



MDG Integration for Visual Studio

Welcome to the MDG Integration for Visual Studio. The MDG Integration for Visual Studio takes the high-level modeling power of Enterprise Architect and the Unified Modeling Language and directly integrates it with Visual Studio 2005 and 2008.



© Copyright 1998-2008 Sparx Systems Pty Ltd

MDG Integration for Visual Studio

Introduction

by Alistair Leslie-Hughes

MDG Integration for Visual Studio takes the high-level modeling power of Enterprise Architect and the Unified Modeling Language, and directly integrates it with Visual Studio 2005 and 2008.

MDG Integration for Visual Studio

© 1998-2008 Sparx Systems Pty Ltd

All rights reserved. No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Printed: April 2008

Publisher

Sparx Systems

Managing Editor

Geoffrey Sparks

Technical Editors

Alistair Leslie-Hughes

Special thanks to:

All the people who have contributed suggestions, examples, bug reports and assistance in the development of Enterprise Architect. The task of developing and maintaining this tool has been greatly enhanced by their contribution.

Table of Contents

Foreword	1
Part I Introduction	3
1 Copyright Notice	3
2 Software Product License Agreement	4
3 Using MDG Integration for Visual Studio	6
Part II Getting Started	8
1 Add an Enterprise Architect Model	8
2 Link to a Model Package	11
3 Multiple Linking	11
4 MDG Integrate Options	12
Part III Start Using UML 2.1	15
1 EA Project Explorer	15
Object Properties	17
2 Add New Elements / Packages	19
3 Model Tab	20
Navigating Hyperlinks	22
View UML diagrams	22
4 Search Tab	25
5 Project Discussion Forum	26
Categories, Topics and Posts	27
Forum Message Dialog	28
6 Edit Diagrams	28
Part IV Import and Synchronize TFS Work Items	31
1 Maintain Work Items	33
2 Manage Mapped Fields	34
Part V Version Control	37
1 Version Control Overview	39
2 Controlled Packages	40
Part VI XML Technologies	42
1 XML Schema (XSD)	42
2 Web Services (WSDL)	43
Part VII Working with Code	45
1 Import Binary	45

2 Import Directory	46
3 Model Driven Transformation	47
Part VIII Import Database Schema from ODBC	51
Part IX Baselines, Differencing and Merges	54
Part X Generate RTF Documentation	56
Part XI Generate HTML Documentation	58
Index	59

Foreword

MDG Integration for Visual Studio takes the high-level modeling power of Enterprise Architect and the Unified Modeling Language, and directly integrates it with Visual Studio 2005 and 2008

Part



1 Introduction



Welcome to the Enterprise Architect MDG Integration for Visual Studio, version 3.5. This set of tools takes the high-level modeling power of Enterprise Architect 7.1 and the Unified Modeling Language 2.1, and directly integrates it with Visual Studio 2005 and 2008.

With MDG Integration you can:

- Provide the UML Analyst, Designer and Architect with the tools to build detailed and precise UML 2.1 models
- Give the Visual Studio developer focused access to UML model content
- Offer the development team strong traceability features, from requirements to model, code, tests and finally to deployed artifacts
- Increase productivity by linking UML models to Domain Specific Language (DSL) tools and artifacts.

Before working with MDG Integration for Visual Studio, please review the following:

- [Copyright Notice](#)^[3]
- [Software Product License Agreement](#)^[4]
- [Using MDG Integration For Visual Studio](#)^[6]

1.1 Copyright Notice

Copyright © 1998-2008 Sparx Systems Pty. Ltd. All rights reserved.

The software contains proprietary information of Sparx Systems Pty Ltd. It is provided under a license agreement containing restrictions on use and disclosure and is also protected by copyright law. Reverse engineering of the software is prohibited. Please read the [license agreement](#)^[4] for full details.

Due to continued product development, this information may change without notice. The information and intellectual property contained herein is confidential between Sparx Systems and the client and remains the exclusive property of Sparx Systems. If you find any problems in the documentation, please report them to us in writing. Sparx Systems does not warrant that this document is error-free. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of Sparx Systems. Licensed users are granted the right to print a single hardcopy of the user manual per licensed copy of the software, but may not sell, distribute or otherwise dispose of the hardcopy without written consent of Sparx Systems.

Sparx Systems Pty. Ltd.

7 Curtis St,
Creswick, Victoria 3363,
AUSTRALIA

Phone: +61 (3) 5345 1140
Fax: +61 (3) 5345 1104

Support Email: support@sparxsystems.com
Sales Email: sales@sparxsystems.com

Website: www.sparxsystems.com

Visual Studio is copyright (C) 2008 Microsoft
website: msdn.microsoft.com/vstudio/

1.2 Software Product License Agreement

MDG Integration Version 3.5 for Visual Studio

Copyright (C) 1998-2008 Sparx Systems Pty Ltd. All Rights Reserved

IMPORTANT-READ CAREFULLY: This End User License Agreement ("EULA") is a legal agreement between YOU as Licensee and SPARX for the SOFTWARE PRODUCT identified above. By installing, copying, or otherwise using the SOFTWARE PRODUCT, YOU agree to be bound by the terms of this EULA. If YOU do not agree to the terms of this EULA, promptly return the unused SOFTWARE PRODUCT to the place of purchase for a full refund.

The copyright in the SOFTWARE PRODUCT and its documentation is owned by Sparx Systems Pty Ltd A.C.N 085 034 546. Subject to the terms of this EULA, YOU are granted a non-exclusive right for the duration of the EULA to use the SOFTWARE PRODUCT. YOU do not acquire ownership of copyright or other intellectual property rights in any part of the SOFTWARE PRODUCT by virtue of this EULA.

Your use of this software indicates your acceptance of this EULA and warranty.

DEFINITIONS

In this End User License Agreement, unless the contrary intention appears,

- "EULA" means this End User License Agreement
- "SPARX" means Sparx Systems Pty Ltd A.C.N 085 034 546
- "Licensee" means YOU, or the organization (if any) on whose behalf YOU are taking the EULA.
- "Registered Edition of MDG Integration for Visual Studio" means the edition of the SOFTWARE PRODUCT which is available for purchase from the web site: (http://www.sparxsystems.com/ea_purchase.htm) following the thirty day free evaluation period.
- "SOFTWARE PRODUCT" or "SOFTWARE" means MDG Integration for Visual Studio, which includes computer software and associated media and printed materials, and may include online or electronic documentation.
- "Support Services" means email based support provided by SPARX, including advice on usage of Enterprise Architect, investigation of bugs, fixes, repairs of models if and when appropriate and general product support.
- "SPARX support engineers" means employees of SPARX who provide on-line support services.
- "Trial edition of MDG Integration for Visual Studio" means the edition of the SOFTWARE PRODUCT which is available free of charge for evaluation purposes for a period of 30 days.

GRANT OF LICENSE

In accordance with the terms of this EULA YOU are granted the following rights:

- a) To install and use one copy of the SOFTWARE PRODUCT, or in its place, any prior version for the same operating system, on a single computer. As the primary user of the computer on which the SOFTWARE PRODUCT is installed, YOU may make a second copy for your exclusive use on either a home or portable computer.
- b) To store or install a copy of the SOFTWARE PRODUCT on a storage device, such as a network server, used only to install or run the SOFTWARE PRODUCT over an internal network. If YOU wish to increase the number of users entitled to concurrently access the SOFTWARE PRODUCT, YOU must notify SPARX and agree to pay an additional fee.
- c) To make copies of the SOFTWARE PRODUCT for backup and archival purposes.

EVALUATION LICENSE

The Trial version of MDG Integration for Visual Studio is not free software. Subject to the terms of this agreement, YOU are hereby licensed to use this software for evaluation purposes without charge for a period of 30 days.

Upon expiration of the 30 days, the Software Product must be removed from the computer. Unregistered use of MDG Integration for Visual Studio after the 30-day evaluation period is in violation of Australian, U.S. and international copyright laws.

SPARX may extend the evaluation period on request and at their discretion.

If YOU choose to use this software after the 30 day evaluation period a license must be purchased (as described at http://www.sparxsystems.com/ea_purchase.htm). Upon payment of the license fee, YOU will be sent details on where to download the registered edition of MDG Integration for Visual Studio and will be provided with a suitable software 'key' by email.

ADDITIONAL RIGHTS AND LIMITATIONS.

YOU hereby undertake not to sell, rent, lease, translate, adapt, vary, modify, decompile, disassemble, reverse engineer, create derivative works of, modify, sub-license, loan or distribute the SOFTWARE PRODUCT other than as expressly authorized by this EULA.

YOU further undertake not to reproduce or distribute license key-codes except under the express and written permission of SPARX.

If the Software Product purchased is an Academic Edition, YOU ACKNOWLEDGE THAT the license is limited to use in an educational context, either for self-education or use in a registered teaching institution. The Academic Edition may not be used to produce commercial software products or be used in a commercial environment, without the express written permission of SPARX.

ASSIGNMENT

YOU may only assign all your rights and obligations under this EULA to another party if YOU supply to the transferee a copy of this EULA and all other documentation including proof of ownership. Your license is then terminated.

TERMINATION

Without prejudice to any other rights, SPARX may terminate this EULA if YOU fail to comply with the terms and conditions. Upon termination YOU or YOUR representative shall destroy all copies of the SOFTWARE PRODUCT and all of its component parts or otherwise return or dispose of such material in the manner directed by SPARX.

WARRANTIES AND LIABILITY

WARRANTIES

SPARX warrants that the SOFTWARE PRODUCT will perform substantially in accordance with the accompanying written materials for a period of ninety (90) days from the date of receipt, and any Support Services provided by SPARX shall be substantially as described in applicable written materials provided to YOU by SPARX, and SPARX support engineers will make commercially reasonable efforts to solve any problems associated with the SOFTWARE PRODUCT.

EXCLUSIONS

To the maximum extent permitted by law, SPARX excludes, for itself and for any supplier of software incorporated in the SOFTWARE PRODUCT, all liability for all claims, expenses, losses, damages and costs made against or incurred or suffered by YOU directly or indirectly (including without limitation lost costs, profits and data) arising out of:

- YOUR use or misuse of the SOFTWARE PRODUCT
- YOUR inability to use or obtain access to the SOFTWARE PRODUCT
- Negligence of SPARX or its employees, contractors or agents, or of any supplier of software incorporated

in the SOFTWARE PRODUCT, in connection with the performance of SPARX'S obligations under this EULA, or

- Termination of this EULA by either party for any reason.

LIMITATION

The SOFTWARE PRODUCT and any documentation are provided "AS IS" and all warranties whether express, implied, statutory or otherwise, relating in any way to the subject matter of this EULA or to this EULA generally, including without limitation, warranties as to: quality, fitness; merchantability; correctness; accuracy; reliability; correspondence with any description or sample, meeting your or any other requirements; uninterrupted use; compliance with any relevant legislation and being error or virus free are excluded. Where any legislation implies in this EULA any term, and that legislation avoids or prohibits provisions in a contract excluding or modifying such a term, such term shall be deemed to be included in this EULA. However, the liability of SPARX for any breach of such term shall if permitted by legislation be limited, at SPARX'S option to any one or more of the following upon return of the SOFTWARE PRODUCT and a copy of the receipt:

- If the breach relates to the SOFTWARE PRODUCT:
 - the replacement of the SOFTWARE PRODUCT or the supply of an equivalent SOFTWARE PRODUCT
 - the repair of such SOFTWARE PRODUCT; or the payment of the cost of replacing the SOFTWARE PRODUCT or of acquiring an equivalent SOFTWARE PRODUCT, or
 - the payment of the cost of having the SOFTWARE PRODUCT repaired.
- If the breach relates to services in relation to the SOFTWARE PRODUCT:
 - the supplying of the services again, or
 - the payment of the cost of having the services supplied again.

TRADEMARKS

All names of products and companies used in this EULA, the SOFTWARE PRODUCT, or the enclosed documentation may be trademarks of their corresponding owners. Their use in this EULA is intended to be in compliance with the respective guidelines and licenses. Windows, Windows NT, Windows ME, Windows XP and Windows 2000 are trademarks of Microsoft.

GOVERNING LAW

This agreement shall be construed in accordance with the laws of the Commonwealth of AUSTRALIA.

1.3 Using MDG Integration for Visual Studio

The MDG Integration for Visual Studio brings together the model-and-design aspects of Enterprise Architect and UML with all the power of Visual Studio.

Architects and Engineers can communicate directly and efficiently within the Visual Studio environment, and Engineers can see exactly which project elements they are working on and how they relate to the rest of a system. Model elements appear in a special Enterprise Architect window within Visual Studio. Navigation from code to model only takes a mouse-click, and does not require leaving the Visual Studio interface.

For example, a workflow might go like this:

- Architect and designers prepare the model. In this case assume that the model resides in a central database.
- Specific coding tasks are assigned to the software engineers. The engineers can view the model from within Visual Studio. Once assigned a task, an engineer can locate all the model elements within their task domain, along with any notes made by the Architect.
- All the team members involved on the project can use the inbuilt Forum function to swap notes and files. Not only does this facilitate communication amongst team members, but helps to keep track of progress and changes to a project.

To begin using the MDG Integration for Visual Studio, see [Getting Started](#) .

Part



2 Getting Started

After installation, you are ready to integrate your Visual Studio project with Sparx Systems' Enterprise Architect.

An Enterprise Architect model (a file with a .eap extension) can be added to a project using standard Visual Studio features. In addition, a wizard is supplied to automate creation and addition in one step. The following subsections describe this process in detail.

- [Add an Enterprise Architect Model](#)^[8]
- [Link to a Model Package](#)^[11]
- [Multiple Linkings](#)^[11]

See Also

- [MDG Integrate Options](#)^[12]

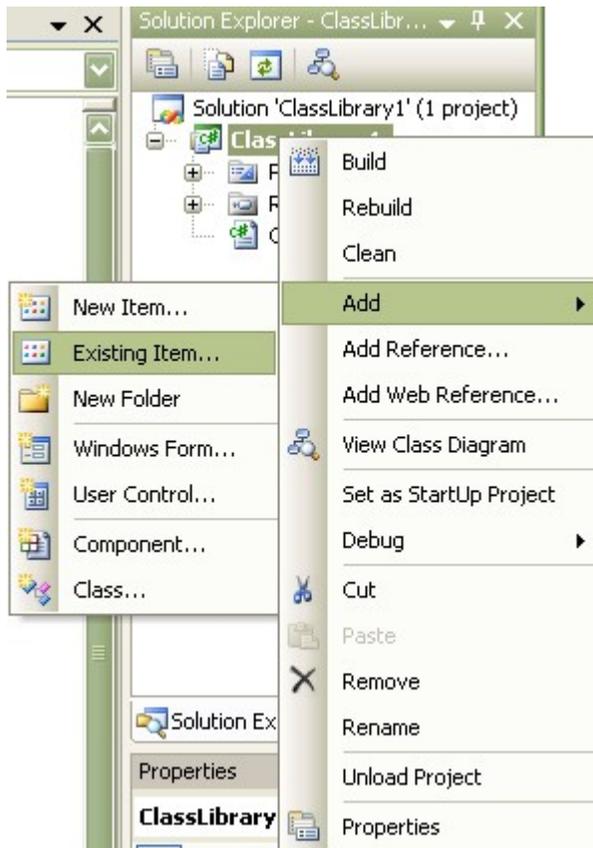
2.1 Add an Enterprise Architect Model

Add Existing Enterprise Architect Models

If you have an existing .EAP file to incorporate into your Visual Studio solution or project, you can add it using the standard Visual Studio facilities:

- **Project | Add Existing Item** ([Shift]+[Alt]+[A])
- **Solution Explorer's** context menu: **Add | Existing Item**.

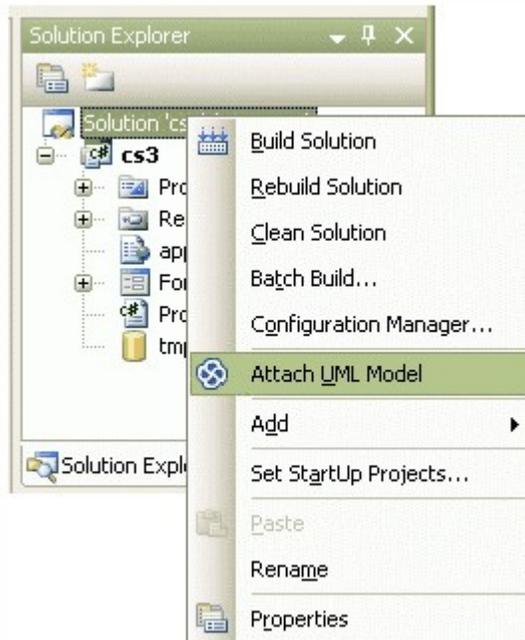
The following illustration shows the **Solution Explorer** option.



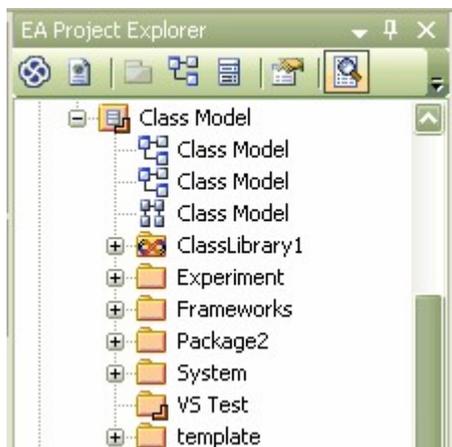
When an Enterprise Architect model has been added in this way it might appear in the **Solution Explorer** unopened. To open it, double click on it.

Create New Enterprise Architect Models

New Enterprise Architect models are created using a wizard available through either the **Project Menu | Attach UML Model** menu option or through the solution's context menu as indicated below. Models added in this way are always placed inside the *Solution Items* folder.



After a new or existing model has been added through the ensuing wizard, the model hierarchy displays in an Enterprise Architect [EA Project Explorer](#)^[15] window on the Visual Studio screen.



Embed Multiple Models

While it is possible to embed multiple Enterprise Architect models into a single Visual Studio solution (and embedded projects), it is not possible for the MDG to identify which, of multiple linked projects, contain an element you are trying to view (eg. through **View in UML**).

It is therefore important that you ensure that any linked model is in the *Solution Items* folder, and is the first model listed in that folder.

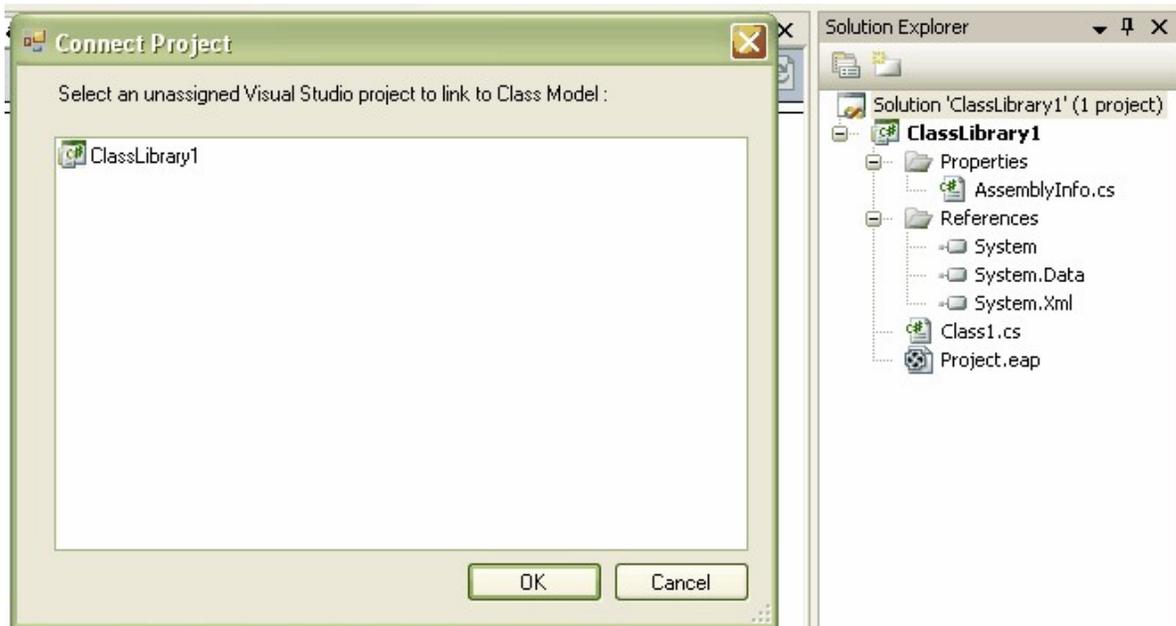
See Also

- [Link to a Model Package](#)^[11]

2.2 Link to a Model Package

To link a Visual Studio project with an Enterprise Architect model package, follow these steps:

- Select an existing package, or create a new model package in the **EA Project Explorer** - right-click on the parent node and select the **Add | New Package** menu option; give the package a meaningful name.
- Link the package to a Visual Studio project by right-clicking on the package and selecting **Current Package | Link Existing UML Package to Visual Studio Project**. The **Connect Project** dialog displays, listing the currently-active projects.
- Select the project to link with the Enterprise Architect file, and click the **OK** button.



When a package has been linked, this status is indicated by a Visual Studio icon next to the package name.



The UML package and the Visual Studio project are now integrated, enabling you to work using the UML model and the powerful toolset of Enterprise Architect, all from within Visual Studio.

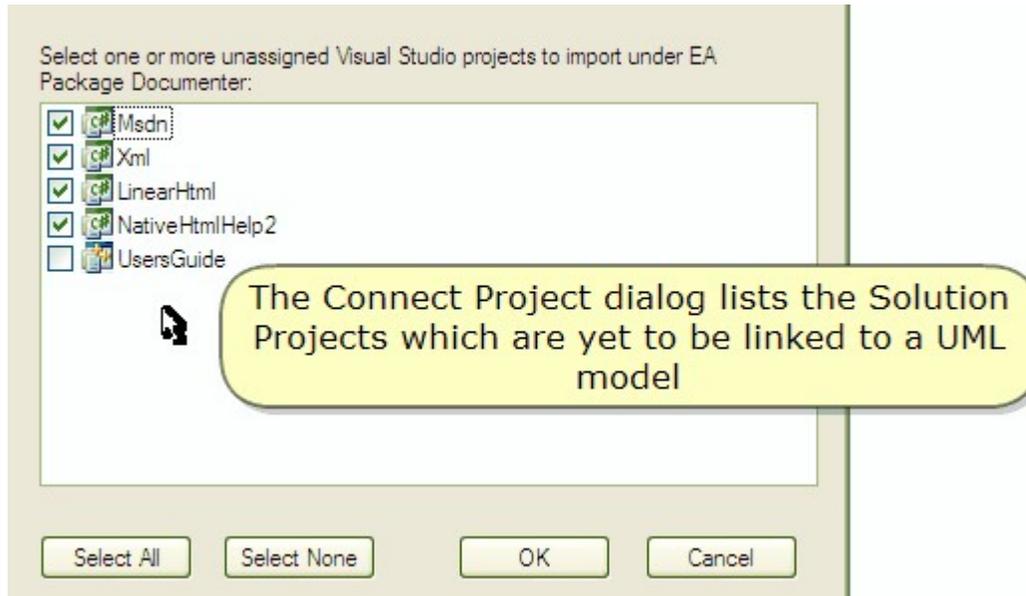
See Also

- [Multiple Linkings](#)

2.3 Multiple Linking

It is possible to link many different Visual Studio projects with multiple UML packages simultaneously.

Right-click on the required parent package in the **EA Project Explorer** window and select the **Current Package | Import and Link Visual Studio Projects** menu option.



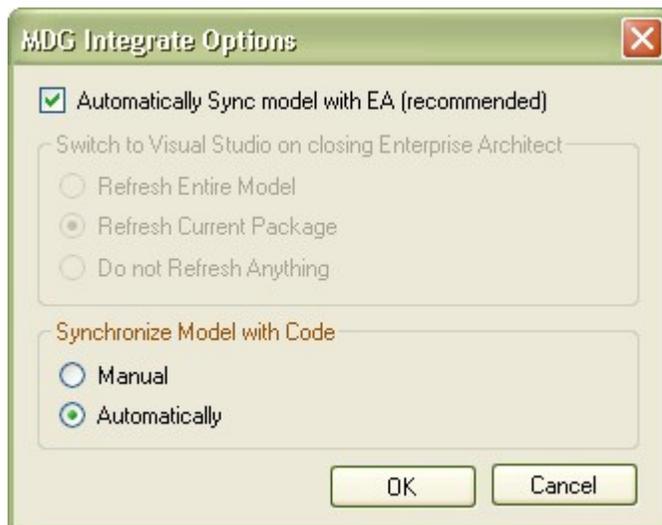
Select the check box for each project to import, or click on the **Select All** button to select all projects in the list. Click on the **OK** button to reverse engineer the project(s). A new package is generated for each project, under the selected parent package.

Once the Integration Environment has successfully imported and linked the projects, you can view them in the [EA Project Explorer](#) ¹⁵⁷ window.

2.4 MDG Integrate Options

Before you start using the MDG Integration for Visual Studio, you should set the options for synchronizing your work in Visual Studio and Enterprise Architect.

In the [EA Project Explorer](#) window, right-click on the linked package and select the **MDG Options** context menu option. The [MDG Integrate Options](#) dialog displays.



Option	Function
Automatically Synch model with EA (recommended)	MDG automatically refreshes the EA Project Explorer when elements within Enterprise Architect change.
Switch to Visual Studio on closing Enterprise Architect	Click on the appropriate radio button: <ul style="list-style-type: none"> • Refresh Entire Model - The entire model is refreshed. • Refresh Current Model - The currently-selected package in MDG is refreshed when Enterprise Architect is closed. <p>Note:</p> <p>If a non-package is selected, MDG iterates up the tree and refreshes from the first package that is found.</p> <ul style="list-style-type: none"> • Do not Refresh Anything - Nothing is refreshed.
Synchronize Model with Code	Click on the appropriate radio button: <ul style="list-style-type: none"> • Manual - You manually synchronize the code with the model. • Automatically - When code is added or saved, the model is automatically updated to reflect the change.

In the **MDG Integrate Options** dialog, the **Automatically Sync model with EA** option enables synchronization of the **EA Project Explorer** when you switch to the full Enterprise Architect user interface and back (using the **Open in Enterprise Architect** menu option). The **Synchronize Model with Code Automatically** radio button, however, makes MDG automatically reverse synchronize your source into your model when you save changes to your source files.

To automatically synchronize changes made in your model to your code, open Enterprise Architect using the **Open in Enterprise Architect** command, right-click on the MDG linked package, select the **Build and Run | Package Build Scripts** menu option and select the **Use Live Code Generation** checkbox. With this enabled, any changes you make in your model should be immediately synchronized in your source code.

Part



3 Start Using UML 2.1

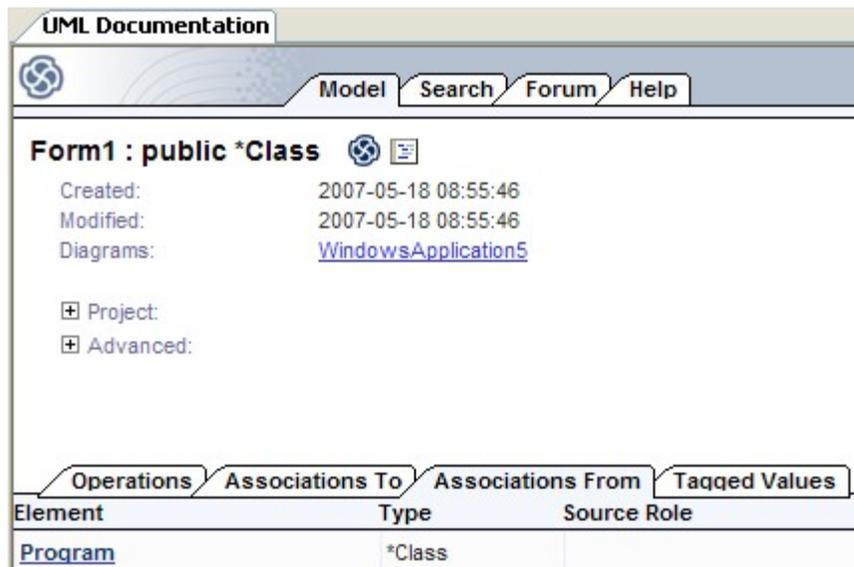
UML elements can be viewed and, to some extent, manipulated through Enterprise Architect's **Project Browser** and **Documentation View** without linking. For easy cross-referencing of UML and code models, however, you must link a Visual Studio project to an Enterprise Architect package. See [Link To a Model Package](#)^[11] for instructions. Equally, you can double-click on any .EAP file visible in the **Solution Explorer**.

This activates the MDG Integration for Visual Studio main interface components:

- The [EA Project Explorer](#)^[15] window, which shows the UML packages, diagrams and elements in a hierarchical view
- The **UML Documentation** tab, which is the main work area of MDG Integration for Visual Studio (see below)
- The **<elementname>.<language>** tab, which displays the code for an element selected from the **EA Project Explorer**
- The [UML Diagram tab](#)^[28], which displays a diagram selected from the **EA Project Explorer** or **UML Documentation** tab.

The **UML Documentation** tab itself has four tabs:

- The [Model](#)^[20] tab displays the diagrams and UML properties of the model elements; most of the report information from the MDG Integration for Visual Studio is displayed on this tab
- The [Search](#)^[25] tab is used to find UML elements; search returns are shown as a report view with clickable items
- The [Forum](#)^[26] tab enables you to discuss projects using a BBS-style forum interface within Visual Studio
- The **Help** tab displays the HTML-based help for quick reference.

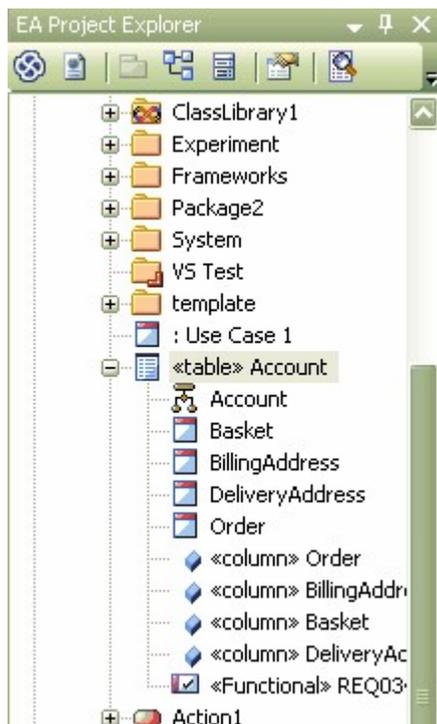


To display the **UML Documentation** tab, in the **EA Project Explorer** window either:

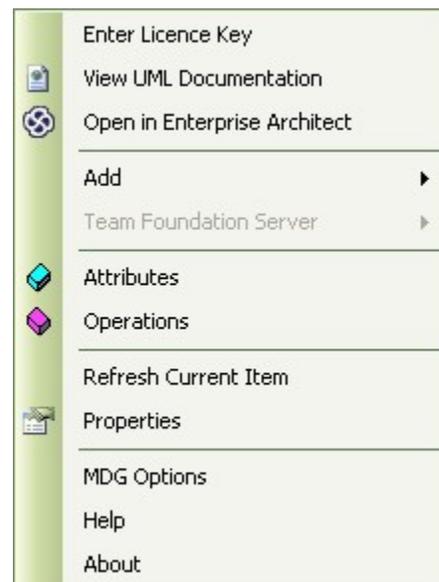
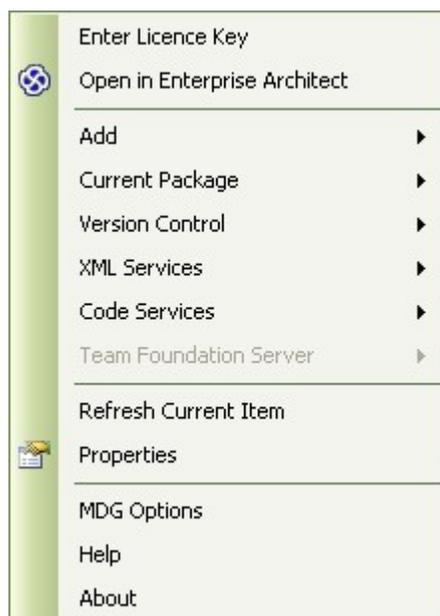
- double-click on an element name, or
- right-click on an element name and select the **View UML Documentation context menu**^[16] option.

3.1 EA Project Explorer

The **EA Project Explorer** contains an MS Explorer-style representation of the UML model, as shown below. It lists the UML packages, diagrams, elements, attributes and methods.



The **EA Project Explorer** helps you navigate your UML project from within Visual Studio. Right-click on an item in the tree to open a context-sensitive menu that enables you to investigate the item, or to perform operations on it. The following examples show the context menus for a package and an element.

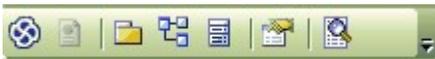


From these menus you can also perform other actions such as:

- [Browse UML](#)¹⁵⁾
- [View Properties](#)¹⁷⁾

- [Edit UML Diagrams](#) [28]
- [XML Services](#) [42]
- [Import Team Foundation Server Work Items](#) [31]
- [Code Generation](#) [45]
- [Model Driven Transformation](#) [47]

Alternatively, you can use the **EA Project Explorer** toolbar icons.



From left to right, these icons enable you to:

- Open the selected project in Enterprise Architect
- View the UML documentation
- Add a package
- Add a diagram
- Add an element
- Display the properties of the selected object
- Perform a search via the [Search](#) [25] tab.

3.1.1 Object Properties

Right-click on an element, diagram, attribute or method in the **EA Project Explorer** and select the **Properties** context menu option. Alternatively, click on the object and on the **Properties** icon in the **EA Project Explorer** toolbar.

The appropriate **Properties** dialog displays.

See the *Enterprise Architect User Guide* for information on object properties and their settings, responsibilities, constraints, links, scenarios, associated files, object files and classifiers, and boundary element settings.

To display Help on properties from the *Enterprise Architect User Guide*, click on either:

- The **Help** button on the displayed **Properties** dialog, or
- This link to [diagram details](#)
- This link to [element details](#)
- This link to [attribute details](#)
- This link to [operation / method details](#).

Changes to any information in the **Properties** dialogs are automatically reflected on the **Model** tab. In this example the **Notes** of Class *Form1* have been modified.

The screenshot shows the 'General' tab of a UML class editor. The class name is 'Form1'. The 'Stereotype' dropdown is empty, and the 'Abstract' checkbox is unchecked. The 'Author' dropdown is empty. The 'Scope' is set to 'Public'. The 'Status' is 'Proposed', 'Complexity' is 'Easy', and 'Language' is 'C#'. The 'Persistence' dropdown is empty. The 'Phase' is '1.0' and 'Version' is '1.0'. There is an 'Advanced' button. The 'Notes' section contains the text: 'This is a modified form1 note. This change will be reflected in the class properties.'

The change is reflected in the [UML Documentation](#) tab below:

The screenshot shows the 'UML Documentation' tab for the class 'Form1'. The title is 'Form1 : public Class'. It shows the creation and modification dates: 'Created: 2007-05-18 08:55:46' and 'Modified: 2007-05-18 09:09:02'. There are expandable sections for 'Project' and 'Advanced'. The 'Advanced' section is expanded and contains the note: 'This is a modified form1 note. This change will reflect in the class properties.' Below this, there are tabs for 'Attributes', 'Operations', and 'Tagged Values'. The 'Attributes' tab is active, showing a table with columns 'Method - All Public Protected Private' and 'Parameters'.

Method - All Public Protected Private	Parameters
Dispose (bool) : void protected	[in] bool disposing true if mar disposed; otherwise, false.

3.2 Add New Elements / Packages

Add New Package

MDG Integration for Visual Studio enables you to add new elements and packages to the model. To start, in the **EA Project Explorer** select the package under which to create your new package and either:

- Right-click and select the **Add | New Package** context menu option, or
- Click on the **New Package** icon in the **EA Project Explorer** toolbar.

Give the package a relevant name. If you do not want a diagram for this package, deselect the **Automatically add new diagram** checkbox.

Click on the **OK** button. If you are also adding a diagram, provide the diagram name and type on the [New Diagram](#) dialog.

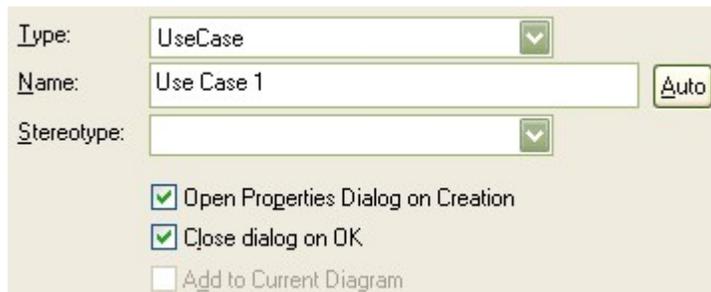
Add New Element

Either:

- Right-click on the newly-created package and select the **Add | New Element** context menu option, or
- Click on the **New Element** icon in the **EA Project Explorer** toolbar.

The **New Element** dialog displays.

In this example, the selected **Type** is **UseCase** with the name **Use Case 1**.



The screenshot shows the 'New Element' dialog box with the following fields and options:

- Type:** UseCase (dropdown menu)
- Name:** Use Case 1 (text box) with an **Auto** button to its right.
- Stereotype:** (empty dropdown menu)
- Open Properties Dialog on Creation
- Close dialog on OK
- Add to Current Diagram

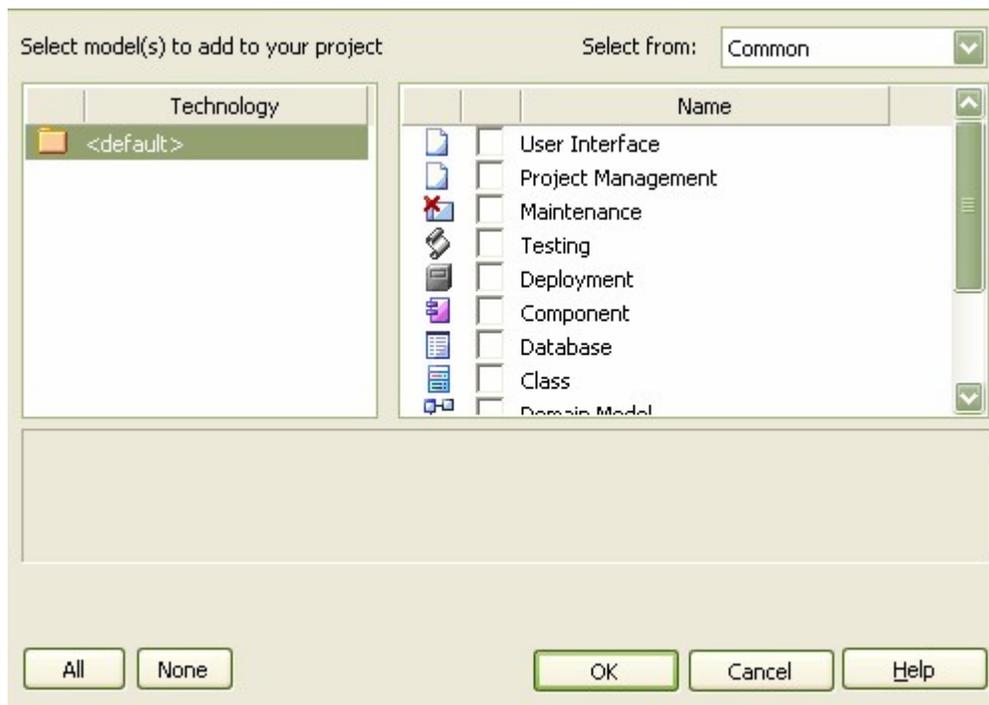
Checkboxes

- **Open Properties Dialog on Creation** - Select this checkbox to display the **Properties** dialog for the element, to tailor its information; for more information on this window, see [Object Properties](#).^[17]
- **Close Dialog on OK** - Closes the **New Element** dialog when you click on the **OK** button; deselect the checkbox to add multiple elements in one go.
- **Add to Current Diagram** - Add the newly imported Class to the open diagram.

Add Model using Wizard

You can also add one or more basic model structures to your project using a template wizard.

Right-click on the appropriate root package and select the **Add | Add Model using Wizard** context menu option. The **Model Wizard** dialog displays.



Click on the checkbox for each model to add to your project.

Control	Description
Select From	Select the model template group from which to select the template on which to base the model.
All	Select all of the models.
None	Clear all models selected.
OK	Click on this button to create the standard hierarchy for your project.
Cancel	Click on this button to leave a blank project tree.
Help	Display Help on the dialog.

3.3 Model Tab

The **Model** tab shows the currently selected model element. The element name is displayed in the top left corner of the tab.

The screenshot shows the UML Documentation window for 'Class1.cs'. The main content area displays the following information for 'Class7 : public Class «table»':

- Created: 2007-04-18 14:56:10
- Modified: 2007-12-18 09:40:02
- Diagrams: [Class Model](#)
- Project: (expandable)
- Advanced: (expandable)

Below this information are tabs for 'Attributes', 'Operations', 'Associations To', and 'Tagged Values'. A table below these tabs shows the following details:

Method - All Public Protected Private	Parameters	Details
FK_Class7_Table2 (VARCHAR) public «FK»	[in] VARCHAR Something	Tags: {property = Delete Cascade=0;Update Cascade=0; }
PK_Class7 (VARCHAR) public «PK»	[in] VARCHAR Sempervit	

Just after the element name are two icons - an Enterprise Architect icon and a code page icon.

- Click on the Enterprise Architect icon to open Enterprise Architect in the current model. (If Enterprise Architect is already open, this icon opens another instance of the application.)
- Click on the code page icon to display the `<elementname>.<language>` tab, which displays the code for the selected element, including its attributes, operations, and associations.

The element's attributes, operations, Tagged Values, parameters and associations - both to and from the element - are also shown in the main body of the **Model** tab.

Additional information on the element can be seen by clicking on the **Project** and **Advanced** expansion boxes.

3.3.1 Navigating Hyperlinks

Within the **UML Documentation** tab, you can navigate between diagrams and sections using hyperlinks.

Form1 : public *Class

Created: 2007-05-18 08:55:46
 Modified: 2007-05-18 08:55:46
 Diagrams: [WindowsApplication5](#)

+ Project:
 + Advanced:

Operations Associations To Associations From Tagged Values

Element	Type	Source Role
Program	*Class	

For example, you might click on the diagram name and [display the diagram](#).

Or perhaps, under the **Associations From** tab, click on an element hyperlink (such as *Program*, above) and display the element details for the source element. On that screen you could check under the **Associations To** tab and follow the link back to the original (*Form1*) element.

3.3.2 View UML diagrams

By clicking on the **Diagrams** hyperlink on the **UML Documentation - Model** tab, you can also display the UML models themselves. In the following example, the hyperlink **WindowsApplication5** is clicked on.

Form1 : public *Class

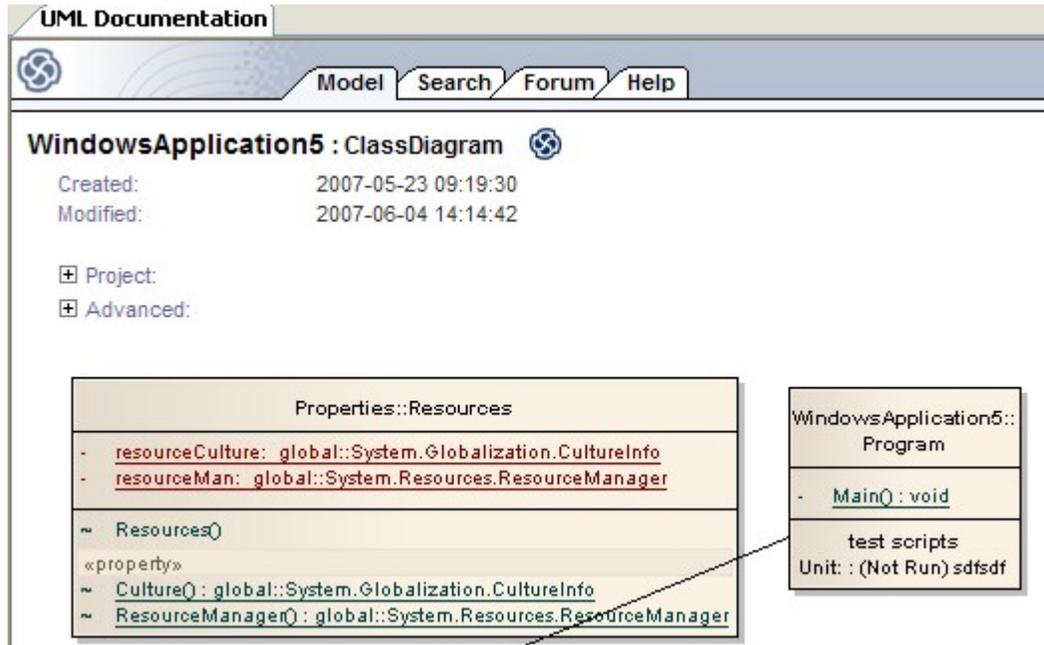
Created: 2007-05-18 08:55:46
 Modified: 2007-05-18 08:55:46
 Diagrams: [WindowsApplication5](#)

+ Project:
 + Advanced:

Operations Associations To Associations From Tagged Values

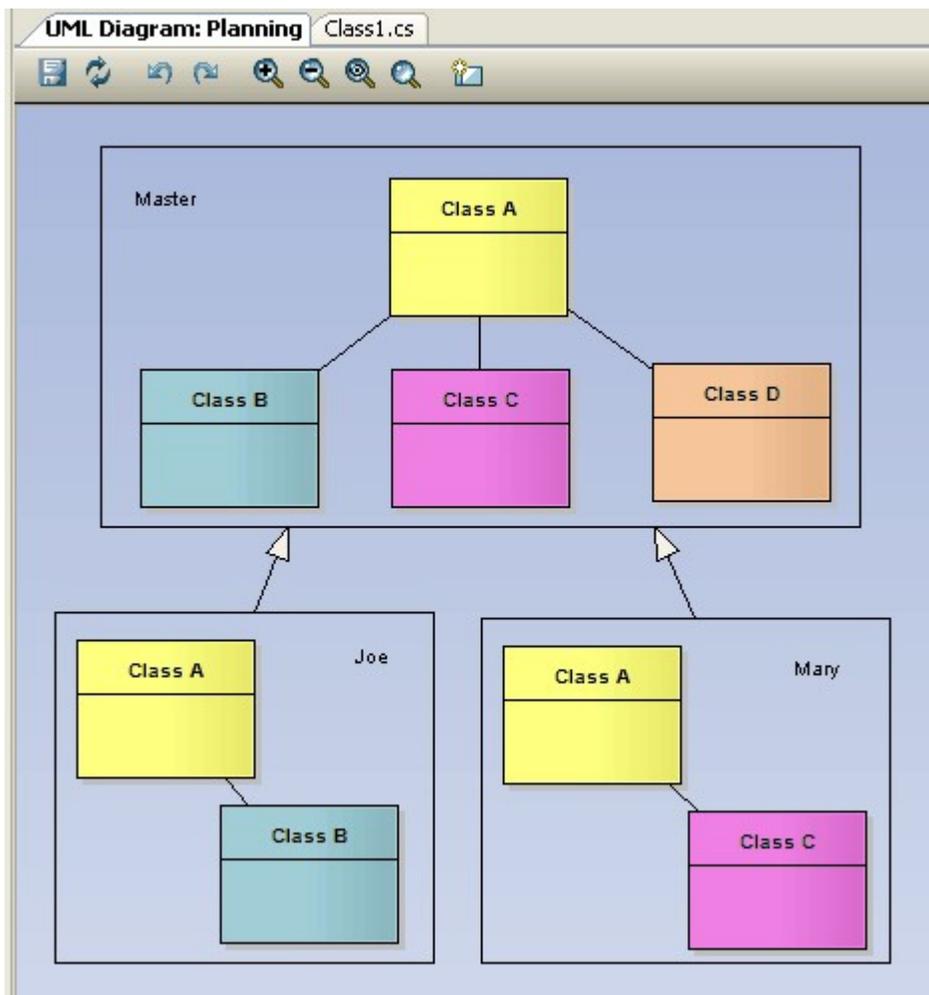
Element	Type	Source Role
Program	*Class	

This displays the UML diagram on the **UML Documentation** view (**not** the **UML Diagram** tab).

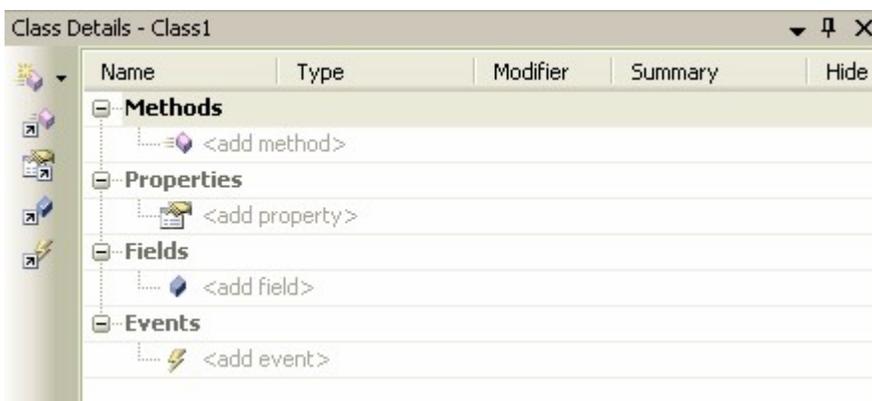


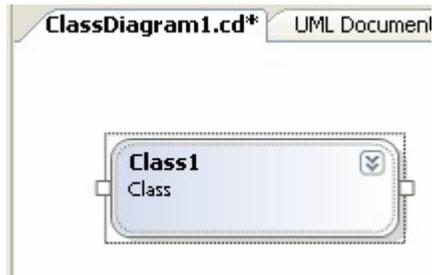
Notice that you can view the details of the Class, including its attributes and methods, all taken from Enterprise Architect. You **should not** change data in this view.

Alternatively, double-click on a diagram in the [EA Project Explorer](#) window, and click on the [UML Diagram](#) ²⁸ tab. (This has no effect on the [UML Documentation](#) tab). This is the view in which you **can** edit the diagram.



You can also add your elements into a new Visual Studio Class diagram. To do this, right-click on an element inside a linked folder, and select the **View Class Diagram** context menu option. The **Class Details** tab displays at the bottom of the screen, and a **Diagram** tab opens in the body of the screen.





3.4 Search Tab

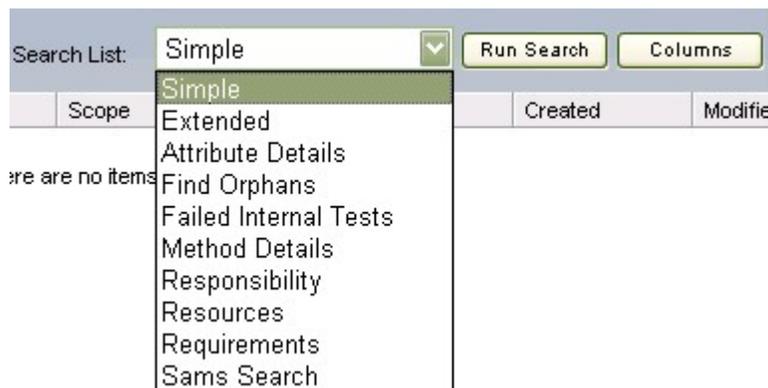
The **Search** tab is a convenient way of locating the elements of a model. You can search on a range of criteria, from element name, type, and scope to element connections, or status within a project (work-in-progress, completed).

To begin a search, click on the **Search** tab.

The screenshot shows the 'UML Documentation' window with the 'Search' tab selected. The search term is 'Form' and the search list is 'Extended'. The results are displayed in a table with columns: Object, Type, Stereotype, Scope, Status, Phase, and Created. Each row includes a small icon and a descriptive text snippet.

Object	Type	Stereotype	Scope	Status	Phase	Created
Note	Note		Public	Proposed	1.0	20/11/2005
The Business Process Model describes both the behavior and the information flows within an organization or system.						
As a model of business activity, it captures the significant events, inputs, resources, processing and outputs associated with business processes.						
Note	Note		Public	Proposed	1.0	20/11/2005
The Stakeholders package contains model elements representing the various people, organizations and information systems some way connected into the current business context						
Note	Note		Public	Proposed	1.0	20/11/2005
The Business Objects package contains representations of information, reports, data stores and other artifacts which are used within the business workflows						
report1	Object	information	Public	Proposed	1.0	11/01/2006
Note	Note		Public	Proposed	1.0	20/11/2005
The Workflow package contains diagrams modeling the processing of information flows throughout the business domain						
Note	Note		Public	Proposed	1.0	5/01/2006

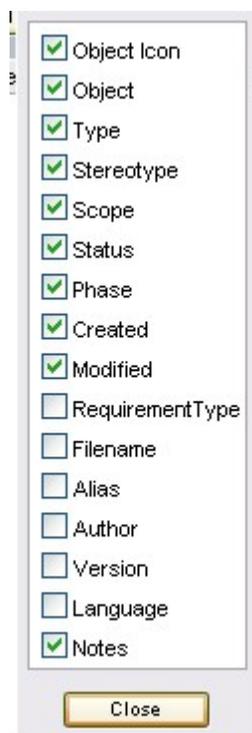
In the **Search Term** input box, enter the text string to search for, then click on the drop-down arrow in the **Search List** field and select the type of search to perform.



To execute the search, click on the **Run Search** button.

You can click anywhere on the entry for a returned result to navigate to the **Model** tab for the item.

You can also specify which columns are returned. Click on the **Columns** button to display a list of the information that is returned. To turn a column on or off, simply select or deselect the checkbox next to the column title.



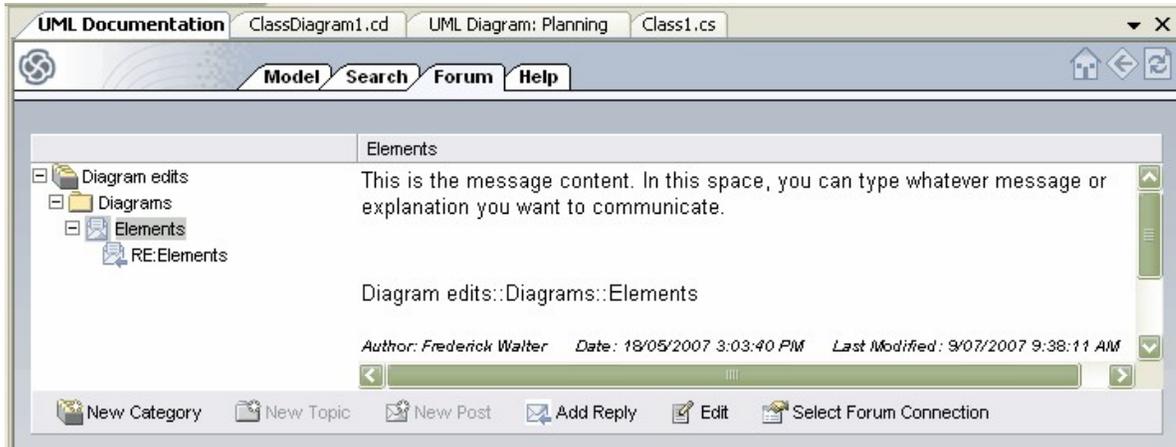
3.5 Project Discussion Forum

The **Project Discussion Forum** can be used to discuss the development of your project from within the Visual Studio environment. It operates much like any other web-based forum you might have used, applying the concept of Categories, Threads, and Posts.

You can access the **Project Discussion Forum** via the **UML Documentation** tab, selecting the **Forum** tab.

The **Forum** tab consists of two main areas: the message thread area, and the message contents area.

The message thread area is located on the left hand side, and appears as a tree. The message thread area is used to create new categories and threads, and to select posts for viewing, editing or deleting. When a post is selected for viewing, it appears in the message contents area on the right hand side.



See Also

- [Categories, Topics and Posts](#) ²⁷
- [Forum Message Dialog](#) ²⁸

3.5.1 Categories, Topics and Posts

The **Project Discussion Forum** enables you to create *Categories*, which contain *Topics*, which contain *Posts*. You can also edit and reply to posts.

Add Category

To create a new Category, click on the **New Category** icon at the bottom of the **Forum** tab. The [Create New Category](#) ²⁸ dialog displays.

Enter the name and any relevant details into the **Text** field. Enter the name of the author. Click on the **OK** button. You can now add new topics to the category.

Add Topic

To create a new Topic, click on the **New Topic** button at the bottom of the **Forum** tab. The [Create New Topic](#) ²⁸ dialog displays.

Enter the name and any relevant details into the **Text** field, and enter the name of the author. Click on the **OK** button. You can now add new posts to the topic.

Add Post

To create a new Post, click on the **New Post** button at the bottom of the **Forum** tab. The [Create New Post](#) ²⁸ dialog displays.

Enter the name and any relevant details into the **Text** field, and enter the name of the author. Click on the **OK** button. Other users can now reply to the post.

Reply to Post

To reply to a Post, click on the Post in the **Forum** tab and click on the **Add Reply** button at the bottom of the **Forum** tab. The [Reply to Post](#) ²⁸ dialog displays.

Enter the name and any relevant details into the **Text** field, and enter the name of the author. Click on the **OK**

button.

Edit Post

To edit a Post, click on the Post in the Forum tab and click on the **Edit** button at the bottom of the Forum tab. Alternatively, press **[Ctrl]+[E]**. The [Edit Post](#) dialog displays.

Enter the name and any relevant details into the **Text** field. You cannot change the name of the author. Click on the **OK** button. Other users can now reply to the post.

3.5.2 Forum Message Dialog

The **Project Discussion Forum** message dialogs (**Create New Category**, **Create New Topic**, **Create New Post**, **Edit Post** and **Reply to Post**) all share the same functionality.

The table below describes the operation of each option available for the dialogs.

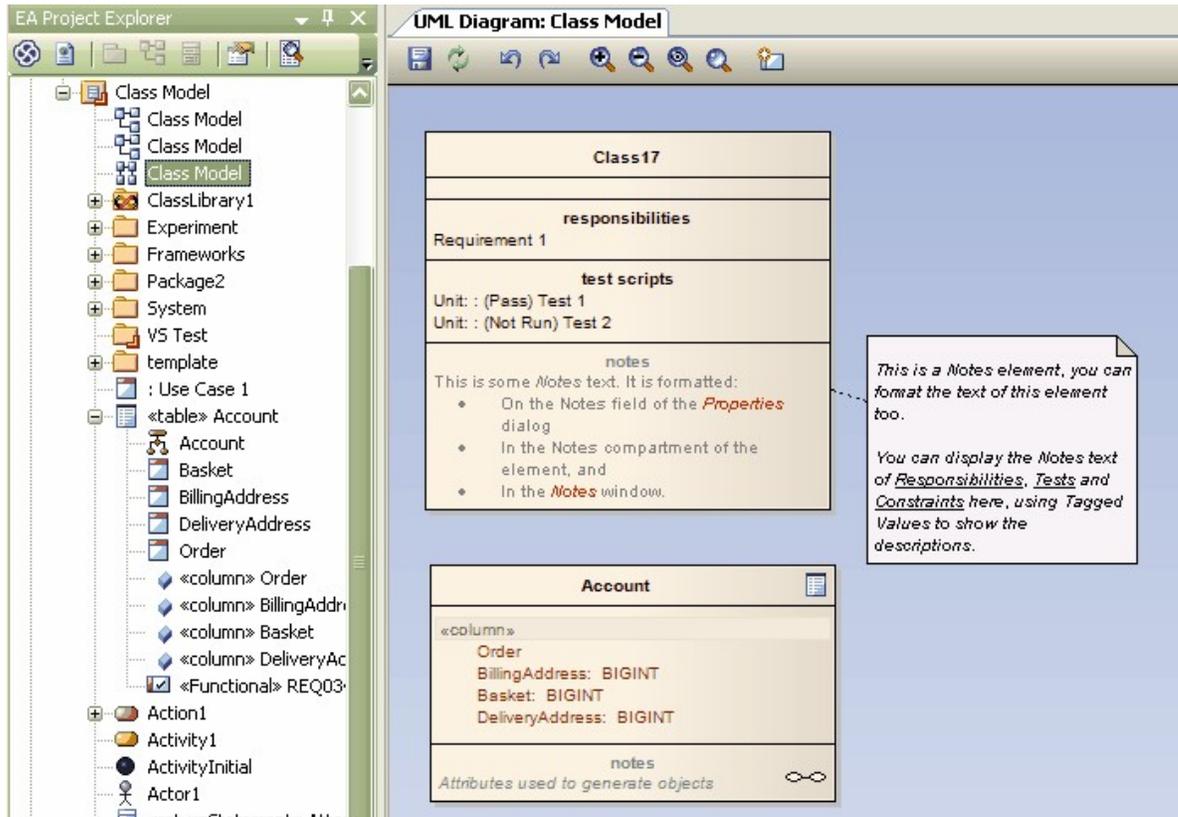
Control	Description
Name	Type in the name of the message category, topic or post.
Author	Click on the drop-down arrow and select the message author name, or type in a new name if the author name is not present in the list. The names in the drop-down list are defined in the model Authors list. If you type a name into the Author field, it is used for this post but it is not added to the Authors list.
Formatting Tools	Standard formatting options for text.
OK	Click on this button to confirm the message.

3.6 Edit Diagrams

You can easily edit the UML diagrams from the **EA Project Explorer** in two ways, by:

- Double-clicking on a diagram name or
- Right-clicking on a diagram name and selecting the **Edit Diagram** menu option

The selected diagram displays on the **UML Diagram** tab, as shown below.



You can add new elements and give them their own attributes, operations and types, and customize or arrange them. You can also drag existing elements from the **EA Project Explorer** window.

To add elements and connectors to the diagram, either use the Enterprise Architect [Quick Linker](#) arrow or right-click on the diagram background and select the **New Element or Connector** context menu option to display the [UML Toolbox shortcut menu](#).

To add attributes and operations, right-click on the element in the diagram or **EA Project Explorer** and select the **Attributes** or **Operations** context menu option. For further information, open the *Enterprise Architect User Guide* topic by:

- Clicking on the **Help** button on the **Attributes** or **Operations** dialog, or
- Selecting these Sparx Systems website links for [attributes](#) and [operations](#).

Part



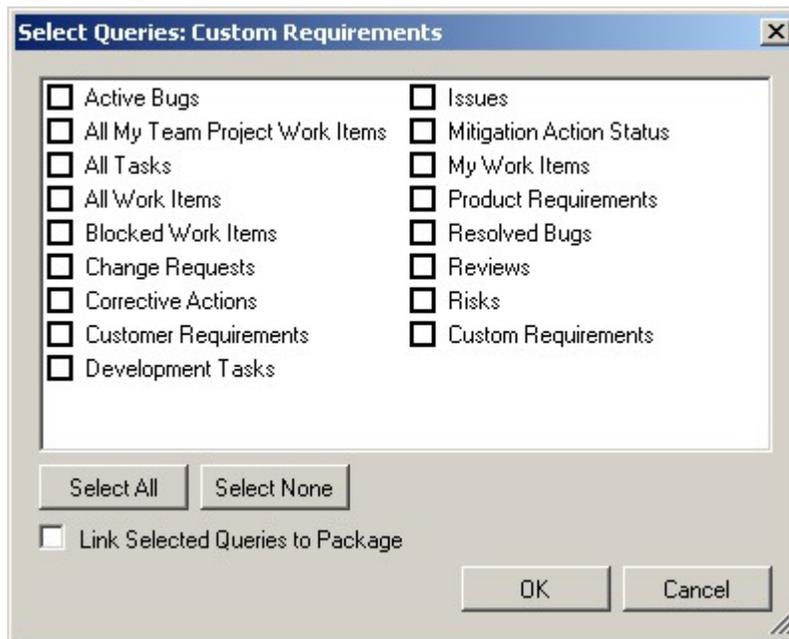
4 Import and Synchronize TFS Work Items

MDG Integration for Visual Studio enables you to import and synchronize work items from Team Foundation Server. It also enables you to [add, view, edit and unlink work items](#)^[33] that have been linked against a UML element, and to [map work item fields](#)^[34] against Enterprise Architect elements and element properties.

Import Work Items

To import work items, follow the steps below:

1. In the **EA Project Explorer**, right-click on the required package and select the **Team Foundation Server | Import Work Items** context menu option. The **Select Queries** dialog displays.



2. Click on the checkbox against each query for which to import work items from Team Foundation Server.
3. Click on the **Link Selected Queries to Package** checkbox.
4. Click on the **OK** button. The work items in the selected queries are imported and, if the **Link Selected Queries to Package** checkbox is selected, the queries are stored against the package.

You can return to this dialog to add and remove queries for a package.

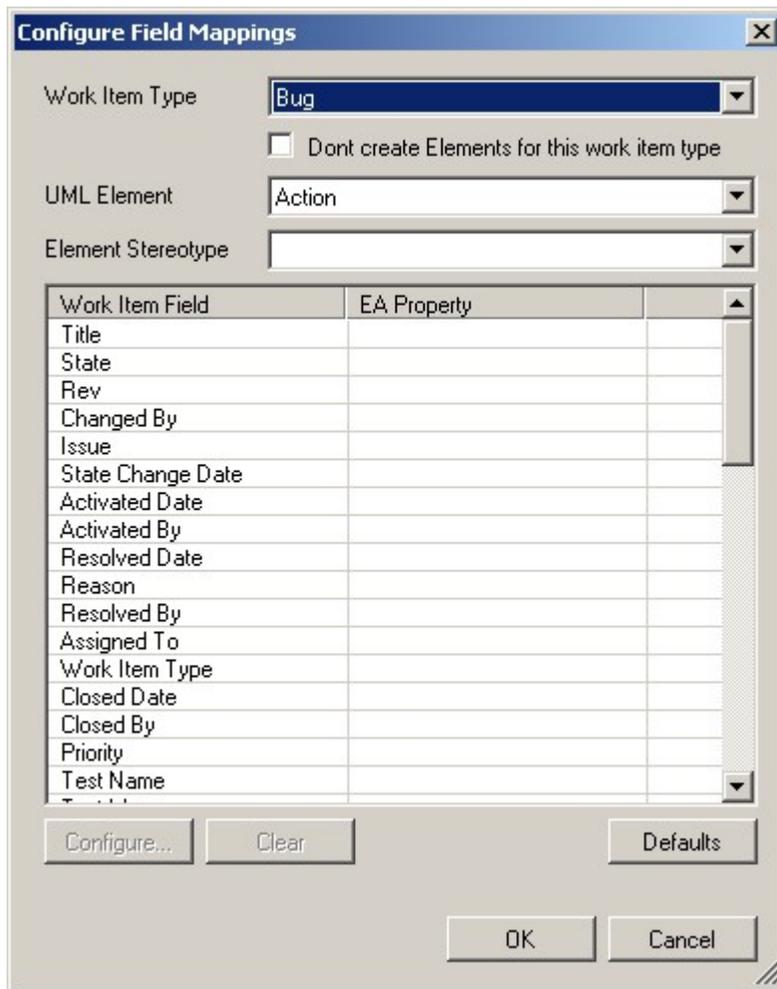
Synchronize With TFS

When a package has stored queries against it, new elements are automatically added and existing elements updated, based on each query.

Note:

Elements are never deleted.

To manage the mapped fields for a work item linked against a UML element, right-click on the required package in the **EA Project Explorer** and select the **Team Foundation Server | Manage Mapped Fields** context menu option.



Field/Button	Description
Work Item Type	Click on the drop-down arrow and select the type of work item to configure.
Don't create Elements for this work item type	Select this checkbox to prevent MDG Integration For Visual Studio from creating an Enterprise Architect element if the query returns a work item of the specified type.
UML Element	If MDG Integration For Visual Studio is to create an element, click on the drop-down arrow and select the type of element to create.
Element Stereotype	If required, click on the drop-down arrow and select the stereotype to apply to the element.
Work Item Field	If required, click on a work item field against which to configure an Enterprise Architect property.
Configure	Click on this button to select an Enterprise Architect property to configure against the selected work item field.
Clear	Clear the currently-selected mapping.
Default	Apply the default mapping for this work item type.

4.1 Maintain Work Items

The **EA Work Items** tab enables you to add and update work items against a selected element, configure the connection to the Team Foundation Server, and connect to or disconnect from the server.

To display the **EA Work Items** tab, right-click on the required element in the **EA Project View** and select the **Team Foundation Server | Maintain Work Items** context menu option.

The screenshot shows the 'EA Work Items' dialog box. At the top, there is a toolbar with icons for adding, saving, linking, removing, and connecting/disconnecting. Below the toolbar is a table with the following data:

ID	Work Item...	Assigned To	Created By	Priority	Title
34	Requirement	Alistair Lesli...	Alistair Lesli...	2	Web Site

Below the table, there are several sections for configuring the work item:

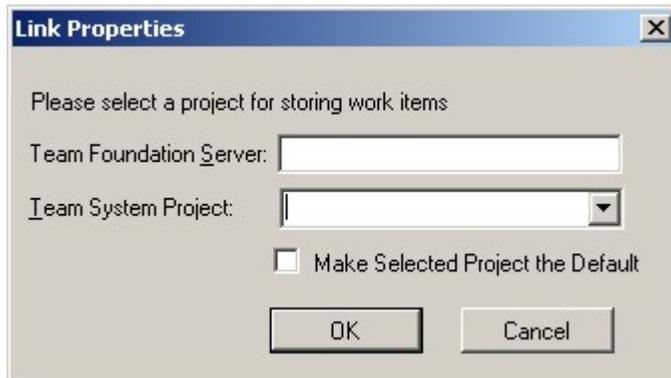
- Title:** Web Site
- Type:** Operational
- Classification:**
 - Area path: ALH\Requirements
 - Iteration path: ALH\Approved
- Status:**
 - Assigned to: Alistair Leslie-Hughes
 - Blocked: Yes
 - Priority: 2
 - State: Proposed
 - Triage: Triaged
 - Reason: Investigation Complete
 - Committed: No
- Description:** The web site Needs to look pretty.

The **EA Work Items** tab has a toolbar. The functions provided by the toolbar icons are, from left to right:

- **Add New Work Item** - create a new work item linked to the currently-selected element
- **Save** - Save all changes to the current work item (selected from the panel underneath the toolbar)
- **Link** - Link one or more work items to the selected element
- **Remove** - unlink selected work items from the selected element
- **Properties** - Define the current Team Foundation Server connection properties; displays the [Link Properties](#) dialog
- **Connect** - Connect to the Team Foundation Server
- **Disconnect** - Disconnect from the Team Foundation Server.

Connection Properties

The **Link Properties** dialog enables you to configure the connection to the Team Foundation Server.



1. In the **Team Foundation Server** field, type the name of the server to connect to.
2. In the **Team System Project** field, type or select the name of the project to connect to.
3. Select the **Make Selected Project the Default** checkbox to make the specified project the default.
4. Click on the **OK** button.

4.2 Manage Mapped Fields

To manage the mapped fields for a work item linked against a UML element, right-click on the required package in the **EA Project Explorer** and select the **Team Foundation Server | Manage Mapped Fields** context menu option.

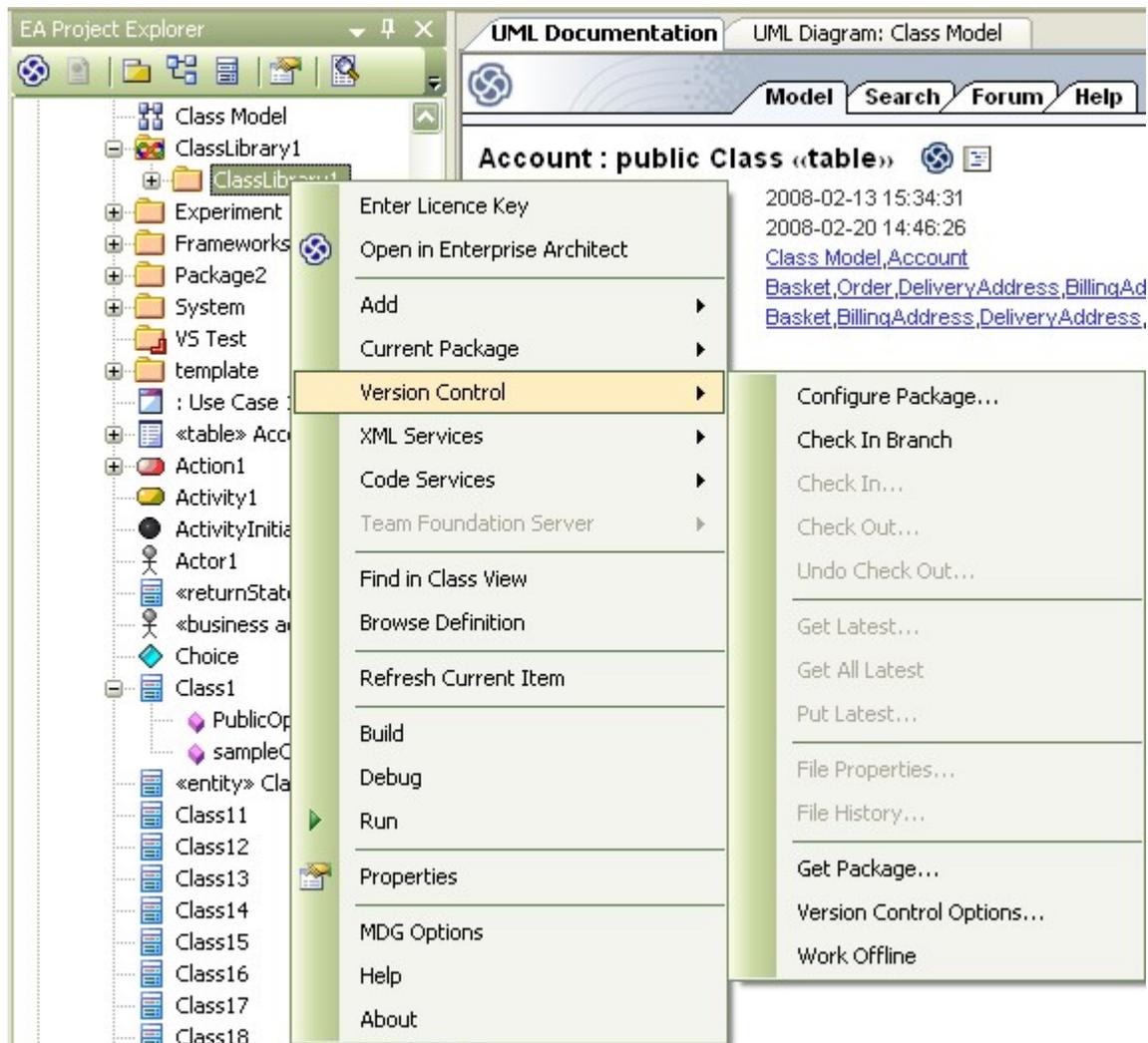
Field/Button	Description
Work Item Type	Click on the drop-down arrow and select the type of work item to configure.
Don't create Elements for this work item type	Select this checkbox to prevent MDG Integration For Visual Studio from creating an Enterprise Architect element if the query returns a work item of the specified type.
UML Element	If MDG Integration For Visual Studio is to create an element, click on the drop-down arrow and select the type of element to create.
Element Stereotype	If required, click on the drop-down arrow and select the stereotype to apply to the element.
Work Item Field	If required, click on a work item field against which to configure an Enterprise Architect property.
Configure	Click on this button to select an Enterprise Architect property to configure against the selected work item field.
Clear	Clear the currently-selected mapping.
Default	Apply the default mapping for this work item type.

Part



5 Version Control

MDG Integration for Visual Studio supports Enterprise Architect's version control of packages and their component sub-packages in a central repository. This repository is maintained by third-party version control applications that control access and record revisions. Version controlled packages are packages that have been configured for use with version control software. The supported Version Control products are CVS, SCC, TFS and Subversion.



Version control can be assigned to individual packages. Each package can only be linked to one version control configuration at a time, although it is possible to connect multiple control configurations for each model. The **Version Control Configurations** dialog can be used to connect to an SCC provider, CVS configuration, MS Team Foundation Server or Subversion configuration.

In MDG Integration for Visual Studio, right-click on the required package in the **EA Project Explorer** and select the **Version Control** menu option. To set the version control configuration then select the **Version Control Options...** menu item.

The options on the **Version Control** menu are described in the following table.

Menu Item	Functionality
Configure Package	Displays the Package Control dialog, which enables you to specify whether this package (and its children) is controlled, and which file it is controlled through.
Check In Branch	For the selected branch of the model, (i.e. the selected package and all of its child packages) displays a list of all version controlled packages within that branch that are checked out to the current user. You can then select packages in the displayed list, to be submitted for check-in.
Check In	Submits the currently selected package and all sub-packages to the central repository. Enterprise Architect prompts you to enter optional comments describing changes to the packages.
Check Out	Retrieves the latest revision of the currently selected package and sub-packages from the central repository, overwriting the current packages. After check out the packages are available for editing.
Undo Check Out	Cancels all changes you have made to the currently-selected package and sub-packages. Restores the model to the state it was in before package was checked out, leaving the selected package and sub-packages locked.
Get Latest	Available only on Private Models, for packages that are checked in. Retrieves the latest revision of the package from the repository.
Get All Latest	Available only on Private Models. Retrieves the latest revision of all version controlled packages in the project. Only retrieves packages that are checked in.
Put Latest	Updates the central repository with the currently-selected package (which you have checked out), while retaining checkout status on the package. This is equivalent to checking a package in and immediately checking it back out again.
File Properties	Asks the version control provider to show the version control properties associated with the XML export file pertaining to the currently-selected package.
File History	Where the controlling package has been configured by an SCC provider, this provider shows a change history for the package. Refer to your provider's documentation for details on how to use the control. Otherwise, if the version control is CVS the history is shown via Enterprise Architect's internal CVS history menu.
Get Package	Enables you to gain access from packages in the version control repository that is not currently available in the users model.
Version Control Options	Displays the Version Control Options dialog.
Work Offline	Toggles version control between offline and online.

More Information

For further information on version control, see the *Enterprise Architect User Guide*. To access the *Enterprise Architect User Guide*, either:

- Click on the **Help** button on the **Version Control Settings** dialog, or
- Click on this [Sparx Systems web page](#) link.

See Also

- [Version Control Overview](#) ³⁹
- [Controlled Packages](#) ⁴⁰

5.1 Version Control Overview

Features

The version control feature provides two key facilities:

- Coordinating the sharing of packages between users
- Saving a history of changes to Enterprise Architect packages, including the ability to retrieve previous versions.

System Requirements

To use version control in MDG Integration for Visual Studio, a third-party source-code control application is required. MDG Integration for Visual Studio supports the following version control applications:

- Subversion, which is available from <http://subversion.tigris.org/>
- CVS, which is available from <http://www.tortoisecvs.org/>
- Any version control product that complies with the Microsoft Common Source Code Control standard, version 1.1 or higher.

Set-Up

Before using MDG Integration for Visual Studio's version control facility, your version control software must be installed on each machine where it is intended to be used.

Typically there are:

- A server component that manages a version control repository
- Client components on the workstations that MDG Integration for Visual Studio uses to communicate with the server.

A version control client must be installed on every machine where you run MDG Integration for Visual Studio and want to access your version control system. Once the version control software has been installed and configured, you must define a Version Control Configuration within MDG Integration for Visual Studio, to use your installed version control product.

Usage

There are four basic ways in which you might apply the version control facility:

Use	Description
Single Shared model	Users share an MDG Integration for Visual Studio model, stored in a central EAP file or DBMS repository. This configuration enables users to see other users' packages without explicitly having to retrieve them. <ul style="list-style-type: none"> • Version control regulates access to packages, and maintains package revision history.
Multiple Private models	An MDG Integration for Visual Studio model is created by a single user who configures it for version control. The model file is then distributed to other users, with each user storing their own private copy of the model. <ul style="list-style-type: none"> • Users update their model's packages through version control. • Version control regulates access to packages, and maintains package revision history. • Other users' new packages are retrieved using the Get Package menu option.
Shared packages	Individual users create separate MDG Integration for Visual Studio models but share one or more packages. <ul style="list-style-type: none"> • Users share packages through version control.

Use	Description
Standard packages	<p>A company might have a standard set of packages that are broadly shared (as read-only files).</p> <ul style="list-style-type: none"> Individual users retrieve packages with the Get Package menu option.

See Also

- [Version Control](#) ^[37]
- [Controlled Packages](#) ^[40]

5.2 Controlled Packages

Controlled packages are a powerful means of 'externalizing' parts of an MDG Integration for Visual Studio model. Using controlled packages you can:

- Support widely distributed development by having team members submit packages in the form of XML for import into a central Enterprise Architect repository.
- Support version control, by writing model elements in XML text files suitable for version control using standard version control software. Using XMI this way enables you to manually connect to third-party version control software outside the MDG Integration for Visual Studio environment. MDG Integration for Visual Studio internally supports the configuration of version control through SCC and CVS.
- Support import and export of model elements between different models; for example, a Class library can be re-used in many models and kept up to date in target models using controlled packages, reloading packages as required when new versions of the Class model become available.

Package XML is standard XMI-compliant output that can be loaded into any XML viewer, or used by any XML-based tool to perform manipulations and extracts, such as document or code generators.

For more information on Controlled Packages, see the *Enterprise Architect User Guide* topic via this [Sparx Systems web Help](#) link.

Part



6 XML Technologies

MDG Integration for Visual Studio enables rapid modeling and forward and reverse engineering of two key W3C XML technologies: [XML Schema \(XSD\)](#) and [Web Service Definition Language \(WSDL\)](#).

XSD and WSDL support is critical for the development of a complete Service Oriented Architecture (SOA), and the coupling of UML 2.1 and XML provides the natural mechanism for specifying, constructing and deploying XML based SOA artifacts within an organization.

The following topics explain how to work with these technologies using MDG Integration for Visual Studio:

- [XML Schema \(XSD\)](#)⁴²
- [Web Services \(WSDL\)](#)⁴³

6.1 XML Schema (XSD)

MDG Integration for Visual Studio enables forward and reverse engineering of W3C XML schemas (XSD).

Model XSD Schema

XML schemas are modeled using UML Class diagrams within MDG Integration for Visual Studio, as in Enterprise Architect. See the [Model XSD Schema](#) help topic in the *Enterprise Architect User Guide*.

The [UML Profile for XSD](#) specifies a set of *stereotypes*, *Tagged Values* and *constraints* that can be applied to the UML model in order to change particular aspects of the resulting schema.

Note:

You cannot edit Tagged Values in MDG Integration for Visual Studio. To work on Tagged Values, switch to Enterprise Architect.

When modeling XSD constructs, it is often useful to have the XSD primitive types represented as UML elements. In this way, user-defined types (for example) can reference the datatype elements as part of inheritance or association relationships.

Sparx Systems provides the set of primitive XSD data types as a UML package in the form of an XMI file. Each XSD primitive type is represented by a UML Class in a package named [XSDDatatypes](#).

Generate XSD

The *Generate XML Schema* feature forward engineers a UML Class model to a W3C XML Schema (XSD) file. An XML schema corresponds to a UML package in MDG Integration for Visual Studio, therefore XML schema generation is a package-level operation.

To generate an XML schema from a package, follow the steps below:

1. In the **EA Project Explorer**, right click on the package to be converted to XSD. The context menu displays.
2. Select the **XML Services | Generate XML Schema** menu option. The **Generate XML Schema** dialog displays, showing the name of the selected package in the **Source Package** field.
3. See the [Generate XSD](#) topic in the *Enterprise Architect User Guide*.

Import XSD

The *Import XML Schema* facility reverse engineers a W3C XML Schema (XSD) file as a UML Class model. XSD files are imported into MDG Integration for Visual Studio as a UML package.

To import an XSD file, follow the steps below:

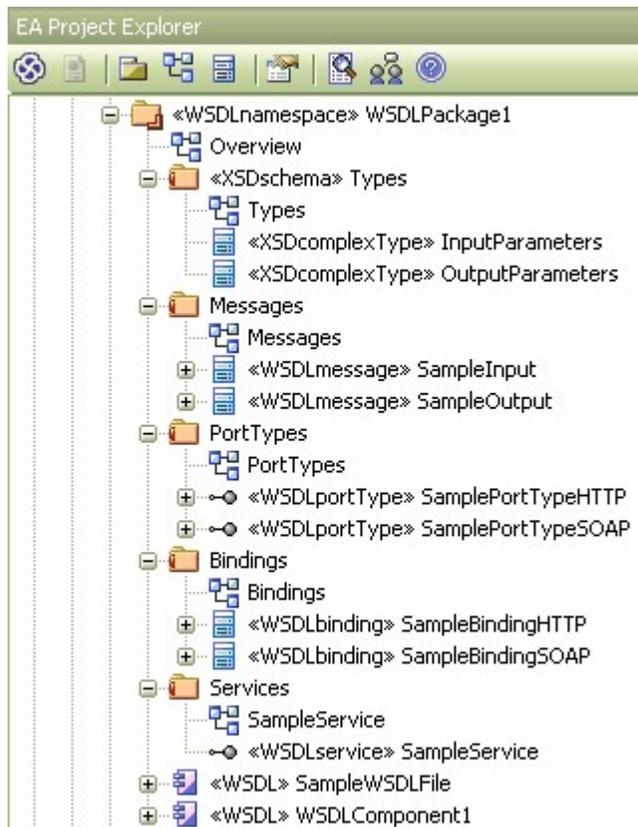
1. In the **EA Project Explorer**, right click on the package to contain the imported XSD package. The context menu displays.
2. Select the **XML Services | Import XML Schema** menu option.

3. See the [Import XSD Schema](#) topic in the *Enterprise Architect User Guide*.

6.2 Web Services (WSDL)

MDG Integration for Visual Studio supports forward engineering and reverse engineering of the W3C Web Service Definition Language (WSDL).

WSDL documents are represented as components marked with the stereotype *WSDL*. WSDL documents are contained in a package hierarchy representing the target WSDL namespace and its constituent XSD Types, Messages, PortTypes, Bindings and Services. The top-level package is stereotyped as a *WSDLnamespace*. The figure below shows a skeletal WSDL namespace package structure:



A *WSDLnamespace* package can contain one or more WSDL components. Each WSDL component can be automatically generated to a WSDL file using Enterprise Architect's built-in WSDL generator.

For information on the Enterprise Architect WSDL generator and importing WSDL, see the *Enterprise Architect User Guide* via this [Sparx Systems web Help](#) link.

Part



7 Working with Code

MDG integration for Visual Studio enables you to generate code directly from model packages and elements, and to automatically synchronize model and code.

To generate code for a UML model element, such as a Class, right-click on it in the **EA Project Explorer** and select the **Code Services | Generate Code** context menu option.

To generate the code for a model package, right-click on the package and select either of the following:

- The **Code Services | Generate Code** context menu option to simply generate code for an individual package element; the **Generate Package Source Code** dialog displays.
- The **Code Services | Generate Package** option to generate code for the entire selected package; the **Synchronize Package Contents** dialog displays, with the options to either forward engineer the code (from model to source) or reverse engineer (source to model).

Synchronization keeps your models and your code in line, so that you can always be sure that what is represented in code is represented in the model. For instance, if you have made changes to a Class definition by hand-coding, your model is out of date. Synchronization ensures that the Class you have altered is updated in the model to reflect the changes you have made.

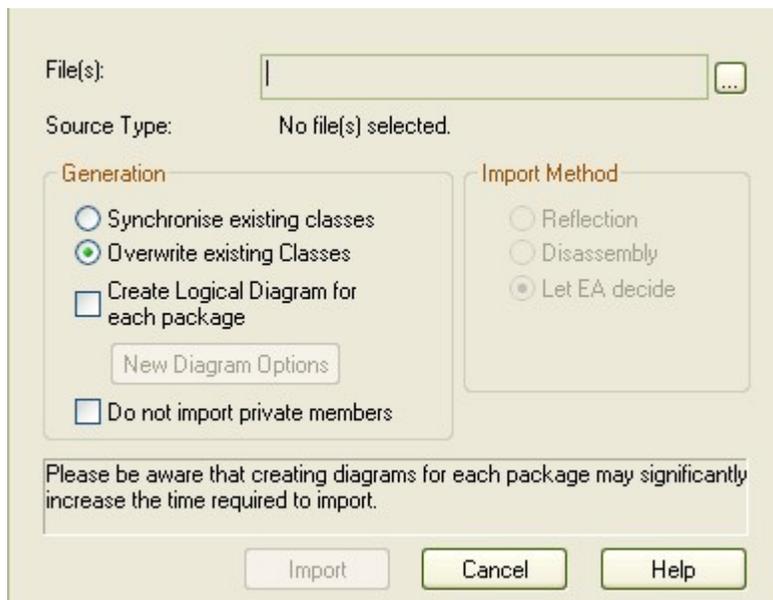
Reverse Engineering

The MDG Integration for Visual Studio is also able to reverse engineer both source code and Visual Studio binary portables into UML Class diagrams.

7.1 Import Binary

Enterprise Architect is capable of reverse engineering Visual Studio portable binaries (*.exe, *.dll) and generating Class models.

1. Right-click on the target package (in which to store the resulting models) in the **EA Project Explorer** and select the **Code Services | Import Binary Module** context menu option. The **Import** dialog displays.



2. Select the file to import. Once you have selected the file you must set certain options, as outlined below.
3. Once all your settings are set, click on the **Import** button. Enterprise Architect imports the binary

module; the UML representation is then constructed as a diagram and laid out.

Generation

Select whether

- Pre-existing classes are to be synchronized or overwritten
- To automatically create a Logical Diagram for each package
- To import private members.

New Diagram Options

This button displays the **New Diagram Options** dialog, through which you define what features are to be visible in any diagrams generated by the import.

Import Method

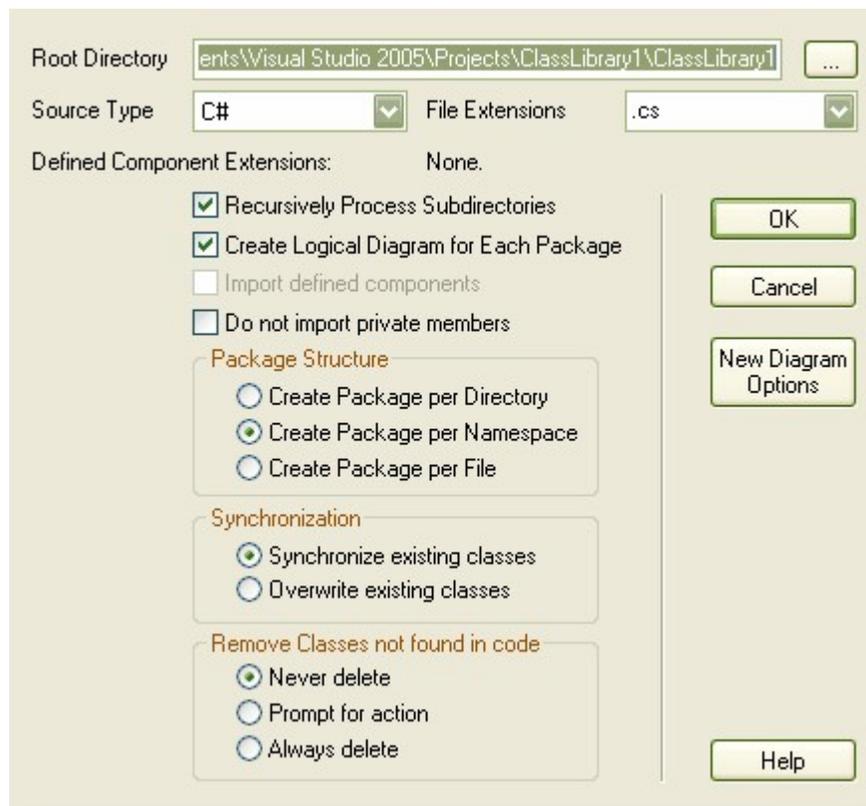
Enables you to select the method Enterprise Architect uses to analyse the binary file. Select from:

- **Reflection**
- **Disassembly** or
- **Let EA decide**, which triggers Enterprise Architect to select the most appropriate method for the selected file.

7.2 Import Directory

Reverse engineering your project code into UML Class models is a simple process, as follows:

1. Create and link a new package, or use a linked package associated with the project to reverse engineer.
2. Right-click on the package name in the **EA Project Explorer**, and select the **Code Services | Import Directory** context menu option. The **Import Source Directory** dialog displays.



(The above screen shows the **default settings for C#**.)

3. Select the root directory for the package to import.
4. Set the source code type (such as C++ or C#) and the expected file extension (.c, .cs). You can select from a number of further options to control the import process, as below.
5. Once you have set your options, click on the **OK** button to invoke Enterprise Architect to process the directory. When Enterprise Architect is finished, the newly created models appear in the **EA Project Explorer** and in the **Model** tab.

Options

Main Body of Dialog

These options define what data is imported.

- **Recursively Process Subdirectories** - select to make Enterprise Architect search the directory being imported for subdirectories, and to also process them
- **Create Logical Diagram for Each Package** - select to make Enterprise Architect create a logical diagram for each package being imported
- **Import defined components** - select to import only those packages with defined components
- **Do not import private members** - select to prevent private members from being imported.

Package Structure

This selection offers different methods for controlling packaging of the imported objects.

- **Create Package Per Directory** - select to create a new package for each directory, including the selected root and all subdirectories if recursion is checked
- **Create Package Per Namespace** - select to create a new model package for each namespace encountered in the code being imported
- **Create Package Per File** - select to create a new package for each source file that is being imported.

Synchronization

This section controls the way Enterprise Architect's import process deals with pre-existing models.

- **Synchronize existing classes** - select to synchronize models; existing models are altered to comply with the results of reverse engineering, but are not completely overwritten or deleted
- **Overwrite existing classes** - select to overwrite any model with the same name already existing in the package you are importing to, with the newly-generated model.

Remove Classes not found in code

- **Never delete** - select to never delete any Classes found in the model but not found in the code
- **Prompt for action** - select to prompt you if Classes found that are not in the code are to be removed first
- **Always delete** - select to delete Classes without prompting you.

New Diagram Options

This button displays the **New Diagram Options** dialog, through which you define what features are to be visible in any diagrams generated by the import.

7.3 Model Driven Transformation

MDG Integration for Visual Studio supports the Model-Driven Architecture and the use of Platform Independent Models (PIMs) and Platform Specific Models (PSMs).

You can create a PIM and define rules for transforming a PIM into a PSM. For instance, a single independent model might generate specific models that account for particular features of a system or language, such as C# or Java.

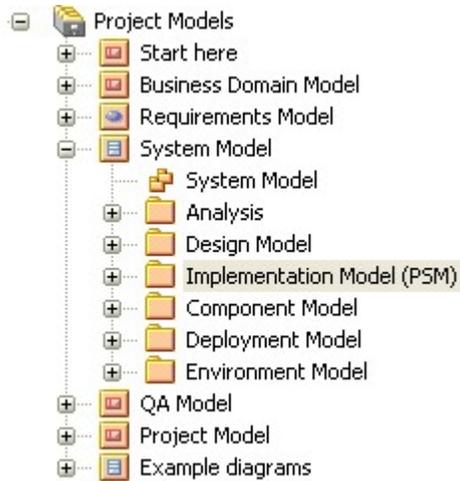
To perform an MDA transform you must have a master model, the PIM. Once you have created or imported a

model, right-click on the containing package and select the **Current Package | Apply MDA Transformation** context menu option. The **Model Transformation** dialog displays.

When the dialog displays, all elements are selected and all transformations previously performed from any of the Classes are checked.

Control	Description
Elements	Selects the elements that are to be included in the transformation.
All	Selects all of the elements from the list to be included in the transformation.
None	Deselects all of the elements from the list.
Transformations	Enables you to select which transformations to perform and the package each of them should be transformed to.
Select Package [...]	Use the [...] button to select the package in which the transformed elements are created.
Generate Code on result	Specifies whether or not to automatically generate code from the target classes.
Perform Transformations on result	Specifies whether transformations previously done on target classes should be automatically executed.
Intermediary File Path	Specifies the filename of the intermediary file (if any).
Write Always	Specifies whether an intermediary file should be written to disk.
Write Now	Generates the intermediary file but doesn't perform the transform.
Do Transform	Executes the transform command.

For instance, to transform the basic package into a C# application, in the **Transformations** panel select the checkbox for **C#**. Once you select the transformation type, Enterprise Architect prompts you to select the destination folder. In the example below the *Implementation Model (PSM)* folder is selected:



Click on the **Do Transform** button to perform the transformation. These Classes are also generated as code and imported into the Visual Studio Project.

Part



8 Import Database Schema from ODBC

MDG integration for Visual Studio supports importing database tables from an ODBC data source. Tables are imported as stereotyped Classes with suitable data definitions for the source DBMS.

Note:

Import of stored procedures and views is supported for DB2; SQL Server; Firebird/Interbase; Informix; Ingres; Oracle 9i, 10g and 11g; MySQL; PostgreSQL; Sybase Adaptive Server Enterprise (ASE) and Sybase Adaptive Server Anywhere (ASA).

Import Database Tables and Stored Procedures

To import database tables and stored procedures, follow the steps below:

1. Select a package in the **EA Project Explorer**.
 2. To import into:
 - the package only, right-click on the package and select the **Code Services | Import DDL from ODBC** context menu option
 - a suitable diagram in the selected package, right-click on the opened diagram and select the **Import DB Schema from ODBC** context menu option.
- The **Import DB Schema from ODBC Source** dialog displays.

Database Name: Post Testing

Filter

Schema/Owner:

Include System Objects

Include User Views

Include User Packages (Oracle)

Include User Stored Procedures...

Import as individual classes

Import as class operations

Include User Functions...

Import as individual classes

Import as class operations

Include User Sequences...

Import as individual classes

Import as class operations

Synchronization

Synchronize existing classes

Synchronize Table/Column Comments

Synchronize Column Default Values

Synchronize Check Constraints

Import as New objects

Import To...

Diagram & Package

Package Only

Import

Close

Help

3. See the [Import Database Schema from ODBC](#) topic in the *Enterprise Architect User Guide*.

Part



9 Baselines, Differencing and Merges

MDG integration for Visual Studio includes tools to help you manage and review changes to your models over time. These tools apply the concepts of *Baselines*, *Differencing* and *Merges*.

To access these facilities, right-click on the required package in the **EA Project Explorer** and select the **Current Package | Manage Baselines** menu option.

Baselines

MDG integration for Visual Studio provides a facility to create a *Baseline* (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*) 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 XML 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.

For further information on the Baseline and Differencing facilities, see the [Enterprise Architect User Guide](#).

Part



10 Generate RTF Documentation

MDG integration for Visual Studio can automate the generation of RTF documentation based on your project models. Rich text reports are documents produced by Enterprise Architect in Rich Text Format (RTF), a format common to many word processors.

The RTF Generator

Enterprise Architect has an enhanced RTF Document Generator that features:

- Powerful WYSIWYG RTF style template editor support, enabling:
 - Headers and Footers
 - Images
 - Indexes
 - Tabular Sections
 - Nested Sections
 - All model elements, connectors, diagrams and their properties
 - Template import and export using XML
 - Basic templates supplied for customization.
- A document generator that:
 - Provides simplified options
 - Generates complex documents based on RTF templates.
- An embedded RTF viewer that you use to view RTF documents generated in Enterprise Architect directly within Enterprise Architect.

To generate RTF Documentation

Briefly, to generate the documentation for a model package:

1. Right-click on the package name in the **EA Project Explorer**.
2. Select the **Current Package | Documentation | Rich Text Format (RTF) Report** menu option. The **Generate RTF Documentation** dialog displays.
3. Enter a filename for the document to be created, and select a style template.
4. Click on the **Generate** button to start Enterprise Architect generating the RTF file. The **Progress** bar displays the progress of the RTF generation.

Once the document has been created you can view it immediately by clicking on the **View** button. You can also view the document at any time later by opening the file from the directory in which it was created.

More Information

For further information on the **Generate RTF Documentation** dialog and RTF report generation, review the *Enterprise Architect User Guide*. To access this information, either:

- Click on the **Help** button on the **Generate RTF Documentation** dialog, or
- Click on this [Sparx Systems web page](#) link.

Note:

MDG Integration for Visual Studio does not apply Word Masters, Bookmarks or Virtual Documents. It uses the Enhanced RTF Document Generator and has no access to the Enterprise Architect Legacy RTF Generator.

Part



11 Generate HTML Documentation

MDG integration for Visual Studio can automate generation of documentation based on your project models.

To generate documentation for a model package:

1. Right-click on the package name in the [EA Project Explorer](#).
2. Select the **Current Package | Documentation | HTML Report** context menu option. The [Generate HTML Report](#) dialog displays.
3. Enter a title and the output directory for the web site to be generated.
4. Click **Generate** to generate the HTML files. The **Progress** field shows the progress of the HTML Generation.

Once the document has been created you can view it immediately by clicking on the **View** button on the dialog.

More Information

For further information on the [Generate HTML Report](#) dialog and HTML report generation, review the *Enterprise Architect User Guide*. To access this information, either:

- Click on the **Help** button on the [Generate HTML Report](#) dialog, or
- Click on this [Sparx Systems web page](#) link.

Index

- * -

*.EAP 8

- A -

Add

.EAP file 8
EA Model 8
Model Using Wizard 19
New Elements 19
New Packages 19

- B -

Baseline

Introduction 54

- C -

Category, Forum

Add 27

Code

Forward Engineer 45
Generate 45
Synchronize With Model 45
Working With 45

Compare

Utility 54

Compiled 17 April 2008 3

Connect

To TFS 33

Connection

Properties 33
To TFS, Configure 33

Controlled Packages 40

Create

Category In Forum 27
Post In Forum 27
Topic In Forum 27

- D -

Diagram

Edit 28
Properties 17

Diff Utility 54

Disconnect

From TFS 33

Discussion Forum 26

Add Category 27

Add Post 27

Add Topic 27

Edit Post 27

Message Dialog 28

Reply to Post 27

Documentation

HTML 58

RTF 56

- E -

EA Project Explorer 15

Introduction 15

Edit

Diagrams 28

Post In Forum 27

Element

Add 19

EULA 4

- F -

Forum 26

- G -

Generate

HTML Documentation 58

RTF Documentation 56

- H -

HTML Documentation

Generate 58

Hyperlinks

Hyperlinks
 Navigating 22

- I -

Import
 Binary 45
 Database Schema from ODBC 51
 DDL Schema from ODBC 51
 Directory 46
 TFS Work Items 31

- L -

License Agreement 4
 Link
 Multiple Projects 11
 To Model Package 11
 Visual Studio Project To Model Package 11
 Visual Studio Solution To Model Package 11

- M -

Manage
 Mapped Work Item Fields 34
 Mapped Fields
 Manage 34
 MDA Transformation 47
 MDG Integration for Visual Studio
 Components 15
 Copyright Notice 3
 Getting Started 8
 Introduction 3
 Model Tab 20
 Options 12
 Overview 6
 Software Product License Agreement 4
 Using 15
 Workflow 6
 Message Dialog
 Create New Category 28
 Create New Post 28
 Create New Topic 28
 Edit Post 28
 Reply to Post 28
 Model Driven Transformation 47
 Model Package

Link Project To 11
 Model Tab 20
 Hyperlinks 22
 View UML Diagrams 22
 Model Wizard 19
 Multiple Linking 11

- O -

ODBC
 Import From 51
 Options
 Refresh Model 12
 Synchronize Code 12

- P -

Package
 Add 19
 Assign Version Control 37
 Check In 37
 Check Out 37
 Configure 37
 Controlled 40
 Get Latest 37
 Get Package 37
 Put Latest 37
 WSDL Namespace 43
 PIM 47
 Platform Independent Model 47
 Platform Specific Model 47
 Post, Forum
 Add 27
 Edit 27
 Reply To 27
 Properties
 Diagram 17
 PSM 47

- R -

Reply
 To Post In Forum 27
 Reverse Engineer
 Import Binary 45
 Import Directory 46
 ODBC Data Sources 51

RTF Documentation
 Generate 56
 Run Search 25

- S -

Search
 Project 25
 Source Code Control 37
 Synchronize
 TFS Work Items 31

- T -

Team Foundation Server
 Configure Connection 33
 Connect To 33
 Disconnect From 33
 Import Work Items 31
 Maintain Work Items 33
 Synchronize Work Items 31

TFS
 Configure Connection 33
 Connect To 33
 Disconnect From 33
 Import Work Items 31
 Maintain Work Items 33
 Synchronize Work Items 31

Topic, Forum
 Add 27

- U -

UML 2.0
 Using 15
 UML Documentation View 15
 Display Diagrams 22
 UML Model 8
 Using UML 2.0 15

- V -

Version Control
 Assign 37
 Check In 37
 Check Out 37
 Configure 37

Controlled Packages 40
 CVS 37
 Features 39
 Get Latest 37
 Get Package 37
 Options 37
 Overview 39
 Put Latest 37
 SCV 37
 Setup 39
 Subversion 37
 System Requirements 39
 TFS 37
 Usage 39

View
 Model 20
 UML Diagrams 22
 Views
 Documentation 15

- W -

Web Services (WSDL) 43
 Work Item
 Manage Mapped Fields 34
 Map Fields To Enterprise Architect Properties 34
 Work Items
 Add New 33
 Import 31
 Link To Element 33
 Remove From Element 33
 Synchronize 31
 TFS 31
 TFS, Maintain 33
 WSDL 43

- X -

XML Schema (XSD) 42
 XML Technologies
 Introduction 42
 Web Services (WSDL) 43
 XML Schema (XSD) 42
 XSD
 XML Schema 42

MDG Integration for Visual Studio
www.sparxsystems.com