



Baseline UML Models

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

This booklet explains the Baseline and Differencing facilities of Enterprise Architect.



Enterprise Architect - Baseline UML Models

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Managing Editor

Geoffrey Sparks

Technical Editors

Geoffrey Sparks

Bill Mioch

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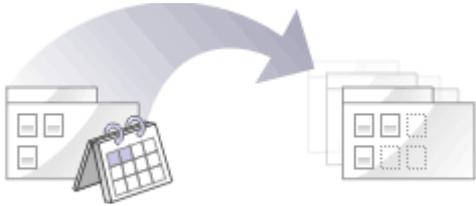
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Foreword

This user guide provides an introduction to the
Baselines and Differencing facilities of
Enterprise Architect.

Baselines, Differencing and Merges



Enterprise Architect (Corporate, Business and Software Engineering, System Engineering and Ultimate editions) includes tools to help you manage and review changes to your models over time. These tools apply the concepts of *Baselines*, *Differencing* and *Merges*.

You can also obtain a snapshot of selected items in the model, using the Model View facility (see the *View Options* section of *Using Enterprise Architect - UML Modeling Tool*). In the Corporate, Business and Software Engineering, Systems Engineering or Ultimate editions of Enterprise Architect, this facility enables you to automatically generate this snapshot at intervals and, if there are changes in the items collected by the defined search, to trigger a notification to you of such changes. This enables you to monitor work flow and other events of concern to you (see *UML Model Management*).

Baselines

Enterprise Architect (Corporate, Business and Software Engineering, System Engineering and Ultimate editions) provides a facility to create a [Baseline](#)^[3] or snapshot of the contents of a selected package and its child packages at a particular point in time, enabling you to later compare that branch of the model at that time with the current state of the branch. Baselines are stored in the same XML format as is used for version control, but are stored *within* the project in compressed format. You can also have parallel copies of parts of your model for team development, and create Baselines within each copy to merge changes into the project master.

Differencing

Differencing (*Diff*, or [Compare](#)^[6]) enables you to explore the differences between the current state of a specific part of your project, and previous or parallel versions captured in a Baseline or an XMI 1.1 file on disk.

Merges

Once Differencing is complete, you can merge information from the Baseline into the current project; it is not possible to go the other way. You can merge information manually, change by change, or automatically by electing to merge in all changes in one batch procedure. You can also revert completely to the original Baseline by importing the stored XMI directly, and merge in information and elements from a Baseline in a different project, making it possible to keep multiple versions of a single model in synch.

The [merge options](#)^[9] are available on the **Compare Utility** tab, which shows the results of a comparison. The options are available through the toolbar, context menus and the keyboard.

Notes:

- You use Baselines, Differencing and Merges essentially to compare two snapshots of a specific part of your project, to capture the differences between them and either roll back or incorporate selected changes or all changes. Enterprise Architect Corporate, Business and Software Engineering, System Engineering and Ultimate editions have another facility, Auditing, which you can switch on to perform continuous monitoring of changes across the project. (See *Auditing UML Models*.) You can dovetail your use of each facility to meet the range of your change management requirements.
- If a package under version control forms part of a Baseline, and that package is checked in to the model, you cannot merge the original data from the Baseline into that package.
- If security is enabled you must have **Manage Baselines** permission to create, import and delete Baselines, and **Restore From Baseline** permission to merge data from a Baseline. Security permissions are not required to select an existing Baseline and perform a comparison with the model. See *User Security in UML Models*.

1 Baselines

Enterprise Architect (Corporate, Business and Software Engineering, System Engineering and Ultimate editions) provides a facility to 'Baseline' (snapshot) a model branch at a particular point in time for later comparison with the current package state. This is most useful for determining changes made to the model during development compared to some Baseline saved at a crucial point - for example the completion of a phase or version iteration. Baselines are stored within the model in compressed XML format. More than one Baseline can be stored against a single Enterprise Architect package.

You can also save a Baseline to an XML file for storage or archive, or for distributing to other users working on models derived from a master project.

Baselines are particularly useful during requirements management to check for changes, additions and deletions that have occurred since the start of the current work phase. Knowing how a model has changed is an important part of managing change and the overall development process.

Baselines are generally used in conjunction with the [Compare utility \(diff\)](#), which is built into the Professional, Corporate, Business and Software Engineering, System Engineering and Ultimate editions of Enterprise Architect.

A typical scenario for [using Baselines](#) would be to:

1. [Create](#) the base model branch to a sufficient point to create a Baseline (checkpoint). Create and store the Baseline as Version 0.1a.
2. As work continues on development, managers and developers can check the current model branch against the Baseline for important modifications, additions and deletions. The Compare (diff) tool can be invoked from the **Baseline** dialog to check the current model branch against the stored version.
3. As required, minor Baselines can be created to check recent progress. These 'temporary Baselines' are useful for managing change when a lot of work is being done and it is important to only see what has changed in, for example, the last 24 hours.
4. At sign-off or the move to a new version/phase, a major Baseline can be created to capture the new state of the model. Minor Baselines created earlier can be deleted if required to save space.

Important Considerations

- Baselines are based on the GUID or unique ID of a particular package. Enterprise Architect checks for that ID as the root element within the XML document being used as a Baseline. When you export a package to XML, the package you export is the root element. Likewise when you create a Baseline, the current package is the root package of the XML Baseline. When you save information in a version control system, the current version controlled package is again the root package of the document.
- It is not useful to create a Baseline by importing an XMI package file created by version controlling a package that itself contains version-controlled child packages. That type of XMI package file contains stubs for the child packages, not full information on the child packages and elements.
- XML files must be in the same format used by the Baseline engine - currently the **UML 1.3 XMI 1.1 format** (plus Enterprise Architect extensions), which contains all the information necessary to reconstruct a UML model, even a UML 2.x model.

1.1 Manage Baselines

Enterprise Architect provides a range of facilities for working with and managing Baselines, through the **Manage Baselines** dialog.

To open this dialog, right-click on the package at the head of the appropriate model branch and select the **Package Control | Manage Baselines** context menu option.

Current Baselines For Package: Class Model

Name	Versi...	Notes
Class Model	0.3	Baseline time: 29/01/2008 3:10:43 PM
Class Model	0.2	Baseline time: 7/11/2007 2:32:59 PM
Class Model	0.1	Baseline time: 7/11/2007 2:26:28 PM

Buttons: Show Differences, Restore to Baseline, New Baseline, Delete Selected, Load Other Baselines (dropdown), Import File, Export File, Compare Model to File, Options, Close, Help

Connected To: Project.eap

Option	Use to
Current Baselines For Package: <Name>	Review the baselines for the current model branch, listed by version reference ⁵ with the highest alphabetical/numerical value at the top. If an entry is longer than the display area, a horizontal scroll bar displays at the bottom of the panel. Use this to scroll to the text that is not shown.
Show Differences	Run the Compare ⁶ utility on the selected Baseline and the current model branch, and to display the differences ⁸ between the two.
Restore to Baseline	Completely restore the model branch from the selected Baseline.
New Baseline	Create a new Baseline ⁵ .
Delete Selected	Delete the selected Baseline.
Load Other Baselines	Display a drop-down menu that enables you to load Baselines from another model, in either an .EAP file or a DBMS file. <ul style="list-style-type: none"> For .EAP files, a browser displays; locate the required project file For DBMS files, the Windows Data Link Properties dialog displays; select the data provider and click on the OK button to display the Select Data Source dialog, from which you select the required project. In either case, the <i>Connected To:</i> message at the bottom of the Manage Baselines dialog changes to the name of the alternative model. To return the dialog to the original project, select the third option on the drop down list: Load From Selected Package .
Import File	Import an XML 1.1 file from the file system as a new Baseline for this current model branch.

Option	Use to
Export File	Export the selected Baseline to an XML file on disk.
Compare Model to File	Compare the selected model branch with an XML 1.1 file on disk. A browser displays, which you use to locate the file.
Options	Set filters ⁷ to make the comparison more specific.

1.2 Create Baselines

Open the **New Baseline** dialog by clicking on the **New Baseline** button on the [Manage Baselines](#) ³ dialog.

The screenshot shows a dialog box with the following fields and controls:

- Name:** Resources
- Version:** 1.2.1
- Include sub-packages:**
- Note:** Baseline time: 30/11/2009 9:30:26 AM
- Buttons:** OK, Cancel

Option	Use to
Name	Display the package name of the currently selected model branch.
Version	Type a unique version reference for this Baseline. This can consist of any alphanumeric characters. The Manage Baselines dialog sorts the Baselines according to the value of this field.
Include sub-packages	Include the entire sub-package hierarchy of this branch in the Baseline. Defaults to selected. If you deselect the checkbox, only the immediate contents (XMI stubs) of the package are included in the Baseline.
Note	Edit the default current time and date to any other value. The field is a single-line entry, for display on the Manage Baselines dialog (a one-line-per-entry list).

Click on the **OK** button to create a new Baseline and return to the **Manage Baselines** dialog.

2 The Compare Utility (Diff)

Notes:

- This utility is available in the Professional, Corporate, Business and Software Engineering, System Engineering and Ultimate editions of Enterprise Architect.
- You cannot compare the current model with an XMI 2.1 file; the utility can only compare with an XMI 1.1 file.

Enterprise Architect has a comprehensive and powerful differencing utility built in. This utility enables you to compare a model branch in Enterprise Architect with:

- A Baseline created using the Baseline functionality (Corporate, Business and Software Engineering, System Engineering and Ultimate editions)
- A Baseline stored in a *different* model
- An XML 1.1 file on disk created previously using the Enterprise Architect XML export facility (user selects file), or
- The current version-controlled XMI 1.1 file on disk as created when using Version Control in Enterprise Architect (file automatically selected).

Compare (diff) lets you explore what has changed within a model over time and how previous versions of a model branch differ from what is currently in the model. It is even possible to do a full model comparison by exporting all of Model A to XMI, then using **Compare Model to File** from within the current model (Model B).

Comparing and checking model development at various points in the process is an important aspect of managing change and development, keeping track of what is being modified and ensuring the development and design process is on track.

Access to the *Compare* utility is available from:

1. The [Baseline](#) ^[3] [dialog](#) ^[3]; from the **Project Browser** context menu, select the **Package Control | Manage Baselines** option.
2. The **Project Browser** context menu; select **Package Control | Compare with XMI File** (for a package not under version control).
3. The **Project Browser** context menu; select **Package Control | Compare with Controlled Version** (for a package under version control).

Differencing With Baselines

As a Baseline is stored within a model and contains all the information, elements and connections for a package at a point in time, it can be used within Enterprise Architect to track changes to model elements over time. The Differencing engine first builds a representation of the current package in memory, based on what is currently in the model. It then compares this with the stored Baseline, highlighting changes, new elements, missing elements and elements that have been moved to other packages. It is possible to [filter the resultant output](#) ^[7] to display only one particular kind of change: for example, additions to the model.

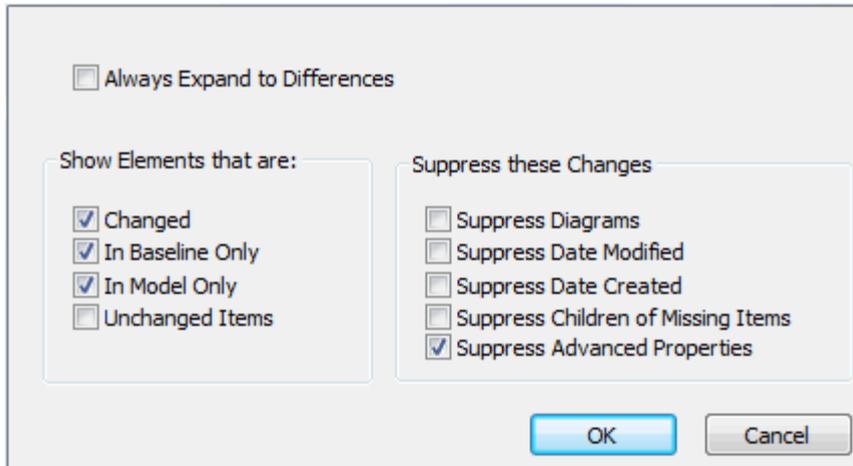
If a Baseline has been created to [ignore child package content](#) ^[5], a comparison between that Baseline and the model does not include any child package content in the model.

See [Example Comparison](#) ^[8] for an example of a model comparison.

3 Compare Options

The **Compare Options** dialog enables you to refine the output of the Compare utility when it compares the current model with a Baseline. To display the dialog, either:

- Click on the **Options** button on the **Manage Baselines** dialog, or
- Click on the **Compare Options icon**  on the **Compare Utility** tab toolbar.



Option	Use to
Always Expand to Differences	<p>Always display the list of elements fully expanded to show changes.</p> <p>If you deselect the checkbox, when the Compare Utility tab is first opened it lists the package contents to element level, and you expand each element as required to show the changed items.</p> <p>For large branches of the model, it is better to leave the checkbox unselected.</p>
Show Elements that are	<p>List elements that:</p> <ul style="list-style-type: none"> • Have been changed since the Baseline was created • Are in the Baseline only (that is, have been deleted from the model since the Baseline was created) • Are in the model only (that is, have been created since the Baseline was created) • Have not changed since the Baseline was created (you might generally leave this checkbox unselected).
Suppress these Changes	<p>Exclude:</p> <ul style="list-style-type: none"> • Changes to diagrams • Changes to the Date Modified field for an item • Changes to the Date Created field for an item • Child items of a deleted item • Changes to advanced properties (defaults to selected).

If the **Compare Utility** tab shows the results of a Baseline comparison, when you click on the **OK** button the display refreshes to refine the information according to the options you have selected.

4 Example Comparison

The diagram below shows the result of a comparison between a package (*Business Process Model*) in the current project and that package in a Baseline (*version 0.1*) captured at an earlier date. Notice that:

- The results are displayed on the **Compare Utility** tab.
- A hierarchy of model elements is displayed in the left-hand pane. It is clearly visible, from the **Status** column and from the triangular icons, which items in the hierarchy have been changed (*Status Changed*), deleted from the model (*Baseline only*), added to the model (*Model only*) and switched to different packages (*Moved*) since the Baseline was captured.
- If you click on an item with a **Status** entry in the left hand pane, the right-hand pane displays a table of properties showing the values of those properties in the current model and in the Baseline. For each property where there is a difference between the model and the Baseline, the row is highlighted. This example shows that the Class element named *Application* was moved from the *Business Process Model* package (as shown in the Baseline) to the *Business Rules Model* package on 5 June 2009 (as shown in the Model).

Model Elements	Status	Property	Model	Baseline
Business Process Model		Abstract	false	false
Rules		Alias		
People must wear safety belts in all se...	Changed	Author	Suzanne Pearson	Suzanne Pearson
No more than 5 persons in a vehicle	Changed	Date Created	16/01/2009 12:07:15 PM	16/01/2009 12:07:15 PM
Passengers under 8 years old must b...	Model only	Date Modified	5/06/2009 10:15:00 AM	16/01/2009 12:07:30 PM
Customer		Complexity	1	1
RuleFlow		Filename	C:\Documents and Settings\...	C:\Documents and Settings\...
Eligibility		Language	C#	C#
address	Changed	IsLeaf	false	false
Application	Moved	IsSpec	false	false
Status	Baseline only	IsRoot	false	false
Constraints		Keywords		
AllowableValues{Accept, Reje...	Baseline only	Multiplicity		
		Name	Application	Application
		Notes		
		Parent Package	Business Rules Model	Business Process Model
		Persistence		
		Phase	1.0	1.0
		Scope	Public	Public
		Status	Proposed	Proposed
		Stereotype		
		Type	Class	Class
		Version	1.0	1.0
		Classifier		
		Visibility		
		Concurrency		
		Cardinality		
		Style	Locked=false;	Locked=false;
		Advanced		\$XREFPROP=\$XID={475E54...
		Properties		property\$TYP;\$VIS=Public\$V

The **Compare Utility** tab enables you to perform operations (such as merging or rolling back changes) on the reported information, using the [toolbar, context menu and keyboard](#).

Higher Level of Detail

The right panel of the **Compare Utility** tab might, for some fields, display only part of the value (such as **Advanced Properties**, above). It might also not be immediately obvious what a change is. In either case, you can double-click on the property to display full details and to highlight the exact differences. The following example shows the highlighted changes to **Parent Package**.

Model	Baseline
Business Rules Model	Business Process Model

4.1 Compare Utility Tab Options

The **Compare Utility** tab enables you to perform operations on the reported information, using the toolbar, context menu and certain keyboard keys.

Note:

If a package under version control forms part of a Baseline, and that package is checked in to the model, you cannot merge the original data from the Baseline into that package.

Toolbar

The toolbar is at the top of the left-hand panel. The icons operate either on the comparison as a whole or on the currently-selected item in the left hand panel.



The toolbar icon names and functions are, from left to right:

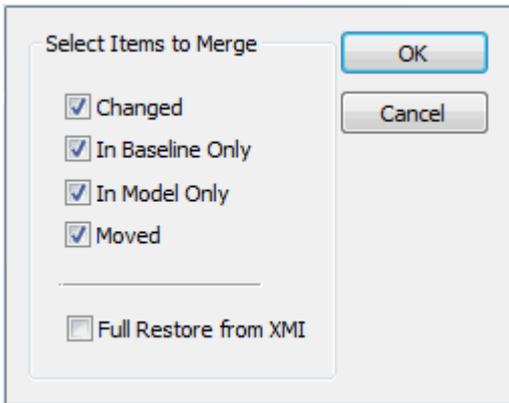
Option	Use to
Refresh	Re-run the comparison to refresh the current display.
Merge To Model	Merge the values of the currently-selected item in the Baseline back into the model.
Next Change	Highlight the next changed item (skips <i>Moved</i> items).
Previous Change	Highlight the previously-changed item.
Expand All	Fully expand the selected item.
Collapse All	Collapse the changed items in the selected item.
Expand To Changed Items	Expand the selected item to show changed items only (in the event that you have selected to also show ⁷ unchanged items in the comparison).
Find in Project Browser	Highlight the item in the Project Browser .
Log To XML	Log the changes to an XML file. A browser displays, on which you specify the file name and location.
Compare Options	Display the Compare Options ⁷ dialog.
Manage Baselines	Display the Manage Baselines ³ dialog.
Help	Display the Help topic Baselines, Differencing and Merges ² .

Context Menu

Each item in the hierarchy has a context menu, which you display by right-clicking on the item. The options displayed depend on the level of the item in the hierarchy, but include some or all of the following:

Option	Use to
Merge from Baseline Add from Baseline	Restore the item in the model to the Baseline state, or restore a deleted item from the Baseline.
Delete from Model	Remove a recently-created item from the model.
Merge From Baseline	(For the root node of the hierarchy on the Compare Utility tab.)

Option	Use to
(with Options)	Display the Merge dialog (see below) which enables you to specify options for rolling back the whole model branch to the Baseline state.
Refresh	(Object-level items). Re-run the comparison to refresh the current display.
Find in Project Browser	Locate and highlight the item in the Project Browser .
Expand All	Fully expand the selected item.
Expand To Changed Items	Expand the selected item to show changed items only.
Collapse All	Collapse the changed items in the selected item.
Log To XML	Log the changes to an XML file. A browser displays, on which you specify the file name and location.
Compare Options	Display the Compare Options dialog.



Select the appropriate checkbox against each type of difference to roll back in the model from the Baseline.

Option	Use to
Changed	Restore all changed items in the model branch to the Baseline state.
In Baseline Only	Restore all deleted items to the model branch from the Baseline.
In Model Only	Remove all recently-created items from the model branch.
Moved	Restore all moved items to their original locations, as identified in the Baseline.
Full Restore from XMI	Completely restore the model branch to the version held in the Baseline XMI 1.1 file, (using the XMI Import function). (Automatically selects all the other options.)

Keyboard

You can also use the following keyboard keys to move up and down the hierarchy, or to roll back changes:

- **[Ctrl]+[↓]** - expand and highlight the next changed item
- **[Ctrl]+[↑]** - expand and highlight the previous changed item
- **[Ctrl]+[←]** - undo the changes for a selected item (roll back to the Baseline values).

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