

TIBCO Spotfire® Extension for OpenSpirit®

User's Guide

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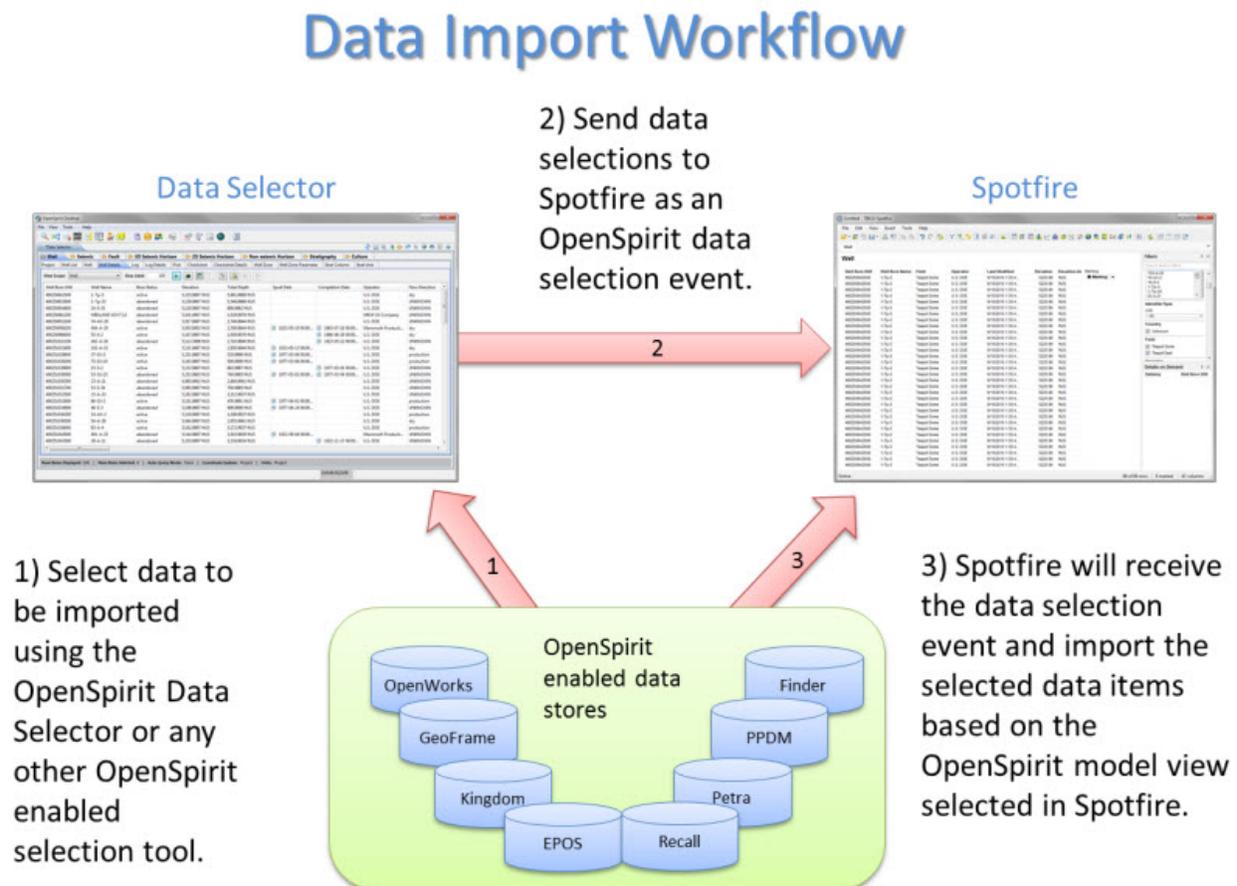
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Overview

TIBCO Spotfire® Extension for OpenSpirit® (Spotfire Extension) enables TIBCO Spotfire® Analyst users to access data from any OpenSpirit enabled data store (e.g. OpenWorks, Studio, GeoFrame, PPD, Kingdom, Petra, etc.) and allows them to exchange OpenSpirit events with other OpenSpirit enabled applications. The Spotfire Extension also enables TIBCO Spotfire® Analyst users to interactively share data and user selections with ESRI's ArcGIS for Desktop application when used in combination with the TIBCO OpenSpirit® Extension for ArcGIS (ArcGIS Extension) and to provide seismic and horizon data to the Ruths.ai 3D Subsurface Spotfire Visual.

Data Import Workflow

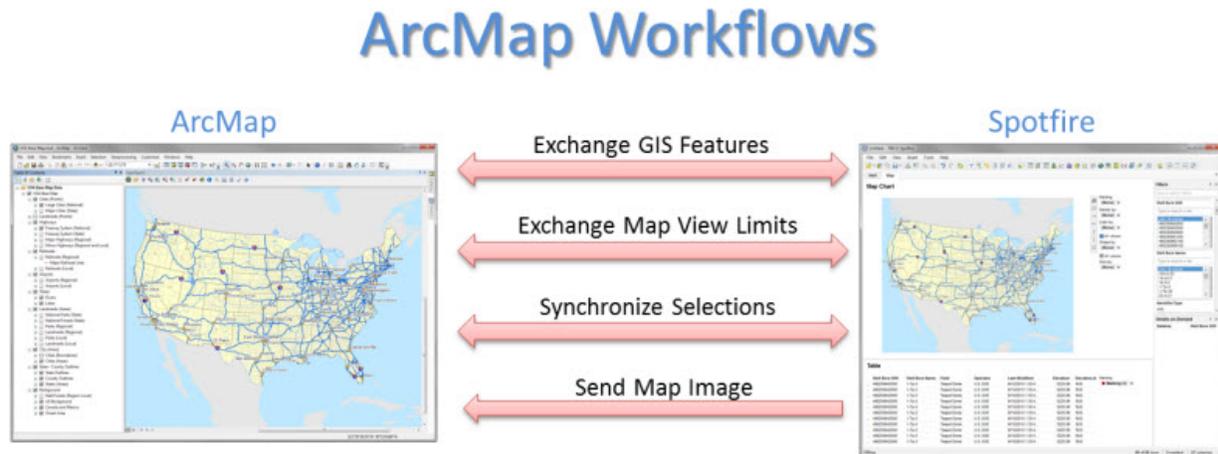
One of the main features of the Spotfire Extension is the ability to import data into Spotfire from any data store supported by an OpenSpirit data connector. The following diagram illustrates the steps in a typical data import workflow.



The data import workflow is described in more detail in the Import Using Data Selection Events section of this guide.

ESRI ArcMap Workflows

The Spotfire Extension also enables a number of workflows between Spotfire and ESRI's ArcMap application. The workflows are used to exchange GIS data between Spotfire and ArcMap and to synchronize map view limits and selections.



The ArcMap workflows are described in more detail in the Import Using GIS Events, Sending GIS Events, Map Image Event, Synchronizing Map Views, and Synchronizing Selections sections of this guide.

Software Usage Licenses

Software licenses are required in order to use the Spotfire Extension. The Spotfire Extension uses the *OpenSpirit License Service* to manage software usage entitlements. The OpenSpirit License Service is included with the OpenSpirit Runtime product.

Each licensed OpenSpirit product requires one or more license feature to be available in order for the product to function. License features are managed on a per-concurrent user basis. This means that one license feature is checked out from the service for each user that is currently using the software product enabled by the license feature. A user may concurrently run multiple executions of the software product, but will only consume one license feature for that product. The license feature is checked back in when the user is no longer using the software product.

The Spotfire Extension requires two license features to be available when connecting to OpenSpirit. The required license features are named *OspSpotfireExtension* and *OspRuntime*. Additional license features are required to use OpenSpirit data connectors or to use the ArcGIS Extension. These license features are provided when you purchase your OpenSpirit products. Contact your TIBCO OpenSpirit sales representative to obtain licenses for OpenSpirit products.

Spotfire Usage

This help guide assumes the reader has a basic understanding of TIBCO Spotfire Analyst and ESRI ArcGIS Desktop. The guide's purpose is to explain how to use the Spotfire Extension. Refer to the Spotfire documentation for information about using Spotfire, the ArcGIS Desktop documentation for information about using ArcGIS Desktop, and the ArcGIS Extension documentation for information about using the ArcGIS Extension.

Installation

Installing the Spotfire Extension involves deploying the extension package to the Spotfire server, installing the Spotfire Extension license feature, and loading the Spotfire model views into the OpenSpirit runtime.

Supported Platforms

The Spotfire Extension is supported on the Microsoft Windows operating systems that both the TIBCO OpenSpirit Runtime and TIBCO Spotfire Analyst are supported on. Refer to the release notes for these products for operating system platform requirements.

System Requirements

The Spotfire Extension requires TIBCO Spotfire Analyst version 7.5.0 or higher and TIBCO OpenSpirit Runtime version 4.1.0 or higher. Several ESRI ArcMap workflows described in this help guide require ESRI ArcGIS Desktop version 10.1 or higher and the TIBCO OpenSpirit Extension for ArcGIS version 2015.0.0 or higher.

Installing the Spotfire Extension

The Spotfire Extension is installed by deploying the extension's Spotfire package file to the Spotfire server. The Spotfire package file is included in the ZIP file available from the TIBCO Spotfire Extension for OpenSpirit product download web page.

The package file is deployed using the Spotfire Administration Console. The package deployment procedure is outlined below. Refer to the Spotfire Administrator Guide for more details about using the Spotfire Administration Console and deploying extension packages.



There is no need to install the OpenSpirit Runtime or any other OpenSpirit software on the Spotfire server. The only OpenSpirit software required on the server is the deployed Spotfire Extension package.

Deploying the Spotfire Extension Package

Perform the following steps to deploy the Spotfire Extension to your Spotfire server. You will need to have the Spotfire Extension deployment package file available during this procedure. The Spotfire Extension deployment file is named *Spotfire-OpenSpirit-Ext_1.2.0.spk*.

Open the Spotfire Administration Console by entering the Spotfire server URL in your web browser. The URL will look something like **http://serverhost/spotfire** where **serverhost** is the host name of your Spotfire server.

Click on the **Open Administrator Console** button to open the administrator console and select the **Deployments & Packages** option.

Select the **Production Area** or the **Test Area** view depending on which view you want to use to deploy the OpenSpirit Spotfire Extension.

Now click on the **Add packages** button above the list of installed packages. This will open a window used to select the package file. Click on the **Choose File** button and select the file named "**Spotfire-OpenSpirit-Ext_1.2.0.spk**" from the folder where the Spotfire Extension product ZIP file was unzipped. Click on the **Open** button to complete the package file selection.

Click on the **Upload** button after selecting the package file to add the Spotfire Extension package to the Spotfire server's package list. This will upload the package file to the Spotfire server.

Click on the **Validate** button when the upload is complete to verify that the package file was successfully uploaded to the server.

Finally, click on the **Save** button to save and publish the Spotfire Extension deployment. Enter a version number and a description into the save window that appears and click the **Ok** button to complete the save.



A firewall exemption must be added for the **Spotfire.Exp.exe** program executable in your Spotfire software installation if your Windows firewall is enabled in order to receive OpenSpirit events.

Installing License Feature

A license is needed to use the Spotfire Extension. A FlexNet license feature must be added to the license file used by your OpenSpirit runtime. See the Software Usage Licenses section of this guide for more information about Spotfire Extension licensing. Contact your TIBCO sales representative or TIBCO support to obtain your license features.

Loading the Spotfire Model Views

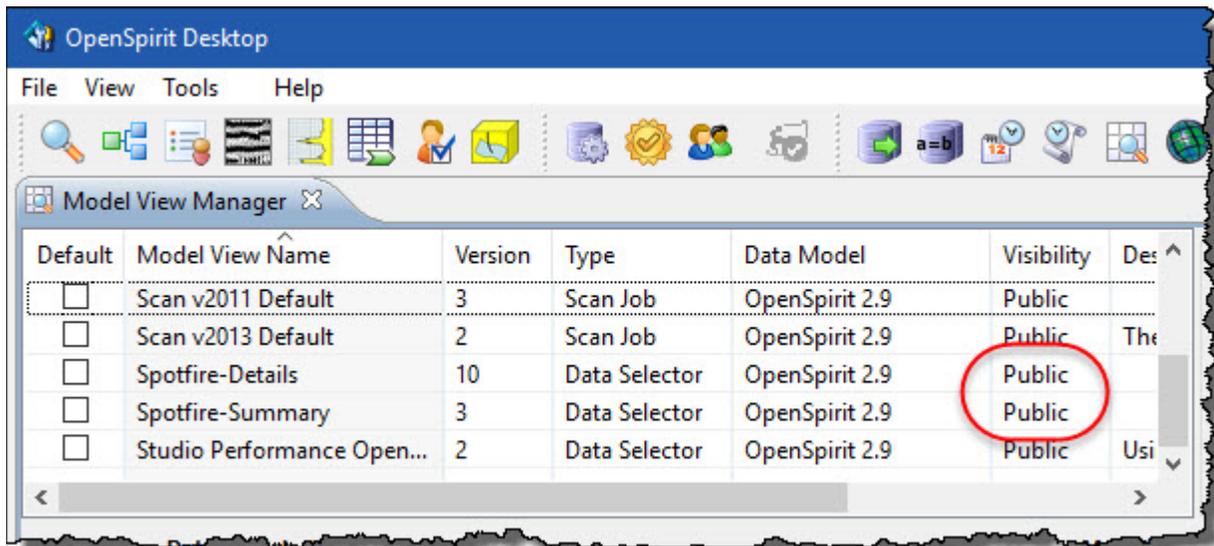
Two OpenSpirit model views are provided with the Spotfire Extension. The model views are provided in files named **Spotfire-Summary.ospmodelview** and **Spotfire-Details.ospmodelview**. These model view files should be imported into the OpenSpirit runtime installation that will be used by the Spotfire Extension users. The Model View Manager tool that resides in the OpenSpirit Desktop is used to import the model view files.

An account that has OpenSpirit administrator privilege or has been granted the **Administer Data Views** right in the OpenSpirit runtime installation must be used to load the model views. Log into an account with the required privileges and start the OpenSpirit Desktop.

Select the Model View Manager option in the OpenSpirit Desktop's Data Manager menu, or click on the Model View Manager button  in the Data Manager tool bar to start the

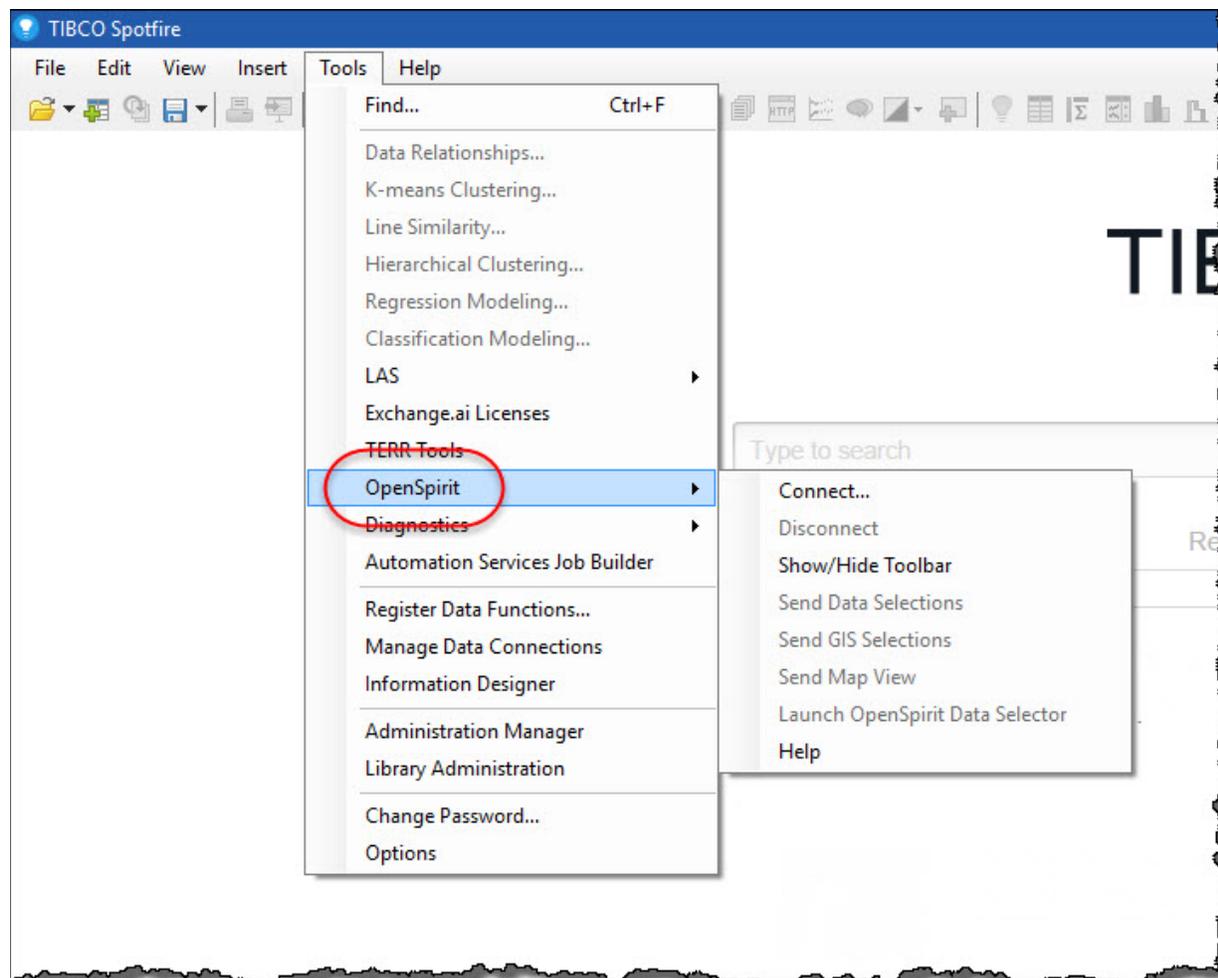
Model View Manager. Click on the import button  in the Model View Manager's tool bar to select the model view files to import. Locate and select the model view files and click the **Open** button to perform the import.

The model views will appear in the list of loaded model views. Make sure the value in the visibility column is Public so that all the Spotfire users will be able to see and select the model views.



Getting Started

The Spotfire Extension adds an **OpenSpirit** entry into the Spotfire Tools menu.



OpenSpirit Menu

The OpenSpirit entry is a cascading menu that contains several options used to control the Spotfire Extension. Several options in the OpenSpirit menu are disabled until Spotfire is in an appropriate state to use the options. The OpenSpirit menu items are also available in the Spotfire Extension tool bar which is described in the following section.

The Spotfire Extension is enabled by establishing a connection to the OpenSpirit Runtime services. This is referred to as "connecting to OpenSpirit".

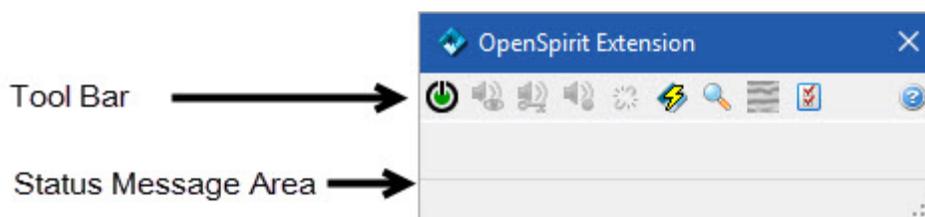
Select the **Connect...** menu option to initiate a connection to OpenSpirit.

The OpenSpirit Runtime services must be running and the required Spotfire Extension software usage licenses must be available in order to connect. See the Software Usage Licenses section of this guide for more information about Spotfire Extension licensing.

A small window containing the Spotfire Extension tool bar will appear when the connection is established. The **Show/Hide Toolbar** menu option can be used to display the Spotfire Extension tool bar window without connecting to OpenSpirit.

Spotfire Extension Window

The OpenSpirit Spotfire Extension window contains a tool bar containing buttons used to control the Spotfire Extension. Some of the buttons are also available as options in the **OpenSpirit** menu that resides in the Spotfire **Tools** menu. The Spotfire Extension window also contains a status area that will display messages when certain actions are performed by the extension.



The window can also be used as a drop target for OpenSpirit data selections. See the Import Using Data Selection Events section of this guide for more information about drag/drop of data selections.

Each of the tool bar buttons are described in the following sections.

Connect Toggle Button

The connect/disconnect tool bar button is used to toggle the Spotfire Extension's connection to OpenSpirit on and off. The button appears green  when the extension is currently connected to OpenSpirit. The button appears red  when the extension is not connected.

Send Map View Event Button

The send map view event button  is enabled when the Spotfire Extension is connected to OpenSpirit and the currently active visual in Spotfire is a Map Chart visual. Clicking on this button will send an OpenSpirit map view event to all applications that are running and listening for map view events. See the Synchronizing Map Views section of this guide for more information about map view events.

Send Data Selection Event Button

The send data selection event button  is enabled when the Spotfire Extension is connected to OpenSpirit and one or more rows are selected in a Spotfire data table that contains an OpenSpirit data key column. Data tables that were created by receiving an OpenSpirit data selection event will have an OpenSpirit data key column.

Send GIS Event Button

The send GIS event button  is enabled when the Spotfire Extension is connected to OpenSpirit and one or more rows are selected in a Spotfire data table that contains a *WKB* column. The table may have been created by receiving an OpenSpirit data selection event, receiving a GIS event, or by importing an ESRI shape file. See the Sending GIS Events section of this guide for more information about sending GIS events.

Selection Highlight Button

The selection highlight button is enabled when the Spotfire Extension is connected to OpenSpirit and a document is open in Spotfire. It is a tri-state button used to establish a selection highlighting session between Spotfire and another application. The other application will most commonly be ESRI's ArcMap application. The button initially appears in the *initiate highlight session* state . The button will transition to the **highlight session pending** state  and finally to the *highlight session established* state . See the Synchronizing Selections section of this guide for more information about establishing highlighting sessions.

Event Listening Toggle Button

The event listening toggle button is enabled when the Spotfire Extension is connected to OpenSpirit. It is used to turn OpenSpirit event listening on and off. The button appears in the on state  when OpenSpirit event listening is enabled. The Spotfire Extension will respond to all OpenSpirit event types when event listening is enabled. The Spotfire Extension does not respond to any OpenSpirit event when the button is in the off state .

Launch Data Selector Button

The launch data selector button  is enabled when the Spotfire Extension is connected to OpenSpirit. It is used to run the OpenSpirit Data Selector application so it can be used to select data to be imported into Spotfire. See the Import Using Data Selection Events section of this guide for more information about using the OpenSpirit Data Selector to import data into Spotfire.

Read Bulk Data Button

The read bulk data button  is enabled when the Spotfire Extension is connected to OpenSpirit and a document is open in Spotfire. Clicking on the read bulk data button opens a window that can be used to import 2D and 3D seismic trace data and horizon grid data. See the Reading Bulk Data section of this guide for details of using the bulk data reading feature of the Spotfire Extension.

Preferences Button

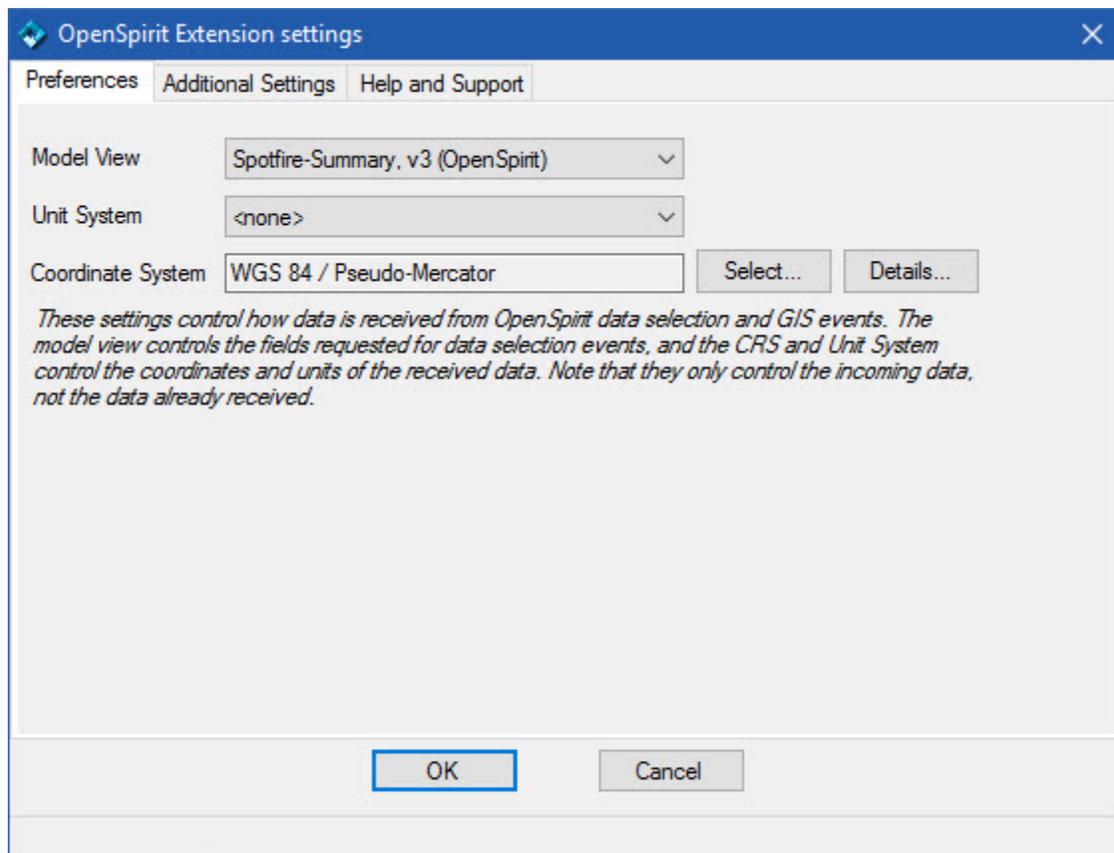
The preferences button  is enabled when the Spotfire Extension is connected to OpenSpirit. This button is used to display the Spotfire Extension preferences settings window. See the Preference Settings section of this guide for more information about Spotfire Extension preference settings.

Help Button

The help button  is always enabled. Clicking on the help button opens this help guide.

Preference Settings

Preference settings can be viewed and modified by clicking on the Show Preferences button  in the OpenSpirit tool bar. The Spotfire Extension must be connected to OpenSpirit to enable the preferences button. The preference settings window will also open automatically when connecting to OpenSpirit if preferences have never been previously saved by clicking on the **Ok** button during the current or a prior run of the Spotfire application.



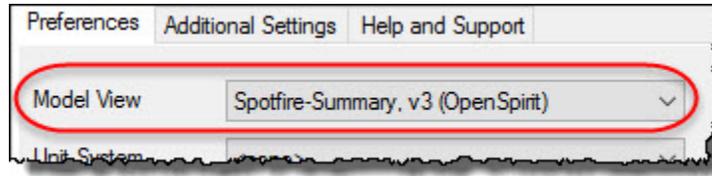
The setting values are preserved in the OpenSpirit metadata repository between runs of the Spotfire Extension when the **Ok** button is pressed to dismiss the settings window. The settings are also preserved on any Spotfire document that the Spotfire Extension is used with and on any Spotfire data table that is created by the Spotfire Extension. See the Document Properties section of this guide for more information about how preference settings are saved as properties on the Spotfire document.

Preferences Tab

The preferences tab contains settings that control how data is imported into Spotfire in response to a data selection event and in response to GIS events. Each setting found on the preferences tab is described below.

Model View

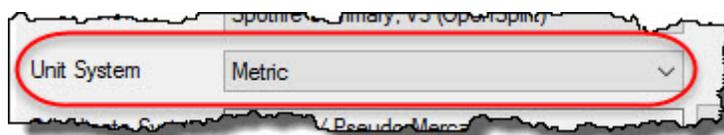
The *model view* preference controls how data tables are created and populated in response to receiving data selection events. The Spotfire Extension will listen for data selection events for data types included for display in the selected model view.



 The model view selection determines the data that can be imported using OpenSpirit data selection events. The model view can also have a significant impact on the amount of time it takes to perform the import. Make sure the **Spotfire Summary** and **Spotfire Details** model views appear in the model view selection list. Ask your OpenSpirit administrator to load the Spotfire model views if they do not appear in the selection list. See the Model Views section of this help guide for information about how the model view controls data import behavior.

Unit System

The unit system preference is used when importing data type attributes that are one of the quantity types (FLOAT_QUANTITY, DOUBLE_QUANTITY, FLOAT_QUANTITY_SERIES, and DOUBLE_QUANTITY_SERIES). Quantity types consist of a numeric value or array of values and a unit of measure designation. The unit system preference is also used for the vertical axis of the coordinate system preference. This determines the unit used to represent Z values in imported spatial data.

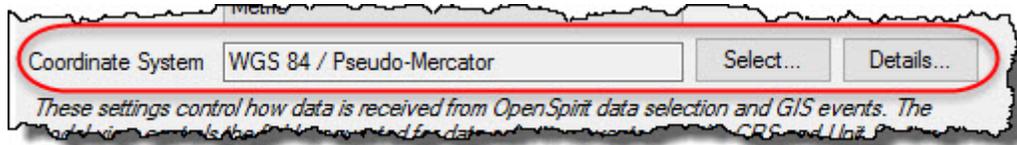


Model view attributes that are one of the four quantity types and are assigned a unit measurement will have their values converted to a common unit if the selected unit system contains a unit for the attribute's assigned measurement type. Representing all the numeric values in a given Spotfire data table column using a common unit makes the information more useful than having the values represented in different units.

For example, the OpenSpirit *Well* data type has an attribute called **Total Depth** that has type **FLOAT_QUANTITY**. The attribute is also tagged with the unit measurement **length vertical**. This means that if the selected unit system contains a unit preference for the **length vertical** unit measurement, all the values imported into the *Well* data table's **Total Depth** column will be converted to that unit. Importing total depth values where some values are expressed in feet and some are expressed in meters will result in all the values appearing in Spotfire expressed in meters if a metric unit system preference was selected. All the values will appear expressed in feet if an imperial unit system preference was selected.

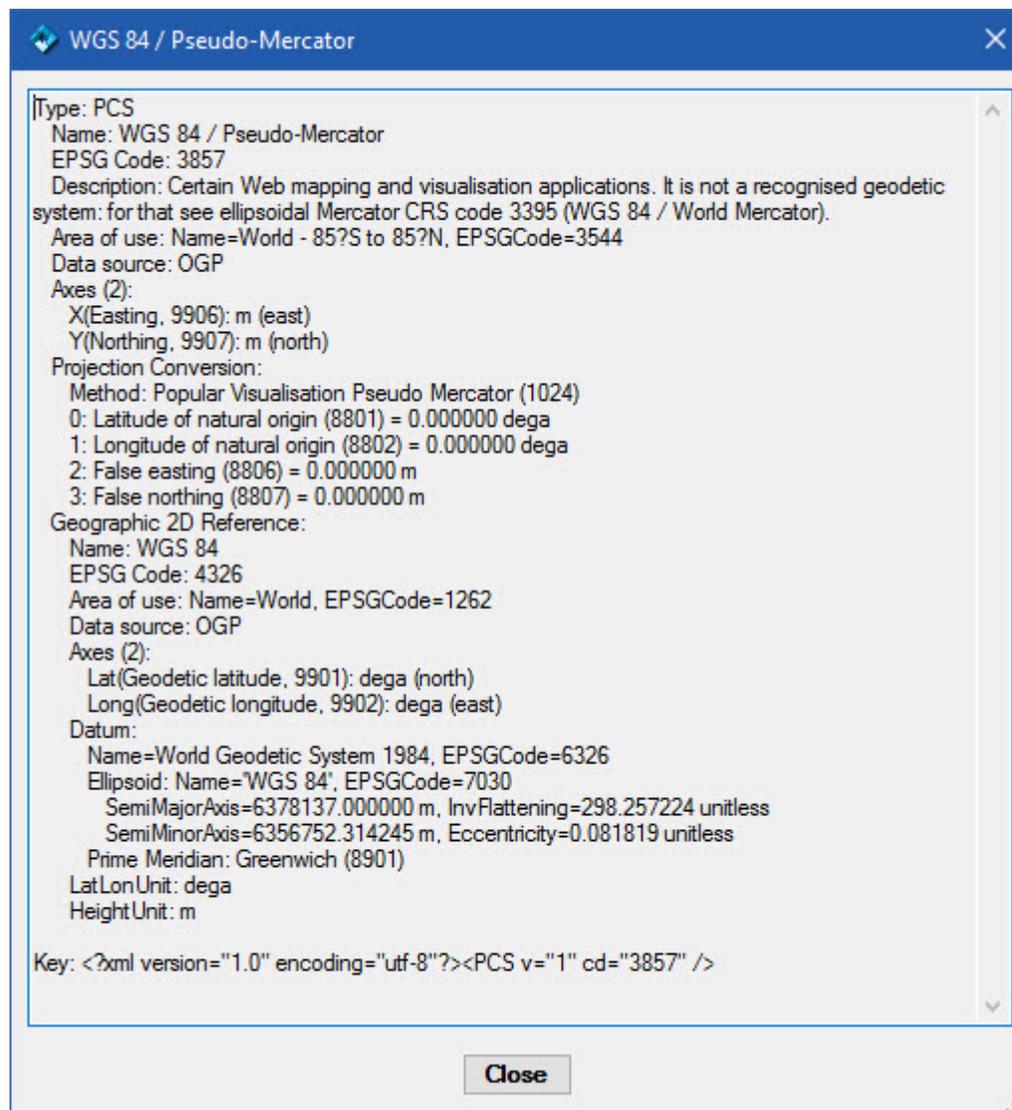
Coordinate System

The coordinate system preference is used when importing spatial data as part of data selection event handling and as part of GIS event handling.



WGS 84 / Pseudo-Mercator is the preselected default coordinate system. It is a coordinate system that is applicable anywhere on earth and is used by many popular web maps, such as Google Maps and Bing Map. Values are expressed in terms of easting and northing values (i.e. X/Y), not in latitude and longitude values.

Click on the **Details...** button to see a detailed description of the selected coordinate system.



Click on the *Select...* button to select from any of the hundreds of predefined EPSG coordinate systems provided as part of the OpenSpirit runtime if you need to work with spatial data using a different coordinate reference system. This will open the coordinate system selection window.

The screenshot shows the 'Coordinate System Selector' dialog box. It features a title bar with a close button. The main content is organized into several sections:

- Coordinate System:** Contains two radio buttons: 'Map Projection' (which is selected) and 'Geographic'.
- Constraints:** Includes a section 'Appropriate for this location:' with input fields for 'Latitude:' and 'Longitude:', and a 'Select from map...' button. Below this is a 'Where system name contains:' field with the text 'WGS 84 / Pseudo-Mercator' and a 'Clear constraints' button.
- System Name:** A dropdown menu currently showing 'WGS 84 / Pseudo-Mercator' and a 'Details...' button.
- Datum Shift to WGS84:** A 'Selected transform:' field and a 'Details...' button.
- Table:** A table with three columns: 'Name', 'Method', and 'Area of Use'. The table body is currently empty.

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

The coordinate system selection window enables selection of geographic (i.e. Latitude/Longitude) coordinate systems and projected (i.e. X/Y) coordinate systems. The system name selection list can be filtered by entering a partial name in the **Where system name contains:** field, and by entering a latitude and longitude of a location representative of the spatial data you will be importing into Spotfire.

The bottom section of the coordinate system selection window is used to select the datum shift to WGS 84 that will be used if there is a need to convert imported spatial data that resides in a different geographic datum from the selected coordinate system.

 Changing the coordinate system or unit preference on a Spotfire document that has already had data imported into it is not recommended. This can lead to inconsistent spatial location values and inconsistent measurement values between data tables.

Current Source of Preferences Information

The preferences tab provides an indication of where the current preference values were obtained. The indication appears just below the coordinate system selection section of the preferences tab. The *Current source of preference information* indication will not appear if the preferences have never been saved by pressing the **Ok** button. The source will appear as *OpenSpirit*, *Document*, or *Previous Prompt* when the indication is present.

OpenSpirit

The Spotfire Extension preference settings are saved as user preferences in the OpenSpirit master installation's metadata repository each time the **Ok** button is pressed on the preference settings window. This enables the Spotfire Extension to remember the settings that were used the last time the Spotfire Extension was connected to OpenSpirit. The current source of preferences will appear as *OpenSpirit* when the preference settings window is showing preferences obtained from the OpenSpirit metadata repository.



Document

The preference settings are also saved as properties on the current Spotfire document if a document is open at the time the **Ok** button is pressed on the preference settings window. Opening a Spotfire document that contains Spotfire Extension preference properties will cause the preference settings window to display the preferences that were being used the last time the Spotfire document was saved. The current source of preferences will be *Document* when the preference settings window is showing preferences obtained from the Spotfire document. See the Document Properties section of this guide for more information about how preference settings are saved as properties on the Spotfire document.



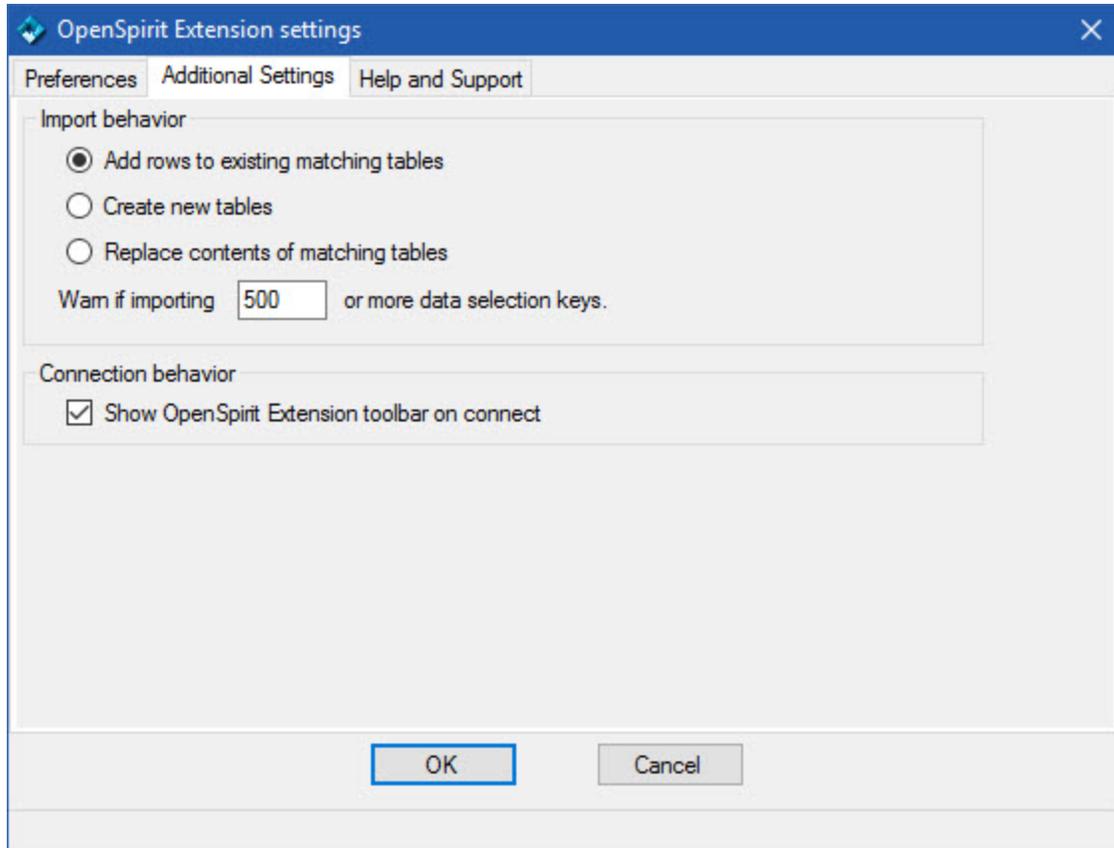
Previous Prompt

The current source of preferences will appear as *Previous Prompt* when one or more preference setting is changed and the **Ok** button is pressed.



Additional Settings Tab

The additional settings tab contains settings that control some behaviors of the Spotfire Extension. Each setting found on the additional settings tab is described below.



Import Behavior

The import behavior option controls how the Spotfire Extension reacts to received data selection events.

Add rows to existing tables

Selecting the *Add rows to existing tables* option causes the Spotfire Extension to add new data rows to existing Spotfire tables if data tables already exist with OpenSpirit property values that identify currently selected model view. New Spotfire tables are created if there is not an existing data table that has been tagged with a matching model UUID and entity view name property. See the Data Table Properties section of this guide for more information about data table properties.

Create new tables

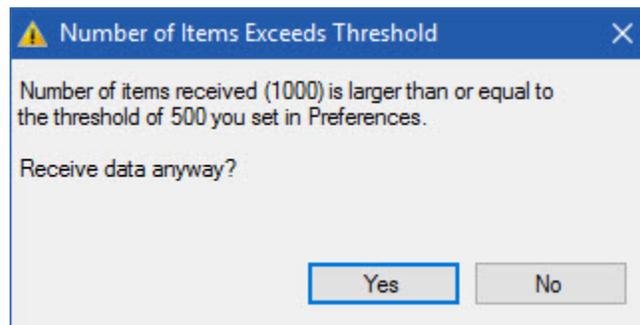
Selecting the *Create new tables* option causes the Spotfire Extension to create new tables for each received data selection event. A count surrounded by parentheses is appended to the table name to prevent clashes with existing table names. For example, receiving a selection for a model view type called "*Well*" will create a new table called "*Well (2)*" if a table already exists with the name "*Well*".

Replace contents of matching tables

Selecting the *Replace contents of matching tables* option causes the Spotfire Extension to replace all existing data rows in existing Spotfire tables if data tables already exist with the same model view UUID, version, and entity view name as is specified by the currently selected model view. New Spotfire tables are created if no data table is found with matching model view properties. See the Data Table Properties section of this guide for more information about data table properties.

Warn if importing

The *Warn if importing* value is used to protect against inadvertently importing a large number of rows of data. Selection events that are received that contain more data item keys than the threshold value will cause a prompt to appear asking you really want to import all the data.



Click on *Yes* to proceed with importing all the data, click on *No* to ignore the data selection event.

Connection Behavior

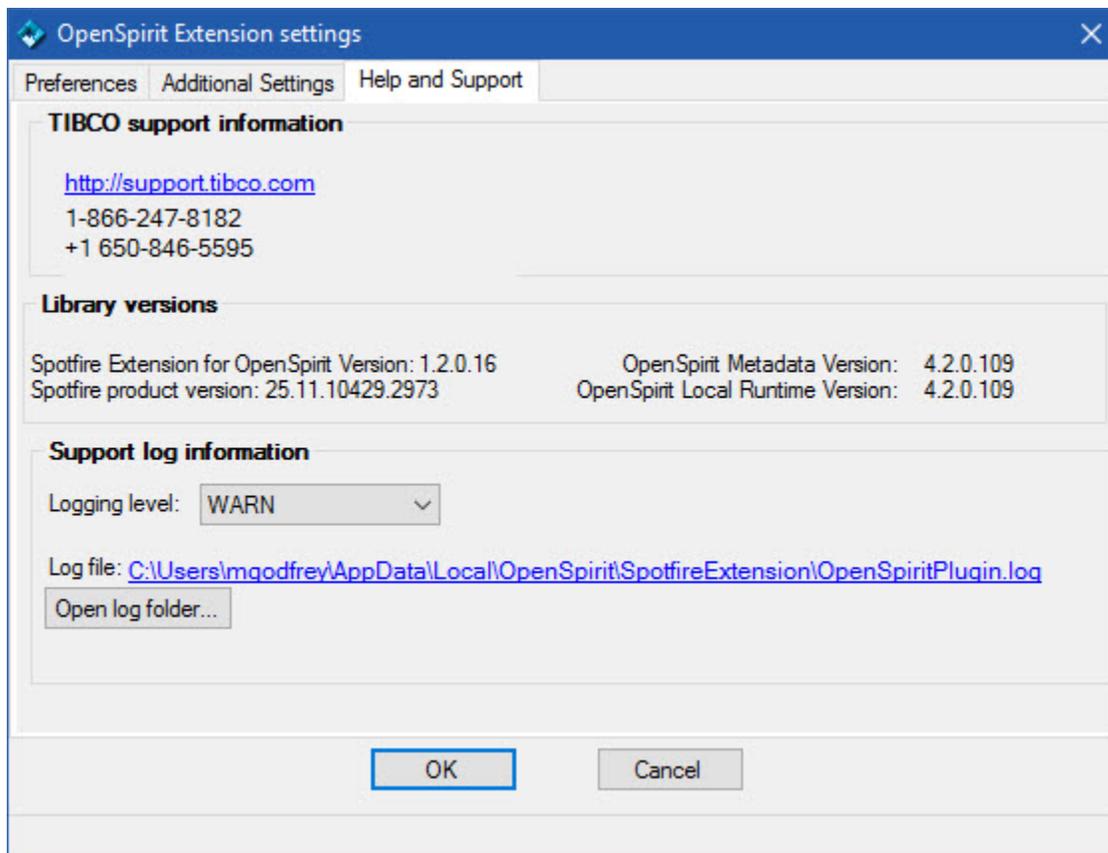
The connection behavior option controls the behavior when choosing the *Connect...* option in the OpenSpirit menu.



Select this option to have the Spotfire Extension tool bar window appear when connecting to OpenSpirit. De-select this option if you do not want the tool bar window to appear. The *Show/Hide* menu option can still be used to open the Spotfire Extension tool bar window when this option is not enabled.

Help and Support Tab

The help and support tab provides information that can help TIBCO support personnel identify problems you may encounter using the Spotfire Extension.



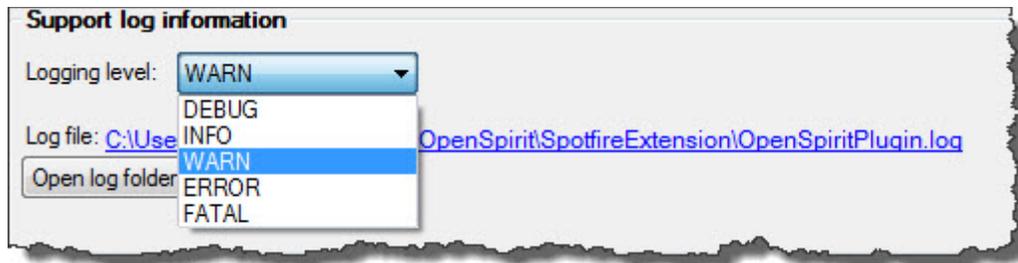
The top section of the tab provides TIBCO support contact information.

The middle section of the tab provides version information for Spotfire, the Spotfire Extension, and for your OpenSpirit Runtime. TIBCO support will need this version information.

The bottom section of the help and support tab is used to control and view logging information generated by the Spotfire Extension.

Logging Level

The logging level setting controls the amount of detail that is written to the Spotfire Extension log file.



You should avoid setting this to **DEBUG** unless instructed to do so by OpenSpirit support in order to avoid overwhelming the log file with a massive amount of log message.

The meaning of each log level is described in the following table.

Logging Level	Description
FATAL	Produces the least amount of log file output. Only failure information is reported. This level should only be used if you have no interest in anything but the most severe problems.
ERROR	Produces log file output only for fatal and non-fatal errors.
WARN	The default level. This is the recommended log level unless you are investigating a problem you are experiencing using the Spotfire Extension.
INFO	Produces less output than DEBUG. Consider using this level if you are investigating a problem, but are also trying to keep the log file size down and are not interested in details of successful operations.
DEBUG	Produces a large amount of output. You typically should not use this level unless instructed by OpenSpirit support. Large numbers of messages needed to diagnose problems are produced when this log level is used.

Log File

Clicking on the log file hyperlink will open the Spotfire Extension log file in your system's default log file viewer. Click on the *Open log folder...* button to open the folder that contains the Spotfire Extension log file in Windows File Explorer.



Spotfire Properties

The Spotfire Extension creates properties on Spotfire documents, data tables, and columns. The properties are used to insure that spatial data and measurement data are properly handled when added to a Spotfire data table. The properties are also used to provide information that can be helpful in tracking down problems and to help Spotfire users better understand data imported using the Spotfire Extension. The properties are described in the following sections of this guide.

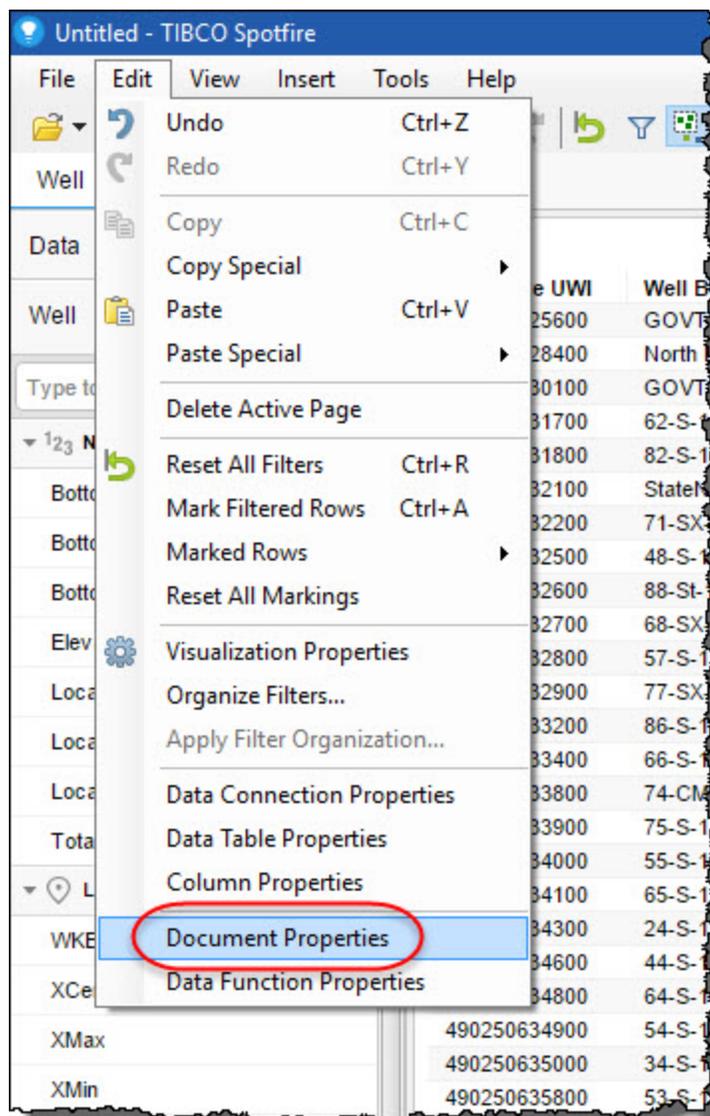
Document Properties

The following properties are added to the currently open Spotfire document when the Spotfire Extension is used. The properties are updated whenever the Spotfire Extension preference settings are changed while the document is open in Spotfire. Opening a Spotfire document that has these properties causes the Spotfire Extension preference settings to be changed to the values found in the document's properties.

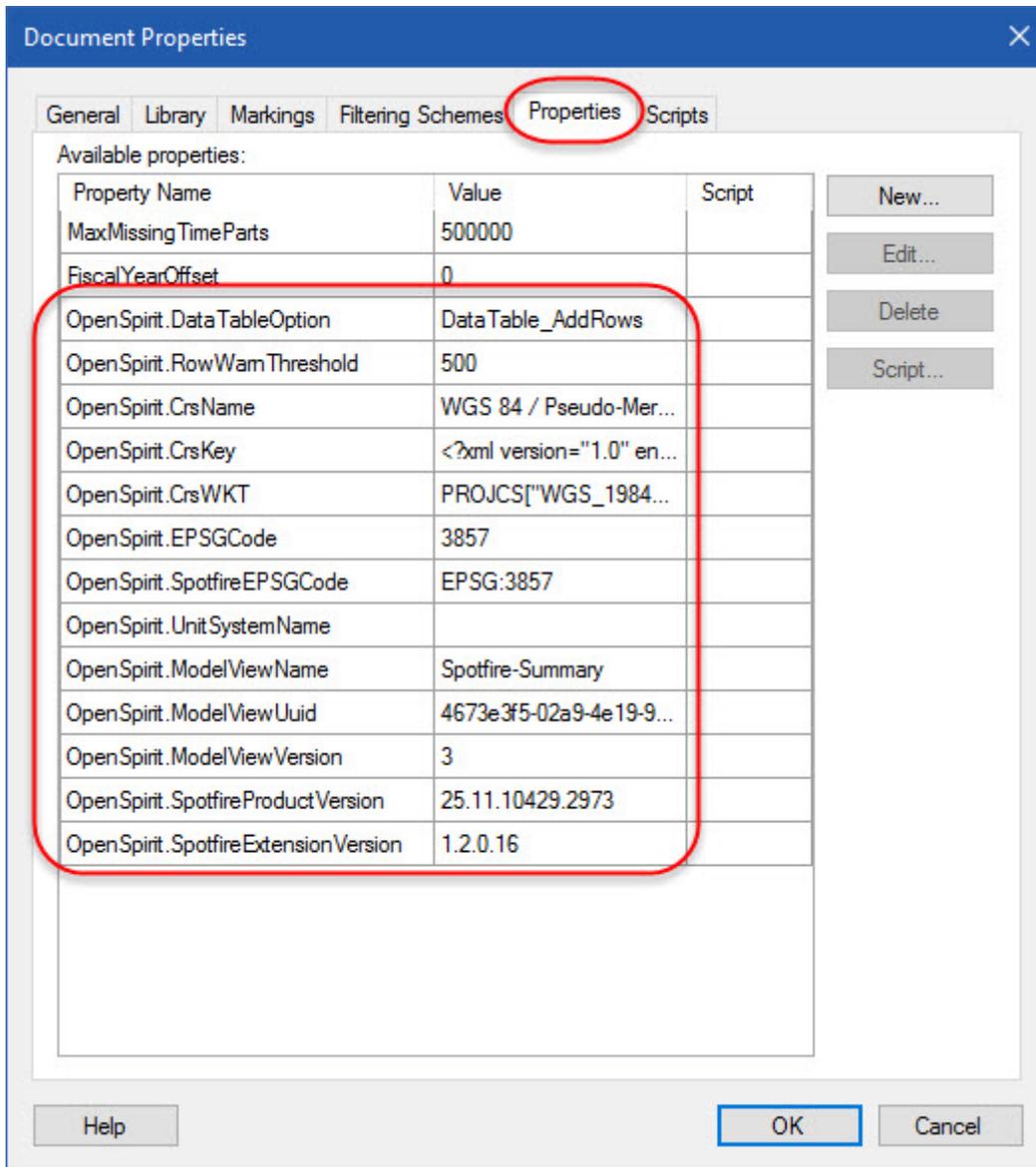
Property Name	Description
OpenSpirit.DataTableOption	Indicates the most recent Spotfire Extension Import behavior setting. The value will be one of the following: <ul style="list-style-type: none"> • DataTable_AddRows • DataTable_CreateTable • DataTable_ReplaceTable
OpenSpirit.RowWarnThreshold	Indicates the most recent Spotfire Extension Warn if importing ### or more data selection keys setting. The value will be the number of data selection keys that triggers a warning.
OpenSpirit.CrsName	Name of the most recent Spotfire Extension Coordinate System selection.
OpenSpirit.CrsKey	OpenSpirit coordinate system key representation of the most recent Spotfire Extension Coordinate System selection.
OpenSpirit.CrsWKT	ESRI Well Known Text representation of the most recent Spotfire Extension Coordinate System selection.
OpenSpirit.EPSGCode	EPSG code representation of the most recent Spotfire Extension Coordinate System selection.
OpenSpirit.SpotfireEPSGCode	Spotfire formatted EPSG code representation of the most recent Spotfire Extension Coordinate System selection. The value will be blank if Spotfire cannot handle the Spotfire Extension Coordinate System selection.
OpenSpirit.UnitSystemName	Name of the most recent Spotfire Extension Unit System selection.
OpenSpirit.ModelViewName	Name of the most recent Spotfire Extension Model View selection.

Property Name	Description
OpenSpirit.ModelViewUuid	Unique identifier of the most recent Spotfire Extension Model View selection.
OpenSpirit.ModelViewVersion	Version of the most recent Spotfire Extension Model View selection.
OpenSpirit.SpotfireProductVersion	Version of Spotfire that the Spotfire Extension was used in.
OpenSpirit.SpotfireExtensionVersion	Version of the Spotfire Extension.

The document properties can be viewed in Spotfire by selecting the *Document Properties* option in the Spotfire *Edit* menu.



This opens a window that can be used to inspect the document properties. Select the Properties tab to view the document properties. Properties added by the Spotfire Extension have property names that begin with "*OpenSpirit*".

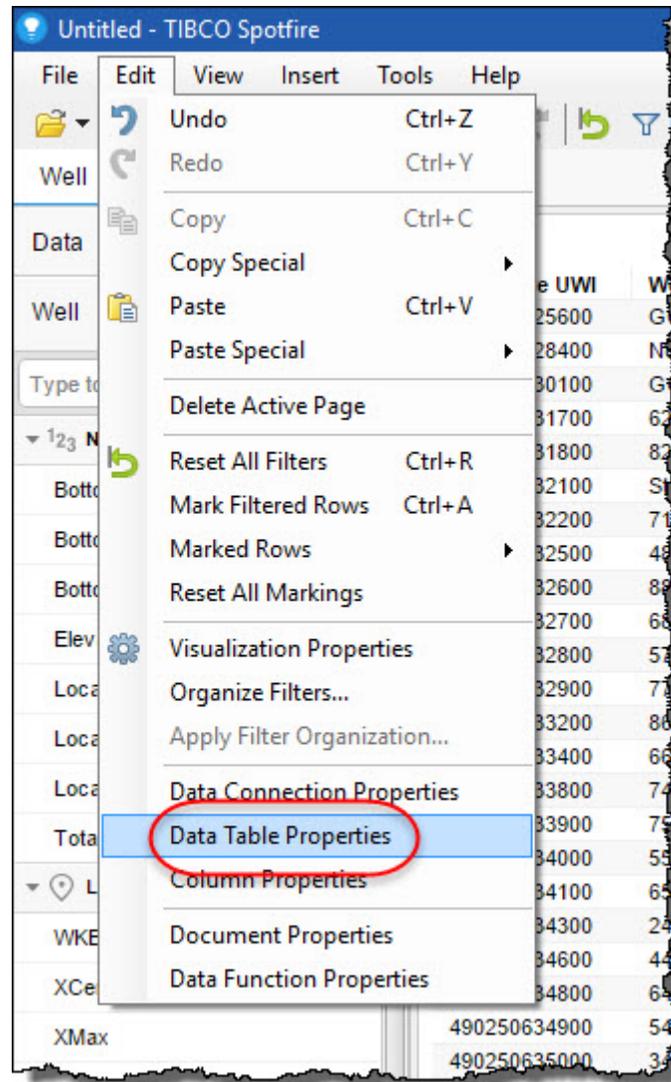


Data Table Properties

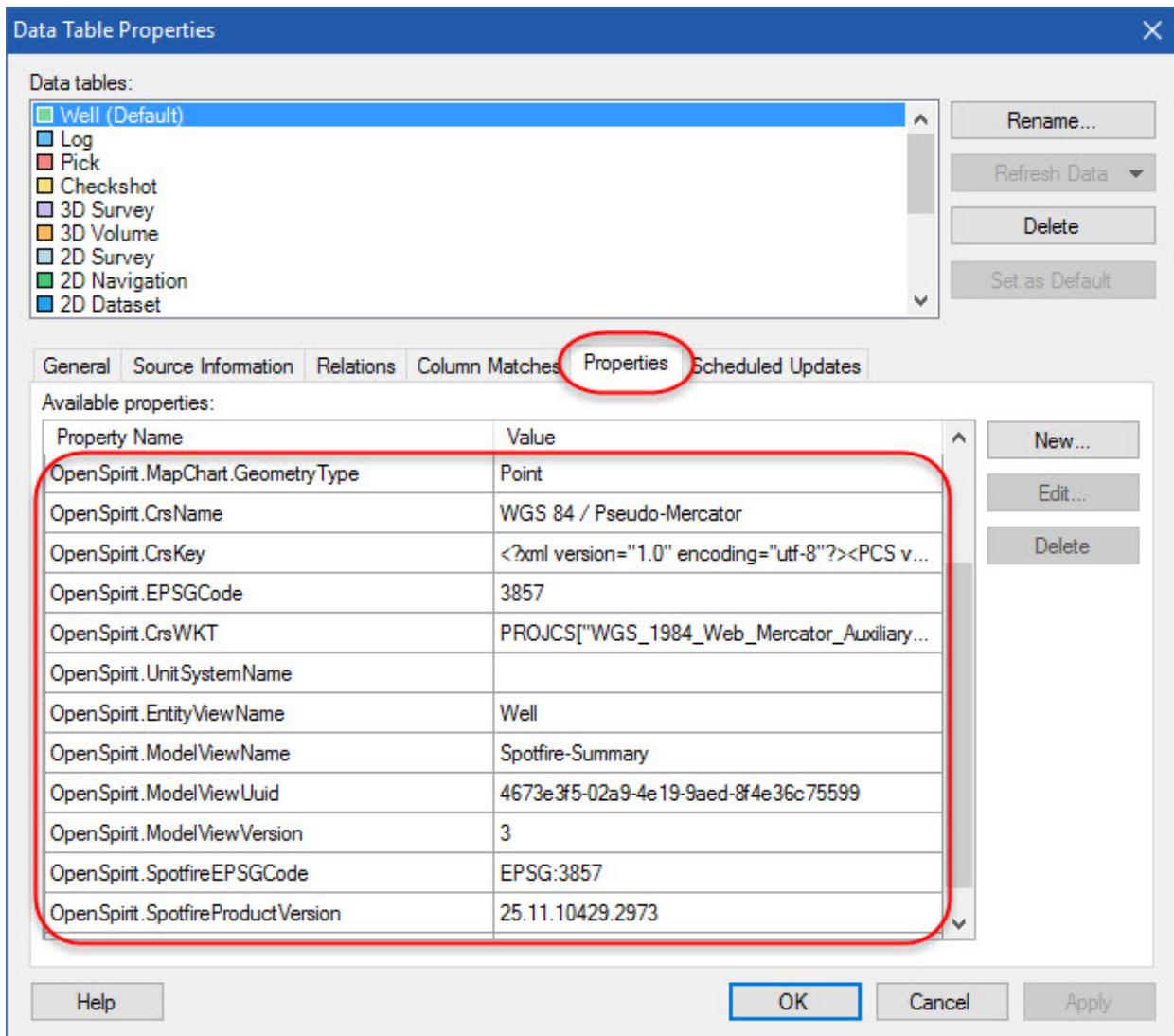
The following properties are added to data tables that are created by the Spotfire Extension when processing a received data selection event or a received GIS event. The properties are assigned values based on the Spotfire Extension preference settings at the time the event is received. The data table properties are not modified once the data table has been created, even if your preference settings are changed. Any new rows added later to the data table by the Spotfire Extension are transformed to the coordinate system and unit system identified by the data table property values that were set when the data table was originally created by the Spotfire Extension.

Property Name	Description
OpenSpirit.MapChart.GeometryType	Identifies the type of geometry that is represented by the data table's geometry column, if the data table has a geometry column. The property value will be blank if the data table does not have a geometry column. The property value will contain one of the following values if the data table does have a geometry column. <ul style="list-style-type: none"> • Point • LineString • Polygon
OpenSpirit.CrsName	Name of the Spotfire Extension Coordinate System preference setting at the time the data table was created.
OpenSpirit.CrsKey	OpenSpirit coordinate system key representation of the Spotfire Extension Coordinate System preference setting at the time the data table was created.
OpenSpirit.CrsWKT	ESRI Well Known Text representation of the Spotfire Extension Coordinate System preference setting at the time the data table was created.
OpenSpirit.EPSGCode	EPSG code representation of the of the Spotfire Extension Coordinate System preference setting at the time the data table was created.
OpenSpirit.SpotfireEPSGCode	Spotfire EPSG code string representation of the of the Spotfire Extension Coordinate System preference setting at the time the data table was created.
OpenSpirit.UnitSystemName	Name of the Spotfire Extension Unit System preference setting at the time the data table was created.
OpenSpirit.ModelViewName	Name of the Spotfire Extension Model View preference setting at the time the data table was created.
OpenSpirit.ModelViewUuid	Unique identifier of the Spotfire Extension Model View preference setting at the time the data table was created.
OpenSpirit.ModelViewVersion	Version of the Spotfire Extension Model View preference setting at the time the data table was created.
OpenSpirit.EntityViewName	Name of the model view entity view used to create the data table. The property value will be blank if the data table was created from a GIS event.
OpenSpirit.SpotfireProductVersion	Version of Spotfire that the Spotfire Extension was used in.
OpenSpirit.SpotfireExtensionVersion	Version of the Spotfire Extension.

The data table properties can be viewed in Spotfire by selecting the **Data Table Properties** option in the Spotfire *Edit* menu.



This opens a window that can be used to inspect data table properties. Select the Properties tab to view the properties for the data table that is selected in the top section of the window. Properties added by the Spotfire Extension have property names that begin with *"OpenSpirit."*

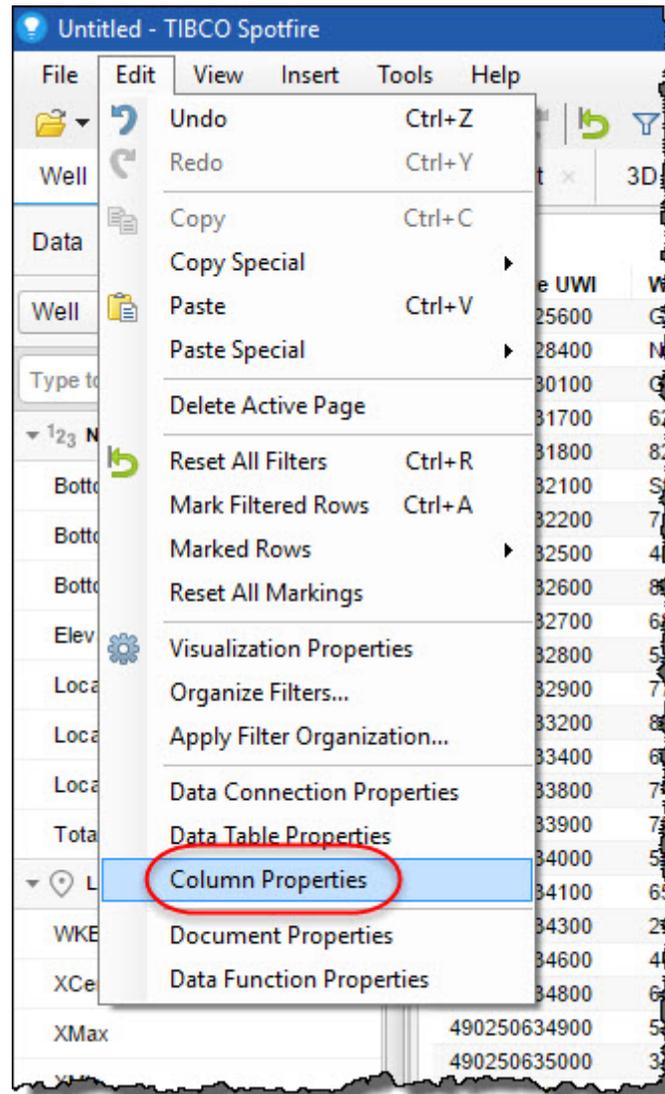


Column Properties

The following properties are added to data table columns that are created by the Spotfire Extension when processing a received data selection event or a received GIS event. The properties are assigned values based on the data type of the OpenSpirit value being represented by the column. The column properties are not modified once the data table column has been created by the Spotfire Extension.

Property Name	Description
OpenSpirit.OspTypes	Indicates the OpenSpirit data type of values represented in the column.
OpenSpirit.OspTypes.Meta	This property is blank for most column data types. Columns that represent a spatial X, Y, or Z value or a measurement value may have a non-blank value for this property.

The column properties can be viewed in Spotfire by selecting the *Column Properties* option in the Spotfire *Edit* menu.



This opens a window that can be used to inspect column properties. Select the Properties tab to view the properties for the data table that is selected in the top section of the window and column selected in the middle section of the window. Properties added by the Spotfire Extension have property names that begin with "*OpenSpirit.*".

Column Properties

Data table: Well

Columns and hierarchies:

Type to search

Name	Column Type	Data Type	ExternalName	ExternalId	IsValid
Elevation.Unit	Imported	String	Elevation.Unit		True
Elevation Datum	Imported	String	Elevation Datum		True
Bore Status	Imported	String	Bore Status		True
Location.X	Imported	Real	Location.X		True
Location.Y	Imported	Real	Location.Y		True
Location.Z	Imported	Real	Location.Z		True
XMin	Imported	Real	XMin		True

General Formatting **Properties** Geocoding Sort Order

Available properties:

Property Name	Value
DefaultContinuousColorScheme	
DefaultCategoricalColorScheme	
ContentType	
Keywords	
GeocodingType	
GeocodingRepresentation	
GeocodingHierarchyName	
OpenSpirit.Osp Types	Point
OpenSpirit.Osp Types.Meta	X
Mapchart.ColumnTypeID	
IsHiddenColumn	False

Help OK Cancel Apply

Import Using Data Selection Events

The Spotfire Extension enables OpenSpirit data selection events to be used to create and populate Spotfire data tables. This enables Spotfire users to easily import geotechnical data into Spotfire from any data source supported by an OpenSpirit data connector. Examples of geotechnical data stores supported by OpenSpirit are OpenWorks, Studio, GeoFrame, PPDM, Kingdom, Petra, EPOS, and Recall.

Data Selection Events

A data selection event is an event that can be broadcast from a number of OpenSpirit tools as well as from applications from a variety of software vendors that have created linkages between their application and the OpenSpirit framework. Applications that can listen for data selection events, such as the Spotfire Extension, typically respond to a data selection event by using the OpenSpirit data service to read the data identified by the data selection event. The Spotfire Extension responds to data selection events by loading the data identified by the event into one or more new or existing Spotfire data tables.

Data Keys

A data selection event contains a collection of data keys. A data key is similar in concept to an internet URL used by web browsers. Internet URLs identify a web page, whereas an OpenSpirit data key identifies a row of data that resides in an OpenSpirit enabled data store.

A data key is represented using XML which contains all the information needed to locate a specific row of data using the OpenSpirit data service. A data key does not contain the data, it only contains values required to uniquely identify a data item. Using SQL terminology it can be described as containing the database identity, a table name, and the primary key values needed to identify a specific row in the table. Following is an example of a data key used to identify a well bore that resides in an OpenWorks R5000 project.

```
<key en="EpiWell_WellBore" mv="2.9" dn="R5000_ONSHORE" tn="OpenWorks" tv="R5000"
pn="TEAPOTDOME_V1"><se n="gdiWellEntire_t" id="1"/><a n="wellid" ei="1">1166</a></key>
```

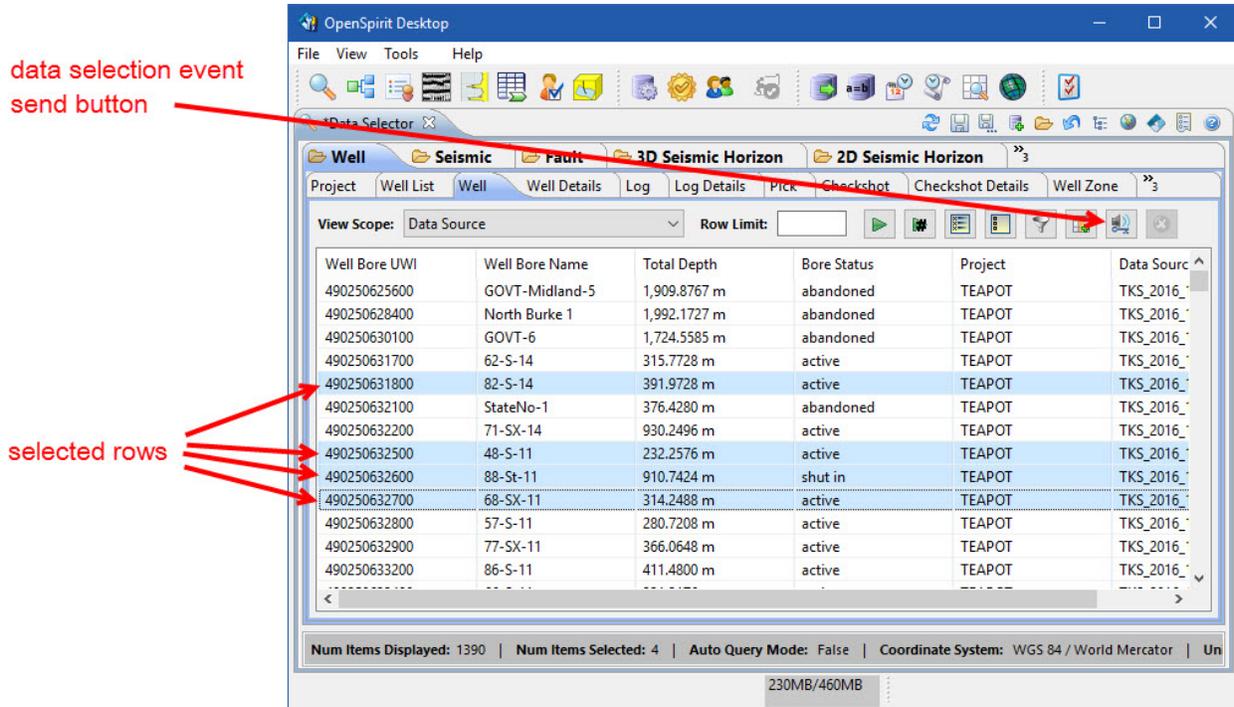
Data keys are not intended to be readable or created by humans. Data keys are created by the OpenSpirit data service. A data key is shown here so that you will be able to recognize it if one appears in an error log file or an error message.



Data keys do not contain any *model view* information. They contain information about a data model. A data key indicates the data model data type that the key identifies. There may be many model views that have defined data type views for the key's data model data type. For example, the OpenSpirit data model contains a data type named *EpiWell_WellBore*. This is the data model data type for the example data key shown above. The *OpenSpirit Default* data selector model view defines two data type views for *EpiWell_WellBore*, a data type view named *Well* and another data type view named *Well Details*.

OpenSpirit Data Selector

The tool that is most commonly used to generate and send data selection events is the Data Selector tool found in the OpenSpirit Desktop. The OpenSpirit Desktop is an application that is included in the TIBCO OpenSpirit Runtime product. The Data Selector is used to browse data residing in OpenSpirit enabled data stores. Data is displayed in tables organized by data type. Rows of displayed data can be selected and the data keys associated with the selected rows can be broadcast to other applications by sending them in a data selection event.



The OpenSpirit Data Selector is a powerful data browsing and selection tool with many features. See the Data Selector section of the OpenSpirit Desktop Help guide for information about using the OpenSpirit Data Selector.



Other applications can be used to send data selection events to the Spotfire Extension. The Esri ArcMap application used in conjunction with the TIBCO OpenSpirit Extension for ArcGIS can be used to select data that has been added to maps using OpenSpirit and send data selection events. Geoscience engineering applications such as Schlumberger's Petrel application can also be used to send data selection events.

The following image shows what Spotfire looks like after receiving the data selection event sent by the Data Selector shown above.

Well Bore UWI	Well Bore Name	Country	Field	Operator	Total Depth
490250625600	GOVT-Midland-5		West Teapot	Trigood Oil	6265.9
490250628400	North Burke 1		Wildcat	Davis Oil Co.	6535.9
490250630100	GOVT-6		Wildcat	Trigood Oil	5657.9
490250631700	62-S-14		Teapot Dome	U.S. DOE	1036.0
490250631800	82-S-14		Teapot Dome	U.S. DOE	1286.0
490250632100	StateNo-1		Wildcat	Snyder Oil Corp	1235.0
490250632200	71-SX-14		Teapot Dome	U.S. DOE	3051.9
490250632500	48-S-11		Teapot Dome	U.S. DOE	762.0
490250632600	88-St-11		Teapot Dome	U.S. DOE	2987.9
490250632700	68-SX-11		Teapot Dome	U.S. DOE	1031.0
490250632800	57-S-11		Teapot Dome	U.S. DOE	921.0
490250632900	77-SX-11		Teapot Dome	U.S. DOE	1201.0
490250633200	86-S-11		Teapot Dome	U.S. DOE	1350.0
490250633400	66-S-11		Teapot Dome	U.S. DOE	1087.0
490250633800	74-CMX-10-WD		Teapot Dome	U.S. DOE	6863.9
490250633900	75-S-11		Teapot Dome	U.S. DOE	1239.0
490250634000	55-S-11		Teapot Dome	U.S. DOE	882.0
490250634100	65-S-11		Teapot Dome	U.S. DOE	1026.0
490250634300	24-S-11		Teapot Dome	U.S. DOE	562.0
490250634600	44-S-11		Teapot Dome	U.S. DOE	745.0
490250634800	64-S-11		Teapot Dome	U.S. DOE	1001.0
490250634900	54-S-11		Teapot Dome	U.S. DOE	867.0

Drag and Drop

Data can also be imported into Spotfire using drag and drop from the OpenSpirit Data Selector or from any other application that supports OpenSpirit drag and drop. Drag and drop is performed using the OpenSpirit Data Selector by selecting the rows to be imported in the Data Selector and then clicking on the selected rows keeping the left mouse button pressed while you drag the selected rows to the Spotfire Extension's tool bar window. You must release the mouse button while the mouse cursor is over the Spotfire Extension's tool bar window for Spotfire to receive the drop.



Drag and drop can be useful if you are running multiple OpenSpirit enabled applications and wish the data selections to be received only by Spotfire rather than by all applications that are listening for data selection events. It is also useful if you are having Windows firewall problems that are preventing Spotfire from receiving OpenSpirit events.

Column Type Mappings

The OpenSpirit data service supports a richer set of column data types than Spotfire. The following table shows how each OpenSpirit column data type has been mapped into Spotfire column data types.

OpenSpirit Data Type	Spotfire Data Type	Comments
BIGINT	LongInteger	

OpenSpirit Data Type	Spotfire Data Type	Comments
BIGINT_ARRAY	LongInteger	Row duplication is used to import all array values.
BOOLEAN	Boolean	
BOOLEAN_ARRAY	Boolean	Row duplication is used to import all array values.
BULK_DATA	n/a	Ignored, no column is created in Spotfire.
CHAR	String	
COLOR	String	The color's name is used if it can be determined, otherwise the color's RGB values
GEOMETRY	Real & Binary	<p>Real columns are created for the X, Y, and Z values for Point, LineString, and MultiPoint geometry types.</p> <p>Row duplication is used to import all LineString points and MultiPoint points.</p> <p>Polygon, MultiPolygon, and MultiLineString geometries are ignored unless the model view attribute was designated as the spatial attribute.</p> <p>A Binary column named WKB is also created if the model view attribute was designated as the spatial attribute. The Binary column will contain the geometry represented as ESRI WKB. The WKB column facilitates using a Map Chart visualization to spatially view the Spotfire data table.</p> <p>Real columns named XMin, XMax, XCenter, YMin, YMax, and YCenter are also created to facilitate use with Spotfire Map Chart markers and pies if the model view attribute was designated as the spatial attribute.</p>
COORDINATE_REFERENCE_SYSTEM	String	The name of the coordinate system is imported.
DATAKEY	String	Data keys are imported as strings, but the columns are hidden in the table visualization. You can un-hide the column to see data key values in the Spotfire table.

OpenSpirit Data Type	Spotfire Data Type	Comments
DATAKEY_ARRAY	n/a	Ignored, no column is created in Spotfire.
DATE	DateTime	
DOUBLE	Real	
DOUBLE_ARRAY	Real	Row duplication is used to import all array values.
DOUBLE_QUANTITY	Real & String	<p>A Real column is created for the value and a String column is created for the unit.</p> <p>Unit conversion may be performed if a unit system was selected in the Spotfire Extension preferences and if the attribute was assigned a UnitMeasurement in the OpenSpirit or native data model.</p>
DOUBLE_QUANTITY_SERIES	Real & String	<p>A Real column is created for the values and a String column is created for the unit.</p> <p>Row duplication is used to import all array values.</p> <p>The unit appears in all duplicated rows.</p> <p>Unit conversion may be performed if a unit system was selected in the Spotfire Extension preferences and if the attribute was assigned a UnitMeasurement in the OpenSpirit or native data model.</p>
FLOAT	SingleReal	
FLOAT_ARRAY	SingleReal	Row duplication is used to import all array values.
FLOAT_QUANTITY	SingleReal & String	<p>A SingleReal column is created for the value and a String column is created for the unit.</p> <p>Unit conversion may be performed if a unit system was selected in the Spotfire Extension preferences and if the attribute was assigned a UnitMeasurement in the OpenSpirit or native data model.</p>

OpenSpirit Data Type	Spotfire Data Type	Comments
FLOAT_QUANTITY_SERIES	SingleReal & String	<p>A SingleReal column is created for the values and a String column is created for the unit.</p> <p>Row duplication is used to import all array values.</p> <p>The unit appears in all duplicated rows.</p> <p>Unit conversion may be performed if a unit system was selected in the Spotfire Extension preferences and if the attribute was assigned a UnitMeasurement in the OpenSpirit or native data model.</p>
INTEGER	Integer	
INTEGER_ARRAY	Integer	Row duplication is used to import all array values.
SMALLINT	Integer	
SMALLINT_ARRAY	Integer	Row duplication is used to import all array values.
STRING_ARRAY	String	Row duplication is not used. The array elements are concatenated into a single string using a comma separator.
TIME	Time	
TIMESTAMP	DateTime	
TINYINT	Integer	
TINYINT_ARRAY	Integer	Row duplication is used to import all array values.
UNIT	String	The unit symbol is imported.
VARCHAR	String	
BLOB	n/a	Ignored, no column is created in Spotfire.
CLOB	n/a	Ignored, no column is created in Spotfire.

Row Duplication

Row duplication may occur when importing rows using a model view that contains array column types. Geometry columns that contain a LineString or MultiPoint geometry type will cause the same row duplication as array columns.

The array or geometry column having the largest number of elements determines the number of rows that will be created for a data key that is being imported. Array columns or geometries that have fewer elements than the longest array or geometry column will not have values in the duplicated rows beyond their own element size. Scalar column values are repeated in all of the duplicated rows.

For example, the following table illustrates row duplication that occurred when importing two well logs into Spotfire.

Name	Curve Name	PathMD	TraceIndex	TraceData	Curve Unit
401-A-28	GR	0.0	2600.0	26.74	gAPI
401-A-28	GR	1634.0	2600.5	27.94	gAPI
401-A-28	GR	2925.0	2601.0	30.21	gAPI
401-A-28	GR		2601.5	28.99	gAPI
401-A-28	GR		2602.0	27.78	gAPI
71-StX-10	RHOB	0.0	1139.5	2.09	g/cm3
71-StX-10	RHOB	1357.0	1140.5	2.15	g/cm3
71-StX-10	RHOB		1141.0	2.21	g/cm3
71-StX-10	RHOB		1141.5	2.23	g/cm3
71-StX-10	RHOB		1142.0	2.14	g/cm3
71-StX-10	RHOB		1142.5	2.05	g/cm3
71-StX-10	RHOB		1143.0	1.98	g/cm3

The *PathMD*, *TraceIndex*, and *TraceData* columns have array data types. The first log with *Curve Name* "GR" had a *PathMD* array that contained 3 elements. The "GR" log's *TraceIndex* and *TraceData* arrays each contained 5 elements. The *PathMD* array had 2 fewer elements than the *TraceIndex* and *TraceData* arrays, so 2 of the "GR" log's rows contain no values in the *PathMD* column. The *Name*, *Curve Name*, and *Curve Unit* columns have scalar (i.e. single value) data types, so the values were replicated in all rows created for the "GR" log.

The log with *Curve Name* "RHOB" had a *PathMD* array containing 2 elements and a *TraceIndex* and *TraceData* array each containing 7 elements. The *PathMD* array had 5 fewer elements than the other arrays, so the *PathMD* column for the "RHOB" log has 5 rows with no values.

The column types that cause row duplication are indicated in the comments of the column type mapping table shown above.

Conversions

Conversions may be performed on values for some column data types. Values that have a *GEOMETRY* or one of the *QUANTITY* data types may be converted during import.

Coordinate System Conversions

Coordinate system conversions are performed on values that have a **GEOMETRY** OpenSpirit data type when data is imported into a Spotfire document. All geometry values are converted to the coordinate system selected as your Spotfire Extension Coordinate System preference setting when new data tables are created. Geometry values are converted to the coordinate system specified in data table properties when rows are added to an existing data table that was previously created by the Spotfire Extension. See the Data Table Properties section of this guide for more information about data table properties.



Any value that cannot be converted due to an incompatible coordinate system will appear as a null value in the Spotfire data table.

Imported X/Y or Latitude/Longitude values will be expressed in the horizontal axis unit of the coordinate system selected in your preference settings. The Z values of 3D geometry values are converted to the horizontal axis unit of the coordinate system selected in your preference settings if the coordinate system preference is a projected coordinate system. Z values are converted to the geographic system height unit, which is almost always meter, if the coordinate system preference is a geographic coordinate system.



Coordinate system conversion can be avoided by setting your Spotfire Extension Coordinate System preference setting to the same coordinate system that is used by the spatial data being imported.



Changing your Spotfire Extension Coordinate System preference setting between imports to the same Spotfire document is strongly discouraged. This will cause spatial location values in the document to be inconsistent.

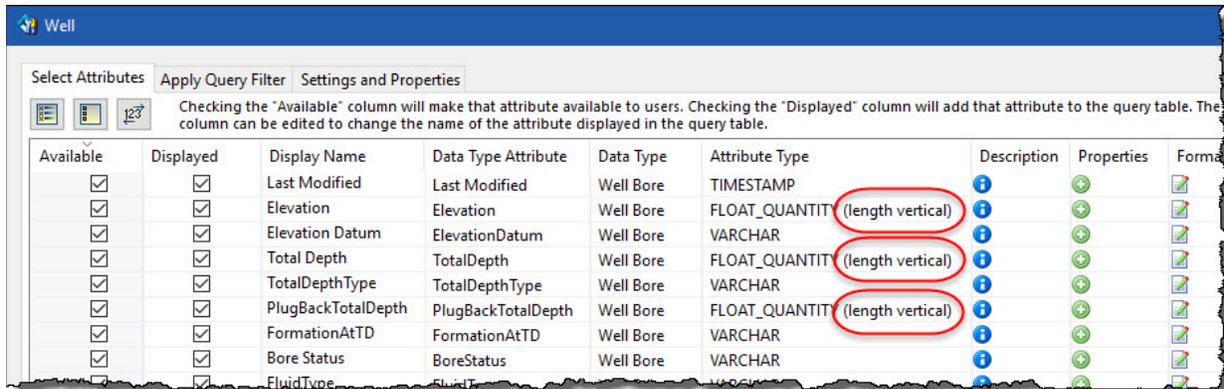
Unit Conversions

Unit conversion may be performed on values that have a quantity OpenSpirit data type when data is imported into a Spotfire document if a unit system was selected in the Spotfire Extension preferences window. The quantity data types are **FLOAT_QUANTITY**, **FLOAT_QUANTITY_SERIES**, **DOUBLE_QUANTITY**, and **DOUBLE_QUANTITY_SERIES**. Unit conversions are only performed on quantity attributes that are assigned a unit measurement in the OpenSpirit or native data model. Quantity values imported into existing data tables are converted to the unit indicated by the unit system name property on the data table when rows are added to an existing data table that was previously created by the Spotfire Extension. See the Data Table Properties section of this guide for more information about data table properties.



You can determine if an OpenSpirit or native data model attribute has an assigned unit measurement using the OpenSpirit Data Selector. Select the model view you are using in Spotfire when selecting a data source to use in the Data Selector. The model view can be selected at the bottom of the Data Source Selection window that appears when starting the Data Selector. Choose the tab in the data selector for the data type that you are interested in.

Click on the column selection button  in the Data Selector tab's tool bar. Find the quantity data model attribute you are interested in and look at the information in the *Attribute Type* column. Quantity types that have been assigned a unit measurement will show the name of the unit measurement in parenthesis next to the data type.



Available	Displayed	Display Name	Data Type Attribute	Data Type	Attribute Type	Description	Properties	Format
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Last Modified	Last Modified	Well Bore	TIMESTAMP			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Elevation	Elevation	Well Bore	FLOAT_QUANTITY (length vertical)			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Elevation Datum	ElevationDatum	Well Bore	VARCHAR			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Total Depth	TotalDepth	Well Bore	FLOAT_QUANTITY (length vertical)			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TotalDepthType	TotalDepthType	Well Bore	VARCHAR			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PlugBackTotalDepth	PlugBackTotalDepth	Well Bore	FLOAT_QUANTITY (length vertical)			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FormationAtTD	FormationAtTD	Well Bore	VARCHAR			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Bore Status	BoreStatus	Well Bore	VARCHAR			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FluidType	FluidType	Well Bore	VARCHAR			

Model Views

The data types (e.g. Well, Pick, Log, 2D Navigation, Production Volume, Casing, etc.) that can be imported into Spotfire is determined by the *model view* that is selected in the Spotfire Extension preference settings. The selected model view also determines the columns that will exist in the data tables that are created during the import. The model view also determines the names that will be given to the Spotfire data tables and columns.

A Model View represents a custom view of the OpenSpirit data model or of a native data model. Model Views are similar in concept to SQL views. They are used to present a database in a more user friendly form. A model view can present a subset of the data model's data types and attributes. A model view can also change the names of data types and attributes and can join related data types to create a new data type. Model views enable companies to present data in the OpenSpirit tools using terminology common to the company. Model views also enable companies to subset the data types to only expose the data types and attributes that are populated with data in their data stores.

Default Model Views

Two model views created specifically for use with the Spotfire Extension are included with the Spotfire Extension software. The model views are named *Spotfire-Summary* and *Spotfire-Details*. Both model views are views of the OpenSpirit data model and therefore will work with any OpenSpirit enabled data store.

The summary model view contains almost all of the OpenSpirit data types that are supported by at least one OpenSpirit data connector. However, the summary model only contains the most commonly used attributes of each data type. The summary model view does not contain any array attributes to avoid row duplication during import.

The model views should be imported into your OpenSpirit installation as part of deploying the Spotfire Extension to your Spotfire server. See the Loading the Spotfire Model Views section of this help guide for instructions on importing model views.

Custom Model Views

Model views are created and maintained using the Model View Manager which is one of the data manager tools provided by the OpenSpirit Desktop. Model views are typically created and maintained by someone serving in a data management role. Spotfire users will typically use one of the default model views provided with the Spotfire Extension software, or they will use model views created by a data manager that has had Model View Manager training.

This guide does not describe how to use the Model View Manager tool. See the Model View Manager section of the OpenSpirit Desktop Help guide for information about model views and model view creation. The Custom Model View Considerations section of this guide does discuss a few issues to consider when creating a custom model view for use with the Spotfire Extension.



TIBCO's OpenSpirit consulting services group can help you create custom model views. Contact your TIBCO sales representative for more information about this service.

Import Behavior

Zero or more Spotfire data tables are created when a data selection event is received by the Spotfire Extension. Data table creation is determined by your Spotfire Extension preference settings, the *model view* being used, the data tables that are already present in your Spotfire document, and the data keys contained in the data selection event.

The data keys in a data selection event can all be for the same data model data type, or the event may contain data keys for more than one data model data type. For example, a data selection event may contain a collection of keys for well logs. Another data selection event may contain data keys for well logs, well picks, 2D seismic lines, and production volumes.

The Import behavior preference setting determines if an attempt will be made to append rows to an existing Spotfire data table when processing a data selection event. The default behavior is to always create a new Spotfire data table. Changing the import behavior setting to *Add rows to existing tables* will cause the Spotfire Extension to look for an existing Spotfire data table that has been tagged with data table properties that match the model view UUID and version of the currently selected model view preference setting. The imported rows will be appended to the existing Spotfire data table if the model view matches. Otherwise, a new data table is created in Spotfire.

Spotfire data tables created during data selection event processing are given the name of the model view data type view used to perform the import. A sequence number contained in parenthesis is appended to the name if a data table already exists with the same name as the model view data type. For example, if your Spotfire document already contains a data table

named *Well*, and the data selection event processing is using a model view data type with name *Well*, the new data table is given the name *Well (2)*.

Data selection events that contain data keys for a single data type can result in creating multiple data tables in Spotfire. This will happen if the model view being used has more than one data type view for the data model data type contained in the selection event's data keys.

For example, consider a data selection event that contains a single data key for the OpenSpirit data model's *EpiWell_WellBore* data type. Using the *OpenSpirit Default* data selector model view to process this event would result in two Spotfire data tables being created. A data table would be created for the *Well* data type view and another data table would be created for the *Well Details* data type view.



Use the *Spotfire-Summary* or the *Spotfire-Details* model views rather than the *OpenSpirit Default* data selector model view to avoid multiple data tables being created for the same data model data type.

Reading Bulk Data

The bulk data read feature is used to import seismic trace data and horizon grid data into Spotfire so that analysis can be performed on the bulk data. Bulk data can only be read through the OpenSpirit common model. Native data models cannot be used to read bulk data. Also, the *model view* used to import data into Spotfire must contain property settings to enable bulk data reading. The **Spotfire-Details** model view provided with the Spotfire Extension has been configured with the model view properties needed to enable bulk data reading. See the Bulk Data Model View Properties section of this guide for a description of the model view properties required to enable bulk data reading.

Data tables must be created in Spotfire and populated with the seismic and horizon data items that bulk data will be read from prior to reading bulk data. See the Import Using Data Selection Events section of this guide for information about importing data into Spotfire. New Spotfire data tables are created for the bulk data when it is read.

Click on the **Read bulk data** button  to open the bulk data reading pop-up window which is used to initiate bulk data reading. The window consists of a tool bar along the top with a collection of tabbed panes below the tool bar. A tab exists for each bulk data type that has been enabled by properties set on the model view. A pair of memory indicators appear below the tabs. The memory indicators show the amount of memory available to the Spotfire process and an estimate of the amount of memory that will be needed to read the bulk data that has been selected for import. A progress indicator appears along the bottom of the window during the bulk data reading. No visuals are created for the data tables that are created to hold the bulk data.

Bulk Import Tool Bar

The tool bar  located at the top of the bulk data import window contains buttons used to perform operations on the tabs displayed below the tool bar.

Refresh Listings Button

Clicking on the refresh listings button  causes the Spotfire document to be re-examined to locate all items of the tab's data type in all the document's data tables and displays them in the tab. The refresh also looks for already imported items in order to properly set the **Existing** column indicator. The refresh button is most commonly used after an import has been performed to update the **Existing** column to reflect the newly imported item.

Select All Button

Clicking on the select all button  causes all rows on the visible tab to be selected.

Deselect All Button

Clicking on the deselect all button  causes all selected rows on the visible tab to be deselected.

Import Button

Clicking on the import selected items button  initiates the import of all the selected items on the visible tab to be imported. A progress bar appears at the bottom of the window to indicate progress of the import.

Help Button

Clicking on the help button  opens this user guide.

Bulk Import Tabs

Each tab contains rows showing all of the items of the tab's data type that appear in data tables in the currently opened Spotfire document. For example, the 3D Volume tab will contain a row for every 3D seismic volume that appears in any 3D Volume data table in the Spotfire document. The first column in each tab is the **Import** check box which is used to select items for import. Each tab also contains a column named **Existing** which indicates which items have already been imported into the Spotfire document. Each tab contains columns showing information that may be useful in making the decision to import that item.



The names of the tabbed panes are determined by the data type names that appear in the model view that is being used. The following descriptions use the names that appear when using the **Spotfire-Details** model view provided with the Spotfire Extension. You may see different tab names if you use your own custom model view.

Import Behavior

The Import behavior setting is respected by the bulk import with a few exceptions. The bulk data import behavior of each of the three possible settings are described below.



When the term "import operation" is used in the following paragraphs it is referring to clicking on the **Import Selected Items** button  in the bulk import window's tool bar without regard for how many items are selected for import. It does not refer to the importing of each individual selected item.

Add rows to existing matching tables

Setting the import behavior to **Add rows to existing matching tables** results in each import operation importing the bulk data into the same data table. The 3D seismic bulk data is an exception. A new data table is always created for each 3D seismic volume that is imported.

Create new tables

Setting the import behavior to **Create new tables** results in a new data table being created for each import operation that is performed. The new data tables will have a number in parenthesis appended to the name if a table already exists with the name that would normally be used for the new table.

Replace contents of matching tables

Setting the import behavior to **Replace contents of matching tables** results in any existing data table created by a previous bulk data import being cleared of all rows prior to importing new bulk data rows. Note, if the **Create new tables** option was used to create additional data tables having a number in parenthesis appended to the data table name are not cleared. Only the first data table with no numeric suffix is cleared when importing using this option.

The following sections describe each of the import tabs.

3D Volume Tab

The 3D Volume tab is used to import seismic traces from a 3D seismic volume. A data table is created for each volume that is imported. The name of the data table created for a volume is the survey name combined with the volume name separated by a comma. Each seismic trace that is read appears as a row in the data table. The trace sample values are stored as a blob in a column named "Values". The data table has columns containing the inline number, crossline number, X location, Y, location, and the min and max Z value of the trace. Each trace can have a different Z range depending on the type of sub-setting that was specified for the import.

The seismic traces that are imported can be sub-setted by specifying a Z range, or by a Z window along a selected horizon, or by a range between a pair of selected horizons. Click on the edit icon  in the **Subset volume** column of the volumes to be imported. This will open the **Set Top/Base Boundaries** window which is used to set the seismic trace sub-setting parameters that will be used with the volume is imported.

By default, the **Defined by multiple horizons and optional settings** option will be selected. The **Top Boundary** will be set to a **Constant Z** value which is equal to the **Min Z** value of the volume. The **Base Boundary** will be set to a **Constant Z** value which is equal to the **Max Z** value of the volume. This default setting will result in all of the trace samples being imported into Spotfire. The constant Z values of the top and base boundaries can be changed to any Z value that falls within the Z range of the volume. The top boundary Z must be less than the bottom boundary Z. You can also select a horizon for the top and/or bottom boundary to use in lieu of a constant Z value. The horizons that are available for selection are the seismic horizons belonging to the same survey that the volume is associated with and having the same domain (time or depth). A Z offset from the horizon can also be specified.



If the selected top and/or bottom horizon crosses (taking into account any offset) at a trace location, the blob imported for that trace will contain zero samples.



Using a selected horizon for the top and/or the bottom boundary will almost certainly result in traces with differing numbers of samples being imported into Spotfire. You will need to make sure any scripting you may be using in your analysis can handle variable length trace sample blobs.

The **Defined by single horizon** option can be selected to import the samples above and below a time or depth window along a selected horizon. The horizons that are available for selection are the seismic horizons belonging to the same survey that the volume is associated with and having the same domain (time or depth). Click on the **set** button to open a list of horizons that can be selected.

3D Seismic Horizon Tab

The 3D Seismic Horizon tab is used to import the Z values of seismic horizon grids. A single data table is created to hold the grid values for all of the horizons that are imported. The name of the data table that is created is **3D Seismic Horizon Values** if the Spotfire-Details model view is being used. The data table name will be the name of your custom model view data type with "Values" appended if you are using a custom model view. Each horizon grid cell that is read appears as a row in the data table. The table contains an **X, Y, Z, Horizon, Feature, Domain, and Feature Key** column. The value in the **Z** column will be blank for grid cells that have a null value (i.e. a hole in the horizon).

3D Seismic Horizon Property Tab

The 3D Seismic Horizon Property tab is used to import the property values of seismic horizon property grids. A single data table is created to hold the grid values for all of the properties that are imported. The name of the data table that is created is **3D Seismic Horizon Property Values** if the Spotfire-Details model view is being used. The data table name will be the name of your custom model view data type with "Values" appended if you are using a custom model view. Each horizon property grid cell that is read appears as a row in the data table. The table contains an **X, Y, Z, Horizon, Feature, Domain, and Feature Key** column. The data table will also have a column for each property type that is imported. For example, importing a property grid with property type **Amplitude** and a second property grid with property type **Depth** will result in the created data table also having a column named **Amplitude** and a column named **Depth**. The **Amplitude** column will contain the property grid values of the amplitude property and the **Depth** column will contain the property grid values of the depth property. The values in the property columns will be blank for grid cells that have a null value. The **Z** column will contain the time or depth value of the property's associated geometry grid.

2D Dataset Tab

The 2D Dataset tab is used to import seismic traces from a 2D seismic dataset. All of the 2D seismic datasets that are selected are imported into the same data table. The name of the data table that is created is **2D Dataset Values** if the Spotfire-Details model view is being used. The data table name will be the name of your custom model view data type with "Values" appended if you are using a custom model view. Each seismic trace that is read appears as a row in the data table. The table contains a **Name, ShotPoint, Trace, X, Y, Min Z, Max Z, and Values** column. The value in the **Values** column will be a blob column containing the seismic trace samples.

Non-seismic Horizon Grid Tab

The Non-seismic Horizon Grid tab is used to import the Z values of non-seismic horizon grids. A single data table is created to hold the grid values for all of the horizons that are imported. The name of the data table that is created is **Non-seismic Horizon Grid Values** if the Spotfire-Details model view is being used. The data table name will be the name of your

custom model view data type with “Values” appended if you are using a custom model view. Each horizon grid cell that is read appears as a row in the data table. The table contains an **X**, **Y**, **Z**, **Horizon**, **Feature**, **Domain**, and **Feature Key** column. The value in the **Z** column will be blank for grid cells that have a null value (i.e. a hole in the horizon).

Non-seismic Horizon Grid Property Tab

The Non-seismic Horizon Grid Property tab is used to import the property values of non-seismic horizon property grids. A single data table is created to hold the grid values for all of the properties that are imported. The name of the data table that is created is **Non-seismic Horizon Grid Property Values** if the Spotfire-Details model view is being used. The data table name will be the name of your custom model view data type with “Values” appended if you are using a custom model view. Each horizon property grid cell that is read appears as a row in the data table. The table contains an **X**, **Y**, **Z**, **Horizon**, **Feature**, **Domain**, and **Feature Key** column. The data table will also have a column for each property type that is imported. For example, importing a property grid with property type **Amplitude** and a second property grid with property type **Depth** will result in the created data table also having a column named **Amplitude** and a column named **Depth**. The **Amplitude** column will contain the property grid values of the amplitude property and the **Depth** column will contain the property grid values of the depth property. The values in the property columns will be blank for grid cells that have a null value. The **Z** column will contain the time or depth value of the property's associated geometry grid.

Import Using GIS Events

The Spotfire Extension can be used to import GIS point, line string, and polygon features into Spotfire. It can also be used to import GIS grids. GIS events can be sent from any application capable of sending OpenSpirit GIS Feature Selection events or Grid events.

GIS Feature Selection Events

The OpenSpirit GIS Feature Selection event can contain zero or more point layers, line string layers, and polygon layers. A layer is a named collection of features that all have the same shape type (point, line, polygon, multi-point, multi-line, etc.) and the same set of named attributes.

A shape contains one or more 2 dimensional or 3 dimensional points that spatially describe the feature it belongs to along with a coordinate system that defines the meaning of the X, Y, and Z values in the points. The X value in a point may be a Longitude or a projected map X axis location. The Y value in a point may be a Latitude or a projected map Y axis location. The shapes of all features in a layer use the same coordinate system.

Following is a hypothetical example of the content of a typical GIS event. The actual content of an event is determined by the information that the sending application decides to put in the event. This is usually determined by data selections made in the sending application.

Example Event

A GIS event could contain a layer named "Cities" that contains a collection of point features. Each point feature has a X, Y, and optionally a Z value that indicates a location on earth. Each point feature will also have a name, such as "London", "Paris", "New York", "Beijing", etc. Each point feature may have attributes named "Country", "Population", and "Elevation".

The event could also have a layer named "Countries" that contains a collection of polygon features that describe the territorial boundaries of countries. Each polygon feature would likely have a name, such as "USA", "China", "Mexico", etc. along with attributes that provide additional information about each country.

The event may also have a layer named "Rivers" that contains a collection of line string features. Each line string feature has collection of points that describe the river's path, and a name such as "Nile", "Amazon", "Mississippi", "Yangtze", etc. Each line string feature may have attributes named "Length (km)", "Outflow", etc.

The event may have another point layer named "Airports" that contains features with names such as "JFK", "Schiphol", "Heathrow", "De Gaulle", etc.

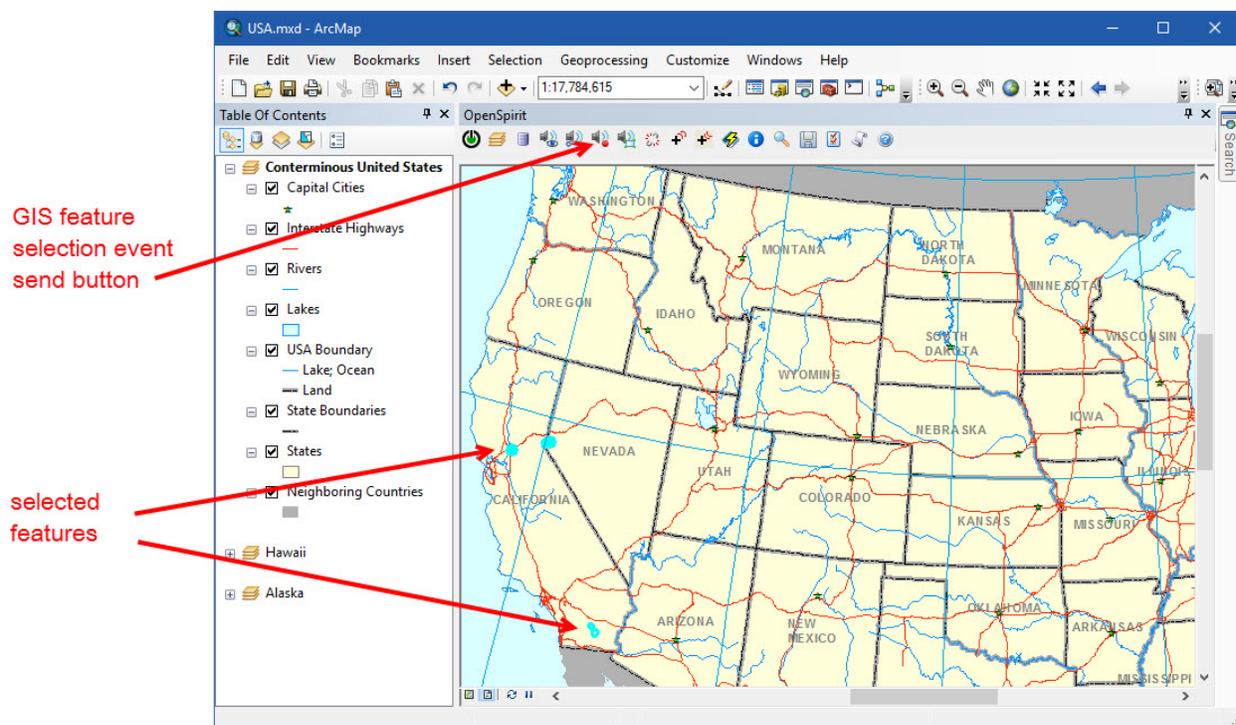
Grid Selection Events

The OpenSpirit Grid Selection event contains a two dimensional grid of single precision floating point values along with the geographic locations of the corners of the grid. The event also contains a grid name.

A new Spotfire data table named **Grids** is created when a grid selection event is received. A row is created in the Grids table for each cell in the received grid. The grid cell values appear in a column named **Value**. An **X (Longitude)**, **Y (Latitude)**, **Z**, **Z Unit**, and **Name** column are also created. The **Z** column will also contain the grid cell values if the Z unit is a depth or time unit. The **Z** column will contain the value 0.0 if the grid's Z unit is any unit other than a depth or time unit. The **Value** and **Z** columns will be blank if the grid cell contains a null value.

ESRI ArcMap

The most widely used application for sending OpenSpirit GIS events is ESRI's ArcMap application. The TIBCO OpenSpirit Extension for ArcGIS must be installed as an extension to ArcMap in order to send OpenSpirit GIS events from ArcMap.



See the TIBCO OpenSpirit Extension for ArcGIS for information about how to use ArcMap to send GIS events.



Other OpenSpirit enabled applications, such as Schlumberger's Petrel application, can also be used to send GIS events to the Spotfire Extension.

Coordinate System Conversions

The spatial information contained in received GIS events is handled in the same way that *GEOMETRY* data types are handled when importing data using data selection events. This is described in the Import Using Data Selection Events section of this help guide. All layers in a received GIS event are converted to the coordinate system selected in your preference settings. The layers are converted to the coordinate system identified by data table properties when adding rows to an existing data table. See the Data Table Properties section of this guide for more information about data table properties.

 Received GIS events are not imported into Spotfire if any of the layers in the event cannot be converted to the coordinate system selected in your Spotfire Extension Coordinate System preference setting or specified by data table properties. See more information about conversion failures at the bottom of this page.

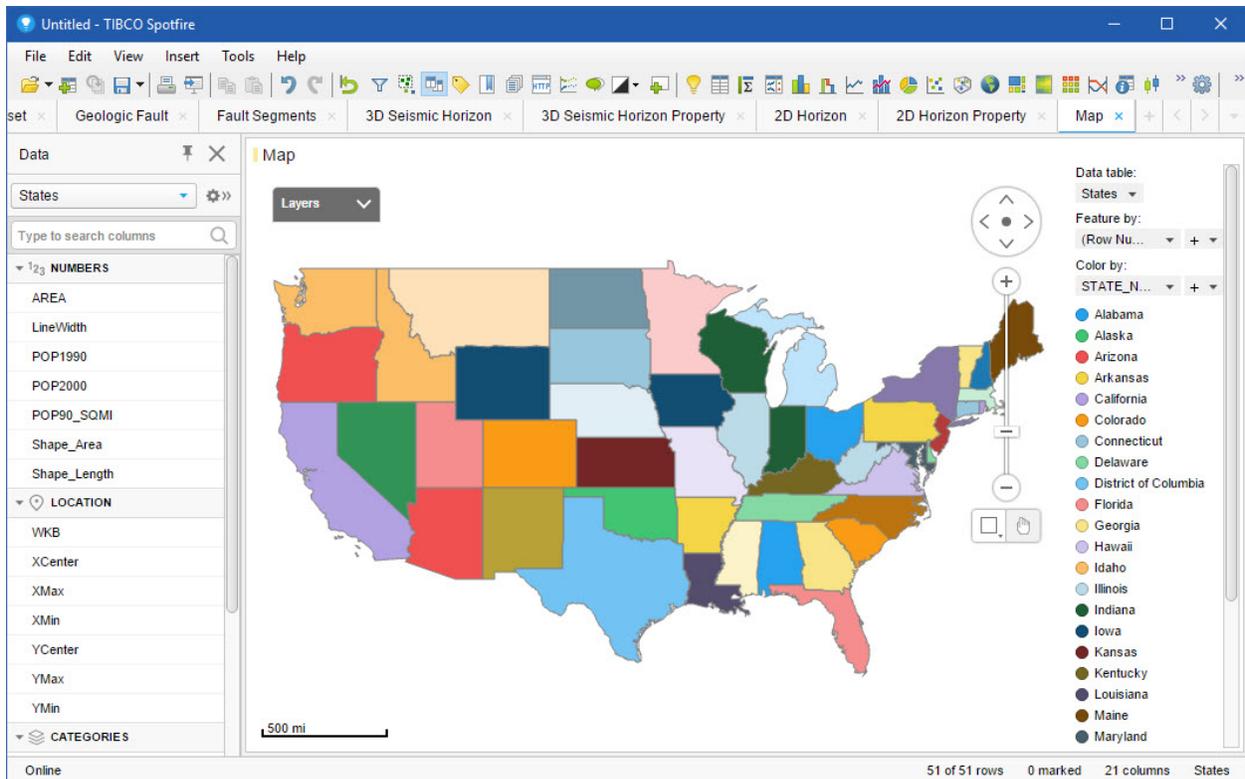
Imported X/Y or Latitude/Longitude values will be expressed in the horizontal axis unit of the coordinate system. The Z values of 3D geometry values are represented in the depth unit specified by the Unit System preference setting.

 Coordinate system conversion can be avoided by setting your Spotfire Extension Coordinate System preference setting to the same coordinate system that is used by the spatial data being imported.

 Changing your Spotfire Extension Coordinate System preference setting between imports to the same Spotfire document is strongly discouraged. This will cause spatial location values in the document to be inconsistent between data tables.

GIS Event Import Behavior

Sending a GIS event to the Spotfire Extension causes a new data table to be created in Spotfire for each GIS layer contained in the received GIS event. If the currently selected visual is a map chart, the layers are added to that map chart. If the currently selected visual is not a map chart, a new map chart will be created and the layers are added to that map chart. The map chart's view limits are set to a horizontal and vertical range that includes all the features in all the layers.



The GIS feature's shape is imported into a data table column with a Binary data type in the ESRI WKB format. This enables the Spotfire Map Chart visualization to be used to view the spatial data using *interactive shapes* map type. Data table columns are also created for all of the feature attributes included in the GIS event.

An *XMin*, *XMax*, *XCenter*, *YMin*, *YMax*, and *YCenter* column are also created to enable switching the map type of the map chart from *interactive shapes* to *markers and pies*.

Coordinate System Conversion Failure

An attempt is made to convert all layers in each received GIS event to the coordinate system selected in your Spotfire Extension Coordinate System preference setting. Sometimes the conversion will fail. Failures occur when one or more features in the received GIS event are beyond the bounds of the coordinate system or the geographic transform selected in your preference settings.

No features are imported if a conversion failure occurs. Make sure you choose a coordinate system and geographic transform that are valid for the geographic region that the GIS features included in the event reside in.

A *GIS conversion failure* message appears in the status area of the Spotfire Extension's tool bar window when a conversion failure occurs. Also, an error is logged to the Spotfire notification service which causes a [Details...](#) hyperlink to appear in the status area at the lower left corner of the Spotfire window.

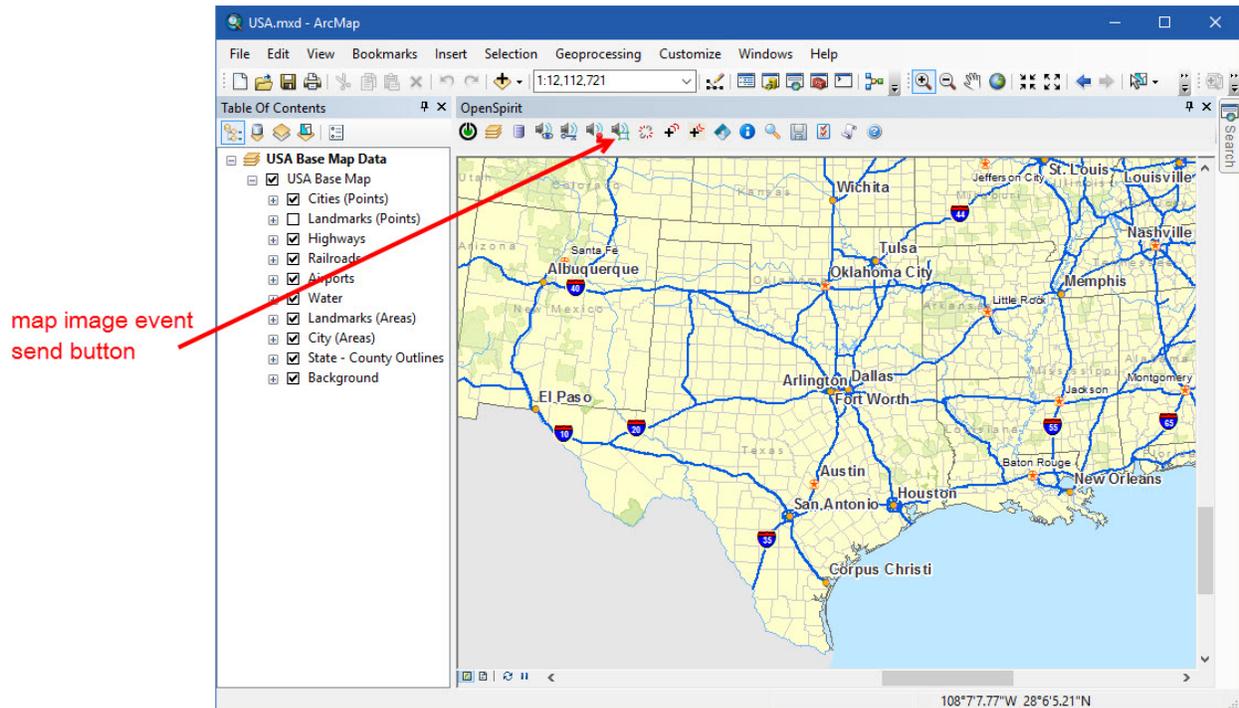


Click on the [Details...](#) hyperlink to see additional information about the conversion failure. Press the **Clear** button on the bottom of the details window to remove the hyperlink from the Spotfire status area.

Map Image Event

The map image event is used to capture an image of your map display from ArcMap to Spotfire. A map image event is sent from ArcMap by clicking on the *Send map image* button

 in the *ArcGIS Extension* tool bar.

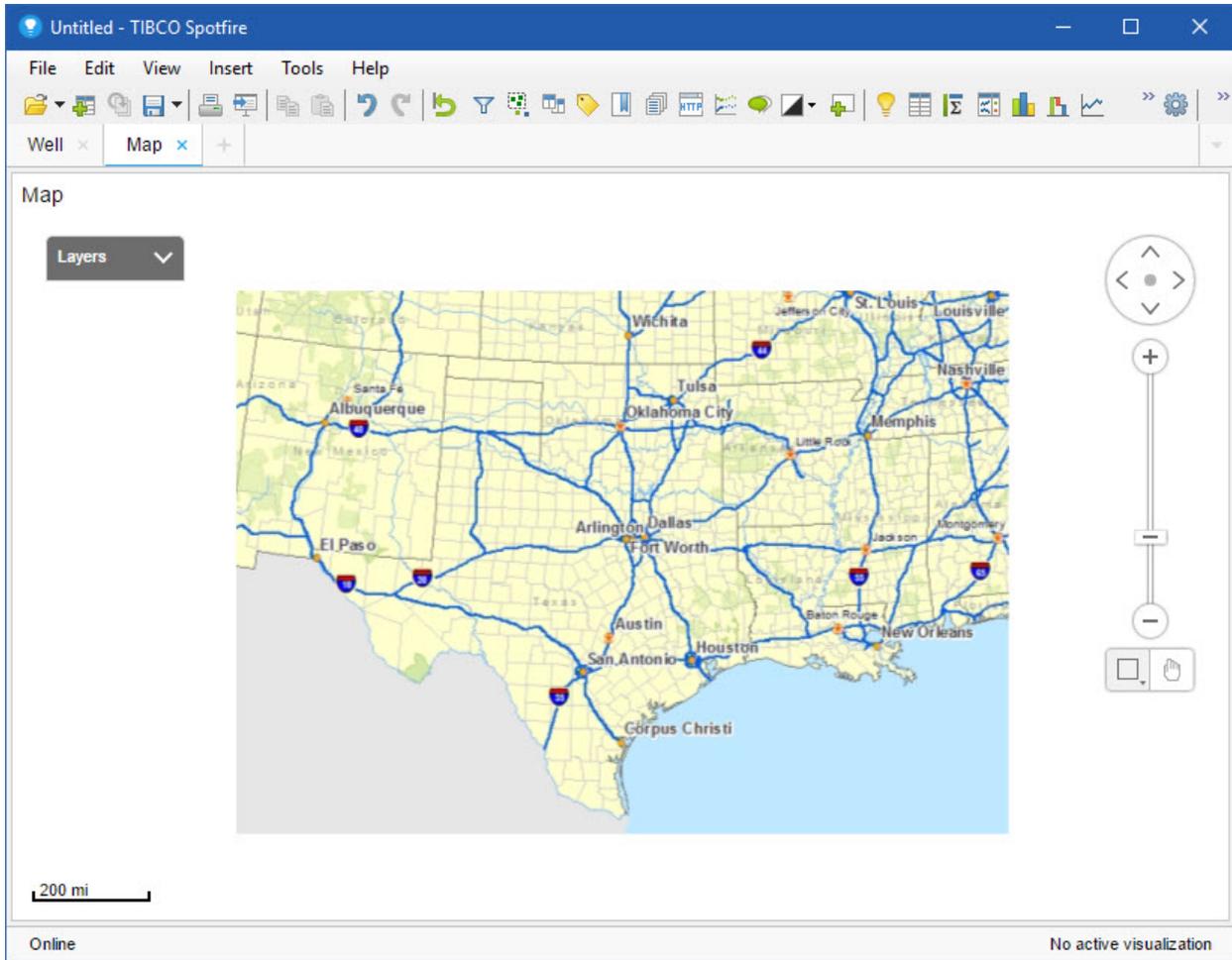


Pressing the send map image button causes an image file to be created that contains exactly what is currently displayed in the ArcMap map window. The image will include any feature selection highlighting, so be sure to un-select all the features if you don't want the highlighting included in the image.

An event is then broadcast that contains the path to the image file and the geographic locations of the corners of the image. The locations are defined in terms of your ArcMap display coordinate system.

The Spotfire Extension will respond to the map image event by creating a new map chart visualization named *Map*.

 A Spotfire document must be open in order to receive a map image event. A *Ignoring Map Image event: No document* message will appear in the status area of the Spotfire Extension's tool bar window when a map image is event is received and no document is open in Spotfire.



If the currently selected visual is a map chart, the map image is added as an image layer to that map chart. If the currently selected visual is not a map chart, a new map chart is created and the map image is added as an image layer to it.



Displaying a received map image in a Spotfire MapChart is only accurate when the image CRS exactly matches the Spotfire MapChart display CRS. A warning or an error is displayed if the received map image is in a different coordinate system from the Spotfire MapChart. The following coordinate system mismatch conditions may be encountered.

Coordinate System Mismatch	Result
The map image coordinate system is a projected system and the MapChart coordinate system is a geographic system.	A map image layer is not added to the MapChart. Change the coordinate system on the map that is used to send the image, or change the coordinate system of the Spotfire MapChart.
The map image coordinate system is a geographic system and the MapChart coordinate system is projected system.	A map image layer is not added to the MapChart. Change the coordinate system on the map that is used to send the image, or change the coordinate system of the Spotfire MapChart.

Coordinate System Mismatch	Result
<p>The map image coordinate system is a projected system and the MapChart coordinate system is a different projected system.</p>	<p>A map image layer is added to the MapChart even though some distortion may be occur. A warning message will be displayed.</p> <p>The image layer is converted to the MapChart's coordinate system if it has the same geodetic datum as the OpenSpirit coordinate system preference setting. The map image is added with its original coordinate system if it has a different geodetic datum from the preference setting leaving Spotfire to handle the coordinate conversion.</p>
<p>The map image coordinate system is a geographic system and the MapChart coordinate system is a different geographic system.</p>	<p>A map image layer is added to the MapChart even though some distortion may be occur. A warning message will be displayed.</p> <p>The image layer is converted to the MapChart's coordinate system if it has the same geodetic datum as the OpenSpirit coordinate system preference setting. The map image is added with its original coordinate system if it has a different geodetic datum from the preference setting leaving Spotfire to handle the coordinate conversion.</p>



The quality of the map image will deteriorate when zooming in. You will need to send a zoomed in image from ArcMap if you want a high quality image of the zoomed in area. This will create a new map chart that will be constrained to the zoomed in area.

Sending Data Selection Events

Spotfire can be used to send data selection events as well as to receive data selection events. This allows Spotfire to be used to send data selections to other applications that have been enabled to receive OpenSpirit data selection events.

Spotfire data tables that were created using OpenSpirit data selection events will have a hidden column named ***Datakey***. This hidden column contains an OpenSpirit data key. The ***Send data selections*** button  in the Spotfire Extension tool bar is enabled when one or more rows are selected in a Spotfire data table that has one of these ***Datakey*** columns. Click on the ***Send data selections*** button to broadcast a data selection event that contains the keys for the selected data table rows.

Sending GIS Events

Spotfire can be used to send GIS feature selection events as well as to receive GIS feature selection events. This allows Spotfire to be used to send GIS events to other applications that have been enabled to receive OpenSpirit GIS events.

GIS events are sent by selecting one or more rows in a Spotfire data table that has a *WKB* column and clicking on the *Send GIS data* button  in the Spotfire Extension tool bar.

WKB columns have a Binary column data type and contain a point, line string, or polygon represented using the ESRI Well Known Binary format. Spotfire data tables that were created from an ESRI shape file or from receiving an OpenSpirit GIS event will have a *WKB* column. Data tables created from an OpenSpirit data selection event will also have a *WKB* column if a spatial attribute was designated in the model view for that model view data type.

Synchronizing Map Views

The current zoom viewport in a Spotfire map chart can be set by sending a map view event from another application that is enabled to send OpenSpirit map view events. This is most commonly done using the ESRI ArcMap application with the TIBCO OpenSpirit Extension for ArcMap. Map views can also be sent from Spotfire to another application such as ArcMap.

Receiving Map View Events

Map view events are sent from ArcMap by clicking on the *Send map view event* button  in the *ArcGIS Extension* tool bar. This will broadcast an event that contains the corner points of the current ArcMap view. The *ArcGIS Extension* will receive the map view event if OpenSpirit event listening is enabled in the Spotfire Extension and if a map chart is the active visualization in Spotfire. The map view event will be ignored if the active visualization is not a map chart.

The rectangle described by the map view must be completely within the bounds of the active map chart in order to receive the event. An *Ignoring MapView event: Outside bounds* message will appear in the status area of the Spotfire Extension's tool bar window if a map view event is received that is partially or completely outside the bounds of the map chart's extent. The map chart will zoom to the map view if it is within the map chart extent.

Sending Map View Events

Map view events can also be broadcast from Spotfire. The *Send map view definition* button  in the Spotfire Extension's tool bar is enabled when the currently active Spotfire visualization is a map chart. Click on the *Send map view definition* button to broadcast the map chart's current view. ArcMap will zoom to the same view if OpenSpirit event listening is enabled in the *ArcGIS Extension*.

Synchronizing Selections

Selection highlighting can be synchronized between Spotfire and ESRI's ArcMap application, using the selection synchronization feature provided by the OpenSpirit Spotfire Extension and the OpenSpirit *ArcGIS Extension*. Synchronization is accomplished by establishing a highlighting session between the two applications.

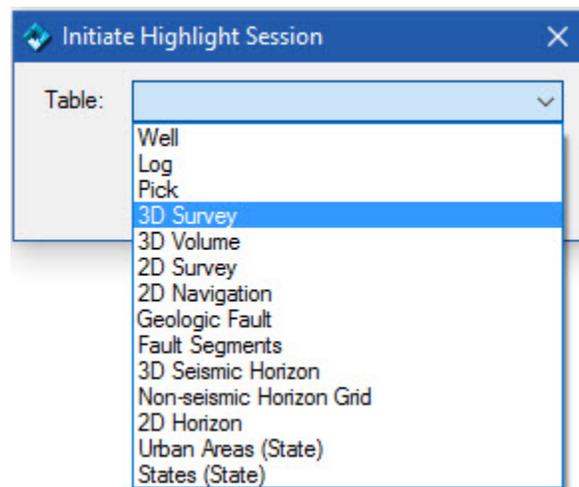
Highlighting Session

A highlighting session defines a link between a data table in Spotfire and a feature class in ArcMap. One or more columns in the Spotfire data table are associated with the same number of feature class fields in ArcMap. Once the highlighting session has been established selections in either application will cause the corresponding rows or features in the other application to be highlighted based on matching values in the associated columns and fields.

Creating a Highlighting Session

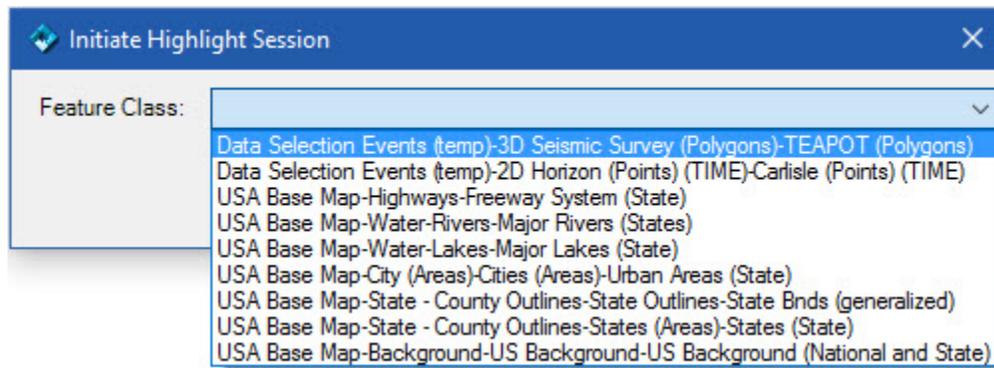
A highlighting session is initiated by clicking on the highlighting initiation button  in the Spotfire Extension tool bar or in the *ArcGIS Extension* tool bar. It does not matter which application is used to initiate the highlighting session.

Clicking on the highlighting initiation button in Spotfire causes a window to appear where you are asked which Spotfire data table you wish to use for the highlighting session.



Select the data table that you want to link to a feature class in ArcMap. Any data table can be selected. The data table does not need to contain spatial information in order to link it to an ArcMap feature class. The data table just needs to have column values that appear as field values in the feature class you will be linking to.

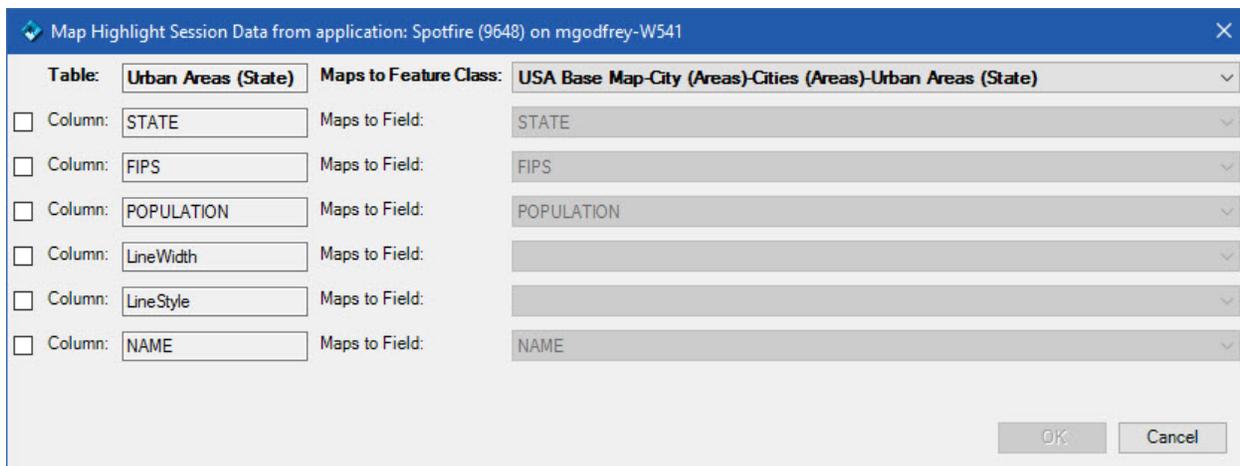
Clicking on the highlighting initiation button in ArcMap causes a window to appear where you are asked which ArcMap feature class you wish to use for the highlighting session.



A Feature class must be selectable in ArcMap in order for it to appear in the feature class list. Select the feature class that you want to link to a Spotfire data table.

Click the **Ok** button after selecting the Spotfire table or ArcMap feature class. This will broadcast a highlight session request event and change the highlighting initiation button to appear in the pending state . The other application (Spotfire or ArcMap depending on which application was used to initiate the highlight session) will respond to the request by opening a window that is used to select the data table or feature class that is to be linked along with the columns or fields that will be used to determine a selection match.

The image below is the highlight session mapping window that appears in ArcMap when initiating the highlighting session from Spotfire. A similar window would appear in Spotfire if the session was initiated from ArcMap.



The left half of the mapping window shows the Spotfire data table that was selected when initiating the highlighting session from Spotfire. Below the data table name is a list of all the columns defined in the data table.

A feature class selection drop down list appears to the right of the Spotfire table name. The drop down selector contains a list of all ArcMap feature classes that are selectable. Select the feature class that you want to link to the Spotfire data table.

A check box appears to the left of each Spotfire column. Check the box next to all columns that will be used to determine a selection match. The ArcMap feature class should be selected before checking boxes next to the columns.

A feature class field selection drop down list will be enabled next to each column that is checked. Select the feature class field that you want to match against the Spotfire column.

Click on the **Ok** button when you have selected all the column / field mappings. At least one column / field mapping must be selected to enable the **Ok** button.

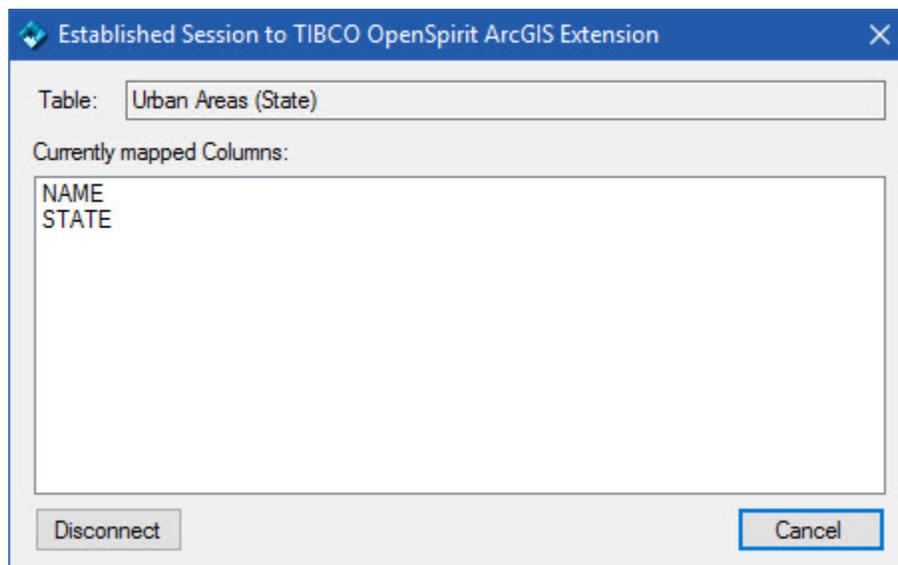


Do not map more columns than are required to uniquely identify a match. The values of all mapped columns for all selected rows or features will be sent to the other application each time a selection changes. Selecting too many columns will significantly degrade the performance of the selection highlight synchronization.

The highlight session mapping window will go away and the highlighting session will be in effect. The highlighting session button will appear in the linked state . Selecting rows in the linked Spotfire data table will cause ArcMap to highlight matching features belonging to the linked feature class. Features are matched based on comparing values using the column / field associations made during the session initiation.

Ending a Highlighting Session

Click on the highlighting button  in either application to end the highlighting session. A confirmation window will appear which shows the data table/feature class linkage that is being used for the highlighting session. Click on the **Disconnect** button to end the highlighting session. Click on the **Cancel** button to dismiss the window and continue using the highlighting session.



Custom Model View Considerations

There are a few items to consider when creating a custom model view for use in Spotfire. The following model view recommendations assume the reader is familiar with OpenSpirit model views and with the Model View Manager.

Displayed Attributes

All attributes of a model view type that have the *Displayed* option checked will be added to the Spotfire data table. There is no reason to mark a model view data type attribute as *Available* but not *Displayed* unless it is also being used in a query filter or to join to related data types.

Model View Type

The list of model views available for selection in the Spotfire Extension model view preference setting are limited to model views having a model view type of *Data Selector*. Other model view types, such as *Scan Job*, are ignored by the Spotfire Extension.

Duplicate Data Types

The Model View Manager permits multiple copies of a data model data type to be added to a model view. This is done in the *OpenSpirit Default* model view that is included with the *OpenSpirit Runtime*. The *Log* data type appears twice in the *OpenSpirit Default* model view, once as model view type *Log* and again as model view type *Log Details*. This was done to enable the *Log* tab in the Data Selector to be used to view header information for many logs from a large project or database, and then select a few of the logs to view their details in the *Log Details* tab. The *Log Details* tab includes many attributes of the log, including all the log samples. Viewing many thousands of logs in the Data Selector using the *Log Details* tab would consume large amounts of computer memory and would take much longer to display than viewing the log headers.

Having a summary model view data type and details model view data type in the same model view used by the Spotfire Extension does not help performance and memory consumption, it makes it worse. The Spotfire Extension will import data for all model view data types that were created from the data model data type referenced in the data selection event data keys. There would be no reason to import the log details into one Spotfire data table and then bring the header attributes again into a second Spotfire table.

This is one reason why two model views are provided with the Spotfire Extension, a summary model view and a details model view.

View Scope

The ability to assign a view scope to a model view data type exists to facilitate efficient hierarchical navigation of data in the Data Selector. The view scope is assigned in the Model View Manager from the *Apply Query Filter* tab on a model view data type's configuration settings window. This enables the Data Selector to be used to only show data that is related to the selected rows in the tab set as its view scope.

The Spotfire Extension does not provide any hierarchical data navigation capability. Setting a view scope will cause the data import queries executed by the Spotfire Extension to perform more slowly. Import of some data model types will be much slower when a view scope is set. This is one reason why data import using the *OpenSpirit Default* model view can be much slower than when using one of the Spotfire model views included with the Spotfire Extension.

Always set the view scope to *Data Source* when configuring a model view data type for use with Spotfire.

Spatial Attribute

Set the spatial attribute of model view data types that have a *GEOMETRY* data type if you want to have a *WKB* column created in the Spotfire data table during import.

Array Attributes

Including one or more attribute with an array or quantity series data type in a model view data type will cause row duplication during import.

LineString Attributes

Including a *GEOMETRY* attribute that contains *LineString* geometries in a model view data type will cause row duplication during import.

Some OpenSpirit data model data types have a *GEOMETRY* attribute defined to be *LineString* that really represent a polygon. The *Polygon* geometry type was not supported by the OpenSpirit framework when the OpenSpirit data model was defined, so the data model used *LineString* geometries to represent polygons.

A property can be added to these model view attributes to force the Spotfire Extension to treat these attributes as *Polygons* when importing them into a Spotfire data table. The property name is *PolygonCoersion* and the property value should be set to *true*. An example of this property can be seen on the *Extent* attribute of the *3D Survey* data type included in the *Spotfire-Details* model view.

Bulk Data Model View Properties

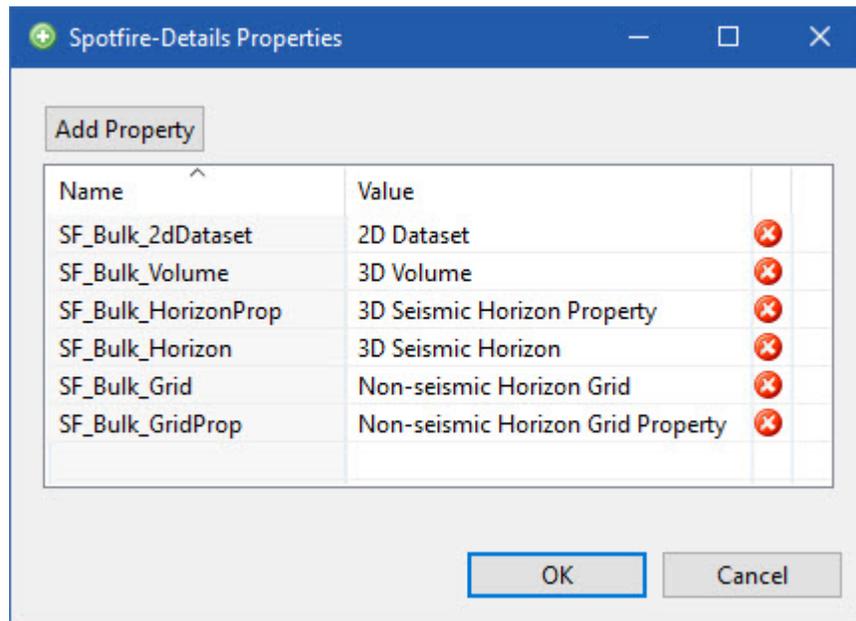
Bulk data reading is controlled by property settings in the *model view* that is used in the Spotfire Extension.

Model View Properties

Six properties can be set at the model view level to specify which model view data types should be enabled for bulk data reading. Enabling a model view data type in the model view causes the data type to appear in the Import bulk data window. The six properties are:

Property Name	Property Value
SF_Bulk_Volume	The name of the model view data type that represents 3D seismic volumes.
SF_Bulk_2dDataset	The name of the model view data type that represents 2D seismic datasets.
SF_Bulk_Horizon	The name of the model view data type that represents seismic horizon Z value grids.
SF_Bulk_HorizonProp	The name of the model view data type that represents seismic horizon property grids.
SF_Bulk_Grid	The name of the model view data type that represents non-seismic horizon Z value grids.
SF_Bulk_GridProp	The name of the model view data type that represents non-seismic horizon property grids.

The **Spotfire-Details** model view provided with the Spotfire Extension sets all of the six possible model view properties. The following image shows the bulk data property settings from the **Spotfire-Details** model view.



Data Type Properties

Properties must be set on each of the model view data types that have been selected for bulk data reading. A different set of properties is required for each type. The following tables describe the required properties for each data type.

SF_Bulk_Volume

Property Name	Property Value
Bulk_BinGridCRS	The display name of the model view attribute that represents the seismic volume's seismic bin grid coordinate system.
Bulk_Data	The display name of the model view attribute that represents the seismic volume's bulk data key.
Bulk_DeltaZ	The display name of the model view attribute that represents the Z delta of the seismic volume.
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the seismic volume.
Bulk_MaxZ	The display name of the model view attribute that represents the maximum Z value of the seismic volume.
Bulk_MinZ	The display name of the model view attribute that represents the minimum Z value of the seismic volume.
Bulk_NumCrosslines	The display name of the model view attribute that represents the number of crosslines in the seismic volume.
Bulk_NumInlines	The display name of the model view attribute that represents the number of inlines in seismic volume.
Bulk_SRD	The display name of the model view attribute that represents the seismic reference datum of the seismic volume.
Bulk_StorageOrder	The display name of the model view attribute that represents the seismic volume's storage order.
Bulk_Survey	The display name of the model view attribute that represents the name of the seismic volume's survey.
Bulk_SurveyKey	The display name of the model view attribute that represents the data key of the seismic volume's survey.
Bulk_Volume	The display name of the model view attribute that represents the name of the seismic volume.

SF_Bulk_2dDataset

Property Name	Property Value
Bulk_Dataset	The display name of the model view attribute that represents the name of the 2D seismic dataset.
Bulk_DeltaZ	The display name of the model view attribute that represents the Z delta of the 2D seismic dataset.
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the 2D seismic dataset.
Bulk_Line	The display name of the model view attribute that represents the name of the 2D seismic dataset's line geometry.
Bulk_MaxZ	The display name of the model view attribute that represents the maximum Z value of the 2D seismic dataset.
Bulk_MinZ	The display name of the model view attribute that represents the minimum Z value of the 2D seismic dataset.

Property Name	Property Value
Bulk_SRD	The display name of the model view attribute that represents the seismic reference datum of the 2D seismic dataset.
Bulk_Survey	The display name of the model view attribute that represents the name of the 2D seismic dataset's survey.
Bulk_Traces	The display name of the model view attribute that represents the 2D seismic dataset's bulk data key.

SF_Bulk_Horizon

Property Name	Property Value
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the horizon.
Bulk_EarthModel	The display name of the model view attribute that represents the name of the horizon's earth model.
Bulk_Feature	The display name of the model view attribute that represents the name of the horizon feature.
Bulk_Horizon	The display name of the model view attribute that represents the name of the horizon's horizon.
Bulk_Interpreter	The display name of the model view attribute that represents the horizon's interpreter.
Bulk_MaxValue	The display name of the model view attribute that represents the maximum grid value of the horizon.
Bulk_MinValue	The display name of the model view attribute that represents the minimum grid value of the horizon.
Bulk_NumColumns	The display name of the model view attribute that represents the number of column values in the horizon grid.
Bulk_NumRows	The display name of the model view attribute that represents the number of row values in the horizon grid.
Bulk_SRD	The display name of the model view attribute that represents the seismic reference datum of the horizon.
Bulk_Survey	The display name of the model view attribute that represents the name of the horizon's survey.
Bulk_SurveyKey	The display name of the model view attribute that represents the data key of the horizon's survey.

SF_Bulk_HorizonProp

Property Name	Property Value
Bulk_DataUnit	The display name of the model view attribute that represents the unit of the horizon property.
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the horizon property's Z values.
Bulk_Feature	The display name of the model view attribute that represents the name of the horizon property's feature.
Bulk_FeatureKey	The display name of the model view attribute that represents the data key of the horizon property's feature.
Bulk_Horizon	The display name of the model view attribute that represents the name of the horizon property's horizon.
Bulk_Interpreter	The display name of the model view attribute that represents the horizon property's interpreter.

Property Name	Property Value
Bulk_NumColumns	The display name of the model view attribute that represents the number of column values in the horizon property grid.
Bulk_NumRows	The display name of the model view attribute that represents the number of row values in the horizon property grid.
Bulk_Property	The display name of the model view attribute that represents the name of the horizon property.
Bulk_PropertyType	The display name of the model view attribute that represents the type of the horizon property.
Bulk_SRD	The display name of the model view attribute that represents the seismic reference datum of the horizon property.
Bulk_Survey	The display name of the model view attribute that represents the name of the horizon property's survey.

SF_Bulk_Grid

Property Name	Property Value
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the non-seismic horizon grid.
Bulk_EarthModel	The display name of the model view attribute that represents the name of the non-seismic horizon grid's earth model.
Bulk_Feature	The display name of the model view attribute that represents the name of the non-seismic horizon grid's feature.
Bulk_Grid	The display name of the model view attribute that represents the name of the non-seismic horizon grid.
Bulk_Interpreter	The display name of the model view attribute that represents the non-seismic horizon grid's interpreter.
Bulk_NumColumns	The display name of the model view attribute that represents the number of column values in the non-seismic horizon grid.
Bulk_NumRows	The display name of the model view attribute that represents the number of row values in the non-seismic horizon grid.

SF_Bulk_GridProp

Property Name	Property Value
Bulk_DataUnit	The display name of the model view attribute that represents the unit of the non-seismic horizon grid property.
Bulk_Domain	The display name of the model view attribute that represents the time/depth domain of the non-seismic horizon grid property's Z values.
Bulk_Feature	The display name of the model view attribute that represents the name of the non-seismic horizon grid property's feature.
Bulk_FeatureKey	The display name of the model view attribute that represents the data key of the non-seismic horizon grid property's feature.
Bulk_Grid	The display name of the model view attribute that represents the name of the non-seismic horizon grid property's grid.
Bulk_Interpreter	The display name of the model view attribute that represents the non-seismic horizon grid property's interpreter.
Bulk_NumColumns	The display name of the model view attribute that represents the number of column values in the non-seismic horizon grid property.
Bulk_NumRows	The display name of the model view attribute that represents the number of row values in the non-seismic horizon grid property.

Property Name	Property Value
Bulk_Property	The display name of the model view attribute that represents the name of the non-seismic horizon grid property.
Bulk_PropertyType	The display name of the model view attribute that represents the type of the non-seismic horizon grid property.

Glossary

A

ArcGIS Extension: OpenSpirit Extension for ArcGIS

E

EPSG: European Petroleum Survey Group

G

GIS: Geographic Information System, a term used to refer to data that describes real world spatial information using points, lines, or polygons.

GIS event: An OpenSpirit event that contains collections of points, lines, and polygons along with associated named properties.

L

License feature: The name of a software license that enables a specific software product or an optional feature of a software product.

M

Model view: A custom view of a native data model or the OpenSpirit data model. A model view can present a subset of the data model's data types and attributes. A model view can also change the names of data types and attributes and can join related data types to create a new data type.

O

OpenSpirit License Service: A service process used to manage OpenSpirit software license entitlements. The service must be running in order to use most OpenSpirit software products. The license service is included as part of the TIBCO OpenSpirit Runtime product.

OpenSpirit Runtime: The software services provided by the TIBCO OpenSpirit Runtime product. These include the OpenSpirit Data Service, Unit Service, Coordinate Service, and Event Service,

S

Spotfire Extension: TIBCO Spotfire Extension for OpenSpirit

W

WGS 84: World Geodetic System 1984

WKB: Well Know Binary is a binary data type that contains information describing a Point, Polyline, or Polygon GIS feature.

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