



## **UML Modeling with Enterprise Architect - UML Modeling Tool**

*Enterprise Architect is an intuitive, flexible and powerful UML analysis and design tool for building robust and maintainable software.*

*This booklet explains how to use the modeling facilities of Enterprise Architect.*



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# UML Modeling with Enterprise Architect - UML Modeling Tool

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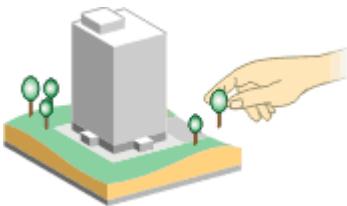
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# **Foreword**

This user guide describes how to use the modeling facilities of Enterprise Architect.

## Modeling



In relation to using Enterprise Architect, UML modeling can be described as graphically representing a business process or software system. The resulting model can be used to emphasize a certain aspect of the system being represented and to record, document and communicate its detail. A study of such a model can enable insight or understanding of the system.

### The Enterprise Architect Modeling Platform

Enterprise Architect's modeling platform is based on the Unified Modeling Language (UML), a standard that defines rules and notations for specifying business and software systems.

For information on UML, see the *UML Dictionary*.

For examples of the UML models that Enterprise Architect can help you build, see the *Model Templates* topic in *Using Enterprise Architect - UML Modeling Tool*.

### Building a Model

Using Enterprise Architect, you can quickly build a model using a hierarchy of *packages* to represent the structure and organization of the model. Each package can contain:

- Other packages
- *Diagrams* that represent various aspects of the equipment, environment and business processes of the system
- *Elements* that represent the objects and actions within the system or process, arranged in an organization defined by relationships represented by *UML connectors*.

The *Create a Project - Quick Start* topic briefly shows you how to create a diagram within a package, containing elements and connectors. See *Getting Started with Enterprise Architect*. Sparx Systems also provide a [demonstration of quickly developing a Use Case model](#).

For specific details of configuring and combining the components of a model, see:

- [Work With Packages](#) [3]
- [Work With Diagrams](#) [7]
- [Work With Elements](#) [67]
- [Work With Connectors](#) [197].

### Relationship Matrix

The Relationship Matrix enables you to display and manage the relationships between the elements within selected packages. You can refine the display to show specific types of relationship between specific types of element. The [Relationship Matrix](#) [224] is an effective and convenient method of visualizing relationships quickly and definitively.

## 1 Work With Packages



A package is a container of model elements, and is displayed in the **Project Browser** using the 'folder' icon familiar to Windows users. This topic explores the tasks you can perform with packages, including:

- [Open a package](#) 
- [Add a package](#) 
- [Rename a package](#) 
- [Copy a package](#) 
- [Drag a package onto a diagram](#) 
- [Show or hide a package](#) 
- [Delete a package](#) 

### Note:

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Update Element** permission to update or delete a package. See *User Security in UML Models*.

### 1.1 Open Package in the Project Browser

To open a package from the **Project Browser**, follow the steps below:

1. Double-click on a package; the contents display in the **Project Browser**.
2. Click on the + and - symbols next to the folder icon to open or close the package respectively.

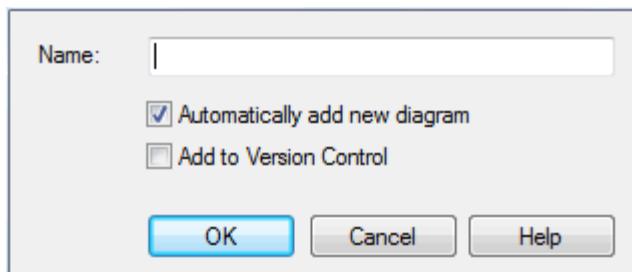
### Tip:

Package contents are arranged alphabetically and elements can be dragged from one package to another using the mouse.

### 1.2 Add a Package

To add a new package:

1. In the **Project Browser**, select the package or view under which to add a new package.
2. Right-click on the folder icon within the **Project Browser**. The context menu displays.
3. Select the **Add | Add Package** menu option. The **New Model Package** dialog displays.



4. In the **Package Name** field type the name of the new package.

5. To immediately create a diagram for the package, leave the **Automatically add new diagram** checkbox selected. To avoid creating a diagram, deselect the checkbox.
6. If you are adding a package to a parent package that is under version control, the **Add to Version Control** option displays, with the checkbox selected. Deselect the checkbox to exclude the new package from version control, otherwise leave it selected. (See *Version Control Within UML Models Using Enterprise Architect*.)
7. Click on the **OK** button. The new package is inserted into the tree at the current location and, if you left the **Automatically add new diagram** checkbox selected, the [New Diagram dialog](#)  displays.
8. If you have selected to put the package under version control, the **Package Control Options** dialog displays. Complete this dialog as required. See the *Controlled Packages* topic in *UML Model Management*.

**Tip:**

You can also add a package using the Enterprise Architect UML **Toolbox** and pasting a new package element into a diagram. In this case the package is created under the diagram's owning package, and is created with a default diagram of the same type as that in which the package is created.

**Note:**

In a multi-user environment, other users do not see the change until they reload their project. (See *Version Control Within UML Models Using Enterprise Architect*.)

## 1.3 Rename a Package

To rename a package, follow the steps below:

1. Select the package to rename in the **Project Browser**.
2. Right-click to display the context menu.
3. Click on the **Package Properties** option.
4. In the **Name** field, type the new name.
5. Click on the **OK** button.

Alternatively, highlight the package to rename, and press **[F2]**.

**Note:**

In a multi-user environment, other users do not see the change until they reload their project. (See *Version Control Within UML Models Using Enterprise Architect*.)

## 1.4 Copy a Package

Enterprise Architect enables you to quickly and easily duplicate a complete package, including its child packages, elements and diagrams. You can insert a copy of a package under the same parent or under one or more other packages, in the same model or project or any other model or project.

This procedure is effectively the same as exporting and importing the package XMI file, with the **Strip GUIDs** checkbox selected (see the *Copy Packages Between Projects* topic in *UML Model Management*). You would tend to use this procedure for copying sections of a model within the project rather than reproducing an entire model or project, although copying these larger structures is equally feasible.

**Notes:**

- A copy of a package does not have the external cross references of the source package; that is, the following connectors are discarded:
  - Connectors coming *from* packages and elements outside the package being copied, *into* the package being copied
  - Connectors going *to* packages and elements outside the package being copied, *from* the package being copied.
- You cannot paste a package into a parent package that is locked by another user (see *User Security in UML Models*) or that is checked in (see *Version Control Within UML Models Using Enterprise Architect*). The **Paste...** option is grayed out in the context menu.

To copy a package, follow the step below:

1. In the **Project Browser**, right-click on the required package and select the **Copy Package to Clipboard** context menu option (or click on the package and press **[Ctrl]+[C]**). The **Copy Package to Clipboard** dialog briefly displays until the copy operation completes.

To paste a package, follow the step below:

1. In the **Project Browser**, right-click on the package into which to paste the copied package, and select the **Paste Package from Clipboard** context menu option (or click on the package and press **[Ctrl]+[V]**). The **Paste Package from Clipboard** dialog briefly displays until the paste operation completes.

The target package is expanded to expose the pasted package in the **Project Browser**. If you are pasting the package within the same model as the copied source, the source parent package is also collapsed.

If the target package already contains:

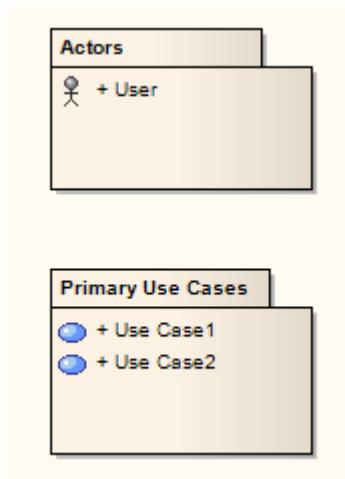
- a package with the same name as the pasted package, the pasted package name has the suffix - *Copy*
- a package with the same name as the pasted package *including* the - *Copy* suffix, the suffix becomes - *Copy1* (or - *Copy2*, - *Copy3* and so on, as copies of the package accumulate in the target parent package).

You can keep the same package name as the source, or you can rename the package either by clicking twice on it and editing the name in the **Project Browser**, or by double-clicking on it and editing the name in the **Properties** dialog.

## 1.5 Drag a Package Onto a Diagram

You can drag a package element from the **Project Browser** onto the current diagram. This displays the package and any contents within. This is a useful feature to help organize the display and documentation of models.

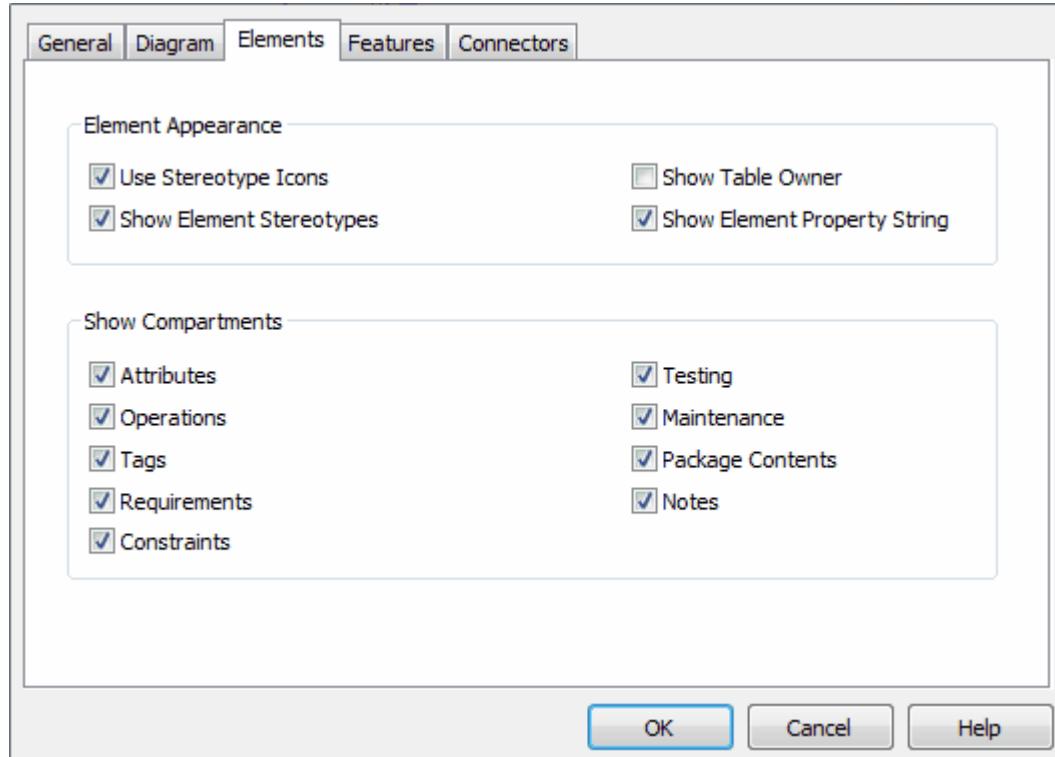
The following illustration shows how a package is displayed in a diagram; note the child Actor and Use Case icons.



## 1.6 Show or Hide Package Contents

To show or hide the contents of packages in a diagram, follow the steps below:

1. Load a diagram.
2. Double-click in the background area to open the **Diagram Properties** dialog.
3. Click on the **Elements** tab.



4. Select or clear the **Package Contents** checkbox as required.
5. Click on the **OK** button.

## 1.7 Delete a Package

To delete a package, follow the steps below:

1. Highlight the package in the **Project Browser**.
2. Right-click to open the context menu.
3. Click on the **Delete** option. A confirmation prompt displays.
4. Click on the **OK** button.

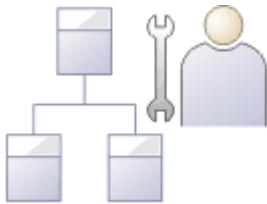
### Warning:

Deleting a package also deletes all contents of the package, including sub-packages and elements. Make very sure that you really want to do this before proceeding.

### Note:

In a multi-user environment, other users do not see the change until they reload their project. (See *Version Control Within UML Models Using Enterprise Architect*.)

## 2 Work With Diagrams



Diagrams are collections of project elements laid out and inter-connected as required.

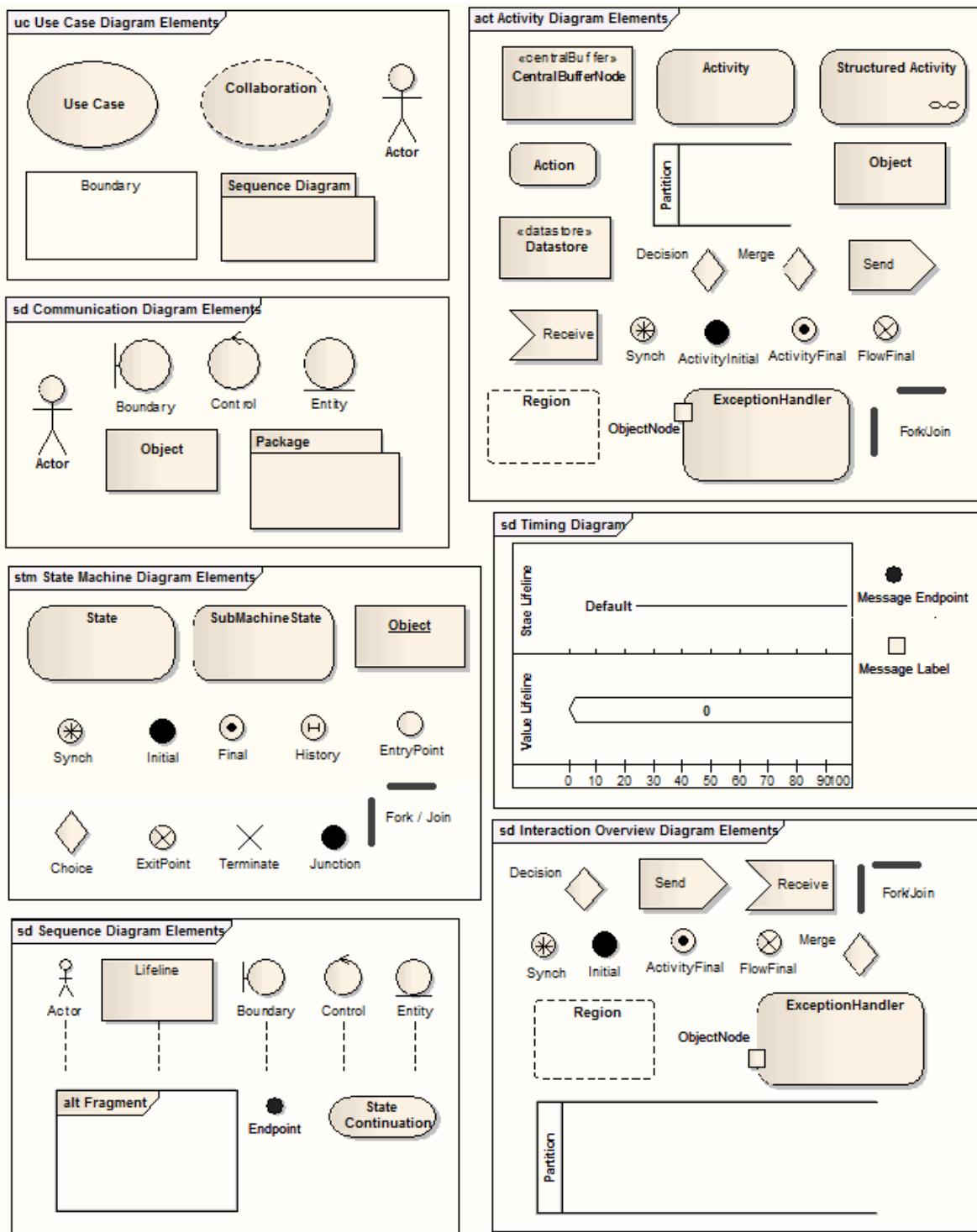
Enterprise Architect supports all of the UML diagrams, as well as some custom extensions. Together with the Enterprise Architect elements and connectors, these form the basis of the model. Diagrams are stored in packages and can have a parent object (optional). Diagrams can be moved from package to package.

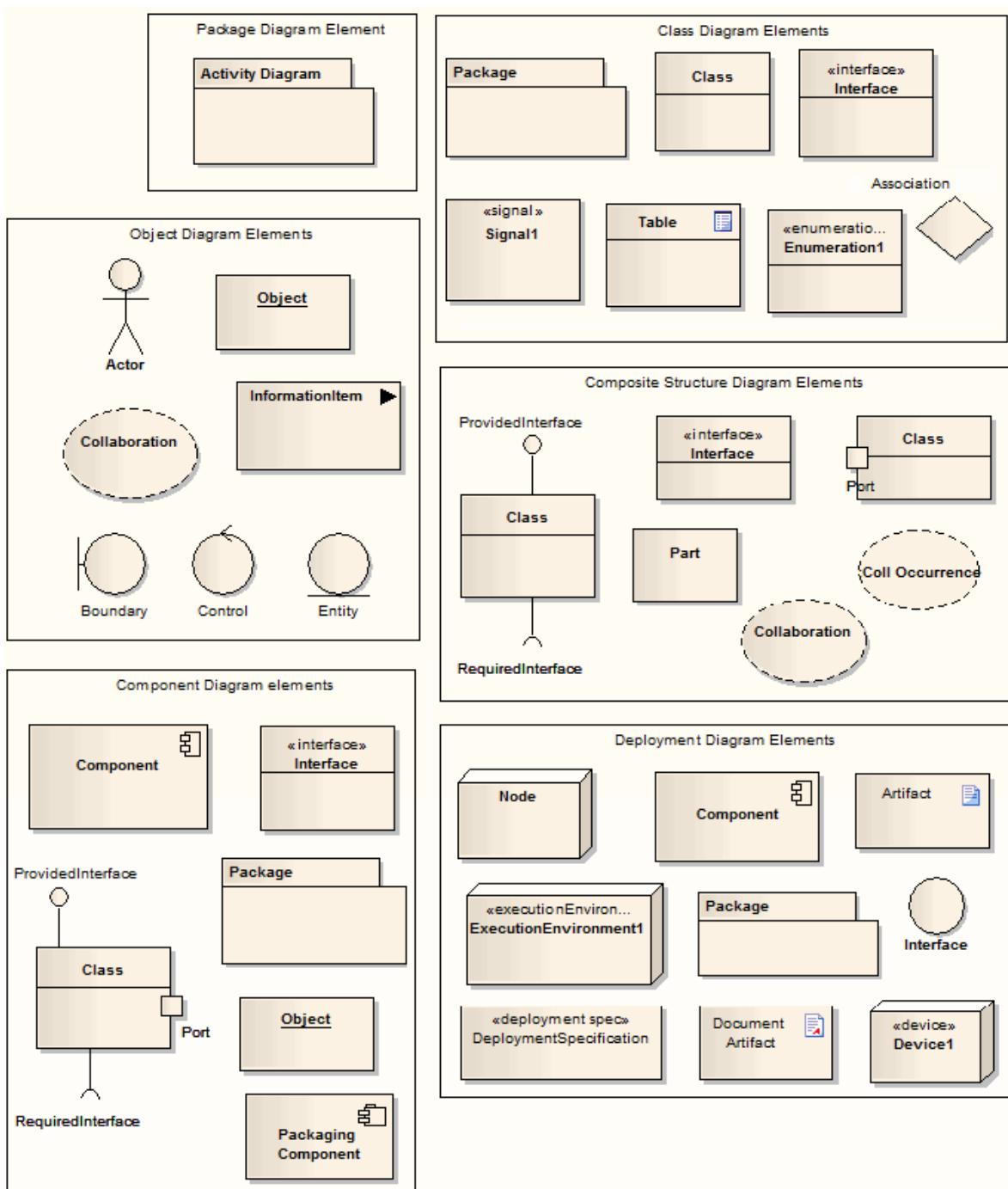
The basic elements used in each type of diagram are shown below. After you have looked at these illustrations, go to the following topics:

- [Diagram Context Menu](#)
- [Diagram Tasks](#)

**Tip:**

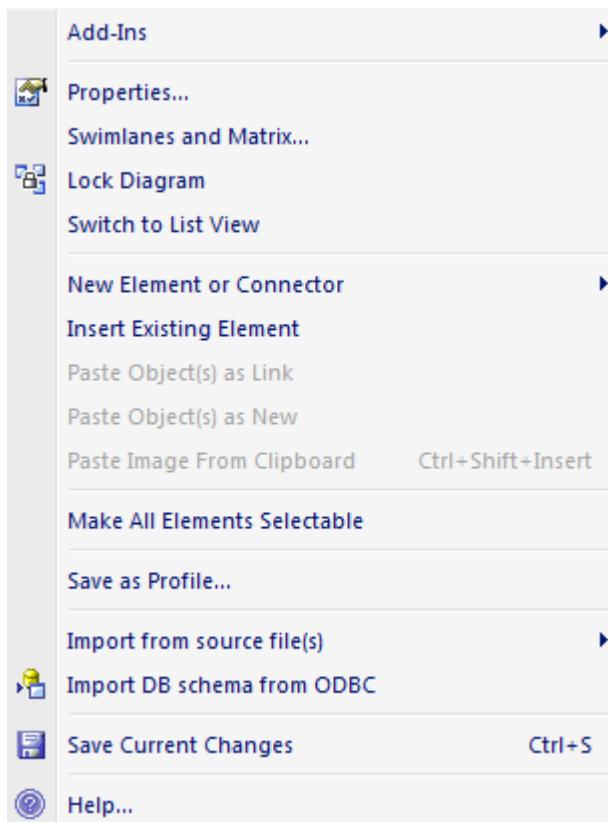
If the diagram display is too small to read comfortably, click on the diagram, press and hold **[Ctrl]** and use the mouse wheel to temporarily expand or reduce the display magnification.





## 2.1 Diagram Context Menu

Open the required diagram and right-click on the diagram background to open the diagram context menu. Not all menu options shown below appear on all diagram context menus.



The diagram context menu enables you to:

- View the [Diagram Properties](#) [52] dialog
- Add [Swimlanes](#) [47] or a [Swimlanes Matrix](#) [41] to the diagram
- Protect a diagram from inadvertent changes ([Lock Diagram](#) [50])

**Note:**

This does not apply in the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions if security is enabled. In that case, see the *Lock Model Elements* topic in *User Security in UML Models*.

- Display the diagram contents as an Element List instead of as a diagram (see *Using Enterprise Architect - UML Modeling Tool*)
- Insert various elements into a diagram (see below)
- [Paste copied element](#) [30](s) as a link or as new elements
- Paste an image held on the clipboard into the diagram (see the *Paste Elements Submenu* topic in *Using Enterprise Architect - UML Modeling Tool*)
- Make all the elements on the diagram selectable. If an element is selectable, you can move it around the diagram and perform right-click context-menu operations. If an element is unselectable, you cannot move it around the diagram and the only right-click operation available is to make the element selectable. This option has no effect on double-click operations on the element, such as displaying child diagrams.
- Save the current diagram as a Profile (see the *Export a UML Profile* topic in *SDK for Enterprise Architect*)
- Import, or reverse engineer, source code (not available in the Desktop edition) (see the *Import Source Code* topic in *Code Engineering Using UML Models*)
- Import database tables from an ODBC data source (not available in the Desktop edition) (see the *Import Database Schema from ODBC* topic in *Code Engineering Using UML Models*)

- Save any changes to the current diagram
- View the Enterprise Architect Help on the type of diagram currently displayed.

### Insert Items

When you click on the **New Element or Connector** context menu option, a list of elements and connectors displays, as shown below for a Class diagram:



The structure of this list is as follows:

- **Other** - expands to offer options to select elements and connectors from diagram types other than either the current diagram type or pinned Enterprise Architect **Toolbox** pages
- The expanded list of elements and connectors for the current diagram type
- Collapsed lists of elements and connectors for pages that have been pinned in the **Toolbox**; if an MDG Technology:
  - is active
  - automatically pins Toolbox pages, and
  - has pages that redefine UML or Extended pagesthe MDG Technology pages override the UML or Extended pages, which are not shown
- (At the end) **Common** - expands to display a list of the common elements and connectors.

## 2.2 Diagram Tasks

This topic details many of the common tasks associated with managing diagrams.

### Note:

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Update Element** permission to update or delete items on a diagram, and **Manage Diagram** permission to create, copy or delete diagrams. See *User Security in UML Models*.

- [Add New Diagrams](#) [13]
- [Delete a Diagram](#) [29]
- [Rename a Diagram](#) [30]
- [Copy And Paste Diagram Element](#) [30]
- [Diagram Navigation Hotkeys](#) [30]
- [Z Order Elements](#) [32]
- [Copy Image to Disk](#) [31]
- [Copy Image to Clipboard](#) [31]
- Present Diagrams in a Model Views Slideshow (See *Using Enterprise Architect - UML Modeling Tool*)
- [Set Default Diagram](#) [59]
- [Change Diagram Type](#) [31]
- [Open a Package](#) [33]
- [Duplicate a Diagram](#) [32]
- [Feature Visibility](#) [33]
- [Insert Diagram Properties Note](#) [36]
- [Autosize Elements](#) [36]
- [Paste from the Project Browser](#) [37]
- [Place Related Elements on Current Diagram](#) [40]
- [Swimlanes](#) [47]
- [Swimlanes Matrix](#) [41]
- [Using the Image Manager](#) [44]
- [Show Realized Interfaces for a Class](#) [49]
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- [Lock Diagram](#) [50]
- [Manage Legend Elements](#) [60]
- [Lay Out a Diagram](#) [26]
- [Set Diagram Properties](#) [52]
- [Undo Last Action](#) [51]
- [Redo Last Action](#) [51]

## 2.2.1 Add New Diagrams

This topic explains how to add a UML diagram, Extended diagram or MDG Technology diagram to a model in Enterprise Architect.

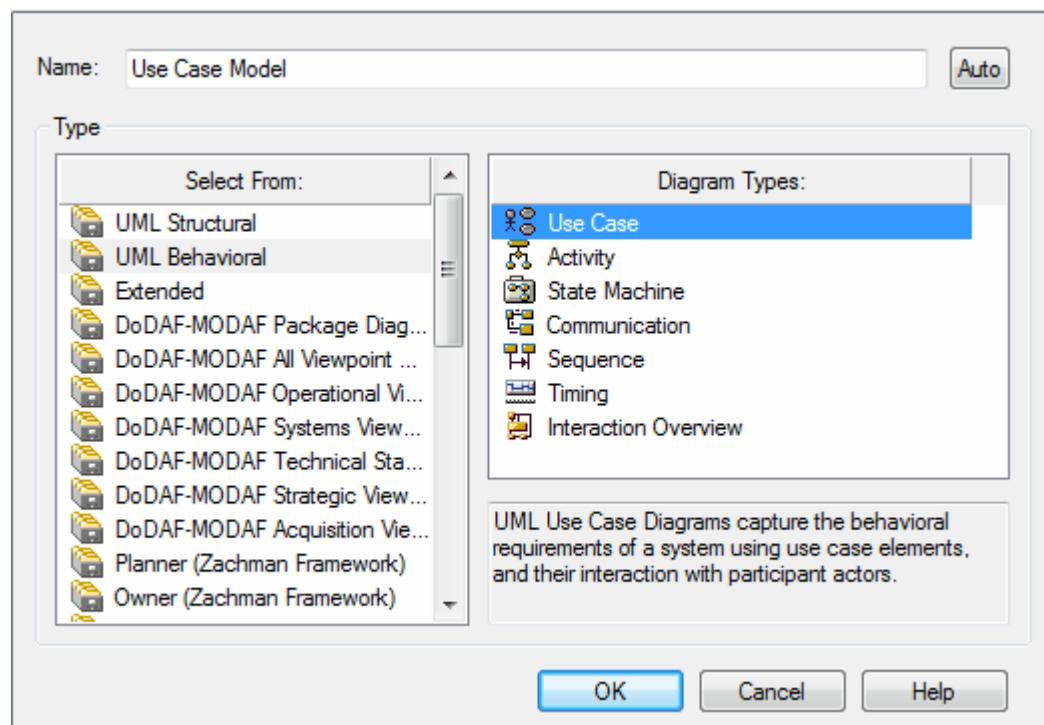
### Note:

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Manage Diagram** permission to create new diagrams. See *User Security in UML Models*.

To add a new diagram to an existing package or element, follow the steps below:

1. In the **Project Browser**, select the appropriate package or element under which to place the diagram.
2. Do one of the following:
  - In the **Project Browser** toolbar click on the **New Diagram** icon
  - Right-click to open the context menu and select the **Add | Add Diagram** or **Add | Add <type> Diagram** menu option
  - Press **[Insert]** and select the **Add | Add Diagram** or **Add | Add <type> Diagram** menu option, or
  - Select the **Project | Add Diagram** menu option.

The **New Diagram** dialog displays.



3. The **Name** field defaults to the name of the selected package or element; if necessary, type a different name for the new diagram.
4. In the **Select From** panel, click on the appropriate diagram category for the diagram. The **Diagram Types** panel displays a list of the diagram types within the selected category. (See the *UML Diagrams* topic in the *UML Dictionary*.)
5. In the **Diagram Types** panel, click on the type of diagram to create.
6. Click on the **OK** button to create your new diagram.

### Note:

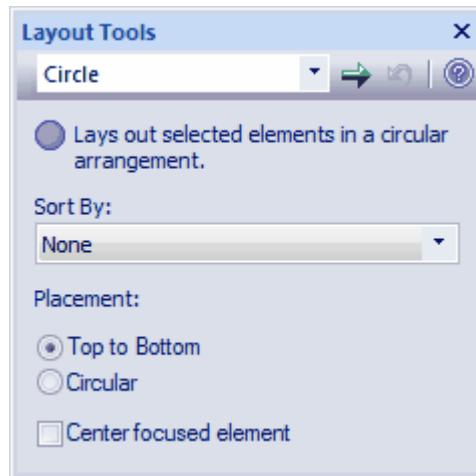
The diagram type determines the default toolbar associated with the diagram and whether it can be set as a child of another element in the **Project Browser** (for example, a Sequence diagram under a Use Case).

## 2.2.2 Layout Diagrams

Enterprise Architect provides a **Layout Tools** window to enable you to lay out the elements in a diagram. Unless the diagram is very simple, this facility does not lay out the entire diagram; it consists of a set of tools to set out different areas or sets of elements in the diagram.

To start to lay out a diagram, follow the steps below:

1. Open the **Layout Tools** window; either:
  - Select the **View | Layout Tools** menu option, or
  - Right-click on the main toolbar and select the **Layout Tools** context menu option.



2. Select the elements to lay out on the currently-active diagram - hold **[Shift]** or **[Control]** while you click on each required element, or hold the mouse button down while you sweep over the area containing the required elements.

### Note:

If no elements are selected on the active diagram, then all elements on the diagram are laid out (except where otherwise documented).

3. Click on the drop-down arrow on the top left field of the **Layout Tools** window, and select the required layout type.
  - [Circle/Ellipse](#) <sup>15</sup>
  - [Box](#) <sup>18</sup>
  - [Per Page](#) <sup>19</sup>
  - [Digraph](#) <sup>20</sup>
  - [Spring](#) <sup>21</sup>
  - [Neaten](#) <sup>21</sup>
  - [Converge/Diverge](#) <sup>22</sup>
  - [Fan Relations](#) <sup>24</sup>
  - [Auto Route](#) <sup>25</sup>
4. The layout type determines the fields presented in the window, therefore the appropriate fields are described in the topic for each layout type.

5. When you have completed the fields, click on the button.

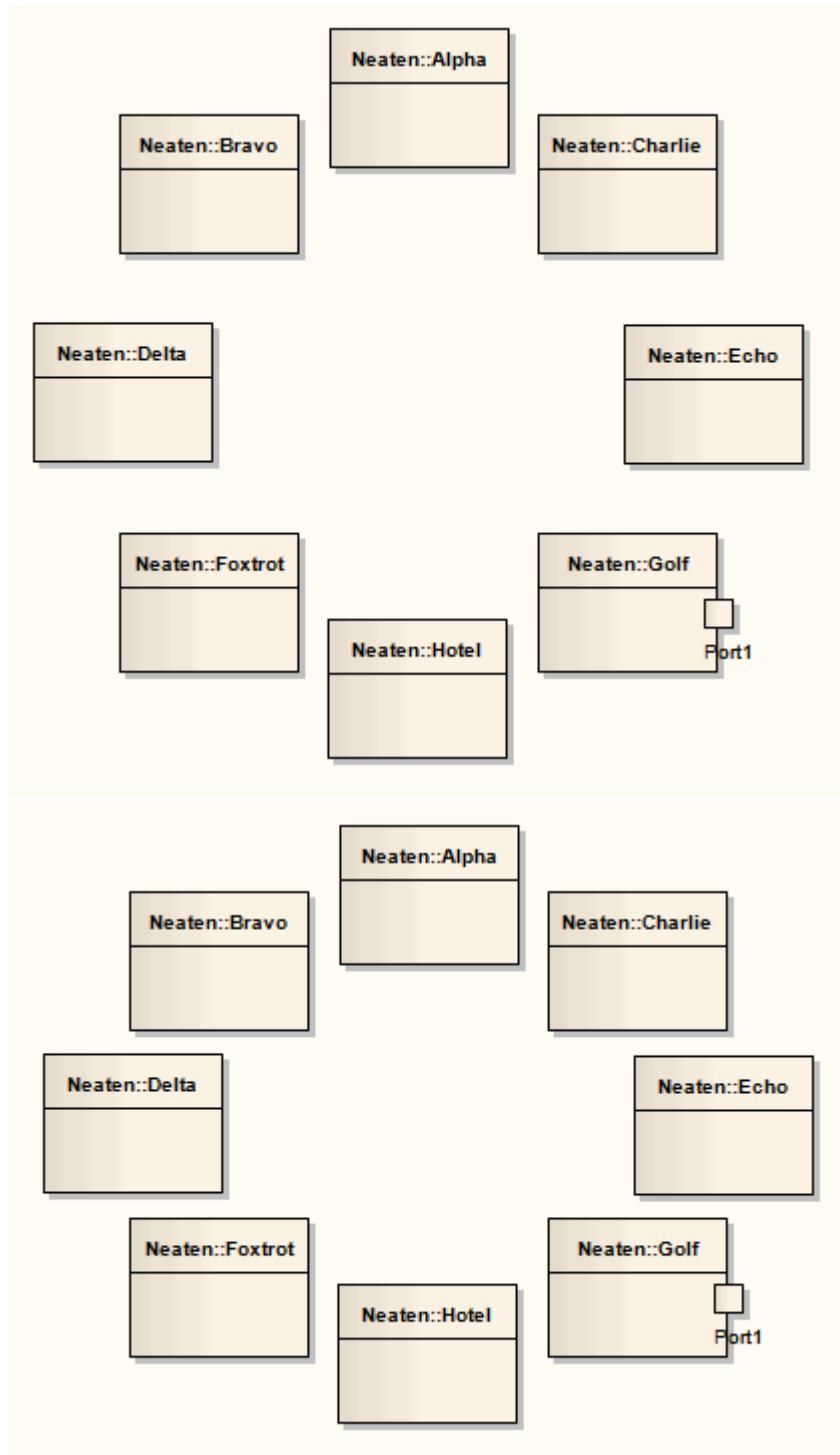
Enterprise Architect sets out the selected elements according to the options you have selected.

6. If you do not want to work with the new layout, click on the **Undo** button in the toolbar (.

Enterprise Architect also provides a facility for [automatically laying out a diagram](#) <sup>26</sup>. If necessary, you can manually adjust the final result of this automatic process.

### 2.2.2.1 Circular/Elliptical Layout

The *Circle* and *Ellipse* layouts arrange the selected elements in a circle or elliptical pattern, using the largest horizontal and vertical element edge in the set of elements when calculating the radius of the layout arc.



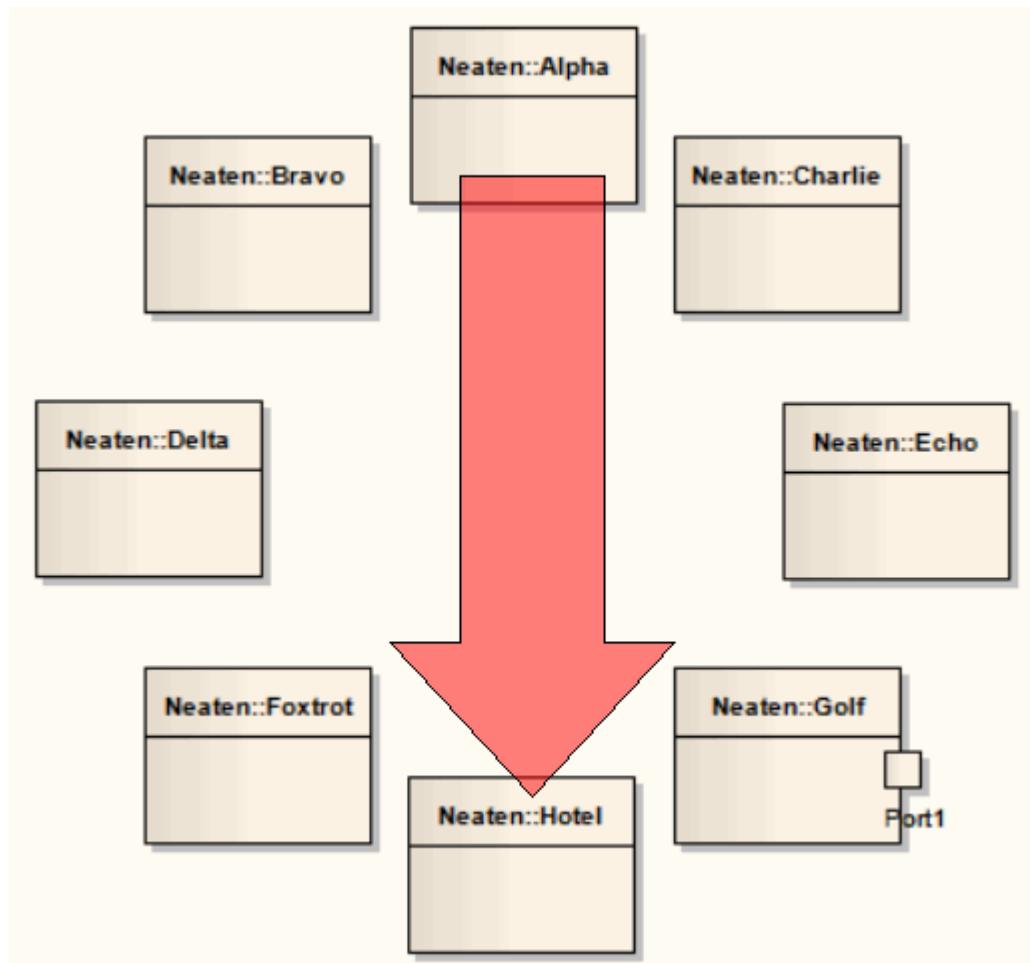
To invoke these layouts, follow the steps below:

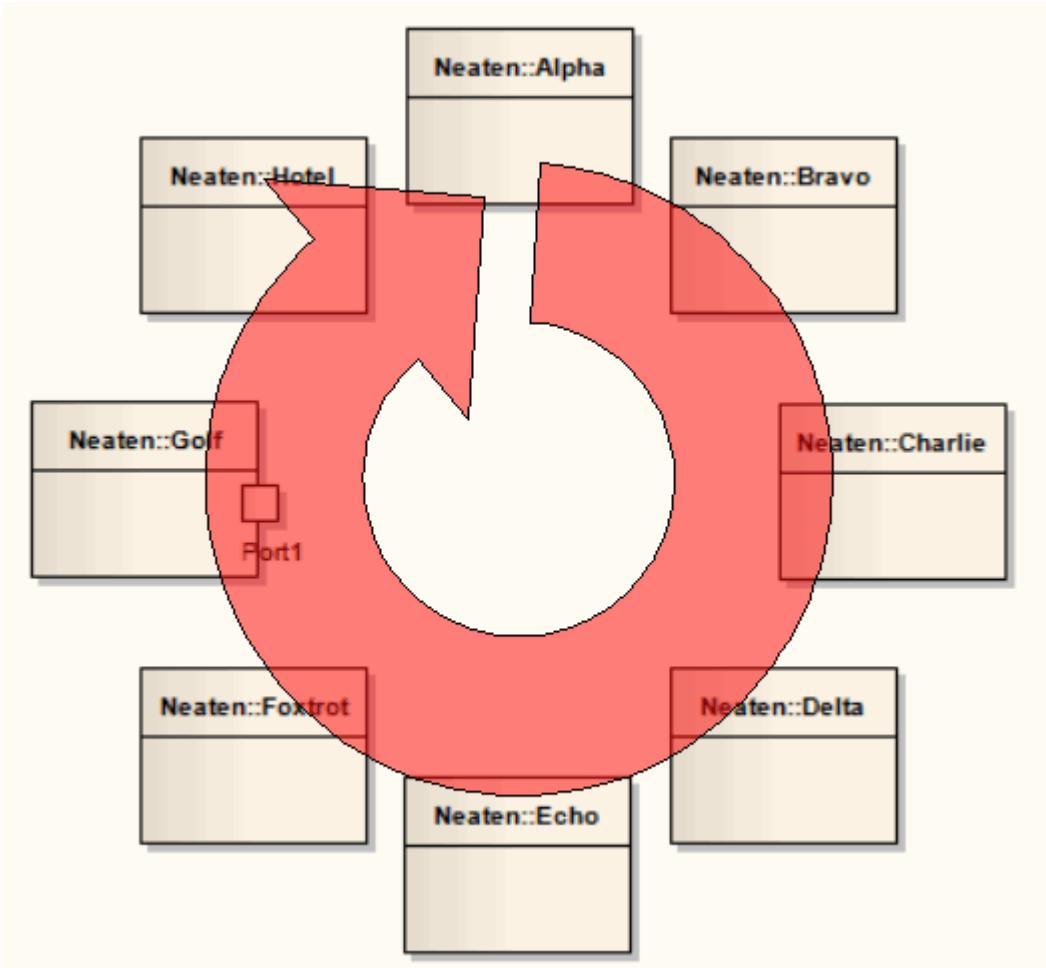
1. Follow the general [Layout Diagrams](#)<sup>14</sup> procedure, and at step 3 select either **Circle** or **Ellipse** as required.
2. Click on the drop-down arrow in the **Sort By:** field and select the required sort parameter. The options

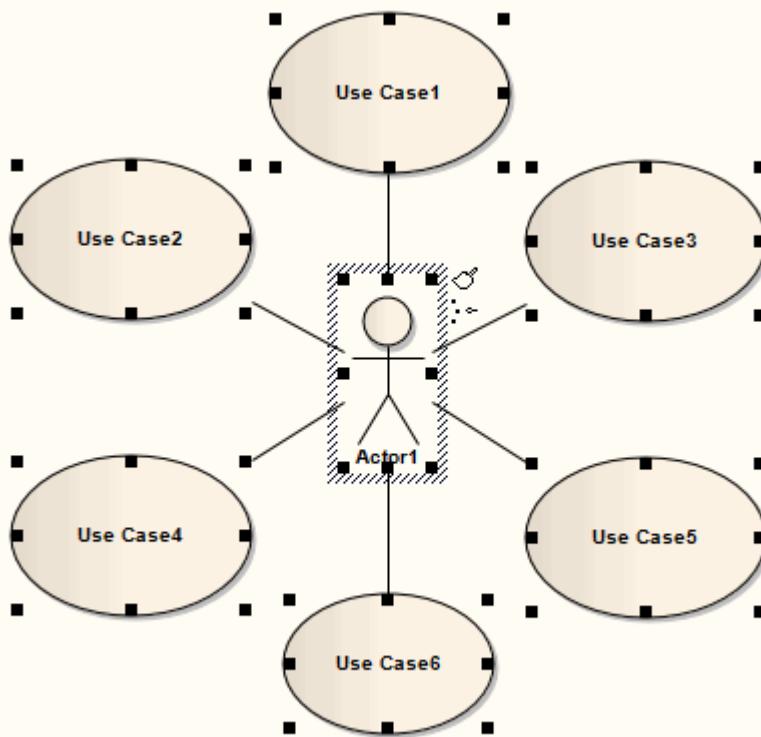
are:

- **None** - Elements are passed to the specified layout in the order in which they appear on the original diagram (left to right, top to bottom)
  - **Area (Ascending)** - Elements are passed to the specified layout in order of the screen space they occupy, smallest to largest
  - **Area (Descending)** - Elements are passed to the specified layout in order of the screen space they occupy, largest to smallest
  - **Name (Ascending)** - Elements are passed to the specified layout in alphanumeric order, based on the element name
  - **Name (Descending)** - Elements are passed to the specified layout in reverse alphanumeric order, based on the element name
  - **Element Type** - Elements are grouped by type (for example, Class, Use Case) and in alphanumeric order within the group by name.
3. Under the **Placement** option, select either:
- **Top to Bottom** (the elements are positioned in the required order, zig-zagged across the perimeter of the circle or ellipse - see *Diagram A*)
  - **Circular** (the elements are placed in the required order, clockwise around the perimeter of the circle or ellipse - see *Diagram B*)
4. Select the **Center focused element** checkbox to put the last-selected element (the one with the hashed border) in the center of the circle or ellipse - see *Diagram C*.

*Diagram A - Top To Bottom Layout*

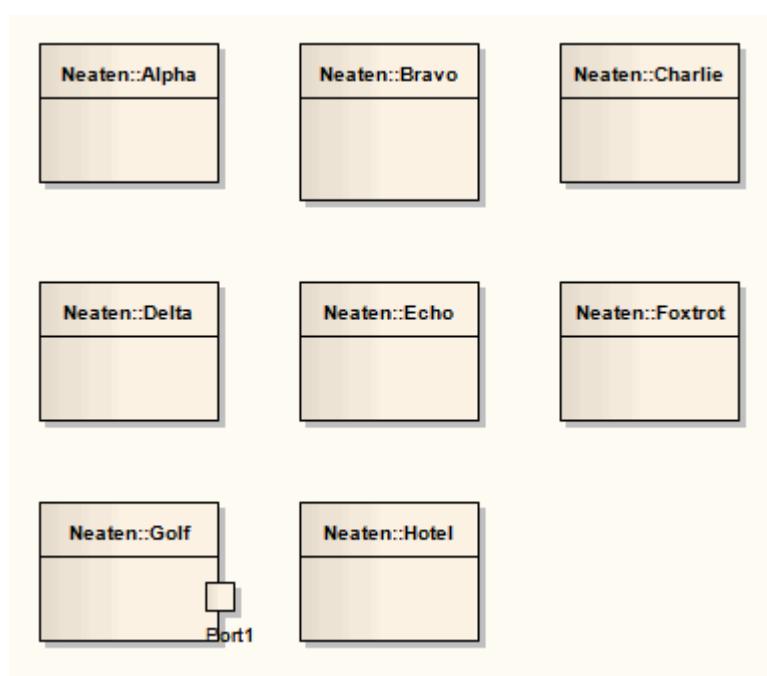


*Diagram B - Circular Layout*

*Diagram C - Center Focused Element*

### 2.2.2.2 Box Layout

The *Box* layout arranges the set of selected elements into a square grid.



The dimensions of the box are determined by the square root of the number of selected elements (for

example, 16 elements create a 4x4 box).

To invoke this layout, follow the steps below:

- Follow the general [Layout Diagrams](#)<sup>14</sup> procedure, and at step 3 select **Box**.
  - Click on the drop-down arrow in the **Sort By:** field and select the required sort parameter. The options are:
    - None** - Elements are passed to the specified layout in the order in which they appear on the original diagram (left to right, top to bottom)
    - Area (Ascending)** - Elements are passed to the specified layout in order of the screen space they occupy, smallest to largest
    - Area (Descending)** - Elements are passed to the specified layout in order of the screen space they occupy, largest to smallest
    - Name (Ascending)** - Elements are passed to the specified layout in alphanumeric order, based on the element name
    - Name (Descending)** - Elements are passed to the specified layout in reverse alphanumeric order, based on the element name
    - Element Type** - Elements are grouped by type (for example, Class, Use Case) and in alphanumeric order within the group by name.
  - In the **Padding (px)** field, type the vertical and horizontal distance between elements, in pixels.
  - Select the appropriate element distribution option:
    - Automatically distribute**: Automatically calculate the dimensions of the box (the square root of the number of selected elements; for example, 16 elements create a 4x4 box)
    - Specify distribution**: Manually define the width of the box, in columns.
  - If you selected **Specify Distribution**, in the **Columns** field type the required number of columns.

### **2.2.2.3 Per Page Layout**

The *Per Page* layout divides each diagram page into a number of cells, which house the selected elements. The number of cells per page is determined by the page distribution parameter, as explained below.



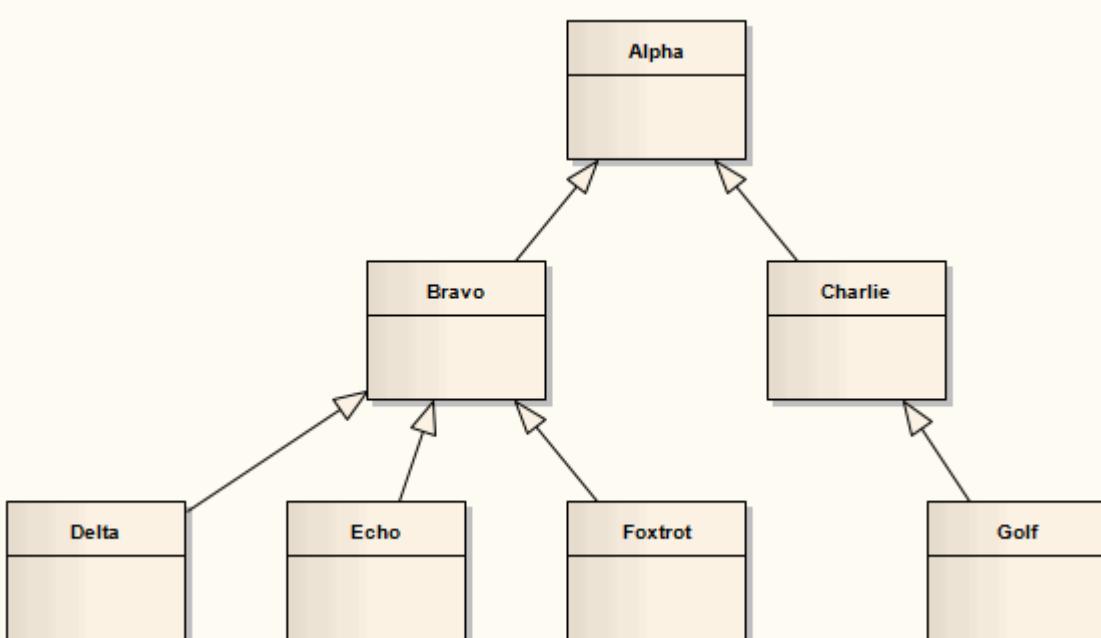
To invoke this layout, follow the steps below:

1. Follow the general [Layout Diagrams](#)  procedure, and at step 3 select **Per Page**.

2. Click on the drop-down arrow in the **Sort By:** field and select the required sort parameter. The options are:
  - **None** - Elements are passed to the specified layout in the order in which they appear on the original diagram (left to right, top to bottom)
  - **Area (Ascending)** - Elements are passed to the specified layout in order of the screen space they occupy, smallest to largest
  - **Area (Descending)** - Elements are passed to the specified layout in order of the screen space they occupy, largest to smallest
  - **Name (Ascending)** - Elements are passed to the specified layout in alphanumeric order, based on the element name
  - **Name (Descending)** - Elements are passed to the specified layout in reverse alphanumeric order, based on the element name
  - **Element Type** - Elements are grouped by type (for example, Class, Use Case) and in alphanumeric order within the group by name.
3. In the **Padding (px)** field, type the vertical and horizontal distance between cells, in pixels.
4. Select the appropriate page distribution option:
  - **Automatically distribute:** Automatically calculate the optimum number of cells, taking into consideration the largest horizontal and vertical element edges
  - **Specify distribution:** Manually enter the per page grid dimensions.
5. If you selected **Specify Distribution**, in the **Rows** and **Columns** fields type the required number of rows and columns.
6. Select the **Center Elements** checkbox to place each element in the center of its cell. Otherwise the element placement defaults to the top left corner of the cell.
7. In the **Start Page** field, type the number from which to start page numbering. Pages begin at the top left and continue horizontally to the right.

#### 2.2.2.4 Digraph Layout

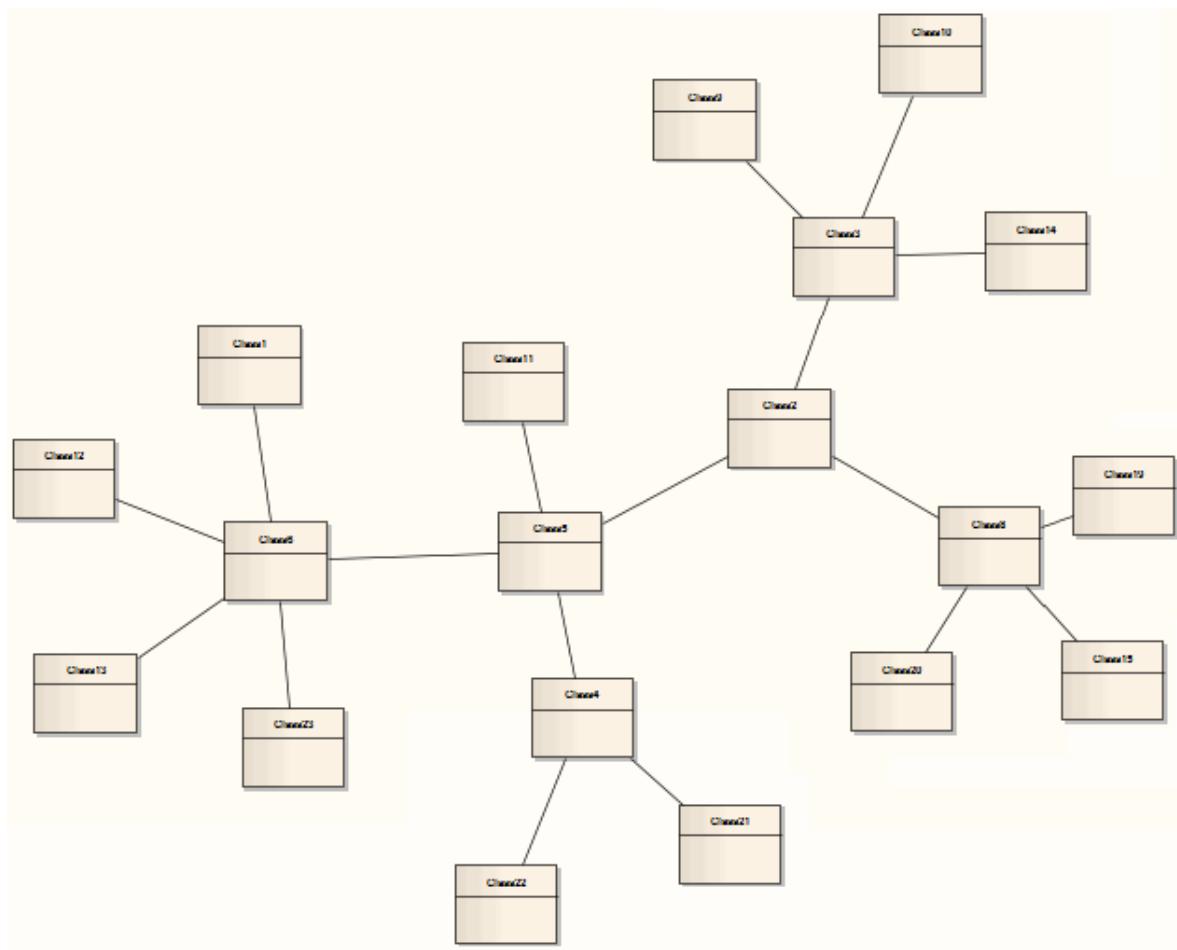
The *Digraph* layout arranges the selected elements into a directed graph (digraph for short). The Digraph attempts to highlight the hierarchy of the elements while keeping the direction of all connectors pointing to the same edge of the diagram.



The Digraph layout provides the same behaviour as the Automatic Diagram layout. For information on how to apply this layout, see the [Layout Diagrams](#)<sup>[14]</sup> topic and, for details of the layout parameters, the [Layout a Diagram Automatically](#)<sup>[26]</sup> topic.

### 2.2.2.5 Spring Layout

The **Spring** layout uses a force-directed approach to arrange the selected elements organically.



The Spring layout employs a physical analogy to lay out elements. Each element is treated as a particle with a like electrical charge that repels other elements. Connectors act as springs (hence the term Spring layout) that draw connected elements back together. The layout is good for highlighting clusters of related objects and identifying symmetry in the graph.

To invoke this layout, follow the steps below:

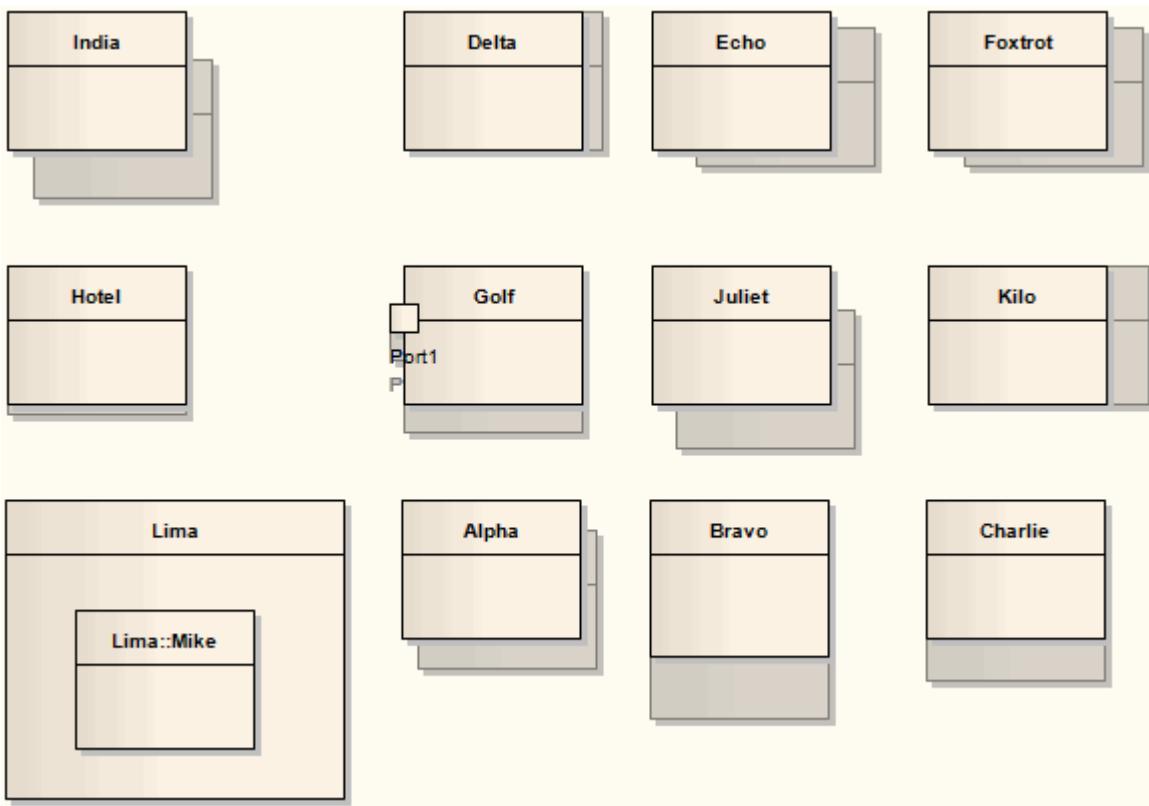
1. Follow the general [Layout Diagrams](#)<sup>14</sup> procedure, and at step 3 select **Spring**.
2. In the **Iterations** field, type the number of iterations, or rounds, to perform to reach the final layout.

The layout is developed over several iterations. Depending on the complexity of the graph, increasing the number of iterations produces a better result but takes longer to calculate.

3. If the diagram contains elements that significantly vary in size, and that might overlap in the final layout, select the **Scale to prevent overlap** checkbox to scale up the positions of the selected elements (preserving size) until no elements overlap.

### 2.2.2.6 Neaten Layout

The **Neaten** layout attempts to arrange the selected elements into a grid based on their horizontal and vertical proximity to each other. Elements that share the same row or column are aligned based on the **Column** and **Row Snap** parameters.

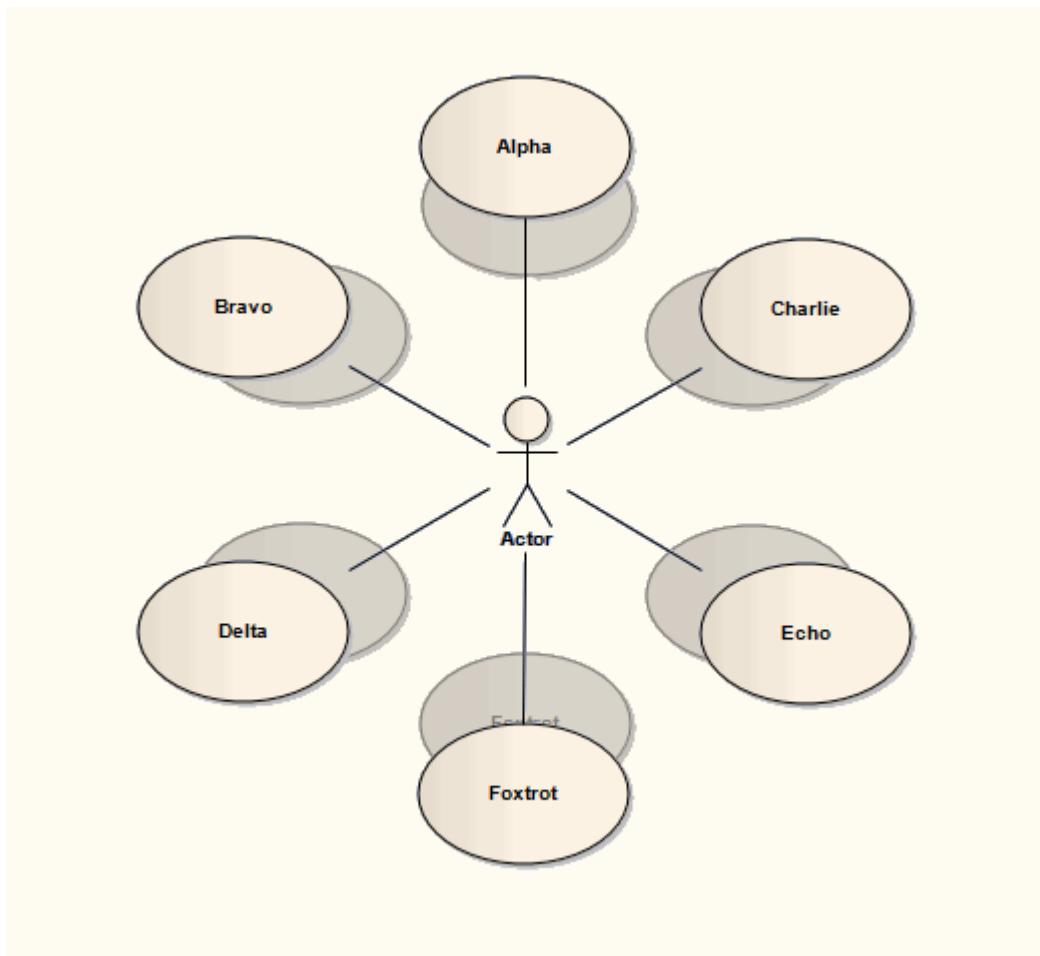


To invoke this layout, follow the steps below:

1. Follow the general [Layout Diagrams](#)<sup>14</sup> procedure, and at step 3 select **Neaten**.
2. In the **Threshold (px)** field, type the height or width distance, in pixels, at which elements should be considered to be in the same row or column. A lower threshold value produces a tighter result, with only elements that are extremely similar - vertically or horizontally - considered to be in the same row or column.
3. In the **Column Snap** field, click on the drop-down arrow and select the appropriate alignment for elements in the same column.
  - **Left** - elements are aligned with the left edge of the left-most element in the column
  - **Center** - elements are aligned with the vertical center of the center-most element in the column
  - **Right** - elements are aligned with the right edge of the right-most element in the column.
4. In the **Row Snap** field, click on the drop-down arrow and select the appropriate alignment for elements in the same row.
  - **Top** - elements are aligned with the top edge of the highest element in the row
  - **Center** - elements are aligned with the horizontal center of the center-most element in the row
  - **Bottom** - elements are aligned with the bottom edge of the lowest element in the column.

#### 2.2.2.7 Converge/Diverge Layout

The *Converge* layout attracts the set of selected elements towards the center of their bounding rectangle. Conversely, the *Diverge* layout repels the set of selected elements away from the center of their bounding rectangle. The *Converge/Diverge* layout also tries to maintain connector angles if an element in the set contains a connector with waypoints.



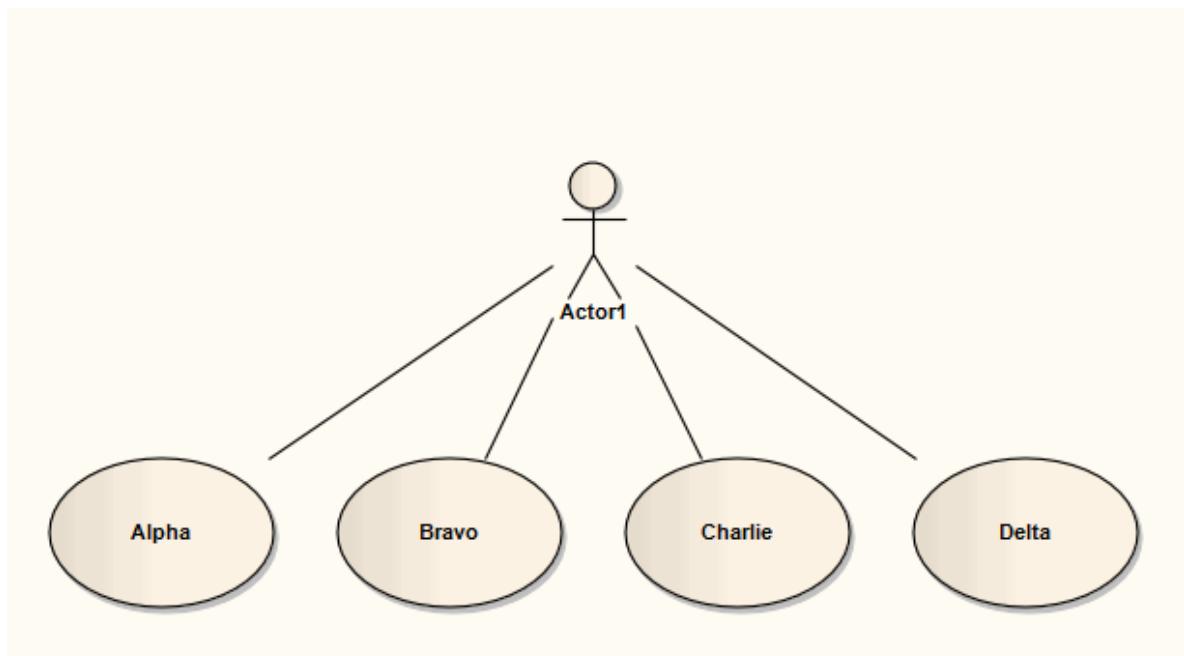
To invoke this layout, follow the steps below:

1. Follow the general [Layout Diagrams](#) procedure, and at step 3 select **Converge/Diverge**.
2. For **Direction**, select the required layout:
  - **Converge** - attracts the set of selected elements to the center point
  - **Diverge** - repels the set of selected elements from the center point
3. The **Amount (%)** slider determines how far the elements are moved towards or away from the center point. The movement is the element's current distance from the center point multiplied by the percentage value set on the slider. In the Converge layout, the element moves towards the center point; in the Diverge layout the element moves further away from the center point.

Set the slider to the required percentage.

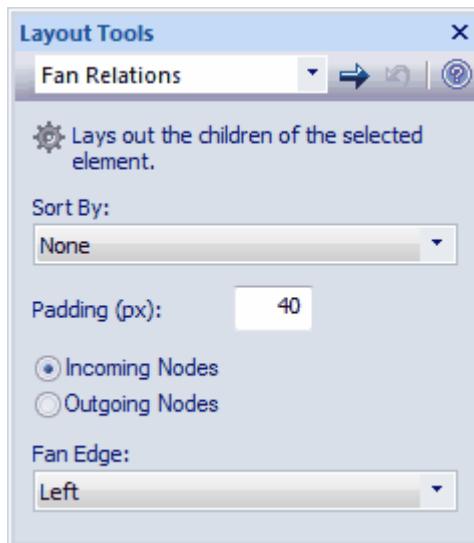
### 2.2.2.8 Fan Relations Layout

The *Fan Relations* layout arranges the immediate relations of an element around a specified edge. This layout requires a single element to be selected on the diagram, to be used as the context for the layout.



To invoke this layout, follow the steps below:

1. Open the **Layout Tools** window; either:
  - Select the **View | Layout Tools** menu option, or
  - Right-click on the main toolbar and select the **Layout Tools** context menu option.

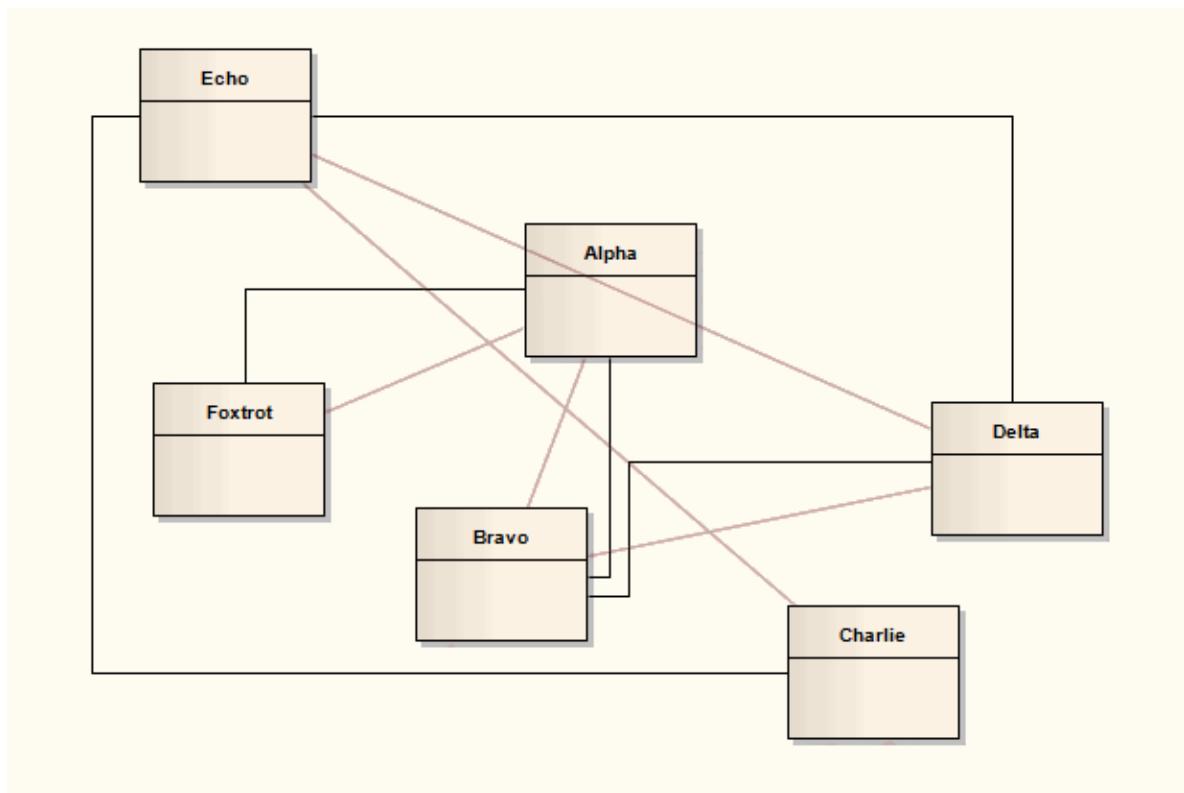


2. Select the single element around which to lay out related elements on the currently-active diagram.
3. Click on the drop-down arrow on the top left button of the **Layout Tools** window, and select **Fan Relations**.
4. Click on the drop-down arrow in the **Sort By:** field and select the required sort parameter. The options are:
  - **None** - Elements are passed to the specified layout in the order in which they appear on the original

- diagram (left to right, top to bottom)
- **Area (Ascending)** - Elements are passed to the specified layout in order of the screen space they occupy, smallest to largest
  - **Area (Descending)** - Elements are passed to the specified layout in order of the screen space they occupy, largest to smallest
  - **Name (Ascending)** - Elements are passed to the specified layout in alphanumeric order, based on the element name
  - **Name (Descending)** - Elements are passed to the specified layout in reverse alphanumeric order, based on the element name
  - **Element Type** - Elements are grouped by type (for example, Class, Use Case) and in alphanumeric order within the group by name.
5. In the **Padding (px)** field, type the separation required between the selected element and its related elements, in pixels.
  6. Select the connector direction to use in determining the related elements to lay out. Either:
    - **Incoming Nodes** - to lay out related elements that have the selected element as the target
    - **Outgoing Nodes** - to lay out related elements that have the selected element as the source.
  7. In the **Fan Edge** field, click on the drop-down arrow and specify the edge of the selected element from which to lay out the related elements.
    - **Left** - to arrange related elements to the left of the selected element
    - **Right** - to arrange related elements to the right of the selected element
    - **Top** - to arrange related elements from the top of the selected element
    - **Bottom** - to arrange related elements from the bottom of the selected element.

#### 2.2.2.9 Auto Route Layout

The *Auto Route* layout orthogonally routes connectors between the selected elements. The layout attempts to find the shortest path between the two connected elements while minimizing crossings. In the following layout, the original connectors are shown in red.



To invoke this layout, follow the steps below:

1. Follow the general [Layout Diagrams](#)<sup>14</sup> procedure, and at step 3 select **Auto Route**.
2. When calculating connector routes, the algorithm divides the diagram into cells of a size determined by the **Cell Size** value. A smaller cell size results in connectors being placed closer together.  
In this **Cell Size (px)** field, type the value in pixels.
3. In the **Element Margin** field, type the preferred separation between connector segments and element borders, in pixels.

#### 2.2.2.10 Lay Out a Diagram Automatically

Enterprise Architect provides the facility to layout diagrams automatically. This creates a tree-based structure from the diagram elements and relationships in a diagram. Owing to the complexity of many diagrams, you might then have to do some manual 'tweaking'.

##### Notes:

- This facility is available for Structural diagrams and Extended diagrams, but not for Behavioral diagrams (see the *UML Diagrams* topic in the *UML Dictionary* for a description of the diagram types). However, the facility is also available for Sequence diagrams generated by the Enterprise Architect Debugger.
- Dynamic and Analysis diagrams are **NOT** suited to this form of layout - please ensure first that the diagram type you are laying out benefits from the action.
- If you dislike the autolayout, you can reverse it before saving the diagram. Click **[Ctrl]+[Z]**.

### Layout a Diagram

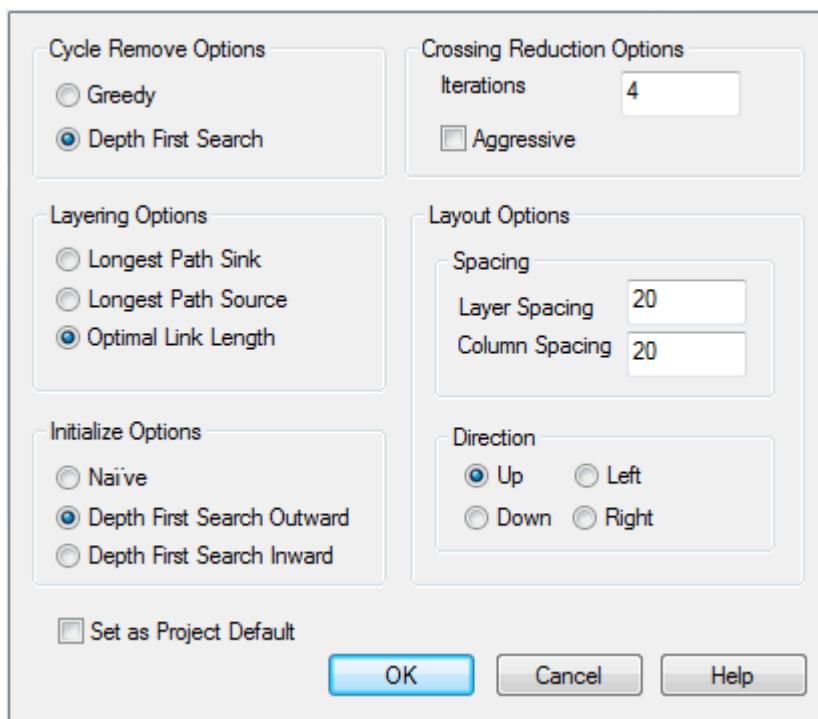
To layout a diagram, follow the steps below:

1. Select a diagram.
2. Click on either:
  - The **Diagram | Layout Diagram** option, or
  - The **Auto Layout** button on the diagram toolbar.

### Access the Diagram Layout Options Dialog

For a fine degree of control of the elements in your diagram, you can use the **Diagram Layout Options** dialog. Generally the default layout parameters provide adequate layouts for a wide range of diagrams, but there are times when more specific settings are required. To access the **Diagram Layout Options** dialog, follow the steps below:

1. Double-click on the background of the diagram to display the **Diagram Properties** dialog.
2. Click on the **Diagram** tab, then click on the **Set Layout Style** button. The **Diagram Layout Options** dialog displays.
3. When you have made the required changes, click on the **OK** button to save the changes.



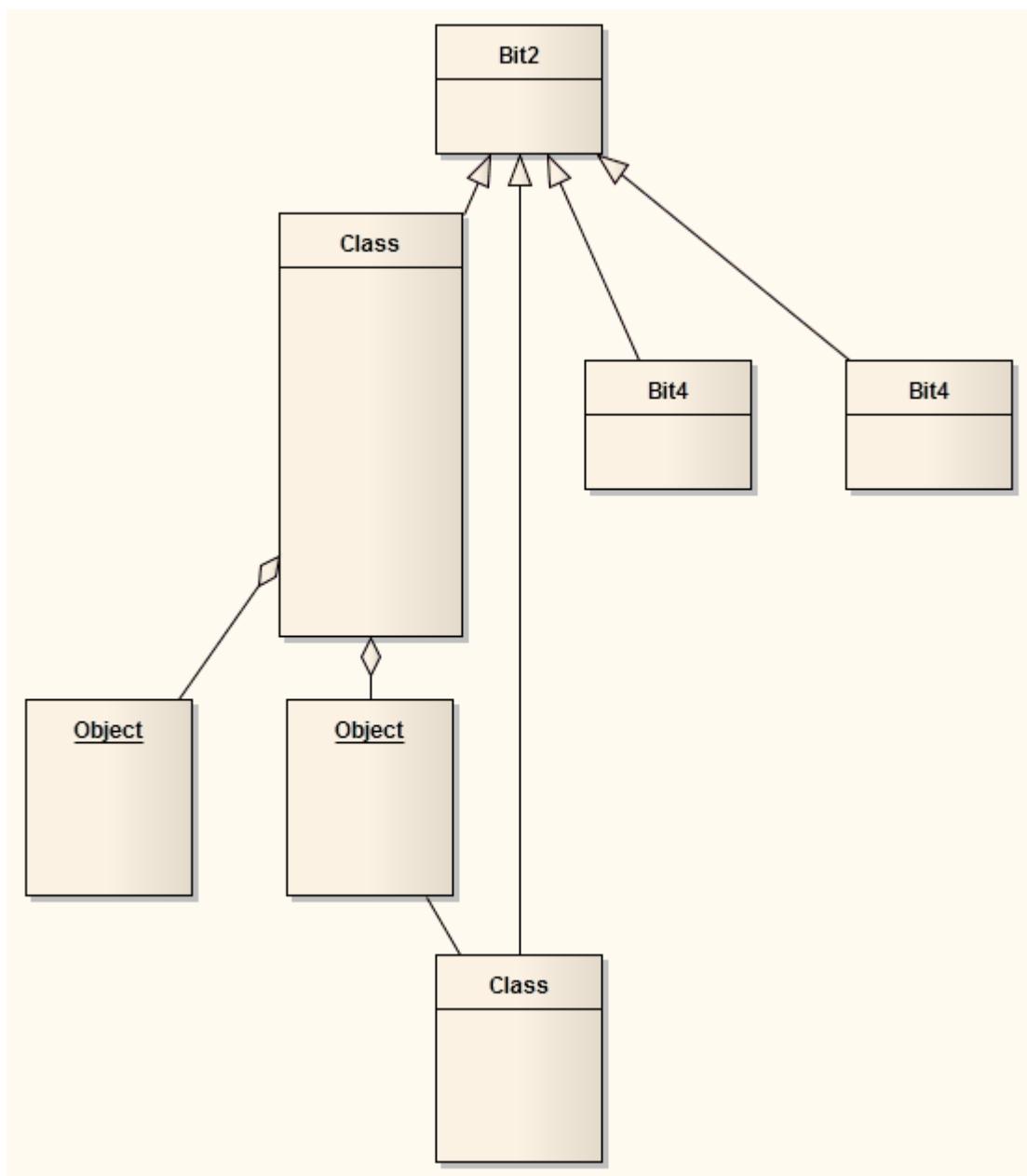
You can alter any of the following settings on the [Diagram Layout Options](#) dialog to refine your layout:

- **Cycle Remove Options** panel - these settings remove cycles in the element organization (where element X is the source of a path but also becomes the target of a branch of the path), by reversing the connectors that impose the cycling and then reorganizing the diagram and reinstating the reversed relationships. This identifies the primary source element in the diagram.
  - **Greedy** - Select to use the *Greedy Cycle Removal* algorithm, which minimizes the number of connectors reversed.
  - **Depth First Search** - Select to use the *Depth First Search Cycle Removal* algorithm, which establishes the longest linear sequence possible, before establishing parallel sequences and branches. This algorithm is less effective in large and/or complex diagrams, but produces a more natural layout than the *Greedy* algorithm.
- **Crossing Reduction Options** panel - these options determine how long the routine should look for ways of reorganizing the layout to avoid crossed relationships:
  - **Iterations** - Type the number of iterations to be used during cycle removal (more than 8 does not usually provide any improvement).
  - **Aggressive** - Select to use an aggressive (detailed and time-consuming) crossing reduction step.
- **Layering Options** panel - these settings determine how elements are organized in layers during layout:
  - **Longest Path Sink** - Select to use the *Longest Path Sink Layering* algorithm, where the final target elements (*sinks*, which have no relationships issuing from them) are arranged in a layer at the top of the diagram, and the relationship paths built downwards from there in as many layers as there are nodes in the longest path.
  - **Longest Path Source** - Select to use the *Longest Path Source Layering* algorithm, where the original *source* elements (those with no relationships entering them) are arranged in a layer at the bottom of the diagram and the relationship paths built up from there in as many layers as there are nodes in the longest path.
  - **Optimal Link Length** - Select to use the *Optimal Link Length Layering* algorithm, which organizes the elements into whichever layers minimize the total source-to-sink relationship chain; in this layout you can have both source elements and sink elements at various levels of the diagram.
- **Layout Options** panel
  - **Layer Spacing** - Type the default number of logical units between layers of elements (vertical spacing).
  - **Column Spacing** - Type the default number of logical units between elements within a layer (horizontal spacing).
  - **Up, Down, Left, Right** - Select the direction in which directed connectors should point, to set the position of the primary source element and the overall flow of the diagram.

- **Initialize Options** panel - the autolayout routine inserts line waypoints and connectors into relationship paths to help plot the direction of relationships. The routine then assigns an index number to every node, such that nodes in the same layer are numbered left to right. The settings in this panel determine how those index numbers are assigned.
  - **Naive** - Select to use the *Naive Initialize Indices* algorithm, which assigns index numbers to nodes as they are encountered in a sweep and tends to place all waypoints to the right of real nodes (and therefore long relationships between a small number of elements to the right of chains of short relationships between several elements).
  - **Depth First Search Outward** - Select to use the *Depth First Out Initialize Indices* algorithm, which assigns index numbers to nodes as they are encountered in a depth first search from source nodes outwards (and would therefore place longer relationship chains to the left of shorter chains, with the primary source node at the start of the diagram flow).
  - **Depth First Search Inward** - Select to use the *Depth First In Initialize Indices* algorithm, which also assigns index numbers to nodes as they are encountered in a depth first search, but from sink nodes inwards (and would therefore place longer relationship chains to the left of shorter chains, with the ultimate target node at the end of the diagram flow).
- **Set as Project Default** checkbox
  - Select this checkbox to apply the diagram layout settings to all diagrams in the project. If you later check this box and click on the **OK** button for a different diagram, the new settings override the settings saved earlier.

The following is an example of an automatically laid out diagram, with the following options set:

- **Depth First Search**
- **Optimal Link Length**
- **Depth First Search Outward**
- **Direction - Up**.



### 2.2.3 Delete Diagram

#### Warning:

In Enterprise Architect there is no *Undo* feature for deleting diagrams, so be certain that you want to delete a diagram before you do so.

#### Note:

When you delete a diagram, you do not delete the elements in the diagram from the *model*.

To delete a diagram from your model, follow the steps below:

1. In the **Project Browser**, right-click on the diagram to delete. The context menu displays.
2. Select the **Delete '<diagram name>'** menu option. A confirmation prompt displays.

3. Click on the **OK** button to confirm the delete.

You can also delete multiple diagrams from the **Project Browser**, by holding **[Ctrl]** or **[Shift]** while you select them, then right-clicking on one of them and selecting the **Delete selected items** context menu option.

#### 2.2.4 Rename Diagram

To rename a diagram, follow the steps below:

1. Open the **Diagram Properties** dialog by double-clicking on the diagram background, or by selecting the **Diagram | Properties** menu option.
2. In the **Name** field on the **General** tab, type the new name for your diagram.
3. Click on the **OK** button to save changes.

#### 2.2.5 Copy And Paste Diagram Element

To copy a diagram element, follow the steps below:

1. Select the element(s) to copy.
2. For multiple elements, right-click to open the context menu and select the **Copy** menu option. Alternatively, press **[Ctrl]+[C]**.
3. For single elements, select the **Edit | Copy** menu option or alternatively press **[Ctrl]+[C]**.

#### Paste Diagram Elements

To paste diagram elements, follow the steps below:

1. Open the diagram to paste into.
2. Right-click on the diagram background to open the diagram context menu.
3. Select either the **Paste Object(s) as New** menu option (completely new element) or the **Paste Object(s) as Link** menu option (reference to the existing element).

**Note:**

The *Date Created* and *Time Created* parameters of a pasted-as-new element are set to the current date and time; the parameters for a linked element remain the same as the copied element.

#### 2.2.6 Diagram Navigation Hotkeys

The diagram hotkeys enable you to quickly navigate to and select elements within a diagram. The following table details the key combinations and their functionality.

Hotkey Command	Use To
<b>[Shift]+[Arrow]</b> , Element(s) selected	Move the selected element(s) by increments.
<b>[Arrow]</b> , No element selected	Scroll around the diagram.
<b>[Esc]</b>	Clear the current selection.
<b>[Tab]</b>	Select the first element in the diagram if none currently selected.
<b>[Shift]+click</b>	Add the clicked element to the current selection.
<b>[Ctrl]+click</b>	Add the clicked element to the current selection.
<b>[Ctrl]+[Shift]+drag</b>	Pan the diagram.
<b>[Alt]+[G]</b>	Select the item in the <b>Project Browser</b> and give it focus.

### 2.2.7 Copy Image to Disk

You can copy a diagram image to a disk file in the following formats:

- Windows bitmap (256 color bitmap)
- GIF image
- Windows Enhanced Metafile (standard metafile)
- Windows Placeable Metafile (older style metafile)
- PNG format
- JPG
- TGA.

To copy a diagram image to file, follow the steps below:

1. Open the diagram to save.
2. Select the **Diagram | Save Image** menu option, or press **[Ctrl]+[T]**.
3. When prompted, enter a name for the file and select an image format.
4. Click on the **OK** button.

**Note:**

Enterprise Architect clips the image size to the smallest bounding rectangle that encompasses all diagram elements.

### 2.2.8 Copy Image to Clipboard

You can copy diagram images onto the MS Windows clipboard and paste them directly into MS Word or other applications.

To copy an image to the clipboard, follow the steps below:

1. Open the diagram to copy.
2. Select the **Diagram | Copy Image** menu option, or press **[Ctrl]+[B]**.
3. Click on the **OK** button.

The diagram has been copied to the clipboard and can now be pasted into compatible applications or into another diagram. You can set the clipboard format on the **Options** dialog (**Tools | Options** menu option, **General** page; see *Using Enterprise Architect - UML Modeling Tool*). Enterprise Architect supports bitmap or metafile format.

### 2.2.9 Change Diagram Type

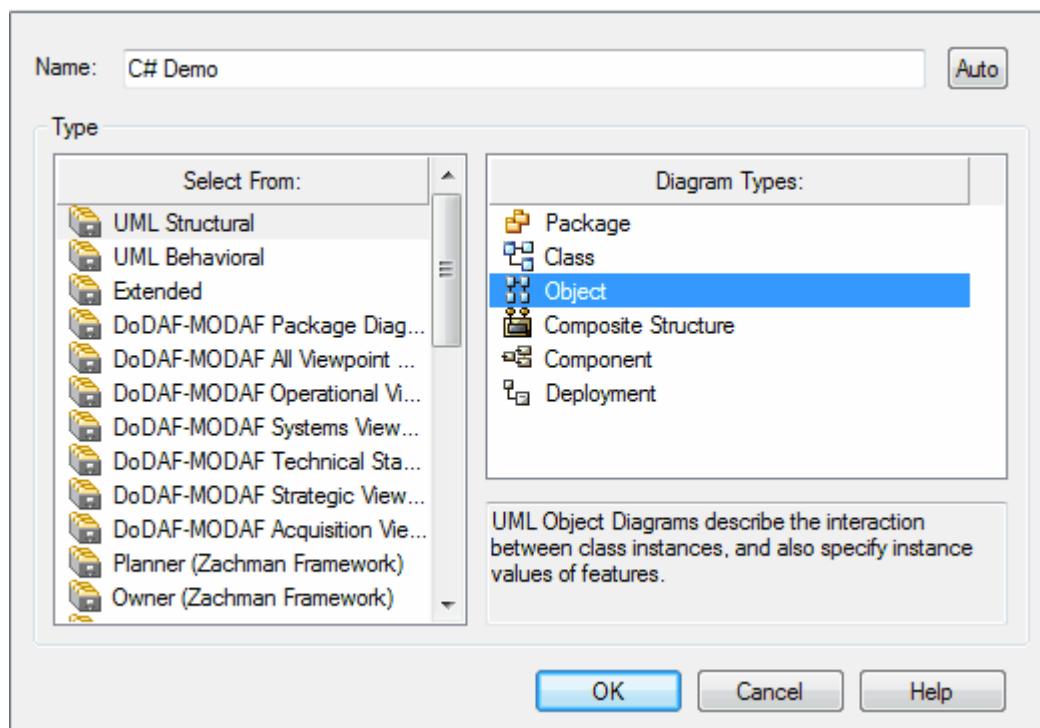
If necessary, you can change one type of diagram to another type. This is useful if you have either made a mistake in selecting the diagram type to begin with, or if the purpose and nature of a diagram changes during analysis.

**Note:**

Some diagram types do not transfer to others; for example you cannot change a Class diagram into a Sequence diagram.

To change a diagram type, follow the steps below:

1. Open the diagram to change.
2. Select the **Diagram | Change Type** menu option. The **Change Diagram Type** dialog displays.



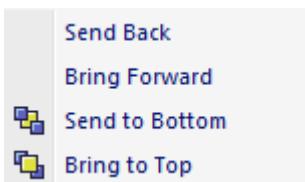
3. Select the required diagram type.
4. Click on the **OK** button to save changes.

### 2.2.10 Z Order Elements

Z Order refers to an element's depth in the diagram perspective, and thus influences which elements appear in front of others and which appear behind.

To set the Z Order of an element, follow the steps below:

1. Right-click on the element in the **Diagram View**.
2. Select the **Z order** menu option. The following submenu displays:



3. Select the operation to perform. The element is moved to the new position in the diagram perspective.

### 2.2.11 Copy (Duplicate) Diagram

Enterprise Architect makes it easy to duplicate a complete diagram, either with links back to the original diagram elements (*shallow mode*), or with complete copies of all elements in the diagram (*deep mode*).

When you copy a diagram in shallow mode, the elements in the new diagram are linked to the originals, so if you change the properties of one, the other reflects those changes. If you copy the diagram in deep mode, then all elements are duplicated completely, so that changing an element on one does not affect the other.

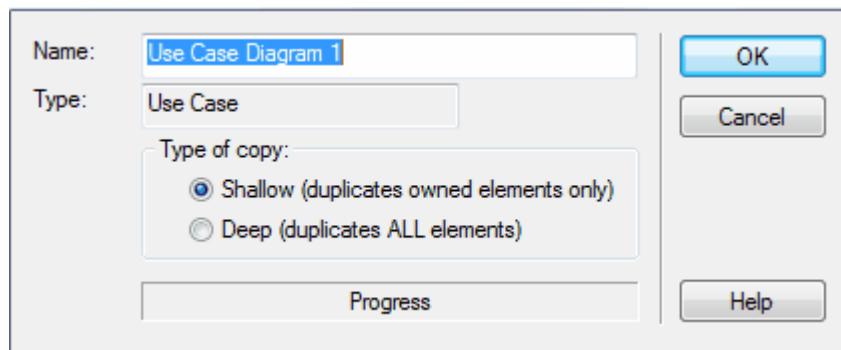
Element position and size should be independent in both copy modes.

You can also paste a copied diagram as a child of a composite element.

## Procedure

To duplicate a diagram, follow the steps below:

1. In the **Project Browser**, select the diagram to copy.
2. Right-click to display the context menu and select the **Copy Diagram** menu option.
3. Navigate to the package to host the new diagram, and right-click to open the context menu.
4. Select the **Paste Diagram** menu option. The **Copy Diagram** dialog displays.



5. In the **Name** field, type the name for the new diagram.
6. In the **Type of copy** panel, click on the radio button for the type of copy you require; either linked elements (shallow copy) or complete copies of the originals (deep copy).
7. Click on the **OK** button.

Enterprise Architect automatically creates the new diagram, links or creates new elements and arranges them as in the original diagram. All links are also copied between diagram elements where appropriate.

### 2.2.12 Open Package From Diagram

To open a package from within a diagram follow the steps below:

1. Open a diagram that shows the package to open.
2. Right-click on the package element to open the context menu.
3. Select the **Open Package** option. Alternatively, press **[Ctrl]+[K]**.

#### Note:

Enterprise Architect finds the package default diagram and opens it for you. This is the first available diagram in the package, selected in alphabetical order; for example, a diagram called *Alpha* in a child package or element several levels down opens before a diagram called *Beta* immediately under the selected package.

### 2.2.13 Feature Visibility

Enterprise Architect enables you to set the visibility of attributes and operations - where shown - for selected elements on a specific diagram only. You can hide or show attributes and operations by scope, or you can hide attributes and operations individually. The visibility you set applies only to the current diagram, so a Class can appear in one diagram with all features displayed, and in another with features hidden. For example, you can hide all protected attributes, all private operations or any other combination of attributes and operations.

It is possible to show inherited attributes, operations, requirements, constraints and Tagged Values for elements that support those features. When Enterprise Architect displays inherited features, it creates a merged list from all generalized parents and from all realized interfaces. If a child Class redefines something found in a parent, the parent feature is omitted from the Merge List.

**Tip:**

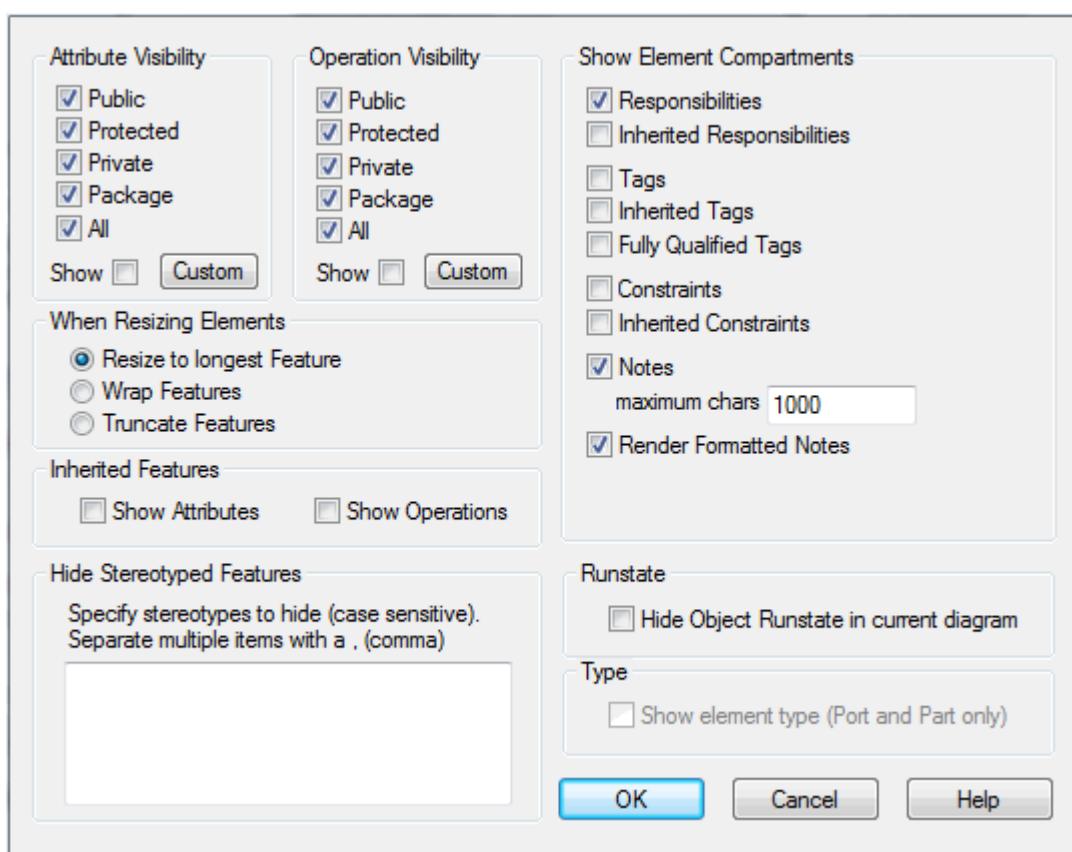
To show features for element types that do not have visible compartments, such as Use Cases and Actors, right-click on the diagram object to display the context menu and select the **Advanced Settings | Use Rectangle Notation** option.

## Customize Feature Visibility

To customize feature visibility, follow the steps below:

1. Either:
  - Click on the element in the diagram and either click on the **Element | Feature Visibility** menu option or press **[Ctrl]+[Shift]+[Y]**, or
  - Right-click on the element in the diagram to display the context menu and click on the **Feature Visibility** option.

The **Feature Visibility** dialog displays.



2. To filter display of attributes or operations by scope, select the checkbox against each scope that should be visible and clear the checkbox against each scope that should not.

**Note:**

The **Show** checkbox, if selected, overrides these selections to display all attributes or operations in the element, except those specifically deselected in the [Show Features in Diagram](#) <sup>35</sup> dialog.

3. In the **Show Element Compartments** panel, select the compartments to display for the element on the diagram.

The **Fully Qualified Tags** checkbox enables you to display the full provenance of a Tagged Value, where the same Tagged Value can be used several times in different contexts with different values. The description in the Tagged Value compartment reads: <Profile>::<Stereotype>::<Tagged Value name>=<Value>, for example: BPMN::Activity::Activity Type = Task. (Only for Tagged Values created in Enterprise Architect release 7.1 or later.)

If you select the **Notes** checkbox, the Notes compartment on the element in the diagram displays the text that has been typed into the **Notes** field of the **Element Properties** dialog. This checkbox also enables the **maximum chars** field, which defaults to 1000 as the number of characters of notes text displayed. Overtype this value to display less text or more text.

The change only applies to the selected elements on the diagram, so you can display full notes for a selected element whilst the other elements on the diagram have no notes text.

#### Note:

If you have selected the **Notes** checkbox, you can select the **Render Formatted Notes** checkbox to display the text on the diagram, formatted using the **Rich Text Notes** toolbar. (See *Using Enterprise Architect - UML Modeling Tool*.)

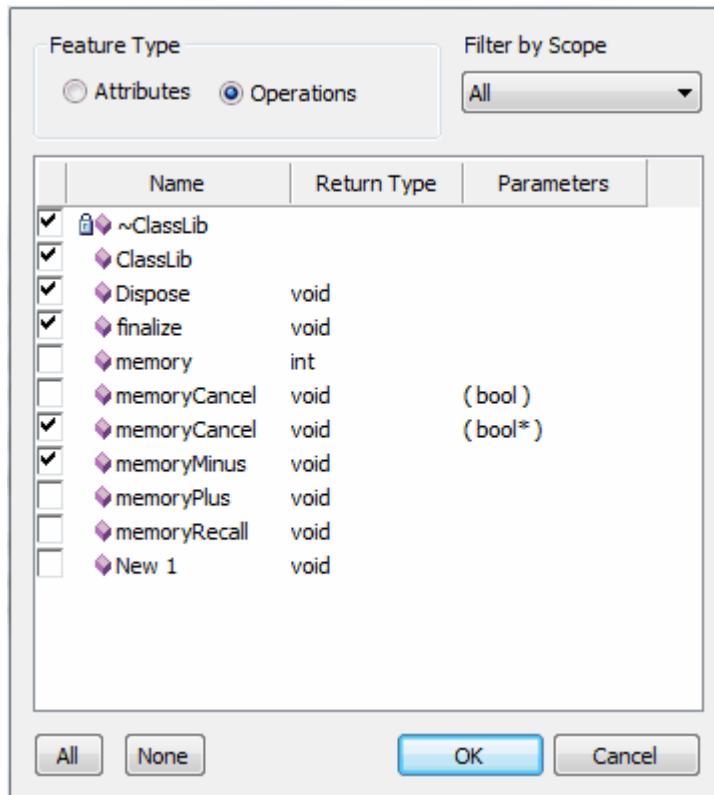
- In the **When Resizing Elements** panel, select the appropriate option for resizing the Class, object or table to prevent very wide diagram objects.

The selected option defaults to **Resize to longest Feature**, so that the minimum width for a diagram object is determined by its longest displayed attribute, method or other compartment value. If necessary, you can change the option to **Wrap Features** (so that any longer features are wrapped onto multiple lines) or **Truncate Features** (so that longer features are not displayed in full).

- If required, in the **Inherited Features** panel, select one or both checkboxes to set whether Enterprise Architect should display inherited features as well as directly owned ones.
- Click on the **OK** button to save changes. Enterprise Architect redraws the diagram with the appropriate level of feature visibility.

## SUPPRESS OR SHOW SPECIFIC FEATURES

The **Custom** button in the **Attribute Visibility** and **Operation Visibility** panels enables you to show or hide specific operations and attributes. If you select the **Show** checkbox, the **Custom** button displays the **Show Features in Diagram** dialog; if you deselect the checkbox, the button displays the **Suppress Features in Diagram** dialog.



The two dialogs are identical, but in the first you select the checkboxes of specific features to show, and in the

second you select the checkboxes of specific features to hide.

You can also use the **Filter by Scope** button in this dialog to, for example, list only operations that are Protected and select, say, two of them to hide, so that on the diagram the element displays all but two of the Protected operations and all operations of other scopes.

### 2.2.14 Insert Diagram Properties Note

Properties of a diagram can be displayed on screen within a custom text box. You can move this text box around and change its [appearance](#)<sup>[96]</sup>. You cannot change what the text box says.

Name:	UseCaseDiagram
Author:	Frederick Walter
Version:	1.0
Created:	25/05/2007 12:00:00 AM
Updated:	1/05/2009 2:02:33 PM

To create the note, drag the *Diagram Notes* element from the **Common** page of the Enterprise Architect UML **Toolbox** onto the diagram.

Alternatively, select the **Diagram | Property Note** menu option, or click on the **Diagram Properties Note** button on the **UML Elements** toolbar and click on the diagram.



#### Note:

This is not the same as the diagram details note, which displays in the top left corner of the diagram if the **Show Diagram Details** checkbox is selected on the [Diagram Properties](#)<sup>[54]</sup> dialog. You cannot move the diagram details, nor change the appearance. To hide the diagram details, deselect the checkbox.

### 2.2.15 Autosize Elements

You can autosize an element or group of elements in a diagram to the default size for the element type (for a Class, 90 x 70 pixels at 100% zoom). However, if the element contains more information than the default size can show (such as a long name, long attributes or additional compartments) the autosize option resizes the element to the minimum size for revealing the information.

The size change effectively operates around the mid point of each element, so the layout and size of the diagram do not change. To automatically change the layout of a diagram, see the [Lay Out a Diagram](#)<sup>[26]</sup> topic.

To autosize elements, follow the steps below:

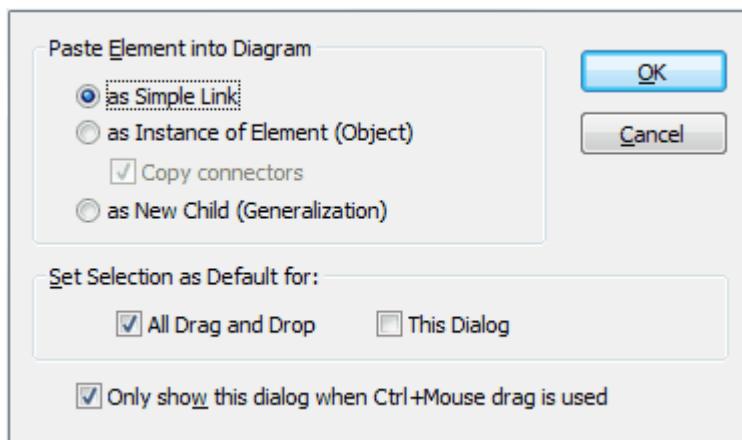
1. Select the elements to resize (press **[Ctrl]+[A]** to select all).
2. Either:
  - Right-click on any of the elements and, on the context menu, select the **Autosize** menu option, or
  - Press **[Alt]+[Z]**.

#### Note:

- Not all elements resize: elements such as Events remain the same; Timing and Sequence diagrams (where position is crucial) are unchanged; and elements added from a profile or Shape Script maintain any size definitions imposed by the profile.
- With an element image created with a Shape Script that contains a `defSize` command, **Autosize** returns the element to the `defSize` value and *not* the element default size. (See *SDK for Enterprise Architect*).

## 2.2.16 Paste from Project Browser

As well as creating new elements in a diagram, you can drag existing elements from the **Project Browser** into the current diagram. When you do this, the **Paste Element** dialog displays to prompt you to select the type of paste action to carry out. (If the dialog does not display, press and hold **[Ctrl]** while dragging the element onto the diagram.)



Three paste options are available:

1. Paste the element as a simple link. In this case the original element exists both in the current diagram and in the original source diagram. Changes to the element are reflected in all diagrams in which it is shown.
2. Paste as an [instance](#)<sup>[148]</sup> of the element. If the element can have instances such as an Object, Sequence instance or Node instance, you can drop the element in as an instance of the source element, with the classifier pre-set to the original source. This is useful when creating multiple instances of a Class in a Sequence diagram or Communication diagram.

If you select this option, the **Copy connectors** checkbox is enabled. If you select this checkbox, any connectors between the original element and any other elements that have also been pasted to this diagram are reproduced as connectors between the instances.

3. Create as a child of the source element. This automatically creates a new Class - which you are prompted to name - with a Generalization connector back to the source. This is very useful when you have a Class library or framework from which you inherit new forms; for example, you can paste a Hashtable as "MyHashtable" which automatically becomes a child of the original Hashtable. Used with the [Override parent operations](#)<sup>[164]</sup> and features, this is a quick way to create new structures based on frameworks such as the Java SDK and the .NET SDK.

You can make your selection on this dialog the default for:

- all drag and drop operations, or
- only those where you display this **Paste Element** dialog.

If you select the **This Dialog** checkbox, you should then select the **Only show this dialog when [Ctrl] +Mouse drag is used** checkbox and, on the **Diagram Behavior** page of the **Options** dialog, the **Auto Instance** checkbox (see *Using Enterprise Architect - UML Modeling Tool*).

The effect of these selections is to give you two default paste options:

- Just drag the element onto the diagram and automatically create an instance
- Press **[Ctrl]** while you drag the element from the **Project Browser**, displaying the **Paste Element** dialog, and click on the **OK** button to automatically paste the element according to whatever option you last selected from the dialog.

If you select the **All Drag and Drop** checkbox on the **Paste Element** dialog, this deselects the **Auto Instance** checkbox on the **Options** dialog and enables you to add existing elements to the diagram according to the paste option you selected, without pressing **[Ctrl]** and without displaying a dialog. (If you want to change the default paste option, press **[Ctrl]** as you drag to display the dialog again and make your changes.)

### See Also

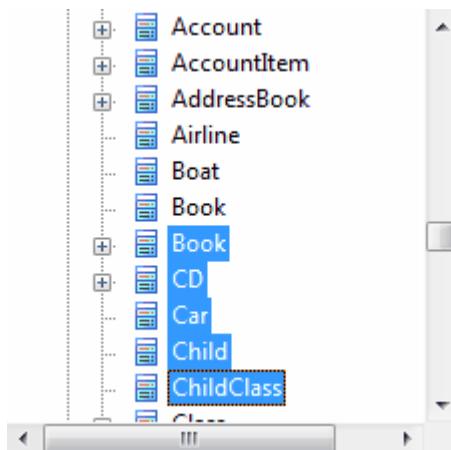
- Connect Requirements (see *Requirements Management*)
- [Create Object From Attribute](#) [117]
- [Make Linked Element A Local Copy](#) [102]

#### 2.2.16.1 Paste Multiple Items

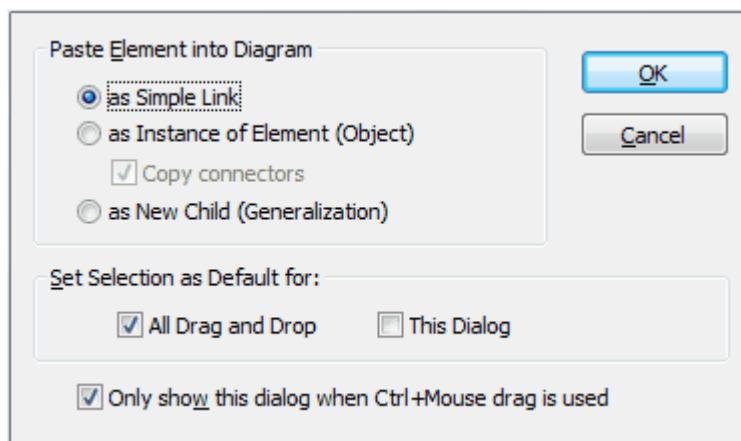
You can paste multiple elements from the **Project Browser** into the current diagram.

To select multiple elements, click on the selected items from the **Project Browser** while pressing and holding:

- **[Ctrl]** to add single items to the selection of multiple elements, or
- **[Shift]** to select all the elements between the first and last selected items in the **Project Browser**.

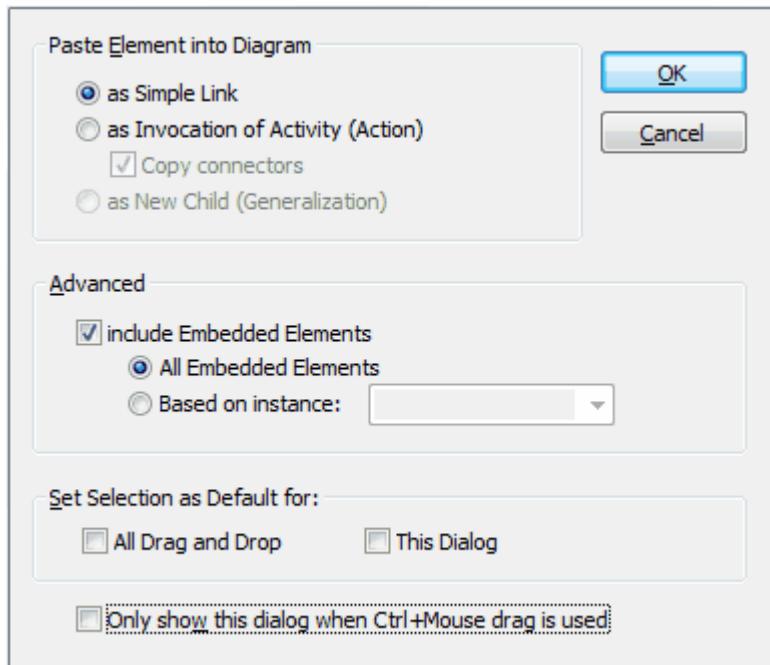


You can then drag the selected elements from the **Project Browser** onto the current diagram, pressing and holding **[Ctrl]**; for each element you have selected, the **Paste Element** dialog displays, prompting you to [select the type of paste action](#) [37] to carry out.



### 2.2.16.2 Paste Composite Elements

When you drag a Composite element from the **Project Browser** onto the current diagram with **[Ctrl]** held down, Enterprise Architect prompts you to select the type of paste action to carry out with the Composite element.



Two advanced options are available for pasting Composite elements; these require the **include Embedded Elements** checkbox to be selected:

1. The **All Embedded Elements** option, which pastes all of the Composite element's embedded elements.
2. The **Based on instance** option, which pastes only the elements contained in a specific instance of the Composite element, maintaining the layout of the embedded elements.

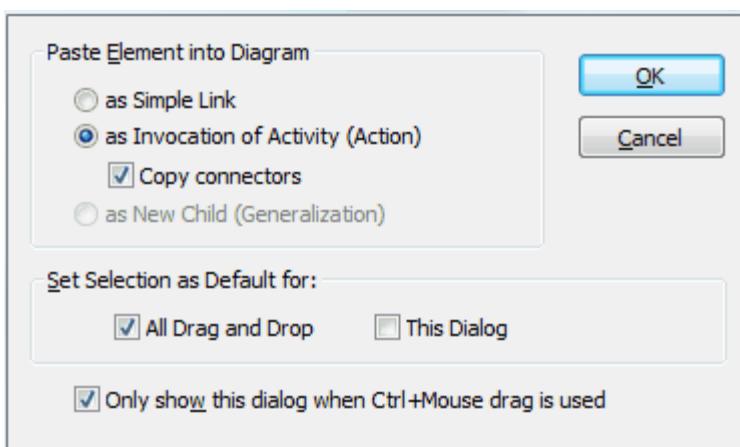
Click on the drop-down arrow and select the appropriate instance.

For details of the other options on this dialog, see the [Paste from Project Browser](#) topic.<sup>37</sup>

### 2.2.16.3 Paste Activities

You can paste an Activity from the **Project Browser** into the current diagram. (See [UML Dictionary](#).)

When you hold **[Ctrl]** down and drag an Activity from the **Project Browser** onto the current diagram, The **Paste Element** dialog displays, prompting you to select the type of paste action to carry out.



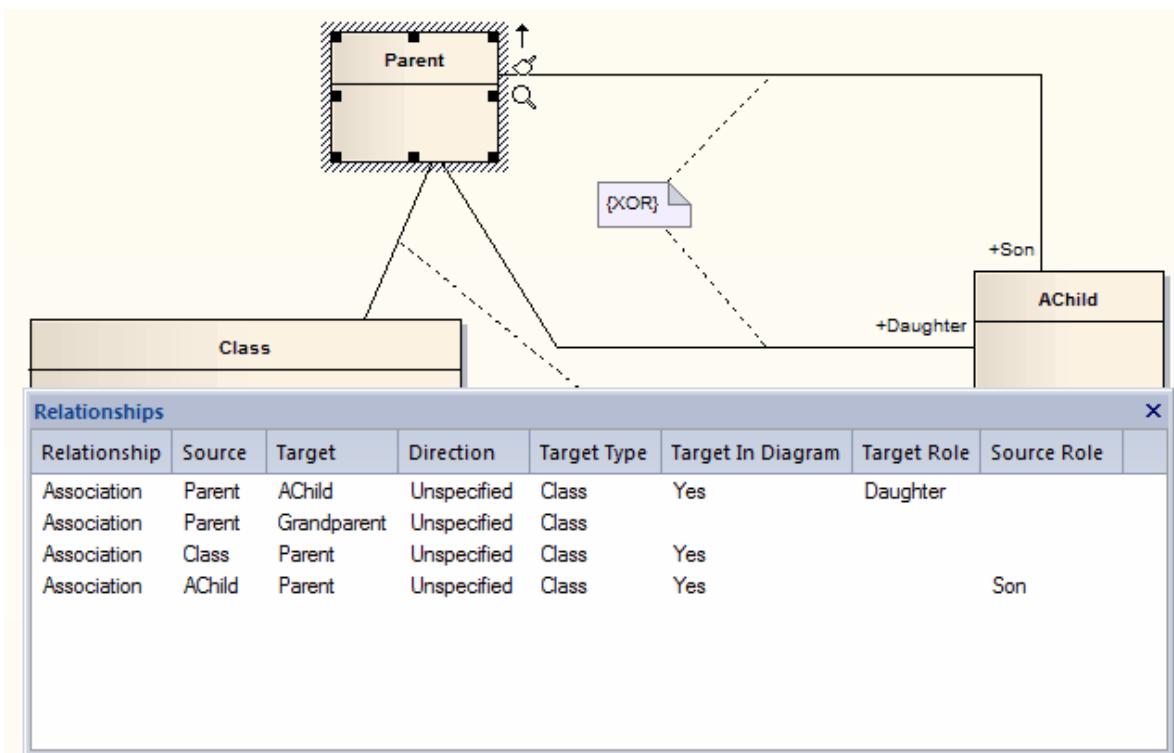
Two options are available:

- Paste the Activity as a link: in this case the Activity appears in the current diagram as a simple reference to the original source Activity. Changes to the Activity in the diagram affect all other links to this Activity.
- Paste as an invocation of the Activity; if you select this option, the **Copy connectors** checkbox is enabled. If you select this checkbox, any connectors between the original Activity and any other elements that have also been pasted to this diagram are reproduced as connectors between the instances.

For details of the other options on this dialog, see the [Paste from Project Browser](#) topic.

### 2.2.17 Place Related Elements on Diagram

To find and place related elements on the current diagram, use the **Relationships** window (**View | Other Element Tools | Relationships**).



Right-click on any connector in the list to open the context menu.



If an element is not present in the current diagram, the context menu contains the **Place Target Element in Diagram** option. This is useful when you are building up a picture of what an element interacts with, especially when reverse engineering an existing code base.

Select the **Place Target Element in Diagram** option. Move the cursor to the required position in the diagram and click to place the element. Alternatively, press **[Esc]** to cancel the action.

### 2.2.18 Swimlanes Matrix

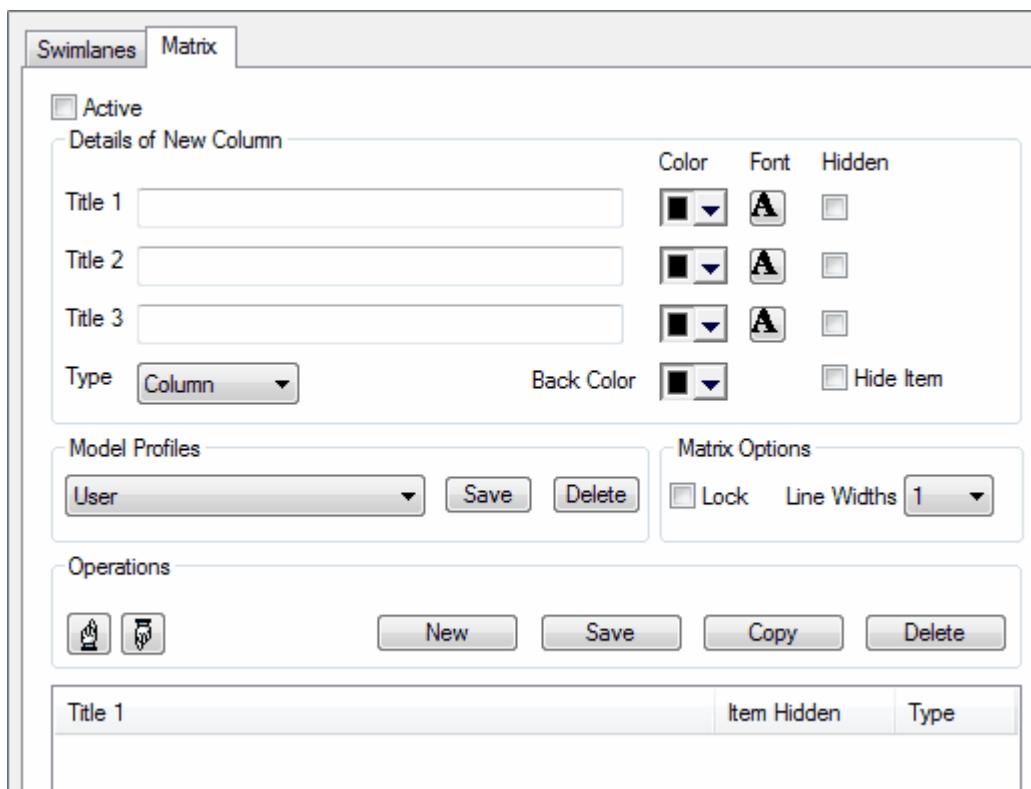
Enterprise Architect diagrams support a *Swimlanes Matrix* for all diagram types, based on the Zachman Framework.

<b>The Zachman Framework</b>	DATA What (Things)	FUNCTION How (Process)	NETWORK Where (Location)	PEOPLE Who (People)	TIME When (Time)	MOTIVATION Why (Motivation)
SCOPE (Contextual) Planner						
BUSINESS MODEL (Conceptual) Owner						
SYSTEM MODEL (Logical) Designer						
TECHNOLOGY MODEL (Physical) Builder						
DETAILED REPRESENTATIONS (Out-of-Context) Sub-Contractor						
FUNCTIONING ENTERPRISE						

The *Swimlanes Matrix* divides the diagram into cells of vertical columns and horizontal rows. The cell in the top left corner of the *Swimlanes Matrix* contains the heading of the matrix. The first cell at the top of each column contains the column title text. The first cell at the left of each row contains the row title text.

### Set up Swimlanes Matrix

To set up and manage the *Swimlanes Matrix*, select the **Diagram | Swimlanes and Matrix** menu option to display the **Swimlanes and Matrix** dialog. Click on the **Matrix** tab.



### Activate the Matrix

To activate the Swimlanes Matrix, select the **Active** check box.

At the same time, you can define the line width for all lines on the matrix; in the **Line Widths** field, click on the drop-down arrow and select the appropriate width.

### Create the Heading of the Swimlanes Matrix

To define the heading for the matrix, follow the steps below.

1. Click on the **New** button.
2. In the **Type** field in the **Details of New Column** panel, click on the drop-down arrow and select **Heading**.
3. In one or more of the **Title** fields, type the heading name. You can enter up to three text strings as heading text.
4. If necessary, click on the **Color**, **Font** and **Back** options and select the heading text font, color and background color.
5. Click on the **Save** button in the **Operations** panel. The *Heading* cell displays on the diagram.

#### Note:

The heading is the first item in the list; you create only one heading.

### Create Columns and Rows:

To define the column and row headings for the matrix, follow the steps below.

1. Click on the **New** button.
2. In the **Type** field, in the **Details of New Column** panel, click on the drop-down arrow and select either **Column** or **Row** as appropriate.
3. In one or more of the **Title** fields, type the column or row name. You can enter up to three text strings as title text.
4. If necessary, click on the **Color**, **Font** and **Back** options and select the title text font, color and background color.

5. Click on the **Save** button in the **Operations** panel. The column or row heading cell and column or row lines display on the diagram.

**Note:**

When you define columns and rows, you define the header or title cells. The properties of these cells do not reflect on the matrix cells themselves. For example, the intersection cell of a column and row has a transparent background and therefore takes the color and shading effect of the diagram background.

**Lock the Matrix**

To lock the matrix so that it cannot be edited on the diagram, on the **Swimlanes and Matrix** dialog select the **Lock** checkbox.

**Edit items in the list:**

As you create the heading, column and row title cells, they are added to the list in the bottom of the dialog. To edit an item, follow the steps below.

1. Click on the required item in the list.
2. Make the relevant changes in the **Edit Selected ...** panel.
3. Click on the **Save** button in the **Operations** panel.

**Delete items from the list:**

To delete the heading or a column or row from the matrix, follow the steps below.

1. Click on an item in the list.
2. Click on the **Delete** button in the **Operations** panel.

**Model Profiles:**

After creating a Swimlane Matrix, you can save it into a *Model Profile* and apply it to other diagrams. Model Profiles are available on any diagram in your model.

**Save a Model Profile:**

To save a Model Profile, follow the steps below.

1. In the **Model Profiles** panel, click on the **Save** button. The **Save Model Profile** dialog displays.
2. In the **Name** field, type the name of your profile.
3. Click on the **OK** button.

The profile is now visible in the profile name drop-down list here and on other diagrams.

**Note:**

You can also transport all the matrix profiles between models (as Diagram Matrix Profiles), using the **Export Reference Data** and **Import Reference Data** options on the **Tools** menu. (See the *Reference Data* topic in *UML Model Management*.)

**Apply a Model Profile:****Note:**

By applying a Model Profile, you replace the current profile. Save the current profile to avoid losing it.

To apply a Model Profile to a diagram, follow the steps below.

1. In the **Model Profiles** panel, click on the drop-down arrow of the profile name field, and select the required profile from the list.  
The list contains a predefined Zachman profile, as well as an empty profile should you want to replace the current profile with one that you create on the spot.
2. A confirmatory prompt displays. Click on the **OK** button to display the profile details on the **Swimlanes and Matrix** dialog.
3. Click on the **OK** button at the bottom of the **Swimlanes and Matrix** dialog to apply the profile to the matrix on the diagram.

## Size the Matrix

To size the rows and columns, drag the row and column borders on the diagram.

Elements placed inside each cell are shifted when sizing. To prevent the elements shifting, press and hold **[Ctrl]** while sizing.

### See Also

- [Swimlanes](#) 

## 2.2.19 Using the Image Manager

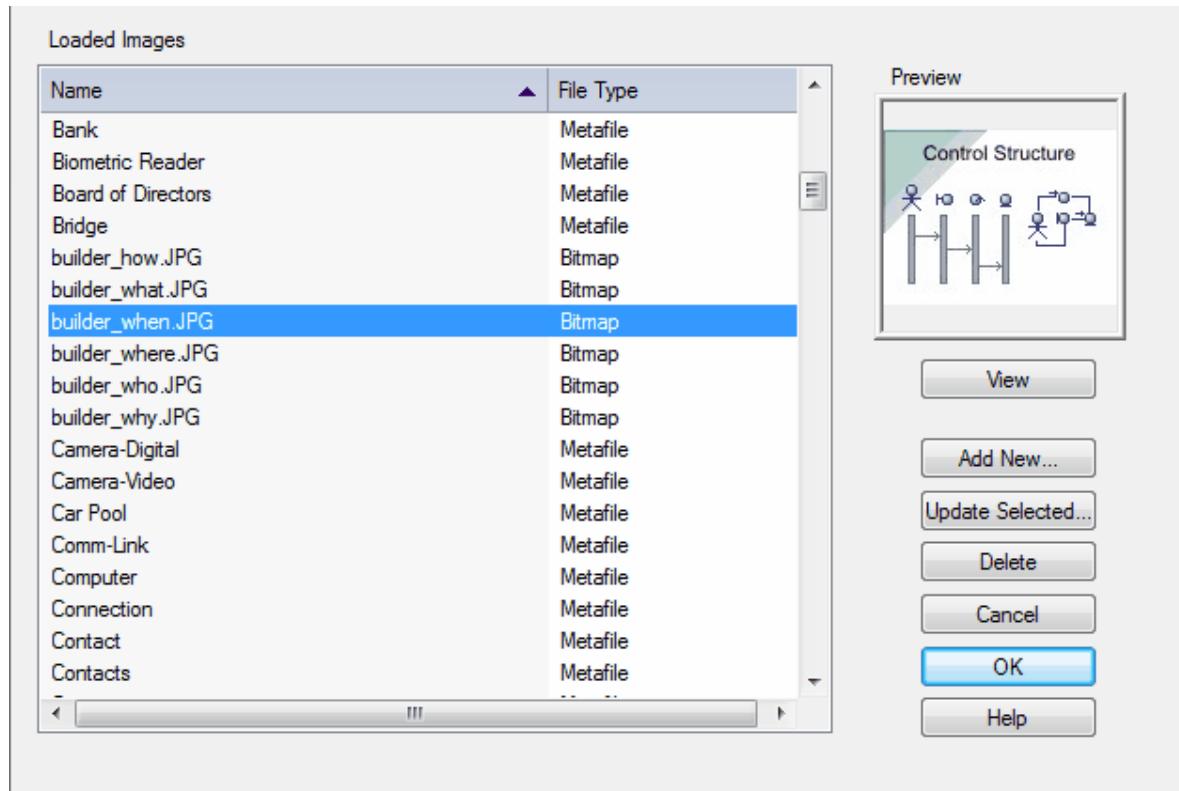
The **Image Manager** dialog enables you to insert alternative images in diagrams, rather than inserting standard UML elements. For example, you might want to place a [custom background image](#)  on a diagram, or display a custom image such as a Router or PC on a UML element.

### Notes:

- For elements with lifelines, such as those used on Sequence diagrams, the Lifeline must remain intact to enable messages to be created between the elements. Therefore such elements cannot have alternative images.
- In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Configure Images** permission to configure alternative element images. See *User Security in UML Models*.

To display the **Image Manager** dialog, either:

- Right-click on the element within the diagram and, from the context menu, select the **Appearance | Select Alternate Image** option, or
- Select the element in the diagram and press **[Ctrl]+[Shift]+[W]**.



To locate and display an image, click on individual image filenames, or press **[↑]** and **[↓]** to scroll through the list of images. As you highlight each image filename, the **Preview** panel changes to reflect the image. Double-

click on the required image filename to display the image in full size.

On the **Image Manager** dialog, the following buttons are available:

Option & Function Keys	Use to
<b>View [Alt]+[V]</b>	Display the selected image in full size.
<b>Add New [Alt]+[A]</b>	Browse appropriate directories to search for and import new images. You can import images in .BMP, .PNG, .EMF, .WMF, .TGA, .PCX or .JPG format. Internally, Enterprise Architect stores the images in .PNG or metafile format to conserve space.
<b>Update Selected [Alt]+[U]</b>	Refresh the selected image; for example, after it has been modified.
<b>Delete [Alt]+[D]</b>	Delete the selected image. A message displays to indicate how many elements use the image. Click on the <b>Continue</b> button to delete information about the image from those elements, which then revert to their previous appearance.
<b>Close</b>	Close the <b>Image Manager</b> dialog.
<b>OK [Alt]+[O]</b>	Confirm selection of the alternative image for the element selected in the diagram.

#### Notes:

- If you are creating many elements of the same type that have a particular image, you should use a custom stereotype with an associated metafile (see *Extending UML in Enterprise Architect*)
- You can transport image files between models, using the **Export Reference Data** and **Import Reference Data** options on the **Tools** menu. (See the *Reference Data* topic in *UML Model Management*.)

### 2.2.19.1 Create Custom Diagram Background

Enterprise Architect diagrams have a single-color 'wash' background that you can set to a solid color or a fade gradient down the screen. You set the color on the **Standard Colors** page of the **Options** dialog, and whether to have a fade gradient on the **Diagram Appearance** page. (See *Using Enterprise Architect - UML Modeling Tool*.)

Alternatively, using the **Image Manager** dialog, you can create a non-tiled background for diagrams. To perform this operation follow the steps below:

1. Create a Boundary object (see the *System Boundary* topic in the *UML Dictionary*) from the **Use Case Elements** page of the Enterprise Architect UML **Toolbox**. Do not use the **Boundary** element from any other section of the **Toolbox**. (See *Using Enterprise Architect - UML Modeling Tool*.)
2. Stretch the Boundary to a size that can contain all of the elements you intend to place on the diagram, and drag it to the edges of the diagram workspace.
3. Right-click on the Boundary element. The context menu displays.
4. Select the **Z-Order | Send to Bottom** menu option. This ensures that the Boundary is not displayed in front of any other element in the diagram.
5. Either:
  - Press **[Ctrl]+[Shift]+[W]**, or
  - Right-click on the Boundary to display the context menu, and select the **Appearance | Alternate Image** menu option.
6. On the **Image Manager**  dialog, select an appropriate image as the diagram background and ensure that the image size is large enough to span the required size of the diagram background.
7. When you have selected the required image, click on the **OK** button.

Alternatively, you can copy an image from another source onto the Windows clipboard, right-click on the Boundary element in the Enterprise Architect diagram, and select the **Appearance | Apply Image From Clipboard** context menu option.

### 2.2.19.2 Import Image Library

Using the Image Library enables you to create attractive diagrams with custom images. A bundled clip art collection of UML-based images is available as an Imported Image Library, from [www.sparxsystems.com/resources/image\\_library.html](http://www.sparxsystems.com/resources/image_library.html). Image libraries enable you to import a collection of images into the Image Manager in one process.

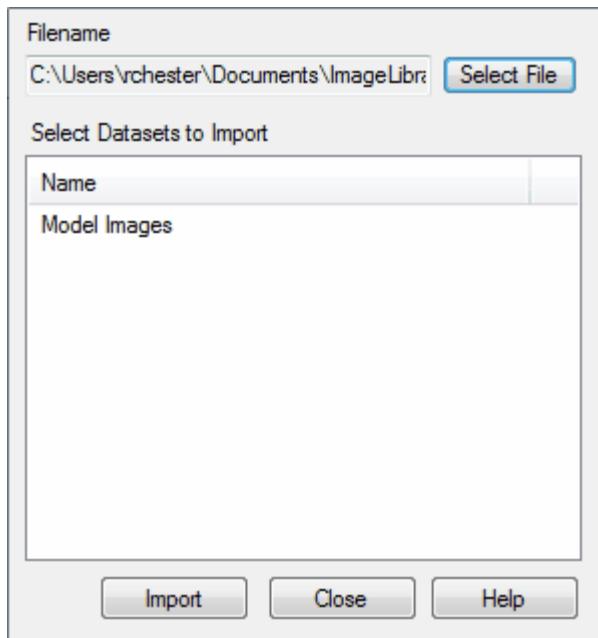
**Note:**

Images contained within the Image Library are copyright of Sparx Systems, are only available for use in conjunction with Enterprise Architect, and are supplied on the understanding that they are not used under any other circumstance.

### Import an Image Library

To import an Image Library you must have a suitable Image Library file. To import the Image Library, follow the steps below:

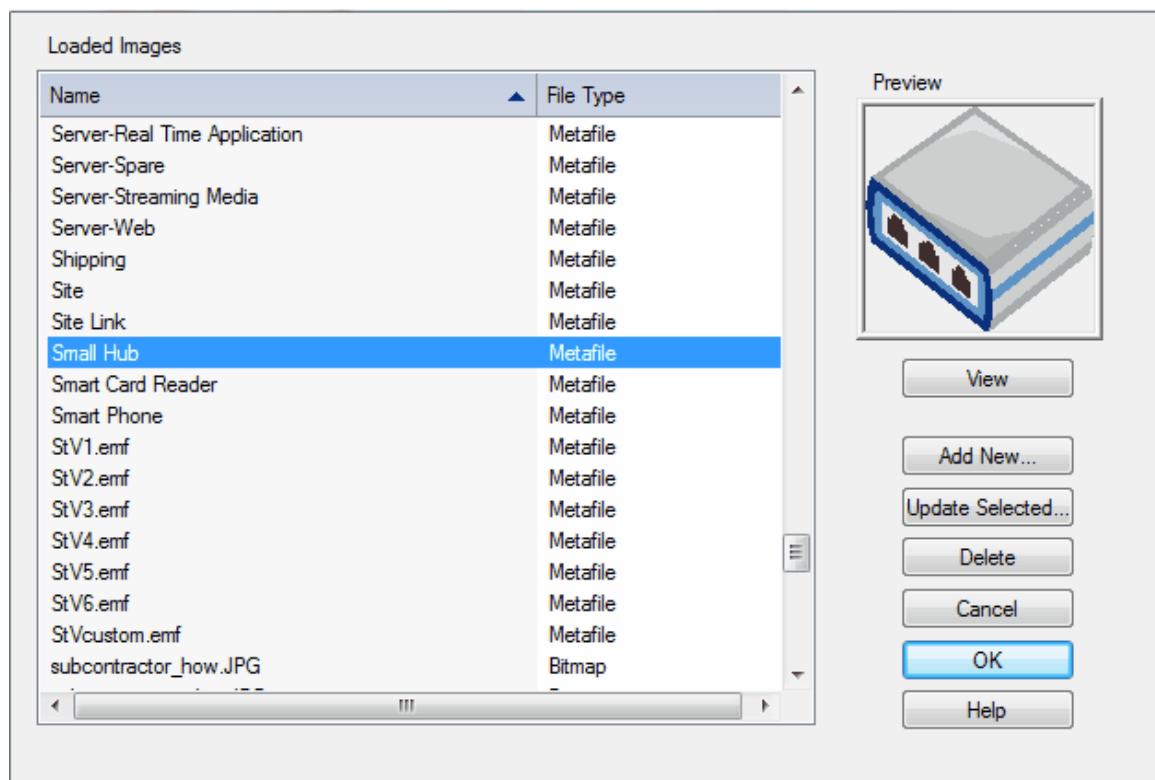
1. Download the Image Library from [www.sparxsystems.com/resources/image\\_library.html](http://www.sparxsystems.com/resources/image_library.html).
2. Select the **Tools | Import Reference Data** menu option. The **Import Reference Data** dialog displays.
3. Locate the XML Image Library file to import using the **Select File** button. The file name is *ImageLibrary.xml* in the directory in which you saved the file.
4. Select the data set containing the Image Library. Then click on the **Import** button.



### Use the Image Library

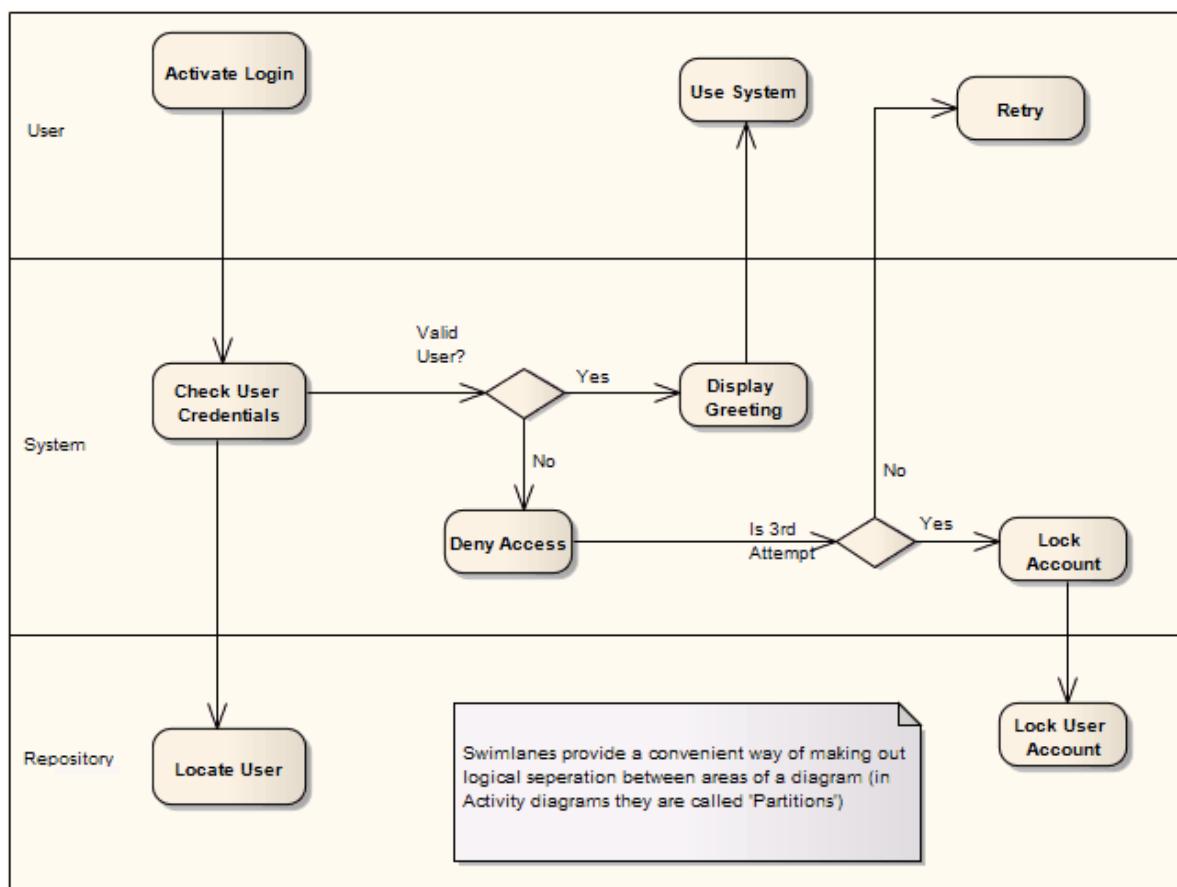
To use the images contained within the Image Library, follow the steps below:

1. Create a diagram to associate with the images contained in the Image Library.
2. Select the element to change from the default appearance to one of the images contained within the library.
3. Press **[Ctrl]+[Shift]+[W]**, or right-click on the selected element to display its context menu and then select the **Appearance | Select Alternate Image** option.
4. On the **Image Manager** dialog, in the **Name** field highlight the appropriate image name and then click on the **OK** button.

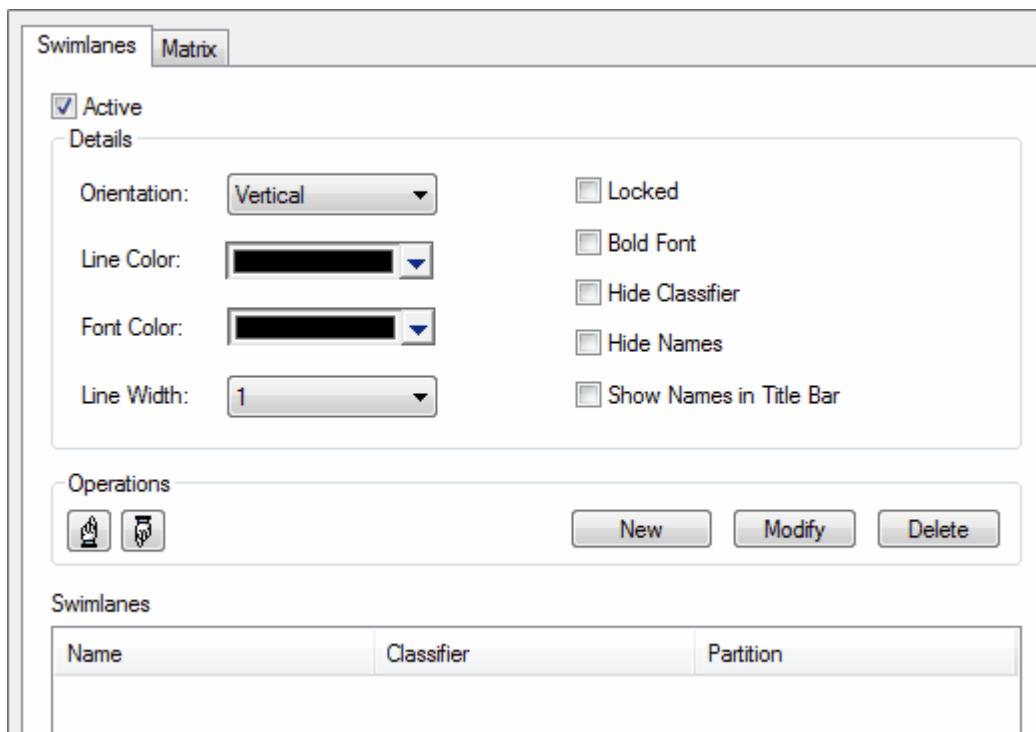


### 2.2.19.3 *Swimlanes*

Enterprise Architect diagrams support *Swimlanes* for all diagram types. Swimlanes are vertical or horizontal bands in a diagram that divide the diagram into logical areas or partitions. In the example below the activities relating to particular entities within the model (such as the User, or the back end Repository) are placed within a containing swim lane to indicate their association.



To manage swimlanes, select the **Diagram | Swimlanes and Matrix** menu option to display the **Swimlanes and Matrix** dialog. The dialog defaults to the **Swimlanes** tab.



This dialog enables you to set the orientation (vertical or horizontal), line color and width of the swimlanes, and lock the swimlanes to prevent further movement. You can also specify the font color and bold font, hide names, hide the classifier and show the name in the title bar. Use the **New**, **Modify** and **Delete** buttons to

change aspects of the selected swimlane. Use the and (up and down) buttons to change the order of swimlanes within the diagram.

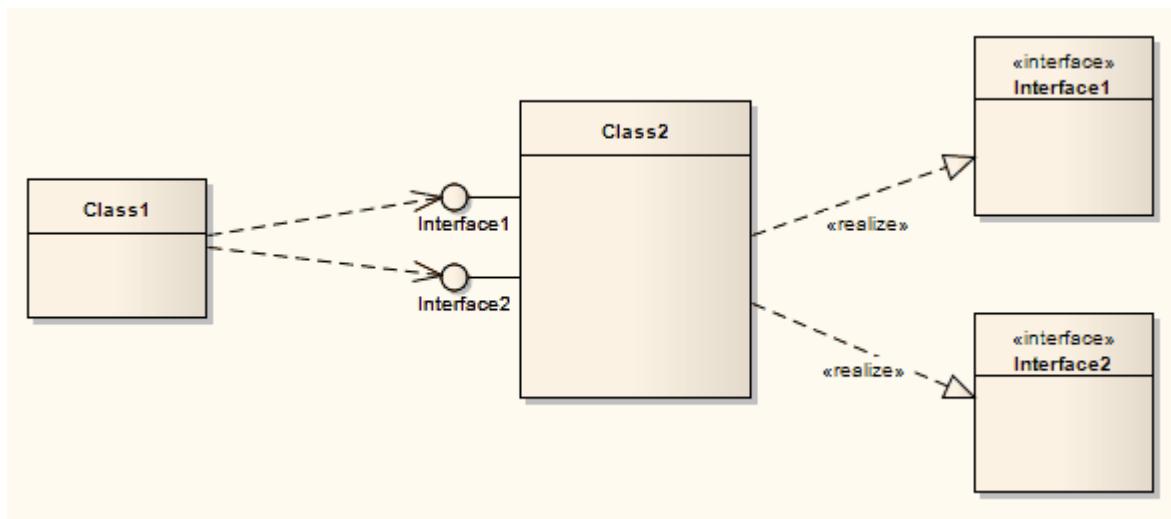
If you set a background color for a swimlane, it takes on the same shading profile as the main diagram background.

#### See Also

- [Swimlanes Matrix](#)

### 2.2.20 Show Realized Interfaces of Class

You can display each interface directly realized by a Class as a 'lollipop' style interface node, which protrudes from the left-hand side of the Class. Connectors can be directly attached to the node, indicating usage of the interface part of the Class or component. See the example below:



In this example, *Class2* realizes *Interface1* and *Interface2* as represented by the interface nodes protruding from the Class. *Class1* is dependent on these two interfaces, which is shown by the Dependency connectors linking to the nodes.

To show nodes for the interfaces a Class realizes, as in the above diagram, right-click on the Class and select the **Embedded Elements** | **Show Realized Interfaces** context menu option. This setting only applies to the selected Class, and can be changed at any time.

### 2.2.21 Label Menu Section

You can add labels to both connectors and elements, using the element or connector context menu as follows:

- Element:
  - Select the [Embedded Elements](#) menu option and either the **Add <element>** option or the **Embedded Elements** option; the label is the embedded element name
  - Apply an [alternative image](#) to an element (that might also have a run state - see *The UML Dictionary*); the run state, attributes and operations of the element are then displayed as a label of the element.
- Connector - Select the [Properties](#) option and define the connector name, stereotype, constraints and/or source and target roles.

Once you have these labels, you can edit and format them using the **Labels** context menu.

To display the **Labels** context menu, right-click on a label.

**Note:**

As labels can be concentrated on and around the element or connector, make sure that you click on a section of the required label that is clear of any other label or structure.

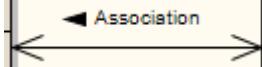
## Element Labels

The **Labels** menu associated with embedded elements provides the following options:

Menu Option	Use to
<b>Set Label Color</b>	Specify a color for the label.
<b>Hide Label</b>	Hide the label; to unhide the label, right-click on the element and select the <a href="#">Appearance   Show labels</a> context menu option.
<b>Bold</b>	Set the label font to bold.
<b>Text Alignment</b>	Align the text within the label text area. The options available from the submenu enable you to specify left, center and right alignment.
<b>Label Rotation</b>	Orient the label in the horizontal or vertical planes, with the vertical plane offering the option of clockwise or anti-clockwise position.
<b>Default Position</b>	Move the label to the initial default location.
<b>Default Color</b>	Set the label color to the default color.

## Connector Labels

The **Labels** menu associated with connectors provides the following options:

Menu Option	Use to
<b>Set Label Color</b>	Specify a color for the label.
<b>Hide Label</b>	Hide the label; to unhide the label use the <b>Visibility   Set Label Visibility</b> option on the connector context menu.
<b>Bold</b>	Set the label font to bold.
<b>Text Alignment</b>	Align the text within the label text area. The options available from the submenu enable you to specify left, center and right alignment.
<b>Label Rotation</b>	Orientate the label horizontally or vertically and, if vertically, in a clockwise or anti-clockwise position.
<b>Direction</b>	Set a small arrow at the end of the label pointing to either the label source or the destination dependent upon selection from the available options.   This is part of the label, so if there is no label there is no direction indicator.
<b>Default Position</b>	Move the label to the default location.
<b>Default Color</b>	Set the label color to the initial default color.

### 2.2.22 Lock Diagram

You can lock a diagram against inadvertent changes, such as moving or sizing elements.

To lock a diagram, follow the steps below:

1. Open the diagram to lock.
2. Right-click on the background to open the diagram context menu.
3. Click on the **Lock Diagram** option to prevent further changes.
4. Click on the **OK** button.

If a user selects an item on a locked diagram, the object border or outline displays in red.

**Note:**

This does not apply in the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions if security is enabled. In that case, see the *Lock Model Elements* topic in *User Security in UML Models*.

### 2.2.23 Undo Last Action

When editing diagrams, Enterprise Architect supports multiple undo levels for moving, re-sizing and deleting elements, and for deleting connectors.

There are three ways to undo the last action:

- Press **[Ctrl]+[Z]**
- Select the **Edit | Undo** menu option
- Click on the **Undo** button in the **Default Tools** toolbar.



**Warning:**

Currently you cannot undo element additions or connector moves.

### 2.2.24 Redo Last Action

When editing diagrams, Enterprise Architect supports multiple undo levels for moving, re-sizing and deleting elements, and for deleting connectors. If an Undo action is in error, you can redo the action to reverse the Undo.

There are three ways to redo the last action:

- Press **[Ctrl]+[Y]**
- Select the **Edit | Redo** menu option
- Click on the **Redo** button in the **Default Tools** toolbar.



### 2.2.25 View Last and Next Diagram

Enterprise Architect enables you to step backwards and forwards through the currently-open diagrams, including the **Start Page**.



To view the previous or next diagram use the **Previous** or **Next** buttons on the **Diagram** toolbar.

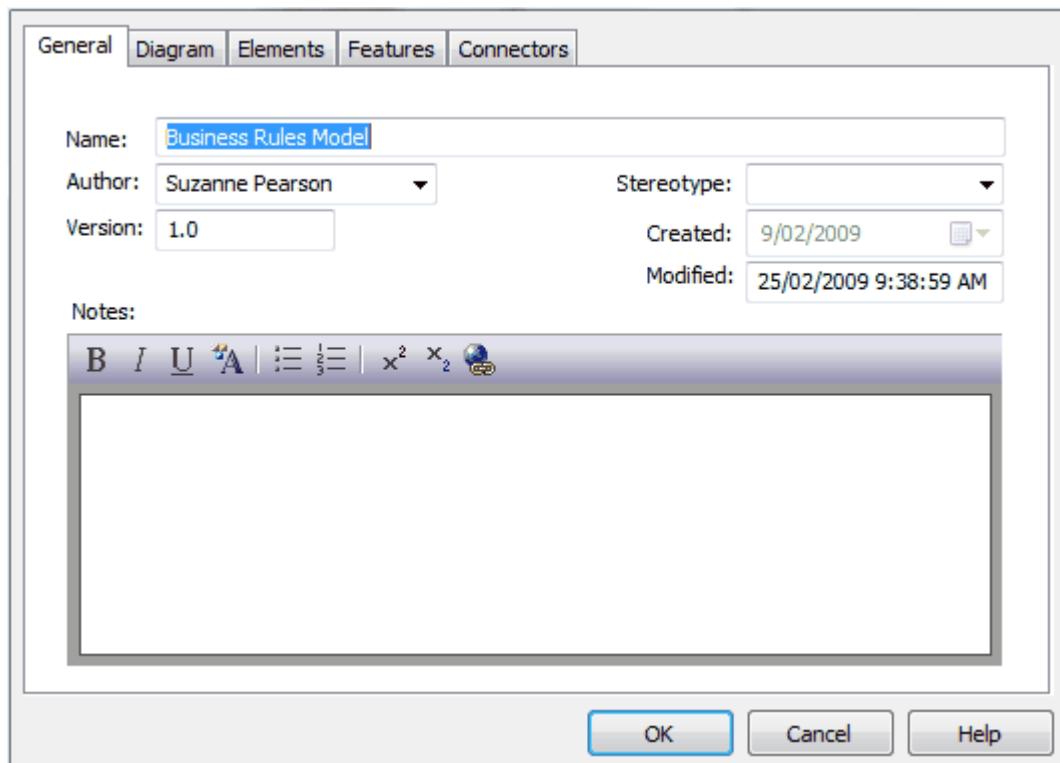
Use the **Home** button to display the [default project diagram](#) (if one has been specified).

## 2.2.26 Diagram Properties

You can set several properties of a diagram using the diagram **Properties** dialog. Some properties influence the display and some are logical attributes that appear in the documentation.

### Note:

You can also set the default diagram background color and the element fill color on the **Standard Colors** page of the **Options** dialog. You can set color gradients for both diagram background and element fill color on the **Diagram Appearance** page of the dialog. (See *Using Enterprise Architect - UML Modeling Tool*.)



There are several options for opening the diagram **Properties** dialog for a given diagram:

- Select the **Diagram | Properties** menu option to open the **Properties** dialog for the currently active diagram
- Right-click on the required diagram in the **Project Browser** and select the **Properties** context menu option
- Right-click on the background of the open diagram and select the **Properties** context menu option
- Double-click in the background of the open diagram.

In the **Diagram Properties** dialog you can set properties including name, author and version information, zoom factor, paper size and layout, diagram notes and various appearance attributes. Once you have made any necessary changes, click on the **OK** button to save and exit.

See the following topics:

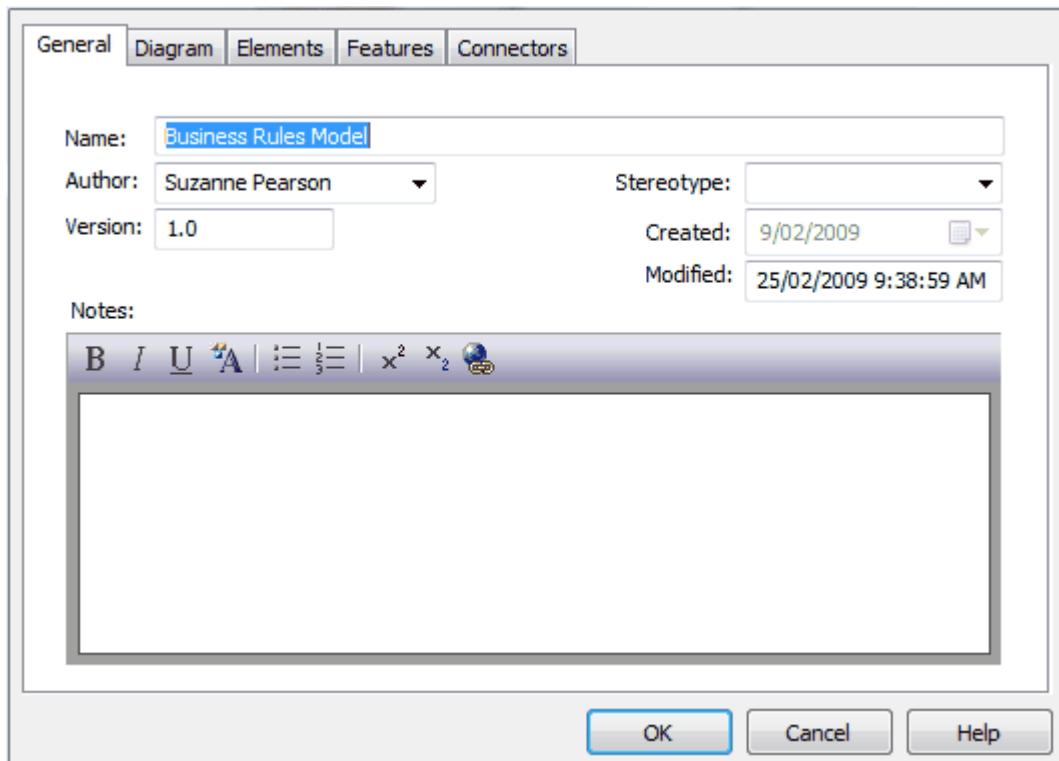
- [General Tab](#)<sup>53</sup>
- [Diagram Tab](#)<sup>54</sup>
- [Elements Tab](#)<sup>55</sup>
- [Features Tab](#)<sup>57</sup>
- [Connectors Tab](#)<sup>58</sup>

### 2.2.26.1 General Tab

The **General** tab of the diagram **Properties** dialog enables you to define characteristics of the overall diagram, such as its title, version and modification date.

**Note:**

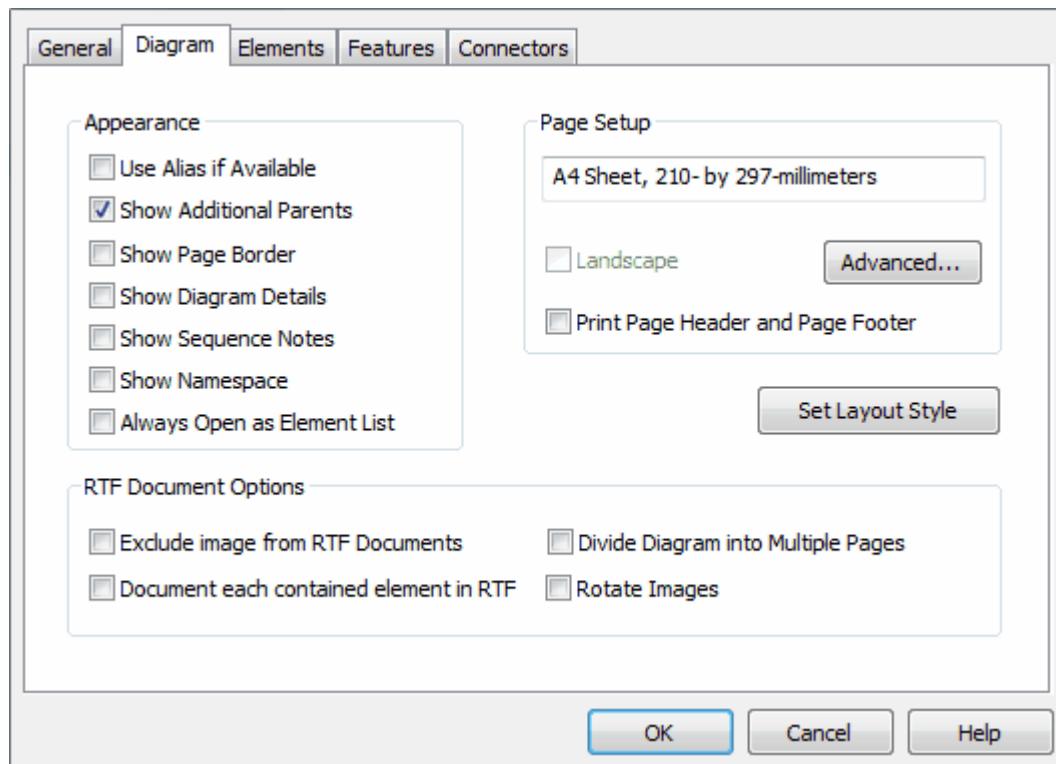
In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Update Diagrams** permission to update diagram properties. See *User Security in UML Models*.



Field	Use to
Name	Type the name of the diagram (defaults to the name of the parent package).
Author	Type or select the name of the person who created the diagram.
Version	Type the version number of the diagram (defaults to 1.0).
Stereotype	Type or select the name of the stereotype for the diagram. You can define stereotypes to select here using the <b>Settings   UML</b> menu option, selecting the <b>Stereotypes</b> tab and creating stereotypes with a <b>Base Class of Diagram</b> (see <i>SDK For Enterprise Architect</i> ).
Created	Automatically display the date the diagram was created.
Modified	Type the date and time on which the diagram was last modified (defaults to the current date and time).
Notes	Type any additional notes about the diagram. You can format the notes using the <b>Rich Text Notes</b> toolbar at the top of the field. (See <i>Using Enterprise Architect - UML Modeling Tool</i> .)

### 2.2.26.2 Diagram Tab

The **Diagram** tab of the diagram **Properties** dialog enables you to define the structure of the diagram.

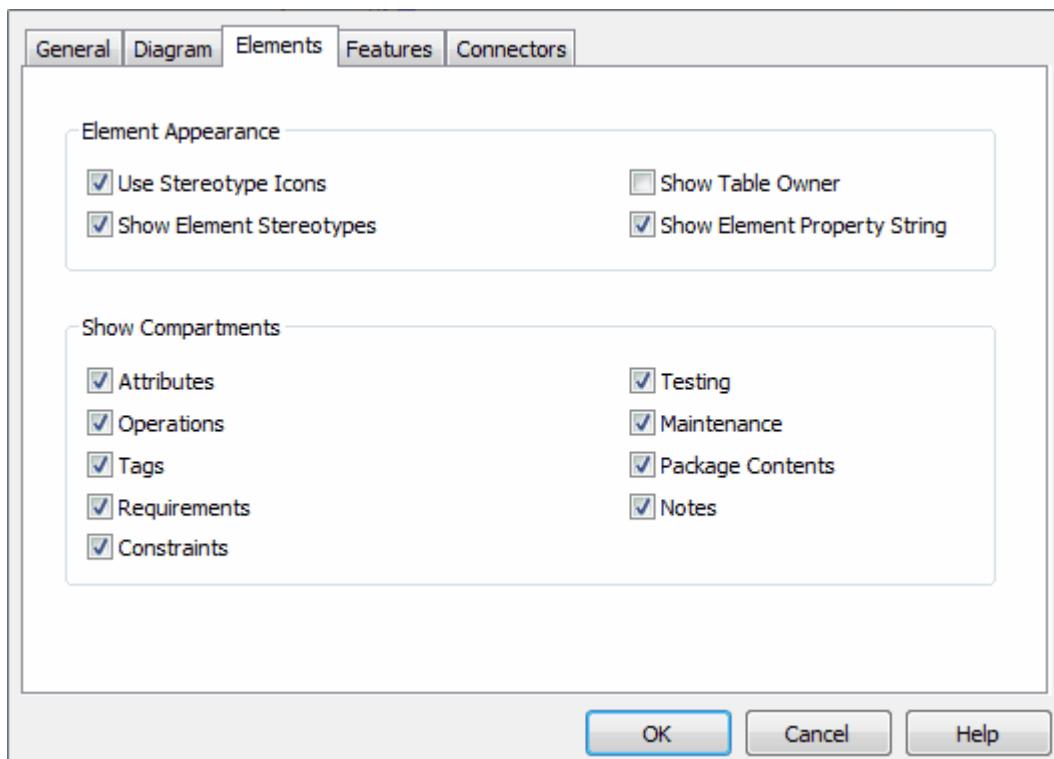


Field	Use to
<b>Use Alias if Available</b>	Display the element alias as the name if the alias is specified.
<b>Show Additional Parents</b>	Show the name of all parents not in the current diagram for all Classes and interfaces.
<b>Show Page Border</b>	Show a page border to align elements with.
<b>Show Diagram Details</b>	Show diagram details in a note in the top left corner of the diagram. (Deselect to hide the diagram details.)
<b>Show Sequence Notes</b>	Show the Sequence Notes on the current diagram.
<b>Show Namespace</b>	Show the namespace of each element on the diagram, under the element; that is, <i>PackageName::ElementName</i> .
<b>Always Open as Element List</b>	Always display the diagram contents as an <b>Element List</b> rather than as a diagram. See <i>Using Enterprise Architect - UML Modeling Tool</i> .
<b>Page Setup</b>	See <a href="#">Scale Image to Page Size</a> .
<b>Print Page Header and Page Footer</b>	Add page headers and footers to a print-out of the diagram. The headers and footers are generated from the diagram characteristics, such as the name of the creator and the date of modification.
<b>RTF Document Options</b>	Options for generating RTF reports for a particular diagram. See <i>Report Creation in UML Models</i> .
<b>Exclude image from RTF documents</b>	Exclude this diagram image from any RTF document generated on the parent package or element.

Field	Use to
<b>Document each contained element in RTF</b>	<p>Include documentation on each element in the diagram, in any RTF document generated on the parent package or element.</p> <p>(Applies only in the <a href="#">Legacy RTF Report Generator</a>; for the extended RTF Report Generator, use the <a href="#">Generate RTF Documentation</a> dialog. See <a href="#">Report Creation in UML Models</a>.)</p>
<b>Divide Diagram into Multiple Pages</b>	<p>Divide each large diagram into separate pages in the RTF document.</p> <p><b>Note:</b> This option is only effective when the <a href="#">Scaled Printing option</a> [62] is set to <b>None</b> on the <a href="#">Print Advanced</a> dialog.</p>
<b>Rotate Images</b>	<p>Rotate each diagram image by 90 degrees in the RTF document.</p> <p><b>Note:</b> Only valid for bitmap (.bmp) images.</p>

### 2.2.26.3 Elements Tab

The **Elements** tab of the diagram [Properties](#) dialog enables you to define what components of the elements should be displayed on the diagram.

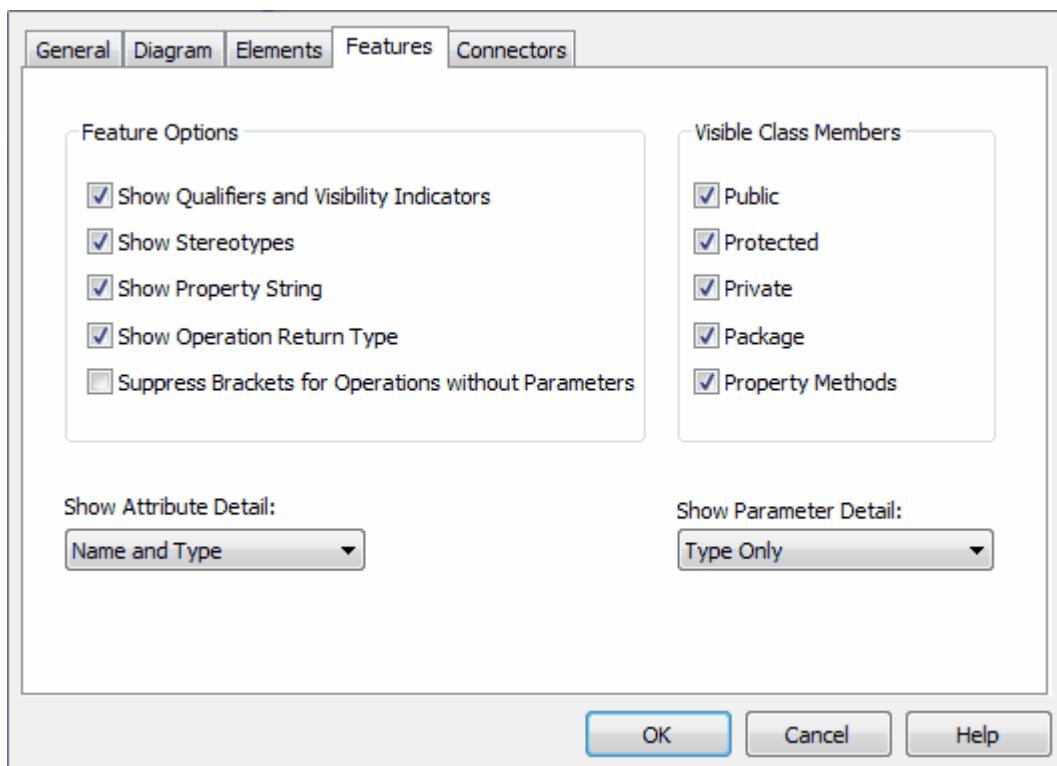


Field	Use to
<b>Use Stereotype Icons</b>	For elements that have whole shapes drawn by Enterprise Architect (such as Analysis stereotypes - see the <i>UML Dictionary</i> ), draw the alternative shape (if defined).

Field	Use to
	For elements that have an icon displayed in the top right corner, (such as an Artifact element - see the <i>UML Dictionary</i> ) if <b>Show Element Stereotypes</b> is selected, display the stereotype icon instead of the stereotype text.
<b>Show Element Stereotypes</b>	For elements that have whole shapes drawn by Enterprise Architect, if <b>Use Stereotype Icons</b> is deselected, display any stereotype on the element. For elements that have an icon displayed in the top right corner, indicate that a stereotype is present (icon if <b>Use Stereotype Icons</b> is selected, text if not).
<b>Show Table Owner</b>	Display the Table Owner. For more information, see the <i>Set Table Owner</i> topic in <i>Code Engineering Using UML Models</i> .
<b>Show Element Property String</b>	Show the advanced property string for all elements; for example, {leaf}.
<b>Show Compartments</b>	Enable the following compartments to be shown or hidden for any element using rectangle notation: <ul style="list-style-type: none"> <li>• Attributes</li> <li>• Operations</li> <li>• Tags (Tagged Values)</li> <li>• Requirements</li> <li>• Constraints</li> <li>• Testing (Testing Scripts) - see the <i>Testing</i> topic in <i>Project Management with Enterprise Architect</i></li> <li>• Maintenance (Maintenance Scripts) - see the <i>Maintenance</i> topic in <i>Project Management with Enterprise Architect</i></li> <li>• Package Contents</li> <li>• Notes.</li> </ul>

#### 2.2.26.4 Features Tab

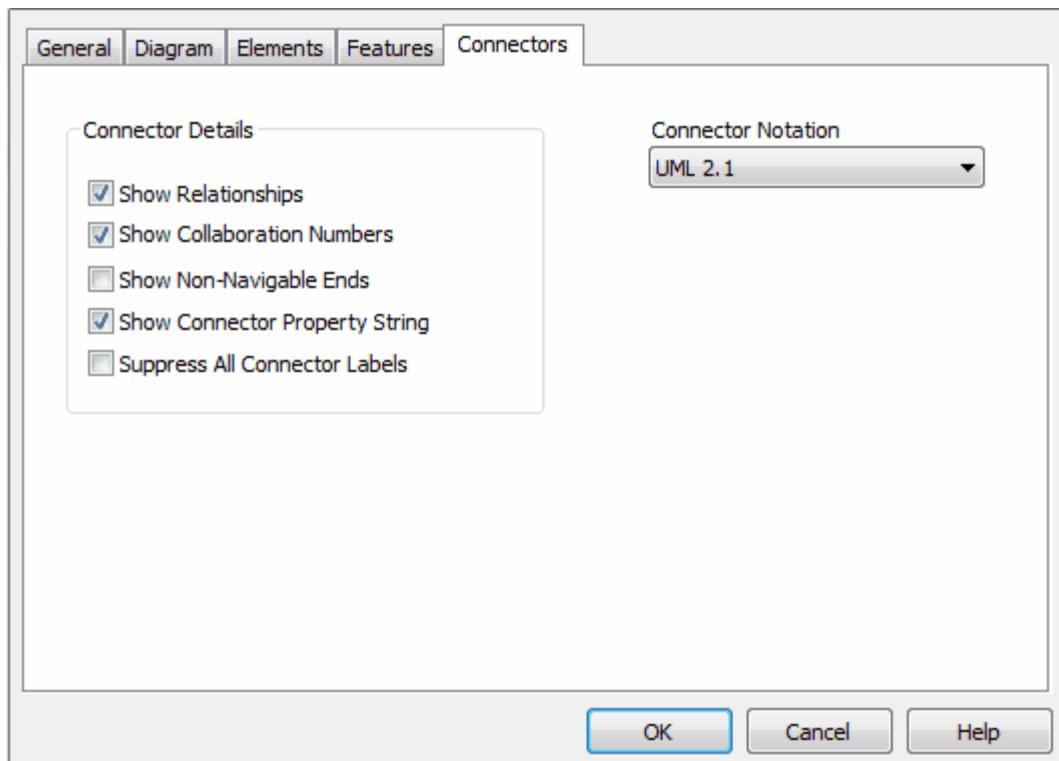
The **Features** tab of the diagram **Properties** dialog enables you to define the features of the diagram.



Field	Use to
Show Qualifiers and Visibility Indicators	Show or hide the qualifiers and visibility indicators on the diagram. <i>Qualifiers</i> include such things as the 'derived' symbol (/) and the public key symbol (PK). <i>Visibility indicators</i> include such things as +, -, # and ~, which indicate the scope of access of the item (such as an attribute, operation or role) - see the <i>Modeling Conventions</i> topic in <i>Code Engineering Using UML Models</i> .
Show Stereotypes	Show the stereotypes on all features.
Show Property String	Show the advanced property string for all element features, for example, {readOnly}.
Show Operation Return Type	Display the return data type of operations.
Suppress Brackets for Operations Without Parameters	Suppress brackets on operations that have no parameters; that is, <b>Opn</b> ; rather than <b>Opn();</b>
Visible Class Members	Hide Class members according to their scope and methods that specify properties. See the <a href="#">Visible Class Members</a> topic.
Show Attribute Detail	Select whether to show both the attribute name and type or the attribute name only.
Show Parameter Detail	Control the display of method parameters. See the <a href="#">Visible Class Members</a> topic.

### 2.2.26.5 Connectors Tab

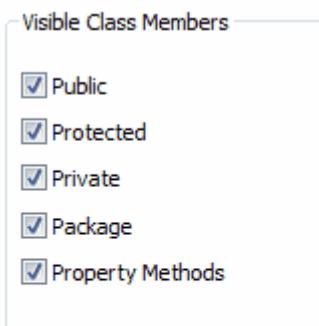
The **Connectors** tab of the diagram **Properties** dialog enables you to define the appearance of the connectors on the diagram.



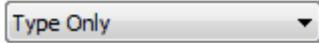
Field	Use to
Show Relationships	Show relationships in the current diagram.
Show Collaboration Numbers	Show numbering in Communication diagrams.
Show Non-Navigable Ends	Indicate when an Association end is not navigable; a cross is presented at the Association connector.
Show Connector Property String	Show the property string for connectors.
Suppress All Connector Labels	Hide all connector labels.
Connector Notation	Display the required connector notation: <ul style="list-style-type: none"> <li>• <b>UML 2.1</b> - use the standard UML 2.1 notation for connectors</li> <li>• <b>Information Engineering</b> - use the Information Engineering (IE) connection style; for more information see the <a href="http://www.agiledata.org/essays/dataModeling101">http://www.agiledata.org/essays/dataModeling101</a> page</li> <li>• IDEFX1 - use the Integrated Definition Methods IDEFX1 connection style; for more information see the <a href="http://www.idef.com/IDEF1X.html">http://www.idef.com/IDEF1X.html</a> page.</li> </ul>

### **2.2.26.6 Visible Class Members**

On the **Features** tab of the diagram **Properties** dialog, the **Visible Class Members** panel enables you to hide Class members by their scope and methods that specify properties. Use the checkboxes to define the visibility of Class members.



Show Parameter Detail:



## Show Parameter Detail

The **Show Parameter Detail** field enables you to control the display of method parameters with the following options:

Option	Effect
<b>None</b>	No details shown.
<b>Type Only</b>	Shows the type of parameter only.
<b>Full Details</b>	Shows all of the details for parameters.
<b>Name Only</b>	Shows the name of the parameter only.

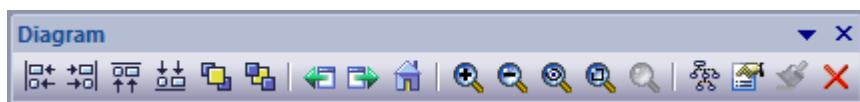
### **2.2.27 Set the Default Diagram**

A project might have a default diagram. If set, this diagram loads when Enterprise Architect first opens the model. It is often convenient to place hyperlinks to other diagrams and resources on the default diagram, thus creating a Home Page for your model.

To set the currently active diagram as the model default, select the **Diagram | Make Model Default** menu option - see the *Diagram Menu* topic in *Using Enterprise Architect - UML Modeling Tool*. (Also use this option to cancel the default setting.)

### **Tip:**

Once you have specified a default diagram, the **Home** icon on the **Diagram** toolbar takes you back to that diagram from your current location in the model.



### 2.2.28 Create Legends

A *Legend* shape identifies colors and styles you have used to group other elements on the diagram. You can use the Legend to assist in distinguishing different elements, connectors or systems on the diagram. For example, the Legend could show that all elements concerned with the management system are shaded in blue, and all outcomes connectors are shown in red. The Legend displays as a key to the diagram, with the filled shape styles first and the lines and connector styles underneath.

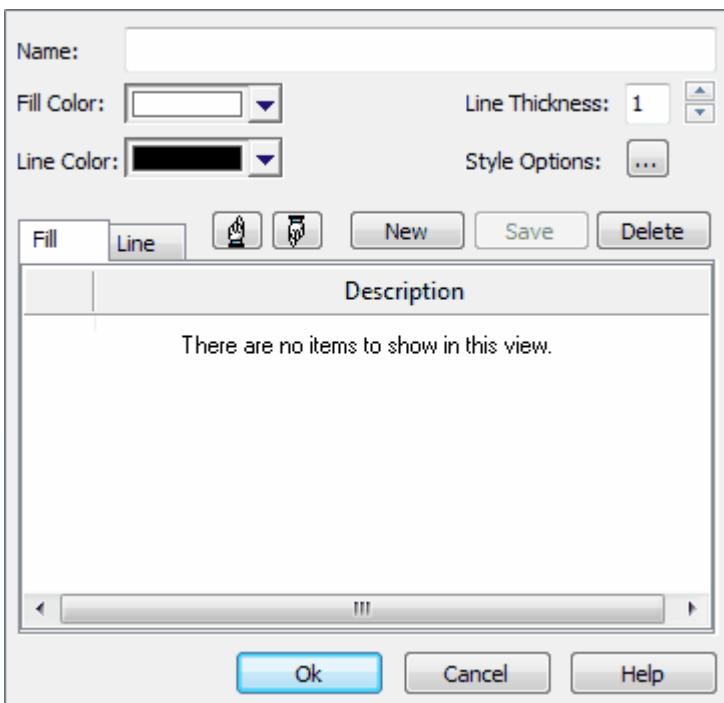


You add a Legend to the diagram, then edit it to add Legend elements, which define the colors and styles used in the diagram.

#### Add a Legend

To add a Legend to a diagram, drag the *Diagram Legend* element from the **Common** page of the Enterprise Architect UML **Toolbox** onto the diagram (or click on the **New Diagram Legend** icon (  ) on the **UML Elements** toolbar, and click on the diagram).

The **Legend** dialog displays.



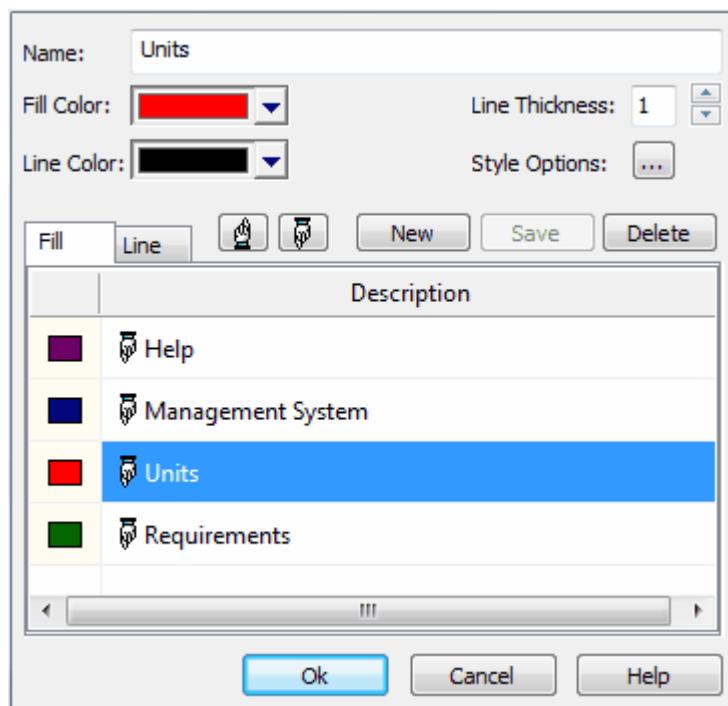
Click on the **OK** button. The Legend displays on the diagram as a simple rectangle.

## Legend

### Edit a Legend

To edit the Legend follow the steps below:

1. Either:
  - Double-click on the Legend, or
  - Right-click on the Legend and select the **Properties** context menu option.The **Legend** dialog displays.



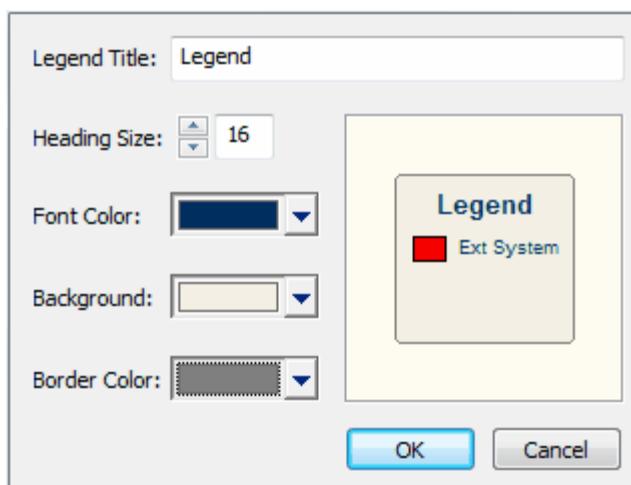
#### Note:

The **Legend** dialog enables you to add, delete, modify or re-sequence Legend elements. Use the **Fill** tab to define the Legend elements for shapes, then click on the **Line** tab to define Legend elements for lines and connectors.

2. In the **Name** field, type the name of the Legend element; for example, **Management System** or **Help**.
3. Use the drop-down arrows to select the fill color, line color and line thickness for the Legend element.
4. Click on the **Save** button to save the Legend element. The element displays in the **Fill** or **Line** tab, as appropriate.
5. Click on the **New** button to add another Legend element.

### Style Options

Click on the **Style Options** button [...] to display the **Style Options** dialog, on which you can modify a Legend title, font size, background color and border color. If you choose default options for the colors, the Legend automatically assumes colors based on the diagram background color.



Click on the **OK** button on the [Style Options](#) dialog and again on the [Legend](#) dialog. The Legend displays on the diagram.

### 2.2.29 Scale Image to Page Size

When you print a diagram (see [Using Enterprise Architect - UML Modeling Tool](#)), the default setting is to scale the image to fit the size of the printer paper you have defined in the page set-up. The image is not scaled up to fill the page, but it is scaled down if it exceeds the current page boundary. The image retains its current proportions; that is, it is scaled down equally in the X and Y dimensions. For a large diagram, this can mean that the components of the diagram are small and hard to read.

Alternatively, you can print a multi-page image; that is:

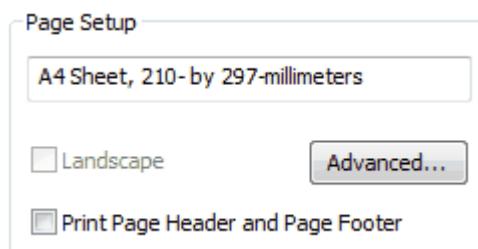
- allow the diagram image to print on as many printer pages as it naturally occupies, (no scaling), or
- scale the diagram image to exactly fit a specified number of pages.

In all three cases you also define the paper size and orientation.

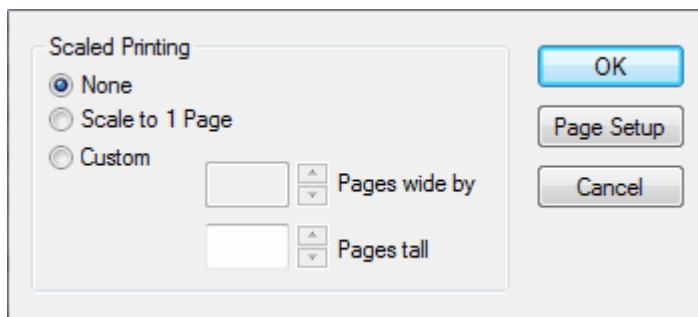
### Scale Images

To turn off or customize image scaling options, follow the steps below:

1. Select the diagram to scale.
2. Double-click on the diagram background to display the [Diagram: <name>](#) dialog, or right-click on the background and select the **Properties** context menu option.
3. Click on the **Diagram** tab and, in the [Page Setup](#) panel click on the **Advanced** button.



The [Print Advanced](#) dialog displays.



From the **Print Advanced** dialog the following options are available:

- **None:** select to print on as many pages as the diagram image covers
- **Scale to 1 page:** select to scale the diagram image to fit on the currently selected page
- **Custom:** select to specify the width and height of the diagram images across a specified number of pages
- **Page Setup:** click to select the [page size and alignment](#)<sup>63</sup>.

**Note:**

Before printing, make sure you have selected the required page layout using the **Page Setup** button.

### 2.2.30 Set Diagram Page Size

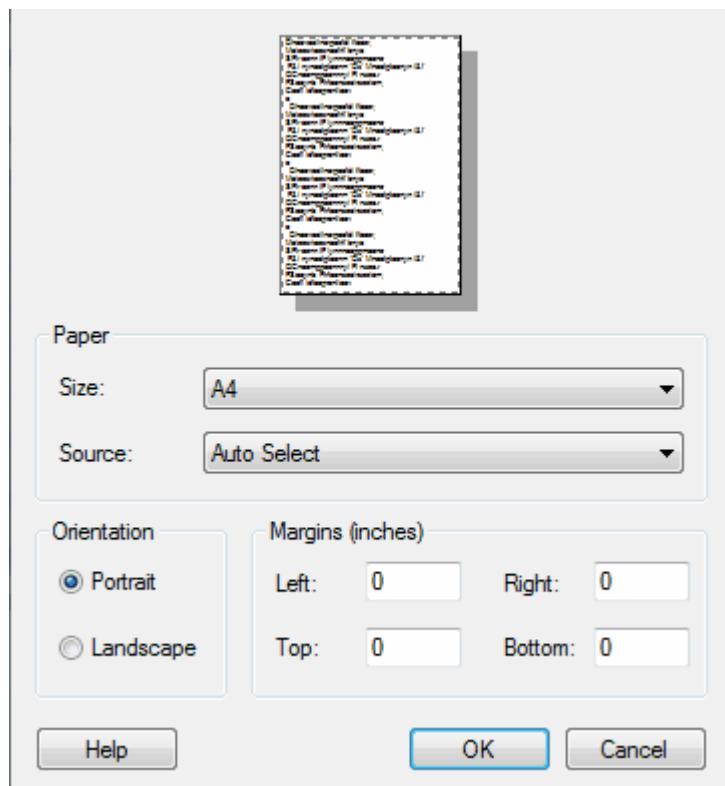
You can change the size of the diagram area (or scrollable/printable area) using the **Diagram Properties** dialog.

**Note:**

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Update Diagrams** permission to change diagram page setup. See *User Security in UML Models*.

To set the page size, follow the steps below:

1. Load a diagram.
2. Double-click on the background to open the **Diagram Properties** dialog.
3. Click on the **Diagram** tab and, in the **Appearance** panel ensure that the **Show Page Border** checkbox is selected.
4. On the **Page Setup** panel, click on the **Advanced** button. The **Print Advanced** dialog displays.
5. Click on the **Page Setup** button. The **Page Setup** dialog displays.



#### Note:

As you adjust the settings on this dialog, the page icon at the top illustrates the effects of your changes.

6. In the **Size** field, click on the drop-down arrow and select an appropriate page size.
7. In the **Orientation** panel click on the radio button for the orientation of the page to print.
8. In the **Margins** panel, type the required left, right, top and bottom page margins for the diagram, in inches.
9. Click on the **OK** button on the **Page Setup** dialog, the **Print Advanced** dialog, and the **Diagram Properties** dialog.

The area within the page boundary lines on your diagram is expanded or reduced accordingly. When you print or print preview, the output is cropped to these boundary lines and the diagram divided between the necessary number of pages.

### Setting the Default Paper Size for New Diagrams

You can set the default paper size for new diagrams on the **Diagram** page of the **Options** dialog (select the **Tools | Options | Diagram** menu option). Once the paper size is set there, all new diagrams have that as the default size.

See the *Configure Local Options - Diagram* topic in *Using Enterprise Architect - UML Modeling Tool*.

### 2.2.31 Pan and Zoom a Diagram

#### Pan

Pan the **Diagram View** in the following ways:

- Use [**←**], [**→**], [**↑**], [**↓**], [**Page Up**], [**Page Down**], [**Home**] and [**End**] when the **Diagram View** is selected
- Use the scrollbars
- Use the middle mouse button
- Use the **Pan & Zoom** window - see the **Pan & Zoom Window** topic in *Using Enterprise Architect - UML*

*Modeling Tool.*

### Zoom

You can zoom into and out from a diagram using the zoom buttons on the diagram toolbar, or by using the **Diagram | Zoom** submenu.



Change the zoom level by 10% by clicking on either the **Zoom In (+)** or **Zoom Out (-)** buttons. Alternatively, select the **Zoom In** or **Zoom Out** options from the **Diagram | Zoom** submenu.



There are three ways to return the diagram to 100%:

- Click on the button
- Select **Zoom to 100%** from the **Diagram | Zoom** submenu
- **[Ctrl]+middle-click** the mouse.

#### Tip:

You can zoom in and out of the main window dynamically by holding **[Ctrl]** and rolling the mouse wheel.

#### Note:

- Changes in diagram magnification through the zoom options can be saved as permanent changes to the diagram.
- At high levels of zoom, element features cease to display. This is because of the difficulty the Windows font mapper has in choosing a font for extreme conditions, and the result can look odd.

## 2.2.32 Move Elements In Diagram Sections

As you build up a diagram, you might find that you need to move part of the diagram up, down or to one side. You can do this in one of two ways:

- Hold the left mouse button down and drag over a group of elements to move (creating an outline around the elements), then click on an element in the outline and move the group as required
- Press **[Alt]** and click on the diagram, then drag the cursor to move everything beyond the cursor in the direction of the movement.

The first method enables you to reposition groups of elements within the larger diagram. The second method enables you to create space within the diagram without pushing some elements into others, as might happen if you cannot see the whole diagram on one screen.

When you press **[Alt]** and click on the diagram, as you move the cursor a line displays on the diagram just behind the cursor. If you are moving the cursor left, everything to the left of the line moves with the cursor. If you move the cursor up, everything above the line moves up.

However, if you move the cursor diagonally, two lines display to create a quadrant, and everything within the quadrant moves. For example, if you move the cursor left and down, everything below and left of the cursor moves.

### Fine Movement

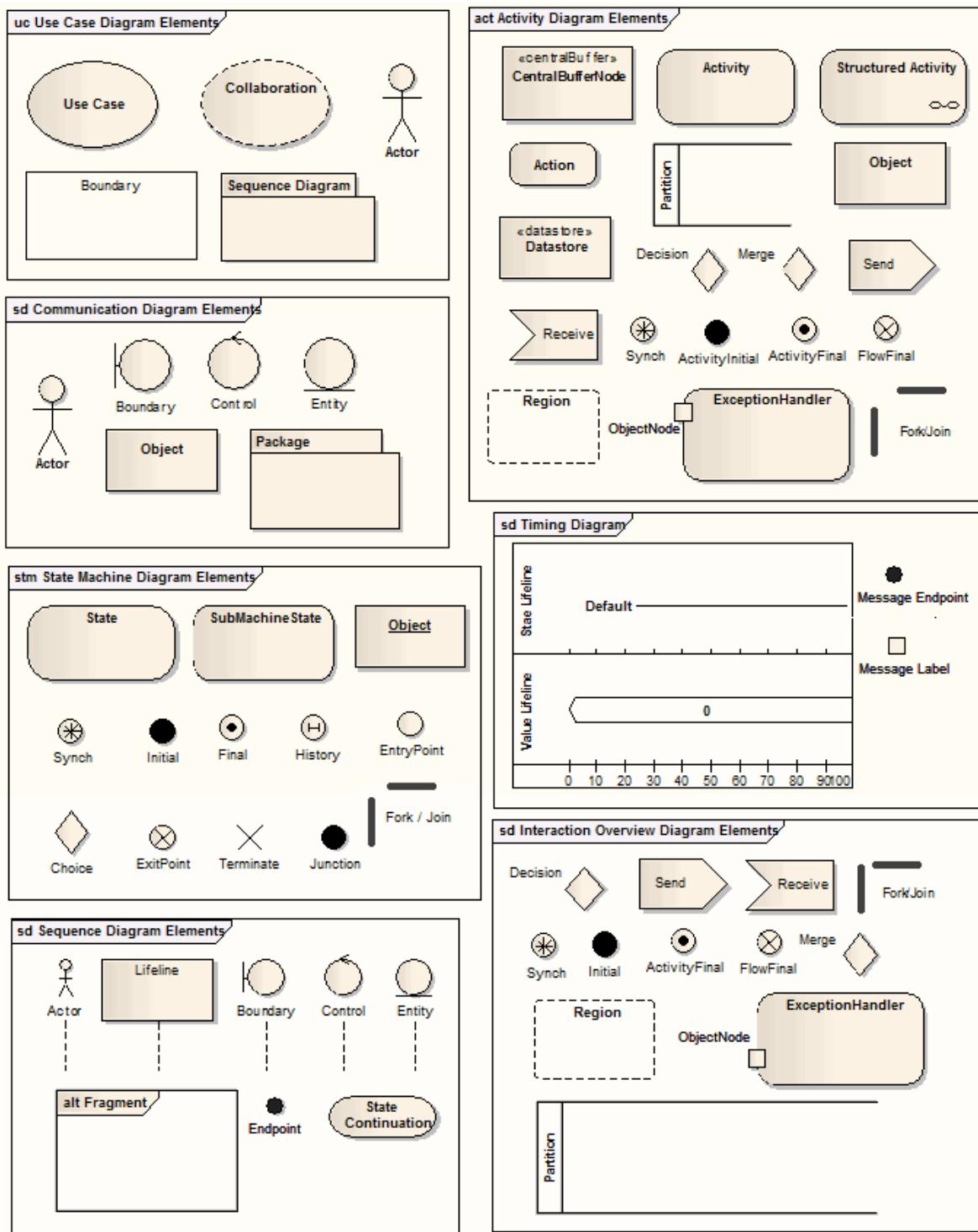
To adjust (or 'nudge') the position of a single element or a selected group of elements, press **[Shift]+[→], [←], [↑], [↓]**.

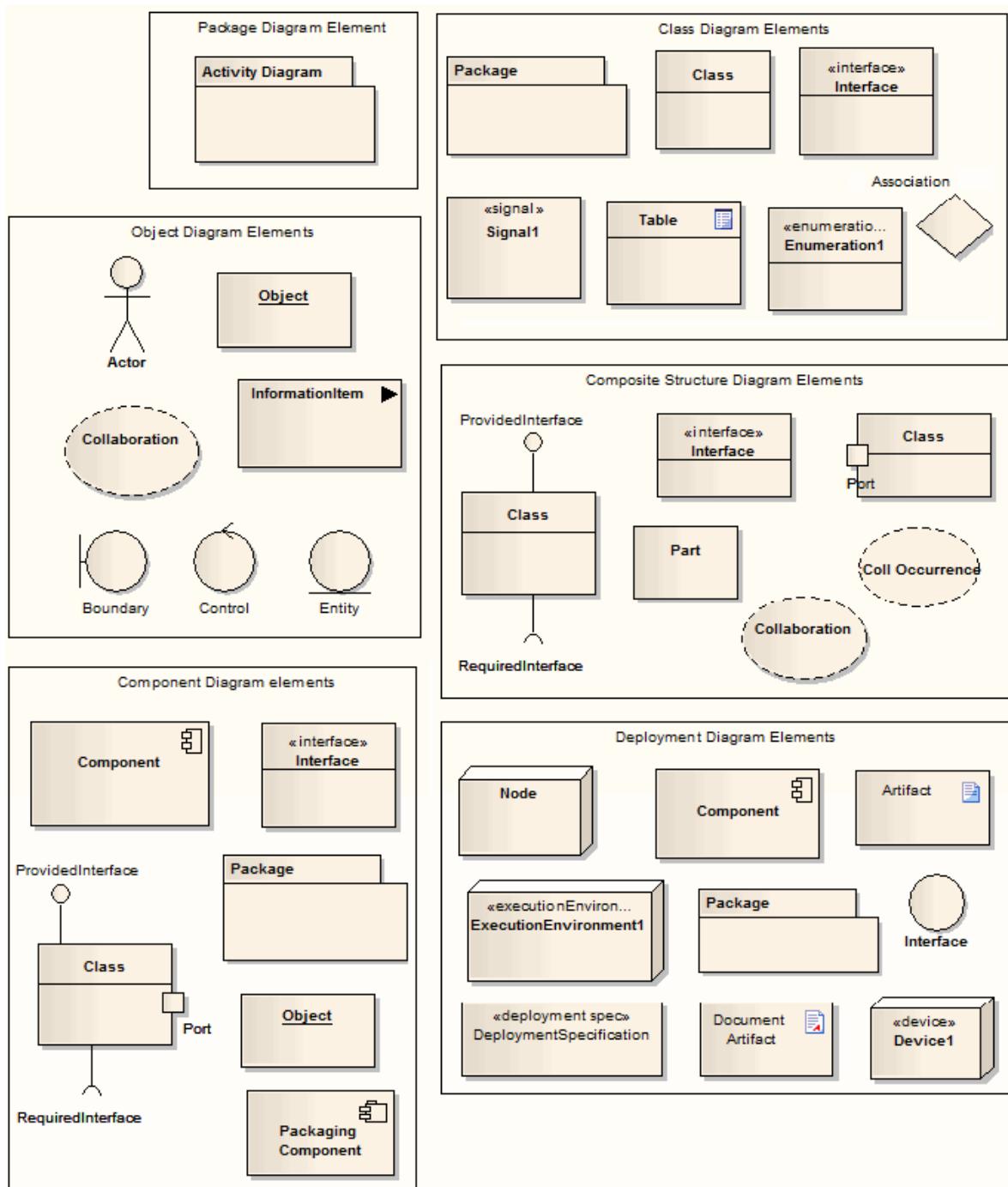
[↑] or [↓].

### 3 Work With Elements



UML Models are constructed from elements, each of which has its own meaning, rules and notation. Elements can be used at different stages of the design process for different purposes. The basic elements for UML 2.1.1 are depicted in the following diagrams:





### 3.1 Element Context Menu

Right-click on a single element in a diagram to open the element context menu. If two or more elements are selected, a different, [multiple selection context menu](#) [79] is displayed.

The element context menu is split into a number of sections and submenus:

- [Properties](#) [70]
- [Add](#) [73]
- [Find](#) [74]
- **Transform [Ctrl]+[H]** - Transform the selected element from one domain to another (see the *Transform*

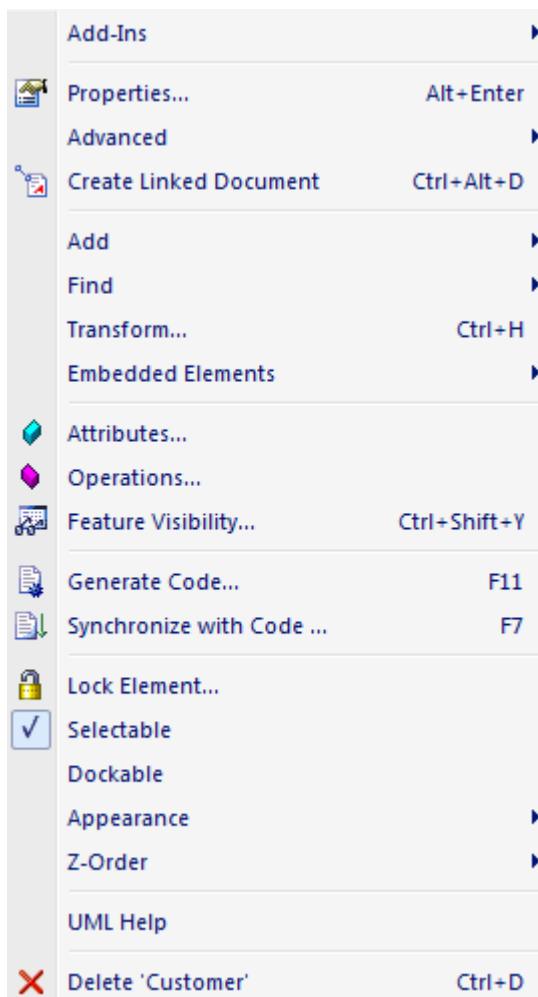
*Elements topic in the MDA Transformations User Guide)*

- [Embedded Elements](#) 
- [Features](#) 
- **Generate DDL** - Generate DDL for a table, procedure or view Class (see the [Generate DDL](#) topic in [Code Engineering Using UML Models](#))
- [Code Engineering](#) 
- [Appearance](#) 
- **UML Help** - display the Enterprise Architect Help topic for the UML element type
- **Delete [Ctrl]+[D]** - delete the element.

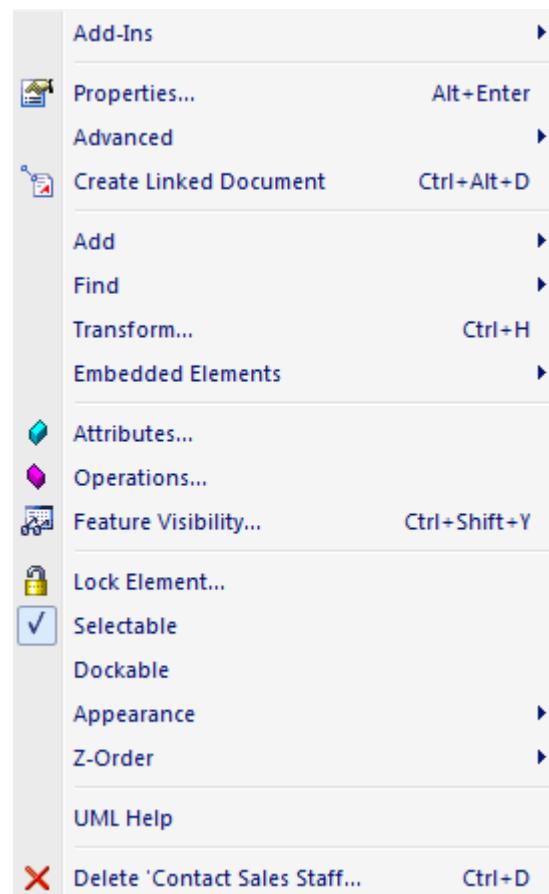
**Note:**

Context menus vary between element types. The **Code Engineering** options won't display for a Use Case element, for example.

**Example Context Menu for a Class:**



**Example Context Menu for an Activity:**



### 3.1.1 Properties Menu Section

The **Properties** section of the element context menu can contain the following options:

Menu Option & Function Keys	Use to
<b>Properties</b> [Ctrl]+[Enter]	Open the <a href="#">Properties dialog</a>  for the selected element.

Menu Option & Function Keys	Use to
	For State Lifeline and Value Lifeline elements, display the <a href="#">Configure Timeline</a> dialog. See the <i>UML Dictionary</i> .
<b>Advanced</b>	Open the <a href="#">Advanced</a>  sub-menu.
<b>Rule Composer</b>	For a Rule Task element, invoke the <a href="#">Rule Composer</a>  tab in Business Rule Modeling. (See <i>Extending UML in Enterprise Architect</i> .)
<b>Other Properties</b>	For State Lifeline and Value Lifeline elements, display the <a href="#">Properties dialog</a>  for the selected element.
<b>Create (or Edit) Linked Document [Ctrl]+[Alt]+[D]</b>	(Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions) <a href="#">Create</a>  an RTF document linked to the element.
<b>Delete Linked Document</b>	Delete an existing linked document for the element.

### 3.1.1.1 Advanced Submenu

The **Advanced** submenu on an element context menu can contain the options listed in the table below.

#### Notes:

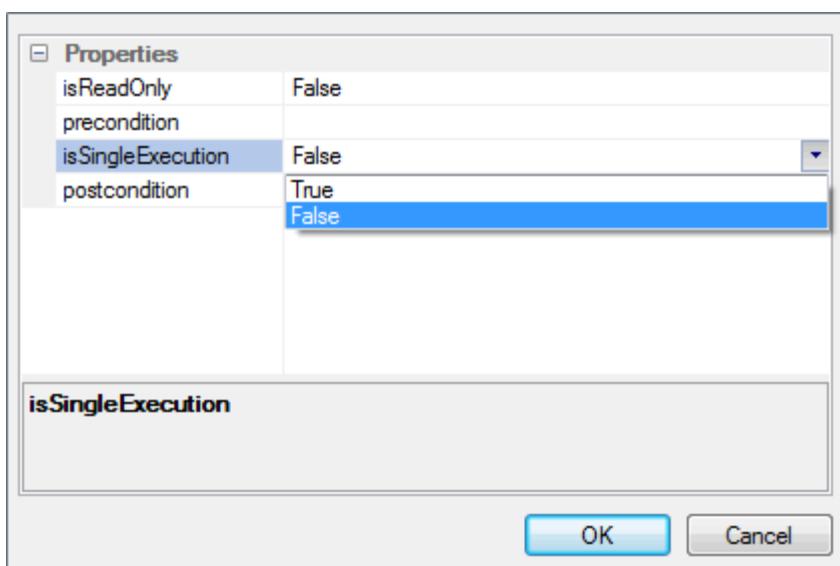
- Context menus vary between element types. Not all menu options shown here are present on all element context menus; for example, the **Partition Activity** option only displays for an Activity element.
- If an element appearance is overridden by a Shape Script (see *UML Model Management*), several of the appearance options are disabled; for example, **Use Rectangle (Circle) Notation**.

Menu Option & Function Keys	Use to
<b>Custom Properties [Ctrl]+[Shift]+[Enter]</b>	Open the <a href="#">Custom Properties</a>  dialog.
<b>Parent [Ctrl]+[I]</b>	<a href="#">Set the element parent</a>  .
<b>Instance Classifier [Ctrl]+[L]</b>	Set the <a href="#">instance classifier</a>  for the element, on the <a href="#">Select &lt;Item&gt;</a> dialog.
<b>Classifier Properties [Ctrl]+[Alt]+[Enter]</b>	Open the <a href="#">Properties</a>  dialog for the <i>classifier</i> of the selected element.
<b>Make Composite</b>	Set the element as a Composite element. See <i>The UML Dictionary</i> .
<b>Change to State (Value) Lifeline</b>	Switch one type of Lifeline element to the other.
<b>Show Composite Diagram</b>	Display a mini-picture of the contents of a composite element within that element.
<b>Multiplicity</b>	Define the multiplicity for the element, using the format defined on the <a href="#">Cardinality</a> tab. (See <i>UML Model Management</i> .)  This is the number of instances of the element that can exist in a set. The value displays on the element in a diagram, in the <i>Name</i> compartment.
<b>Edit Extension Points</b>	For an extended Use Case, display the <a href="#">Use Case Extension Points</a> dialog, which you use to insert the point at which the behavior should be inserted. See <i>The UML Dictionary</i> .

Menu Option & Function Keys	Use to
<b>Association Class</b>	Connect the Class to a new Association (if the element is a Class). See <i>The UML Dictionary</i> .
<b>Use Rectangle (Circle) Notation</b>	Use rectangle notation for the element. See <i>The UML Dictionary</i> .
<b>Partition Activity</b>	Define an Activity Partition. See <i>The UML Dictionary</i> .
<b>Set Run State</b>	Add a new instance variable to the element using the <b>Define Run State</b> dialog. See <i>The UML Dictionary</i> .
<b>Set Property Value</b>	(Part elements) Set the property value for the Part, using the <b>Set Property Values</b> dialog.
<b>Override Attribute Initializers</b> <b>[Ctrl]+[Shift]+[R]</b>	Pre-define initial values for attributes that can be used to override existing defaults.
<b>Convert to Instance (Property)</b>	Convert this classifier to an instance or a property, depending on the type of classifier selected (for example, SysML classifiers are always converted to properties).
<b>Convert Linked Element To Local Copy</b>	Convert the occurrence of the element on this diagram from a link to the original element to a local copy of the element.
<b>Make Sender/Receiver</b>	Toggle the element from a sender to a receiver and vice versa.
<b>Accept Time Event</b>	Change the notation for an Accept Event action to an Accept Time Event action.
<b>Set Object State</b> <b>[Ctrl]+[Shift]+[S]</b>	Set the state of an object-instance based on the child states of its classifier. See <i>The UML Dictionary</i> .
<b>Define Concurrent Substates</b>	Define a set of substates that can be held simultaneously within that composite state. See <i>The UML Dictionary</i> .
<b>Use State Label Notation</b>	Display State Label Notation for a State object (the element name is displayed on a box on top of the element rather than inside it).
<b>Deep History</b>	Change the type of pseudo-state to a Deep History. Applies only when right-clicking on a History pseudo-state.
<b>Set Attached Links</b>	<a href="#">Attach the selected Note element</a> to a connector, or several connectors.
<b>Link to Diagram Note</b>	Display the diagram notes as the Note element text. The option simply deletes any current text and blocks the Note from being edited other than through the <b>Notes</b> field in the diagram <b>Properties</b> dialog.

### 3.1.1.2 Custom Properties Dialog

Certain elements and connectors feature the **Custom Properties** option in their context menu. The following example shows the **Custom Properties** dialog for an Activity element. Properties differ between the various types of element or connector.



As shown above, you can change the values of properties either by selecting the value from the property's drop-down list or by typing the value in the field to the right of the property.

### 3.1.2 Add Submenu

The **Add** submenu enables you to add supporting elements and diagrams to the selected element.

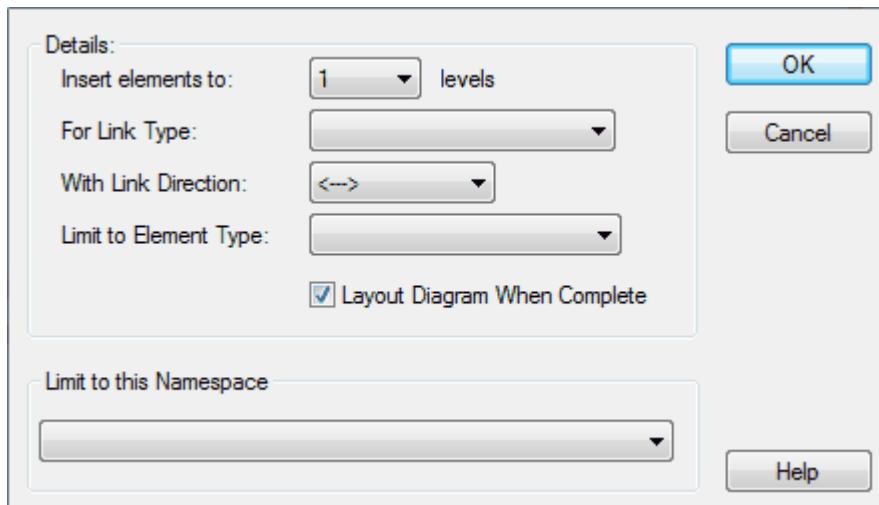
Menu Option	Use to
Tagged Value	<a href="#">Add a Tagged Value</a> <sup>[147]</sup> .
Related Elements	Open the <a href="#">Insert Related Elements</a> <sup>[74]</sup> dialog.
Note	Create and attach a blank <a href="#">Note</a> <sup>[95]</sup> element to the current element.
Constraint	Create and attach a blank Constraint element to the current element. See <i>The UML Dictionary</i> .
Activity	Add an Activity element as a child of the current <a href="#">Classifier</a> <sup>[148]</sup> element, with either an Activity diagram or an Interaction Overview diagram. See <i>The UML Dictionary</i> .
Interaction	Add an Interaction element as a child of the current Classifier element, with either a Sequence diagram, a Communication diagram or a Timing diagram. See <i>The UML Dictionary</i> .
State Machine	Add a State Machine element as a child of the current Classifier element, with a State Machine diagram. See <i>The UML Dictionary</i> .
RuleFlow activity	For a Class element, create a <a href="#">Rule Flow Activity</a> <sup>[242]</sup> element with a child Rule Flow diagram, as a behavior for the Class. See <i>Extending UML in Enterprise Architect</i> .
Add Diagram	Add a child diagram to the Classifier element, using the <a href="#">New Diagram</a> <sup>[13]</sup> dialog.

**Note:**

Not all menu options shown here are present on all element context menus. Context menus vary between element types. The options relating to Classifiers, for example, are not available for Object elements.

### 3.1.2.1 Insert Related Elements

The **Insert Related Elements** dialog can be accessed from the **Add | Related Elements** option on most element context menus. This dialog enables you to insert connected elements from elsewhere in the model into the current diagram.



You can specify the following details:

Option	Use to
<b>Insert elements to: «x» levels</b>	Select the level down to which to insert connected elements, between levels 1 and 5. You can select levels 4 or 5 to see how far the element/relationship hierarchy extends, but as this can produce a complicated and tangled diagram, it is better to use level 1 or 2 on selected elements in turn.
<b>For Link Type</b>	Select a type of connector to limit the inserted elements to those connected by that relationship type.
<b>With Link Direction</b>	Select whether the connectors are to be a single direction or bi-directional.
<b>Limit to Element Type</b>	Select a type of element to limit the inserted elements to those of that element type.
<b>Layout Diagram When Complete</b>	Select whether Enterprise Architect should layout the diagram after the elements have been inserted. The layout applied is the <a href="#">Digraph</a> layout.  <b>Note:</b> If no elements have been added, this option has no effect. Elements have to be added for Enterprise Architect to adjust the layout.
<b>Limit to this Namespace</b>	Select a specific namespace from which the inserted elements are to come.

### 3.1.3 Find Submenu

The **Find** submenu on the element context menu can contain the following options:

Menu Option & Function Keys	Use to
<b>In Project Browser [Alt]+[G]</b>	Highlight the currently selected element in the <a href="#">Project Browser</a> .

Menu Option & Function Keys	Use to
Locate Classifier In Project Browser [Ctrl]+[Alt]+[G]	Highlight the classifier for the currently-selected object, in the <b>Project Browser</b> .
Locate Operation in Project Browser [Ctrl]+[Alt]+[G]	Highlight the call operation for the currently-selected Activity, in the <b>Project Browser</b> . See the <i>UML Dictionary</i> .
In Diagrams [Ctrl]+[U]	Open the <a href="#">Element Usage</a> [85] dialog.
Custom References [Ctrl]+[J]	Set up <a href="#">Cross References</a> [86].
Add to Favorites	Add the element to the Favorites folder in the <b>Resources</b> window. See the <i>Favorites</i> topic in <i>Using Enterprise Architect - UML Modeling Tool</i> .

### 3.1.4 Embedded Elements Submenu

The **Embedded Elements** submenu on the element context menu can contain the following options:

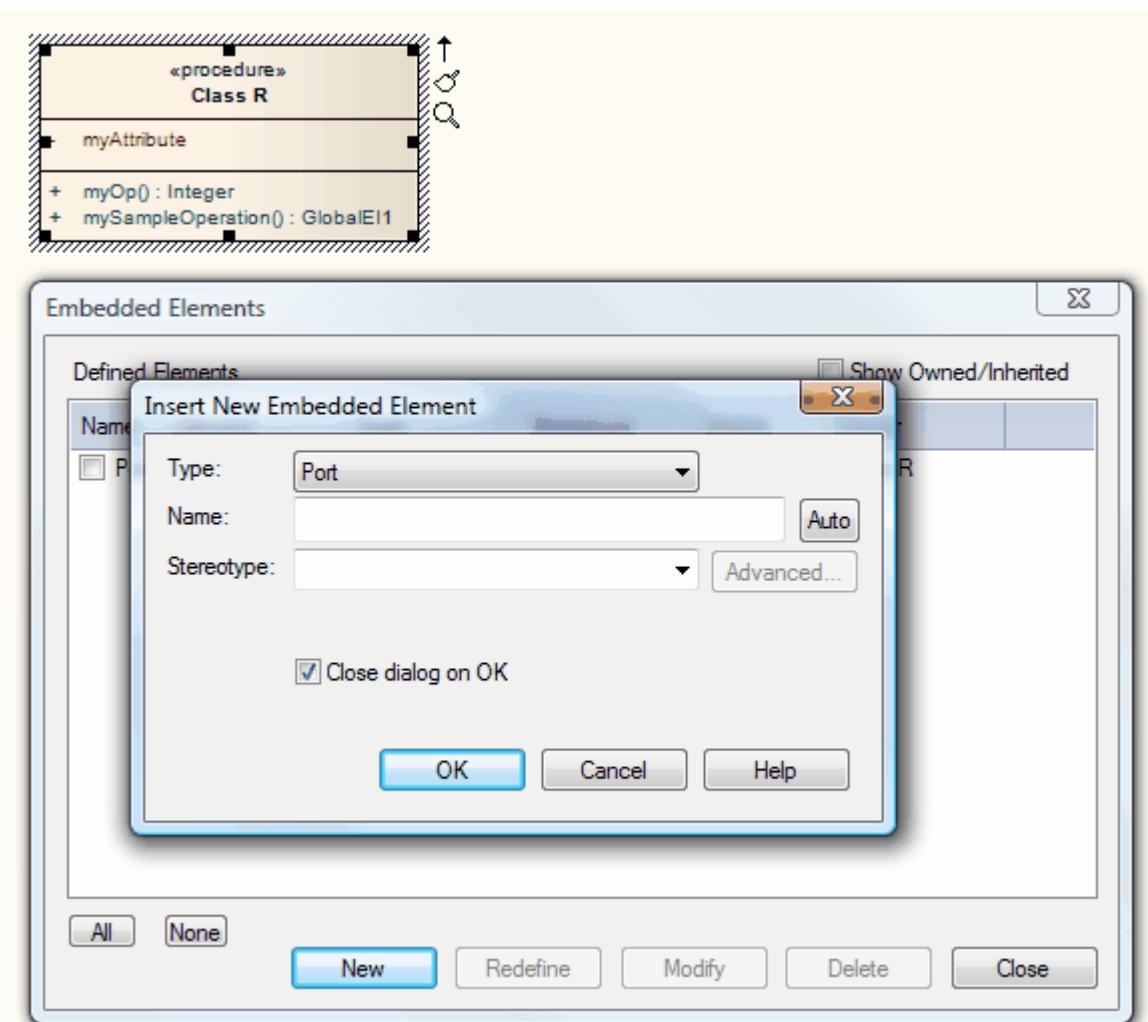
Menu Option	Use to
Add Port	Add an embedded Port to the element.
Add Required Interface	Add an embedded Required Interface to the element.
Add Provided Interface	Add an embedded Provided Interface to the element.
Add Action Pin	Add an embedded Action Pin to the element.
Add Expansion Node	Add an embedded Expansion Node to the element.
Add Object Node	Add an embedded Object Node to the element.
Add Activity Parameter	Add an embedded Activity Parameter to the element.
Add Entry Point	Add an embedded Entry Point to the element.
Add Exit Point	Add an embedded Exit Point to the element.
Embedded Elements	Open the <a href="#">Embedded Elements</a> [75] window.
Show Realized Interfaces	Display each interface <a href="#">directly realized</a> [49] by a Class.
Show Dependent Interfaces	Display each dependency relationship for that model element as a lollipop style node attached to its left-hand side.

**Note:**

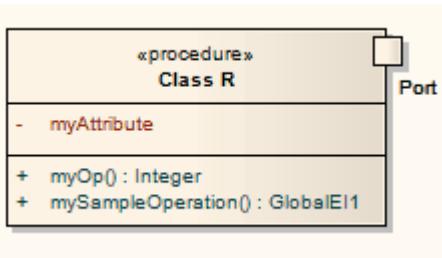
Not all menu options shown here are present on all element context menus. Context menus vary slightly between element types. Of the **Add** options, only **Add Port** displays for a Class element, for example.

#### 3.1.4.1 Embedded Elements Window

The **Embedded Elements** dialog enables you to embed particular elements into other elements. For example, a Port can be embedded into a Class. The **Embedded Elements** option is available on the context menu of some elements.



In the **Embedded Elements** dialog, click on the **New** button to create a new embedded element. Enter details such as type, name and stereotype, and click on the **OK** button. The embedded element now shows on the primary element as shown below.



You can add as many embedded elements as necessary. Modify or delete embedded elements using the **Embedded Elements** dialog.

To incorporate inherited or owner properties, select the **Show Owned/Inherited** checkbox.

The name of the embedded element is a label, which you can edit using the [Labels](#) context menu.

### 3.1.5 Features Menu Section

The **Features** section of the element context menu can contain the following options:

Menu Option & Function Keys	Use to
<b>Attributes</b>	Open the <a href="#">Attributes</a> [105] dialog.
<b>Operations</b>	Open the <a href="#">Operations</a> [155] dialog.
<b>Feature Visibility</b> [Ctrl]+[Shift]+[Y]	Open the <a href="#">Feature Visibility</a> [33] dialog.

**Note:**

Not all menu options shown here are present on all element context menus. Context menus vary slightly between element types. The **Attributes** and **Operations** options won't display for an Action element, for example.

### 3.1.6 Code Engineering Menu Section

The **Code Engineering** submenu on the element context menu can contain the following options:

Menu Option & Function Keys	Use to
<b>Generate Code</b> [F11]	Generate source code for the selected element (forward engineer). See <i>Code Engineering Using UML Models</i> .
<b>Synchronize With Code</b> [F7]	Reverse engineer source code for the selected element. See <i>Code Engineering Using UML Models</i> .
<b>View Source Code</b> [F12]	Open the source editor if a file exists for that selected element. See <i>Using Enterprise Architect - UML Modeling Tool</i> .
<b>Create Workbench Instance</b> [Ctrl]+[Shift]+[J]	Create a workbench instance for the <b>Debug Workbench</b> (if a debug command has been configured for the parent package). See <i>Visual Execution Analyzer in Enterprise Architect</i> .

**Note:**

Not all menu options shown here are present on all element context menus. Context menus vary slightly between element types. These Code Engineering options won't appear for a Use Case element, for example.

### 3.1.7 Appearance Menu Section

The **Appearance** section of the element context menu can contain the following options:

Menu Option	Use to
<b>Lock Element</b>	Lock the element so it can't be edited. To unlock the element, select <b>Lock Element</b> again.  <b>Note:</b> This does not apply in the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions when security is enabled; in that situation, see the <i>Lock model elements</i> topic in <i>User Security in UML Models</i> .
<b>Selectable</b>	Toggle whether the element is selectable or not. If an element is selectable, you

Menu Option	Use to
	<p>can move it around the diagram and perform right-click context menu operations.</p> <p>If an element is unselectable, you cannot move it around the diagram and the only right-click operation available is to make the element selectable.</p> <p>This option has no effect on double-click operations on the element, such as displaying child diagrams or <b>Properties</b> dialogs.</p> <p>Note that an element on a locked diagram is also unselectable - if you click on it, the element outline displays in red.</p>
<b>Dockable</b>	<p>Align and join two elements either vertically or horizontally, on the current diagram only.</p> <p>Both elements must have the <b>Dockable</b> option selected, and must have the joining edges parallel. As the distance between the elements narrows, the moving element snaps to the edge of the other element. For Activity Partitions, the option is selected by default. See <i>The UML Dictionary</i>.</p> <p>Deselecting the <b>Dockable</b> option does not separate the elements; if necessary, you can simply move the elements apart again.</p>
<b>Appearance</b>	Display the <b>Appearance</b> submenu; see the table below.
<b>Z-Order</b>	Set the <a href="#">Z-Order</a> of the element.

**Note:**

You can also change the appearance (and other aspects) of [several selected elements at once](#).

### Appearance Sub-Menu

Menu Option & Function Keys	Use to
<b>Default Appearance [F4]</b>	<p>Override the <i>global</i> default appearance of all elements (which you set on the <b>Options</b> dialog, <b>Standard Colors</b> page and <b>Diagram Appearance</b> page) with a different <a href="#">default for just the selected element</a> on all diagrams in which it is found.</p> <p>To change the appearance of the selected element on the <i>current diagram only</i>, use the <b>Format toolbar</b>. See <i>Using Enterprise Architect - UML Modeling Tool</i>.</p>
<b>Apply Image From Clipboard</b>	Paste the image held on the clipboard onto the selected element.
<b>Select Alternate Image [Ctrl]+[Shift]+[W]</b>	Select an alternative image using the <a href="#">image manager</a> .
<b>Hide/Show Name Under Image</b>	Hides or redisplays the name label under an element with an alternative image.
<b>Set Font</b>	Change the <a href="#">font</a> type, size, color and effects for the text in an element.
<b>Show Labels</b>	Reveal any hidden labels on the element.
<b>Copy Appearance to Painter</b>	Copy the default element appearance (set using the <b>Default Appearance</b> option, above) to the painter. You then paste the default appearance using the <b>Paste Appearance</b> option on the <b>Diagram toolbar</b> . See <i>Using Enterprise Architect - UML Modeling Tool</i> .
<b>Copy Image to Clipboard</b>	Copy the element image to the clipboard.

**Note:**

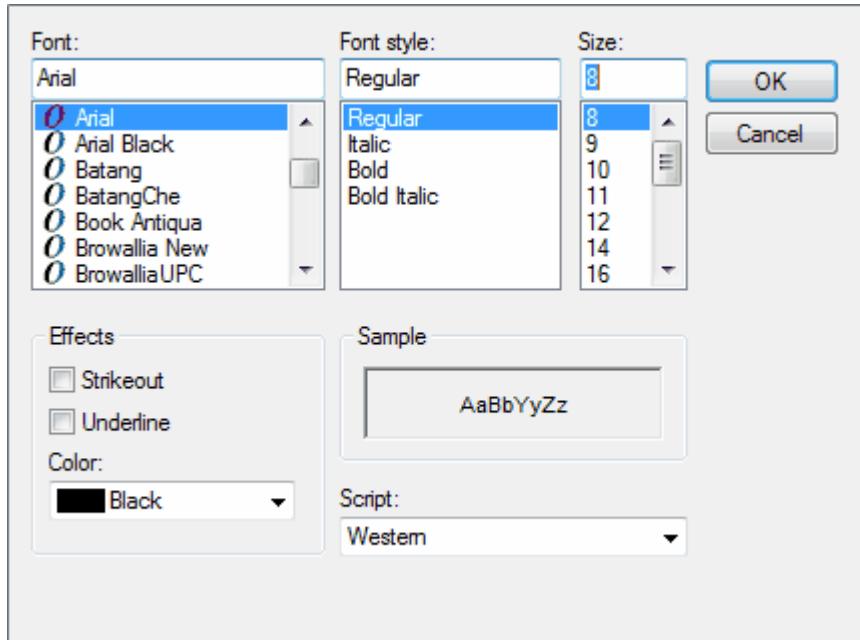
Not all menu options shown here are present on all element context menus. Context menus vary slightly between element types. The **Alternate Image** option won't display for a Lifeline element, for example.

### 3.1.7.1 Set Element Font

You can change the appearance of the text within an element, for one or more selected elements, by either:

- Selecting the **Appearance | Set Font** context menu option, or
- Selecting the **Font** icon on the **Format** toolbar. See *Using Enterprise Architect - UML Modeling Tool*.

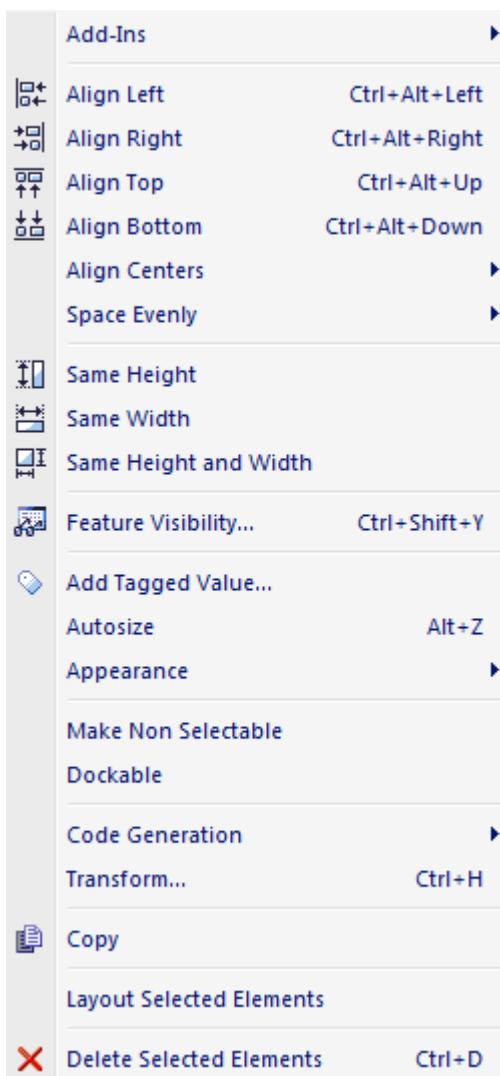
The **Font** dialog displays.



Select the font, style, size, color and effects, and (if necessary) the script type. Click on the **OK** button to save your changes.

### 3.1.8 Element Multiple Selection Menu

You can perform operations on two or more elements on a diagram at once. To select the required elements, either click and drag the cursor over the group to highlight them, or press **[Shift]** and click on each element. Right-click on an element to display the following context menu:



This menu enables you to do the following:

**Note:**

Where elements are made the same, they are matched to the element you right-clicked on.

- Align elements (by left edge, right edge, top, bottom, center in a column or center in a row)
- Space elements evenly (across or down)
- Standardize the dimensions of the selected elements
- Specify the [visibility of features](#) [33] for all selected elements
- Add the same Tagged Value to all selected elements - see the *Assign a Defined Tagged Value to an Item* topic in *Using Enterprise Architect - UML Modeling Tool*
- Automatically resize elements to match (element content permitting)
- Turn the [Dockable](#) [78] option on or off for all selected elements on a diagram
- Set the [default appearance](#) [96] and [font](#) [79] for multiple elements at once
- Make the selected elements on the diagram [non-selectable](#) [77]; to make them selectable again, right-click on the diagram and select the **Make All Elements Selectable** context menu option
- Generate code for all selected elements at once, or synchronize the code against the selected elements
- Transform the selected elements - see the *MDA Transformations User Guide*
- Copy all selected elements to the clipboard
- Automatically adjust the layout of the selected elements on the diagram

- Delete all selected elements.

**Tip:**

It is much faster to assign an appearance or characteristic to a group of elements than to one element at a time.

## 3.2 Element Tasks

This topic describes the following common UML tasks that you can perform on elements in Enterprise Architect:

- [Create Elements](#) [81]
- [Add Elements Directly to Packages](#) [83]
- [Use Auto Naming and Auto Counters](#) [83]
- [Set Element Parent](#) [84]
- [Show Element Use](#) [85]
- [Set Up Cross References](#) [86]
- [Move Elements Between Packages](#) [89]
- [Move Elements Within Diagrams](#) [88]
- [Copy Elements Between Packages](#) [90]
- [Change Element Type](#) [91]
- [Align Elements](#) [91]
- [Resize Elements](#) [92]
- [Delete Elements](#) [93]
- [Customize Visible Elements](#) [94]
- [Create Notes and Text](#) [95]
- [Set an Element's Default Appearance](#) [96]
- [Get/Set Project Custom Colors](#) [98]
- [Use Element Templates](#) [100]
- [Highlight Context Element](#) [101]
- [Make Linked Element a Local Copy](#) [102]
- [Copy Features \(Attributes and Operations\) Between Elements](#) [103]
- [Move Features Between Elements](#) [104]

**Note:**

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, if security is enabled you must have **Update Element** permission to update element properties or delete an element. See *User Security in UML Models*.

### 3.2.1 Create Elements

Elements within a model are typically arranged on diagrams to visually communicate the relationships between a given set of elements. Enterprise Architect provides simple mechanisms for creating elements in the model, using diagrams or the [Project Browser](#).

#### Create Elements on a Diagram

The fastest and simplest way to create elements directly on a diagram is to press **[Spacebar]** or **[Insert]** on the diagram. This displays a list of elements and connectors that mirrors the current [Toolbox](#) pages; usually these are the most appropriate elements and connectors for the diagram.



You can display and select from a longer list of elements by clicking on the **Other** option.

The following topics describe other approaches for creating elements on a diagram:

- Create Elements In Place Using the Quick Linker - see *Using Enterprise Architect - UML Modeling Tool*
- Create Elements Using the Enterprise Architect UML Toolbox - see *Using Enterprise Architect - UML Modeling Tool*
- [Create Elements Using the Diagram Context Menu](#)<sup>10</sup>
- Create a Group of Elements Using UML Patterns - see *Extending UML in Enterprise Architect*
- Create Domain Specific Elements from UML Profiles - see *Extending UML in Enterprise Architect*.

**Tip:**

If you are creating several elements of one type, after creating the first just press **[Shift]+[F3]** or **[Ctrl]+click** to create the next element of that type.

## Re-Use Existing Elements

Be aware that once you have created elements, you can re-use them by [dragging them](#)<sup>37</sup> from the **Project Browser** and dropping them onto your diagrams.

## Add Elements Directly to a Package

Sometimes it is useful to add elements to a package, without a diagrammatic representation. This can be accomplished via the **Project Browser** window and is explained in the following topic:

- [Add Elements Directly to a Package](#)<sup>83</sup>.

### See Also - in the UML Dictionary:

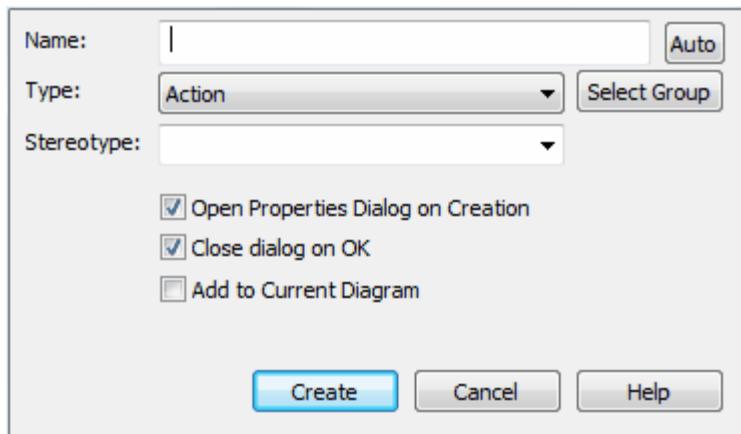
- Behavioral Diagram Elements - summary of all elements used in Behavioral diagrams
- Structural Diagram Elements - summary of all elements used in Structural diagrams

### 3.2.2 Add Elements Directly To Packages

You can quickly add new elements to a package without the necessity of adding a diagram element at the same time. This is particularly useful in defining a group of Requirements, Changes, Issues, base Classes or other element types that might not require diagrammatic representation in the model.

To add a new element to a package, follow the steps below:

1. In the **Project Browser**, right-click on the appropriate package. The context menu displays.
2. Select the **Add | Add Element** menu option. The **New Element** dialog displays.



3. In the **Name** field, type the name of the element.
4. In the **Type** field, click on the drop-down arrow and select the element type.

**Note:**

The drop-down list is populated from one of the **Toolbox** page groups (including profile, Add-In and MDG Technology groups). If the list does not represent the group containing the element you require, click on the **Select Group** button and, from the list, select the appropriate **Toolbox** page group. The drop-down list then shows the elements from that group.

The <default> group in the list contains a basic set of elements drawn from across the UML Behavioral and Structural groups, and the Enterprise Architect Extended groups.

5. If required, in the **Stereotype** field either type the stereotype name or click on the drop-down arrow and select the stereotype.
6. Select the **Open Properties Dialog on Creation** checkbox if the **Properties** dialog is to open immediately after the element is created.
7. Deselect the **Close Dialog on OK** checkbox to add multiple elements in one session.
8. Click on the **OK** button to create the element.

**Note:**

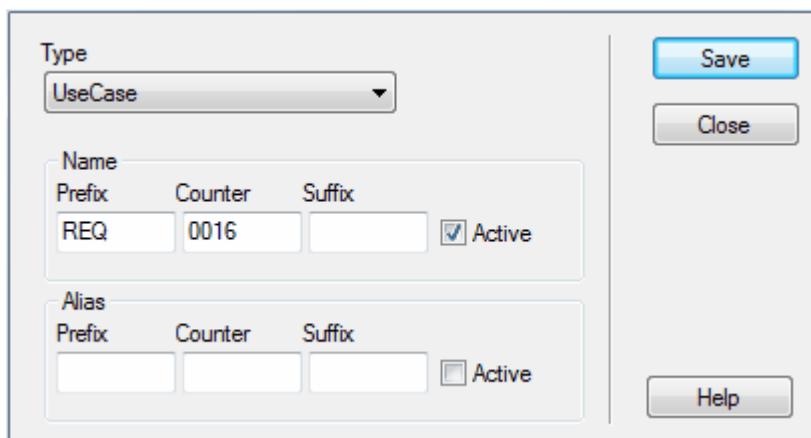
If you have a diagram open, the **Add to Current Diagram** checkbox is available and defaulted to selected to add the new element to the diagram. If you do not want the element in that diagram, deselect the checkbox.

### 3.2.3 Use Auto Naming and Auto Counters

The **Auto Element Naming** dialog enables you to configure automatic naming for any element type. Each element can have separately configured automatic names and aliases.

To set up auto naming, follow the steps below:

1. Select the **Settings | Auto Name Counters** option from the main menu. The **Auto Name Counters** dialog displays.



2. In the **Type** field, click on the drop-down arrow and select the element type (for example, Activity).
3. In the **Name** panel:
  - In the **Prefix** field, type a prefix for the new name (optional).
  - In **Counter** field, type the counter value; use as many 0's as required to pad the name.
  - In the **Suffix** field, type a suffix for the new name (optional).
  - If required, click on the **Active** checkbox to turn auto naming on for this element type.
4. In the **Alias** panel:
  - In the **Prefix** field, type a prefix for the new alias (optional).
  - In **Counter** field, type the counter value; use as many 0's as required to pad the alias.
  - In the **Suffix** field, type a suffix for the new alias (optional).
  - If required, click on the **Active** checkbox to turn alias auto naming on for this element type.
5. Click on the **Save** button.

New elements of this type now have an automatically-generated name and/or alias with an incrementing counter value.

**Note:**

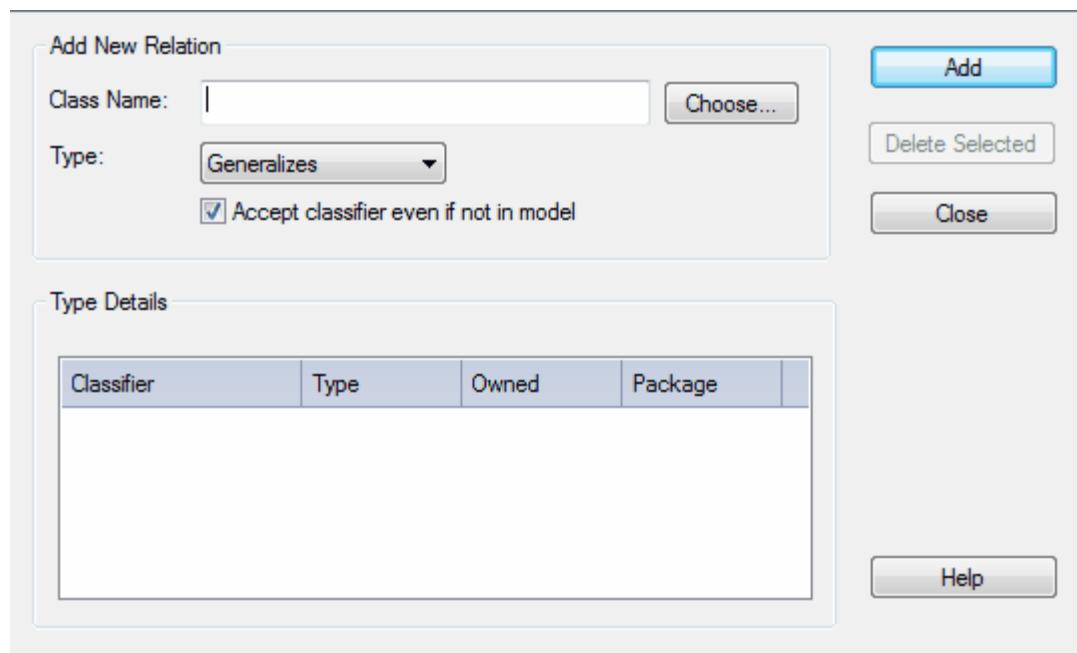
If an Alias is active then auto naming applies; however, to view the Alias in a diagram requires that the option **Use Alias if Available** is selected in [Diagram Properties](#) [52].

### 3.2.4 Set Element Parent

You can manually set an element's parent or an interface it realizes, using the [Type Hierarchy](#) dialog.

To set the element parent, follow the steps below:

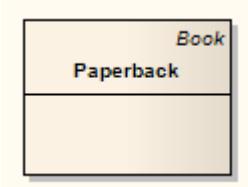
1. Select a generalizable element in a diagram.
  2. Select the **Element | Advanced | Set Parents and Interfaces** menu option. Alternatively:
    - Press **[Ctrl]+[I]** or
    - Right-click and select the **Advanced | Parent** context menu option.
- The [Set Parents and Interfaces](#) dialog displays.



3. You can elect to enter a parent or interface name by either manually typing it in, or clicking on the **Choose** button to locate the element within the current model.
4. Set the **Type** of relationship (**Implements** or **Generalizes**) from the drop-down list.
5. Click on the **Add** button to add the relationship.
6. Click on the **Delete Selected** button to remove the current selected relationship.

**Note:**

If Parents are not in the same diagram as their corresponding related element, the parentage is shown in the top right corner of the child element, as shown below:

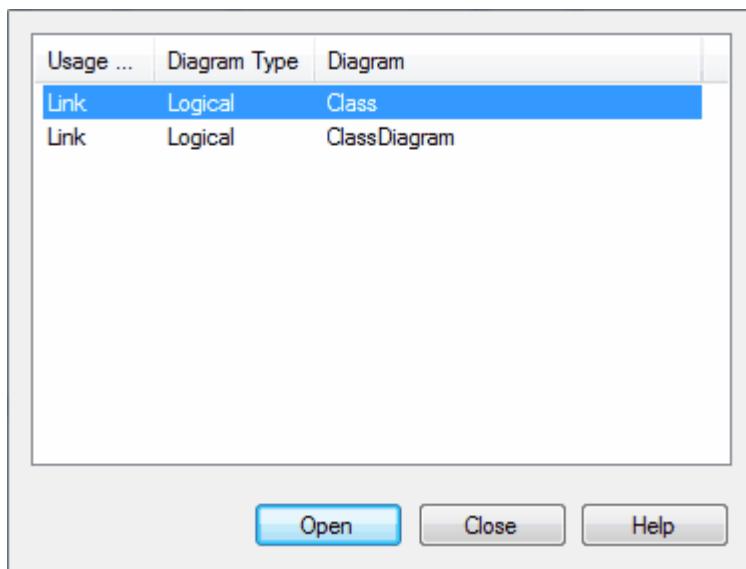


### 3.2.5 Show Element Use

You can display the use of an element using the **Element Usage** dialog. This lists all occurrences of the element throughout the model, and enables you to easily navigate to any occurrence.

To show element usage, follow the steps below:

1. Select an element in a diagram.
2. Select the **Element | Find in Diagrams** menu option. Alternatively, press **[Ctrl]+[U]**. If the element exists in other diagrams, the **Element Usage** dialog displays, listing all occurrences of the current element in diagrams in the model.



3. Double-click on a line item to open the relevant diagram and display the selected element. If you want to display the usage information in a more readable layout, you can resize the dialog and its columns.

**Note:**

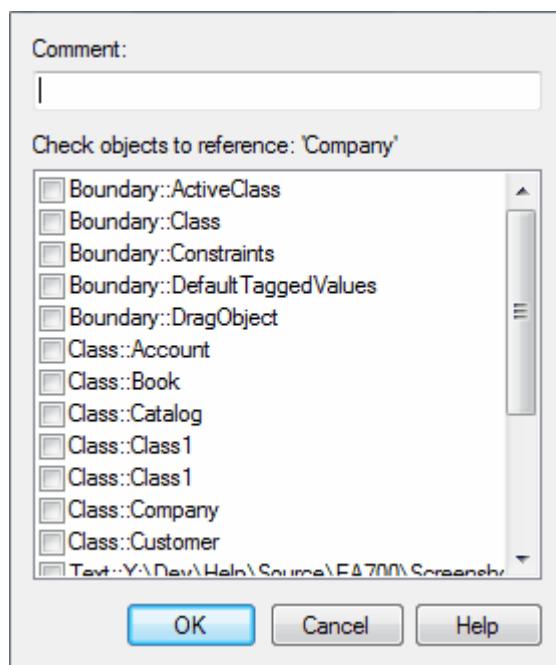
You can also access this feature from the **Project Browser**; select an element in the tree and select the **Element | Find in Diagrams** menu option. If there is only one instance of the element in any diagram, that diagram displays instead.

### 3.2.6 Set Up Cross References

It is possible to set up a cross reference (or *Custom Reference*) from one element in Enterprise Architect to another. You can also view existing cross references on an element, using the [Context References](#)<sup>[143]</sup> tab on the element's **Properties** dialog, or the **Traceability** window (see *Using Enterprise Architect - UML Modeling Tool*).

To set up a cross reference, follow the steps below:

1. In the **Project Browser**, locate the target element or diagram (that is, the object of the cross reference).
2. Open a diagram that contains the elements that are to have the currently selected element as a reference.
3. Right-click on the element in the **Project Browser**. The context menu displays.
4. Select the **Add custom reference** menu option.
5. In the **Set up references** dialog, select the checkbox against each element to that is to have the target element as a reference.
6. Optionally, in the **Comment** field, type some text to describe the purpose of the reference.



- Click on the **OK** button.

## Use the Cross Reference

To use the cross reference, follow the steps below:

- Select an element in a diagram.
- Select the **Element | Custom References** menu option. Alternatively, either press **[Ctrl]+[J]**, or right-click on the element and select the **Find | Custom References** context menu option.
- The **Custom References** dialog displays, showing a list of elements that have been set as cross references for the selected element.

Type	Package	Name	Comment	
Element	Class Diagram	Company		

- You can open the **Properties** dialog for an element by highlighting it and clicking on the **Open** button.
- If you have a diagram cross reference, you can open that diagram.
- If you have a string of diagram links, click on the **Home** button to return to the original diagram.

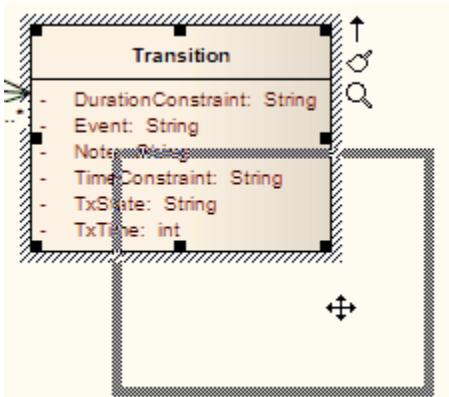
### Note:

You can delete a cross reference by selecting it on the **Custom References** dialog and clicking on the **Delete** button. Cross references are also automatically deleted if the source or target element in the reference is deleted.

### 3.2.7 Move Elements Within Diagrams

Any one of the following options enables you to move an element within a diagram. Select an element or group of elements in the diagram view, then:

- Use the mouse to drag the element to the required position (the cursor switches to the four-arrow icon as shown below)



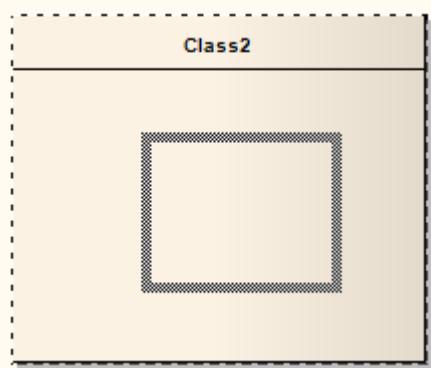
- Hold down **[Shift]** and use the arrow keys to move the element by increments to the required position
- Use the **Left**, **Right**, **Up** and **Down** options in the **Element | Move** submenu
- Align multiple elements using the **Element | Alignment** submenu, the **Alignment** options in the right-click context menu, or the **Alignment** buttons on the **Diagram** toolbar.



### Confirm Possible Parent Elements

As you organize the elements within a diagram, you can drag any element over another and, provided the dragged element is within and on top of the possible parent, it is always encapsulated by the lower element and moved within the lower element. However, the lower element might not be a valid parent.

You can confirm that a possible parent element is able to accept a selected child element. When you drag the child element over the potential parent, the target element border changes to a dashed line if it can accept the selected element as a child. If the border does not change, the selected element cannot be a child to the target element.



**Notes:**

- The **Support for Composite Objects** checkbox must be selected on the **Objects** page of the **Options** dialog (select the **Tools | Options | Objects** option). If this option is not selected, the dashed border does not show and the child element cannot be embedded on the parent in the diagram.
- Both elements must already exist on the diagram; an element border does not change if you drag a potential child element over it from the **Toolbox** or **Project Browser**.
- The child element must have equal or higher z-order placement than the parent; that is, the parent element must be level with or behind the child.
- The child element borders must be completely within the parent element borders.

For example, if you drag a Signal over a Class, the Class border changes; a Class element can be a parent to a Signal. If you drag a Class element over a Signal element, the Signal border does not change. A Signal cannot be a parent to a Class.

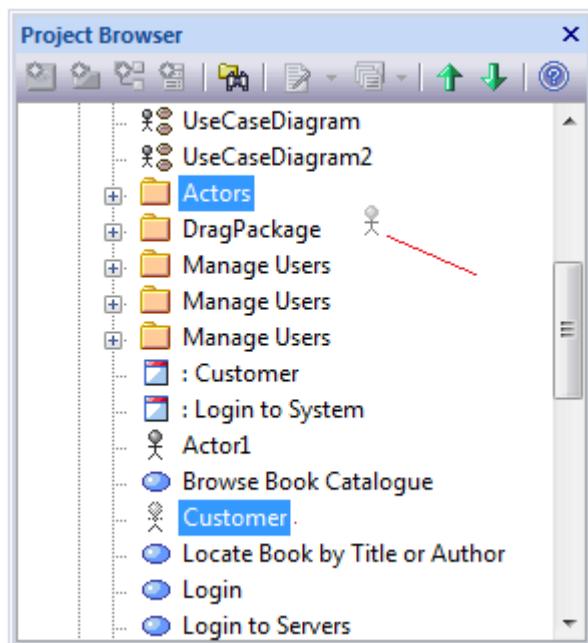
When you embed a child element on its parent, the child element becomes part of the parent element hierarchy in the **Project Browser**. Similarly, if you drag the child element out of the parent, the child element becomes independent and is no longer embedded in the parent element hierarchy.

### 3.2.8 Move Elements Between Packages

Elements and packages can be moved from one package to another by dragging and dropping the element to the target destination in the **Project Browser**. Note that if you move a package, ALL the child packages and their contents are moved to the new location also.

To move an element between packages, follow the steps below:

- Click on the element in the **Project Browser**. (See *Customer* in the diagram below.)
- Drag the element so that the cursor is over the target package icon. The element symbol (and, in some operating systems, the element name) displays at the moving cursor position.)



- Release the mouse button. The element is moved into the target package.

**Tip:**

You can also drag the element under a host element in the new package; for example, drag an element under a Class.

**Notes:**

- Moving an element has no effect on any relationships that the element might have.
- Moving an element in the **Project Browser** has no effect on the use of that element in any diagram.
- Moving a diagram generally does not affect the location of elements in packages. If you move a diagram out of one package into another, all the elements in the diagram remain in the original package. However, certain elements (such as Decision, Initial and Final elements) are used only within one diagram, have no meaning outside that diagram, and are never re-used in any other diagram. Therefore, if you move a diagram containing these elements, they **are** moved to the new parent package with the diagram.

**Warning:**

In a multi-user environment, if one person moves or updates the **Project Browser** structure, other users must reload their project to see the latest changes in the **Project Browser** (see *Version Control Within UML Models Using Enterprise Architect*). Although this is true of any addition or modification to the tree, it is most important when big changes are made, such as dragging a package to a different location.

### 3.2.9 Copy Elements Between Packages

Enterprise Architect enables you to quickly and easily duplicate one or more elements, including their child elements and diagrams. You can insert a copy of an element under one or more other packages, in the same .eap file or any other .eap file.

**Notes:**

- A copy of an element does not have the external cross references of the source element; that is:
  - if one element is copied it has no connectors
  - if more than one element is copied, only the connectors between the copied elements are retained
    - however, if those elements come from a Sequence or Communication diagram and the diagram itself is not copied, the message connectors between the copied elements are not retained.
- You cannot paste an element into a package that is locked by another user (see *User Security in UML Models*) or that is checked in (see *Version Control Within UML Models Using Enterprise Architect*). The **Paste...** option is grayed out in the context menu.

To copy elements, follow the step below :

1. In the **Project Browser**, select each required element, right-click on one of them and select the **Copy Element(s) to Clipboard** context menu option (or click on a selected element and press **[Ctrl]+[C]**). The **Copy Element(s) to Clipboard** dialog briefly displays until the copy operation completes.

To paste the copied elements, follow the step below:

1. In the **Project Browser**, right-click on the package into which to paste the copied elements, and select the **Paste Element(s) from Clipboard** context menu option (or click on the package and press **[Ctrl]+[V]**). The **Paste Element(s) from Clipboard** dialog briefly displays until the paste operation completes.

The target package is expanded and the pasted elements are exposed in the **Project Browser**. If you are pasting the elements within the same model as the copied source, the source parent package is also collapsed.

If the target package already contains:

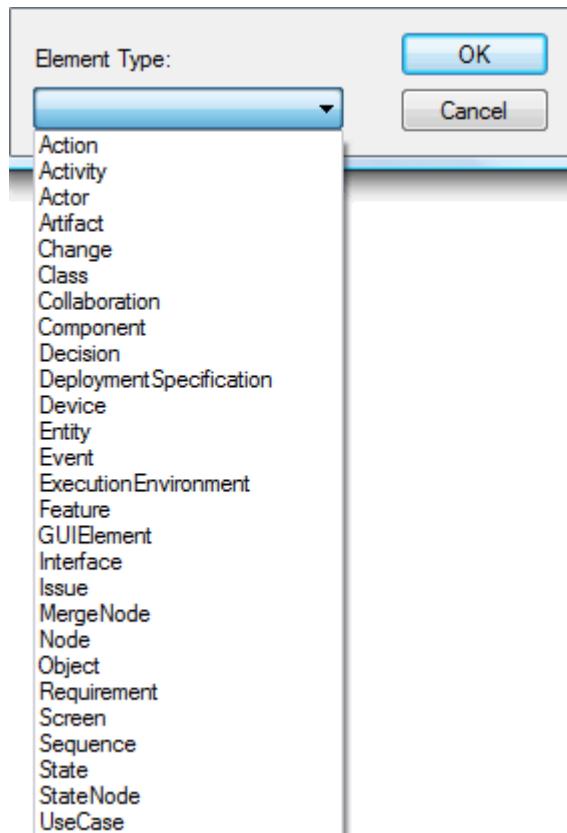
- an element of the same type with the same name as a pasted element, the pasted element name has the suffix - *Copy*
- an element with the same name as the pasted element *including* the - *Copy* suffix, the suffix becomes - *Copy1* (or - *Copy 2*, - *Copy3* and so on, as copies of the element accumulate in the target package)

You can keep the same element names as the source, or you can rename each element either by clicking twice on it and editing the name in the **Project Browser**, or by double-clicking on it and editing the name in the **Properties** dialog.

### 3.2.10 Change Element Type

To change an element type, follow the steps below:

1. In the **Diagram View**, click on the element to change.
2. Select the **Element | Advanced | Change Type** menu option. The **Select Element Type** dialog displays.



3. In the **Element Type** field, click on the drop-down arrow and select the required element type.
4. Click on the **OK** button.

The target is transformed into the required type.

### 3.2.11 Align Elements

To align multiple elements, follow the steps below:

1. Select a group of elements by drawing a selection box around them all. (Or select them one by one by holding down **[Ctrl]** and clicking on each element).
2. Right-click on the element in the group to align others to. The context menu displays.
3. Select the alignment function you require.

All selected elements are aligned to the one beneath the cursor.

**Tip:**

You can also use the **Diagram** toolbar.



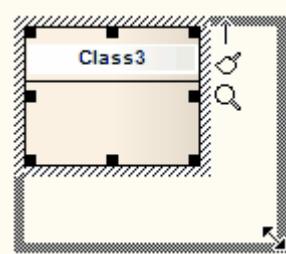
The first four buttons are used to align elements, and are made available when more than one element is selected in a diagram.

You can also select the **Element | Alignment** menu option.

### 3.2.12 Resize Elements

Any one of the following options enables you to resize an element. Select an element or group of elements in the diagram view, then:

- Use the resize handles that appear at each corner and side to resize the element(s) by dragging with the mouse (the cursor switches to the double-ended arrow as shown below)

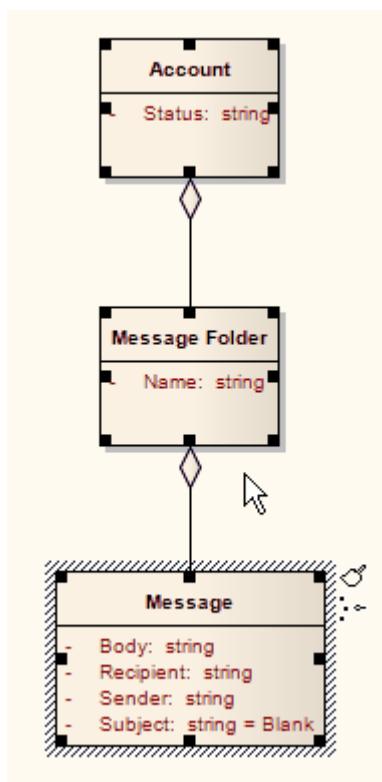


- Press and hold **[Ctrl]** and use the arrow keys to resize by increments as required
- Use the **Wider**, **Narrower**, **Taller** and **Shorter** options in the **Element | Move** submenu
- Autosize selected element(s) using the option in the **Element | Appearance** submenu, or by pressing **[Alt] +[Z]**. (With multiple elements selected, **Autosize** also appears in the right-click context menu)
- Set multiple elements to the same height, width or both, using these options in the **Element | Make Same** submenu, or the options in the right-click context menu.

#### Resize a Set of Objects to a Specific Size

If you right-click a selected set of objects, you can resize them to the same dimensions (height, width or both) using the context menu. When you select multiple elements using **[Ctrl]+click**, then resize the dimensions, the dimensions of the selected hatched object are used to set the dimensions of the other selected objects.

For example, in the diagram below, the *Message* Class height and width are used to set the height and width of the *Account* and *Message Folder* Classes. The aim is to make the *Account* and *Message Folder* elements the same height and width as the *Message* element.



To do this follow the steps below:

1. Set one element to the required size (for example, *Message* as above).
2. Select all other elements (for example, *Account* and *Message Folder* as above).
3. Right-click on the pre-sized element (for example, *Message*).
4. Select your resizing option (such as same height, width) from the context menu.

#### See Also

- [Highlight Context Element](#)

### 3.2.13 Delete Elements

#### Delete an Element From a Diagram

Follow the steps below:

1. In the active diagram, click on the element to delete.
2. Either:
  - Press **[Delete]**, or
  - Right-click to display the context menu and select the **Delete <element name>** option.

#### **Note:**

This does not delete the element from the model, only from the current diagram.

#### Delete an Element From the Model

Follow the steps below:

1. In the **Project Browser**, right-click on the element to delete. The context menu displays.
2. Select the **Delete <element name>** option. A confirmation prompt displays.
3. Click on the **Yes** button.

Alternatively:

1. Click on the element in the **Project Browser** and press **[Ctrl]+[Delete]**.

The element is completely removed from the model.

## Delete Multiple Elements From a Diagram

Follow the steps below:

1. In the active diagram, **[Ctrl]+click** on each element to delete.
2. Either:
  - Press **[Delete]**, or
  - Right-click to display the context menu and select the **Delete selected elements** option.

## Delete Multiple Elements From a Diagram and Model

Follow the steps below:

1. Open the diagram containing the elements to remove from the model.
2. Press **[Ctrl]+[A]** to select all of the elements in the diagram, or use **[Ctrl]+click** to select specific elements.
3. Press **[Ctrl]+[Delete]** to completely remove the elements from the model.

## Delete Multiple Elements from the Project Browser and Model

Follow the steps below:

1. In the **Project Browser**, press and hold either **[Shift]** or **[Ctrl]** and click on the required items.
2. To completely remove the elements from the model, either:
  - Press **[Ctrl]+[Delete]**, or
  - Right-click on the selected items and select the **Delete selected item(s)** context menu option.

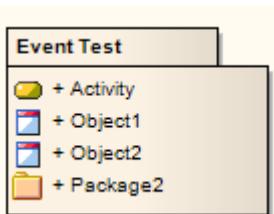
### Note:

If you delete an element in this way, you delete all its properties and connectors as well.

### 3.2.14 Customize Visibility of Elements

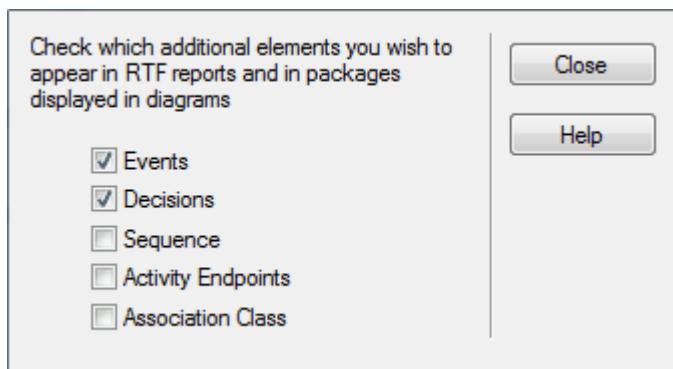
Some elements are hidden from view in packages and in RTF documents by default. These include Events, Decisions, Sequence elements and Associations. You have the option of turning these elements back on.

For example, some Events and Decisions contained in a package do not appear in the package view, as in the example below.



To show additional elements, follow the steps below:

1. Select the **Tools | Options | Objects** menu option. The **Objects** page of the **Options** dialog displays.
2. Click on the **Advanced** button. The **Advanced Settings** dialog displays.



3. Select the checkbox for each type of element to show in packages and in RTF documents.
4. Click on the **Close** button on each dialog.
5. Reload the current diagram if required (see *Version Control Within UML Models Using Enterprise Architect*).

The package from the example above now shows the Event and Decision elements it contains:



### 3.2.15 Create Notes and Text

You can create both notes and text on a diagram; the two are slightly different.

#### Create a Note

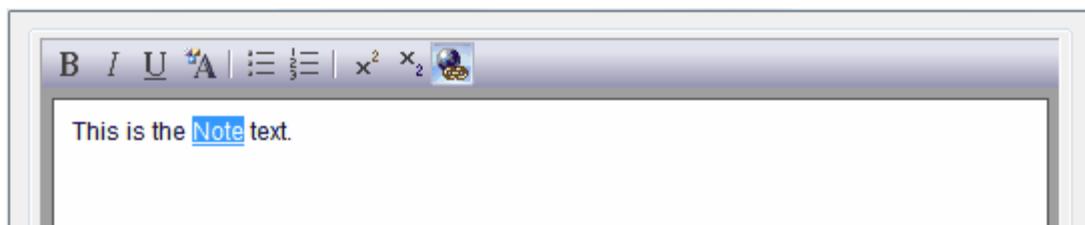
To create a note, follow the steps below:

1. Drag the **Note** icon from the **Common** page of the Enterprise Architect UML **Toolbox** onto the diagram.
  - If you have the **Edit Object On New** checkbox *deselected* on the **Objects** page of the **Options** dialog (**Tools | Options | Objects**), the Note element displays on your diagram; type your note text directly within the Note element

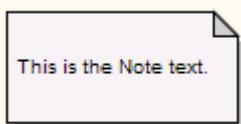


- If you have the checkbox selected, the **Notes** window displays; type your text in that window. If you want to display the Notes information in a more readable layout, you can resize the dialog.

You can format the text if necessary, using the **Rich Text Notes** toolbar at the top of the window (see *Using Enterprise Architect - UML Modeling Tool*). When you have completed the text, click on the **OK** button to save it.



The Note text displays in the Note element.



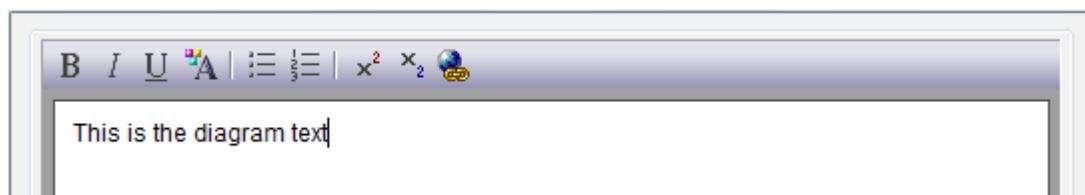
#### Note:

You can also create a note by clicking on the **New Note** icon (the text page) on the **UML Elements** toolbar and clicking on the diagram (see *Using Enterprise Architect - UML Modeling Tool*).

### Create Text

To create text, follow the steps below:

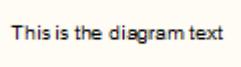
1. Drag the **Text Element** icon from the **Common** page of the Enterprise Architect UML **Toolbox** onto the diagram. The **Notes** window displays.



2. Type your text in the window. If you want to display the Notes information in more readable layout, you can resize the dialog.

You can format the text if necessary, using the **Rich Text Notes** toolbar at the top of the window (see *Using Enterprise Architect - UML Modeling Tool*). When you have completed the text, click on the **OK** button to save it.

Your text displays on the diagram in the following format, with no border:



### 3.2.16 Set an Element's Default Appearance

You can set the global appearance of all elements throughout a model, using the **Options** dialog. Select the **Tools | Options** menu option, then select **Standard Colors** and **Diagram | Appearance** from the options tree. See the **Standard Colors** and **Appearance** topics in *Using Enterprise Architect - UML Modeling Tool*.

To override the global appearance and define a default appearance for a specific element on all diagrams on which it is found, right-click on the element and select the **Appearance | Default Appearance** context menu option. The **Default Appearance** dialog displays.

To change the appearance of an element on the current diagram only, use the **Format** toolbar. If the **Format** toolbar is not displayed, select the **View | Toolbars | Format Tool** menu option (see *Using Enterprise Architect - UML Modeling Tool*).

**Note:**

You can adjust several elements at the same time. Select all of the required elements, right-click on one of them and select the **Default Appearance** context menu option, or use the **Format** toolbar.



### Change a Background, Font or Border Color

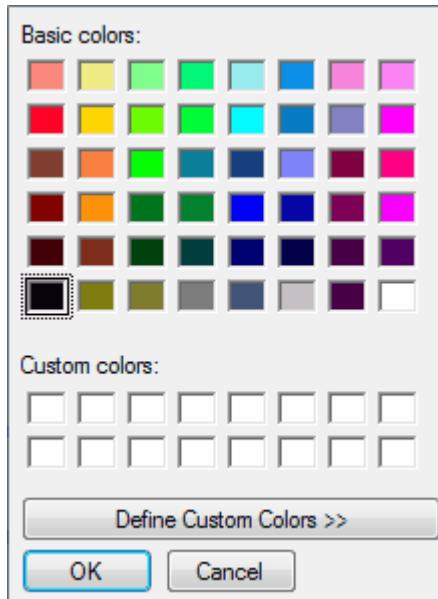
To reset the background color, font color or border color, follow the steps below:

1. On the **Default Appearance** dialog, select the **Background Color**, **Font Color** or **Border Color** radio button as appropriate.

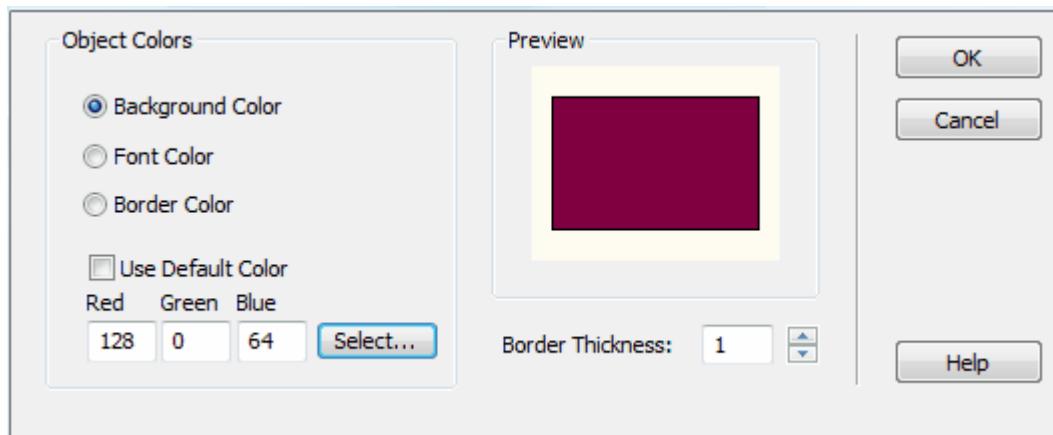
**Note:**

You have further options for changing the font of element text in the **Set Font** menu option.

2. Deselect the **Use Default Color** checkbox, to enable the **Select** button.
3. Click on the **Select** button. The **Color** dialog displays.



4. Select the required color (click on the **Define Custom Colors>>** button and define a specific color if necessary) and click on the **OK** button. You return to the **Default Appearance** dialog, on which the **Preview** panel indicates the selected color for the element.

**Note:**

To change to a different color, click on the **Select** button again, or to return to the default color, select the **Use Default Color** checkbox.

- Click on the **OK** button. The new color is applied to the selected element or elements.

### Change the Border Thickness

To change the border thickness, follow the steps below:

- On the **Default Appearance** dialog, in the **Border Thickness** field, type the number of points to apply. Alternatively, click on the scroll arrows to increase or decrease the number.

The **Preview** panel indicates the effect of the change in border thickness.



- Click on the **OK** button. The new border thickness is applied to the selected element or elements.

### 3.2.17 Get/Set Project Custom Colors

If more than one person is working on a project, each person might want to use specific colors for elements within the project. The **Settings | Colors | Set Project Custom Colors** and **Get Project Custom Colors** options enable you to set specific colors and subsequently get the colors in a different session, without having to remember RGB values.

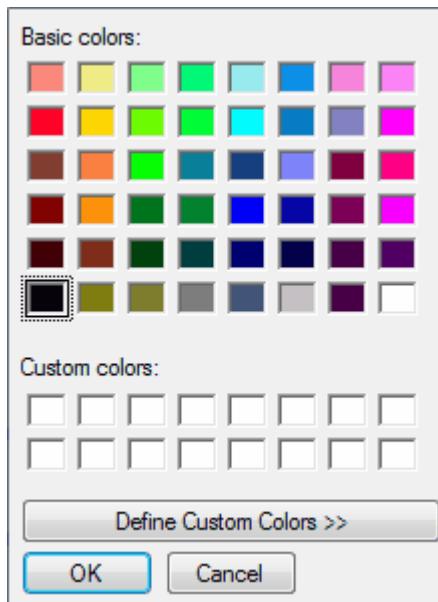
### Set a Project Custom Color

Follow the steps below to set your project's custom colors:

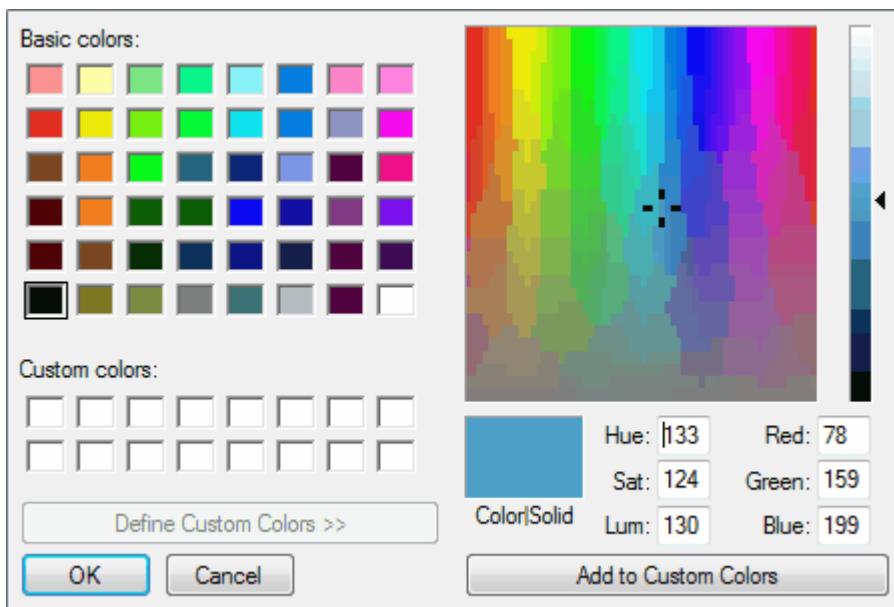
- Select an element to be colored.
- Select the **Element | Appearance | Default Appearance...** menu option. The **Default Appearance** dialog displays.



3. Deselect the **Use Default Color** checkbox to enable the **Select** button.
4. Click on the **Select** button. The **Color** dialog displays.



5. Click on the **Define Custom Colors >>** button.
6. Create the color in the color mixer panel on the right of the dialog.



- Click on the **Add to Custom Colors** button to add the color to the **Custom colors** blocks on the left hand side of the dialog.



- Click on the **OK** button to close the **Color** dialog, then click on the **OK** button to close the **Default Appearance** dialog.
- Select the **Settings | Colors | Set Project Custom Colors** menu option to save the custom color you have created.

## Get a Project Custom Color

To get your project's custom colors, follow the steps below.

- Select the **Settings | Colors | Get Project Custom Colors** menu option. This applies any saved custom colors to this project.
- Click on an element to be colored and select the **Element | Appearance | Default Appearance** menu option. The **Default Appearance** dialog displays.
- Deselect the **Use Default Color** checkbox to enable the **Select** button.
- Click on the **Select** button to view the applied custom colors (as listed at step 7, above).
- Click on the required color and click on the **OK** button to close the **Color** dialog, then click on the **OK** button to close the **Appearance** dialog. The element changes to the selected color.

### 3.2.18 Set Element Templates Package

In building up a model, you might want to represent or emphasize certain characteristics of elements in the appearance of those elements, or select particular display options as standard. For example, you could make new Interface elements a different default color to new Class elements, ensure all new Activity Partitions are vertical rather than horizontal, or set a specific group of display options for new diagrams. You could also define a set of characteristics to use for each development stage of a project.

To do all this, you create a diagram with all the characteristics you require, and store it in an element *Templates* package. Enterprise Architect then checks this folder whenever you start to create an element in a diagram and, if it finds a template for that diagram type, applies the settings in that template to the new element or to the display options of the diagram. For example, you could save a diagram under the name *ClassTemplate*, to apply a set of display characteristics to all new Class elements.

You should create the Templates package in an administrative View of the project file, rather than in any work area. This prevents the package from being changed or lost in any project development work.

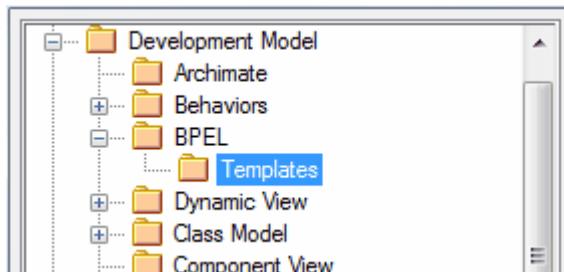
There are two other ways in which you can modify the appearance of elements in diagrams:

- You can define the default appearance of elements (and other structures) grouped in a diagram by using UML Profiles (see *Extending UML in Enterprise Architect*). These provide a means of extending the UML Language, which enables you to build UML models in particular domains. They are based on additional stereotypes and Tagged Values that are applied to elements, attributes, methods, connectors, connector ends and so on.
- You can modify the appearance of elements (and connectors) of a specific type using stereotypes (see *Extending UML in Enterprise Architect*). Stereotypes take precedence over templates; if you drop an unstereotyped element - a Class, for example - onto a diagram, Enterprise Architect searches the Templates package for a Class diagram that defines an unstereotyped Class, and applies that definition to the new Class. If you drop a stereotyped Class onto a diagram, the stereotype defines the Class appearance so the template is not accessed. Stereotypes are much more flexible for defining the appearance of an element under different scenarios.

## Procedure

To set up the element Templates package, follow the steps below:

1. Create a new package in the appropriate administration View. You can give this package any name; *Templates* is an unambiguous option.
2. Within the Templates package create new diagrams, one for each type of diagram to template. Give them easily recognized names; for example *ClassTemplate* for the template for Class diagrams.
3. Add new elements to the template diagrams from the Enterprise Architect UML **Toolbox** and configure the size, appearance, notes, version and other properties.
4. Select the **Settings | Template Package** menu option to set the templates as the default element templates. The **Browse Project** window displays.



5. Locate and click on the Templates package, and click on the **OK** button to set the package as the default element template.

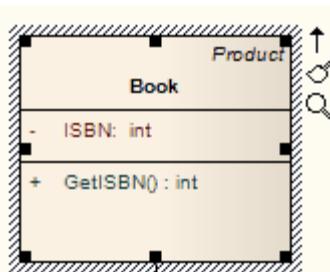
Now each new element you add to your project is created with the settings from the appropriate Template diagram.

### Note:

If you decide not to use the default element template, set the default element template to **<none>** in the **Browse Project** window. The **<none>** package is at the bottom of the hierarchy shown in the **Browse Project** window.

### 3.2.19 Highlight Context Element

You can show a hatched border around a selected element by selecting the **Always Highlight Context Element** checkbox on the **Diagram Behavior** page of the **Options** dialog (select the **Tools | Options | Diagram | Behavior** menu option). If you have selected this checkbox, the selected element displays similarly to the following example:

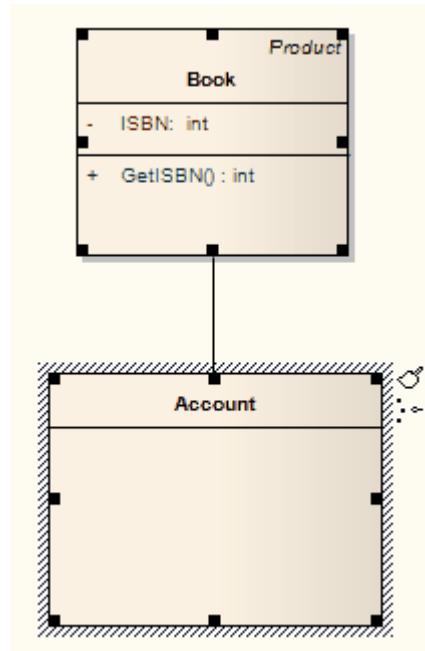


If you have not selected the **Always Highlight Context Element** checkbox, the selected element does not have a hatched border around it.

### Multiple Selections

Whether you have selected the **Always Highlight Context Element** checkbox or not, if you select multiple elements one of the elements you select always has a hatched border. If you align the elements, this element is the one used to align the other elements against.

For example, if the elements in the diagram below are aligned, the top element aligns to the bottom element (the element showing a hatched border).



### Change the Element to Align Against

To change which element has a hatched border in a selected group (and thus the element that is aligned with) click on the element that the other elements are to align with.

#### 3.2.20 Make Linked Element a Local Copy

To convert a linked element to a local copy, follow the steps detailed below:

1. Open the diagram with the linked element.
2. Select the linked element and right-click on it to display its context menu.
3. Select the **Convert Linked Element to Local Copy** menu option.

The element changes to a local copy and is placed in the appropriate package.

### 3.2.21 Copy Features Between Elements

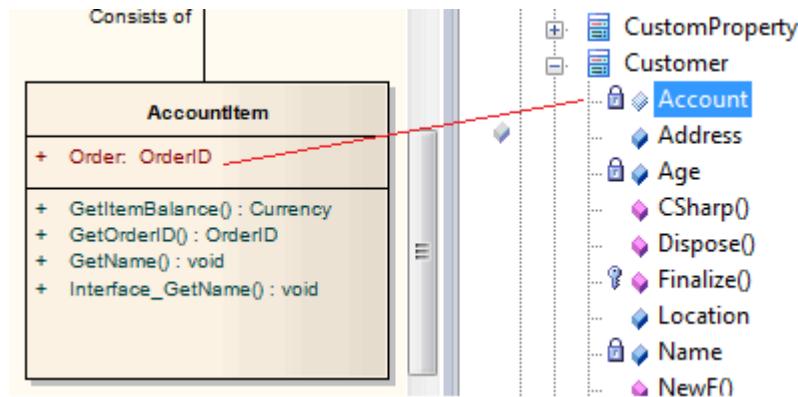
Using drag and drop, you can copy [attributes](#)<sup>[105]</sup> and/or [operations](#)<sup>[154]</sup> from an element in the Project Browser on to another element in a diagram.

To move attributes and operations, see [Move Attributes and Operations Between Elements](#)<sup>[104]</sup>.

#### Copy an Element Feature

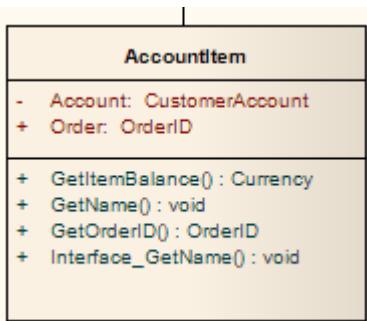
To copy an element feature, follow the steps below:

1. Open a diagram that contains the target element (in the example below, the *AccountItem* Class is the target and *Customer* element is the donor).
2. Click on the attribute or operation and drag to the target element.



3. Release the mouse button.

The image below shows *AccountItem* after the attribute *Account* has been dropped from the browser on to it.



#### Copy Multiple Element Features

To copy multiple element features, follow the steps below:

1. Open a diagram that contains the target element (in the example above, the *AccountItem* Class is the target and *Customer* element is the donor).
2. Hold down **[Ctrl]** (separate features) or **[Shift]** (select a range) and click on the attributes and/or operations to copy, then drag the selected features to the target element.
3. Release the mouse button.

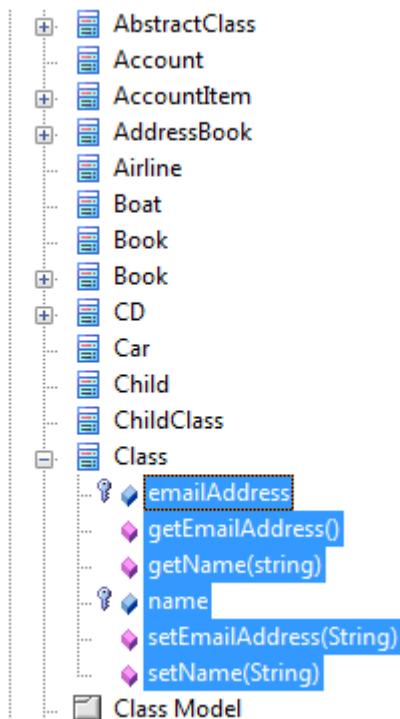
### 3.2.22 Move Features Between Elements

Using drag and drop, you can move [attributes](#)<sup>[105]</sup> and/or [operations](#)<sup>[154]</sup> from an element in the Project Browser on to another element within the Project Browser.

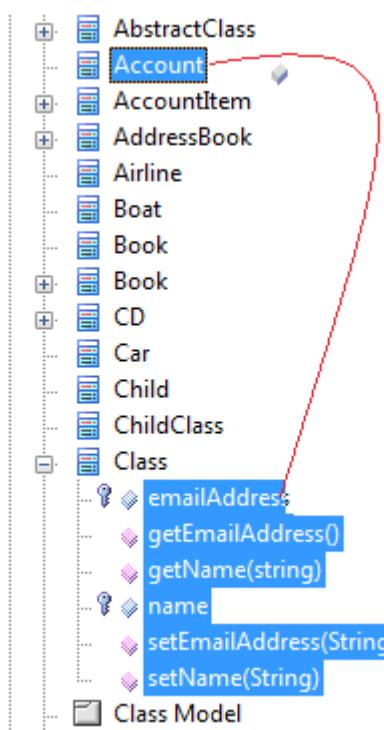
To copy attributes and operations, see [Copy Attributes and Operations Between Elements](#)<sup>[103]</sup>.

To move element features, follow the steps below:

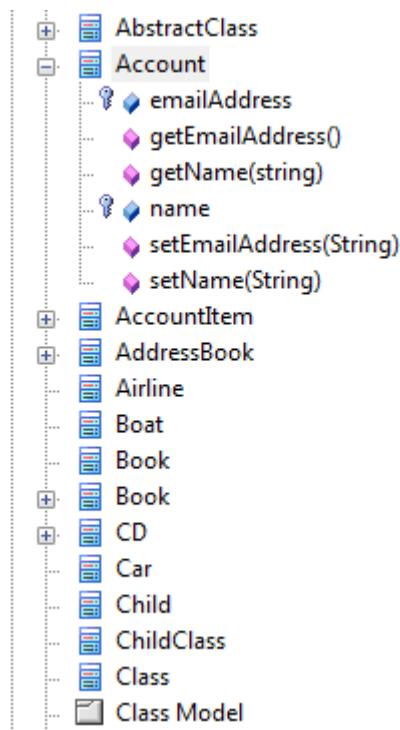
1. In the Project Browser, locate the attributes and/or operations to move from the target element and select them while holding down **[Ctrl]** (single item select) or **[Shift]** (multiple item select).



2. Holding down the mouse button, drag the attributes and/or operations to the target element. A single feature symbol (and, under some operating systems, the feature name) displays during the move; however all of the selected features are moved.



- Release the mouse button. The image below shows the final stage of the attribute and operations move between the Class element and the Account element.



### 3.3 Attributes

Attributes are features of an element that represent the properties or internal data elements of that element. Not all element types support attributes, and others have restrictions - for example, attributes of Interfaces must have Public scope.

Elements with attributes (typically Classes) display their features in diagrams in the manner shown below.

Attributes display in the first compartment of properties in colored text - the default color is red (for example, `Age : int`).



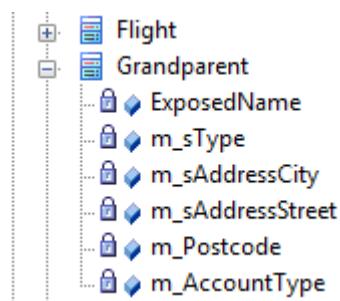
For a Customer Class, `CustomerName` and `CustomerAddress` can be attributes. Attributes have several important characteristics, such as type, scope (visibility), static, derived and notes.

## Create and Modify Element Attributes

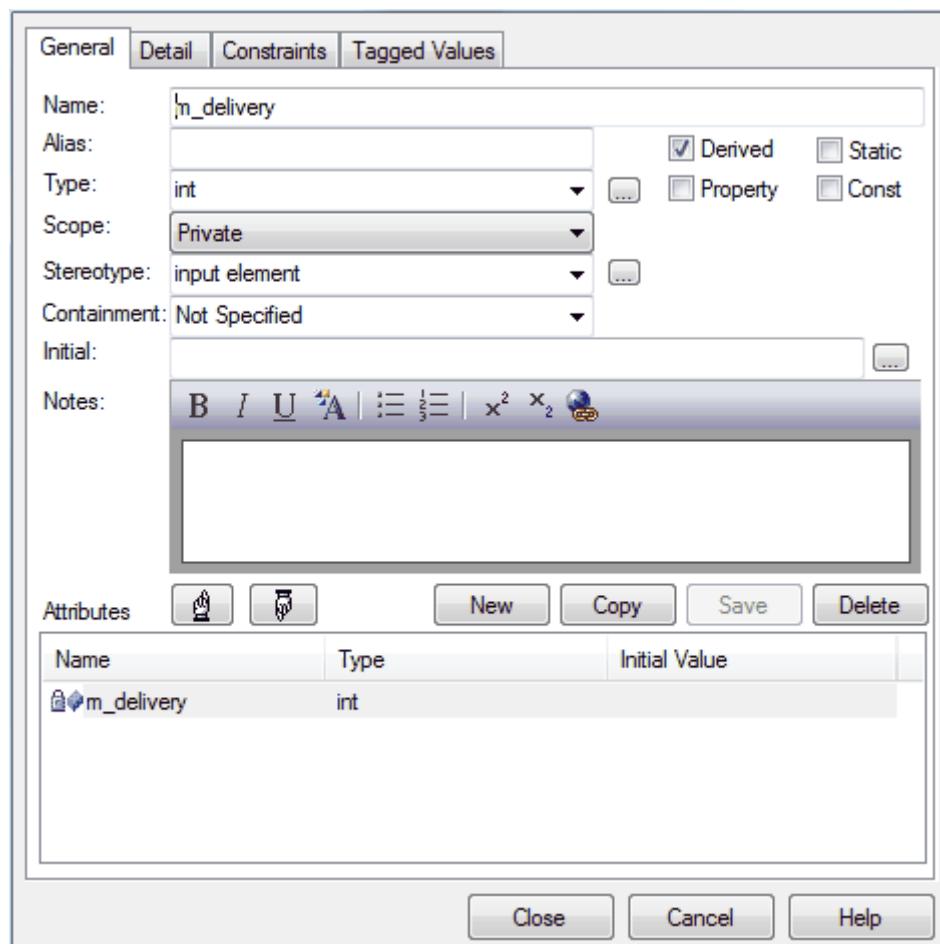
### Note:

This facility is only available if the element supports attributes.

In the **Project Browser**, Classes with attributes have their features collected beneath them, each preceded by a blue box (◊).



1. In the **Diagram** view, either:
  - Right-click on the element to be edited, and from the context menu select the **Attributes** menu option
  - Click on the element and press **[F9]**, or
  - Drag the attribute from the **Project Browser** onto the element.
2. The **<Element name> Attributes** dialog displays.

**Notes:**

- If you make changes and do not save them, the **Cancel** button prompts you to save or cancel the changes, whilst the **Close** button closes the dialog immediately and does not save the changes.
- If you are creating many attributes, go to the **Attribute/Operations** page of the **Options** dialog (**Tools | Options | Source Code Engineering | Attribute/Operations**) and select the **After save, re-select edited item** checkbox. Now, when you create an attribute and click on the **Save** button, the dialog fields clear ready for you to enter the details of the next attribute. This helps you when you want to create attributes quickly and might not necessarily want to fully define each one as you create it.

See the topics on the **Attributes** dialog [General](#)<sup>[108]</sup>, [Detail](#)<sup>[110]</sup> and [Constraints](#)<sup>[111]</sup> tabs.

**Note:**

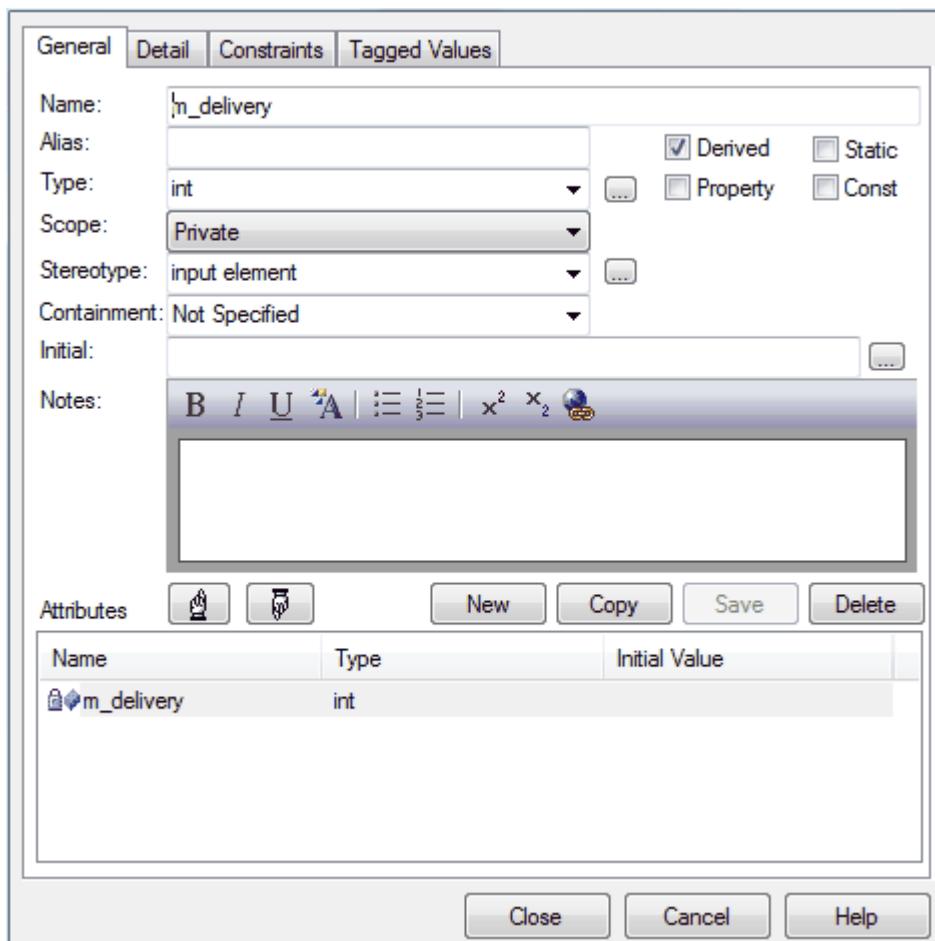
If the parent element provides source or target roles for a connector, the connector can be attached to a specific attribute. See the [Connect to Element Feature](#)<sup>[202]</sup> topic.

**See Also**

- [Attribute Tagged Values](#)<sup>[112]</sup>
- [Create Properties](#)<sup>[114]</sup>
- [Display Inherited Attributes](#)<sup>[115]</sup>
- [Create Object From Attribute](#)<sup>[117]</sup>

### 3.3.1 Attributes Dialog - General Tab

The **General** tab of the **Attributes** dialog is shown below:



To review an existing attribute, click on the attribute name in the **Attributes** panel.

To delete an existing attribute, click on the attribute name in the **Attributes** panel and click on the **Delete** button.

To create a new attribute, either:

- Click on the **New** button, or
- Click on an existing attribute name in the **Attributes** panel, and click on the **Copy** button.

Review, edit or complete the fields as indicated in the following table.

Field	Use to
Name	Display the name of the attribute. For a new attribute, type the name (with no spaces).
Alias	Display an optional alias for the attribute. If necessary, type in a new alias.
Type	<p>Display the attribute's type. If necessary, click on the drop-down arrow and select a different type.</p> <p>The type can be defined by the code language (data type) or by a classifier element. When you click on the drop-down arrow, the first set of values in the list provides the data types, and the second (longer) set provides the possible classifiers.</p> <p>To add new code language data types that can be displayed in this list, see the <i>Data</i></p>

Field	Use to
	Types topic (see <i>UML Model Management</i> ).
[ ... ] (Select) button	Open the <a href="#">Select &lt;Item&gt;</a> <sup>[149]</sup> dialog, which you use to select or define a different attribute classifier type that might not be in the <b>Type</b> drop-down list.
<b>Scope</b>	Define the attribute as <b>Public</b> , <b>Protected</b> , <b>Private</b> or <b>Package</b> . If necessary, click on the drop-down arrow and select a different scope.
<b>Stereotype</b>	Define the optional stereotype of the attribute. If necessary, either type a different stereotype name or click on the drop-down arrow and select a stereotype.
<b>Containment</b>	Define the containment type (by reference, by value or not specified). If necessary, click on the drop-down arrow and select a different containment type.
<b>Derived</b>	Indicate that the attribute is a calculated value. If you select this checkbox, the attribute name in the element attributes compartment has the derived symbol (/) as a prefix.
<b>Static</b>	Indicate that the attribute is a static member.
<b>Property</b>	Indicate that the attribute has <a href="#">automatic property creation</a> <sup>[114]</sup> .
<b>Const</b>	Indicate that the attribute is a constant.
<b>Is Literal</b>	(For Enumeration elements.) Defaults to selected, to define the attribute as an enumeration literal. Deselect to define the attribute as a normal element attribute.  In the <i>Attributes</i> compartment on the diagram, the enumeration literals are listed separately, above the normal attributes. (Ensure that the <b>Stereotype</b> field for the normal attribute is not set to <b>enum</b> .)
<b>Initial</b>	Display an optional initial value. If necessary, type in a new initial value.
<b>Notes</b>	Enter any free text notes associated with the attribute. You can format the notes text using the <a href="#">Rich Text Notes</a> toolbar at the top of the field (see <i>Using Enterprise Architect - UML Modeling Tool</i> ).

To change the position of an attribute in the list in the **Attributes** panel, click on the **Scroll Up** or **Scroll Down** (hand) buttons.

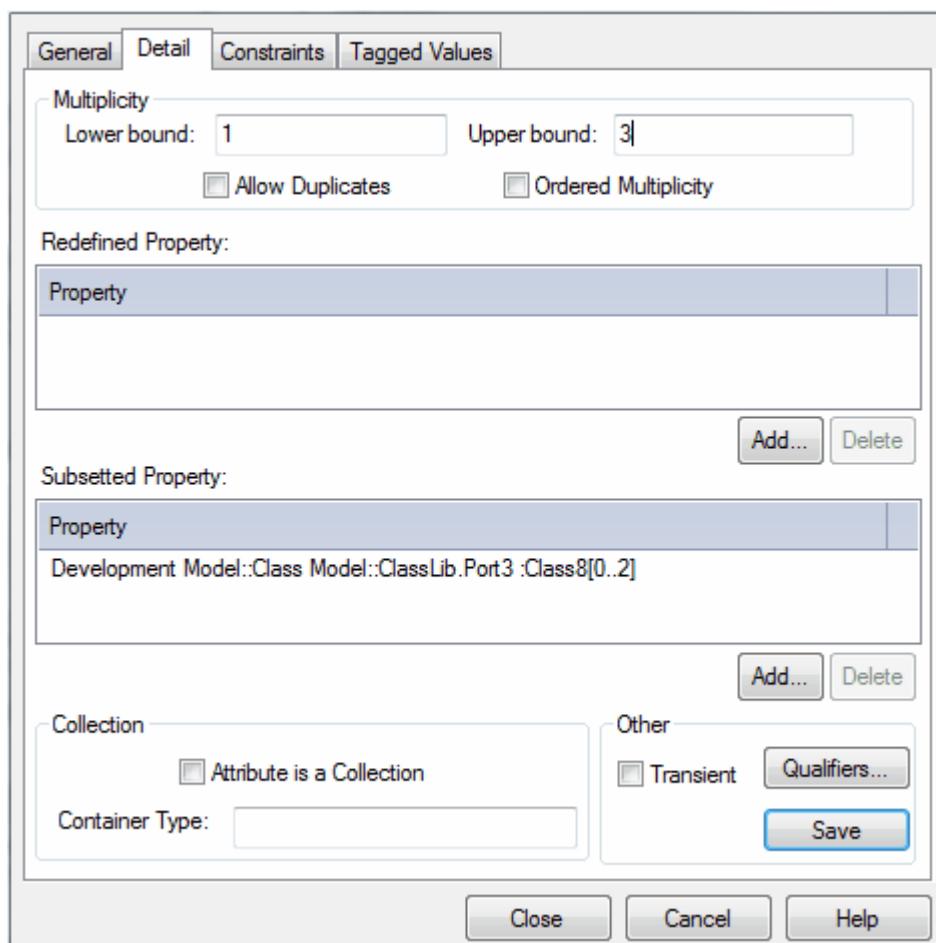
**Note:**

By default, the attributes are listed in alphabetical order. Before changing this sequence, you must deselect the **Sort Features Alphabetically** checkbox on the **Objects** page of the **Options** dialog (**Tools | Options | Objects**).

If you have changed the attribute details, click on the **Save** button to save the changes.

### 3.3.2 Attributes Dialog - Detail

To define additional details relating to collections, click on the **Detail** tab of the **Attributes** dialog.



Field	Use to
Multiplicity	
Lower bound	Define a lower limit to the number of elements allowed in the collection.
Upper bound	Define an upper limit to the number of elements allowed in the collection.
Allow Duplicates	Indicate that duplicates are allowed. Maps to the UML property <i>isUnique</i> , value <i>FALSE</i> ).
Ordered Multiplicity	Indicate that the collection is ordered.
Redefined Property	Review the redefined properties for the attribute. Add redefined properties by clicking on the <b>Add</b> button to display the <a href="#">Select Property</a> [15] dialog.
Subsetted Property	Review the subsetted properties for the attribute. Add subsetted properties by clicking on the <b>Add</b> button to display the <a href="#">Select Property</a> [15] dialog.

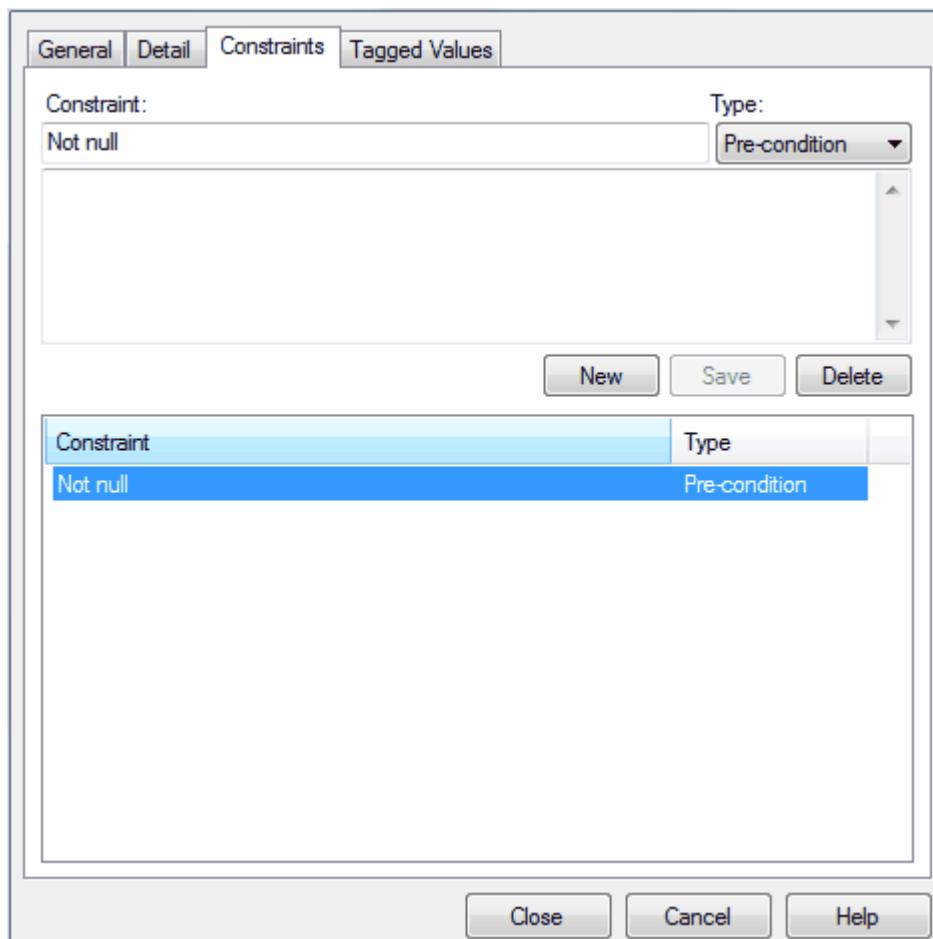
Field	Use to
Collection	Code the attribute as an array, so that it can contain multiple concurrent values rather than a single value.
Attribute is a Collection	Indicate that the attribute is a collection (array).
Container Type	Enter the name of the container type.
Other	
Transient	(For Java code) indicate that the attribute can change regardless of what the code is performing.
Qualifiers	Click on this button to add Qualifiers to the attribute, The <b>Qualifiers</b> dialog displays (see <i>The UML Dictionary</i> ).

When you have completed these fields, click on the **Save** button.

### 3.3.3 Attributes Dialog - Constraints

Attributes can also have constraints associated with them. Typically these indicate such things as maximum value, minimum value and length of field.

Select the **Constraints** tab of the **Attributes** dialog to define these constraints.



To review an existing constraint, click on the constraint name in the panel at the bottom of the dialog.

To delete an existing constraint, click on the constraint name in the panel and click on the **Delete** button.

To create a new constraint, click on the **New** button.

Review, edit or complete the fields as indicated in the following table.

Field	Use to
<b>Constraint</b>	Type the constraint name.
<b>Type</b>	Click on the drop-down arrow and select the constraint type.
<b>(Notes)</b>	Type any comments or notes concerning the constraint.

If you have created or edited the data, click on the **Save** button to save the changes.

### 3.3.4 Attribute Tagged Values

You can define Tagged Values for an attribute. Tagged Values are a convenient means of extending the properties a model element supports. This in turn can be used by code generators and other utilities to transform UML models into other forms.

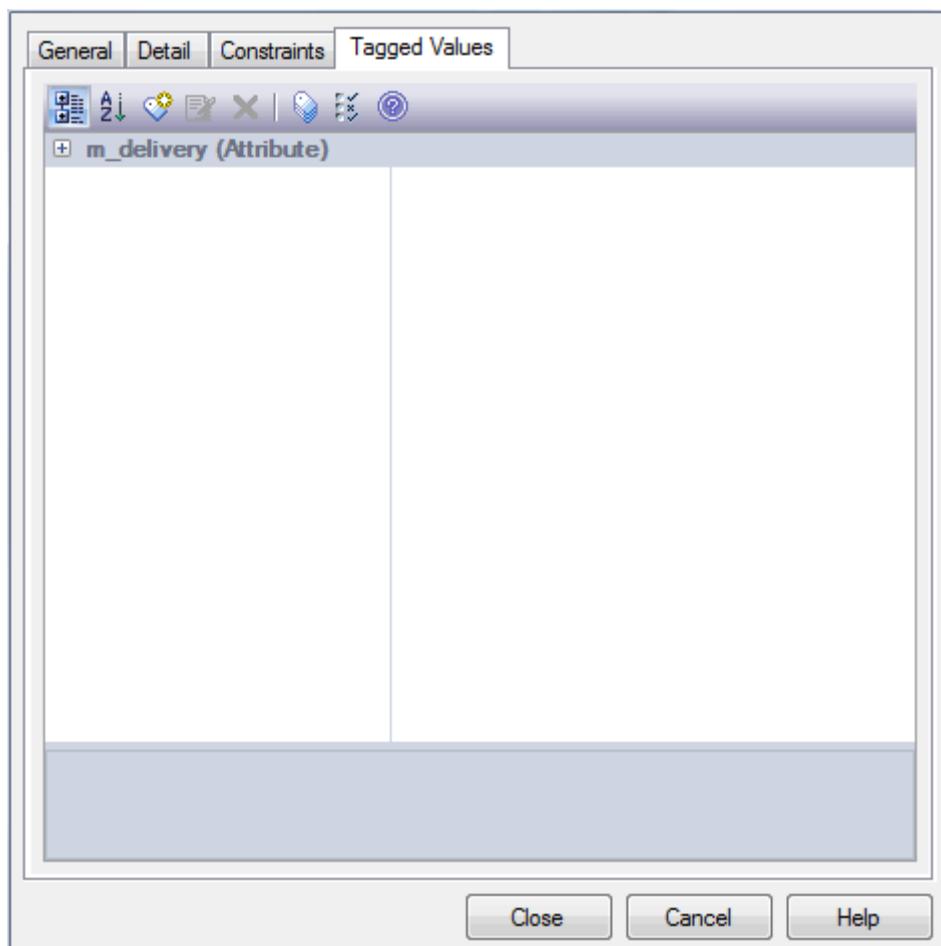
**Note:**

Tagged Values are supported for attributes, operations, objects and connectors.

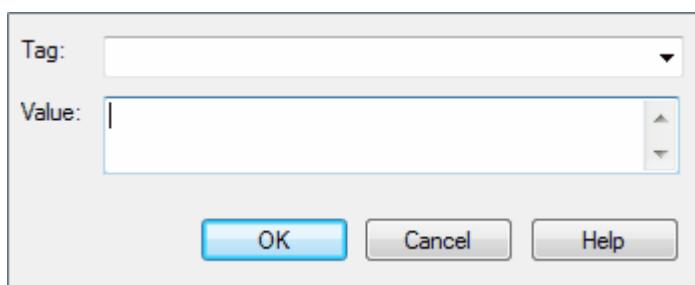
#### Add a Tagged Value

To add a Tagged Value to an attribute, follow the steps below:

1. Click on the **Tagged Values** tab of the **Attribute Properties** dialog.



2. Click on the **New tag** button ( ). The **Tagged Value** dialog displays.



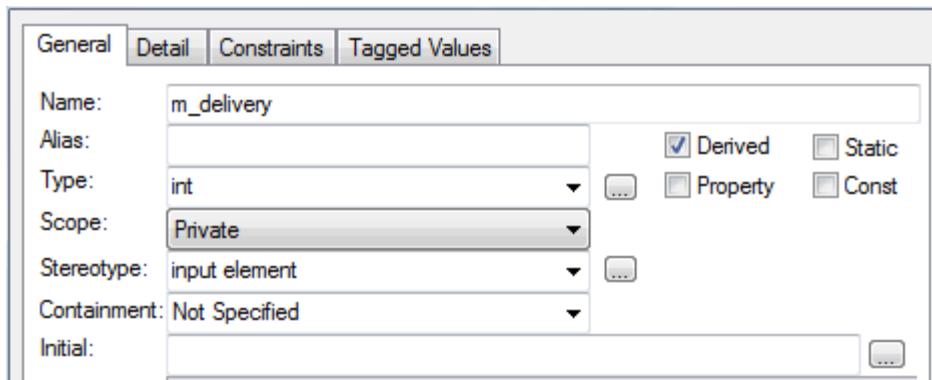
3. In the **Tag** field, type the tag name or click on the drop-down arrow and select a defined tag.
4. If appropriate, in the **Value** field type a specific value for the tag.
5. Click on the **OK** button to confirm the operation. The tag name and value are displayed under the attribute in the **Tagged Values** tab.

**Note:**

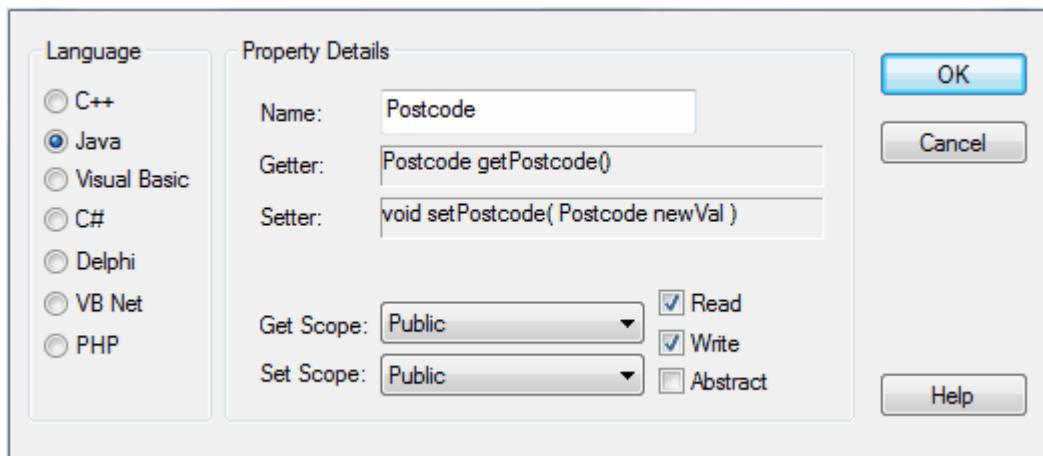
You can define custom tags by creating a Custom Tagged Value. For more information see *SDK for Enterprise Architect*.

### 3.3.5 Create Properties

Enterprise Architect has capabilities for automatically creating properties in various languages. Property creation is controlled from the **General** tab of the **Attribute** dialog.



Select the **Property** checkbox. The **Create Property Implementation** dialog immediately displays.

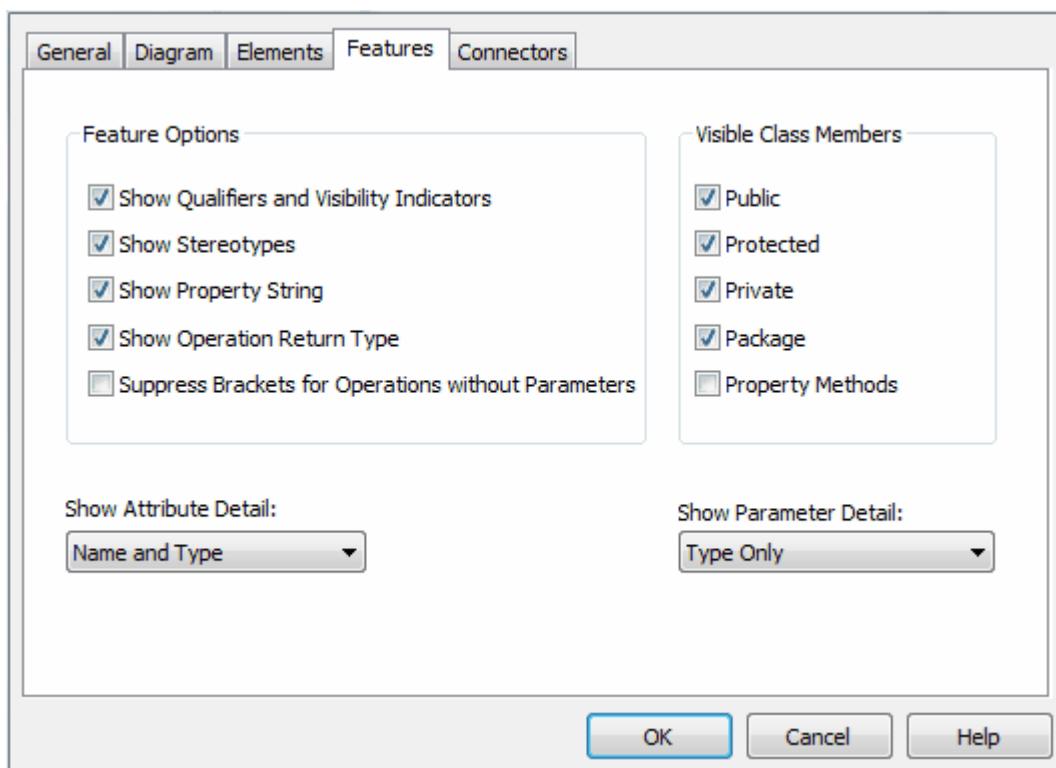


The **Language** panel defaults to the Class language; however, you can change this and generate the properties for any language. Each language has slightly different syntax and generates slightly different results. For example:

- Java and C++ generate get and set functions
- C# and VB.Net create property functions
- Delphi creates get and set functions as well as a specialized Delphi property Tagged Value.

Type in the required details and click on the **OK** button. Enterprise Architect generates the required operations and properties to comply with the selected language.

Note that *get* and *set* functions are stereotypes with «*property get*» «*property set*» making it easy to recognize property functions. You can also hide these specialized functions by deselecting the **Property Methods** checkbox in the **Features** tab of the **Diagram Properties** dialog for a specific diagram (select the **Diagram | Properties** menu option). This makes it easier to view a Class, uncluttered by many *get* and *set* methods.

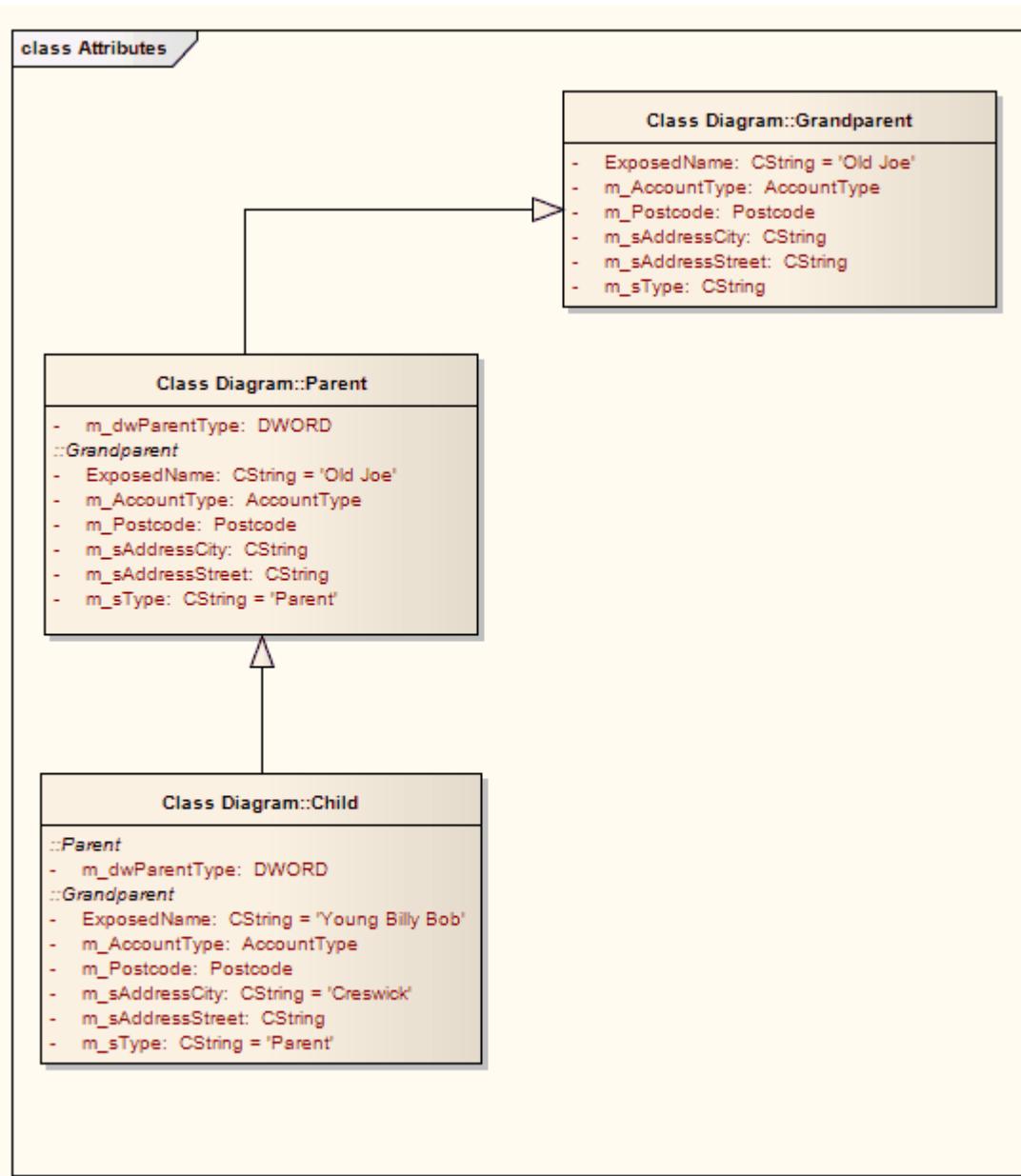


Note that for Delphi you must enable the [Tagged Values](#) compartment to see the generated properties. See [Compartments](#)<sup>187</sup> for the steps for doing this.

### 3.3.6 Display Inherited Attributes

When displaying a Class with attributes in a diagram, you can also show the inherited attributes from all parents in the elements type hierarchy (ancestors).

To show inherited attributes, use the [Specify Feature Visibility](#)<sup>33</sup> dialog.



Note that for elements that have attributes, you can also override an inherited attribute's initial value, using the element context menu option **Advanced | Override Attribute Initializers**. This displays the **Override Attribute Initializers** dialog.



In the **Override Attribute Initializers** dialog, select the variable name and enter a new initial value. If required, you can type a note in the **Note** field. When you display inherited attributes, Enterprise Architect merges the list of attributes from all ancestors and merges the attribute initializers, so that the final child Class displays the correct attribute set and initial values.

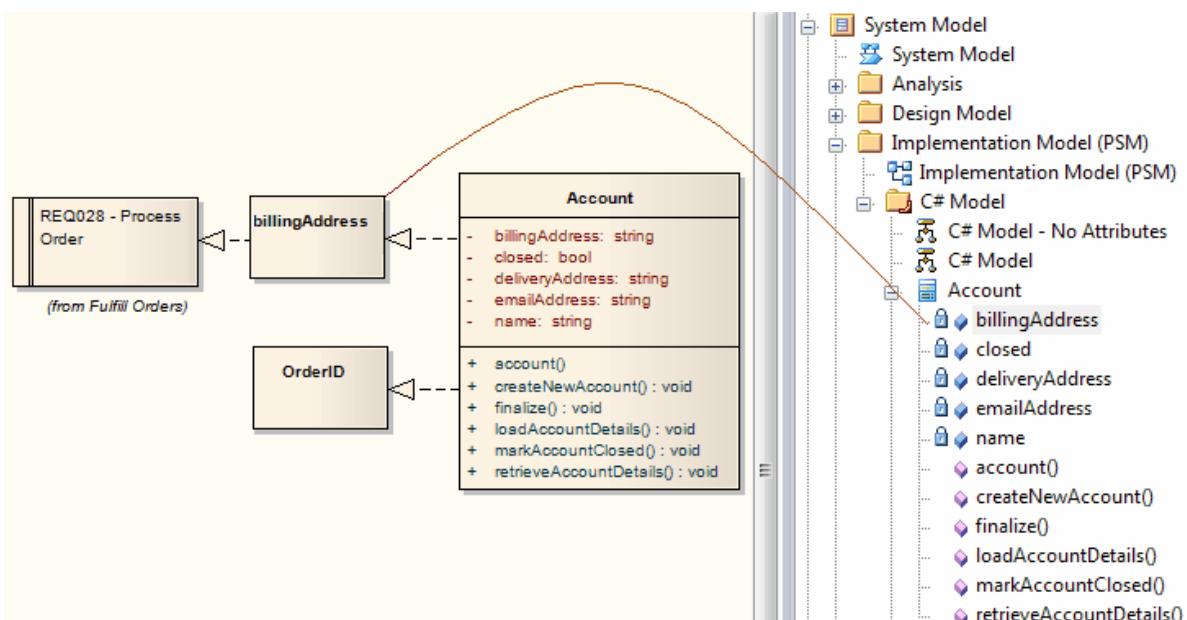
### 3.3.7 Create Object From Attribute

If you drag an attribute from the **Project Browser** onto an *Activity* diagram, the attribute generates an **Object** element of the same name. This is very useful for creating connectors between elements and specific attributes. For example, a **Class** element of stereotype *table* defines its fields as attributes; Requirement elements that define requirements for those fields can then be linked to the appropriate table fields via the attribute **Object** elements.

#### Note:

From Enterprise Architect release 7.5, you can create this relationship more directly by linking an attribute in an element to another element, or linking two attributes in different elements. See the [Connect to Element Feature](#)<sup>[202]</sup> topic.

In the following diagram, the *billingAddress* Object was generated by dragging the *billingAddress* attribute from the **Account** Class in the **Project Browser** onto the diagram. The user then created *Realize* relationships between the **Account** element and the *billingAddress* element, and between the *billingAddress* element and the **REQ028** Requirement element.



### 3.4 Properties

This topic area covers element properties and their settings, responsibilities, constraints, connectors, scenarios, Tagged Values, associated files, object files and classifiers, and boundary element settings.

To display the element **Properties** dialog, use any of the following methods:

- Select an element in the **Diagram View** and select the **Element | Properties** menu option
- Right-click on an element in the **Diagram View**, and select the **Properties** context menu option
- Select an element in the **Diagram View**, and press **[Alt]+[Enter]**
- Double-click on an element in the **Diagram View**
- Right-click on an element in the **Project Browser**, and select the **Properties** context menu option.

To suppress display of the **Properties** dialogue when placing a new element, uncheck the **Edit Object on New** option on the **Objects** page of the **Options** dialog (**Tools | Options | Objects**).

#### Note:

There are several variations of the **Properties** dialog:

- The dialog for a Table or Stored Procedure element has slight differences on the **General** tab, and a **Table (Stored Procedure) Details** tab instead of a **Details** tab; see the **Set Table Properties** topic in *Code Engineering Using UML Models*.
- The dialog for a Class element of a stereotype other than Table is as shown in [General Settings](#) [119].
- The dialog for an element of any other type does not have a **Details** tab.
- Port and Part elements have a **Property** tab (see the element descriptions in *The UML Dictionary*).
- Activity elements have a [Behaviors](#) [167] tab, and Action and Invocation elements (depending on their type) have other tabs such as Effect, Trigger and [Call](#) [167] tabs (see the element descriptions in *The UML Dictionary*).
- Action Pins have a **Pin** tab (see the element description in *The UML Dictionary*).

In all cases, the **Properties** dialog is an expandable window, which you can stretch to enable longer entry and clearer inspection of the text field values.

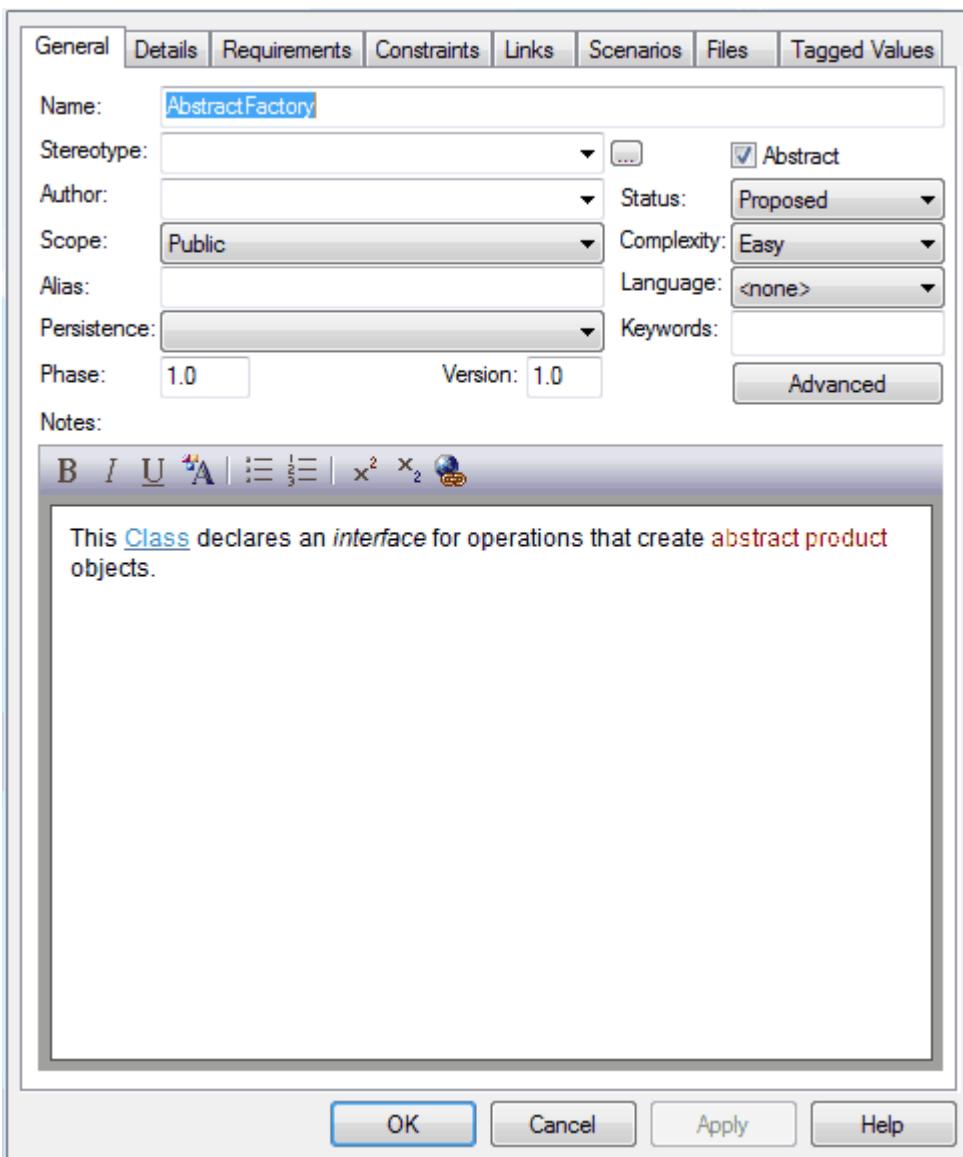
The following topics describe each of the tabs in the Class **Properties** dialog in detail.

- [General](#) [119]
- [Details](#) [121]
- [Requirements](#) [122]
- [Constraints](#) [125]
- [Links](#) [126]
- [Scenarios](#) [127]
- [Files](#) [144]
- [Tagged Values](#) [145]

Follow the links for information on [Tagged Values](#) [145], [Object files and Classifiers](#) [148], and the Boundary element appearance (see the element description in *The UML Dictionary*).

### 3.4.1 General Settings

The **General** tab of the element **Properties** dialog is shown below:



Complete the following fields:

Field	Use to
Name	Change the element's name.
Stereotype	(Optional) Type the name of a stereotype for the element, or click on the drop-down arrow and select one.
Abstract	Indicate that the element is abstract.
Author	Enter or select the name of the original author.
Status	Indicate the current status of the element (such as Approved, Proposed).
Scope	Indicate the element's scope (public, private, protected, package).

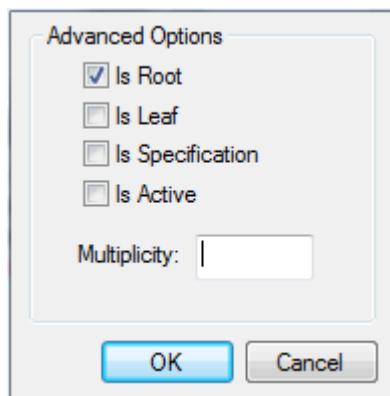
Field	Use to
<b>Complexity</b>	Indicate the complexity of the element (used for project estimation). Assign <b>Easy</b> , <b>Medium</b> or <b>Hard</b> .
<b>Alias</b>	Enter an alias (alternative display name) for the object.
<b>Language</b>	Select the programming language for the object.
<b>Keywords</b>	Enter free-text items such as keywords or context information. This can be filtered in <b>Use Case Metrics</b> and <b>Search</b> dialogs.
<b>Phase</b>	Indicate the phase this element is to be implemented in (for example, 1, 1.1, 2.0 ...).
<b>Version</b>	Enter the version of the current element.
<b>Notes</b>	Enter any notes text associated with the element, as described for the <b>Notes</b> window. You can format the notes text using the <b>Rich Text Notes</b> toolbar at the top of the field (see <i>Using Enterprise Architect - UML Modeling Tool</i> ).

Further facilities are made available by pressing the **Advanced** button. See [Advanced Settings](#) [120] for details.

### 3.4.1.1 Advanced Settings

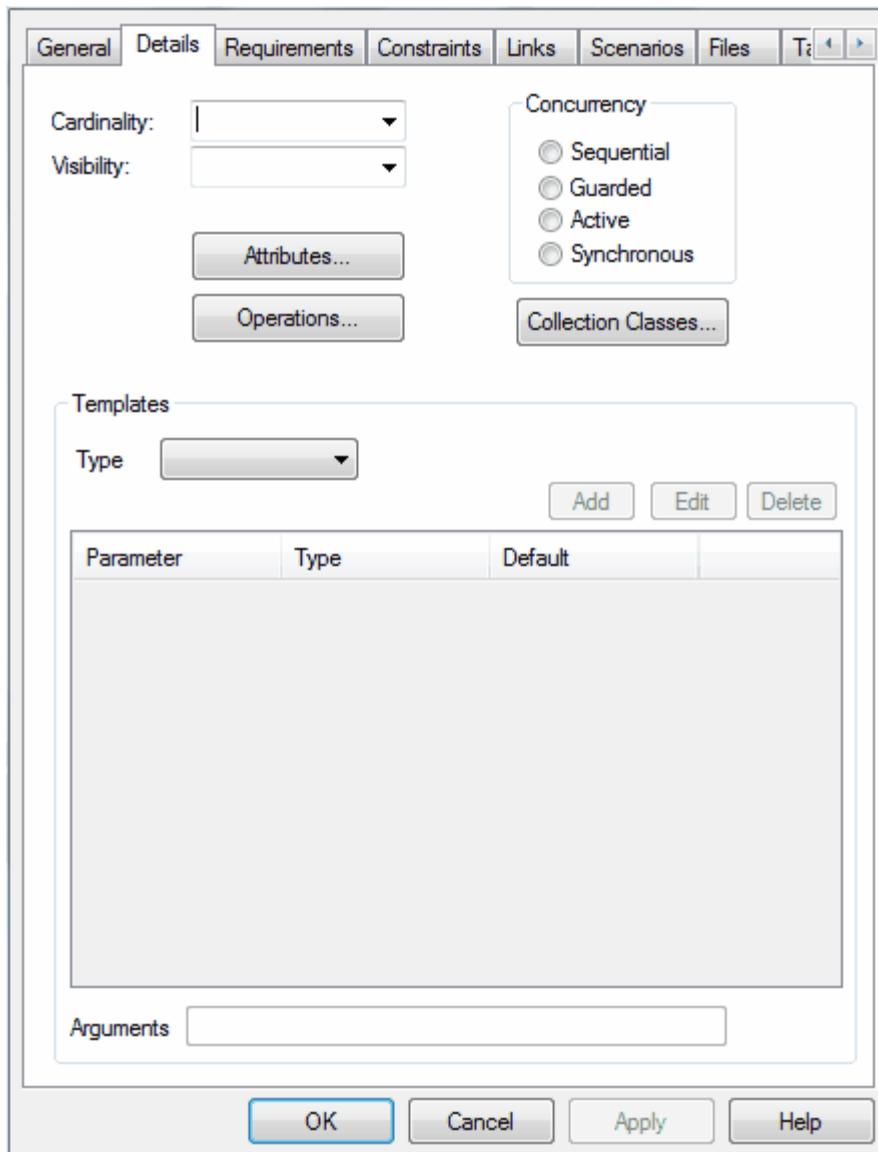
Some elements support additional attributes. These are *Generalizable* elements, and by clicking on the **Advanced** button on the element **Properties** dialog you can set the following:

- **IsRoot** - the element is a root element and cannot be descended from another
- **IsLeaf** - the element is *final* and cannot be a parent for other elements
- **IsSpecification** - the element is a specification
- **IsActive** - the element is active; for example, an Active Class (see the *UML Dictionary*)
- **Multiplicity** - the number of instances of the element that can exist. The value displays on the element in a diagram, in the *Name* compartment. Use the format defined in the **Cardinality** tab (see *UML Model Management*).



### 3.4.2 Details

The **Details** tab of the element **Properties** dialog is shown below. It enables you to define the structural and processing details for the selected Class element.



#### Note:

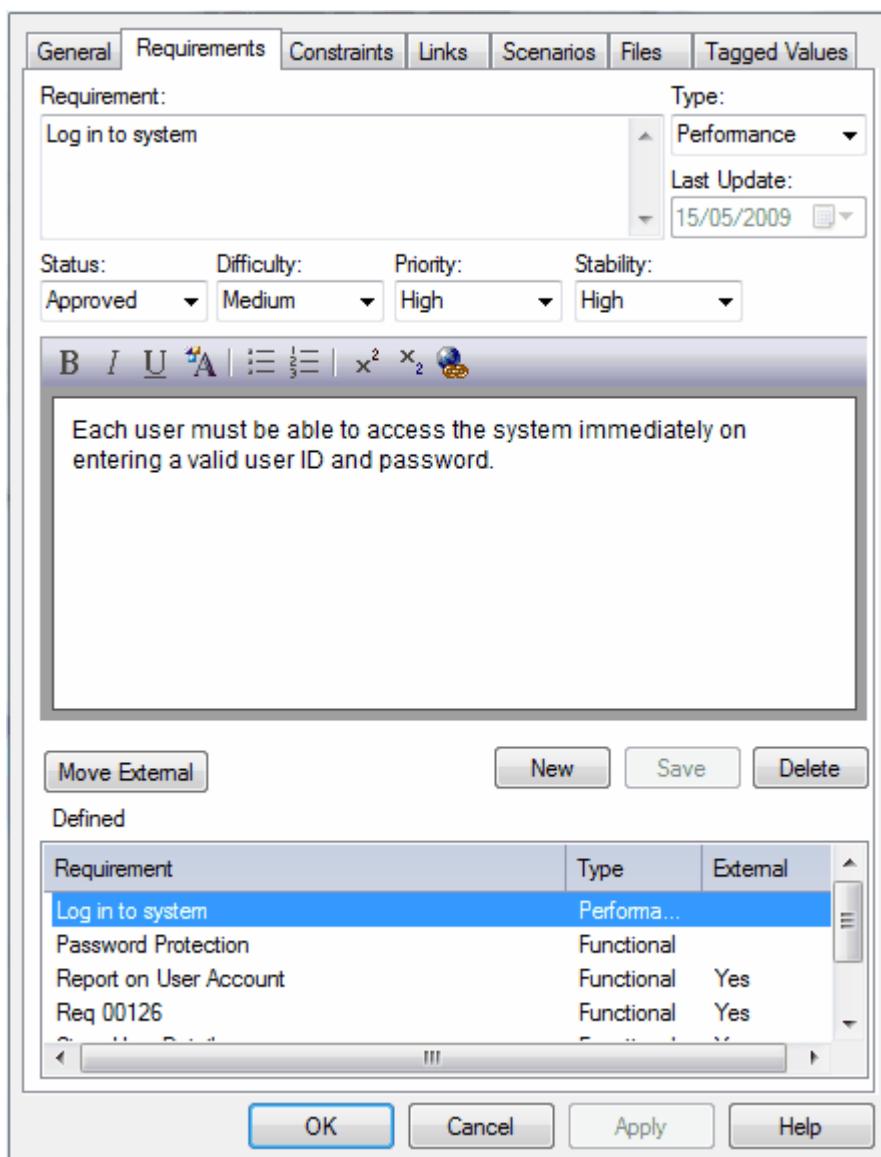
When launched from MDG Integration, the **Attributes** and **Operations** buttons are not available.

Field/Button	Use to
<b>Cardinality</b>	<p><b>Note:</b></p> <p>Cardinality and Multiplicity are effectively the same. It is recommended that you define the value in the <b>Multiplicity</b> field of the <a href="#">Advanced dialog</a>; this ensures that the value displays on the element in a diagram.</p> <p>Select the number of elements in a set for the Class.</p>
<b>Visibility</b>	Select the visibility of the Class.

Field/Button	Use to
<b>Attributes</b>	Define attributes for the Class. The <a href="#">Attributes Properties</a> <sup>[105]</sup> dialog displays.
<b>Operations</b>	Define operations for the Class. The <a href="#">Operations Properties</a> <sup>[155]</sup> dialog displays.
<b>Concurrency</b>	Specify how concurrent activities should be processed.
<b>Collection Classes</b>	Define Collection Classes (for generating code from Association connectors) that apply to this Class. The <a href="#">Collection Classes for Association Roles</a> dialog displays (see the <i>Set Collection Classes</i> topic in <i>Code Engineering Using UML Models..</i> )
<b>Type</b>	Select the type of Class template parameter to add or list. You can also edit or delete parameters. See the <i>Parameterised Classes</i> topic in the <i>UML Dictionary</i> .
<b>Arguments</b>	Select a parameter and type any required argument for that parameter.

### 3.4.3 Requirements

The Requirements tab of the element **Properties** dialog is shown below. Use this page to create requirements that this element is designed to meet. Requirements are of two types: *internal requirements* (responsibilities - see *Requirements Management*) and *external requirements*<sup>[124]</sup> (system requirements, elements connected to this element by a Realize connector). Enterprise Architect shows both types, but you can only edit the internal type from this tab.



You can show the requirements for an element on the diagram directly, using the [Specify Feature Visibility](#) function. (It is also possible to show inherited requirements in this way).

Field/Button	Use to
Requirement	Enter the name and high level detail of the requirement.
Type	Specify the type; for example, <b>Functional</b> or <b>Non-functional</b> . Functional requirements are things that the system must do, such as identify franked, unfranked and total credit for a dividend; non-functional requirements are things that the system must be, such as reliable, cost effective.
Last update	Specify the date of the last requirement update.
Status	Specify the current status of the requirement.
Difficulty	Identify the complexity of implementing the current requirement.
Priority	Specify how urgent the requirement is.

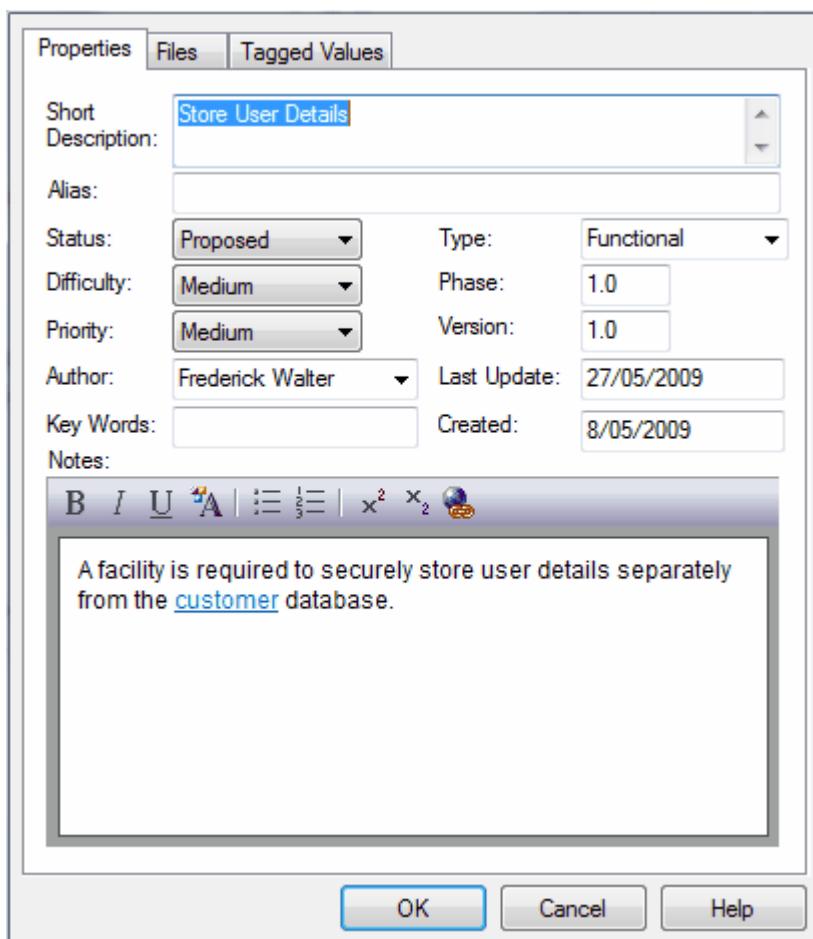
Field/Button	Use to
<b>Stability</b>	Specify the estimated stability of the requirement. This is an indication of the probability of the requirement - or understanding of the requirement - changing. High stability indicates a low probability of the requirement changing.
<b>Notes</b>	Record details of the requirement. As for the <b>Notes</b> window, you can format the notes text using the <b>Rich Text Notes</b> toolbar at the top of the field. (See <i>Using Enterprise Architect - UML Modeling Tool</i> .)
<b>Move External</b>	Make an internal responsibility into an external requirement. (See <i>Requirements Management</i> .)
<b>New</b>	Create a new requirement.
<b>Save</b>	Save changes to requirements.
<b>Delete</b>	Delete a selected requirement.
<b>Defined</b>	List the defined requirements associated with this element.

### 3.4.3.1 External Requirements

External requirements are those Requirement elements that have been connected to the current element using a *Realization* connector. By creating the connector from the element to the requirement, you create an expectation that the element must implement the requirement as part of the system solution.

In Enterprise Architect, linked requirements are shown in the **Requirements** tab of the element **Properties** dialog, but they are marked *external* and cannot be directly edited (on selection, the tab fields are grayed out).

Double-click an external requirement in the list to activate the **Properties** dialog for the associated requirement, where you can view and modify the requirement details and check the requirement hierarchy details.



#### See Also (in Requirements Management)

- Create Requirements
- Make Internal Requirement External

#### 3.4.4 Constraints

The **Constraints** tab of the element **Properties** dialog is shown below.

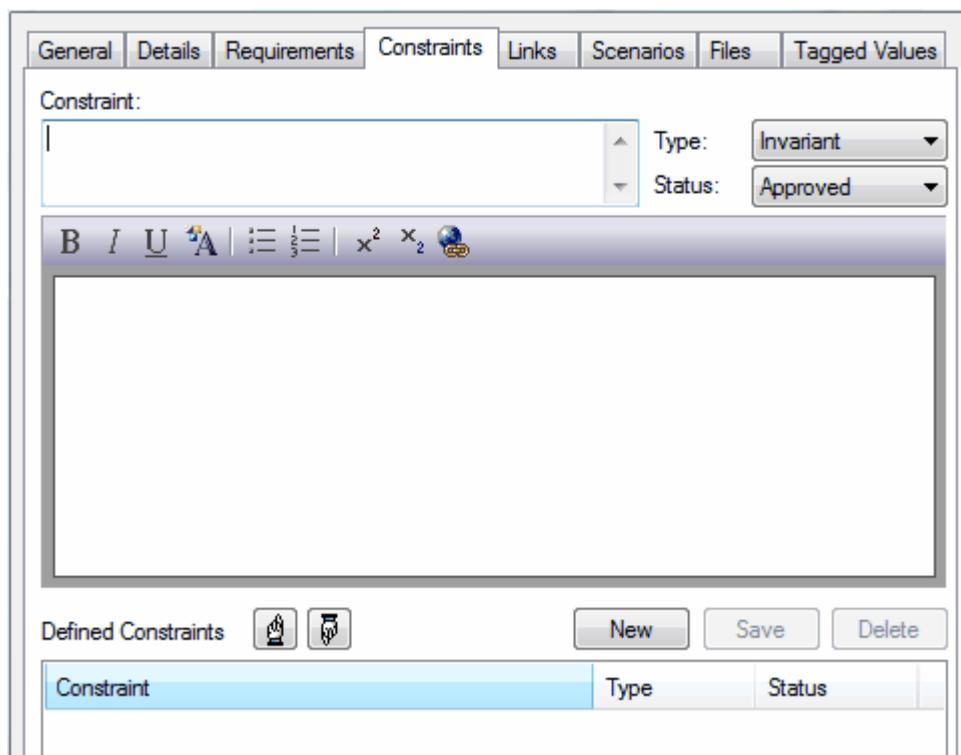
Elements can have associated constraints placed on them. These are conditions under which the element must exist and function. Typical constraints are pre- and post- conditions, which indicate things that must be true before the element is created or accessed and things that must be true after the element is destroyed or its action complete.

Use the [Specify Feature Visibility](#)<sup>33</sup> function to show constraints for an element on the diagram directly (it is also possible to show inherited constraints in this way).

#### Add Constraints to a Model Element

To add constraints to a model element, follow the steps below:

1. Open the element **Properties** dialog.
2. Select the **Constraints** tab.



3. In the **Constraint** field, type the name of the constraint.
4. In the **Type** and **Status** fields, click on the drop-down arrow and select the constraint type (**Pre-condition**, **Post-condition** or **Invariant**) and status.
5. In the larger text field, type any additional notes required.
6. Click on the **Save** button.

Constraints are used in conjunction with [responsibilities](#) to define the conditions and rules under which an element operates and exists.

### 3.4.5 Links

The **Links** tab of the element **Properties** dialog displays a list of all relationships active for the current element.

Element	Element Stereotype	Type	Connection	Stereotype
Report on User Account	Functional	Requirement	Realization	

The **Relationships** panel lists the relationships this element has. The:

- **Element** column identifies the elements this element is related to
- **Element Stereotype** column identifies the stereotype (if any) of the element
- **Type** column identifies the element type of the related element
- **Connection** column identifies the type of relationship
- **Stereotype** column identifies the stereotype (if any) of the relationship.

From the **Links** tab you can perform operations on a relationship, by right-clicking on the relationship to display the context menu.

- [Hide Relation](#)
- [Relationship Properties](#)
- [Locate Related Object](#)
- [Delete relationship](#)

To:

- Hide the relationship on the diagram, click on the **Hide Relation** menu option; the option then changes to **Show Relation**, which you select to redisplay the relationship on the diagram
- Display the relationship [Properties](#) [217] dialog, click on the **Relationship Properties** menu option
- Highlight the related element in the [Project Browser](#), click on the **Locate Related Object** menu option
- Delete the relationship from the model and all diagrams, click on the **Delete Relationship** menu option; the system prompts you to confirm the deletion.

### 3.4.6 Scenarios

A scenario is a real-world sequence of operations that describes how an element works in real-time. It can be applied to any element - generally Use Cases - and can describe functional behavior, business work flows and end-to-end business processes.

The [Scenario](#) tab of the element [Properties](#) dialog has two internal tabs, as described below.

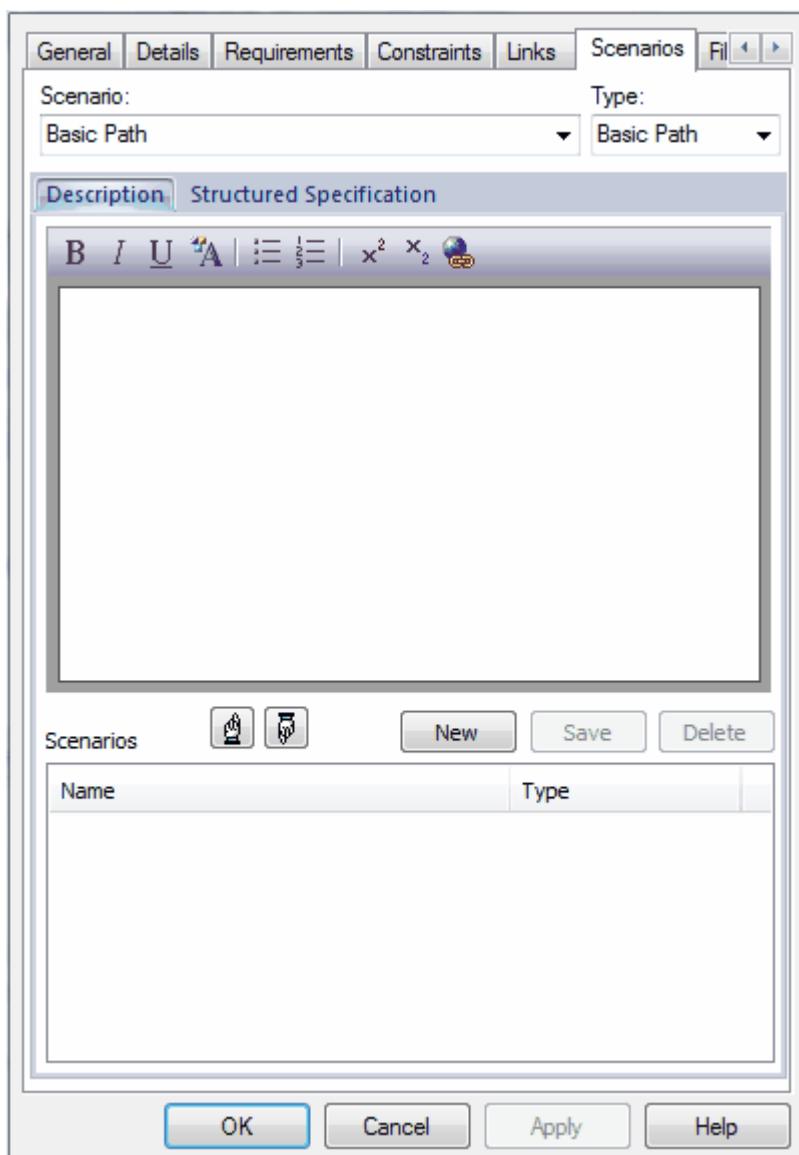
- The **Description** tab enables you to create scenarios and provide a simple text description of each scenario, or of the structure of each scenario.
- The [Structured Specification](#) [129] tab enables you to create scenarios or select those you have created elsewhere and, for each scenario:
  - Create a series of steps for each part of the scenario
  - Structure the scenario to show how the basic path diverges into the alternate paths and exception paths
  - Generate a [number of types of diagram](#) [135] from the structure
  - Generate a structured scenario [from an Activity diagram](#) [143]
  - Generate a structured scenario [from text on the clipboard](#) [133]; this option has a variation in the **Description** tab that enables you to [translate scenario descriptions](#) [129] created prior to release 8.0 of Enterprise Architect, into structured scenarios in the latest release.

#### Notes:

- The [Scenarios](#) tab does not prevent you from creating more than one basic path, but it would be unusual to define more than one.
- All the functions available on the [Scenarios](#) tabs are also available through the [Scenarios & Requirements](#) window/view (see *Using Enterprise Architect - UML Modeling Tool*). Use the **Browse Element** icon in the window toolbar to list and select the scenarios for the element.

### Description Tab

When you first select the [Scenarios](#) tab, it defaults to the **Description** tab and sets both the **Scenario** (name) field and the **Type** field to **Basic Path**, to enable you to define the basic path first. You can overtype the scenario name with more appropriate text if required. As you go on to create other scenarios, you set the type to **Alternate** or **Exception** as appropriate.



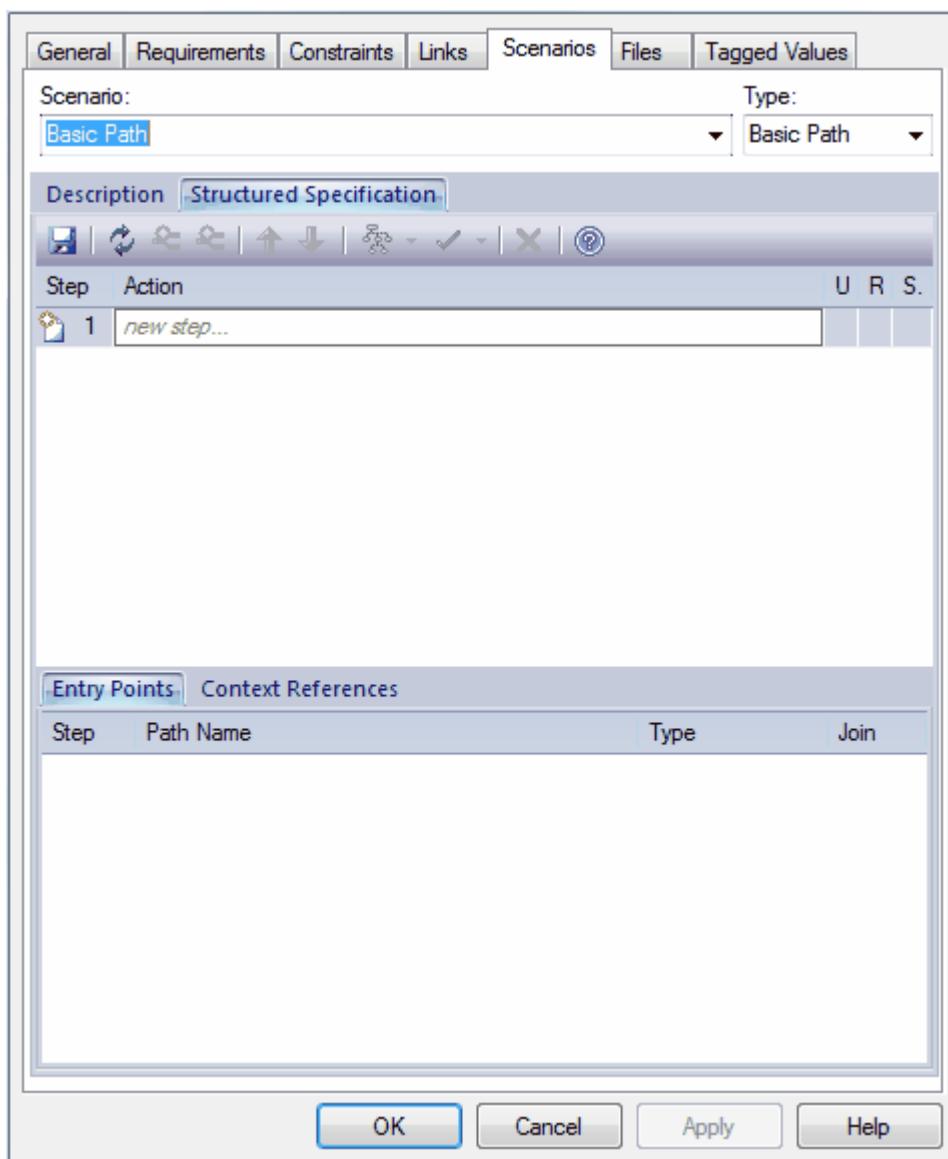
Complete the fields as described below.

Field	Use to
<b>Scenario</b>	Type in the name of the scenario (or, for existing scenarios, click on the drop-down arrow and select one from the list).
<b>Type</b>	Specify the type of scenario; the options are: <ul style="list-style-type: none"> <li>• <b>Basic Path</b> - the direct set of steps for the scenario</li> <li>• <b>Alternate</b> - an alternative set of steps, in parallel with part of the basic path</li> <li>• <b>Exception</b> - the path the scenario follows if a step of the basic path does not produce an appropriate result.</li> </ul>
<b>Description</b>	Record a textual description of how the user uses the current element. As for the <b>Notes</b> window, you can format the notes text using the <b>Rich Text Notes</b> toolbar at the top of the field. (See <i>Using Enterprise Architect - UML Modeling Tool</i> .) As well as the <b>Notes</b> window facilities, you can also generate a structured specification from the text in this field. Highlight the text, right-click on it and select the <b>Create</b>

Field	Use to
	<b>Structure from Notes</b> context menu option. The text is copied to the <a href="#">Structured Specification</a> <sup>129</sup> tab for the current scenario, either as a new specification or as the continuation of an existing specification, with a new step created at each carriage return. Subsequent changes to the text on the <b>Structured Specification</b> tab are not reflected on the <b>Description</b> tab.
<b>New</b>	Clear the data fields so that you can enter data in them to create a new scenario.
<b>Save</b>	Save a new scenario, or changes to an existing scenario.
<b>Delete</b>	Delete a scenario selected from the <b>Scenarios</b> panel, below.
<b>Scenarios</b>	Display a list of defined scenarios for this element. You can change the order in which the scenarios are listed, using the  and  buttons.

#### 3.4.6.1 Structured Specification Tab

The **Structured Specification** tab enables you to define the structure, actions and interactions of the scenarios defined for an element such as a Use Case. These scenarios can be the main or basic path, alternate paths, or exception paths.



When you open the **Structured Specification** tab it defaults to the basic path (as shown above) so that if it does not already exist, you can create it. You can create alternate paths and exception paths as part of the process of adding them to steps of the basic path.

You can also create all three types of scenario paths on the **Description**<sup>[127]</sup> tab, or in the **Scenarios & Requirements** window (see *Using Enterprise Architect - UML Modeling Tool*).

## Set Up Scenario Specification

You can create a specification for a scenario in one of several ways:

- Enter the specification yourself, as described below
- Generate a specification [from an Activity diagram](#)<sup>[143]</sup> created under a Use Case element
- Generate a specification [from the notes text](#)<sup>[127]</sup> of the scenario in the **Description** tab
- Generate a specification from [text held on the clipboard](#)<sup>[133]</sup>.

To enter the specification yourself, starting with the basic path, follow the steps below:

1. In the **Scenario** field, click on the drop-down arrow and select the *Basic Path* scenario.
2. In the *new step* field in the **Action** column, type the text of the first step or action.

**Note:**

An entry for the basic path displays in the **Entry Points** tab, as **Step 0** with no value in the **Join** column (the basic path does not rejoin itself).

3. Tab to the **Uses** column and, if necessary, type the name of each element used in this step.

**Note:**

The values in the **Uses**, **Results** and **State** columns, whilst optional, are significant if you want to [generate a diagram](#)<sup>[135]</sup> from the specification. If you type the name of an element linked to the current element (and listed in the [Context References](#)<sup>[143]</sup> tab), the element name is highlighted and underlined.

4. Tab to the **Results** column and, if necessary, type the outcome of completing this step.
5. Tab to the **State** column and, if necessary, type the name of the state into which the step moves the action.
6. When you move out of the **Action** column, the next *new step* field displays underneath. Repeat steps 2 to 5 as many times as is necessary.

By default, the steps begin with a user step (indicated by an actor icon) and alternate between user and system (indicated by a screen icon) steps. To change the entity responsible for a step, either double-click on the icon, or right-click on the step and select the **Set Step as 'System'** or **Set Step as 'User'** context menu option as required.

The **Structured Specification** tab should now resemble the following illustration:

Structured Specification				
Step	Action	Uses	Results	State
1	First step of basic path	Customer	Machine activated	ON
2	Continue, or go to alternate step Access 1	Use Case 1		
3	Continue main path	Customer		
4	Continue, or go to alternate step ATM	ATM	Machine Validating	VALIDATION
5	Continue on main path			
6	Continue, or if error go to Exception	Use Case 2		
7	Continue and finish			
8	new step...			

Entry Points			
Step	Path Name	Type	Join
0	Main Task	Basic Path	-

Repeat the **Scenario Steps** procedure for each scenario you have created. You can now adapt, enhance and interrelate the scenario specifications using the facilities of the **Structured Specification** tab.

## Facilities Of the Structured Specification Tab

The **Structured Specification** tab offers a wide range of facilities for generating and modifying scenario specifications. These are available through the tab toolbar and a number of context menus.

### Toolbar

The icons on the **Structured Specification** toolbar offer the following facilities:

Icon	Use to																								
	Save changes to the scenario specification.																								
	Display the basic path specification (only if another specification is currently displayed).																								
	<p>(Only enabled when the basic path is displayed - you cannot add an alternate path to another alternate path or an exception path.)</p> <p>Create a branch from the selected step to an alternate path scenario - select the path from the displayed list. If the appropriate scenario does not yet exist, double-click on the <i>new path</i> line and type the scenario name, then click off the line and back on to it. Click on the <b>OK</b> button.</p> <p><b>Note:</b></p> <p>An entry for this alternate path displays in the <b>Entry Points</b> tab, as <b>Step a</b> of the basic path step it branches from; in the <b>Join</b> column, click on the drop-down arrow and select the number of the step at which action flows back to the basic path, or select <b>End</b> if the path terminates separately from the basic path.</p> <table border="1"> <thead> <tr> <th colspan="4">Entry Points</th> </tr> <tr> <th>Step</th> <th>Path Name</th> <th>Type</th> <th>Join</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Main Task</td> <td>Basic Path</td> <td>-</td> </tr> <tr> <td>2a</td> <td>Access 1</td> <td>Alternate</td> <td>6</td> </tr> <tr> <td>4a</td> <td>ATM Path</td> <td>Alternate</td> <td>End</td> </tr> <tr> <td>6a</td> <td>Exception</td> <td>Exception</td> <td>End</td> </tr> </tbody> </table>	Entry Points				Step	Path Name	Type	Join	0	Main Task	Basic Path	-	2a	Access 1	Alternate	6	4a	ATM Path	Alternate	End	6a	Exception	Exception	End
Entry Points																									
Step	Path Name	Type	Join																						
0	Main Task	Basic Path	-																						
2a	Access 1	Alternate	6																						
4a	ATM Path	Alternate	End																						
6a	Exception	Exception	End																						
	<p>(Only enabled when the basic path is displayed - you cannot add an exception path to another exception path or an alternate path.)</p> <p>Create a branch from the selected step to an exception path scenario - select the path from the displayed list. If the appropriate scenario does not yet exist, double-click on the <i>new path</i> line and type the scenario name, then click off the line and back on to it. Click on the <b>OK</b> button.</p> <p><b>Note:</b></p> <p>An entry for this exception path displays in the <b>Entry Points</b> tab, as <b>Step a</b> of the basic path step it branches from; in the <b>Join</b> column, click on the drop-down arrow and select the number of the step at which action flows back to the basic path, or select <b>End</b> if the path terminates separately from the basic path.</p>																								
	Move the currently-selected step one place up.																								
	Move the currently-selected step one place down.																								
	Display a list of diagrams that you can <a href="#">generate from the scenario</a> <sup>[135]</sup> ; select the type of diagram that you want to generate.																								
	<a href="#">Generate Test Cases</a> <sup>[142]</sup> based on this Use Case scenario; you can generate either internal Test Cases or External Test Cases.																								
	Delete the selected step from the scenario.																								
	Display the Help topic for this tab.																								

### Item/Blank Space Context Menu

To display this context menu, right-click on a step or blank line on the **Structured Specification** tab. The following options are available:

Option	Use to
<b>Create Structure From Clipboard Text - New Lines</b>	Generate a set of steps from a text description or list captured on the clipboard. A new step is generated: <ul style="list-style-type: none"> <li>• after each carriage return in the captured text (<b>New Lines</b>), or</li> <li>• for each sentence in the text; that is, after each full stop/space/capital letter combination (<b>Sentences</b>).</li> </ul> If a set of steps is already displayed, it is overwritten by the generated steps.
<b>Create Structure From Generated Activity Diagram</b>	Generate a set of steps <a href="#">from an Activity Diagram</a> <sup>[143]</sup> created for a Use Case. If a set of steps is already displayed, it is overwritten by the generated steps.
<b>Add Alternate Path</b>	Create a branch from the selected basic path step to an alternate path (see previously).
<b>Add Exception Path</b>	Create a branch from the selected basic path step to an exception path (see previously).
<b>Set Step As 'User'</b> <b>Set Step As 'System'</b>	Switch the entity responsible for performing the action of the selected step between user and system.
<b>Link Step to Use Case</b>	Either <i>include</i> the actions of an existing Use Case element, <i>extend</i> an existing Use Case element, or <i>invoke</i> a Use Case as the action of the selected step. Selecting the appropriate sub-option displays the <a href="#">Select Use Case</a> <sup>[149]</sup> dialog, which you use to browse for and select the required Use Case element.  The appropriate <i>includes</i> , <i>extends</i> or <i>invokes</i> stereotyped connector is created between the current element and the selected Use Case.  For the <i>include</i> and <i>extend</i> actions, any text in the <b>Action</b> field is overwritten by the link to the Use Case. For the <i>invoke</i> action, the following link is added to the end of the <b>Action</b> text:  [Invokes: <Use Case Name>]
<b>Merge With Step</b>	Merge the selected step with another. A list of the other steps in the scenario displays; click on the step to merge with the selected step.
<b>Move After Step</b>	Move the selected step to another position in the scenario. A list of the other steps in the scenario displays; click on the step after which to position the selected step.
<b>Delete</b>	Delete the selected step. A prompt displays to confirm the deletion. Any subsequent steps are moved up one place.

### Text Selection Context Menu

To display this context menu, *highlight* the text in a user-editable field within a step on the **Structured Specification** tab. The following options are available:

Option	Use to
<b>Create</b>	Create a glossary definition (see <i>Using Enterprise Architect - UML Modeling Tool</i> ) or a <a href="#">new element</a> <sup>[83]</sup> based on the highlighted text.
<b>Link Step to Use Case</b>	Either <i>incorporate</i> the actions of an existing Use Case element, or <i>extend</i> an existing Use Case element, as the action of the selected step. Selecting the appropriate sub-option displays the <a href="#">Select Use Case</a> <sup>[149]</sup> dialog, which you use

Option	Use to
	to browse for and select the required Use Case element. Any text in the <b>Action</b> field is overwritten by the link to the Use Case.
<b>Link to existing Element</b>	( <b>Uses</b> and <b>Results</b> fields only.) Create a Realization or Dependency relationship to a Requirement, Feature or other element elsewhere in the model.  You select the element and connector types from submenu options, which then display the <a href="#">Select Element</a> <sup>[149]</sup> dialog, which you use to browse for and select the required element.
<b>Insert Context Reference</b>	Add a reference to an element stored elsewhere in the model, and create an entry for the element in the <a href="#">Context References</a> <sup>[143]</sup> tab.  Selecting this option displays the <a href="#">Select Element</a> <sup>[149]</sup> dialog, which you use to browse for and select the required reference element.  See also the <a href="#">Floating Toolbar</a> <sup>[135]</sup> section, below.
<b>Insert glossary definition</b>	Insert an existing glossary term at the cursor position. To select the term, double-click on it in the displayed list.  When you select the term it is inserted into the field as highlighted and underlined text, which displays the definition when you move the cursor over it. If you highlighted part of the original text, the term overwrites that text.
<b>Split Step</b>	Splits the selected step into two consecutive steps.  The option is available only if you highlight a <i>portion</i> of the text in the selected field. The new step takes the highlighted text as its <b>Action</b> text.
<b>Search for &lt;text&gt;</b>	Displays a sub-menu of options for locating the selected text in a number of locations (see <i>Using Enterprise Architect - UML Modeling Tool</i> ).
<b>Undo</b>	Undo any unsaved changes you have just made in the step.
<b>Cut</b>	Perform simple editing operations on the highlighted text.
<b>Copy</b>	
<b>Paste</b>	
<b>Delete</b>	
<b>Select All</b>	

### Entry Points Context Menu

The **Entry Points** tab shows how the basic path, alternate path and exception path scenarios for the element are organized and interrelated. If an alternate path or exception path has been defined but has not yet been added to the basic path, it is not listed on this tab.

You can switch focus between the **Entry Points** tab and the **Structured Specification** tab by pressing **[Alt]+[Q]**.

To display the context menu for this tab, highlight an entry and right-click on it. The following options are available:

Option	Use to
<b>Edit Path</b>	Display the steps of the scenario in the <b>Structured Specification</b> tab, with the first step highlighted.
<b>Join with Step</b>	(Available only if the basic path scenario is displayed in the <b>Structured Specification</b> tab. Not available to edit the basic path scenario.)

Option	Use to
	Highlight the <b>Join</b> field and its drop-down arrow. Click on the drop-down to define or change the step number at which the alternate or exception path rejoins the basic path. Select <b>End</b> if the path does not rejoin the basic path steps.
<b>Delete</b>	(Available only if the basic path scenario is displayed in the <b>Structured Specification</b> tab. Not available to delete the basic path.)  Delete the relationship between the selected path and the basic path, and remove the entry from the <b>Entry Points</b> tab.

### Floating Toolbar

Wherever a reference to another element exists on the Scenario tab (that is, where the text is highlighted and underlined), if you hover the cursor over the element name a short floating toolbar displays, which you can use to:

- display the element **Properties** dialog
- locate the element in its parent diagram
- locate the element in the **Project Browser**.

#### 3.4.6.2 Generate Diagrams

If you have created a structured scenario, you can generate any of the following diagrams from that scenario:

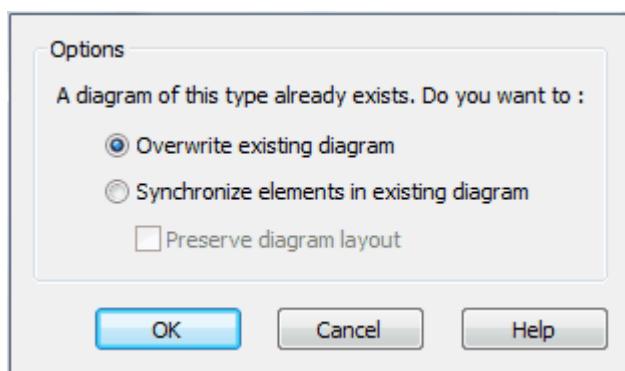
- [Activity](#) 
  - With [ActivityParameter](#) 
  - With [Action](#) 
  - With [Action Pin](#) 
- [Rule Flow](#) 
- [State Machine](#) 
- [Sequence](#) 
- [Robustness](#) 

To generate the required diagram, follow the steps below:

- Create the scenario structure on the [Structured Specification](#)  tab.
- Click on the **Generate Diagram** icon () in the toolbar on the tab.
- Click on the type of diagram to generate.

Enterprise Architect generates the diagram and notifies you that generation is complete. Close the **Properties** dialog to review the diagram.

If the diagram being generated already exists under the selected element, the following prompt displays:



Select the appropriate radio button to:

- Overwrite the existing diagram (delete the existing diagram and elements, and create a new diagram and elements) or
- Synchronize the elements in the existing diagram with the scenario steps (however, Sequence and Robustness diagrams cannot be synchronized).

**Note:**

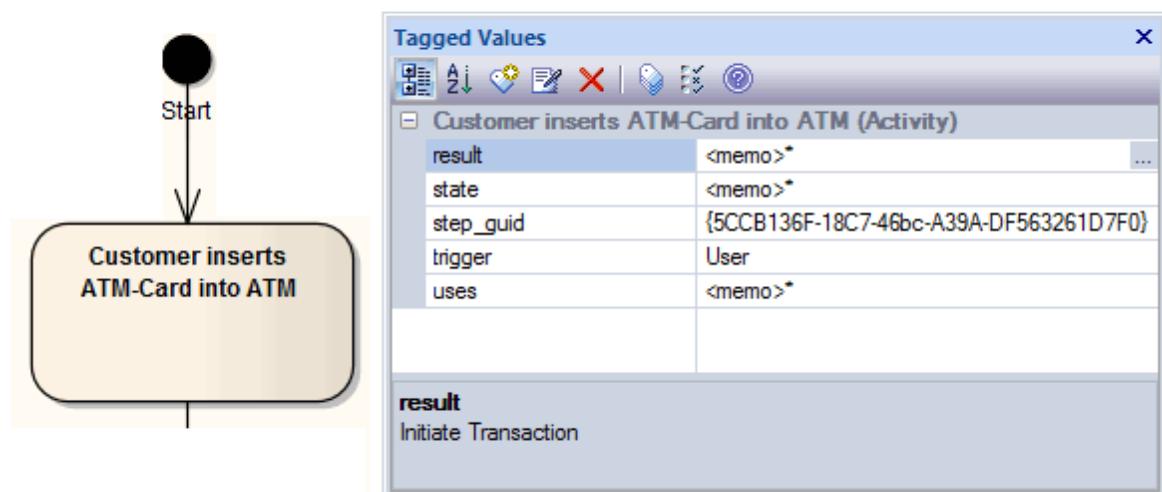
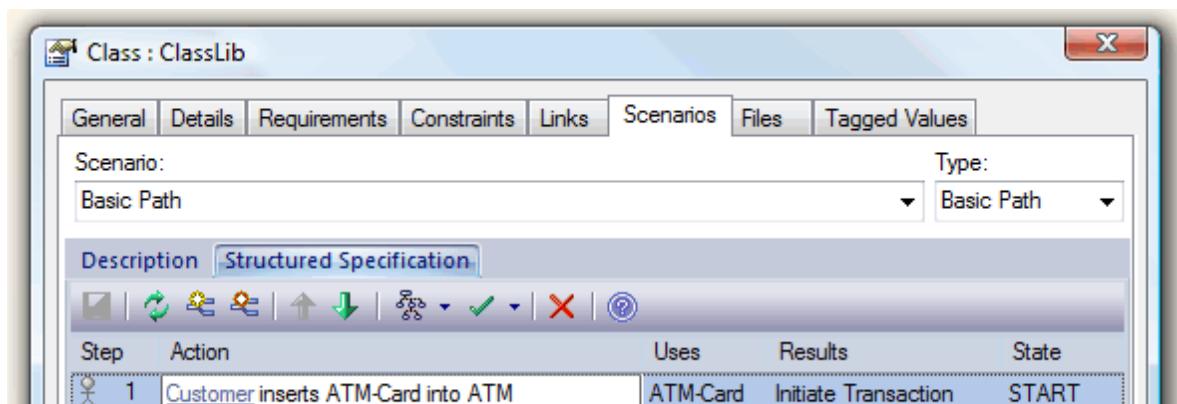
The **Synchronize elements in existing diagram** option enables the **Preserve Diagram Layout** checkbox, which you can select to preserve the existing arrangement of elements and connectors on the diagram. Any new elements are added to the diagram in the default position, and you manually position them in the diagram as required. If you do not select the checkbox, the diagram is recast in the default layout.

It is recommended that you uncheck the **Preserve Diagram Layout** checkbox if you are synchronizing elements with scenario steps:

- When new steps have been added or existing steps have been deleted or moved within the Use Case
- For the first time in a Use Case that has been imported from XMI with the **Strip GUIDs** option selected
- For the first time in a Use Case that has been copied and pasted<sup>90</sup> in the **Project Browser**, or
- For the first time in a Use Case whose containing package has been copied and pasted<sup>4</sup> in the **Project Browser**.

## Activity Diagram

An Activity is generated as a child of the selected element, to act as a container for the diagram. The scenario steps are modeled as Activities, and the values of the *Uses*, *Results* and *State* columns for each step are added as Tagged Values of the corresponding Activity.



### Activity with ActivityParameter

The values of the *Uses* and *Results* columns are modeled as ActivityParameters.

The value of the *State* column is added as a Tagged Value of the Activities.

**Note:**

ActivityParameters are added to the [Project Browser](#) and not to the diagram.

### Activity with Action

The scenario steps are modeled as Actions, and the values of the *Uses*, *Results* and *State* columns are added as Tagged Values of the Actions.

### Activity with ActionPin

The scenario steps are modeled as Actions, and the values of the *Uses* and *Results* columns are modeled as Input Pins and Output Pins respectively.

The value of the *State* column is added as a Tagged Value of the Actions.

**Note:**

ActionPins are added to the [Project Browser](#) and not to the diagram.

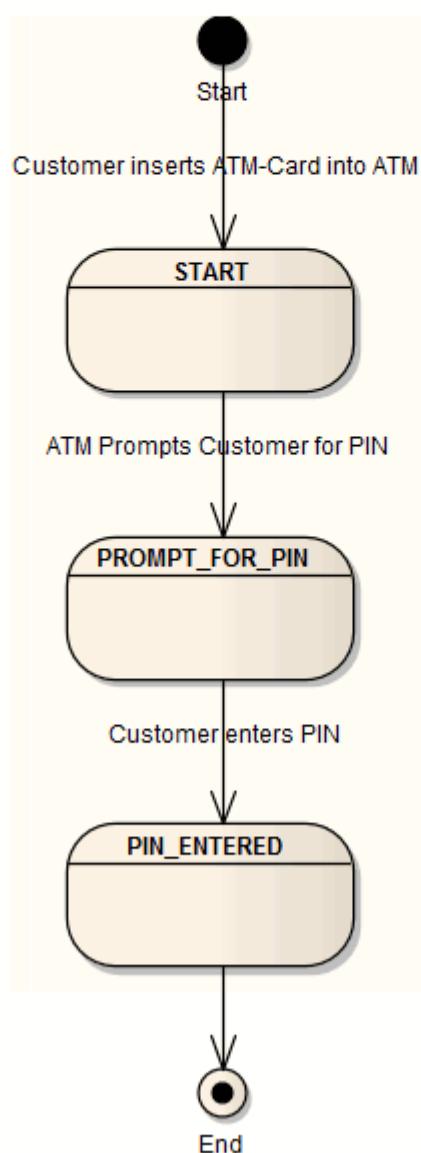
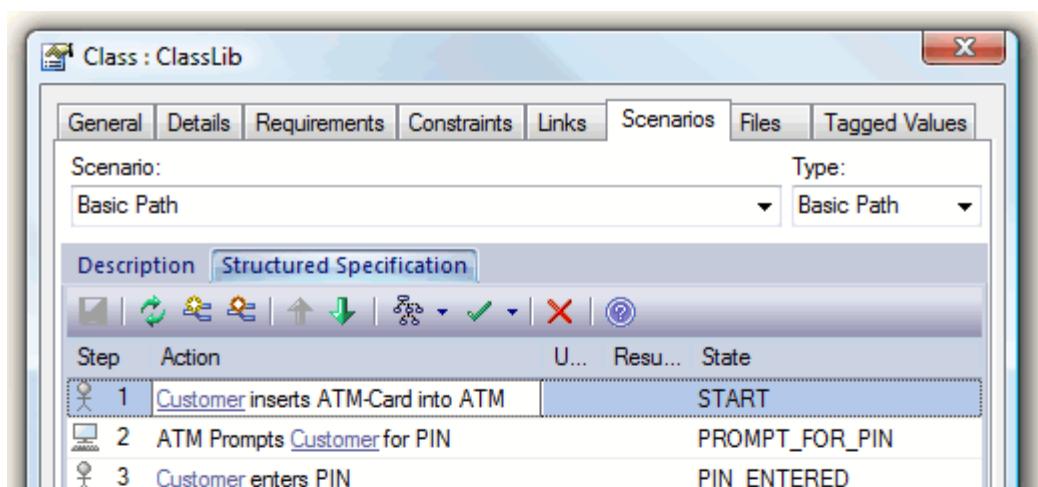
### RuleFlow Diagram

A Rule Flow Activity is created as a child of the selected element, to act as a container for the diagram. The scenario steps are modeled as RuleTasks, and the values of the *Uses*, *Results* and *State* columns are added as Tagged Values of the RuleTasks.

### State Machine Diagram

A StateMachine is created as a child of the selected element, to act as a container for the diagram. Each value in the *State* column is modeled as a State.

The scenario steps become the Transition connectors between the States, and the values of the *Uses* and *Results* columns are added as Tagged Values of the Transitions.



## Sequence Diagram

**Note:**

All the elements involved in the scenario should be identified in the [Context Reference](#)<sup>[143]</sup> tab. That is, relationships must already exist between the scenario parent element and the other elements named in the scenario.

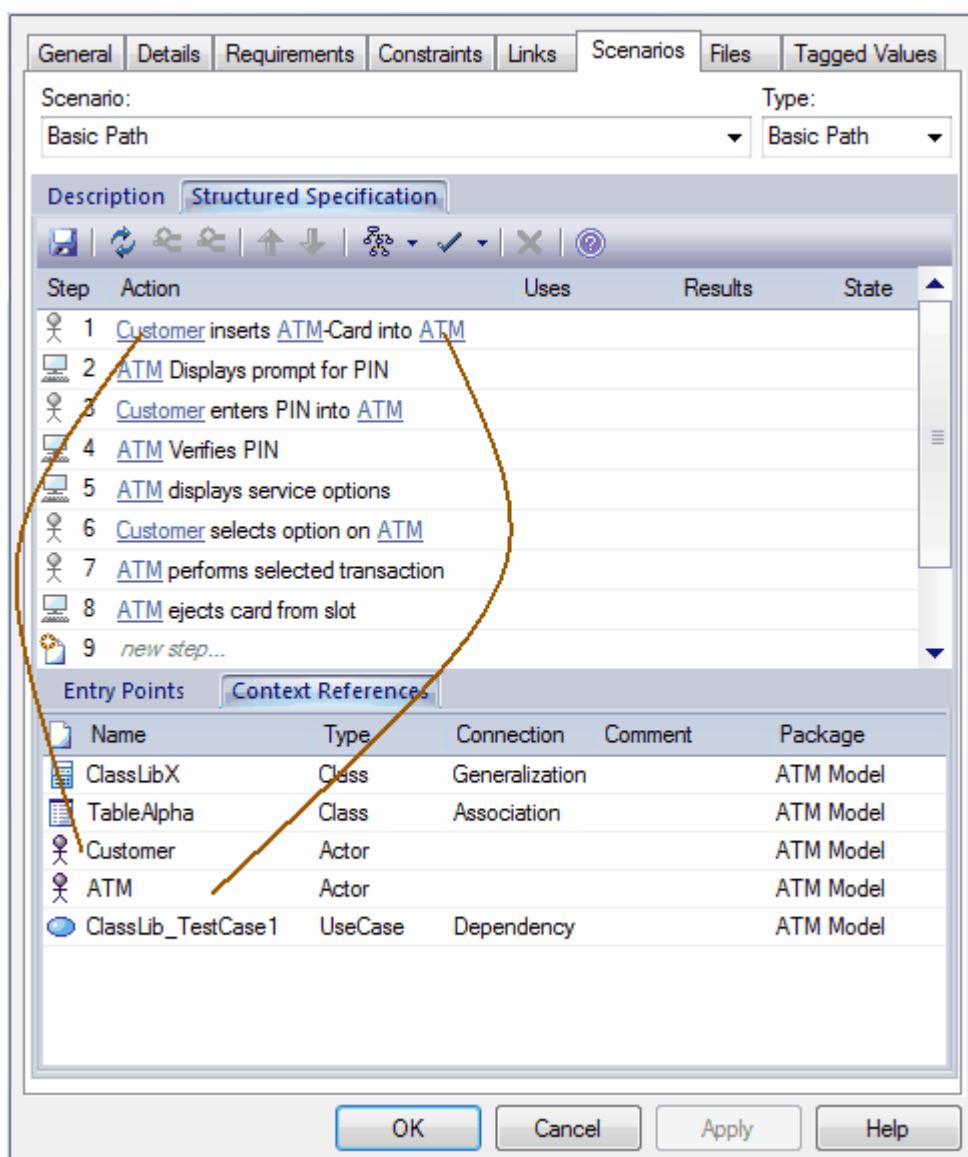
An Interaction is created as a child of the selected element, to act as a container for the diagrams - the Basic, Alternate and Exception paths are modeled as separate Sequence diagrams under the Interaction.

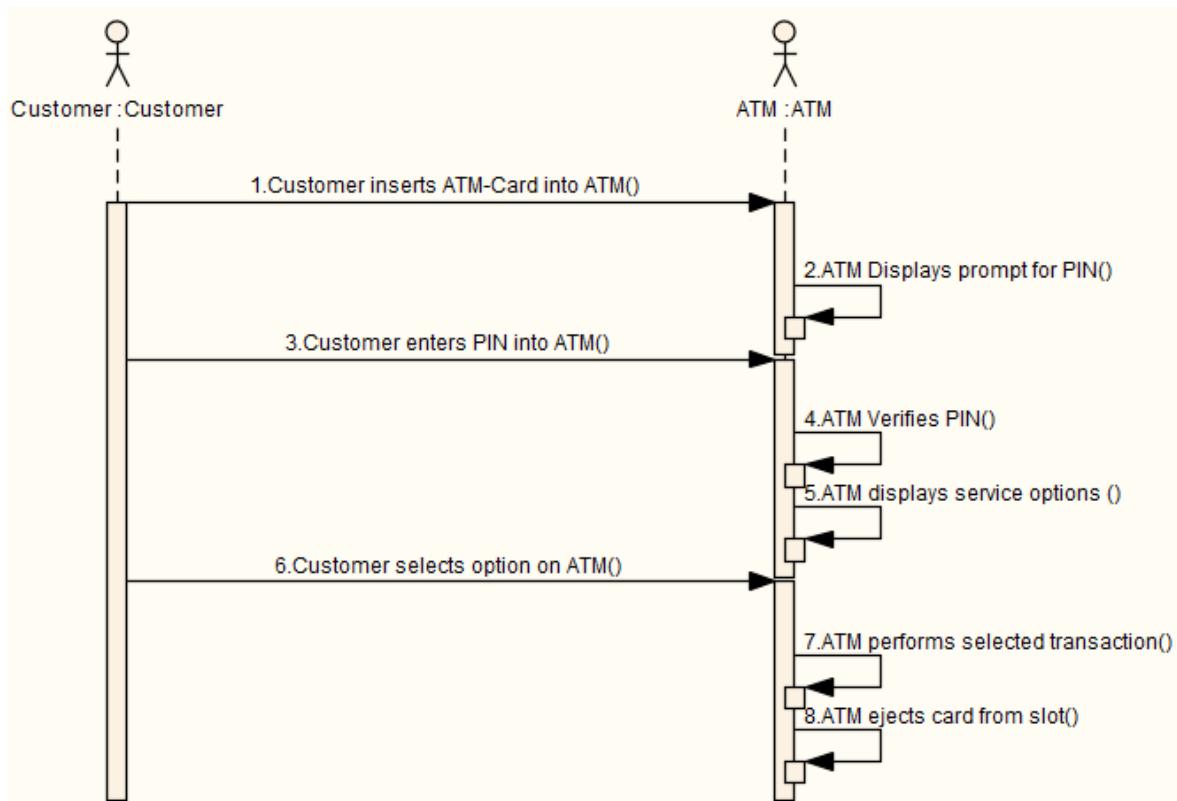
Each Context Reference element named in a scenario step is modeled as a Lifeline. The step itself becomes the Message between an originator and its destination(s); the first Context Reference element in a step is treated as the originator, and the subsequent Context Reference element(s) become the destination(s).

**Note:**

Because the diagram generator acts on element names in the step, you should take care to avoid using the element names as normal text. For example, in step 1 in the dialog below, the term *ATM-Card* is interpreted as a reference to the ATM element, and **two** *Customer inserts ATM-Card into ATM* Messages are generated for the step. (To avoid confusion, in the diagram the first Message has been deleted.)

The values of the *Uses*, *Results* and *State* columns are added as Tagged Values of the Message.



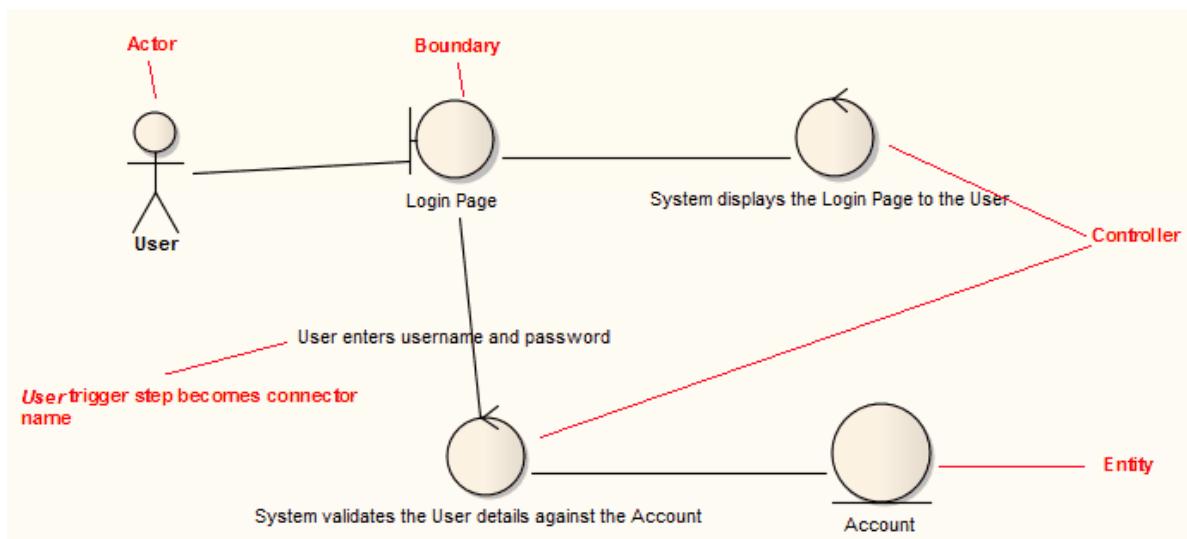
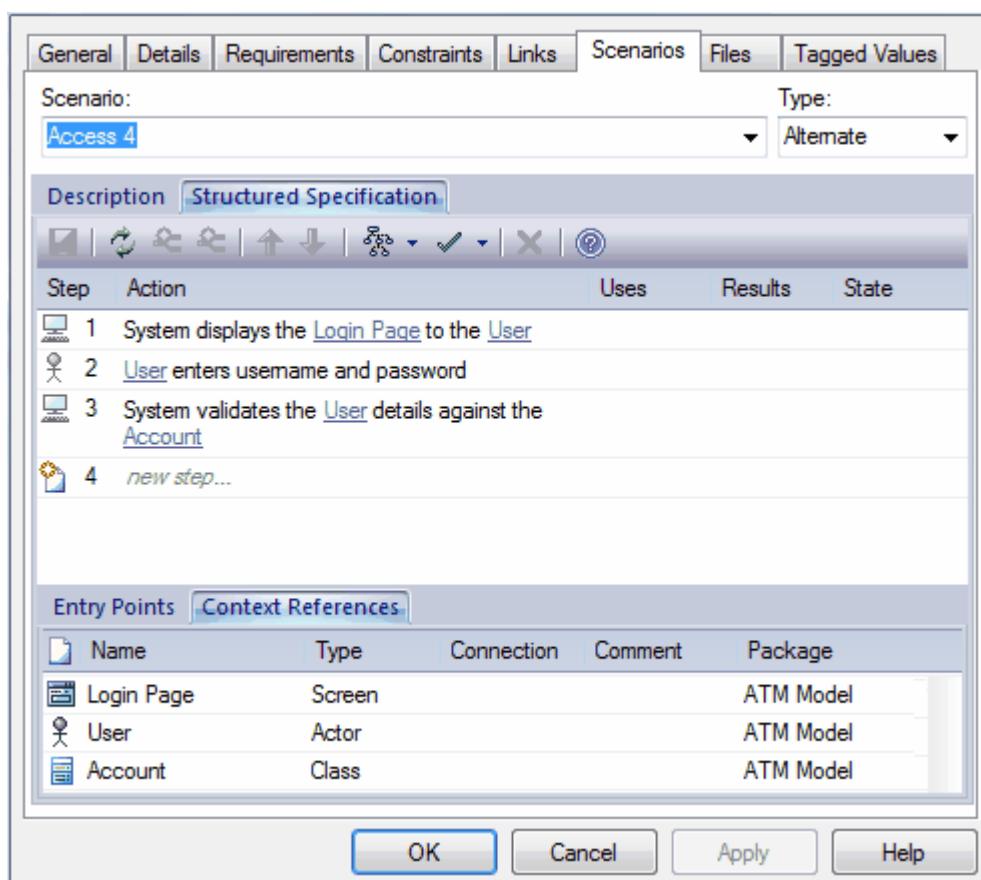


## Robustness Diagram

A Collaboration is created as a child of the selected element, to act as a container for the Robustness diagram. For further information on these objects, and on those mentioned in the following **Notes**, see *The UML Dictionary*.

### Notes:

- All the elements involved in the scenario should be identified in the [Context Reference](#) tab. That is, relationships must already exist between the scenario parent element and the other elements named in the scenario.
- Any values in the **Uses**, **Results** and **State** columns are ignored and not represented in the diagram.
- Each UI element in a step becomes a Boundary element. A Dependency relationship is created from this Boundary element to the UI element (this connector is not shown on the diagram).
- Each Actor referenced in a step is dropped into the Robustness diagram as a simple link.
- Each Class referenced in a step is dropped into the Robustness diagram as a simple link, and is given the stereotype *entity*.
- Each step with a *System* trigger becomes a Controller. Alternate/exception path Controllers are displayed with a red background color.
- Each step with a *User* trigger becomes the name of the Association between Controllers.



### 3.4.6.3 Generate Test Cases

When you select a scenario and click on the **Test Case Generation** icon in the window toolbar, Enterprise Architect prompts you to select to generate either an Internal Test Case or an External Test Case.

#### Internal Test Case

A test is generated for the basic path and each alternate and exception path in the scenario, and added to the

selected element. In addition, for each step in the basic, alternate and exception paths that has a value in the *Results* column, a test is generated and added to the selected element.

To view these tests, click on the element and display the **Testing** window (**View | Testing**) (see *Using Enterprise Architect - UML Modeling Tool*).

#### **Note:**

These generated tests are written to the **Scenario** test tab of the **Testing** window. You can move the tests to another test-type tab if required (see the *Testing* section of *Project Management With Enterprise Architect*).

#### **External Test Case**

A Test Case element is created, linked to the selected element using the Trace connector. A test case is generated and added to the Test Case element for the basic path, and for each alternate and exception path (see *The UML Dictionary*).

In addition, for each step in the basic, alternate and exception paths that has a value in the *Results* column, a test is generated and added to the Test Case element.

#### **Notes:**

- The Test Case element is added to the **Project Browser** and not to the diagram.
- You can review the tests within the Test Case element using the **Testing** window, as for Internal Test Cases.

#### **3.4.6.4 Generate Scenario From Activity Diagram**

You can [generate a range of diagrams](#)<sup>138</sup> from a scenario in an element. Conversely, you can also generate a structured scenario within an element from an Activity diagram, reverse engineering the steps from the diagram elements (effectively either regenerating the scenario within the Use Case, or transferring a scenario into another Use Case).

#### **Notes:**

- The source Activity diagram must be generated from another Use Case Scenario.
- Any existing scenario steps are deleted and replaced by the generated scenario.
- This facility does not operate on the enhanced Activity diagrams generated from a Use Case - those generated with ActivityParameters, Actions and Action Pins.

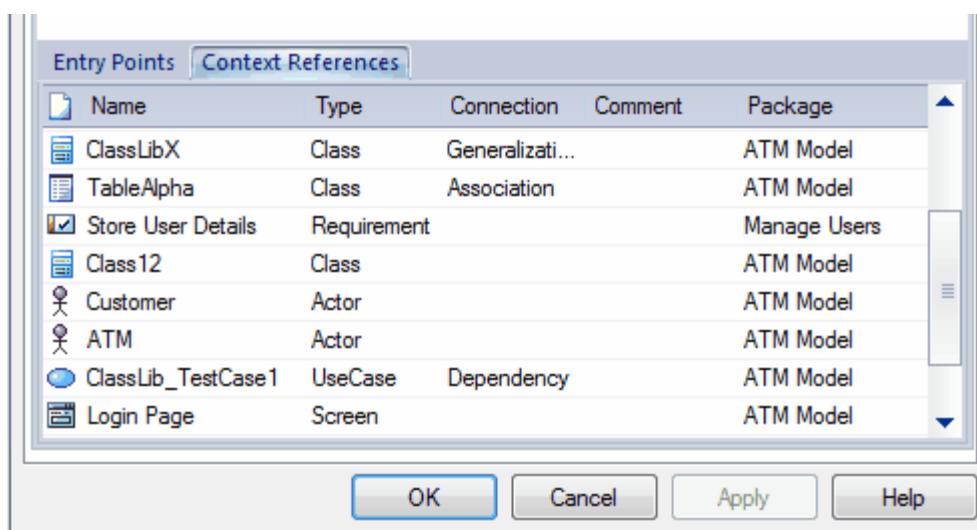
To generate the scenario from the Activity diagram, follow the steps below:

1. Open the element **Properties** dialog, select the **Scenarios** tab, and select the **Structured Specification** tab.
2. Right-click in the empty space within the tab, and select the **Create Structure From Generated Activity Diagram** context menu option. The [Select an Activity](#)<sup>149</sup> (generated from a UseCase Scenario) containing the Diagram dialog displays.
3. Search for and select the Activity containing the required diagram. Enterprise Architect validates the diagram (displaying the results in the **Output** window - see *Using Enterprise Architect - UML Modeling Tool*) and, if the diagram is valid, generates the scenario steps in the **Structured Specification** tab (replacing any existing scenario steps).

#### **3.4.6.5 Context References Tab**

On the **Scenarios** tab of the element **Properties** dialog, the **Context References** tab displays a list of all elements that are either:

- connected to the current element by any connector, on the current diagram or another, or
- defined as a cross reference (or [custom reference](#)<sup>186</sup>) on the current element.



This tab enables you to add custom references - right-click anywhere in the list and select the **Add Reference** context menu option. The [Select Element](#) dialog displays, in which you can locate and select the required cross reference element or elements. For each cross reference you can also use context menu options to delete the entry in the list, or to open the **Comment** field so that you can add or edit comment text.

For each element in the **Context References** list, wherever the name of that element appears in the structured specification, the name is highlighted and underlined. You can press **[Ctrl]+click** on the highlighted name to view the element **Properties** dialog.

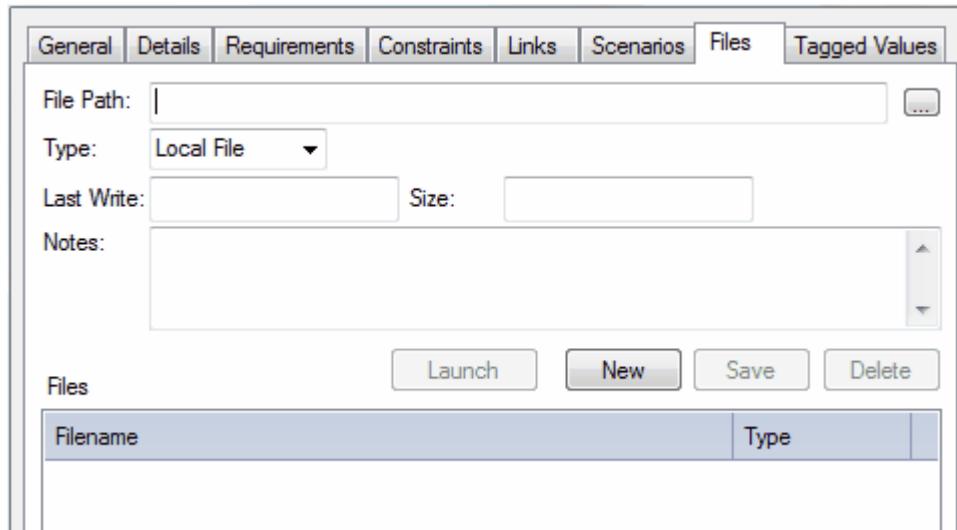
### 3.4.7 Associated Files

An element can be linked to files held in the database, using the **Files** tab of the element's **Properties** dialog.

#### Note:

Linked files are a good way to link elements to additional documentation and/or source code.

You can also insert hyperlinks in diagrams to other files, and launch them directly from the diagram (see the *UML Dictionary*). This is an alternative method to that described here.



Field/Button	Use to
File Path	Type in or browse for the directory path and name of the file.
Type	Display the local file or web address.
Last Write	Display the date and time the file was last updated.
Size	Display the size of the file.
Notes	Type in free text about the file.
Files	Display the list of linked files.
Launch	Open the selected file. Local files open with their default Windows application and web files open in the default browser.

### 3.4.8 Tagged Values Tab

The **Tagged Values** tab of the element **Properties** dialog simply provides the **Tagged Values** window within the frame of the **Properties** dialog (see *Using Enterprise Architect - UML Modeling Tool*).



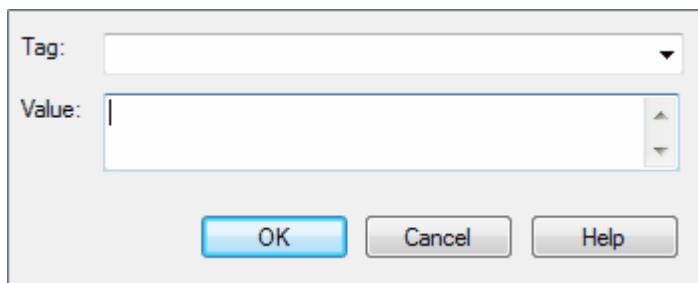
### 3.4.9 Tagged Values

Tagged Values are a convenient way of adding additional information to an element, in addition to that directly supported by UML. UML provides the *Tagged Value* element for just this purpose. Often Tagged Values are used during code generation or by other tools to pass information or operate on elements in particular ways. For more information relating to using Tagged Values see *The Tagged Values Window* topic in *Using Enterprise Architect - UML Modeling Tool*.

#### Add a Tagged Value

To add a Tagged Value to an element, follow the steps below:

1. Open the element **Properties** dialog, and select the **Tagged Values** tab.
2. Click on the **New Tag** button in the **Tagged Values** toolbar or press **[Ctrl]+[N]**. The **Tagged Value** dialog displays.
3. In the **Tag** field, type the tag name (or click on the drop-down arrow and select a defined tag), then in the **Value** field type the appropriate value.



4. Click on the **OK** button to save the Tagged Value.

**Tip:**

You can define custom tags using a predefined Tagged Value Type. For more information see *SDK for Enterprise Architect*

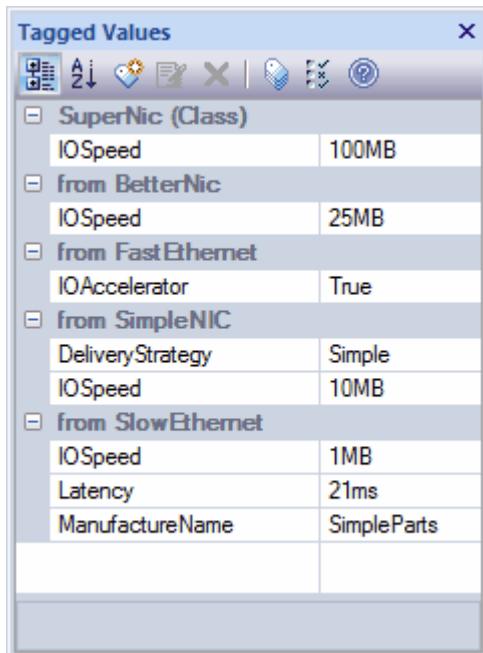
Tagged Values are the preferred method of extending the code generation capabilities of the modeling tool per element / per language.

### 3.4.9.1 Advanced Tag Management

Tagged Values can also be managed within a type hierarchy and with respect to element instances, using the **Tagged Values** window (see *Using Enterprise Architect - UML Modeling Tool*).

Using the **Tagged Values** window it is possible to:

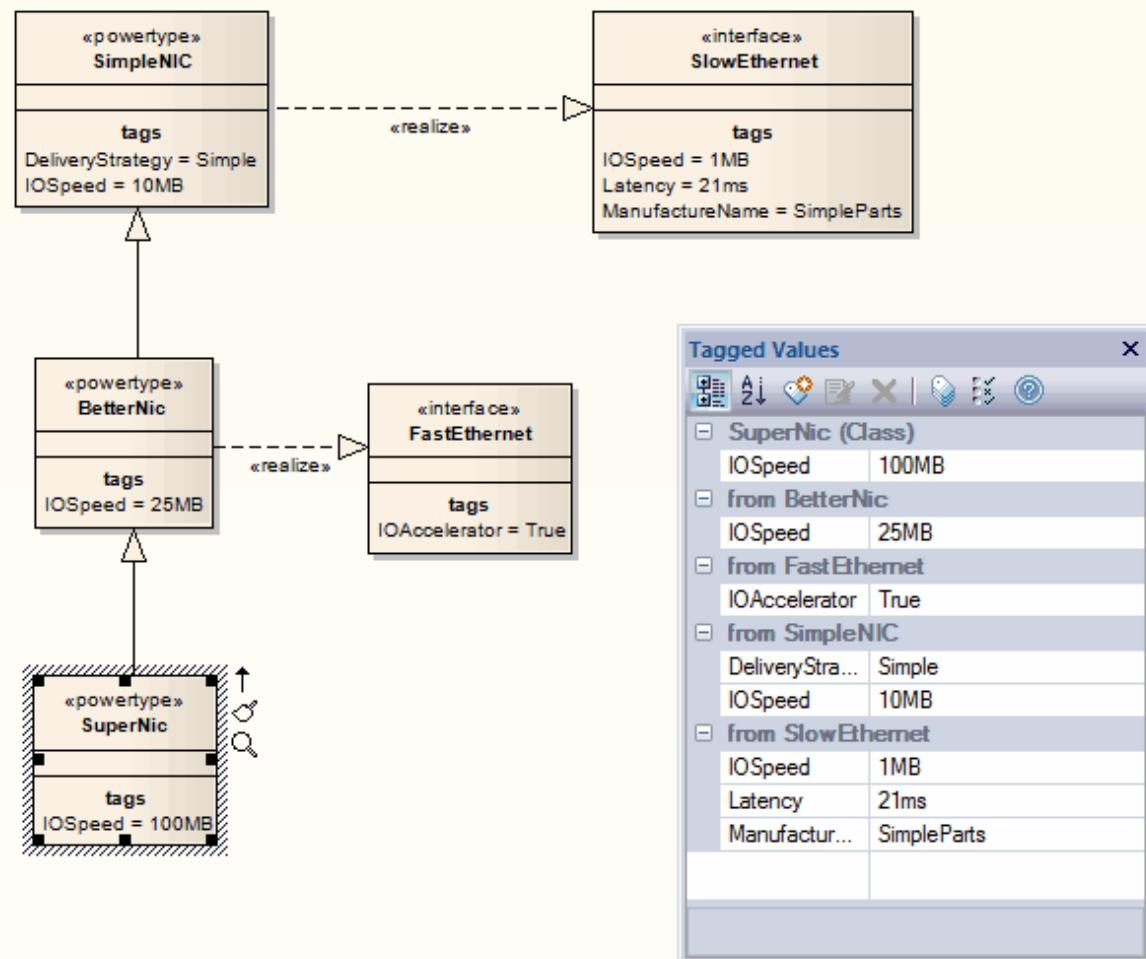
- View Tagged Values inherited from parent Classes or realized interfaces or applied stereotypes
- Override Tagged Values derived from parents or applied stereotypes with a unique value for the current element
- Delete Tagged Values from the current element (if a parent version of the Tagged Value exists, it reappears in the list after the override is deleted).



The diagram below illustrates a complex tag hierarchy and the way Tagged Values can be either inherited or overridden in specialized Classes to create the final tagged property set for an element.

Note also that a similar concept applies to instances, in which case the full tag set is created from the directly owned tags, plus all of those merged in from the classifier's type hierarchy, additional stereotypes and realized

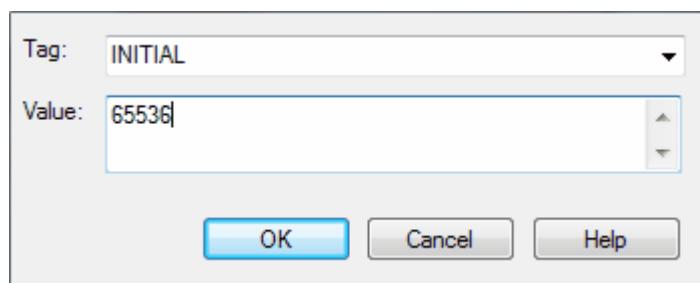
interfaces.



### 3.4.9.2 Quick Add of Tagged Values

It is possible to add a single Tagged Value to one or more elements with a special shortcut.

- From an element context menu (or the context menu of a multi-selection) choose the **Add | Tagged Value** menu option. (Alternatively, select one or more elements and press **[Shift]+[Ctrl]+[T]**). The **Tagged Values** dialog displays, which enables you to enter a **Name** and **Value** for the tag.



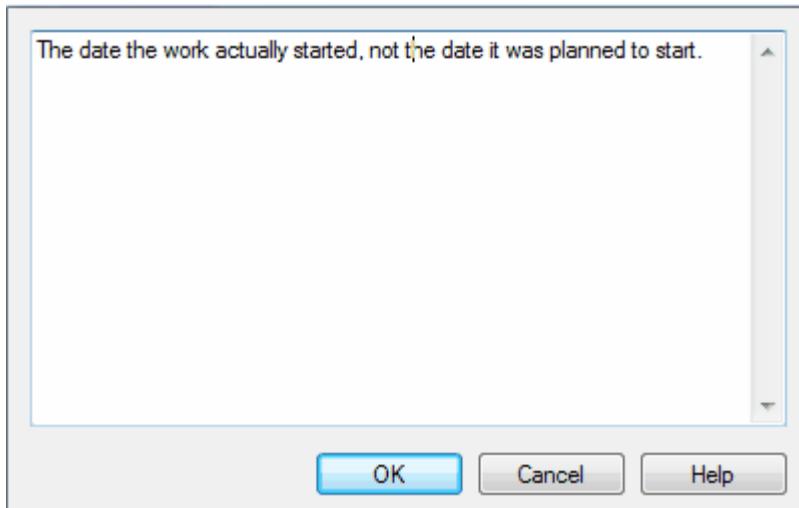
- Click on the **OK** button to add your new Tagged Value to all the currently selected elements.

**Note:**

You can also use the **Current Element** toolbar. The last button is a shortcut to the *Add Tagged Value* function.

To delete this property you must open the element **Properties** dialog, go to the **Tagged Values** tab and manually delete the item. There is currently no shortcut to delete tags from multiple elements at one time.

To add notes to the Tagged Value, go to the **Tagged Values** tab, click on the Tagged Value name, and click on the **Edit Notes** button in the tab toolbar. The **Notes** dialog displays.



Any **Notes** text you enter also displays in the *Info* section at the bottom of the **Tagged Values** window.

### 3.4.10 Object Classifiers

Many elements in UML model classifications (such as Classes and Actors), and then other elements model instances of such classifications (such as Objects, Actors again, and Sequence diagram objects). These instance elements represent real things in a run-time scenario; for example, a *Person* element named *Joe Smith*. In UML this is written as *Joe Smith: Person*.

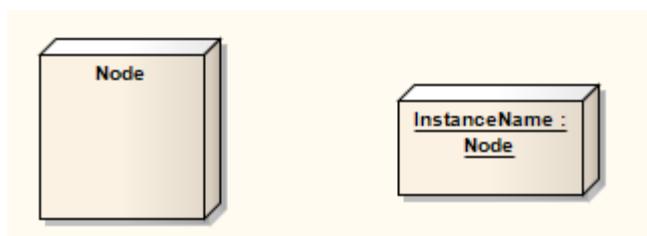
You can define a classifier first, and then instances of that classifier. Alternatively, as a model develops from a rough sketch to a detailed design, many objects become examples of a defined Class, so in the early analysis phase you might model a *Joe Smith* and a *Jane Smith*, and later a *Person* Class from which *Joe* and *Jane* are instantiated.

Enterprise Architect enables you to associate an Object with its template element (its classifier), such as a Class. Doing this greatly increases the descriptive power of the model in capturing the functionality and responsibility of Objects at run-time and their associated state. For example, if you describe a *Person* Class with attributes such as *Age*, *Name*, *Address* and *Sex*, and functions such as *GetAge* and *GetName*, then when you associate your Object with the *Person* Class it is seen to have all the *Person* Class behavior and state (as well as inherited state and behavior from *Person's* ancestors).

**Tip:**

This is a powerful means of moving your model from the analysis phase into detailed design.

Elements that are classifiers and support instances of themselves at runtime can be dropped from the **Project Browser** as a link to the classifier itself, or a new instance of the classifier. The example below shows a linked Node element on the left and an instance of the Node on the right. Note that the instance is drawn like a simple element with the : <*ElementName*> displayed. If you name your instance it displays <*InstanceName*> : <*ElementName*>.



### 3.4.10.1 Using Classifiers

If you right-click on an Object in a diagram, the element context menu displays the **Advanced | Instance Classifier** menu option. Select this option to choose a single element (generally a Class) as the classifier or template for this Object.

The [Select <Item>](#)<sup>149</sup> dialog displays. Use this to set the instance classifier.

The Object name is then displayed as *Object: Classifier*, for example a Person object named Joe Smith is displayed as *Joe Smith: Person*.

### Several Changes Occur if an Object has a Classifier

It is important to remember that an Object is only an instance of a classifier at runtime, so the appropriate attributes and operations are those of the classifier, not the Object. Therefore, in the context menu for the Object, if you select the **Attributes** or **Operations** menu options, the **Attributes** or **Operations** dialog displays for the classifier, not the Object.

If you set the classifier for an Object in a Sequence diagram, when you add a message the drop-down list of available messages derived from the target Object come from the classifier, not the Object selected. This enables you to associate Sequence diagram objects with Classes and use the defined behavior of the Class to model actual behavior at run time.

You can also select a message for a State Flow connector. The same rules apply as for Sequence diagram objects.

Note that in the **Message** dialog you can also select to include messages defined in the target classifier's inheritance hierarchy.

### 3.4.11 Select <Item> Dialog

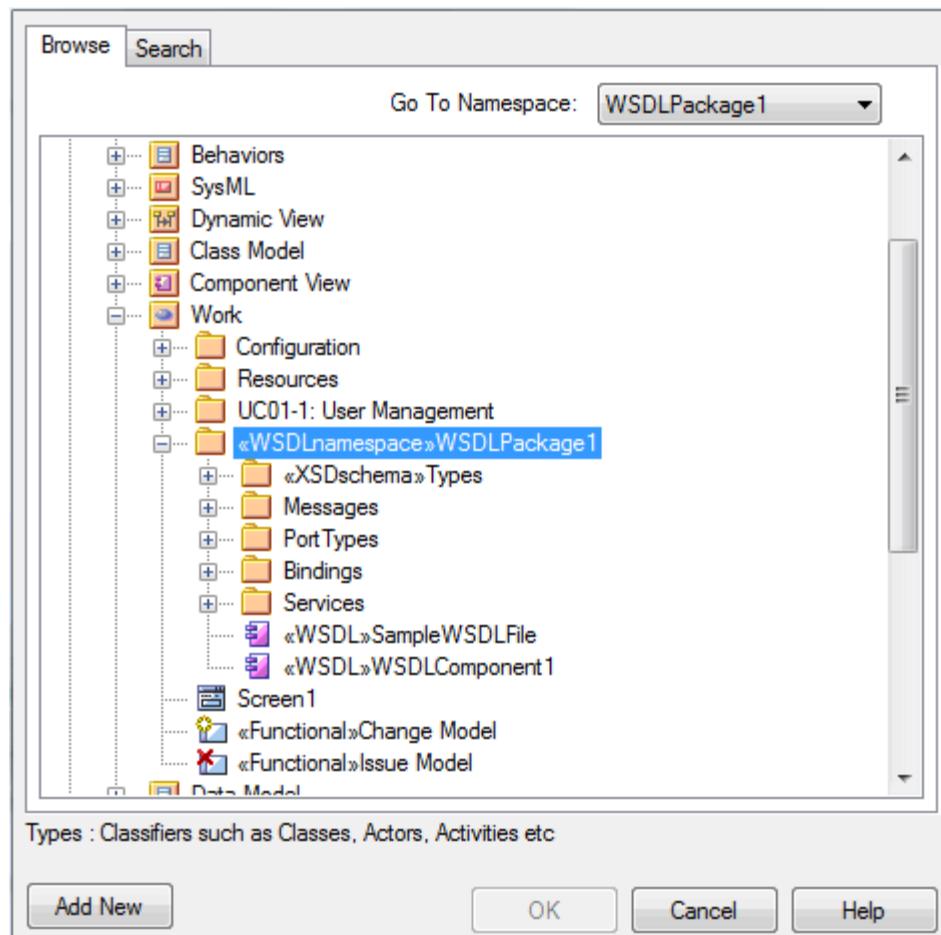
The **Select <Item>** dialog is a multi-purpose browser and search tool for locating model items such as Classifier elements, properties, attributes and behaviors. The **<Item>** in the dialog title changes to represent the type of item the original operation is working on. The dialog is called in a range of operations; for example, setting:

- The base type or [classifier](#)<sup>149</sup> for an Object, Swimlane or Lifeline (see the *UML Dictionary*)
- Classifiers for the [return types](#)<sup>155</sup> for operations
- Classifiers for [generalization sets](#)<sup>212</sup>
- The associated behavior for a [behavior call](#)<sup>165</sup>
- The type and return type for [operation parameters](#)<sup>182</sup>
- Activities for State transitions (see the *UML Dictionary*)
- [Activities from which to generate Use Case Scenarios](#)<sup>143</sup>
- Pattern element defaults (see *Extending UML With Enterprise Architect*)
- Locating the target element for a connector created with the Quick Linker (see *Using Enterprise Architect - UML Modeling Tool*)
- The values of Tagged Values (see *Using Enterprise Architect - UML Modeling Tool*).

To select a required item, follow the steps below:

1. During an operation, when it is necessary to locate an element or feature, you click on the [ ... ]

(browse) button. The **Select <Item>** dialog displays.



2. If required, in the **Go To Namespace** field select a namespace to reduce the scope of the displayed hierarchy. The dialog opens the section of the hierarchy associated with that namespace, and closes all previously-open sections associated with other namespaces.
3. You can either:
  - expand the selected area of the hierarchy on the **Browse** tab, or any other package, and locate the required item (go to step 5) or
  - click on the **Search** tab and, in the **Find** field, type a partial or complete text string to search for the item.

Element	Type	Stereotype	Package	Path
SampleBindingSOAP	Class	WSDLbinding	Bindings	Development Model::Work::WSDLPackage1
SamplePortTypeSOAP	Interface	WSDLportType	PortTypes	Development Model::Work::WSDLPackage1
<none>				

4. On the **Search** tab, you can filter the search further by selecting the **Whole Word** and **Match Case** checkboxes.

Each list entry shows the name of the item, the type, any stereotype the item has, the immediate

package in which the item is held, and any successive parent packages (the package path). You can either:

- Select the item immediately on the **Search** tab or
  - Right-click on one item or a group of items and select the **Locate item(s) in tree** context menu option; this redisplays the **Browse** tab and highlights each selected item in the <namespace> hierarchy.
5. Click on the required item.
  6. Click on the **OK** button.

**Note:**

When you have selected an item, the **Select <Item>** dialog retains the context and item. Next time you display the dialog, if the context is similar the dialog opens to the same Namespace and item. For example, if you have selected an activity for a State transition and you start to do the same for another transition, the dialog opens to the activity you previously selected.

If the context is totally dissimilar, the dialog opens with the Namespace <any> and a collapsed model hierarchy.

If the available items do not meet your requirements, you can create a new item and define the appropriate properties. Click on the **Add New** button. The appropriate **Add <Item>** dialog displays, on which you define the required item.

**Note:**

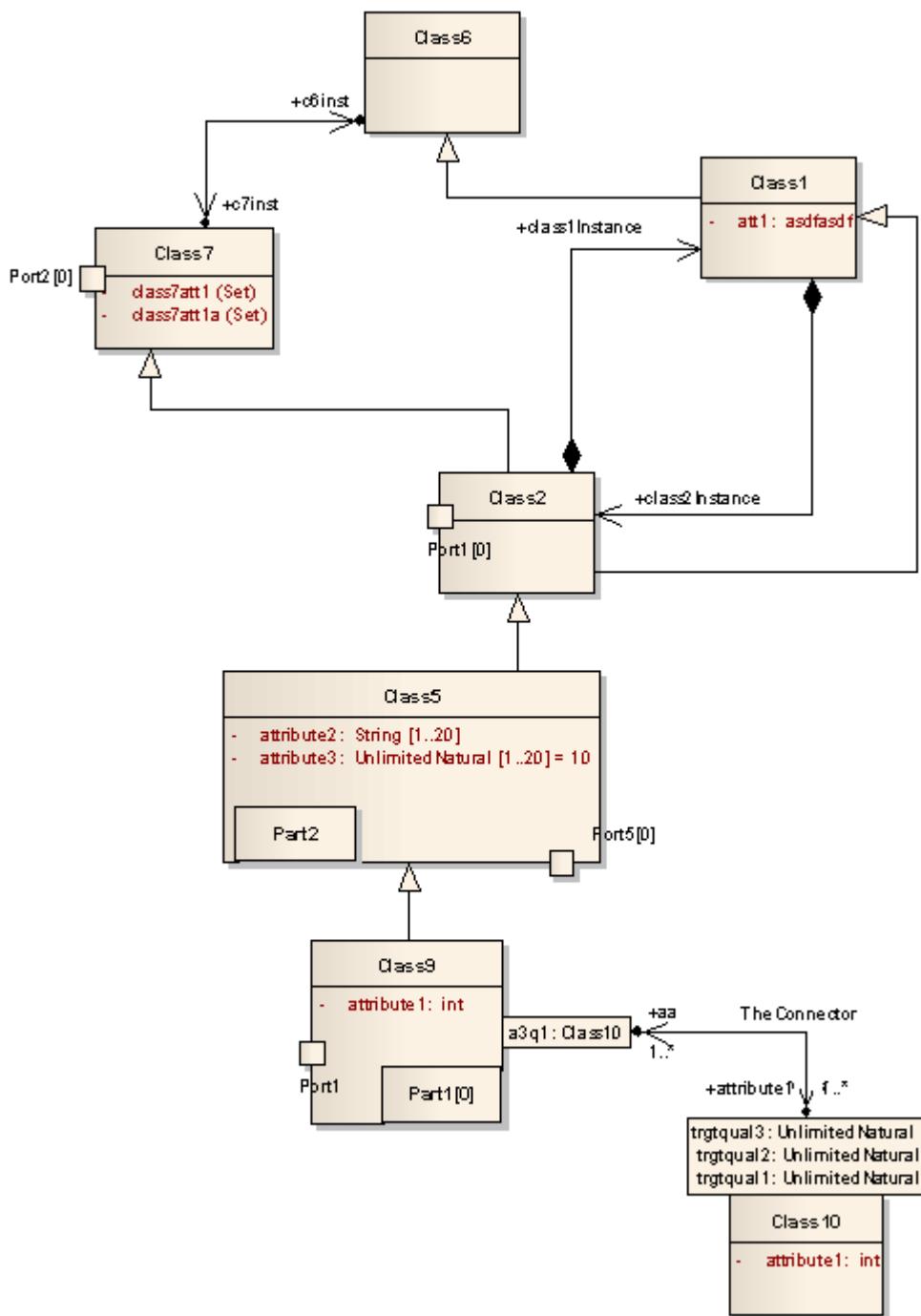
The **Add New** button is not always available, depending on the context and the type of item being searched for.

## Multiple Selection

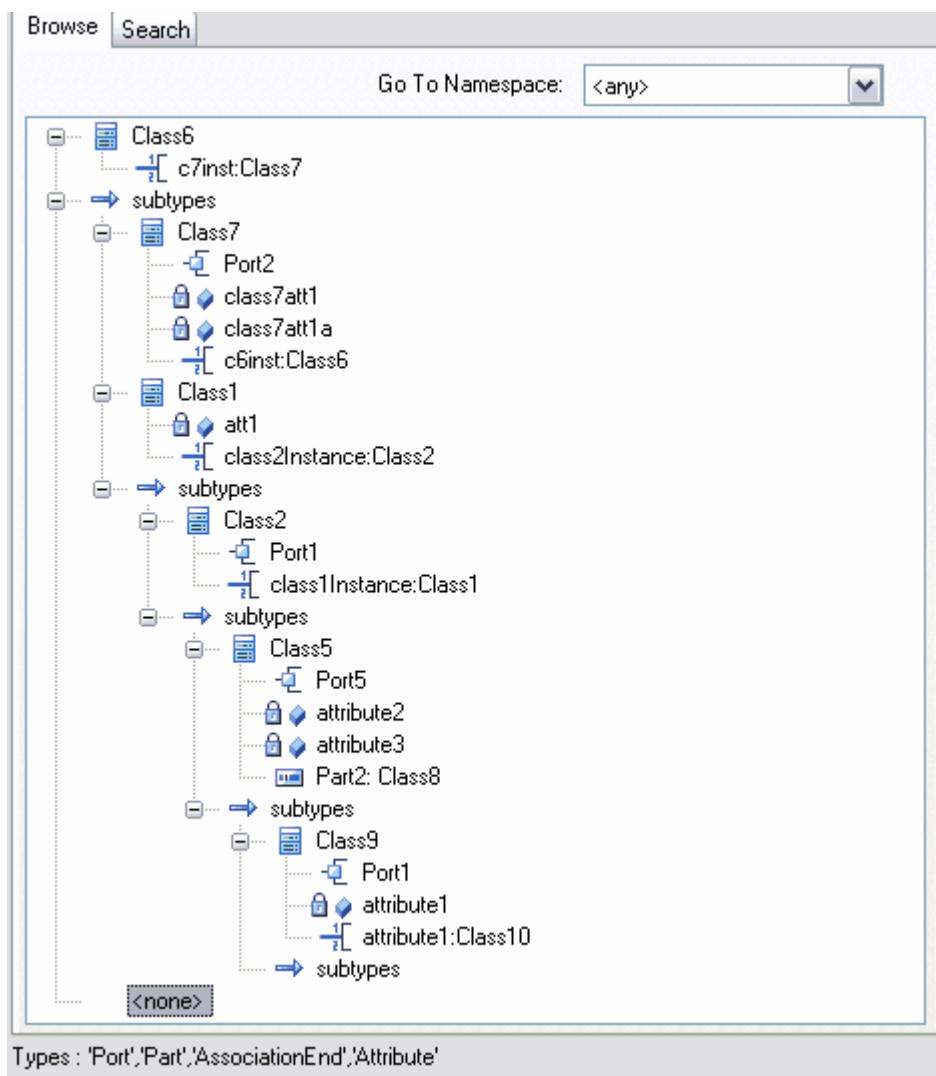
Where an operation permits the selection of multiple items, the **Select <Item>** dialog is automatically enabled to support this. To select the items, press **[Ctrl]** as you click on each item. Having selected an item, you can continue to expand and browse the hierarchy, and/or search for items; the dialog retains the existing selections until you click on the **OK** button.

### 3.4.11.1 Select Property Dialog

The **Select Property** dialog is a specific instance of the **Select <Item>**<sup>[149]</sup> dialog; it is used to select Ports, Parts, Attributes and Association Ends as redefined or subsetted properties, from a *hierarchical list* of Classes and their contained properties in the model. For example, consider the section of the model below:



This would be represented in the dialog as follows:

**Note:**

Association ends should be owned by the Class to be listed in the dialog.

Locate and click on the required object to select it, then click on the **OK** button. (To select several objects at once, press and hold **[Ctrl]** while you click on each object.)

### 3.5 Behavioral Modeling

Enterprise Architect enables you to define an element's behavior through the element's operations and parameters. You can also define the behavior of more specific behavioral elements such as Activities, Interactions, Actions and Interaction Occurrences, through the **Behavior** and **Call** tabs of the element **Properties** dialogs. For further details, see the following topics:

- [Operations](#)<sup>154</sup>
- [Interactions and Activities](#)<sup>167</sup>
- [Behavior Calls](#)<sup>167</sup> (Actions and Interaction Occurrences)
- [Behavior Parameters](#)<sup>168</sup>
- [Behavior Call Arguments](#)<sup>174</sup>

### 3.5.1 Operations

Operations are features of a Class or other element that represent the behavior or services an element supports. For a Customer Class, *UpdateCustomerName* and *GetCustomerAddress* can be operations. Operations have several important characteristics, such as type, scope (visibility), static, abstract and notes.

#### How to Access Operations

If an element supports operations (typically Classes and Interfaces), the right-click context menu contains the **Operations** menu item. Select this to open the [Operations dialog](#)<sup>[155]</sup>. Alternatively, press [F10].

#### How Operations Appear in Diagrams

Elements with operations (typically Classes) display their features in diagrams in the manner shown below. Operations display in the second compartment of properties in colored text - the default color is dark green (for example, *Finalize() : void*). Some characteristics display in shorthand form; for example, *static* displays as \$, *abstract* as \*.



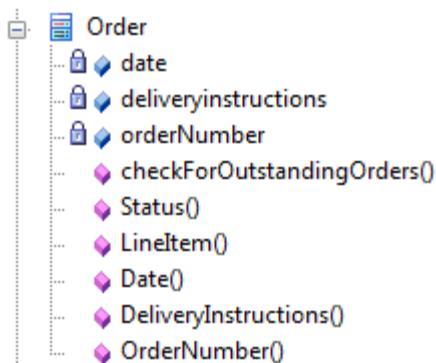
#### Note:

If the parent element provides source or target roles for a connector, the connector can be attached to a specific operation. See the [Connect to Element Feature](#)<sup>[202]</sup> topic.

#### Operations in the Project Browser

In the **Project Browser**, Classes with operations have their features collected beneath them, each preceded by a pink box (✿). Right-click on an operation and select the **Operation Properties** context menu option to open the **Operations** dialog and edit details for the feature.

From the **Project Browser**, you can drag operations onto new elements to give them the same operations.



#### See Also

- [Parameters](#) [168]

#### 3.5.1.1 Operations Dialog - General

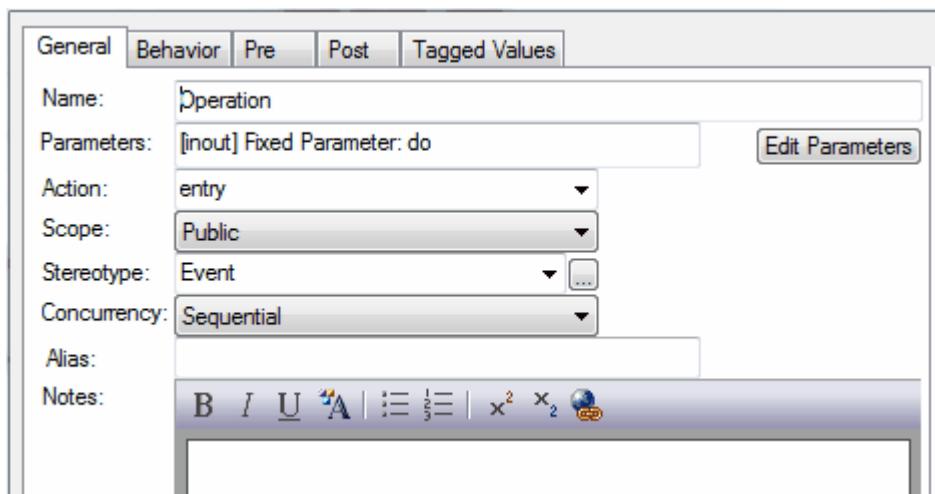
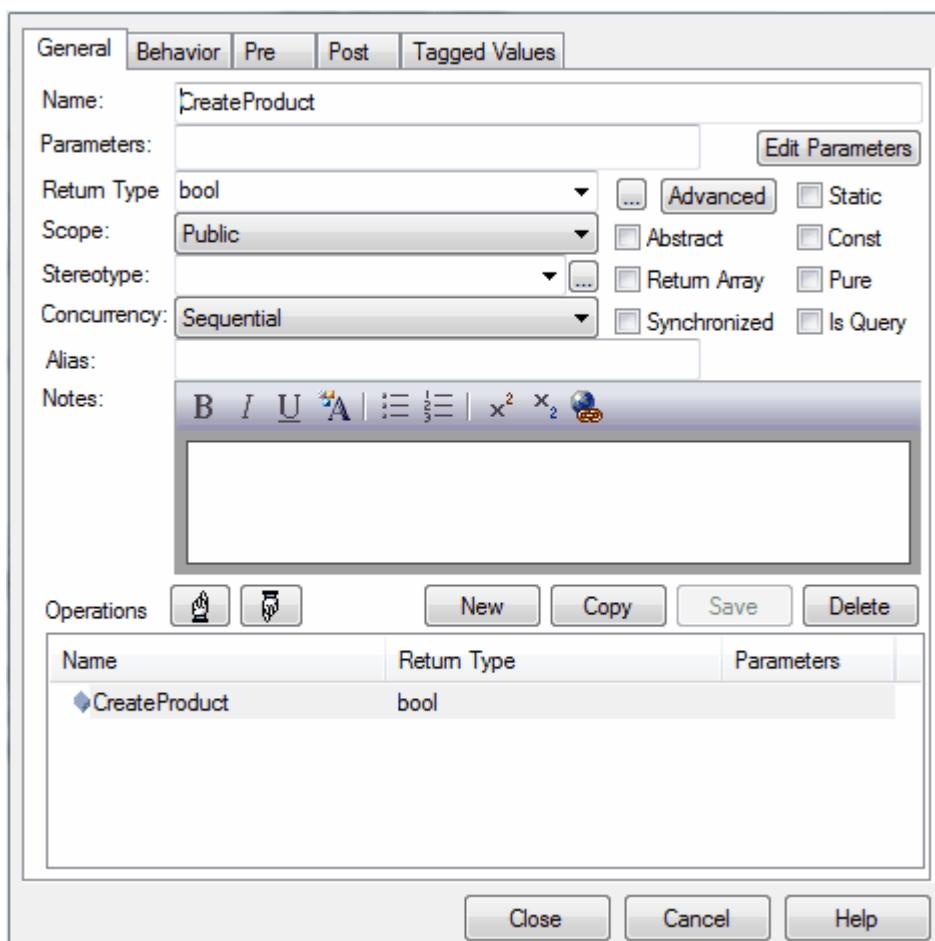
The **Operations** dialog has five tabs:

- General, from which you can also define [operation parameters](#) [170]
- [Behavior](#) [158]
- Pre-conditions and Post conditions (that is, [Constraints](#) [162])
- Tagged Values.

The **General** tab of the **Operations** dialog enables you to define new operations and set the most common properties, including name, access type and return.

#### Note:

The **General** tab can vary according to the type of element you are adding an operation to. If defining operations for a data modeling table, see the *Indexes, Triggers and Check Constraints* topic in *Code Engineering Using UML Models*. The following illustrations are for the operations of an Object element and a State element.



Field/Button	Use to
<b>Name</b>	Display the selected operation name.
<b>Parameters</b>	Display the parameter list. See <a href="#">Operation Parameters</a> [170] for information regarding what this string can contain.
<b>Edit Parameters</b>	Open the <a href="#">Parameters</a> dialog.

Field/Button	Use to
<b>Return Type</b>	(Not shown for <i>State</i> or <i>State Machine</i> elements.) Display the data type returned by the operation. The type can be defined by the code language (data type) or by a classifier element. When you click on the drop-down arrow, the set of values in the list provides the appropriate data types. To select or define possible classifiers, either click on the <b>Select Type</b> option in the list, or click on the [ ... ] (Select) button to display the <a href="#">Select &lt;Item&gt;</a> dialog. To add new code language data types that can be displayed in this list, see the <i>Data Types</i> topic in <i>UML Model Management</i> .
[ ... ] (Return Type Browse button)	Open the <a href="#">Select &lt;Item&gt;</a> dialog to select the operation return type. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Action</b>	Define the action of the operation: <b>do</b> , <b>exit</b> or <b>entry</b> . (For <i>State</i> or <i>State Machine</i> elements. See the <i>UML Dictionary</i> .)
<b>Scope</b>	Select <b>Public/Protected/Private/Package</b> .
<b>Stereotype</b>	Specify an optional stereotype for this operation.
<b>Concurrency</b>	Set the concurrency of the operation.
<b>Alias</b>	Define an optional alias for the operation.
<b>Notes</b>	Enter free text notes. You can format this text if necessary, using the <a href="#">Rich Text Notes toolbar</a> at the top of the field. See <i>Using Enterprise Architect - UML Modeling Tool</i> .
<b>Virtual/Abstract</b>	If the operation's language is set to C++, map to the C++ <b>Virtual</b> keyword. Otherwise this option is <b>Abstract</b> , pertaining to an abstract function. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Return Array</b>	Indicate that the return value is an array. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Synchronized</b>	Specify a code engineering flag that relates to multi threading in Java. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Static</b>	Indicate that the operation is a static member. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Const</b>	Indicate that the return type of this method is constant. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Pure</b>	Indicate that C++ is pure virtual syntax - for example: <code>virtual void myFunction( ) = 0;</code> (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>IsQuery</b>	Indicate that this method does not modify the object. (Not shown for <i>State</i> or <i>State Machine</i> elements.)
<b>Operations</b>	List the defined operations.
<b>Up/Down Buttons</b>	Change the order of operations in the list.
<b>New</b>	Create a new operation.

Field/Button	Use to
<b>Copy</b>	Copy the currently selected operation.
<b>Save</b>	Save a new operation, or save modified details for existing operation.
<b>Delete</b>	Delete the currently selected operation.

**Note:**

- If you make changes and do not save them, the **Cancel** button prompts you to confirm or cancel the changes, whilst the **Close** button closes the dialog immediately and does not save the changes.
- If you are creating many operations, go to the **Attribute/Operations** page of the **Options** dialog (**Tools | Options | Source Code Engineering | Attribute/Operations**) and select the **After save, re-select edited item** checkbox. Now, when you create an operation and click on the **Save** button, the dialog fields clear ready for you to enter the details of the next operation. This helps you when you want to create operations quickly and might not necessarily want to fully define each one as you create it.

### 3.5.1.1.1 Operations Dialog - Behavior

This topic illustrates how to elaborate a method's function in a diagram.

The **Behavior** tab of the **Operations** dialog enables you to enter free text to describe the functionality of an operation. Use pseudo-code, structured English or just a brief description.

You can also use the **Behavior** tab to formally describe a method or State action and have the text appear under the method/action name in a diagram.

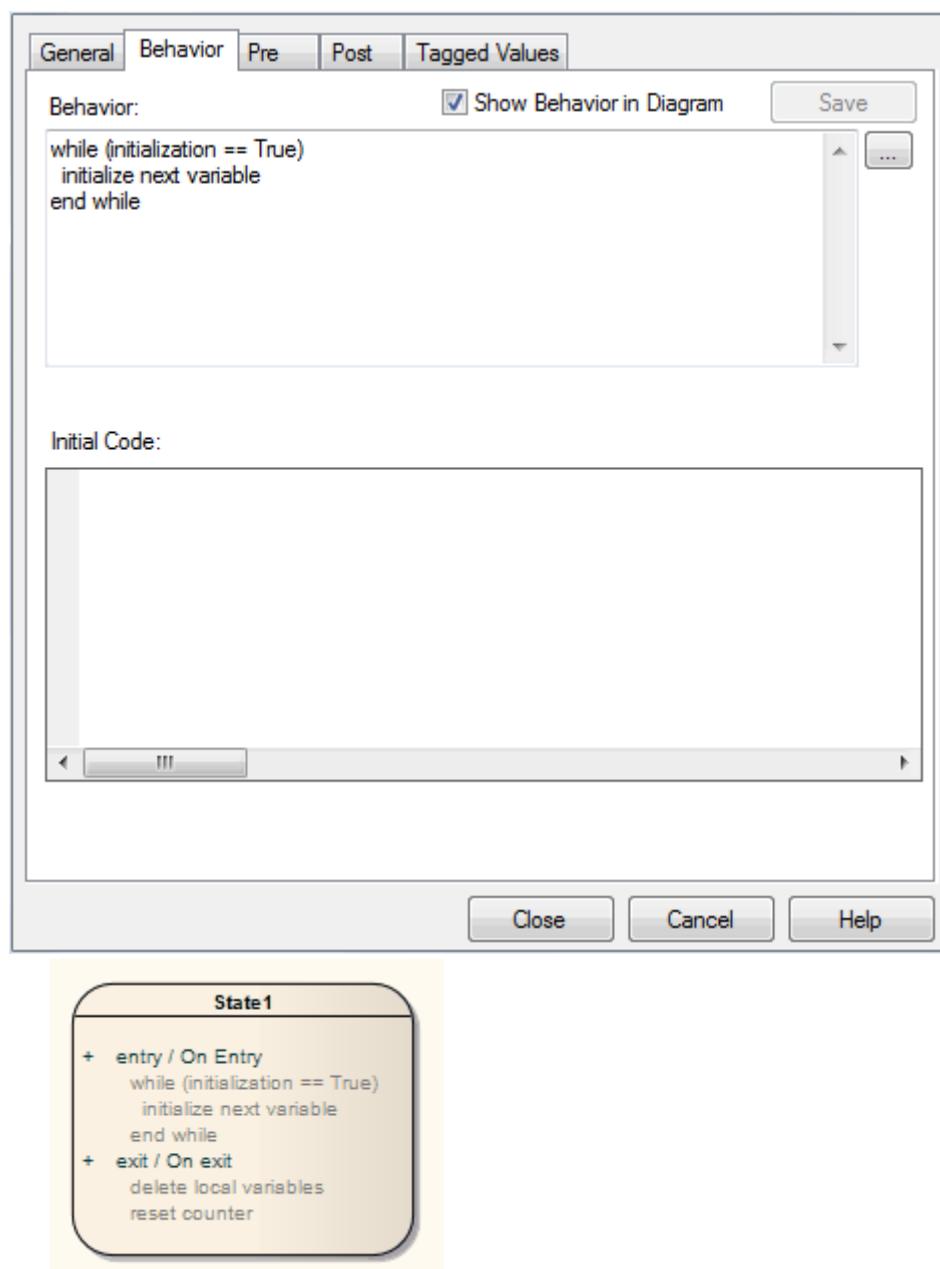
### State Operations - Behavior

A State's *do*, *entry* and *exit* operations optionally refer to other behaviors such as Activities, Interactions or Operations. Use the [ ... ] (browse) button to invoke the [Select <Item>](#)<sup>[149]</sup> dialog, and locate and select the required behavior.

### Show Behavior in a Diagram

To show behavior in a diagram, follow the steps below:

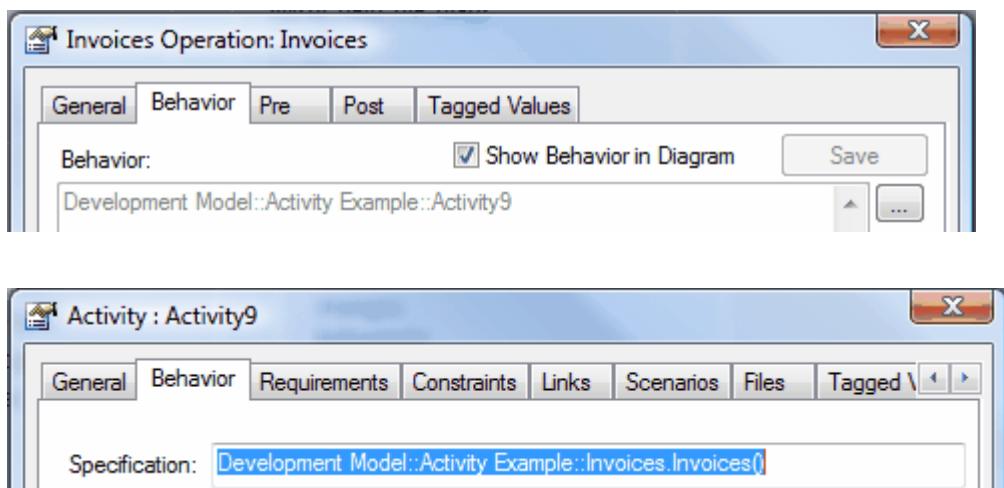
1. Create or locate the required operation.
2. Click on the **Behavior** tab of the **Operations** dialog.



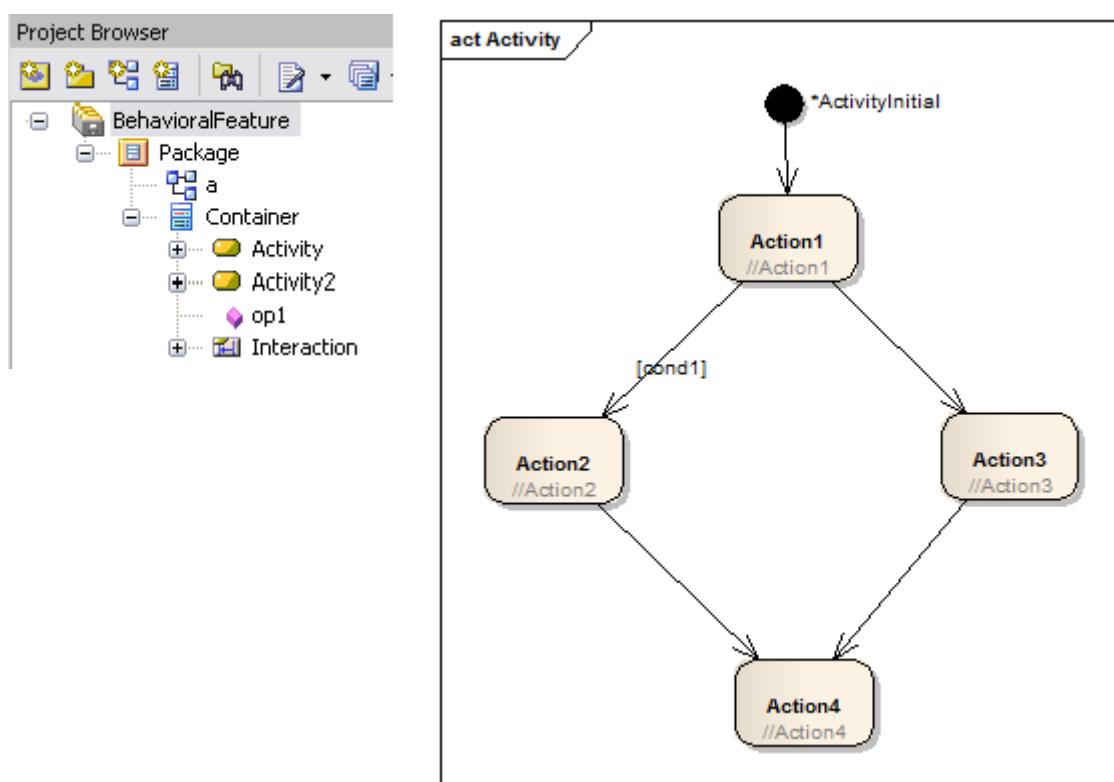
3. Select the **Show Behavior in Diagram** checkbox.
4. Click on the **Save** button.

### Associate With Behavior

A Class operation can be associated with a behavior elsewhere in the model. Display the operation's **Properties** dialog, select the **Behavior** tab, click on the [ ... ] (browse) button and select the required behavior from the [Select Element](#) [149] dialog. The behavior is set in the **Behavior** field, and the operation is then set as the specification of the associated behavior. For example:



In behavioral code generation, the behavior of the associated behavioral element is generated as the operation's code. In the following illustration, *Op1* is associated with the Activity *Activity*.



The generated code for *Op1* is as follows:

```
package Package;
public class Container {
    public Container(){
    }

    public void finalize() throws Throwable {
    }
}
```

```

public void op1(){
    /*Activity element(Activity1)'s behavior rendered as
     //Action1;
    if (cond1)
    {
        //Action2;
    }
    else
    {
        //Action3;
    }
    //Action4;
}
/*Activity element(Activity1)not rendered*/
public void Activity2()
{
    // behavior is a Activity
}

public void Interaction()
{
    // behavior is a Interaction
}
}//end Container

```

#### See Also

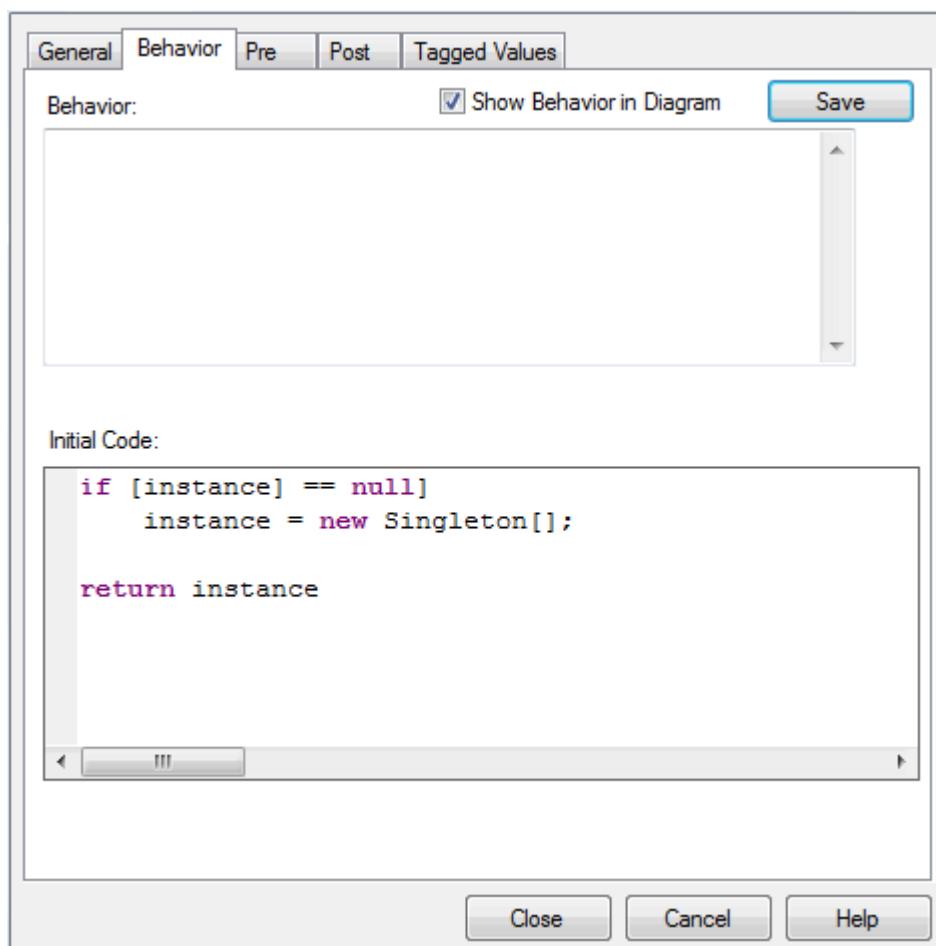
- [Initial Code](#) 

On the **Behavior** tab of the **Operations** dialog, you can use the **Initial Code** field to enter code to be inserted into an operation body when the operation is first generated to file. After this point, forward code generation and synchronization do not replace the existing operation code with the **Initial Code** field.

By default, the **Initial Code** field also is not imported into the model during reverse engineering, but you can select to import the field by selecting the **Include method bodies in model when reverse engineering** checkbox on the **Options** dialog (see the *Options - Attributes and Operations* topic in *Code Engineering Using UML Models*).

This field is most useful when combined with UML Patterns (see *Extending UML in Enterprise Architect*). Elements within a pattern often require the same stub code. Notice that the language specific patterns available from [www.sparxsystems.com/resources/developers/uml\\_patterns.html](http://www.sparxsystems.com/resources/developers/uml_patterns.html) include initial code for some of the defined operations. This helps speed up the process of applying patterns from model to implementation. The **Initial Code** section is also useful for ensuring that the generated code is directly compilable.

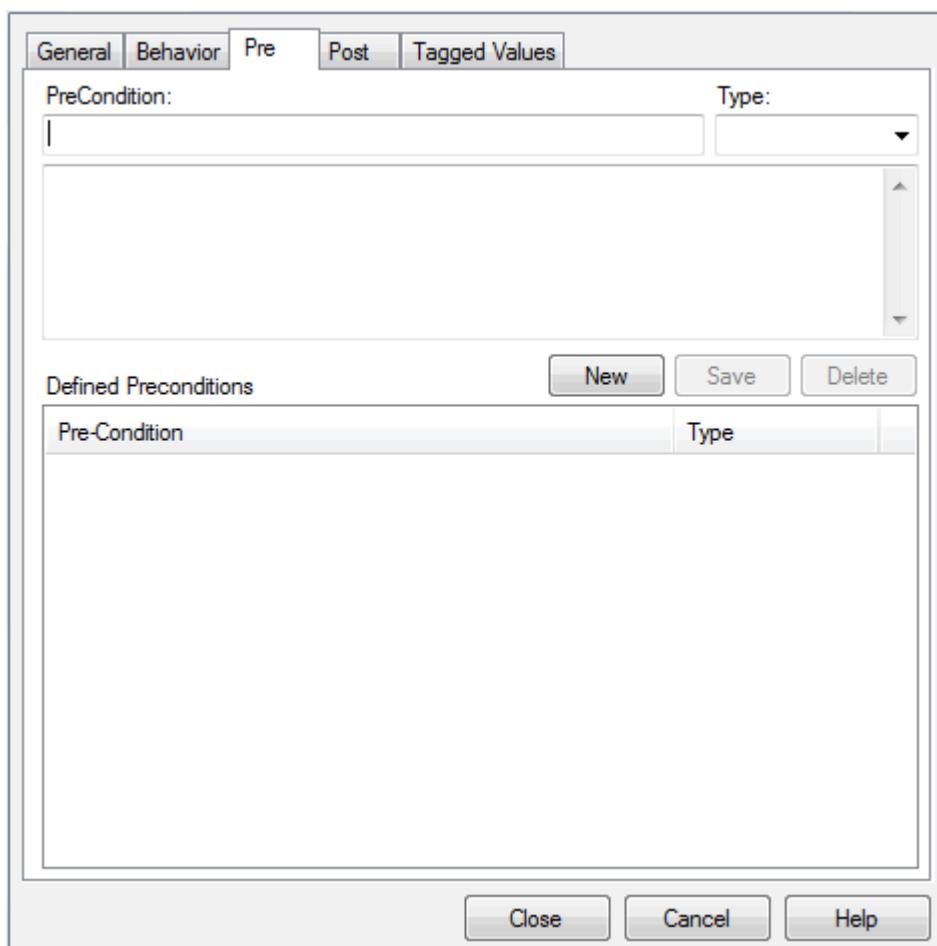
This example shows the contents of the **Initial Code** field for the *Instance()* operation of the *Singleton* element in the C# Singleton pattern:



### 3.5.1.1.2 Operations Dialog - Constraints

Operations can have pre- and post- conditions defined. For each type, give the condition a name, a type and enter notes.

Constraints define the contractual behavior of an operation, what must be true before they are called and what is true after. In this respect they are related to the state model of a Class and can also relate to the guard conditions that apply to a transition.



### 3.5.1.2 Operation Tagged Values

Operations can have Tagged Values associated with them. Tagged Values offer a convenient extension mechanism for UML elements, so you can define any tags you like and then assign values to them using this form.

Tagged Values are written to the XMI output, and can be input to other third party tools for code generation or other activities.

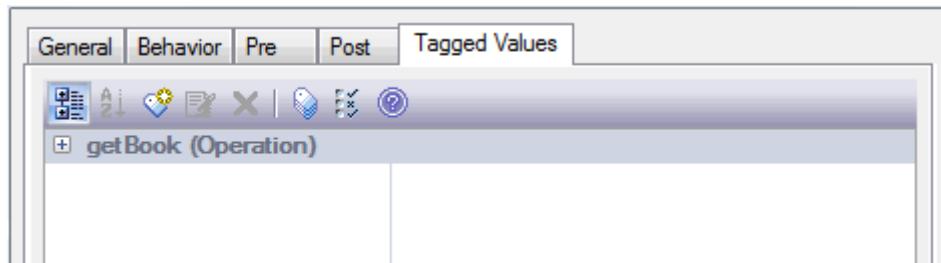
**Tip:**

Tagged Values are supported for attributes, operations, objects and connectors.

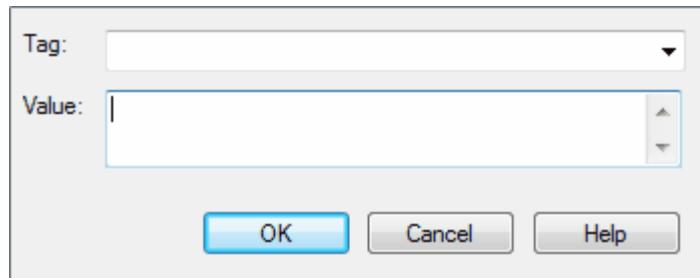
### Add a Tagged Value

To add a Tagged Value for an operation, follow the steps below:

1. Click on the **Tagged Values** tab of the operation **Properties** dialog.



2. Click on the **New Tags** button. The **Tagged Value** dialog displays.



3. In the **Tag** field, type the tag name (or select a defined tag from the drop-down list), then in the **Value** field type the initial tag value.  
 4. Click on the **OK** button to confirm the operation.

**Note:**

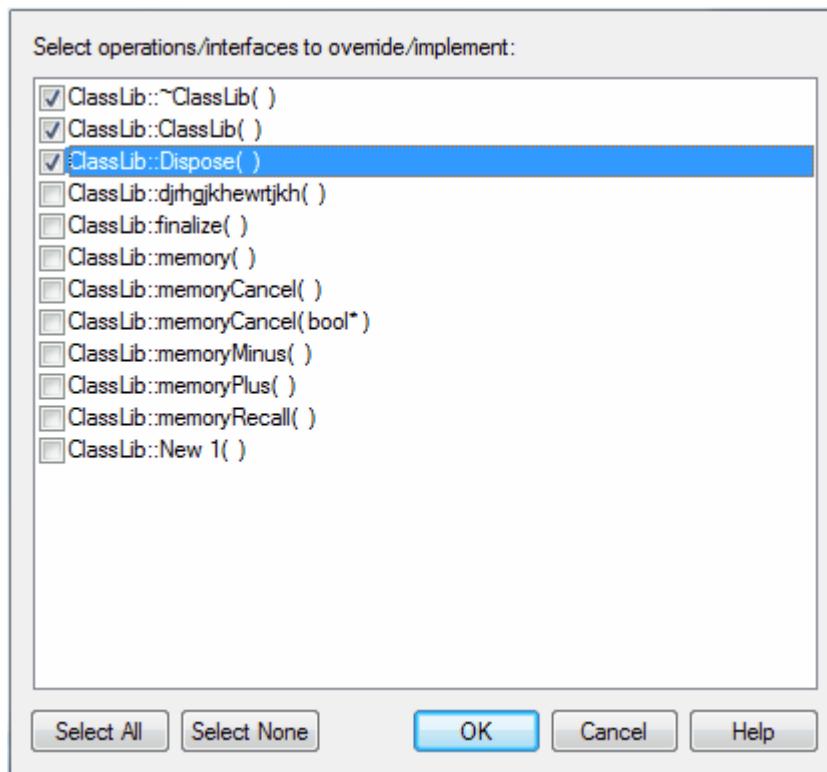
You can define custom tags using a predefined Tagged Value Type. For more information see *SDK for Enterprise Architect*.

### 3.5.1.3 Override Parent Operations

In Enterprise Architect, you can automatically override methods from parent Classes and from realized Interfaces.

Select a Class that has a parent or realized interface and select the **Element | Advanced | Overrides & Implementations** menu option.

In the **Override Operations/Interfaces** dialog, check the operations/interfaces to automatically override and click on the **OK** button. Enterprise Architect generates the equivalent function definitions in your child Class.



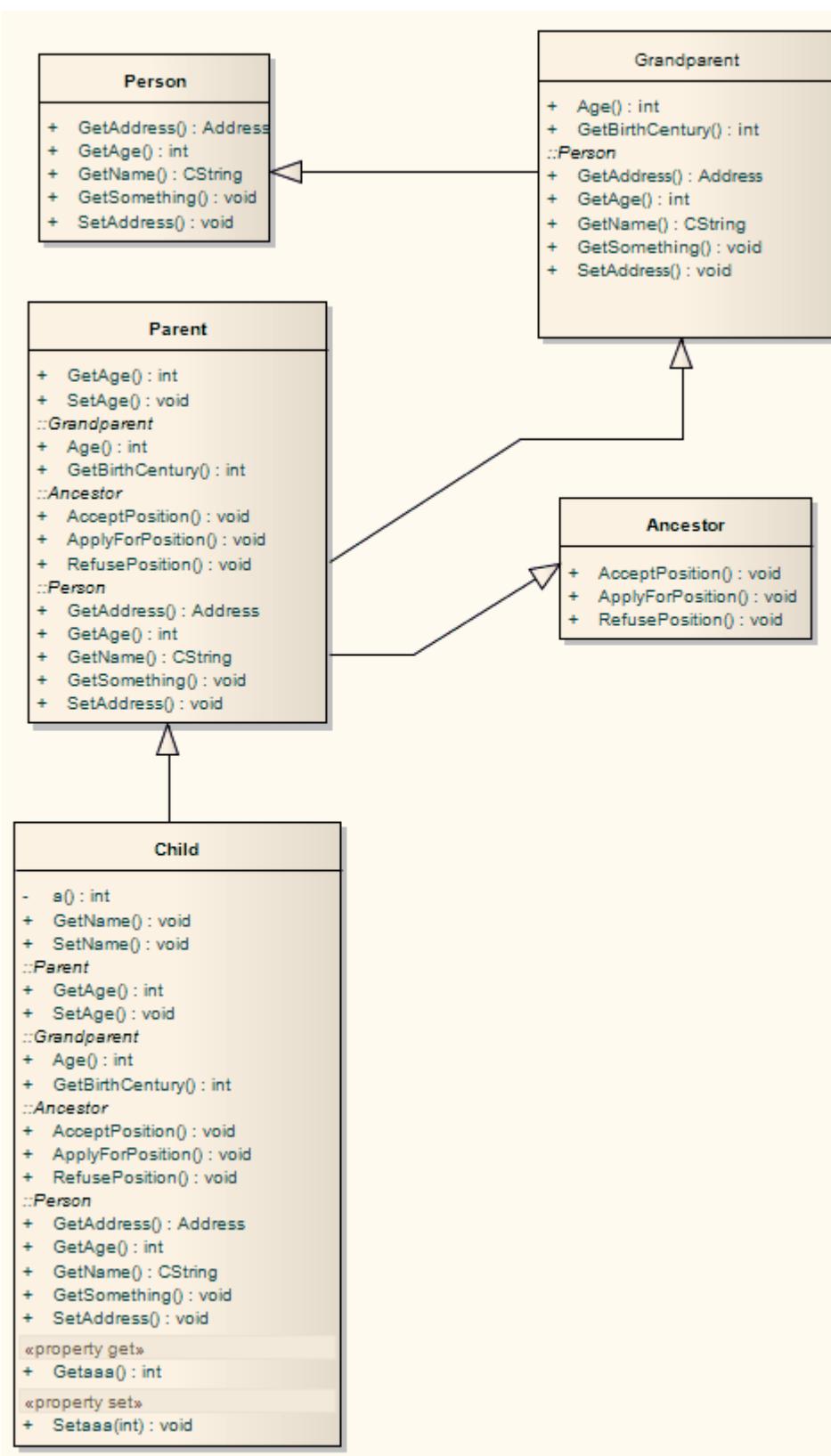
You can configure Enterprise Architect to display this dialog each time you add a Generalization or Realization connector between Classes, and review their possible operations/interfaces to override/implement. Do this from the [Links](#) page of the [Options](#) dialog (select the **Tools | Options | Links** menu option).

- Show Uses arrowheads
- Show Override Operation dialog on new connector
- Suppress '+' Role Scope

#### 3.5.1.4 Display Inherited Operations

You can configure an element in a diagram to display the complete operation set obtained from all ancestors in the element's type hierarchy, as well as those directly owned. To do this, use the **Element | Feature Visibility**  function from the main menu, or press **[Ctrl]+[Shift]+[Y]**.

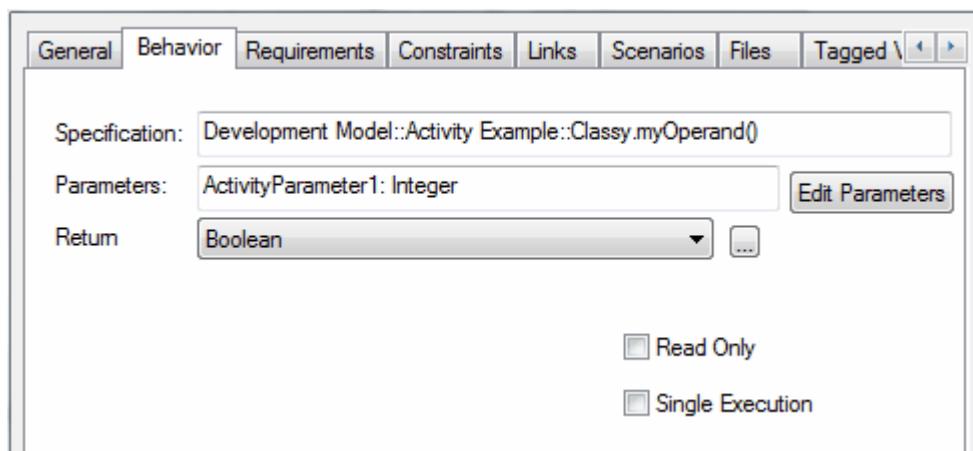
The following diagram illustrates this behavior when enabled for each element in a simple hierarchy.



### 3.5.2 Interactions and Activities

The behavioral aspects of Interactions and Activities are modeled using the **Behavior** tab of the element **Properties** dialog, which enables you to assign parameters and return types to the elements.

Use the **Edit Parameters**<sup>170</sup> button to edit an element's parameters. When you create a new parameter using the dialog, it internally creates an *Activity Parameter Node* for an Activity or an *Interaction Parameter* for an Interaction (see the *UML Dictionary*). In the **Return** field, click on the drop-down arrow and select the return type of the element.

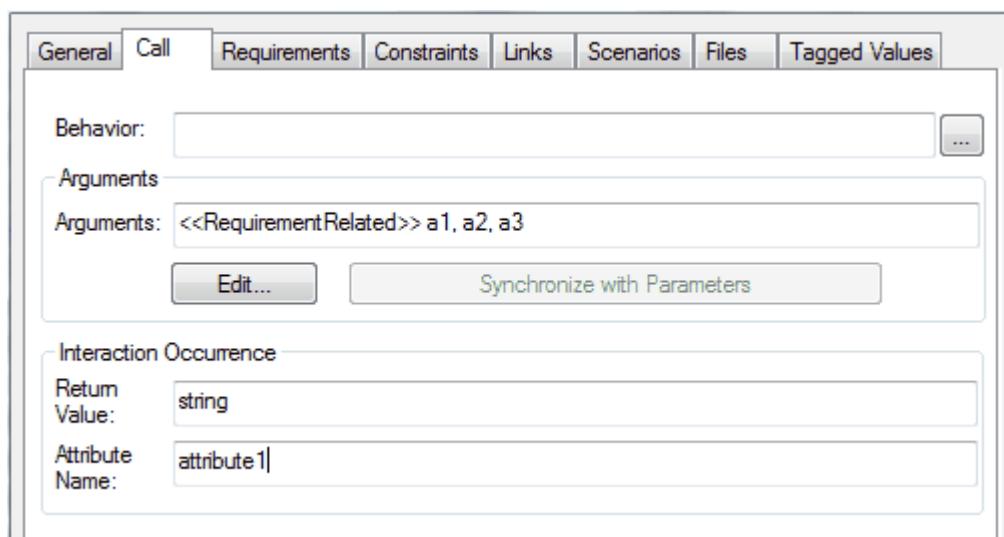


The specification field is populated automatically when an operation is [associated with the activity as a behavior](#)<sup>158</sup>.

### 3.5.3 Behavior Calls

A behavior call is the invocation of a behavior. You can represent an invocation with a *Call Operation Action* (*Operation*), *Call Behavior Action* (*Activity*) or *Interaction Occurrence* (*Interaction*) element (see the *UML Dictionary*). You model the properties of the behavior call using the **Call** tab of the element **Properties** dialog, on which you:

- [Edit Arguments](#)<sup>171</sup>
- [Re-associate the call with a different behavior](#)<sup>168</sup>
- [Synchronize the arguments](#)<sup>168</sup> with the parameters in the associated behavior.



Click on the **Edit** button to create and delete arguments, and relate them to a corresponding parameter in the associated behavior.

Click on the [ ... ] (**Select Behavior**) button to re-associate the invocation with a different behavior or to remove any association with the current behavior.

The **Interaction Occurrence** panel is displayed only for Interaction Occurrence elements. It enables you to enter the return value and attribute of the behavior call.

### 3.5.3.1 Associate with Different Behaviors

On the **Call** tab of the Behavior Call **Properties** dialog, when you click on the [ ... ] (**Select Behavior**) button the [Select <Item>](#)<sup>[149]</sup> dialog displays, listing all available behaviors in the model.

Select <**none**> to remove any existing association between an invocation and a behavior, or select another classifier to re-associate the invocation with a different behavior.

The **Synchronize with Parameters** button is enabled only if a valid behavior is identified in the **Behavior** field.

### 3.5.3.2 Synchronize Arguments

On the **Call** tab of the element **Properties** dialog, click on the **Synchronize with Parameters** button to synchronize the number of arguments in the invocation element with the number of parameters in the associated behavior. This automatically creates or deletes arguments based on the number of parameters in the behavior. If any arguments are to be deleted, Enterprise Architect prompts you to confirm the operation. Click on the **Yes** button to confirm.

**Note:**

The **Synchronize with Parameters** button is enabled only if the invocation is associated with a valid behavior, as identified in the **Behavior** field.

## 3.5.4 Behavior Parameters

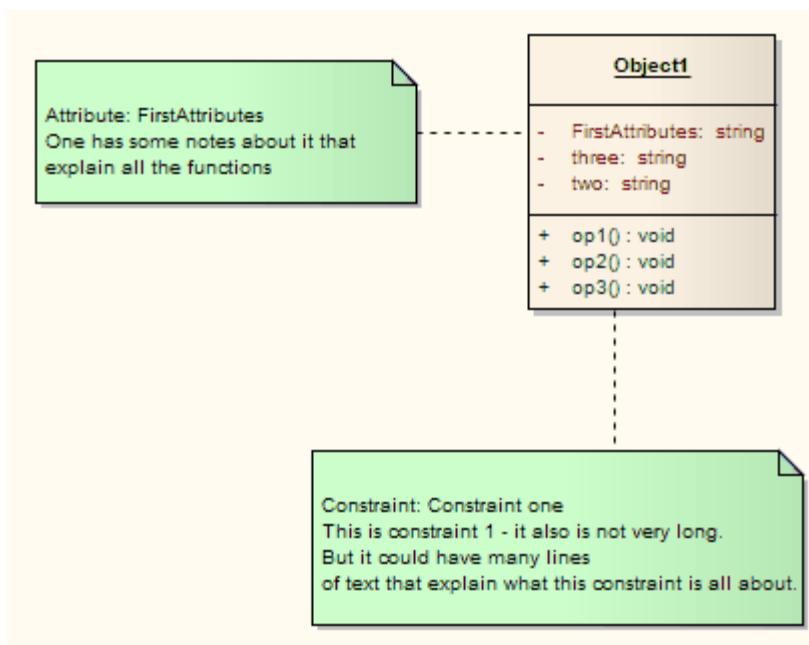
This topic area describes the facilities for defining, editing and extending the parameters of behavioral operations, Activities and Interactions.

- [Parameter Dialog](#)<sup>[170]</sup>
- [Parameter Tagged Values](#)<sup>[172]</sup>
- [Operation Parameters By Reference](#)<sup>[173]</sup>

### 3.5.4.1 Link Note to Internal Documentation

It is possible to connect a *Note* element to another element's internal documentation. This enables you to externalize model documentation to the diagram level, and as Enterprise Architect keeps the note and the internal structure in synch, you do not have to worry about updating the note contents; this is done automatically.

In the example below, two notes are connected into an element's internal structures. One is connected to an attribute, and displays the attribute name and notes. The other is connected to a constraint, showing the constraint name and documentation.



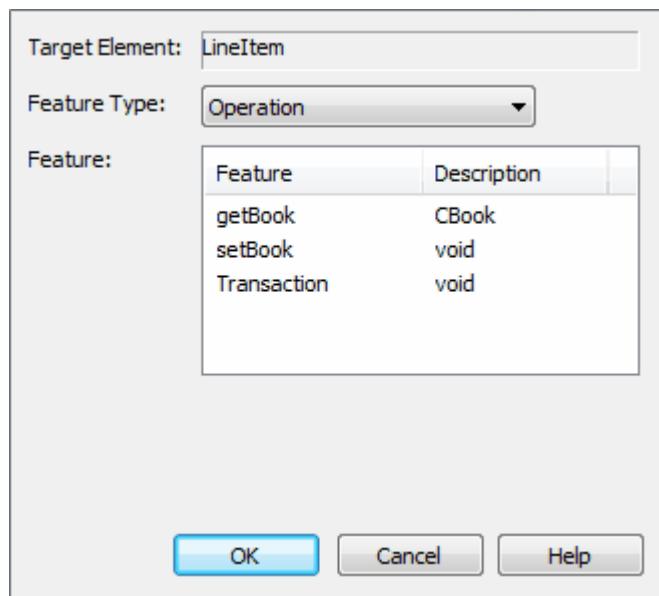
## Procedure

To connect a Note element to a feature of another design element, follow the steps below:

1. Click on the element and then click on the feature to link the note to.
2. Select the **Element | Inline Features | Create Linked Note** context menu option. This creates a Note element linked to the selected feature, reflecting the content of that feature.

Alternatively:

1. Insert the target element into a diagram.
2. Drag the **Note** icon from the **Common** page of the **Toolbox** onto the diagram, next to the target element. The **Notes** dialog displays. Do not type any text, just click on the **OK** button.
3. Click on the **Note Link** icon from the **Common** page of the **Toolbox**, click on the Note, and drag across to the target element to create the connector.
4. Right-click on the Note Link to display the context menu.
5. Select the **Link this Note to an Element Feature** menu option. The **Link note to element feature** dialog displays.



6. In the **Feature Type** field, click on the drop-down arrow and select the type of feature to link to.
7. In the **Feature** list, click on the specific feature to link to.
8. Click on the **OK** button.

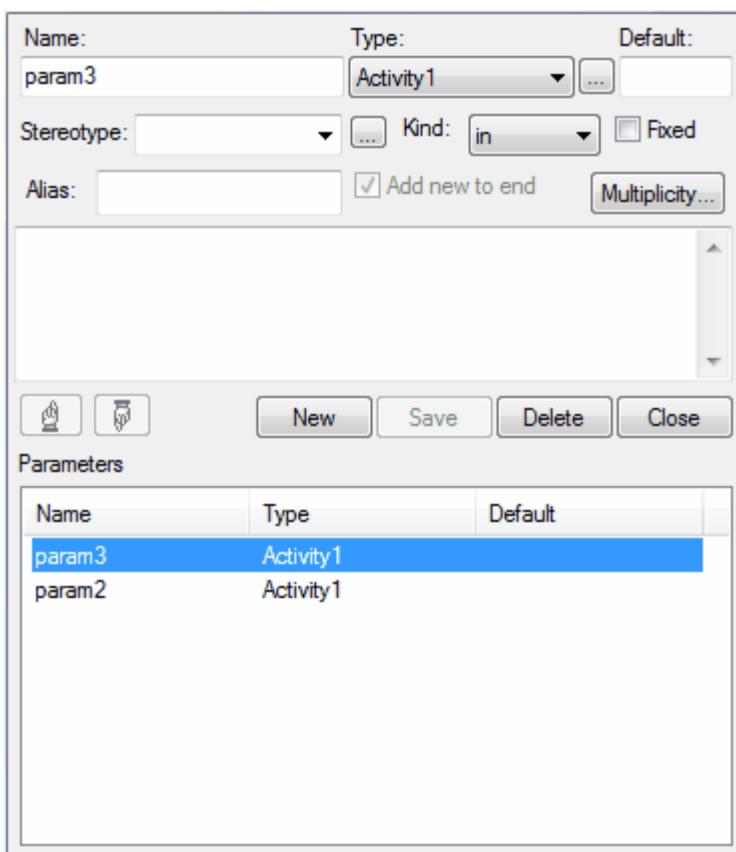
The note now automatically derives its contents from the target element.

#### 3.5.4.2 Parameters Dialog

The **Parameters** dialog enables you to define the parameters of an operation, Activity or Interaction. The parameter list is reproduced in code in the order the parameters appear in the parameters list, so use the **Up** and **Down** buttons to move parameters into their required positions. Additionally, you can select the **Add new to end** checkbox to force new parameters to appear at the end of the list instead of the top.

**Tip:**

Set the amount of parameter detail to display in a specific diagram using the [Show Parameter Detail](#) drop-down list on the **Diagram Properties** dialog. The setting applies only to the current diagram. The default is to show the type only.



Option	Use to
<b>Name</b>	Type the parameter name.
<b>Type</b>	Select the data type of the parameter. Alternatively, click on the [ ... ] button and select the element classifier to define the type.
<b>Default</b>	Type an optional default value for the parameter.
<b>Stereotype</b>	Type a stereotype name, or click on the drop-down arrow and select a stereotype for the parameter.
<b>Kind</b>	Indicate the way a parameter is passed to a function: <ul style="list-style-type: none"> <li>• <b>In</b> = By Value</li> <li>• <b>InOut</b> = By Reference</li> <li>• <b>Out</b> is passed by Reference, but only the return value is significant.</li> </ul>
<b>Fixed</b>	Set the parameter to <i>const</i> , even if passed by reference.
<b>Alias</b>	Type an optional alias for the parameter.
<b>Add new to end</b>	Place new parameters at the end of the list instead of the start.
<b>Multiplicity</b>	Display the <b>Multiplicity</b> dialog, to specify the multiplicity of the parameters.
<b>Notes</b>	Type any additional notes on the parameter.

## Multiplicity Dialog

Field	Use to
<b>Lower bound</b>	Define a lower limit to the number of elements allowed in the collection.
<b>Upper bound</b>	Define an upper limit to the number of elements allowed in the collection.
<b>Allow Duplicates</b>	Indicate that duplicates are allowed. Maps to the UML property <i>isUnique</i> , value <i>FALSE</i> ).
<b>Multiplicity is Ordered</b>	Indicate that the collection is ordered.

### See Also

- [Parameter Tagged Values](#) [172]
- [Operation Parameters by Reference](#) [173]

### 3.5.4.3 Parameter Tagged Values

Behavioral parameters can have Tagged Values associated with them. Tagged Values offer a convenient extension mechanism for UML elements; you can define any tags you like and then assign values to them using this form.

Tagged Values are written to the XMI output, and can be input to other third party tools for code generation or other activities.

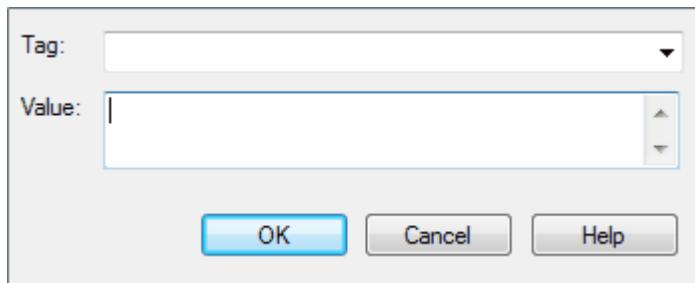
#### Tip:

Tagged Values are supported for attributes, operations, objects and connectors.

## Add a Tagged Value

To add a Tagged Value for a parameter, follow the steps below:

1. Double-click on the operation, Activity or Interaction containing the parameter in a diagram or in the **Project Browser**. The **Properties** dialog displays.
2. Click on the **Tagged Values** tab, which shows the Tagged Values for the selected object and its parameters.
3. Click on the required parameter in the **Parameters** compartment of the **Tagged Values** tab, and click on the **New Tags** button. The **Tagged Value** dialog displays.



4. In the **Tag** field, type the tag name (or select a defined tag from the drop-down list), then in the **Value** field type the initial tag value .
5. Click on the **OK** button to confirm the Tagged Value.

#### Tip:

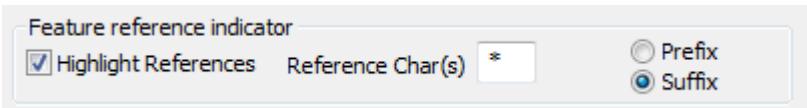
Custom tags can be created using a predefined Tagged Value Type. For more information see *SDK for Enterprise Architect*.

### 3.5.4.4 Operation Parameters by Reference

#### Note:

This facility currently applies to operations only.

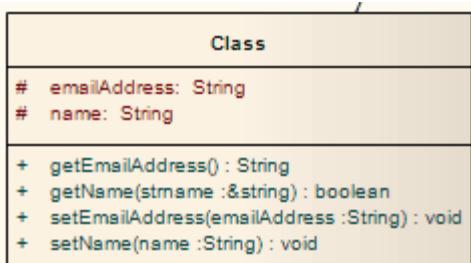
You can select to highlight parameters declared as 'Kind: *inout*' or 'Kind: *out*' with an additional user-defined prefix or suffix. On the **Objects** page of the **Options** dialog (select the **Tools | Options | Objects** menu option), the **Feature reference indicator** panel enables you to set whether references are highlighted or not.



If you select the **Highlight References** checkbox, you can also indicate whether a prefix or suffix should be used, and the actual reference character to use. In the example above, the & character has been set as a prefix.

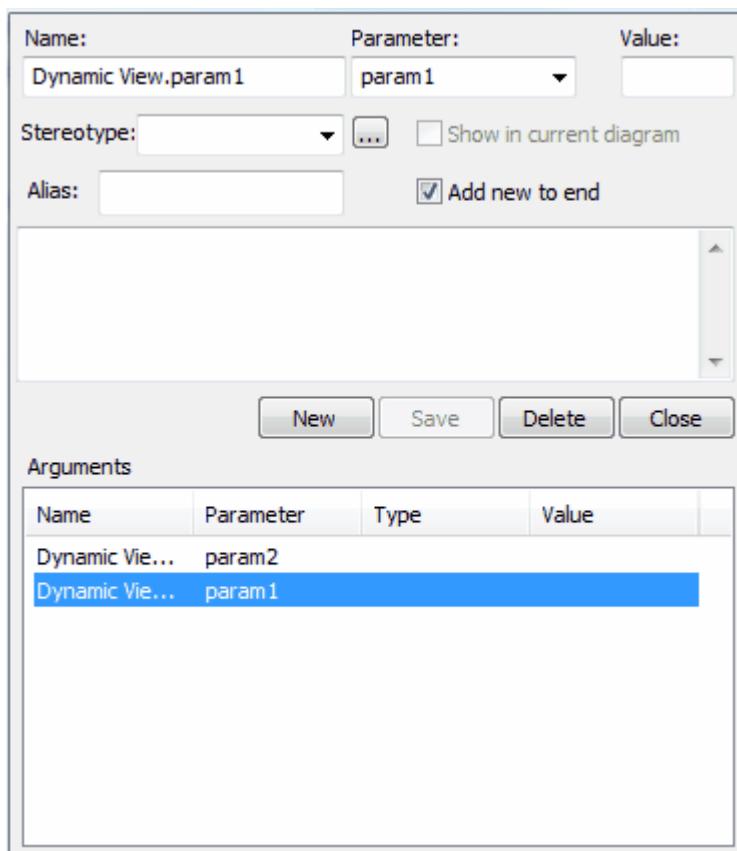
When you declare a parameter of type *inout*, it is assumed you are passing the parameter by reference rather than by value. If you have elected to highlight references, then this is displayed in the **Diagram View**.

The example below shows that, in the *getName* operation, the parameter *strName* is a *string* reference, and is highlighted using the chosen character and position.



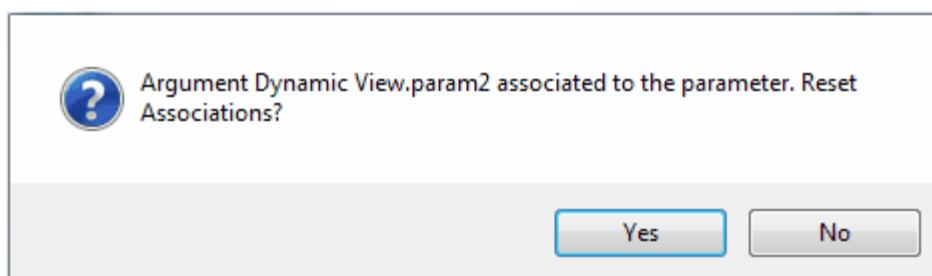
### 3.5.5 Behavior Call Arguments

You define the arguments of a [Behavior Call](#)<sup>[167]</sup> using the **Arguments** dialog, which you display by clicking on the **Edit** button on the **Call** tab of the element **Properties** dialog.



1. In the **Name** field, type the name of an argument to map to the behavior.
2. In the **Parameters** field, click on the drop-down arrow and select a behaviors parameter from the list of parameters associated with the behavior.
3. In the **Value** field, set any required value.
4. If a diagram is displayed, and if required, select the **Show in current diagram** checkbox to add an Action Pin on the diagram (see *The UML Dictionary*).
5. Click on the **Save** button.
6. If appropriate, click on the **New** button and repeat steps 1 to 5 for another argument:parameter mapping.

If you attempt to map a newly created argument to a parameter that is already associated with a different argument, Enterprise Architect identifies the mapping and prompts you to confirm that you intend to change the association.



### 3.6 Element In-place Editing Options

This topic explores the tasks that can be performed using in-place editing of elements on a diagram in Enterprise Architect. The tasks include:

- [View Properties](#)<sup>[175]</sup>
- [Edit Element Item Name](#)<sup>[176]</sup>
- [Edit Stereotype](#)<sup>[177]</sup>
- [Edit Scope](#)<sup>[178]</sup>
- [Edit Attribute Keyword](#)<sup>[179]</sup>
- [Edit Operation Parameter Keyword](#)<sup>[179]</sup>
- [Insert Operation Parameter](#)<sup>[182]</sup>
- [Edit Parameter Kind](#)<sup>[180]</sup>
- [Insert New Attribute or Operation](#)<sup>[181]</sup>
- [Add Maintenance Item](#)<sup>[182]</sup>
- [Add Test Item](#)<sup>[184]</sup>
- [Delete Selected from Model](#)<sup>[176]</sup>

#### 3.6.1 In-place Editing Tasks

To use the options that are available through the in-place editing menu, follow the steps below:

1. Open the diagram containing the element.
2. Click on the element, and on the item to manipulate within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Edit and manipulate the items in the element, either by pressing the appropriate keyboard keys or by right-clicking on the highlighted item and choosing a task from the **Element Items** context menu. The following commands are available:

To...	Select menu option...	Or press...
Change the name, scope or stereotype of the element or element item	<b>Edit Selected</b>	[F2]
Display the dialog containing details of the element	<b>View Properties</b>	[Enter]
Insert a new item in the element	<b>Insert New After Selected</b>	[Insert]
Locate the item in the <b>Project Browser</b>	<b>Find in Project Browser</b>	
Add an attribute to the element	<b>Add Attribute</b>	[Ctrl]+[Shift]+[F9]
Add an operation to the element	<b>Add Operation</b>	[Ctrl]+[Shift]+[F10]

To...	Select menu option...	Or press...
Insert a feature on the specific element item, such as Maintenance features and Testing features	Add Other	[Ctrl]+[F11]
Delete the selected item from the model	Delete Selected from Model	[Delete]
Display the source code for the element.	View Source code	[F12]
Set a breakpoint on a highlighted operation (including a breakpoint, start recording marker, end recording marker or stack auto-capture marker) (see <i>Visual Execution Analyzer in Enterprise Architect</i> ).	Set Breakpoint	
Navigate Diagram Selection, to navigate the diagram between elements without having to use the mouse		[Ctrl]+[Shift]+[arrow key]
Toggle element highlight option on and off		[Shift]+[Enter]

Other options that are available while editing element attributes or operations in a diagram include:

To...	Press...
Accept current changes	[Enter]
Accept current changes and open a new slot to add a new item	[Ctrl]+[Enter]
Abort the edit, without save	[Esc]
Display the context menu for in-place editing	[Shift]+[F10]
Invoke the <i>Classifier</i> dialog	[Ctrl]+[Space]

#### Note:

Most of the in-place editing menu commands have keyboard alternatives. For many of them, if the selected item happens to be off-screen when you press the appropriate keys, the diagram automatically scrolls to show the whole element, so that you can see what you are changing.

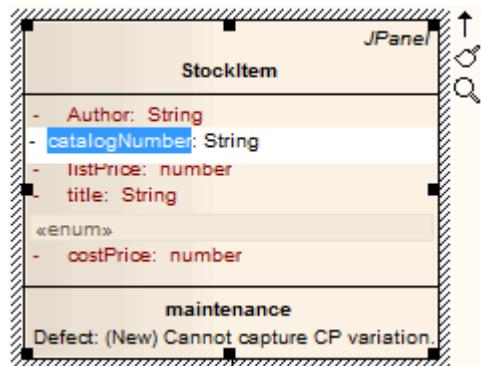
### 3.6.2 Edit Element Item Name

The in-place editing feature enables you to change the name of the element, or the name of an operation or attribute, directly from the diagram. To use this feature follow the steps below:

1. Open the diagram containing the element.
2. Click on the element and on the name to change within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press **[F2]**) to enable you to edit the item directly from the diagram. The name of the attribute or operation is highlighted.

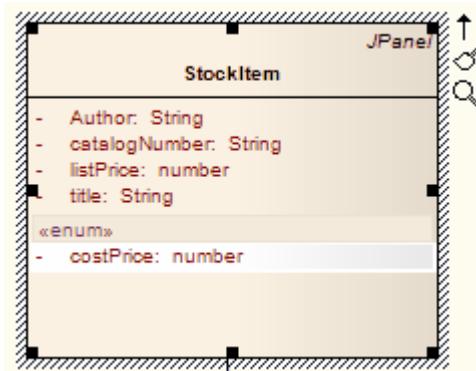


5. Delete or type over the name. Press **[Enter]** to accept the change, or **[Esc]** to cancel the change.

### 3.6.3 Edit Feature Stereotype

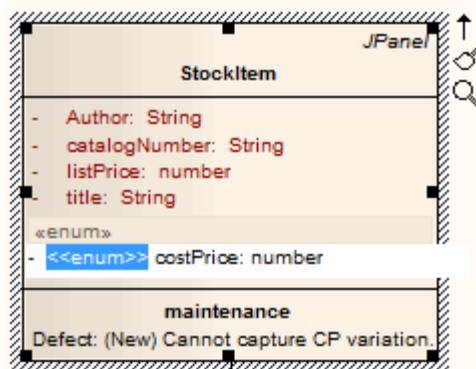
You can use the in-place editing feature to change the stereotype of an operation or attribute directly from the diagram. To use this feature, follow the steps below:

1. Open the diagram containing the element.
2. Click on the element, and on the item to edit within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press **[F2]**) to enable you to edit the attribute or operation directly from the diagram. The name of the item is highlighted.
5. Move the cursor to the position before the name or within the existing attribute or operation stereotype

(denoted by «stereotype name»).



6. Delete or type over the previous name to change the stereotype name of the attribute or operation. Press [Enter] to accept the change or [Esc] to cancel the change. You can assign multiple stereotypes by including a comma-separated list inside the stereotype markers.

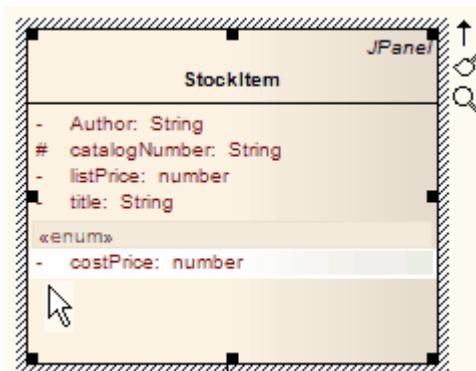
#### 3.6.4 Edit Feature Scope

The in-place editing feature enables you to rapidly change the scope of an attribute or operation directly from the diagram. To use this feature follow the steps below:

1. Open the diagram containing the element.
2. Click on the element and on the item to edit within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press [F2]) to enable you to edit the attribute or operation directly from the diagram. The name of the item is highlighted.
5. Move the cursor to the scope of the item and delete the previous entry.

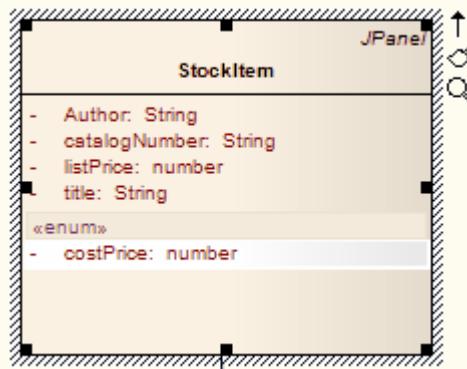


6. Reassign the entry by typing in one of the following symbols:
  - + indicates that the scope is Public
  - - indicates that the scope is Private
  - ~ indicates that the scope is Package
  - # indicates that the scope is Protected.
7. Press **[Enter]** to save the change, or **[Esc]** to cancel the change. The diagram is updated to reflect the changes. (Also see the *catalogNumber* attribute in the above screen illustrations.)

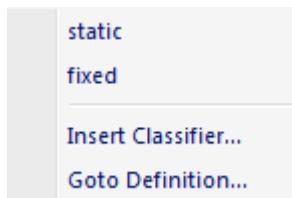
### 3.6.5 Edit Attribute Keyword

You can add features such as attribute keywords and classifiers directly to an element, using the **Element Keywords and Classifiers** menu. This enables you to rapidly assign details element item by element item, directly from a diagram. To use this feature, follow the steps below:

1. In Enterprise Architect, open the diagram containing the element.
2. Click on the element, and on the attribute to edit within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press **[F2]**) to enable you to edit the attribute directly from the diagram. The name of the attribute is highlighted.
5. Right-click on the attribute name to display the context menu.



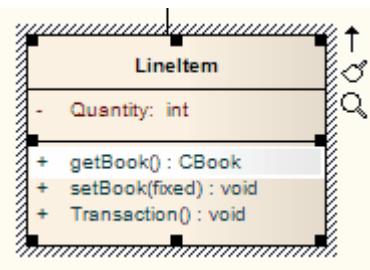
6. From the context menu, you can:
    - Change the attribute classifier to static or fixed - select the **static** or **fixed** menu options as appropriate; the diagram is updated to reflect the changes.
    - Display the Class properties - click on the **Goto Definition** menu option; Enterprise Architect locates the Class in the **Project Browser** and opens its **Properties** dialog.
- If the data type is a raw data type, Enterprise Architect displays the message: *The data type is a raw data type.*

### 3.6.6 Edit Operation Parameter Keyword

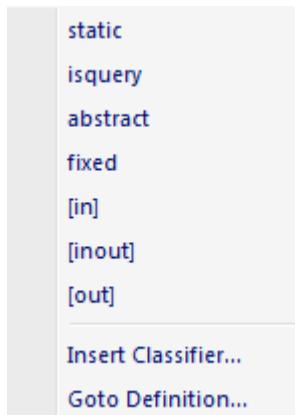
You can directly edit operation classifiers by element, using the in-place editing menu. This enables you to rapidly assign parameter keywords. To use this feature, follow the steps below:

1. Open the diagram containing the element.

2. Click on the element, and on the operation to edit within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press [F2]) to enable you to edit the operation directly from the diagram. The name of the operation is highlighted.
5. Right-click on the data type of a parameter to display the context menu.



6. From the context menu you can:
  - Change the operation classifier by clicking on the appropriate menu option - **static**, **isquery**, **abstract** or **fixed**. The diagram is updated to reflect the changes.
  - Display the Class properties - click on the **Goto Definition** menu option.

If the data type is Class, Enterprise Architect locates the Class in the **Project Browser** and opens its [Properties](#)<sup>[118]</sup> dialog.

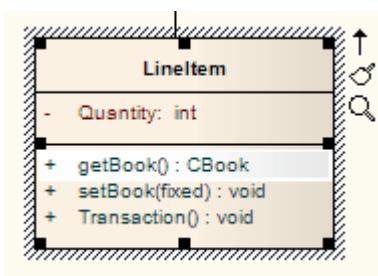
If the data type is a raw data type, Enterprise Architect displays the message *This data type is a raw data type*.

If the data type is not defined in the model, the message is: *The data type is not defined in the model*.

### 3.6.7 Edit Parameter Kind

You can edit operation parameter kinds such as *[in]*, *[inout]* and *[out]* directly from a diagram element by element, using the **Element Keywords and Classifiers** menu. This enables you to rapidly assign the parameter directly from a diagram. To use this feature follow the steps below:

1. In Enterprise Architect, open the diagram containing the element.
2. Click on the element, and on the operation to edit within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Right-click on the item. The context menu displays.
4. Select the **Edit Selected** menu option (or press **[F2]**) to enable you to edit the item directly from the diagram. The name of the item is highlighted.
5. Right-click on the item name to display the context menu.

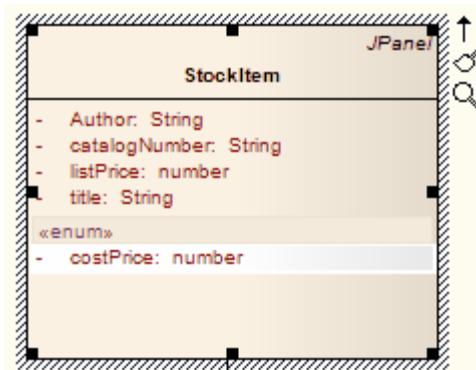


6. Select the appropriate menu option for the parameter kind value: **[in]**, **[inout]** and **[out]**. The diagram is updated to reflect the change.

### 3.6.8 Insert New Feature

You can add attributes and operations to an element using the in-place editing options. To add attributes and operations to a Class diagram element, follow the steps below:

1. Open the diagram containing the element to which you are adding an attribute or operation.
2. Click on the element, and within the element on the item after which to insert the operation or attribute. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Press **[Insert]**. Alternatively, right-click on the selected element item to display the context menu and select the **Insert New After Selected** menu option.

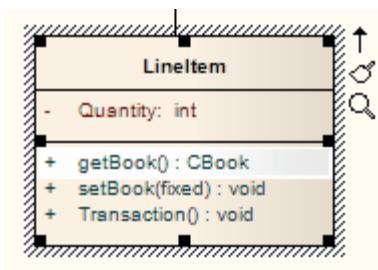
Enterprise Architect inserts a new data line in the diagram, underneath the selected item.

- Type in the relevant information for the attribute or operation. Press [Enter] to accept the change or [Esc] to cancel the change. The diagram is updated to reflect the changes.

### 3.6.9 Insert Operation Parameter

You can add operation parameters to an operation through the in-place editing options, using hotkey commands or menu shortcuts. To add parameters to operations in a Class diagram element, follow the steps below:

- Open the diagram containing the element.
- Click on the element, and on the operation to update within the element. The item line is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



- Press [F2], or right-click on the selected item to display the context menu and select the **Edit Selected** option.
- Move the cursor inside the parameter brackets and click on the reference to the parameter (for example, *bks*: for a vector containing books). Either:
  - Type the name of the parameter or
  - Place the cursor after the reference, right-click the mouse to display the inline editing options context menu and select the **Insert Classifier** option.



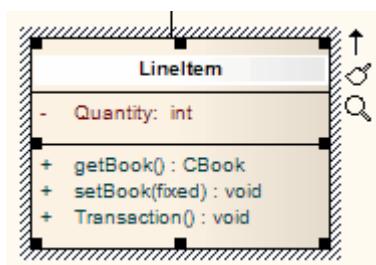
The [Select <Item>](#) dialog displays.

- Locate and select the appropriate parameter, and click on the **OK** button. The parameter is displayed on the diagram.
- Press [Enter] to accept the change or [Esc] to cancel the change. The diagram is updated to reflect the changes.

### 3.6.10 Insert Maintenance Feature

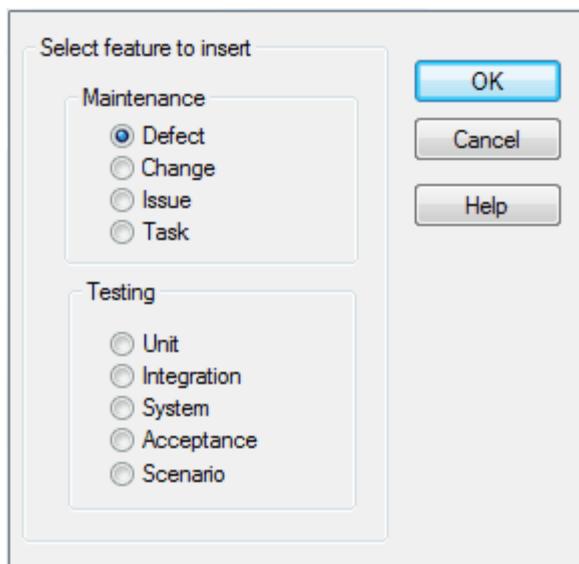
You can rapidly assign maintenance details such as Defects, Changes, Issues and Tasks directly to an element from a diagram, using the **Element Items** menu. To use this feature follow the steps below:

- Open the diagram containing the element.
- Click on the element name. The name is highlighted in a lighter shade (the default is white), to indicate that it has been selected.

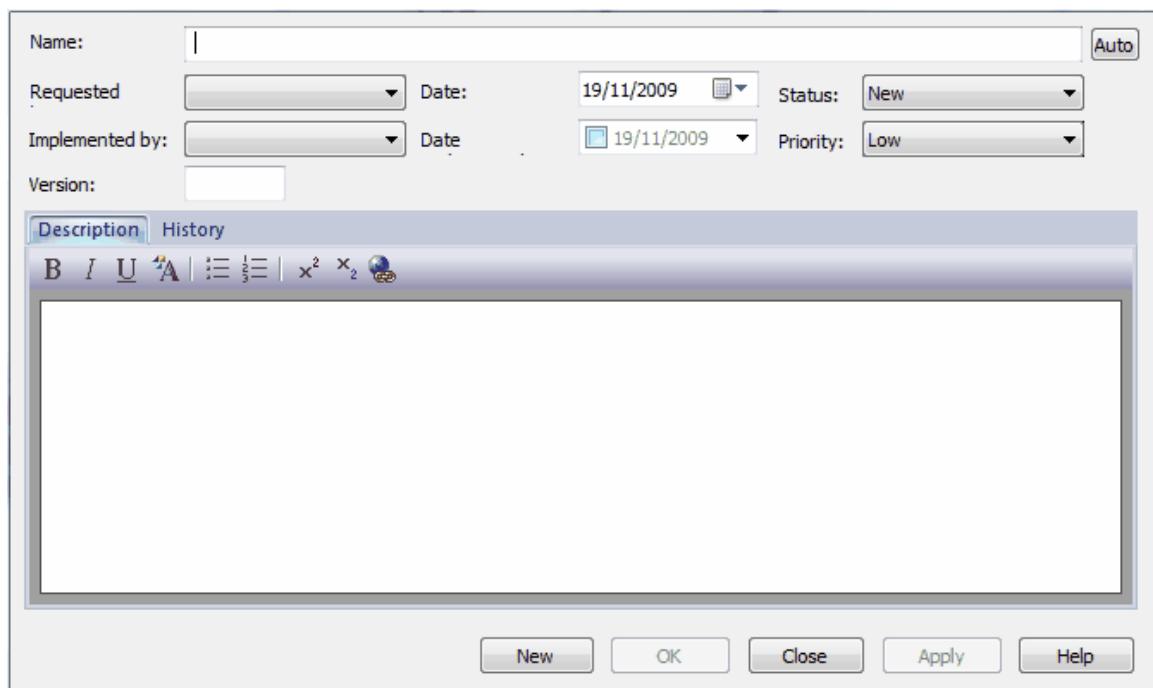


3. Either:
  - Press **[Ctrl]+[F11]** or
  - Right-click on the highlighted name to display the context menu, and select the **Add Other** option.

The **Insert Feature** dialog displays.

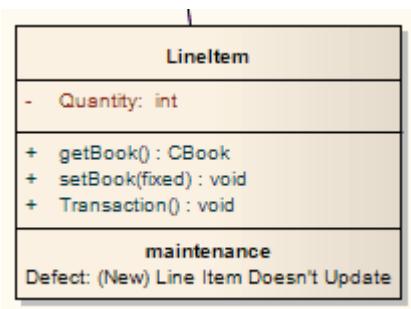


4. Click on the appropriate radio button option to associate the required maintenance feature with the element item.
5. Click on the **OK** button. The **<Maintenance Feature> details for <element>** dialog displays.



6. Complete the fields to define the maintenance activity, and then click on the **Apply** button. To create a subsequent maintenance activity of this type, click on the **New** button.
7. When you have defined all of the maintenance activities of this type, click on the **OK** button. The maintenance details are added to the element.

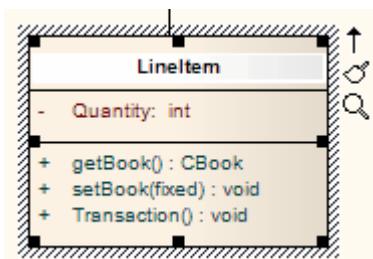
To ensure that the maintenance items are visible in the diagram element, as shown in the example below, select the **Maintenance** checkbox on the **Elements** tab of the **Diagram Properties** dialog. For more information on diagram appearance options, see the *Show Maintenance Scripts in Diagram* topic in *Project Management with Enterprise Architect*.



### 3.6.11 Insert Testing Features

You can rapidly add testing features such as Unit, Integration, System, Acceptance and Scenario tests to an element directly from a diagram, using the **Element Items** menu. To use this feature follow the steps below:

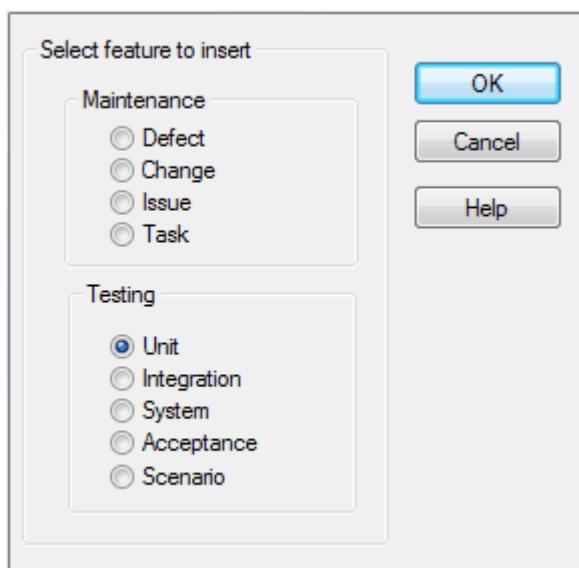
1. Open the diagram containing the element.
2. Click on the element. The element name is highlighted in a lighter shade (the default is white), to indicate that it has been selected.



3. Either:

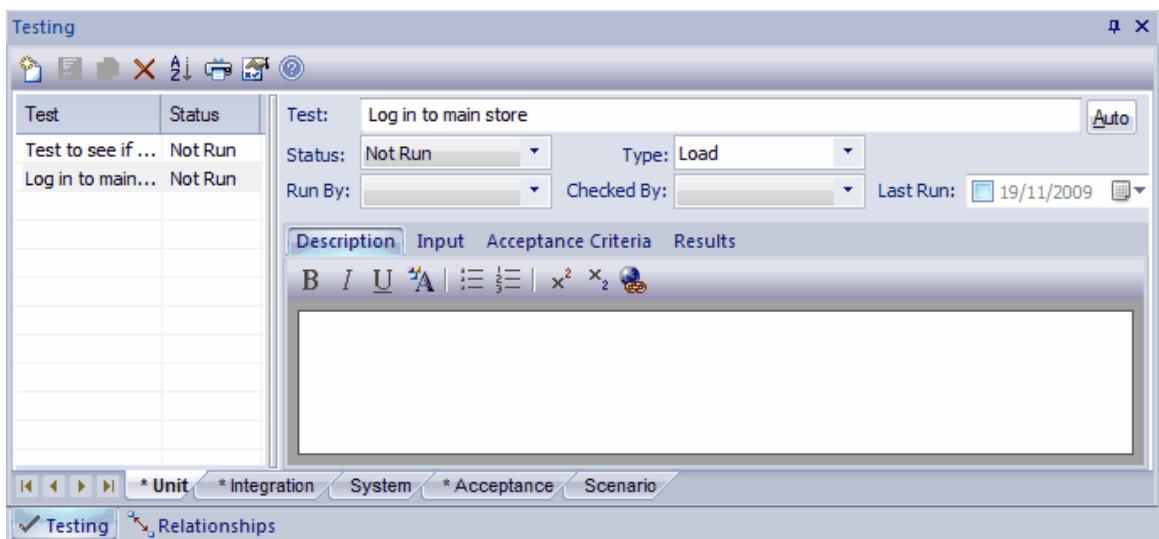
- Press **[Ctrl]+[F11]** or
- Right-click on the highlighted name to display the context menu and select the **Add Other** option.

The **Insert Feature** dialog displays.



4. Click on the appropriate radio button option to associate the required testing feature with the element.

5. Click on the **OK** button. The **Testing** window opens, showing the appropriate panel for the type of test selected.

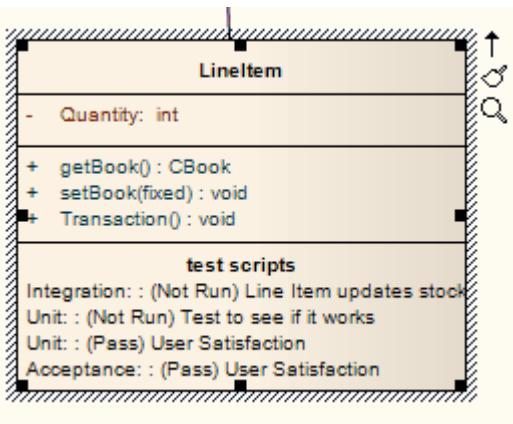


6. Complete the fields to define the test activity, and then click on the **Save** icon in the window toolbar (see

the *Testing Workspace* topic in *Project Management with Enterprise Architect*). The test is added to the element.

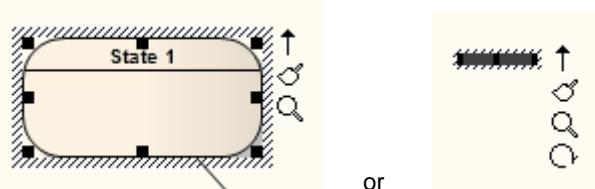
- To create a subsequent test activity of this type, click on the **New** icon, or to add items for other types of test, click on the appropriate tab.

To ensure that the test items are visible in the diagram element, as shown in the example below, select the **Testing** checkbox on the **Elements** tab of the **Diagram Properties** dialog. For more information on diagram appearance options, see the *Show Test Scripts in Compartments* topic in *Project Management with Enterprise Architect*.



### 3.7 Element Icons

When you add an element to a diagram, or select an existing element, a number of small icons display off the right hand side of the element, underneath the Quicklinker arrow. For example:



These icons display small versions of the diagram toolbars or perform specific actions, to enable you to quickly edit the element you have highlighted.

Icon	Description
↻	Rotates a Fork/Join element from vertical to horizontal and vice-versa.
♂	Displays the Format toolbar, for changing element appearance.
🔍	Displays the Current Element toolbar, to edit the element's properties and features.
⋮	When multiple elements are selected, displays the Diagram Toolbar for changing or aligning the elements together.
☰	Toggles an Activity Partition between vertical and horizontal.

For more information on the toolbars and their options, see *Using Enterprise Architect - UML Modeling Tool*. For information on Activity Partitions, see the *UML Dictionary*.

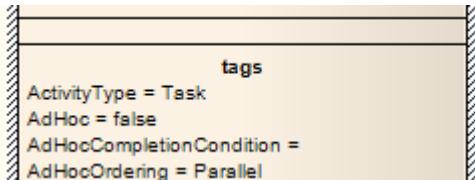
### 3.8 Compartments

In addition to the attributes and operations compartments shown in a Class element, Enterprise Architect also supports other compartments that can optionally be displayed.

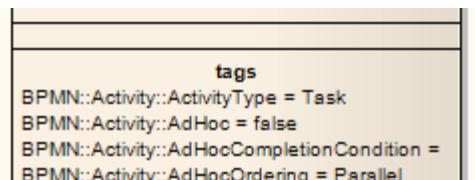
To set the visibility of the various compartments, see [Feature Visibility](#)<sup>[33]</sup>.

#### Tags Compartment

The **tags** compartment lists all Tagged Values for an element as entered in the [Tagged Values](#)<sup>[145]</sup> window.



Or, in the [fully qualified](#)<sup>[33]</sup>, expanded format:



#### Note:

The **fully-qualified** option operates only on those Tagged Values that were created in Enterprise Architect release 7.1 or later. It does not expand Tagged Values created in earlier releases.

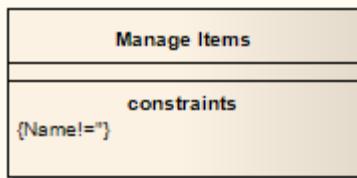
#### Responsibility Compartment

The responsibility compartment shows a list of responsibilities as entered on the [Require](#)<sup>[122]</sup> tab of the element [Properties](#) dialog.



#### Constraint Compartment

The constraint compartment shows a list of element constraints as entered in the [Constraint](#) tab of the element [Properties](#) dialog.



## Testing Compartment

The testing compartment lists all of the tests associated with an element as listed in the **Testing** window (select the **View | Testing** menu option). For more information on Testing, see *Project Management with Enterprise Architect*.

## Maintenance Compartment

The maintenance compartment lists all of the defects, changes, issues and tasks associated with an element, as listed in the **Maintenance** window (select the **View | Other Element Tools | Maintenance** menu option). For more information on Maintenance, see *Project Management with Enterprise Architect*.

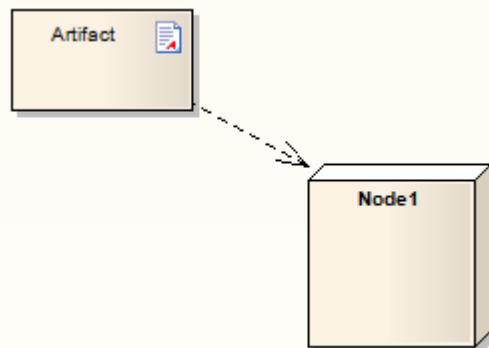
## 3.9 Linked Documents

In the Corporate, Business and Software Engineering, Systems Engineering and Ultimate editions of Enterprise Architect, you can link an RTF document to any UML element in the model.

All editions of Enterprise Architect provide an additional UML Artifact - Document Artifact (see the *UML Dictionary*) - that can contain an RTF document internally.

You create linked documents from Linked Document Templates, which you define with the **Document Template Editor**; see the [Create Linked Document Templates](#)<sup>[194]</sup> and [Edit Linked Document Templates](#)<sup>[195]</sup> topics.

The Document Artifact and the Document Editor are illustrated below:



*<This section can include identification of the project to be developed along with an overview of resources required.>*

## Scope

*<This section states the scope for defining the resources. This provides a breakdown of the resources, other than budget, required to carry out the project. >*

## Timeline Estimate

*<This gives an overview of the estimated time to carry out the major sections of the project. It should broadly cover the timing expected to perform the major sections of the project using the resources stated above. >*

**Note:**

When you have saved the document, an A symbol displays in the bottom right corner of the element.



Documents created via the Document Artifact element are rendered into RTF Documentation by selecting the **Linked Document** checkbox in the **RTF Style Template Editor**. See the *Select Model Components For Documentation* topic in *Report Creation in UML Models*.

The screenshot shows the RTF Style Template Editor interface. On the left, there is a tree view of model elements under a package. The 'Element' node is expanded, showing 'Requirement', 'Constraint', 'Tagged Value', 'Custom Property', 'Linked Document', 'Scenario', 'File', 'Test', 'Change', 'Defect', 'Issue', and 'Tool'. The 'Linked Document' checkbox is checked. On the right, there are two sections: 'Custom Properties' and 'Scenarios'. The 'Custom Properties' section contains a single item: '{CustomProperty.Name} = {CustomProperty.Value}'. The 'Scenarios' section contains a single item: '{ElemScenario.Scenario} {ElemScenario.Notes}'.

The **Linked Document** checkbox is within the **Element** hierarchy, towards the end. Remember that checkboxes can be moved up and down the hierarchy (as has been done above) to position information in the generated document as you require. In some templates, the **Linked Document** checkbox is only available as a child of the **External Requirements** checkbox.

The linked document is rendered into the RTF documentation at:

```
linked document >
<linked document
```

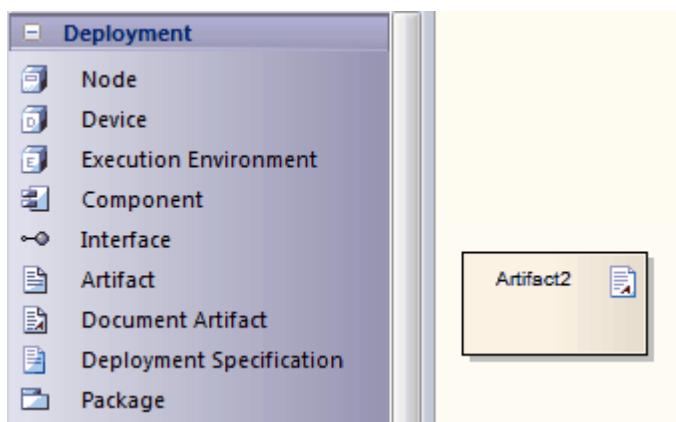
#### See Also

- [Create Document Artifact](#)<sup>[190]</sup>
- [Link Document to UML Element](#)<sup>[191]</sup>
- [Edit Linked Documents](#)<sup>[192]</sup>
- [Hyperlink From Linked Document](#)<sup>[193]</sup>
- [Create Element From Document](#)<sup>[193]</sup>
- [Replace or Delete Linked Documents](#)<sup>[194]</sup>
- RTF Report Dialog Options in *Report Creation in UML Models*

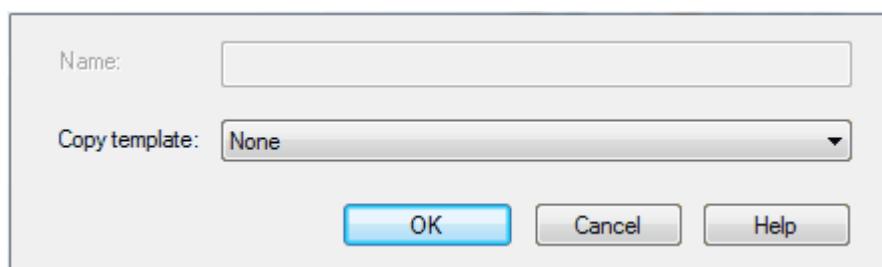
### 3.9.1 Create Document Artifact

You create a Document Artifact element In a *Component* or *Deployment* diagram (see the *UML Dictionary*).

Drag and drop the *Document Artifact* element from the Enterprise Architect UML **Toolbox** into your diagram.



Double-click on the Document Artifact element. The [Linked Document Editor](#)<sup>[191]</sup> opens, with the **New Linked Document** dialog.



In the **Copy template** field, click on the drop-down arrow and select a previously-created *Linked Document Template*. Click on the **OK** button.

For more information on how to create and edit Linked Document Templates, see [Create Linked Document Templates](#)<sup>[194]</sup> and [Edit Linked Document Templates](#)<sup>[195]</sup>.

### 3.9.2 Link Document to UML Element

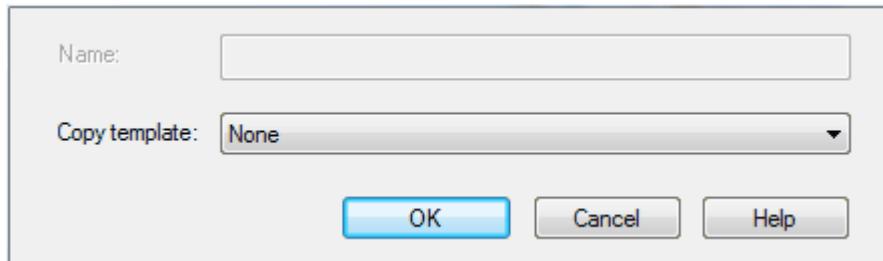
**Note:**

This operation is available in the Corporate, Business and Software Engineering, System Engineering and Ultimate editions.

Click on an element in the **Project Browser**, **Element List**, **Model Search** or diagram, and:

- select the **Element | Linked Document** menu option
- press **[Ctrl]+[Alt]+[D]** or
- right-click and select the **(Create) Linked Document** option from the context menu.

The following dialog displays.



Select the previously-created template from which to create the document.

Click on the **OK** button.

The [Linked Document editor](#) [194] displays, in which you enter the text of the document.

**Note:**

When you have saved the document, an **A** symbol displays in the bottom right corner of the element.

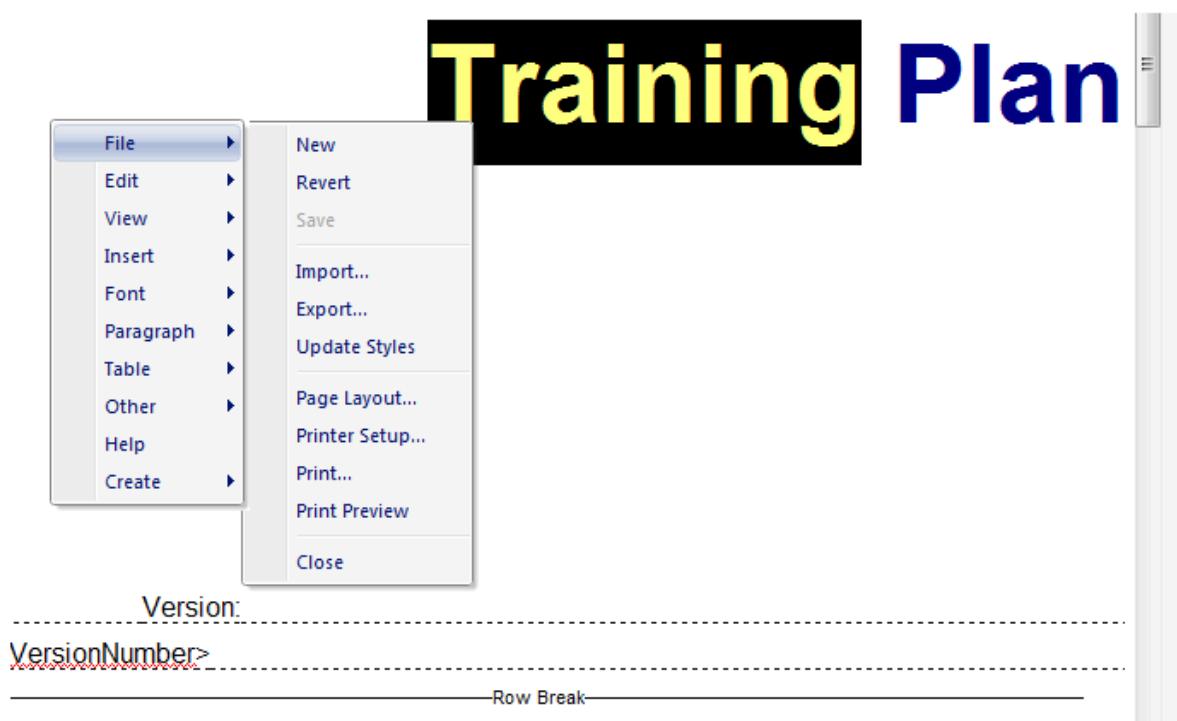


For more information on how to create Linked Document Templates, see [Create Linked Document Templates](#) [194] and [Edit Linked Document Templates](#) [195].

### 3.9.3 Edit Linked Documents

Enterprise Architect provides a Windows-like word processor to help you edit Linked Documents. This is a simplified version of the RTF Style Template Editor, and it provides the same convenient features.

The main difference between the two editors is that you access the *RTF Style Template Editor* features through a menu bar at the top of the screen, whilst you access the *Linked Document Editor* features through a context menu. To access the context menu, just right-click anywhere on the document.



You can format and edit the document in a number of ways, and add links from and references to the content of the document. For example, you can highlight a word or term in the linked document and select **Create | Glossary Definition** to create a glossary definition for that term. Anyone reading the document can, if they check for the term in the **Project Glossary**, read the definition (see *Project Management With Enterprise Architect*).

The following topics (mostly in *Report Creation in UML Models*) provide assistance on using the **Document Editor**.

- Scroll Through Text
- File and Print Options
- Cut and Paste Options
- Image and Object Imports
- Character Formatting
- Paragraph Formatting
- Tab Support
- Page Breaks and Repagination
- Insert Headers and Footers
- Insert Bookmarks
- Table Commands
- Sections and Columns
- Stylesheets and Table of Contents
- Text/Picture Frame and Drawing Objects
- View Options
- Search/Replace Commands
- [Hyperlink From Linked Document](#) [193]
- [Create Elements From Linked Documents](#) [193]

### 3.9.4 Hyperlink From Linked Document

Within a linked document, you can add hyperlinks to other objects (elements, packages, diagrams, attributes and operations) in the Enterprise Architect **Project Browser**.

To do this, click on the object in the **Project Browser** and drag it to the point at which to create the hyperlink. The linked document editor automatically creates the hyperlink, using the object name as the hyperlink text. You can edit this text if required.

Similarly, you can create a hyperlink to an element in the model by highlighting the link text in the linked document, right-clicking on it and selecting the **Create | Link to Existing Element** context menu option. This displays the [Select Classifier](#)<sup>149</sup> dialog, from which you select the element to link to.

In either case, when you next open the document, you can double-click on the hyperlink to locate and highlight the object in the **Project Browser**. You can then perform all normal operations on the object, including opening any linked document on the highlighted element.

You can also create a hyperlink to a wide range of additional objects, such as web pages, Help files, Model Searches and **Team Review Forums** (see *Using Enterprise Architect - UML Modeling Tool*), by highlighting the appropriate text and then selecting the **Create | New | Hyperlink** context menu option. This displays the **Hyperlink Details** dialog (see *The UML Dictionary*).

For an alternative method of creating a hyperlink to an external document, Help file or web page, see the **Hyperlinks and Bookmarks** topic in *Report Creation in UML Models*.

### 3.9.5 Create Element From Document

Using the **Linked Document Editor**, you can create document-specific elements and diagrams in the **Project Browser**, with hyperlinks from the document to the created item. When you click on the hyperlink, the element or diagram is highlighted in the **Project Browser**. The element or diagram is created in the same package as the element for which the linked document was created.

You can create and link to any type of element or diagram, but the facility has specific options for the following element types:

- Class (see the *UML Dictionary*)
- Requirement (see the *UML Dictionary*)
- Issue (see *Project Management with Enterprise Architect*).

You can create the same arrangement with existing elements, diagrams and packages by dragging them from the **Project Browser** into the text of the document, creating a [hyperlink](#)<sup>193</sup> with the item name as the text.

#### Create Item

To create an element or diagram in the **Project Browser**, whilst in a linked document, follow the steps below:

1. Open the linked document, either from a [Document Artifact](#)<sup>190</sup> element or through the [context menu](#)<sup>191</sup> for an existing element (Corporate, Business and Software Engineering, System Engineering and Ultimate editions).
2. Enter some text, including appropriate text to act as the link (such as the element or diagram name).
3. Highlight the appropriate text and right-click on it. The editor context menu displays.
4. Select the **Create | New** menu option, and the required submenu option. If you select the:
  - **Class, Requirement or Issue** option, the corresponding element is immediately created in the **Project Browser**.
  - **Other** option, the [New Element dialog](#)<sup>183</sup> displays; specify the element type and - if appropriate - stereotype, and click on the **Create** button.
  - **Diagram** option, the [New Diagram](#)<sup>134</sup> dialog displays; specify the diagram type and click on the **OK** button.
5. The highlighted text is now a hyperlink. Click on the link to highlight the new element or diagram in the **Project Browser**.

You can now edit or expand the element or diagram as required.

### 3.9.6 Replace or Delete Documents

If a linked document is out of date, you can either [edit](#) the text or replace the entire contents from another file. To replace the contents:

1. Click in the body of the document and press **[Ctrl]+[A]** to select all the document text.
2. Press **[Delete]**.
3. Right-click and select the **File | Import** context menu option. The Windows **Open** dialog displays, in which you can browse for the file to import into the document.
4. Click on the **Save** icon in the **Linked Document** screen toolbar.

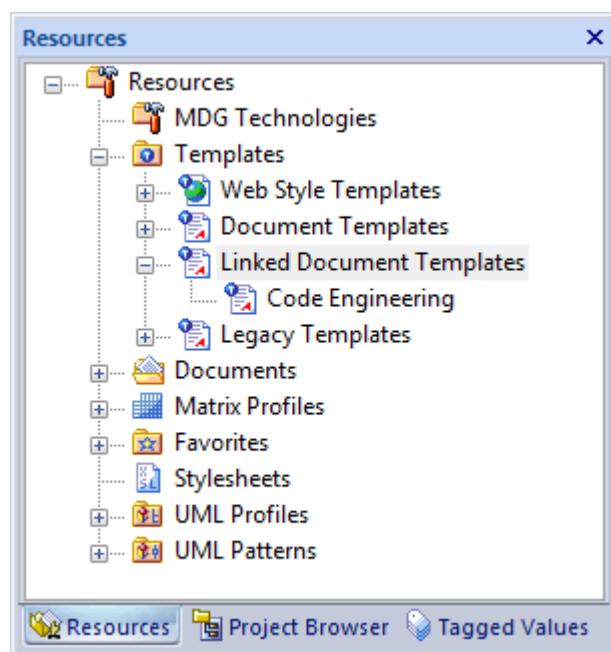
Alternatively, you can delete the linked document. To do this:

1. Click on an element in the **Project Browser** or diagram, and either:
  - select the **Element | Delete Linked Document** menu option or
  - right-click and select the **Delete Linked Document** context menu option.
2. Enterprise Architect prompts you to confirm the deletion; click on the **Yes** button.

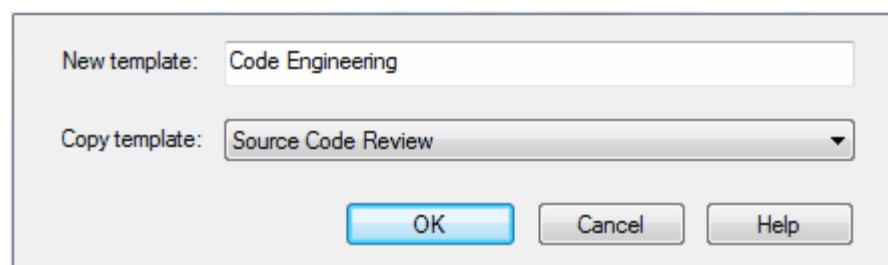
If required, you can now create another linked document for the element.

### 3.9.7 Create Linked Document Templates

Linked Document templates can be created via the **Resources** window.



Under the **Templates** folder, right-click on the **Linked Document Templates** icon and click on the **Create Template** context menu option. The following dialog displays.



Enter a name for your template, or select a previously-created template. Click on the **OK** button.

You can group your templates into folders. Right-click on your newly created template and select the **Assign Template to Group** context menu option. Enter a category name and click on the **OK** button.

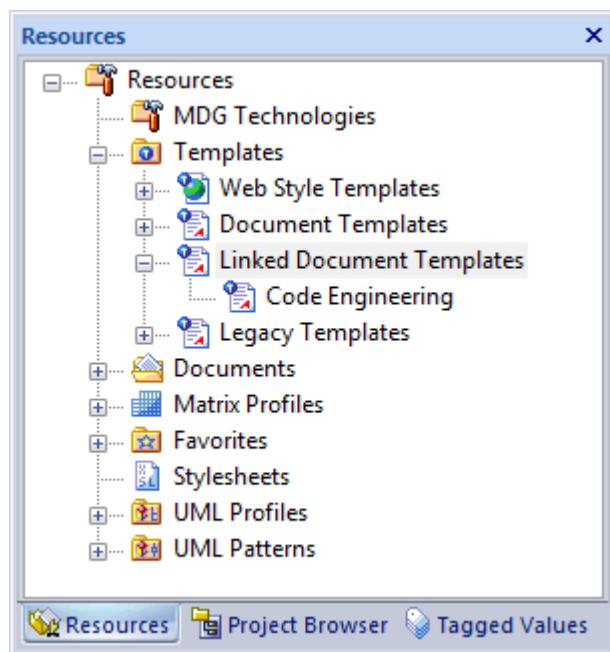
You can also [modify](#)<sup>195</sup> and delete the templates using the context menu options.

**Note:**

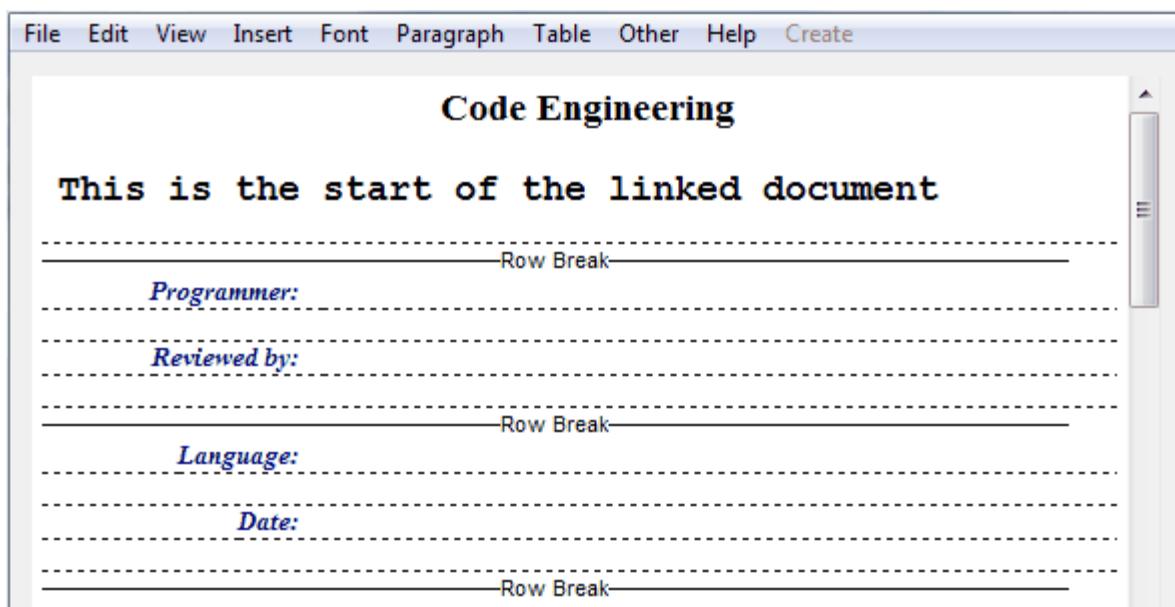
You can transport these linked document templates between models, using the **Export Reference Data** and **Import Reference Data** options on the **Tools** menu. See *UML Model Management*.

### 3.9.8 Edit Linked Document Templates

Double-click on a previously created template in the **Resource View** to invoke the **Linked Document Template Editor**.



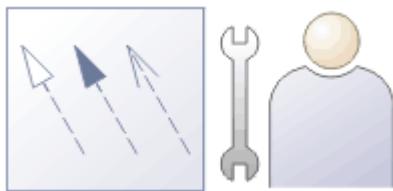
The **Document Template Editor** is built into Enterprise Architect.



The following topics in *Report Creation in UML Models* provide assistance on using the Document Editor.

- Scroll Through Text
- File and Print Options
- Cut and Paste Options
- Image and Object Imports
- Character Formatting
- Paragraph Formatting
- Tab Support
- Page Breaks and Repagination
- Headers, Footers Hyperlinks and Bookmarks
- Table Commands
- Sections and Columns
- Stylesheets and Table of Contents
- Text/Picture Frame and Drawing Objects
- View Options
- Search/Replace Commands

## 4 Work With Connectors



UML connectors, along with elements, form the basis of a UML model. Connectors link elements together to denote some kind of logical or functional relationship between them. Each connector has its own purpose, meaning and notation and is used in specific kinds of UML diagrams. For more information on using connectors, see:

- [Connector Context Menu](#) [197]
- [Connector Tasks](#) [201]
- [Connector Properties](#) [217]

### Off-Page Connector

UML, and therefore Enterprise Architect, does not have a connector that continues activity flow between two diagrams. In creating a model diagram, if the need arises to continue flow to another diagram, you should consider revising and simplifying the structure of the process so that groups of Actions are captured in composite Activity elements, and each group of Actions is modeled within the child diagram of an Activity.

BPMN, however, does enable you to create off-page connectors (see *Extending UML in Enterprise Architect*). You can also use the [Suppress Line Segments](#) [208] menu option to indicate continuation of flow in a large diagram that, when printed, occupies several pages. Be aware that these options are purely diagrammatic and do not indicate any diagram relationships in any of the relationship tools.

### 4.1 Connector Context Menu

If you right-click on a connector in a diagram, the connector context menu displays. This provides quick access to some important functions. The menu is split into up to seven distinct sections:

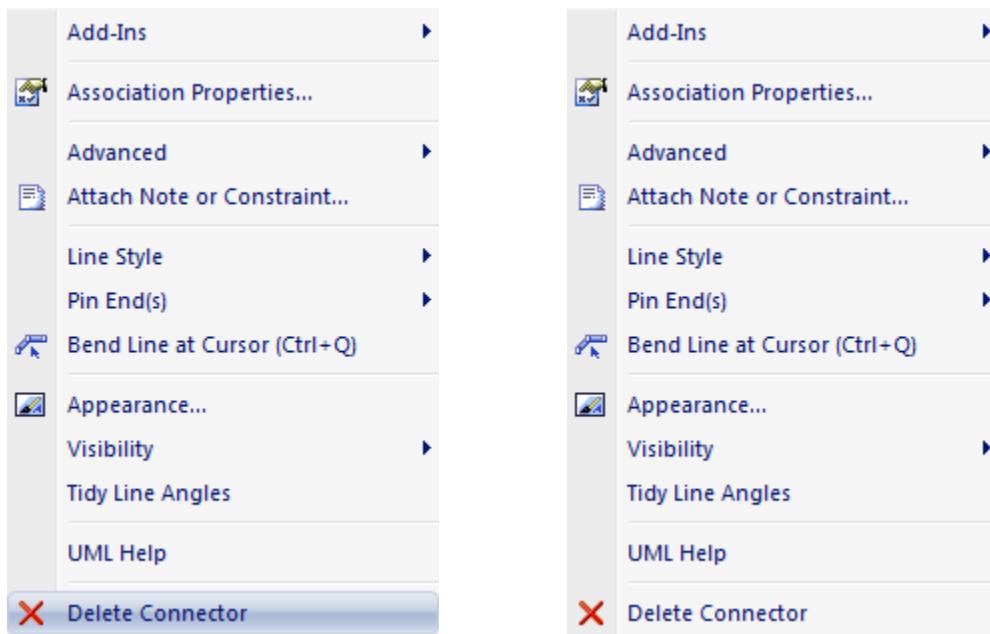
- **Add-Ins** - displays in the first section only if you have Add-Ins installed and registered, such as Eclipse
- [Properties](#) [198]
- [Type Specific](#) [199]
- [Style](#) [199]
- [Appearance](#) [200]
- **UML Help** - Displays the Enterprise Architect Help topic for this connector type
- **Delete** - delete the connector with this option.

#### Note:

Not all menu options are present on all connector context menus. Context menus vary slightly between connector types. The type-specific menu options are not always included, for example.

**Example Context Menu for a Generalization:**

**Example Context Menu for an Association:**



## Connector Role Context Menu

For connectors with *Roles*, right-clicking a connector within up to 60 pixels of an end point displays a role-specific context menu.

The **Role** context menu has three additional menu options:

- A **Source/Target Role...** menu option that opens the connector specification dialog with the respective [role page](#)<sup>[219]</sup> selected.
- A **Multiplicity** submenu that enables the multiplicity for the role to be set.
- A **Link to Element Feature** menu option that displays a dialog through which you can attach the end of the connector to a [specific attribute or operation](#)<sup>[202]</sup>.

### 4.1.1 Properties Menu Section

The *Properties* section of the connector context menu contains the following options:

Menu Option	Use to
<Connector type> Properties	Open the <a href="#">Properties</a> <sup>[217]</sup> window for the selected connector.
Advanced	Display the <a href="#">Advanced</a> <sup>[199]</sup> menu.
Attach Note or Constraint	<a href="#">Attach a note or constraint</a> <sup>[203]</sup> to the connector.

#### Note:

Not all menu options are present on all connector context menus. Context menus vary slightly between connector types. The type specific menu options are not always included, for example.

#### 4.1.2 Type-Specific Menu Section

The *Type-Specific* section of the connector context menu is specific to the object, and only appears for a few different connectors. Some examples are shown below:

Connector	Menu Option	Use to
Transition	Message	Set the value of the Message.
Aggregation	Set Aggregation to Composite	Change the Aggregation to composite.
Aggregation	Set Aggregation to Shared	Set the Aggregation to shared. Appears after <b>Set Aggregation to Composite</b> has been selected.

**Note:**

Not all menu options are present on all connector context menus. Context menus vary between connector types. The type-specific menu options are not always included, for example.

#### 4.1.3 Advanced Menu Section

The *Advanced* section of the connector context menu contains the following options:

Menu Option	Use to
Set Source and Target	<a href="#">Change the source and/or target</a> [206] of the connector.
Change Type	<a href="#">Change the connector type</a> [205].
Reverse Direction	Reverse the direction of the connector. For example, if the connector is an arrow, the arrowhead swaps to the other end.
Specialize Associations	Specify how the properties of this Association specialize the properties of other Associations.
Information Flows Realized	Realize any information items conveyed on an Information Flow connector between these same two elements. See the <i>UML Dictionary</i> .
Dependency Properties	Select a stereotype for the Dependency (or Trace, Role Binding, Occurrence or Represents connector).
Custom Properties	Display the <a href="#">Custom Properties</a> [72] dialog, on which you can set the values for predefined properties for a particular type of connector. For example, set <b>isDerived</b> to <b>True</b> or <b>False</b> for an Association.

**Note:**

Not all menu options are present on all connector context menus. Context menus vary slightly between connector types. The type specific menu options are not always included, for example.

#### 4.1.4 Style Menu Section

The *Style* section of the connector context menu provides the following options:

Menu Option & Function Keys	Use to
Line Style	<a href="#">Set the connector line style</a> [206] - options are Direct, Auto Routing, Custom, Bezier, Tree (Horizontal) or Tree (Vertical).

Menu Option & Function Keys	Use to
<b>Pin End(s)</b>	<p>Pin the connector start and/or end to the current position on the target element. A sub-menu displays to offer the options of pinning the start point only, the end point only, or both.</p> <p>Once one or both ends are pinned, a fourth option is available to unpin both ends.</p>
<b>Bend Line at Cursor [Ctrl]+[Q]</b>	<p><a href="#">Insert an anchor point</a><sup>[206]</sup> on the line at the point of the cursor so you can change the shape of the line.</p>
<b>Suppress Line Segment</b>	<p>Hide a segment of a connector so that you can view a part of the diagram that it crosses.</p> <p>To reverse the change, right-click on the connector and select the <b>Show All Line Segments</b> context menu option.</p>
<b>Straighten Line at Cursor [Ctrl]+[Q]</b>	<p><a href="#">Remove an anchor point</a><sup>[206]</sup> on the line at the point of the cursor. (This is the exact opposite of <b>Bend Line at Cursor</b>, and <b>[Ctrl]+[Q]</b> toggles the connector point between the options.)</p>

**Note:**

Not all menu options are present on all connector context menus. Context menus vary slightly between connector types. The type specific menu options are not always included, for example.

#### 4.1.5 Appearance Menu Section

The *Appearance* section of the connector context menu provides the following options:

Menu Option	Use to
<b>Appearance</b>	Set the line color and line thickness of the connector.
<b>Visibility</b>	Set connector visibility; see table below for sub-menu options.
<b>Tidy Line Angles</b>	<a href="#">Tidy the line angles</a> <sup>[206]</sup> of a custom connector.

#### Visibility Sub-Menu

Menu Option	Use to
<b>Hide Connector</b>	Hide the connector. To show the connector again, follow the steps in the <a href="#">Hide/Show Connector</a> <sup>[212]</sup> topic.
<b>Hide Connector in Other Diagrams</b>	<a href="#">Hide or show the connector in other diagrams</a> <sup>[212]</sup> .
<b>Hide All Labels</b>	Hide or show all labels attached to the connector.
<b>Set Label Visibility</b>	<a href="#">Hide or show labels</a> <sup>[214]</sup> attached to the connector, individually.

**Note:**

Not all menu options are present on all connector context menus. Context menus vary slightly between connector types. The type specific menu options are not always included, for example.

## 4.2 Connector Tasks

This topic details some of the tasks associated with managing model connectors, such as:

- [Connect Elements](#) [201]
- [Connect to an Element Feature](#) [202]
- [Change Connector Styles](#) [206]
- [Arrange Connectors](#) [205]
- [Change Connector Type](#) [205]
- [Create Connector in Project Browser](#) [209]
- [Reverse Connector](#) [214]
- [Delete Connectors](#) [210]
- [Hide/Show Connectors](#) [212]
- [Hide/Show Labels](#) [214]
- [Create Generalization Set](#) [212]
- [Change the Source or Target Element](#) [206]
- [Set Relation Visibility](#) [210]
- [Add a Note to a Connector](#) [203]
- [Use Tree Style Hierarchy](#) [216]
- [Create Connector in Project Browser](#) [209]
- [Show Uses Arrow Head](#) [215]
- [Set Association Specializations](#) [214].

### Note:

In the Corporate, Business and Software Engineering, System Engineering and Ultimate editions, if security is enabled, you must have **Update Element** permission to update or delete a connector. See *User Security in UML Models*.

### 4.2.1 Connect Elements

#### Connect Elements on a Diagram

The fastest and simplest ways to create connectors are using the Quick Linker and using the Enterprise Architect UML **Toolbox**. The following topics describe these and other approaches for creating connectors on a diagram:

- [Create Connectors In Place Using the Quick Linker](#) (see *Using Enterprise Architect - UML Modeling Tool*)
- [Create Connectors Using the Enterprise Architect UML Toolbox](#) (see *Using Enterprise Architect - UML Modeling Tool*)
- [Create a Group of Elements Using UML Patterns](#) (see *Extending UML With Enterprise Architect*)
- [Create Domain Specific Connectors From UML Profiles](#) (see *Extending UML With Enterprise Architect*).

### Tip:

To repeat the last connector you used, click on the appropriate source element and press **[F3]**.

#### Select Connectors

To select a connector, simply click on it. Drag handles display, indicating that the connector is selected. This gives the connector focus for keyboard commands such as **[Delete]**, and displays connector properties in docked windows such as the **Tagged Values** window. If there is more than one connector on a diagram, you can cycle through them using the arrow keys.

#### Drag Connectors

You can drag a connector to position it. Click on the connector and drag the connector to where it is to appear.

Note that there are some limitations on how far or to where you can drag a connector.

#### Notes:

- You can reposition a connector by selecting and dragging the connectors as required.
- If a connector has source and target roles, you can attach either end of the connector to a [specific attribute or operation](#)<sup>[202]</sup> in the source or target element.

#### Tip:

To reattach the end of a connector to a different source or target element, see the [Change the Source or Target Element](#)<sup>[206]</sup> topic.

## Connector Properties and Commands

You can double-click on a connector to [change properties](#)<sup>[217]</sup>, or right-click to display the context menu containing commands to [change connector type](#)<sup>[205]</sup> and [direction](#)<sup>[214]</sup>.

You can also highlight the connectors on a specific element. Select the element and press [L]. All the connectors issuing from or terminating at that element are highlighted.

## Create Connectors Without a Diagram

Sometimes it is useful to create relationships between elements without a diagrammatic representation. You can do this using the **Project Browser** and the **Relationship Matrix**, as explained in the following topics:

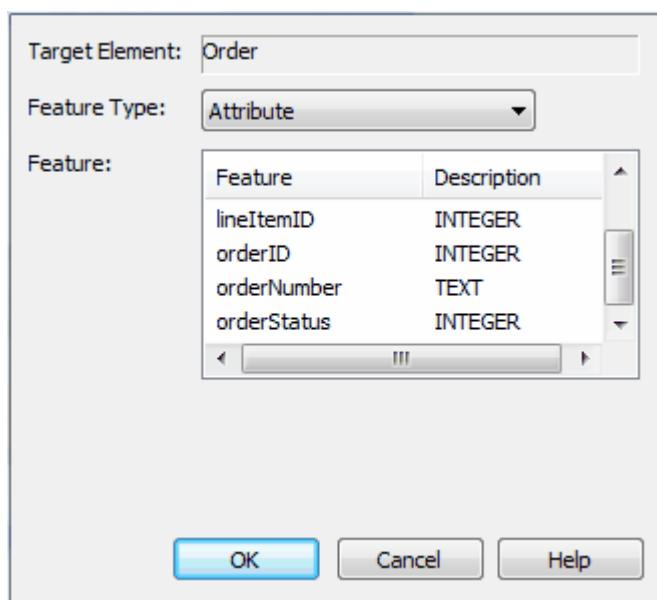
- [Add Connectors With the Project Browser](#)<sup>[209]</sup>
- [Add Connectors With the Relationship Matrix](#)<sup>[224]</sup>.

### 4.2.2 Connect to Element Feature

If a connector has source and target roles, you can connect either end of the connector to a specific operation or attribute in the source or target element. This is entirely a visual aid, to indicate which features are significant in the relationship. In code generation or transformation, the link is interpreted as a normal source-element to target-element relationship.

To do this, follow the steps below:

1. Right-click on the end of the connector joined to the element containing the required feature.
2. Select the **Link to Element Feature** context menu option. The **Link to Element Feature** dialog displays.

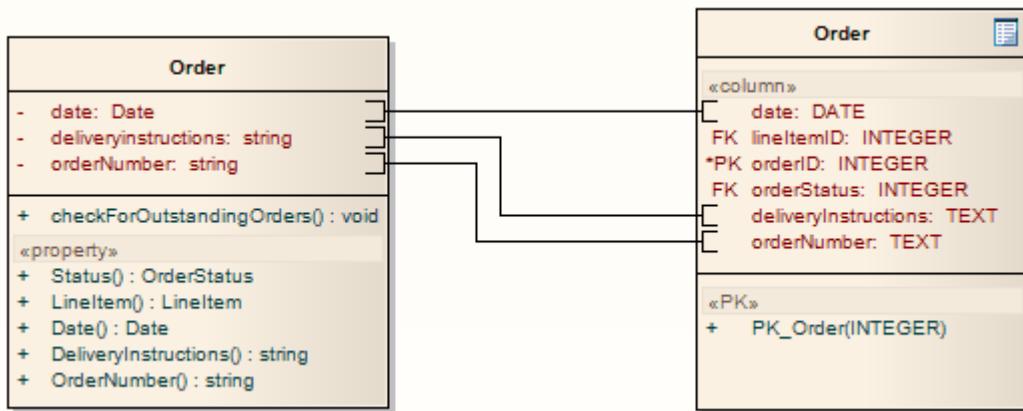


3. In the **Feature Type** field, click on the drop-down arrow and select the required feature type - **Attribute** or **Operation**. The attributes or operations from the element are listed in the **Feature** field.
4. Click on the required attribute or operation, and click on the **OK** button.

The end of the connector changes to a bracket next to the selected feature.



You might create a number of feature-to-feature relationships between two elements (such as a Class and a Table that represents the Class data) to produce a diagram similar to the following:



You can change the feature to which the connector is attached by following the above procedure and selecting the new feature.

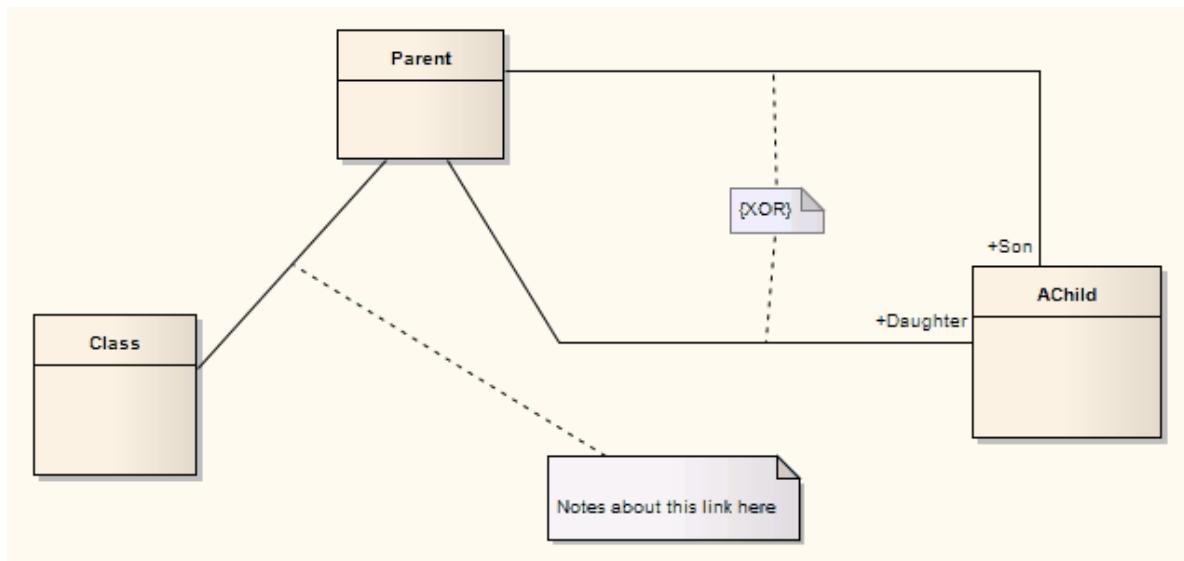
You can break the link to the selected feature in the following ways:

- Follow the above procedure, setting the **Feature Type** to **None**.
- Delete the attribute or operation from the element
- Change the connector type to a type that does not have source and target roles
- Change the connector to a different source or target element that does not contain the feature.

Note that reversing the direction of the connector does not break the connector's attachment to the feature.

#### 4.2.3 Add a Note to a Connector

You can connect notes and constraints to graphical relationships. Notes enable you to provide explanations and further detail for one or more connectors on a diagram, with a visible note element, as in the example below.

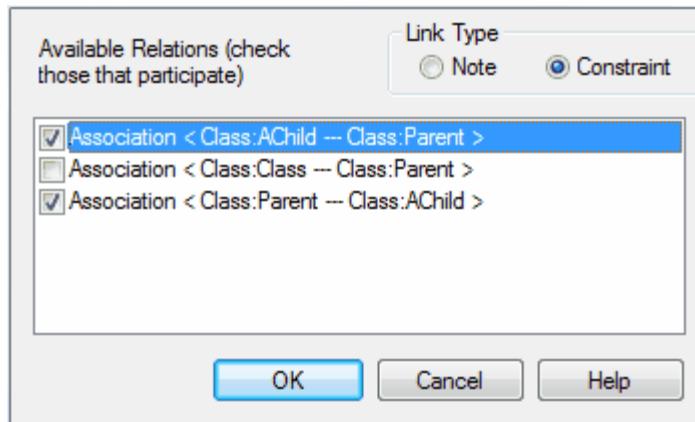


Constraints let you specify a logical or informal constraint against a set of connectors; for example the {XOR} constraint in the image above indicates that only one of the connectors in the specified set can be true at any one time (exclusivity).

### Attach a Note or Constraint to a Connector

To attach a note or constraint to one or more connectors, follow the steps below:

1. Right-click on one of the connectors to attach a note to. The context menu displays.
2. Select the **Attach Note or Constraint** menu option. The **Link Relations** dialog displays.
3. Check all the connectors that participate in the set. In the example below, two connectors have been checked to participate in a logical constraint.



4. Click on the **OK** button to complete the note or constraint creation.
5. You can then use the normal **Note** dialog to enter the appropriate text for the note or constraint.

#### Note:

The constraint note is drawn slightly differently to a regular note, and has { and } automatically added to visually indicate the constraint form.

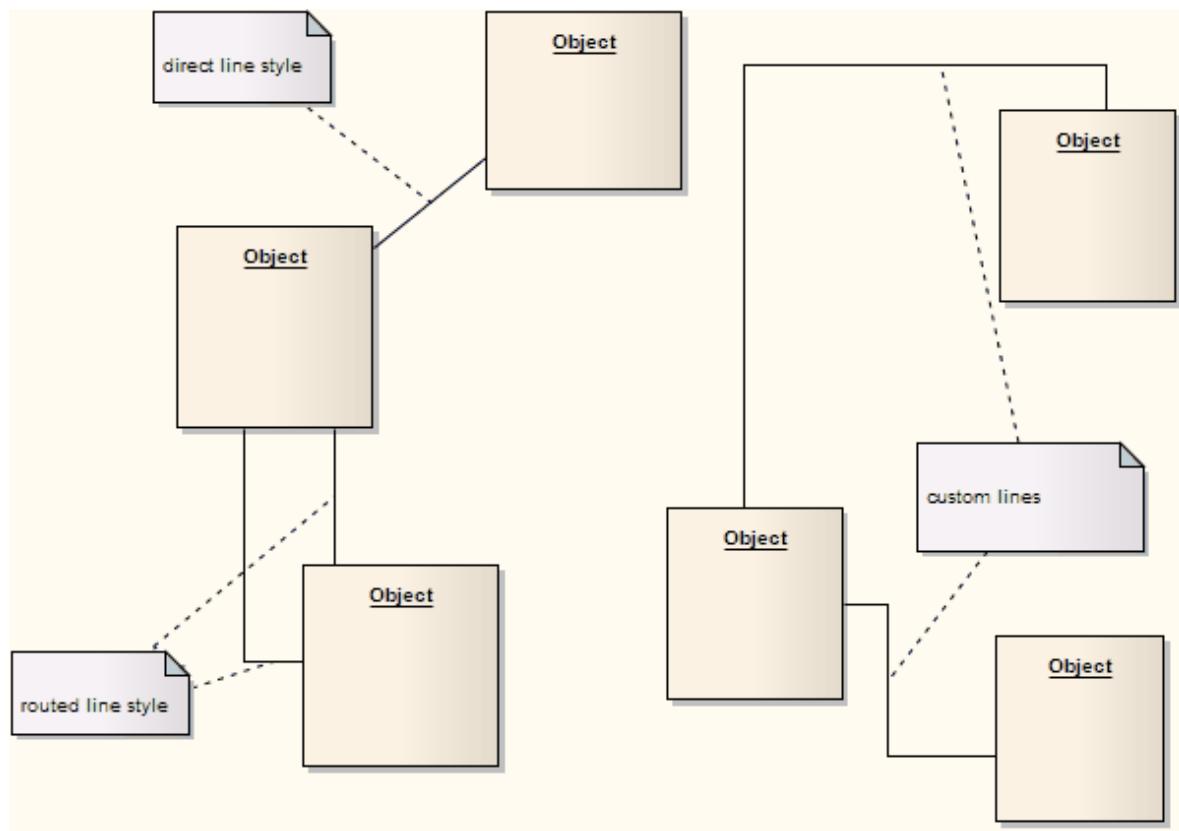
#### 4.2.4 Arrange Connectors

Connectors between two elements can be moved around the element borders to create a good layout. There is a limit to how much a connector can be moved around, but generally it is very easy to find an acceptable layout. For the best layouts, use the *custom* line style; this enables you to add as many line points and bends as you require to create a clean and readable diagram.

#### Move a Connector

To move a connector, follow the steps below:

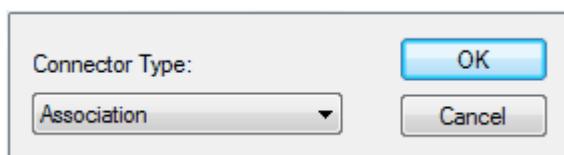
1. Click once on the connector to select it.
2. Holding the mouse button down, move the connector in the required direction.
3. To refine the movement, click and hold very near to one end of the connector; this enables a slightly different movement range.
4. To further refine the movement and range, select either a *routed*, *direct* or *custom* line style. Each behaves slightly differently (see [Connector Styles](#) [206]).



#### 4.2.5 Change Connector Type

To change a connector type, follow the steps below:

1. In the **Diagram view**, right-click on the connector to change. The context menu displays.
2. Select the **Connection Detail | Change Type** menu option.



3. In the **Connector Type** field, click on the drop-down arrow and select the required connector type.
4. Click on the **OK** button to apply changes.

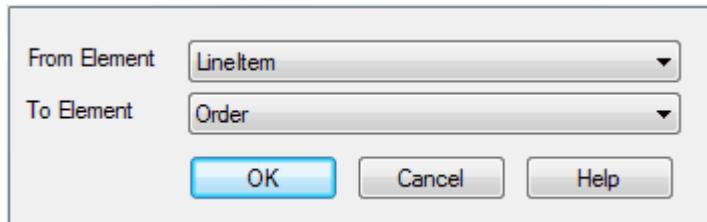
#### 4.2.6 Change the Source or Target Element

After you have created a connector between two elements, you might later want to change either the source or target. Instead of deleting and re-creating the connector, Enterprise Architect enables you to change the source or target. There are two ways of doing this: using the **Set Source and Target** dialog or using the mouse.

##### Using the Set Source and Target dialog

To change the source or target element of a connector using the **Set Source and Target** dialog, follow the steps below:

1. Right-click on the connector to open the context menu.
2. Select the **Advanced | Set Source and Target** menu option. The **Set Source and Target** dialog displays.



3. Click on the drop-down arrows on the **From Element** and **To Element** fields, and select the source and target elements.
4. Click on the **OK** button to apply changes.

##### Using the Mouse

To change the source or target element of a connector using the mouse, follow the steps below:

1. Click on the connector and position the cursor over the 'handle' at one end.
2. When the cursor changes, click the mouse and drag the handle to the new element.

##### Note:

The connector does not actually move until you release the mouse button over the new source or target element. However:

- A dotted line shows where the connector would be during the move, and
- The solid outline of the nearest element or extension changes to a hatched outline as you move the cursor onto it; this helps you identify where the connector will connect to, if there are many closely-arranged elements, Parts, Ports and other extensions.

#### 4.2.7 Connector Styles

Connectors come in five different routing styles:

Style	Description
<b>Direct</b>	A straight line from element A to element B. You can move the line (back and forward, up and down) to a limited degree.
<b>Auto Routing</b>	A vertical and horizontal route from A to B with 90-degree bends. You can move the line to improve the route, but the location and number of bends are not configurable.
<b>Bezier</b>	A smooth curved line from A to B. Bezier style is directly available for Data Flow diagram connectors, Mind Mapping connectors, State Flows, State Transitions, Object

Style	Description
	<p>Flows, and Control Flows.</p> <p><b>Note:</b></p> <p>You can convert other types of relationship to Bezier style by assigning the Tagged Value <b>_Bezier</b>, with an integer value other than <b>0</b>. However, some relationship types (such as Aggregate) do not accommodate this style very well.</p> <p>This Tagged Value over-rides the value of the <b>Style</b> field in the connector <a href="#">Properties</a> dialog.</p>
<b>Custom Line</b>	The most flexible option. You can add one or more line points and bend and push the line into virtually any shape, using the <b>Toggle Line Point at Cursor</b> option.
<b>Tree Style - Vertical</b> <b>Tree Style - Horizontal</b>	<p>A line from element A to B with two right-angle bends, and the end points fixed to selected locations on the elements (Vertical or Horizontal).</p> <p><b>Note:</b></p> <p>You can convert relationships to Tree style by assigning the Tagged Value <b>_TreeStyle</b>, with a value of <b>H</b> (Horizontal) or <b>V</b> (Vertical).</p> <p>This Tagged Value over-rides the value of the <b>Style</b> field in the connector <a href="#">Properties</a> dialog.</p>
<b>Lateral - Vertical</b> <b>Lateral - Horizontal</b>	<p>A line from element A to B with a single right-angle bend, and the end points fixed to selected locations on the elements (Vertical or Horizontal).</p> <p><b>Note:</b></p> <p>You can convert relationships to Lateral style by assigning the Tagged Value <b>_TreeStyle</b>, with a value of <b>LH</b> (lateral-horizontal) or <b>LV</b> (lateral vertical).</p> <p>This Tagged Value over-rides the value of the <b>Style</b> field in the connector <a href="#">Properties</a> dialog.</p>

## Set the Connector Style

To set the connector style, follow the steps below:

1. Right-click on the connector to change; the context menu displays.
2. Select the **Line Style** option.
3. From the submenu, select the required style - Direct, Auto Routing, Custom, Tree or Lateral (or Bezier, where appropriate).

Alternatively:

1. Select the connector to change.
2. Press the following keys to change the style:
  - **[Ctrl]+[Shift]+[D]** for Direct
  - **[Ctrl]+[Shift]+[A]** for Auto Routing
  - **[Ctrl]+[Shift]+[C]** for Custom
  - **([Ctrl]+[Shift]+[Z])** for Bezier, where appropriate).

## Bend Connectors

To bend a connector to quickly and easily route connectors in the required layout, follow the steps below:

1. Right-click on the connector; the context menu displays.
2. Set the line style to Custom Line (**[Ctrl]+[Shift]+[C]**); this enables the **Bend Line at Cursor** option in the context menu.
3. Click on the **Bend Line at Cursor** option to add a line point.

**Note:**

Right-clicking a line point displays the **Straighten Line at Cursor** context menu option, which you can use to remove the line point.

- Using the mouse, drag the line point to the required position.

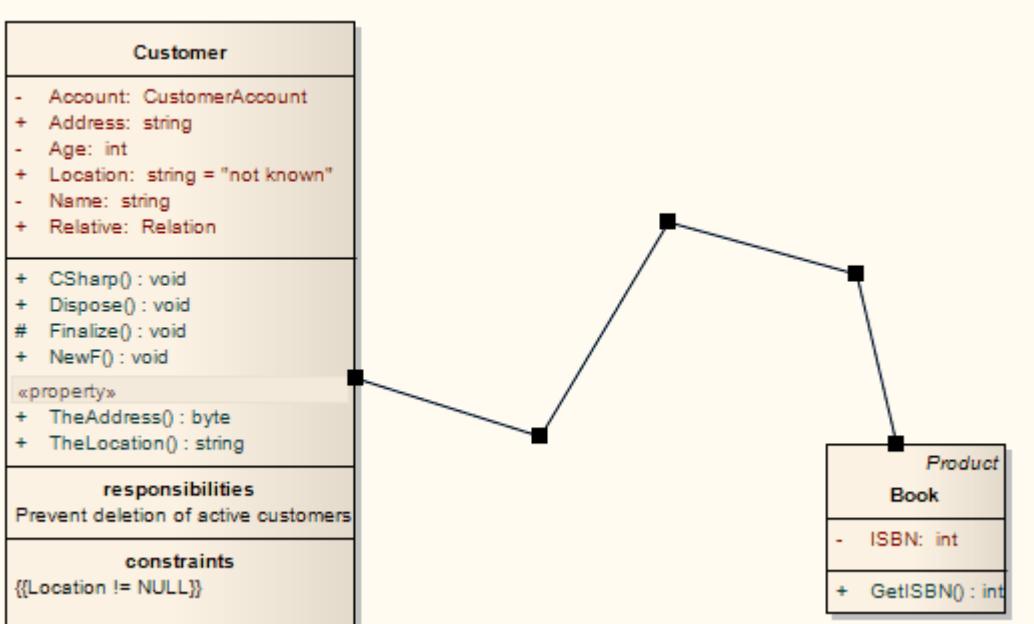
Alternatively:

- Hold down **[Ctrl]** or **[Shift]** and click on a point on the connector to create a line point.

**Note:**

**[Ctrl]+click** also removes a line point.

- Using the mouse, drag the line point to the required position.



## Tidy Line Angles

To tidy line angles (custom connector), follow the steps below:

- Right-click on the connector; the context menu displays.
- Click on the **Tidy Line Angles** menu option; this nudges the custom line in horizontal and vertical increments, saving you the time of trying to get a good layout manually.

**Note:**

You can set the **Tidy Line Angles** option to operate by default; click on the **Tools | Options** menu option to display the **Options** dialog, and select the **Diagram Behavior** page.



## SUPPRESS LINE SEGMENTS

To suppress individual line segments, follow the steps below:

- Right-click on the connector; the context menu displays.
- Set the line style to Custom Line (**[Ctrl]+[Shift]+[C]**), this enables the **SUPPRESS LINE SEGMENT** option in the context menu.

- Click on the **Suppress Line Segment** option to suppress a line between two bend points.

**Note:**

The segment you right-clicked on is suppressed.

- To show the segment again, right-click on the line and click on the **Show All Line Segments** context menu option.

One application for this is to represent the continuation of flow when your diagram crosses the page boundary marker in the **Diagram View**. When you suppress the line segment that crosses the boundary, the link name (connector properties) displays at both ends of the hidden segment. When you print the diagram on multiple pages, the link name identifies the connection apparently broken by the page boundary.

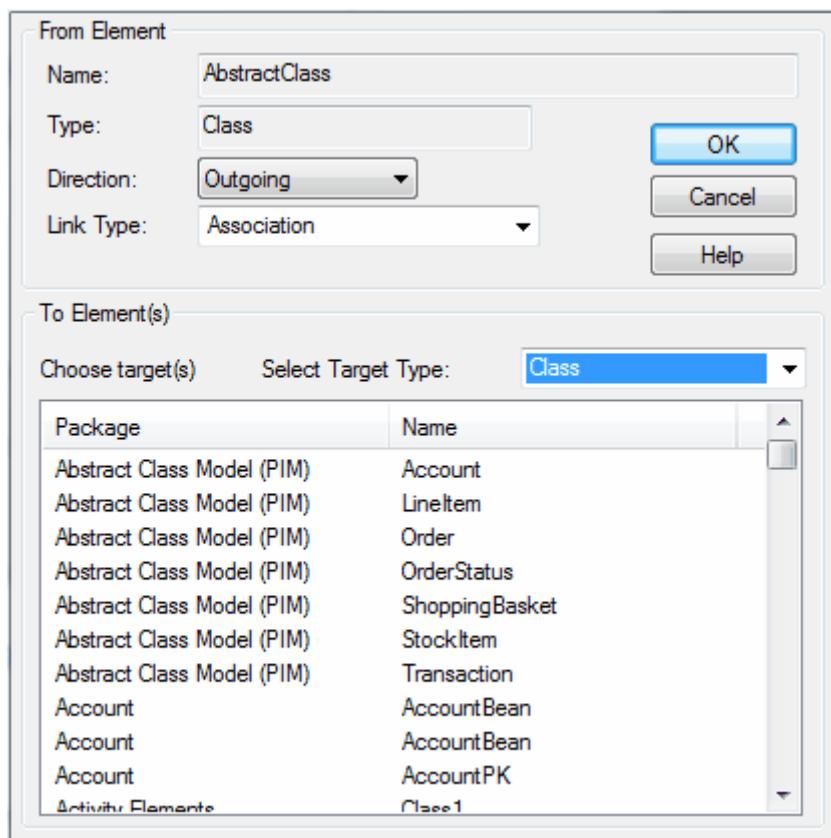
#### 4.2.8 Create Connector in Project Browser

You can create a connector from one element to another directly in the **Project Browser**.

##### Connect Elements from the Project Browser

To connect elements from the **Project Browser**, follow the steps below:

- In the **Project Browser**, either:
  - Right-click on the element to create a connector for, and select the **Add | Create Link** context menu option, or
  - Select the element, press **[Insert]** and select the **Create Link** context menu option.  
The **Create Link** dialog displays.
- In the **Direction** field, click on the drop-down arrow and select the direction of the new connector (**Outgoing** means this element is the source).



- In the **Link Type** field, click on the drop-down arrow and select the type of connector.
- In the **Choose target(s)** list, click on the name of the target. (If necessary, in the **Select Target Type** field click on the drop-down arrow and select a feature to list only elements having that feature.)

5. Click on the **OK** button to create the connector.

**Note:**

You can also reproduce an existing connector between two elements when you paste those elements from the **Project Browser** into a diagram as instances. [An option](#) enables you to copy the relationship as well, or just the elements.

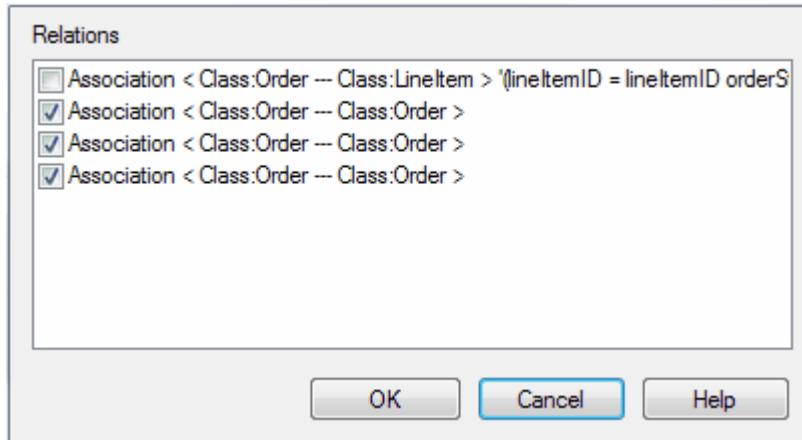
#### 4.2.9 Relationship Visibility

You can change the visibility of individual connectors or relationships, diagram by diagram.

##### Set Relationship Visibility

To set relationship visibility, follow the steps below:

1. Open the diagram to change.
2. Select the **Diagram | Visible Relations** menu option. Alternatively, press **[Ctrl]+[Shift]+[I]**. The **Set Visible Relations** dialog displays.

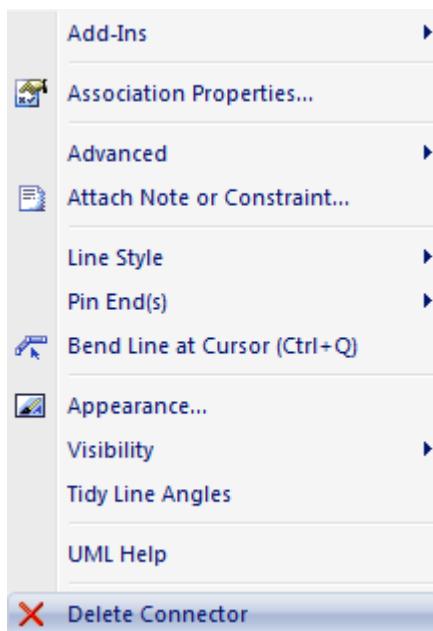


3. Select the checkbox against each list item to show, and clear the checkbox against each item to hide. If you want to display the information in a more readable layout, you can resize the dialog.
4. Click on the **OK** button to apply the changes.

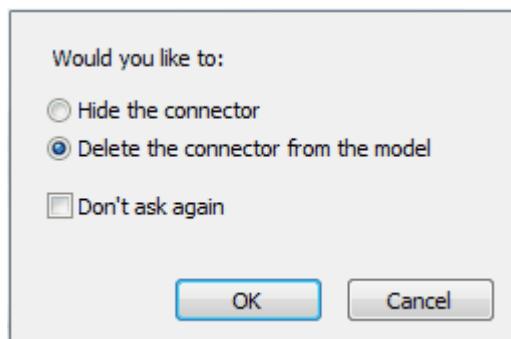
#### 4.2.10 Delete Connectors

To delete a connector, follow the steps below:

1. Right-click on the connector. The context menu displays.



2. Select the **Delete Connector** option. The **Remove Connector** dialog displays.



3. This dialog provides the options to hide the connector so that it remains functional, or remove the connector completely. Click on the appropriate radio button and click on the **OK** button.

If you select the **Hide** option, it has the same effect as [hiding the connector](#)<sup>212</sup> on the **Links** tab of the source element **Properties** dialog, or using the **Visibility | Hide Connector** context menu option. It also hides the connector on the **Relationships** window (see *Using Enterprise Architect - UML Modeling Tool*).

#### Note:

The dialog does not display if:

- You have previously selected the **Don't ask again** checkbox or
- On the **Links** page of the **Options** dialog (**Tools | Options | Links**) the **Prompt on connector deletes** checkbox is not selected.

Selecting the **Don't ask again** checkbox also deselects the **Prompt on connector deletes** checkbox. Selecting the **Prompt on connector deletes** checkbox restores the dialog if you have used the **Don't ask again** checkbox.

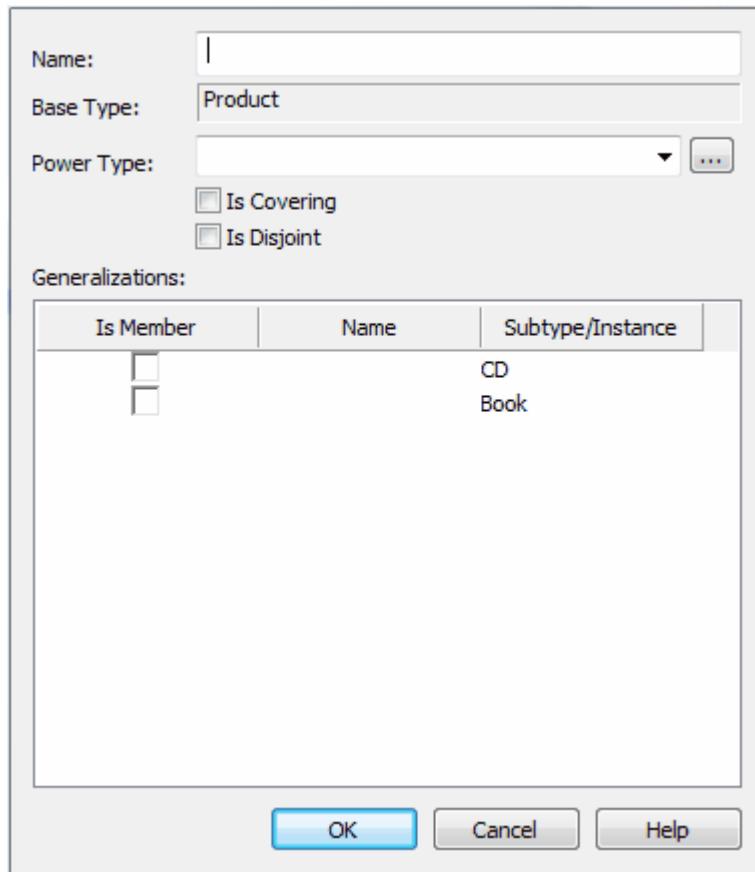
If you hide the dialog, the **Delete Connector** context menu option defaults to the setting you last used on the dialog. Make sure that you have selected the right option to default to.

#### 4.2.11 Generalization Sets

A generalization set enables you to specify the relationship of a group of subtypes.

To create a generalization set, follow the steps below:

1. Right-click on the connector. The context menu displays.
2. Select the **Advanced | Generalization Set | New** menu option. The following dialog displays.



3. In the **Name** field, type the name of the Generalization set; for example, **Gender**.
4. In the **Power Type** field, either type a new power type, or click on the drop-down arrow or [browser button](#) [ ... ] and select an existing one.
5. Check the **IsMember** column for the child subtypes that are part of this Generalization set.

The OMG UML specification (*UML Superstructure Specification, v2.1.1, section 7.3.21, p. 77*) states:

*Each Generalization is a binary relationship that relates a specific Classifier to a more general Classifier (e.g. from a class to its superclasses). Each GeneralizationSet defines a particular set of Generalization relationships that describe the way in which a general Classifier (or superclass) may be divided using specific subtypes.*

#### 4.2.12 Hide/Show Connectors

Connectors/relations that appear in multiple diagrams can be selectively shown or hidden. This makes it easier to read diagrams where elements might have many connectors, but not all are relevant in the context of the current diagram.

##### Hide or Show a Connector in the Current Diagram

To hide or show a connector in the current diagram, follow the steps below:

1. Double-click on the required diagram element in the **Diagram** view. The element **Properties** dialog

displays.

2. Select the **Links** tab. This lists the connectors linked to the element, whether or not they are hidden on the diagram.
3. Right-click on the connector to hide or show. The context menu displays.
4. Select the **Show Relation** menu option to show the hidden connector on the diagram, or the **Hide Relation** menu option to hide the visible connector.

**Tip:**

Alternatively, hide a connector by right-clicking on it on the diagram and selecting the **Visibility | Hide Connector** context menu option. However, you must use the **Links** tab of the element **Properties** dialog to show the relationship again.

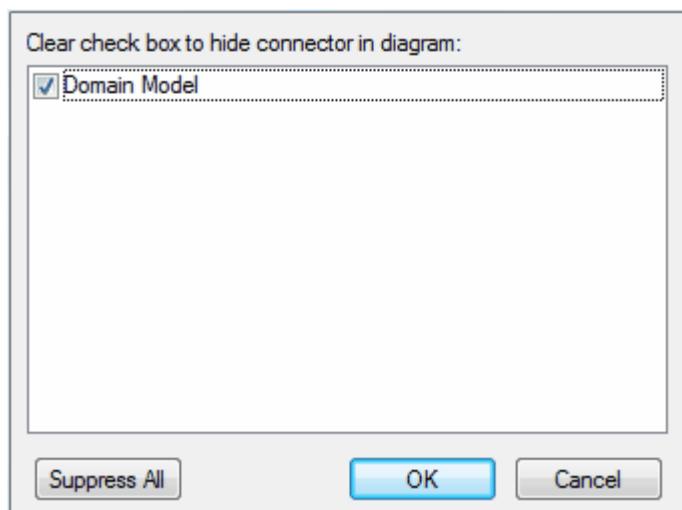
**Note:**

Certain elements, such as Requirements, do not have a **Links** tab in the **Properties** dialog. In these cases, open the **Relationships** window (**View | Other Element Tools | Relationships**) for the element and right-click on the relationship in the list to display the context menu. (See *Using Enterprise Architect - UML Modeling Tool*.) This enables you to hide or show that relationship in the diagram. Be aware that, in the Corporate, Business and Software Engineering, System Engineering and Ultimate editions with security on, locks on the diagram and elements can make the required option unavailable.

## Hide or Show a Connector in Other Diagrams

To hide or show a connector in other diagrams, follow the steps below:

1. Right-click on the connector in the diagram. The context menu displays.
2. Select the **Visibility | Hide Connector in Other Diagrams** menu option. The **Set Connector Visibility** dialog displays.



3. If the two connected elements have been included in other diagrams, these diagrams are listed here. In the list, all diagrams for which the checkbox is selected show the connector. Deselect the checkbox for any diagrams in which to hide the connector. If you want to display the information in a more readable layout, you can resize the dialog.

**Tip:**

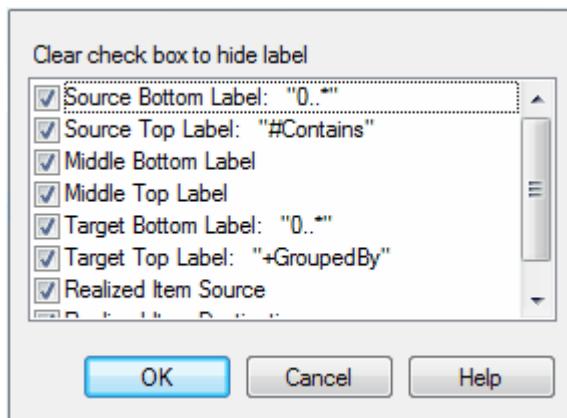
To hide the connector in all of the diagrams listed, click on the **Suppress All** button.

4. Click on the **OK** button to save the changes.

#### 4.2.13 Hide/Show Labels

You can hide or display one or more labels on a connector. To do this, follow the steps below:

1. Right-click on the connector. The context menu displays.
2. Select the **Visibility | Set Label Visibility** menu option. The **Label Visibility** dialog displays.



If you have several, long labels, you can resize this dialog for greater clarity.

3. Select the checkbox against each label to display, and clear the checkbox against each label to hide.
4. Click on the **OK** button.

#### 4.2.14 Connector In-place Editing Options

You can edit many of the Enterprise Architect connector labels directly on the diagram. Each label can be bound to a single connector field.

##### Procedure

To put a label into Edit mode, either:

- Select the **Edit Label** option from the context menu, or
- Select a label and press **[F2]**.

To save the current text to the field, either press **[Return]** or deactivate the **Edit** window.

To cancel edit mode without saving any changes, press **[Esc]**.

#### 4.2.15 Reverse Connector

You can reverse the direction of a connector without having to delete and re-create it. This is helpful if your design changes or you add the connector wrongly to begin with.

##### Procedure

To reverse a connector, follow the steps below:

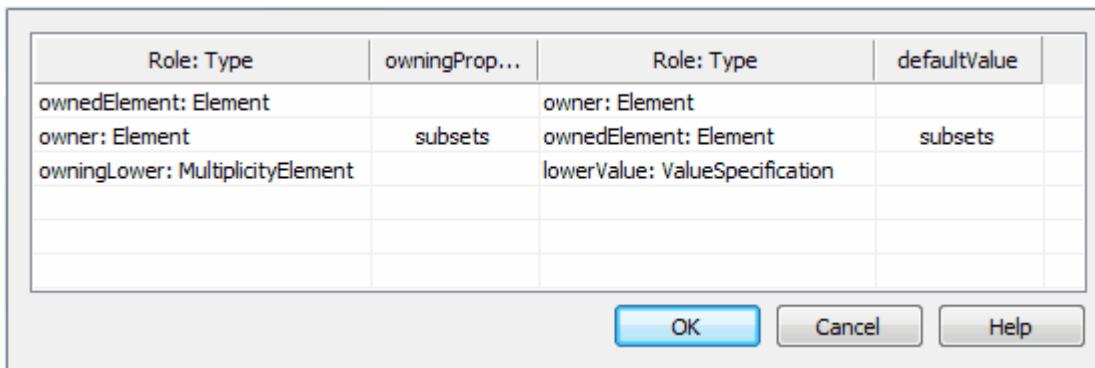
1. Right-click on the incorrect connector to open the context menu.
2. Select the **Connection Detail | Reverse Direction** menu option.

#### 4.2.16 Set Association Specializations

UML enables specialization of properties defined by Associations. Enterprise Architect enables this through the **Specialize Associations** option in the advanced section of the context menu for an Association.

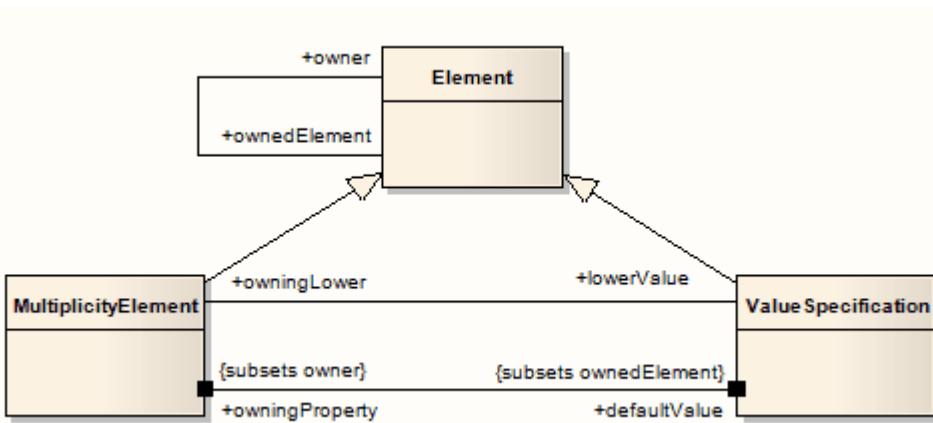
The following dialog displays, showing all Associations between the two Classes connected by the current

Association and their parents.



The left two columns define the source role of the current Association, while the right two define the target role. With this you are able to select the relationships of each end of the properties listed. When a relationship is set then this is drawn at the corresponding end of the connector on any diagram it appears on.

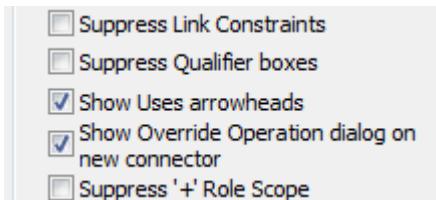
The dialog above displays when you select the **Advanced | Specialize Associations** context menu option on the lowest Association connector in the following diagram.



#### 4.2.17 Show Uses Arrow Head

By default the *Use* connector in Use Cases has no arrow head. To generate arrow heads on the connectors, follow the steps below.

1. Select the **Tools | Options Links** menu option. The **Links** page of the **Options** dialog displays.
2. In the **General** panel, select the **Show Uses arrowheads** checkbox.

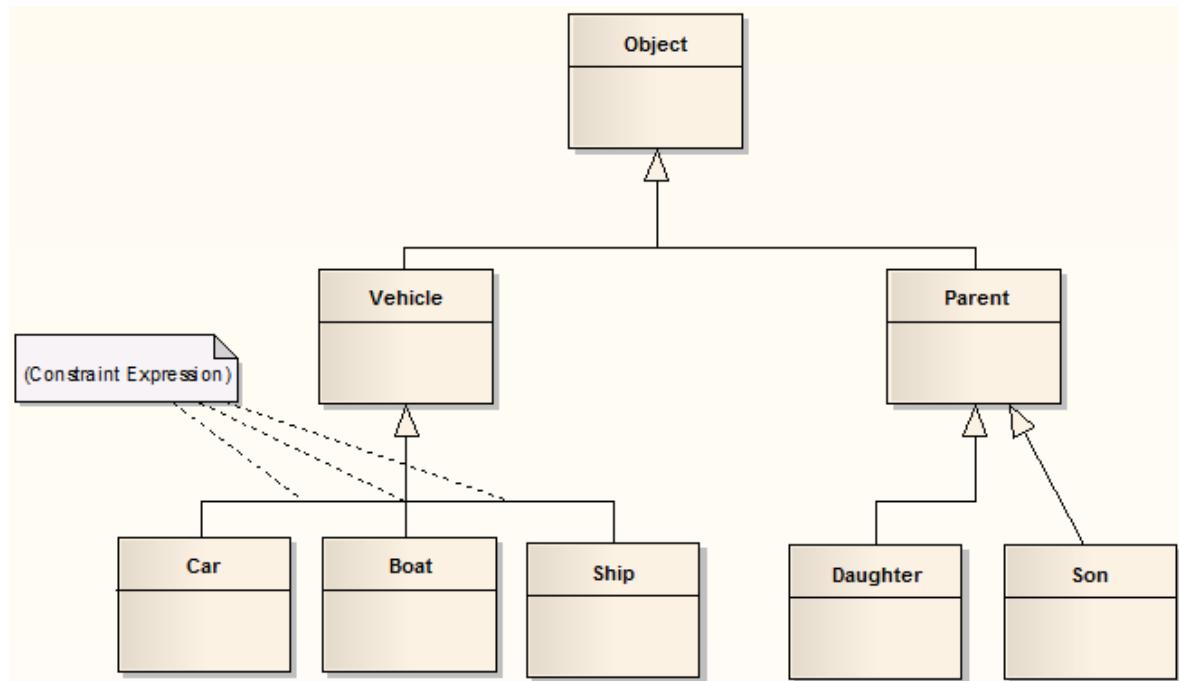


3. Click on the **Close** button.

When you save the Use Case diagram, the Use connectors change to display arrowheads.

#### 4.2.18 Tree Style Hierarchy

In Enterprise Architect you can create a tree style inheritance diagram using a special form of the Generalization connector, as shown below.



**Note:**

The Son ->Parent connector has not yet been put in Tree Style - Vertical style.

This style of diagram provides a clearer layout for inheritance hierarchies and is easy to work with.

#### Create a Tree Style Connector

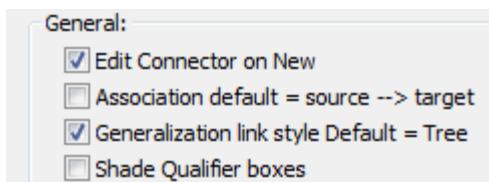
To create a tree style connector, follow the steps below:

1. Create a normal Generalization between two elements.
2. Right-click on the connector to open the context menu.
3. Select the **Line Style | Tree Style - Vertical** or the **Line Style | Tree Style - Horizontal** menu option.
4. Enterprise Architect automatically makes the Generalization layout conform to a specific shape. By adding more Generalization connectors, and checking their **Tree Style** options, you can achieve the appearance of the diagram above. You can slide the root and child Classes left and right to achieve the required result; Enterprise Architect maintains the conformity of the branch connectors.

#### Set the Default Connector Style

To set this style of connector as default, follow the steps below:

1. Select the **Tools | Options | Links** menu option. The **Links** page of the **Options** dialog displays.



2. Select the **Generalization link style Default = Tree** checkbox to make this branching style the default style for inheritance connectors.

### 4.3 Connector Properties

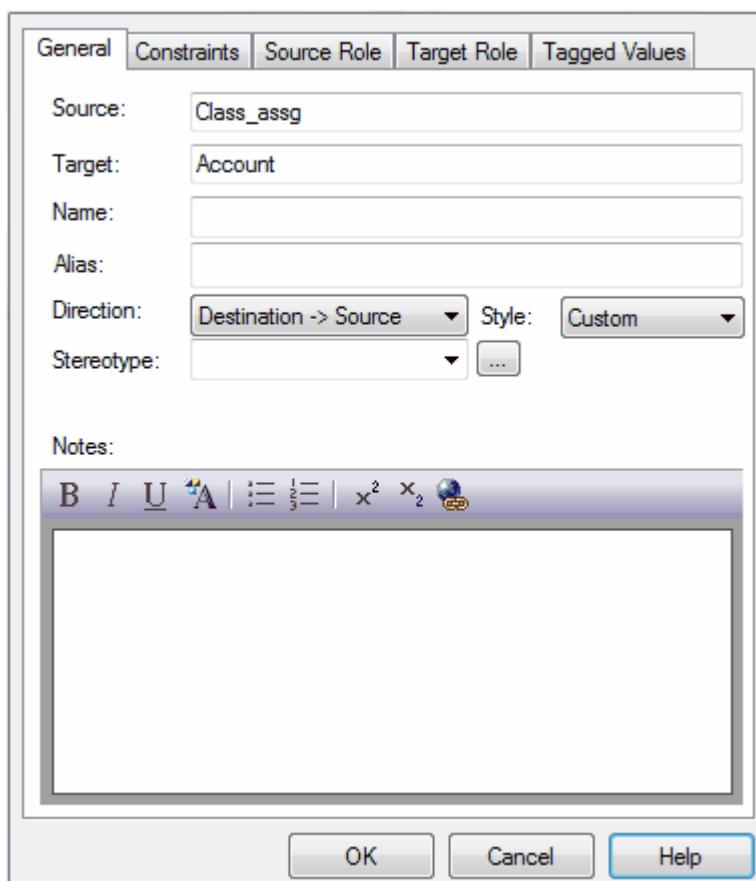
To access the connector **Properties** dialog, double-click on a connector in a diagram. You can change several characteristics of connectors from this dialog.

Many of these characteristics generate text labels on or around the connector. You can change these labels using the [Label](#) context menu.

The connector **Properties** dialog has the following tabs:

- General (see below)
- [Constraints](#)
- [Source Role](#)
- [Target Role](#)
- [Tagged Values](#)

The **General** tab enables you to configure the name of the connector, the direction, the line style, the stereotype (optional) and a comment.



Option	Use to
Source	Type in the name of the source element for the connector.
Target	Type in the name of the target element for the connector.
Name	(Optional) Type a name for the connector. If entered, the name displays on the diagram.
Alias	(Optional) Type an alternative name or alias for the connector.
Direction	Select the appropriate direction details: from source to destination, destination to source, or bi-directional.

Option	Use to
	Some connectors have arrow heads that depend on this setting. Some connectors are logically dependent on this (such as Inheritance).
<b>Style</b>	Select the appropriate connection style; choose from: <b>Direct</b> , <b>Auto-Routing</b> , <b>Bezier</b> , <b>Custom</b> , <b>Tree (Vertical)</b> or <b>Tree (Horizontal)</b> .
<b>Stereotype</b>	(Optional) Type the name of a stereotype for the connector, or click on the drop-down arrow and select one. Alternatively, click on the [ ... ] button and select the stereotype from the <b>Stereotype Selector</b> dialog (see <i>Extending UML in Enterprise Architect</i> ). If entered, the stereotype is displayed on the diagram and over-rides the connector type in the RTF documentation.
<b>Virtual Inheritance</b>	Indicate that inheritance is virtual. Available only for <i>Generalization</i> connectors.
<b>Scope</b>	Select the appropriate value for the scope (used for inheritance). Available only for <i>Generalization</i> connectors where the child Class is C++.
<b>Notes</b>	(Optional) Type any notes on the connector. The notes are displayed in documentation, if required. As for the <b>Notes</b> window, you can format the text, using the <b>Rich Notes Text</b> toolbar at the top of the field (see <i>Using Enterprise Architect - UML Modeling Tool</i> ).

**See Also**

- [Message Scope](#) 

**4.3.1 Connector Constraints**

A UML connector can also have associated constraints placed on it. Constraints tell us something about the rules and conditions under which a relation operates. For example, it might be a pre-condition that a customer is of a certain type before an Association connector to an Account is allowed.

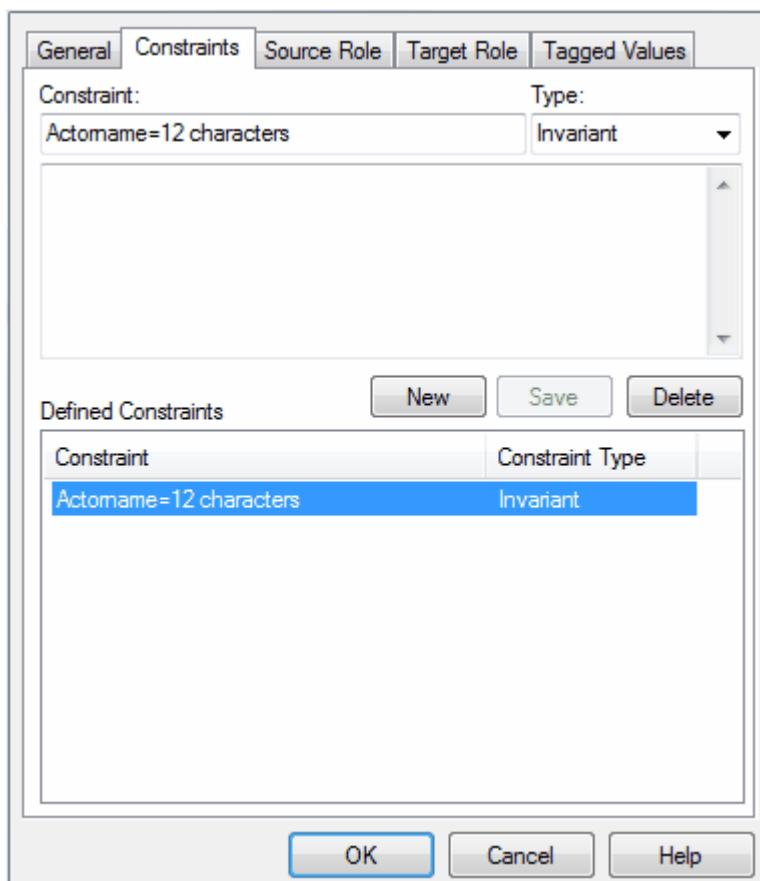
**Tip:**

Constraints about an Association (connector) can be added to further refine the model. Constraints detail the business and operational rules for the model.

**Set Constraints on a Connector**

To set constraints on a connector, follow the steps below:

1. Double-click on a connector to open the Connector **Properties** dialog.
2. Select the **Constraints** tab.
3. Fill in details of the constraint(s) that apply and click on the **Save** button.



Option	Use to
Constraint	Type in the name of the constraint.
Type	Specify the type of constraint (such as pre-condition).
Notes	Type in any notes about the connector.
Defined Constraints	Review the list of constraints for this connector.

#### 4.3.2 Source Role

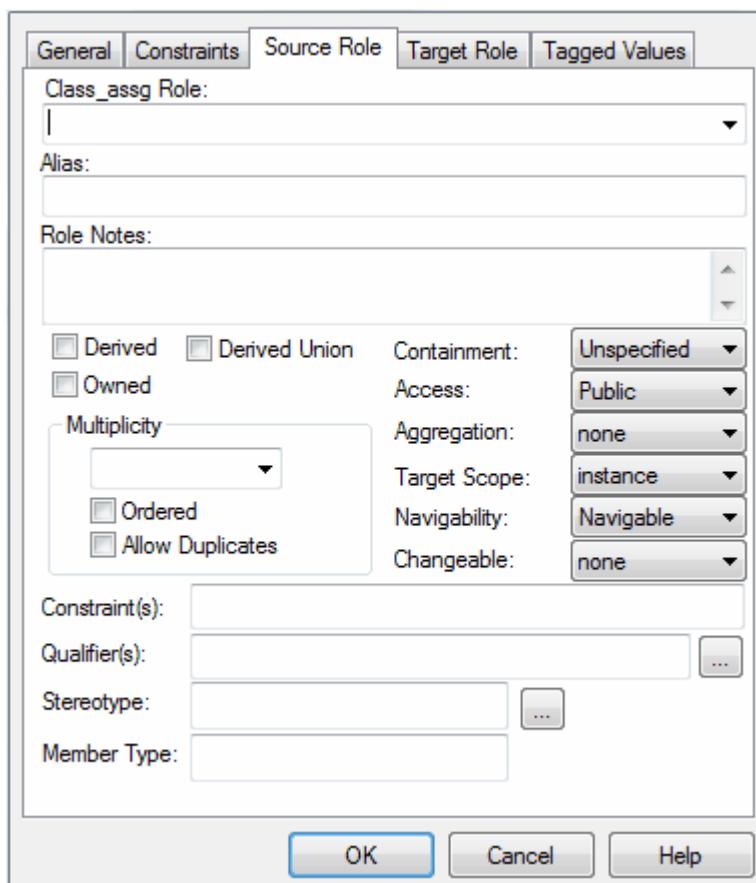
This description refers to the role of the *Source* element in a relationship, but applies equally to the role of the *Target* element.

A connector can have certain properties assigned to one end, and be associated with the particular role that element plays in the relationship. You can enter details about this role to further develop your model.

##### Set Source Role Details

To set the source role details, follow the steps below:

1. Double-click on a connector. The Connector **Properties** dialog displays.
2. Select the **Source Role** tab.
3. Enter the required details and click on the **OK** button.



Option	Use to
<Type> Role	Type in or select the name of the role to be played.
Alias	Type an alias for the role, if required.
Role Notes	Type in any required notes about the role.
Derived	Indicate that the role value or values can be computed from other information.
Owned	Indicate that the role is owned by the opposite Class rather than the Association. Selecting this checkbox adds a 'dot' to the appropriate end of the connector. (  )
Derived Union	Indicate that the role is derived from the properties that subset it.
Multiplicity	<p>Specify the role multiplicity. (You can define the values of this field on the <b>Cardinality</b> tab of the <a href="#">UML Types</a> dialog - see <i>UML Model Management</i>.)</p> <p>This is the range of instances of the role that can be active in the relationship; for example, one employee can be assigned to tasks; for the target role you define the range of instances (such as tasks) the employee could be assigned to.</p> <p>The values have the following formats:</p> <ul style="list-style-type: none"> <li>• *, or 0..* - zero, one or many instances</li> <li>• 0..n - zero or up to n instances, but no more than n</li> <li>• n - exactly n instances</li> <li>• n..* - n, or more than n instances.</li> </ul> <p>Note that you can also define source and target element multiplicity in the element</p>

Option	Use to
	<a href="#">Attribute properties</a> [116]
<b>Ordered</b>	Indicate that the role is a list and the list is ordered.
<b>Allow Duplicates</b>	Indicate that the role can contain duplicate elements (relevant only if multiplicity is > 1). Maps to the UML property <i>isUnique</i> (selecting the checkbox maps to the <i>isUnique</i> value of FALSE).
<b>Containment</b>	Indicate the nature of the containment at the Destination (reference, value...).
<b>Access</b>	Select the access level for the role.
<b>Aggregation</b>	Select the type of aggregation that this role uses.
<b>Target Scope</b>	Select the level at which this role applies (instance or classifier).
<b>Navigability</b>	Select whether or not this role is navigable (non-navigable ends are shown depending on diagram properties).
<b>Changeable</b>	Select whether this role is subject to change.
<b>Constraint(s)</b>	Type in any constraint on the role.
<b>Qualifier(s)</b>	Type any qualifiers or restrictions on the role. Separate multiple qualifiers with a semi-colon. Alternatively, click on the [...] button at the end of the field, and define a new qualifier on the <b>Qualifiers</b> dialog (see the <i>UML Dictionary</i> ). (Qualifiers typed into the <b>Qualifier(s)</b> field are also automatically added to this dialog.)
<b>Stereotype</b>	(Optional) Type the name of a stereotype that applies to this end of the Association, or click on the [...] button at the end of the field and select a stereotype from the <b>Stereotype Selector</b> dialog (see <i>Extending UML With Enterprise Architect</i> ).
<b>Member Type</b>	Type a role type that can be used when generating collection Classes for multiplicity > 1.

**Note:**

Source role details are displayed at the start end of a connector. If you have drawn the connector the wrong way, you can always use the **Reverse Direction** menu option from the connector context menu.

### 4.3.3 Target Role

A connector can have certain properties assigned to one end, and be associated with the particular role that element can play in the relationship.

You can enter details about this role to further develop your model.

#### Set Destination Role Details

To set the destination role details, follow the steps below:

1. Double-click on a connector to open the Connector **Properties** dialog.
2. Select the **Target Role** tab.
3. The details and appearance of this tab are identical to the **Source Role** tab. See [Source Role](#) [219].

**Note:**

Destination role details are displayed at the terminating end of a connector on the diagram.

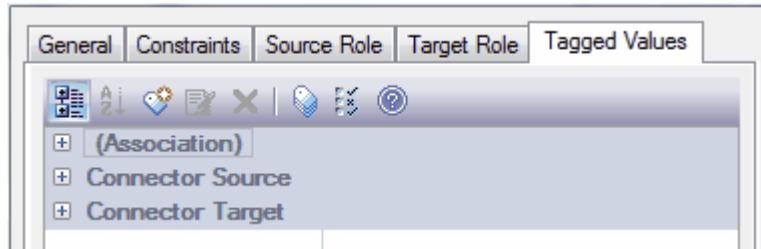
#### 4.3.4 Connector Tagged Values

The **Tagged Values** tab of the connector **Properties** dialog simply provides the **Tagged Values** window within the frame of the **Properties** dialog. You can define Tagged Values for the connector and, on *Association* and *Aggregation* connector types, you can set additional Tagged Values for the source and/or target role.

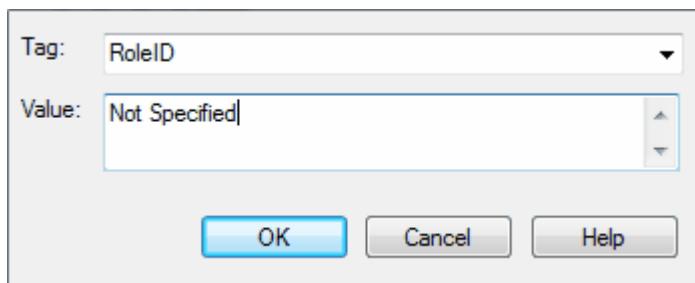
#### Set Tagged Values

To set Tagged Values for the connector, follow the steps below:

1. On the **Properties** dialog for the connector, click on the **Tagged Values** tab.



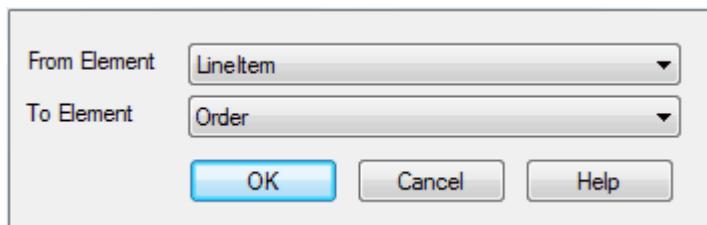
2. Select the connector type, **Connector Source** or **Connector Target** as required.
3. Either click on the **New Tags** button or press **[Ctrl]+[N]**. The **Tagged Value** dialog displays.



4. In the **Tag** field type the tag name and value, or click on the drop-down arrow and select a predefined Tagged Value type.
5. Click on the **OK** button to save the changes.

#### 4.4 Message Scope

A message in a Sequence diagram represents a dynamic interaction from one element to another. Sometimes when you are designing your model you might have to change either the start or end point of a message as the responsibilities of elements change during design. For this reason, Enterprise Architect enables you to change the message scope by setting a new start or end element.



#### Change Message Scope

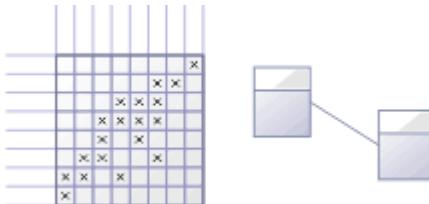
To change message scope, follow the steps below:

1. Select the message in the Sequence diagram.
2. Right-click on the message to open the context menu.

3. Select **Advanced | Set Source and Target**.
4. In the pop up dialog, in the **From Element** and **To Element** fields, click on the drop-down arrows and select the required elements.
5. Click on the **OK** button to save changes.

The message is re-routed to meet your changed requirements.

## 5 Relationship Matrix



The **Relationship Matrix** is a spreadsheet display of relationships between model elements within packages. You select a source package and a target package, the relationship type and direction, and Enterprise Architect identifies all the relationships between source and target elements by highlighting a grid square and displaying an arrow indicating the direction of the relationship.

### Note:

The direction is a reflection of which elements are the source elements and which are the target. It does not indicate the **Direction** property of the connector, as defined in the connector **Properties** dialog.

The **Relationship Matrix** is a convenient method of visualizing relationships quickly and definitively. It also enables you to create, modify and delete relationships between elements with a single mouse click - another quick way to set up complex sets of element relationships with a minimum of effort.

Relationship Matrix															
		Source: Activity Example	Type: <All>	Link Type: Realisation		Profile:									
		Target: Activity Example	Type: <All>	Direction: Both		Refresh		Options							
		Activity Example:Artifact1	Activity Example:arg_intpar	Activity Example:ASD	Activity Example:Cart:Cart	Activity Example:Class R	Activity Example:Class2	Activity Example:Class3	Activity Example:Classy	Activity Example:Customer	Activity Example:Event1	Activity Example:Event2	Activity Example:Event3	Activity Example:Event4	Activity Example:Event5
Activity Example:Artifact1						↑									
Activity Example:ASD						↑									
Activity Example:Cart:Cart							↑								
Activity Example:Class R			↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Activity Example:Class2						↑									

If you click on a square in the matrix, the square, the row headers and the column headers are highlighted, as shown in the example above. The example also illustrates the 'bent arrow' icon, indicating that connectors exist in both directions between the source and target elements.

The relationship squares in the example are green. This indicates that the source element is not locked (because the parent package has not been checked in under version control - see *Version Control Within UML Models Using Enterprise Architect*). If the element is locked (the parent package has been checked in) the highlight is pink, as follows:



For information on accessing the **Relationship Matrix**, see the [Open the Relationship Matrix](#) topic.

You can also:

- [Select options](#)<sup>[228]</sup> for modifying the type of information the Relationship Matrix displays
- [Update, delete and create](#)<sup>[229]</sup> relationships through the Relationship Matrix
- Export the contents of the Relationship Matrix to a [CSV file](#)<sup>[230]</sup> or to a [.png or .emf](#)<sup>[228]</sup> file
- [Print the contents](#)<sup>[228]</sup> of the Relationship Matrix, scaled down if required
- [Save a profile](#)<sup>[230]</sup> of the Relationship Matrix settings to monitor development of the same source and target packages
- [Investigate the Source and Target elements](#)<sup>[231]</sup> in the relationship.

## 5.1 Open the Relationship Matrix

To open the Relationship Matrix you can:

- Select the **View | Relationship Matrix** menu option
- Right-click on any package in the **Project Browser**, and select the **Documentation | Open in Relationship Matrix | As Source** or **As Target** context menu option.

Once the Relationship Matrix opens you can:

- [Set the source and target packages](#)<sup>[227]</sup>
- [Select which element type to show](#)<sup>[225]</sup>
- [Select connector type and direction to show](#)<sup>[226]</sup>

The Relationship Matrix refreshes after every change you make to the input parameters.

**Tip:**

The Relationship Matrix includes ALL child elements in a hierarchy. Sometimes in a large model this can be a lot of elements, possibly too many to be useful. Take care in selecting the source and target package.

## 5.2 Set Element Type

The Relationship Matrix can show all element types, or you can specify which type to show.

To set the element type, follow the steps below:

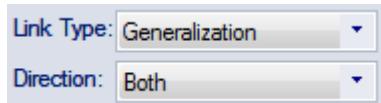
1. Click on the **Type** drop-down arrow for the Source or Target package.
2. Find the required connector in the list and click on it. Enterprise Architect refreshes the Relationship Matrix content.



### 5.3 Set Connector Type and Direction

The **Relationship Matrix** requires that you set the connector type to report on and the connector direction. To do this, follow the steps below:

1. Click on the **Link Type** drop-down arrow to display a list of connector types.



2. Scroll through the list and click on the appropriate connector type.
3. Click on the **Direction** drop-down arrow to display a list of directions.
4. Scroll through the list and click on the appropriate direction.

Enterprise Architect refreshes the **Relationship Matrix** content.

#### Notes:

- If you set **Direction** to **Both**, each relationship is indicated by two arrows - a *From-To* arrow and a *To-From* arrow. See the screen illustration in the [Relationship Matrix](#) topic.
- The direction is a reflection of which elements are the source elements and which are the target. It does not indicate the **Direction** property of the connector, as defined in the connector **Properties** dialog.

## 5.4 Set Source and Target Package

You must set both the source and target packages for the **Relationship Matrix** before relationships can be displayed.

**Tip:**

You set the source and target packages AFTER setting the connector and element types/details; as Enterprise Architect refreshes the content after each change, this is usually faster.

### Set the Source or Target Package

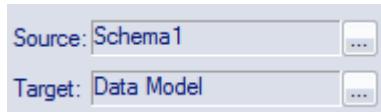
To set the source or target package, follow the steps below:

1. In the **Project Browser**, click on the required source package, then press **[Ctrl]** and click on the required target package, to select the two packages together.
2. Drag the selected packages over the **Source** and **Target** fields; the first-selected package name displays in the **Source** field, and the second-selected package name displays in the **Target** field.

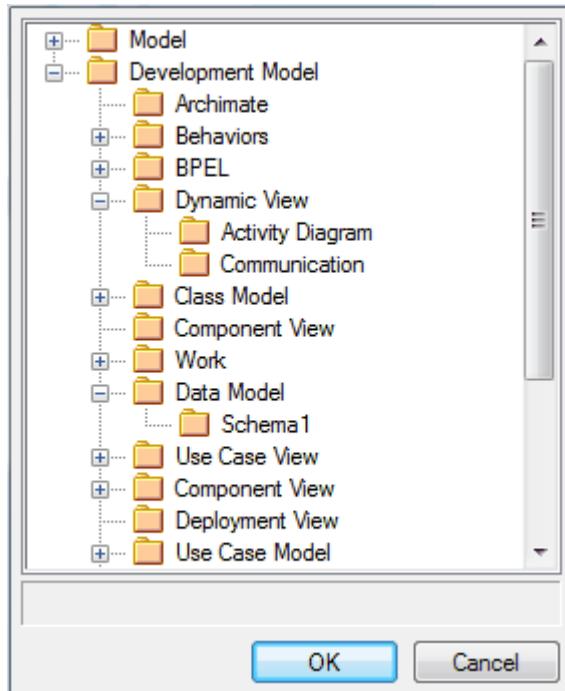
You can also select and drag a single package name over the required field, to change just the source or the target package. If you drop the package name anywhere else on the **Relationship Matrix**, the system prompts you to specify whether to add it to the **Source** or **Target** field.

*Alternatively:*

1. Click on the **[ ... ]** (Browse) button at the end of the **Source** or **Target** field.



2. The **Browse Project** dialog displays.



3. Select the required package and click on the **OK** button.

## 5.5 Relationship Matrix Options

The **Relationship Matrix** provides a menu of options that enable you to:

- [Output](#)<sup>[228]</sup> the information on the **Relationship Matrix** to the printer or to a metafile, .png file or [.csv file](#)<sup>[230]</sup>
- Create and update [profiles of the configurations of the matrix](#)<sup>[230]</sup> that you have designed
- [Define local settings](#)<sup>[229]</sup> to control what the **Relationship Matrix** displays.

### Output Relationship Matrix Information

Click on the **Options** button on the **Relationship Matrix** and click on the **Matrix** menu option. The following submenu displays:



#### Print Relationship Matrix

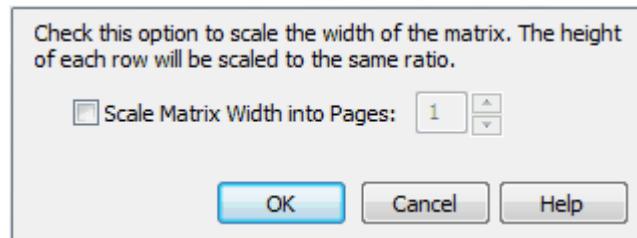
To print a WYSIWYG representation of the **Relationship Matrix** contents, click on the **Print** option. The **Print** dialog displays, on which you select the output printer and specify the printer properties, the range of pages to print, and the number of copies.

If you want to check what the matrix might look like on the page before you print, click on the **Print Preview** menu option. This displays the **Print Preview** screen (see *Using Enterprise Architect - UML Modeling Tool*).

#### Scale Printout

When you print the **Relationship Matrix**, by default it prints on as many pages wide and long as the matrix requires. You can scale the printout into a fixed number of pages wide, and the row height is automatically adjusted to maintain the proportions of the matrix. This reduces the overall size of the printout and improves appearance, especially when used in conjunction with the **Landscape** option in the printer properties. For example, a 16-page printout without scaling can, with a scaling of 2 pages wide, be reduced to 6 pages.

To set the page scaling, click on the **Scale Setting** menu option. The **Scale Matrix** dialog displays.



Select the **Scale Matrix Width Into Pages** checkbox, and type or select the number of pages in width to scale to. Click on the **OK** button to apply the setting.

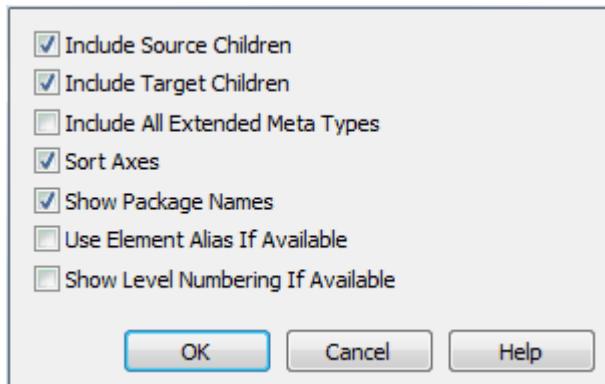
#### Save Relationship Matrix as Graphic File

To save the current **Relationship Matrix** output as a graphic, click on the **Save as Metafile** or **Save as PNG** options. A **Browser** dialog displays that enables you to select the target file location and specify the filename of the .emf or .png file in which to save the output.

You can incorporate these files in an RTF or HTML report, as a hyperlinked file or an included file.

## Manage Display Content

Click on the **Options** button on the **Relationship Matrix** and click on the **Options** menu option. The **Matrix Options** dialog displays.



Select from the following options:

- **Include Source Children** - to recursively include child packages and contents under the Source
- **Include Target Children** - to recursively include child packages and contents under the Target
- **Include All Extended Meta Types** - to include elements that are extensions of a specified meta-type. For example, if there are Block elements (extending Class) in the package, selecting this option and specifying the type Class includes Class and Block elements, and any further derivatives of Block in the matrix.
- **Sort Axes** - to ensure package elements display in alphabetical order
- **Show Package Names** - to hide or show package names in the **Relationship Matrix**; this is useful for shortening the displayed texts, especially in circumstances where packages have long names
- **Use Element Alias If Available** - to display an element's alias instead of the element name, if an alias has been defined
- **Show Level Numbering If Available** - to reproduce level numbering in the **Relationship Matrix**, if it is turned on in the **Project Browser**; see the screen illustration in the [Relationship Matrix](#)<sup>[224]</sup> topic.

## 5.6 Modify Relationships in Matrix

You can modify or delete relationships, or create new relationships, directly from the **Relationship Matrix**.

### To Modify or Delete Relationships

Right-click on a highlighted relationship to open the context menu, and select from the following options:

- **View relationship** - opens the **Properties** dialog for the selected relationship
- **Source element properties** - opens the **Properties** dialog for the source element
- **Target element properties** - opens the **Properties** dialog for the target element
- **Delete relationship**.

If you have selected **Delete relationship**, Enterprise Architect prompts you to confirm this action.

#### Note:

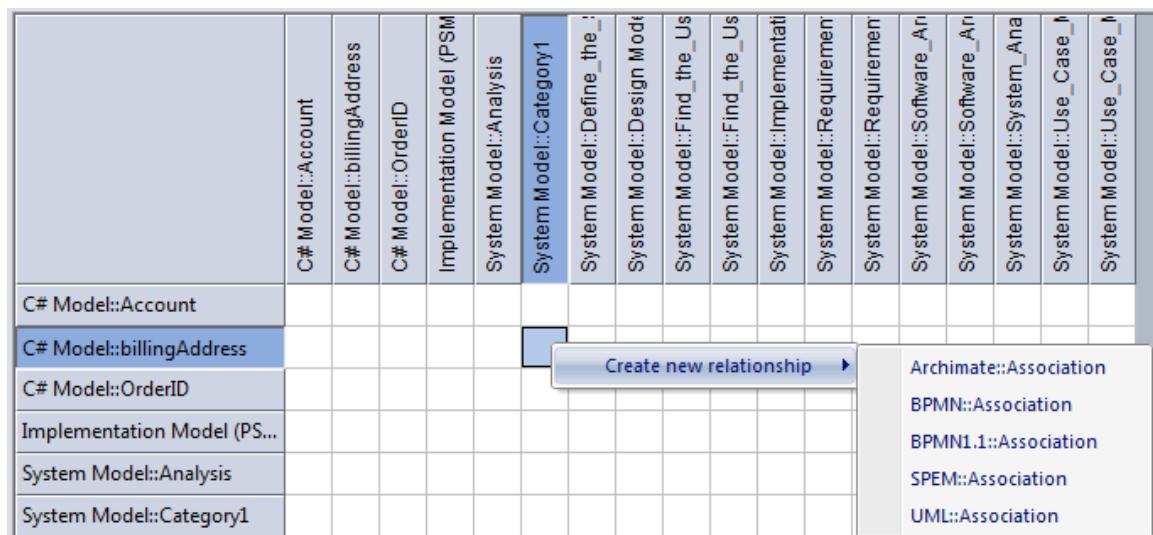
The **Delete relationship** option does not work if:

- The source element (that is, the owner) is locked
- You have selected **Both** in the **Direction** field - you are effectively trying to delete half a relationship.

If you have selected one of the other options, modify any properties as required, and click on the **OK** button to save the changes.

## To Create a New Relationship

1. Select the required relationship type in the **Link Type** field.
2. Right-click on the empty intersection of the source row and target column to display the context menu.



3. Select the **Create new relationship...** option; a submenu displays, listing the types of relationship you can create.
4. Click on the required type of relationship to create a new connector between the two elements.

### Tip:

Use the matrix relationship management features to quickly create and manage relationships like Realization and Aggregation between Requirements and implementation elements (such as Use Cases).

## 5.7 Export to CSV

The contents of the **Relationship Matrix** can be exported to a CSV file. This provides a convenient mechanism for moving the matrix data to a spreadsheet environment such as Microsoft Excel. (This option is also active in the 'Lite', read-only version of Enterprise Architect - see *Getting Started With Enterprise Architect*.)

To export to CSV, follow the steps below:

1. Click on the **Options** button on the **Relationship Matrix** to display the context menu.
2. Select the **Matrix | Export to CSV** menu option. The Windows **Browser** dialog displays.
3. Browse to the required file location and type in a .CSV filename to export to.
4. Click on the **Save** button to export the data.

## 5.8 Matrix Profiles

To save a certain **Relationship Matrix** configuration as a named profile for later recall, follow the steps below:

1. Set up the **Relationship Matrix** as required, with source and target, element types and relationship types.
2. Click on the **Options** button on the **Relationship Matrix** to display the context menu, then select the **Profiles | Save as New Profile** menu option.
3. In the **Enter Value** field, type a profile name of up to 12 characters. Click on the **OK** button.

Once you have created a profile, you can select it from the drop-down list in the **Profile** field at the top of the **Relationship Matrix** screen.

You can also select an existing profile, modify it on the **Relationship Matrix** screen, then save it under the same profile name by selecting the **Profiles | Update Current Profiles** menu option.

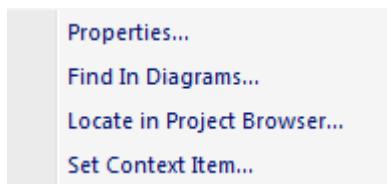
To delete an existing profile, select it in the drop-down list and select the **Profile | Delete Current Profile** menu option.

## 5.9 Review Source and Target Elements

As well as providing information on connectors and relationships, the **Relationship Matrix** enables you to obtain information on the source and target elements in a relationship.

To help you quickly identify which source or target elements have relationships with a particular element, you can highlight the entire row or column for the element by clicking on the element name in the row or column titles. If the list of elements is long, you can scroll across or down the highlighted row or column and quickly identify where the relationships are.

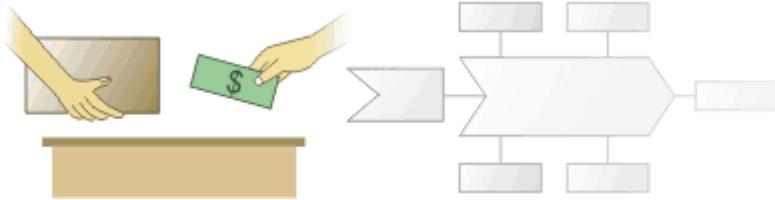
If you right-click on an element name in the row or column titles, the following context menu displays:



This enables you to:

- Display the **Properties** dialog for the selected element
- Display either the only diagram in which the element is used, with the element highlighted, or a list of the diagrams in which the element is used; you then select and open a diagram from the list
- Locate and highlight the element name in the **Project Browser**
- Make the selected element the context or focus in any docked screens or windows that are open, such as the **Tagged Values** window.

## 6 Business Modeling



### Modeling the Business Process

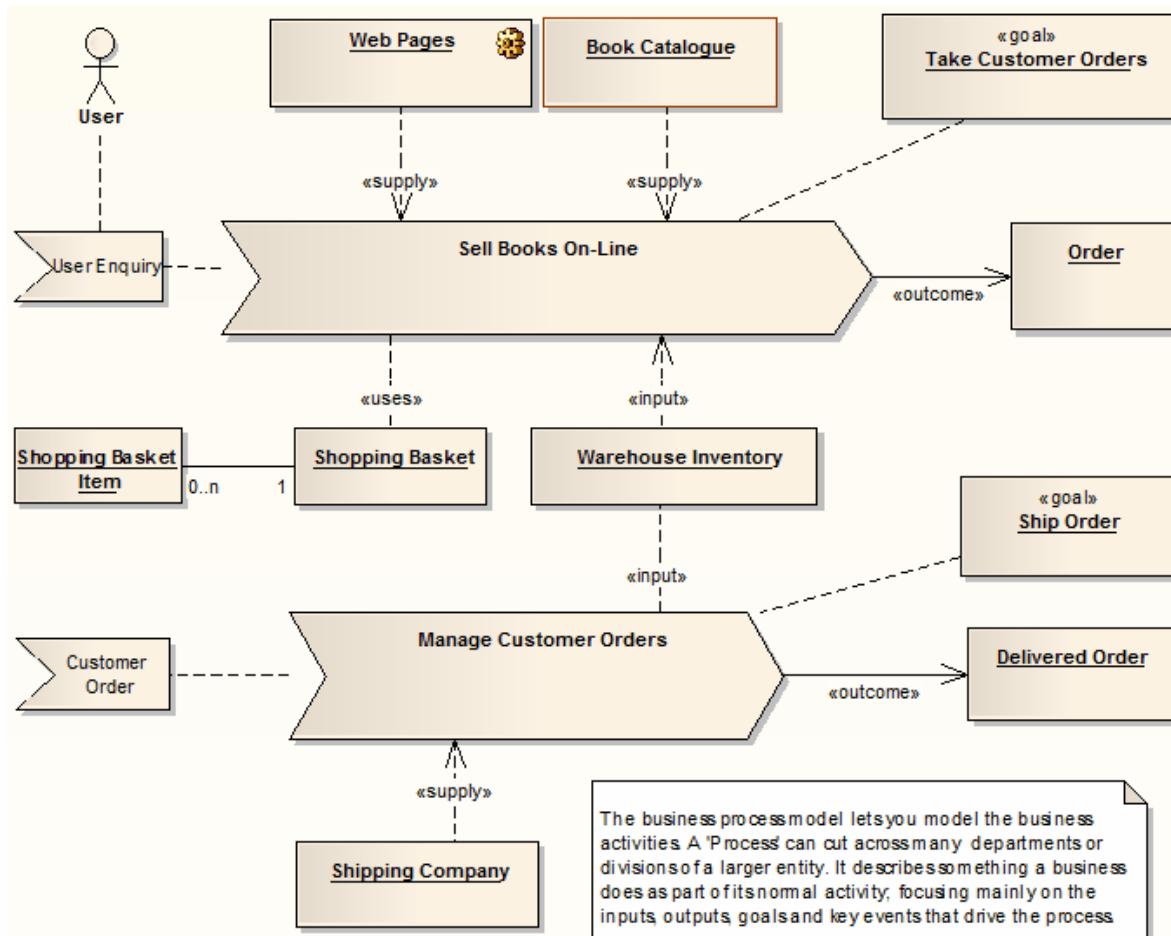
Modeling the business process is an essential part of any software development process. It enables the analyst to capture the broad outline and procedures that govern what it is a business does. This model provides an overview of where the proposed software system being considered fits into the organizational structure and daily activities. It can also provide the justification for building the system by capturing the current manual and automated procedures that are to be rolled up into a new system, and the associated cost benefit.

As an early model of business activity, it enables the analyst to capture the significant events, inputs, resources and outputs associated with business process. By connecting later design elements (such as Use Cases) back to the business process model through Implementation connectors, it is possible to build up a fully traceable model from the broad process outlines to the functional requirements and eventually to the software artefacts actually being constructed.

As the Business Process Model typically has a broader and more inclusive range than just the software system being considered, it also enables the analyst to clearly map what is in the scope of the proposed system and what is to be implemented in other ways (such as a manual process).

### An Example

The example below demonstrates the kind of model that can be built up to represent a business process. In this model, the goal of the business process is to take customer orders and to ship those orders out. A user starts the process with an inquiry, which leads to the involvement of the Book Catalogue, Shopping Cart, online pages and warehouse inventory. The output of significance to the business is a customer order.



The second half of the process model is to respond to a customer order and ship the required items. The second process involves the warehouse inventory and shipping company, and completes when an order is delivered to the customer.

#### See

- [Process Modeling Notation](#) [233]
- [Inputs, Resources and Information](#) [234]
- [Events](#) [235]
- [Outputs](#) [235]
- [Goals](#) [235]
- [A Complete Business Process](#) [236]

#### See Also

- Business Modeling and Business Interaction Diagrams
- Web Stereotypes

## 6.1 Process Modeling Notation

A business process model typically defines the following elements:

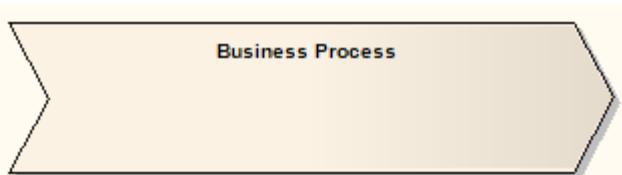
- The goal or reason for the process
- Specific inputs
- Specific outputs
- Resources consumed
- Activities that are performed in some order, and

- Events that drive the process.

The business process:

- Can affect more than one organizational unit
- Can have a horizontal organizational impact
- Creates value of some kind for the customer; customers can be internal or external.

A business process is a collection of activities designed to produce a specific output for a particular customer or market. It implies a strong emphasis on how the work is done within an organization, in contrast to a product's focus on what. A process is thus a specific ordering of work activities across time and place, with a beginning, an end, and clearly defined inputs and outputs: a structure for action. The notation used to depict a business process is illustrated below.



The process notation implies a flow of activities from left to right. Typically an [Event](#)<sup>[235]</sup> element is placed to the left of the process and the output to the right. To specifically notate the internal activities, UML Activity elements can be placed inside the process element.

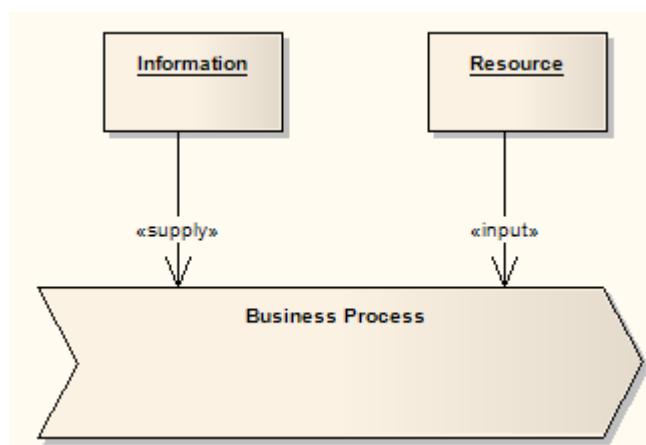
### The BPMN Profile

One popular notation and approach to business modeling is the Business Process Modeling Notation (BPMN). This notation is specifically targeted at the business modeling community and has a relatively direct mapping to UML through a BPMN Profile. Sparx Systems provides a built-in UML profile for BPMN modeling in Enterprise Architect.

## 6.2 Inputs, Resources and Information

Business processes use information to tailor or complete their activities. Information, unlike resources, is not consumed in the process; rather it is used as part of the transformation process. Information can come from external sources, from customers, from internal organizational units and could even be the product of other processes. A resource is an input to a business process and, unlike information, is typically consumed during the processing. For example, as each daily train service is run and actuals recorded, the service resource is 'used up' as far as the process of recording actual train times is concerned.

The notation to illustrate information and resources is shown below.

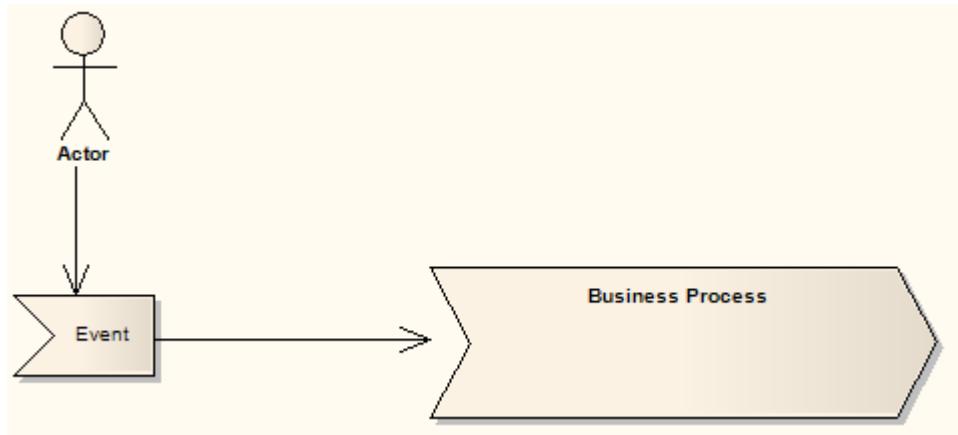


A *Supply* connector indicates that the information or object linked to the process is not used up in the processing phase. For example, order templates can be used over and over to provide new orders of a certain style; the templates are not altered or exhausted as part of this activity.

An *Input* connector indicates that the attached object or resource is consumed in the processing procedure. As an example, as customer orders are processed they are completed and signed off, and typically are used only once per unique resource (order).

### 6.3 Events

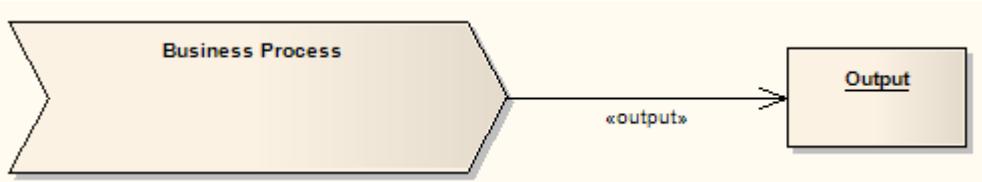
An event is the receipt of some object, a time or date reached, a notification or some other trigger that initiates the business process. The event might be consumed and transformed (for example a customer order) or simply act as a catalyst (for example, nightly batch job).



### 6.4 Outputs

A business process typically produces one or more outputs of value to the business, either for internal use or to satisfy external requirements. An output might be a physical object (such as a report or invoice), a transformation of raw resources into a new arrangement (a daily schedule or roster) or an overall business result such as completing a customer order.

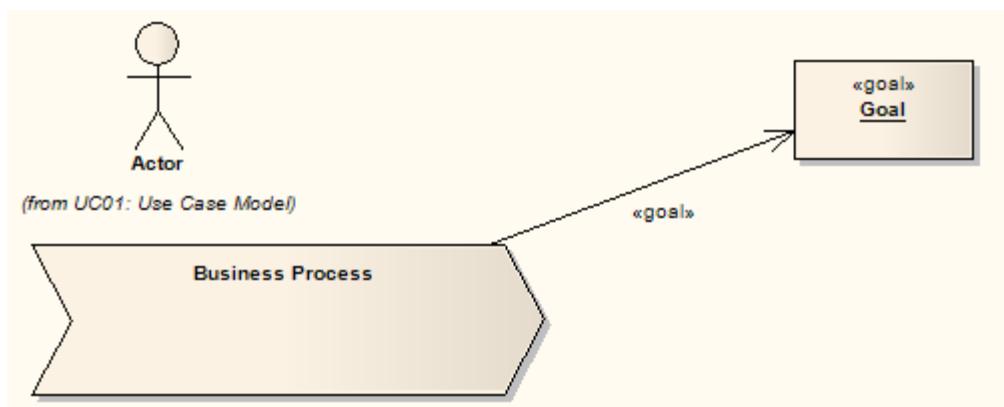
An output of one business process might feed into another process, either as a requested item or a trigger to initiate new activities.



An Output connector indicates that the business process produces some object (either physical or logical) that is of value to the organization, either as an externally visible item or as an internal product (possibly feeding another process).

### 6.5 Goals

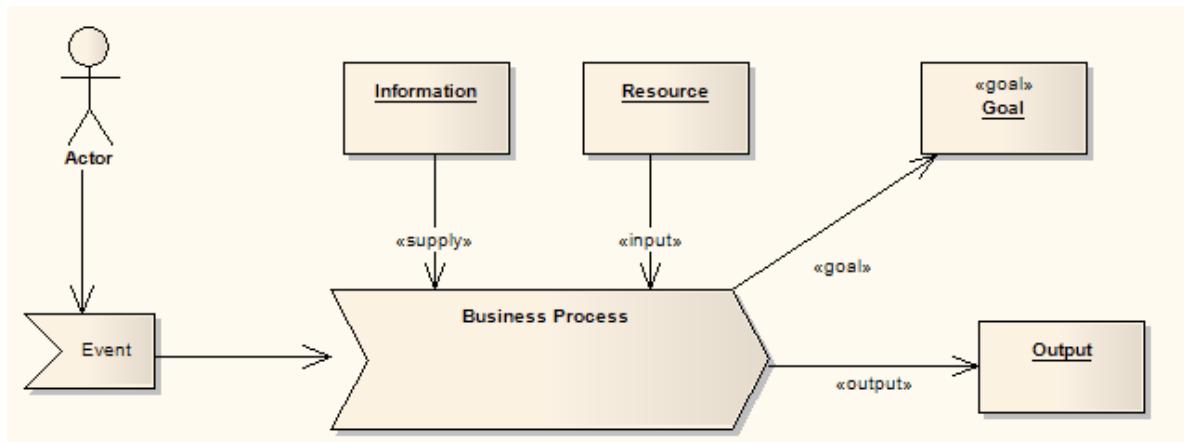
A business process has some well defined goal. This is the reason the organization does this work, and should be defined in terms of the benefits this process has for the organization as a whole and in satisfying the business requirements.



A Goal connector indicates that the attached object to the business process describes the goal of the process. A goal is the business justification for performing the activity.

## 6.6 A Complete Business Process

The diagram below illustrates how the various model elements can be grouped together to produce a coherent picture of a named business process. Included are the inputs, outputs, events, goals and other resources that are of significance.



## 7 Business Rule Modeling

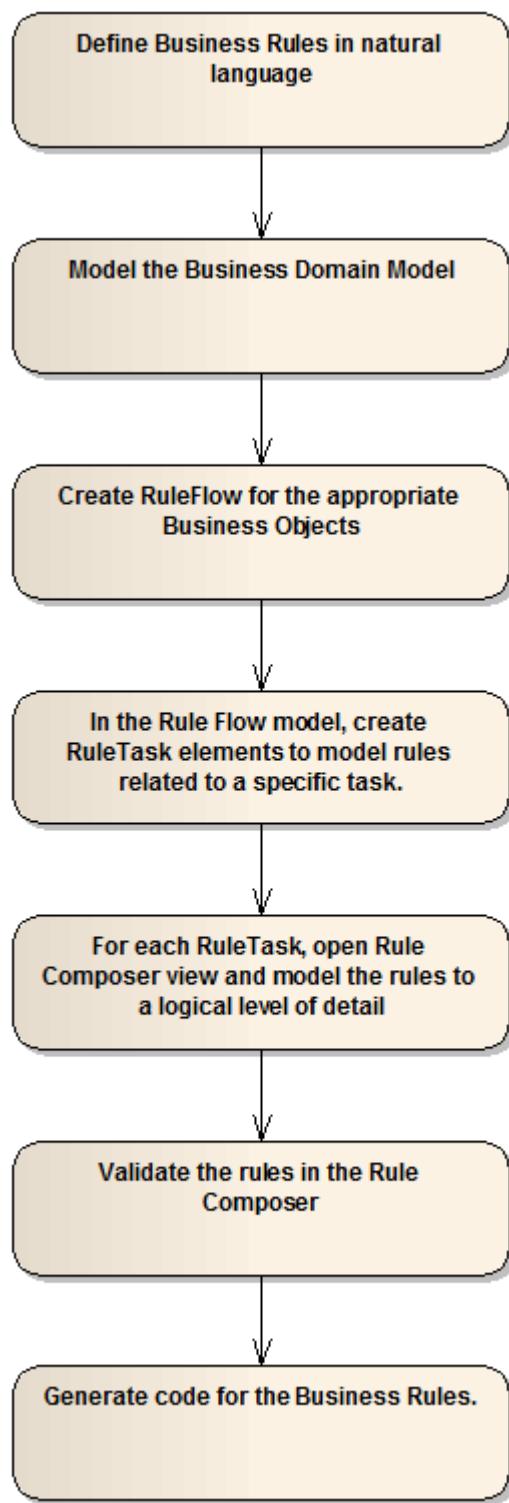
### Note:

Business Rule Modeling is available in the Business and Software Engineering edition and Ultimate edition of Enterprise Architect.

To model Business Rules in Enterprise Architect, you work through the following steps:

- [Create a Rule model](#)<sup>[238]</sup> to define business rules.
- [Create a Business Domain model](#)<sup>[241]</sup>, which provides the business vocabulary for defining business rules.
- [Create a Rule Flow](#)<sup>[242]</sup> [model](#)<sup>[242]</sup>, which groups the rules for a specific task under a Rule Task, and provides the order in which the business rules are executed.
- Model the rules in the [Rule Composer](#)<sup>[248]</sup>, which enables the rules to be transformed to a logical level of detail.
- [Validate](#)<sup>[253]</sup> the rules in the [Rule Composer](#).
- [Generate code for the business rules](#)<sup>[254]</sup> using Enterprise Architect's general code generation methods.

These steps are represented graphically in the following flow:



## Create a Business Rule Model

You can create a Business Rule Model from a template provided with Enterprise Architect. To do this, follow the steps below:

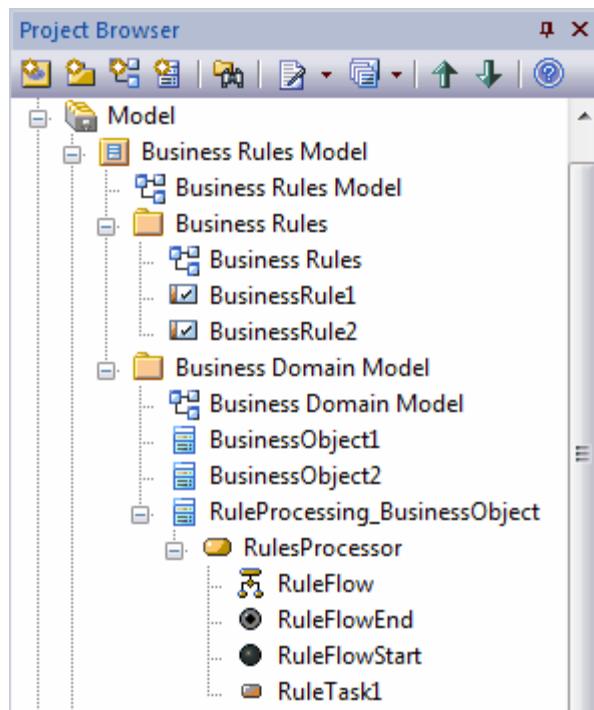
1. In the **Project Browser**, either:
  - Click on the **New Model From Pattern** icon in the toolbar

- Right-click on a model root node and select the **Add a New Model using Wizard** context menu option, or
- Right-click on a package and select the **Add | Add a New Model using Wizard** context menu option.

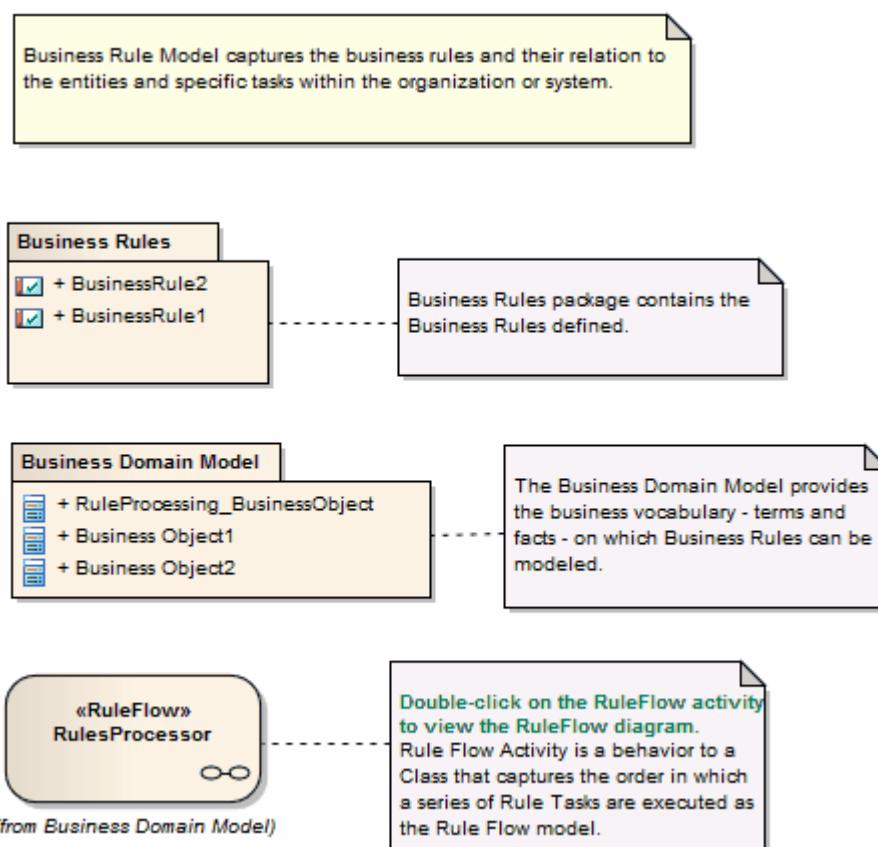
The **Select Model(s)** dialog displays.

2. In the **Select From** field, click on the drop-down arrow and select **Business Rule Model**. Alternatively, if it is listed in the **Technology** panel, select the **Business Rule Model** item.
3. In the **Name** panel, select the checkbox next to the **Business Rule Model** icon.
4. Click on the **OK** button.

The following model structure is created in the **Project Browser**:



The *Business Rules Model* diagram, shown below, encapsulates the components of the Business Rules model.

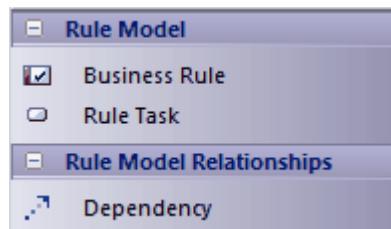


## 7.1 Model Business Rules For RuleTasks

The *Rule Model* enables you to define *Business Rule* elements and associate them with a Rule Task. In the example, you might define a set of rules to perform an eligibility check for a customer, to determine if the customer is eligible to rent a car.

To do this, follow the steps below:

1. Create a diagram of type *Rule Model*. The *Rule Model* pages display in the Enterprise Architect UML Toolbox.



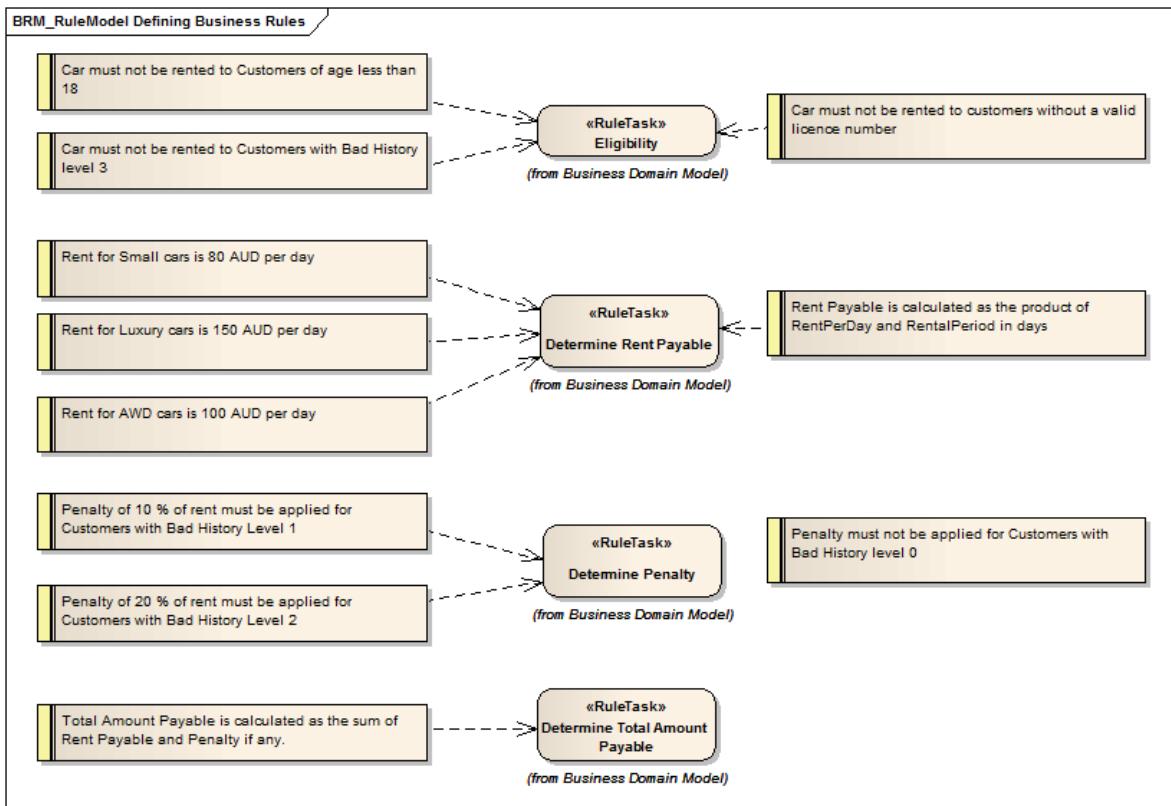
2. Drag and drop a Rule Task element (*Eligibility* in the example) from the Rule Flow Activity diagram package onto the Rule Model diagram.
3. Drag as many Business Rule elements as necessary from the *Toolbox* (or *Project Browser* if they exist already) onto the diagram. You type the rule as the element name here, then define the parameters of the rules using the [Rule Composer](#)<sup>[248]</sup>.
4. Create a Dependency relationship between each Business Rule element and the Rule Task element.

**Note:**

However, when you bring the rule into the **Rule Composer**, it automatically creates the Dependency relationship anyway.

- Repeat steps 2 - 4 for the next Rule Task element.

The resulting Rule Model resembles the following diagram:



After you have modeled rules for all the Rule Task elements in the Rule Flow diagram, the Business Domain model is ready for [code transformation](#) [254]. The code templates for generating technology-specific rule code work hand-in-hand with the EASL code templates to generate the code for the Rule Flow diagram.

## 7.2 Create a Business Domain Model

The *Business Domain Model* provides the business vocabulary - terms and facts - on which Business Rules can be modeled. In Enterprise Architect a Business Domain model is created as a conceptual Class diagram.

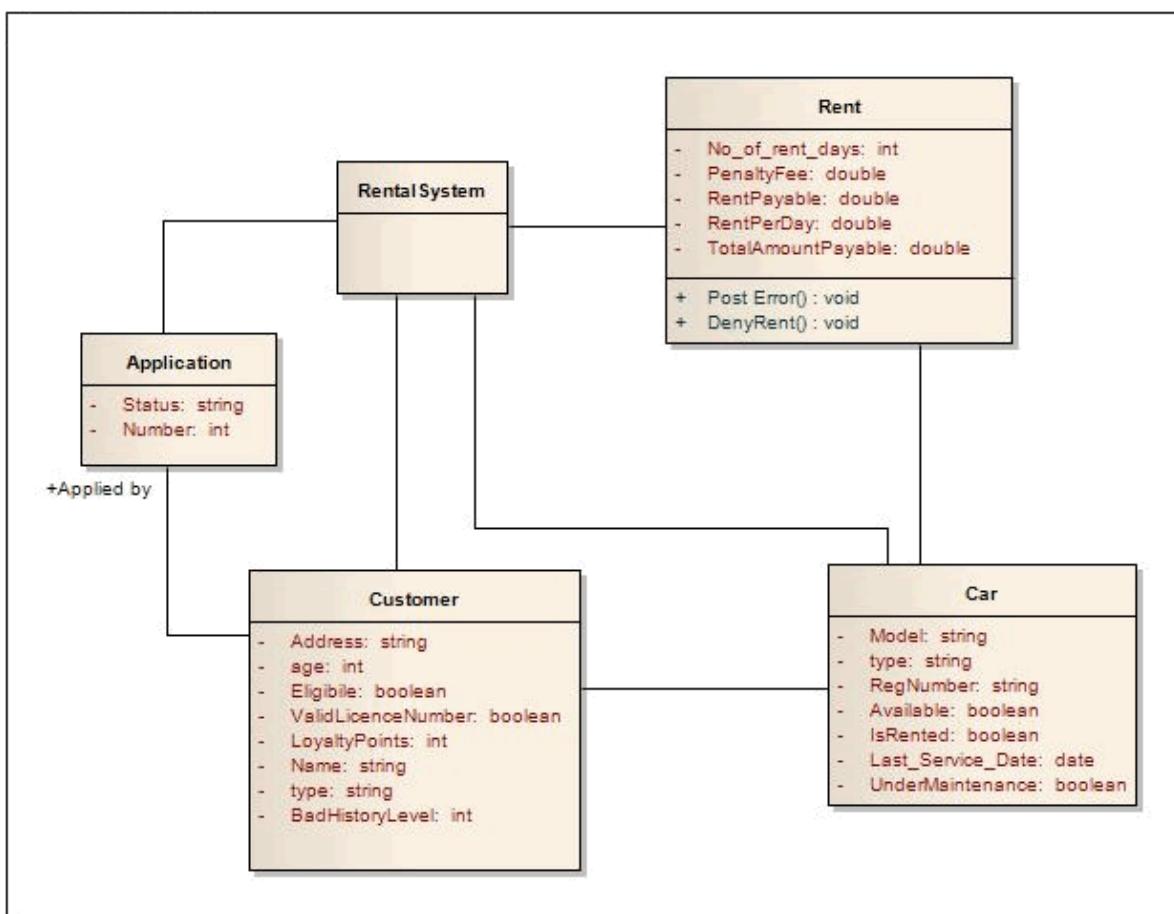
**Note:**

When you create Classes in the Business Domain model, select the correct language for code generation to ensure that the correct data type is set for attributes and operation parameters.

Business Rules code generation is supported for the following languages:

- C++
- C#
- Java
- VbNet.

The following diagram shows an example Business Domain model, for a Car Rental system.



In the example Business Domain model, the Classes *Rent*, *Customer*, *Car* and *Application*, together with their attributes and operations, provide the terms for the business vocabulary. The Class *Rental System* processes the rules. To make *Rental System* process the rules, you add a [Rule Flow Activity](#)<sup>[242]</sup> as a behavior for this Class.

When you create a Rule Flow behavior (Activity) under a Class you can model the rules as *Rule Tasks* (Actions). When code is generated the rule flow behavior is rendered as a method inside the corresponding Class.

Alternatively, if you have existing operations in the Class that already suit the purpose, you can [model business rules in those operations](#)<sup>[246]</sup>. When code is generated for the Class the rules logic is generated as the method body for the corresponding operation.

### 7.3 Create a Rule Flow Model

You create a *Rule Flow Activity* as a behavior for a Class, to enable that Class to process a set of rules.

To add a Rule Flow Activity to a Class, follow the steps below:

1. On the Business Domain model diagram, right-click on the Class that processes the rules (in the example, *Rental System*).
2. From the context menu select the **Add | RuleFlow Activity** menu option.

A new Rule Flow Activity with a *Rule Flow diagram* is created as a behavior for the selected Class. The Rule Flow diagram models the sequence in which a series of *Rule Tasks* are executed.

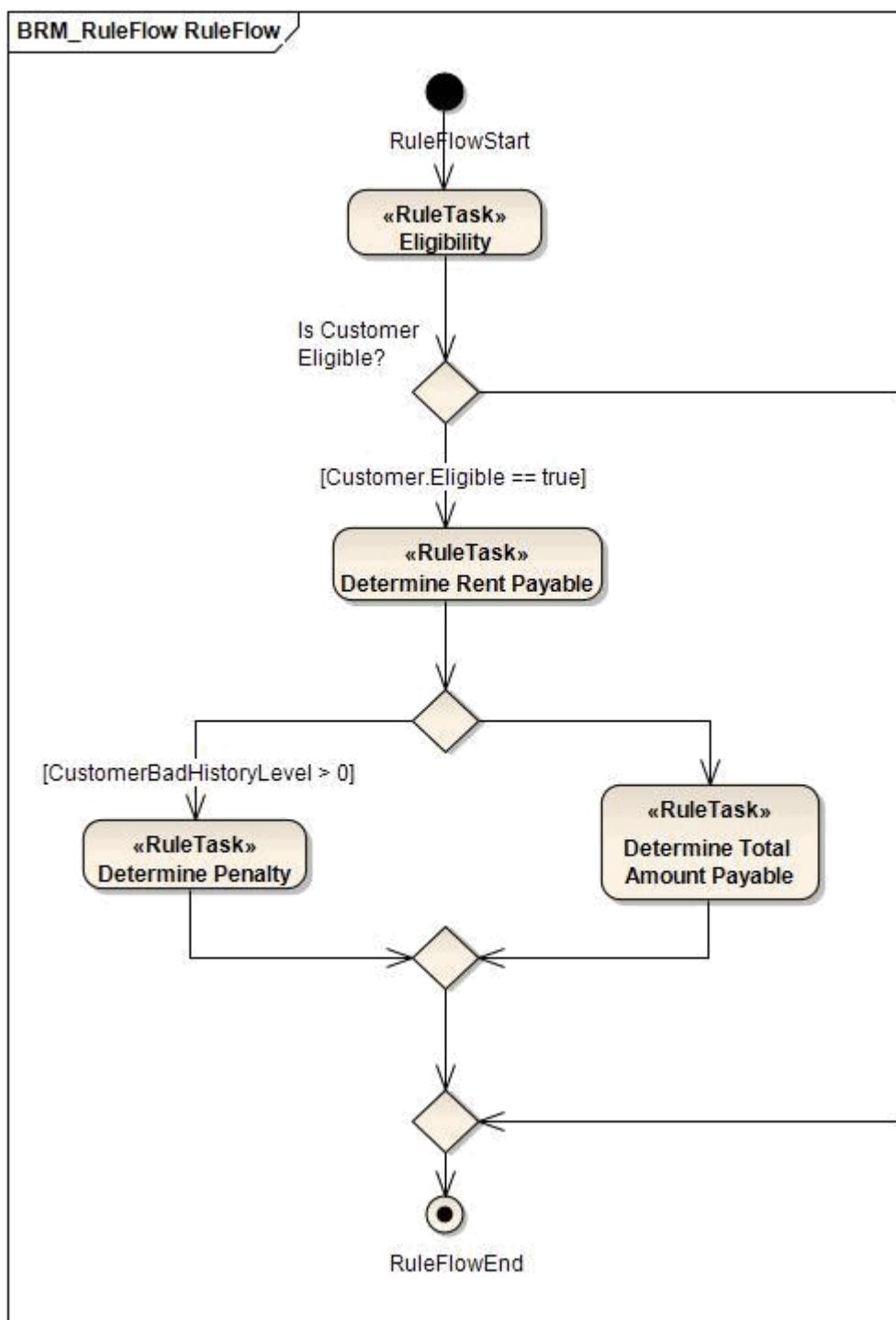
Code generation for a Rule Flow model renders each RuleFlow Activity as a set of operations or methods. Depending on what you want these methods to do, you might want to pass in some parameters to be used within the Rule Flow Activity. See the [Pass Parameters to Rule Flow Activity](#)<sup>[245]</sup> topic.

## Add a Rule Task

A Rule Task is a stereotyped Action that groups Business Rules for a specific task. You create Rule Task elements in a Rule Flow diagram using the associated [Rule Flow](#) pages of the Enterprise Architect UML Toolbox.



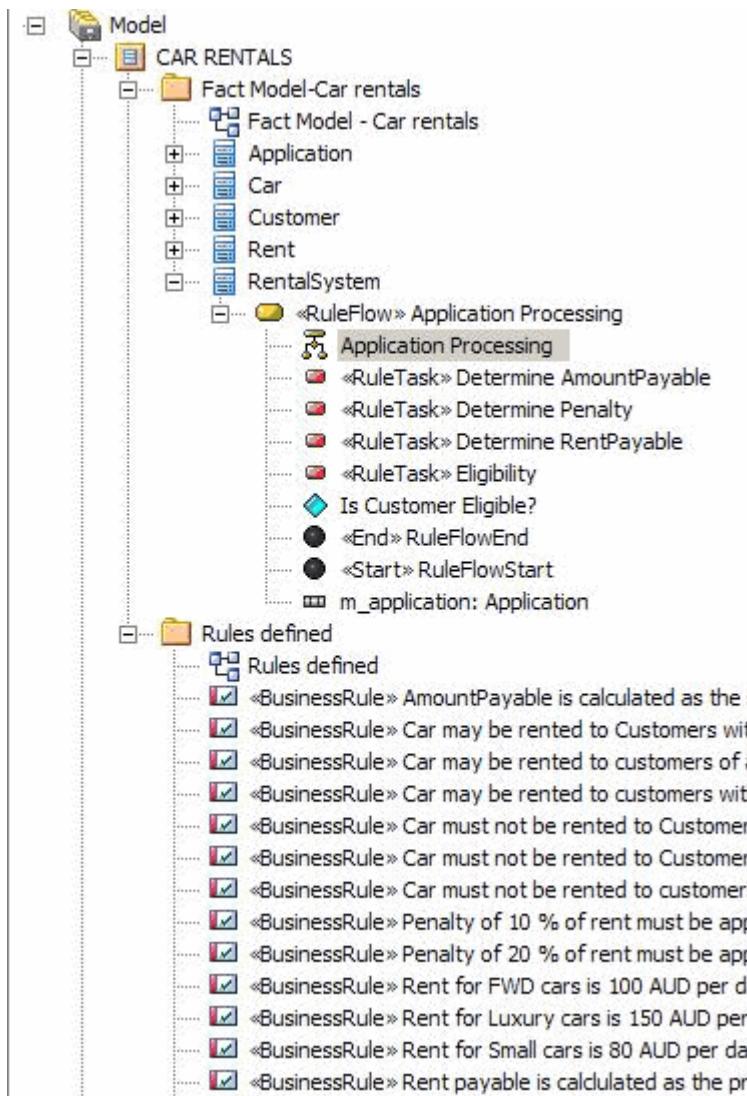
The following illustration is of a possible Rule Flow diagram for the car rental example.



The Rule Task elements *Eligibility*, *Determine Rent Payable*, *Determine Penalty* and *Determine Total Amount Payable* group the business rules for the specific task indicated by the element name. You then [identify the business rules](#)<sup>[240]</sup> for each group.

**Notes:**

- In a Rule Flow diagram, every *Decision Node* has a matching *Merge Node* to ensure proper code generation.
- For code generation, the Rule Task elements must be grouped inside the appropriate Rule Flow Activity in the **Project Browser**. However, Rule elements can be defined anywhere in the model, as they can be used in more than one Rule Task.



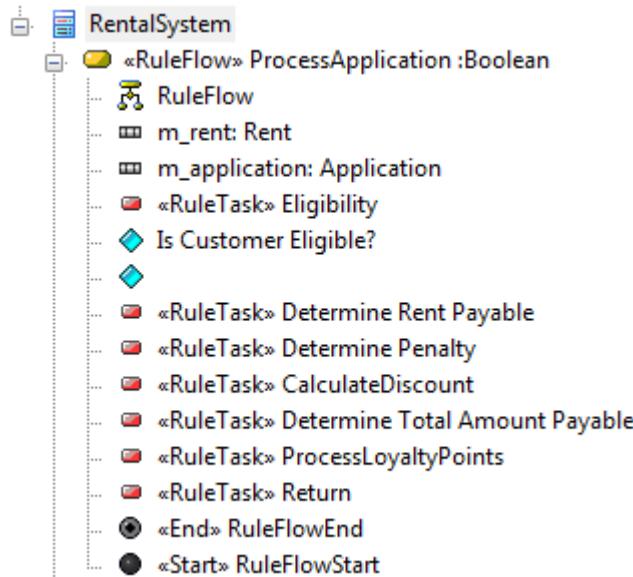
### 7.3.1 Pass Parameters to Rule Flow Activity

To pass in parameters to be used within a Rule Flow Activity, follow the steps below:

1. In the **Project Browser**, double-click on the Rule Flow Activity. The element **Properties** dialog displays.
2. Click on the **Behavior** tab.
3. Click on the **Edit Parameters** button. The **Parameters** dialog displays.
4. Create and define<sup>[170]</sup> each parameter, setting Type and Default values.
5. Save each parameter and, when you have finished setting the parameters, close both dialogs.

The Rule Flow Activity parameters can be accessed by the Rule Tasks within the parent Rule Flow Activity. In

the following hierarchy, the parameters *m\_rent* and *m\_application* can be used by any of the Rule Tasks under the *ProcessApplication* Rule Flow Activity.



You can use the parameters as condition variables or action variables in the Business Rule [Decision Table](#)<sup>[248]</sup>, or as rule variables in the [Computation Table](#)<sup>[249]</sup> for any of the Rule Tasks. If the Activity parameter is not accessible to a Rule Task, Enterprise Architect displays an error message.

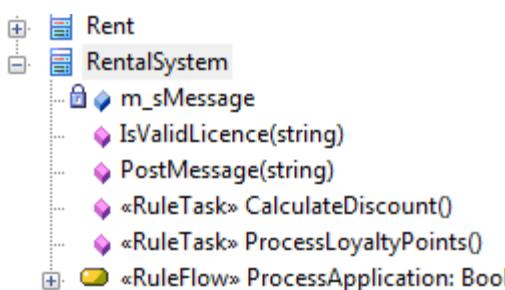
### 7.3.2 Model Rules In an Operation

You can model business rules either in the [Business Rule](#)<sup>[240]</sup> elements attached to the Rule Task element in a [RuleFlow Activity](#)<sup>[242]</sup> diagram, or in the operations of the rule Class in the [Business Domain model](#)<sup>[241]</sup>.

To model business rules for an operation:

1. Open the [Properties](#) dialog for the operation and, in the **Stereotype** field on the **General** tab, type the value **RuleTask**.
2. In the [Project Browser](#), right-click on the operation and select the **Rule Composer** option to open the **Rule Composer**.
3. [Model the rules for the operation](#)<sup>[248]</sup>.

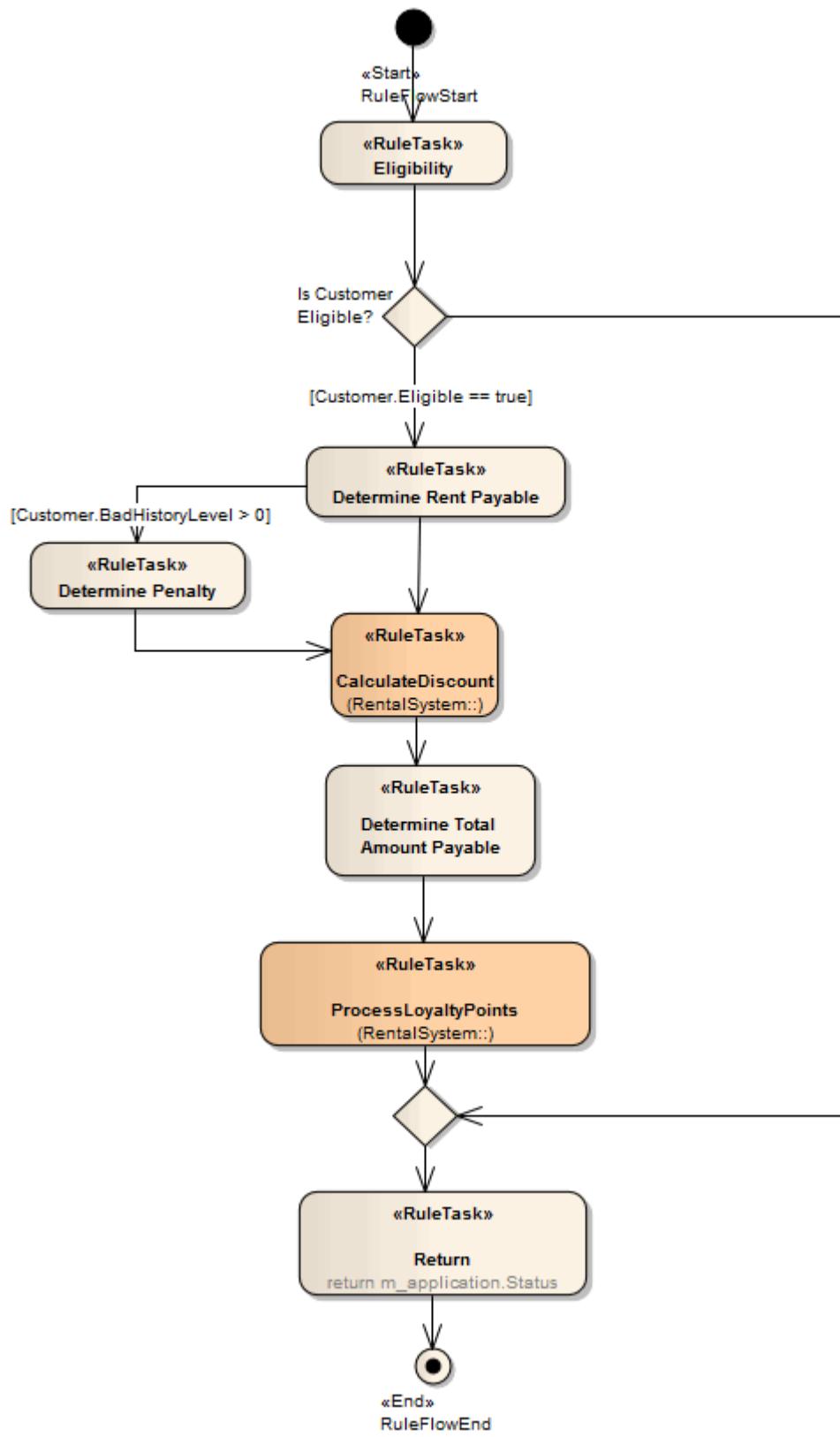
The operations appear in the [Project Browser](#) as shown below:



On code generation, the code for rules logic is generated in the method body.

When you drag and drop a RuleTask operation onto a Rule Flow diagram, an [operation call behavior action](#)<sup>[167]</sup> is created. To pass the parameters for this operation call, open the [Properties](#) dialog and select the **Call** tab. Set the **Behavior** field to the operation to be called. Under the **Arguments** field, click on the **Edit Arguments** button and [edit the argument values](#)<sup>[174]</sup> to be passed.

On the diagram, the call behavior actions for the RuleTask operations are indicated as shown below:



## 7.4 Compose Business Rules

You use the **Rule Composer** to define a business rule written in plain text within a Business Rule element or Class operation. The **Rule Composer** enables you to model conceptual-level business rules at a logical level in tabulated format, which assists in transforming the rules to technology-specific rules ([code](#)<sup>[254]</sup>).

You can also [download](#)<sup>[253]</sup> the contents of the **Rule Composer** to a spreadsheet application such as Microsoft Excel, via a CSV file.

### Access The Rule Composer

To access the **Rule Composer**, right click on a Rule Task element and select the **Rule Composer** context menu option. The **Rule Composer** displays in the central work area on its own tab.

The screenshot shows the Rule Composer interface with three main sections:

- Rule Statements:** A table listing business rules. Row 1: "Car must not be rented to customers without a valid licence number". Row 2: "Car must not be rented to Customers of age less than 18". Row 3: "Car must not be rented to Customers with Bad History level 3".
- Decision Table:** A table mapping rule conditions to allowable values. Row 1: Customer.age with conditions >18 and <50, <18, >50, -. Row 2: Customer.BadHistoryLevel with conditions 0, 1, 2, 3, -. Row 3: Customer.ValidLicenceNumber with conditions Yes, No, -. Columns represent Value1, Value2, and Value3.
- Computation Rule Table:** A table defining actions and their outcomes. Row 1: Application.Status with outcome Accept, Reject. Row 2: Customer.Eligibile with outcome Yes, No, -. Row 3: An empty row. Columns represent Result1, Result2, and Result3.

The **Rule Composer** consists of:

- a **Rule Statements** list
- a **Decision Table** and
- a **Computation Rule Table**.

To assist with traceability, as the **Rule Composer** is completed, selections in one table automatically highlight the corresponding rows and columns of the other tables. For example, If a Rule Statement is selected, the related rule column in the **Decision Table** and row in the **Computation Rule Table** are highlighted. Similarly, if a Computational Rule is selected, the corresponding column in the **Decision Table** and row in the **Rule Statements** list are highlighted.

### Rule Statements Table

The **Rule Statements** table lists the rules associated with the selected Rule Task. You add a rule to the table by dragging an existing Business Rule element from the **Project Browser** onto an empty row in the **Rule Statements** table. You cannot create new rules within the table.

To define a business rule associated with the selected Rule Task, follow the steps below:

1. For the first rule, select the text within the Business Rule element and drag it onto the empty row.

2. For a subsequent rule, click on the **No** column and select the **Add Row** context menu option. An empty row is added to the **Rule Statements** table.

No	Rule Statements
1	Car must not be rented to customers without a valid licence number
2	Car must not be rented to Customers of age less than 18
3	Car must not be rented to Customers with Bad History level 3
4	

3. Drag the required Business Rule element from the **Project Browser** onto the new row. If the Business Rule element is not already on the diagram, this adds the element to the diagram and creates a Dependency relationship between the Business Rule and Rule Task elements.

To remove a rule that is no longer required in the **Rule Composer**, right-click on the appropriate **No** field and select the **Remove Rule** context menu option.

#### Note:

This removes the rule from the **Rule Composer** and deletes the Dependency relationship with the Rule Task element. However, it does not remove the Business Rule element from either the diagram or the **Project Browser** (where, in either case, it might be in use with other Rule Task elements).

## Decision Table

The **Decision Table** enables you to model *conditional* rules (for example: *Cars must not be rented to customers of age less than 18*).

The table has three sections:

- **Rule Conditions** – to model condition variables
- **Rule Actions** – to model action variables
- **Rule Bindings** – to link the rule in the rule table.

Decision Table		Computation Rule Table			
>	Rule Bindings	Allowable Values	Value1	Value2	Value3
<	Customer.age	<18, >18 and <50, >55	<18		
>					
No	Rule Conditions	Allowable Values	Value1	Value2	Value3
1	Customer.age	<18, >18 and <50, >55	<18		
2					
No	Rule Actions (Outcome)	Allowable Values/Parameters	Result1	Result2	Result3
1	Customer.Eligible	Yes, No	No	Yes	Yes
2	Application.Status	Accept, Reject	Reject	Accept	Accept
3					

## Rule Conditions Section

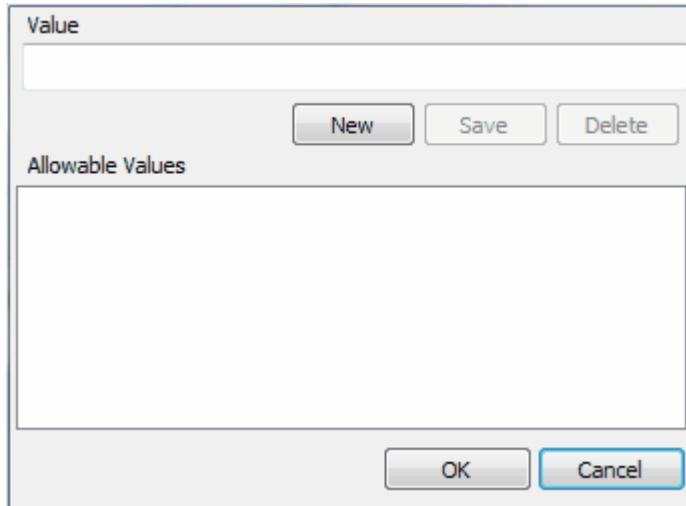
To model Rule Conditions, follow the steps below:

1. The Business Domain model defines the business terms (such as *Customer*) and their associated attributes. From the appropriate Class element in the **Project Browser**, drag and drop the required condition attribute (such as *age*) or operation (such as *IsValidLicense()*) onto the **Rule Conditions** column.

**Notes:**

- The **Rule Condition** field enables you to use intellisense to display a list of possible entries for the field. Press **[Ctrl]+[Spacebar]** in the field to display the list of entries.
- If the Rule Condition is of type *enum*, the **Allowable Values** fields are automatically set with the enum literals. The procedure then ends here.

- Define a range of accepted values for the Rule Condition.
- Right-click on the **Allowable Values** column and select the **Edit Allowable Values** context menu option. The **Edit Allowable Values** dialog displays.



Type each required value or range of values in the **Value** field, and click on the **Save** button to display the value in the **Allowable Values** list box; for example:

age could have the values:

**<18**  
**>18 and <50**  
**>50**

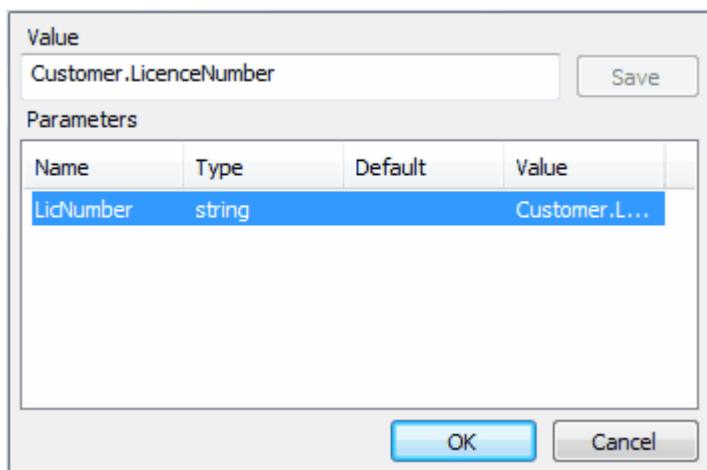
isValidLicense() could return:

**True**  
**False**

- Click on the **OK** button to save the values and close the dialog. A new constraint *AllowableValues* is created for the attribute.

**Notes:**

- You can check this constraint by opening the **Properties** dialog for the attribute and selecting the **Constraints** tab.
  - If the Rule Condition references an enumeration, the enum literals are not editable in the **Edit Allowable Values** dialog.
- If the Rule Condition is an operation, you can pass parameters to it. Right click on the **Allowable Values** field, and select the **Edit Parameters** context menu option. The **Edit Parameters** dialog displays. Select the parameters and type their values into the **Value** text box. Click on the **OK** button to cancel the dialog.

**Note:**

You can add an operation as a Rule Condition more than once, to allow calling the operation with different sets of parameters.

To add another Rule Condition, right-click on the **No** column and select the **Add Row** context menu option. An empty row is added to the table.

To remove a Rule Condition from the table, right-click on the appropriate **No** field and select the **Delete Row** context menu option. This does not affect the original attribute or the new constraint in the model. You can either re-use the attribute with its constraint, or use the attribute **Properties** dialog to remove the constraint.

### Rule Actions Section

In the **Rule Actions** section, when a specific value of a Rule Condition calls an operation (such as *post error*) or decision attribute (such as *Eligible - Yes/No*), you assign the operation or attribute as an action. To model Rule Actions, follow the steps below:

- From a business term Class element in the **Project Browser**, drag and drop the required attribute or operation onto the **Rule Actions** field.

**Note:**

The **Rule Actions** field enables you to use intellisense to display a list of possible entries for the field. Press **[Ctrl]+[Spacebar]** in the field to display the list of entries.

- For an attribute, double-click on the **Allowable Values/Parameters** field. The **Edit Allowable Values** dialog displays; type the range of values in the text box (such as **Yes, No**; or **Accept, Reject**), click on the **Save** button and close the dialog. Select the appropriate response in the **Result** column fields.

**Note:**

If the dropped action variable is of type *enum*, the **Allowable Values/Parameters** fields are automatically set with the enum literals.

- For an operation, a checkbox displays in each of the **Result** column fields. To call the operation, select the checkbox in the appropriate column.

To pass parameters to the operation, double-click on the **Allowable Values/Parameters** field. The **Edit Parameters** dialog displays. Select the parameters and type the values into the **Value** text box. Click on the **Save** button and close the dialog.

**Note:**

You can add an operation as a Rule Action more than once, to allow calling the operation with different sets of parameters.

- Click on the **Save** button in the **Rule Composer** toolbar to save the values.

**Note:**

Alternatively, you can *right-click* on an **Allowable Values/Parameters** field to display a context menu with two options:

- If the Rule Action is an attribute, the **Edit Allowable Values** option is enabled and this displays the [Edit Allowable Values](#) dialog
- If the Rule Action is an operation, the **Edit Parameters** option is enabled and this displays the [Edit Parameters](#) dialog.

To add another Rule Action, right-click on the **No** column and select the **Add Row** context menu option. An empty row is added to the table.

To remove a Rule Action from the table, right-click on the appropriate **No** field and select the **Delete Row** context menu option. This does not affect the original attribute or operation in the model.

### Rule Bindings Section

The **Rule Bindings** section lies on top of the **Rule Conditions** section. It binds the Rule Condition and Rule Action values to the appropriate rule in the **Rule Table**. To bind a rule, follow the steps below.

1. Select the rule number in the **Rule Bindings** field over one of the **Value<n>** or **Result<n>** columns.
2. Ensure that the values set in the **Value<n>** or **Result<n>** field for the Rule Condition or Rule Action, underneath the rule number, all satisfy the rule.
3. Click on the **Save** icon in the **Rule Composer** toolbar.

For example, (referring to the screen diagram at the top of this *Rule Composer* topic) if rule 2 is *Car must not be rented to Customers of age less than 18*:

- Select **2** in the **Rule** field over the **Value1** column
- Select **< 18** against *Customer.age* in the **Value1** column in the Rule Conditions table
- Select **No** against *Customer.Eligible* in the **Result1** column in the Rule Action table
- Select **Reject** against *Application.Status* in the **Result1** column in the Rule Action table.

### Computation Rule Table

The **Computation Rule** table enables you to model rules involving computations.

Computation Rule Table				
No	Computation Rule Actions	Expression	Rule Bindings	Rule Dependency
1	Rent.TotalAmountPayable	Rent.RentPerDay + Rent.PenaltyFee	1	
2				

The table has the following columns:

- **Computation Rule Actions**
- **Expression**
- **Rule Bindings**
- **Rule Dependency**.

To define a computation rule, follow the steps below:

1. From the [Project Browser](#), drag and drop the appropriate attribute from a Class in the *Fact* model into the **Computation Rule Actions** field.

**Note:**

Both the **Computation Rule Actions** field and the **Expression** field enable you to use intellisense to display a list of possible entries for the fields. Press **[Ctrl]+[Spacebar]** in the field to display the list of entries.

2. In the **Expression** field, type the expression to be evaluated.
3. In the **Rule Bindings** field, type the rule number from the **Rule** table of the rule being modeled, to link the table data to the rule.
4. If the rule depends on another rule being satisfied first, type the number of that rule in the **Rule Dependency** field.
5. Click on the **Save** icon in the **Rule Composer** toolbar to save the computation rule.

If the computation rule is also a Rule Conditions rule, add the condition variable in the **Decision** table and bind the appropriate rule in the **Rule Bind** section.

### Export Rules To CSV File

To export the contents of the **Rule Composer** to a CSV file, follow the steps below:

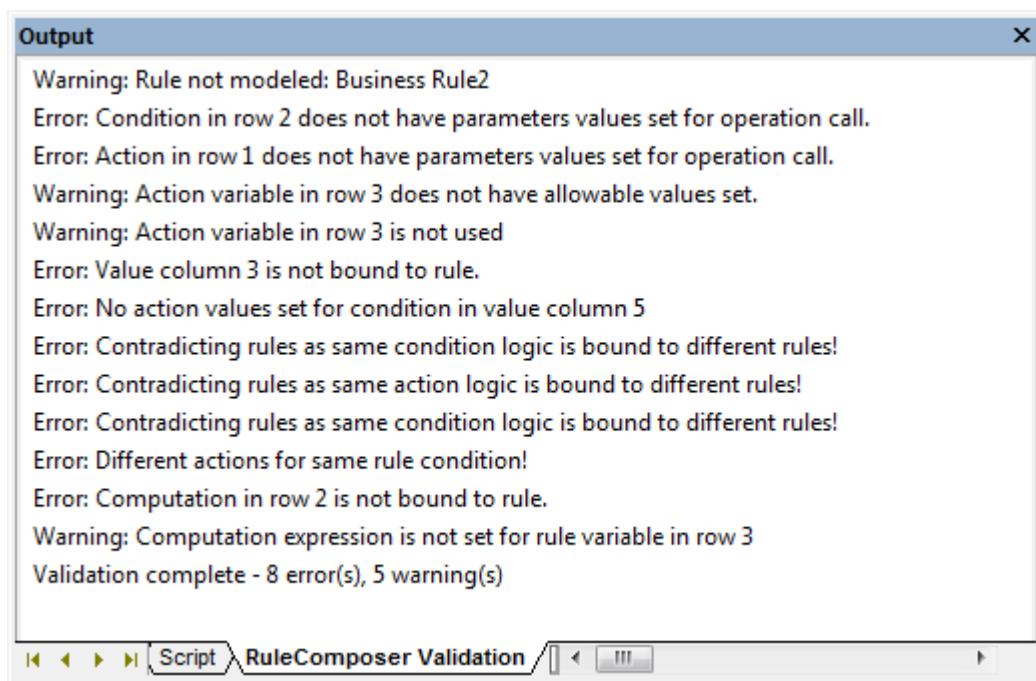
1. Click on the **Export to CSV** icon () in the **Rule Composer** toolbar. The Windows **Browser** dialog displays.
2. Browse to the required file location and type in a .CSV filename to export to.
3. Click on the **Save** button to export the data.

### 7.5 Validate Business Rules

It is recommended practice to validate the business rules in the **Rule Composer** before you generate code for the Rule Task elements. To do this, click on the **Validation** (green tick) icon in the **Rule Composer** toolbar.



The business rules on the **Rule Composer** are parsed and any errors or warnings that might indicate incomplete or unfavorable code generation are displayed on a **Rule Composer Validation** tab on the **Output** screen. For example:



To highlight and investigate the faulty data in the **Rule Composer**, double-click on the appropriate warning or error message.

## 7.6 Code Generation For Business Rules

After you have modeled the business rules for all the Rule Task elements in the Rule Flow diagram, you can generate code from the Rule Flow behavior.

To return a value from the Rule Flow behavior:

1. Double-click on the last Rule Task element before the end node of the Rule Flow diagram. The element's **Properties** dialog displays.
2. Click on the **Effect** tab.
3. In the **Effect** field, type the *return* statement; for example, *return true*.
4. Click on the **Save** button, and on the **OK** button to close the dialog.

Generate code for the Class containing the rule flow behavior (in our initial example, [Rental System](#)<sup>[24]</sup>). The code for business rules logic is generated, with the rule statements expressed in natural language as comments.

The following code snippet was generated from the *Rental System* Class element in our example:

```
///////////
// RentalSystem.cs
// Implementation of the Class RentalSystem
// Generated by Enterprise Architect
// Created on: 08-May-2009 2:39:23 PM
///////////

public class RentalSystem {

    public Customer m_Customer;
    public Car m_Car;
    public Rent m_Rent;

    public RentalSystem(){}
    }

    ~RentalSystem(){}
    }

    public virtual void Dispose(){}
    }

    /* Begin - EA generated code for Activities and Interactions */

    public bool ProcessApplication(Rent m_rent, Application m_application)
    {
        // behavior is an Activity

        /*CAR MUST NOT BE RENTED TO CUSTOMERS WITHOUT A VALID LICENCE NUMBER*/
        if( m_Customer.ValidLicenceNumber == "FALSE" )
        {
            m_application.Status = "Reject";
            m_Customer.Eligible = false;
        }
        /*CAR MUST NOT BE RENTED TO CUSTOMERS OF AGE LESS THAN 18*/
        if( m_Customer.age < 18 )
        {
            m_application.Status = "Reject";
            m_Customer.Eligible = false;
        }
        /*CAR MUST NOT BE RENTED TO CUSTOMERS WITH BAD HISTORY LEVEL 3*/
        if( m_Customer.BadHistoryLevel == 3 )
        {
            m_application.Status = "Reject";
        }
    }
}
```

```

        m_Customer.Eligible = false;
    }
    if (Customer.Eligible == true)
    {

        /*RENT FOR SMALL CARS IS 80 AUD PER DAY*/
        if( m_Car.type == Small )
        {
            m_rent.RentPerDay = 80;
        }
        /*RENT FOR AWD CARS IS 100 AUD PER DAY*/
        if( m_Car.type == AWD )
        {
            m_rent.RentPerDay = 100;
        }
        /*RENT FOR LUXURY CARS IS 150 AUD PER DAY*/
        if( m_Car.type == Luxury )
        {
            m_rent.RentPerDay = 150;
        }
        /*RENT PAYABLE IS CALCULATED AS THE PRODUCT OF RENTPERDAY AND
RENTALPERIOD IN DAYS*/
        m_rent.RentPayable = m_rent.RentPerDay * m_rent.No_of_rent_days;
        if (CustomerBadHistoryLevel > 0)
        {

            /*PENALTY OF 20 % OF RENT MUST BE APPLIED FOR CUSTOMERS
WITH BAD HISTORY LEVEL 2*/
            if( m_Customer.BadHistoryLevel == 2 )
            {
                m_rent.PenaltyFee = m_rent.RentPayable * 0.2;
            }
            /*PENALTY OF 10 % OF RENT MUST BE APPLIED FOR CUSTOMERS
WITH BAD HISTORY LEVEL 1*/
            if( m_Customer.BadHistoryLevel == 1 )
            {
                m_rent.PenaltyFee = m_rent.RentPayable * 0.1;
            }
            else
            {
            }
        }

        /*TOTAL AMOUNT PAYABLE IS CALCULATED AS THE SUM OF RENT PAYABLE
AND PENALTY IF ANY.*/
        m_rent.TotalAmountPayable = m_rent.RentPerDay + m_rent.PenaltyFee;
    }
    else
    {

    }
    return m_application.Status;
}

/* End - EA generated code for Activities and Interactions */

}//end RentalSystem

```

## 8 Systems Engineering Modeling

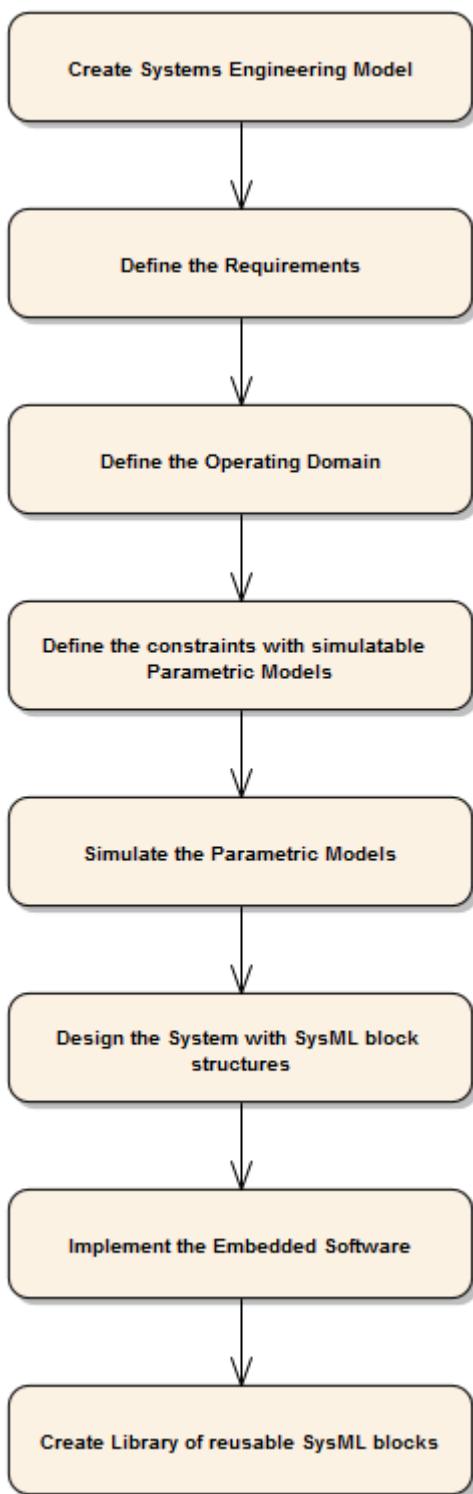
### Note:

Systems Modeling Language (SysML) is available in the Systems Engineering edition and Ultimate edition of Enterprise Architect.

To model Systems using SysML in Enterprise Architect, you work through the following steps:

- [Create a Systems Engineering model](#)<sup>[257]</sup> to develop your system.
- [Create a Requirements model](#)<sup>[258]</sup> to define the systems requirements and expectations.
- [Create an Operational Domain model](#)<sup>[260]</sup>, which describes the environment that the system operates within, and the entities it interacts with.
- [Create Constraint models](#)<sup>[262]</sup> to describe the systems operating characteristics using parametric models.
- [Simulate the parametric models](#)<sup>[263]</sup> to verify their correctness and obtain the desired characteristic.
- [Design the system's composition](#)<sup>[264]</sup> using SysML Blocks and Parts.
- Implement the embedded software using UML Classes and behavioral models.
- [Create a Library of reusable SysML blocks](#)<sup>[265]</sup>, representing subsystems that can be reused on other projects, and other common Type definitions.

These steps are represented graphically in the following flow:



### Create a Systems Engineering Model

You can create a Systems Engineering Model from a template provided with Enterprise Architect. To do this, follow the steps below:

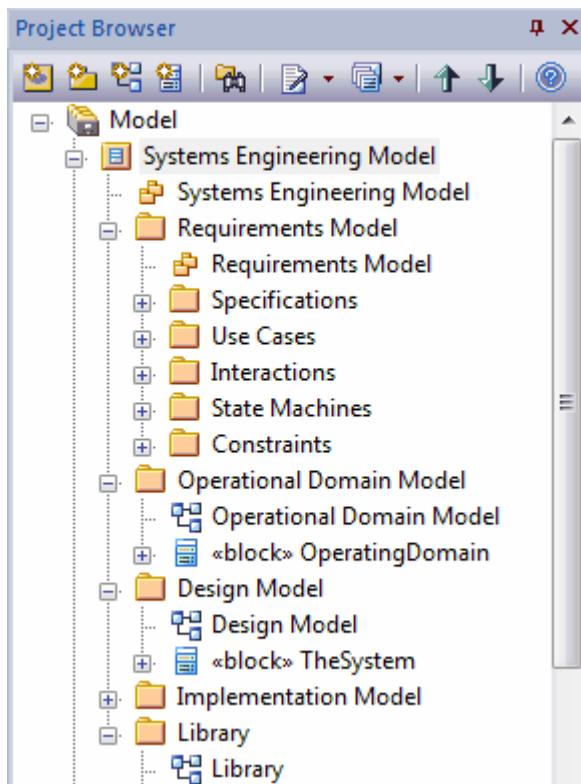
1. In the **Project Browser**, either:
  - Click on the **New Model From Pattern** icon in the toolbar

- Right-click on a model root node and select the **Add a New Model using Wizard** context menu option, or
- Right-click on a package and select the **Add | Add a New Model using Wizard** context menu option.

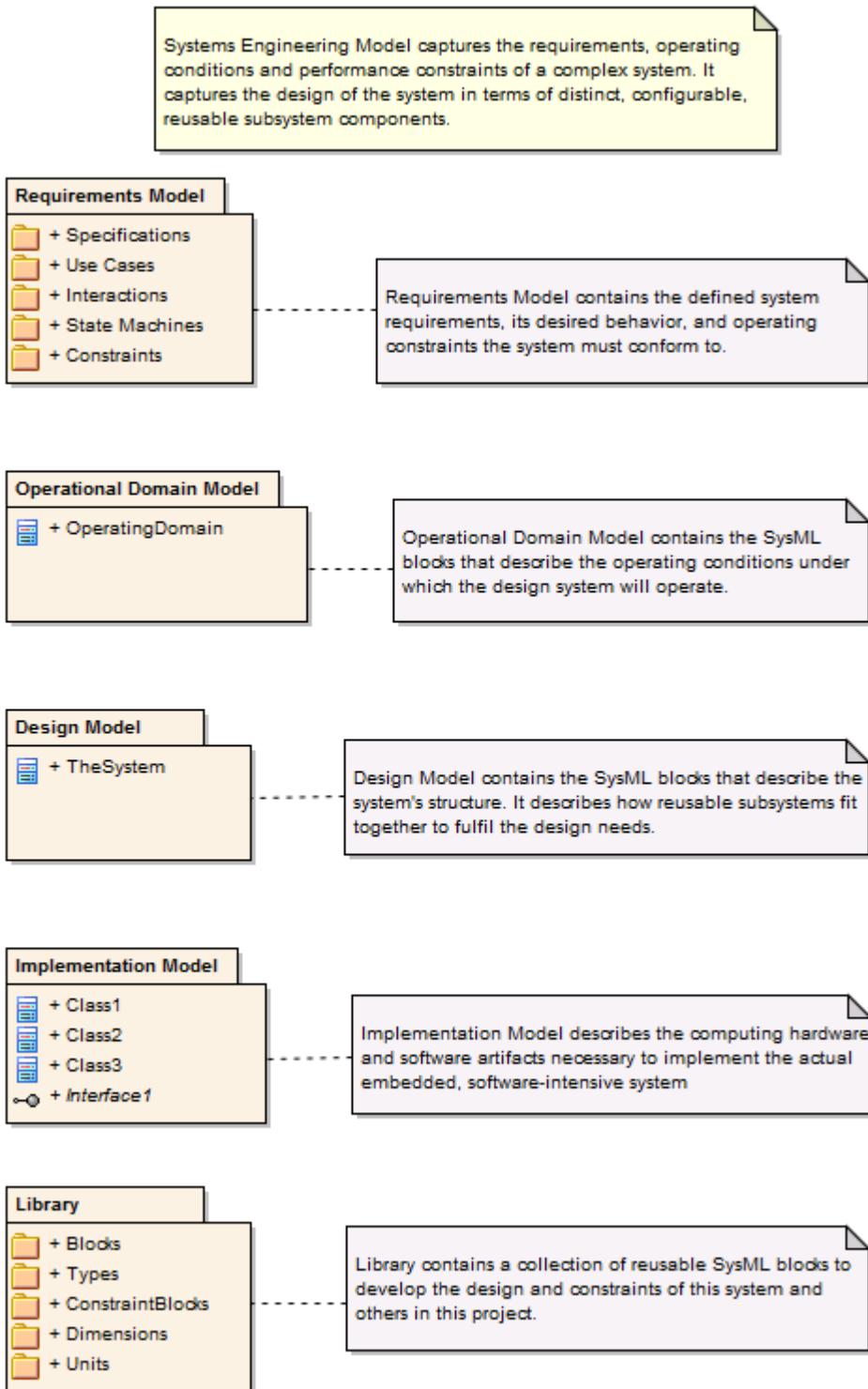
The **Select Model(s)** dialog displays.

2. In the **Select From** field, click on the drop-down arrow and select **Systems Engineering Model**. Alternatively, if it is listed in the **Technology** panel, select the **Systems Engineering Model** item.
3. In the **Name** panel, select the checkbox next to the **Systems Engineering Model** icon.
4. Click on the **OK** button.

The following model structure is created in the **Project Browser**:



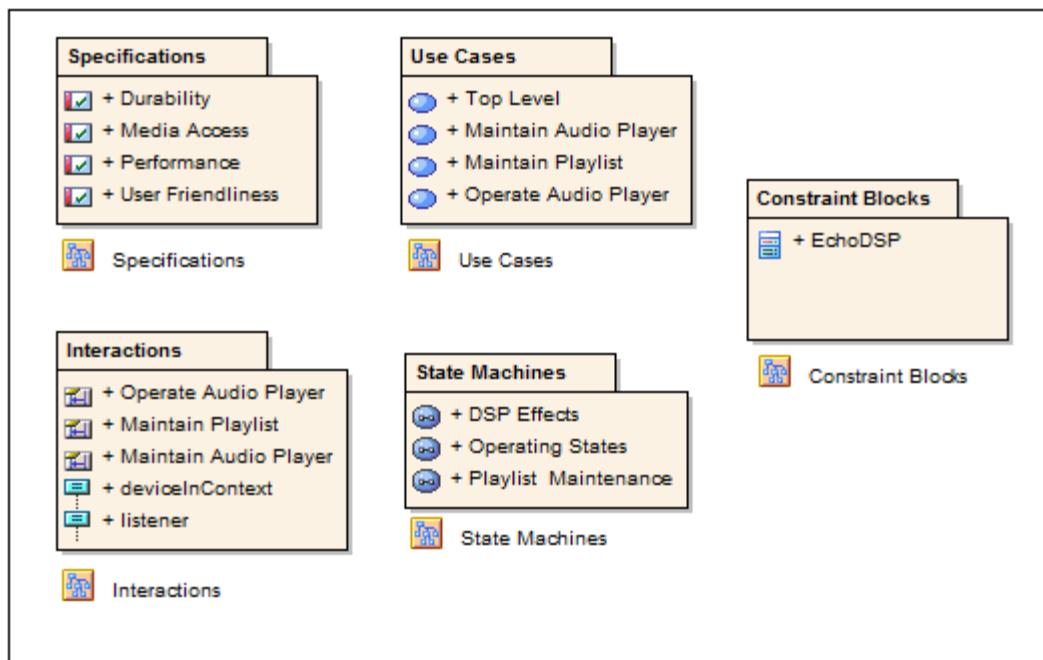
The *Systems Engineering Model* diagram, shown below, encapsulates the key components of the Systems Engineering model.



## 8.1 Create a Requirements Model

The SysML *Requirements Model* provides the system requirements, the expected abstract behavior and the operating constraints that the designed system must conform to.

The following diagram shows an example requirements model for a *Portable Audio Player*.



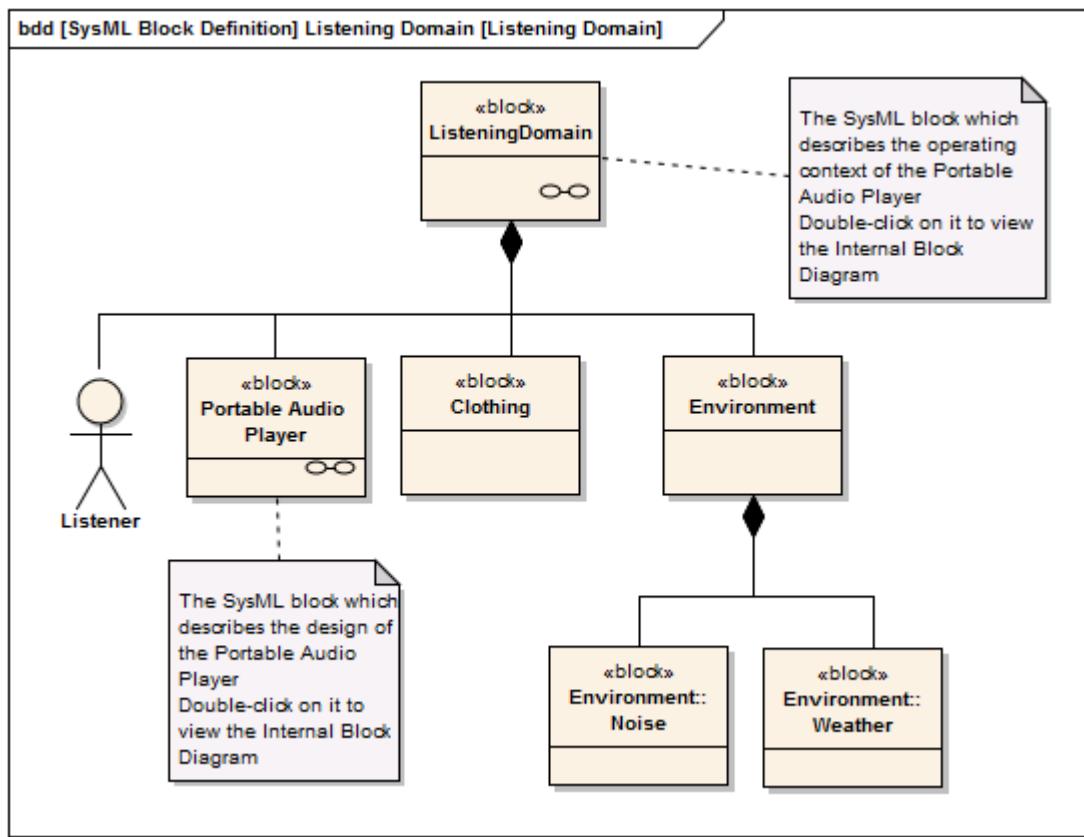
In the example *Requirements Model*, each of the child packages contains child models that capture the following aspects of the system's requirements:

- The *Specifications* package contains SysML Requirements describing the overall expectations of the designed system.
- The *Use Cases* package contains SysML Use Cases that describe the general interaction between the system and its users.
- The *Interactions* package contains SysML Interactions that describe a detailed sequence of interactions between the system and its users.
- The *State Machines* package contains SysML State Machines that describe each of the operational states the designed system has.
- The *Constraint Blocks* package contains SysML ConstraintBlocks that describe the expected performance and operating boundaries of the system.

## 8.2 Create an Operational Domain Model

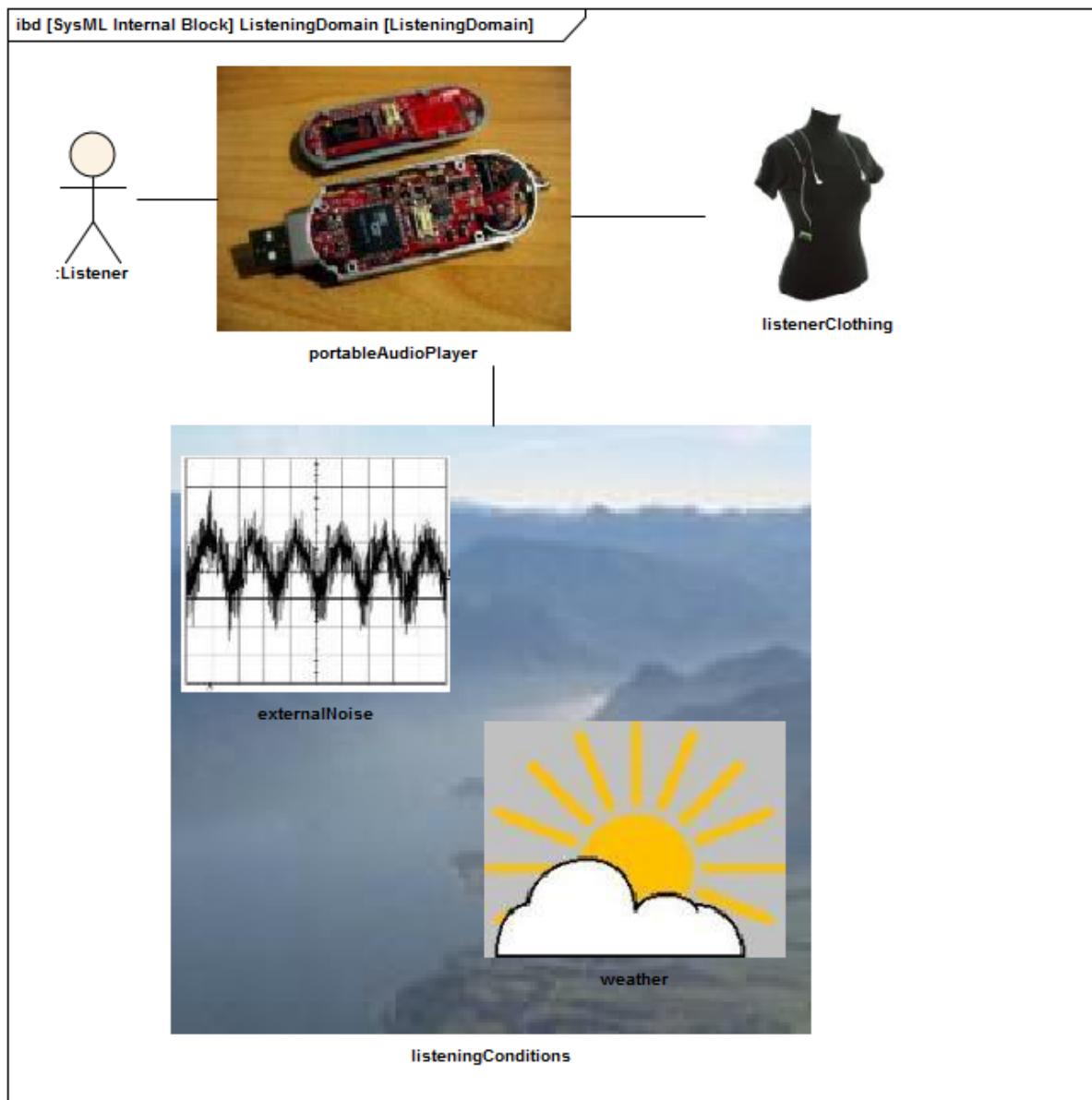
The SysML *Operational Domain Model* defines the system's operating environment, which describes the operating conditions that the system is intended to operate within.

The following diagram shows an example Operational Domain model for a *Portable Audio Player*. The SysML Block Definition Diagram describes the Operational Domain (in this example - the *ListeningDomain*) as a system composition.



In this example, the *ListeningDomain* is defined as a system containing other subsystems within it. The domain contains subsystems that define the *Listener* (i.e. User), the *Portable Audio Player*, *Clothing* (which the user wears), and the External *Environment*.

Details of the *ListeningDomain* system are further detailed in the *ListeningDomain's Internal Block Diagram*.



In this example, the *ListeningDomain*'s system's detailed composition shows how the Portable Audio Player and other sub-systems fit together to form the Listening Domain. It also describes the binding relationships between the parts, which describe how they are functionally bound to one another.

### 8.3 SysML Parametric Models

#### Note:

Systems Modeling Language (SysML) is supported in the Systems Engineering and Ultimate editions of Enterprise Architect.

SysML Parametric models support the engineering analysis of critical system parameters, including the evaluation of key metrics such as performance, reliability and other physical characteristics. They unite requirements models with system design models by capturing executable constraints based on complex mathematical relationships.

The following text is derived from the [SysML](#) entry in the online Wikipedia.

*The advantages of SysML over UML for systems engineering become obvious if you consider a*

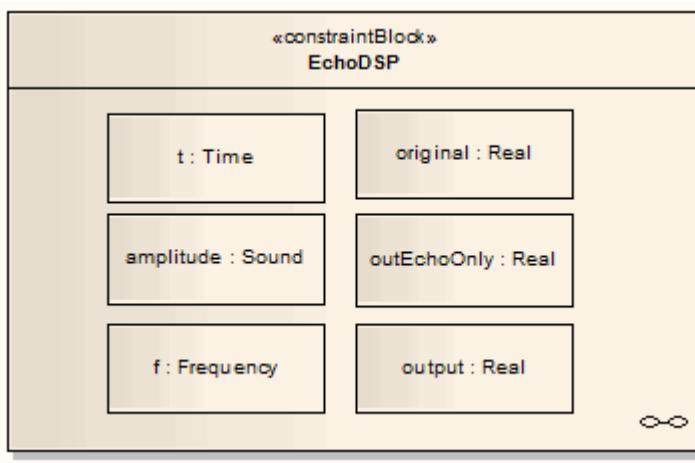
concrete example, such as modeling an automotive system. With SysML you can use Parametric diagrams to precisely define performance and mechanical constraints such as maximum acceleration, curb weight, air conditioning capacity, and interior cabin noise management.

For further information on the concepts of SysML Parametric models, refer to the official [OMG SysML](#) website and its linked sources.

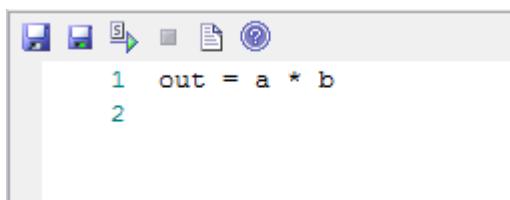
## Create a Parametric Model

Enterprise Architect enables you to develop SysML Parametric models quickly and simply; these models can also be [simulated](#)<sup>[265]</sup>. To create a Parametric model, follow the steps below:

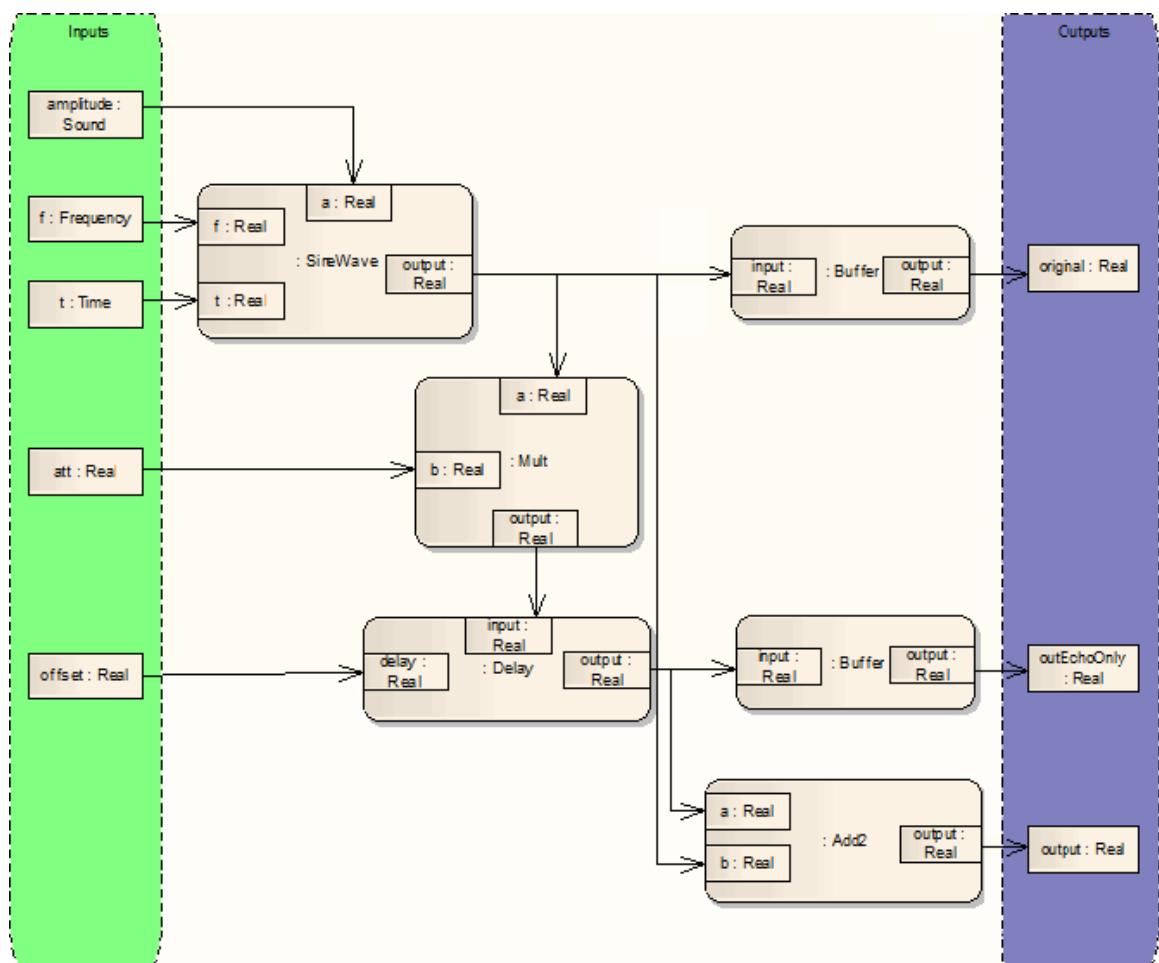
1. Create a collection of SysML *Constraint Blocks* that formally describe the function of a constraint in a simulation model. Each Constraint Block contains properties that describe its input and output parameters, as well as *Element Script* that describes the constraint's executable component.



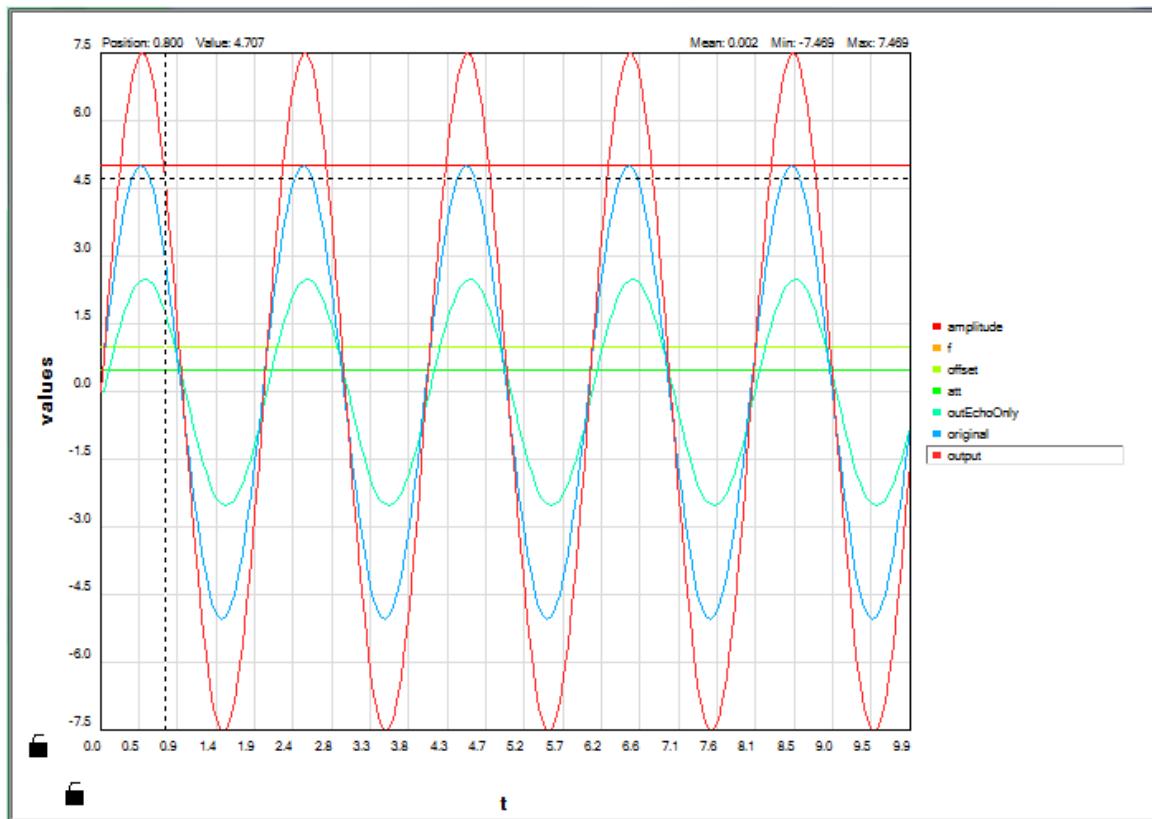
2. Right-click on each of the *constraintBlocks* and select the **SysML | Add Element Script** context menu option to add script to the constraint block. This is where you express the relationship / behavior of the constraint block as an executable script.



3. Create a SysML Constraint Block to contain the Parametric model to simulate. The Parametric model contains properties and occurrences of constraint blocks as *Constraint Property* elements, connected in a Parametric Diagram.



4. Right-click within a Parametric Diagram and select the **SysML | Simulate Diagram...** context menu option.
5. Depending on your [configuration selections](#), the simulation's results are either written to a comma-separated CSV file or graphed in a 2-dimensional plot.



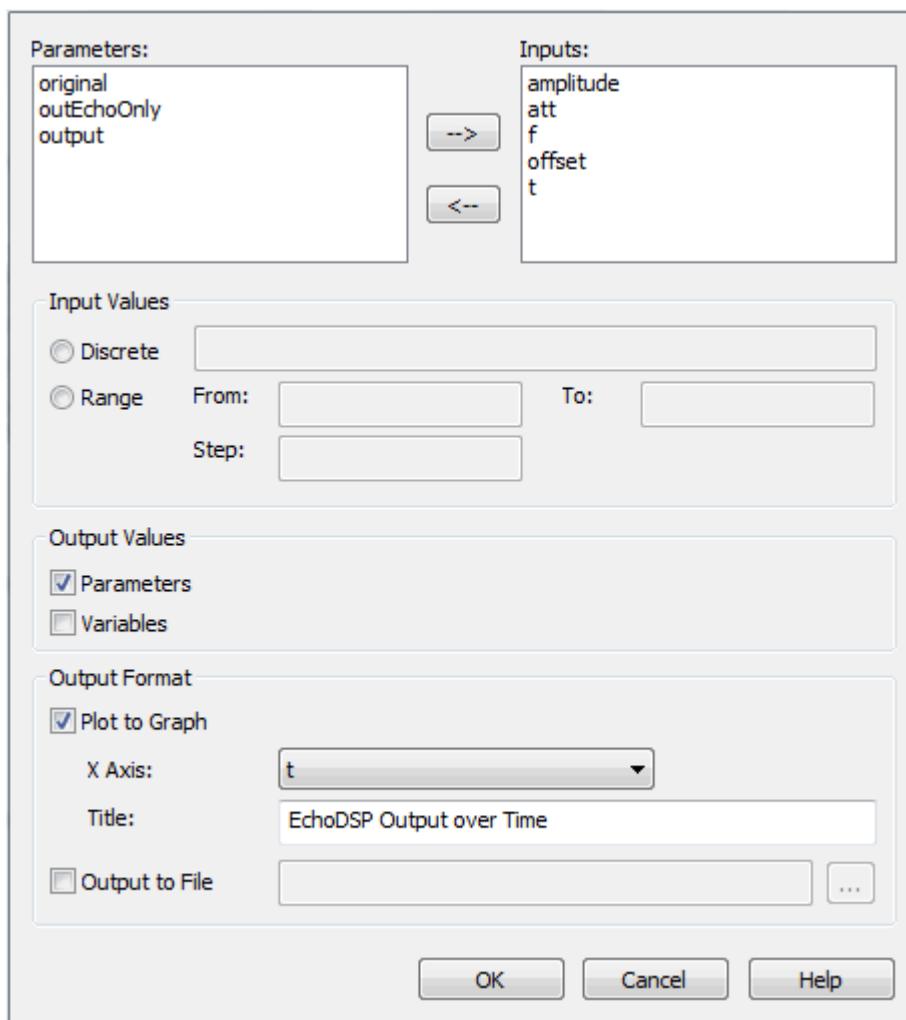
### 8.3.1 Simulate a SysML Model

**Note:**

Systems Modeling Language (SysML) is supported in the Systems Engineering and Ultimate editions of Enterprise Architect.

To simulate a SysML model, follow the steps below:

1. Right-click within a Parametric Diagram and select the **SysML | Simulate Diagram...** context menu option. The **Simulation Configuration** dialog displays.



2. The **Parameters** panel lists all of the parameters that can be assigned input. Select each of the required parameters and click on the right **Arrow** button to assign them as input. Parameters designated as input parameters are listed in the **Inputs** panel on the right.

**Note:**

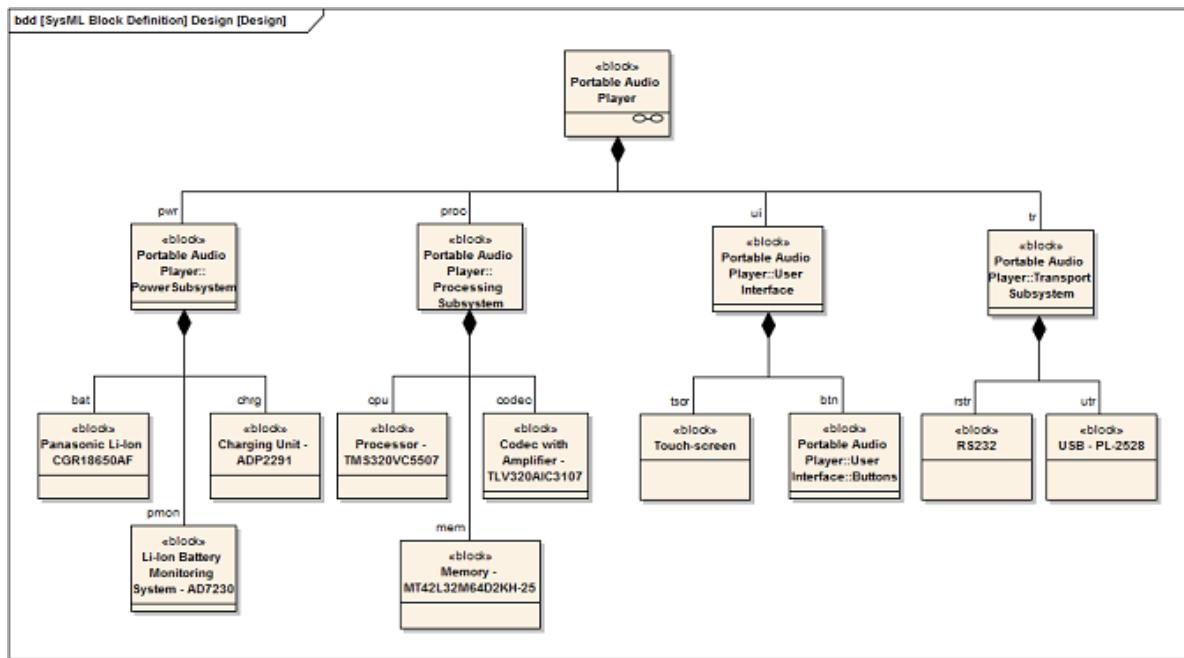
There must be at least one input parameter assigned for the simulation to execute.

3. Assign a set of values for each of the designated input parameters. For each input parameter, in the **Input Values** panel select one of the two possible value kinds:
  - **Discrete** - To enter a constant or a comma-separated range of discrete values
  - **Range** - To enter a range of values beginning at the **From** value and ending at the **To** value. The input values are incremented by the **Step** value.
4. Specify the classes of output value:
  - **Parameters** - To output the parameters' data, select the checkbox
  - **Variables** - To output the data generated within each internal variable, select the checkbox. Internal variables are automatically generated by the simulator
5. Specify how the simulation results are to be reported. The **Output Format** panel enables you to choose how the simulation outputs the simulation data.
  - **Plot To Graph**: To plot the results on a 2-dimensional graph, select the checkbox; if you select this option, you must specify an input parameter for the plot's **X Axis**
  - **Title** - To enter a title for the graph, type in the title text
  - **Output to File** - To output the results to a CSV text file, select the checkbox and type or browse ([...]) for the file name.
6. Click on the **OK** button to execute the simulation.

## 8.4 Compose System Design

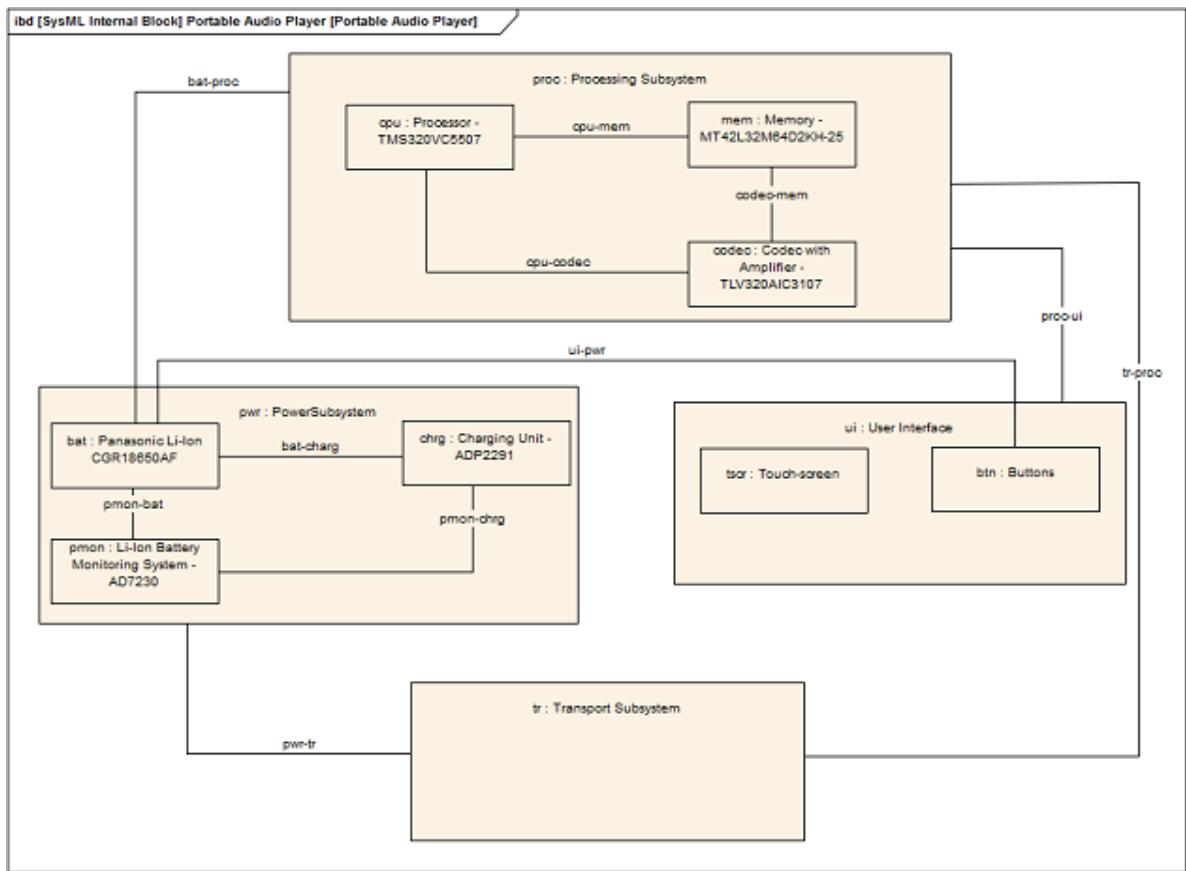
The SysML *Design Model* contains the blocks that define the system's composition. It describes the manner in which reusable subsystems fit together to fulfill the design requirements.

The following diagram shows an example Design Model for a *Portable Audio Player*. The SysML *Block Definition Diagram* describes the *Portable Audio Player* as a composition of various reusable off-the-shelf subsystems in-house designed ones.



In the example above, the *Portable Audio Player* is defined as a SysML system containing subsystems that perform specific tasks. The design contains subsystems for supplying power, performing playback and audio processing, interfacing with other devices, and the user interface.

Details of the Portable Audio Player's composition are further described in detail within the Portable Audio Player's *Internal Block Diagram*.

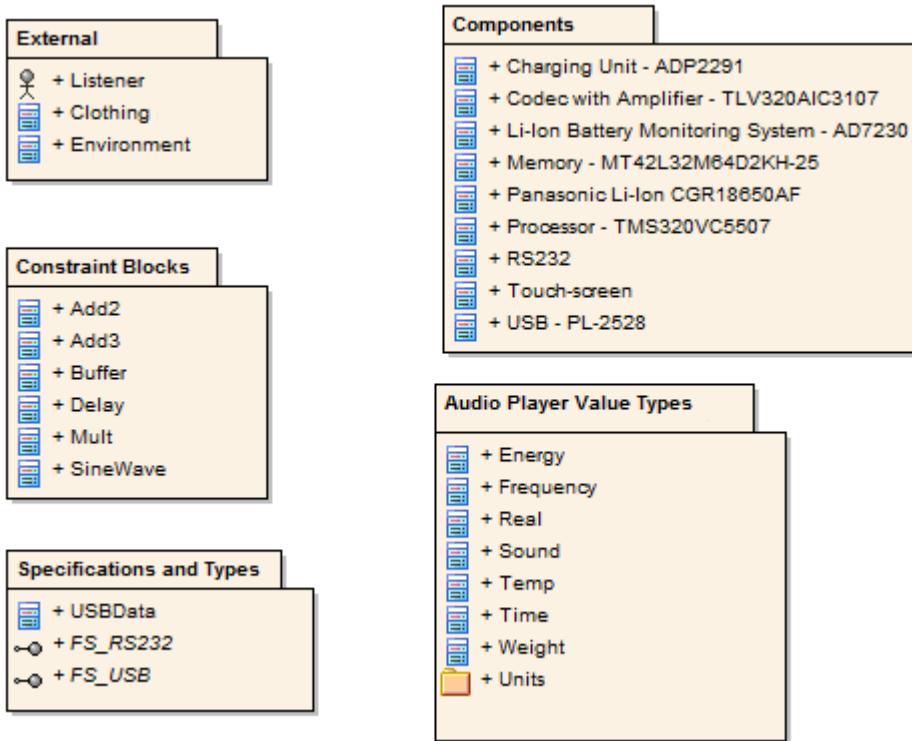


In this example, the Portable Audio Player's composition is described, detailing how each of the sub-systems is structured. It also describes the binding relationships between the parts, which describe how they are functionally bound to one another - for example, the *CPU*, *Memory* and *Codec* are interfaced together in the *Processing Subsystem*.

## 8.5 Create Reusable Subsystems

Model Based Systems Engineering provides the flexibility and expressiveness to define complex systems quickly effectively by reusing common entities across design projects. A *Library* is a package containing many reusable subsystems, parametric constraints, common data types and common value types, dimensions and units.

The following diagram shows an example library model.



In the example Library, each of the child packages contains child models that capture the following reusable entities:

- *Blocks* defining systems such as those listed in the *Components* package, or those defined in the *External* package.
- *ConstraintBlocks* defining parametric constraints for use in parametric models.
- *Value Types* describing quantities, expressed as measurable dimensions in specific units.
- *Data Types* and *Flow Specifications* describing data structures and *Flows*.

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