TIBCO Business Studio™

Modeling User's Guide

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Two-Second Advantage®

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Preface

This guide is intended for business analysts and describes using the process modeling capabilities of TIBCO Business Studio. No previous software experience is necessary, but a familiarity with Business Process Modeling Notation (BPMN) is useful (see http://www.bpmn.org).

- This guide does not cover implementation, export, or deployment. For more information about how to develop processes for a specific runtime environment, see the appropriate implementation guide.

- The features described in this guide are available in the Modeling perspective (for more information about perspectives, see "Capabilities and Perspectives" in *TIBCO Business Studio Concepts*).

Topics

Related Documentation

This section lists documentation resources you may find useful.

Third-Party Documentation

The Eclipse help contains useful information on the Workbench and the Eclipse user interface.

TIBCO Business Studio supports the following standards:

- Business Process Modeling Notation (BPMN)

  http://www.bpmn.org

- XML Process Definition Language (XPDL)

  http://www.wfmc.org/standards/xpdl.htm

Typographical Conventions

The following typographical conventions are used in this manual.

Table 1   General Typographical Conventions

Convention	Use
TIBCO_HOME *STUDIO_HOME*	Many TIBCO products must be installed within the same home directory. This directory is referenced in documentation as *TIBCO_HOME*. The default value of *TIBCO_HOME* depends on the operating system. For example, on Windows 7 systems, the default value is C:\Program Files (x86)\tibco TIBCO Business Studio installs into a directory within <*TIBCO_HOME*>. This directory is referenced in documentation as *STUDIO_HOME*. The default value of *STUDIO_HOME* depends on the operating system. For example on Windows 7 systems, the default value is C:\Program Files (x86)\TIBCO\studio-bpm-35.
code font	Code font identifies commands, code examples, filenames, pathnames, and output displayed in a command window. For example: Use MyCommand to start the foo process.
bold code font	Bold code font is used in the following ways: • In procedures, to indicate what a user types. For example: Type **admin**. • In large code samples, to indicate the parts of the sample that are of particular interest. • In command syntax, to indicate the default parameter for a command. For example, if no parameter is specified, MyCommand is enabled: MyCommand [**enable** | disable]
italic font	Italic font is used in the following ways: • To indicate a document title. For example: See *TIBCO ActiveMatrix BusinessWorks Concepts*. • To introduce new terms For example: A portal page may contain several portlets. *Portlets* are mini-applications that run in a portal. • To indicate a variable in a command or code syntax that you must replace. For example: MyCommand *PathName*

Table 1   General Typographical Conventions (Cont'd)

Convention	Use
Key combinations	Key name separated by a plus sign indicate keys pressed simultaneously. For example: Ctrl+C.
	Key names separated by a comma and space indicate keys pressed one after the other. For example: Esc, Ctrl+Q.
	The note icon indicates information that is of special interest or importance, for example, an additional action required only in certain circumstances.
	The tip icon indicates an idea that could be useful, for example, a way to apply the information provided in the current section to achieve a specific result.
	The warning icon indicates the potential for a damaging situation, for example, data loss or corruption if certain steps are taken or not taken.

Connecting with TIBCO Resources

How to Join TIBCOmmunity

TIBCOmmunity is an online destination for TIBCO customers, partners, and resident experts. It is a place to share and access the collective experience of the TIBCO community. TIBCOmmunity offers forums, blogs, and access to a variety of resources. To register, go to http://www.tibcommunity.com.

How to Access TIBCO Documentation

You can access TIBCO documentation here:

http://docs.tibco.com

How to Contact TIBCO Support

For comments or problems with this manual or the software it addresses, contact TIBCO Support as follows:

- For an overview of TIBCO Support, and information about getting started with TIBCO Support, visit this site:

  http://www.tibco.com/services/support

- If you already have a valid maintenance or support contract, visit this site:

  https://support.tibco.com

  Entry to this site requires a user name and password. If you do not have a user name, you can request one.

I - PROCESS MODELING

The following chapters describe the most common activities involved in process modeling in TIBCO Business Studio. For the concepts behind these activities, refer to *TIBCO Business Studio Concepts*.

Topics

- Getting Started for Designers, page 23
- Working with Projects, Packages, and Processes, page 37
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Chapter 1   # Getting Started for Designers

TIBCO Business Studio can be installed using two separate installations (**Studio for Analysts** and **Studio for Designers**), each of which is appropriate to a different type of user. See the *TIBCO Business Studio Installation Guide* and the *TIBCO Business Studio For Analysts Installation Guide* for more information.

- **Studio for Analysts**   enables the business analyst to model the business processes and access all the artifacts from a single file. This installation is suited to users doing high level or abstract modeling. The ribbon-based toolbar provides a familiar, easy to use interface that supports this type of modeling. To launch TIBCO Business Studio For Analysts, go to **Start > Programs > TIBCO >** *environment_name* **> TIBCO Business Studio** 3.5 **Analyst Edition > Studio for Analysts**.

- **Studio for Designers**   provides a project based view and enables the solution designer to add details to and manage the processes at a project level. This installation is suited to users who are more comfortable with developer tools, and who need access to all files related to the project. To launch TIBCO Business Studio as a solution designer, go to **Start > Programs > TIBCO >** *environment_name* **> TIBCO Business Studio** 3.5 BPM Edition **> Studio for Designers**.

This section covers starting to work with Studio for Designers. For more information on working with Studio for Analysts, see the *TIBCO Business Studio for Analysts User Guide*.

Topics

Creating a Project, Package and Process

This section describes how to create a new TIBCO Business Studio project, package and process.

- If you have processes that you created using previous versions of TIBCO Business Studio, you must migrate them to the current version as described in Migrating Projects Created in Previous Versions on page 38.

- This section describes how to create a project, and at the same time create a package and process using a template. You can however, perform each operation separately.

1. Select **File** > **New** > **Analysis Project**.

2. Complete the **New Analysis Project** dialog as follows:

Field	Description
Project name	Enter a descriptive name for the project.
Location	Either accept the default location for the project (your workspace) or de-select the **Use default location** checkbox and click **Browse** to select a different location.
Version	Either accept the default version (**1.0.0.qualifier**) or enter a version for the project in the standard Eclipse format: major.minor.micro.qualifier The specified version will be the default for project artifacts such as process packages and organization models, and can be used to track revisions to the project. The version can be changed later as described in Changing Project Lifecycle Settings on page 57.
Status	Package life cycle status for informational purposes. How or whether you use life cycle statuses is up to you, but they are typically used as follows: • Under revision - for packages in development • Under test - for packages in User Acceptance Testing (UAT) • Released - for packages in production

Field	Description
Destination Environments	Select the **Destination Environment** (optional). This specifies the intended runtime environment for project artifacts.
	For example, for processes, TIBCO Business Studio performs validation according to the selected destination environments. Other artifacts (for example, organization models) are not affected by project destination settings.
	For processes:
	• All processes are validated for BPMN 1.2 - additionally, other destinations can be selected to validate processes for use in specific environments
	• If you select **BPM**, the Process will be validated against BPM.
	• If you select **Simulation**, processes created under this project will be validated for simulation in TIBCO Business Studio as well as for BPMN correctness.
	• If you do not select a destination environment, basic BPMN validation will be performed.

• To set a default destination which will then be ticked already in this dialog, select **Window** > **Preferences** > **User Profile**, and select the required destination from the dropdown next to the Project Destination field.

• The exact destination environments that are displayed depend on the edition of TIBCO Business Studio and any addins that you have installed.

The specific destination components that make up a destination environment can be viewed by selecting **Window** > **Preferences**, and selecting **Destination Environments**.

• To avoid error messages and warnings associated with modeling constructs that cannot be executed in the runtime environment, set the appropriate destination environment on the process.

• You can change or select the destination environment after the Process has been completed on the **Destinations** tab of the Process Properties.

Click **Finish** on this dialog (or on any of the subsequent dialogs) to create a project with the settings you have made to that point. Click **Next** to modify the default project settings and create a process using a template.

3. The **Asset Type Selection** dialog displays the types of assets that you can include in your project.
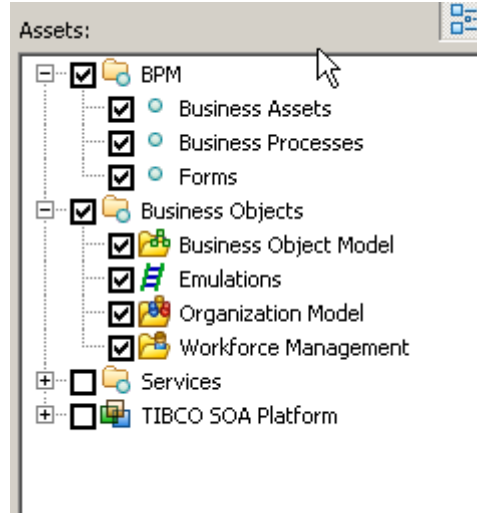
For a full description of the different types of assets, see Assets on page 54. Select the types of assets you want to include in your project and click **Finish** if you are done, or **Next** to specify more options.

4. In the **Business Assets** dialog, enter the name of the folder that you want to designate for business assets files. Click **Finish** if you are done, or **Next** to specify more options.

5. In the **Select quality process project** dialog, select the name of the quality process project that you want to use. If you have not already created a Quality Process project in your workspace, you will receive a message telling you that there are no Quality Process projects in the current workspace, but you can add them later using the New Quality Process wizard. Click **Finish** if you are done, or **Next** to specify more options.

6. In the **Organization Model** dialog, enter the name of the folder that you want to designate for the organization model.

    Select the checkbox under Model Details if you want to create an initial organization model.

    Give the Organization Model you want to create a filename, or use the default one provided. The filename will automatically have a prefix of the domain name, as set in **Window** > **Preferences** > **User Profile**, and will end with *.om*.

    Select the Default Schema Types checkbox unless you want to define different schema types.

    You can also select to apply the default organization type to the Organization model you are creating.

    Click **Finish** if you are done, or **Next** to specify more options.

7. In the **Business Object Model** dialog, enter the name of the folder that you want to designate for the Business Object Model.

   Select the checkbox under Model Details if you want to create an initial Business Object Model.

   Give the Business Object Model you want to create a filename or use the default one provided. The filename will automatically have a prefix of the domain name, as set in **Window** > **Preferences** > **User Profile**, and will end with *.bom*.

   Select a Type for the Business Object Model. 3 types are provided for you to select from: the Business Object Model (no profile), Concept Model or Persistent Business Object Model.

   Click **Finish** if you are done, or **Next** to specify more options.

8. In the **Emulations** dialog, enter the name of the folder that you want to designate for Emulations.

   Click **Finish** if you are done, or **Next** to specify more options.

9. In the **Business Processes** dialog, enter the name of the folder that you want to designate for Business Processes.

   Under Package Details, you can accept the pre-selected checkbox and either enter a filename or accept the default filename.

   By default when you create a project, TIBCO Business Studio creates a package and process as well. The default packages Folder is called **Process Packages** and the default packages file is **ProcessPackage.xpdl**. Either accept the default names or rename the packages file and folder. Click **Finish** if you are done, or **Next** to specify more options.

10. The **Package Information** dialog is displayed. Either accept the default properties of the package, or modify them as necessary and click **Finish** if you are done, or **Next** to specify more options.

    — **Package Label** Descriptive label for the package. Defaults to the same name as the filename of the package and is used for purposes such as simulation reports.

    — **Author** Username of the user who created the package.

    The name of the author can be defined in the User Name: field on **Window** > **Preferences** > **User Profile**. If no user is defined there, it uses the default user system property.

— **Created** Displays the date/time that the package was created.

— **Description** Text description of the package.

— **Documentation Location** URL or filename of any supporting documentation.

— **Status** Package life cycle status for informational purposes. How or whether you use life cycle statuses is up to you, but they are typically used as follows:

Under revision - for packages in development

Under test - for packages in User Acceptance Testing (UAT)

Released - for packages in production

— **Business Version** Version information about the package (this is inherited from the setting in the **New Analysis Project** dialog in step 2).

The version you specify in this field is unrelated to any source control system and their use is entirely user-defined.

— **Cost Unit** Three-letter currency code that provides context for the costs reported in Simulation. For example, there is a Cost Per Unit for Participants in Simulation, that displays an integer with no currency. For example, use this informational field to specify to anyone using the process that a Cost Per Unit of 50 is intended to be read 50 USD. GBP is the default.

Both **Cost Unit** and **Language** provide content assist. Press Ctrl+Space to see a list of allowed values for these fields.

— **Language** Provides context for user-visible language in processes. For example, annotations in a process may be in a language or character set unfamiliar to the user of the process. Use this field to specify the language used. Note that this field is informational; it does not change any system or TIBCO Business Studio-specific language settings.

11. The **Select Template** dialog allows you to create a process using a template. Select a template from those available and click **Finish** if you are done, or **Next** to specify more options.

12. The **Set Special Folders** dialog displays the default special folders for each asset type that you selected in the previous step. Either accept the default names or enter your own names and click **Finish**.

The newly-created package, process, and project are displayed in the Project Explorer. For more information about the Project Explorer, see Project Explorer View on page 374.

Working with Processes

This section describes some common tasks and shortcuts to help you use the Process Editor to create processes.

For additional information, see .

Adding Objects Using an Object's Gadget

When an object is selected, initially one gadget of each applicable type is displayed, and if multiple gadgets of a particular type are available, these are displayed when the mouse cursor is moved over the first.

A gadget is a user interface aid that allows you to easily create sequence flows or other links between objects.

For example, if a task is selected, the **Create Connection** gadget is visible to the lower right of the task:
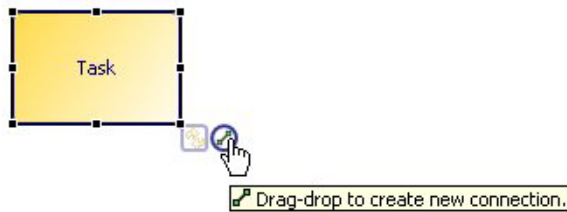
Gadgets that can be used to designate references to other objects can be used to designate a reference (drag-drop gadget onto target object) or go-to a currently referenced object.

The following gadgets are provided:

- **Cycle Object Type Gadget** Change the activity type by cycling through the different types.

- **Create Connection Gadget** Create sequence flows to existing object or create and connect to new object.

- **Link Event Gadget** Designate a throw and catch link event pair.

- **Signal Event Gadget** Designate a throw and catch signal event pair.

- **Reply Activity Gadget** Specify a request - reply relationship (with throw and catch message events or send and receive tasks).

- ⊘ **Reference Task Gadget** Select the task that the current task will reference.

You can control the display of gadgets using the toolbar tool, or the **Show Click/Drag Gadgets** drop-down list from the **Diagram** toolbar:
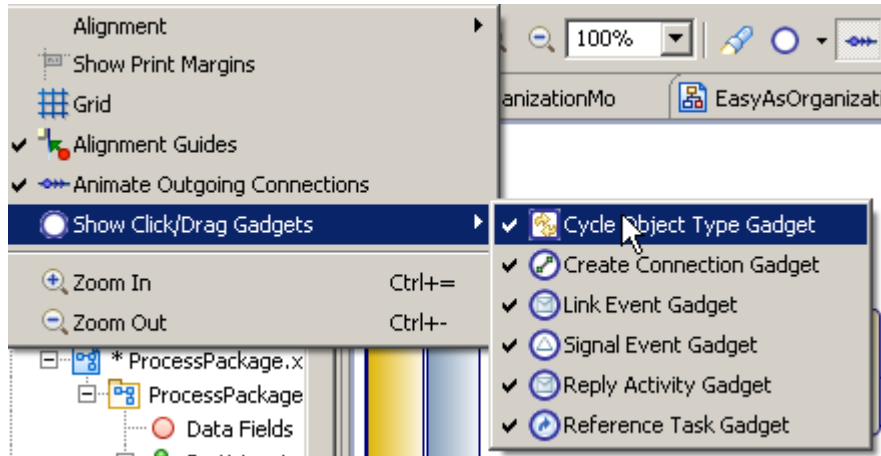
To add an object, click the **Create Connection** gadget, and drag and drop it in a lane content area or embedded sub-process content area.

A popup menu is displayed showing a selection of applicable main object types that can be created (available types governed by the source object and drop location).

You can also drag onto an existing sequence flow, and the object is inserted onto the sequence flow. If the target flow is not to or from the selected object then a new flow added to the new object.
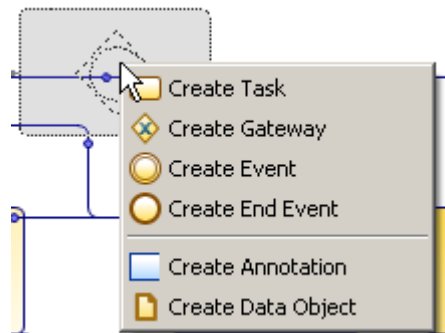
Adding Objects Using the Palette

You can use the palette to add objects (for example, a task).

When you first start TIBCO Business Studio, if the palette is not visible, expand it by clicking the **Show Palette** button to the right of the window:

1. Click the appropriate tool in the palette. If an object has more than one type (for example, a task can be a service task, or user task, and so on), each type has a tool on the palette. For example:

Click another tool to display the available sub-types. For example, click the Gateway tool to see the different types of gateways; this closes the currently open tool drawer if more space is required to open the new tool drawer. To change this behavior and cause the available tasks to remain open, click the **Pin Open** button ( ).

- To add more than one object of the same type, hold down the **Ctrl** key.

- You can customize certain palette preferences by selecting **Customize** from the right-click menu on the palette. This allows you to define preferences such as the default tool drawer states on editor startup. There is also a Favorites drawer that you can customize (see Customizing Palette Favorites on page 35).

2. Position the pointer on the process at the place where you want to place the object.

    The pointer changes shape:

3. Click the process to add the object.

 You can also drag and drop from the palette. So select an item on the palette and drag and drop it to where you require it in the process.

Using an Object's Gadget to Connect Objects

You can connect objects in the process by creating a sequence flow using the **Create Connection** gadget, but a similar procedure applies to all connection types:

1. Select the object. For example:

2. Drag the **Create Connection** gadget to connect to another object. For example:
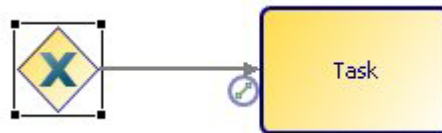
3. If you add more connections or references, additional gadgets are added. These are only visible if you position the mouse over the visible gadget. For example:
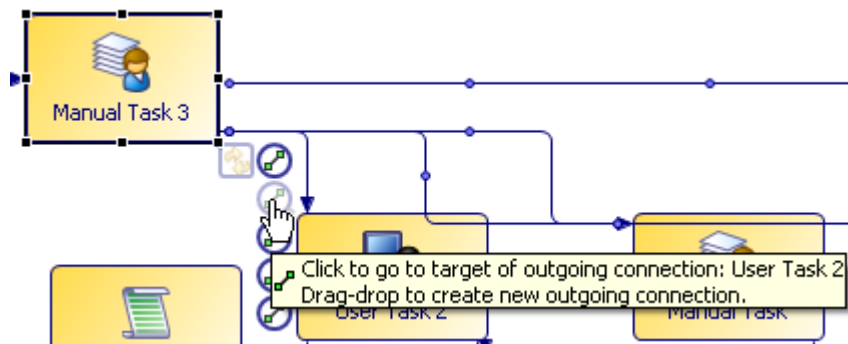
In this example, there is a **Create Connection** gadget for each outgoing sequence flow. Clicking a gadget selects the referenced or connected object in the Process

Editor (for example, clicking the gadget attached to a reference task selects the referenced task).

Using Connection Tools on the Palette to Connect Objects

To connect two objects with sequence flow, use the **Sequence Flow** tool.

1. Click the **Sequence Flow** tool.

2. Position the pointer over the object that will be the source of the sequence flow.

   The pointer changes shape:

3. Draw the sequence flow using one of the following methods:

   — Click the source object, then position the pointer over the target of the sequence flow. If you are satisfied with the shape of the flow, click the target.

   — Click the source object, holding down the mouse button, drag the pointer to the target object and release the mouse button.

> While drawing the sequence flow, you can add bendpoints by right-clicking or pressing the spacebar as you create the flow.

> You can also drag and drop from the palette. So select an item on the palette and drag and drop it to where you require it in the process.

> When you connect objects, as the default the sequence flows use Multi Entry/Exit Point connection routing (meaning that there will be multiple separate lines from the entry or exit point to those objects they are connected to. You can tailor this behavior, by selecting the process, and from the **Properties** tab, select the **Appearance** tab. You can then select from the following connection routing styles:
>
> • Multi Entry/Exit Point
>
> • Single Entry/Exit Point
>
> • Uncentered on tasks
>
> Once you have selected a different connection routing style, the diagram will be reformatted to use this selection.

Selecting Objects

You can select objects using the **Select** tool on the palette or the **Marquee** tool.

• Using the **Select** tool on the palette. Hold down the **Ctrl** to add single objects to the selection or **Shift** keys to select a range of objects.

- Using the **Marquee** tool. This allows you to drag a rectangle around all the objects that you want to select.

Finding Objects

TIBCO Business Studio provides different tools to find objects in a diagram.

To find an object on a process, press **Ctrl+F** or click the [icon] icon on the toolbar. In the resulting dialog enter the name or partial name of the object you are looking for. For example:
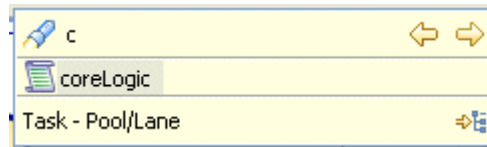
In this example the only task that starts with "c" is a script task called *coreLogic*. Clicking on the task displays it in the Process Editor.

You can also use the search facility to locate workspace elements such as processes, package names, and process interfaces by pressing **Ctrl+F** or the search toolbar button in the Project Explorer view. For example:

The arrow buttons allow you to select the next or previous item in the list. You can also double-click or press Enter to select items in the list.

This button allows you to restrict the types of items you want to search for.
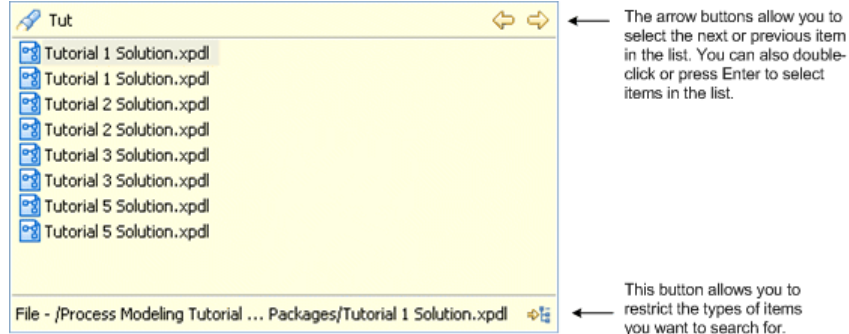
You can also use the search facility to locate a business object model package, class, primitive types and enumerations, as well as organization models, by pressing **Ctrl+F** or the search toolbar button in the Project Explorer view.

You can also search for items using the first characters from the start of each capitalized word (CamelCase searching). For example, "BP" returns a file called **BankPayment.wsdl**.

The wildcard **?** returns all elements. Use the ***** wildcard to restrict the results (for example, ***2** to return all matches ending in 2). Note that the wildcard ***** by itself does not return any results; it only works in conjunction with a string.

Customizing Palette Favorites

The palette contains a drawer labelled **Favorites** that contains some of the most commonly used objects., which you can customize by adding or removing objects.

1. Right-click in the Favorites drawer, and select **Customize**.
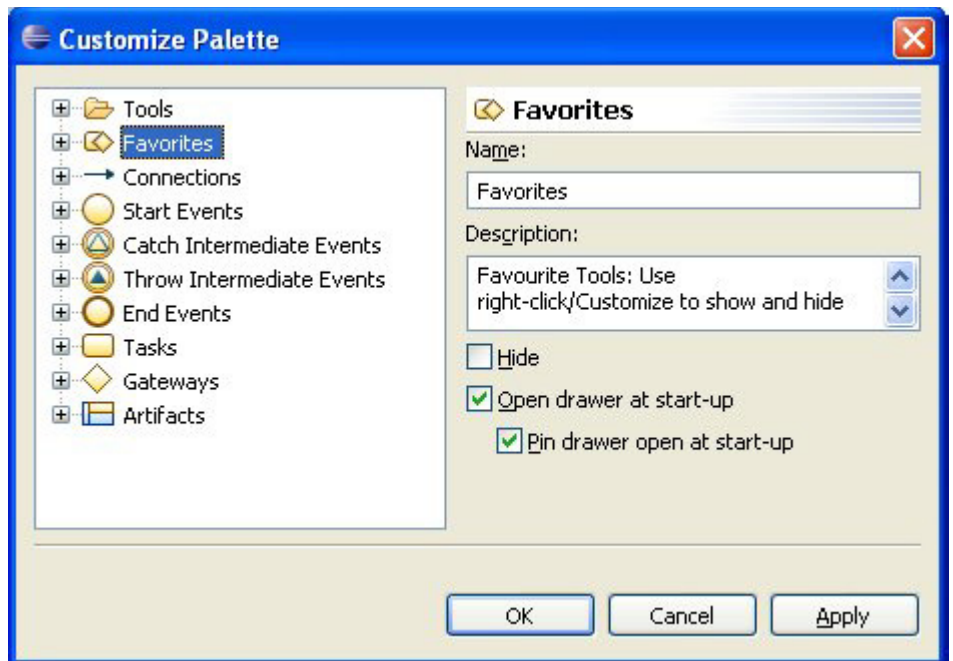
2. Expand the **Favorites** item in the **Customize Palette** dialog.

3. Select an object and use the **Hide** check box to display or hide the object in the
    favorites drawer:
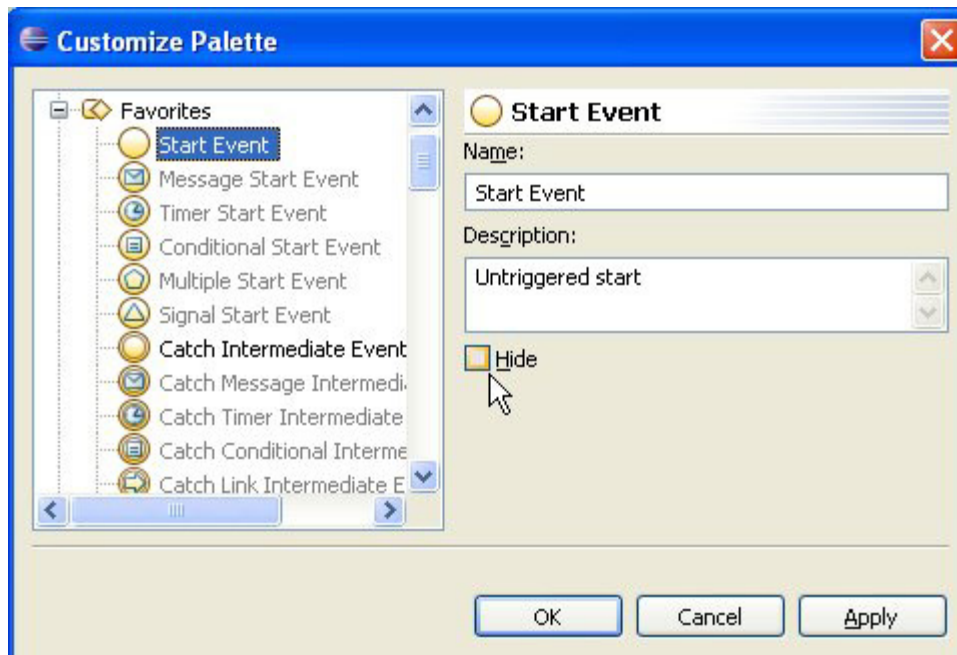
Chapter 2   **Working with Projects, Packages, and Processes**

This section describes how to work with projects, packages, and processes in TIBCO Business Studio.

Topics

Migrating Projects Created in Previous Versions

Projects created in previous versions of TIBCO Business Studio may need to be migrated to the current version before they can be opened, depending on how you import them.

- If you are migrating a project created in a previous version using **File** > **Import** > **Existing Studio Projects into Workspace**, migration will happen automatically.

  If you are importing a project from SVN, then you may be unable to access all files in the imported project until you have reviewed the Problems view and resolved the problem covering migration using the **Quick Fix** provided.

  Alternatively, if there is a problem marker on the project in the Project Explorer view, press **Ctrl+1** and look for the Problem

  "Project 'xxx' is of an older version and needs to be migrated."

  Select the "Migrate the Project" quick fix in the popup.

- If you are importing a single file (for example, an XPDL) then you may need to migrate this file using the **Quick Fix** available.

- If you are importing a project created in a newer version of TIBCO Business Studio, you will see a problem marker (for example, "Project 'xxx' was created by (or migrated to) a newer version of the product and should not be used with this version"). Install a newer version of TIBCO Business Studio if that is appropriate or return to an earlier version of the product/project.

Creating a Package

You can create a package as part of creating a project (see Creating a Project, Package and Process on page 24) or independent of project creation as described here.

1. Right-click the Process Package folder under which you want to create the package and select **New > Process Package**.

2. If you want to change the Packages Folder under which the package is created, click **Browse** or enter an existing folder name.

3. Enter the name of the **File** or accept the default filename. The filename must have **.xpdl** as the extension. Click **Next**.

4. The **Package Information** dialog shows the name of the package and its default properties (for a full explanation, see step 10 in Creating a Project, Package and Process on page 24).

   Either accept the default properties of the package, or modify them as necessary. Then, click **Finish** to create a process using the default template, or click **Next** to create a process using a different template.

5. By default a process will be created with start and end event connected by sequence flow. The **Select Template** dialog allows you to create a process using a different template. Select a template from those available and click **Finish**.

The newly-created packages and any processes that you elected to create are displayed in the Project Explorer.

To avoid error messages and warnings associated with modeling constructs that cannot be executed in the runtime environment, set the appropriate destination environment on the process (see Destinations and Validation on page 220).

TIBCO Business Studio restricts the number of open editors to 8 by default to avoid adverse performance issues. To edit this setting, select **Window** > **Preferences** > **General** > **Editors** and under **Close editors automatically**, edit the value for **Number of opened editors before closing**.

Copying a Package

You can copy a package into the same project, or into a different project in your workspace.

1. In the Project Explorer, highlight the package file you want to copy.

2. Press **Ctrl+C** to copy the package.

3. Open the project into which you want to copy the package.

4. Select the folder into which you want to copy the package (for example, the **Process Packages** folder).

5. Press **Ctrl+V** to paste the package. If copying the package within the same project, you are prompted to enter a new name. If copying the package to a different project when a package of that name already exists, you are prompted to overwrite the file.

After copying a package, errors similar to the following are displayed in the Problems view:

❌ XPDL 2.0 : The following files have duplicate process IDs: /mond/Process Packages/ProcessPackage.xpdl

To correct this, right-click the problem, and select **Quick Fix**. Accept the suggested fix for this problem to resolve the duplicate IDs.

Creating a Business Process

You can create a Process and its containing package and Project in one operation () or you can create a business process as described here.

1. Before creating a process, you must create a project and a package to contain your process.

2. In the Project Explorer, select the package you created, right-click and select **New** > **Business Process**.

3. The **New Business Process** wizard is displayed.

> If you start this wizard from the **File** > **New** menu, the first dialog is the **Project and Package** dialog, where you must specify a valid project and package. This dialog is not displayed if you right-click at the package level to start the dialog; however you can click **Back** to display it if necessary.

4. Enter the **Label** of the process. To use a template to create the process, select the template and click **Next**. The following example shows one of the basic templates (a task sequence).
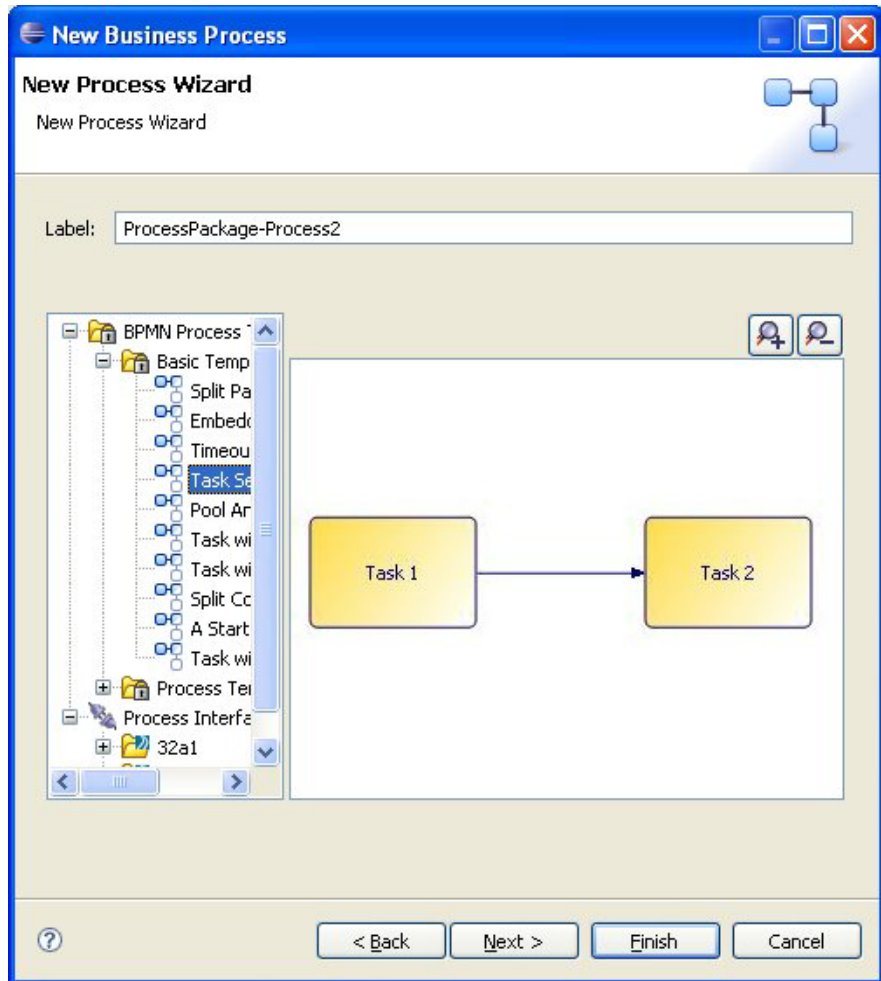
In addition to the process templates, you can select a process interface as the basis for your new process. This creates a process with the necessary events, parameters that are specified in the process interface.

5. In the **Description** dialog, add optional text that describes the process, an optional URL that links to documentation about the process, and click **Next**.

6. In the **Destinations** dialog, select the **Destination Environment** (optional). This controls the validation that TIBCO Business Studio performs when you save the process:

— The exact destination environments that are displayed depend on the edition of TIBCO Business Studio that you have installed.

— The specific destination components that make up a destination environment can be viewed by selecting **Window** > **Preferences**, and selecting **Destinations**.

— All processes are validated for BPMN 1.2 - additionally, other destinations can be selected to validate processes for use in specific environments

— If you select **BPM**, the Process will be validated against TIBCO ActiveMatrix BPM 2.x.

— If you select **Simulation**, the Process will be validated for simulation in TIBCO Business Studio as well as for BPMN correctness.

— If you select **Modeling**, the Process will be validated for modeling in TIBCO Business Studio as well as for BPMN correctness.

If you do not select a destination environment, basic BPMN validation will be performed.

To avoid error messages and warnings associated with modeling constructs that cannot be executed in the runtime environment, set the appropriate destination environment on the process.

You can change or select the destination environment after the Process has been completed on the **Destinations** tab of the Process Properties.

7. The **Extended** dialog is displayed. This allows you to add optional supplemental information to the XPDL for the process. For more information see Creating Extended Attributes on page 49.

8. Click **Finish**.

9. The process that you created is displayed in the Process Editor. When you first start the Process Editor, the palette (on the right side of the diagram) might be collapsed; if so, expand it:
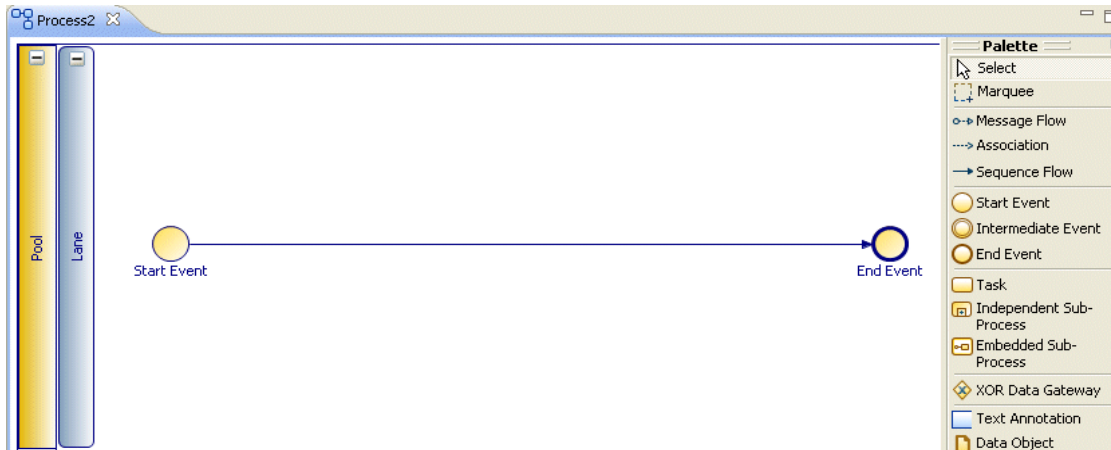
You can expand this window to fill your screen by double-clicking the title bar (in this example, the area labeled **Process2**).

The Process Editor provides a **Pool** and **Lane** that you can rename if you plan on using pools and lanes (see Controlling Flow in a Process on page 117). You add elements of your business process using the Palette.

Creating a Pageflow Process

You can create a Process and its containing package and Project in one operation (Creating a Project, Package and Process on page 24) or create a pageflow process as described here.

1. Before creating a pageflow process, you must create a project and a package to contain your process.

2. In the Project Explorer, select the package you created, right-click and select **New** > **Pageflow Process**.

3. The **New Pageflow Process** wizard is displayed.

If you start this wizard from the **File** > **New** menu, the first dialog is the **Project and Package** dialog, where you must specify a valid project and package. This dialog is not displayed if you right-click at the package level to start the dialog; however you can click **Back** to display it if necessary.

Enter the **Label** of the process. If you want to use a template to create the process, select the template and click **Next**.

In addition to the process templates, you can select a process interface as the basis for your new pageflow process. This creates a process with events and parameters that are specified in the process interface.
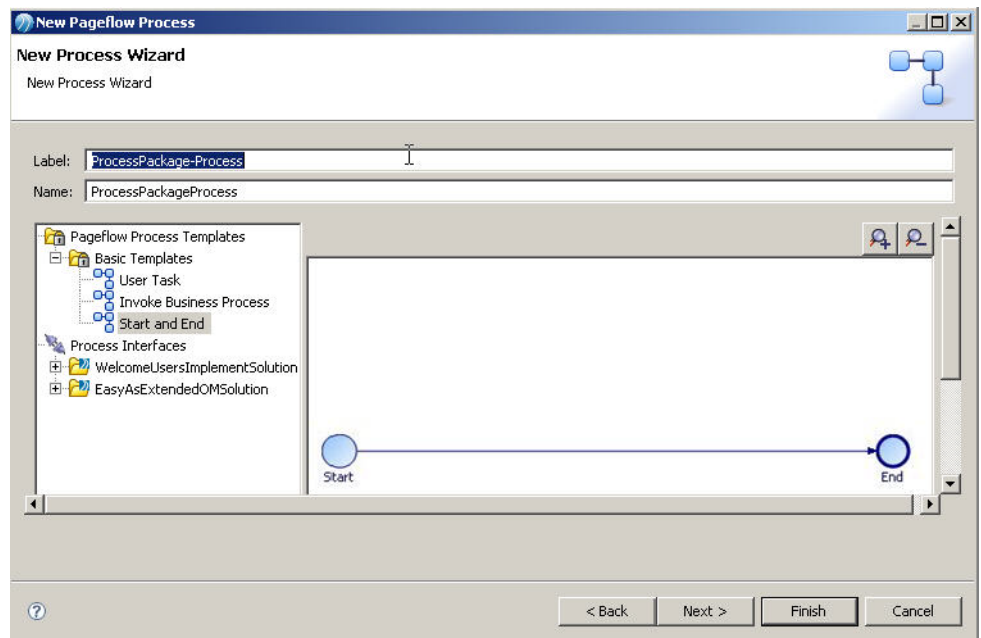
4. In the **Description** dialog, add optional text that describes the process, an optional URL that links to documentation about the process, and click **Next**.

The **Documentation Url** field is intended for design-time collaboration; it is not displayed in the runtime environment.

5. In the **Destinations** dialog, select the **Destination Environment** (optional). This controls the validation that TIBCO Business Studio performs when you save the process:

— The exact destination environments that are displayed depend on the edition of TIBCO Business Studio that you have installed.

— The specific destination components that make up a destination environment can be viewed by selecting **Window** > **Preferences**, and selecting **Destinations**.

If you do not select a destination environment, basic BPMN validation will be performed.

To avoid error messages and warnings associated with modeling constructs that cannot be executed in the runtime environment, set the appropriate destination environment on the process.

You can change or select the destination environment after the Process has been completed on the **Destinations** tab of the Process Properties.

6. The **Extended** dialog is displayed. This allows you to add optional supplemental information to the XPDL for the process. .

7. Click **Finish**.

8. The process that you created is displayed in the Process Editor:

When you first start the Process Editor, the palette (on the right side of the diagram) might be collapsed; if so, expand it. You can expand this window to fill your screen by double-clicking the title bar. A pageflow process has a different default color scheme from a business process.

Pageflows do not contain pools or lanes.

Deleting a Process

You can delete a process and decide whether to delete referenced processes.

1. Do one of the following:

   — Right-click the process in the Project Explorer, and select **Delete**.

   — Highlight the process and select **Edit** > **Delete**.

   — Highlight the process and press **Delete**:

2. If the process you are deleting is referenced in the parent package (for example, you are deleting a sub-process), the following dialog is displayed:
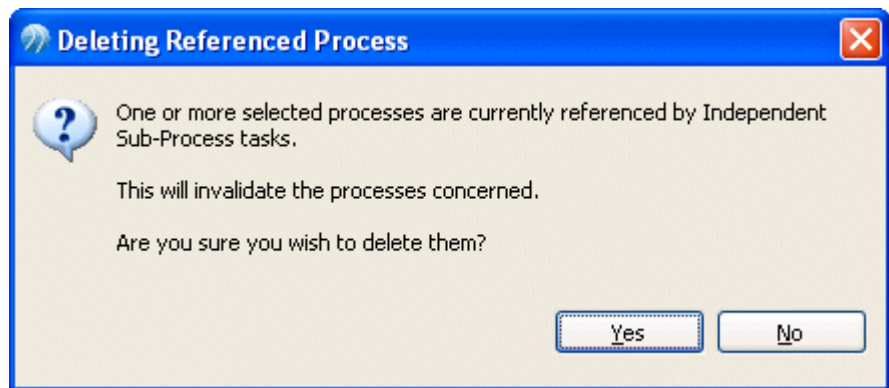
   — If you are sure that you want to invalidate the process that is referring the the process you are deleting, click **Yes**.

   — If you do not want to delete the process, click **No**.

3. If the process you are deleting is not referenced in the parent package, it is still possible that it is referenced by a process in a different package. TIBCO Business Studio cannot validate against this however and the following dialog is displayed:
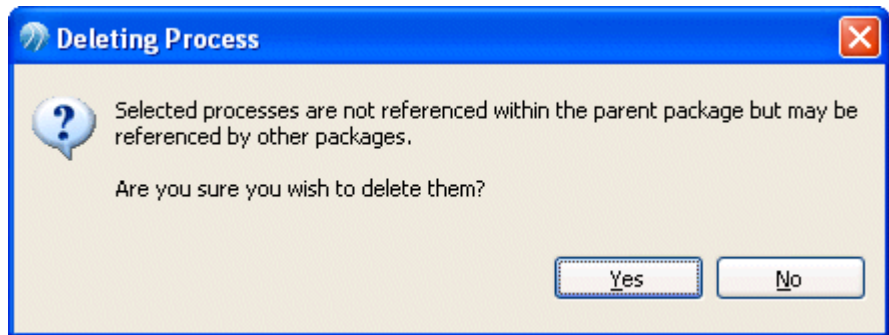
— If you are sure that processes in different packages do not reference the process you are deleting, click **Yes**.

— If you do not want to delete the process, click **No**.

It is also possible to delete a process by deleting the XPDL file of the package that contains the process in Windows Explorer. This will delete all processes in that package. If you delete a package in Windows Explorer while TIBCO Business Studio is open, you must refresh the Project Explorer to see an updated view of the workspace.

Creating Extended Attributes

Extended attributes can be used to add extra information to the schema.

For example:

- **XML** For example, an XSD file used by a web service.

- **Plain text** For example, Supply Chain Management (SCM) metrics and best practices.

To add extended attributes to an object, do the following:

You can also add extended attributes when creating a new Process or Process Interface as described in Creating a Business Process on page 41 and Creating a Process Interface on page 204.

1. Click the **Extended** tab.

This tab is only available on the Properties view for objects that support extended attributes.

2. Click **Add** to add a new extended attribute.

3. Modify the following:

   — **Name** Provide a **Name** for the attribute (you cannot include spaces in the name).

   — **Value** Add any text for the **Value**.

   — **Escape Body** Select this check box if you want the parser to interpret the contents of the body attribute as text rather than XML (you do not want the parser to interpret symbols such as < or >). If you are entering XML, do not select this checkbox so the parser can validate the body attribute.

   — **Body** Enter whatever text or XML you want to make up the body of the attribute.

4. Save the package that contains the process.

Creating Project References

Project references can be created either explictitly in the project properties or automatically (subject to user confirmation), when you select an object from outside the current Project.

- Explicitly: see Creating References in the Project Properties, page 51).

- Automatically: see Creating Project References in a Selection Dialog on page 51).

Creating References in the Project Properties

You can create a reference from one Project to another in the project properties,

1. Right-click the project, select **Properties**, and highlight **Project References**:
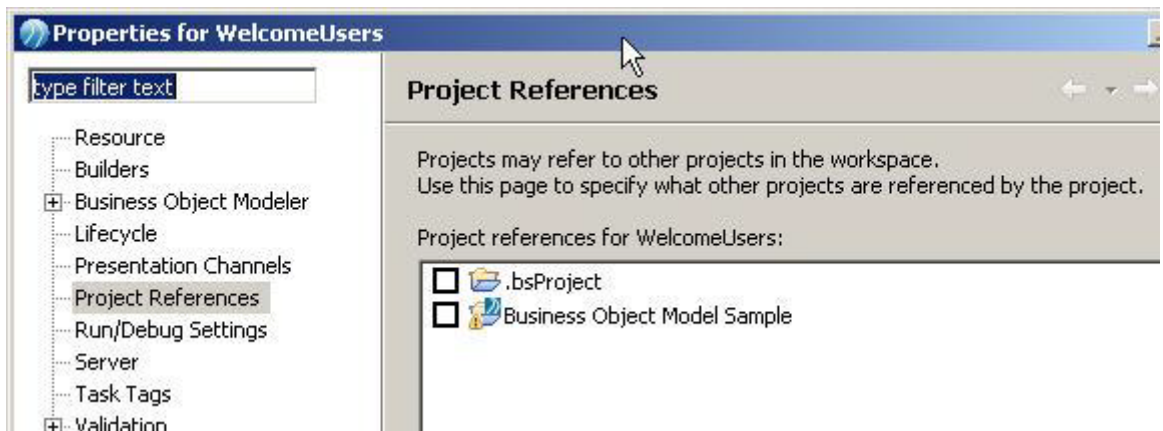
2. In this dialog, select any projects that you want to refer to from the selected project.

Creating Project References in a Selection Dialog

Project references can automatically be created when an object from outside the project is selected.

For example, when defining a sub-process call, you select from a list of all the sub-processes in the workspace:
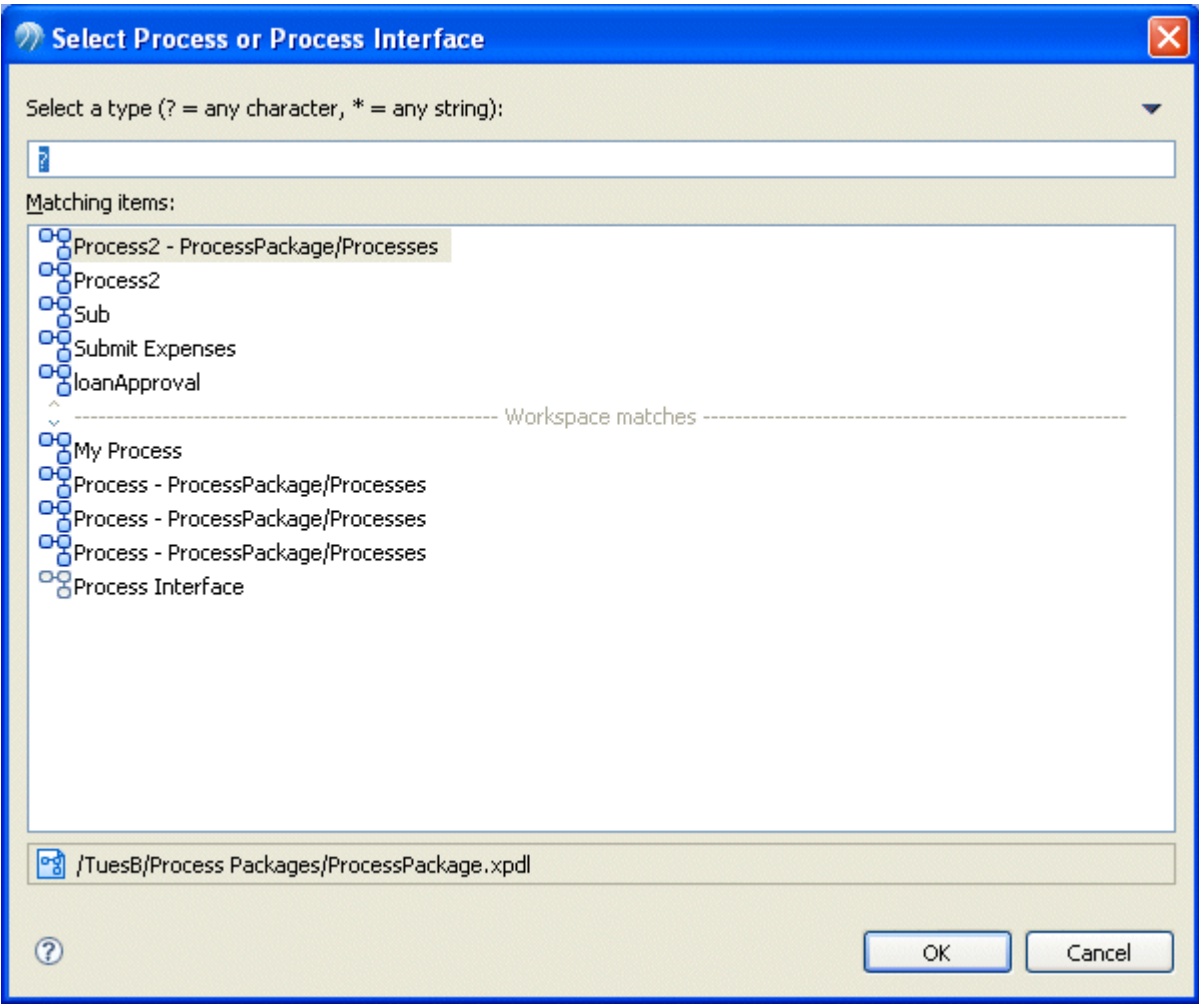
If the selected sub-process is not part of the project in which the sub-process call is located, the following message is displayed:
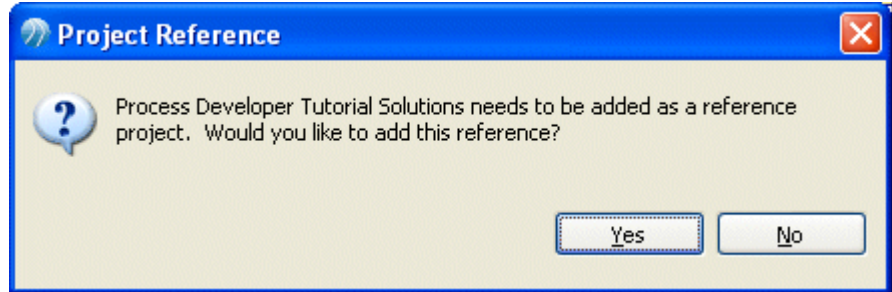
Clicking **Yes** creates a reference to the project that contains the sub-process.

Assets

See "Assets" in *TIBCO Business Studio Concepts*.

Quality Process Business Assets

TIBCO Business Studio provides assets to support quality processes or methodologies.

To include quality process templates, you must do the following:

1. Creating a New Quality Process Project to contain the templates.

2. Refer to Using Quality Processes in Your Project to associate a quality project with another project.

Creating a New Quality Process Project

You can create a new quality process project as follows:

1. Select **New** > **Project**, expand **Business Modeling**, select **Quality Process Project**, and click **Next**.

2. Enter a project name. Either accept the default location for the project (your workspace) or de-select the **Use default location** checkbox and click **Browse** to select a different location.

3. Click **Next**. In the resulting dialog, you can either create an empty quality archive project (into which you can copy your own template), or select Prince2 templates:
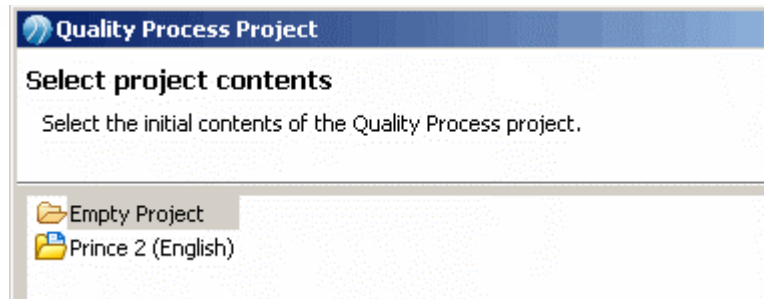
4. If you used the Prince2 templates, they are used to create the project:
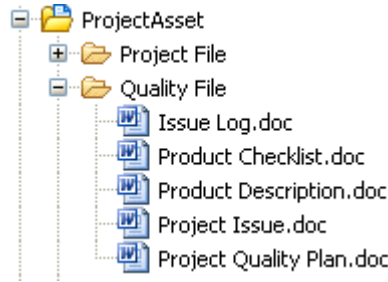
If you created an empty project, copy the files and folders for your quality process.

Using Quality Processes in Your Project

You can associate a quality process project with other project types in order to keep the documents expected by your quality team with other project assets.

You can do this using one of the following methods.

From the New Project Wizard

1. Create a project, selecting Business Assets as one of the asset types to be included in the project.

2. When prompted, specify the quality process project containing the correct templates (or accept the default).

After Project Creation

1. After creating a project you can add business assets by selecting a standard folder and then **Special Folders** > **Other** > **Use as Business Assets**.

2. When prompted, specify the quality process project containing the correct templates (or accept the default).

Adding Ad-hoc Assets

You can add business assets by right-clicking and selecting **New** > **Folder** or **New** > **File**, and selecting the appropriate **Parent Folder**.

Ad-hoc assets include Microsoft Office documents and image files not recognized as project management assets.

To view the folder or files you have created, go to the Navigator view. In the Navigator view, you can also drag files and folders to different locations.

Enabling and Disabling Special Folders

See "Special Folders" in *TIBCO Business Studio Concepts*.

You can disable a special folder by highlighting it in the Project Explorer, right-clicking, and selecting **Special Folders** > **Do not use as *SpecialFolderType.***

> The following example uses the special folder for business processes as an example, however the special folders for other asset types are enabled and disabled in the same manner.

To disable the packages folder by highlighting the **Process Packages** folder in the Project Explorer and selecting **Special Folders** > **Do not use as Process Packages Folder**, which results in a view of the package like this:
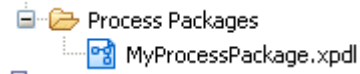
Conversely, you can enable the use of the special packages folder by highlighting the packages folder in the Project Explorer and selecting **Special Folders** > **Use as Process Packages Folder**. This results in a view of the package like this:
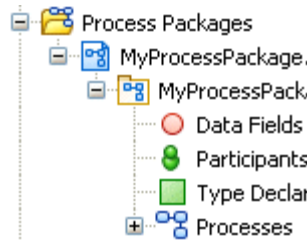
Project Lifecycle

See "Project Lifecycle" in *TIBCO Business Studio Concepts*.

Changing Project Lifecycle Settings

To change project lifecycle settings (such as a project version), do the following:

1. Right-click the project and select **Properties** and **Lifecycle**. The following dialog is displayed:
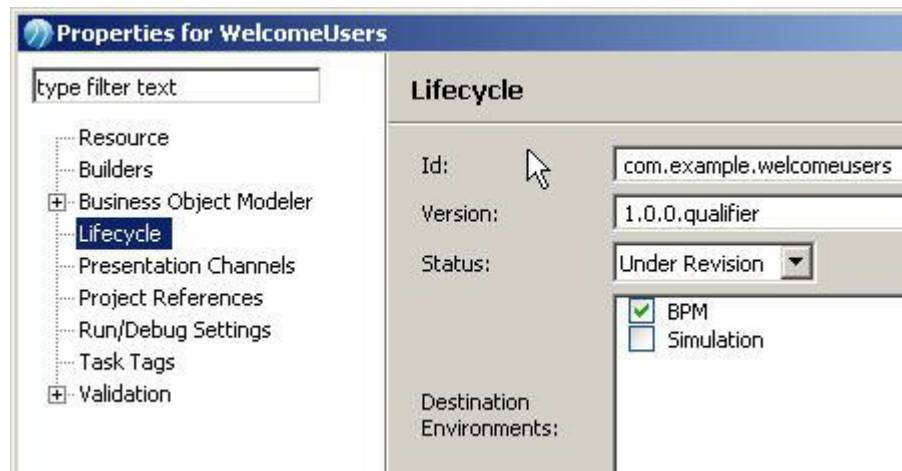
2. Enter the new settings and click **OK**.

3. Any new project artifacts will be created with the new settings. For example, if you changed the version, new process packages will be created with the new version. If there are project artifacts that were created with the previous settings that you want to update to the new settings, continue with .

Refactoring Lifecycle Settings

The lifecycle settings of project artifacts (such as process packages or organization models) can be changed to match the settings of the parent project.

1. Right-click the project and select **Refactor > Project Lifecycle...** A dialog is displayed that shows any project artifacts that can be refactored. When you select an artifact the settings that can be changed are displayed.
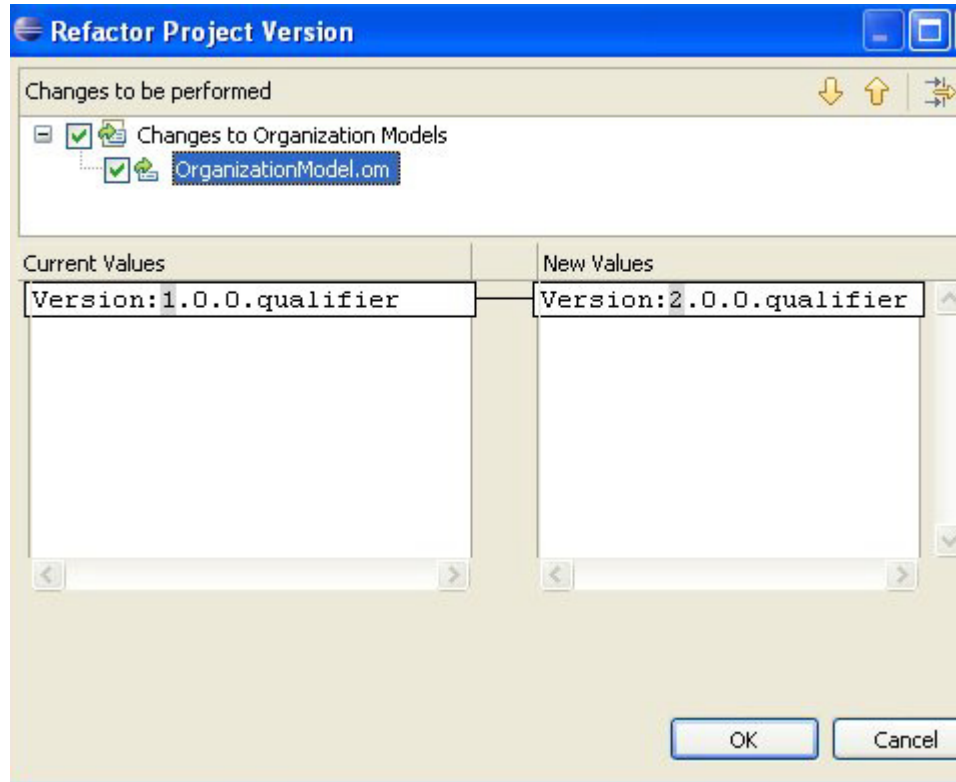
In this example, the project has the version **2.0.0.qualifier** and the organization model was created with the version **1.0.0.qualifier** (you can also refactor other settings such as status if they have changed).

2. To refactor the version of the organization model to match the version of the project, click **OK**.

Process Fragments

See "Process Fragments" in *TIBCO Business Studio Concepts*.

Migrating Fragments from Previous Versions

Any fragments that you created in previous versions of TIBCO Business Studio must be migrated to the current version, but the predefined fragments that TIBCO Business Studio provides do not need to be migrated because they are available in the current version.

To migrate fragments that you have defined, do the following:

1. Select **File** > **Import** > **General** > **Existing Fragments Projects into Workspace**, and click **Next**.

2. In the **Import** dialog, click **Browse** to select the directory where your fragments are located.

3. Select the fragments that you want to migrate, and click **Finish**.

Using the Predefined Fragments

To use one of the predefined fragments, do the following:

1. Open the process.

2. Make sure that the Fragments view is visible. If it is not, select **Window** > **Show View** > **Fragments**.

3. In the Fragments view, there is a treeview that looks similar to the Project Explorer. This is the **Fragment Explorer**. Expand **BPMN Process Fragments** folder. This contains categories of BPMN process fragments.

4. Expand the category that contains the fragment you want to use.

5. Select the fragment.

6. Drag the fragment onto the process.

You can also use the **Copy** and **Paste** menu options either by right-clicking or by selecting from the **Edit** menu.

Creating Custom Fragments

If a portion of your process is one that you are likely to reuse in other processes, you can capture the useful part of the process and save it as a custom fragment.

1. Create a new category by either right-clicking **BPMN Process Fragments** in the Fragment Explorer and selecting **New** > **New Category** or by clicking the **Create New Category** button ( ).

2. Double-click in the name field of the newly added category and enter a name:
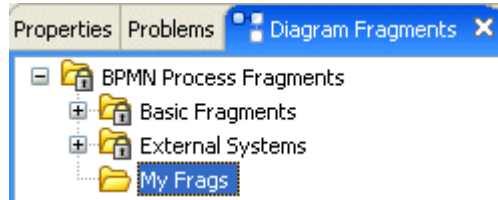
3. Do the following:

   a. Holding down the Ctrl key, select the activities and sequence flows in the process that comprise the fragment.

   b. Copy and paste the fragment into the Fragments view:
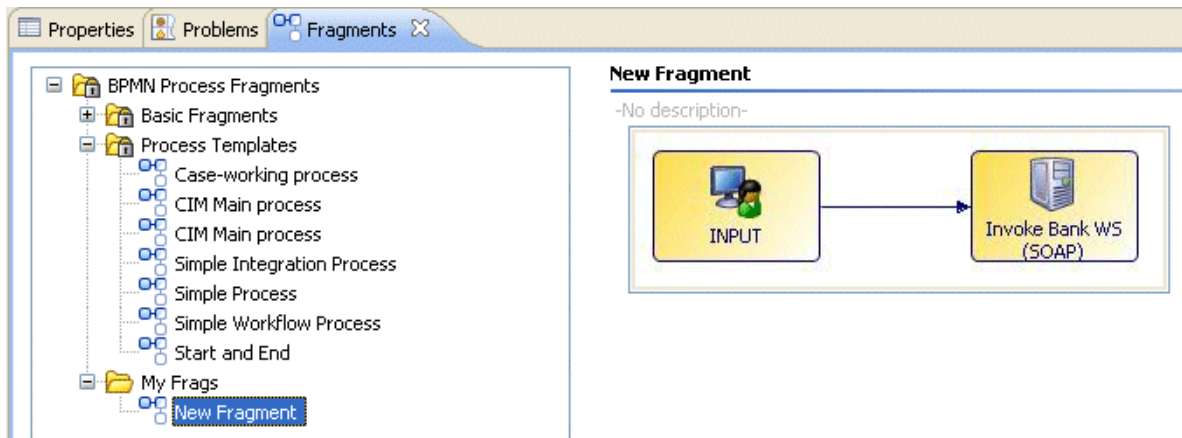
Importing Custom Fragments

You can import custom fragments from an archive file or a .bsProject folder.

Import an Archive File

1. Create an archive file that contains the **.bsProjects** folder from your workspace. This folder contains your custom fragments.

2. The recipient of the archive file can then import it. To do this, select **File** > **Import** > **General** > **Existing Fragments Projects into Workspace**, and click **Next**.

3. In the **Import** dialog, select the **Select archive file** check box and click **Browse** to select the archive file that contains the fragments you want to import.

4. Click **Finish**. The fragments are imported into the current workspace.

Import the .bsProject Folder

1. Select **File** > **Import** > **General** > **Existing Fragments Projects into Workspace**, and click **Next**.

2. In the **Import** dialog, select the **Select root directory** check box and click **Browse** to select the location of the **.bsProject** folder from the file system.

3. Click **Finish**. The fragments are imported into the current workspace.

Source Control

See "Source Control" in *TIBCO Business Studio Concepts*.

Using Subversion with TIBCO Business Studio

Subclipse is an Eclipse plug-in that adds Subversion integration to the Eclipse environment, and is bundled with TIBCO Business Studio.

This section describes how to use Subclipse for source control.

> This section assumes that you or your Subversion administrator have installed an SVN server (see http://subversion.tigris.org/) or that you are using the version bundled with TIBCO Business Studio (Asset Central).

Right-click an existing project that contains items you wish to source control. Select **Team** > **Share Project**. Obtain the URL for the Repository Location from your Subversion administrator.

Creating a Project from an Existing Project in Source Control

You can create a project from an existing project in source control.

1. Select **File** > **Import**. The Import wizard is displayed.

2. Expand **SVN** and select **Checkout projects from SVN** and click **Next**.

3. Set up the repository with the assistance of your Subversion administrator, (this should point to the parent directory to the one containing the project folder) and click **Next**.

4. Select the project folder and click **Next**.

5. Select the method for checking out the project and click **Next**.

6. Either use the default workspace or click **Browse** to check out the project elsewhere.

7. Click **Finish**. The project is checked out to your workspace.

> We recommend that you import or export individual projects, and do not attempt to import or export the workspace.

Browsing SVN Repositories

You can browse SVN repositories.

1. Select **Window** > **Open Perspective** > **Other**.

2. Select **SVN Repository Exploring**.

3. This opens a perspective from which you can browse SVN repositories. For example:
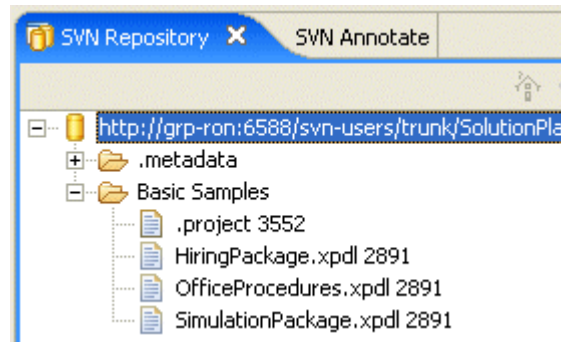
Deleting Projects from SVN Repositories with Asset Central

If you are using Asset Central and want to delete a project that you have put in Subversion, it may appear that you have deleted the Project using Asset Central, however it remains in the Subversion repository until you delete it using another tool such as Tortoise SVN, the command line interface to Subversion, or a web-based tool.

Design Considerations for Process Migration

A process instance can only migrate to a new version of a process when certain criteria become satisfied.

These are automatically identified by TIBCO Business Studio at design-time, but you should be aware of the points described in Migration Point Restrictions on page 65.

Viewing Migration Points

Valid migration points in a process are denoted by an icon next to the task in the Process Modeler, and by process diagram annotations which allow identification of individual activities as migration points as and when they are viewed in the diagram.

You can increase or decrease the visibility of these icons by hovering over the icon and using the selections (shown in the screenshot below).
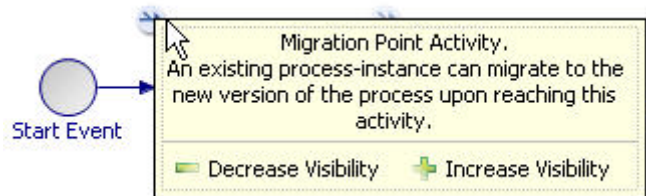
Each selection you make is additional to those you have made before. For example, when you select a data field then all the activities that reference that data field are highlighted in the process diagram. If you then also select the Highlight Activities With Scripts option, then only the activities that reference the data field **and** have scripts are highlighted.
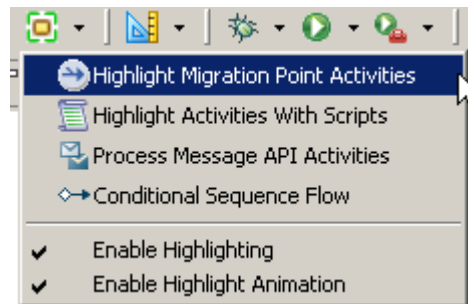
To clear selections, click in the Process Editor window again, and it will go back to its default setting, which is to show migration points.

You can also choose to highlight migration points by selecting Highlight Migration Point Activities from the drop-down toolbar.

Migration Point Restrictions

You should be aware of a number of restrictions when designing your process to be sure that it can migrate correctly.

• The task name is used to identify a migration point. This means that all tasks must have names.

By default, gateways do not have names. This means that you must specify a name for all gateways in your process if you want them to be valid migration points.

Note that:

— task names must not be duplicated.

— task names in source and destination process templates must be the same.

• Migration cannot be performed on pageflow processes. Pageflow processes are short-lived processes whose data is not persisted, therefore migration should not be required.

• For a user task, migration should be set before the user task is scheduled. Migration does not happen if the changes are made after the user task is OFFERED to a user.

• Valid migration points are points of the process template where a single process thread executes. Therefore, a task that starts a parallel path is a valid migration point but any tasks that follow are not until those paths are rejoined.

• Part of a process that does not appear to be a parallel flow may be treated as a parallel flow. A primary example of this is receive tasks without inflows and any sort of task boundary event. If the flows out of these tasks are not merged back into the process then everything after that point is treated as a parallel flow. This is because without an explicit merge back into the flow then there is an implicit merge at the end of the process (hence all other activities on those flows are counted as "in-parallel" with the receive task).

• Any tasks inside embedded sub processes cannot be migration points, but the embedded sub process itself may be a migration point. See Embedded Sub-Processes, page 184. Migration takes place before starting the sub process.

• The following events cannot be migration points:

— start events

— events placed on the boundaries of tasks.

See Working with Events, page 125.

- Tasks that follow these gateways are not valid migration points:

  — Inclusive

  — Complex

  — Parallel

- Tasks following tasks that have Timer events placed on their boundary with **Continue Task on Timeout** selected are not valid migration points:

- Tasks following tasks with multiple instance loops with ordering set to Parallel and flow conditions that are set to One are not valid migration points. This is equivalent to an exclusive gateway, and means that only the completion of the first activity instance causes flow to continue.

- **BPM Validation Configuration** on the Resource properties tab of a process is used to suppress problems markers for the 'No migration point activities in the process' Problem. It gives you the choice of validation, suppressing the error until the next process flow change, or suppressing the error until a manual reactivation via Resource properties.

- Migration points cannot be set on an event handler flow but it is possible to modify an event handler flow which can then be triggered after a process migration from a migration point set somewhere on the main flow.

- Event handlers (and other incoming message activities) are automatically re-initialized during process migration. This means that they will be re-activated using the new values for correlation data.

- Migration is delayed with an audit message if the event handler thread is not complete. The migration will complete once all outstanding event handler threads have been completed.

Comparing Different Versions of a Process Package

You can compare the local Process Package you are working on with another version.

This can be used to identify:

• any changes you have made since the last time you saved that Process Package. See Performing a Two-way Compare.

• any changes made by another user in the Subversion copy since you last checked it out. See Using the Process Package Comparison Editor with a Two-way Compare.

> This ability to show a comparison graphically is also available for Task Libraries.

See Source Control on page 62 for more information using source control to manage your processes.

Performing a Two-way Compare

You can compare your current local copy of the Process Package with a previous local revision.

1. Select the Process Package .xpdl file in Project Explorer, and right-click it.

2. Select **Team > Show Local History**. This will show you a list of your revisions to the file.

3. Select the previous revision you are interested in comparing with your current version, and right-click **Compare Current with Local**.

> The default is to keep local history available for 7 days. If you need to see more history than this, select **Window > Preferences > General > Workspace > Local History** and edit the settings.

4. You can then compare the file you selected with your current local copy. The Process Package Comparision Editor is displayed showing you a tree of elements that are different in the two files. This is a **two-way compare**. In the Process Package Structure Compare window at the top of the screen, expand the Process Package and select the level you are interested in (for example, **Activities**).

The left/right revision views are populated with the tree structure of the different descendents of that element.The differences in your local copy will be shown in the left-hand column.

Using the Process Package Comparison Editor with a Two-way Compare

The following notes will help you interpret the results of a two-way compare. The screenshot below shows you an example of a two-way compare.
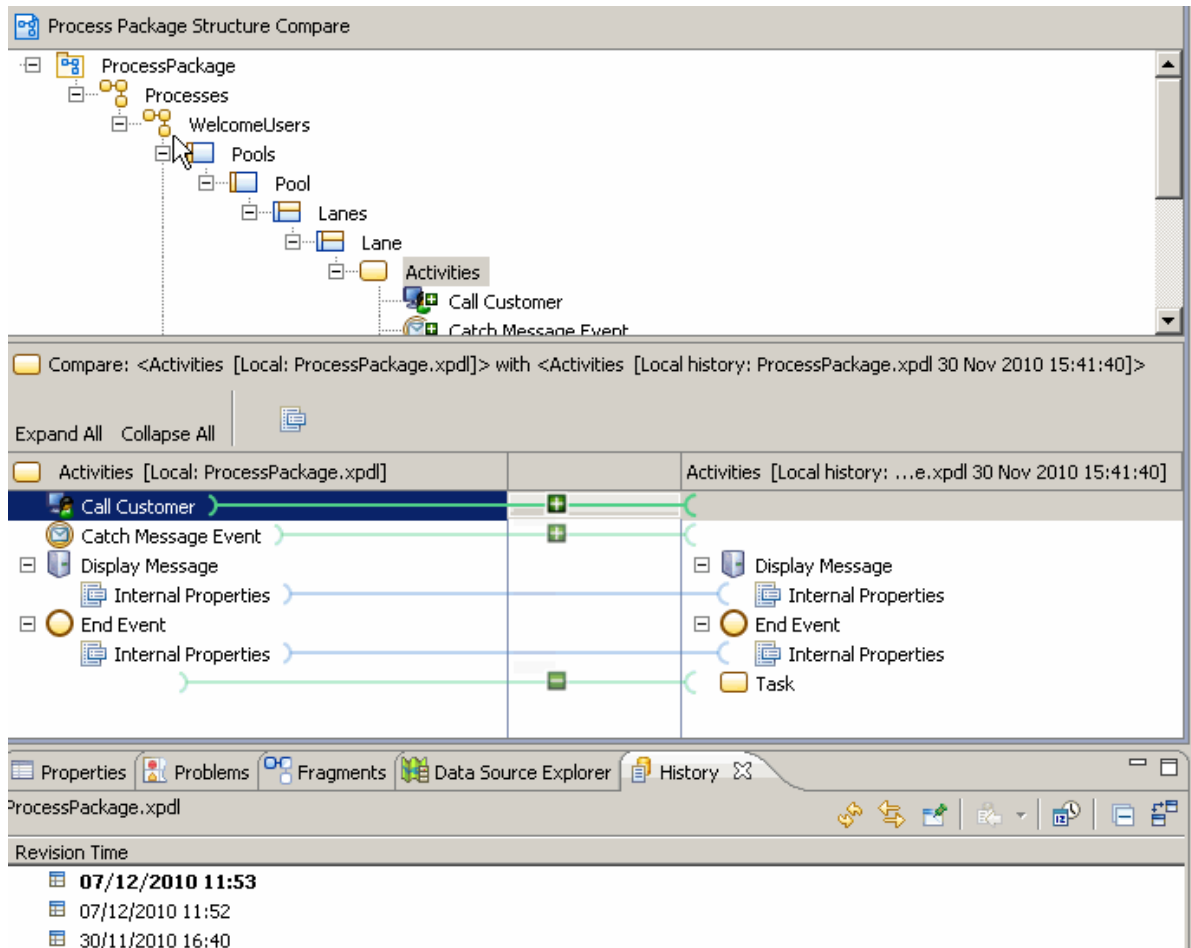
- The following icons indicate changes in a two-way compare:

  As no common ancestor is available for comparison, all differences are treated as if changes were made on the left hand revision):

  A green [+] (with no indication of direction) indicates elements that appear in the left hand revision that do not appear in the right hand revision.

A green [-] (with no indication of direction) indicates elements that appear in the right hand revision that do not appear in the left hand revision.

Items that do not have an icon by them are changed in either the left or right hand revision, or both (or have added, deleted or changed descendents).

• If you hover the cursor over the relevant icon, tooltip pop-ups will let you know that the information was added to the left or deleted to the right - so you may have added something, or the other version may have deleted something.

In a two-way compare is it not possible to identify which version the change was made in.

• In the Comparison view, you see Information elements (as indicated by the ⓘ icon. These elements are always shown regardless of whether there are any differences in the data that they represent. This is to give you a context for given elements and usually will contain the 2 or 3 major configurations for that element (such as task type, name and so on).

• 📑 Internal Properties | Internal Properties (found at the level below a task, for example) is used to group a number of smaller changes made as the result of your main change/s under one heading. You are unlikely to need to examine these, but if you do want to see them in more detail select the 📑 button above and to the right of the left/right content view.

• The central section of the comparison view shows connection lines between correlating objects on the left and right side. These include icons according to what the difference is (and on the side of the connection line where the change that caused the difference was made). The lines are colour coded to indicate the type of change that they represent (red=conflicting change, green=addition or deletion, blue = existing element changed).

Performing a Three-way Compare

A **three-way compare** is used to compare your changes to a Process Package with those of another user, as well as with the original (common ancestor) file on which both are based.

Typically, you might want to do this if another user checked a process package out of Subversion when you did, and they made changes and checked them back in. When you go to check your own version back in, Subversion identifies a potential conflict. To identify areas which the other user has changed and decide whether to adopt their changes and abandon yours, or overwrite them with your own, you can do a three-way compare.

Three-way compare is only available once a synchronize has been performed on the file (or its project). Synchronize is performed automatically for any file when it is committed to Subversion (to ensure that no conflicts exist with another user's changes).

See Source Control on page 62 for information about using source control to control your project information.

To do a three-way compare (when you have checked a project file out of the source repository and made changes and saved them - and another user has done the same and commited their changes):

1. Attempt to commit your changes in the Team Synchronizing perspective.

   You will discover that your changes conflict with those of another user and you will not be able to commit your changes until you have rectified this.

2. Select **Open in Compare Editor** to identify whether you want to adopt the changes from the other user, or commit your own changes instead.

Using the Process Package Comparison Editor with a Three-way Compare

The following notes will help you interpret the results of a three-way compare.

• The following icons indicate changes in a three-way compare:

	A blue left-pointing arrow containing [+] indicates an element added in the right hand revision (as compared with the common ancestor).
	A blue left-pointing arrow containing [-] indicates an element removed in the right hand revision (as compared with the common ancestor).
	A plain blue left-pointing arrow indicates an element changed in the right hand revision (as compared with the common ancestor).
	A grey right-pointing arrow containing [+] indicates an element added in the left hand revision (as compared with the common ancestor).
	A grey right-pointing arrow containing [-] indicates an element removed in the left hand revision (as compared with the common ancestor).

	A plain grey right-pointing arrow indicates an element changed in the left hand revision (as compared with the common ancestor).
	Red arrows pointing both ways indicate a conflict: the element or its descendents were changed in both the left hand revision and the right hand revision.

- If you hover the cursor over the relevant icon, tooltip pop-ups will let you know that the information was added to the left or deleted to the right - so you may have added something, or the other version may have deleted something.

  In a three-way compare, you can distinguish whether an additional element was caused by an addition by someone else or a deletion by you. This is because the comparison can check whether the additional element existed in the common ancestor, and if it did not, then you will know whether you have changed it or whether it was another user.

- In the Comparison view, you see Information elements (as indicated by the icon. These elements are always shown regardless of whether there are any differences in the data that they represent. This is to give you a context for given elements and usually will contain the 2 or 3 major configurations for that element (such as task type, name and so on).

- (found at the level below a task, for example) is used to group a number of smaller changes made as the result of your main change/s under one heading. You are unlikely to need to examine these, but if you do want to see them in more detail select the button above and to the right of the left/right content view.

- The central section of the comparison view shows connection lines between correlating objects on the left and right side. These include icons according to what the difference is (and on the side of the connection line where the change that caused the difference was made). The lines are colour coded to indicate the type of change that they represent (red=conflicting change, green=addition or deletion, blue = existing element changed).

Emailing Processes

The XPDL package files and the processes contained within can be sent using email.

To send a Process:

1. In the Project Explorer, find the name of the package that contains the process you want to send.

2. Attach the package file to the email message using a method such as copy and paste or drag and drop.

If you receive a Process:

Get the Process into TIBCO Business Studio as follows:

> Be careful of overwriting existing packages with the same name.

• Save the attachment directly into your workspace and refresh the Project Explorer.

> The default workspace location is **C:\Documents and Settings*username*\\workspace**. However, you may have selected an alternate location when you first started TIBCO Business Studio.

• Save the attachment to a file then do one of the following:

— Drag the package file from Windows Explorer into a packages folder in the Project Explorer in TIBCO Business Studio.

— In Windows Explorer, press **Ctrl+C** to copy it, return to TIBCO Business Studio, and press **Ctrl+V** to paste it into the Project Explorer, into a process packages folder.

Documentation

See "Documentation" in *TIBCO Business Studio Concepts*.

> Letters sometimes get truncated from task labels while exporting documentation. To avoid this, you can add a period (.) to the end of the label.

Creating Documentation from within TIBCO Business Studio

You can create documentation from within TIBCO Business Studio.

1. You can do one of the following:

   — Right click on a model resource (for example: an **.xpdl**, **.bom** or **.om** file).

   — Right click on a project.

   — Right click on a 'special' folder.

2. You can do one of the following:

   — If you selected a model resource or the whole project, select **Export > Documentation.**

   — If you selected a 'special' folder, select **Export > Export** > **Documentation**.

3. One of the following will happen:

   — If you selected a model resource in step 1, it is selected in the wizard (you can change the selection here if required).

   — If you selected the entire project or a 'special' folder in step 1 all possible resources are selected in the wizard.)

4. You have the option to select the destination for the documentation files.

   — The default location for generation is <*ProjectPath*> > **Documentation** > *** Model Documentation**.

   — The default for the Index page is <*ProjectPath* > > **Documentation**.

> You can specify a location outside the workspace. In this case, the location must exist or an error will appear in the wizard)

5. Click **Finish** to generate documentation for the selected model file(s) and generate an index page containing overview information for the selected files(s).

Creating Documentation from the Command Line

You can create documentation from the command line.

1. Close the workspace that contains the project for which you want to generate documentation.

2. Navigate to the directory that contains the TIBCO Business Studio executable file. For example:

   C:\Program Files\TIBCO\BusinessStudio

3. Open a command window.

4. Enter a command line including specification of:

   — Workspace

   — Project name

   — Output location

This will generate documentation for the selected file(s) and also an index page.

An example of command line invocation would be:

TIBCOBusinessStudio.exe -application com.tibco.xpd.resources.ui.documentation -data <workspace> -projectName <project name> -outputPath <output path>

If you do not want to see the TIBCO Business Studio splash screen then provide an extra argument (-noSplash) with the above command as:

TIBCOBusinessStudio.exe -application com.tibco.xpd.resources.ui.documentation -data <workspace> -projectName <project name> -outputPath <output path> -noSplash

Generating Documentation On Demand

You can generate documentation on demand from your local filesystem, without requiring a workspace or TIBCO Business Studio project.

To do this, you require a supported file type (.maa) on the local filesystem. An .maa file is a way of compressing a TIBCO Business Studio project.

To create an .maa file, in the Project Explorer in TIBCO Business Studio, go to your project, and select the Documentation folder. Then right click to select **Export > Archive File**. When naming the file, give it the suffix **.maa**.

To generate documentation on demand do one of the following when opening an .maa file:

• If the file is already associated with the Documentation tool, double-click the desired file within file system explorer.

• If the file is not already associated with the Documentation tool, right click on the file and choose "Open With.." and point to the Documentation tool (<*Business Studio Home*>/studio-doc.exe).

The command line generates documentation in the same path as the .maa file for the selected file(s) and also an index page.

If an output path is provided in the <*Business Studio Home*>/studio-doc.ini the documentation is generated in the path provided. To add an output path, add the following to the beginning of the studio-doc.ini file:

-outputPath

<*OutputPath*>

Viewing Documentation

You can view documentation you have created from TIBCO Business Studio.

1. Export the documentation as described in Creating Documentation from within TIBCO Business Studio.

2. If you created the documentation from within TIBCO Business Studio:

   — In the Project Explorer, expand **Documentation**.

   — Right-click the HTML file for the package and select **Open With** > **Web Browser**.

   If you created the documentation from the command line:

   — Navigate to the directory where you created the HTML file and open it in a web browser.

   — If you created the HTML file in a directory in your workspace, you can refresh the Project Explorer, right-click the HTML file for the package and select **Open With** > **Web Browser**.

3. Note that the sections of the documentation are hyper linked as well as the image of the process (for example, clicking a task displays the section that describes that task).

   See "Deploying BPM Applications" in the *TIBCO Business Studio BPM Implementation* guide for more information.

Presentation Channels

See "Presentation Channels" in *TIBCO Business Studio Concepts*.

Editing Email Attributes at Workspace Level

You can edit the attributes of the Openspace Email channel type at the workspace level or the project level.

> Project level configuration overrides workspace channel configuration.

To edit at the workspace level:

1. Select **Window > Preferences > Presentation Channels**.

2. Expand **Default Channel (Default)** to view the presentation channels available.
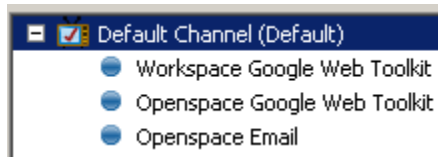
3. The Channel Type **Openspace Email** is included in the Default Channel. Double-click on Default Channel, or click the edit sign on the right of the **Presentation Channels** dialog. You see a list of the following available Channel Types to add (the channel types which are already part of the Default Channel are ticked):

> WorkSpace Email cannot be added in the default channel and a channel having WorkSpace Email in it cannot be set as the default.

Name	Target	Presentation	Implementation	Runtime Version
☐ ● Workspace Email	E-mail	TIBCO General In...	Push	[1.0, 2.0)
☐ ● Workspace General...	TIBCO Workspace	TIBCO General In...	Pull	
☑ ● Workspace Google ...	TIBCO Workspace	Google Web Toolkit	Pull	
☑ ● Openspace Google ...	TIBCO Openspace	Google Web Toolkit	Pull	
☐ ● Openspace Mobile	iPhone	Google Web Toolkit	Pull	
☑ ● Openspace Email	E-mail	Google Web Toolkit	Push	

Label: Default Channel

Channel Types:

4. Click on **Openspace Email** to view its attributes. The attributes are as follows:

Name	Value
◆ mailTemplateLocation	
◆ mailSubject	
◆ mailPriority	3
◆ fromAddress	
◆ ccAddress	
◆ mailHeaders	
◆ attachments	
◆ presentationChannelId	openspaceGWTPull_DefaultChannel

Attributes | Extended Attributes | Properties

You can edit the values of the Email attributes to meet your own requirements:

mailTemplateLocation	This attribute allows you to specify a custom email template. It is currently TIBCO branded. It contains a picker, (...) to allow you to tailor it to your own requirements. See Creating an Alternative Email Template on page 79.
mailSubject	A brief summary of the contents of the message.
mailPriority	An entry is required here. The default setting is 3. Settings can range from 5-1, with 1 being the highest priority and 3 being what is considered Normal.

fromAddress	Address where the message originated from, including an optional name, for example, Jane Smith jsmith@anycompany.com. This is a mandatory field.
	This needs to be a valid address, depending on your SMTP server settings. Refer to your SMTP Server documentation for more information.
	Note that this does not support multibyte characters. The character repertoire is limited to ASCII as specified in RFC 822 (standard) .
ccAddress	An additional delimited list of recipients. This is an optional field.
	Note that this does not support multibyte characters. The character repertoire is limited to ASCII as specified in RFC 822 (standard) .
mailHeaders	List of custom headers, of the format *Header Name:Header Value*. This is an optional field.
	Note that this does not support multibyte characters. The character repertoire is limited to ASCII as specified in RFC 822 (standard) .
attachments	Reserved for future use.
presentationChannelId	This is the channelId used when the user clicks the HTML link in the pushed email message.The default setting is openspaceGWTPull_DefaultChannel . This is a mandatory field.

The following "tokens" can be put into any of the above Email attributes:

- **%%token.workItemId%%** - The work item id.

- **%%token.entityName%%** - The entity name who requires push notifications as defined in the Organizational Model.

- • **%%token.mailDate%%** - The date and time the pushed mail message was sent.

You can add a token by typing the string directly into an attribute value. For example, for **mailSubject** you could enter:

PUSH DEMO - Pushing Work Item Id %%token.workItemId%%

Then at runtime, the token will be replaced by the actual value:

PUSH DEMO - Pushing Work Item Id 1

Editing Email Attributes at Project Level

You can edit email attributes at the project level.

1. From Project Explorer, right-click on the project and select **Properties** > **Presentation Channels**. Check the tickbox for **Enable project specific settings**.

    — or select **Window > Preferences > Presentation Channels** and click on **Configure Project Specific Settings...** Select the project you want to configure and press **OK**.

2. Expand **Default Channel (Default)** to view the presentation channels available

3. Select **Openspace Email** and edit the attributes as described above.

4. Click **Apply**. The attribute changes are applied next time you deploy your project.

To restore default values you can click **Restore Defaults**.

Extended attributes are also available for custom use.

Creating an Alternative Email Template

You can create your own email template which can contain organization-specific information, with your own logos and corporate style.

After deployment it can be used as the default email template for any Push Destination using the **Openspace Email** channel type.

The files you can use to create your email template are as follows:

- **HTML file** (Mandatory) This contains the information about what you want the email to contain. It typically includes:

  — a reference to the .css file as its stylesheet. This can be included using an html line similar to the following:

  `<link rel="stylesheet" type="text/css" href="cid:Easycss" />`

  — references to any of the graphics files contained in the cid.properties file (referred to by their cid: identifier, prefaced by 'cid:') , for example:

  `<img src="cid:cidOne"/>`

  refers to NewProductLogo.png in the example in cid.properties above. Referring to them in this way means they can by shown externally as part of the email when the html file is used to create an email after deployment.

  — the content you want to include in the email.

  This html can contain any of the following tokens, each of which will be replaced by an actual value at runtime;

"%%token.workItemUrl%%"	URL of the work item.
"%%token.workTypeDescription%%"	Description of the work type.
"%%token.workItemId%%"	The id of the work item.
"%%token.entityName%%"	The entity name who requires push notifications as defined in the Organizational Model.
"%%token.mailDate%%"	The date and time the pushed mail message was sent.
"%%token.mailFrom%%"	The name of the sender of the pushed mail message.
"%%token.workItemAllocationMethod%%"	The allocation method used for the work item. For example, Allocate Work Item(s) To World.
"%%token.workItemStartDate%%"	The start date for the work item.
"%%token.workItemEndDate%%"	The end date for the work item.
"%%token.workItemPriority%%"	The priority of the work item.
"%%token.workItemScheduleStatus%%"	The schedule status of the work item. For example, DURING.
"%%token.mailSubject%%"	The subject line for the pushed mail message.

"%%token.mailTo%%"	The user/s who the pushed mail message is sent to.
"%%token.mailCc%%"	The user/s who the pushed mail message is copied to.
"%%token.mailBcc%%"	The user/s who the pushed mail message is blind-copied to.
"%%token.workItemState%%"	The state of the work item. For example, ALLOCATED.
"%%token.processActivityId%%"	The id of the process activity.
"%%token.processTemplate%%"	The name of the process template.
"%%token.processApplicationId%%"	The id of the process application.
"%%token.workItemGroupId%%"	The Group id for the work item.
"%%token.hostIPAddress%%";	The IP address of the host.
"%%token.hostMachineName%%"	The host machine name.
"%%token.baseurl%%"	The base URL.

- **CSS (Cascading Style Sheet) file** This is a stylesheet file, typically for your organization, which contains standard information such as banners or background colors, that you want to be in every email you send.

- **graphics** you are referencing from the cid.properties file, which would then be used by the html file. These must be available locally, and can either be in the same directory (**Presentation Resources**), or in a sub-directory.

- **cid.properties** This allows you to reference any graphics files you have available locally (in the same directory, or a subdirectory) which you want to be used when you push the work item (which then sends an email to notify the user of the work item). It is specifically used for embedded images / css in emails, rather than providing the option of external calls.

- Each filename will have a **cid:<*name*>** identifier which allows it to be accessed remotely as well as locally. For example, the cid.properties file might contain lines such as the following, where cidOne is the cid: identifier for NewProductLogo.png when you reference it later in the HTML file:

  cidOne:NewProductLogo.png

To create your Email template files:

In Project Explorer, navigate to the project you want to add the Email template to:

1. Right-click **New** > **Folder** and name your folder.

2. Right-click on the folder you created, and select **Special Folders** > **Use as Presentation Resources Folder**.

3. From the Presentation Resources folder you created, right-click **New** >**File** and create the files you require.

Alternatively:

•   Right-click **Presentation Resources** > **New** > **File**, and create the files you require

> If you create the files you require elsewhere, copy and paste them by copying them and then clicking on **Presentation Resources (**or your new Presentation Resources folder**) > Paste**.

> This email template will be available to this project only. If you attempt to access it from another project, you will receive a validation error, as the files contained are not available outside this project.

To apply the Email template to a Project:

1. From the project, right-click **Properties** > **Presentation Channels**. Select the checkbox **Enable project specific settings**.

    —   or select **Window** > **Preferences** > **Presentation Channels,** and click **Configure Project Specific Settings...** Select the project you want to configure and click **OK**.

2. Expand **Default Channel** and select **Openspace Email**.

3. Click in the **Value** field for **mailTemplateLocation**, and you will see the picker, ([...]):

4. Use the picker, ([...]) to navigate to the HTML file you created in the Presentation Resources folder, and click **OK**.

5. Click **Apply**.

Next time you push an email, it will use this template.

> Email templates are scoped to one project only. If the template is applied on the workspace level, then all relevant projects should have the specified custom template files available inside them. It is then recommended to overwrite the workspace Presentation Channel definition on the project level when the custom email template needs to be provided.

Chapter 3 **Importing and Exporting Projects**

This section describes how to import existing projects, MAA files and archive files into TIBCO Business Studio, and how to export projects from it to archive files, MAA files, a work data model, or file systems.

TIBCO recommends that you import or export individual projects, and do not attempt to import or export the workspace.

Topics

Importing Existing Studio Projects into Workspace

You can import a project into the workspace.

1. From the File menu, select **Import**, and you see the **Select** page of the Import dialog.

2. Expand the General folder, select **Existing Studio Projects into Workspace** and click **Next**.
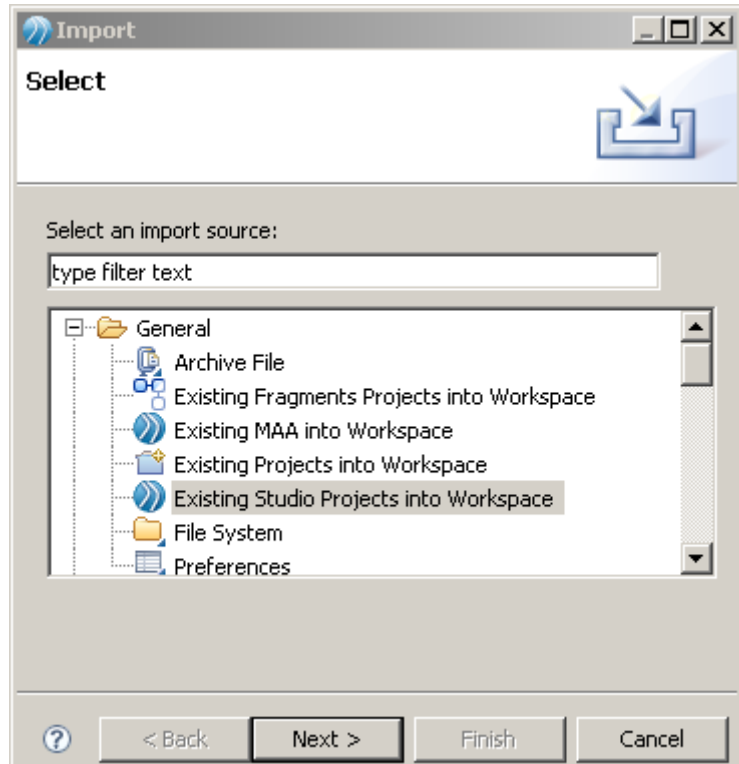
TIBCO recommends that you use the **Existing Studio Projects into Workspace** and not the **Existing Projects into Workspace** option, as it will only import the files you require.

3. Do one of the following:

   — Click on the **Browse** button for **Select root directory:** to locate other projects that are somewhere on the file system (for instance, in another workspace).

   — Check the radio button for **Select archive file:** and click on the **Browse** button to see projects that have already been archived which you may want to import.
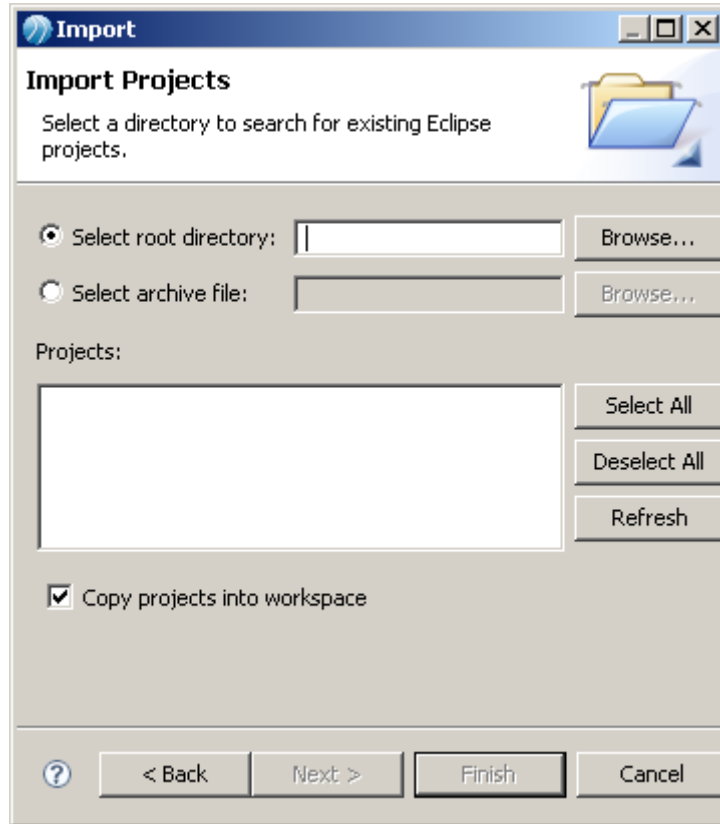
4. Select the project you want to import, and click **Open**. The project is now selected.

   This does not work if there is already a project of the same name in the workspace.

5. Select the **Copy projects into workspace** checkbox and click **Finish.** The project is now imported and appears in Project Explorer.

Importing Existing Modelled Application Archive (MAA) Files into Workspace

You can import existing Modelled Application Archive (MAA) files into the workspace.

1. From the File menu, select **Import**, and you see the **Select** page of the Import dialog.

2. Expand the General folder, select **Existing MAA into Workspace** and click **Next**.

3. Do one of the following:

    — Click on the **Browse** button for **Select root directory for MAA files:** to locate other MAA files that are somewhere on the file system (for instance, in another workspace). This can be used to import multiple MAA files in one single go.

    — Check the radio button for **Select MAA file:** and click on the **Browse** button to see MAA files that have already been archived which you may want to import. This is used to import one single MAA file at a time.

4. Select the MAA file you want to import, and click **Open**. The MAA file is now selected.

> This does not work if there is already a project of the same name in the workspace.

5. Click **Finish.** The MAA file is now imported and appears in Project Explorer.

> You can create an MAA file in TIBCO Business Studio for Analysts, save it and then import it as an existing MAA into TIBCO Business Studio. You can then work on the projects it contains and save it, and export it to MAA, and then access it again from TIBCO Business Studio for Analysts.

> When importing an MAA created in TIBCO Business Studio for Analysts there is no destination set on the project and therefore you must set this before you use the project. You can do this in the following ways:
>
> • Right-click on the project and select **Properties** > **Lifecycle** and select the appropriate destination environment.
>
> • Right-click on the project and select **Refactor** > **Project Lifecycle...** to apply the destination to each process.

Importing Archive Files into Workspace

You can import an archived project into the workspace.

1. From the File menu, select **Import**, and you see the **Select** page of the Import dialog.

2. Expand the General folder, select **Archive File** and click **Next.**

3. In the **From archive file:** field, use the **Browse** button to locate the archive file you want to import.

4. In the **Into folder:** field, use the **Browse** button to identify the folder into which you want to import the file. This can be one of your existing projects. You can choose whether to check the **Overwrite existing resources without warning** checkbox.

5. Click **Finish**. The archive file is now imported into the location you have identified.

Importing Nimbus Process Diagrams

Nimbus Process Diagrams can be imported into into an existing TIBCO Business Studio project.

In order to be imported into TIBCO Business Studio, Nimbus Process Diagrams must be exported from the Nimbus Control application using the **Simplified XML export** format. See the TIBCO Nimbus Control documentation for more details.

To import Nimbus Process Diagrams into TIBCO Business Studio:

1. Right-click at the process package level of an open project and select **Import > Import Nimbus Process Diagram(s)**.

   Alternatively, from the File menu, select **Import**, and from the **Select** page of the Import dialog expand the **Business Process Management** folder, select **Nimbus Process Diagram(s)** and click **Next**. This method will involve additional pages to those in the process below, which are explained in the wizard.

2. On the **Import Nimbus Process Diagram(s)** page, in the **From Directory:** field, enter the directory where you saved your Nimbus Process Diagrams, or use the Browse button to find it.

3. The Nimbus Process Diagrams in the directory you selected appear on the right hand side. Select the one(s) you require

4. In the **Into folder:** field, enter the directory in which you want to place the Nimbus Process Diagrams.

5. The **Validate Import Files** screen shows the validation status of Nimbus Process Diagram files. If the files are valid (in the expected simplified XML export format and containing only Nimbus simple diagrams) click **Finish**. If the files are not valid, you will not be able to finish and need to go back and re-export the files from Nimbus Control as simplified XML.

6. The Nimbus Process Diagram files are now imported into the Process Packages folder you specified in step 4.

Equivalences between Nimbus Process Diagrams and TIBCO Business Studio BPMN Processes

Nimbus Export File	Process Package (xpdl File)
Process Diagram	**Business Process** per diagram • One pool and one lane for all activities. • Diagram documentation URL is added to the process (visible on the **Description** property tab) and to each individual task sourced from that diagram.
Activity	• Activity Type: — Creates a sub-process task for a Nimbus drill-down activity. — Parameter mappings are created where the data created for start/end connections in the drill-down process have equivalent named data in the calling process diagram. — If drill-down activities reference Nimbus diagrams in other export files then these should be imported either at the same time or prior to the referencing file (if you do not do this, you will get a broken reference and a validation problem that you then will have to resolve manually). • If a non-drill-down activity has a resource then it is a **User Task**. • If an activity has no resource then the task type is always type "None" with no resource.
Activity Notes (Notes bubble)	**Text annotation** attached to task.
Activity Commentary	Start of **Task Description**.
Statement Links	Appended to **Task Description** (for example, statements of required compliance with standards).
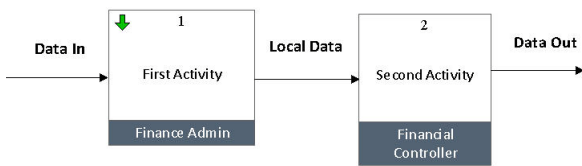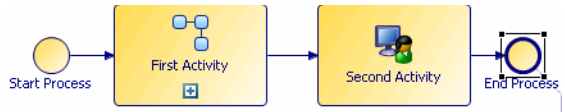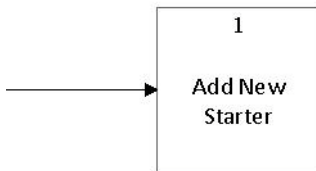
Nimbus Export File	Process Package (xpdl File)
Diagram URL	• Added to each task sourced from a given diagram.
	• It is provided in the Process Description Documentation URL and Activity Description Documentation URL, and as an activity tooltip popup including the Documentation URL as a clickable hyperlink. See Activity Properties on page 383 for more information on the Documentation URL.
	• You can browse to the original Nimbus Diagram and documentation.
Activity Resource	• One package participant per unique named resource.
	• User tasks are assigned participant(s) for the activity resource(s).
Connections	• Treats connections both as routing between activities and as incoming/outgoing data.
	• Multiple connections in the same direction, between the same Nimbus activities, are collapsed into a single connection.
	• All start connections (connection without source object) are connected to a single start event implying that all data is passed and all connections happen at the start of a process.
	• All end connections (connection without a target object) are connected to a single end event.
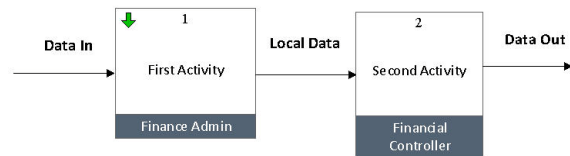
Nimbus Export File	Process Package (xpdl File)
Start/End Connection Label	• For each unique start/end connection label a formal parameter is created.
	• The uniqueness of labels is based only on their alphanumeric content (white space and symbols are ignored) and is case-insensitive.
	• The formal parameter mode is set according to whether the label appears on a start connection (In) or end connection (Out) or both (In-Out).
	• All formal parameters are associated in the start-event activity interface data.
Connection Between Activities Label	• For each unique label that only appears on connections between activities (not on start/end connections) a **data field** is created.
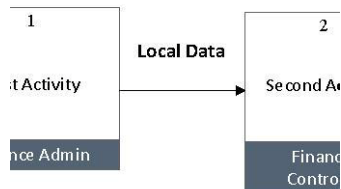
Nimbus Export File	Process Package (xpdl File)
All Connection Labels	• As the connection labels are treated as process data, **interface data associations** are added to user tasks for the data identified by its incoming / outgoing connections.
	• The interface **data mode** is set according to whether the label appears on an incoming connection (In) or outgoing connection (Out) or both (In-Out).
Connection Commentary	• Added to **formal parameter / data field** description
	— For multiple connections with equivalent labels, all commentaries are added.
	• Added to **sequence flow description**.
	— For multiple connections between same activities all commentaries are added.
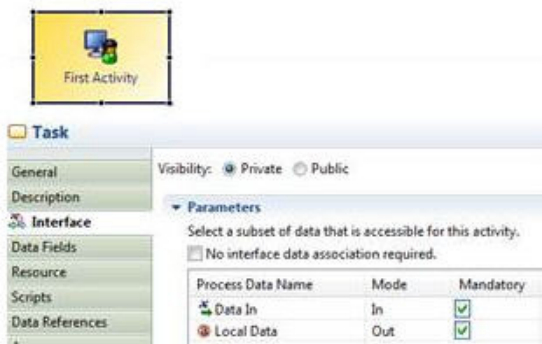
Exporting TIBCO Business Studio Projects to Archive File

You can export a project from Project Explorer to an archive file.

1. In your workspace, make sure you have the project you would like to export selected, and from the File menu, select **Export**. You see the **Select** page of the Export dialog:

2. Expand the General tab, select **Studio Projects to Archive** and click **Next**.
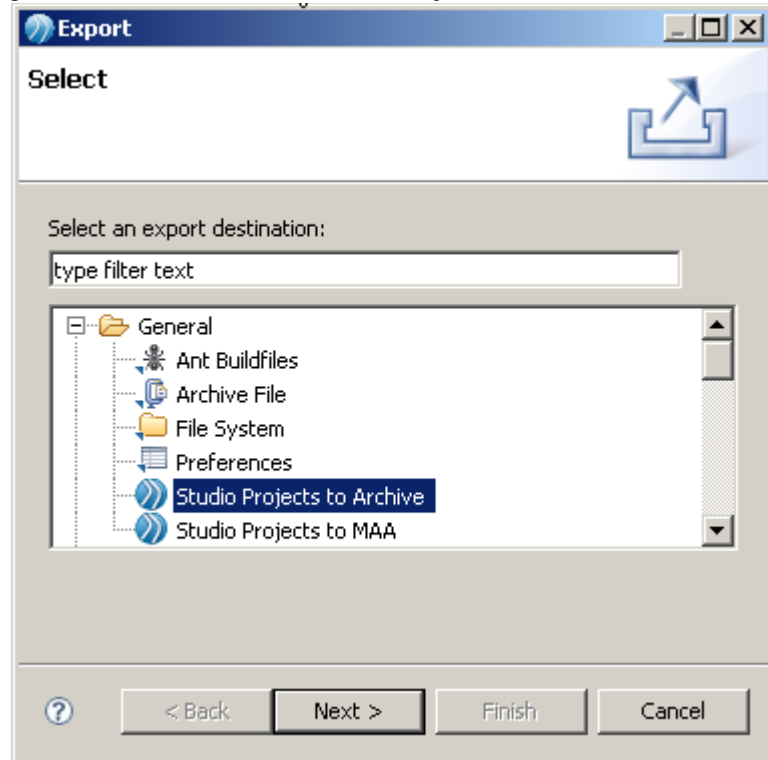
3. Select the project you want to archive from the list of projects available. Enter a location in the **To archive file:** box. You can use the Browse button to see existing archive files, and either use one of these or create a new one.

4. A number of archive options are available. Either accept the default settings or adjust them to your requirements, and click **Finish**.
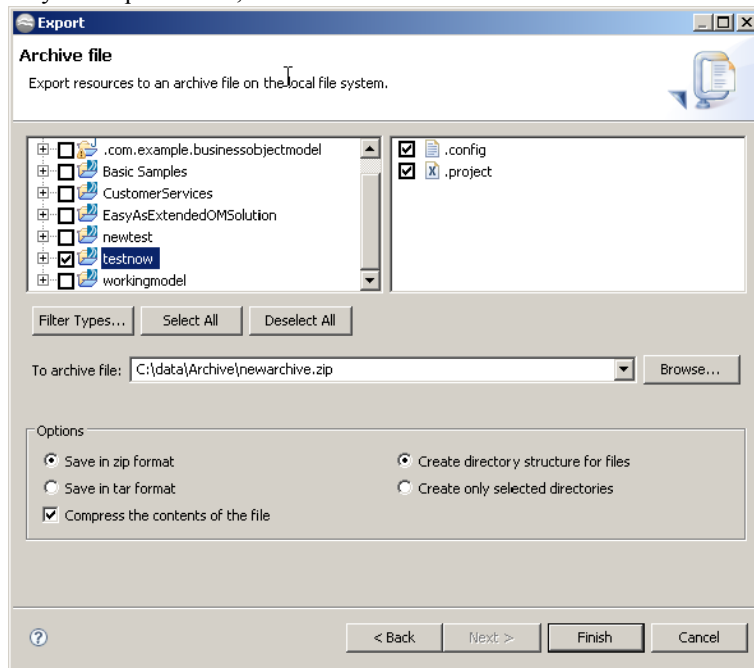
Exporting Projects to File System

Perform the same steps as above - but at step 2 select **File System**, and browse to the place you wish to save the files and click **Finish**.

Exporting Projects to Modelled Application Archive (MAA)

You can export a project or multiple projects from Project Explorer to a Modelled Application Archive (MAA) file.

1. From the **File** menu, select **Export > General > Studio Projects to MAA**. You see the **Export** page of the Modelled Application Archive (MAA)Export Wizard.

2. Select the project or projects you want to export to MAA, and the location you want to export them to and click **Finish**. The default project location is **Exports/MAA** for each project.

Exporting Projects to a Work Data Model

You can export a project to a Work Data Model.

1. Select the project in Project Explorer, and right-click **Export** > **Work Data Model Export**.

2. The Work Data Model Export Wizard displays. Click **Finish** to accept the selection of this project, and the location where the Export will be placed (by default this is in the Exports folder under the project).

For each Work Data Model, TIBCO Business Studio creates a date-time sub-folder to reflect the state of the exported project at the particular export time.

See "Work Data Models" in the *TIBCO Business Studio Concepts Guide*.

Chapter 4   # Working with Activities

See "Activities" and "Sub-Processes" in *TIBCO Business Studio Concepts*.

Topics

Creating References

You can create references using the Reference Task gadget, or in the Properties view.

Creating a Reference with the Reference Task Gadget

A gadget is a graphical tool that allow you to easily create references.

You can create references to tasks on the diagram using a gadget as follows:

1. Place a reference task on the diagram.

2. Select the reference task.
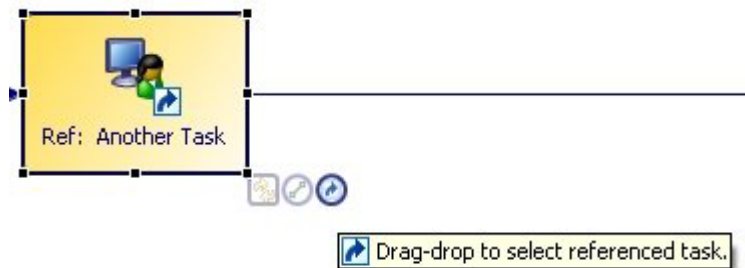
3. Drag the **Reference Task** gadget to the task to which you want to refer.
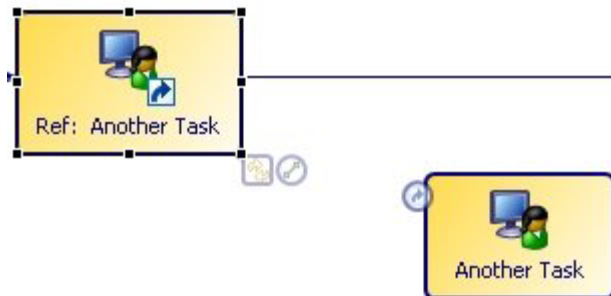
If the task to which you want to refer is not in the visible area of the Process Editor, drag the gadget to the right-hand edge of the Process Editor. After a short pause, the Process Editor scrolls to the right. Alternatively, select **Diagram** > **Zoom Out** until you can see the task to which you want to refer.

4. Once you create a reference, you can click the **Reference Task** gadget to go to the referenced task, or drag the **Reference Task** gadget to create more references:
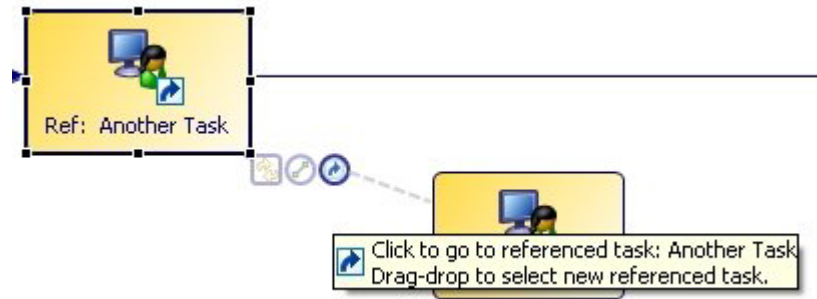
Creating a Reference in the Properties View

To create a reference to another task on the **General** tab of the Properties view for the task, complete the **Referenced Task** field by clicking [...] and selecting a task from the list:
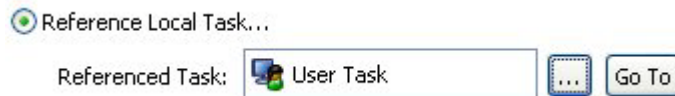
After you have a created a task reference, clicking **Go To** selects the target of the reference task and brings it into the visible part of the Process Editor (it also displays the Properties view for the task). To return to the previously-selected task, click ⇦ on the toolbar.

Request Response Operation with Send and Receive Tasks

To configure a process to receive a request-response message from an external application, and then to reply to the request, use message events, send and receive tasks, or a combination thereof.

For example,

In this example, because the send task is configured as a reply to the receive task in the Properties view:
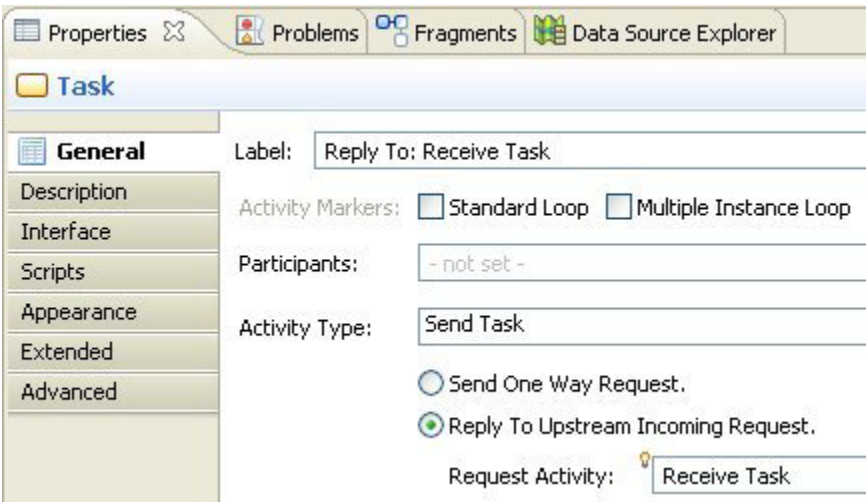
For more information about using message events, see Implementing Message Events on page 143.

Creating Scripts

All types of task can have scripts that write information to a destination-specific system. User tasks can have scripts that are run for example, when the work item is opened or closed.

The **Scripts** tab allows you to add text that describes these scripts. It is the task of the solution engineer to translate the outline of the script into a scripting language supported by the selected destination environment.

To add scripts:

1.   Click the task to which you want to add a script.

2.   In the Properties view for the task, click the **Scripts** tab.

3.   The Scripts available are divided into two sets, **Process Manager Scripts** and **Work Manager Scripts**. Open the set you require (if one set is not available to you for this task, it will be grayed out)
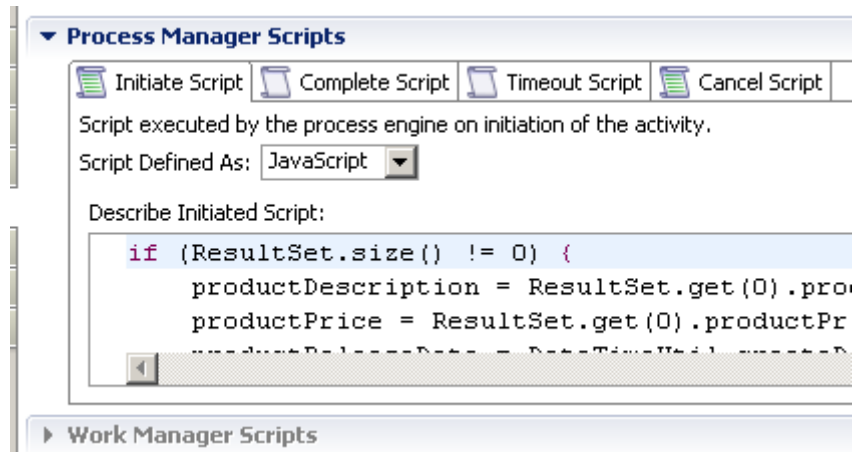
4.   Click the tab for the desired type of script. Any tabs that have scripts defined have a script icon before the script name. Tabs with no script defined have an empty script icon. So in the example above, a script is defined for the **Initiate Script** and **Cancel Script** tab.

5.   Select **Free Text** from the **Script Defined As** list. Describe your script in the area provided. For more information about how the various types of scripts are implemented, see the appropriate implementation guide.

You can highlight tasks in a process that contain scripts. Click in the Process Editor for the process. On the toolbar, you will see a button:

Click on this to see the dropdown, and select **Highlight Activities with Scripts**.

	Highlight Activities With Scripts
	Process Message API Activities
	Conditional Sequence Flow
✔	Enable Highlighting
✔	Enable Highlight Animation

This will highlight all activities in a process that contain scripts, and all other activities will be grayed out.

User Tasks and Pageflow Processes

In addition to creating a standalone pageflow process, you can do the following from a user task:

- Select an existing pageflow process.

- Create a pageflow process that is referenced from the selected user task.

In the runtime environment, the pageflow process is run when the work item associated with the user task is opened.

When you right-click a user task, the **Pageflow** menu provides the following options:
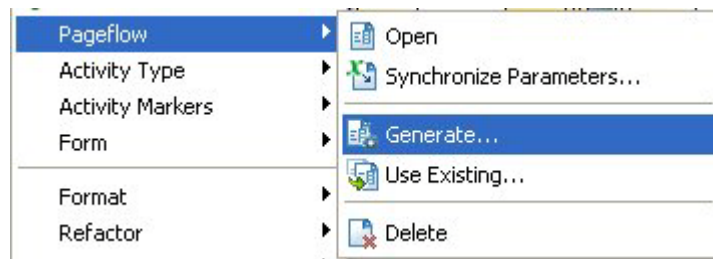
- **Open** Select this option to open the associated pageflow process in the Process Editor (if a pageflow process has already been selected for the task).

- **Synchronize Parameters** Select this option if you have made changes to the parameters in the user task, and want the changes reflected in the corresponding parameters in the associated pageflow process (see).

- **Generate** Select this option to generate a new pageflow process that will be associated with this user task. The parameters associated with the user task are replicated for the pageflow process.

- **Use Existing** Opens the **Select Form** dialog from which you can select an existing pageflow process.

- **Delete** Deletes the reference from the user task to the pageflow process. The pageflow process itself is not affected.

Selecting a Pageflow Process

If you have already created a pageflow process, you can select it from a user task.

1. Select the user task.

2. Do one of the following:

    — On the **General** tab for the user task, select the Pageflow option and click ⌷ to display the **Select Pageflow Process** dialog.

    Expand the projects to select a pageflow process and click **OK**.

    — Right-click the user task and select **Pageflow** > **Use Existing** to display the **Select Pageflow Process** dialog. Expand the projects to select a pageflow process and click **OK**.

3. The **Pageflow** field is automatically completed with a URL that points to the pageflow process (relative to the **Forms** special folder). You can open the pageflow process by clicking **Open Pageflow Process**.

Creating a Pageflow Process From a User Task

1. Select the user task to which you want to associate a pageflow.

2. Right-click and select **Pageflow** > **Generate**. The **New Pageflow Process** dialog is displayed.

3. Confirm the data that you want to associate with the pageflow process and click **Next**:

    — **User Task Interface Data** Select from the process data specified on the **Interface** tab of the user task. If no explicit process data is selected on the **Interface** tab, all process data is available.

    — **Other Available Process Data** Select from the process data that is not associated with the user task.

> The parameters that you associate with the pageflow process are available to user task forms after the pageflow process is created.

4. Enter the **Label** of the process. If you want to use a template to create the process, select the template and click **Finish** to create the pageflow process or **Next** to specify additional options..

Synchronizing Parameters With a Pageflow Process

When a pageflow process is first generated from a user task, a dialog is displayed that allows you to create the pageflow process with its own set of parameters (either replicating the existing data fields and parameters of the user task, or a subset thereof). User tasks in the pageflow process can display forms that utilize these parameters.

If you add or remove new parameters to the user task in the parent process (after the pageflow process is generated), you can update the list of user task parameters that are known to the pageflow process as follows:

1. Right click the user task, and select **Pageflow** > **Synchronize Parameters**. The **Synchronize Pageflow Parameters With User Task** dialog is displayed:

2. Confirm the changes and click **Finish**. For example, if parameters have been added to the pageflow process but not the user task, synchronizing deletes them from the pageflow process. If parameters have been added to or removed from the user task, synchronizing adds or removes the corresponding parameters in the pageflow.

After synchronizing, the parameters in the Project Explorer listed for the pageflow process should be identical to the parameters listed for the parent process.

Mandatory Parameters and Pageflow Processes

When a pageflow process has a mandatory parameter, that parameter must have a value before the pageflow can be considered complete. This is different to sub-process parameters, where the mandatory flag controls whether mapping to the parameter is required or optional.

This means that a pageflow process and associated user task are expected to have the same data available. As a result, mandatory pageflow parameters are mandatory in all user task forms within the pageflow. However, if this is not the desired behavior, explicitly associate the parameter with the user task in the pageflow and de-select the mandatory flag.

Resource Patterns and Work Distribution

See "Resource Patternss and Work Distribution" in *TIBCO Business Studio Concepts*.

Separation of Duties

Specify that tasks should be considered separate by using the right-click menu on the Process Editor.

1. Select the user or manual tasks that you want performed by separate resources (use the Ctrl or Shift keys to select multiple tasks).

2. Right-click and select **Resource Patterns** > **Create a Separation of Duties Group**.

3. If you have not already done so, you must assign participants to the tasks.

4. The selected tasks are displayed on the **Resources** tab in the Properties view:
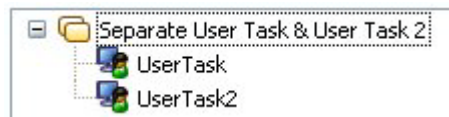
To see other task groups, click the **See all task groups(s) in the process** link on the **Resources** tab. This displays the **Task Groups** tab for the process. This shows task groups of which this task is a member.

Resources Tab

Specify that tasks should be considered separate on the **Resources** tab for the task.

If you have already set up a task group, the **Resources** tab shows the groups to which the selected task belongs.

1. Click the **Resources** tab and expand the **Separation of Duties** section.

2. Click the [icon] button to create a new task group. The **Select Tasks** dialog is displayed.

3. Select the tasks that you want to include in the group and click **OK**.

4. Once you have selected the task group members, you can also use the following buttons:

   — [icon] Use this button to add or remove tasks to and from the group.

   — [icon] Use this button to either delete tasks for the group or delete the group.

> To see other task groups, click the **See all task groups(s) in the process** link on the **Resources** tab. This displays the **Task Groups** tab for the process. This shows task groups of which this task is a member.

Task Groups Tab

Specify that tasks should be considered separate on the **Task Groups** tab for the process. If you have already set up a task group, the **Task Groups** tab shows the groups contained in the selected process.

1. Select the process in the Project Explorer and click the **Task Groups** tab.

2. Click the 🗀 button to create a new task group. The **Select Tasks** dialog is displayed.
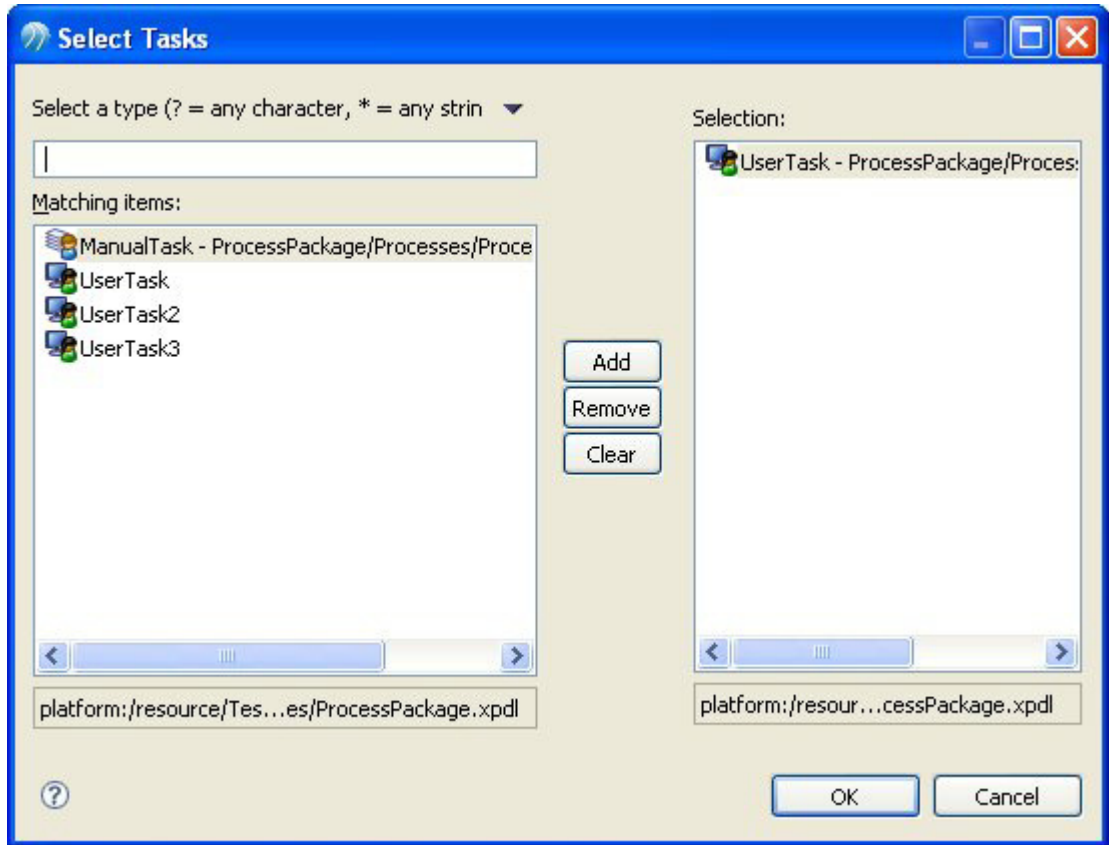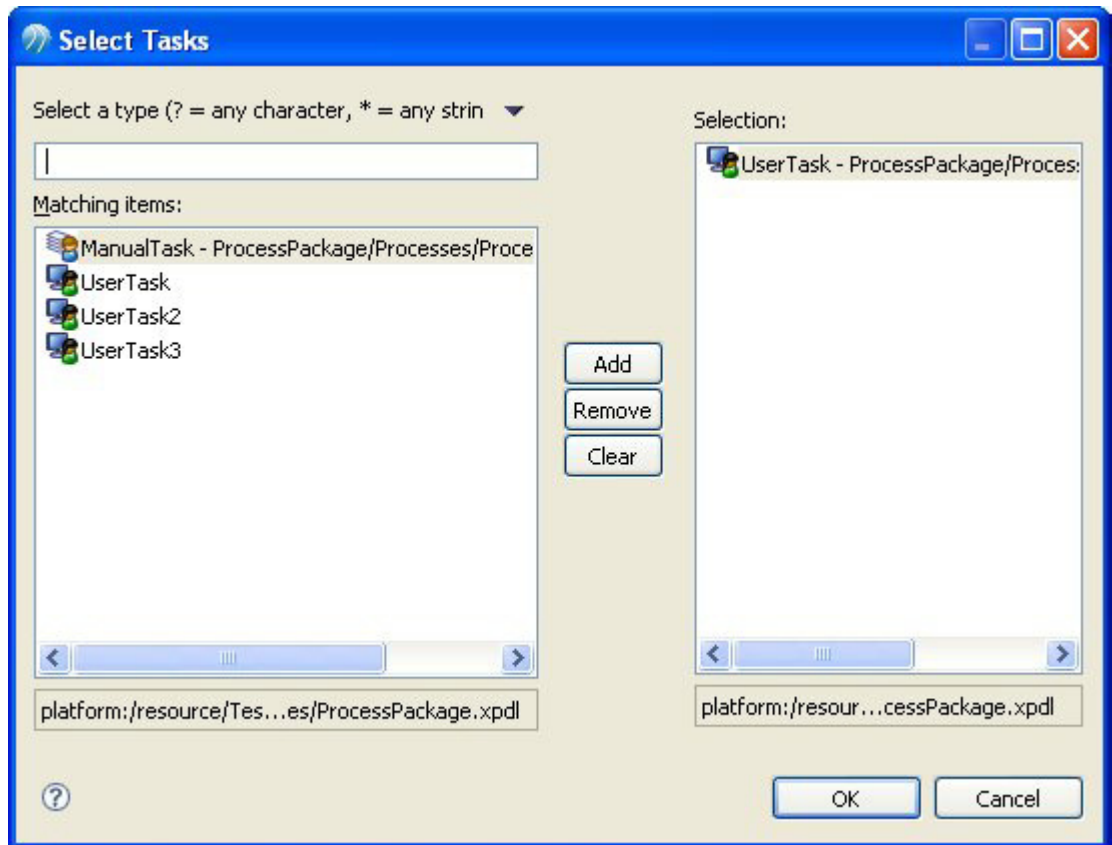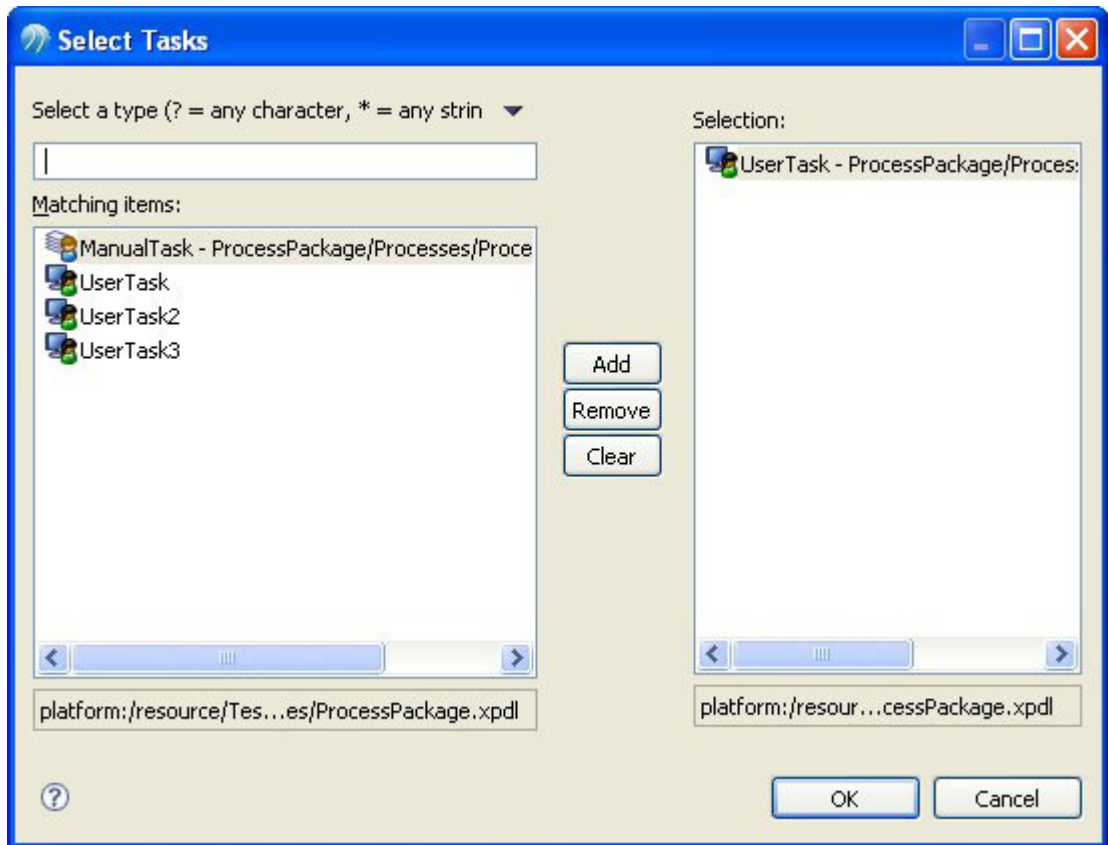
3. Select the tasks that you want to include in the group and click **OK**.

4. Once you have selected the task group members, you can also use the following buttons:

   — 🖳 Use this button to add or remove tasks to and from the group.

   — ✖ Use this button to either delete tasks for the group or delete the group.

Retain Familiar

Specify tasks should be part of a Retain Familiar group using the right-click menu on the Process Editor:

1. Select the user or manual tasks that you want to include in the group (use the Ctrl or Shift keys to select multiple tasks).

2. Right-click and select **Resource Patterns** > **Create a Retain Familiar Group**.

3. If you have not already done so, you must assign participants to the tasks.

4. The selected tasks are displayed on the **Resources** tab in the Properties view:

To see other task groups, click the **See all task groups(s) in the process** link on the **Resources** tab. This displays the **Task Groups** tab for the process. This shows task groups of which this task is a member.

Resources Tab

Specify that tasks should be part of a Retain Familiar group on the **Resources** tab for the task. If you have already set up a task group, the **Resources** tab shows the groups to which the selected task belongs.

1. Click the **Resources** tab and expand the **Retain Familiar** section.

2. Click the [icon] button to create a new task group. The **Select Tasks** dialog is displayed.

3. Select the tasks that you want to include in the group and click **OK**.

4. Once you have selected the task group members, you can also use the following buttons:

   — [icon] Use this button to add or remove tasks to and from the group.

   — [icon] Use this button to either delete tasks for the group or delete the group.

To see other task groups, click the **See all task groups(s) in the process** link on the **Resources** tab. This displays the **Task Groups** tab for the process. This shows task groups of which this task is a member.

Task Groups Tab

Specify that tasks should be considered separate on the **Task Groups** tab for the process. If you have already set up a task group, the **Task Groups** tab shows the groups contained in the selected process.

1. Select the process in the Project Explorer and click the **Task Groups** tab.

2. Click the [button] button to create a new task group. The **Select Tasks** dialog is displayed.

3. Select the tasks that you want to include in the group and click **OK**.

4. Once you have selected the task group members, you can also use the following buttons:

    — [button] Use this button to add or remove tasks to and from the group.

    — [button] Use this button to either delete tasks for the group or delete the group.

Chained Execution- Multiple Parallel Paths in a Chaining Group

When multiple parallel paths exist in a chaining group, items will be chained in the order they are scheduled, and not the order of process flow. For example:
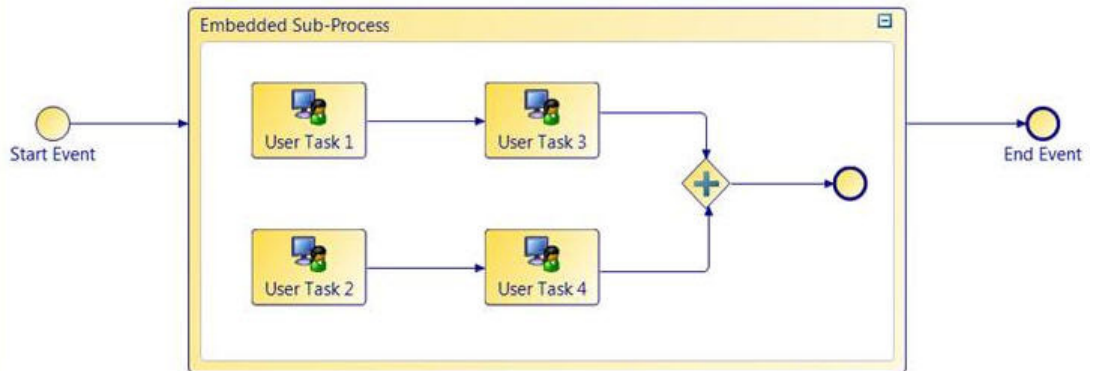
In the example above, User Task 1 or User Task 2 would be performed first. Both would appear in the relevant user's work list. If User Task 1 was opened first then on completion User Task 2 would be performed (it would be the only user task in the chained group available at that point). It is likely that whilst User Task 2 is completed that User Task 3 would be scheduled. This would be performed and then User Task 4 would be performed last. The user tasks would therefore be performed in scheduled order and not according to the connections between the user tasks.

Chapter 5   **Controlling Flow in a Process**

This section describes some of the common tasks that you perform using TIBCO Business Studio to control flow in a process.

See "Flows", "Loops" and "Gateways" in *TIBCO Business Studio Concepts*.

Topics

Creating a Standard Loop

A standard loop is indicated by the following symbol:
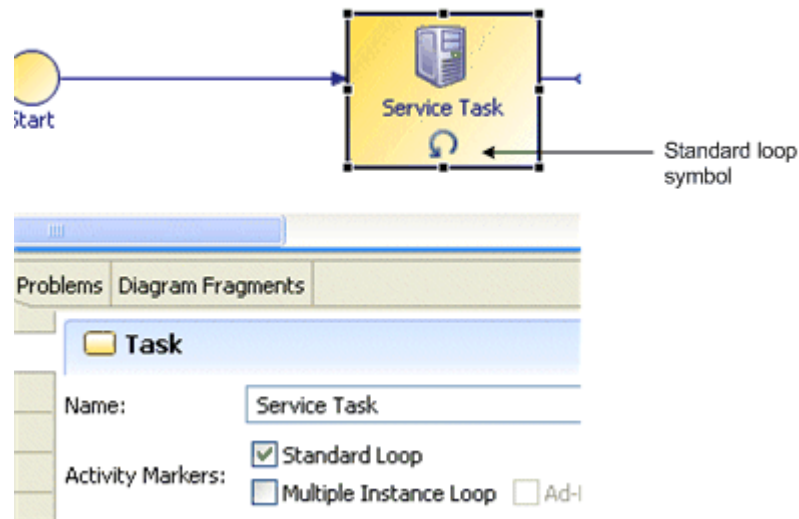
Standard loop symbol

Click the **Loops** tab to set the details of the loop:

Set the following parameters as appropriate for the loop you want to create:

- **Test Time** Select either **Before** or **After**. The **Before** option is equivalent to the programming construct "while": the expression is evaluated *before* the activity is performed, and therefore if the expression evaluates to False, the activity is not performed. The **After** option corresponds to the programming construct "Do: while": the expression is evaluated after the activity has been performed, guaranteeing that the activity is performed at least once.

- **Loop Maximum** Optionally specify an integer to control the maximum number of times the activity is performed. In the event of conflict between **Loop Maximum** and

the result of the Javascript defined under **Script Defined As**, the **Loop Maximum** will override the script calculation.

- **Script Defined As** Select one of the following options:

  — **Free Text** Allows you to describe how you would like the loop to be tested if you prefer to leave the specific implementation of the loop expression to someone else.

  > A BPMN warning is generated if you leave the script area blank. To remove the warning, enter a text description of the intended script implementation.

  — **JavaScript** Allows you to enter JavaScript that will be evaluated for the loop expression.

  — **Unspecified** Allows you to specify that there is no expression or description for this loop.

Creating a Multi-Instance Loop

A parallel multi-instance loop is indicated by the following symbol (a sequential multi-instance loop uses the standard symbol):

Click the Loops tab to set the details of the loop:

Set the following parameters as appropriate for the loop you want to create:

Ordering

Select either **Sequential** or **Parallel**. The Sequential option causes the instances of the activity to occur in succession rather than at the same time. The Parallel option causes the instances of the activity to occur at the same time.

Flow Condition

This property can be used to mimic the functions of a gateway. Select one of the following options:

- **All (perform outgoing flow when all instances complete)** The outgoing flow is processed once after all activity instances have completed.

- **One (perform outgoing flow once when first instance completes)** The outgoing flow is processed when the first activity instance completes (existing instances can still be completed but the outgoing flow is not processed when they complete).

- **No Condition (perform outgoing flow for each completed instance)** The outgoing flow is processed for every activity instance as it completes.

- **Complex (behavior defined by Complex Flow Condition)** The outgoing flow is processed for each instance for which the Complex Flow Condition tab evaluates to true.

Scripts for Multi-Instance

Select **Free Text** for the **Script Defined As** field if you want to describe how you would like the loop to be tested, and prefer to leave the specific implementation of the loop expression to someone else. You can also select **Unspecified** if there is currently no condition or description for the loop.

> Depending on the destination environment you have selected, **JavaScript** may be available as an option. Use this option if you want to enter JavaScript that will be evaluated for the loop expression.

There are three tabs on which you can specify scripts:

- **Loop Expression** Specify either a script that evaluates to an integer or a description of the desired script.

- **Complex Flow Condition** This expression is evaluated if you selected Complex as the Flow Condition.

- **Additional Instances Expression** This expression is used for control-flow pattern WCP-15 (additional activity instances may be required at runtime) when you only need to add instances when the task is complete. See the table "Supported Control Flow Patterns" in the "Workflow Patterns Reference" appendix of the *TIBCO ActiveMatrix BPM - BPM Concepts* guide. If you need to add instances while the task is in progress, see Adding Additional Instances to a Multi-Instance Loop Task Whilst the Task is in Progress.

The additional instances script is evaluated after the last instance completes. If the script evaluation calls for additional instances, they will be done and the script will be evaluated again once the last additional instance completes.

> If an Additional Instances Expression is specified then this expression must eventually evaluate to zero so no more instances occur.

Adding Additional Instances to a Multi-Instance Loop Task Whilst the Task is in Progress

You can add additional instances to a multi-instance loop while the task is still in progress. This implements control-flow pattern WCP-15—see the table "Supported Control Flow Patterns" in the "Workflow Patterns Reference" appendix of the *TIBCO ActiveMatrix BPM - BPM Concepts* guide.

> If you have a multi-instance user task and a loop which allows you to generate multiple copies of that task, if you have concurrent copies of the multi-instance user task, each with multiple instances, and then "add additional activity instances", the additional instances are added to every copy of the multi-instance user task.

To do this, you need to execute a script somewhere on a parallel path whilst the loop task is active. The script can add instances to the loop task using an expression similar to the following:

> **Process.addActivityLoopAdditionalInstances** ("OrderStock",1);

which contains a string for the name of the task (in this example, OrderStock), and an integer for the number of additional instances required (in this example, 1)..

If you wish to add additional instances to a dynamic sub-process task, you need to pre-populate the array that is chosen as the runtime identifier field with the name or names of the sub-process implementation that you wish to add, as well as any associated arrays used to provide input into the dynamic sub-process. See Creating Dynamic Sub-Processes on page 214.

You can also add additional instances to a loop in the loop task itself, **but only** in the task Complete script.

In this example, the task **Add parts to order** would order an additional item each time it was used.

▼ **Process Manager Scripts**

| Initiate Script | Complete Script | Timeout Script | Cancel Script |
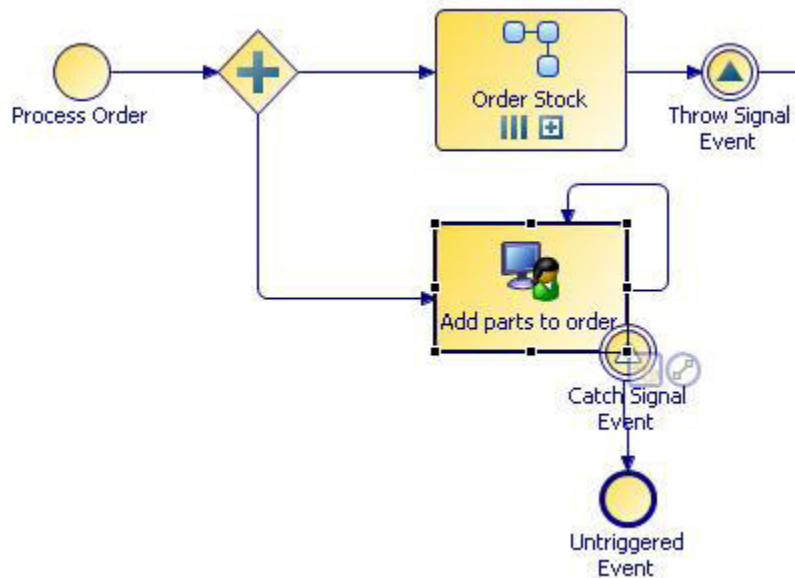
Script executed by the process engine on completion of the activity.

Script Defined As: JavaScript ▾

Describe Completed Script:

```
Process.addActivityLoopAdditionalInstances("OrderStock",1);
```

Example - Multiple Instances with Synchronization (WCP-13)

This workflow pattern specifies that multiple instances of an activity should be created, each instance being synchronized and able to run concurrently. See the table "Supported Control Flow Patterns" in the "Workflow Patterns Reference" appendix of the *TIBCO ActiveMatrix BPM - BPM Concepts* guide. Note that:

- The number of instances required is known and specified at design time.

- Each task instance has access to all the process data (data fields, parameters, and so on).

- All the instances must be complete before the next task is started.

The following process has three activities:
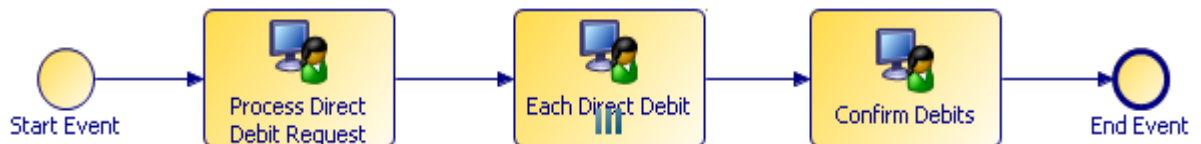
There can be multiple instances of the Each Direct Debit task. This is indicated on the General tab of the Properties view:
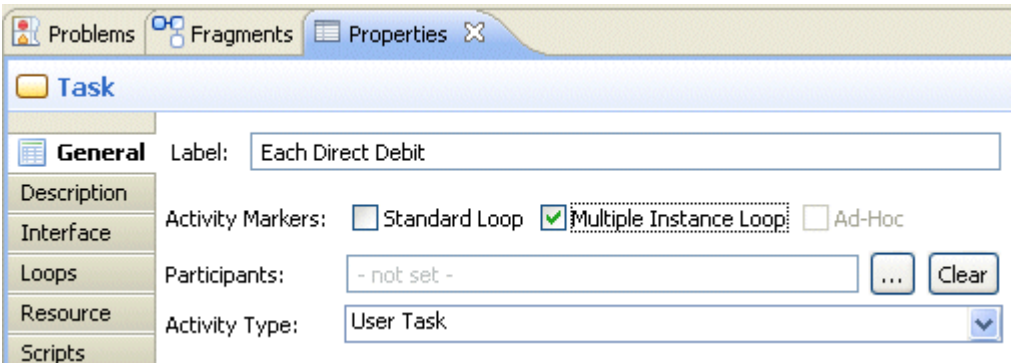
The details are specified on the Loops tab:
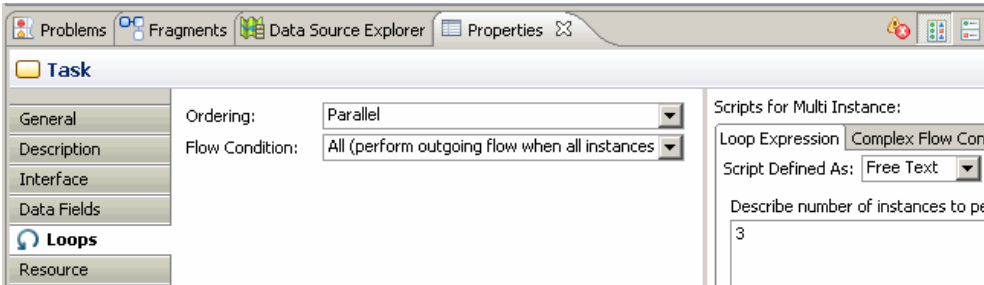
The **Parallel** ordering setting and **All** flow condition means that the activity instances will be performed at the same time and will be synchronized. The number of instances is set to **3** on the right side of the Properties view.

Chapter 6 **Working with Events**

This section describes some of the common tasks that you perform using BPMN events.

See "Events" in *TIBCO Business Studio Concepts*.

Topics

References Between Throw and Catch Events

As an alternative to creating references between throw and catch events in the Properties view, TIBCO Business Studio provides graphical tools called gadgets that allow you to easily create references.

The example in this section shows throw and catch signal events, but the same procedure applies to all throw and catch events.

You can designate throw and catch event pairs on the diagram as follows:

1. Place the throw and catch events on the diagram.

2. Select the throw event.

3. Drag the event reference gadget to the desired catch event.

4. Once you link a throw and catch event, you can click the event reference gadget to go to the catch event, or drag the event reference gadget to select additional catch events:
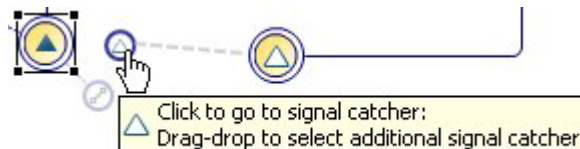
Configuring Timer Event Scripts

You can specify that a script is executed for a start timer event or an intermediate timer event (either inflow or on a task boundary).

For example, the following intermediate timer event has been placed on a task boundary:

In the Properties view, you can choose a script type from the **Script Defined As** list:
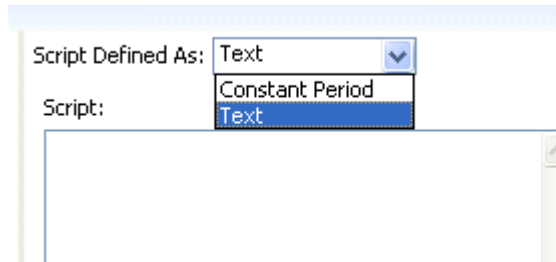
Depending on the destination environments selected, there can be other script types in the **Script Defined As** list.

Select one of the script types:

- **Free Text** If you want to leave the implementation of the script for the solution designer, you can select Text and use this area provided to describe the desired behavior for the script.

- **Constant Period** This allows you to specify the timeout period after the event is initiated using the following time units:

- **JavaScript** This script type allows you to enter JavaScript statements in the space provided. For more information, see the appropriate implementation guide.

The JavaScript script type is not available in the Business Analysis capability.

- **Unspecified** This means that no description or script is supplied.

Rescheduling Timer Events

You can reschedule the timeouts of timer events on user tasks (including the work item deadline). This can be achieved by selecting timers to reschedule from a non-cancelling signal event on the same user task.

Timer events that have already timed-out will not be rescheduled.

A catch signal event attached to a user task, that is configured as **Continue task when signal is caught** allows selection of timer events to reschedule one of the following:

*   all

*   The Timer currently set as Activity deadline

*   one or more explicitly selected timers

When a timer event is selected for reschedule in any one of the above ways then the user **must** define a reschedule timer script on the timer event's General properties tab.

In the example below, the process has a user task with two timers, Deadline and Nudge. When "Unexpected Delay" is triggered, the Allow_User_More_Time signal is thrown and this explicitly reschedules the Deadline timer by adding an extra day to the current Deadline timeout.
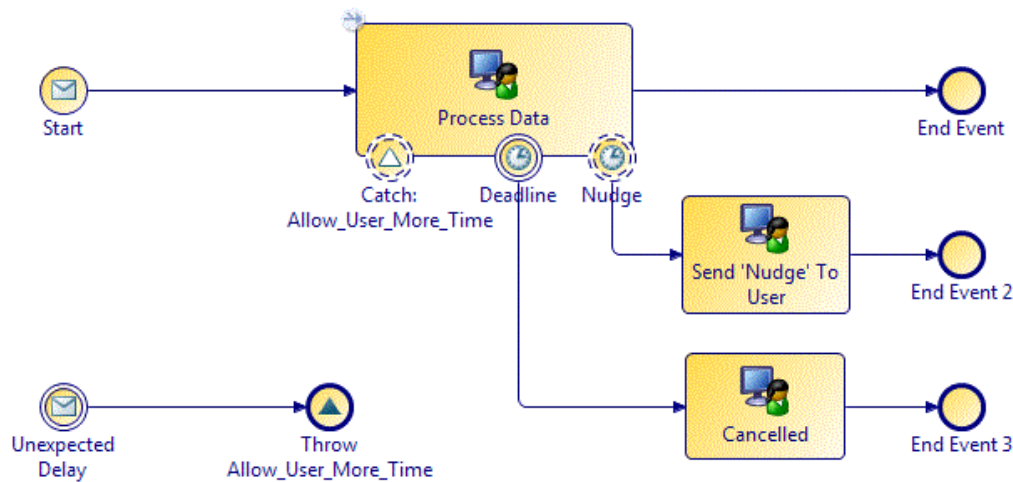
The Properties page for Catch: Allow User More Time looks like this:

The Properties page for Deadline looks like this:

Label:	Deadline
Name:	Deadline
Trigger Type:	Catch Timer

☐ Use as activity deadline

◉ Withdraw Task On Timeout   ○ Continue Task On Timeout

◉ Date and/or Time   ○ Cycle

Description:

▸ Initial Timer Script

▾ Reschedule Timer Script

Script Defined As: Constant Period

Durations Relative To: ○ Reschedule Time   ◉ Current Timeout

Specify timeout as offset from event initiation:

Years:	0	Hours:	0
Months:	0	Minutes:	0
Weeks:	0	Seconds:	0
Days:	1	Micro Seconds:	0

Using Catch Signal Events

In BPMN, when an event on the boundary of a task is triggered, the task is cancelled and the alternative flow from that event is followed.

For example:
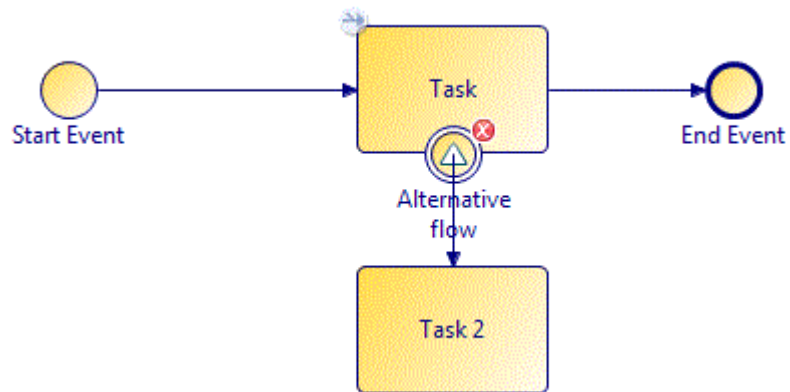
In this example, if the signal event is triggered, the task to which it is attached is cancelled and the sequence flow to Task 2 is followed.

Throw and Catch Signal Events

With throw/catch signal events, an *in-flow* signal event broadcasts a signal, and if there is an active task with a signal event on the task boundary, that event "catches" the signal, and generally follows the exception path.

A catch signal can cancel the task it is attached to or, for user tasks, can allow the task to continue. If they are set to "continue" they cannot have an outgoing flow but they can map data into the task that they are attached to and also reschedule timers attached to the same task.

For example:
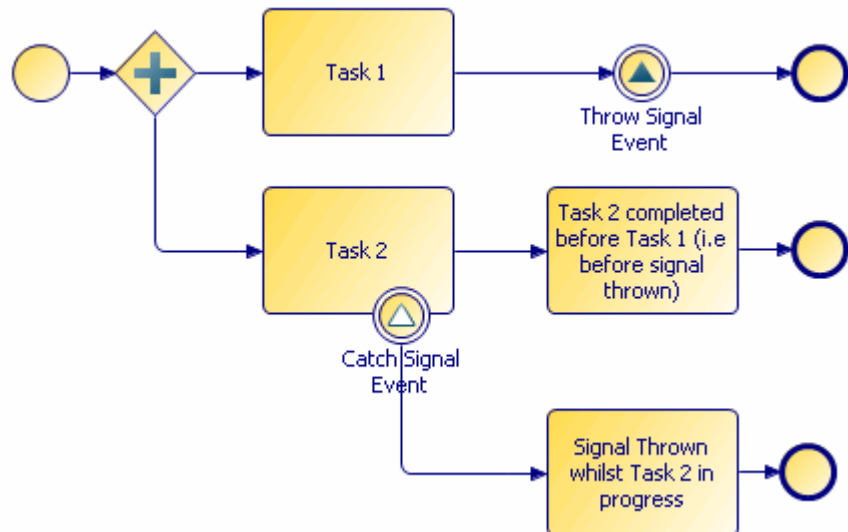
A Signal is transient: when it is thrown, if there is nothing to catch it at that moment, it is discarded. It is not stored for later use.

You may specify a signal name with a throw signal event. With a catch signal event, a signal name is optional:

- If a catch signal event has no signal name specified, it catches any thrown signals in the process (while the task it is attached to is active).

- If a catch signal event has a signal name specified, it only catches signal events that throw that signal.

When you specify signal names in the Properties view for signal events, you can use content assist. This means for example, that if you have entered **SIGNAL1** for a throw signal event, when you specify the signal name for the catch signal event you can press Ctrl+Space and the available signal names are displayed from which you can select one.

You can define whether you want to update a scheduled work item from a non-cancelling signal event. Select from a pair of radio buttons directly beneath the signal name from the Properties view of a catch signal event attached to a task boundary:

- Cancel task when signal caught
- Continue task when signal caught

Use the **Map from Signal** tab to map from the throw-signal's payload data (listed in its interface tab) to the data associated with the attached user task.

See the example in Using Message Event Handlers in Business Processes on page 147 which demonstrates the use of event handlers and non-cancelling signal events to update work item data

A signal end event functions like any other inflow signal event, except that when one fires, if there are more tasks that need to complete as the result of an exception flow, the outstanding tasks complete; if there are no more tasks that need to be completed, the process ends.

Throw and Catch Error Events

An error event attached to a task boundary can be set to catch any error, or errors thrown by the task to which it is attached.

For example:

- when attached to a web service task, you can configure the catch error event to catch any WSDL fault associated with the web service operation that is invoked by the service task.

- when attached to an email service task, you can configure the catch error event to catch emails when the email server is unavailable:
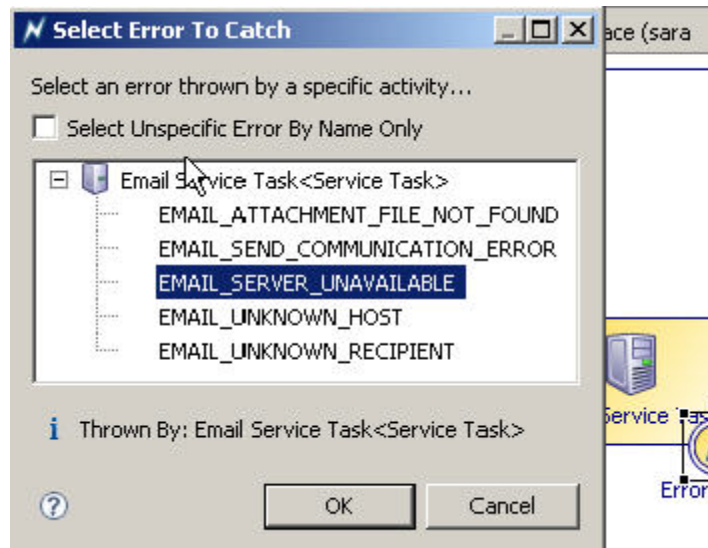
When attached to a reusable or embedded sub-process task, the event can catch errors thrown by any of the following:

- Activities within the sub-process.

- End error events

- Process interface error events (if the reusable sub-process task references a process interface rather than a process)

- Any other error throwing activity executed within the sub-process (including its sub-process tasks). This includes activities whose errors cannot be caught directly by attaching the error event (for example, throw message intermediate event and end event that invokes a one way message).

Configuring Error Events

Error events are configured in the Properties view:
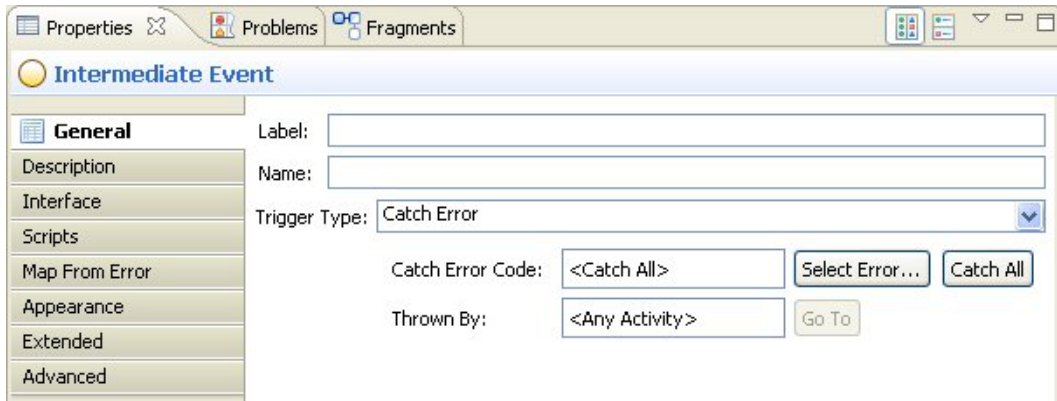
For a catch error event, you can do the following:

- **Catch All Errors** *(default)* Catches any error thrown by any event.

- **Catch Named Errors** To do this, click **Select Error** and select the **Select Unspecific Error By Name Only** checkbox. The dialog lists the catchable error codes. Select the error codes that you want to catch. This configures the event to catch the selected error from any activity.

- **Catch Specific Errors from Specific Activities** Click **Select Error** and deselect the **Select Unspecific Error By Name Only** checkbox. The dialog lists events and

activities that throw error codes. Expand the desired event or activity to catch a
specific error thrown by a specific activity. For example:
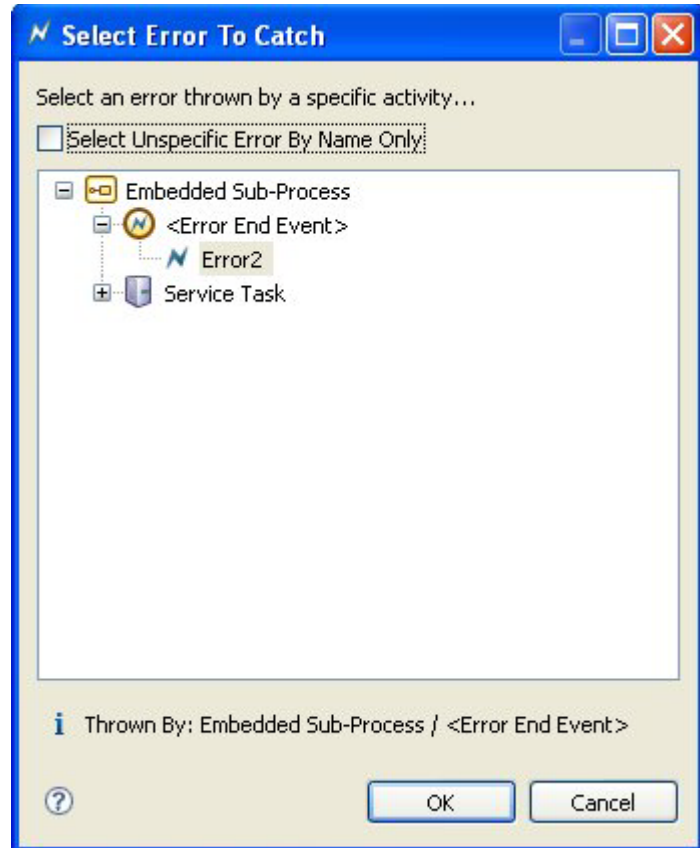
- **Catch Specific WSDL Fault** WSDL faults are caught in the same ways as other errors (either named WSDL faults, or specific errors from a specific service task). For example:
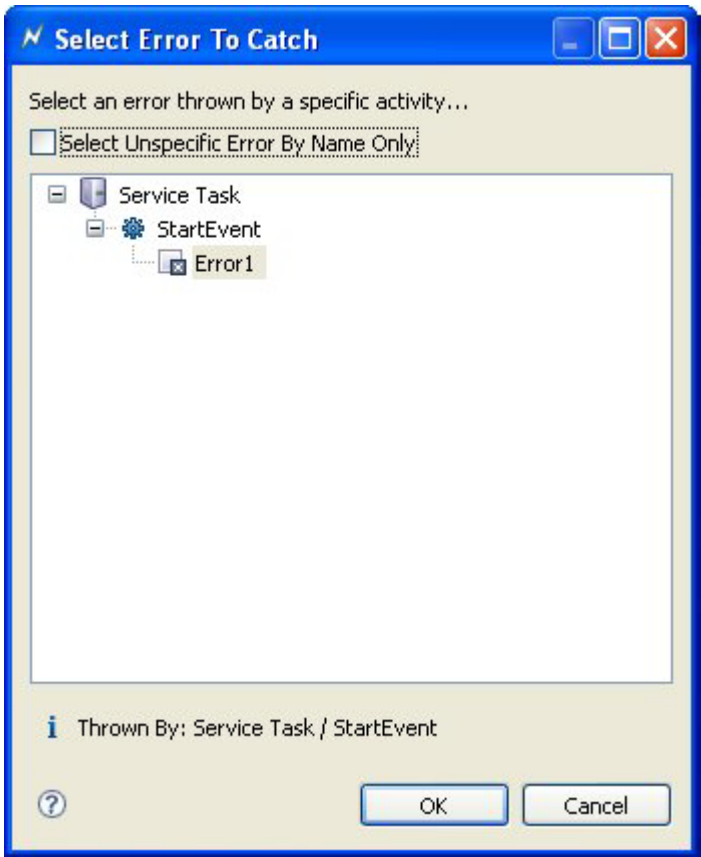
In this example, the catch error event is attached to the service task. The error is thrown by a process in a different project (see Creating References in the Project Properties on page 51).
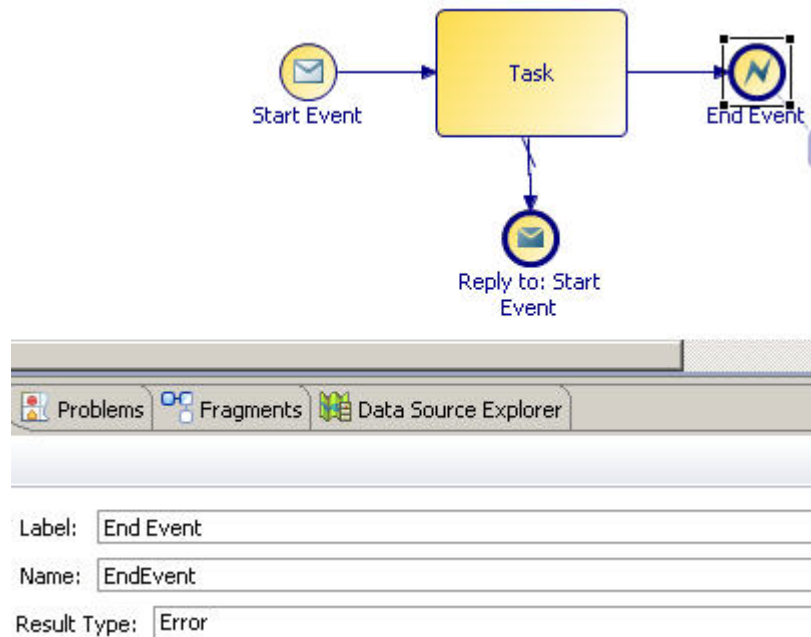
Fixing Invalid Error Events

After configuring a catch error event, the event that throws the error code is deleted, invalidating the catch error event as shown in the Properties view.
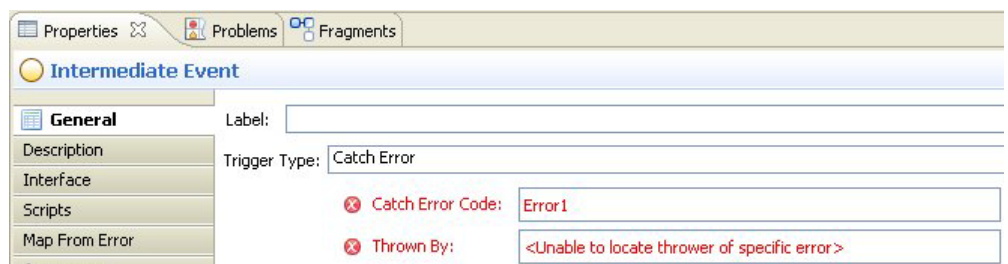
Other causes of invalid error events include:

- The event is detached from the task.

- The activity no longer throws the given error.

- The activity that throws a specific selected error is no longer processed as a result of the task the to which the event is attached.

To fix the error event, click **Select Error**. If possible TIBCO Business Studio identifies the closest match to the originally selected error code. Select an error code and click **OK**.

Mapping Error Data

Click the **Map From Error** tab to map error parameters to process data.

For example:
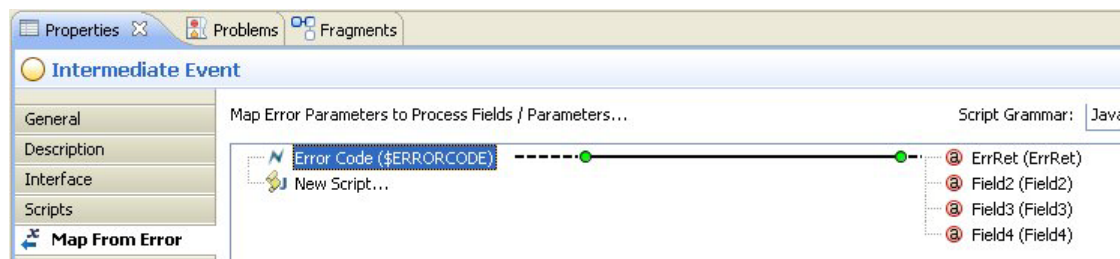
The process data available on the right side of the tab is either all data or a subset of data as specified on the selection on **Interface** tab.

The content of the left side of the **Map From Error** tab depends on the configuration of the **General** tab:

- **Catch All / Catch Named Errors** Only the automatically provided error code can be used for mapping as shown in the previous example. Typically, this error code is mapped to a process text data field or parameter for display to the user. At run time, the text data field or parameters is populated with the error code name when the error is caught.

- **Catch Specific Error Thrown By Sub-Process End Error Event** All parameters with a mode of **Out** or **In/Out** that are associated with the throw error end event (on the **Interface** tab) are displayed for mapping:
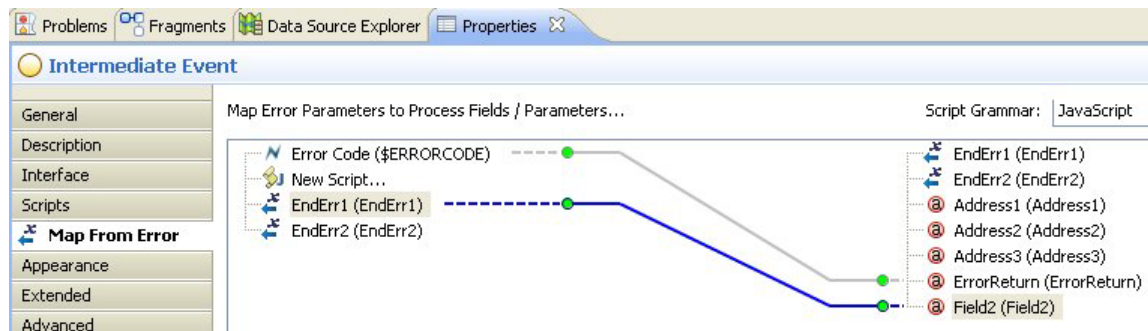
- **Catch Specific WSDL Fault** WSDL fault message parameters are displayed on the left side and can be mapped as normal.

Configuring Compensation Events

Compensation events are used to reverse the effect of previously executed tasks.

For example:
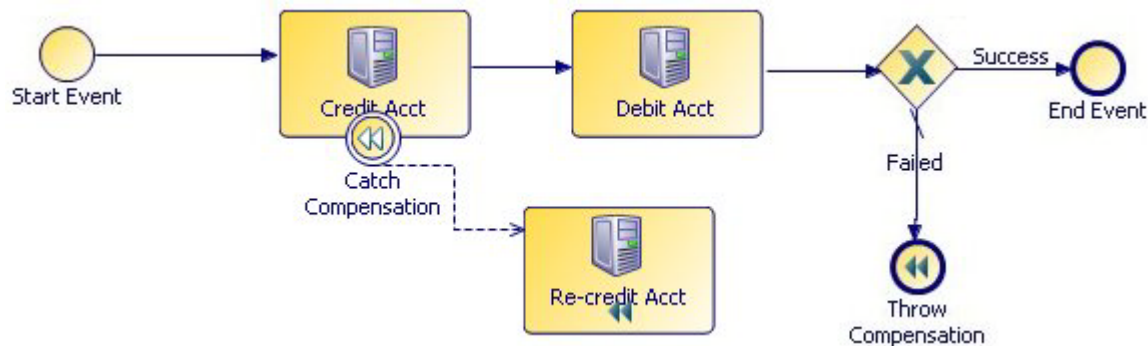
In this example, if the credit/debit fails, a compensation event is thrown. The target of the event is the **Credit Acct** task, which catches the error and proceeds with the **Re-credit Acct** task. In the Properties view for the **Throw Compensation** end event, you can press Ctrl+Space to see a list of tasks from which you can select the target of the compensation. Alternatively, you can compensate all previously executed tasks by not specifying a target for the compensation:
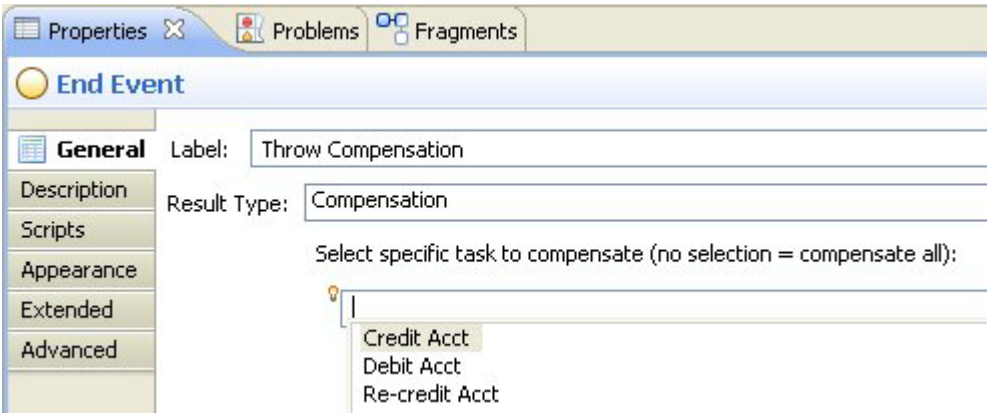
Implementing Message Events

TIBCO Business Studio supports the following Message Exchange Patterns (MEPs):

MEP	Description	How to Model
Receive one-way request from external application	The process receives a message from an external application and does not send a response.	• Start message event (if the process is started upon receipt of the message) • Intermediate catch message event • Receive task See Receiving a One-Way Request Operation on page 144.
Send one-way request to external application	The process sends a message to an external application but expects no response.	• End message event • Intermediate throw message event • Send task See Sending a One-Way Request Operation on page 144 and Creating References on page 100.
Receive request-response message from an external application	The process receives a request response message from the external application, and replies to the request.	• Start message event • Intermediate catch message event, or • Receive task *paired with* • Message end event • Intermediate throw message event, or • Send Task See Receiving a Request-Response Operation on page 145 and Request Response Operation with Send and Receive Tasks on page 102.

MEP	Description	How to Model
Send request-response message to an external application	A client (service consumer) sends a request message to the web service (service supplier).	Service task.
	The web service (service supplier) returns a response message to the client (service consumer).	
	The web service may optionally return a fault message in the event of an error.	

Whether a message event performs a one-way operation or is part of a request-response operation is configured on the Properties view for the events.

Receiving a One-Way Request Operation

To configure an event to receive a one-way request operation, use either a start message event or a catch message event. The solution designer is responsible for configuring the event (for example, selecting a web service and mapping the input parameters to the process).

A receive task can be used in place of a catch message event .

Sending a One-Way Request Operation

To configure an event to perform a one-way operation, use either a end message event or a throw message event. In the Properties view, ensure that **Send One Way Request** is selected:
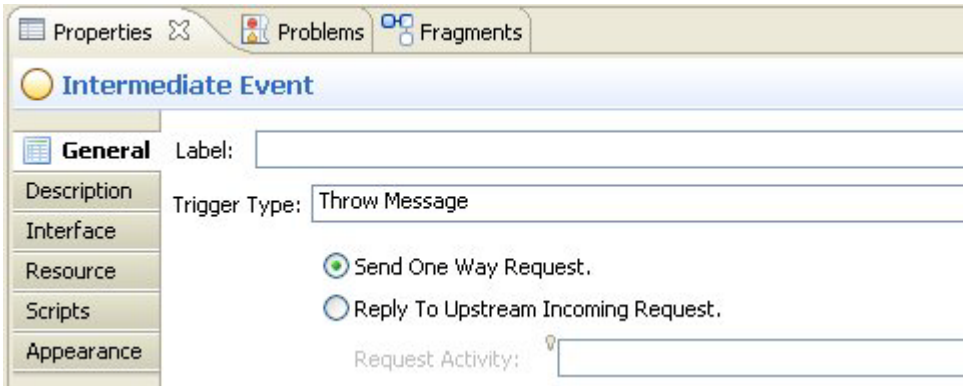
- Throw message events are set to send one-way requests by default.
- A send task can be used in place of a throw message event.

Receiving a Request-Response Operation

There are several options for receiving a request-response operation.

For example, a message start event can be paired with a message end event as follows:

In this example, the end message event is configured as follows:

End message events are set to reply to upstream requests by default. In addition, if there is only one upstream request (for example, a start message event), the end event is automatically configured to reply to that request.

A send task can also be paired with a start message event as follows:

The tasks between the request and reply parts of the process should complete quickly enough that they do not cause the service calling the process to timeout. For this reason, avoid putting user tasks or manual tasks in between the request and reply parts of the process.

The start message event and send task can be exposed as a synchronous receive-request operation

Receive Balance Request

Send Balance

Obtain Customer Details

Translate Data Formats

Obtain Balance

...provided the database and script tasks are not deemed to be arbitrary length tasks
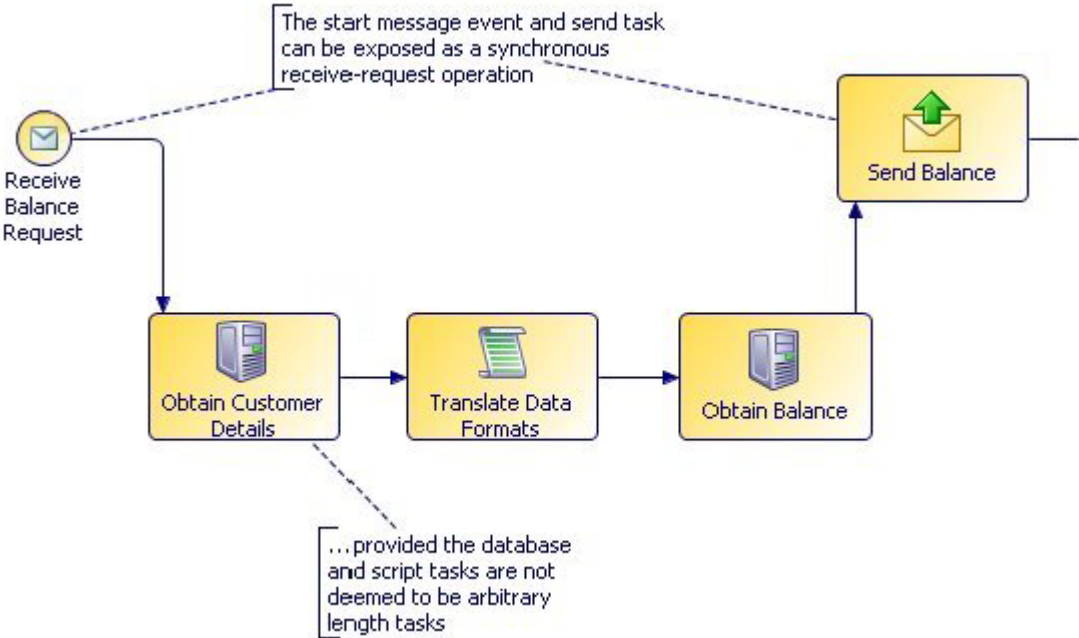
Event Handlers

See "Event Handlers" in the *TIBCO Business Studio Concepts Guide*.

Using Event Handlers in Pageflows

You could use the event handler to update the process data as shown in the example. Another way to use it would be to add to the runtime identifier array and associated input mapping arrays to add instances to a dynamic sub-process invocation.
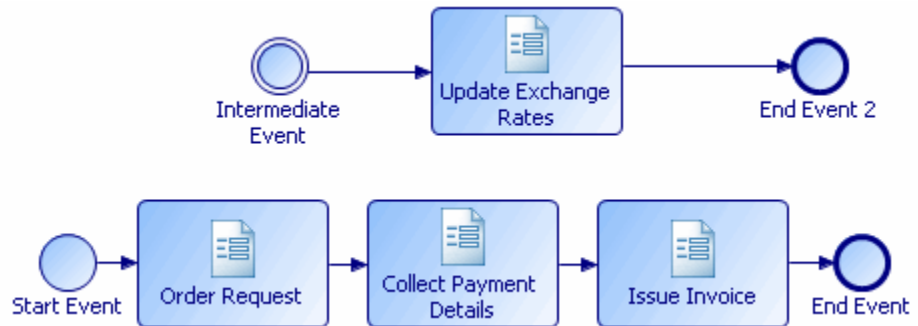
In this example, a pageflow process is used to manage an order request. The event handler is used to update exchange rate information regularly. This updated exchange rate information is then used as input to the task **Issue Invoice**.

Using Message Event Handlers in Business Processes

Message event handlers allow you to process a separate flow in an existing process instance via a web-service operation. As with any incoming message activity, correlation to a process instance has to be configured.

Blocking and Non-Blocking Message Handlers

You can configure what happens when an event handler is triggered prior to completion of the flow from a previous triggered instance.

They can be one of the following:

*   **Blocking**: The **Serialize concurrent flows for this event handler** option means that further event triggers are queued until an existing event handler flow completes (unless the main process flow completes).

- **Non-blocking**: The **Allow concurrent flows for this event handler** option means that if the event is triggered multiple times, the flow from each can be processed in parallel.

The configuration options are shown under Event Handler on the following screenshot:

○ **Intermediate Event**

General	Label: Event Handler
Description	Name: EventHandler
Interface	
Data Fields	┌─Event Handler───────────────────────────
Input To Process	◉ Serialize concurrent flows for this event handler
Scripts	○ Allow concurrent flows for this event handler
Data References	
Appearance	Intitializers:
Extended	StartEvent ⌞...⌟
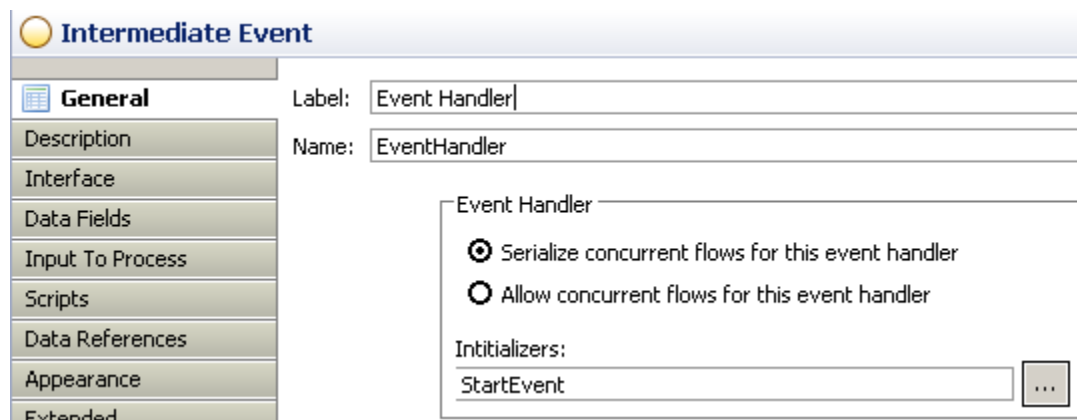
Initalizing Event Handlers

You can specify a list of activities after which the event handler will be initialized (or reset if already initialized). You need to do this because if the value of correlation data associated with the event handler is changed during the life of the process then existing event handlers will not be triggered according to the new correlation data value unless they are initialized.

You also need to do this if the initial correlation values are set in the complete script of the message start event or any other script activity, as opposed to initializing on the message start event mapper.

You will also need to do this if the correlation data required for the event handler is not explicitly initiated in mapping on all process start activities (otherwise the event handler will be initialized when correlation data may not yet have been set).

Select initalizers for the event handler using the **Initalizers:** selection under Event Handler (see screenshot above). You can select any task, embedded-sub-process or event activity (except those attached to task boundary, or events that are themselves event handlers). This includes activities on event handler outgoing flows.

If you do not specify any activities then the event handler will initialize during processing of the first start-activity but before the start-activity's Complete script. For this to happen one of the following must happen:

- The correlation data associated with each event handler must be initialized in correlation data mappings in each start activity.

- For any event handlers in processes with non-message start activities (such as sub-processes) you must explicitly state the activities after which the event handler(s) are initialized. Once any activities are explicitly stated in this way, then the event handler will only be initialized after those activities complete .

    Even if the correlation data is initialized in the Complete script of a start activity, if you wish an event handler to initialize correctly you must use this method of explicitly stating the initialize-after activities on each event handler (that is, if the event handler is to be initialized at start of a process instance then the start activity must be explicitly stated).

Example: Using Event Handlers in a Business Process

The following simple example covers updating work item data using an event handler and a non-cancelling signal event.

In this example, a business process is used to manage a request. The event handler is used to update information related to the request . This updated information is then used as input via a non-cancelling signal event to the task **Register Request**..
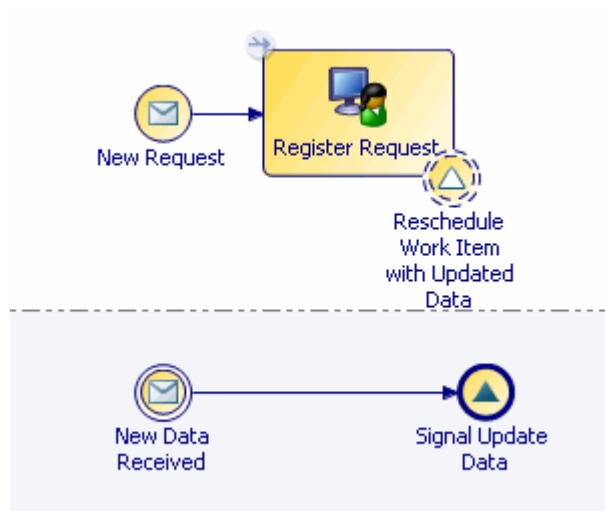
Migration and Upgrade when using Event Handlers

Migration:

See Design Considerations for Process Migration on page 64" for information on process migration considerations when using event handlers.

Upgrade:

Adding, deleting or modifying event handlers from which web-service operations are generated affect the interface and therefore prevent upgrade, but subsequent event handler changes are valid. See "Application Upgrade" in the *BPM Implementation Guide* for more guidelines.

Chapter 7 **Working with Process Data**

This section describes how to use data that is used in processes such as data fields, parameters, and participants.

Topics

Adding Data Fields or Parameters to a Package or Process

See "Data Fields and Parameters" in the *TIBCO Business Studio Concepts Guide*.

There are two ways to add data fields or parameters to a package or process:

- in the Properties view table provided when the **Parameters** or **Data Fields** folder is selected in Project Explorer (this method is better if you need to create several data fields or parameters), or

- using the wizard to create one at a time.

See Associating Participants with Activities on page 168 for information on how to highlight all the tasks in a process that have a particular data field or parameter assigned to them.

Using the Properties View

To create a new data field or parameter in the Properties view:

1. In the Project Explorer, expand the package or process where you want to add a data field or parameter.

   If the **Data Fields** folder is empty under a package, it will be hidden by default. This is because the preferred usage is to define Data Fields at the Process level.
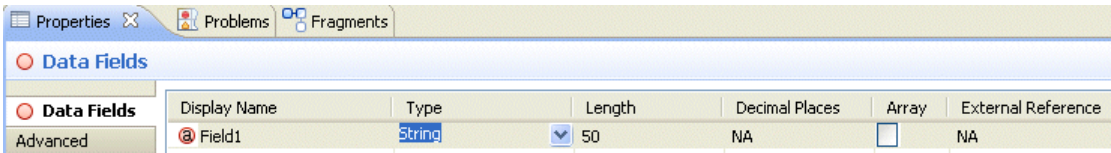
   If you want to show the Data Fields folder under a package, regardless of whether it is empty or not, then you need to go to Project Explorer, and click the **View Menu** icon in the top right corner, then select **Customize View**. You can then deselect **BPM Package Data Fields** on the list of filters which are set.

2. As appropriate, click **Data Fields** or **Parameters** folder in the Project Explorer. If you need to add a Data Field at the Package level, select **New** > **Data Field** as described in Using the Wizards below.

   The Properties view is displayed.

3. Click ![plus icon].

   A new data field or parameter is added.

Properties ✕	Problems	Fragments				
⊙ **Data Fields**						
⊙ **Data Fields**	Display Name	Type	Length	Decimal Places	Array	External Reference
Advanced	ⓐ Field1	String ∨	50	NA	☐	NA

As appropriate, modify the properties.

Using the Wizards

To create a new data field or parameter:

1. In the Project Explorer, expand the package or process where you want to add a data field or parameter.

2. As appropriate, right-click **Data Fields** or **Parameters** and select **New** > **Data Field** or **New** > **Parameter**. The **New Data Field** or **New Parameter** dialog is displayed.

> If you start this wizard from the **File** > **New** menu, the first dialog is the project and package dialog, where you must specify a valid project and package. This dialog is not displayed if you right-click at the process level to start the dialog; however you can click **Back** to display it.

3. Specify a label for the data field or parameter; you cannot specify leading or trailing spaces.

4. For parameters, specify the following:

   — **Mandatory** (*Parameter only*) Select this checkbox to specify that the parameter must be present when the process is started.

   — **Read Only** Select this checkbox to specify that the value of the data field or parameter cannot be modified after it is created.

   — **Mode** (*Parameter only*) Select whether the parameter will be an input (**In**) output (**Out**) or both (**In/Out**).

> The parameters specified on the **Interface** tab for a user task are from the perspective of the *form*, not the *user*. This means that input parameters are sent to the form by the process, not the user. Output Parameters are sent to the form by the user.

5. Specify the type of data field or parameter you want to create:

   — **Basic Type** If you select this type, you can choose from **Text**, **Decimal Number**, **Integer Number**, **Boolean**, **Date, Time**, **Date Time** or **Performer**. For more information about using performer data types, see the appropriate implementation guide.

> If you need to create a **Text** field of unlimited length, ensure that the Length field is empty. If you wish to limit the number of characters enter the appropriate numeric value.

— **Initial Value** For data fields, you can optionally specify an **Initial Value** by clicking in the provided text entry area and entering a value. For arrays, you can add more than one value:
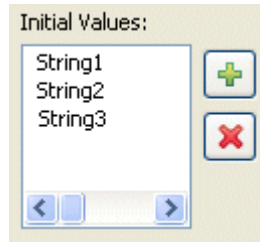
You can add rows by clicking the ⊕ button. You can also delete rows by clicking the ✖ button.

— **Allowed Values** For parameters, you can optionally specify the permitted input values (values that may be supplied by application starting an instance of the process). You can add rows by clicking the ⊕ button. You can also delete rows by clicking the ✖ button.

— **Declared Type** This option allows you to select from the declared types that you have already defined.

— **External Reference** Allows you to refer to a business object defined in the Business Object Modeler.

6. Select whether you want the data field or parameter to be an array. Selecting the **Array** checkbox creates an array of the Basic Type that is selected. For example, if you select the **Array** checkbox and Text, you are defining the data field or parameter as an array of Text values.

7. Click **Finish** to create the data field or parameter, or click **Next** to specify a documentation URL, description, or extended attributes.

8. The **Documentation Url** and **Description** fields allow you to specify supplementary information about the data field or parameter that you have created.

9. The **Extended** dialog allows you to specify extended attributes.

The parameter that you created appears in the Project Explorer.

Constraints on Field or Parameter Values

This section applies only if one of the destinations for your process is set as BPM.

If you place any constraint on the possible values of a data field or a parameter of any Basic Type, that constraint is ignored at runtime. This is because BPM's Process Engine cannot enforce these constraints. For example:

- If an Integer or Decimal field has its **Length** set to 9, a warning is displayed that format restrictions are not enforced, and at runtime you can still assign a value with more than 9 digits.

- If a Decimal field has **Decimal Places** set to 2, a warning is displayed that format restrictions are not enforced, and at runtime you can still assign a value with 3 decimal places.

- If a Text type data field has its **Length** set to 50, you can still assign a value with more than 50 characters.

Note that in the case of the Text field, no warning is displayed.

You can produce the same effect as limiting the value of the field or parameter by using a BOM data type defined with the restricted values you need. See *TIBCO Business Studio Business Object Modeling User's Guide* for more details of BOM data types.

Adding Data Fields to an Activity

To create a new data field for an activity:

1. Select the activity for which you want to create a data field.

2. On the Properties view, click **Data Fields**.

> Activities that do not support activity-level data fields (such as gateways) do not have a **Data Fields** tab on their Properties view.
>
> A validation error is displayed if you define a data field for an activity on the **Data Fields** tab, but the destination environment selected for the parent process does not support activity-level data fields for that activity type.

3. Click ⊞ . A new data field is added.

4. Modify the data field's properties as appropriate.

> You can only assign a value to an activity-level data field by using the **Scripts** tab on the activity. See the appropriate implementation guide for more information.

• The process begins with a start message event (the process is started upon receipt of a one-way message from an external web service). The business analyst decides whether elements within the incoming data from the web service can be used to uniquely identify instances of this process. If the incoming data can be used to identify the process (later on in the process when there are incoming messages), the business analyst creates a correlation data field (for example, **OrderRef**), and associates it with the start event on the **Interface** tab.

• After the user task, the receive task (**Receive Authorization**) waits for the correct incoming authorization. To do this, the business analyst associates the **OrderRef** correlation data field with the **Receive Authorization** task. When an incoming message is received, the incoming data is compared to the correlation data to make sure that it applies to that process instance.

After creating correlation data fields, and associating them with the relevant events or tasks, the correlation data must be mapped with the incoming data. This is the job of the solution designer. For more information, see the appropriate implementation guide.

Creating Correlation Data

See "Correlation Data" in the *TIBCO Business Studio Concepts Guide*.

There are several ways to create correlation data fields:

• using the Properties view table provided when the **Correlation Data** folder is selected in Project Explorer (this method is recommended if you need to create several data fields or parameters).

• using the wizard available either from the Project Explorer or from the **File** menu.

Additionally you can create correlation data fields by

• refactoring an existing data field into a correlation data field (right-click the data field and select **Convert to Correlation Data**).

• copying a data field and pasting it under the **Correlation Data** folder in the Project Explorer.

Creating Correlation Data Using the Properties View

To create a new correlation data field in the Properties view:

1. In the Project Explorer, expand the package or process where you want to add a correlation data field.

2. Click **Correlation Data** in the Project Explorer.

   The Properties view is displayed.

3. Click [+].

   A new correlation data field is added.

Properties ⊠	Problems	Fragments			
⊙ Correlation Data					
⊙ **Data Fields**	Length	Decimal Places	Array	External Reference	Type Declaration
Advanced	50	NA	☐	NA	NA

As appropriate, modify the properties.

To prevent accidental reassignment of correlation data fields, they are set to read-only by default. If you want to assign a value to correlation data that does not come from an incoming message, deselect the **Read Only** checkbox.

See Associating Correlation Data with an Event or Task on page 162 to assign correlation data to a start message event, catch message event, or receive task.

Creating Correlation Data Using the Wizard

To create a new correlation data field:

1. In the Project Explorer, expand the package or process where you want to add a data field or parameter.

2. Right-click **Correlation Data** and select **New** > **Correlation Data**. The **New Data Field** dialog is displayed.

> If you start this wizard from the **File** > **New** menu, the first dialog is the project and package dialog, where you must specify a valid project and package. This dialog is not displayed if you right-click at the process level to start the dialog; however you can click **Back** to display it.

For information about how to complete the remainder of the fields in the wizard pages, see Using the Wizards on page 153 (the properties of a correlation data field are exactly like those of a standard data field).

The correlation data that you created appears in the Project Explorer.

> If a correlation data field has data that you want to continue to use in your process, but that you no longer want to use for correlation, you can convert the correlation data field to a "standard" data field, by right-clicking it and selecting **Convert Correlation Data to Data Field**.

See Associating Correlation Data with an Event or Task on page 162 to assign correlation data to a start message event, catch message event, or receive task.

Associating Process Data with Events and Tasks

There are many reasons to associate process data with tasks or events.

For example:

- A data field needs to be displayed in a form.

- A process cannot be started unless a particular parameter is passed to a start event.

Drag and Drop   You can drag process data and drop it onto a user task as follows:

> You can drop process data onto a blank part of the process to create a new user task with the associated process data. For more information, see Using Participants to Create Tasks on page 174.

1. In the Project Explorer, click the data field or parameter you want to associate with your activity, holding down the mouse button, drag the pointer to the user task and release the mouse button.

> You can select multiple data fields or parameters for drag and drop operations using the Ctrl (for single selection) or Shift (to select a range) keys.

2. A menu is displayed with the following options:

   — **Add Data To View And Assign** Selecting this option adds the process data as an **In/Out** parameter on the **Interface** tab. This means that in the runtime environment, users will be able to display the associated form to view the field and also to assign new values to it.

   — **Add Data To View** Selecting this option adds the process data as an **In** parameter on the **Interface** tab. This means that in the runtime environment, users will be able display the associated form to view the field, however they can not assign new values to it.

   — **Add Data To Assign** Selecting this option adds the process data as an **Out** parameter on the **Interface** tab. This means that in the runtime environment, users will be able display the associated form to assign new values to the field.

Using the Interface Tab   Associating process data with events or tasks is done using the **Interface** tab.

1. Select the event or task.

2. In the Properties view, click the **Interface** tab.
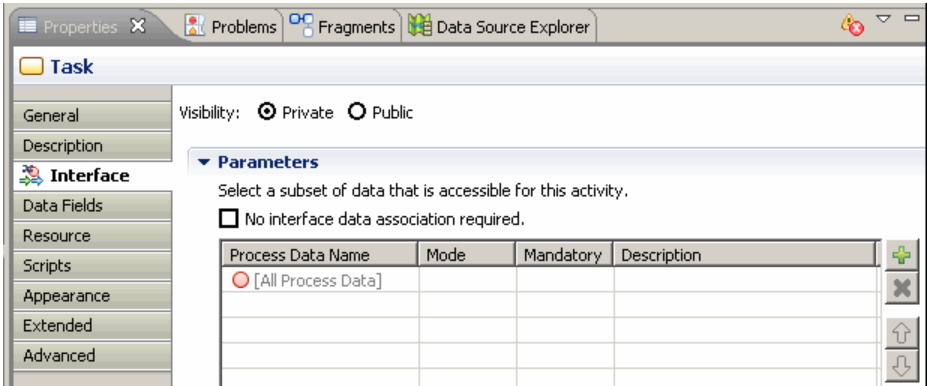
3. Select whether you want the visibility of the event or task to be private or public - see

4. Choose between the following:

    — Select the checkbox **No interface data association required** if you do not want to associate process data with the event or task. This will delete any associations that already exist.

    Usually if no data is explicitly associated with an event or task, then all available data is implicitly associated. Selecting this option prevents this, which can be useful for example when you wish to define an incoming message event with no parameters, even though the process already has formal parameters for other reasons.

— Click [+] to select the process data that you want to associate with the event or task. The **Select Data Field or Formal Parameter** dialog displays the list of available process data:
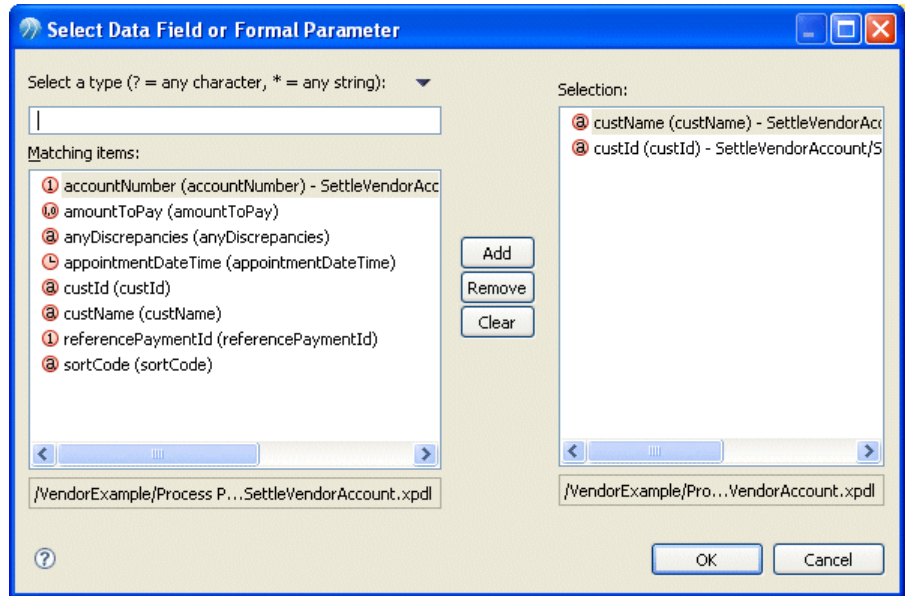
- By default all process data is available to a task. When you explicitly associate process data with an event or task, only the process data you associate with the event or task can be used by that task.

- The process data displayed depends on what type of event or task is selected. Most events and tasks can have both data fields and formal parameters associated with them, however receive tasks and events of type None can have only formal parameters associated with them. End events of type Message can only have formal parameters if the selected WSDL has both input and output parameters.

5. The process data you select is added to the table of data. Select whether you want the data to be mandatory.

The mandatory setting on the Interface tab for a formal parameter overrides the mandatory setting in the Properties view for the formal parameter. This allows complete freedom in designing the process - you can define a formal parameter as mandatory in one place in a process, and optional in another.

Use the space provided if you want to add an optional usage description of the process data. Selected parameters also display their mode (In, Out, or In/Out). You can change the mode by selecting from the drop-down list.

Associating Correlation Data with an Event or Task

Catch message events and receive tasks must have correlation data associated with them. Start message events can optionally have correlation data.

This is done on the **Interface** tab as with other process data. There is a special section on the **Interface** tab for correlation data:

If you do not want a start message event to have correlation data, select the **No correlation data initialization required** check box in the Correlation Data section of the **Interface** tab. If you select this check box, you must ensure that correlation data is initialized (for example, using a script) before it is required in the process.

By default, all correlation data is associated with an event or task, but you can explicitly associate only selected correlation data as described in this section.

1. In the Process Editor, select the event or task to which you want to add correlation data.

2. Click the **Interface** tab.

If the **Interface** tab does not display the **Correlation Data** section, make sure that the event or task you have selected is one of the types listed previously. Other types of event or task do not require correlation data and therefore do not display this section on the **Interface** tab.

3. Click to select the correlation data that you want to associate with the event or task. The **Select Data Field** dialog displays the list of available correlation data fields.
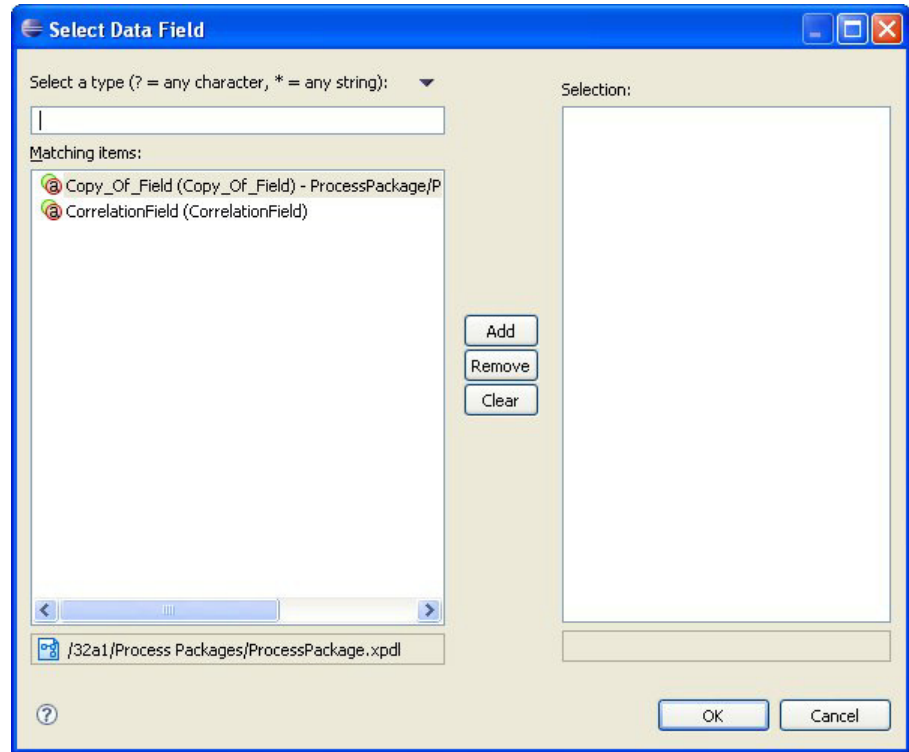
4. When you have finished selecting correlation data, click **OK**.

5. Select the mode of the correlation data.

> Depending on the type of event or task, TIBCO Business Studio provides appropriate defaults. For example, start message events are usually where correlation data is initialized, so the default mode for start message events is **Initialize**.

— **Correlate** *(Intermediate Catch Message Event and Receive Task Only)* The specified incoming data is compared to that of existing process instances to ascertain the target of the request.

— **Initialize** Specifies that the correlation data is expected to receive its value from the incoming data. For a start message event, a process instance is started, then the correlation data field is initialized with a value from the incoming data.

— **Join** *(Start Event or Received Tasks without incoming flow Only)* Causes the correlation data (mapped from the input data) to be compared to the correlation data for any existing process instances. If no matching process instances are found, a new process instance is started. If the correlation data matches that of an existing

process instance, the request is directed to that instance (a new process instance is not started).

6. If you want to configure the timeout of the correlation event, click the **Resource** tab. Expand Correlation Timeout and define the timeout you require.

You may want to configure the timeout of the correlation event to avoid a problem of either:

— an event that should correlate to an earlier process instance that does not correlate, sits waiting and then correlates with a later process instance with the same correlation data.

— an event that does not correlate immediately and waits in a queue, potentially permanently, using up resources unnecessarily.

Setting Event and Task Visibility (Private and Public)

The visibility of an event or task (whether it is private or public) controls whether process information (such as required parameters) is available to an external process or application. Setting the visibility to public results in a subset of events or steps that are then available to external processes or applications.

The runtime effect of this setting is entirely destination specific.

For each event or task, you can specify a list of expected input fields (on the **Interface** tab), and define the URL of the document describing the purpose of the public event or task (on the **Description** tab).

By default, events and tasks in a process are private; in a process interface, they are public. If you want to change the visibility of an event or task:

1. Select the event or task.

2. On the Interface tab, select the visibility (**Private** or **Public**).

3. Click ![plus icon] to add parameters to the event or task. Use the Mandatory checkbox to specify parameters that must be present.

4. *(Optional)* Select the **Description** tab. Enter a URL that provides documentation describing how the event or task is used.

Using Process Data to Create Tasks

If you have created data fields or parameters, you can drag them to a blank area of a process to automatically create a user task:

1. In the Project Explorer, click the data field or parameter, and holding down the mouse button drag the pointer to a blank part of the process and release the mouse button:

You can select multiple data fields or parameters for drag and drop operations using the **Ctrl** (for single selection) or **Shift** (to select a range) keys.

Create User Task To View And Assign Data ('In/Out')
Create User Task To View Data ('In')
Create User Task To Assign Data ('Out')
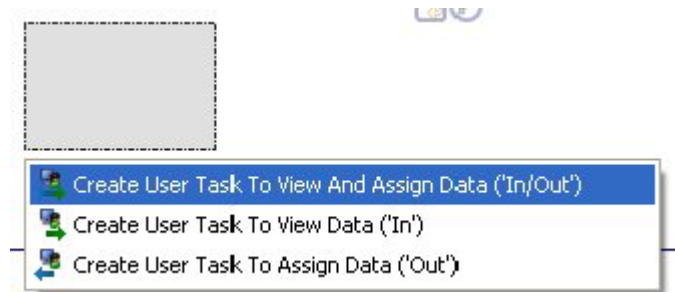
2. A menu is displayed with three options:

— **Create User Task To View And Assign Data** Selecting this option creates a user task with the process data as an **In/Out** parameter on the **Interface** tab. This means that in the runtime environment, users will be able to display the associated form to view the field and also to assign new values to it.

— **Create User Task To View Data** Selecting this option creates a user task with the process data as an **In** parameter on the **Interface** tab. This means that in the runtime environment, users will be able display the associated form to view the field, however they can not assign new values to it.

— **Create User Task To Assign Data** Selecting this option creates a user task with the process data as an **Out** parameter on the **Interface** tab. This means that in the runtime environment, users will be able display the associated form to assign new values to the field.

Creating a Participant

See "Participants" in the *TIBCO Business Studio Concepts Guide*.

To create a new participant:

1. In the Project Explorer, expand the package where you want to add a participant.

2. Right-click **Participants** and select **New** > **Participant**. The **New Participant** dialog is displayed.

3. Click the **Back** button if you need to change either the name of the **Project** and **Package** where the participant will be created. If you want to change either, click the **Project** or **Package** button.

    Participants can be created at either the package level or at the process level. Creating them at the package level is recommended as it enables them to be shared amongst processes. Select the **Process** checkbox and specify a process if you want to create the participant at the process level.

> If the Participants folder is empty at the Process level, it will be hidden by default. This is because the preferred usage is to define Participants at the Package level.

4. Click **Next**.

5. Specify the **Name** and **Type** of the participant (either a basic type, or an external reference as described previously in this section) and click **Finish**.

    — To create a basic type, select **Basic Type** and choose from **Role**, **Organization_Unit**, **Human**, **System** and **Organization Model Query**, and click **Finish.**

    If you select the **Organization Model Query** button, you can then enter the Organization Model Query Script in Resource Query Language (RQL) using a script or expression in the General tab of the Properties view. This is evaluated when a referencing task is executed at run-time, so the actual participant is resolved and the activity dispatched and offered to the participant. A query could resolve to a participant in the package/process or to an entity in the organizational model.

    — To create an external reference to an organization model, select **External Reference**, and click ⬚ to select a type from the organization model.

    Choose a type from those shown in Matching Items, or key in the first few characters of the name you are looking for in the field under **Select type(s)(? = any character, * = any string** and choose from those shown. Click **OK**.

The participant that you created appears in the Project Explorer.

— You can import participants from other projects. At the process package level, right-click and select **Import Participants Wizard**. You can then select which project/s you wish to import participants from.

— All external references to participants from within the same project must be to the same **major version** of the organization model. However, you can reference different minor or micro versions of the model. For example, if you have included a reference to a participant in version 1.0.0.qualifier of the organization model, and the model subsequently changes, you could reference a participant in version 1.1.0.qualifier, but not version 2.0.0.qualifier.

Associating Participants with Activities

You can associate a participant with an activity to identify who or what performs the activity. You can do this either by dragging and dropping the participant onto the activity or in the Properties view for the activity.

Drag and Drop   You can drag a participant onto an activity as follows:

1. Expand participants in the Project Explorer.

2. Click the participant you want to associate with your activity, holding down the mouse button, drag the pointer to the activity and release the mouse button.

— You can select multiple participants for drag and drop operations using the **Ctrl** (for single selection) or **Shift** (to select a range) keys.

— You can also select as a participant a data field or formal parameter of the type **Performer**.

3. A menu is displayed with two options:

— **Add Task Participant(s)** Selecting this option adds the participants to any existing participants for the activity.

— **Set Task Participant(s)** Selecting this option clears any existing participants associated with the activity, before setting the participants to those you selected.

Properties View   To associate a participant with an activity do the following:

1. In the Process Editor, highlight the desired activity.

2. Either:

— In the Properties view, click [...] .

— Right-click the activity, and select **Participant**.

The Select Participants dialog is displayed:
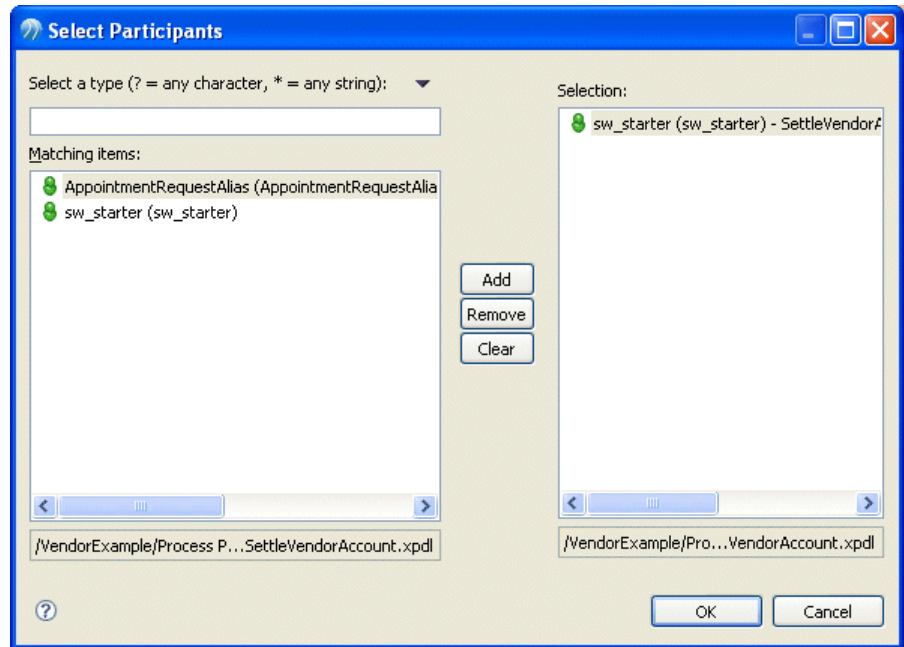
3. Highlight participants you want to select and click **Add** to move them to the **Selection** column. When you have finished selecting Participants, click **OK**.

— You can select multiple participants by pressing either the **Ctrl** (for single selection) or **Shift** (to select a range) keys while making your selection.

— The wildcard **?** returns all matching participants. Use the ***** wildcard to restrict the results (for example, ***2** to return all Participants ending in 2. Note that the wildcard ***** by itself does not return any results; it only works in conjunction with a string.

— You an also select as a participant a data field of the type **Performer**.

4. The participants you selected are displayed in the Properties view and also when you hover the pointer over the activity in the Process Editor.

Highlighting Participants

To see what tasks a participant is assigned to, click in the Process Editor for the process. On the toolbar, you will see a button:

Click on this to see the dropdown, and select **Enable Highlighting**.
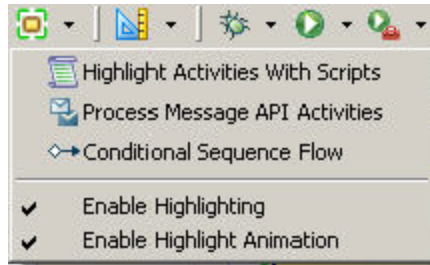
Alternatively, you can select **Diagram** > **Highlighting** > **Enable Highlighting**.

Select the participant in Process Explorer, and in the Process Editor the tasks which use this participant will be highlighted (framed with green lines). Other tasks in the process will be grayed out.

This behavior also applies to data fields and parameters.

Highlights are cumulative.

• If you select more than one participant, data field or parameter in Project Explorer, only tasks which reference all of those selected will be highlighted.

• If you select "Activities With Scripts" followed by "Process Message API Activities" then the diagram objects highlighted will be process message API activities that have scripts.

The current highlight filter is shown when you use the Process Editor mouse-over tooltip.

Highlights are removed when anything other than the highlighted diagram objects are selected.

Exporting Participants to an Organization Model

To create an organization model based on the participants in a process package, or a number of process packages, use the procedure described in this section.

- Process packages with errors cannot be selected as the basis for organization model creation.

- Processes must contain only one pool, but can have many lanes.

- If a process package references another process package, the referenced process package is automatically selected.

1. Right-click the XPDL package file in the Project Explorer and select **Refactor** > **To Organization Model**.

2. In the resulting dialog, select the process packages that you want to refactor into an
organization model, and click **Finish**:
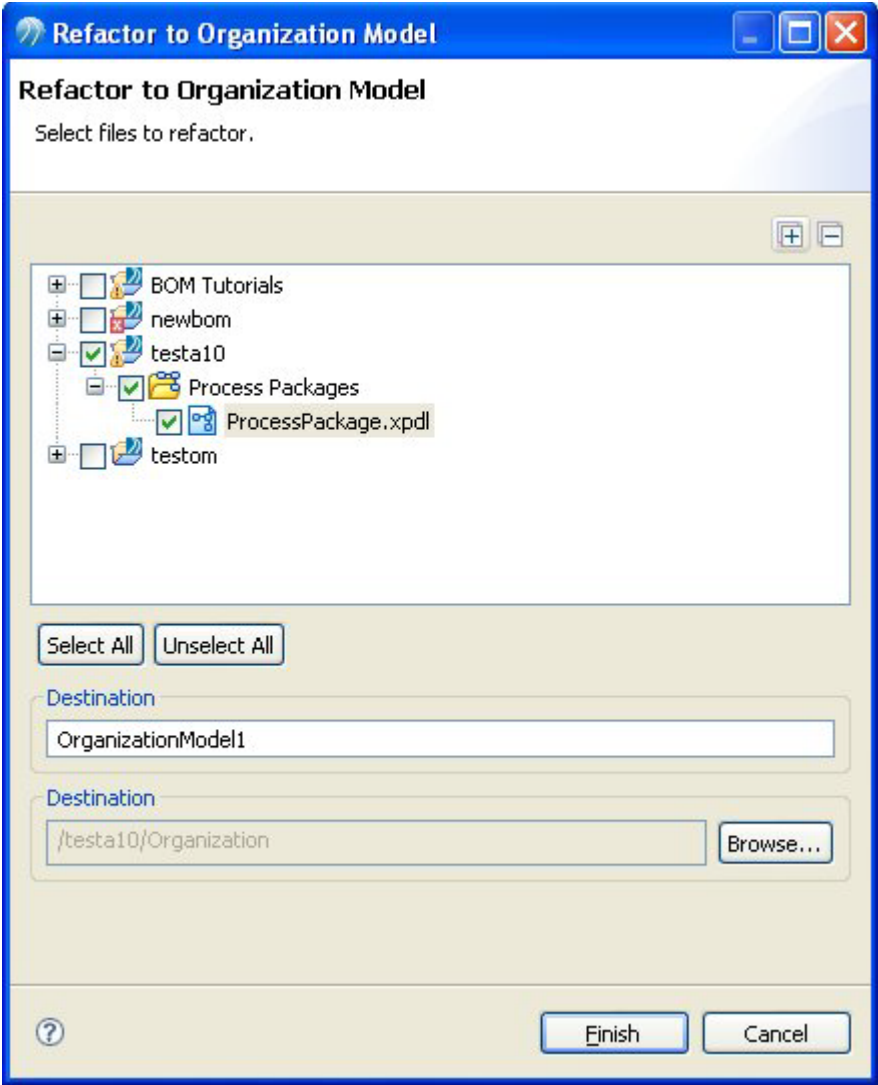
3. The following message indicates that the process packages were correctly refactored:
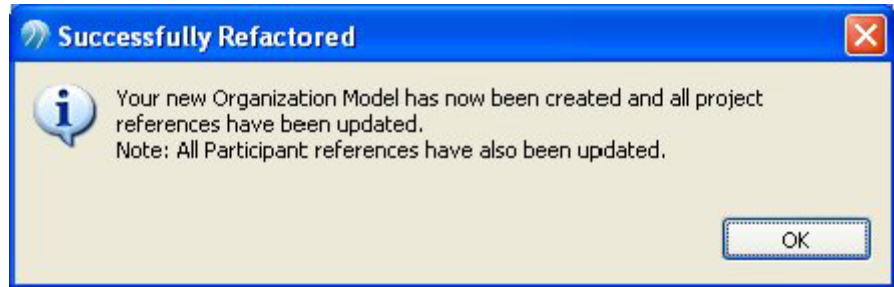
The existing participants are changed from basic types to external references to the organization model.

Participant to Organization Model Mapping

The following table shows how participants that *are not* referenced in a process appear in the exported organization model.

Process Participant Type	Organization Model Object
Human	Position in default organization model unit
Organization unit	Top-level organization unit
Role	Top-level group
System	Ignored

The following table shows how participants that *are* referenced in the process (for example, in a user task) appear in the exported organization model.

Process Participant Type	Organization Model Object
Human participant	Position in organization unit (unit is named after the lane in the original process)
Organization unit	Organization unit within an organization unit (the containing unit is named after the lane in the original process)
Role	Top-level group
System	Ignored

Using Participants to Create Tasks

If you have participants, you can drag them to a blank area of a process to automatically create several types of task:

1. In the Project Explorer, click the participant, and holding down the mouse button drag the pointer to a blank part of the process and release the mouse button.

> You can select multiple participants for drag and drop operations using the **Ctrl** (for single selection) or **Shift** (to select a range) keys.

2. A menu is displayed with the following options:
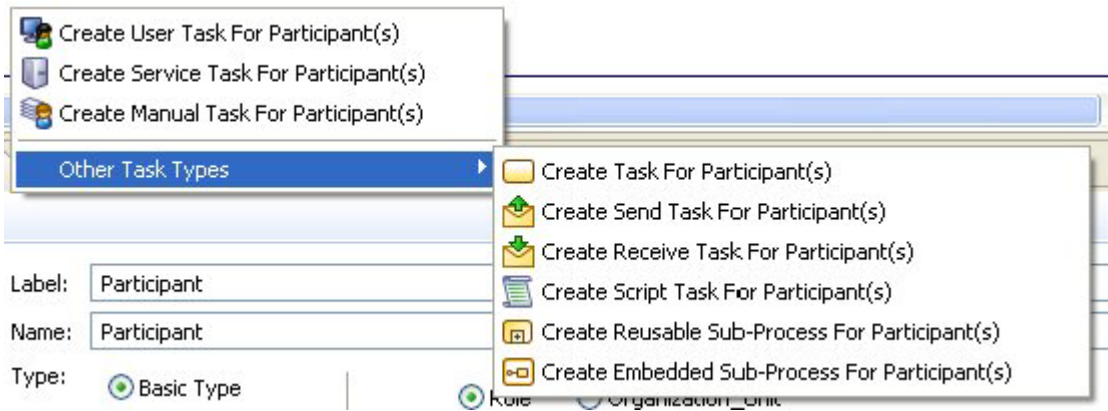
— **Create User Task For Participant(s)** Selecting this option creates a user task with the selected participants.

— **Create Service Task For Participant(s)** Selecting this option creates a service task with the selected participants.

— **Create Manual Task For Participant(s)** Selecting this option creates a manual task with the selected participants.

— **Other Task Types** This submenu contains more task types that you can create from a participant.

Deleting Data Fields, Parameters, Participants, and Type Declarations

You can delete a project object such as a data field, parameter, participant, or type declaration by right-clicking it in the Project Explorer and selecting **Delete**. However, if the project object has been associated with another object such as an activity or a sequence flow, the following message is displayed:
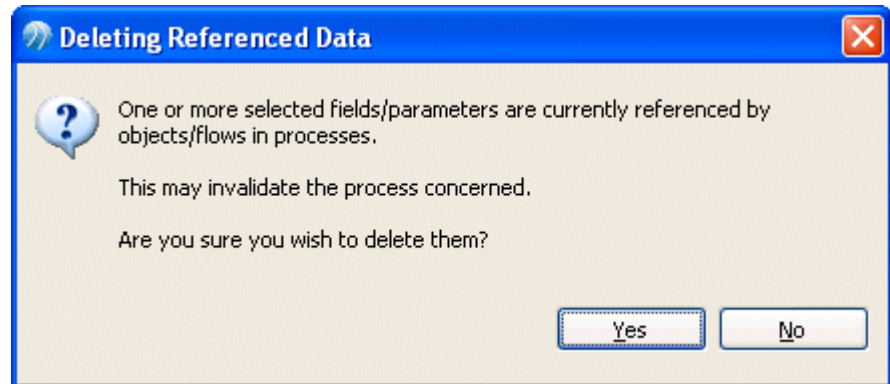
If you click **Yes**, the project object (in this example, a data field) is deleted, but it will still be referenced in XPDL for the project, which can cause problems. If you click **No**, the project object is not deleted. You can then go to the Properties view and examine the references to that object:
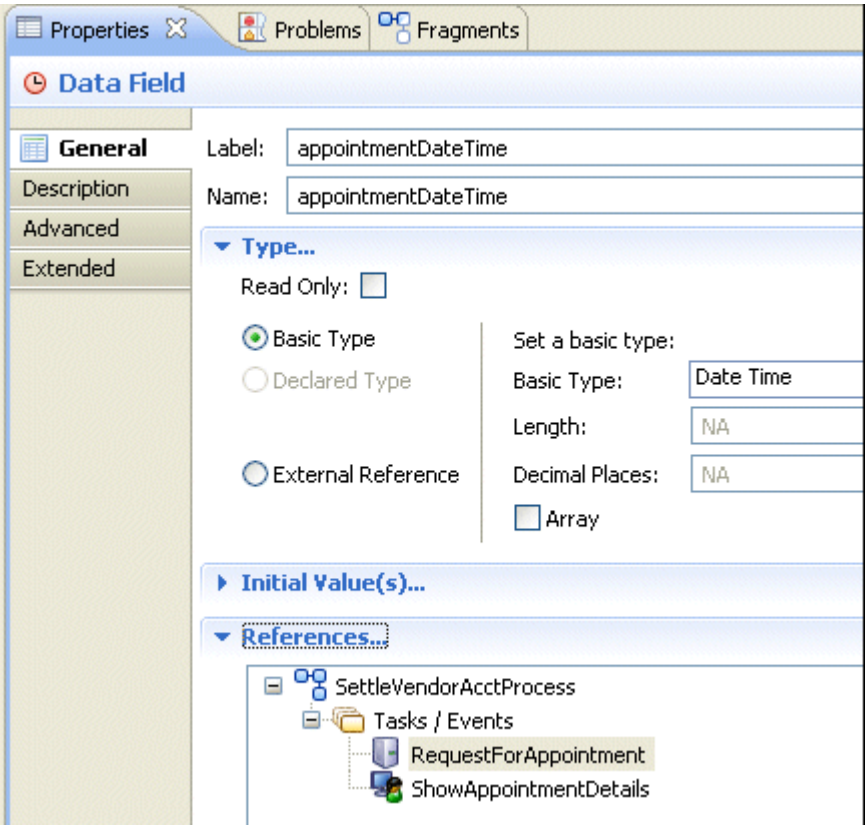
In this example, the data field is referenced in the service task **RequestForAppointment** and in the user task **ShowAppointmentDetails**. Click **Go To** to show that task in the Process Editor.

Chapter 8 **Using Sub-Processes and Process Interfaces**

This chapter describes how to work with sub-processes and process interfaces in TIBCO Business Studio.

Topics

Reusable Sub-Processes

See "Reusable Sub-Processes" in *TIBCO Business Studio Concepts.*

There are different ways of creating a call to a reusable sub-process:

- By refactoring objects in your process (see Creating a New Embedded Sub-Process on page 186).

- By dragging a process from the Project Explorer and dropping it onto your process (described in this section).

- Using the reusable sub-process tool from the palette (described in this section).

If you modify a sub-process (for example, by adding a parameter) and that sub-process is referenced by a main process in a different package, validation in the main process does not occur until you save the sub-process package.

Drag and Drop   To create a reusable sub-process call using drag and drop, do the following:

1. Expand the Project Explorer to locate the process that you want to be the sub-process.

2. Click the intended sub-process, holding down the mouse button, drag the pointer to the calling process (open in the Process Editor), and release the mouse button.

You can select multiple processes for drag and drop operations using the Ctrl key.

3. If you are dropping more than one process, a menu is displayed with two options:

— **Create Sub-Process Task Sequence** Selecting this option allows you to create sub-process tasks connected by sequence flow. The following dialog is displayed to allow you to control the order of the tasks:
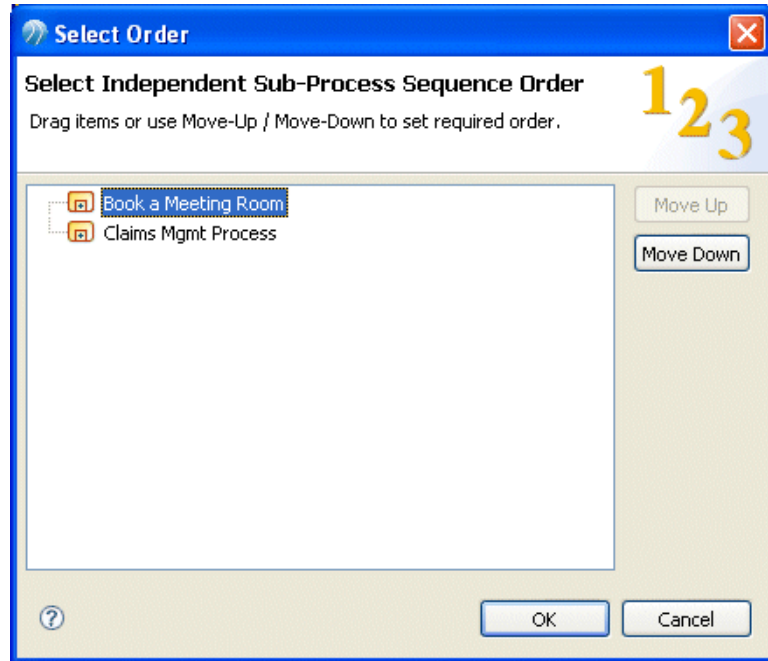
Use the **Move Up** and **Move Down** buttons or drag and drop to control the order of the tasks. When you are finished, click **OK** to place the tasks.

— **Create Unsequenced Sub-Process Tasks** Selecting this option places the tasks in the process without a connecting sequence flow.

Palette   To create a reusable sub-process call using the palette, do the following:

1. In the Process Editor, select the **reusable sub-process** tool.

2. Click in the process where you want to place the activity that calls the sub-process.

3. On the Properties view for the activity, browse for the process you want to call as a sub-process.

If the process you select is not in the current project, you are prompted to create a project reference:

Project Reference

? MailTask needs to be added as a reference project. Would you like to add this reference?

Yes   No
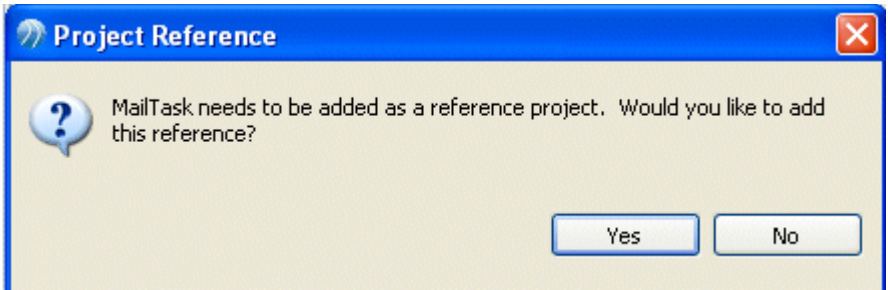
Example

The following example demonstrates how a top-level process could use sub-processes in an insurance environment:
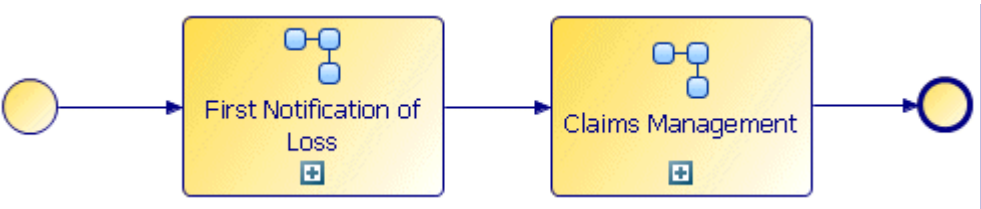
Each of the activities in the process calls sub-processes that are executed in the runtime environment. For example, the sub-process called from the Claims Management activity could look like this:
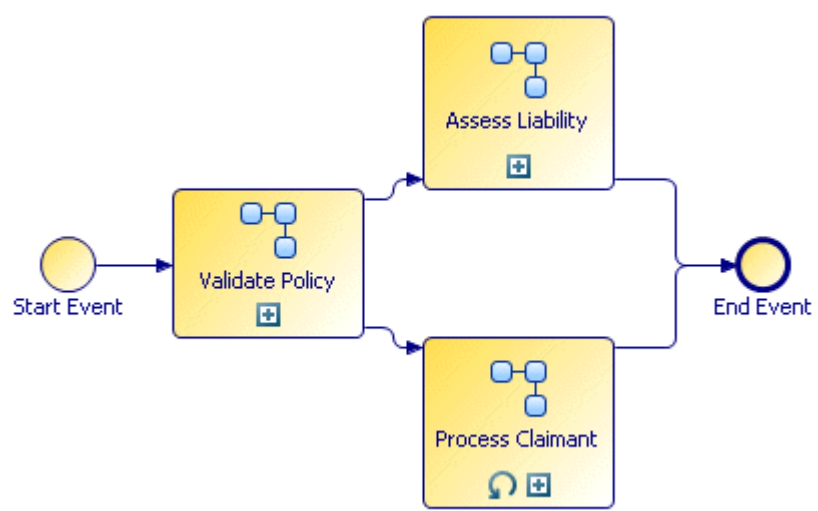
Note the following about this sub-process:

- The Validate Policy sub-process can be re-used. For example, when a customer calls to renew their policy, the first step of the Renewal Process could be to confirm that they have an existing policy. The Validate Policy Activity could be re-used for this purpose in the Renewal process.

- The Process Claimant activity has a **Loop** Activity Marker, that indicates that the activity is repeated for each Claimant.

- The *actual* sub-process called by the Assess Liability activity is a manual Process. However, the *to be* sub-process (planned for the future), could be implemented as an automatic process that consists of a series of questions used to determine liability. Simulation could be used to demonstrate the performance and cost-savings of migrating the Assess Liability activity to an automatic process.

Expanding a Sub-Process

An activity that calls a sub-process looks like this:

To expand the sub-process associated with this activity, either click the ⊞ symbol, or do the following:

1. In the Process Editor, select the activity that calls the sub-process.

2. In the Properties view, select the **General** tab.

3. Click **Open Sub-Process**:

> Invocation of Sub-Process: (<u>Open Sub-Process</u>)
> Sub-Process location: MyProcessPackage1.xpdl
> Sub-Process name: My Process...

4. The sub-process opens in the Process Editor.

Configuring a Sub-Process

Use the Lifecycle option, on the **General** tab in the **Properties** view, to configure whether the sub-process should execute immediately or whether its start request should be queued.

> ☐ Is A Transaction
> Invocation of Sub-Process: (<u>Open Sub-Process</u>)
> Sub-Process location: - the same package -   ...
> Sub-Process name: subproc-Process (subprocProcess)   ...
> Runtime Identifier Field: ⓘ - undefined -   ...
> Lifecycle: ○ Start Immediately
>   ◉ Schedule Start Request
>   Priority: Inherit From Parent process ▼
>   ☑ Suspend/Resume Sub-Process With Parent Process

If you select **Schedule Start Request**, then you set the initial priority for the sub-process start and the tasks within that using the options in the **Priority** drop-down.

If you select **Start Immediately** then you can still set the priority of the task within the process in the process **Resource** tab. See Prioritizing a Scheduled Reuseable Sub-Process on page 183.
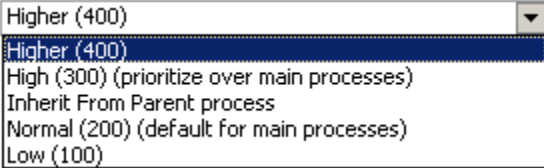
You can specify whether sub-process instances should suspend and resume when the parent process is suspended or resumed by selecting or deselecting the **Suspend/Resume With Parent Process** tickbox.

Prioritizing a Scheduled Reuseable Sub-Process

Reusable sub-processes configured to **Schedule Start Request** are started with the default priority at which a main process is started. This means they may be queued behind a large number of main processes already waiting to be executed.

In this case you may want to prioritize reuseable sub-processes in a process. To do this use the drop-down from the Priority field from the **Resource** tab for the re-useable sub-process. This contains the following priorities:

Priority:

Higher (400)
Higher (400)
High (300) (prioritize over main processes)
Inherit From Parent process
Normal (200) (default for main processes)
Low (100)

Embedded Sub-Processes

See "Embedded Sub-Processes" in *TIBCO Business Studio Concepts*.

To create an embedded sub-process, refactor one or more objects in your process as described in Creating a New Embedded Sub-Process on page 186.

If you want to use the chained execution resource pattern, you can do so by selecting the **Chained Execution** check box in the Properties view for the embedded sub-process. For more information, see Chained Execution- Multiple Parallel Paths in a Chaining Group on page 115.

Adding Local Data Fields

You can add data fields that are local to a sub-process (they are not used in the process that contains the embedded sub-process). By default, activities in the embedded sub-process have access to all local data and process data. However, using the **Interface** tab, a subset of data can be selected.
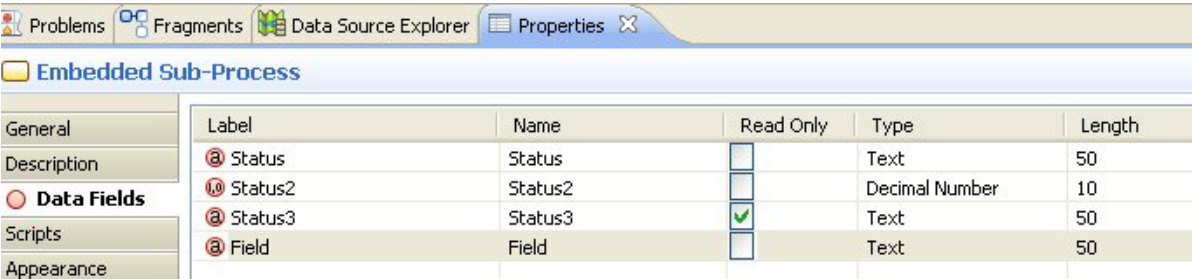
To add local data fields to an embedded sub-process:

1. Click the **Data Fields** tab in the Properties view for the embedded sub-process.

2. At the right of the **Data Fields** tab, click ![add icon] to add local data fields. The properties of the data fields that you create are the same as for process data (see Adding Data Fields or Parameters to a Package or Process on page 152).

Local data fields are not displayed in the Project Explorer.

For example:

	Label	Name	Read Only	Type	Length
General					
Description	Status	Status	☐	Text	50
Data Fields	Status2	Status2	☐	Decimal Number	10
Scripts	Status3	Status3	☑	Text	50
Appearance	Field	Field	☐	Text	50

In this example, the data fields **Status**, **Status2**, **Status3**, and **Field** are local to the embedded sub-process. On the **Interface** tab for activities within the embedded sub-process, you can access the local data as well as the process data:
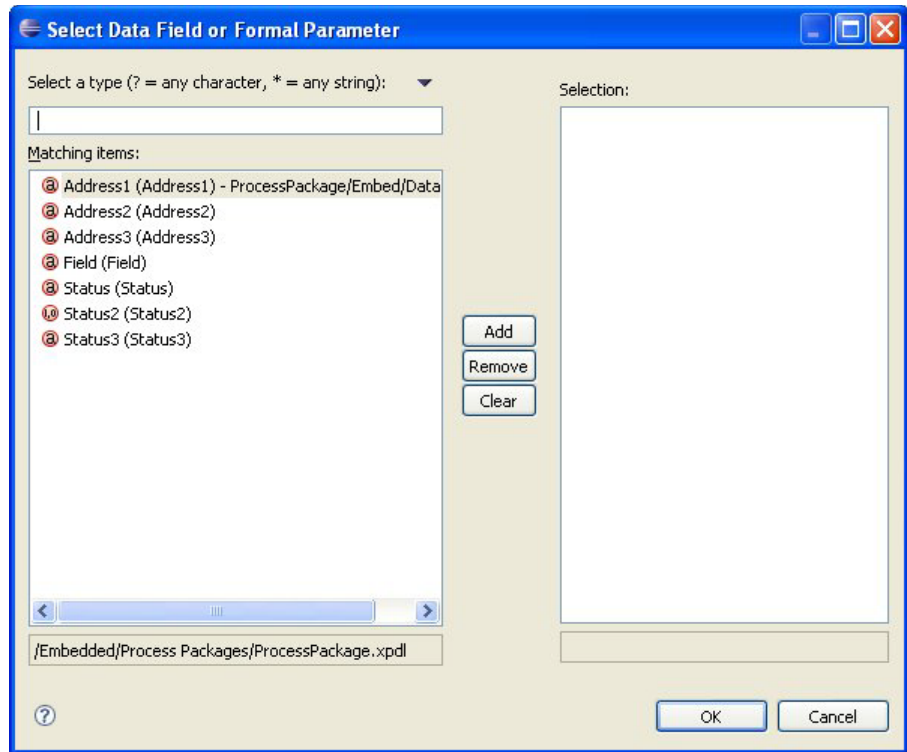
In this case the address data fields (process data) and the local data defined on the **Data Fields** tab are both available.

> You can quickly create an embedded sub-process that has local data by using the fragment **BPMN Process Fragments** > **Basic Fragments** > **Embedded Sub-Process with Data Fields**. For more information about fragments, see Process Fragments on page 59.

Using Local Data Fields in Loops

When using local data fields in loops, the value taken by the local data field during each iteration depends on the type of loop.

Multi-instance loop

Each instance of a multi-instance loop has a separate instance of the local data field, allowing parallel loops to execute without interfering with each other. However, the local data fields cannot be used in the loop expression.

Standard loop   The local data field is shared between all instances of a standard loop. It can be used to
                     pass data between instances, and can be used in the loop conditional script.

> You cannot initialize a local data field prior to the first "Before" condition
> test.

> For both multi-instance and standard loops, the task initiate script runs just before
> executing the task for each iteration of the loop.

Creating a New Embedded Sub-Process

1. Select the objects that you want to put in the embedded sub-process. For example:
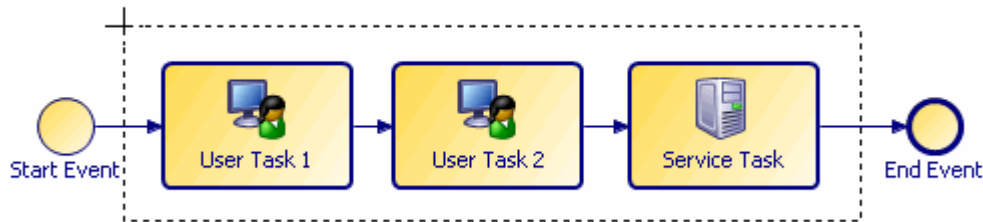
2. Right-click and select **Refactor** > **Move into New Embedded Sub-Process**.

3. The following dialog is displayed:
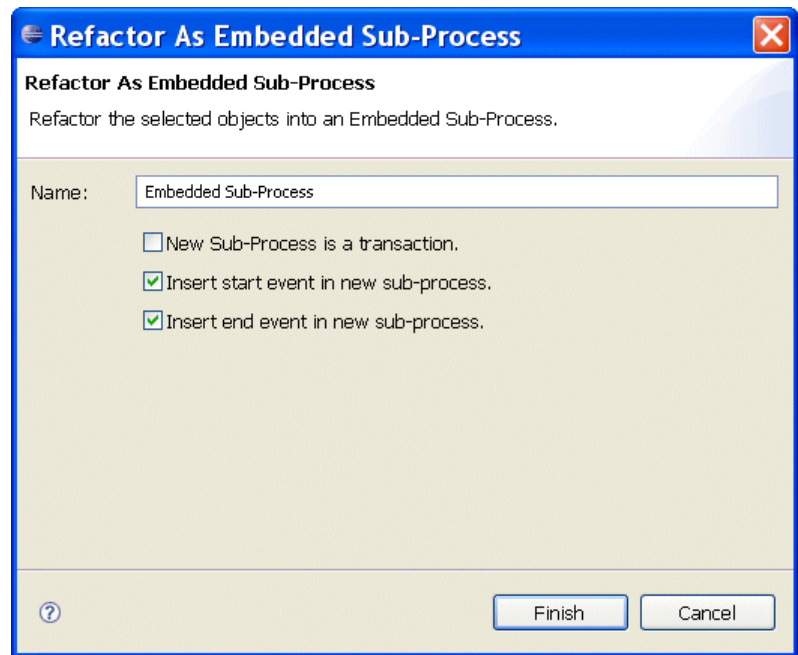
Complete the dialog as follows:

a. Enter a name for the embedded sub-process that you want to create.

b. Select the **New Sub-Process is a transaction** checkbox if you want the new sub-process to become a transaction and therefore be under transaction control (see User Tasks and Pageflow Processes on page 105).

c. Select the **Insert start event in new sub-process** and **Insert end event in new sub-process** checkboxes to control whether start and end events are added to the refactored sub-process.

4. Click **Finish**. The objects that you selected are placed within a new embedded sub-process (with start and end events if those options were selected):

Creating a New Reusable Sub-Process

1. Select the objects that you want to put in the reusable sub-process. For example:
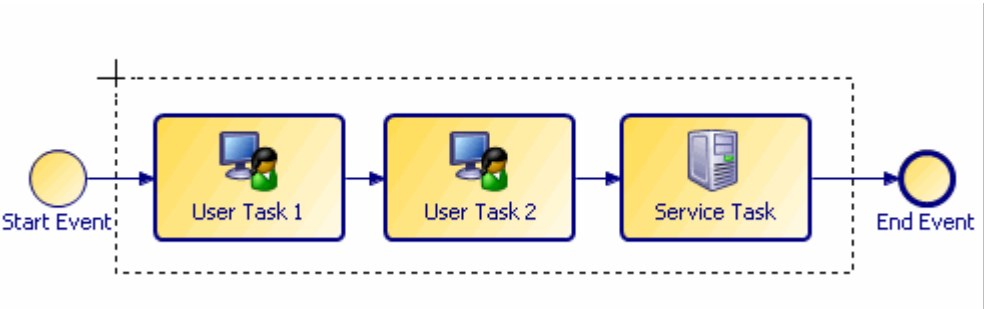
In this example, the two user tasks have the following parameters (two data fields and one formal parameter):

The user tasks also have a participant associated with them.

Select all three tasks.

2. Right-click and select **Refactor** > **Extract into New Reusable Sub-Process**.

3. Because the data fields and participants are only referenced in this activity (and not used by any other activities), the following message is displayed:
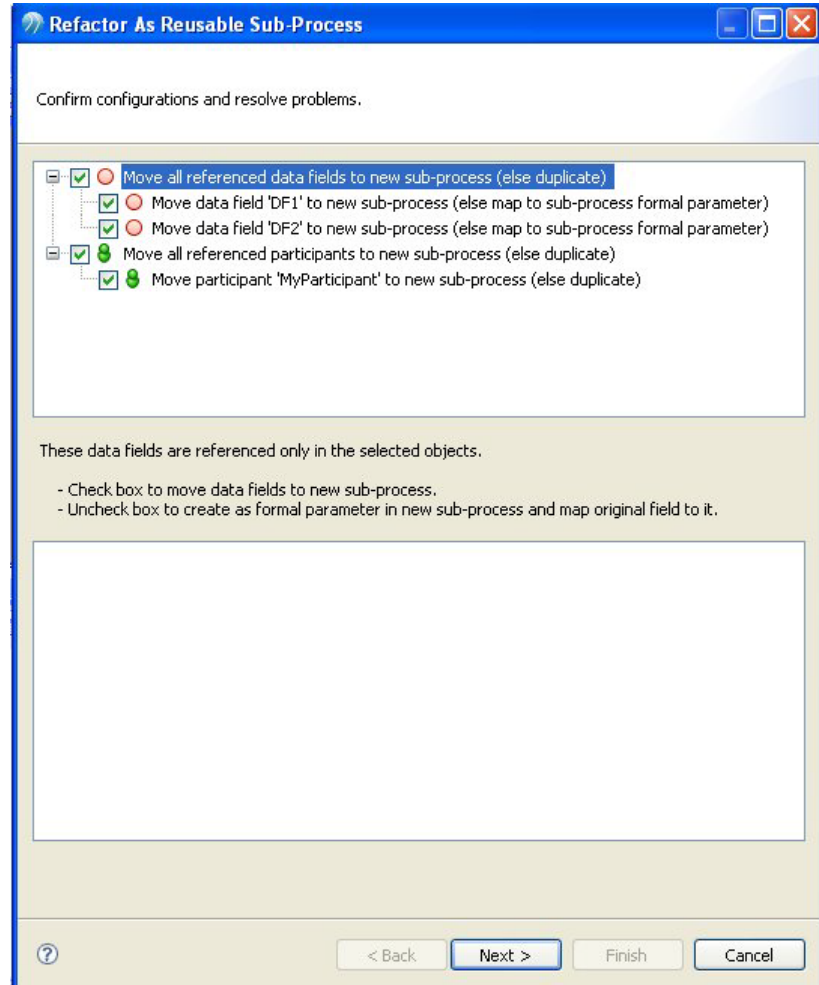
— For the participant, TIBCO Business Studio gives you the option of either moving this participant into the reusable sub-process, or duplicating the participant in both the parent process and the sub-process.

— If you select the data fields, they are moved into the Sub-Process.

— If you do not select the data fields, they are created as formal parameters in the sub-process (and mapped to those formal parameters).

4. The following dialog is displayed:
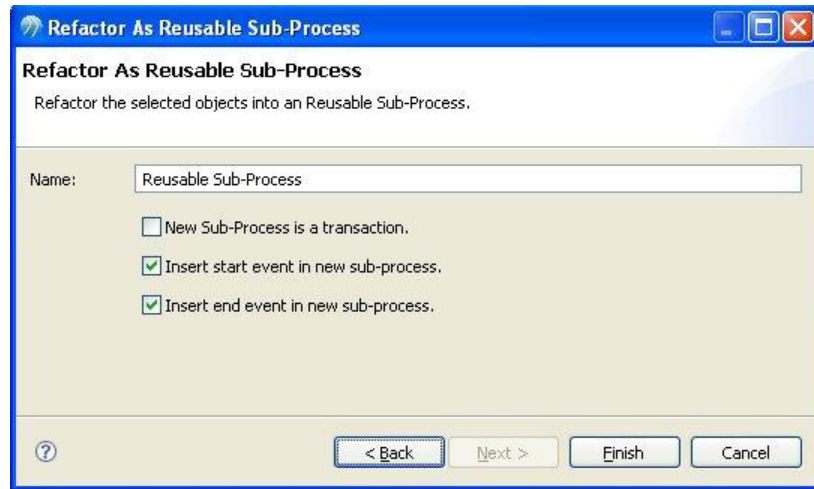
Complete the dialog as follows:

— Enter a name for the reusable sub-process that you want to create.

— Select the **New Sub-Process is a transaction** checkbox if you want the new sub-process to become a transaction and therefore be under transaction control (see User Tasks and Pageflow Processes on page 105).

— Select the **Insert start event in new sub-process** and **Insert end event in new sub-process** checkboxes to control whether start and end events are added to the refactored sub-process.

5. Click **Finish**. The objects that you selected are copied to the new sub-process and the selected objects are replaced with a task that calls the reusable sub-process.

If you chose to create formal parameters for the data fields, you can see them in the Project Explorer, under the sub-process:
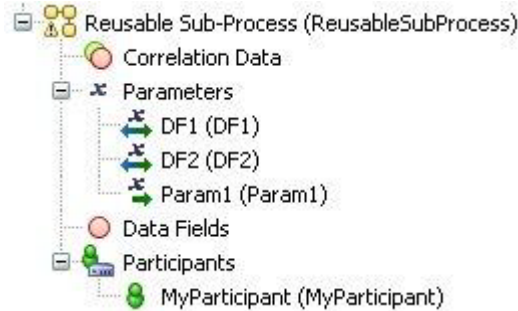
In addition, if you click the task in the parent process that calls the sub-process and go to the Properties view, you can see the mappings that have been created between data fields and formal parameters of the parent process and the formal parameters created in the sub-process. For example:
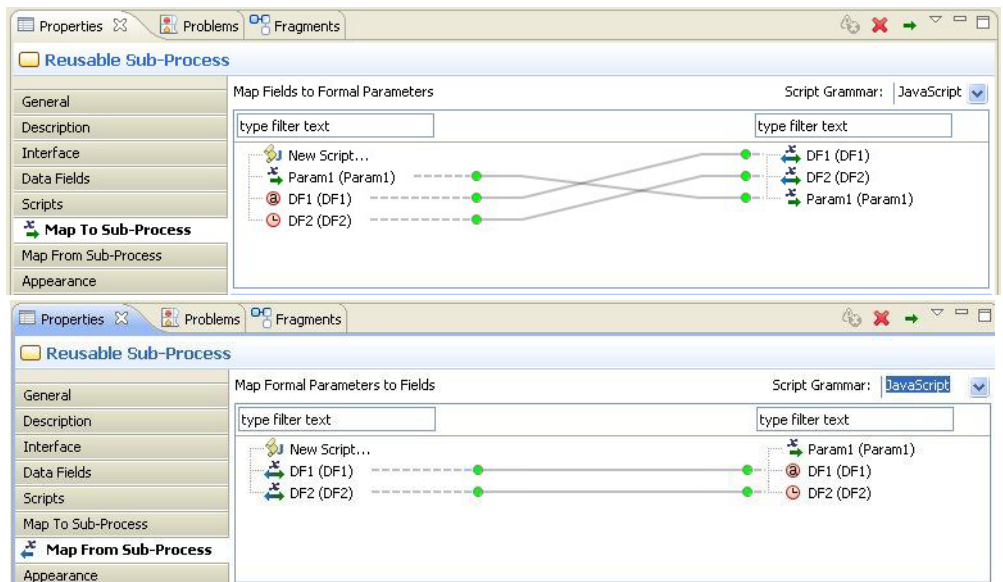
Notes on Refactoring Objects into Reusable Sub-Processes

Note the following when refactoring objects into reusable sub-processes:

• Formal parameters in the parent process are created as formal parameters in the sub-process. They are mapped according to their mode as defined in the process API.

• If a data field is referenced only in the selection that you are refactoring, you have the option of moving or copying it. Data fields that are *copied* into the sub-process are

created as formal parameters and mapped. Data fields that are *moved* into the sub-process are created as data fields. By default, data fields are *moved*. In order to *copy* them as formal parameters, you must uncheck the selection boxes on the dialog.

• If a data field is referenced in one or more of the tasks you select for refactoring but is also referenced elsewhere, it is *automatically copied* into the sub-process as a formal parameter.

• A mapping is created between data fields and formal parameters of the sub-process and any corresponding formal parameters that are created in the sub-process. You can view this mapping by selecting the task that calls the sub-process and clicking the **Map To Sub-Process** and **Map From Sub-Process** tabs in the Properties view.

Changes in Process Logic

When refactoring objects into a reusable sub-process, you can potentially change the logic of the process flow. Consider the following process:
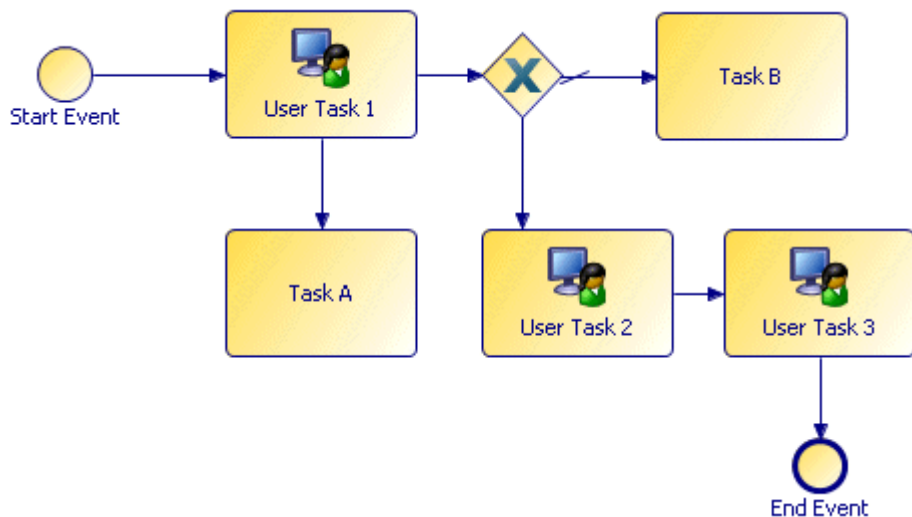
In this process, flow proceeds from **User Task 1** to the gateway without necessarily waiting for **Task A** to finish. If **User Task 1** and **Task A** are refactored into a reusable sub-process, an end event is inserted into the sub-process, effectively synchronizing the flow. TIBCO Business Studio prompts you to confirm this change to the process:
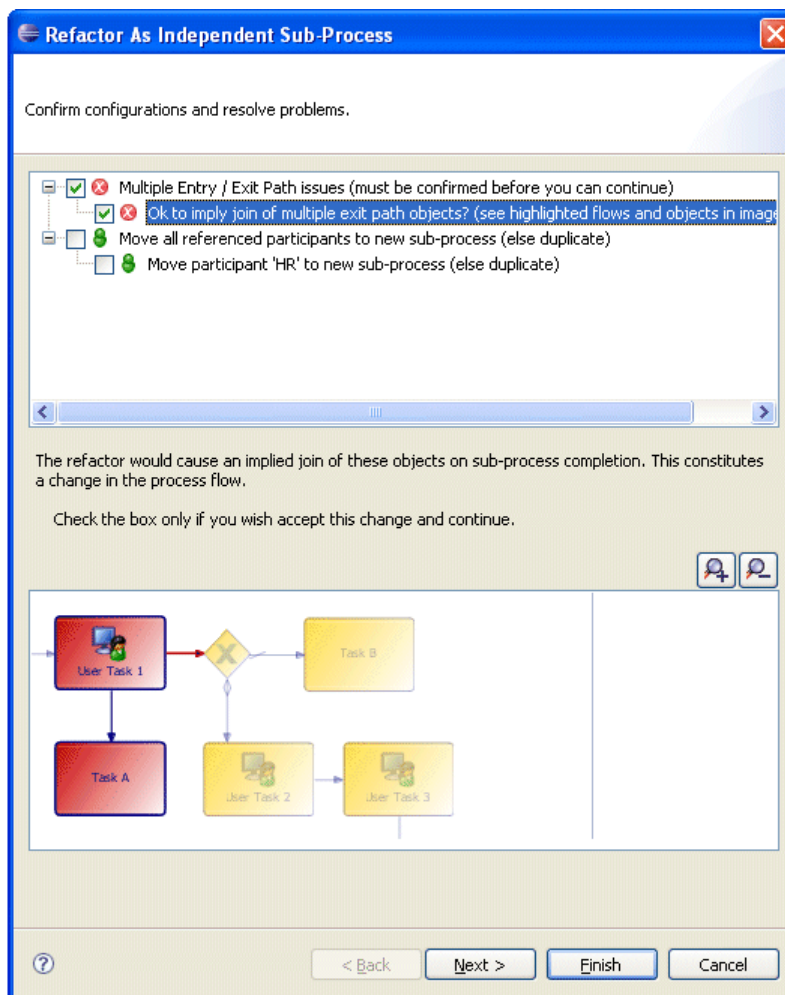
Inline Sub-Process Content

This option creates an embedded sub-process from a reusable sub-process. The reason for making a reusable sub-process inline is that in some cases the tasks in the sub-process execute relatively quickly and the overhead of invoking a sub-process can be comparatively high.

To refactor a reusable sub-process into an embedded sub-process, do the following:

1. Right-click the reusable sub-process task, and select **Refactor** > **Inline Sub-Process Content**.

Only a single level of a process hierarchy can be made inline at a time. If the sub-process you want to make inline contains a sub-process task, after refactoring, it will be brought into the embedded sub-process as a sub-process task. (the refactor does not extend into additional levels of the process hierarchy).

2. The reusable sub-process called by the selected task is analyzed, and a dialog is displayed with the results:

— If there are no problems with the refactoring operation, the following dialog is displayed:
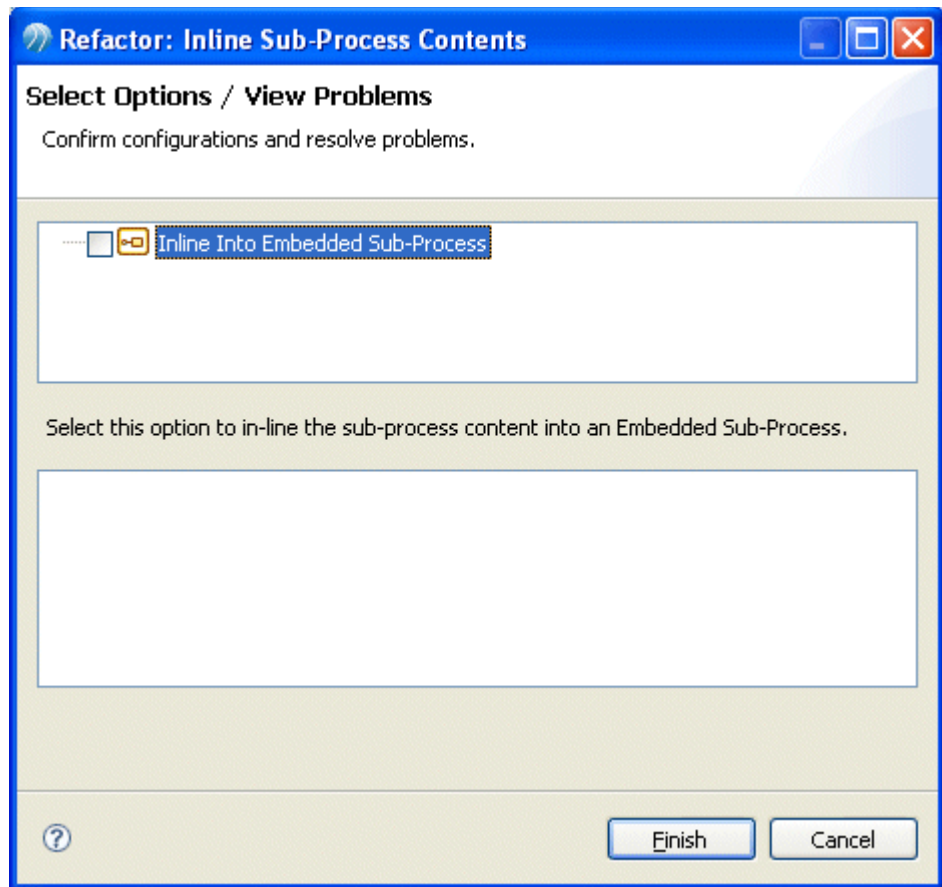
Select **Inline into Embedded Sub-Process** and click **Finish**.

— If there are problems with the refactoring, but the problems can be resolved by making the sub-process inline, a dialog is displayed showing the problems:
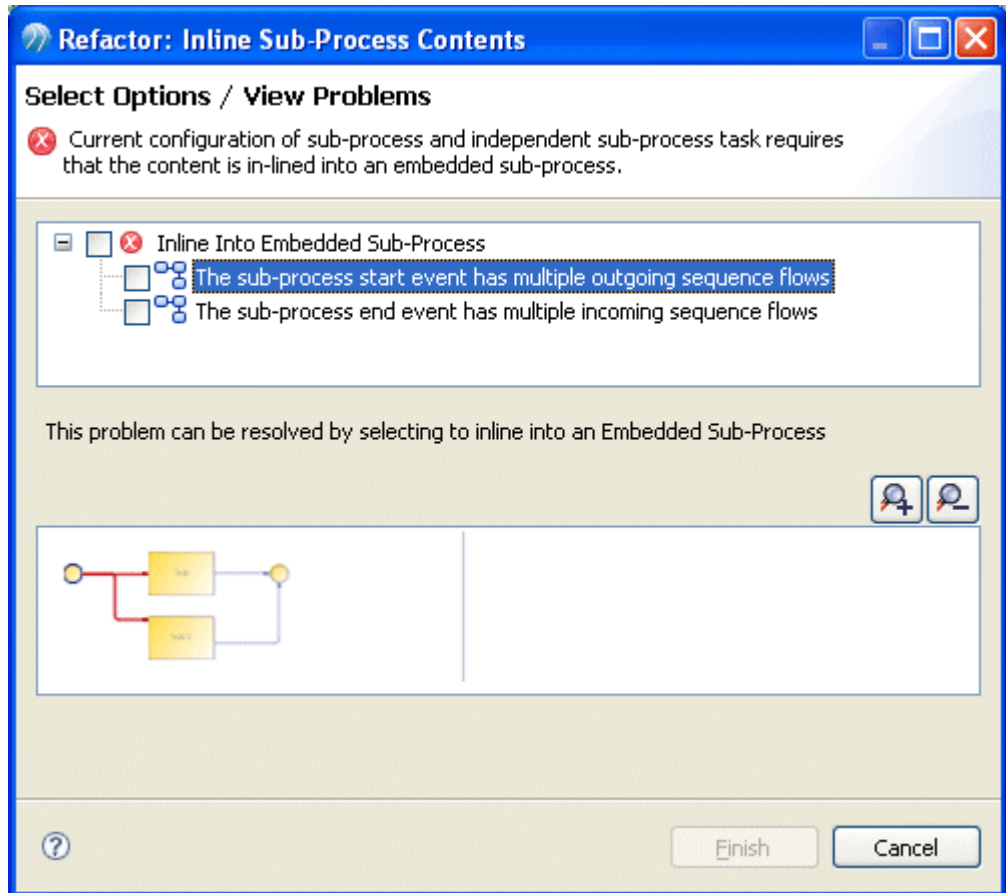
The possible problems displayed in this dialog are similar to those for process package optimization, except that some of these problems that are not resolvable for package optimization are resolvable by refactoring into an embedded sub-process (such as those reported in the previous dialog).

Also, problems dealing with nesting of sub-processes are not applicable because manual refactoring affects only a single level of sub-process hierarchy at a time.

You can see the location of each problem by highlighting it. If you select all of the problems in this dialog, the **Finish** button is enabled and you can refactor the sub-process.

— If there are problems that cannot be resolved by refactoring, a dialog similar to the following is displayed:
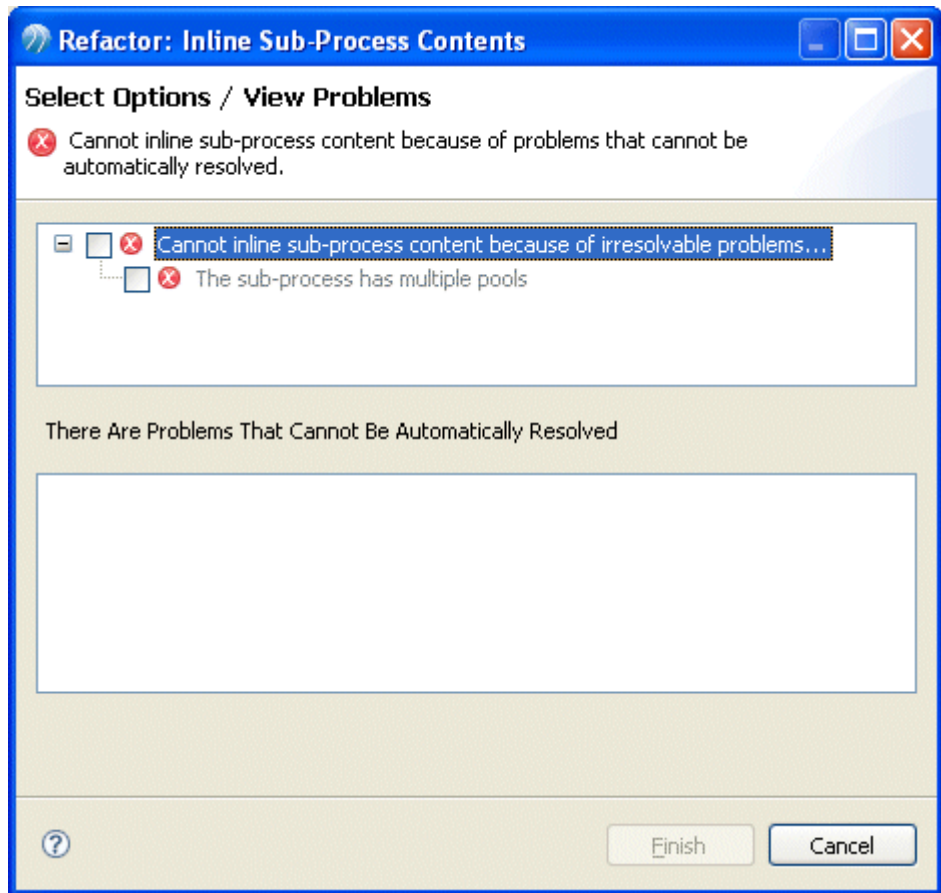
Because the errors cannot be resolved, click **Cancel**, resolve the problems manually, and retry the refactoring.

3. If the sub-process was able to be refactored, its contents are placed in an embedded sub-process, however the sub-process that was made inline is not removed.

The following are potential consequences of a refactoring. For more information, see Inline Sub-Process in Detail on page 198:

- References to sub-process parameters in the sub-process content are swapped for the calling process data fields that are mapped to them.

- Sub-process data fields and unmapped parameters are copied up to the calling process and renamed with a sequence number if the data field or parameter already exists in the calling process.

- Sub-process participants are copied to the calling process (if they do not already exist).

- Type declarations referenced by data copied up from the sub-process are copied to the package of the calling process *only* if the sub-process is in a different package.

- If the sub-process implements a process interface (see Process Interfaces on page 201), the start or intermediate events that implement interface-defined events are changed so that they are no longer flagged as such.

Inline Sub-Process in Detail

This section describes in detail what happens when you use an inline sub-process (including its parameters, participants, and so on).

Data Fields and Mapped Parameters

References to parameters in sub-processes are replaced according to the parameter mapping. For example, consider the parameter mapping to the following sub-process:
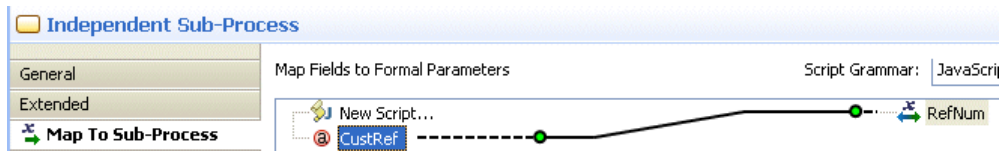
The data field **CustRef** in the parent process is mapped to **RefNum** in the sub-process. In the sub-process, the parameter **RefNum** is used by the single user task:
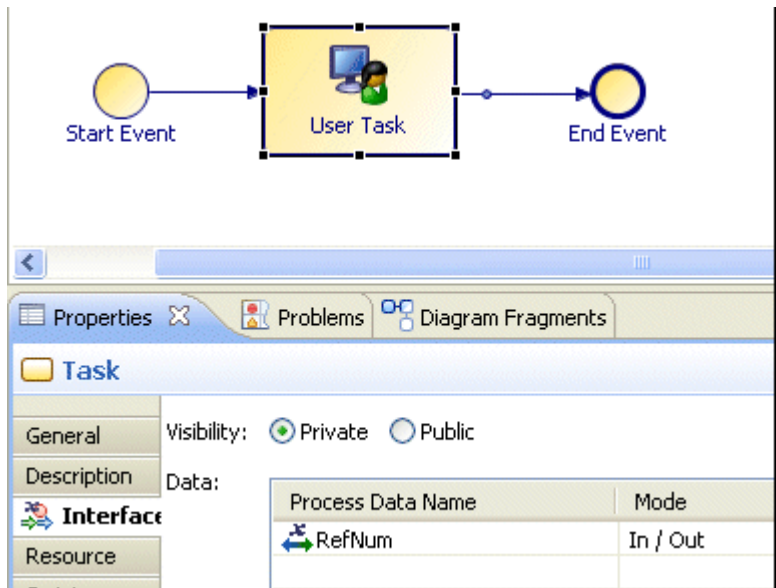
After refactoring as an inline sub-process, the user task is brought into the main process with **RefNum** as its parameter.

Every effort is made to ensure that when a sub-process is inlined, it is semantically the same as if it were not in-lined. However, not every potential scenario can be catered for.

For example, if the same calling-process field is used in the parameter mappings for two parallel reusable sub-process tasks, the calling-process field will now be used in-parallel in the two sets of sub-process contents that were moved up into the calling-process. This may have undesired effects.

Sub-Process Data Fields and Unmapped Formal Parameters

Sub-process data fields and unmapped formal parameters are moved up to the calling process after refactoring. In order to preserve the original semantics of the sub-process, any data fields or unmapped formal parameters in the sub-process that also exist in the calling-process are renamed (each new instance of the same named data is suffixed with a sequence number). Any references to the renamed sub-process data are updated when the sub-process activities and flows are moved up to the calling process.

Package-level data fields are not included in this behavior unless the sub-process is in a different package to the calling process.

Example

A sub-process has a data field called CustomerField which its activities use internally. The calling process also has a field called CustomerField which it uses internally.

When the sub-process is in-lined, the sub-process CustomerField is copied into the calling-process as CustomerField2. All references to CustomerField in sub-process activities and flows are replaced with references to CustomerField2.

Multiple Calls to a Sub-Process

This rule also applies when several sub-processes are called from a single process. If the sub-processes have the same data fields names, then each invocation will cause separate, sequence-numbered instances of data fields in the calling process when they are made inline.

Example

There are two calls to the same inline sub-process from a single calling process. The sub-process has a field called CustomerField.

The copy of sub-process activities and flows 'moved up' in place of one reusable sub-process task will operate on CustomerField and the other will operate on CustomerField2.

Field Name
Conflicts

This rule also applies when inline sub-processes are nested, and have conflicting field names.

Example

The calling-process (MainProcess) calls an inline sub-process (SubProcess) which in turn calls a nested inline sub-process (SubSubProcess).

Each process has a field called CustomerField.

1. SubSubProcess is in-lined into SubProcess so that its instance of CustomerField becomes CustomerField2 in SubProcess.

2. SubProcess now has 2 fields, CustomerField and CustomerField2. When this is in-lined into MainProcess CustomerField in SubProcess is dealt with first (alphabetically) and is therefore renamed as CustomerField2 in MainProcess.

3. Now when the SubProcess field CustomerField2 is subsequently copied into MainProcess, a CustomerField2 already exists so it is renamed as CustomerField3.

Sub-Process Participants And Type Declarations

Participants are moved up to the calling process if the calling process does not already have a participant with the same name. If the Participant already exists in the calling process, references to the sub-process participant are exchanged for references to the calling process participant in the sub-process content that is moved up.

Similarly, type declarations (that are referenced by sub-process data fields and unmapped formal parameters) are moved up to the calling process if the calling process does not already have a type declaration with the same name. Otherwise, the calling-process type declaration is used.

Process Interfaces

See "Process Interfaces" in *TIBCO Business Studio Concepts*.

Optionally, you can create a process interface with one or more message events This creates an abstract WSDL file that is stored in a folder named Generated Services:
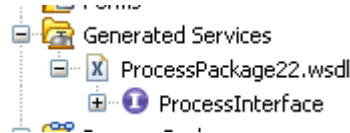
You can then call this abstract WSDL file in a service task, or optionally add the concrete implementation details to the WSDL file.

Using the Process Interface Editor, you can modify the interface to add events or parameters:
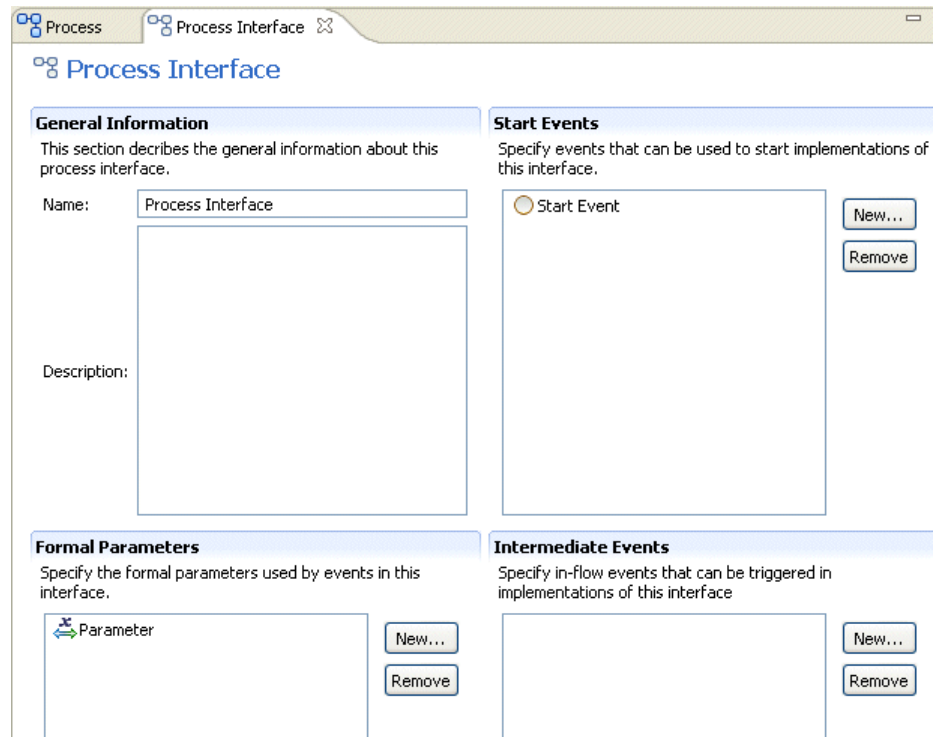
Once created, a process interface can be used by several different processes. If a process is created using a process interface, all the events and parameters specified in the interface must be present in a process that implements that interface. You can add additional events or parameters, but removing any of those required by the process interface will invalidate the process.

If you have additional parameters that are local to a process that implements a process interface, you can move the parameters into the process interface by right-clicking the parameter and selecting **Move Parameter to Interface**:
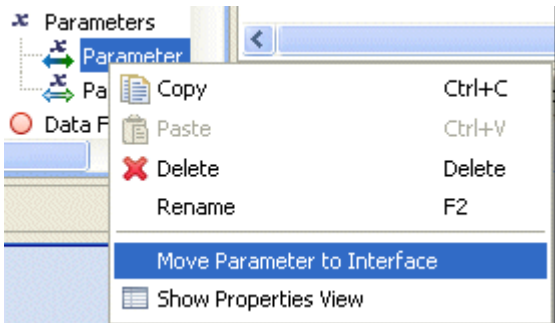
This option is only available for processes that implement a process interface in the same package, and only for parameters that do not have problems in the Problems view.

If you create a process using a process interface, the process that you create inherits the events and parameters created in the interface. For example, a message event in a process created using a process interface displays the following properties:

If you cannot see the right-hand side of the following dialog, switch to the Solution Design capability using the following menu or click **Provide Implementation Details**.

Creating a Process Interface

1. Select **File** > **New** > **Other**.

2. Expand **Business Modeling** > **Business Process Modeling**, select **Process Interface**, and click **Next**.

3. Enter a name for the process interface you are creating and click **Next**.

4. Enter a description for the process interface you are creating and click **Next**.

5. Select the intended destination environments for the process interface and click **Finish**. The Process Interface editor is displayed. Use this to add or remove start events, intermediate events, and parameters.

6. Enter any extended attributes and click **Next**.

Creating Error Events

Error events are created in the Project Explorer as follows:

1. Create a process interface.

2. In the Project Explorer, under the process interface, expand an event. For example:
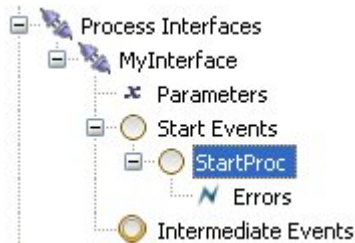
3. Right-click **Errors** and select **New** > **Error**. The following dialog is displayed:
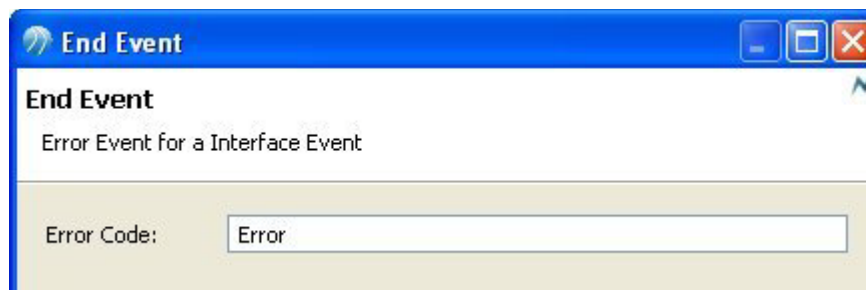
4. Enter a name for the error code and click **Finish**. The error code you created is displayed in the Project Explorer, and in the Process Interface Editor:

Continue with Error Codes and Process Interfaces on page 206 to see how these error codes are used in processes created from a process interface with error codes.

Error Codes and Process Interfaces

When a process implements a process interface that has error codes, the error codes can be used to throw either WSDL fault messages from a message-based process, or errors thrown by a sub-process.

For example, consider the following process interface:

This process interface has a start event, an error code (**WSDL error**), and two parameters, **Account** and **Balance**.

When you create a process from this interface, it creates the following:
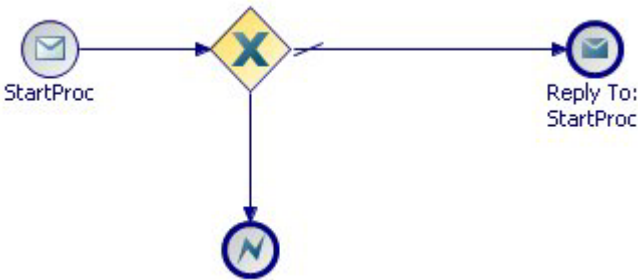
The default sequence flow from the gateway replies to the start event. The conditional sequence flow from the gateway throws an error with the code **WSDL error**.
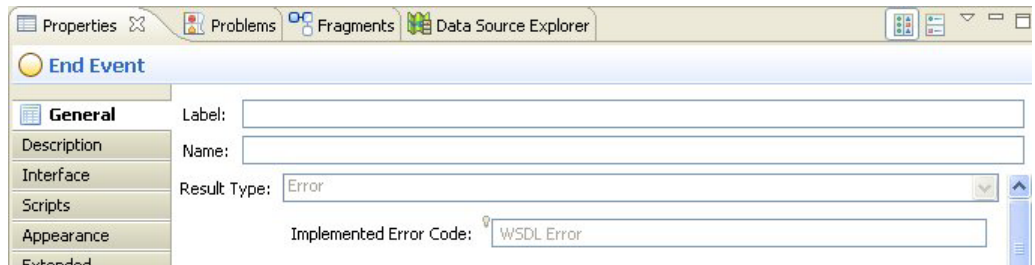
The process with more tasks looks like this:
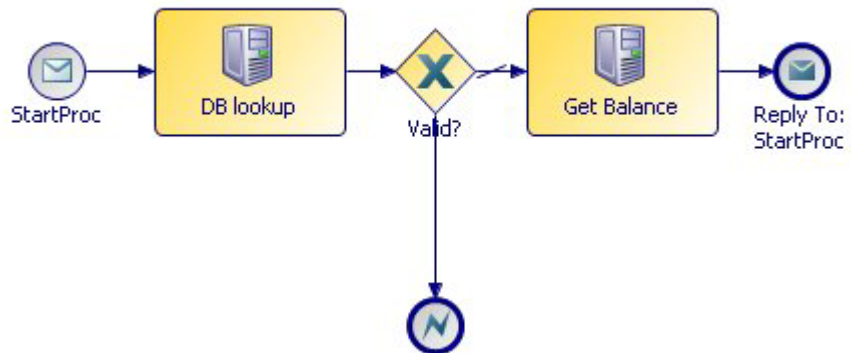
The process flow is as follows:

1. The process is started upon receipt of a message that contains an account.

2. The database task looks up the account in the database to verify if it is valid.

3. If the account is valid, another database task gets the balance, and the balance and account number are sent as output.

   If the account is not valid the error code is thrown.

The following example shows how the previous "get balance" example could be implemented as a sub-process (in this case, the process interface has normal start and end events rather than start message and end message events):
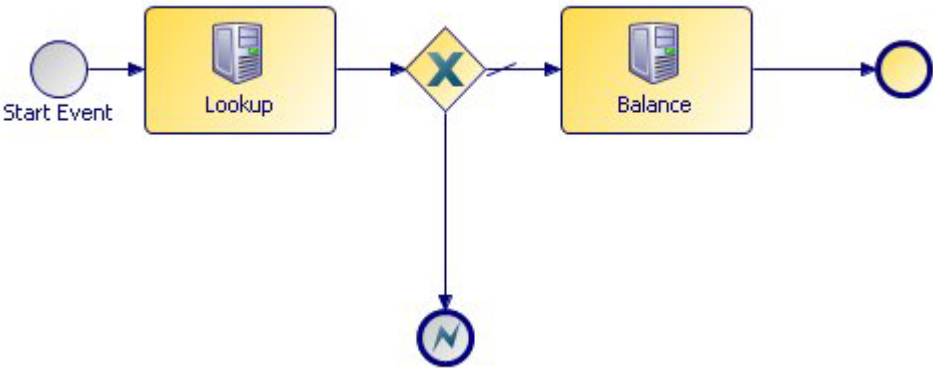
In this case, the sub-process throws an error, and in the calling process the error is dealt with:
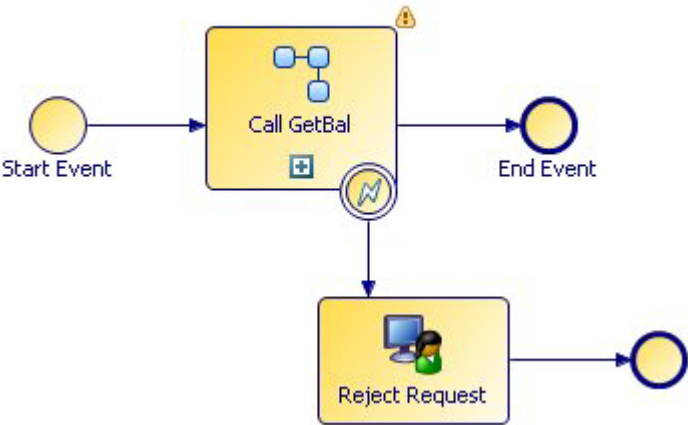
The catch error event is configured to catch the error thrown from the sub-process:

Making a Sub-Process Call to a Process Interface

There are two different ways of creating a call to a process interface:

- By dragging a process interface from the Project Explorer and dropping it onto your process.

- Using the reusable sub-process tool from the palette.

Drag and Drop   To create a reusable sub-process call using drag and drop, do the following:

1. Expand the Project Explorer to locate the process interface that you want to implement.

2. Click the process interface, holding down the mouse button, drag the pointer to the calling process (open in the Process Editor), and release the mouse button.

You can select multiple processes for drag and drop operations using the Ctrl key.

3. If you are dropping more than one process interface, a menu is displayed with two options:

— **Create Sub-Process Task Sequence** Selecting this option allows you to create sub-process tasks connected by sequence flow. The following dialog is displayed to allow you to control the order of the tasks:
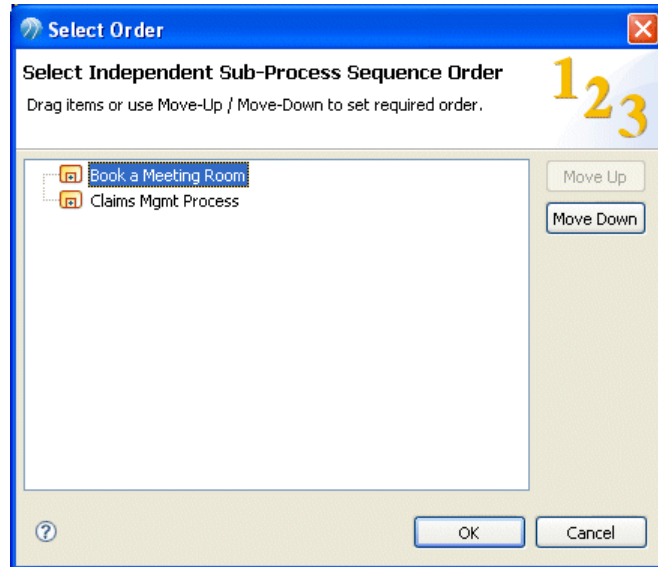
Use the **Move Up** and **Move Down** buttons to control the order of the tasks. When you are finished, click **OK** to place the tasks.

— **Create Unsequenced Sub-Process Tasks** Selecting this option places the tasks in the process without a connecting sequence flow.

Palette   To create a reusable sub-process call process interface using the palette, do the following:

1. In the Process Editor, select the **reusable sub-process** tool.

2. Click in the process where you want to place the activity that calls the sub-process.

3. On the Properties view for the activity, browse for the process interface you want to call as a sub-process.

If the process interface you select is not in the current project, you are prompted to create a project reference:

Project Reference

MailTask needs to be added as a reference project. Would you like to add this reference?

Yes   No
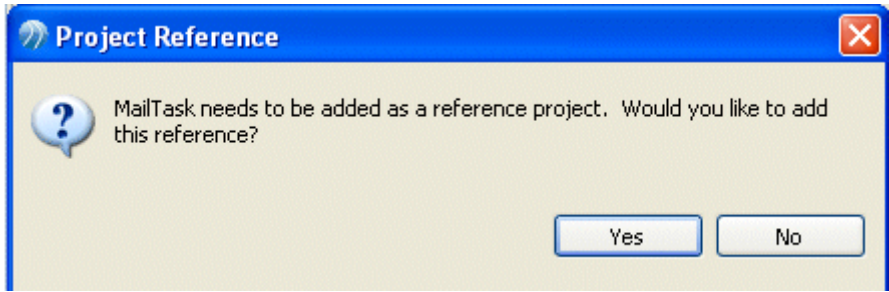
Modifying a Process Interface

You can modify a process interface using the Process Interface editor, however any changes made cause validation errors in processes that have already implemented the interface. For example:

To correct this problem, ensure that the changes made to the process interface are reflected in any processes that have already implemented the interface.

Dynamic Sub-Processes

See "Dynamic Sub-Processes" in *TIBCO Business Studio Concepts*

Creating Dynamic Sub-Processes

1. Create a process interface that specifies the start event and its input/output parameters. Each process that is to be invoked from the dynamic sub-process task **must** implement the same process interface. See Creating a Process Interface on page 204.

2. Create one or more Reusable Sub-Process tasks in your process.

3. From the General tab for each Reusable Sub-Process task:

    a. Using the picker, (⋯) select the process interface created in step 1.

    b. In the Runtime Identifier Field select a formal parameter or data field using the picker (⋯). This must be a text field or an array. Arrays can be used for multi-instance sub-process tasks where potentially different sub-processes are required for each instance of the same task.

    ☐ Is A Transaction

    Invocation of Sub-Process: (Open Sub-Process)

Sub-Process location:	- the same package -
Sub-Process name:	BookAppointmentInterface (BookAppointmentInterface)
Runtime Identifier Field:	ProcessIdentifierAr

4. Initialize the Runtime Identifier Field. For example, for a multi-instance sub-process task you could create a Script task before it to populate the array data field with a sub-process name element for each task instance. For a single instance sub-process task simply set the runtime identifier field to the required sub-process name in a script prior to the task.

For a sub-process implementation which resides in an external sub-process library., you could use a script something like the script shown in the following illustration:

Script Defined As: JavaScript

Describe Task Script:

```
if (type.toString()== "One") {
        runtimeID = "/APPE/Process Packages/APPE.xpdl.APPEProcess" ;
} else if (type.toString()=="Two") {
        runtimeID = "/APPE/Process Packages/APPE.xpdl.APPEProcess2";
}
```
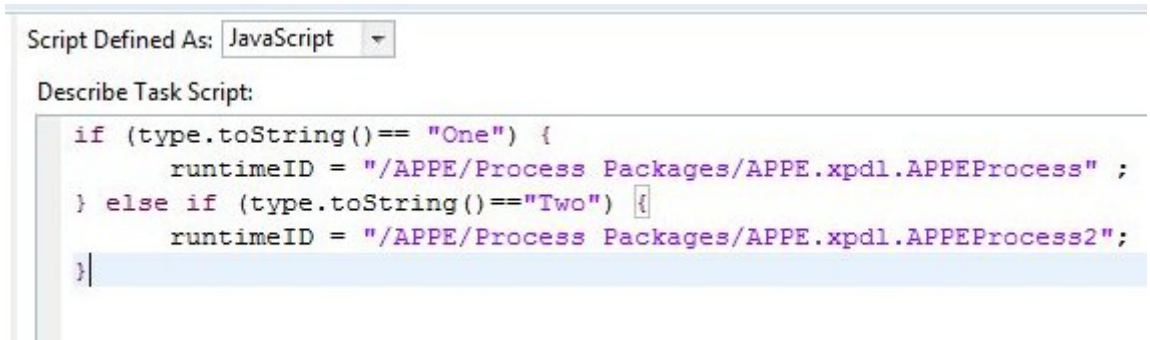
5. In the Reusable Sub-Process task, map data to and from the called process (to pass data between the process and sub-process):

   — Map the input to the interface in Map To Sub-Process.

   — Map the output from the interface in Map From Sub-Process.

   For example:
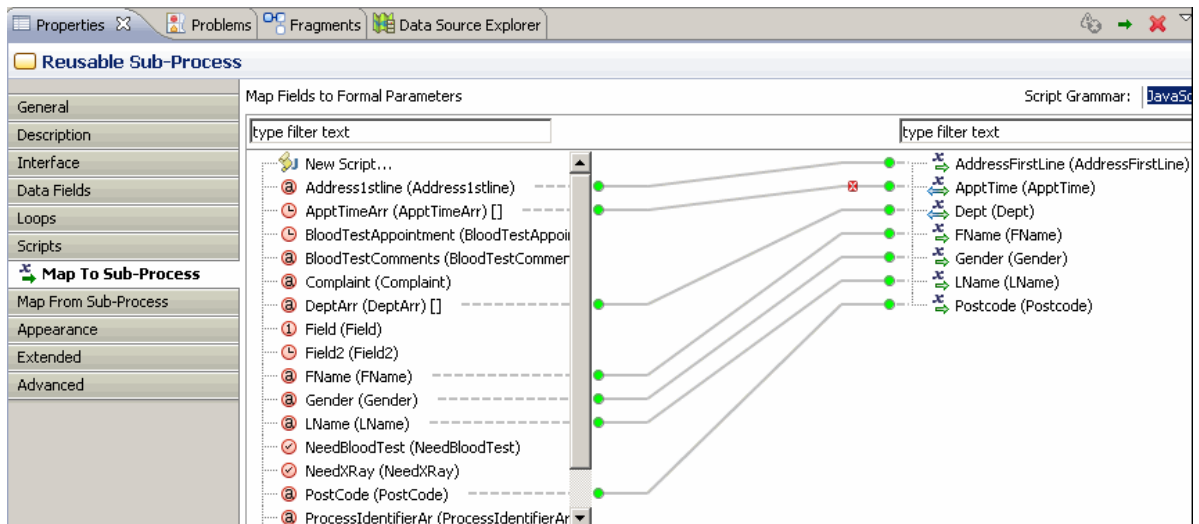
Automatically Passing Different Data To and From Sub-Process Instances

If the Reusable Sub-Process task is multi-instance (or loop) it is possible to automatically pass different data to and from each separate sub-process instance.

Inputting Different Data To Each Sub-Process Instance

1. Specify an array data field that matches the type of a non-array sub-process/interface input parameter.

2. In a script prior to the sub-process task, populate this array data field with different data for each sub-process instance. For example:

    — appointmentTypeArray.set(0, "X-Ray");

    — appointmentTypeArray.set(1, "PlasterDept");

    — appointmentTypeArray.set(2, "Physio");

3. In the "Map to Sub-Process" property tab, map the array data field to the non-array sub-process/interface parameter. The sub-process invoked from each instance of the task will receive the list element corresponding to the instance index of that task (see 'getActivityLoopIndex()' in the 'Process Scripting' appendix of the *TIBCO ActiveMatrix BPM Business Data Services* guide for more information). For example:

    — The first instance (activity loop index=0) will receive the data "X-Ray" into its "appointmentType" parameter.

    — The second instance (activity loop index=1) will receive the data "PlasterDept" into its "appointmentType" parameter.

    — The third instance (activity loop index=2) will receive the data "Physio" into its "appointmentType" parameter.

Returning Different Data From Each Sub-Process Instance

1. Specify an array data field that matches the type of a non-array sub-process/interface output parameter.

2. In the "Map From Sub-Process" property tab, map the output parameter to that array field.

    At runtime the array field will be populated with the return data from each sub-process instance. The list element index will correspond to the activity loop index from which the sub-process instance was invoked.

    For example, if the sub-process returned an integer parameter "ReturnParam" with value "X-OK" when passed "X-Ray", "PL-OK" when passed "PlasterDept" and "PH-OK" when passed "Physio", and you mapped this to an array data field "ReturnArrayField", then:

    — ReturnArrayField.get(0) will be "X-OK"

    — ReturnArrayField.get(1) will be "PL-OK"

    — ReturnArrayField.get(2) will be "PH-OK"

The way that this data is passed behaves in the same way for multi-instance statically defined sub-process tasks (tasks that reference an actual sub-process at design time).

Controlling the Flow in Dynamic Sub-Processes

The flow of processing within dynamic sub-processes can be controlled using the facilities described in Chapter 5, Controlling Flow in a Process. In particular you can specify whether mutiple instances of the sub-processes should be performed sequentially or in parallel by using the **Ordering** and **Flow Condition** fields of the **Reusable Sub-Process** task. See Creating a Standard Loop on page 118 for more details.

You can also add additional instances to the loop while the sub-process is running, using a script on a parallel procesing path. For details, see Adding Additional Instances to a Multi-Instance Loop Task Whilst the Task is in Progress.

Chapter 9   **Integrating with Other Applications**

This section describes use TIBCO Business Studio to integrate with other applications.

Topics
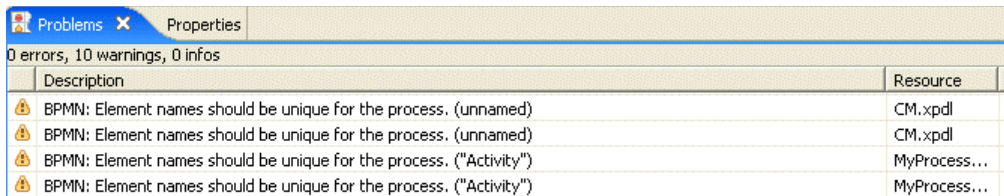
Destinations and Validation

Correcting Validation Errors

Any problems that result from validation are shown in the Problems view.

To correct the problem do one of the following:

* Right-click the problem and select **Quick Fix** (if enabled for the current problem). The gives you the option of having TIBCO Business Studio correct the problem for you.

* Double-click the problem or right-click the problem and select **Go To**. This displays the Process in the Process Editor, highlighting the offending object and allowing you to manually correct the problem.

Setting the Validation Preferences

You can customize the validation that is performed in the Process Editor. Specifically, for each validation error you can specify its severity level as **Error**, **Warning**, **Info**, or **Ignore**.

To customize the Process Editor validation, do the following:

1. Select **Window** > **Preferences**.

2. Expand **Process Editor** and select **Errors/Warnings**. The following dialog is displayed:
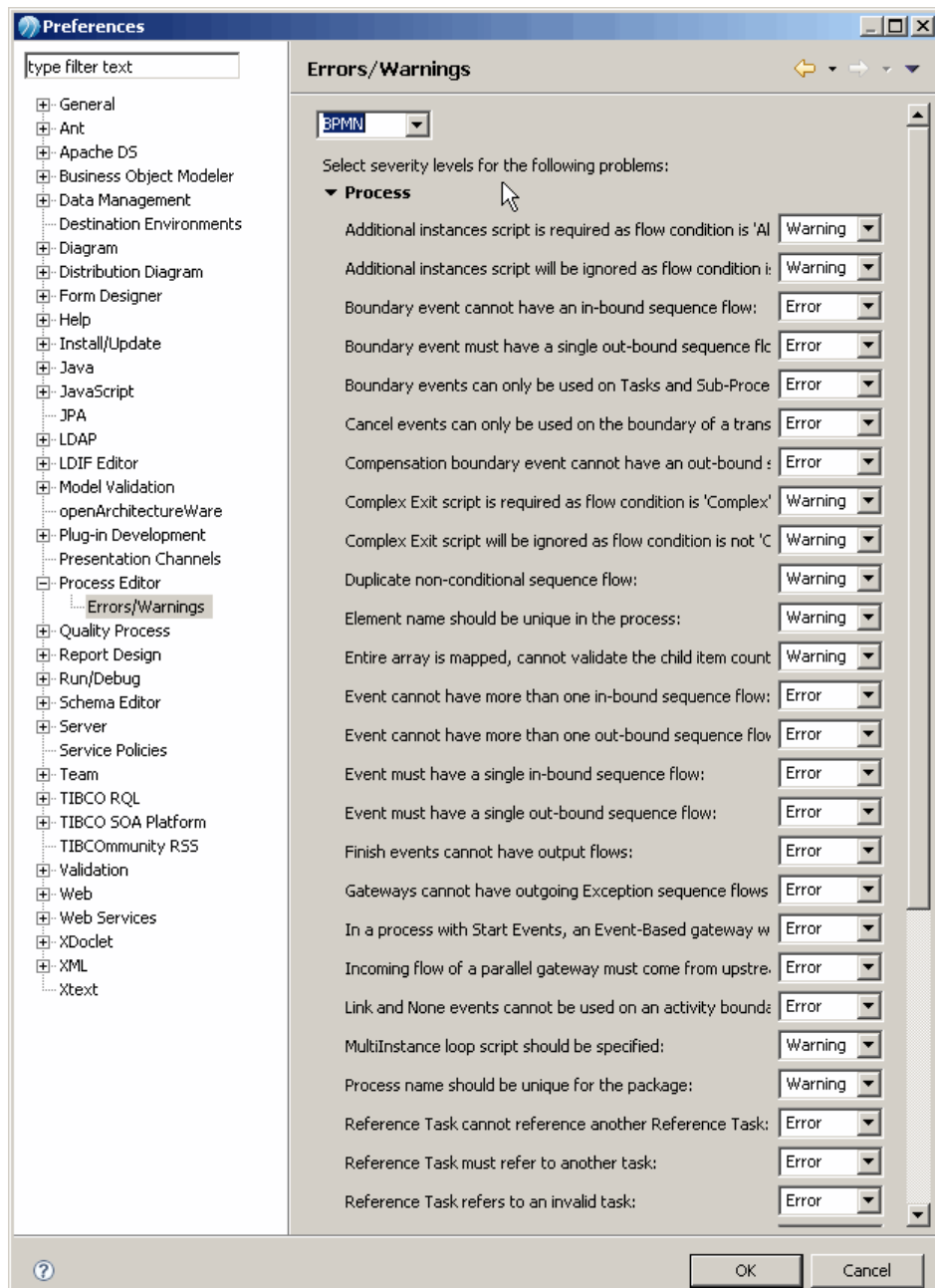
3. If you want to change the severity level for a Process Editor problem, select from the drop-down list. When you have finished, click **Apply** to effect any changes you have made.

You can downgrade the severity of BPMN errors, however some TIBCO Business Studio errors are not displayed because downgrading them would allow processes to be deployed that would be invalid in the runtime environment.

4. The following dialog is displayed:
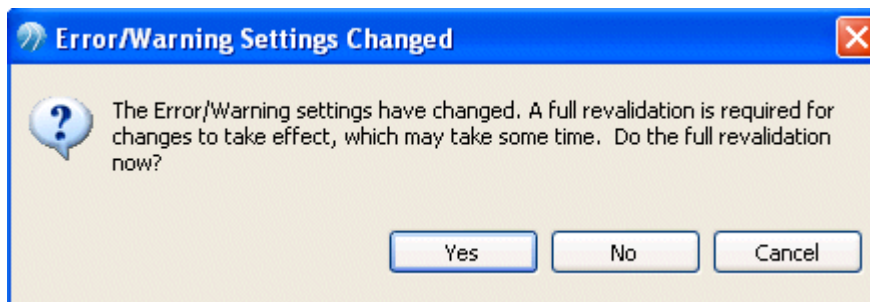
— Click **Yes** to revalidate your workspace. Depending on the size of the workspace and the number of errors, there is a delay while the revalidation occurs.

— Click **No** to revalidate your workspace later. The revalidation will take place when the concept file next changes or is saved, or when you explicitly request a rebuild of the project or workspace.

— Click **Cancel** if you do not wish to apply your changes.

At the top of the dialog there is a drop-down list that allows you to select either **BPMN** or **Simulation**.

Configuring the Problems View

You can configure the appearance and display of the Problems view by selecting items from the menu in the upper right of the Problems view:
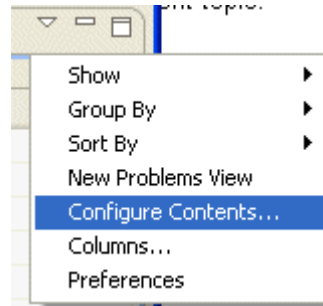
By selecting **Configure Contents**, you can filter the problems that are displayed:
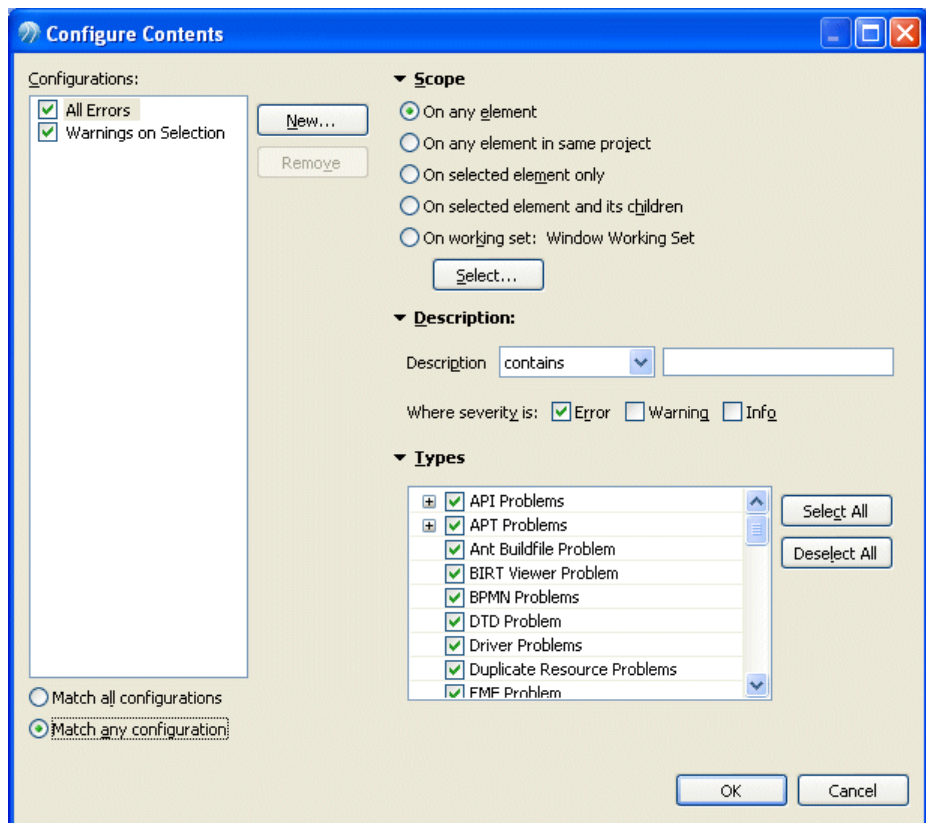
Two configurations are provided by default, **All Errors** and **Warnings on Selection**. You can create and save your own configurations. You also can reduce the number of errors displayed by selecting a different scope. For example, by choosing **Selected element only** as the scope in conjunction with the **All Errors** configuration, you will see all errors for the selected element only rather than for all elements in the workspace.

By default, problems in the Problems view are grouped by severity of the problems. However, you can change this using the Group By menu option. For example, to arrange the Problems by their type, select **Group By** > **Plug-in Problem Type**. You can also add or remove types in the previous **Configure Contents** dialog.

Integration with ARIS Software

ARIS software provides business diagramming and analysis capabilities. You can import processes created with ARIS Business Designer 7.2 software into TIBCO Business Studio.

First, use the XML Export Wizard in ARIS Business Designer to create an XML file. Then, use the Import Wizard in TIBCO Business Studio to import the XML into TIBCO Business Studio.

- Only eEPC (Extended event-driven process chain) type processes and associated FADs (Function Allocation Diagrams) created using the ARIS Business Designer can be imported.

- If you have selected processes from several different groups in ARIS Business Designer, they are imported under one Package in TIBCO Business Studio.

For more information, see Object Mappings — ARIS Software on page 229.

Creating Custom Symbols in ARIS Business Designer (Optional)

You can create custom symbols in ARIS processes that you want to export.

For example, you can specify that a certain type of ARIS object displays a graphic of your choice rather than the default graphic.

1. Log in to the ARIS database that contains the data you want to export.

2. Expand **Configuration** and click **Method**.

3. Click the **Symbols** tab.

4. Right-click the object for which you want to specify a different symbol and select **New** > **Symbol**.

5. Browse to select a graphic of the type AMF, WMF, or EMF.

6. Click **Next** and change the **Name** of the object if desired.

7. After you have created the object, log out of the database.

8. Choose **Configuration** > **Update Configuration**.

9. Log in to the ARIS database.

Using Custom Symbols in TIBCO Business Studio

If you have created custom symbols in ARIS, you must perform the configuration described in this section before you can use those symbols with ARIS processes that you import.

1. Navigate to the **\LocalServer\sysconfig** subdirectory of the ARIS installation directory.

2. Open the **methodextension.cpf** file. This file contains a universal ID (**Guid**) for each custom symbol that you have defined. For example:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<!-- Do not edit this file !!-->
<SCSMethodExtension version="1" >
 <UserDefName KindNum="1" ItemTypeNum="66218" LocaleId="1033"    Name="Actor (sample)"/>
 <MetaFile Guid="da459755-894d-4a86-86bb-66624fde7434"    NewSN="65549" RefSN="13" size="12036"
Amf="false"/>
 <MetaFile Guid="b783fa5d-a484-46f6-a357-b848ef6e328c"    NewSN="65569" RefSN="33" size="12036"
Amf="false"/>
 <MetaFile Guid="9616e674-0dcb-40ac-b370-e7bc28271949"    NewSN="66218" RefSN="682" size="12036"
Amf="false"/>
</SCSMethodExtension>
```

The **Guids** listed in the file correspond to graphics files located in the same directory.

3. Locate the graphics files listed in the **methodextension.cpf** file and copy them to a temporary directory.

4. Rename the graphics files to **.emf** or **.wmf** file extensions.

5. Open each image and save it to Portable Network Graphics (PNG) format.

6. In TIBCO Business Studio, create a folder called **images** in the Project into which you will import the ARIS Process.

7. Copy the PNG versions of the graphics into the **images** folder.

8. Export the ARIS process and then import it into TIBCO Business Studio as described in this chapter. The custom symbols you created in ARIS should be displayed in TIBCO Business Studio.

If the symbol does not display correctly, click the Data Object and check that the file specified for **External References** is correct.

Preparing to Export from ARIS to XML

If any of the Processes or groups of Processes that you want to export contain FADs, do the following before exporting from ARIS Business Designer:

1. Log in to the ARIS database that contains the data you want to export.

2. Open the main process.

3. Select the function type that contains the FAD.

4. Right-click and choose **Select** > **Select All Objects of the 'Function' Type**.

5. Right-click the selection and select **Assignments** > **Show**.

6. Save the process and perform the export as described in the following section.

Exporting from ARIS to XML

To export the ARIS data to XML, do the following:

1. Log in to the ARIS database that contains the data you want to export.

2. Highlight the group or Business Processes that you want to export.

3. Right-click and select **Export/Import** > **XML Export**. The **Select Attribute Language** dialog is displayed.

4. Select the language and click **Next**. The **Select Export File** dialog is displayed.

5. Browse for the location for the Export.

6. Click **Finish** to complete the export.

Importing ARIS XML Files into TIBCO Business Studio

To import an ARIS XML file into TIBCO Business Studio, do the following:

1. Select **File** > **Import**. The Import Wizard is displayed.

2. Expand **Business Process Management**, select **ARIS XML** and click **Next**.

3. Browse for the Directory where the ARIS XML file is located.

4. Browse for the Project folder into which you want to import the ARIS XML file and click **Finish** to complete the import.

Example

In ARIS Business Designer, in the demo database, there are several examples of eEPC processes. The following example shows the TIBCO Business Studio import of the ARIS example process **Ticket Reservation** (in **Movie Palace** > **Business processes** > **Customer service** >**Ticket reservation**).
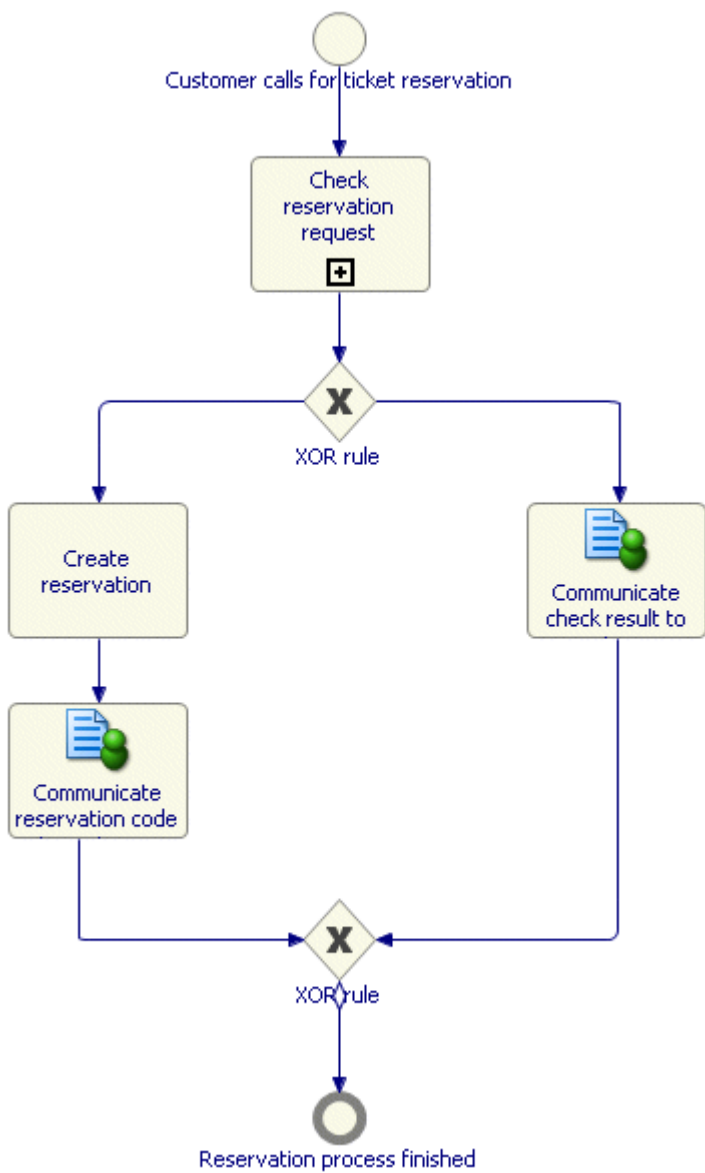
Object Mappings — ARIS Software

When you import a Process from ARIS Software into TIBCO Business Studio, the original objects from ARIS are mapped into objects that TIBCO Business Studio supports. This section describes the mapping between ARIS objects and TIBCO Business Studio objects.

Table 2: ARIS and TIBCO Business Studio Object Mappings
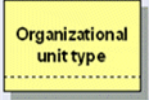
ARIS Object	ARIS XML Type	Corresponding TIBCO Business Studio Object
Event	• (Start) OT_EVT with outgoing connections only • (End) OT_EVT with incoming connections only • (Intermediate) OT_EVT with incoming and outgoing connections	Depending on the position of the Event, a Start Event, Intermediate Event, or End Event.
Function (User Activity type; for example)	OT_FUNC, not starting with ST_SYS	User Task.
Function (System Activity type; for example)	OT_FUNC, starting with ST_SYS	Service Task.
AND Rule	OT_RULE with: ST_OPR_AND_1, ST_OPR_AND_2, ST_OPR_AND_3, ST_AND	Parallel Gateway.
XOR Rule	OT_RULE with: ST_OPR_XOR_1, ST_OPR_XOR_2, ST_OPR_XOR_3, ST_XOR	Exclusive Data Based Gateway.
OR Rule	OT_RULE with: ST_OPR_OR_1, ST_OPR_OR_2, ST_OPR_OR_3, ST_OR	Inclusive Gateway.
Rule	OT_RULE (with none of the previous SymbolNum types)	Default (Exclusive Data Based) Gateway.

Table 2: ARIS and TIBCO Business Studio Object Mappings (Cont'd)

ARIS Object	ARIS XML Type	Corresponding TIBCO Business Studio Object
Organizational Unit Type, Organizational Unit, System Organizational Unit, and so on.	OT_ORG_UNIT, OT_ORG_UNIT_TYPE	Participant of the type **Organizational Unit** (multiple Participants are supported).
Person Type, Internal Person, External Person, Group	OT_PERS, OT_PERS_TYPE, OT_GRP, OT_EMPL_INST	Participant of the type **Human** (multiple Participants are supported).
Position Type, Position, Position Description	OT_POS	Participant of the type **Role** (multiple Participants are supported).
Application System Type, System Organizational Unit, Module Type	OT_SYS_ORG_UNIT, OT_SYS_ORG_UNIT_TYPE, OT_APPL_SYS, OT_APPL_SYS_CLS, OT_APPL_SYS_TYPE, OT_MOD_TYPE, OT_MOD	Participant of the type **System** (multiple Participants are supported).
D Attribute (ERM), K Attribute (ERM), FK Attribute (ERM), COT Attribute, Technical Term	OT_ERM_ATTR, OT_TECH_TRM, OT_ATTR_TYPE_GRP	Data Field.
Non-function object without connections		Data Object.
Non-function object that is not a recognized data type or participant and has only one connection (incoming or outgoing) to a function object		Data Object with connection.

Extended Attributes

Any attributes of an ARIS XML file that are not required or recognized by the TIBCO Business Studio Process model are stored as extended attributes. This preserves the information after the import into TIBCO Business Studio.

For example:
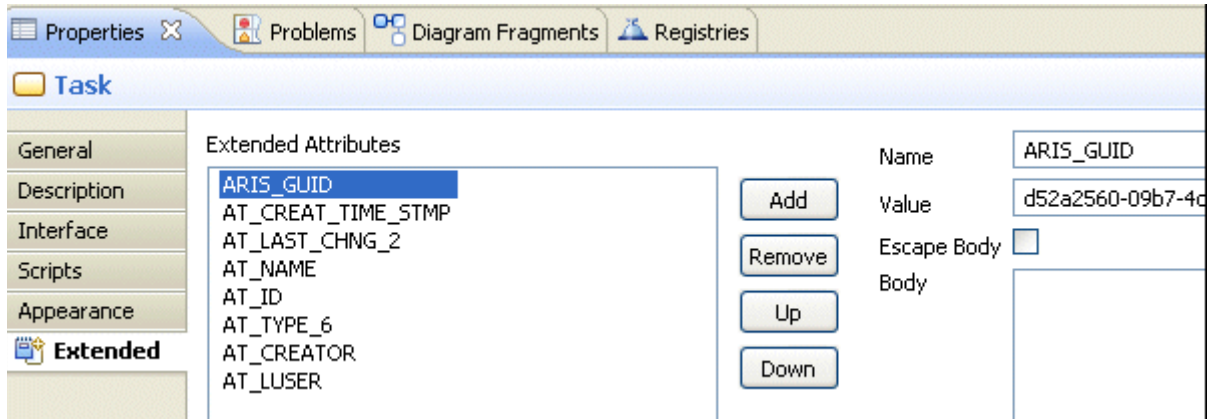
II - BUSINESS OBJECT MODELING

The following chapters provide detailed information about activites involved in Business Object Modeling. For the concepts behind these activities, refer to *TIBCO Business Studio Concepts*.

Topics

Chapter 10   **Business Object Modeler Tasks**

This section of the help describes some of the common tasks that you perform using the Business Object Modeler in TIBCO Business Studio, including:

Topics

Business Object Model Definition

The business object model is where you define in business terms the Classes, Attributes, Primitive Types, Operations, Associations, and so on that describe your business.

You can use quick-find (Ctrl+F) in the project explorer to find existing business object model entities and select them in the project explorer.

When you have created a business object model, you can search for business object model diagram elements within it using quick-find (Ctrl-F) within the diagram, and entering the initial characters of the name you are searching for. Double-click the element you are shown in the search to go to its location in the diagram.

Creating an Analysis Project with a Business Object Model

1. Select **File > New** > **Project**.

2. In the **New Project** dialog, select **Analysis Project** or **BPM Developer Project**, and click **Next**.

3. Enter a **Project name** and click **Next**.

This accepts default values for **ID, Location, Version, Status** and **Destination Environments**. For more details about these fields and about the **New Project** dialog, see the *TIBCO Business Studio Modeling User's Guide*.

4. In the **Asset Type Selection** dialog, you can see that **Business Objects** is selected. Select any other Asset Types you want to include in your Project. Click **Next**.

5. The **Business Object Model** dialog is displayed. (Depending on what options you selected at the previous dialog, you may see other dialogs first, for example to configure the organization model.)
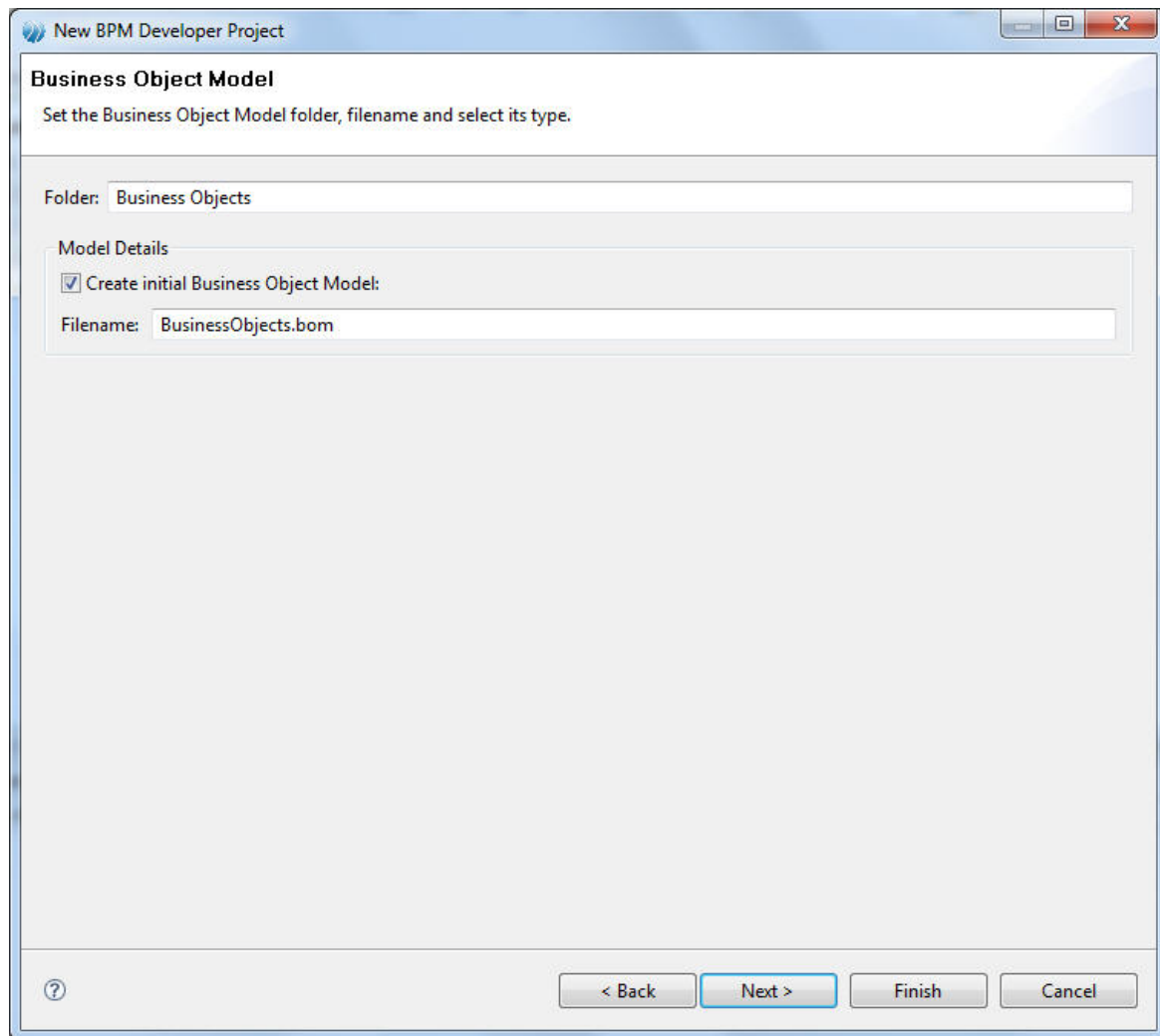
By default the **Create initial Business Object Model** field is checked and the **Business Object Model (no profile)** radio button is selected. Accept these defaults. (If you want to create a Concept Model, select that radio button instead. See Adding a Child Diagram to a Business Object Model on page 260 for more about concept models.). Click **Finish**.

6. If you are not already in the **Modeling** perspective, you are prompted to switch to it. Click **Yes** to switch perspective.

7. In the Project Explorer you can see that a new Project has been created with a folder for the business object models:
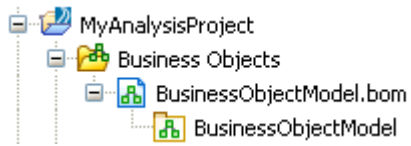
> By default, the Business Object Model name is prefixed by the domain name, as set in Window > Preferences > User Profile.

Creating a Business Object Model in an Existing Project

Alternatively, you can create a business object model in an existing project. To do so, carry out the following instructions:

1. In the Project Explorer, right-click the **Business Objects** folder and select **New** >
    Business Object Model.
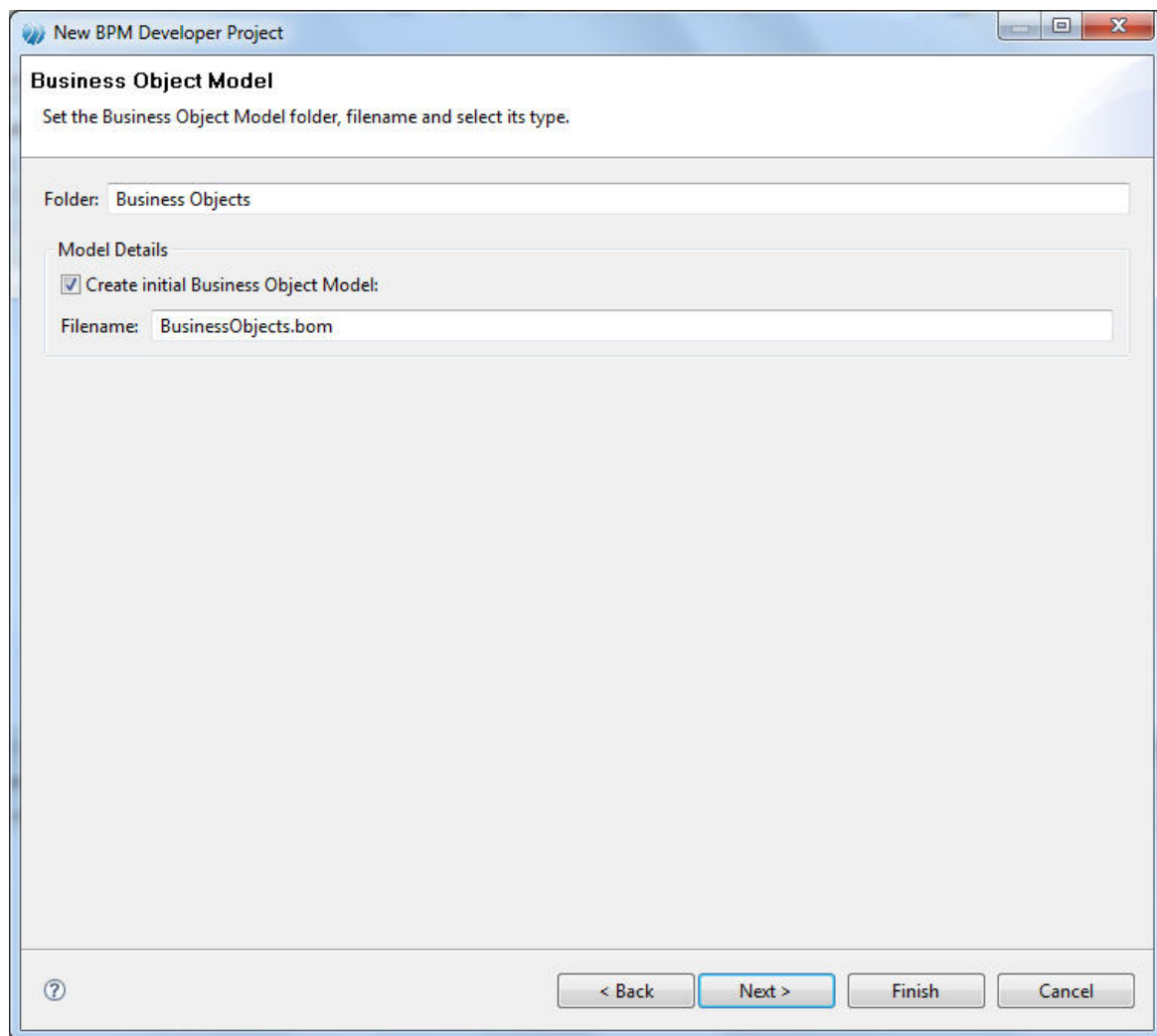
2. Name the business object model.

⚠️   If you rename a business object model that has not been saved, any changes you have
    made will be lost.

Click **Finish** on this dialog to create a business object model with default settings. Click **Next** to modify the default project settings and create a business object model using a template, or a concept model. Select a template from those available and click **Finish**.

3. In the Project Explorer you can confirm that the business object model has been created:
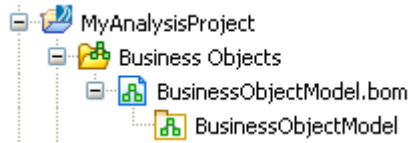
By default, the Business Object Model name is prefixed by the domain name, as set in Window > Preferences > User Profile.

4. To apply a UML Profile to a business object model, see Applying a UML Profile to a Business Object Model on page 269.

5. To apply stereotypes to a Model, see Applying Stereotypes on page 270.

Creating a Model by Import

As an alternative to using the Business Object Modeler to create a business object model, you can import a model in any one of several formats, and TIBCO Business Studio will automatically convert it to a business object model. You can import:

- An existing business object model from a database;

- A Unified Modeling Language (UML) model,

- An XML Schema Definition (XSD) file,

- A Web Services Description Language (WSDL) file

TIBCO Business Studio translates the imported XSD or WSDL file into a business object model. This is especially useful if, for example, you have already generated UML models or XSDs that contain information that you want to incorporate in your business object model.

The way that import works with regards to imports and includes is as follows:

- If **MyXSD1** *imports* **MyXSD2** (each have different namespaces), upon import each XSD file becomes a separate business object model.

- If **MyXSD1** *includes* **MyXSD2** (they share the same namespace), only one business object model is created.

Importing a Business Object Model from a Database

1. Make sure that a database connection profile for the database that you require has been set up, as described in the implementation guide for your destination platform.

2. If TIBCO Business Studio does not connect automatically to the database, connect as also described in the implementation guide for your destination platform.

3. Start the database import wizard using one of the following methods:

   — Right-click the **Business Objects** folder, and select **Import** > **Database**.

   — Select **File** > **Import** > **Business Object Modeler** > **Database**.

4. The **Import from Database** dialog is displayed. It lists any databases that have been found.
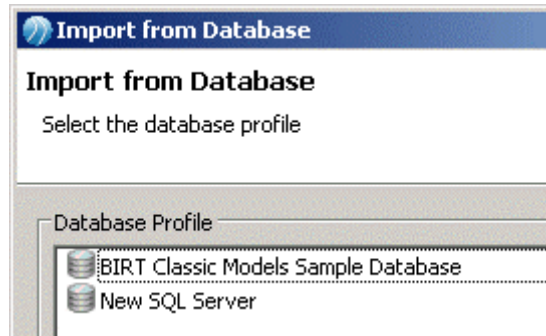
5. Select the database required from the list displayed and click **Next**.

6. The **Select BOM destination location** dialog is displayed. This enables you to specify where the imported business object model should be created.
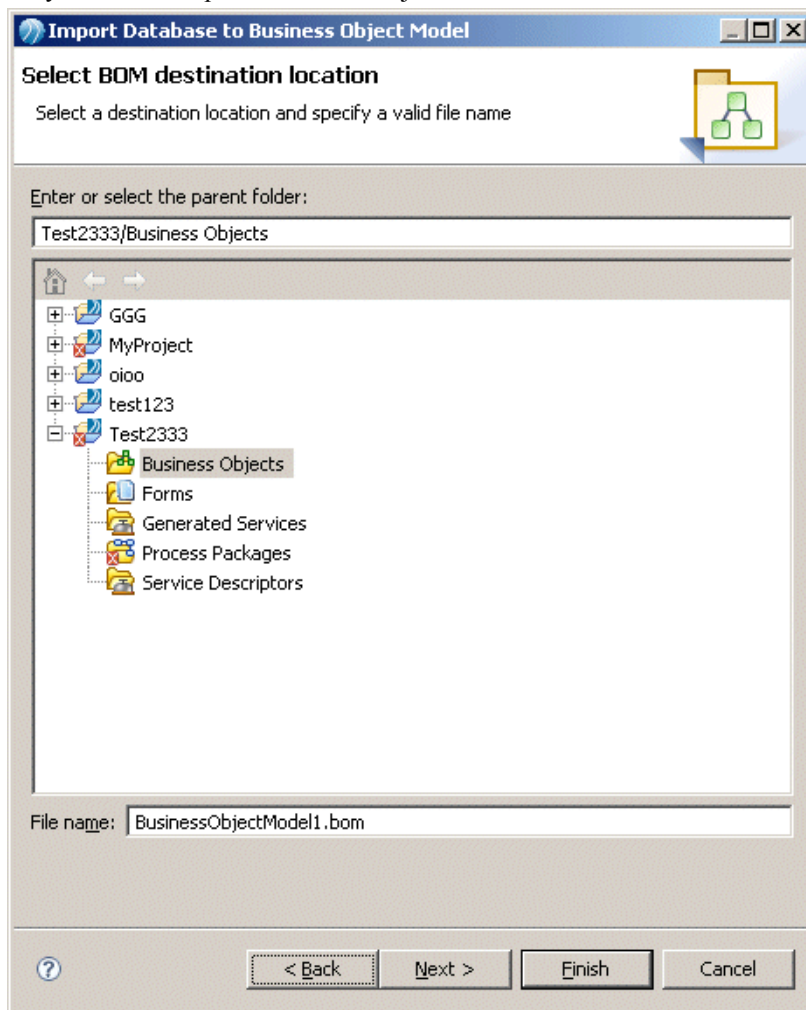
The Business Objects folder of the current project is selected as the default location, You can change this, and you can specify a name for the imported file. Specify the values you want.

7. You can now either click **Finish**, to import all tables in the database, or click **Next** to specify what to import.

8. If you click **Next**, the **Database Tables** dialog is displayed. By default, all the tables in the database are selected.
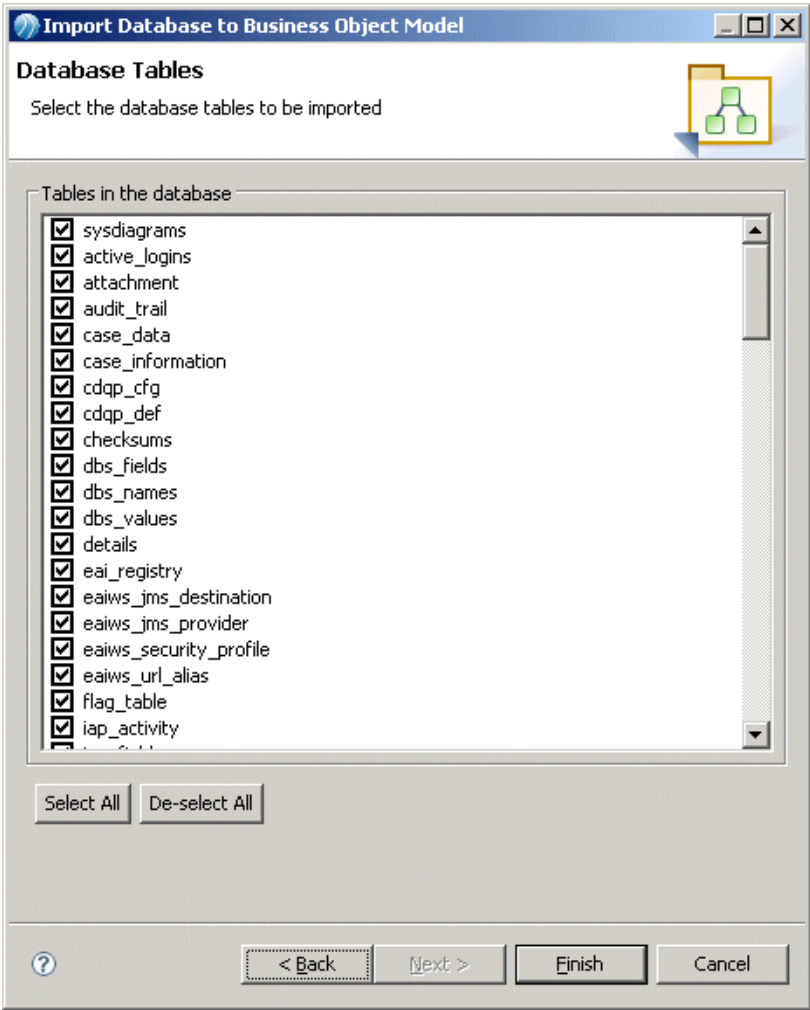
Select or deselect database tables as you require, and then click **Finish**. The selected tables from the database are imported to the location you specified, and a business object model is created from them.

When a model is imported from a database:

- Each database table is mapped to a Class in the Business Object Modeler.

- Each column in a table is mapped to an Attribute in a business object model Class.

- If foreign key constraints are present in the imported tables, an Association is created between the Classes that represent the tables. Even if more than one foreign key constraint is present in the same table, one Association is created.

Importing Existing UML Models into the Business Object Modeler

1. Start the import wizard using one of the following methods:

   — Right-click the **Business Objects** folder, and select **Import** > **UML Model**.

   — Select **File** > **Import** > **Business Object Modeler** > **UML Model**.

2. The **Import UML Model** dialog is displayed:
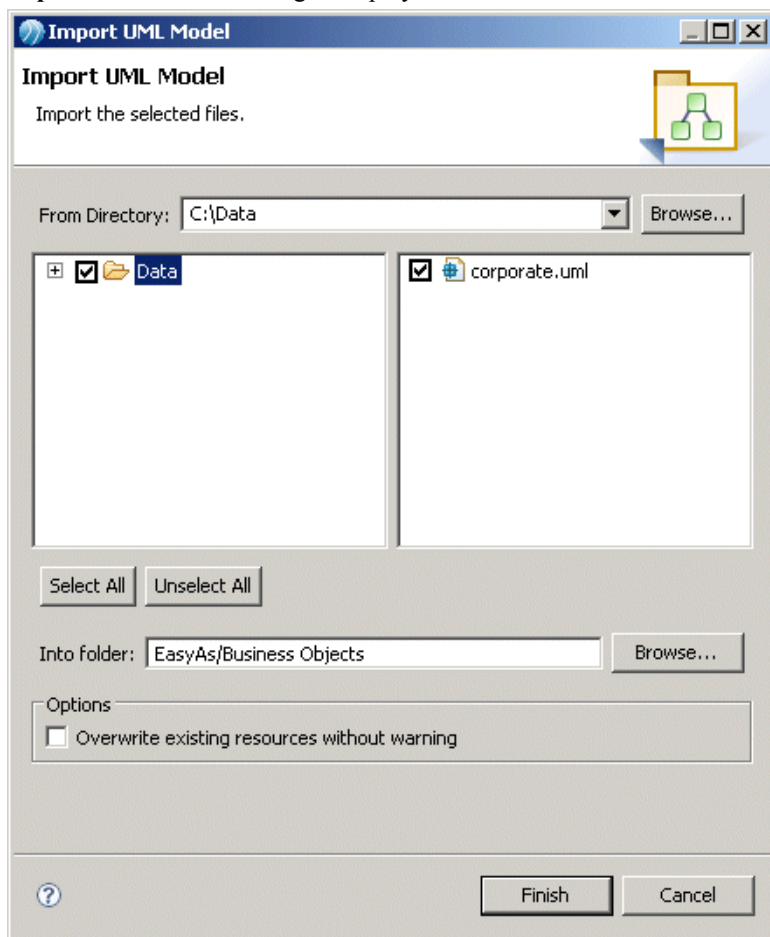
   Click the **Browse** button to select the **From Directory** where you have stored the UML model. Any UML models that are found are displayed.

   In this example, the UML model **C:\Data\corporate.uml** is selected.

3. Browse to select the **Business Objects** folder into which you want to import the model.

Select the **Overwrite existing resources without warning** checkbox if you know you want to replace an existing model with the one you are importing; otherwise TIBCO Business Studio prompts you to confirm whether to overwrite the existing model.

4. Click **Finish**. The Model is imported into the folder that you specified.

Importing XML Schema Files

1. Start the import wizard using one of the following methods:

   — Right-click the **Business Objects** folder, and select **Import** > **XSD Schema**.

   — Select **File** > **Import** > **Business Object Modeler** > **XSD Schema**.

2. The **Import XSD Schema** dialog is displayed:
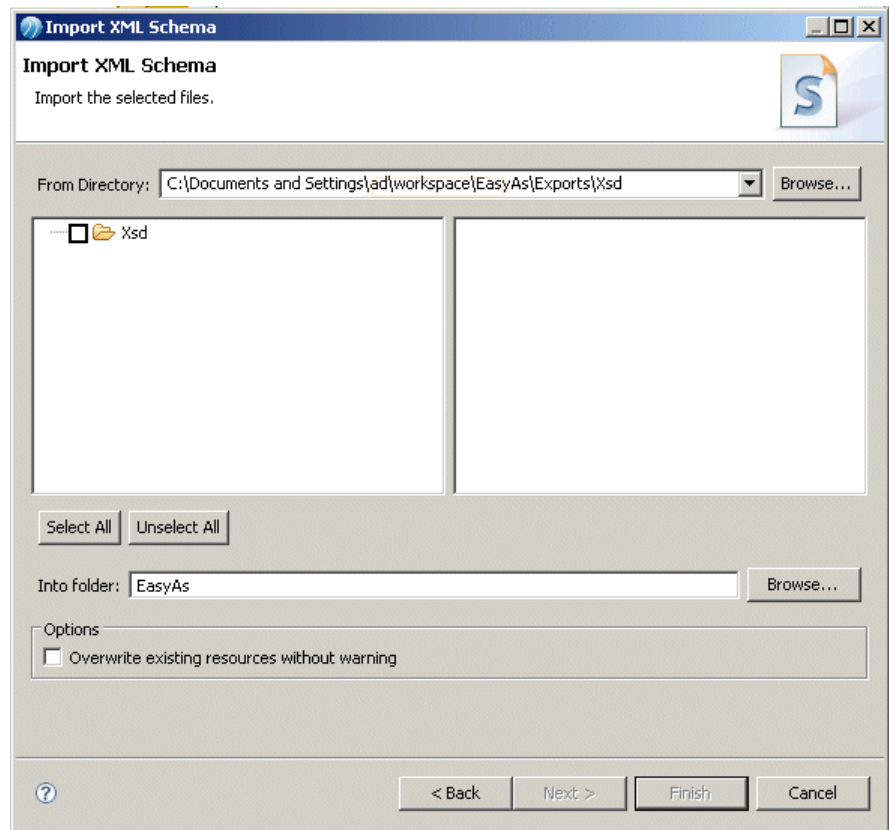
— Click the **Browse** button to select the directory that contains the XSD file that you want to import. Then select the folder, and the specific XSD files you want to import. For example:
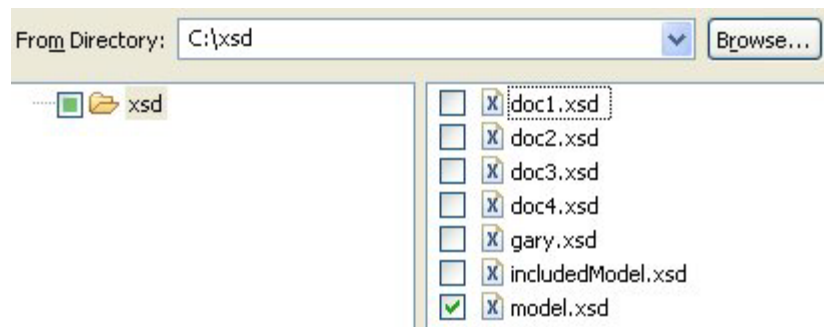
— Click the **Browse** button to select the folder into which you want to import the XSD file. This must be a Business Object Model special folder.

3. Click **Finish**. Depending on the size of the XSD file, there is a pause while TIBCO Business Studio converts the file to a business object model. When the business object model has been created, check the Problems view for errors or warnings. For more information about how XSD files are converted to TIBCO Business Studio objects, see Chapter 11, Business Object Model Mappings to XML Schema, on page 283.

Importing WSDL Files

1. Start the import wizard using one of the following methods:

   — Right-click the **Business Objects** folder, and select **Import** > **WSDL**.

   — Select **File** > **Import** > **Business Object Modeler** > **WSDL**.

2. The **Import WSDL** dialog is displayed:
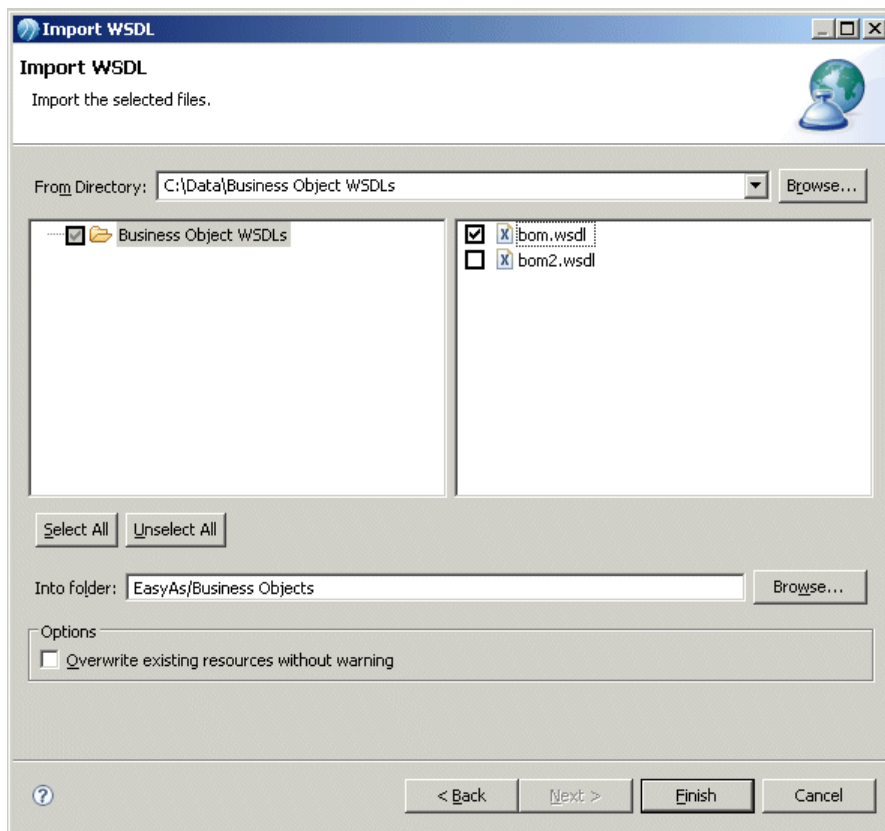
— Click the **Browse** button to select the directory that contains the WSDL file that you want to import. Then select the folder, and the specific WSDL files you want to import. For example:
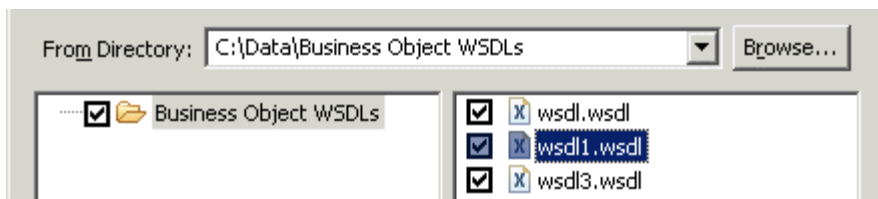
— Click the **Browse** button to select the folder into which you want to import the WSDL file. This must be a Business Object Model special folder.

Click **Finish**. Depending on the size of the WSDL file, there is a pause while TIBCO Business Studio converts the file to a business object model. When the business object model has been created, check the Problems view for errors or warnings. For more information about how WSDL files are converted to TIBCO Business Studio objects, see Chapter 11, Business Object Model Mappings to XML Schema, on page 283.

Editing Models

You can add objects to your business object model or concept model, and edit them, using the Business Object Model Editor.

Adding Diagram Nodes

To create a business object model, you add diagram nodes (Package, Class, Attribute, Primitive Type and Operation) and connect them with Connections (Generalization, Association, Aggregation, and Composition).

You can add diagram nodes and connections in any of the following ways:

*   Using the tools on the diagram editor's palette. The palette contains tools that enable you to add a diagram node or a connection either by selecting the required tool in the palette and dragging and dropping on to the diagram, or by clicking on the tool in the palette and then clicking on the diagram.

    If there is a stereotype already applied to your business object mode, the palette contains additional tools to create business objects with the stereotype already applied to them. See for more detail about stereotypes.

*   Using the pop-up icons. If you hover your mouse over the empty area of the diagram, or over a Package, a pop-up containing icons appears. Move your cursor on to one of these icons to display label as shown in the following illustration, and then click to create a new node of that type in the diagram.
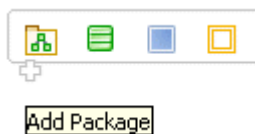
Similarly, hovering the mouse over a Class displays icons for Attribute and Operation.

*   Using the Project Explorer. You can add new diagram nodes (such as adding a new Package, Class, or Attribute) using right-click menus in the Project Explorer. For

example, to add a new Class, you can expand the Project Explorer, select the business object model, and right-click **Add Child** > **Class**:
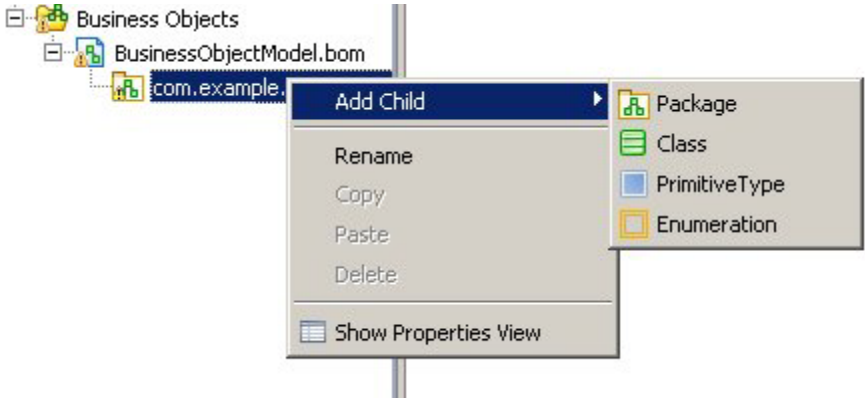
The Project Explorer menus list the objects appropriate to the context. For example, if you select a Class and right-click **Add Child**, the following menu is displayed:
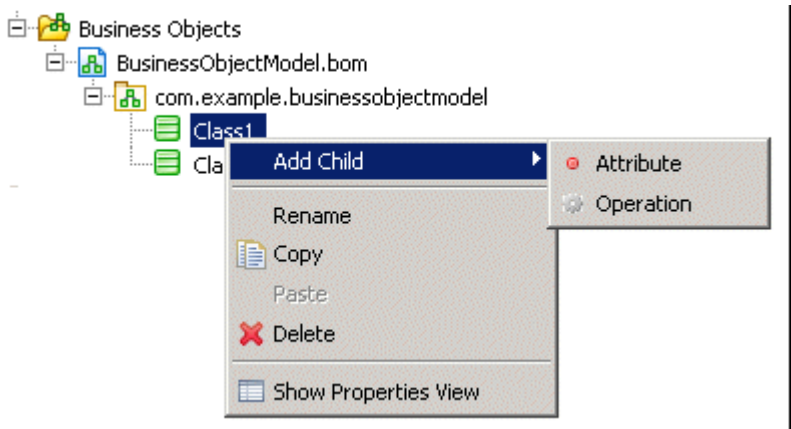
Adding Packages

Packages can be used as containers to organize Classes in your model.

1. In the Business Object Modeler palette, select the Package tool, drag it over an empty part of the diagram canvas and drop it. This places the Package in the model:
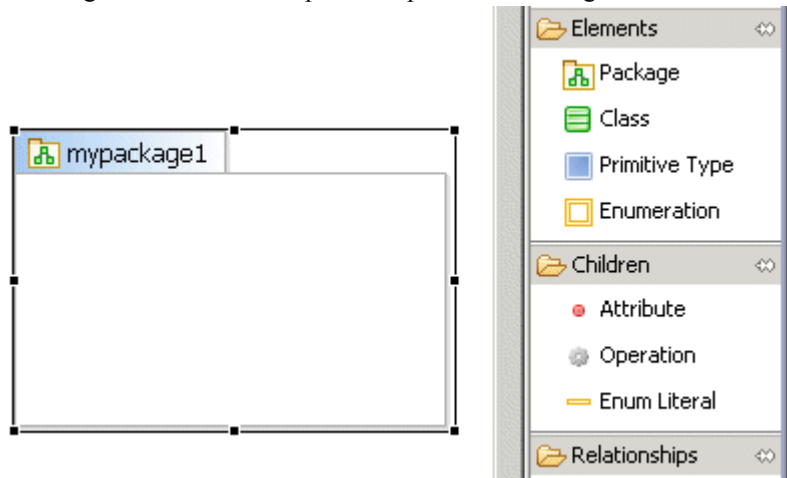
Alternatively you can select the tool and click on the empty part of the business object model diagram.

2. Enter a name for the Package and if necessary, resize it to give yourself more room in which to place Classes.

3. Note that you can nest Packages. For example:
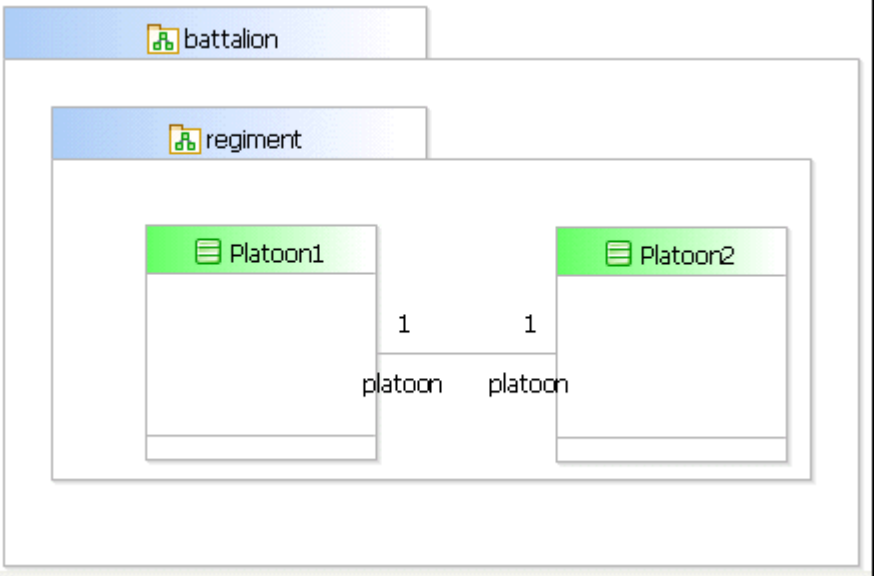
The Properties view for the Package lists any Classes and Packages that it contains (see Package Properties on page 400).

4. To apply a UML Profile to a Package, see Applying a UML Profile to a Business Object Model on page 269.

5. To apply stereotypes to a Package, see Applying Stereotypes on page 270.

Opening a Diagram Editor for a Package

If you double-click on a Package header, a new Business Object Model Editor window opens, showing only the contents of that Package. This may be useful if the main editor is too crowded to see the contents of a Package clearly. You may need to re-arrange the contents of the Package in the new editor to make them all clearly visible. If so, start by right-clicking on a blank area of the editor and select the **Arrange All** option.

The illustration shows a Package Editor window opened on a package named **points**, in a hypothetical business object model.
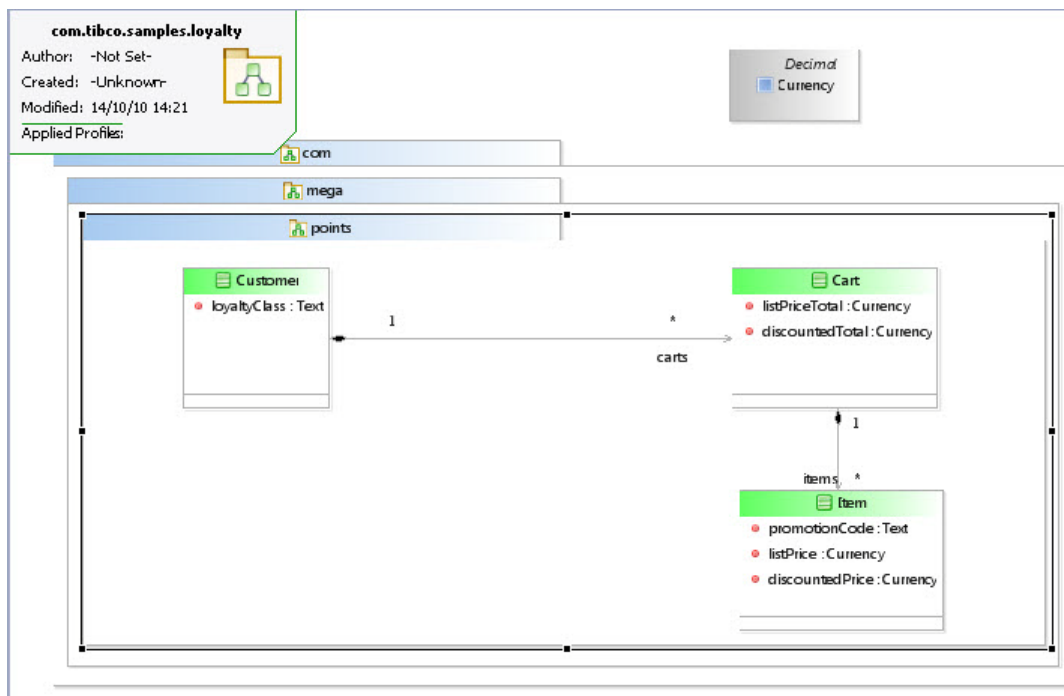
This editor is an exact window on the main Business Object Model Editor; any changes made in one window are reflected in the other.

Click the shortcut icon 🔄 on the badge to return to the main editor.

Adding Classes, Attributes and Operations

1. Using the Class tool, place a Class on the model and name it.

2. Using the Attribute tool, place Attributes within the Class.

3. In the Properties view for each Attribute, select the Type and specify whether there can be multiple values for the Attribute (whether it is an array). (See "Attributes" in *TIBCO Business Studio Concepts* for more information about attribute types and multiplicity). When you specify multiplicity values in the Properties view for Attributes, you can use content assistance. Press **Ctrl + space** in the field and the available multiplicity values are displayed.

   To apply restrictions to your Primitive Type, click the **Resource** tab and expand **Restrictions**.

4. Using the Operations tool, place Operations within the Operations Compartment in the lower section of the Class graphic.

5. In the Properties view for each Operation, specify the return value type and any parameters or parameter types.

6. In the **Properties View** for each Class, Attribute or Operation, click the **Stereotypes** tab to apply any stereotypes you want to apply. See Applying Stereotypes on page 270 for more information.

Adding Primitive Types

To add a Primitive Type to your business object model, use the Primitive Type tool, drag and drop a Primitive Type on the model and name it.

When you create a Primitive Type, it is always created with a standard type of Text. To select another standard type for the Primitive Type:

1. In the **Properties View** for the Primitive Type, select the **General** tab.

2. Click [...] to display the **Select Type** dialog. To display a list of the available types you can set, type **?** in the **Select Type(s)** field. A list of the available standard types is displayed.

3. From the **Matching Items** box, select a standard type and click **OK**.

To apply stereotypes to the Primitive Type, click the **Stereotypes** tab. See Applying Stereotypes on page 270 for more information.

To apply restrictions to your Primitive Type, click the **Resource** tab and expand **Restrictions**.

Creating Connections

Connections indicate the relationships between Classes and include Generalization, Association, Aggregation, and Composition.

Creating a Generalization between Two Classes

1. Click the Generalization tool on the Palette.

2. Drag from the Class that is the Derived Class to the Class that will be the Super Class. For example, if you want to indicate that a Patient is a person:
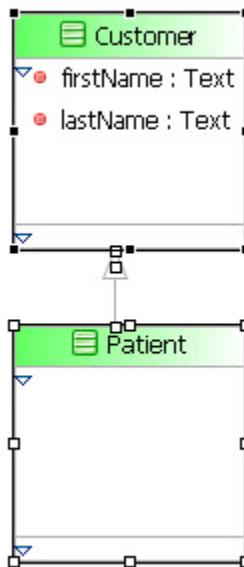
You can also create a Generalization by clicking **Select** to populate the **Inherits From** field on the Properties view of the Class.

3. In the Properties View for each Association, click the **Stereotypes** tab to apply any stereotypes you want to apply. See Applying Stereotypes on page 270 for more information.

To create an Association between Two Classes

1. Click the Association tool on the Palette.

2. Drag from one Class to the other. This creates a bi-directional Association. You can change the direction of the Association by selecting from the **Navigability** drop-down list in the Properties view. You can also change the **Source** or **Destination** of the Association in the Properties view.

A bi-directional Association shows both the **Source** and **Destination** on the business object model. A uni-directional Association shows only the **Destination**.

You can also set the Multiplicity of each end of the Association by selecting from the **Source Role Multiplicity** and **Target Role Multiplicity** drop-down lists in the **Properties** view.

3. In the Properties View for each Association, click the **Stereotypes** tab to apply any stereotypes you want to apply. See Applying Stereotypes on page 270 for more information.

Aggregation and Composition

Aggregation and Composition are created in the same way as an Association and share the same properties. The only difference is the meaning and appearance of the Connection.

Adding Text to a Model

You can add a note or text to your business object model to describe the business object model or to add any supporting explanations to the diagram nodes.

When adding text or a note, press Ctrl + Enter to start a new line.

Adding a Note

- Right-click on the Business Object Model Editor and select **Add** > **Note**.

- In the Business Object Modeler palette, select the Note tool in the upper part of the palette.
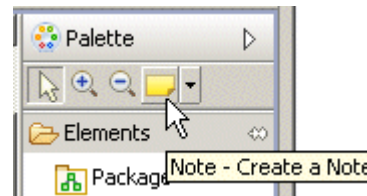
Then click on the Business Object Model Editor.

You can also select Text or Note Attachment from this menu. The icon for the tool changes to show the item you have selected.
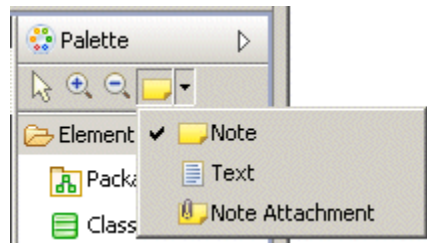
A Note is displayed where you can enter any text you require. Use the **Note Attachment** option to draw a line connecting a Note to the Class it comments on.

Adding Text

- Right-click on the Business Object Model Editor and select **Add** > **Text**.

- In the Business Object Modeler palette, select the Text tool in the upper part of the palette and then click on the Business Object Model Editor.

A Text box is displayed where you can enter any text you require.

Adding a Child Diagram to a Business Object Model

You can add a child diagram to a Business Object Model, to allow you to reuse part of a parent diagram, and focus on that part of the diagram.

To add a child diagram:

1. From the Diagrams folder under the Business Object Model file in Project Explorer, select **Add Child > Diagram**.

    You can also make this selection from the Business Objects folder (**New > Other > Other > Diagram**, and you will then be asked which Business Object Model to use), or from the .bom file: **New > Diagram** or **New > Other > Other > Diagram**.

2. From the New Business Object Model Diagram wizard, name the child diagram, and select the elements of the Business Object Model which you want to include in your new diagram.
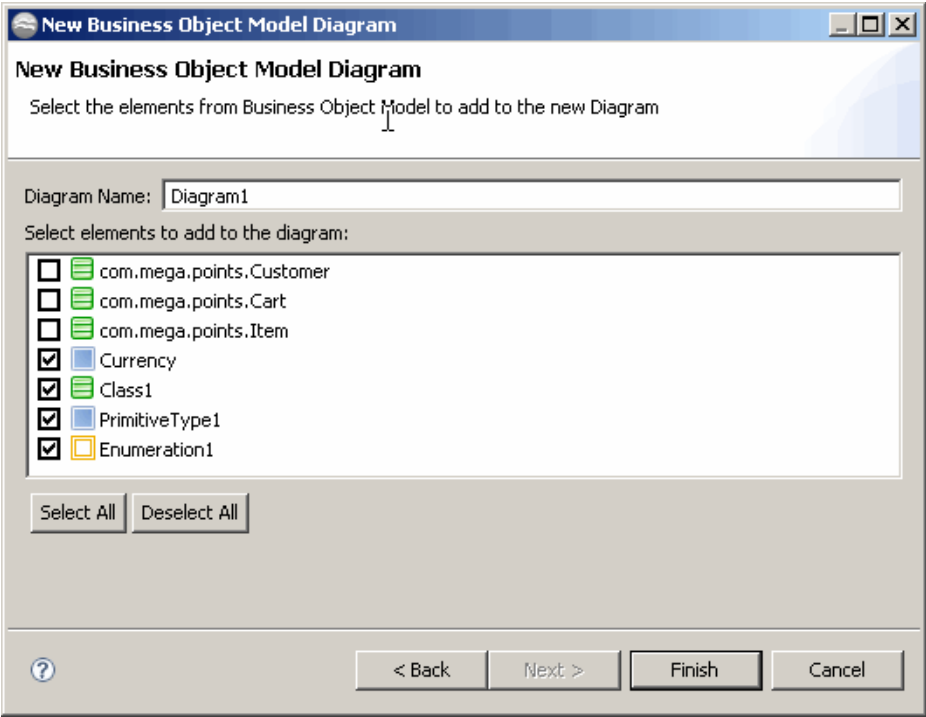
The elements you can include in your diagram are Class, Primitive Type and Enumeration. **Packages are not available for you to include**.

3. Click **Finish**. Using the elements selected above, your child diagram looks like this:
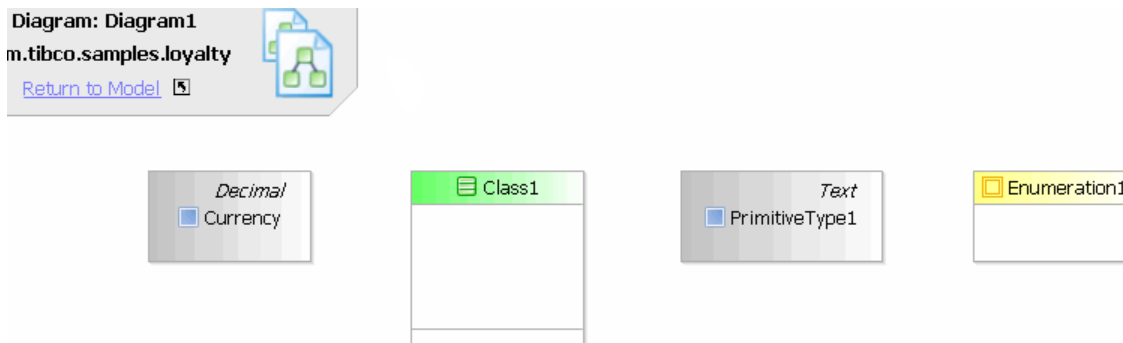
Adding Elements to the Child Diagram

To add elements to a child diagram after you have created it, you can drag and drop Class, Primitive Type or Enumeration elements from the parent Business Object Model model in Project Explorer (you can drag and drop from other Business Object Models but then you can only create copies or subclasses).

Drag the element, and when you drop it, you will see the following menu:
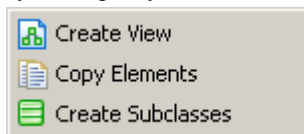
- To create a view of the element in this diagram, select **Create View**. This means that you can see the element in this diagram, as well as in the main (parent) Business Object Model diagram.

- To make a new copy of the element in the diagram select **Copy Elements**. In this case, a new copy of the element will appear in this diagram, and also in the main (parent) Business Object Model diagram

- (when dragging and dropping a Class) To create a subclass of the selected class, select **Create Subclasses**. In this case, the subclass will appear in this diagram, and also in the main (parent) Business Object Model diagram.

You can also use the Palette to add Elements, Children, and Relationships to the diagram, by dragging and dropping the elements from the palette onto the child diagram. When you do this, the elements are new elements, and will appear in the child diagram and also in the main (parent) Business Object Model diagram.

Deleting Elements from the Child Diagram

If you want to delete any of the elements from the child diagram, select the element, and select **Delete from Diagram** or **Delete from Model**. If you delete from diagram, the elements will only be deleted from this child diagram. If you delete from model, the element will be deleted from the child diagram and also from the main (parent) Business Object Model diagram.
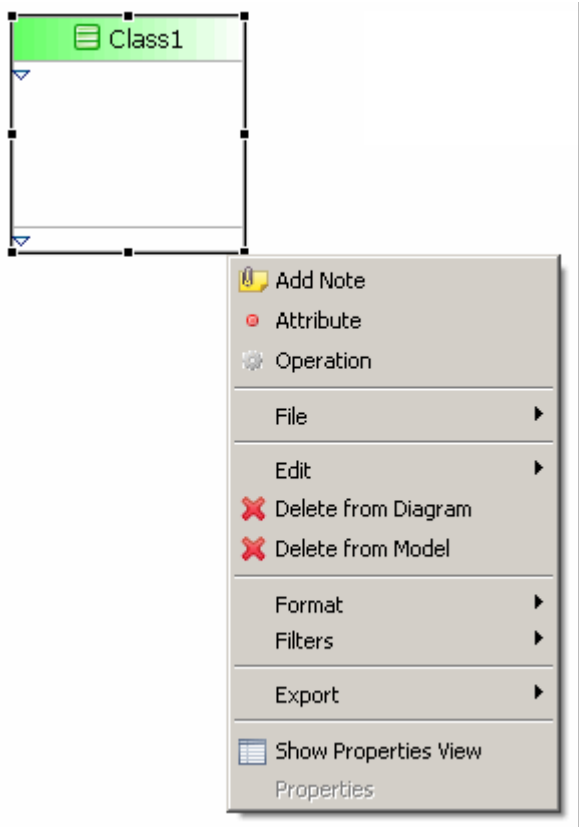
You can also delete the element using the Delete key. This has the same action as **Delete from Diagram**, that is, only the graphical view is deleted.

Concept Models

A concept model is a business object model with the addition of a UML Profile. Therefore many of the tasks that you need to perform when creating a concept model are the same as the tasks you perform when creating a business object model. This section describes how to migrate existing concept models and create new concept models in the Business Object Modeler.

Migrating Concept Models

To migrate concept models that have been created in earlier versions of TIBCO Business Studio.

1. Copy the Package that the contains the concept model into the Project Explorer or select **File** > **Import**, expand **General**, select **Existing Projects into the Workspace**, and follow the instructions in the wizard to import the Project.

2. Right-click the concept model you want to migrate and select **Migrate Concept Model to Current Version**.

3. In the **Problems** view for the concept model that you migrated, the following error message is displayed:

   ✖ Problems while loading the file. Possible version problem.

   Right-click and select **Quick Fix**. When you have resolved the problems, you can open the concept model in the Business Object Modeler.

You can correct several migration problems at once from the **Quick Fix** dialog by clicking **Find Similar Problems**, selecting them, and clicking **OK** to apply the fix. The number of similar problems found depends on the filtering that you have set up in the Problems view.

Creating New Concept Models

The following section describes how to create new concept models:

Creating an Analysis Project with a Concept Model

For information on creating an Analysis Project, see Creating an Analysis Project with a Business Object Model on page 236. In the **Business Object Model** dialog, check the **Concept Model** radio button instead of the **Business Object Model** button.

Creating a Concept Model in an Existing Project

1. In the Project Explorer, right-click the **Business Objects** folder and select **New** > **Concept Model**.

2. Name the concept model and click **Finish**.

> Alternatively, if you select **New** > **Business Object Model** and click **Next** at the first dialog of the **Create Business Object Model** wizard, you can select the option to create a concept model. See Creating a Business Object Model in an Existing Project on page 238.

In the Project Explorer you can confirm that the concept model has been created:
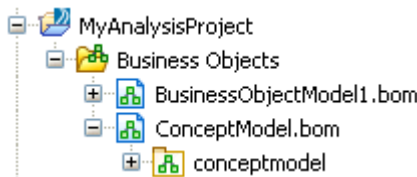
Adding Diagram Nodes

Many of the tasks you need to perform when adding diagram nodes to a concept model are the same as the tasks you need to perform when adding diagram nodes to a business object model. The following section describes how to add diagram nodes to a concept model.

Packages

For information on creating Packages, see Adding Packages on page 253.

Concepts and Attributes.

> Although a Class is called a Concept in a concept model, the steps for creating a Concept are the same as for creating a Class in a business object model.

> Operations are not available in a concept model.

For information on creating Concepts and Attributes, see Adding Classes, Attributes and Operations on page 255.

Domain Values

In a concept model, Attributes can have Domain Values. To specify Domain Values for Attributes, do the following:

1. Click the Domain Values tab in the Properties view to add any values that the Attribute could have.
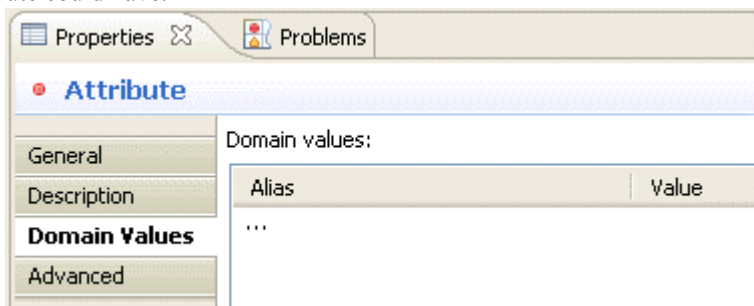
For more information about the Properties view for Attributes, see Association Class Properties on page 411.

Primitive Types

For more information on creating Primitive Types, see Adding Primitive Types on page 256.

Connections

For more information about creating connections between objects in a concept model, see Creating Connections on page 256.

Working with Models

There are various short cuts you can use when creating your Business Object or concept models. This section describes how to use them.

Copying Diagram Nodes Between Models

You can copy Packages, Classes, Attributes and Primitive Types between models. The business object models can be in the same project or in different projects. To copy business objects between projects you must create a project reference between the two projects.

To do this:

1. In the Project Explorer, expand the business object model that contains the diagram nodes you want to copy.

2. Open the business object model that you want to copy the diagram nodes to.

3. Drag the diagram node to the Business Object where you want to add or create a new object. A menu is displayed in the new model asking what you want to do with the new object. The menu that is displayed depends on the type of business object you have copied. An example is shown below:
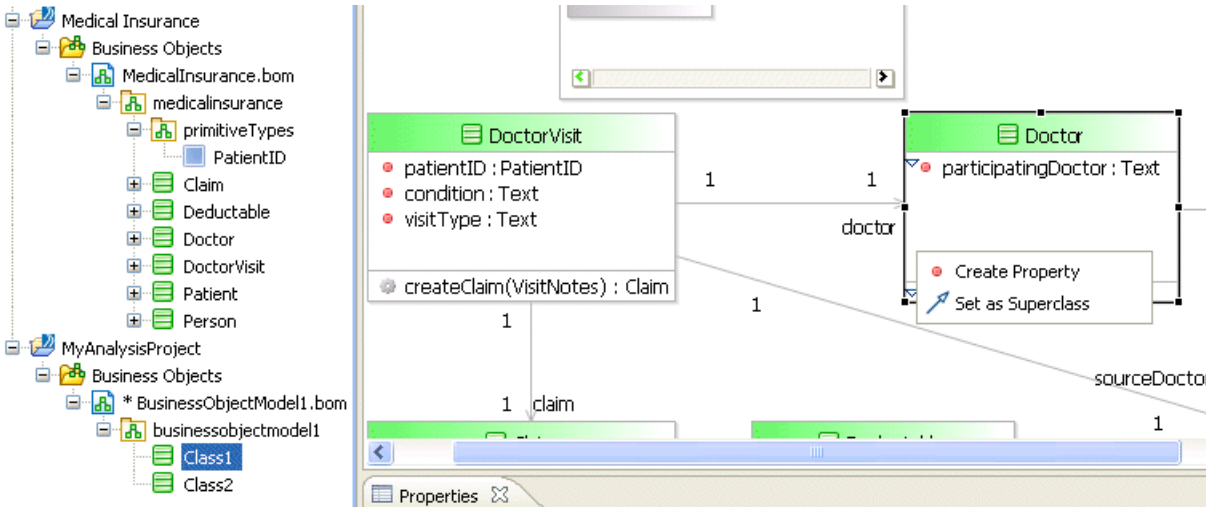
If the business object models are in the same project the item is copied to the new model. If the models are in different projects, the following message is displayed.
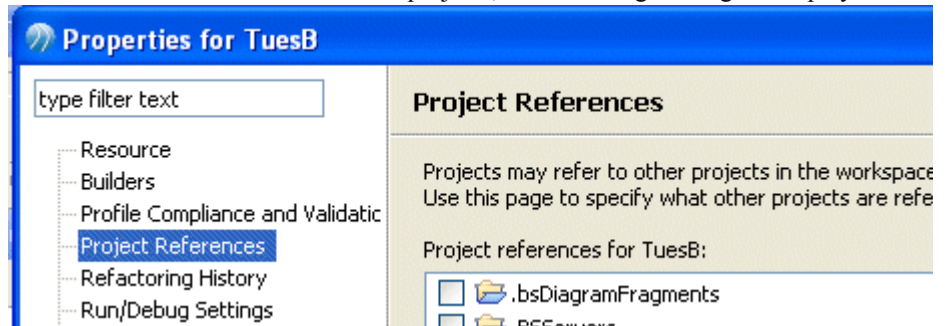
Click **Yes** to create the project reference or **No** if you do not want to create the project reference. If you click **Yes**, the object is copied to the new model.

Organizing Your Model

Some models are simple to follow but larger and more complex models are more difficult to read. The Business Object Modeler provides the following tools to make models easier to understand.

Icon	Command	Description
	Apply the applicable appearance properties of the first selected shape to the other selected shapes	Applies the applicable appearance properties of the first selected shape to the other selected shapes.
	Select All	Selects all business objects in the Model.
	Select All Shapes	Selects all shapes in the selected Package.
	Select All Connectors	Selects all connections in the selected Package
	Arrange All	Arranges all the business objects in the Model so that they are evenly spaced.
	Arrange Selection	Arranges the business objects in the Model that you have selected so that they are evenly spaced.
	Align Left	Aligns the selected business objects to the left of the Model.
	Align Centre	Aligns the selected business objects to the centre of the Model.
	Align Right	Aligns the selected business objects to the right of the Model.

Icon	Command	Description
	Align Top	Aligns the selected business objects to the top of the Model.
	Align Middle	Aligns the selected business objects to the middle of the Model.
	Align Bottom	Aligns the selected business objects to the bottom of the Model.
	Autosize	Automatically sizes the selected business objects to the smallest size.
	All Connector Labels	Displays all connector labels in the Model
	No Connector Labels	Displays no connector labels in the Model.
	All Compartments	Displays all the compartments within a selected Class.
	No Compartments	Only displays the name of a selected Class. Attributes and Operations are not displayed.

UML Profiles

Your business object model must already exist before you can apply UML profiles and stereotypes to it.

You can apply UML profiles that have been created elsewhere to your business object model. Once your UML profile is available to your business object model, you can use it to apply stereotypes to the various business objects in your business object model.

Once you have applied a UML profile to your business object model, you should not change it. This is because any changes you make to the UML profile could adversely affect your business object model.

Applying a UML Profile to a Business Object Model

1. To use an existing UML profile, copy the file that contains the UML profile to your **Business Object**s folder in the Project Explorer. The UML profile is displayed as follows:
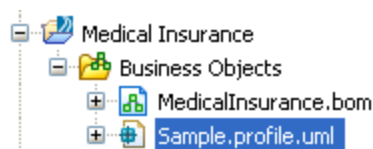
2. Select the **Properties View** for the Model or Package that you want to apply a UML profile to.

3. Select the **Profiles** tab.

4. Click [...] to display the **Select Type** dialog. To display a list of the available profiles you can apply to the Package, type **?** in the **Select Type(s)** field. A list of the available profiles is displayed.

5. From the **Matching Items** box, select a profile and click [Add].

6. Click **OK** to close the dialog.

Applying Stereotypes

You can apply stereotypes to all the business objects in your business object model. You can apply as many UML profiles to a model or Package as you require. You can apply the UML profile to the business object model or Package first, or it can be applied automatically when you apply a stereotype to an object.

The UML profile must exist in the BOM Special Folder (normally the **Business Objects** folder for your project). The **Select Type(s)** dialog used to apply stereotypes will then display all the available stereotypes in that profile. If you select a stereotype from a profile that has not yet been applied to the business object model or Package, the profile will automatically be applied when you click OK to apply a stereotype.

To apply stereotypes to the individual business objects:

1. In your business object model, select the **Properties View** for the business object that you want to apply stereotypes to.

2. Click the **Stereotypes** tab.

3. Click [...] to display the **Select Type(s)** dialog. To display a list of the available stereotypes that you can apply, type **?** in the **Select Type(s)** field.

4. From the **Matching Items** box, select a stereotype and click [Add].

5. Click **OK** to close the dialog.

6. To edit your stereotypes, select the **Properties View** for the diagram node which has the stereotype applied to it and click the **Resource** tab. The Stereotype is displayed in the **Resource** tab.

Exporting Business Object Model Documentation

You can export a business object model to HTML output for documentation purposes as follows:

1. Select **File** > **Export**. The **Export** dialog is displayed.

2. Expand the Business Process Management folder, select **Documentation**, and click **Next**.

3. Drill-down through the Project and Business Object folder to select the specific business object model for which you wish to export documentation.

4. Select a destination for the export by either:

    — Selecting **Project** (to put the export in the **Documentation** sub-directory within your Project directory), or

    — Selecting **Path:** and clicking **Browse...** to specify a directory for the export.

5. Click **Finish**.

6. The Business Object Model Documentation is saved to the location you specified. See for more information.

Viewing Business Object Model Documentation

1. Export the documentation as described in .

2. In the Project Explorer, expand the **Documentation** sub-directory within your Project directory; or if you exported the documentation to another destination, navigate to that destination folder.

3. Right-click the HTML file for the package and select **Open With** > **Web Browser**.

Exporting Business Object Models to XML Schema or WSDL Files

You can export a business object model to XML Schema Definition (XSD) or WSDL files, perhaps for compatibility with other applications that support those formats.

For more information about how business object models are converted to XSD files see Business Object Model Mappings to XML Schema on page 283. For information on specifying whether the business object model should be validated for export as an XML Schema or a WSDL file, see Setting Generation Preferences on page 280 and Business Object Model Mappings to WSDL on page 315.

> If you want to define which elements to export as top-level elements when you export to XSD, go to the Properties page for a user-defined BOM, and on the Exports tab you will see **XML Schema Export Options**. This will show the elements available in your BOM, and you can select those you want to 'Export to XSD Top Level Element' in subsequent XML Schema exports.
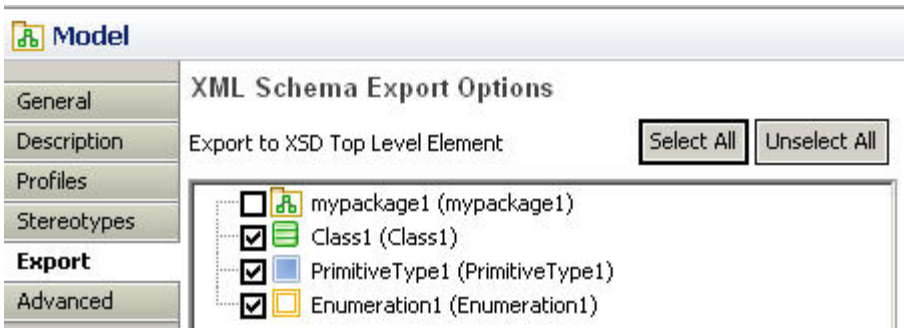
Exporting Business Object Models to XML Schema Files

To export a business object model to an XSD file:

1. Start the export wizard using one of the following methods:

    — Right-click the **Business Objects** folder, and select **Export** > **XML Schema**.

    — Select **File** > **Export** > **Other** > **XML Schema**.

2. The **XML Schema** dialog is displayed:
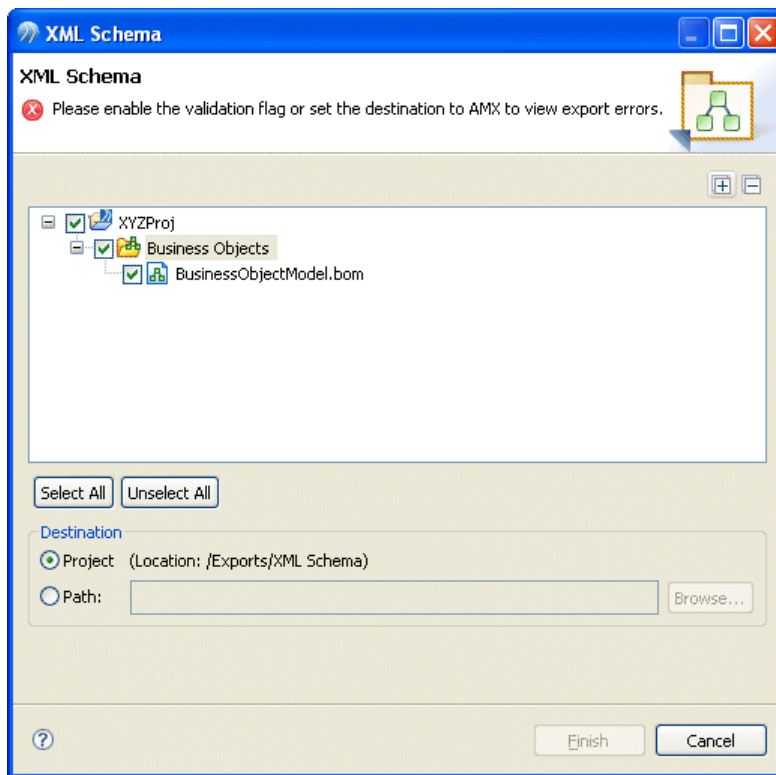
Select the business object models that you want to export, and select a destination for the XSD file (either in the **/Exports/XML Schema** directory in the project, or in a different path). The Exports folder is created if it does not yet exist and shown in the Project Explorer.

3. Click **Finish**. The XSD files are generated in the specified location. A separate XSD file is created for each package in the business object model.

Exporting Business Object Models to WSDL Files

You can export a business object model to a WSDL. The export procedure is very similar to that for exporting to XSD; the business object model is first converted to XSD format and then the XSD file is converted to WSDL format.

To export a business object model to WSDL:

1. Start the export wizard using one of the following methods:

   — Right-click the **Business Objects** folder, and select **Export** > **WSDL**.

   — Select **File** > **Export** > **Other** > **WSDL**.

2. The Export WSDL dialog is displayed:
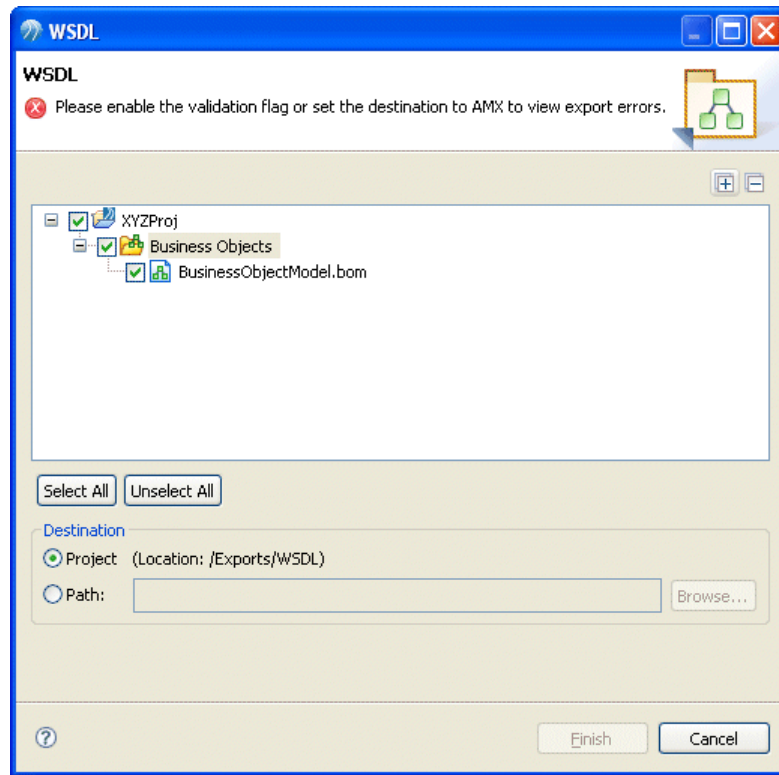
Select the business object models that you want to export, and select a destination for the WSDL file (either in the **/Exports/WSDL** directory in the project, or in a different path). The Exports folder is created if it does not yet exist and shown in the Project Explorer.

3. Click **Finish**. The WSDL files are generated in the specified location.

Exporting a Class to XML Schema File

You can export a specific class to an XML Schema file without exporting the entire business object model of which it is a part. Any objects on which that class has a dependency - for example, any attributes or operations it contains - will be exported with it. This dependency is worked out recursively, so that any dependencies of the dependencies, and so on, are also exported.

To export a class to an XML Schema file,:

1. Right-click on the representation of the class in the business object model diagram editor, and select **Export** > **XML Schema**.

2. The XML Schema dialog is displayed:
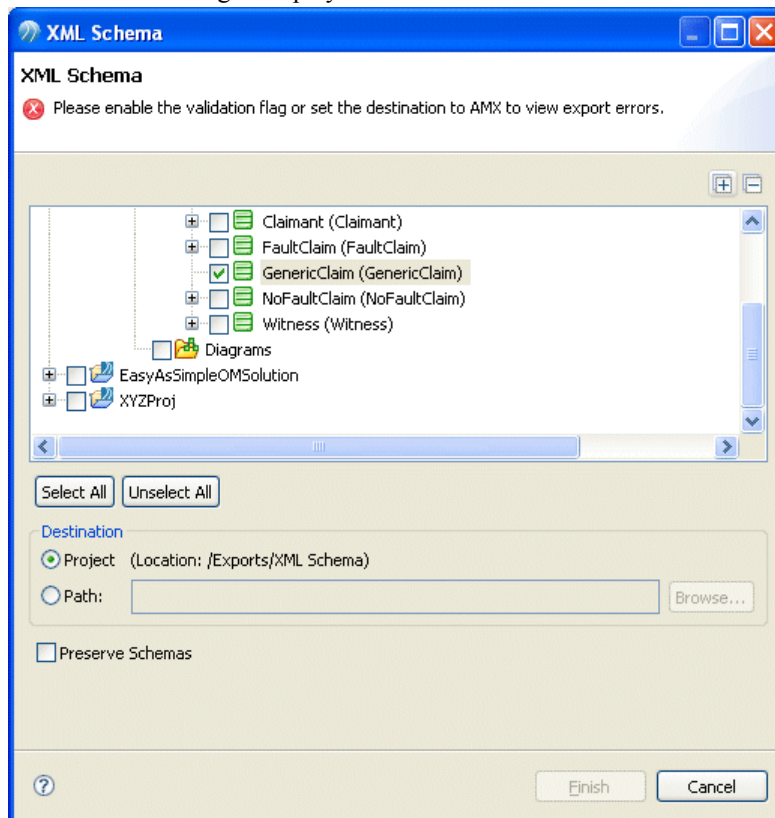
Check the selection and change it if necessary. Select a destination for the XSD file (either in the **/Exports/XML Schema** directory in the project, or in a different path). The Exports folder is created if it does not yet exist and shown in the Project Explorer.

If you check the **Preserve Schemas** checkbox, the export process will try to preserve the structure of the schema by creating a separate XSD file for each package that is included in the export. If you do not check that box, the export process flattens out all packages into one XSD file.

3. Click **Finish**. The XSD files are generated in the specified location.

Exporting a Class to WSDL Format

You can export a specific class to an WSDL file. Any objects on which that class has a dependency - for example, any attributes or operations it contains - will be exported with it. This dependency is worked out recursively, so that any dependencies of the dependencies, and so on, are also exported.

To export a class to an WSDL file:

1. Right-click on the representation of the class in the business object model diagram editor, and select **Export** > **Export to WSDL**.

2. The **WSDL** dialog is displayed:
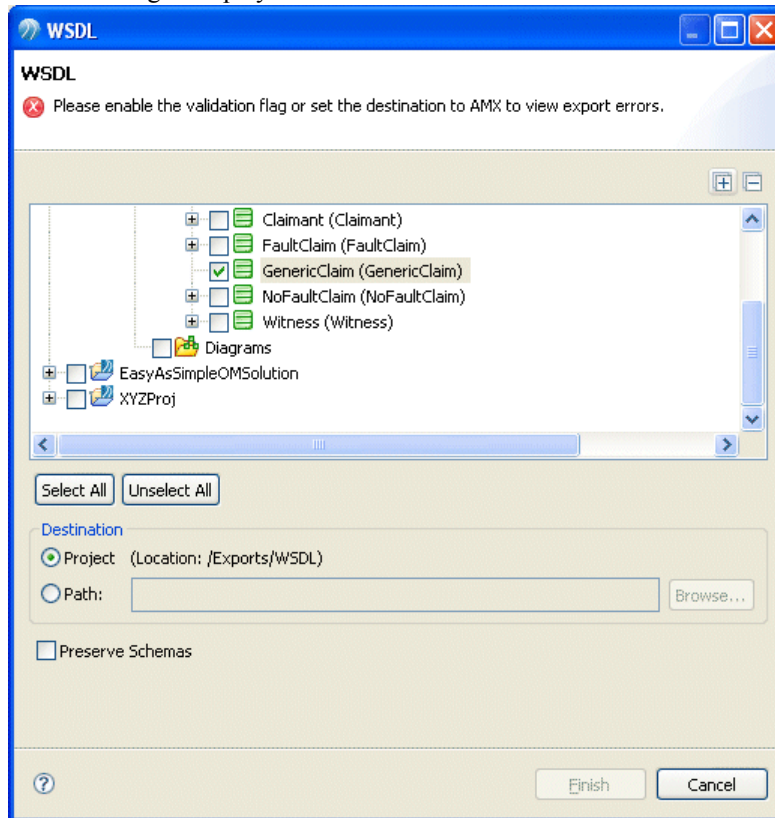
Check the selection and change it if necessary. Select a destination for the WSDL file (either in the **/Exports/WSDL** directory in the project, or in a different path). The Exports folder is created if it does not yet exist and shown in the Project Explorer.

If you check the **Preserve Schemas** checkbox, the export process will try to preserve the structure of the schema by creating a separate WSDL file for each package that is included in the export. If you do not check that box, the export process flattens out all packages into one WSDL file.

3. Click **Finish**. The WSDL files are generated in the specified location.

Setting Diagram Preferences

You can customize the appearance of the Business Object Modeler as follows:

1. Select **Window** > **Preferences**.

2. Expand **Diagram** and **Business Object Model Diagram**.

    — Clicking **Appearance** displays a dialog that allows you to change the color of fonts, backgrounds, fill colors, and so on.

    — Clicking **Connections** displays a dialog that allows you to change the line style of the Connections in the Business Object Modeler (for example, Associations, Generalizations, and so on).

    — Clicking **Pathmaps** displays a dialog that allows you to specify path variables to modeling artifacts that you might want to use in your business object model.

There are two more options **Printing** and **Ruler and Grid**. Even though these options are not displayed directly under **BOM Diagram**, they apply only to the Business Object Modeler, and not to the Process Modeler.

    — Clicking **Printing** displays a dialog that allows you to specify the print settings for your business object models (for example, orientation, page size and the margins).

    — Clicking **Ruler and Grid** displays a dialog that allows you to specify whether or not the ruler or grid is displayed when defining business object models in the Business Object Modeler.

Any changes you apply affect new objects only. To change the appearance of existing objects, select the object then use the Appearance tab in the Properties view or the options on the **Diagram** menu.

Setting the Validation Preferences

You can customize the validation that is performed on the business object models that you create. Specifically, you can specify its severity level as **Error**, **Warning**, **Info**, or **Ignore**. To customize the business object model validation:

1. Select **Window** > **Preferences**.

2. Expand **Business Object Modeler** and select **Errors/Warnings**. The following dialog is displayed:
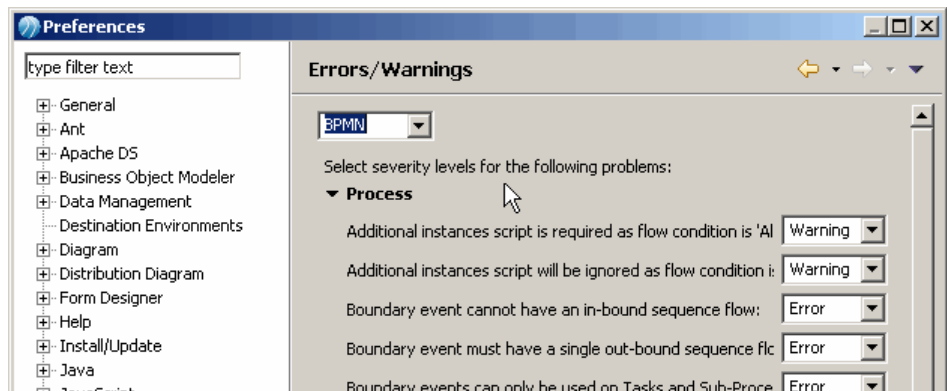
3. If you want to change the severity level for a business object model problem, select from the drop-down list. When you have finished, click **OK** to make the changes and close the window, or **Apply** to put into effect any changes you have made and keep the dialog open.

4. The following dialog is displayed:
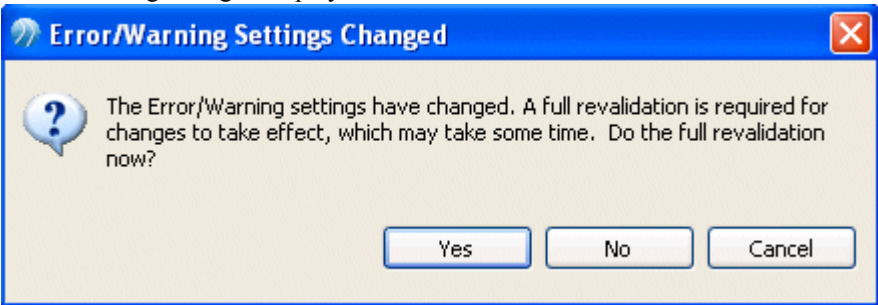
— Click **Yes** to revalidate your workspace. Depending on the size of the workspace and the number of errors, there is a delay while the revalidation occurs.

> This rebuilds every Project in the workspace. This could cause the deployment of any Projects that are set to deploy automatically on save.

— Click **No** to revalidate your workspace later. The revalidation will take place when the business object file next changes or is saved, or when you explicitly request a rebuild of the project or workspace.

— Click **Cancel** if you do not wish to apply your changes.

Setting Generation Preferences

You can specify whether TIBCO Business Studio should automatically validate business object models to check whether they are correctly formed for export as XSD or WSDL files. To specify this:

1. Select **Window** > **Preferences**.

2. Expand **Business Object Modeler** and select **Business Object Model Generator**. The following dialog is displayed:
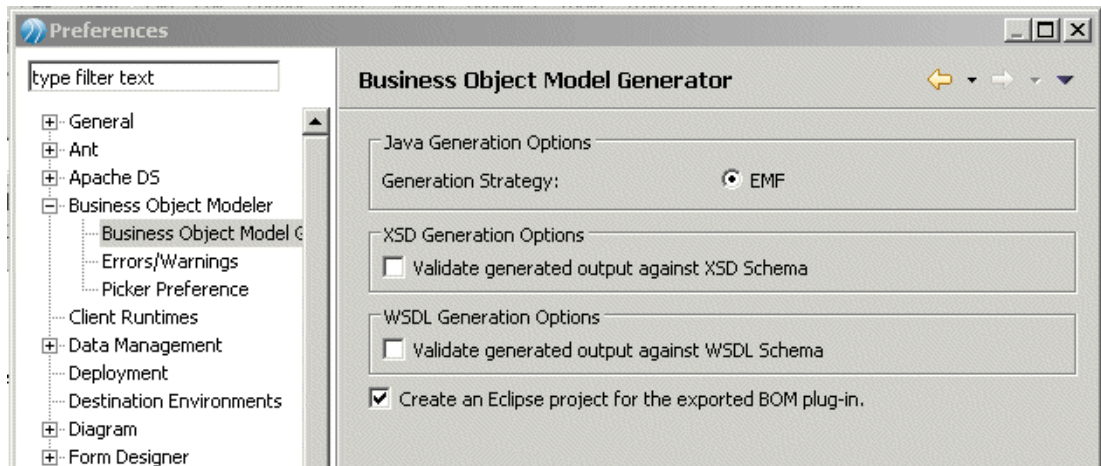
3. If you want to make any changes, check or uncheck the appropriate boxes under the **XSD Generation Options** and **WSDL Generation Options** headings. When you have finished, click **OK** to make the changes and close the window, or **Apply** to put into effect any changes you have made, and keep the dialog open.

These options have the following effects:

- If you check **Validate generated output against XSD Schema**, TIBCO Business Studio automatically runs the XSD validation rules for any business object model that you try to export in XML Schema format. If the model does not meet these validation rules, the XML Schema files are still created, so that you can examine them to diagnose the problem, but an error is generated.

- If you check **Validate generated output against WSDL Schema**, TIBCO Business Studio automatically runs the WSDL validation rules for any business object model that you try to export in WSDL format. The model must meet both these validation rules and the XSD validation rules - because the process of exporting to WSDL includes an initial export to XSD, as described in Exporting Business Object Models to WSDL Files on page 273 - if it is to be exported to WSDL. If the model does not meet these validation rules, the WSDL files are still created, so that you can examine them to diagnose the problem, but an error is generated.

See XSD Export Validation Rules on page 311 for the XSD and WSDL validation rules.

Note that for either XML Schema or WSDL files to be validated, you must either:

• Have no destination environment selected for the process,

• Have at least one valid destination environment selected for the process.

If you have selected only environments that are not valid for XSD export (such as Simulation), then no validation or export will be performed.

See the section 'Destinations and Validation' in the *TIBCO Business Studio Modeling User's Guide* for more details about destination environments.

Chapter 11 **Business Object Model Mappings to XML Schema**

This section describes how XML Schema Definition (XSD) files and business objects are mapped to each other during import and export, and how business object models are validated for export to XSD formats.

Topics

Import Mappings - XSD to Business Object Model

Importing XML Schema Files on page 246 describes how an XML schema document (XSD) can be imported into TIBCO Business Studio to create a Business Object Model. This section describes the mappings between the original XSD constructs and the resulting Business Object Model constructs.

In addition to creating UML elements in the Business Object Model, the original XSD information is also stored internally as stereotypes defined within a custom UML profile. This information is used if the Business Object Model originating from an XML schema import is re-exported as XSD so that the exported schema can be reconstructed to be logically equivalent to the original without loss of information (see Export Mappings on page 298). Note however, that this information exists only until the user makes a change to the model of the newly created Business Object Model. At this point the user will be presented with the following dialog:
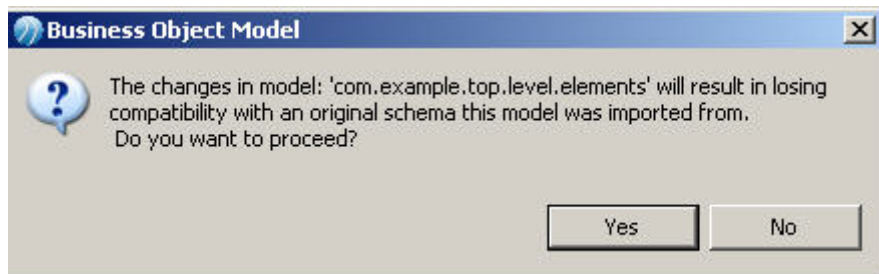
Clicking **OK** will remove the profile containing the original XSD information. Subsequent export of this Business Object Model to XML Schema will follow the mappings for a "user-defined" Business Object Model outlined in Export Mappings on page 298.

Target Namespace

The schema ExampleSchema.xsd with the following namespace information:

```
<schema xmlns=http://www.w3.org/2001/XMLSchema targetNamespace="http://www.example.org/ExampleSchema"
 mlns:tns="http://www.example.org/ExampleSchema" elementFormDefault="qualified">
</schema>
```

Creates a Business Object Model called ExampleSchema.bom with the following:

```
org.example.example.schema
Author:   anon
Created: 07/01/11 16:08
Modified: 07/01/11 16:15
Applied Profiles:
```

Included Schemas

XML schemas can include other schema of the same target namespace. Included schemas are merged into a single Business Object Model.

Imported Schemas

If ExampleSchema.xsd has the following <import> construct:

```
<import namespace="http://www.example.org/ImportedSchema" schemaLocation="ImportedSchema.xsd"/>
```

Then in addition to ExampleSchema.bom another BOM is generated called org.example.imported.schema.bom with the following details

```
org.example.imported.schema
Author:   anon
Created: 07/01/11 16:22
Modified: 07/01/11 16:26
Applied Profiles:
```

XSD SimpleType

Basic SimpleType

XML Schema SimpleType constructs are mapped directly to a Business Object Model PrimitiveType. For example:

```
<simpleType name="SimpleType2">
 <restriction base="string" />
</simpleType>
```

Maps to:

XML schema to Business Object Model data type mappings are described in section **Data Type Mappings on page 305**

SimpleType that Extends Another SimpleType

The following XML schema construct:

```
<simpleType name="SimpleType3">
 <restriction base="tns:SimpleType2" />
</simpleType>
<simpleType name="SimpleType2">
 <restriction base="string" />
</simpleType>
```

Maps to:

Note that SimpleType3 extends (generalizes) SimpleType2.

Annotation within SimpleType

The following XML schema construct:

```
<simpleType name="SimpleTypeAnnot">
 <annotation>
  <documentation>Annotation to a SimpleType</documentation>
 </annotation>
```

```
 <restriction base="integer"></restriction>
</simpleType>
```

Maps to:
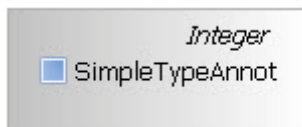
The text contained within the <documentation> tag will be visible in the Description tab of the Business Object Model PrimitiveType property sheet.

XSD Complex Type

XML Schema ComplexType constructs are mapped directly to a Business Object Model Class. Element and attribute constructs within the ComplexType will map to Business Object Model attributes with multiplicity dependent on context (see examples below).

ComplexType with Attributes and Sequence of Elements

The following XML schema construct:

```
<complexType name="Address">
 <sequence>
 <element name="firstName" type="string" />
 <element name="lastName" type="string" />
 <element name="firstLineAdress" type="string" />
 <element name="city" type="string" />
 <element name="region" type="string" />
<element name="postcode" type="string" />
 </sequence>
 <attribute name="id" type="integer" />
</complexType>
```

Maps to:

Note that <element> constructs, in the absence of any maxOccurs and minOccurs facets, map by default to a Business Object Model attribute with multiplicity of 1. The <attribute> construct will always map to a Business Object Model attribute with multiplicity 0..1, reflecting the optional nature of an XSD attribute.

ComplexType with Element of Type ComplexType

The following XML schema construct:

```
<complexType name="BankCustomer">
 <sequence>
 <element name="id" type="integer" />
 <element name="name" type="string"></element>
 <element name="account" type="tns:Account" />
 </sequence>
</complexType>
<complexType name="Account">
 <sequence>
 <element name="number" type="integer" />
 </sequence>
</complexType>
```

Maps to:

In this example, Account is a ComplexType and hence represented as a Class on the Business Object Model. The BankCustomer Class, subsequently, has a composition relationship with Account representing the "account" <element>.

ComplexType with SimpleContent

The following XML schema construct:

```
<simpleType name="SimpleType">
 <restriction base="string">
 </restriction>
</simpleType>

<complexType name="ComplexType">
 <simpleContent>
 <extension base="tns:simpleType" />
 </simpleContent>
</complexType>
```

Maps to:

Note that the <simpleContent> construct maps to a Class attribute with multiplicity 0..1. The anonymous nature of the <simpleType> construct meant that the Business Object Model had to assign the name "value" to its attribute.

ComplexType with ComplexContent Extension

The following XML schema construct:

```
<complexType name="Person">
 <sequence>
  <element name="name" type="string"></element>
 </sequence>
</complexType>

<complexType name="Customer">
 <complexContent>
 <extension base="tns:Person">
 <sequence>
  <element name="id" type="string"></element>
 </sequence>
 </extension>
 </complexContent>
</complexType>
```

Maps to:

The Business Object Model creates a Generalization relationship between the Customer and Person Classes.

ComplexType with ComplexContent Restriction

The following XML schema construct:

```xml
<complexType name="shoppingBasket">
 <sequence>
  <element name="productId" type="positiveInteger"   maxOccurs="unbounded"/>
 </sequence>
</complexType>

<complexType name="basketCapped">
 <complexContent>
 <restriction base="tns:shoppingBasket">
 <sequence>
  <element name="productId" type="positiveInteger" maxOccurs="5" />
 </sequence>
 </restriction>
 </complexContent>
</complexType>
```
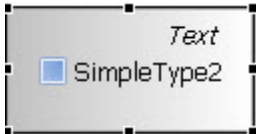
Maps to:

Note that the multiplicity of productId in the basketCapped class is represented by a 1..n, that is, more restrictive that the shoppingBasket class productId that has unbounded multiplicity.

Anonymous ComplexType

The following XML schema construct:

```
<complexType name="Ct1">
 <sequence>
  <element name="Elem">
   <complexType>
    <sequence>
     <element name="anon" type="string"></element>
    </sequence>
   </complexType>
  </element>
 </sequence>
</complexType>
```
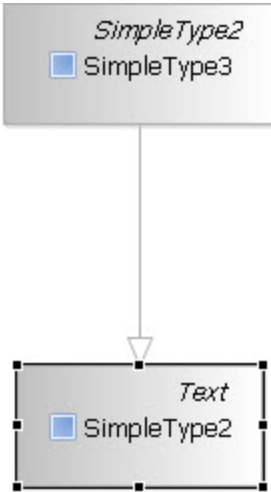
Maps to:
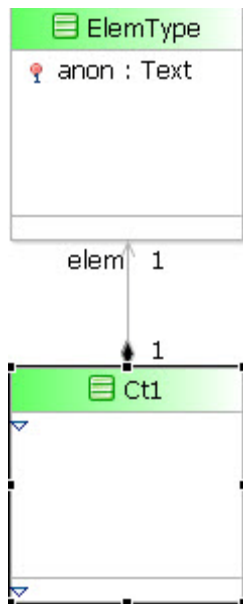
The anonymous ComplexType within the "elem" element means "elem" is represented as a Class on the Business Object Model, with an assigned name of "ElemType". The containment of "ElemType" within "ct1" is represented by a Composition relationship.

Annotation within ComplexType

The <documentation> information in the following XML schema constructs will be visible in the Description tab of the Business Object Model PrimitiveType property sheet.

The following XML schema construct:

```
<complexType name="ComplexTypeAnnot">
 <annotation>
 <documentation>Annotation to a ComplexType</documentation>
 </annotation>
</complexType>
```

Maps to:
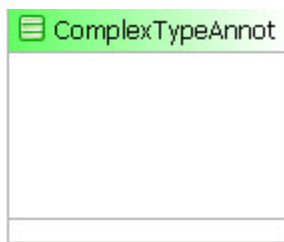
ComplexType with Mixed Construct

The following XML schema construct:

```
<xs:complexType name="Car" mixed="true">
 <xs:sequence>
  <xs:element name="colour" type="xs:string" />
 </xs:sequence>
</xs:complexType>
```
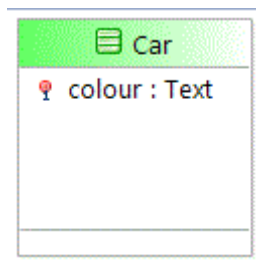
Maps to:

ComplexContent with Mixed Construct

The following XML schema construct:

```
<xs:complexType name="Car">
        <xs:complexContent mixed="true">
                <xs:extension base="SuperCar">
                        <xs:sequence>
                                <xs:element name="engine" type="xs:string"/>
                        </xs:sequence>
                </xs:extension>
        </xs:complexContent>
</xs:complexType>
```
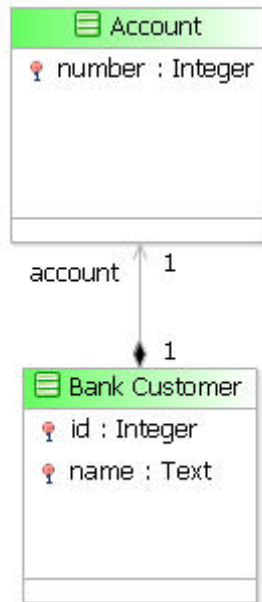
Maps to:
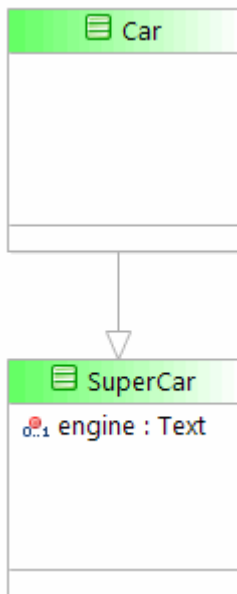
A mixed complex content can only exist if it extends another complex type that is also labelled as mixed.

See http://www.w3.org/TR/xmlschema11-1/#dcl.ctd.ctcc.common

> It is not valid for the mixed construct on complex type and complex content to be different.

XSD Global Elements

XML schema global elements and attributes do not translate directly into Business Object Model (i.e. UML) data. However, they do need to be represented by some means so that they can be reconstructed in exported XML schema, if the Business Object Model originated from an XML schema import.

Simple Element and Attribute Type

The following XML schema construct:

```
<schema>
 <element name="TestStringData" type="string"></element>
</schema>
```

Maps to Business Object Model Primitive Type:
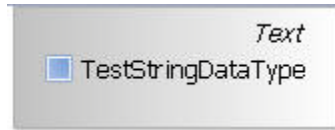
A stereotype is applied to the "TestStringData" PrimitiveType identifying it as a XSD global element.

Element of Complex Type

The following XML schema construct:
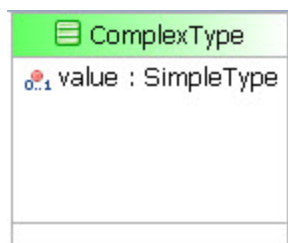
```
<element name="PersonElement" type="Person"></element>
<complexType name="Person">
 <sequence>
 <element maxOccurs="1" minOccurs="1" name="name">
 <simpleType>
 <restriction base="string">
 <maxLength value="50"></maxLength>
 </restriction>
 </simpleType>
 </element>
 </sequence>
</complexType>
```

Maps to a Business Object Model Class representing the Person ComplexType:

Maps to:
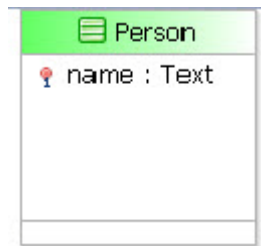
The global element "PersonElement" is not represented directly on the Business Object Model diagram. Instead, the Class "Person" has a stereotype applied to it that stores data representing all the global elements in the original schema that were of this type.

Top Level Enumeration Elements

The following XML schema construct:

```
<element name="topElement" type="SubAccountType"></element>
<simpleType name="SubAccountType">
 <restriction base="string">
 <enumeration value="Cash"></enumeration>
 <enumeration value="Margin"></enumeration>
```
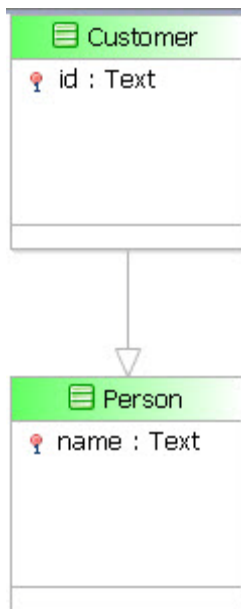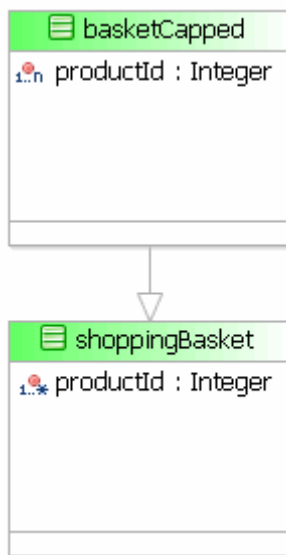
```
<enumeration value="Income"></enumeration>
<enumeration value="Short"></enumeration>
<enumeration value="DVP/RVP"></enumeration>
<enumeration value="Dividend"></enumeration>
</restriction>
</simpleType>
```

Maps to a Business Object Model Class representing the SubAccountType ComplexType:
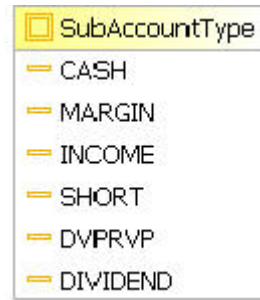
The appropriate stereotype information represents the global element "topElement".

Export Mappings

Exporting Business Object Models to XML Schema or WSDL Files on page 272 describes how Business Object Models can be exported to XML Schema (XSD) files. This appendix describes the XML schema constructs that result from the original Business Object Model constructs.

There will be differences in the exact nature of the export transformation depending on the origin of the Business Object Model i.e. whether it:

• was created as a new Business Studio asset.

• originated from an XML Schema import.

If it originated from an XML Schema import, the exported Business Object Model will create XML schema logically equivalent to the original imported schema, using the information stored as stereotypes in an internal UML profile. However, this is dependent on the user not having changed the Business Object Model after the import, in which case the profile information will have been discarded.

The examples described in this section are for **user-defined** Business Object Models only.

Primitive Type

Business Object Model primitive types are translated to XSD simple types. The simple types' base restriction is set to the xsd data type corresponding to the original Business Object Model data type. These mappings are defined in **Data Type Mappings on page 305**.

For example:
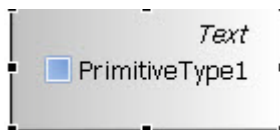
Transforms to:

```
<xsd:simpleType id="_5_yrABpLEeChWL2te4gBZg" name="PrimitiveType1">
  <xsd:restriction base="xsd:string">
   <xsd:maxLength value="50"/>
  </xsd:restriction>
  </xsd:simpleType>
```

Class

Complex Type

A Business Object Model Class is transformed into an XSD ComplexType.

For example:
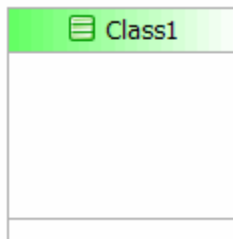
Transforms to:

```
<xsd:complexType id="_Q8fQQBpMEeChWL2te4gBZg" name="Class1"/>
```

Complex Type - Class with Attributes

Business Object Model attributes contained within a Class are transformed into XSD elements within a sequence contained within the ComplexType created to represent the Class.

For example:
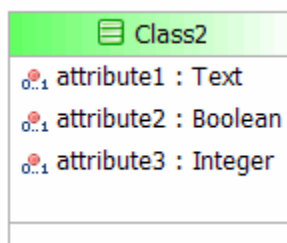
Transforms to:

```
<xsd:complexType id="_oyUc8BpMEeChWL2te4gBZg" name="Class2">
  <xsd:sequence>
    <xsd:element id="_pSM24BpMEeChWL2te4gBZg" maxOccurs="1" minOccurs="0" name="attribute1">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:maxLength value="50"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:element>
    <xsd:element id="_ppTIQBpMEeChWL2te4gBZg" default="false" maxOccurs="1" minOccurs="0"
      name="attribute2">
```

```
    <xsd:simpleType>
      <xsd:restriction base="xsd:boolean"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element id="_sVEK8BpMEeChWL2te4gBZg" maxOccurs="1" minOccurs="0" name="attribute3">
    <xsd:simpleType>
      <xsd:restriction base="xsd:int">
        <xsd:totalDigits value="10"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:element>
  </xsd:sequence>
</xsd:complexType>
```

Enumeration

A Business Object Model Enumeration is transformed into an XSD SimpleType.

For example:

Transforms to:

```
<xsd:simpleType id="_-xfC8BpMEeChWL2te4gBZg" name="COLORS">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="RED"/>
    <xsd:enumeration value="GREEN"/>
    <xsd:enumeration value="BLUE"/>
  </xsd:restriction>
```

Model

The name of the UML Model construct (which forms the base package of the Business Object Model), is used to define the target namespace of the exported XML schema, and the name of the XML schema file.

For example a file called example.Business Object Model:
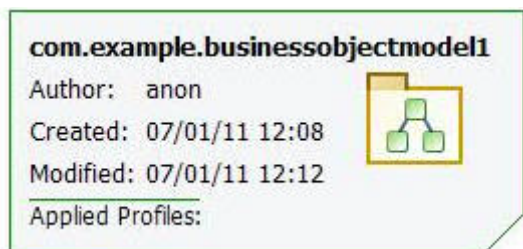
Transforms to file com.example.businessobjectmodel1.xsd with the following namespace information:

```
<xsd:schema
    xmlns="http://example.com/businessobjectmodel1" xmlns:tns1="http://example.com/businessobjectmodel1"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" targetNamespace="http://example.com/businessobjectmodel1">
  <xsd:annotation>
    <xsd:documentation>BOMORIGIN::/p1/Business Objects/BusinessObjectModel1.bom</xsd:documentation>
  </xsd:annotation>
</xsd:schema>
```

Package

For each Business Object Model Package encountered during the export transformation, a new separate XSD file will be created. Similar to the UML Construct, the Package name is used to define the XSD filename and target namespace.

If the following package exists in the above model com.example.businessobjectmodel1:

Then two schema files will be generated:

- *com.example.businessobjectmodel1.xsd* (as above)

- A separate xsd file will be generated to represent the package called:

  com.example.businessobjectmodel1.comexamplewwwstockcheck.xsd

  with the following namespace information:

```
<xsd:schema
```

```
xmlns="http://example.com/businessobjectmodel1/comexamplewwwstockcheck"
 xmlns:tns1="http://example.com/businessobjectmodel1/comexamplewwwstockcheck"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 targetNamespace="http://example.com/businessobjectmodel1/comexamplewwwstockcheck">
<xsd:annotation>
 <xsd:documentation>BOMORIGIN::/p1/Business Objects/BusinessObjectModel1.bom</xsd:documentation>
 </xsd:annotation>
</xsd:schema>
```

> Furthermore, the com.example.businessobjectmodel1.xsd schema will contain an <import> construct referencing *com.example.businessobjectmodel1.comexamplewwwstockcheck.xsd*

that is:

```
<xsd:schema xmlns="http://example.com/businessobjectmodel1"
 xmlns:tns2="http://example.com/businessobjectmodel1"
 xmlns:tns1="http://example.com/businessobjectmodel1/comexamplewwwstockcheck"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema" targetNamespace="http://example.com/businessobjectmodel1">
 <xsd:annotation>
 <xsd:documentation>BOMORIGIN::/p1/Business
Objects/BusinessObjectModel1.bom</xsd:documentation>
 </xsd:annotation>
 <xsd:import
namespace="http://example.com/businessobjectmodel1/comexamplewwwstockcheck"
schemaLocation="com.example.businessobjectmodel1.comexamplewwwstockcheck.xsd" />
</xsd:schema>
```

Relationships

> Currently, only two Business Object Model relationships are supported for XML schema export, namely Generalizations and Compositions.

Generalization   A Class may generalize another Class:
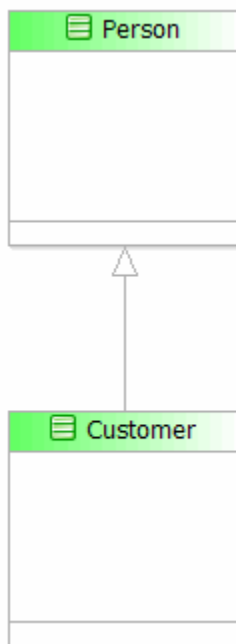
Transforms to:

```
<xsd:complexType id="_sJ1ZEBpREeChWL2te4gBZg" name="Customer">
 <xsd:complexContent>
   <xsd:extension base="tns1:Person"/>
 </xsd:complexContent>
</xsd:complexType>
<xsd:complexType id="_so-MIBpREeChWL2te4gBZg" name="Person"/>
```

A Primitive Type may generalize another Primitive Type.

Transforms to:

```xml
<xsd:simpleType id="_Gf-mYBpSEeChWL2te4gBZg" name="BaseType">
 <xsd:restriction base="xsd:string">
  <xsd:maxLength value="50"/>
 </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType id="_GpqG0BpSEeChWL2te4gBZg" name="ExtendedType">
 <xsd:restriction base="tns1:BaseType">
  <xsd:maxLength value="50"/>
 </xsd:restriction>
</xsd:simpleType>
```
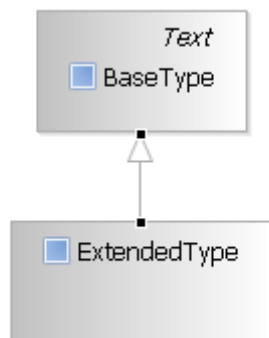
Composition   The following composition construct:
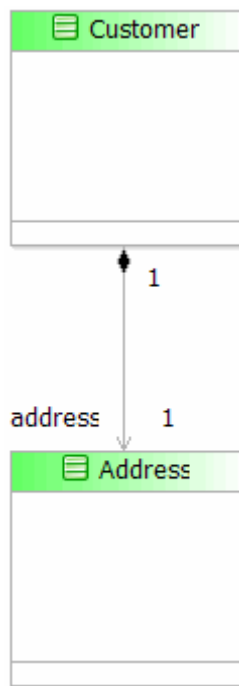
Transforms to:

```xml
<xsd:complexType id="_7-Eb8BpTEeChWL2te4gBZg" name="Customer">
 <xsd:sequence>
  <xsd:element id="_DkCHxBpUEeChWL2te4gBZg" maxOccurs="1" minOccurs="1" name="address"
    type="Address"/>
 </xsd:sequence>
</xsd:complexType>
<xsd:complexType id="_8PfjIBpTEeChWL2te4gBZg" name="Address"/>
```

Data Type Mappings

XML Schema to Business Object Model Import Mappings

During the import process XML Schema data types (defined at http://www.w3.org/TR/xmlschema-2/) are mapped to the existing primitive Business Object Model data types with appropriate restrictions. In many cases there is no direct mapping and consequently the closest match is made.

XSD data type	Mapping to Business Object Model primitive type
xsd:gDay	**Text** The following pattern is used to ensure valid formatting: \-\-\-(0[1-9]|[12][0-9]|3[01])(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))
xsd:gMonth	**Text** The following pattern is used to ensure valid formatting: \-\-(0[1-9]|[1][0-2])(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))
xsd:gMonthDay	**Text** The following pattern is used to ensure valid formatting: \-\-(0[1-9]|[1][0-2])\-(0[1-9]|[12][0-9]|3[01])(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))
xsd:gYear	**Text** The following pattern is used to ensure valid formatting: (\-\d{4,}|\d{4,})(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))
xsd:gYearMonth	**Text** The following pattern is used to ensure valid formatting: (\-\d{4,}|\d{4,})(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))\-(0[1-9]|[1][0-2])(|Z|[+-](0[0-9]|[1][0-3]):(0[0-9]|[12345][0-9]))
xsd:IDREF	**Text** The following pattern is used to ensure valid formatting: [\i-[:]][\c-[:]]*

XSD data type	Mapping to Business Object Model primitive type
xsd:IDREFS	**Text** A stereotype is used to indicate the original IDREFS type, but no pattern is enforced.
xsd:language	**Text** The following pattern is used to ensure valid formatting: ([a-zA-Z]{2}|[iI]-[a-zA-Z]+|[xX]-[a-zA-Z]{1,8})(-[a-zA-Z]{1,8})*
xsd:Name	**Text** The following pattern is used to ensure valid formatting: \i\c*
xsd:NCName	**Text** The following pattern is used to ensure valid formatting: [\i-[:]][\c-[:]]*
xsd:NMTOKEN	**Text** A stereotype is used to indicate the original NMTOKEN type. The following pattern is used to ensure valid formatting: \c+
xsd:NMTOKENS	**Text** A stereotype is used to indicate the original NMTOKENS type, but no pattern is enforced.
xsd:normalizedString	**Text** The following pattern is used to ensure that tab, linefeed and return characters are replaced by spaces: [^\t\n\r]+
xsd:QName	**Text** The following pattern is used to ensure valid formatting: ([\\i-[:]][\\c-[:]]*:)?[\\i-[:]][\\c-[:]]*
xsd:string	**Text**

XSD data type	Mapping to Business Object Model primitive type
xsd:ENTITY	**Text.** The following pattern is used to ensure valid formatting: [\i-[:]][\c-[:]]
xsd:anyType	This is mapped to a non-typed attribute or primitive type.
xsd:anySimpleType	This is mapped to a non-typed attribute or primitive type.
xsd:token	**Text** The following pattern is used to ensure valid formatting: \c+([ ]\c+)*
xsd:boolean	**Boolean**
xsd:base64Binary	**Attachment**
xsd:hexBinary	**Attachment** The following pattern is used to ensure valid formatting: ([0-9a-fA-F][0-9a-fA-F])*
xsd:byte	**Integer** The following pattern is used to ensure valid formatting: minInclusive = -128 maxInclusive = 127
xsd:unsignedByte	**Integer** The following restrictions are applied: minInclusive = 0 maxInclusive = 255
xsd:integer	**Integer** A stereotype is used to indicate the original xsd:integer type.
xsd:long	A **Fixed Integer** subtype of the **Integer** primitive type. The following restrictions are applied: minInclusive = -9223372036854775808 maxInclusive = 9223372036854775807

XSD data type	Mapping to Business Object Model primitive type
xsd:negativeInteger	**Fixed Integer** The following restrictions are applied: maxInclusive = -1
xsd:nonNegativeInteger	**Fixed Integer** The following restrictions are applied: minInclusive = 0
xsd:nonPositiveInteger	**Fixed Integer** The following restrictions are applied: maxInclusive = 0
xsd:positiveInteger	**Fixed Integer** The following restrictions are applied: minInclusive = 1
xsd:short	**Integer** The following restrictions are applied: minInclusive = -32768 maxInclusive = 32767
xsd:unsignedInt	**Fixed Integer** The following restrictions are applied: minInclusive = 0 maxInclusive = 4294967295
xsd:unsignedLong	**Fixed Integer** The following restrictions are applied: minInclusive = 0 maxInclusive = 18446744073709551615
xsd:unsignedShort	**Fixed Integer** The following restrictions are applied: minInclusive = 0 maxInclusive = 65535

XSD data type	Mapping to Business Object Model primitive type
xsd:int	A **Signed Integer** subtype of the **Integer** primitive type.
	The following restrictions are applied:
	minInclusive = -2147483648 maxInclusive = 2147483647
xsd:float	A **Floating Point** subtype of the **Decimal** primitive type.
	The following restrictions are applied:
	minInclusive = -3.4028235E38 maxInclusive = 3.4028235E38
xsd:double	A **Fixed Point** subtype of the **Decimal** primitive type.
	The following restrictions are applied:
	minInclusive = -1.7976931348623157E308 maxInclusive = 1.7976931348623157E308
xsd:anyURI	**URI**
xsd:date	**Date**
xsd:time	**Time**
xsd:dateTime	**DateTime**
xsd:duration	**Duration**
xsd:ID	**Text**
	The following pattern is used to ensure valid formatting:
	[\i-[:]][\c-[:]]*
	(Note that this is the same pattern as for xsd:NCName.)
xsd:mixed	**Boolean**

Business Object Model to XML Schema Export Mappings

Business Object Model Primitive Type	Mapping to XML Schema data type
Boolean	xsd:boolean
Date	xsd:date
Date Time	xsd:dateTime
Date Time and Time Zone	xsd:dateTime The following pattern is used to ensure valid formatting: .+T.+(Z|[+-].+)
Decimal	xsd:double xsd:decimal
Duration	xsd:duration
ID	xsd:string The following pattern is used to ensure valid formatting: [\i-[:]][\c-[:]]*
Integer	xsd:int xsd:integer
Object	xsd:any
Text	xsd:string The following restrictions are applied: maxLength value="50"
Time	xsd:time
URI	xsd:anyURI

Round-trip Export

Note that the original XSD data types are preserved on export if the Business Object Model has not been modified by the user and hence the XSD Notation profile is still applied.

XSD Export Validation Rules

If you have specified that business object models should be validated for export to XSD or to WSDL, as specified in Setting Generation Preferences on page 280, the following rules are applied

Rule	Severity
Class cannot contain multiple ID attributes	Error
Enum Literal does not match the required regular expression	Error
Enumeration must contain a subset of Enumeration Literals as Enumeration	Error
Class contains a duplicate attribute name	Error
Primitive Type default value will be lost on transformation	Warning
The current Destination ignores default values for Primitive Types	Warning
Operations are ignored for the current Destination(s)	Warning
Only Generalization and unidirectional composition are supported	Error
Invalid Package name	Error
Association Classes are not supported	Error
constraint exceeded	Error
Attribute default value exceeds Max Text Length	Error
Attribute lower limit exceeds upper limit	Error
Attribute lower limit exceeds default value	Error
Attribute default value exceeds upper limit	Error
Attribute lower limit value length exceeds max number length	Error
Attribute upper limit value length exceeds max number length	Error
Attribute default value length exceeds max number length	Error

Rule	Severity
Attribute lower limit value has more decimal places than the maximum defined	Error
Attribute upper limit value has more decimal places than the maximum defined	Error
Attribute default value has more decimal places than the maximum defined	Error
Attribute default value does not conform to defined pattern	Error
Attribute's number of decimal places exceeds number length	Error
Cyclic Dependency has been detected for this resource	Error
Classifier exports to top level element and name cannot end with "Element"	Error
PrimitiveType cannot be set to type Object	Error
More that one attribute of type Object exists in Class hierarchy	Error
Attribute type must be set	Error
Cannot generalize a Classifier with XSD Notation attribute "final"	Error
An attribute of type Object xsd:any must be the last in the parent's list of attributes	Error
Attribute preceding Object xsd:any must have equivalent max and min multiplicity values	Error
Attribute following Object xsd:any must have equivalent max and min multiplicity values	Error
Object type multiplicity must be fixed if container Class is generalized	Error

XSD Import Restrictions

The following XSD constructs are not supported by Business Object Model import.

When importing XML Schema the files are scanned to ensure the following elements do not occur. If they do, an error is shown and the transformation cannot take place:

Unsupported Elements

- xsd:key
- xsd:keyref
- xsd:list
- xsd:redefine
- xsd:unique

Unsupported Built-in Datatypes

- xsd:NOTATION

Chapter 12 **Business Object Model Mappings to WSDL**

A Business Object Model generated from a WSDL represents:

*   Each <wsdl:portType> construct as a UML class.

*   The <wsdl:operation> construct as a UML operation.

*   The <wsdl:schema> constructs used to define data types in <wsdl:message> constructs as Business Object Model entities according to mapping rules defined in Business Object Model Mappings to XML Schema on page 283.

The name of the Business Object Model file is derived from the target namespace of the WSDL.

Topics

Worked Example

The following WSDL generates a Business Object Model file called
com.example.example1.bom.:

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions xmlns:tns1="http://example.com/example1"
 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 targetNamespace="http://example.com/example1">
<wsdl:types>
 <xsd:schema targetNamespace="http://example.com/example1">
  <xsd:complexType name="Person">
   <xsd:sequence>
    <xsd:element name="firstName" type="xsd:string" />
    <xsd:element name="lastName" type="xsd:string" />
    <xsd:element name="id" type="xsd:string" />
    <xsd:element name="category" type="xsd:string" />
   </xsd:sequence>
  </xsd:complexType>
 </xsd:schema>
</wsdl:types>
<wsdl:message name="myOutputMessage">
 <wsdl:part name="person" type="tns1:Person" />
</wsdl:message>
<wsdl:message name="myInputMessage">
 <wsdl:part name="lastName" type="xsd:string" />
 <wsdl:part name="id" type="xsd:boolean" />
</wsdl:message>
<wsdl:portType name="GetPersonData">
 <wsdl:operation name="my_operation">
  <wsdl:input message="tns1:myInputMessage" name="myInputMessage" />
  <wsdl:output message="tns1:myOutputMessage" name="myOutputMessage" />
 </wsdl:operation>
 </wsdl:portType>
</wsdl:definitions>
```

The Business Object Model file contains the following Business Object Model entities:

Note the following:

- The GetPersonData class represents the <wsdl:portType> construct in the original
  WSDL.

- The <wsdl:operation name="my_operation"> construct is represented by the "my_operation" UML operation in class GetPersonData.

- The <wsdl:input> and <wsdl:output> constructs are represented by the input and return parameter type respectively, of the "my_operation" UML operation. The <wsdl:message> and <wsdl:part> constructs are used to set the input and return parameter types.

- The embedded schema's complexType "Person" results in the UML Class Person. If the target namespace of the embedded schema had been different from the WSDL's, or if it had been from an imported schema, then a new, separate Business Object Model would have been created.

WSDL Import Restrictions

Importing a WSDL to create a Business Object Model is not supported in the following circumstances:

• The WSDL to be imported has more than one output part. Business Object Model operations can have only one return type.

• The XML schema has import restrictions, as outlined in XSD Import Restrictions on page 313.

• The WSDL is invalid.

In each of these cases the import does not complete and a dialog is displayed summarizing the error.

Export Mappings – Business Object Model to WSDL

Exporting a Business Object Model to a WSDL file generates:

- A port type for every Class within the Business Object Model that has at least one operation.

- Within each port type, a WSDL operation corresponding to each Class operation.

- An output message corresponding to the return type of each Business Object Model operation.

- An input message for each input parameter of the Business Object Model operation.

- An embedded XML schema generated following the transformation rules described in Export Mappings on page 298.

For example the following Business Object Model Class:

Maps to the following WSDL constructs:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions
  xmlns:tns1="http://example.com/businessobjectmodel" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" targetNamespace="http://example.com/businessobjectmodel">
 <wsdl:types>
  <xsd:schema targetNamespace="http://example.com/businessobjectmodel">
   <xsd:annotation>
    <xsd:documentation>BOMORIGIN::/p1/Business Objects/BusinessObjectModel.bom</xsd:documentation>
   </xsd:annotation>
   <xsd:complexType id="_4SxvkAbDEeCEXKKc2dARYw" name="MyClass1"/>
   <xsd:element name="MyClass1Element" type="tns1:MyClass1"/>
  </xsd:schema>
 </wsdl:types>
 <wsdl:message name="MyClass1_operation1_outputMessage">
  <wsdl:part name="operation1_outputPart" type="xsd:boolean"/>
 </wsdl:message>
 <wsdl:message name="MyClass1_operation1_inputMessage">
  <wsdl:part name="inputParam1" type="xsd:string"/>
  <wsdl:part name="inputParam2" type="xsd:string"/>
 </wsdl:message>
 <wsdl:portType name="MyClass1">
  <wsdl:operation name="operation1">
   <wsdl:input message="tns1:MyClass1_operation1_inputMessage" name="operation1_inputMessage"/>
   <wsdl:output message="tns1:MyClass1_operation1_outputMessage" name="operation1_outputMessage"/>
```

```
    </wsdl:operation>
   </wsdl:portType>
  </wsdl:definitions>
```

Note that if a Business Object Model operation contains a parameter that is not a default primitive type, then the exported WSDL includes the appropriate XML schema so that the operation can refer to this schema.

III - ORGANIZATION MODELING

This section covers the activities involved in Organization Modeling. The concepts behind these activies are covered in *TIBCO Business Studio Concepts*.

Topics

Chapter 13 **Creating an Organization Model**

This section describes how to create a basic Organization Model using the Organization Modeler in TIBCO Business Studio.

Topics

Creating an Organization Model

An Organization Model must be contained within a project that contains an Organization Model special folder. You can create an Organization Model in the following ways:

- Create a new Organization Model Project (or Analysis Project or BPM Developer Project, which by default create an Organization Model and corresponding special folder);

- Add an Organization Model and corresponding special folder to an existing project.

Creating a Project Containing an Organization Model

To create an Organization Model in a new project:

1. Select **File > New > Organization Model Project**.

> You can also select **File** > **New > Analysis Project** or **File** > **New >BPM Developer Project** and create a project containing an Organization Model as well as other assets.

2. The **New Project** wizard is displayed. Enter a name for your project in the **Project name** field and click **Next**.
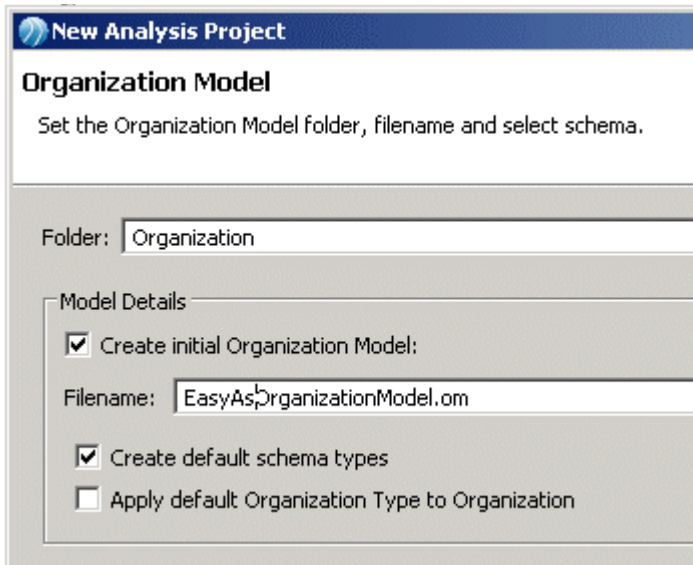
> This accepts default values for **Location, Id, Version, Status** and **Destination Environments**. For more details about these fields and about the **New Project** dialog, see the *TIBCO Business Studio Modeling User's Guide*.

3. In the **Asset Type Selection** dialog, ensure that the **Organization Model** box is checked. Click **Next**.

4. In the **Organization Model** dialog, ensure that **Create initial Organization Model** is checked. In the **Filename** field, enter a name for the Special Folder for Organization Models, or use the one provided by default. Click **Finish**.

New Analysis Project

Organization Model

Set the Organization Model folder, filename and select schema.

Folder: Organization

Model Details

☑ Create initial Organization Model:

Filename: EasyAsOrganizationModel.om

☑ Create default schema types

☐ Apply default Organization Type to Organization

Leave the **Create default schema types** box checked to use the delivered schema.

Check the **Apply default Organization Type to Organization** box if you want the Organization Type delivered in the default schema to be applied to the initial organization created. If not, leave it unchecked.

See Creating a Schema on page 327 for further details.

5. If you are not already in the **Modeling** perspective, you are prompted to switch to it. Click **Yes** to switch perspective.

Adding an Organization Model in an Existing Project

To add an Organization Model to an existing project you must first create a special folder:

1. Right-click the project where you want to add the Organization Model and select **New > Folder**. The **New Folder** dialog is displayed.

2. In the **Folder Name** field, type a relevant folder name. Click **Finish** to close the dialog.

3. Right-click the **Organization** folder and select **Special Folders > Other > Use as Organization Models Folder**. If you right-click on the **Organization** folder now, the option to create a new Organization Model is available.

Creating a Schema

The Organization Schema is contained in the Organization Model file (named by default *organization*.**om**, where *organization* is the name of the organization for which you are creating the Organization Model).

To create the default schema, when you are creating an organization model, either as part of creating a new project or separately, ensure that you leave the **Create default schema types** checkbox selected.
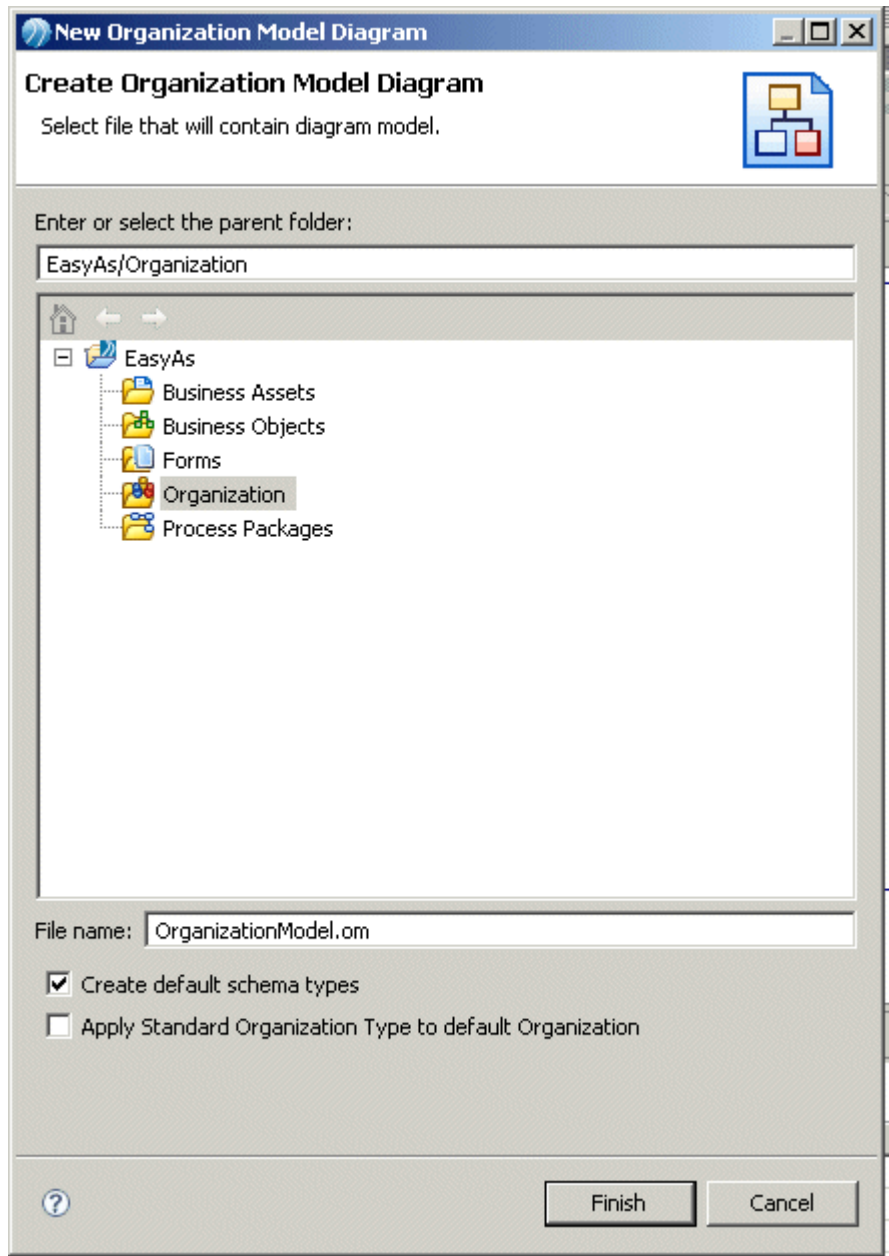
If you select the **Apply default Organization Type to Organization** checkbox, the default Organization Type (called **Public Company**) from the default schema is

applied to the initial Organization that is automatically created as part of this Organization Model. If you leave this checkbox empty, the Standard Organization Type is not applied.

Note that if you do not select **Create default schema types**, the **Apply default Organization Type to Organization** checkbox is not available:

4. Click **Finish**. The default schema is created.
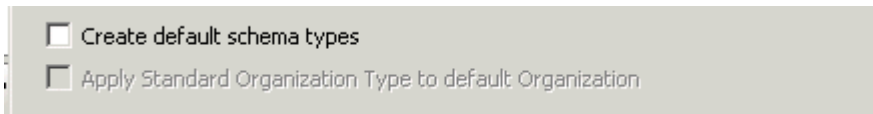
Using Your Own Schema Types

If you want to create your own schema, follow the same procedure described in Creating a Schema on page 327, but do not select the **Create default schema** checkbox. A schema is still created, but it does not include the standard types provided with the default schema. The only type created is one Resource type, the Human Resource Type.

Note that unlike the Human Resource Type created in the default schema, this one has no attributes defined.

The following illustration shows what is visible in the Project Explorer when you have created a non-default schema:
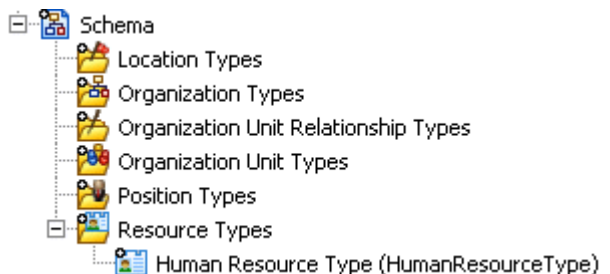
Creating Types in the Schema

If you are building your own schema, you need to create the types that make it up. If you are using the default schema provided, you can create new types to add to the schema in the same way as you would for a new schema. You can also modify the types provided. This enables you to extend the default schema provided by setting up additional attributes to define more closely the elements that make up the organization you wish to model.

Creating a Location Type

To create a location type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. In the **Schema** folder, right-click **Location Types** and select **Add Child** > **Location Type**. A new Location Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Location Type.

4. Click the **Attributes** tab. Click [+] to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can specify. You can also add a default value for the Attribute, depending on your requirements.

5. Click [✖] to remove attributes.

Creating an Organization Type

To create an Organization type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. In the **Schema** folder, right-click **Organization Types** and select **Add Child** > **Organization Type**. A new Organization Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Organization Type.

4. To add an Organization Unit as a member to the Organization Type:

   a. In the **Unit Members** box, click [+] . Type the name of the member in the **Label** field.

   b. To specify that the member should be of a particular Organization Unit Type, click on the **Type** field and then click the [...] button that then becomes available.

   c. The **Select Type** dialog is displayed. Click on the Organization Unit Type you require, and the click **OK**.

5. In the **Multiplicity** field, type in the multiplicity you want.

6. Click [✖] to remove Organization elements.

7. Click the **Attributes** tab. Click [+] to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can set for attributes. You can also add a default value for the Attribute, depending on your requirements.

8. Click [✖] to remove attributes.

Creating an Organization Unit Type

To create an Organization Unit type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. In the **Schema** folder, right-click **Organization Unit Types** and select **Add Child** > **Organization Unit Type**. A new Organization Unit Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Organization Unit Type.

4. To add another Organization Unit as a member to the Organization Unit Type:

   a. In the **Unit Members** box, click . Type the name of the member in the **Label** field.

   b. To specify that the member should be of a particular Organization Unit Type, click on the **Type** field and then click the button that then becomes available.

   c. The **Select Type** dialog is displayed. Click on the Organization Unit Type you require, and the click **OK**.

5. In the **Multiplicity** field, type in the multiplicity you want.

6. To add a Position as a member to the Organization Unit Type:

   a. In the **Position Members** box, click . Type the name of the member in the **Label** field.

   b. To specify that the member should be of a particular Position Type, click on the **Type** field and then click the button that then becomes available.

   c. The **Select Type** dialog is displayed. Click on the Position Type you require, and the click **OK**.

7. In the **Multiplicity** field, type in the multiplicity you want.

8. Click to remove Position and Unit elements.

9. Click the **Attributes** tab. Click to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can specify for Attributes. You can also add a default value for the Attribute, depending on your requirements.

10. Click to remove attributes.

Creating a Position Type

To create a Position type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. Right-click *Organization* and select **Add Child** > **Position Type**. A new Position Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Position Type.

4. Click the **Attributes** tab. Click ➕ to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can specify. You can also add a default value for the Attribute, depending on your requirements.

5. Click ✖ to remove attributes.

Creating an Organization Unit Relationship Type

To create an Organization unit relationship type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. In the **Schema** folder, right-click **Organization Unit Relationship Types** and select **Add Child** > **Organization Unit Relationship Type**. A new Organization Unit Relationship Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Organization Unit Relationship Type.

4. Click the **Attributes** tab. Click ➕ to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can specify. You can also add a default value for the Attribute, depending on your requirements.

5. Click ✖ to remove attributes.

Creating a Resource Type

To create a resource type, do the following:

1. In the **Project Explorer**, expand the **Schema** folder for your Organization Model.

2. In the **Schema** folder, right-click **Resource Types** and select **Add Child** > **Resource Type**. A new Resource Type is created.

3. Click the **General** tab in the **Properties** view. In the **Label** box, type the name of the Resource Type.

4. Click the **Attribute** tab. Click ➕ to add an attribute. Type in the name and select a type for the Attribute from the **Type** drop-down list. See "Attributes" in *TIBCO Business Studio Concepts* for more information about the types you can specify. You can also add a default value for the Attribute, depending on your requirements.

5. Click ✖ to remove attributes.

Using the Organization Modeler Diagram Editors

Organization Modeler provides two graphical editors for producing organization diagrams:

- An Organization Model Editor for the root Organization Model diagram

- An Organization Editor for the diagrams of each Organization included in the Model

The Organization Model Editor shows a high-level view of the organization or organizations that you have created. The following example shows an Organization Model diagram which includes two organizations, one being your own organization and the second a representation of an external organization with which your organization has dealings, in this case an outsourcing company.
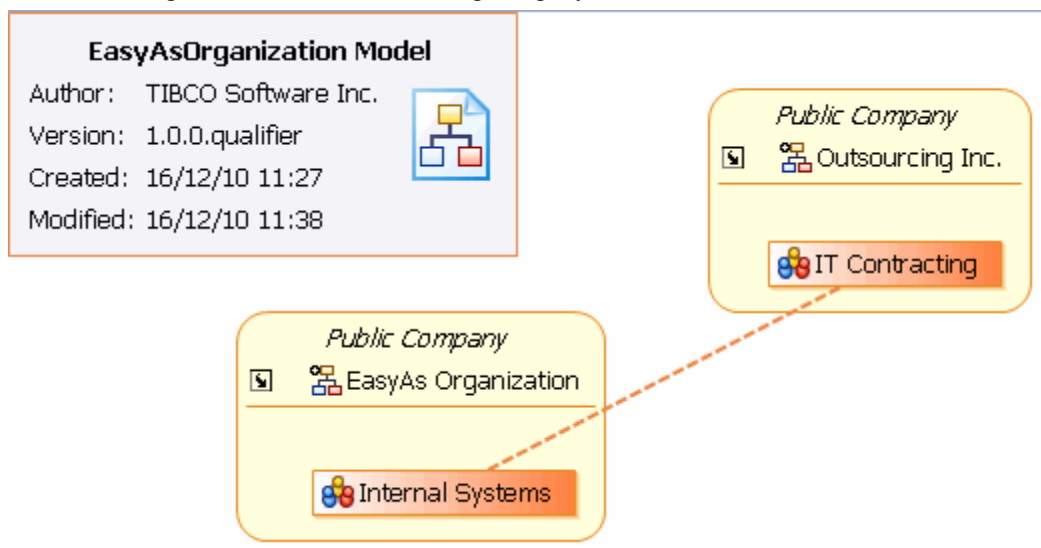
The Organization Model Editor opens when you:

- Double-click on an Organization Model **.om** file in the Project Explorer,

- Right-click on an Organization Model **.om** file in the Project Explorer, and select **Open** or **Open With > Organization Model Diagram Editing**,

- From the Organization Editor displaying any Organization in that Organization Model, click on the shortcut arrow that is displayed on the badge.
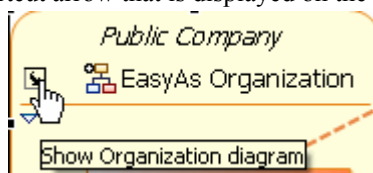
The Organization Editor shows a more detailed view of one Organization, including the Organization Units and Positions that it includes, and the relationships between them.
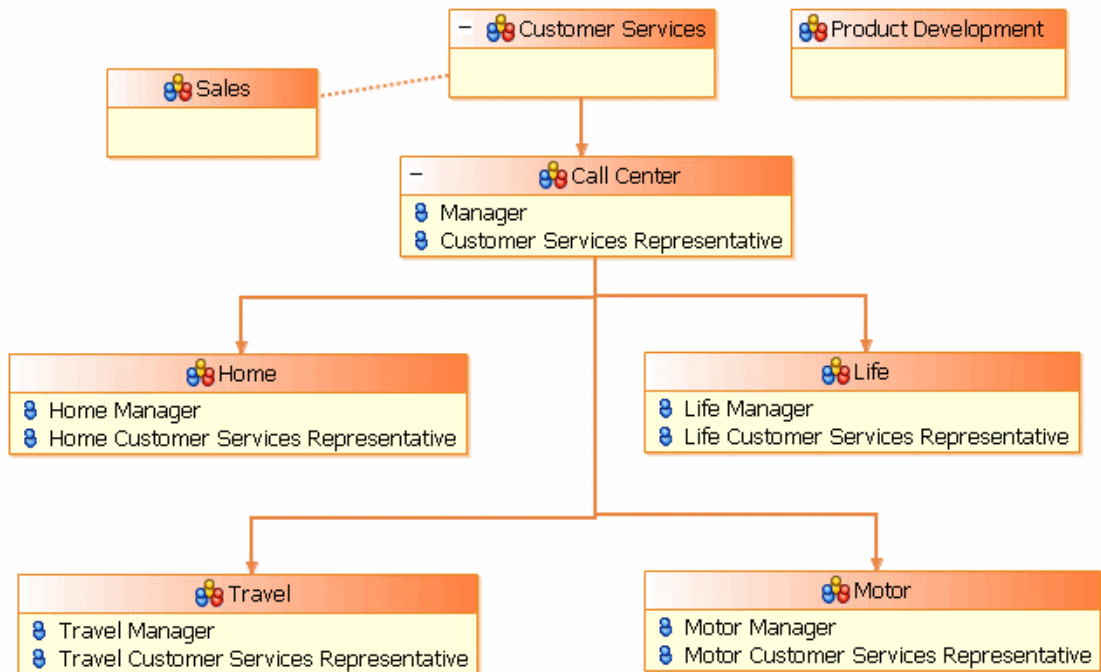
The Organization Editor opens:

- Automatically for the default Organization that is created when you create a new Organization Model Diagram,

- When you double-click on the header part of the representation of an Organization in the Organization Model Editor,

- When you double-click on an Organization in the Project Explorer,

•   From the Organization Model Editor, when you click on the shortcut arrow that is displayed on the representation of each Organization within the model.
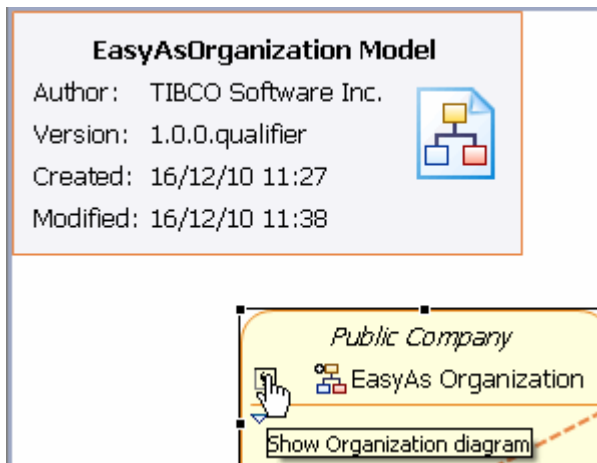
Adding Objects in Organization Modeler Diagrams

You can add objects to Organization Modeler diagrams in any of several ways:

•   Using the tools on the diagram editor's palette

•   Using the pop-up icons

•   Using the context menu

•   Using the Project Explorer

Using the Palette

To add an object to an organization diagram, you can use the tools provided on the diagram editor's palette.

In the Organization Model Editor, the following tools are always available in the palette:

•   Organization

•   Association
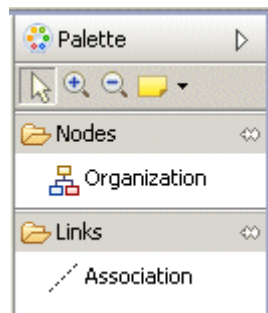
If you have applied a Schema to your organization model, and it contains any Organization Types, tools for adding these will also be available. For example, if you have used the standard Schema but added a new Organization Type to it, both the Standard Organization Type and the additional one will be available in the palette, as in the following illustration.
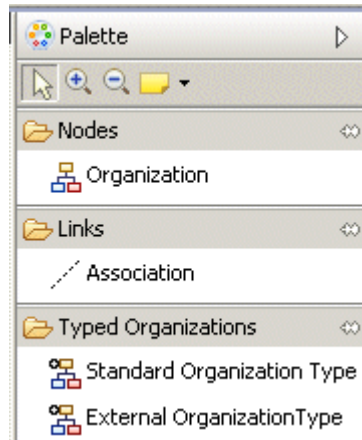
In the Organization Editor, the following tools are always available in the palette:

• Organization Unit

• Position

• Hierarchy

• Association
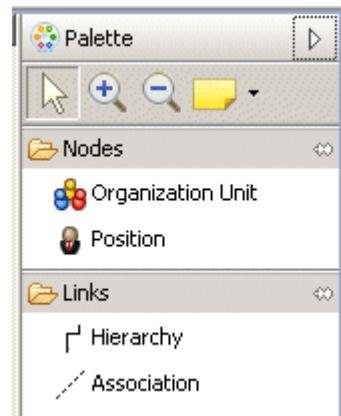
Additional tools are available if you have applied a Schema to your organization model. If you have applied the Standard Organization Type to the Organization, the palette contains the following tools for the elements that are defined in that Standard Organization Type:

• Head Unit

• Member Unit

• Manager Position

• Member Position
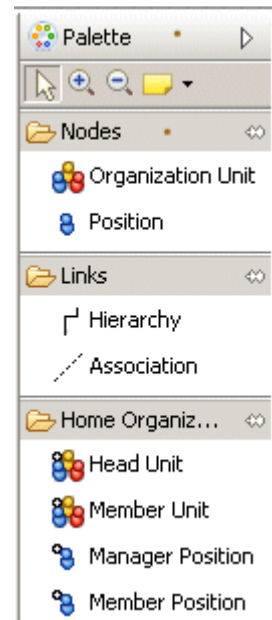
Note that the Sub Unit element is not available from the palette.

Similarly, if the Organization that you are editing has a different or modified Type applied, tools are included in the palette for the elements that are defined for that Type. The following illustration shows an example. Here an Organization is used that has two Organization Unit Types defined.
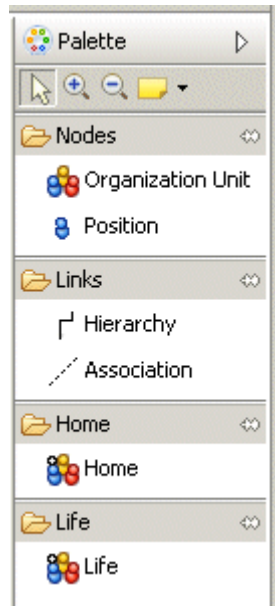
The availability of these tools on the palette is dynamic; if you add a new Type to the Schema, it is immediately made available on the palette.

To use any of these tools, you can either:

• Select the required tool and drag and drop on to the diagram, or

• Click on the required tool in the palette to select it, and click on the diagram.

Where you should drop, or click, depends on the object you are adding:

• For Organization and Organization Unit (including Types of Organization Unit), use the empty part of the diagram.

• For Position (including Types of Position), drop into or click on the position compartment of an Organization Unit - that is, the empty space below the title bar.

• For Hierarchy or Association, drop into or click on the Organization Unit where the connection is to start from, and drag the connection to the Organization Unit where it is to end.

When you add an Organization, Organization Unit, or Position object, the Label field on the title bar is automatically selected. Enter a name for the object.

Using the Pop-up Icons

An alternative method of adding objects is to use the pop-up icons that are available. If you hover your mouse over the empty area of the diagram, an icon appears. In the Organization Model Editor, this is the **Add Organization** icon. Move your cursor on to the icon to display the Add Organization label as shown in the following illustration, and then click to create a new Organization in the diagram.

In the Organization Editor, hovering your mouse in the empty area produces the **Add Organization Unit** icon, which works in the same way as the **Add Organization** icon. Similarly, hovering your mouse over the Position compartment of an Organization Unit displays the **Add Position** icon, as shown in the following illustration.
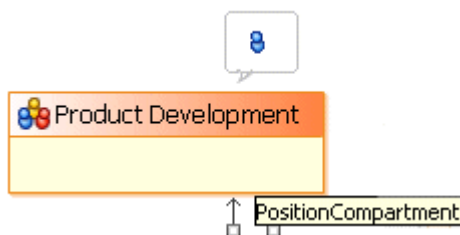
You can add a connection between two objects in a diagram by clicking and dragging one of the handles that are displayed when you hover your cursor over the object. Click the handle and drag to the object to which you want to connect, as shown in the following illustration.
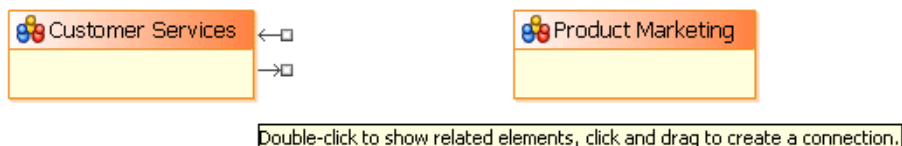
This process creates a Hierarchy. If you want a non-hierarchical connection, you can change it to an Association as described in Hierarchy and Association Properties on page 419.

Using the Context Menu

You can add objects to the organization diagram by right-clicking in the Organization Editor and selecting the object you require from the context menu that is displayed.

If you right-click on the background of the Organization Editor, you can select:

*   An Organization Unit with no Type defined;
*   If the Organization has the Standard Organization Type set, a Head Unit, Member Unit, or Sub Unit;
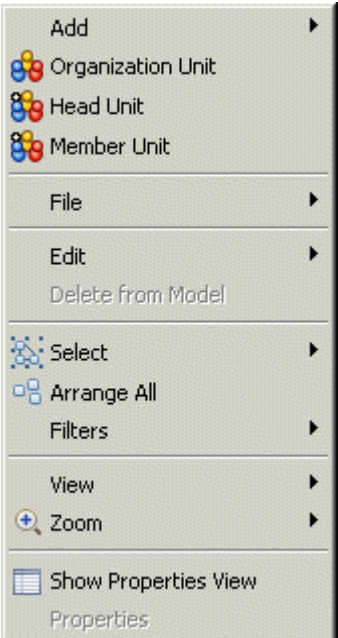
*   If the Organization is set to another Type of Organization defined in the Schema, an Organization Unit of any of the Types defined for that Organization Type.

If you right-click on an Organization Unit in the diagram, you can select:

*   A Position with no Type defined;

- If the Organization Unit has an Organization Unit Type set, a Position of any of the Types defined for that Unit Type.
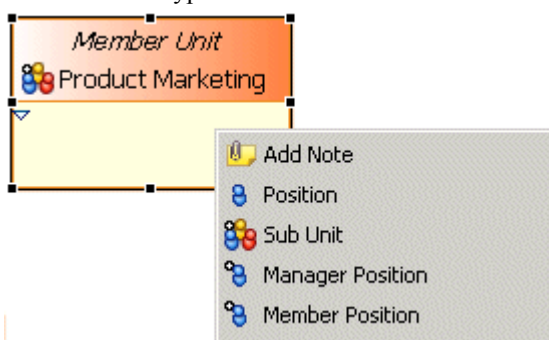
Using the Project Explorer

You can also add objects to the diagram editor from the **Project Explorer**, by.

1. Selecting the parent in the Project Explorer.

2. Right-clicking on the parent and selecting **Add Child**.

For example, to add an untyped Organization Unit you would right-click on the parent Organization and select **Add Child > Organization Unit**. If you are using the Schema, the choices displayed will include not just the basic Organization Unit but the Types of Organization Unit available.

Adding Notes and Labels

You can add notes or text labels by:

- right-clicking on an object in the editor and selecting **Add Note** from the pop-up context menu,

- right-clicking on the background in the editor and selecting **Add -> Note** or **Add -> Text** from the pop-up context menu,

- In the Organization Editor palette, selecting the Note tool in the upper part of the palette.
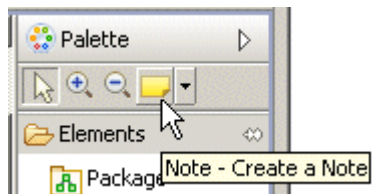
Then click on the Organization Editor.

You can also select Text or Note Attachment from this menu. The icon for the tool changes to show the item you have selected.
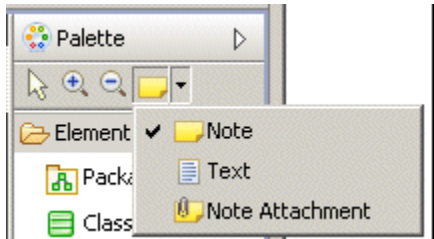
The following illustration shows a note being used to add explanation to an Association. A note attachment is drawn between the note and the object with which it is associated.
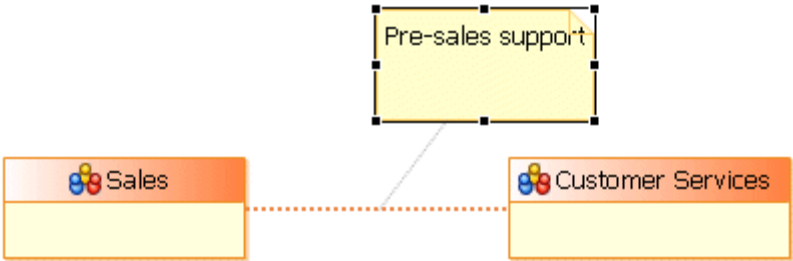
Tailoring the Appearance of Organization Modeler Diagrams

You can change the level of detail that the Organization Modeler diagrams display. In the overview diagram, each Organization is by default shown including all the Organization Units that make it up, and the Hierarchies and Associations that link them. To hide the detail, click on the downward-pointing arrowhead that is shown in the corner when you select the Organization, as shown in the following illustration.

Click here to hide the contents of the Organization
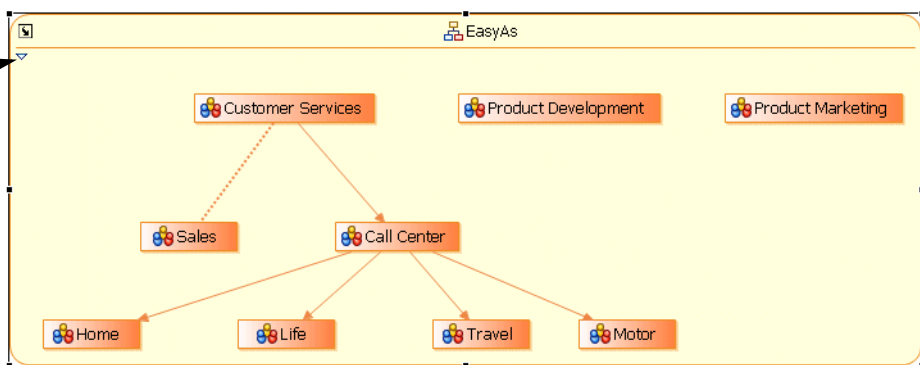
This action hides the contents of the Organization, and displays the collapsed version shown below.
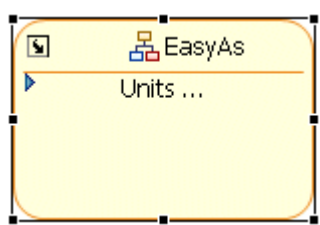
A solid right-pointing arrowhead is now displayed in place of the downward-pointing one when the Organization is selected. Clicking on this restores the display of the Organization's contents.

In the Organization Editor, the same arrowheads appear in Organization Units, and you can use them to hide or to display the Positions defined within those Organization Units.

Also in the Organization Editor, you can choose to display or to hide the hierarchy of Organization Units that depend on the selected unit. The following illustration shows an excerpt from an organization diagram, with several Organization Units dependent on the Call Center unit.
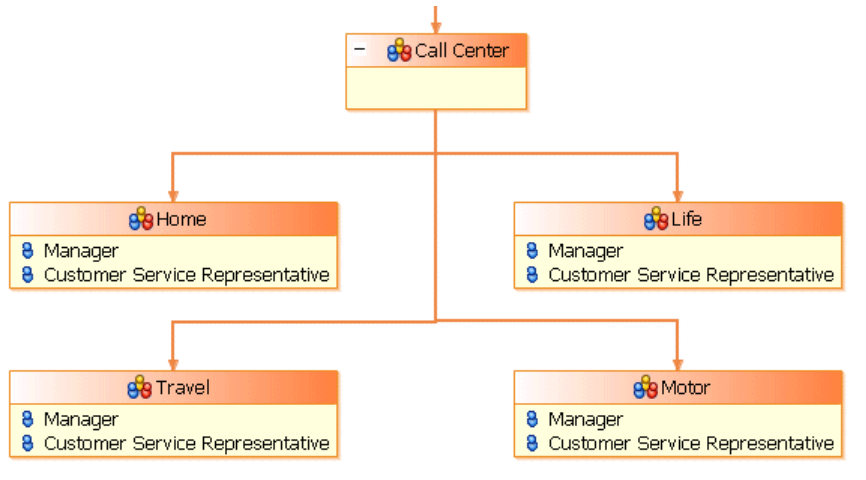
If you click on the small minus sign in the title bar of the Call Center, the display changes to the following collapsed view.
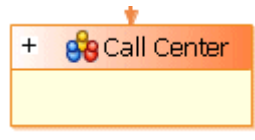
Click on the plus sign to restore the hierarchical view.

You can also:

- use the options in the **Diagram** menu to arrange the objects on the diagram editor screen,

- right-click on the background of the diagram and select **Arrange All** to make the diagram more ordered.

Opening an Organization Model

The Organization Model is contained in a file called ***name*.om**, where *name* is typically the name of the entity for which you are creating the Organization Model. An Organization Model can contain more than one Organization.

The steps below describe creating an Organization Model.

1. In the **Project Explorer**, select the **Organization** folder in the project where you want to create your Organization Model.

2. Right-click the **Organization** folder or the **OrganizationModel.om** folder and select **New** > **Organization Model Diagram**.

3. The **Create Organization Model Diagram** wizard is displayed.

   Make sure that the **Create default schema types** box is checked.

   The folder you selected should be displayed in the **Create Organization Model Diagram** wizard. You can use the folder you selected or select a different folder, depending on your requirements. However, it must be a special folder of the **Organization** type.

4. In the **File name:** field, type the name you want to apply to your Organization Model, followed by the suffix **.om**. Click **Finish**.

The Organization Editor is displayed, representing the single default Organization created in the Organization Model. This information is displayed in the badge in the top left hand corner of the editor. You can navigate to the parent Organization Model editor by clicking on the shortcut arrow in the badge.
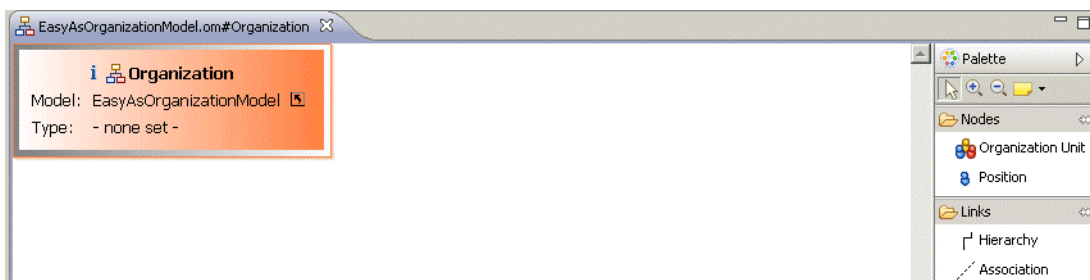
The Organization Model is also displayed in the Project Explorer view.
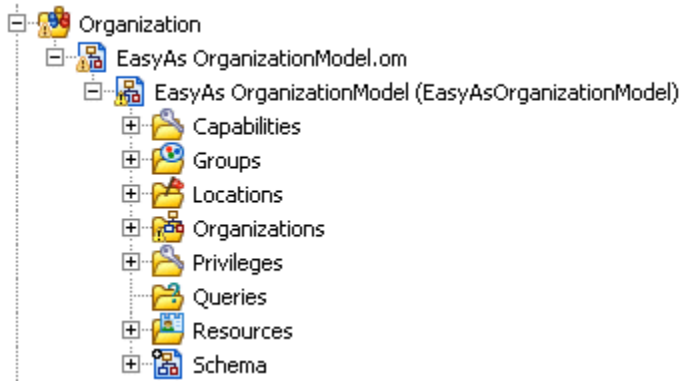
You can use quick-find (Ctrl+F) in the project explorer to find existing organization model entities and select them in the project explorer.

When you have created an organization model, you can search for organization model diagram elements using quick find (Ctrl-F) within the diagram, and entering the initial characters of the name you are searching for. Double-click on the element you are shown in the search to go to its location in the diagram.

Creating an Organization

The steps below describe creating an Organization:

1. Activate the Organization Model Editor for your Organization Model.

2. Select the Organization tool in the Organization Model Editor palette, and click on the empty part of the Organization Model editor. This places an Organization in the Model.

> You can alternatively expand the Organization Model in the Project Explorer. Right-click **Organizations** and select **Add Child** > **Organization**. A new Organization is created.

3. At this point the **Label** field of the Organization is automatically selected. Enter the label you require. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces. For example, if you put Head Office in the **Label** field, the **Name** will be HeadOffice.

4. If the **Properties View** is not already displayed, right-click the organization you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for an Organization, see Organization Properties on page 415.

5. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Organization and/or any supporting explanations, depending on your requirements.

6. Next to the **Type** field, click [...] to display the **Select Type** dialog. This enables you to change the type for the Organization, depending on your requirements.

7. Next to the **Location** field, click [...] to display the **Select Type** dialog. This enables you to specify a Location Type for the Organization, depending on your requirements..

8. To specify start and end dates for the Organization, click [...] next to the date fields to display the calendars.

9. If you have assigned a Type to the Organization, the **Attribute Values** tab is displayed. Any attributes that are defined for this type of Organization are displayed here. Click the **Value** field next to each defined attribute to display a list of available values for that attribute.

> The **Attribute Values** tab is available only if you have previously applied a Type as described in step 6 on page 347.

Creating an Organization Unit

To create a Organization Unit, do the following:

1. In the Organization Model editor, double-click on the organization in which you want to place an Organization Unit. The Organization Editor for that organization is opened.

2. Select the Organization Unit tool in the Organization Modeler palette, and click on the empty part of the Organization diagram. This places an Organization Unit in the Organization.

3. At this point the **Label** field of the Organization Unit is automatically selected. Enter the label you require. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

4. If the **Properties View** is not already displayed, right-click the organization Unit you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for an Organization Unit, see Organization Unit Properties on page 417.

5. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Organization Unit and/or any supporting explanations, depending on your requirements.

6. If you are using the default schema, or if you have created your own schema and defined any Organization Unit Types, you can assign a Type to this Organization Unit by selecting it in the **Element** field.

7. Next to the **Location** field, click [...] to display the **Select Type** dialog. This enables you to specify a Location Type for the Organization.

8. To specify start and end dates for the Organization Unit, click [...] next to the date fields to display the calendars.

9. If you have applied a Type to the Organization Unit, the **Attribute Values** tab is displayed. Any attributes that are defined for this type of Organization Unit are displayed here. Click the **Value** field next to each defined attribute to display a list of available values for that attribute. See "Attributes" in *TIBCO Business Studio Concepts* for more information about attributes.

10. Click the **Privileges** tab. Click [...] to display the **Select Type** dialog. This enables you to specify the Privileges for the position. See "Capability and Privilege" in *TIBCO Business Studio Concepts* for more information about Privileges.

Creating a Position

To create a Position, do the following:

1. Select the Position tool in the Organization Modeler palette, and click on the Organization Unit where you want to create the Position.

2. At this point the **Label** field of the Position is automatically selected. Enter the label you require. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

3. If the **Properties View** is not already displayed, right-click the Position you just created and select **Show Properties View**. The **Properties View** is displayed.

For a complete description of all the properties you can configure for an Position, see Position Properties on page 420.

4. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Organization and/or any supporting explanations, depending on your requirements.

5. If you are using the default schema, or if you have created your own schema and defined any Position Types, you can assign a Type to this Position by selecting it in the **Element** field.

6. Next to the **Location** field, click ... to display the **Select Type** dialog. This enables you to specify a Location for the Position.

7. To specify start and end dates for the Organization, click ... next to the date fields to display the calendars.

8. If you have applied a Type to the Position, the **Attribute Values** tab is displayed. Any attributes that are defined for this type of Position are displayed here. Click the **Value** field next to each defined attribute to display a list of available values for that attribute. See "Attributes" in *TIBCO Business Studio Concepts* for more information about attributes.

9. Click the **Capabilities** tab. Click ... to display the **Select Type** dialog. This enables you to specify the Capabilities for the Position. See "Capability and Privilege" in *TIBCO Business Studio Concepts* for more information about capabilities.

10. Do the same for the **Privileges** tab.

Creating a Group

To create a group, do the following:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Groups** folder and select **Add Child** > **Group**. Right-click the Group and select **Rename**. Type the label of the Group you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

> To add a sub-group, right-click on the group where you want to create your sub-group and select **Add Child** > **Group**.

3. If the **Properties View** is not already displayed, right-click the Group you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for an Group, see Group Properties on page 422.

4. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Organization and/or any supporting explanations, depending on your requirements.

5. Click the **Capabilities** tab. Click [...] to display the **Select Type** dialog. This enables you to specify the Capabilities for the position. See "Capability and Privilege" in *TIBCO Business Studio Concepts* for more information about capabilities.

6. Do the same for the **Privileges** tab.

Creating Capabilities

The steps below describe creating a Category:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Capabilities** folder and select **Add Child > Capability Category**. A new **Category** is created.

3. Right-click on the Category you just created and select **Rename**.

4. Type the label of the Category you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

> For a complete description of all the properties you can configure for a Category, see Category Properties on page 423.

Creating a Capability

The steps below describe creating a Capability:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. You can either:

   — Right-click the **Capabilities** folder and select **Add Child** > **Capability**. A new **Capability** is created.

   — Right-click on a Category and select **Add Child** > **New Capability**. A new **Capability** is created.

3. Right-click on the Capability you just created and select **Rename**.

4. Type the label of the Capability you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

5. If the **Properties View** is not already displayed, right-click the Capability you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for a Capability, see Capability Properties on page 424.

6. Click the **General** tab.

7. You can specify a type for your capability by doing the following:

   a. Select the **Has qualifier** checkbox. The **Show qualifier ...** option is displayed.

   b. Click the **Show qualifier ...** option. The **Qualifier** tab is displayed.

   c. Click the **Qualifier** tab. In the **Type** field, select an available type from the drop-down list.

   d. If required, specify a default value for the qualifier. See "Capability and Privilege" in *TIBCO Business Studio Concepts* for more information on the types you can specify.

8. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Privilege and/or any supporting explanations, depending on your requirements.

Creating Privileges

The steps below describe creating a Category:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Privileges** folder and select **Add Child** > **Privilege Category**. A new **Category** is created.

3. Right-click on the Category you just created and select **Rename**.

4. Type the label of the Category you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

> For a complete description of all the properties you can configure for a Category, see Category Properties on page 423.

Creating a Privilege

The steps below describe creating a Privilege:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. You can either:

   — Right-click the **Privileges** folder and select **Add Child** > **New Privilege**. A new **Privilege** is created.

   — Right-click on a Category and select **Add Child** > **New Privilege**. A new **Privilege** is created.

3. Right-click on the Privilege you just created and select **Rename**.

4. Type the label of the Privilege you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

5. If the **Properties View** is not already displayed, right-click the Privilege you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for a Privilege, see Privilege Properties on page 425.

6. Click the **General** tab.

7. You can specify a type for your privilege by doing the following:

   a. Select the **Has qualifier** checkbox. The **Show qualifier ...** option is displayed.

   b. Click the **Show qualifier ...** option. The **Qualifier** tab is displayed.

   c. Click the **Qualifier** tab. In the **Type** field, select an available type from the drop-down list.

   d. If required, specify a default value for the qualifier. See "Capability and Privilege" in *TIBCO Business Studio Concepts* for more information on the types you can specify.

Organization model deployments to the same major version are always additive.

This means that changes in the qualifier value of privileges will reflect every previous value you set. So if you set the qualifier for Position 'Tester' with Privilege 'All' to 10 and deploy the organization model, and then change the qualifier to 11 and redeploy it (as a different minor version) , Position 'Tester' now has two assignments of privilege 'All'; one with a qualifier of 10, and with a qualifier of 11.

8. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Privilege and/or any supporting explanations, depending on your requirements.

Creating a Location

The steps below describe creating a Location:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Locations** folder and select **Add Child** > **Location**.

3. Right-click the Location and select **Rename**.

4. Type the label of the Location you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

5. If the **Properties View** is not already displayed, right-click the Location you just created and select **Show Properties View**. The **Properties View** is displayed.

For a complete description of all the properties you can configure for a Location, see Location Properties on page 426.

6. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Location and/or any supporting explanations, depending on your requirements.

7. Next to the **Type** field, click [...] to display the **Select Type** dialog. This enables you to change the type for the Location, depending on your requirements.

8. To specify start and end dates for the Location, click [...] next to the date fields to display the calendars.

9. If you have assigned a Type to the Location, the **Attribute Values** tab is displayed. Any attributes that are defined for the Type are displayed here. Click the **Value** field next to each defined attribute to display a list of available values for that attribute. See "Attributes" in *TIBCO Business Studio Concepts* for more information about attributes.

Creating a Resource

The steps below describe creating a Resource:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Resources** folder and select **Add Child** > **Resource**. A new **Resource** is created.

3. Right-click the Resource and select **Rename**.

4. Type the label of the Resource you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

5. If the **Properties View** is not already displayed, right-click the Resource you just created and select **Show Properties View**. The **Properties View** is displayed.

> For a complete description of all the properties you can configure for a Resource, see Resource Properties on page 426.

6. In the **Purpose** field on the **General** tab, and on the **Description** tab, you can enter some text to describe the purpose of the Resource and/or any supporting explanations, depending on your requirements.

7. Next to the **Type** field, click [...] to display the **Select Type** dialog. This enables you to change the type for the Resource, depending on your requirements.

8. If you have assigned a Type to the Resource, the **Attribute Values** tab is displayed. Any attributes that are defined for the Type are displayed here. Click the **Value** field next to each defined attribute to display a list of available values for that attribute. See "Attributes" in *TIBCO Business Studio Concepts* for more information about attributes.

Creating Queries

The steps below describe creating a Query:

1. In the **Project Explorer**, expand the folder for your Organization Model.

2. Right-click the **Queries** folder and select **Add Child** > **Organization Query**. A new **Organization Query** is created.
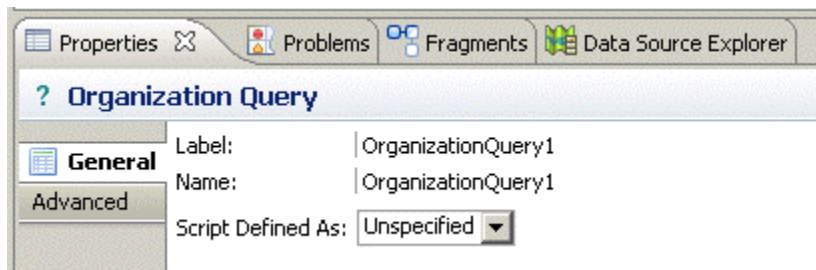
3. Right-click the Query and select **Rename**.

4. Type the label of the Query you wish to create. The **Name** field is automatically filled with the same text as the **Label**, but without any internal spaces.

5. On the **General** tab of the Properties View, select either **Free Text** or **RQL** from the dropdown list in the **Script Defined As** field. An input field is displayed.
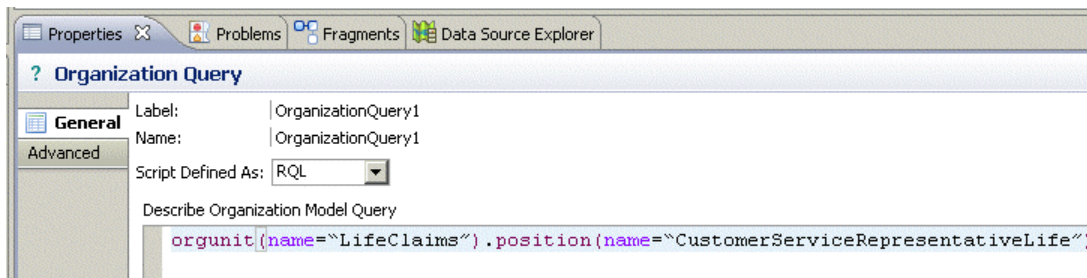
6. Type the Query into the **Describe Organization Model Query** field. You can either enter free text that will describe to the solution designer what you intend the query to accomplish, or use the structure of RQL to enter a query that will be validated by TIBCO Business Studio.1

Using a Schema in an Organization Model

An example of an organization unit that you may want to model as a Schema is shown below.
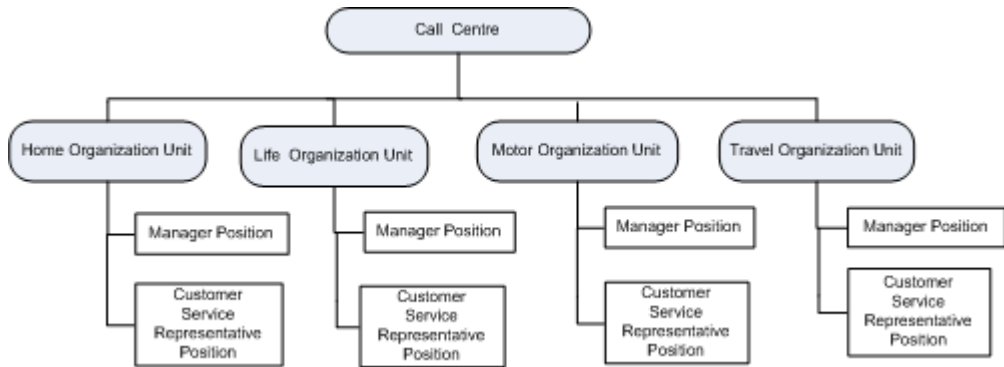
The following section describes an overview of the steps you need to carry out to create this example as a Schema and then use it in an Organization Model.

1. Create a project. On the **Organization Model** dialog of the **New Project** wizard, uncheck the **Create default schema types** field.

   The Schema for this project will therefore contain only those types that you define.

2. Create the following types in the Organization Schema:

   — An Organization Type called **Call Center**. See Creating an Organization Type on page 330.

   — Organization Unit Types called **Home**, **Life**, **Travel** and **Motor**. See Creating an Organization Unit Type on page 331.

   — A Position Type called **Manager**. See Creating a Position Type on page 331.

   — A Position Type called **Customer Services Representative**. See Creating a Position Type on page 331.

3. For the **Call Center** Organization Type, specify the **Home**, **Life**, **Motor** and **Travel** Organization Unit Types as Organization elements.
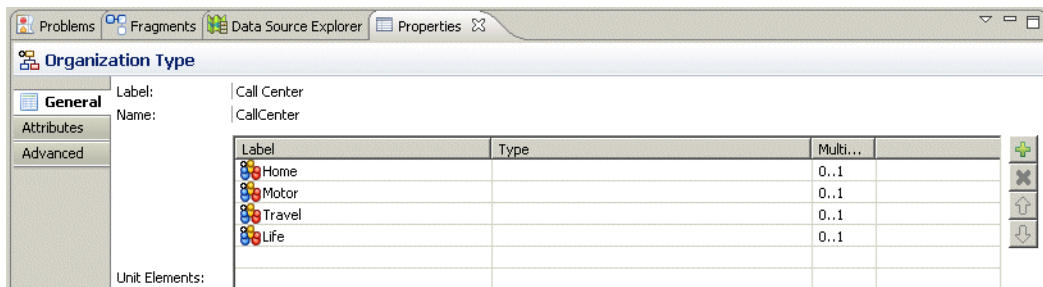
4. For the **Home**, **Life**, **Travel** and **Motor** Organization Units, specify the **Manager** and **Customer Service Representatives** as Position Elements.
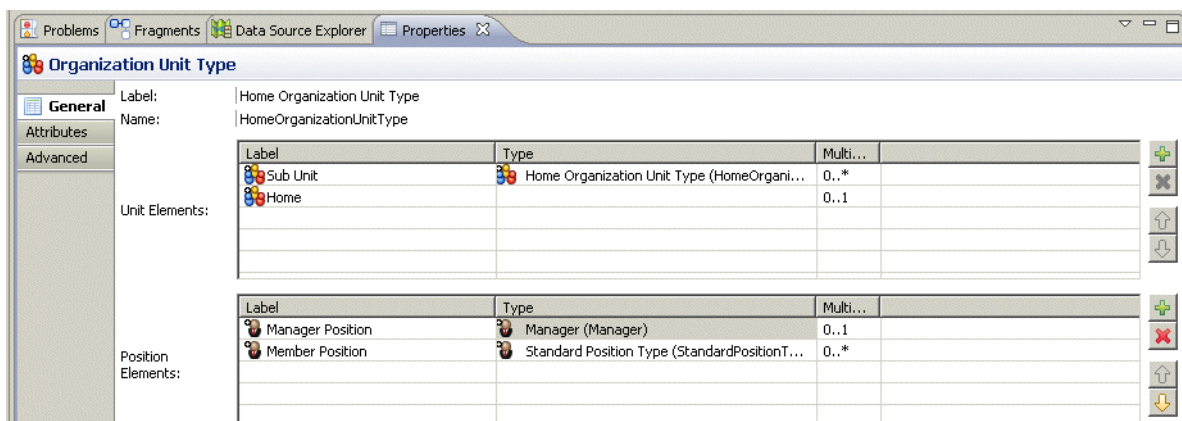
5. Create an Organization Model. Ensure that you uncheck the **Create default schema** checkbox.

6. Create an Organization within that Organization Model.

7. On the **General** tab in Properties view, change the Type of the Organization you have just created from a **Standard Organization Type** to the **Call Center Type**.

8. In the Organization diagram editor, right-click on the empty canvas. The context menu that pops up enables you to select **Home**, **Life**, **Motor** and **Travel** Organization Units, as shown below. You can also select an untyped Organization Unit.
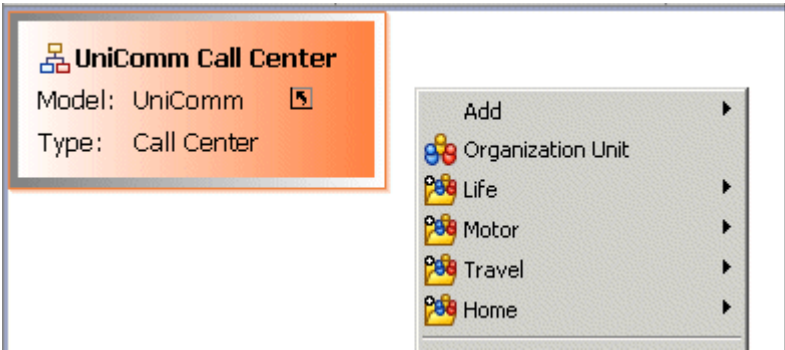
9. Create either a **Home**, **Life**, **Travel** or **Motor** Organization Unit.

10. If you right click on the Organization Unit you created, the **Manager** and **Customer Service Representative** Positions are displayed, as shown below.
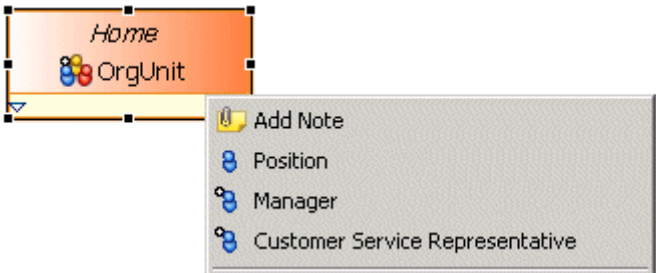
Exporting Organization Model Documentation

You can export an organization model to files in HTML format for documentation purposes as follows:

1. Select **File** > **Export**. The **Export** dialog is displayed.

2. Expand the **Business Process Management** folder, select **Documentation**, and click **Next**.

3. Drill-down through the Project and Organization folder to select the specific organization model for which you wish to export documentation. By default all documentation within the project you are working in is selected. Deselect documentation you do not require.

4. Select a destination for the export by either:

   — Selecting **Project** (to put the export in the **Documentation** sub-directory within your Project directory), or

   — Selecting **Path:** and clicking **Browse...** to specify a directory for the export.

5. Click **Finish**.

6. The Organization Model documentation is saved to the location you specified. See Viewing Organization Model Documentation for more information.

Viewing Organization Model Documentation

To view organization model documentation:

1. Export the documentation as described in Exporting Organization Model Documentation.

2. In the Project Explorer, expand the **Documentation > Organization Model** sub-directory within your Project directory; or if you exported the documentation to another destination, navigate to that destination folder.

3. Right-click the exported file for the package and select **Open With** > **Default Editor**.

IV - REFERENCE

This section covers reference information to help you when modeling in TIBCO Business Studio. The concepts behind these activies are covered in *TIBCO Business Studio Concepts*.

Topics

Chapter 14 **Troubleshooting**

This section describes some issues encountered when working with TIBCO Business Studio and their possible solutions.

In previous versions of TIBCO Business Studio, TIBCO recommended disabling in-memory validation by deselecting **Project** > **Build Automatically** as a way of achieving performance gains. Because of performance enhancements with this version of TIBCO Business Studio, this is no longer necessary and is not desirable as it causes problems resolving references.

Topics

Application Upgrade Issue

This section describes a workaround to an issue which occurs when TIBCO Business Studio 3.5.3 projects that have corresponding processes deployed to a TIBCO ActiveMatrix BPM 1.3 runtime are upgraded to new software versions.

When these projects are imported into TIBCO Business Studio 3.5.4 and redeployed to an upgraded TIBCO ActiveMatrix BPM 2.0 runtime, the XML schemas derived from the Business Object Models are regenerated. The regenerated schemas are then incorporated into WSDLs generated from business processes.

When the project DAAs are deployed to the TIBCO ActiveMatrix BPM 2.0 runtime, the User Application upgrade process performs a checksum comparison on the new TIBCO Business Studio 3.5.4 WSDLs and the previously deployed TIBCO Business Studio 3.5.3 WSDLs to determine whether there have been any changes to the process interfaces. However, these checksum comparisons fail because of the regenerated schema changes, **not** because of any interface changes, and deployment fails.

Workaround

1. Start TIBCO Business Studio 3.5.4 with a new workspace.

2. Switch off auto-build (select **Project** and de-select **Build Automatically**).

3. Select **Window** > **Preferences** > **Business Object Modeler** > **Business Object Model Generator**, and ensure that the WSDL and XSD Export/Generation preference options are **unchecked**.
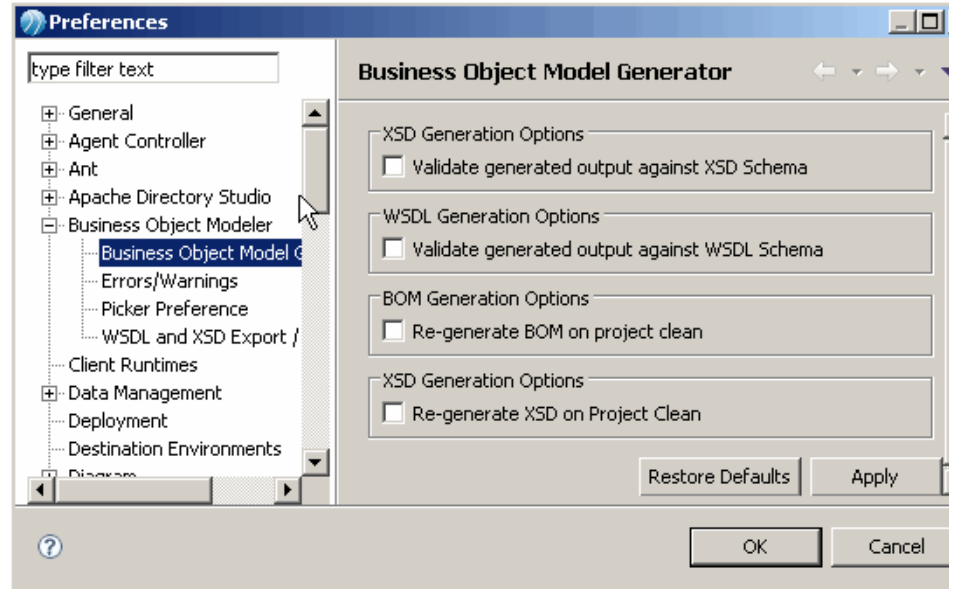
4. Import old (TIBCO Business Studio 3.5.3) projects one at a time using **Import** > **Existing Projects into Workspace** (that is, Eclipse importer) Do not use the **Existing Studio Projects into Workspace** option. Ensure that the **Copy projects to workspace** checkbox is ticked.

5. For each imported project, right-click and open Properties. Uncheck the Builders **BOM to XSD Builder** and **WSDL Generator Builder** and click **OK**.
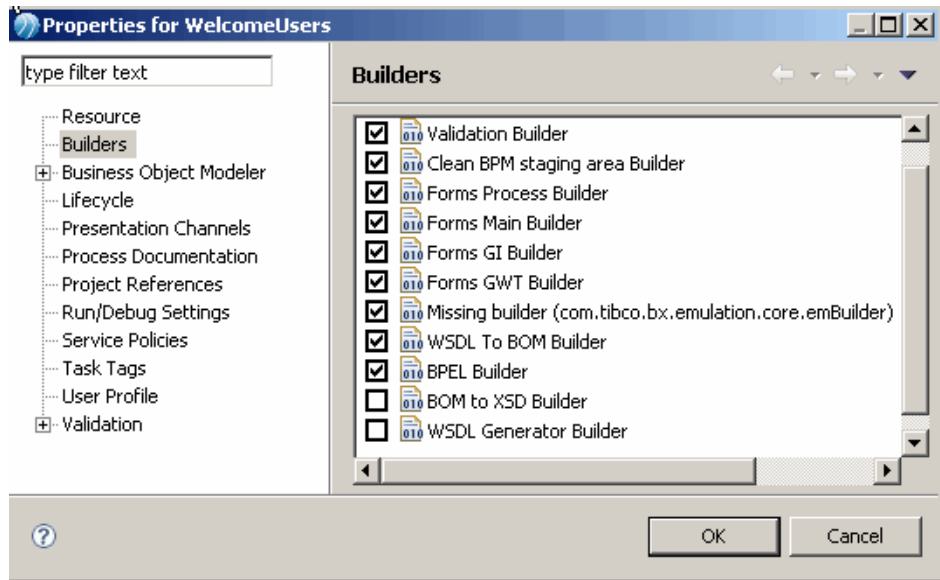
6. Select **Project** and **Build Automatically** and wait for the builds to finish.

7. Resolve errors such as 'project needs migrating' or 'special folder missing' using quick-fixes in the Problems view.

8. Generate the DAAs for projects.

9. Deploy the DAAs (which will upgrade the existing application).

Default Channels are Unavailable

The default presentation channels are unavailable if the default channel is not enabled.

1. Select the project in the Project Explorer, and click **File > Properties**.

2. In the navigation pane on the left side of the **Properties** dialog, click **Presentation Channels**.

3. Verify that the **Enable project specific settings** checkbox is checked.

Submenus Selection not Available when you Switch Workspace

Sometimes when you click on **File** > **Switch Workspace** > submenus are displayed, but then you cannot select anything since no focus is available on submenus.

If this occurs, try again. Click back on **File** > **Switch Workspace** > submenus, and then focus is available and you can select the intended option.

Manual Deletion of Presentation Resources Special Folder Problem

If you manually delete the **Presentation Resources** special folder from a project and then try to generate a DAA, DAA generation fails with an error similar to the one below:

org.eclipse.core.runtime.CoreException: Project 'Sanity-Hotfix' is missing a special folder of kind 'presentation'. Please invoke the asset configuration quick fix from the Problems view.

Applying the quick fix in this situation will not work. You must manually create a folder and set it as a **Presentation Resources** special folder and retry generating the DAA.

Refactoring When Importing from Studio for Analysts into Studio for Designers

For projects imported from "Studio for Analysts" into "Studio for Designers", the destination (that is, BPM) specific validators and other features are not applicable This is because the destination cannot be set in Studio for Analysts, and therefore is not set when you import the project.

For example, you will not have the JavaScript option on sequence flows (it is not applicable in Studio for Analysts, and therefore is not available after import).

In this case, after import:

1. Open the project properties and set the applicable destination (for example, BPM) on the 'Lifecycle' page.

2. Right-click on the project > **Refactor** > **Project Lifecycle**.

Although the JavaScript option is available for scripts after refactoring, you still need to manually select it.

Importing Projects

These sections cover issues when importing projects.

Importing Projects into your Workspace which were Created in a Previous Version of TIBCO Business Studio

When you import projects into your workspace which were created in a previous version of TIBCO Business Studio, they may show a problem marker by the project name in Project Explorer. This occurs when a newer version of TIBCO Business Studio has different project configuration and/or file format requirements. The normal validation and build of projects will be disabled until this problem is fixed.

Select the project, and click **Ctrl +1**. You can then select one quick fix to automatically migrate the entire project (including all the BOM & XPDL files) to the current version, and clean (**Project** > **Clean**) and build it (**Project** > **Build Project**).
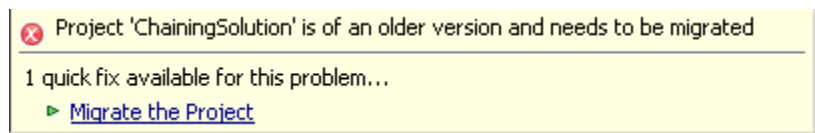
If you try to open an individual package within the project before you migrate the project, you will see a message similar to the following (you will also see a migration validation error in the Problems view for an old XPDL).:
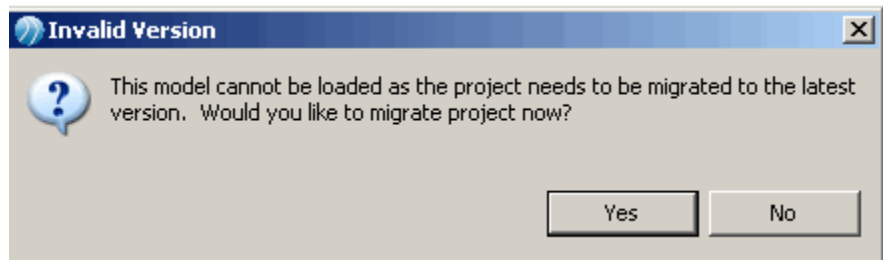
Select **Yes** and the quick fix will be applied to migrate the whole project.

Importing Projects from Subversion

When you import projects from Subversion, they may throw a number of validation errors.

This is expected behavior. When you apply the "missing special folder" resolution this will cause a full project build, which means that the missing generated BOMs will be generated and all problems resolved.

When you committ the project to Subversion, any folder or file that is marked as "derived" will not be committed and therefore these resolved special folders will not be committed and this means you will receive the error again.

It is usually good practice to run a clean build on projects checked out of Subversion.

Chapter 15 **Reference**

This section describes the major parts of the TIBCO Business Studio user interface, including the perspectives and views that are provided.

Topics

Project Explorer View

This shows a view of the project in which you can view and create projects, packages, processes and assets such as services and so on. In contrast to the Navigator view (available within the Resource Perspective) the Project Explorer view shows a contextual view of the Project.

For example, the following shows both the Navigator and Project Explorer views of the same Project.
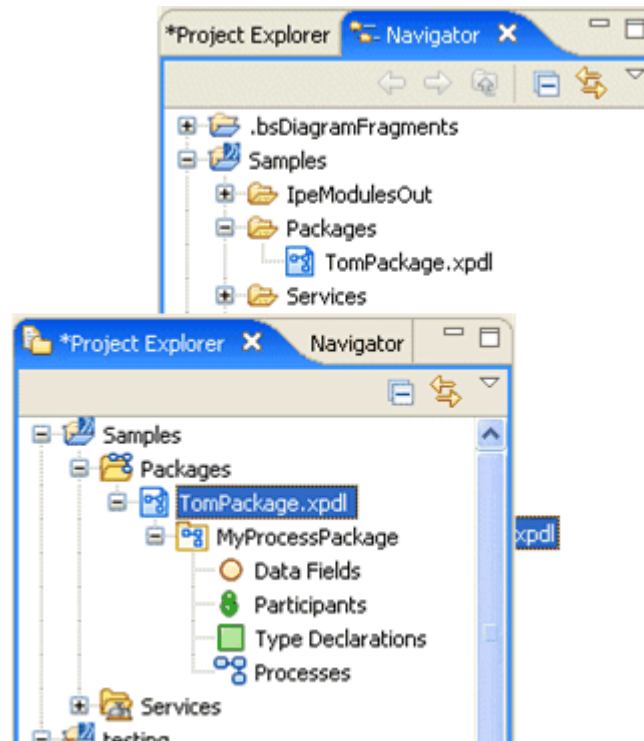
To see this view, select **Window** > **Show View** > **Project Explorer**, or **Window** > **Show View** > **Other**, then expand the **General** folder and select **Project Explorer**.

You can also use the search facility to locate workspace elements in the Project Explorer view such as processes, package names, and process interfaces by pressing **Ctrl+F** or the search toolbar button in the Project Explorer view. For more information, see Finding Objects on page 34.

Problems View

The Problems view is where the software displays warnings, errors and messages about the resources used in your Project. To see this view, select **Window** > **Show View** > **Problems**, or **Window** > **Show View** > **Other**, then expand the **General** folder and select **Problems**.

The Problems view also displays error messages that result from validation of your process. When you save your process, it is validated for BPMN correctness and for deployment or export to the selected destination environments.

For information about correcting problems, see Correcting Validation Errors on page 220.

Outline View

The **Outline View** allows you to focus on specific areas of a large process. The **Outline View** looks like this:

Area of the Process that is shown in the Process Editor.

Remainder of Process (not visible in the Process Editor).
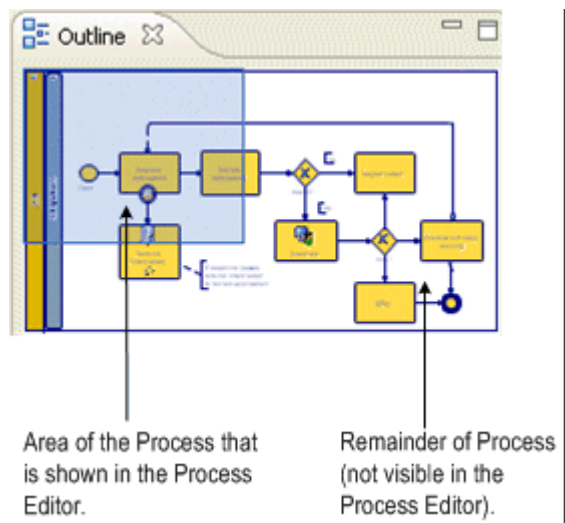
To see this view, select **Window** > **Show View** > **Outline**. By positioning the mouse pointer over the shaded area and holding the left mouse button down, you can reposition the shaded area of the **Outline View** and thus see different parts of the process.

Fragments View

The **Fragments** view allows you to store selected objects from your process and reuse them in a different process. You can also select predefined process fragments and use them in your process:
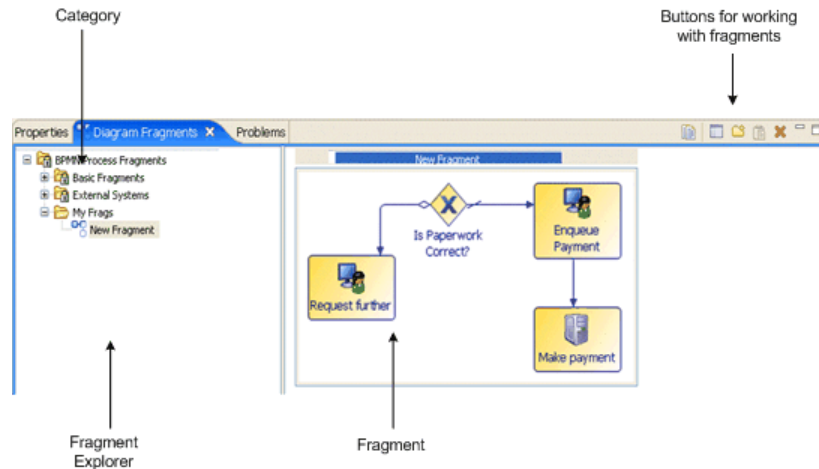
To see this view, select **Window** > **Show View** > **Fragments**. The buttons in the upper right of the view allow you to do the following:

- Copy a diagram fragment to the clipboard in preparation for pasting it onto a Process.

- Edit fragment/category properties such as the **Name** and **Description**.

- Create a custom fragment category in which to store your fragments.

- Paste a fragment from clipboard into the Fragments view or into the process.

- Delete a fragment or category.

Process Modeler Properties View

The **Properties View** shows you detailed information about the currently selected object and allows you to specify the characteristics of an object.

The Business Process Modeling Notation (BPMN) complete set is supported by the Properties View. For example, if you are creating a gateway in your process diagram, you can select the type of gateway you want in the Properties View:
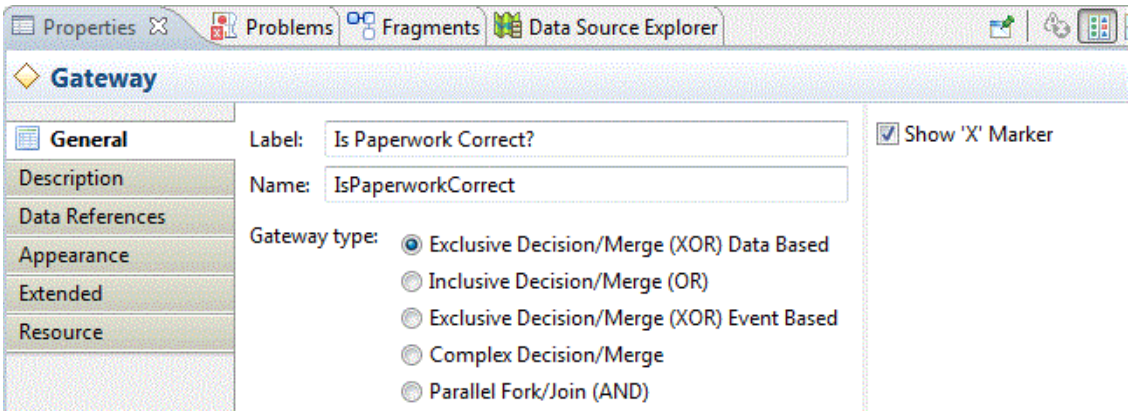
To see this view, select **Window** > **Show View** > **Properties** or **Window** > **Show View** > **Other**, then expand the **General** folder and select **Properties**. To view property information, you must have an object selected.

Properties related to simulation are only present when **Simulation** is selected as the destination environment.

Properties related to the implementation of a process (for example, the **Input To Service** and **Output From Services** tabs for service tasks) are described in the appropriate implementation guide.

Labels and Names

When using the Business Analysis capability, process objects such as data fields, task names, and so on, have labels that may contain spaces or non-alphanumeric characters.
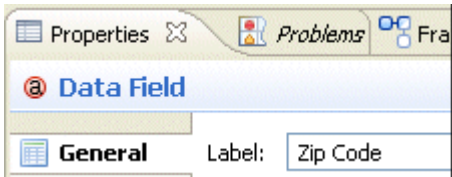
With the Solution Design capability selected, the Label as well as the Name is displayed. For example:
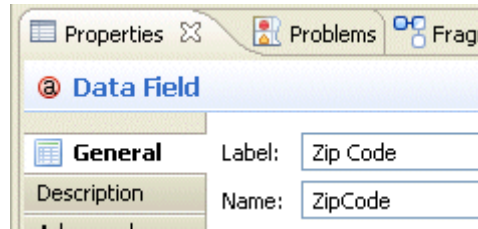
The Name is usually made up of the Label without whitespace or special characters. If you migrate a process from an earlier version, the migration XSLT creates Labels from the Name. The Name is used for referencing items where whitespace or special characters are restricted (for example, scripts and expressions). The Label is used for on-screen display.

If the Name has not been modified from the default, it automatically changes to match the Label when the Label is changed.

Process Properties

When you have selected a Process in the Project Explorer, the following properties are available.

Table 3: Process Property Reference

Tab	Property	Description
General	Label	Label associated with the process. You can change the label if necessary.
	Process Interface	Lists the location and name of the process interface implemented by the selected process. Specifying a process interface allows the dynamic selection of sub-processes at runtime. For more information, see Process Interfaces on page 201.
	Inline Sub-Process:	Select the **Inline sub-process during Process Package Optimization** checkbox so that at runtime, the objects such as activities and events contained in the reusable sub-process are brought into the top-level process and executed there, rather than by making a call to the sub-process.

Table 3: Process Property Reference (Cont'd)

Tab	Property	Description
	References	Lists any processes or tasks that use the selected process, and the contexts in which the data is used. For example, if you select a reusable sub-process the process and task that use the reusable sub-process are displayed. Click **Go To** to display the referencing object. This field helps prevent deleting a process that is used in another. Note, however that a process may be used by other packages, and these references cannot be displayed in this field.
Description		Optional textual description of the activity.
	Documentation URL	The Documentation URL controls allow you to launch a web browser for the given URL (you can use the actual **Documentation URL:** label or the browser button).
		The browser is opened either in TIBCO Business Studio (in the editor pane) or in an external browser according to the user defined settings (**Preferences**> **General**>**Web Browser**).
Destinations		Enter the target environment for the process. When you save the process, validation is performed according to this setting:

- All processes are validated for BPMN 1.2 - additionally, other destinations can be selected to validate processes for use in specific environments
- If you select **BPM**, the Process will be validated against TIBCO ActiveMatrix BPM 2.x.
- If you select **Simulation**, processes created under this project will be validated for simulation in TIBCO Business Studio as well as for BPMN correctness.
- If you do not select a destination environment, basic BPMN validation will be performed.

Table 3: Process Property Reference (Cont'd)

Tab	Property	Description
Work Resource	Resources...	You can specify the Initial Priority, which indicates the relative urgency with which the item should be completed. You can edit this from the Default setting, to be one of the values below, with Higher (400) being the one which would be processed first. • Higher (400) • High (300) • Default • Normal (200) • Low (100)
	Separation Of Duties *(Manual and user tasks)*	Allows you to specify that certain manual or user tasks must be executed by different resources at runtime. For more information, see Separation of Duties on page 109.
	Retain Familiar *(Manual and user tasks)*	Tasks within a Retain Familiar task group will, by preference, be offered to the same user.
	Calendar Reference	Allows you to choose a calendar reference alias (content assist will show references which already exist), or pick a Runtime Identifier field that will provide the Calendar Reference alias at runtime.
Participants		Provides the Label, Name, Type, and External Reference for all participants used in the process.
Parameters		Provides information about all parameters defined in the process.
Data Fields		Provides information about all data fields defined in the process.

Table 3: Process Property Reference (Cont'd)

Tab	Property	Description
Appearance	Connection Routing	The connection routing style is used to change the appearance of entry and exit connections on activities such as events and gateways.
		The connection routing style can be one of the following:
		• **MultiEntry/Exit Point** (default). This means that connection points are to/from the same activity side, and are automatically spaced out from the centre of that side.
		• **Single Entry/Exit Point.** This means that all extry and exit points are amalgamated into one entry point and one exit point on each side of an activity.
		• **Uncentered On Tasks.** This means that entry and exit points on task activities are automatically positioned towards the corners when the source/target object is not in-line. This is the equivalent default from earlier versions of TIBCO Business Studio.
		With all the above styles, it is still possible to manually set a specific entry / exit point by dragging the end of a connection to the required position on an activity's border (rather than the center of the object).
Extended		Extended attributes can be used to add extra information to the schema. Click **Add** to add a new extended attribute.
		Modify the following:
		• **Name** - provide a **Name** for the attribute (you cannot include spaces in the name).
		• **Value** - add any text for the **Value**.
		• **Escape Body** - Select this checkbox if you want the parser to interpret the contents of the body attribute as text rather than XML (you do not want the parser to interpret symbols such as < or >). If you are entering XML, do not select this checkbox so the parser can validate the body attribute.
		• **Body** - enter whatever text or XML you want to make up the body of attribute.

Table 3: Process Property Reference (Cont'd)

Tab	Property	Description
Resource	BPM Fault Configuration System Error Action	BPM only: This configures how an instance of this process behaves at runtime if an executing activity encounters an unexpected error condition: • **(server defined default)** - use system wide default behavior (see "Configuring Error Handling Behavior for Process Instances" in the *TIBCO ActiveMatrix BPM Administrator's Guide* for how to define this). • **Halt** - process instance halts. You can then use Openspace, Workspace or the BPM API to investigate/fix the problem. • **Error** - process instance fails immediately and cannot be resumed. See the **BPM Retry Action** property on the Reference tab in Activity Properties on page 383 for more information.
	BPMN Extensions	Allows you to enter duration values for the process as per BPMN. How these durations are used is dependent on how they are implemented in a particular destination environment.
	BPM Validation Configuration...	This is used to suppress problems markers for the **'No migration point activities in the process' Problem**. It gives you the choice of validation, suppressing the error until the next process flow change, or suppressing the error until a manual reactivation via Resource properties.

Activity Properties

When you have selected an activity in the Process Editor, the following properties are available:

Table 4: Activity Property Reference

Tab	Property	Description
General	Label	Label for the activity that will be displayed on the diagram.
	Activity Markers	Select from **Standard Loop**, **Multiple Instance Loop**, or **Ad-Hoc**. For more information, see User Tasks and Pageflow Processes on page 105.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Participants	Specify the participant responsible for this activity (see Creating a Participant on page 167).
	Activity Type	For example, **Task**, **User Task**, **Service Task**, and so on, (see Creating References on page 100). If you select **Reusable Sub-Process**, you must browse to locate the sub-process.
	• No Form URL • User Defined Form • Form • Pageflow	Configure the user task as follows: • **No Form URL** Select this option if you do not want to display a form for the user task. • **User Defined Form** Select this option if you want to use the F**orm Identifier** field to point to a specific URI (for example, if you authored a form outside of TIBCO Business Studio). Manually enter the URI. TIBCO Business Studio cannot validate the URI, so ensure it is correct. If you select this option but do not specify a URI, upon export a standard form is created. • **Form** Use this option if you have created a form using TIBCO Business Studio Forms. Either automatically create a form (in which case the **Form** field is completed automatically) or browse to select a form from a **Forms** special folder. • **Pageflow** Select this option if you want the user task to call a pageflow. Browse to select a pageflow process. When deployed, the specified pageflow process is run when the work item associated with the user task is opened.
	Reference Task *(Activities of type Reference Task)*	Select one of the following and browse to select the name of the task that is referenced from the currently selected task. • **Reference Task Library Task** • **Reference Local Task**

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Is a transaction *(Activities of type **Embedded Sub-Process)***	Select the **New Sub-Process is a transaction** checkbox if you want the new sub-process to become a transaction and therefore be under transaction control (see User Tasks and Pageflow Processes on page 105).
	Chained Execution *(Activities of type **Independent** or **Embedded Sub-Process)***	Specifies that the selected sub-process implements the chained execution resource allocation pattern (see Creating a New Embedded Sub-Process on page 186).
	Sub-Process location *(Activities of type **reusable sub-process)***	**Sub-Process location** is populated with the path to the **Sub-Process name** that you select.
	Sub-Process name *(Activities of type **reusable sub-process)***	Browse to select the **Sub-Process name**.
	Runtime Identifier Field *(Activities of type **reusable sub-process)***	Specify the field that will be used in the runtime process engine to dynamically select a sub-process that implements a process interface. For more information, see Process Interfaces on page 201.
	Lifecycle *(Activities of type **reusable sub-process)***	Use this to configure whether the sub-process should execute immediately or whether its start request should be queued. If you select **Schedule Start Request**, then you set the initial priority for the sub-process start and the tasks within that using the options in the Priority drop-down. If you select **Start Immediately** then you can still set the priority of the task within the process in the process Work Resource tab. You can specify whether sub-process instances should suspend and resume when the parent process is suspended or resumed by selecting or deselecting the **Suspend/Resume With Parent Process** tickbox.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	• No form	Specify the form to be used.
	• Default form	If you select Default form or Workspace form, you can click Preview to see a preview of the form layout.
	• Workspace form	
	• External form	
	• Other	
Description		Optional textual description of the activity.
	Documentation URL	The Documentation URL controls allow you to launch a web browser for the given URL (you can use the actual **Documentation URL:** label or the browser button).
		The browser is opened either in TIBCO Business Studio (in the editor pane) or in an external browser according to the user defined settings (**Preferences**> **General**>**Web Browser**).
		The activity tooltip popup includes the Documentation URL as a clickable hyperlink to launch the URL in a browser.
Interface *(all task types except Reference)*	Visibility	Specify the visibility of an event or task (whether it is private or public). Public events or tasks publish information (such as required parameters) to an external process or application. Private events or tasks to publish any information to external applications.
	Reschedule work item: *(User tasks)*	**Overwrite Data Already Modified In Work Item** is unset by default. Check it to overwrite data already modified in a work item when you reschedule a user task.
		This is the same as the setting available on the Map From Signal tab for a catch signal which reschedules a task.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Parameters	Allows you to select the data fields or parameters that the task requires as input and output.
		By default all process data is available to a task. When you explicitly associate process data with an Event or task, only that process data is associated with the event or task. After you add data fields, you can control whether it is an input parameter, output parameter, or both by setting its **Mode** (to **In**, **Out**, or **In/Out**). You can also specify whether the process data is mandatory. For more information, see Associating Process Data with Events and Tasks on page 159
		Note that for user tasks, inbound and outbound parameters are from the perspective of the *form*, not the *user*. This means that inbound parameters are sent to the form by the process, not the user. outbound parameters are sent to the form by the user. For more information, see the appropriate implementation guide.
Data Fields		Provides information about all data fields defined in the activity.
Work Resource	Participants *(Manual and user tasks only)*	This is the same as the Participant specified on the **General** tab.
	Initial Priority *(Manual and user tasks only)*	Specifies a relative priority for the work item. The affect and meaning of this setting is destination specific (refer to appropriate implementation guide).
	Distribution Strategy *(Message events and user tasks only)*	Allows you to specify a resource allocation pattern. For more information, see Resource Patterns and Work Distribution on page 109.
	Piling *(Manual and user tasks only)*	
	Separation of Duties *(Manual and user tasks)*	Allows you to specify that certain manual or user tasks must be executed by different resources at runtime. For more information, see Separation of Duties on page 109.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Retain Familiar *(Manual and user tasks)*	
Scripts		Allows you to add text that describes various types of scripts that you want added to a task. It is the task of the solution engineer to translate the outline of the script into a scripting language supported by the selected destination environment. For more information about implementing scripts, see the appropriate implementation guide.
Map To Sub-Process *(Activities of type **reusable sub-process**)*		Use this section to create a mapping from an actual parameter (data field or parameter) into the formal parameters of the reusable sub-process. Create a mapping by clicking a parameter, dragging to the destination parameter, then releasing the mouse button.
Data References	Grouped by Data	Contains a table with a row for each referenced data field, along with a list of the contexts in which it is used.
	Grouped by Reference Context	Contains a table with a row for each context along with the data which is referenced.
Map From Sub-Process *(Activities of type **reusable sub-process**)*		Use this section to create a mapping from a formal parameter of a reusable sub-process to an actual parameter (data field or parameter). Create a mapping clicking a parameter, dragging to the destination parameter, then releasing the mouse button.
Appearance	Line Color	Click the button next to **Color** to select the line color for the border of the selected activity. Click **Set As Default For Type** to apply your current color settings to any new activities of that type that you place on the process. You can revert to the default color settings by clicking **Restore Factory Settings**.
	Fill Color	Click the button next to **Color** to select the fill color for the selected activity. Click **Set As Default For Type** to apply your current color settings to any new activities of that type that you place on the process. You can revert to the default color settings by clicking **Restore Factory Settings**.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Task Icon	Select a valid image file for the Studio project if one is available.
Extended		See the description of the **Extended** tab for the Process Properties on page 379.
Resource	BPMN Extensions	Allows you to enter duration values for the task as per BPMN. How these durations are used is dependent on how they are implemented in a particular destination environment.
	BPM Task Retry *(Service tasks)*	Allows you to determine how to deal with task retry which is triggered by the activity when it determines that a failure may not be permanent. Retry properties are **not** available for pageflow processes. **Maximum Number of Retries**, **Initial Retry Period** and **Retry Period Increment** define the retry configuration on the following activity types: **Service Task**, **Send Task** (send one way, not reply), **Throw Message Intermediate** and **End** Events (send one way, not reply). **Maximum Retry Action** defines the action to take when the maximum number of retries are reached. • **process/server defined default** - use system wide default behavior (see "Configuring Error Handling Behavior for Process Instances" in the *TIBCO ActiveMatrix BPM Administrator's Guide* for how to define this). • **Halt** - process instance halts. You can then use Openspace, Workspace or the BPM API to investigate/fix the problem. • **Error** - the process instance fails immedately and cannot be resumed. This value, if set, takes precedence over the System Error Action value set for the process. See the **BPM Fault Configuration** property on the **Resource** tab in Process Properties on page 379.

Table 4: Activity Property Reference (Cont'd)

Tab	Property	Description
	Correlation Timeout (*for Receive task with incoming flow*)	Set the following to configure the timeout for correlation events: 1. Days 2. Hours 3. Minutes 4. Seconds These settings are used to configure the mimimum number of days/hours/minutes/seconds before the timeout occurs.

Gateway Properties

When you have selected a gateway in the Process Editor, the following properties are available:

Table 5: Gateway Property Reference

Tab	Property	Description
General	Label	Label for the gateway that will be displayed on the diagram.
	Gateway type	Choose the type of gateway.
	Discriminator Type *(Complex Gateway)*	Allows you to select a structured discriminator.
	Parallel Split Name *(Complex Gateway)*	Allows you to specify the name of the upstream parallel gateway that this complex gateway is handling.
	Incoming Paths *(Complex Gateway)*	Specifies how many input Sequence flows are required before the output sequence flow is followed.
Description		Optional textual description of the gateway.

Table 5: Gateway Property Reference

Tab	Property	Description
Data References	Grouped By Data	Contains a table with a row for each item of referenced process data, along with a list of the contexts in which it is used.
	Grouped By Reference Context...	Contains a table with a row for each context along with the process data which is referenced.
Appearance		See the description of the **Appearance** tab for the Activity Properties on page 383.
Extended		See the description of the **Extended** tab for the Process Properties on page 379.
Resource		Shows properties and values for the gateway.

Sequence Flow Properties

When you have selected a sequence flow in the Process Editor, the following properties are available:

Table 6: Sequence Flow Property Reference

Tab	Property	Description
General	Label	Label for the flow that will be displayed on the diagram.
	Type	Choose the type of Sequence Flow.
Description		Optional textual description of the Sequence Flow.
Data References	Grouped By Data	Contains a table with a row for each item of referenced process data, along with a list of the contexts in which it is used.

Table 6: Sequence Flow Property Reference (Cont'd)

Tab	Property	Description
	Grouped by Reference Context	Contains a table with a row for each context along with the process data which is referenced.
Appearance		See the description of the Appearance tab for the Activity Properties on page 383.
Extended		See the description of the Extended tab for the Process Properties on page 379.
Resource		Shows properties and values for the sequence flow.

Event Properties

When you have selected an Event in the Process Editor, the following Properties are available:

Table 7: Event Property Reference

Tab	Property	Description
General	Label	Label for the event that will be displayed on the diagram.
	Trigger Type (*for Start or Intermediate events*) or **Result Type** (*for End events*)	You specify the trigger for a Start or Intermediate event and the result for an End event. The properties displayed on this page depend on the **Trigger Type** or **Result Type** you have selected. For more information about the types of events, see Working with Events on page 125.
	Catch Action (*for catch signal intermediate events only*)	Select either **Cancel task when signal caught** or **Continue task when signal caught**. When you select the latter, you can select between the following Reschedule Task Timer Events: • **None** No timer events are rescheduled when signal arrives. • **All** All timer events attached to same task are rescheduled when signal arrives. • **Deadline** The timer event set as the activity deadline; note this is evaluated at runtime rather that statically when this option is selected (so that if the deadline timer event is changed, this still works). • **Select...** One or more timer events can be manually selected.

Table 7: Event Property Reference (Cont'd)

Tab	Property	Description
	Catch Error Code (*for catch error intermediate events only*)	Set to one of the following, depending on what error codes you want caught: • **Catch All** The event catches any error thrown by any event. • **Catch By Name** The event catches an error of the specified name, thrown by any activity. • **Catch Specific** The event catches a specific error thrown by a specific activity.
Description		Optional textual description of the Event.
Interface		See description for Activity Properties on page 383.
Scripts		See description for Activity Properties on page 383.
Data References	Grouped By Data	Contains a table with a row for each item of referenced process data, along with a list of the contexts in which it is used.
	Grouped by Reference Context	Contains a table with a row for each context along with the process data which is referenced.
Map From Error *(for catch error intermediate events only)*		Use this section to create a mapping from error parameters to process data fields or parameters.
Map From Signal*(for catch signal intermediate events only)*		Use this section to create a mapping from signal parameters to process data fields or parameters.

Table 7: Event Property Reference (Cont'd)

Tab	Property	Description
Appearance		See the description of the Appearance tab for the Activity Properties on page 383.
Extended		See the description of the Extended tab for the Process Properties on page 379.
Resource	Correlation Timeout (*for catch message intermediate events only*)	Set the following to configure the timeout for correlation events: 1. Days 2. Hours 3. Minutes 4. Seconds These settings are used to configure the mimimum number of days/hours/minutes/seconds before the timeout occurs.

Lane Properties

When you have selected a Lane in the Process Editor, the following Properties are available:

Table 8: Lane Property Reference

Tab	Property	Description
General	Label	Label for the lane that will be displayed on the diagram.
Appearance		See the description of the Appearance tab for the Activity Properties on page 383.
Extended		See the description of the Extended tab for the Process Properties on page 379.
Resource		This tab may contain destination-specific properties.

Cheat Sheets View

When you first start TIBCO Business Studio, a Welcome Cheat Sheet is displayed. You can view TIBCO Cheat Sheets and other Cheat Sheets by selecting **Help** > **Cheat Sheets** and selecting from the list.

Process Editor

The **Process Editor** is where you create your business process. It includes a Palette that contains the tools you use to create your Process.

Palette

You can create your Process using the tools on the palette. The Business Process Modeling Notation (BPMN) core set is supported by the palette, which contains the following tools:

Table 9: Palette Tool Reference

Palette Item	Description
Select	Allows you to select objects.
Marquee	Allows you to select several objects by drawing a box around them.
Favorites	Displays some of the most common process objects. You can customize the Favorites drawer by right-clicking it and selecting **Customize**.
Connections	Allows you to connect objects: • Sequence flow shows the order of objects in the process. • Conditional sequence flow is followed based on the evaluation of a condition. • Default sequence flow is followed if other conditions evaluate to false. • Message flow indicate the flow of messages between objects in separate Pools or between Pools. • Association either connects flow and non-flow objects or specifies the compensation task for a compensation event on a task boundary.

Table 9: Palette Tool Reference

Palette Item	Description
Start Events	Indicates the beginning of the process as None, Message, Timer, Conditional, Multiple, or Signal.
Catch Intermediate Events	Catches a "throw" event. The following Types are available: None, Message, Timer, Conditional, Link, Signal, Multiple, Error, Compensation, and Cancel.
Throw Intermediate Events	Throws an event. The following Types are available: Message, Compensation, Signal, Multiple and Link.
End Events	Indicates the end of the process. The following types are available: None, Message, Multiple, Error, Compensation, Cancel, Signal, and Terminate.
Tasks	Tasks of the following types: None, User, Manual, Service, Script, Send, Receive, Reference, Reusable Sub-Process, Embedded Sub-Process. For more information, see Creating References on page 100.
Gateways	Controls the flow of the process with the following types of gateways: Exclusive (Data), Parallel, Exclusive (Event), Inclusive, and Complex.

Table 9: Palette Tool Reference

Palette Item	Description
Artifacts	Allows you to enhance the process with Text Annotations, Data Objects, Groups, Pools, and Lanes.

Alignment Tools

For easier alignment of objects in the Process Editor, you can select either or both of the following options:

• **Diagram** > **Grid** - This allows you to align objects to a grid.

• **Diagram** > **Alignment Guides** - As you move objects in a Process Editor, a blue line appears when the center of two objects coincide.

You can also align objects that you have selected by choosing options from the **Diagram** > **Alignment** menu. For example, if you have two Activities selected, you can align them horizontally on their centers by selecting **Diagram** > **Alignment** > **Align Middle**. Alternatively you can use the alignment buttons on the toolbar that correspond to the menu options.

Business Object Modeler Properties View

This section describes the major parts of the TIBCO Business Studio Business Object Modeler User Interface (UI).

In Eclipse, a Perspective includes the views and set of editors that you commonly use for a specific type of work. TIBCO has created several TIBCO Business Studio perspectives that include the views and editors you commonly use when creating business processes. The Business Object Modeler and its associated views are part of the **Modeling Perspective**. For more information about parts of the Modeling Perspective that are not related to the Business Object Modeler, see the *TIBCO Business Studio Modeling User's Guide*.

The **Properties View** shows you detailed information about the currently selected object and allows you to specify the characteristics of an object.

Package Properties

When you have selected a Package in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Name	Name of the Package. You can re-name the Package here by entering a new name.
Description		Area in which you can enter text to describe the Package or any supporting explanations.
Profiles	Profiles	Lists the UML profiles that have been applied to this package. Clicking [...] displays the **Select Type** dialog from which you can add or remove profiles.
	Applied Profiles	The name of the applied profile.
	Location	The location of the file that contains the applied profile.
Stereotypes		Lists the stereotypes that have been applied to this package. Clicking [...] displays the **Select Type** dialog from which you can add or remove stereotypes.

Tab	Property	Description
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Export	XML Schema Export Options	Lists the available elements and allows selection of which to export as top level elements in the XML Schema.
Resource	Property	
	Value	The name of the package.

Class Properties

When you have selected a Class in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Name	Name of the Class. You can re-name the Class here by entering a new name.
	Superclass	In object oriented terms, the Super Class provides attributes which are inherited by any Derived Classes. Clicking [...] displays the **Select Type** dialog from which you can select a Class to form the SuperClass. Click [Clear] to remove a SuperClass.
Description		Area in which you can enter text to describe the Class or any supporting explanations.
Attributes		Lists the Attributes that belong to the Class, including its **Name**, **Type**, **Multiplicity** (whether there can be several of the Attribute), and **Stereotypes** (whether any stereotypes have been applied). You can add additional Attributes by clicking [+]. You can delete an Attribute by selecting it and clicking [✖].

Tab	Property	Description
Operations		Lists the Operations that belong to the Class, including its Name, Return Type, Multiplicity (whether there can be several of the Operation), Arguments and Stereotypes (whether any stereotypes have been applied). You can add additional Operations by clicking ⊕ . You can delete an Operation by selecting it and clicking ✖ .
Stereotypes		Lists the stereotypes that have been applied to this class. Clicking ... displays the **Select Stereotype** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Appearance	Fonts and Colors	Enables you to change the font type and size of the text on your business object model. You can also change the weight and color of both the text and the business objects in the business object model.
	Lines and Arrows	Enables you to change the appearance of lines and arrows in your business object model. This is currently deselected.
	Gradient	Enables you to change the gradient of colors for your business objects in the business object model.
Resource	Property	
	Value	The name of the class.

Attribute Properties

When you have selected an Attribute in the Business Object Modeler, the following Properties are available.

| Tab	Property	Description
General	Name	Name of the Attribute. You can re-name the Attribute here by entering a new name.
	Multiplicity	Allows you to select whether multiple copies of an Attribute are permitted. See Multiplicity on page 11 for information on the values you can set.
	Type	Select the type of data you expect the Attribute to contain. See Attribute on page 11 for information on the types an Attribute can have. Clicking [...] displays the **Select Type** dialog from which you can change the type of an attribute. Click [Clear] to remove a type.
Description		Area in which you can enter text to describe the Attribute or any supporting explanations.
Stereotypes		Lists the stereotypes that have been applied to this package. Clicking [...] displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Resource	Property	
	Restrictions	Expand this to specify any restrictions for the Attribute. For example, you can specify a default value, or maximum length, depending on the type of your Attribute.
	Value	The name of the Attribute.

Operation Properties

When you have selected an Operation in the Business Object Modeler, the following Properties are available.

| Tab	Property	Description
General	Name	Name of the Operation. You can re-name the Operation here by entering a new name.
	Return Type	Select the type of data you want the return value of the Operation to return. See Operations on page 14 for information on Operations. Clicking ⬚... displays the **Select Type** dialog from which you can select the type of an attribute. Click ⬚Clear to remove a type.
	Multiplicity	Allows you to set a multiplicity value for the Operation. For example, using the drop-down list you can select 0..1, 1..0, 1..*, and so on. See Multiplicity on page 21 for more information
	Arguments	Lists the Arguments that you can specify for an Operation, including its **Name** and **Type**. You can add additional Arguments by clicking ⬚. You can delete an Argument by selecting it and clicking ⬚.
Description		Area in which you can enter text to describe the Operation or any supporting explanations.
Stereotypes		Lists the stereotypes that have been applied to this package. Clicking ⬚... displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Resource	Property	
	Value	The name of the Operation.

Primitive Type Properties

When you have selected a Primitive Type in the Business Object Modeler, the following Properties are available:

Tab	Property	Description
General	Name	Name of the Primitive Type. You can re-name the Primitive Type here by entering a new name.
	Superclass	In object oriented terms, the Superclass provides attributes which are inherited by any Derived Classes.
		Clicking [...] displays the **Select Type** dialog from which you can select a Type to form the Superclass for the Primitive Type. Click [Clear] to clear a Superclass.
Description		Area in which you can enter text to describe the Primitive Type or any supporting explanations.
Stereotypes		Lists the stereotypes that have been applied to this package.
		Clicking [...] displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Appearance	Fonts and Colors	Enables you to change the font type and size of the text on your business object model. You can also change the weight and color of both the text and the business objects in the business object model.
	Lines and Arrows	Enables you to change the appearance of lines and arrows in your business object model. This is currently deselected.
	Gradient	Enables you to change the gradient of colors for your business objects in the business object model.
Resource	Property	

Tab	Property	Description
	Restrictions	Expand this to specify any restrictions for the Primitive Type. For example, you can specify a default value, or maximum length, depending on the type of your Primitive Type.
	Value	The name of the Primitive Type.

Enumeration Properties

When you have selected an Enumeration in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Name	Name of the Enumeration. You can re-name the Enumeration here by entering a new name.
	Superclass	In object oriented terms, the Superclass provides attributes which are inherited by any Derived Classes. Clicking [...] displays the **Select Type** dialog from which you can select a Class to form the Superclass. Click Clear to remove a Superclass.
Description		Area in which you can enter text to describe the Enumeration or any supporting explanations.
Enum Literals		
Stereotypes		Lists the stereotypes that have been applied to this Enumeration. Clicking [...] displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.

Tab	Property	Description
Appearance	Fonts and Colors	Enables you to change the font type and size of the text on your business object model. You can also change the weight and color of both the text and the business objects in the business object model.
	Lines and Arrows	Enables you to change the appearance of lines and arrows in your business object model. This is currently deselected.
	Gradient	Enables you to change the gradient of colors for your business objects in the business object model.
Resource	Property	
	Value	The name of the Enumeration.

Enumeration Literal Properties

When you have selected an Enumeration Literal in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Name	Name of the Enumeration Literal. You can re-name the Enumeration Literal here by entering a new name.
	Value	**Single:** The value of the enumeration literal. The format of the value entered here depends on the data type of which the enumeration containing this enumeration literal is a generalization. **Range:** is not supported.
Description		Area in which you can enter text to describe the Enumeration Literal or any supporting explanations.
Stereotypes		Lists the stereotypes that have been applied to this Enumeration Literal. Clicking ... displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.

Tab	Property	Description
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Resource	Property	
	Value	The name of the Enumeration Literal.

Generalization Properties

When you have selected a Generalization in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Specific	Identifies the specific Class in the Generalization relationship. This is read-only.
		The generalization relationship indicates that, of the two related Classes, one is a more general form of the other and one is a more specific form. For example, a Doctor is a more specific form of the general form Person.
	General	Identifies the general Class in the generalization relationship. This is read-only.
		The generalization relationship indicates that, of the two related Classes, one is a more general form of the other and one is a more specific form. For example, a Doctor is a more specific form of the general form Person.
Description		Area in which you can enter text to describe the Generalization or any supporting explanations.
Stereotypes		Lists the stereotypes that have been applied to this package.
		Clicking [...] displays the **Select Type** dialog from which you can add or remove stereotypes.
	Applied Stereotype	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.

Tab	Property	Description
	Location	The location of the file that contains the stereotype.
Appearance	Fonts and Colors	Enables you to change the font type and size of the text of the labels on your connections on your business object model. You can also change the weight and color of the connections.
	Routing	Enables you to determine how the connections are routed in the model. For example, you can choose to make the connections avoid obstructions to make the model easier to read.
	Lines and Arrows	Enables you to change the appearance of lines and arrows in your business object model. This is currently deselected.
	Jump Links	If you have connections that cross over each other in your model, specify jump links so that the connections jump over each other.
	Smoothness	Enables you to change the smoothness of the connections.
Resource	Property	
	Value	The name of the Generalization Property.

Association/Aggregation/Composition Properties

When you have selected an Association, Aggregation or Composition connection in the Business Object Modeler, the following Properties are available.

| Tab	Property	Description
General	Name	Name of the Association, Aggregation or Composition. You can re-name the connection here by entering a new name.
	Navigability	Select the direction of the connection from the drop-down list either **Bi-directional** or *ClassName1* to *ClassName2*.

Tab	Property	Description
	Aggregation Kind	Specifies the Aggregation kind from the Source Class to the target Class. You can choose one of the following Aggregation kinds: • None - no Aggregation is used. • Aggregation - An aggregate connection is used. • Composition - A composite connection is used. See Relationships on page 17 for more information about these connections.
Description		Area in which you can enter text to describe the Association, Aggregation or Composition and any supporting explanations.
Stereotypes	Applied Stereotypes	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	Location	The location of the file that contains the stereotype.
Appearance	Fonts and Colors	Enables you to change the font type and size of the text of the labels on your connections on your business object model. You can also change the weight and color of the connections.
	Routing	Enables you to determine how the connections are routed in the model. For example, you can choose to make the connections avoid obstructions to make the model easier to read.
	Lines and Arrows	Enables you to change the appearance of lines and arrows in your business object model. This is currently deselected.
	Jump Links	If you have connections that cross over each other in your model, specify jump links so that the connections jump over each other.
	Smoothness	Enables you to change the smoothness of the connections.
Resource	Property	

Tab	Property	Description
	Value	The name of the Association/Aggregation/Composition Property

Association Class Properties

When you have selected an Association Class in the Business Object Modeler, the following Properties are available.

Tab	Property	Description
General	Name	Name of the Association Class. You can re-name the Association Class here by entering a new name.
	Superclass	In object oriented terms, the Super Class provides attributes which are inherited by any Derived Classes. Clicking ... displays the **Select Type** dialog from which you can select a Class to form the SuperClass. Click Clear to remove a SuperClass.
Description		Area in which you can enter text to describe the Association Class or any supporting explanations.
Stereotypes	Apply/Unapply Stereotypes	Lists the stereotypes that have been applied to this Association Class. Clicking ... displays the **Select Stereotype** dialog from which you can add or remove stereotypes.
	Applied Stereotypes	The name of the stereotype.
	Profile	The name of the profile that contains the stereotype.
	File	The path to the file that contains the stereotype.
Appearance	Fonts and Colors	Enables you to change the font type and size of the text on your business object model. You can also change the weight and color of both the text and the business objects in the business object model.
Resource	Stereotypename where Stereotypename is the name of any applied stereotypes.	If a stereotype is applied, the name of the stereotype is displayed here. Expand this to edit any properties of the stereotype.

Tab	Property	Description
	General	The name of the Association Class.
	Superclass	In object oriented terms, the Super Class provides attributes which are inherited by any Derived Classes. Clicking ⊡ displays the **Select Type** dialog from which you can select a Class to form the SuperClass. Click ⬚Clear to remove a SuperClass.

Organization Modeler Properties View

This section of the help describes the major parts of the TIBCO Business Studio Organization Modeler User Interface (UI).

In Eclipse, a Perspective includes the views and set of editors that you commonly use for a specific type of work. TIBCO has created several TIBCO Business Studio perspectives that include the views and editors you commonly use when creating business processes. The Organization Modeler and its associated views are part of the **Modeling Perspective.** For more information about parts of the Modeling Perspective that are not related to the Organization Modeler, see the *TIBCO Business Studio Modeling User's Guide*.

The **Properties View** shows you detailed information about the currently selected object and allows you to specify the characteristics of an object.

The following section describes the Properties that are available for the elements in an Organization Model.

Organization Model Properties

When you select the Organization Model itself, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization Model. You can re-name the Organization Model here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.

Tab	Property	Description
	Version	The version of the Organization Model. This defaults to the version specified when the project was created, which in turn defaults to **1.0.0.qualifier**. You can retain this or enter a different version for the Organization Model in the standard Eclipse form of:
		major.minor.micro.qualifier
		There is a limit of 6 on the number of organization model versions supported.
		Changes to the version of the Organization Model do not directly affect other project artifacts, such as process packages. However, all references within a project must be to the same **major** version of the Organization Model.
		At run-time, the **Organization Model Version** field in the Organization Browser in Workspace displays only the first digit of this version number, that is the major version.
	Author	The username that created the Organization Model.
		The name of the author can be defined in the User Name: field on Window > Preferences > User Profile. If no user is defined there, it uses the default user system property.
	Date Created	The date the Organization Model was created.
Privileges - Assigned	Privilege	The name of the Privilege associated with this Organization Model. Click [...] to open the **Select Type** dialog to add or remove a Privilege.
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.

Tab	Property	Description
System Actions	Name	The name of the system action.
		If you associate one or more privileges with a system action, they are listed on the lines below that action. Click ⊞ to expand the display and show the privileges, and click ⊟ to collapse the display.
		Click 🔑 to assign a privilege to a system action. The Select Type dialog is displayed, enabling you to add or remove a privilege. You can also remove a privilege by selecting it and clicking ✖ .
		Click ⬆ to move the privilege up the list, or ⬇ to move it down. These icons are only available if there is more than one privilege attached to a system action.
	Qualifier Value	If a privilege has qualifying information specified, this column lists the value of the qualifier.
		Click ↩ to reset the value of a qualifier to the default value defined for it.
Resource	Property Value	Displays the Label and Name of the Organization Model. You can edit the values from this tab by clicking on the Value field.

Organization Properties

When you have selected an Organization in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization. You can re-name the Organization here by entering a new name.
		The default name of the Organization Model will be used here, which is Organization1. To change the default, select Window > Preferences > User Profile and edit the Organization Name field.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.

Tab	Property	Description
	Type	The type for the Organization. This can be the Standard Organization Type, for example or may be a type that you have defined yourself. See Schema on page 28 for more information about types. Clicking ... displays the **Select Type** dialog from which you can add or remove Organization Types.
	Allocation Method	One of Random or Round Robin. Determines how work is allocated.
	Purpose	Area in which you can enter text to describe the purpose of the Organization.
	Dates	Enables you to specify start and end dates for the Organization. Click ... next to the date fields to display the calendars.
	Location	The location for the Organization. Click ... next to the Location field to select it.
Units	Label	The name of any Organization Units that are defined as being children of this Organization. Click ➕ to add an Organization Unit. You can delete an Organization Unit by selecting it and clicking ✖ .
	Type Location Start Date End Date	The characteristics of the Organization Unit named by **Label**. These are display-only.
Appearance	Fonts and Colors	
	Lines and Arrows	
Resource	Property Value	Displays the Label and Name of the Organization. You can edit the values from this tab by clicking on the Value field.

Organization Unit Properties

When you have selected an Organization Unit in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization Unit. You can re-name the Organization Unit here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Member of	If you are using the default schema, or if you have created your own schema and defined any Organization Unit Types, you can assign a Type to this Organization Unit by selecting it in the Member of field.
	Allocation Method	One of Random or Round Robin. Determines how work is allocated.
	Purpose	Area in which you can enter text to describe the purpose of the Organization Unit.
	Dates	Enables you to specify start and end dates for the Organization Unit. Click [...] next to the date fields to display the calendars.
	Location	The location for the Organization Unit. Click [...] next to the Location field to select it.
Units	Label	The name of any Organization Units lower in the hierarchy that are defined as being children of this Organization Unit. Click [+] to add an Organization Unit. You can delete an Organization Unit by selecting it and clicking [x].
	Type Location Start Date End Date	The characteristics of the Organization Unit named by **Label**. These are display-only.
Positions	Label	The name of any Positions that are defined as being children of this Organization Unit. Click [+] to add a Position. You can delete a Position by selecting it and clicking [x].

Tab	Property	Description
	Type Location Start Date End Date	The characteristics of the Position named by **Label**. These are display-only.
Privileges - Assigned	Privilege	The name of the Privilege you want to specify for this Organization Unit. Click [...] to open the **Select Type** dialog to add or remove a Privilege.
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.
System Actions	Name	The name of the system action. If you associate one or more privileges with a system action, they are listed on the lines below that action. Click ⊞ to expand the display and show the privileges, and click ⊟ to collapse the display. Click 🔑 to assign a privilege to a system action. The Select Type dialog is displayed, enabling you to add or remove a privilege. You can also remove a privilege by selecting it and clicking ✖. Click ⬆ to move the privilege up the list, or ⬇ to move it down. These icons are only available if there is more than one privilege attached to a system action.
	Qualifier Value	If a privilege has qualifying information specified, this column lists the value of the qualifier. Click ↩ to reset the value of a qualifier to the default value defined for it.
Appearance	Fonts and Colors	
	Lines and Arrows	
	Gradient	
Resource	Property Value	Displays the Label and Name of the Organization Unit. You can edit the values from this tab by clicking on the Value field.

Hierarchy and Association Properties

When you have created a Hierarchy or Association connection in an Organization Model, the following Properties are available.

| Tab	Property	Description
General	Label	The displayed name of the Hierarchy or Association. You can re-name the Hierarchy or Association here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Type	The type for the Hierarchy or Association. This can be an Organization Unit Relationship Type, for example or may be a type that you have defined yourself. See Schema on page 28 for more information about types. Clicking [...] displays the **Select Type** dialog from which you can add or remove Types.
	Is Hierarchical	This checkbox determines whether the connection is a Hierarchy or an Association. If this is checked, the connection is a Hierarchy; if unchecked, it is an Association. You can change the type of connection by checking or unchecking this box.
	Purpose	Area in which you can enter text to describe the purpose of the Hierarchy or Association.
	Dates	Enables you to specify start and end dates for the Hierarchy or Association. Click [...] next to the date fields to display the calendars.
Appearance		
Resource	Property Value	Displays the Label and Name of the Hierarchy or Association, and the From and To values. You can edit the values from this tab by clicking on the Value field.
	From	The Organization Unit the relationship runs from. In a Hierarchical relationship, this is the unit at the higher level of the hierarchy.

Tab	Property	Description
	To	The Organization Unit the relationship runs to. In a Hierarchical relationship, this is the unit at the lower level of the hierarchy.

Position Properties

When you have selected a Position in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Position. You can re-name the Position here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Position Type	If you are using the default schema, or if you have created your own schema and defined any Position Types, you can assign a Type to this Position by selecting it in the Element field.
	Allocation Method	One of Random or Round Robin. Determines how work is allocated.
	Number	Enter the ideal number of people there should be in this Position within the Organization Unit.
	Purpose	Area in which you can enter text to describe the purpose of the Position.
	Dates	Enables you to specify start and end dates for the Position. Click ... next to the date fields to display the calendars.
	Location	The location for the Position. Clicking ... displays the **Select Type** dialog from which you can add or remove Locations.
Capabilities - Assigned	Capability	The name of the Capability you want to specify for this Position. Click ... to open the **Select Type** dialog to add or remove a Capability.

Tab	Property	Description
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.
Privileges - Assigned	Privilege	The name of the Privilege you want to specify for this Position. Click ⬚ to open the **Select Type** dialog to add or remove a Privilege.
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.
Organization Resources	Label	Shows any Resources allocated to the Position. Click ➕ to add a Resource. You can delete a Resource by selecting it and clicking ✖.
System Actions	Name	The name of the system action. If you associate one or more privileges with a system action, they are listed on the lines below that action. Click ⊞ to expand the display and show the privileges, and click ⊟ to collapse the display. Click 🔑 to assign a privilege to a system action. The Select Type dialog is displayed, enabling you to add or remove a privilege. You can also remove a privilege by selecting it and clicking ✖. Click ⬆ to move the privilege up the list, or ⬇ to move it down. These icons are only available if there is more than one privilege attached to a system action.
	Qualifier Value	If a privilege has qualifying information specified, this column lists the value of the qualifier. Click ↩ to reset the value of a qualifier to the default value defined for it.
Description	Description	Area in which you can enter text to describe the Position or any supporting explanations.
Resource	Property Value	Displays the Label and Name properties of the Position. You can edit the values from this tab by clicking on the Value field.

Group Properties

When you have selected a Group in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Group. You can re-name the Group here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Allocation Method	One of Random or Round Robin. Determines how work is allocated.
	Purpose	Area in which you can enter text to describe the purpose of the Group.
Capabilities - Assigned	Capability	The name of the Capability you want to specify for this Group. Click [...] to open the **Select Type** dialog to add or remove a Capability.
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.
Privileges - Assigned	Privilege	The name of the Privilege you want to specify for this Group. Click [...] to open the **Select Type** dialog to add or remove a Privilege.
	Qualifier Value	You can enter qualifying information here if required. See Capability and Privilege on page 17 for more information about qualifications.
Groups	Label	Shows any sub-Groups that are part of the Group. Click [+] to add a Group. You can delete a Group by selecting it and clicking [x].
Organization Resources	Label	Shows any Resources allocated to the Group. Click [+] to add a Resource. You can delete a Resource by selecting it and clicking [x].

Tab	Property	Description
System Actions	Name	The name of the system action.
		If you associate one or more privileges with a system action, they are listed on the lines below that action. Click ⊞ to expand the display and show the privileges, and click ⊟ to collapse the display.
		Click 🔑 to assign a privilege to a system action. The Select Type dialog is displayed, enabling you to add or remove a privilege. You can also remove a privilege by selecting it and clicking ✖ .
		Click ⬆ to move the privilege up the list, or ⬇ to move it down. These icons are only available if there is more than one privilege attached to a system action.
	Qualifier Value	If a privilege has qualifying information specified, this column lists the value of the qualifier.
		Click ↩ to reset the value of a qualifier to the default value defined for it.
Description	Description	Area in which you can enter text to describe the Group or any supporting explanations.
Resource	Property Value	Displays the Label and Name of the Group. You can edit the values from this tab by clicking on the Value field.

Category Properties

When you have selected a Capability Category or a Privilege Category in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Category. You can re-name the Category here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Capabilities or Privileges	Lists the Capabilities or Privileges that are members of this category.

Tab	Property	Description
Resource	Property Value	Displays the Label and Name of the Category. You can edit the values from this tab by clicking on the Value field.

Capability Properties

When you have selected a Capability in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Capability. You can re-name the Capability here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Has qualifier	Select this option if you want to add qualifying information to a Capability or Privilege. See Capability and Privilege on page 17 for more information about qualifications.
		If this check box is selected the **Show qualifier ..** link is enabled. Click **Show qualifier ..** or click on the **Qualifier** tab title to display the **Qualifier** tab. This enables you to specify a data type for your qualifying information.
	Purpose	Area in which you can enter text to describe the purpose of the Capability.
	Category	Shows the Category of which this Capability is a member. Click to open the **Select Type** dialog to add or remove a Category.
Description	Description	Area in which you can enter text to describe the Capability or any supporting explanations.
Resource	Property Value	Displays the Label and Name of the Capability. You can edit the values from this tab by clicking on the Value field.

Privilege Properties

When you have selected a Privilege in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Privilege. You can re-name the Privilege here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Has qualifier	Select this option if you want to add qualifying information to a Capability or Privilege. See Capability and Privilege on page 17 for more information about qualifications.
		If this check box is selected the **Show qualifier ..** link is enabled. Click **Show qualifier ..** or click on the **Qualifier** tab title to display the **Qualifier** tab. This enables you to specify a data type for your qualifying information.
	Purpose	Area in which you can enter text to describe the purpose of the Privilege.
	Category	Shows the Category of which this Privilege is a member. Click ... to open the **Select Type** dialog to add or remove a Category.
Qualifier	Label	The displayed name of the Qualifier.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Type	From the Type drop-down list, select a data type for the qualifying information. See Capability and Privilege on page 17 for more information about the data types that qualifying information can have.
	Default Value	You can specify a default value for the Qualifier here.
Description	Description	Area in which you can enter text to describe the Privilege or any supporting explanations.
Resource	Property Value	Displays the Label and Name of the Privilege. You can edit the values from this tab by clicking on the Value field.

Location Properties

When you have selected a Location in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Location. You can re-name the Location here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Type	The type for the Location. This can be the Standard Location Type, for example or may be a type that you have defined yourself. See Schema on page 28 for more information about types. Clicking [...] displays the **Select Type** dialog from which you can add or remove Location Types.
	Allocation Method	One of Random or Round Robin. Determines how work is allocated.
	Purpose	Area in which you can enter text to describe the purpose of the Location.
	Dates	Enables you to specify start and end dates for the Location. Click [...] next to the date fields to display the calendars.
Description	Description	Area in which you can enter text to describe the Location or any supporting explanations.
Resource	Property Value	Displays the Label and Name of the Location. You can edit the values from this tab by clicking on the Value field.

Resource Properties

When you have selected a Resource in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Resource. You can re-name the Resource here by entering a new name

Tab	Property	Description
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
	Type	The type for the Resource. This can be the Human Resource Type, for example, or may be a type that you have defined yourself. See Schema on page 28 for more information about types. Clicking [...] displays the **Select Type** dialog from which you can add or remove Resource Types.
	Purpose	A field in which you can enter text for a brief description of the purpose of the Resource.
	Dates	Enables you to specify start and end dates for the Resource. Click [...] next to the date fields to display the calendars.
Attribute Values	Label	The name of any attributes that are defined for this type of Resource are displayed here.
	Value	Click the **Value** field next to each defined attribute to display a list of available values for that attribute. See Attributes on page 32 for more information about attributes.
Description	Description	Area in which you can enter text to describe the Resource or any supporting explanations.
Resource	Property Value	Displays the Label and Name of the Resource. You can edit the values from this tab by clicking on the Value field.

Organization Query Properties

When you have selected an Organization Query in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Query. You can re-name the Query here by entering a new name
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.

Tab	Property	Description
	Script defined as	Whether the query is entered in free text or in Resource Query Language (RQL). Defaults to Unspecified when a query is created.
Resource	Property Value	Displays all the properties of the Query. You can edit the values from this tab by clicking on the Value field.

Properties View for the Organization Schema

The following section describes the Properties that are available for the elements in an Organization Schema.

Organization Type Properties

When you have selected an Organization Type in the Organization Modeler, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization Type. You can re-name the Organization Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
Resource	Property Value	Displays the Label and Name of the Organization Type. You can edit the values from this tab by clicking on the Value field.

Organization Unit Type

When you have selected an Organization Unit in the Organization Modeler, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization Unit Type. You can re-name the Organization Unit Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
Resource	Property Value	Displays the Label and Name of the Organization Unit Type. You can edit the values from this tab by clicking on the Value field.

Position Type Properties

When you have selected a Position in the Organization Modeler, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Position Type. You can re-name the Position Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
Resource	Property Value	Displays the Label and Name of the Position Type. You can edit the values from this tab by clicking on the Value field.

Location Type Properties

When you have selected a Location in the Organization Modeler, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Location Type. You can re-name the Location Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
Resource	Property Value	Displays the Label and Name of the Location Type. You can edit the values from this tab by clicking on the Value field.

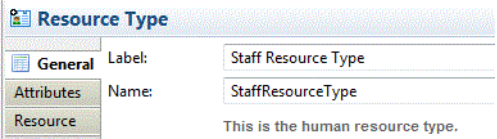## Organization Unit Relationship Type Properties

When you have selected an Organization Unit relationship in the Organization Modeler, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Organization Unit Relationship Type. You can re-name the Organization Unit Relationship Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.

Tab	Property	Description
Resource	Property Value	Displays the Label and Name of the Organization Unit Relationship Type. You can edit the values from this tab by clicking on the Value field.

Resource Type Properties

When you have selected a Resource Type in an Organization Model, the following Properties are available.

Tab	Property	Description
General	Label	The displayed name of the Resource Type. You can re-name the Resource Type here by entering a new name.
	Name	The internal name. This defaults to the same value as the Label, but with any internal spaces removed.
Attributes	Label	The name of any attributes that you want to define for this Resource Type. See Attributes on page 32 for more information about attributes.
		This tab lists all attributes that are associated with this Resource Type and also all that are associated with its parent, its parent's parent, and any other Resource Types in the chain of inheritance.
		Click [+] to add an attribute. You can delete an attribute by selecting it and clicking [×].
	Type	One Resource Type in the schema must be defined as the **Human Resource Type**, for compatibility purposes once the Organization is exported. It cannot be deleted from the Schema.
		This text is displayed on the **General** tab of the Human Resource Type. The Type is therefore still identifiable as the Human Resource Type even if you change its label and name.
Resource	Property Value	Displays all the properties of the Resource. You can edit the values from this tab by clicking on the Value field.

Human, Durable and Consumable Resource Types

One Resource Type must always be the **Human Resource**, whether or not you have used the default Schema. If your Schema retains the default Schema, then in addition one resource type must have the **Durable Resource** property, and one the **Consumable Resource** property. If you select **Resource Types** in the Project Explorer, the **General** tab in the **Properties View** displays a matrix showing which type has which property.

The Resource Type with one of these properties does not have to have the corresponding name. In this example some of the Types have been renamed:

You can change the assignment of these attributes by checking boxes in this matrix - for example, you could check **Durable Resource** in the **Construction machinery** line. If you do this, the corresponding box in the **Building** line would automatically be unchecked: there must be one, and only one Resource Type with each attribute.

Chapter 16 **Tips and Tricks**

This chapter contains tips for working with the TIBCO Business Studio user interface.

Topics

Process Editor

The following tips relate to the Process Editor:

I can't see the palette.	Make sure you are in the Process Editor and that the palette is expanded (click the arrow to the right, top of the scroll bar).
I have a large diagram that is difficult to view. How can I find a specific task?	Press Ctrl+F and enter the name or a partial name in the resulting dialog. A list of search results is displayed. Clicking one of the results displays it in the Process Editor.
How can I create several objects of the same type using the palette?	Press the Ctrl key while adding the objects to your Process. For example, if you want to create several Sequence Flows, press and hold the Ctrl key while clicking the Flow tool and adding the Sequence Flows.
How do I align objects in the Process Editor?	There are two features that allow you to better align objects in the Process Editor - **Grid** and **Alignment Guides**. These are both available from the **Diagram** menu when using the Process Editor. **Grid** allows you to snap objects to the grid lines, and **Alignment Guides** shows a centering line when you have aligned two objects. With several objects selected in the Process Editor you can also select options from the **Diagram** > **Alignment** menu to control the vertical and horizontal alignment of the objects.
I'm using Grid alignment in the Process Editor and I want to place an object without using the Grid.	Pressing the Alt key while moving an object allows you to position it between grid lines.
I want to see a larger view of my Process.	You can expand the Process Editor to fill your screen by double-clicking its title bar or pressing Crtl+M. You can temporarily display the Properties view by double-clicking any diagram element. The Properties view will be hidden again when you click on the diagram.

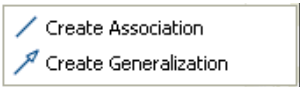|	
How can I easily resize an Activity in the Process Editor?	Pressing the Ctrl key while resizing one side of an object automatically resizes the opposite side as well.
I can't get my Sequence Flows to look right.	Occasionally when you reposition a Sequence Flow several times you create too many bendpoints and make the flow illegible. To restore a Sequence Flow, click the flow and select **Reset Bendpoints**.
How can I create bendpoints when I draw a Sequence Flow?	Whilst holding down the left mouse button and positioning the Sequence Flow, right-click to add a bendpoint.
I can't get a Sequence Flow to dock where I want it to dock.	Sequence Flows are docked at the nearest docking point rather than where you attempt to dock them. Try repositioning the middle of the Sequence Flow to change the docking point.
How can I position Sequence Flows using the keyboard?	Highlight the Sequence Flow, the press the Period key (.) to move along the bendpoints. With a bendpoint highlighted, use the arrow keys to position them and change the shape of the flow. When you are done, press the Return key.
How can I email someone a Process I am working on?	Send them the XPDL Package file that contains the Process. Locate the Package file name in the Project Explorer. The Package file is stored in your workspace (by default this is **C:\Documents and Settings*username*\\workspace**).
A task label is truncated in the Process Editor - how can I show the whole label?	Set the zoom level to width or height and all letters become visible in the Process Editor Alternatively, you can add a period (.) to the end of the label.

Business Object Model Editor

The following tips relate to the Business Object Model Editor:

How can I quickly create a connection between two Classes?	Make sure you are in the Business Object Modeler and that the Palette is expanded (click the arrow to the right, top of the scroll bar). If you click a Class, the following symbols are displayed on its border: You can drag either of these to another Class. The following menu is displayed from which you can choose the type of connection you want to create:
How can I quickly add Attributes to a Class?	Click the Class. The following symbol is displayed: • Clicking ● adds an Attribute to the selected Class. • Clicking ⚙ adds an Operation to the selected Class.

Workbench

The following tips relate to the Eclipse Workbench:

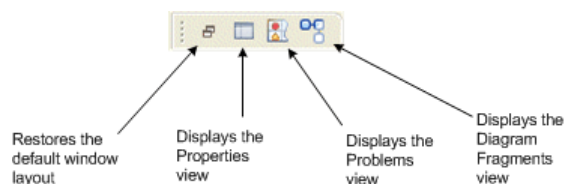|	
How can I quickly change Perspectives?	There are buttons in the upper right of the screen so you can change between the Simulation and Modeling perspectives. You can also do this using Ctrl+F8.
My windows are a mess. How can I reset them?	Select **Window** > **Reset Perspective**. This restores the current Perspective to its default.
How can I switch to a different workspace?	Select **File** > **Switch Workspace** and browse for the location of the workspace. Note that after you select a workspace and click **OK**, TIBCO Business Studio must restart before you can access the new workspace.
After starting TIBCO Business Studio, I get the following error message: Unable to read workbench state. workbench UI layout will be reset	This error occurs because a UI element (for example, editor, view, or perspective) that was displayed at the close of the last TIBCO Business Studio session is no longer available. This error usually indicates a change in the installation environment (a product has been removed or upgraded), and can safely be ignored.
How can I navigate to other views while in full screen mode?	When a view or editor is expanded to fill the window, Eclipse provides several buttons around the border of the screen that allow you to display other views in addition to the expanded view of the Process. For example, the following buttons are displayed around the border of the screen:

Problems View

The following tips relate to the Problems view:

How can I correct validation errors?	Either: • Right-click the problem and select **Quick Fix** (if enabled for the current problem). This gives you the option of having TIBCO Business Studio automatically correct the problem for you. - or - • If no quick fix is available, Double-click the problem or right-click the problem and select **Go To**. This displays the Process in the Process Editor, highlighting the offending object and allowing you to manually correct the problem.
In the Problems view I see not only problems for my Process/Project, but problems for all Processes/Projects.	From the menu in the upper right of the Problems view, select **Configure Contents**. This allows you to customize the problems display. For example, you can select options to display problems for the selected resource only, or for any resource in the same Project.