



Visual Studio Architecture Tooling Guide

Questions & Answers

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Visual Studio ALM Rangers

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Visual Studio ALM Rangers

This content was created by the Visual Studio ALM Rangers, a special group with members from the Visual Studio Product Team, Microsoft Services, Microsoft Most Valued Professionals (MVPs) and Visual Studio Community Leads.

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Acronyms

This guide uses the following common acronyms:

ACRONYM	DESCRIPTION
ATDT	Application Tier, Data Tier
HOL	Hands-on Lab
IIS	Internet Information Services
SDK	Software Development Kit Includes software and documentation needed to develop applications that are compatible with specified public operating-system and component interfaces.
TFS	Microsoft Visual Studio Team Foundation Server. Microsoft change management software for software development. Components include work item tracking, source code control, policy support and notifications, and report generating capabilities.
TR	TechReady is an internal Microsoft technology awareness and readiness event.
VC	Version control
WIT	Work item tracking
WSS	Microsoft Windows SharePoint Services A Microsoft Web-based team collaboration environment that provides the ability to create and access virtual workspaces for managing documents, discussions, lists, surveys and other important contextual information, such as team member status and presence.

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Introduction

Overview

Welcome to the Visual Studio Architecture Guidance.

This guidance discusses commonly asked questions and the answers as defined by the Product Group and Rangers.

This guidance should be used in conjunction with documentation that accompanies the product and Microsoft Developer Network (MSDN) at <http://msdn.microsoft.com>.

Visual Studio ALM Rangers

This content was created in a Visual Studio ALM Rangers project. Visual Studio ALM Rangers is a special group with members from the Visual Studio Product group, Microsoft Services, Microsoft Most Valued Professionals (MVP) and Visual Studio Community Leads. Their mission is to provide out of band solutions to missing features and guidance.

This guide targets the Microsoft “200-300 level” users of TFS. The target group is considered as intermediate to advanced users of TFS and has in-depth understanding of the product features in a real-world environment. Parts of this guide may be useful to the TFS novices and experts but users at these skill levels are not the focus of this content.

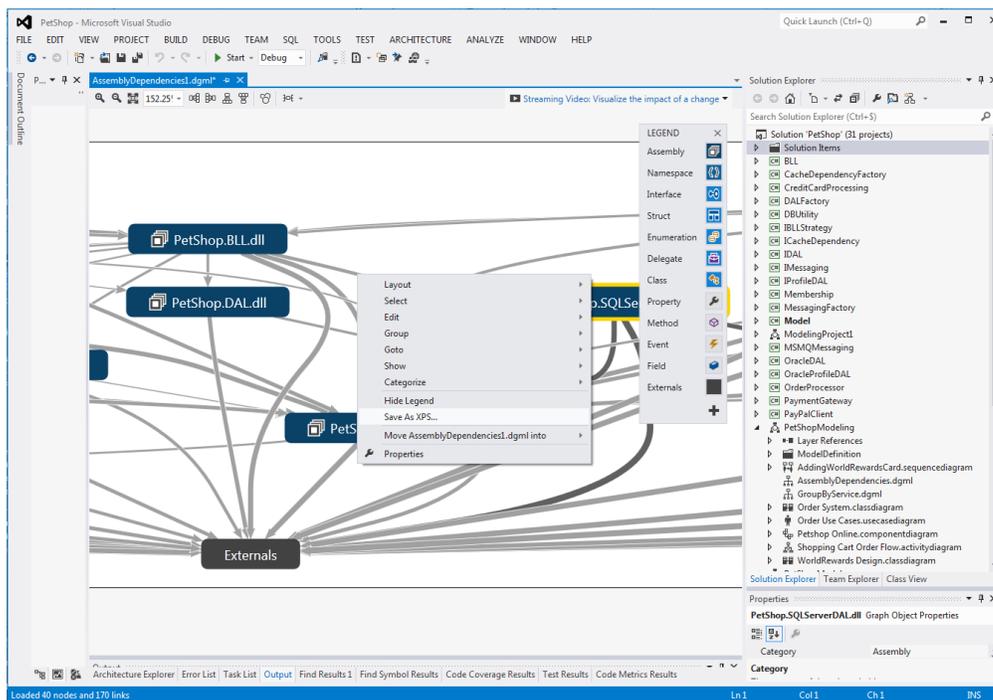
Questions & Answers Visual Studio Ultimate

Using Visual Studio Ultimate

Can I export a DGML Diagram?

Yes, using XPS for printing and as an image if you wish to embed image. Right-click the diagram surface and then click:

- **Save as XPS**
- Or -
- **Copy Image**



What artefacts do not support validation on layer diagram?

Artefacts that do not support validation against a layer diagram include Office documents, plain text files, and web sites. You can link them to layers, but the validation process will ignore them. C++ layer validation was also cut from Visual Studio 2012.

Can I validate the layer diagram as part of a team or buddy build?

Layer diagram validation is a powerful feature that enables you to validate your project or solution during the build process, which includes the local (F5 build & run) build, the Team Build, and Buddy Build. To enable the validation you need to follow these three steps:

- (1) set the Build Action property of the diagram to validate
- (2) set the Validate Architecture property to True
- (3) set the <ValidateArchitecture TaskOnBuild> element to true

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For more information, see [Validate Code Automatically during a Team Foundation Build¹](#). Refer to [Professional Application Lifecycle Management with Visual Studio 2010²](#) for more information on the team and buddy (private) builds and the layer diagram validation.

Can I update a sequence diagram from code?

When you generate a sequence diagram from code, you can update it manually to help discuss different proposals to change the code. But Visual Studio doesn't automatically update the diagram from code changes.

Does Architectural Validation based on Layer Diagrams in Visual Studio 2010 work with native, unmanaged C++ projects?

Layer validation does not work with native projects.

Can I export models to HTML?

You can write a text template to generate HTML from a model, or you can write your own menu command to do so. For more information, see [How to: Generate Code from UML Class Diagrams³](#). Additional support for code generation from layer diagrams and UML models is provided in [Export UML as images](#). However, there is no built-in command for rendering a model in HTML.

Does Visual Studio 2012 support forward engineering - UML to source code (UML to C#, Visual Basic.NET, ASP.NET, Visual C++.NET)?

The tool supports code generation from a diagram for C#, and you can add text templates for other languages. Moreover, the tool has an extensibility API that will allow you to transform the UML model data to any other kind of data, source included. For more information, see [How to: Generate Code from UML Class Diagrams⁴](#). For advanced scenarios, please see [How to Generate Files from a UML Model](#).

Is it possible to use Visual Studio 2012 to reverse engineer code into UML to visualize code and help with the review of the class models, dependencies and communication?

You can reverse engineer managed code projects (C# and Visual Basic.NET) to sequence diagrams in Visual Studio 2010 Ultimate. For more information, see [Exploring Code with Sequence Diagrams⁵](#). There are also other ways to help you understand existing code, such as [Visualizing Existing Code⁶](#). Dependency Graphs and Architecture Explorer, and new in Visual Studio 2012, Solution Explorer, provide a fantastic way to explore the dependencies or communications among parts of your source code or managed assemblies.

Solution Explorer isn't new in Visual Studio 2012, but you can now view classes and methods in code files and create dependency graphs.

You can also drag namespaces and classes from Architecture Explorer to a UML class diagram, and drag types from Solution Explorer to a UML class diagram.

Although you can visualize code in diagrams and generate code from models, Visual Studio does not support round-trip synchronization between UML models and code.

¹ [http://msdn.microsoft.com/en-us/library/fda2bad5\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/fda2bad5(v=vs.110).aspx)

² <http://www.amazon.com/gp/product/0470484268?ie=UTF8&tag=briakell-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0470484268>

³ [http://msdn.microsoft.com/en-us/library/ff657795\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/ff657795(v=vs.110).aspx)

⁴ <http://msdn.microsoft.com/library/ff657795.aspx>

⁵ [http://msdn.microsoft.com/en-us/library/ee317485\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/ee317485(v=vs.110).aspx)

⁶ [http://msdn.microsoft.com/en-us/library/dd409365\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/dd409365(v=vs.110).aspx)

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Is it possible to generate a word document containing use case diagram and the description of each use case in the diagram?

There is no out-of-the box support for this feature at this stage, but some community members are working on an extensibility tool <http://uml2doc.codeplex.com>. The API with which you can write your own tools of this kind is described at [Extending UML Models and Diagrams](#)⁷.

There is a sample on the Code Gallery [Simple Example of Creating Word Document from a Modeling Project](#).

Is there a two-way sync from model to code and code to model?

Other than [Visual Studio 2010 Class Diagram](#)⁸, which is also available in Visual Studio 2005 and Visual Studio 2008, the five UML diagrams that were included with Visual Studio 2010 do not support two-way synchronization. You can write templates that allow you to [generate code from a UML model](#), which can be [automatically updated](#) when you update the model. Code generation for C# and reverse engineering for managed languages is also provided.

Is there a way to set stereotypes (such as .NET Class) on classes in a UML class diagram?

Yes. You have to attach a profile to a package or to the root of your model. A profile contains a set of stereotype definitions. You can then use those stereotypes on elements in the package or model.

There are some standard profiles, which you can select by setting the Profile property of a package or model – for example, the .NET profile. You can also define your own profiles and stereotypes. For more information, see [Customizing your Model with Profiles and Stereotypes](#)⁹ and [VSTA 2010 & UML Profiles \[make your own\]](#)¹⁰.

Is XMI export/import supported? If yes, what version(s) of XMI?

XMI Import is available for XMI version 2. For more information, see [How to Import Model Elements from XMI Files](#)¹¹. Support for XMI Export is not directly provided, but you can build and use the VsVmSdk sample named [“XMI Exporter Extension for UML Designers.”](#)

What are the recommendations or best practices concerning multi-user editing of model projects?

Use packages. The contents of each UML package are stored in a separate .uml file in the project. This minimizes possible merge conflicts. For more information, see [Managing Models and Graphs under Version Control](#)¹².

What interactions are supported between the UML features and work items?

In Visual Studio 2012, you are able to link any number of work items to any model elements. See [How to: Link Work Items to Model Elements](#)¹³. For example, you can associate work items with a use case diagram or its elements. If you also install Visual Studio Team Foundation Server 2012, you can link to models from work items.

What is the complete list of all of the new architecture tools features introduced with Visual Studio Team Foundation Server 2012 and Visual Studio 2012?

[Support for UML Diagrams](#), including:

- [Class](#)

⁷ [http://msdn.microsoft.com/en-us/library/ee329484\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/ee329484(v=vs.110).aspx)

⁸ <http://msdn.microsoft.com/library/ab7aty24.aspx>

⁹ <http://msdn.microsoft.com/library/dd465156.aspx>

¹⁰ <http://www.clemensreijnen.nl/?tag=/uml+profiles>

¹¹ [http://msdn.microsoft.com/en-us/library/ff657797\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/ff657797(v=vs.110).aspx)

¹² [http://msdn.microsoft.com/en-us/library/dd574364\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/dd574364(v=vs.110).aspx)

¹³ [http://msdn.microsoft.com/en-us/library/dd465152\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/dd465152(v=vs.110).aspx)

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- [Use Case](#)
- [Sequence](#)
- [Component](#)
- [Activity](#)

Architectural Validation¹⁴

- [Layer Diagrams](#) let you model the layers, the key components and communication. You can [validate your code](#) against the layer diagram.
- [Validating the code as part of the build](#), using specialized MSBuild tasks.
- Code discovery
- [Architecture Explorer](#)
- DGML Graphs.
 - DGML: DGML, in this context, refers to Directed Graph Mark-up Language. Cameron Skinner (Visual Studio Ultimate lead) has a great post on it [here](#)¹⁵. In addition, <http://www.lovetsoftware.com> is a great source of information.
 - Tools for [exploring code with DGML](#) are provided out of the box. You can also create your own tools to generate directed graphs to help you explore any set of relationships.
 - Visual Studio 2012 brings a lot of improvements, among which are scalability and performance, thanks to the use of a code index, as described in [Visualize Code with Visual Studio 2012](#). It is also worth watching the video from [What's new in Visual Studio 2012 Dependency Graph Features](#).
- [.NET sequence diagrams from code](#)
- [Work Item integration](#)

Extensibility

- [MEF](#) based
 - MEF stands for Managed Extensibility Framework, which enables plug-in extensions into the VSTS product.
- MEF is included from the .NET 4.Framework
- For more information about MEF, refer to <http://www.codeplex.com/MEF> or [http://msdn.microsoft.com/en-us/library/dd460648\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/dd460648(v=vs.110).aspx)

Code index

- There is an SDK for the Code Index (See <http://blogs.msdn.com/b/visualstudioalm/archive/tags/code+index/>)

Which version of UML is supported?

Visual Studio 2012 supports UML version 2.1.1.

¹⁴ [http://msdn.microsoft.com/en-us/library/dd418995\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/dd418995(v=vs.110).aspx)

¹⁵ <http://blogs.msdn.com/camerons/archive/2008/12/16/introduction-to-directed-graph-markup-language-dgml.aspx>

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Environment (Install, Configure, ...)

Do we now require Ultimate to use the .NET Class Diagram, or is that still included in the lower levels of Visual Studio?

The .NET Class Diagram still exists in Visual Studio Professional.

The UML Class Diagram (and all other architecture diagrams) can be opened quasi-read only in Visual Studio Premium. Quasi-read only means that user can make some diagram only edits (moving/expanding) shapes, but cannot change the underlying model, that is, users cannot add/remove any model elements (shapes or relationships). Visual Studio Ultimate allows full read/write access to everything.

Do developers and build machines require Visual Studio Ultimate to validate the architecture?

You do not need to install Visual Studio Ultimate, because "Validate Architecture" is also enabled in Visual Studio 2010 Premium.

Note:

- You cannot edit the models using Visual Studio Premium, such as add or remove items on a diagram.
- You need Premium or Ultimate installed on the build machine to validate the Layer diagram.

Do we now require Visual Studio Ultimate to use the DGML Graphs?

The DGML graphs are available as quasi-read only (see above) in Visual Studio Premium and Visual Studio Professional. Getting DGML diagrams from your code is only available in Visual Studio Premium. The Code Index is also only available in Visual Studio Ultimate.

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General

Were the architecture diagrams and features developed using the DSL Tools?

The five UML diagrams (Class, Sequence, Use Case, Component, and Activity) plus the Layer diagram are built upon the DSL tools. Rich capabilities to customize these diagrams are provided as well. See [Extending Models and Diagrams](#) (page 16) for details.

Do Layer Diagrams support code generation?

You can read the model, but there is no direct assistance in generating code from a layer diagram. See [Visual Studio Feature Pack June 2010¹⁷](#) for more information.

Can Graph documents graph store procedures or database objects?

If you mean in an ER-like notation, the simple answer is “No.” You could use UML and Profiles to represent database schema and procedures. So we’d point you back the [database diagramming¹⁸](#) features that have been in Visual Studio for a long time now, as well as at the [Entity Data Model¹⁹](#) designers if you are interested in generating an object-relational model (ORM) above your database.

Is there any link from the UML diagrams to the actual classes in code?

There is no out-of-the box support for this feature at this stage. In

Visual Studio Ultimate 2012, you can create a UML class diagram that has links back to the code. You can also write your own extensions that can [associate references of any kind to any UML element²⁰](#). Finally, you might be interested in the following sample: [“Visual Studio UML : Link elements to slides, Word, files, diagrams”](#)

What version of the .NET Frameworks do the code visualization features support? 1.1? 4?

Yes – any version. If it is a managed assembly, we can visualize it.

¹⁶ <http://msdn.microsoft.com/library/ee329484.aspx>

¹⁷ <http://go.microsoft.com/fwlink/?LinkID=190713>

¹⁸ <http://msdn.microsoft.com/library/ms188251.aspx>

¹⁹ <http://msdn.microsoft.com/library/bb738482.aspx>

²⁰ <http://msdn.microsoft.com/library/ee534032.aspx>

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Extensibility

Is there a way to do layer validation at check-in time?

Yes, for users with Visual Studio Premium or Visual Studio Ultimate. Include `<ValidateArchitecture>true</ValidateArchitecture>` in the modeling project (.modelproj). For more information, see [Validate Code Automatically in a Local Build](#).

Note: Layer diagram validation requires Visual Studio Premium or higher.

DSL Tools

Can I migrate a Domain-Specific Language to a new version from Visual Studio 2010 to Visual Studio 2012?

Yes, you can migrate your DSL's projects. To understand how to you can migrate visit: [http://msdn.microsoft.com/en-us/library/cc825931\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/cc825931(v=vs.110).aspx)