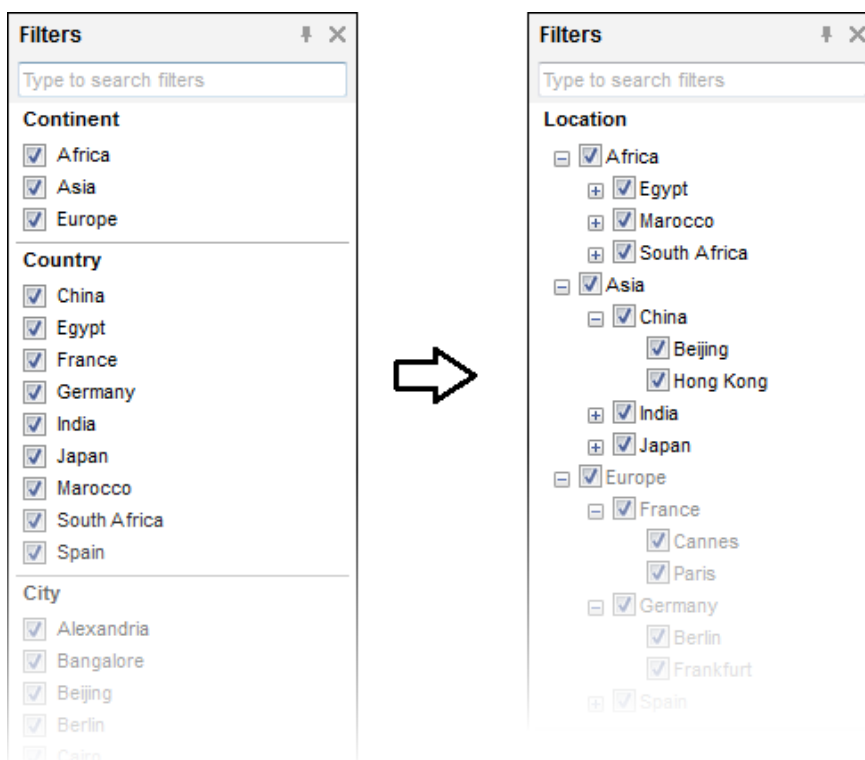
In this example, we see three separate columns (Continent, Country, City) originally displayed as three separate check box filters. These are then combined into one hierarchy filter, creating a structure that is easier to work with.

In order to combine many columns into a hierarchy filter, there must be an inherent hierarchy in the data. The data in the example above looks like this:

| Continent | Country | City | Sales | Date of Sale ▲ |
|---|---|---|---|---|
| Asia | China | Beijing | 1422 | 10/22/2002 |
| Europe | Germany | Frankfurt | 414 | 11/11/2002 |
| Asia | China | Hong Kong | 1556 | 11/25/2002 |
| Asia | China | Beijing | 6312 | 1/5/2003 |
| Africa | Marocco | Casablanca | 3556 | 5/17/2003 |
| Africa | Marocco | Casablanca | 6822 | 6/22/2003 |
| Asia | Japan | Tokyo | 288 | 11/1/2003 |
| Europe | Germany | Berlin | 2806 | 11/10/2003 |

To learn how to create a hierarchy filter, see Creating a Hierarchy Filter.

## 8.2.7.2 Creating a Hierarchy Filter

Creating a hierarchy filter is done by combining a selection of columns or date categories into a hierarchy. Note that combining columns into a hierarchy filter will not automatically remove all other filters representing the same columns—this must be done manually, if desired.

### ► To combine several columns into a hierarchy filter:

1. Right-click anywhere in the **Filters** panel.
2. Select **Insert Hierarchy...**.
   Response: The Insert Hierarchy dialog appears.
3. If more than one data table is available in the analysis, specify which **Data table** to work on.
4. Select the columns you want to include in your hierarchy filter from the Available columns list, and click **Add >**.

Response: The columns appear in the Hierarchy list.

5. Select a column in the Hierarchy list, and use the Move Up and Move Down buttons to position it correctly in the hierarchy.

Comment: The least granular category should be placed at the top of the list. For example, Continent above Country above City.

6. Enter a name for the new hierarchy in the **Hierarchy name** field.

7. Click **OK**.

Response: The new hierarchy filter appears at the bottom of the list of filters (for the specified data table) in the filters panel.

**Note:** Creating a hierarchy with a very large number of nodes may take a long time. It may also result in a hierarchy filter with too many check boxes to be practically useful. Use the Filtering Scheme Properties or the Column Properties to edit the hierarchy and remove the column with too many unique values if this should happen.

### ► To create a hierarchy filter from a date column:

1. Right-click anywhere in the **Filters** panel.

2. Select **Insert Hierarchy...**.

Response: The Insert Hierarchy dialog appears.

3. Select the **Data table** containing the desired date column.

4. In the Available columns list, the date column has several sub-categories:
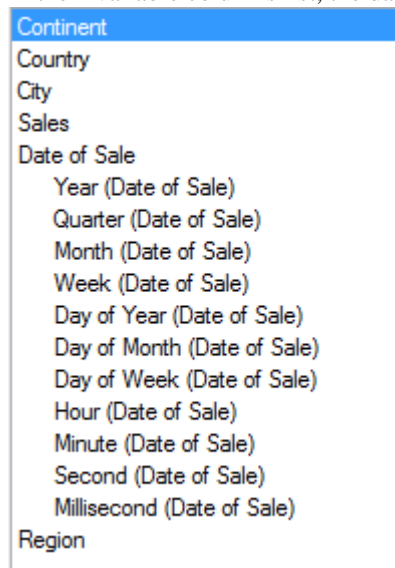


5. Select the sub-categories you want to include in your hierarchy filter from the Available columns list, and click **Add >**.

Response: The sub-categories appear in the Hierarchy list.

6. Remove unwanted entries from the Hierarchy list by selecting them and clicking < **Remove**. Most often you will not want to include the actual Date column in the hierarchy filter, only a selection of its sub-categories.

7. Select an entry in the Hierarchy list, and use the Move Up and Move Down buttons to position it correctly in the hierarchy.

Comment: The least granular category should be placed at the top of the list. For example, Year above Quarter above Month.

8. Enter a name for the new hierarchy in the **Hierarchy name** field.

9. Click **OK**.

Response: The new hierarchy filter appears at the bottom of the list of filters (for the specified data table) in the filters panel.

# 8.3     Filters Panel

## 8.3.1     Searching for Filters

When using a data table with many columns, you often have just as many filters. Sometimes it can be hard to find the filter you wish to manipulate by scrolling through the filters panel. A quick way to find a certain filter is to use the search function at the top of the filters panel.

**Note:** The filter search will not display filters that have been explicitly hidden. To search among all filters, you must first show them all. This can be done by clicking on the Show all link at the bottom of the filters panel.

### ► To search for a filter:

1.  Type a search expression in the search field at the top of the filters panel.
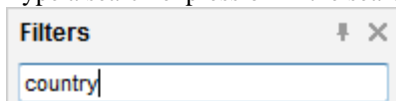


2.  Any filters with names that do not match this are hidden from the filters panel. As you enter text, the filters panel is continuously updated with the filters whose names begin with the current substring.
3.  To show all filters again, just clear the search box.

You can use wildcards and boolean operators to search for parts and combinations of words. For a listing of the basic search syntax, see Searching in TIBCO Spotfire.

### Filters specific search:

-   Type **status:modified** to find all filters which have been modified.
-   Type **datatable:<datatablename>** where <datatablename> for example could be "Sales Data", to find all filters for a specific data table if you have several in your analysis. Type a part of a name or use quotation marks to search for explicit data table names.

## 8.3.2     Changing Filter Name

Changing a filter name is the same thing as changing the name of the corresponding column in the data table.

### ► To change a column name:

1.  Right-click on a filter.
2.  Select **Rename...** from the pop-up menu.
3.  Type a new name for the column.
4.  Click **OK**.
    Response: The filter (and the corresponding column in the data table) now has the new name.

You can also change the name of a column from the Column Properties dialog. In this dialog you can also make other adjustments to the column. For example, change the sort order of the categories in a column, or change the formatting settings.

## 8.3.3     Showing and Hiding Filters

When using a data table with many columns, you often have just as many filters. If you are only interested in manipulating some of these, you can hide unwanted filers so that they do not appear in the filters panel. The corresponding columns in the data table are of course still present. The showing and hiding of filters is made per page.

**► To hide a filter:**

1.  Right-click on a filter in the page of interest.
2.  Select **Hide Filter**.

    Response: The filter is hidden and is not seen in the filters panel.

**► To show hidden filters:**

When one or more filters have been hidden on a page, the following link is displayed at the bottom of the filters panel:

Some filters are hidden.    Show all

Click on the **Show all** link to display all filters.

To show only a few of many hidden filters, you can do so from the Organize Filters dialog. Follow the steps below to learn how to do this:

1.  Right-click anywhere in the filters panel.
2.  Select **Organize Filters...**.

    Response: The Organize Filters dialog is displayed.
3.  Find the filter you want to show in the **Visible data tables, groups and filters** list.
4.  Select the check boxes corresponding to the filters you want to make visible.

    Click **OK**.

    Comment: The changes made in the Organize Filters dialog only affect the active page. If you want to show these filters on more pages you need to repeat these steps for all pages where you want to display the filter. A shortcut for showing/hiding filters on multiple pages is to right-click and use the Apply Filter Organization feature. Note that when the active filter organization is applied to other pages, the complete filter organization is copied, including the visibility and sorting of groups and filters.

## 8.3.4    Moving and Sorting Filters

You can change the order of the filters in the filters panel, either by moving them as you like, or by sorting them in alphabetical order.

**► To move a filter:**

1.  Click on a filter and drag it to another position in the filters panel.

    Response: A horizontal black line appears, indicating where the filter will be placed.
2.  Drop the filter where you want to place it.

    Comment: You can only move a filter within the data table group that it belongs to, not to another data table.

**► To sort the filters and groups:**

1.  In the filters panel, right-click somewhere inside the data table group that you want to sort. Avoid clicking inside a filter group since that will allow you to sort only the filters in that group.
2.  Select **Sort Filters and Groups** from the pop-up menu.
3.  Select whether you want to sort the filters and groups in **Ascending** or **Descending** alphabetical order.

    Response: The filters and groups within the selected data table group is sorted according to you selection. Note that it is only the actual filter groups that are sorted; filters within a filter group will not be sorted. To filter within a filter group, see below.

**► To sort the filters within filter groups:**

1.  In the filters panel, right-click on the filter group that you want to sort.
2.  Select **Sort Filters** from the pop-up menu. (If you click on the filter group heading, select Sort Filters In Group from the menu).

3. Select whether you want to sort the filters in **Ascending** or **Descending** alphabetical order.

Response: The filters in the selected filter group are sorted according to you selection.

## 8.3.5 Grouping Filters

To make it easier to get an overview of the filters, you can create groups in the filters panel, and place certain filters in these. You can only group filters that belong to the same data table. You can then expand or collapse various groups to only work with the filters you want for the moment. Groups can be hidden if you do not want them for a while, and you can also sort the filters in a certain group alphabetically. The groups are specified per page.

► **To create a new group:**

1. Right-click in the filters panel on the page of interest.

Comment: If multiple data tables are used in the document, the group will be placed within the data table where the filter you right-clicked on belongs.

2. Select **New Group...** from the pop-up menu.

Response: The New Group dialog is opened.

3. Enter a name for the new group.

4. Click **OK**.

Response: The new filter group is added to the filters panel in the position where you right-clicked.

► **To move filters into a group:**

1. Click and drag a filter, and drop it on the header of a group.

or

2. Right-click on a filter, select **Move to Group** from the pop-up menu and select a group.

Comment: Select New Group from the menu to create a new group and move the filter to that group. Select (No Group) to move the filter out of the group.

► **To hide a group:**

1. Right-click on the header of the filter group you want to hide.

2. Select **Hide Group** from the pop-up menu.

► **To show a hidden group:**

1. Right-click anywhere in the filters panel.

2. Select **Organize Filters...** from the pop-up menu.

Response: The Organize Filters dialog is opened.

3. Select the check box of the group you want to make visible.

4. Click **OK**.

Response: The selected filter group is now shown in the filters panel.

Comment: The changes made in the Organize Filters dialog only affect the active page. If you want to show the group on more pages you need to repeat these steps for all pages where you want the group to be displayed. A shortcut for adding a group to multiple pages is to right-click and use the Apply Filter Organization feature. Note that when the active filter organization is applied to other pages, the complete filter organization is copied, including the visibility and sorting of individual filters.

► **To sort the filters in a group:**

1. Right-click on the header of the group you want to sort.

2. Select **Sort Filters In Group** from the pop-up menu.

3.  Select whether you want to sort the filters in **Ascending** or **Descending** alphabetical order.
    Response: The filters in the selected filter group are sorted according to you selection.

# 8.3.6      Filters Panel Properties

## 8.3.6.1      Filters Panel Properties

What you see in the filters panel depends on two different collections of settings, controlled via two dialogs:

- Filtering Scheme Properties - Determines the types and specific settings for the filters in a filtering scheme. Note that the settings for a filtering scheme can affect filters on several different pages (all pages and visualizations that use that filtering scheme).

- Organize Filters – Controls which filters should be visible on each page, as well as the sorting and grouping of the filters. These settings only affect the page on which you opened the dialog. If you want to reuse the filter organization from a page, you can right-click in the filters panel on that page and select **Apply Filter Organization...** and the page on which you want to apply the filter organization.

When a new page is created, the filtering scheme and filter organization is inherited from the active page.

### ► To reach the Filtering Scheme Properties dialog:

1.  Right-click on the filters panel on a page that is using the filtering scheme whose properties you wish to change.
2.  Select **Filtering Scheme Properties** from the pop-up menu.

### ► To reach the Organize Filters dialog:

1.  Right-click on the filters panel on the page you wish to change the filter organization for.
2.  Select **Organize Filters...** from the pop-up menu.

## 8.3.6.2      Details on Filtering Scheme Properties

In the Filtering Scheme Properties dialog you can view and change the settings for the filters in a filtering scheme. The different filter types have slightly different settings as described below. The properties specified for a filter in this dialog affect all pages and visualizations where the current filtering scheme is used.

**Note:** The visibility and order of filters within a data table group are instead handled per page, using the Organize Filters dialog.

### ► To reach the Filtering Scheme Properties dialog:

1.  Right-click in the **Filters** panel on a page where the filtering scheme of interest is used.
2.  From the pop-up menu, select **Filtering Scheme Properties**.

| Option | Description |
|---|---|
| **Data table** | Specifies which data table to work with. |
| [Type to search filters] | If the list of filters is long, you can enter a search expression here to limit the list to show only filters that match your search. |
| [Filter list] | Lists all the filters in the selected data table. Click on a column header to sort the list according to the values in that column. |
| **Column name** | Displays the name of the currently selected column in the list. This is also the name of the filter. |
| **Rename...** | Opens the Rename Column dialog where you can change the name of the selected column.<br>**Note:** This will change the name of the filter, as well as all the instances of the column throughout the analysis. |
| **Filter type** | Specifies the type of the selected filter. |
| **Filter settings [Range Filter]** | When selecting a range filter, you can modify the Data range and Scale.<br>Select either **Automatic** data range (default) or **Specific** data range.<br>If you selected Specific, you can either click the Range from Filtered button to set the data range to what the range slider is currently set to, or, you can manually enter a Min and Max value in the fields.<br>You can also select whether the scale should be Original or Log10 from the drop-down menu. |
| **Filter settings [Hierarchy Filter]** | When selecting a hierarchy filter, you can modify the hierarchy by clicking on the **Edit** button that appears inside the Filter settings area. |

| Filter settings [List Box Filter] | When selecting a list box filter, you can modify the appearance of the filter. The check box "Show search field" allows you to set if the search field is displayed in the filter or not. You can set the number of rows shown in the filter by typing a number or setting the number with the arrows. |
| --- | --- |

**Note:** Most of the settings in this dialog, such as renaming a filter, changing the filter type or range filter scale, will not be affected when you select Reset Filter or Reset All Filters from the right-click menu in the Filters panel. Resetting a filter only affects modifications related to filtering of the data; for example, clearing any check boxes in a check box filter, or narrowing down the range of values in a range filter.

## 8.3.6.3    Details on Organize Filters

The Organize Filters dialog handles the visibility, grouping, and sorting of the filters on the active page.
**Note:** The filter type and settings for a specific filter are instead handled by the Filtering Scheme Properties dialog.

### ► To reach the Organize Filters dialog:

1.  Right-click in the **Filters** panel on the page of interest.
2.  From the pop-up menu, select **Organize Filters...**.

    Comment: You can also select Edit > Organize Filters... from the main menu to display the Organize Filters dialog for the active page.
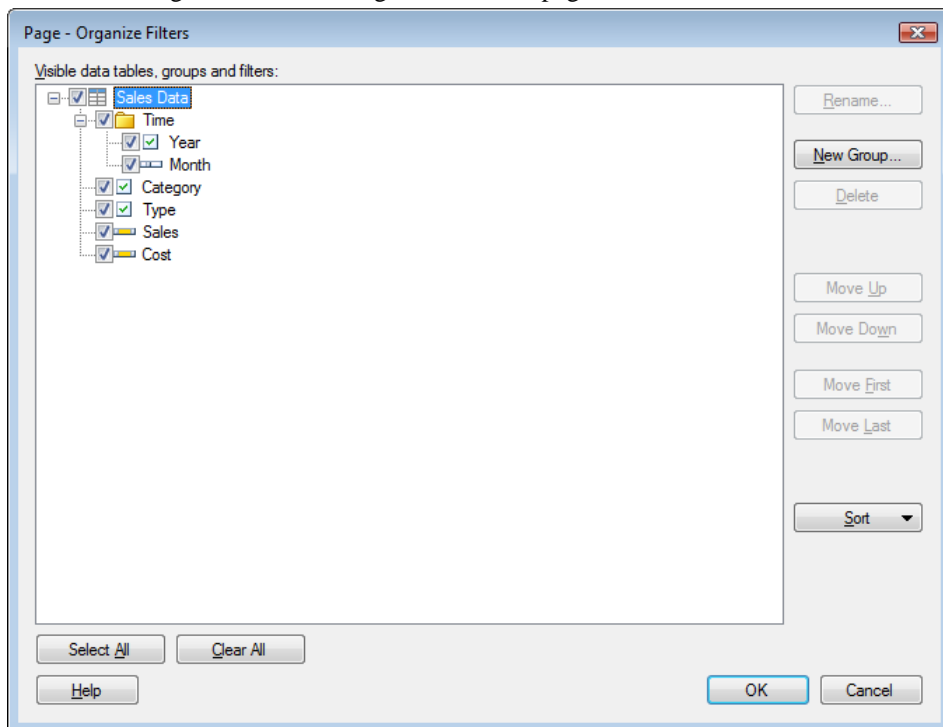


| Option | Description |
| --- | --- |
| **Visible data tables, groups and filters** | This list shows all filters, groups and data tables in the document. The check boxes can be selected to show/hide the filters from the filters panel. The order of the filters in this list also represents the order they occur in the filters panel. |

| | |
|---|---|
| **Rename...** | Select a filter or group, and click this button to rename it. Note that renaming a filter also renames the column that the filter is based on. |
| **New Group...** | Click this button to create a new group. |
| **Delete** | Select a group, and click this button to delete it. |
| **Move Up** | Select a filter, group, or data table, and click this button to move it up in the list. This list represents the order the filters are displayed in the filters panel. Filters and groups cannot be moved to a different data table. |
| **Move Down** | Select a filter, group, or data table, and click this button to move it down in the list. This list represents the order the filters are displayed in the filters panel. Filters and groups cannot be moved to a different data table. |
| **Move First** | Select a filter, group, or data table, and click this button to move it to the top of the list. |
| **Move Last** | Select a filter, group, or data table, and click this button to move it to the bottom of the list. |
| **Sort** | In the drop-down menu, select either Ascending or Descending order to sort all items in the list. |
| **Select All** | Makes all filters, groups and data tables visible. |
| **Clear All** | Hides all filters, groups and data tables. |

## 8.3.6.4    Details on New Group

### ► To reach the New Group dialog:

1. Right-click in the filters panel on the page of interest. If the analysis contains multiple data tables, make sure to click inside the data table in which you want to place the new group.
2. Select **New Group...** from the pop-up menu.

OR

3. Open the Organize Filters dialog.
4. Under Visible data tables, groups and filters, select in which data table you want to create a new filter group.
5. Click on **New Group...**.

| Option | Description |
|---|---|
| **Name** | Specify the name for the new group as it will be presented in the filters panel. |
| | **Tip:** If you want a group to be available on more than one page, you can right-click on the page and select **Apply Filter Organization...** from the pop-up menu. The filter organization, such as which filters are shown or hidden as well as the order of data tables, groups and filters in the filters panel will be copied to all of the selected pages when this function is used. New pages automatically inherit the filter organization from the active page. |

## 8.3.6.5 Details on Rename Column

### ► To reach the Rename Column dialog:
1. Right-click on the filter representing the column you want to rename.
2. Select **Rename...** from the pop-up menu.

OR

3. Open the Filtering Scheme Properties dialog.
4. In the list of columns, select the column you want to rename.
5. Click on **Rename...**.
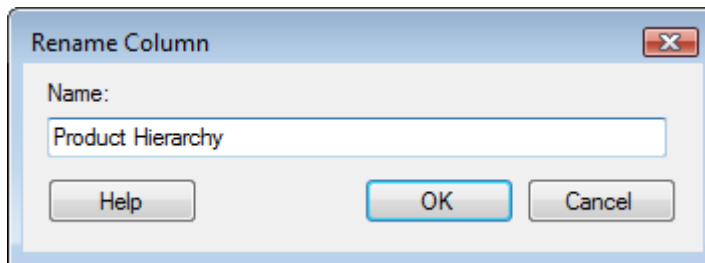


| Option | Description |
|---|---|
| **Name** | Specify a new name for the column. |
| | **Note:** The filters use the same name as the columns, so renaming a filter will also change the column name in all other instances as well. |

## 8.3.6.6 Details on Rename Group



| Option | Description |
|---|---|
| **Name** | Specify a new name for the group, as it should be presented in the filters panel. |
| | **Note:** The group names are specified per page, so if you want the same name to be used on several different pages, it may be a good idea to first change the group name and then use the Duplicate Page feature to |

create the other pages. When a page is duplicated, all settings in the filters panel are inherited from the old page.

You can also right-click in the filters panel of the page containing the correct group name and select **Apply Filter Organization...**. In that case, the complete filter organization, including which filters are shown or hidden as well as the order of data tables, groups and filters in the filters panel will be copied to all of the selected pages.

### 8.3.6.7 Details on Apply Filter Organization

The Apply Filter Organization functionality allows you to reuse the layout you have created on one page and apply it on one or several other pages.

#### ► To reach the Apply Filter Organization dialog:

1. In the **Filters** panel, right-click to display the pop-up menu.
2. Select **Apply Filter Organization...**.
   Comment: You can also select Edit > Apply Filter Organization... from the main menu.
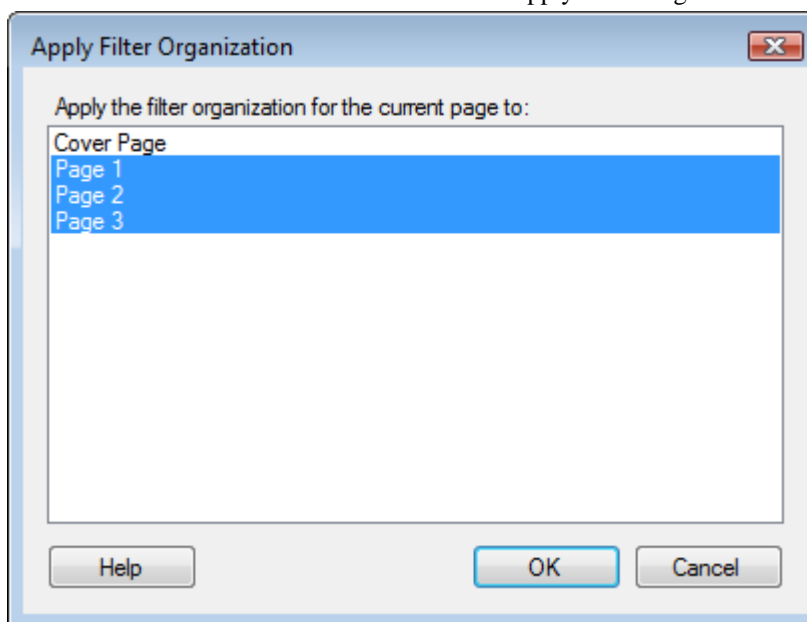


Click to select all pages to which you wish to apply the filter organization from the active page.

# 8.4 Filtering Schemes

One of the main strengths of TIBCO Spotfire is the ability it gives you to filter your data, hence, to control what data shall be visible and used in some calculations. This means that you can show/hide data for specific categories, change the time range to look at, step through a sequence of values one at a time, etc.

You have the possibility to add your own filtering schemes, which can be applied to the analysis per page or per visualization. This gives you the complete freedom to control which pages and visualizations will affect each other. You can set up the filtering schemes to work on any combination of visualizations and/or pages in your analysis. For example, you can keep all the visualizations on all the pages related by using the same filtering scheme for all of them, or, you can choose to specify different filtering schemes for all the visualizations in an analysis, or any combination in between these two extremes. See Limiting What is Shown in Visualizations to learn how to set up a visualization to use a different filtering scheme than the filtering scheme used on the page.

The filter type is a part of the filter settings in a filtering scheme. This and other filter settings are controlled via the Filtering Scheme Properties. It is reached via the right-click menu in the filters panel. The selection of which filters are visible on a page is, in contrast, specified per page, via the Organize Filters option on the right-click menu.

### ► **To create a new filtering scheme:**

1.  Select **Edit > Document Properties**.
2.  Go to the **Filtering Schemes** tab.
3.  Click **New...**.
4.  Type a name and click **OK**.

### ► **To change the filtering scheme to use on a page:**

1.  Make sure that the filtering scheme menu is visible at the top of the filters panel.

    Comment: If the filtering scheme menu has been hidden, it can be shown by selecting Edit > Document Properties > Filtering Schemes tab and the check box **Show filtering scheme menu in Filters panel**.
2.  Click on the filtering scheme menu.
3.  Select the desired filtering scheme.

# 8.5 Filtering in Related Data Tables

When you have multiple data tables that are related to each other in your analysis, and the data tables do not include exactly the same rows, you may want to handle filtering in the related data tables in different ways, depending on whether you are interested in the filtered rows or the filtered out rows. To help show the difference between the three options available, we use an example with two related data tables, DT1 and DT2. Both DT1 and DT2 contain rows that are not available in the other data table (pink and yellow), but they also contain common rows (blue):
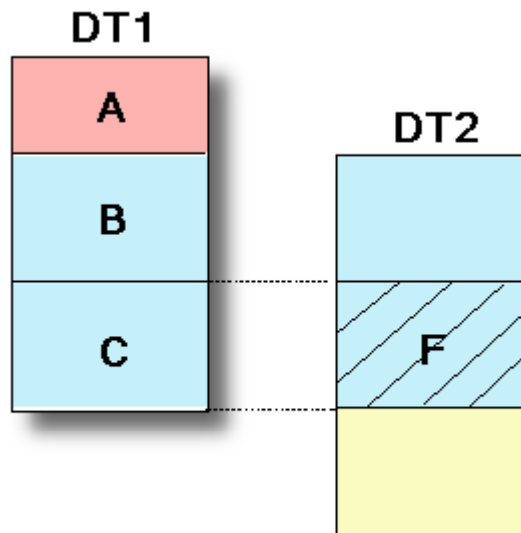


A = Rows in DT1 that are not available in DT2.

B = Rows in DT1 that are available in DT2, but have been filtered out.

C = Rows in DT1 that are available in DT2 and included in the currently filtered rows of DT2.

F = The filtered rows (rows remaining after filtering) in DT2.

When the filtering management for DT2 is specified (from the DT1 data table header) the different options will give the following results:

## Include Filtered Rows Only

The first option will make all row that are only present in DT1 disappear from the visualizations using DT1, since only the rows that are currently filtered in DT2 will be included. Hence, this option keeps only those rows that are present in both data tables (and have not been filtered out).

In the example above, this means that only the rows in C will remain after filtering in DT2.

## Exclude Filtered Out Rows

The second option will remove those rows that have been filtered out from DT2 from all visualizations using DT1. Hence, this option keeps those rows that are filtered in DT2 as well as the additional rows from DT1.

In the example above, this means that A and C will remain after filtering in DT2.

## Ignore Filtering

The third option is to ignore any filtering done in the related data table completely. This way, all rows that are available in the current data table will remain available.

In the example above, this means that A, B and C will all remain after filtering in DT2.

Note that you need to specify how each table should respond to filtering in all other related tables separately, to be certain of what will be shown in the visualizations after filtering.

### ► To change the way filtering in a related data table affects a data table:

1. Go to the **Filters** panel and locate the data table header for the data table of interest.

2. Click on the Filtering in related data tables icon, .

    Response: A drop-down menu is shown, where all related data tables are available.
    **Note:** If a relation has become invalid, the icon will turn red.

3. Select the data table for which you want to change how filtering should affect the current data table, and select one of the options **Include Filtered Rows Only**, **Exclude Filtered Out Rows** or **Ignore Filtering**.

# 9 Tags

## 9.1 What are Tags?

Tags are annotations that can be attached to marked rows. Each row can only contain a single tag from each tag collection, but the document can contain many tag collections simultaneously. A tag collection is basically a column containing a set of different tags, or annotations. Each tag collection is represented by a new column in the data table and can be used for filtering the data, just like any other column. Tags can only be attached to rows from a single data table, but the same tag collection and tag names can be used for multiple data tables.

Tags are similar to Lists, but Tags are specific to the current analysis, while with Lists you work with the same collection of lists all the time, from one session to the next. Combining the functionality from Tags and Lists can be very useful. You can create lists from tag collections, and you can create tag collections from lists. This means that Lists can be a way to transfer knowledge from one analysis to another, while Tags can be a way to use lists within an analysis. See What are Lists? to learn more.

You can view and manage Tags in a popover, in a docked panel, or as a floating window. See Panels and Popovers

for more information. Click on the Tags button on the toolbar, , or select **View > Tags** to open Tags. The Tags panel or popover will open in the mode it was opened the last time you had it open. The image below shows the docked Tags panel with two tag selections.
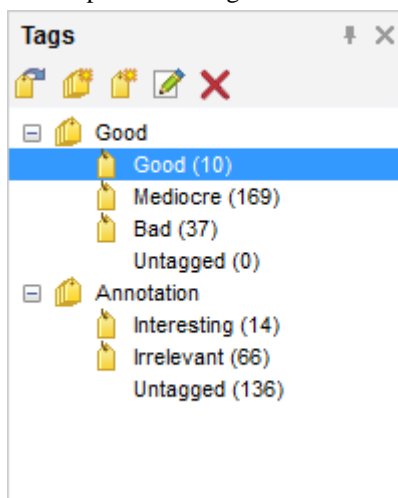


When more than one data table is available in the analysis, another level with the name of the data table is added to the tags panel. When attaching tags to marked rows, the active visualization defines which marking to get the marked rows from.
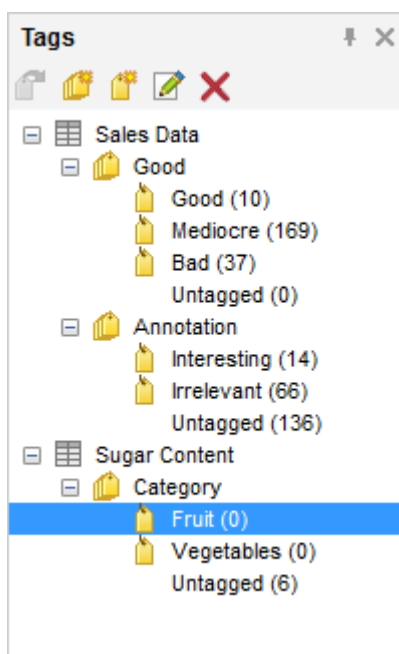
**Note:** If tags are to be reapplied after reloading linked data, you need to specify key columns that can be used to uniquely identify the rows in each data table. See Details on Select Key Columns for more information.

# 9.2 How to Work with Tags

**Note:** If tags are to be reapplied after reloading linked data, you need to specify key columns that can be used to uniquely identify the rows in each data table. See Details on Select Key Columns for more information.

### ► To create a new tag collection:

1. If Tags are not already visible, select **View > Tags**.
2. If you have more than one data table in the document, click to select the data table where you want to add the tag collection.
3. Click on the New Tag Collection button, .
4. Type a **Name** for the tag collection.

   Comment: This name will also be used as column name when the tag collection is viewed as a column in visualizations.
5. Optionally, type a **Description** with details about the tag collection.
6. Click **New...**.
7. Type a **Tag name**.
8. Click **OK**.

   Response: The tag is added to the Tags list in the New Tag Collection dialog.
9. Repeat steps 6 to 8 until you have added all tags that you want to include in this tag collection.
10. Click **OK**.

    Response: The Tags are updated to display the new tag collection and its content.

### ► To attach tags to marked rows:

1. If Tags are not already visible, select **View > Tags**.
2. In a visualization, mark the rows that you wish to tag.

   Comment: You can only attach one tag at a time.

3. Select the tag you want to apply.

4. Click on the Attach Tag to Marked Rows button, 🔲.

   Comment: You can also drag the desired tag to the center of the visualization and drop it on the attach tag drop target.

   Response: The marked rows are annotated with the selected tag.

5. Mark a new set of rows and repeat steps 3 to 4 until you have attached all tags that you want.

### ► To mark all rows with a specific tag:

1. If Tags are not already visible, select **View > Tags**.
2. Make sure that a visualization using the desired data table and marking is active.
3. Right-click on the tag of interest.
4. Select **Mark Tagged Rows in Active Visualization** from the pop-up menu.

   Response: The rows with the selected tag are marked.

   Comment: You can also double-click on a tag to mark all rows with that tag immediately.

### ► To mark all rows without a tag in a data table:

1. If Tags are not already visible, select **View > Tags**.
2. Make sure that a visualization using the desired data table and marking is active.
3. Right-click on the **Untagged** item of the desired data table and tag collection.
4. Select **Mark Rows without Tags** from the pop-up menu.

   Response: The untagged rows are marked.

### ► To add the rows with a specific tag to the marked set:

1. If Tags are not already visible, select **View > Tags**.
2. Make sure that a visualization using the desired data table and marking is active.
3. Press **Ctrl** on the keyboard while double-clicking on a tag.

   Response: The rows attached with that tag are added to the currently marked set.

### ► To find rows with a specific tag within a previously marked set:

1. If Tags are not already visible, select **View > Tags**.
2. Make sure that a visualization using the desired data table and marking is active.
3. Press **Alt** on the keyboard while double-clicking on a tag.

   Response: Only the rows that were previously marked AND also have the specified tag will remain marked.

### ► To delete a tag or a tag collection:

1. If Tags are not already visible, select **View > Tags**.
2. Click on the tag or tag collection you wish to delete.
3. Click on the Delete button, ❌.

   Response: A confirmation message is displayed.
4. Click **OK**.

### ► To remove all tags for a specific tag collection:

1. If Tags are not already visible, select **View > Tags**.
2. For the desired data table, right-click on the tag collection item.
3. Select **Remove All Tags** from the pop-up menu.

   Response: A confirmation message is displayed.

4. Click **OK**.

Response: All tags are removed for that specific tag collection (in the specific data table).

### ► **To remove all tags from marked rows:**

1. If Tags are not already visible, select **View > Tags**.
2. Make sure that a visualization using the desired data table is active and that the rows from which you wish to remove tags are marked.
3. Right-click on the **Untagged** item of the desired data table and tag collection.
4. Select **Remove Tags from Marked Rows** from the pop-up menu.

Response: All tags from the specific tag collection are removed from the marked rows.

Comment: You can also drag the Untagged item and drop it on the drop target in the visualization.

### ► **To remove a specific tag from all rows:**

1. If Tags are not already visible, select **View > Tags**.
2. For the desired data table, right-click on the tag that you want to remove from all rows.

Comment: If you have more than one data table in your analysis and the same tag is available in more than one data table, you need to make sure that you right-click on the tag in the actual data table of interest. This command works regardless of which data table is active.

3. Select **Remove Tag from All Rows** from the pop-up menu.

Response: The selected tag is removed from all rows in the specific data table.

# 9.3    Details

## 9.3.1    Details on New Tag Collection

### ► **To reach the New Tag Collection dialog:**

1. If the tags panel is not already visible, select **View > Tags**.
2. Click on the New Tag Collection button, .
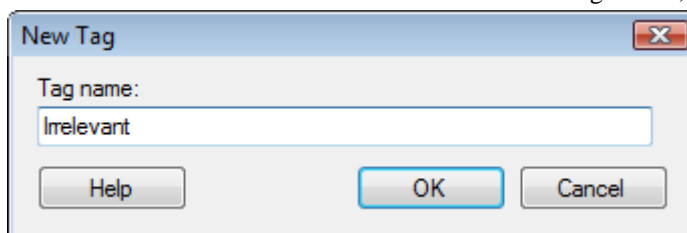
| Option | Description |
|---|---|
| **Name** | The name of the annotation column that will be added to the data table. |
| **Description** | Optional. A description of the tag collection and its contents. |
| **Tags** | Lists the tags that belong to the current tag collection. New tags are added to the list using **New...**. |
| **New...** | Opens the New Tag dialog, where new tags can be added to the collection. |
| **Edit...** | Opens the Edit Tag dialog, where the name of the selected tag can be edited. |
| **Delete** | Removes a tag from the tag collection. |
| **Move Up** | Moves the tag up in the Tags list. |
| **Move Down** | Moves the tag down in the Tags list. |

## 9.3.2 Details on New Tag

► **To reach the New Tag dialog:**

1. Make sure that a tag collection has been created.

2.  In the New/Edit Tag Collection dialog, click **New...**, or, in the tags panel, select the tag collection of interest and click on the New Tag button, 🏷️.
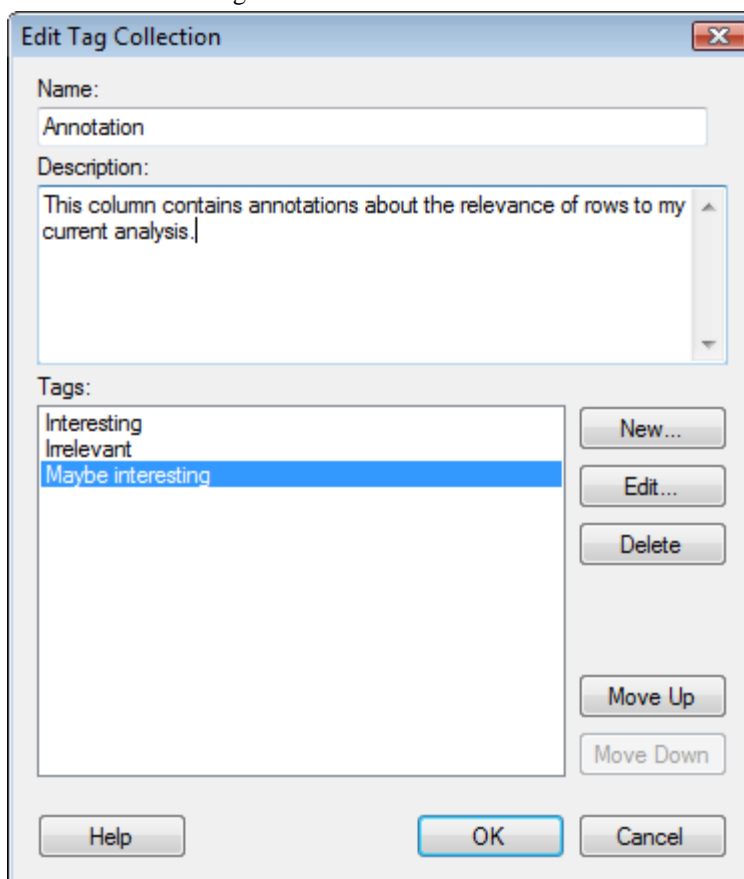


| Option | Description |
|---|---|
| **Tag name** | Type the text that you want to use as an annotation on a marked set of rows. |

## 9.3.3    Details on Edit Tag Collection

► **To reach the Edit Tag Collection dialog:**

1.  If Tags are not already visible, select **View > Tags**.

2.  Select the tag collection of interest and click on the Edit button, 📝.



| Option | Description |
|---|---|
| **Name** | The name of the annotation column that will be added to the data table. |

| | |
|---|---|
| **Description** | Optional. A description of the tag collection and its contents. |
| **Tags** | Lists the tags that belong to the current tag collection. New tags are added to the list using **New...**. |
| **New...** | Opens the New Tag dialog, where new tags can be added to the collection. |
| **Edit...** | Opens the Edit Tag dialog, where the name of the selected tag can be edited. |
| **Delete** | Removes a tag from the tag collection. |
| **Move Up** | Moves the tag up in the Tags list. |
| **Move Down** | Moves the tag down in the Tags list. |

## 9.3.4     Details on Edit Tag

### ► To reach the Edit Tag dialog:

1. Make sure that a tag collection has been created.
2. In the New/Edit Tag Collection dialog, click Edit..., or, in the tags panel, select the tag of interest and click on the Edit button, .
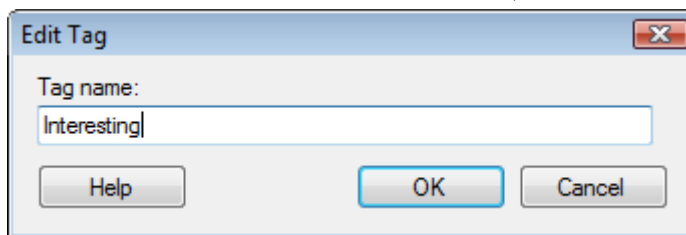


| Option | Description |
|---|---|
| **Tag name** | Type the text that you want to use as an annotation on a marked set of rows. |

## 9.3.5     Tags Pop-up Menus

There are different options available depending on which type of object you right-click on in the tags panel.

### Data Table:

This pop-up menu is reached by right-clicking on a data table in Tags:

| Option | Description |
|---|---|
| **New Tag Collection...** | Opens the New Tag Collection dialog where you can define a name and description for a new tag collection. You can also define which tags should be available in the new tag collection. |

### Tag Collection:

This pop-up menu is reached by right-clicking on a tag collection in the tags panel.

| Option | Description |
|---|---|
| **New Tag Collection...** | Opens the New Tag Collection dialog where you can define a name and description for a new tag collection. You can also define which tags should be available in the new tag collection. |
| **New Tag...** | Opens the New Tag dialog where you can specify a new tag within this tag collection. |
| **Edit Tag Collection...** | Opens the Edit Tag Collection dialog where you can change the name and description of the tag collection. You can also define which tags should be available in the tag collection. |
| **Delete Tag Collection** | Deletes the tag collection and its corresponding column from the data table. |
| **Remove All Tags** | Removes all tags in this tag collection from all rows in the data table. |

### Tag:

This pop-up menu is reached by right-clicking on a tag in the tags panel.

| Option | Description |
|---|---|
| **Attach Tag to Marked Rows** | Attaches the tag to the marked rows in the active visualization (only available when the active visualization is based on the same data table as the tag).<br><br>If some the marked rows already have a different tag from this tag collection attached you will be able choose whether to attach the tag to rows without a tag only, or to remove the old tag and attach the tag to all marked rows. |
| **Remove Tag from Marked Rows** | Removes the selected tag from the set of marked rows. |
| **Mark Tagged Rows in Active Visualization** | Marks all rows that are tagged with the selected tag in the active visualization (only available when the active visualization is based on the same data table as the tag). |
| **New Tag...** | Opens the New Tag dialog where you can specify a new tag within this tag collection. |
| **Edit Tag...** | Opens the Edit Tag dialog where you can change the name of the tag. |
| **Edit Tag Collection...** | Opens the Edit Tag Collection dialog where you can change the name and description of the tag collection. You can also define which tags should be available in the tag collection. |
| **Delete Tag** | Deletes the specified tag from the tag collection. All rows that had the tag attached will be untagged. |
| **Remove Tag from All Rows** | Removes this specific tag from all rows (within this tag collection). |

**Untagged:**

This pop-up menu is reached by right-clicking on an Untagged item in the tags panel.

| Option | Description |
|---|---|
| **Mark Rows without Tags** | Marks all rows which currently has no tag attached for this tag collection. |
| **Remove Tags from Marked Rows** | Removes all tags in the current tag collection from the set of marked rows. |

# 10   Bookmarks

## 10.1   What are Bookmarks?

Bookmarks are snapshots of the state of an analysis. Add a bookmark to your analysis to be able to return to a state where you found something interesting when you marked or filtered out certain items. A bookmark can be applied at any time, allowing you to quickly return to a previously created view of the data. You can also share your insights with others by making your bookmarks available to other users, or by sending links to the bookmarks.

One of the most important uses of bookmarks is that they can be included as links in a text area. This helps you create guided analyses where the recipient of your analysis can click on action links or buttons to quickly move through several different views of the analysis.

A bookmark can capture one or more of the following: specific rows you have marked, active pages and visualizations, and even specific filtering that you have applied. A bookmark also contains information about visualization properties such as what column was used on an axis, what column was used to color by, etc., as well as any custom property values you have used on the active page. You decide what should be included in a captured state, but a bookmark that is added without making any adjustments will automatically include all those parts in the bookmark. It can be worth noting that a bookmark never recreates any removed visualizations or pages. Neither will any added pages or visualizations be removed when a bookmark is applied.

You can view and manage bookmarks in a popover, in a docked panel, or as a floating window. See Panels and Popovers for more information. Click on the Bookmarks button on the toolbar,

, or select **View > Bookmarks** to open Bookmarks. The Bookmarks panel or popover will open in the mode it was opened the last time you had it open. The image below shows the Bookmarks popover with three added bookmarks.
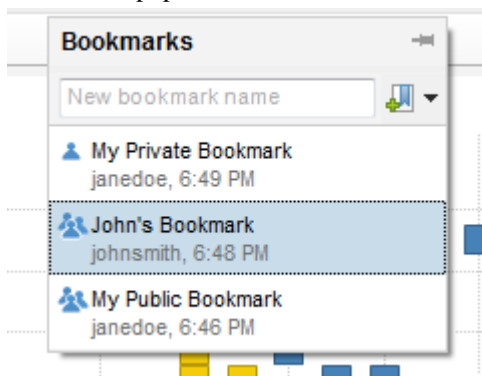


**Note:** If bookmarks are to be reapplied after reloading linked data, you need to specify key columns that can be used to uniquely identify the rows in each data table. See Details on Select Key Columns for more information.

### Private and Public Bookmarks

Bookmarks can be either private or public. Only you can see your private bookmarks, while public bookmarks are visible to all users of the analysis. An icon showing a single person indicates that a bookmark is private, and an icon with multiple people indicates that a bookmark is public. When adding a new bookmark, it is private by default. If you want to make it available to other users, you can right-click on the bookmark and select Public Bookmark from the menu. As seen in the popover above, private bookmarks are listed before public bookmarks. The bookmarks are also sorted in chronological order with the bookmark that was last updated at the top of the list.

## Share Bookmarks

You can copy and share URLs pointing to specific bookmark states of an analysis. If a bookmark is private, it is still possible to send a URL including the private bookmark to a colleague in order to share that bookmark. See To create a URL to an analysis with a bookmark to learn how to do this. There are three different link types you can use, and which one to choose depends on the software available to the receiver of the link. See Bookmarks Pop-up Menu and Links to Analyses in the Library for more information about the link types. As mentioned earlier, you can also include bookmarks (both private and public) in an action control in a text area to make it available to other people. See To add a bookmark or bookmark part to a link, button or image in a text area to learn how to do this. Note that before you can copy and share links to bookmarks, the analysis must be published to the library. Before that, all bookmarks are stored locally, and have no link associated with them.

## Indicators

There are a couple of indicators that let you know when you may want to pay attention to the bookmarks.

If bookmarks are added or updated while you do not have the popover or panel open, the

bookmarks button in the toolbar will indicate this with a green arrow: . Click on the button to view the updates. This will make the arrow disappear.

If a bookmark becomes invalid, for example if the active page in the bookmark has been deleted, a red error provider is shown as seen below.
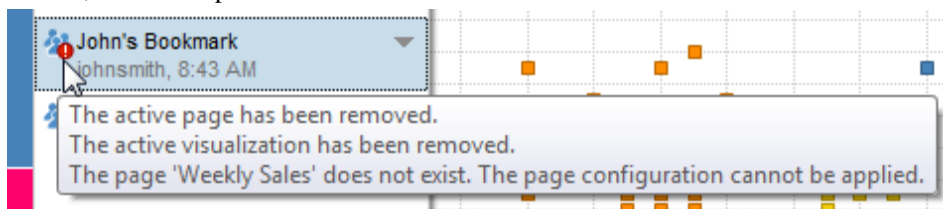


Point to the error provider to see a tooltip with information about why the bookmark has become invalid.

## Permissions

You can always apply any bookmarks that are visible to you in an analysis, but the ability to add and modify bookmarks can be restricted on two levels:

- Library folder permissions – The creator of an analysis can specify the folder permissions required to add bookmarks in the Document Properties dialog. See Details on Document Properties – Library for a list of the available alternatives. To learn more about folder permissions in the library, see Permissions.
- Licenses – Which license you have determines whether or not you will be able to add bookmarks to analyses.

## Limitations on Bookmarks

- Bookmarks cannot capture filtering which is created using Marked Rows > Filter To.
- It may not be possible to apply all parts of a bookmark if there are significant changes to the underlying data.
- If data is refreshed, bookmarks can only reapply markings provided that key columns have been configured for that data table.
- Bookmarks are saved per user, per document. If your Web Player is configured for "impersonation" in order to allow multiple users to log in anonymously, these users all impersonate a single user profile, so any private bookmarks captured by one user will be visible to all the other users under the same user profile.

# 10.2     How to Use Bookmarks

**Note:** If bookmarks are to be reapplied after reloading linked data, you need to specify key columns that can be used to uniquely identify the rows in each data table. See Details on Select Key Columns for more information.

## ► To add a new bookmark:

1.  If Bookmarks are not already visible, select **View > Bookmarks**, or press **CTRL+B** on the keyboard.

    Comment: Press Ctrl+Shift+B to open the Add Bookmark Special dialog where you can select to add partial bookmarks. To learn more about the different parts, see Details on Add Bookmark Special.

2.  Type a name for the bookmark in the text field.

3.  Click on the Capture Bookmark button, , next to the name field.

    Response: The bookmark is added to the analysis.

## ► To apply a bookmark:

1.  If Bookmarks are not already visible, select **View > Bookmarks**, or press **CTRL+B** on the keyboard.

2.  Double-click on the bookmark of interest, or click on the menu arrow for the bookmark of interest and then select **Apply** from the menu.

    Comment: Bookmarks can also be added to action controls (links, buttons or images) in a text area or as actions on dynamic items in a graphical table. In that case, clicking on the action control will apply the bookmark.

    Comment: You can also choose to apply just a part of the bookmark by selecting Apply Special from the menu. See Bookmarks Pop-up Menu to learn more about the different bookmark parts. For Filter Settings, you can select a few different apply methods from the pop-up menu.

## ► To add a bookmark or bookmark part action to a link, button or image in a text area:

1.  Make sure that you have created a bookmark according to the steps above.

2.  Create a text area by clicking on the New Text Area button, .

    Response: An empty text area is displayed.

3.  Right-click on the text area and select **Edit Text Area** from the pop-up menu.

4.  Type any explaining text in the text field, and where you want the bookmark-link to be placed, click on the Insert Action Control button, .

    Response: The Action Control dialog is displayed.

5.  On the **Actions** page, type a **Display text** to be used as the link or button text in the text area.

6.  Select the **Control type** from the drop-down list: Link, Button, or Image.

7.  In the Available actions list, click on the plus sign next to **Bookmarks** to expand the list, and then click on the desired bookmark.

    Comment: To add only a part of the bookmark, click on the plus-sign next to the bookmark of interest to expand the list, and then click on the bookmark part you want to add.

8.  Click **Add**.

    Response: The bookmark is added to the Selected actions list.

    Comment: If desired, you can add more actions to the same link.

9.  Click **OK**.

Response: The action control is added to the text area.

10. Exit the text area edit mode to test the action control.

### ► To create a URL to an analysis with a bookmark:

1. If Bookmarks are not already visible, select **View > Bookmarks**, or press **CTRL+B** on the keyboard.

2. Click on the menu arrow for the bookmark from which you want to create a URL.

3. Select **Copy Bookmark URL** and choose one of the link types from the menu.

   Comment: To learn more about the different link types and when to use each of them, see Links to Analyses in the Library.

   Response: The link to the bookmark is copied to the clipboard and you can now paste it into, for example, an email or a web page.

### ► To update a bookmark:

1. If Bookmarks are not already visible, select **View > Bookmarks**, or press **CTRL+B** on the keyboard.

2. Click on the menu arrow for the bookmark you wish to update and select **Update Bookmark** from the menu.

   Response: The bookmark parts available in the bookmark are updated with the current analysis settings.

### ► To delete a bookmark:

1. If Bookmarks are not already visible, select **View > Bookmarks**, or press **CTRL+B** on the keyboard.

2. Click on the menu arrow for the bookmark you wish to delete.

3. Select **Delete** from the menu.

   Response: The bookmark is removed from the analysis.

### ► To use the 3.2 bookmarks panel:

For compatibility reasons, you can go back to use the 3.2 version of the bookmarks, this is possible using the following steps.

1. Select **Tools > Options**.

2. Go to the **Compatibility** page.

3. Select the **Use 3.2 bookmark panel** check box.

4. Click **OK**.

   Response: The next time you open the bookmarks panel, it will use the 3.2 style and behavior. (If the new bookmarks panel is open, you need to close it and reopen to see the change.)

   Comment: See How to Use 3.2 Bookmarks and What are 3.2 Bookmarks? to learn more about 3.2 bookmarks.

### ► To convert 3.2 bookmarks to new bookmarks:

If an older analysis containing bookmarks is opened in TIBCO Spotfire 3.3 or later, and you are using the new Bookmarks popover or panel, a link will be shown at the bottom of the popover or panel. Click **Convert** to transform all old-type bookmarks to the new type. If you want to display the old bookmarks without converting them, you can go to Tools > Options, Compatibility page and select the Use 3.2 bookmark panel check box. Clear the check box to see the new type bookmarks.

# 10.3 Bookmarks Example Scenarios

The concept of Bookmarks has many potential usages and usage goals. The list below presents some possible scenarios where bookmarks can be useful.
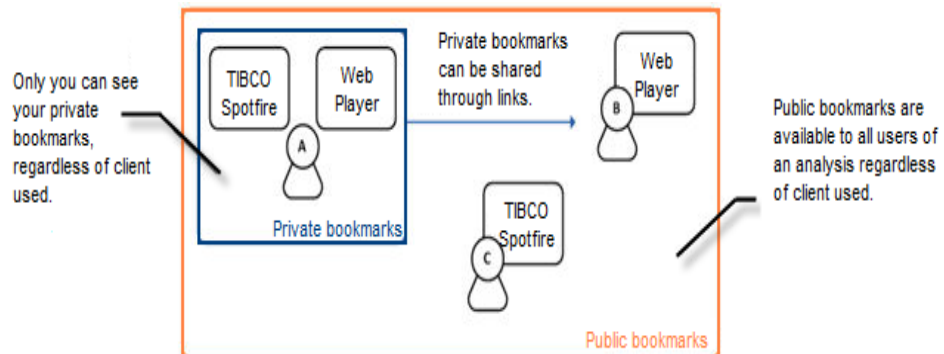


The example flows in this section aim to describe how private and public bookmarks work across clients and between different users.

## Private bookmarks – available to a user regardless of client used:
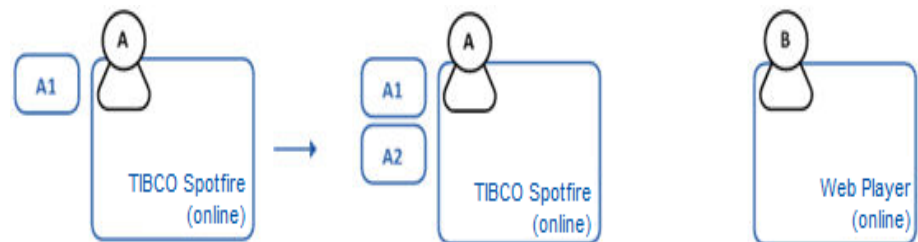


User A captures a private bookmark (A1) in TIBCO Spotfire and saves the analysis to the library.

User A opens the analysis using the Web Player. The analysis is opened in the saved state and private bookmark A1 is available. User A captures another private bookmark (A2).

User B opens the analysis using the Web Player. The analysis is opened in the saved state. No bookmark is available.

Private bookmarks can be used to save settings (an analysis state) from one occasion to another, in order to avoid repetitive work every time you open up an analysis. You can also use private bookmarks to capture an interesting state that later can be revisited, to analyze previously captured insights by sharing states with others or comparing them with other states in order to understand how different parameters (settings) affect the result.

## Public bookmarks – available to all users of an analysis regardless of client used:
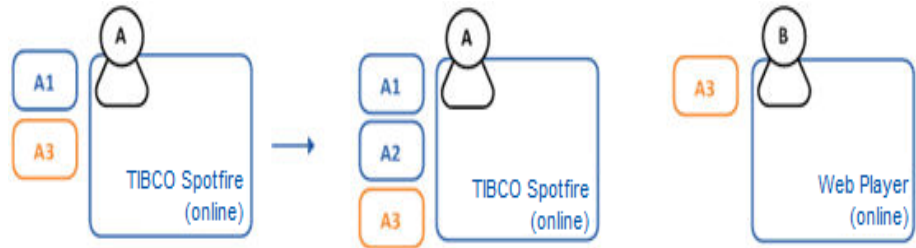


User A captures private bookmark A1 and public bookmark A3 in TIBCO Spotfire and saves the analysis to the library.

User A opens the analysis using the Web Player. The analysis is opened in the saved state and both private bookmark A1 and public bookmark A3 are available. User A captures another private bookmark (A2).

User B opens the analysis using the Web Player. The analysis is opened in the saved state. Public bookmark A3 is available.

Public bookmarks can be used as starting points for end users of an analysis. The captured states may guide users to interesting aspects in an analysis, or they might be used for navigation as an alternative to pages or links. By sharing captured states with other users you may also induce discussions of the insights made during analysis.

## Private and public bookmarks as building blocks in action links:
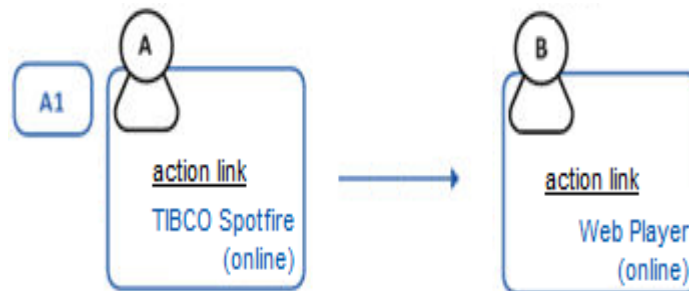


User A captures a private bookmark (A1) in TIBCO Spotfire and ties it to an action link, then saves the analysis to the library.

User B opens the analysis using the Web Player. The action link sets bookmark state. No bookmark is available to user B.
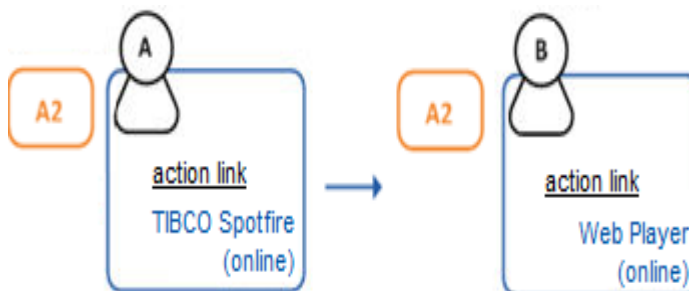
User A captures a public bookmark (A2) in TIBCO Spotfire and ties it to an action link, then saves the analysis to the library.

User B opens the analysis using the Web Player. The action link sets bookmark state. Bookmark A2 is available.

Both private and public bookmarks can be used as building blocks in action links/buttons when setting up a guided analysis for other users. The action links/buttons typically guide users to insights or relevant starting points in the analysis. This also enables a way to include some restricted interaction possibilities in the application and a possibility to hide controls such as the filters panel.

## Send private bookmark to colleague:
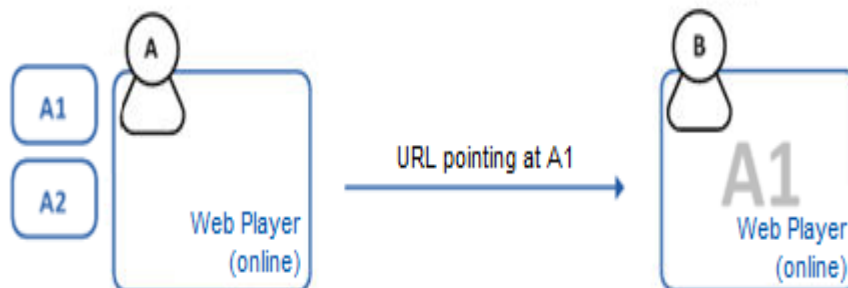


User A captures private bookmarks (A1 & A2) in the Web Player and wants to inform a colleague about insights captured in A1.

User B clicks link in email, which opens the analysis in the Web Player. The analysis is opened in A1 state. No bookmark is available.

A private bookmark can be used to pass on a captured insight to a specific colleague or group of colleagues only. This can easily be done by sending a URL that points to an analysis in a particular (bookmark) state.

## Send public bookmark to colleague:
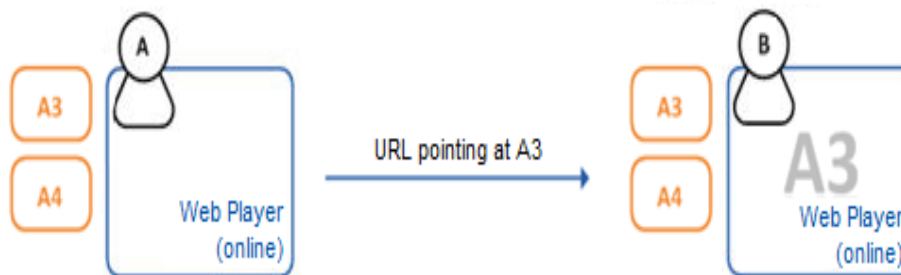


User A captures public bookmarks (A3 & A4) in the Web Player and wants to inform a colleague about insights captured in A3.

User B opens the analysis using the Web Player. The analysis is opened in A3 state. Both A3 and A4 are available.

Public bookmarks can also be referred to directly using a link.

**Offline collaboration:**
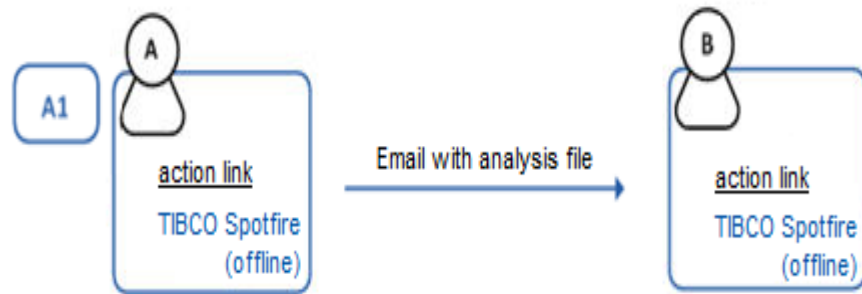


User A captures a private bookmark (A1) in TIBCO Spotfire and ties it to an action link, then saves the file and sends it to a colleague.

User B opens the analysis in TIBCO Spotfire. The action link sets the bookmark state. No bookmark is available to user B so A1 cannot be updated by user B.
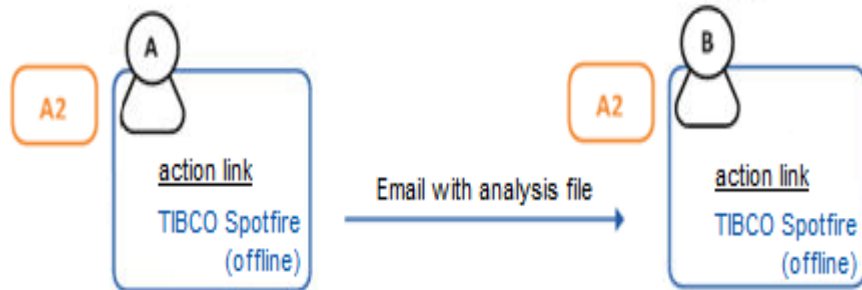


User A captures a public bookmark (A2) in TIBCO Spotfire and ties it to an action link, then saves the file and sends it to a colleague.

User B opens the analysis in TIBCO Spotfire. The action link sets the bookmark state. Bookmark A2 is available.

# 10.4    Bookmarks Pop-up Menu

Right-click on a bookmark to bring up the pop-up menu. You can always apply any bookmarks that are visible to you in an analysis, but whether or not you can add new bookmarks, or update, delete and otherwise modify existing ones depends on permissions defined by the creator of the analysis as well as your licenses. See Permissions to learn more.

| Option | Description |
| --- | --- |
| **Apply** | Sets the analysis to the state defined by the bookmark. |
| **Apply Special** | Allows you to apply only a part of a bookmark. Select one or more of the following parts:<br>**Page Layout and Visualizations** – Applies the same layout and setup of the visualizations as when the bookmark was captured. This includes all specified visualization properties. For example, selections on the axes of a visualization, coloring, formatting, and which visualization features are shown or hidden.<br>**Active Page** – Sets the active page to the page that was active when the bookmark was captured. |

| | |
|---|---|
| | **Active Visualization** – Sets the active visualization to the visualization that was active when the bookmark was captured. |
| | **Filter Settings** – Sets the filtering and filter types to those used when the bookmark was captured. You need to select **Set all filters**, **Set only adjusted filters**, or **Mark filtered rows** from the submenu. See below for a description of these alternatives. |
| | **Filter Organization** – Sets the layout of the filters panel (sort order, filter groups, hidden filters) to the same as when the bookmark was captured. |
| | **Markings** – Marks the items that were marked in the visualizations when the bookmark was captured. Note that you can only apply this part of a bookmark if you use the same marking in the visualizations as when the bookmark was captured. |
| | **Properties** – Applies any editable document, data table, and column properties used on the active page, as well as any property values referred to in a property control. |
| **Rename** | Allows you to change the name of the selected bookmark. |
| **Copy Bookmark URL** | Allows you to copy and share URLs pointing to a specific bookmark state for an analysis. Select one of the link types listed below. See Links to Analyses in the Library for more information about the different link types. Note that Copy Bookmark URL is only available when the bookmark has been stored in the library. |
| **Direct TIBCO Spotfire URL** | Copies the URL for the analysis at the state of the selected bookmark, so that a link can be used to open the analysis directly using TIBCO Spotfire Professional. Select this option if you want to send your insights to a fellow analyst working in TIBCO Spotfire. |
| **Web Player URL** | Copies the URL for the analysis at the state of the selected bookmark, so that a link can be used to open the analysis using TIBCO Spotfire Web Player. Select this option if you know that your target audience all use TIBCO Spotfire Web Player. |
| **Redirect Page for Unknown Clients** | Copies a link to a redirect page where the end users of the link can choose whether they want to open the analysis using TIBCO Spotfire Professional or the Web Player. Select this option if you do not know what type of clients are available for the audience of the link or if you do know that some of the people have access to TIBCO Spotfire Professional and some have only the TIBCO Spotfire Web Player. For example, use this option to publish a URL in a blog post which can be read by people from many departments and at different positions in your company. |
| **Private Bookmark** | Makes the selected bookmark private. |
| **Public Bookmark** | Makes the selected bookmark public. |
| **Save as Private Bookmark** | Creates a private copy of the selected bookmark. |
| **Update Bookmark** | Updates the bookmark to the current state in the analysis. Note that if you have captured a partial bookmark, only the parts included in the original bookmark will be updated. |
| **Delete** | Deletes the selected bookmark. |

**Filter Settings Submenu**

| Option | Description |
|---|---|
| **Set All Filters** | Applies the exact filter settings for the active filtering scheme, as stored in the bookmark. |
| **Set Only Adjusted Filters** | Keeps everything as it is in the filters panel except for those filters that were changed in the bookmark, which are updated. |
| **Mark Filtered Rows** | Uses the filter condition from the bookmark to mark rows in the analysis, but leaves the filtering exactly as it was before applying the bookmark. |

# 10.5 Details on Add Bookmark Special

This dialog allows you to select exactly which bookmark parts to include in your bookmark.



| Option | Description |
|---|---|
| **Name** | The name of the bookmark. |
| **Include** | Select the bookmark parts you want to capture in your bookmark. |
| | **Page Layout and Visualizations** – Captures the layout and the setup of the visualizations on the active page. This includes all specified visualization properties. For example, selections on the axes of a visualization, coloring, formatting, and which visualization features are shown or hidden. |
| | **Active Page** – Captures which page is active when the bookmark is captured. |
| | **Active Visualization** – Captures which visualization is active when the bookmark is captured. |

| | |
|---|---|
| | **Filter Settings** – Captures the filtering and filter types used on the active page. |
| | **Filter Organization** – Captures the layout of the filters panel (sort order, filter groups, hidden filters). |
| | **Markings** – Captures which items are marked in the visualizations in the bookmark. Note that the active marking for a visualization is included in the Page Layout and Visualizations bookmark part. |
| | **Properties** – Captures any editable document, data table, and column properties used on the active page, as well as any property values referred to in a property control. |
| **Select All** | Click this button to select all check boxes. |
| **Deselect All** | Click this button to clear all check boxes. |

# 10.6    3.2 Bookmarks

## 10.6.1    What are 3.2 Bookmarks?

In TIBCO Spotfire 3.3, a new version of the bookmarks functionality was created in order to allow the capturing of visualization properties along with the previously available settings for page, filtering, marking, etc. See What are Bookmarks? for information about the new bookmarks. However, for compatibility reasons, you can go back to use the 3.2 version of the bookmarks instead.

### ► To use the 3.2 bookmarks panel:

1. Select **Tools > Options**.
2. Go to the **Compatibility** page.
3. Select the **Use 3.2 bookmark panel** check box.

    Response: The next time you open the bookmarks panel it will use the 3.2 style and behavior. (If the new bookmarks panel is open you need to close it and reopen to see the change.)

### ► To convert 3.2 bookmarks to new bookmarks:

If an older analysis containing bookmarks is opened in TIBCO Spotfire 3.3 or later, and you are using the new Bookmarks popover or panel, a link will be shown at the bottom of the popover or panel. Click **Convert** to transform all old-type bookmarks to the new type. If you want to display the old bookmarks without converting them, you can go to Tools > Options, Compatibility page and select the Use 3.2 bookmark panel check box. Clear the check box to see the new type bookmarks.

### Description of 3.2 Bookmarks

Bookmarks are snapshots of the state of an analysis, which can be applied at any time, allowing you to return to a previously created view of the data.  A bookmark can update one or more of the following: what rows to be marked, the page and visualization to be active and what filtering to be applied. The bookmarks can optionally be sorted into different folders.

One of the most important uses of bookmarks is that they can be included as links in a text area. This helps you to create guided analyses where the recipient of your analysis file can click on action links to quickly move through several different views of the analysis.

Bookmarks are managed in the bookmarks panel, which can be displayed by clicking on the

Bookmarks button on the toolbar, , or by selecting **View > Bookmarks**. The visibility of

the bookmarks panel is controlled per page. The panel visibility of new pages is inherited from the active page.
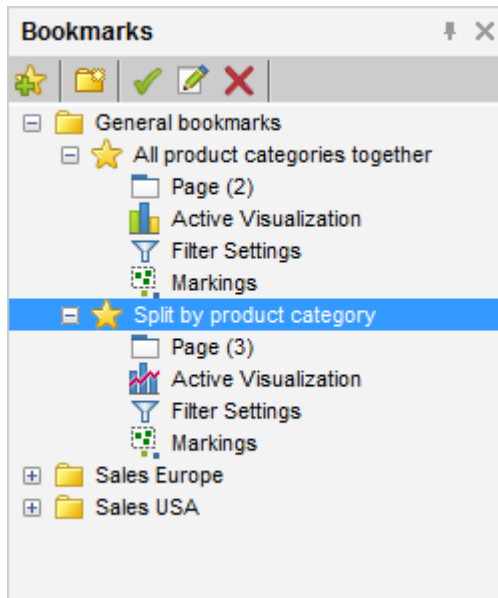


If a bookmark becomes invalid, for example if the active page in the bookmark has been deleted, a red error provider is shown:
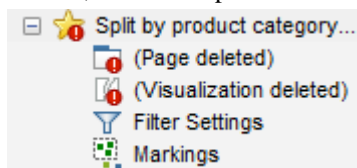


**Tip:** The 3.2 bookmarks do not save the state of visualization properties, such as what column to use on an axis, what column to color by, etc. If you want to guide a user through visualization of different states, duplicate the visualization and create one visualization for each state instead. The duplicates can be moved by dragging and dropping on different pages, if desired.

## 10.6.2    How to Use 3.2 Bookmarks

In TIBCO Spotfire 3.3, a new version of the bookmarks functionality was created in order to allow the capturing of visualization properties along with the previously available settings for page, filtering, marking, etc. See What are Bookmarks? for information about the new bookmarks. However, for compatibility reasons, you can go back to use the 3.2 version of the bookmarks instead.

### ► To use the 3.2 bookmarks panel:

1.  Select **Tools > Options**.
2.  Go to the **Compatibility** page.
3.  Select the **Use 3.2 bookmark panel** check box.

    Response: The next time you open the bookmarks panel it will use the 3.2 style and behavior. (If the new bookmarks panel is open you need to close it and reopen to see the change.)

### ► To convert 3.2 bookmarks to new bookmarks:

If an older analysis containing bookmarks is opened in TIBCO Spotfire 3.3 or later, and you are using the new Bookmarks popover or panel, a link will be shown at the bottom of the popover or panel. Click **Convert** to transform all old-type bookmarks to the new type. If you want to

display the old bookmarks without converting them, you can go to Tools > Options, Compatibility page and select the Use 3.2 bookmark panel check box. Clear the check box to see the new type bookmarks.

### ► To add a new 3.2 bookmark:

1. Click on the Capture Bookmark button, 🌠, on the toolbar or in the bookmarks panel.
2. Type a **Name** for the bookmark.
3. Optionally, type a **Description** with details about the bookmark.
4. Click **OK**.

   Response: The bookmark is added to the bookmarks panel and it can be used when adding links to a text area.

### ► To apply a 3.2 bookmark:

1. If the bookmarks panel is not already visible, select **View > Bookmarks**.
2. In the bookmarks panel, double-click on the bookmark of interest or click on the

   bookmark of interest and then click on the Apply button, ✔.

   Comment: Bookmarks can also be added to links or buttons in a text area. In that case, clicking on the link or button in the text area will apply the bookmark.

   Comment: You can also choose to apply just a part of the bookmark by clicking on one of the bookmark components and then click Apply. For the filter settings component, you can select a few different apply methods from the pop-up menu.

### ► To add a 3.2 bookmark to a link or button in a text area:

1. Make sure that you have created a bookmark according to the steps above.

2. Create a text area by clicking on the New Text Area button, 🖾.

   Response: An empty text area is displayed.

3. Right-click on the text area and select **Edit Text Area** from the pop-up menu.
4. Type any explaining text in the text field, and where you want the bookmark-link to be

   placed, click on the Insert Action Control button, 🔲.

   Response: The Action Control dialog is displayed.

5. On the **Actions** page, type a **Display text** to be used as the link or button text in the text area.
6. Select the **Control type** from the drop-down list: Link or Button.
7. In the Available actions list, click on the plus-sign next to **Bookmarks** to expand the list, and then click on the desired bookmark.
8. Click **Add**.

   Response: The bookmark is added to the Selected actions list.

   Comment: If desired, you can add more actions to the same link.

9. Click **OK**.

   Response: The link or button is added to the text area.

10. Exit the text area edit mode to test the link or button.

### ► To update a 3.2 bookmark:

1. If the bookmarks panel is not already visible, select **View > Bookmarks**.
2. Right-click on the bookmark you wish to update and select **Update...** from the pop-up menu.

   Response: A dialog asking you if you are sure you want to update the bookmark is displayed.

3. Click **OK**.

Response: The bookmark components available in the bookmark are updated with the current analysis settings.

Comment: It is normally recommended to update complete bookmarks instead of separate bookmark components. If you still choose to update a separate part of the bookmark, note that there may be some deviations between what is shown and what is actually applied. For example, the active visualization always takes precedence before the active page, so if the active visualization is on a different page than the one currently specified by the bookmark component, you will not end up on the page currently set as a bookmark component.

### ► To delete a 3.2 bookmark:

1. If the bookmarks panel is not already visible, select **View > Bookmarks**.
2. Click on the bookmark you wish to delete.
3. Click on the Delete button, ![X].

### ► To organize 3.2 bookmarks into folders:

1. If the bookmarks panel is not already visible, select **View > Bookmarks**.
2. Click on the Create New Folder button, ![folder].
   Response: The New Folder dialog is displayed.
3. Type a **Folder name** and click **OK**.
4. Use drag-and-drop to move bookmarks and folders between folders.

## 10.6.3    Details

### 10.6.3.1    Details on New Folder (3.2 Bookmarks)

If your analysis contains many 3.2 bookmarks, they can be arranged in separate folders to help locate specific bookmarks in the bookmarks panel.

### ► To create a new folder:

1. In the Bookmarks panel, click on the Create New Folder button, ![folder].
   Response: The New Folder dialog is displayed.
2. Type a name for the new folder.
   Comment: You can rename a previously created folder by right-clicking on it in the bookmark panel and selecting Edit... from the pop-up menu.
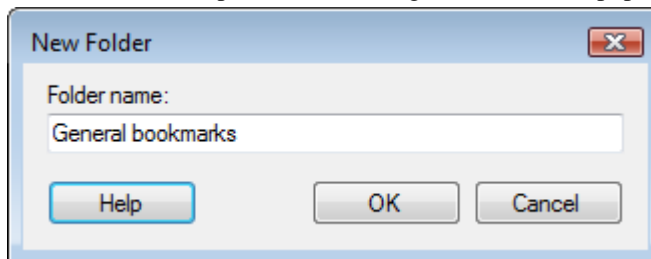


| Option | Description |
| --- | --- |
| **Folder name** | Specifies the name of the new folder. |

## 10.6.3.2 Details on Capture Bookmark (3.2 Bookmarks)

► **To reach the Capture Bookmark dialog:**

1. Click on the Capture Bookmark button, ⭐, on the toolbar or in the Bookmarks panel.
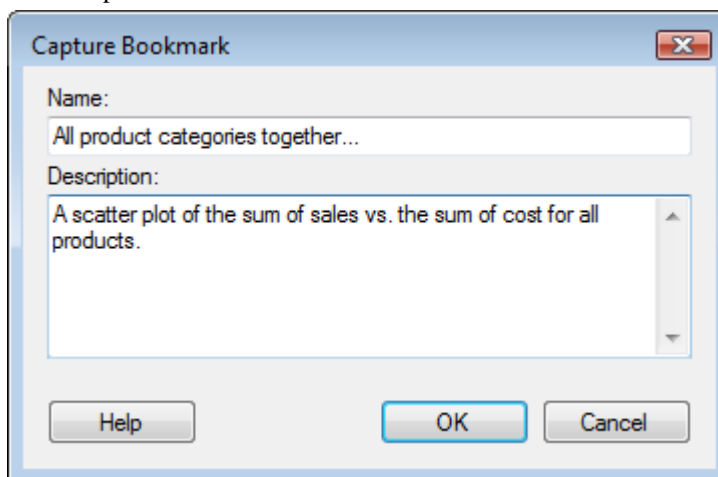


| Option | Description |
|---|---|
| **Name** | The name of the bookmark. |
| **Description** | Optional. A description of the bookmark and its contents. |

## 10.6.3.3 Details on Edit Bookmark (3.2 Bookmarks)

► **To reach the Edit Bookmark dialog:**

1. If the Bookmarks panel is not already visible, select **View > Bookmarks**.

2. In the Bookmarks panel, click on the Edit button, 🖊.
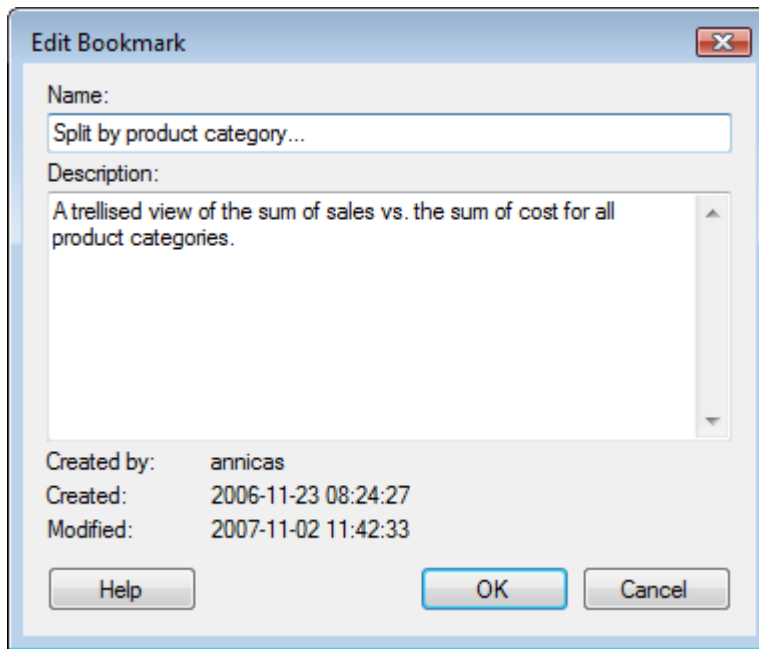
| Option | Description |
|---|---|
| **Name** | The name of the bookmark. |
| **Description** | Optional. A description of the bookmark and its contents. |
| **Created by** | Shows the username who created the bookmark in the first place. |
| **Created** | Shows the date when the bookmark was created. |
| **Modified** | Shows the date when the bookmark was last modified. |

**Note:** To update the settings of a previously added bookmark, right-click on the bookmark in the Bookmark Panel and select **Update...**. This will update the selected bookmark components with the current settings.

# 11 Lists

## 11.1 What are Lists?

Lists represent captured knowledge from one or many data sources. For example, you may have identified a number of transactions where the sum of cost was high. You can then create a list containing the rows representing these transactions. This will make it easier to access the interesting items for further analysis based on the findings. See Creating Lists, to learn more about adding new lists.

Lists are available from one session to the next and are automatically saved when you modify them. Lists are similar to Tags, but with Lists you work with the same collection of lists all the time, while Tags are specific to the current analysis. Combining the functionality from Lists and Tags can be very useful. You can create tag collections from lists, and you can create lists from tag collections. This means that Lists can be a way to transfer knowledge from one analysis to another, while Tags can be a way to use lists within an analysis. See What are Tags? and Creating Tag Collections from Lists to learn more.

You can view and manage lists in a popover, in a docked panel, or as a floating window. See Panels and Popovers

for more information. Click on the Lists button on the toolbar, , or select **View > Lists** to open Lists. The Lists panel or popover will open in the mode it was opened the last time you had it open. The image below shows the docked Lists panel.

## The Lists panel user interface
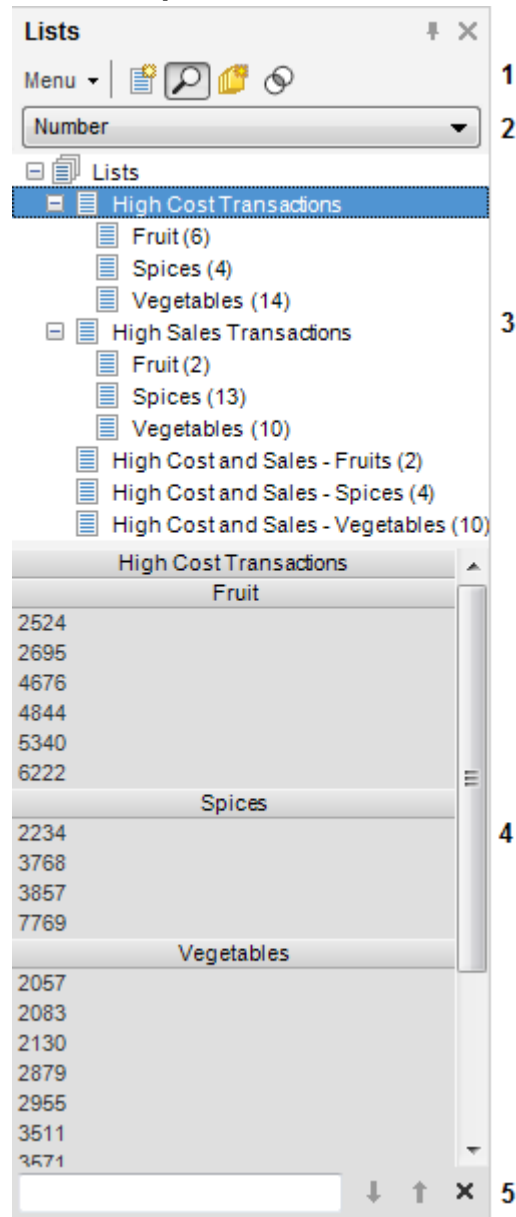


| Number | Description |
|--------|-------------|
| 1 | Toolbar |
| 2 | Identifier Selector |
| 3 | Lists |
| 4 | List Items |
| 5 | Search Field |

### Toolbar

The toolbar, consisting of buttons and a menu, is located in the upper part of the panel. You can perform most of the actions in the Lists panel from the toolbar.

### Identifier selector

The identifier column selector is where you select which column in the data set to use as the identifier. You can choose the identifier from any column that contains any of the following types: string, integer, longinteger, or date. In the example above, the column "Number" was selected. It contains values representing ID numbers of sales transactions. The values in the chosen column are the ones that are displayed as list items when you select one or more lists.

### Lists

The collection of lists has a hierarchical structure where the top level, named "Lists", cannot be removed. In the example above, five lists have been added on the level below the top level. Two of them, "High Cost Transactions" and "High Sales Transactions" contain three sublists each. You can expand and collapse lists with sublists by clicking on the +/- sign to the left of the list name. The number of items in a list is displayed to the right of the name. In the example above, the selected list (highlighted in blue) "High Cost Transactions" does not contain any list items itself, but its sublists do, as can be seen in the parentheses beside the sublists' names: Fruit (6), Spices (4), and Vegetables (10). To view the items of a list, click on the list to select it. The items will then be displayed in the lower part of the panel. To learn more about selecting lists, see Selecting Lists and List Items.

### List items

In the lower part of the panel, the list items of the selected lists are displayed. In the example above, the items of the "High Cost Transactions" list are displayed. To learn more about how to select lists and items, see Selecting Lists and List Items.

### Search field

You can search lists, list items, and annotations by entering a text string in the search field. To learn more about searching in the Lists panel, see Searching the Lists Panel.

### Read-only mode

As mentioned, you always work with the same list collection. This means that if more than one instance of Spotfire is open, you can only modify lists and items in one of these instances. The Lists panel will be in read-only mode in the other Spotfire instances. This is indicated by the read-only button, ![](read-only icon), on the toolbar. Click on the button to update the Lists panel view in case it was modified in the other instance. When a read-only instance of the Lists panel becomes available for editing again you must click the button, , before you can make any changes.

# 11.2    How to Use Lists

## 11.2.1    Selecting Lists and List Items

To select a list or item of interest, click on it. To select many lists or items, press Ctrl or Shift while clicking. You can also use Ctrl + click to deselect lists or items.

You can choose whether to show or hide all sublist items of a selected list. In the example below, the panel to the left shows the selected list's items, but not the sublists' items. The panel to the right displays the selected list's items as well as the sublists' items.
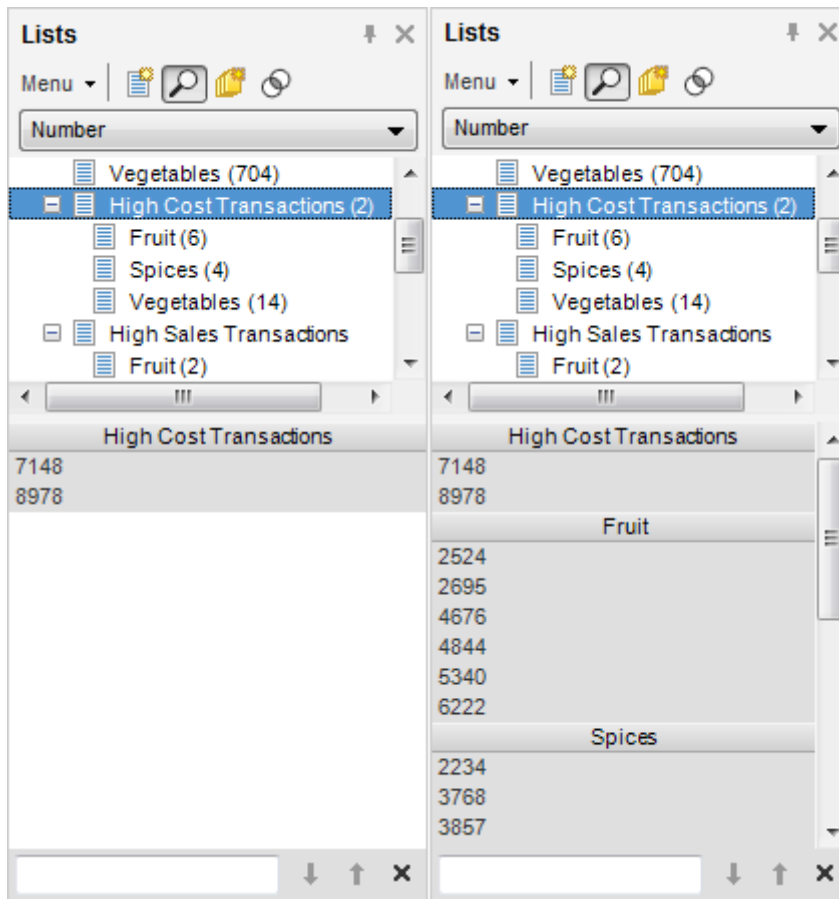
► **To show/hide sublist items:**

1. On the Lists toolbar, select **Menu > Show All Sublists**.

   Response: All the items in the sublists of the selected list or lists are displayed in the lower part of the panel.

## 11.2.2 Marking Items in Visualizations

You can mark items in visualizations by interacting with lists or list items in the panel.

► **To mark items in visualizations:**

1. Make sure you have selected the correct identifier column in the drop-down list.
2. Select the lists or list items of interest in the Lists panel.
3. On the Lists toolbar, select **Menu > Mark Items**.

   Response: The items corresponding to the selected lists or list items are marked in the visualizations.

   Comment: You can also double-click on a list or list item to mark the corresponding items in the visualizations.

► **To mark items automatically:**

1. On the Lists toolbar, select **Menu > Mark Automatically**.

   Response: When you click on a list or list item, the corresponding rows will now become marked automatically.

## 11.2.3    Creating Lists

You can create new lists in two ways. One way is to mark items in a visualization and make a new list based on these. Another way is to add a list from list logic, which means that you create a new list by comparing existing lists using boolean operators. This lets you determine which list items are present or not in a certain combination of lists. The result of the comparison is then added as a new list in the Lists panel.

### ► To add a list from marked items:

1. If Lists are not already visible, select **View > Lists**.
2. Select a list under which you want the new list to be added. To learn more about how to select lists and list items, see Selecting Lists and List Items.
3. In the visualization, mark the items you want to include in the new list.
4. Right-click in the visualization to display the pop-up menu.
5. Select **Marked Rows** to open the submenu.
6. Select **New List from Marked...**.

   Response: The New List from Marked dialog is opened.
7. In the **Name** field, type a name to use for the list.
8. Optionally, select a column to group the list by.

   Comment: If you select to group the list by a column, then the new list will have sublists, one sublist for each value in the column.
9. Click **OK**.

   Response: The new list is added as a sublist in the selected list. If more than one list is selected, the new list will be added on the hierarchical level below the closest common parent of the two lists.

### Example:
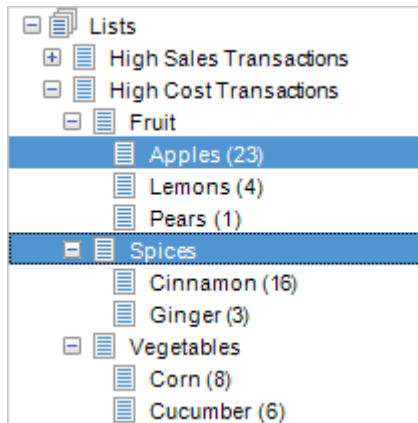


In the example above, two lists which are not on the same hierarchical level are selected. If you add a list from these selections, the new list will be added to the level just beneath the closest common parent of the selected lists; in this case, High Cost Transactions. If the two selected lists are on the same hierarchical level, the new list will be added on the same level as the selected lists.

### ► To add a list from List Logic:

1. If Lists are not already visible, select **View > Lists**.
2. Optionally, select the lists you want to compare in the Lists panel.
3. Click on the New List from List Logic button on the Lists panel toolbar, .

Response: The New List from List Logic dialog is opened. If you selected one or more lists in the panel before opening the dialog, the check boxes corresponding to these lists will be selected in the dialog.

4. Type a **Name** to use for the list in the provided text field.

5. In the **Lists to use** list, choose which lists to compare by selecting the corresponding check boxes.

   Comment: When you select a list, all its sublists are automatically included in the selection. Clear the check boxes for the sublists you do not want to include.

6. Under **Include items appearing**, select one of the three methods of logical operation to use when comparing the previously selected lists.

   Comment: You can select either **In all lists (AND)**, **In any list (OR)**, or **ONLY in this list**. If you select **ONLY in this list**, you need to select a list in the drop-down menu.

7. When done, click **OK** to close the dialog.

   Response: The new list is added in the Lists panel. Note that lists created from List Logic are always added to the top level in the list hierarchy.

# 11.2.4 Modifying Lists

You can modify existing lists in a number of ways, which are described below. For more information, see separate sections about Importing Lists and Items and Exporting Lists and Items.

## Rearranging the lists and items

Use drag and drop to change the order of lists and/or list items in the Lists panel. You can move several lists or items at a time. Just select the ones of interest and drag them to the desired location.

## Sorting list items

To sort the items in a list, right-click on that list and select **Sort List Items** from the pop-up menu. If a list contains sublists, you will need to sort each sublist separately.

## ► To add marked items to a list:

You can add items to an existing list by marking rows in a visualization.

1. If Lists are not already visible, select **View > Lists**.

2. Select the list to which you want to add items.

   Comment: You can only add items to one list at a time. To learn more about how to select lists, see Selecting Lists and List Items.

3. In the visualization, mark the items of interest.

4. Right-click in the visualization to display the pop-up menu.

5. Select **Marked Rows > Add Marked to List...**.

   Response: The marked rows are added as items to the selected list. The added items are selected in the lower part of the panel to make it easier to see which ones were added.

## ► To remove marked rows from a list:

You can remove items from an existing list by marking rows in a visualization.

1. If Lists are not already visible, select **View > Lists**.

2. Select the list from which you want to remove items.

   Comment: You can only remove items from one list at a time. To learn more about how to select lists, see Selecting Lists and List Items.

3. In the visualization, mark the rows of interest.

4. Right-click in the visualization to display the pop-up menu.

5. Select **Marked Rows > Remove Marked from List...**.

   Response: Items that correspond to the marked rows and are present in the selected list are removed from that list.

   Comment: Items in sublists will not be removed.

► **To delete lists or list items:**

1. If Lists are not already visible, select **View > Lists**.
2. Right-click on the list or item you want to delete.
3. Select **Delete** from the pop-up menu.
4. Click **Yes** in the dialog that opens.

   Response: The selected list (including any sublists) or list item is removed.

   Comment: Alternatively, you can select the lists or items you wish to delete and press the Delete key.

► **To cut, copy, and paste in the panel:**

1. If Lists are not already visible, select **View > Lists**.
2. Click on the list or item you want to cut or copy.

   Comment: Press Ctrl and click to select multiple objects in the Lists panel.
3. Right-click to open the pop-up menu.
4. Select **Cut** or **Copy**.

   Response: The selected object is placed on the clipboard. If you selected Cut, the selected object is also removed from the panel.
5. Right-click on the list to which you want to paste the contents of the clipboard.
6. Select **Paste** from the pop-up menu.

   Response: The list or list item is pasted into the selected location in the Lists panel.

   **Tip:** List items can also be pasted into tools outside of Spotfire, such as a text editor.

## 11.2.5    Importing Lists and Items

You can import lists or list items previously exported from TIBCO Spotfire or TIBCO Spotfire DecisionSite. List files exported from Spotfire have the extension .lists, while list files from DecisionSite have the extension .srp or .xml. List item files always have the extension .lst when exported from either Spotfire or DecisionSite.

► **To import lists:**

1. If Lists are not already visible, select **View > Lists**.
2. In the panel, select the list to which you want to add the imported list.

   Comment: You can only import to one list at a time. To learn more about how to select lists and list items, see Selecting Lists and List Items.
3. Open the **Menu**, and select **Import > Lists...**.
4. In the Import Lists dialog, locate the list file of interest.
5. Click **Open**.

   Response: The imported lists appear in the specified location in the Lists panel.

► **To import list items:**

1. If Lists are not already visible, select **View > Lists**.
2. In the panel, click to select the list to which you want to add the imported list items.

   Comment: You can only import to one list at a time.
3. Open the **Menu**, and select **Import > List Items...**.
4. In the Import List Items dialog, locate the list item file of interest.

5. Click **Open**.

Response: The imported list items appear in the specified location in the Lists panel.

## 11.2.6 Exporting Lists and Items

You can export lists or list items to a file. When you export an entire list, the structure is kept exactly as it appears in the Lists panel or popover, including any sublists. You can export many lists to the same file. Exported lists get the file extension .lists.

When you export individual list items, the items will be listed in the exported file with no structure from the original list preserved. This means that if you export all the list items from a list with sublists, you will be unable to see which sublist the individual items belonged to. Exported list item files get the extension .lst.

### ► To export lists:

1. If Lists are not already visible, select **View > Lists**.
2. Select the list or lists you want to export. Sublists are automatically included when you click on a list header.

   Comment: To select more than one list, press Ctrl and click on the lists to include. To learn more about how to select in the Lists panel, see Selecting Lists and List Items.
3. Open the **Menu**, and select **Export > Selected Lists...**.
4. Specify a file name and a location where you want to save the list or lists.
5. Click **Save**.

   Response: The file is saved to the specified location.

### ► To export list items:

1. If Lists are not already visible, select **View > Lists**.
2. Select the list or lists in the upper part of the Lists panel.
3. In the lower part of the Lists panel, select the list items you want to export.

   Comment: To select more than one list or item, press Ctrl and click on the lists or items to include. See Selecting Lists and List Items to learn more.
4. Open the **Menu**, and select **Export > Selected List Items...**.
5. Specify a file name and a location where you want to save the list items file.
6. Click **Save**.

   Response: The items or lists are saved as an LST file at the specified location.

## 11.2.7 Creating Tag Collections from Lists

You can create tag collections from one or more lists. Tag collections created from Lists work in the same way as those created in the Tags panel. To learn more about tags, see What are Tags?

### ► To create a new tag collection:

1. If Lists are not already visible, select **View > Lists**.
2. Select the lists you want to include in the new tag collection.
3. Click the Create Tag Collection button, , on the Lists toolbar.

   Response: A new tag collection, named Lists Tag Collection, is added to the tag panel. A corresponding column is also added to the data table.

**Note:** Tag collections have flat structures. This means that if you create a tag collection from lists containing sublists, their hierarchical structure will not be preserved in the tag collection.

## 11.2.8    Searching the Lists Panel

You can search for lists, list items, and annotations by entering a search string in the search field located at the bottom of the Lists panel or popover.
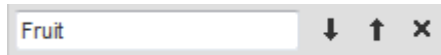


Searching for a simple text string, as in the example above, will by default look for matching text in the names of lists and list items. You can use wildcards and boolean operators to search for parts and combinations of words. For a listing of the basic search syntax, see Searching in TIBCO Spotfire. See below for a listing of search properties specific to Lists.

When you search for a specific word or combination of words, the results will be the list or lists that contain your search terms. The matching lists will be bolded in the upper part of the panel as in the example below.
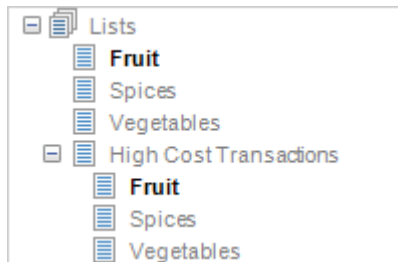


If you were searching for individual list items, click on the bolded lists to see those list items that match your search. You can use the arrow buttons on the right-hand side of the search field to step through the search matches.

### Lists specific search:

| Keyword | Example | Function |
|---|---|---|
| <text string> | fruit | Locates lists and list items with the specified word (or word part) in the name. |
| **name:**<name of list or list item> | name:apple<br><br>name::apple | Locates lists and list items with the specified word in the name.<br><br>The first example will return all lists and list items containing your search string, such as "Apple", "apples", "apples and bananas", and so on.<br><br>The second example will return only lists and list items which match your search string exactly. |
| **list:**<name of list> | list:fruit | Locates lists with the specified word (or word part) somewhere in the name. |
| **lists:**<number of lists> | lists:2<br><br>lists:>2 | Locates lists that contain the specified number of sublists. Note that a sublist will only count as one list even if that sublist itself contains sublists.<br><br>The first example will return lists containing exactly two sublists, while the second example will return lists with two sublists or more. |

| | | |
|---|---|---|
| **item:**<name of list item> | item:apple | Locates lists that contain list items with the specified word (or word part) somewhere in the name. |
| **items:**<number of list items> | items:14<br><br>items:<14 | Locates lists that contain the specified number of list items. Note that the number of items is always calculated on individual lists.<br>The first example will return lists containing exactly 14 items, while the second example will return lists with 14 items or fewer. |
| **annotation:** <content of annotation> | annotation:important | Locates lists or list items with an annotation containing the specified words.<br>**Note:** If the annotation has a specified name, you need to use the search property described below instead. |
| <annotation name>**:**<content of annotation> | "sum of sales":"below 8,000" | Locates lists or list items with the specified annotation name and where the annotation contains the specified words. Note that you must provide the entire annotation name and enclose it in quotation marks. |
| **type:**<type of wanted search matches> | type:list<br>type:item | The first example will locate all the lists in the panel. The second example will locate all the list items.<br>This search property is especially useful in combination with other search properties. For example:<br>type:list AND annotation:important<br>This will find all the lists where the annotation contains the word "important". |

### ► **To display the search field:**

1. On the Lists toolbar, click on the Toggle Search Field button, 🔍.
   OR
2. Select **Menu > Search...**.
   Response: The search field is displayed at the bottom of the Lists panel or popover.

### ► **To hide the search field:**

1. On the Lists toolbar, click on the Toggle Search Field button, 🔍.
   OR

2. To the right of the search field, click on the Hide Search Field button, ✖.
   Response: The search field is hidden.

You can also perform a search based on marked items in a visualization. This is a way to find if any of the items that you have marked in a visualization are also included in any of the lists in the lists collection.

### ► **To search for marked items in lists:**

1. Mark the items of interest in a visualization.
2. Right-click in the visualization to display the pop-up menu.
3. Select **Marked Rows > Search Marked in Lists**.

   Response: The matching lists are bolded in the upper part of the panel. In the search field, a search string corresponding to the marked rows will be displayed, as seen below.

   Item::"Apples" OR Item::"Bananas" OR Item::"Pears"   ↓  ↑  ✕
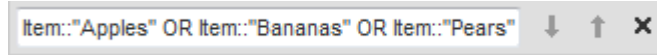
## 11.2.9     Working with Annotations

You can add annotations to both lists and list items. To view annotations, hover with the mouse pointer over the list or list item of interest. A tooltip with the annotations will appear, as seen in the example below.
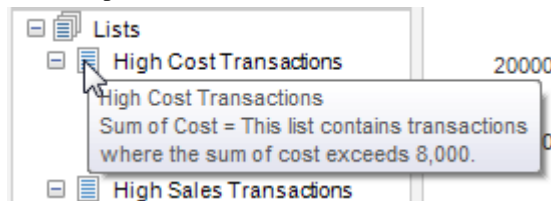


The tooltip shows the name of the list, "High Cost Transactions", followed by the annotation text. "Sum of Cost" is the name of the annotation, but specifying a name is optional. If you add many annotations to the same list or list item, the annotations will be listed vertically after each other in the tooltip. It is possible to search for lists and list items with a particular annotation. See Searching the Lists Panel to learn more about how to search for lists with annotations.

### ► **To add a new annotation:**

1. If Lists are not already visible, select **View > Lists.**
2. Right-click on the list or list item to which you want to add an annotation.
3. Select **List Properties** or **List Item Properties** from the pop-up menu.

   Response: Depending on whether you clicked on a list or a list item, either the List Properties dialog, or the List Item Properties dialog is opened.
4. Click on the **New...** button.

   Response: The New Annotation dialog is opened.
5. Enter the annotation in the **Annotation** text field.

   Comment: Press Ctrl + Enter to get a line break in the annotation text.
6. Optionally, enter a name in the **Name** field.
7. When done, click **OK**.

   Response: The annotation is added to the Annotations list.
8. To add more annotations to the same list or list item, repeat steps 4 to 7, and click **OK** when done.

   Response: The annotations are added to the selected list or list item.

### ► **To edit an annotation:**

1. If Lists are not already visible, select **View > Lists.**
2. Right-click on the list or list item with the annotation you want to modify.
3. Select **List Properties** or **List Item Properties** from the pop-up menu.

   Response: Depending on whether you clicked on a list or a list item, either the List Properties dialog, or the List Item Properties dialog is opened.

   Select the annotation you want to edit in the **Annotations** list.
4. Click on the **Edit...** button.

Response: The Edit Annotation dialog is opened.

5. Make the desired changes in the **Annotation** and **Name** fields.
6. When done, click **OK**.

   Response: The annotation is updated in the Annotations list.
7. To edit other annotations for the same list or list item, repeat steps 4 to 7, and click **OK** when done.

   Response: The annotations for the selected list or list item are updated.

### ► To remove an annotation:

1. If Lists are not already visible, select **View > Lists.**
2. Right-click on the list or list item with the annotation you want to remove.
3. Select **List Properties** or **List Item Properties** from the pop-up menu.

   Response: Depending on whether you clicked on a list or a list item, either the List Properties dialog, or the List Item Properties dialog is opened.
4. Select the annotation you want to remove in the **Annotations** list.
5. Click on the **Delete** button.

   Response: The annotation is removed from the **Annotations** list.
6. To remove more annotations for the same list or list item, repeat steps 4 and 5.
7. Click **OK** when done to close the dialog.

# 11.3  Details

## 11.3.1  Details on New List from Marked

### ► To reach the New List from Marked dialog:

1. If Lists are not already visible, select **View > Lists**.
2. Make sure the items you want to include in the list are marked in the visualizations, and select a location for the new list.

   Comment: See Selecting Lists and List Items to learn more about how to specify a location for the new list.
3. Click the New List from Marked button, , on the Lists toolbar.
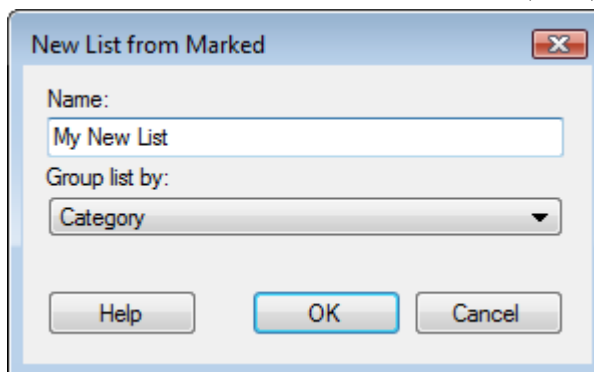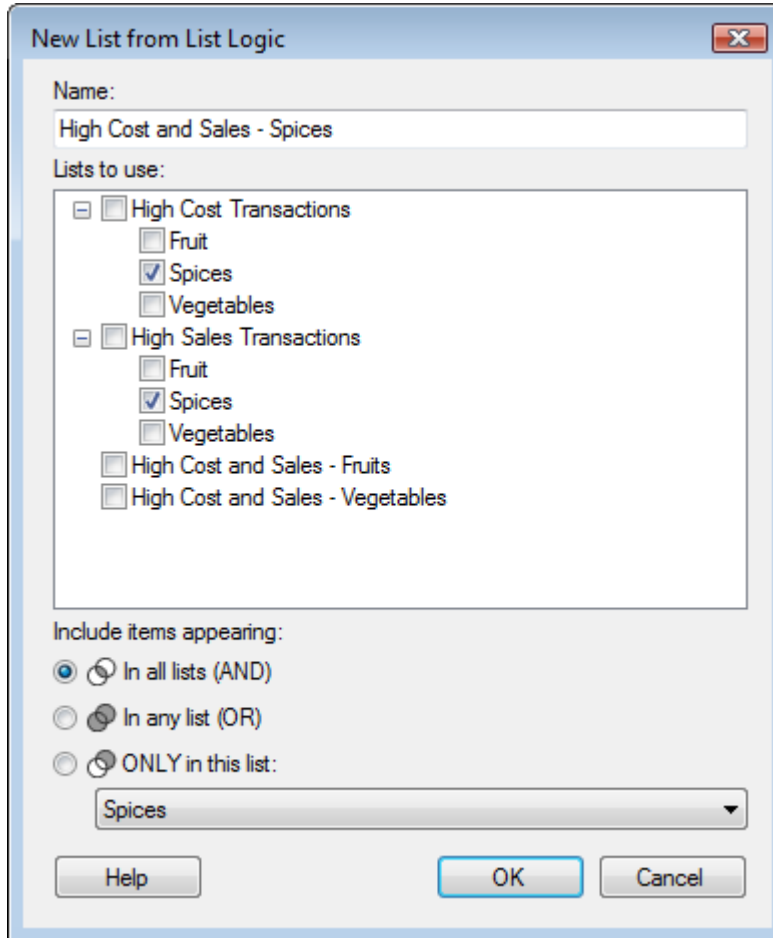


| Option | Description |
| --- | --- |
| **Name** | The name of the new list. |
| **Group list by** | Specifies a column to group the items in the list by. The new list will be divided into a number of sublists; one sublist for each value in the selected column. |

## 11.3.2    Details on New List from List Logic

► **To reach the New List from List Logic dialog:**

1.  If Lists are not already visible, select **View > Lists**.

2.  Click the New List from List Logic button, , on the Lists toolbar.
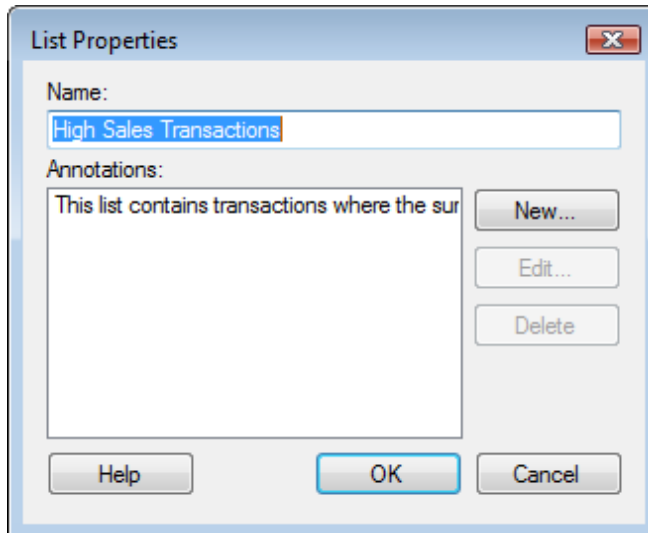


| Option | Description |
|---|---|
| **Name** | The name of the new list. |
| **Lists to use** | Displays the available lists. Select the lists from which you want to create a new list. |
| **Include items appearing** | |
| **In all lists (AND)** | Creates a new list containing only those items present in all of the selected lists. |
| **In any list (OR)** | Creates a new list containing all items present in any of the selected lists. Each item will appear only once in the new list, even if that item is present in several of the selected lists. |
| **ONLY in this list** | Creates a new list containing only those items present in the list that has been selected in the drop-down list, and not any of the other lists. |
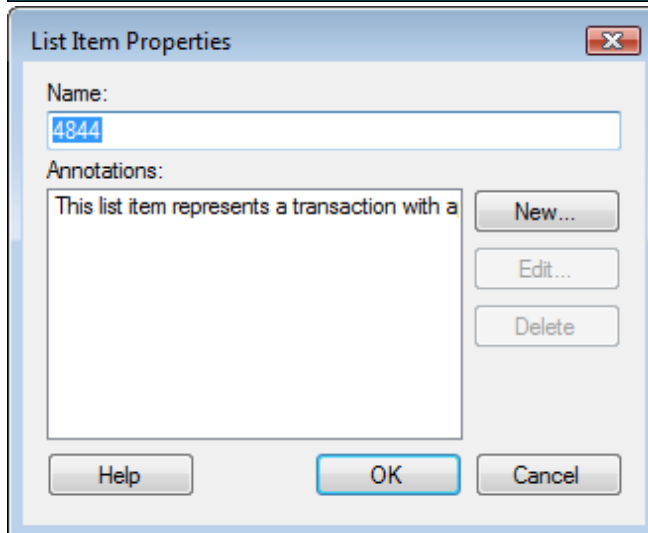
## 11.3.3    Details on List/List Item Properties

► **To reach the List/List Item Properties dialog:**
1. If Lists are not already visible, select **View > Lists**.
2. Right-click on the list or list item of interest.
3. From the pop-up menu, select **List Properties** or **List Item Properties**.

| Option | Description |
|---|---|
| **Name** | The name of the list or list item as it will be displayed in the Lists panel. |
| **Annotations** | Lists the annotations, if any, for the list or list item. |
| **New...** | Opens the New Annotation dialog, where you can define new annotations for the list or item. |
| **Edit...** | Opens the Edit Annotation dialog where you can edit the selected annotation. |
| **Delete** | Removes the selected annotation from the list or item. |

## 11.3.4    Details on New/Edit Annotation

► **To reach the New/Edit Annotation dialog:**

1. If Lists are not already visible, select **View > Lists**.
2. Right-click on the list or list item of interest.
3. From the pop-up menu, select **List Properties** or **List Item Properties**.

   Response: Depending on whether you clicked on a list or a list item, either the List Properties dialog, or the List Item Properties dialog is opened.

   To create a new annotation, click on the **New...** button. To edit an existing annotation, select the annotation to edit in the **Annotations** list, and then click on the **Edit...** button.

| Option | Description |
|---|---|
| **Annotation** | The contents of the annotation. |
| **Name** | An alias for the annotation can be entered here. This is optional. |

# 12 Collaboration

## 12.1 Collaboration Panel

### 12.1.1 What is the Collaboration Panel?

The collaboration panel is a tool that allows you to view web pages in Spotfire. This is useful, for instance, if you use some kind of web based collaboration tool, such as tibbr®, a communication and collaboration tool designed for the workplace, enabling users to collaborate by participating in communication threads about different subjects.
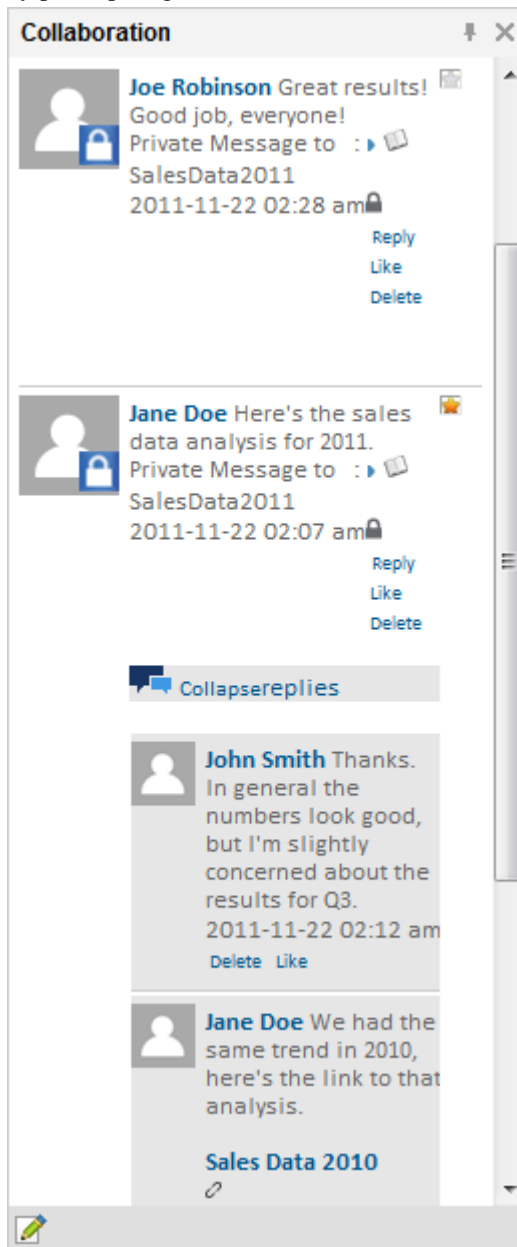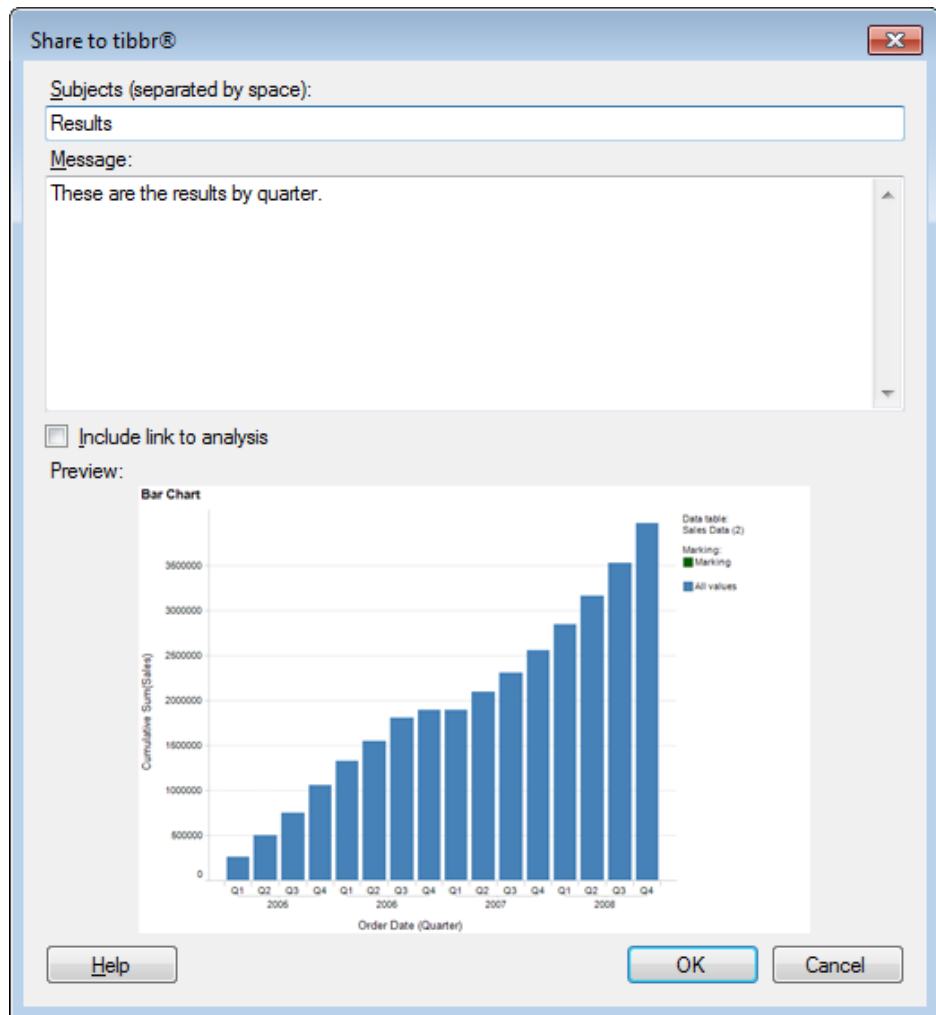


You can configure the Collaboration to go to different URLs on different pages in the analysis, thus making it possible to follow several different subjects within a single analysis.

## 12.1.2    How to Use the Collaboration Panel

► **To show and hide the Collaboration Panel:**

1. Click the Collaboration Panel icon, ⬜, in the status bar or select **View >
   Collaboration**.
   Response: The Collaboration Panel will be shown or hidden.

► **To configure the Collaboration Panel:**

1. In the Collaboration Panel, click the configure icon in the bottom left corner. ✎
   Response: The **Configure Collaboration Panel** dialog will open.
2. Type or paste the **URL** of interest in the dialog.
   Comment: The Collaboration Panel is configured per page in the analysis, so you can
   link the Collaboration Panel on different pages to different URLs.
3. Click **OK**.

## 12.1.3    Details on Configure Collaboration Panel

To configure the Collaboration Panel, you can enter a URL to a web page that TIBCO Spotfire
will show in the Collaboration Panel.

In TIBCO Spotfire, the Collaboration Panel will run an instance of the Internet Explorer
rendering engine installed on the machine to parse content.

In TIBCO Spotfire Web Player, the Collaboration Panel will open in an iframe and use the same
rendering function available to the rest of the Web Player. If the Collaboration Panel is used in
both TIBCO Spotfire and the Web Player, this could potentially lead to differences in html
rendering between different web browser versions.

**Note:** The Collaboration Panel is configured per page in the analysis, so you can link the
Collaboration Panel on different pages to different URLs.
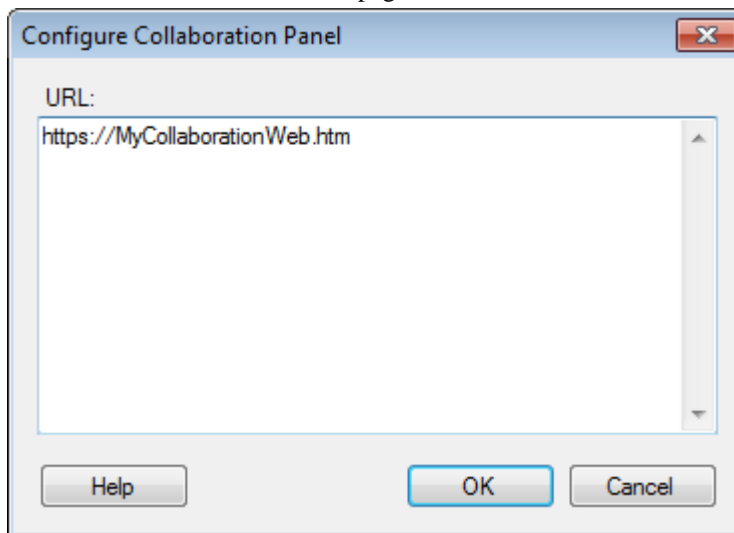


| Option | Description |
|--------|-------------|
| **URL** | Type or paste the URL to the web page of interest here. |

**Example:**

You can use the collaboration panel to integrate with tibbr®. For example, you may want to follow and post to a certain tibbr subject thread and show that thread in the collaboration panel.

To show a tibbr subject thread in the collaboration panel, the URL should be in the following format:

http(s)://<tibbr server>/a/gadgets/subject_messages.html?id=<subject>&name=<subject>
where <tibbr server> and <subject> should be replaced by your tibbr server and subject of choice. Also note that you need to use http or https depending on what the tibbr server configuration requires.

For example, if your tibbr server is called mytibbrserver, and you have a subject called SpotfireTibbrDemo, the URL will appear as below:

https://mytibbrserver.com/a/gadgets/subject_messages.html?id=SpotfireTibbrDemo&name=SpotfireTibbrDemo

See the tibbr®, tibbr Service, tibbr Community, and tibbr Community Service – Installation and Configuration manual for a list of other tibbr gadgets.

# 12.2    Share

## 12.2.1    What is the Share Menu?

The Share menu allows you to quickly share your analyses with other people you are collaborating with. If you are using tibbr in your organization, you can post messages with images of the analysis you are working with to the tibbr® flow. Your company may also have added other collaboration tools, besides tibbr®, to the Share menu.

Right click on a visualization, on a bookmark, or on a page title to access the Share menu. Depending on what you have clicked upon you will see different options on the menu.
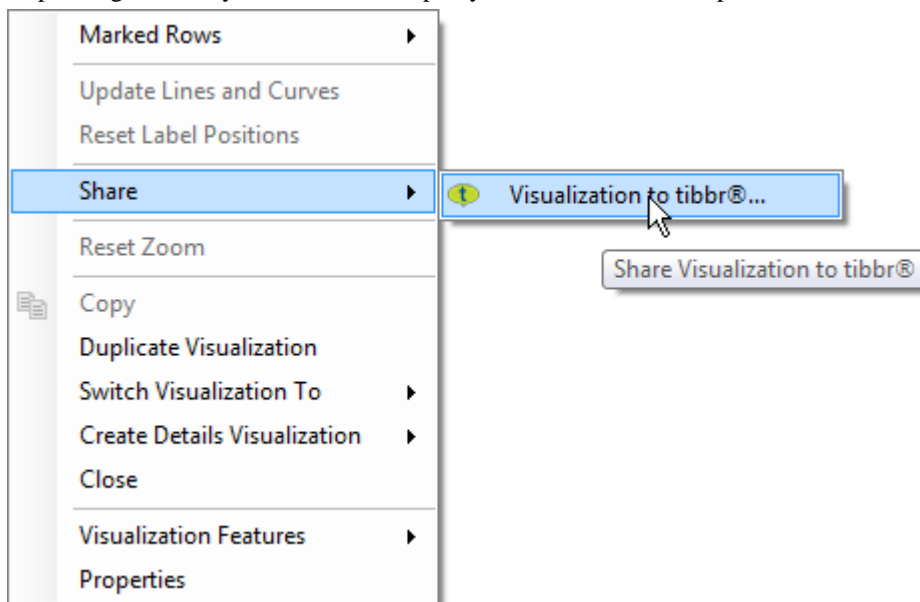


| Option | Description |
| --- | --- |
| **Share** | |
| **Page to tibbr®** | [When right-clicking on a page title.]<br>Opens the Share to tibbr® dialog so that the selected page can be shared to tibbr. |

|  |  |
|---|---|
| **Bookmark to tibbr®** | [When right-clicking on a bookmark.] <br> Opens the Share to tibbr® dialog so that the selected bookmark can be shared to tibbr. |
| **Visualization to tibbr®** | [When right-clicking on a visualization.] <br> Opens the Share to tibbr® dialog so that the selected visualization can be shared to tibbr. |

**Tip:** To follow tibbr® flows from within TIBCO Spotfire, you can configure the Collaboration Panel to view different tibbr® subjects.

## 12.2.2    Details on Login to tibbr®

To be able to log into a tibbr® server, the Spotfire *tibbr® host* preference must be set by a Spotfire Administrator. This preference is found under **Application > tibbr®** in the **Preferences** tab in the **Spotfire Administration Manager**. Enter the hostname without http://, for instance `tibbrserver`.



| Option | Description |
|---|---|
| **Username** | Your login name on the tibbr® server. |
| **Password** | Your password on the tibbr® server. |
| **tibbr host** | The hostname of the tibbr® server. <br> **Note:** This cannot be changed. Instead, this is a preference set by the Spotfire Administrator. See above. |

## 12.2.3    Details on Share to tibbr®

tibbr® is a communication and collaboration tool designed for the workplace, enabling users to collaborate by participating in communication threads about different subjects.

If you use tibbr® to collaborate with your colleagues, you may want to share your Spotfire analyses with them. Specifically, you can share pages, visualizations, and bookmarks.

### ► To reach the Share to tibbr® dialog:

1. Right click on a page title, in a visualization, or on a bookmark and select **Share > Page/Visualization/Bookmark to tibbr®**.

   Response: If this is the first time you share to tibbr® during this Spotfire session, you will be prompted to log into the tibbr® server. See Details on Login to tibbr.
   Otherwise, you will be directly presented with the dialog below:

| Option | Description |
|---|---|
| **Subjects** | Type the tibbr® subject to which to post here. If you start writing something you will be presented with a list of available subjects, starting with that letter, to choose from.<br>**Note:** If you do not enter a subject, you will post to your own wall. |
| **Message** | Type a message to post to tibbr here. |
| **Include link to analysis** | Select this option to include a link to the Web Player version of the analysis.<br>**Note:** This option will only be available if the analysis is stored in the library and the Web Player is installed and configured. Otherwise, only the Preview image will be shown. |
| **Preview** | This is a preview of the image that will be posted to tibbr. |

# 13　Tools

## 13.1　Find

### 13.1.1　Find

The find tool is a fast way to find contents in your data, navigate in the analysis, and to perform actions found in the menus of Spotfire. It consists of a text field where you enter a search string and a list of results for the search.

```
ap|                                                    ×

Perform Action
Apply Filter Organization
Add Values to Marking
Month - April
Type - Apples
```
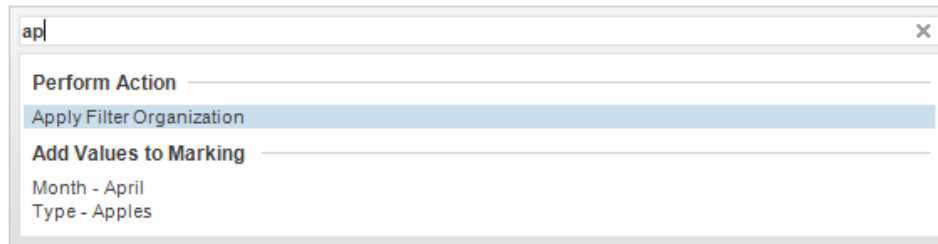
**► To reach the Find dialog:**

1. Press **Ctrl+F**.
   OR
2. Select **Tools > Find...**.

**Searchable categories**

- **Go to Page** - If there are several pages in the analysis, select a page from the list to go to it.
- **Go to Visualization** - Select a visualization to go to the relevant page in the analysis and highlight the visualization.
- **Tag Marked Rows With** - If you have created tags in the Tags panel, select a tag in the list to add the marked values in the visualization to that tag.
- **Perform Action** - Select an action to perform it.
- **Add Values To Marking** - Mark a selected subset from the data table. If all the values are already marked, they will be unmarked by this. If there are multiple data tables, each table with matching data will get a separate category with the name of the data table added. Select **All matching values** to mark all the matching values in a specific column or in the entire data table. If there are more than 1000 matching values for a column, the individual values will not be listed, just the All matching values option.
- **Open File** - Lists recently used files; select one to open it.

**Example**

When text is entered in the search field, all matching actions, parts of the analysis, and subsets of the data are returned. Some additional examples of what can be entered in the search field are:

- If nothing is entered, the latest executed actions from find are listed.
- **y:sales** will list all visualizations with Sales on the y-axis.
- **sales category:page** will only list all pages with "sales" in the title. **Category:** can be used with all the categories listed above; type part of the category's name after the colon.

### Syntax

You can also use logical expressions in your search strings. For information on the syntax for searches, see the Searching in TIBCO Spotfire page.

# 13.1.2    Searching in TIBCO Spotfire

There are many places in TIBCO Spotfire where you can search for different items. For example, you can search for filters, analyses in the library or elements used to build information links in the Information Designer. All of the available search fields use the same basic search syntax, which is presented below. For more information regarding search of a specific item, see the links at the bottom of this page.

### Basic Rules

- By default, a search will match against all words in the name, description or keywords. Searching for **Apple** will match every item that includes words that start with Apple, and will match items with the values "Apples are tasty" and "This is an apple".
- Search matches the beginning of all words. For example, **ple** will match Plenty and Plexiglas but not Apple.
- Search is not case-sensitive.
- Boolean AND is implicit when words in the search expression are separated by space. For example, **Apple Banana** will match anything where a word starts with Apple and another word starts with Banana.

| Keyword | Example | Function |
|---|---|---|
| * | *ple<br>*ple* | Finds items with a word ending in **ple**.<br>Finds items where a word contains **ple**. |
| Quotation marks | "A Green Apple" | Finds items where the word starts with the phrase "**A Green Apple**". |
| Double quotation marks | "9"" nails" | Finds items where the word starts with **9" nails**. Add a second double quote to escape a literal quote. |
| AND | Apple AND Fruit | Finds items with a word that starts with **Apple** and another word that starts with **Fruit**. |
| OR | Apple OR Banana | Finds items that include a word that starts with **Apple** or **Banana**. |
| NOT | Ban NOT *ana | Finds items that have a word that starts with **Ban** but does not end with **ana**. For example, **Bangles** and **Banned** would be found, but **Banana** would not. |
| ( ) | Apple and (Banana or Pear) | Used to group items in Boolean searches. See below for more information about searching for text within parentheses. |
| Quoted keywords | "and"  "or"  "not" | Finds strings that are protected keywords. Just typing **and** in the search field will not find anything since the |

| | | | |
|---|---|---|---|
| | | | word **and** is a protected keyword. If you need to search for the word "**and**", you must use quotation marks around it. |
| : | | DataType:Integer | [Not applicable for row search.] |
| | | | The colon is used to search for item attributes. In this example it finds columns where the column property DataType has a word that starts with Integer. |
| | | | Almost any property can be used in the search, including custom properties. See Column Properties Descriptions for information about the available default column properties. |
| :: | | Name::Apple | [Not applicable for row search.] |
| | | | Finds items where the exact value of the property Name is **Apple**. In this example, an item named only **Apple** would match, but an item named **Apple from Spain** would not. |
| | | DataType::Date | If you want to search for the Date data type, and not get any hits on DateTime columns, use :: instead of a single colon. |
| :< | | DistinctValueCount:<10 | [Not applicable for row search.] |
| | | | Finds columns with less than or equal to 10 unique values. |
| :> | | RowCount:>10 | [Not applicable for row search.] |
| | | | Finds columns with more than or equal to 10 values. |
| Null, Empty or not existing column property. | | Tag:null  or  DistinctValueCount:null | [Not applicable for row search.] |
| | | | Finds all items with no Tags or if the column property DistinctValueCount does not exist. |
| | | Keywords:null | Finds all items with no keywords. |

## Logical precedence

Search expressions are evaluated from left to right for logical operators with the same precedence. For example, the search expression:

Apple Banana or Pear

will be evaluated as

(("Apple") AND (("Banana") OR ("Pear")))


**Tip**: If you cannot find what you are looking for, try adding more wildcards. For example, to locate a filter called "Sales ($)" , enter the search expression "Sales ($*", to avoid interpreting the text within the parenthesis as a Boolean expression.

# 13.2 Data Relationships

## 13.2.1 What is the Data Relationships Tool?

The Data Relationships tool is used for investigating the relationships between different column pairs. The tool always works on the currently filtered data. The Linear regression and the Spearman R options allow you to compare numerical columns, the Anova option will help you determine how well a category column categorizes values in a (numerical) value column, the Kruskal-Wallis option is used to compare sortable columns to categorical columns, and the Chi-square option helps you to compare categorical columns.

For each combination of columns, the tool calculates a p-value, representing the degree to which the first column predicts values in the second column. A low p-value indicates a probable strong connection between two columns.

The resulting table displays the p-value for each combination of Y and X columns. The table is sorted by p-value. Clicking on a column heading will sort the rows according to that column.

### Example:

Consider the following data table, which lists a few attributes of a group of people:

Eye color, Gender, Height (m), Weight (kg), Age
blue, female, 1.65, 62.7, 29
blue, female, 1.50, 57.0, 31
blue, female, 1.69, 64.2, 18
blue, male, 1.58, 63.2, 31
green, male, 1.76, 70.4, 44
green, male, 1.82, 72.8, 26
green, male, 1.92, 76.8, 33
green, female, 1.54, 61.6, 39
green, female, 1.76, 70.4, 22
brown, female, 1.67, 66.8, 34
brown, female, 1.47, 58.8, 41
brown, male, 1.69, 71.0, 23
brown, male, 1.78, 74.8, 35
brown, male, 1.83, 76.9, 20
brown, female, 1.62, 87, 62
blue, male, 1.87, 86.5, 23
brown, male, 1.76, 92, 65
brown, male, 1.62, 59, 13
green, female, 1.70, 59, 32

### ► To test if there is a relationship between numerical columns:

1. Select **Tools > Data Relationships...**.
   Response: The Data Relationships dialog is displayed.
2. Select **Linear Regression (numerical vs numerical)** as the comparison method.

3. Send all Available Y-columns to the Selected Y-columns list by clicking on them in the list and then click on **Add >**.



4. Send all Available X-columns to the Selected X-columns list by clicking on them in the list and then click on **Add >**.



5. Click **OK**.

Response: A new data relationships table is created, together with a scatter plot based on the marked row in the table.

## Data Relationships (Linear Regression)

| Y (numerical) | X (numerical) | p-value ▲ | FStat | RSq ▼ | R | Df |
|---|---|---|---|---|---|---|
| Height (m) | Weight (kg) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Height (m) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Age | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Age | Weight (kg) | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Height (m) | Age | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |
| Age | Height (m) | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |

## Data Relationships (Details)
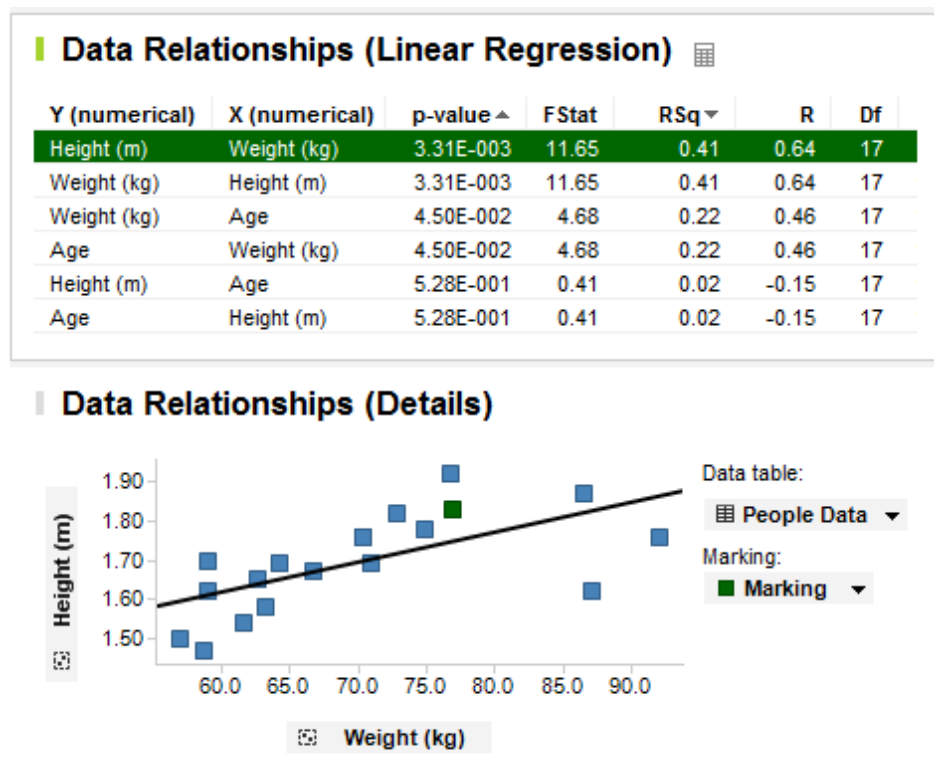


The scatter plot shows the Y and X column from the currently marked row in the data relationships table. Since Height vs. Weight got the lowest p-value of all columns investigated, this column pair is listed first in the data relationships table, and is marked by default. Not surprisingly, it appears as if there is a correlation between the Height and Weight of the test persons.

By clicking on a different row in the data relationships table, the scatter plot changes to display the new column pair:

## Data Relationships (Linear Regression)

| Y (numerical) | X (numerical) | p-value ▲ | FStat | RSq ▼ | R | Df |
|---|---|---|---|---|---|---|
| Height (m) | Weight (kg) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Height (m) | 3.31E-003 | 11.65 | 0.41 | 0.64 | 17 |
| Weight (kg) | Age | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Age | Weight (kg) | 4.50E-002 | 4.68 | 0.22 | 0.46 | 17 |
| Height (m) | Age | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |
| Age | Height (m) | 5.28E-001 | 0.41 | 0.02 | -0.15 | 17 |

## Data Relationships (Details)



Data table: ▦ People Data ▼

Marking: ■ Marking ▼

The p-value for Age vs. Height is quite high and according to the scatter plot, there does not seem to be any significant correlation between those two columns in the current data.

# 13.2.2 How to Use Data Relationships

**► To calculate Data Relationships:**

1. Select **Tools > Data Relationships...**.

   Response: The Data Relationships dialog is displayed and all available columns are listed in the Available columns field.

2. Type a **Comparison name** or use the default name Data Relationships.

3. Select the **Comparison method** you wish to use, depending on the type of columns that you want to compare.

   Comment: Choose from **Linear regression (numerical vs numerical)**, **Spearman R (numerical vs numerical), Anova (numerical vs categorical)**, **Kruskal-Wallis (sortable vs categorical)** and **Chi-square (categorical vs categorical)**.

4. Move the desired columns into the two fields Selected Y-columns and Selected X-columns.

   Comment: Select columns from Available Y-columns and Available X-columns and click on the corresponding Add > button. You must select at least one column for the Y-columns field and one for the X-columns field. Click < Remove to move a column back to the list of available columns.

5. Click **OK**.

   Response: A new page with the specified comparison name is created, showing a data relationships table and a scatter plot (for linear regression), a cross table (for chi-square) or a box plot (for Anova and Kruskal-Wallis).

#### ► **To use the Data Relationships table to control the other visualization:**

1. In the data relationships table, click on the column pair you are interested in.

   Response: The visualization under the table is updated to show the currently marked columns on its axes.

#### ► **To update the Data Relationships table:**

If you filter your data after performing a data relationships calculation, the p-values in the table will no longer reflect the current selection in your other visualizations, and the Refresh calculation icon will turn red.

1. Click on the Refresh calculation icon to the left of the Data Relationships table, .

   Response: The Data Relationships table is updated to show calculated values for the currently filtered data.

#### ► **To change the number of measures shown in the table:**

1. Right-click on the Data Relationships table.
2. Select **Properties** from the pop-up menu.
3. Select the **Columns** page in the dialog.
4. Add or remove columns from the Selected columns list by using the **Add >** or **< Remove** buttons.

   Comment: Click on a column in the Selected columns list and then click Move Up or Move Down to change the order of the columns.
5. Click **Close**.

#### ► **To sort the data relationships table:**

1. Click on the column header by which you want to sort the table.

   Response: The table is sorted in ascending order.

   Comment: Click on the column heading again to sort in descending order. Note the small arrow beside the column title, showing the sort order.

#### ► **To rearrange the horizontal order of the table:**

1. Place the mouse pointer on a table header.
2. Drag the header to the desired position.

#### ► **To adjust the column width:**

1. Place the mouse pointer on the separator between two column headers.
2. Click-and-drag the separator to the desired position.

   Comment: You can also right-click on the column header and select Column Width... from the pop-up menu to specify a column width in number of pixels.

## 13.2.3    Details on Data Relationships



| Option | Description |
|---|---|
| **Data table** | Specifies the data table on which the calculation will be performed. |
| **Calculation name** | The name that will be displayed on the new page, created by the data relationships calculation. |
| **Comparison method** | The method by which you wish to compare the columns. Choose from **Linear regression (numerical vs numerical)**, **Spearman R (numerical vs numerical), Anova (numerical vs categorical)**, **Kruskal-Wallis (sortable vs categorical)** and **Chi-square (categorical vs categorical)**. |
| **Available Y-columns** | The columns available for use on the Y-axis in the calculation. |
| | Click a column name in the list to select it. To select more than one column, press Ctrl and click the column names in the list. Use the Add > button to send the selected columns to the Selected Y-columns field, see below. |
| **Add >** | Moves the selected columns from the Available Y-columns field to the Selected Y-columns field. |

| | |
|---|---|
| **< Remove** | Removes the selected columns from the Selected Y-columns field. |
| **Remove All** | Removes all columns from the Selected Y-columns field. |
| **Selected Y-columns** | The selected columns that you wish to compare against the columns below. |
| **Available X-columns** | The columns available for use on the X-axis in the calculation. Click a column name in the list to select it. To select more than one column, press Ctrl and click the column names in the list. Use the Add > button to send the selected columns to the Selected X-columns field, see below. |
| **Add >** | Moves the selected columns from the Available X-columns field to the Selected X-columns field. |
| **< Remove** | Removes the selected columns from the Selected X-columns field. |
| **Remove All** | Removes all columns from the Selected X-columns field. |
| **Selected X-columns** | The selected columns. Categorical columns should typically not contain too many unique values. If more than 1000 unique values are available in a selected column, the resulting data relationships table for the Anova, Kruskal-Wallis and Chi-square options will display an error. |

## 13.2.4 Data Relationships Column Descriptions

The Data Relationships table displays a number of different measures for the different types of calculations. A description of the statistics available is found below:

### All calculations

| Option | Description |
|---|---|
| **Y (numerical/categorical)** | The name of the Y column concerned. |
| **X (numerical/categorical)** | The name of the X column concerned. |
| **p-value** | The calculated p-value, representing the degree to which the first column predicts values in the second column. A low p-value indicates a probable strong connection between two columns. |
| **n** | The number of valid pairs. |

### Linear regression

| Option | Description |
|---|---|
| **FStat** | The F-statistic calculated according to [Ref. Arnold]. |
| **RSq** | The squared correlation value. |
| **R** | The correlation value. |

| | |
|---|---|
| **Df** | The degrees of freedom = the number of non-empty rows in the column pair - 2. |

## Spearman R

| Option | Description |
|---|---|
| **FStat** | The F-statistic calculated according to [Ref. Lehmann]. |
| **Rank R sqared** | The square of rank R. |
| **Rank R** | The correlation of the ranked values of the X and Y columns. |
| **Df** | The degrees of freedom = the number of non-empty rows in the column - 2. |

## Anova

| Option | Description |
|---|---|
| **FStat** | The F-statistic. See Anova algorithm for more information. |
| **S2Btwn** | The sum of squares between groups. |
| **S2Wthn** | The sum of squares within groups. |
| **dfBtwn** | The degree of freedom between groups. |
| **dfWthn** | The degree of freedom within groups. |

## Kruskal-Wallis

| Option | Description |
|---|---|
| **H-stat** | The H-statistic. See Kruskal-Wallis algorithm for more information. |
| **Df** | The degrees of freedom = k-1, where k is the number of categories. |

## Chi-square

| Option | Description |
|---|---|
| **Chi2-stat** | The Chi2-statistic, which is a direct relationship between the observed and the expected values. |
| **Df** | The degrees of freedom = (I-1)(J-1) where I is the number of unique values in the first column and J is the number of unique values in the second column. |

# 13.2.5    Data Relationships Error Codes

If your data contain empty values or errors, or if filtering has reduced the number of valid rows too much, the data relationships calculation may result in errors for specific cells in the table. The available error codes are described below:

| Error Code | Description |
|---|---|
| **#No valid pairs** | There were no valid rows to calculate on. This may occur if you have filtered out too many rows, or if the two compared columns have a different set of valid rows on which to perform the calculation only. |
| **#Only one valid pair** | There were not enough valid rows to perform a calculation. See above. |
| **#Only two valid pairs** | There were not enough valid rows to perform a calculation. The number of valid pairs must be larger than two. See '#No valid pairs' above. |
| **#Only one unique value for column '{0}'** | This happens if the number of unique values equals one. |
| **#More than 1000 unique values for categorical column '{0}'** | Categorical data relationships methods, i.e., Anova, Kruskal-Wallis and Chi-square, cannot be used on columns where the number of unique values is larger than 1000. In that case, the number of categories to split by becomes too large. |
| **#All values unique for column '{0}'** | Categorical data relationships methods, i.e., Anova, Kruskal-Wallis and Chi-square, cannot be used if you only have a single value within each category. |

## 13.2.6     Theory and Methods

### 13.2.6.1     Overview of Data Relationships Theory

The Data Relationships tool calculates a probability value (p-value) for any combination of columns. This p-value can be used to determine whether or not the association between the columns is statistically significant.

- Linear regression
- Spearman R
- Anova
- Kruskal-Wallis
- Chi-square

### Linear regression

(For a mathematical description of linear regression, see Data Relationships Linear regression algorithm.)

The linear regression option is used to calculate an F-test investigating whether the independent variable X predicts a significant proportion of the variance of the dependent variable Y.

Linear regression, or the "least squares" method, works by minimizing the sum of the square of the vertical distances of the points from the regression line and obtain a correlation coefficient. The correlation coefficient can take values between -1 and +1. If there is a perfect negative correlation, then R=-1; if there is a perfect positive correlation, then R=+1. If R=0, then there is no correlation at all and the two columns are completely independent of each other.
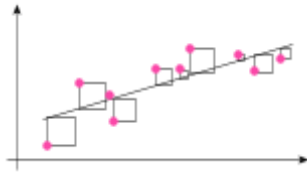
## Spearman R

(For a mathematical description of Spearman R, see Data Relationships Spearman R algorithm.)

The Spearman R option is used to calculate a nonparametric equivalent of the correlation coefficient. It is used on occasions when the variables can be ranked. Since it is only the rank of the values that is interesting in the calculation, Spearman R can be used even if the underlying distribution family is unknown, provided that each row can be assigned a rank. Similar to Linear regression, the correlation coefficient can take values between -1 and +1.

## Anova

(For a mathematical description of Anova, see Data Relationships Anova algorithm.)

*Anova* means **An**alysis **o**f **Va**riance. The Anova option is used for investigating how well a category column categorizes a value column. For each combination of category column and value column, the tool calculates a p-value, representing the degree to which the category column predicts values in the value column. A low p-value indicates a probable strong connection between two columns.

Consider the following scatter plot representing data about eight subjects: gender (male/female), owns car (yes/no), income ($), and height (cm). Income is plotted on the horizontal axis, and height on the vertical.
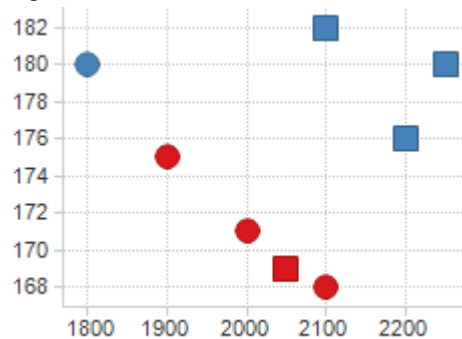


Blue markers represent car owners, red markers represent non-car owners. Squares represent male subjects, circles female subjects. If we perform an Anova calculation with gender and car as category columns, and income and height as value columns, the result will be four p-values as follows.

| Value column | Category column | p-value |
| --- | --- | --- |
| Height | Car | 0.00464 |
| Income | Gender | 0.047 |
| Height | Gender | 0.433 |
| Income | Car | 0.519 |

A low p-value indicates a higher probability that there is a connection between category and value column. In this case, Height and Car seem closely related, while Income and Car are not. We can verify this by examining the scatter plot.

See Requirements on input data for data relationships for more information about what data to use with this tool.

## Kruskal-Wallis

(For a mathematical description of the Kruskal-Wallis test, see Data Relationships Kruskal-Wallis algorithm.)

The Kruskal-Wallis option is used to compare independent groups of sampled data. It is the nonparametric version of one-way Anova and is a generalization of the Wilcoxon test for two independent samples. The test uses the ranks of the data rather than their actual values to calculate the test statistic. This test can be used as an alternative to the Anova, when the assumption of normality or equality of variance is not met.

## Chi-square

(For a mathematical description of the chi-square calculation, see Data Relationships Chi-square independence test algorithm.)

The chi-square option is used to compare observed data with the data that would be expected according to a specific hypothesis (for example, the null-hypothesis which states that there is no significant difference between the expected and the observed result). The chi-square is the sum of the squared difference between observed and expected data, divided by the expected data in all possible categories. A high chi-square statistic indicates that there is a large difference between the observed counts and the expected counts.

From the chi-square statistic it is possible to calculate a p-value. This value is low if the chi-square statistic is high. Generally, a probability of 0.05 or less is considered to be a significant difference.

# 13.2.6.2    Data Relationships Linear Regression Algorithm

The Linear Regression option calculates the p-value under the assumption that there are no empty values in the data table.

**Note:** If there are empty values in the data table, the data table will first be reduced to the rows containing values for both the first and the second column.

Let $n$ be the total number of values and denote by $(x_i, y_i)$, $i = 1, ..., n$ the set of data points to fit a straight line

$$y = \beta_0 + \beta_1 x$$
.

The least square estimates of $\beta_0$ and $\beta_1$ are:

$$\beta_0 = \frac{\left(\sum_{i=1}^{n} x_i^2\right)\left(\sum_{i=1}^{n} y_i\right) - \left(\sum_{i=1}^{n} x_i\right)\left(\sum_{i=1}^{n} x_i y_i\right)}{n \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}$$

$$\beta_1 = \frac{n \sum_{i=1}^{n} x_i y_i - \left(\sum_{i=1}^{n} x_i\right)\left(\sum_{i=1}^{n} y_i\right)}{n \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}$$

The p-value is then calculated from the F-distribution where the F-statistic is calculated with the sum of squares between the estimated line and the total mean of the $y_i$'s having one degree of freedom as numerator and the residual sum of squares divided by the number of degrees of freedom (n-2) as denominator.

## References:

Arnold, Steven F., The Theory of Linear Models and Multivariate Analysis.

Rice, John A., Mathematical Statistics and Data Analysis, 2nd ed. pp 509.

## 13.2.6.3　　Data Relationships Spearman R algorithm

The Spearman R option calculates the p-value under the assumption that there are no empty values in the data table.

**Note:** If there are empty values in the data table, the data table will first be reduced to the rows containing values for both the first and the second column.

The Spearman R calculation is a nonparametric comparison based on the ranks of the observations, rather than on the values themselves. This test can be used as an alternative to the Linear Regression, when the assumption of normality or equality of variance is not met. For example, this is useful on occasions where outliers contribute too much to the calculations in a parametric test.

Spearman R can be calculated in several different ways depending on whether or not ties are common in the data table , that is, if several values are identical and thus have the same rank. Since it is quite common with ties in general data analysis, TIBCO Spotfire uses an algorithm where these can be handled. When ties occur, they are all given the mean of the ranks that they would have had if they had not been exactly identical (see Ranking Functions, "ties.method=average").

The correlation value is calculated according to:

$$r_s = \frac{1 - \frac{6}{N^3 - N}\left(D + \frac{1}{12}\Sigma_k(f_k^3 - f_k) + \frac{1}{12}\Sigma_m(g_m^3 - g_m)\right)}{\left(1 - \frac{\Sigma_k(f_k^3 - f_k)}{N^3 - N}\right)^{\frac{1}{2}}\left(1 - \frac{\Sigma_m(g_m^3 - g_m)}{N^3 - N}\right)^{\frac{1}{2}}}$$

where

$N$ = the number of valid pairs of measurements ($x_i$, $y_i$),

$f_k$= the number of ties in the $k^{th}$ group of ties among the Y-column values

and

$g_m$= the number of ties in the $m^{th}$ group of ties among the X-column values.

The test statistic, FStat is then:

$$FStat = r_s^2\left(\frac{N - 2}{1 - r_s^2}\right)$$

where

$r_s^2$= RSq = the squared correlation value.

In TIBCO Spotfire, the Spearman t method has then been applied to calculate the p-values. This method has been chosen in order to allow the same calculation method to be used at all times and with an acceptable performance. The Spearman exact method is not suitable for cases with a lot of ties in the data. The Spearman Monte-Carlo method is suitable for any type of data, but when a lot of p-values are to be calculated then this method has too low performance.

### References:

Lehmann, E. L., Nonparametrics: Statistical Methods based on Ranks (1975), p. 297 – 303.

Kendall, M., Rank Correlation Methods (1948), p. 37-54.

## 13.2.6.4　　Data Relationships Anova Algorithm

The Anova option computes the difference between groups by comparing the mean values of the data in each group. The results are obtained by testing the null hypothesis; the hypothesis that there is no difference between the means of the groups. More formally, the p-value is the probability of the actual *or a more extreme* outcome under the null-hypothesis.

**Note:** If there are empty values in the data table, the data table will first be reduced to the rows containing values for both the first and the second column.

### ► For each combination of category and value column, a p-value is computed as follows:

1. Rows are grouped according to their value in the category column.
2. The total mean value of the value column is computed.

$$\bar{x}_{tot} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

3. The mean within each group is computed.
4. The difference between each value and the mean value for the group is calculated and squared.
5. The squared difference values are added. The result is a value that relates to the total deviation of rows from the mean of their respective groups. This value is referred to as the *sum of squares within groups*, or **S2Wthn**.
6. For each group, the difference between the total mean and the group mean is squared and multiplied by the number of values in the group. The results are added. The result is referred to as the *sum of squares between groups*, or **S2Btwn**.

$$S2Btwn = N_1(\bar{x}_1 - \bar{x}_{tot})^2 + N_2(\bar{x}_2 - \bar{x}_{tot})^2 + \cdots + N_N(\bar{x}_N - \bar{x}_{tot})^2$$

7. The two sums of squares are used to obtain a statistic for testing the null hypothesis, the so called F-statistic. The F-statistic is calculated as:

$$F = \frac{S2Btwn/dfBtwn}{S2Wthn/dfWthn}$$

where *dfBtwn* (degree of freedom between groups) equals the number of groups minus 1, and *dfWthn* (degree of freedom within groups) equals the total number of values minus the number of groups.

8. The F-statistic is distributed according to the F-distribution (commonly presented in mathematical tables/handbooks). The F-statistic, in combination with the degrees of freedom and an F-distribution table, yields the p-value.

The p-value is the probability of the actual *or a more extreme* outcome under the null-hypothesis. The lower the p-value, the larger the difference.

**Note:** A very small p-value may also arise if an effect is tiny but the sample sizes are large. Similarly, a higher p-value can arise if the effect is large but the sample size is small. This is because the hypothesis tests whether the effect is zero or not.

### Reference:

Arnold, Steven F., The Theory of Linear Models and Multivariate Analysis.

## 13.2.6.5    Data Relationships Kruskal-Wallis Algorithm

The Kruskal-Wallis option calculates the p-value under the assumption that there are no empty values in the data table.

**Note:** If there are empty values in the data table, the data table will first be reduced to the rows containing values for both the first and the second column.

The Kruskal-Wallis test can be seen as the nonparametric version of a one-way Anova. The test uses the ranks of the data rather than their actual values to calculate the test statistic. This test can be used as an alternative to the Anova, when the assumption of normality or equality of variance is not met.

For k groups of observations, all N observations are combined into one large sample, the result is sorted from smallest to largest values and ranks are assigned, assigning ties (when values occur more than once) the same rank.

Now, after regrouping the observations, the sum of the ranks are calculated in each group. The test statistic, H, is then:

$$H = \frac{\frac{12}{N(N+1)} \sum_{i=1}^{k} N_i \left( \bar{R}_i - \frac{(N+1)}{2} \right)^2}{1 - \frac{\sum_{j=1}^{m} (T_j^3 - T_j)}{(N^3 - N)}}$$

k = number of categories

N = number of cases in the sample

$N_i$ = number of cases in the $i^{th}$ category

$\bar{R}_i$ = average of the ranks in the $i^{th}$ category

$T_j$ = ties for the $j^{th}$ unique rank

m = number of unique ranks

A p-value can be calculated from the test statistic by referring the value of H to a table with the chi-square distribution with k-1 degrees of freedom. This can be used to test the hypothesis that all k population distributions are identical.

### Example:

For the following data table, the different parameters used in the test are as follows:

| Data table | | Parameters | |
| --- | --- | --- | --- |
| **Category** | **Value** | **Rank** | **Ties** |
| A | 1 | 1 | 1 |
| A | 3 | 2.5 | 2 |
| A | 3 | 2.5 | |
| B | 5 | 5.5 | 2 |
| B | 5 | 5.5 | |
| B | 4 | 4 | 1 |

k = 2

N = 6

$N_A$= 3

$N_B$= 3

$\bar{R}_A$ =2

$\bar{R}_B$ =5

$T_1$= 1

$T_2$= 2

$T_3$= 2

$T_4$= 1

m = 4

H = 4.091

### Reference:

Lehmann, E. L., Nonparametrics: Statistical Methods based on Ranks (1975), p. 204 – 210.

## 13.2.6.6     Data Relationships Chi-square Independence Test Algorithm

The Chi-square option calculates the p-value under the assumption that there are no empty values in the data table.

**Note:** If there are empty values in the data table, the data table will first be reduced to the rows containing values for both the first and the second column.

Let $n$ be the total number of values and denote by $I$ the number of unique values in the first column and by $J$ the number of unique values in the second column. Also for $i = 1, ..., I$ let $n_i$ be the number of occurrences of the $i^{th}$ unique value and for $j = 1, ..., J$, let $n_j$ be the number of occurrences of the $j^{th}$ unique value. If we now let $n_{ij}$ denote the number of rows containing the $i^{th}$ unique value in the first column and the $j^{th}$ unique value in the second column, the Pearson's chi-square statistic is:

$$T = \sum_{i=1}^{I} \sum_{j=1}^{J} \frac{\left(n_{ij} - n_i n_j/n\right)^2}{n_i n_j/n}$$

with $(I-1)(J-1)$ degrees of freedom.

The p-value is then calculated from the chi-square distribution with $(I-1)(J-1)$ degrees of freedom.

### Reference:

Rice, John A., Mathematical Statistics and Data Analysis, 2nd ed., p 489-491.

## 13.2.6.7     Requirements on Input Data for Data Relationships

### Experimental design

In this tool, a one-way layout of Anovas has been employed. This means that the experimental design should be of the type where the outcome of a single continuous variable is compared between different groups. The tool cannot be used to analyze experiments where two or more variables vary together.

**Tip:** You can create a new column using the Concatenate function (or '&') of the Insert Calculated Column tool (**Insert > Calculated Column...**) if you want to analyze two or more variables together.

### Distribution of data

The Anova and Linear regression comparisons assume the following:

- The data is approximately normally distributed.
- The variances of the separate groups, or the variances of the errors in the case of linear regression, are approximately equal.

If the data do not fulfill these conditions, the Anova and Linear Regression comparisons may produce unreliable results. In this case, it may be more valid to use a Kruskal-Wallis or Spearman R comparison instead.

**Note:** If more than one test is performed at the same time, then it is more likely that there will be at least one p-value less than 0.05 than in the case where only one test is performed. A guideline of when to reject the hypothesis is then "Reject the hypothesis if the p-value is less than 0.05 divided by the number of tests". This is called the Bonferroni method for multiple tests.

# 13.3    K-means Clustering

## 13.3.1    How to Perform a K-means Clustering

The K-means Clustering tool cannot be used unless you have created a suitable line chart to base the calculation on. For example, you cannot use multiple Y-axes scales or an X-axis which is both continuous and binned when performing a K-means clustering. See below for more information about how to set up the line chart.

**►  To cluster data:**

1.  Create a line chart visualization by clicking on the New Line Chart button on the toolbar.

    Comment: The tool uses the lines specified in a line chart to define the data for the calculation.

2.  Make sure that all values that should be included in the calculation are selected on the Y-axis.

3.  If more than one column is selected on the Y-axis, make sure that (Column Names) is selected on the X-axis.

    Comment: (Column Names) is an option that treats the names of the columns selected on the Y-axis as separate categories.

4.  Use Line By, Color By or Trellis By to split the lines according to at least one column, in order to create multiple lines.

    Comment: See examples on how to split lines on How to Use the Line Chart. If you want to create one line for each individual row, one of these options must be set to define a unique identifier for all rows. "(Row Number)" is a fictive column representing the row index of all rows and can be used for this purpose.

5.  Select **Tools > K-means Clustering...**.

    Response: The K-means Clustering dialog is displayed.

6.  Make sure that the line chart you just created is selected under **Line chart to work on**.

7.  Select whether to **Create new** result column or **Update existing** result column.

    Comment: Update existing is only available when you have previously performed a K-means clustering during this analysis.

8.  Select a **Distance measure** to use in the calculation.

    Comment: For more information see Correlation or Euclidean distance.

9.  Specify the **Max number of clusters** that you wish to create.

    Comment: The actual number of clusters may be smaller than the specified maximum.

10. Click **OK**.

    Response: A result column is created, specifying a cluster ID for each individual row (line).

    Comment: Note that the result column is based on a snapshot of the line chart from the moment of performing the calculation and it may become invalid when any additional filtering is applied.

    **Note:** When opening an analysis file in which data has been saved linked to, any result columns generated by the clustering operation are dynamically re-evaluated, based on the new data.

    **Note:** If the input line chart is trellised, the column or expression used to trellis by will be moved to the Line By setting upon running a K-means clustering. This is done in order to keep the original lines in the line chart after presenting the K-means result in trellis panels.

    **Tip:** If you do not want to be able to overwrite the result column by consecutive clusterings, or when saving an analysis file with linked data, you can turn it into a static column by performing the following: Select **Edit > Column Properties.** Click

on the result column to select it, and then click on the **Freeze Column** button in the lower part of the General tab.

# 13.3.2 Details on K-means Clustering

K-means clustering is an algorithm for partitioning a data table into subsets (clusters), in such a way that the members of each cluster are relatively similar.

The K-means clustering in TIBCO Spotfire is based on a line chart visualization which has been set up either so that each line corresponds to one row in the root view of the data table, or, if the line chart is aggregated, so that there is a one to many mapping between lines and rows in the root view. The clustering is initialized using data centroid based search, using unit weights, and correlation or Euclidean distance as the distance measure. The clustering is always performed on filtered rows. If you wish all rows to be included in the clustering you need to reset all filters prior to clustering. The columns the clustering operation should be based on are specified in the line chart that is used as starting point.

If "break on empty" is not active, empty values will be replaced using row (line) interpolation, similar to what is shown in the visualization. If "break on empty" is active, any rows (lines) containing empty values shall be excluded from the clustering operation.

**Note:** If the input line chart is trellised, the column or expression used to trellis by will be moved to the Line By setting upon running a K-means clustering. This is done in order to keep the original lines in the line chart after presenting the K-means result in trellis panels.

## ► To reach the K-means Clustering dialog:

1. Make sure you have set up a line chart according to the steps in How to Perform a Line Similarity Comparison.
2. Select **Tools > K-means Clustering...**.
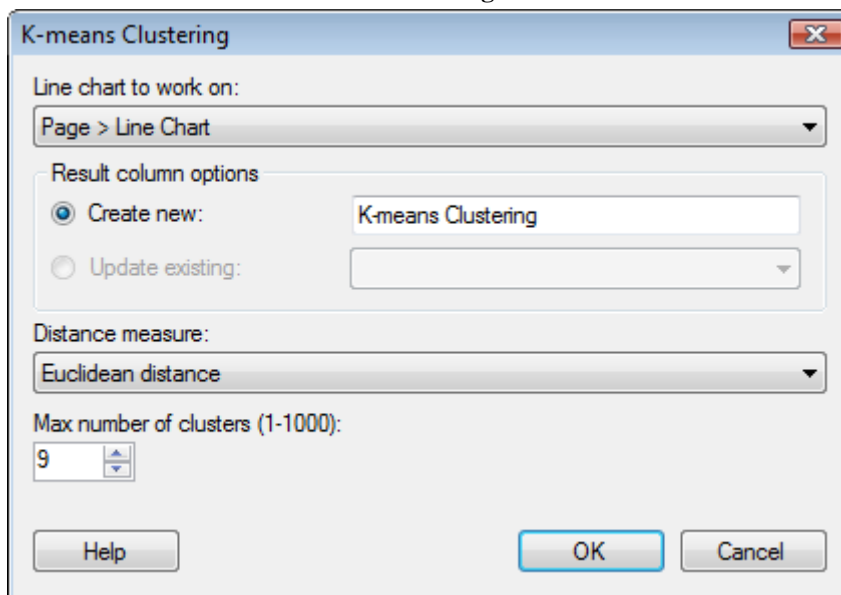


| Option | Description |
|---|---|
| **Line chart to work on** | Select the line chart on which you want to base the calculation from the drop-down list. |
| **Result column options** | |
| **Create new** | Use this option to create a new K-means clustering result column. |

| Update existing | Use this option to update a previously added result column. Only available when at least one clustering result column has been added earlier. |
| --- | --- |
| Distance measure | Select the distance measure to base the similarity calculation on. See Distance measures for more information. |
| Max number of clusters | The maximum number of clusters that you want to calculate (some may turn out empty and will in that case not be displayed). |

### References:

Mirkin, B. (1996) Mathematical Classification and Clustering, Nonconvex Optimization and Its Applications Volume 11, Pardalos, P. and Horst, R., editors, Kluwer Academic Publishers, The Netherlands.

MacQueen, J. (1967). Some methods for classification and analysis of multivariate observations. In Le Cam, L. M. and Neyman, J., editors, Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability. Volume I: Statistics, pages 281-297. University of California Press, Berkeley and Los Angeles, CA.

Hair, J.F.Jr., Anderson, R.E., Tatham, R.L., Black, W.C. (1995) Multivariate Data Analysis, Fourth Edition, Prentice Hall, Englewood Cliffs, New Jersey.

## 13.4    Line Similarity

## 13.4.1    How to Perform a Line Similarity Comparison

**Note:** The Line Similarity tool cannot be used unless you have created a suitable line chart to base the calculation on. For example, you cannot use multiple Y-axes scales or an X-axis which is both continuous and binned when performing a line similarity comparison. See below for more information about how to set up the line chart.

### ► To perform a line similarity comparison:

1. Create a line chart visualization by clicking on the New Line Chart button on the toolbar, ⌷.

   Comment: The tool uses the lines specified in a line chart to define the data for the calculation.

2. Make sure that all values that should be included in the calculation are selected on the Y-axis.

3. If more than one column is selected on the Y-axis, make sure that (Column Names) is selected on the X-axis.

   Comment: (Column Names) is an option that treats the names of the columns selected on the Y-axis as separate categories.

4. Use Line By, Color By or Trellis By to split the lines according to at least one column, in order to create multiple lines.

   Comment: See examples on how to split lines on How to Use the Line Chart. If you want to create one line for each individual row, one of these options must be set to define a unique identifier for all rows.  "(Row Number)" is a fictive column representing the row index of all rows and can be used for this purpose.

5. If desired, mark one or more lines to use as the master line against which the search will be performed.

6. Select **Tools > Line Similarity...**.

   Comment: You can also right-click in the line chart and select Line Similarity... from the pop-up menu.

Response: The Line Similarity dialog is displayed.

7. Make sure that the line chart you just created is selected under **Line chart to work on**.
8. Select whether to **Create new** result columns or **Update existing** result columns.

   Comment: Update existing is only available when you have previously performed a line similarity comparison during this analysis.
9. Select a **Distance measure** to use in the calculation.

   Comment: For more information see Correlation or Euclidean distance.
10. Select whether to use a master line **Based on marked lines** or on a **Custom** shape.

    Comment: Marked lines create a master line which is the average of all marked lines. With the custom alternative, you can select a master line from a number of predefined line shapes.

    Comment: If the currently marked lines contain empty values they cannot be used to create a master line, and the custom alternative will automatically be selected.
11. Click **OK**.

    Response: Two new columns are added to the data table (and two new filters representing the columns are shown in the filters panel).

    Comment: Note that the result columns are based on a snapshot of the line chart from the moment of performing the calculation and they may become invalid when any additional filtering is applied.

**Tip:** If you do not want to be able to overwrite the result columns by consequent calculations, or when saving an analysis file with linked data, you can turn them into static columns by performing the following: Select **Edit > Column Properties.** Click on a result column to select it, and then click on the **Freeze Column** button in the lower part of the General tab.

## 13.4.2  Details on Line Similarity

The Line Similarity tool is used to compare the lines in a line chart to a selected master line. As a result, two new columns are generated. The first is a similarity column, where the similarity to the master line is presented for each individual row (line). The second is a rank column, where the line most similar to the master line receives the rank 1. Correlation or Euclidean distance is used as the distance measure.

If "break on empty" is not active, empty values will be replaced using row (line) interpolation, similar to what is shown in the visualization. If "break on empty" is active, any rows (lines) containing empty values shall be excluded from the line similarity calculation.

### ► To reach the Line Similarity dialog:

1. Make sure you have set up a line chart according to the steps in How to Perform a Line Similarity Comparison.
2. Select **Tools > Line Similarity...**.
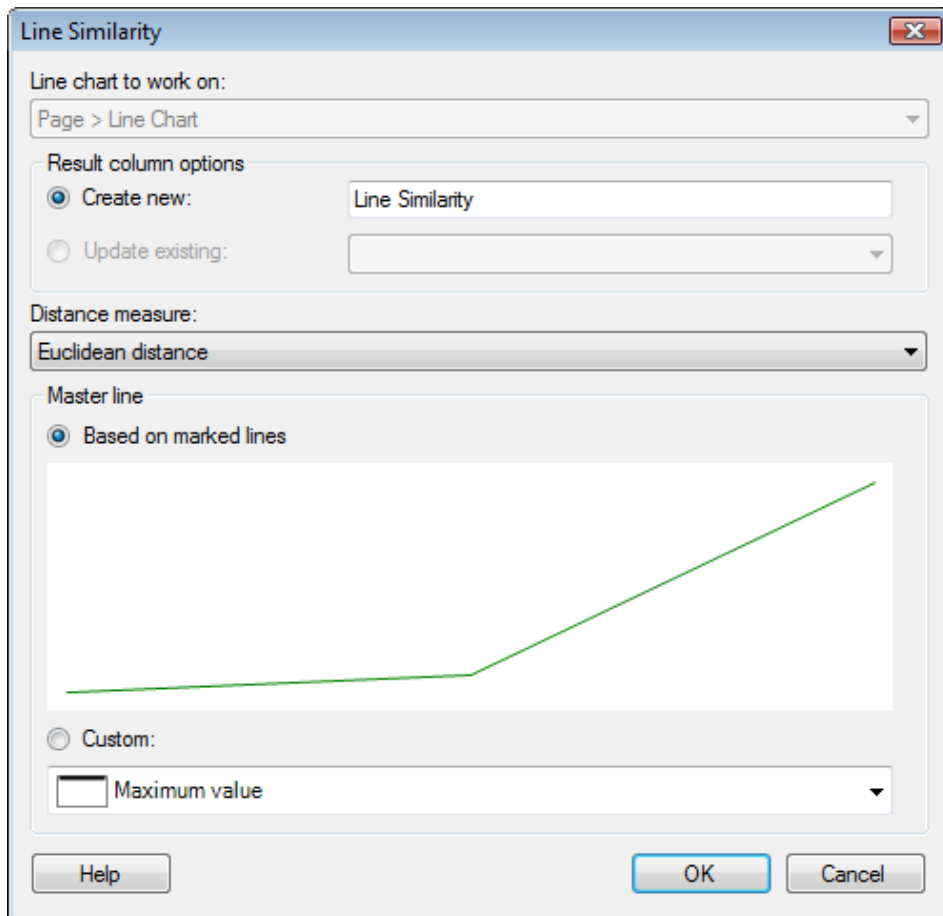
| Option | Description |
|---|---|
| **Line chart to work on** | Specifies which line chart will be used in the calculation (if there are more than one suitable line chart in the document). |
| **Result column options** | |
| **Create new** | Use this option to create new line similarity result columns. Create a new (calculation) is marked by default. Specify a name for the group, to which the two created columns belong. |
| **Update existing** | Use this option to update previously added result columns. Only available when at least one line similarity has been calculated earlier. |
| **Distance measure** | Select the distance measure to base the similarity calculation on. See Distance measures for more information. |
| **Master line** | |
| **Based on marked lines** | Use this option to search for lines as similar to the marked lines as possible. |
| **Custom** | Use this option to search for lines as similar to the shape selected in the drop-down list as possible. |

# 13.5    Hierarchical Clustering

## 13.5.1    What is the Hierarchical Clustering Tool?

The Hierarchical Clustering tool groups rows and/or columns in a data table and arranges them in a heat map visualization with a dendrogram (a tree graph) based on the distance or similarity between them. When using the hierarchical clustering tool, the input is a data table, and the result is a heat map with dendrograms. You can also initiate hierarchical clustering on an existing heat map from the Dendrograms page of the Heat Map Properties. See How to Use the Heat Map to learn more.

### ► To perform a clustering with the Hierarchical Clustering tool:

1. Select **Tools > Hierarchical Clustering...**.

   Response: The Hierarchical Clustering dialog is displayed.

2. If the analysis contains more than one data table, select a **Data table** to perform the clustering calculation on.

3. Click **Select Columns...**.

   Response: The Select Columns dialog is displayed.

4. Select the columns you want to include in the clustering, and then click **OK** to close the dialog.

5. Select the **Cluster rows** check box if you want to create a row dendrogram.

6. Click the **Settings...** button to open the Edit Clustering Settings dialog.

7. Select a **Clustering method**.

   Comment: For more information on clustering methods, see Clustering Methods Overview.

8. Select a **Distance measure**.

   Comment: For more information on distance measures, see Distance Measures Overview. Distances exceeding 3.40282e+038 cannot be represented.

9. Select **Ordering weight** to use in the clustering calculation.

   Comment: For more information see Ordering Weight.

10. Select an **Empty value replacement Method** from the drop-down list.

    Comment: The available replacement methods are described in Details on Edit Clustering Settings.

11. Select a **Normalization Method** to use in the clustering calculation.

    Comment: For more information, see Normalizing Columns.

12. Click **OK**.

13. Select the **Cluster columns** check box if you want to create a column dendrogram.

14. Go through steps 6 to 12 to define settings for the column dendrogram.

15. Click **OK**.

    Response: The hierarchical clustering calculation is performed, and a heat map visualization with the specified dendrograms is created. A cluster column is also added to the data table and made available in the filters panel.

    Comment: See Dendrograms and Clustering to learn more about dendrograms and cluster columns.

## 13.5.2    Details on Hierarchical Clustering

### ► To reach the Hierarchical Clustering dialog:

1. Open the **Tools** menu.

2. Select **Hierarchical Clustering...**.



| Option | Description |
|---|---|
| **Data table** | Lists the data tables currently available in the analysis. Select the data table for which you want to perform a clustering calculation. |
| **Columns** | |
|    **Select Columns...** | Click to open the Select Columns dialog, where you can select which columns to include in the clustering calculation. |
| **Cluster rows** | Select this check box to perform clustering on the rows in the data table. |
|    **Settings...** | Opens the Edit Clustering Settings dialog where you can define which clustering method, distance measure, and ordering weight to use for the clustering calculation. You can also define a normalization method and a method to use for replacing empty values.<br><br>To learn more about hierarchical clustering, see Overview of Hierarchical Clustering Theory. To learn more about normalization, see Normalizing Columns. |
| **Cluster columns** | Select this check box to perform clustering on the columns in the data table. |
|    **Settings...** | Opens the Edit Clustering Settings dialog where you can define which clustering method, distance measure, and ordering weight to use for the clustering calculation. You can also define a normalization method and a method to use for replacing empty values.<br><br>To learn more about hierarchical clustering, see Overview of Hierarchical Clustering Theory. To learn more about normalization, see Normalizing Columns. |

# 13.5.3    Theory and Methods

## 13.5.3.1    Overview of Hierarchical Clustering Theory

Hierarchical clustering arranges items in a hierarchy with a treelike structure based on the distance or similarity between them. The graphical representation of the resulting hierarchy is a tree-structured graph called a dendrogram. In Spotfire, hierarchical clustering and dendrograms are strongly connected to heat map visualizations. You can cluster both rows and columns in the heat map. Row dendrograms show the distance or similarity between rows, and which nodes each row belongs to as a result of clustering. Column dendrograms show the distance or similarity between the variables (the selected cell value columns). The example below shows a heat map with a row dendrogram.
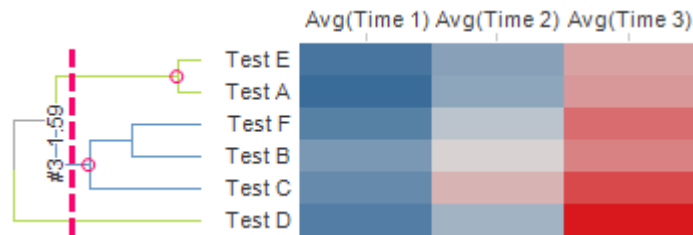


You can perform hierarchical clustering in two different ways: by using the Hierarchical Clustering tool, or by performing hierarchical clustering on an existing heat map visualization. If you use the Hierarchical clustering tool, a heat map with a dendrogram will be created. To learn more about heat maps and dendrograms, see What is a Heat Map? and Dendrograms and Clustering.

### Algorithm

The algorithm used for hierarchical clustering in Spotfire is a hierarchical agglomerative method. For row clustering, the cluster analysis begins with each row placed in a separate cluster. Then the distance between all possible combinations of two rows is calculated using a selected distance measure. The two most similar clusters are then grouped together and form a new cluster. In subsequent steps, the distance between the new cluster and all remaining clusters is recalculated using a selected clustering method. The number of clusters is thereby reduced by one in each iteration step. Eventually, all rows are grouped into one large cluster. The order of the rows in a dendrogram are defined by the selected ordering weight. The cluster analysis works the same way for column clustering.

Note: Only numeric columns will be included when clustering.

## 13.5.3.2    Distance Measures

### 13.5.3.2.1    Distance Measures Overview

The following measures can be used to calculate the distance or similarity between rows or columns:

- Correlation
- Cosine Correlation
- Tanimoto Coefficient
- Euclidean Distance
- City Block Distance
- Square Euclidean Distance
- Half Square Euclidean Distance

The term *dimension* is used in all distance measures. The concept of dimension is simple if we are describing the physical position of a point in three dimensional space when the positions on the x, y and z axes refer to the different dimensions of the point. However, the data in a

dimension can be of any type. If, for example, you describe a group of people by their height, their age and their nationality, then this is also a three dimensional system. For a row (or column), the number of dimensions is equal to the number of variables in the row (or column).

**Note:** The result from a cluster calculation will be presented either as the similarity between the clustered rows or columns, or as the distance between them. Euclidean distance, City block distance, Square Euclidean distance, and Half square Euclidean distance will present the distance between the rows or columns. The results from Correlation, Cosine correlation, and Tanimoto coefficient, on the other hand, are presented as similarity between the rows or columns.

**Note:** When used in clustering, the similarity measures Correlation, Cosine correlation, and Tanimoto coefficient may be transformed so that they are always greater than or equal to zero (using 1 – similarity value).

### 13.5.3.2.2 Correlation

The *correlation* between two points, *a* and *b*, with *k* dimensions is calculated as:

$$\frac{cov(a,b)}{std(a) \times std(b)}$$

where

$$cov(a, b) = \frac{1}{k}\sum_{j=1}^{k}(a_j - \bar{a}) \times (b_j - \bar{b})$$

$$std(a) = \sqrt{\frac{1}{k}\sum_{j=1}^{k}(a_j - \bar{a})^2}$$

$$\bar{a} = \frac{1}{k}\sum_{j=1}^{k}a_j$$

This correlation is called *Pearson Product Momentum Correlation*, simply referred to as *Pearson's correlation* or *Pearson's r*. It ranges from +1 to -1 where +1 is the highest correlation. Complete opposite points have correlation -1.
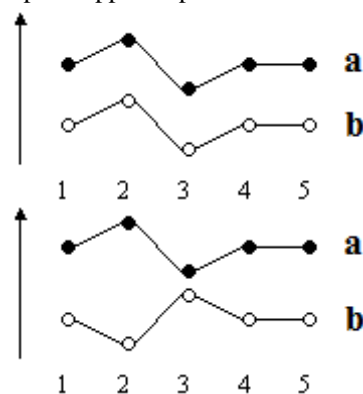


*a* and *b* are identical, which means they have maximum correlation.

*a* and *b* are perfectly mirrored, which means they have the maximum negative correlation.

### 13.5.3.2.3 Cosine Correlation

The *Cosine correlation* between two points, *a* and *b*, with *k* dimensions is calculated as:

$$\frac{\sum_{j=1}^{k}a_j \times b_j}{norm(a) \times norm(b)}$$

where

$$norm(a) = \sqrt{\sum_{j=1}^{k} a_{j^2}}$$

The cosine correlation ranges from +1 to -1 where +1 is the highest correlation. Complete opposite points have correlation -1.

## Comparison between Cosine correlation and Correlation

The difference between Cosine correlation and Correlation is that the average value is subtracted in Correlation. In the example below, the Cosine correlation will be +1 between any combination of points *a*, *b*, and *c*, but it will be slightly less than that between point *d* and any of the other points (+0.974). However, the regular Correlation will be +1 between any of the points, including point *d*.
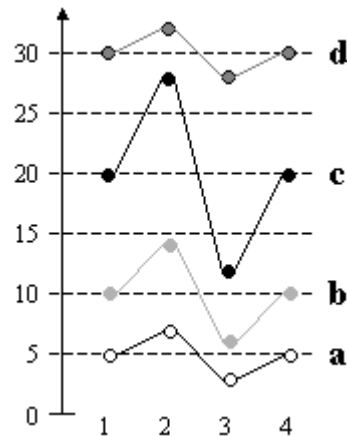


### 13.5.3.2.4    Tanimoto Coefficient

The *Tanimoto coefficient* between two points, *a* and *b*, with *k* dimensions is calculated as:

$$\frac{\sum_{j=1}^{k} a_j \times b_j}{\left(\sum_{j=1}^{k} a_j^2 + \sum_{j=1}^{k} b_j^2 - \sum_{j=1}^{k} a_j \times b_j\right)}$$

The Tanimoto similarity is only applicable for a binary variable, and for binary variables the Tanimoto coefficient ranges from 0 to +1 (where +1 is the highest similarity).

### 13.5.3.2.5    Euclidean Distance

The *Euclidean distance* between two points, *a* and *b*, with *k* dimensions is calculated as:

$$\sqrt{\sum_{j=1}^{k} (a_j - b_j)^2}$$

The Euclidean distance is always greater than or equal to zero. The measurement would be zero for identical points and high for points that show little similarity.

The figure below shows an example of two points called *a* and *b*. Each point is described by five values. The dotted lines in the figure are the distances $(a_1-b_1)$, $(a_2-b_2)$, $(a_3-b_3)$, $(a_4-b_4)$ and $(a_5-b_5)$ which are entered in the equation above.
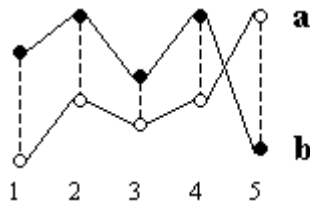
### 13.5.3.2.6    City Block Distance

The *City block distance* between two points, *a* and *b*, with *k* dimensions is calculated as:

$$\sum_{j=1}^{k}\left|a_j - b_j\right|$$

The *City block distance* is always greater than or equal to zero. The measurement would be zero for identical points and high for points that show little similarity.

The figure below shows an example of two points called *a* and *b*. Each point is described by five values. The dotted lines in the figure are the distances $(a_1\text{-}b_1)$, $(a_2\text{-}b_2)$, $(a_3\text{-}b_3)$, $(a_4\text{-}b_4)$ and $(a_5\text{-}b_5)$ which are entered in the equation above.
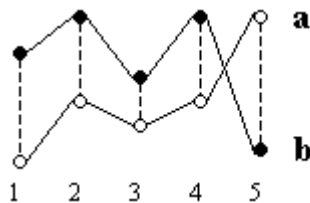


In most cases, this distance measure yields results similar to the *Euclidean distance*. Note, however, that with *City block distance*, the effect of a large difference in a single dimension is dampened (since the distances are not squared).

The name *City block distance* (also referred to as *Manhattan distance*) is explained if you consider two points in the xy-plane. The shortest distance between the two points is along the hypotenuse, which is the *Euclidean distance*. The *City block distance* is instead calculated as the distance in x plus the distance in y, which is similar to the way you move in a city (like Manhattan) where you have to move around the buildings instead of going straight through.

### 13.5.3.2.7    Square Euclidean Distance and Half Square Euclidean Distance

The *Square Euclidean* distance between two points, *a* and *b*, with *k* dimensions is calculated as

$$\sum_{j=1}^{k}\left(a_j - b_j\right)^2$$

The *Half Square Euclidean* distance between two points, *a* and *b*, with *k* dimensions is calculated as

$$\frac{1}{2}\sum_{j=1}^{k}\left(a_j - b_j\right)^2$$

The half square Euclidean distance is always greater than or equal to zero. The measurement would be zero for identical points and high for points that show little similarity.

The figure below shows an example of two points called *a* and *b*. Each point is described by five values. The dotted lines in the figure are the distances $(a_1\text{-}b_1)$, $(a_2\text{-}b_2)$, $(a_3\text{-}b_3)$, $(a_4\text{-}b_4)$ and $(a_5\text{-}b_5)$ which are entered in the equation above.
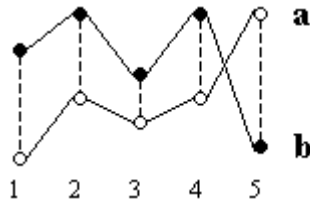
## 13.5.3.3    Clustering Methods

### 13.5.3.3.1    Clustering Methods Overview

Hierarchical clustering starts by calculating the distance between all possible combinations of two rows or columns using a selected distance measure. These calculated distances are then used to derive the distance between all clusters that are formed from the rows or columns during the clustering. You can select one of the following clustering methods:

*   UPGMA
*   WPGMA
*   Single Linkage
*   Complete Linkage
*   Ward's Method

### 13.5.3.3.2    UPGMA

UPGMA stands for Unweighted Pair-Group Method with Arithmetic mean.

Assume that there are three clusters called $C_1$, $C_2$ and $C_3$ including $n_1$, $n_2$ and $n_3$ number of rows or columns. Clusters $C_2$ and $C_3$ are aggregated to form a new single cluster called $C_4$.

The distance between cluster $C_1$ and the new cluster $C_4$ is calculated as:

$$distance_{c1,c4} = a \times distance_{c1,c2} + b \times distance_{c1,c3}$$

where

$$a = \frac{n_2}{(n_2 + n_3)}$$
$$b = \frac{n_3}{(n_2 + n_3)}$$

### 13.5.3.3.3    WPGMA

WPGMA stands for Weighted Pair-Group Method with Arithmetic mean.

Assume that there are three clusters called $C_1$, $C_2$ and $C_3$ including $n_1$, $n_2$ and $n_3$ number of rows. Clusters $C_2$ and $C_3$ are aggregated to form a new single cluster called $C_4$.

The distance between cluster $C_1$ and the new cluster $C_4$ is calculated as:

$$distance_{c1,c4} = \frac{1}{2}\left(distance_{c1,c2} + distance_{c1,c3}\right)$$

### 13.5.3.3.4    Single Linkage

This method is based on minimum distance. To calculate the distance between two clusters, each possible combination of two rows (or columns) between the two clusters is compared. The distance between the clusters is the same as the distance between the two rows (or columns) in the clusters that are least distant.

Assume that there are three clusters called $C_1$, $C_2$ and $C_3$. Clusters $C_2$ and $C_3$ are aggregated to form a new single cluster called $C_4$. The distance between cluster $C_1$ and the new cluster $C_4$ is calculated as:

$$distance_{c1,c4} = min\left(distance_{c1,c2}, distance_{c1,c3}\right)$$

### 13.5.3.3.5 Complete Linkage

This method is based on maximum distance and can be thought of as the opposite of *Single linkage*. To calculate the distance between two clusters, each possible combination of two rows (or columns) between the two clusters is compared. The distance between the two clusters is the same as the distance between the two rows (or columns) in the clusters that are most distant.

Assume that there are three clusters called $C_1$, $C_2$ and $C_3$. Clusters $C_2$ and $C_3$ are aggregated to form a new single cluster called $C_4$. The distance between cluster $C_1$ and the new cluster $C_4$ is calculated as:

$$distance_{c1,c4} = max\left(distance_{c1,c2}, distance_{c1,c3}\right)$$

### 13.5.3.3.6 Ward's Method

Ward's method means calculating the incremental sum of squares. *Half square Euclidean distance* is the only distance measure that can be used with this clustering method. Therefore the distance measure is automatically set to *Half square Euclidean distance* when Ward's method is selected.

Assume that there are three clusters called $C_1$, $C_2$ and $C_3$ including $n_1$, $n_2$ and $n_3$ number of rows (or columns). Clusters $C_2$ and $C_3$ are aggregated to form a new single cluster called $C_4$.

The distance between cluster $C_1$ and the new cluster $C_4$ in the example above is calculated as:

$$distance_{c1,c4} = a \times distance_{c1,c2} + b \times distance_{c1,c3} - c \times distance_{c2,c3}$$

where

$$a = \frac{n_1 + n_2}{(n_1 + n_2 + n_3)}$$

$$b = \frac{n_1 + n_3}{(n_1 + n_2 + n_3)}$$

$$c = \frac{n_1}{(n_1 + n_2 + n_3)}$$

### 13.5.3.4 Ordering Weight

The ordering weight controls in what vertical order the rows are displayed in the row dendrogram. For column dendrograms it controls the horizontal order of the columns. The two subclusters within a cluster (there are always exactly two subclusters) are weighted and the cluster with the lower weight is placed above (to the left of) the other cluster. The weight can be any one of the following:

- **Input average rank** of the rows (or columns). This is the order of the rows (or columns) during import to Spotfire.

- **Average value** of the rows (or columns). For example, a row $a$ with 5 dimensions would have the average $(a_1+a_2+a_3+a_4+a_5)/5$. The average for a row $a$ with $k$ dimensions is calculated as

$$\bar{a} = \frac{1}{k}\sum_{j=1}^{k} a_j$$

### Calculating the weight of a cluster

To calculate the weight $w_3$ of a new cluster $C_3$ formed from two subclusters $C_1$ and $C_2$ with a weight of $w_1$ and $w_2$, and each containing $n_1$ and $n_2$ rows, you use the following expression:

$$w_3 = \frac{n_1 \times w_1 + n_2 \times w_2}{(n_1 + n_2)}$$

## 13.5.3.5 Hierarchical Clustering References

### Hierarchical clustering

Mirkin, B. (1996) Mathematical Classification and Clustering, Nonconvex Optimization and Its Applications Volume 11, Pardalos, P. and Horst, R., editors, Kluwer Academic Publishers, The Netherlands.

Sneath, P., Sokal, R. R. (1973) Numerical taxonomy, Second Edition, W. H. Freeman, San Francisco.

### General information about clustering

Hair, J.F.Jr., Anderson, R.E., Tatham, R.L., Black, W.C. (1995) Multivariate Data Analysis, Fourth Edition, Prentice Hall, Englewood Cliffs, New Jersey.

# 13.6 Data Functions

## 13.6.1 What are Data Functions?

Data functions are calculations based on S-PLUS or R that you make available in the TIBCO Spotfire environment. Once a function has been defined and saved in the Spotfire library using the Register Data Functions dialog, it can be applied at many different places in an analysis. For example, it can be used as a transformation step when you add or replace data tables. It can also be a separate tool that is run from the Insert menu.

S-PLUS or R data functions can be defined from either an existing function in the corresponding Spotfire Statistics Services package repository or by writing a script directly in the Register Data Functions dialog. During the set-up of a data function, a number of input and output parameters can be specified.

**Concerning R:**

To use R functionality with TIBCO Spotfire, you must configure TIBCO Spotfire® Statistics Services with an R engine. For more information on setting up Spotfire Statistics Services or your Spotfire Statistics Services Local Adapter using R, please read the TIBCO Spotfire Statistics Services Installation and Administration Guide or the README file included with the Statistics Services Local Adapter. (Other 3rd party calculation tools can be added using the TIBCO Spotfire API.)

R is available under separate open source software license terms and is not part of TIBCO Spotfire.  As such, R is not within the scope of your license for TIBCO Spotfire. R is not supported, maintained, or warranted in any way by TIBCO Software Inc.  Download and use of R is solely at your own discretion and subject to the free open source license terms applicable to R.

### Example 1:

A simple conversion of the values in a column from degrees Celsius to degrees Fahrenheit. This is of course just as easy to accomplish using the Insert Calculated Column tool, but it serves as an example simple enough to show input and output parameter handling in more detail.

## ► **To create and run an S-PLUS script data function:**

1. Assume that the data table in TIBCO Spotfire contains a column with temperatures expressed in degrees Celsius.

2. First, select **Tools > Register Data Functions...**.

3. Choose the **Type** S-PLUS script from the drop-down list and define the script that will perform the conversion on the Script tab:

   # Define the convertTemperature function:

   convertTemperature <- function(x)

   {

     x*(9/5) + 32

   }

   # Run the function to produce the output:

   out <- convertTemperature(x);

4. Define the Input parameter x as a column with the allowed data types Integer and Real.

   Parameters:

   | Name | Display Name | Type | Allowed Data Types |
   |------|-------------|------|-------------------|
   | x | Temperature in Celsius | Column | Integer, Real |

   **Tip:** You can select the parameter in the Script tab and use the pop-up menu option **Input Parameter...** to reach the Input Parameter dialog directly.

5. Define the Output parameter out as a column.

   Parameters:

   | Name | Display Name | Type |
   |------|-------------|------|
   | out | Temperature in Fahrenheit | Column |

   **Tip:** You can select the parameter in the Script tab and use the pop-up menu option **Output Parameter...** to reach the Output Parameter dialog directly.

   Note that the output display name will not be propagated to the output column name. The column name is always the output specified by the S-PLUS script.

6. Save the data function to the library, as Temperature converter.

7. To connect the input and output parameters to your current data in TIBCO Spotfire and run the calculation, select **Insert > Data Function....**

   Comment: You need to have some data loaded in TIBCO Spotfire to use this functionality.

8. Click on the **Temperature converter** data function and click **OK**.

9. In the Data Functions - Parameters dialog, specify that the input parameter *x* should be a column and select the data table and column to convert.

   Input parameters:

   | Name | Description | Type | Required |
   |------|------------|------|----------|
   | Temperature in Celsius | This is the input... | Column | Yes |

   Input handler:

   Column
   Expression

   Data table:

   Temperature Data

   Column:

   Value

10. Click on the Output tab and specify that the output parameter *out* should be handled as a column.

Output parameters:

| Name | Description | Type |
|------|-------------|------|
| Temperature in Fahrenheit | This is the output... | Column |

Output handler:

| Data table |
|------------|
| Columns |
| Rows |

Data table:

Temperature Data

11. Click **OK**.

The data function calculation is performed and a new column is added to the data table. You can change the parameter settings or refresh the calculation later by selecting Edit > Document Properties, Data Functions tab.

### Example 2:

If the function to use is a Principal Component Analysis (PCA) calculation, the input would be a number of numerical data columns retrieved from the current data in TIBCO Spotfire and, optionally, a parameter specifying the percent variation to be preserved by the principal components. The output would include three new data tables (scores, loadings and eigenvalue/explained variance table) and a scalar indicating the number of principal components generated.

## 13.6.2    How to Use Data Functions

Data functions can be used to enhance the functionality of TIBCO Spotfire in many ways. Below are a few examples of where and how data functions can be defined and applied. Note that you or your admin must first set the address to TIBCO Spotfire Statistics Services or TIBCO Spotfire Statistics Services Local Adapter as explained below. See also What are Data Functions?

### ► To register an S-PLUS function in Spotfire:

1. When a function that you want to use from within TIBCO Spotfire has been defined and saved to your package repository in Spotfire Statistics Services, you need to write down or remember its name, together with the names of all required input and output parameters.

2. In TIBCO Spotfire, select **Tools > Register Data Functions...**.

   Response: The Register Data Functions dialog is displayed.

3. From the **Type** drop-down list, select **S-PLUS function**.

4. In the **S-PLUS packages** field, type the exact name of the package where the function is located in the Spotfire Statistics Services package repository. (This is only necessary if there is more than one function bearing the same name in the repository, or the packages are not loaded automatically.)

5. In the **S-PLUS function name** field, type the exact name of the function of interest, as it was defined in the Spotfire Statistics Services package repository.

   Comment: TIBCO Spotfire will not be able to locate the function in the Spotfire Statistics Services package repository unless the name is exactly the same.

6. If desired, type a new **Description** of the function.

7. On the **Input Parameters** tab, add all required input parameters.

Comment: How the input parameters should be handled is defined upon execution of the data function.

8. If necessary, move the input parameters so that the order in the list reflects the order in which the input parameters should be retrieved.

9. On the **Output Parameters** tab, add all required output parameters.

Comment: How the output parameters should be handled is defined upon execution of the data function.

10. **Save** the data function.

Comment: You can specify keywords upon saving that will help in locating the function in the library at a later stage.

Response: The registered data function is saved in the library.

11. Click **Close**.

Comment: The data function can now be added to an analysis by running it from the Insert menu (see below).

The same steps would be used if the function was instead created using R.

### ► To map and execute a previously registered data function from the Insert menu:

1. In TIBCO Spotfire, select **Insert > Data Function....**

Response: The Data Functions - Select Function dialog is displayed.

2. Optionally, click on a **Keyword** or use the search field to limit the number of shown functions in the dialog.

Comment: For more information about search expressions, see Searching in TIBCO Spotfire.

Response: Only the functions whose names match the keyword or search expression are shown in the dialog.

3. Click to select the desired function.

4. Click **OK**.

Response: The Data Functions - Parameters dialog is displayed.

5. Specify whether or not to **Refresh function automatically**.

Comment: If the check box is selected a new calculation will be performed each time the input parameters change. If the check box is cleared, you need to refresh the data function manually.

6. Specify what to do with the input or output parameters and then click **OK**.

Comment: For a description of the available input and output handlers, see Details on Data Functions - Parameters.

Response: The function is executed. Depending on how the output parameters were set up, you may get a new or updated data table, new columns or rows, or an updated data table or document property, which can be used to control a variety of settings in your analysis. A Details... link with progress information  will be available in the lower left part of the TIBCO Spotfire window. Click on the link for more information.

**Note:** Time and Date formats are not directly supported by Spotfire Statistics Services. When sending this type of input to Spotfire Statistics Services you will get the data back in a DateTime (TimeDate) format where a default date or time part has been appended to the original data. Columns with the data type Currency cannot be used in data functions.

### ► To refresh a data function from a text area:

Once executed in the document, data functions can also be refreshed by clicking on an action link or button in a text area. This can be a way to make it easier for other users of the analysis to find and use the data function. For example, if the data function has been set up to work with filtered rows, many people can access the analysis, filter to their special area of interest and click on a button to receive calculation results relevant for them.

1. Create an analysis where the data function can be used and run the data function from the Insert menu as described above.

   Comment: This is done in order to make the current document aware of the data function.

2. Create a text area and enter edit mode by clicking on the Toggle Edit Mode button, .

3. Click on the Insert Action Control button, .

   Response: The Action Control dialog is displayed.

4. Click on **Data Function** in the left-hand pane.

5. Type a **Display text** to use on the button or link.

6. Select the **Control type** to use: Button or Link.

7. Click to select the data function of interest from the **Available data functions** list.

   Comment: Only those data functions that have been executed from within the current document and do not use automatic refresh will be available.

8. Click **OK**.

   Response: The button or link is added to the text area.

## ► To use the result from a data function to draw a line in a visualization:

Data functions can be used to calculate new data which can be used to do such things as drawing a line in a visualization. This can be accomplished in a variety of ways, but the steps below describe an example where the data function result is presented as two new columns containing coordinate values.

1. Define and execute a data function which uses the current data columns as input and performs a calculation before the new resulting columns are added to the data table.

   Response: The data function is added to the document, and the result columns are added to the data table.

2. Create a visualization which can display lines and curves, such as, a scatter plot.

   Comment: Line from Column Values cannot draw curves over categorical axes, so make sure that the value columns on both axes are continuous.

3. Right-click in the visualization and select **Properties**.

   Comment: You can also select Edit > Visualization Properties from the main menu.

   Response: The Visualization Properties dialog is displayed.

4. Click on **Lines & Curves**.

5. Click **Add** and select **Line from Column Values...**.

   Comment: This is the option to use if the data results are located in one X-values and one Y-values column. If the results from the data function are presented as curve parameters you should use Curve from Data Table instead, and if a curve equation is calculated, use Curve Draw.

   Response: The Line from Column Values dialog is displayed.

6. Select the **Data table with line values**.

   Comment: This should be the data table where the result columns were added.

7. Select the **X-values column**.

8. Select the **Y-values column**.

9. If desired, select a **Sorted by column**, to specify a different sort order.

10. Specify whether to **Ignore (skip) empty values** or to **Split curve at empty values**.

11. Specify whether to use an **Automatic** or a **Custom** curve name.

12. Click **OK**.

    Response: The curve is added to the visualization.

► **To change settings for a saved data function in an analysis:**

1. Select **Edit > Document Properties**.

   Response: The Document Properties dialog is displayed.

2. Click on the **Data Functions** tab.

   Response: All data functions that have been executed in the analysis are shown in the Available data functions list.

3. Click to select the function of interest in the **Available data functions** list.

4. Click **Edit...**.

   Comment: To simply update the data function using the same settings as last time, click Refresh.

   Comment: Use the Sync button to update the data function with any changes done to the data function in the library.

   Response: The Data Functions - Parameters dialog is displayed.

5. If desired, change whether or not to **Refresh function automatically**.

6. Change the Input parameter settings and click **OK**.

   Comment: You cannot change the Output parameter settings from here. If this is required, you must execute the data function from the Insert menu again.

   Response: The data function is updated using the new settings.

► **To change the address to Spotfire Statistics Services:**

The address to Spotfire Statistics Services is normally specified by the TIBCO Spotfire administrator, on a group level. This step instruction shows how an administrator can change the address for a user group. It is also possible to use a local calculation engine (see below).

1. Login to TIBCO Spotfire as a user with administration rights.

2. Select **Tools > Administration Manager**.

   Response: The Administration Manager is displayed.

3. Click on the **Preferences** tab.

4. Click on the group of interest in the **Selected group** list.

   Response: The preferences and configuration sets for the selected group are displayed.

5. On the Preferences tab, click on the plus sign next to **TIBCO Spotfire Statistics Services** to expand that group.

6. Click on **StatisticsServices** in the TIBCO Spotfire Statistics Services group.

   Response: The currently specified S-PLUS URL and R URL are shown.

7. For the implementation of your choice, click **Edit**.

   Response: The Edit Preferences dialog is displayed.

8. Type or paste a new URL for Spotfire Statistics Services.

9. Click **OK**.

10. Click **Close**.

► **To use an alternative calculation engine, e.g., TIBCO Spotfire® Statistics Services Local Adapter:**

1. Select **Tools > Options**.

   Response: The Options dialog is displayed.

2. Go to the **Data Functions** page.

3. Click the **Custom URL** radio button.

4. Type the address to the local calculation engine.

5. Click **OK**.

### ► To delete a saved data function from the library:

If you have administrative rights, you can delete and edit the name, description and keywords of a data function using the Library Administration tool.

1. Select **Tools > Library Administration**.

   Response: The Library Administration dialog is displayed.

2. Click to select the data function of interest.

   Comment: You can use the search field at the top right corner of the dialog to help in locating the data function. (Use 'type:datafunction' as the search expression in the search field to find all data functions.) See Searching the Library for more information about search expressions.

3. Click on the **Delete** button at the top of the dialog.

   Response: A dialog asking you if you are sure you want to delete the data function is displayed. Click Yes and the data function is removed.

4. Click **Close**.

### ► To edit the name, description or keywords of a saved data function in the library:

If you have administrative rights you can delete and edit the name, description and keywords of a data function using the Library Administration tool.

1. Select **Tools > Library Administration**.

   Response: The Library Administration dialog is displayed.

2. Click to select the data function of interest.

   Comment: You can use the search field at the top right corner of the dialog to help in locating the data function. (Use 'type:datafunction' as the search expression in the search field to find all data functions.) See Searching the Library for more information about search expressions.

3. Click on the **Edit...** link next to the Selected Item header in the lower part of the dialog.

   Response: The Edit Properties dialog for the selected data function is displayed.

4. Change the properties for the data function and click **OK**.

5. Click **Close**.

### ► To recreate a deleted result column:

If you run a data function which creates one or more columns and you then delete one of the result columns from the analysis, the lost column will remain gone when refreshing the data function. In order to recreate the lost column you must run the data function from the Insert menu once again.

## 13.6.3    Details

### 13.6.3.1    Details on Register Data Functions

The Register Data Functions dialog is used to set up which S-PLUS or R functions in your Spotfire Statistics Services package repository should be available for end users of TIBCO Spotfire. Once a function has been registered, it is available from the library and can be used in any analysis.

### ► To reach the Register Data Functions dialog:

1. Select **Tools > Register Data Functions...**.

| Option | Description |
|---|---|
| **New Function** | Clears all text fields and list views in the dialog so you can start defining a new data function. |
| **Open** | Allows you to open a previously saved data function from the library for further configuration. |
| **Save** | Saves an edited data function to the library. |
| **Save As** | Opens the Save as Library Item dialog where you can specify a name and a location in the library where you want the data function to be saved. |
| **Run** | Opens the Data Functions - Parameters dialog so that you can specify settings for the input and output parameters and execute the current data function. This is mostly meant as a shortcut for testing the data function before it is saved to the library. Run the saved data function using Tools > Data Function... before saving the analysis in order to be able to synchronize the data function with any updates in the library in the future. See also Document Properties - Data Functions. |
| **Name** | Displays the name of the data function when it has been saved to the library. If the function has not yet been saved, this field will be empty. |
| **Type** | Allows you to select what type of function to use. The types available will depend on which calculation engine you have access to. For predefined functions, select S-PLUS or R function. To define a new script, select S-PLUS or R script. |

| | |
|---|---|
| **S-PLUS/R packages** | Optional. Allows you to specify any packages in the Spotfire Statistics Services package repository that are being used by your current data function. |
| | For example, if you want to create a data function based on a predefined statistical S-PLUS function, you need to provide the name of the package in the S-PLUS repository where this function is located (e.g., stat). |
| | If more than one package is required, separate the package names with semicolons. |
| **S-PLUS/R function name** | [Available for S-PLUS/R functions only, not for scripts.] |
| | This is where you type the function name as it has been defined in Spotfire Statistics Services. |
| **Description** | Optional but recommended. A description of the function. This description is stored in the library and can help the end users of the data function to select the proper function. |
| **Allow caching** | Select this check box to allow calculations to be reused if the same subset of input values has been calculated before. |
| | Clear this check box if some of the input data comes from somewhere else than your current analysis and you want a new calculation from Spotfire Statistics Services each time input data are changed (even for changes into something that has already been computed before). Input data are often changed when the input is depending on filtered values, marked values or a property value. |
| | For example, if the data function includes a random number generator, you will probably not want to cache a previously generated random number but instead calculate a new one for each refresh of the data function. Another example is a data function that includes the current date or time. |

## Script tab

Only available for script type data functions. To change to a script type data function, click on the **Type** drop-down list above and select **S-PLUS script** or **R script**.

```
# Define the convertTemperature function:
convertTemperature <- function(x)
{
    x*(9/5) + 32
}
# Run the function to produce the output:
out <- convertTemperature(x);
```
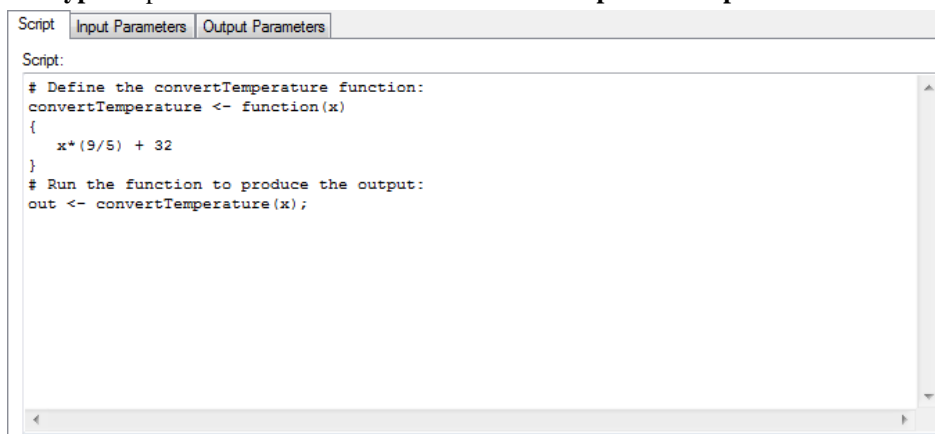
Here you can type or paste any script in the specified script type language.

The font settings for the script tab can be changed using Tools > Options, Fonts page and selecting Expression and script editor.

## Input Parameters tab



| Option | Description |
|---|---|
| **Parameters** | Lists all input parameters that have been mapped using the Input Parameter dialog. |
| **Add...** | Opens the Input Parameter dialog. |
| **Edit...** | Opens the Input Parameter dialog with the selected input parameter and its current settings available for editing. |
| **Remove** | Removes the selected input parameter from the list. |
| **Move Up** | Moves the selected input parameter up one step. The order of the input parameters in this list determines the order in which the input parameters should be retrieved. |
| **Move Down** | Moves the selected input parameter down one step. |

## Output Parameters tab



| Option | Description |
|---|---|
| **Parameters** | Lists all output parameters that have been mapped using the Output Parameter dialog. |
| **Add...** | Opens the Output Parameter dialog. |

| | |
|---|---|
| **Edit...** | Opens the Output Parameter dialog with the selected output parameter and its current settings available for editing. |
| **Remove** | Removes the selected output parameter from the list. |
| **Move Up** | Moves the selected output parameter up one step. Use this button to place the most important output parameters at the top of the list. |
| **Move Down** | Moves the selected output parameter down one step. |

## 13.6.3.2 Details on Input Parameter



| Option | Description |
|---|---|
| **Input parameter name** | The name of the parameter as it has been referred to in the function or script. |
| **Display name** | The name of the parameter as you want it to be displayed to the end users. |
| **Type** | The input type, which can be Value, Column or Table. This defines whether the input parameter can be one or more columns, or just a single value. |
| **Allowed data types** | Specifies which data types are supported by this input parameter. Select the check box for all data types that you want to allow. |

| | |
|---|---|
| **All** | Click All to select all data types. |
| **Numeric** | Click Numeric to select all numeric data types. |
| **None** | Click None to clear all check boxes. Then select one or more data types to continue. |
| **Description** | Optional. Can contain more information about the input parameter. |
| **Required parameter** | Select this check box to make the parameter required when calling the function. If the check box is cleared, the parameter is optional and the function should be able to work without it. |

## 13.6.3.3    Details on Output Parameter



| Option | Description |
|---|---|
| **Result parameter name** | The name of the parameter as it has been referred to in the function or script. |
| **Display name** | The name of the parameter as you want it to be displayed to the end users. |
| **Type** | The output type, which can be Value, Column or Table. This defines whether the output parameter can be one or more columns, or just a single value. |
| **Description** | Optional. Can contain more information about the output parameter. |

## 13.6.3.4    Details on Save as Library Item

This dialog is reached when you have selected to save a new item (e.g., a data function or a color scheme) in the library.



| Option | Description |
|---|---|
| Library path (Upper part of the dialog) | Shows the path from the library root folder down to the folder where you are currently located in the library. You can navigate upwards in the folder structure by clicking on the name of a folder that you want to navigate to. |
| Folder contents list (Middle part of the dialog) | Lists all the folders and files in the folder you are currently located in. |
| **Name** | The name of the item as it will be displayed in the library. It is important that the title is informative with regard to what the item actually does. **Note:** The name can be 256 characters at most, and the following characters are not supported: \ / : * ? " < > \| |
| **Keywords (separated by semicolons)** | Keywords specific to the content of the item. Keywords are separated by a semicolon, i.e., if you write "temperature conversion; Fahrenheit" this will be two keywords, "temperature conversion" and "Fahrenheit". Keywords are used to group data functions in the Data Functions - Select Data Function dialog. A data function will appear in several different groups if it has multiple keywords. |

| New Folder... | Opens the New Folder dialog where you can specify a new folder. |
| Folder Permissions... | Opens a dialog where you can change the folder permissions. |

## 13.6.3.5 Details on Data Functions - Select Function

This dialog is used to select which data function in the library to execute. The data functions are organized by the keywords entered while saving them to the library. A data function can appear in several different groups if it has multiple keywords. Data functions without keywords are only placed in the default (All) group.

### ► To reach the Data Functions - Select Function dialog:

1. Open the analysis in which to apply the data function.
2. Select **Insert > Data Function...**.
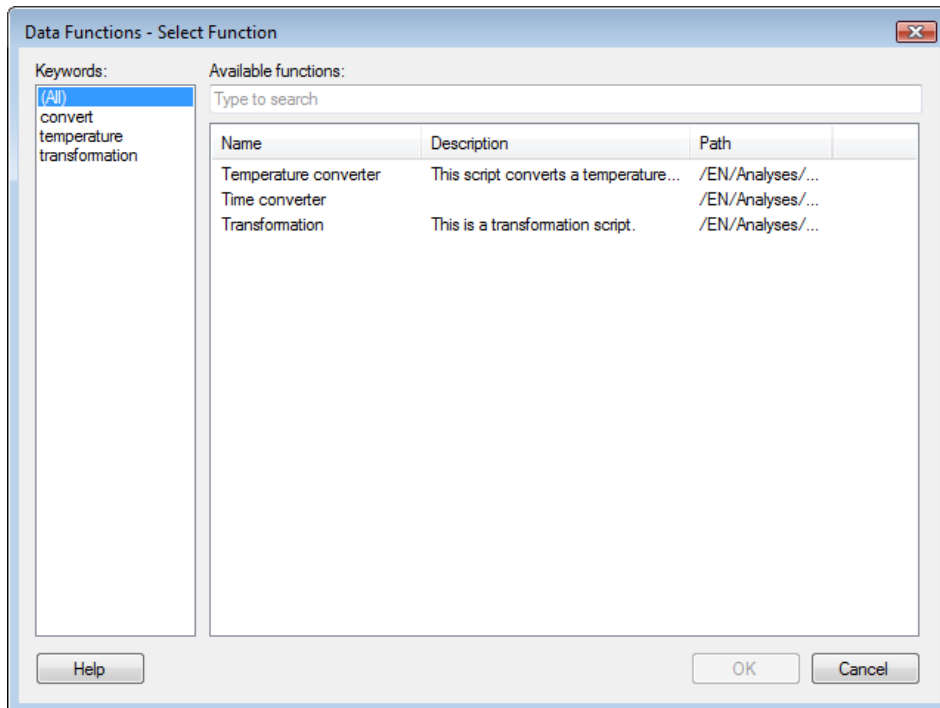


Click to select a keyword in the Keywords list that matches the type of data function you are looking for. You can further limit the number of data functions shown by typing some text in the search field. This limits the data functions visible to the ones matching the current search expression. For more information about valid search expressions, see Searching in TIBCO Spotfire.

## 13.6.3.6 Details on Data Functions - Parameters

This dialog allows you to define how the input and output parameters of the selected data function should be handled. It is necessary to specify a mapping of all required parameters to Spotfire in order to use the data function.

If you have reached the dialog from the Document Properties - Data Functions dialog then any previously executed output cannot be changed. When a data function already has been executed, only the input parameters and previously unspecified output parameters are available. Execute the data function from the Insert menu again if you need to change some of the other output parameter settings.

### ► To reach the Data Functions - Parameters dialog:

1. Open the analysis in which to apply the data function.
2. Select **Insert > Data Function...**.
3. Click to select the function of interest from the list, then click **OK**.

## Input tab



| Option | Description |
|---|---|
| **Name** | Lists the name of the selected data function. |
| **Refresh function automatically** | Select this check box to update the results from the data function automatically each time the input settings are changed. If the check box is cleared, a manual refresh is needed in order for any updates to take effect. <br><br> A data function set to load automatically will switch to manual update if cyclic dependencies are detected in the analysis. |
| **Input parameters** | Lists all input parameters that have been defined for the selected data function. Select an input parameter in this list to edit its settings. |
| **Input handler** | Lists all possible input handlers for the selected input parameter. Depending on which input handler you select in this list, a different set of settings is available to the lower right in the dialog. |
| [Input handler settings] | See the table below. |
| **OK** | Executes the selected data function. |

## Input handler settings

Note that which input handlers are available depends on the type of input parameter that is selected (Value, Column or Table). You will not be able to select from all of the input handlers described below when specifying the input for a selected parameter.

| Option | Description |
|---|---|
| **Column** | |
| **Data table** | Allows you to select the data table from which to retrieve the input column. |
| **Column** | Allows you to specify which column to use as input from the selected data table. |
| **Limit by** | Use a combination of filtering and markings to limit the calculations to rows matching the specified settings only. If more than one option is selected then calculations will be performed for rows matching the intersection of the selected filtering and markings only.<br>Leave both the Filtered rows and the Marked rows check boxes blank to base calculations on all rows. |
| **Filtered rows** | Select this check box to limit the calculations to rows remaining after filtering with the specified filtering scheme. |
| **Marked rows** | Select this check box to limit the calculations to rows marked by the selected markings.<br>If more than one marking is available in your analysis you need to determine which marking or markings to control the calculation. If more than one marking is selected, then calculations will be performed for rows matching the intersection of the markings. |
| **Columns** | |
| **Data table** | Allows you to select the data table from which to retrieve the input columns. |
| **Columns** | Lists the selected input columns. Click Select Columns... to change columns. |
| **Select Columns...** | Opens a dialog where you can specify which columns to include as input to the function. |
| **Limit by** | See a description of the options under Column above. |
| **Expression** | |
| **Data table** | Allows you to select the data table to evaluate the expression against. |
| **Expression** | Displays the expression. |
| **Edit...** | Opens the Edit Expression dialog where you can specify an expression. |
| **Limit by** | See a description of the options under Column above. |

| | |
|---|---|
| **Value** | |
| **Value** | Allows you to type an input value in the text box. |
| **Document property** | |
| **Property** | Allows you to select a document property to use as input. Use the search field to help locate your property. |
| **New...** | Opens the New Property dialog where you can define a new document property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **Data table property** | |
| **Data table** | Allows you to select the data table to work with. |
| **Property** | Allows you to select a data table property to use as input. Use the search field to help locate your property. |
| **New...** | Opens the New Property dialog where you can define a new data table property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **Column property** | |
| **Data table** | Allows you to select the data table to work with. |
| **Column** | Allows you to select which column to work with. |
| **Property** | Allows you to select the column property you wish to use as input. |
| **New...** | Opens the New Property dialog where you can define a new column property to use as an input parameter. |
| **Edit...** | Opens the Edit Property dialog where you can change the value of the selected property. |
| **Delete** | Deletes the selected property. |
| **None** | No input handler has been selected. This can be used for optional input parameters. If the input parameter is required, you must specify a different input handler to be able to continue. |

## Output parameters tab



| Option | Description |
|---|---|
| **Name** | Lists the name of the selected data function. |
| **Refresh function automatically** | Select this check box to automatically update the results from the data function each time the input settings are changed. If the check box is cleared, a manual refresh is needed in order for any updates to take effect. |
| **Output parameters** | Lists all output parameters that have been defined for the selected data function. Select an output parameter in this list to edit its settings. |
| **Output handler** | Lists all possible output handlers for the selected output parameter. Depending on which output handler you select in this list, a different set of settings will become available in the lower right portion of the dialog. |
| [Output handler settings] | See the table below. |
| **OK** | Executes the selected data function. |

### Output handler settings

Note that which output handlers are available depends on the type of output parameter that is selected (Value, Column or Table). You will not be able to select from all of the output handlers described below when specifying the output for a selected parameter.

| Option | Description |
|---|---|
| **Data table** | |
| **Create a new data table** | Allows you to create a new data table with the name specified in the text field. |
| **Replace existing data table** | Allows you to replace a previously added data table by selecting it from the drop-down list. |
| **Columns** | |
| **Data table** | Allows you to select a data table where the result columns should be placed. |
| **Map to input rows** | Allows you to specify how the resulting values should be added to the data table. For example, if you have chosen to calculate results for filtered values only, you will probably want to add the results to those rows that were filtered when the calculation was performed. |
| **Replace columns on update** | Select this check box if you want the results to update the columns in the data table rather than adding new columns for each calculation. |
| **Rows** | |
| **Data table** | Allows you to select a data table destination where the resulting rows should be placed. |
| **Replace rows on update** | Select this check box if you want the results to update existing rows in the specified data table rather than adding new rows for each refresh. |
| **Document property** | |
| **Property** | Allows you to specify which document property to update using the output from the data function. |
| **New...** | Opens the New Property dialog where you can define a new document property to use as an output parameter. Note that a property created at this point will not be of any specified data type, and the property will not be created until the data function has successfully finished its execution. |
| **Edit...** | Opens a dialog where you can change the name of a newly created property. Note that you cannot edit properties that have been created before entering the Data Functions - Parameters dialog. |
| **Delete** | Deletes the selected property. (Newly created properties only.) |

**Data table property**

| | |
|---|---|
| **Data table** | Allows you to specify which data table the property is associated with. |
| **Property** | Allows you to specify which data table property to update using the output from the data function . |
| **New...** | Opens the New Property dialog where you can define a new data table property to use as an output parameter. Note that a property created at this point will not be of any specified data type, and the property will not be created until the data function has successfully finished its execution. |
| **Edit...** | Opens a dialog where you can change the name of a newly created property. Note that you cannot edit properties that have been created before entering the Data Functions - Parameters dialog. |
| **Delete** | Deletes the selected property. (Newly created properties only.) |

**Column property**

| | |
|---|---|
| **Data table** | Allows you to specify which data table the property is associated with. |
| **Column** | Allows you to specify which column the property is associated with. |
| **Property** | Allows you to specify which column property to update using the output from the data function. |
| **New...** | Opens the New Property dialog where you can define a new column property to use as an output parameter. Note that a property created at this point will not be of any specified data type, and the property will not be created until the data function has successfully finished its execution. |
| **Edit...** | Opens a dialog where you can change the name of a newly created property. Note that you cannot edit properties that have been created before entering the Data Functions - Parameters dialog. |
| **Delete** | Deletes the selected property. (Newly created properties only.) |
| **None** | No output handler has been selected. Use this option when the data function is set up with many output parameters and there is one output parameter that you do not want to use in the current calculation. |

## 13.6.3.7 Details on Select Columns

This dialog allows you to select a number of columns on which to base the selected calculations.



| Option | Description |
|---|---|
| **Available columns** | Lists all columns available for selection. |
| [Type to search] | Type a search string to limit the number of items in the Available columns list. It is possible to use the wildcard character * in the search. See Searching in TIBCO Spotfire for more information. |
| **Selected columns** | Lists the columns selected to be used in this particular location. |
| **Add >** | Adds the columns selected in the Available columns list to the Selected columns list. |
| **< Remove** | Removes the selected columns from the Selected columns list. |
| **Remove All** | Removes all columns from the Selected columns list. |
| **Move Up** | Moves the selected column up in the Selected columns list. The order of the columns in this list determines the order of the columns in the temporary data table to be used in calculations. |
| **Move Down** | Moves the selected column down in the Selected columns list. The order of the columns in this list determines the order of the columns in the temporary data table to be used in calculations. |

## 13.6.3.8 Details on TIBCO Spotfire Statistics Services Login

This dialog is shown when the TIBCO Spotfire Statistics Services administrator has turned on Authentication and you try to execute a data function. Enter your credentials and click Login.

| Option | Description |
|--------|-------------|
| **Username** | Type your TIBCO Spotfire Statistics Services username. |
| **Password** | Type your TIBCO Spotfire Statistics Services password. |
| **URL** | The URL to TIBCO Spotfire Statistics Services that you are trying to connect to. |

# 13.6.4    Data Type Mapping

**Data dimensions**

| TIBCO Spotfire data | S-PLUS / R data |
|---------------------|-----------------|
| Value | Vector  of length 1 (list for timeDate) |
| Column | Vector (list for timeDate) |
| Data table | data.frame |

**Data types sent and received via S-PLUS / R data functions**

| TIBCO Spotfire data type | Class (mode)  for S-PLUS / R data type |
|--------------------------|----------------------------------------|
| Integer | integer (numeric) |
| Real | numeric (numeric) |
| SingleReal | single (numeric)   --  not supported with R |
| String - encoded as UTF-16 | character (character) --  encoded as ISO8859-1 |
| Date | timeDate (list) |
| Time | timeDate (list) |
| DateTime | timeDate (list) |
| Boolean | logical (logical) |
| Binary | raw (raw)  -- only supported for a single value |

- A timeDate value received from S-PLUS / R is always stored as DateTime in TIBCO Spotfire.

- S-PLUS / R factors are sent from TIBCO Spotfire Statistics Services as strings.
- Other data types than the ones described above are not supported.

## Support for invalid values

All numeric invalid values in TIBCO Spotfire are represented as NAs in S-PLUS / R. There is no special support for invalid values of other types; they become valid default values in S-PLUS / R.

## Calling conventions for functions

The names of the data function input arguments must match the names of the S-PLUS / R function arguments.

For functions that return only one value (not a list of values), the single data function output parameter will be matched to the value.

For functions returning a list of values, the data function output parameters must match the names of the list elements.

### Concerning R:

R is available under separate open source software license terms and is not part of TIBCO Spotfire. As such, R is not within the scope of your license for TIBCO Spotfire. R is not supported, maintained, or warranted in any way by TIBCO Software Inc. Download and use of R is solely at your own discretion and subject to the free open source license terms applicable to R.

# 13.6.5    Name Encoding for Column Names Sent to Spotfire Statistics Services

Column names in TIBCO Spotfire are stored as UTF-16 encoded strings, while variable names in TIBCO Spotfire Statistics Services are built from 8-bit ASCII characters matching [.0-9a-zA-Z]. Thus, the column names that are sent to TIBCO Spotfire Statistics Services must be encoded. This is done automatically when sending data to TIBCO Spotfire Statistics Services via the built-in data functions input handlers. If you need to provide column name input by some other means (e.g., via a document property) you may need to use the NameEncode function manually, in order to encode the column names prior to applying the data function.

Decoding may be necessary to interpret column names when the result from a data function is a text report about the columns. Use the NameDecode function to decode results that have not been automatically decoded by Spotfire output handlers.

NameDecode (and NameEncode) can be written as an S-PLUS script for ASCII and ISO-8859-1 characters.

**Code UTF-16 to 0-9a-ZA-Z and .**

Let 0-9, a-z, A-Z be the digits in a 62-base system. Cast 16-bit characters to unsigned short integers and write those integers in the 62-base system. Example; '£' is casted to 162, this is coded to '02C'. Let .. be the starting tag for a coded character.

The code range will be ..001 to ..h31 (where h31 is equal to 65635 in the 62-base system).

## Code  examples:

NameEncode("Column.2") = "Column.2"

NameEncode("Column 2") = "Column..00w2"

NameEncode("Column £") = "Column..00w..02D"

# 13.7     Information Designer

## 13.7.1     What is the Information Designer?

The Information Designer is a tool for setting up data sources and creating and opening *information links*. An information link is a database query specifying the columns to be loaded and any filters needed to narrow down the data table prior to creating visualizations in TIBCO Spotfire. In Information Designer, information links are created from building blocks such as columns and filters using joins, calculations and aggregations.

The Elements tree in Information Designer is a representation of the folder structure in the library. The permissions for each folder specify which databases and elements should be available for different users or groups when creating information links. Folder permissions can be specified in the Information Designer, but the main permission handling is done with the Library Administration tool.

Once information links have been created in Information Designer, they can be opened by any user who has the appropriate licenses, allowing users who may not have knowledge of SQL or the underlying database structures to be able to execute advanced database queries.

Information links are opened by selecting **File > Open From > Library...**.

Note that neither the Information Designer, nor the resulting information links are available when you are working offline.

## 13.7.2     General Workflow

This is the general workflow for using Information Designer:

### 1. Set up the data sources

Enter the information required to connect to the databases which will be accessed through Information Designer.

### 2. Create folders for storing elements and set permissions

The library is a hierarchical structure where data sources, elements and information links can be organized into folders. Given that the library is also used for storing analysis files, it could be worthwhile to spend some time thinking over a suitable structure.

Different groups of users are given different levels of access to data.

### 3. Combine tables by creating joins

If you want to work with data from different tables, you first need to create joins.

### 4. Define column elements from available data sources

Define the column elements to be shown when creating information links. These columns can be taken directly from tables in one or more databases. They can also be calculated, filtered or otherwise modified.

### 5. Create filter elements to limit the data retrieved

Create filter elements with descriptive names to be applied when creating information links.

### 6. Create information links

Create information links that retrieve data from one or more databases and share them with your colleagues.

## 13.7.3    General Guidelines for Setting Up an Information Model

The Information Model (IM) concept aims to supply each end user with the data they need, with a minimum of effort and confusion.  Consequently, when building an IM, it is important to understand who the end users are and what data they require for their work.

**Who are the end users?**

Permissions are set on the folder level. Finding groups of users who work on related data will give you a good clue about the folder structure you should implement. Do not give all users access to everything - this will only cause confusion.

**What data do they need?**

What information is needed? How much data can users handle in a single request? Are there any commonly used threshold values? Answering these questions will guide you in setting up the correct joins, columns and filters.

**Will users build their own information links?**

Some end users will want to use the column and filter elements that you design, and assemble their own information links using Information Designer. Others will be less experienced, or may perform repetitive tasks. For these you should consider preparing complete information links in advance.

**Tip:** If your data source contains well-ordered data you can right-click on the data source and select **Create Default Information Model...** in order to quickly set up a simple information model.

## 13.7.4    Icon Explanations

In the Elements tree, the following icons may appear. Click on a link in the table below to find out more about each element type. In the Data sources tree only the items belonging to a database are visible.

| Icon | Element type |
|------|--------------|
| | Folder |
| | Information link |
| | Filter |
| | Boolean column |
| | String column |
| | Integer column or LongInteger column |
| | Real, ShortReal or Currency column |
| | Date column |
| | DateTime column |
| | Time column |
| | Procedure |
| | Binary Large Object |
| | Character Large Object |

| | |
|---|---|
| 📊 | Join |
| ⊟ | Database instance. |
| 🛢 | Database link/catalog - a link to another database. |
| 🏗 | Schema - a collection of tables and/or procedures. |
| ⊞ | Table - a set of columns. |
| 📊 | Table alias. You can create a duplicate reference to a database table from Information Designer. This duplicate is called a Table Alias. |
| ??? | Unknown column.<br>Must be set manually to one of the accepted column types (above) before it can be saved as a column element. |

# 13.7.5    Fundamental Concepts

The Information Designer in TIBCO Spotfire requires no prior knowledge of query languages such as SQL. However, it is important to understand a few terms and concepts as they are used in this product:

- Information links
- Column elements
- Filter elements
- Folders
- Procedures

# 13.7.6    Information Links

## 13.7.6.1    Information Links

An information link is a structured request for data which can be sent to the database. These specifications include one or more columns, and may include one or more filters.

Stated in plain English, an information link could be: "Fetch the *Name*, *Address* and *Phone_number* for employees that pass the filter *High_Income*."

Information links can also be used to limit what data to open in an analysis in a number of different ways. See Loading Data Overview for a summary of the various methods.

## 13.7.6.2    Editing Information Links

### 13.7.6.2.1    Creating an Information Link

Information Designer allows you to create information links. The building blocks are column-, filter- and procedure elements that have been set up by you or the database administrator.

#### ► To create an information link:

1. Click **New** and select **Information Link**.

   Response: An Information Link tab is opened.

2. In the **Elements** tree, select the column or filter element that you want to include. You can also include procedures.

   Comment: If the Elements tree is not visible in the left-hand pane, click on the Elements tab to display it. Click the + symbol to expand a folder. You can select

multiple elements simultaneously by pressing Ctrl and clicking on the elements of interest, or by pressing Shift and clicking on the first and last element in a list.

3. Click **Add >**.

    Response: The selected element is added to the Elements list on the Information Link tab.

    Comment: To remove an item from the information link, select the item and click < Remove.

4. If the selected elements come from more than one data source table, you need to specify a **Join path**. This means that you must create all joins needed to link all data tables together and you must also specify these in the Join path section on the Information Link tab.

5. In the **Description** field, type some text describing the purpose of the information link. This is optional.

6. If you want to filter the data, open the **Filters** section and follow the instructions under Adding Hard Filters.

7. If you want to add prompts (run-time filtering), open the **Prompts** section and follow the instructions under Adding Prompts.

8. Optionally, you can also choose to specify any **Conditioning**, **Parameters** or **Properties** that are needed for your information link. See Information Link Tab for more information.

9. Click **Save**.

    Response: The Save As dialog appears.

10. In the folder tree, select where you want the information link to be saved.

11. In the **Name** field, type a name for the information link.

12. Click **Save**.

    Response: The new information link is added to the library. It can now be accessed by other users.

**Tip:** You can test the information link directly by clicking on **Open Data**.

**Tip:** You can view and edit the SQL behind the information link by clicking **SQL...**.

## 13.7.6.2.2    Modifying an Information Link

If you have Browse + Access + Modify permission to a folder, you can edit existing information links in that folder.

### ► To modify an information link:

1. In the **Elements** tree, double-click on the information link you wish to edit.

    Response: The content of the information link is opened in a new Information Link tab.

2. Edit the link in the Information Link tab by adding or removing elements or by changing the filtering or prompting for a column.

3. Open the modified link by clicking **Open Data** or save it by clicking **Save**.

    Comment: Replace the old information link by choosing the same name and folder location as the old link. Type a new name (or put the link in another folder) to keep both the old and the modified information links.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

### 13.7.6.2.3     Deleting an Information Link

#### ► To delete an information link from the Information Model:

1. In the **Elements** tree, right-click on the information link you wish to delete.
2. Select Delete from the pop-up menu.
   Response: A dialog appears, prompting you to confirm that you want to delete the link.
3. Click **OK**.

### 13.7.6.2.4     Adding Hard Filters

Hard filters are set up as you define the information link and are saved with the link. This means that they cannot be reused in other links. Also, hard filters can only specify a range or a list of values, and are therefore less complex than filter elements.

#### ► To add hard filters for a column:

1. Create an information link.
2. Go to the **Filters** section on the Information Link tab for that information link.
3. Click **Add**.
   Response: The Add Column dialog is displayed.
4. Select the column for which you wish to add a hard filter from the drop-down list.
5. Click **OK**.
   Response: The column is added to the Filters list.
6. Repeat steps 3 to 5 add filters for more columns.
7. For each column, use the **Filter Type** drop-down list to select whether to filter by range or by values.
   Comment: Filtering by *range* means entering the upper and lower limits of the desired range. Filtering by *values* means entering the exact values that you want to include in the returned data, separated by semicolon.
8. Set the upper and lower limits (range) in the Min Value and Max Value fields, or type the desired values, separated with semicolons in the Values field. You can also type **?param_name** in the Values field to use a parameter as the filter for the chosen column, where param_name is the name to identify the parameter by.
   Comment 1: Limits are inclusive. In other words, if the lower limit is set to 1000, the value 1000 will be included in the data table.
   Comment 2: When setting upper and lower limits on columns of type String, 'A' is considered to come before 'AA', and 'S' comes before 'Smith'. This means that the name 'Smith' will not be present when choosing names from 'D' to 'S'. The order of characters is standard ASCII.

**Tip:** When entering values for filtering you are allowed to use wildcard characters. These are:

\*     Matches any characters (example: '\*mber' would return the following months: September, November and December).

?     Matches any single character (example: '???ember' would only return the months November and December).

### 13.7.6.2.5     Adding Prompts

An alternative to setting filter conditions in the Filters section (see Adding Hard Filters) is to configure your information link to prompt for filter values as the columns are retrieved. This way you do not have to specify filter conditions in advance. The data table will be pared down before the next column in sequence is processed (unless you have specified prompt groups to treat the columns as independent). See Prompted Information Link Example for further information.

### ► To enable prompts:
1. Create a new information link or modify an existing link.
2. On the **Information Link** tab, go to the **Prompts** section.
3. Click **Add**.

   Response: The Add Column dialog is displayed.
4. Select the column for which you wish to add a prompt from the drop-down list.
5. Click **OK**.

   Response: The column is added to the Prompts list.
6. Repeat steps 3 to 5 add prompts for more columns.
7. For each column, use the **Prompt Type** drop-down list to select how you want to be prompted for filter conditions during data retrieval.

   Comment: Selecting **Values** will let you enter a list of values to include. **Range** will let you specify a range of values. **Multiple selection** will present a list of available values from which you can select multiple values. **Single selection** will present a list of available values from which you can select a single value.
8. Save the information link, or open it.

**Note:** When opening a prompted information link, the prompts will appear in the order that the columns appear in the Information Link tab. You can use the Move Up and Move Down buttons to move columns up or down. (*Filter elements* are always applied before any prompts, regardless of order.)

**Tip:** When entering values for filtering you are allowed to use wildcard characters. These are:

* \*    Matches any characters (example: '\*mber' would return the following months: September, November and December).

* ?    Matches any single character (example: '???ember' would only return the months November and December).

## 13.7.6.2.6    Using Prompt Groups

The default behavior of prompted information links is that each subsequent step lists values based on earlier selections (See Prompted Information Link Example). However, if you are working against a STAR schema database the procedure may require multiple joins since the elements queried for the prompts can only be joined by also joining over the large fact table in the STAR schema. This may result in very long times passing between each prompt. To avoid the long prompt times, it may be useful to treat the various elements as independent and avoid filtering upon each prompt step. This can be accomplished by using prompt groups.

### ► To use prompt groups to make elements independent:
1. Create a new information link or modify an existing link.
2. In the **Information Link** tab, go to the **Prompts** section.
3. Click on **Groups...**.

   Response: The Prompt Groups dialog is displayed.
4. For each element, specify a prompt group by clicking on the number to the right of the column name.

   Comment: All column elements belonging to the same prompt group will depend on each other and, hence, filtering will be performed between each prompt step for these elements. Elements belonging to a different prompt group will be independent of all filtering made within a different prompt group. Note that setting columns or filters as independent may result in no data returned from the information link.
5. Save the information link, or open it.

**Note:** By specifying a separate prompt group for an element no previous selections in the prompt steps will be reflected in the listing for this (independent) element. Neither will any of

the selections made in the prompt step for the independent element be reflected in later prompt steps (regardless of whether the later prompt steps are independent or not).

## 13.7.6.2.7 Adding Procedures

Procedures are added to an information link in the same way as any other elements such as a column or a filter. You select them from the Elements tree and click **Add >**. The procedure icon looks like this:

### Priority of Execution:

You can include column elements, filter elements and procedure elements in the same information link. These will be executed in a certain priority order when the information link is executed:

- All **pre-update procedures** will execute in top-down order. The procedure is executed before any data is retrieved. No data is expected from the pre-update procedure, and no join is performed. Any prompting will occur in the top-down order.
- All **query procedures** and **column elements** will execute in top-down order. The procedures run as a part of the data retrieval. Data from the procedures are joined with the rest of the columns. Any prompting will occur in the top-down order.
- All **post-update procedures** will execute in top-down order. The procedure is executed after the data has been retrieved. No data are expected from the post-update procedure, and no join is performed. Any prompting will occur in the top-down order.

Note that the order of the elements in the user interface only has significance for the elements of the same "priority class". A pre-update procedure will always execute before a query procedure regardless if that pre-update procedure is placed at the bottom of the list.

## 13.7.6.2.8 Parameterized Information Links

Using parameterized information links you can set up a data source to return only information applicable for a certain user or group. Depending on which user is logged in and accesses the information link, or, for example from where the user accesses the information link, different subsets of the data will be available.

The concept is similar to the personalized information links, but more general, and in need of API configurations to work properly. While the parameters are created in Information Designer, their properties and definitions are defined in the API.

A parameterized information link is an information link that contains a number of parameters. In Information Designer, you define these parameters with a name and a type, and can use the parameters when creating various elements in the information link. To be able to open a parameterized information link in Spotfire, the values for these parameters must be provided. How is determined in the API.

### Why use parameters?

Parameters can be used if you, for example, wanted to set up the Web Player from an external source. If the Web Player is integrated into a portal or similar, the contents of the analysis can be defined by parameters. The values of these parameters can then be defined by another application in the portal, or by settings the users have applied in other parts of the portal.

Another example is if you wanted to create an analysis file but then be able to easily create different versions of it for different users. You can then set up a template file using parameterized information links, and from that file, and using the API, create different files with different parameter values.

## Where can parameters be included?

| Element Type | Parameterized Property |
|---|---|
| Column | Column calculation. <br> Aggregate column key expression. <br> Filter condition. |
| Filter | Filter condition. |
| Procedure | Input parameter default value. |
| Information Link | Static filter. <br> Edited SQL (Pre-updates, Query, Post-updates). |
| Data Source | Open session commands. <br> Close session commands. |

## Examples:

For filter condition expressions, parameters can be used as the condition for the selected columns.



In the SQL editor, you can set parameters directly.

```
FROM
    "Sales"."dbo"."SalesandCost" S1
WHERE
    (S1."Sales" > ?MinSales)
```

**Note:** If you alter parameters in the SQL code, the changes will override the parameter settings made elsewhere, such as the filter part of the information link tab.

## Syntax

The syntax of the naming of the parameterized information links is:

?param_name

Where "?" indicates that it is a parameter and param_name is the name the parameter is identified by.

**Note:** The parameter name should start with a letter from A-Z or a-z and can contain the following characters: a-z, A-Z, 0-9, _ and '.'.

## 13.7.6.2.9 Editing a Parameter

### ► To edit a parameter:

1. Make sure the information link of interest is opened on an Information Link tab.
2. Click **Parameters**.
3. Select the parameter you want to edit.

   Comment: You may need to click Refresh to be able to see the parameter, Note that if you have edited the SQL of the information link, the altered SQL code overrides the parameters settings in the user interface and a parameter that was added in, for example, the filters section of the information link tab will not be visible.
4. Click **Edit**...

   Response: The Edit Parameter dialog is displayed.
5. Change Data type and/or Value type.
6. Click **OK**.

## 13.7.6.2.10 Personalized Information Links

Using personalized information links you can set up a data source to return only information applicable for a certain user or group. Depending on which user is logged in and accesses the information link, different subsets of the data will be available. For example, you could set up an information link that detects whether the user retrieving data is a member of the sales force for Europe, Asia or the US and only return data for that continent.

Below are two examples of personalized information links. The first will retrieve data depending on which user is logged in, the second depending on which groups that user is a member of.

### User Name via Lookup Table

Scenario: You want to set up an information link to a data table showing sales made by all the sales people in the company. However, depending on which person from the sales department accesses an analysis using this information link, only the sales figures pertaining to that single user should be retrieved.

First, take a look at the Sales table containing the total sales of every person in the sales force.

| Order ID | Employee ID | Product | Sale ($) |
|----------|-------------|---------|----------|
| 1 | 101 | Cornflakes | 100 |
| 2 | 150 | Soda | 550 |
| 3 | 244 | Cornflakes | 160 |
| 4 | 101 | Mineral water | 400 |
| 5 | 101 | Soda | 120 |
| 6 | 339 | Mineral water | 200 |

Then you must create a "Lookup Table" on the data source, that matches the **Employee ID** to the **actual Spotfire Username** for each person logging into the TIBCO Spotfire Server.

| Spotfire Username | Employee ID |
|-------------------|-------------|
| mikesmith | 101 |
| lauraclarke | 150 |
| sarahdonovan | 244 |
| malcolmreynolds | 339 |

Next, you create a **Filter** or **Column** element that constrains the "Spotfire Username" column to only return values for the currently logged in user. (In the example below, a new, restricted column element is created by adding the personalized condition as a hard filter on the column element. This is the column element that will be used in the information link.)



An example of the resulting SQL for the user malcolmreynolds  would be:
 "LookupTable"."Spotfire Username" = 'malcolmreynolds'.

Finally, you create a **Join** between the Sales table and the Lookup table—joining the **Employee ID** columns.

Add the restricted column element (or the filter element) to an information link, together with any other columns of interest and save it. The information link is now ready to be used and will only retrieve data for the currently logged in user.

## Group Membership

Scenario: You want to set up an information link to a data table showing sales made by all the sales people in the company. However, depending on which person from the sales department accesses an analysis using this information link, only the sales figures pertaining to the region that sales person is assigned to should be retrieved. For example, if a sales person is working in the East region, she should only be allowed to see sales figures made in that region (by any person).

The Spotfire Administrator has created groups on the Spotfire Server named **SalesForce-East**, **SalesForce-West**, **SalesForce-South**, and **SalesForce-North**. Each sales person is a member of one or more of these.

**Note:** You can also create a Lookup table, just as in the first example, in which you assign various users or groups to categories that match your Sales table. That way you do not need to create superfluous groups on the Spotfire Server if groups with matching names are not already available.

You then take a look at the Sales table containing the total sales of every person in the sales force.

| Order ID | Employee ID | Region | Product | Sale ($) |
|---|---|---|---|---|
| 1 | 101 | SalesForce-East | Cornflakes | 100 |
| 2 | 150 | SalesForce-West | Soda | 550 |
| 3 | 244 | SalesForce-North | Cornflakes | 160 |
| 4 | 101 | SalesForce-East | Mineral water | 400 |
| 5 | 101 | SalesForce-East | Soda | 120 |
| 6 | 339 | SalesForce-East | Mineral water | 200 |

Next, you add a **Filter** or **Column** element that constrains the "Region" column so that it only returns values if the currently logged in user is a member of a group with that exact name. (In the example below, a new, restricted column element is created by adding the personalized condition as a hard filter on the column element. This is the column element that will be used in the information link.)



An example of the resulting SQL for a user belonging to the SalesForce-East and the SalesForce-North groups would be:  "SalesTable"."Region" = ('SalesForce-East','SalesForce-North').

Add the restricted column element (or the filter element) to an information link, together with any other columns of interest and save it. The information link is now ready to be used and will only retrieve data for groups that the currently logged in user is a member of.

### Syntax

The syntax for the personalized information link parameters is:

%CURRENT_USER%

and

%CURRENT_GROUPS%

## 13.7.6.2.11    Editing the SQL of an Information Link

Information links are created using the Information Designer. However, sometimes there may be situations where complex SQL queries are needed that cannot be generated by Information Designer and the elements in the information model. An example might be to retrieve information from relational databases or databases with complex schemas, where queries generated by Information Designer are not fast enough and need tuning to reach an acceptable performance. For those purposes the possibility to manipulate the generated SQL of an information link has been introduced.

### ► To modify the SQL of an information link:

1. Make sure the information link of interest is opened on an Information Link tab.
2. Click **SQL...**.
   Response: The Edit SQL dialog is displayed.
3. Select the **Data source** that you want to work with from the drop-down list.
   Comment: Complex information links may contain elements from several different data sources. You can only edit the SQL part of the query that belongs to a single data source at a time. After you have saved your first changes you can switch to another data source to edit the rest of the SQL.
4. To edit **Pre-Updates**, **Query** or **Post-Updates**, click the corresponding radio button.
   Comment: Use **Query** to modify the SELECT statement of the information link. Use **Pre-Updates** or **Post-Updates** to add new statements or scripts to be run before or after the data retrieval.
5. Edit the SQL statement (or add Pre- or Post-Updates) in the **Modified SQL** text box.

Comment: You can compare the changes that you have made in the Modified SQL to the **Original SQL** at all times. Multiple SQL statements are allowed as long as they are separated with a semicolon and new line (except the last statement in sequence).

Comment: You can use parameters in your SQL statements (and in your Pre- and Post-updates).

**Note:** If you alter parameters in the SQL code, the changes will override the parameter settings made in, for example, the filter part of the information link tab.

6.  Click **OK** when you are finished.

    Comment: If you change your mind and want to start over with the original SQL, click *Reset to Original*.

**Note:** The modified SQL is not validated before execution. For this reason, you should not:

- alter the name of a column (the AS-part of SELECT xxx AS yyy)

- alter the number of columns returned

- alter the datatype of columns returned

- alter the order of columns returned

- remove <temporary_result_#> from the FROM-clause in information links that go against multiple data sources

- remove the trailing WHERE <conditions>, as it will be replaced by any conditions applied at runtime

## 13.7.6.2.12   Selecting Join Path

When you are using columns from more than one table in the same information link you have to specify a join path between all used tables. If multiple joins are created, you can specify which joins will be the default ones. The default joins will be presented in the join path field when the Suggest Joins button is clicked (if they are suitable for the current information link).

However, sometimes you may want to specify a different join path for an information link.

Let's say the default join path between Table 1 and Table 4 is via Table 3 and the joins TABLE1.ID=TABLE3.ID and TABLE3.NAME=TABLE4.NAME.
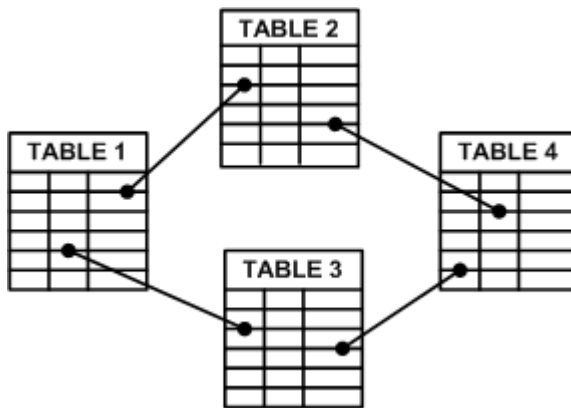


For a certain information link this is not what you want, instead you wish to configure the link to join via Table 2 using the joins TABLE1.ID=TABLE2.ID and TABLE2.COST=TABLE4.COST.

This can be done in the Join Path section for the information link by simply selecting the desired joins instead of the suggested ones.

### ► To Select a Join Path:

1.  Go to the **Join Path** section on the information link tab.
2.  Select a join from the Joins tree that you wish to use and click **Add**.
3.  Response: The new join is added to the **Selected Joins** list.

4.  Repeat step 2 for any additional joins.
5.  Click **Save** to save the information link.

    Comment: The **Selected Joins** will be saved with the information link, and will always be used when retrieving data via the information link.

**Note:** When executing an information link against several data sources, all subqueries are run first and then the main query, joining all subresults. This means that the joins in the main query are performed after all joins in the subqueries.

## 13.7.6.3     Opening Information Links

### 13.7.6.3.1     Opening Information Links from Information Designer

Once defined, information links are normally opened by selecting **File > Open From > Library...**. However, you can also open information links from within Information Designer. This can be useful while creating the information link, or if you need to make some minor adjustments to the original information link.

#### ► To execute an information link from Information Designer:

1.  Create a new information link or edit an existing link (see Modifying an Information Link).

    Comment: You can also right-click in the Elements tree and select **Open Data...** from the pop-up menu.
2.  Click **Open Data**.

    Response: The query is executed, and the data is shown in TIBCO Spotfire. If the information link includes prompted filters, one or more dialogs will appear before the data is loaded. See Using Prompts for details.

### 13.7.6.3.2     Using Prompts

#### ► To specify filter parameters during retrieval:

1.  Open an information link that contains prompts.

    Response: The system will begin to retrieve data. For each column with a prompt (see Adding Prompts) a dialog will appear, asking you to specify the filter conditions for this column.
2.  Enter the filter conditions that you want to apply.

    Comment: If you are using the Multiple selection or Single selection prompt methods, then you will find that only values that have not been eliminated by previous filter conditions (in the same prompt group) are shown.
3.  Click **Next >**, or **Finish** when you have come to the last column.

    Response: The data is retrieved and displayed in TIBCO Spotfire.

**Note:** Dialogs are displayed in the order the columns appear in the Information Link tab. In other words, the first column for which a prompt has been added will be the first to display a dialog.

### 13.7.6.3.3     Prompted Information Link Example

Information links may include more than one column with prompts. In this case each filter will reduce the data table, so that subsequent prompts may present fewer values. (This can be overridden by using prompt groups.) Consider the following example:

This is the data as it would look if no filters were being applied:

| Name | Salary | Location |
|------|--------|----------|
| **Prompt: None** | **Range** | **Multiple selection** |
| Miller | 1300 | New York |
| King | 1400 | New York |
| Clark | 700 | New York |
| Ford | 1100 | Dallas |
| Adams | 900 | Dallas |
| Scott | 1300 | Dallas |
| Jones | 1200 | Dallas |
| James | 800 | Chicago |
| Turner | 1000 | Chicago |

As the information link is opened, Salary will be filtered first (the order is set in the Information Link tab).

| Lower limit: | 1100 |
|--------------|------|
| Upper limit: | 1300 |

The user enters the limits 1100 to 1300. After the first filter, the following remains:

| Name | Salary | Location |
|------|--------|----------|
| **Prompt: None** | **Range** | **Multiple selection** |
| Miller | 1300 | New York |
| Ford | 1100 | Dallas |
| Scott | 1300 | Dallas |
| Jones | 1200 | Dallas |

Several rows, including all Chicago employees, have been filtered out. This means that when the Location filter is shown, Chicago will not be presented as an option:

Select values:
DALLAS
NEW YORK

### 13.7.6.3.4     Using Current Filter Settings as a Filter

When opening information links with columns prompted for values (see Adding Prompts) it is possible to use the visual capabilities of TIBCO Spotfire to set these values.

#### ► To use the current visualization for filter definition:

1. Open a suitable data table in TIBCO Spotfire.
2. Choose a subset either by filtering or by marking rows.
3. Open an information link that contains prompts.

4. When the **Open Information Link** dialog for the desired column appears, click **Get Values...**.

   Response: The Column Values dialog is displayed.

5. From the **Column** drop-down list, select the column (in the visualized data table) from which you want to get the values.

6. Click **All rows, Filtered rows** or **Marked rows**, depending on which values you want to use.

7. Click **OK**.

8. In the **Open Information Link** dialog, click **Next >** (or **Finish** if this is the last prompted column).

9. Repeat steps 4 to 8 for each prompted column.

   Response: The data is loaded and displayed in a visualization.

## 13.7.6.4    Transforming the Data

### 13.7.6.4.1    Eliminating Duplicates

Eliminating duplicates means removing all duplicate rows from the returned data table. By duplicates we mean rows where *all fields* are identical to all fields of another row. Consider the following example:

Before removing duplicates

| Name | Income |
|------|--------|
| Smith | 1200 |
| Jones | 700 |
| Banks | 700 |
| Smith | 1200 |
| Smith | 900 |

After removing duplicates

| Name | Income |
|------|--------|
| Smith | 1200 |
| Jones | 700 |
| Banks | 700 |
| Smith | 900 |

#### ► To eliminate duplicates:

1. Create a new information link or edit an existing link (see Modifying an Information Link).
2. In the **Information Link** tab, go to the **Conditioning** section.
3. Click **Distinct**.
4. Open or save the information link.

   Response: Duplicate rows will be removed from the data table returned by this information link when it is opened.

### 13.7.6.4.2    Pivoting Data in Information Designer

Pivoting is a method of rearranging rows into columns. This flexibility allows you to rotate row and column headings around the core data. In general, pivoting is used to be able to carry out visual analyses on data that originally reside in a tall/skinny format. Pivoting may also be used to create more filters in the filters panel by splitting a column into several other columns.

#### ► To pivot data:

1. Create a new information link or edit an existing link (see Modifying an Information Link).
2. In the **Information Link** tab, go to the **Conditioning** section.

3. Select **Pivot** as conditioning type.
4. Click **Edit...**.
   Response: The Pivot Conditioning dialog opens.
5. In the **Identity** section, click **Add...** to select the columns that you want to use to identify rows.
   Comment: Each unique value in the chosen identity column produces a row in the generated table.
6. In the **Category** section, click **Add...** to select the columns that you want to use for generating new columns in the new table.
   Comment: Each unique value in the chosen category column produces a new column in the generated table.
7. In the **Values** section, click **Add...** to select the column that you want to aggregate.
   Comment: The column from which the data is pulled. The values in the generated table are computed according to the method selected under Aggregation method in the Add Column dialog.
8. Type a Column name expression to use for naming the pivoted columns.
9. In the **Other columns** section, click **Add...** to select any other columns that you want to include in the new table.
10. Click **OK**.
    Response: The Pivot dialog is closed.
11. Open or save the information link.
    Response: The data will be pivoted when the information link is opened.

## 13.7.6.4.3    Example of Pivoting in Information Designer

Pivoting a data table means changing it from a tall/skinny format to a short/wide format. Consider the following tall/skinny table, based on a series of temperature measurements:

| City | Month | Temp |
|---|---|---|
| London | February | 4 |
| New York | February | 6 |
| London | May | 16 |
| New York | May | 19 |
| London | August | 28 |
| New York | August | 26 |
| London | November | 13 |
| New York | November | 11 |

As we add more observations, the table grows taller, but remains three columns wide. While useful during data collection, this format may not be appropriate for certain types of calculations or visualizations. For example, the entities that interest us are the different cities, so we may want a representation with a single row for each city.

Pivoting this table produces the following (note that avg(Temp) is the average of a single cell):

| City | avg(Temp) for February | avg(Temp) for May | avg(Temp) for August | avg(Temp) for November |
|------|------------------------|-------------------|----------------------|------------------------|
| London | 4 | 16 | 28 | 13 |
| New York | 6 | 19 | 26 | 11 |

Each city is now represented by a single row. The following steps have been performed during the pivoting:

- A row has been created for each unique value in City.
- A column has been created for each unique value in Month.
- A value from Temp has been entered for each cell in the resulting grid.

The following settings were made in the Pivot Conditioning dialog to produce this result:

- Identity: City
- Category: Month
- Values: Temp

### 13.7.6.4.4 Example of Pivoting with Aggregation in Information Designer

**Note:** To understand this example, it is recommended to read Example of Pivoting first.

Apart from changing format from tall/skinny to short/wide, pivoting can be used to create a more compact table. Consider the following table, based on a series of temperature measurements:

| City | Month | Day | Temp |
|------|-------|-----|------|
| London | February | 1 | 5 |
| London | February | 15 | 8 |
| London | May | 1 | 15 |
| London | May | 15 | 22 |
| New York | February | 1 | 9 |
| New York | February | 15 | 7 |
| New York | May | 1 | 18 |
| New York | May | 15 | 24 |

Tall/Skinny=>Short/Wide conversion lets us pivot and aggregate this table, producing the following:

| City | avg(Temp) for February | avg(Temp) for May |
|------|------------------------|-------------------|
| London | 6.5 | 18.5 |
| New York | 8 | 21 |

A smaller table has been created, summarizing the original table. The following settings were made in the Pivot Conditioning dialog to produce this result:

- Identity: City
- Category: Month
- Values: Temp

## 13.7.7     Data Sources

### 13.7.7.1     Data Sources Overview

Data sources are the physical units from which data can be retrieved, usually databases. Connecting to a database requires technical know-how not always found among end users. Therefore, Information Designer lets the administrator make all the required settings in advance, including database name, username, password, etc. This information becomes part of elements and items in the library so that when an end user executes an information link, the connection to any required databases can be established automatically and invisibly.

User authentication to the data source can be made in two ways. The first way is to set up the authentication while creating the data source connection. In this case, all users connect with the same credentials. This is a simple way to authenticate users when everyone has the same permissions to the data source. Further limitation of the access to a data source can be applied by placing the data source within a folder with limited permissions for some users or groups. For more information, see Setting Folder Permissions.

The other way is to require authentication each time a connection is used. This is useful when a more detailed security model is required. Using user authentication, row level security can be obtained. The credentials can either be supplied by the user or by a plug-in when running an information link against this data source. A plug-in minimizes the number of times one has to log into the TIBCO Spotfire environment, leaving it up to the plug-in to deliver the data source credentials. Without a plug-in, users will have to supply their data source credentials in a prompt. Credentials can be cached in the data source so that users are prompted only once for each session.

The layout and handling of the data sources affect most other actions involving the creation of information links. Therefore, it is most valuable to do a proper planning before starting to work on the layout. Modifications to the data sources after the structure has been set up in the library and information links have been defined will probably mean that some manual work is needed to make sure all information links are still functional.

### 13.7.7.2     Creating a Data Source

#### ► To create a new data source:

1. On the Start tab, click **Setup Data Source**.
   Response: A Data Source tab is displayed.
2. In the **Name** field, type the name of the new data source.
3. Specify the **Type** of the data source.
4. Modify the **Connection URL**.
5. Type a **Username** and **Password** that gives access to the data source.
6. Select whether a user must be authenticated when accessing the data source.
   Response: If this option is selected, authentication is required when accessing this connection, either by the user or by a plug-in. If not selected, the credentials supplied above will be used for all users. Even if user authentication is selected, **Username** and **Password** must be supplied since they are used by Information Designer.
7. Enter any additional configuration settings.
8. Click **Save**.

**Note:** If you are connecting to a non-writable data source (for example, SAS/SHARE or ODBC) you must clear the **Allow writing in temporary tables** check box.

**Note:** For SAS/SHARE and ODBC data sources, both Min and Max **No of connections** should be set to 0 in order to disable connection pooling. The same holds for other data sources that do not support pooled connection since there is no valid ping command.

## 13.7.7.3    Modifying a Data Source

### ► To modify an existing data source:

1.  In the **Data Sources** tree or in the **Elements** tree, double-click on the data source you wish to edit.

    Response: The data source settings are shown in a new Data Source tab.

2.  Change any fields.

3.  Click **Save**.

    Response: The data source is updated.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with data source names containing these characters can be imported. However, you cannot edit and resave data sources using their old names if they contain forbidden characters.

## 13.7.7.4    Removing a Data Source

### ► To remove a reference to a database:

1.  In the **Data Sources** tree, right-click on the data source you wish to delete.

2.  Select Delete from the pop-up menu.

    Response: A dialog appears, prompting you to confirm that you want to delete the data source.

## 13.7.7.5    Creating a Table Alias in Information Designer

You can create a duplicate reference to a database table from Information Designer. This duplicate is called a Table Alias, and references the very same data, only using an alias. This can be useful in certain cases, most often when in need of a **self join** within a table (below).

### ► To create a table alias:

1.  Select a table on the Data Sources tab.

2.  Right-click the table and select **Create Table Alias**.



3.  Type a name for the table alias and click **OK**.

    Response: A table alias of the table is created.

### Self Joins

A self join is a join from a table to itself. In Information Designer this is implemented by using a table alias.

| ID | Name | Manager |
|---|---|---|
| 1 | Sarah | 2 |
| 2 | Mike | 3 |
| 3 | Carla | Null |
| 4 | Vincent | 2 |
| 5 | Adrian | 3 |

The above database table lists a number of employees at a company, and specifies who the manager of each employee is. Carla is the head of the department. Mike and Adrian report directly to Carla, whereas Sarah and Vincent report to Mike.

In order to produce a list where the ID stated in the Manager column is replaced by a name (see below), we would need a **self join** in the table. The table needs to look up the ID column in itself.

| Name | Manager |
|---|---|
| Sarah | Mike |
| Mike | Carla |
| Carla | |
| Vincent | Mike |
| Adrian | Carla |

This is done by first creating a **Table Alias** of the table, and then creating a join between the table and its alias:

WHERE TABLE.ID=TABLE_ALIAS1.MANAGER

# 13.7.8   Folders

## 13.7.8.1   Folders Overview

Folders are used to organize information links and other elements such as filters, columns and joins in the library. The hierarchical structure of the folders can be seen in the Elements tab of Information Designer, and they have the same collapsible and expandable behavior as folders in any tree structure. The folder structure in the library is independent of the physical location of data, so it is possible to combine elements from several different data sources in one folder.

A folder may contain other folders. For example, a department may have a folder, within which each research group has its own subfolder. If you have administrative rights, you can control which users have access to specific folders.

Folder permissions can be changed directly in the Information Designer by editing each folder, or by using the Library Administration tool. With TIBCO Spotfire 3.0 and forward it is also possible to place data sources within folders and, hence, control which users should have access to a certain data source through its folder permissions.

The export and import of folders and their content is handled by the Library Administration tool.

## 13.7.8.2     Creating a New Folder in Information Designer

To be able to save column and filter elements, you must first create a folder in the library. This can be done either in Information Designer or by using the Library Administration tool.

### ► To create a new folder in Information Designer:

1.  Click **New** and select **Folder**.

    Response: The New Folder dialog is displayed.
2.  In the **Name** field, type the name of the new folder.
3.  In the **Description** field, type your own description of this folder (optional).
4.  If desired, you can add **Keywords** to help locate the folder when searching in the library.
5.  Click **OK**.

    Response: The folder is added to the library.

    Comment: If you want to change the permissions for the new folder, follow the instructions under Setting Folder Permissions.

## 13.7.8.3     Setting Folder Permissions

Access rights to different data sources, elements and information links in the library are specified on a folder level. If you have administrator rights, you can give users or groups which have been set up using the Administration Manager tool different levels of access to your folders. The folder permissions can also be changed in the Library Administration tool.

### ► To set permissions for a folder in Information Designer:

1.  Create a new folder or edit an existing one.
2.  In the Elements tree, right-click on the folder of interest.
3.  Select **Folder Permissions...** from the pop-up menu.

    Response: The Library Folder Permissions dialog is displayed.
4.  Select whether or not you want the folder to **Inherit permissions from parent folder** by selecting or clearing the check box.

    If you choose to inherit permissions then you cannot specify any more details. Click **OK** and you are done.

    If you choose to set explicit permissions then proceed to the next step.

    Response: When the check box is cleared, the fields displaying the available groups and the different levels of permission become available. The previously inherited permissions are shown to give you a template to start working from.
5.  Use the drop-down list below the search field to select whether to **Search users**, **Search groups** or **Search users/groups**.
6.  In the search field, type a search expression to display  users or groups of interest and click **Search**.

    **Tip:** You can use wild cards, or asterisks (*), to simplify the search. For example, use * to display all users and groups, or append it to a word to display all users and groups beginning with that word. Example: Group4* will find Group41, Group421 and so on.

7.  Click to select the appropriate users or groups in the list and then click the > button of the permission level they should receive.
8.  Repeat steps 5 through 7 until you have added all the users and groups to the permission levels you want.

    Comment: To remove a user or group from a permission level, select it and click the < button for that permission level.
9.  Once you have selected the users or groups of interest, click **OK**.

    Response: The folder will be updated with the new permissions.

**Note:** What licenses are enabled for a certain user or group can also limit the functionality available for that user or group.

## 13.7.8.4    Editing a Folder

### ► To change the name and description of a folder:

1. In the **Elements** tree, right-click on the folder that you want to edit.
   Response: A pop-up menu is displayed.
2. Select **Edit Properties...** from the pop-up menu.
   Response: The Edit Properties dialog is opened with the information for the selected folder.
3. Modify the desired fields.
4. Click **OK**.

**Note:** You can only edit the properties of folders where you have sufficient permissions.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

## 13.7.8.5    Deleting a Folder

### ► To delete a folder and all its contents:

1. In the **Elements** tree, right-click on the folder that you want to delete.
   Response: A pop-up menu is displayed.
2. Select **Delete** from the pop-up menu.
   Response: The folder and all its content are deleted from the library.

**Note:** You can only delete folders to which you have sufficient permissions.

## 13.7.8.6    Moving a Folder

### ► To move a folder and all its contents:

1. In the **Elements** tree, drag the folder you wish to move and drop it on a different folder.
   Response: The folder and all its contents are moved to the new location.

# 13.7.9    Joins

## 13.7.9.1    Joins Overview

Joins are used to define how rows in different tables relate to one another. Normally an identifier column in one table maps to a similar column in another table. This allows information links to draw values from two or more different tables. When column elements from two or more data tables are to be retrieved within the same information link you must always include a join path at the creation of the information link. Joins can also be set up between tables in different data sources.

In the Elements tree, joins are represented by this icon: 

From a technical point of view, join elements can be placed anywhere in the tree structure. The Suggest Joins button on the Information Link tab helps you to find suitable joins for the currently used elements. However, you might want to place joins where they can easily be found. Just like filter and column elements, join elements are under permission control. This

means that you must make sure that the folder where the joins are located is accessible to all users and groups that need to create their own information links.

## 13.7.9.2 Creating a Join in Information Designer

If you want to combine columns from two disparate data sources, for example if one field is in a different table than the rest of the information, you need to create a join between two tables.

### ► To create a join:

1. Click **New** and select **Join.**

   Response: A Join Element tab is opened.
2. In the **Data Sources** tree, select the first column to include in the join operation.
3. Click **Add >**.

   Response: The selected column is added to the Source columns list on the Join Element tab.
4. Select the second column to include in the join operation.
5. Click **Add >**.
6. Optionally, repeat steps 4 and 5 for any additional columns to be included in the join.
7. Select a join operator from the **Condition** drop-down list, to specify how the two tables should be joined.

   Comment: There are two basic types of joins that can be done between tables: *inner joins* and *outer joins*. An inner join will return rows for which only the matching fields in both tables are equal. An outer join will return all the rows (including NULL values) from one table, and only the matching rows from the other table. If none of the default join options is suitable for your purposes, use the Freehand Join option to specify the join conditions manually.
8. Select the **Target tables** using the two drop-down lists.

   Comment: This is necessary when more than two tables are involved in defining the join. See also Freehand joins.
9. In the **Description** field, type your own description of the join.
10. Sometimes you may want to create more than one join between the same two tables. In such a situation, you may want to make one of the joins a default join that most information links should use. The default join is displayed when clicking on the Suggested Joins button in the Information Link Join Path field. If you want the join you are currently creating to be the default one, select the check box **Default join**.
11. Click **Save** or Save As... to specify the name and the folder to save the join in.

    Response: The join is added to the library and can be seen in the selected folder in the Elements tree.

## 13.7.9.3 Freehand Joins in Information Designer

In many situations, a join can be defined using one of the operators in the *Condition* drop-down list. However, it may sometimes be desirable to use more complex conditions, such as:

- $\%1 = 2 * \%2$ (mathematical calculation prior to comparison)
- $\%1 = \%3$ AND $\%4 = \%2$ (an intermediate table used to set up the join)

In the latter case, it is important to select which tables to join - the tables in which $\%1$ and $\%2$ occur. The other columns included in the join condition, $\%3$ and $\%4$, are found in an intermediate table. No join is created between this table and the other two.

### Example:

In the following tables, we want to create a join that links T1 and T3. In this way, we will be able to query the database for, say, the address of the person who earns 1400. To achieve this,

T2 is used as intermediate table. The tables T1 and T3 should be selected from the *Target tables'* drop-down lists (see Creating a Join). The join, again, is defined as:

%1 = %3 AND %4 = %2

| T1 | | T2 | | T3 | |
|---|---|---|---|---|---|
| **Name (%1)** | **Salary** | **Name (%3)** | **Number (%4)** | **Number (%2)** | **Address** |
| John | 1000 | John | 1 | 1 | Boston |
| Steve | 1400 | Steve | 2 | 2 | Stockholm |
| Lisa | 1200 | Lisa | 3 | 3 | Tokyo |

## 13.7.9.4    Editing a Join in Information Designer

### ► To edit a join:

1. In the **Elements** tree, double-click on the join that you want to edit.

   Response: The join is displayed in a Join Element Tab.
2. Modify the desired fields.
3. Click **Save** or **Save As...**.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

## 13.7.9.5    Deleting a Join in Information Designer

### ► To delete a join:

1. In the **Elements** tree, right-click on the join that you want to delete.

   Response: A pop-up menu is displayed.
2. Select **Delete** from the pop-up menu.

   Response: The join is deleted from the information model and its icon is removed from the Elements tree.

## 13.7.9.6    Creating a Table Alias in Information Designer

You can create a duplicate reference to a database table from Information Designer. This duplicate is called a Table Alias, and references the very same data, only using an alias. This can be useful in certain cases, most often when in need of a **self join** within a table (below).

### ► To create a table alias:

1. Select a table on the Data Sources tab.

2. Right-click the table and select **Create Table Alias**.



3. Type a name for the table alias and click **OK**.

Response: A table alias of the table is created.

### Self Joins

A self join is a join from a table to itself. In Information Designer this is implemented by using a table alias.

| ID | Name | Manager |
|----|------|---------|
| 1 | Sarah | 2 |
| 2 | Mike | 3 |
| 3 | Carla | Null |
| 4 | Vincent | 2 |
| 5 | Adrian | 3 |

The above database table lists a number of employees at a company, and specifies who the manager of each employee is. Carla is the head of the department. Mike and Adrian report directly to Carla, whereas Sarah and Vincent report to Mike.

In order to produce a list where the ID stated in the Manager column is replaced by a name (see below), we would need a **self join** in the table. The table needs to look up the ID column in itself.

| Name | Manager |
|------|---------|
| Sarah | Mike |
| Mike | Carla |
| Carla | |
| Vincent | Mike |
| Adrian | Carla |

This is done by first creating a **Table Alias** of the table, and then creating a join between the table and its alias:

WHERE TABLE.ID=TABLE_ALIAS1.MANAGER

# 13.7.10 Column Elements

## 13.7.10.1 Column Elements Overview

Column elements in an information link may refer to multiple tables in different databases. However, with Information Designer, columns are represented as if they were located in the same spreadsheet, regardless of the physical location of the data.

In a TIBCO Spotfire context, columns are entities that can be assigned to the axes of a visualization. For example, data from a fruit company may include fruit type, sales and cost:



All information in a relational database is represented explicitly as values in tables, composed of rows (records) and columns (fields).

Column elements created in Information Designer can be based on several database columns. For example, a column element can be calculated as the sum of the values in two different columns. The underlying columns can reside in the same database table, in different tables, or even on different databases.

Columns can be defined with built-in column filters that are automatically applied when the column is retrieved. You can also add a personalized or a parameterized column filter condition that limits data depending on the currently logged in user, see Personalized Information Links and Parameterized Information Links. Columns can also be set up to include aggregated data.

In the Information Designer, columns are represented by these icons:

| Icon | Description |
| --- | --- |
| 1.34 | Real, SingleReal or Currency column |
| 345 | Integer or LongInteger column |
| abc | String column |
| ✔✗ | Boolean column |
| ▦ | Date column |
| 🕒 | DateTime column |
| 🕐 | Time column |
| 101 010 | BLOB (binary large object) column |
| nXy Vzt | CLOB (character large object) column |
| ??? | Unknown column (in the Data Sources tree only). Must be set manually to one of the accepted column types (above) before it can be saved as a column element. |

## 13.7.10.2   Creating a Column Element in Information Designer

► **To add a column:**

1.   Click **New** and select **Column.**
     Response: A Column Element tab is opened.
2.   In the **Data Sources** tree, select the column (leaf node) that you want to include.
3.   Click **Add >**.
     Response: The selected element is added to the Source columns list on the Column Element tab.

Comment: Repeat this step if you need to include more data to calculate your column element.

4. If you want the column to be calculated, type the expression in the **Expression** field.

Comment: For instance, if you have added two numerical columns you could calculate the sum by entering "%1+%2". More

5. Select the **Data type** of the column element.

Comment: It is recommended that you use conversion functions for mapping columns. See notes below.

6. In the **Description** field, type your own description of the column.

7. In the **Filter** section, click ⊙ to show the filtering controls. More

8. In the **Aggregation** section, click ⊙ to show the aggregation controls. More

9. In the **Properties** section, click ⊙ to show the column properties controls. More

10. Click **Save**.

Response: The column is saved in the library and is shown with an icon denoting its type in the Elements tree.

**Note:** If the column in the database is of the type Real, and you want to create a column element of the type Integer, then set the Data type (step 5 above) to Integer. Similarly, if the column in the database is of the type Unknown, you must manually choose an appropriate type before the column can be saved. It is also strongly recommended that you use a conversion function (for example ROUND) in the Expression field (step 4 above). Look for descriptions of available conversion functions in the manual for your database.

## 13.7.10.3 Creating Multiple Column Elements in Information Designer

The Multiple Columns tab can be used if you want to create many column elements in one operation.

**Note:** Whole databases and schemas cannot be added, only columns and tables are available.

### ► To add multiple columns to the information model:

1. Click **New** and select **Multiple Columns**.

Response: A Multiple Column Elements tab is opened.

2. In the **Data Sources** tree, select the column (leaf node) or table that you want to include.

3. Click **Add >**.

Response: The selected column is added to the Source columns list. If a table was selected, all columns in the table will be added to the list on the Multiple Column Element tab.

Comment: Repeat this step if you want to include more data columns.

4. Click on an element in the Source columns list and change its name by typing in the **Column element name** field (or go to step 8 to add the columns using the default settings).

Comment: This step is not necessary unless you want to change the name or description of the element.

5. If desired, change the description of each column element.

Comment: The description is metadata on the column which can be used in search expressions inside TIBCO Spotfire.

6. Click **Create Columns...**.

Response: The Create Multiple Columns dialog is displayed.

7. Click to select the folder where you wish to store the column elements.

8. Click **Create Columns**.

Response: The columns are stored in the specified folder in the library. Columns of type Unknown will be mapped to the data type String when they are added through the Multiple Columns tab. The data type can be changed later by editing each column element.

## 13.7.10.4    Editing a Column in Information Designer

### ► To edit a column:

1. In the **Elements** tree, double-click on the column element you wish to edit.
   Response: A Column Element tab is displayed.
2. Modify the desired fields.
3. Click **Save** to save/update the column, or click **Save As...** to create a copy.
   Comment: Use Save As... if you want to keep the old column definition unchanged.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

## 13.7.10.5    Deleting a Column in Information Designer

### ► To delete a column:

1. In the **Elements** tree, right-click on the column element you wish to delete.
   Response: A pop-up menu is displayed.
2. Select **Delete** from the pop-up menu.
   Response: The column is deleted from the information model.

## 13.7.10.6    Calculating a Column in Information Designer

### ► To calculate a column:

1. Start by adding at least one column from the Data Sources tree.
2. If you want a column to be calculated, type an expression in the **Expression** field, for example %1+%2, or AVG(%1).
3. Click on ⊙ next to the respective section to access functions for aggregating data, or for creating a built-in filter.
4. If desired, type a **Description**.
5. Click **Save** or **Save As...**.

## 13.7.10.7    Defining a Column Filter in Information Designer

Column filters are automatically applied when the column is retrieved. Such filters, unlike filters that are defined and saved as separate elements (filter elements), cannot be disabled by the user.

Column filters are defined while the column element is being created. The following steps should be taken in addition to what is described in Creating a Column Element.

### ► To define a column filter:

1. In the **Filter** section, click ⊙ to show the filtering controls.
2. In the **Data Sources** tree, select a column and then click the **Add >** button to add the column to use in the filter expression.

Comment: Repeat this step if you need to include more columns in your filter expression.

3. In the **Expression** field, define a filter condition based on the chosen column or columns. For example, %1<2000, or if you are using two columns, %1<%2.

   Comment: To combine conditions, use the AND or OR operators, for example %1>2000 AND %2<1000.

   Comment: You can also add a personalized filter expression that limits data depending on the currently logged in user. See Personalized Information Links for more information.

   Comment: You can also add a parameterized filter expression. See Parameterized Information Links for more information.

4. Write a clear description of how the column is filtered. This is important, since the user will not be able to disable the filter when using this column element.

**Note:** When an information link is executed, aggregation is always applied before the filter.

## 13.7.10.8    Date and Time Columns in Information Designer

A data source may provide date and time information as DATE columns. This format can be mapped to a DATE, a TIME or a DATETIME data type when a column element is created in Information Designer (see Creating a Column Element).

### ► To find the number of days between two DATE columns:

1. From the **Data Sources** tree, select two columns of type DATE.
2. In the **Expression** field, type the expression *%1 - %2*.

   Comment: By selecting only one column, you can also find the elapsed number of days from today, using the expression *sysdate - %1* if you are running against an Oracle data source.

3. Set the **Data type** to *Integer*.

### ► To generate a Spotfire Date column from a DATE column:

1. From the **Data Sources** tree, select a column of type DATE.
2. Set the **Data type** to *Date.*

**Note:** Any SQL arithmetic expression may be entered into the Expression field. However, you need to make sure to use the correct syntax since no validation will be performed. Also note that different databases may have different syntaxes.

## 13.7.10.9    Working with Aggregation

## 13.7.10.9.1    Using Aggregation in Information Designer

### ► To calculate average values:

1. Click **New** and select **Column.**
2. Click to select a value column in the **Data Sources** tree, for example a Sales column.
3. Click the topmost **Add >** button.
4. In the **Expression** field, type:

   **AVG(%1)**

   Comment: AVG is the average function.

5. Click ⊙ next to **Group By** to show the controls determining over which column the aggregation will be made.
6. Click **New** to add an empty group by expression.

7. Click to select the column to group by in the **Data Sources** tree, for example a Type column.

8. Click **Add >** in the Group By Settings section.

9. Click **Save**.

 Response: The resulting column will consist of the average of the value column, for each value in the group by column. Using the example columns above it would be a column containing the average sales for each type of product.

**Tip:** Rather than hard coding the columns to aggregate over, you may consider marking the column as **Drillable**. The column will then be aggregated over any other columns retrieved in the same information link.

**Note:** When an information link is executed, aggregation is always applied before a column filter.

## 13.7.10.9.2  Aggregating Over Many Columns in Information Designer

There may be situations where it is necessary to use more than one column to group by when an aggregated column is calculated. In the following table, for example, we can compare the salary of each employee with the average salary of employees at the same department and job.

| Employee Name | Job ▲ | Department | Salary | Average Salary |
|---|---|---|---|---|
| FORD | ANALYST | RESEARCH | 3000.00 | 3000.00 |
| SCOTT | ANALYST | RESEARCH | 3000.00 | 3000.00 |
| ADAMS | CLERK | RESEARCH | 1100.00 | 950.00 |
| SMITH | CLERK | RESEARCH | 800.00 | 950.00 |
| MILLER | CLERK | ACCOUNTING | 1300.00 | 1300.00 |
| JAMES | CLERK | SALES | 950.00 | 950.00 |
| JONES | MANAGER | RESEARCH | 2975.00 | 2975.00 |
| CLARK | MANAGER | ACCOUNTING | 2450.00 | 2450.00 |
| BLAKE | MANAGER | SALES | 2850.00 | 2850.00 |
| KING | PRESIDENT | ACCOUNTING | 5000.00 | 5000.00 |
| TURNER | SALESMAN | SALES | 1500.00 | 1400.00 |
| MARTIN | SALESMAN | SALES | 1250.00 | 1400.00 |
| WARD | SALESMAN | SALES | 1250.00 | 1400.00 |
| ALLEN | SALESMAN | SALES | 1600.00 | 1400.00 |

To produce this table, we must define the Average Salary column with two group by expressions: Job and Department.

### ► To use multiple group by expressions:

1. Select a value column from the **Data Sources** tree, for example Salary.

2. Click the topmost **Add >** button.

3. In the **Expression** field, type:

 **AVG(%1)**

 Comment: AVG is the average function.

4. In the **Group By** section, click ⊙ to show the group by controls.

5. Click **New** to add a new Group by expression.

6. From **Data Sources**, select the first column to group by (for example Job).

7. Click **Add >** in the Settings field.

8. Click **New** to add a second Group by expression.

9. Select the second column to group by (for example Department).

10. Click **Add >**.

11. Click **Save**.

Response: The resulting column will consist of the average of the value column, for each value in the group by columns.

**Note:** It would not have been possible to produce the table above using the Drillable option. If the Average Salary column element had been drillable, it would have appeared identical to the Salary column, since the Employee Name and Salary columns would also have been used to group by.

### 13.7.10.9.3 Using Drillable

When creating an aggregated column, it is possible to specify group by expressions determining over which categories the aggregation should be made. This is done from the Column Element tab, in the Group By section.

It is also possible to ignore the Group By settings, by selecting the Drillable check box. This way the column will always be aggregated over all other columns being retrieved in the same information link. The following table illustrates this. *Average Salary Drillable* is calculated using the AVG function. No group by expressions have been specified, and instead the Drillable check box has been selected.

| Job | Average Salary Drillable |
| --- | --- |
| ANALYST | 3000.00 |
| CLERK | 1037.50 |
| MANAGER | 2758.33 |
| PRESIDENT | 5000.00 |
| SALESMAN | 1400.00 |

As we see above, the average salary is computed for each value in Job. We could just as well have defined a salary column *explicitly* aggregated over Job. However, by using the Drillable option, we can now retrieve a different set of columns and still get a useful answer:

| Job ▲ | Department | Average Salary Drillable |
| --- | --- | --- |
| ANALYST | RESEARCH | 3000.00 |
| CLERK | ACCOUNTING | 1300.00 |
| CLERK | RESEARCH | 950.00 |
| CLERK | SALES | 950.00 |
| MANAGER | ACCOUNTING | 2450.00 |
| MANAGER | RESEARCH | 2975.00 |
| MANAGER | SALES | 2850.00 |
| PRESIDENT | ACCOUNTING | 5000.00 |
| SALESMAN | SALES | 1400.00 |

In this table, the Average Salary Drillable column displays the average salary for the clerks from each department instead of a combined value for all clerks.

## 13.7.11 Filter Elements

### 13.7.11.1 Filter Elements Overview

Filters are conditions that limit the amount of data returned by an information link. For example, a filter could set the conditions "X > 10 AND Y < 100". There are three ways of filtering data when working with information links:
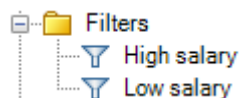
**Filter elements** appear in the Elements tree of Information Designer. They can be added to any information link, just like column elements. See Creating an information link to find out how to include a filter element.

**Hard filters** are set up as you define the information link, and are saved with the link. This means that they cannot be reused in other links. Also, hard filters can only specify a range or a list of values, and so are less versatile than filter elements. See Adding Hard Filters for more details.



**Prompts** are also set up when you create an information link. However, the actual conditions are entered by the person running the information link only when the link is opened (executed). For each column that has been set up like this, a dialog will appear allowing the user to enter threshold values or select individual values. See Adding Prompts for more details.

Filters correspond to the WHERE clauses in SQL, and are used to specify that only certain rows of a table shall be retrieved from the data source, based on the criteria described in the filtering condition.

Filter elements can be applied as required by the person creating information links. In the Elements tree, they are represented by this icon: 

## 13.7.11.2   Creating a Filter Element

This topic describes how to create filters as separate elements. These can be applied as required by the person creating information links. See Defining a Column Filter for information on how to add a filter as part of a column definition.

► **To create a filter:**

1. Click **New** and select **Filter.**

   Response: A Filter Element tab is opened.

2. In the **Data Sources** tree, select the column to use in the filter condition.

3. Click **Add >**.

   Response: The selected column is added to the Source columns list on the Filter Element tab.

   Comment: Repeat this step if you need to include more columns in your filter expression.

4. Define a filter expression with the chosen columns, for example %1>=2000, or if you are using two columns, %1<%2. See Relational Operators for more information on defining expressions.

   Comment: You can also add a personalized filter expression that limits data depending on the currently logged in user. See Personalized Information Links for more information.

   Comment: You can also add a parameterized filter expression. See Parameterized Information Links for more information.

5. In the **Description** field, type your own description of the filter.

6. Click **Save**.

   Response: The Save As dialog is displayed.

7. Click to select the folder where you wish to save the filter element.

8. Click **Save**.

   Response: The filter element is saved in the library.

### 13.7.11.3 Editing a Filter in Information Designer

#### ► To edit a filter element:

1. In the **Elements** tree, double-click on the filter that you want to edit.

   Response: The name of the filter and filter conditions are shown on a Filter Element tab and enabled for editing.
2. Modify the desired fields.
3. Click **Save** or **Save As...**.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

### 13.7.11.4 Deleting a Filter in Information Designer

#### ► To delete a filter:

1. In the **Elements** tree, right-click on the filter that you want to delete.

   Response: A pop-up menu is displayed.
2. Select **Delete** from the pop-up menu.

   Response: The filter is deleted from the library.

### 13.7.11.5 Relational Operators

The following operators can be used in filters:

| | |
|---|---|
| = | Equal |
| <> or != | Not Equal |
| < | Less Than |
| > | Greater Than |
| <= | Less Than or Equal To |
| >= | Greater Than or Equal To |

- Generally, with text columns, it is best to use = or !=.
- Make sure that any text that appears in the statement is surrounded by single quotes (').
- To combine multiple conditions, use the AND or OR operators, for example %1>2000 AND %2<1000.

## 13.7.12 Procedures

### 13.7.12.1 Procedures Overview

#### Database Procedures

A database procedure is a set of SQL statements that can be stored in the database. Once this has been done, clients do not need to keep reissuing the individual statements but can refer to the database procedure instead.

Database procedures can be useful in many situations:

- When multiple client applications are written in different languages or work on different platforms, but need to perform the same database operations.

- Some institutes, like banks, where security is important, use database procedures for all common operations. This provides a consistent and secure environment, and procedures can ensure that each operation is properly logged. In such a setup, applications and users would not get any access to the database tables directly, but can only execute specific database procedures.

- Database procedures can provide improved performance because less information needs to be sent between the server and the client. However, this increases the load on the database server system because more of the work is done on the server side and less is done on the client (application) side. Take this into consideration if many client machines (such as Web servers) are serviced by only one or a few database servers.

- Database procedures also allow you to have libraries of functions in the database server. This is a feature shared by modern application languages that allow such design internally, for example, by using classes.

## Database Procedures in Information Designer

Using Information Designer you select pre-made database procedures and configure these to be accessible in information links. These information links are available to the TIBCO Spotfire users to retrieve or manipulate data.

In Information Designer you select a database procedure from your available data sources, and define which input parameters that the procedure should prompt for, and any potential resulting columns and joins.

Then you configure a complete information link with one or more combinations of procedures and columns from other tables.

## The Three Kinds of Procedures

Information Designer defines three kinds of procedures:

- **Pre-update procedure** - this procedure does not return any data, it only performs an operation on one or more databases. All pre-update procedures in an information link will always be executed before any query procedure.

- **Query procedure** - just like a database table, this procedure returns data.

- **Post-update procedure** - this procedure does not return any data, it only performs an operation on one or more databases. All post-update procedures in an information link will always be executed after any query procedure.

**Note:** If using Oracle stored procedures that return data, Information Designer only support procedures that return data of the type REF CURSOR (also known as Table Function).

## 13.7.12.2    Creating a Pre- or Post-procedure

### ► To Create a Pre-update or Post-update procedure:

1. Click **New** and select **Procedure**.

   Response: A Procedure Element tab is opened.

2. In the **Data Sources** tree, click on the database procedure you wish to use.

3. Click **Select**.

   Response: The database procedure is added to the tab. Information Designer analyzes the database procedure and makes a guess as to whether it is a pre-update procedure or a query procedure (it never sets post-procedure by default).

4. Select the **Procedure type**: Pre-update procedure or Post-update procedure.

    Comment: Pre-update procedures are always executed first in an information link. Post-update procedures are always executed last in an information link.

5. If the database procedure requires any **Input Parameters**, their name and type are displayed.



6. Select whether the input parameter should receive a **Default Value** by typing a value (of the appropriate type) in the input field. If not, leave the field blank.

    Comment: Type ?param_name to use a parameter as the default value, where param_name is the name to identify the parameter by. **Note:** If you use a parameter for the default value, you must choose Prompt: None. See Parameterized Information Links for more information.

7. Select whether you want the end user to be prompted for a single value, multiple values, or not at all, from the **Prompt** drop-down list.

    Comment: If you select multiple values, the end user will be allowed to enter several values. The procedure will run once for each of these values in an iterative loop. For more information, see Multiple Value Procedure Prompts.

8. If you want to allow the input parameter to be Null, select the **Permit Null** check box.

    Example 1: Type a Default value and set prompt to None. This means that the specified default value will always be used as input parameter.
    Example 2: Leave Default value empty, select Permit Null and Single value prompt. This will cause the end user to be prompted for a value. If the end user does not enter a value in the prompt, Null will be used.
    Example 3: Leave Default value empty, leave Permit Null empty and Single value prompt. This will cause the end user to be prompted for a value. If the end user does not enter a value in the prompt, an error message will appear since Null is not allowed.
    Comment: You cannot select the combination: No Default value, Not allow Permit Null and No Prompt, since this is a paradox.

9. In the **Description** field, type your own description of the procedure.

10. Click **Save**.

    Response: The Save As dialog is displayed.

    Click to select the folder where you wish to save the procedure element.

11. Click **Save**.

    Response: The procedure is saved in the selected folder, and will be denoted with the
    icon. Note that the procedure object will be visible to the end user in the list of information links. You can also make larger, more complex information links using the procedure when creating an information link in Information Designer.

## 13.7.12.3　Creating a Query Procedure
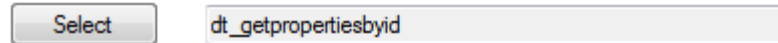
### ► To Create a Query procedure:

1. Click **New** and select **Procedure**.
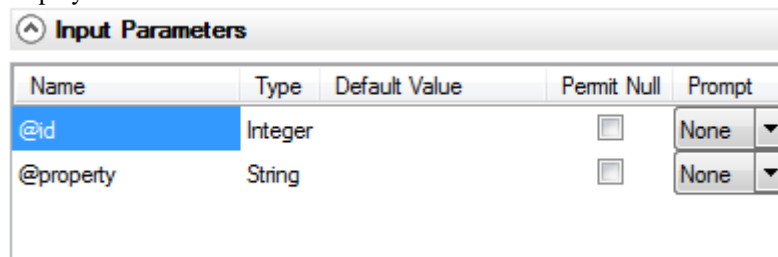
   Response: A Procedure Element tab is opened.

2. In the **Data Sources** tree, click on the database procedure you wish to use.

3. Click **Select**.

   Response: The database procedure is added to the tab. Information Designer analyzes the database procedure and makes a guess as to whether it is a pre-update procedure or a query procedure (it never sets post-procedure by default).





4. Select the **Procedure type**: Query.

5. In the **Description** field, type your own description of the procedure.

6. If the database procedure requires any **Input Parameters**, their name and type are displayed.



7. Select whether the input parameter should receive a **Default Value** by typing a value (of the appropriate type) in the input field. If not, leave the field blank.

   Comment: Type ?param_name to use a parameter as the default value, where param_name is the name to identify the parameter by. **Note:** If you use a parameter for the default value, you must choose Prompt: None. See Parameterized Information Links for more information.

8. Select whether you want the end user to be prompted for a single value or not at all, from the **Prompt** drop-down list.

9. If you want to allow the input parameter to be Null, select the **Permit Null** check box.

   Example 1: Type a Default value and set prompt to None. This means that the specified default value will always be used as input parameter.
   Example 2: Leave Default value empty, select Permit Null and Single value prompt. This will cause the end user to be prompted for a value. If the end user does not enter a value in the prompt, Null will be used.
   Example 3: Leave Default value empty, leave Permit Null empty and Single value prompt. This will cause the end user to be prompted for a value. If the end user does not enter a value in the prompt, an error message will appear since Null is not allowed.
   Comment: You cannot select the combination: No Default value, Not allow Permit Null and No Prompt, since this is a paradox.

10. Expand the **Result Columns** section.

11. Either keep the **Include all result columns** check box selected, or clear the check box and click **Add...** to specify your own result columns. If the check box is selected, go to step 15, otherwise continue with step 12.

12. In the **Original name** field, enter the exact name of a column the database procedure returns. This name is specified in the actual database procedure, so you have to know this beforehand.

13. Type a **Display name** to use when the result column is opened in TIBCO Spotfire.

14. Select the **Data type** the resulting column should have.

15. If you want to specify a join between the database procedure and another table, use the **Join** section.
    Comment: Joining is necessary if you intend to use the result columns from this procedure together with column elements from another data table in an information link. You can only specify one join.

16. Join columns can be added from three different sources:
    \* From the Data Sources tree. This option is similar to selecting join columns at the creation of join elements. Click on a column in the Data Sources tree (or click on the column under its data source in the Elements tree) and then select the From Data Sources Tree option in the Add drop-down list.
    \* From a previously specified Result Column. Any result columns that have been defined will be listed directly in the Add drop-down list.
    \* From a New Result Column. The third option is used if you want to join over a result column from the procedure but you do not want to use it as output when retrieving data.
    Click **Add** and select an option from the drop-down list.

17. Repeat step 16 for another join column. Normally, you will have one column from the data sources tree and one result column in the join.

18. Select a **Condition** from the drop-down list.
    Comment: There are two basic types of joins that can be done between tables: *inner joins* and *outer joins*. An inner join will return rows for which only the matching fields in both tables are equal. An outer join will return all the rows (including NULL values) from one table, and only the matching rows from the other table.  See also Freehand Joins.

19. Click **Save**.
    Response: The Save As dialog is displayed.

20. Click to select the folder where you wish to save the procedure element.

21. Click **Save**.
    Response: The procedure is saved in the selected folder, and will be denoted with the ⚙ icon. Note that the procedure object will be visible to the end user in the list of information links. You can also make larger, more complex information links using the procedure when creating an information link in Information Designer.

## 13.7.12.4   Editing a Procedure

### ► To edit a procedure:

1. In the **Elements** tree, double-click on the procedure that you want to edit.
   Response: The procedure is loaded on a Procedure Elements tab and enabled for editing.

2. Modify the desired fields.

3. Click **Save** or **Save As...**.

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.

## 13.7.12.5    Deleting a Procedure

### ► **To delete a procedure:**

1.  In the **Elements** tree, right-click on the procedure that you want to delete.
    Response: A pop-up menu is displayed.
2.  Select **Delete** from the pop-up menu.
    Response: The procedure is deleted from the library.

## 13.7.12.6    Multiple Value Procedure Prompts

If a list is used as input for a pre- or post-update procedure, the procedure is run as many times as the number of values in the list. If lists of different lengths are used at the same time, one of two things will happen depending on the length of the lists.

### Example 1:

If one of the lists contains only one value, that value will be distributed to the values of the other list.

List X: [1,2,3]
List Y: [A      ]

Result: First call procedure with parameters: 1,A
Then: 2,A
Then: 3,A

### Example 2:

If both lists contain more than one value, the values of the shorter list will be distributed to the values of the longer list, and null will be added to the remaining values.

List X: [1,2,3]
List Y: [A, B  ]

Result: 1,A
2,B
3,null

A query procedure does not accept a list as input, only a single value.

# 13.7.13    User Interface Details

## 13.7.13.1    Elements Tree

The Elements tree displays the data access layer (the information model) in the library as a folder structure including all available information links, column elements, filter elements and joins. All elements can be sorted into different folders. Click the plus (+) and minus (-) next to a folder icon to expand the folder and browse the tree. Click on the desired element to select it. It is possible to drag an element from one place to another. Right-clicking on an element opens a pop-up menu where you can edit the selected element, validate information links, etc.

Use the Search field to locate folders or elements in the tree. The search field automatically searches for the name and keywords of the elements, but you can also search for other properties using the following syntax: <property name>:<value>. See Searching in TIBCO Spotfire and Searching the Library for more information regarding search. Click on Clear Search to return to the full Elements tree.

**Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.
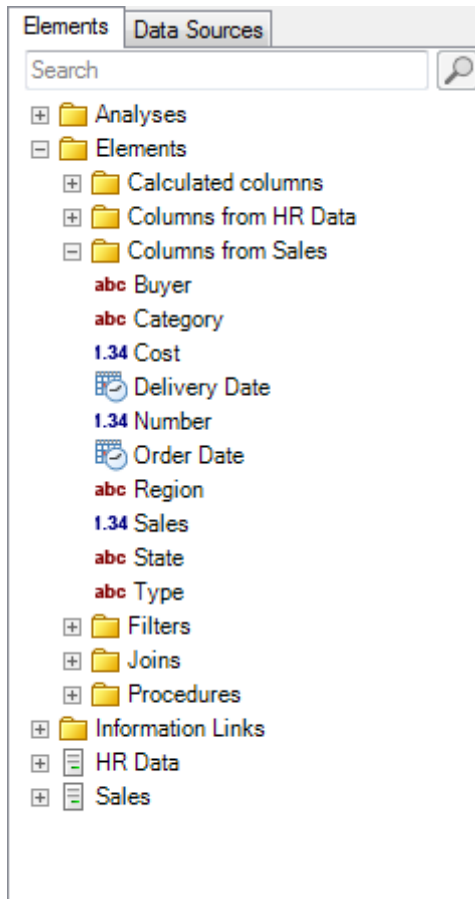


**Tip:** You can also press the * key on the numeric keypad to expand all nodes at the highest unexpanded level below the selected folder.

## 13.7.13.2    Icon Explanations

In the Elements tree, the following icons may appear. Click on a link in the table below to find out more about each element type. In the Data sources tree only the items belonging to a database are visible.

| Icon | Element type |
| --- | --- |
|  | Folder |
|  | Information link |
|  | Filter |
|  | Boolean column |
| abc | String column |

| | |
|---|---|
| 345 | Integer column or LongInteger column |
| 1.34 | Real, ShortReal or Currency column |
| | Date column |
| | DateTime column |
| | Time column |
| | Procedure |
| 101 010 | Binary Large Object |
| nXy Vzt | Character Large Object |
| | Join |
| | Database instance. |
| | Database link/catalog - a link to another database. |
| | Schema - a collection of tables and/or procedures. |
| | Table - a set of columns. |
| | Table alias. You can create a duplicate reference to a database table from Information Designer. This duplicate is called a Table Alias. |
| ??? | Unknown column. Must be set manually to one of the accepted column types (above) before it can be saved as a column element. |

### 13.7.13.3    Data Sources Tree

The data sources tree lists all currently defined data sources and their content. Click the plus (+) and minus (-) next to a data source icon to expand/collapse the data source. Click on the desired element to select it. Right-clicking on an item opens a pop-up menu where you can edit the selected data source, create multiple column elements etc.

**Tip:** You can also press the * key on the numeric keypad to expand all nodes at the highest unexpanded level below the selected node.

Use the Search field to search for the name, description and keywords of a database. Click on Clear Search to return to the full Data Sources tree.

**Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.
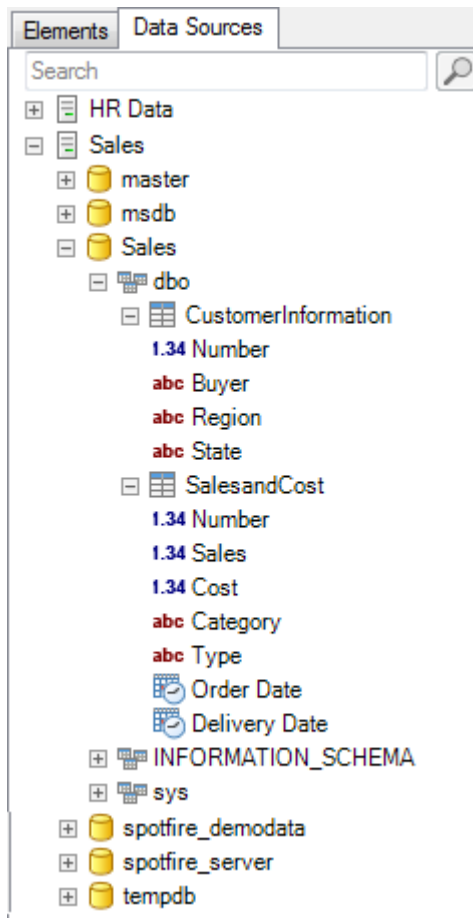
| Icon | Item | Description |
|------|------|-------------|
| | **Database instance** | The name of the database instance. |
| | **Database link / Catalog** | A link to another database. |
| | **Schema** | The owner or database administrator that has set up the different tables. |
| | **Table** | A set of columns. |
| abc, ... | **Column** | The column has an icon that denotes the column type. See Column Elements Overview for a description of the different column icons. |
| | **Table Alias** | You can create a duplicate reference to a database table from Information Designer. This duplicate is called a table alias. |

## 13.7.13.4    Tabs

### 13.7.13.4.1    Start Tab

When Information Designer is started, the Start tab is visible. From here, you can reach all functions of the Information Designer. Each link in the start tab opens a separate tab where you can perform the various tasks.

**Tip:** Close a tab by clicking on the x symbol on the top right hand side of the tab page. You can also click on the tab with the middle mouse button or mouse wheel in order to close it.

**Tip:** You can right-click on any tab in Information Designer to display a pop-up menu which allows you to navigate to any of your current tabs or to close all tabs simultaneously. You can also locate the currently edited element in the Elements tree.

| Option | Description |
|---|---|
| **Create Information Link** | Opens an Information Link tab. You can have multiple information link tabs open at the same time. |
| **Create Elements** | **Column** - Opens a Column Element tab where you can define a column element which shall be a part of the information model and, hence, available when creating information links. |
| | **Multiple Columns** - Opens a Multiple Column Elements tab where many column elements can be defined simultaneously. |
| | **Filter** - Opens a Filter Element tab where a column filter can be defined. |
| | **Procedure** - Opens a Procedure Element tab where a stored procedure can be defined. |
| **Create Join** | Opens a Join Element tab where you can define a join between columns from different tables. |
| **Setup Data Source** | Opens a Data Source tab where you can specify a data source that should be available for creating elements. |
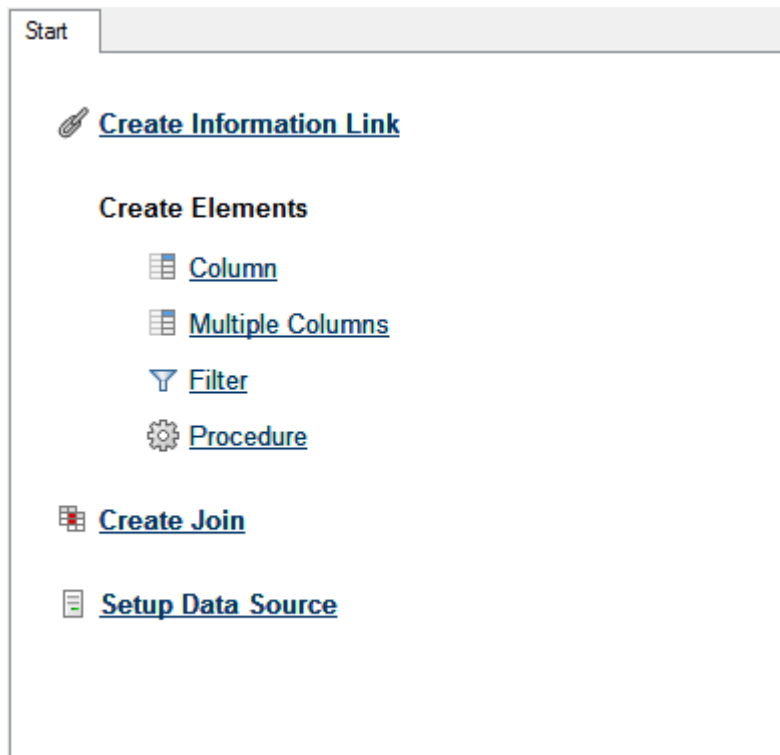
## 13.7.13.4.2    Information Link Tab
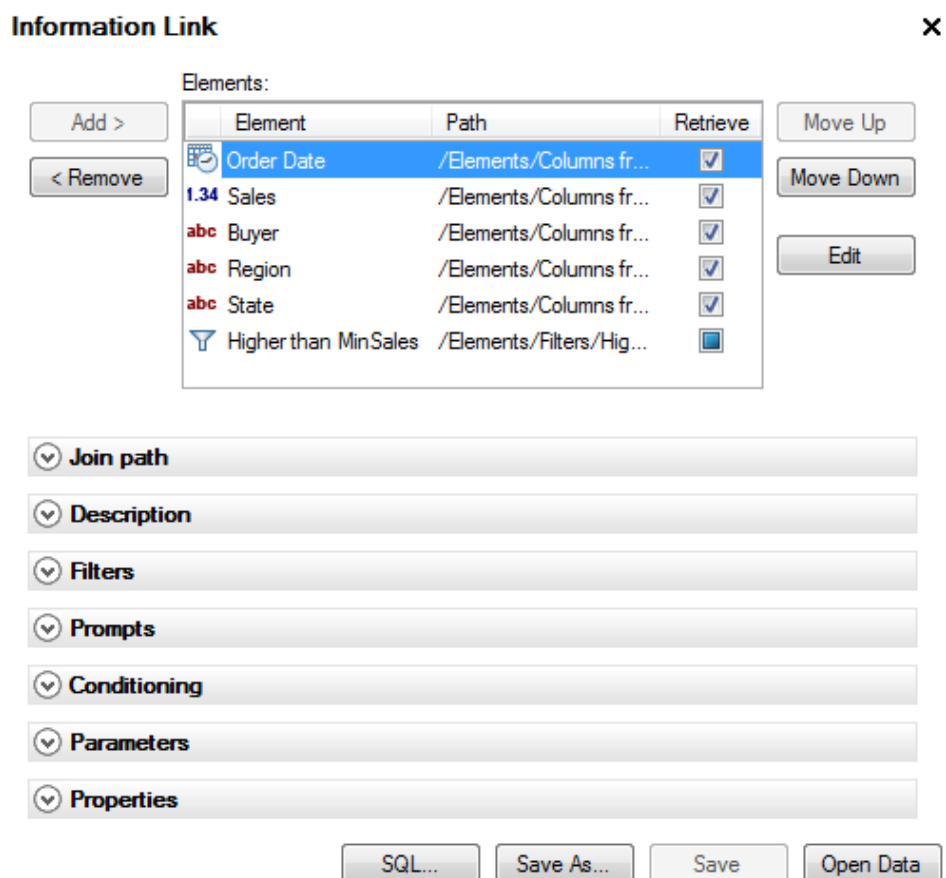
| Option | Description |
|---|---|
| **Add >** | Adds the element selected in the Elements tree to the information link. |
| **< Remove** | Removes the selected element from the link. |
| **Elements** | Lists all elements currently included in the information link. Clear the Retrieve check box to prevent a column from being loaded. (Filter conditions will still affect the amount of data loaded.) |
| **Move Up** | Moves the selected element up in the list. |
| **Move Down** | Moves the selected element down in the list. |
| **Edit** | Opens the Column Element tab for the selected element so that it can be edited. |
| **SQL...** | Opens the Edit SQL dialog where you can view and edit the SQL that the current information link is generating. |
| **Save As...** | Displays the Save As dialog which saves the configuration currently shown in the information link tab into a new information link. |
| **Save** | Saves the information link. |
| **Open Data** | Executes the currently selected data as an information link and retrieves the data into Spotfire. |



| Option | Description |
|---|---|
| **Add >** | Adds the selected join from the Elements tree to the Selected joins list. |
| **< Remove** | Removes the selected join from the Selected joins list. |
| **Selected joins** | Lists the joins that will be used in the join path between the tables in the information link. |
| **Suggest Joins** | If any joins have been specified between the tables currently used in the information link, clicking this button will automatically add one or more |

suitable joins to the Selected joins list. If a default join has been specified, then this join will be used if possible.

| | |
|---|---|
| **Join data source** | If more than one join database have been defined during the setup of the server, then you can select where the joining should take place here. |



| Option | Description |
|---|---|
| **Description** | An optional description of the contents of the information link. This can be helpful for end users of the information link when searching for information links in the library. |



| Option | Description |
|---|---|
| **Column** | The names of added columns to filter on. |
| **Filter Type** | Select **Range** or **Values** to specify how the filtering conditions will be set. |
| **Values** | List the required values (separated by semicolons) for a values filter. Type **?param_name** to use a parameter as the filter for the chosen column, where param_name is the name to identify the parameter by. |
| **Min Value** | Type the lower range value for a range filter in this field. |
| **Max Value** | Type the higher range value for a range filter in this field. |
| **Add** | Opens the Add Column dialog where you can select a column to filter on. |
| **Remove** | Removes the selected column from the Filters section. |

| Option | Description |
|---|---|
| **Column** | The names of added columns to prompt. |
| **Prompt Type** | Select what kind of selections should be available in the prompt when the link is opened. |
| | **Values** lets you enter your own list of values to include. This prompt type should only be used if all end users of the information link know which values are valid for the column. |
| | **Range** lets you specify a range of values. This prompt type is suitable for numerical or Date/DateTime/Time columns when a sustained range of numbers or time periods are to be retrieved. |
| | **Multiple selection** presents a list of available values from which you can select multiple values. This type of prompt can be used even if the end users of the information link have no previous knowledge of the data. |
| | **Single selection** presents a list of available values from which you can select a single value only. This type of prompt can be used even if the end users of the information link have no previous knowledge of the data. |
| | See also Details on Open Information Link. |
| **Mandatory** | Select this check box to make it mandatory to select values in the prompt. It is not possible to clear the check box if Single selection has been chosen. |
| | For non-mandatory prompts the end user can leave the prompt step dialog untouched in order to retrieve all data for that step. |
| **Max Selections** | Type the maximum number of selections allowed. It is not possible to specify a maximum number of selections if Single selection or Range has been chosen. |
| **Add** | Opens the Add Column dialog where you can select a column on which to add a prompt. |
| **Remove** | Removes the selected column from the Prompts section. |
| **Move Up** | Click to move an element up. This is used to control the order of the columns with prompts. Filter elements are always applied before prompts regardless of order. |
| **Move Down** | Click to move an element down. |
| **Groups...** | Opens the Prompt Groups dialog where you can specify different prompt groups for different prompts, making elements independent from each other. This is used to improve the performance of information links when |

retrieving data from STAR schema databases. See Using Prompt Groups for more information.



| Option | Description |
| --- | --- |
| **None** | No conditioning. |
| **Distinct** | Removes all duplicate rows (rows where all fields are identical) from the returned data table. |
| **Pivot** | Allows you to transform your data from a tall/skinny format to a short/wide format by rotating row and column headings around the core data. Select which columns to work on by clicking Edit.... |
| **Edit...** | Opens the Pivot Conditioning dialog. |



| Option | Description |
| --- | --- |
| **Parameter Name** | Lists the names of all added parameters. **Note:** You have to click Refresh for parameters to appear in the list the first time you display the list after creating a parameter. |
| | If a parameter is not listed even after clicking Refresh, you may have created a parameter containing unsupported characters. See Parameterized Information Links for more information. It is also possible that you have edited the SQL of the information link. In that case, the altered SQL code overrides the parameters settings in the user interface. |
| **Data Type** | Lists the data type of all added parameters. |
| **Value Type** | Lists the value type of all added parameters. |
| **Edit...** | Opens the Edit Parameter dialog which lets you edit the selected parameter in the list. |
| **Refresh** | Refreshes the list of parameters. **Note:** You have to click Refresh for parameters to appear in the list the first time you display the list after creating a parameter. |

| Option | Description |
|---|---|
| **Property name** | Shows the names of custom properties defined for this information link. Custom properties are metadata that can be used when searching in the Library by using the following syntax: <Property name>:<Value>. For example, MyCompany.Property:Property1. |
| **Value** | Shows the value of each custom property. |
| **Add...** | Opens the Add Information Link Property dialog where custom properties can be defined. |
| **Edit...** | Opens the Edit Information Link Property dialog. |
| **Delete** | Deletes the selected property. |

## 13.7.13.4.3    Column Element Tab

| Option | Description |
|---|---|
| **Add >** | Select a column from the Data Sources tree and click on this button to include it in the new column. |
| **< Remove** | Deletes the selected column from the composition. |
| **Source columns** | Lists all source columns that will be included in the calculation of the new column element. |
| **Expression** | To perform any calculation on the column, enter the expression in this text field. |
| **Data type** | Specifies the data type of the column. |



| Option | Description |
|---|---|
| **Description** | An optional description of the column element. |



| Option | Description |
|---|---|
| **Add >** | Select a column from the Data Sources tree and click on this button to include it in the filter. |
| **< Remove** | Removes the selected column from the composition. |
| **Expression** | In this field, enter an expression containing the selected column or columns. |

The Group by section is only important if you have specified some type of aggregation in the Expression field at the top of the page. When an aggregation has been defined, you can select the categories to group by here. See Using Aggregation in Information Designer for more information.

| Option | Description |
|---|---|
| **Group by expressions** | Lists the group by expressions specified using the source columns selected under Settings and any calculations done in the Expression field. |
| **New** | Adds a new, empty expression to the Group by expressions list. |
| **Delete** | Deletes the selected expression from the Group by expressions list. |
| **Add >** | Adds the columns selected in the Data Sources tree to the Source columns list, where it can be used in a group by expression. |
| **< Remove** | Deletes the selected column from the Source columns list. |
| **Source columns** | Lists the columns that are to be used in the expression determining what to group by. |
| **Expression** | Enter an expression here to define what to group by. |
| **Drillable** | Select the check box if you want the column to group by all other columns that are included together with this column element in an information link. See Using Drillable for more information. |

| Option | Description |
|---|---|
| **Property name** | Shows the names of custom properties defined for this column. Custom properties are metadata that can be used when searching for columns using the following syntax: <Property name>:<Value>. For example, MyCompany.Property:Property1. Custom column properties can also be used for drawing lines in some of the visualizations. |
| **Value** | Shows the value of each custom property. |
| **Add...** | Opens the Add Column Property dialog where custom properties can be defined. |
| **Edit...** | Opens the Edit Column Property dialog. |
| **Delete** | Deletes the selected property. |

### 13.7.13.4.4 Multiple Column Elements Tab



| Option | Description |
|---|---|
| **Add >** | Select one or more tables or columns from the Data Sources tree, and then click this button to include the columns as new column elements in the library. |
| **< Remove** | Deletes the selected columns from the Source columns list. |
| **< Remove All** | Removes all columns from the Source columns list. |
| **Column element name** | The name of the column to be saved as it will be displayed in the Elements tree once imported to the library. Click on a column element name to edit the text. |
| **Source column name** | Displays the source name of the selected column element. |
| **Type** | Displays the data type of the selected column element. |
| **Path** | Displays the path to the column in the data sources tree. |
| **Selected column description** | A short (optional) description of the purpose of the column. (Click on a column element in the Source columns list to edit the description of that column.) |
| **Create Columns...** | Creates the columns and adds them to the library, after you specify their location in the Create Multiple Columns dialog. |

## 13.7.13.4.5 Filter Element Tab



| Option | Description |
|---|---|
| **Add >** | Select a column from the Data Sources tree, and then click this button to include it in the filter. |
| **< Remove** | Deletes the selected column from the composition. |
| **Condition** | In this field, enter a condition containing the selected column or columns. |
| **Description** | A short (optional) description of the purpose of the filter. |
| **Save As** | Click **Save As** to create a copy of the filter element. |
| **Save** | Click **Save** to save or update the filter. |

### 13.7.13.4.6 Procedure Element Tab



| Option | Description |
|---|---|
| **Select** | Select a database procedure from the Data Sources tree, and then click this button to include it. |
| **Procedure type** | Information Designer defines three kinds of procedures:<br>**Pre-update procedure** - this procedure does not return any data, it only performs an operation on one or more databases. All pre-update procedures in an information link will always be executed before any query procedure.<br>**Query procedure** - just like a database table this procedure returns data.<br>**Post-update procedure** - this procedure does not return any data, it only performs an operation on one or more databases. All post-update procedures in an information link will always be executed after any query procedure. |
| **Save As...** | Click **Save As** to create a copy of a procedure. |
| **Save** | Click **Save** to save or update the procedure. |
| **Run** | Runs the procedure. |

| Option | Description |
| --- | --- |
| **Description** | A short description of the purpose of the procedure. |



| Option | Description |
| --- | --- |
| **Name** | States the name of the input parameters detected in the database procedure. |
| **Type** | States the type of the input parameters detected in the database procedure. |
| **Default Value** | If the input parameter should receive a default value, type a value (of the appropriate type) in the input field. If not, leave the field blank.<br><br>Type **?param_name** to use a parameter as the default value, where param_name is the name to identify the parameter by.<br><br>**Note:** If you use a parameter for the default value, you must choose Prompt: None. |
| **Permit Null** | Select this check box if you want to allow the input parameter to be Null. |
| **Prompt** | Select whether you want the end user to be prompted for a single value, multiple values or not at all, from the **Prompt** drop-down list box.<br><br>Comment: If you select multiple values, the end user will be allowed to enter several values. The procedure will run once for each of these values in an iterative loop. For more information, see Multiple Value Procedure Prompts. |

| Option | Description |
|---|---|
| **Include all result columns** | Select this check box to include all columns from the procedure. Clear the check box if you like to specify the result columns yourself. |
| **Add** | This button becomes available when the Include all result columns check box is cleared. Click on the button to add a new row in the result columns list on the right. A dialog is opened where you can enter the Original name and Display name of the result column, as well as specify its data type. |
| **Delete** | Deletes the selected result column. |
| **Original Name** | In the **Original Name** field, the exact name of a column the database procedure returns should be entered. This name is specified in the actual database procedure, so you have to know this before adding the result column. |
| **Display Name** | Enter a descriptive **Display Name** for the resulting column. This is the name the end user will see when columns have been imported to TIBCO Spotfire. |
| **Type** | Select the **Type** the resulting column should have. |



| Option | Description |
|---|---|
| **Add** | Displays a drop-down list containing columns from three different |

<blockquote>

sources:

* **From Data Sources Tree**. This option is similar to selecting join columns at the creation of join elements. Click on a column in the Data Sources tree (or click on the column under its data source in the Elements tree) and then select the From Data Sources Tree option in the Add drop-down list.

* Previously specified **Result Columns**. Any result columns that have been defined above will be listed directly in the Add drop-down list.

* **New Result Column...**. The third option is used if you want to join over a result column from the procedure but you do not want to use it as output when retrieving data.

Select a column from either source to include it in the join.

</blockquote>

| | |
|---|---|
| **Remove** | Removes a column from the Join columns list. |
| **Join columns** | Lists the name of the columns you wish to join. |
| | This may be one of the columns specified in the Result Columns section, but can also be another procedure column as long as it is available from the database procedure result (for example an ID column). It also lists the columns you have added from the Data Sources tree. |
| **Condition** | Select one of the alternatives to specify which type of join to use. |
| | An inner join will return rows for which only the matching fields in both tables are equal. An outer join will return all the rows (including NULL values) from one table, and only the matching rows from the other table. |
| **Freehand** | You can also specify your own join definition by typing directly in the freehand field. See Freehand Joins for more information. |

## 13.7.13.4.7  Join Element Tab



1004

| Option | Description |
|--------|-------------|
| **Add >** | Select a column from the Data Sources tree, and then click this button to include it in the join. |
| **< Remove** | Removes a column from the list of columns included in the join. |
| **Join columns** | Lists the columns that should be included in the join. |
| **Condition** | Select one of the alternatives to specify which type of join to use. An inner join will return rows for which only the matching fields in both tables are equal. An outer join will return all the rows (including NULL values) from one table, and only the matching rows from the other table. |
| **Freehand** | Select this option to specify your own join definition. |
| **Target tables** | Select one table from each drop-down list. If you are only using two columns in the join, then you cannot alter the default choices. If more than two columns are included in the join condition (for example, an intermediate table), then it is important to select the two tables that are to be joined. |
| **Default join** | Select this check box if you want this join to be the default one if two different joins between the same tables exist. The default join is the one that is suggested in the Join path field when defining an information link, if the Suggest Joins button is clicked. |
| **Description** | A free-text description of the join. |
| **Save As** | Click **Save As** to create a copy of the join element. |
| **Save** | Click **Save** to save or update the join. |

## 13.7.13.4.8    Data Source Tab

All data sources that have been defined and you have access to are listed in the Data Sources tree and also in the Elements tree. By placing a data source in a folder, you can specify which users will have permission to access the data therein. Right-click on a data source and select Edit from the pop-up menu to modify a previously added data source.

| Option | Description |
|---|---|
| **Name** | The name of the data source, as you want it to appear in the Data Sources tree and in the Elements tree. |
| **Type** | Type of database. For example, choose from Oracle and SQL Server through JTDS or DataDirect. If more databases have been set up, they will appear in this list. See TIBCO Spotfire Server – Installation and Configuration Manual for details on setting up connections to other databases. |
| **Connection URL** | URL of the database. The format of this URL depends on the type of database. Change the placeholders in the default URL so that it links to your selected database. |
| **No of connections** | **Min** is the minimum number of database connections created for a given data source.<br>**Max** is the maximum number of database connections created for a given data source. There can never be more connections open at a given moment than the specified max number.<br>**Note:** If you use SAS/SHARE, ODBC or other data sources that do not |

| | |
|---|---|
| | support pooled connections (i.e., there is no valid ping command), set both min and max to 0. |
| **Username** | Username for the data source. |
| **Password** | Password for the data source. |
| **User authentication** | Use individual usernames to authenticate users when running information links. By default, this will prompt the user for credentials when running the information link against this data source for the first time. Optionally, you can develop a custom plug-in and use it to retrieve the credentials.<br>**Note:** If you are using Kerberos Delegation for database connections be sure to select this check box. |
| **Credentials timeout (hours)** | The number of hours to save credentials so that an end user does not have to login again when making multiple connections to the same data source. If no number is specified, the credentials will need to be specified again after 24 hours.<br>Data source credentials caching is done on both the TIBCO Spotfire client as well as on the TIBCO Spotfire Server.<br>On the client, data source credentials are cached for the duration of the TIBCO Spotfire session. This means that once a user has authenticated against a data source those credentials will be cached on the client side until the client is closed. Once the user has authenticated against a particular data source he/she will not be prompted for credentials for that data source for the remainder of the client session.<br>In addition, data source credentials are also cached on the TIBCO Spotfire server. On the server, data source credentials are stored on a per user, per data source basis. Credentials can be stored from a minimum of 36 seconds (0.01 hours) up to a full week.<br>Once authenticated a user will not be prompted for data source credentials during this time even if the client is restarted.<br>The server side credentials caching uses what is called a moving window for the timeout of the cached credentials. Hence, if a credential is used the caching period will be reset to the maximum timeout period. |
| **Allow writing in temporary tables** | Allows the Information Services to create temporary tables in this data source. This is needed when running information links that join data from several data sources or have a large number of filter values.<br>To guarantee full compatibility between Information Services and Oracle databases, it is recommended that the compatible setting in init.ora (for the databases) is set to: compatible=8.1.0.0.0 |
| **Open session commands** | Commands executed when acquiring a database connection from the connection pool or creating a new connection if pooled connections are not supported.<br>Can be used, for example, to authorize a user in an Oracle VPD context.<br><br>Example:<br>exec set_vpd_user(%CURRENT_USER%) |
| **Close session commands** | Commands executed when returning a database connection to the connection pool or closing a connection if pooled connections are not supported. |

| | Can be used, for example, to clear an authorized user in an Oracle VPD context.

Example:
exec set_vpd_user('') |
| **Connection initialization** | Command executed when initializing a database connection. |
| **Fetch size** | The maximum number of values in each block of data retrieved from the database. Used for performance tuning. In general, use higher values for physically distant databases. Use lower values when the number of users is high. Entering the value zero will make the JDBC driver use its default value. |
| **Batch size** | The maximum number of values in each block of data sent to the database. Used for performance tuning. In general, use higher values for geographically distant databases. Use lower values when the number of users is high. Entering the value zero will make the JDBC driver use its default value. |
| **Save As** | Click **Save As** to save a copy of the data source. |
| **Save** | Click **Save** to save or update the data source. |

## 13.7.13.5   Details

### 13.7.13.5.1   Pop-up Menus

#### Elements:
This pop-up menu is reached by right-clicking on an element in the Elements tree:

| Option | Description |
|--------|-------------|
| **Open Data** | [Only available when right-clicking on an information link.] Imports data into TIBCO Spotfire. |
| **Edit...** | Opens the tab used to edit the selected element (Information Link, Join, Column, Filter, Procedure or Data source). |
| **Edit Properties...** | Opens the Edit Properties dialog where you can change the name and description of the selected item. You can also add keywords for improving the chances of finding the correct elements when searching the library. |
| **New >** | [Only available when right-clicking on a folder.] Provides a shortcut entry to the Create Element options, opening a new tab were the new element can be specified. |
| **Delete** | Removes the selected element from the library. |
| **Refresh** | Refreshes the content of the currently selected folder. |
| **Refresh All** | Refreshes the entire tree. |

| | |
|---|---|
| **Find All References** | [Only available when right-clicking on a column, filter, procedure or join element.] |
| | Opens a Find Results tab where all references to the selected element are listed. (For example, all information links where a certain column element is included.) |
| **Validate** | Validates the content of the selected element and opens a Validation Result dialog or a tab with information about errors and/or warnings. |
| **Copy ID** | Copies the GUID of the selected element to the clipboard. |
| **Folder Permissions...** | [Only available when right-clicking on a folder.] |
| | Opens the Library Folder Permissions dialog where you can change the permissions for all users or groups to the selected folder. |

## Data Sources:

This pop-up menu is reached by right-clicking in the Data sources tree or on a data source in the Elements tree:

| Option | Description |
|---|---|
| **Edit...** | Opens the tab used to edit the selected data source. |
| **Edit Properties...** | [Only available when right-clicking on a data source.] |
| | Opens the Edit Properties dialog where you can change the name and description of the selected data source. You can also add keywords describing the data source. |
| **Create Default Information Model...** | Allows you to specify a location and automatically create a default set of elements and information links based on the selected data source, catalog, schema or table. See also Details on Create Default Information Model Settings. |
| **Create Column Elements** | [Only available when right-clicking on a table.] |
| | Opens a Multiple Column Elements tab with the content of the table already added to the Source columns list. |
| **Create Table Alias** | [Only available when right-clicking on a table.] |
| | Opens a dialog where you can specify a name for the table alias and appends a copy of the selected table to the data source. See Creating a Table Alias for more information. |
| **Delete** | [Only available when right-clicking on a data source or a table alias.] |
| | Removes the selected data source or table alias from the library. |
| **Refresh** | Refreshes the content of the currently selected instance. |
| **Refresh All** | Refreshes the entire Data sources tree. |
| **Find All References** | Opens a Find Results tab where all references to the selected instance are listed. (For example, all elements referring to a column from a certain database table.) |

| | |
|---|---|
| **Validate** | [Only available when right-clicking on a data source.] |
| | Validates the content of the selected data source and opens a Validation Result dialog or a tab with information about errors and/or warnings. |
| **Copy ID** | [Only available when right-clicking on a data source.] |
| | Copies the GUID of the selected data source to the clipboard. |

### Tab titles:

This pop-up menu is reached by right-clicking on the tab title of the Start tab or any other open tabs on the right-hand side of Information Designer.

| Option | Description |
|---|---|
| **Close** | Closes the currently active tab. |
| **Close All but This** | Closes all tabs except the currently active tab and the Start tab. |
| **Locate in Tree** | Locates the currently active tab in the Elements tree. |
| [Titles of open tabs] | Allows you to quickly navigate to any of the currently open tabs. |

## 13.7.13.5.2    Details on Edit SQL



| Option | Description |
|---|---|
| **Data source** | Displays the data sources used by the current information link in a drop-down list. You can only edit the SQL of one data source at a time. |
| **Pre-Updates** | Click this radio button to enter statements to be executed before the data retrieval. For example, this could be a call to a stored procedure or |

statements such as 'CREATE TABLE' or 'INSERT'.

| | |
|---|---|
| **Query** | Click this radio button to display and modify the SQL of the information link. |
| **Post-Updates** | Click this radio button to enter statements to be executed after the data retrieval. For example, 'DROP TABLE'. |
| **Modified SQL** | Modify the SQL of the information link in this text box. Multiple SQL statements are allowed in pre-updates and post-updates as long as they are separated with double new lines.<br><br>**Note:** If you alter parameters in the SQL code, the changes will override any parameter settings made elsewhere, such as in the filter part of the information link tab. |
| **Original SQL** | Displays the original SQL of the information link so that you can immediately see the differences that you have made upon your modification. |
| **Reset to Original** | Resets the Modified SQL to the SQL originally created in the information link. |

### 13.7.13.5.3    Pivot Conditioning in Information Designer
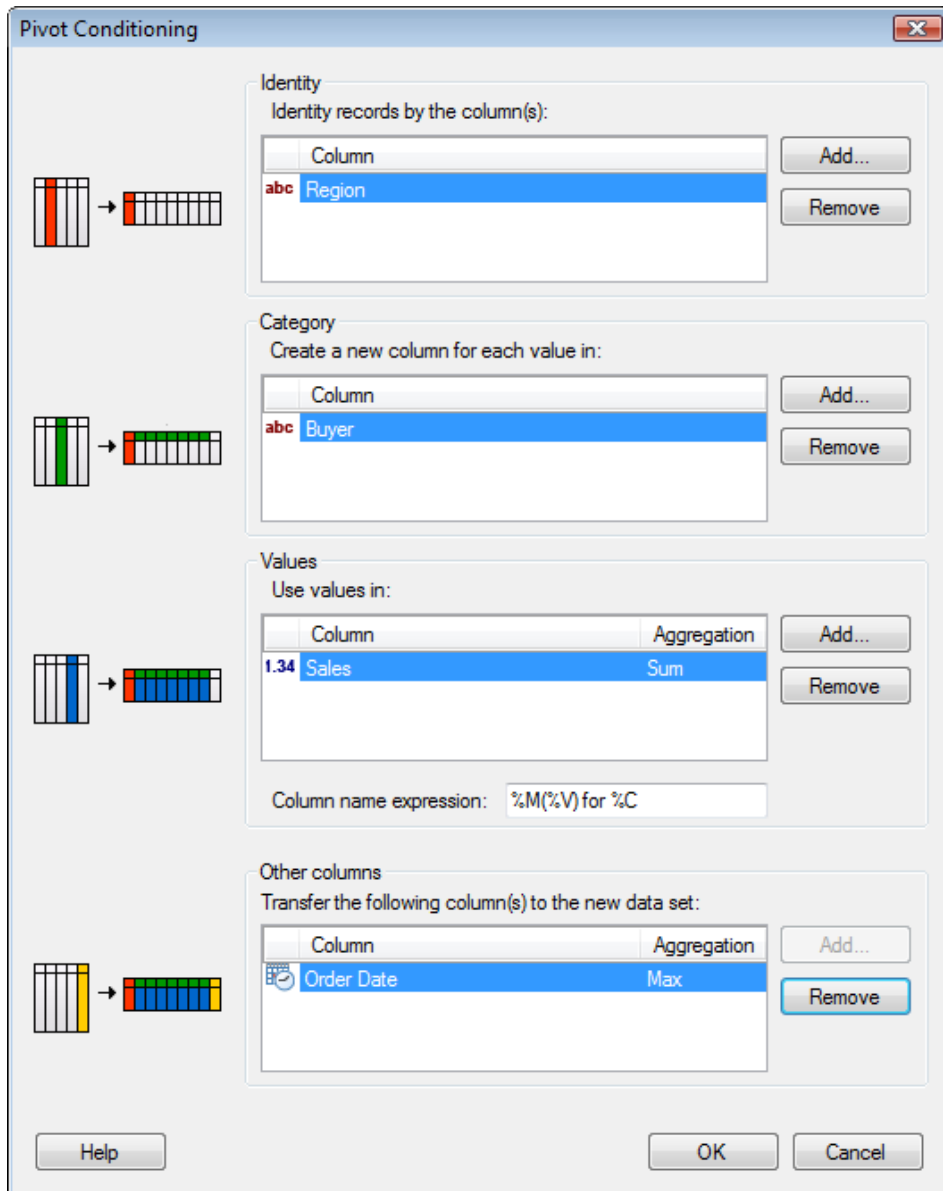


| Option | Description |
|---|---|
| **Identity** | Each unique value in the chosen identity column produces a row in the generated table. |
| | If you choose more than one column, then the new table will have a separate row for each unique combination of values in the chosen columns. |
| **Other columns** | Each unique value in the chosen category column produces a new column in the generated table. |
| | Selecting more than one column  means that the new table will have a separate column for each unique combination of values in the chosen columns. |
| **Values** | The column from which the data is pulled. The values in the generated |

table are computed according to the method selected under Aggregation (for example, Average).

**Note:** If you are certain that each combination of Identity and Category has a unique value, then you can select the Aggregation: **None** which will not apply any aggregation of the data. However, the pivot will fail if you select **None**, and each combination of Identify and Category is *not* unique.

| | |
|---|---|
| **Column name expression** | You can select how the pivoted columns should be named. By default the predefined option is:<br><br>  Method(Value) for Column<br><br>You can also create a custom naming scheme for your pivoted columns. |
| **Other columns** | This option allows you to include an overall average of a particular measurement, for each row in the generated table. |

### 13.7.13.5.4    Details on Prompt Groups

Prompt groups are used to specify which prompts should be dependent of each other, and which should not.
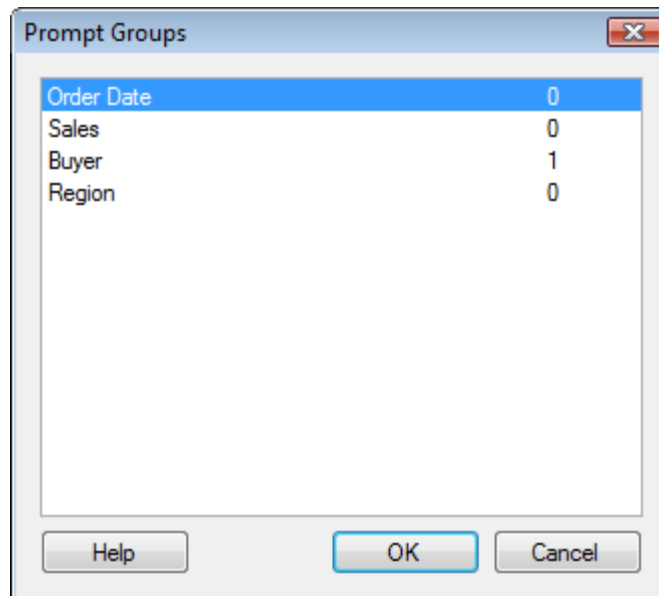


| Option | Description |
|---|---|
| **Element** | Lists all elements currently available in the information link. |
| **Group** | By entering the same group number for two columns you specify that these columns should be dependent of each other, but not by columns from a different prompt group. |

### 13.7.13.5.5    Details on Add Column

This dialog is shown when you have selected to add a filter or a prompt to an information link. It is also used to select columns when you want to apply a Pivot conditioning. Columns that have been added to the information link are available in the drop-down list.
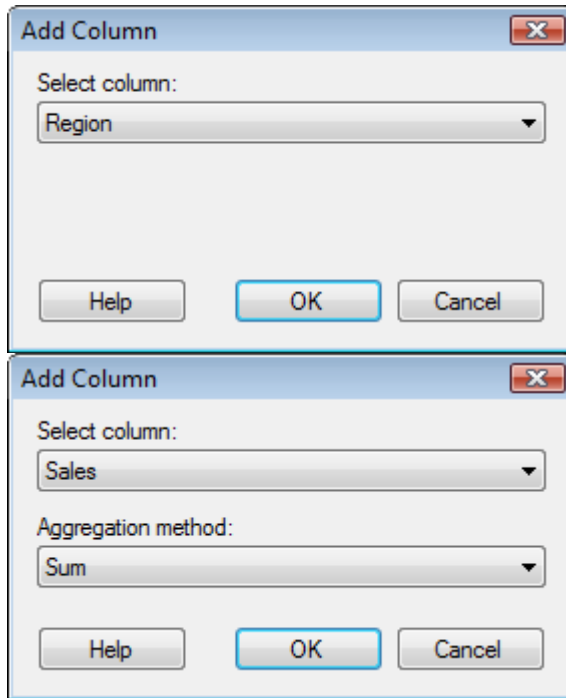
| Option | Description |
|---|---|
| **Select column** | Specifies which of the column elements should be used in this particular place. |
| **Aggregation method** | Specifies the aggregation method to use for the column. |

## 13.7.13.5.6    Details on the Save As Dialog
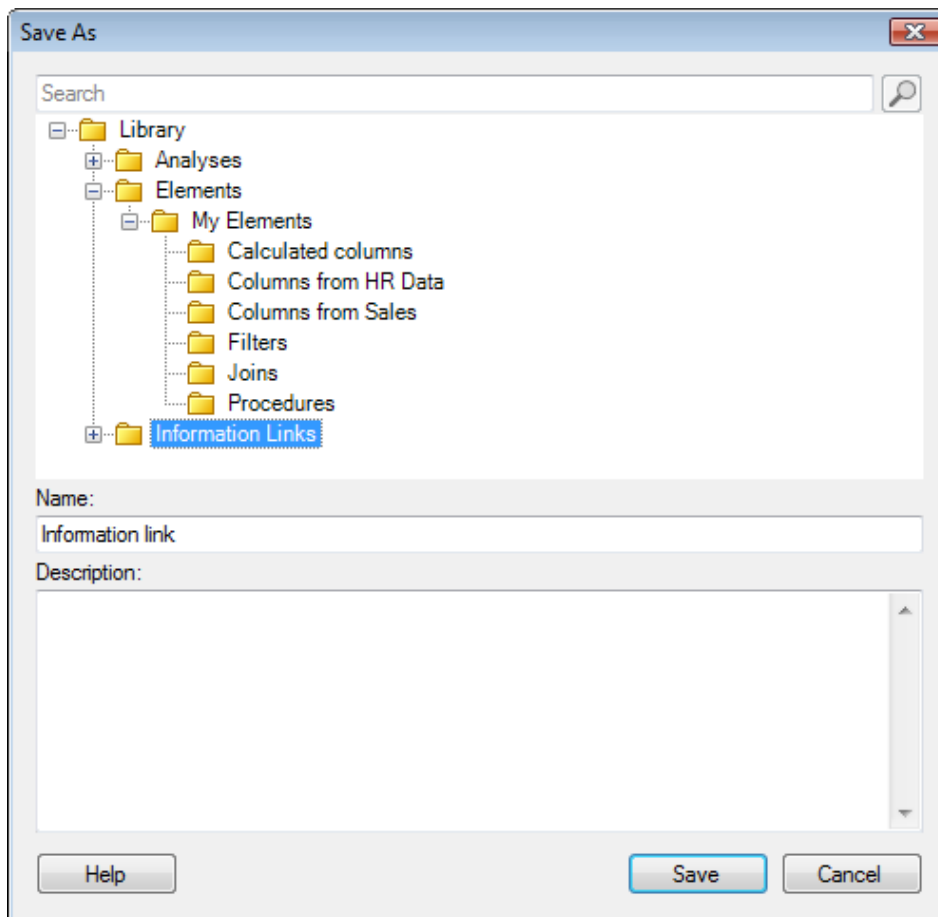


| Option | Description |
|---|---|
| Search | Type a search expression to limit the tree view below the search field so that it shows folders and elements matching the search expression only. |
| **Clear Search...** | [Link available only after a search has been performed.] Click on the link to clear the search and return to view the full Elements tree. |
| [Elements tree or search results] | Click to select the folder where you want to save the element. |
| **Name** | The name of the element to be saved/edited. |
| **Description** | A short description of the purpose of the element. |
| **Save** | Click **Save** to save or update the element. |

**Note:** Some characters are forbidden in the element names and file system of TIBCO Spotfire 3.0 and forward: /\*"?:<>|

Old information models with element names containing these characters can be imported. However, you cannot edit and resave elements using their old names if they contain forbidden characters.
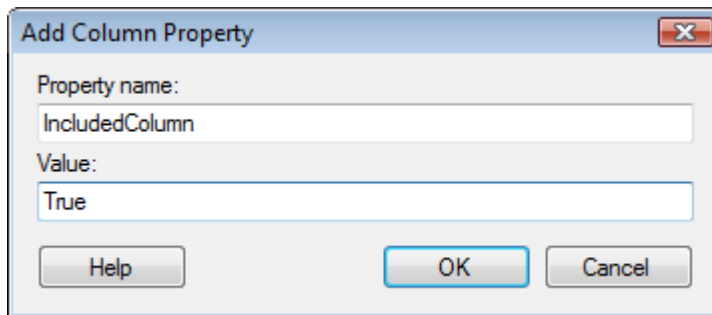
### 13.7.13.5.7　Details on Create Multiple Columns
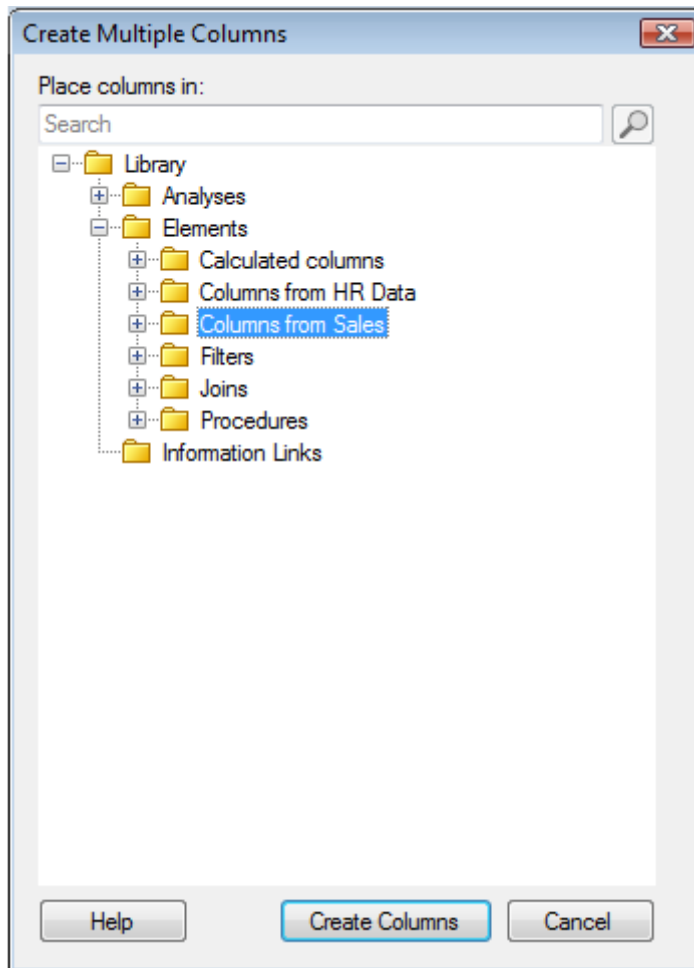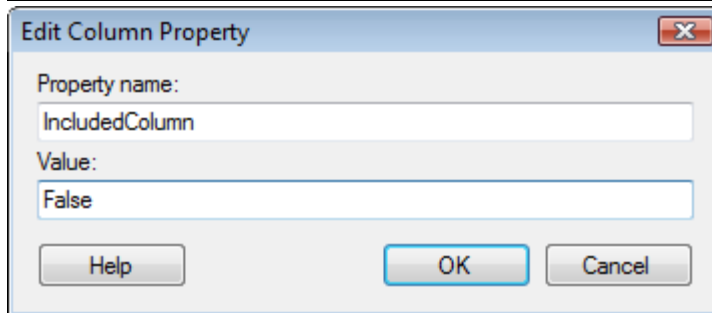


| Option | Description |
| --- | --- |
| **Place columns in** | Click on the folder in the tree where you want the new column elements to be created. |
| **Search** | Type a search expression to limit the tree view below the search field so that it shows folders and elements matching the search expression only. |
| **Clear Search...** | [Link available only after a search has been performed.]<br>Click on the link to clear the search and return to view the full Elements tree. |
| **Create Columns** | Creates the column elements in the specified folder. |

### 13.7.13.5.8　Details on Add/Edit Column Property

Custom properties are metadata that can be used when searching for columns using the following syntax: <Property name>:<Value>. For example, IncludedColumn:True.
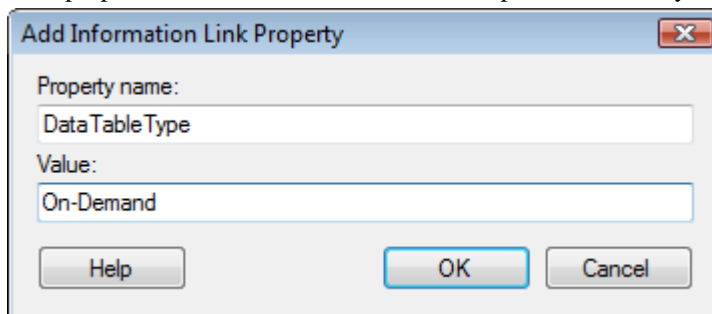
| Option | Description |
|---|---|
| **Property name** | Specifies the name of the custom property. |
| **Value** | Allows you to specify a value for the selected property. |

### 13.7.13.5.9 Details on Add/Edit Information Link Property

Custom properties are metadata that can be used when searching in the library by using the following syntax: <Property name>:<Value>. For example, DataTableType:On-Demand or DataTableType:"Additional Data Table". Information link properties are transformed to data table properties when the information link is opened in an analysis.

| Option | Description |
|---|---|
| **Property name** | Specifies the name of the custom property. |
| **Value** | Allows you to specify a value for the selected property. |

## 13.7.13.5.10  Details on Open Information Link

The Open Information Link dialog appears when an information link is being opened, and a column is encountered that has been set up with a prompt (a run-time filter). The dialog may take various forms depending on the type of prompt selected.

**Note:** If the prompt step not is marked as mandatory by the person setting up the information link, then clicking Finish or Next > will automatically retrieve all available values for that step. However, if you make any changes to the dialog, such as selecting the Include empty values for this step check box, then the step is seen as modified and you will only retrieve the values actually selected in the dialog. This applies to all prompt types except Single selection.

### Values



| Option | Description |
|---|---|
| **Enter values** | Type column values that you want to use as a constraint and separate them by pressing ENTER.<br>Type * to retrieve all possible values. |
| **Get Values...** | Use this button to set the column filter by fetching values from loaded data tables in TIBCO Spotfire. Opens the Column Values dialog. |
| **Include empty values for this step** | Select this check box to also include rows that do not contain any data for this column. |

### Range



| Option | Description |
|---|---|
| **Lower limit** | Type the lower limit for the values of the column. |
| **Upper limit** | Type the upper limit for the values of the column. |
| **Include empty values for this step** | Select this check box to also include rows that do not contain any data for this column. |

### Multiple selection



| Option | Description |
| --- | --- |
| **Select values** | Select individual values for the column by clicking the entries in the list. To select consecutive values, click the first item, press and hold down SHIFT, and then click the last item. To select multiple entries that are not consecutive, press and hold down CTRL, and then click each item. |
| **Include empty values for this step** | Select this check box to also include rows that do not contain any data for this column (and consequently are unavailable in the list). |

### Single selection



| Option | Description |
|---|---|
| **Select one value** | Select a single value for the column by clicking on it in the list. |
| **Include empty values for this step** | Select this check box to also include rows that do not contain any data for this column (and consequently are unavailable in the list). |

## 13.7.13.5.11  Details on Column Values

### ► To reach the Column Values dialog:

1. Open an Information Link with prompts.
2. When the **Open Information Link** dialog for the desired column appears, click **Get Values...**.
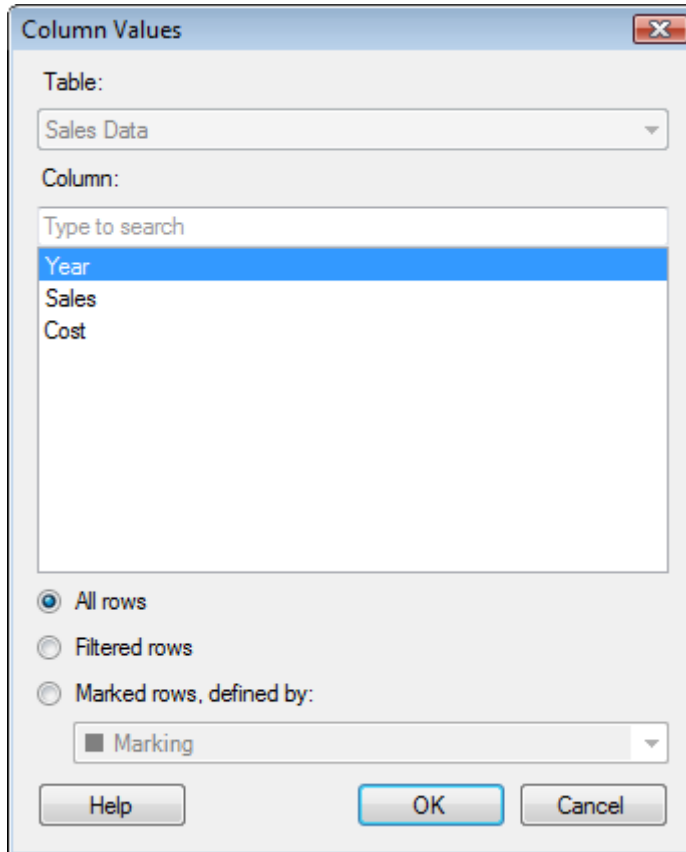
| Part | Description |
|---|---|
| **Table** | Select a data table from the drop-down list. |
| **Column** | Shows the available columns in the selected data table. Select a column by clicking on it in the list. You can narrow down the list of available columns by typing a part of a name in the "Type to search" field. |
| **All rows** | Gets values from all rows available in the entire data table, regardless of filtering. |
| **Filtered rows** | Gets values from the rows remaining after the current filtering (using the filtering scheme on the active page) only. |
| **Marked rows, defined by:** | Gets values from the rows marked in the visualizations (using the specified marking) only, regardless of filtering. |

### 13.7.13.5.12 Details on Edit Parameter



| Option | Description |
|--------|-------------|
| **Name** | Shows the name of the parameter you want to edit. |
| **Data type** | Lists the different data types available for your parameter. Select one from the list to change the data type your parameter expects the values it receive to be in. |
| **Value type** | |
| **Single value** | Choose single value if the parameter is supposed to receive just one value. |
| **Array** | Choose array if the parameter is supposed to receive several values. |

### 13.7.13.5.13 Details on Missing Parameter Value

If you have the correct license, this dialog is shown when you open a parameterized information link or file and for some reason the value of a parameter has not been supplied. You can use this dialog to type a value for that parameter.



**Note:** If the parameter expects an array as input (multiple values) and the values come from a string column that has commas within the values (e.g., last name and first name in a name column)  the syntax to use is "Smith, John", "Williams, Peter", and so on. Any comma that is not within quote signs will be interpreted as the end of a value.

## 13.7.13.5.14  Details on Missing Information Link

This dialog is shown if an analysis with data linked to an information link is opened and the information link is missing.
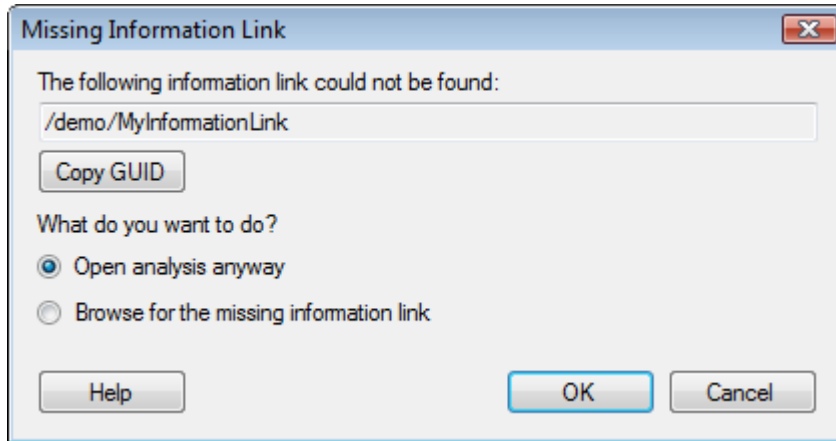


| Option | Description |
|---|---|
| **Copy GUID** | Copies the GUID of the information link to the clipboard. The GUID is a unique identifier for the information link that remain the same if the name of the information link is changed. This can be useful for support or an administrator if the information link cannot be found. |
| **Open analysis anyway** | Opens the analysis without the missing information link. |
| **Browse for the missing information link** | Opens a dialog that lets you browse or search for the missing information link. |

### 13.7.13.5.15 Details on Create Default Information Model Settings

This dialog allows you to specify a description and keywords for all elements created by the Create Default Information Model menu option. This type of information can be used to identify all elements created by this operation at a later stage. It also lets you specify how to handle any name conflicts with existing elements.



| Option | Description |
|---|---|
| **Description** | An optional description of the data. The description could contain detailed information about the data enabling quick overviews. |
| **Keywords** | Keywords specific to the data. Keywords are separated by semicolons. This means that if you write "sales representatives; cost" it will be interpreted as two keywords, "sales representatives" and "cost". Keywords are used to enhance organization and search capabilities. |
| **If a created item has the same name as an existing item** | |
| **Automatically assign a new name to the created item** | Appends a number, e.g., (2), to the name of the new item. |
| **Replace existing item** | Replaces all existing items. |
| **Keep existing item** | Keeps all existing items and adds only those items that previously did not exist. |

### 13.7.13.5.16  Details on Select Destination Folder

This dialog is used to specify where to place the new default information model.
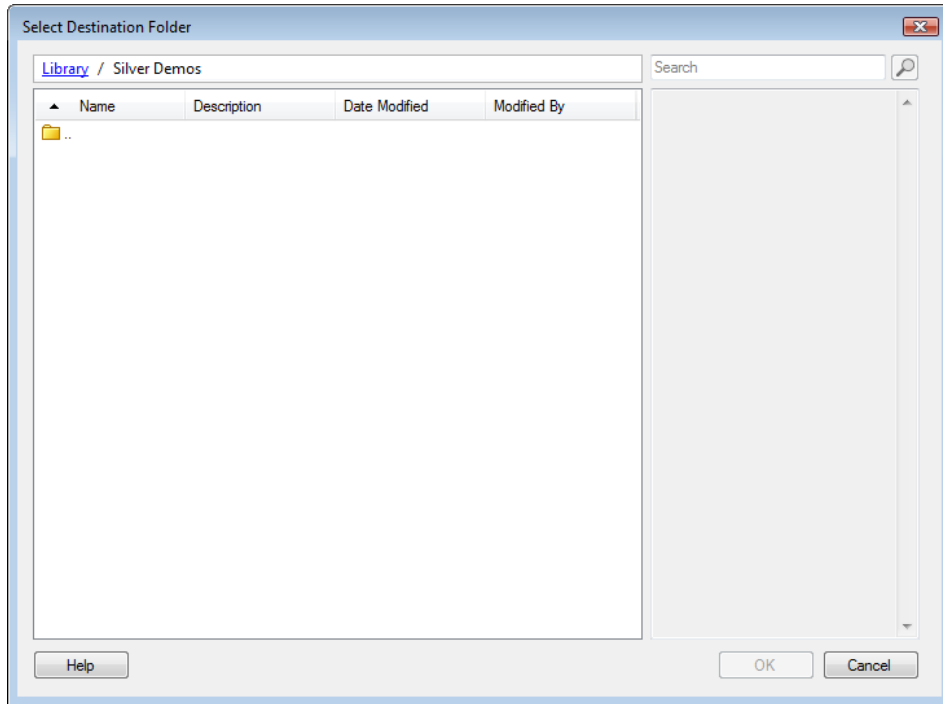


Navigate through the folders, and select the folder where you want the new elements and information links to be created. Information about the selected folder is displayed to the right of the list of folders. Which library folders you have access to is controlled by group privileges. Contact your Spotfire administrator if you cannot reach all the necessary folders.

You can search for a folder in the library by entering a name, or part of a name in the search field in the upper right corner in the dialog, and then pressing Enter. All folders matching your search string will then be listed. See Searching the Library for more information about search expressions.

### 13.7.13.5.17  Data Source Login Dialog

This dialog is displayed when the data source administrator has selected to use data source authentication (the User authentication check box on the Data Source Tab in Information Designer).
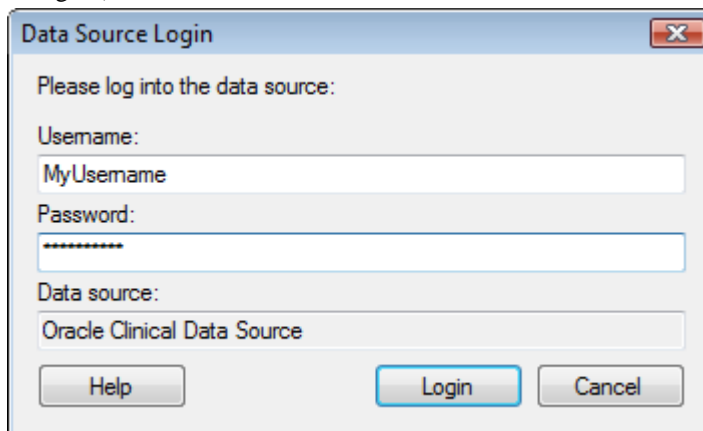
| Option | Description |
|---|---|
| **Username** | The username for the specified data source. |
| **Password** | The password for the specified data source. |
| **Data source** | The data source that you are trying to connect to. |

### 13.7.13.5.18  Details on Edit Properties

This dialog is used to edit the properties for an item in the library. It can be reached by right-clicking on the item of interest in the Information Designer tree structure and selecting **Edit Properties...** from the pop-up menu.



To edit the properties of an item you must have Browse + Access + Modify permissions to the folder it is placed in.

| Option | Description |
|---|---|
| **Name** | The name of the library item. The following characters are not accepted in titles:<br>\ / : * ? " < > \| $ & + = @ # % ; , { [ ] } ^ ' ~ ´ |
| **Description** | A description of the library item. |
| **Keywords** | Allows you to add keywords which can be used for finding the item in the library. Keywords are separated by a semicolon. |

# 13.7.14    Tips and Examples

## 13.7.14.1    Understanding Filters in Information Designer

There are two ways to control filtering in Information Designer. One is to create separate filter elements. These will appear as icons, and allow the end user to apply them in an information link at will. The other method is to associate a filter directly to the column. This means that when the column element is used in an information link, the column filter is automatically applied.

Use column filters (hard filters) only when there is no reason to believe the user will ever want to use the column without a filter. Make sure the column description makes it clear to the user that a filter is being applied.

Use filter elements when you want to give users the option to use or not use the filter. Again, remember to write a good description of the filter.

## 13.7.14.2    When to Use Prompt Groups

Prompt groups can be used to treat elements (columns or filters) as independent from elements in other prompt groups during the opening of prompted information links. The default behavior of prompted information links is that each subsequent step lists values based on earlier selections. However, if you are working against, for example, a STAR schema database the procedure may require multiple joins since the elements queried for the prompts are linked only by the large fact table in the STAR schema.

By assigning an element to a different prompt group no previous selections in the prompt steps will be reflected in the listing for the independent element. Neither will any of the selections made in the prompt step for the independent element be reflected in later prompt steps (regardless of whether the later prompt steps are independent or not). It may also be of interest to specify a different prompt group for an element that is not prompted, for example, a column with a hard filter.

### Example:

Say that you have information about your employees and their salaries stored in a STAR schema database with a layout similar to the one below:
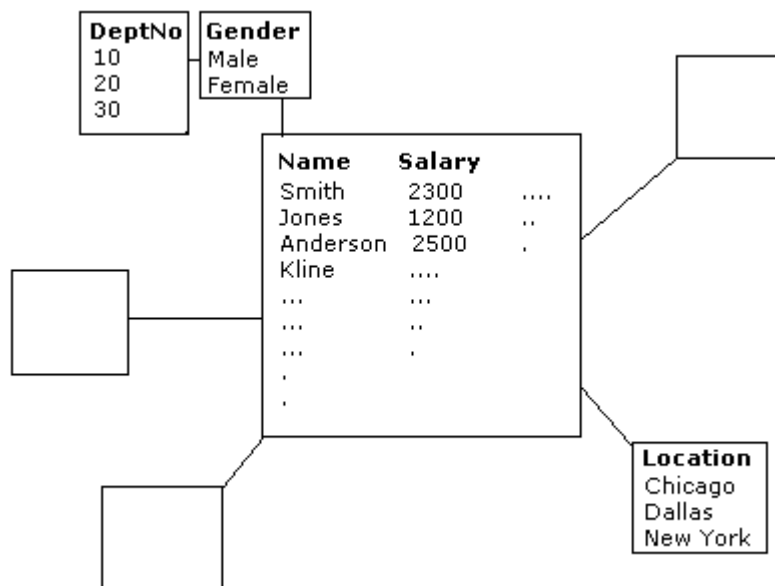


Now, you want to retrieve information about the salary of your employees in the Chicago office, with the possibility to filter using DeptNo and Gender upon running the information link.

## ► These are the steps you would perform to retrieve this type of information:

1. Create an information link by adding all the interesting columns to the Information Link tab.
2. In the **Filters** section, add the **Location** column.
3. Select **Values** as **Filter Type**.
4. Type **Chicago** in the Values text field.
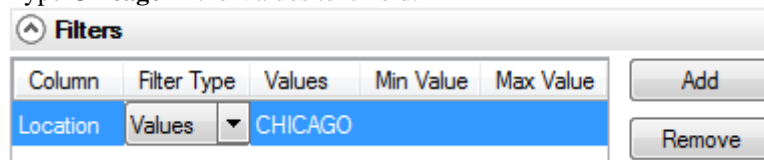


5. In the **Prompts** section, add the **DeptNo** and **Gender** columns.
6. Select suitable **Prompt type** options (for example, Multiple selection)) for the **DeptNo** and **Gender** columns.
7. Click **Groups...** and enter a different prompt group for the **Location** column.
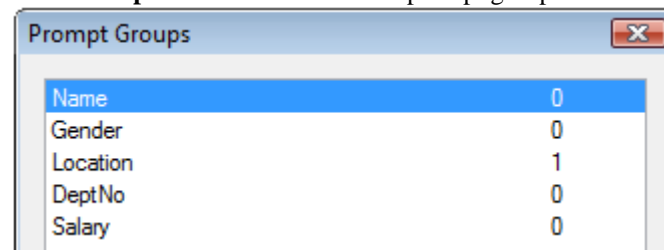


By making Location independent you avoid having to join to the large fact table for each prompt. When the information link is opened you will first be prompted to choose a DeptNo. Instead of going through the large fact table to the Location table and filter out all values except the ones for Chicago, you will see all values in the DeptNo column. For the next prompt step the much quicker connection between DeptNo and Gender is used directly, thus improving the performance of the information link.

**Note:** When Location is made independent you will see all possible values in the prompt step for DeptNo even though some of them perhaps are inapplicable due to the hard filter setting Chicago on the Location column.
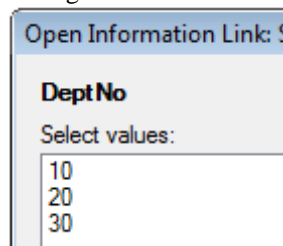


This means that if all employees in the Chicago office belong to department number 30, you might accidentally select number 20 in the prompt step for DeptNo with the result that no data is retrieved from the server.

If no prompt group changes had been made, the hard filter on Chicago would have been applied prior to the first prompting step and DeptNo 30 would have been the only one displayed in the prompt list:
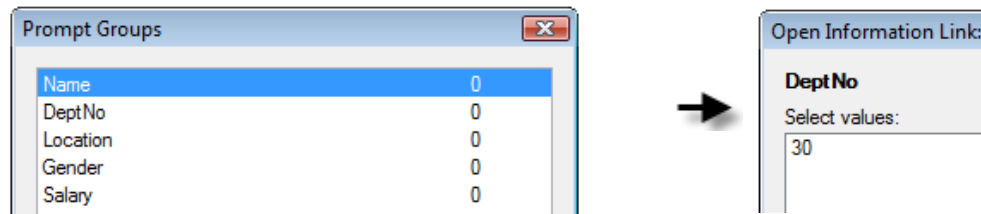
In this case, the risk of selecting wrong data in a prompt step is minimized.

## 13.7.14.3 Replacing Null

Sometimes a column returns null values. By using the Oracle SQL function **NVL**, null values can be replaced with another value.

**Note:** The following example only applies to data retrieved from an Oracle database.

### ► To modify a column to replace null values with 0 (zero):

1. Right-click on the column in the Elements tree.
2. Select **Edit** from the pop-up menu.
3. In the **Expression** field, type:

   **NVL(%1,0)**

4. Click **Save**.

**Note:** Sometimes a null value has a meaning different from zero, such as "value unknown". Make sure you understand how the data is meant to be interpreted before replacing values!

## 13.7.14.4 Limiting the Number of Records Returned

The Oracle pseudo column **ROWNUM** makes it possible to use a filter to control the number of rows returned by an information link. In the example below, only the first ten rows are to be retrieved.

**Note:** The following example only applies to data retrieved from an Oracle database
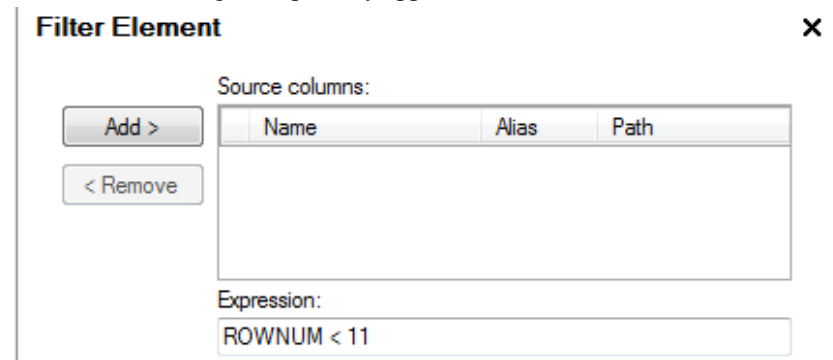


### ► To create a filter that limits the number of rows returned by an information link:

1. Click **New** and select **Filter**.
   Response: A Filter Element tab is opened.
2. In the **Expression** field, type:

   **ROWNUM < 11**

3. Type a suitable **Description**.
4. Click **Save**.

## 13.7.14.5 Concatenating Strings

The Oracle SQL function **CONCAT** lets you create a column by concatenating strings from different tables.

**Note:** The following example only applies to data retrieved from an Oracle database.

► **To combine strings from two different tables into a single column element:**



1. Click **New** and select **Column**.

   Response: A Column Element tab is opened.
2. In the Data Sources tree, select the first column (Region in the example above).
3. Click **Add >**.

   Response: The selected element is added to the Source columns list on the Column Element tab.
4. Select the second column (State in the example above).
5. Click **Add >**.
6. In the **Expression** field, enter:

   **concat ( concat (%1, ' '), %2)**

7. Select **String** from the **Data type** drop-down list.
8. Type a suitable **Description**.
9. Click **Save**.

## 13.7.14.6 Aggregate Functions

Aggregate functions summarize the values in a column. Below are some examples of aggregate functions that can be used when retrieving data from an Oracle database. Please see the documentation for your own database for more information.

**Note:** The following functions only apply to data retrieved from an Oracle database:

| Function | Description |
| --- | --- |
| SUM (%1) | total of all the rows in column %1, given that the column is numeric |
| AVG (%1) | average of column %1 |
| MAX (%1) | largest figure in column %1 |
| MIN (%1) | smallest figure in column %1 |
| COUNT(%1) | number of rows in column %1 |

| | |
|---|---|
| `CORR(%1,%2)` | coefficient of correlation of columns %1 and %2 |
| `COVAR_POP(%1,%2)` | population covariance of columns %1 and %2 |
| `COVAR_SAMP(%1,%2)` | sample covariance of columns %1 and %2 |
| `REGR_SLOPE(%1,%2)` | slope of the line described by columns %1 and %2 |
| `REGR_INTERCEPT(%1,%2)` | y-intercept of the regression line described by columns %1 and %2 |
| `REGR_COUNT(%1,%2)` | integer that is the number of non-null number pairs used to fit the regression line |
| `REGR_R2(%1,%2)` | coefficient of determination (also called "R-squared" or "goodness of fit") for the regression |
| `REGR_AVGX(%1,%2)` | average of the independent variable (%2) of the regression line |
| `REGR_AVGY(%1,%2)` | average of the dependent variable (%1) of the regression line |
| `REGR_SXX(%1,%2)` | computed as: REGR_COUNT(%1, %2) * VAR_POP(%2) |
| `REGR_SYY(%1,%2)` | computed as: REGR_COUNT(%1, %2) * VAR_POP(%1) |
| `REGR_SXY(%1,%2)` | computed as: REGR_COUNT(%1, %2) * COVAR_POP(%1, %2) |
| `STDDEV(%1)` | sample standard deviation of column %1 |
| `STDDEV_POP(%1)` | computes the population standard deviation of column %1 and returns the square root of the population variance |
| `STDDEV_SAMP(%1)` | computes the cumulative sample standard deviation of column %1 and returns the square root of the sample variance |
| `VAR_POP(%1)` | population variance of column %1 |
| `VAR_SAMP(%1)` | sample variance of column %1 |
| `VARIANCE(%1)` | variance of column %1 |

## 13.7.14.7    Examples of Generated SQL

### 13.7.14.7.1    SQL - Filters

In this example we will define a column element with a filter. The column should only return sales transactions above 10000.

**Column Element**

Source columns:

| Name | Alias | Path |
|------|-------|------|
| 1.34 Sales | %1 | /Sales/Sales/dbo/SalesandCost/... |

Expression:

%1

Data type: Real

⌄ **Description**

⌃ **Filter**

Source columns:

| Name | Alias | Path |
|------|-------|------|
| 1.34 Sales | %1 | /Sales/Sales/dbo/SalesandCost/... |

Expression:

%1 > 10000

Save the column element with the name High Sales.

The column element defined above will result in the following SQL when executed as part of an information link:

```
SELECT
    S1."Sales" AS "HIGHSALES"
FROM
    "Sales"."dbo"."SalesandCost" S1
WHERE
    (S1."Sales" > 10000)
    AND <conditions>
```

### 13.7.14.7.2    SQL - GROUP BY

In the following example, we will use aggregation to calculate the average profit that our company made for a number of products, in order to locate our best product. We are assuming that the database provides the columns containing the price we got from the buyers at each transaction (Sales) and the price our company paid for the raw material (Cost) at that time. We also have a column containing the type of the product sold at each transaction (Type).

Define a column element called "Average Profit" as follows:

## Column Element



We must also define a column element "Type" from Type which returns the product type.

If we define an information link using these three columns, the following SQL will be generated (notice the GROUP BY clause):

```
SELECT
    tmp1."AVERAGEPROFIT",
    E1."TYPE" AS "TYPE"
FROM
    "Sales"."dbo"."SalesandCost" S1
        SELECT
            AVG(E1."Sales" - E1."Cost") AS
"AVERAGEPROFIT",
            E1."TYPE" AS col1
        FROM
            "Sales"."dbo"."SalesandCost" S1
        GROUP BY
            E1."TYPE"
    ) tmp1
WHERE
    (E1."TYPE" = tmp1.col1)
    AND <conditions>
```

## 13.7.14.7.3   SQL - Subqueries

Information Designer supports subqueries (inner SQL). In this example we will demonstrate how to retrieve all sales transactions greater than the average.



We create a new column "High Sales Transactions" with the following filter expression:

```
%1 > (Select avg(Sales) from
Sales.dbo.SalesandCost)
```

**Note:** Be careful to include all brackets or it will not work!

The column element defined above will result in the following SQL when executed as part of an information link (notice that the WHERE clause includes the sub query from the filter condition):

```
SELECT
    S1."Sales" AS "HIGHSALESTRANSACTIONS"
FROM
    "Sales"."dbo"."SalesandCost" S1
WHERE
    (S1."Sales" >(
       Select
          avg(Sales)
       from
          Sales.dbo.SalesandCost
    ))
    AND <conditions>
```

## 13.7.14.8    PL/SQL Functions

In the following example, we will retrieve sales information for employees in both USD and EUR. One way of doing this is to write a function in SQLplus that performs the calculation:

```
CREATE FUNCTION money_converter
( amount IN NUMBER)
  RETURN NUMBER IS
  return_val NUMBER (10,2) := 0;
  BEGIN
    return_val := amount * 0.75;
    Return (return_val);
  END;
/
```

The sales in USD is used as input, and the output is a value that is 0.75 times smaller. Store the function in the SDP_ADMIN schema (or elsewhere if a different administrator username is used) to make it accessible by Information Designer.

Now create a column element with the name "Sales (EUR)" as follows:



Also create a column element "Type" with product types, and "Sales (USD)" with the original sales values.

When an information link with these three columns is executed from Information Designer, the generated SQL looks something like this:

```
SELECT
    S1."Type" AS "Type",
    S1."Sales" AS "SALESUSD",
    money_converter(S1."Sales") AS "SALESEUR"
FROM
    "Sales"."dbo"."SalesandCost" S1
```

# 13.8 Library Administration

## 13.8.1 Introduction

The TIBCO Spotfire system features a library. Using the Spotfire library, people can publish and share all their analysis material, information links, data sources, etc. The Spotfire library contains a folder structure where you can set permissions on folder level.

While most Spotfire users can open and save files to the library from the normal Open and Save dialogs in TIBCO Spotfire, the Library Administration tool lets certain users access the library in a more administrative role. The Library Administration tool lets you structure the library and its contents. You can copy and move files and folders, create new folders and build folder structures. You can set permissions for folders so that only certain users are allowed access to certain parts of the library. If you want, you can also import content into the library, or export parts of the library to file.

To access the Library Administration tool you must have enabled the license feature **Library Administration** included in the **TIBCO Spotfire Administrator** license. Note that this license does not affect the actual permissions set for the various folders in the library, it only enables a user to open the Library Administration tool.

To have full control over the library you must be a member of the **Library Administrator** group that is always present in the Spotfire system. Members of this group will override any permission levels in the library and have full control of the entire library. Members of this group are also the only ones allowed to create, delete and change permissions for **top level folders** in the library.

## 13.8.2 Permissions

### Permissions

Permissions are always set on folders, never on items.

There are four levels of permissions that can be set for a folder in the library:

- **Access** - The user or group is allowed to execute information links that are placed in the folder, but is not allowed to browse the contents or open analysis files.
- **Browse + Access** - The user or group is allowed to access and browse the folder contents. The user can open and use items found in such folders, but not save or modify them.
- **Browse + Access + Modify** - The user or group is allowed to browse and access the contents of the folder and also modify items or save new items. The user can also create new subfolders.
- **Full Control** - The user or group is allowed to access and browse the folder, modify and save items, and also change permissions for the folder and its contents.

### The Library Administrator Group

There is a group called **Library Administrator** that is always present in the Spotfire system. Members of this group will override any permission levels in the library, and have full control of the entire library. By default, members of this group are also the only ones allowed to create, delete and change permissions for **top level folders**.

### Inheritance

By default, a subfolder inherits the permissions of its parent folder. This holds true for entire chains of subfolders in the library. However, if you have Full Control of a folder, you can edit the permissions for it and specify the exact permissions that you want it to have. When explicit permissions are set for a folder, the inheritance from the parent folder (or any folder higher up in the hierarchy) is completely severed.

It is important to note that for a user to be able to browse the contents of a folder, he must also have Browse + Access permission for the parent folder, and its parent folder, and so on all the way to the top level of the library. If the Browse + Access permission is removed for a folder in the hierarchy, the user cannot browse to any folders further down that folder structure regardless of the permissions set for such folders.

## 13.8.3 Creating a New Folder

To create a new folder you must have Browse + Access + Modify permissions in the folder where you want the new folder to appear.

### ► To create a new folder:

1.   Navigate to the folder in which you want to create a new folder.
2.   Click on the **New Folder** button.
     Response: The New Folder dialog appears.
3.   Enter a **Name** for the folder.
     Comment: The following characters are not accepted in folder titles: \ / : * ? " < > | $ & + = @ # % ; , { [ ] } ^ ' ~ ´
4.   Optionally, enter a **Description** for the folder.
5.   Optionally, enter **Keywords** for the folder. These should be separated with semicolons.
6.   Click **OK**.

**Note:** The new folder will by default inherit the permissions from its parent folder.

## 13.8.4 Deleting an Item

To delete items you must have Browse + Access + Modify permissions for the folder they are placed in. If you want to delete a folder, you must have Browse + Access + Modify permissions for all subfolders in the underlying folder structure.

### ► To delete an item using the Library Administration tool:

1.   Select the items and folders to delete by clicking on them. You can use Ctrl or Shift to multi-select.
2.   Click on the **Delete** button.
3.   When prompted, confirm that you want to delete the selected items by clicking **OK**.

**Tip:** You can also right-click an item in the library tree and select Delete from the pop-up menu. The pop-up menu is also available in the Open from Library and Save as Library Item dialogs.

It is possible to have access to the Library Administration tool without being a member of the Library Administrator group. To get access to the Library Administration tool, the license called TIBCO Spotfire Administrator, as well as the license feature called Library Administration below it, must be enabled.

## 13.8.5 Moving an Item

To move items you must have Browse + Access + Modify permissions for both the source folder and the destination folder. If you want to move a folder, you must also have Browse + Access + Modify permissions for the entire underlying folder structure of the source folder.

### ► To move an item:

1.   Select the items or folders to move.
     Comment: You can multi-select using Ctrl or Shift.
2.   Click the **Move** icon.

Response: The Select Destination Folder dialog appears.

3. Select a destination folder.
4. Click **OK**.
5. Select how you want to handle any potential name conflicts, and click **OK**.

   Comment: Read more about how to handle conflicts in How Are Conflicts Resolved?

   The moved folders will keep any permissions explicitly set for them. If a folder is set to inherit its permissions, then it will inherit its permissions from the new parent folder after it has been moved.

## 13.8.6 Copying an Item

To copy items you must have Browse + Access + Modify permissions for both the source folder and the destination folder. If you want to copy a folder, you must also have Browse + Access + Modify permissions for the entire underlying folder structure of the source folder.

### ► To copy an item:

1. Select the items or folders to move.

   Comment: You can multi-select using Ctrl or Shift.
2. Click the **Copy** icon.

   Response: The Select Destination Folder dialog appears.
3. Select a destination folder.
4. Click **OK**.
5. Select how you want to handle any potential name and conflicts, and click **OK**.

   Comment: Read more about how to handle conflicts in How Are Conflicts Resolved?

The copied folders will keep any permissions explicitly set for them. If a folder is set to inherit its permissions, then the new copy will inherit its permissions from the new parent folder after it has been copied.

Folders or items that replace other folders or items will take on the identity of the destination folder or item, which means that references to the destination item or folder will continue to work but references to the moved folder will be broken.

## 13.8.7 Importing to Library

To import any content into the library from file, you must be a member of the **Library Administrator** group.

**Note:** Before importing content into the library, you should always make a backup of your existing library by using the Export function. Read more about this in Exporting from Library.

**Note:** When information model elements are being imported, the elements should not be accessed from the library or from Information Designer until after the import has been completed. If the import takes place on a server used by others, it is recommended either that no external access is allowed during the import, or that the information model is temporarily imported into a folder with no access permissions for other users. After the import has been performed, the permissions for the import folder can be changed, or the resulting elements can be moved to another place in the library.

### ► To import content into the library from file:

1. Click on the **Import** button.

   Response: The Import dialog appears.
2. Click **Browse**.

   Response: The Select File to Import dialog opens.
3. Select the file you want to import, and click **OK**.

   Comment: You can only import zip archives containing appropriate library content. It is not possible to import a single analysis. Also, such zip archives must be placed in a

specific folder (or in its sub-folders) on a specific machine. This folder is called the "Shared Disk Location" and is set from the TIBCO Spotfire Configuration Console. In an environment with only one TIBCO Spotfire Server, this folder is by default located on the TIBCO Spotfire Server machine in the folder <server installation directory>/tomcat/application-data/library. In an environment with more than one Spotfire Server, one of them is dedicated to hold Library exports. See the TIBCO Spotfire Server - Installation and Configuration Manual for more information about how to set this up.

In the **Import items of type** drop-down list, select whether or not you want to limit the import to only include certain types of items.

4. Select if you want to **Include permissions** if such are stored in the file. If you do not include any permissions, the imported items will inherit the permissions of the destination folder.

5. Select **Ignore empty directories** if you do not want to import any empty library folders.

6. Select how you want to handle any potential name and/or GUID conflicts.

    Comment: Read more about how to handle conflicts in How Are Conflicts Resolved?

7. Click **OK**.

    Response: The Select Destination Folder dialog appears.

8. Select a folder to import to, and click **OK**.

    Response: The Library Import status dialog appears.

9. Click **Refresh** to update the status messages in the dialog.

10. Click **Close** when the **Log** states Import done.


# 13.8.8    Exporting from Library

To export a folder and its contents to file you must be a member of the **Library Administrator** group.

The folder and its contents will be saved as a zip archive. This zip archive will be placed in a specific folder (or in its subfolders) on a specific machine. This folder is called the "Shared Disk Location" and is set from the TIBCO Spotfire Configuration Console. In an environment with only one TIBCO Spotfire Server, this folder is by default located on the TIBCO Spotfire Server machine in the folder <server installation directory>/tomcat/application-data/library/. In an environment with more than one Spotfire Server, one of them is dedicated to hold Library exports. See the TIBCO Spotfire Server - Installation and Configuration Manual for more information about how to set this up.

### ► To export a folder:

1. Select the folder to export.

2. Click the **Export** icon.

    Response: The Export dialog appears.

3. Enter a name for the file that will be created.

4. In the **Export items of type** drop-down list, select if you want to limit the export to only include certain types of items.

5. Select whether to **Include permissions** or not.

6. Click **OK**.

    Response: The Library Export status dialog appears.

    Click **Refresh** to update the status messages in the dialog.

7. Click **Close** when the **Log** states Export done.

**Note:** Make sure that all dependencies (columns, filters, etc.) needed by the exported elements are included in the exported folder.

# 13.8.9     Searching the Library

You can search for library items in the Open from Library dialog, in the Library Administration tool and in Information Designer.

Searching for a text string will by default look for matching text in the **title** and **keywords** of the items in the library. You can use wildcards and boolean operators to search for parts and combinations of words. For a listing of the basic search syntax, see Searching in TIBCO Spotfire.

## Library specific search:

| Keyword | Example | Function |
|---|---|---|
| **title:**<word in title> | title:sales | Locates library items with the specified word (or part of word) somewhere in the title. |
| **created_by:** <username> | created_by:admin<br><br>created_by::admin | Locates library items created by a certain user.<br>In the first example, all items modified by any users beginning with admin will be found. In the second example, only items modified by the user 'admin' will be found. |
| **modified_by:** <username> | modified_by:admin | Locates library items modified by a certain user. |
| **item_type:**<type> or **type:**<type> | item_type:datasource | Locates items of a specific type. The available types are: column, filter, join, procedure, query (=information link) folder, dxp (= TIBCO Spotfire analysis file), datasource, datafunction and colorscheme. |
| **item_id::**<GUID> or **id::**<GUID> | item_id::dac3cd8c-47ec-454a-a8f2-691c60ece052 | Locates a specific library item based on its unique identifier. |
| **depends_on** (<expression>) | depends_on(item_id::538bcde4-7212-475f-a348-5bb41ba39c41)<br><br>depends_on(Sales) | Locates all items that depend on a specific element. |
| **required_by** (<expression>) | required_by(item_id::6f6dc7e0-57bd-11d7-5ac0-0010ac110132) | Locates all items that are required by another item. If the GUID in the example to the left belongs to an information link, the search will find all columns, filters, etc. that are included in that information link. |

| **modified** | modified:"2 days ago"<br>modified:"a week ago"<br>modified:>"an hour ago"<br>modified:today<br>modified:<"this month" | It is possible to search for items that have been modified during a specified time span, relative to today. There are two different ways of describing relative dates and times:<br><br>1) State the number of time parts ago in a string surrounded by quotes. The available time parts are seconds, minutes, hours, days, weeks, months and years. For example, search for modified:<"6 months ago". The given number of time units will be subtracted from the current time in the search.<br><br>2) State the time period to look back at using either of the keywords; today, yesterday, "this week", "this month", "this year". Note that you need quotes around all keywords consisting of more than one word. In this type of search, the last part of the date or time is "reset" (the time gets set to zero, the day of the month gets set to 1 etc.). The start day of a week is dependent on your server locale. For a en-US locale the first day of the week would be Sunday. |
| | modified::>created | Modified, created and accessed can also be used in comparisons with each other. The example to the left locates all items that have been modified after their creation. |
| | modified:"2009-02-01T18:27:55CEST" | Modified can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items modified at a specific time. |
| **created** | created:>"this week"<br>created:<"2 weeks ago" | It is possible to search for items that have been created during a specified time span, relative to today. See details regarding the allowed time spans under "modified" above.<br><br>Modified, created and accessed can be used in comparisons with each other. |
| | created:>"2009-02-01T18:27:55CEST" | Created can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items created at a certain time. |
| **accessed** | accessed:>"this month"<br>accessed:<"2 weeks ago" | It is possible to search for items that have been accessed during a specified time span, relative to today. See details regarding the allowed time spans under "modified" above. |

| | accessed:null | Modified, created and accessed can be used in comparisons with each other. |
|---|---|---|
| | | Accessed can also be used together with a timestamp of ISO 8601 format ("yyyy-MM-dd'T'HH:mm:ssz") to find items accessed at a certain time. |
| | | The example accessed:null finds all items that have never been accessed. |
| | accessed:>"2009-02-01T18:27:55CEST" | The last example finds all items that have been accessed after the first of February 2009. |
| **::>** | modified::>created | Used to finds items strictly greater than the expression following the operator. |
| | | For example, finds all items that have been modified after their creation. |
| **::<** | accessed::<modified | Used to finds items strictly less than the expression following the operator. |
| | | For example, finds all items that have been modified after they were last accessed. |
| **parent_id::** <folder GUID> | parent_id::538bcde4-7212-475f-a348-5bb41ba39c41 | Locates all items located in the specified folder. |
| **format_version:** <string or null> | format_version:null | Locates all items of a specified format version. For example, all items which have no format version specified can be found. |
| **content_size:** <byte> | content_size:>10000 content_size:>500KB content_size:<2MB | Locates all items of a specific byte size. In the first example, all items larger than 10000 bytes are found. If nothing else is specified, the number is interpreted as bytes, but you can specify content sizes in KB, MB or GB as well. |

## Analysis files:

When searching for analysis files, there are a number of search parameters that may help you locating a specific group of analyses. If you want to locate analysis files only, add type:dxp to the search expression.

| Keyword | Example | Function |
|---|---|---|
| **description** | description:sales | Locates all items containing the specified word in their description. |
| | type:dxp description:sales | Locates all analysis files |

| | | containing the specified word in their description. |
|---|---|---|
| **keywords** | keywords:sales | Locates all items containing the specified keyword. |
| | type:dxp keywords:sales | Locates all analysis files containing the specified keyword. |
| **AllowWebPlayerResume:** <true or false> | AllowWebPlayerResume:true | If true, locates all analysis files that allow personalized views for all web player users. |
| **EmbedAllSourceData:** <true or false> | EmbedAllSourceData:true | If true, locates all analysis files that embed all source data. (Override and embed all data check box selected.) |
| **OnDemandInformationLinks:** <GUID> | OnDemandInformationLinks:* <br><br> OnDemandInformationLinks:c45618c3-b7ac-43aa-bafe-e14f39fd4bb7 | The first example locates all analyses that use on-demand data tables. You can also specify a GUID to locate all analyses that use a specific information link as an on-demand data table. |
| **AllTablesEmbedded:** <true or false> | AllTablesEmbedded:true | If true, locates all analysis files that only have embedded data tables. |

## Information Model elements:

If you want to locate information model elements of a specific type only, add type:column (or filter, join, procedure, query, folder or datasource) to the search expression.

| Keyword | Example | Function |
|---|---|---|
| **description** | description:sales | Locates all items containing the specified word in their description. |
| | type:query description:sales | Locates all information links containing the specified word in their description. |
| **column** | column:Sales | Locates all items referring to a source column with the specified name. |
| | column::Sales | The source column could be referred to in the conditions or groupings of a column element, a filter condition, a join condition or the join condition of a procedure. |
| **table** | table:SalesandCost | Locates all items referring to a source table or stored procedure with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **schema** | schema:dbo | Locates all items referring to a source schema with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **catalog** | catalog:Sales | Locates all elements referring to a source catalog with the specified name. |
| | | This could be referred to in the conditions or groupings of a column element, a filter condition, the condition or target tables of a join or in the source procedure or join condition of a procedure. |
| **datatype** | datatype:integer | Locates all columns of the specified data type (integer, real, string, date, time, datetime, clob or blob). |
| **parameter** | parameter:MinSales parameter:* | Locates information links using the specified parameter. |
| <property_name>: | "my.prop":* | Custom properties in any information |

| | |
|---|---|
| <property_value> | model element are searchable using the same syntax. |
| | However, note that the property name must by quoted if it contains a '.' delimiter. |

## Combinations of keywords:

You can combine many of the keywords described above to create more advanced search expressions. For example:

**type:query depends_on(type:column salary)** - searches for information links that contains a column named salary

**type:query depends_on(column:salary)** - searches for information links that contains an element that refers to a data source column named salary

**required_by(type::query InformationLinkName)** - shows the elements used by the information link with the name InformationLinkName.

**(not (required_by(type:dxp))) and type:query** - searches for information links that are not used by any analysis file in the library.

### ► To search for items in the Open from Library dialog:

Depending on where you are searching, you may get different search results. Analyses and information links are shown when searching in the Open from Library dialog, not any information model elements or data sources, etc.

1. Navigate to the top folder of the structure you want to perform the search in. If you want to search the entire library, navigate to the library root.
2. Type the text you want to search for in the search field at the top right corner of the dialog.
3. Click on the search button with a magnifying glass.
   Response: The dialog will switch to a Search Results view.
4. The items matching your search criteria will be displayed in the list. To return to the normal folder view, click the **Back to folder** link.

### ► To search for items in the Library Administration tool:

1. Navigate to the top folder of the structure you want to perform the search in. If you want to search the entire library, navigate to the library root.
2. Type the text you want to search for in the search field at the top right corner of the Library Administration tool.
3. Click on the **Search** button.
   Response: The Library Administration tool will switch to a Search Result view. **Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.
4. The items matching your search criteria will be displayed in the list. To return to the normal folder view, click the **Back to folder** link.

### ► To search for items in Information Designer:

Depending on where you are searching, you may get different search results. Information model elements, information links and data sources are shown when searching in Information Designer, not any analyses, etc.

1. Type the text you want to search for in the search field at the top of the Elements tree.
2. Click on the search button with a magnifying glass, .

Response: The search results are displayed. **Note:** Searching for data sources does not include searching for database entities like catalogs, schemas or tables. It is only the database instance itself that can be located via search.

3. The items matching the search result are shown in the list. To return to the normal folder view, click the **Clear Search...** link.

### ► To use search expressions in custom RSS feeds:

You can create a customized RSS feed showing the latest changes to the library items you are interested in by appending a library search expression to a URL.

Use the following syntax to create your own feed:

http://<server>/spotfire/library[/path/to/something/interesting]?rss[&search=<search_expression>]

The **path and  search** parameters are optional. If you only specify http://myspotfireserver/spotfire/library?rss, the feed will return the 20 most recently modified files in the library. You can also add a **max-results** section if you want to limit the number of results shown, see example below.

Examples:

http://myspotfireserver/spotfire/library?rss&search=content_size:>500KB

http://myspotfireserver/spotfire/library?rss&search=created_by::admin

http://myspotfireserver/spotfire/library?rss&max-results=10&search=title:sales

### ► To use search expressions in tibcospotfire links:

You can incorporate a search expression in a tibcospotfire link in order to directly populate the Open from Library dialog with some suitable analyses or information links. See Links to Analyses in the Library for more information about links. The links are a list of keys and value pairs. The key and value are separated using colon, :, and each key and value pair are also separated with colons:

tibcospotfire:<key1>:<value1>:<key2>:<value2>...<keyN>:<valueN>

The following keys and values are allowed:

Search: <search expression> with optional parameters.

OrderBy : Title | Modified | Created | Accessed | ContentSize | Description

MaxResult: <positive integer>

SortDirection: Ascending | Descending

The values should be encoded using the following pattern:

| Value | Encoded to: |
|-------|-------------|
| : | \: |
| " | \' |
| \ | \\ |

Examples:

tibcospotfire:search:*:OrderBy:Modified:SortDirection:Descending:MaxResult:20

tibcospotfire:search:modified\:<\'3 days ago'\:OrderBy:Modified:SortDirection:Descending

## 13.8.10   Editing Properties

To edit the properties of an item you must have Browse + Access + Modify permissions for the folder it is placed in. You can edit the Name, Description and Keywords for all types of library items. For analyses it is also possible to edit some document-specific properties.

### ► **To edit properties:**
1. Select the item you want to edit properties for.
2. Click on the **Edit...** link for the **Selected Item**.
   Response: The Edit Properties dialog is displayed.
3. Enter a **Name** for the item.
   Comment: The following characters are not accepted in names: \ / : * ? " < > | $ & + = @ # % ; , { [ ] } ^ ' ~ ´
4. Optionally, enter a **Description** for the folder.
5. Optionally, enter **Keywords** for the folder. These should be separated with semicolon.
6. Optionally, for an analysis file, make any changes to the properties on the Document-tab.
7. Click **OK**.

## 13.8.11   Editing Folder Permissions

To edit the permissions that are set for a folder, you must have Full Control permission for the folder.

### ► **To edit folder permissions:**
1. Select the folder you want to edit permissions for.
2. Click on the **Edit...** link to the right of the **Permissions for Current Folder** title.
   Response: The Folder Permissions dialog appears.
3. Select whether you want the folder to inherit permissions from its parent folder, or if you want to specify explicit permissions for it. Do this by selecting/deselecting the **Inherit permissions from parent folder** check box.
   If you choose to inherit permissions then you cannot specify any more details. Click **OK** and you are done.
   If you choose to set explicit permissions then proceed to the next step.
4. When you clear the **Inherit permissions from parent folder** check box, the permissions the folder used to inherit are set explicitly. This gives you a template to work from if you want to remove certain permissions or perhaps add some.
   In the search field, type in the name of the user or group you want to add permissions for.
   Tip: You can use wild cards (that is, asterisks "*"), to simplify the search. For example, use a wild card to display all users and groups, or append it to a word to display all users and groups beginning with that word. Example: Group4* will find Group41, Group421 and so on.
5. Using the drop-down selector below the search field, select if you want to search only for **Groups**, only for **Users** or both **Users and Groups**.
6. Click **Search**.
   Response: The users and/or groups matching the search criteria are displayed in the list to the left.
7. Select the appropriate users/groups in the list and click the **>** button of the permission level they should receive.
8. Repeat steps 4 through 7 until you have added all the users and groups to the permissions level you want.
9. To remove a user or group from a permission level, select it and click the **<** button for that permission level.
10. Click **OK**.
    Response: The folder will be updated with the new permissions.

## 13.8.12   Copying URLs

Items in the library such as analysis files have a unique URL. By copying this URL and pasting it into a web browser, you can open that file in TIBCO Spotfire or perhaps save the file to disk.

Also, if you have a TIBCO Spotfire Web Player server connected to your library, a second URL is available for each analysis file. By copying this to a web browser, the analysis will be opened in the TIBCO Spotfire Web Player running in your web browser.

### ► To copy a URL and open in TIBCO Spotfire:

1. Click on an analysis file to select it in the Library Administration window.
   Response: Under the **Link to Selected Item** heading,  a **URL** is displayed.
2. Right-click on the URL and select **Copy**.
3. Open a web browser and paste the URL into the address field.
   Response: The analysis is opened in a new instance of TIBCO Spotfire.

### ► To copy a Web Player URL and open in TIBCO Spotfire Web Player:

1. Click on an analysis file to select it in the Library Administration window.
   Response: Under the **Link to Selected Item** heading, a **Web Player URL** is displayed.
2. Right-click on the Web Player URL and select **Copy**.
3. Open a web browser and paste the URL into the address field.
   Response: The analysis is opened in TIBCO Spotfire Web Player.

### ► To copy a URL for unknown clients:

If you want to send a link to a larger audience where you do not know whether they have access to TIBCO Spotfire or just the Web Player, you can use a link to a redirect page instead.

1. Right-click on an analysis file or information link in the Library Administration window.
2. Select **Copy TIBCO Spotfire URL > Server Redirect Page for Unknown Clients** from the pop-up menu.
   Response: A URL leading to a redirect page is copied to your clipboard. Here, each user can select whether to open the analysis in TIBCO Spotfire, TIBCO Spotfire Web Player or to Download the analysis file.

## 13.8.13   How Are Conflicts Resolved?

Items and folders in the library are identified by two things: their name and a unique identifier (GUID). Several items can have the same name provided that they are not located in the same folder, but every item will always have a unique identifier. This identifier is used in external references to the item, such as a link to an analysis file that you can send to a colleague. If your colleague clicks the link, she can open the analysis file in TIBCO Spotfire. Here is an example of such a link:

http://spotfireserver:8080/spotfire/library?guid=2d89e46f-3b15-463a-b581-96d3dfb41742

### Copy and Move

When you copy or move an item to a folder where an identically named item is already present, you must decide how to handle this conflict.

- **Automatically rename copied item** - this will append a "(2)" to the name of the file you copied.
- **Replace existing item** - this will replace the existing item with the one you copied.
- **Keep existing item** - this will keep the existing item.

## Import

If an imported item has the same name or GUID as an existing item there will be a conflict. There are three options for how to handle this. These options are explained in detail below.

- **Automatically assign new name or GUID to imported item**
- **Replace existing item**
- **Keep existing item**

    The following images explain in detail how various conflicts are handled. This is primarily important for library administrators about to import content into the library, since one should be aware of the result if there are conflicts on GUIDs or names. Each section starts with an image showing the task performed, and then the result is shown for each of the three options.

## Name Conflict Resolution

**Import Folder A from Library 1 to Library 2**
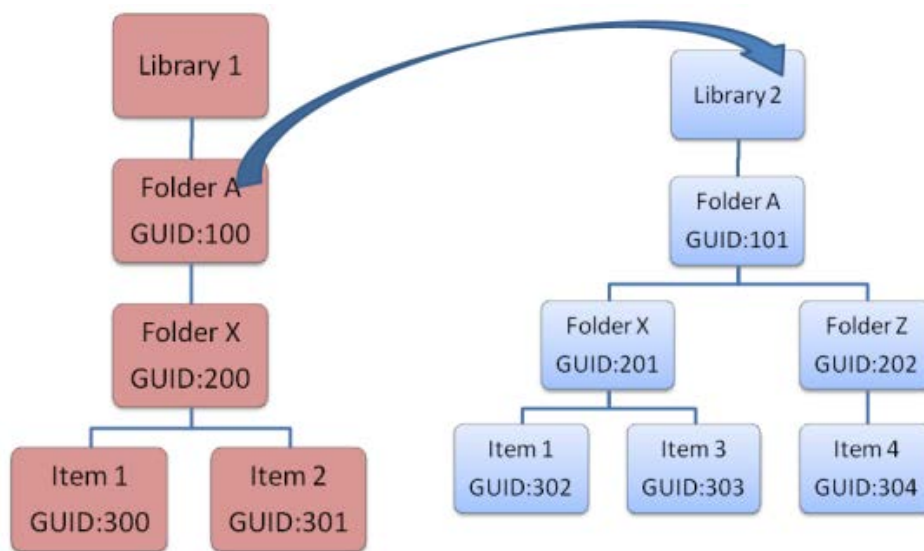


**Automatically rename copied item**
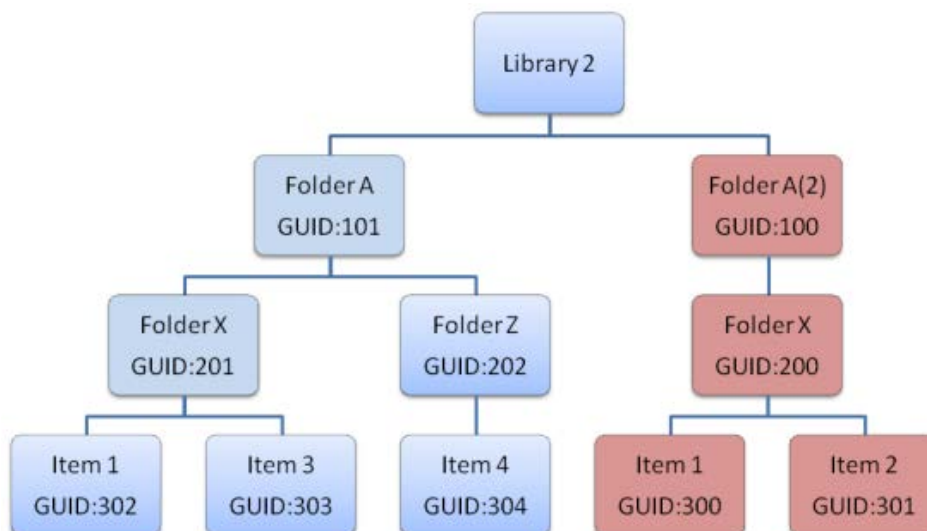
**Replace existing item**
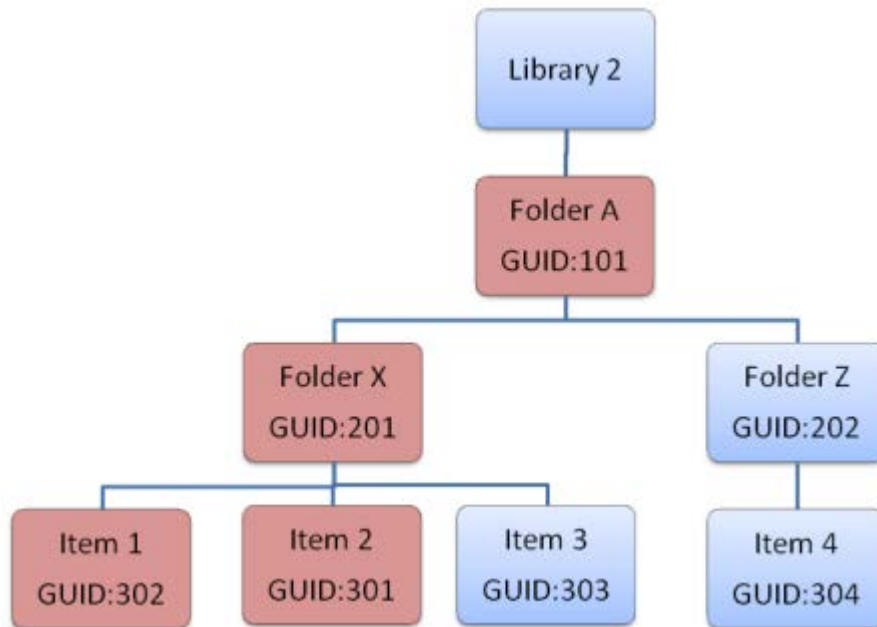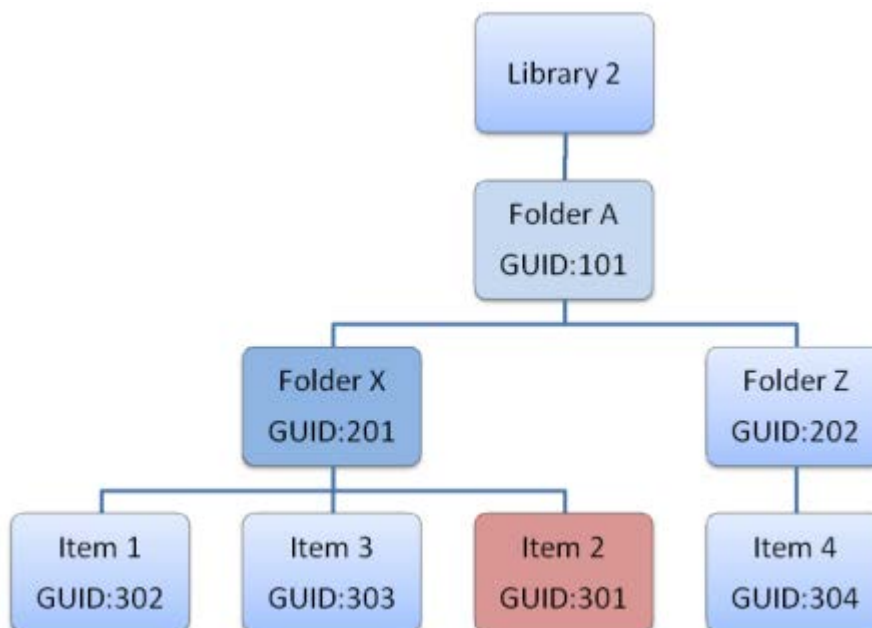


**Keep existing item**

## GUID Conflict Resolution
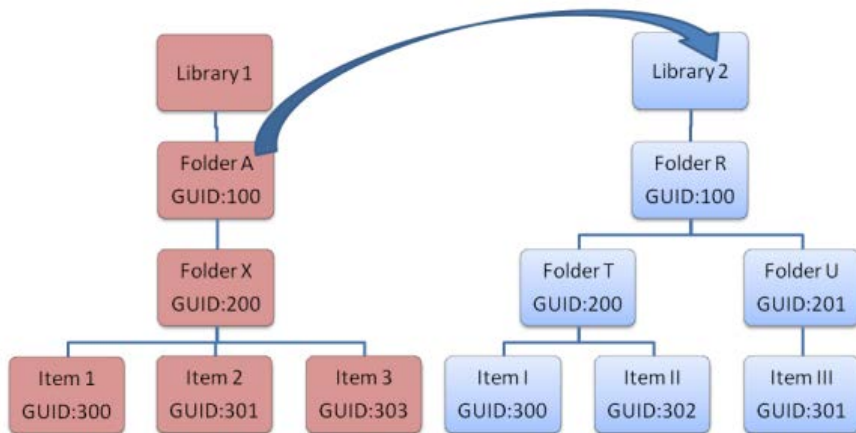
**Import Folder A from Library 1 to Library 2**



**Automatically assign new name or GUID to imported item**
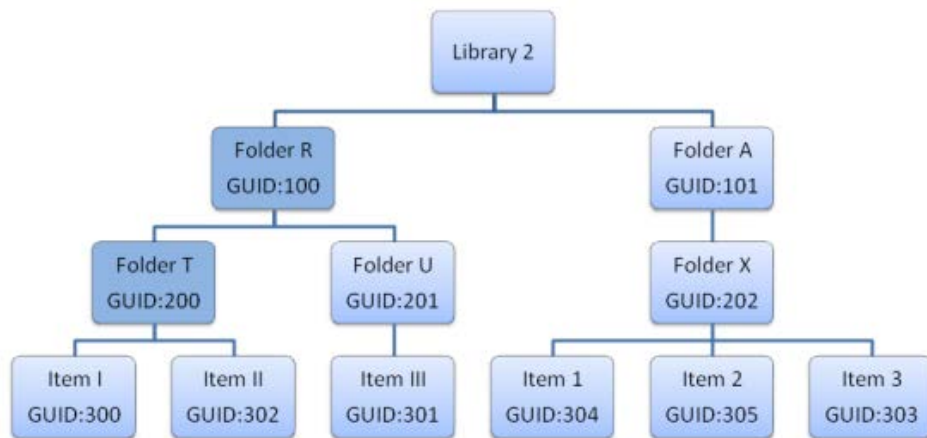


**Replace existing item**
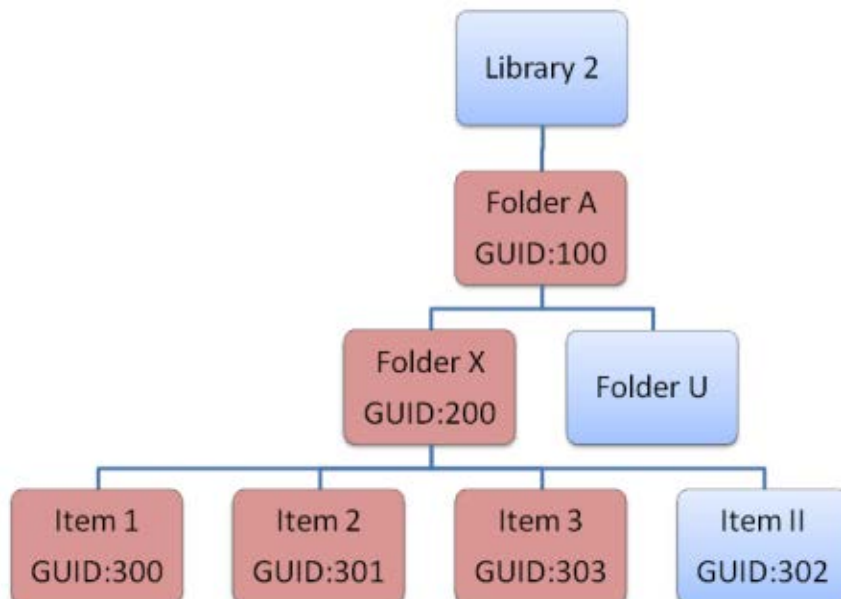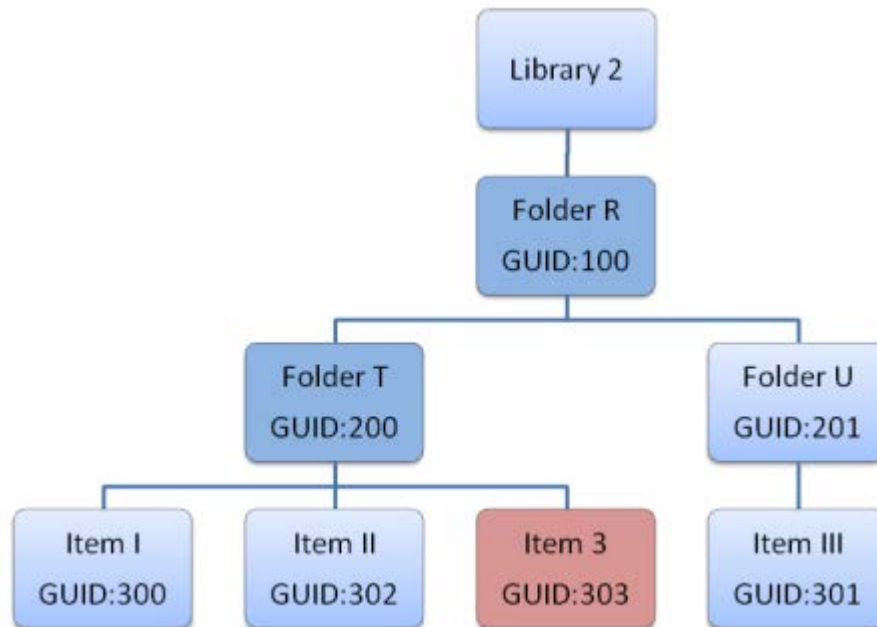
**Keep existing item**



## Name and GUID Conflict Resolution
**Import Folder A from Library 1 to Library 2**
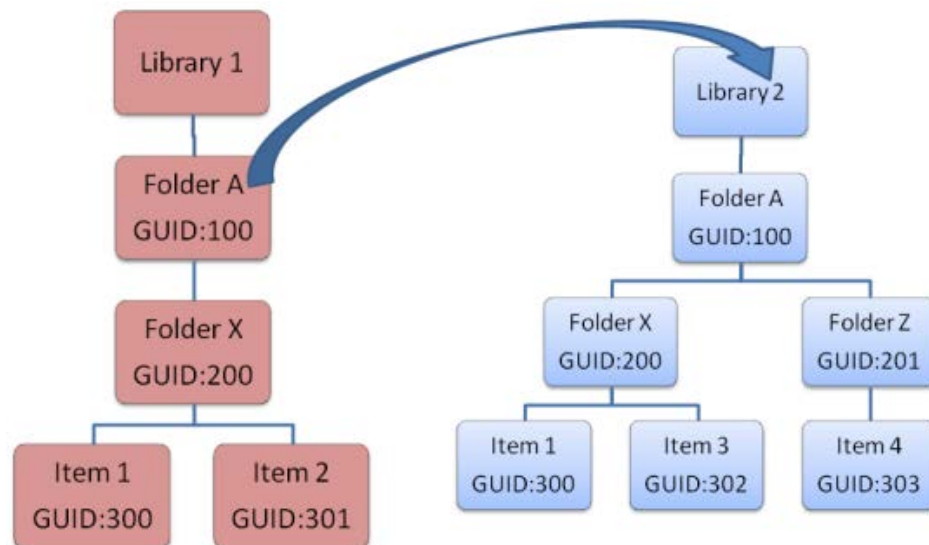
**Automatically assign new name or GUID to imported item**
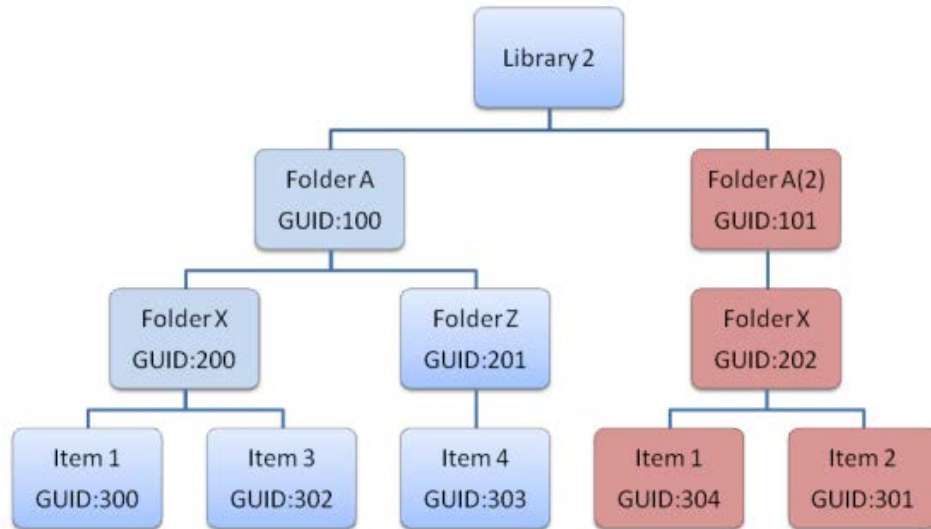


**Replace existing item**
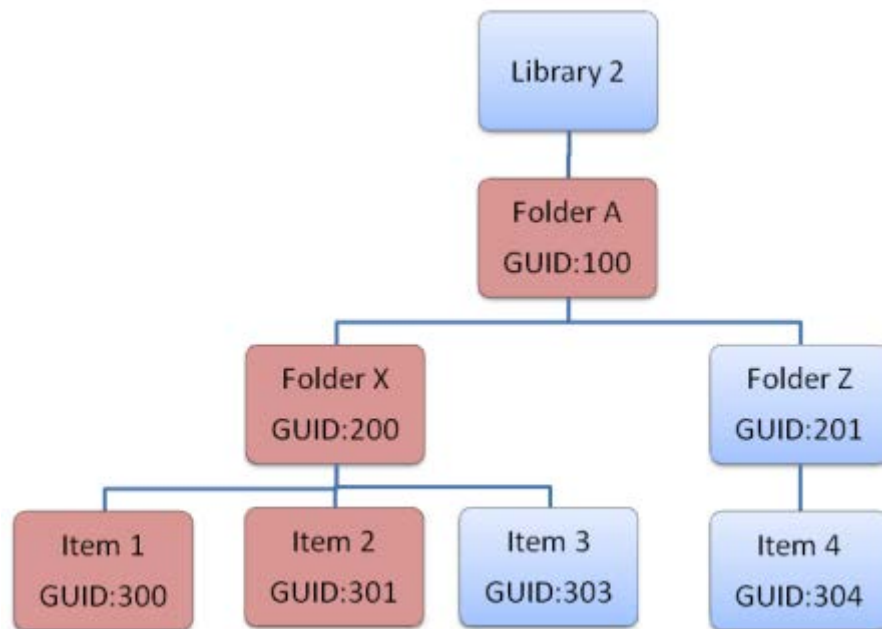
**Keep existing item**
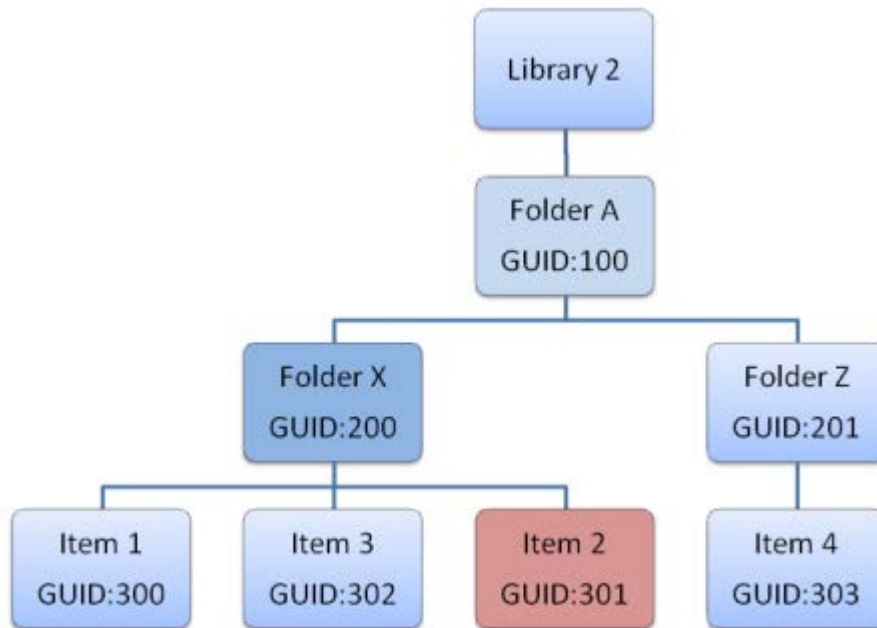
# 14 Creating a Guided Analysis

## 14.1 What is a Guided Analysis?

There may be times when you want to create and share an analysis file with other people and have them perform their own analysis on it. You might want to set up the analysis file to load particular data and show certain visualizations, but also provide instructions for other people on how to use the document. There might be a specific order a person should go through the pages, and detailed instructions on what to look for and which filters are relevant to manipulate on each page. To aid in this, there are a number of things you can do in TIBCO Spotfire to set up a guided flow through your document.

When the recipients of your analysis file open it, they will be guided through the analysis as per your instructions, but be able to do their own filtering and look closer at any noteworthy aspects they find interesting. This allows you to set up a generic analysis covering a subject such as sales over the entire United States, but instruct the recipients to filter down to the state they work in.

Some methods you can use to make your analysis guided are:

- Create a cover page.
- Write instructions in text areas.
- Place links or buttons leading to relevant tools, pages or views in the text areas.
- Switch to step-by-step mode or define your own page navigation through actions using history arrows navigation mode.
- Use customized filtering schemes.
- Keep in mind the intended end users' level of data access.

### Create a cover page

Show the cover page for your document and explain the purpose of the analysis on this page. Tell the recipients what kind of data are included in the analysis, and the possible results to look for. When you save the analysis file, before sharing it with your colleagues, make sure the cover page is active so that the analysis file will open showing that page first.

### Write instructions in text areas

You might want several pages in your document. The first page might display a map chart of the United States showing overall sales results. The second page might have a bar chart comparing the sales and expenditures across the different states. The third page might show sales figures for each individual salesperson.

It is recommended that each page include a text area in which you provide some explanatory text about what the page shows and its purpose. Give the reader some instructions on what filters are relevant to manipulate, and perhaps mention that they can mark interesting items in the visualization and see more information about those items in the Details-on-Demand window. For example, on the second page with the bar chart comparing states' sales and expenditures – you could ask the recipients to select the radio button that filters down to the state they work in.

**Tip:** To more easily indicate which filter you want users to manipulate, right-click on the filter, select Copy, then open the text area, and Paste the image of the filter there along with your instructions.

The use of property controls in the text area may be a great help when creating analyses for other people. Just remember to add instructions regarding any constrictions for the control and inform about the purpose of the control using regular text.

## Place links or buttons to relevant tools or views in the text areas

In some cases, it might be relevant for the recipients to use a tool or an option from the menu bar. Instead of writing an instruction for them to click on File > Export > PowerPoint..., you can create a link or a button in the text area that performs this action when clicked. The instruction you write in the text area can be simpler, like "When you are satisfied with the results, click this link to place a snapshot in PowerPoint." Links and buttons are a very powerful way to allow even casual users of TIBCO Spotfire to perform analysis of data in a fast and easy manner.

Links or buttons can also include bookmarks that show a specific view of the data, thus explaining the steps that have led you to a particular conclusion. Using custom properties to define the visualizations, and property controls that allow the end users to easily change the property values can further simplify the analysis procedure for many people.

## Use step-by-step or history arrows page navigation

When you want to emphasize that the recipients of your analysis file should step through the pages in a certain order, you should change the page navigation from titled tabs to step-by-step navigation. This means that the pages will instead be shown as numeric links, together with a Previous and Next link, above the visualization area. The recipient of the analysis file will then start on the cover page, if you have selected to show it, or on the first real page. By clicking Next, the user will step through each page in order, performing the analysis described in the text areas along the way.

This can be very powerful since, by default, the filtering done on one page affects all other pages as well. You can therefore create a procedural flow wherein the first page allows the recipient to filter out unwanted data by looking at one visualization. Then he can proceed to the next page, where he continues to drill down into the data, filtering out more unwanted rows which he might see using another visualization, and so on.

You can also select Page Navigation > History Arrows and define your own navigation flow using actions in text areas or in graphical tables. This way, clicking on an item directly on the pages will be the only way to move forward within the analysis. However, the page history arrows located above the visualizations will always make it possible to return to a previously visited page.

## Use customized filtering schemes

By default, the filter settings are the same for every page in the document, and they will stay the same until you start changing the filtering schemes. The filtering schemes give you complete control and complete freedom to decide which pages of your guided analysis should affect one another and which should not. You can keep the same filtering scheme for all pages, create a different one for each page, or assign the same filtering scheme to two or more pages.

Applying different filtering schemes can be useful if your guided analysis consists of several separate analyses originating from the same data table. When two pages use the same filtering scheme, the filtering performed on one page is propagated to the second page and vice versa. If they use different filtering schemes the filtering on each page only affects that very page.

For example, you can create one page where State is the only activated filter, permitting the recipients to click through and compare sales for the states without being bothered with any other filters. (If you want to, you can also use organize filters to hide all unused filters.) On the next page, you can apply a different filtering scheme relevant to another analysis of the sales data and so on.

## Keep in mind the intended end users' level of data access

Always make sure the end users of your guided analysis have access to the same data sources as you do. Permissions to analyses and information links are handled using the Library Administration tool. See also Preparing Analyses for the TIBCO Spotfire Web Player. You may also consider adding prompt steps that could limit the available data for each end user. If prompts should be shown each time the analysis is loaded, then this should be specified in the Data Table Properties dialog before saving the analysis to the library.

# 15    Multiple Data Tables

## 15.1    How to Insert Multiple Data Tables into the Analysis

Data can be added to the analysis in several different ways: as new columns, as new rows or as new data tables. Adding data as separate data tables is useful if the new data are unrelated to the previously opened data table or if the new data are in a different format (pivoted vs. unpivoted).

If you have a visualization made from a particular data table which has filtering and marking that you would like to apply to visualizations made from another data table, then you must define a relation between the two tables. For a relation to be useful, you need to have one or more key columns (identifier columns) available in both data tables, and use these to define which rows in the first data table will correspond to rows in the second data table. If you need more than one key column to set up a unique identifier, you must add one relation for each identifier column.

**Note:** The map chart is the only visualization where you can use different data tables in the same visualization. If you need to bring data from different data sources together in any other single visualization, use the Insert Columns from External Data or Insert Rows from External Data tool instead.

### ►  To add new data tables to the analysis:

1.  Select **File > Add Data Tables...**.

    Response: The Add Data Tables dialog is displayed.

2.  Click **Add** and select the type of data to add from the drop-down list.

    Comment: You can add data tables from files, information links, databases, the clipboard, data functions or from current data tables within your analysis. You may also have access to other sources if they have been set up by your administrators.

    Response: Depending on your selection you will be presented with a dialog where you can specify which file, information link, etc., to add. If you need more information on specific data sources, see Opening a Text File, Opening an Excel File, Opening a SAS File, Opening an Information Link or Opening Data from a Database.

3.  Select the source data and specify any required settings.

4.  If desired, type a new **Data table name**.

5.  Apply transformations (optional).

6.  If you want to add more data tables, repeat steps 2-5 for each data table.

7.  Determine whether or not the new data tables will be related to each other or to previously added data tables. If a relation is necessary, click **Manage Relations...** and specify the relation.

    Comment: See To define a new relation below for more information. Remember that you need to define a relation if the new data table is to be used to create details visualizations for the previously added data tables.

8.  Click **OK**.

    Response: The new data tables are incorporated into the analysis and are ready to be used.

**Note:** If you want to add a new data table that is loaded on demand you should instead use the **File > Add On-Demand Data Table** option. See Loading Data on Demand for more information.

### ► To define a new relation:

1. In the Add Data Tables dialog, click **Manage Relations...**.

   Response: The Manage Relations dialog is displayed.

2. Click on **New...**.

   Response: The New Relation dialog is displayed.

3. Select the two data tables you want to connect from the **Left data table** and **Right data table** drop-down lists.

4. Select the columns containing the identifiers from the **Left column** and **Right column** drop-down lists.

5. If desired, you can apply a **Left method** or **Right method** to modify the values of one or both columns.

   Comment: For example, if the identifiers are written in uppercase letters in one of the data tables and in lowercase letters in the other, you can use the Lower method on the uppercase column and change the letters to lowercase.

   Response: The result of the method application is shown in the Sample field.

6. Click **OK**.

**Tip:** You can always go back and edit relations as well as create new ones using the Data Table Properties dialog.

# 15.2 How to Handle Multiple Data Tables in One Analysis

When you set up an analysis in TIBCO Spotfire, you may want to be able to visualize data from more than one data table. Adding other data tables is fairly easy; just select **File > Add Data Tables...** and use the Add button to select the data source of interest. See How to Insert Multiple Data Tables to the Analysis for more information. However, if you choose to bring in a lot of data tables, you may find it difficult to keep track of which data tables are related and which are not. Therefore, TIBCO Spotfire will add some extra visual hints when more than one data table is available.

You can always get a collected view of all data tables in the analysis by selecting **Edit > Data Table Properties**.

### ► To see which data table is used by a certain visualization:

Data from different data tables cannot be used in the same visualization; not even if they are related (with some exception for map charts). Each visualization can be specified to show data from any data table.

1. Look for the data table selector in the legend of the visualization.
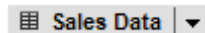
   

   Comment: When a new data table is added, the default visualization created will normally show the legend with the data table selector visible. However, any old visualizations created before the second data table was added will not display their data table selectors automatically.

2. If you cannot see the data table selector in the legend, right-click in a white area of the legend and select **Data table**.

3. Alternatively, in the Visualization Properties dialog you can go to the **Data** page and directly see which data table is being used, or, you can go to the **Legend** page and display the legend and the data table selector by selecting the appropriate check boxes.

   Comment: You can switch to a different data table from the menu on the data table selector.

## ► To view information about the active data table:

The status bar at the bottom of the TIBCO Spotfire application window displays information about the data table used by the active visualization (the visualization that was last clicked upon).

| 133 of 216 rows | 10 marked | 11 columns | Sales Data |
| --- | --- | --- | --- |

The information displayed is:

- the current number of filtered rows,
- the total number of rows in the data table (but if the data table is loaded on demand, then the number of currently loaded rows is shown),
- the number of marked rows,
- the number of available columns,
- the name of the active data table.

## ► To see which visualizations are related:

1. Look at the color stripe on the left-hand side of the title bar for the visualizations. Visualizations using the same data table or related data tables will display the same color on the color stripe.

   Comment: The true color of the color stripe is only visible for the active visualization and any related visualizations. All unrelated visualizations are shown with a gray color stripe until activated.

2. Click to activate a visualization using an unrelated data table.

   Response: The visualizations working on the new data table get their relations color shown and the previously colored visualizations become gray.

## ► To differentiate two data tables in the filters panel:

The filters from one data table are always grouped within a single data table group, which can be expanded or collapsed in the filters panel. Filters cannot be moved from one data table group to another.

1. Look at the color stripe on the left-hand side of the filters.

   Comment: Filters belonging to the same data table are marked with the same color stripe. The color used is identical to the color of visualizations that use the same data table. Only the filters belonging to the data table used by the active visualization or any related data table show their true color. Other filters have a gray color stripe. This is regardless of how filtering in related data tables has been specified (whether the filtering in related data tables affects the filtering in another data table or not).

2. Click to activate a visualization using an unrelated data table.

   Response: The filters working on the new data table get their relations color shown and the previously colored filters become gray.

## ► To see which data tables are related:

When more than one data table is available, a color stripe is added to the data table group and its subgroups and filters in the filters panel. If two data tables are related, they will have the same color in the filters panel. The currently active data table is written in bold typeface.
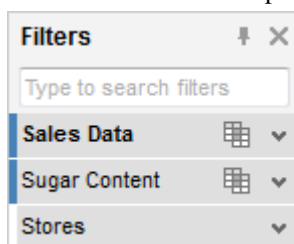
In the image above, the two data tables "Sales Data" and "Sugar Content" are related to each other (and the active visualization uses Sales Data), whereas the "Stores" data table is unrelated to the others. You can also check the relations between data tables in the Data Table Properties dialog:

1. Select **Edit > Data Table Properties**.
2. Go to the **Relations** tab.
3. Click on each data table and look at the **Relations color** at the lower part of the dialog. All related data tables will have the same relations color. All related data tables are also listed under Related data tables.

   Comment: The relations color is used in the title bars of the visualizations as well as in the filters panel and in the Details-on-Demand. You can change the Relations color for all related data tables by selecting a different color from the drop-down list.

### ► To change the way filtering in a related data table affects a data table:

1. Go to the filters panel and locate the data table header for the data table of interest.

   Comment: Note that you need to specify how each table should respond to filtering in all other related tables separately, to be certain of what will be shown in the visualizations after filtering.

2. Click on the Manage relations icon, 🏢.

   Response: A drop-down menu is shown, where all related data tables are available.

3. Select the data table for which you want to change how the filtering should affect the current data table, and select one of the following options: **Include Filtered Rows Only**, **Exclude Filtered Out Rows** or **Ignore Filtering**.

   Comment: See Filtering in Related Data Tables for more information about the different options.

# 15.3 Data Tables Overview

With TIBCO Spotfire is possible to load more than one data table within a single analysis. Below is a short description of the different concepts used when handling multiple data tables.

A data table is either data loaded from an external source, or data created within the application. It has one or more columns and zero or more rows.

Data tables loaded from an external source can be linked or embedded. Linked data tables can be loaded completely into the application, but if the source is an information link they can also be configured to load data on demand only.

Data tables can be related to each other, using primary and/or foreign keys (key columns), but they can also be unrelated. When data tables are related, any marking or filtering in one data table may be propagated to the other related data tables, but data from multiple data tables cannot be used in a single visualization.

**Tip:** If you want to use data from different sources in a single visualization, you should use the Insert Columns from External Data or Insert Rows from External Data tools to add the data to the existing data table, rather than defining another data table with a relation to the first data table.

**On-Demand Data Table**

On-demand data tables are data tables to which only rows related to marked rows in other, related, data table are loaded. Changing the marking means changing the "demand", i.e., that more, fewer or other rows are loaded into the data table. On-demand data tables can be used by Details Visualizations, and only data from information links can be loaded on demand.

As a means of helping you keep track of which data tables are related, a stripe of color will be added to the left of the filters in the filters panel when more than one data table is available. Filters from related data tables (which may affect each other when they are manipulated) all

have the same color. Also, the visualizations that use related data tables will show the same color in the title bar, if it is displayed.

**Note:** You can specify whether or not filtering in a data table should affect what is shown in visualizations used by other, related data tables. The default setting is to ignore filtering in related data tables. See Filtering in Related Data Tables for more information.

### ► To add a new data table:

1. See How to Insert Multiple Data Tables to the Analysis.

### ► To delete a data table:

1. Select **Edit > Data Table Properties**.
2. Click on the data table you wish to remove from the analysis.
3. Click on **Delete**.

### ► To rename a data table:

1. Select **Edit > Data Table Properties**.
2. Click on the data table you wish to rename.
3. Click on **Rename...**.
4. Type a new data table name and click **OK**.

### ► To reload a data table:

1. Select **Edit > Data Table Properties**.
2. Click on the data table you wish to reload.
3. Click **Refresh Data**.

   Comment: The Refresh Data button may be unavailable for some of your data tables. For example, this happens if you have added rows or columns to an embedded data table, or if you have frozen some columns in an embedded data table. In that case the data table cannot be reloaded.

### ► To reload all data tables:

**Note:** Reloading all data tables may take a long time if one or more data tables are very big.

1. Click on the Reload Data button on the toolbar, .

### ► To set up an on-demand data table:

1. Select **File > Add On-Demand Data Table...**.
2. Specify an information link to use and click **OK**.
3. Define what type of input will control the on-demand loading.

   Comment: For more details see Loading Data on Demand and Details on Define Input.
4. Click **OK**.

### ► To update a visualization using an on-demand data table manually:

1. When the marking controlling the on-demand data table is changed, a red refresh button is shown on the title bar of the visualization.

   Comment: If the title bar has been hidden, right-click on the visualization and select Properties. On the General page, select the Show title bar check box.
2. Click on the refresh button, .

### ► To replace a data table:

1. See Replacing Data.

### ► **To recalculate a data table:**

1. When the filtering behind a calculated data table is changed, a red refresh button is shown on the title bar of the visualization.

   Comment: If the title bar has been hidden, right-click on the visualization and select Properties. On the General page, select the Show title bar check box.

2. Click on the refresh button, ![icon].

### ► **To save data tables:**

All data tables currently in the analysis will be saved in the document when saving an analysis file. See Saving an Analysis File or Saving an Analysis File in the Library for more information.

### ► **To export data from a data table:**

1. See Exporting Data.

### ► **To prompt for settings each time an analysis file is loaded:**

1. Select **Edit > Data Table Properties**.
2. Click **Linked to source.**
3. Select **Prompt for new settings before loading**.
4. Click **OK**.

   Comment: You can also change this setting when you save your analysis. Click the Edit button in the Save dialog or in the third step of the Save as Library Item wizard. This will open the Data Table Properties dialog.

### ► **To filter a data table:**

1. In the **Filters** panel, locate the data table header for the data table of interest.
2. Use the filters to modify what is shown in the visualizations using the specified data table (and, optionally, in other related data tables).

### ► **To use a data table in a visualization:**

1. Click on the data table selector in the legend of the visualization and select the data table of interest.

   Comment: See How to Handle Multiple Data Tables in One Analysis for more information.

# 15.4    Examples

## 15.4.1    Master-Detail Visualizations

This is an example of multi-step Master-Detail visualizations. The visualizations in this example are based on the same data table and show different levels of detail. However, the visualizations could just as well be based on data from different data tables. Marking in one visualization defines the data of the next visualization, making it possible to drill down in level of detail.

**Note:** Related visualizations (as the Master-Detail case) can be placed on different pages in a visualization. This means that markings in a visualization that is not visible for the moment can affect the analysis that you are looking at. If a visualization is empty, it may be because it is based on markings from another visualization. Go to the master visualization and mark an item to display information in the details visualization.

**Note:** The Details-on-Demand displays information about the marked rows from the active visualization; it could be either the master or the details visualization.

In this example the master visualization shows Sales per Year. If you mark a year, for example, 2003, in the master visualization, data will be displayed in the details visualization. This details visualization shows Sales per Category (fruit and vegetables) for 2003.
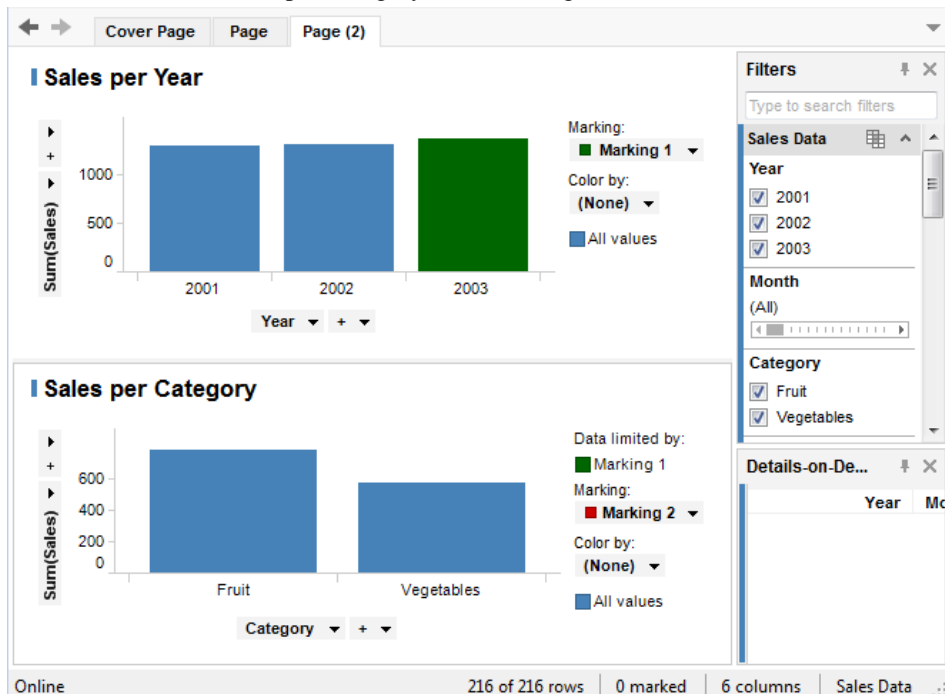


Marking an item in the next visualization, Sales per Category, can also be setup to display an even more detailed visualization. Below, another visualization has been created, where marking the category "vegetables" in Sales per Category displays a more limited visualization; in this case the percentage of sales per type (cucumber, lettuce and tomato) in that category for 2003.
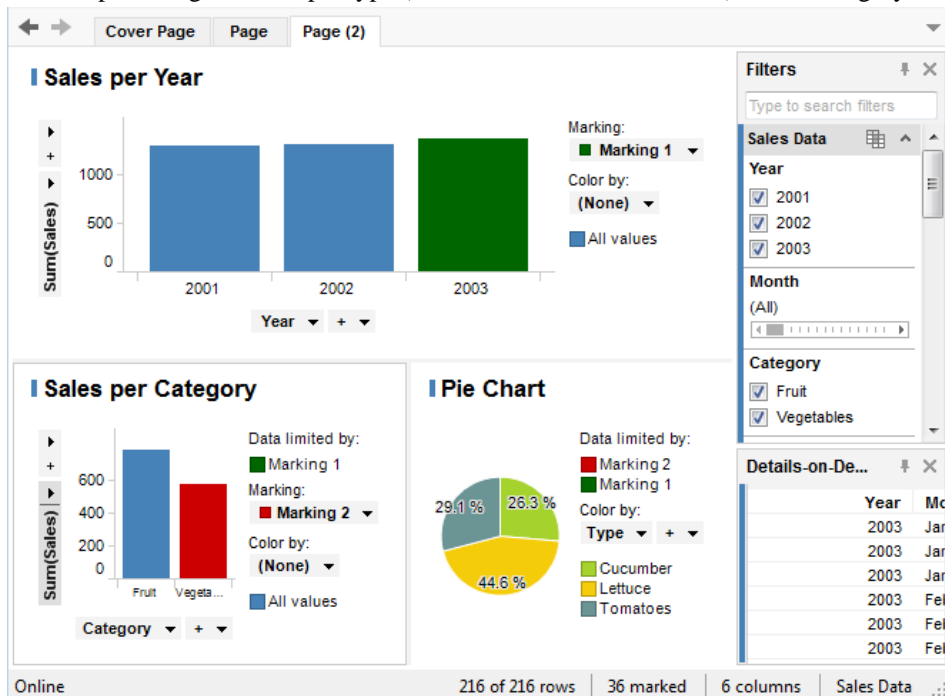


This image shows three different visualizations displaying different aspects of the same data table.

## 15.4.2    Independent Data Tables

This is an example of independent data tables. These two visualizations are placed on the same page, but they are not related to each other. The visualizations correspond to separate data tables. Marking or filtering in one visualization will not affect the other when they are independent. The Details-on-Demand displays information about the marked item in the active visualization. Color stripes are used to indicate what visualization, filter and Details-on-Demand that are related.

In this example, the bar chart shows the sum of sales for different types of fruits and vegetables. The scatter plot shows the content of fructose and glucose for different types of fruits and vegetables.
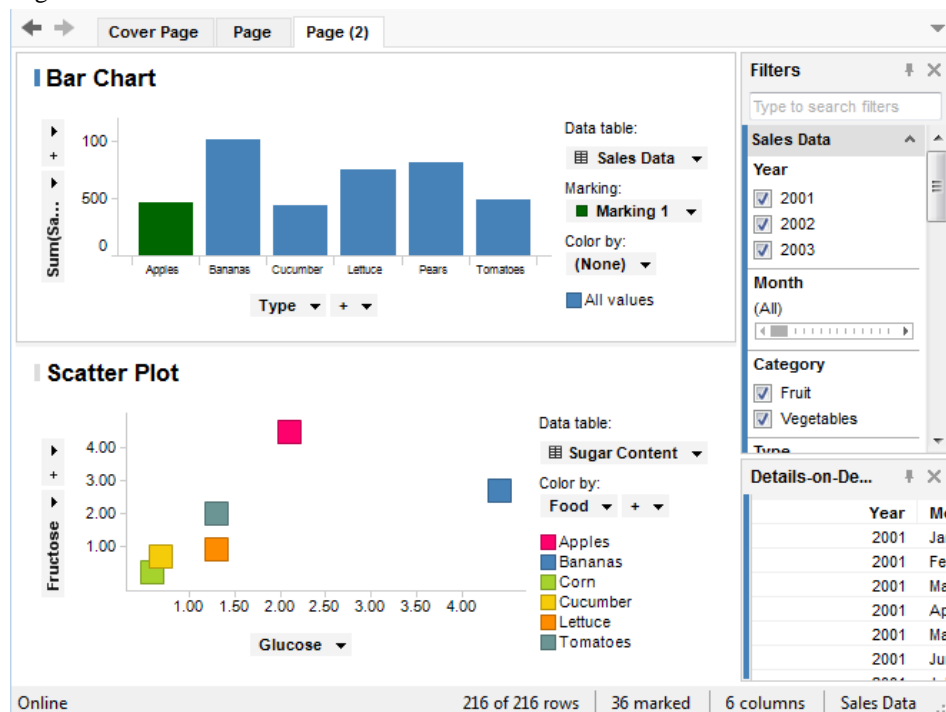


## 15.4.3    Multiple Related Data Tables

This is an example of multiple related data tables. The visualizations are based on different data tables that are related. Marking items in one visualization will mark the corresponding items in the related visualizations. Filtering data in one data table may filter the related data in the other data tables. The relation between the data tables is set up in TIBCO Spotfire. Visualizations that are related share the same color in the color stripe to the left in the visualization. Filters belonging to related data tables also share the same color stripe.

**Note:** Related visualizations can be placed on different pages in an analysis. This means that markings that are not visible for the moment can affect the analysis that you are looking at.

In this case, two data tables with information about fruit and vegetables are related. The scatter plot shows the amount of glucose and fructose for different types of fruits and vegetables, while the bar chart shows the sum of sales for the same types of fruits and vegetables. Marking an item in the scatter plot, in this case the one with the highest level of fructose (Apples), will mark the Sum(Sales) for Apples in the Bar Chart.
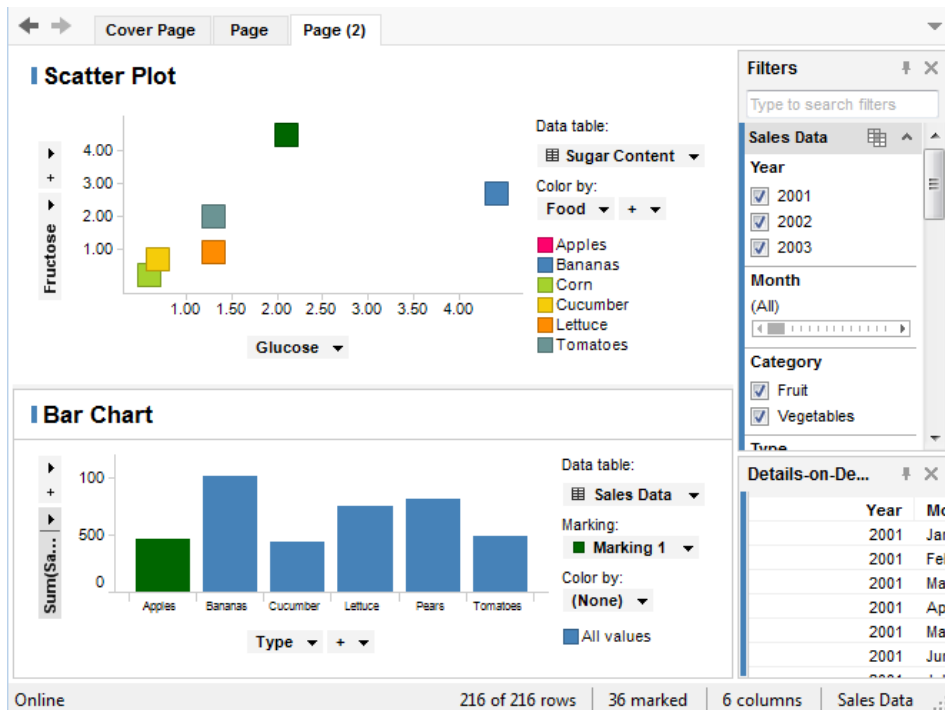
## 15.4.4 Insert Columns from External Data - Example

By inserting columns or rows from external data, it is possible to combine data from different sources into a single data table that can be used in a visualization.

In this example, a data table with information about the cost and sales for different kinds of fruits and vegetables (Table 1) has been joined together with an external data table with information about the content of Glucose, Fructose, Maltose and Saccharose (Table 2) per fruit and vegetables. In this case, two columns from the external data have been added, Glucose and Fructose (Table 3).

**Table 1**

| Food | Sales | Cost |
|------|-------|------|
| Apples | 12 | 10 |
| Pears | 21 | 13 |
| Bananas | 29 | 26 |
| Cucumber | 9 | 6 |
| Tomatoes | 13 | 11 |
| Lettuce | 22 | 20 |

**Table 2**

| Food | Glucose | Fructose | Maltose | Saccharose |
|------|---------|----------|---------|------------|
| Apples | 2.10 | 4.50 | 0.00 | 1.30 |
| Bananas | 4.40 | 2.70 | 0.00 | 6.40 |
| Corn | 0.60 | 0.20 | 0.30 | 2.30 |
| Cucumber | 0.70 | 0.70 | 0.00 | 0.00 |
| Lettuce | 1.30 | 0.90 | 0.00 | 0.00 |
| Tomatoes | 1.30 | 2.00 | 0.00 | 0.00 |

**Table 3**

| Food | Sales | Cost | Glucose | Fructose |
|------|-------|------|---------|----------|
| Apples | 12 | 10 | 2.10 | 4.50 |
| Pears | 21 | 13 | | |
| Bananas | 29 | 26 | 4.40 | 2.70 |
| Cucumber | 9 | 6 | 0.70 | 0.70 |
| Tomatoes | 13 | 11 | 1.30 | 2.00 |
| Lettuce | 22 | 20 | 1.30 | 0.90 |

# 16 Saving and Exporting

## 16.1 Saving

### 16.1.1 Save Overview

When an analysis has been set up (or when you are in the process of creating an analysis), you need to determine how to save your document. If the analysis is intended to be used by a larger audience you probably want to save it as a **library item**. Once in the library your colleagues can easily access the analysis. When more than one person is going to use the analysis, you always need to make sure that any linked data sources are available to all end users. See Preparing Analyses for TIBCO Spotfire Web Player for some useful tips.

If the analysis is to be used by a smaller number of people you could instead save it as a regular **file**.

If you are working with an analysis in the library and you make some changes that you do not want to save in the original file, you can use one of the **Save Copy As** alternatives instead.

### 16.1.2 Saving an Analysis File

You can save your analysis as a DXP file. All visualizations, filter settings and other work you have done will be saved in the file so you can continue working with the analysis just as you left off.

Depending on from where you opened the data in the analysis, you may encounter some different options when saving an analysis file. These options are described in the procedure below.

► **To save an analysis file:**

1. Select **File > Save As... > File...**.

   Response: Provided that there is some linked data in the analysis the Save dialog is displayed, showing the current settings for the data tables in the analysis file. Otherwise, go to step 6.

2. If you want to keep the settings, go to step 5. If you want to change the settings, click on the **Edit...** button.

   Response: The Data Table Properties dialog is displayed. Here you can choose whether to embed the data in the analysis or keep it linked to the original sources.

   Comment: "Embedded in analysis" incorporates the data in the analysis file itself. "Linked to original data source" keeps one or more data tables in the analysis file linked to the data sources. This reduces the file size and allows you to keep visualizations and settings even though raw data is updated or changed.

   Comment: If you want all data to be embedded in the analysis, you can also select the check box **Override these settings and embed all data**, and then go to step 5.

3. If you select linked data, click on the **Edit...** button if you want to select key columns, and then click **OK** when done.

   Comment: You should select key columns if you want to be able to see the markings that were active when saving the file, or if you want any specified tags or bookmarks to be able to be reapplied when reopening the analysis file. Make sure to select columns that uniquely identify all rows in the data table.

4. Click **OK** when you are done configuring the data table properties.

5. Click **OK** in the Save dialog.

6. Specify a file name and a location for the analysis file and click **Save**.

**Tip:** You can define your preferred settings for each data table in the analysis from the Data Table Properties dialog at any time while working on your analysis. This way you will not have to define those settings when saving the analysis, which makes the save procedure quicker.

### ► To save a copy of an analysis file:

If you want to save a backup copy of the analysis you are working on, without modifying the original file, you can use the Save Copy As option instead.

1. Select **File > Save Copy As... > File...**.

   Response: Provided that there is some linked data in the analysis the Save dialog is displayed, showing the current settings for the data tables in the analysis file. Otherwise, go to step 6.

2. If you want to keep the settings, go to step 5. If you want to change the settings, click on the **Edit...** button.

   Response: The Data Table Properties dialog is displayed. Here you can choose whether to embed the data in the analysis or keep it linked to the original sources.

   Comment: "Embedded in analysis" incorporates the data in the analysis file itself. "Linked to original data source" keeps one or more data tables in the analysis file linked to the data sources. This reduces the file size and allows you to keep visualizations and settings even though raw data is updated or changed.

   Comment: If you want all data to be embedded in the analysis, you can also select the check box **Override these settings and embed all data**, and then go to step 5.

3. If you select linked data, click on the **Edit...** button if you want to select key columns, and then click **OK** when done.

   Comment: You should select key columns if you want to be able to see the markings that were active when saving the file, or if you want any specified tags or bookmarks to be able to be reapplied when reopening the analysis file. Make sure to select columns that uniquely identify all rows in the data table.

4. Click **OK** when you are done configuring the data table properties.

5. Click **OK** in the Save dialog.

6. Specify a file name and a location for the analysis file and click **Save**.

   Response: The copy is saved to the specified location. Note that you will continue to have the original analysis open and any further changes will be made to that analysis and not to your copy.

## 16.1.3    Details on Save

| Option | Description |
|---|---|
| **Settings for data tables in analysis** | Lists the save settings for every data table in the analysis. |
| **Edit...** | Opens the Data Table Properties dialog where you can change the save settings. |
| | Note that it is particularly important that the save settings are correct when you are preparing analyses for other people. See Data Table Properties - General for more information. |
| **Override these settings and embed all data** | Select this option if you want to embed the data when saving instead of using the settings listed in the upper part of the dialog. |

## 16.1.4    Saving an Analysis File in the Library

Using the Library, you and your colleagues can collaborate on the same analysis, keeping everyone up to date. When publishing your document, your current analysis is stored as a DXP file in the Library. Files in the Library can also be opened by your colleagues who run TIBCO Spotfire Web Player. If this is the intended use of the file, see the chapter Preparing Analyses for TIBCO Spotfire Web Player to be aware of the limitations on the files available to Web Player users.

The Open from Library functionality is not available if you are working offline (without a connection to a server).

### ► To save an analysis file in the Library:

1. Select **File > Save As... > Library Item...**.
   Response: The Save as Library Item dialog is opened.
   Comment: The path in the upper part of the dialog shows your current location in the folder structure of the library.
2. Navigate to the folder where you want to save the analysis file.
   Comment: Double-click on a folder to open it, double-click on the uppermost folder with two dots next to it to move up in the folder structure, click on the New Folder button to create a new folder to save your analysis file in.
3. Specify a **Name** for the analysis file.
4. Click **Next >**.
5. Optionally, type a **Description** for the analysis file.
6. Optionally, type one or more **Keywords** specific to the content of the analysis.
   Comment: Keywords are separated by a semicolon, i.e., if you write "primary screening;quality" this will be two keywords, "primary screening" and "quality".
7. Click **Next >**.
   Response: The settings for the data tables in the analysis are shown.
8. If you want to keep the settings, go to step 14. If you want to change the settings, click on the **Edit...** button.
   Response: The Data Table Properties dialog opens.
   Comment: If you want all data to be embedded in the analysis, you can also select the check box **Override these settings and embed all data**, and then go to step 14. An Administrator may change the default setting of this check box, or force embedding of data when saving to library, using preference settings. This may be desired in order to make sure that all data are available to all users of the library. The preference settings are reached in the Administration Manager, Preferences tab under Application > LibraryPreferences.

9. On the General tab, you can choose for every data table in the analysis whether to embed the data in the analysis or keep it linked to the original sources.

   Comment: "Embedded in analysis" incorporates the data in the analysis file itself. "Linked to original data source" keeps one or more data tables in the analysis file linked to the data sources. This reduces the file size and allows you to keep visualizations and settings even though raw data is updated or changed.

10. If you select linked data, click on the **Edit...** button if you want to select key columns, and then click **OK** when done.

    Comment: You should select key columns if you want to be able to see the markings that were active when saving the file, or if you want any specified tags or bookmarks to be able to be reapplied when reopening the analysis file. Make sure to select columns that uniquely identify all rows in the data table.

    To set up the routines for sharing linked data, click on the Sharing Routines tab.

    For each data table, specify how data should be shared and/or refreshed by clicking the appropriate radio button.

    Comment: This step is only available when a TIBCO Spotfire Web Player server has access to the Library where you are publishing the analysis.

    Click **OK** when you are done configuring the data table properties.

11. Click **Finish**.

    Response: The document is published and the confirmation dialog for the wizard is displayed.

12. The confirmation dialog includes hyperlinks to the Library folder containing the analysis you just published, which you can click on to view the final result. You can also click **Copy Link** to copy a link to the clipboard, or **Send Email** to launch your email program with the links included in the mail.

13. Click **Close**.

**Tip:** Right-click in the library tree to display a pop-up menu where you can delete or edit the properties of previously added files and folders.

It is also possible to delete and edit files in the library via the Library Administration tool. You do not have to be  a member of the Library Administrator group to use the tool. To get access to the Library Administration tool the license called TIBCO Spotfire Administrator, as well as the license feature Library Administration below it, must be enabled.

## ► **To save a copy of an analysis in the library:**

If you want to save a backup copy of the analysis you are working on, without modifying the original file, you can use the Save Copy As option instead.

1. Select **File > Save Copy As... > Library Item...**.

   Response: The Save Copy as Library Item dialog is opened.

   Comment: The path in the upper part of the dialog shows your current location in the folder structure of the library.

2. Navigate to the folder where you want to save the copy of the analysis.
   Comment: Double-click on a folder to open it, double-click on the uppermost folder with two dots next to it to move up in the folder structure, click on the New Folder button to create a new folder to save your analysis file in.

3. Specify a **Name** for the analysis file.

4. Click **Next >**.

5. Optionally, type a **Description** for the analysis file.

6. Optionally, type one or more **Keywords** specific to the content of the analysis.

   Comment: Keywords are separated by a semicolon, i.e., if you write "primary screening;quality" this will be two keywords, "primary screening" and "quality".

7. Click **Next >**.

   Response: The settings for the data tables in the analysis are shown.

8. If you want to keep the settings, go to step 14. If you want to change the settings, click on the **Edit...** button.

   Response: The Data Table Properties dialog opens.

   Comment: If you want all data to be embedded in the analysis, you can also select the check box **Override these settings and embed all data**, and then go to step 14.

9. On the General tab, you can choose for every data table in the analysis whether to embed the data in the analysis or keep it linked to the original sources.

   Comment: "Embedded in analysis" incorporates the data in the analysis file itself. "Linked to original data source" keeps one or more data tables in the analysis file linked to the data sources. This reduces the file size and allows you to keep visualizations and settings even though raw data is updated or changed.

10. If you select linked data, click on the **Edit...** button if you want to select key columns, and then click **OK** when done.

    Comment: You should select key columns if you want to be able to see the markings that were active when saving the file, or if you want any specified tags or bookmarks to be able to be reapplied when reopening the analysis file. Make sure to select columns that uniquely identify all rows in the data table.

    To set up the routines for sharing linked data, click on the Sharing Routines tab.

    For each data table, specify how data should be shared and/or refreshed by clicking the appropriate radio button.

    Comment: This step is only available when a TIBCO Spotfire Web Player server has access to the Library where you are publishing the analysis.

    Click **OK** when you are done configuring the data table properties.

11. Click **Finish**.

    Response: The copy is published and the confirmation dialog for the wizard is displayed. Note that you will continue to have the original analysis open and any further changes will be made to that analysis and not to your copy.

12. The confirmation dialog includes hyperlinks to the Library folder containing the analysis you just published, which you can click on to view the final result. You can also click **Copy Link** to copy a link to the clipboard, or **Send Email** to launch your email program with the links included in the mail.

13. Click **Close**.

# 16.1.5　Preparing Analyses for TIBCO Spotfire Web Player

When an analysis file is saved to the library, it becomes available to use in Spotfire Web Player. Spotfire Web Player is a web browser-based version of Spotfire for viewing and exploring prepared analyses.

You can choose to copy the link to the web player analysis from the final step of the Save to Library wizard and paste the link, in an email or similar, to share the information with colleagues and give access to the analysis.

Any analysis can be published to the library and opened with Spotfire Web Player, but there are a few things to keep in mind that can make things easier for the Spotfire Web Player users. First, consider how familiar your target audience is with the visualized data. The familiarity of the target audience may affect the instructions required as well as the setup of the analysis. For example, you may need to change the visibility of some filters for a certain audience. Second, bear in mind that all users of the analysis may not have access to the same data sources.

### ► Tips when preparing analyses for TIBCO Spotfire Web Player:

1. Use the text areas to write instructions about the analysis and how it is set up. For instance, if master-detail visualizations are used, try to explain their relationship.
2. Use informative titles for the visualizations.

3. The overview of data will be improved if you hide filters that are not relevant for the visualizations in the analysis. For an explanation of how to hide filters, see Showing and Hiding Filters.

4. When using links or buttons in the text area, try to write instructions so that the information is helpful, even if the links should happen to become temporarily unavailable.

5. Consider whether all users of the analysis have access to all of the original data sources. If not, you may need to save some data tables embedded in the analysis, rather than linked to the original data sources. See Permissions for information about how permissions are handled in the library. There may also be user authentication limitations directly on the data source itself. Talk to your Spotfire Administrator or data manager to understand how the permissions for different user groups have been set up within your company.

6. It is not possible to view the 3D Scatter Plot in Spotfire Web Player. Also note that some custom visualizations may not be shown. The analysis can still be opened in Spotfire Web Player, but the visualizations that are not supported will not be shown.

7. Consider whether or not Web Player users should be allowed to export data from tables. Make the appropriate settings on the Appearance page of the Table Properties, Cross Table Properties, Summary Table Properties, and/or Details-on-Demand Properties.

8. Consider whether or not Web Player users should be able to open a personalized view of the analysis and/or be allowed to add bookmarks. Open the Document Properties dialog to change these settings.

## Design for the intended platform

If you know that your end users will view an analysis using a particular equipment or with a specific browser you can look up the current visualization area size on that device and then design your analysis so that it is optimized for that particular screen size. Note that the current visualization area size is dependant on what browser and which toolbars and items are shown in the browser, so make sure that you are using the same settings when creating the analysis.

Tips when designing for a smaller screen size:

a. Remove all things that do not fit the small screen size.
b. Use **Tools > Options > Fonts** to globally resize the important font categories to fit the intended display.
c. Resize and move around the contents of the analysis.
d. Remove legends, axis selectors, etc., if they are not needed.
e. Use the popover mode rather than panels for filters, bookmarks and lists.

If you want to set up an analysis that works both on a desktop computer with a large screen and also on a projector you can use bookmarks to switch between the different sizes and layouts. The sizes for the projector and the large screen desktop computer can be stored by an administrator in the preferences.

## ► To use bookmarks for adapting an analysis to different screen sizes:

1. Set up an analysis that works well on your large screen with the intended fixed size preset. Configure all text areas to **Include configuration in bookmark**.
2. When the document is finished, add a bookmark named something like "Large screen desktop computer".
a. Switch to the fixed size preset for the projector, and make updates to make the analysis work on a projector:
a. Change the size of text areas and fonts.

b. Change font sizes for titles, axis labels, etc., using Tools > Options, Fonts page and Apply to Document.

c. Update the layout, remove unnecessary legends, etc.

3.  When the projector version of the analysis is finished, add a bookmark named "Projector".

4.  Save the analysis.

The analysis is now adapted both to a projector and to a large screen desktop computer.

# 16.1.6     Links to Analyses in the Library

Once an analysis has been published to the library, you can reach it or share it using a number of different link types. A bookmark URL can be included to guide other people to an interesting aspect or starting point in an analysis. See the table below for an overview of the link types available.

| Link type | Description | Retrieve where? | Use when or where? |
|---|---|---|---|
| **Direct TIBCO Spotfire URL** | Opens the analysis in your default version of TIBCO Spotfire Professional.<br><br>Example:<br>tibcospotfire:server:http\://<br>myspotfireserver/:analysis:/<br>Data/My Analysis | By right-clicking on an analysis in the Library Administrator and Library Open/Save dialogs.<br><br>In the Document Properties dialog. | Anywhere where you know the end users of the link have access to TIBCO Spotfire Professional and you want to open the analysis in a new instance of TIBCO Spotfire. |
| -"-<br><br>(with a bookmark) | Can include a bookmark, if copied from the Bookmarks popover.<br><br>Example:<br>tibcospotfire:server:http\://<br>myspotfireserver/:analysis:/<br>Data/My Analysis:bookmark:<br>7c0669f2-9701-44d4-96b3-7<br>fefd9e129fa | From the Bookmarks popover (Web Player and Professional) | -"- |
| -"-<br><br>(pointing to server but not analysis) | Point a TIBCO Spotfire client to a certain TIBCO Spotfire server.<br><br>Example:<br>tibcospotfire:server:http\://<br>myspotfireserver/ | Manually edited. | You can also use this type of link to point the end users to a specific server without determining |

| | | | which analysis to open. |
|---|---|---|---|
| -"- (with pre-configured library search) | Opens TIBCO Spotfire Professional with a pre-configured library search. Example: tibcospotfire:search:modified \:<\'3 days ago\':OrderBy:Modified: SortDirection:Descending | Manually edited. | When you know the end users of the link have access to TIBCO Spotfire Professional and you want to give them easy access to a number of analyses or information links selected through a library search. (The example displays all analysis files and information links that have been modified within the last three days.) See Searching the Library for more information about available search expressions. |
| -"- (with a configuration block) | Opens the analysis with a configuration block. Example: tibcospotfire:server:http\:// myspotfireserver/:analysis:/Data/ My Analysis:configurationBlock:SetFilter (columnName=\'User\',values={\'jsmith\'}); | Manually edited. | See the Spotfire Technology Network for information about configuration blocks. |

| Server Redirect Page for Unknown Clients | Opens a web page where you can select whether to open the analysis in Web Player, in TIBCO Spotfire, or to download the analysis.<br><br>Example:<br>http://myspotfireserver/spotfire/redirect?analysis=/Data/My%20Analysis | By right-clicking on an analysis in the Library Administrator and Library Open/Save dialogs. | When you do not know whether the end users of the link want to open the analysis in Web Player, in TIBCO Spotfire, or to download the analysis. For example, when publishing a URL in a blog post or sending an email with the URL to people from many departments that have access to different Spotfire solutions. |
| --- | --- | --- | --- |
| Redirect Page for Unknown Clients | Opens a web page where you can select whether to open the analysis with a bookmark in Web Player or in TIBCO Spotfire.<br><br>Example:<br>http://myspotfireserver/spotfire/redirect?analysis=/Data/My%20Analysis&bookmark=7c0669f2-9701-44d4-96b3-7fefd9e129fa | From the Bookmarks popover (in TIBCO Spotfire Professional) | When the intended audience may have access to either the Web Player or TIBCO Spotfire and you want to include a bookmark in the link. For example, when publishing a URL in a blog post or sending an email with the URL to people from many departments that have access to different |

| | | | Spotfire solutions. |
|---|---|---|---|
| **Web Player URL** | Opens the analysis in TIBCO Spotfire Web Player.<br><br>Example:<br>http://mywebclient/SpotfireWeb/ViewAnalysis.aspx?file=/Data/My%20Analysis | By right-clicking on an analysis in the Library Administrator and Library Open/Save dialogs.<br><br>In the Document Properties dialog. | When you want the recipients of the link to open the analysis directly in the Web Player. |
| -"-<br>(with a bookmark) | Can include a bookmark, if copied from the Bookmarks popover.<br><br>Example:<br>http://mywebclient/SpotfireWeb/ViewAnalysis.aspx?file=/Data/My%20Analysis&bookmark=a444c142-b411-4130-aee5-db36e5bc1ac9 | From the Bookmarks popover (Web Player and Professional) | -"- |
| -"-<br>(with a configuration block) | Opens the analysis in the Web Player with a configuration block.<br><br>Example:<br>http://mywebclient/SpotfireWeb/ViewAnalysis.aspx?file=/Data/My%20Analysis&configurationBlock=SetFilter(columnName%3D%22User%22%2Cvalues%3D%7B%22jsmith%22%7D)%3B | Manually edited. | See the Spotfire Technology Network for information about configuration blocks. |

The TIBCO Spotfire protocol handler is registered on all Windows client machines running TIBCO Spotfire 3.3 or later, which means that links can be used in emails, web pages, etc., to directly open analyses. The default version of TIBCO Spotfire to use when opening tibcospotfire links can be set under Tools > Options, Application.

A tibcospotfire link to another analysis can be added to the text area. When an end user of the analysis clicks on the link, the link will be re-written so that the linked analysis will be opened in TIBCO Spotfire Professional for persons using that client and in TIBCO Spotfire Web Player for others, depending on context .
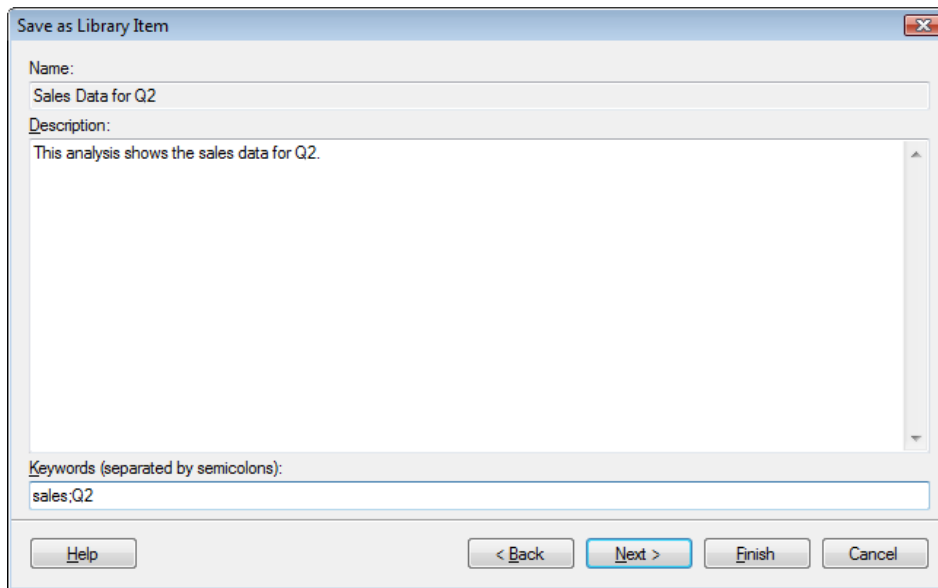
## 16.1.7      Details on Save to Library

### 16.1.7.1      Save as Library Item - Step 1



| Option | Description |
|---|---|
| Library path (Upper part of the dialog) | Shows the path from the library root folder down to the folder where you are currently located in the library. You can navigate upwards in the folder structure by clicking on the name of a folder that you want to navigate to. |
| Folder contents list (Middle part of the dialog) | Lists all the folders and files in the folder you are currently located in. |
| **Name** | The name of the analysis as it will be displayed in the library. It is important that the title is informative with regard to what the analysis actually does.<br>**Note:** The name can be 256 characters at most, and the following characters are not supported:<br>$\setminus / : * ? " < > |$ |
| **New Folder...** | Opens the New Folder dialog where you can specify a new folder. |
| **Folder Permissions...** | Opens a dialog where you can change the folder permissions. |

## 16.1.7.2    Save as Library Item - Step 2



| Option | Description |
|---|---|
| **Name** | The name of the analysis as it will be displayed in the Library. This is the name you provided in the previous step. |
| **Description** | An optional description of the functions of the analysis. The description could contain detailed information about the analysis enabling quick overviews. |
| **Keywords (separated by semicolons)** | Keywords specific to the content of the analysis. Keywords are separated by a semicolon, i.e., if you write "sales representatives; cost" this will be two keywords, "sales representatives" and "cost". Keywords are used to enhance organization and search capabilities. |

### 16.1.7.3 Save as Library Item - Step 3



| Option | Description |
|---|---|
| **Settings for data tables in analysis** | Lists the save settings for every data table in the analysis. |
| | **Note:** It is particularly important that the save settings are correct when you are preparing analyses for other people. If you save an item with the data table linked to an original source that is saved locally on your computer, it will not be possible for other users to open it from the library. To make the item available, select to embed the data. See also Preparing Analyses for TIBCO Spotfire Web Player. |
| **Edit...** | Opens the Data Table Properties dialog where you can change the save settings. |
| | Note that prompted information links do not display the prompt each time the analysis is loaded by default. If you want to display the prompt step, then the Prompt for new settings before loading check box in the Data Table Properties dialog should be selected. See Data Table Properties - General for more information. |
| **Override these settings and embed all data** | Select this option if you want to embed all data when saving, instead of using the settings listed in the upper part of the dialog. |
| | **Note:** An Administrator may change the default setting of this check box, or force embedding of data when saving to library, using preference settings. This may be desired in order to make sure that all data are available to all users of the library. The preference settings are reached in the Administration Manager, Preferences tab under Application > LibraryPreferences. |

## 16.1.7.4    Save as Library Item - Published



| Option | Description |
|---|---|
| **Location for the file in the Library** | Click on the link to open the Library folder containing your published analysis. |
| **Copy Link** | Copies the library location link to the clipboard for later use. Using the link, the analysis can easily be referenced in email discussions or from web pages or portals. |
| **The Analysis can be accessed with the TIBCO Spotfire Web Player from** | Click on the link to open the analysis in TIBCO Spotfire Web Player. |
| **Copy Link** | Copies the TIBCO Spotfire Web Player link to the clipboard for later use. Using the link, the analysis can easily be referenced in email discussions or from web pages or portals. Using the links retrieved with Copy Link, analyses can be accessed from any web environment using the URL and name supplied. |
| **Send Email** | If your default email client is Microsoft Outlook, clicking on this button will launch a new email containing the URLs to the analysis and other relevant information.<br>**Note:** It may also work with other email clients, but Microsoft Outlook is the only supported client. |
| **Close** | Closes the notification dialog. |

## 16.1.7.5 Details on Edit Properties - General

This dialog is used to edit the properties for an item in the library. It can be reached by right-clicking on the item of interest in any view representing the library structure and selecting **Edit Properties...** from the pop-up menu. In the Library Administration tool, it is reached when clicking on the **Edit...** link for the **Selected Item**.



To edit the properties of an item you must have Browse + Access + Modify permissions to the folder it is placed in.

| Option | Description |
| --- | --- |
| **Name** | The name of the library item. The following characters are not accepted in titles: \ / : * ? " < > \| $ & + = @ # % ; , { [ ] } ^ ' ~ ´ |
| **Description** | A description of the library item. |
| **Keywords** | Allows you to add keywords which can be used for finding the item in the library. Keywords are separated by a semicolon. |

## 16.1.7.6    Details on New Folder

This dialog is used to create a new folder in the library. It can be reached whenever you attempt to save something in the Library by clicking **New Folder**.
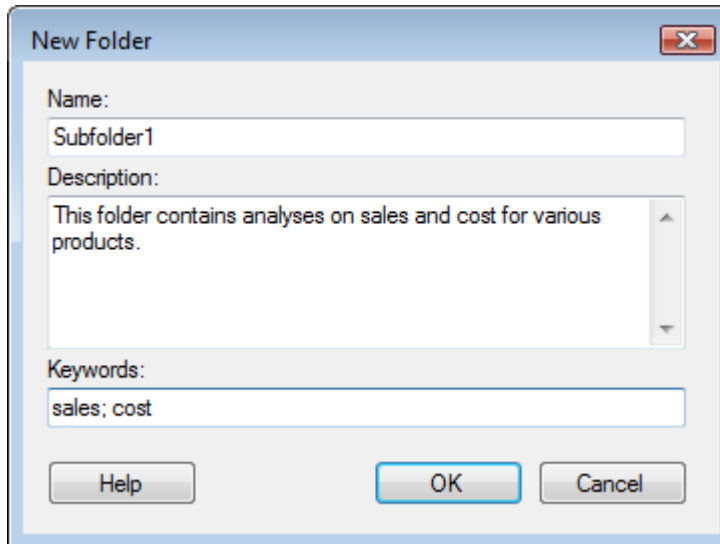


To create a new folder you must have Browse + Access + Modify permissions in the folder where you want the new folder to appear. The new folder will by default inherit the permissions from its parent folder.

When you create a new folder you can specify:

- Name
- Description
- Keywords

The following characters are not accepted in titles:

\ / : * ? " < > | $ & + = @ # % ; , { [ ] } ^ ' ~ ´

Keywords are separated by a semicolon.

# 16.2    Export Image

## 16.2.1    Exporting an Image

You can export any visualization as an image and save it to disk.

### ► To export a visualization as an image:

1. Make sure the visualization you want to export is active.
2. Select **File > Export > Image...**.
3. Response: The Export Image dialog appears.
4. Specify a file name and a location for the file.
5. Select the image format you want.
6. Click **Save**.

**Tip:** You can also select **Edit > Copy Special > Visualization Image...** to copy the active visualization.

# 16.3     Export Data

## 16.3.1     Exporting Data

You can export data from TIBCO Spotfire and save as a text file, a TIBCO Spotfire Binary Data Format file (see below) or a Microsoft Excel file. The text file can be either a regular tab separated text file, or a Spotfire Text Data Format file. The Excel file can be either an XLS file or an XLSX file.

**Note:** Data from a visualization can only be exported to an Excel file if the visualization is a table.

### ► To export data from a visualization:

1.  Select **File > Export > Data...**.
2.  Click the **Visualization** radio button.
3.  Select the visualization to base the new data file on from the drop-down list.

    Comment: You can export all or marked data from a table, cross table or a summary table, or the marked data from any other visualization. You can also select to export the data currently shown in the Details-on-Demand.
4.  If both options are available for the selected visualization, select whether to export:
    **Data for all items** - the rows remaining after the current filtering.
    **Data for marked items** - the currently marked rows. Note that all marked rows will be exported, even if they are filtered out.

    Comment: The Data for all items option is only available if you have selected a table, a cross table, a summary table, or the Details-on-Demand in the Visualization drop-down list. Data for marked items is only available if there are marked items in the analysis.
5.  Click **OK**.
6.  Specify a file name and a location for the file in the **Save As** dialog.
7.  Click **Save**.

    Comment: You can export the data to a text file, to an Excel file, to a TIBCO Spotfire Text Data Format file (*.stdf) or to a TIBCO Spotfire Binary Data Format file (*.sbdf). See below for more information.

### ► To export data from a data table:

1.  Select **File > Export > Data...**.
2.  Click the **Data table** radio button.
3.  In the drop-down list, select which data table to export data from.
4.  Select what data to export:
    **All rows** - the entire data table regardless of all filtering.
    **Filtered rows** - the rows remaining after the current filtering by the specified filtering scheme.
    **Marked rows** - the rows marked in the visualizations using the specified marking. Note that all marked rows will be exported, even if they are filtered out.
5.  Click **OK**.
6.  Specify a file name and a location for the data file in the **Save As** dialog.
7.  Click **Save**.

    Comment: You can export the data to a text file, to an Excel file, to a TIBCO Spotfire Text Data Format file (*.stdf) or to a TIBCO Spotfire Binary Data Format file (*.sbdf). See below for more information.

The TIBCO Spotfire Binary Data Format stores the data and metadata from your analysis in binary form. It can be used to greatly increase the performance when working with linked data in TIBCO Spotfire.

The TIBCO Spotfire Text Data Format also includes metadata. For example, the data types of the columns are saved, so you do not need to specify any import settings when opening files of this data format in TIBCO Spotfire. If you select the TIBCO Spotfire Text Data Format (*.txt) you will be able to open the file in older versions of TIBCO Spotfire (before 3.1) and in TIBCO Spotfire DecisionSite, but you will not get all functionality of the Spotfire Text Data Format.

# 16.3.2    Details on Export Data

### ► To reach the Export Data dialog:

1. Select **File > Export > Data...**.



| Option | Description |
| --- | --- |
| **Export data from** | Allows you to select whether to export data based on a visualization or on a data table. |
| **Visualization** | Select this option to export data based on one of the visualizations in the active page, including the Details-on-Demand (if visible). <br> **Note:** Data from a visualization can only be exported to an Excel file if the visualization is a table. <br> You can export the data to a text file, to an Excel file, to a TIBCO Spotfire Text Data Format file (*.stdf) or to a TIBCO Spotfire Binary Data Format file (*.sbdf). See below for more information. |
| **Data for all items** | Only available for tables, cross tables and summary tables. Exports all data in the selected visualization, the way it looks right now. This means that only the data remaining after the current filtering will be exported. |
| **Data for marked items** | Exports data for the marked items in the selected visualization. Note that all marked rows will be exported, even if they are filtered out. |

| Data table | Select this option to export data based on one of the data tables in the document. |
|---|---|
| | You can export the data to a text file, to an Excel file, to a TIBCO Spotfire Text Data Format file (*.stdf) or to a TIBCO Spotfire Binary Data Format file (*.sbdf). See below for more information. |
| All rows | Exports all rows available in the entire data table, regardless of filtering. |
| Filtered rows | Exports the rows remaining after the current filtering (using the filtering scheme on the active page) only. |
| Marked rows, defined by | Exports the rows marked in the visualizations (using the specified marking) only, regardless of filtering. |

The TIBCO Spotfire Binary Data Format stores the data and metadata from your analysis in binary form. It can be used to greatly increase the performance when working with linked data in TIBCO Spotfire.

The TIBCO Spotfire Text Data Format also includes metadata. For example, the data types of the columns are saved, so you do not need to specify any import settings when opening files of this data format in TIBCO Spotfire. If you select the TIBCO Spotfire Text Data Format (*.txt) you will be able to open the file in older versions of TIBCO Spotfire (before 3.1) and in TIBCO Spotfire DecisionSite, but you will not get all functionality of the Spotfire Text Data Format.

# 16.4    Export to PowerPoint

## 16.4.1    Exporting to Microsoft PowerPoint

In order to export to PowerPoint, you need to have Microsoft® PowerPoint® installed on your computer.

### ► To export to PowerPoint:

1.   Select **File > Export > To Microsoft® PowerPoint®...**.

     Response: The Export to Microsoft® PowerPoint® dialog is opened.

2.   Adjust to your preferred settings in the dialog.

3.   Click **Export**.

     Response: If you chose to export to a new presentation, PowerPoint is started and the selected visualizations are shown in a new presentation. If you chose to export to an open presentation, the selected visualizations are appended as new slides in an open presentation.

Comment: See Details on Export to Microsoft PowerPoint for more information about the various export options.

## 16.4.2    Details on Export to Microsoft PowerPoint

### ► To reach the Export to Microsoft® PowerPoint® dialog:

1.   Select **File > Export > To Microsoft® PowerPoint®...**.

| Option | Description |
|---|---|
| **Export what** | Defines which parts of the analysis to export. |
| **Active visualization** | Exports the active visualization in the analysis to a single slide in PowerPoint.<br>**Note:** Tables and trellised visualizations may be extended to more than one slide. |
| **Active page** | Exports all the visualizations on the active page in the analysis to a single slide in PowerPoint. |
| **Active page (new page for each visualization)** | Exports all the visualizations on the active page in the analysis to one or more slides in PowerPoint. Each visualization on the active page will be exported to a new slide in the PowerPoint presentation.<br>**Note:** Tables and trellised visualizations may be extended to more than one slide. |
| **All pages** | Exports all the visualizations on all the pages in the analysis. Each page will be exported to a new slide in the PowerPoint presentation. |
| **All pages (new page for each visualization)** | Exports all the visualizations on all the pages in the analysis. Each visualization in the analysis will be exported to a new slide in the PowerPoint presentation. |

| | |
|---|---|
| | **Note:** Tables and trellised visualizations may be extended to more than one slide. |
| **Details-on-Demand** | Exports the Details-on-Demand to one or more slides in PowerPoint. Select the check box Trellis panels and table rows not visible on screen if you want to export all the data in Details-on-Demand, including data that is not visible. |
| **Use entire page** | Select this check box to fill the entire space of the PowerPoint slide. The visualizations or pages that you export will be redrawn to fit the slide orientation. This means that the proportions will not be preserved, and some content may be altered. |
| | Clear this check box if you want to export the content that is currently visible in the visualizations or pages in the analysis. The pages and/or visualizations will keep the same proportions as in the analysis, but will be resized to fit the PowerPoint slide orientation. The exported parts may become more detailed, but never lose any information that is visible in the analysis. |
| **Include** | |
| **Visualization title** | Select whether or not you want the visualization titles to be included in the export. |
| **Description** | Select whether or not you want visualization descriptions to be included in the export. The description will only be visible for visualizations where a description has been entered. If the description is visible in the legend, it will automatically be included in the export as a part of the legend. |
| | **Note:** If a description is long, it may be cut off if you include it as a part of the legend. |
| **Filter settings** | Select whether or not you want the filter settings to be included in the export as textual information. Only the values of the modified filters will be listed. |
| **Page title** | Select whether or not you want the page titles to be included in the export. |
| **Trellis panels and table rows not visible on screen** | Select whether or not to include non-visible data in trellis panels and tables in the export. If a table contains too many rows to fit on one slide, it will be extended to the following slides. Similarly, a trellised visualization with many panels will be extended to the following slides. |
| | **Note:** Not available if you select to export Active page or All pages. You must select an option where each visualization is exported to a new slide. |
| **Page footer** | Select the check box to enable the text field where you can enter a text that you want to include as a footer on each slide in the exported PowerPoint presentation. |
| **Options** | |
| **Export to** | |
| **A new presentation** | Exports the selected option to a new PowerPoint presentation. |

| | |
|---|---|
| **An open presentation** | Appends new slides to an open PowerPoint presentation. If several presentations are open, select one from the drop-down list. |
| **Export as editable image** | Select this check box to export the images as enhanced meta files, which can be edited in Microsoft PowerPoint. If the check box is cleared, the images are exported in PNG format. |

# 16.5 Export to PDF

## 16.5.1 Exporting to PDF

In order to view an exported PDF document, you need to have a PDF reader installed on your computer,

### ► To export to PDF:

1. Select **File > Export > To PDF...**.
   Response: The Export to PDF dialog is opened.
2. Adjust to your preferred settings in the dialog.
3. Click **Export**.
4. Specify a file name and where you want to save the PDF document.
5. Click **Save**.
   Response: If you selected the check box **Open in PDF reader after export**, the resulting PDF document will be opened in your default PDF reader.

Comment: See Details on Export to PDF for more information about the various export options.

## 16.5.2 Details on Export to PDF

### ► To reach the Export to PDF dialog:

1. Select **File > Export > To PDF...**.

| Option | Description |
|---|---|
| **Export what** | Defines which parts of the analysis to export. |
| **Active visualization** | Exports the active visualization in the analysis to a single page in a PDF document.<br>**Note:** Tables and trellised visualizations may be extended to more than one page. |
| **Active page** | Exports all the visualizations on the active page in the analysis to a single page in a PDF document. |
| **Active page (new page for each visualization)** | Exports all the visualizations on the active page in the analysis to one or more pages in a PDF document. Each visualization on the active page will be exported to a new page in the PDF document.<br>**Note:** Tables and trellised visualizations may be extended to more than one page. |
| **All pages (All pages)** | Exports all the visualizations on all the pages in the analysis. Each page will be exported to a new page in the PDF document. |
| **All pages (new page for each visualization)** | Exports all the visualizations on all the pages in the analysis. Each visualization in the analysis will be exported to a new page in the PDF document.<br>**Note:** Tables and trellised visualizations may be extended to more than one page. |
| **Details-on-Demand** | Exports the Details-on-Demand to one or more pages in a PDF document. Select the check box Trellis panels and table rows not |

| | |
|---|---|
| | visible on screen if you want to export all the data in Details-on-Demand, including data that is not visible. |
| **Use entire page** | Select this check box to fill the entire space of the PDF page. The visualizations or pages that you export will be redrawn to fit the selected page layout. This means that the proportions will not be preserved, and some content may be altered. |
| | Clear this check box if you want to export the content that is currently visible in the visualizations or pages in the analysis. The pages and/or visualizations will keep the same proportions as in the analysis, but will be resized to fit the selected page layout. The exported parts may become more detailed, but never lose any information that is visible in the analysis. |
| **Include** | |
| **Visualization title** | Select whether or not you want the visualization titles to be included in the export. |
| **Description** | Select whether or not you want visualization descriptions to be included in the export. The description will only be visible for visualizations where a description has been entered. If the description is visible in the legend, it will automatically be included in the export as a part of the legend. |
| | **Note:** A long description may be cut off when you export to PDF. |
| **Filter settings** | Select whether or not you want the filter settings to be included in the export as textual information. Only the values of the modified filters will be listed. |
| **Page title** | Select whether or not you want the page titles to be included in the export. |
| **Trellis panels and table rows not visible on screen** | Select whether or not to include non-visible data in trellis panels and tables in the export. If a table contains too many rows to fit on one page in the PDF document, it will be extended to the following pages. Similarly, a trellised visualization with many panels will be extended to the following pages. |
| | **Note:** Not available if you select to export Active page or All pages. You must select an option where each visualization is exported to a new page. |
| **Page footer** | Select the check box to enable the text field where you can enter a text that you want to include as a footer on each page in the exported PDF document. |
| **Options** | |
| **Page layout** | Defines the size and orientation of the pages in the resulting PDF document. The following alternatives are available: A4 Portrait, A4 Landscape, US Letter Portrait, and US Letter Landscape. |
| **Open in PDF reader after export** | Select whether or not to view the resulting PDF document in a PDF reader after the export is carried out. |

# 16.6      Export to HTML

## 16.6.1      Exporting to HTML

Export to HTML can be seen as an alternative to printing a paper report of your analysis. By exporting to HTML instead of printing, the report can be viewed in a web browser. The settings for export to HTML are similar to the print settings. For example, you can choose paper size and orientation. Exporting to HTML always results in one single HTML document. For example, if you export all the pages in an analysis, the result will be one single HTML document where the pages from the analysis are placed after each other vertically. To learn more about the various export options, see Details on Export to HTML.

### ► To export to HTML:

1. Select **File > Export > To HTML...**.
2. Response: The Export to HTML dialog is opened.
3. Adjust to your preferred settings in the dialog.
4. Click **Export**.
5. Specify a file name and where you want to save the files.
6. Click **Save**.

    Response: If you selected the check box **Open in web browser after export**, the resulting HTML document will be opened in your default web browser.

## 16.6.2      Details on Export to HTML

### ► To reach the Export to HTML dialog:

1. Select **File > Export > To HTML...**.

| Option | Description |
|---|---|
| **Export what** | Defines which parts of the analysis to export. |
| **Active visualization** | Exports the active visualization in the analysis. |
| **Active page** | Choose this option if you want to export only the active page in the analysis. |
| **Active page (new page for each visualization)** | Exports all the visualizations on the active page in the analysis. The visualizations on the active page will be placed after each other vertically in the HTML document. |
| **All pages** | Exports all the visualizations on all the pages in the analysis. The pages in the analysis will be placed after each other vertically in the HTML document. |
| **All pages (new page for each visualization)** | Exports all the visualizations on all the pages in the analysis. The visualizations in the analysis will be placed after each other vertically in the HTML document. |
| **Details-on-Demand** | Exports the Details-on-Demand. Select the check box Trellis panels and table rows not visible on screen if you want to export all the data in Details-on-Demand, including data that is not visible. |
| **Use entire page** | Select this check box to fill the entire space of the target page. The visualizations or pages that you export will be redrawn to fit the selected page layout. This means that the proportions will not be preserved, and some content may be altered. |
| | Clear this check box if you want to export exactly what is currently visible in the visualizations or pages in the analysis. The pages and/or visualizations will keep the same proportions as in the analysis, but will possibly be resized to fit the selected page layout. |
| **Include** | |
| **Visualization title** | Select whether or not you want the visualization titles to be included in the export. |
| **Description** | Select whether or not you want visualization descriptions to be included in the export. The description will only be visible for visualizations where a description has been entered. If the description is visible in the legend, it will automatically be included in the export as a part of the legend. |
| | **Note:** A long description may be cut off when you export to HTML. |
| **Filter settings** | Select whether or not you want the filter settings to be included in the export as textual information. Only the values of the modified filters will be listed. |
| **Page title** | Select whether or not you want the page titles to be included in the export. |

| | |
|---|---|
| **Trellis panels and table rows not visible on screen** | Select whether or not to include non-visible data in trellis panels and tables in the export. If a table contains too many rows to fit on one page, it will be extended to the next page. Similarly, a trellised visualization with many panels will be extended to the following pages. |
| | **Note:** A page in this case refers to the selection you make in the Page layout drop-down list. |
| | **Note:** Not available if you select to export Active page or All pages. You must select an option where each visualization is exported to a new page. |
| **Page footer** | Select the check box to enable the text field where you can enter a text that you want to include as a footer in the export. |
| **Options** | |
| **Page layout** | Defines the size and orientation of the pages in the resulting HTML document. The following alternatives are available: A4 Portrait, A4 Landscape, US Letter Portrait, and US Letter Landscape. |
| **Open in web browser after export** | Select whether or not to view the resulting HTML document in a web browser after the export is carried out. |

# 16.7    Printing

## 16.7.1    Printing

You can print a single visualization, an entire page, all pages in an analysis, or the Details-on-Demand. For more information about the various print options, see Details on Print Layout Options.

► **To print visualizations and pages in an analysis:**

1. Select **File > Print...**.
   Response: The Print Layout Options dialog is opened.
2. Select what to print and what to include in the print-out.
3. Click **Page Setup** to open a dialog where you can define the size and orientation of the pages in the resulting print-out.
4. Click **OK** to close the Page Setup dialog when done.
5. Optionally, click on **Preview** to see what the print-out will look like.
6. Close the Print preview window.
7. Click **Print**.
   Response: The Windows standard print dialog is opened.
8. Adjust to your preferred settings in the dialog.
9. Click **Print**.
   Response: The selected visualizations or pages are printed according to the specified settings.

## 16.7.2    Details on Print Layout Options

► **To reach the Print Layout Options dialog:**

1. Select **File > Print...**.

| Option | Description |
|---|---|
| **Print what** | Defines which parts of the analysis to print. |
| **Active visualization** | Prints the active visualization in the analysis to a single page. **Note:** Tables and trellised visualizations may be extended to more than one page each. |
| **Active page** | Prints all the visualizations on the active page in the analysis to a single page. |
| **Active page (new page for each visualization)** | Prints all the visualizations on the active page in the analysis to one or more pages. Each visualization on the active analysis page will be printed to a new page. **Note:** Tables and trellised visualizations may be extended to more than one page. |
| **All pages** | Prints all the visualizations on all the pages in the analysis. Each analysis page will be printed to a new page. |
| **All pages (new page for each visualization)** | Prints all the visualizations on all the pages in the analysis. Each visualization in the analysis will be printed to a new page. **Note:** Tables and trellised visualizations may be extended to more than one page. |
| **Details-on-Demand** | Prints the Details-on-Demand to one or more pages. Select the check box Trellis panels and table rows not visible on screen if you want to print all the data in Details-on-Demand, including data that is not visible. |
| **Use entire page** | Select this check box to fill the entire space of the printed page. The visualizations or pages that you print will be redrawn to fit the selected page layout. This means that the proportions will not be preserved, and some content may be altered. Clear this check box if you want to print the content that is currently visible in the visualizations or pages in the analysis. The pages and/or |

| | | |
|---|---|---|
| | | visualizations will keep the same proportions as in the analysis, but will be resized to fit the selected page layout. The printed parts may become more detailed, but never lose any information that is visible in the analysis. |
| **Include** | | |
| | **Visualization title** | Select whether or not you want the visualization titles to be included in the print-out. |
| | **Description** | Select whether or not you want visualization descriptions to be included in the print-out. The description will only be visible for visualizations where a description has been entered. If the description is visible in the legend, it will automatically be included in the print-out as a part of the legend. **Note:** A long description may be cut off when you print. |
| | **Filter settings** | Select whether or not you want the filter settings to be included in the print-out as textual information. Only the values of the modified filters will be listed. |
| | **Page title** | Select whether or not you want the page titles to be included in the print-out. |
| | **Trellis panels and table rows not visible on screen** | Select whether or not to include non-visible data in trellis panels and tables in the print-out. If a table contains too many rows to fit on one printed page, it will be extended to the following pages. Similarly, a trellised visualization with many panels will be extended to the following pages. **Note:** This option is not available if you select to print Active page or All pages. You must select an option where each visualization is printed to a new page. |
| | **Page footer** | Select the check box to enable the text field where you can enter a text that you want to include as a footer on each page in the resulting print-out. |
| **Page Setup** | | Opens a dialog where you can define the size and orientation of the pages in the resulting print-out. |
| **Preview** | | Click this button to see a preview of the print-out. |
| **Print** | | Click this button to view the Windows standard print dialog and select printer, before starting to print. |

# 17 Appendix

## 17.1 How to Contact Support

If you have any questions about a TIBCO Spotfire® product, please do the following:

- Use the built-in help function.
- Consult the README files which are included with the product.
- Visit the Spotfire support website, http://spotfire.tibco.com/support, where you can send questions to our support department.
- On the same website, you can also get personal contact from TIBCO Spotfire Support.

TIBCO Spotfire offers a variety of support agreements. Contact TIBCO Spotfire for more information about support, training, consulting agreements, and our Product Subscription Programs.

## 17.2 Details on Support Diagnostics

This dialog contains information that may be useful in contact with TIBCO Spotfire customer support, as well as possibilities for specifying client side logging and error reporting.

**► To reach the Support Diagnostics and Logging dialog:**

Select **Help > Support Diagnostics and Logging**.

**Product File Information Tab**
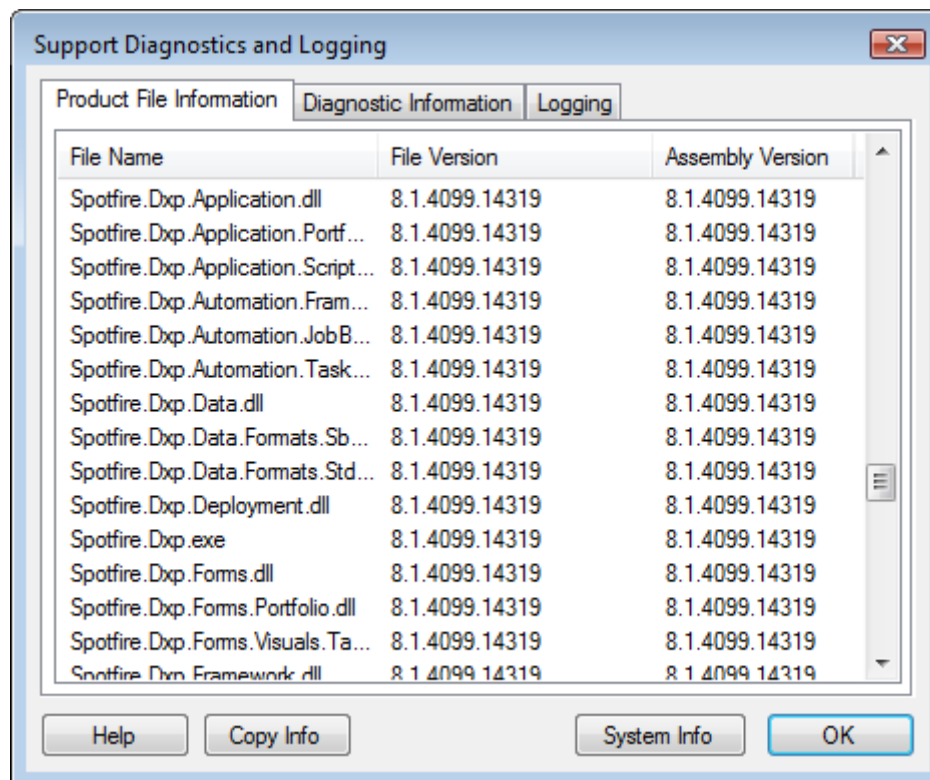
| Option | Description |
|---|---|
| **Product File Information** | Displays detailed information about the versions of various files and assemblies. |
| **Copy Info** | Copies all information available in the Support Diagnostics dialog to the clipboard. This is often requested if you are in contact with Spotfire Support. |
| **System Info** | Opens the Microsoft System Information dialog, displaying additional information. |

## Diagnostic Information Tab
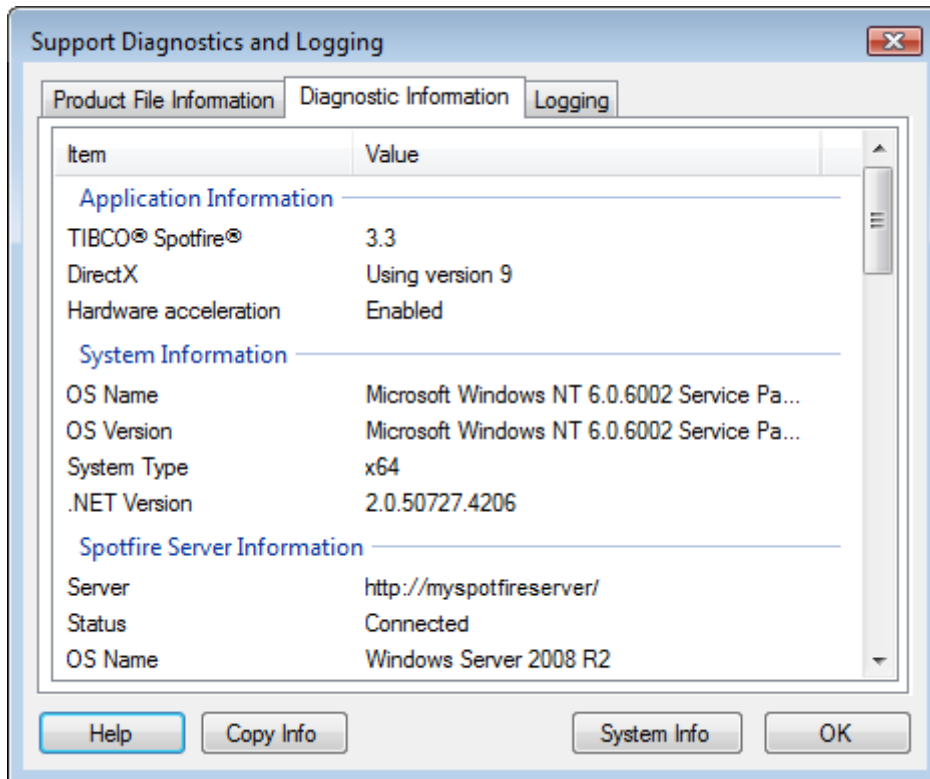


| Option | Description |
|---|---|
| **Application Information** | Lists the version of TIBCO Spotfire and DirectX installed on your computer as well as information about whether or not hardware acceleration is enabled. |
| **System Information** | Lists the name and version of your operative system, as well as the .NET version on your computer. |
| **Spotfire Server Information** | Lists the name and version of the operating system on the TIBCO Spotfire Server, together with other information about the server  you are connected to. |
| **TIBCO Spotfire Statistics Services for S-PLUS** | Lists information about TIBCO Spotfire Statistics Services and the currently used S-PLUS engine. |

| | |
|---|---|
| **TIBCO Spotfire Statistics Services for R** | Lists information about TIBCO Spotfire Statistics Services and the currently used R engine. |
| **Copy Info** | Copies all information available in the Support Diagnostics dialog to the clipboard. This is often requested if you are in contact with Spotfire Support. |
| **System Info** | Opens the Microsoft System Information dialog, displaying additional information. |

## Logging

The logging tab settings are not available if you have created a custom log4net.config file, see Make this the default log level for future sessions below for more information.
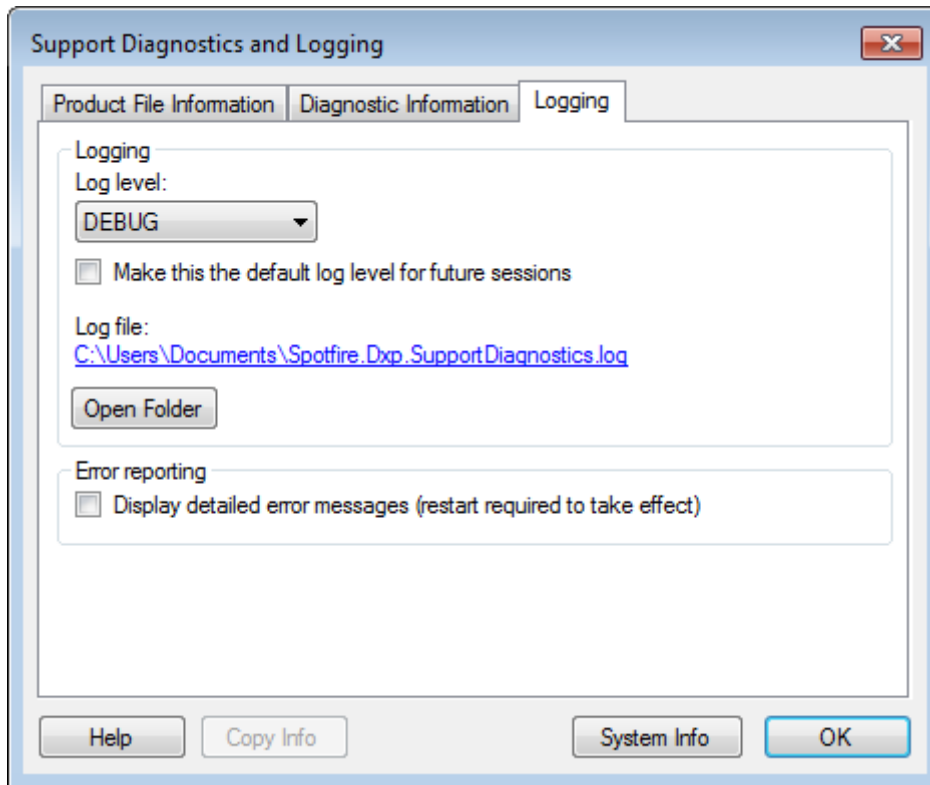


| Option | Description |
|---|---|
| **Log level** | Allows you to specify the log level. An increased log level may be useful when communicating with TIBCO Spotfire Support, while trying to troubleshoot TIBCO Spotfire. |
| **None** | This is the default log level if nothing else is specified. No information is logged. |
| **DEBUG** | Used to log detailed information and events when debugging the application. This is the log level that collects the most information. |
| **INFO** | Used to log information regarding the progress of the application, including all potentially harmful situations and errors. |

| | |
|---|---|
| **WARN** | Used to discover all kinds of potentially harmful situations. |
| **ERROR** | Used when tracking fatal and non-fatal error events. |
| **FATAL** | Used when tracking severe error events only. |
| **Make this the default log level for future sessions** | Select the check box to make Spotfire remember the selected log level from session to session. If the check box is selected your current log settings will be saved in a log4net.config file. If the check box is cleared, then the generated config file will be deleted. The automated logging settings will not be available if you already have a custom log4net.config file in the TIBCO Spotfire AppData directory. |
| **Log file** | Shows the path to the log file. Click on the link to open the log file directly. |
| **Open Folder** | Opens Windows Explorer to the folder containing the log file. |
| **Display detailed error messages (restart required to take effect)** | Allows detailed error messages to be displayed. For the setting to take effect you need to restart your computer. |
| **System Info** | Opens the Microsoft System Information dialog, displaying additional information. |

# 18   Glossary

### 3D Scatter Plot
A visualization that represents quantitative information as a point along three axes. Used to explore relationships.

### Analysis File
The file type used for analysis files created with TIBCO Spotfire. Can be saved to disk and to the Library. Defines what data to include and how to present it. Can include linked or embedded data based on user settings when saving the file. Includes one or more pages. There can only be one analysis file open at a time, but it is possible to run several instances of TIBCO Spotfire simultaneously, and one analysis file can also contain several data tables. See also DXP File.

### Axis
A line that provides a reference from which coordinates in a visualization are measured; it orients the visualizations and provides a frame around it. Each axis is associated with at least one scale.

### Axis Selector
A control used to change what will be shown on each axis in the visualization. The axis selector is what tells you which column is assigned to the axis. See also Column Selectors.

### Bar
A vertical or horizontal rectangle whose height represents a numerical value.

### Bar Chart
A visualization that represents quantitative information by means of a series of vertical or horizontal rectangles known as bars.

### Bar Labels
Words or numbers used to identify and describe a bar and data associated with it.

### Bar Segment
A section of a bar that represents a subset of data that the whole bar is made up of.

### Bar Segment Labels
Words or numbers used to identify and describe a bar segment and data associated with it.

### Binning

A way to create a categorical column from a column with continuous data. Binning is used to create a new column where the values of a specified column are grouped into different bins using a binning method.

### Bookmark

A Bookmark is a snapshot of the state of an analysis, which can be applied at any time, allowing you to return to a previously created view of the data.

### Box Plot

A visualization used for examining key statistical properties of a variable. Measures, such as median, mean and quartiles are displayed using boxes, whiskers and other symbols.

### Calculated Column

A column that has been created from different expressions where calculations on other columns could be included.

### Calculated Value

A dynamic item that can be included in a graphical table or in a text area. It displays the result of an aggregated expression.

### Categorical Axis

An axis that is associated with a categorical scale.

### Category Axis

The category axis is the horizontal axis in a bar chart where the bars are displayed vertically. When bars are displayed horizontally, the category axis is the vertical axis.

### Categorical Scale

A scale on which the values have interruptions, such as values representing names, places, things or events.

### Cell

A box or other unit on a spreadsheet or a table at the intersection of a column and a row.

### Check Box Filter

A Filter used to filter out rows based on whether or not a column value is a member of a set of values.

### Collaboration Panel

A tool that can be used to view web pages in Spotfire. For instance, a web based collaboration tool such as tibbr®.

### Color Mode

The way colors in a color scheme are assigned to the values in the data. There are five color modes in Spotfire: Fixed, Categorical, Gradient, Segments, and Unique Values.

### Color Palette

A group of default colors you could choose from when changing a color in a color scheme.

### Color Scheme

A set of colors and a definition of how they are applied to values. The definition includes whether the scheme is categorical or continuous, and whether colors are simply applied by index or by specific values.

### Color Scheme Grouping

A color scheme grouping works as a container for one or more columns or axis values on which you want to apply the same color scheme when working with coloring in tables, cross tables, and heat maps.

### Column

A vertical list of values in a data table.

### Column from Marked

Column from marked is a way to make a visualization axis dependent on the cell value of a marked row of a data table related to, or unrelated to, the data table used by the visualization.

### Column Name

The name of a column as displayed in the user interface. It is a normalized, trimmed, and unique text string. It is initially set to a tidied form of the external name, but it may be modified through a Rename Column operation.

### (Column Names)

When more than one column is used to define the values on an axis in a visualization (for example, on the value axis in a bar chart), the option (Column Names) becomes available for selection on other axes, in the Color by column selector, in the trellising column selectors, etc. This option will treat the column names of the selected value columns as separate categories, so that if Sales and Cost are selected on the value axis, (Column Names) can be used to apply different colors on bars or bar segments showing Sales and Cost.

### Column Selector

A control used to change the column or hierarchy used to define a certain property (axis column, color, size, etc.) in a visualization. Column selectors can be dragged and dropped to change the order of dynamic hierarchies, or, to apply or remove columns from a specific property using drop targets in the visualizations.

### Combination Chart

A visualization that combines the features of the bar chart and the line chart. It represents quantitative information by means of a number of bars and/or lines.

### Comparison Circles

Circles in the box plot used to show whether or not the mean values for various categories are significantly different from each other.

### Continuous Axis

An axis that is associated with a continuous scale.

### Continuous Scale

A scale on which there are no interruptions between values, for example if the values are real numbers.

### Cover Page

The cover page is the first page in an analysis. It normally contains information about the analysis and the person who created the analysis. If desired, a cover page can automatically be added when creating new analyses.

### Cross Table

A cross table is a two-way table consisting of rows and columns. It is typically used to determine whether there is a relation between the row variable and the column variable. Each row and column can be summarized to a grand total. If the vertical axis is a hierarchy, subtotals can be displayed in the columns of the cross table.

### Curve Fit

Curve fit or regression analysis allows you to summarize a collection of sample data points by fitting them to a model that will describe the data and display a curve or a line on top of a visualization. There are several different models available in Spotfire.

### Custom Expression

The column selectors can, in addition to specifying one or more columns to use on an axis or to define a property, also be set to use a custom expression. This means that a dynamic calculation can be performed using more or less complex expressions, involving one or more columns, aggregation measures, or mathematical expressions. When a custom expression is used on an axis, the values on that axis are dynamically recalculated using filtered rows only. To create a

new column which is always based on the values of all rows, you should instead use the Insert Calculated Column tool.

## Data Relationships

The Data Relationships tool is used for investigating the relationships between different column pairs, using comparison methods such as Linear regression, Spearman R, Anova, Kruskal-Wallis or Chi-square.

## Data Source

A handle to an external data source, such as a file or information link. A data source produces a single table of data.

## Data Table

A data table in TIBCO Spotfire is defined as either data loaded from an external source, or new data created within the application. It has one or more columns and zero or more rows. A visualization is based on a single data table.

Data tables loaded from an external source can be linked or embedded. Linked data tables can be loaded completely into the application, but if the source is an information link they can also be configured to load data on demand only.

Data tables can be related to each other, using primary and/or foreign keys (key columns), but they can also be unrelated.

## Dendrogram

A dendrogram is a branching diagram which represents a hierarchy of categories based on the degree of similarity or number of shared characteristics.

## Details-on-Demand

The concept of expanding a small set of items to reveal more data behind it.

## Details Visualization

A visualization where the data is limited by one or more markings.

## Drop Targets

Specifically, icons in the middle of a visualization onto which filters or column selectors can be dropped in order to define a specific property.

## DXP File

DXP is the file extension for an Analysis File. See Analysis File.

## Dynamic Items

Small visualizations that can be included in a graphical table or in a text area. For example, sparklines, calculated values and icons.

### Empty Values

Empty values, or null values, are values that are missing in your data table.

### Error Bars

Used in bar charts, line charts and/or scatter plots to indicate the estimated error in a measurement.

### Escape characters

Since certain characters have a special meaning in the Spotfire expression language, you need to perform some actions if you are going to use those characters for other purposes, such as including them in column names.

An escape character is a special character used to inform the expression language that the following character in a character sequence should be seen as a standard character rather than as an item performing its special purpose.

### External Column ID

A GUID string, retrieved from an information link. May or may not be present, and may or may not be well-formed.

### External Column Name

The original column name, exactly as it came from the data source. It is a non-null, but possibly empty text string. It is not trimmed or normalized, and duplicates may exist among the columns of a data view.

### Filter

Used to reduce the amount of data to work on in TIBCO Spotfire. The same as Query Devices in TIBCO Spotfire DecisionSite. Filters can be either column filters, directly related to a column, or hierarchy filters (tree filters) which represent a hierarchy. Filters can be grouped into folders in the Filters panel.

### Filtering Scheme

A filtering scheme is a data selection that points out what data shall be filtered (visible). Each analysis can hold several filtering schemes. What filtering scheme to use can be specified separately for each page and/or each visualization. Each filtering scheme can be used by several pages and visualizations.

### Filtered Out Rows

The rows that have been removed after one or more filtering operations.

### Filtered Rows

The rows that remain after one or more filtering operations.

## Filters Panel

The area where filters are shown. Adjusting the filters modifies the filtering that is used by the page.

The filters panel visibility is set per page, just like the visibility of the individual filters. When the filtering scheme is changed for the page, the filtering showed by the filters and visualizations are changed, but the visibility of the filters panel and the filters therein are kept.

## Find

A tool in TIBCO Spotfire that lets you search for data content, perform menu actions, and much more, by entering words or parts of words in a text field.

## Formatting

Describes how different values in a data set should be presented, for example as text or currency, or how many decimals should be shown.

## Graphical Table

A summarizing table visualization designed to provide a lot of information at one glance. It can display dynamic items such as sparklines, calculated values and icons.

## Gridlines

Lines that form a grid inside a visualization to serve as a reference for the viewer.

## GUID

A unique identifier for an information link that remains the same if the name of the information link is changed.

## Heat Map

A visualization that presents data in the form of a table which contains colors instead of numbers. It can be used to identify clusters of similar values, as these are displayed as "areas" of similar color.

## Hierarchical Clustering

Hierarchical clustering arranges objects in a hierarchy with a treelike structure based on the similarity between them.

## Hierarchy

A hierarchy is defined as A) a set of ordered columns where the order defines the hierarchy, B) a timestamp column where it is possible to derive a natural hierarchy or C) an external hierarchical structure where every node maps to one or more rows in the data table through an identifier column.

### Hierarchy Filter

A filter based on a predefined hierarchy. The same thing as a tree filter.

### Horizontal Bars

Bars displayed horizontally in a bar chart. You can change the orientation of the bars by right-clicking in the visualization and selecting Horizontal Bars or Vertical Bars.

### Hyperlink

A link to that will launch your default web browser when clicked on.

### Icon

A dynamic item that can be included in a graphical table or in a text area. Icons are defined using rules.

### Information Link

Information links are predefined database queries, specifying the columns to be loaded, and any filters needed to reduce the size of the data table prior to visualization.

### Item Filter

A filter used to filter out rows based on whether or not a column value is equal to a specified value. The behavior is similar to a radio button filter, but the appearance is different, and it is more suited to selecting a value from a large number of unique values.

### Jittering

An option that displaces the visualization items randomly in the display window, thereby making overlapping markers visible. Attention can be brought to areas where many markers overlap. Such regions can then be investigated further, by zooming, changing axes, etc.

### K-means Clustering

A tool that helps you group rows into a defined number of clusters based on their similarity. A line chart is needed in order to use the tool.

### Label

In a visualization, labels come in three varieties:
1. Marker labels, showing the value of the marker.
2. Scale labels, showing the scale of an axis.
3. Line & Curve labels, showing the name and description of a line or curve.

### Legend

Information that helps the viewer identify what the graphics in the visualization represent.

### Library

The Library is a space on the server where you can publish or open shared analysis files.

### Line By

In a line chart, the line itself can visualize a column or a hierarchy. This is set up in the properties of the visualization.

### Line Connection

In a scatter plot or a map chart, markers may be connected with a line to show trend or other relation. This is set up in the properties of the visualization.

### Line Chart

A visualization that represents quantitative information by means of one or more lines.

### Line Labels

Words or numbers used to identify and describe a line and the data associated with it.

### Line Similarity

A tool where you can compare the similarity of different lines in a line chart against each other.

### Lines & Curves

To connect or otherwise show relationship between Markers, Lines and Curves may be drawn on top of the visualization according to a number of models and functions.

### List Box Filter

A Filter used to filter out rows based on which rows you mark in a list of all rows in a certain column.

### Lists

Lists consist of sets of rows in your data representing captured knowledge from one or many data sources. You work with the same list collection from one session to the next.

### Map Chart

A map chart is used to organize information visually in relation to an image or a shape file map.

### Marked Row

An item in a visualization becomes marked when you click on it, or, when it is captured using the rectangle method (left mouse button pressed while moving pointer). Marked rows are given a definable color to distinguish them from the rest of the data.

## Marking

A marking identifies marked rows in the data tables of an analysis. If the data tables are related, the marked rows are propagated using the specified key relation between the data tables. Setting a marking in one data table does not affect the marking of unrelated data tables.

Each analysis can hold multiple markings and each marking has its own marking color. One or more markings can be used to limit what data are displayed in a visualization.

## Marker

A graphical object that represents a category.

## Marker Labels

Words or numbers used to identify and describe a marker and the data associated with it.

## Page

A page can be thought of as a "container" for visualizations, filters, a Details-on-Demand, etc. Pages make it possible to set up several sheets of visualizations that you can switch between in an analysis. Pages can contain visualizations and text areas that guide you through the analysis. Visualizations can only exist inside a page (they cannot be dragged outside even partly).

All visualizations in an analysis can be linked, both within and between pages, but they do not have to be. The visualizations on a page use one or more filtering schemes, and the filtering schemes determine whether visualizations are linked or not. The visualizations in a page can use one or several data tables.

## Parallel Coordinate Plot

A parallel coordinate plot is used to compare the values within a multitude of columns for a number of rows in the analysis.

## Parameterized Information Link

The data an information link returns on different occasions or by different users may be parameterized, which means it depends upon for instance user input or other factors. A Personalized Information Link is a special case of this, where the identity of the user is used as a parameter in deciding which data to be returned.

## Personalized Information Link

A personalized information link returns a subset of data depending on the identity of the user.

## Pie

A circular graphic divided into sectors used to show the relative values of entities compared to each other and to the whole.

## Pie Chart

A visualization composed of one or more pies.

### Pie Labels

Words or numbers used to describe a pie.

### Pie Sector

A part of a pie that represents a subset of data of which the whole pie is made up.

### Pie Sector Labels

Words or numbers used to describe a pie sector.

### Pivot

A transformation used to transform data from a tall/skinny format to a short/wide format.

### Primary Key

This is a set of one or more columns whose values uniquely identify every data row. By saving value tuples for the primary key, the application can support persistent masks and annotations for linked data tables. The primary key is a setting on the root view.

### Properties

Properties can be compared to variables. All changeable settings in visualizations, data tables or documents are properties in some sense, but you can also create your own properties and use them to control the configuration of visualizations, calculations, or on-demand data loading. You can create property controls in a text area to simplify the process of changing a property value.

### Radio Button Filter

A filter used to filter out rows based on whether or not a column value is equal to a specified value. The behavior is similar to an item filter, but the appearance is different, and it is more suited to selecting a value from a small number of values.

### Range Filter

A filter used to filter out rows based on whether or not the values in a column fall between a certain lower and upper value.

### Range Filter Data Range

The data range that the filter is operating on.

### Range Filter Lower Value

All values below this limit are excluded from the filtered rows by the range filter.

### Range Filter Upper Value

All values above this limit are excluded from the filtered rows by the range filter.

### Renderer

In a Table Visualization, how values are presented in cells depends on which renderer is used.

### Root View

The default view of a data table, as it is first opened, with no modifications such as binned columns or filtered out data.

### Row

A horizontal list of values in a data table.

### Scale

A line with tick marks and labels used as a reference along an axis in a visualization.

### Scale Labels

Words or numbers along a scale.

### Scatter Plot

A visualization that represents quantitative information as a point along two axes. Used to explore relationships.

### Series By

In a combination chart, it is possible to divide the data into slices, called series. Each series will be represented by a line or a set of bars in the visualization.

### Share

A tool that can be used to quickly share parts of an analysis, such as bookmarks, visualizations, and pages, with others. The Share tool is reached from the right-click menu.

### Short Number Format

The method of writing multiples of 10 using non-numerical characters, such as k for 1,000 and M for 1,000,000.

### Short Number Symbol

The non-numerical character used instead of a multiple of 10, such as k or M.

### Sparkline

A dynamic item that can be included in a graphical table or in a text area. It is a small simple line graph used for displaying trends or variations of some variable.

### Spotfire Server

TIBCO Spotfire Server is the server that a user of TIBCO Spotfire logs into and is able to save data to.

### Spotfire Text Data Format

A well-defined text data format that does not require type guessing when read by TIBCO Spotfire or TIBCO Spotfire DecisionSite.

### Stacked Bar

A set of vertical rectangles (bars) stacked on top of each other to represent a numerical value and how different components contributed to that numerical value.

### Summary Table

A visualization that summarizes statistical information about data in table form.

### Symbol Set

A collection of Short Number Symbols.

### Table

A visualization with information arranged in rows and columns.

### Table Cell

The intersection of a table row and a table column, where values are located.

### Table Column

A vertical list of cells in a table.

### Table Column Header

The title of a table column.

### Table Row

A horizontal list of cells in a table.

### Table Row Header

The title of a table row.

### Tags Panel

The area where tags are being defined and handled.

### Tags

Tags are annotations which can be added to different sets of marked rows and included in an annotation column.

### Text Area

A text area can contain information about a visualization, instructions on how to perform the analysis, or links which are shortcuts to specific tools in TIBCO Spotfire. In regards to the layout of a page, a text area is treated the same way as a visualization.

### Tick Marks

Short lines drawn perpendicular to a scale and used to mark off uniform increments along that scale.

### Time Scale

A scale consisting of units of time organized in a sequence so that intervals of equal physical size represent equal increments of time.

### Tooltip

In addition to the ordinary tooltips that give information about buttons and controls in the user interface, TIBCO Spotfire also contains configurable tooltips displaying detailed information about the smallest items in a visualization. For example, when you hover with the mouse pointer over a bar segment in a bar chart, the tooltip will by default show the exact category axis and value axis values, as well as information about the coloring, if any split by color has been applied.

### Tree Filter (Hierarchy Filter)

A filter based on a predefined hierarchy.

### Treemap

A visualization that displays hierarchically structured data using nested rectangles.

### Trellis

A Trellis is a split view of a visualization, organized by category in separate panels.

### Unpivot

A transformation used to transform data from a short/wide format to a tall/skinny format.

## URL

A world wide web address.

## Value Axis

The value axis is the vertical axis in a bar chart where the bars are displayed vertically. When bars are displayed horizontally, the value axis is the horizontal axis.

## Value Columns

The columns used to calculate a measure based on the measure method, the dimension and the dimension aggregation level.

## Vertical Bars

Bars displayed vertically in a bar chart. You can change the orientation of the bars by right-clicking in the visualization and selecting Horizontal Bars or Vertical Bars.

## Virtual Column

A column that is added to a table visualization by loading data from a remote source, such as a database.

## Visualization

A representation of some data in TIBCO Spotfire. For example, a table, a bar chart, a pie chart, etc. A visualization displays data from one data table. The data displayed can be limited by one or more filtering schemes and by zero, one or several markings. A visualization shows and allows modification to one marking.

## Visualization Item

The smallest building block of a visualization. For example, a pie sector in a pie chart, a line in a line chart or a cell in a table.

## Visualization Title

Words or text used to identify a visualization.

## Web Player

TIBCO Spotfire Web Player is the web client that can be used to view Spotfire data. You can export data for view in Web Player from Spotfire.

## X-Axis

The horizontal axis in most 2D visualizations or the first axis in a 3D visualization.

## Y-Axis

The vertical axis in most 2D visualizations or the second axis in a 3D visualization.

### Z-Axis

The third axis in a 3D visualization.

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