magicdraw™

Architecture Made Simple

USER MANUAL

version 17.0.1

No Magic, Inc.

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CONTENTS

CONTENTS

CONTENTS

1 INTRODUCING MAGICDRAW

In the “Introducing MagicDraw” chapter, you will find the introductory information about MagicDraw.

About MagicDraw and UML

Today’s graphical software can be extremely complex in its structure and architecture, but that does not mean it must be difficult to use. We have learned much from the hardware industry, where everything you see is scattered pieces. This approach also works well in the software world – objects at a higher abstraction level are treated like “software pieces”. To simplify the process further, we may use pictures instead of textual descriptions to show the relationships between objects in a complex system. Though pictures work better than textual descriptions alone, experience has proven that communicating complex ideas effectively requires more than simple flowcharts.

Early methodologies, such as Booch notation, OMT, and others served the same purpose: to graphically express the software’s architecture information. However, these methodologies accomplished this in slightly different ways and with different levels of thoroughness. In 1994, Grady Booch, Jim Raumbaugh, and Ivar Jacobson came together to unify their varied methods and experience. The UML (Unified Modeling Language) was the fruit of their joint effort. UML was crafted with two objectives: To reflect the best practices of the industry and to demystify the process of software system modeling.

In short, UML provides standardized pictures of your software applications and allows your development team to quickly grasp the functionality contained within the application. UML is a language and a process with neutral notation. This means that you can use it to design your entire OO system in any programming language and any software development process.

The development of a model for an industrial-strength software system, prior to its construction or renovation, is as essential as having a blueprint for a large building. Good models are vital for effective communication among project teams.

In the early 1990s, the tools for OO software modeling emerged, followed by the development of the visual modeling approach. Visual modeling means that you first design your system by drawing diagrams (blueprints) and then employ tools to convert those diagrams into code. The value of such an approach is that the often tedious framework coding is done automatically, freeing the programmer to focus on design issues. The transition from the design to the implementation phase is smoother and more straightforward. Moreover, using the features of reverse engineering and code generation, the developer can move back and forth between the code and the design that is being expressed in the diagrams.

Today, visual modeling tools provide many features that replace some of the more tedious tasks for the designer, programmer, and documentation writer. Some of the leading tools provide so-called round-trip code engineering capabilities – the structure of reverse engineered code is changed in the modeling tool and is generated back without the implementation of specific information (e.g. method bodies, comments) being lost.

MagicDraw is a visual UML modeling and CASE tool with teamwork support. Designed for Business Analysts, Software Analysts, Programmers, QA Engineers, and Documentation Writers, this dynamic and versatile development tool facilitates analysis and design of Object Oriented (OO) systems and databases. It provides the industry's best code engineering mechanism (with full round-trip support for Java, C#, C++, WSDL, XML Schema, and CORBA IDL programming languages), as well as database schema modeling, DDL generation and reverse engineering facilities.

As of the version 17.0.1, MagicDraw supports UML v2.4. For the detailed information about supported changes of UML specification from version 2.3 to 2.4, see "NEW! Appendix II: UML 2.4.1 Support" on page 823.

MagicDraw Editions and Features

A detailed list of MagicDraw features can be found at:
http://www.magicdraw.com/files/brochures/a4/MagicDrawDataSheet.pdf

MagicDraw Editions

MagicDraw Personal Edition

MagicDraw Personal Edition contains powerful UML diagramming capabilities, including full UML 2 support and extensibility features, basic reporting functionality, and image export. Exported files are stored in XMI format. **NEW!** Sine of the version 17.0.1 MagicDraw supports XMI 2.4 format.

All model elements can be accessed via the MagicDraw Open API.

In this edition, you will find everything you need to draw, edit, and publish your UML models.

Personal Edition is available only in a standalone version and is not designed for use with MagicDraw Teamwork Server.

MagicDraw Standard Edition

MagicDraw Standard Edition provides all of the Features of Personal Edition and adds WAE, content, and Robustness diagrams. Standard Edition also adds model analysis and facilitation features, customizable and extendable patterns, integrations with most popular IDEs, and a set of predefined model templates and UML profiles.

Standard Edition supports UNISYS XMI and the latest Model Driven Architecture (MDA) tool offerings. UNISYS XMI diagramming extensions allow the interchange of MagicDraw models with other UML modeling tools. **NEW!** Sine of the version 17.0.1 MagicDraw supports XMI 2.4 format.

Standard Edition is available in standalone, floating and mobile license versions and is fully compatible with MagicDraw Teamwork Server.

Standard Edition is ideally suited for analysts and architects who need various model extensions and modeling facilitations.

MagicDraw Professional Edition

Professional Edition is built on the Standard Edition capabilities and is available in one of three programming language specific versions-Java, C++ and C#. In addition to the Standard Edition features, Professional Edition adds code generation and reverse engineering functionality. Depending on the language version selected, the user will receive:

- **Java version** - Code engineering for Java, Java bytecode. Integration with Java IDEs.

- **C++ version** - Code engineering for C++.
- **C# version** - Code engineering for C#, CIL (MSIL).

Professional Edition is ideal for anyone who wants to generate code from an existing model or create a UML model from an existing project.

MagicDraw Architect Edition

The Architect Edition is specially packaged to provide the optimal price and technical features necessary for architects that do not need the full capabilities of the Enterprise Edition. This edition combines the common functionality of the Standard Edition together with some powerful options from the Enterprise Edition. These include: advanced modeling facilitations and analysis, reverse engineering and code generation for DDL, WSDL, CORBA IDL and XML. Architects have less need for IDE integrations as well as Java and C++ code engineering, so these capabilities are not included.

MagicDraw Enterprise Edition

MagicDraw Enterprise Edition represents the top of the line in the MagicDraw family of products, as well as the ultimate solution for all your modeling needs. Enterprise Edition combines all of the functionality of the Personal and Standard Editions, and all three versions of the Professional Edition, into a comprehensive state-of-the-art UML programming solution. But the Enterprise Edition does not stop there, adding code engineering and diagramming functionality in CORBA IDL, EJB, WSDL and XML schema. For working with DB structure, Enterprise Edition not only provides code engineering and diagramming, but also provides structure retrieval via JDBC.

Enterprise Edition is a must when working with multiple development technologies and databases.

The MagicDraw family of award-winning products represents the most powerful and best value in the UML modeling industry today.

MagicDraw Reader Edition

MagicDraw Reader Edition is made for reading and previewing UML models created with MagicDraw and it is free of charge. It is extremely useful when you want to share your ideas expressed in UML with partners, colleagues, or clients, who do not have a copy of MagicDraw. Printing and image export capabilities are also included.

Since MagicDraw version 14.0, Reader Edition has the ability to open and review Teamwork Server projects.

Other MagicDraw Features and Add-ons

Reports Generation

You will find a complete description of the MagicDraw Report Wizard, related OpenAPI, and tutorial in"MagicDraw ReportWizard UserGuide.pdf".

Floating License

The Floating license agreement does not limit the number of clients you can install on different computers. It only limits the number of applications that can run at the same time. To control loaded applications, a server is required. The server can be installed on several computers, but simultaneously can be started only on the one of them. The license key of the floating server provides information to the server about how many applications may run simultaneously for the particular MagicDraw edition. If you upgrade the MagicDraw version, you do not have to obtain a new license key for the server. The Administrator's Console is used to manage client connections and configure the server.

For more information about MagicDraw Floating License, see "MagicDraw FloatingLicense UserGuide.pdf".

Teamwork Server

NOTE	The Teamwork Server is available with MagicDraw application (Standard, Professional, Architect, and Enterprise editions).

With MagicDraw Teamwork Server, you can assign as many developers as needed to work simultaneously on the same project using multiple workstations. The resulting Teamwork project is saved on the server for sharing by other MagicDraw applications. Users with administrator rights can create new users by giving them their own login name and various permissions to work on projects. Depending on permissions, users can update, commit, edit, create, and delete model elements, diagrams, and projects.

To enable Teamwork support, you should install and run the MagicDraw Teamwork Server software. Each MagicDraw application acts as a client in the Teamwork system.

Teamwork Server functionality is available with MagicDraw client Standard, Professional, and Enterprise Editions only. MagicDraw Reader Edition is allowed to open and review teamwork projects.

As of version 17.0 you can use the secure connection (SSL) while working with Teamwork Server.

For more information about Teamwork License Server, see "MagicDraw Teamwork UserGuide.pdf".

Code and Database Engineering

MagicDraw code engineering provides a simple and intuitive graphical interface for merging code and UML models, as well as preparing both code skeletons out of UML models and models from code.

MagicDraw code engineering features can be very useful in several situations:

- You already have code that needs to be reversed to a model.
- You wish to have the implementation of the created model.
- You need to merge your models and code.

The tool may generate code from models and create models out of code (reverse). Changes in the existing code can be reflected in the model, and model changes may also be seen in your code. Independent changes to a model and code can be merged without destroying data in the code or model.

MagicDraw UML code engineering supports Java, Java Bytecode, C++ (ANSI, CLI, Managed), C#, CIL, CIL Disassembler, CORBA IDL, DDL (Cloudscape, DB2, Microsoft Access, Microsoft SQL server, MySQL, Oracle, Pervasive, Pointbase, PostgreSQL, Standard SQL, Sybase), XML Schema, WSDL, and EJB 2.0 notation.

For more information on working with code engineering and databases, see "MagicDraw CodeEngineering UserGuide.pdf".

OpenAPI

This document describes the MagicDraw Open Java API and provides instructions on how to write your own plug-ins, create actions in the menus and toolbars, change UML model elements, and create new patterns.

For more information on working with OpenAPI, see "MagicDraw OpenAPI UserGuide.pdf".

Integrations

MagicDraw supports the following integrations:

- Eclipse
- RAD
- IntelliJ
- NetBeans
- OAW
- AndroMDA
- ProActivity
- CVS
- CaliberRM

For more information about MagicDraw integrations, see "MagicDraw Integrations UserGuide.pdf".

MagicDraw Customization

MagicDraw introduces several advanced customization engines, based on UML Profiles:

- Custom Diagram Wizard allows creating your own diagram types for custom profile. You may include your own toolbars, stereotyped elements, symbol styles, and custom smart manipulators. Such customization is saved in the special "diagram descriptor" that could be exchanged between users. This allows others to use your custom diagrams.
- Domain Specific Language Customization Engine (DSL customization engine) allows "tuning" domain specific profiles, customizing multiple GUI, model initialization, and semantic rules, creating your own specification dialogs. DSL customization is model-driven approach, based on UML profiling. Customization is saved as a UML model.
- Advanced UML Profiling allows the use of some profiling enhancements that are not defined in UML, but helps to solve some common problems like tag grouping, unwanted stereotypes, tags hiding, etc.

For more information about MagicDraw customization, see "UML Profiling and DSL UserGuide.pdf".

MagicDraw Plugins

For the full MagicDraw plugins list, see the following website: www.magicdraw.com/plugin.

For the third party add-ons, check out https://secure.nomagic.com/third_party_plugins

NOTE	For information about MagicDraw and Plugins compatibility see the following website: http://www.magicdraw.com/compatibility. The table shows which versions of MagicDraw and MagicDraw Plugins can work together.

UPDM

The UPDM plugin for MagicDraw UML/SysML modeling solution fully supports building integrated enterprise architectures meeting DoDAF and MODAF requirements ensuring mission critical project success. The plugin supports all DoDAF 1.5, DoDAF 2.0, and MODAF 1.2 viewpoints and views dependent on the selected user environment. Each user environment provides architecture framework specific concepts, artifacts, new project templates, samples, and architecture framework specific usability features. A user environment can be changed any time by fully converting model to meet requirements of the selected architecture framework.

More information at https://secure.nomagic.com/updm_plugin

SysML

The SysML plugin includes SysML profile, template, all SysML diagrams, SysML samples project, SysML usability features, and System Engineer perspective. The System Engineer perspective (the specific mode of the MagicDraw user interface for SysML modeling) includes SysML specific menus, toolbars, diagrams, specification dialogs and user interface.

More information at https://secure.nomagic.com/sysml

Cameo DataHub

Cameo DataHub™ is a tool that allows the user to import, export, synchronize, and make references between Cameo Requirements+™, MagicDraw, SysML Plugin, DoDAF Plugin, Telelogic DOORS, Rational RequisitePro, and CSV files.

More information at https://secure.nomagic.com/cameodatahub

Cameo SOA+

Cameo SOA+™ leverages the Unified Modeling Language® (UML®) along with the latest SOA modeling standard, SoaML™, to provide both architects and developers an integrated solution for creating optimal SOA architectures and implementations. Cameo SOA+™ brings together SOA at both the business and technology levels to address the full spectrum of services. From Enterprise and Business Architectures to implementing, using and composing services on your favorite enterprise service bus (ESB) or application server, this integrated plug-in is versatile enough for both personal and team-based development. SoaML helps create and use services based on new and existing capabilities using composite services.

More information at https://secure.nomagic.com/cameo_soa

Cameo Data Modeler

Cameo Data Modeler™ plugin for MagicDraw® provides support for Entity-Relationship modeling. It expands previous Business Entity-Relationship diagram (a limited form of ER diagram) to full featured Entity-Relationship diagram - including extended entity-relationship concepts - generalization support.

More information at https://secure.nomagic.com/cameo_data_modeler

Cameo Business Modeler

Cameo Business Modeler™ plugin for MagicDraw provides support for BPMN 2.0 profile, diagrams, user perspective, usability features for BPMN modeling, manual, samples, and import from BPMN 1.1 models that were created with MagicDraw. All four BPMN 2.0 diagrams are supported.

More information at https://secure.nomagic.com/cameobusinessmodeler

Merge

Model Merge enables copying changes between different project versions. This functionality is usually needed when there are several branches that reflect different releases or versions of the product, e.g. when certain fixes have to be copied from a release branch to the mainstream development.

More information at https://secure.nomagic.com/merge

MagicRQ

MagicRQ plugin for MagicDraw is the first true Requirements Hub that can move requirements between Telelogic's DOORS or IBM Rational® RequisitePro® seamlessly. All of the requirements information is moved into MagicDraw for maximum traceability and interaction.

More information at https://secure.nomagic.com/magicrq

ParaMagic

ParaMagic plugin using the quantitative information and constraint relationships displayed in SysML diagrams, model-builders can run simulations from the earliest stages of system design. In traditional domains of system engineering like aerospace and transportation, users can explore system performance, estimate cost and allocate resources. Developers leveraging MagicDraw's DoDAF and business modeling capabilities can add parametric simulation using SysML submodels for defense planning, business process analysis and computational finance.

More information at https://secure.nomagic.com/paramagic

DoDAF

The DoDAF plugin includes DoDAF profile, template, all DoDAF diagrams, DoDAF documentation generation feature, DoDAF samples project, DoDAF usability features, and DoDAF Architect perspective. The DoDAF Architect perspective (the specific mode of the MagicDraw user interface for DoDAF modeling) includes DoDAF specific menus, toolbars, diagrams, specification dialogs and user interface.

More information at https://secure.nomagic.com/dodaf

Methodology Wizards

Methodology Wizards Plugin automates modeling tasks and extends methodology support in MagicDraw. This Wizard guides you through model creation process according to a set methodology.

More information at https://secure.nomagic.com/methodology_wizards

MARTE Profile

This specification of a UML® profile adds capabilities to UML for model-driven development of Real Time and Embedded Systems (RTES). This extension, called the UML profile for MARTE (in short MARTE), provides support for specification, design, and verification/validation stages. This new profile is intended to replace the existing UML Profile for Schedulability, Performance and Time.

More information at https://secure.nomagic.com/marte_profile

CSV Import

The CSV Import plugin is a MagicDraw plugin that will read values in a comma separated values (CSV) file and create model elements, diagrams and relationships from that data. MagicDraw users will have the capability to create MagicDraw models from their data stored in spreadsheets, relational databases and other repositories.

More information at https://secure.nomagic.com/csv_import_plugin

SPEM

SPEM - Adopted standard for software engineering process description. Standard provides generic elements those allow to describe any software development process. The purpose of SPEM is to support the definition of software development processes specifically including those processes that involve or mandate the use of UML. The SPEM plugin includes SPEM profile, template, all SPEM diagrams and properties customization.

More information at https://secure.nomagic.com/spem_plugin

SoaML Profile

Service oriented architecture Modeling Language (SoaML) profile.The goals of SoaML are to support the activities of service modeling and design and to fit into an overall model-driven development.

Enterprise Architect Import Plugin

MagicDraw has the capability to import UML models that conform to various XMI versions (including XMI 2.4) from other tools. Sparx Systems Enterprise Architect (EA) is one of those tools. EA provides a XMI export functionality which makes it possible to export UML2.4(XMI2.4). However, the XMI exported from EA contains some XMI conflicts and EA-specific data that do not conform to UML standards. The main purposes of Enterprise Architect Import Plugin are thus to solve XMI conflicts between EA and MagicDraw that cause problems when loading the XMI to MagicDraw and also to transform some EA-specific data to the form of UML elements with stereotypes.

MagicDraw RConverter

MagicDraw RConverter generates data files in Rational Rose's (*.mdl) to MagicDraw's (*.xml). By obtaining information from Rational Rose via Rational Rose API (REI) and using VB6.0 to calculate the change, the resulting file is saved in the MagicDraw file (xml file extension) format.

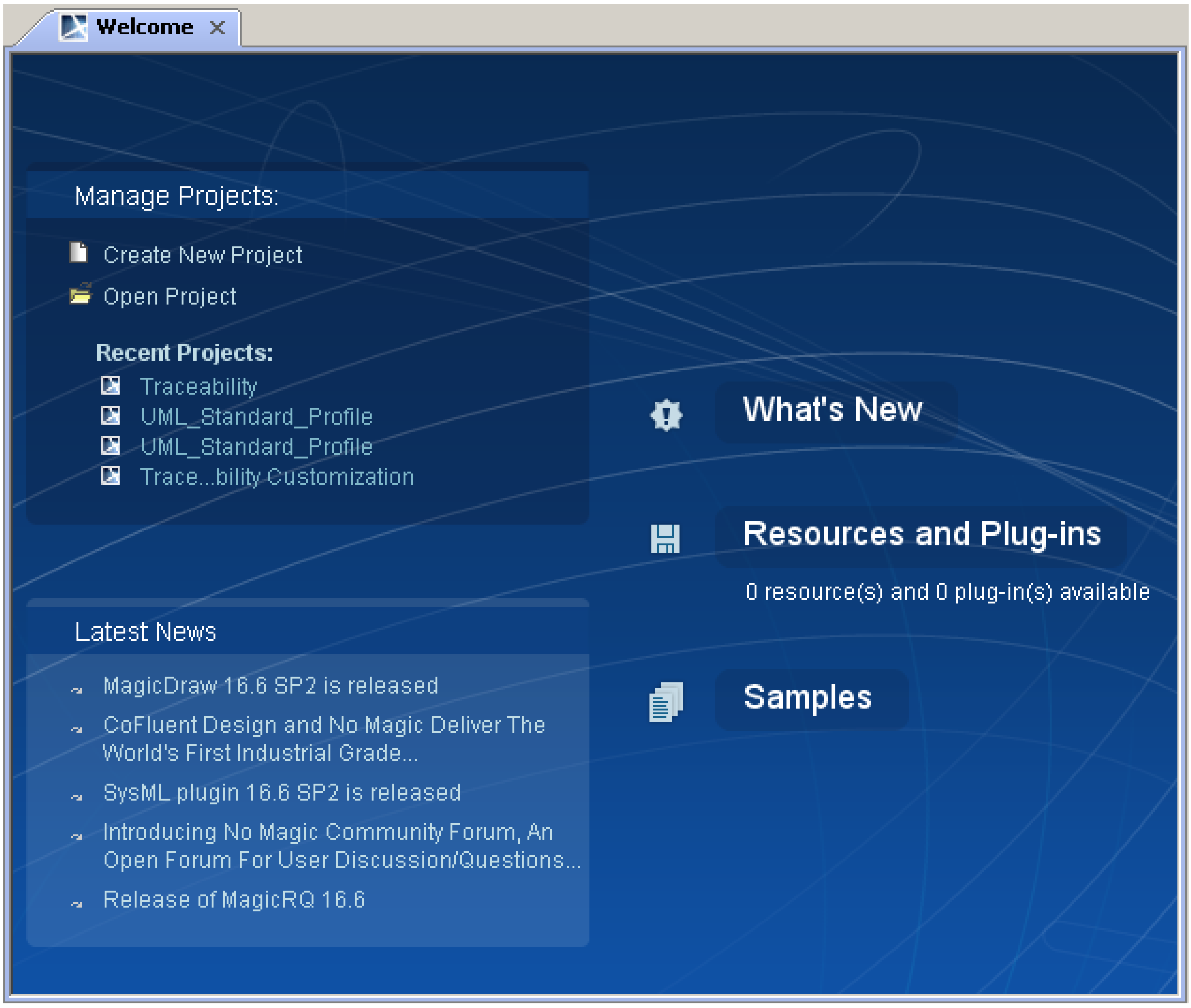
For information on working with RConverter, see "NM_MagicDraw_RConverter_UserManual.pdf".

MagicDraw Welcome Screen

The Welcome screen is displayed in the MagicDraw desktop when no projects are opened. It helps to manage projects, provides quick access to the product descriptions, samples, the latest news and updates. See the Welcome screen in Figure 1 on page 26.

To open the Welcome screen from the **Help** main menu, choose the **Show Welcome Screen** command (note that no projects should be opened).

The **Show Welcome Screen** option is added to the **Environment Options** dialog box, **General** branch, **Display** group. Using this option you can set whether the Welcome Screen will be displayed.



Welcome

Manage Projects:
- Create New Project
- Open Project

Recent Projects:
- Traceability
- UML_Standard_Profile
- UML_Standard_Profile
- Trace...bility Customization

Latest News
- MagicDraw 16.6 SP2 is released
- CoFluent Design and No Magic Deliver The World's First Industrial Grade...
- SysML plugin 16.6 SP2 is released
- Introducing No Magic Community Forum, An Open Forum For User Discussion/Questions...
- Release of MagicRQ 16.6

What's New

Resources and Plug-ins

0 resource(s) and 0 plug-in(s) available

Samples

Figure 1 -- The MagicDraw Welcome Screen

Manage Projects

- Click **Create New Project**, to create a blank project.
- Click **Open Project**, to open existing project.
- The **Recent Projects** list contains list of the recently opened projects.

Latest News

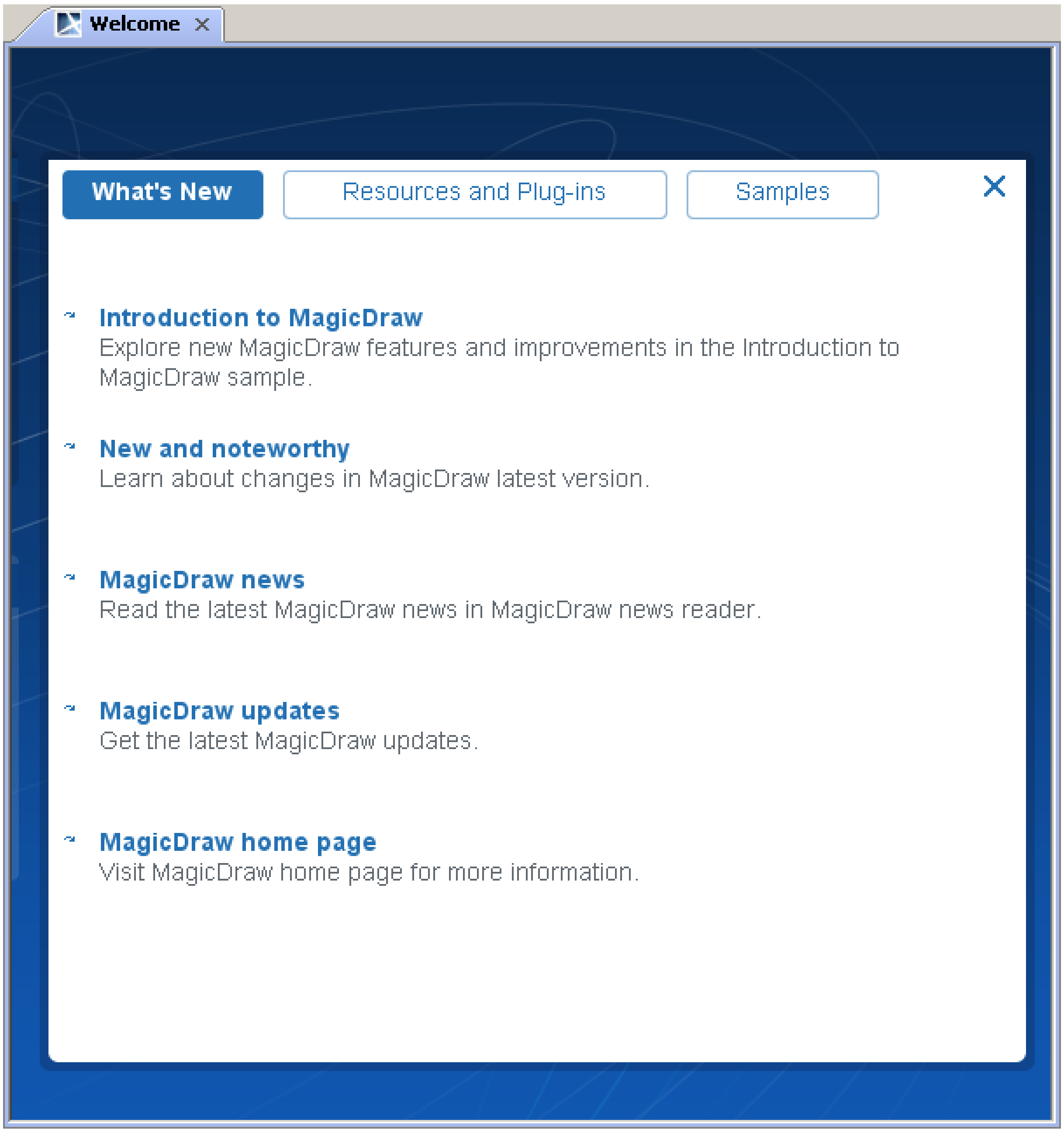
- Click on the particular news to read more detailed description. The news will be displayed in the MagicDraw News Reader. For more information, see “MagicDraw News Reader” on page 30.

What’s New tab

Click the description to open the following items:

- Introduction to MagicDraw. The introductory MagicDraw sample is opened.

- New and noteworthy. The www.magicdraw.com/newandnoteworthy webpage is opened. See the list of a new MagicDraw features for the newest version.
- MagicDraw news. The MagicDraw News Reader is opened. For more information, see "MagicDraw News Reader" on page 30.
- MagicDraw updates. The **Updates Information** dialog box opens, with a list of the latest updates. Here you will be able to see what updates are available and update to a newer version.
- MagicDraw home page. Click this link to navigate to the www.magicdraw.com webpage.



Introduction to MagicDraw
Explore new MagicDraw features and improvements in the Introduction to MagicDraw sample.

New and noteworthy
Learn about changes in MagicDraw latest version.

MagicDraw news
Read the latest MagicDraw news in MagicDraw news reader.

MagicDraw updates
Get the latest MagicDraw updates.

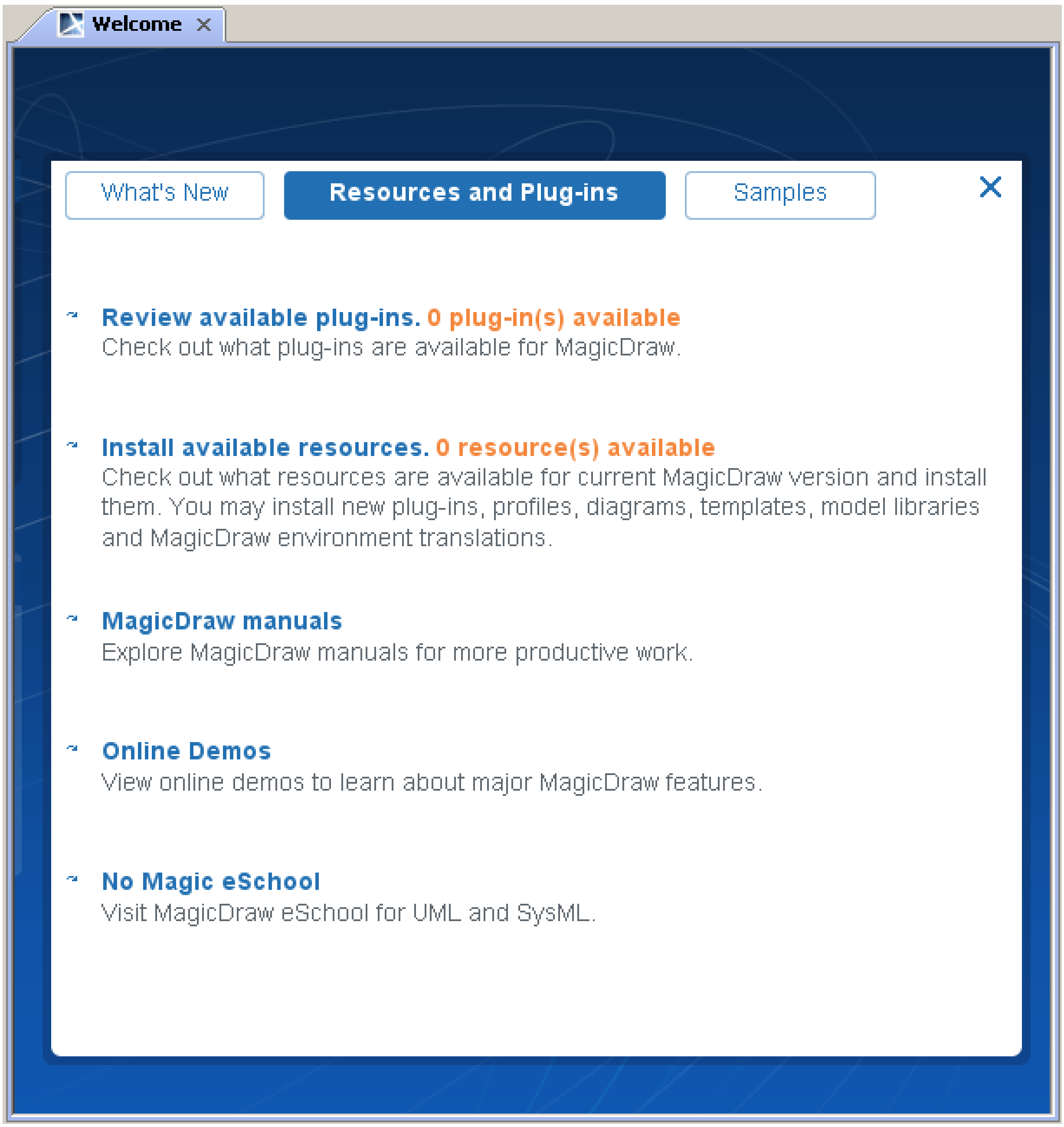
MagicDraw home page
Visit MagicDraw home page for more information.

Figure 2 -- The Welcome Screen, What's New tab

Resources and Plugins

- Review available plugins. The www.magicdraw.com/plugin page is opened. All available plugins descriptions are available in this page.

- Install available resources. Click to open the **Resource/Plugin Manager** window. Download and install available resources and plugins using this manager. For more information, see “Resource Manager” on page 369.
- MagicDraw manuals. Click to open the <MagicDraw installation directory>\manuals folder, which contains MagicDraw manuals.
- Online demos. The www.magicdraw.com/viewlets webpage is opened. View demos, which introduces MagicDraw and MagicDraw features.
- MagicDraw eSchool. The http://school.nomagic.com/ webpage is opened.



Review available plug-ins. 0 plug-in(s) available
Check out what plug-ins are available for MagicDraw.

Install available resources. 0 resource(s) available
Check out what resources are available for current MagicDraw version and install them. You may install new plug-ins, profiles, diagrams, templates, model libraries and MagicDraw environment translations.

MagicDraw manuals
Explore MagicDraw manuals for more productive work.

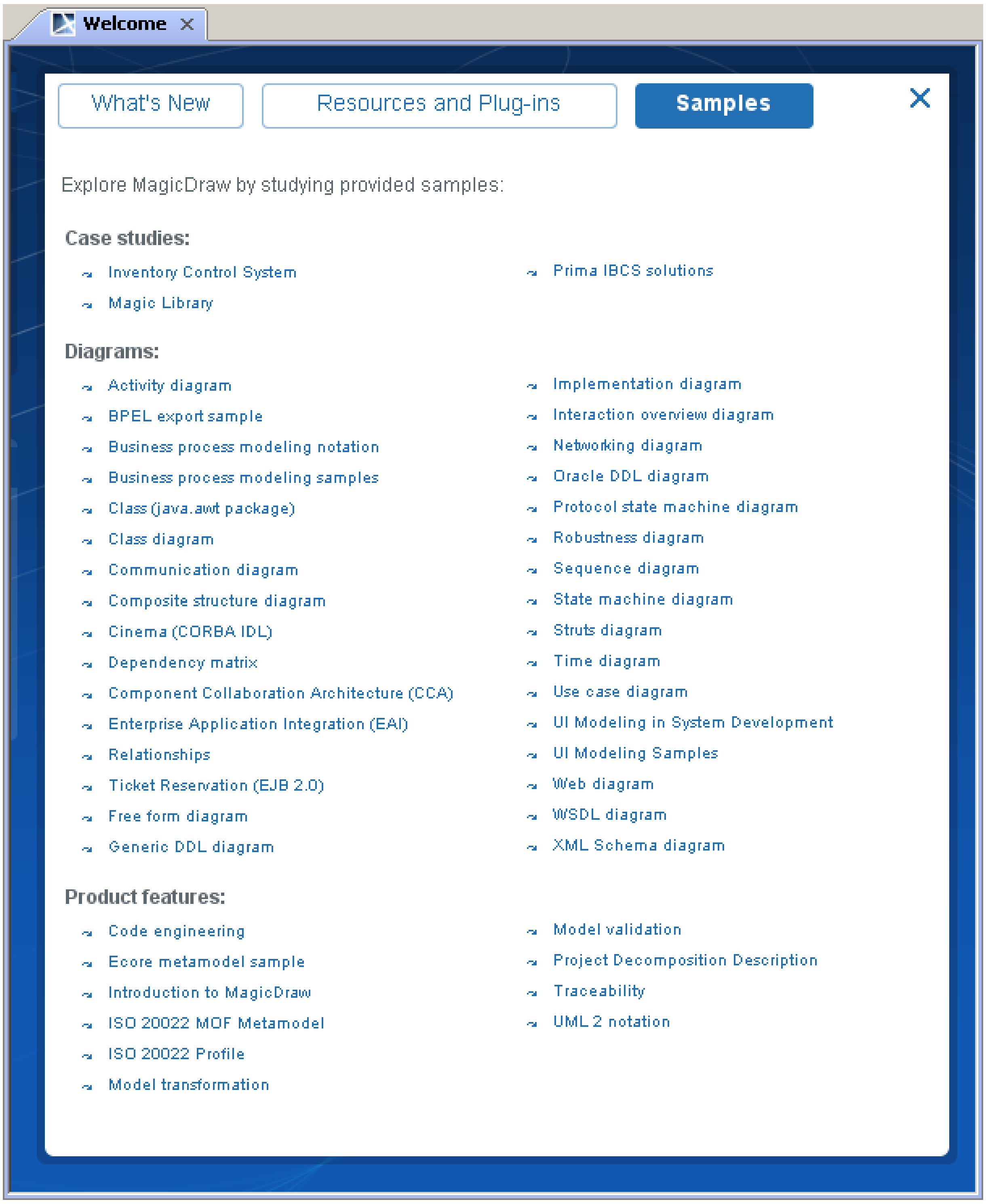
Online Demos
View online demos to learn about major MagicDraw features.

No Magic eSchool
Visit MagicDraw eSchool for UML and SysML.

Figure 3 -- The Welcome Screen, Resources and Plugins tab

Samples

Quick navigation to MagicDraw samples. All samples from <MagicDraw installation folder> \samples directory are accessible in this page.



Explore MagicDraw by studying provided samples:

Case studies:

- Inventory Control System
- Magic Library
- Prima IBCS solutions

Diagrams:

- Activity diagram
- BPEL export sample
- Business process modeling notation
- Business process modeling samples
- Class (java.awt package)
- Class diagram
- Communication diagram
- Composite structure diagram
- Cinema (CORBA IDL)
- Dependency matrix
- Component Collaboration Architecture (CCA)
- Enterprise Application Integration (EAI)
- Relationships
- Ticket Reservation (EJB 2.0)
- Free form diagram
- Generic DDL diagram
- Implementation diagram
- Interaction overview diagram
- Networking diagram
- Oracle DDL diagram
- Protocol state machine diagram
- Robustness diagram
- Sequence diagram
- State machine diagram
- Struts diagram
- Time diagram
- Use case diagram
- UI Modeling in System Development
- UI Modeling Samples
- Web diagram
- WSDL diagram
- XML Schema diagram

Product features:

- Code engineering
- Ecore metamodel sample
- Introduction to MagicDraw
- ISO 20022 MOF Metamodel
- ISO 20022 Profile
- Model transformation
- Model validation
- Project Decomposition Description
- Traceability
- UML 2 notation

Figure 4 -- The Welcome Screen, Samples tab

MagicDraw News Reader

Information about the latest MagicDraw events is provided in the new MagicDraw News Reader. The News Reader is accessible from the MagicDraw **Help** main menu, the **News Reader** command (see Figure 5 on page 31).

MagicDraw News Reader informs about:

- No Magic News. All news regarding company news, product news, new services provided, etc.
- New Versions. Messages about new MagicDraw releases, betas, service packs, plug-ins.
- Resources. Messages about MagicDraw resources updates.

When some news is available, a small envelope icon will be displayed at the right of MagicDraw status bar. Click on this icon to invoke the MagicDraw News Reader (see Figure 6 on page 31).

Reading news in the MagicDraw News Reader

Select the news channel at the left side of the MagicDraw News Reader and then select one of the news in the list. Bellow the title of the selected news, the description is presented. Unread messages are displayed in bold.

Click the **Open in Browser** link to read description on www.magicdraw.com website.

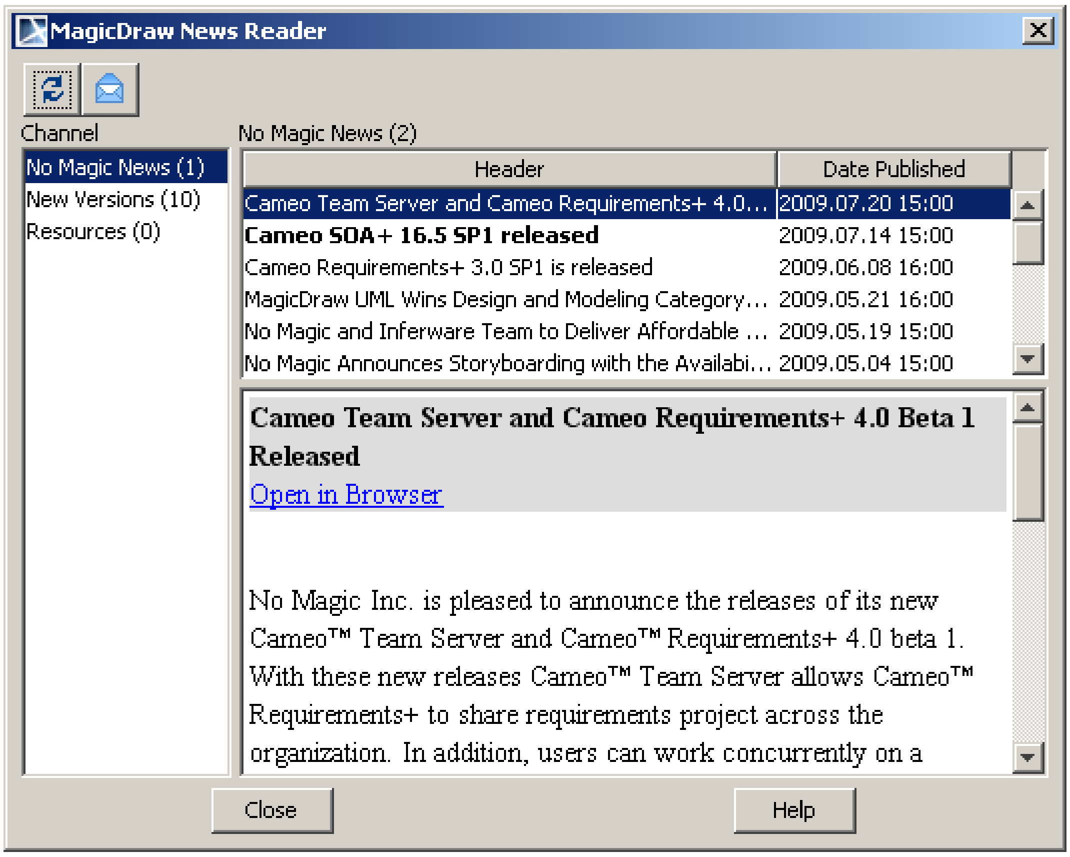
To refresh news, click the **Refresh** button at the left top corner of the **MagicDraw News Reader** window.

To mark all the selected items as read, click the **Mark item as read** button.

Setting options of the MagicDraw News Reader

To change the checking period, change the **Check for News** property in the **General** section of the **Environment Options** dialog. Property provides the following options:

- Once a day
- Once a week
- Once a month
- Do not check.



Header	Date Published
Cameo Team Server and Cameo Requirements+ 4.0...	2009.07.20 15:00
Cameo SOA+ 16.5 SP1 released	2009.07.14 15:00
Cameo Requirements+ 3.0 SP1 is released	2009.06.08 16:00
MagicDraw UML Wins Design and Modeling Category...	2009.05.21 16:00
No Magic and Inferware Team to Deliver Affordable ...	2009.05.19 15:00
No Magic Announces Storyboarding with the Availabi...	2009.05.04 15:00

Cameo Team Server and Cameo Requirements+ 4.0 Beta 1 Released
Open in Browser

No Magic Inc. is pleased to announce the releases of its new Cameo™ Team Server and Cameo™ Requirements+ 4.0 beta 1. With these new releases Cameo™ Team Server allows Cameo™ Requirements+ to share requirements project across the organization. In addition, users can work concurrently on a

Figure 5 -- MagicDraw News Reader

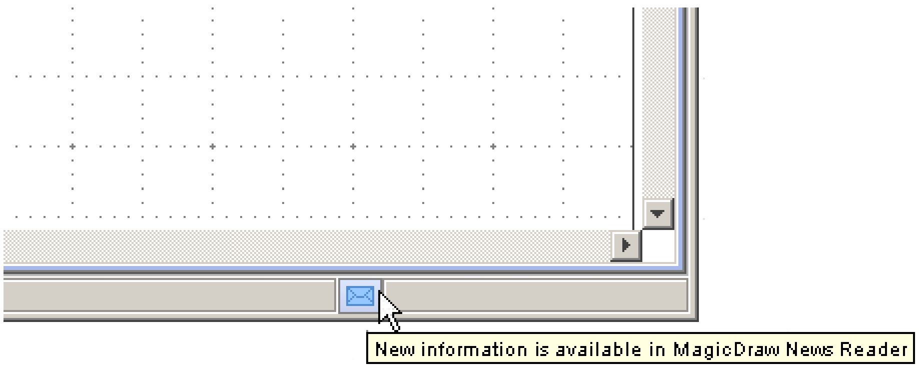


Figure 6 -- Envelope icon informs about news in MagicDraw News Reader

MagicDraw Documentation and Support

MagicDraw provides several kinds of documentation. Choose the way you want to learn.

The main source of information about MagicDraw is www.magicdraw.com and documentation can be downloaded from www.magicdraw.com/documentation.

New and Noteworthy

For information on MagicDraw new features, see New and Noteworthy at http://www.magicdraw.com/newand-noteworthy.

Manuals and User Guides

You can find the MagicDraw manual and user guides in “<MagicDraw installation>\manual” folder.

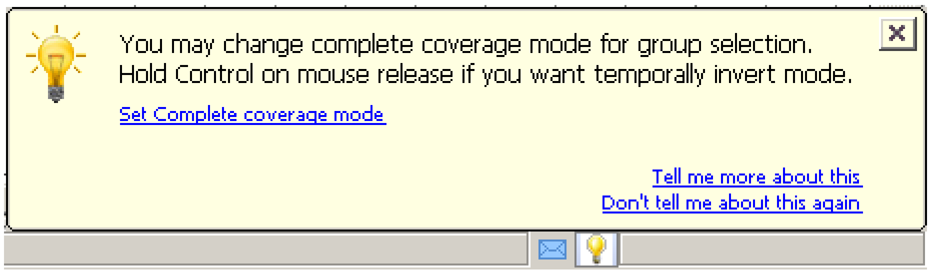
Help

The integrated help within MagicDraw is based on JavaHelp. MagicDraw help provides detailed descriptions of all MagicDraw dialog boxes, commands, and shortcut menus. You will also find a How-to list, as well as main descriptions and examples of all UML model elements.

Hints Associated to User’s Actions

MagicDraw now provides hints to help you MagicDraw (Figure 7 on page 32). Hints related to your actions will open and inform you about the functionality that is available in MagicDraw and show you how to perform some operations more effectively.

Hints are displayed in the lower right-hand corner of the MagicDraw application. Figure below shows an example of a hint.


You may change complete coverage mode for group selection.
Hold Control on mouse release if you want temporally invert mode.

Set Complete coverage mode

Tell me more about this
Don't tell me about this again

Figure 7 -- Hints Associated to User’s Actions

Hint is displayed for a 10 seconds or for a period while mouse is rolled on hint. Small icon will be displayed in a status bar after hint will hide. Clicking on this icon, you can open hint again.

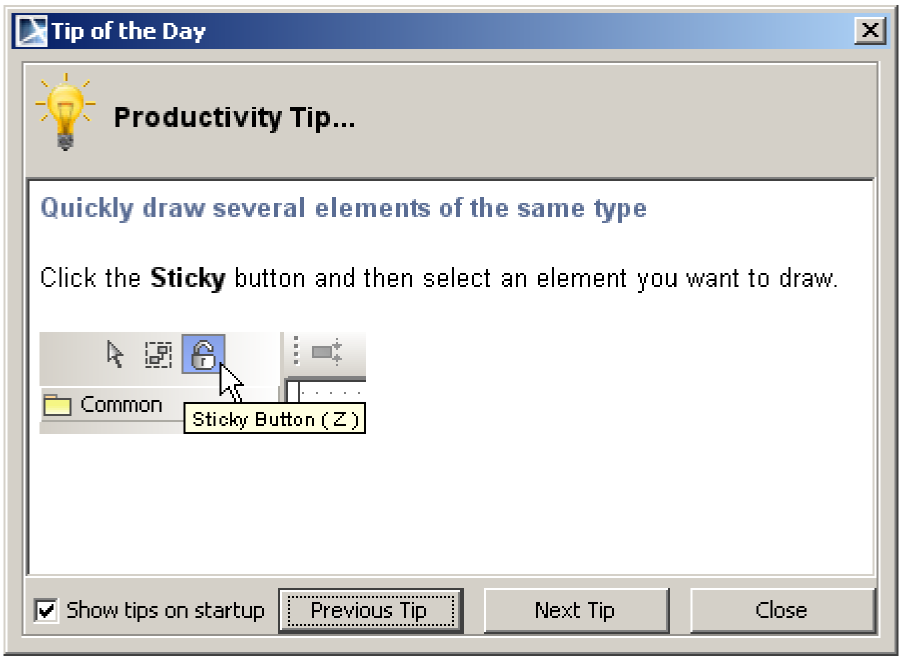
To change hints display mode

Change the **Hints display mode** property in the **Environment Options** dialog box, **General** branch, **Display** group.

The **Hints display mode** property specifies whether hints on MagicDraw functionality related to user actions will be displayed. Custom hint set does not include hints, that are asked not to be shown by user. Select option **Display all hints again** to reset custom hint set to show all hints. Selecting value **Show all hints again** will delete the list of the hints that should not be displayed.

Productivity Tips Displayed in Progress Window

MagicDraw now displays productivity tips in a progress window whenever it performs a long task (Figure 8 on page 33).



Tip of the Day

Productivity Tip...

Quickly draw several elements of the same type

Click the **Sticky** button and then select an element you want to draw.

Figure 8 -- Productivity Tip

To show or hide productivity while running long task:

Select or clear the **Show tips while running long tasks** property in the **Environment Options** dialog box, **General** branch, **General** group.

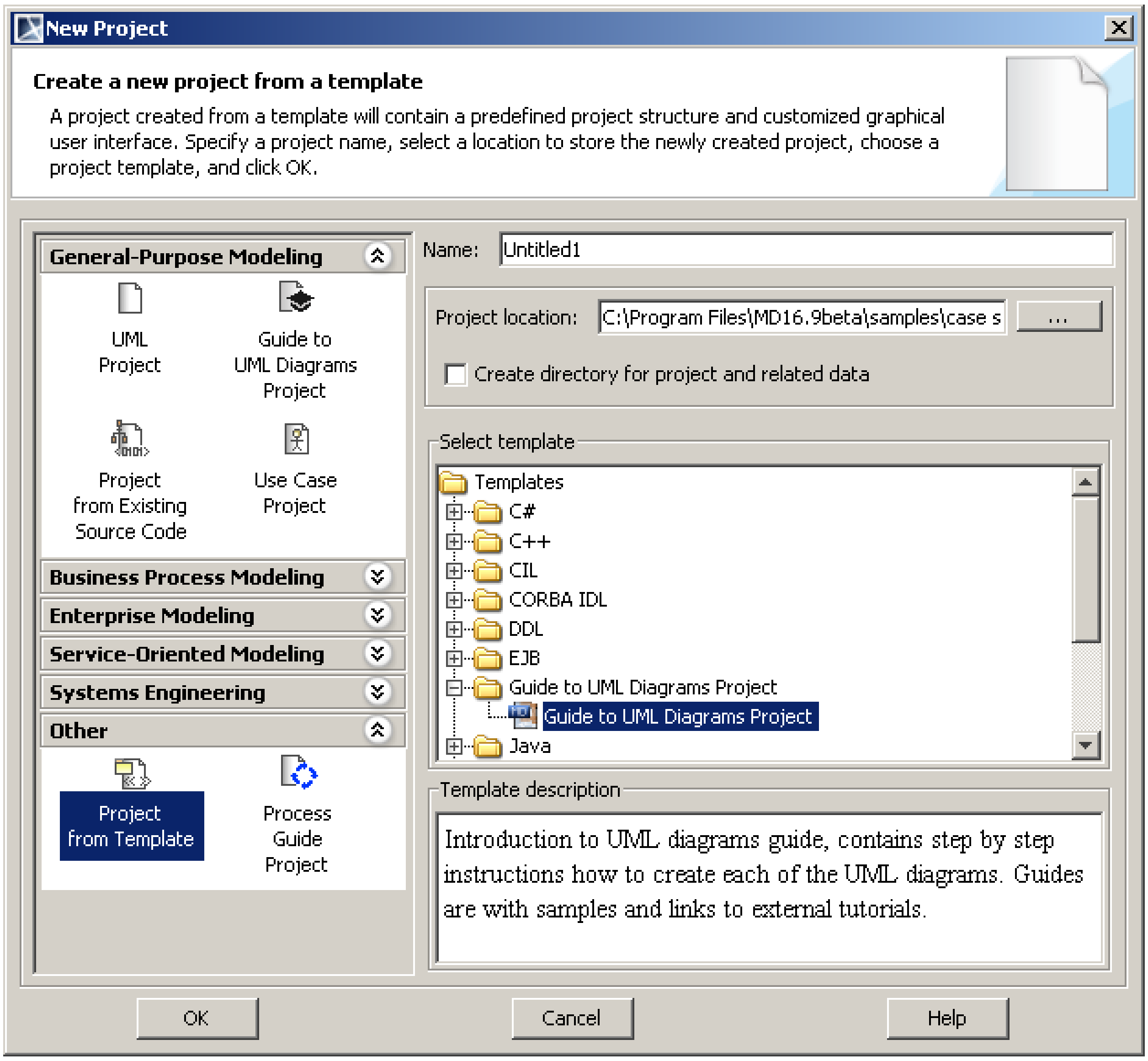
Tutorials

Quick Start tutorials for UML diagrams provide the step-by-step on-screen instructions on how to work with UML diagrams and start modeling with MagicDraw. They also give the links to the associated information in the other MagicDraw user's documentation and to the worldwide tutorials sources as well.

Try the Quick Start tutorials for the new diagram, Class diagram, Use Case diagram, Activity diagram, Sequence diagram, and others.

To open the Quick Start tutorials:

1. From the **File** menu, select **New Project**. The **New Project** dialog will open (Figure 9 on page 34).
2. Select the **Project from Template** icon on the left-hand side of the **New Project** dialog.
3. Select **Guide to UML Diagrams Project** > **Guide to UML Diagrams Project** in the Select template tree.
4. Click **OK**. The MagicDraw project with its tutorials will open (Figure 10 on page 35).



New Project

Create a new project from a template

A project created from a template will contain a predefined project structure and customized graphical user interface. Specify a project name, select a location to store the newly created project, choose a project template, and click OK.

Name: Untitled1

Project location: C:\Program Files\MD16.9beta\samples\case s

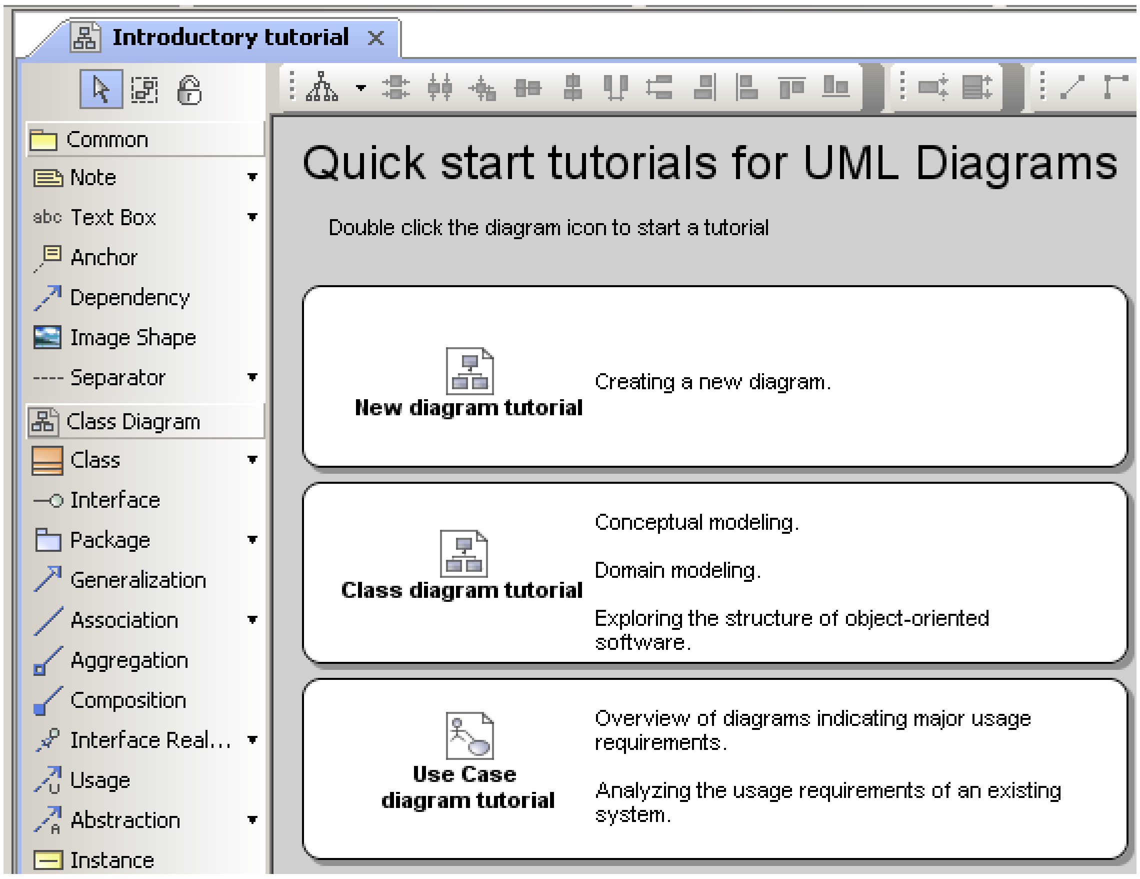
Create directory for project and related data

Select template

Template description

Introduction to UML diagrams guide, contains step by step instructions how to create each of the UML diagrams. Guides are with samples and links to external tutorials.

Figure 9 -- The New Project Dialog



Quick start tutorials for UML Diagrams

Double click the diagram icon to start a tutorial

New diagram tutorial	Creating a new diagram.
Class diagram tutorial	Conceptual modeling. Domain modeling. Exploring the structure of object-oriented software.
Use Case diagram tutorial	Overview of diagrams indicating major usage requirements. Analyzing the usage requirements of an existing system.

Figure 10 -- Quick Start Tutorials for UML Diagrams

Other Documentation

- The readme.html file is located in the main MagicDraw installation directory. Readme documents are also available for MagicDraw integrations.
- *Viewlets*. View online demos introducing MagicDraw and particular functionalities. You may find online demos at www.magicdraw.com/viewlets.
- *Samples*. In the MagicDraw installation directory (samples directory), you will find the samples of MagicDraw projects.

Support

FAQ

Before calling or registering an issue, please have a look in our FAQ section. It is constantly updated and may contain an answer to your question.

Forum

Discuss and get answers about No Magic products in No Magic Community Forum. With respect to the growing interest in No Magic products, we have expanded the capabilities that had been provided by our newsgroups and have moved the content to the online Forum.

You are welcome to post your comments and questions here.

Note: If you are interested in old discussions from the newsgroups, you can find them in the Forum as well as in the newsgroups in a read-only mode.

- If you are a new user, ask questions and get started on learning about UML and MagicDraw by the NEW USER section.
- Discuss issues related to technologies and processes in the STANDARDS/METHODOLOGIES section.
- Share your professional experience in terms of using MagicDraw, including installation and running, MagicDraw OpenAPI, scripting, integrations with other 3rd party tools, etc. in the MAGICDRAW section.
- Find new product versions, updates, and major events in the ANNOUNCEMENT section.
- Post your suggestions for improvements and new features that you would like to see added to the Forum in the OTHER section, the Suggestions subsection.

Knowledge Base. New issue registration

- Knowledge base and New issues registration - https://support.nomagic.com.
- sales@magicdraw.com - e-mail address for questions regarding academic or site license discounts and quotes.
- contact@magicdraw.com - e-mail address for the other contacts.

The support system https://support.nomagic.com provides:

- Submitted issues status tracking.
- Ability to submit private and public questions, suggestions, improvements, and problems.
- Ability to search through the existing public issues, view status of your issues, provide your vote for suggestions.

We provide free professional support for:

- Registered users with a valid No Magic Software Assurance contract (SA). SA provides you with technical support, software upgrades and maintenance releases at no additional cost for a contract period.
- Pre-sales users during the evaluation period.
- New customers for 30 days.
- Inquiries about registration, licensing and product updates.

Customer support levels

A customer support level determines customer access rights and the response time for support requests. To find out yours customer support level, please, visit the knowledgebase - https://support.nomagic.com.

Support level	Applies for	Ensured support
Limited support	Customer with no Software Assurance (SA)	Self-help: FAQ, Knowledge base, documentation, online demos, No Magic Community Forum.
Full support	• Customer with SA • Inquiries about registration, licensing, and product updates. • With valid evaluation key. • 30 days after purchase.	Response within business hours, with 24 - 48 hours response time.
Premium support	VIP customer* (marked as VIP)	Response within business hours, with 24 hours response time.

* VIP customer usually is our partner.

Note:	During the support period covered by our SA, you can also report any software problems or errors. If it is determined that a reported reproducible issue in the software actually exists, and this significantly impacts the usability of the software, No Magic agrees to make reasonable efforts to provide a usable workaround solution or to correct the issue in an upcoming maintenance release or update.

End-of-life policy

Public service packs are primarily released for the newest version. As we understand that switching from one version to another can take some time, in case of significant issues we provide service packs (or private patches) for up to one year old versions when applicable.

We support and provide patches to older versions only when you own Software Assurance (SA) contracts https://secure.nomagic.com/software_assurance only on your purchased products, so please be sure you are covered.

We always strongly recommend using the newest version as it contains all newest fixes, usability features, new capabilities, and support for standards and technologies.

Reporting issues directly from MagicDraw

We highly recommend to submit report any problem, suggest improvements, or ask about new features directly from MagicDraw. Report will create an issue in to our Online Customer Support System https://support.nomagic.com.

These reports help us address issues in a more timely manner, as well as speeding up maintenance releases that are free of known defects.

To report an issue directly from MagicDraw

1. On the help menu, click **Report an Issue**.
2. Fill in the first and last names together with your email address.

NOTE	If you supplied the email address used when registering at www.magicdraw.com, you will be able to track the status of your submitted issue in our Online Customer Support System located at https://support.nomagic.com. If you used another email address, you will only receive email notifications of status changes.

3. Choose the product, issue type, and component.
4. Describe your issue by providing as much information as possible.

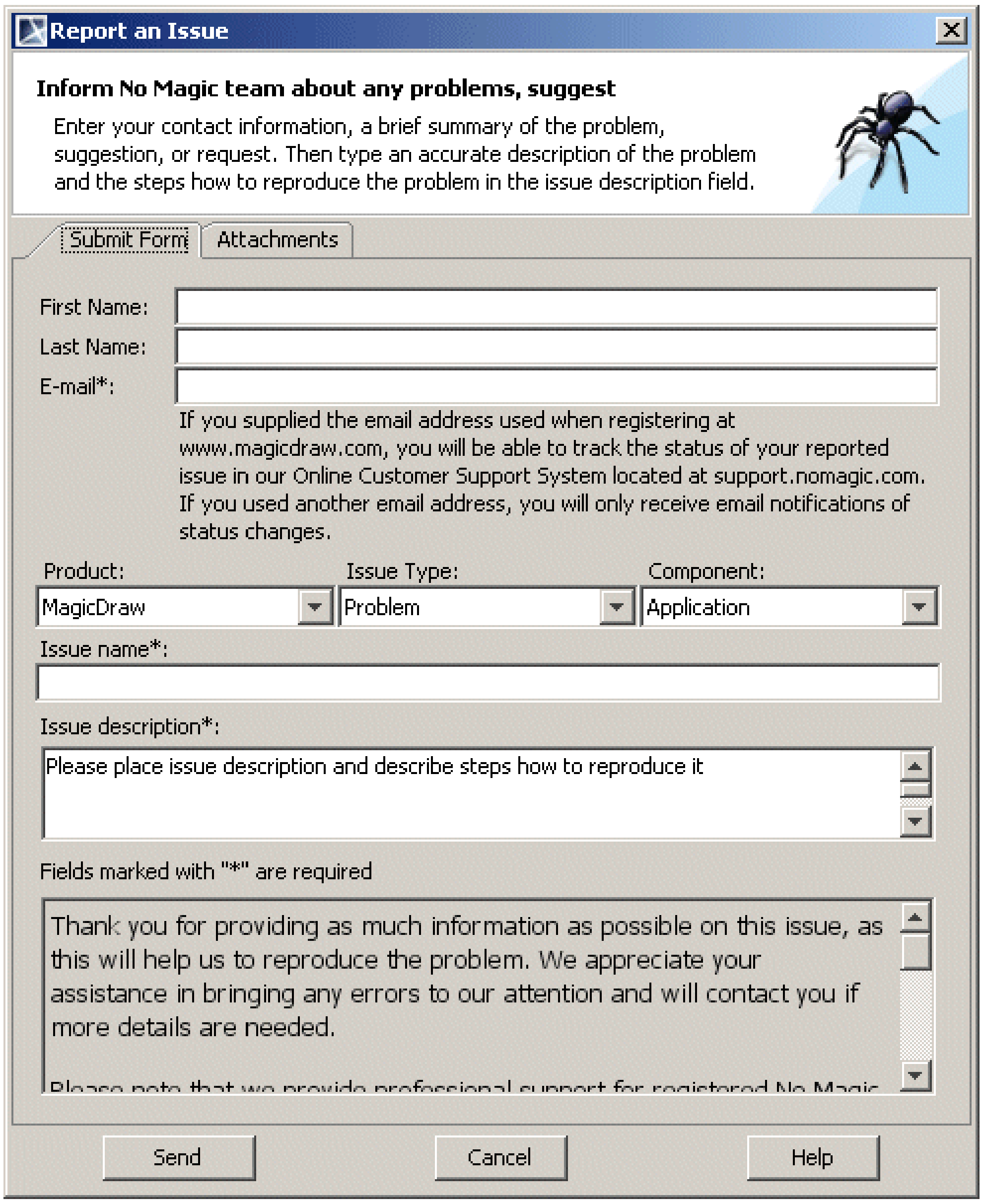
NOTE	Please note that we provide a professional support for registered MagicDraw users with the valid No Magic Software Assurance Contract (SA). SA provides you with technical support together with the major software updates and maintenance releases at no cost throughout the contract period. Issues are normally handled within one or two business days during regular business hours.

5. In the **Attachments** tab, select files you would like to send together with your issue report:
   - **Attach log file** - the log file will be sent together with your issue report.
   - **Attach project file** - the opened and last saved project file will be sent together with your issue report.
   - **Attach used modules** - modules that have been used in the opened project file will be sent together with your issue report.

- **Attach diagrams images** - choose diagrams, whose images you would like to send together with your issue report. Also specify the images format.

6. If you are registered user, track you issue at https://support.nomagic.com.

NOTE If you are already registered personal information will be filled into the Report an Issue dialog.


Report an Issue

Inform No Magic team about any problems, suggest

Enter your contact information, a brief summary of the problem, suggestion, or request. Then type an accurate description of the problem and the steps how to reproduce the problem in the issue description field.

Submit Form | Attachments

First Name:
Last Name:
E-mail*:

If you supplied the email address used when registering at www.magicdraw.com, you will be able to track the status of your reported issue in our Online Customer Support System located at support.nomagic.com. If you used another email address, you will only receive email notifications of status changes.

Product: MagicDraw
Issue Type: Problem
Component: Application

Issue name*:

Issue description*:

Please place issue description and describe steps how to reproduce it

Fields marked with "*" are required

Thank you for providing as much information as possible on this issue, as this will help us to reproduce the problem. We appreciate your assistance in bringing any errors to our attention and will contact you if more details are needed.

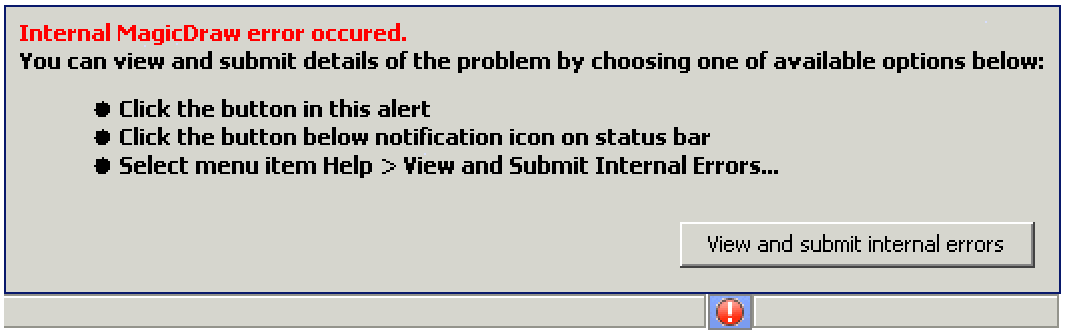
Figure 11 -- Report an Issue dialog box, Submit Form tab

To report an issue when application is unresponsive

If MagicDraw becomes unresponsive, a separately executable tool is provided for analyzing the status of the process to aide in bug submission. In these situations, manually start the submitbug.exe file (located in the <MagicDraw installation directory>\bin folder) and follow directions. After submitbug.exe is started, the **Report an Issue** dialog box opens. For more information about the **Report an Issue** dialog box, see “To report an issue directly from MagicDraw” on page 37.

View and submit internal errors

If an error occurs, an error message will appear at the bottom of the MagicDraw window.


Internal MagicDraw error occured.
You can view and submit details of the problem by choosing one of available options below:

- Click the button in this alert
- Click the button below notification icon on status bar
- Select menu item Help > View and Submit Internal Errors...

Figure 12 -- Message, about MagicDraw internal error.

To view internal errors

To view internal errors you have to open the **Unhandled Errors** dialog box. There are three methods for to open the **Unhandled Errors** dialog.

- Click the **View and submit internal errors button** in the message window.
- From the **Help** main menu, choose the **View and Submit internal errors** command.
- Click the notification icon on the status bar.

Note: The **View and Submit internal errors** command is only active in the **Help** menu and the red button at the bottom of the status bar only exists if the **Submit errors** dialog box contains errors.

To submit an error

1. Open the **Unhandled Errors** dialog box.
2. Click the **Submit** button in the **Unhandled Errors** dialog box. The **Submit Error** dialog box appears.
3. Fill in **Your name**, **Your e-mail** and **Bug description** fields and click the **Send** button. The error will be sent to the MagicDraw support team.

2 GETTING STARTED

In the Getting Started chapter, you will find information about how to install, update, register, and configure MagicDraw.

System Requirements

To run MagicDraw UML, your system must meet the following requirements:

Resource type	Minimum	Recommended
Memory	1 GB	2 GB RAM recommended; more memory generally improves responsiveness. 4 GB RAM is recommended for MicrosoftTM Windows Vista and for very large projects
Disk space	500 MB	500 MB or more
Video mode	800*600 @ 64k Colors	1280*1024 @ 64k Colors
Operating system	All that have Java compatible JVM 1.6.0: Windows 95/98/NT/2000/XP/Vista/7, Linux, Mac OS X (most testing procedures and debugging were performed on these operating systems)	
HTML browser	Any	Mozilla Firefox or IE. Safari for Mac OS X.
Java Virtual Machine (JVM)	JDK 1.6.0	Sun's JDK 1.6.0_24

Java Virtual Machine (JVM)

You may have the JVM installed on your computer or install JVM together with MagicDraw specifically for the MagicDraw application. JVM is an application that provides the interpretation of the Java bytecode Java class files. Different operating systems may have different JVM implementations, therefore some bugs may be specific to the operating system or JVM.

MagicDraw is a stable environment, if it is configured properly and if a stable JVM is used. **USE THE RECOMMENDED JVM TO AVOID MOST PROBLEMS**. All recommendations are written below. Because MagicDraw is a Java application, most of the stability and performance depends on the JVM implementation. Refer to the JVM specification and problems description, if you have problems on a specific OS.

JDK 1.1.x, 1.2.x, 1.3.x, 1.4.x, and 1.5.x are not supported.

You can review your system and the JVM information in the **About** dialog box, **Environment** tab (from the **Help** menu, select **About**). The JDK version can also be encountered from the command line by typing:

```
java -version
```

To change Java version

All platforms:

Change line in file mduml.properties (this file is in <MagicDraw installation directory>/bin folder):

JAVA_HOME = <path to new JDK>

NOTE Integrated MagicDraw runs on the JVM specified by the IDE. In order to change the JVM, you need to modify the startup properties for the IDE that MagicDraw integrates with. If you are running MagicDraw integrated with IDE, read the appropriate readme.html for specific integration. This file can be found in <MAGICDRAW installation directory>/integrations/<IDE directory>.

To redirect output to the console instead of a log file

By default all MagicDraw output info goes into a file. The output can be redirected to the console instead of a log file.

All platforms:

Pass application argument (not java property) -verbose.

Add argument into the JAVA_ARGS line in the mduml.properties file (this file is in <MagicDraw installation directory>/bin folder):

APP_ARGS =-verbose

Operating System-dependent issues

Because MagicDraw is 100% Pure Java, it is platform independent and runs on a variety of operating systems. However, for Java applications to interact properly with the operating system, Java Virtual Machine (JVM) software is required. JVM software varies depending on the operating system and MagicDraw may perform inadequately with the wrong one.

The performance of Java applications depends on the performance of the Java Virtual Machine. A badly designed Machine may degrade the performance of MagicDraw. It could even cause MagicDraw to fail or crash. To avoid these problems, we recommend that you use the following Virtual Machines:

- Sun (JDK standard) for Linux. JDK 1.6.0_24 is recommended.
- Sun (JDK standard) for Windows (95/98, 2000, 2003, NT, Vista, 7). JDK 1.6.0_24 for both 32-bit and 64-bit Windows OS is recommended.
- Sun (JDK standard) for Mac OS X Leopard and Mac OS X Snow Leopard. JDK 1.6.0_24 for both 32-bit and 64-bit Mac OS X is recommened.

Installation Procedure

First, obtain the MagicDraw installation files. You can download the latest version from the MagicDraw homepage (http://www.magicdraw.com/.) Because MagicDraw is a Java application, you will need more than the installation files to run the tool successfully. You can also install JVM together with MagicDraw or you may already have it installed. Information about the latest Java ports is available at http://www.magicdraw.com/jvm_list.htm.

NOTE	If an installation is for Windows, and has a JVM you do not need anything else.

Using the installer

If you use an operating system other than Windows, Unix, or Mac OS X, we recommend to run MagicDraw from the no-install package (see section "Using no-install package" on page 42).

Windows 2000/2003/NT/XP/Vista/7

1. Download the installer:
   - *MD_UML_<version number>_win.exe* for 32-bit Windows (or *MD_UML_<version number>_PE_win.exe* in case of downloading Personal edition)
   - *MD_UML_<version number>_win64.exe* for 64-bit Windows (or *MD_UML_<version number>_PE_win64.exe* in case of downloading Personal edition)

2. Double-click the installer.

The Setup Wizard automatically adds MagicDraw UML shortcuts to the start menu and the desktop. You may also execute the shortcuts from the installation directory.

NOTE	MagicDraw runs on Windows Vista as of version 12.5.

Unix

1. Download *MD_UML_<version number>_unix.sh* (or *MD_UML_<version number>_PE_unix.sh* in case of downloading Personal edition).

2. Using the command-line prompt go to the directory wherein you have downloaded the installer.

3. Type the command:

```
sh ./MD_UML_<version number>_unix.sh
```

IMPORTANT!	Be sure you have JVM installed.

MAC OS X

1. Download *MD_UML_<version number>_mac.dmg* (or *MD_UML_<version number>_PE_mac.dmg* in case of downloading Personal edition).

2. Double-click the installer.

3. Drag the MagicDraw UML folder to the Applications or some other folder.

IMPORTANT!	Be sure you have JVM installed.

Using no-install package

Download the no-install package to run MagicDraw on any operating system.

Windows 95/ 98/ NT/ 2000/ XP/ Vista*/ 7

1. Download *MD_UML_<version number>_no_install.zip* (or *MD_UML_<version number>_PE_no_install.zip* in case of downloading Personal edition).

2. Extract the file.

3. Go to the bin directory and run:

- *mduml.exe* to start MagicDraw on 32-bit Windows operating system
- *mduml64.exe* to start MagicDraw on 64-bit Windows operating system

NOTE MagicDraw runs on Windows Vista as of version 12.5.

Unix

1. Download *MD_UML_<version number>_no_install.zip* (or *MD_UML_<version number>_PE_no_install.zip* in case of downloading Personal edition).

2. Extract the file.

3. Using the command-line prompt go to the bin directory and type the command:

```
sh ./mduml
```

IMPORTANT! Be sure you have JVM installed.

Mac OS X

1. Download *MD_UML_<version number>_no_install_mac.zip* (or *MD_UML_170_PE_no_install_mac.zip* in case of downloading Personal edition).

2. Extract the file.

3. Using the command-line prompt go to the bin directory and type the command:

```
./mduml
```

IMPORTANT! Be sure you have JVM installed.

Licensing Information

Information about installed or needed licenses and the status is presented in the MagicDraw **About** screen with the ability to remove unused licenses (see Figure 13 on page 44).

The following information about installed or needed licenses are available:

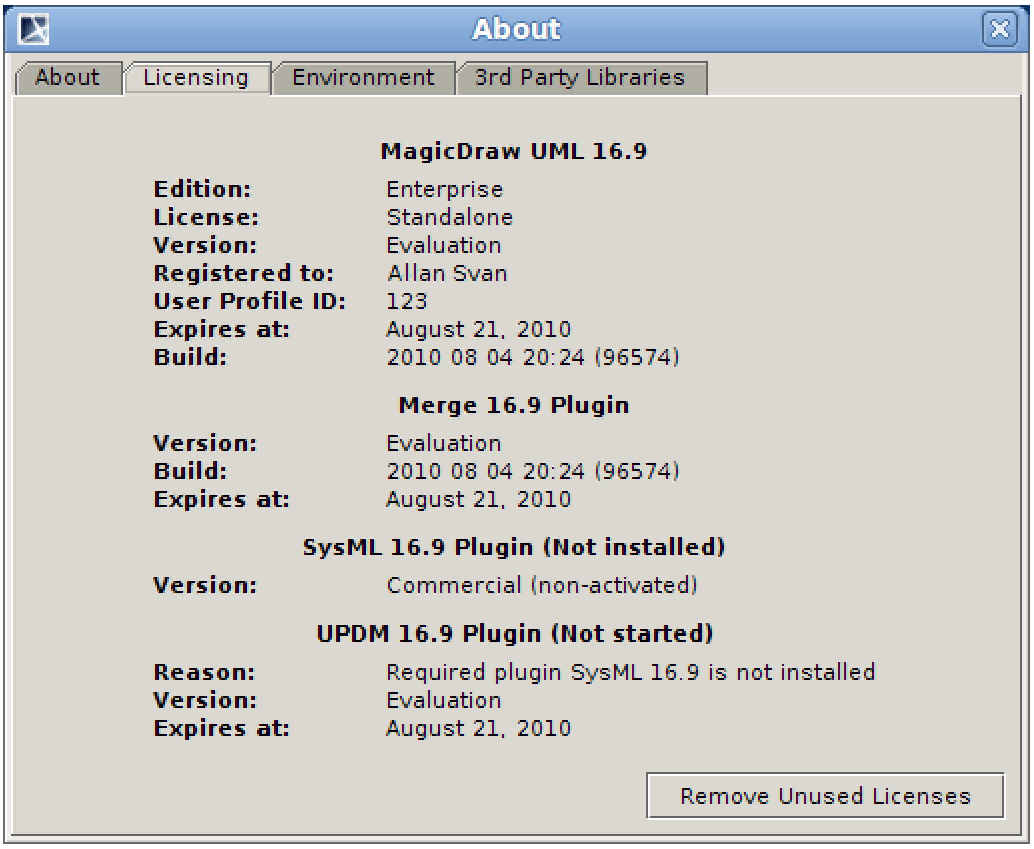
Information item	Description
User ID	User ID is displayed in the **About** dialog box, **Licensing** tab. Please refer to user ID when contacting support or sales.
Not installed indication	If license is not installed, "Not installed" text is displayed after the license name.

Information item	Description
Not started indication	If licenses is installed but not started "Not started" text is displayed after license name and reason is be given. Possible reasons: • Required resource is not installed. • Plugin startup failed. • Other.

Removing Unused Licenses

Press button **Remove Unused Licenses** in the **About** screen, **Licensing** tab to remove licenses of not installed plugins.

NOTE If you have any questions or issues, please report them using the **Report an Issue** dialog. For more information, see “View and submit internal errors” on page 39.



MagicDraw UML 16.9

Edition:	Enterprise
License:	Standalone
Version:	Evaluation
Registered to:	Allan Svan
User Profile ID:	123
Expires at:	August 21, 2010
Build:	2010 08 04 20:24 (96574)

Merge 16.9 Plugin

Version:	Evaluation
Build:	2010 08 04 20:24 (96574)
Expires at:	August 21, 2010

SysML 16.9 Plugin (Not installed)

Version:	Commercial (non-activated)

UPDM 16.9 Plugin (Not started)

Reason:	Required plugin SysML 16.9 is not installed
Version:	Evaluation
Expires at:	August 21, 2010

Figure 13 -- The MagicDraw About window, Licensing tab

MagicDraw Configuration

MagicDraw configuration files location

By default MagicDraw configuration and auxiliary files are stored in the user home directory - <User home directory>/.magicdraw/<version>.

You may also save configuration files:

- In the MagicDraw installation directory.
- In your chosen directory.

You may check the exact path to the configuration files in the MagicDraw **About** screen, **Environment** tab, **Configuration files** line (invoke the About screen from the **Help** main menu, **About MagicDraw** command).

To store MagicDraw configuration files in the MagicDraw installation directory

Add argument to JAVA_ARGS line in the file mduml.properties file (this file is in <MagicDraw installation directory>/bin):

```
JAVA_ARGS=-DLOCALCONFIG=false
```

To store MagicDraw configuration files to your chosen location

You may define custom path for configuration files in two ways:

- In the mduml.properties file, JAVA_ARGS line add the property

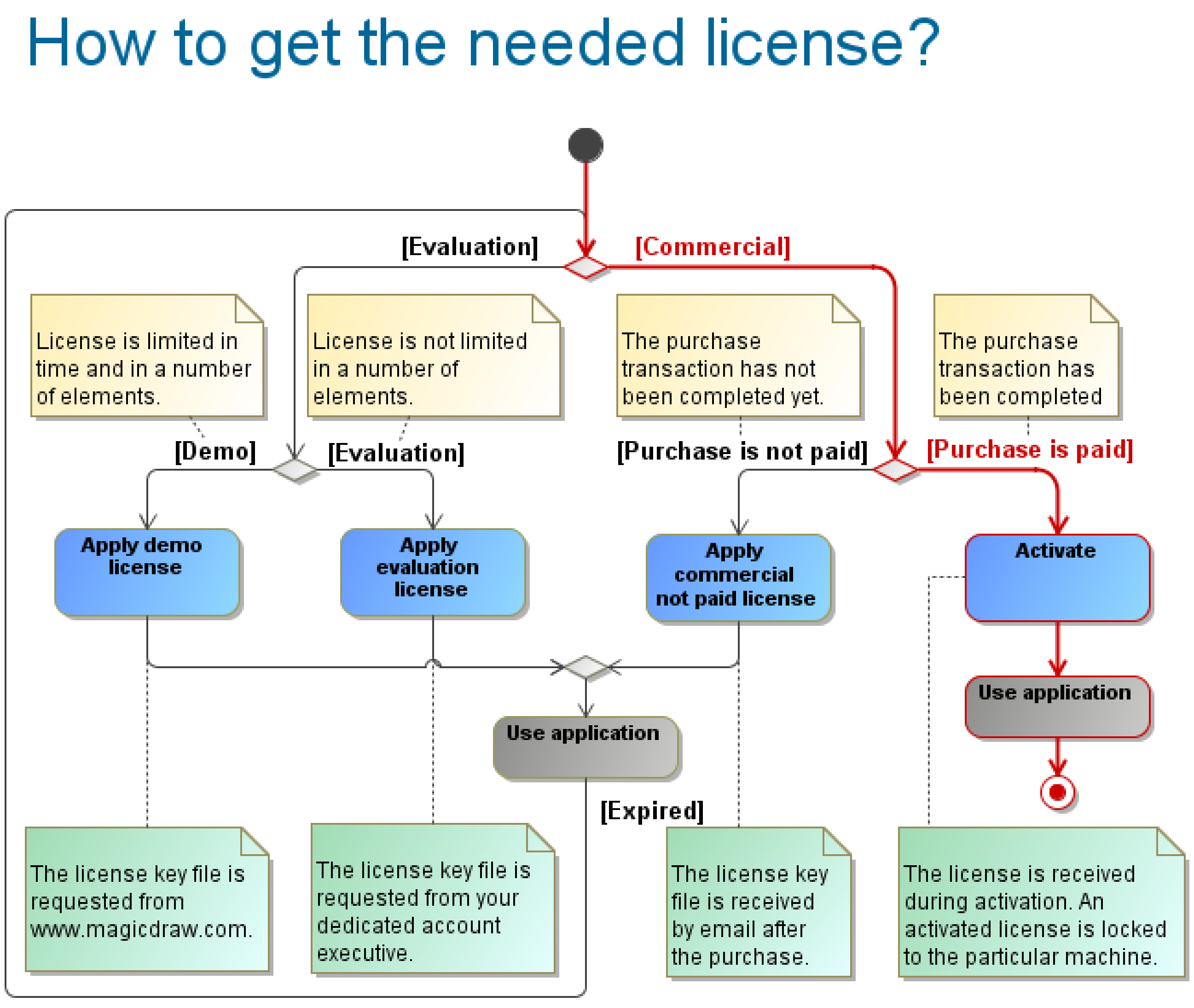
  ```
  -Dlocalconfig.location=<custom path>
  ```

- Define custom path in a newly created file:
  1. In the <User home directory>/.magicdraw/<version> folder, create a file named *magicdrawredirect.*
  2. In the created file, type the absolute path where the MagicDraw configuration and auxiliary files will be saved, for example: *C:\<directory name>.*

NOTE	If MagicDraw is configured to store files in the MagicDraw installation directory (see the topic “To store MagicDraw configuration files in the MagicDraw installation directory” above), files will not be stored to your chosen location.

Unlocking MagicDraw

Unlock MagicDraw with evaluation, demo, or commercial license key file.


How to get the needed license?
[Evaluation]
[Commercial]
License is limited in time and in a number of elements.
License is not limited in a number of elements.
The purchase transaction has not been completed yet.
The purchase transaction has been completed
[Demo]
[Evaluation]
[Purchase is not paid]
[Purchase is paid]
Apply demo license
Apply evaluation license
Apply commercial not paid license
Activate
Use application
Use application
[Expired]
The license key file is requested from www.magicdraw.com.
The license key file is requested from your dedicated account executive.
The license key file is received by email after the purchase.
The license is received during activation. An activated license is locked to the particular machine.

To unlock MagicDraw:

1. After downloading MagicDraw v16.9 or later, you will get license key file to your mailbox.
2. Save this key file into the local file system before starting MagicDraw.
3. When starting MagicDraw for the first time, you will be asked to choose the license key file. Click the **Select Licenses Key Files** button and select the file from the directory you have saved the file.
4. System will automatically start MagicDraw and you will be able to use it.

Activating the commercial license after the purchase (v16.9 or later)

As of version 16.9, in order to improve software protection and to prove our customers' investments, the solid product licensing is introduced. Licenses are locked to the machine. You will be able to monitor and control, on what machines the commercial licenses are used.

After updating to v16.9, you will be requested to activate and receive the commercial licenses dedicated for the particular machine.

Flexera Software FLEXnet licensing system, the industry leader helping to manage and secure flexible software licensing, is used to manage No Magic products licenses.

How to get the commercial Activated license?

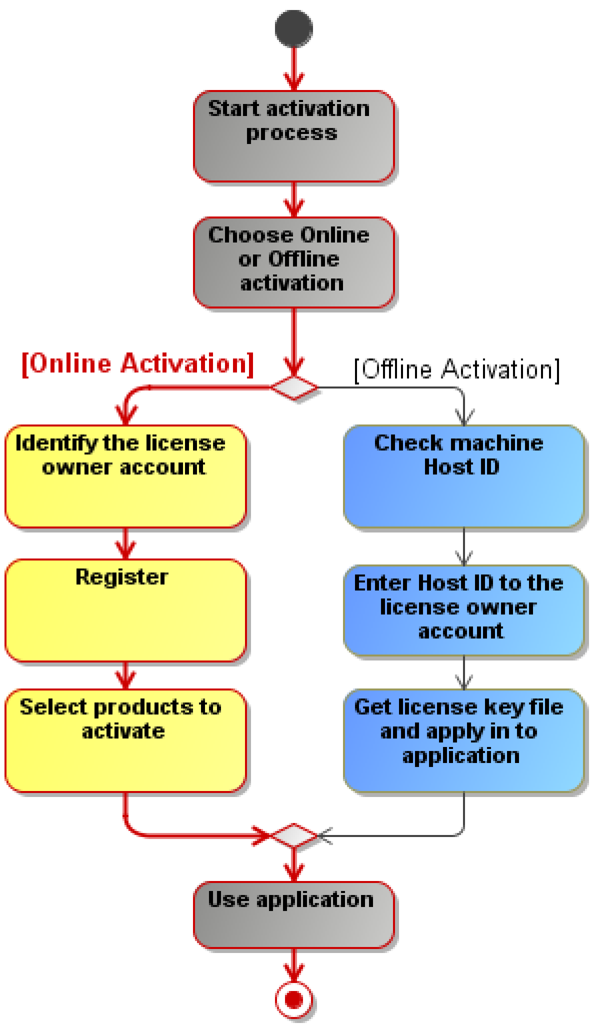

Start activation process
Choose Online or Offline activation
[Online Activation]
[Offline Activation]
Identify the license owner account
Register
Select products to activate
Check machine Host ID
Enter Host ID to the license owner account
Get license key file and apply in to application
Use application

Figure 14 -- Activation process. How to get a commercial license.

All the updated information about the commercial license activation you may also find at http://www.magicdraw.com/CommercialLicenseActivation.

In this section you will find the following subsections:

- "Commercial license activation process" on page 48
- "Commercial license types" on page 51

- “Host ID” on page 51
- “Identification” on page 52
- “Registration” on page 54
- “Deactivation” on page 54

Commercial license activation process

The commercial license activation is required after the purchase transaction has been completed. The activation process allows receiving the commercial license dedicated for the particular machine.

NOTES	• Only commercial activated licenses are locked to the particular machine. • During the activation process, identification and registration is required. Any key file (evaluation, demo, commercial not activated and other) can be used for the identification of the license owner. • Commercial not activated keys allow using the application for 7 days according to obtained licenses, before requesting activation. Not activated keys can be used during activation process for identification of the account on which the purchases are.

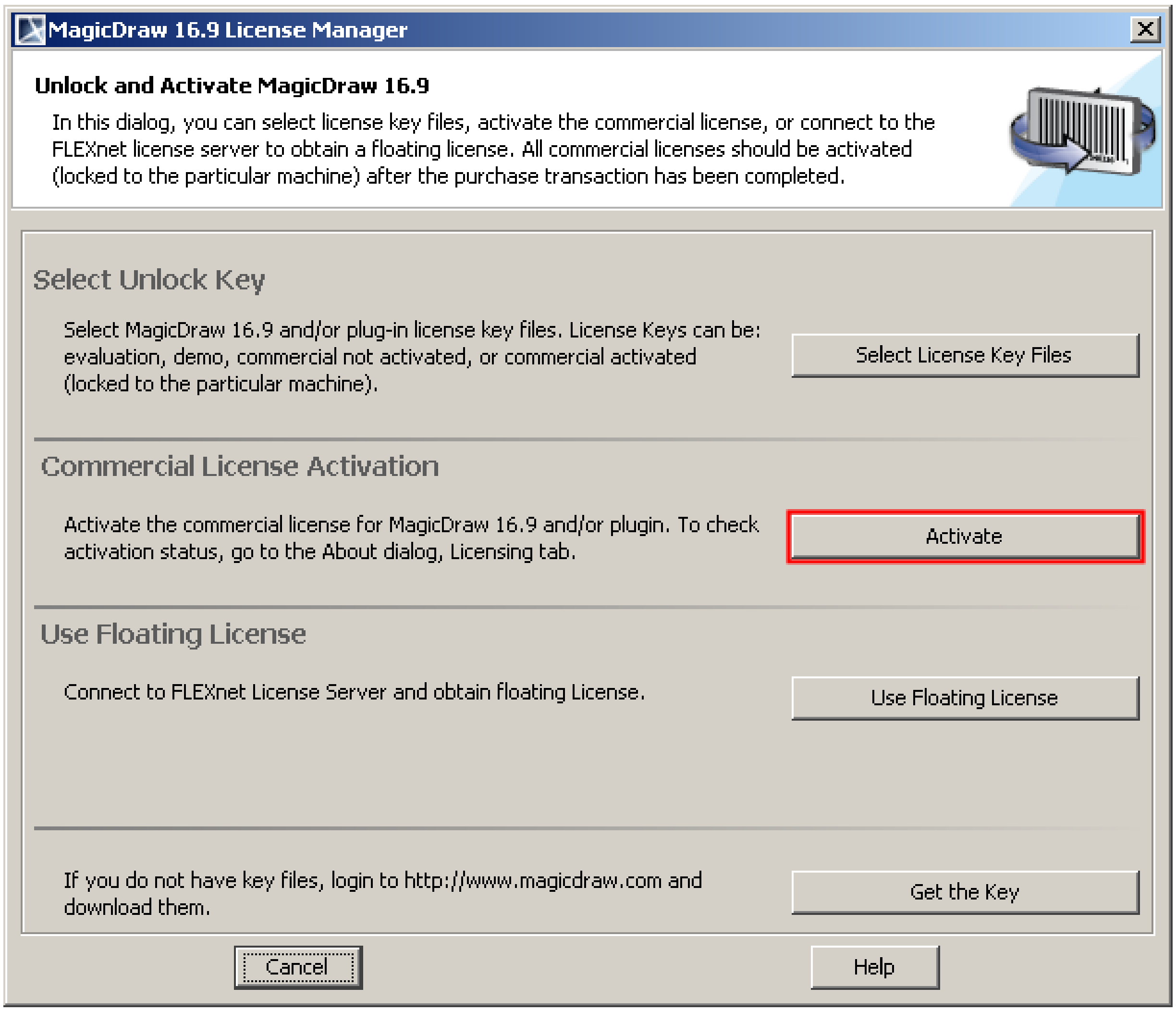
Online and offline activation is available.

Online activation

Choose online activation and enable commercial activated (without expiration) licenses automatically.

To activate the license online

1. Click the **Activate** button in the **License Manager** dialog of the application.



MagicDraw 16.9 License Manager

Unlock and Activate MagicDraw 16.9

In this dialog, you can select license key files, activate the commercial license, or connect to the FLEXnet license server to obtain a floating license. All commercial licenses should be activated (locked to the particular machine) after the purchase transaction has been completed.

Select Unlock Key

Select MagicDraw 16.9 and/or plug-in license key files. License Keys can be: evaluation, demo, commercial not activated, or commercial activated (locked to the particular machine).

Commercial License Activation

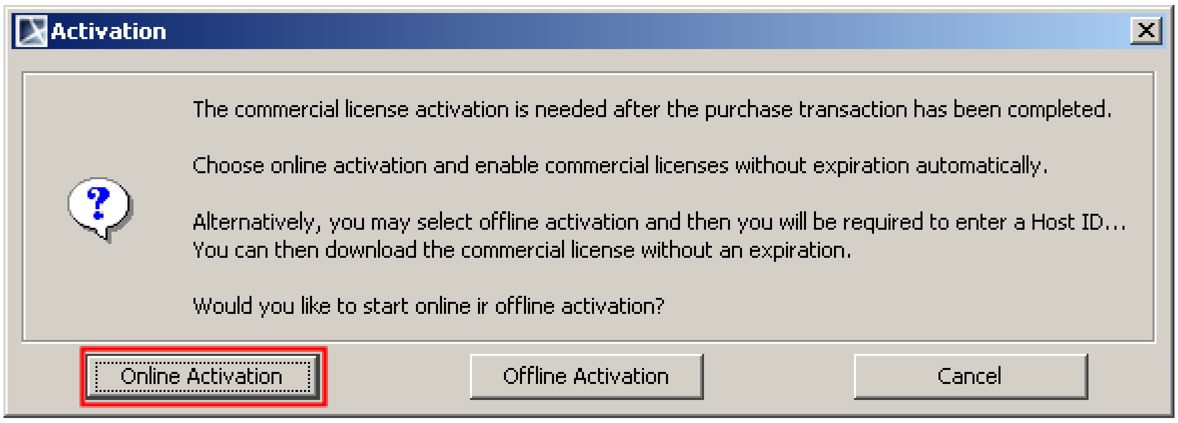
Activate the commercial license for MagicDraw 16.9 and/or plugin. To check activation status, go to the About dialog, Licensing tab.

Use Floating License

Connect to FLEXnet License Server and obtain floating License.

If you do not have key files, login to http://www.magicdraw.com and download them.

2. Click **Online Activation**.



Activation

The commercial license activation is needed after the purchase transaction has been completed.

Choose online activation and enable commercial licenses without expiration automatically.

Alternatively, you may select offline activation and then you will be required to enter a Host ID... You can then download the commercial license without an expiration.

Would you like to start online ir offline activation?

3. If you will be requested, identify yourself and register.
4. Select licenses you need to activate.

Offline activation

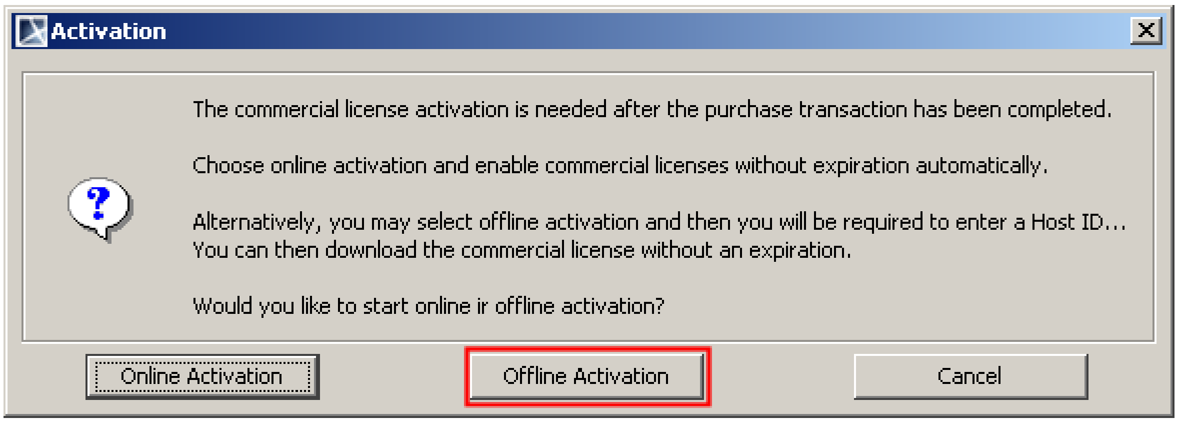
Alternatively, you may select offline activation, get the Host ID, enter it in the license owner account and then download the commercial activated license.

To activate the commercial license offline

1. Login to the license owner account on www.magicdraw.com.
2. Click the **LicenseActivationManagement** (www.magicdraw.com/LicenseActivationManagement) item in the **Members** menu.
3. Click the **Create New License Activation Record** button and enter user details and Host ID of the machine.
4. Download or send the key to your e-mail.

Determining a Host ID (for offline activation)

1. Click the **Activate** button in the **License Manager** dialog of the application.
2. Click **Offline Activation**.


Activation

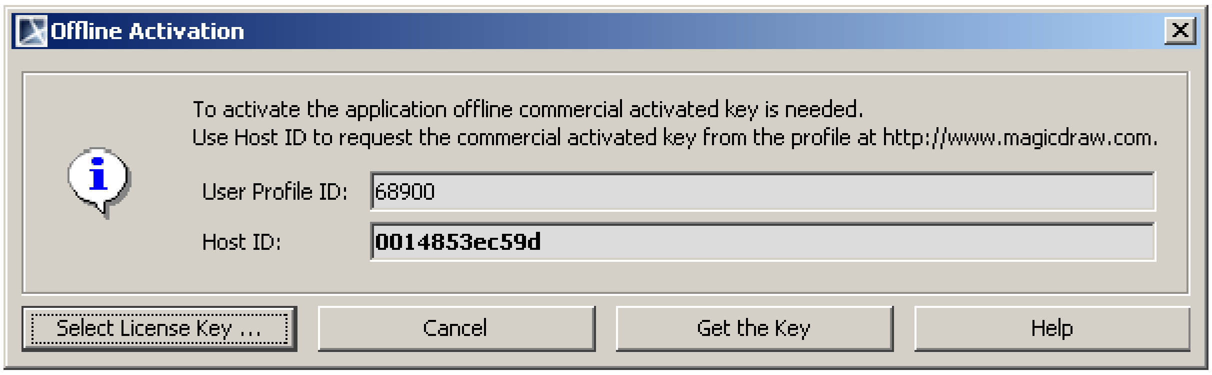
The commercial license activation is needed after the purchase transaction has been completed.

Choose online activation and enable commercial licenses without expiration automatically.

Alternatively, you may select offline activation and then you will be required to enter a Host ID...
You can then download the commercial license without an expiration.

Would you like to start online ir offline activation?

3. Host ID is shown.


Offline Activation

To activate the application offline commercial activated key is needed.
Use Host ID to request the commercial activated key from the profile at http://www.magicdraw.com.

User Profile ID: 68900

Host ID: 0014853ec59d

NOTE	Host ID is the Ethernet address of the machine on which application will run.

Related topics

Commercial license types
Host ID
Identification
Registration
Deactivation

Commercial license types

DEFINITIONS	● **Commercial not activated license** is used only to determine the account on www.magicdraw.com and allows using the application for 7 days according to obtained licenses, before requesting the activation. *Example: MagicDraw_16_9_Professional_C#_Standalone_ Not activated key.txt* ● **Commercial activated license** is the license without expiration, locked to the particular machine, and can be deactivated. *Example: MagicDraw_16_9_Professional_C#_Standalone_ Activated_key_for_<name>_<surname>.txt*

After the purchase transaction has been completed, you will receive the **commercial not activated license**. They are used ONLY to determine the account on www.magicdraw.com from which activated keys should be requested. Any other license, evaluation, demo, or commercial can be used for identification of the license owner account during activation.

Commercial not activated license requires activation. It allows using the application for 7 days according to obtained licenses, before requesting the activation. After the online or offline activation you will get the **commercial activated licens**e.

After the online activation, commercial activated license will be applied automatically and you will be able to use the application on the particular machine.

During the offline activation you will be required to enter a Host ID <link to Host ID section> in the license owner account at www.magicdraw.com/LicenseActivationManagement. You can then download the commercial activated license and select it from the application.

Related topics

Commercial license activation process

Host ID

Identification

Registration

Deactivation

Host ID

A Host ID is the value of a specific system attribute (MAC / Ethernet address) that uniquely identifies the host / machine under which an application is running. A Host ID is used for the locked to particular machine license. Only commercial activated licenses are locked to the particular machine.

For the Host ID determining instructions refer to “Determining a Host ID (for offline activation)” on page 50.

Determining a Host ID using lmhostid

One of the ways for determining Ethernet address (Host ID) is using lmhostid utility. This way can be useful when the list of Host IDs of multiple machines should be discovered, even before installing the applications itself. If you are a system administrator, you can provide end users with commercial activated licenses without requesting licenses from them.

The lmhostid is a command line utility, which prints the Host ID that is required. The Lmhostid utility is available as an executable called lmutil. Download it for a particular OS from http://www.globes.com/support/fnp_utilities_download.htm.

Run lmutil with lmhostid parameter from the command line. Lmhostid displays the default hostid for the current platform.

For exact commands for specific OS refer to: License Administration Guide (Obtaining System Hostids).

NOTE	If two or more Ethernet addresses are available on the particular machine, the first one printed by the hostid command should be used.

Related topics

Commercial license activation process

Commercial license types

Identification

Registration

Deactivation

Identification

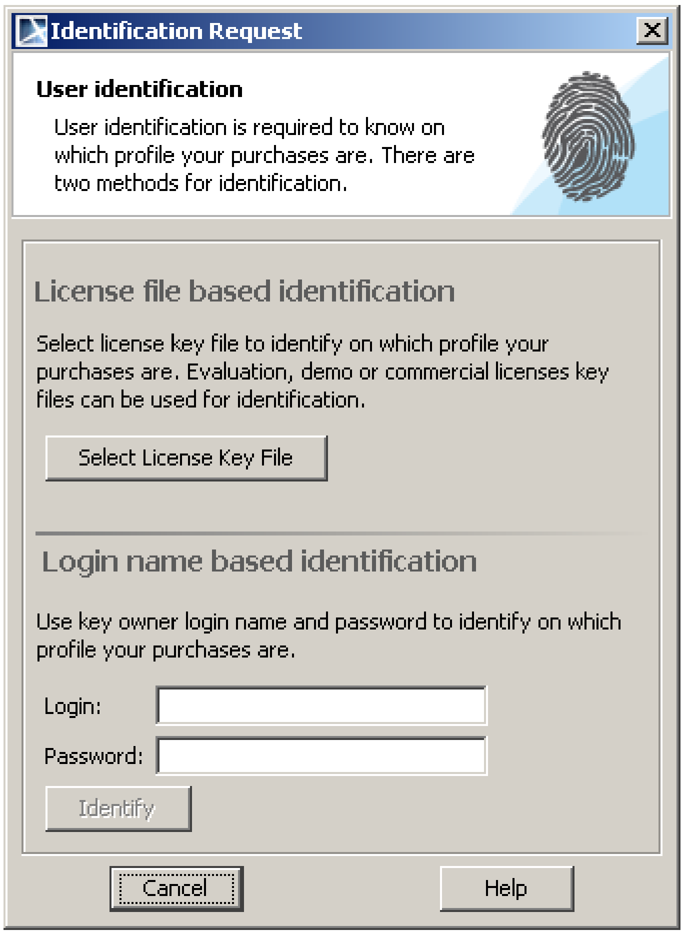
To determine a license owner, the user identification is requested during activation process.

Identification is requested only if you have not added any license key file, have not registered your installation, or have not performed identification.

There are two methods available for the user identification:

- **License file based identification**. Select the license key file to identify the license owner account. Evaluation, demo, or commercial license files can be used for the identification.

- **Login name based identification**. Use the license owner login name and password to identify on which account on www.magicdraw.com your purchases are.


Identification Request

User identification

User identification is required to know on which profile your purchases are. There are two methods for identification.

License file based identification

Select license key file to identify on which profile your purchases are. Evaluation, demo or commercial licenses key files can be used for identification.

Select License Key File

Login name based identification

Use key owner login name and password to identify on which profile your purchases are.

Login:

Password:

Identify

Cancel

Help

Figure 15 -- ***Identification Request*** *dialog*

Ones identification is performed, it will not be requested the next time during activation.

NOTE	In case you need to change identification records, just apply the new license key file. The last applied license key file is used for the identification.

Related topics

Commercial license activation process

Commercial license types

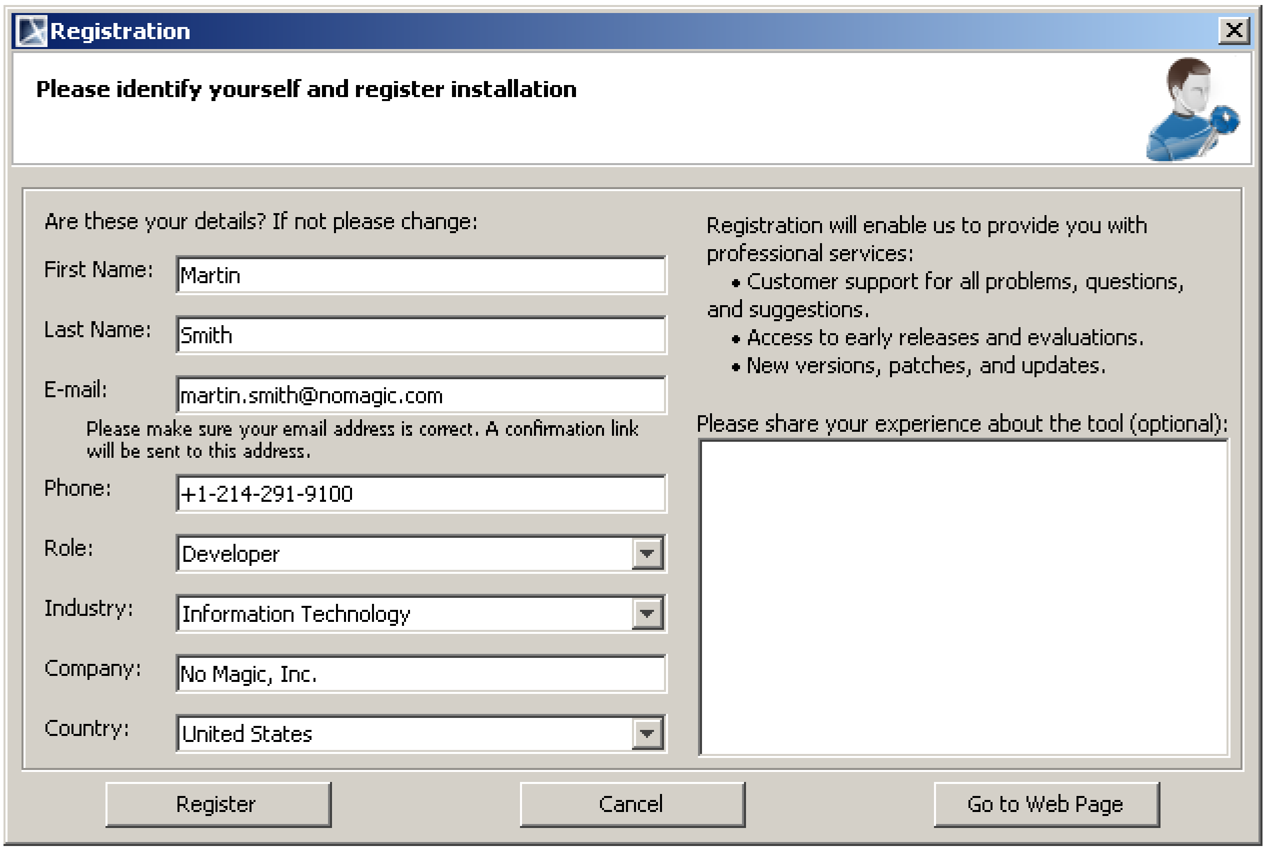
Host ID

Registration

Deactivation

Registration

The user registration is required during activation process in order to obtain the commercial activated license.



Please identify yourself and register installation

Are these your details? If not please change:

First Name:	Martin
Last Name:	Smith
E-mail:	martin.smith@nomagic.com
	Please make sure your email address is correct. A confirmation link will be sent to this address.
Phone:	+1-214-291-9100
Role:	Developer
Industry:	Information Technology
Company:	No Magic, Inc.
Country:	United States

Registration will enable us to provide you with professional services:
• Customer support for all problems, questions, and suggestions.
• Access to early releases and evaluations.
• New versions, patches, and updates.

Please share your experience about the tool (optional):

Figure 16 -- Registration window

The registration will help us to provide you with:

- Customer support. Issues, questions, and suggestions can be reported and existing ones tracked on https://support.nomagic.com.
- Access to early releases and evaluations.
- New versions, patches, and updates.

Related topics

User Registration
Commercial license activation process
Commercial license types
Host ID
Identification
Deactivation

Deactivation

The deactivation is the process, which allows returning commercial activated licenses. You may remove and return all activated (locked to the particular machine), not used commercial licenses by deactivating them.

To deactivate a license in the application

1. Click the **Deactivate** button in the **License Manager** dialog of the application or uninstall the application.
2. Commercial licenses will be deactivated automatically and returned online.

   If the online licenses return is not available, licenses will be deactivated and offline deactivation - licenses return message with License Deactivation ID - will be shown. To update the account information manually, return the used license by entering the License Deactivation ID to the license owner account at www.magicdraw.com/LicenseActivationManagement.
3. The application is deactivated and licenses are returned.

NOTES
- The deactivated license still will be active for 7 days.
- The returned licenses can be activated on the same or another machine.
- Online deactivation from the application side or the deactivation with the License Deactivation ID is treated as the confirmed deactivation case and does not decrees an available rehost limit.

Deactivating from the License Activation Management screen

You can deactivate licenses not only from application, but also from the License Activation Management screen in the license owner account at www.magicdraw.com/LicenseActivationManagement.

NOTE The deactivation from the License Activation Management screen should be used only if the deactivation from application side is not available: installation has been lost or corrupted.

To deactivate an application from the license owner account:

1. Go to license owner account at www.magicdraw.com/LicenseActivationManagement.
2. Remove all products assigned for the particular installation in the **Activated Products** column.
3. Application will be deactivated on the next start-up. Licenses will be returned.

NOTE The number of available, not confirmed, deactivations from the License Activation Management screen is 1 for the each obtained license per year. The Confirmed deactivation case from the application side will not decrease the rehost limit.

License Deactivation ID

License Deactivation ID is the value of a specific system attribute that uniquely identifies license deactivation/return from the particular host/machine under which application was running. The License Deactivation ID is used for the license offline deactivation.

To determine License Deactivation ID (for offline deactivation):

1. Click the Deactivate button in the License Manager dialog of the application.
2. The license Deactivation ID will be shown if the online deactivation will not be available.

Confirmed deactivation case

The license deactivation, about which confirmation is received in the license owner account at www.magicdraw.com/LicenseActivationManagement is treated as confirmed deactivation case.

The deactivation confirmation can be received either online, during online deactivation, or offline, with the help of the License Deactivation ID, which is shown during the offline deactivation.

The deactivation from the License Activation Management screen without the License Deactivation ID, is treated as NOT confirmed deactivation and decreases the rehost limit. An exception is, if after such the deactivation, automatic confirmation is received from the application side that the license has been also deactivated on the application side.

Rehost limit

The rehost limit is the number of available, not confirmed, deactivations from the License Activation Management screen. By default such number is 1 for the each obtained license per year. The confirmed deactivation case from the application side will not decrease the rehost limit.

If the rehost limit is exceeded you can request extension from your dedicated account executive by filling the reason of the request and clicking the Request Rehost Increase button.

Rehosting - moving the license from one machine to another

You may moving of the activated (locked to the particular machine) licenses from one machine to another is called rehosting.

To rehost a license

1. Deactivate the license on the old installation.
2. Install an application on the new machine.
3. Activate the license on the new installation.

Related topics

Commercial license activation process

Commercial license types

Host ID

Identification

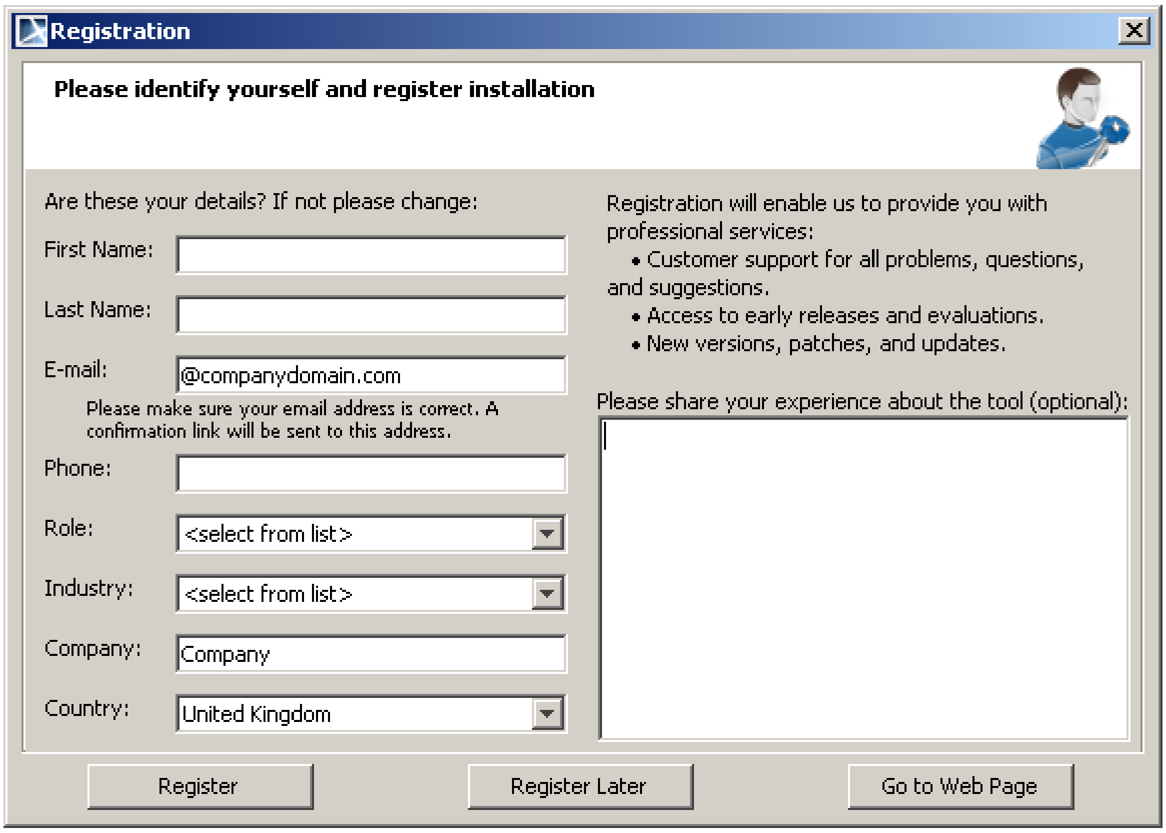
Registration

User Registration

User Registration allows you to access dedicated resources on MagicDraw Website such as dedicated online support, answers database, new products evaluation, and beta products.

The **Registration** window will open the first time MagicDraw is started (Figure 17 on page 57). You can complete Product Registration at any time by selecting **Register** on the MagicDraw **Help** menu.

NOTES	• No Magic, Inc. respects your privacy. We will only use your personal information for communications and management of your online account, and the products you register with your account. • Registration for the owners of commercial licenses is mandatory.



Registration

Please identify yourself and register installation

Are these your details? If not please change:

First Name:	
Last Name:	
E-mail:	@companydomain.com
Phone:	
Role:	<select from list>
Industry:	<select from list>
Company:	Company
Country:	United Kingdom

Please make sure your email address is correct. A confirmation link will be sent to this address.

Registration will enable us to provide you with professional services:

- Customer support for all problems, questions, and suggestions.
- Access to early releases and evaluations.
- New versions, patches, and updates.

Please share your experience about the tool (optional):

Figure 17 -- The Registration Dialog

Registration Workflow

The registration process is straightforward. After a new key application, you will be requested to register your installation. If you have successfully sent the online registration form, you will receive an e-mail with a link to confirm your registration and the correctness of information furnished through online registration.

Upon confirmation, a dedicated account will be created for you at www.magicdraw.com.

NOTE	If you have an existing profile at www.magicdraw.com you may register with the same user information and the same profile information will be used for registration.

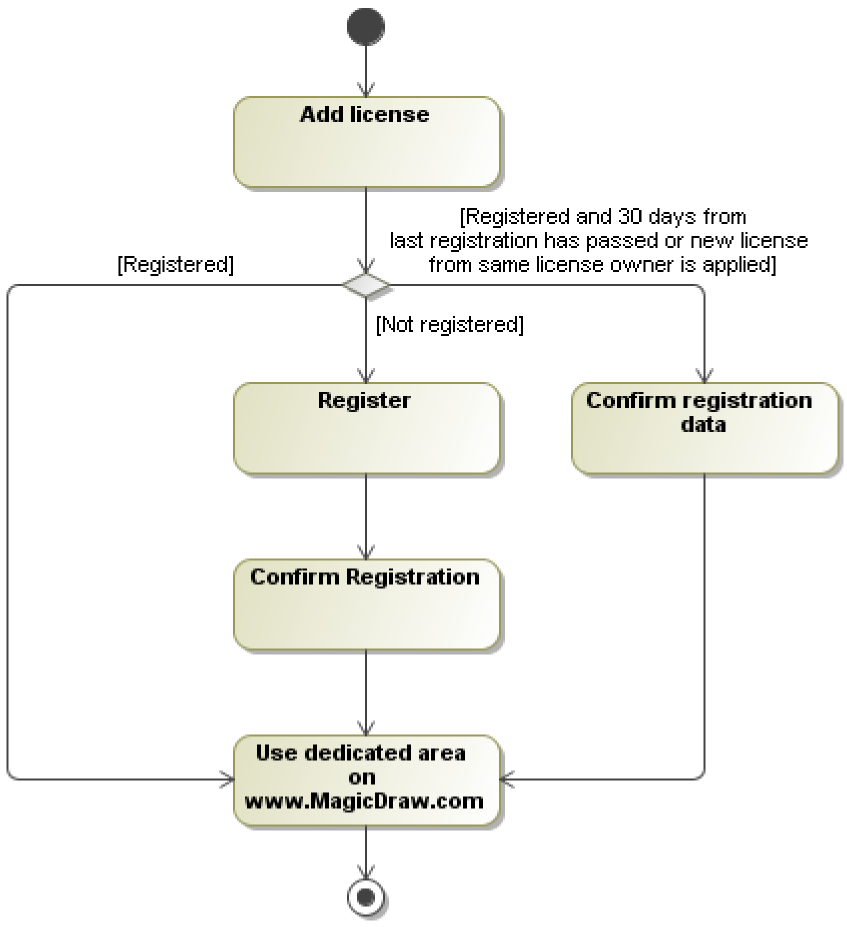

Add license
[Registered]
[Registered and 30 days from last registration has passed or new license from same license owner is applied]
[Not registered]
Register
Confirm registration data
Confirm Registration
Use dedicated area on www.MagicDraw.com

Figure 18 -- Registration Workflow

Adding a License

MagicDraw always checks the registration status at startup after license has been provided, an unlock key has been added, or a Floating server has been selected.

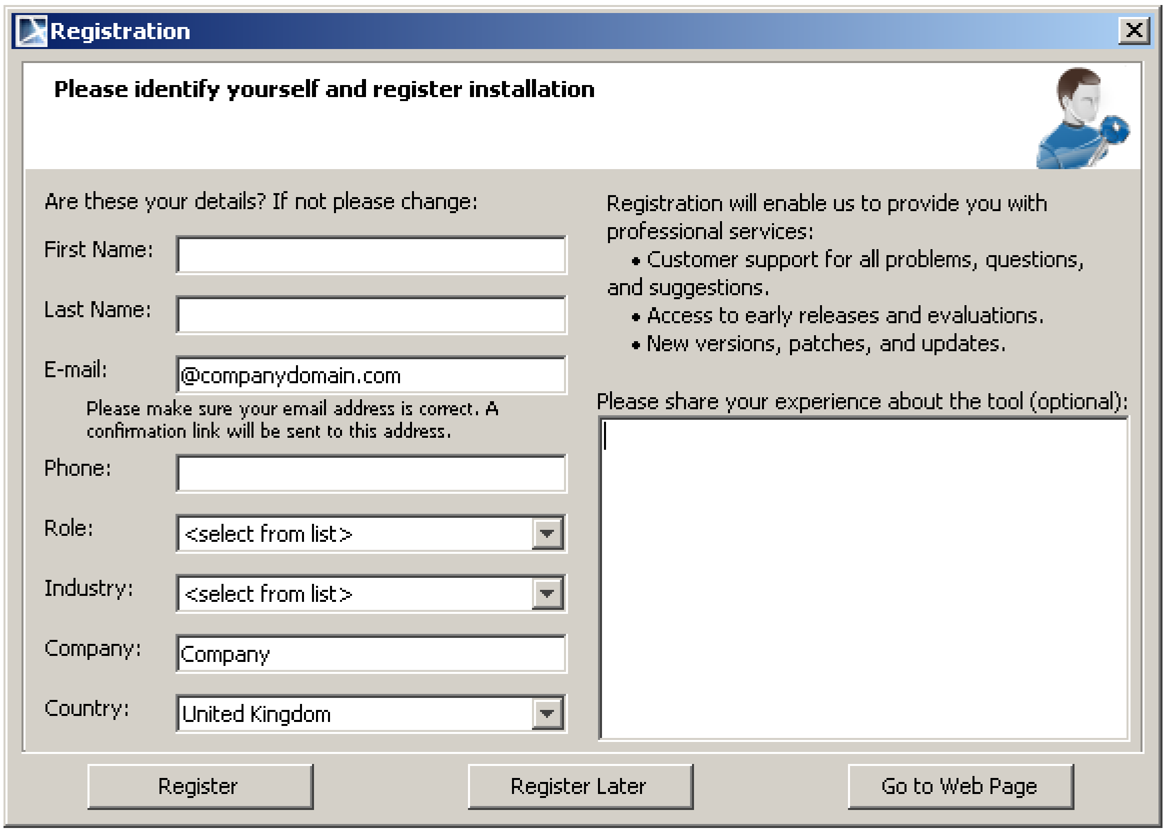
Registering

If you are not a registered user, MagicDraw will open the **Registration** dialog at startup, prompting you to register.

NOTE	You do not have to complete the online User Registration to use MagicDraw, however, it is recommended to do so to receive the benefits available for a registered user. You can complete Product Registration at any time by clicking **Register** on the MagicDraw **Help** menu.

To complete Product Registration:

1. On the MagicDraw main menu, click **Help** > **Register**. The **Registration** dialog will open (Figure 19 on page 59).
2. Provide the requested information in the **Registration** dialog (some information has been profiled from the key owner profile in order to provide a more usable registration process).
3. Share your experience about the tool (optional).
4. Click **Register** to send data to the server and to receive a confirmation email later on.


Registration

Please identify yourself and register installation

Are these your details? If not please change:

First Name:	
Last Name:	
E-mail:	@companydomain.com
	Please make sure your email address is correct. A confirmation link will be sent to this address.
Phone:	
Role:	<select from list>
Industry:	<select from list>
Company:	Company
Country:	United Kingdom

Registration will enable us to provide you with professional services:
- Customer support for all problems, questions, and suggestions.
- Access to early releases and evaluations.
- New versions, patches, and updates.

Please share your experience about the tool (optional):

Figure 19 -- The Registration Dialog

NOTES
- You can click the **Confirm Later** button to register at a later time and close the **Registration Confirmation** dialog.
- A message reminding about Registration Confirmation will appear at MagicDraw startup if you do not complete the registration process.
- No Magic, Inc. respects your privacy. We will only use your personal information for communications and management of your online account, and the products you register with your account.

Confirming Your Registration

An e-mail with registration data and a confirmation link will be sent to the e-mail address provided during registration. Click the confirmation link to confirm the registration process and create or navigate (if it has been created) to your dedicated area at www.magicdraw.com.

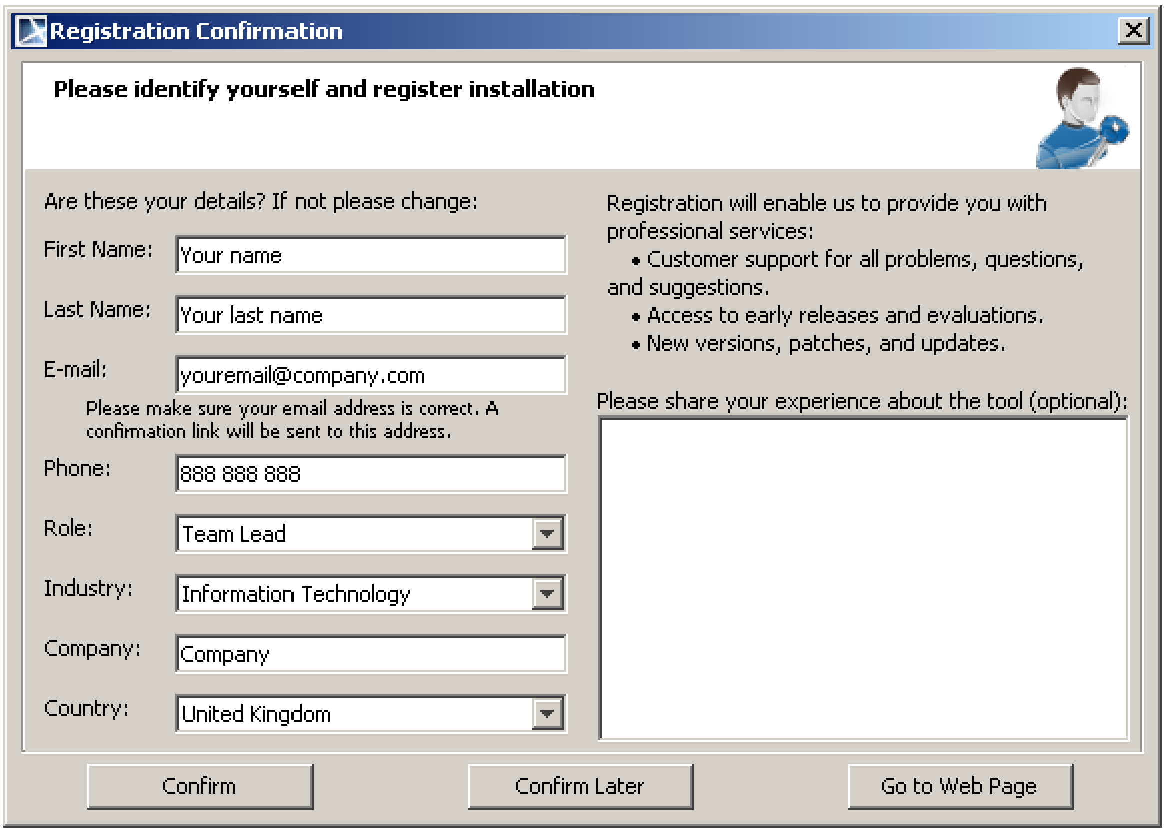
Logging in to Your Dedicated Area at www.magicdraw.com

Use your login name and password received upon confirming your registration to log in to the user dedicated area at www.magicdraw.com.

Your registration will enable us to provide you with the following professional services:
- Dedicated customer support for all problems, questions, and suggestions.
- Access to early releases and evaluations.
- New versions, patches, and updates.

Registration Data Confirmation

After a period of 30 days has passed since the date of your registration or a new license from the same licensed owner has been applied, you will be requested to confirm that you are the one using the software installation at MagicDraw startup. A profiled **Registration Confirmation** dialog will open. Check the correctness of data and click the **Confirm** button.



Registration Confirmation

Please identify yourself and register installation

Are these your details? If not please change:

First Name:	Your name
Last Name:	Your last name
E-mail:	youremail@company.com
	Please make sure your email address is correct. A confirmation link will be sent to this address.
Phone:	888 888 888
Role:	Team Lead
Industry:	Information Technology
Company:	Company
Country:	United Kingdom

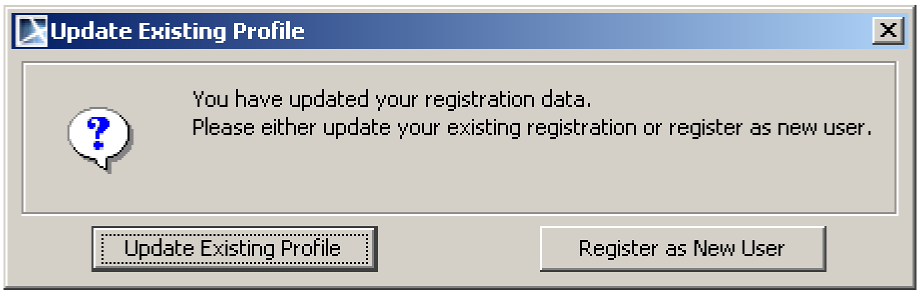
Registration will enable us to provide you with professional services:
- Customer support for all problems, questions, and suggestions.
- Access to early releases and evaluations.
- New versions, patches, and updates.

Please share your experience about the tool (optional):

Figure 20 -- Registration Confirmation

NOTE You will receive no email upon confirming your registration.

If you are registering as a new user, with different profile information, the **Update Existing Profile** question will appear. You can either update your existing profile or identify yourself as a different user using the product installation.



Update Existing Profile

You have updated your registration data.
Please either update your existing registration or register as new user.

Figure 21 -- Updating Existing Profile

Bug Report

If you are a registered user, your personal information will be provided in the **Report an Issue** dialog. Submit notifications of software errors dialog is available from **Help** menu > **Report an Issue**.

If the provided information does not correspond to the information you have provided during registration, once you click the **Send** button to submit the bug, you will be asked to register or update your information. The **Registration** dialog will open and profiled with your personal information from previous registration with changes from the **Report an Issue** dialog or details from the **Report an Issue** dialog if you have not yet registered.

For more information about bug reporting, see “Reporting issues directly from MagicDraw” on page 37.

Troubleshooting

Issue	**Solution**
Registration is requested on each startup	The **Registration Confirmation** dialog will open each time MagicDraw starts until you register the product installation. The registration process is straightforward and requires minimum data for you to access dedicated online support, answers database, new products evaluation, and beta products. Clicking the **Confirm Later** button will close the **Registration Confirmation** dialog.
Registration confirmation is requested at each startup	If you do not click the registration confirmation link, installation will not be confirmed. You may request a new confirmation email from the registration confirmation message.
No email with a confirmation link is received	Your spam or virus filter may filter out the e-mail with a confirmation link. If that is the case, you can request a new confirmation e-mail by clicking **Help** > **Register** on the MagicDraw main menu.
The No connection to registration server message opens	Check your internet connection and try to reconnect. NOTE: User Registration is encouraged, but is not required to use MagicDraw.
You are getting can not connect to server message on registration dialog invocation from **Help** menu -> **Registration**	Check your internet connection and try to reconnect. NOTE: User Registration is encouraged, but is not required to use MagicDraw.
The Registration dialog does not opens at Startup	• You have already registered and the period of 30 days since the date of your last registration has not been used up. • There are network limitations to check your registration status. Note: User Registration is encouraged, but is not required to use the MagicDraw.

NOTE	If you encounter problems during the registration process, please contact us registration@nomagic.com

Updating

An automatic updates feature is implemented in MagicDraw. Notification and update of all the patches can be done automatically.

To enable an automatic checking for MagicDraw updates

1. Open the **Environment Options** dialog, **Update** pane.
2. In the **Check for Updates** drop-down list, select a period how often MagicDraw should check for updates. Choises of periods are the following:
   - **Manually**
   - **On startup**
   - **Once a day**
   - **Once a week**
   - **Once a month**

It is recommended to check for updates once a month.

NOTE	You may also manually check for updates: go to the **Help** menu and select the **Check for Updates** command.

Auto-Check for Updates dialog box

The dialog opens when automatic checking for MagicDraw updates is enabled on the **Update** pane in the Environment Options dialog and the **Show Auto-Checking Confirmation Dialog Box** value is set to true.

Element Name	Function
Show this tip next time	If selected, the dialog opens each time that MagicDraw should be updated according to the schedule selected in the **Update** pane in the Environment Options dialog.
Check	Starts checking for MagicDraw updates on the http://www.magicdraw.com page.
Cancel	Closes the dialog box without saving changes.
Help	Displays **MagicDraw Help**.

3 USING MAGICDRAW

In “Using MagicDraw”, you will find information about how to define MagicDraw according to perspective, an introduction to the MagicDraw User Interface, and defining your environment.

Customizing and Selecting Perspective

Launch MagicDraw for the first time and after the application starts, the **MagicDraw Startup** dialog appears. In this dialog you may select your work perspective.

Due to the growing number of MagicDraw features, many features may be configured for standard or expert user. MagicDraw can satisfy the needs of different software development process roles. In order to better satisfy user needs, MagicDraw configuration depends on Perspective.

Perspectives allow:

- The selection of a predefined MagicDraw configuration and features according to your software development process role.
- Finding features faster, because there are less of them.
- To choosing a suitable MagicDraw experience mode with a single click.
- Customizing a set of predefined features and configuration based on user needs.

There are five perspectives in MagicDraw:

- **Business Analyst** - this perspective provides features for the Business Analyst. This role is responsible for defining business architecture. Code engineering, transformations, extensions, and other features are hidden.
- **Full Featured** - Perspective provides all features available in MagicDraw and installed plugins.
- **Quick Start** - Quick Start perspective provides basic features dedicated for modelling and not overcrowded interface for quick learning. Code engineering, transformations and other advance features are hidden, however easily reachable in expert mode of this perspective.
- **Software Architect** - this perspective provides features primarily involved in designing and implementing projects. It is a set of roles consisting of Software Architect, Designer, Interface designer, and Database designer. This is the default MagicDraw configuration. All functionalities are available for expert mode.
- **System Analyst** - this perspective provides features primarily dedicated to obtaining requirements and modeling the system. Analysis features are highlighted. Configuration is modeling oriented. Code engineering, transformations and other features are hidden.

To set the perspective for the MagicDraw environment

- Launch MagicDraw for the first time. The **MagicDraw Startup** dialog will appear with the possibility to switch between perspectives. Select the desired perspective from the list and click the **OK** button.
- From the **Options** menu, choose **Perspectives** and then click **Perspectives**. The **Select Perspective** dialog opens. Select the desired perspective and click the **Apply** button.
- On the **Perspectives** toolbar, select the desired perspective from the available perspectives list.

NOTE	For more information about the Perspectives toolbar, see "Perspectives Toolbar" on page 803.

Customizing MagicDraw Perspectives

Perspective customization allows the grouping of functional MagicDraw features to standard/expert modes. Customization also allows the user to hide unnecessary commands, which makes MagicDraw simpler and faster to use.

To open the **Customize Perspectives** dialog

- From the **Options** menu, choose **Perspectives** and then **Customize**.
- In the **Perspectives** dialog, click the **Customize** button.

MagicDraw has six customizable areas in different perspectives. Each of these areas has a set of commands, which can be shown in standard/expert mode, or hidden:

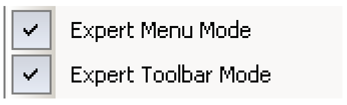
- Main menu;
- Main toolbars;
- Diagram toolbars;
- Diagram modeling elements toolbar;
- Context menu actions;
- Reports.

To customize the selected MagicDraw area in a predefined perspective

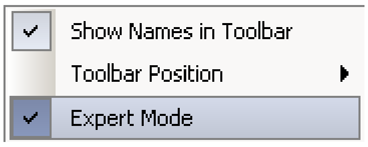
1. In the **Customize Perspectives** dialog, select the perspective and click the **Edit** button near the selected MagicDraw area. The appropriate **Customize** dialog opens.
2. Expand tree sections and select radio buttons beside items in the tree depending on your choice for **Standard and Expert**, **Expert** only or **Hidden** modes.
3. Click **OK** to save changes, then **OK** in the **Customize Perspectives** dialog, and then **Apply** in the **Select Perspective** dialog (if needed).

To switch between Standard/Expert menu, toolbar, or diagram toolbar modes

- From the toolbar shortcut menu, select/clear the **Expert Menu Mode** or **Expert Toolbar Mode** check box.

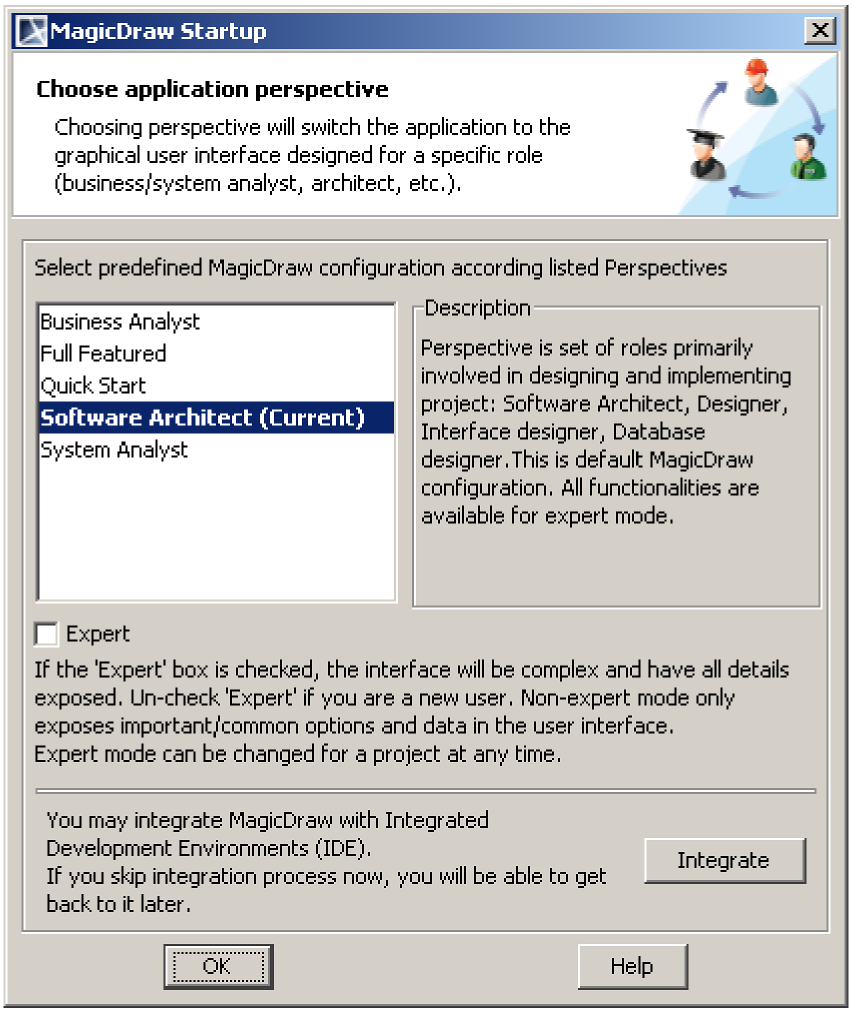


- From the diagram buttons toolbar menu, select/clear **Expert Mode** check box.



MagicDraw Startup dialog

Launch MagicDraw for the first time. The **MagicDraw Startup** dialog will appear with the possibility to switch between perspectives.


MagicDraw Startup

Choose application perspective

Choosing perspective will switch the application to the graphical user interface designed for a specific role (business/system analyst, architect, etc.).

Select predefined MagicDraw configuration according listed Perspectives

- Business Analyst
- Full Featured
- Quick Start
- **Software Architect (Current)**
- System Analyst

Description

Perspective is set of roles primarily involved in designing and implementing project: Software Architect, Designer, Interface designer, Database designer.This is default MagicDraw configuration. All functionalities are available for expert mode.

☐ Expert

If the 'Expert' box is checked, the interface will be complex and have all details exposed. Un-check 'Expert' if you are a new user. Non-expert mode only exposes important/common options and data in the user interface.
Expert mode can be changed for a project at any time.

You may integrate MagicDraw with Integrated Development Environments (IDE).
If you skip integration process now, you will be able to get back to it later.

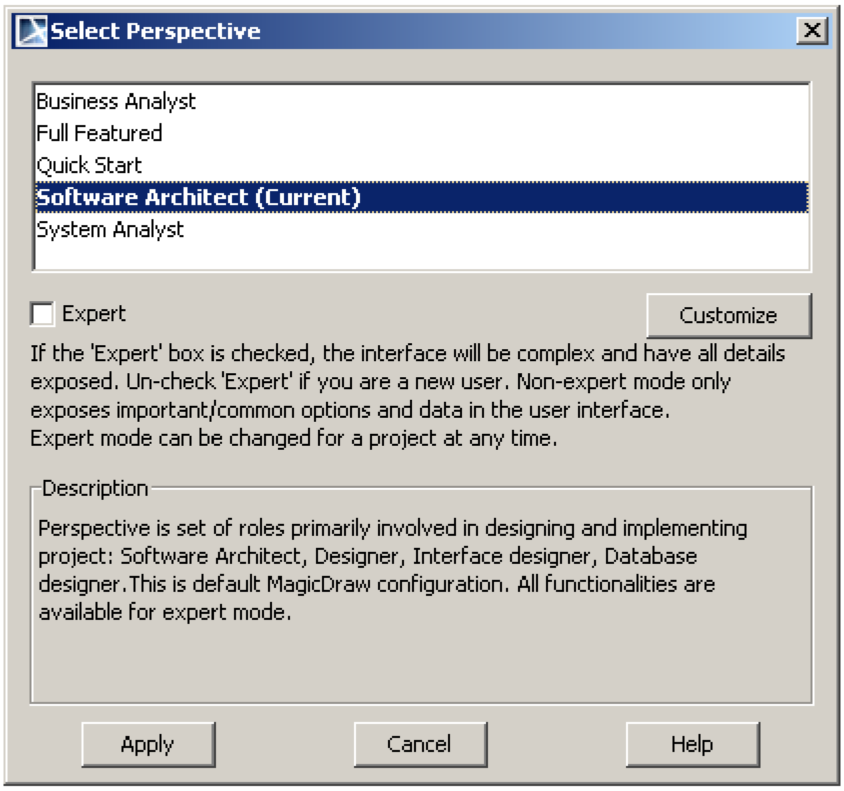
Figure 22 -- MagicDraw Startup dialog

Element Name	Function
Business Analyst **Full Featured** **Quick Start** **Software Architect** **System Analyst**	Possible perspectives to set, which will load a predefined MagicDraw configuration.
Expert	If not selected, a simplified MagicDraw interface with the most popular items and features will be opened and the specification properties will be shown in Standard Mode.
Integrate	Opens the **Integrations** dialog for quick integration with the selected tool.

Element Name	Function
OK	Loads MagicDraw with the selected perspective.
Help	Displays **MagicDraw Help**.

Select Perspective dialog

From the **Options** main menu, choose **Perspectives** and then **Perspectives**.



Select Perspective

Business Analyst
Full Featured
Quick Start
Software Architect (Current)
System Analyst

Expert

If the 'Expert' box is checked, the interface will be complex and have all details exposed. Un-check 'Expert' if you are a new user. Non-expert mode only exposes important/common options and data in the user interface. Expert mode can be changed for a project at any time.

Description

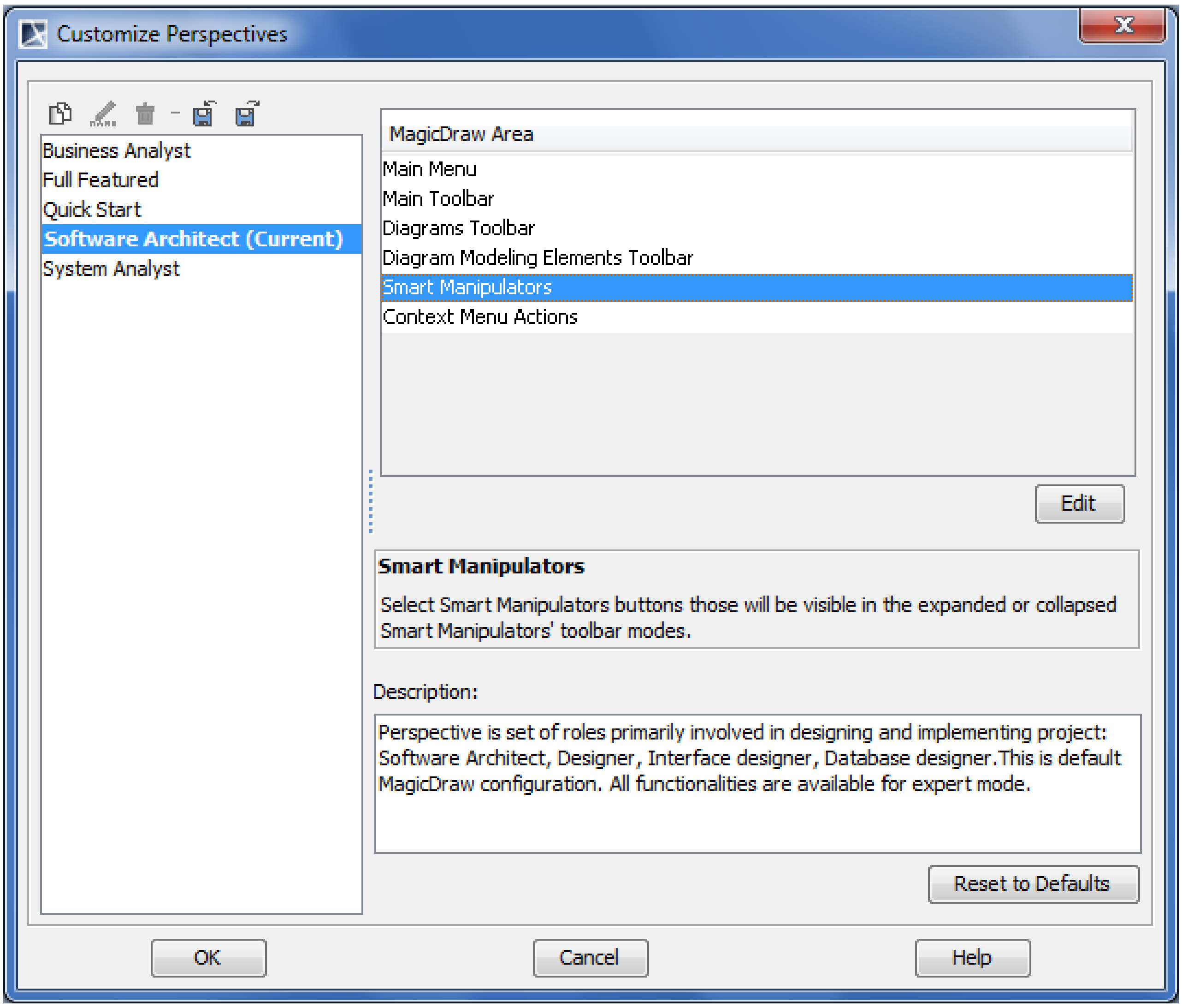
Perspective is set of roles primarily involved in designing and implementing project: Software Architect, Designer, Interface designer, Database designer.This is default MagicDraw configuration. All functionalities are available for expert mode.

Figure 23 -- Select Perspective dialog

Element Name	Function
Business Analyst **Full Featured** **Quick Start** **Software Architect** **System Analyst**	List of possible perspectives, which will load a predefined MagicDraw configuration.
Customize	Opens the **Customize Perspective** dialog.
Expert	If not selected, a simplified MagicDraw interface with the most popular items and features will be opened and the specification properties will be shown in Standard Mode.
Apply	The selected perspective will be applied for current MagicDraw mode.
Cancel	Closes the dialog box without saving changes.
Help	Displays **MagicDraw Help**.

Customize Perspectives dialog

From the **Options** main menu, choose **Perspectives** and then **Customize**.



Smart Manipulators

Select Smart Manipulators buttons those will be visible in the expanded or collapsed Smart Manipulators' toolbar modes.

Description:

Perspective is set of roles primarily involved in designing and implementing project: Software Architect, Designer, Interface designer, Database designer.This is default MagicDraw configuration. All functionalities are available for expert mode.

Figure 24 -- Customize Perspectives dialog

Element Name	Function
Clone Selected Perspective	Copies the selected perspective to a new one.
Rename Selected Perspective	The **Enter Perspective Name** dialog opens. Change name of the perspective and click **OK**. Renaming can also be performed using the F2 shortcut key.
Remove Selected Perspective	Deletes the selected perspective from the list.
Import New Perspective	The **Open** dialog appears. Select *.umd extension file and click **Open** to import the perspective into the MagicDraw environment.

Element Name	Function
Export Selected Perspective	The **Save** dialog opens. Type a name for the created perspective and click **Save** to store it as *.umd extension file.
Business Analyst Software Architect System Analyst	List of possible perspectives, which will load the predefined MagicDraw configuration.
MagicDraw Area	List of customizable toolbars and command sections.
Edit	Click the **Edit** button to open the **Customize Main Menu** dialog in which a commands mode could be changed by selecting radio buttons.
Description	Displays short description about each selected area.
Reset to Defaults	Resets changes back to the default configuration.

Understanding MagicDraw User Interface (UI)

MagicDraw main window has the following parts:

- **Main menu**
- **Main toolbars**
- **Model Browser**
- **Diagram toolbars**
- **Diagram pallet**
- **Diagram pane**

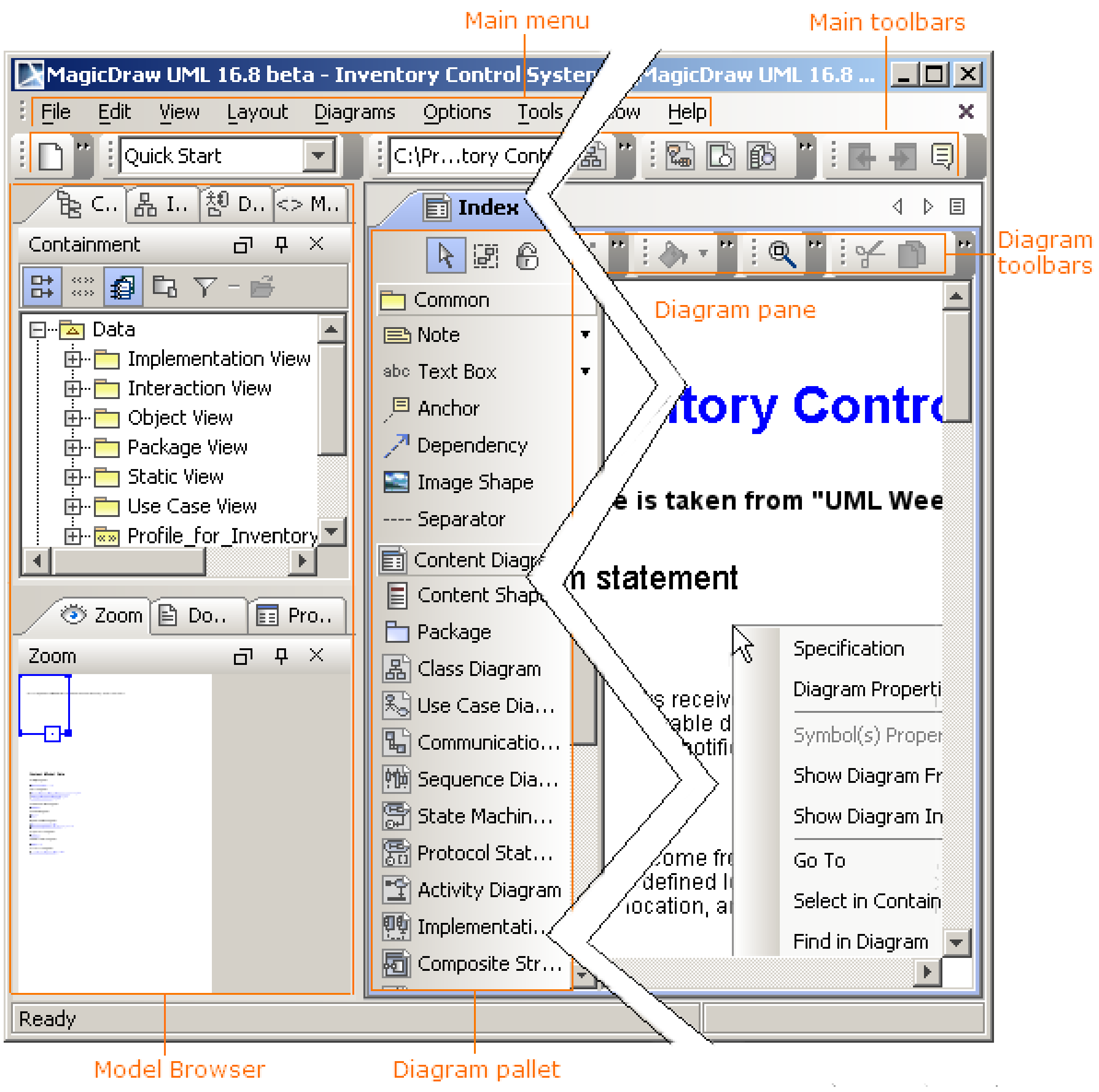


Figure 25 -- MagicDraw main UI structure

Nearly all MagicDraw commands can be accessed from multiple places within MagicDraw:

- Main menu
- Main toolbars
- Model Browser
- Diagram toolbars

- Shortcut menus (accessible by right-clicking)
- Shortcut keys
- Smart manipulators (accessible by selecting a symbol on the diagram pane).

The table below shows the accessibility of several commands in various ways:

Function	Accessibility
Main operations of editing (copy, cut, paste, delete)	• **Edit** menu. • Main toolbar buttons. • Shortcut keys. • Shortcut menu commands from Browser.
Opening of the Specification **dialogs**	• By double-clicking the model element. • **Specification** command from the element shortcut menu on the diagram or Browser. • When adding one model element to another model element from the Specification dialog or Browser.
Defining symbols properties (font, color, etc.)	• Symbol shortcut menu > **Symbol(s) Properties**. • **Options** menu > **Project**. • Main toolbar buttons

NOTES	The Symbol shortcut menu is also accessible from the **Edit** menu, **Symbol**. The toolbar of a particular diagram presents the paths and shapes available for the corresponding diagram. If an arrow is placed on the diagram toolbar button, select a button representing the corresponding model element by right-clicking the button.

Menus

The description of all menu commands you may find in Section “Menu System” on page 780

You may customize menu items by selecting and/or modifying perspectives. More information about customizing perspectives, you may find in Section “Customizing and Selecting Perspective” on page 63.

NOTE	Various plugins might bring additional menu items.

Toolbars

Toolbars help to speed up your work with MagicDraw, when performing commonly used tasks. There are main toolbars and diagram toolbars in the main window of MagicDraw.

To show or hide different toolbars

- Right-click the toolbars area and then select or clear the check boxes of the toolbars you want to be displayed or hidden.

You may also save your own toolbars configuration and set it as a default one (for more information see "Customizing toolbars", on page 72).

Main toolbars

The main window of MagicDraw contains the following main toolbars:

- **File** (main)
- **Diagrams**
- **Analysis Diagrams**
- **Other Diagrams**
- **Diagrams Navigation**
- **Opened Projects**
- **Perspectives**
- **Collaboration**
- **External Tools**
- **Validation**

For detailed information about the commands of the main toolbars, see "Main Toolbars", on page 796.

Diagram toolbars

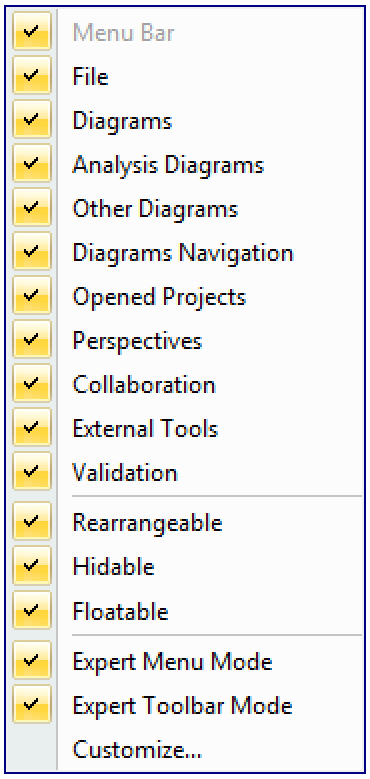
The main window of MagicDraw contains the following diagram toolbars:

- **Symbol Editing**
- **Shape Editing**
- **Path Editing**
- **Edit**
- **View**
- **Layout**

For detailed information about the commands of the diagram toolbars, see "Diagram Toolbars" on page 803.

Customizing toolbars

Toolbars configuration shortcut menu has the following commands:



Check box	Function
Rearrangable	If selected, it is possible to change the toolbar position by selecting the dotted line in front of the desired toolbar group and dragging it to a new location.
Hidable	If selected, there is no possibility to close a separately opened toolbar group (for example, dragged diagram pane) with the X button on the right top corner.
Floatable	If selected, the toolbar group can be dragged to any desirable position inside the MagicDraw borders.
Expert Menu Mode	If selected, all menu commands will be listed on the menu. Otherwise, the command list will be shortened and you can expand it by clicking the arrow on the bottom.
Expert Toolbar Mode	If selected, displays all toolbar buttons, which were marked to be shown in the Expert mode perspective.
Customize	Opens the **Customize Toolbars** dialog.

To add a new toolbar

1. From the toolbars configuration shortcut menu, choose **Customize**. The **Customize Toolbars** dialog opens.
2. Click **Add** > **New Toolbar**.
3. Type the name for a new toolbar.
4. Click **OK**.

To add a new button to the selected toolbar

1. From the toolbars configuration shortcut menu, choose **Customize**. The **Customize Toolbars** dialog opens.
2. Click **Add** > **Button**.
3. Select the desired command.
4. Click **OK**.

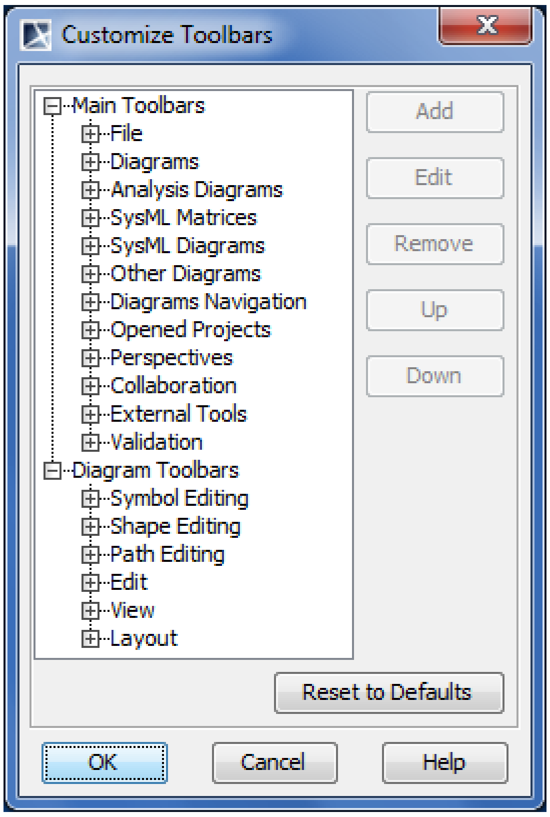


Figure 26 -- The Customize Toolbars dialog

Button	**Function**
Add	Adds a new button or a toolbar.
Edit	The **Edit Icon** dialog opens. Click the "..." button to add an icon to the selected toolbar button.
Remove	Removes the selected button from the toolbar section.
Up	Moves the selected button up the toolbar list.
Down	Moves the selected button down the toolbar list.
Reset to Defaults	Resets changes made to the toolbar back to the default settings.

Using the Model Browser

View Online Demo	MagicDraw Basics

The Model Browser provides a visual representation of the hierarchy of your model elements. The items in this hierarchy are either:

- Compressed - a plus sign next to an icon indicates that the icon is compressed, which means that it contains other model elements. This is the default setting when you start your application. Click the plus sign to expand the icon and view its subordinate items.
- Expanded - a minus sign next to an icon indicates that the icon is fully expanded. Click the minus sign to collapse the item.

If there is no sign next to an icon, it does not contain other model elements.

The Model Browser is a hierarchical navigation tool that allows you to manage your model data, including packages, components, classes, all UML diagrams, extension mechanisms, and other data. The Model Browser may be used as an alternative tool to the menus and toolbars that are in MagicDraw. It is easier to work with project diagrams and data elements using the Model Browser. The Model Browser performs the following operations:

- Creation and specification of model elements without viewing them.
- Copying, cutting, and pasting of model elements.
- Opening and deleting of model elements.
- Dragging and dropping of model elements to the Diagram pane and inside the Model Browser.
- Dragging and dropping of data in the Code engineering sets (you may create data in the Data branch, drag it to the Code Engineering sets, and then the round trip object is created automatically).
- Hierarchical viewing of all model elements.
- Trace viewing for the selected model element.
- Symbol creation for the selected model element in the current diagram.
- Managing diagrams.
- Managing extension mechanisms such as constraints, stereotypes, and tagged values.
- Java reversing of a class directly from the classpath.
- Adjusting the code engineering sets.
- Code generation for particular sets.
- Filtering of the visible items, by any model type, (for example, class, package, operation, component, state and others - for both views and dates), when the Filter from the Model Browser shortcut menu is selected.
- Sorting of the visible items for the selected model element.
- Sorting of all model elements.
- Displaying search results.

The Model Browser window is divided into two parts:

- **Containment** tree / **Diagrams** tree / **Inheritance** tree / **Model Extensions** tree / **Search Results** / **Locked Elements** tree.
  The Containment tree tab groups data in the logical sets.
  The Diagrams tab groups diagrams that are represented on the diagram pane according to the diagrams type or shows them as a list.
  The Inherence tree tab represents the class hierarchy of the project.
  The Model Extensions tree tab represents all predefined and created constraints and stereotypes.

The Search results tab displays search results.
The Locked Elements tree tab represents locked elemets of the project.

NOTE	The **Locked Elements** tree tab can appear if you are working on a server project. For more information about this tab, refer to “Representation of locked elements” in “MagicDraw Teamwork UserGuide.pdf”.

- **Documentation** / **Zoom Control** part. The Documentation tab shows documentation associated with the selected item. The **Zoom Control** tab is responsible for zooming the current diagram.

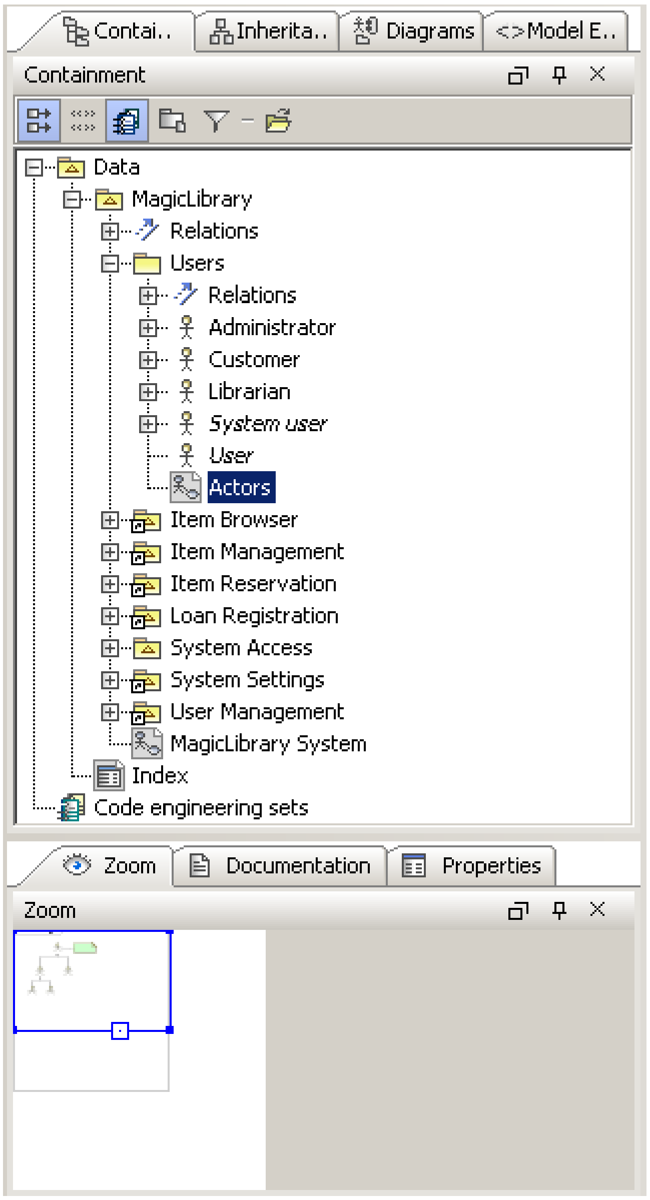


Figure 27 -- The Model Browser window

When at least one Project is open, the Model Browser is placed to the left side of the main window. Beginning with MagicDraw version 7.5, it is possible to move the Model Browser to any place on the the MagicDraw application. Also, all tabs can be viewed separately and you may set up the Model Browser according to your needs by hiding the desired tabs.

To change the size of either part of the Model Browser

- Drag the bar that separates the two parts.

To change the Model Browser position from the **Options** menu

1. From the **Options** menu, select **Environment**. The **Environment Options** dialog opens.
2. Click on the **Browser** tab.
3. In the Browser environment options pane, change the **Browser Position** property to **Right** or **Left**.

To close or reopen the desired tab of the Model Browser

- From the **Window** menu, choose the tab you want to close or open.

To reset all Model Browser tabs to the default position

- From the **Window** menu, choose **Reset Windows Configuration** command.

To sort items in Model Browser alphabetically

1. From the **Options** menu, select **Environment**. The **Environment Options** dialog opens.
2. Click on the **Browser** tab.
3. In the Browser environment options pane, set the **Sort Always** check box to “true” (default “true”).

Containment tree

The Containment tree displays model data, grouping it in logical sets.

To open the Containment tree

- At the top of the Model Browser, click the **Containment** tab.
- If the Containment tree is hidden, from the **Window** menu, select **Containment.**

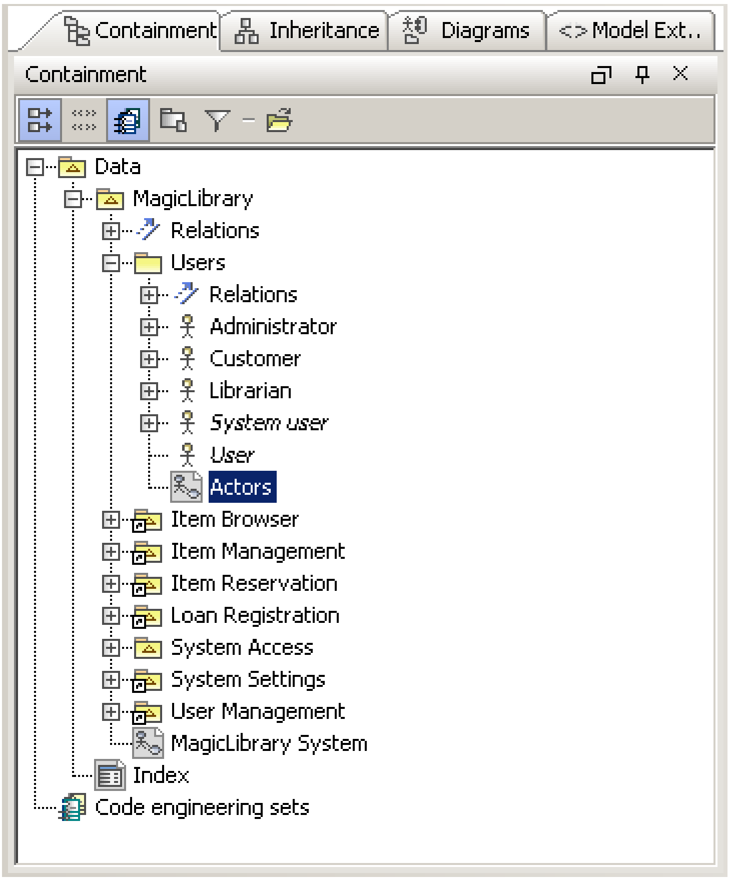


Figure 28 -- Containment tree

To show full information of operations, attributes, and relationships in the Containment Tree

Do one of the following:

- In the **Containment** tab, click the **Show Full Types in Browser** button .
- Do the following:
  1. Choose **Environment** command from the **Options** menu. The **Environment Options** dialog box appears.
  2. In the **Browser** tab, set the Show Full Types in Browser check box to “true” (default “false”).

To show stereotypes in the Containment tree

Do one of the following:

- In the **Containment** tab, click the **Show Stereotypes in Browser** button .
- Do the following:
  1. Select **Environment** from the **Options** menu. The **Environment Options** dialog opens.
  2. In the **Browser** tab, set the **Show Stereotypes in Browser** check box to “true” (default “false”).

To show/hide Code Engineering sets branch

Do one of the following:

- In the **Containment** tab, click the **Show Code Engineering Sets** button .
- Do the following:
    1. Select **Environment** from the **Options** menu. The **Environment Options** dialog opens.
    2. In the **Browser** tab, set the **Show Code Engineering Sets** check box to “true” (default “true”).

To show/hide Modules

Do one of the following:

- In the **Containment** tab, click the **Show Auxiliary Resources** button .
- Do the following:
    1. Select **Environment** from the **Options** menu. The **Environment Options** dialog opens.
    2. In the **Browser** tab, set the **Show Auxiliary Resources** check box to “true/false” (default “true”).

To filter types of elements to be displayed

To improve accessibility the **Filter** button has been added to the Containment Tree toolbar (Figure 29 on page 78). Previously the **Filter** menu was accessible only from the Containment tree shortcut menu (Figure 30 on page 79).

The **Items Filter** dialog allows you to choose what types of elements to be displayed in the Containment tree (Figure 31 on page 79).

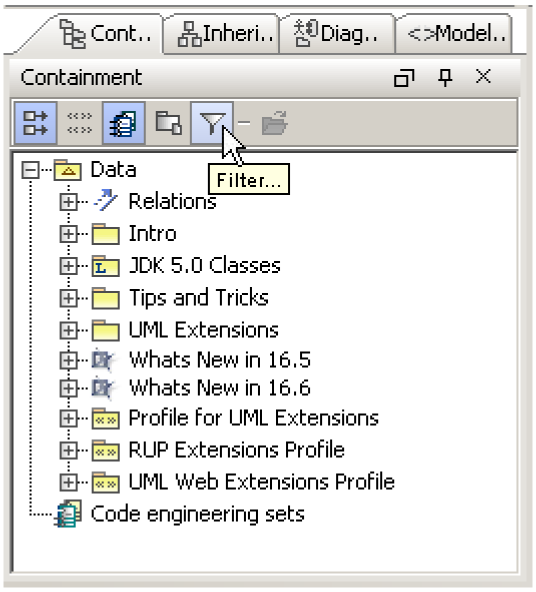
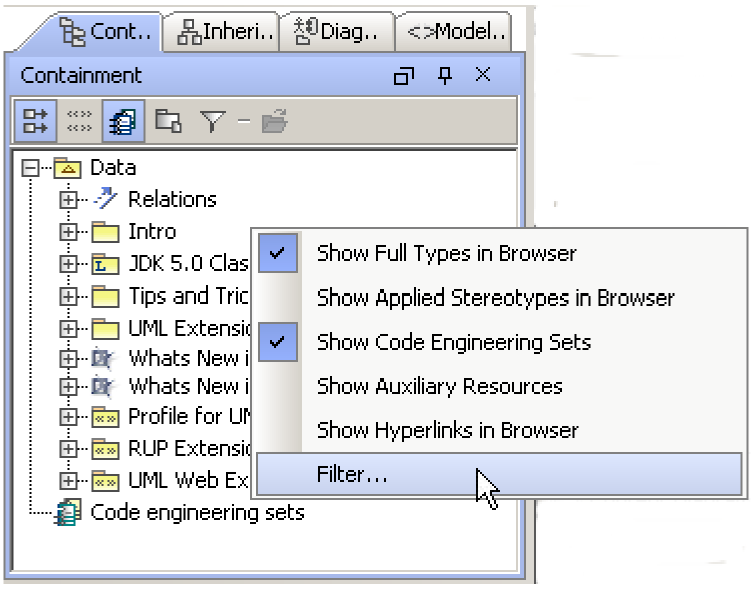
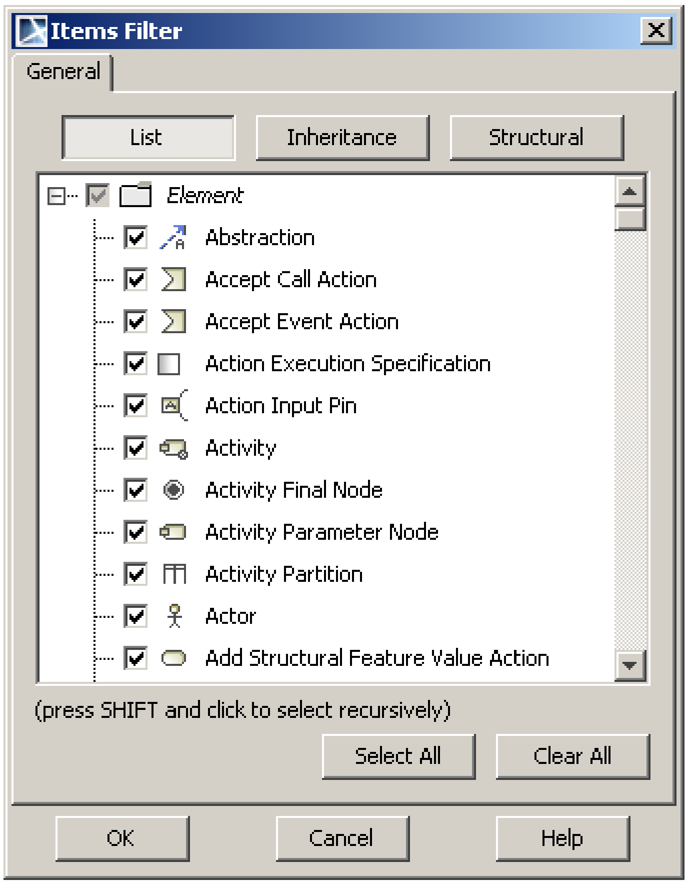


Figure 29 -- The Filter Button in the Containment Tree



- [✓] Show Full Types in Browser
- Show Applied Stereotypes in Browser
- [✓] Show Code Engineering Sets
- Show Auxiliary Resources
- Show Hyperlinks in Browser
- Filter...

Figure 30 -- The Filter command in the Model Browser shortcut menu



- Element
  - [✓] Abstraction
  - [✓] Accept Call Action
  - [✓] Accept Event Action
  - [✓] Action Execution Specification
  - [✓] Action Input Pin
  - [✓] Activity
  - [✓] Activity Final Node
  - [✓] Activity Parameter Node
  - [✓] Activity Partition
  - [✓] Actor
  - [✓] Add Structural Feature Value Action

(press SHIFT and click to select recursively)

Figure 31 -- The Items Filter dialog

To open package contents in a new tab

- In the **Containment** tab, click the **Open in New Tab** button . New tab with package name and tree contents will be opened in the Model Browser.

Data branch

The **Data** branch represents the model and structure of a project. All model elements are stored in packages. This helps you distribute data into logical groups. By default, all new model element data (inner structure) are stored in the **Data** package. You may create your own packages for storing your model element data.

The **Data** branch also contains the **File View** package, **UML Standard Profile** with stereotypes and data types, and **Relations** package (appears only when at least one path is drawn on the diagram pane).

The **File View** package is where the components are placed during code engineering.

The **UML Standard Profile** contains a list of stereotypes, data types, and elements from the UML 2 metamodel.

To create a new element

1. In the Containment tree, from the package shortcut menu, choose **New Element** and select the desired element from the list.
2. Type the name of the element directly in the Containment tree.

For more information about managing model elements from the Browser, see "Working with Elements in the Model Browser" on page 85.

Code engineering sets

The Code engineering sets branch is a gateway between your source code and model data. Using sets, you can perform Java, C++, IDL, DDL, EJB, CIL, and C# round-trip code engineering (code generation + reverse engineering).

To create a new Code engineering set

1. Right-click the **Code Engineering Sets** item and select **New** from the item shortcut menu or open the **Code Engineering Sets** dialog and click the **New** button. The **New Set** dialog opens.
2. Type the set name and select the programming language from the drop-down list (by default - Java).
3. Click **OK** to finish the set creation.

To edit the selected set

- Select **Edit** from the set shortcut menu. The **Round Trip Set** dialog opens. Add/remove files or classes from the Code engineering set.

To rename the selected set

- Select **Rename** from the set shortcut menu and type the set name.

To change the code generation properties

- Select **Properties** from the set shortcut menu. The **CG Properties Editor for Data** dialog opens.

To delete the selected set

- Select **Delete** from the set shortcut menu.

To restore the deleted set

- From the **Edit** menu, select **Undo** or press the shortcut keys CTRL+Z.

To generate code from the selected set

1. Select **Generate** from the set shortcut menu. The **Code Generation Options** dialog opens.
2. Adjust the code generation options.
3. Click **OK**. The **Messages Window** dialog opens. Information about generated files is shown.

To check syntax

- Select **Check Syntax** from the set shortcut menu. If no errors are found, then a message opens stating there are no syntax errors in the model.

To reverse the selected set

1. Select **Reverse** from the set shortcut menu.
2. The **Reverse Options** dialog opens. Define options and click **OK**.
   For the detailed descriptions about the reverse, see Section Reverse in the Code Engineering User’s Guide.

To reverse files that have been changed

1. Select **Refresh** from the set shortcut menu.
2. The **Reverse Options** dialog opens. Define the options and click **OK**.
   For detailed description about the reverse process, see the “Reverse” Section in the Code Engineering User’s Guide.

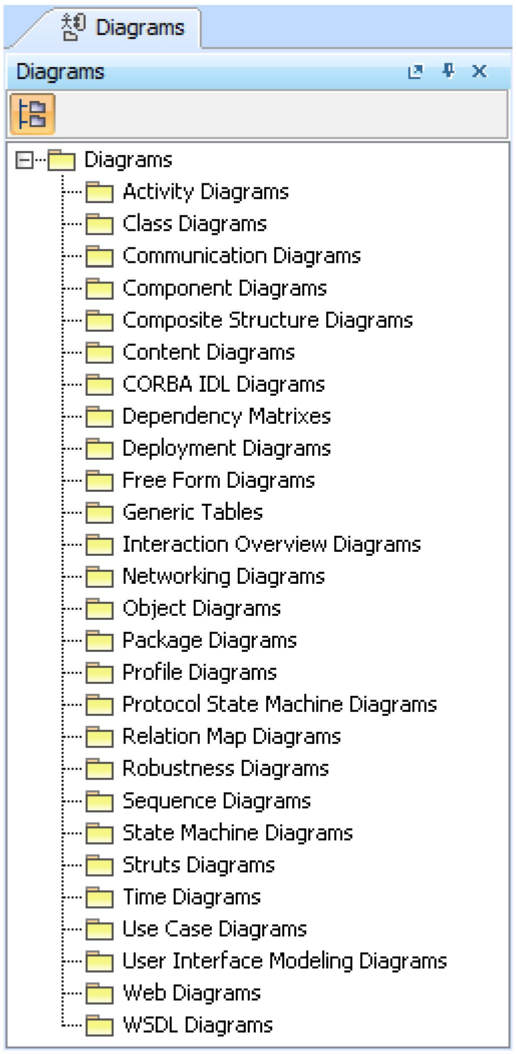
TIP! All functions listed above can be performed in the **Code Engineering Sets** dialog.

To select a text editor for source code

1. In the **Options** menu, select **Environment,** then select the **Launchers** group in the dialog that opens.
2. In the **Default launchers** field, click the “...” button and select the directory where the text editor is located.
3. Click **OK**.

Diagrams tree

The Diagrams tree in the Browser represents the external structure of a diagram.



- Diagrams
  - Activity Diagrams
  - Class Diagrams
  - Communication Diagrams
  - Component Diagrams
  - Composite Structure Diagrams
  - Content Diagrams
  - CORBA IDL Diagrams
  - Dependency Matrixes
  - Deployment Diagrams
  - Free Form Diagrams
  - Generic Tables
  - Interaction Overview Diagrams
  - Networking Diagrams
  - Object Diagrams
  - Package Diagrams
  - Profile Diagrams
  - Protocol State Machine Diagrams
  - Relation Map Diagrams
  - Robustness Diagrams
  - Sequence Diagrams
  - State Machine Diagrams
  - Struts Diagrams
  - Time Diagrams
  - Use Case Diagrams
  - User Interface Modeling Diagrams
  - Web Diagrams
  - WSDL Diagrams

Figure 32 -- Diagrams tree

In the Diagrams tree, with the selected diagrams, you can perform the operations listed below.

To group diagrams according to their diagram type

- Click the **Group by Diagram Type** button in the Diagrams tree.
- From the shortcut menu, select the **Group by Diagram Type** check box.

To open the selected diagram from the Browser

- Select **Open** from the item shortcut menu or double-click the item in the diagram.

To delete the selected diagram

- Select **Delete** from the selected diagram shortcut menu.

To rename the selected diagram

- Select **Specification** from the diagram shortcut menu. The corresponding **Diagram Specification** dialog opens. Type the diagram name and click **OK**.

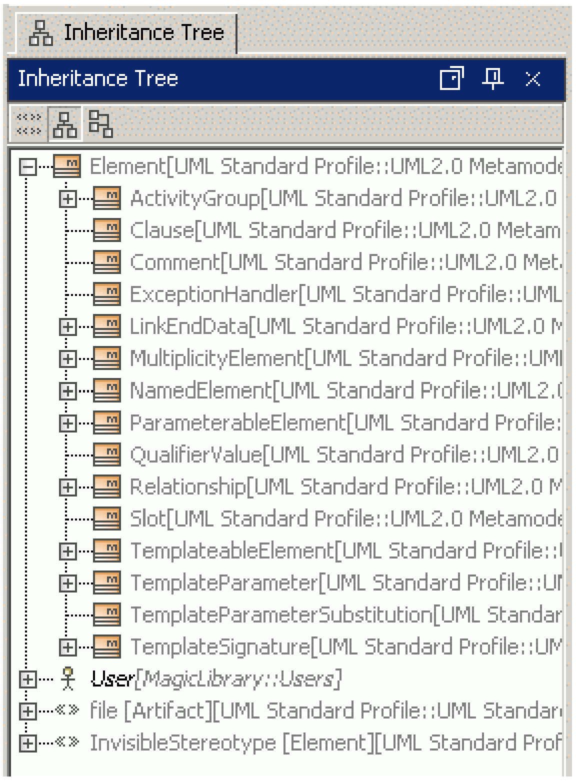
TIP! In the **Diagram Specification** dialog you can add documentation to the diagram, view the relationships in which the diagram participates, and define hyperlinks, stereotypes, constraints, and tagged values.

To print the selected diagram

- Select **Print** from the diagram item shortcut menu. If the diagram is empty, it will not be printed.

Inheritance tree

The Inheritance tree represents classifiers, packages, data types, and stereotypes hierarchy within your project. Inheritance according to the UML Specification is shown using the generalization relationship.



```
Element[UML Standard Profile::UML2.0 Metamode
    ActivityGroup[UML Standard Profile::UML2.0
    Clause[UML Standard Profile::UML2.0 Metam
    Comment[UML Standard Profile::UML2.0 Met
    ExceptionHandler[UML Standard Profile::UML
    LinkEndData[UML Standard Profile::UML2.0 M
    MultiplicityElement[UML Standard Profile::UMI
    NamedElement[UML Standard Profile::UML2.(
    ParameterableElement[UML Standard Profile:
    QualifierValue[UML Standard Profile::UML2.0
    Relationship[UML Standard Profile::UML2.0 M
    Slot[UML Standard Profile::UML2.0 Metamode
    TemplateableElement[UML Standard Profile::
    TemplateParameter[UML Standard Profile::UI
    TemplateParameterSubstitution[UML Standar
    TemplateSignature[UML Standard Profile::UM
User[MagicLibrary::Users]
«» file [Artifact][UML Standard Profile::UML Standar
«» InvisibleStereotype [Element][UML Standard Prof
```

Figure 33 -- Inheritance tree

To show stereotypes in the Inheritance tree

- In the **Inheritance Tree** tab, click the **Show Stereotypes in Browser** button .

1. Select **Environment** command from the **Options** menu. The **Environment Options** dialog opens.
2. In the **Browser** tab, set the **Show Stereotypes in Browser** check box to "true" (default "false").

To show classifier hierarchies in the Inheritance tree

- In the **Inheritance Tree** tab, click the **Show only Hierarchies** button . If the classifier has no generalization relationship, it will not be visible on the tree.

1. Select **Environment** command from the **Options** menu. The **Environment Options** dialog opens.

2. In the **Browser** tab, set the **Show Only Hierarchies** check box to “true/false” (default “false”).

To invert tree in the Inheritance tree

- In the **Inheritance Tree** tab, click the **Invert Tree** button . The current view in the Inheritance tab shows classifiers, more specific classifiers are shown as their children. After inverting a tree, the classifiers tree view will be change to show the child as a root classifier.

1. Select **Choose Environment** command from the **Options** menu. The **Environment Options** dialog opens.
2. In the **Browser** tab, set the **Invert Tree** check box to “true/false” (default “false”).

Model Extensions tree

The Model Extensions Tree contains all Stereotypes that are predefined and created manually in the project.

In this tree you can create, review, copy/paste, and delete extension mechanisms.

It is mainly used for the work of a team using a server for locking for edit / unlocking extension mechanisms.

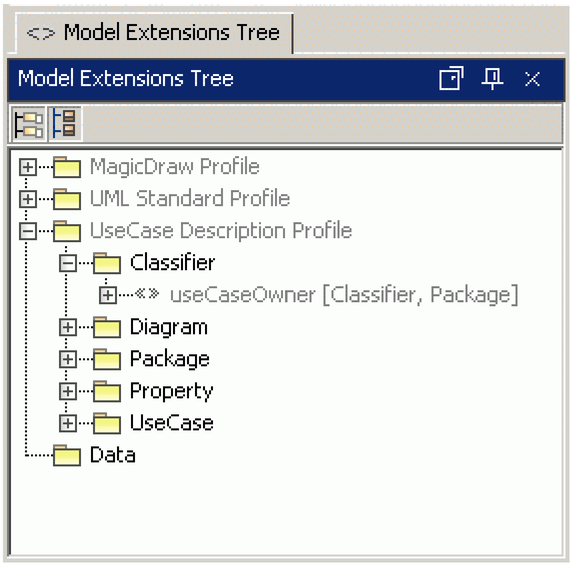


Figure 34 -- Model Extensions Tree

To group extensions by profiles

- In the Model Extensions Tree, click the **Group by Profiles** button .
- From the Model Extensions Tree shortcut menu, select the **Group by Profiles** check box.

To group extensions by metaclasses

- In the Model Extensions Tree, click the **Group by Metaclasses** button .
- From the Model Extensions Tree shortcut menu, select the **Group by Metaclasses** check box.

Search Results Tree

The Search Results tree shows results of a search, which may be performed through the **Find** dialog.

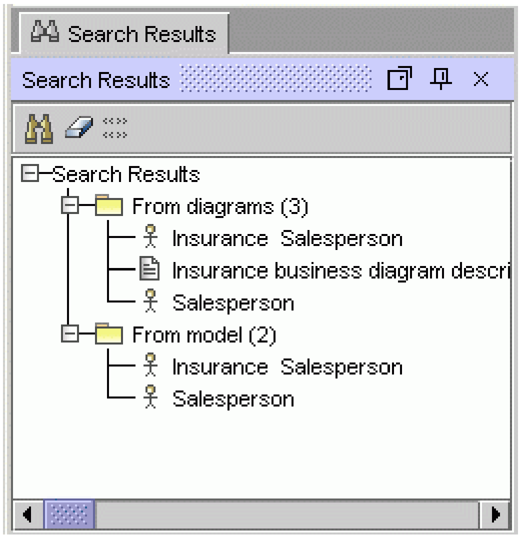


Figure 35 -- Search Results tab

The results in the tab are displayed in two packages:

- From Diagrams - elements are shown that are displayed on the diagram(s).
- From Model - elements are shown that are created in the model data.

For information about how to perform a search, see “Searching” on page 109.

To open the **Find** dialog box from the **Search Results Tree**

- Click the **Find** button , or press CTRL+F keys.

To clear the results of the previous search

- Click the **Clear Results** button or select the **Clear Results** button from the **Search Results** tab.

Working with Elements in the Model Browser

To create an element in the Model Browser

1. In the Containment tree, right-click the package.
2. Click **New Element** and select the model element you wish to create.

To create a diagram in the Model Browser

1. In the Containment tree, right-click the package.
2. Click **New Diagram** and select the diagram you wish to create.

To copy/cut and paste the selected model element in the Model Browser

1. From the element’s shortcut menu, select **Copy** or **Cut**.
2. Select the container, where you wish to put the model element.
3. From the container’s shortcut menu, select **Paste**.

To copy/cut and paste the selected model element among different projects

1. From the item shortcut menu, select **Copy** or **Cut**.
2. From the **Opened Projects** main toolbar, select the other project.
3. Select the container, where you wish to put the element.
4. From the container's shortcut menu, select **Paste**.

To delete a model element from the Model Browser

- From the element's shortcut menu, select **Delete**.

To drag-and-drop the selected item in the Model Browser

1. Make sure that the place you wish to drag the item is visible.
2. Drag the selected item to the destination and drop it.

To draw a symbol on the diagram

- From the items shortcut menu, select **Create Symbol**.

TIP!	You may draw a symbol by dragging and dropping an item to the Diagram pane.

To show/hide the model elements in the Model Browser

1. Do one of the following:
   - From the Browser shortcut menu, select **Filter**.
   - On the Containment tree toolbar, click **Filter**.
2. In the **Items Filter** dialog, clear the check boxes of those model elements that you would not like to appear in the Model Browser.

For more information about how to filter items, see "To filter types of elements to be displayed" on page 78.

Multiple selection

A group of model elements can be selected within the Browser tree and you can edit all the selected model elements at the same time.

To make multiple selections

- Hold down the SHIFT key and click the last element you wish to include in the multiple selection.
- For more precise selection, hold down the CTRL key and click (while holding the key down) with the mouse on the elements you wish to select.

To select all model elements or all browser tree items

- Click the mouse pointer in the area you want to select all elements and press the shortcut keys CTRL+A.

NOTE	All selected model elements can be moved or deleted as a single selected element. While moving the group of elements, a border appears denoting the area you have selected. Be careful when deleting multiple elements because no confirmation dialog will appear.

Zoom panel

The **Zoom** panel enables you to preview any selected diagram. To select a diagram go to Model Browser > Containment/Diagram tree. You can also use this panel for zooming in or out the active diagram.

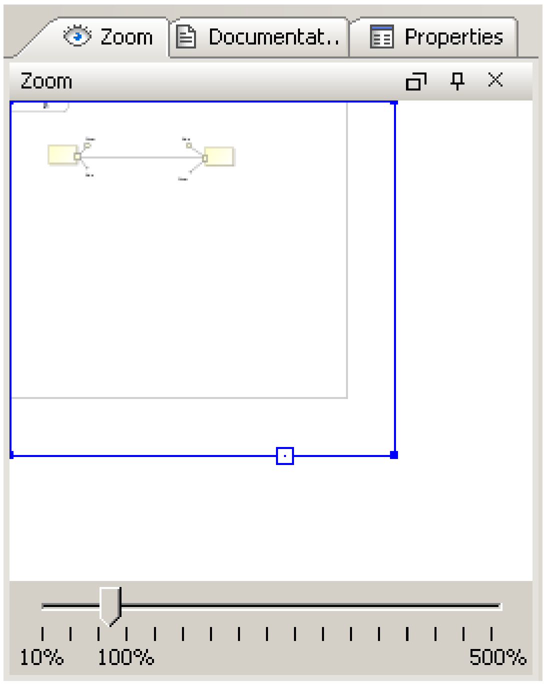


Figure 36 -- Zoom panel

To open the **Zoom** panel

Do one of the following:

- In the Model Browser, click the **Zoom** panel.
- On the **Window** menu, click **Zoom**.

To zoom in or out the active diagram

- In the **Zoom** panel, drag corners of the blue square.

NOTE	By default the zoom slider is not visible. To display the zoom slider in the **Zoom** panel, go to **Options** > **Environment**. In the **Environment Options** window select the **Browser** tab. Then select the **Show diagram zoom slider** check box.

To access quickly any part of the diagram

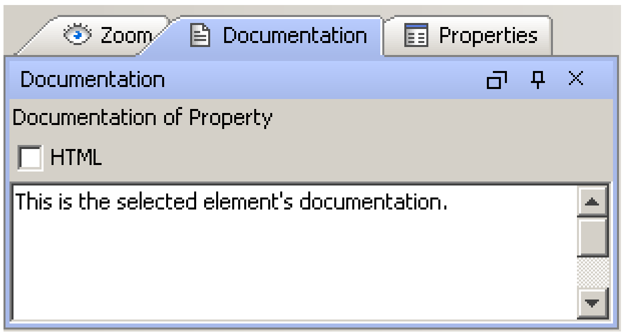
- In the **Zoom** panel, drag the blue square to the desired part of the diagram. The desired diagram part will be displayed in the diagram window.

To fit the diagram to the window

- In the **Zoom** panel, on the blue square, click the **Fit in Window** button .

Documentation panel

The **Documentation** panel shows the information associated with the selected model element in the Model Browser or on a diagram pane.



Documentation of Property

HTML

This is the selected element's documentation.

Figure 37 -- Documentation panel

To open the **Documentation** panel

Do one of the following:

- In the Model Browser, click on the **Documentation** panel.
- On the **Window** menu, click **Documentation**.

NOTE If there is no documentation for the selected element, the text area is empty.

To write documentation for the selected model element

- In the **Documentation** panel, click on the text area and type the text.

Properties panel

The **Properties** panel at the bottom of the the Model Browser allows you to quickly access the basic information about the selected element or diagram.

To open the **Properties** panel

Do one of the following:

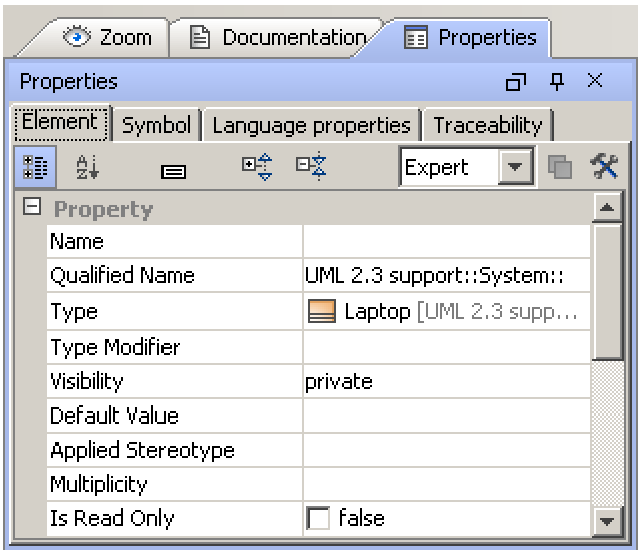
- In the Model Browser, click the **Properties** panel.
- On the **Window** menu, click **Properties**.

The **Properties** panel includes the following tabs:

Tab name	**Description**
Element	Contains the main properties of the element’s or diagram’s specification. For information about editing values of different property types, refer to “Editing Property Values” on page 237.
Symbol	Contains the element symbol’s properties. **NOTE:** This tab is available for symbols only.
Language properties	Contains the same data as the **Language Properties** tab in the element’s Specification window. **NOTE:** This tab is available only for the elements, which are used for code generation, e.g., class, attribute, operation.

Tab name	Description
Traceability	Contains the same data as the **Traceability** tab in the element's Specification window. For more information about traceability, see "Traceability" on page 389.

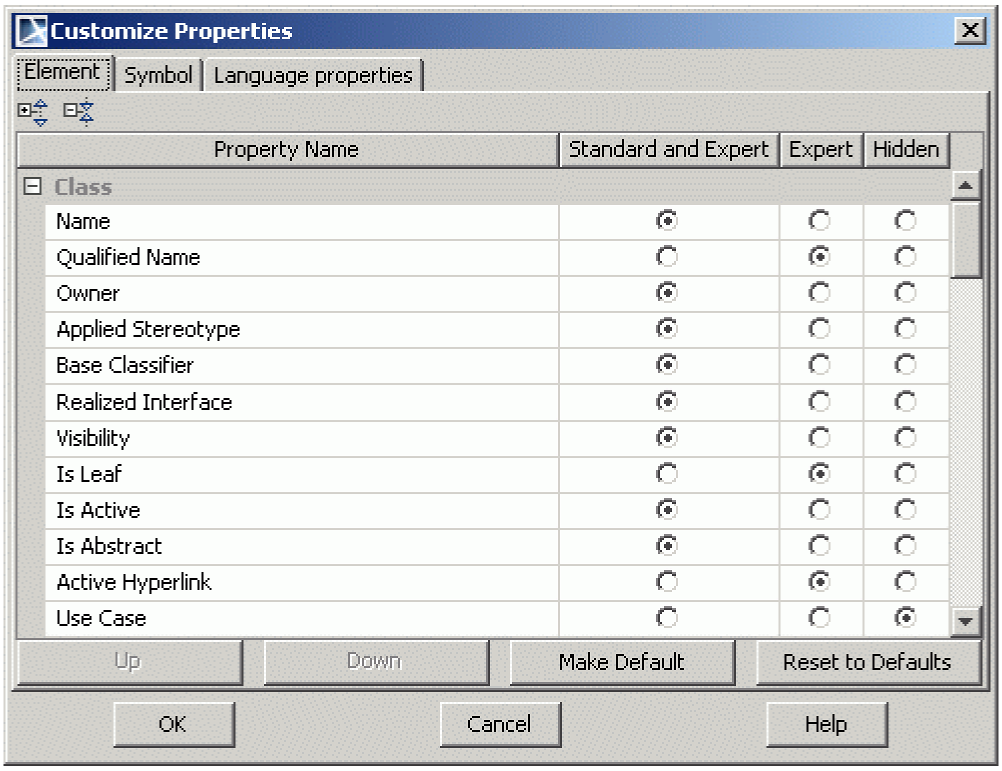
All **Properties** panel tabs, except the one for traceability properties, has two modes: **Standard** and **Expert**. Choose the mode that best suits your needs.



Property	
Name	
Qualified Name	UML 2.3 support::System::
Type	Laptop [UML 2.3 supp...
Type Modifier	
Visibility	private
Default Value	
Applied Stereotype	
Multiplicity	
Is Read Only	☐ false

Figure 38 -- Properties panel

Click the **Customize** button to open the **Customize Properties** dialog wherein you can set which properties will be visible in the **Standard** and / or **Expert** modes and which ones will be hidden in any mode.



Property Name	Standard and Expert	Expert	Hidden
Class			
Name	●	○	○
Qualified Name	○	●	○
Owner	●	○	○
Applied Stereotype	●	○	○
Base Classifier	●	○	○
Realized Interface	●	○	○
Visibility	●	○	○
Is Leaf	○	●	○
Is Active	●	○	○
Is Abstract	●	○	○
Active Hyperlink	○	●	○
Use Case	○	○	●

Figure 39 -- Customize Properties dialog

Customizing Environment Options

You can customize the application environment according to your preferences via the **Environment Options** dialog.

To open the **Environment Options** dialog

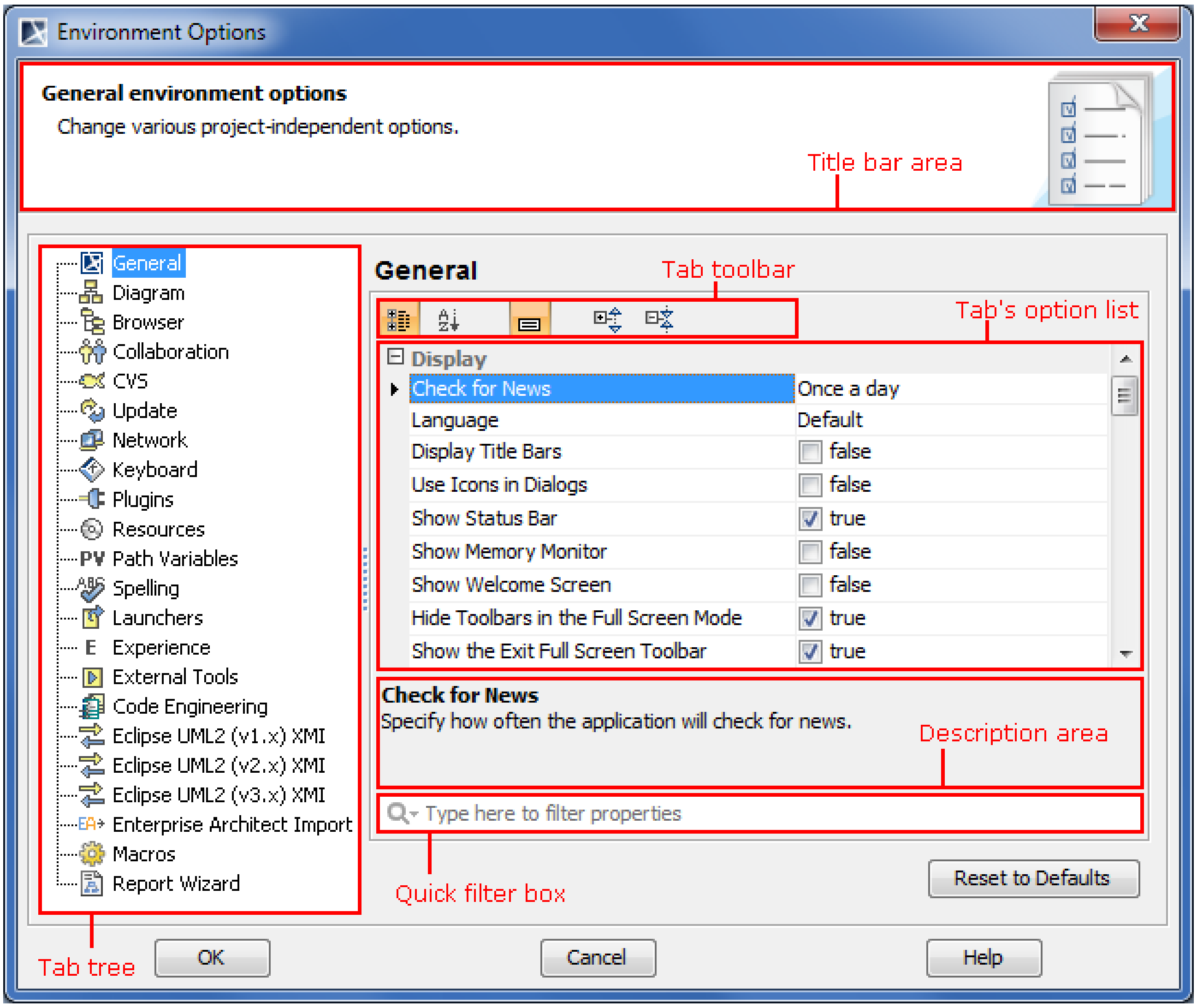
- From the **Options** menu, select **Environment**.

The **Environment Options** dialog contains various project-independent options grouped by different features (e.g., diagrams, Model Browser, code engineering). Each option group is available in a different tab. Tabs are displayed in the tab tree.

An option value can be simply changed by typing a new value, setting a value to true / false, or selecting a value from the list.

Learn more about the **Environment Options** dialog in the following sections:

- "Using Environment Options dialog" on page 91.
- "Common elements in Environment Options dialog" on page 91.



General environment options
Change various project-independent options.

General

Display

Check for News	Once a day
Language	Default
Display Title Bars	false
Use Icons in Dialogs	false
Show Status Bar	true
Show Memory Monitor	false
Show Welcome Screen	false
Hide Toolbars in the Full Screen Mode	true
Show the Exit Full Screen Toolbar	true

Check for News
Specify how often the application will check for news.

Figure 40 -- Structure of Environment Options dialog

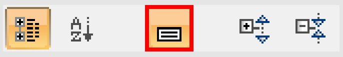
Using Environment Options dialog

In order to change a desired environment option, first of all you may need to find it. It can be rather difficult to find a desired option, if the tab's option list contains 10 or more options. In this case the Quick filter appears in the dialog. Using the Quick filter you can quickly find the desired option in the list. For more information about the Quick filter please refer to "Quick filter" on page 223.

NEW! For better understanding an option you can read its description that tells what is the effect of changing the option value.

To read the option description

IMPORTANT! Make sure that the Show Description mode is turned on in the **Environment Options** dialog. To turn the Show Description mode on or off, click the Show Description button on the tab toolbar.



1. Click an option, whose value you want to change.
2. Read the option description in the area below the tab options list. You are ready now to change the option value.

Common elements in Environment Options dialog

For the common element descriptions look in the following table.

Element	Element Type	Description
Quick filter	Text box	Type an option name or its fragment. For more information about the Quick filter box please refer to "Quick filter" on page 223.
Reset to Defaults	Button	Resets all options to their default values.
OK	Button	Saves changes and closes the dialog.
Cancel	Button	Closes the dialog without saving changes.
Help	Button	Opens MagicDraw Help.

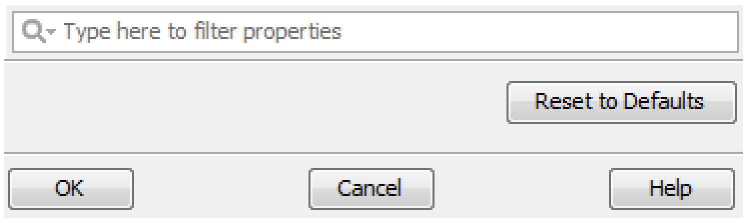


Figure 41 -- Fragment of Environment Options dialog. Quick filter and common buttons

Performance Improvements

When you work with very large models or use a lot of diagrams at a time, the performance of MagicDraw may become slow. To increase an efficiency of modeling, we suggest the following solutions:

- **Increase a java heap size**. See the procedure "To change the java heap size" on page 93.
- **Do not keep unused diagrams open**. Perform the procedure "To open project without loading diagrams" described bellow this list. Your projects will be opened over a shorter period of time without opening a diagram as well as use less memory.
- **Increase an active validation period**. Perform the procedure "To increase an active validation period" described bellow this list. Reduced active validations using takes less memory.
- **Split the project to read only modules**. Keep read only modules not loaded. This may help only if your project contains several parts with minimal dependencies between them. For more information about working with partially loaded projects, see "Working with partially loaded projects" on page 124. You can also find the "Project Decomposition Description" sample in <MagicDraw installation directory>\samples\product features\ project decomposition.
- **Use Garbage Collector to free unused memory**. See the procedure "To free unused memory" on page 93.

To open project without loading diagrams

1. On the **Option** menu, click **Environment**. The **Environment Options** dialog opens.
2. In the **General** option list, expand the **Save / Load** options group.
3. To the **Diagrams Lode Mode** option, assign the **Do not load diagrams** value.
4. Restart MagicDraw.

To increase an active validation period

1. On the **Option** menu, click **Environment**. The **Environment Options** dialog opens.
2. In the **General** option list, expand the **Active Validation** options group.
3. Increase the **Active Validation Period (seconds)** value.

IMPORTANT!	Be aware about limits of the **Active Validation Period** size, as a long period may be an alternative of switching an active validation off.

4. Restart MagicDraw.

Memory Monitor

In order to monitor the memory used by MagicDraw while working with larger projects, you can turn the **Memory Monitor** on.

Memory Monitor shows two values: currently used memory and a current java heap size. While working with MagicDraw, the java heap size increases until it reaches a limit.

The Garbage Collector is designed to find and free unused memory.

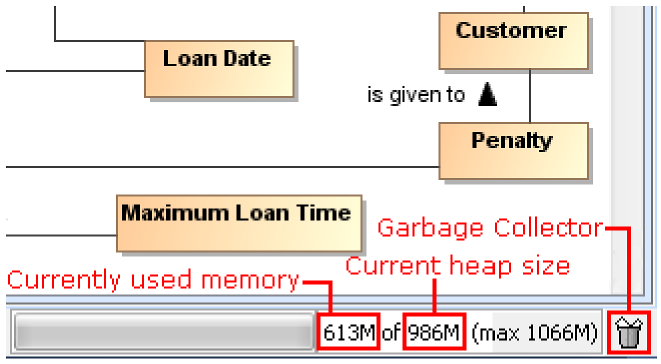


Figure 42 -- Memory monitor bar

Typically, when working with a program, used memory grows up because actions are stored in the undo list, opened diagrams are not unloaded.The Memory Monitor bar becomes red when used memory takes more than 85% of the total heap. Red bar shows that MagicDraw may run out of memory soon. Even if all heap size is used, the Garbage Collector may recover enough memory to save a project, but this may take few minutes.

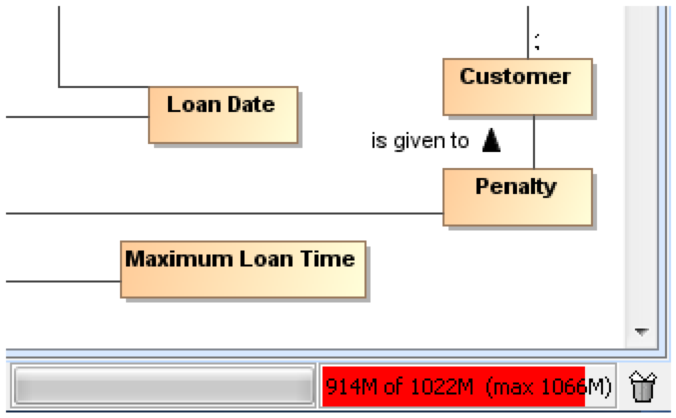


Figure 43 -- Memory Monitor with increased memory usage

To turn Memory Monitor on

- On the **View** menu, select **Status Line** > **Show Memory Monitor**. The **Memory Monitor** bar appears in the right bottom corner of the MagicDraw window.

To free unused memory

- Click the Garbage Collector several times and wait few seconds:
  1. If the Memory Monitor bar is still red, save the project and restart MagicDraw and reload the project.
  2. If the Memory Monitor bar is red after reloading the project, the maximum heap size should be increased.

IMPORTANT!	When almost all heap memory is used, the Garbage Collector starts to free unused memory after each action automatically. It slows down the program as the most CPU power is used for the Garbage Collector.

To change the java heap size

1. Open the <MagicDraw installation directory>\bin\mduml.properties file for edit.

2. In the `JAVA_ARGS` line, increase the value next to `-Xmx`. For example, change the `-Xmx800M` value to `-Xmx1066M`.

NOTE	Detailed information about heap size increasing is presented in the MagicDraw UML readme file. You can find this file in the <*MagicDraw installation directory*> folder.

Look and Feel: Controlling the Interface

The appearance of MagicDraw windows, dialog boxes, menus, and everything inside them can be changed. The **Look and Feel** submenu allows you to personalize the user interface of the MagicDraw. You can set your favorite colors and fonts.

To make changes to the interface

- From the **Options** menu, choose **Look and Feel** and then choose the style you wish to apply.

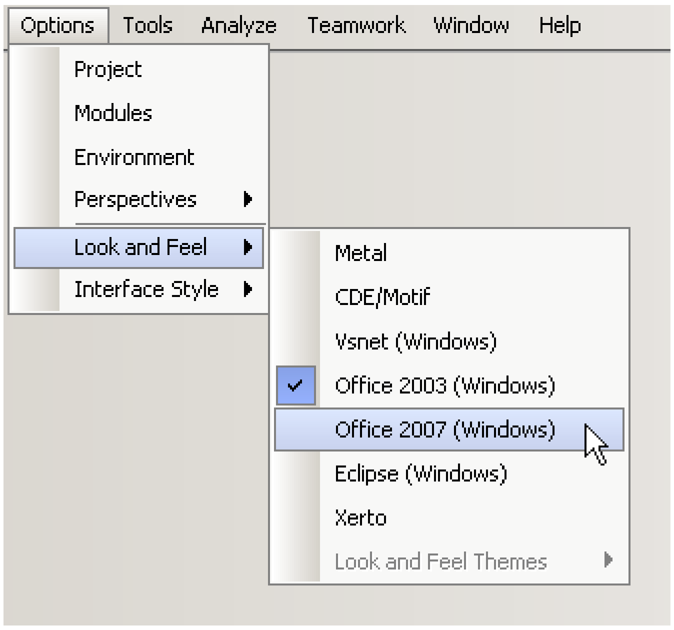
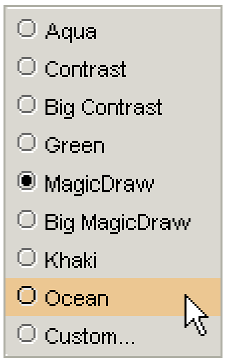


Figure 44 -- Interface styles for MagicDraw

The chosen style will not look exactly like the applications in those operating systems because every style of graphical interface is implemented within a Swing library, but it will look quite similar.

Depending on the operating system you use, some choices might be unavailable for you. For example, Windows9x/NT users may not switch to the Mac interface style.

Note that themes listed in **Look and Feel Themes** are valid only for the **Metal** style. You can choose any of the following themes:



After choosing the Custom theme, the **Properties** dialog for setting your own options will be opened.

Single and Multiple Windows interface styles

Beginning with MagicDraw version 7.5, the modern JIDE library is implemented (called Single Window interface style). Using the **JIDE** interface style, it is possible to work with the Browser window in a more flexible way, use documentation, zoom, and dock message windows above the main window. You can arrange the Browser window in combinations or even hide the desired Browser windows.

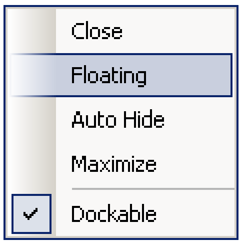
Also, you may use the different **Multiple Windows** style. It allows you to manage all windows independently, as if they belong to different applications. For instance, you can overlap the windows across each other, resize them independently, and so on. There is no main window containing all the other windows.

To set the interface style

- From the **Options** menu, select **Interface Style**, and then select one of the desired interface styles: **Single Window** or **Multiple Windows**.

To make the Model Browser a separate window

- From the Model Browser shortcut menu, select **Floating** and move the window to any desired position.



NOTE	If the **Dockable** check box is selected, the floating tab window will appear in a fixed edge position after trying to move it outside the MagicDraw window borders.

Assigning Shortcut Keys

To assign or change a command shortcut key

1. From the **Options** menu, select **Environment**.
2. The **Environment Options** dialog opens.
3. Select the **Keyboard** tab and assign the desired shortcut keys in the right pane of the dialog.

4 WORKING WITH PROJECTS

The term “project” is used to describe the problem that must be solved, including all the possible solutions for how the problem can be resolved and finally developed. All work in MagicDraw^{TM} UML is organized into projects. Project is the top entity where all model-related data (the set of diagrams) is held. Project data is organized by object orientation, which makes its management intuitive and in accordance with the problem that is being solved.

In this chapter, you will find the following sections:

Creating a Project

View Online Demo	MagicDraw Basics

Creating a new project

All project information is stored in a single file. A project name matches the file name where the project is saved.

The newly created project consists of the following packages:

- **Data** package is empty and holds all model elements.
- **File View** package contains components that are created during code engineering and represent source files. Adding a resident element to a particular component causes that element to be generated within the source file.
- **UML Standard Profile** contains stereotypes that are necessary for working with MagicDraw, primitive data types and constraints (which are UML standard), and UML 2 metamodel elements. The following data types are specified in MagicDraw: boolean, byte, char, date, double, float, int, Integer, **NEW!** real long, short, void, and string.

You can also create your own packages for holding the model elements. By default, packages cannot be deleted or renamed in a project (except for the File View package).

To start a new project, you must create a new workspace for it.

You can select a project type from the following domains:

- **General-Purpose Modeling** (UML, Use Case, Guide to UML Diagrams projects, Project from Existing Source Code)
- **System Engineering** (SySML project)
- **Enterprise Modeling** (DoDAF, DoDAF 2.0, MODAF projects)
- **Business Process Modeling** (BPMN 2.0 project)
- **Service-Oriented Modeling** (Cameo SOA+ project)
- **Other** (Project from Template, Process Guide project)

On a new project creation the **General-Purpose Modeling** domain opens by default.

To create a new workspace for a blank project

- From the **File** menu, select **New Project**.
- On the main toolbar, click the **New Project** button.
- Press shortcut key CTRL+N.

In all cases, the **New Project** dialog box opens.

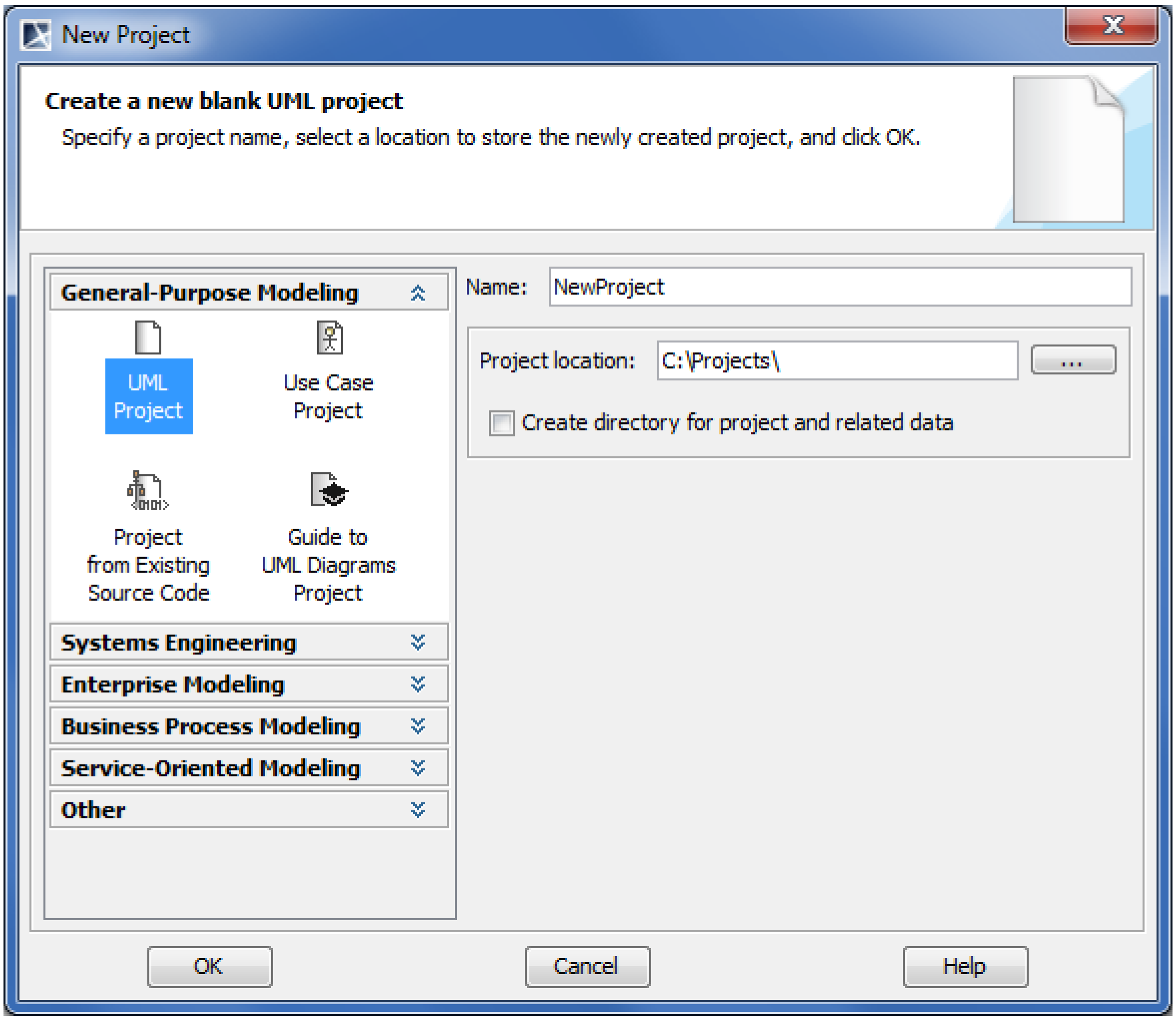

New Project
Create a new blank UML project
Specify a project name, select a location to store the newly created project, and click OK.
General-Purpose Modeling
UML Project
Use Case Project
Project from Existing Source Code
Guide to UML Diagrams Project
Systems Engineering
Enterprise Modeling
Business Process Modeling
Service-Oriented Modeling
Other
Name: NewProject
Project location: C:\Projects\
...
Create directory for project and related data
OK
Cancel
Help

Figure 45 -- New Project dialog box

1. Select the **UML Project** icon in the **General-Purpose Modeling** domain.
2. Specify the file name in the **Name** box.

3. Click the **...** button to select the location to store a newly created project in your computer. Click **OK**.

Working with multiple projects

Because you may need to manage several projects at the same time, MagicDraw allows you to work with several projects simultaneously.

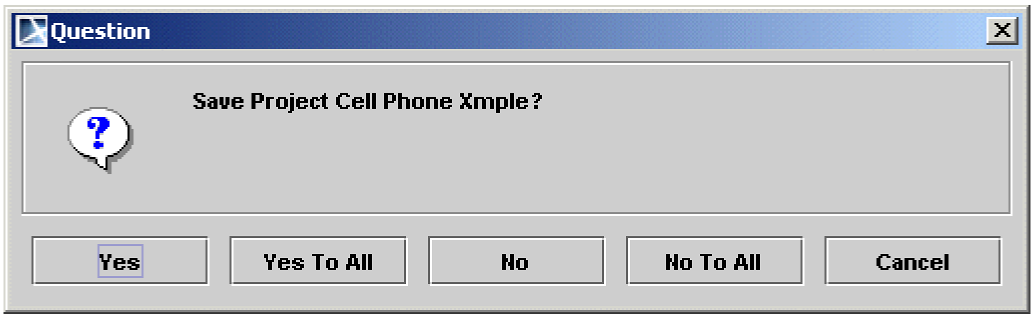
All open projects are held in separate workspaces. Different active projects may exchange data. Entities from one project can be copied or moved to another.

To switch between loaded projects

- In the **Projects** drop-down list, click the additional project you wish to open.
- Select **Projects** from the **File** menu, click the name of the project you wish to open.

To close all open projects

Select **Close All Projects** from the **File** menu. The **Question** message box appears.


Question

Save Project Cell Phone Xmple?

Figure 46 -- Question message box

Choose the way your projects will be closed:

Yes	The project you are currently closing will be saved (its name appears in the question). The dialog box is displayed again when the next project closes.
Yes To All	Save all projects without prompting. The **Save** dialog box will not appear for each open project.
No	Project you are currently closing will not be saved. The dialog box is displayed again when the next project closes.
No To All	All the projects will be closed without saving or further prompting.
Cancel	Cancel saving projects.

To exchange model entities between open projects

- Use the **Cut**, **Copy**, and **Paste** commands in the **Edit** menu, or the appropriate shortcut keys: Ctrl+X, Ctrl+C, Ctrl+V or the toolbar buttons.
- Drag-and-drop the created model element from the Browser tree to the Diagram pane.

NOTE	Data may only be exchanged between projects that are currently open within MagicDraw. You may not copy/paste elements between instances of different tools that are currently running or to other applications.

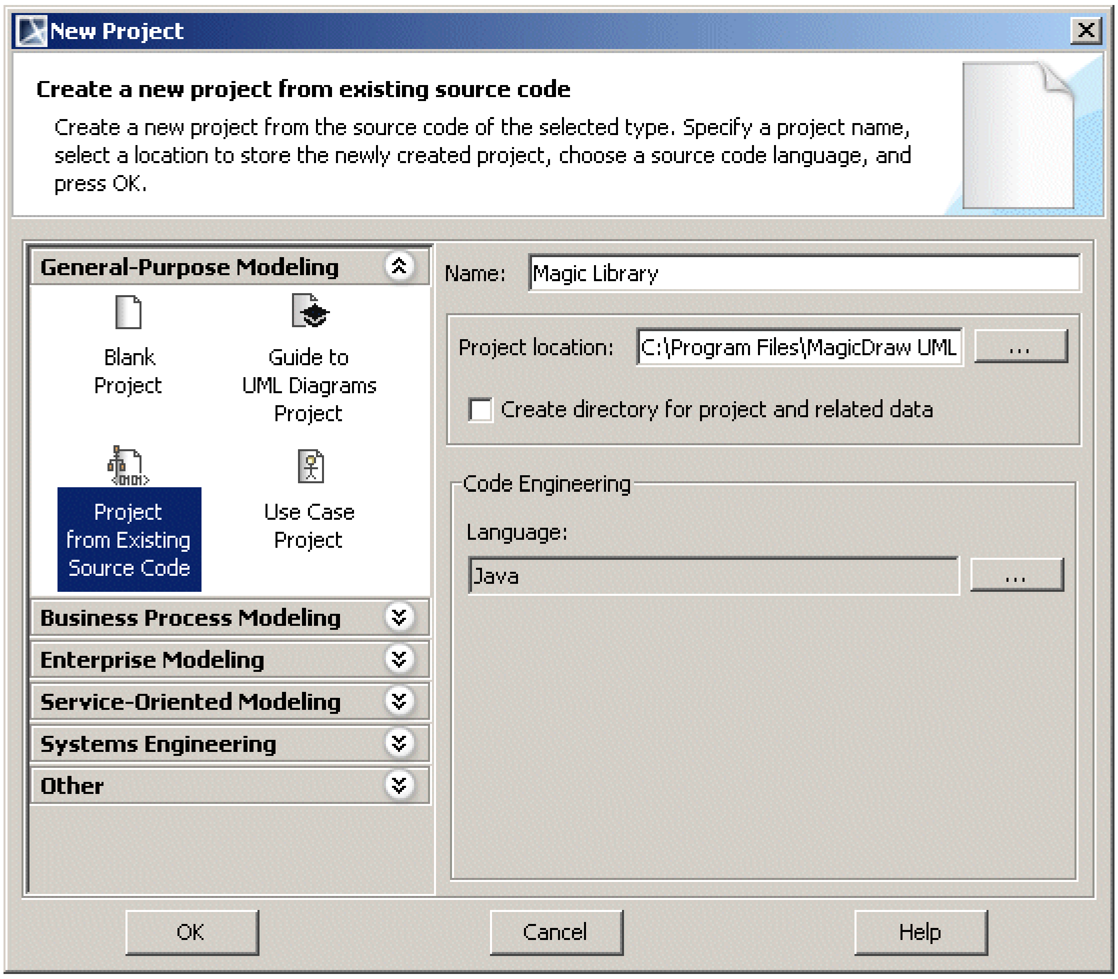
Creating a new project from the existing source code

To create a new project from existing source files

- From the **File** menu, select **New Project**.
- On the main toolbar, click the **New Project** button.
- Press shortcut key CTRL+N.

In all cases, the **New Project** dialog box opens.

1. Select the **New Project from Existing Source** icon.
2. Specify the file name in the **Name** text box.
3. Click the "..." button to select the location to store a newly created project in your computer.
4. Select a code engineering language from the list by clicking the "..." button and click **OK**.


New Project

Create a new project from existing source code

Create a new project from the source code of the selected type. Specify a project name, select a location to store the newly created project, choose a source code language, and press OK.

Name: Magic Library

Project location: C:\Program Files\MagicDraw UML

Create directory for project and related data

Code Engineering

Language: Java

Figure 47 -- New Project dialog box - New Project from Existing Source

5. The **Round Trip Set** dialog box opens. Add the source files to enable code engineering to reverse them into a newly created project.

Creating a new project from a previously created template

NOTE	This functionality is available in Standard, Professional, Architect and Enterprise editions only.

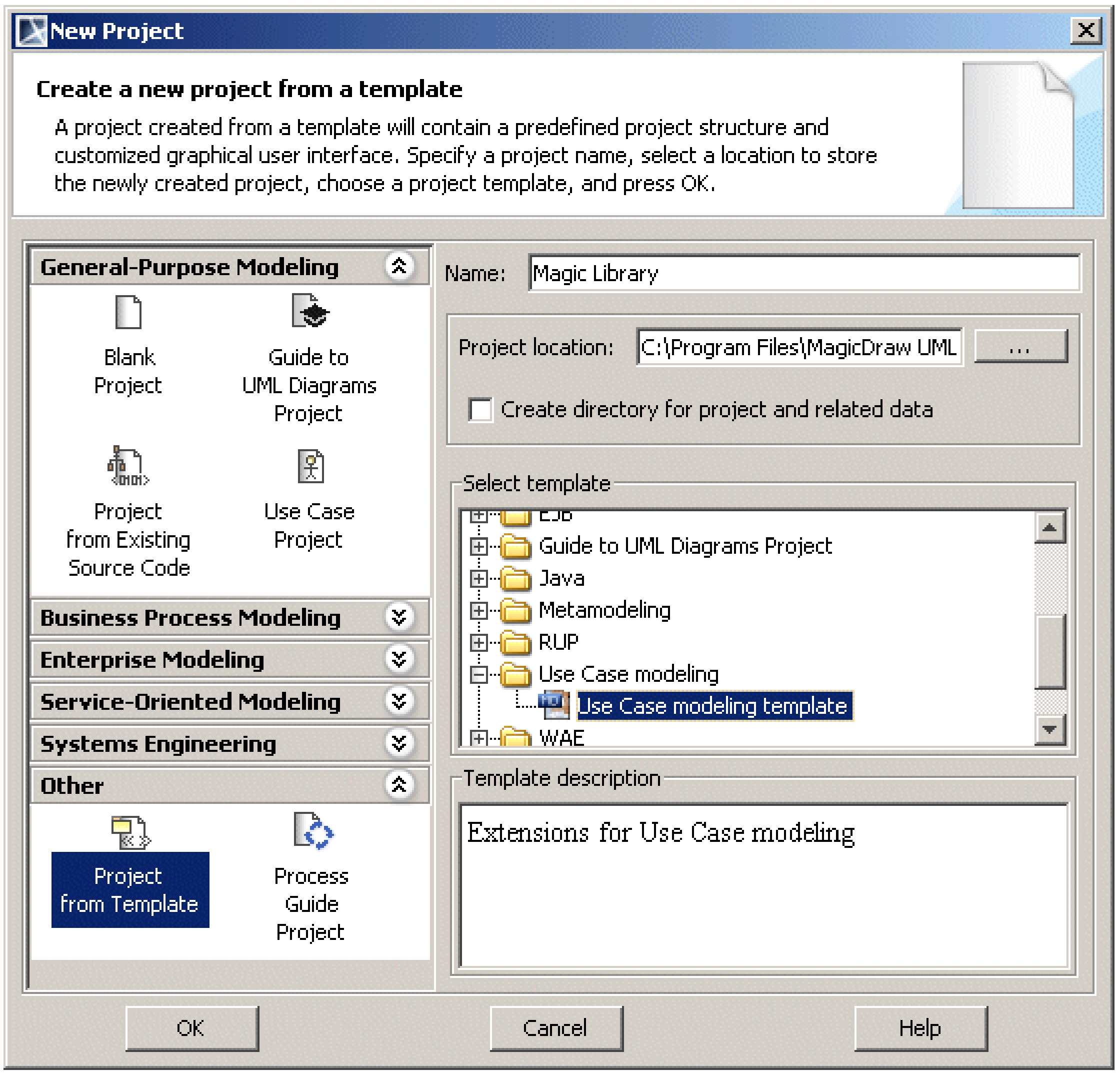
C++, CIL, Java, C#, DDL, EJB, WSDL, XML Schema, Metamodeling, RUP extensions, CORBA IDL, and UML-WebExtension templates are available in the **New Project** dialog box.

To create a new project from a specified template

- From the **File** menu, select **New Project**.
- On the main toolbar, click the **New Project** button.
- Press shortcut key CTRL+N.

In all cases, the **New Project** dialog box opens.

1. Select the **New Project from Template** icon.
2. Specify the file name in the **Name** text box.
3. Click the "..." button to select the location to store a newly created project in your computer.
4. Select the template from the templates tree and click **OK**.


New Project

Create a new project from a template

A project created from a template will contain a predefined project structure and customized graphical user interface. Specify a project name, select a location to store the newly created project, choose a project template, and press OK.

Name: Magic Library

Project location: C:\Program Files\MagicDraw UML

Create directory for project and related data

Select template

Template description

Extensions for Use Case modeling

Figure 48 -- New Project dialog box - New Project from Template

The newly created project from a template will contain specific model elements and stereotypes.

TIP!	All MagicDraw templates are located in the <MagicDraw installation directory>/templates folder so you can import the desired template into your previously created project using the **Import MagicDraw Project** command from the **File** menu.

Creating a new Use Case project

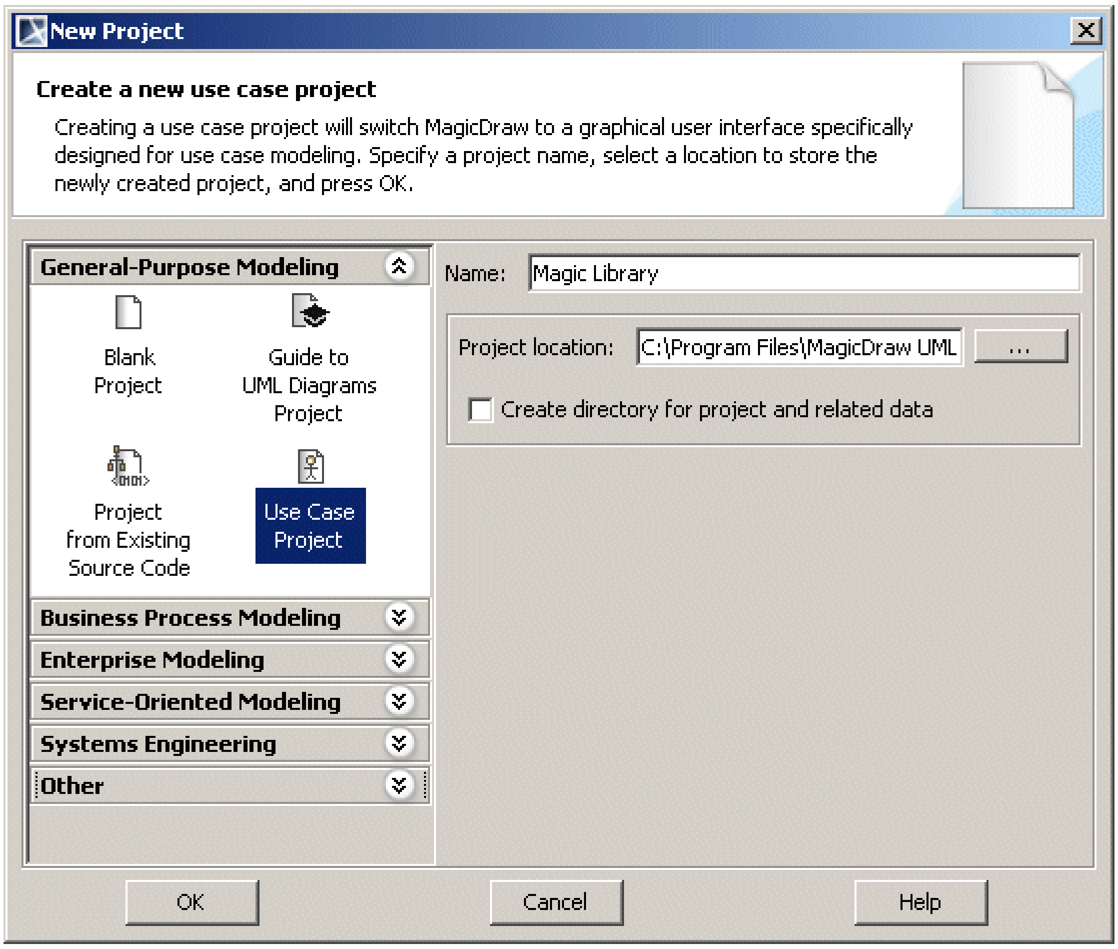
To create a new project from existing source files

- From the **File** menu, select **New Project**.
- On the main toolbar, click the **New Project** button.
- Press shortcut key CTRL+N.

In all cases, the **New Project** dialog box opens.

1. Select the **Use Case Project** icon.
2. Specify the file name in the **Name** text box.

Click the "..." button to select the location to store a newly created project in your computer.



New Project

Create a new use case project

Creating a use case project will switch MagicDraw to a graphical user interface specifically designed for use case modeling. Specify a project name, select a location to store the newly created project, and press OK.

Name: Magic Library

Project location: C:\Program Files\MagicDraw UML

☐ Create directory for project and related data

General-Purpose Modeling
Blank Project
Guide to UML Diagrams Project
Project from Existing Source Code
Use Case Project
Business Process Modeling
Enterprise Modeling
Service-Oriented Modeling
Systems Engineering
Other
...
OK
Cancel
Help

Figure 49 -- New Project dialog box - Use Case Project

The newly created project will automatically load the **UseCase Description Profile**. Also *Actor*, *High-Level Use Case* and *System-Level Use Case* packages will be created in the Data tree. Additional properties will be displayed in the newly created use cases **Specification** dialog box.

Saving a Project

IMPORTANT!	The native MagicDraw format is *.mdzip and *.mdxml. Saving in *.xml, *.xml.zip format will also be allowed.

To save changes for later sessions, revised projects must be saved. While saving, you can edit the name of the project and the file format.

To save the project

1. From the **File** menu, select the **Save Project** or **Save Project As** command. Alternatively, you can click the **Save** button on the main toolbar or press the shortcut keys CTRL+S. The **Save** dialog box opens.
2. Select the destination directory (where you wish to save the project) and type the chosen file name.

NOTE Default project save location is set according to your OS:

- Windows: My Documents/
- Linux: /home/<username>/
- Mac: Users/Documents/

3. Select the format for saving a project: **Packed MagicDraw File Format** (*.mdzip) (default), **MagicDraw File Format** (*.mdxml), or **XML** (*.xml).

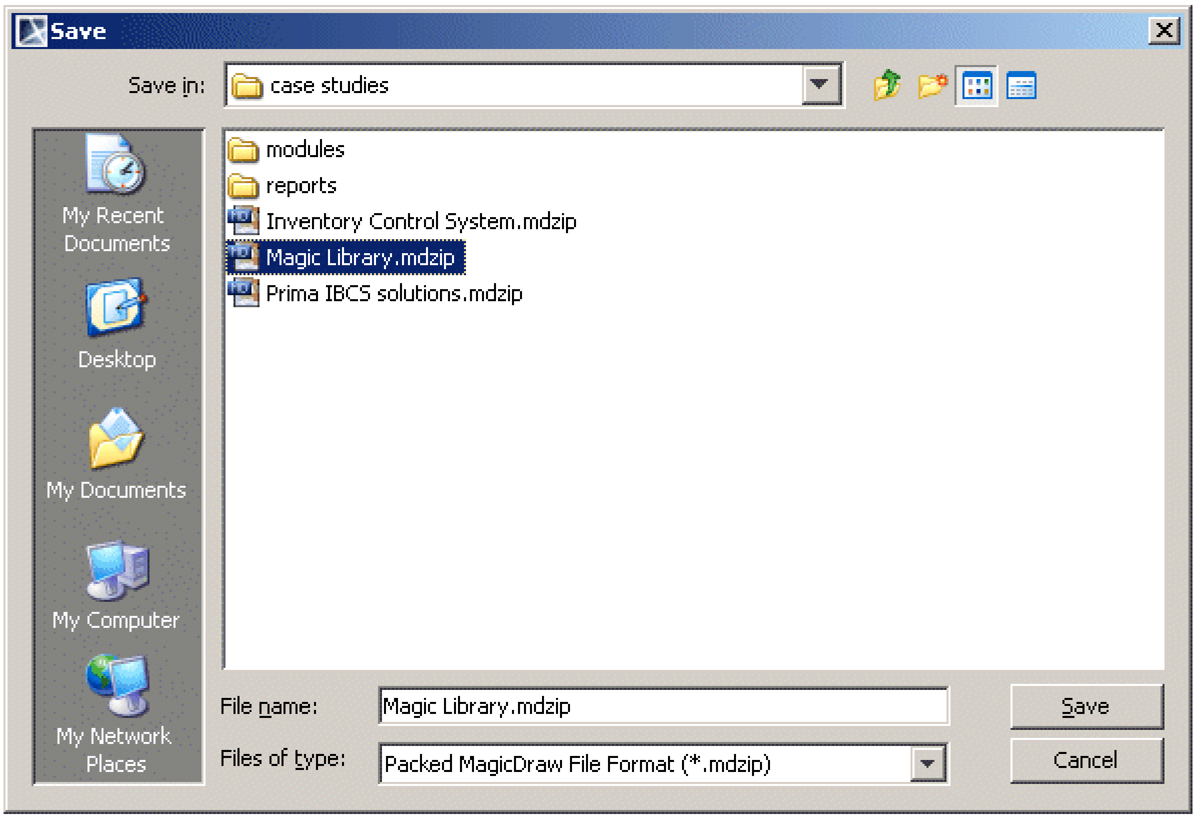


Figure 50 -- Save dialog box

NOTES

- If the **Create Backup File** check box is selected in the **Environment Options** dialog box, MagicDraw always creates a backup file of the previously saved project. The backup is held in a file with a name identical to that of the project. For a detailed description of the **Environment Options** dialog box, see “Customizing Environment Options” on page 90.
- If you want to save maximum additional information to an xmi file (not required in loading to MagicDraw load, but may be useful when using other tools), select the **Rich XMI** check box in the **Environment Options** dialog.

Autosave

After you stop working with MagicDraw, an idle time passes and the current project is saved to a special file called the AutoRecovery file.

If the application is terminated normally, the AutoRecovery file is removed. If the application crashes, the AutoRecovery file is left. On startup, MagicDraw checks for an AutoRecovery file. If it exists, MagicDraw suggests loading the project from this file.

To save an AutoRecovery file of the open project(s) when a system is not in use.

1. Open the **Environment Options** dialog box.
2. In the **General** pane, select the **Save Project Recovery Data on Idle** check box**.** Enter the system idle time (in minutes) in the **Idle Time to Activate Recovery Save** text box. This is the length of time the system must be idle in order to activate an AutoRecovery save.

Opening a Project

IMPORTANT!	The native MagicDraw format is *.mdxml, or *.mdzip.

To edit or review previously created projects

- From the **File** menu, select **Open Project**. In the **Open** dialog, select the project and click **Open**.
- On the main toolbar, click the **Open Project** button.
- Drag the project from the open window to MagicDraw. The project starts immediately.
- Double-click a project file with the *.mdxml or *.mdzip extension. A new MagicDraw application window opens.

TIP!	To start MagicDraw with the last project you worked on, select **Options** > **Environment** and set **Open Last Project on Startup** to true.

XMI 2.4 / UML 2.4 is the main file format, used by MagicDraw for a model storage. This format does not specify how to store diagrams, so MagicDraw stores or loads diagram data in XMI extension sections. If you use MagicDraw to open an XMI file exported from another tool, only the model will be loaded, not diagrams or views.

Correspondingly, if you open a MagicDraw produced file in another tool, diagrams or views will not be loaded in that tool (unless the tool understands MagicDraw specific file extensions).

For the model interchange, you can use MagicDraw RConverter, MagicDraw RSXConverter, or Cameo Inter-Op. For more information about the data conversion, see "Import Data to MagicDraw" on page 381.

You may load more than one project within the same MagicDraw session. A separate workspace will be created for the each opened project.

Importing a Project

To import a previously created project to an open project

1. On the **File** menu, point to **Import From** and select file type which from you want to import.
2. The Import dialog opens. Select the project you want to import and click **Open**. The diagrams of the imported project are placed in the open project.

Exporting Projects

MagicDraw allows for exporting projects to the following file formats:

- UML XMI 2.4 File. You can export a project to file formats that are supported by MagicDraw.
- MagicDraw Native XML File. You can export a project to an .xml file format.
- EMF Ecore File. You can export either the whole project or selected packages to an .ecore file.
- MOF XMI File You can export a project to the MOF (both CMOF and EMOF) XMI file.
- Eclipse UML2 (v1.x, v2.x, v3.x) XMI File. You can export a project to an Eclipse based UML2 (v1.x / v2.x / v3.x) compatible XMI file.

You can export a part of a project as a module and share it with other users or projects. For the description of the exporting procedure, see "Exporting the module of a project" on page 117.

You can also export your project as a template. For the description of the exporting procedure, see "Exporting Projects as Templates" on page 106.

To export a project

1. On the main menu, click **File** > **Export To**.
2. Select a file format you want to export your project.
3. The following actions depends on the dialog that corresponds to the selected file format. Exportin procedures in details are described in the following sections:
   - "Exporting the module of a project" on page 117.
   - "Exporting Projects as Templates" on page 106.
   - "Exporting projects to Ecore files" on page 143.
   - "Exporting projects to MOF files" on page 130.
   - "Exporting Project as Eclipse UML2 (v1.x / v2.x / v3.x) XMI File" on page 106.

Exporting Projects as Templates

NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions.

You can save (or export) the created project as a template and use the same project for creating other new projects.

To export project as template

1. Open a project you want to export as a template. From the **File** menu, select **Export** > **Template**.
2. The **Export Template** dialog opens.
3. Type the name and the description of the template.
4. Click **OK**.

Exporting Project as Eclipse UML2 (v1.x / v2.x / v3.x) XMI File

The export of a MagicDraw model to an Eclipse based UML2 (v1.x / v2.x / v3.x) compatible XMI file enables the interchange of the UML2 models for the further manipulations and transformations with the most popular MDA tools, such as AndroMDA, OpenArchitectureWare, and other.

To export a project as an Eclipse UML2 (v1.x / v2.x / v3.x) XMI file

1. Open a project you want to export as an Eclipse UML2 (v1.x / v2.x / v3.x) XMI file.
2. On the **File** menu, click **Export To** and select one of the following command:
    - **Eclipse UML2 (v1.x) XMI File**.
    - **Eclipse UML2 (v2.x) XMI File**.
    - **Eclipse UML2 (v3.x) XMI File**.
3. Specify a location for exported project files.
4. Click **Export**.

NOTE	A project exported as an Eclipse UML2 (v1.x) XMI file is saved with the .uml2 file extension. A project exported as an Eclipse UML2 (v2.x / v3.x) XMI file is saved with the .uml file extension.

To change export property values

1. From the **Options** menu, select **Environment**.
2. Click the one of the following tabs:
    - **Eclipse UML2 (v1.x) XMI**.
    - **Eclipse UML2 (v2.x) XMI**.
    - **Eclipse UML2 (v3.x) XMI**.
3. In the property list, specify desired property values. You can see descriptions of each property in the description area below the property list.

Setting Project Options

Use the **Project Options** dialog to do the following:

- Specify general project-specific options.
- Specify summarizing information (for example, diagram author, diagram creation and modification dates) that will be displayed on each diagram.
- Specify symbol property styles for shapes, paths, diagrams, and stereotypes within the project.

TIP!	For the instructions how to create, edit, clone, import / export, or remove symbol property styles, please refer to "Style Engine" on page 259.

- Change default element property values.

TIP!	For the instructions about setting the default element property values, see "Default Property Values" on page 235.

- Set general code generation or code reversing options as well as code formatting styles for selected programming languages.

The **Project Options** dialog includes tabs, each designated for one of the above mentioned features and containing lists of corresponding options. Tabs are displayed in the dialog's tab tree.

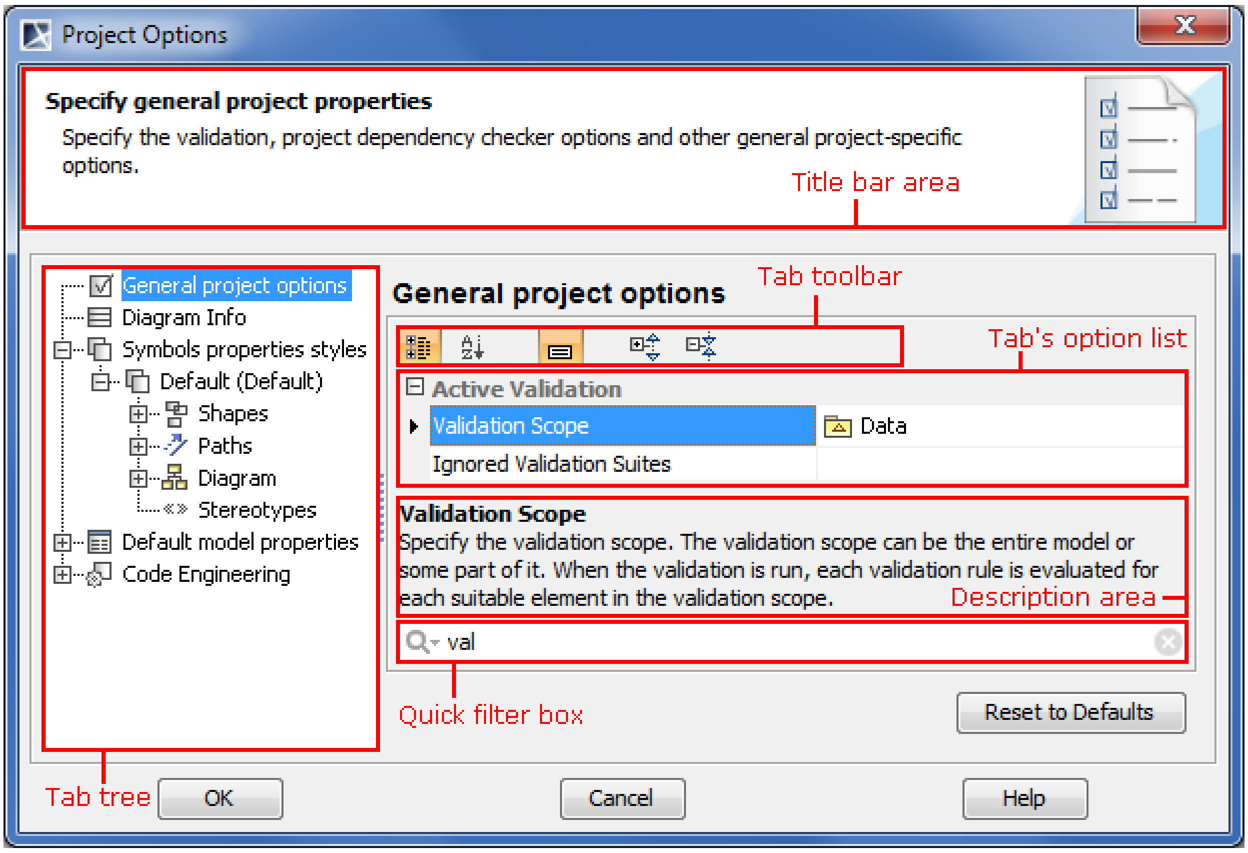
An option value can be simply changed by typing a new value, setting a value to true / false, or selecting a value from the list.

Learn more about the **Project Options** dialog in the following sections:

- "Using Project Options dialog" on page 108.
- "Common elements in Project Options dialog" on page 109.

To open the **Project Options** dialog

- From the **Options** menu, select **Project**.



Project Options

Specify general project properties

Specify the validation, project dependency checker options and other general project-specific options.

General project options

⊟ Active Validation	
Validation Scope	Data
Ignored Validation Suites	

Validation Scope

Specify the validation scope. The validation scope can be the entire model or some part of it. When the validation is run, each validation rule is evaluated for each suitable element in the validation scope.

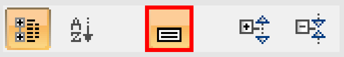
Figure 51 -- Structure of Project Options dialog

Using Project Options dialog

In order to change a desired project option, first of all you may need to find it. It can be rather difficult to find a desired option, if the tab's option list contains 10 or more options. In this case the Quick filter box appears in the dialog. Using the Quick filter box you can quickly find the desired option in the list. For more information about the Quick filter box please refer to "Quick filter" on page 223.

NEW! For better understanding an option you can read its description that tells what is the effect of changing the option value.

To read the option description

IMPORTANT!	Make sure that the Show Description mode is turned on in the **Environment Options** dialog. To turn the Show Description mode on or off, click the Show Description button on the tab toolbar. 

1. Click an option, whose value you want to change.

2. Read the option description in the area below the tab options list. You are ready now to change the option value.

Common elements in Project Options dialog

For the common element descriptions look in the following table.

Element	Element Type	Description
Quick filter	Text box	Type an option name or its fragment. For more information about the Quick filter box please refer to "Quick filter" on page 223.
Reset to Defaults	Button	Resets all options to their default values.
OK	Button	Saves changes and closes the dialog.
Cancel	Button	Closes the dialog without saving changes.
Help	Button	Opens MagicDraw Help.

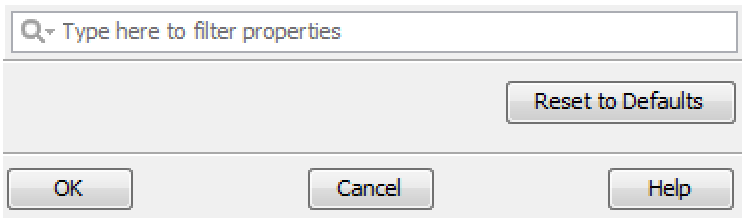


Figure 52 -- Fragment of Project Options dialog. Quick filter box and common buttons

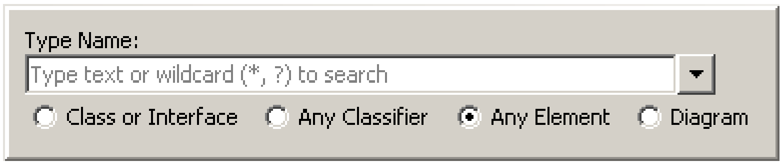
Searching

The MagicDraw search mechanism allows for searching within model elements, symbols, and extensions.

You can also search for usages and dependant elements of the selected elements. This functionality is described in "Analyzing Usages and Dependencies" on page 385.

To quickly find the needed classifier or diagram

1. From the **Edit** menu, select **Quick Find** or press CTRL+ALT+F.
2. In the opened dialog, type the name of the classifier or diagram (also, you can select it from the drop-down list) and choose one of the option buttons for the advanced search.



( ) Class or Interface ( ) Any Classifier [✓ Any Element] ( ) Diagram

Figure 53 -- Quick Find dialog

Filters in the autocompletion dialog allow the filtering of rarely used items, such as “metaclasses” and “elements from modules”. This allows comfortable and clear usage of the autocompletion dialog for modeling, without active usage of the elements from profiles and it increases modeling speed.

At the bottom of the drop-down list box, you will find buttons to perform filtering:

- **The Auto completion includes metaclasses button**. When pressed, the list of available elements, element types, or stereotypes includes metaclasses (in MagicDraw metaclasses are placed in the *UML Standard Profile*) appears.
- **The Auto completion includes elements from profiles and modules button**. When pressed, the list of available elements, element types or stereotypes includes elements, which are placed in modules appears. (**Note**! This option toggles all profiles except the *UML Standard Profile*.)
- **The Auto completion uses camel case button**. When pressed, you may search for elements via the capital letter patterns. For example, instead of typing *ArrayIndexOutOfBoundsException* you may type *AIOOBE*.

Find all elements of the same type

1. From the **Edit** menu, select **Find**, or press corresponding shortcut key Ctrl+F, or click the Find button on the main toolbar. The **Find** dialog opens.
2. Type the "*" symbol in the **Name** text box.
3. Click the "..." button near the **Type** text box to open the **Select Element/Symbol Type** drop-down combo box. Select the types of elements and click **OK**. The Model elements in this box are listed according to the metamodel.
4. Click the **Find** button to start search. The search results will appear in the **Search Tree** in the Browser.

TIP!	To generalize the beginning or ending of the name, add the "?" symbol to the front or to the end of the string.

Find model elements and symbols in your project

1. Choose **Find** from the Edit menu or press the corresponding shortcut key Ctrl+F or click the **Search** tab in the Browser.
2. In the **Name** text box, type the name of the element. If you want to find all elements of the selected type, enter the "*" symbol in the **Name** text box.
3. Click the "..." button near the **Type** text box to open the **Select Model Element/Symbol Type** drop-down combo box. Select the types of elements and click **OK**. The Model elements in this box are listed according to the metamodel.
4. To start a search, click the **Find** button. The search results will appear in the **Search Results** tree in the Browser.

TIP!	To generalize the beginning or ending of the name, add the "?" symbol to the front or to the end of the string.

NOTE	If the **Clear Previous Results** check box is cleared, new results are appended to the previous search results in the tree.

TIP!	Select **Search Data Unused in Diagrams** check box to find only elements without shapes.

To search for symbols in an active diagram

Search in the active diagram using the **Find** or **Quick find** dialog is a time saving feature.

You can search for the symbols of elements, which are drawn in the open diagram:

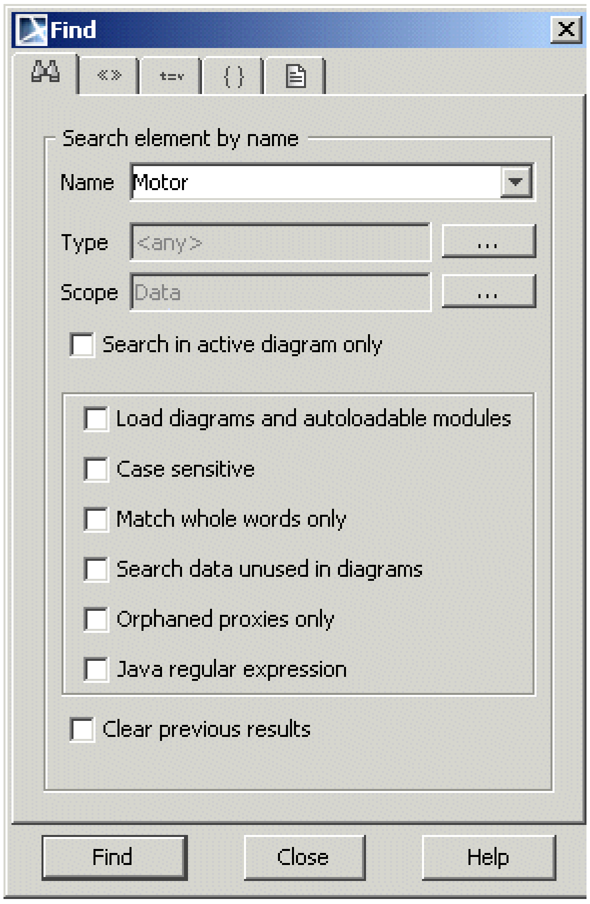
1. Select the **Find** in Diagram command from the diagram shortcut menu. The **Find** dialog box opens. In the **Find** dialog box, the **Limit results to active diagram** check box is selected.
2. Type the element name for the symbol you are searching for. Click the **Find** button.

3. In the **Search Results** tree, double click on the element and the symbol of this element is selected on the diagram pane.

-or-

- Press the **Shift+F** key. The **Find** dialog box opens.
- Press the **Ctrl+Shift+F** key to open the **Quick find** dialog.

Find dialog box



Search element by name
Name: Motor
Type: <any>
Scope: Data
☐ Search in active diagram only
☐ Load diagrams and autoloadable modules
☐ Case sensitive
☐ Match whole words only
☐ Search data unused in diagrams
☐ Orphaned proxies only
☐ Java regular expression
☐ Clear previous results

Figure 54 -- Find dialog box

The **Find** dialog box contains five tabs:

Tab Name	Tab Icon
Search Element by Name	🔍
Search Element by Stereotype	«»
Search Element by Tagged Value	t=v
Search Element by Constraint Value	{ }
Search Element by Documentation	🗎

Search Elements

Element	Function
Name	Type the name of the item you wish to find. **NOTE:** You may define wildcards <*> and <?> for the search. For example, if you define the following input string <a*b>, the system looks for items with <a> at the beginning and <b> at the end of the string. If you define the string as <?agicDraw>, all strings containing <agicDraw> will be found.
Type	Select an element type from the proposed items, or leave the default value of <any>.
Scope	Specify a package where the content search will be performed.
Limit results to active diagram	The search scope is limited to the symbols of active diagrams. The Check box is disabled if all diagrams are closed or if the active diagram is empty. The default value is *false*. If the **Find** dialog box is opened from the diagram shortcut menu, the **Limit results to active diagrams** check box is selected. **NOTE:** The **Limit results to active diagrams** check box does not exist in the **Find** dialog box when it is opened from the model comparing dialog.
Value	Select or input a value of the Tagged Value or Constraint Value. **NOTE:** Only available for **Search Element by Tagged Value** and **Constraint Value** tab.
Load elements (not loaded) and autoloadable modules	If the model has diagrams or modules that are not loaded, select this check box to load all elements to be included in the search. **NOTE:** Elements will not be included in the search if the module load mode is set to **Manual load**.
Case Sensitive	Search for items that have capitalization exactly as defined in the string entered in the **Item to Find** box. When the check box is cleared, **MagicDraw** does not distinguish between uppercase and lowercase characters of the item name entered in the **Name** box while searching.
Match Whole Words Only	Search for items with names that exactly match the string entered in the **Item to Find** box. When the check box is cleared, **MagicDraw** searches for items with names matching the first part of the string entered in the **Name** field.
Search Data Unused in Diagrams	Only searches elements that do not contain symbols in any diagram.
Java Regular Expression	In the “Java Regular Expressions” on page 113, you can find several expressions that will help you to make a search in MagicDraw.
Clear Previous Results	Removes all previous search results from the Browser tree.
Find	Searches for items and displays the results in the found items list field. If **MagicDraw** does not find any items, a message is displayed.
Close	Exits the dialog box.
Help	Displays **MagicDraw Help**.

Java Regular Expressions

Metacharacters

There are several characters supported, which are used to form search patterns ([{\^$|)?*+.

There are two ways to force a metacharacter to be treated as an ordinary character:

- + Precede the metacharacter with a backslash
- + Enclose it within \Q (starts the quote) and \E (ends it).

Character Sets

[abc]	Any character of a, b, or c.
[^abc]	Any character except a, b, or c (negation).
[a-z]	All characters from a to z (range).
[a-z[A-Z]]	All characters from a to z and A to Z (union).
[a-z&&[r-z]]	Characters from r to z (intersection).
[a-z&&[^r-z]]	Characters from a to q (subtraction).

Predefined character sets:

.	Any character.
\d	Any digit character.
\D	Any non digit character.
\s	White space character (\t\n\x0B\f\r).
\S	Any non white character.
\w	Word character (a-z, A-Z,_,0-9).
\W	Any non word character.

Example:

Regular expression: [ABC][^\s]\d

Matched text: any sequence starting with an "A", "B", or "C" symbol, followed by any non white space character and any digit.

Grouping

Capturing groups helps to treat multiple characters as a single unit.

Example:

Regular Expression: ABC|(\dABC)

Matched text: any text containing ABC symbol set or ABC symbol set beginning with any digit symbol.

Quantifiers

Quantifiers allow specify a number of character (X) appearances.

X?	Match X zero or one time.

X*	Match X zero or many time.
X+	Match X one or many time.
X{n}	Match X exactly n times.
X{n,}	Match X at least n times.
X{n,m}	Match X exactly n times, but not more than m times.

Example:

Regular expression: Cla(s{2})

Matched text:any sequence starting with “Cla” symbols, followed by “s” symbol two times. It will match any text containing the string “Class”.

Boundary Matchers

Boundary matchers help to match strings more precisely. Boundary matchers help by matching a particular word, beginning or end of line, or beginning or end of the input.

^	Beginning of the line.
$	The end of the line.
\b	A word boundary.
\B	A non word boundary.
\A	Beginning of the input.
\z	End of the input.

Example:

Regular expression: \bCla(s{2})\b

Matched text:any sequence starting with “Cla” symbols, followed by “s” symbol two times. It will match any text containing string “Class” as whole word (“Classs” won't be matched).

Embedded Flag Expressions

Allows setting to set properties for a regular expression matcher.

(?i)	Case insensitive matching.
(?x)	Ignores white spaces in regular expression.
(?m)	Enables multi line option. If not specified, boundary matches ^ and $ matches beginning of the input and end respectively.
(?s)	Enables expression "." to match any character including line terminators. If not specified, dot in expression does not match line terminators.
(?u)	Enable Unicode-aware case folding. When this flag is specified, case insensitivity is applied to the Unicode standard.
(?d)	Enable Unix lines mode. Only terminator '\n' is recognized in behavior of ".","^","$"

Example:

Regular expression: (?m)^\bCla(s{2})\b

Matched text: any sequence from a new line, starting with “Cla” symbols, followed by “s” symbol two times.

References

http://java.sun.com/docs/books/tutorial/extra/regex/index.html

Replacing

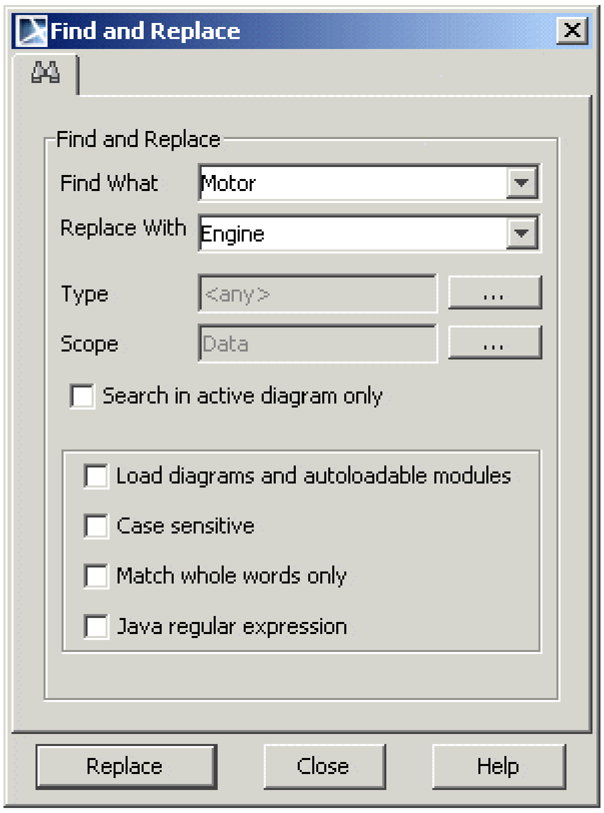
The Find and Replace functionality allows replacing one specified model value with another value.

You can change the values for the following properties:

- Names
- Documentation
- Tag values
- Text included to Notes
- Text included to Text Boxes
- Expressions.

To replace a value:

1. From the **Edit** menu, select **Find and Replace**. The **Find** and **Replace** dialog box opens.



Find What: Motor
Replace With: Engine
Type: <any>
Scope: Data
☐ Search in active diagram only
☐ Load diagrams and autoloadable modules
☐ Case sensitive
☐ Match whole words only
☐ Java regular expression

Figure 55 -- Find and Replace dialog box

2. Type the value to be replaced into the **Find What** field.
3. In the **Replace With** field, type the value that will replace the value of the found element.
4. Specify the search criteria. For more information about the search criteria, see “Searching” on page 109.

5. Click the **Replace** button to start the replacement. On each property replacement the question appears. You may choose to replace value, replace all values or not replace.

NOTE	You will see the error when changing value to not valid: ● For example, if value type is *boolean*, you may replace values from *true* to *false* or from *false* to *true*, but if you will try to replace the value *true* or *false* to other, for example, to *Motor,* an error message will be displayed. ● You will not be allowed to change the *Integer* value to *String* when it is a part of the value. For example, if you have the *120* value and trying to replace *20* with *AB*, an error message will be displayed.

Project Partitioning

View Online Demo	Shared Packages

Partitioning the model

If you developed, or are developing, a large model that has several weakly dependent parts, it is advisable to split it into several module files. Partitioning opens up possibilities for reusing model parts in several related projects and may improve performance on very large projects, when modules are loaded selectively.

Partitioning has a package level granularity. Smaller elements cannot be split into separate modules. In principle each package in a containment tree could be partitioned into a separate module, however this is excessive.

The decision on how to split a model into parts should be made carefully. You should isolate model parts, which form some cohesive, logically complete piece of structure (subsystem, code library, profile) and have light interdependencies.

When there are many one-way dependencies to some model part (parts **A, B, C** depend on part **D**, but part **D** does not depend on any of the parts **A, B, C**), this part is a good candidate for placement into module.

When one big project is used to store all the modeling information of the project models (use case models, high level architectural models of the project, detailed implementation level class, sequence, state, etc.), it may be useful to partition the models according to the modeling domains (use cases in one module, architectural models in another, implementation level models in yet another). This allows unloading unnecessary modules while working on one part or another (saving computer and improving performance), but still retain the relationships between domains and load modules, on demand.

NOTE	Avoid partitioning a model into parts, which have circular dependencies. (A ⇔ B or A->B->C->A situations)!

Usually programmers are very adept at splitting large code bases into libraries. The very same criteria should be applied to splitting the large models into modules.

MagicDraw module functionality allows two important possibilities:

- possibility to work without all modules loaded;
- read-write modules.

Modules are often used for profile storing, however a module **is not** a profile and it is important not to mix the two. Any model part can be stored in the module.

Exporting the module of a project

NOTE:	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

Using the **Export Module** dialog box, you can partition the model and save the content of a selected package as a separate module. Once exported, the package and its containing elements are read-only and the module name is displayed in brackets next to the package name in the Browser tree.

To export any module using the **File** menu

1. From the **File** main menu, select **Export**, and then select **Module**. The **Export Profile/Module** dialog box opens.

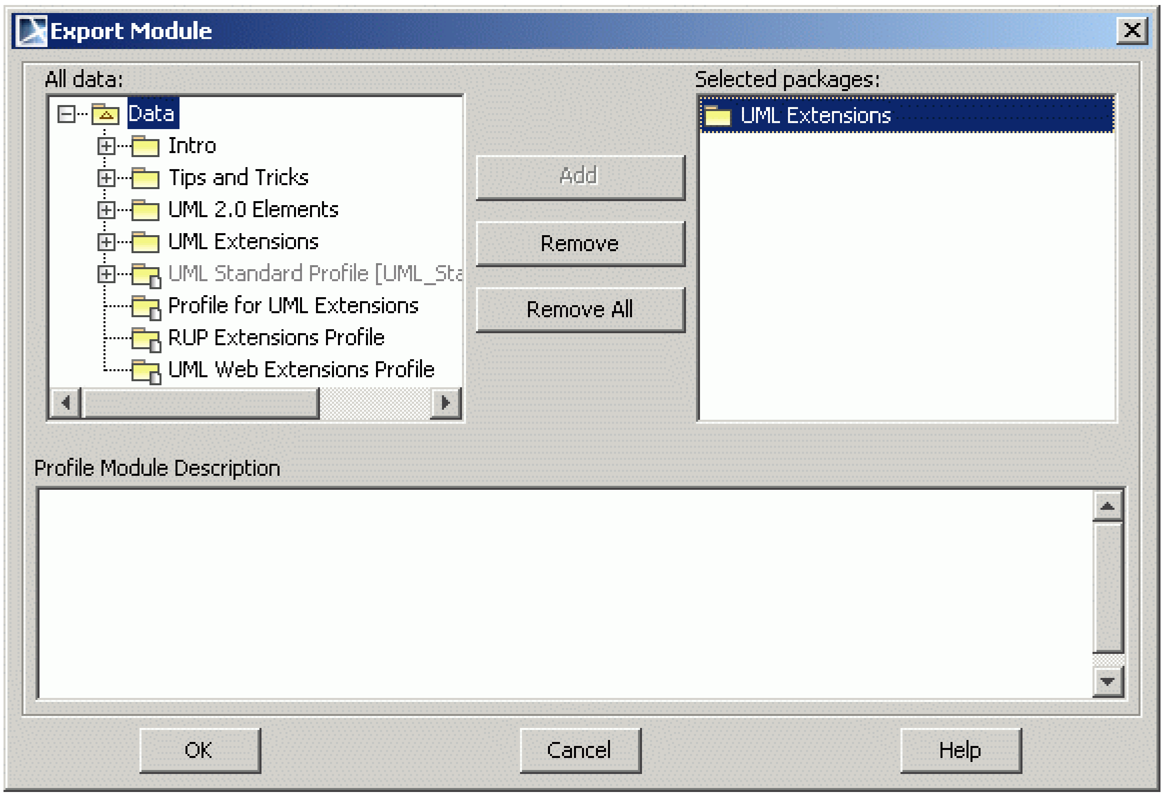


Figure 56 -- The Select Package dialog box for module exportation

2. In the **All Data** list, select the package you want to save as a separate module. Click **Add**. The package is added to the **Selected Objects** list.
3. If desired, type a description of the module in the **Profile Module Description** window. This description is displayed in the documentation of the package.
4. Click **OK**.

To export the selected module using the package shortcut menu

1. In the Browser tree, select the package you want to save as a separate module (you can also select multiple packages).
2. From the package shortcut menu, select **Modules,** and then select **Export Module**. The **Export Module** dialog box opens.

3. In the **All Data** list, select the package you want to save as a separate module. Click **Add**. The package is added to the **Selected Objects** list.
4. If desired, type the description of the module in the **Profile Module Description** window. This description is displayed in the documentation of the package.
5. Click **OK**.

MagicDraw will check for dependencies from the exported part of the model to the part of the model not. You will have to resolve them. The dependency resolution process is the same as for dependency resolution between shared and parts of the module not shared.

When dependencies are resolved, MagicDraw will ask for the file and export the module.

This action can be thought as consisting of 3 elementary steps:

- Saving model elements into the module file.
- Sharing the entire contents of the module.
- Using the module in the main project.

Alternatively, if you have several small, related projects, you can join them together into a larger, partitioned project to work with all the information from one place. This is achieved by using the **Use Module** command that was previously mentioned.

NOTE: Only packages can be exported as modules. To export the created diagram, you must move it to a package containing elements to export.

Sharing the module of a project

NOTE: This functionality is available in Standard, Professional, Architect and Enterprise editions only.

Not all module contents are visible in the project being used. The Module has a shared part and private part. Only contents of the shared part are visible in the project being used. The concept is similar to the public/private parts of modules in programming languages (e.g. Pascal).

To designate packages of the module as shared

- From the **File** main menu, select **Shared Packages**.
- From the package shortcut menu, select **Modules** and then **Shared Packages**. The **Shared Packages** dialog box opens. Use the **Add** button to select more packages for multiple simultaneous sharing, if needed. Click **OK**.

Only the package selected is shared and everything else is not shared.

When the module with shared package(s) is used in the project, the shared part(s) is mounted into the module of the project. Each shared package can have a different mount point. Modules of profiles are typically mounted directly under the top level **Data** element of the package being used, however this can be changed.

Example:

Shared package "*util*" from the module can be mounted on the "*com::company*" path in the main project - to form the "*com::company::util*" path. The Preferred Path of the Shared Package (can be tuned in the **Shared Packages** dialog box) of the module, serves as a hint for MagicDraw on where to mount the package.

Modules form a recursive data structure - the main project uses one or several modules; these modules in turn can use other modules; those other modules can use yet another set of modules and so on. All model pieces from these modules are gathered and connected into the integral model, which is shown in the model Browser when the main project is opened.

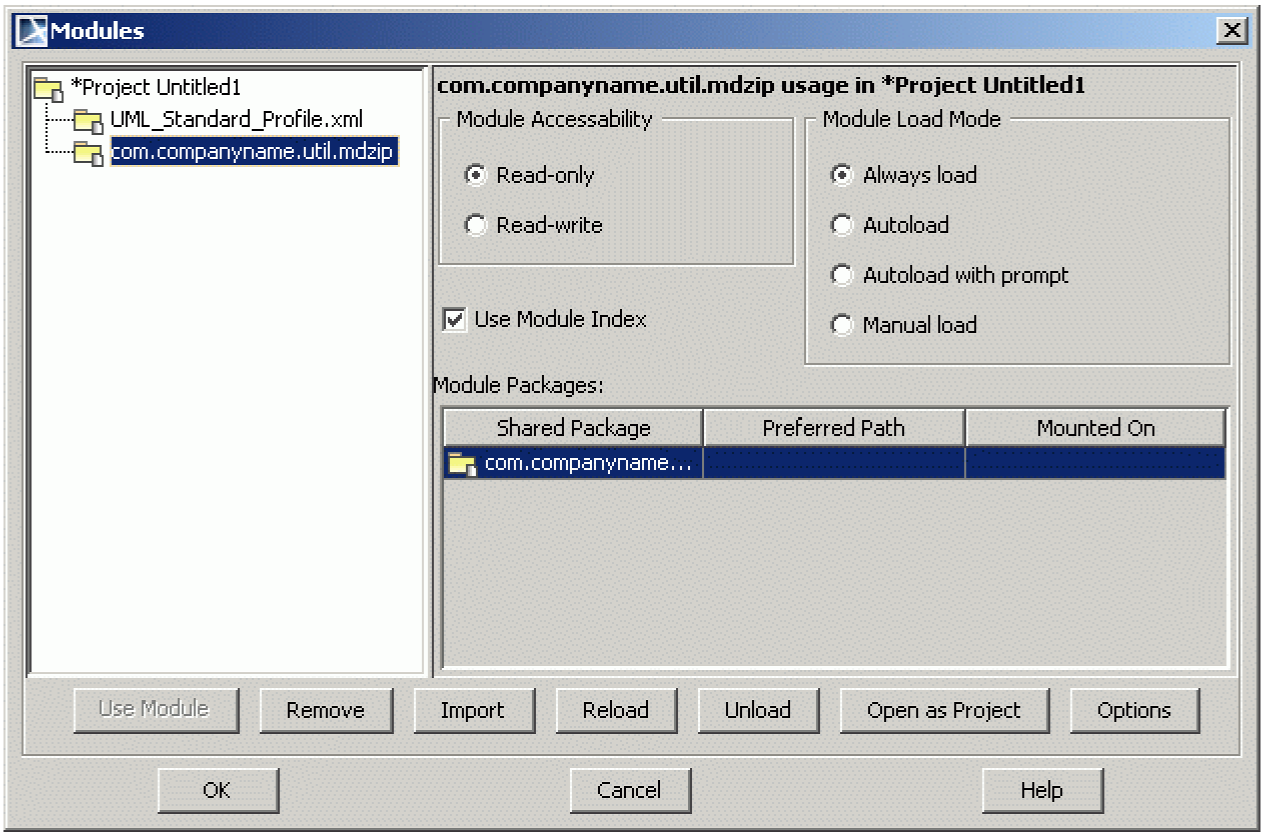
Managing Modules

You can manage modules via the **Modules** dialog.

To open the **Modules** dialog

Do one of the following:

- From the **Options** menu, select **Modules**.
- Right-click a module in the Containment tree and from the shortcut menu select **Modules** > **Module Options**.



com.companyname.util.mdzip usage in *Project Untitled1

Module Accessability: [✓ Read-only] Read-write

Module Load Mode: [✓ Always load] Autoload / Autoload with prompt / Manual load

[✓] Use Module Index

Module Packages:

Shared Package	Preferred Path	Mounted On
com.companyname...		

Figure 57 -- The Modules dialog

Box name	Function
Module Accessability	Specifies the way a module can be used in a project: • **read-only** modules are not editable within the project using it. • **read-write** modules can be edited in place - directly in the project using it.

Module Load Mode	Sets the module loading mode: • **Always load** (default) - modules are always loaded when the project is opened. • **Autoload** - module is not loaded when the project using it is loaded. However, MagicDraw monitors user activities in the project and tries to anticipate guess when the user might want to use the model piece from the unloaded module. • **Autoload with prompt** - mode is similar to Autoload. However, MagicDraw will ask the user before loading the module. • **Manual load** - module is not loaded when the project using it is loaded.
Use Module Index	If selected, uses the indexing scope specified in the **Project Options** dialog. For more information about indexing, see “Indexing” on page 126.
Shared Package	Name of the shared package.
Preferred Path	Carries the information about the path where the shared package should be placed in the project using it.
Mounted On	Holds the packages of the project on which the corresponding module share is mounted. Click the “...” button to change package or create a new one.
Use Module	Enabled, when the module is selected as read-write. Allows the use of the module in the selected module.
Remove	Removes module from the project.
Import	Imports module to the project.
Reload	Reloads module in the project.
Unload	Unloads module from the project.
Open as Project	Opens the selected project as a module.
Options	The **Project Options** dialog box opens.

Analyzing Dependencies Among Elements

A package can be exported to an independent module only if it does not depend on external elements (except other modules). Cyclical dependencies between several modules are not allowed.

All the information about analyzing and checking package dependencies you may find in the Section “Analyzing Package Dependencies” (see on page -440)

There are three types of dependencies:

- Dependency by relationship
- Dependency by reference
- Diagram dependencies

Using the module of a project

When a module is used in another project, its contents are linked-in and made accessible in the model tree of the project using them as if it were part of the project.

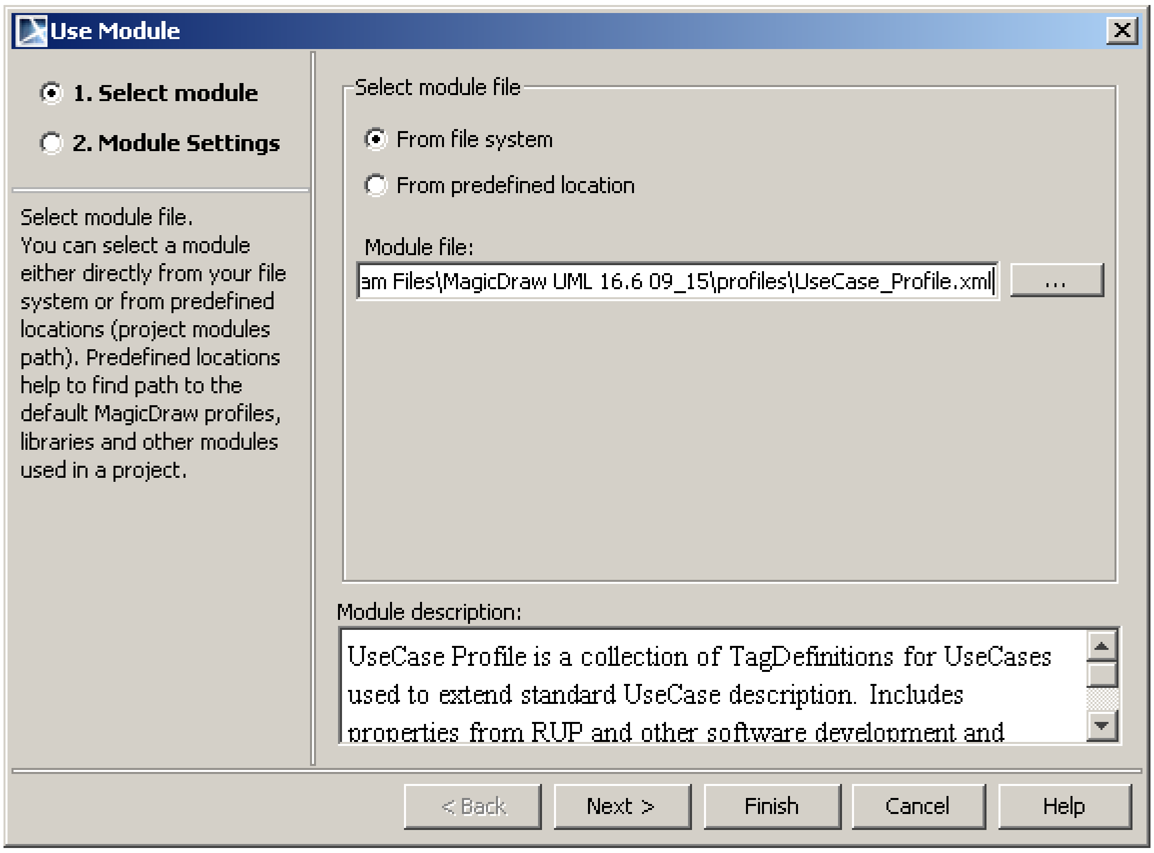
To use a module in a project

1. From the **File** main menu, select **Use Module.**
2. In the **Use Module** dialog box, select the module you want to use in your project, specify the module settings and click **OK.**

The model elements are still stored separately; module elements - in the module file and main project elements - in the main project file.

The Use Module wizard

From the **File** menu, select **Use Module**.



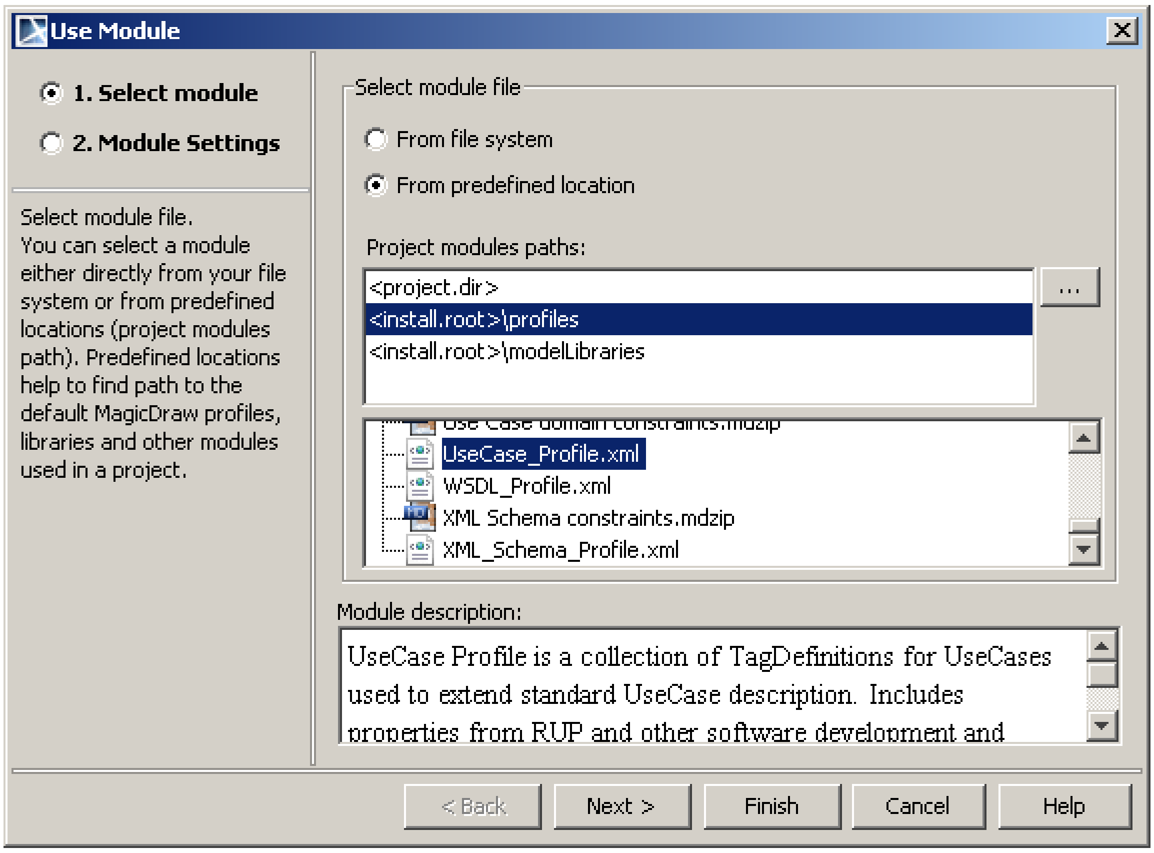
Select module file.
You can select a module either directly from your file system or from predefined locations (project modules path). Predefined locations help to find path to the default MagicDraw profiles, libraries and other modules used in a project.

Select module file: [✓ From file system] From predefined location

Module file: am Files\MagicDraw UML 16.6 09_15\profiles\UseCase_Profile.xml

Module description:
UseCase Profile is a collection of TagDefinitions for UseCases used to extend standard UseCase description. Includes properties from RUP and other software development and

Figure 58 -- Use Module Wizard. Selecting module from file system



Select module file.
You can select a module either directly from your file system or from predefined locations (project modules path). Predefined locations help to find path to the default MagicDraw profiles, libraries and other modules used in a project.

Select module file
From file system [✓ From predefined location]

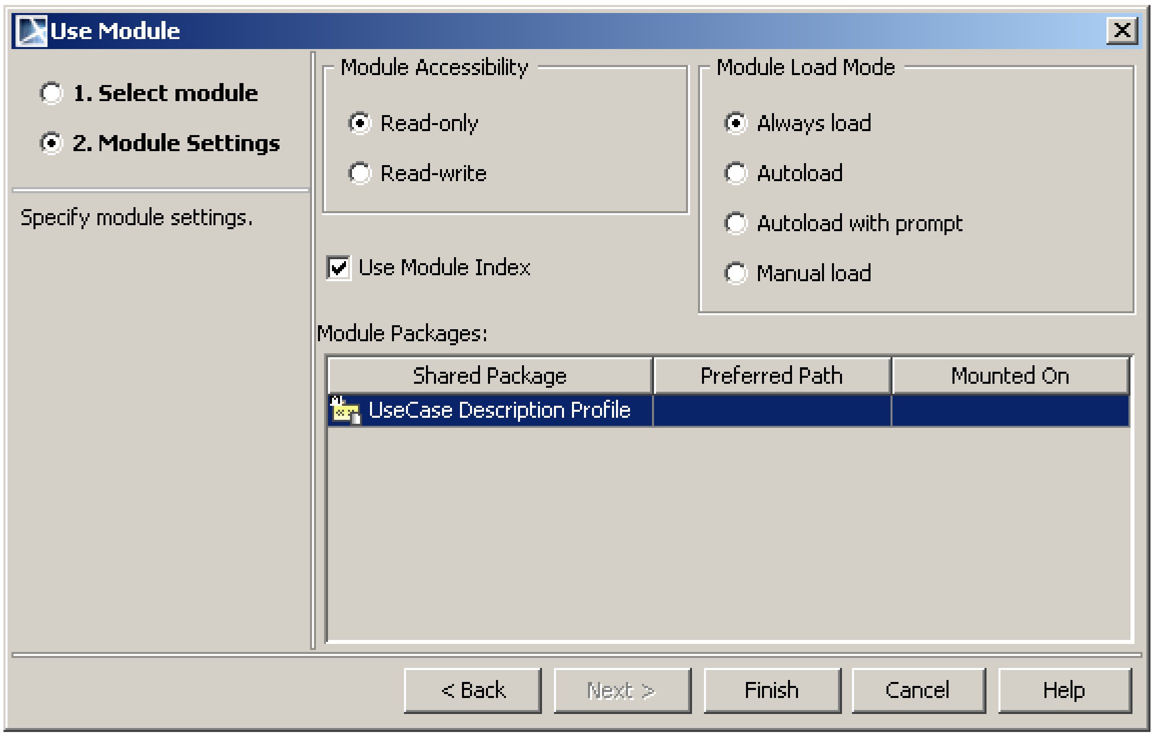
Project modules paths:
<project.dir>
<install.root>\profiles
<install.root>\modelLibraries

Use Case domain constraints.mdzip
UseCase_Profile.xml
WSDL_Profile.xml
XML Schema constraints.mdzip
XML_Schema_Profile.xml

Module description:
UseCase Profile is a collection of TagDefinitions for UseCases used to extend standard UseCase description. Includes properties from RUP and other software development and

Figure 59 -- Use Module Wizard. Selecting module from predefined location

Box name	Function
From file system	Allows selecting module file from your file system. Click the "..." button next to the **Module file** text box, to browse to module file (Figure 58 on page 121).
From predefined location	Allows selecting modules from predefined locations. Select project module path from a paths list, and then select module file from the list below. Click the "..." button next to the **Project modules paths** text box to add new module path to your project. The **Select Folder** dialog box will open (Figure 59 on page 122).
Module description	Displays the module description.
Next	Proceeds to the next step.
Finish	Saves changes and closes the dialog box.
Cancel	Cancels the dialog box without saving changes
Help	Displays MagicDraw Help.



Specify module settings.

Module Accessibility: [✓ Read-only] Read-write

Module Load Mode: [✓ Always load] Autoload, Autoload with prompt, Manual load

[✓] Use Module Index

Module Packages:

Shared Package	Preferred Path	Mounted On
UseCase Description Profile		

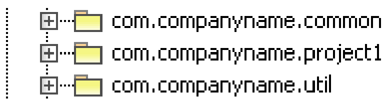
Figure 60 -- The Use Module Wizard, Step2 - Module Settings

For more information about the options in this step, see “Managing Modules” on page 119.

Reusing model parts between models

When models are properly partitioned, model parts can be reused in other projects.

For example, a common situation in Java software projects is this layout of the packages (in project **A**):



```
com.companyname.common
com.companyname.project1
com.companyname.util
```

Common and *util* packages are good candidates for refactoring into modules. Then in project **B** these modules can be reused.

There are two ways to use the module in the project:

- read-only modules are not editable within the project using it.
- read-write modules can be edited in place - directly in the project using it.

The usage mode can be specified in the **Use Module** Wizard**,** Step 2. By default, the module is used in the project in read-only mode.

To change module accessibility mode

1. From the **Options** main menu, select **Module.** The **Module Options** dialog box opens.
2. Select module in the tree and change the **Module Accessibility** option from read-only to read-write or vice versa. Click **OK**.

You can change content of a module and make its inner elements editable by selecting **Open Module As Project** (from the module shortcut menu, **Modules** submenu). The module opens as a separate project.

When to use read-only module?

The decision to use a module as read-only or read-write depends on the maturity of the module and the organization ownership/responsibility rules for the projects, developing modules.

If the library in the module is mature (changes to it are not expected/likely/possible) it should be used in read-only mode.

If the module is owned by a team, working on one project, and this team is responsible for this module and the module is reused in another project, the module should be used in the other project as read-only. This prevents inadvertent changes to the library.

When to use read-write module?

In the case where a module is actively developed and evolves together with the projects that are using it, a module should be used read-write.

In this case, if there are multiple projects using the module, you should be careful and remember, that your changes to the module will be reflected in other projects, therefore care should be exercised. Usage of teamwork server might be advisable in this case. And, of course, there can be mixed usage situations - when a module is used read-only in some projects and read-write in others.

Reloading the module of a project

The best way to access the latest changes to your module is to reload it. All modifications made in the other project for this module and then exported as modules with the same name, are reloaded in the current project.

To reload the module

In the Browser tree, from the exported module shortcut menu, select **Modules**, and then select **Reload Module**.

NOTE: If you open your module as a project, be sure to save any changes you have made (by using the Save command). All modifications appear after reloading the module in the other open project, which includes your module as a component.

Importing the module of a project

If you wish to store model elements of the module in the main project file, you can import the module into the project.

To import a module into a project

From the package shortcut menu in the Browser, select **Modules** and then **Import Module**.

All the model elements from the module will be copied into the main project, and the module will be unlinked from the project.

Working with partially loaded projects

In MagicDraw v11.5, the possibility to work with some modules unloaded was added. Prior to this release, all the modules were required to be loaded when the main project was loaded. If the module file was missing, it was an error.

This feature allows some memory to be saved and improved performance when working with very large projects. “Large” for MagicDraw is several thousands of classes and other complex elements. If counting all the small elements, such as properties, methods, method parameters, ~50K of elements is considered a large project. A good example of a large module is a module having a model of Java rt.jar reversed into it. Also diagrams are large elements - 20 or more complex diagrams should be considered large.

When working with a large project partitioned into several modules, at any moment a module can be unloaded. When editing a project, if you see that the module will not be used for some time (perhaps you are working on a different part of the large project), you can unload it - this will save resources.

To unload a module from a project

From the module shortcut menu, select **Modules** and then **Unload Module**.

An unloaded module can be loaded at any time.

To load a module in a project

From the module shortcut menu, select **Modules** and then **Load Module**.

When the module is unloaded, there are some model elements left in the place where the module was mounted. These elements are not editable, and they have a small M in the upper right corner of their icon.

These are the so-called "proxy" elements of the real elements from the module. Instead of the real model elements, the proxy carries only the name and kind of the model element information - it is a lightweight surrogate for the real model element. The proxies are left in the place of those module elements, which are referenced from the main project. These proxies are normal and necessary to maintain project integrity (so that there are no dangling ends of relationships, types of properties do not disappear, etc.).

There are 4 module loading modes:

- Always load (default) - this mode of operation closely mimics the pre-v11.5 MagicDraw functionality. In this mode, modules are always loaded when the project is opened. They can be unloaded if the user deems it necessary.
- Autoload - module is not loaded when the using project using it is loaded. However, MagicDraw monitors user activities in the project and tries to anticipates when the user might want to use the model piece from the unloaded module. E.g. if the user does the search, finds usages/dependencies, reports, metrics, transformations, or code engineering actions with a scope that touches the unloaded module, MagicDraw will load the module.
- Autoload with prompt - mode differs from the *Autoload* mode in this way: MagicDraw will ask the user before loading the module.
- Manual load - module is not loaded when the project using it is loaded. It can be loaded, using the aforementioned **Load Module** command.

To change the module loading mode

1. From the **Options** main menu, select **Module.** The **Module Options** dialog box opens.
2. Select a module in the tree and change **Module Load Mode** by selecting the appropriate radio button.

Modules, which are used very frequently, should be set in the *Always load* mode.

Modules, which are used only occasionally, should be set in the *Autoload* mode (or *Autoload with prompt* if you like to have more control on the loading behavior).

Modules, which are used only very rarely, can be put in the *Manual load* mode. Another frequent case where modules can be set into *Manual load* mode is when modules represent some software library, which is not expected to change. See the paragraph 1.6.1 Indexing below.

Advanced Concepts

Indexing

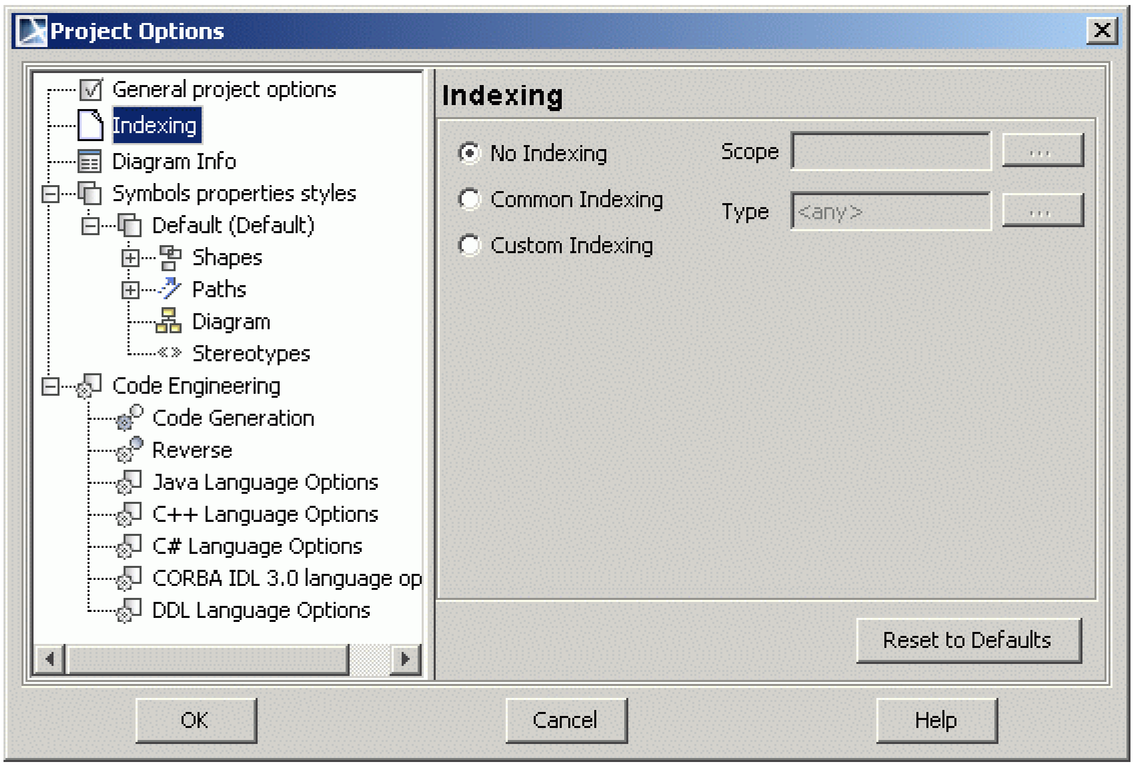
Indexing can be considered as an intermediate form of work, between working with a fully loaded module and working with the module unloaded.

When a module is unloaded/not loaded in the project, only necessary proxy elements are shown in the place of the module. However, there is a possibility to retain more proxies from the unloaded module than is kept by default. There is one case, where this functionality is particularly useful.

Consider the large software library module in a project. Let's say, only the various classes are used in the main project - some library classes are set as types of properties in the model classes, some model classes inherit from the library classes, etc. In this case, structural information of the library classes (their properties and methods) is not important. If proxies of all classes could be retained when the module is unloaded, this library module could be used in the main project in the unloaded state (saving a considerable amount of computer resources). The indexing feature allows achieving this functionality.

To specify indexing scope

1. First open the module as a project.
2. From the **Options** menu, select **Project**. The **Project Options** dialog box opens. Select the **Indexing** section.



[✓ No Indexing] Common Indexing Custom Indexing

3. Select the **Common Indexing** radio button. This enables indexing of the module and determines what information will be indexed.
4. When common indexing is chosen, classifiers and their inheritance relationships will be indexed. If you want more elements to be indexed, select the **Custom Indexing** option and fine-tune what element types (properties, methods, etc) should be indexed. The more elements

you select, the more elements will be accessible in the project using them as proxies. However, your gains in performance from the module unloading will also diminish. Hence, a balance is needed when customizing the index. It is usually better to use the common indexing variant. Click **OK**.

5. In the project using the indexed module, go to the options of this module (**Options** menu ->**Modules**) and select the **Use Module Index** check box for that module.

Such setup causes all the classes of the module to be visible as proxies when the module is not loaded (it is also advisable to change the loading mode of this module to Manual loading).

These proxies can be used as normal model elements in the project using them, without ever loading the module. They can be set as types of properties of the classes in the main project, they can be set as an association ends, classes may be derived from them, etc. If you ever need more information from that module, you can load it at any time to access the full data in the module.

An example could be in the module holding standard Java classes (rt.jar was reversed into it). This module is large, having all the details of standard Java classes. Many of these details are unused in the project; frequently only class information is used in the project for modeling tasks.

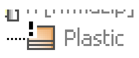
Missing elements for the proxies (orphaned proxies)

Orphaned proxy is really an indication of the dangling reference. Appearance of the proxy is indication that some other elements for example from outside the module (i.e. elements in the main project or other modules) reference to the element in the module that was previously there but no longer exists. Element was deleted/removed/somehow made unavailable in the module. In such case MagicDraw creates so called “orphaned proxy” in place of the missing element - a surrogate/not real element in place where real element was once in the past.

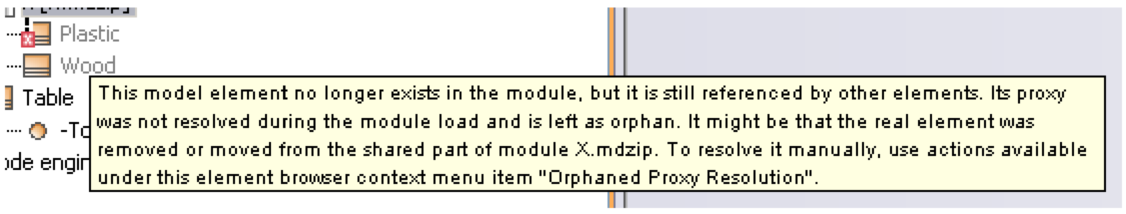
Displaying orphaned proxies in a project

MagicDraw distinguish orphaned proxies from normal elements in the project:

- Orphaned proxies are indicated with [!] adornment in the model tree.

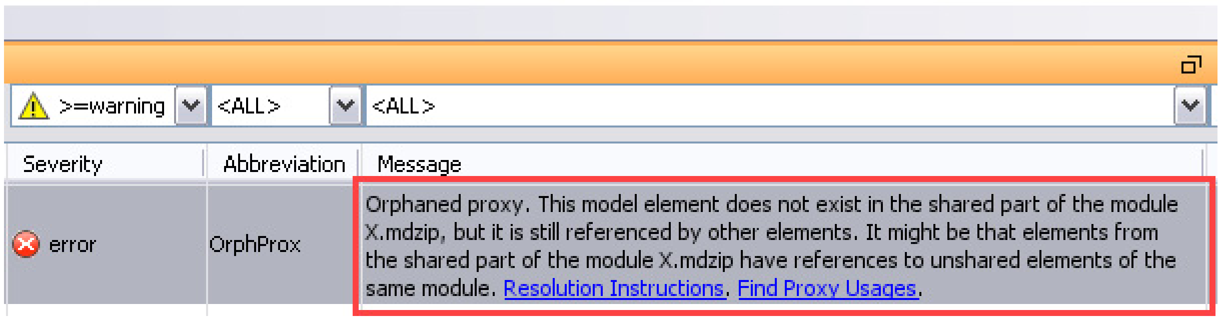


- A special Tool Tip is displayed for every orphaned proxy. The Tool Tip describes the reason why the orphaned proxy has been created and gives a suggestion how to resolve it.



This model element no longer exists in the module, but it is still referenced by other elements. Its proxy was not resolved during the module load and is left as orphan. It might be that the real element was removed or moved from the shared part of module X.mdzip. To resolve it manually, use actions available under this element browser context menu item "Orphaned Proxy Resolution".

- Active Validation founds and marks orphaned proxies as validation errors in the projects.



>=warning | <ALL> | <ALL>

Severity	Abbreviation	Message
error	OrphProx	Orphaned proxy. This model element does not exist in the shared part of the module X.mdzip, but it is still referenced by other elements. It might be that elements from the shared part of the module X.mdzip have references to unshared elements of the same module. Resolution Instructions. Find Proxy Usages.

Searching for orphan proxies

Run a search (Ctrl+F) and check the **Orphaned Proxies Only** check box. This will give you all the orphan proxies in your model in the search results.

Resolving orphaned proxies

Each orphaned proxy can be resolved.

To resolve the orphaned proxy:

- Right-click the orphaned proxy in the search result or Containment Tree and select the menu item **Orphaned Proxy Resolution**.

There are 4 actions you can do with the orphaned proxies:

1. Clear Proxy Usages. This resolution can also be triggered by simply pressing the **Delete** button. The action clears all the references to this non existing element, hence there is no more need for the proxy to appear.
2. Replace With. This resolution replaces all references to the orphaned proxy with references to the chosen element.
3. Create New Substitute. This resolution “resurrects” the element which is missing. Note: This resolution is disabled when the orphaned proxy containing module is read-only.
4. Find Proxy Usages. This command works as a helper to the other resolutions. It lists all usages of the orphaned proxy in the project. This also helps to identify from which module there are usages of orphaned proxies.

Which one of them to choose depends on wherever these missing elements are necessary or are they unnecessary.

If they are necessary (i.e. you want these elements to exist; they must be there), this means that they were deleted by mistake at some point in the past. Maybe MagicDraw can not find the required module? Or elements were moved to some other module? Or maybe the old version of the module is used, which hasn't got these elements? The causes may be numerous.

MagicDraw can help to identify why orphaned proxy appeared, as it remembers, if possible, the last existence of the real element in the module. There are tree main causes of orphaned proxies:

- If an element was removed from the module or moved from the shared part of the module to the unshared part. In this case all such orphaned proxies shall be located under the module shared package where that module is being used.

Resolving such orphaned proxies must be done in the proxy-containing module. This module is provided in the Tool Tip of the orphaned proxy.

- If elements in the module of the shared part have some references to the elements that are located not in the shared part of the module. In this case, all such orphaned proxies shall be located not under the proxy-containing module package (which is provided in the Tool Tip of the orphaned proxy). To check if this is the case, open the proxy containing module as a project and execute the module dependency checker: **Tools**->**Dependency Checker**. If the dependency checker finds any errors, try to fix them.
- If elements in the module of the shared part have some references to the elements that are located in another project. This could happen if the module was mounted in the project in the read-write mode and somebody added a reference to the project data. In such case, there will be no orphaned proxies in that project, but if the module is being opened as a project, orphaned proxies are created for such another-project elements.

To resolve the orphaned proxies into the real element, you have to find. where real elements are in your modules/main project.

- If they were moved to some other module, you have to use that module into your main project (File>Use module).
- If real elements were in the part of the module which was unshared, share this module part again.
- If MagicDraw can not find the module on disk, it should ask you to provide path to it on project load.
- If elements were deleted from the module/main project, you have to roll back to the previous version of the module/project (in your version control system or Teamwork server, or wherever you back your files up into) which still had these elements.

Creating New Substitute

As the last resort, if you have no version saved, where these elements still exist, you can try to “resurrect” them. Right-click each proxy>**Orphaned Proxy Resolution**>**Create New Substitute**. MagicDraw will recreate the missing element from the bits of information it still has (which is not much - ID, name and kind of the element).

NOTE	This action might be disabled if the substitute to be created must be in the module, but this module read-only. In this case simply change module to read-write in the **Module Options** dialog (**Options**>**Modules**) and the action will be enabled.

Deleting orphan proxies

If these elements are unnecessary (i.e. you want them to disappear; they must not be there), this means that they were deleted properly. Now all we have to do is clear the dangling references, which still exist in the other modules/main project to these non existing elements.

To delete orphan proxy:

- Right-click each proxy>**Orphaned Proxy Resolution**>**Clear Proxy Usages**.
- Press **Delete** on the selected orphan proxy.

You can also do this en masse:

1. Run a search (**CTRL+F**).

2. Check the **Orphaned Proxies Only** check box. This will give you all the orphan proxies in your model in the search results.
3. Select them all and press **Delete**.

When references to them are cleared, orphan proxies will disappear.

NOTES

- Note that if references to these non existing elements are in the modules, which are mounted read-only, this action can not clear them. MagicDraw will list the modules that still has references to the orphaned proxy but currently could not be removed (because module(s) are mounted as read-only).
- Clear Proxy Usages or Del button resolution method works temporarily only- when project is loaded next time orphan proxies will reappear. To delete proxies fully you have to open each module as project and clean orphan proxies there.

MOF Support

This feature renews the MagicDraw metamodeling portfolio. MagicDraw is able to export / import the UML model into / from the MOF (both CMOF and EMOF) XMI file. **NEW!** MOF 2.4 is now supported.

The MOF domain model is described in “Meta Object Facility (MOF) Core Specification” (OMG Available Specification Version 2.0 (2006, January). *Meta Object Facility (MOF) Core Specification*. Retrieved February 04, 2011, from http://www.omg.org/spec/MOF/2.0/PDF/).

This section contains the following subsections:

- "Exporting projects to MOF files" on page 130.
- "Importing projects from MOF files" on page 132.

Exporting projects to MOF files

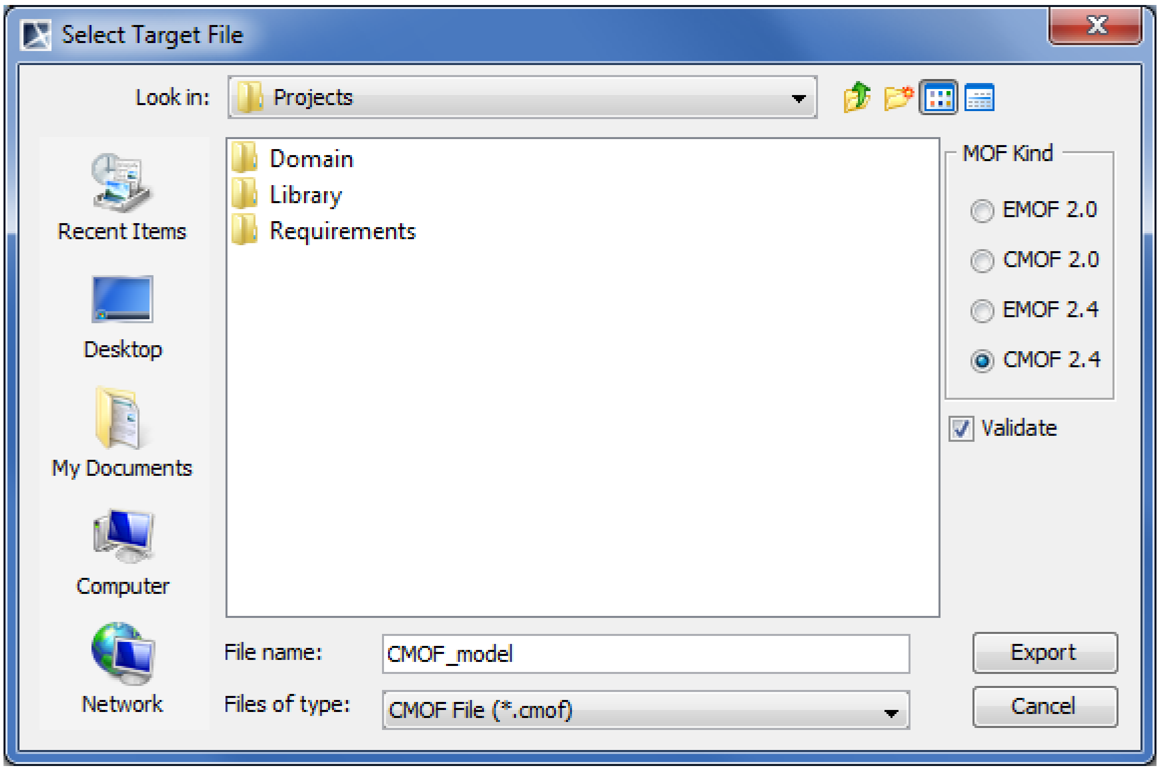
MagicDraw allows for exporting a selected project either to the EMOF or the CMOF package. You can choose to export either the whole project or selected packages only. The model, all except auxiliary resources (for example, the UML Standard Profile package), will be eported to the selected MOF file.

IMPORTANT! Diagram data and model features available only in UML (behavioral models in particular) can not be exported.

To export a project to a MOF file

1. From the main menu, select **File** > **Export To** > **MOF XMI File** > **MOF Whole Model**. The **Select Target File** dialog opens (see the following figure).
2. Type a file name and select a location for the exported model.
3. On the right side of the dialog under **NEW! MOF Kind**, select a MOF kind. The file type of the exported model changes according to your selection.
4. Click to select or to clear the **Validate** chech box. For more information about validating refer to "Exported elements validation" on page 131.

5. Click the **Export** button when you are finished.

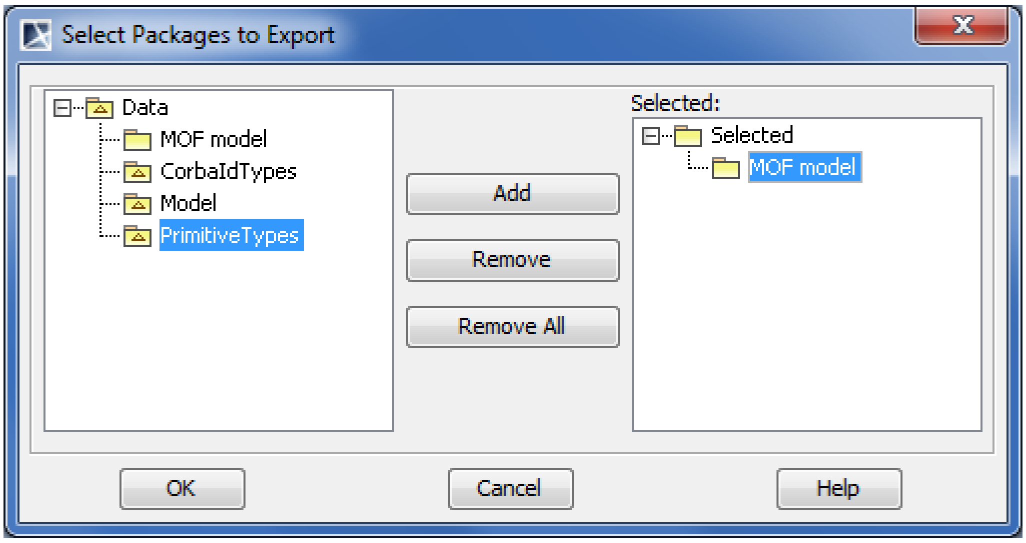


File name: CMOF_model
Files of type: CMOF File (*.cmof)
MOF Kind: EMOF 2.0 CMOF 2.0 EMOF 2.4 [✓ CMOF 2.4]
[✓ Validate]

Figure 61 -- Select Target File dialog. Exporting project to CMOF 2.4 file

To export selected packages to a MOF file

1. From the main menu, select **File** > **Export To** > **MOF XMI File** > **MOF Selection**.
2. In the **Select Packages to Export** dialog, select packages you want to export and click **Add** to move them to the **Selected** list. Click **OK** when you are done.



3. Perform the procedure "To export a project to a MOF file" starting from the step #2.

Exported elements validation

MagicDraw provides two validation suites (one for CMOF and one for EMOF) for validating a model that is being exported to a MOF file. These suites contain batches of rules to check exported elements. Warnings about not exported elements (for example, diagrams, behavioral elements, or other) are displayed after the validation process is completed.

The vallidation process does not preclude the model from being exported. Unsuitable elements are simply skipped.

You can choose whether to run the validation or not before exporting the model (see the procedure "To export a project to a MOF file" on page 130).

Importing projects from MOF files

To import a project from a MOF file

1. From the main menu, select **File** > **Import From** > **MOF XMI File**.
2. In the opened dialog, select the EMOF or CMOF file you want to import and click **Open**. The file is imported as a separate project.

Ecore Support

The Ecore model is a model type supported by Eclipse Modeling Framework (EMF). This model type can be colloquially called the EMF model (even though EMF supports many types of models, e.g., the UML model).

The Ecore model can be used for various purposes. Several of them are as follows:

- Metamodeling purposes, where its expressive power is roughly similar to EMOF (and even slightly higher than EMOF).
- Simple class modeling purposes, where the Ecore model is used as a subset of UML.

Ecore models, prepared with MagicDraw, can be exported as Ecore models for the further processing (generating model repositories, code or XML parsing and storing, etc.) with other EMF tools.

This section contains the following subsections:

- "Creating projects for Ecore modeling" on page 130.
- "Ecore modeling" on page 135.
- "Exporting projects to Ecore files" on page 143.
- "Importing projects from Ecore files" on page 147.

Creating projects for Ecore modeling

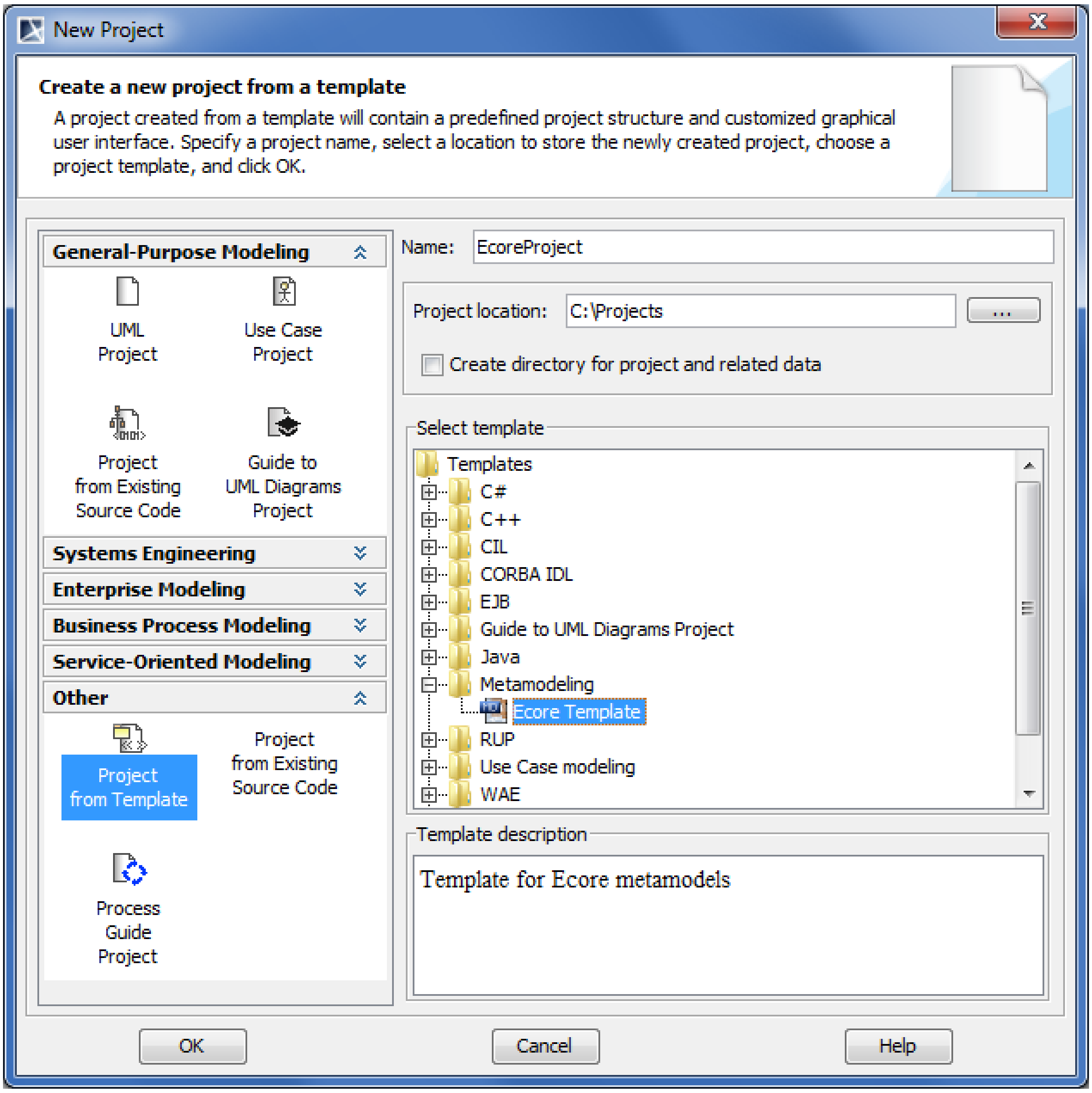
You can use the following ways to create a project for Ecore modeling:

- To create a new project from the Ecore template (page 132).
- To apply the Ecore profile to a project (page 133).
- To use the standard Ecore library in a project (page 134).

To create a new project from the Ecore template

1. From the main menu, select **File** > **New Project**. The **New Project** dialog opens.
2. In the **Other** domain, select **Project from Template**.
3. Type a project name.

4. Specify the project location.
5. Under **Select Template**, expand **Metamodeling** and then select **Ecore Template**.
6. Click **OK** when you are done.


New Project

Create a new project from a template

A project created from a template will contain a predefined project structure and customized graphical user interface. Specify a project name, select a location to store the newly created project, choose a project template, and click OK.

Name: EcoreProject

Project location: C:\Projects

Create directory for project and related data

Select template: Templates > Metamodeling > Ecore Template

Template description: Template for Ecore metamodels

Figure 62 -- Creating project from Ecore template

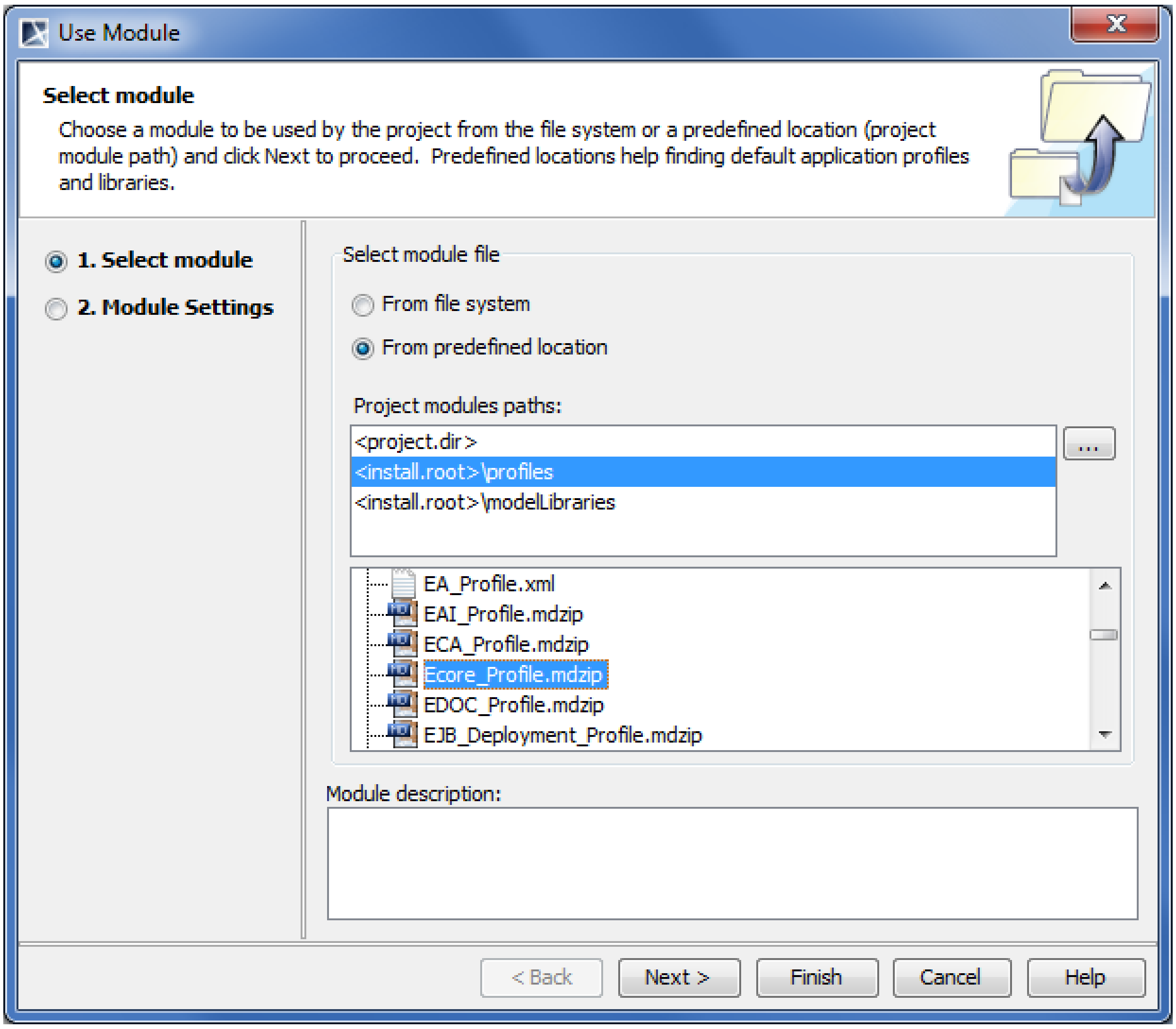
For more information about creating a project from a template refer to the procedure "To create a new project from a specified template" on page 101.

To apply the Ecore profile to a project

NOTE The Ecore profile can be applied only to existing UML or CMOF / EMOF projects.

1. From the main menu, select **File** > **Use Module**. The **Use Module** wizard opens.
2. Under **Select module file**, click **From predefined location**. The **Project modules paths** list appears.
3. Select **<install root>\profiles\**. The content of the <install root>\profiles folder is listed bellow.
4. Select **Ecore_Profile.xml** in the list.

5. Click **Next**, if you want to change module usage settings.
6. Click **Finish**.



Use Module

Select module

Choose a module to be used by the project from the file system or a predefined location (project module path) and click Next to proceed. Predefined locations help finding default application profiles and libraries.

1. Select module
2. Module Settings

Select module file

From file system [✓ From predefined location]

Project modules paths:

<project.dir>
<install.root>\profiles
<install.root>\modelLibraries

EA_Profile.xml
EAI_Profile.mdzip
ECA_Profile.mdzip
Ecore_Profile.mdzip
EDOC_Profile.mdzip
EJB_Deployment_Profile.mdzip

Module description:

Figure 63 -- Selecting Ecore profile

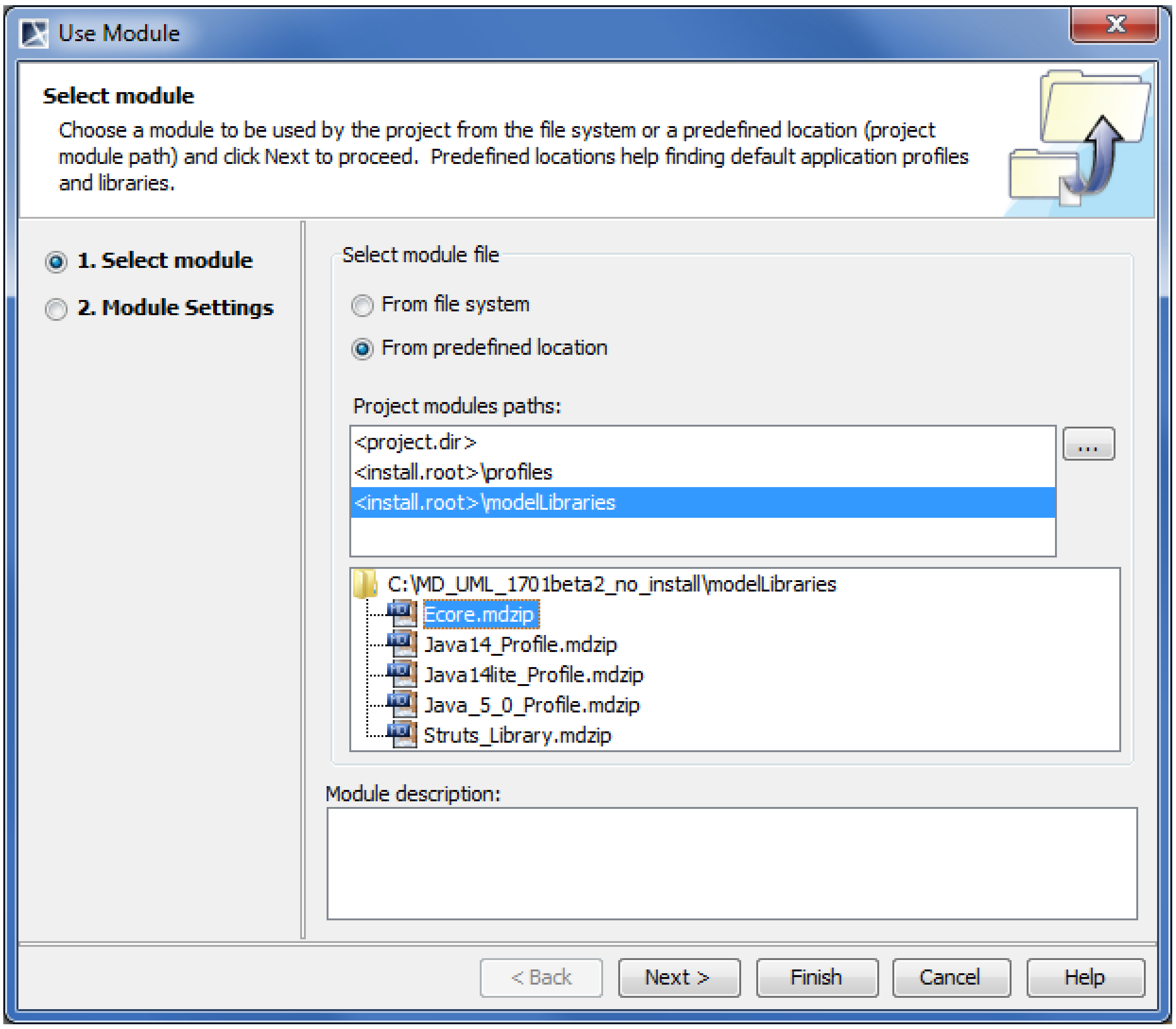
For more information about the **Use Module** wizard refer to Section "The Use Module wizard" on page 121.

If your Ecore model references some standard Ecore elements (such as standard data types (for example, EShort) or standard metaclasses (for example, EStructuralFeature), you need to use the standard Ecore library in your project.

To use the standard Ecore library in a project

1. From the main menu, select **File** > **Use Module**.The **Use Module** wizard opens.
2. Under **Select module file**, click **From predefined location**. The **Project modules paths** list appears.
3. Select **<install root>\modelLibraries**. The content of the <install root>\modelLibraries folder is listed bellow.
4. Select **Ecore.mdzip** in the list.
5. Click **Next**, if you want to change module settings.

6. Click **Finish**.



Choose a module to be used by the project from the file system or a predefined location (project module path) and click Next to proceed. Predefined locations help finding default application profiles and libraries.

Select module file

From file system [✓ From predefined location]

Project modules paths:

<project.dir>
<install.root>\profiles
<install.root>\modelLibraries

C:\MD_UML_1701beta2_no_install\modelLibraries
- Ecore.mdzip
- Java14_Profile.mdzip
- Java14lite_Profile.mdzip
- Java_5_0_Profile.mdzip
- Struts_Library.mdzip

Module description:

Figure 64 -- Selecting Ecore library

For more information about the **Use Module** wizard refer to Section "The Use Module wizard" on page 121.

Ecore modeling

Learn about Ecore modeling in the following subsections:

- "Diagrams and elements in Ecore models" on page 135.
- "Element properties in Ecore models" on page 137.
- "Annotation modeling" on page 139.

Diagrams and elements in Ecore models

There are no specific diagrams for editing Ecore models in MagicDraw. You can use the same Class diagrams as you use for your UML models. Since Ecore is almost a subset of UML (with a few additions), familiar UML elements are used for the modeling. You can also develop Ecore models without using the Ecore profile at all. If your Ecore model uses only UML-specific information, you can develop it using plain UML and export it to Ecore without any problem.

Ecore is even more similar to EMOF. You can export the same model to both Ecore and EMOF.

Class, DataType, Enumeration, Package, Operation, Parameter have a direct one-to-one correspondence between UML and Ecore.

Ecore has two flavors of structural features, EAttribute and EReference, while UML has just one - Property. Fortunately a differentiation between an attribute and a reference is unambiguous and automatically resolved: the property, whose type is a data type is treated as EAttribute; the property, whose type is a class is treated as EReference. Hence the user does not need to worry about this - he/she can simply use properties.

There are no standalone Association and Generalization model elements in Ecore, but there is analogous information in Ecore: two EReferences, pointing to each other by their **opposite** property is equivalent to the association; the EClass::**eSuperTypes** property is equivalent to a generalization. Hence it is possible and meaningful to draw associations and generalizations in your model for exporting this information to Ecore.

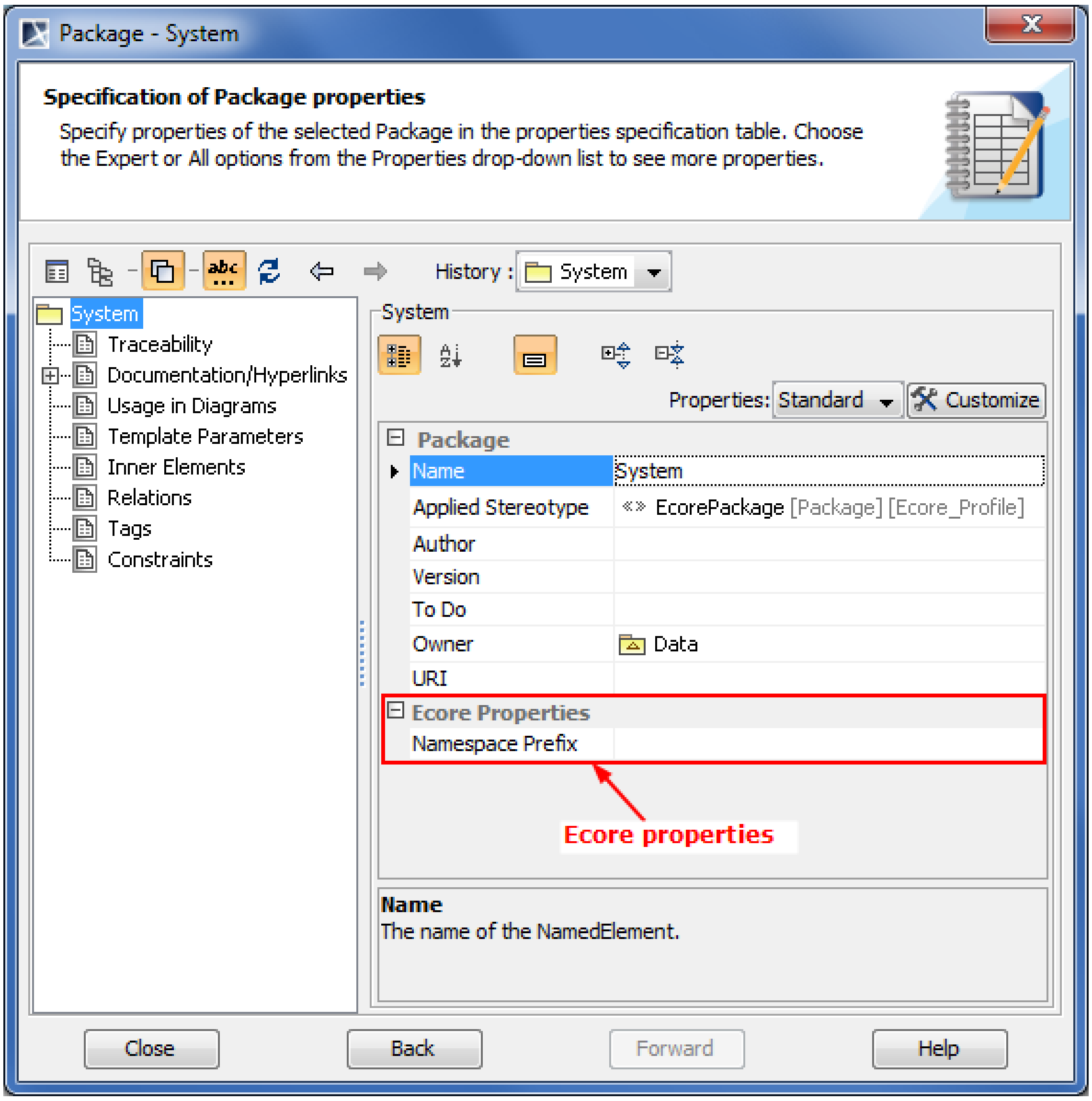
Ecore generics (templates) are also supported. You can use the UML template support to model Ecore generics. While the modeling is not trivial (and not one-to-one due to weak semantics of Ecore's EGenericType), it is possible to model all cases of template types, even ones with complexly nested type bounds like, for example, **SortedList<T extends Comparable<? super T>>**.

Your models can also contain any other UML elements, which are not present in Ecore. These elements are simply skipped during the export to Ecore. A warning is given about these elements (see "Exported data type mappings" on page 145).

Element properties in Ecore models

There are few Ecore-specific properties, which are brought in when the Ecore profile is used. These properties are used to capture Ecore specific information, not existing in UML. MOF-specific properties are also relevant for Ecore. These special properties are as follows:

- The Ecore package has the additional properties: nsPrefix (**Namespace Prefix**) and nsURI (**NEW!** corresponds to the **URI** property specified in the UML v2.4).



Package - System

Specification of Package properties

Specify properties of the selected Package in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : System

System
- Traceability
- Documentation/Hyperlinks
- Usage in Diagrams
- Template Parameters
- Inner Elements
- Relations
- Tags
- Constraints

System

Properties: Standard | Customize

Package	
Name	System
Applied Stereotype	«» EcorePackage [Package] [Ecore_Profile]
Author	
Version	
To Do	
Owner	Data
URI	
Ecore Properties	
Namespace Prefix	

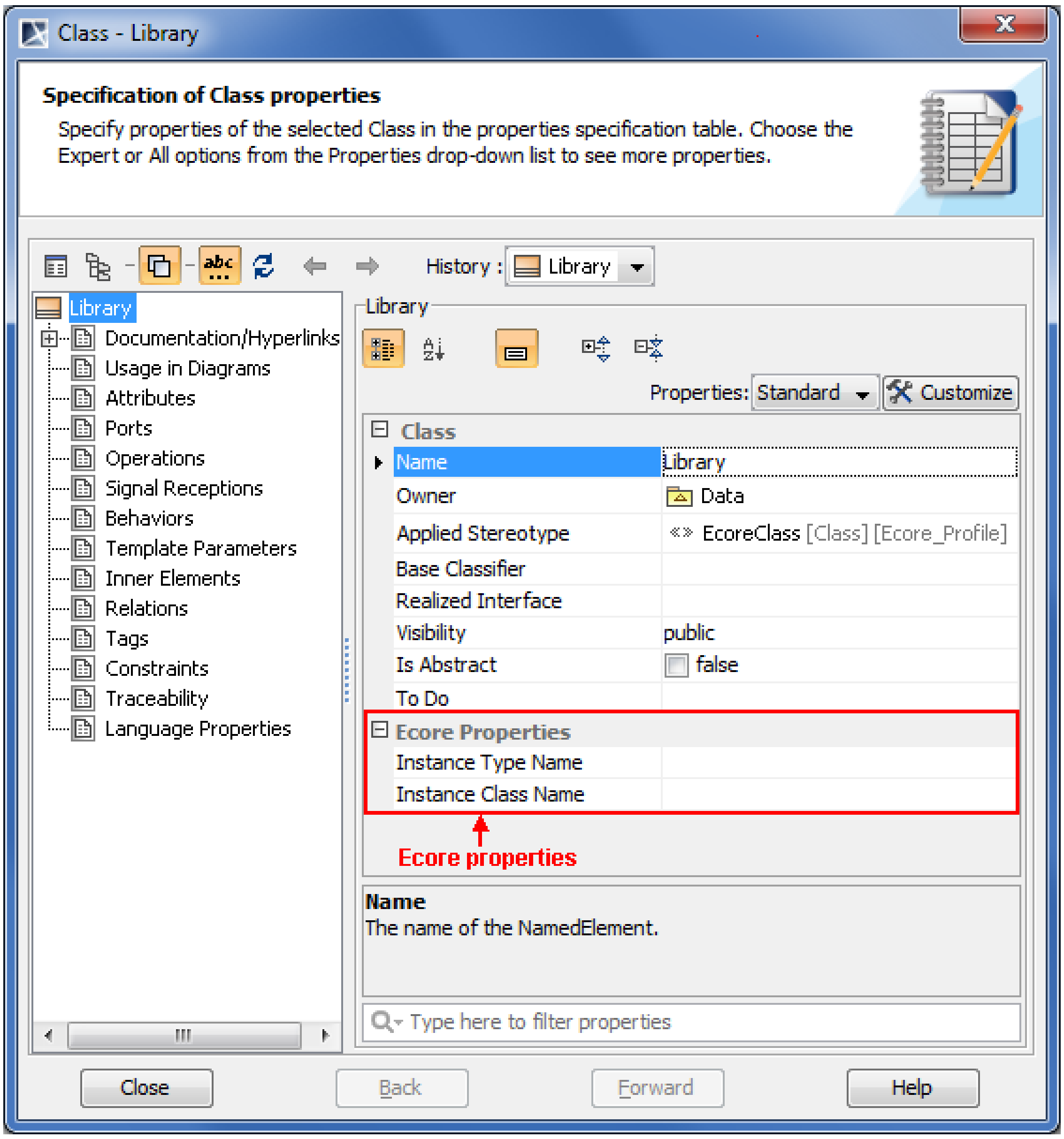
Ecore properties

Name
The name of the NamedElement.

Figure 65 -- Additional properties of Ecore package

- The Ecore classifier (class, data type, enumeration) has the additional properties:

instanceClassName (**Instance Class Name**) and instanceTypeName (**Instance Type Name**).


Class - Library

Specification of Class properties

Specify properties of the selected Class in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Library

Library
- Documentation/Hyperlinks
- Usage in Diagrams
- Attributes
- Ports
- Operations
- Signal Receptions
- Behaviors
- Template Parameters
- Inner Elements
- Relations
- Tags
- Constraints
- Traceability
- Language Properties

Library

Properties: Standard | Customize

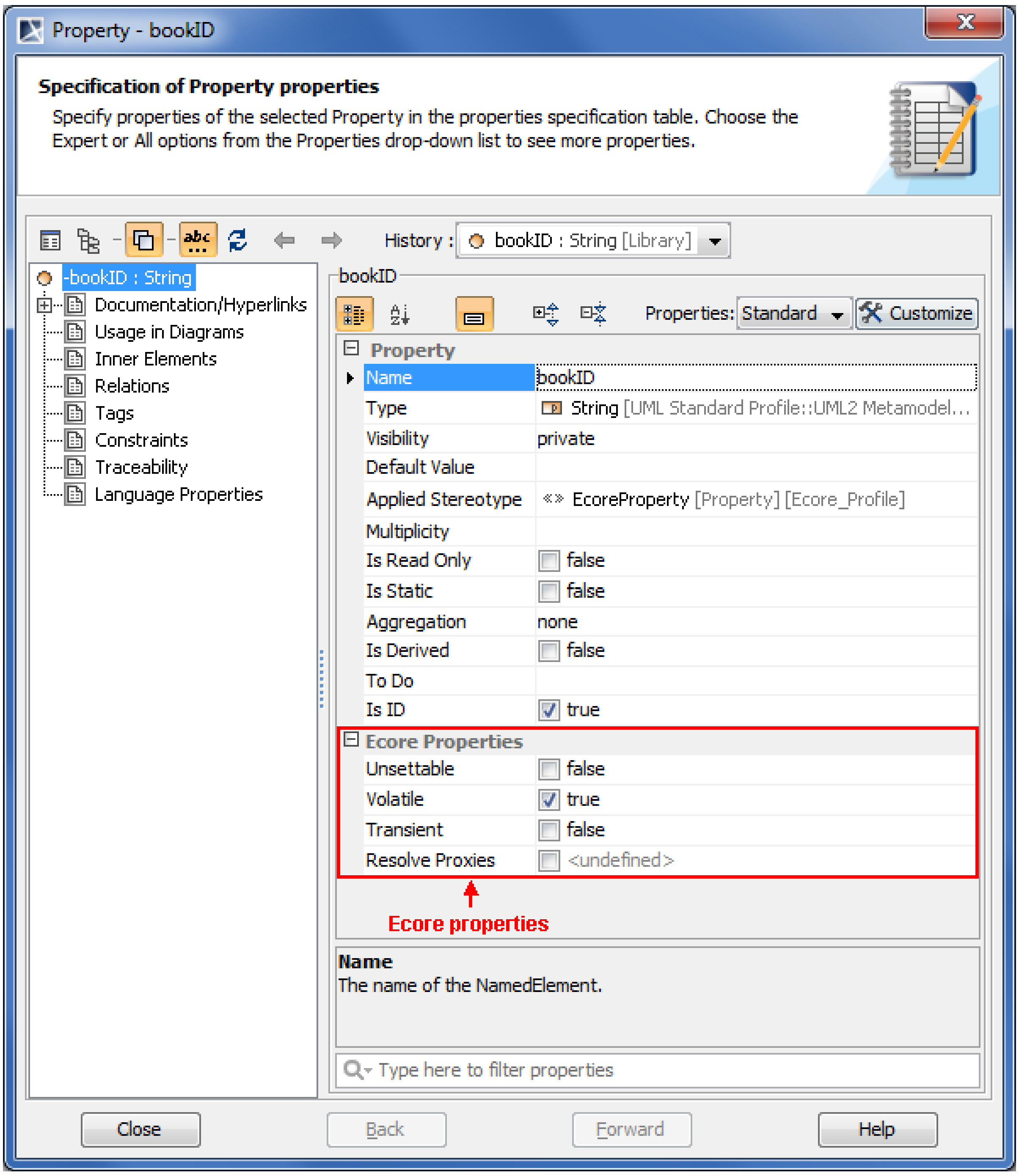
Class	
Name	Library
Owner	Data
Applied Stereotype	«» EcoreClass [Class] [Ecore_Profile]
Base Classifier	
Realized Interface	
Visibility	public
Is Abstract	false
To Do	
Ecore Properties	
Instance Type Name	
Instance Class Name	

Name
The name of the NamedElement.

Figure 66 -- Additional properties of Ecore classifier

- Ecore attributes and references (modeled as the UML property) have the additional properties: volatile (**Volatile**), transient (**Transient**), unsettable (**Unsettable**), and resolveProxies (**Resolve**

Proxies, used for references only).


Property - bookID

Specification of Property properties

Specify properties of the selected Property in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : bookID : String [Library]

-bookID : String
- Documentation/Hyperlinks
- Usage in Diagrams
- Inner Elements
- Relations
- Tags
- Constraints
- Traceability
- Language Properties

bookID

Properties: Standard — Customize

Property	
Name	bookID
Type	String [UML Standard Profile::UML2 Metamodel...
Visibility	private
Default Value	
Applied Stereotype	«» EcoreProperty [Property] [Ecore_Profile]
Multiplicity	
Is Read Only	false
Is Static	false
Aggregation	none
Is Derived	false
To Do	
Is ID	✓ true
Ecore Properties	
Unsettable	false
Volatile	✓ true
Transient	false
Resolve Proxies	<undefined>

Name
The name of the NamedElement.

Type here to filter properties

Figure 67 -- Additional properties of Ecore attribute

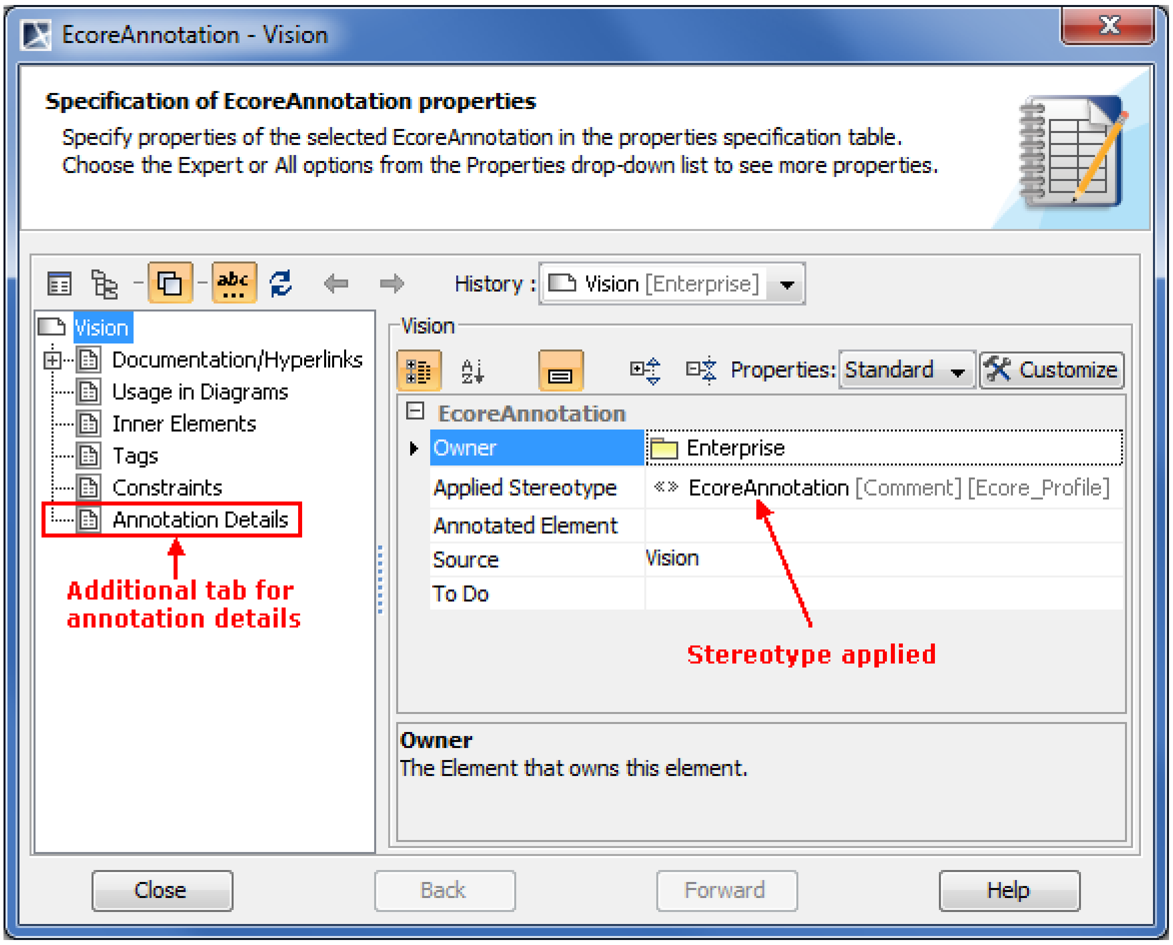
Annotation modeling

Ecore annotations are modeled as UML comments. For simple annotations no additional actions are necessary.

However Ecore annotations have more powerful semantic than UML comments - they can have an internal substructure. In particular they can have an additional key-value map. For this additional information, there is a special «EcoreAnnotation» stereotype, that can be applied on an annotating comment. After applying the stereotype, the key-value map can be entered in a separate node of the annotating comment Specification window. Key-value pairs are stored as internal subcomment elements of the annotation.

To create an Ecore annotation

1. In the Ecore model, create a Comment element.
2. Apply the «EcoreAnnotation» stereotype to the element. For the instructions how to apply a stereotype refer to "Applying a stereotype" on page 629.


EcoreAnnotation - Vision

Specification of EcoreAnnotation properties

Specify properties of the selected EcoreAnnotation in the properties specification table.
Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Vision [Enterprise]

Vision
- Documentation/Hyperlinks
- Usage in Diagrams
- Inner Elements
- Tags
- Constraints
- Annotation Details

Properties: Standard

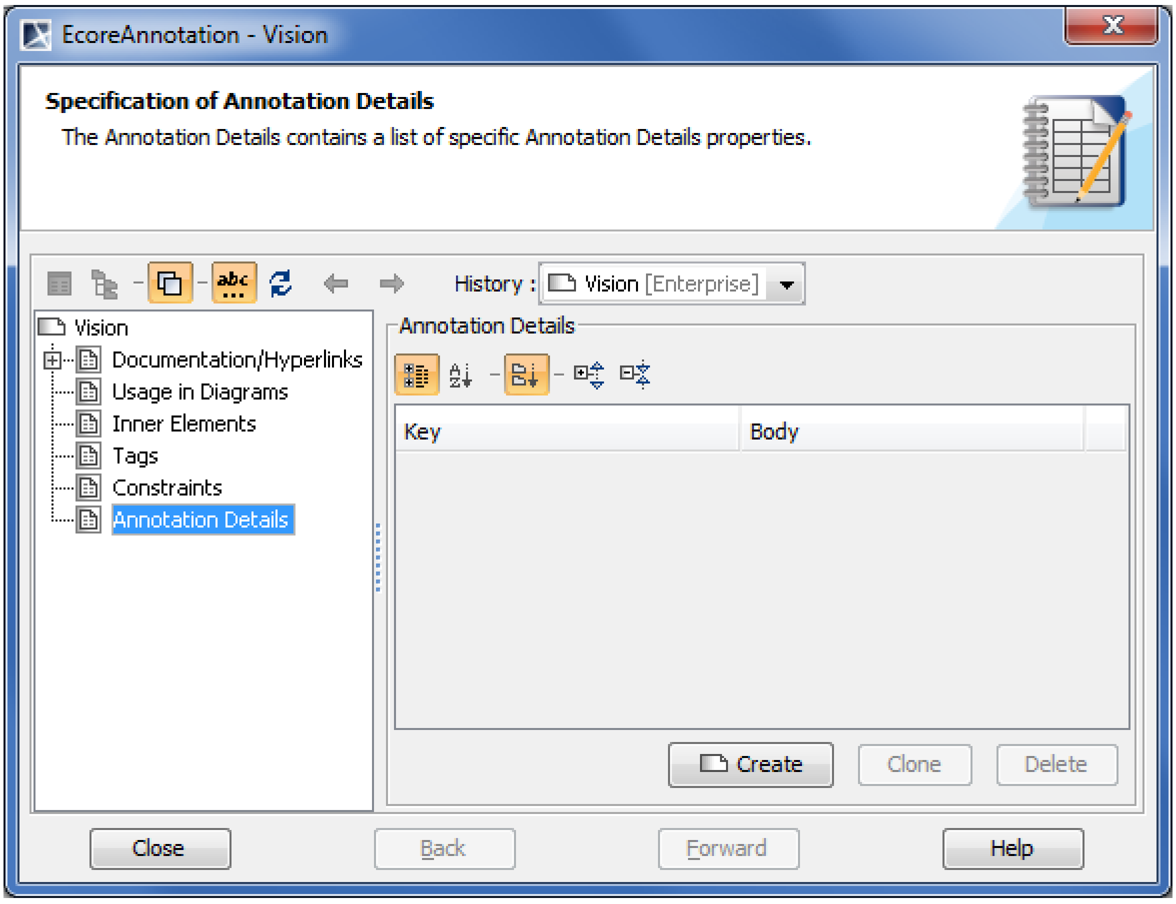
EcoreAnnotation	
Owner	Enterprise
Applied Stereotype	EcoreAnnotation [Comment] [Ecore_Profile]
Annotated Element	
Source	Vision
To Do	

Owner
The Element that owns this element.

Figure 68 -- Ecore annotation's Specification window

To create a key-value pair

1. In the Ecore anontation’s Specification window, select the **Annotation Details** tab.


EcoreAnnotation - Vision

Specification of Annotation Details

The Annotation Details contains a list of specific Annotation Details properties.

History : Vision [Enterprise]

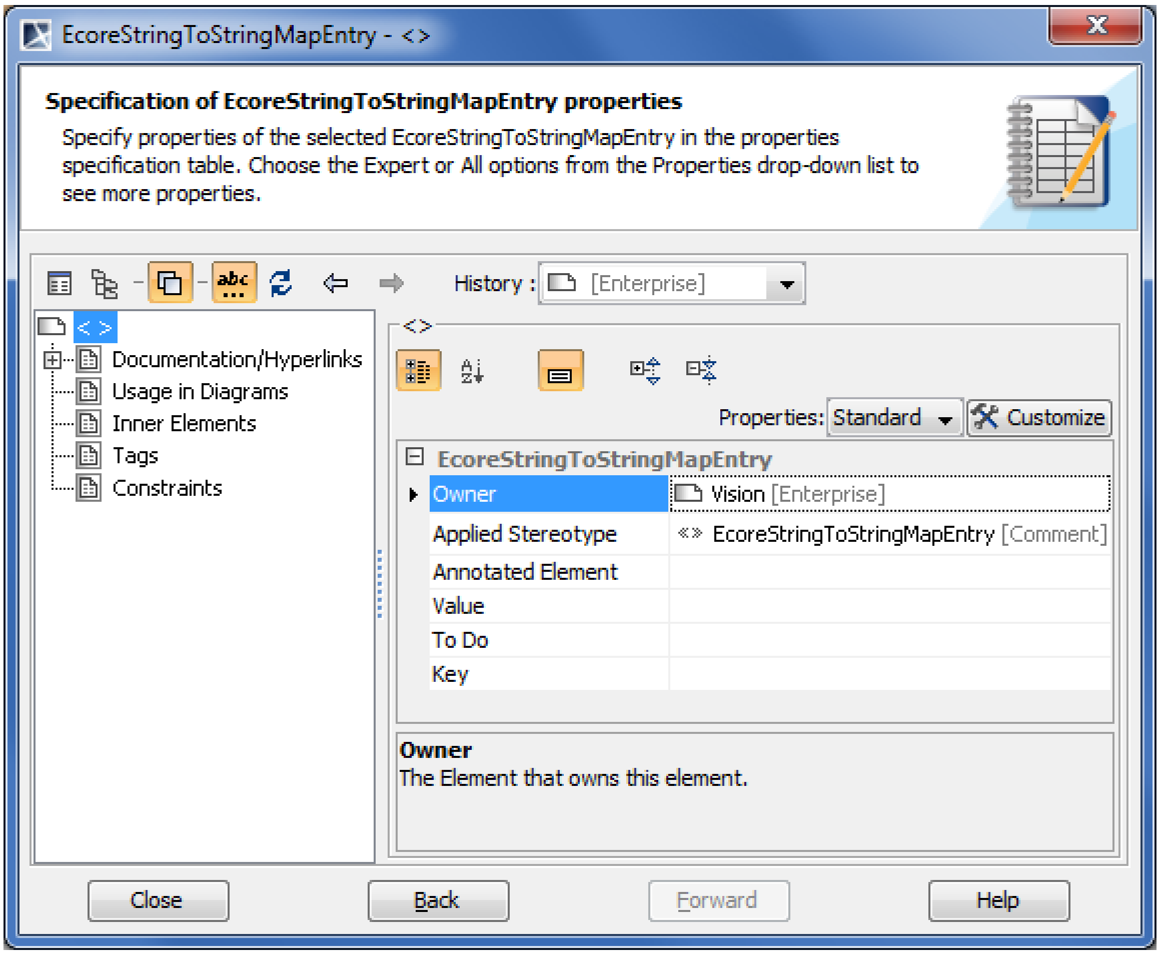
- Vision
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Inner Elements
  - Tags
  - Constraints
  - Annotation Details

Annotation Details

Key	Body

Figure 69 -- Annotation Details tab in Ecore annotation’s Specification window

2. Click the **Create** button. The key-value pair's Specification window opens.


EcoreStringToStringMapEntry - <>

Specification of EcoreStringToStringMapEntry properties

Specify properties of the selected EcoreStringToStringMapEntry in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : [Enterprise]

< >
- Documentation/Hyperlinks
- Usage in Diagrams
- Inner Elements
- Tags
- Constraints

<>

Properties: Standard | Customize

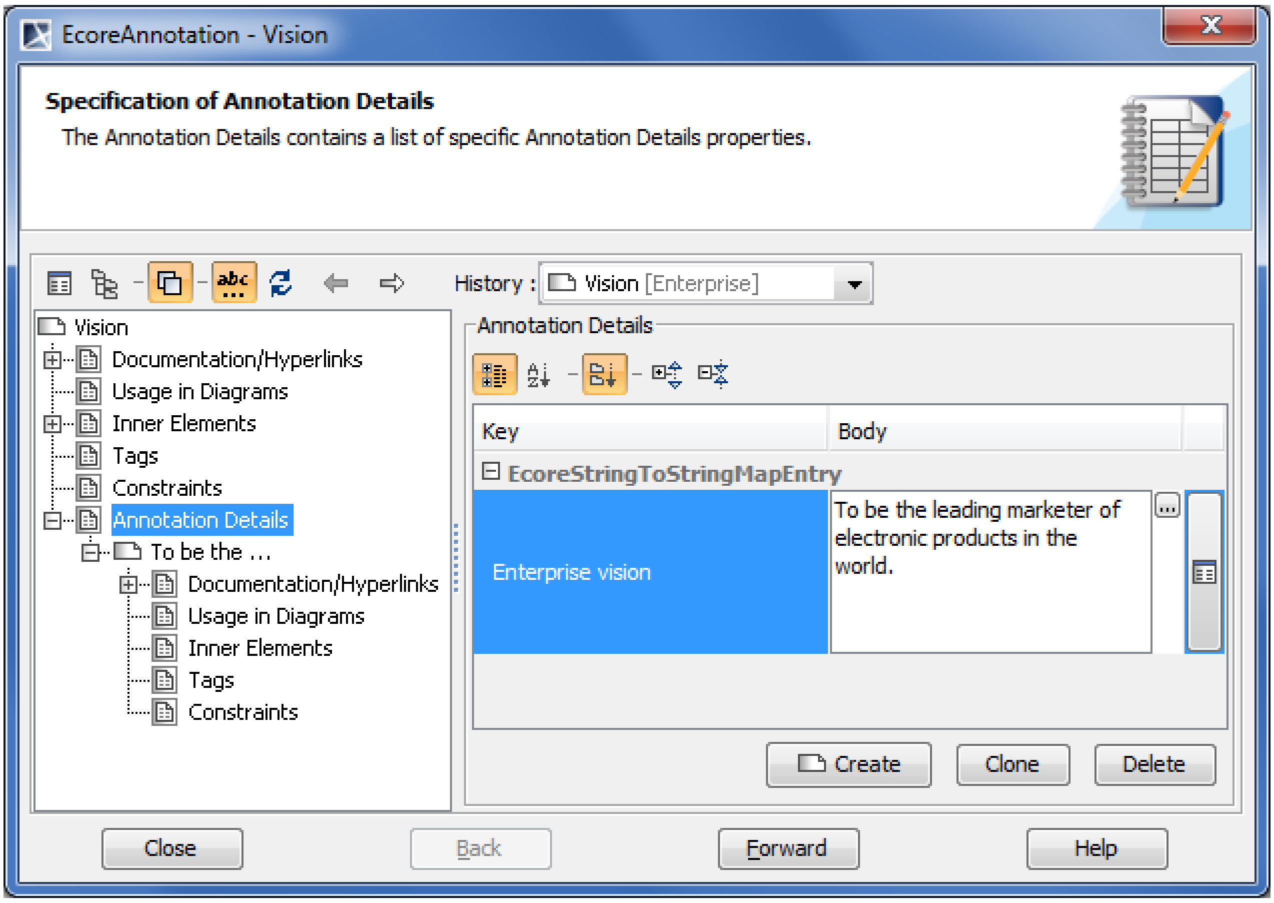
EcoreStringToStringMapEntry	
Owner	Vision [Enterprise]
Applied Stereotype	«» EcoreStringToStringMapEntry [Comment]
Annotated Element	
Value	
To Do	
Key	

Owner
The Element that owns this element.

Figure 70 -- Kay-value pair's Specification window

3. Enter values for both the **Value** and **Key** properties.

4. Click the **Back** button when you are done. You will see the key-value pair created.


EcoreAnnotation - Vision

Specification of Annotation Details

The Annotation Details contains a list of specific Annotation Details properties.

History : Vision [Enterprise]

Vision
- Documentation/Hyperlinks
- Usage in Diagrams
- Inner Elements
- Tags
- Constraints
- Annotation Details
  - To be the ...
    - Documentation/Hyperlinks
    - Usage in Diagrams
    - Inner Elements
    - Tags
    - Constraints

Annotation Details

Key	Body
EcoreStringToStringMapEntry	
Enterprise vision	To be the leading marketer of electronic products in the world.

Figure 71 -- Key-Value pair created

Exporting projects to Ecore files

The Ecore model exporting is very similar to the EMOF / CMOF model exporting. After the Ecore model is created, you can export either the whole project or selected packages to an .ecore file.

This section contains the following subsections:

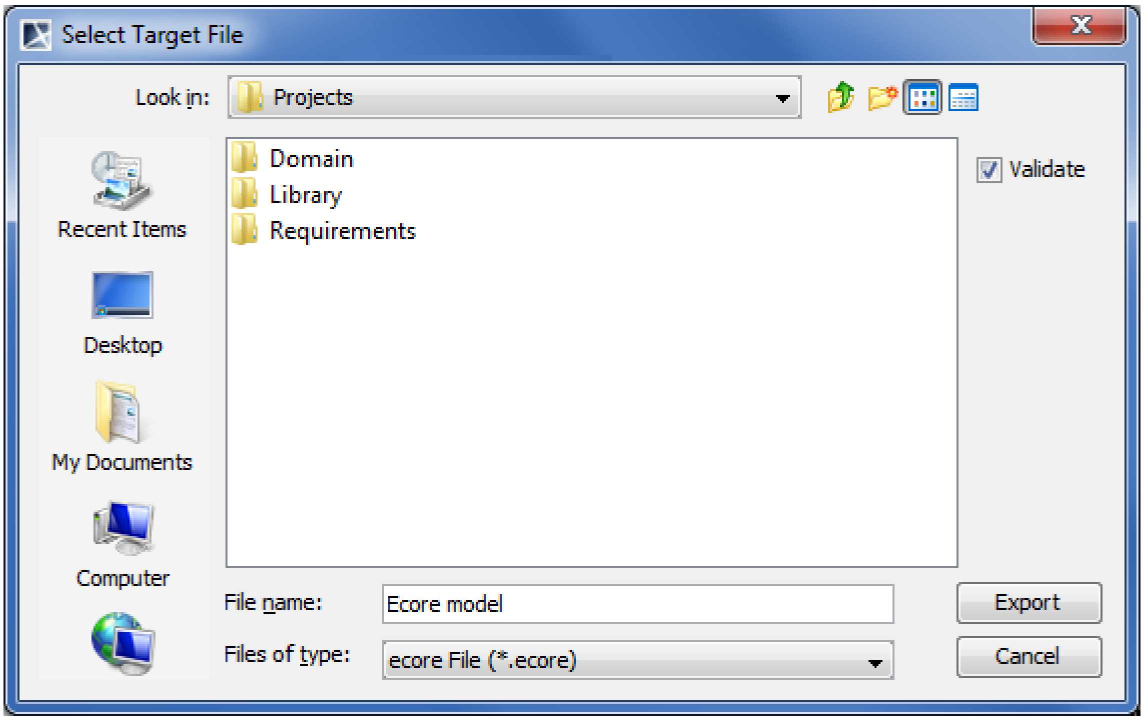
- "Exporting simple projects" on page 143.
- "Exporting project with modules" on page 145.
- "Exported data type mappings" on page 145.
- "Ecore elements validation" on page 146.

Exporting simple projects

To export a project to an Ecore file

1. From the main menu, select **File** > **Export To** > **EMF Ecore File** > **Ecore Whole Model**. The **Select Target File** dialog opens (see the following figure).
2. Type a file name and select a location for the exported model.
3. Click to select or to clear the **Validate** check box. For more information about validating refer to "Ecore elements validation" on page 146.

4. Click the **Export** button when you are finished.



File name: Ecore model

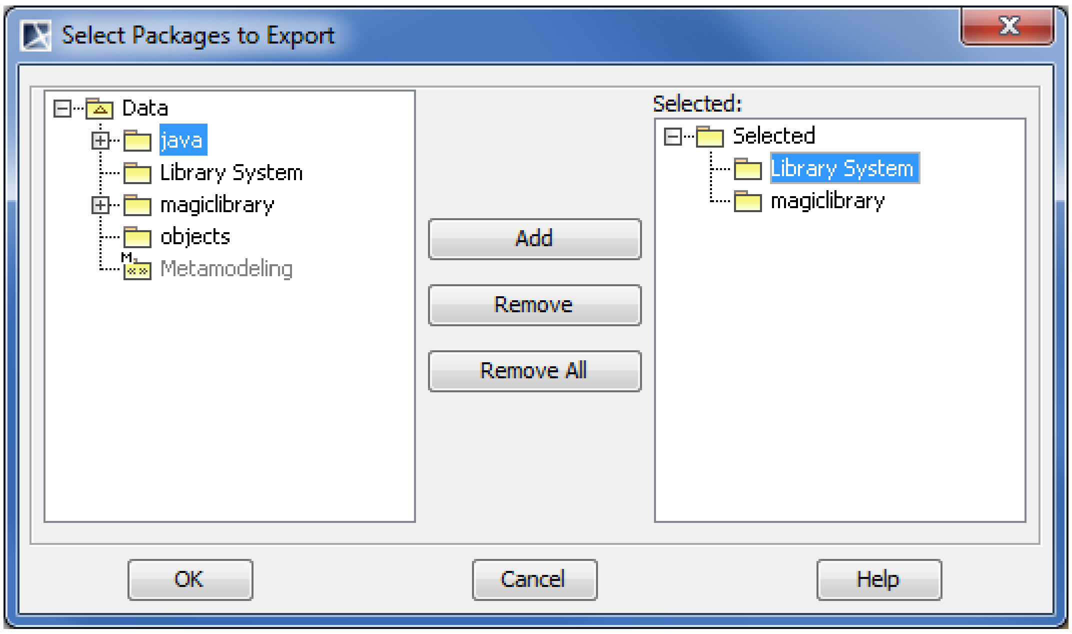
Files of type: ecore File (*.ecore)

☑ Validate

Figure 72 -- Select Target File dialog. Exporting project to Ecore file

To export selected packages to Ecore file

1. From the main menu, select **File** > **Export To** > **EMF Ecore File** > **Ecore Selection**.
2. In the **Select Packages to Export** dialog, select packages you want to export and click **OK** when you are done.



3. Perform the procedure "To export a project to an Ecore file" starting from the step #2.

Exporting project with modules

DEFINITION	A MagicDraw project that has its content shared to be used in any other MagicDraw project is refered as a *module*.

It is important to notice that any modules used by MagicDraw project are not exported together with the project on its export to an Ecore file. Only references to modules are exported. Therefore the output of the project export is an Ecore file (model) containing the direct content of the MagicDraw project and referencing to other Ecore files (modules) that are used in the MagicDraw project. For referencing to modules, i.e., other Ecore files, Ecore references are used.

Each module used by the project must be exported to an Ecore file individually. For this you have to open each module as a project and then export it to an Ecore file (see "Exporting projects to Ecore files" on page 143).

It is strongly recommended to read the following paragraph before your very first attempt to export a MagicDraw project that uses modules. Getting familiar with this information may help you to escape a serious problem that arises because of the nature of Ecore references.

Ecore references, crossing a resource boundary (when the element in one file references the element in another file), *are qualified-name-based, but not id-based* as in case of CMOF, EMOF, or UML. Hence when exporting a project with references to elements in other projects (modules), the export tool must know the full path of elements in the module's Ecore file. This information cannot be determined from UML model without additional information. For this the following approach is adopted:

1. **Save the module after the export.** After a project is exported to an Ecore file, the qualified names (paths) of the shared elements are recorded in special stereotypes («EcoreExportServiceInformation») / tags (ecoreExportPath) of the project's shared packages. The side effect is that the project is modified during the export. To preserve this information for later usage, you need to save the project after the export.
2. **Export modules before exporting the main project.** When a project that references to elements in one or more modules is exported to an Ecore file, the export tool needs to know these elements' paths, saved on the appropriate module export to Ecore. If this information is missing (e.g., in case the project is being exported before modules are exported), the export tool tries to guess the correct path of each element in the module and gives warnings about this. That is why modules should be exported to Ecore before exporting the main project that uses these modules.

Exported data type mappings

Standard UML data types are exported as standard Ecore data types. The following table shows which Ecore data type corresponds to which UML data type.

UML data type	**Ecore data type**
String	EString
Boolean	EBoolean
Integer	EInt
UnlimitedNatural	EInt
NEW! Real	EReal

Standard data types from the MagicDraw profile are exported as Ecore types. The following table shows which Ecore data type corresponds which UML data type.

Data types in MagicDraw profile	**Ecore data type**
boolean	EBoolean
byte	EByte
char	EChar
date	EDate
double	EDouble
float	EFloat
int	EInt
NEW! real	EReal
long	ELong
short	EShort

IMPORTANT!	The void data type is exported as an absence of the type.

References to Ecore model elements (standard datatypes like EInt, metaclasses like EStructuralFeature), defined in the standard Ecore library are exported as standardized Ecore references to Ecore metamodel elements (the resource identifier part of the Href is *http://www.eclipse.org/emf/2002/Ecore*).

Ecore elements validation

MagicDraw provides a validation suite for validating a model that is being exported to an Ecore file. This suite contain batches of rules to check exported elements. Warnings about not exported elements (for example, diagrams, behavioral elements, or other) are displayed after the validation process is completed.

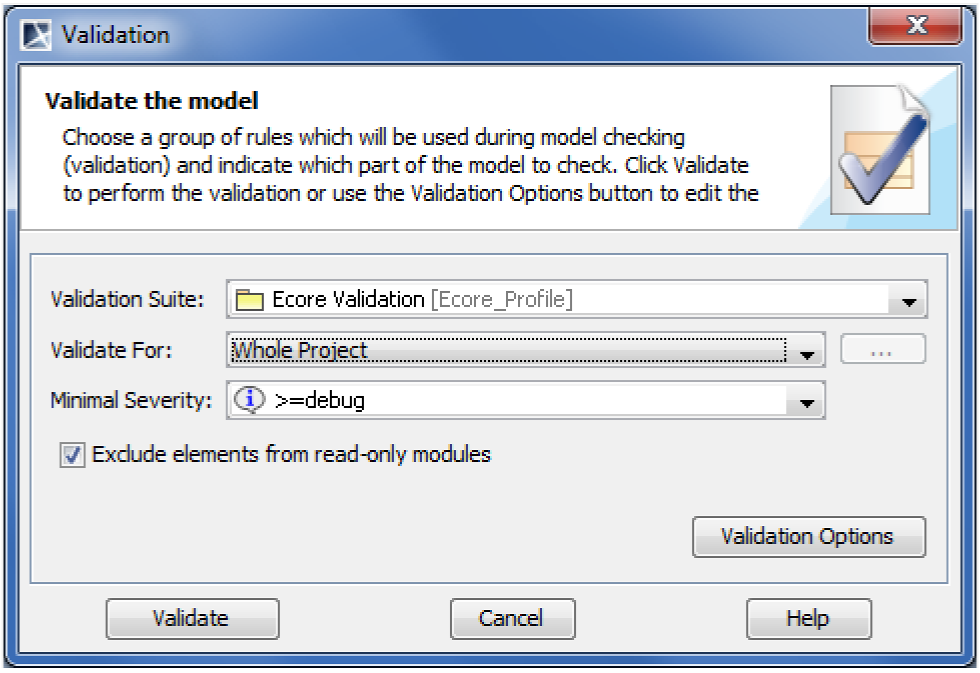
The vallidation process does not preclude the model from being exported. Unsuitable elements are simply skipped.

You can run the Ecore validation on a model (project or module) export to Ecore. All UML elements that are not suitable for the Ecore, will be highlighted.

You can also run this validation suite at any time while you are developing an Ecore model.

To run the Ecore validation

1. From the main menu, select **Analyze** > **Validation** > **Validate**. The **Validation** dialog opens.



Choose a group of rules which will be used during model checking (validation) and indicate which part of the model to check. Click Validate to perform the validation or use the Validation Options button to edit the

Validation Suite: Ecore Validation [Ecore_Profile]

Validate For: Whole Project

Minimal Severity: >=debug

☑ Exclude elements from read-only modules

Figure 73 -- Validation dialog

2. In the **Validation Suite** drop-down list, select **Ecore Validation**.
3. In the **Validate For** drop-down list, select the scope of the validation.
4. In the **Minimal Severity** drop-down list, select the level of severity.
5. Click **Validate**.

Importing projects from Ecore files

There is no possibility to import Ecore files directly. Ecore files could be imported using the EMOF import feature.

To import an Ecore file

1. In the Eclipse environment, open the *.ecore file and save it as *.emof.
2. Use the procedure "To import a project from a MOF file" on page 132.

IMPORTANT! This indirect way looses some Ecore-specific model details that are not existent in EMOF.

Working with Standard Profiles

Standard Profiles as System Resources

All profiles and libraries, which are bundled with MagicDraw family products are considered as standard/system resources, which are non-modifiable and are essential for the correct tool behavior.

We highly recommend not to modify our provided standard profiles and libraries as it could cause problems on version updates, plugins, core MagicDraw tool malfunctions, and model corruptions.

Users will be warned on any intentional or unintentional attempt to modify profiles in the following ways:

- Open a profile as a project.
- Use a module in the read-write mode.
- Import a module into a project.
- Merge projects.
- Any other cases.

Plugin and Profile Versions

Standard profiles are usually upgraded to support newest versions of the specification of standards they represent (for example, SysML 1.2 or UML 2.4) in the every MagicDraw release cycle. The MagicDraw application, the plugins code, and the behavior are modified accordingly to reflect these changes.

There is a very high probability that the new version of MagicDraw or plugins can not work with older or newer profile versions and may cause an unpredictable behavior or even model distortions. For example, MagicDraw SysML 16.5 requires to use SysML Profile of the version 16.5, as it could malfunction when using SysML Profile from the version 16.0 or 16.6.

To protect the user from such cases, every MagicDraw project starting from the version 16.6 knows which profiles or plugins versions were used to create it and are required to load data correctly.

Every standard profile has the version number. Normally it is the same as the MagicDraw (or a plugin) release version number.

MagicDraw requires to use the corresponding version of the profile with the corresponding software version. You will get a warning, if your used plugins or profiles are obsolete or you miss some plugins or profiles .

Resource Manager with selected missing resources will be launched automatically, so you will be able to install missing plugins/profiles in few clicks.

If new versions of plugins are not purchased or you simply do not want to install it, but need to take a look at the project content, warnings may be ignored and the project may be loaded. In this case, proxy elements for missing profile elements will be created to retain missing references. Missing custom diagrams will be loaded as regular UML diagrams or will be restricted for a review. Do not save such project! Use it for the preview only.

Old projects will be loaded/converted without any warnings, if you have newest versions of corresponding plugins and profiles as MagicDraw is always backward compatible.

Standard Profiles in Teamwork Server

Standard / system profiles and modules are not added into Teamwork Server, because every user has recent versions installed locally. As profiles/modules are non-modifiable, the version control is not needed. It solves multiple profiles usage / modification / update issues in the teamwork and at the same time increases the teamwork performance, as standard profiles will not be transferred via networks.

Information about an updating UML Standard Profile due to the migration to UML 2 is presented in the Teamwork Server readme file. You can find this file in the <*MagicDraw Teamwork Server installation directory*> folder.

5 DIAGRAMMING

This chapter offers an overview of working with diagrams and symbols. In general, the topics discussed apply to all supported diagram types.

When working with diagrams it is helpful to keep in mind the following concepts:

- A **shape** refers to a notation of a model element, such as a package, class, state, use case, object, etc.
- A **path** refers to the notation for the various kinds of relationships such as associations, aggregations, dependency, message, and links.
- Both paths and shapes are defined as **symbols**.

In the "Diagramming" chapter, you will find the following sections:

Working with Diagrams

View Online Demo	MagicDraw Basics

Diagram Basics

To create a new diagram

- <u>From the toolbar</u>:
  Click the desired diagram button on the **Diagrams**, **Analysis Diagrams** or **Other Diagrams** toolbar. The **Create Diagram** dialog opens. Type the name of the diagram and select or create a package where you wish to create your diagram.
- <u>From the **Diagrams** menu</u>:
  On the main menu point to **Diagrams** and then select the desired diagram. The corresponding

Diagrams dialog opens. Click **Add**. The **Create Diagram** dialog box opens. Type the name of the diagram and select or create a package where you wish to create your diagram.

- From the Model Browser:
  Right-click the desired model element in which you would like to create a diagram and, from the shortcut menu, select **New Diagram**. Type the name for diagram directly in the Model Browser.
- From the model element's Specification window:
  Open the **Inner Elements** tab in the Package's, Profile's, Model's, or other element's Specification window. Click **Create**. On the shortcut menu point to **New Diagram** and then select the diagram type. Define the diagram name, enter documentation, define stereotypes, and add tagged values and/or constraints.
- Using a diagram creation wizard:
  On the main menu click **Diagrams** > **Diagram Wizards** and then select the appropriate wizard depending on what diagram you want to create. Wizards for creating a Class, Generic Table, Package Dependency, Package Overview, Hierarchy, Activity Decomposition Hierarchy, Realization, Sequence Diagram from Java Source, Content diagram are available.
- Using a diagram creation wizard (from the **Model Visualizer** dialog):
  On the main menu click **Analyze** > **Model Visualizer**. The **Model Visualizer** dialog with the list of available diagram creation wizards will open. Select one and click the **Start** button to open the appropriate diagram creation wizard.

NOTE You should create a diagram in a package, model, or profile.

To open a diagram

- From the Model Browser:
  Select **Open** from the diagram shortcut menu or double-click the diagram.
- From the **Diagrams** menu:
  On the main menu point to **Diagrams** and then select the desired to open diagram type. The corresponding **Diagrams** dialog opens. Select the diagram you want to open and click the **Open** button.
- From the Content Diagram (available in the Standard, Professional, Architect, and Enterprise editions), if the diagram is added to the table of contents or a shape of the diagram is drawn on the diagram pane.
- Double-click a model element, to which the diagram is assigned.

TIP 1! To load all diagrams that have been created in the project, from the **Diagrams** menu, select **Load All Diagrams**.

TIP 2! To open the list of diagrams that have been most recently closed, from the **View** menu, select **Recently Closed Diagrams** and double-click the diagram you want to open. The F12 key also activates this command.

TIP 3! In the **General** pane of the **Environment Options** dialog box, you can select a method for loading diagrams while opening a project. Three options are available:

- **Load all Diagrams** – loads all diagrams that exist in the project.
- **Load Only Open Diagrams** – loads only diagrams that were not closed in earlier usages of the project.
- **Do not Load Diagrams** – all diagrams are not loaded and closed after opening a project.

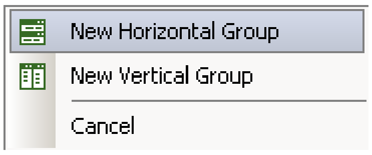
To close a diagram

- Click the **Close** button on the diagram pane or select **Close Diagram** from the diagram shortcut menu.

Define a diagram in its Specification window.

To split diagrams in new horizontal or vertical group

1. Select the open diagram tab and drag it to the diagram pane. The shortcut menu with commands appears.



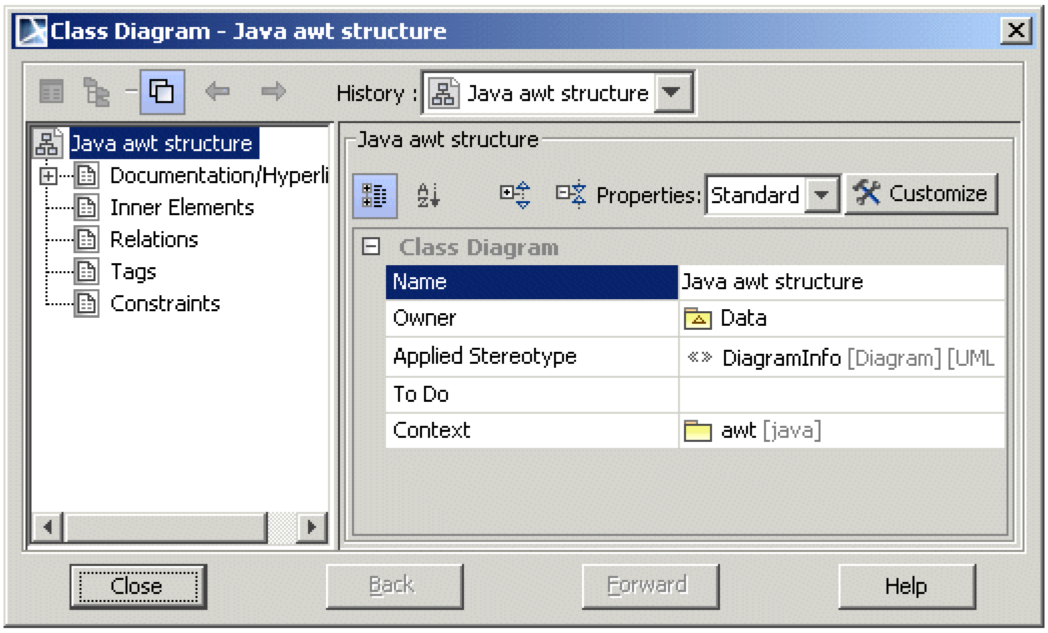
2. Select **New Horizontal Group** or **New Vertical Group** to split diagram pane and have more than one diagram opened at the same time.

Commands can be found in the diagram tab shortcut menu, when so many diagrams are opened that diagram tabs are filled in the toolbar line.

To show the diagram owner on the diagram tab

1. In the package, create diagram.
2. Select the open diagram tab and right-click to open the shortcut menu.
3. Select the **Show Owner** check box. The package name appears on the diagram tab.

Diagram Specification window


Class Diagram - Java awt structure

History : Java awt structure

Java awt structure
- Documentation/Hyperli
- Inner Elements
- Relations
- Tags
- Constraints

Java awt structure

Properties: Standard · Customize

Class Diagram

Name	Java awt structure
Owner	Data
Applied Stereotype	«» DiagramInfo [Diagram] [UML
To Do	
Context	awt [java]

Figure 74 -- Diagram Specification window

To rename a diagram

- Open the diagram Specification window and type a new diagram name.

To change the diagram context

- Open the diagram Specification window, select the **Context** property value, and click the "..." button. Then, the element Selection dialog appears. Select the new diagram context. More information about element Selection dialog, see Section "Selecting an Element" on page 279.

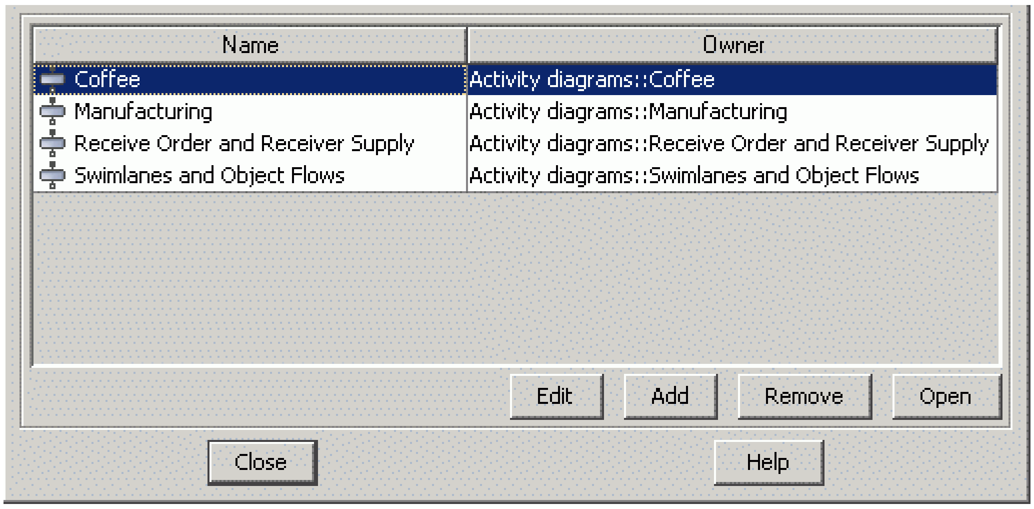
Diagrams Dialog

The **Diagrams** dialog is used for the following purposes:

- For viewing the owner of the diagram.
- For creating a new corresponding type of diagram.
- For editing the name and other characteristics of the diagram.
- For removing a diagram from the project.
- For opening a diagram.

To open the corresponding **Diagrams** dialog box

From the **Diagrams** menu, select one of the diagrams. Depending on the type of diagram, the dialog box that opens has a corresponding title.



Name	Owner
Coffee	Activity diagrams::Coffee
Manufacturing	Activity diagrams::Manufacturing
Receive Order and Receiver Supply	Activity diagrams::Receive Order and Receiver Supply
Swimlanes and Object Flows	Activity diagrams::Swimlanes and Object Flows

Figure 75 -- Diagrams dialog box

The **Diagrams** dialog box contains the following elements:

Element name	Function
Name	The names of all created corresponding diagrams in the open project.
Owner	The name of the package that owns the diagram.
Edit	The **Diagram Specification** dialog box opens. Type the diagram name, select a package, and click **OK**.
Add	Creates a new diagram. The **Create Diagram** dialog box opens. Type the diagram name, select a package, and click **OK**.
Remove	Deletes the selected diagram.
Open	Opens the selected diagram.
Close	Saves all actions performed during the session and exits the dialog box.
Help	Displays the MagicDraw Help.

Diagram Properties

Customize the diagram style (color, grid) in the **Diagram Properties** dialog.

To open the **Diagram Properties** dialog

- Select **Diagram Properties** from the diagram shortcut menu.
- On the **Edit** menu, point to **Symbol**, and then click **Diagram Properties**.
- Press SHIFT+ENTER.

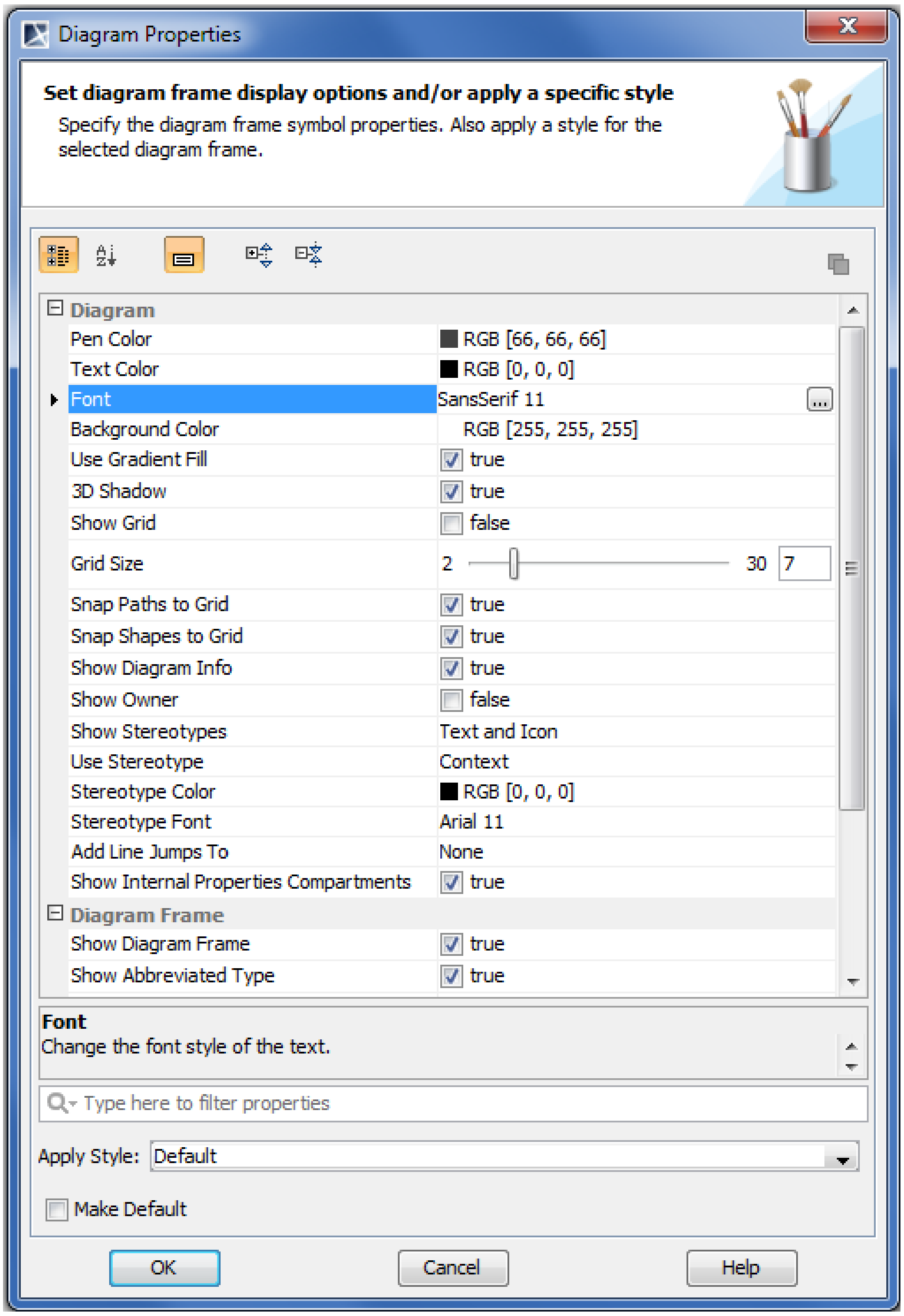


Diagram Properties

Set diagram frame display options and/or apply a specific style
Specify the diagram frame symbol properties. Also apply a style for the selected diagram frame.

Diagram	
Pen Color	■ RGB [66, 66, 66]
Text Color	■ RGB [0, 0, 0]
Font	SansSerif 11
Background Color	RGB [255, 255, 255]
Use Gradient Fill	✓ true
3D Shadow	✓ true
Show Grid	☐ false
Grid Size	2 — 30 7
Snap Paths to Grid	✓ true
Snap Shapes to Grid	✓ true
Show Diagram Info	✓ true
Show Owner	☐ false
Show Stereotypes	Text and Icon
Use Stereotype	Context
Stereotype Color	■ RGB [0, 0, 0]
Stereotype Font	Arial 11
Add Line Jumps To	None
Show Internal Properties Compartments	✓ true
Diagram Frame	
Show Diagram Frame	✓ true
Show Abbreviated Type	✓ true

Font
Change the font style of the text.

Type here to filter properties

Apply Style: Default

☐ Make Default

Figure 76 -- Diagram Properties dialog

The **Diagram Properties** dialog contains the following properties.

Property name	Description
Pen Color	Change the color of paths or diagram frame line.
Text Color	Change the text color of the diagram frame name.
Font	Change the font style of the text.
Background Color	Set the diagram background color. Click the "..." button. The **Color** dialog box opens. Set the color in one of three different ways: using **Swatches**, **HSB**, or **RGB** tabs.
Use Gradient Fill	Sets the gradient for the shapes fill color.
3D Shadow	Displays 3D shadow on symbols.
Show Grid	Shows the grid on the diagram pane.
Grid Size	Sets grid size from 2 to 30.
Snap Paths to Grid	Uses the grid on the diagram for drawing paths.
Snap Shapes to Grid	Uses the grid on the diagram for drawing shapes.
Show Message Numbers	Displays message numbers on the diagram. **NOTE:** This property is available only for the activity, communication, and sequence diagrams.
Use Advanced Numbering	Displays more detailed message numbering on the diagram. **NOTE:** This property is available only for the activity, communication, and sequence diagrams.
Show Diagram Info	Displays a table on the diagram that contains information about the diagram (Diagram name, Author, Creation date, Modification date, etc.). You can specify what information you want to include in the **Project Options** dialog (on the main menu select **Options** > **Project**).
Show Owner	Displays diagram owner on the diagram tab.
Show Stereotypes	Specifies the representation of the diagram stereotype that is displayed in the diagram frame header.
Use Stereotype	Utilizing the **Use Stereotype** property, you may choose to display context stereotype or diagram stereotype in the diagram frame and on the diagram shape. For more information about the **Use Stereotype** property, see "To display the context stereotype icon instead of the diagram stereotype icon on the diagram frame" on page 157.
Stereotype Color	Changes the color of the stereotyped text label.
Stereotype Font	Changes the font style of the stereotyped text label.
Diagram Orientation	Available in activity diagrams for correct rectilinear path braking and drawing paths between shapes from side to side, or from bottom to top shape borders.
Add Line Jumps To	Specifies how line jumps are added to link intersections on the diagram.
Show Internal Properties Compartments	Displays SysML internal properties compartments.

Diagram Name and its Context Name Synchronization

The diagram name and its context name are synchronized automatically.

For example, create an Activity diagram. Type a name for the Activity diagram, for example, Receive. The name of the Activity automatically changes to Receive. And conversely - change the name of the Activity and the Activity diagram name will be changed automatically. This is synchronization of a diagram name and its context name:

Synchronization works in the following cases:

- Activity and Activity diagram inside.
- Interaction and Communication or Sequence diagram inside.
- (Protocol) State Machine and (Protocol) State Machine diagram inside.
- Class and all available inner diagrams inside.

To turn off the synchronization

Clear the **Synchronize the diagram name with it's context name** check box in the **Environment Options** dialog box, **General** branch, and **Editing** group.

NOTE If the second diagram will be created in the branch, diagram names will not be synchronized.

Diagram Frame

As of MagicDraw version 12.0, a UML diagram has the content area that is restricted by the diagram frame as it is stated in UML specification. The diagram frame is primarily used in cases where the diagrammed element has graphical border elements (like ports for classes and components, entry/exit points on statemachines).

By default the diagram frame is displayed on the diagram pane when a new diagram is created. The frame is a rectangle in all diagrams, but state machine and activity. State machine and activity diagram frames have rounded corners.

The frame can be resized manually by dragging its corners or borders.

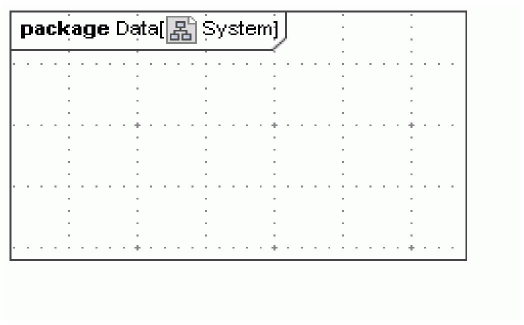


Figure 77 -- An example of the diagram frame

To show/ hide the diagram frame, do one of the following

- From the diagram pane shortcut menu, select/ click to clear the **Show Diagram Frame** check box.
- In the **Diagram Properties** dialog, select/ click to clear the **Show Diagram Frame** check box.

To change the diagram frame properties

Do either:

1. On the **Options** menu, select **Project**. The **Project Options** dialog will open.
2. In the tab tree, expand **Symbols properties styles** and then click **Diagram**. The Diagram options pane will be displayed on the right of the **Project Options** dialog.
3. Change the properties in the **Diagram Frame** property group.

Or:

1. Open the **Diagram Properties** dialog (the ways for opening the dialog are described in Section "Diagram Properties" on page 153).
2. Change the properties in the **Diagram Frame** property group.

Property name	Description
Show Diagram Frame	Displays the diagram frame on the diagram pane.
Show Abbreviated Types	Shows full/abbreviated diagram keyword type on the diagram frame header.
Show Diagram Name	Shows the diagram name and icon in the diagram frame header.
Show Parameters	Diagram context element parameters are displayed in the diagram frame header.
Show Context Name	Diagram context element name is displayed in the diagram frame header.
Show Context Type	Diagram context element type is displayed in the diagram frame header.
Show Diagram Type	Shows the diagram type in the diagram frame header.
Show Context Kind	Shows context kind, which is a keyword predefined in UML (e.g. package, class, activity) in the diagram frame header.
Autosize	Adjusts the size of the diagram frame to the contained information so that it uses minimum space. Autosizing is automatically switched off when the shape is being resized by the user.

To hide the icon on the diagram frame

1. Open the **Diagram Properties** dialog (the ways for opening the dialog are described in Section "Diagram Properties" on page 153).
2. Change the **Show Stereotypes** property value to **Text**.

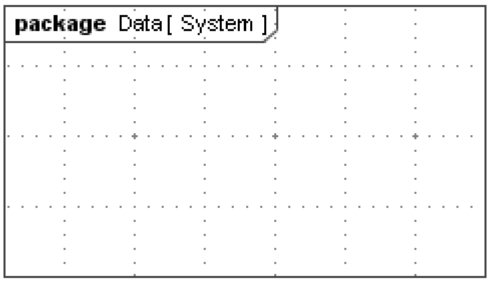


Figure 78 -- Diagram Frame with hidden diagram icon

When a new diagram is created, the diagram stereotype icon is displayed on the diagram frame header by default, though you can change it to the context stereotype icon.

To display the context stereotype icon instead of the diagram stereotype icon on the diagram frame

1. Open the **Diagram Properties** dialog (the ways for opening the dialog are described in Section "Diagram Properties" on page 153).
2. In the **Diagram Frame** property group, change the **Use Stereotype** property value to **Context**. The context stereotype icon will be displayed instead of the diagram stereotype icon in the diagram frame header.

NOTES

- The **Use Stereotype** property takes effect only in case the **Show Stereotypes** property value is **Text and Icon** or **Icon**.
- For more information about the context of a diagram, see the procedure "To change the diagram context" on page 152.

There is a possibility to show the abbreviation of a diagram type instead of the full diagram type in the diagram frame header.

To display the abbreviated diagram type

1. Open the **Diagram Properties** dialog (the ways for opening the dialog are described in Section "Diagram Properties" on page 153).
2. In the **Diagram Frame** property group, select the **Show Abbreviated Type** check box.

The abbreviated diagram types are listed in the following table.

Diagram name	Abbreviation
Use Case	uc
Communication	comm
Sequence	sd
State Machine	stm
Activity	sct
Implementation	impl
Composite Structure	cs

Drawing Diagram Shapes

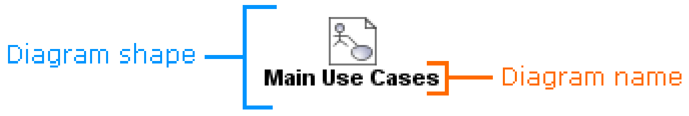
You can draw diagram shapes in any type of diagram.

For more information about working with shapes you can find in section "Working with Shapes of Model Elements" on page 177.

To display a diagram shape on a diagram pane

1. Select the diagram in the Model Browser.

2. Drag the diagram to the diagram pane. The diagram shape will be drawn on the diagram pane (see the example in the following picture).

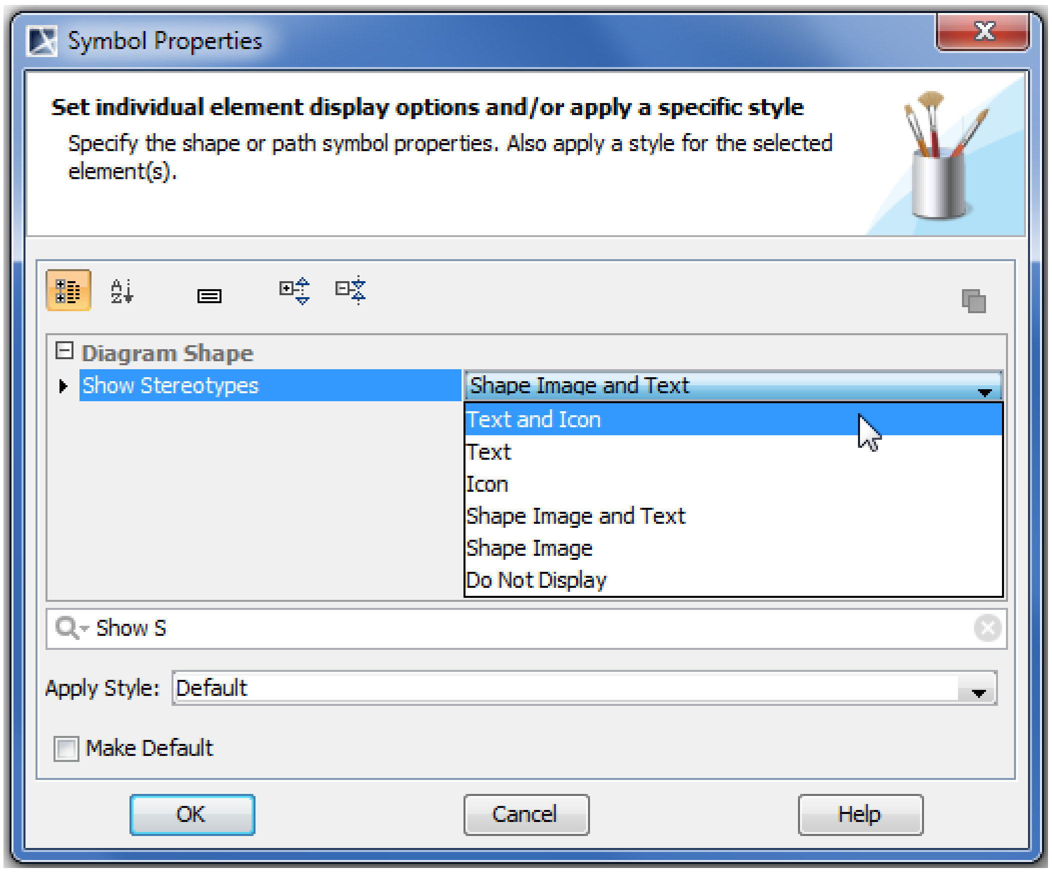


You can change the representation of the diagram shape by changing the diagram stereotype display mode.

To change the representation of the diagram shape

Do either:

1. Right-click the shape and from the shortcut menu select **Symbol(s) Properties**.
2. In the **Symbol Properties** dialog select a new value for the **Show Stereotypes** property (see the following picture).


Symbol Properties

Set individual element display options and/or apply a specific style

Specify the shape or path symbol properties. Also apply a style for the selected element(s).

Diagram Shape

Show Stereotypes: Shape Image and Text

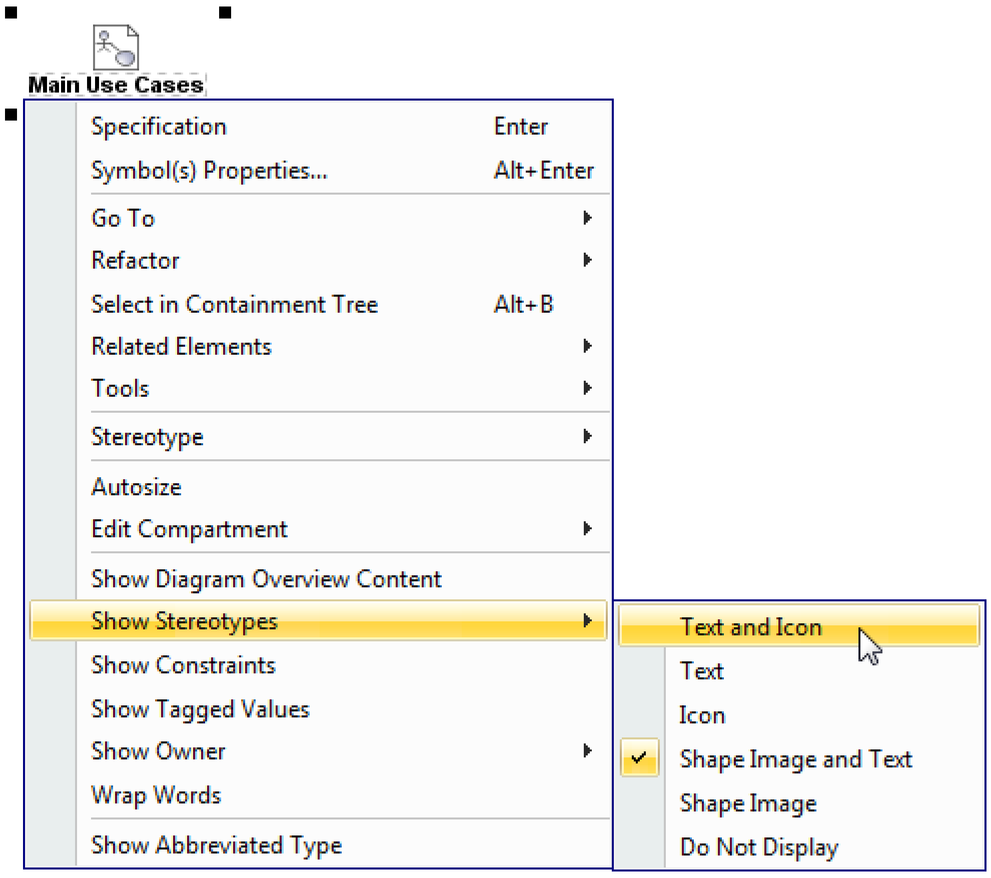
Show S

Apply Style: Default

Make Default

Or:

1. Right-click the shape and from the shortcut menu select **Show Stereotypes**.
2. From the opened submenu select a desired diagram stereotype display mode (see the following picture).



For more information about the shape stereotype display modes, see Section "Changing the stereotype display mode" on page 629.

You can also select showing or hiding diagram stereotype constraints or tagged values on the diagram shape.

To show diagram stereotype constraints and tagged values on the diagram shape

Do either:

1. Right-click the diagram shape and from the shortcut menu select **Symbol(s) Properties**.
2. In the **Symbol Properties** dialog select the **Show Constraints** and **Show Tagged Values** check boxes.

Or:

1. Right-click the diagram shape and from the shortcut menu select **Show Constraints**.
2. Right-click the diagram shape and from the shortcut menu select **Show Tagged Values**.

To display the context stereotype icon instead of the diagram stereotype icon on the diagram shape

1. Right-click the diagram shape and from the shortcut menu select **Symbol(s) Properties**.

2. In the **Symbol Properties** dialog, change the **Use Stereotype** property value to **Context**. The context stereotype icon will be displayed instead of the diagram stereotype icon on the diagram shape.

NOTES
- The **Use Stereotype** property takes effect only in case the **Show Stereotypes** property value is **Text and Icon** or **Icon**.
- For more information about the context of a diagram, see the procedure "To change the diagram context" on page 152.

There is a possibility to show the abbreviation of a diagram type instead of the full diagram type on the diagram shape.

To display the abbreviated diagram type

Do either:

1. On the diagram pane select the diagram shape.
2. In the shortcut menu, select the **Show Abbreviated Type** check box.

Or:

- From the diagram shape shortcut menu, open the **Symbol Properties** dialog box and select the **Show Abbreviated Type** check box.

The abbreviated diagram types are listed at the end of Section "Diagram Frame" on page 155.

Overviewing Other Diagrams

NOTE This feature is available in Standard, Professional, Architect, and Enterprise editions.

TIP! You can also learn about overviewing diagrams while analyzing the Diagram overview sample.

To open the sample, do any of the following:
- On the Welcome screen, select **Samples** and then in the **Product Features** section click **Diagram overview**.
- Go to the folder <MagicDraw installation directory>\samples\product features and open the *diagram overview.mdzip* file.

As of version 17.0 you can overview other diagrams, including dependency matrices, tables, and relation maps, on a diagram pane. For this the diagram overview shape can be used.

Read and learn how to use the diagram overview shape in the following sections:
- "Creating a diagram overview shape" on page 160.
- "Modifying the content of a diagram overview shape" on page 165.
- "Diagram overview shape environment" on page 168.
- "How to..." on page 174.

Creating a diagram overview shape

You can use one of the following ways to create a diagram overview shape:

- **Drag the diagram shape from the Model Browser and change it into the diagram overview shape afterwards.** This way created diagram overview shape *shows the full content* of the corresponding diagram (see Figure 79 on page 165) and is updated automatically according to *all changes* made in this diagram. For detailed description of the procedure see section "To create a diagram overview shape by using a drag-and-drop operation" on page 161.

- **Use the Diagram Overview button that is located in the diagram pallet.** This way created diagram overview shape shows *the full content* of the corresponding diagram (see Figure 79 on page 165) and is updated automatically according to *all changes* made in this diagram. For detailed description of the procedure see section "To create a diagram overview shape by using the diagram pallet" on page 163.
- **Paste a copied part of the diagram's content using a special command from the main menu.** This way created diagram overview shape *shows any copied part* of the corresponding diagram's content (see Figure 80 on page 165) and is updated automatically according only to *the changes made in this copied part*. Note that this way can not be used for dependency matrixes, tables, and relation maps, as it is not allowed to copy and paste different parts of them. For detailed description of the procedure see section "To create a diagram overview shape by pasting any part of diagram's content" on page 164.

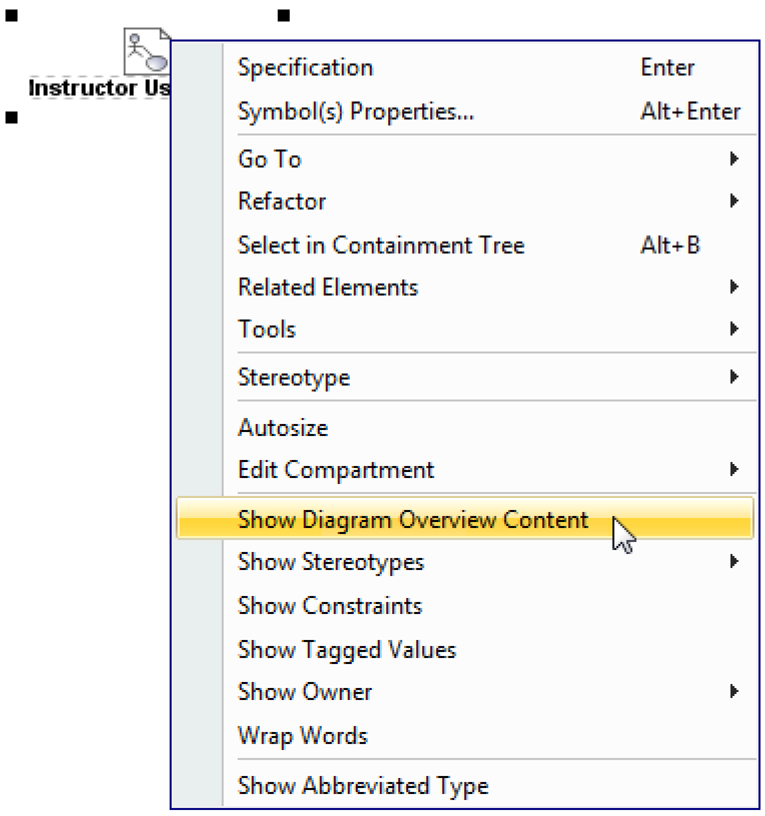
To create a diagram overview shape by using a drag-and-drop operation

1. Open a diagram wherein you want to create the diagram overview shape.
2. In the Model Browser select a diagram you want to overview.
3. Drag the diagram shape to the opened diagram pane. The diagram shape will be drawn on the diagram pane (see the example in the picture below).

NOTE	If you can not drag the diagram shape to the opened diagram pane within a teamwork project, make sure you have the right to edit model of this project and then try to lock for edit this diagram. For more information about locking elements please refer to section "Locking Model Elements and Diagrams for Editing" in "MagicDraw Teamwork UserGuide.pdf".

4. Make the diagram shape show the full content of the corresponding diagram using any of the following GUI features:

- Right-click the diagram shape and from the shortcut menu select **Show Diagram Overview Content**.



- Right-click the diagram shape and from the shortcut menu select **Symbol(s) Properties**. In the opened dialog, set the **Show Diagram Overview Content** property value to *true*.

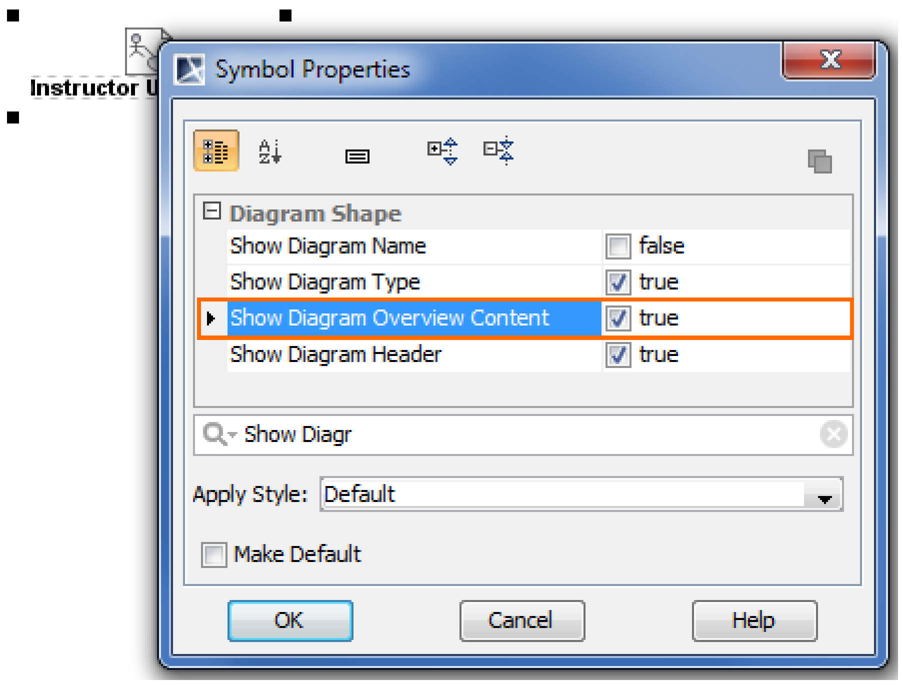


Diagram Shape

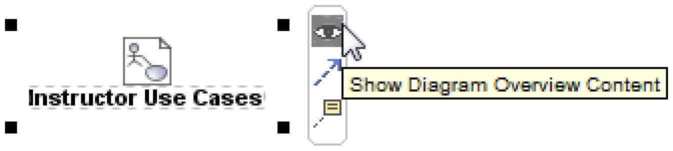
Show Diagram Name	false
Show Diagram Type	✓ true
Show Diagram Overview Content	✓ true
Show Diagram Header	✓ true

Show Diagr

Apply Style: Default

Make Default

- Click the diagram shape and on the Smart Manipulator toolbar select the button.



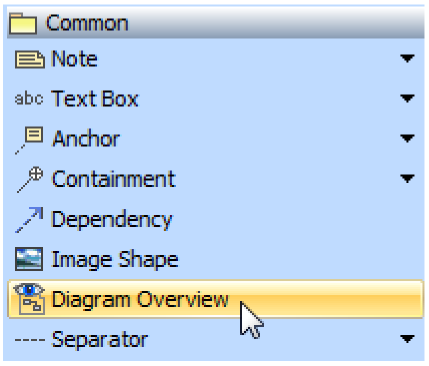
The diagram shape will be changed to the diagram overview shape that shows the full content of the corresponding diagram (see Figure 79 on page 165).

NOTE The content of this way created diagram overview shape will be updated automatically according to *all changes* made in the corresponding diagram.

TIP! Double-click the diagram overview shape to open the corresponding diagram.

To create a diagram overview shape by using the diagram pallet

1. Open a diagram wherein you want to create the diagram overview shape.
2. On the diagram pallet click the **Diagram Overview** button that is located within the **Common** buttons group.

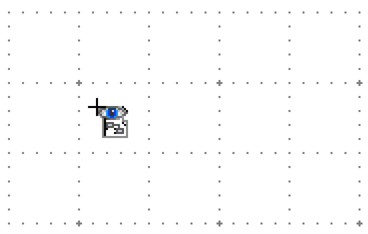


NOTE If the diagram pallet is inactive within a teamwork project, make sure you have the right to edit model of this project and then try to lock for edit this diagram.
For more information about locking elements please refer to section “Locking Model Elements and Diagrams for Editing” in “MagicDraw Teamwork UserGuide.pdf”.

The **Select Diagram** dialog will open (to learn more about using the dialog please refer to section "Selecting an Element" on page 279).

3. Select a diagram for which you want create a diagram overview shape and click **OK**.

4. Click a free space of the diagram pane.



The created diagram overview shape will show the full content of the corresponding diagram (see Figure 79 on page 165).

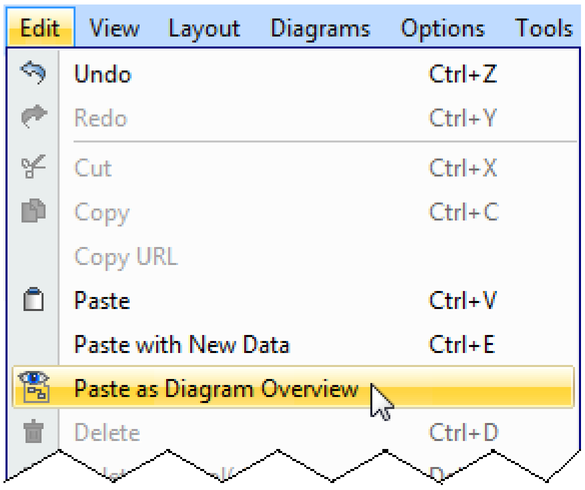
NOTE	The content of this way created diagram overview shape will be updated automatically according to *all changes* made in the corresponding diagram.

TIP!	Double-click the diagram overview shape to open the corresponding diagram.

To create a diagram overview shape by pasting any part of diagram's content

NOTE	This way can not be used for dependency matrixes, tables, and relation maps, as it is not allowed to copy and paste different parts of them.

1. Open a diagram for that you want to create the diagram overview shape.
2. Select the element shapes that you want to appear in the diagram overview shape and then copy them.
3. Open the diagram wherein you want to create the diagram overview shape.
4. On the **Edit** menu, click **Paste as Diagram Overview**.



NOTE	If the command is inactive within a teamwork project, make sure you have the right to edit model of this project and then try to lock for edit the diagram wherein you want to create the diagram overview shape. For more information about locking elements please refer to section "Locking Model Elements and Diagrams for Editing" in "MagicDraw Teamwork UserGuide.pdf".

The created diagram overview shape will show only the copied part of the corresponding diagram's content (see Figure 80 on page 165)

NOTE	The content of this way created diagram overview shape will be updated automatically according only to *the changes made in the copied part* of the corresponding diagram.

TIP! Double-click the diagram overview shape to open the corresponding diagram.

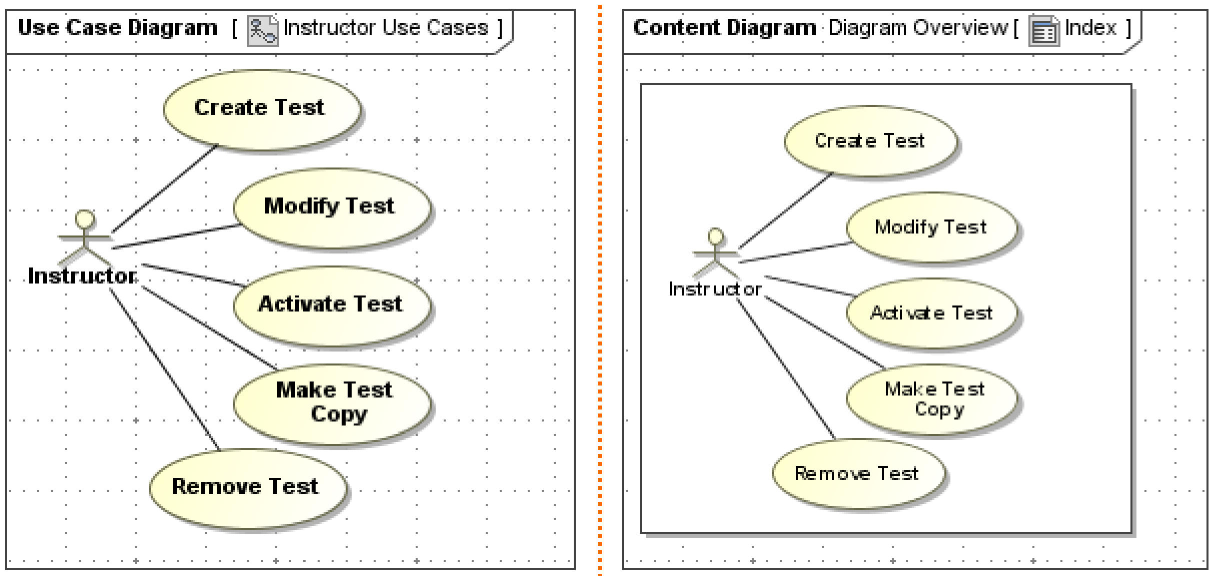


Figure 79 -- An example of diagram and its diagram overview shape showing the full content of the diagram

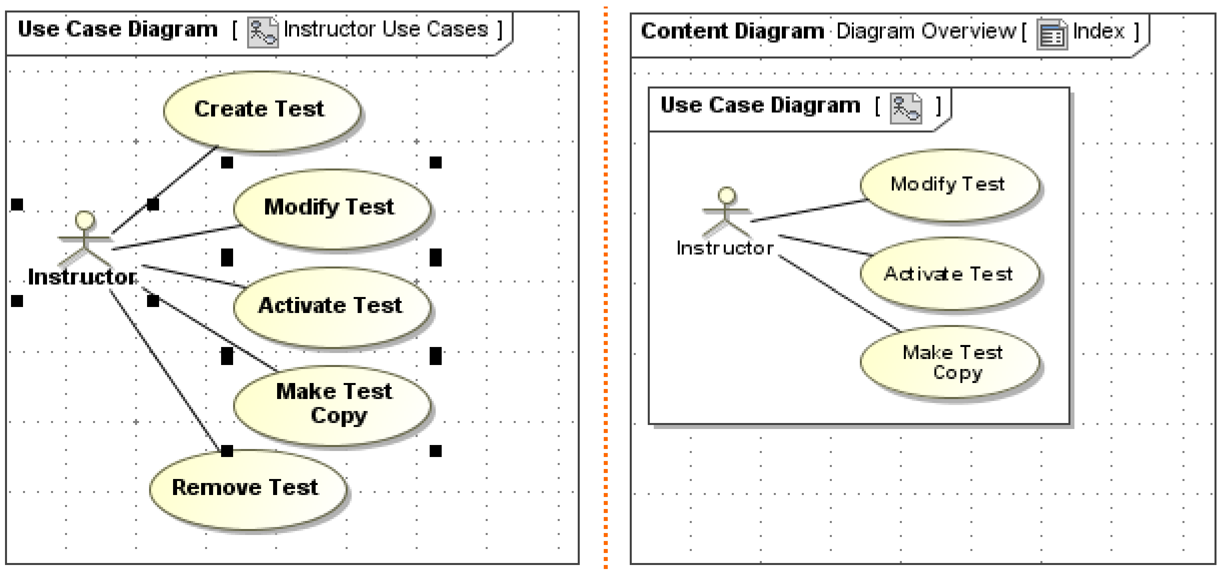


Figure 80 -- An example of diagram and its diagram overview shape showing only the part of the diagram content

Modifying the content of a diagram overview shape

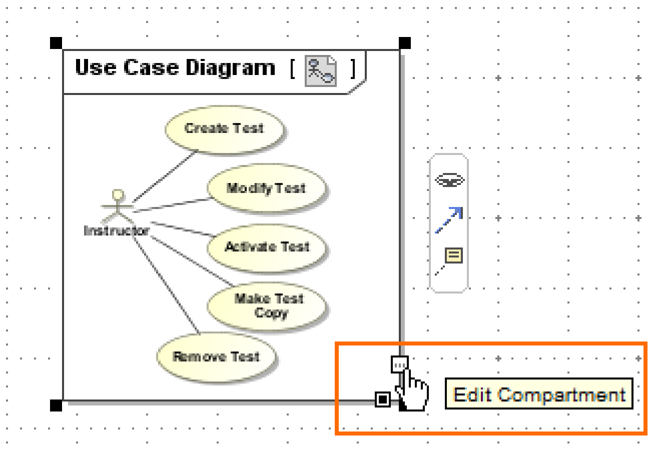
Once the diagram overview shape is created, you can modify its content: add more element shapes or remove no more needed ones by using the **Compartment Edit** dialog.

To open the **Compartment Edit** dialog for modifying the content of a diagram overview shape

Do any of the following:

- Right-click the diagram overview shape, on the shortcut menu point to **Edit Compartment**, and then select **Diagram Overview Content**.

- Click the diagram overview shape and on the shape area click the "..." button.

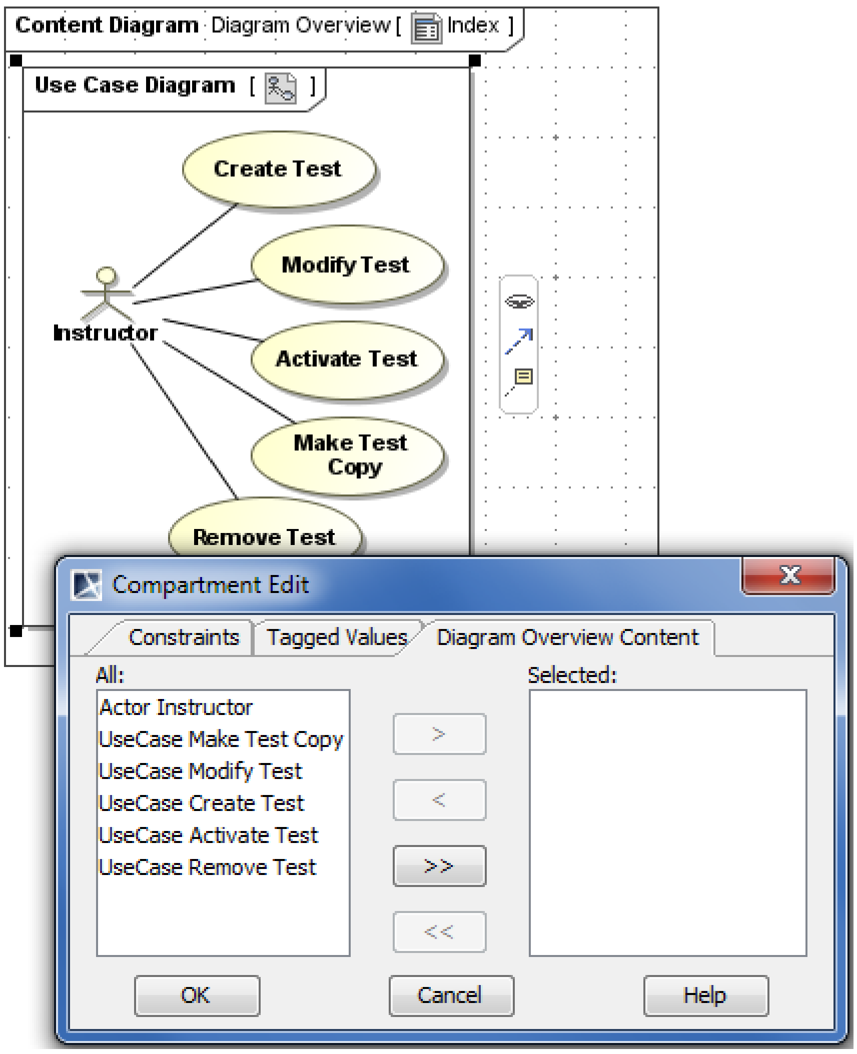


The **Compartment Edit** dialog will open with the **Diagram Overview Content** tab selected.

There are two lists in the **Diagram Overview Content** tab:

All	• If the **Selected** list is *not empty*, lists element shapes that are not shown in the diagram overview shape. • If the **Selected** list is *empty*, lists all element shapes meaning that all of them are shown in the diagram overview shape. In this case the diagram overview shape will reflect any changes in the corresponding diagram.
Selected	Lists element shapes that are shown in the diagram overview shape. In this case the diagram overview shape will reflect only changes of the selected shapes in the corresponding diagram.

If the diagram overview shape is created by using instructions given either in the first or the second procedure in section "Creating a diagram overview shape" on page 160, then you will see that all element shapes are listed in the **All** list within the **Compartment Edit** dialog.

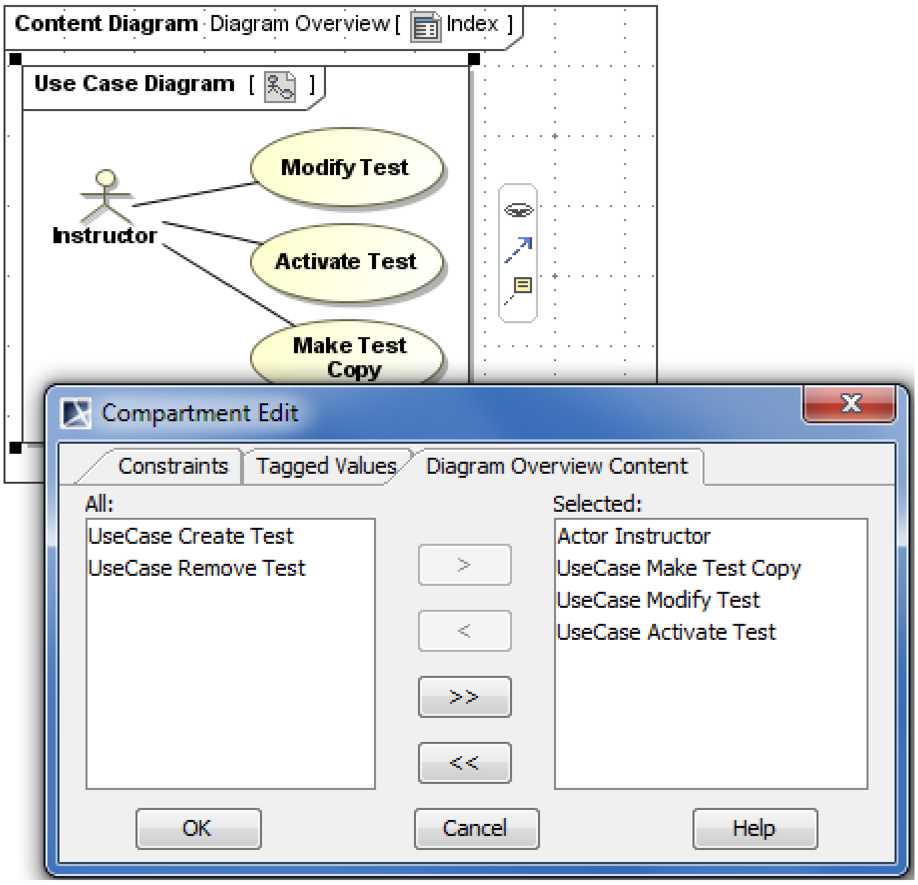


All:
Actor Instructor
UseCase Make Test Copy
UseCase Modify Test
UseCase Create Test
UseCase Activate Test
UseCase Remove Test

Selected:

Figure 81 -- An example of the Compartment Edit dialog in case of showing the full content of the diagram in the diagram overview shape

If the diagram overview shape s created by using instructions given in the third procedure in section "Creating a diagram overview shape" on page 160, then you will see that only the element shapes which are displayed in the diagram overview shape are listed in the **Selected** list (even in case of copying all shapes).



All:
UseCase Create Test
UseCase Remove Test

Selected:
Actor Instructor
UseCase Make Test Copy
UseCase Modify Test
UseCase Activate Test

Figure 82 -- An example of the Compartment Edit dialog in case of showing only the part of the diagram content in the diagram overview shape

To modify the content of the diagram over view shape

1. Open the **Compartment Edit** dialog using one of the ways described in the procedure above.
2. Use the **>**, **>>**, **<**, and **<<** buttons to manage item moving between the lists. Remember the rules of showing and not showing shapes included in each list.
3. Click **OK** when you are finished.

Diagram overview shape environment

This section describes GUI features that can be used for handling the diagram overview shape:

- "Shortcut menu" on page 169.
- "Symbol Properties dialog" on page 171.
- "Smart Manipulator toolbar" on page 173.
- "Shape area buttons" on page 174.

Shortcut menu

This section introduces diagram overview shape-specific commands, but not all commands from the diagram overview shape shortcut menu.

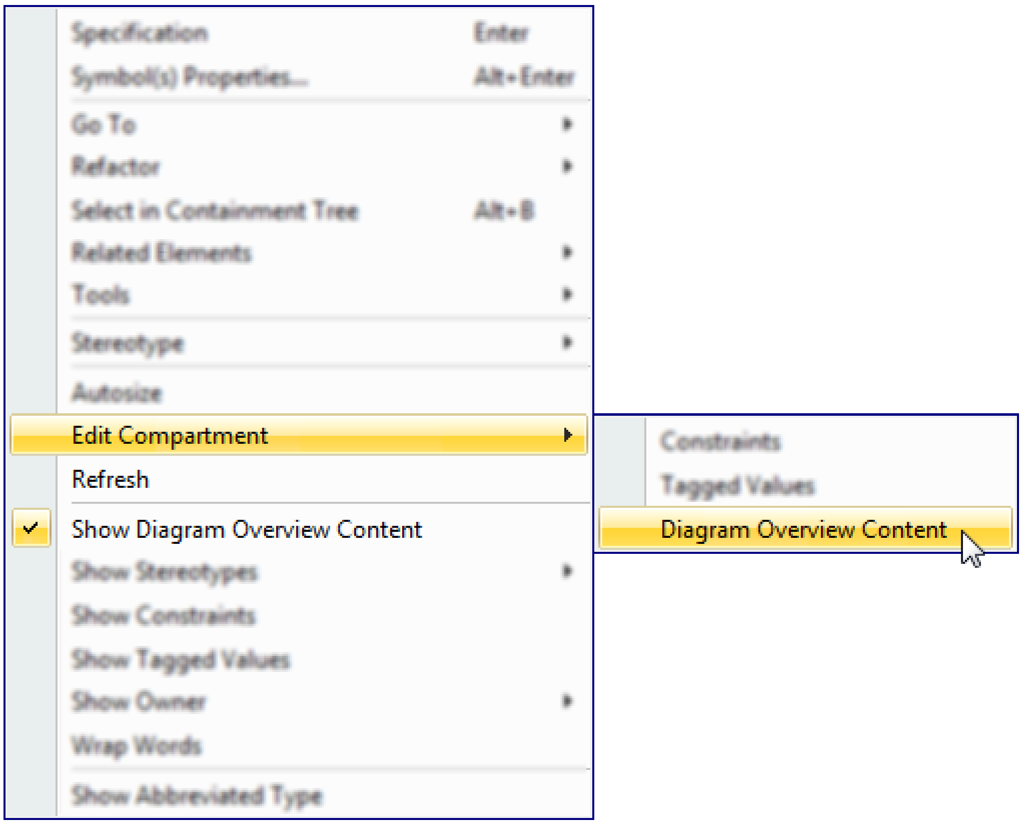


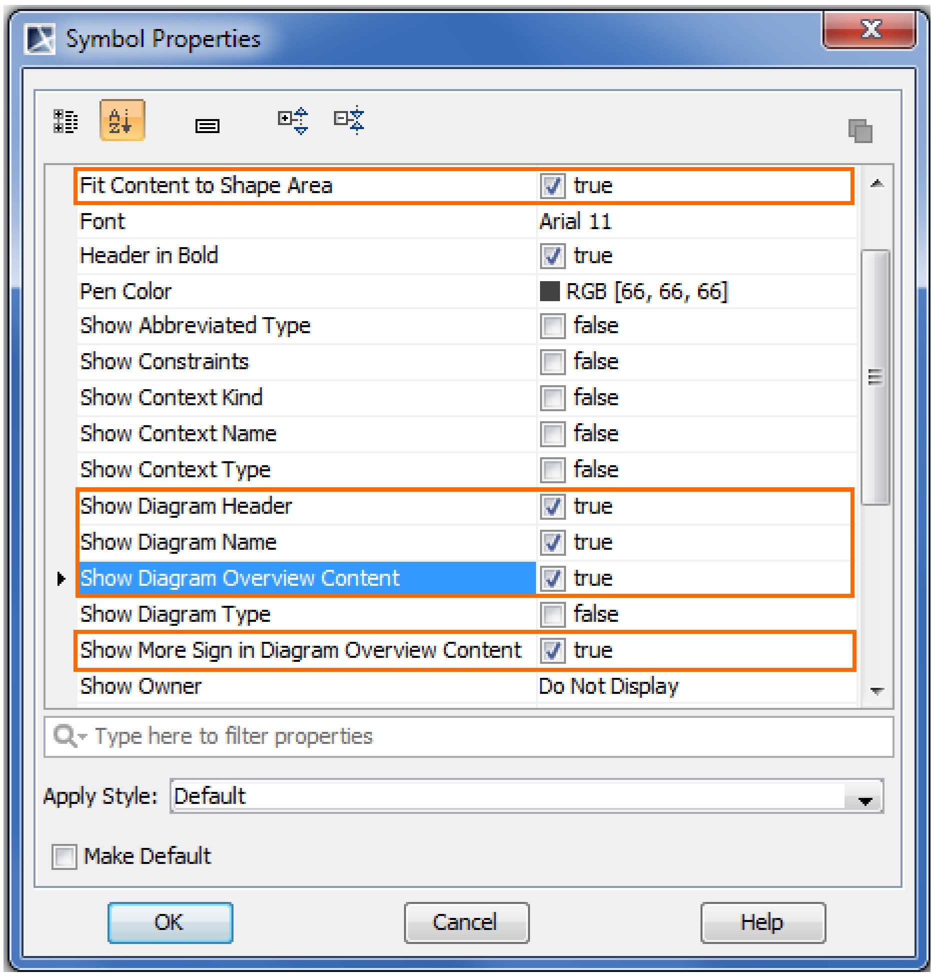
Figure 83 -- Diagram overview shape-specific commands in the shortcut menu

Command	Description
Edit Compartment > Diagram Overview Content	Opens the **Compartment Edit** dialog with the **Diagram Overview Content** tab selected. **TIP!** You can also open this dialog by clicking the "..." button that is on the frame of a diagram overview shape area (to see the button, click the diagram overview shape).
Refresh	Updates the content of the diagram overview shape according to changes in the model. **NOTE:** This button is available in the shortcut menu only if a dependency matrix, table, or relation map is displayed in the diagram overview shape. **TIP!** You can also update the content of the diagram overview shape by clicking the button that is on the frame of a diagram overview shape area (to see the button click the diagram overview shape).

Command	Description
Show Diagram Overview Content	Select to change the diagram shape into the diagram overview shape that shows the content or a part of the content of a corresponding diagram. Unselect to change the diagram overview shape into the diagram shape. For more information about using this command refer to step #4 of the procedure "To create a diagram overview shape by using a drag-and-drop operation" on page 161.

Symbol Properties dialog

This section introduces diagram overview shape-specific properties, but not all properties in the **Symbol Properties** dialog of a diagram overview shape.



Fit Content to Shape Area	✓ true
Font	Arial 11
Header in Bold	✓ true
Pen Color	■ RGB [66, 66, 66]
Show Abbreviated Type	false
Show Constraints	false
Show Context Kind	false
Show Context Name	false
Show Context Type	false
Show Diagram Header	✓ true
Show Diagram Name	✓ true
Show Diagram Overview Content	✓ true
Show Diagram Type	false
Show More Sign in Diagram Overview Content	✓ true
Show Owner	Do Not Display

Apply Style: Default

Figure 84 -- Diagram overview shape-specific properties in the Symbol Properties dialog

Property	Description
Fit Content to Shape Area	Select to adjust the zoom ratio of the diagram content so that it fits the size of the diagram overview shape area. Unselect to fix the current zoom ratio of the diagram content. It will persist in any size change. **NOTE:** Any value setting for this property can take effect on the diagram overview shape in case the **Autosize** property value is *false*. If you need to reset the diagram content ratio to 1:1, set the **Autosize** property value to *true*.
Show Diagram Header	Select to show the diagram header in the diagram overview shape.
Show Diagram Name	Select to show the diagram icon and name in the diagram header of the diagram overview shape, in case the diagram header is displayed, i.e., the **Show Diagram Header** property value is *true*.

Property	Description
Show Diagram Overview Content	Select to change the diagram shape into the diagram overview shape that shows the content or a part of the content of a corresponding diagram. Unselect to change the diagram overview shape into the diagram shape. For more information about using this command refer to step #4 of the procedure "To create a diagram overview shape by using a drag-and-drop operation" on page 161.
Show More Sign in Diagram Overview Content	Select to display the more sign at the bottom of the diagram overview shape area, when only a part of the diagram content is displayed the diagram overview shape (see Figure 85 on page 172).

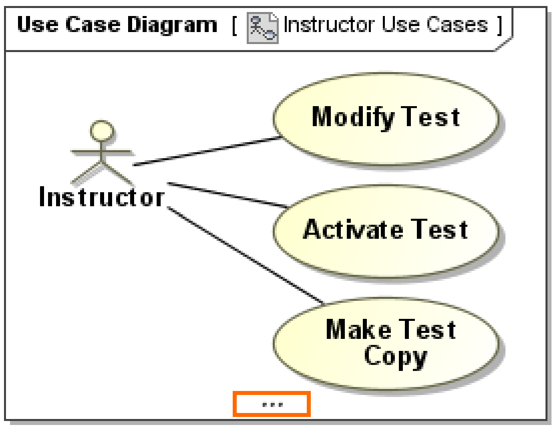


Figure 85 -- An example of the more sign on diagram overview shape area

Smart Manipulator toolbar

In the Smart Manipulator of the diagram (overview) shape there are two buttons that need to be described.

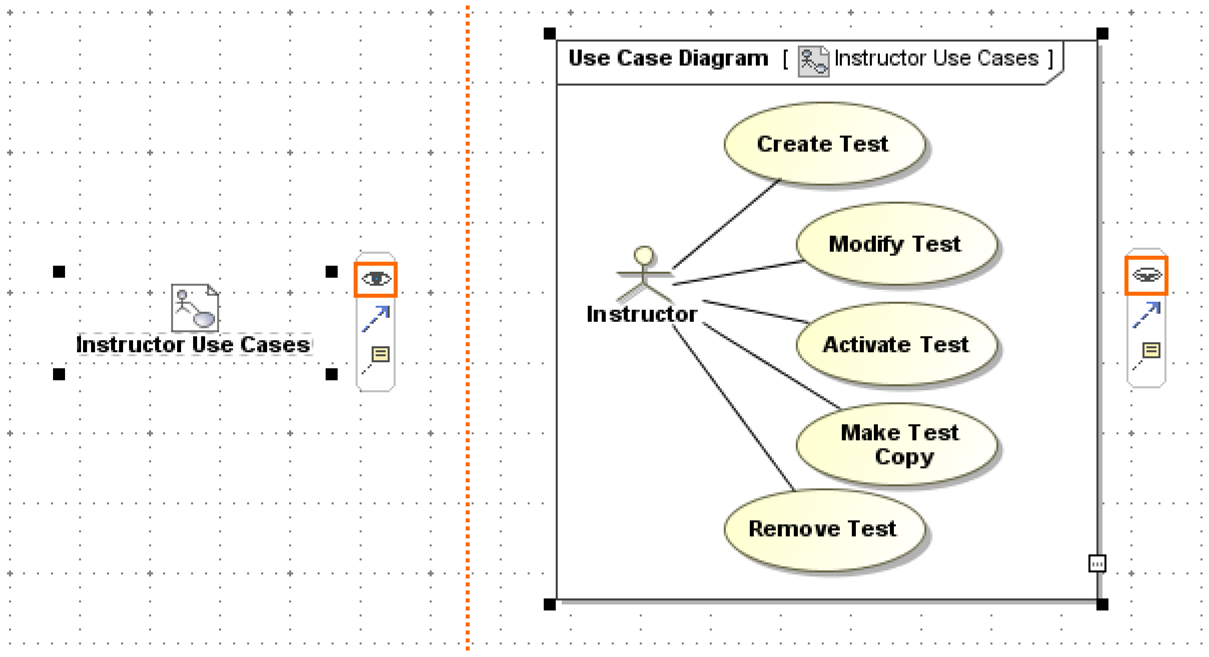


Figure 86 -- Buttons for showing (on the left) and hiding (on the right) the diagram overview content in the Smart Manipulator toolbar

Button	Description
👁	Changes the diagram shape to the diagram overview shape that shows in its content the selected-to-overview shapes of the corresponding diagram. For more information about using this command refer to step #4 of the procedure "To create a diagram overview shape by using a drag-and-drop operation" on page 161.
👁	Changes the diagram overview shape to the diagram shape.

Shape area buttons

There are different sets of buttons on the diagram overview shape area showing a diagram and the one showing a dependency matrix, table, or relation map.

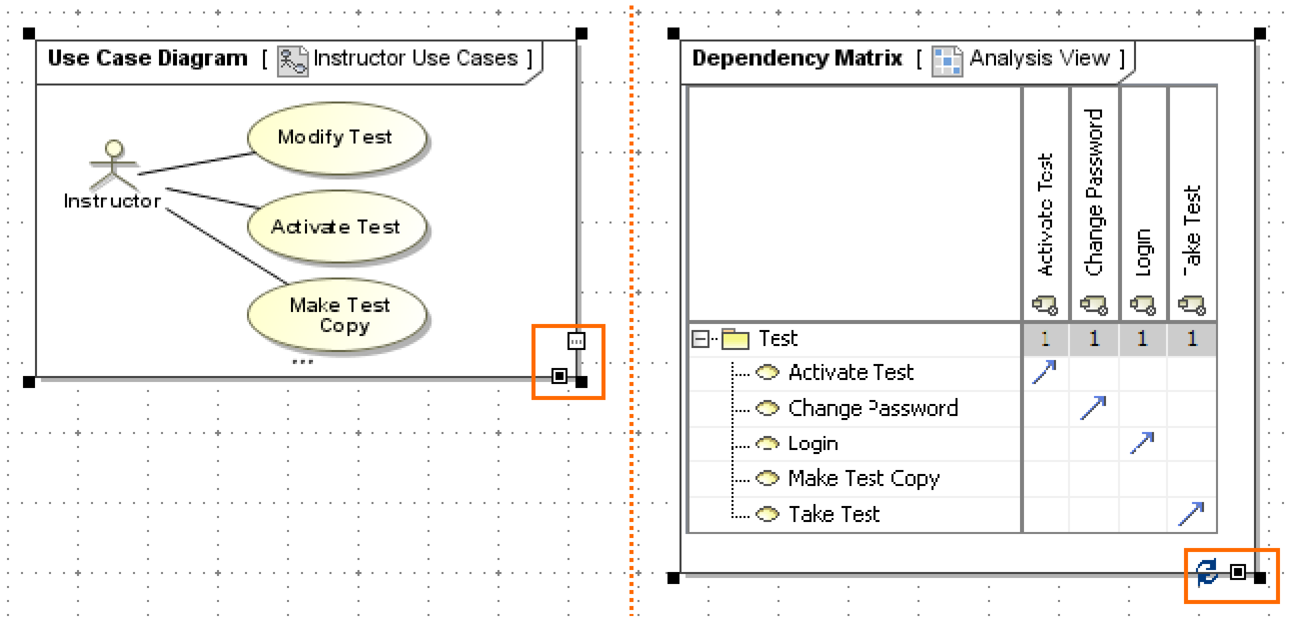


Figure 87 -- Diagram overview shape area buttons in case of overviewing diagram (on the left) and dependency matrix (on the right)

Button	Description
⊡	Opens the **Compartment Edit** dialog with the **Diagram Overview Content** tab selected.
⟳	Updates the content of the diagram overview shape according to changes in the model. **NOTE:** This button is available on the diagram overview shape area only if a dependency matrix, table, or relation map is displayed in the diagram overview shape.
▣	Resets the diagram overview shape's content ratio to 1:1.

How to...

This section gives some remarks that can be useful when struggling to arrange sizes of your diagram overview shapes. The solutions we offer are as follows:

- "How to make a couple of diagram overview shapes to be of the same size?" on page 175.
- "How to set desired shape sizes in the a diagram overview shape?" on page 175.

How to make a couple of diagram overview shapes to be of the same size?

Let's say you have two diagram overview shapes. You want their zoom ratio to be 1:1 and shape areas to be of the same height (or width) at the same time.

Solution

1. For both diagram overview shapes set the **Fit Content to the Shape Area** property value to *false*.

2. For both diagram overview shapes set the **Autosize** property value to *false*.
3. Make both diagram overview shapes of preferred size.
4. Make both diagram overview shapes of the same height (or width) by dragging corners of the shape areas.

How to set desired shape sizes in the a diagram overview shape?

Solution

1. Set the **Fit Content to the Shape Area** property value to *true* for this diagram overview shape.
2. Set the desired shape content size by dragging corners of the shape area.
3. Set the **Fit Content to the Shape Area** property value to *false* for this diagram overview shape.

In case the diagram overview shape shows the full content of the corresponding diagram, all new shapes added to the diagram pane in the diagram overview shape will be of the previously set size.

If you want to reset the shape sizes to ratio zoom 1:1, do any of the following:

- Set for the diagram overview shape the **Autosize** property value to *true*.
- Make the diagram overview shape of the preferred size.

Table with Diagram Information

On the diagram, you may display a table containing various diagram details: its name, author, status, the dates it was created and modified, etc. By default, the Diagram info table is displayed at the right top corner of the diagram frame, but you can drag and drop it to any other position on the diagram.

The table includes the following fields:

- Diagram name
- Author
- Creation date
- Modification date
- Last Modified by
- Other available tag definitions

To show the table containing the diagram information

1. From the diagram shortcut menu, select **Show Diagram Info**.
2. The table with the predefined information will be displayed on the diagram.

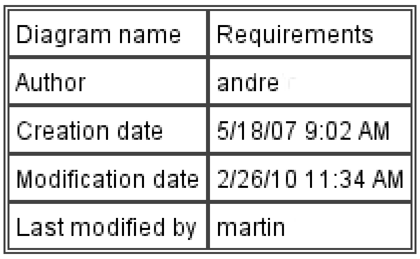


Diagram name	Requirements
Author	andre
Creation date	5/18/07 9:02 AM
Modification date	2/26/10 11:34 AM
Last modified by	martin

To define information that will be included in the table

1. From the diagram info table shortcut menu, select **Customize**, or from the **Options** menu, select **Project**. The **Project Options** dialog box opens.
2. Open the **Diagram Info** pane.

3. In the **Source** pane, select the type of information you want to include in the table: **Standard Mode** or **Custom Mode**.
4. **Standard Mode** contains the following fields that will be shown in the table: Author, Creation date, Modification date, and all other tag definitions that can be assigned to the diagram.
   In the **Custom Mode** field, you may create your own table or any other object in HTML.
5. Preview the selected table or other created object in the **Preview** pane.

Changing the Diagram Type

The diagram type may be changed to another type of diagram if both diagram types are compatible. Note: diagram elements are not converted.

Changing the diagram type is usable:

- To migrate with existing project to the a diagram type which was not available till then. For example, to migrate Class diagram to the SysML Block Definition diagram.
- To migrate with existing project from the diagram type, which will be dropped from your project. For example, if user has decided to drop plug-in, and needs to convert plugin specific diagram to standard MagicDraw diagrams.

Diagram conversion scenarios:

- Any static diagram may be converted to another type of static diagram.
- Any dynamic diagram may be converted to another diagram, if both diagrams are based on the same diagram type and diagrams are compatible.

To change the diagram type:

1. Select one or more the same type diagrams in the Browser (Containment or Diagrams tree).
2. From the shortcut menu, choose command **Change Type To** and select desired diagram type from the list (see Figure 88 on page 177).

You can also convert multiple the same type diagrams – select them in the Browser and choose command **Change Type To**.

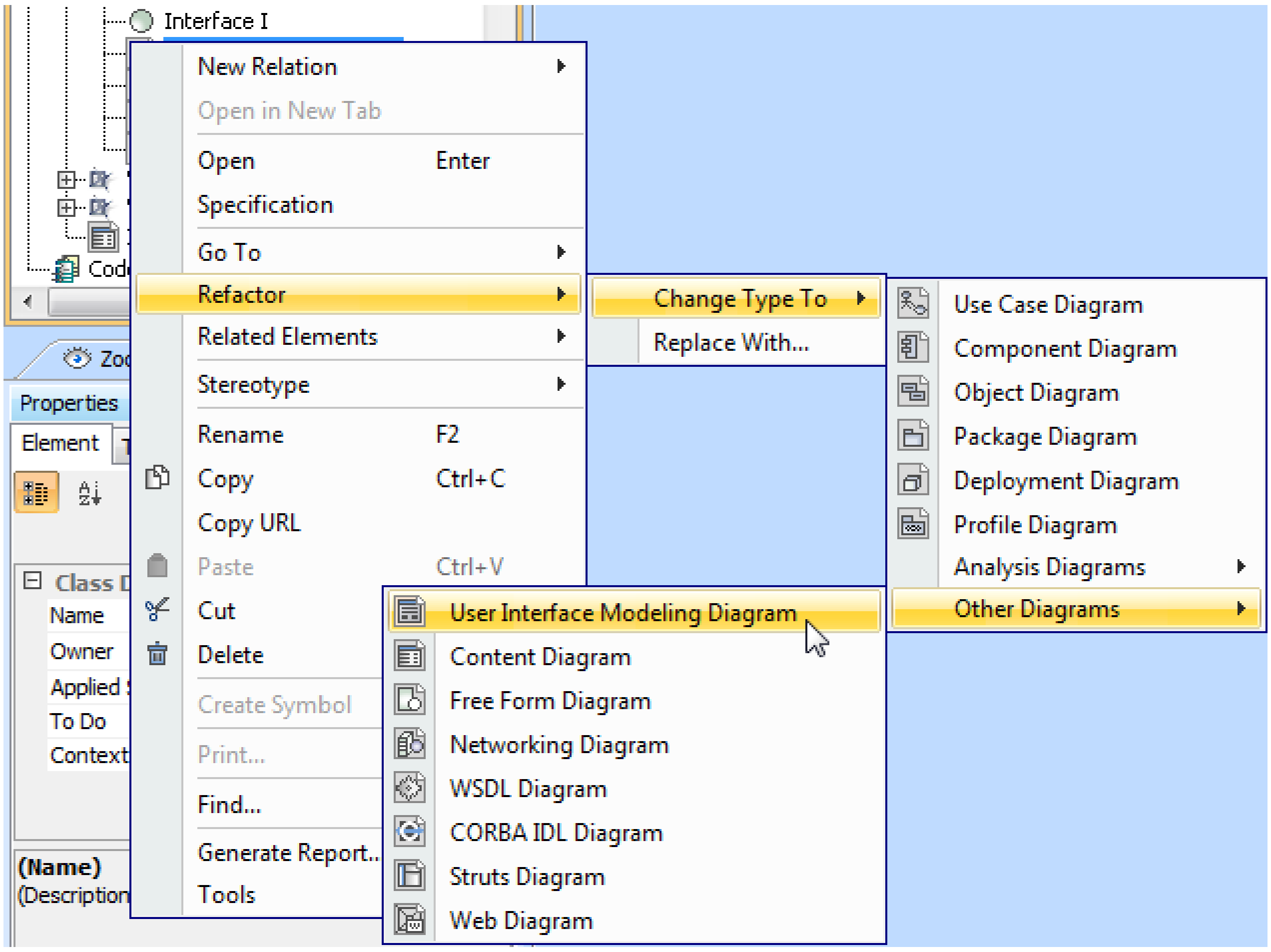


Figure 88 -- Changing the diagram type

Working with Shapes of Model Elements

View Online Demo	MagicDraw Basics

To draw a shape on the Diagram pane

1. Click the shape button on the diagram toolbar, or press the appropriate shortcut key for the shape you wish to draw (the button remains pressed). For a detailed description of diagram toolbars, see “You may customize menu items by selecting and/or modifying perspectives. More information about customizing perspectives, you may find in Section “Customizing and Selecting Perspective” on page 63.” on page 70.
2. Click the desired location on the diagram pane. The new shape is placed on the diagram pane at the point you click.
OR

- Click the shape button on the diagram toolbar, hold down the left mouse button, and drag shape from the toolbar to the diagram. The new shape is placed on the diagram pane at the point you will release the mouse.
- Create the desired model element in the Browser tree. From the created item shortcut menu, select **Create Symbol** or drag and drop the selected model element to the diagram pane.

To draw a number of shapes on the diagram pane

1. Click the shape button on the diagram toolbar, or press the appropriate shortcut key for the shape you wish to draw (the button remains pressed.)
2. Click the **Sticky** button on the diagram toolbar (shortcut key is Z.)
3. Click the desired location on the diagram pane. The new shape is placed on the diagram at the point you click (the button remains pressed.)
4. Click the next location on the diagram pane. The next shape is placed on the diagram pane. Repeat this until you draw the desired number of shapes.
5. To undo the shapes, click the **Sticky** button on the diagram toolbar (shortcut key is Z).

To draw a shape for the selected item in the Browser tree

1. Activate a diagram on which you wish to draw a shape.
2. From the Browser tree, select an item you wish to draw.
3. From the item shortcut menu, select **Create Symbol** or drag and drop the selected model element onto the diagram pane.

To specify the name of the shape (when it is allowed)

1. Double-click the shape or select **Specification** from the shape shortcut menu. The corresponding **Specification** dialog box opens.
2. Type the shape name in the **Name** text box and click **Close**.

- Type the shape name directly on the selected shape on the Diagram pane.
- Type the shape name after slowly double-clicking the shape in the Browser tree.

To create several shapes with the same data

- From the shortcut menu of the desired item in the Browser tree, select **Create Symbol**. Or, drag and drop the selected model element onto the diagram pane.
- Type the same name for multiple shapes directly on the shape after the text cursor appears in that area.

1. Specify a shape name.
2. Draw another shape of the same kind on the Diagram pane.
3. Click the shape in the name area. The list of existing shape names appears.
4. Select a name for the shape from the list.

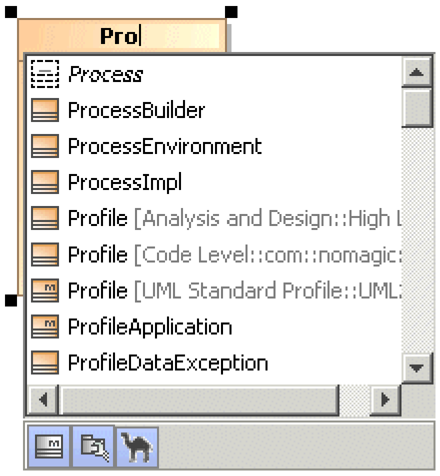
NOTES	●These shapes will contain identical data. ●Auto completion for entering names is available for all elements.

IMPORTANT!	If you attempt to enter an existing name in the corresponding **Specification** dialog box, an error message alerts you to the existence of the current name of the shape. You may not specify a name for a new shape if another shape of the same name and kind is already present in the package.

To use autocompletion when typing the element name

- On the diagram pane, click on the element and then click on the element name area. The autocompletion list with already created elements appears.

- Type the first letter(s) of your searched element and the list is reduced according to the letters you typed. For, example, if you are searching for *Profile* class, type the *Pro* letters and all classes, which begins with *Pro* will be shown in the list.,


Pro
Process
ProcessBuilder
ProcessEnvironment
ProcessImpl
Profile [Analysis and Design::High L
Profile [Code Level::com::nomagic:
Profile [UML Standard Profile::UML:
ProfileApplication
ProfileDataException

You can also press the **Ctrl+Space** or **Ctrl+Backspace** to invoke the autocompletion list.

Filters in the autocompletion dialog allow the filtering of rarely used items as “metaclasses” and “elements from profiles”. This allows comfortable and clear usage of the autocompletion dialog for modeling without active usage of elements from profiles and it increases modeling speed.

At the bottom of the drop-down list box, you will find buttons to perform filtering:

- **The Auto completion includes metaclasses button**. When pressed, the list of available elements, element types, or stereotypes includes metaclasses (in MagicDraw metaclasses are placed in the *UML Standard Profile*) appears.
- **The Auto completion includes elements from profiles and modules button**. When pressed, the list of available elements, element types or stereotypes includes elements, which are placed in modules appears. (**Note**! This option toggles all profiles except the *UML Standard Profile*.)
- **The Auto completion uses camel case button**. When pressed, you may search for elements via the capital letter patterns. For example, instead of typing *ArrayIndexOutOfBoundsException* you may type *AIOOBE*.

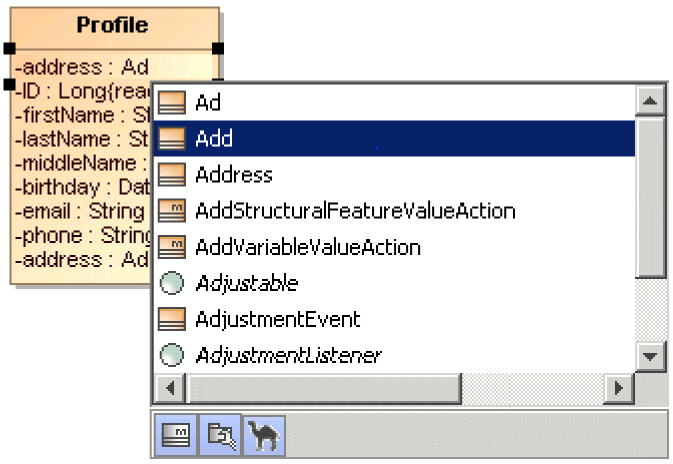
To assign an existing type or to create a new type to an element

You may quickly assign a type for the attribute, operation, parameter, instance, and lifeline using the autocompletion list:

1. On the diagram pane in the element name area type ":" and now you may assign the element its type:

- Type the name of a non-existent element. A new class and the assigned type are created in the project.
- Type the name of an already existing classifier and it will be assigned as the type.
- If in the project two classifiers exist with the same title after the classifier name is typed, the Select Classifier dialog box opens. Select the element you want to assign as type.

2. On the diagram pane in the element name area type ":" and press **Ctrl+Space** or **Ctrl+Back-space**. The list of possible elements to assign opens. To find the element in the list by name, type its name.



To delete the selected model element or symbol

- From the **Edit** menu, select **Delete** (both data and symbol are deleted.)
- On the main toolbar, click **Delete** (both data and symbol are deleted.)
- Press CTRL+D keys (both data and symbol are deleted.)
- Press Delete key (only the symbol is deleted, leaving the data intact.)

NOTE When deleting paths by pressing the DELETE key, the **Delete Data?** message appears. To delete the relationship data from the model, click **Yes**.

When you use other methods to delete relationships, the relationship data is automatically deleted.

Working with Paths and Relationships

View Online Demo	MagicDraw Basics

To create a path between shapes

1. Click the appropriate path button on the diagram toolbar for the relationship you wish to draw. For a detailed description of the diagram toolbars, see "You may customize menu items by selecting and/or modifying perspectives. More information about customizing perspectives, you may find in Section "Customizing and Selecting Perspective" on page 63." on page 70.
2. Click the first (source) shape of the path.
3. Drag the path to the second (target) shape of the path and drop it there.

To remove the selected path between shapes

- To remove the selected path from the diagram, press Delete. After the deletion, the relationship will no longer be referenced by the deleted path (symbol), but still can be referenced by other appropriated symbols.

- To remove the selected relationship from the model, press Ctrl + D.

To create a number of paths

1. Click the appropriate path button on the diagram toolbar.
2. Click the **Sticky** button on the Diagram toolbar (shortcut key is Z.)
3. Click the first (source) shape of the path.
4. Drag the path to the second (target) shape of the path and drop it there.
5. Click the first (source) shape of the path to draw the next path.
6. Drag the path to the target shape and drop it there. The new path is created between the two shapes. Repeat this until you create the desired number of paths of that type.
7. Click the **Sticky** button on the Diagram toolbar (shortcut key is Z.)

To change a path appearance style

1. Select the path.
2. Right-click the path or select **Path** from the **Edit** menu, and select the commands you need:
    - To set the path as rectilinear, oblique, or bezier, select **Path Style**.
    - To select a path style, select **Change Path Style** (shortcut keys CTRL+L.)
    - To reset path labels to the default position, select **Reset Labels Positions**.
    - To remove all angles of the path, select **Remove Break Points**.

NOTES

- Every diagram has the Manipulation Highlighting feature. When drawing a path between two model elements, you will see that those shapes are bordered with a red or blue rectangle. The red color indicates that the path may not be drawn between these shapes. Blue rectangle allows a path to be drawn.
- Remove the manipulation highlighting in the **Environment Options** dialog box, **Diagram** section, **Edit** group. For more information, see “Customizing Environment Options” on page 90.
- For drawing a path, you can use smart manipulations menu, which appears near the element symbol. Select a path and drag it to the target shape.

To make the path corners rounded

1. Select the path.
2. From the paths shortcut menu, select the **Rounded Corners** check box.

- Right-click the path and select **Symbol(s) Properties** and in the **Properties** dialog box, set the **Rounded Corners** property to *true*

To create line jumps

Line jumps represent an intersection of lines. If you have a large diagram with lots of intersecting paths, line jumps make the diagram easier to understand.

By default line jumps are not displayed.You can configure a diagram to display line jumps in the following way:

1. From the diagram shortcut menu, choose **Diagram Properties**. The **Properties** dialog box appears.
2. Change the **Add Line Jumps To** property.

The **Add Line Jumps To** property has the following options:

- *None*. Line jumps are not displayed. (Default value)

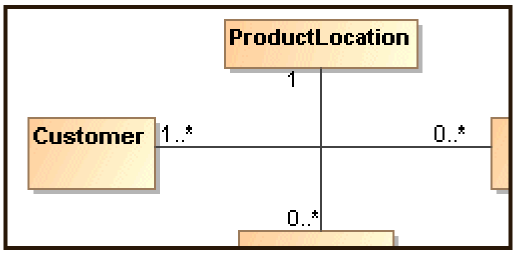


Figure 89 -- Diagram with no line jumps

- *Horizontal Line*. Line jumps are displayed on horizontal lines.

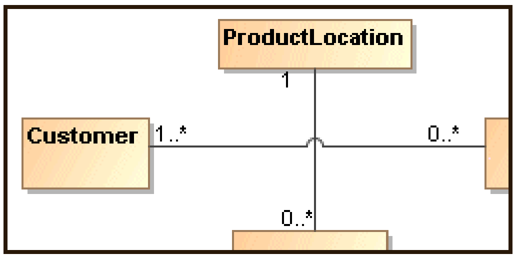


Figure 90 -- Diagram with horizontal line jumps

- *Vertical Line*. Line jumps are displayed on vertical lines.

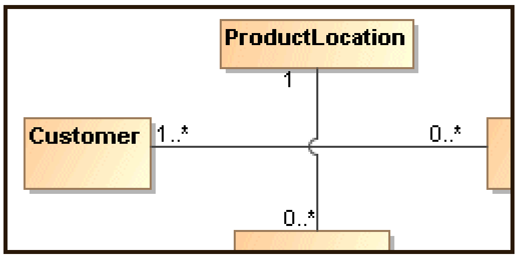


Figure 91 -- Diagram with vertical line jumps

Changing the **Add Line Jumps To** property for a particular diagram from within the diagram **Properties** dialog box, will change line jumps for the current diagram only. For more information about how to change line jumps for the whole project, see"Style Engine" on page 259.

Inserting a Shape on the Path

NOTE: This functionality is available in the State and Activity diagrams.

In the State and Activity diagrams you may split a path into two paths, by drawing a symbol on it. This is valid for Transition / Control Flow / Object Flow relationships and allowed to connect with these path elements.

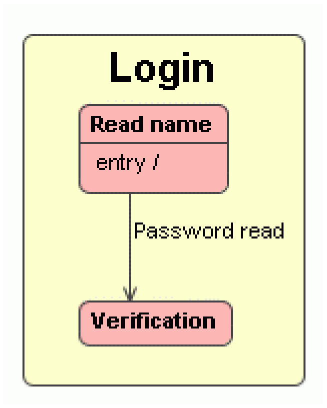
To insert a new shape splitting path on the diagram pane

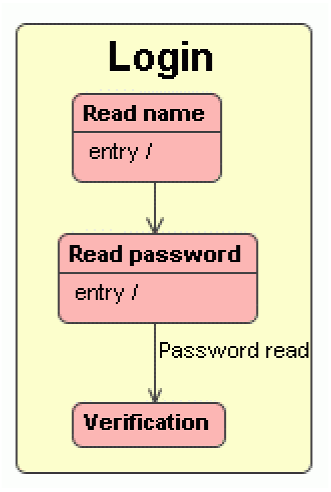
1. Select the symbol you want to insert or click the diagram toolbar button to create a new one.
2. Drag it on the path. The path is highlighted in blue.
3. Drop the symbol. A Message dialog box appears asking if you want to insert the symbol on the path.

Possible solutions:

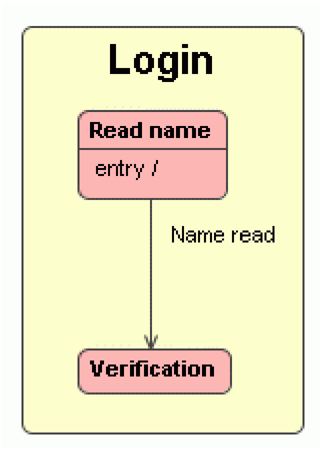
- **Before <path type>.** Symbol is inserted before the path. It means a new path is created, then the dropped element symbol is drawn and then the existing path is drawn. For example:

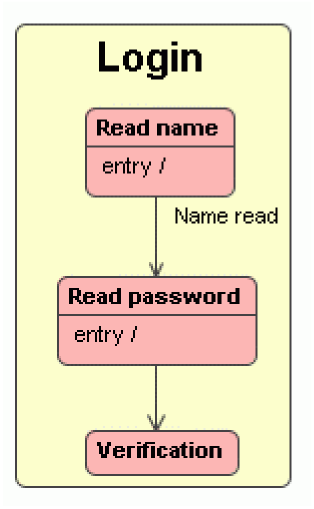
Password read transition is drawn from *Read Name* state to *Verification* state. If you want to insert *the Read password* state before the *Password read* transition, drop the *Read password* state on the transition and in the open dialog, click the **Before Transition** button.





- **After <path type>.** Symbol is inserted before path. It means, the existing path is created, then the dropped element symbol is drawn, and then a new path is drawn. For example: *Name read* transition is drawn from *Read Name* state to *Verification* state. If you want to insert the *Read password* state after the *Name read* transition, drop the *Read password* state on the transition and in the open dialog, click the **After Transition** button.





- **Do not insert.** Action is cancelled and the dialog is closed.

Select the Remember my choice check box and the next time an element will be inserted before or after the path, depending on your selection made this time.

Creating Relations from the Model

The main purpose of this functionality is to allow connecting and create traceability, according to UML, among elements, which are not from the same diagram. In other words, to link elements from a model without the need to place them in the same diagram.

Advantages of this implementation:

- Working time is saved on creating a diagram just to link elements for traceability.

- Some elements cannot be added to the same diagram and linked (elements from Behavior diagrams - Actions, States, Lifelines cannot be added to Static diagrams), this feature will allow the linking of such elements.
- Capability to relate multiple elements to a single element quickly. This is the usual case when a single element is represented with many elements in different abstraction levels or domains.
- The allocation relationship can provide an effective means for navigating the model by establishing cross relationships and ensuring the various parts of the model are properly integrated. For example, activity allocation to a bloc in SysML.
- Another example is creating an abstraction relationship with a stereotype «trace» between the model elements or sets of model elements that represent the same concept in different models.
- Smart manipulators allow connecting to any existing element quickly. Also, any Relation used with an element has a smart manipulator included. Draw any relation from any element and you will be able to select the existing target element from the browser.

To create a new relation for an element

1. From an element shortcut menu in the browser, select **New Relation** and then select the desired link from the group of **Outgoing** or **Incoming** relations. The **Create New <relation name> To (From)** dialog box opens.
2. In the model element tree, select an element to (from) which you want to create a relation. Click **OK.** The link will appear in the Browser. Type the name or leave it unnamed.

-or-

1. In the element **Specification** dialog box, select the **Relations** group.
2. Click the **Outgoing** or **Incoming** button and then select the desired link from the list. The **Create New <relation name> To (From)** dialog box opens.
3. In the model element tree, select an element to (from) which you want to create a relation. Click **OK.** The link will appear in the **Relations** group.

-or-

1. On the diagram pane, select an element and then select the desired link from the smart manipulator relations list that opens.
2. Right-click to open the target element list and select the **Select From Model** command. The **Create New <relation name> To** dialog box opens.
3. In the model element tree, select an element to which you want to create a relation. Click **OK.** The link will be drawn on the diagram pane.

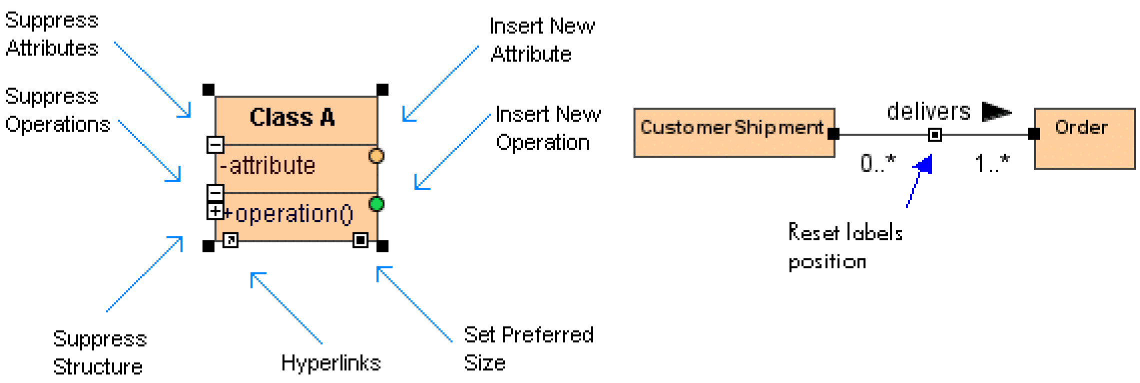
Smart Manipulation

View Online Demo	Smart Manipulators

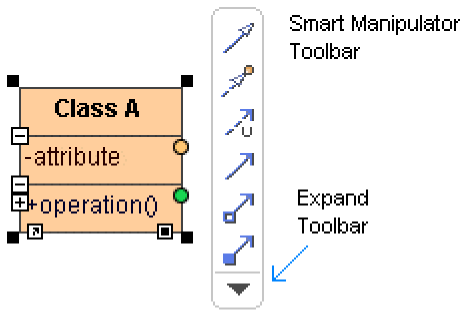
Smart Manipulation is a feature designed to make working with MagicDraw even easier. Use Smart Manipulation to suppress attributes and operations, set an auto-size option, reset a label position on a path, and draw relationships with most commonly used elements. MagicDraw offers varying smart mechanisms depending on the shapes involved.

There are two types of Smart Manipulators:

1. Small buttons are displayed within the symbol on the diagram pane.



2. Smart Manipulator toolbar, which appears when elements are selected on the diagram pane.



In the Smart Manipulator toolbar, smart manipulators are divided into *standard* and *extra* modes. You can toggle between these two modes by clicking the **Expand** button - the arrow symbol - located at the bottom of every Smart Manipulator toolbar. The program remembers your mode choice and displays it for all elements.

Use the Smart Manipulators toolbar to quickly perform simple actions and create new elements.

To create a new element connected to a particular element

1. Select a symbol on the diagram pane. The Smart Manipulator toolbar appears. In the toolbar, select the relationship you want to draw. The drawing of the selected relationship is initiated and the mouse cursor displays the new element which will be created.

For example, create a class symbol. In the class Smart Manipulator toolbar, select the Directed Association relationship for drawing. The drawing of this Directed Association relationship is initiated and the mouse cursor displays a class icon. Click the left mouse button. The element displayed on the mouse cursor is created together with the relationship.

2. Use the Smart Manipulator toolbar to select which element you want to draw at the other end of relationship. In the toolbar, select the relationship and then click the right mouse button. The list of elements available for creating appears. Select the element from the list and it will be created.

TIP!	To create a path breakpoint use the following keyboard combination: Ctrl key + Mouse click.

TIP!	To cancel the drawing of an element, press **Esc**.

The Autosize option is automatically added for all shapes.

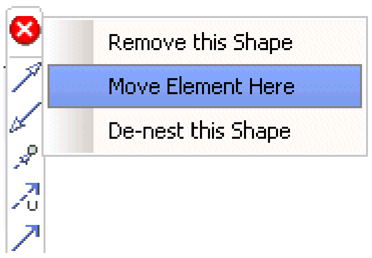
NOTE Autosizing is automatically switched off when the shape is being resized by the user.

To hide smart manipulation

1. From the **Options** menu, select **Environment**. The **Environment Options** dialog box opens.
2. In the **Diagram** pane, S**mart Manipulators** group, clear the **Show Smart Manipulation** check box and click **OK**.

To solve the detected symbol ownership problem

1. Select the element from the diagram pane, which is drawn on an incorrect ownership (which is highlighted in red). The Smart Manipulator toolbar appears.
2. Click the red button, which is at the top of the Smart Manipulator toolbar. The menu with the possible problem solving solutions appears.



For more information see “Resource Manager” on page 369.

Selection and Multiple Selections

To select a shape

- Click the desired shape on the Diagram pane.

To deselect the selected shape

Click outside the shape on the Diagram pane.

To select all shapes of the same type

Press ALT and click the shape. All shapes of the same type are selected.

To select all shapes on the diagram

From the **Edit** menu, select **Select All** (shortcut keys CTRL+A.)To make multiple selections

1. Click the shape on the Diagram pane.
2. Hold down the SHIFT key and click another shape. Repeat until you select the desired number of shapes.

- Drag the cursor diagonally across the area you wish to select. All shapes in the selected area will be selected.

To select a group of shapes

To select a group of shapes drag the cursor diagonally across the area you wish to select. This is a simple and fast way to select a group of shapes on the diagram.

See the sample of the rectangular selection in Figure 1.

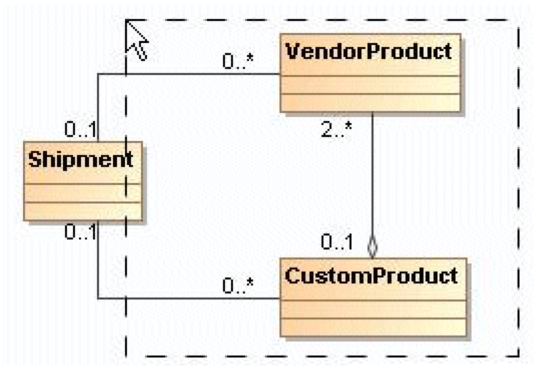


Figure 92 -- Rectangular selection

After the selection process represented in the Figure 1, the following shapes are selected, as shown in Figure 2.

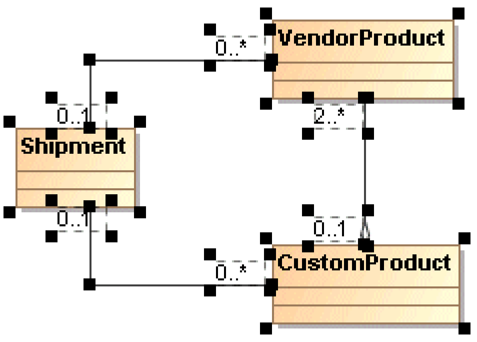


Figure 93 -- Rectangular selection result with partial selection coverage mode

The following rectangular selection modes are available:

1. *Partial coverage*. Symbols which are only partly covered with the rectangular selector are selected. See Figure 2. After the selection process represented in Figure 1, the class *Shipment* is selected by the rectangular selector, even though it was only partially covered.
2. *Complete coverage*. Only those symbols that are fully covered by the rectangular selection process will be selected. See Figure 3. For example, after the selection process shown in the Figure 1, the class *Shipment* and the associations are not selected because these symbols were not fully covered.

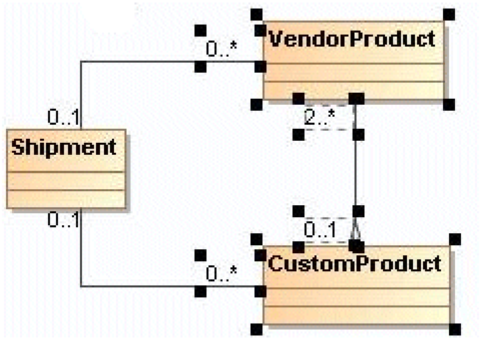


Figure 94 -- Rectangular selection result with complete coverage selection mode

Default selection mode is Partial coverage.

To quickly change the group selection mode from Partial coverage to Complete coverage mode or conversely:

- Press the **Ctrl** key and then drag the cursor diagonally across the area you want to select.

To change the group selection mode for the whole project:

- In the main diagram toolbar press the **Complete coverage mode for group selection** button (see Figure 95 on page 188).

OR

1. From the **Options** main menu, select **Environment**. The **Environment Options** dialog box appears.
2. In the **Diagram** branch, **Symbols Manipulation** group, change the property of the **Group selection mode** option.

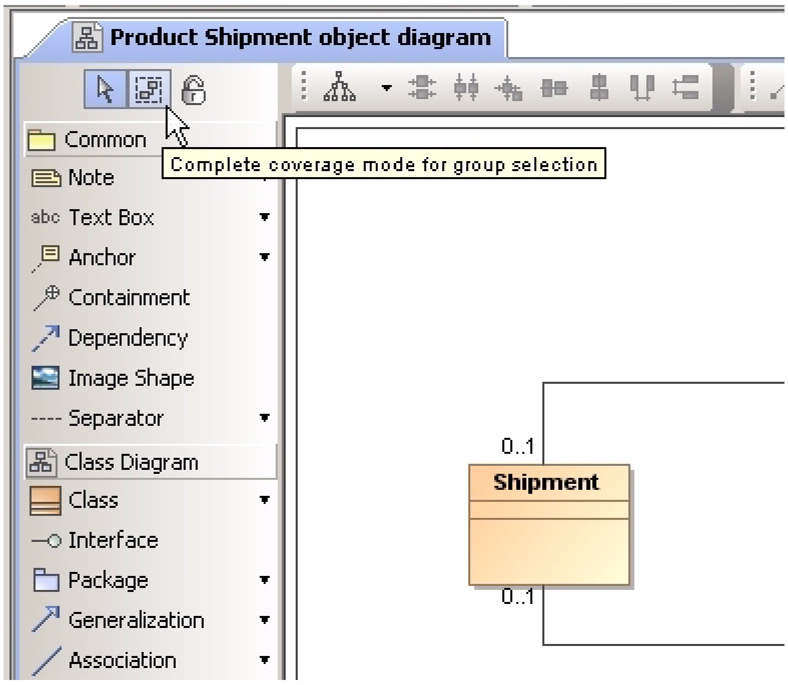


Figure 95 -- The Complete coverage mode for group selection button

Copying/Pasting Text or Images to Diagrams

It is now possible to copy and paste text or images to a diagram. A text box and an image shape will be available for the copied text or image. MagicDraw supports HTML and plain text, .gif, .jpg, .svg, and .png image file types. To copy and paste text or image:

1. Copy text or image(Ctrl+C).
2. Open a MagicDraw diagram.
3. Paste the copied text or image (Ctrl+P). The **Paste Special** dialog will open (Figure 96 on page 189).

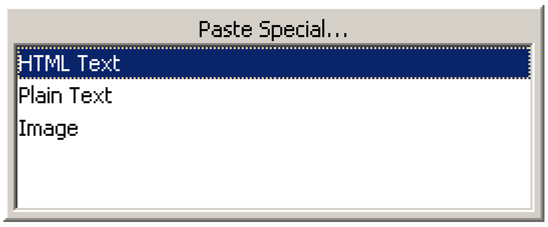


Figure 96 -- The Paste Special Dialog

NOTES

- This copy and paste feature functionality has been extended, allowing you to drag and drop from other applications such as Web browsers.
- The **Paste Special** dialog will open only if the clipboard contains any text or images, text, or HTML text formats.

Nesting Image Shapes

You can now drag an image to any elements in a diagram as nested a element (Figure 97 on page 189).

To drag an image to an element:

1. Select an image in the diagram pane.
2. Drag it to the image shape.

Dragged images will be nested by the following elements: Package, Model, Subsystem, Instance, Node, Part, Combined Fragment, Composite State (State diagram), Interruptible Activity Region, Structured Activity Node, Expansion Region, and Conditional Node (Activity diagram).

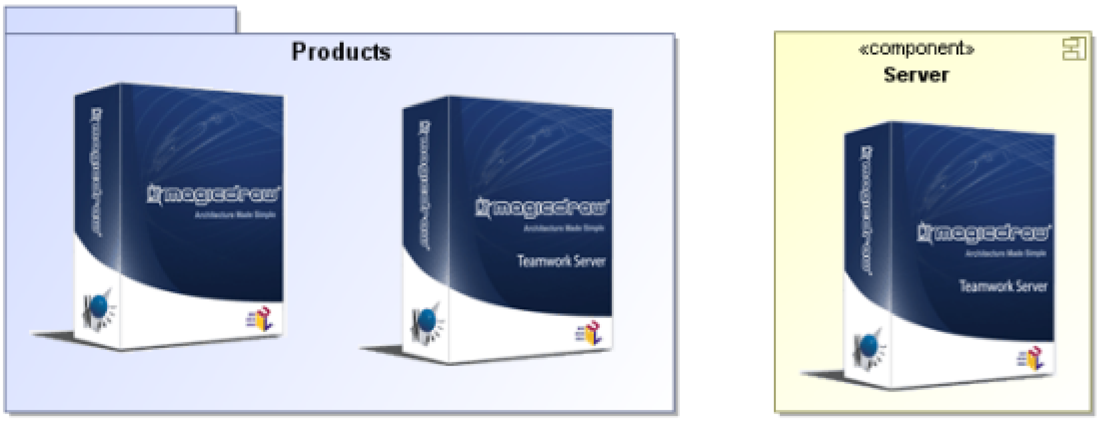


Figure 97 -- Samples of Images Nested to the Products Package and Server Component

Dragging, Copying, Cutting, and Pasting

Move a shape to another location on the diagram pane by dragging-and-dropping.

To drag multiple selected symbols

Select the symbols and drag them to the desired area on the diagram pane.

To copy a shape using dragging-and-dropping

Hold down the CTRL key while dragging the selected shape to the area where you wish to make a copy.

Drag and drop items from the browser to the diagram pane

1. In the Browser tree, select the created model element you wish to draw.
2. Drag it to the desired location on the diagram pane and drop it there.

NOTES
- You may select several model elements and draw them on the diagram pane.
- If the selected model elements are not compatible with the open diagram, you will not be allowed to draw those model elements.

To copy/cut and paste the selected shape on the diagram

1. From the **Edit** menu, select **Copy/Cut** (shortcut keys CTRL+C/CTRL+X.)
2. From the **Edit** menu, select **Paste** (shortcut keys CTRL+V.)

NOTE: You may copy/paste many (but not all) model elements among various diagrams.

To paste one or more copied model elements by creating new data and symbols

From the **Edit** menu, select the **Paste With New Data** command (shortcut keys CTRL+E.)

To copy the whole diagram and paste it to MS Office or other application

1. Select or deselect all model elements on the diagram.
2. From the **Edit** menu, select **Copy as BMP Image**, **Copy as EMF Image**, **Copy as JPG Image**, or **Copy as PNG Image** (shortcut keys CTRL+SHIFT+B, CTRL+SHIFT+E, CTRL+SHIFT+J, or CTRL+SHIFT+P)
3. Open the desired application and paste the copied diagram.

To copy the selected model elements and paste to MS Office or other application

1. Select the desired model elements on the diagram pane.
2. From the **Edit** menu, select **Copy as BMP Image, Copy as EMF Image**, **Copy as JPG Image**, or **Copy as PNG Image** (shortcut keys CTRL+SHIFT+B, CTRL+SHIFT+E, CTRL+SHIFT+J, or CTRL+SHIFT+P).
3. Open the desired application and paste the copied model elements.

TIP! You can drag and drop source code files from the native file manager to a MagicDraw Code Engineering Set.

NOTE You can copy or cut and paste the text only when using the shortcut keys CTRL+C or CTRL+X and CTRL+V. When you use the buttons or commands, the whole element is copied/cut and pasted.

Tooltip text

MagicDraw now displays a tooltip that shows supplementary information of what will happen whenever you drag any elements (Figure 99 on page 192, Figure 100 on page 192, Figure 102 on page 193).

Dragging a File to an Element

The improved drag-and-drop capability allows you to drag any files from your file system to any element in the browser or in a diagram. A hyperlink will be automatically created for the element to which the file is dragged, allowing you to open the file by double-clicking the element.

To drag a file on an element:

1. Select a file in your Explorer (Figure 98 on page 191).
2. Drag it to the element in the browser or in a diagram in MagicDraw (Figure 99 on page 192). A hyperlink to the file will be created.

Figure 99 on page 192 show how a hyperlink from the Products package to the Products_description.doc file is created.

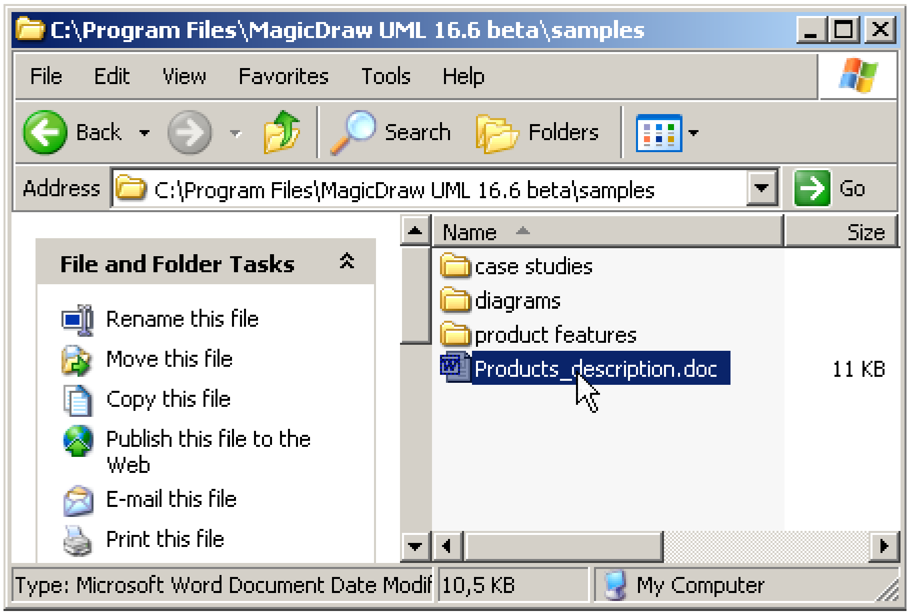


Figure 98 -- Selecting File in Your Explorer

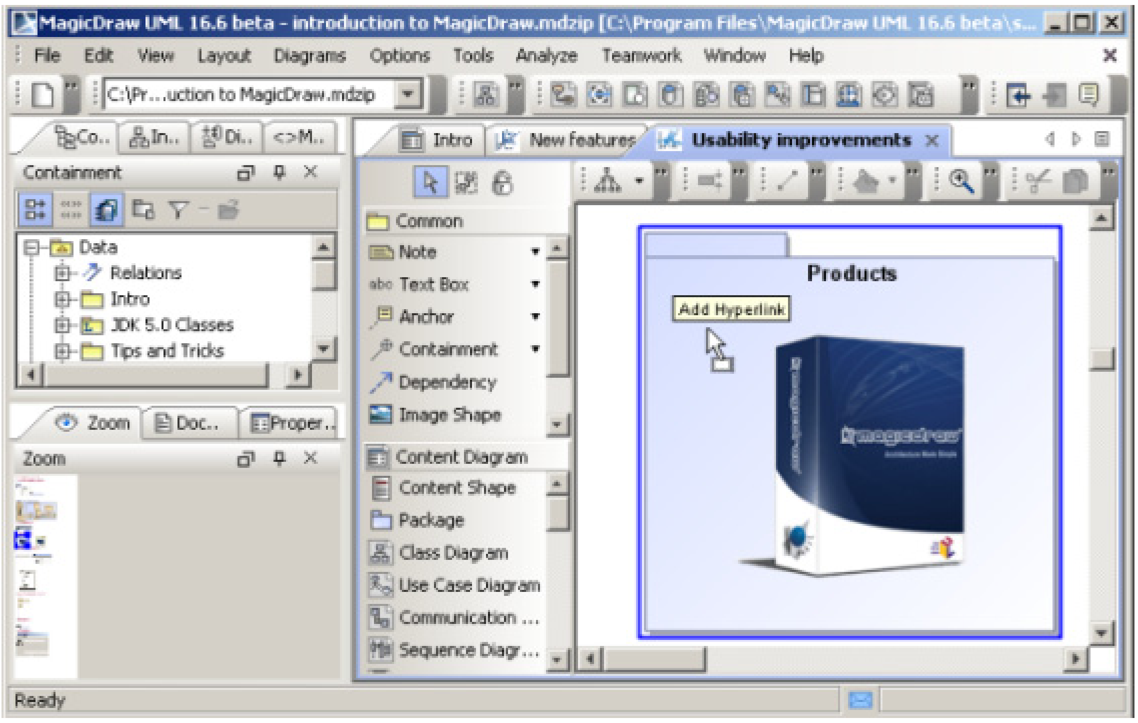


Figure 99 -- Dragging a File to the Element and Creating a Hyperlink

Drag and drop MagicDraw file on a diagram to open project

You can now drag MagicDraw project file from your file system and drop it on a diagram or any non-element. MagicDraw project will open (Figure 100 on page 192).

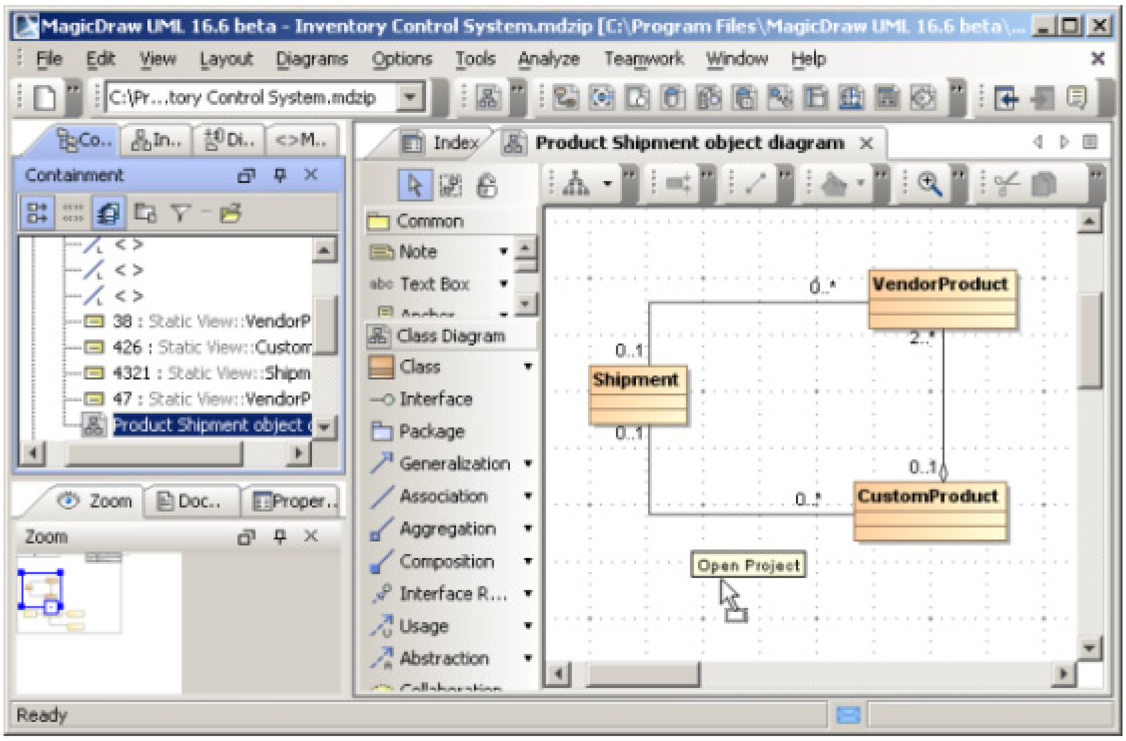


Figure 100 -- Dropping MagicDraw project file to diagram

Dragging an Image to an Element

You can now drag an image file from your file system to an element in the browser or in a diagram (Figure 101 on page 193). The image will be set as the value of the Image property of the element (Figure 102 on page 193).

The image will be set as a Stereotype icon if it is dragged to a Stereotype.

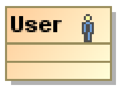
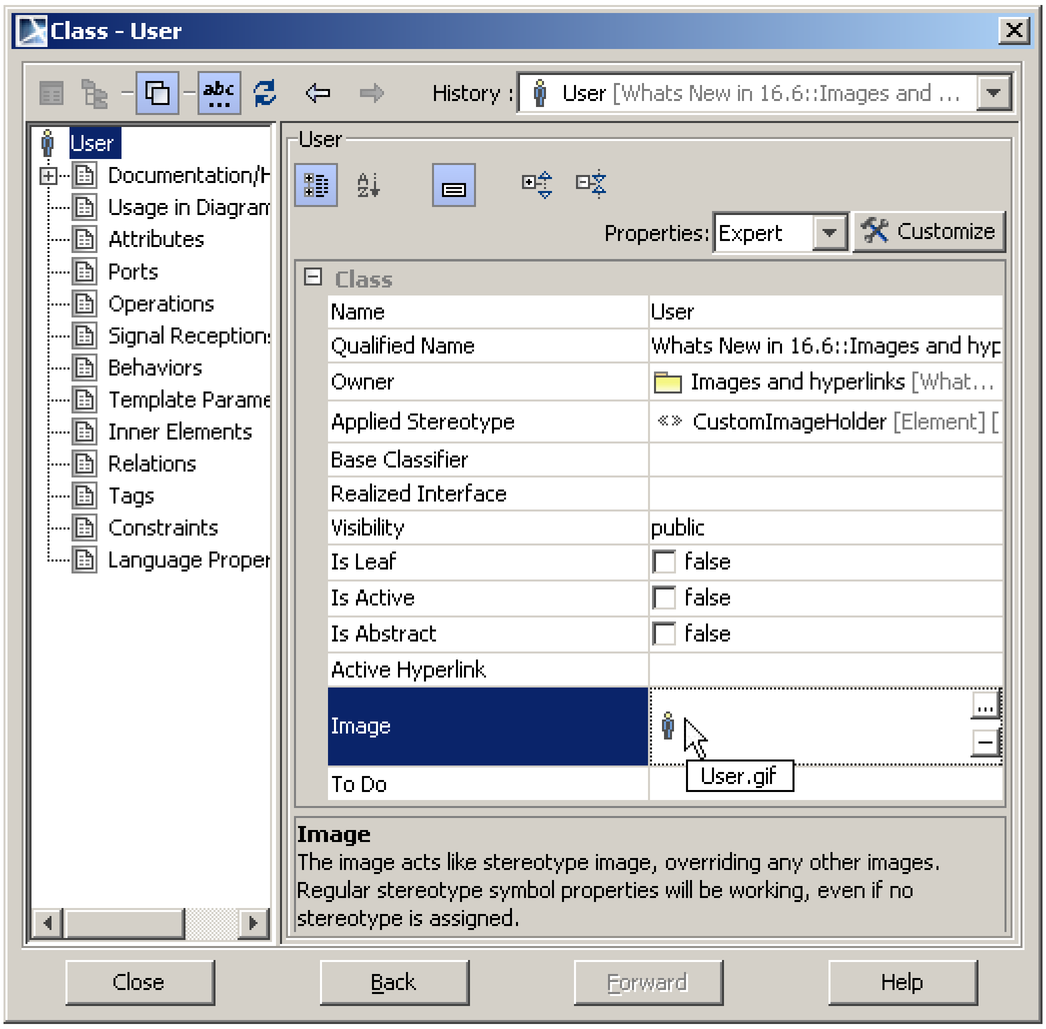


Figure 101 -- Image was Dragged and Dropped to the Class Shape



Class

Name	User
Qualified Name	Whats New in 16.6::Images and hyp
Owner	Images and hyperlinks [What...
Applied Stereotype	«» CustomImageHolder [Element] [
Base Classifier	
Realized Interface	
Visibility	public
Is Leaf	false
Is Active	false
Is Abstract	false
Active Hyperlink	
Image	User.gif
To Do	

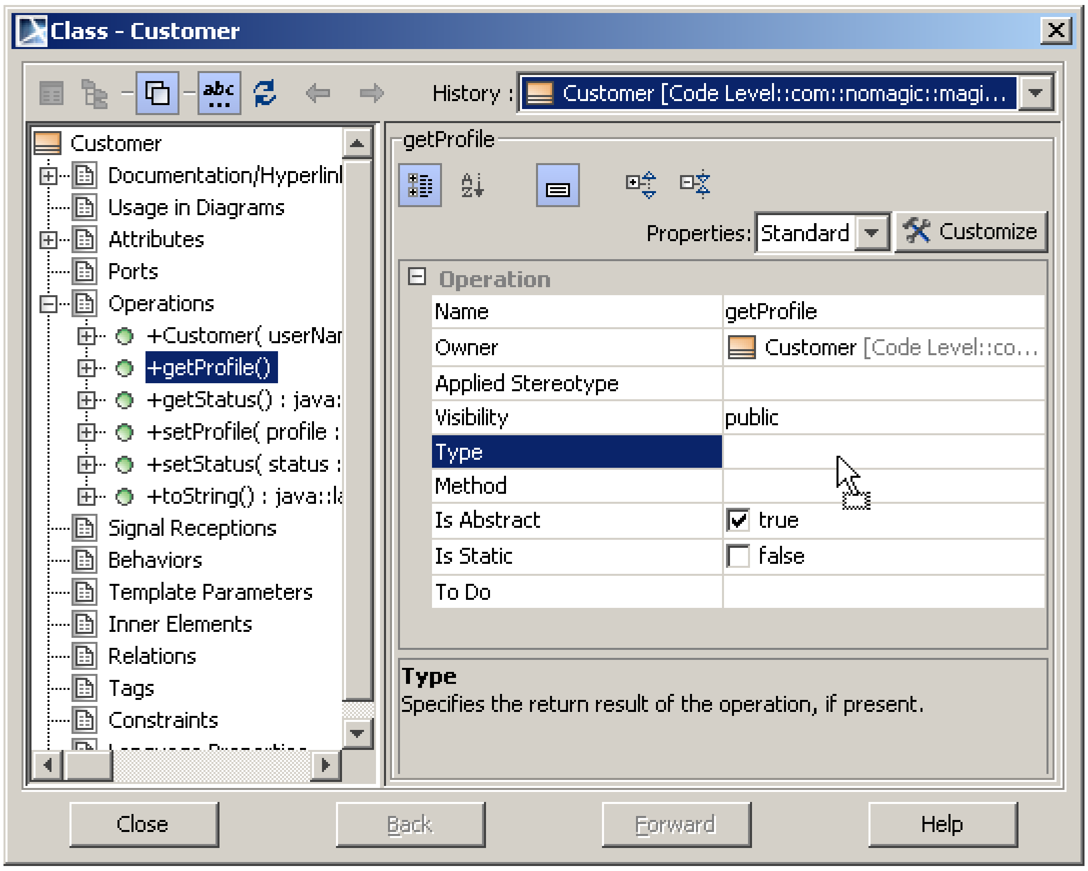
Image
The image acts like stereotype image, overriding any other images. Regular stereotype symbol properties will be working, even if no stereotype is assigned.

Figure 102 -- The Image Property in the Class Specification Dialog

Dragging Elements in the Specification Dialog

You can now drag any elements to any properties in the Specification dialog. For example, you can drag a Class element from the Containment tree to the **Type** property in the **Operation** Specification dialog. The Specification dialog will then assign that Class element as the type of the Operation element. In this case, the step-by-step example is as follows:

1. Open the *Customer* **Class** specification dialog, the **Operations** branch, and select the *getProfile* Operation.
2. Select the *CustomerProfile* class in the Containment tree () and drag it to the **Type** property area in the open Customer **Class** specification dialog (Figure 103 on page 194). The *getProfile* operation type will be assigned to the *CustomerProfile* class.


Class - Customer

History : Customer [Code Level::com::nomagic::magi...

Customer
- Documentation/Hyperlinl
- Usage in Diagrams
- Attributes
- Ports
- Operations
  - +Customer(userNar
  - +getProfile()
  - +getStatus() : java:
  - +setProfile(profile :
  - +setStatus(status :
  - +toString() : java::la
- Signal Receptions
- Behaviors
- Template Parameters
- Inner Elements
- Relations
- Tags
- Constraints

getProfile

Properties: Standard   Customize

Operation

Name	getProfile
Owner	Customer [Code Level::co...
Applied Stereotype	
Visibility	public
Type	
Method	
Is Abstract	☑ true
Is Static	☐ false
To Do	

Type
Specifies the return result of the operation, if present.

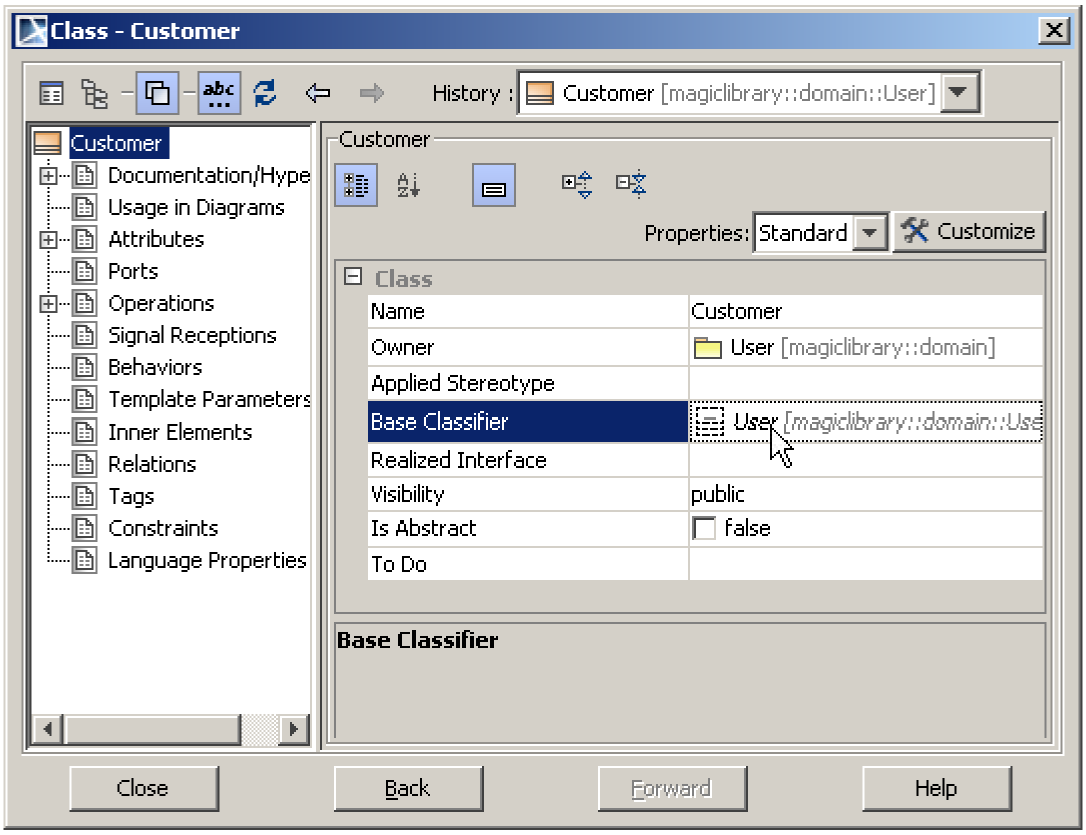
Figure 103 -- Dragging Class to the Property in the Specification Dialog

Dragging elements from the Specification dialog

You can now drag any elements from the Specification dialog to a diagram or to the browser. For example:

1. Open the Class specification dialog.
2. Select User Class, which is assigned as the Base Classifier (Figure 19).
3. Either (i) drag it to a diagram in the empty diagram pane to create a User Class symbol.

- Or (ii) drag it to the existing shape to create a new Attribute with Type.



Class	
Name	Customer
Owner	User [magiclibrary::domain]
Applied Stereotype	
Base Classifier	User [magiclibrary::domain::Use
Realized Interface	
Visibility	public
Is Abstract	false
To Do	

Base Classifier

Figure 104 -- Dragging from the Customer Class Specification Dialog

Drag and drop Stereotype

You can now drag Stereotype from Browser or Diagram on any other element to apply it.

Drag and drop in Sequence diagram

- You can now drag an Operation from the browser to a Message in a Sequence diagram. The message will become a Call Message with once the operation has been assigned.

NOTE The Lifeline type must have/inherit this operation.

- Dragging a Signal to a Message in a Sequence diagram will convert the Message into a Send Signal Message and assign the Signal to the Message.

Drag-and-drop in State Machine Diagrams

You can now drag an Event element to a Transition element in a State Machine diagram. A Trigger with this Event will be created for that Transition element.

Drag-and-drop in Activity Diagrams

It is now possible to:

- Drag a Signal to an Activity diagram to create a Send Signal Action.
- Drag a Signal to a Send Signal Action to set or change the Signal.

- Drag a Signal to a Accept Event Acton to set or change the Signal.

NOTE	Once the Signal is assigned to the Accept Event Action, a Signal Event for the diagram and a Trigger for the action will be created automatically.

- Drag an Event to an Activity diagram to create an Accept Event Action.
- Drag an Event to an Accept Event Action to set the Event.
- Drag a Signal Event to an Activity diagram to create an Accept Event Action.

Zooming

Zooming allows you to select a particular part of a diagram, zoom into it, and make changes while working with a finer level of detail. You can also gain an overview of a diagram by zooming out from it.

To fit the current diagram in the window

- From the **View** menu or from the diagram shortcut menu, select **Fit in Window** (shortcut keys CTRL+W.)
- In the Browser **Zoom** tab, click **Fit in Window** .

To zoom into the current diagram

- From the **View** menu or from the diagram shortcut menu, select **Zoom In** (shortcut keys CTRL+NumPad PLUS SIGN (+) or scroll.)
- Click the **Zoom In** toolbar button .

To zoom out from the current diagram

- From the **View** menu or from the diagram shortcut menu, select **Zoom Out** (shortcut keys CTRL+NumPad MINUS SIGN (-) or scroll.)
- Click the **Zoom Out** toolbar button .

TIP!	You can zoom in or zoom out using the CTRL+wheel keys.

To restore the diagram to the original size

- From the **View** menu or from the diagram shortcut menu, select **Zoom 1:1** (shortcut keys CTRL+NumPad SLASH MARK (/).)
- Click the **Zoom 1:1** toolbar button .

To view the selected shapes at maximum size

Select the shapes and then from either the **View** menu or the diagram shortcut menu, select **Zoom to Selection** (shortcut keys CTRL+NumPad ASTERICS MARK (*).)

To select the zoom settings

1. From the **Options** menu, select **Environment.** The **Environment Options** dialog box opens.
2. Open the **Diagram** pane and change the **Zoom Step Size** property. The maximum number is 1.0 (you may zoom a diagram twice.)

NOTE You may also zoom in or out of the diagram using the zoom panel in the Browser window. For the detailed description, see "Zoom panel" on page 87.

Using the Grid

The grid helps to arrange diagram symbols on the diagram pane. By default the grid is in the visible state.

To change the grid state (visible, not visible)

From either the **View** menu or from the diagram shortcut menu, select **Grid** and then select/clear the **Show Grid** check box.

To pull a path with the intersection of gridlines

From either the **View** menu or from the diagram shortcut menu, select **Grid** and then select/clear the **Snap Paths to Grid** check box.

To pull a shape with the intersection of gridlines

From either the **View** menu or from the diagram shortcut menu, select **Grid** and then select/clear the **Snap Shapes to Grid** check box.

To change the grid size

1. From either the **View** menu or from the diagram shortcut menu, select **Grid** and then select **Grid Size**.
2. The **Grid Size** dialog box opens.
3. Enter a grid size between 2 and 30 (default is 10).
4. Click **OK**.

To change the grid style

1. From the **Options** menu, select **Environment**. The **Environment Options** dialog box opens.
2. From the **Grid Style** drop-down list, select one of the following styles:
   - Dense
   - Sparse (default)

Layout

NOTE	The diagram layout engine is available in Standard, Professional, Architect, and Enterprise editions.

In MagicDraw, it is easy to manage simple or complex diagrams using the automated layout features that optimize diagram layout for viewing.

Arrange your symbols on the Diagram pane using the **Layout** menu, or you can use the symbol shortcut menu when two or more symbols are selected. Since MagicDraw version 8.0, a new layout component has been applied with many more possibilities for arranging your models.

To resize the selected shape

- Drag the corner of the shape to the desired size.

To automatically resize the selected shape to a preferred size

- From the shape shortcut menu, select **Autosize**.

To alter the routing of the path line

- Drag any point of the selected path in any direction.

The MagicDraw layout mechanism is built on various layout tools. All layout tools could be separated into 2 different groups: general layout tools and specific diagram layout tools. These are the general layout tools:

- Orthogonal Layout Tool
- Hierarchic Layout Tool
- Tree Layout Tool
- Organic Layout Tool
- Circular Layout Tool
- Path Router

These layout tools are provided by Files layout tool component. You can arrange each diagram (except Sequence and Time Diagram) by using any of the 6 general layout tools.

Orthogonal Layout Tool

The Orthogonal Layout is well suited for medium sized sparse diagrams. It produces compact drawings with no shape overlaps, few crossings and few bends. All edges will be routed in an orthogonal style, i.e. only rectilinear style paths will be used.

Orthogonal layout options

Option	Values	Default Value	Description
Use Existing Drawing as Sketch	Boolean	False	The layout tool tries to "orthogonalize" the given sketch by interpreting it and without making too many modifications in respect to the original drawing.
Layout Only Top Level Symbols	Boolean	False	Keeps the relative position of symbols inside packages and performs the top level layout.

Option	Values	Default Value	Description
Group Layout Quality	0-1	1	Set the desired layout quality. Higher values result in less connection crossings and smaller layout area, but also increased computation time.
Orthogonal Grid	Integer	50	Defines the virtual grid spacing used by the layout tool. Each shape center point lies on a grid point.

Hierarchic Layout Tool

The Hierarchic layout can be used to highlight the main direction or flow within a diagram. Cyclic dependencies of shapes will be automatically detected and resolved. Shapes will be placed in layers, arranged by hierarchy. Additionally, the ordering of nodes within each layer is chosen in such a way that the number of path crossings is minimal.

Hierarchy layout options

Option	Values	Default Value	Description
Reverse Orientation in Activity Diagram	Boolean	True	If True, orientation is reversed in activity diagram.
Minimal Layer Distance	Integer	40	Determines the minimal distance between shapes that reside in adjacent layers.
Minimal Shape Distance	Integer	30	Determines the minimal distance between adjacent shapes that reside in the same layer.
Minimal Path Distance	Integer	30	Determines the distance between adjacent pairs of horizontal path segments and between horizontal path segments and shapes.
Minimal First Segment Length	Integer	10	Determines the minimal length of the first and last segments for orthogonal path routings, i.e. the length from the intersection points to the first or last bend point respectively.
Orientation	Top to Bottom, Bottom to Top, Left to Right, Right to Left	Top to Bottom	Determines main layout orientation.

Option	Values	Default Value	Description
Shape Placement	Linear Segments, Polyline, Simplex, Pendulum, Median Simplex, Tree	Simplex	Linear Segments. Aligns shapes in such a way that path segments tend to have very few bends. It is a very good choice in combination with Path Routing set to Orthogonal. However, this greatly increases layout width. • **Polyline**. Aligns shapes by slightly reducing the width without shape overlaps. Although, paths will have lots of bends. • **Pendulum**. A sound combination of Linear Segments and Polyline. • **Simplex**. Produces high quality drawings. Similar to Linear Segments, aligns shapes in such a way that path segments tend to have very few bends. Additionally, the resulting layout will be more balanced and more compact. • **Median Simplex**. Tends to produce more locally symmetric layouts for the sake of a few more bends. • **Tree**. Produces very nice layout, when the graph is a tree. If the graph is not a tree, the placement policy of Linear Segments will be used.
Path Routing	Oblique, Orthogonal	Orthogonal	• **Oblique**. Paths are routed to oblique style with a certain number of bends. • **Orthogonal**. Paths are routed to orthogonal style. Orthogonal path routing increases the height of the layout.
Randomization Rounds	Integer	40	Determines the number of rounds that are initialized using different randomized starting positions. Greater values can lead to fewer crossings and longer running times. Huge diagrams with lots of inherent crossings should be processed using smaller values.
Layout Only Top Level Symbols	Boolean	False	Keeps the relative position of symbols inside packages and performs the layout only on the top level.
Make Sub Trees	Boolean	True	Inheritance paths are joined into inheritance arcs.

Tree Layout Tool

The Tree layouter organizes diagram shapes into a tree structure. The Tree layout tool might be applied on shapes that have no undirected cyclic paths between them.

Table 3, Visible Tree layout options

Option	Values	Default Value	Description
Layout Style	Directed, Balloon, **Horizontal-Vertical**	Directed	• **Directed**. The tree is a hierarchy layout hierarchically with the root shape on the top. This is a good choice for directed trees with a unique root shape and a moderate number of shapes on a single hierarchy level. This layout style uses the current diagram layout as a sketch to determine the order of siblings at a common shape. • **Balloon**. The tree is routed in a radial style. This is a good choice for undirected, dense, or huge trees with a high number of shapes on a single hierarchy level. • **Horizontal-Vertical**. Children of a shape are either arranged on a horizontal or on a vertical line. Paths are routed orthogonally. This layout can be very compact if you choose the right alignment type for children of a node.
Make Sub Trees	Boolean	True	Inheritance paths are joined into inheritance arcs.
Directed			
Minimal Layer Distance	Integer	50	Determines the minimal distance between parent and child shapes.
Minimal Shape Distance	Integer	50	Determines the minimal distance between siblings of a shape.
Orientation	Top to Bottom, Bottom to Top, Left to Right, Left to Right	Top to bottom	Determines the main layout orientation. The layout tool tries to arrange shapes in such a way that all paths point in the main layout direction.
Port Style	Border Centered, Border Distributed	Border Centered	Determines the way paths are attached to shapes. • **Border Centered**. Paths are attached to the center of the border of corresponding shapes. • **Border Distributed**. Path attachment points are distributed along the border of corresponding shapes.
Orthogonal Path Routing	Boolean	True	If selected, all paths are routed orthogonally in a bus-like fashion. If not selected, paths are routed as straight line segments.
Balloon			
Root Shape Position	Directed Root, Center Root	Center Root	• **Directed Root**. Selects a shape with indegree zero if present. A good choice for directed root trees. • **Center Root**. Selects the root shape in such a way that the depth of the resulting tree is minimized.

Option	Values	Default Value	Description
Preferred Child Wedge	0-360	340	Determines the angular range of the sector that will be reserved for children of a shape. The remaining angular range will be automatically used to accommodate the edge that connects to the root node.
Preferred Root Wedge	0-360	360	Determines the angular range of the sector that will be reserved around the root shape to accommodate attached subtrees.
Minimal Path Length	Integer	50	Determines the minimal length of a path.
Compactness Factor	0.1-0.9	0.5	A smaller compactness factor will result in shorter paths and a more compact overall layout.
Horizontal-Vertical			
Horizontal Spacing	Integer	20	The minimal horizontal distance between adjacent shapes.
Vertical Spacing	integer	20	The minimal vertical distance between adjacent shapes.

Organic Layout Tool

The organic layout is well-suited for the visualization of highly connected backbone regions with attached peripheral ring or star structures. These structurally different regions of a network can be easily identified by looking at a drawing produced by this layout tool.

Organic layout options

Option	Values	Default Value	Description
Preferred Path Length	Integer	50	Specify the preferred length of all paths. The layout tool tries to arrange the shapes in such a way that paths have a determined path length.
Obey Shape Size	Boolean	True	If True, the distance between two shapes is calculated with respect to the size of the shape.
Gravity Factor	-0.2-2	2	Regulates the tendency of the shapes to be placed near the center of the diagram. The greater the factor is, the closer shapes are placed to the center of diagram. Negative values lead to huge layouts.
Path Attraction	0-2	2	Higher values make Layout tool obey the given preferred path length.
Shape Repulsion	0-2	0	Higher values result in greater shape distances.
Activate Tree Beautifier	Boolean	True	If True, optimizes tree-like substructures of the diagram. The optimization process might ignore some layout options.
Layout Only Top Level Symbols	Boolean	False	If True, the algorithm keeps the relative position of the symbols inside the packages and performs the layout only on the top level.

Option	Values	Default Value	Description
Package Shape Compactness	0-1	0.2	Control the compactness of the package shape. Larger values lead to more compact package shapes, but paths between packages may be longer and the shapes inside packages tend to get clutched together at the center of the package.

Circular Layout Tool

The Circular Layout produces arrangements that emphasize group and tree structures within a network. It partitions shapes into groups by analyzing the connectivity structure of the network. The detected groups are arranged on separate circles. The circles themselves are arranged in a radial tree layout fashion.

Circular Layouter options

Option	Values	Default Value	Description
Layout Style	Compact, Isolated, Single Cycle	Compact	• **Compact**. Each group will consist of shapes that are reachable by two disjoint paths. Shapes that belong to more than one group will be assigned exclusively to one group. • **Isolated**. Each group will consist of shapes that are reachable by two path disjoint paths. All shapes belonging to more than one group will be assigned to an isolated group. • **Single Cycle**. All shapes will be arranged on a single circle.
Minimal Shape Distance	Integer	100	Determines the minimal distance between borders of two adjacent shapes on a common circle. The smaller the distance, the more compact the resulting layout.
Auto Circle Radius	Boolean	True	If True, automatically determines the radius of each circle in the layout. An automatically chosen radius is usually the smallest possible radius that obeys Minimal Node Distance.
Fixed Circle Radius	Integer	200	If Auto Circle Radius is not set, this option determines the fixed radius for all circles in the resulting layout. Minimal Node Distance will be ignored in this case.
Preferred Child Wedge	0-360	340	Determines the angular range of the sector that will be reserved for children of a shape. The remaining angular range will be automatically used to accommodate the paths that connect to the root node.
Minimal Path Length	Integer	50	Determines the minimal length of a path that connects two shapes that lie on separate circles. The smaller the chosen value, the more compact the resulting layout.
Maximal Deviation Angle	10-360	100	The bigger the chosen value, the more compact the resulting layout. If the value is smaller than 90 degrees, the tree-edges might cross through the circularly arranged groups of shapes.

Option	Values	Default Value	Description
Compactness Factor	0.1-0.9	0.5	The smaller the compactness factor, the shorter paths and the more compact the overall layout.

Orthogonal Path Router

This layout routes paths using only vertical and horizontal line segments, while keeping the positions of shapes in the diagram fixed. The routed paths usually will not cross any shapes and will not overlap any other paths**.**

Orthogonal Path layout options

Option	Values	Default Value	Description
Minimal Distance	Integer	20	Specifies the minimal allowed distance between shapes and paths.
Use Existing Bends	Boolean	False	Specifies whether existing bends should be used as an initial solution for the new routing.
Route Only Necessary	Boolean	False	If True, only paths that violate the minimal distance criterion will be rerouted.

Organic Path Router

This layout routes paths using an oblique path style, while keeping fixed positions of shapes on a diagram. The routed paths usually will not cross any shapes and will not overlap any other paths.

Organic Path layout options

Option	Values	Default Value	Description
Minimum Path Distance	Integer	1	Determines the minimum distance between any two path segments.
Custom Minimum Distance to Nodes	Integer	10	Determines the distance between any path segment and any shape side. The path router strictly adheres to the set value. Router does not use this value by default due to increased calculation times.
Route on Grid	Boolean	True	If True, all paths are routed on grid lines from the predefined grid.
Space Driven Vs. Center Driven Search	0-1	1	Determines the ratio between two complementary weighting strategies when looking for a path, namely "center driven" and "space driven" weighting. Values closer to 0 lead to paths that are more distributed over the available space. Values closer to 1 give more emphasis to paths closer to a path center.
Local Crossing Minimization	Boolean	True	If False, the number of crossings seen at a shape side can increase considerably. Since this option has a positive effect on a diagram "readability," it is enabled by default.

Class Diagram Layout Tool

The Class diagram layout tool uses different layout algorithms to improve class diagram readability.

Class Diagram layout options

Option	Values	Default Value	Description
Minimal Layer Distance	Integer	50	Determines the minimal distance between parent and child shapes.
Minimal Shape Distance	Integer	50	Determines the minimal distance between the siblings of a shape.
Orientation	Top to Bottom, Bottom to Top, Left to Right, Right to Left	Top to bottom	Determines the main layout orientation. The layout tool tries to arrange shapes in such a way that all paths point in the main layout direction.
Compactness Factor	0-1	1	Adjusting this value can lead to a variety of differing layouts. For small values, the resulting layout will use more space and shapes tend to be far away from each other. Values around 0.5 lead to evenly distributed shapes, whereas values near 1.0 produce highly compact layouts.
Space Driven Vs. Center Driven Search	0-1	1	Determines the ratio between two complementary weighting strategies when looking for a path, namely "center driven" and "space driven" weighting. Values closer to 0 lead to paths that are more distributed over the available space. Values closer to 1 give more emphasis to paths closer to a path center.
Build Generalization Hierarchies	Boolean	True	Classes connected by generalization paths are organized into hierarchies.
Build Realization Hierarchies	Boolean	False	Classes connected by realization paths are organized into hierarchies.
Build Containment Hierarchies	Boolean	False	Classes connected by containment paths are organized into hierarchies.
Make Sub Trees	Boolean	True	If enabled, inheritance paths will be joined into inheritance arcs.

Activity Diagram Layout Tool

The Activity diagram layout tool uses different layout algorithms to improve activity diagram readability.

Activity Diagram layout options

Option	Values	Default Value	Description
Minimal Layer Distance	Integer	40	Determines the minimal distance between parent and child shapes.
Minimal Shape Distance	Integer	30	Determines the minimal distance between the siblings of a shape.

Option	Values	Default Value	Description
Minimal path distance	Integer	30	Determines the distance between adjacent pairs of horizontal path segments and between horizontal path segments and shapes.
Minimal first segment length	Integer	30	Determines the minimal length of the first and last segments for orthogonal path routings, i.e. the length from the intersection points to the first or last bend point respectively.
Orientation	Top to Bottom, Bottom to Top, Left to Right, Right to Left	Top to bottom	Determines the main layout orientation.
Shape Placement	Linear segments Polyline Simplex Pendulum Median simplex Tree	Simplex	**Linear segments** - aligns shapes in such a way that path segments tend to have very few bends. It is a very good choice in combination with Path Routing set to Orthogonal. However, this greatly increases the width of the layout. **Polyline** - aligns shapes by slightly reducing the width without shape overlaps. Although paths will have lots of bends. **Pendulum** - a sound combination of Linear Segments and Polyline. **Simplex** - produces high quality drawings. Similar to Linear Segments, aligns shapes in such a way that path segments tend to have very few bends. Additionally, the resulting layout will be more balanced and more compact. **Median Simplex** - tends to produce more locally symmetric layouts for the sake of a few more bends. **Tree** - produces very nice layouts, when the graph is a tree. If the graph is not a tree, a placement policy of Linear Segments will be used.
Path Routing	Oblique Orthogonal	Orthogonal	**Oblique** - paths are routed to oblique style with a certain number of bends. **Orthogonal** - paths are routed to orthogonal style. Orthogonal path routing increases the height of the layout.
Randomization Rounds	Integer	40	Determines the number of rounds that are initialized using different randomized starting positions. Greater values can lead to fewer crossings and longer running times. Huge diagrams with lots of inherent crossings should be processed using smaller values.
Layout only top level symbols	Boolean	False	Keeps the relative position of symbols inside packages and performs the top level layout.

For more information about the smart layout feature drawing diagram, see “Smart Activity Diagram layout” on page 543.

Business Process Diagram Layout tool

The Business process diagram layout uses different layout algorithms to improve business process diagram readability.

Business process diagram layout options

Option	Values	Default Value	Description
Minimal Layer Distance	Integer	40	Determines the minimal distance between shapes that reside in adjacent layers.
Minimal Shape Distance	Integer	30	Determines the minimal distance between borders of two adjacent shapes on a common circle. The smaller the distance, the more compact the resulting layout.
Minimal Path Distance	Integer	30	Determines the distance between adjacent pairs of horizontal path segments and between horizontal path segments and shapes.
Minimal first segment length	Integer	30	Determines the minimal length of the first and last segments for orthogonal path routings, i.e. the length from the intersection points to the first or last bend point respectively.
Orientation	Top to Bottom, Bottom to Top, Left to Right, Right to Left	Top to bottom	Determines the main layout orientation.
Shape Placement	Linear segments Polyline Simplex Pendulum Median simplex Tree	Tree	**Linear segments** - aligns shapes in such a way that path segments tend to have very few bends. It is a very good choice in combination with Path Routing set to Orthogonal. However, this greatly increases the width of the layout. **Polyline** - aligns shapes by slightly reducing the width without shape overlaps. Although paths will have lots of bends. **Pendulum** - a sound combination of Linear Segments and Polyline. **Simplex** - produces high quality drawings. Similar to Linear Segments, aligns shapes in such a way that path segments tend to have very few bends. Additionally, the resulting layout will be more balanced and more compact. **Median Simplex** - tends to produce more locally symmetric layouts for the sake of a few more bends. **Tree** - produces very nice layouts, when the graph is a tree. If the graph is not a tree, a placement policy of Linear Segments will be used.
Path Routing	Oblique Orthogonal	Orthogonal	**Oblique** - paths are routed to oblique style with a certain number of bends. **Orthogonal** - paths are routed to orthogonal style. Orthogonal path routing increases the height of the layout.

Option	Values	Default Value	Description
Randomization Rounds	Integer	40	Determines the number of rounds that are initialized using different randomized starting positions. Greater values can lead to fewer crossings and longer running times. Huge diagrams with lots of inherent crossings should be processed using smaller values.
Layout only top level symbols	Boolean	False	Keeps the relative position of symbols inside packages and performs the top level layout.

Quick Diagram Layout Tool

You can use the **Quick Diagram Layout** command from the **Layout** menu when editing a diagram that is other than the class or the sequence diagram. The recommended layout with default options will be applied on the diagram.

Label layout in the diagram

In MagicDraw 16.0 version there is improved label layout in the diagram. The following label positions are improved for paths, relationship ends, and shapes:

- Default label positions were reviewed and improved.
- Label positions after moving a path, shape, or related element.

Default label positions

Default label positions leaves after moving a path, shape, or related element if it is semantically logical decision. See an example below, there association multiplicities leaves at their default positions after class is moved.

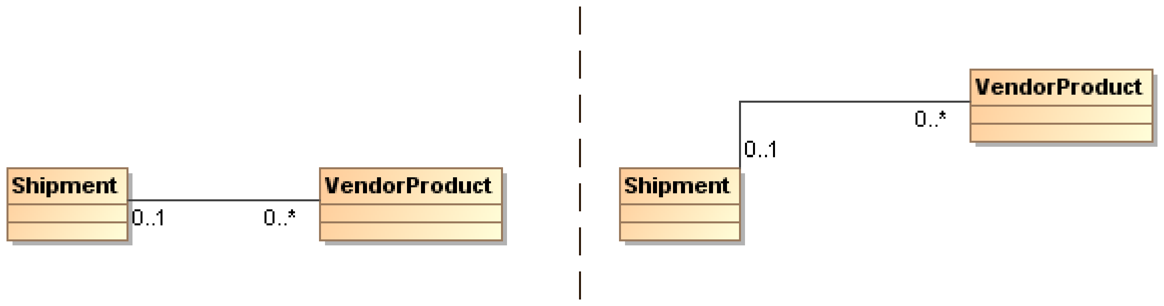


Figure 105 -- Default label position example

NOTE: If labels are at their default position, reset labels position functionality is disabled.

Labels positions after moving a path, shape or related element

After moving a path, shape or related element default label positions leaves if it is semantically logical decision.

For nicer representation of labels in diagram in the following cases labels positions are reseted to their default position automatically:

1. Symbol properties edit. When symbol properties edit causes label text box addition or removal from diagram pane labels positions are reseted.

2. Path, path end or port properties edit. When path, path end or port data edit causes label text box addition or removal from diagram pane labels positions are recalculated. See an example when qualifier is added in Figure 107 on page 209.
3. Path, shape or related element movement. See an example, when related element is moved Figure 108 on page 209.

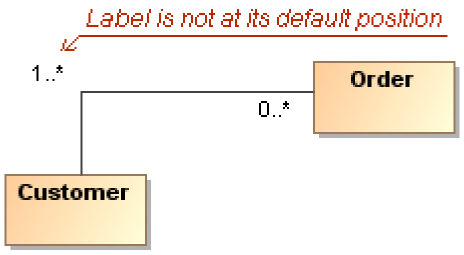


Figure 106 -- Label position before changes

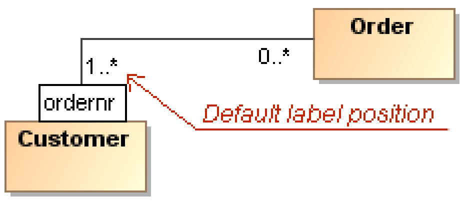


Figure 107 -- Label position is reseted to its default position after qualifier is added

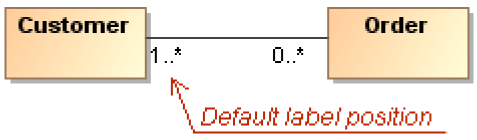


Figure 108 -- Label position is reseted to its default position after Order class movement

Displaying label deviation from default position

While moving text box from default position, dotted line shows deviation from default position. This helps to see the current labels owner (See Figure 109 on page 209).

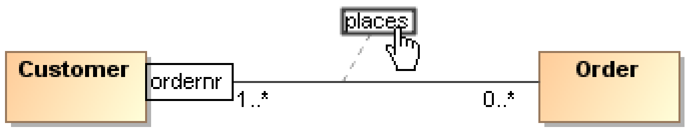


Figure 109 -- Dotted line, which shows deviation from the default position

Indicating label if it is not at its default position

If label is not at its default labels position, label right bottom corner is marked after label owner (path or shape) selection on diagram pane (see Figure 110 on page 210).

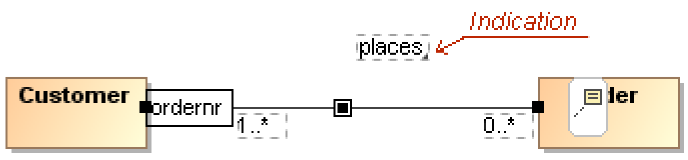


Figure 110 -- Marking the label when it is not at its default position

Showing Diagrams in Full Screen

If you want to see your diagrams in full screen and work exclusively from the diagram, use the (**show diagrams in full screen**) functionality. In full screen mode all necessary modeling commands will be visible, with option to hide, and the Browser will be in auto hide mode. You may also manage the MagicDraw interface components to be displayed or hidden.

To turn on diagram full screen mode

There are four ways to turn on the diagram full screen mode:

- Double click on the diagram tab with the diagram name at the top of diagram.
- From the diagram shortcut menu, select the **Show Diagrams in Full Screen** command.
- From the **View** menu, select the **Show Diagrams in Full Screen** command.
- Press the F11 key.

NOTE: You may change the **Show diagrams in full screen** shortcut key in the **Environment Options** dialog box, **Keyboard** pane. For more information, see “Assigning Shortcut Keys” on page 96.

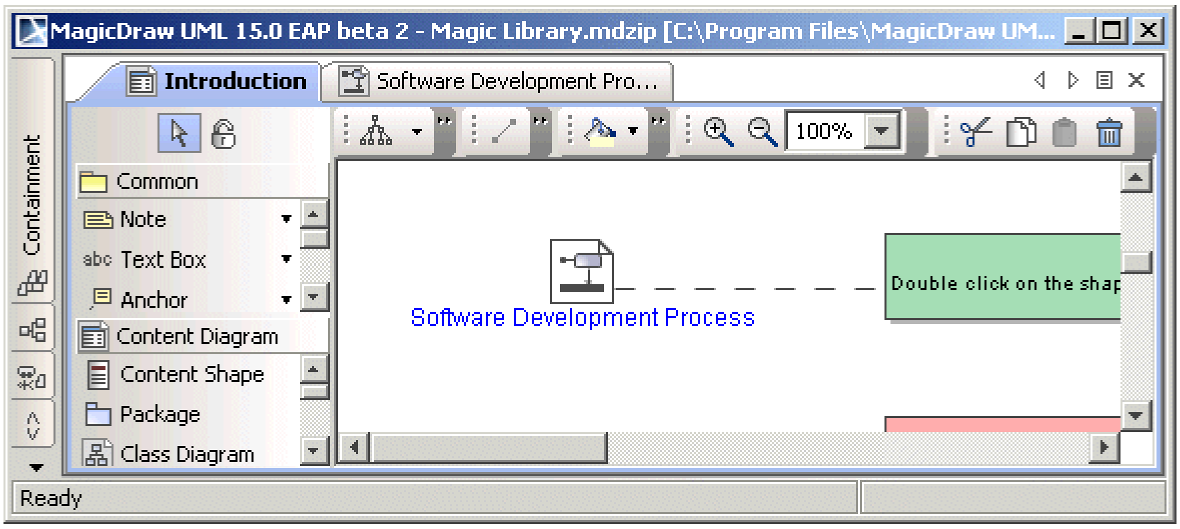

MagicDraw UML 15.0 EAP beta 2 - Magic Library.mdzip [C:\Program Files\MagicDraw UM...
Introduction
Software Development Pro...
Containment
Common
Note
Text Box
Anchor
Content Diagram
Content Shape
Package
Class Diagram
100%
Software Development Process
Double click on the shap
Ready

Figure 111 -- Diagram displayed in full screen mode

You may turn off the diagram full screen mode in the same way as turning it on.

Managing the MagicDraw interface components in the diagram full screen mode:

1. *Browser windows* are in auto hide mode when the diagram full screen mode is turned on. Located at the left side of the window are tabs of browser windows. To display the browser, move the mouse cursor over the browser window tab (for example, on the Containment tab) and the browser window will open. For more information about working with windows in auto hide mode, see “Using the Model Browser” on page 73.
2. *The main toolbar* is hidden when the diagram full screen mode is turned on. To display the main toolbar, clear the **Hide toolbars in full screen mode** check box in the **Environment Options** dialog box, **General** pane, **General** group.
3. *The diagram toolbar* is displayed when the diagram full screen mode is turned on. Right click the diagram toolbar to manage it.

NOTE	Showing the diagram in full screen mode is available only in Single Window (JIDE) interface style.

Floating Diagram Window

Floating diagram windows can be enabled by clicking the **Floating** command from the Diagram tab shortcut menu (Figure 112 on page 211).

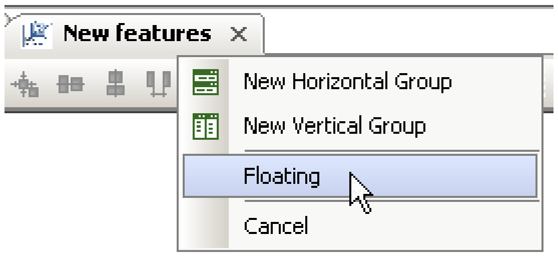


Figure 112 -- The Floating Command on the Diagram tab shortcut menu

Saving as an Image

Diagrams and symbols that were created in the model can be saved as an image in the following formats:

- Enhanced Metafile Format (*.emf) - supports language specific symbols.
- Encapsulated PostScript (*.eps)
- Joint Photographic Experts Group (*.jpg, *.jpeg)
- Portable Network Graphics (*.png)
- Scalable Vector Graphics (*.svg)
- Tagged Image File Format (*.tif, *.tiff)
- Windows Metafile Format (*.wmf)

MagicDraw version 15.0 and above allows exporting of a created diagram to Tagged Image File Format (TIFF) and choice of desired color space and compression. TIFF images can be edited and resaved without suffering a compression loss and it is a flexible and adaptable file format for high color depth images. TIFF format is superior to JPG format.

To save the current diagram or the selected elements within the diagram as an image

1. From the **File** menu, select **Save As Image**. The **Save As Image** dialog box opens.
2. Select the **Active Diagram** or the **Selected Symbols** option button.
3. Select the image format (*.emf, *.eps, *.jpg, *.png, *.svg, *tif, *tiff, *.wmf), file name, and the location directory.

To save the selected diagrams of your project as images

1. Select the **Save As Images** command from the **File** menu. The **Save As Image** dialog box opens.
2. Check the **Selected diagrams** radio button, and select the diagrams you want to save as images from the **Not empty diagrams** list.
3. In the **Working Directory** field, type in the name of the destination directory or click the '...' button to browse to the directory list.

4. Select the graphical file format in the **Image Format** drop down list (EMF, EPS, JPG, PNG, SVG, TIF, or WMF) and click **Save**.

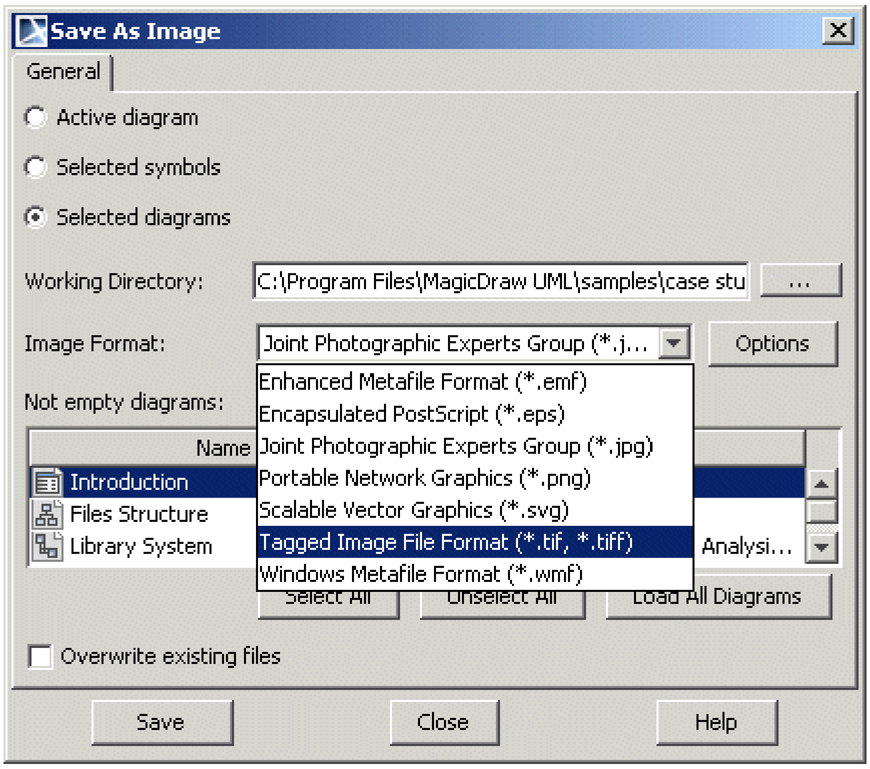

Save As Image
General
Active diagram
Selected symbols
Selected diagrams
Working Directory:
C:\Program Files\MagicDraw UML\samples\case stu
...
Image Format:
Joint Photographic Experts Group (*.j...
Options
Enhanced Metafile Format (*.emf)
Encapsulated PostScript (*.eps)
Joint Photographic Experts Group (*.jpg)
Portable Network Graphics (*.png)
Scalable Vector Graphics (*.svg)
Tagged Image File Format (*.tif, *.tiff)
Windows Metafile Format (*.wmf)
Not empty diagrams:
Name
Introduction
Files Structure
Library System
Analysi...
Select All
Unselect All
Load All Diagrams
Overwrite existing files
Save
Close
Help

Figure 113 -- Save As Image dialog box

The filename of the saved diagram will be the same as the name of that diagram.

The **Not empty diagrams** list contains all exportable diagrams that contain UML elements. Select the diagrams you wish to export.

To make multiple selections

Press the CTRL key and click the diagrams you wish to export.

To select or clear all diagrams

Click the **Select All** button (press CTRL+A keys) or **Unselect All** button.

To display the list of all diagrams that are available in the project

Click the **Load All Diagrams** button in the **Save As Image** dialog box.

Setting image saving options

MagicDraw version 15.0 and above allows changing image size, resolution (DPI), and specifying other image properties specific to the selected image format.

To specify image options:

1. Select the **Save As Images** command from the **File** menu. The **Save As Image** dialog box opens.
2. Select the graphical file format in the **Image Format** drop down list.

3. Click the **Options** button near the **Image Format** drop down list. The **Image Export Options** dialog box opens.

Modify image export properties, which are described in the table below:

Property name	Description	Formats
Save diagram background in image	Saves the diagram with background. By default, the diagram background is white after saving as an image.	This property is included in all format options.
Image resolution (DPI)	This property is the DPI property value with numeric value range from 1 to 4800. Default value is 72.	Property is not included in *SVG* and *WMF* format options.
Exported image size [%]	Define image size in percent. Default value is 100%. For example, if 200% is defined, then the view is enlarged (zoomed) before generating the image. Raster image will not loose its quality as additional pixels are introduced.	Property is not included in *WMF* format options list.

Other image export options:

- **JPEG Compression Quality** property is included in *JPEG* format options list.
- **Use SVG <tag> for text output** property is included in *SVG* format options list.
- **Compression, Color space** properties are included only in *TIFF* format options list.

You may also define image saving options in the **Environment Options** dialog box. For more information see "Customizing Environment Options" on page 90.

Printing

In MagicDraw you can print an active diagram, multiple diagrams, or selected model elements. All printing menu commands are found in the **File** menu. You can also use the toolbar buttons or the shortcut keys.

Before printing, use the **Print** dialog box to set your printing options.

NOTE	If the size of the text is too small, it may not be visible on the printed page.

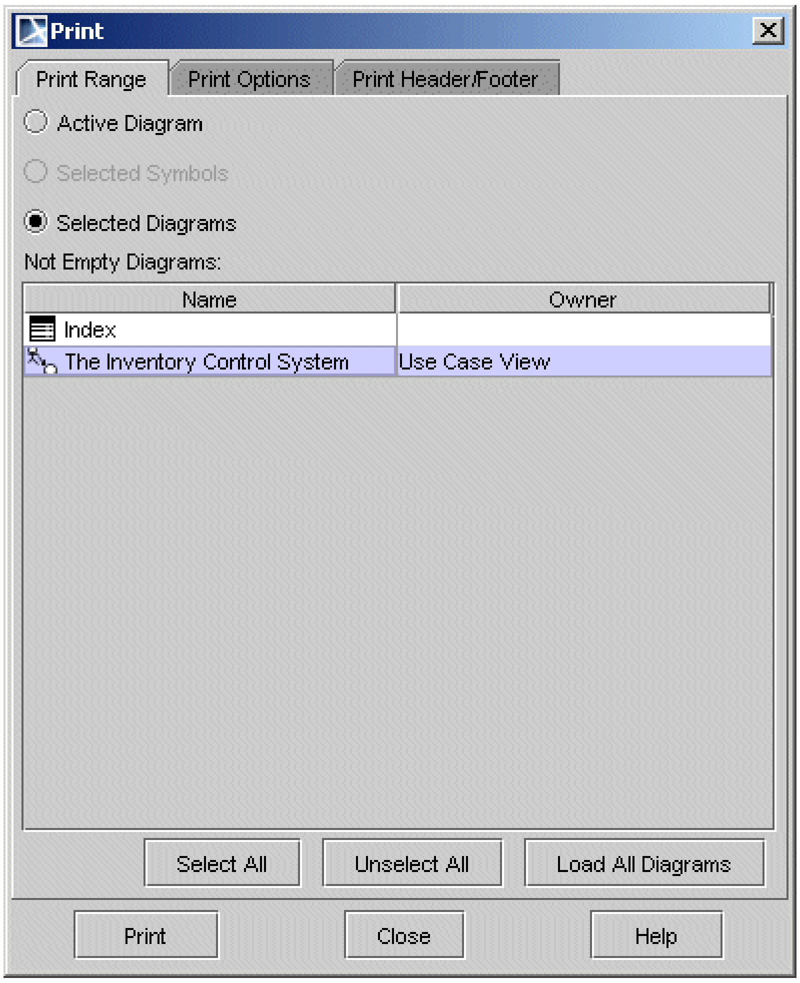
To open the **Print** dialog box

- From the **File** menu, select **Print**.
- In the **Print Preview** screen, click the 🖨 button.

The **Print** dialog box contains the following tabs: **Print Range**, **Print Options,** and **Print Header/Footer**. Descriptions for these tabs appear in the following sections.

Print Range tab

In the **Print Range** tab, select the item you want to print.



( ) Active Diagram
( ) Selected Symbols
(●) Selected Diagrams

Not Empty Diagrams:

Name	Owner
Index	
The Inventory Control System	Use Case View

Figure 114 -- Print dialog box. Print Range tab

Element name	**Function**
Active Diagram	Print the currently open diagram.
Selected Symbols	Print symbols you select on the diagram. The desired symbols should be selected to activate this option button.
Selected Diagrams	From the **Not Empty Diagrams** list, select the diagrams you want to print.
Name	Show available diagrams in the project. To select the diagram for printing, click the name of the diagram in the list. The selected diagrams are highlighted. Press CTRL or SHIFT to select more than one diagram.
Owner	The name of the model element that owns the particular diagram.
Select All	Select all diagrams in the list for printing.
Unselect All	Remove the selection.
Load All Diagrams	Load all diagrams belonging to a project. By default only open diagrams are shown in the **Print** dialog box.
Print	Print the selected diagram(s).
Close	Close the dialog box.

Element name	Function
Help	Display MagicDraw UML Help.

Print Options Tab

Click the **Print Options** tab to customize the printing jobs.

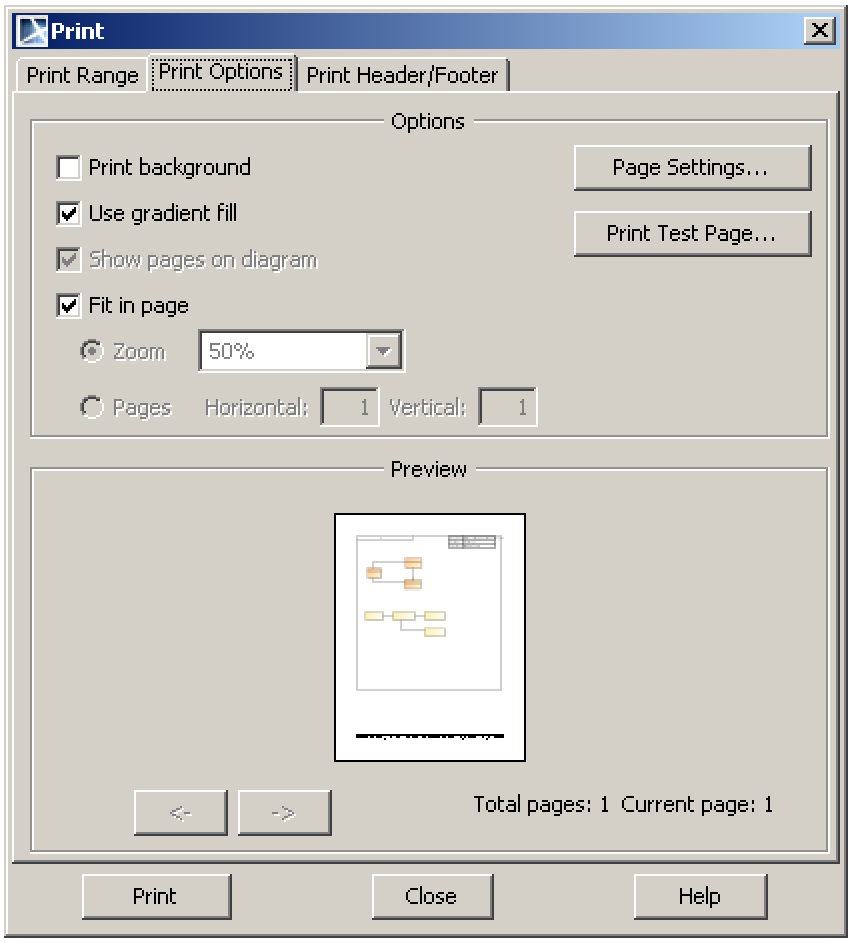


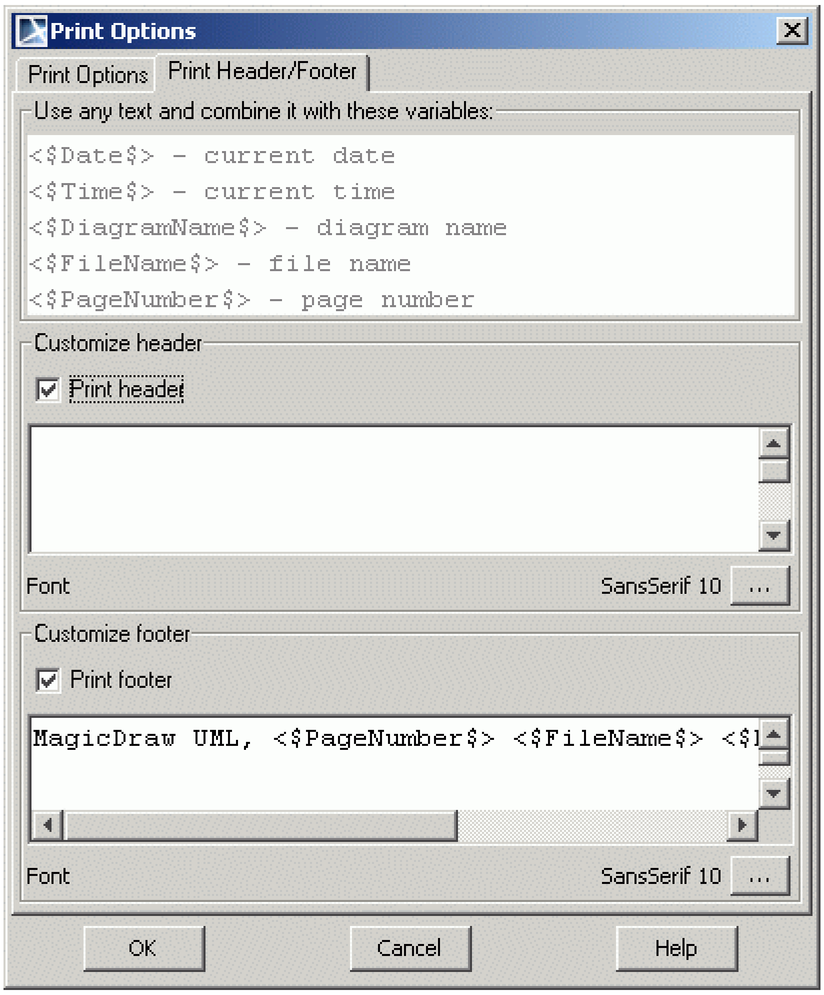
Figure 115 -- Print dialog box. Print Options tab

Element name	Function
Print Background	Print the background color of your diagrams.
Use gradient fill	Select this option to enable diagram symbols gradient fill in printing.
Show Pages on Diagram	Show the page boundary on the diagram pane. **NOTE** You will not see any boundary if the **Fit in Page** check box is selected.
Fit in Page	The printed diagram fits in one page. If the **Fit in Page** check box is cleared and the **Show Pages in Diagram** check box is selected, the gridlines of pages are shown on the diagram pane.
Zoom	Zoom the selected diagram to the size you want for printing. **NOTE** You are not allowed to zoom a diagram if the **Fit in Page** check box is selected.

Element name	Function
Pages	Set the number of pages on which you want to print the diagram. • **Vertical**. The number of vertical pages on which the diagram will be displayed. • **Horizontal**. The number of horizontal pages on which the diagram will be displayed.
Page Settings	The **Page Setup** dialog box opens.
Print Test Page	Print the test page. Set print options in the **Print Options** dialog box.
Preview	Preview the diagram appearance before printing.
<	Preview the previous page.
>	Preview the next page.

Print Header/Footer Tab

Click the **Print Header/Footer** tab to customize the header and footer of the printed pages.



```
<$Date$> - current date
<$Time$> - current time
<$DiagramName$> - diagram name
<$FileName$> - file name
<$PageNumber$> - page number
```

```
MagicDraw UML, <$PageNumber$> <$FileName$> <$1
```

Figure 116 -- Print dialog box. Print Header/Footer tab

- **Use any text and combine it with these variables** box - use this box to indicate which fields you want to include in the header/footer.
- **Customize header** group box - prints the header. Select the **Print Header** check box and type the text you wish to be printed. Use the "…" button to select the desired font.

- **Customize footer** group box - prints the footer. Select the **Print Footer** check box and type or change the text you wish to print. Use the "…" button to select the desired font. By default <$PageNumber$> <$FileName$> <$DiagramName$> <$Date$> <$Time$> is printed.

6 WORKING WITH MODEL ELEMENTS

The Chapter “Working with Elements” includes the following sections:

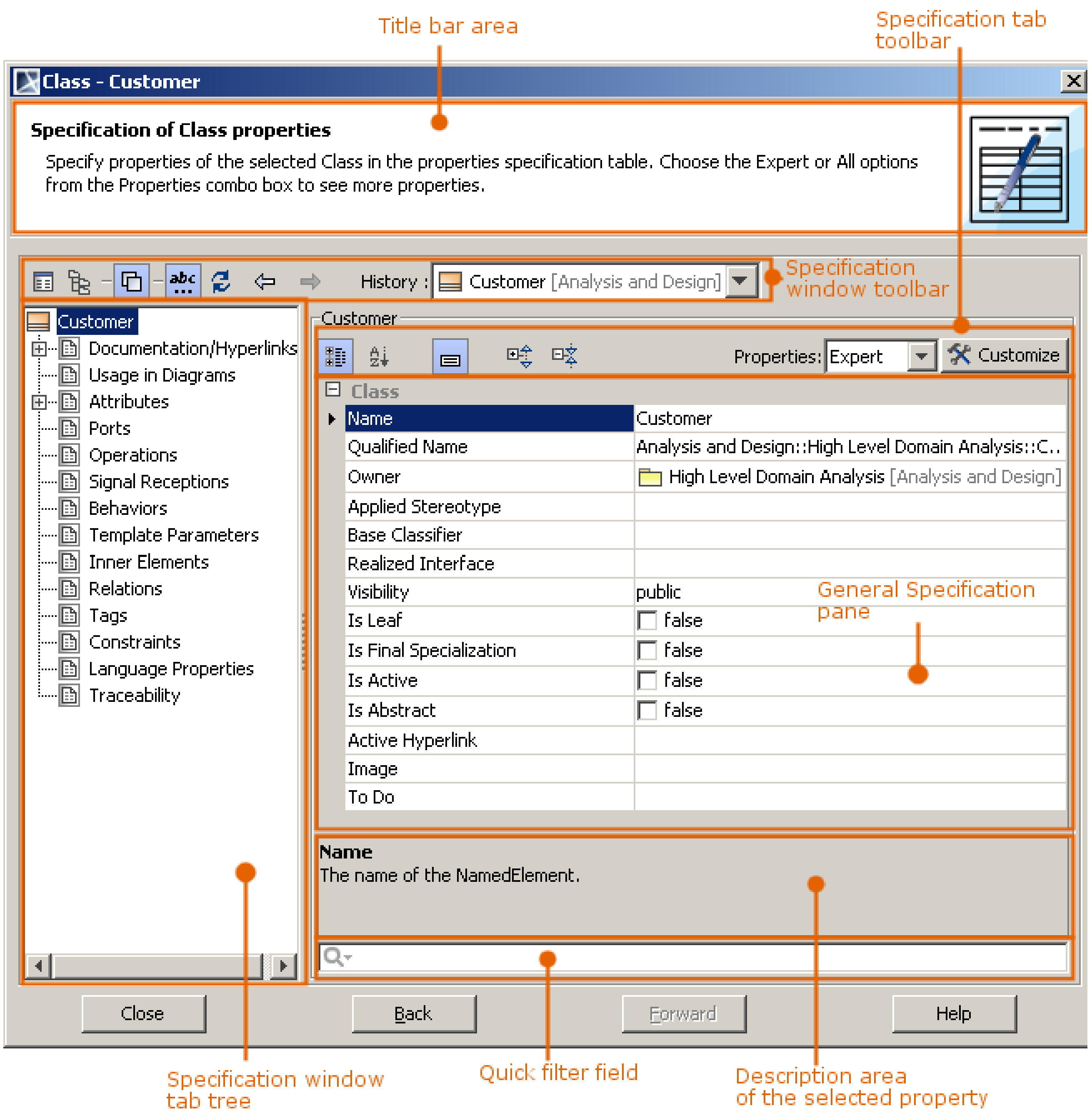
Specification Window

View Online Demo	Specification Windows

You can define all model elements in the Specification window.

MagicDraw shortcut menus, toolbars, and browser help ease the task of editing model elements.

IMPORTANT	Beginning with version 8.0, MagicDraw enables the editing of model elements and symbol properties directly from the Browser, located in the **Properties** panel. For more information, see “Properties panel” on page 88.


Title bar area
Specification tab toolbar
Specification window toolbar
General Specification pane
Specification window tab tree
Quick filter field
Description area of the selected property
Class - Customer
History :
Customer [Analysis and Design]
Properties:
Expert
Customize
Close
Back
Forward
Help

Specification of Class properties

Specify properties of the selected Class in the properties specification table. Choose the Expert or All options from the Properties combo box to see more properties.

- Customer
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Attributes
  - Ports
  - Operations
  - Signal Receptions
  - Behaviors
  - Template Parameters
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Language Properties
  - Traceability

Customer

Class

Name	Customer
Qualified Name	Analysis and Design::High Level Domain Analysis::C..
Owner	High Level Domain Analysis [Analysis and Design]
Applied Stereotype	
Base Classifier	
Realized Interface	
Visibility	public
Is Leaf	false
Is Final Specialization	false
Is Active	false
Is Abstract	false
Active Hyperlink	
Image	
To Do	

Name
The name of the NamedElement.

Figure 117 -- Specification window structure. General specification tab

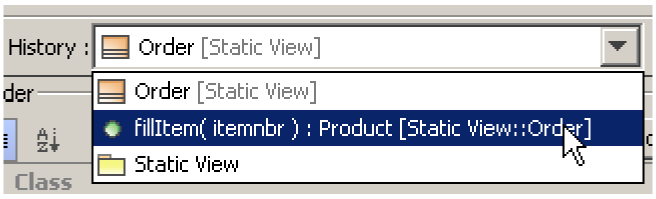
The Specification window is used to define UML model elements such as class, package, activity, and others. Specification window is a non-modal window in which you may edit model element properties and work with a model simultaneously. For more information on how to edit property values, see "Editing Property Values" on page 237.

To open the corresponding Specification window

- From the selected symbol shortcut menu, select **Specification**.
- Double-click a symbol on the Diagram pane or in the Model Browser.
- Select a symbol on the Diagram pane and press the ENTER key.
- The element Specification window opens when you add a model element to an owning model element in its Specification window. The second Specification window opens on top of the first. Use the **Back to** or **Forward to** arrow buttons for switching between windows.

Functions of Specification Window

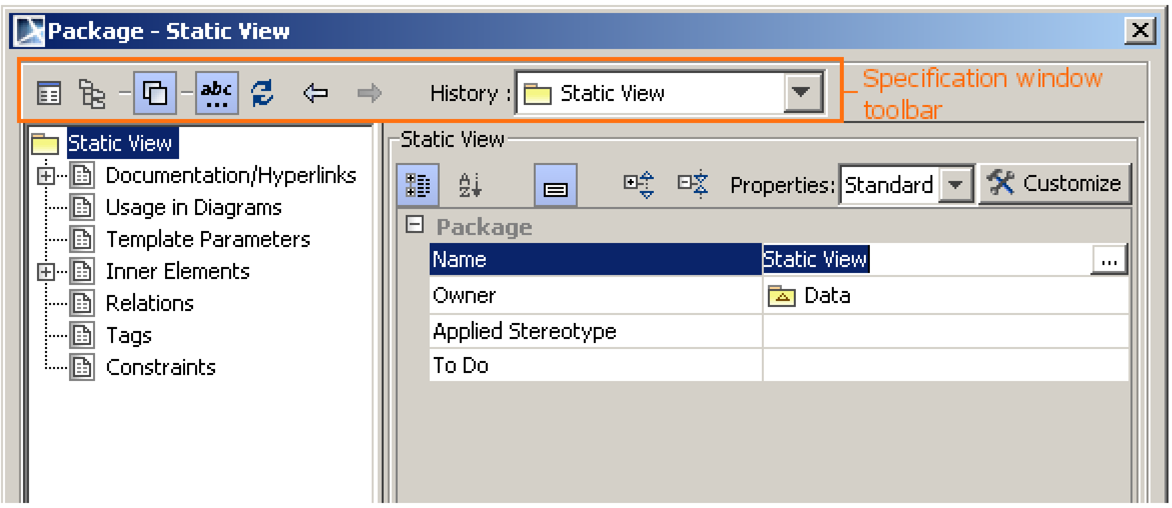
Using Specification window you may perform various actions that are necessary when working with model elements. Every model element has its own specification. In the following table, you will find described only common functions that Specification window is used for.

Function	How to
Add/modify model element properties and inner elements.	From the Specification window tab tree, choose the desired tab and fill its properties in the properties list.
Open referenced elements specifications and work with them in the same window.	Click or Open Specification)
Navigate between specifications that were opened	• Click or . • Click Back or Forward • Select the element from the **History** list  History : Order [Static View] Order [Static View] fillItem(itemnbr) : Product [Static View::Order] Static View
Manage relations	• View all relationships in which the element participates. • Modify the name of the relationship. • View/change the direction of the relationship. • Modify the target element. • Create new outgoing Create Outgoing... or incoming Create Incoming... relationships.

Function	How to
Add/edit the element documentation	Add or edit a documentation of the element. Documentation also can be written in HTML. More information about working with HTML text, see in "HTML Editor" on page 284.
Manage element hyperlinks	Open, edit, add, or remove hyperlinks from the selected model element to a file, web page, other element/symbol, or requirements. More information about working with hyperlinks, see "Defining Hyper-links Between Elements" on page 271.
Manage element tags and their values	More information about working with tags you may find in "Editing tagged value" on page 631.
Manage element constraints	More information about working with constraints you may find in "Work-ing with Constraints" on page 634.
Track the element's symbol usage in dia-grams and open these diagrams.	Find out in which diagrams the symbol is used.
Select the model element in the Containment tree	Click or Select in Containment Tree
Track elements traceability	More information about the traceability you may find in Section "Trace-ability" on page 389.

TIP!	Right-click the specification property and select the action you want to perform.

Specification Window Toolbar



Name	Static View
Owner	Data
Applied Stereotype	
To Do	

Figure 118 -- Specification window toolbar

Icon	Name	Function
	Open Specifi-cation	Opens Specification of the selected referenced element in the same window.

Icon	Name	Function
	Select in Containment Tree	Selects the selected element in the Containment tree of the Model Browser.
	Specification opening mode	If selected, the referenced Specification windows are opened in the same window.
	Strip multiline text	If selected, the property's text (e.g., ToDo), which covers more than five rows, is striped, not showing all of it, by adding three dots at the end of the text.
	Refresh	Refresh data of the Specification window.
	Back to <previously opened element specification> Forward to <previously opened element specification>	Use these buttons for switching between different specifications. You may also use **Back**, **Forward** buttons, and the **History** drop-down list for switching between specifications.

Quick filter

If the general Specification window pane contains 10 or more properties, the Quick filter box appears. Using the Quick filter box you may quickly find the required property in the property list. This is especially handy when the properties list is rather long. Properties can be filtered by the text entered in this box.

Click the Filter settings button to select filter options.

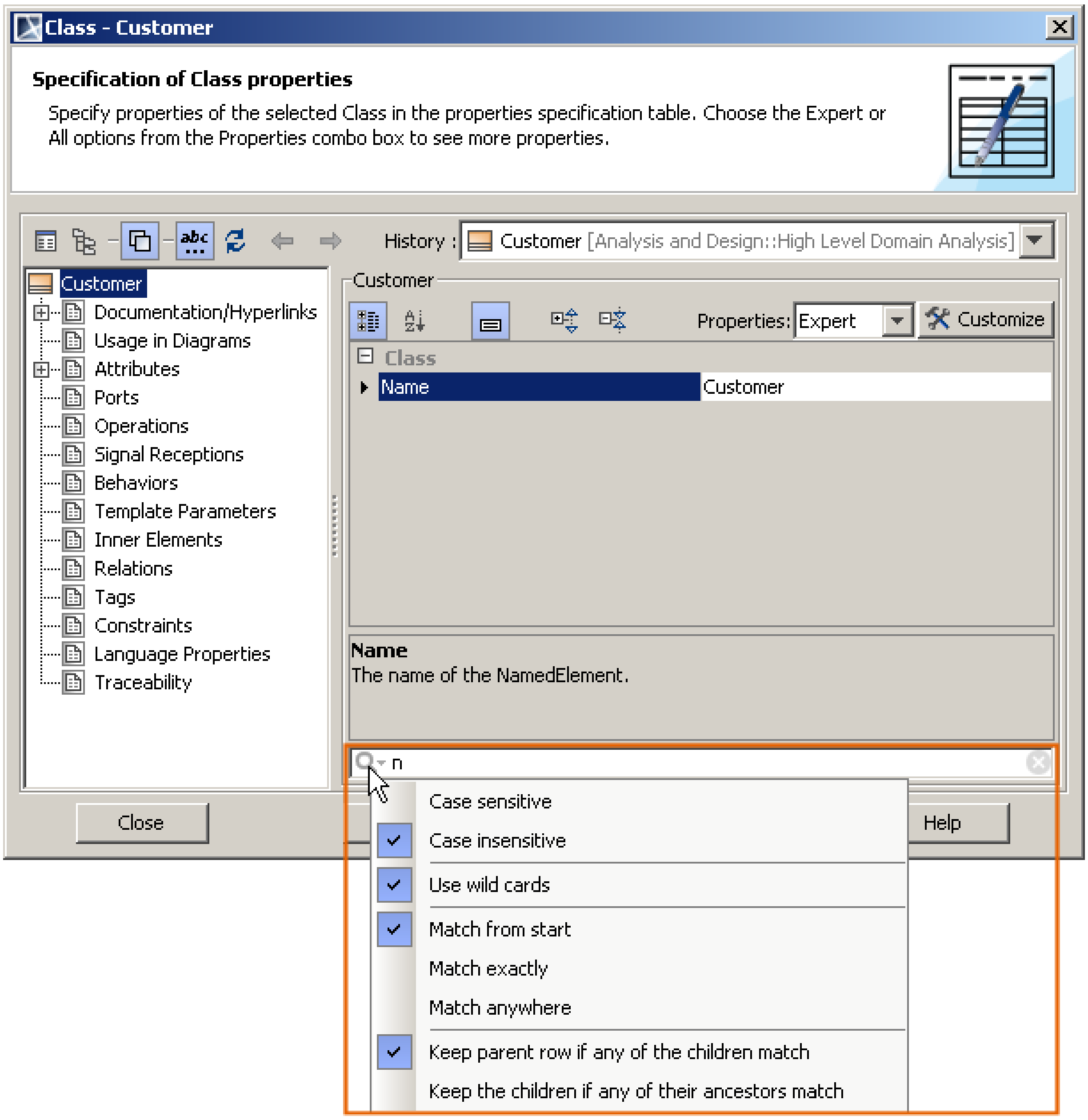

Class - Customer
Specification of Class properties
Specify properties of the selected Class in the properties specification table. Choose the Expert or All options from the Properties combo box to see more properties.
History : Customer [Analysis and Design::High Level Domain Analysis]
Customer
Documentation/Hyperlinks
Usage in Diagrams
Attributes
Ports
Operations
Signal Receptions
Behaviors
Template Parameters
Inner Elements
Relations
Tags
Constraints
Language Properties
Traceability
Properties: Expert
Customize
Class
Name
Customer
Name
The name of the NamedElement.
n
Case sensitive
✓ Case insensitive
✓ Use wild cards
✓ Match from start
Match exactly
Match anywhere
✓ Keep parent row if any of the children match
Keep the children if any of their ancestors match
Close
Help

Figure 119 -- Quick filter box with its options.

Option name	Function
Case sensitive	Words differs in meaning based on differing use of uppercase and lowercase letters.
Case insensitive	Words do not differ in meaning based on differing use of uppercase and lowercase letters.
Use wild cards	Increase the flexibility and efficiency of a quick filter search by using wildcard characters that substitute any of a class of characters in a search.
Match from start	The search will be performed according to the first letters of the property.
Match exactly	The search will be performed according to the exact name of the property.

Match anywhere	The search will be performed according to any of the letter of the property.
Keep parent row if any of the children match	Show the category name of the found property.
Keep the children if any of their ancestors match	Show all other properties that are in the same category as the found property.

Specification window tabs

Model elements that may participate in the relationships contain the **Relations** tab. All model element Specification windows have **Template Parameters**, **Tags**, **Constraints**, and **Documentation/Hyperlinks** tabs. Descriptions of these tabs are presented in the following sections.

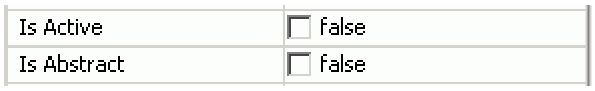
General tab

Name text box

Type or view the model element name. If you enter the name of an existing model element, an error message opens.

For some model elements (attribute, operation, and so forth), the default name *Untitled 1* is set. You can change this name to a preferred name.

Is Active, or Is Abstract check boxes

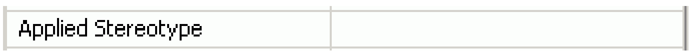

Is Active: false
Is Abstract: false

When one of these check boxes is selected, the model element is correspondingly set as an active or abstract generalizable model element.

A generalizable element is a model element that may participate in a generalization relationship.

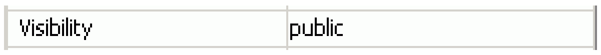
Name	Function
Is Abstract	Specifies whether the generalizable element may or may not have a direct instance. True indicates that an instance of the generalizable element must be an instance of a child of the generalizable element. False indicates that there may be an instance of the generalizable element that is not an instance of a child. An abstract generalizable element is not instantiable since it does not contain all necessary information.

Applied Stereotype



Click the "..." button to open the list of all available applied stereotypes, select the check box for the chosen stereotype and click **Apply**.

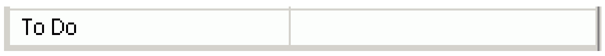
Visibility


Visibility	public

To define an element access level, use the drop down list to set its visibility. There are four levels of access:

- **Public**. The element can be accessed by any outside object.
- **Package**. The element can be accessed by any classifier declared in the same package (or a nested subpackage, to any level).
- **Private**. The element can be accessed only from inside the current class.
- **Protected.** The element can be accessed from inside the current class and classes derived from that class.

ToDo


To Do	

Type or view information about an element. The **To Do** property is used for keeping special information, exclusive cases, or additional records.

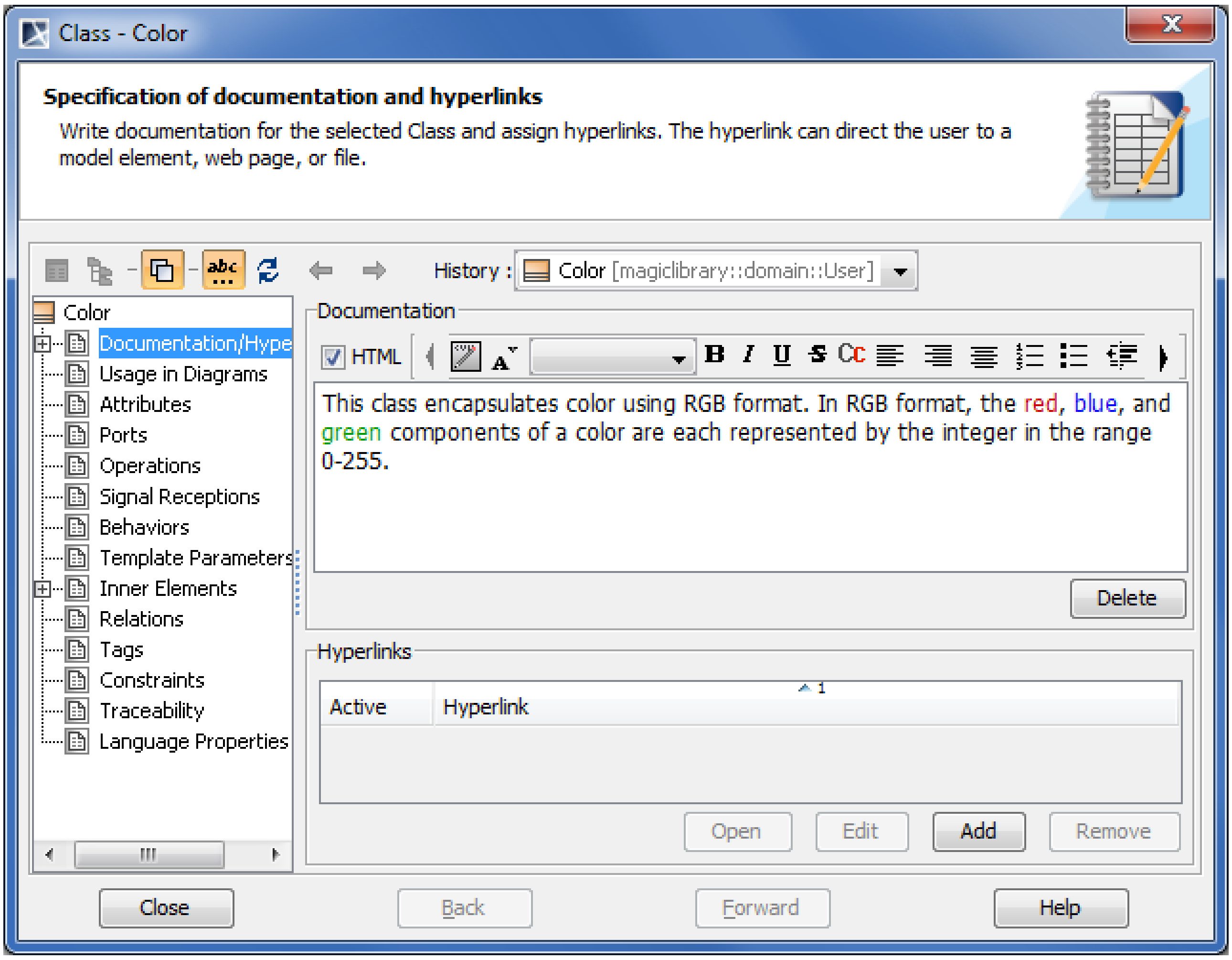
Image

Click the "..." button to assign the image to the element. Assigned image can be displayed on the shape or instead of the shape.

For more information, about changing the image display mode, see "Displaying icon or image" on page 258.

Documentation/Hyperlinks tab

Use the **Documentation/Hyperlinks** tab to add comments to the selected element and to assign hyperlinks. The hyperlink can direct the user to a model element, web page, or a file.


Class - Color

Specification of documentation and hyperlinks

Write documentation for the selected Class and assign hyperlinks. The hyperlink can direct the user to a model element, web page, or file.

History : Color [magiclibrary::domain::User]

Documentation

This class encapsulates color using RGB format. In RGB format, the red, blue, and green components of a color are each represented by the integer in the range 0-255.

Figure 120 -- Specification window. Documentation/Hyperlinks tab

Writing HTML documentation

To write documentation in HTML format, simply select the HTML check box to display a menu with the available text formatting options.

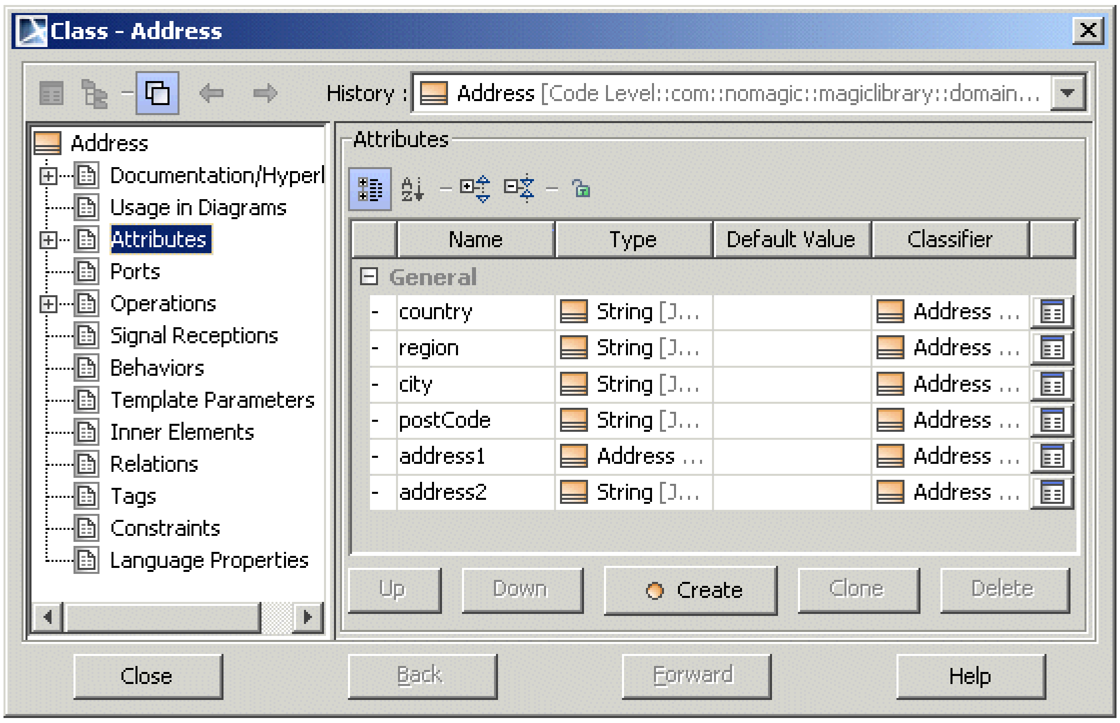
For more information about the HTML editor toolbar, see Section "HTML editor toolbar" on page 290.

Adding Hyperlinks

In the **Hyperlinks** group, manage the hyperlinks you want to add to the model element

Active	If selected, the hyperlink is activated and will work when double-clicking the model element.
Hyperlink	Display information about the hyperlink: a diagram or element name, file path, or URL name.
Open	Opens the previously assigned hyperlink.
Edit	The **Insert Hyperlink** dialog opens. Edit the selected hyperlink.
Add	The **Insert Hyperlink** dialog opens. Select the hyperlink you want to add to the model element.
Remove	Remove the selected hyperlink from the model element.

Attributes tab



	Name	Type	Default Value	Classifier
General				
-	country	String [J...		Address ...
-	region	String [J...		Address ...
-	city	String [J...		Address ...
-	postCode	String [J...		Address ...
-	address1	Address ...		Address ...
-	address2	String [J...		Address ...

Figure 121 -- *Attributes tab*

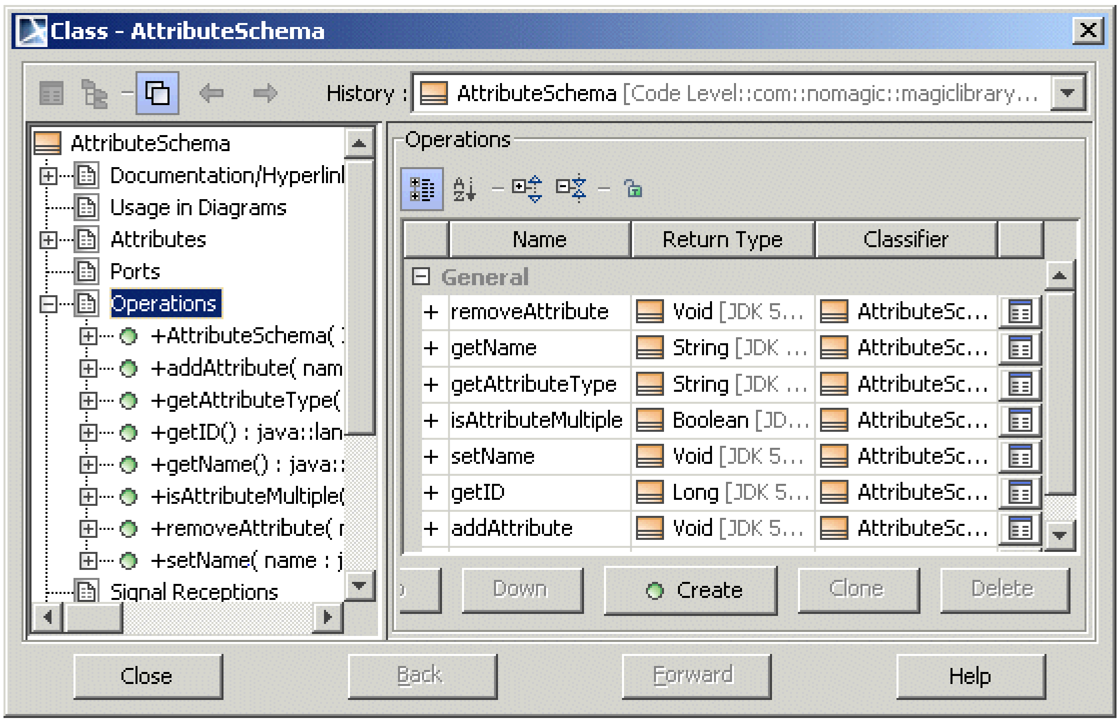
The **Attributes** tab contains the model element attributes list and buttons for editing the attributes list.

Name	Attribute name.
Type	Attribute type. It can be a primitive type or another class.
Default Value	Attribute default value.
Classifier	Class name that contains the current attribute.
Up	Move item to upper position in the list.
Down	Move item to lower position in the list.
Create	Add a new attribute to the class. The attribute Specification window opens. TIP! You may also add a new attribute from the classifier by pressing Insert.
Clone	Enabled when the element is selected in the list. A new element will be created. The new element derives all properties from the cloned element. The name will be changed to "<element_name><number>".
Delete	Remove the selected attribute from the classifier. TIP! You may also delete an attribute from the classifier by pressing Delete.
▤	Click this button to open the attribute Specification window.

Usage in Diagrams tab

For more information about searching for symbol usage in diagrams from the **Usage In Diagrams** branch, see “To search for diagrams in which symbol is used from the element Specification window” on page 411.

Operations tab


Class - AttributeSchema

History : AttributeSchema [Code Level::com::nomagic::magiclibrary...

- AttributeSchema
  - Documentation/Hyperlinl
  - Usage in Diagrams
  - Attributes
  - Ports
  - Operations
    - +AttributeSchema( )
    - +addAttribute(nam
    - +getAttributeType(
    - +getID() : java::lan
    - +getName() : java::
    - +isAttributeMultiple(
    - +removeAttribute(r
    - +setName(name : j
  - Signal Receptions

Operations

	Name	Return Type	Classifier	
⊟ General				
+	removeAttribute	Void [JDK 5...	AttributeSc...	▤
+	getName	String [JDK ...	AttributeSc...	▤
+	getAttributeType	String [JDK ...	AttributeSc...	▤
+	isAttributeMultiple	Boolean [JD...	AttributeSc...	▤
+	setName	Void [JDK 5...	AttributeSc...	▤
+	getID	Long [JDK 5...	AttributeSc...	▤
+	addAttribute	Void [JDK 5...	AttributeSc...	▤

Figure 122 -- Operations tab

The **Operation** tab contains the model element operations list and buttons for managing this list.

Name	Operation name.
Return type	Operation return type.
Classifier	The name of the classifier containing the current operation.
Up	Move item to upper position in the list.
Down	Move item to lower position in the list.
Create	Add a new operation to the model element. The operation Specification window opens. TIP! You may also add a new operation from the classifier by pressing Insert.
Clone	Enabled when the element is selected in the list. A new element will be created. The new element derives all properties from cloned element. The name will be changed to "<element_name><number>".
Delete	Remove the selected operation from the model element. TIP! You may also delete an operation from the classifier by pressing Delete.
▤	Click this button to open the operation Specification window.

Template Parameters tab

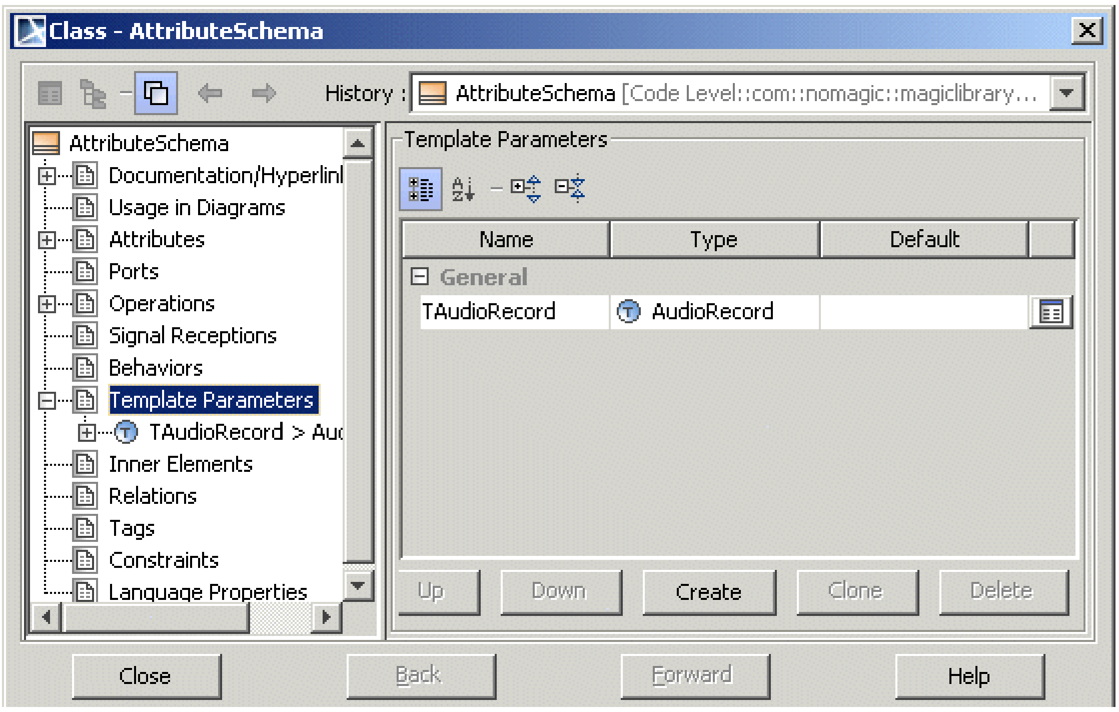


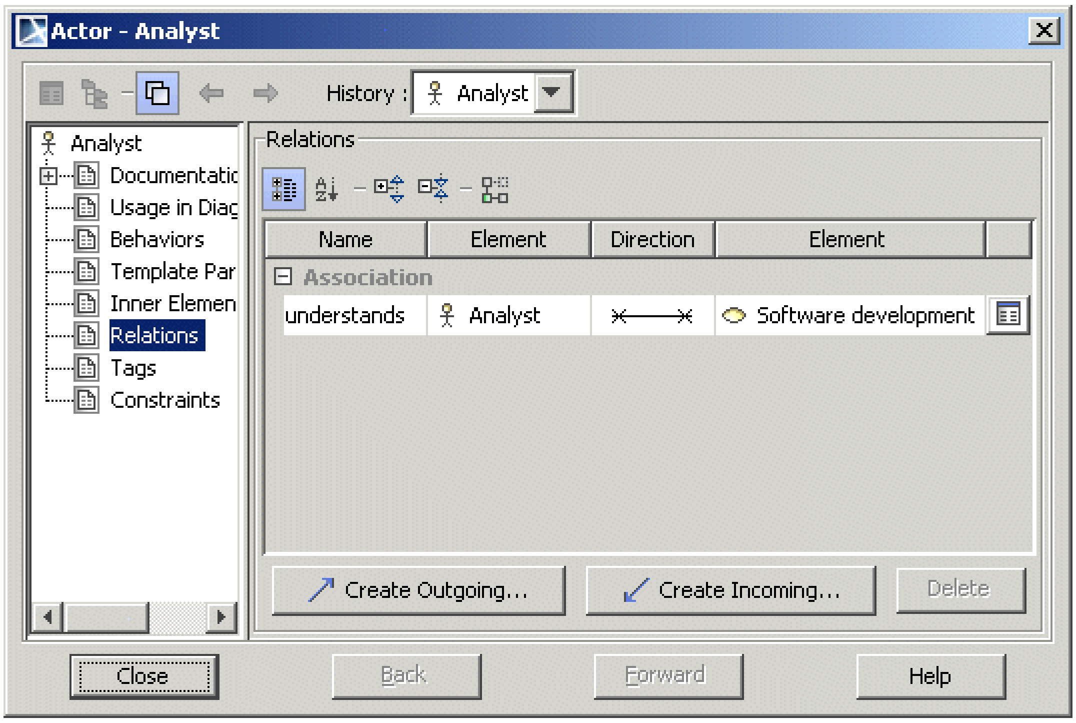
Figure 123 -- Operations tab

The **Template Parameter** tab contains the model element template parameters list and buttons for managing this list.

Name	The name of the template parameter.
Type	Type of template parameter: classifier or data type.
Default	The **Select Element** dialog opens. Here you can assign the element as the default element for the template parameter.
Up	Move the item to the upper position.
Down	Move the item to the lower position.
Create	Create a new template parameter. TIP! You may also delete a template parameter from the classifier by pressing Delete.
Clone	Enabled when the element is selected in the list. A new element will be created. The new element derives all properties from the cloned element. The name will be changed to "<element_name><number>".
Delete	Remove the template parameter from the class. TIP! You may also delete a template parameter from the classifier by pressing Delete.
▤	Click this button to open the template parameter Specification window.

Relations tab

The **Relations** tab contains the list of relationships in which the appropriate model element participates.



Name	Element	Direction	Element
Association			
understands	Analyst	⟷	Software development

Figure 124 -- Specification window. Relations tab

Element name	**Function**
Name	Name of the relationship (optional).
Element	One of the relationship endings.
Direction	Shows a relationship's direction, helps to specify source and target.
Element	Another relationship ending.
Create Incoming Create Incoming...	Create a new incoming relationship by choosing the relationship type from the appeared list.
Create Outgoing Create Outgoing...	Create a new outgoing relationship by choosing the relationship type from the appeared list.
▤	After clicking this button, the relationship Specification window opens.
Delete	Removes the selected relationship from the list.

Tags tab

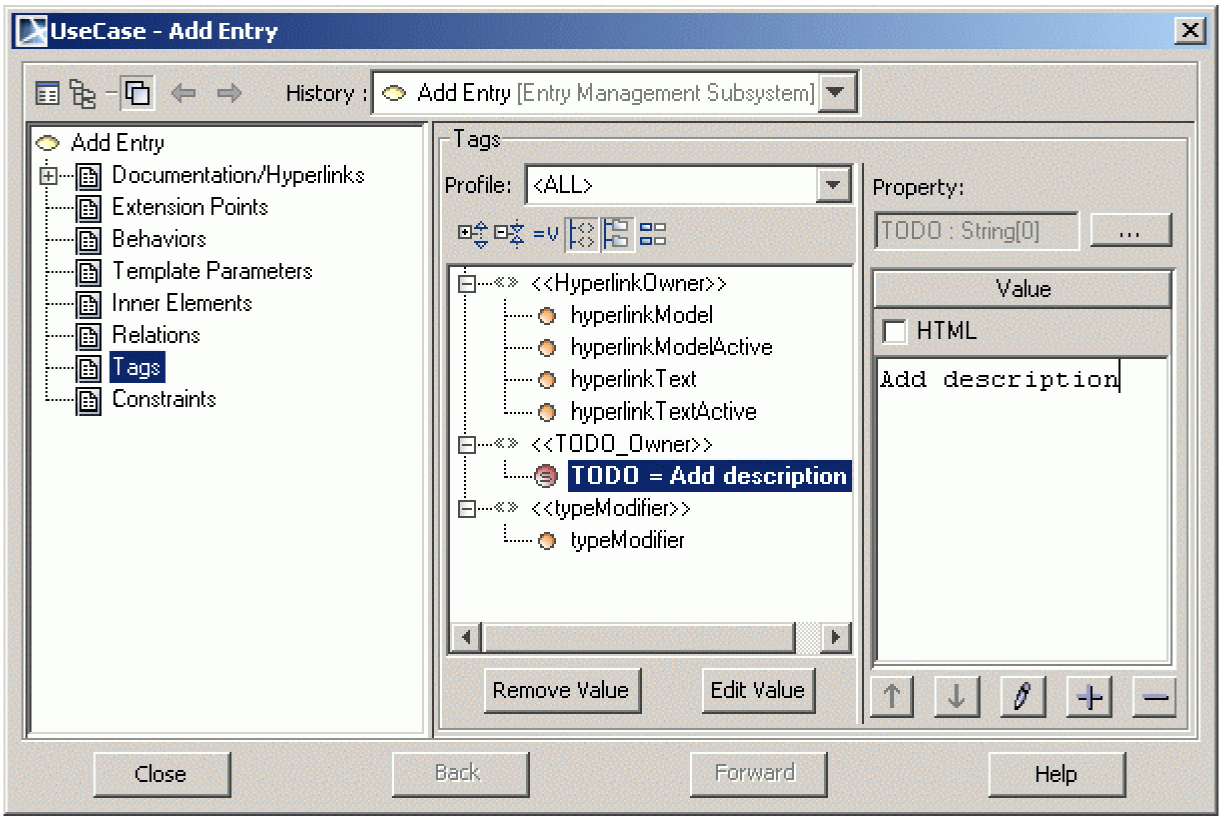


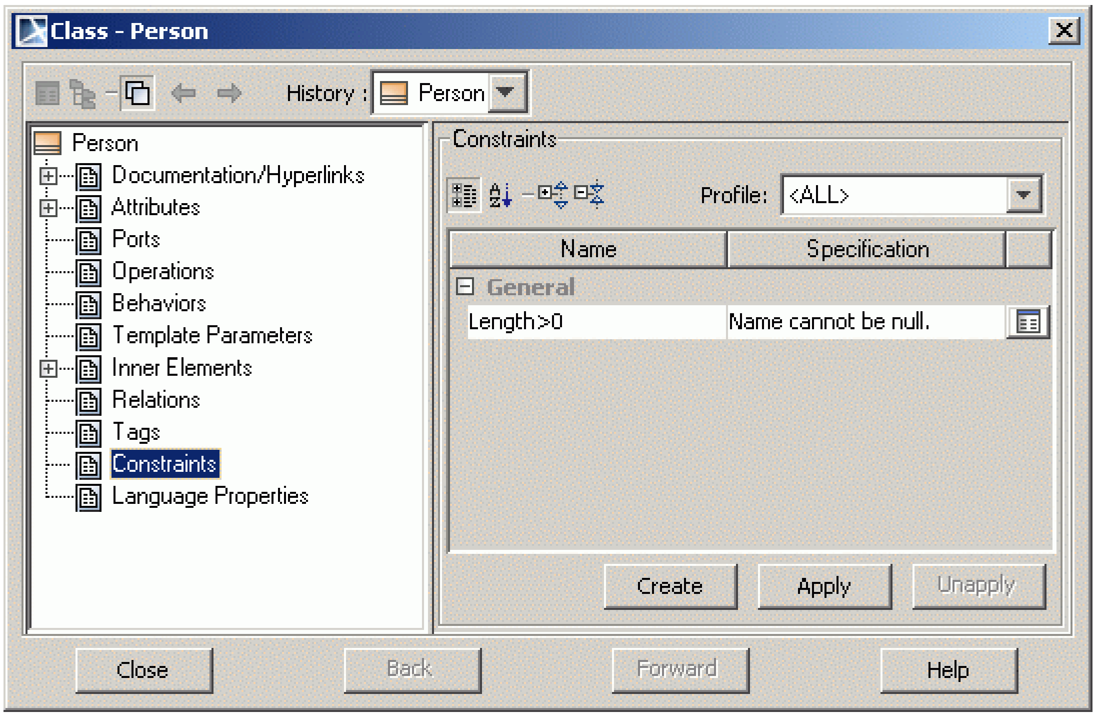
Figure 125 -- Specification window. Tagged Values tab

Element name	Function
Profile	Lists the profiles available for the current project.
Expand	If tag definitions are grouped and those groups are collapsed, expands the groups.
Collapse	If tag definitions are grouped and those groups are expanded, collapses the groups.
T=V **Show Tags with Values**	Only displays in the list those tag definitions that have values.
Show Tag Group	If tag definitions are grouped into specific “packages”, shows those “packages” on the list by grouping tag definitions.
Group by Stereotype	Sorts tag definitions by the assigned stereotypes.
Show Tag Type	Displays types of tag definitions in the list.
Show Only Assigned Stereotypes Tags	In the list of tags, the assigned tag value is highlighted in black.

Element name	Function
Create Value	Creates a value for the selected tag definition. The right pane of the dialog is activated. Select or enter the value. All data types and types of metamodel can be types of values. TIP! You may also create value by dragging and dropping an element from the Browser.
Remove Value (available only when the tag definition has a value)	Removes the value(s) from the selected tag definition.
Edit Value	The Slot Specification window opens, allowing you to edit or extend the selected tagged value.
Right pane of the dialog	
Property "..."	Click the "..." button and edit the selected property in the Property Specification window.
HTML	Set the tagged value text as HTML.
Value (if the value is added)	Type or select the value.
Edit	Edit the selected value.
Add	Add a new value.
Remove	Remove the selected value.

For more information about how to create a new tagged value, see "To create a new tag definition" on page 631.

Constraints tab



Name	Specification
Length>0	Name cannot be null.

Figure 126 -- Specification window. Constraints tab

Element name	Function
	The list of constraints assigned to the current model element.
Name	Enter the name of the constraint.
Specification	A comment associated with the selected constraint. To edit the comment, double click the **Specification** line. Click the “…” button to open the **Edit Specification** dialog. This allows you to edit expressions and select the Object Constraint Language (OCL) to check the expression syntax.
▤	Click this button to open the constraint Specification window.
Create	Creates a constraint.
Apply	The **Select Elements** dialog opens. Select an existing constraint from the model and apply it to the element.
Unapply	Removes the selected constraint from the list.

Traceability tab

The Traceability tab in element’s Specification window is one of the places, wherein the element’s traceability properties, showing its realizing and/ or more specific elements, are represented.

For more information about traceability feature, see "Traceability" on page 389.

Buttons available in the Specification window

Button	Function
Close	Save changes and exit the dialog.
Back	Return to the previous dialog.
Forward	Proceed to the next dialog.
Help	Display MagicDraw Help.

Default Property Values

MagicDraw version 15.0 and above allows for defining the initial (default) properties for elements.

The Default element properties can be defined for:

- the whole project.
- the specific diagram.

To set the default properties for the whole project

1. From the **Options** main menu, select **Project**. The **Project Options** dialog opens.
2. Expand **Default model properties**. Select the exact element and in the right pane side, change the property value.

After creating a new element it will have new property values. Values for previously created elements will not be changed.

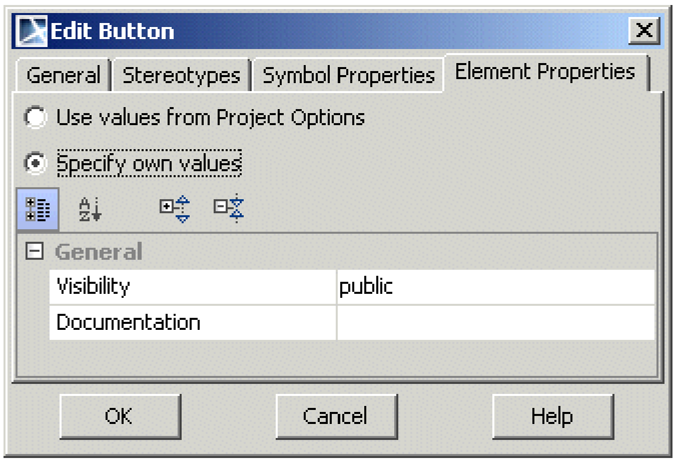
To reset element properties to the default value, click the **Reset to Defaults** button. To reset property values for all elements select the **Default model properties** branch and click the **Reset to Defaults** button.

(Exception: interface attribute default visibility will always be #public, no matter what your settings.)

To set the default properties for the specific diagram

1. From the **Diagrams** main menu, select the **Customize** command. The **Customize Diagram** wizard opens.
2. Define the new or created diagram properties and in the **Specify toolbar buttons** step, click the **Add** button. In the appeared menu that opens, select the **New Button** command. The **Edit button** dialog opens.

3. Open the **Element Properties** tab. Select the **Specify own values** radio button and change the default element property values.



( ) Use values from Project Options
(●) Specify own values

General

Visibility	public
Documentation	

Figure 127 -- The ***Edit Button*** *dialog.* ***Element Properties*** *tab*

Create a new element from the customized diagram toolbar and the element will have the defined, default properties.

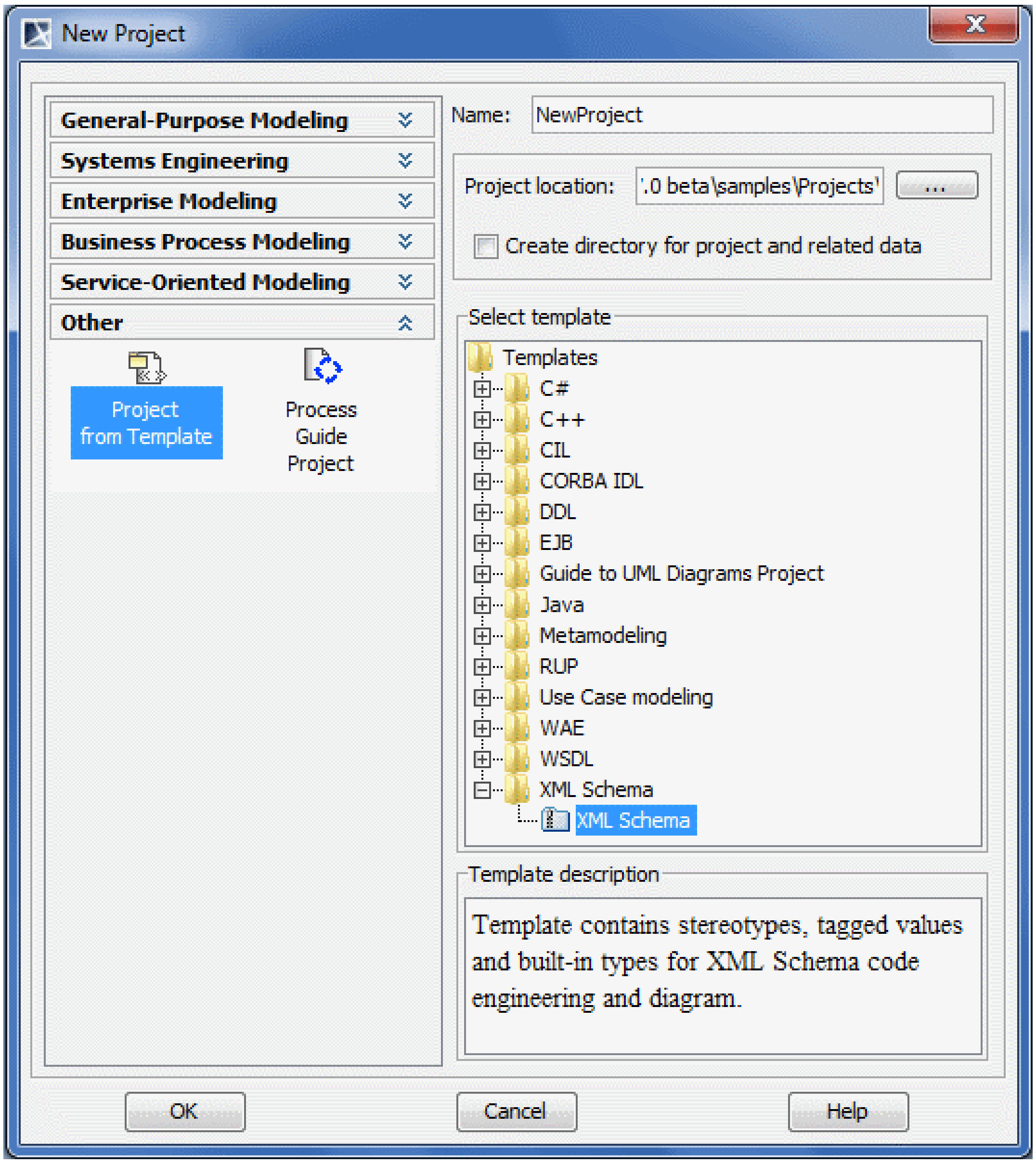
For more information about the **Customize Diagram** wizard, see *UML Profiling and DSL UserGuide.pdf,* which is located in the <*MagicDraw installation directory*>/*Manual* folder.

Sharing the default property values

If you want to share the default properties with other users for their new project, change the property values in the **Project Options** dialog and then create a project template, which other users may use:

1. From the **File** main menu select the **Export** > **Template...** command and save the project as a template. A template will be created in the <*MagicDraw installation directory*>/*templates* directory.
2. To import the created template to a new project from the **File** main menu, select the **New Project** command. The **New Project** dialog opens. Select the **Project from Template** icon from the

Other domain and in the **Select template** tree, select your template. The project options are imported to the project together with the template.



Template contains stereotypes, tagged values and built-in types for XML Schema code engineering and diagram.

Parent topic: "Diagramming", on page 149.

Editing Property Values

You can edit property values in:

- Specification window (see "Specification Window" on page 219).
- Generic table (see "Generic Table" on page 606).
- **Element** tab on the **Properties**panel in the Model Browser (see "Properties panel" on page 88).

A property value can be edited in one of the following ways:

- Directly in the value cell.
- Using the **Edit** command on the property's shortcut menu. Different types of properties have different command names on their shortcut menus.

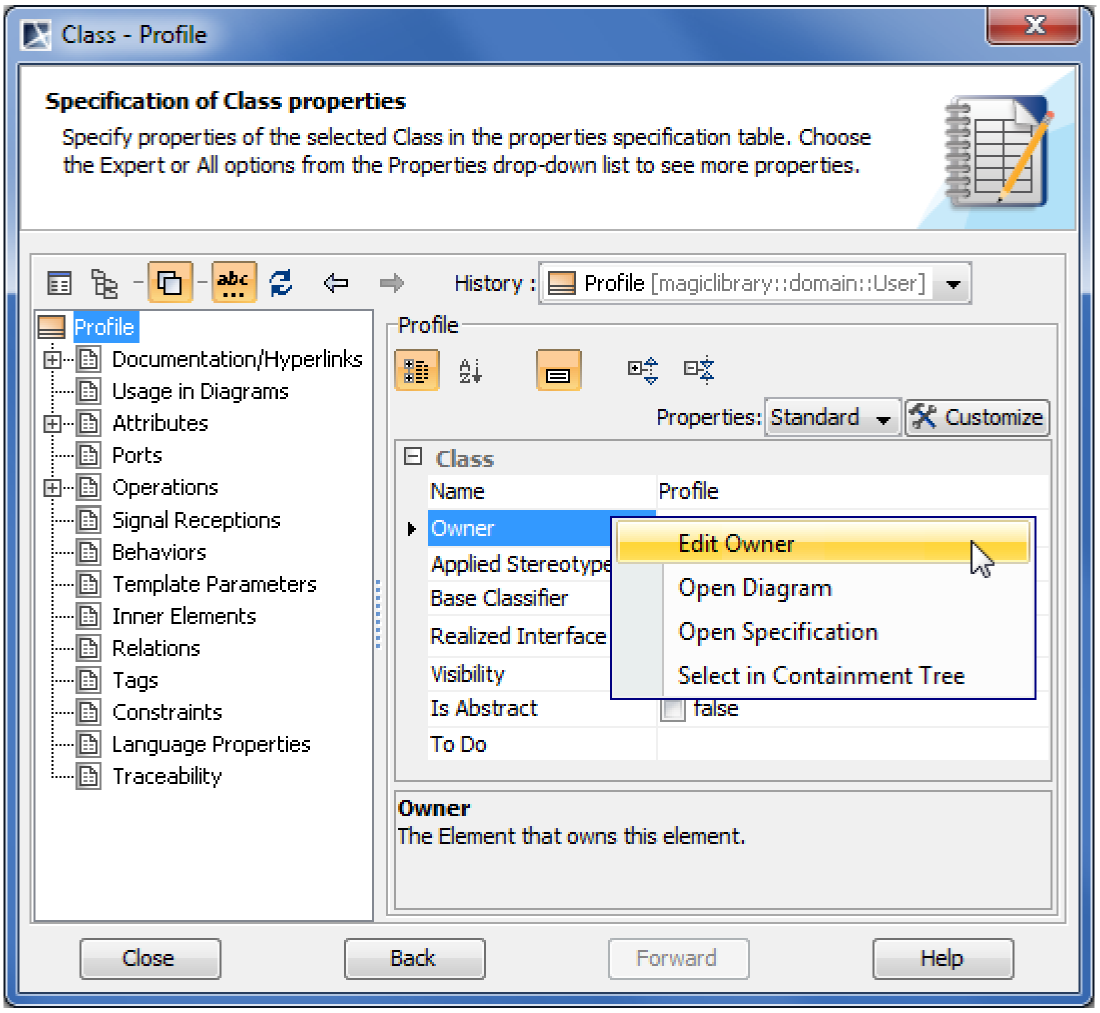


Figure 128 -- Selecting Edit Owner command on property's shortcut menu in Specification window

The way of entering a property value depends on the selected property type.

NOTE Property values in gray are not editable. They are derived from other elements used in your model.

Learn about editing values of different property types in:

- "Editing textual properties" on page 238.
- "Editing logical values" on page 243.
- "Selecting values" on page 244.
- "Cases of advanced editing" on page 251.

Editing textual properties

Textual type property values are usually simply typed in a property value cell. In some specific cases you can also use advanced editing features, i.e., long textual values editor **NEW!** and multiline textual values editor (both available the HTML mode).

Examples of textual type properties: **Name**, **Body**, and other.

To edit a textual property value

1. Click an appropriate property value cell.
2. Type a value.

Learn about advanced cases of editing textual values in:

- "Editing long textual values" on page 239.
- "NEW! Editing multiline textual values" on page 241.

Editing long textual values

In case of editing a value that consists of several words, the value cell may seem too short. In order to avoid this inconvenience you can edit the property value in a dialog specially designated for typing long values.

To edit a textual value consisting of several words

1. Click an appropriate property value cell.
2. Click the Edit button (see the highlighted button in the following figure).

3. In the opened dialog, type a value and click **OK**.

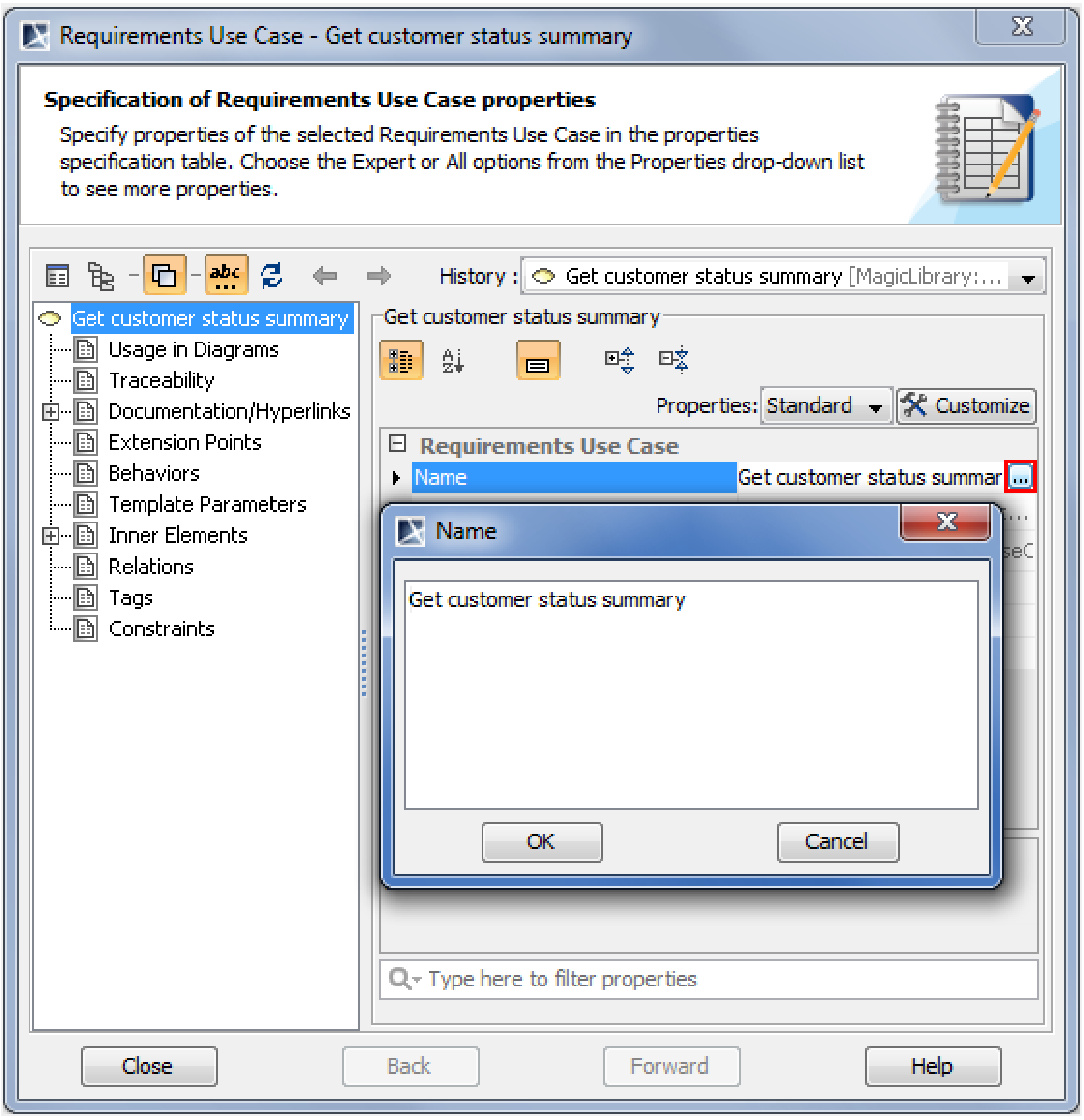
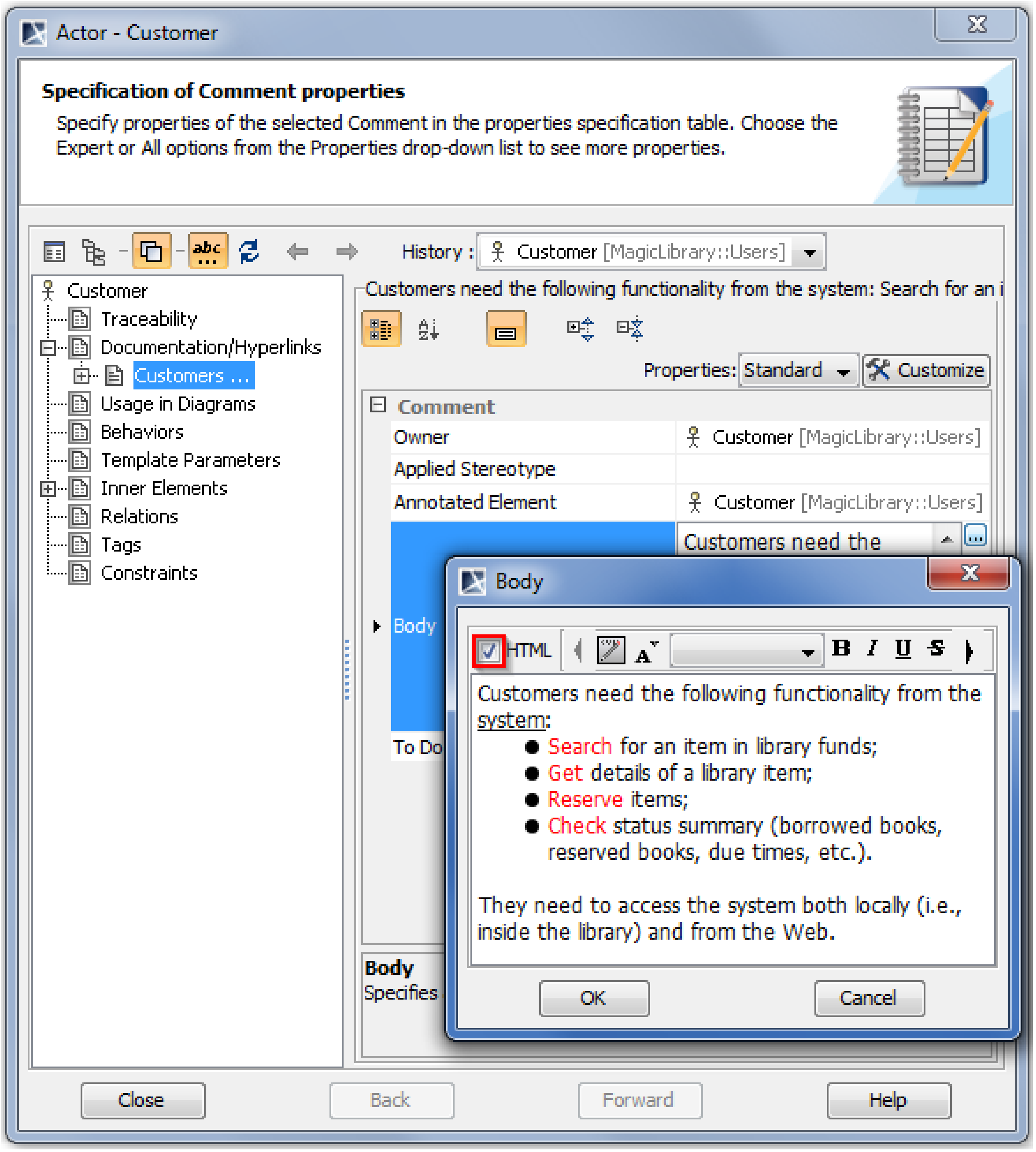

Requirements Use Case - Get customer status summary
Specification of Requirements Use Case properties
Specify properties of the selected Requirements Use Case in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.
History : Get customer status summary [MagicLibrary:...
Get customer status summary
Usage in Diagrams
Traceability
Documentation/Hyperlinks
Extension Points
Behaviors
Template Parameters
Inner Elements
Relations
Tags
Constraints
Properties: Standard
Customize
Requirements Use Case
Name
Get customer status summar
Name
Get customer status summary
OK
Cancel
Type here to filter properties
Close
Back
Forward
Help

Figure 129 -- Editing value that consists of several words in Specification window

There are some textual properties, whose values can keep text formatting settings. You can use the HTML editor in such cases. To use the HTML editor, select the **HTML** check box in the dialog opened for editing this special kind of textual property value.


Actor - Customer
Specification of Comment properties
Specify properties of the selected Comment in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.
History : Customer [MagicLibrary::Users]
Customer
Traceability
Documentation/Hyperlinks
Customers ...
Usage in Diagrams
Behaviors
Template Parameters
Inner Elements
Relations
Tags
Constraints
Customers need the following functionality from the system: Search for an i
Properties: Standard
Customize
Comment
Owner
Customer [MagicLibrary::Users]
Applied Stereotype
Annotated Element
Customer [MagicLibrary::Users]
Body
Customers need the
To Do
Body
Specifies
HTML
OK
Cancel
Close
Back
Forward
Help

Customers need the following functionality from the system:
- Search for an item in library funds;
- Get details of a library item;
- Reserve items;
- Check status summary (borrowed books, reserved books, due times, etc.).

They need to access the system both locally (i.e., inside the library) and from the Web.

Figure 130 -- Editing textual value in HTML editor

For more information about using the HTML editor please refer to "HTML Editor" on page 284.

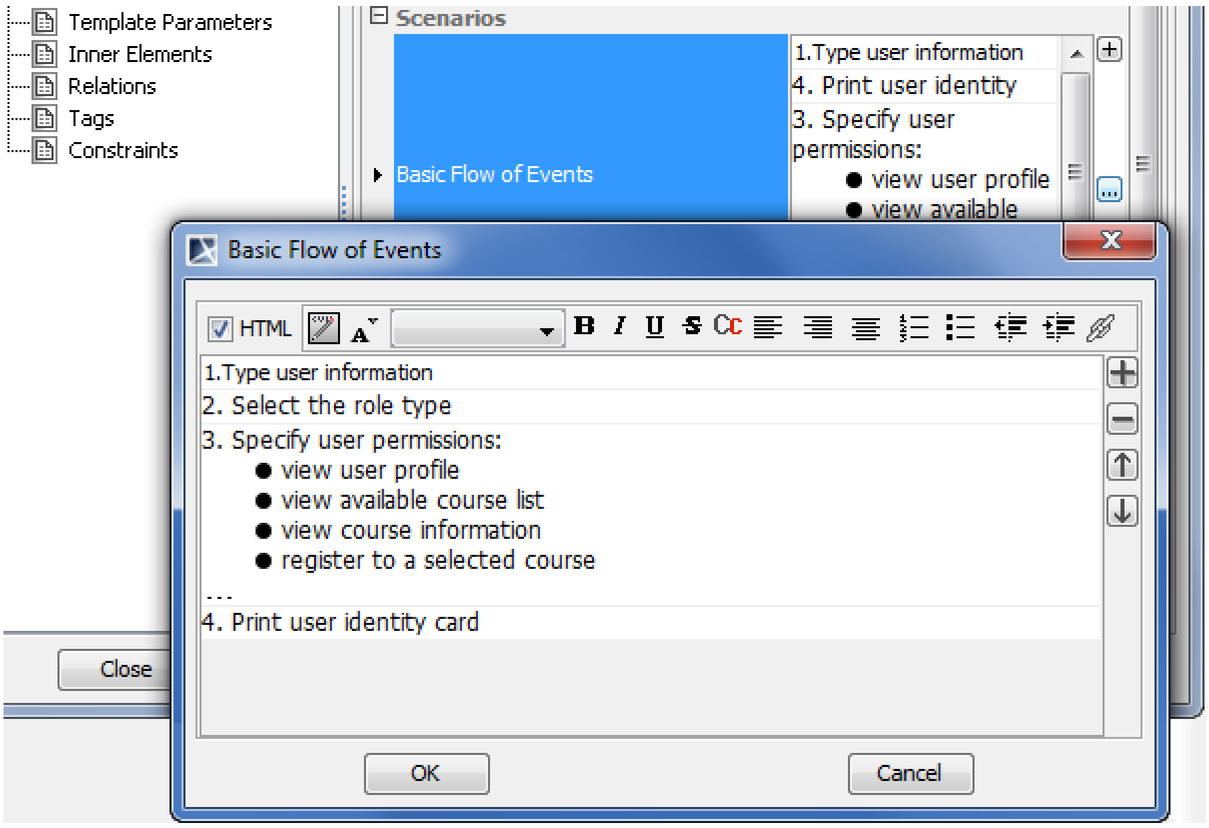
NEW! Editing multiline textual values

Some properties can have more than one textual value, for example, the **Body** property of an opaque expression, the **Pre Condition** and **Post Condition** properties of a use case, and other. You can use a special editor to edit multiline textual values.

Using the editor for multiline textual values, you can perform the following actions:

- Create a new value.
- Remove a selected value.
- Edit each value in the HTML editor separately.
- Reorder values.
- Strip long values (available only in the Specification window).

IMPORTANT!	To strip long values, make sure that the Strip Multiline Text mode is turned on in the Specification window. For more information about buttons on the Specification window toolbar, see "Specification Window Toolbar" on page 222.



1.Type user information
2. Select the role type
3. Specify user permissions:
- view user profile
- view available course list
- view course information
- register to a selected course

...
4. Print user identity card

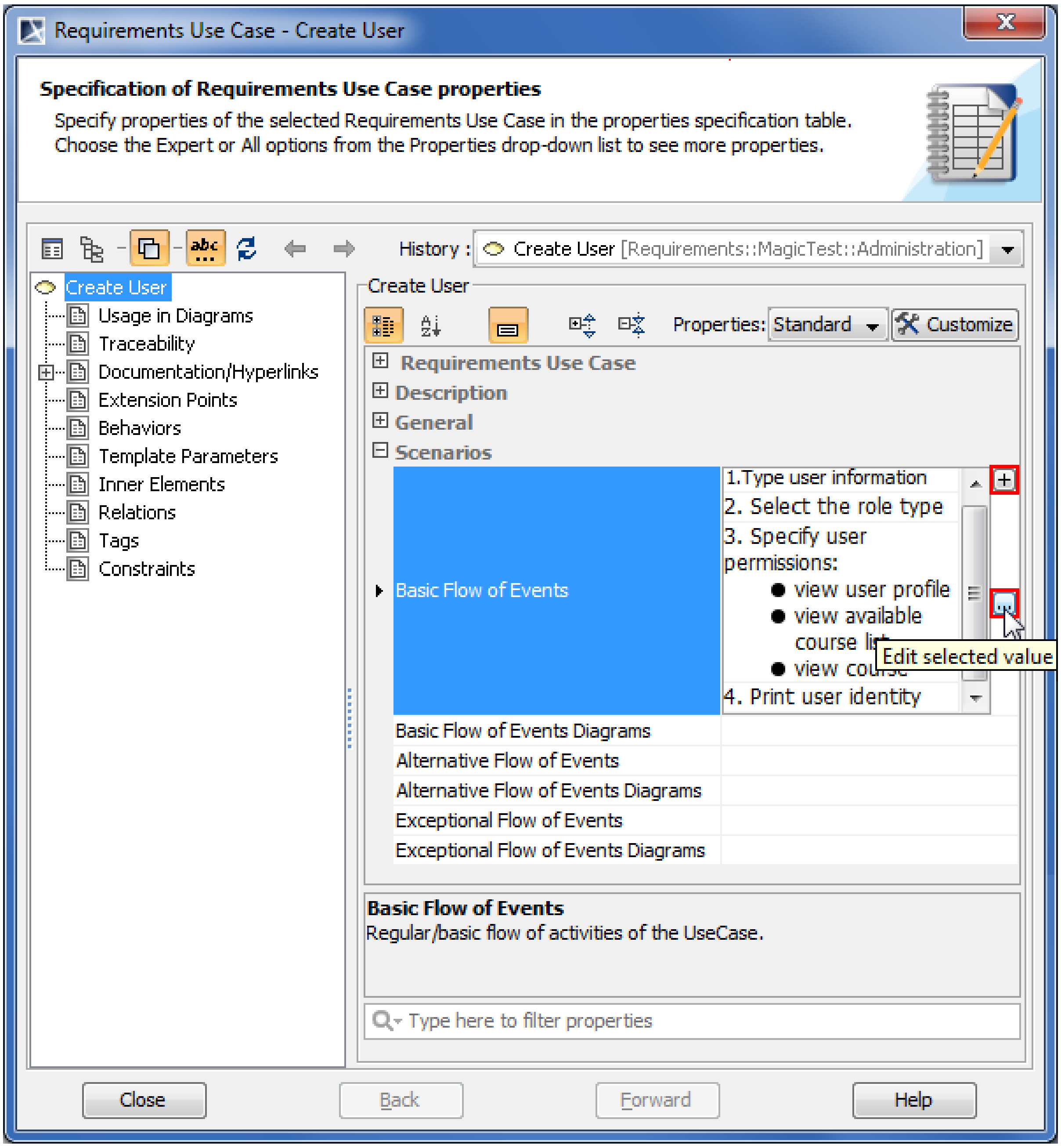
Figure 131 -- Multiline textual values editor

The following table describes functions of buttons used in the editor.

Button	Description
☐ HTML	Select the HTML check box to edit a selected row in the HTML mode. The HTML editor toolbar will appear. For more information about the HTML toolbar, refer to "HTML editor toolbar" on page 290.
⊞	Click to add an empty row after the selected one to type a new value.
⊟	Click to remove a selected row.
↑	Click to moves up a selected row.
↓	Click to moves down a selected row.

To open the multiline textual values editor

1. Click an appropriate property value cell.
2. Do one of the following:
   - Double-click one of the values of the selected property.
   - Click the Edit selected value button (see the highlighted **...** button in the following figure).
   - Click the Add new value button (see the **+** button in the following figure). The editor will be opened with an empty line to type a new value.


Requirements Use Case - Create User

Specification of Requirements Use Case properties

Specify properties of the selected Requirements Use Case in the properties specification table.
Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Create User [Requirements::MagicTest::Administration]

Properties: Standard

Basic Flow of Events	1.Type user information 2. Select the role type 3. Specify user permissions: ● view user profile ● view available course list ● view course 4. Print user identity
Basic Flow of Events Diagrams	
Alternative Flow of Events	
Alternative Flow of Events Diagrams	
Exceptional Flow of Events	
Exceptional Flow of Events Diagrams	

Basic Flow of Events
Regular/basic flow of activities of the UseCase.

Figure 132 -- Opening multiline textual values editor in Specification window

Editing logical values

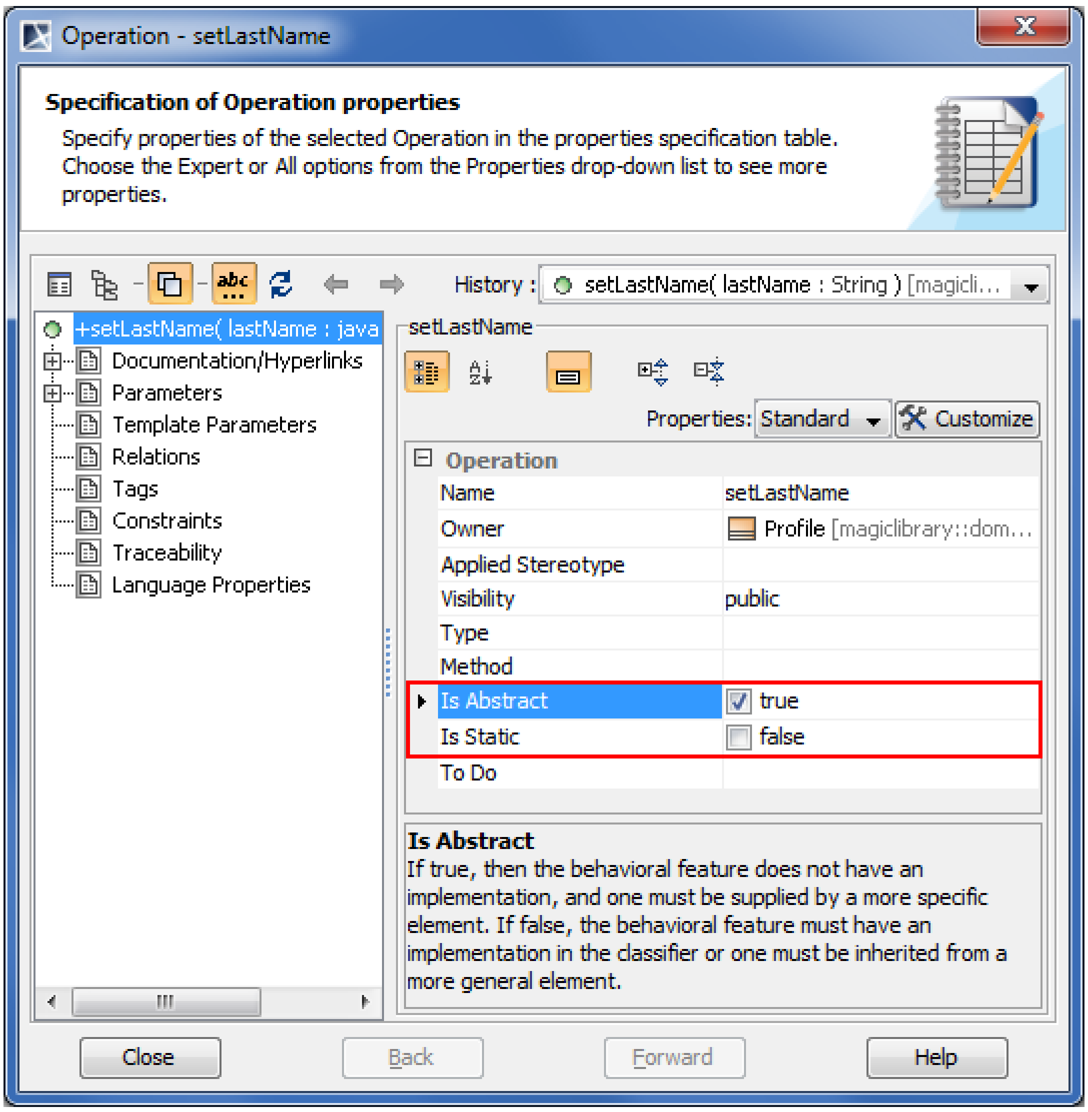
Logical (boolean) type property value can be either *true* or *false*.

Examples of logical type properties: **Is Abstract**, **Is Read Only**, and other.

To edit a logical property value

Do one of the following:

- Select the check box to set the value to *true*.
- Clear the check box selection to set value to *false*.


Operation - setLastName

Specification of Operation properties

Specify properties of the selected Operation in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : setLastName(lastName : String) [magicli...

Properties: Standard

Operation	
Name	setLastName
Owner	Profile [magiclibrary::dom...
Applied Stereotype	
Visibility	public
Type	
Method	
Is Abstract	✓ true
Is Static	false
To Do	

Is Abstract
If true, then the behavioral feature does not have an implementation, and one must be supplied by a more specific element. If false, the behavioral feature must have an implementation in the classifier or one must be inherited from a more general element.

Figure 133 -- Editing logical values in Specification window

Selecting values

Selectable value type property values are selected from lists. There can be two types of lists:

- **Non-editable** - for properties whose value ranges are restricted by UML (for example, Visibility, Message Sort, Event Type, and other).
- **Editable** - for properties whose value ranges are not restricted by UML and can be defined by the user (for example, Type Modifier, Multiplicity, and other).

Learn about selecting property values from lists in:

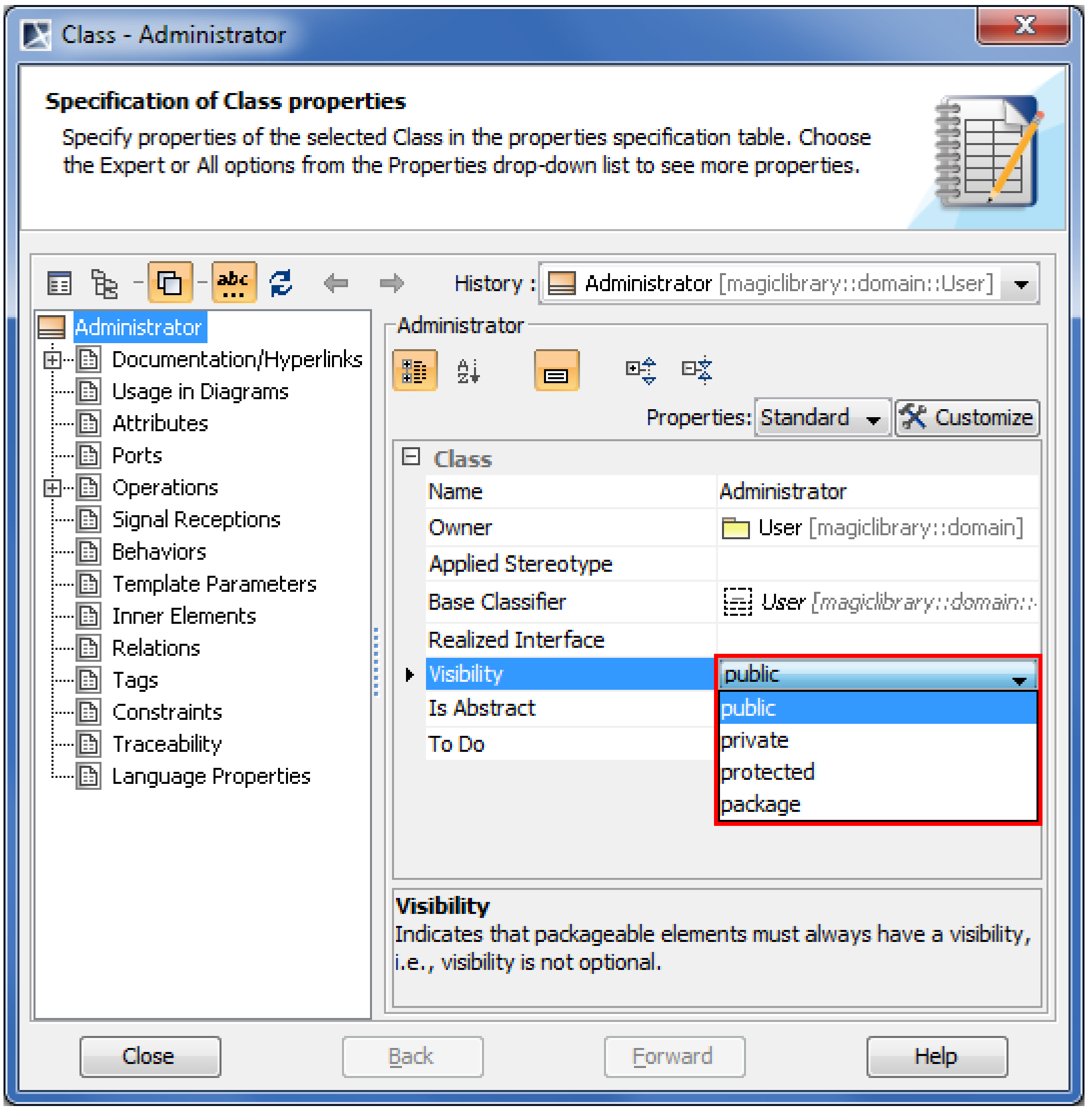
- "Selecting single property value from non-editable list" on page 245.
- "Selecting single property value from editable list" on page 246.
- "Selecting multiple property values" on page 249.

Selecting single property value from non-editable list

In this case you can choose one of predefined values.

To select a property value from a non-editable predefined list

1. Click an appropriate property value cell to open the list.
2. In the drop-down list, select the value.



Specification of Class properties

Specify properties of the selected Class in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

Class	
Name	Administrator
Owner	User [magiclibrary::domain]
Applied Stereotype	
Base Classifier	User [magiclibrary::domain::
Realized Interface	
Visibility	public
Is Abstract	
To Do	

public
private
protected
package

Visibility
Indicates that packageable elements must always have a visibility, i.e., visibility is not optional.

Figure 134 -- Selecting value from non-editable list in Specification window

To remove a property value selected from a non-editable predefined list

NOTE	You can remove the property value only if the property can have an empty value.

1. Click an appropriate property value cell.
2. Click the drop-down arrow to open the list of available values.
3. Select <*UNSPECIFIED*> from the list.

Selecting single property value from editable list

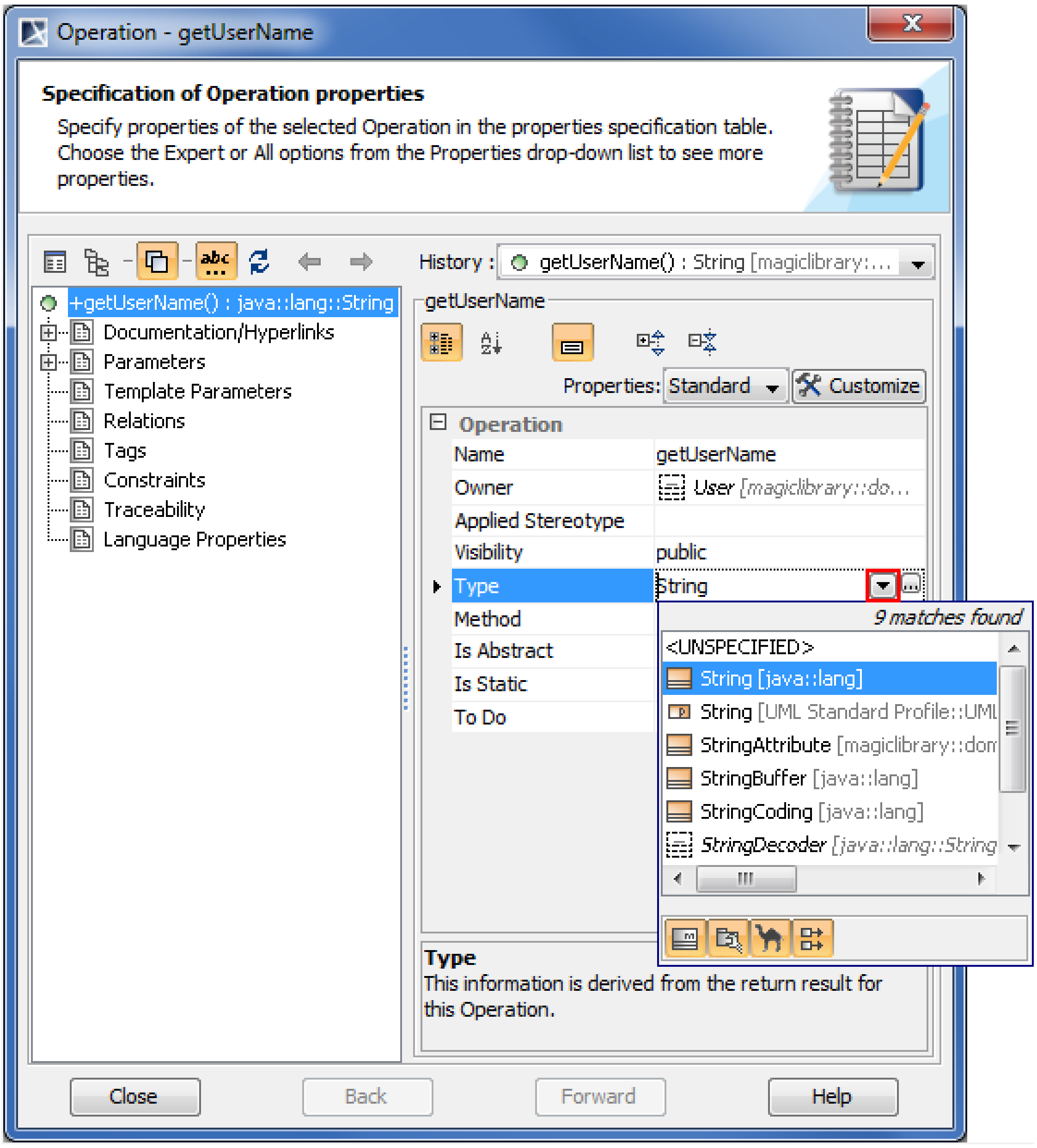
This is the case of assigning a value to a property in one of the following ways:

- Selecting a value either from a predefined value list or from the whole model via the element Selection dialog .
- Creating a new element and selecting it as property value.

To select a property value from a predefined list

1. Click an appropriate property value cell.
2. Click the drop-down arrow (see the highlighted button in the following figure) to open the list of available values.

3. Select a value from the list.



Specification of Operation properties

Specify properties of the selected Operation in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

Operation	
Name	getUserName
Owner	User [magiclibrary::do...
Applied Stereotype	
Visibility	public
Type	String
Method	
Is Abstract	
Is Static	
To Do	

Type
This information is derived from the return result for this Operation.

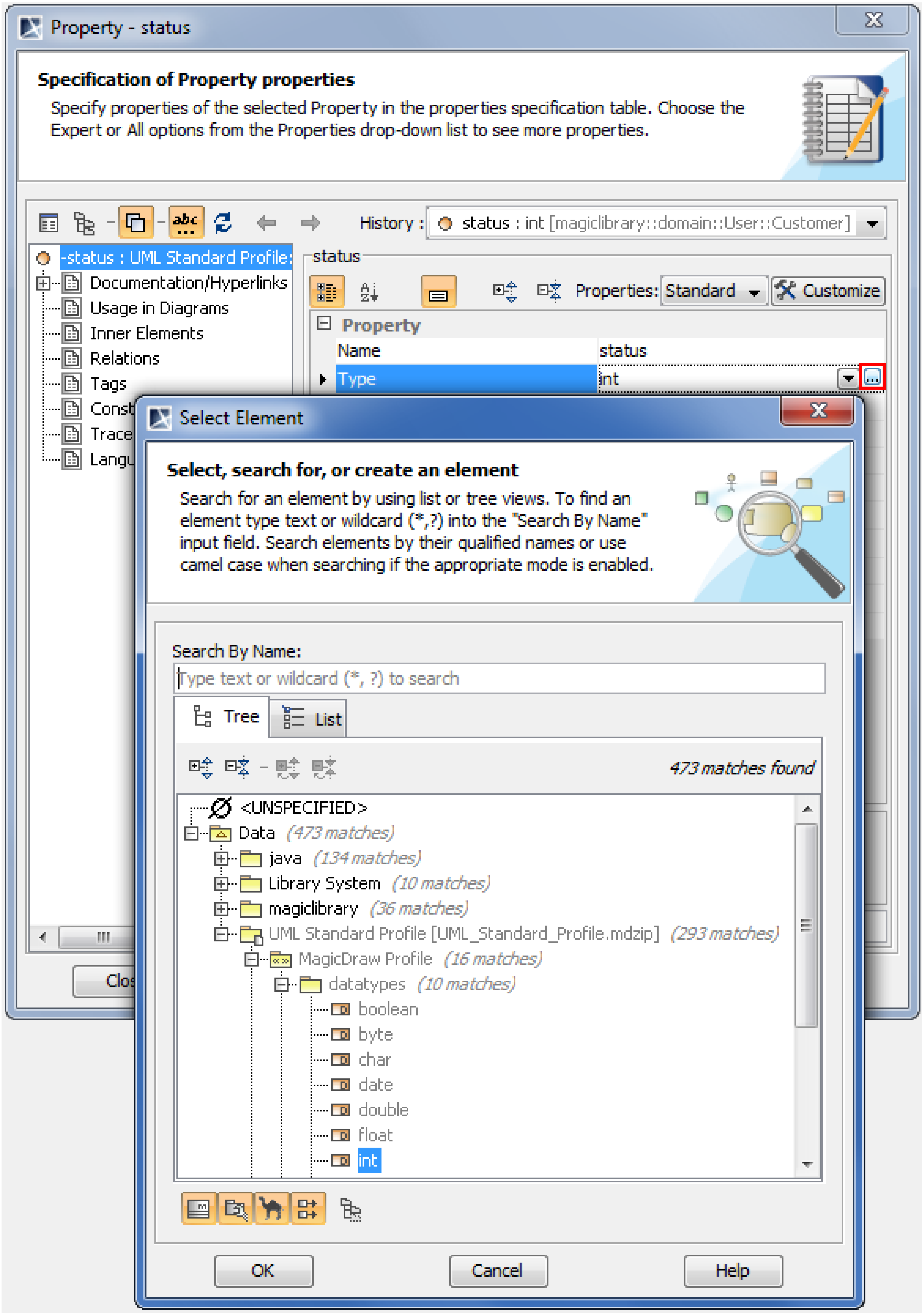
Figure 135 -- Selecting single property value from predefined list in Specification window

For information about the type and mode of searching for an element, refer to "Element search criteria and modes" on page 280.

To assign a property value via the element Selection dialog

1. Click an appropriate property value cell.
2. Click the Edit button (see the highlighted button in the following figure). The element Selection dialog opens.
3. Select an existing element or create a new one. For more information about the element Selection dialog, refer to "Selecting an Element" on page 279.

4. Click **OK** when you are done.


Property - status

Specification of Property properties

Specify properties of the selected Property in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : status : int [magiclibrary::domain::User::Customer]

-status : UML Standard Profile:
Documentation/Hyperlinks
Usage in Diagrams
Inner Elements
Relations
Tags
Const
Trace
Langu

status

Properties: Standard | Customize

Property	
Name	status
Type	int

Select Element

Select, search for, or create an element

Search for an element by using list or tree views. To find an element type text or wildcard (*,?) into the "Search By Name" input field. Search elements by their qualified names or use camel case when searching if the appropriate mode is enabled.

Search By Name:
Type text or wildcard (*, ?) to search

Tree | List

473 matches found

```
<UNSPECIFIED>
Data  (473 matches)
  java  (134 matches)
  Library System  (10 matches)
  magiclibrary  (36 matches)
  UML Standard Profile [UML_Standard_Profile.mdzip]  (293 matches)
    MagicDraw Profile  (16 matches)
      datatypes  (10 matches)
        boolean
        byte
        char
        date
        double
        float
        int
```

Figure 136 -- Selecting single property value via element Selection dialog

To remove a value selected for a single value type property

1. Click an appropriate property value cell.
2. Click the drop-down arrow to open the list of available values.
3. Select <*UNSPECIFIED*> from the list.

Selecting multiple property values

In this case you can assign more than one value to a property via the element Selection dialog.

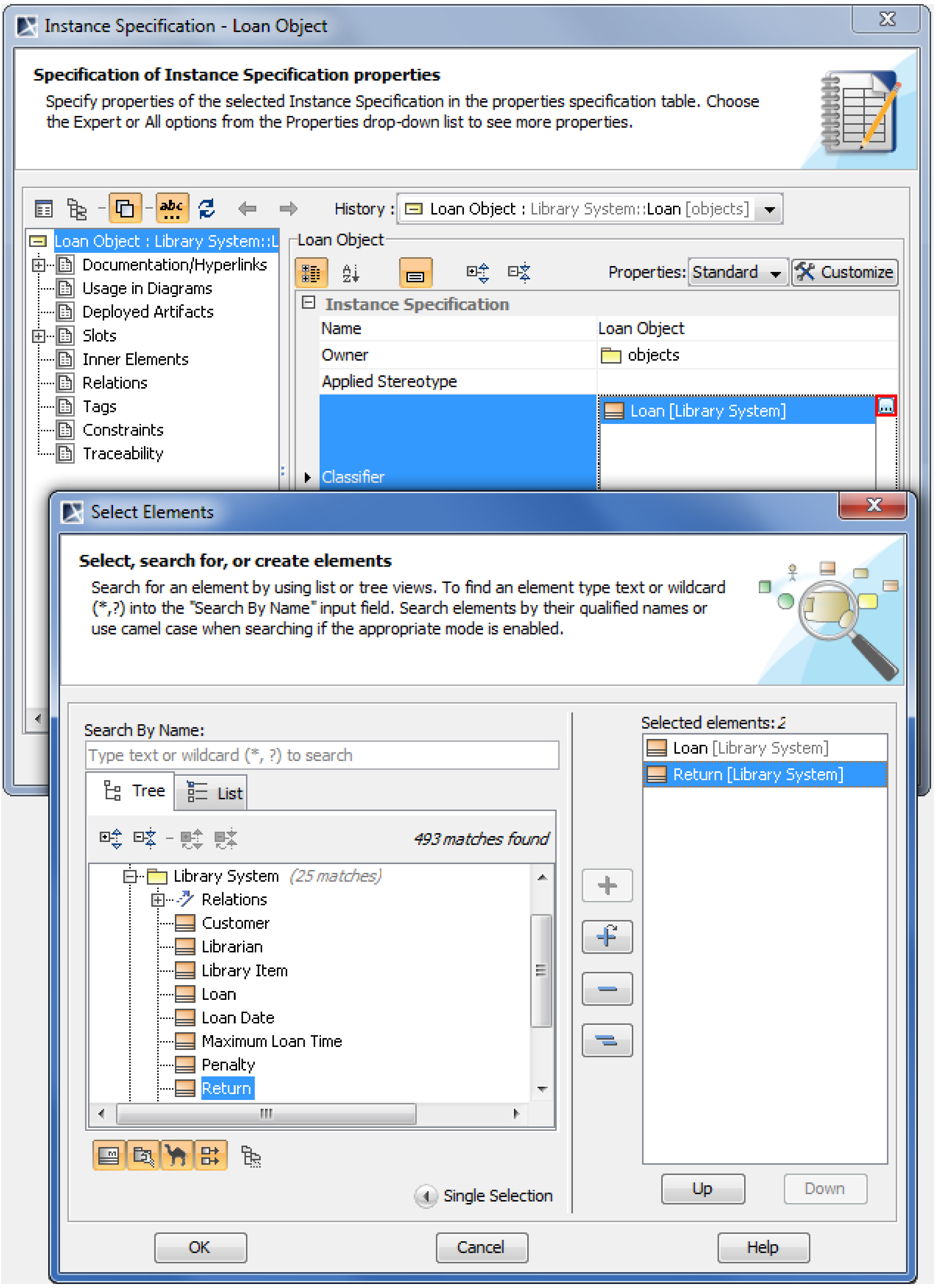
Examples of properties that may have multiple values: **Classifier**, **Method**, and other.

To assign multiple property values

1. Click an appropriate property value cell.
2. Click the Edit button (see the highlighted button in the following figure).The element Selection dialog opens.
3. Select existing elements and / or create new ones. For more information about the element Selection dialog, refer to "Selecting an Element" on page 279.

IMPORTANT!	Make sure the Multiple Selection mode is turned on.

4. Click **OK** when you are done.


Instance Specification - Loan Object

Specification of Instance Specification properties

Specify properties of the selected Instance Specification in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Loan Object : Library System::Loan [objects]

Loan Object : Library System::L
Documentation/Hyperlinks
Usage in Diagrams
Deployed Artifacts
Slots
Inner Elements
Relations
Tags
Constraints
Traceability

Loan Object

Properties: Standard

Instance Specification

Name	Loan Object
Owner	objects
Applied Stereotype	
Classifier	Loan [Library System]

Select Elements

Select, search for, or create elements

Search for an element by using list or tree views. To find an element type text or wildcard (*,?) into the "Search By Name" input field. Search elements by their qualified names or use camel case when searching if the appropriate mode is enabled.

Search By Name:
Type text or wildcard (*, ?) to search

493 matches found

```
Library System (25 matches)
    Relations
    Customer
    Librarian
    Library Item
    Loan
    Loan Date
    Maximum Loan Time
    Penalty
    Return
```

Single Selection

Selected elements: 2
Loan [Library System]
Return [Library System]

Figure 137 -- Selecting multiple property values via the element Selection dialog

Cases of advanced editing

You may have noticed that editing some property values is a sophisticated process. These are the cases of editing such property values:

- "Creating inner element as property value" on page 251.
- "Assigning value specification as property value" on page 254.
- "Editing property values in property groups" on page 254.

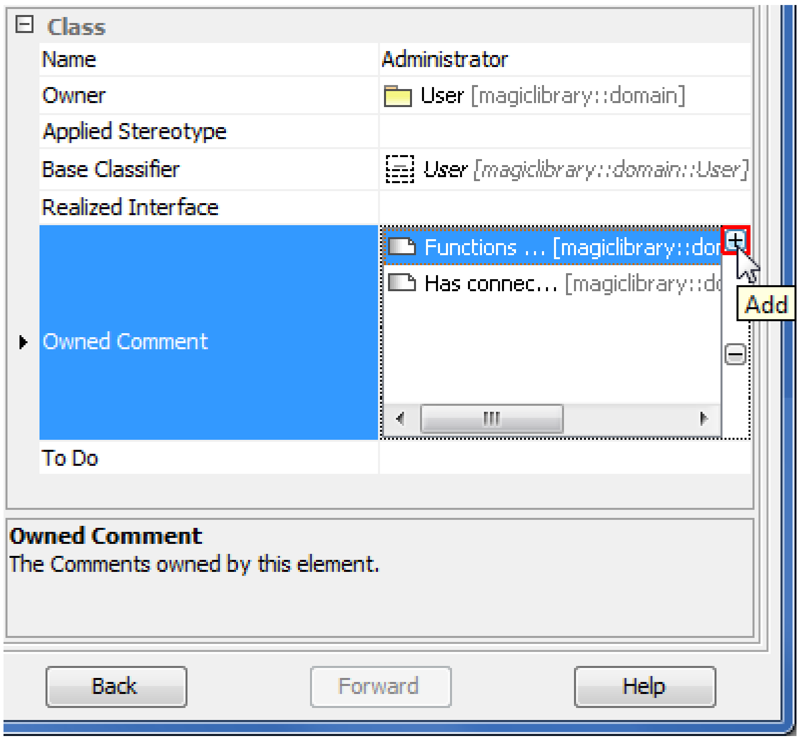
Creating inner element as property value

There are some properties whose values can be their inner elements. Specifying such property value requires to create a new element. The element, which has the property with the inner element assigned as its value, becomes the owner of this inner element.

Examples of properties whose values are their inner elements: **Owned Comment**, **Owned Attribute**, and other.

To create an inner element as a property value

1. Click an appropriate property value cell.
2. Click the Add button (see the highlighted button in the following figure). The Specification window for creating a new element opens.



Class	
Name	Administrator
Owner	User [magiclibrary::domain]
Applied Stereotype	
Base Classifier	User [magiclibrary::domain::User]
Realized Interface	
Owned Comment	Functions ... [magiclibrary::dor Has connec... [magiclibrary::dc
To Do	

Owned Comment
The Comments owned by this element.

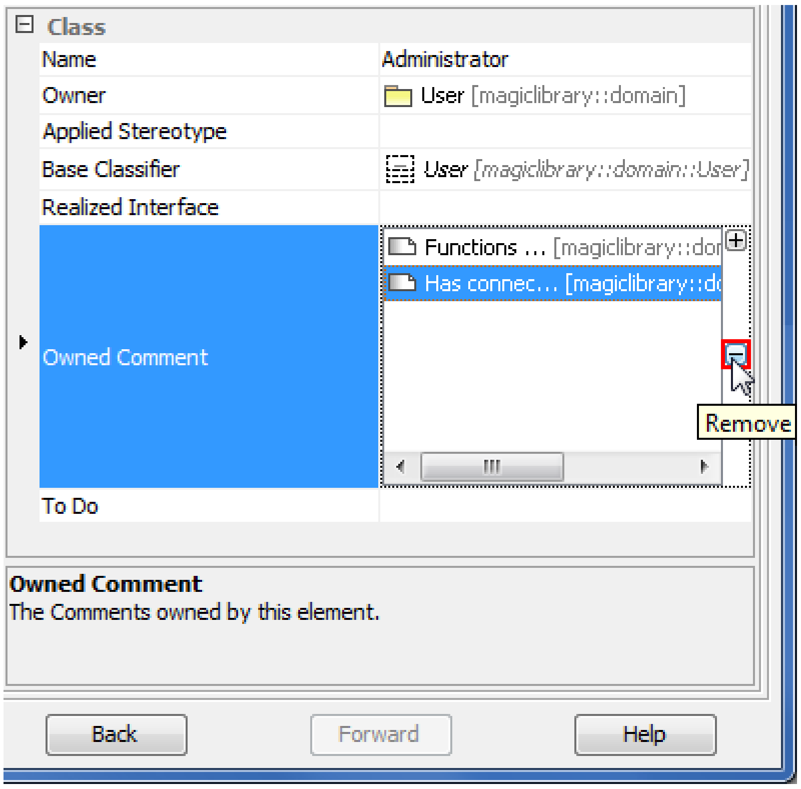
Figure 138 -- Creating inner element (fragment of Specification window)

3. Specify properties of the new inner element's Specification window.
4. When you are done, do one of the following:
   - Close the Specification window.
   - Click **Back** to return to the Specification window of the owning element.

To remove an inner element from a property value list

1. Click an appropriate property value cell.

2. Select the value you want to remove.
3. Click the Remove button.



Class	
Name	Administrator
Owner	User [magiclibrary::domain]
Applied Stereotype	
Base Classifier	User [magiclibrary::domain::User]
Realized Interface	
Owned Comment	Functions ... [magiclibrary::do Has connec... [magiclibrary::d
To Do	

Owned Comment
The Comments owned by this element.

Figure 139 -- Removing inner element (fragment of Specification window)

IMPORTANT!	The element is removed from both the property value list and the model.

Assigning value specification as property value

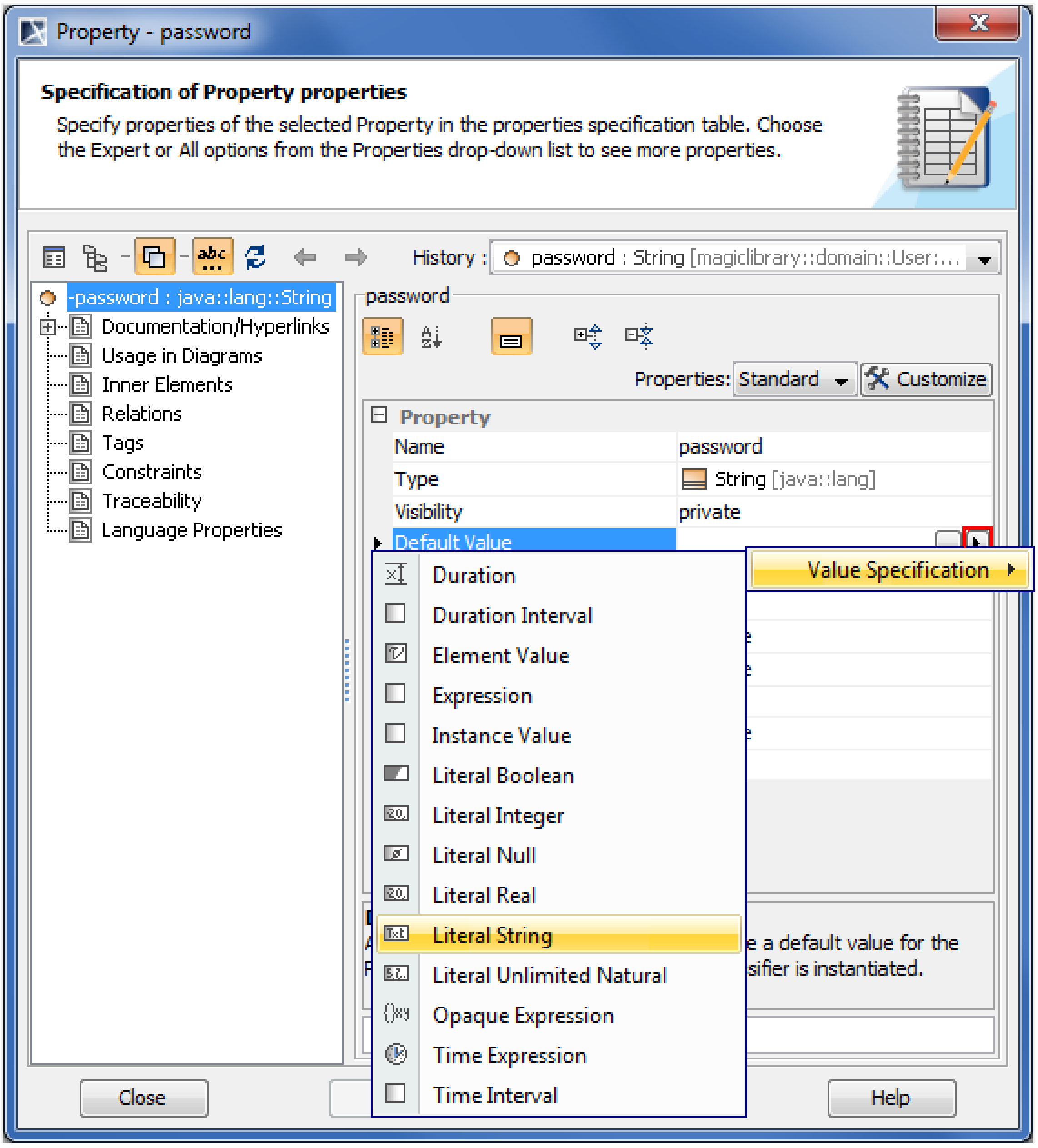
There are some properties whose values can be value specifications. For more information about value specifications, refer to "Value Specification" on page 776.

Examples of properties whose values are value specifications: **Default Value**, **Value**, and other.

To assign a value specification

1. Click an appropriate property value cell.
2. Click the Show Shortcut Menu button (see the highlighted button in the following figure).

3. On the shortcut menu, click **Value Specification** and then select a value specification.



Property - password

Specification of Property properties

Specify properties of the selected Property in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : password : String [magiclibrary::domain::User:...

- -password : java::lang::String
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability
  - Language Properties

password

Properties: Standard | Customize

Property	
Name	password
Type	String [java::lang]
Visibility	private
Default Value	

e a default value for the
sifier is instantiated.

Figure 140 -- Assigning value specification in Specification window

To change an assigned value specification

1. Click an appropriate property value cell.
2. Click the Show Shortcut Menu button (see the highlighted button in the preceding figure).
3. From the shortcut menu, select **Value Specification** > **Delete** <value specification> (see the following figure).

4. Assign a new value specification. See the procedure "To assign a value specification" on page 252.

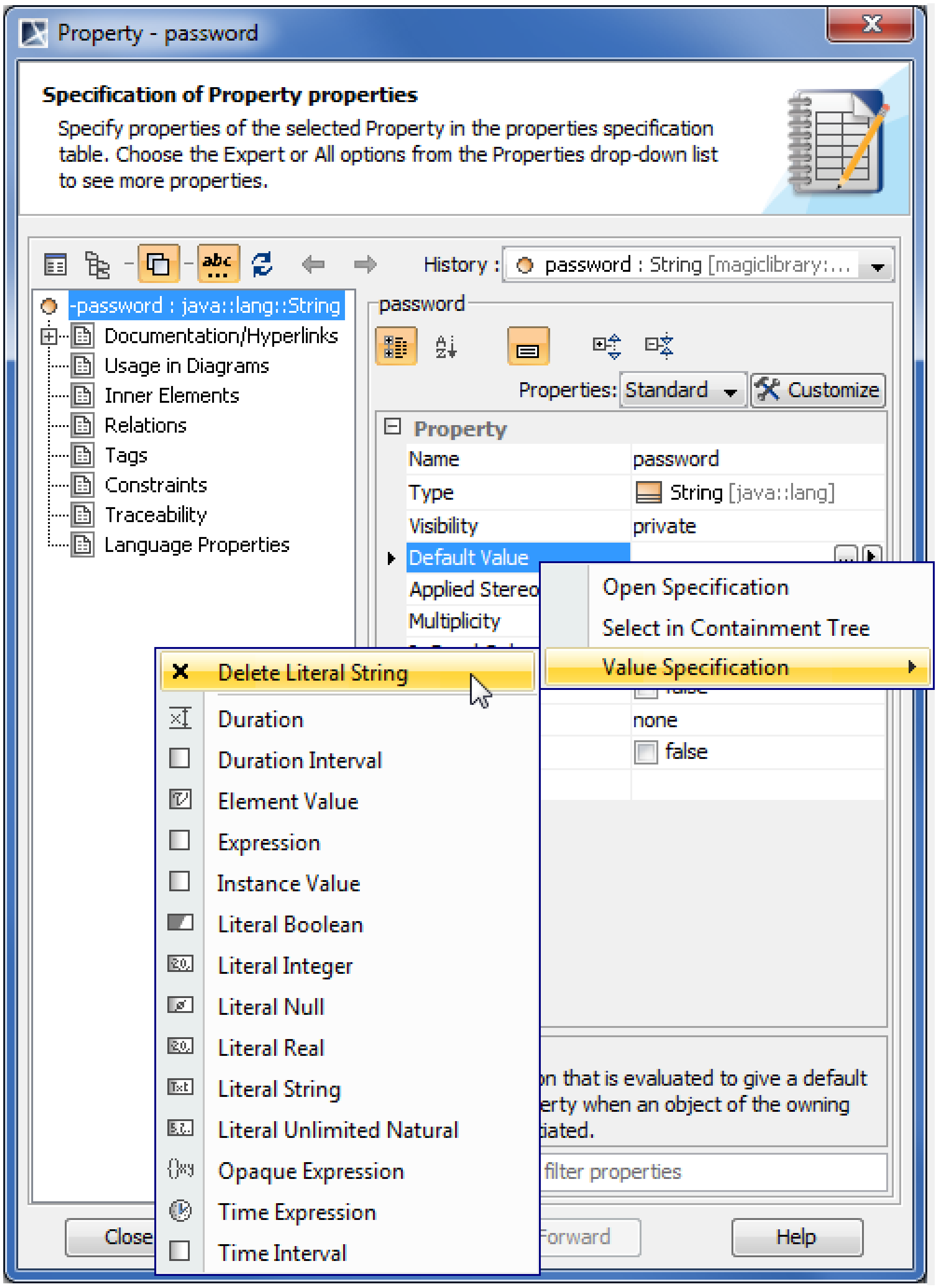


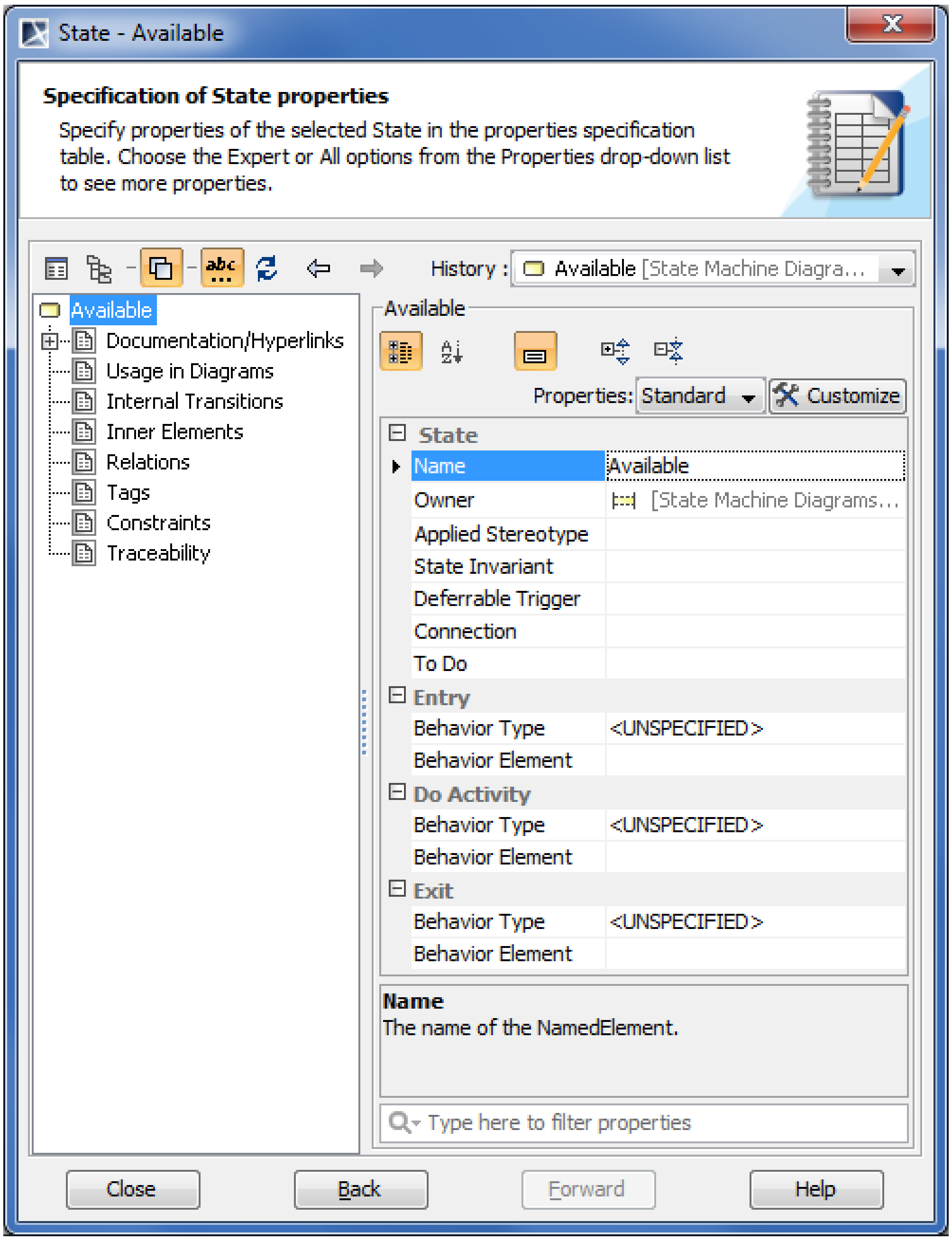
Figure 141 -- Deleting value specification in Specification window

Editing property values in property groups

Some elements can be related to each other as the owner and the owned one, for example, a transition can be an owner of a trigger, and the trigger can be owned by the transition.

MagicDraw allows the handy editing of owned element property values via owner's properties. Owned element properties are available as appropriately named property groups, for example, the **Entry**, **Do Activity**, and **Exit** property groups in the state's Specification window (see the following figure).

IMPORTANT!	When editing owned element properties, keep in mind that you create a new element in your model.


State - Available

Specification of State properties

Specify properties of the selected State in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Available [State Machine Diagra...

- Available
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Internal Transitions
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability

Available

Properties: Standard — Customize

State	
Name	Available
Owner	[State Machine Diagrams...
Applied Stereotype	
State Invariant	
Deferrable Trigger	
Connection	
To Do	
Entry	
Behavior Type	<UNSPECIFIED>
Behavior Element	
Do Activity	
Behavior Type	<UNSPECIFIED>
Behavior Element	
Exit	
Behavior Type	<UNSPECIFIED>
Behavior Element	

Name
The name of the NamedElement.

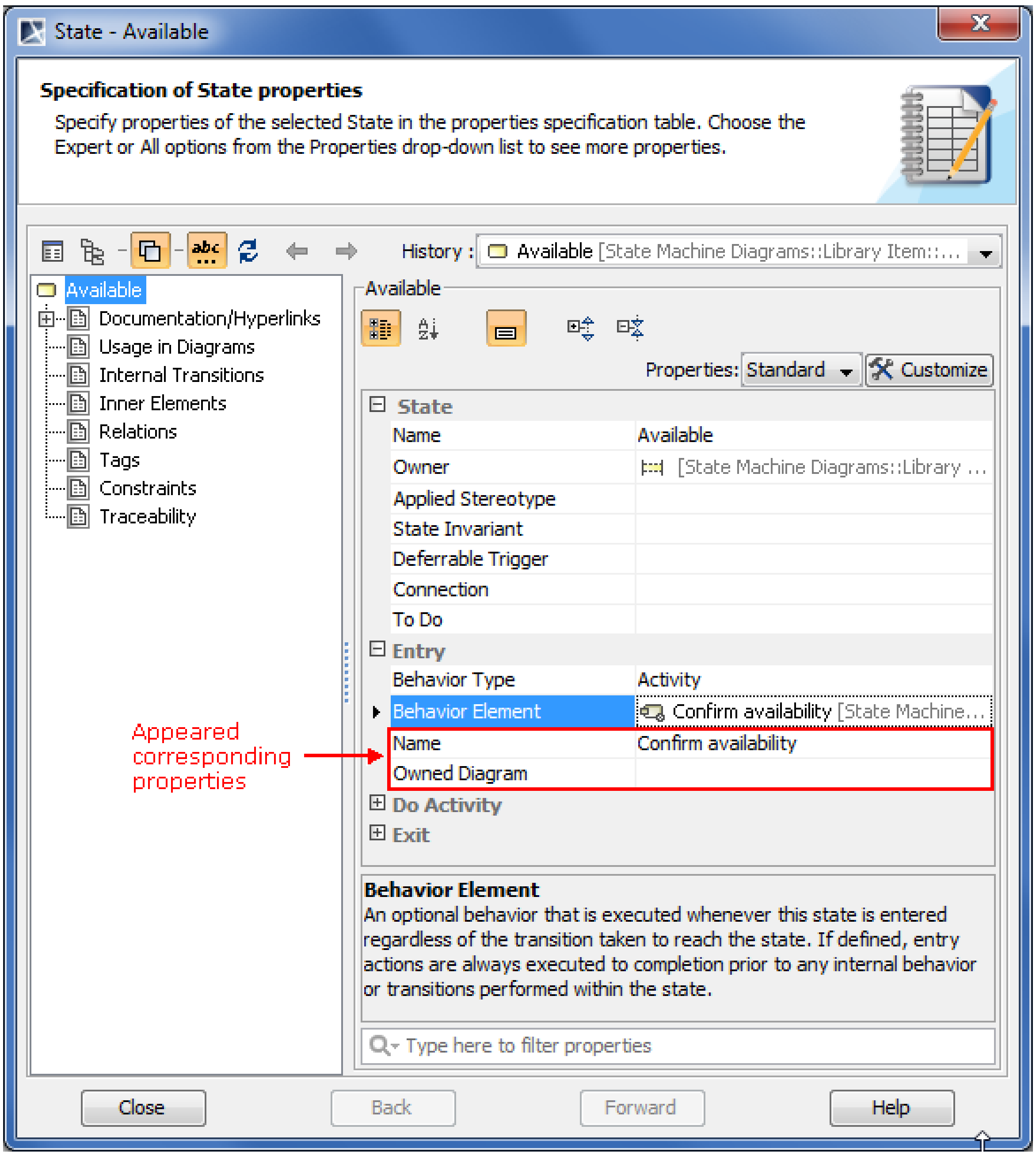
Type here to filter properties

Figure 142 -- Owned element property groups in state's Specification window

Property set in a property group may vary before and after owned element specification. For example, let's say, we have an activity assigned as behavior type in the **Entry** property group. As a result to this certain additional properties for creating a new activity in your model appear in the **Entry** property group: **Name** and **Owned Diagram** (see the following figure).

NOTE Keep in mind that the owner's specification contains only ownership-relevant properties of an owned element.

To view and edit all other properties of the owned element, open its Specification window.



State - Available

Specification of State properties

Specify properties of the selected State in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Available [State Machine Diagrams::Library Item::...

Available
- Documentation/Hyperlinks
- Usage in Diagrams
- Internal Transitions
- Inner Elements
- Relations
- Tags
- Constraints
- Traceability

Properties: Standard | Customize

State	
Name	Available
Owner	[State Machine Diagrams::Library ...
Applied Stereotype	
State Invariant	
Deferrable Trigger	
Connection	
To Do	
Entry	
Behavior Type	Activity
Behavior Element	Confirm availability [State Machine...
Name	Confirm availability
Owned Diagram	
Do Activity	
Exit	

Behavior Element
An optional behavior that is executed whenever this state is entered regardless of the transition taken to reach the state. If defined, entry actions are always executed to completion prior to any internal behavior or transitions performed within the state.

Appeared corresponding properties
Type here to filter properties
Close
Back
Forward
Help

Figure 143 -- Specifying activity as entry in state's Specification window

To create an owned element as a property value

1. In the property group, wherein you want to create the owned element, click any editable property value cell.
2. Specify additional properties corresponding to the created element.

To remove an owned element

1. Click the **<owned element type>** property value cell in the desired to remove owned element property group.
2. In the opened drop-down list, select <*UNSPECIFIED*>.

Formatting Symbols

Every symbol in MagicDraw can have its own style: color, font, size, and so forth. Define these symbol properties:

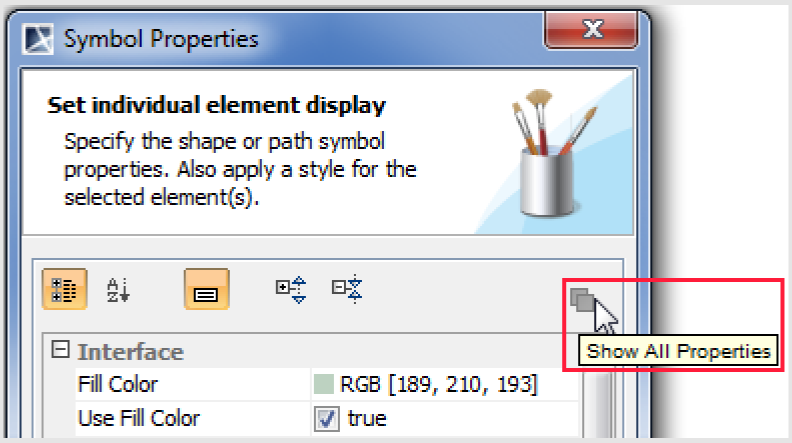
- In the **Symbol Properties** dialog. See the procedure "To open the Symbol Properties dialog" on page 257.
- In the **Symbol** tab on the **Properties** panel at the bottom of the Model Browser.
- In the **Project Options** dialog. Using this dialog you can change all available symbol properties, create your own style for the project, apply different symbol properties for different diagrams, define stereotype properties that may be bound to the symbol, and more. For more information about creating, editing, cloning, importing / exporting, or removing symbol property styles, see "Style Engine" on page 259.
- On the diagram toolbar. Using this toolbar you can change the color, font, and path style of a symbol. For more information about diagram toolbar, see "Diagram toolbars" on page 71.

To open the **Symbol Properties** dialog

1. Select a symbol or a group of symbols.
2. Do one of the following:
   - On the main menu, click **Edit** > **Symbol** > **Symbol(s) Properties**.
   - On the shortcut menu, click **Symbol(s) Properties**.
   - Press ALT+ENTER.

If a group of symbols was selected, only common symbol properties are displayed in the opened dialog.

TIP! If you wish to see all symbol sproperties, click the Show All Properties button that is located on the toolbar in the **Symbol Properties** dialog.


Symbol Properties
Set individual element display
Specify the shape or path symbol properties. Also apply a style for the selected element(s).
Show All Properties
Interface

Fill Color	RGB [189, 210, 193]
Use Fill Color	✓ true

To show / hide model element constraints, stereotypes, and / or tagged values on the diagram pane

Do either:

- Select / clear the **Show Constraints**, **Show Stereotypes**, and/or **Show Tagged Values** check boxes on the symbol's shortcut menu.

Or:

1. From the **Options** menu, select **Project**.
2. The **Project Options** dialog opens. Select / clear the **Show Constraints**, **Show Stereotypes**, and / or **Show Tagged Values** check boxes for the selected model elements.

3. Click the **Apply** button in the **Styles** tab.

Displaying icon or image

You may display icon or image on the symbol or instead the symbol.

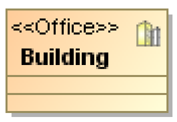
Get acquainted with the following definitions in order to understand this functionality better.

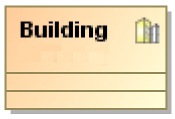
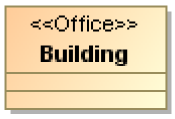
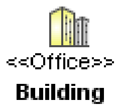
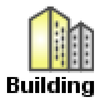
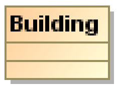
Definition	Description
Symbol	The term "symbol" means a visual representation of some model elements in the diagram. Symbols are subdivided into shapes and paths (lines in the model, for displaying various relationships).
Symbol properties	Every symbol may have its own style: color, font, size, and so forth. Symbol properties may be defined for the concrete symbol, for all symbol of one element, or according to the diagram type. For more information about symbol properties definition, see "Formatting Symbols" on page 257, about style engine, see "Style Engine" on page 259.
Stereotype	"A stereotype defines how an existing metaclass may be extended, and enables the use of platform or domain specific terminology or notation in place of, or in addition to, the ones used for the extended metaclass." [The OMG UML specification (UML 2.4: Superstructure)]. For more information about stereotype, see "Stereotype" on page 626. For more information about applying stereotype properties, see "Stereotype properties" on page 269.
Icon	Icon of stereotype. Icon is a small image displayed in the top-right corner of shape. To assign icon to stereotype in the **Stereotype** Specification window, define the **Icon** property. For more information on how to assign Icon for stereotype, see "To create a stereotype with an image" on page 626.
Text	Stereotype name, displayed on the symbol.
Image	Image which can be assigned to element and displayed as icon or instead of element shape. To assign image to element in the element Specification window, assign the **Image** property. For more information on how to assign icon for element, see "Image" on page 226.

To change the icon visibility mode on the element shape:

1. From the element shape shortcut menu, select the **Presentation Options** > **Show Stereotypes** command and then select the desired property mode.
2. You may change the stereotype/icon visibility mode in the symbol **Properties** dialog > **Show Stereotypes** combo box.

Select one of the six property modes for **Show Stereotypes**. The property modes are described in the table below:

Show Stereotypes Property Mode	Displayed on the diagram pane	Icon of the stereotype and stereotype name are assigned to element	Image to element is assigned
Icon and Text		Icon of stereotype displayed. Name of stereotype displayed.	Image of element is displayed in the corner of shape.

Show Stereotypes Property Mode	Displayed on the diagram pane	Icon of the stereotype and stereotype name are assigned to element	Image to element is assigned
Icon		Icon of stereotype displayed in the corner of symbol. Name of stereotype is not displayed.	Image of element is displayed in the corner of shape.
Text Only		Icon of stereotype is not displayed. Name of stereotype is displayed.	Image of element is not displayed.
Shape Image and Text*		Icon of stereotype is displayed instead of shape. Name of stereotype is displayed.	Image of element is displayed instead of shape.
Shape Image*		Icon of stereotype is displayed instead of shape. Name of stereotype is not displayed.	Image of element is displayed instead of the shape.
Do Not Display		Icon of stereotype is not displayed. Name of stereotype is not displayed.	Image of element is not displayed.

* - To display the icon of a stereotype instead of the element shape all element compartments should be suppressed.

TIP!	If element has assigned both - image and stereotype icon - then image of element will be displayed on the shape.

NOTE	**Shape Image and Text** and **Shape Image** properties are not added to the Path element properties list.

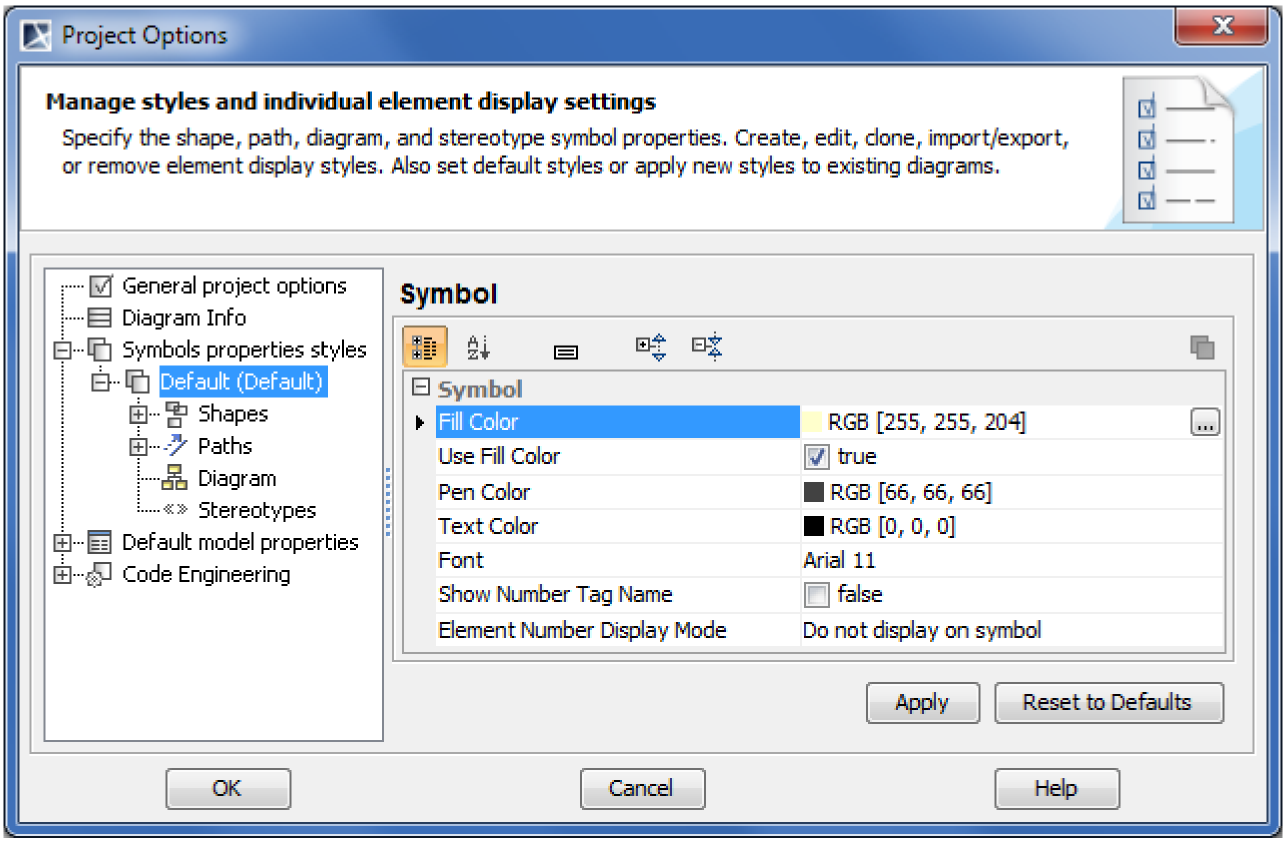
Style Engine

The Style engine is a part of the MagicDraw UML system that defines diagrams, shapes, paths, and stereotype properties. There may be few property styles defined, but all symbols are created according to the style that is selected as default. There is a possibility to apply different presentation styles for diagram/shape/path/stereotype depending on the diagram type.

Symbol Property Styles Tree

Expands the tree hierarchy of all the styles defined within the project. You may use as many of these styles as you wish.

Shape and **Path** trees have the inner structure to help you find the model element, the representation of which must be changed. The right side of the dialog contains possible choices and instruments to manage them.


Project Options

Manage styles and individual element display settings

Specify the shape, path, diagram, and stereotype symbol properties. Create, edit, clone, import/export, or remove element display styles. Also set default styles or apply new styles to existing diagrams.

- General project options
- Diagram Info
- Symbols properties styles
  - Default (Default)
    - Shapes
    - Paths
    - Diagram
    - Stereotypes
- Default model properties
- Code Engineering

Symbol

Symbol	
Fill Color	RGB [255, 255, 204]
Use Fill Color	✓ true
Pen Color	RGB [66, 66, 66]
Text Color	RGB [0, 0, 0]
Font	Arial 11
Show Number Tag Name	false
Element Number Display Mode	Do not display on symbol

Figure 144 -- Project Options dialog. Default style of symbol properties

To opent the **Symbol properties styles** tree

1. On the main menu, click **Options** > **Project**. The **Project Options** dialog opens.
2. In the tree on the dialog's left side, select **Symbols properties styles**.

To create a new style by cloning the existing one

1. Select the default style in the **Styles** list box and click the **Clone** button.
2. Type a name for the new style in the **Enter Style Name** dialog.
3. Change options of the new style.

To change the name of the selected style

1. Select a style you want to rename and click the **Rename** button.
2. Type a new name for the style in the **Enter Style Name** dialog.

To remove the selected style

- Click the **Delete** button in the **Project Options** dialog.

To make a selected style your default style for newly created projects

- Click the **Make Default** button in the **Project Options** dialog.

To apply the selected style or changed option to a current project

- Click the **Apply** button in the **Project Options** dialog, **Styles** pane.

NOTE	You can also apply the desired options to the selected diagram model elements. Click the **Apply** button in the specific elements pane.

To import an already created (and exported) project style

- Click the **Import** button. The **Open** dialog box opens. Select the style you wish to import (*.stl).

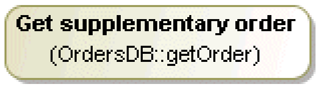
To save the created style (export) for a later usage or for other users

- Click the **Export** button. The **Save** dialog box opens. Select the directory where you wish to export a style.

In the following table you will find all possible options that can be set for the symbols:

Property (alphabetically sorted)	Function (when selected)
Attributes Color	The color of the attribute name. The **Color** dialog box opens.
Attributes Font	The font that is used for the name of an attribute. The **Font** dialog box opens.
Attributes Sort Mode	The mode for sorting attributes. Possible choices: **No Sorting, By Name, By Stereotype,** or **By Visibility.**
Autosize	Adjusts the size of a symbol to the contained information. Element borders are changed so that it uses minimum space.
Background Color	The color of the diagram background. Click the “...” button to open the **Color** dialog box, select the background color.
Constraint Text Mode	Displays constraint name or expression on a symbol.
Direction	The direction of a signal. Possible choices: **Right** or **Left**.
Enable Lolipop notation	If the Enable Lolipop notation check box is selected, notation of the interface becomes as "lolipop". **NOTE** The **Enable Lolipop notation** property is included only for the interface symbol properties
Enumeration Literals Color	The color of the enumeration literal name. The **Color** dialog box opens.
Enumeration Literals Font	The font that is used for the name of an enumeration literal. The **Font** dialog box opens.
Extension Points Color	The color of the extension point name. The **Color** dialog box opens.
Extension Points Font	The font that is used for the name of an extension point. The **Font** dialog box opens.
Fill Color	The fill color of the symbol. The **Color** dialog box opens.
Font	The font that is used for the name and other displayed properties of a model element. The **Font** dialog box opens.
Grid Size	Grid size settings from 2 to 30.
Header in Bold	Shows the name of the symbol in bold.

Property (alphabetically sorted)	Function (when selected)
Header Position	The package name position on the symbol. Possible choices: **Top** or **In Tab**.
HTML Text	Activates the HTML editor for the text of a note and a text box.
Line Style	A line style for a horizontal separator. Possible choices: **Dashed** or **Solid**.
Operations Color	The color of the operation name. The **Color** dialog box opens.
Operations Font	The font that is used for the name of an operation. The **Font** dialog box opens.
Operations Sort Mode	The mode for sorting operations. Possible choices: **No Sorting, By Name, By Stereotype,** or **By Visibility.**
Orientation	Primarily the synchronization bar diagram button is set to the vertical or horizontal position.
Path Style	The drawing style of a path. Possible choices: **Rectilinear**, **Oblique**, or **Bezier**.
Pen Color	The pen color that is used to draw elements. The **Color** dialog box opens.
Show Attributes Constraints	Shows constraints of attributes.
Show Attributes Properties	Shows tagged values of attributes.
Show Attributes Stereotypes	Shows stereotypes of attributes.
Show Attributes Visibility	Shows attribute visibility signs (+, -, #,~).
Show Base Classes	Shows a base class on the stereotype symbol.
Show Classifier	Shows a classifier name near the model element name.
Show Constraints	Shows constraints on symbols.
Show Diagram Info	Shows diagram information table on the diagram pane.
Show Direction Arrow	Shows the Direction Arrow on the association. Default Direction Arrow direction is displayed according path creation direction. It helps to read diagram and explain diagram semantics. For more information about Direction Arrow, see “To show the direction arrow near the association name” on page 651.
Show Elements List	Shows model elements that are assigned to a model, package, or subsystem as a list.
Show Entire Activation	Shows the entire activation bar on an active classifier role in a sequence diagram.
Show Full Classifier Type	Shows all attributes that are defined within a class or assigned classifier.
Show Grid	Shows a grid on the diagram.
Show Initial Attribute Value	Shows the initial attribute value on a class or artifact.
Show Message Numbers	Shows the message numbers on a diagram.
Show More Sign for Attributes	Shows an additional information sign “…” in the class, artifact attributes list, when omissions are made by editing the class compartment.

Property (alphabetically sorted)	Function (when selected)
Show More Sign for Operations	Shows an additional information sign "…" in the class, artifact or numeration operations list, when omissions are made by editing the class, artifact, or enumeration compartment.
Show More Sign for Signal Receptions	Shows additional information sign "…" in the signal reception list, when omissions are made by editing the signal reception compartment.
Show Multiplicity	Shows the multiplicity value.
Show Name	Shows the name of a relationship, role and message/stimulus.
Show Operation Parameters Direction Kind	Shows the direction kind for operation parameters
Show Operations Constraints	Shows constraints of operations.
Show Operations Properties	Shows tagged values and concurrency of an operation.
Show Operations Signature	Shows all of the operation arguments and the return type.
Show Operations Stereotypes	Shows stereotypes of operations.
Show Operations Visibility	Shows operation visibility signs (+, -, ~ #).
Show Owner	Changes the display position of qualified name on the element shape.
Show Predecessors	Shows predecessors on the message.
Show Qualified Name for Operation	The **Show Qualified Name for Operation** property shows the operation name and the class of the operation on the activity shape (using style *ClassName::OperationName*). The default property value is true.  **NOTE** For projects that were created before MagicDraw version 15.0, the **Show Qualified Name for Operation** property is unchecked. For more information about displaying qualified name for operation, see "Call Operation Action" on page 643.
Show Signal Receptions Constraints	Shows constraints of signal reception.
Show Signal Receptions parameter Direction Kind	Shows the direction kind for signal reception parameters.
Show Signal Receptions Properties	Shows tagged values and concurrency of properties.
Show Signal Receptions Signature	Shows the parameter and related information.
Show Signal Receptions Stereotypes	Shows stereotypes of signal receptions.
Show Signal Receptions Visibility	Shows signal reception visibility signs (+, -, ~ #).

Property (alphabetically sorted)	**Function (when selected)**
Show Stereotypes	If you want to change a stereotype and its icon visibility on the element shape, use the **Show Stereotypes** property. For more information about stereotype display mode, see “Changing the stereotype display mode” on page 629.
Show Tagged Values	Shows tagged values on symbols.
Show Visibility	Shows role visibility signs (+, -, #).
Signal Receptions Color	The color of the signal reception name. The **Color** dialog box opens.
Signal Receptions Font	The font that is used for the name of a signal reception. The **Font** dialog box opens.
Signal Receptions Sort Mode	The mode for sorting signal receptions. Possible choices: **No Sorting, By Signal Name, By Stereotype,** or **By Visibility.**
Snap Paths to Grid	Snap paths to grid.
Snap Shapes to Grid	Snap shapes to grid.
Stereotype Color	The color that will be used to draw stereotypes. The **Color** dia-log box opens.
Stereotype Font	The font that will be used to draw stereotypes. The **Font** dialog box opens.
Suppress Actions	Hides actions associated with the state.
Suppress Attributes	Hides the attribute list.
Suppress Enumeration Literals	Hides enumeration literals on a enumeration.
Suppress Extension Points	Hides use-case extensions on a use case.
Suppress Operations	Hides operations compartment section.
Suppress Realization Elements	Hides realization elements of a subsystem.
Suppress Signal Receptions	Hides attributes list from the shape.
Suppress Specification Elements	Hides specification elements of a subsystem.
Text Color	The color that is used for text coloring. The **Color** dialog box opens.
Text Position	Changes the text position of a separator. Possible choices: **Center**, **Left**, or **Right**.
Use Fill Color	Uses the selected fill color and the symbols color changes on the diagram.
Use Fixed Connection Points	The end of the path is connected to the fixed point of the shape.
Use Advanced Members Coloring	Use different colors for text fragments of stereotypes, names, types, and other members.
Wrap Words	Wrap words to a new line when text exceeds the text box width.

Working with Properties Styles

All symbols in MagicDraw are created according to active properties styles. There may be more than one property style in the same project, and the whole style may be applied for the project.

Every style has its own presentation of Diagram, Shape, Path, and Stereotype that you can modify using the **Project Options** dialog box in the **Symbols Properties Styles** branch. You can set your own options for every model element to the current style.

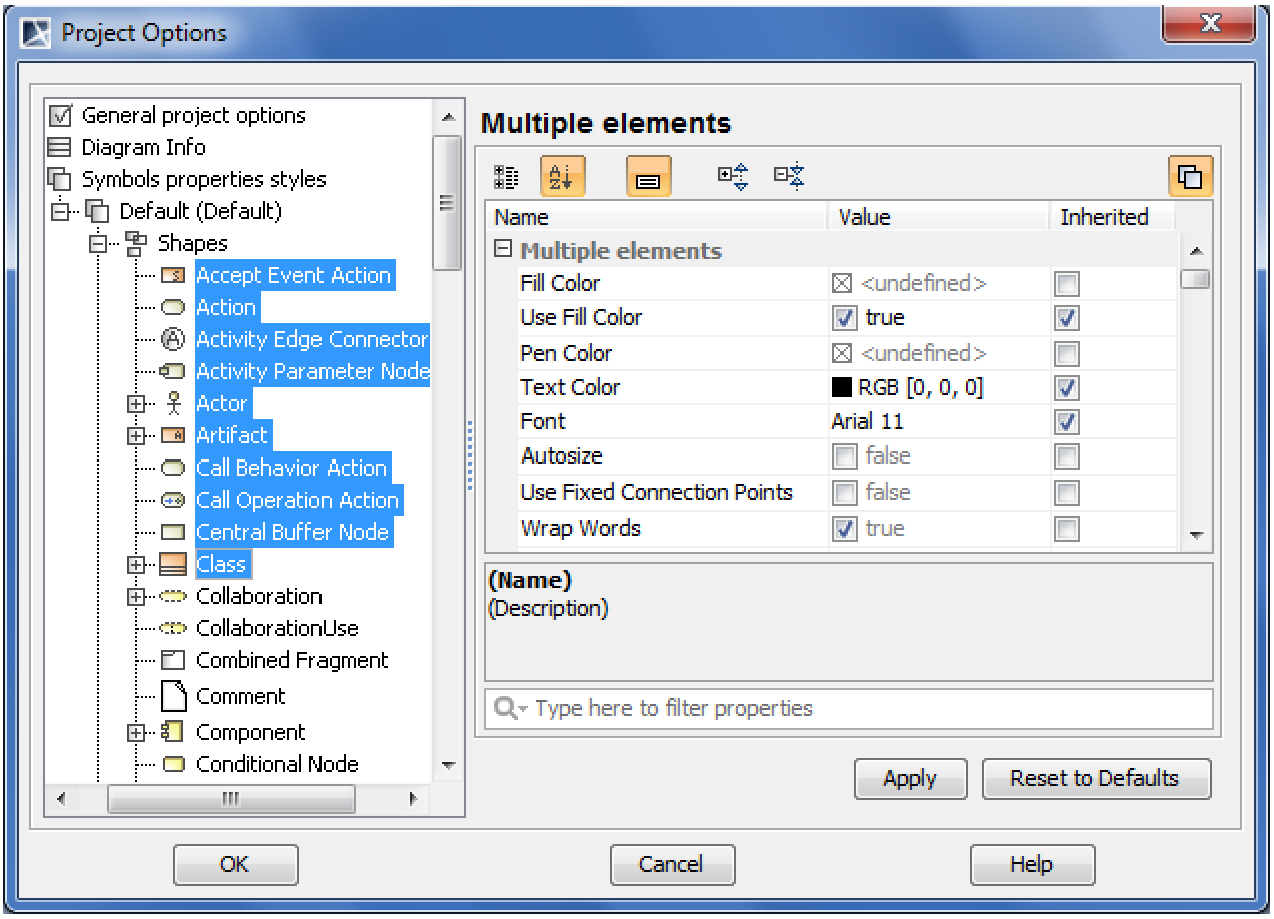
Path, Shape, and **Stereotype** branches have the inner structure that helps you find the model element, the representation of which must be changed. The section on the right side of the dialog box contains possible choices and instruments to manage them.

The following properties are defined for the formatting symbols:

- **Shapes**. Set general options for the shapes in the right pane of the **Project Options** dialog box. You can set options for all shapes that appear on the Diagram pane.
- **Paths**. Set general options for the paths in the right pane of the **Project Options** dialog box. You can set options for all paths that appear on the Diagram pane.
- **Diagram**. Set general options about a diagram.
- **Stereotypes**. Set general options for the stereotypes in the right pane of the **Project Options** dialog box. You can set options for all stereotypes that may be applied to elements on the Diagram pane.

Changing properties for multiple element

To change properties for multiple symbols, using Ctrl or Shift key select few elements in the **Project Options** dialog box, **Symbol properties styles** branch.



Name	Value	Inherited
Multiple elements		
Fill Color	☒ <undefined>	☐
Use Fill Color	✓ true	✓
Pen Color	☒ <undefined>	☐
Text Color	■ RGB [0, 0, 0]	✓
Font	Arial 11	✓
Autosize	☐ false	☐
Use Fixed Connection Points	☐ false	☐
Wrap Words	✓ true	☐

Figure 145 -- The Project Options dialog box, multiple element symbols style is selected

Properties extension by diagram

Diagram, shape, path, and stereotype properties can be extended by the particular diagram type. This means that presentation style options will be applied only for the specified element symbol in the specific diagram.

To extend the element properties by diagram

1. In the **Project Options** dialog box, the **Symbols Properties Styles** tree, expand a branch, select the specific element (shape, path, diagram, or stereotype) and right click the mouse button. The list of diagrams in which the element symbol may be created, opens.

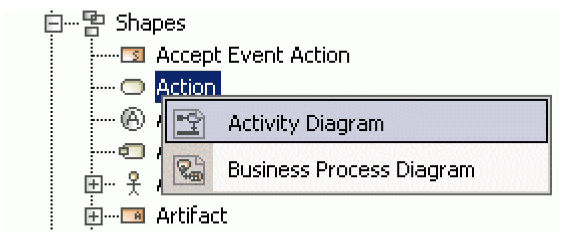


Figure 146 -- Element extension by diagram

2. Select the diagram type. The Diagram is added as an additional branch to the section.

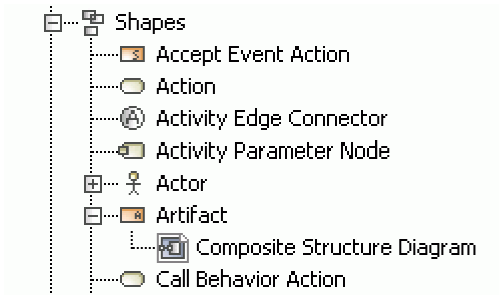


Figure 147 -- Extended diagram addition

3. Set the style properties for the element in the right pane of the **Project Options** dialog box. The properties will be applied only in the specified type of diagram.
   - The element can be extended by diagram in the **Project Options** dialog box, specific elements pane, by clicking the **Extend by Diagram** button. The **Extend by Diagram** dialog box opens. Click the **Add Diagram** button and select a diagram from the list.

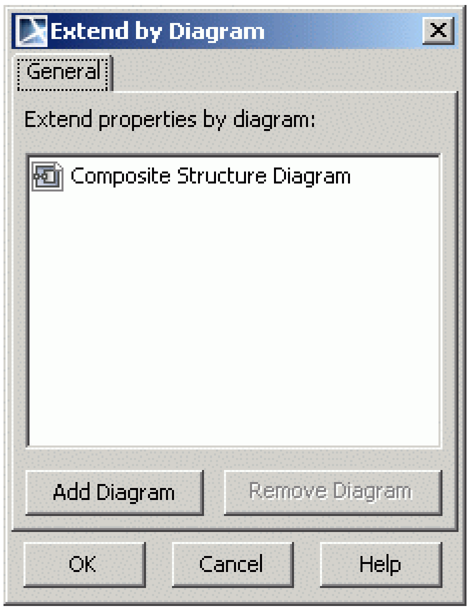


Figure 148 -- Extend by Diagram dialog box

To remove the extended diagram from the tree

- Select the extended diagram and right click on the mouse, then select **Remove**.

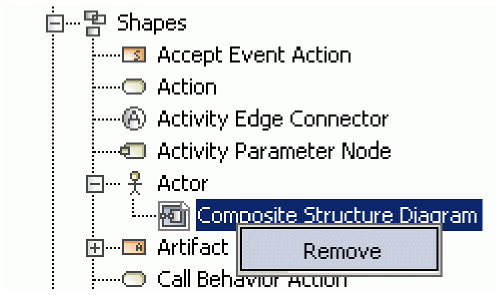


Figure 149 -- Remove extended diagram

- In the **Project Options** dialog box, the extended diagram style properties pane, click the **Remove** button.

Properties Inheritance

All element properties have the “inherited” check box. This check box indicates the property is derived from the base element properties or is it specific.

The **Inherited** column check box value in the elements properties pane specifies if the current property is synchronized with its parent property. When the **Inherited** value is “true”, the element property is changed after changing the parent property.

If the property has no correspondent property in the upper (parent) level, the **Inherited** column check box will be cleared and disabled.

If the property is modified for the specific element and the value differs from the upper level current property value, the **Inherited** column check box is cleared automatically.

General Style Properties

You can define the common properties for the whole style. The style properties are displayed when the properties style is selected in the **Project Options** dialog box styles tree.

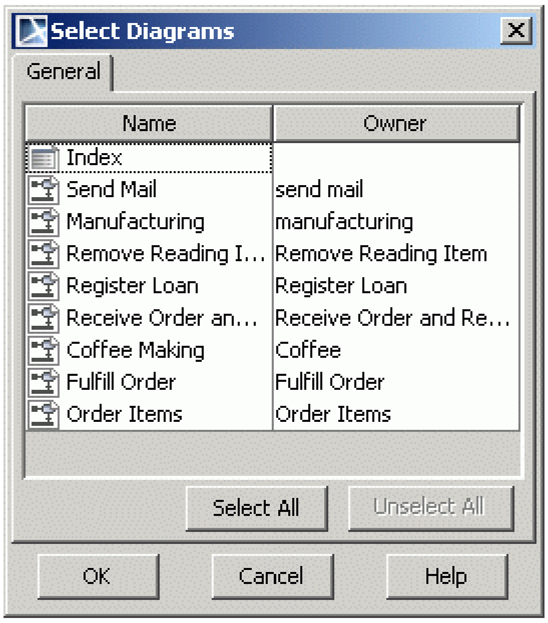
Shape, Path and Diagram Properties

All shapes, paths and diagrams that can be created in the project, are listed in the **Project Options** dialog box. If the **Shape, Path,** or **Diagram** branches are selected in the tree, the general properties can be set in the right pane of this dialog box.

When expanding any of these branches, the style for a concrete element (diagram) can be created.

To apply a new style to a previously created element symbol

1. In the **Project Options** dialog box, change the element style properties and click the **Apply** button. The **Select Diagrams** dialog box opens. The list of diagrams created in the project is displayed.



Name	Owner
Index	
Send Mail	send mail
Manufacturing	manufacturing
Remove Reading I...	Remove Reading Item
Register Loan	Register Loan
Receive Order an...	Receive Order and Re...
Coffee Making	Coffee
Fulfill Order	Fulfill Order
Order Items	Order Items

Figure 150 -- Select Diagrams dialog box

2. Select the diagrams to which the element properties will be applied and click **OK**. The **Select Properties to Apply** dialog box opens.

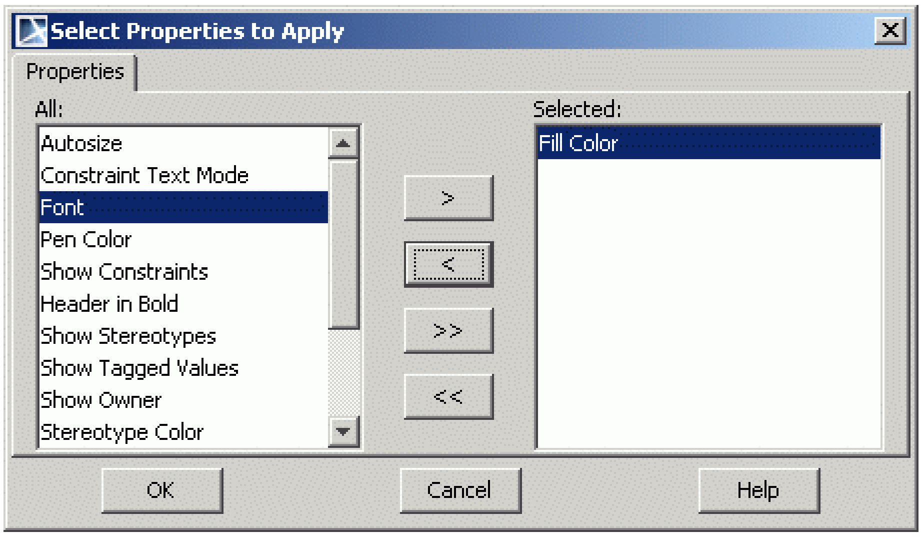


Figure 151 -- Select Properties to Apply dialog box

3. Select the properties to be applied to the element symbol by moving them from the **All** list to the **Selected** list. Click **OK.**

NOTE!	If a new style was set, it will be applied for all newly created elements after drawing them on the diagram pane. You can always set the default symbols style to the element by clicking the **Apply Default Symbol Style** button in the main toolbar.

Stereotype properties

The Stereotype properties can be applied only if the stereotype properties style is created in the **Project Options** dialog box.

The Stereotype properties are derived from their base class. The Stereotype base class is defined in the label of the right pane of the **Project Options** dialog box.

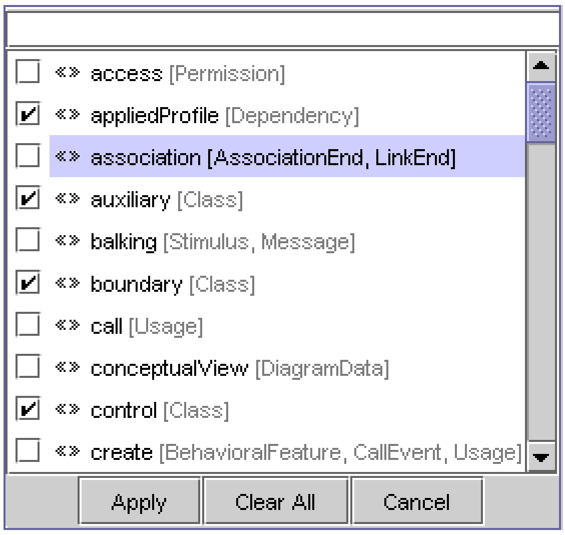
The same element can have several stereotypes assigned. In this case, the style of the first stereotype will be applied to the element symbol. If the stereotype is removed from the element, the next (first) stereotype properties are applied. If the last stereotype is removed from the element, the base class (shape or path) properties are applied to the element symbol.

Stereotypes may be extended by diagram.

All stereotypes that have defined symbol properties are included in the **Stereotypes** branch. By default only *boundary, control,* and *entity* stereotypes are added to the tree when expanding the **Stereotypes** branch. The default style is created for these stereotypes.

To add a stereotype to the branch

1. In the **Project Options** dialog box, the **Symbols Properties Styles** tree, right-click the **Stereotypes** branch. The list of stereotypes opens.



- [ ] «» access [Permission]
- [✓] «» appliedProfile [Dependency]
- [ ] «» association [AssociationEnd, LinkEnd]
- [✓] «» auxiliary [Class]
- [ ] «» balking [Stimulus, Message]
- [✓] «» boundary [Class]
- [ ] «» call [Usage]
- [ ] «» conceptualView [DiagramData]
- [✓] «» control [Class]
- [ ] «» create [BehavioralFeature, CallEvent, Usage]

Figure 152 -- List of stereotypes

2. Select the check box near the stereotype and click the **Apply** button. The stereotype will be included into the **Stereotypes** branch. Set the stereotype style properties in the right pane of the **Project Options** dialog box.

To remove a stereotype from the branch

1. In the **Project Options** dialog box, the **Symbols Properties Styles** tree, select the **Stereotypes** branch. The list of stereotypes opens.
2. Clear the check box near the stereotype and click **Apply.** The stereotype is removed from the branch.

To change stereotype properties

1. Expand the **Stereotypes** branch and select a stereotype.
2. Set properties in the right pane of the **Project Options** dialog box.

To apply the stereotype properties to a previously created symbol with assigned stereotype

1. When the stereotype style properties in the right pane of the **Project Options** dialog box are changed, click the **Apply** button. The **Select Diagrams** dialog box opens.
2. Select the diagrams to which the stereotype properties will be applied and click **OK**.
3. In the **Select Properties to Apply** dialog box, select which properties will be applied to the stereotype. Click **OK.**

NOTE!	You can apply stereotype properties to a symbol after changing the style properties and in the **Project Options** dialog box, click **OK.** The style will be applied when selecting symbol on the diagram pane and clicking the **Apply Default Symbol Style** button on the main toolbar.

To apply the stereotype properties when assigning a stereotype to an element

NOTE!	In the **Environment Options** dialog box, **Diagrams** tab, the **Apply Stereotype Style for All Symbols** check box should be selected and in the **Project Options** dialog box, the style properties should be changed for stereotype.

1. In the created diagram, draw an element.
2. From the element shortcut menu, select **Stereotype**. The list of available stereotypes opens.
3. Select the check box near the stereotype you want to assign to the element. Click **Apply.** The stereotype properties are applied automatically when assigning the stereotype to the element.

Defining Hyperlinks Between Elements

You can set text for notes, text boxes, or separators as HTML text. You can also hyperlink to any model element, diagram, external file, or requirement.

Adding a hyperlink to the model element

There are three ways to add a hyperlink to the model element: from diagram **Smart Manipulator**, from **Specification** and from the Browser tree.

To add a hyperlink from the diagram

1. Select the element and click on the Smart Manipulator for Hyperlink.

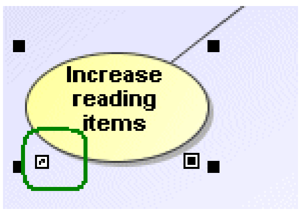


Figure 153 -- Smart manipulator for hyperlinks.

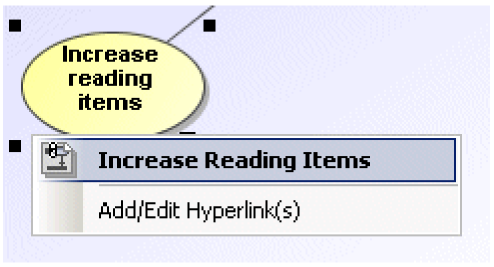
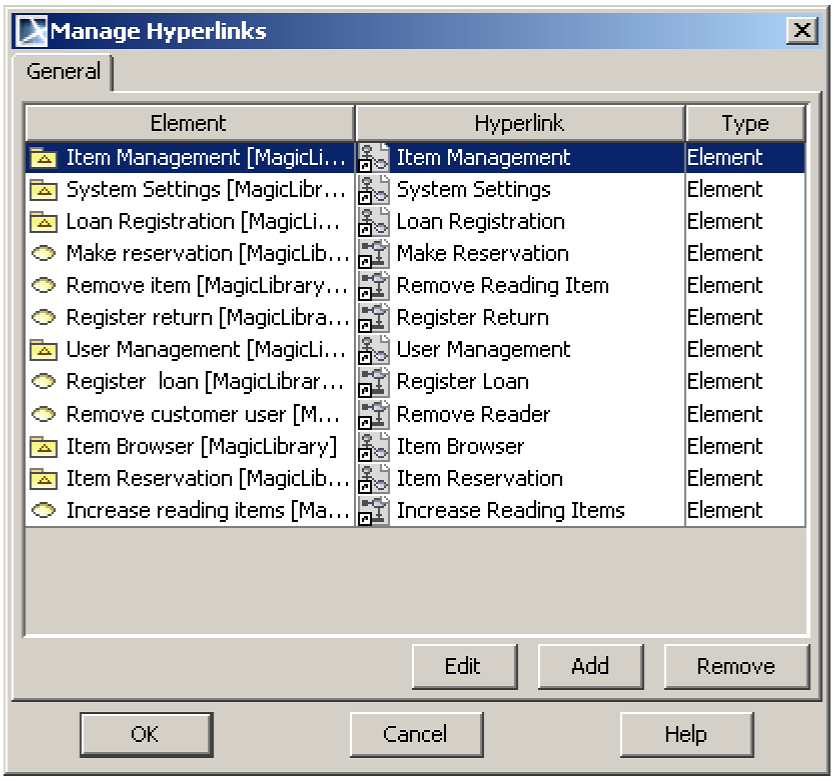


Figure 154 -- Hyperlinks menu.

2. The hyperlink menu opens, listing:
   - Previously created hyperlinks with icons corresponding to element type, diagram type, external file, or requirement.
   - Menu item for adding and editing existing hyperlinks - **Add/Edit Hyperlink(s)**
   - If there are no hyperlinks yet defined, only the menu item to add a hyperlink will be in the hyperlink menu.

3. Click **Add/Edit Hyperlink(s)** item. The hyperlinks creation editing dialog opens.



Element	Hyperlink	Type
Item Management [MagicLi...	Item Management	Element
System Settings [MagicLibr...	System Settings	Element
Loan Registration [MagicLi...	Loan Registration	Element
Make reservation [MagicLib...	Make Reservation	Element
Remove item [MagicLibrary...	Remove Reading Item	Element
Register return [MagicLibra...	Register Return	Element
User Management [MagicLi...	User Management	Element
Register loan [MagicLibrar...	Register Loan	Element
Remove customer user [M...	Remove Reader	Element
Item Browser [MagicLibrary]	Item Browser	Element
Item Reservation [MagicLib...	Item Reservation	Element
Increase reading items [Ma...	Increase Reading Items	Element

Figure 155 -- Manage Hyperlinks dialog

4. Click **Add** and define the hyperlink to any model element, file, or Web page in the **Edit Hyper-link** dialog box. If you want this hyperlink to be active, select the **Active** check box.
5. Click **OK**.

To add a hyperlink from Specification:

1. Open the model element **Specification** window and select the **Documentation/Hyperlinks** tab.
2. Define the hyperlink to any model element, file, or Web page in the **Edit Hyperlink** dialog box. If you want this hyperlink to be active, select the **Active** check box.
3. Click **OK**.

To add a hyperlink from the Browser tree

Now hyperlinks can be created and edited straight from the element shortcut menu:

- Invoke element shortcut menu from the Browser.
- Choose **Go To** and **Hyperlinks** (see Figure 156 on page 273).

For more detailed description on managing hyperlinks, see “To add a hyperlink from the diagram” on page 271.

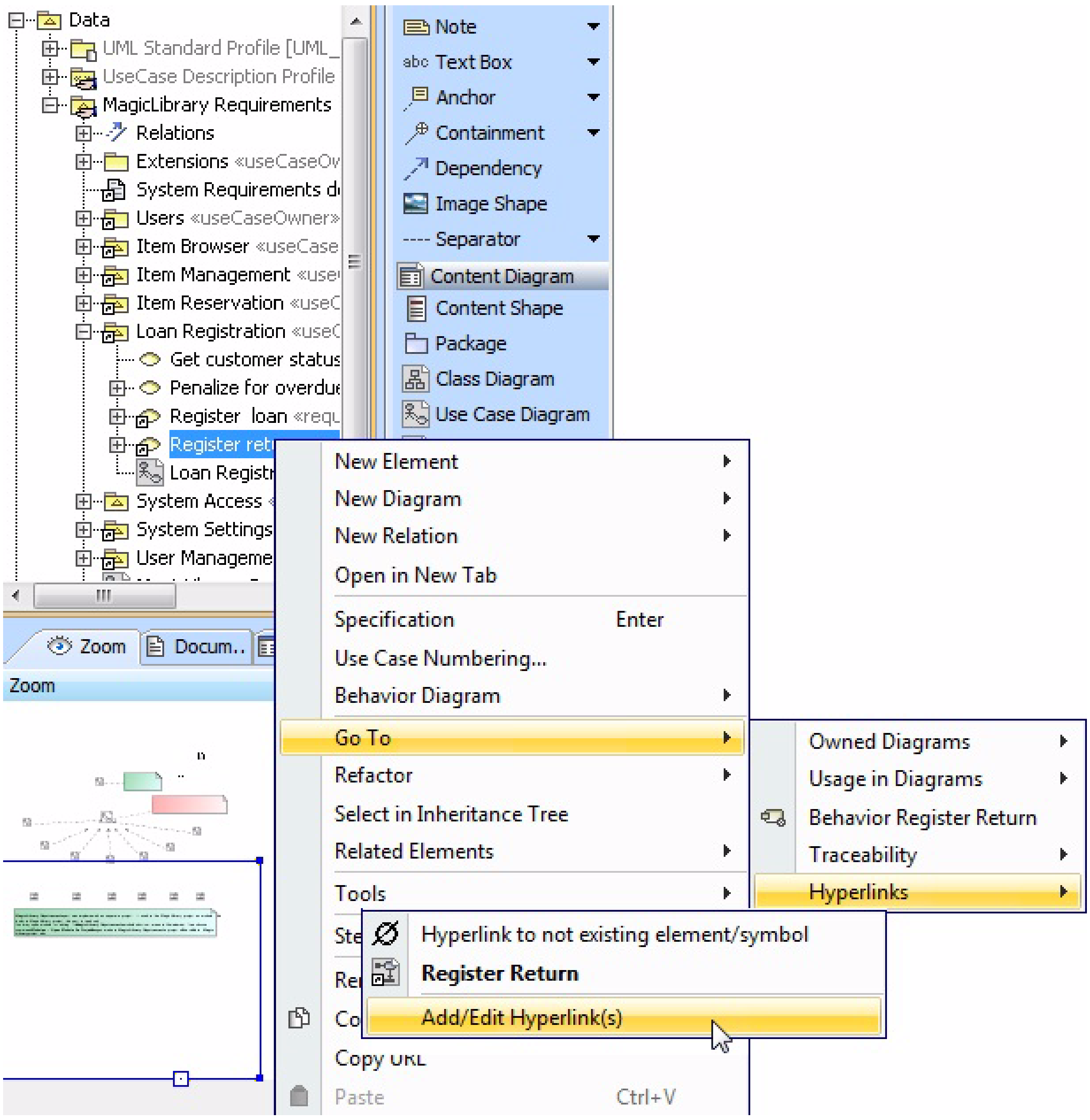


Figure 156 -- Hyperlinks creation from the Browser tree

To add a hyperlink to a note, text box, or separator text

1. Select the text where you want to add a hyperlink and click **Insert Hyperlink** .
2. The **Edit Hyperlink** dialog box opens. Select the hyperlink you want to insert, either to a Web page, another model element, or a file:
   - To link to an existing model element, click the **Element/Symbol** tab. Click the **Select Element/Symbol** "…" button and select the model element or symbol you want to link to in the element Selection dialog. More information about this dialog find in the Section "Selecting an Element" on page 279.

- To link to an existing Web page, click the **Web Page** tab, and in the **Type the Web page name** text box, type the URL of the Web page you want to link to. You can click the "**…**" button and browse the Web for the desired Web page.

NOTE Set the path of the HTML viewer in the **Environment Options** dialog box (for a description, see "Customizing Environment Options" on page 90.)

- To link to an existing file, click the **File** tab and enter the path to the file you want to link to. Or, click the **Type the file name** "**…**" button and, in the **Open** dialog box, select the file you want to link to.

NOTES
- The selected file opens in the HTML browser.
- Set the path of the HTML viewer in the **Environment Options** dialog box.
- You can only link to an existing file. New files are not created for you.

Using the HTML editor toolbar, you can change the font, color, size, and the alignment of the selected text.

Edit Hyperlink dialog box

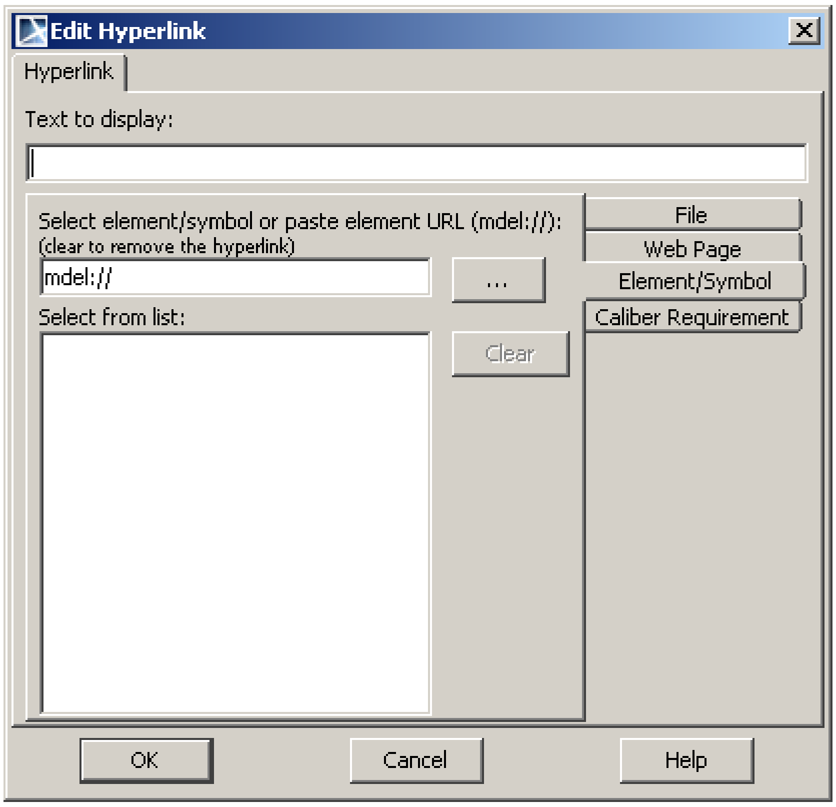


Figure 157 -- The Edit Hyperlink dialog box

Tab name	Box	Function
Element/ Symbol Creates a hyper-link that goes to the selected model element.	**Text to display**	A text that will be displayed as a hyperlink.
	Select Element / Symbol or paste element URL"…"	The element Selection dialog opens. Select the model element you want to link to. You can also paste URL to element. For more information about element URL, see "Copying/Opening Element URLs" on page 292.
	Select from list	A list of all items that have previously been selected as links.
	Clear	Remove all items from the **Select from list**.
	Active	If selected, activates the hyperlink on the diagram. Only one hyperlink can be active. Target referenced by the active hyperlink is accessed after double clicking an element with a hyperlink. By default the last added hyperlink is the active one.
Web Page Creates a hyper-link that goes to the specified Web page.	**Text to display**	The text that will be displayed as a hyperlink.
	Type the Web Page name "…"	Type the web page URL. Click the "…" button. The Web browser window opens. Browse the Web and find the web page you want to link to. **NOTE** Make sure that the path of the HTML viewer is set in the **Environment Options** dialog box.
	Select from list	A list of all items that have previously been selected as links.
	Clear	Remove all items from the **Select from list**.
File Creates a hyper-link that goes to a specified file.	**Text to display**	A text that will be displayed as a hyperlink.
	Type the file name "…"	Type the path to the file you want to be opened or click the "..." button. The **Open** dialog box opens. Select the file you want to link to.
	Select from list	A list of items that have previously been selected as links.
	Clear	Remove all items from the **Select from list**.

Owner of the Model Element

Model elements and diagrams belong to a package, model (system boundary), subsystem or other appropriated model element, which is called *owner*.

The name of the owner is displayed in the model element name compartment in parentheses.

To add a model element to a package, model (system boundary), or subsystem

- Drag a model element to the desired package on the Diagram pane or in the Browser tree.
- Open the **Inner Elements** tab, located in the **Package**, **Model**, or **Subsystem Specification** window. Click **Add** and select a model element or diagram you want to add to a package. Define a model element or diagram in the open **Specification** window and click **OK**.
- From the selected owner shortcut menu in the Browser tree, select **New Element**. From the list, select the desired model element and type its name in the Browser.

To display/hide the package/system boundary/subsystem name (the owner of an actor) on a model element

- From the symbol shortcut menu, select **Symbol(s) Properties**. The **Properties** dialog box opens. Select/clear the **Show Owner** check box.
- From the **Options** menu, select **Project**. The **Project Options** dialog box opens. Select the desired model element and select/clear the **Show Owner** check box. If you want to apply changes for previously created model elements, click **Apply**.

TIP!	For a class, actor, or interface, you may display/hide the name of the owner from the symbol shortcut menu: select **Presentation Options**, and then select/clear the **Show Owner** check box.

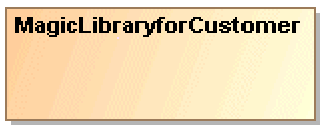
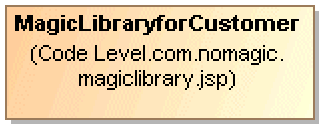
Owner display mode

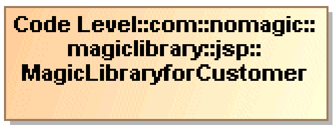
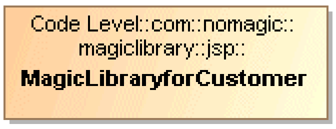
MagicDraw version 15.0 and later has improved the owner display functionality. Now you can change the display position of the qualified name on the element shape.

To change the qualified name position:

- From the element shape shortcut menu, select the **Presentation Options > Show Owner** command and then select the desired property mode.
- You can change the qualified name position in the symbol **Properties** dialog box, **Show Owner** drop-down list.

Select one of the four property modes for **Show Owner**. The property modes are described in the table below.

Show Owner Property Mode	Shape	Description	Notation
Do Not Display		Only element name is displayed on the element shape. This is the default value.	-
Below Element Name	 MagicLibraryforCustomer (Code Level.com.nomagic. magiclibrary.jsp)	Owner is displayed below the element name.	This is MagicDraw style notation. The owner name is constructed from the names of the containing namespaces starting at the root of the hierarchy and ending with the owner of the NamedElement itself. Containing namespaces are separated by dot and owner is displayed in brackets.

Show Owner Property Mode	Shape	Description	Notation
In Same Line With Name	 Code Level::com::nomagic:: magiclibrary::jsp:: MagicLibraryforCustomer	Element owner is displayed in the same line as the element name.	This is a notation from UML specification. The qualified name is constructed from the names of the containing namespaces, starting at the root of the hierarchy and ending with the name of the NamedElement itself. Containing namespaces are separated by double colons. The double colon is shown to separate containing namespaces and element name.
Above Element Name	 Code Level::com::nomagic:: magiclibrary::jsp:: MagicLibraryforCustomer	Owner is displayed above the element name.	Notation is the same as **In Same Line With Name** option notation.

Qualified name starting from model library

MagicDraw version 15.0 and above includes an option to show the owner hierarchy starting from the model library as the root.

Model Library is a package with modelLibrary stereotype.

This option is called **Qualified name display style**. To change its value:

1. From the **Options** menu select the **Project** command. The **Project Option** dialog box opens.
2. Select the **General Project Options** branch. In the right side pane, you can modify the option property.

The **Qualified name display style** property is added to the **Project Options** dialog box, **General Project Options** branch.

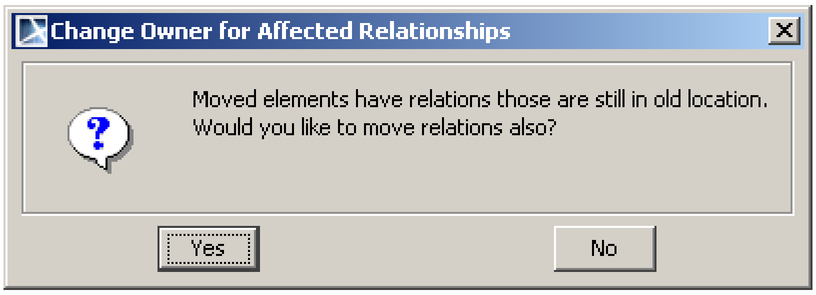
If the **Model Library Relative** property value is selected (default value for a new project), then the full qualified name hierarchy is displayed on the shape, starting from the model library as a root. The model library itself is not displayed. The **Qualified name display style** property allows for having the relative path for library items used in the project.

Relations Changes Ownership when Client or Supplier is Moved to Other Owner

Some issues related to relationships have been addressed to improve usability.

Now relationships will not get lost in Containment tree while changing the element ownership. Relationships will also be moved together with the client or supplier (or both) so that all the related elements can be grouped together in one place. This will also prevent unexpected dependencies on model partitioning.

For example, if you move two Classes which are connected to the Association relationship to another Package in the Containment tree, a question dialog will open, asking if you want to move the relationship as well (Figure 158 on page 278).

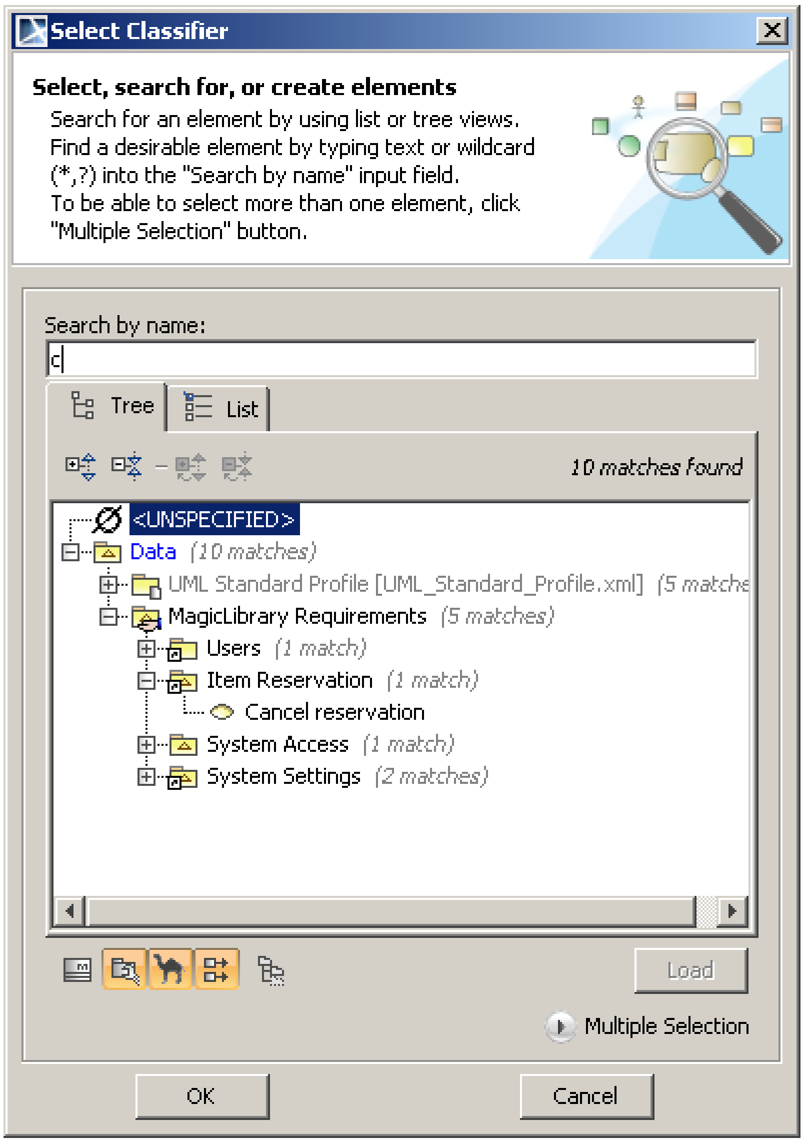

Change Owner for Affected Relationships

Moved elements have relations those are still in old location.
Would you like to move relations also?

Figure 158 -- The Change Owner for Affected Relationships message

Selecting an Element

The element Selection dialog is used for selecting elements from the available contents and adding them to a certain destination scope. The title of the dialog varies depending on the way it is invoked. Depending on the content, the element Selection dialog is used for selecting an element, diagram, or owner.



Select Classifier

Select, search for, or create elements

Search for an element by using list or tree views.
Find a desirable element by typing text or wildcard (*,?) into the "Search by name" input field.
To be able to select more than one element, click "Multiple Selection" button.

Search by name: c

10 matches found

```
<UNSPECIFIED>
Data (10 matches)
  UML Standard Profile [UML_Standard_Profile.xml] (5 matche
  MagicLibrary Requirements (5 matches)
    Users (1 match)
    Item Reservation (1 match)
      Cancel reservation
    System Access (1 match)
    System Settings (2 matches)
```

Figure 159 -- Element Selection dialog

You can perform the following actions in the element Selection dialog:

- Search for an element in List or Tree views.
- Search for an element using various search modes.
- Select single or multiple elements.
- Create an element.

Element selection views

There are two different views for elements selection:

- **List** view displays the elements listed in the alphabetical order.
- **Tree** view displays the hierarchical structure of the elements and enables to create a new one.

Element selection view	Description
List **List** view	The **List** view displays all the items that can be selected in a particular case. Elements are sorted in the alphabetical ascending order. The first 30 list items are selectable elements. Other items can be seen after clicking the **click here to show the remaining matches** at the end of the list. In the event there are over 10000 selectable elements, the list will not sort and display the elements.
Tree **Tree** view	The **Tree** view displays all selectable items and their owners. The following commands helps to manipulate in the Tree view: • **Expand All / Collapse All -** all nodes are expanded/ collapsed recursively. • **Expand selected recursively / Collapse selected recursively -** selected node is expanded/collapsed recursively. • **Load** button - click the **Load** button to load the selected module which is not loaded.
Library view	Available only in UPDM. More information you may find in the "UPDM Plugin UserGuide.pdf", chapter "Common Features", section "Library Support".

Element search criteria and modes

When searching for an element, which you want to select, type the search criteria in the **Search by name** field.

Search type	Description
Simple search in the List and Tree views	In the **Search by name** text field, type the first letters of the required element name. In the **List** and **Tree** views, only the elements matching the search criteria will be displayed. **TIP!** When switching between the element selection views, the selected elements are remembered e.g., if the element is selected in the **Tree** view, it will be selected in the **List** view as well.
Search using wild cards	In the **Search by name** text field, the wildcard symbol (*) substitutes any range of any symbols and the wildcard symbol (?) substitutes any symbol.

There are four search modes available to help to find the required element in the **Tree** or **List** views.

Search mode	**Description**
Search includes meta-classes	If the **Search includes meta-classes** mode is selected, the available search contents will include the meta-classes that match the search criteria.
Search includes elements from modules	If **Search includes elements from modules** mode is selected, the elements from the modules will be included in the search contents.
Search uses camel case	If the **Search uses camel case** mode is selected, when searching for the elements, whose names are written in camel case, type only the upper case letters in the type **Search by name** text field. Lower letters between the upper ones will be skipped when filtering.
Search includes qualified names	If the **Search includes qualified names** mode is selected, you can search for matches in all the qualified names of the selectable elements. The search works as a simple search, except if wildcards are used in front. In the event a wildcard is used in front, the output will be all the elements that have the fragment matching search criteria in the qualified names.

Element creation mode

In the **Tree** view, you can create new elements that can be owned by the selected element in the tree. Element can be created by choosing an element from the list or by cloning the selected element in the tree.

To activate the element creation mode

- Click the **Element creation mode** button . The **Create** and **Clone** buttons will appear.

NOTE	The undo of the action done in the **Select Element** dialog will be active only after closing the dialog.

Creation button	**Description**
Clone	Click the **Clone** button if you want to create a new element based on the data of the selected element. The element will be cloned with all its internal structure and data. You may specify the new element in the Specification window.
Create	Click the **Create** button if you want to create a new element, whose owner is the selected element. If more than one element type can be created, choose an element type form the list. You can specify the new element in the Specification window. **TIP!** You may customize the list of appearing element types using DSL categorization. Further information about DSL customization can be found in the “UML Profiling and DSL UserGuide.pdf”

Elements multiple selection

NOTE The **Multiple Selection** button is available only when it is allowed to select more than one element.

To select more than one element

1. Click the **Multiple Selection** button. The block for the multiple selection in the element Selection dialog will open.
2. Select one or more elements at a time by holding the Control or Shift keys.

To return to the single selection

- Click the **Single Selection** button. The first element that is in the multiple selection list will be selected in the **Tree** view.

NOTE In the event more than one element is selected in the tree or in the list in the multi selection mode, the selection will be reduced to one element (the first one based on alphabetical order), when switching to the single selection mode.

The following buttons are available in the Multiple selection mode:

Add	Adds the selected element(s) to the elements multiple selection list. **TIP!** You can also perform this action by double-clicking an element.
Add Recursively	Adds all the elements owned by selected element and by the elements owned by the selected element and so forth, to the elements multiple selection list.
Remove	Removes selected elements from the elements multiple selection list. **TIP!** You can also perform this action by double-clicking an element.
Remove All	Removes all the elements form the elements multiple selection list.
Up	Moves up per one item the selected element in the elements multiple selection list.
Down	Moves down per one item the selected element in the elements multiple selection list.

Refactoring

Converting an Element

Element conversion allows converting one element type to another. Sometimes, during the modeling process, there is a demand to change a class to a component or another type of classifier. The element conversion copies all compatible properties to a converted element (for example Ports of a class will become Ports of a component). If some properties are not compatible, they will be lost.

Element conversion functionality allows UML element conversion from one meta-class to another.

To convert an element

From the element shortcut menu, select **Refactor** and then **Convert To** and then select the element from the open list, to which you want to convert.

When an element is being converted, the converter finds all usages of this element and recreates these references to a new element after conversion. For example, if an instance specification has an element assigned as a classifier, it remains after conversion.

The usages that are not valid after conversion, will be removed. For example, an Interface has an Interface Realization relationship. An interface is converted to a Class. The Interface Realization will be removed from model.

If the converted element and new element have the same symbol properties, then they are reassigned for the new element. For example, if a class is converted to an interface, and the class had the property **Suppress Operations** - *true*, then the Interface property for **Suppress Operations** will be *true* also.

Replacing an Element

You can replace one model element with another of the same metatype type element. Model element replacement is useful when during the modeling process you notice that one model element needs to be replaced with another. All relations and references to former element are updated to point to the newly selected model element.

After the replacement source will be replaced with replacement target:

- All references to replacement source will be replaced by references to replacement target.
- The replacement target will be displayed in all diagrams instead of replacement source.
- The replacement target after replacement will have all paths of replacement target and replacement source.
- Replacement source will be deleted.

To replace one element with another

1. In the element shortcut menu, select **Refactor** and then **Replace With**.
2. In the element Selection dialog, select the element with which you want to replace. More information about element Selection dialog, see section “Selecting an Element” on page 279.

See an example in the Figure 160 on page 283 and Figure 161 on page 284. In the Figure 160 on page 283 you can see two classes, which are similar to each *other - Customer and User. Using Replacement functionality you can replace User class with Customer* class quickly without redrawing relationships (see Figure 161 on page 284).

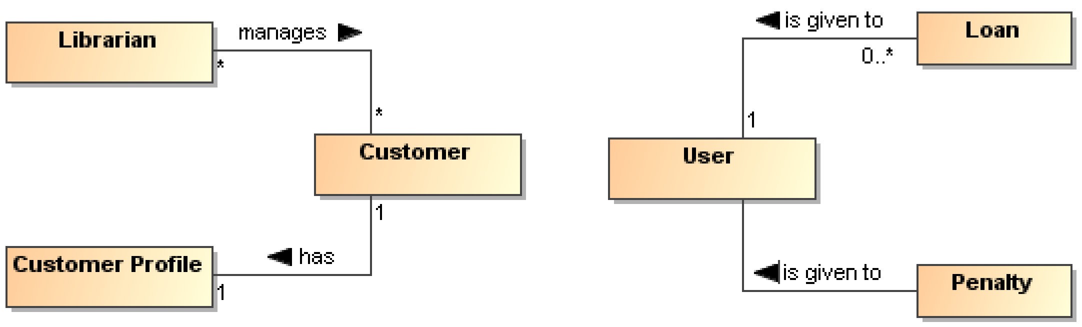


Figure 160 -- Model before the element replacement

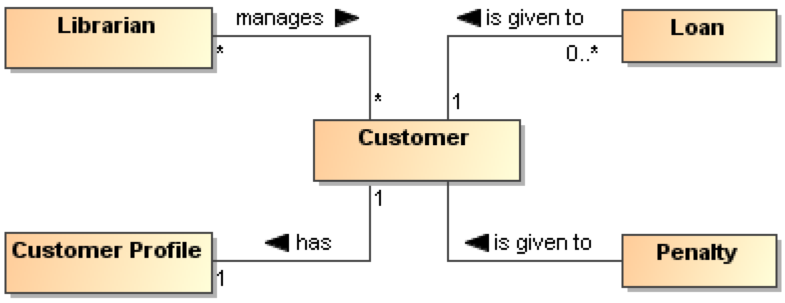


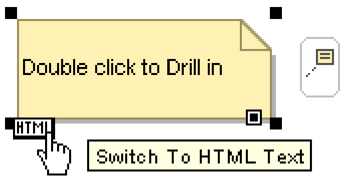
Figure 161 -- Model after the User class has been replaced with the Customer class

HTML Editor

MagicDraw has been enhanced with a new HTML editor to edit HTML text. The new editor improves text editing capability and usability and allows you to preserve the text format when copying formatted text.

To set the note / text box / separator text as HTML

- Select a shape and click Switch To HTML Text that appears on the lower-left corner of the shape.



- From the note / text box shortcut menu, select **HTML Text**.
- Draw the note or text box, using the **Note(HTML text)** or **Text Box(HTML text)** buttons on the diagram pallet.

Click the text area on the selected shape or start typing letters to open the HTML editor toolbar. For more information about the toolbar buttons, see "HTML editor toolbar" on page 290.

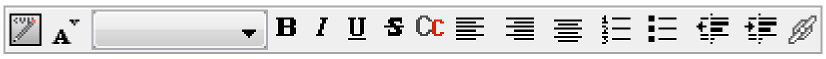


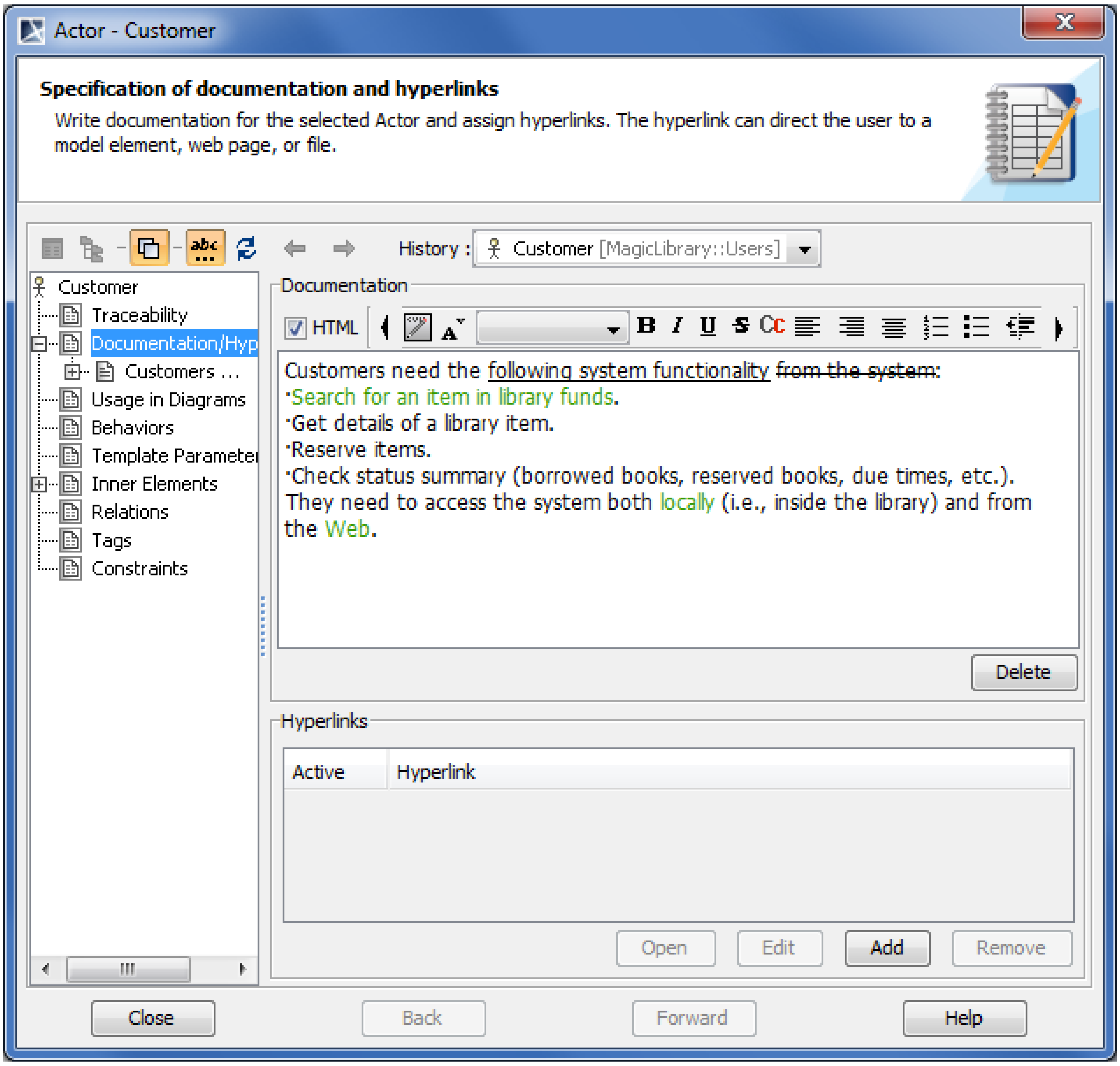
Figure 162 -- HTML editor toolbar

You can write HTML text in various dialogs. To start doing this, you have to turn on the HTML mode first.

To turn on the HTML mode in a dialog

- Click to select the **HTML** check box.
  These are the samples of the **HTML** check box and HTML editor toolbar in various dialogs:
  - Element Specification window, the **Documentation/Hyperlinks** tab (Figure 163 on page 285).
  - In the Model Browser, the **Documentation** panel (Figure 164 on page 286).
  - Element Specification window, the **Tags** tab, when editing a tagged value (Figure 165 on page 287).

- When specifying the **To Do** property in the element Specification window (Figure 166 on page 288).


Actor - Customer

Specification of documentation and hyperlinks

Write documentation for the selected Actor and assign hyperlinks. The hyperlink can direct the user to a model element, web page, or file.

History : Customer [MagicLibrary::Users]

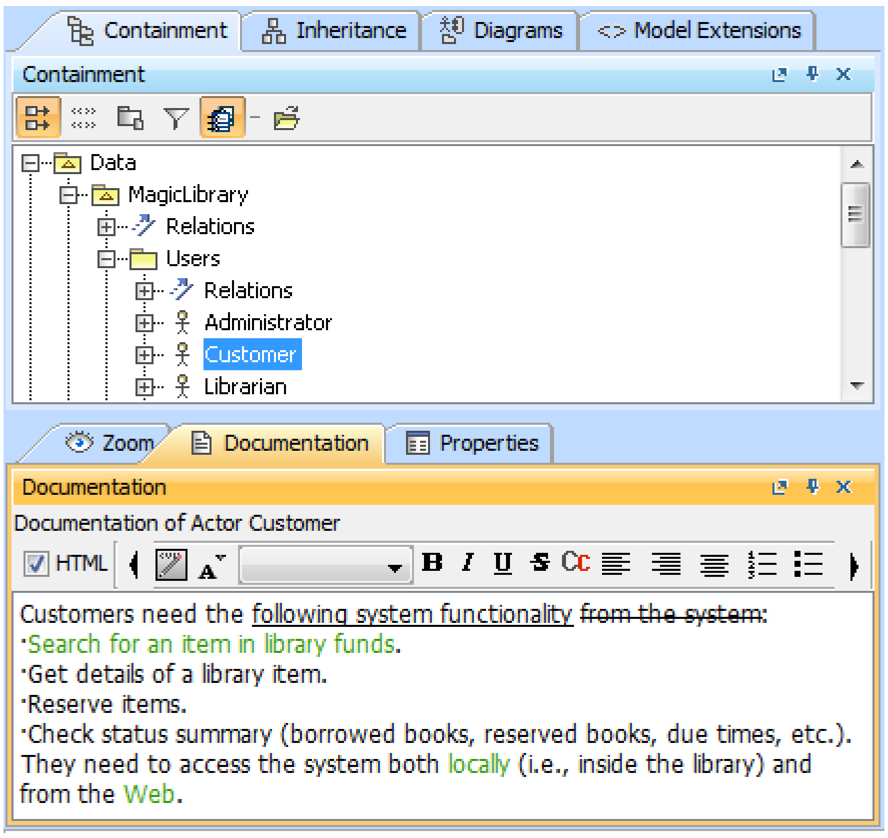
- Customer
  - Traceability
  - Documentation/Hyp
    - Customers ...
  - Usage in Diagrams
  - Behaviors
  - Template Parameter
  - Inner Elements
  - Relations
  - Tags
  - Constraints

Documentation

☑ HTML

Customers need the following system functionality ~~from the system:~~
·Search for an item in library funds.
·Get details of a library item.
·Reserve items.
·Check status summary (borrowed books, reserved books, due times, etc.).
They need to access the system both locally (i.e., inside the library) and from the Web.

Figure 163 -- HTML editor toolbar in Documentation/Hyperlinks tab of element Specification window



Customers need the following system functionality ~~from the system~~:
·Search for an item in library funds.
·Get details of a library item.
·Reserve items.
·Check status summary (borrowed books, reserved books, due times, etc.).
They need to access the system both locally (i.e., inside the library) and from the Web.

Figure 164 -- HTML editor toolbar in Documentation panel on Model Browser

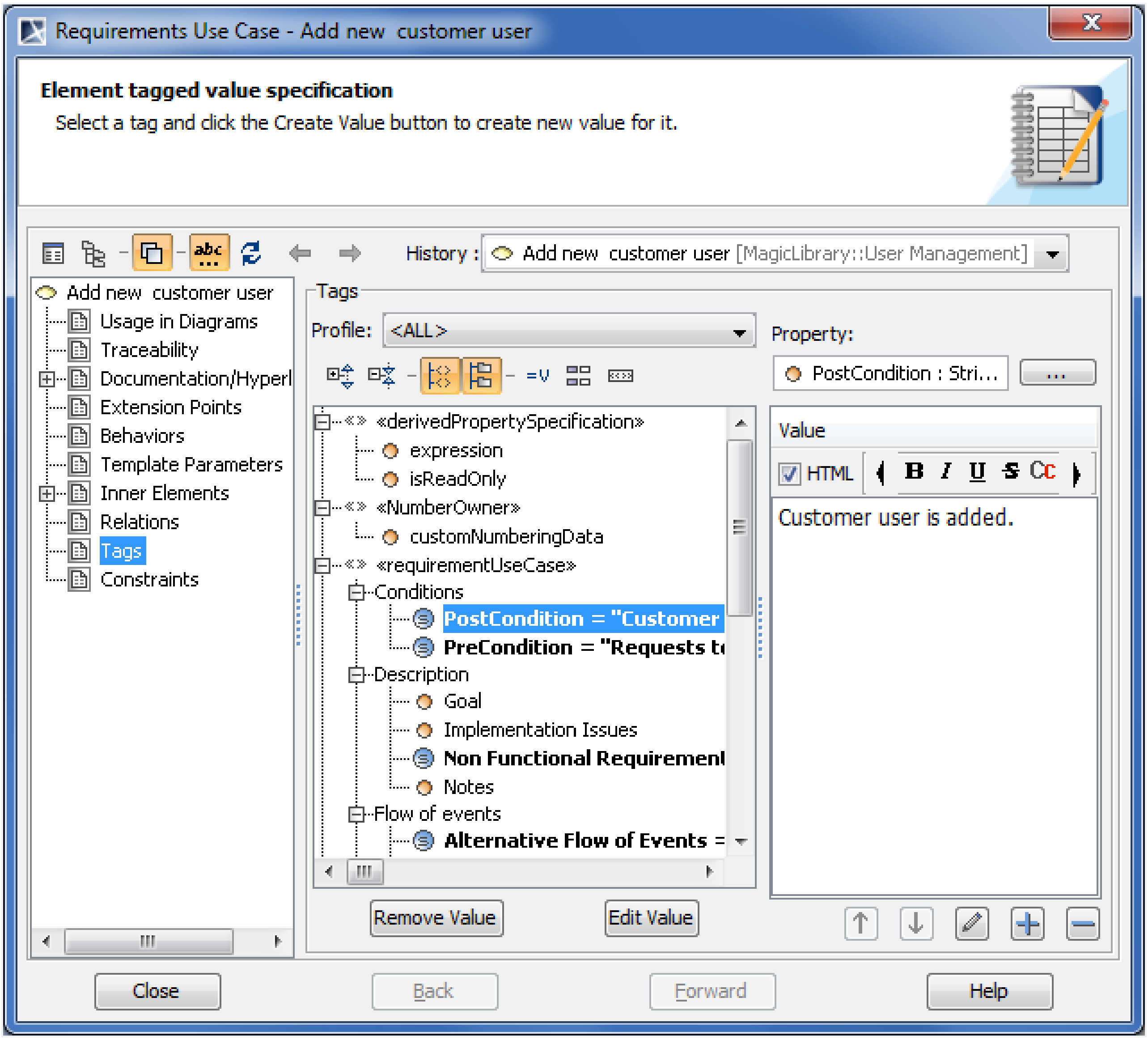
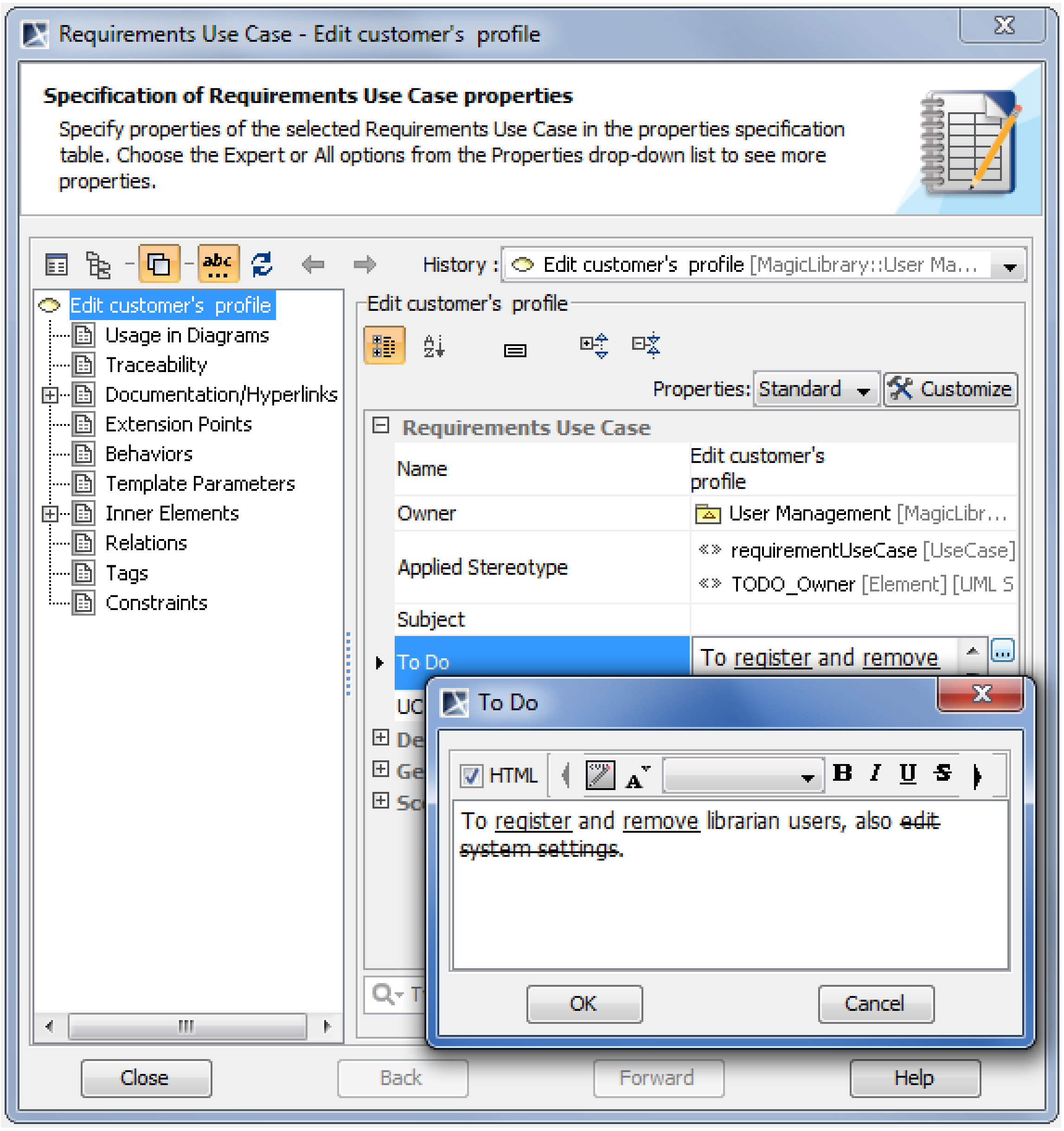


Figure 165 -- HTML editor toolbar in Tags tab of element Specification window when editing tag value



Requirements Use Case - Edit customer's profile

Specification of Requirements Use Case properties

Specify properties of the selected Requirements Use Case in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Edit customer's profile [MagicLibrary::User Ma...

- Edit customer's profile
  - Usage in Diagrams
  - Traceability
  - Documentation/Hyperlinks
  - Extension Points
  - Behaviors
  - Template Parameters
  - Inner Elements
  - Relations
  - Tags
  - Constraints

Edit customer's profile

Properties: Standard | Customize

Requirements Use Case	
Name	Edit customer's profile
Owner	User Management [MagicLibr...
Applied Stereotype	requirementUseCase [UseCase] TODO_Owner [Element] [UML S
Subject	
To Do	To register and remove
UC	

To Do

HTML

To register and remove librarian users, also ~~edit system settings.~~

OK | Cancel

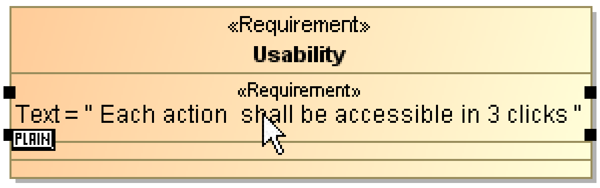
Close | Back | Forward | Help

Figure 166 -- HTML editor toolbar in To Do dialog

You can also use the HTML editor toolbar, when editing a tagged value directly on the element’s shape.

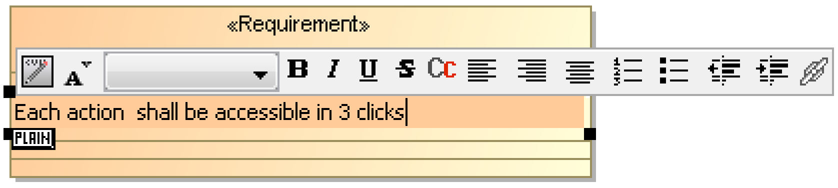
To use the HTML editor toolbar for editing a tagged value

1. Click the tagged value on the element’s shape as it is shown in the following picture.



«Requirement»
Usability
«Requirement»
Text = " Each action shall be accessible in 3 clicks "
PLAIN

2. Click the tagged value once again. The HTML mode will be turned on and the HTML editor toolbar will open for editing this tagged value.



HTML editor toolbar

Button	Description
Advanced HTML Editor	Edit text with advanced HTML editor. The **Advanced HTML Editor** dialog opens.
Font properties	Select font style of the text. The **Font Properties** dialog opens.
Font Size	Select font size of selected text.
Bold	Set text as bold.
Italic	Set text as italic.
Underline	Set text as underlined.
NEW! Strikethrough	Set text as strikethroughed.
Foreground	Select font color of selected text.
Align left	Align selected text to the left side border.
Center	Center selected text.
Align Right	Align selected text to the right side border.
Numbering	Change text style to numbered list.
Bullets	Change text style to bullet list.
Decrease Indent	Decrease indent by moving text closer to the left border.
Increase Indent	Increase indent by moving text closer to the right border.
Insert Hyperlink	Add the hyperlink to a file, a web page, an element, a symbol, or a requirement. The **Edit Hyperlink** dialog opens. For more information, see Section "Adding a hyperlink to the model element " on page 271.

Advanced HTML Editor dialog

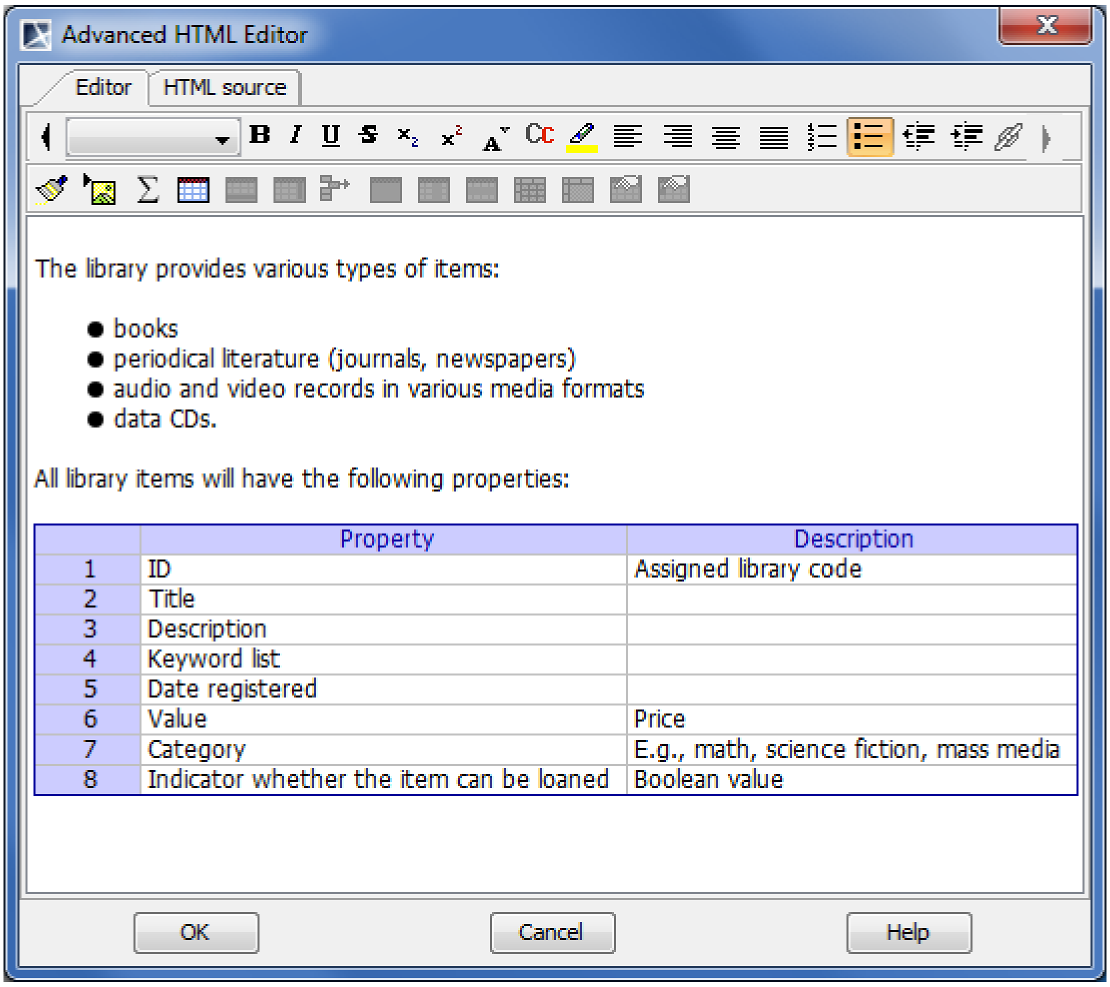
To open the **Advanced HTML Editor** dialog

- Click the **Advanced HTML Editor** button on the HTML editor toolbar.

NOTE	For the information how to turn on the HTML editor, see the procedure "To turn on the HTML mode in a dialog" on page 284.

In the **Advanced HTML Editor** dialog you can change the text style, insert symbols, images, and tables, as well as perform other actions using buttons.

Click the **HTML source** tab to view HTML source.



The library provides various types of items:

- books
- periodical literature (journals, newspapers)
- audio and video records in various media formats
- data CDs.

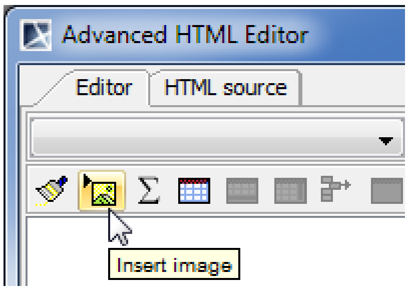
All library items will have the following properties:

	Property	Description
1	ID	Assigned library code
2	Title	
3	Description	
4	Keyword list	
5	Date registered	
6	Value	Price
7	Category	E.g., math, science fiction, mass media
8	Indicator whether the item can be loaned	Boolean value

Figure 167 -- Advanced HTML Editor dialog

To insert an image into HTML text

1. Click the Insert image button as it is shown in the following picture.

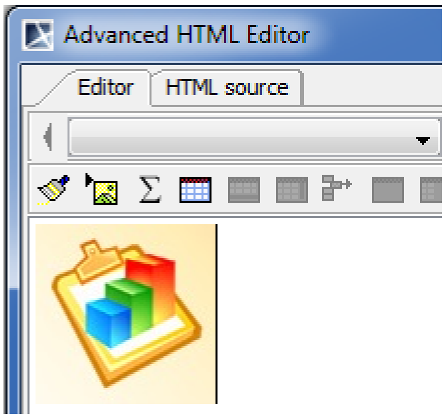


2. In the **Insert Image Location** dialog, specify the image URL. Do one of the following:
   - Type the path to the image location.

- Click **Browse** and browse to the image you want to insert.

IMPORTANT!	If you are working on a Teamwork project, make sure that the path to the image location is accessible from any computer with the Internet. Otherwise the image will not be displayed, when the project is opened on another computer.

3. Click **OK** when you are done. The image will be inserted into HTML text.



Copying/Opening Element URLs

You can now copy a project element URL to a clipboard and share it with other as a quick reference to model elements

To copy a project element URL, do any of the following

- Select **Copy Element URL** from the element shortcut menu in the Containment tree to copy the URL to a model element.

or

- Select the element symbol in a diagram and click **Edit > Copy Element URL** on the main menu to copy the URL to element symbol.

You can open any elements through their URLs by clicking the **Open Element from URL** command and the element will be highlighted in the Containment tree or in the diagram. Custom URL "mdel://" is registered into windows registry. Activating the URL in other applications will allow you to start MagicDraw, open the project (if possible), and select any elements. You can paste URLs from the clipboard to any MagicDraw diagrams. Hyperlinks also can hold URLs of any model elements.

7 TOOLS

MagicDraw provides the following tools and wizards to help you quickly and easily perform design tasks.

- "Model Merge" - Model Merge enables porting changes between different project versions.
- "Pattern Wizard" - creates various GOF, Java, Junit, CORBA IDL, XML Schema and others design patterns.
- "Creating Setters / Getters" – creates getting and setting operators for attributes defined in the class.
- "Implementing or Overriding Operations" – creates defined operations down the inheritance tree.
- "Model Transformation Wizard" - enables running one of the predefined transformations to convert the given model part into another model according to the rules of that transformation. Transformations are usually used for converting models between different modeling domains, for example, UML and SQL.
- "Resource Manager" - MagicDraw Resource Manager functionality allows you to manage resources (Profiles, Plugins, Templates, Language resources, Case studies/examples, Custom diagrams, and others).
- "Spelling Checker" - Spell Checker will check spelling as you type. Select what you want to be spell checked (the whole project or some specific parts).
- "Import Data to MagicDraw" - Data Import to MagicDraw using RConverter and data import from other tools to MagicDraw.

Model Merge

View Online Demo	Model Merge

NOTE	Model Merge functionality is available in Standard Edition and above for an additional fee.

Definitions

Name	Definition
Model Merge	Model Merge enables copying changes between different project versions. This functionality is usually needed when there are several branches that reflect different releases or versions of the product, e.g. when certain fixes have to be copied from a release branch to the mainstream development.
2-way merge	2-way merge is a simple merge, which compares two projects and joins them into one.
3-way merge	3-way merge does not only compare and merge two projects into one project, but it also considers the common ancestor of both projects.
Contributor	Participants of 2-way and 3-way merges are called contributors.
Ancestor	Ancestor is the common parent project for two projects.
Target, Source	In 3-way merge, the target is the contributor into which changes are copied, and the source is the contributor from which changes are copied.
Conflict	A conflict is two changes that are incompatible, i.e. changes that cannot be accepted together. For more information about conflicting changes, see “Conflicting changes” on page 318.

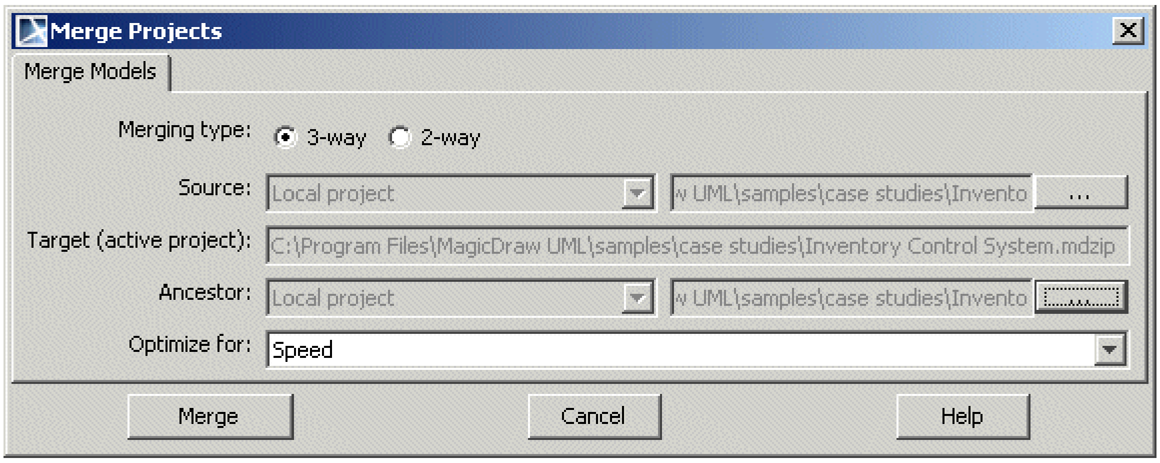
Introduction to Merging

Model merge enables copying changes between different project versions. This functionality is usually needed when there are several branches that reflect different releases or versions of the product, e.g. when certain fixes have to be copied from a release branch to the mainstream development.

Merge functionality in MagicDraw works both on projects stored in MagicDraw Teamwork Server or files.

1. Select **Project Merge** from the **Tools** main menu. The **Merge Projects** dialog box opens.
2. Select the source, target, and ancestor projects (changes are going to be copied from the source to the target project). The source and target projects can be stored in the system file or the Teamwork Server. If both projects are stored in the Teamwork Server, the ancestor is determined automatically. For more information about the **Optimize for** option, see “Controlling Merge memory usage” on page 342.
3. The **Merge** window appears, to let the user accept or reject the changes and resolve the conflicts that occurred in both contributors (e.g. when the same class is edited in both contributors).

4. Confirm the changes made to the target.



Merge Projects

Merge Models

Merging type: (● 3-way) ○ 2-way

Source: Local project | w UML\samples\case studies\Invento | ...

Target (active project): C:\Program Files\MagicDraw UML\samples\case studies\Inventory Control System.mdzip

Ancestor: Local project | w UML\samples\case studies\Invento | ...

Optimize for: Speed

Merge | Cancel | Help

Figure 168 -- *The* ***Merge Projects*** *dialog box*

Two merge types are implemented:

- "3-way merge" on page 295.
- "2-way merge" on page 295.

3-way merge

Conceptually 3-way merge is a reconciliation of 2 difference sets. To merge projects v2 and v3, which have common ancestor v1, difference sets of projects v1-v2 and v1-v3 must be reconciled. 3-way merge can be used for merging changes from one branch into another.

See Figure 169 on page 295, where the merging changes from one branch into another is presented. Branch *b.1* is created from the project version *i*. Team members work in parallel on project version *i* and make changes in project branch *b.1*. The merge is performed and changes made to branch are copied to the trunk.

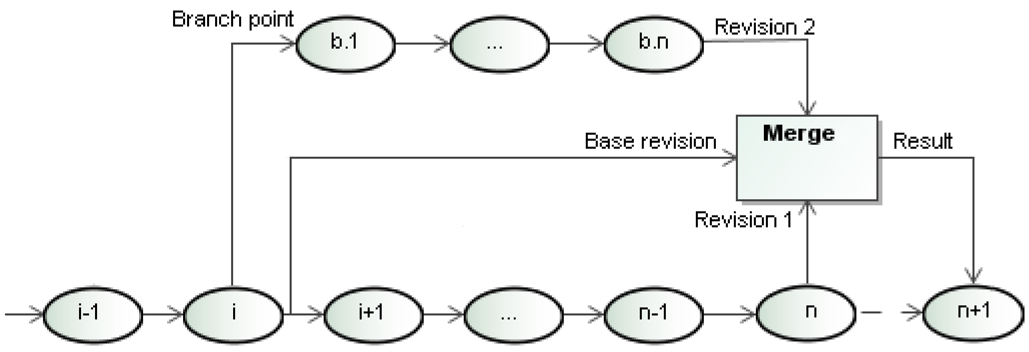


Figure 169 -- 3-way merge

2-way merge

2-way merging is a specific case of 3-way merging. This type of merging is usually used in a non-teamwork environment. In the 2-way merging there is no explicit ancestor available, thus the target version or file is taken as an ancestor.

See Figure 170 on page 296, where the first user works with project version *i* and creates project versions *i+1*, ..., *n-1*, *n* and the other user creates branch *b.1* of the project *i* and later creates project versions *b.1*, ..., *b.n*.

Merging of the following projects is performed: project of the first user (*n)* and project of the second user (*b.n.*) are merged.

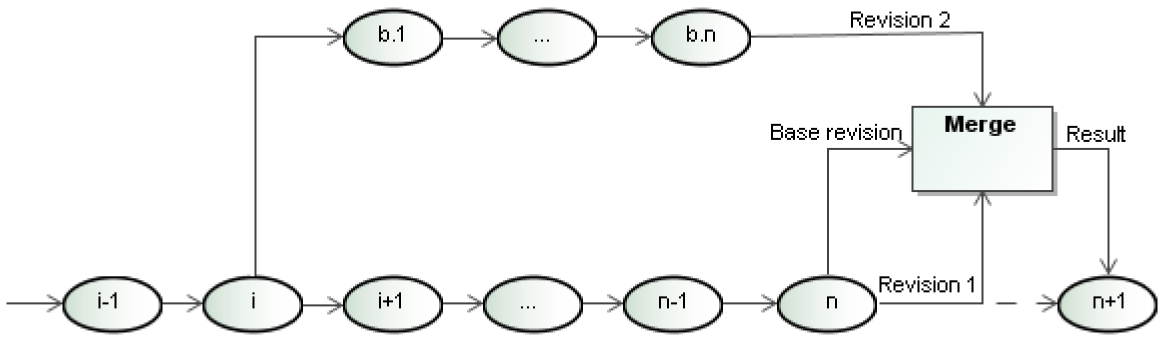


Figure 170 -- 2-way merge

Model Merge Concepts

A change is a delta between the ancestor and participants of a 2-way or 3-way merge. The participants of 2-way and 3-way merges are called contributors. Changes in Model Merge are classified as addition, deletion, modification, move, and order changes. Every change can be accepted or rejected and has dependent changes. If conflicts are detected, the user will be informed which change created the conflict.

Merging begins with building a composite change tree, which consists of model, diagramming, and non-model changes.

Model, diagramming, and non-model changes depend on each other. This means that accepting or rejecting one change not only will accept or reject other changes in the same change tree, but also in other change trees.

For more information about model merge concept, see “Merging concepts in details” on page 316.

Model Merge demonstration

This section demonstrates the following usage scenarios case studies:

- “Usage scenario 1 - 3-way Merge and Analysis” on page 296.
- “Usage scenario 2 - Merging in Collaboration System” on page 300.
- “Usage scenario 3 - Copying changes from the branch to Trunk (in Teamwork) with conflict resolution” on page 306.
- “Usage scenario 4 - Representing DSL elements in the Merged results” on page 314

These case studies show how merging is performed by accepting or rejecting changes and resolving conflicts.Inventory Control System.mdzip project will be used to show basic merge functionality. You can find this project file in the <MagicDraw installation folder>/samples/case studies.

Usage scenario 1 - 3-way Merge and Analysis

The usage scenario 1 presents step-by-step instructions for merging projects and analyzing results.

The model merge functionality in MagicDraw works for both - local projects and projects stored in MagicDraw Teamwork Server. This usage scenario presents model merge of the locally stored projects. For information about how merging is performed in Teamwork, see “Usage scenario 2 - Merging in Collaboration System” on page 300.

In this usage scenario User1 and User2 will make changes in parallel in the same project and later User1 will copy the changes from User2 file to his/her own file.

User 1 actions before merging

1. Open the Inventory Control System.mdzip project.
2. Create a new *Customer Group* class in the *Top Level class diagram* class diagram, in the *Static View* package (see Figure 171 on page 297).
3. Save the project.

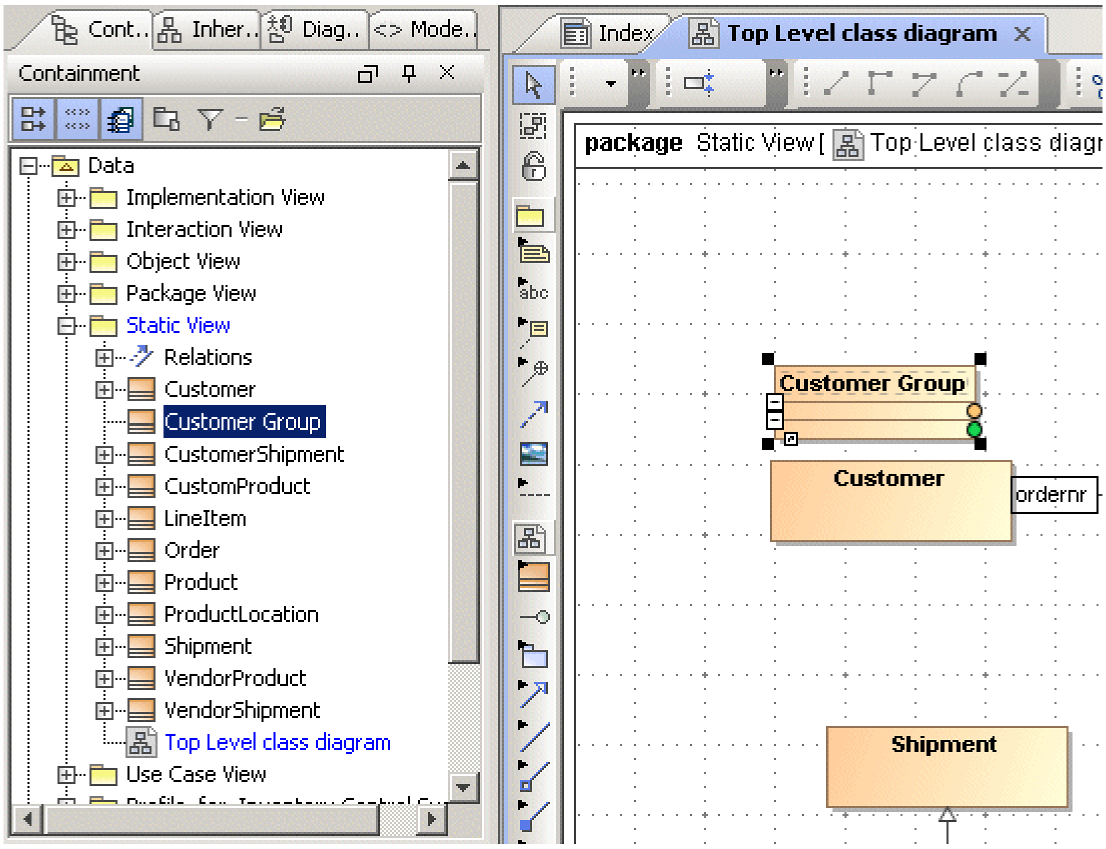


Figure 171 -- Changes made by User1 in the Inventory Control System.mdzip project

User 2 actions before merging

1. Open the original *Inventory Control System.mdzip* project.
2. Rename the *Shipment* class to *Delivery* in the *Product Shipment object diagram* class diagram (see Figure 172 on page 298).

3. Save this project.

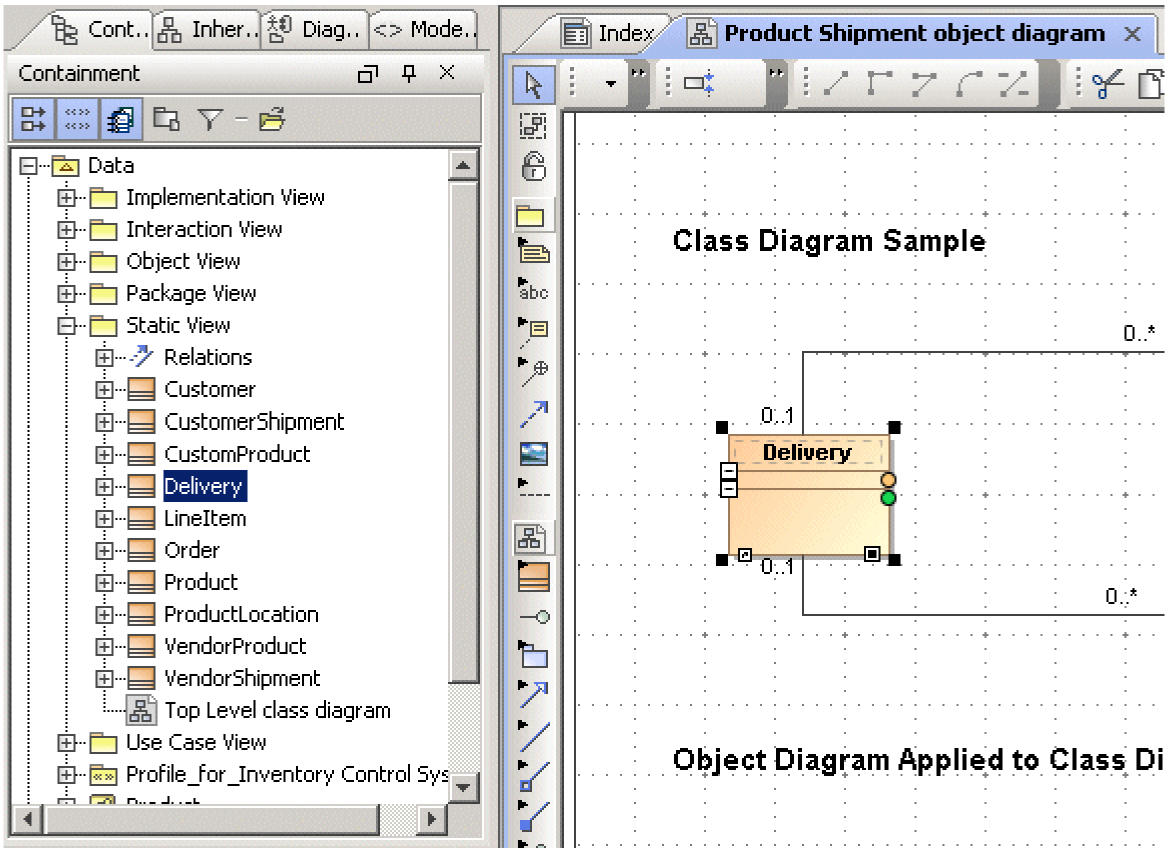
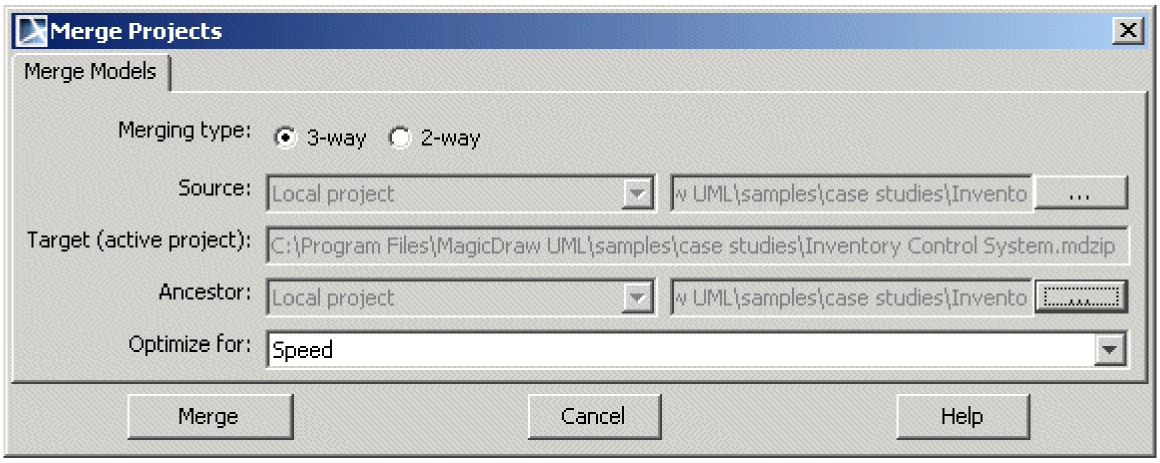


Figure 172 -- Changes made by User2 in the Inventory Control System.mdzip project

User1 actions for merging the projects

1. Open the target Inventory Control System.mdzip project, which includes changes made by him-self/herself.
2. In the **Tools** menu, click **Project Merge**. The **Merge Projects** dialog box opens .



Merging type: [✓ 3-way] 2-way
Source: Local project | w UML\samples\case studies\Invento | ...
Target (active project): C:\Program Files\MagicDraw UML\samples\case studies\Inventory Control System.mdzip
Ancestor: Local project | w UML\samples\case studies\Invento | ...
Optimize for: Speed

Figure 173 -- The Merge Projects dialog box

3. In the **Source** group, click the "..." button and select the Inventory Control System.mdzip project, which includes the changes made by *User2.*
4. In the **Ancestor** group, click the "..." button and select the original *I*nventory Control System.mdzip project that contains no changes.

5. Click **Merge**.

NOTE	A 3-way merging needs an ancestor project. If there is no ancestor project, use 2-way merge. For more information about 2-way and 3-way merge, see the “Introduction to Merging” on page 294.

Analyzing merging results

The **Merge** window allows reviewing differences. The merger automatically applies changes made in both source and target projects and highlights those changes in the Merged Result tree.

Grey lines underneath the *Static View* means that there are changes inside the package. Expand the *Static View* node and see that *Customer* Group class is added in the package, the *Shipment* class and the *Top Level class diagram* are modified.

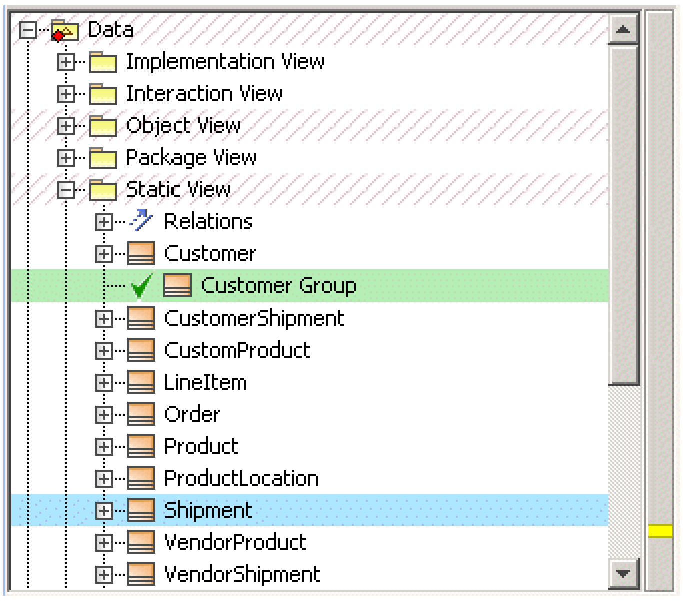


Figure 174 -- The Merged Result tree - the Customer Group class is added in the Static View package

Completing the merging procedure

Confirm the changes made to the target by clicking the **Finish Merging** button. The changes in the source project will be copied to the target project. In this example, the *Customer Group* class is added and the *Shipment* class is renamed as *Delivery* (see Figure 175 on page 300).

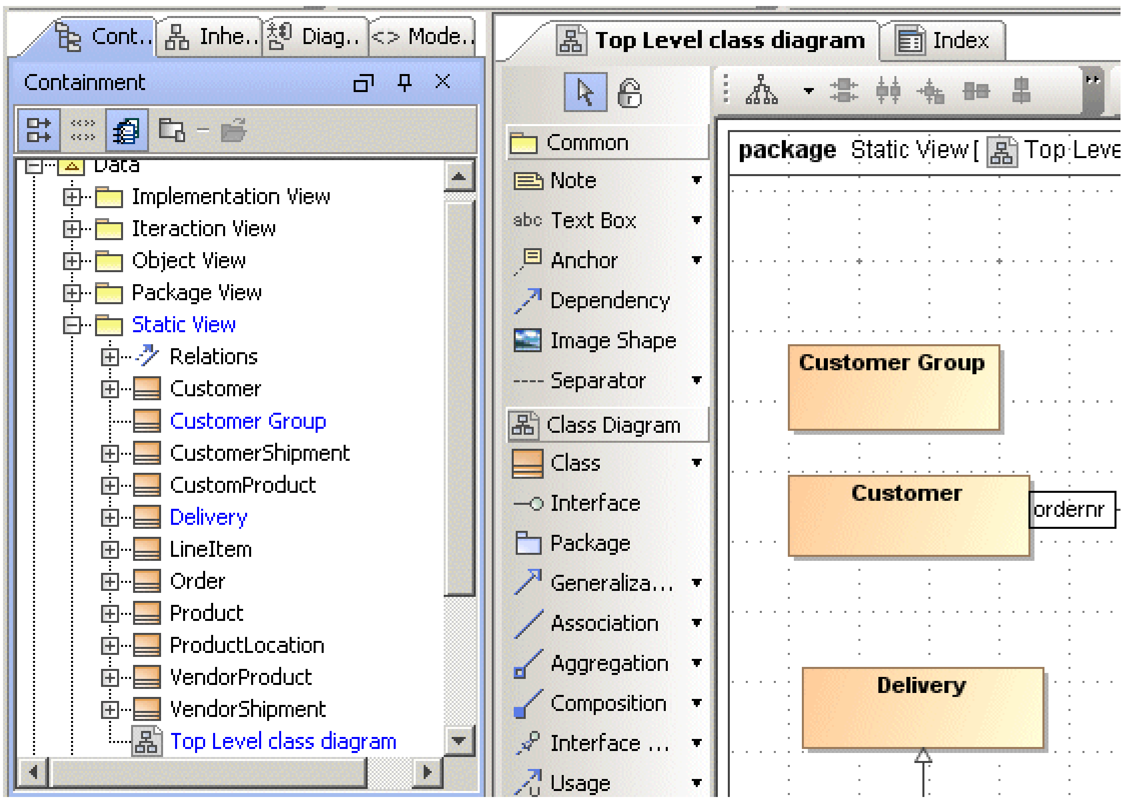


Figure 175 -- The Inventory Control System.mdzip project after merge

Usage scenario 2 - Merging in Collaboration System

This usage scenario shows how simple changes can be copied from the release branch to the main development branch when *User1* and *User2* are working on the same project in Collaboration Environment.

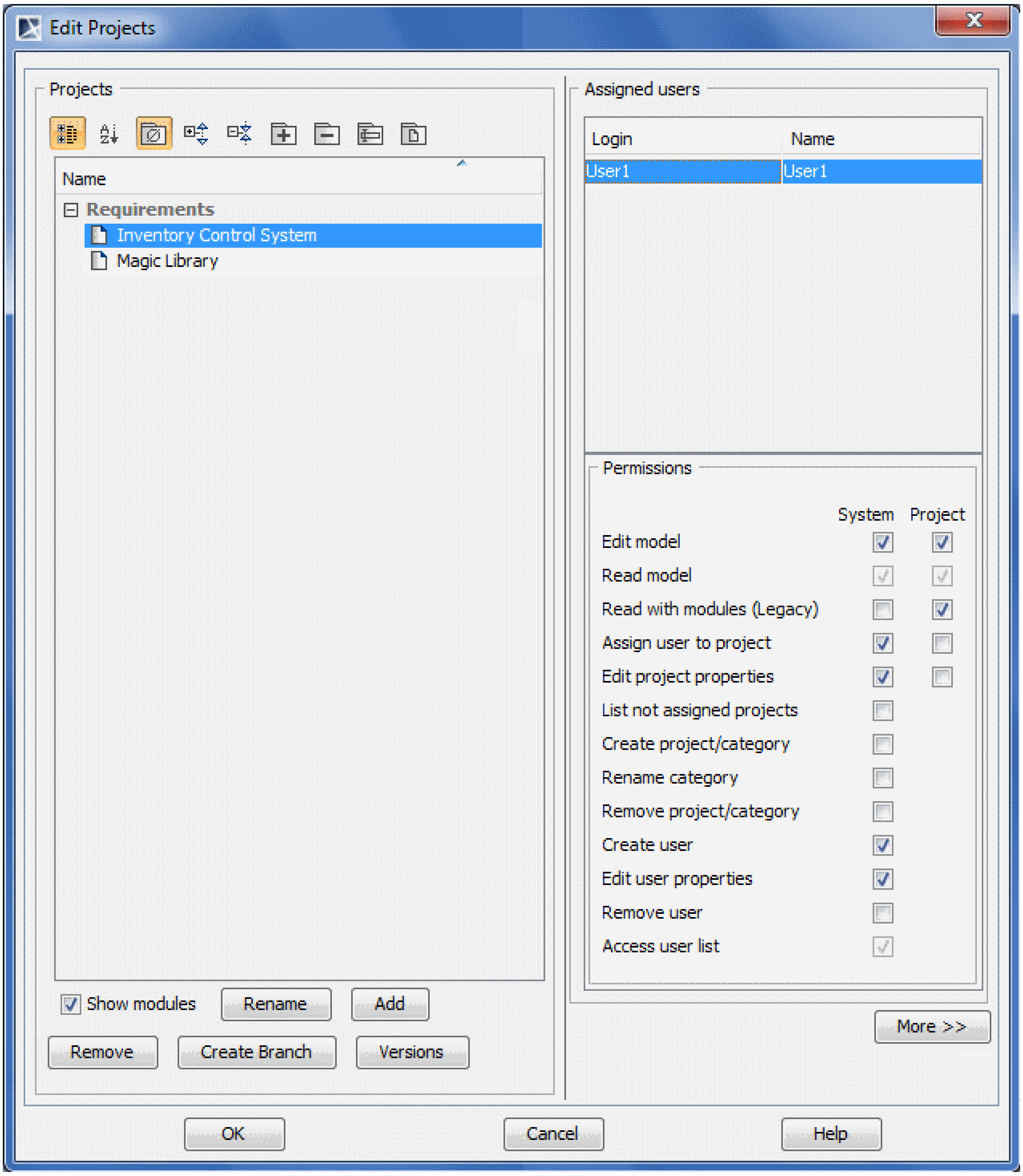
User1 action before merging projects in the Collaboration System

Add the Inventory Control System.mdzip project to the Teamwork Server.

User2 actions before merging: create a branch

Create a branch for the Inventory Control System.mdzip project.

1. In the **Collaborate** menu, click **Projects**. The **Edit Projects** dialog opens.


Edit Projects

Projects

Name

- Requirements
  - Inventory Control System
  - Magic Library

[✓] Show modules

Assigned users

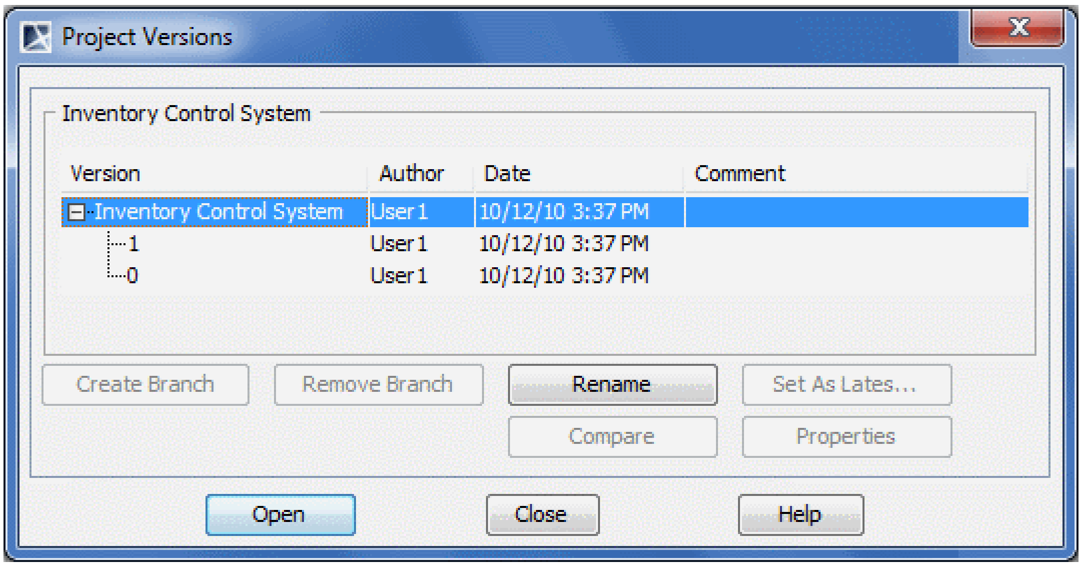
Login	Name
User1	User1

Permissions

	System	Project
Edit model	✓	✓
Read model	✓	✓
Read with modules (Legacy)	☐	✓
Assign user to project	✓	☐
Edit project properties	✓	☐
List not assigned projects	☐	
Create project/category	☐	
Rename category	☐	
Remove project/category	☐	
Create user	✓	
Edit user properties	✓	
Remove user	☐	
Access user list	✓	

Figure 176 -- The Edit Projects dialog

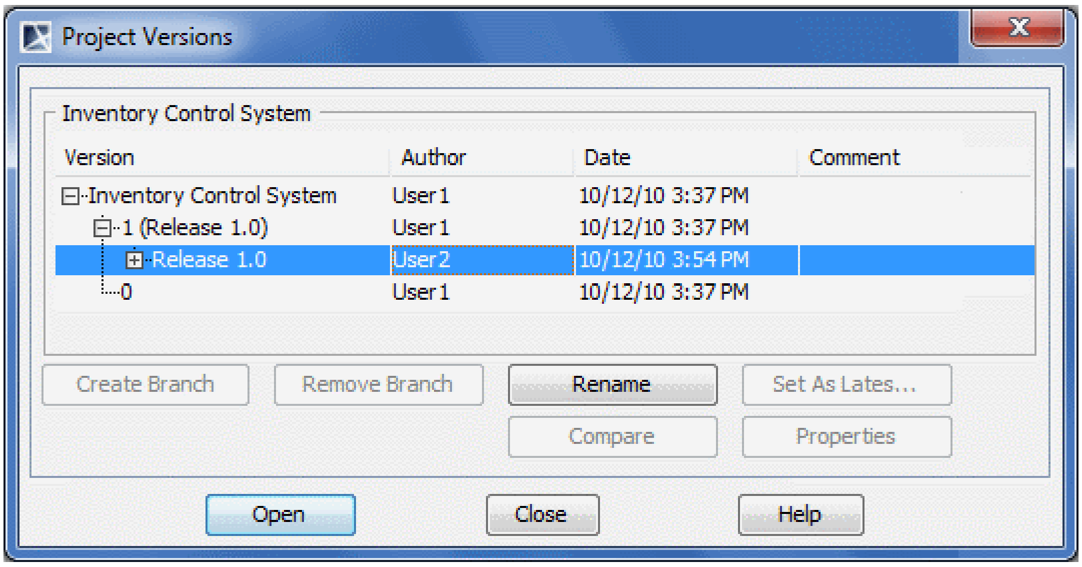
2. Select the Inventory Control System project and click the **Versions** button. The **Project Versions** dialog opens.



Version	Author	Date	Comment
⊟ Inventory Control System	User1	10/12/10 3:37 PM	
1	User1	10/12/10 3:37 PM	
0	User1	10/12/10 3:37 PM	

Figure 177 -- The Versions dialog box

3. Select the first version of the project and click **Create Branch**. Now User2 has created a branch, which is derived from the project version 1 from trunk.



Version	Author	Date	Comment
⊟ Inventory Control System	User1	10/12/10 3:37 PM	
⊟ 1 (Release 1.0)	User1	10/12/10 3:37 PM	
⊞ Release 1.0	User2	10/12/10 3:54 PM	
0	User1	10/12/10 3:37 PM	

Figure 178 -- The Inventory Control System project versions with created Release 1.0 branch

User2 actions before merging: modify the project.

1. In the **Project Versions** dialog, select *Release 1.0* and click **Open**. The *Release 1.0* branch of the *Inventory Control System* project opens.
2. Create the *Customer Group* class in Top *Level class diagram*, in the *Static View* package (see Figure 179 on page 303).
3. Commit changes.

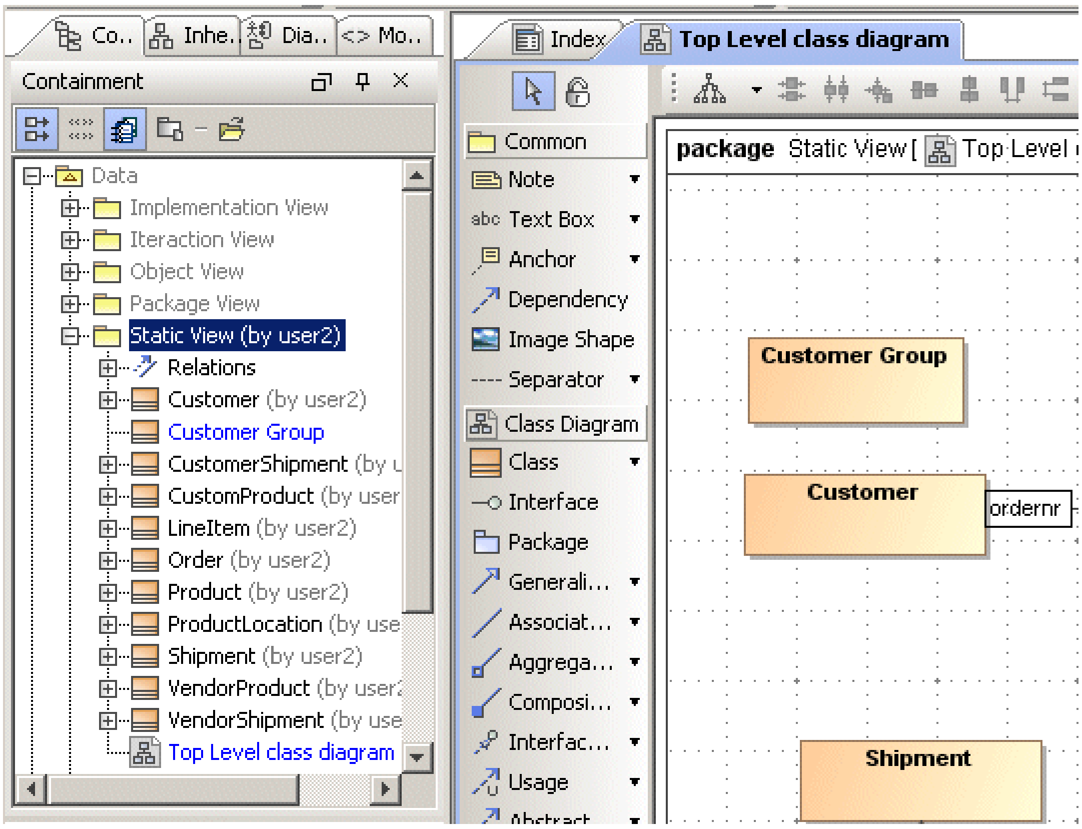


Figure 179 -- Changes made by User2

For more information about branching in Teamwork, see “Project branching in Teamwork” in “MagicDraw Teamwork UserGuide.pdf”.

User1 actions: opening the latest version of trunk.

1. From the **Collaborate** menu, select **Open Server Project**. The **Open Server Project** dialog opens.Select the *Inventory Control System* project and click **Open**. The latest version of trunk is opened.

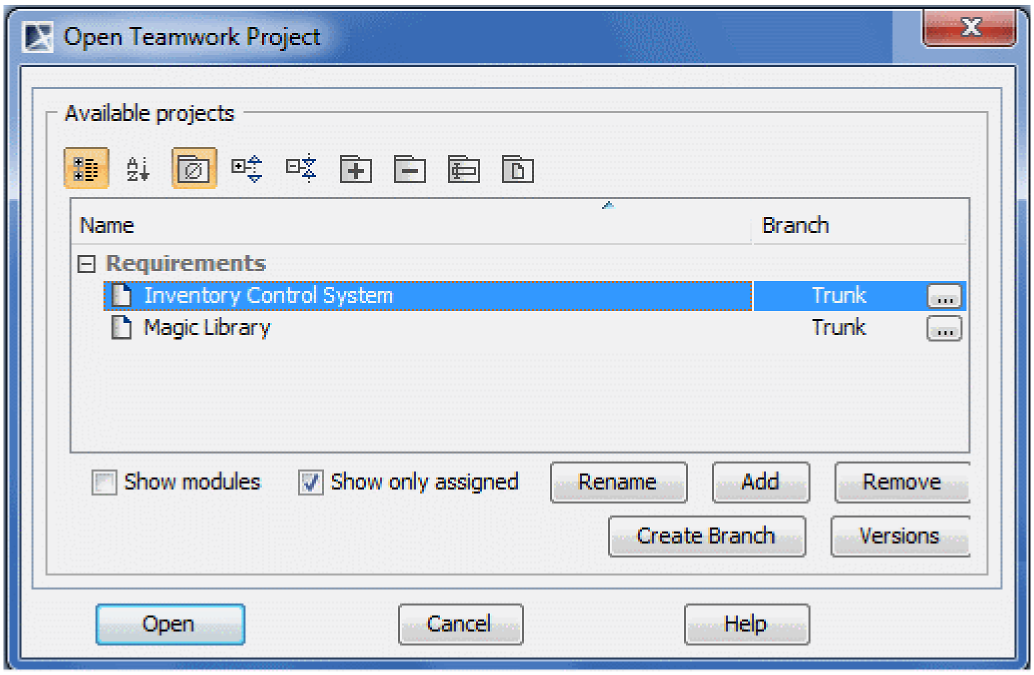
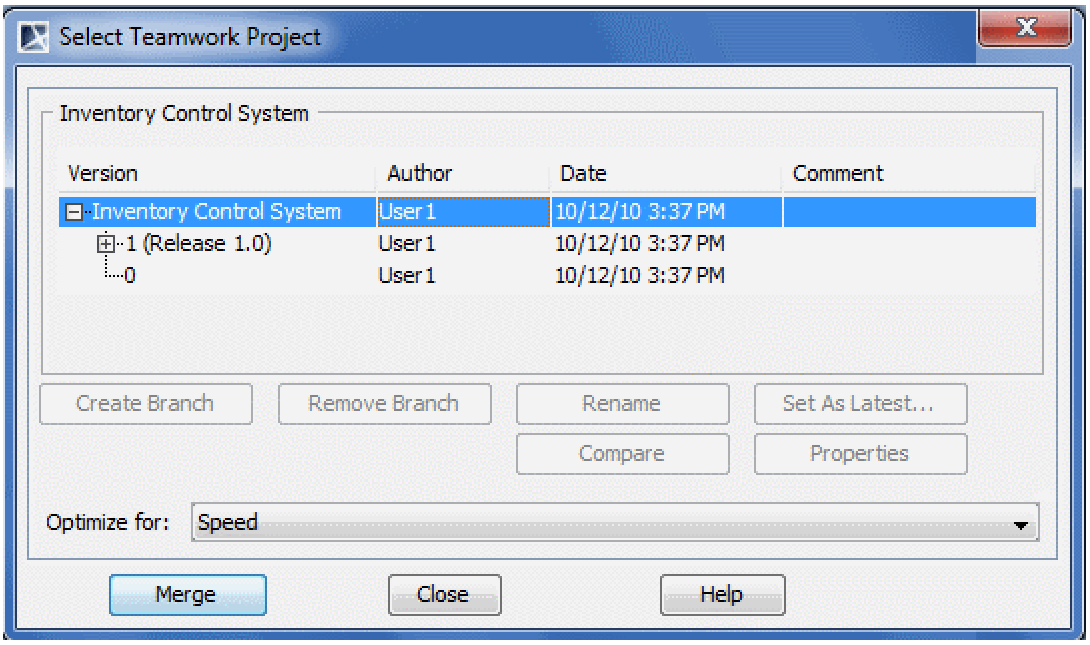


Figure 180 -- The Open Server Project dialog

User1 actions: merge changes from branch into the trunk

2. From the **Collaborate** menu, select **Merge From**. The **Select Teamwork Project** dialog opens.

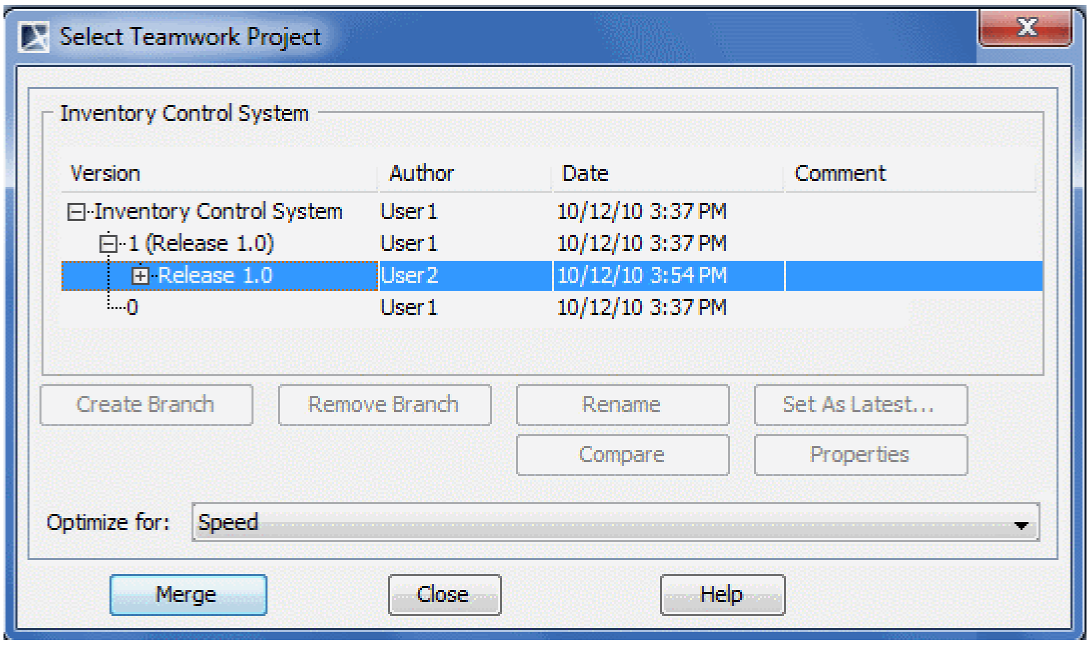


Version	Author	Date	Comment
Inventory Control System	User1	10/12/10 3:37 PM	
1 (Release 1.0)	User1	10/12/10 3:37 PM	
0	User1	10/12/10 3:37 PM	

Optimize for: Speed

Figure 181 -- The Select Teamwork Project dialog

3. Expand the *1*st node and select the *Release 1.0* branch



Select Teamwork Project

Inventory Control System

Version	Author	Date	Comment
⊟ Inventory Control System	User1	10/12/10 3:37 PM	
⊟ 1 (Release 1.0)	User1	10/12/10 3:37 PM	
⊞ Release 1.0	User2	10/12/10 3:54 PM	
0	User1	10/12/10 3:37 PM	

Optimize for: Speed

Figure 182 -- The Select Teamwork Project dialog with selected branch from which we are going to copy changes

4. Click **Merge**. The **Merge** window opens in which you may review differences and complete the merge procedure.

Analyzing the merge results

In the **Merge Result** tree, expand the *Static View* node and you can see that *Customer Group* class has been added to the package and the *Top Level class diagram* has modification changes (see Figure 183 on page 305).

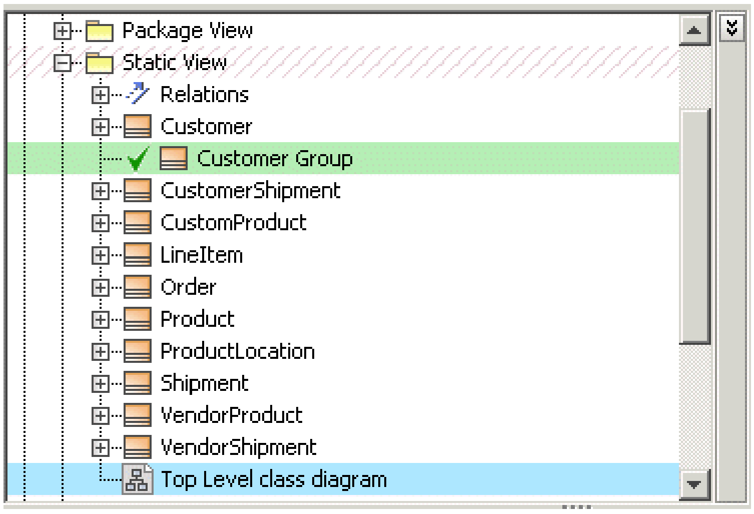


Figure 183 -- Usage scenario 2 - the Merge window, Merge Result tree

User1 actions: confirm changes made to the target project

1. In the **Merge** window, click the **Finish Merging** button. The changes from the source project are copied to the target project. In this sample the *Customer Group* class is added to the trunk project (see Figure 184 on page 306).
2. Commit the changes to the Teamwork Server.

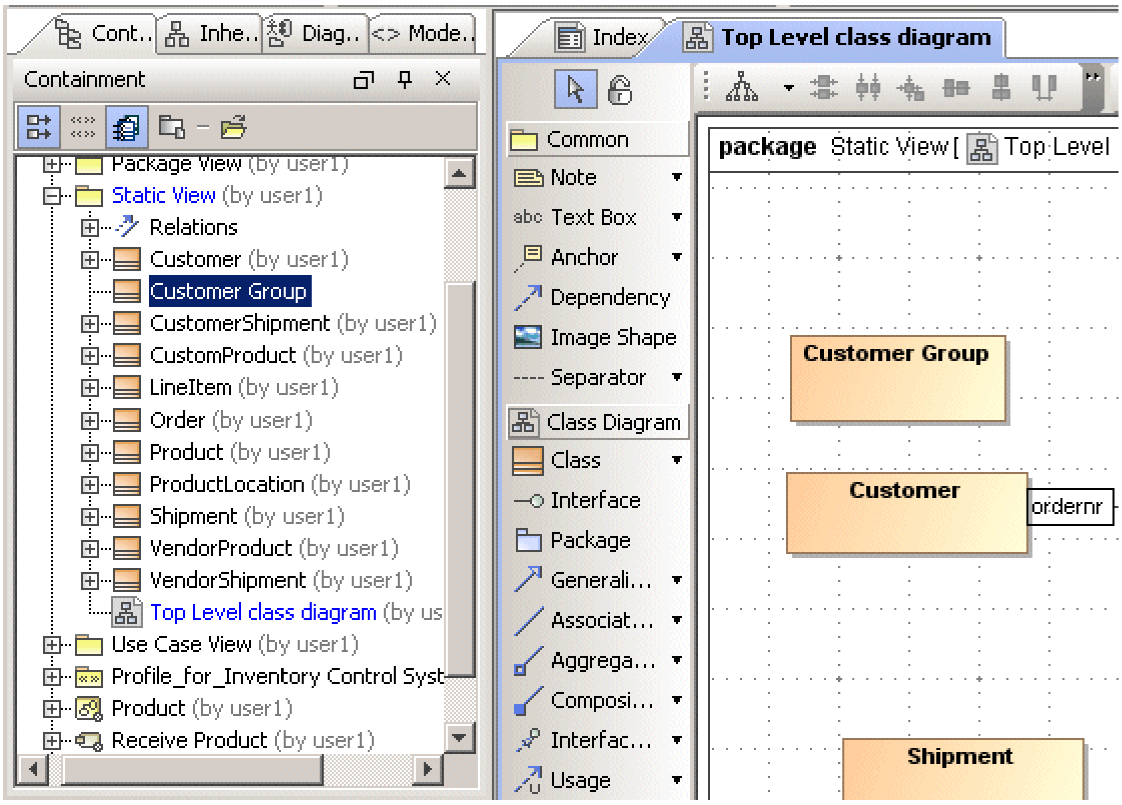


Figure 184 -- Changes are copied from the branch to the Trunk - the Customer Group class is added to the Trunk project

For more information about analyzing merging results, see “Analyzing Merging Results” on page 320.

Usage scenario 3 - Copying changes from the branch to Trunk (in Teamwork) with conflict resolution

This usage scenario 3 analyzes how conflicts are resolved during the merging process.

User 1 actions before merging: add the *Inventory Control System.mdzip* project to the Teamwork Server and modify it

1. Rename the *Customer* class as *Client* class (see Figure 185 on page 307). The *Customer* class is located on *Top Level class diagram*, in the *Static View* package.

2. Commit changes to the Teamwork Server.

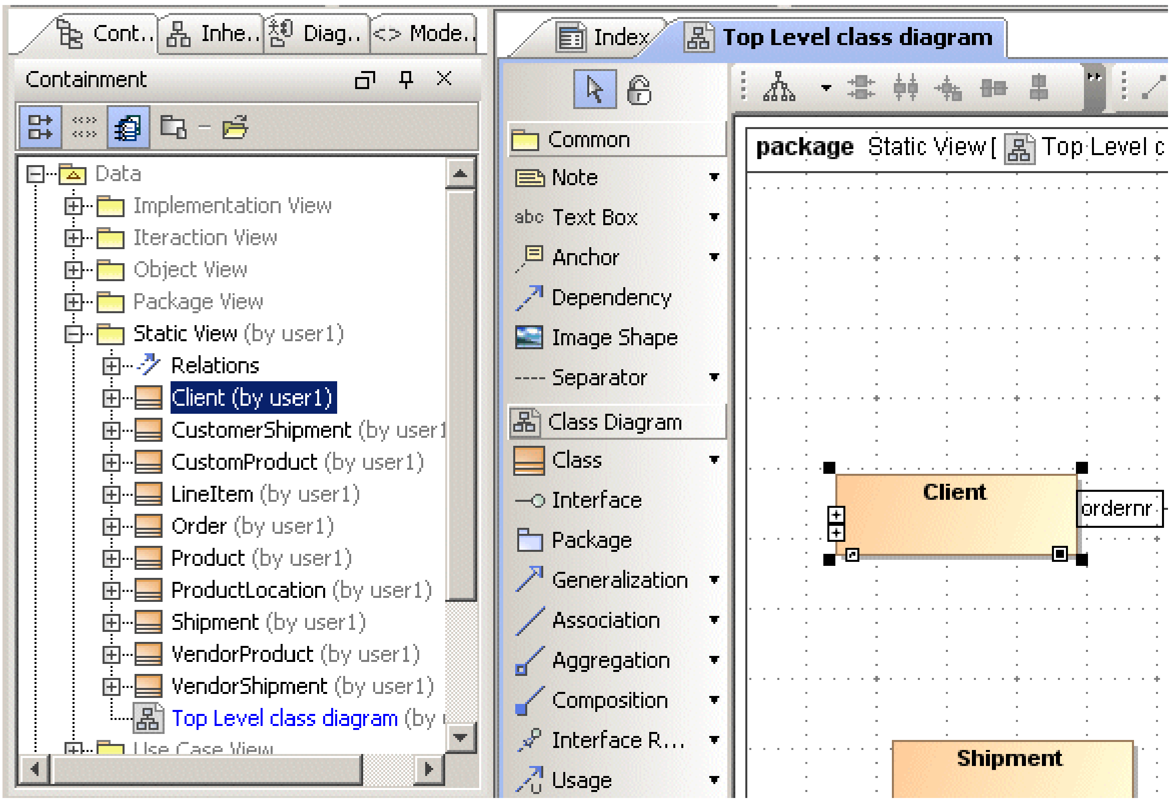
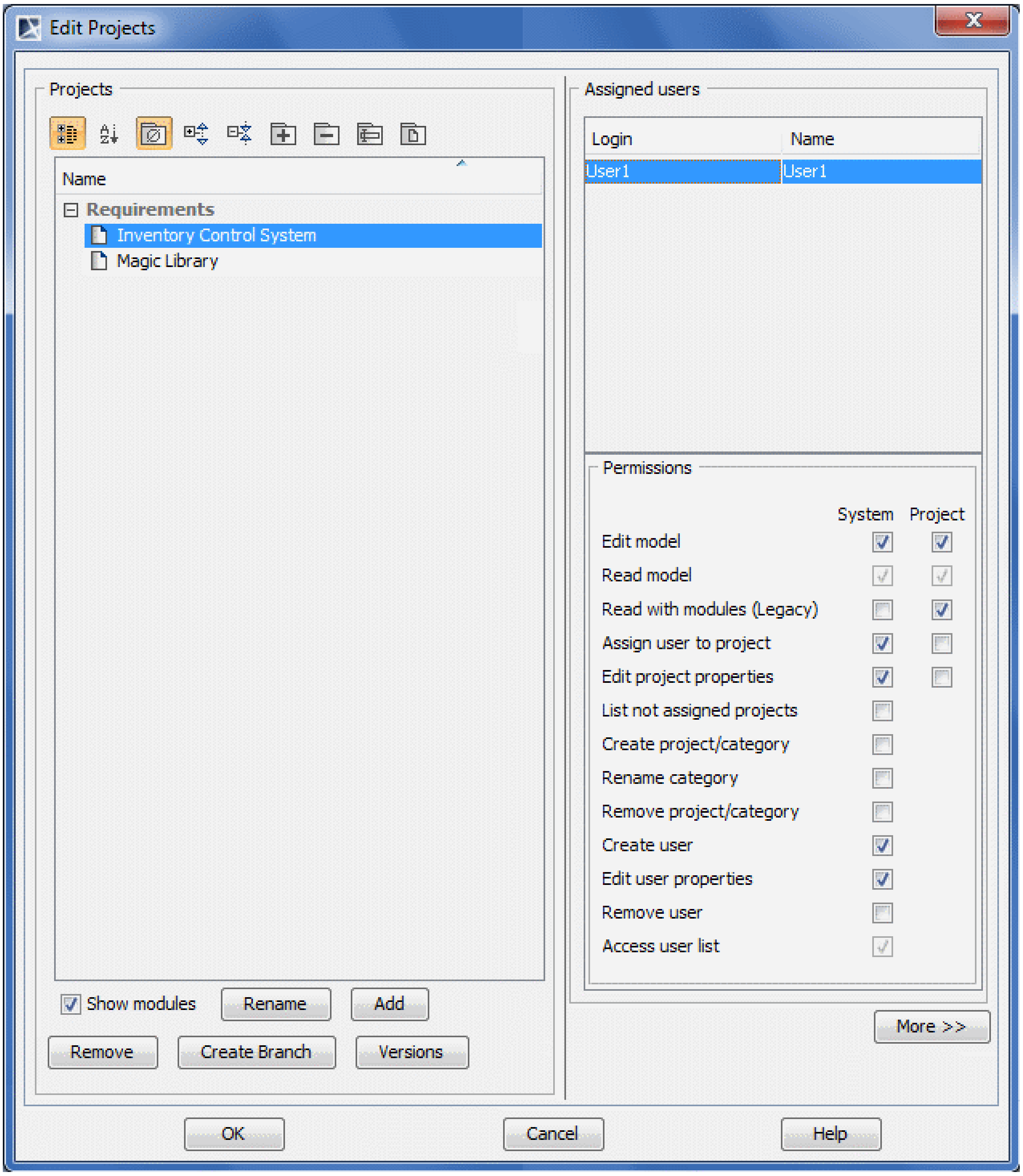


Figure 185 -- Usage scenario 3 - User1 changes in the project

User 2 actions before merging: create a branch of the *Inventory Control System* project

3. From the **Teamwork** menu, select **Projects**. The **Edit Projects** dialog box opens.



Edit Projects

Projects

Name
⊟ Requirements
Inventory Control System
Magic Library

[✓] Show modules

Assigned users

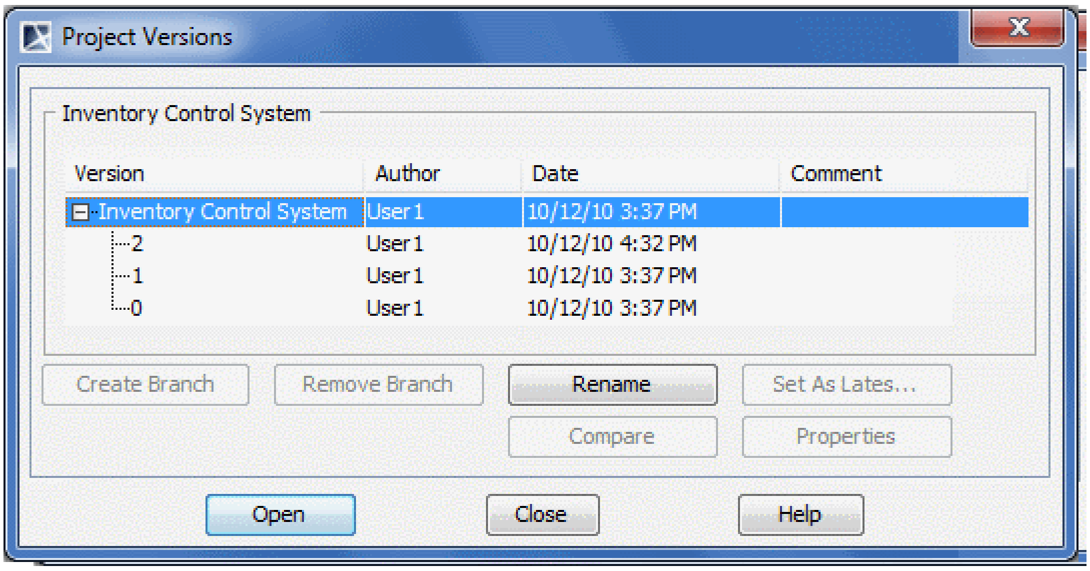
Login	Name
User1	User1

Permissions

	System	Project
Edit model	✓	✓
Read model	✓	✓
Read with modules (Legacy)		✓
Assign user to project	✓	
Edit project properties	✓	
List not assigned projects		
Create project/category		
Rename category		
Remove project/category		
Create user	✓	
Edit user properties	✓	
Remove user		
Access user list	✓	

Figure 186 -- Usage scenario 3 - the Edit Projects dialog box

4. Select the *Inventory Control System* project and click the **Versions** button. The **Project Versions** dialog box opens.

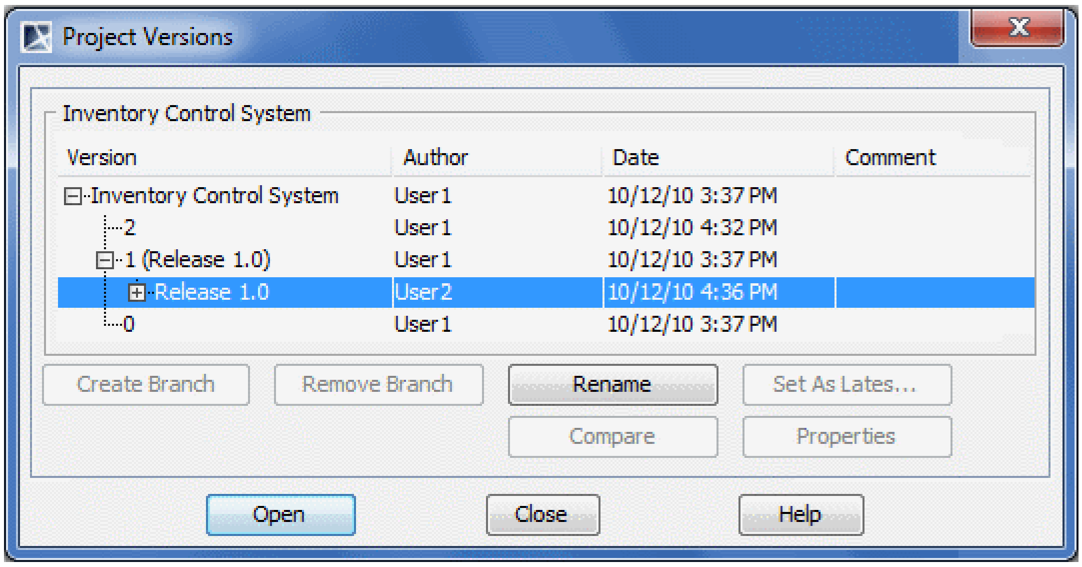

Project Versions

Inventory Control System

Version	Author	Date	Comment
⊟ Inventory Control System	User1	10/12/10 3:37 PM	
2	User1	10/12/10 4:32 PM	
1	User1	10/12/10 3:37 PM	
0	User1	10/12/10 3:37 PM	

Figure 187 -- Usage scenario 3 - the Versions dialog box

5. Select the first version of the project and click **Create Branch**. Now *User2* has created a branch, which is derived from the project version 1 from trunk.


Project Versions

Inventory Control System

Version	Author	Date	Comment
⊟ Inventory Control System	User1	10/12/10 3:37 PM	
2	User1	10/12/10 4:32 PM	
⊟ 1 (Release 1.0)	User1	10/12/10 3:37 PM	
⊞ Release 1.0	User2	10/12/10 4:36 PM	
0	User1	10/12/10 3:37 PM	

Figure 188 -- Usage scenario 3 - the branch Release 1.0 is created

User 2 actions before merging: modify a project branch

1. To open the project, in the **Project Versions** dialog box, select *Release 1.0* and click**Open**. The *Release 1.0* branch of the I*nventory Control System* project opens.
2. Rename the *Customer* class to *Customer Group* class (see Figure 189 on page 310). The *Customer* class is located on *Top Level class diagram*, in the *Static View* package.

3. Commit changes.

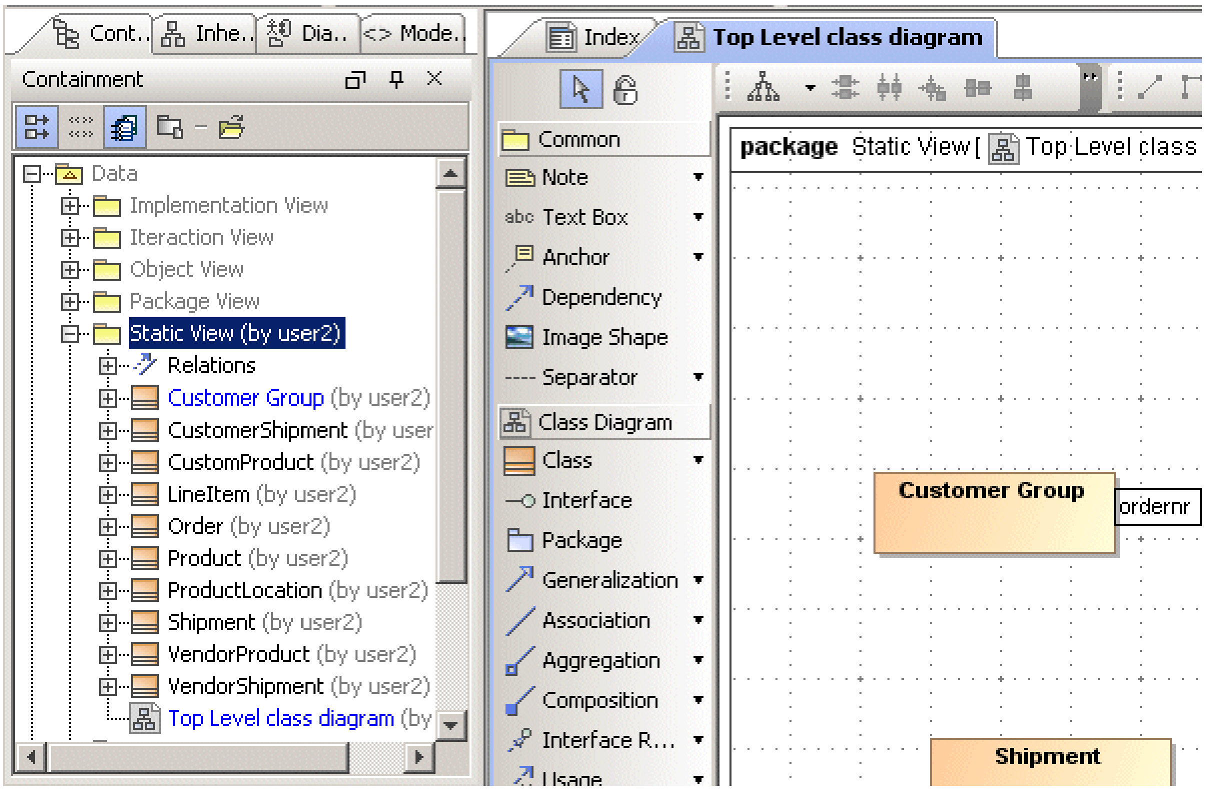


Figure 189 -- Usage scenario 3 - User2 changes made to the project

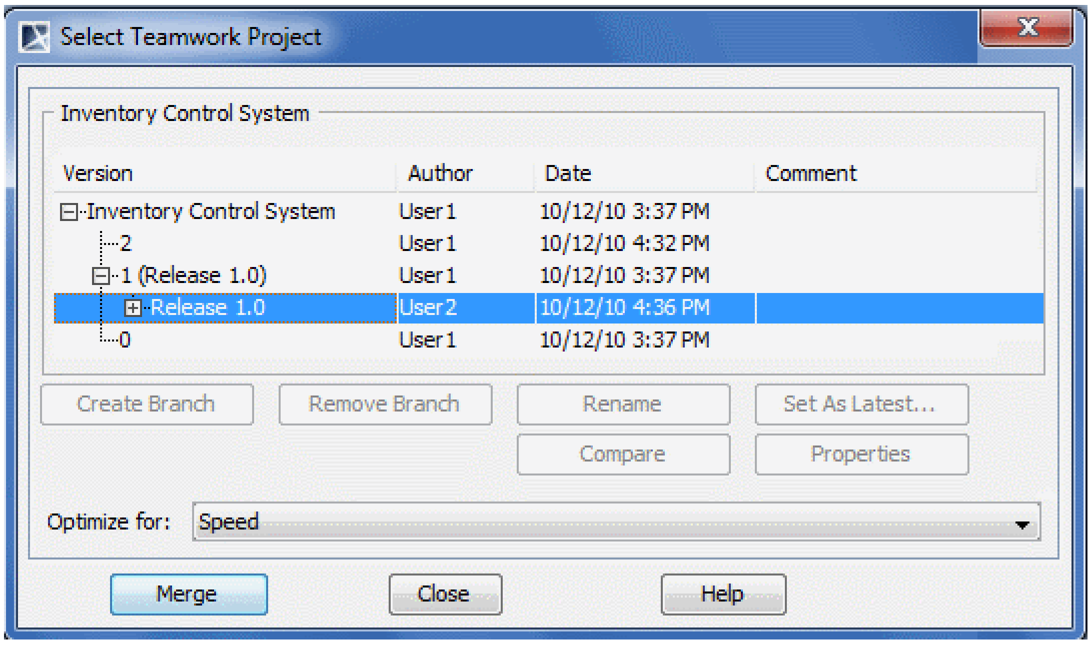
User1 actions: open the latest version of the trunk

1. From the **Collaborate** menu, select **Open Server Project**. The **Open Server Project** dialog opens.
2. Select the *Inventory Control System* project and click **Open**. The latest version of trunk opens.

User1 actions: merge changes from the latest version of the project branch to the current active project

1. From the **Collaborate** menu, choose **Merge From**. The **Select Teamwork Project** dialog opens.

2. Expand the *1* node and selects the *Release 1.0* branch.


Select Teamwork Project

Inventory Control System

Version	Author	Date	Comment
Inventory Control System	User1	10/12/10 3:37 PM	
2	User1	10/12/10 4:32 PM	
1 (Release 1.0)	User1	10/12/10 3:37 PM	
Release 1.0	User2	10/12/10 4:36 PM	
0	User1	10/12/10 3:37 PM	

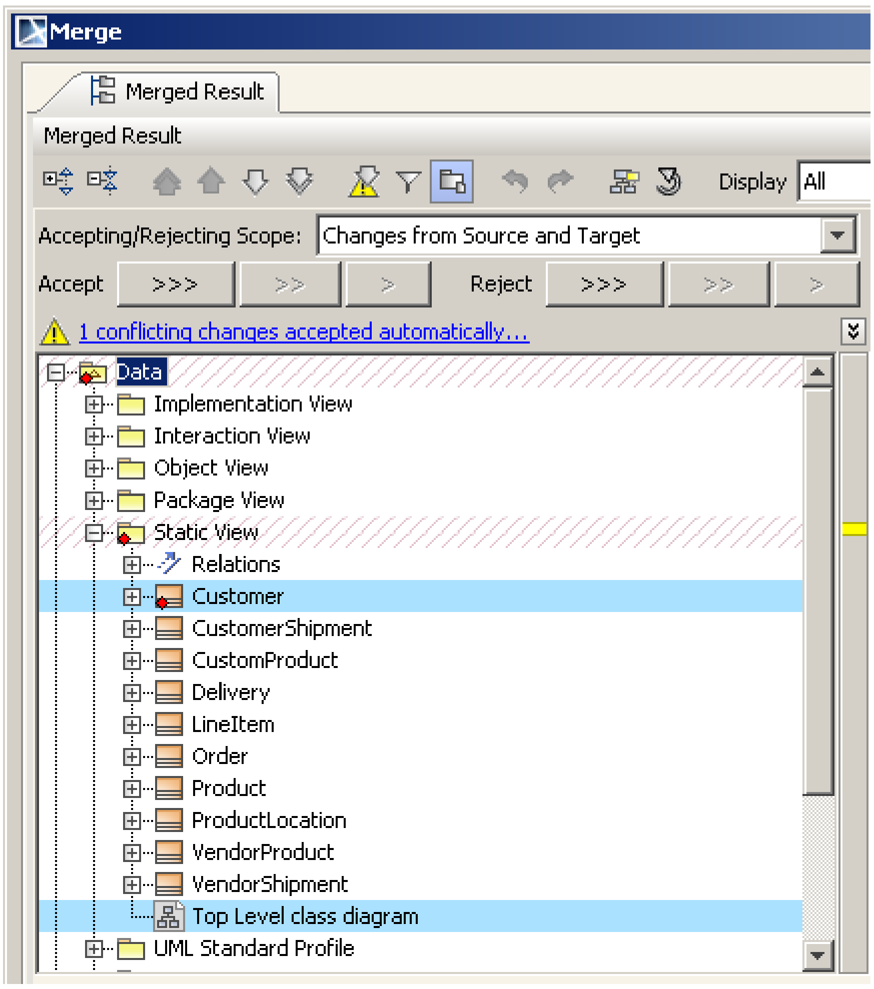
Optimize for: Speed

Figure 190 -- Usage scenario 3 - the Select Teamwork Project dialog box

3. Click the **Merge** button. The **Merge** window opens.

Analyzing conflicting changes

1. Figure on page 311 shows the **Merge Results** tree in which there are conflicting changes that cannot be accepted. They are distinguished by the red diamond shapes. The *Data* package has inner changes and conflicts and the *Customer* class has conflicts (the name was changed in the source and target projects).



Accepting/Rejecting Scope: Changes from Source and Target

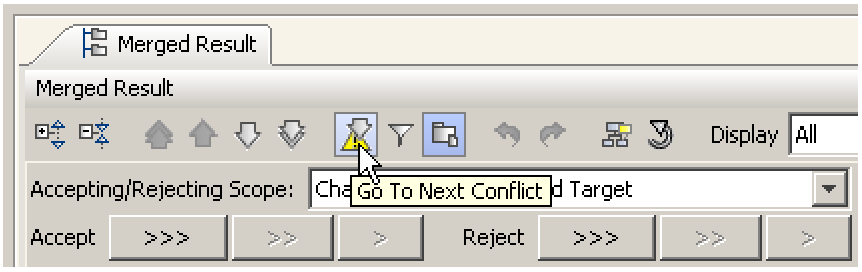
Accept >>> >> > Reject >>> >> >

1 conflicting changes accepted automatically...

```
Data
  Implementation View
  Interaction View
  Object View
  Package View
  Static View
    Relations
    Customer
    CustomerShipment
    CustomProduct
    Delivery
    LineItem
    Order
    Product
    ProductLocation
    VendorProduct
    VendorShipment
    Top Level class diagram
  UML Standard Profile
```

Figure 191 -- The conflicting change

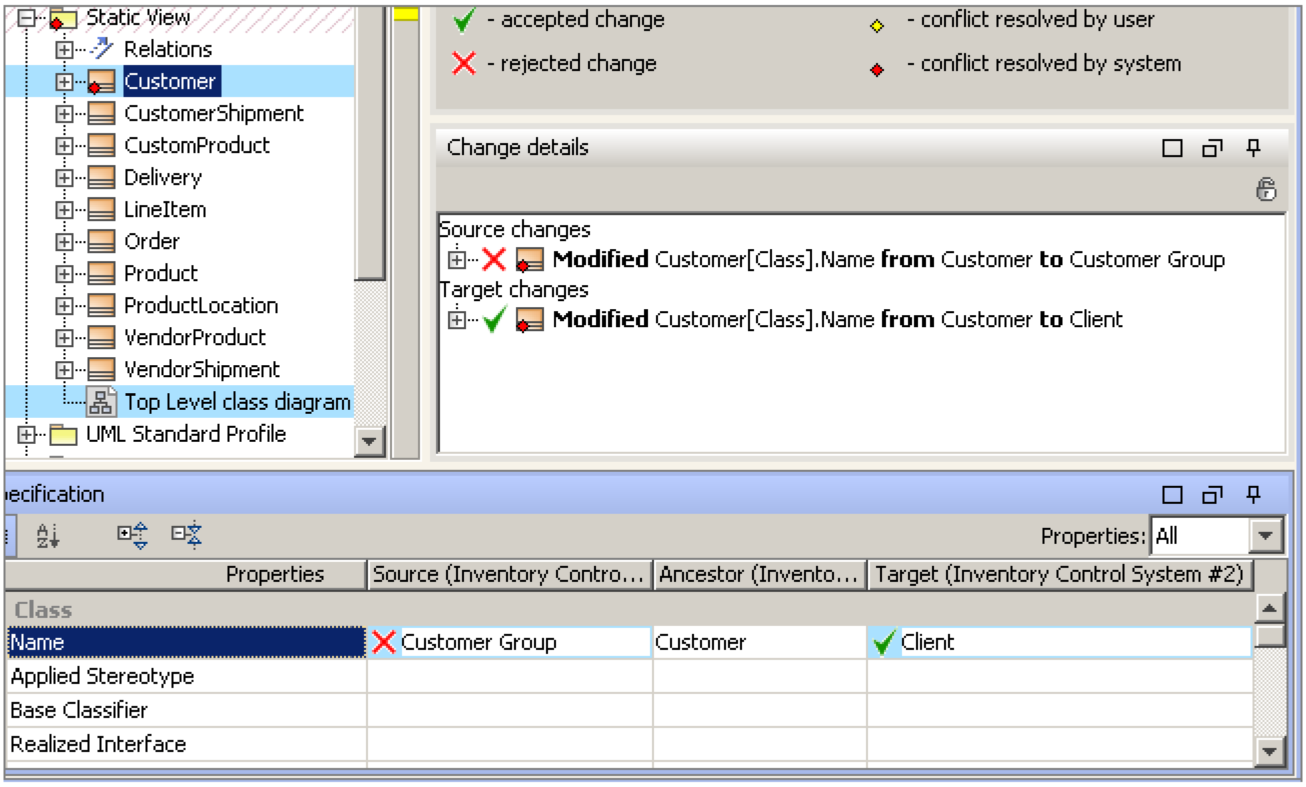
2. The merge engine automatically accepts all non-conflicting changes from the source and target projects. Then it accepts all conflicting changes from the target project and rejects all the conflicting changes from the source. The user can review automatically accepted conflicting changes from the target and select to apply change from the other contributor.
3. Navigate to the automatically accepted conflicting changes from the target project:
   3.1In the quick navigation toolbar, click the **Go To Next Conflict** button.



Accepting/Rejecting Scope: Cha[Go To Next Conflict]d Target

Figure 192 -- Usage scenario 3 - the Merge window, the Go To Next Conflict button

   3.2The element that has conflicts (the *Customer* class) is selected (see Figure 193 on page 313). Its specification is also opened. The name of the *Customer* class is changed in the source and in the target project. Only the change in the target is automatically accepted.



Source changes
✗ **Modified** Customer[Class].Name **from** Customer **to** Customer Group
Target changes
✓ **Modified** Customer[Class].Name **from** Customer **to** Client

Properties	Source (Inventory Contro…	Ancestor (Invento…	Target (Inventory Control System #2)
Class			
Name	✗ Customer Group	Customer	✓ Client
Applied Stereotype			
Base Classifier			
Realized Interface			

Figure 193 -- Usage scenario 3 - the Merge window, Customer class is selected in the Merged Results tree

Changing the conflict resolution and finishing the merge

1. Change the automatic acceptance setting of the conflict resolution and accept the name change from the source project:
2. In the **Change details** panel of the *Customer* class, right-click the not accepted change. The shortcut menu opens..

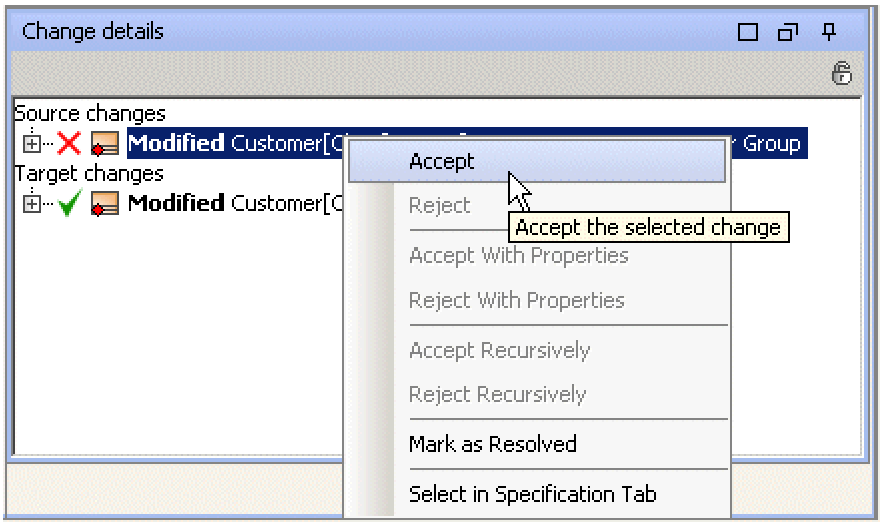


*Figure 194 -- The Merge window, Specification panel with invoked shortcut menuAccept the class name modification from the source project by selecting the **Accept** shortcut menu item. The name modification from the source project is accepted.*

3. Click the **Finish Merging** button and commit changes to Teamwork.

User1 has successfully resolved conflicting changes and merged them into the target project. The *Customer* class is renamed to *Customer Group* (see Figure 195 on page 314)

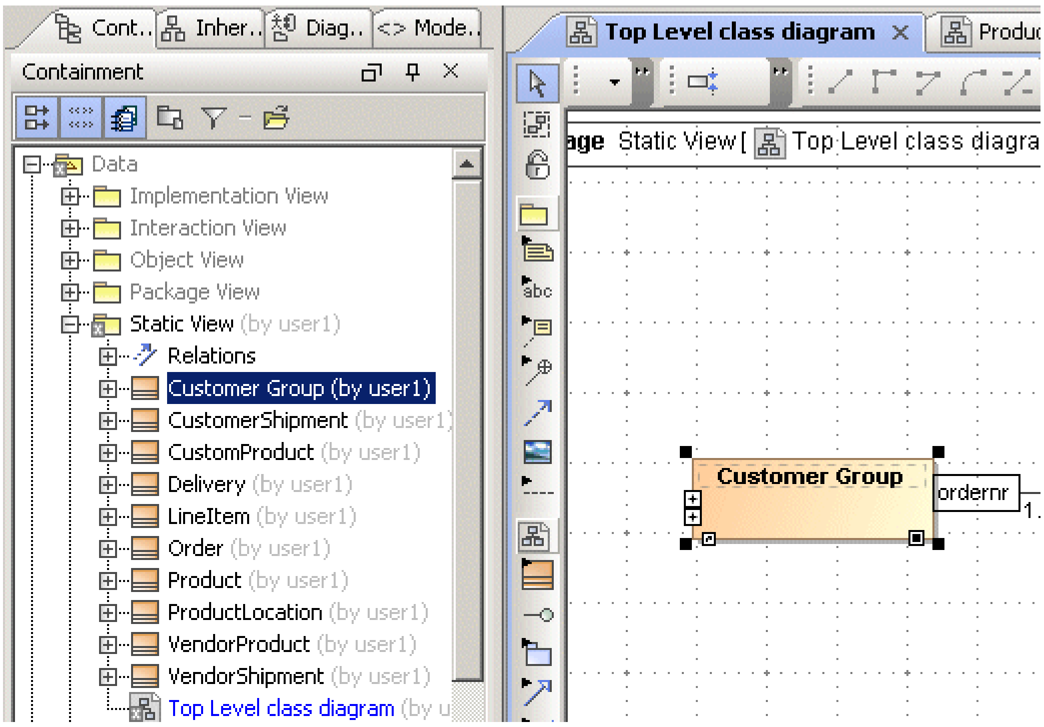


Figure 195 -- Project after merge

Usage scenario 4 - Representing DSL elements in the Merged results

Model elements and their properties are displayed and merged using DSL rules, specified as MagicDraw DSL customization artifacts.

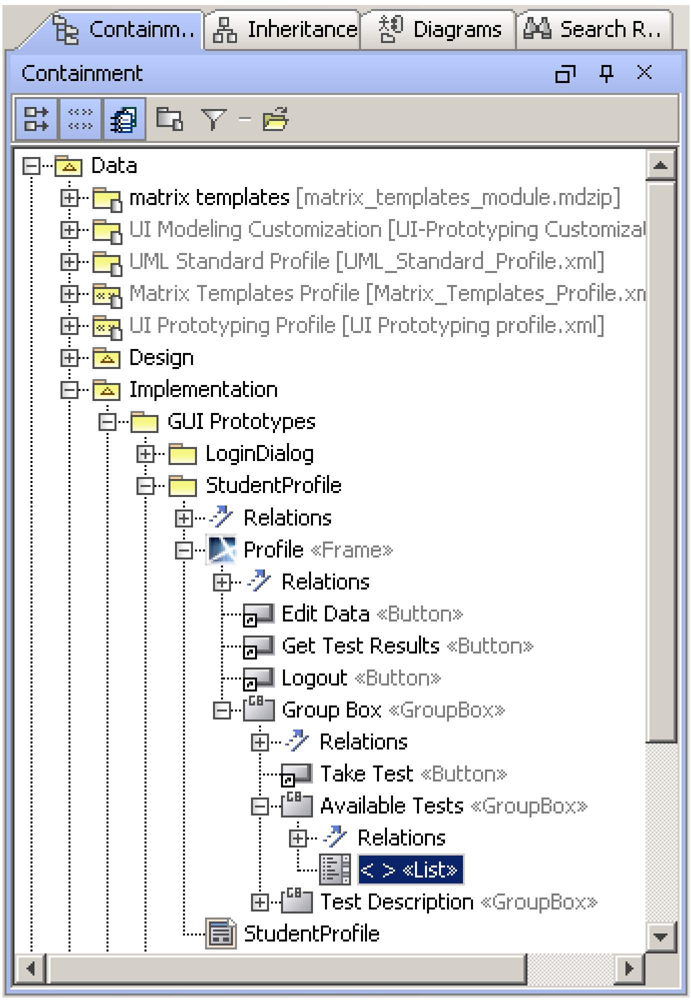
This usage scenario represents how User Interface Modeling diagram (a good DSL example) elements are represented in the **Merge** window.

Actions before merging

The user changes the source project, located in the <MagicDraw installation directory>\samples\diagrams\User Interface Modeling\UI Modeling in System Development.mdzip in the following way:

1. In the model Browser, select the folowing element: Data::Implementation::GUI Prototypes::StudentProfile::Profile::Group Box::Available Tests::<>«List»" (see Figure 196 on page 315). Open the <>«List» Specification window and change the value for **Horizontal Scroll Bar** property to **Always** (see Figure 197 on page 315).

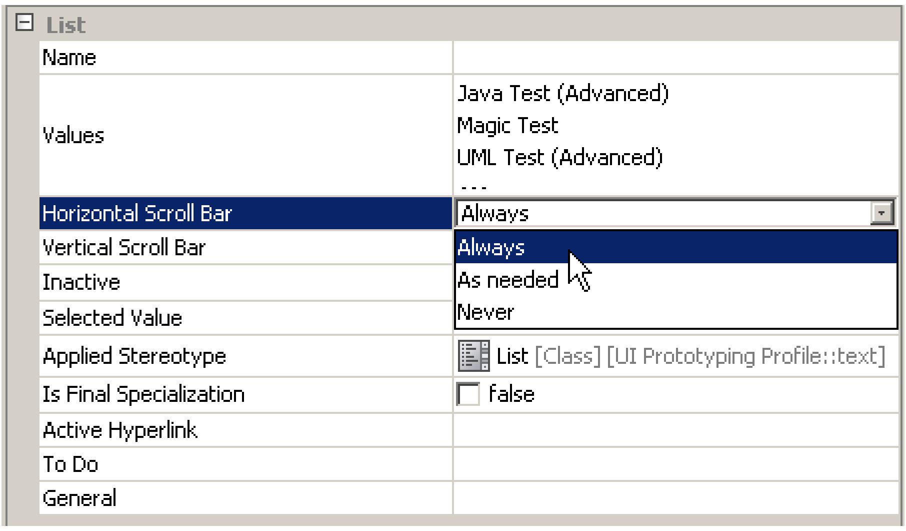
2. Merge the original and modified projects and .


Containm.. | Inheritance | Diagrams | Search R..

Containment

```
Data
  matrix templates [matrix_templates_module.mdzip]
  UI Modeling Customization [UI-Prototyping Customizat
  UML Standard Profile [UML_Standard_Profile.xml]
  Matrix Templates Profile [Matrix_Templates_Profile.xn
  UI Prototyping Profile [UI Prototyping profile.xml]
  Design
  Implementation
    GUI Prototypes
      LoginDialog
      StudentProfile
        Relations
        Profile «Frame»
          Relations
          Edit Data «Button»
          Get Test Results «Button»
          Logout «Button»
          Group Box «GroupBox»
            Relations
            Take Test «Button»
            Available Tests «GroupBox»
              Relations
              < > «List»
            Test Description «GroupBox»
        StudentProfile
```

Figure 196 -- Selecting an element in User Interface Modeling diagram


List

Name	
Values	Java Test (Advanced) Magic Test UML Test (Advanced) ...
Horizontal Scroll Bar	Always
Vertical Scroll Bar	Always
Inactive	As needed
Selected Value	Never
Applied Stereotype	List [Class] [UI Prototyping Profile::text]
Is Final Specialization	false
Active Hyperlink	
To Do	
General	

Figure 197 -- Changing the value for the element with the «List» stereotype

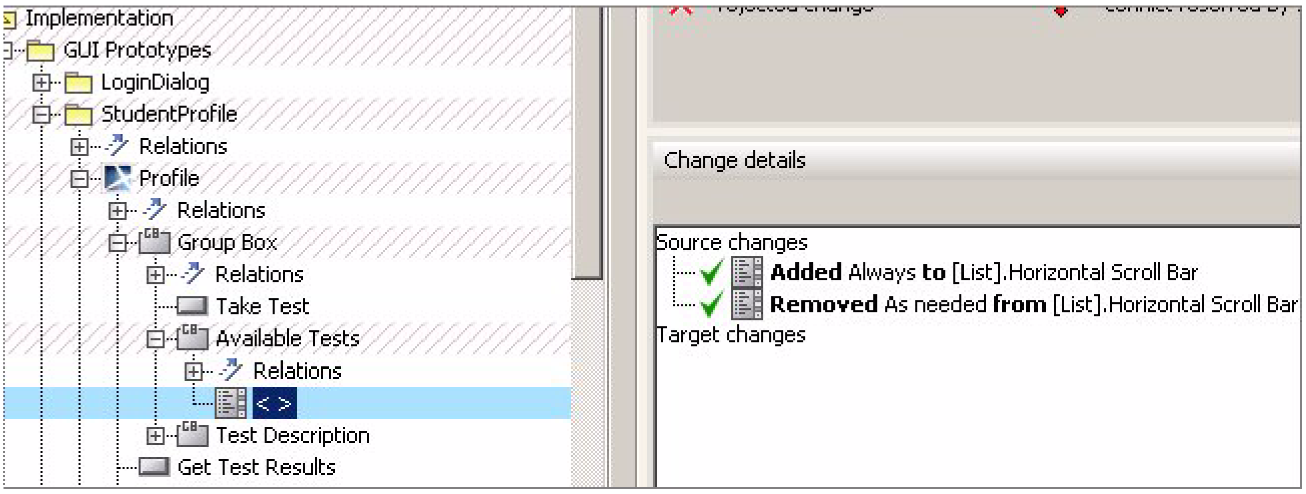
Analyzing the merge results

The merge results are displayed in the Merge window (see DSL elements representation in the Merge window).

You can see that DSL elements in the Merge window are represented in the same way as ordinary UML elements (and they are treated as first-class UML elements):

- In the **Merged Results** tree, elements are displayed with icons assigned to the corresponding stereotype. In this example, the icon of the «List» stereotype is displayed in the Containment tree for the elements stereotyped by it.
- In the **Specification** pane, title of the element matches title of the DSL element

In the **Change details** pane, element changes together with dependencies and conflicts with other changes are represented as a change tree.



Source changes
Added Always **to** [List].Horizontal Scroll Bar
Removed As needed **from** [List].Horizontal Scroll Bar
Target changes

Figure 198 -- DSL elements representation in the Merge window

Merging concepts in details

This section will introduce: the change concept, change the type to accept and reject changes and conflict concept.

A change is a difference, found between the ancestor and participant of the 2-way or 3-way merge. For example, a merger compares elements of the ancestor project to those of the source or target project. Changes are classified as follows:

- addition
- deletion
- modification
- order

For a brief information about changes, see “Change types” on page 316.

Each change can be accepted or rejected and have dependent changes. See “Accepting or Rejecting changes” on page 317 for the details. Dependent changes are described in “Dependent changes” on page 317.

Changes can conflict with each other. See “Conflicting changes” on page 318.

Change types

Addition change

If an element is added to the contributor then an addition change occurs. If the addition change is accepted a new element will be created.

See the example of addition change in the “Addition changes” on page 325.

Modification change

If an element property in the contributor is modified then a modification change occurs (Note: element property means the element specification property, such as I*s Abstract*, *Multiplicity*, and others). For example, if the *Is Abstract* class property in the ancestor has a default value (which is false) and the *Is Abstract* property in the contributor is changed to true, a modification change would occur.

There are three types of modification changes:

- Addition modification change adds a value to the property.
- Deletion modification change removes a value from a property.
- Replacement modification change replaces one value with another. This type of modification change occurs only for properties that have multiplicity less or equal to 1.

For more information about modification change, see “Elements with modified properties” on page 327.

Deletion change

If an element is removed from the contributor, then a deletion change occurs in the removed element. For more information about deletion change, see “Deletion changes” on page 325.

Change order

If the order of elements in the ancestor and contributor differs, then an order change occurs.

For more information about order change, see “Order changes” on page 326.

Accepting or Rejecting changes

Every change, whether it is addition, modification, deletion, or order change, can be accepted or rejected.

Accepted changes are incorporated into the final project. Alternatively, they can be rejected and will not be applied to into the target project.

For more information about accepted or rejected changes in the **Merge** window, see “Analyzing Merging Results” on page 320.

Dependent changes

In some cases, other changes have to be accepted or rejected before accepting or rejecting the selected change. In other words, the selected change sometimes depends on other changes, then it is called a dependent change or dependant.

An example of a dependent change is a type change. If a class attribute type is changed to a type that is created by another change, then the attribute type change is dependent on the change that created the type. This means that type creation has to be accepted before accepting type modification change.

Another example is the type deletion, modification, and addition. Suppose there is an attribute type change in a contributor. The old type is deleted and a new type is added to the contributor. In this case, three changes are formed:

- deletion change (for the old type),

- addition change (for the new type),
- and modification change (for the property type).

These are also ownership changes, but they are accepted together with deletion and addition changes.

A modification change depends on an addition change and a deletion change depends on a modification change. Accepting the addition change does not mean accepting any other changes in this case. Accepting the modification change means accepting the addition change and then accepting itself. Accepting the deletion change means accepting the addition change, the modification change and the deletion change itself. The change dependencies for the described case is depicted in Figure 199 on page 318.

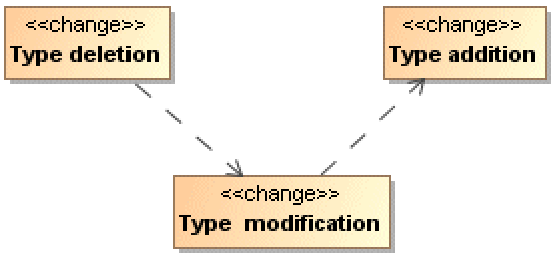


Figure 199 -- Sample of the dependent changes - type deletion, modification, and addition

Conflicting changes

A conflict is two differences that are incompatible with each other, i.e. changes that can not be accepted together. Every change can have several conflicting changes.

NOTE	Conflicting changes occur only in a 3-way merge.

Some examples of the conflicting changes:

- Each contributor changed a class' name or any other element properties (metaproperty).
- One contributor added an operation to a class and the other contributor deleted the class.
- One contributor moved a class into one package while the other contributor moved it to another package.

For more information about the representation of the conflicting changes, see "Analyzing Merging Results" on page 320.

Building change tree

There are two groups of elements that are compared and merged:

1. Model/diagram elements
2. Non-model elements.

The Model/diagram tree is represented in the Merged Result tree as it is done in the Browser in the main MagicDraw window.

The Non-model tree is represented in the Merged Result tree with two branches:

- Module mount table. Module mount table node lists the in the project used modules. See the sample of changes in the module mount table.
- Project options. Project options node shows if any project options is changed or not.

Sample of changes in the module mount table

Three changes occurs in this sample: Profile A module is updated to a newer version (change c1), which has type A removed (change c2), which implies type unsetting for the typed element P2 (change c3) (see Figure 200 on page 319).

Change c1 and c2 are dependent on each other and change c2 depends on change c3. This situation is depicted in Figure 201 on page 319.

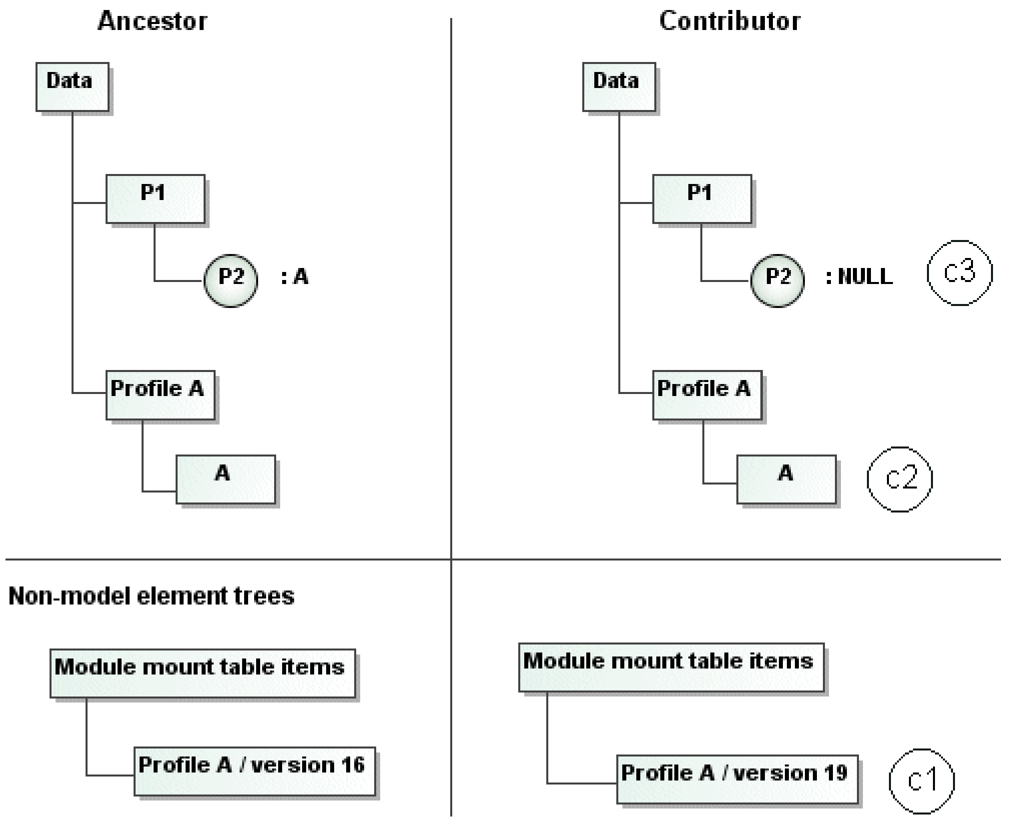


Figure 200 -- Sample of the changes in the module mount table

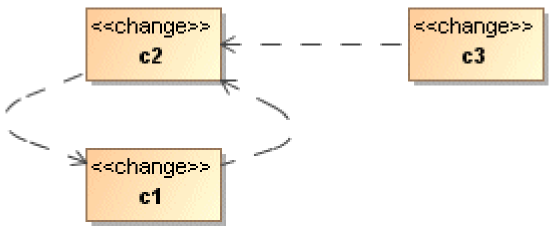
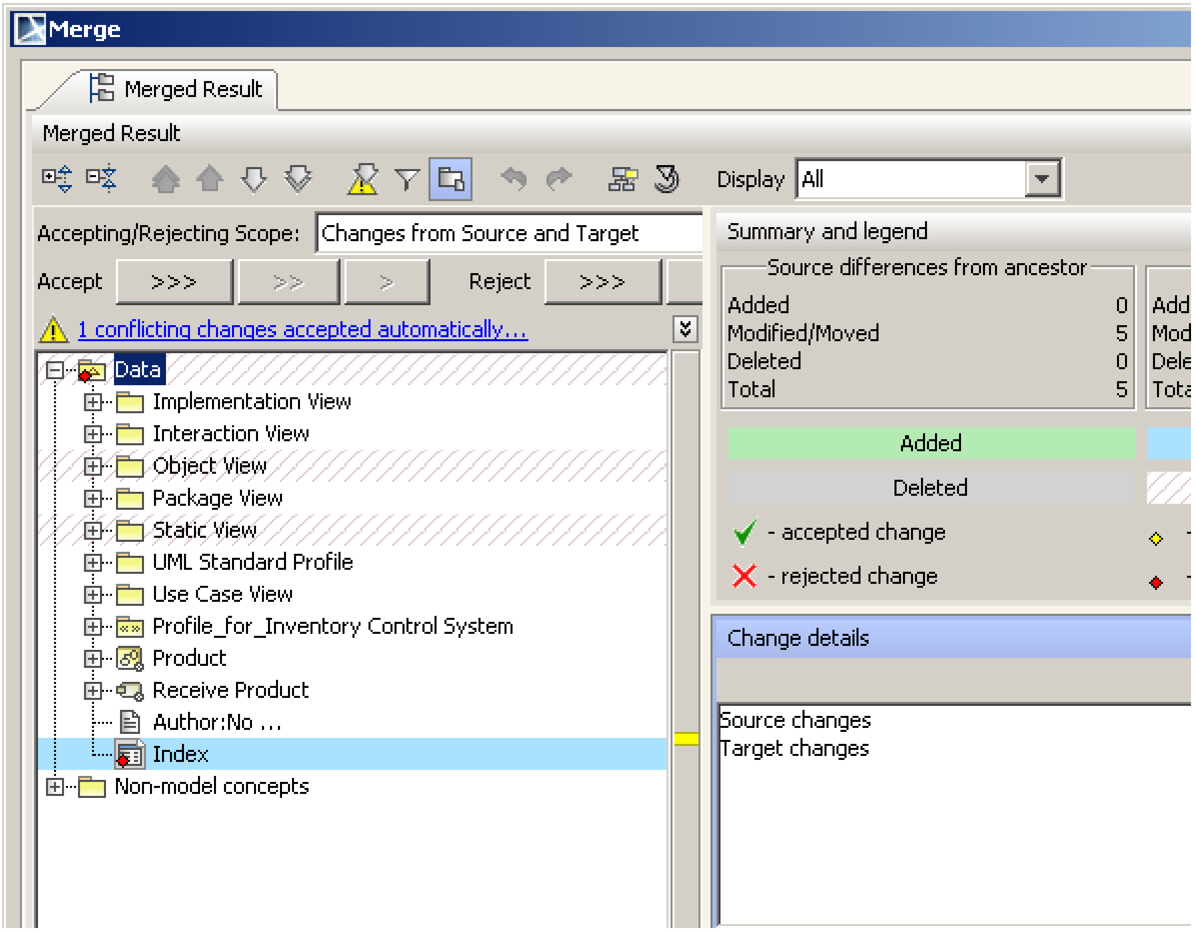


Figure 201 -- Sample of the changes in the module mount table - dependencies

Analyzing Merging Results

Merging results are presented in the **Merge** window.



Display: All

Accepting/Rejecting Scope: Changes from Source and Target

1 conflicting changes accepted automatically...

Source differences from ancestor

Added	0
Modified/Moved	5
Deleted	0
Total	5

Figure 202 -- The Merge window

The Merge window description

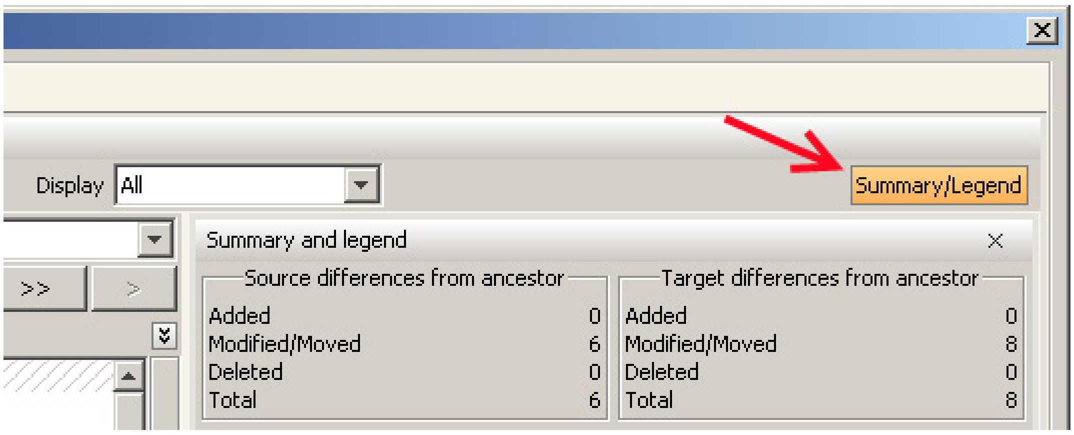
Look at each part of the **Merge** window separately. The **Merge** window consists of the following parts:

- "The Merged Result tree"
- "Toolbar for displaying and navigating through changes"
- "Toolbar for accepting and rejecting changes"
- "Change legend and summary"
- "Buttons for quick navigation through conflicting changes"
- "Element Specification panel"
- "Change details panel"

Reorganizing panels of the **Merge** window

Panels of the **Merge** window can be organized to your desired positions. The following changes can be done to the **Merge** window:

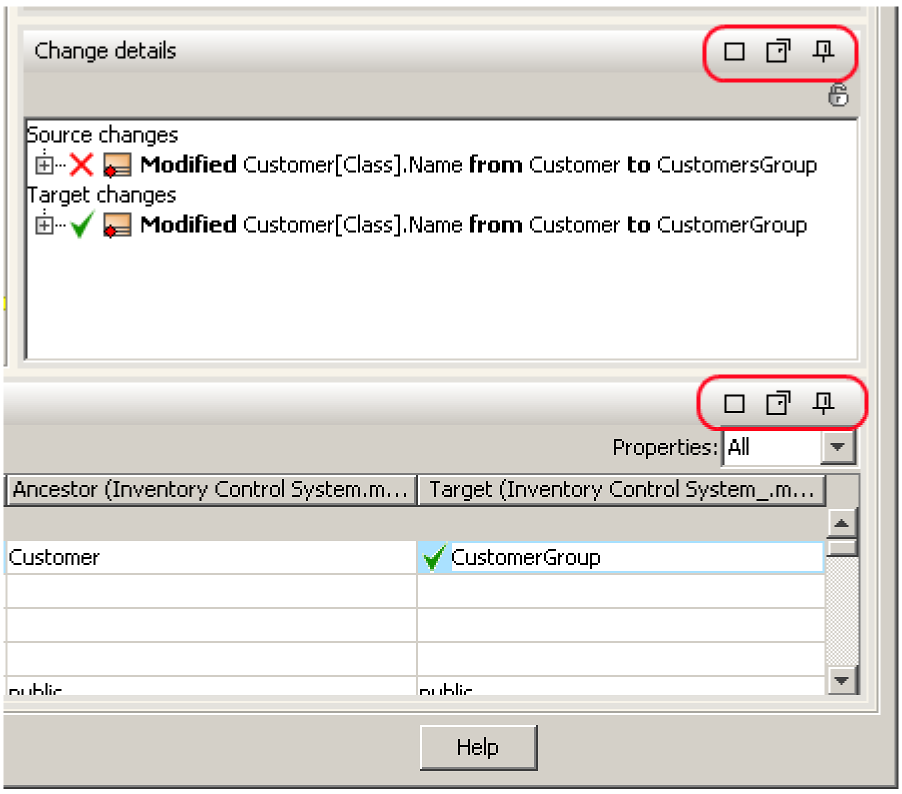
- The **Summary/Legend** panel can be turned on or off using the **Summary/Legend** button, which is on the left side of the **Summary/Legend** panel.



Source differences from ancestor		Target differences from ancestor	
Added	0	Added	0
Modified/Moved	6	Modified/Moved	8
Deleted	0	Deleted	0
Total	6	Total	8

Figure 203 -- *The Summary/Legend button in the Merge window*

- The **Change details** and **Specification** panels can be maximized, toggled to floating or auto-hide windows using buttons, located at the top-right side of the panel.



Source changes
Modified Customer[Class].Name **from** Customer **to** CustomersGroup
Target changes
Modified Customer[Class].Name **from** Customer **to** CustomerGroup

Ancestor (Inventory Control System.m...	Target (Inventory Control System_.m...
Customer	✓ CustomerGroup
public	public

Figure 204 -- *Buttons to manage the Change details and the Specification panels in the Merge window*

- You can also manage panels of the **Merge** window, using shortcut menu. To invoke it, right-click on the title bar of the window. See the location of the shortcut menu invocation in the following screenshots.

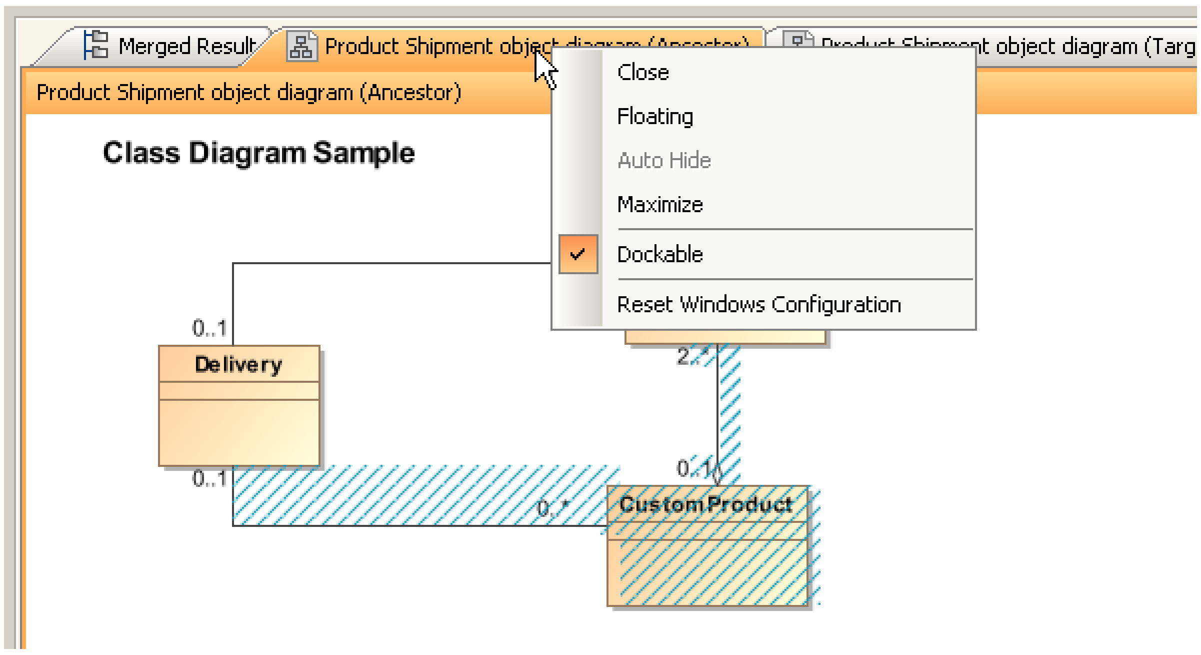


Figure 205 -- Shortcut menu of the Merge panels

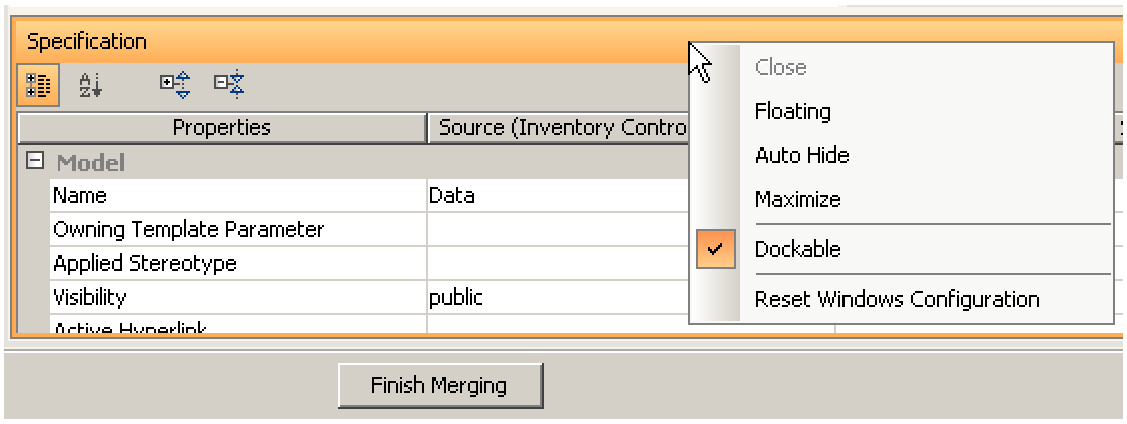


Figure 206 -- Shortcut menu of the Specification window

- To reset the position of the panels of the **Merge** window panel, from the panel shortcut menu select the **Reset Windows Configuration** command or press the **Reset Windows Configuration** button at the top of the **Merge** window.

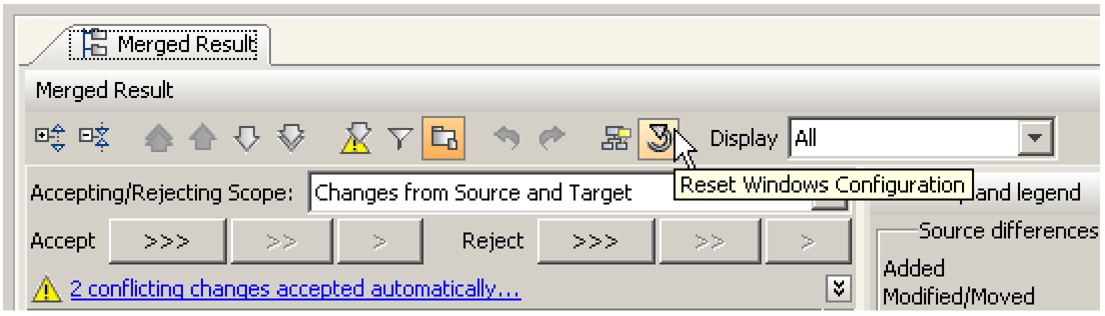

Merged Result
Merged Result
Display
All
Reset Windows Configuration
Accepting/Rejecting Scope:
Changes from Source and Target
and legend
Accept
>>>
>>
>
Reject
>>>
>>
>
Source differences
Added
Modified/Moved
2 conflicting changes accepted automatically...

Figure 207 -- The Merge window, Reset Windows Configuration button

For information about managing diagram tabs, see “Viewing changes in diagrams” on page 334.

The **Merged Result** tree

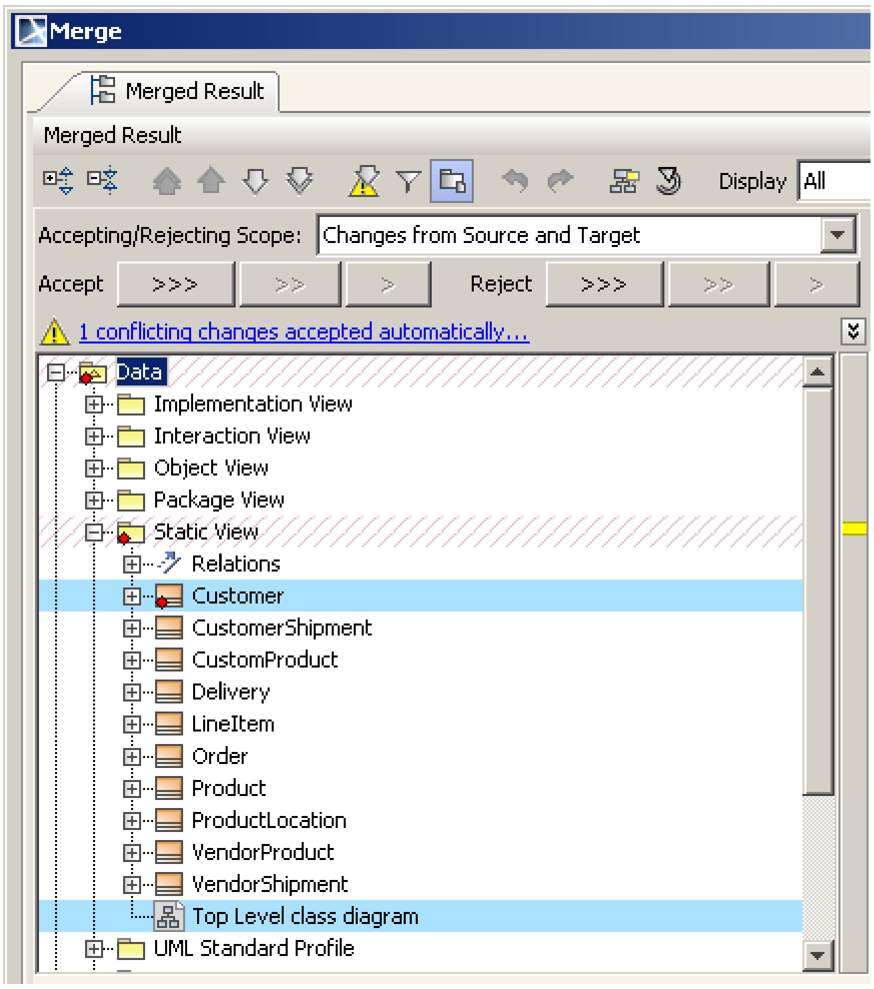


Figure 208 -- The Merged result tree

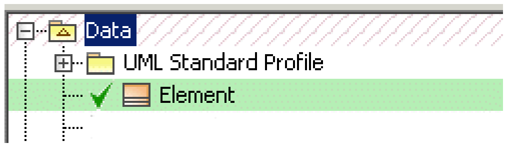
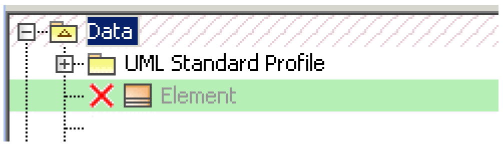
The merged result tree combines both containment and change trees. The following types of changes are displayed in the merged result tree:

1. “Addition changes” on page 325
2. “Deletion changes” on page 325
3. “Move changes” on page 325
4. “Order changes” on page 326
5. “Elements with modified properties” on page 327
6. “Elements with changed inner elements” on page 327.

Modification changes are displayed in the element properties panel other changes are displayed in the **Merged Result** tree.

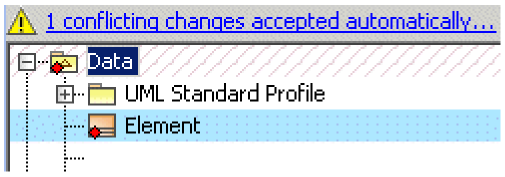
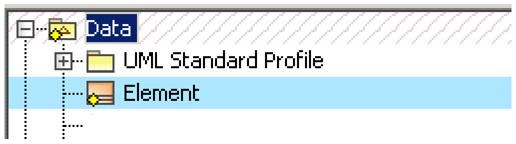
Element decoration in the Merged Result tree

A change occurs on a single element and that element has an icon indicating the state of the change (see the table bellow).

Decoration	Change state	Example
✓ Element (green tick before the element)	Accepted	 New element is created in one of the contributors and its addition is accepted.
✗ Element (red cross before element)	Rejected	 New element is created in one of the contributors and its addition is rejected.

For more information about accepted/rejected changes, see “Accepting or Rejecting changes” on page 317.

Changes that have conflicts are additionally decorated with icons showed in the table bellow. Parents of conflicting elements have conflict decorations too.

Decoration	Change applied by	Example
◆ Element (red diamond on the left-bottom corner of element)	System	1 conflicting changes accepted automatically... Element has conflicting modification change.
◆ Element (yellow diamond on the left-bottom corner of element)	User	 Element has conflicting modification change which is resolved by the user.

Addition changes

Addition changes occur when elements are created in the contributors. In the merged result tree added elements are highlighted with green color (see Figure 209 on page 325).

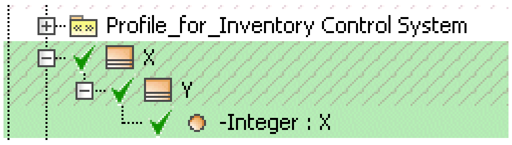


Figure 209 -- Addition change

Deletion changes

Deletion changes occur when elements are deleted in the contributors. Deletion changes are highlighted with grey color (see Figure 210 on page 325).

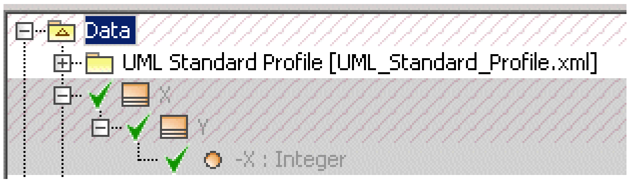


Figure 210 -- Deletion changes

Move changes

Move changes are highlighted using the same blue color that is used to highlight modification changes, because move change is just a kind of modification change. Additionally, move changes are displayed with arrows before the moved element icon. In the following example, element X is moved from package A to package B. The illustration shows the initial situation when where the move change is accepted and element X is owned by package B.

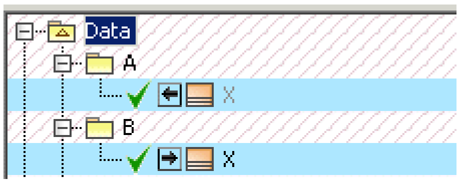


Figure 211 -- Move changes

Navigation from the original to the new location (and vice versa) for elements that have been moved is possible from the moved element shortcut menu (see Figure 212 on page 326 and Figure 213 on page 326).

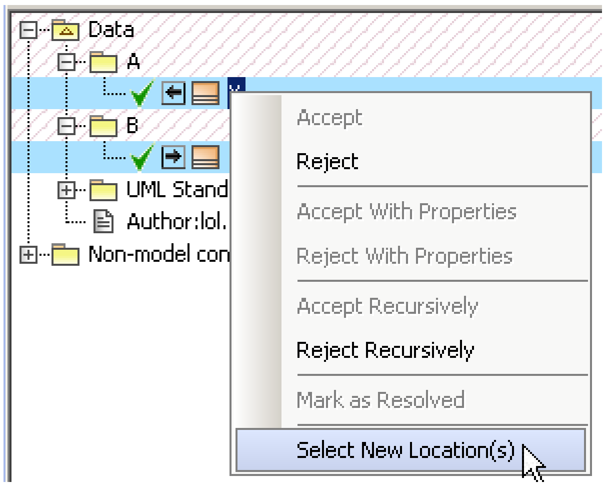


Figure 212 -- Navigation to the new element location

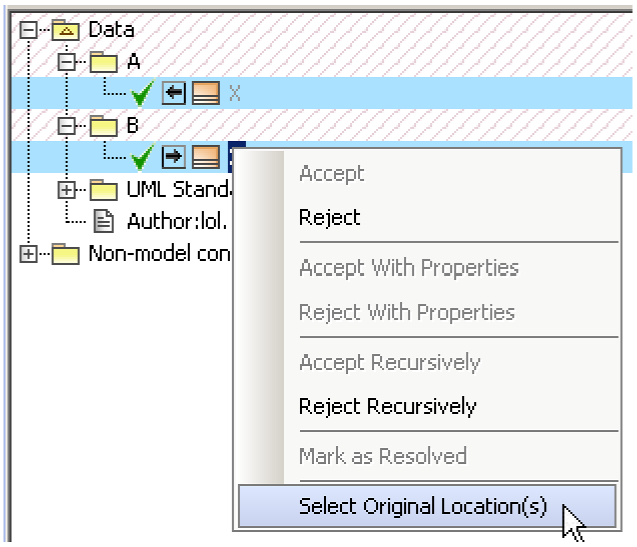


Figure 213 -- Navigation to the original element location

Order changes

Order changes occur on elements such as attributes, operations, and other ordered elements. Even if a single element in a collection has changed its place, the order change is applied to the entire collection. After accepting the change, all elements in the collection is reordered so that it would be the same as in one of the contributors the change occurred.

An element can have several ordered collections. This means several order changes can occur for a single element. Changes in the element will be highlighted using the same blue color that is used to highlight modification changes.

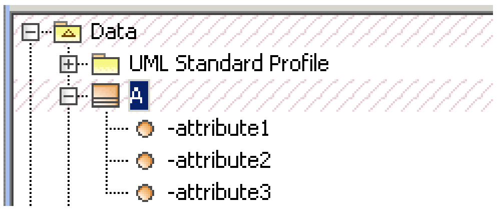


Figure 214 -- Order changes

Elements with modified properties

Modification changes occur when element properties changed in the contributors. Elements whose properties changed are highlighted in blue.

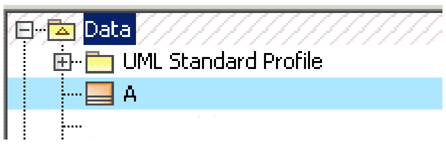


Figure 215 -- Elements with modified properties

Elements with changed inner elements

Elements whose inner elements (in any nesting level) have pending changes are highlighted using red dashes as shown below. If the element has pending property modification changes, then the modification highlight color is mixed with changed inner element highlight, i.e. the element is highlighted using blue color with red dashes.

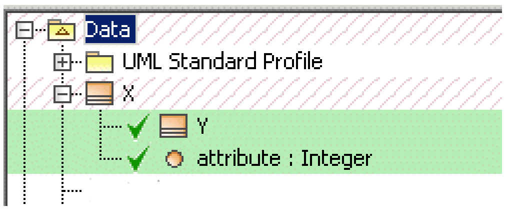


Figure 216 -- Element "X" with changed inner elements "Y" and "attribute"

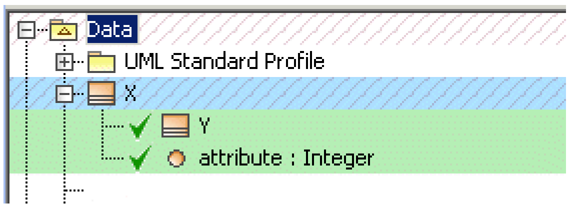
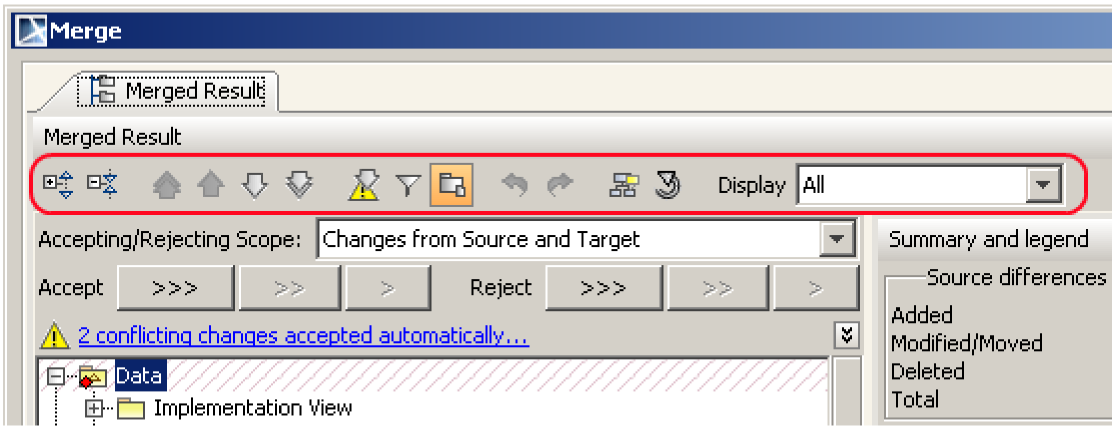


Figure 217 -- Element "X" with changed inner elements "Y" and "attribute" and modification change

Toolbar for displaying and navigating through changes

The toolbar for displaying and navigating through changes is located at the top of the **Merge** window. See the highlighted area in Figure 218 on page 327.



Display: All

Accepting/Rejecting Scope: Changes from Source and Target

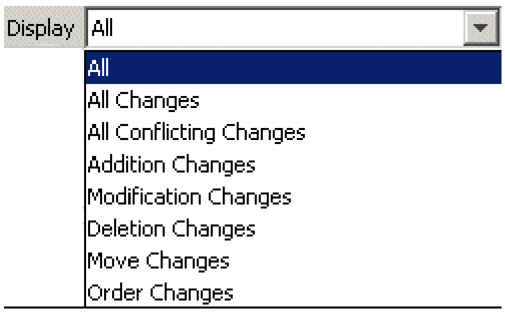
Accept >>> >> > Reject >>> >> >

2 conflicting changes accepted automatically...

Figure 218 -- Toolbar for displaying and navigating through changes

The toolbar buttons are used to navigate through the **Merged Result** tree and the **Specification** panel:

Button	Title	Function
	Expand	Expand all nodes in the merged result tree.
	Collapse	Collapse all nodes in the merged result tree.
	Go To First Change Alt+Home	Select the first model change in the merged result tree. Note: The **Go To First Change** button is disabled if the first change is already selected in the merged result tree.
	Go To Previous Change Alt+up arrow	Select previous change in the merged result tree.
	Go To Next Change Alt + down arrow	Select the next change in the merged result tree.
	Go To Last Change Alt+End	Select the last difference in the merged result tree.
	Go To Next Conflict Alt+Page Down	Select the next conflict in the merged result tree. Note: The **Go To Next Conflict** button is disabled if there are no conflicts. For more information about navigation through conflicting changes, see “Buttons for quick navigation through conflicting changes” on page 331.
	Show auxiliary resources	Press the button to show or hide the profiles, modules with applied «auxiliaryResources» stereotype in the **Merged Result** tree (for example, UML Standard Profile).
	Undo	Undo the last action.
	Redo	Cancel undo command.
	Filter	Press the **Filter** button to invoke the **Items Filter** dialog box. Clear the checkbox next to the it to hide element in the merged result tree.
	Annotate Merged Diagram	Press this button to annotate diagram for the post-merge review. For more information, see “Annotations in the merged diagram” on page 340.
	Reset Windows Configuration	Press the **Reset Windows** button to organize panels of the **Merge** window to its original location. For more information about resetting windows configuration, see “Reorganizing panels of the Merge window” on page 320.

Button	Title	Function
 Display: All; All, All Changes, All Conflicting Changes, Addition Changes, Modification Changes, Deletion Changes, Move Changes, Order Changes		List filter options for types of change in the merged result tree: • **All.** This is the default value. Display all elements in the Merged Result tree. • **All Changes.** Display elements with changes or have inner changes. • **All Conflicting Changes.** Display elements that have conflicting changes or inner conflicting changes. • **Addition Changes.** Display elements that are added to the model or have inner addition changes. • **Modification Changes**. Display elements that have been modified or have inner modification changes. • **Deletion Changes**. Display elements that have been deleted or have inner deletion changes. • **Move Changes**. Display elements that have been moved or have inner move changes. • **Order Changes**. Display elements whose order has been changed or have inner order changes.

Toolbar for accepting and rejecting changes

The toolbar located above the merged result tree is used for accepting and rejecting changes.

Accepting/Rejecting Scope drop-down box is devoted for choosing the contributors from which changes shall be accepted/rejected when using accepting/rejecting buttons and menu items.

Accept and reject buttons are described in the table bellow and more about accepting and reject you can see "Accepting or Rejecting changes" on page 317.

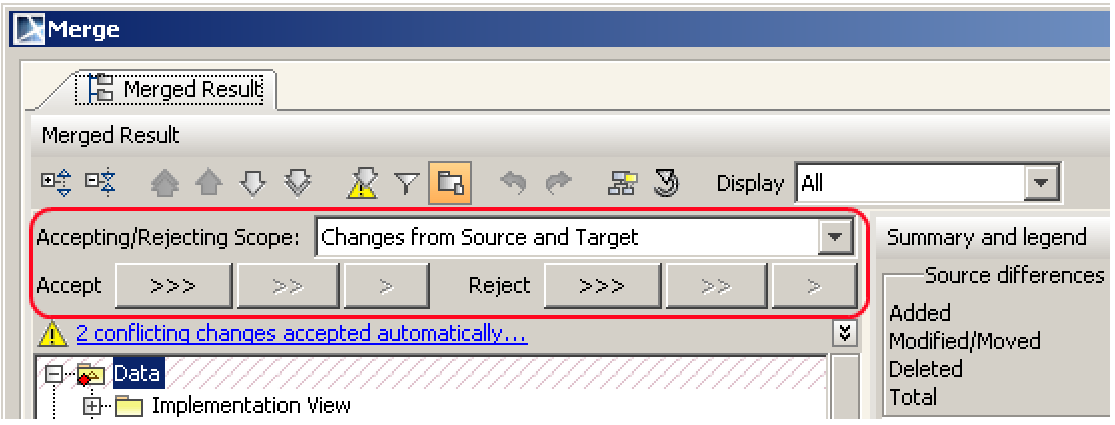


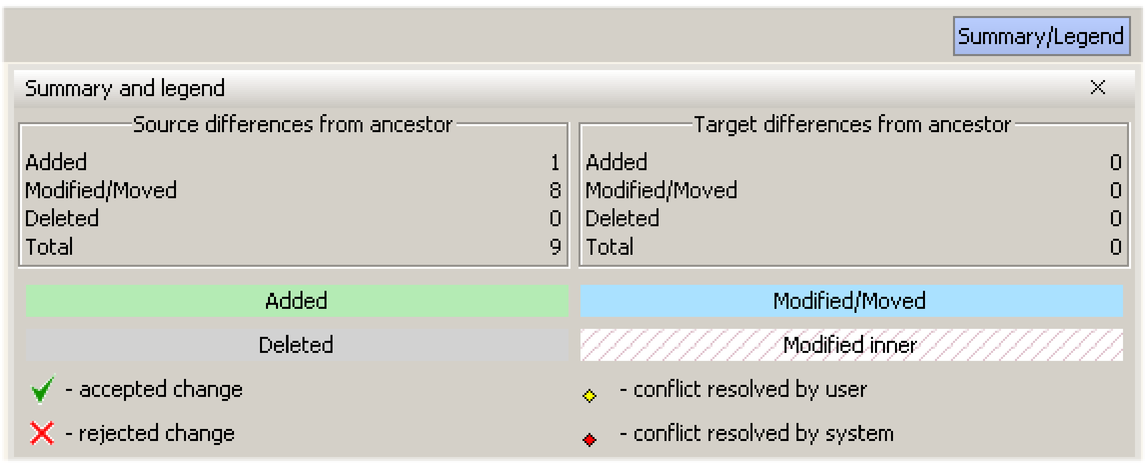
Figure 219 -- The toolbar for accepting and rejecting changes

Button	Title	Function
Accepting/Rejecting Scope drop-down box		
	Changes from Source and Target	Accept/reject changes from both - source and target projects.
	Changes from Source	Accept/reject changes from a source project.

Button	Title	Function
	Changes from Target	Accept/reject changes from a target project.
Buttons for accepting and rejecting changes		
>>>	**Accept the selected change, its property changes and all subelement changes**	Accept all changes from the left and right contributors starting from the selected element. E.g. if the *Data* model is selected, then all changes for the whole project will be accepted.
>>	**Accept the selected change its property change**	Perform the same function as the >>> button, except that only the selected change and its metaproperty changes are accepted.
>	**Accept the selected change**	Perform the same function as the >>> button, except that only the selected change is accepted.
>>>	**Reject the selected change, its property changes and all subelement changes**	Reject all changes from left and right contributor starting from the selected package. E.g. if the *Data* model is selected, then all changes for the whole project will be rejected.
>>	**Reject the selected change its property change**	Reject the selected change and its metaproperty changes.
>	**Reject the selected change**	Reject the selected element change.

Change legend and summary

There is a legend on the right of the merged result for counting differences from ancestor and to display the meaning of colors that are used to mark changed elements.


Summary/Legend

Summary and legend

Source differences from ancestor		Target differences from ancestor	
Added	1	Added	0
Modified/Moved	8	Modified/Moved	0
Deleted	0	Deleted	0
Total	9	Total	0

🟩 Added	🟦 Modified/Moved
⬜ Deleted	▨ Modified inner
✓ - accepted change	◆ - conflict resolved by user
✗ - rejected change	◆ - conflict resolved by system

Figure 220 -- Change legend and summary

Press the **Summary/Legend** button at the top of the change legend to hide or show the summary panel.

Buttons for quick navigation through conflicting changes

Let's analyze the quick navigation through the automatically accepted conflicting changes in the **Merge** window (see Figure 221 on page 331).

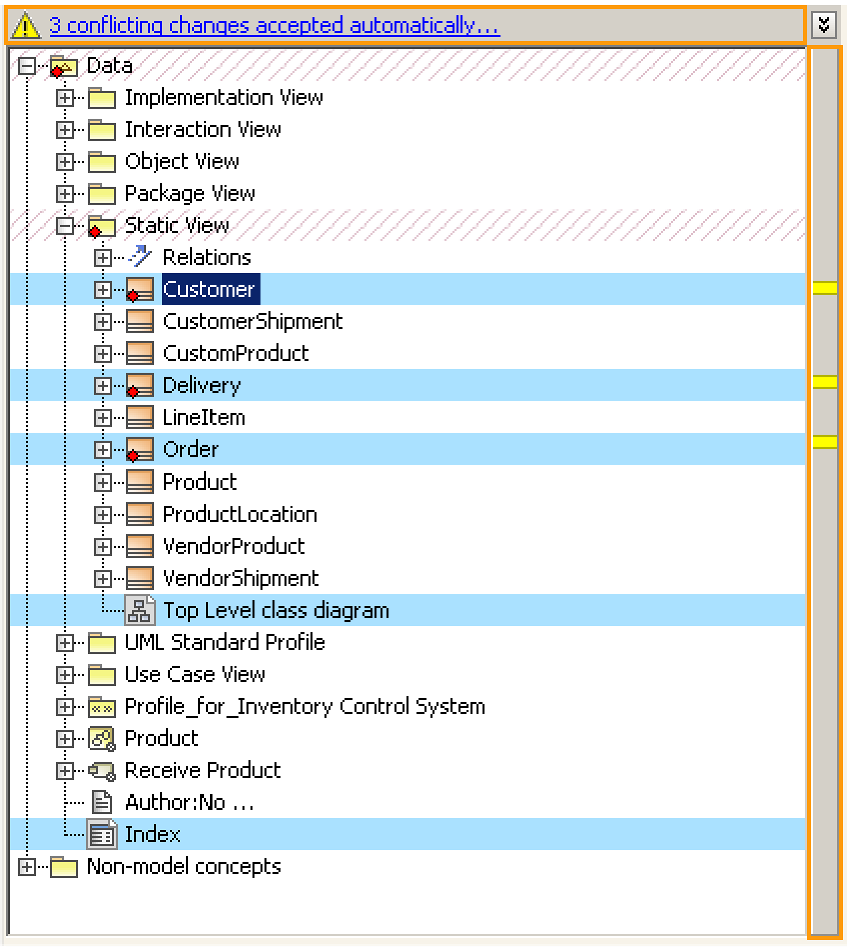


Figure 221 -- Buttons for quick navigation through conflicting changes

The panel to the right of the merged result tree displays yellow buttons representing conflicting changes. Press the yellow button to select the automatically accepted conflicting changes in the merged result tree.

A message with a warning icon is displayed in the **Merge** window stating the number of conflicting changes that are accepted from the target. This message is located above the **Merged Result** tree (see Figure 221 on page 331).

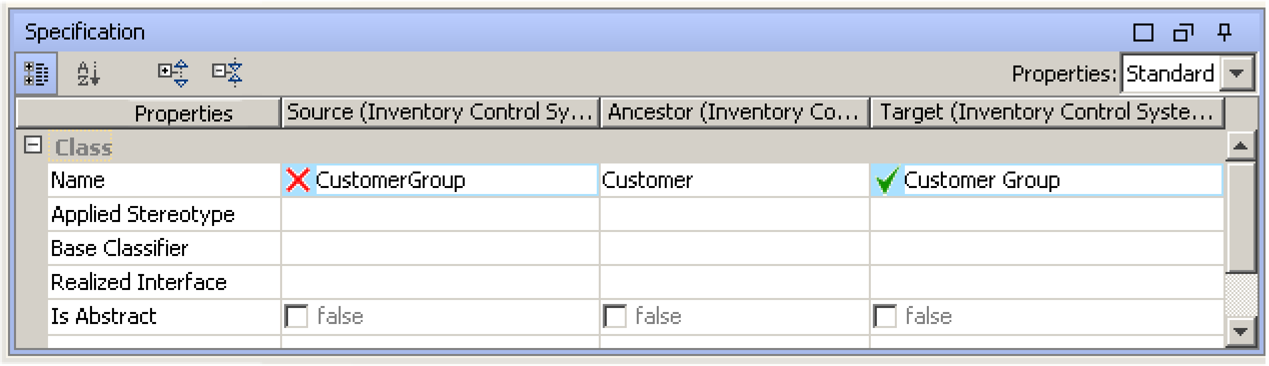
Element Specification panel

Modification changes can only occur in properties. Modification and move changes (which are a certain type of modification changes) are displayed at the bottom of the panel, the **Specification** panel (Figure 222 on page 332).

In the first column of the **Specification** panel, property titles are listed. The *Source*, *Ancestor* and *Target* columns display corresponding change properties from both contributors and the ancestor.

Changed properties have blue background. For example, Figure 222 on page 332 shows a class has different lists of values in source and target. Class is renamed in the source to *B* class and class is renamed to *C* in the target. Green tick in the *Target* column shows that class name change was accepted.

Additions in properties have green background, deletions grey have background (just like in the Merge Result tree) (see Figure 223 on page 332).

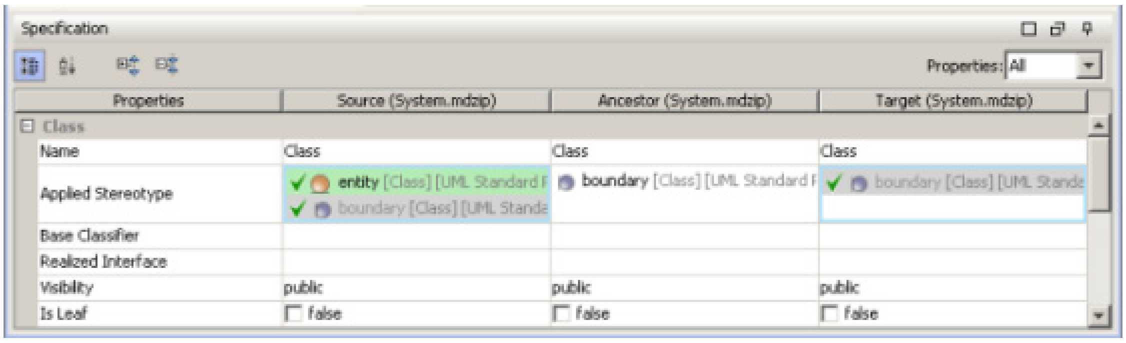


Specification

Properties: Standard

Properties	Source (Inventory Control Sy…	Ancestor (Inventory Co…	Target (Inventory Control Syste…
Class			
Name	✗ CustomerGroup	Customer	✓ Customer Group
Applied Stereotype			
Base Classifier			
Realized Interface			
Is Abstract	☐ false	☐ false	☐ false

Figure 222 -- Displaying changes in element specification panel



Specification

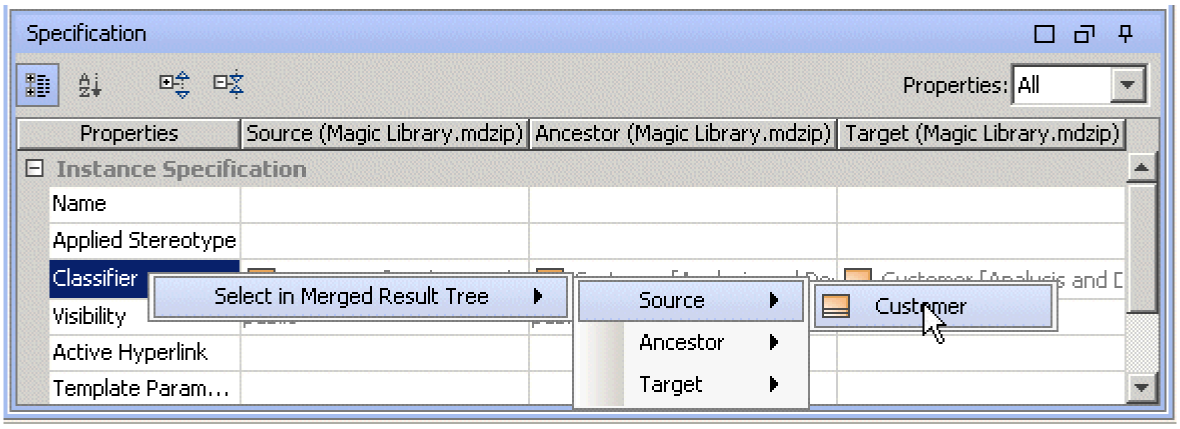
Properties: All

Properties	Source (System.mdzip)	Ancestor (System.mdzip)	Target (System.mdzip)
Class			
Name	Class	Class	Class
Applied Stereotype	✓ entity [Class] [UML Standard P ✓ boundary [Class] [UML Standa	boundary [Class] [UML Standard P	✓ boundary [Class] [UML Standa
Base Classifier			
Realized Interface			
Visibility	public	public	public
Is Leaf	☐ false	☐ false	☐ false

Figure 223 -- Displaying changes in the specification panel - value addition and deletion from a property

To navigate from the **Specification** panel to the **Merged Result** tree:

1. Select a property in the **Properties** column, which references other elements.
2. In the shortcut menu select the **Select in Merged Result Tree** command and then choose element to which you want to navigate (see Figure 224 on page 332).



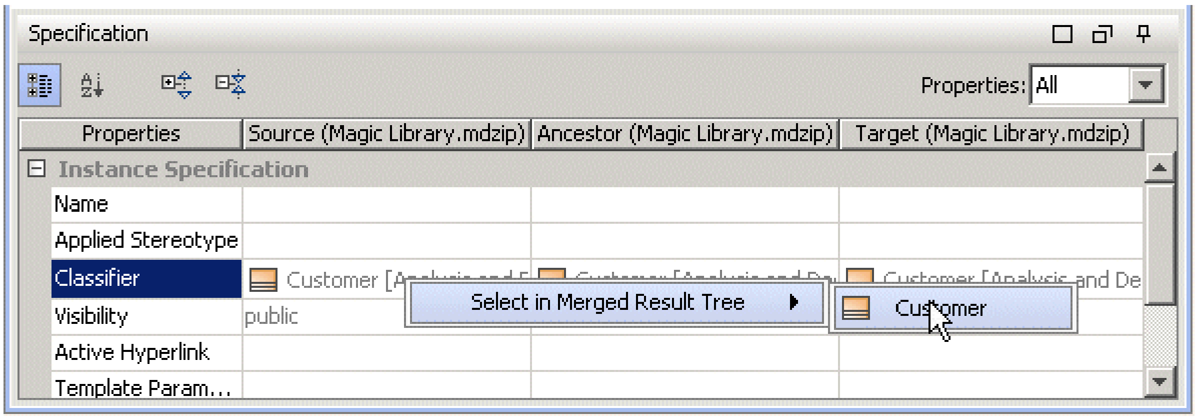
Specification

Properties: All

Properties	Source (Magic Library.mdzip)	Ancestor (Magic Library.mdzip)	Target (Magic Library.mdzip)
Instance Specification			
Name			
Applied Stereotype			
Classifier			Customer [Analysis and D
Visibility			
Active Hyperlink			
Template Param…			

Figure 224 -- Navigating from the Specification panel to the Merged Result tree

You can also navigate to the **Merged Result** tree by invoking shortcut menu from the column cell, which references other elements. The **Select in Merged Result Tree** command has submenu items corresponding to the referenced elements for the selected cell.



Properties	Source (Magic Library.mdzip)	Ancestor (Magic Library.mdzip)	Target (Magic Library.mdzip)
Instance Specification			
Name			
Applied Stereotype			
Classifier	Customer [Analysis and D	Customer [Analysis and D	Customer [Analysis and De
Visibility	public		
Active Hyperlink			
Template Param...			

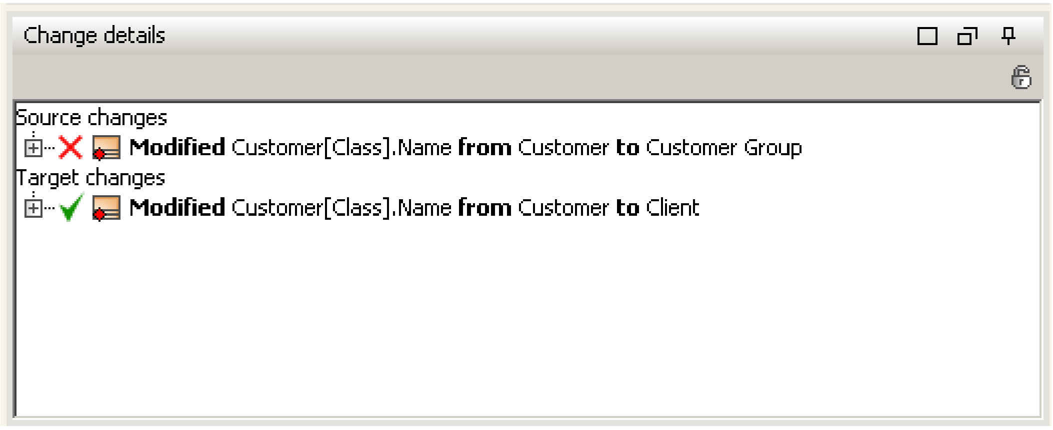
Figure 225 -- Navigating from the Specification panel to the Merged Result tree

Change details panel

The **Change details** panel is located at the bottom of the merge window. The **Change details** panel has a tree reflecting changes occurred on the element selected in the merged result tree or element properties panel. The tree has two root-level nodes:

1. Source changes
2. Target changes

The **Source changes** and **Target changes** nodes display changes occurred in the source or target respectively. If several nodes in the merged result tree are selected, then all changes occurred in the nodes are displayed in the **Change details** panel.

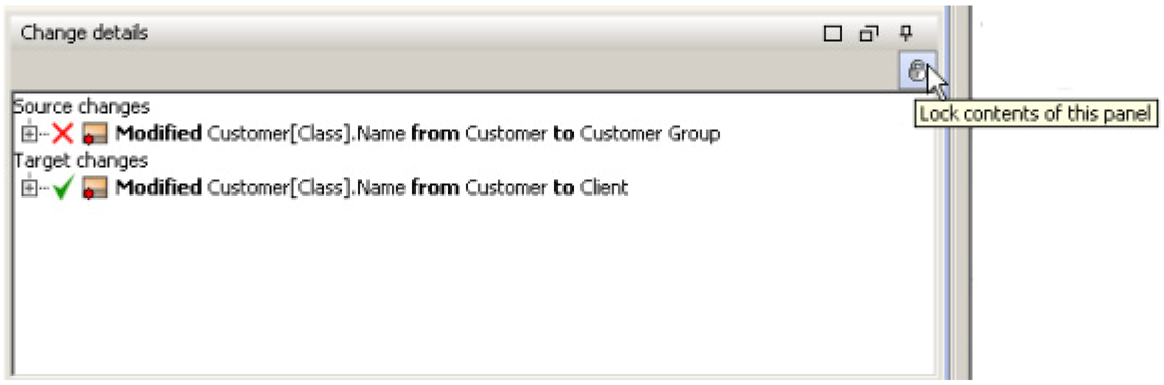


Source changes
Modified Customer[Class].Name **from** Customer **to** Customer Group
Target changes
Modified Customer[Class].Name **from** Customer **to** Client

Figure 226 -- Change details panel

The **Change details** panel displays results after click on the element in the **Merged Result** tree or on property in the **Specification** panel.

Press the **Lock contents of this panel** button in the **Change details** panel to freeze the **Change details** results, that is, the last result is displayed and result is not refreshed (see Figure 227 on page 334). To unfreeze the **Change details** panel, press the **Lock contents of this panel** button again.



Source changes
Modified Customer[Class].Name **from** Customer **to** Customer Group
Target changes
Modified Customer[Class].Name **from** Customer **to** Client

Figure 227 -- The Lock contents of this panel button in the Change details panel

Shortcut menu in the Merge window

The table bellow lists the commands of the shortcut menu, which is available in the **Merged Result** tree and **Change details** panel.

Command Name	**Description**
Accept	Accepts the selected change.
Reject	Rejects the selected change.
Accept With Properties	Accepts the selected change and its property changes.
Reject With Properties	Rejects the selecting change, its property changes.
Accept Recursively	Accepts the selected change, its property changes, and all subelement changes.
Reject Recursively	Rejects the selected change, its property changes, and all subelement changes.
Mark as Resolved	The **Mark As Resolved** command makes the change resolved by user, not the system. The conflicting change is marked as resolved by user too.
Select in Merged Result Tree / Select in Specification panel	This menu item changes depending on the type of the change.

Viewing changes in diagrams

The merge window has functionality to open merged diagrams from the source, ancestor, and target projects in separate tabs.

Opening the diagrams with changes from the **Merge** window

To open diagrams with changes double click on modified diagram in the **Merged Result** tree. Two or free views of the same diagram are opened. Ancestor view of diagram is opened always and source diagram is opened if changes were done in diagram in source project, accordingly the targed diagram is opened if changes were done in diagram in target project. See the Merge window with the opened diagrams (see Figure 228 on page 335).

You can switch between **Merged Result** window and diagram windows, by pressing tabs at the top of the **Merge** window.

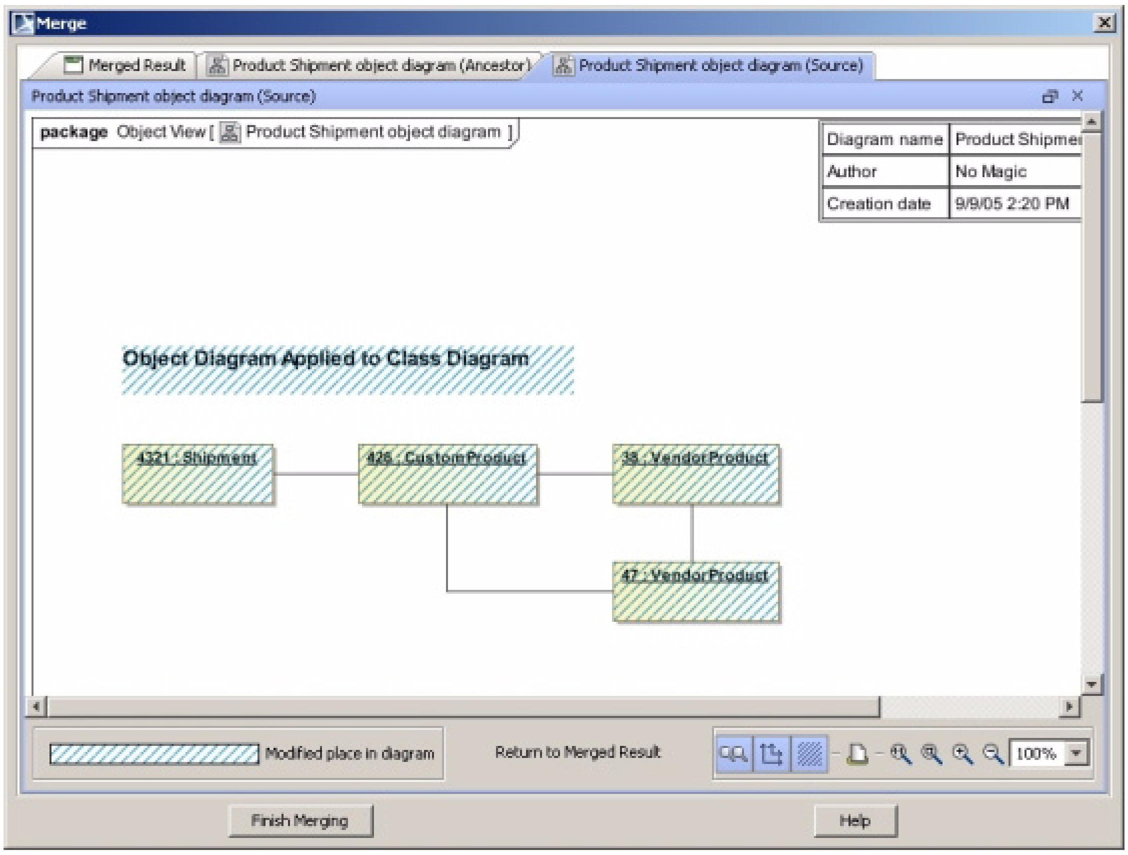

Merge
Merged Result
Product Shipment object diagram (Ancestor)
Product Shipment object diagram (Source)
Product Shipment object diagram (Source)
package Object View [Product Shipment object diagram]
Object Diagram Applied to Class Diagram
4321 : Shipment
426 : CustomProduct
38 : VendorProduct
47 : VendorProduct
Modified place in diagram
Return to Merged Result
100%
Finish Merging
Help

Diagram name	Product Shipme
Author	No Magic
Creation date	9/9/05 2:20 PM

Figure 228 -- The Merge window with opened diagrams

Analyzing differences in diagrams

In opened diagrams changed diagram areas are highlighted with dashed blue background (see Figure 229 on page 336).

The following changes are highlighted in diagrams:

- The symbol or few symbols were moved or resized in diagram
- Then new symbol diagram was added
- The symbol was deleted from diagram

In summary all visual changes in diagram are highlighted.

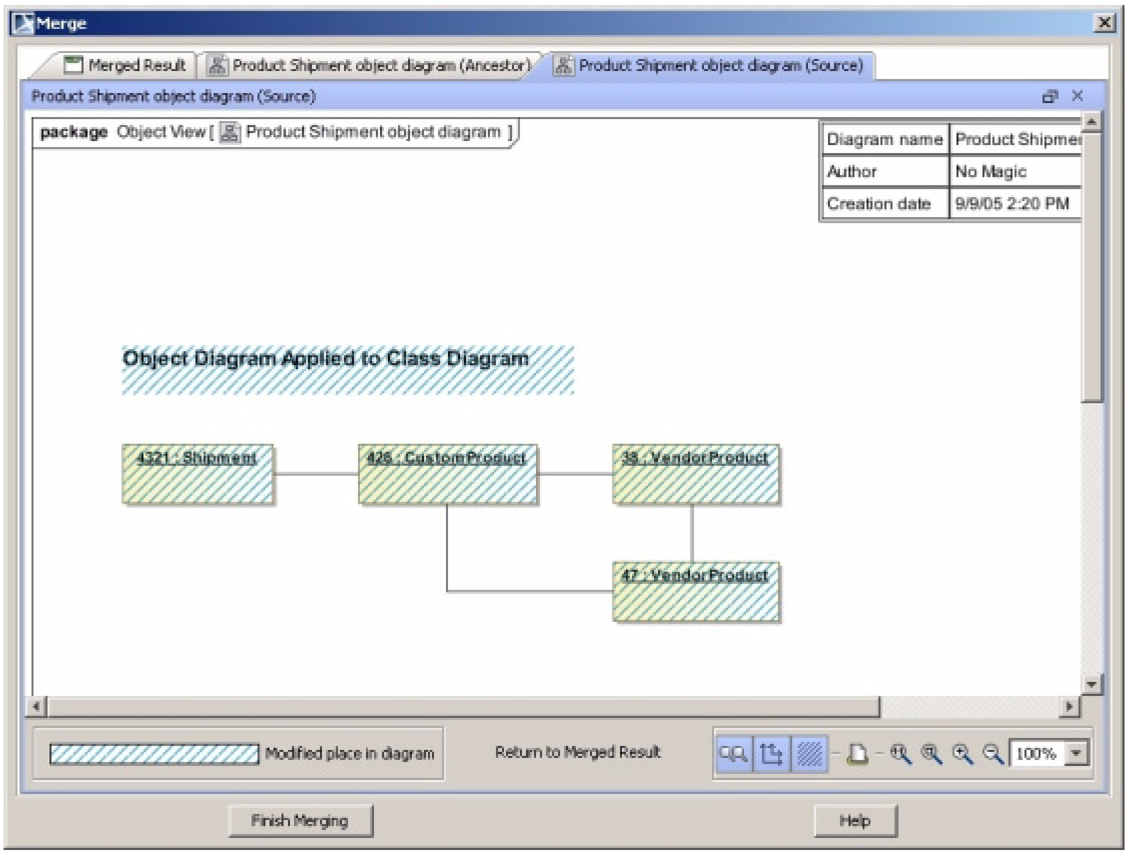

Merge
Merged Result
Product Shipment object diagram (Ancestor)
Product Shipment object diagram (Source)
Product Shipment object diagram (Source)
package Object View [Product Shipment object diagram]
Diagram name | Product Shipmen
Author | No Magic
Creation date | 9/9/05 2:20 PM
Object Diagram Applied to Class Diagram
4321 : Shipment
426 : CustomProduct
38 : VendorProduct
47 : VendorProduct
Modified place in diagram
Return to Merged Result
100%
Finish Merging
Help

Figure 229 -- Diagram with highlighted differences

Managing the diagram view

Using the buttons located at the bottom of the diagram viewer tab (see Figure 230 on page 337) you can turn on or off difference showing, print a diagram, zoom, synchronize zooming and scrolling in diagram view. See the buttons description in the table bellow.

Button image and title	Description
Synchronize Zooming	When button is pressed (default value) source, ancestor, and target diagrams zooming is dependent, i.e. the same zooming operations are performed on diagrams simultaneously. To turn off synchronization of zooming, depress the Synchronize Zooming. **NOTE** Synchronization is valid for the source, ancestor, and target views of the same diagram.
Synchronize Scrolling	When button is pressed (default value) source, ancestor, and target diagrams scrolling is dependent, i.e. the same scrolling operations are performed on diagrams simultaneously. To turn off synchronization of scrolling, depress the Synchronize Zooming. **NOTE** Synchronization is valid for the source, ancestor, and target views of the same diagram.

Button image and title	Description
Mark Changes ▨	Difference showing od hiding is controlled by the **Mark Changes** button. It is possible to press or depress this button in every diagram independently: ● If this button is pressed in the source diagram, then differences are shown in the source and ancestor diagrams. ● If this button is pressed in the target diagram, then differences are shown in the target and ancestor diagrams. ● If this button is pressed in the ancestor diagram, then differences are shown in the source, target, and ancestor diagrams. If buttons in the source and/or target diagrams were depressed previously, they are pressed after pressing this button in the ancestor diagram. If difference showing is turned on for both source and target diagrams or it is turned on for the ancestor diagram, then area that highlights differences in the ancestor is combined from the areas that would be shown in the ancestor if only showing differences for source or target would be enabled.
Print Diagram	To print a diagram, press the **Print Diagram** button. Diagrams are printed with highlighted area with the **Mark Changes** button is pressed (default value).
Zooming 100%	Resize the view of diagram by the zooming buttons. To synchronize or desynchronize zooming use the **Synchronize Zooming** button (see description above).

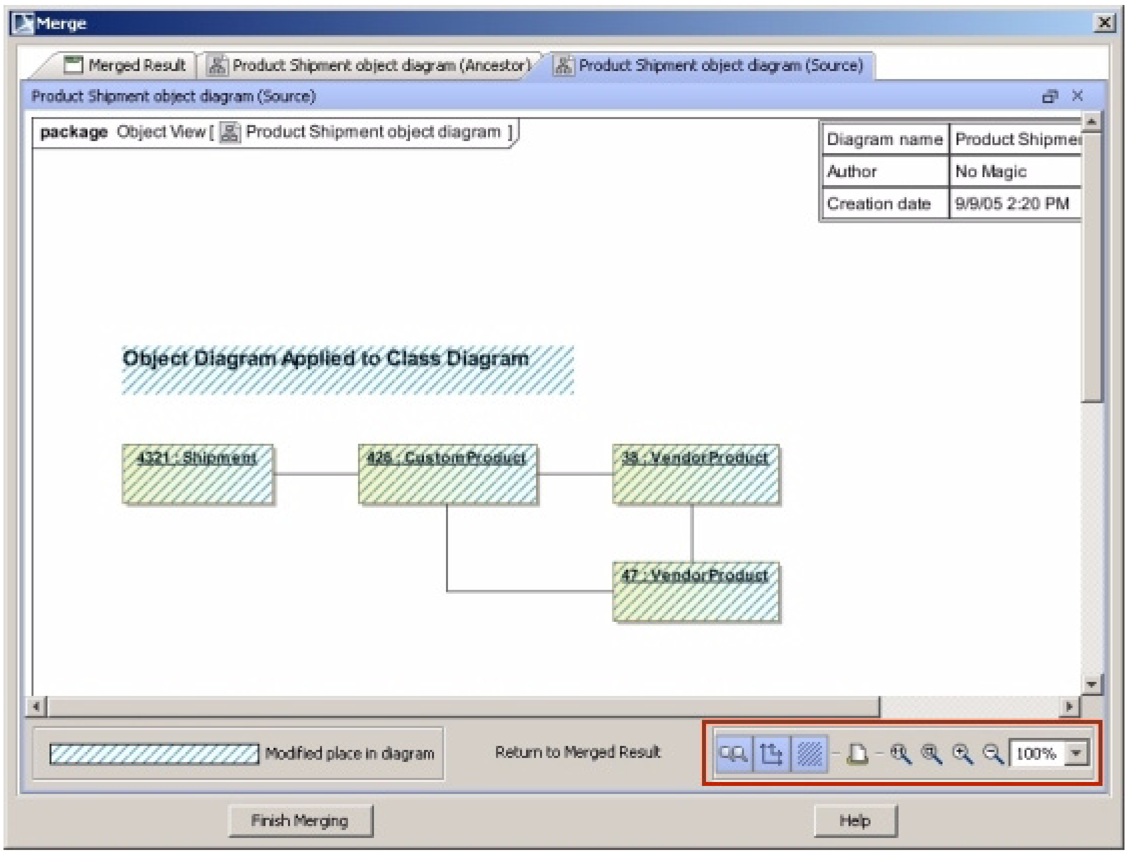

Merge
Merged Result
Product Shipment object diagram (Ancestor)
Product Shipment object diagram (Source)
Product Shipment object diagram (Source)
package Object View [Product Shipment object diagram]
Object Diagram Applied to Class Diagram
4321 : Shipment
426 : CustomProduct
38 : VendorProduct
47 : VendorProduct
Modified place in diagram
Return to Merged Result
100%
Finish Merging
Help

Diagram name	Product Shipmei
Author	No Magic
Creation date	9/9/05 2:20 PM

Figure 230 -- Buttons group in the diagram difference viewer

Symbol properties changes marking in the diagram difference viewer

Symbols, which are marked as changed in diagram difference viewer, but has no visual differences, may have symbol properties changes. It means that symbol properties there changes, but no affect on symbol was made.

See an example in Figure 231 on page 338 and in Figure 232 on page 339. In this example the *Shipment* class is displayed as changed in diagram, but it has no visual differences nor in Target neither in Source diagrams. The following symbol properties change was made to the *Shipment* class: in the class **Properties** dialog box, the **Show Stereotypes** option value was changed. Symbol properties changes were made for the class and they are detected in the diagram difference viewer in order to merge them correctly.

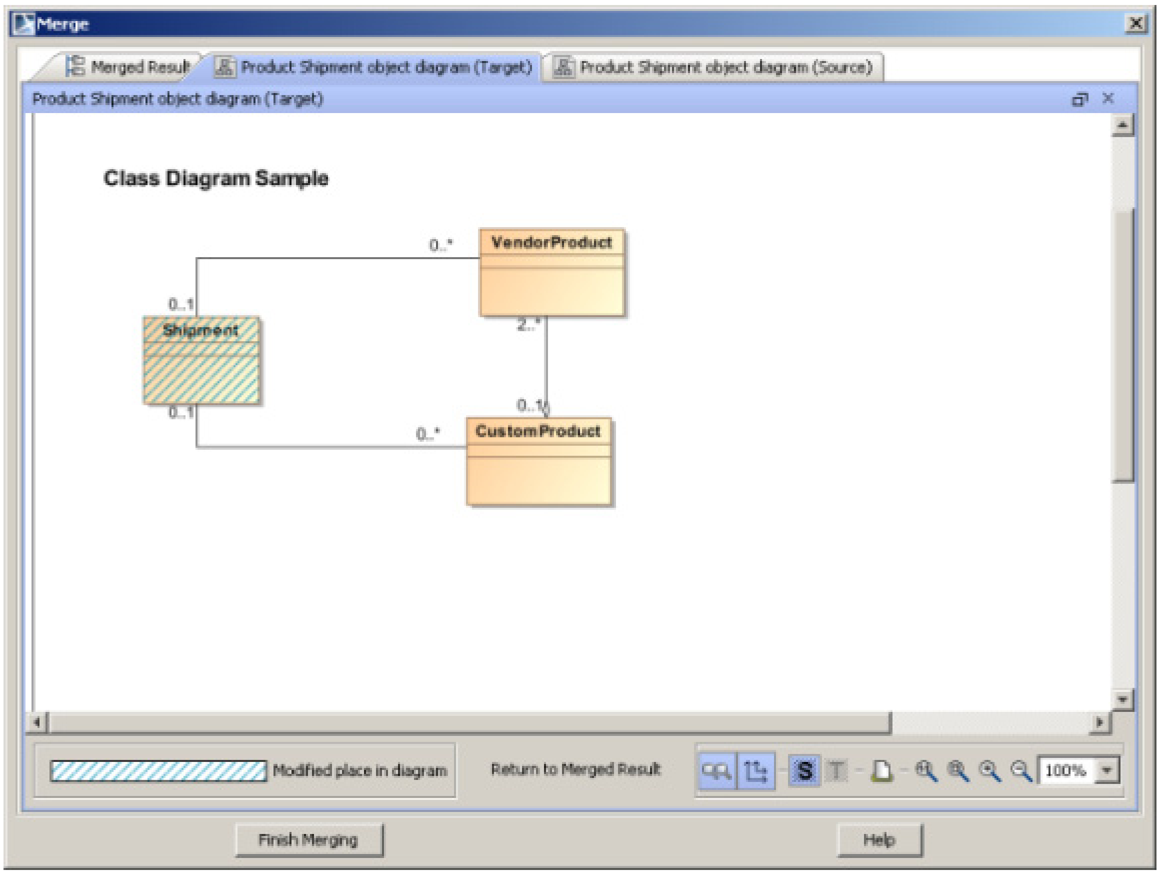

Merge
Merged Result
Product Shipment object diagram (Target)
Product Shipment object diagram (Source)
Product Shipment object diagram (Target)
Class Diagram Sample
VendorProduct
Shipment
CustomProduct
0..*
0..1
2..*
0..1
0..1
0..*
Modified place in diagram
Return to Merged Result
100%
Finish Merging
Help

Figure 231 -- The diagram difference viewer window, displaying symbol properties changes in the Target diagram

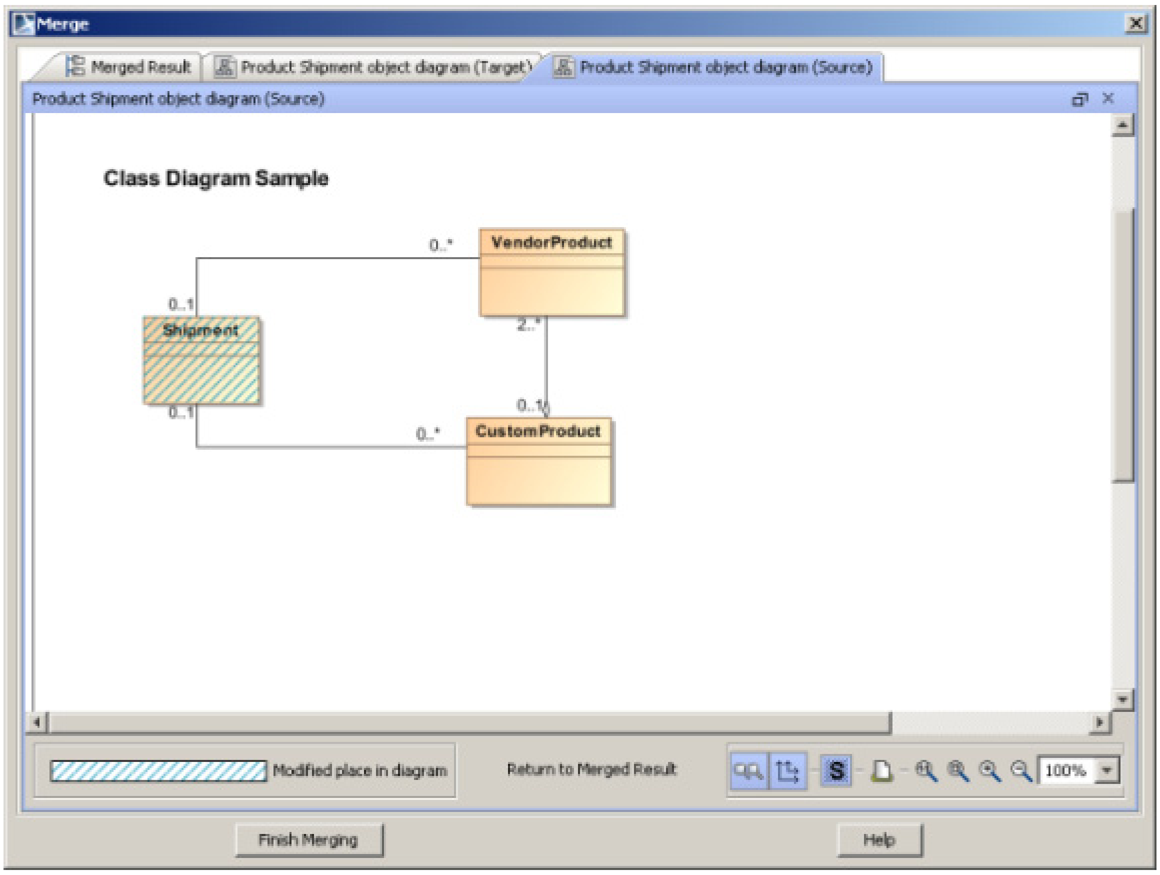

Merge
Merged Result
Product Shipment object diagram (Target)
Product Shipment object diagram (Source)
Product Shipment object diagram (Source)
Class Diagram Sample
VendorProduct
Shipment
CustomProduct
0..*
0..1
2..*
0..1
0..1
0..*
Modified place in diagram
Return to Merged Result
100%
Finish Merging
Help

Figure 232 -- The diagram difference viewer window, displaying symbol properties changes in the Source diagram

Finishing projects merge

To finish the merge, in the **Merge** window, click the **Finish Merging** button. The question dialog box appears (see Figure 233 on page 339).

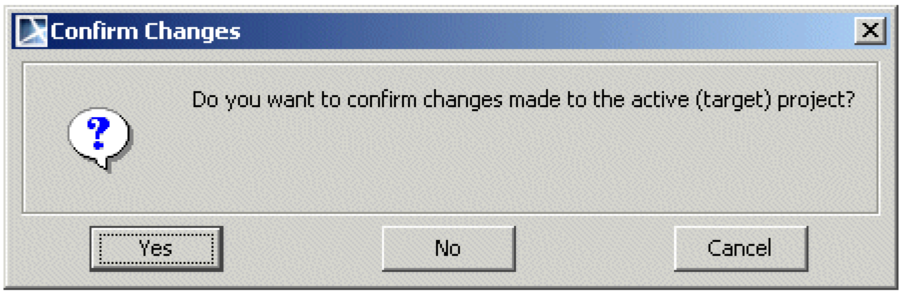

Confirm Changes
Do you want to confirm changes made to the active (target) project?
Yes
No
Cancel

Figure 233 -- The Confirm Changes question dialog box

After pressing **Yes** in the **Confirm Changes** dialog box, project changes to the target project is confirmed.

After pressing **No**, the target project leaves not changed.

Pressing **Cancel** will cancel the **Confirm Changes** dialog box and you will be able to continue merging.

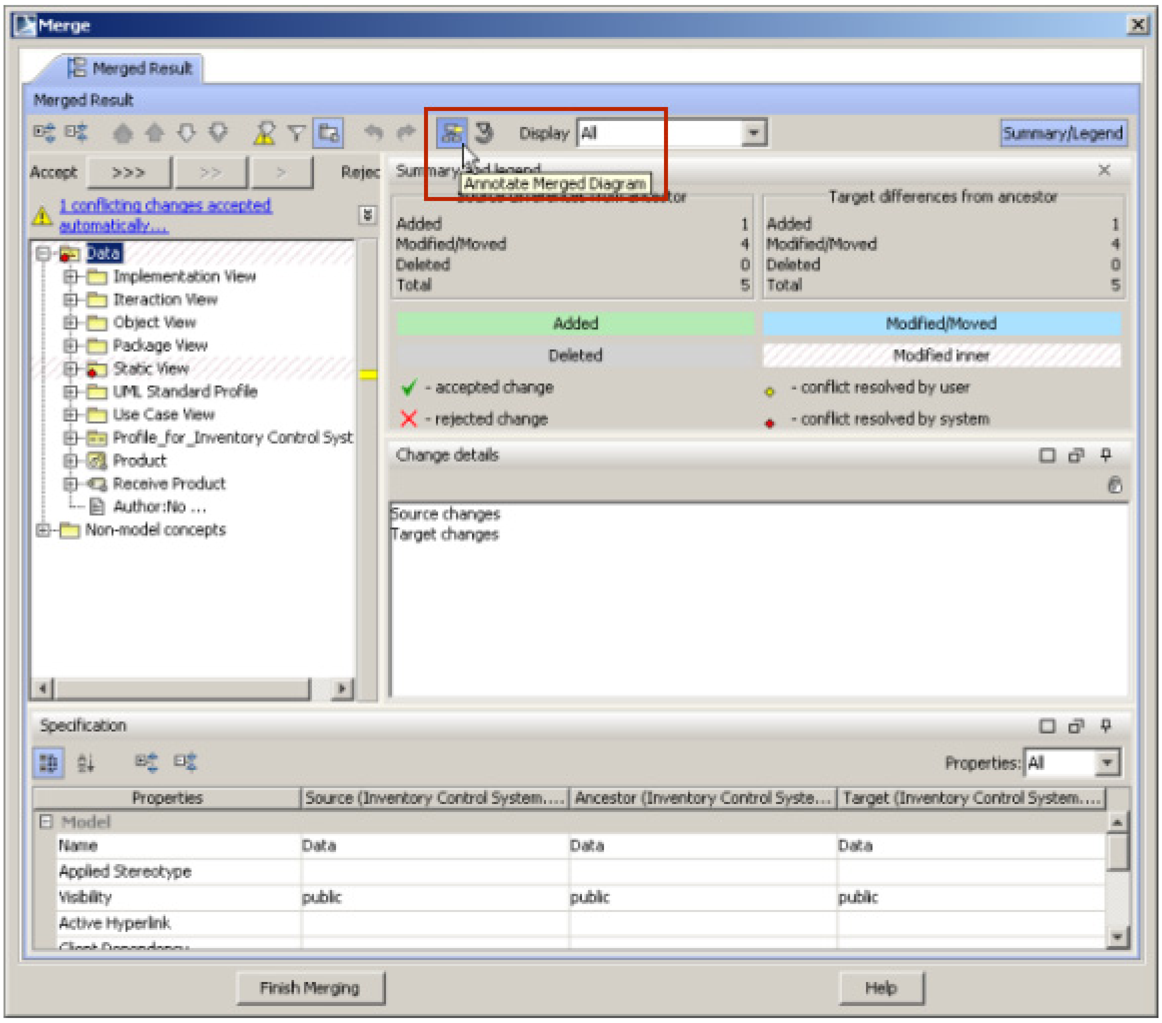
NOTE	After the merge results are copied to the project, do not forget to save or to commit project to Teamwork Server.

Annotations in the merged diagram

The **Annotate merged diagram** button specifies whether merged diagrams will be annotated for the post-merge review or not. Press this button to annotate merged diagram. See the location of the button in Figure 234 on page 340.

See an example of the annotated diagram in Figure 235 on page 341.

Click the ⚠ warning at the right-bottom corner of the MagicDraw window to invoke the **Active Validation Results** window, there information about merged diagrams is represented (see Figure 236 on page 342). For more information, see “Validation” on page 449.



Summary and legend

Source differences from ancestor		Target differences from ancestor	
Added	1	Added	1
Modified/Moved	4	Modified/Moved	4
Deleted	0	Deleted	0
Total	5	Total	5

🟩 Added	🟦 Modified/Moved
Deleted	▨ Modified inner
✓ - accepted change	● - conflict resolved by user
✗ - rejected change	● - conflict resolved by system

Properties	Source (Inventory Control System....	Ancestor (Inventory Control Syste...	Target (Inventory Control System....
Model			
Name	Data	Data	Data
Applied Stereotype			
Visibility	public	public	public
Active Hyperlink			

Figure 234 -- The Merge window, the Annotate Merged Diagram button

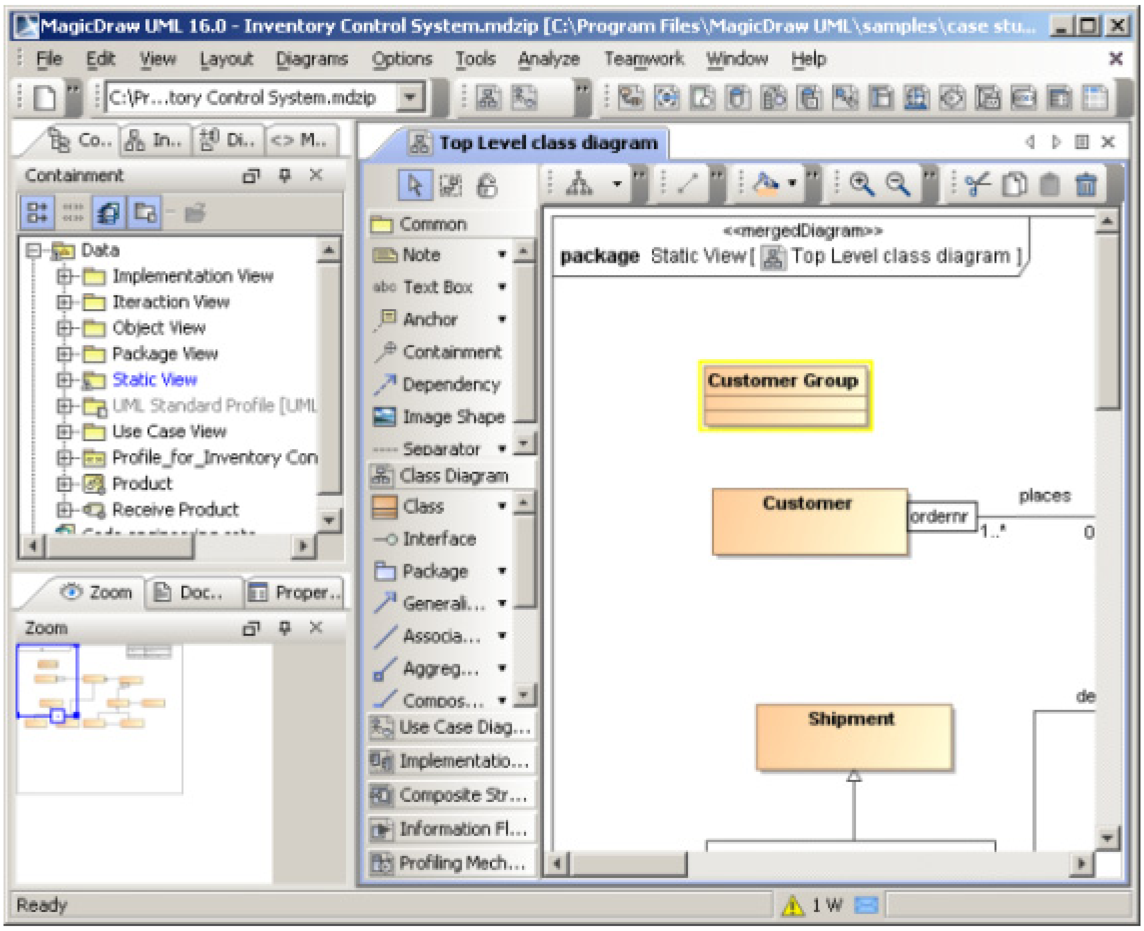
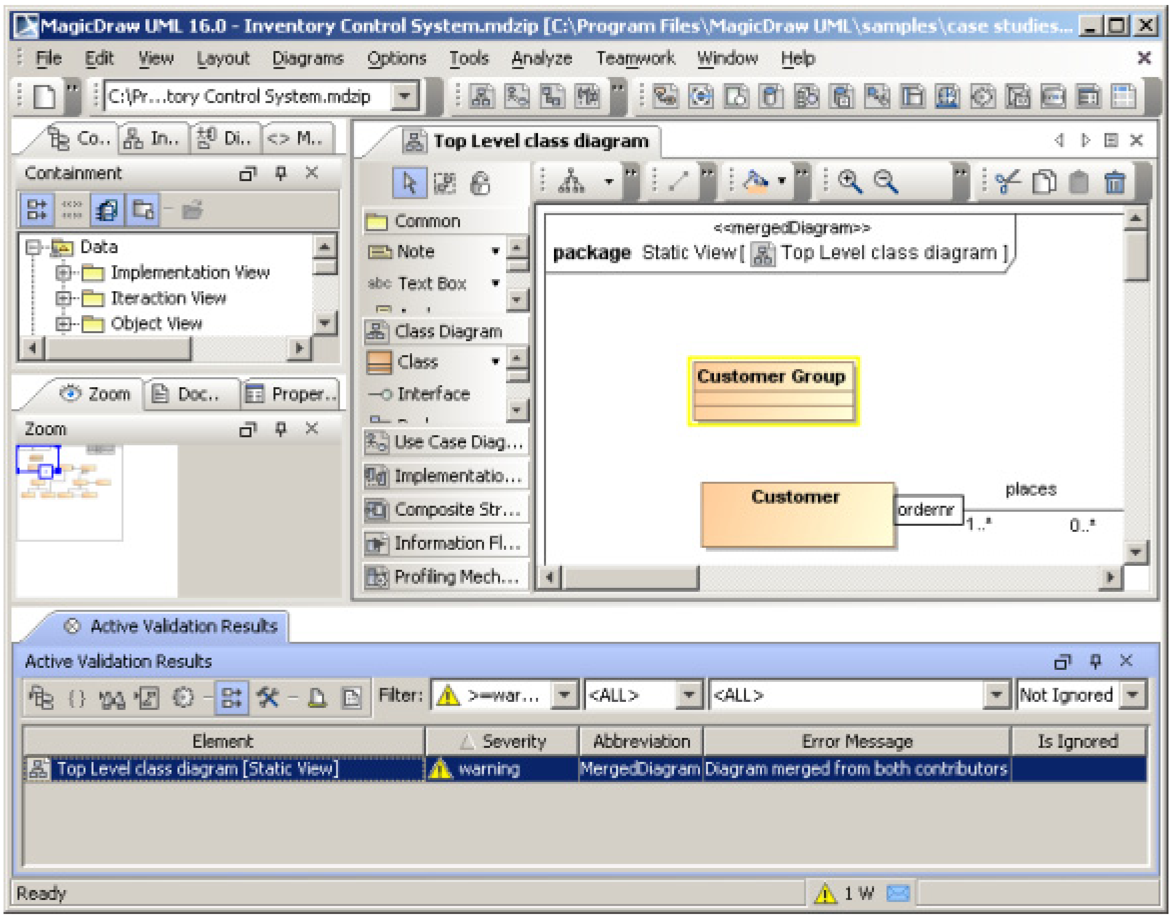


Figure 235 -- Annotations in the merged diagram


MagicDraw UML 16.0 - Inventory Control System.mdzip [C:\Program Files\MagicDraw UML\samples\case studies...
File Edit View Layout Diagrams Options Tools Analyze Teamwork Window Help
Top Level class diagram
Containment
Data
Implementation View
Iteraction View
Object View
Zoom
Common
Note
Text Box
Class Diagram
Class
Interface
Use Case Diag...
Implementatio...
Composite Str...
Information Fl...
Profiling Mech...
<<mergedDiagram>>
package Static View[Top Level class diagram]
Customer Group
Customer
ordernr
places
1..*
0..*
Active Validation Results
Filter: >=war... <ALL> <ALL> Not Ignored
Ready
1 W

Element	Severity	Abbreviation	Error Message	Is Ignored
Top Level class diagram [Static View]	warning	MergedDiagram	Diagram merged from both contributors	

Figure 236 -- Validation results of the merged diagrams

Controlling Merge memory usage

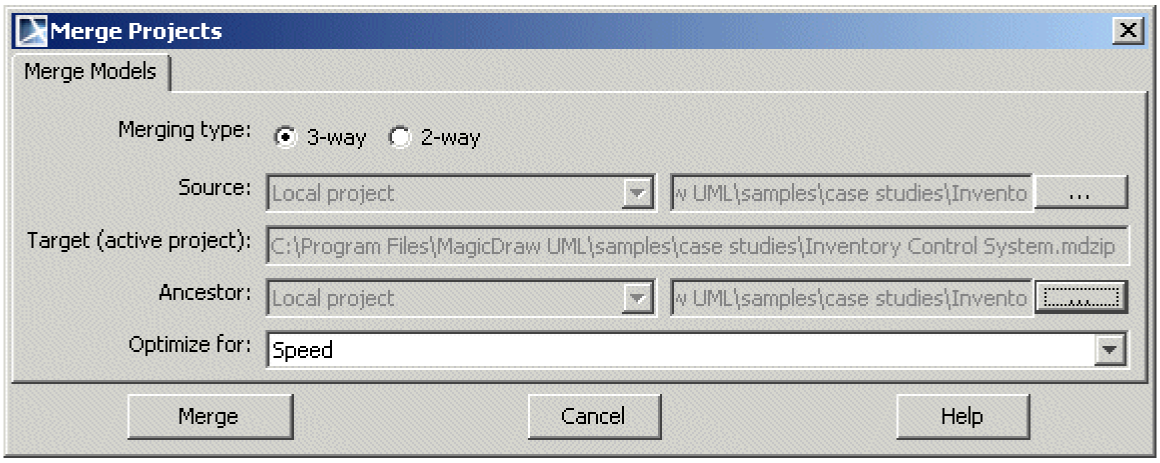
You can customize merge memory usage by selecting the optimization option:

1. From the **Tools** main menu, select the **Project Merge** command. The **Projects Merge** dialog box opens (see the following figure).
2. Select the **Optimize for** option.

You can also specify the **Optimize for** option in the **Environment Options** dialog box, **General** pane, **Merge** group.

Select the **Speed** property to merge the projects faster, but it would require more memory.

If your PC doesn't have memory enough, in the **Optimize for** option, select the **Memory** property. Merge time will be slower, but memory usage will decrease.



Merging type: [✓ 3-way] 2-way
Source: Local project | w UML\samples\case studies\Invento
Target (active project): C:\Program Files\MagicDraw UML\samples\case studies\Inventory Control System.mdzip
Ancestor: Local project | w UML\samples\case studies\Invento
Optimize for: Speed

Figure 237 -- The Merge Projects dialog box

Pattern Wizard

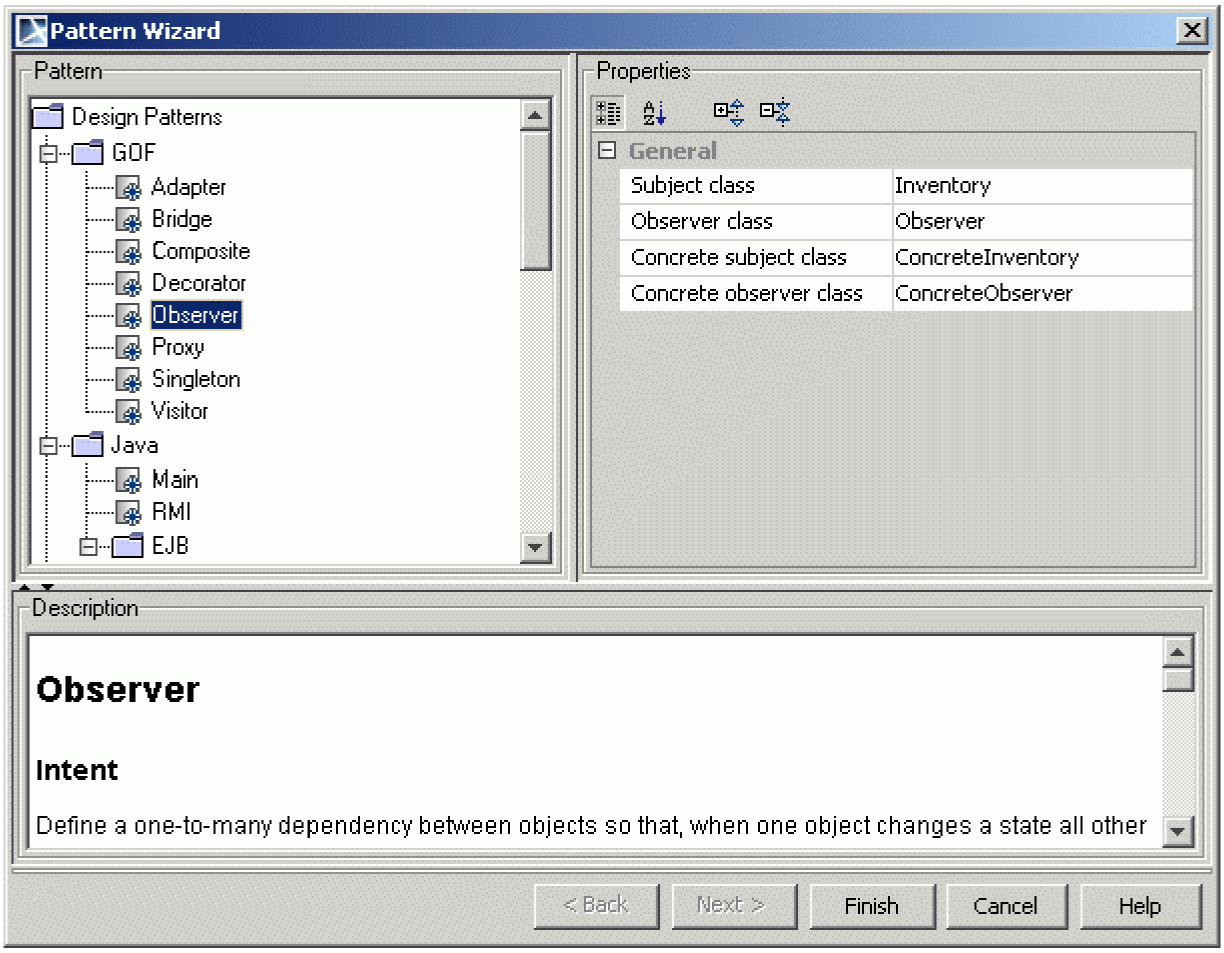
In MagicDraw, you can find various GOF, Java, Junit, CORBA IDL, and XML Schema design patterns.

NOTE	This functionality is available in Standard, Professional, and Enterprise editions only.

You can also create new patterns and edit existing ones using Java code or JPython scripts. For a detailed description, see MagicDraw open API user's guide.

To open the **Pattern Wizard**

- Select **Tools** from the class shortcut menu and then select the **Apply Pattern** subcommand.



Subject class	Inventory
Observer class	Observer
Concrete subject class	ConcreteInventory
Concrete observer class	ConcreteObserver

Observer

Intent

Define a one-to-many dependency between objects so that, when one object changes a state all other

Figure 238 -- Pattern Wizard

The **Pattern Wizard** has three main collections of customizable options, which are represented by the hierarchy tree on the left side of the dialog box:

Category	Design Pattern	Properties
GOF Templates described in the Design Patterns of Reusable Object-Oriented Software	**Adapter**	Interface Class Adapter Class Adaptee Class **NOTE** The **Next >** button is activated. In the **Adapter Operations** screen, add or remove operations you want to use.
	Bridge	Abstraction Implementor Implementor is: Abstract Class or Interface Name of Reference Suffix of the Concrete Implementor **NOTE** The **Next >** button is activated. In the **Deriver Classes** screen, add or remove classes you want to use.
	Composite	Component Class Composite Class **NOTE** The **Next >** button is activated. In the **Composite Operations** screen, add or remove operations you want to use.
	Decorator	Component Class Decorator Class Concrete Decorator Class **NOTE** The **Next >** button is activated. In the **Decorator Operations** screen, add or remove operations you want to use.
	Observer	Subject Class Observer Class Concrete Subject Class Concrete Observer Class
	Proxy	Subject Class Proxy Class Real Subject Class **NOTE** The **Next >** button is activated. In the **Proxy Operations** screen, add or remove operations you want to use.
	Singleton	Singleton class
	Visitor	Visitor Class Implementation Style: visit (MyClass), visitMyClass (MyClass) **NOTE** The **Next >** button is activated. In the **Elements to Visit** screen, select classes and interfaces you want to visit.
Java Specific Java design patterns	**Main**	Main class

Category	Design Pattern	Properties
	RMI	Java RMI classes Remote Interface **NOTE** The **Next >** button is activated. In the **Remote methods** screen, select methods from the **All** list to the **Selected** list.
	EJB	
	Entity	Synchronize Names EJB Name EJB Class Remote Interface Home Interface Local Interface Local Home Interface Display Name Large Icon Small Icon Abstract Schema Name Cmp Version Persistence Type Reentrant Primary Key Class
	Message Driven	EJB Name EJB Class Display Name Large Icon Small Icon Acknowledge Mode Destination Type Subscripting Durability Message Selector Transaction Type
	Session	Synchronize Names EJB Name EJB Class Remote Interface Home Interface Local Interface Local Home Interface Display Name Large Icon Small Icon Session Type Transaction Type **NOTE** The **Next >** button is activated. In the **Remote Methods** screen, add or remove operations you want to use.

Category	Design Pattern	Properties
JUnit JUnit is a regression testing framework. It is used by the developer who implements unit tests in Java. JUnit is Open Source Software. The provided templates allow the user to create the constructions implemented in the JUnit framework. For more information, go to http://www.junit.org.	**TestCase**	TestCase Class Create suite() Create Constructor TestCase(String) Create runTest() Create setUp() Create tearDown()
	Tested Class	Tested Class TestCase Class Create suite() Create Constructor TestCase(String) Create runTest() Create setUp() Create tearDown() **NOTE:** The **Next >** button is activated. In the **Tested Operations** pane, add or remove operations you want to use.
XML Schema Specific XML design patterns	**XSD complex Type**	Target Class Content: XSDcomplex content, XSDsimple content.
	XSD compositor	Target Class Compositor: XSDall, XSDchoice, XSDsequence Particle
	XSD simpleType	Target Class Content: XSDrestriction, XSDlist, XSDunion
	XSD simpleType (XSDlist)	Target Class Item Type
	XSD simpleType (XSDunion)	Target Class

Category	Design Pattern	Properties
	Simple XSD restriction	Target Class Stereotype: XSDsimpleType, XSDsimpleContent Base Min Exclusive Max Exclusive Max Inclusive Min Inclusive Total Digits Fraction Digits Length Min Length Max Length White Space Pattern
WSDL **Specific WSDL design pattern**	**Binding**	Use the **Binding** pattern when you want to create binding of some PortType.
CORBA IDL **Specific CORBA IDL design patterns**	**Interface**	Name Abstract Local Interface
	Value Type	Name Abstract Custom Value Type
	Type Definition	Name Type Definition Specifier: typedef, boxed value Base Type
	Sequence	Name Base Type Sequence Size Anonymous
	Array	Name Base Type Array Size Anonymous
	Fixed	Name Digits Scale Anonymous
	Union	Name Discriminator Type
	Enume ration	Name
	Struct	Name
	Exception	Name

Category	Design Pattern	Properties
< Back		Go back to the **Pattern** screen.
Next >		Go to the other appropriated screen.
Finish		Finish and implement the wizard. The appropriated classes and interfaces are created.
Cancel		Cancel the wizard without implementing your actions.
Help		The MagicDraw Help is displayed.

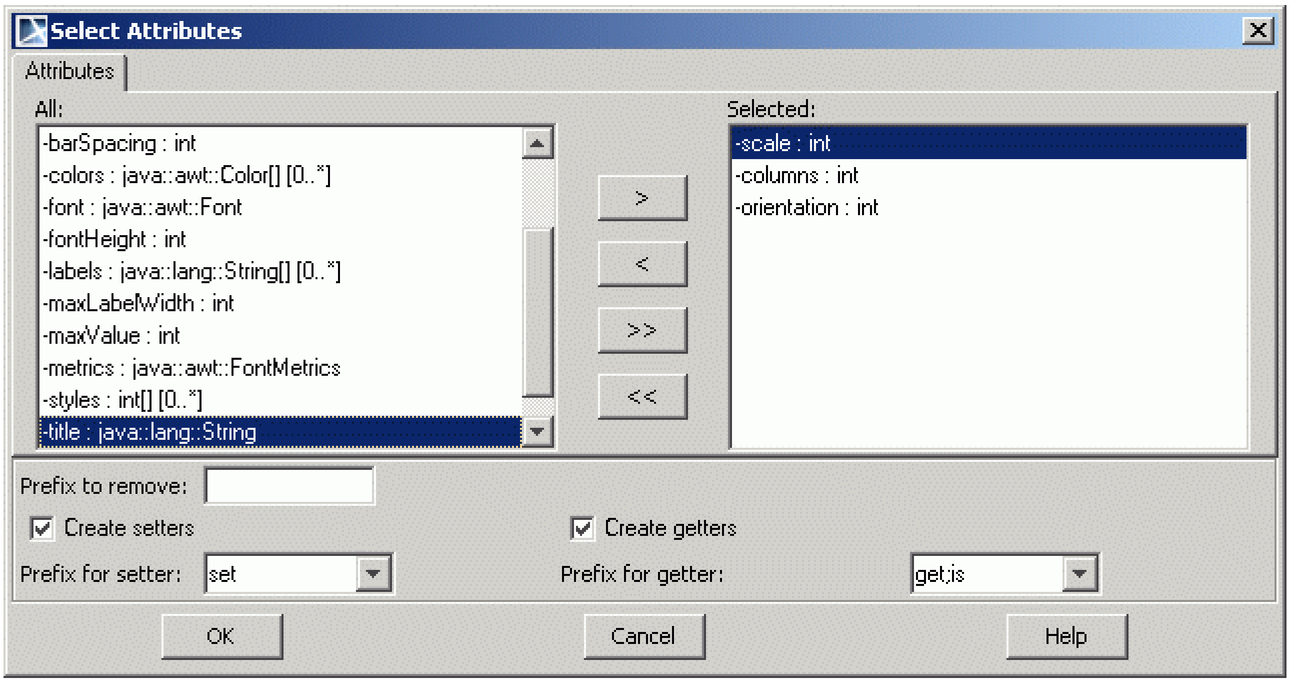
Creating Setters / Getters

NOTE This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

Setters and getters are common operations that contain almost every class. With the help of MagicDraw UML, set and get operations for class attributes can be generated automatically.

To create a setter or getter

- From the shortcut menu of the selected class, select **Tools**, and then select **Create Setters/ Getters**. The **Select Attributes/Association Ends** dialog box opens.
- Add a tagged value "getter/setter for attribute=attribute_name" to the selected class.



All:
-barSpacing : int
-colors : java::awt::Color[] [0..*]
-font : java::awt::Font
-fontHeight : int
-labels : java::lang::String[] [0..*]
-maxLabelWidth : int
-maxValue : int
-metrics : java::awt::FontMetrics
-styles : int[] [0..*]
-title : java::lang::String

Selected:
-scale : int
-columns : int
-orientation : int

Prefix to remove:
[✓] Create setters
[✓] Create getters
Prefix for setter: set
Prefix for getter: get;is

Figure 239 -- Select Attributes dialog box

Box	Function
All	Contains names of all attributes defined within the selected class.
Selected	Contains the selected attributes.

Box	Function
>	Moves the selected attribute from the **All** list to the **Selected** list. Setter for that attribute will be generated.
<	Moves selected attribute from the **Selected** list to the **All** list.
>>	Moves all attributes from the **All** list to the **Selected** list. Setters for all attributes will be generated.
<<	Moves all attributes from the **Selected** to the **All** list.
Prefix to Remove	Type a prefix of an attribute (-, ….) you want to remove while generating setters or getters.
Create Setters	Generates setters for the selected attributes.
Create Getters	Generates getters for the selected attributes.
Prefix for Setter	Select a prefix for the generated setter (operation). Possible choices: set or Set.
Prefix for Getter	Select a prefix for the generated getter (operation). Possible choices: get;is, Get;Is; get, or Get. **NOTE** "Get" is used for every getter, "is" is used if the type of an attribute is set as Boolean.
OK	Generates setters and/or getters for attributes that are in the Selected Items list.
Cancel	Exits the dialog box without any changes.
Help	Displays the MagicDraw Help.

The names of created operations (setters) are combined according to the following format:

```
public void set + <attribute name> (<attribute type> <attribute name>)
```

For example, if you have an attribute called x of type int, then the generated setter will look this way:

```
public void setx (int x)
```

The names of created operations (getters) are combined according to the following format:

```
public <attribute type> get + <attribute name> ( )
```

For example, if you have an attribute called x of type int, then the generated setter will look this way:

```
public int getx ();
```

Implementing or Overriding Operations

NOTE This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

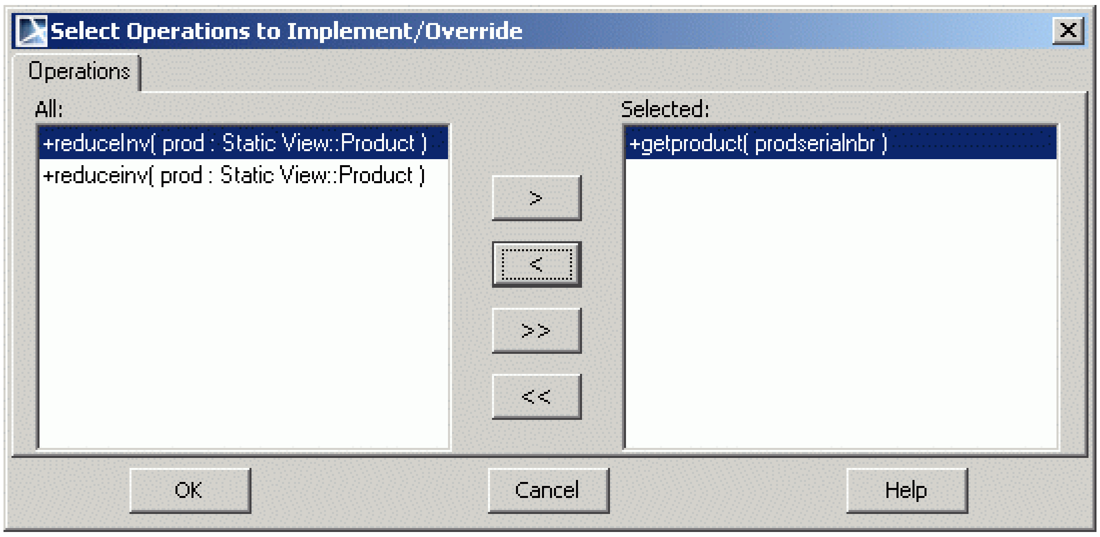
When you inherit classes from the base class that has abstract functions, you have to redefine them in the inherited classes. The implement/override operations tool will help you generate operations that are defined as abstract in the base class.

The **Implement/Override Operations** command can be invoked in 2 cases:

- When one classifier inherits operations from the base classifier (Generalization relationship).
- When some classifiers implement an Interface (Realization relationship).

To start the **Implement/Override Operations** tool

From the shortcut menu of the selected class, select **Tools**. Then, select **Implement/Override Operations**. The **Select Operations to Implement/Override** dialog box opens.



+reduceInv(prod : Static View::Product)
+reduceinv(prod : Static View::Product)
+getproduct(prodserialnbr)

Figure 240 -- Select Operations to Implement/Override dialog box

Box	**Function**
All	Contains names of all operations defined within the selected class.
Selected	Contains the selected operations.
>	Moves the selected operation from the **All** list to the **Selected** list.
<	Moves selected operation from the **Selected** list to the **All** list.
>>	Moves all operations from the **All** list to the **Selected** list.
<<	Moves all operations from the **Selected** to the **All** list.
OK	Generates operations that are in the **Selected** list.
Cancel	Exits the dialog box without any changes.
Help	Displays the MagicDraw Help.

TIP! Double-click the item name and it will be moved to the opposite list.

Model Transformation Wizard

View Online Demo	Transformations

NOTE	Transformation engine itself is available in MagicDraw editions from Standard and up. However, only MagicDraw Architect and Enterprise editions bring any particular transformations. So for MagicDraw Standard and Professional edition users, transformations are not available. Plugins can bring additional transformations regardless of MagicDraw edition. . For example, users, who have the Cameo Data Modeler plugin, can use the transformation engine to run ER to SQL(Generic/ Oracle) transformations, even if they do not have the MagicDraw Architect/Enterprise editions.

The Model Transformation Wizard enables running one of the predefined transformations. When using this wizard to run a chosen transformation, you have to perform the following steps:

1. Choose a transformation type.
2. Specify both the transformation source model (or a part of it) and destination package.
3. Select a type map.
4. Set custom transformation properties.

Each transformation converts the chosen model part into another model according to the rules of this transformation. Transformations are usually used for converting models between different modeling domains, e.g., UML and SQL.

All transformations follow a similar approach. They take a part of a model as the transformation source and copy it to the destination model, establishing traces between the transformation source and target elements. Then each transformation performs the specific model reorganizations, which are necessary for each transformation type according to the transformation options specified by the user in the transformation wizard. Transformation can also be performed in-place, i.e., the source model is not copied to the destination model, but transformation works directly on it instead.

Transformations also perform the so-called type remapping. During the transformation between the different modeling domains, such as UML and SQL, it is necessary to go through the data types used in the source model and change the types from the source domain into the equivalent types in the target domain, for example, changing String type usages in the UML model into the varchar type usages in the SQL model.

Available Transformations

Transformations are usually used for converting models between different modeling domains. Transformations are named by the types of their source models and their destination models. These are the available transformations:

- **Any to Any.** This transformation copies all your model or part of it to another package without making any changes. You can also remap types in the destination model by applying some type mapping rules.

- **Profile Migration.** Helper transformation for migrating models using one profile to models using another profile (usually - between different versions of the same profile - old and new)..

NOTE	**UML to SQL(Generic/Oracle), SQL to UML, UML to XML Schema, XML Schema to UML** transformations are available with the separately-installed Cameo Data Modeler plugin (which comes free of charge with MagicDraw Architect and Enterprise Editions and is separately purchseable for MagicDraw Standard and Professional editions)

NOTE	Additional custom types of transformations can be defined by MagicDraw plugins.

Working with Model Transformation Wizard

The wizard can be opened from several places.

To start the **Model Transformation Wizard**

Do either:

- From the **Tools** menu, choose **Model Transformations**.
- Right-click one or more packages and select **Tools** > **Transform**.

Selecting transformation type

In the first step of the Model Transformation Wizard, a list of the available transformation types is displayed.

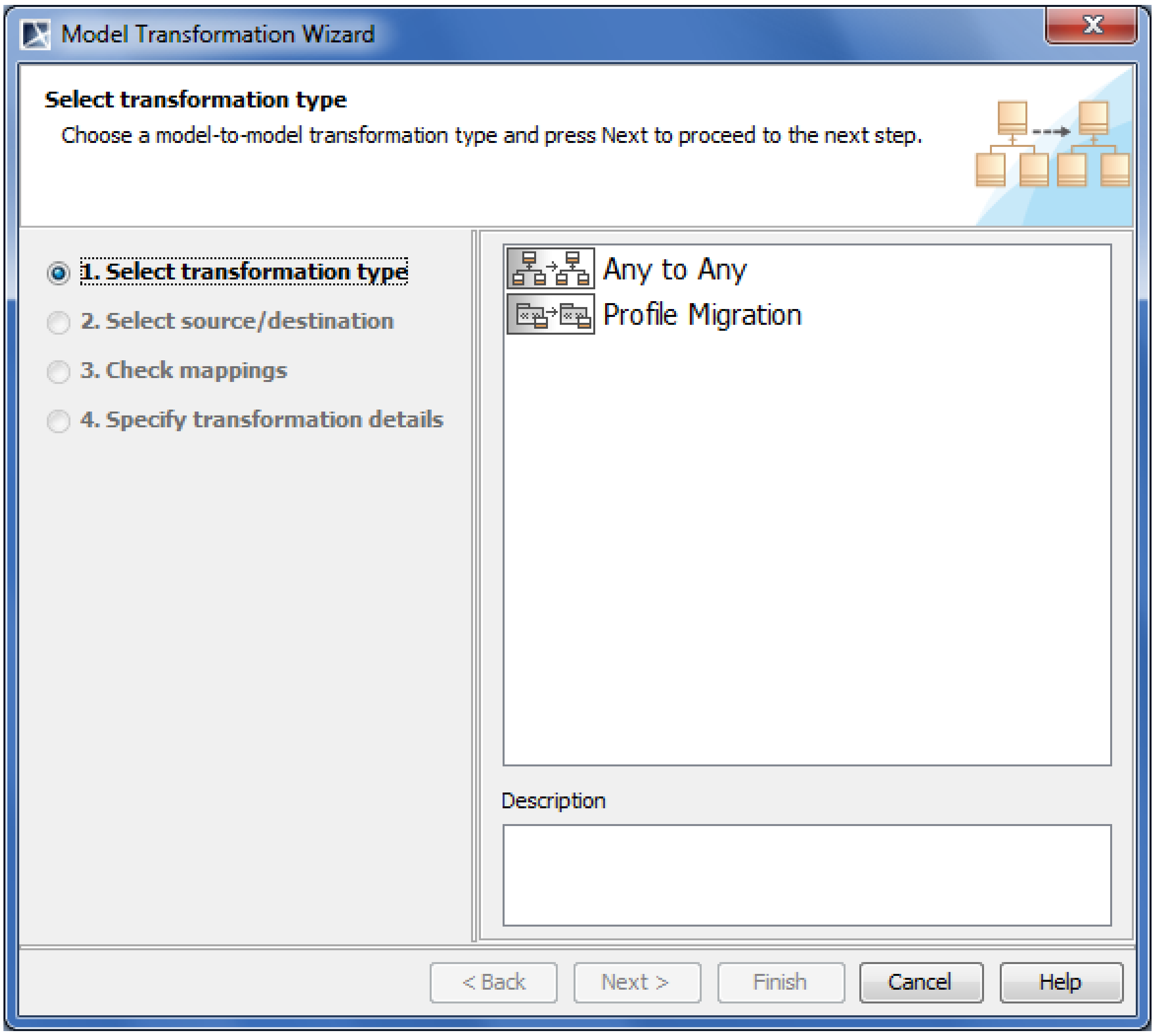

Model Transformation Wizard
Select transformation type
Choose a model-to-model transformation type and press Next to proceed to the next step.
1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details
Any to Any
Profile Migration
Description
< Back
Next >
Finish
Cancel
Help

Figure 241 -- Model Transformation Wizard. Select transformation type

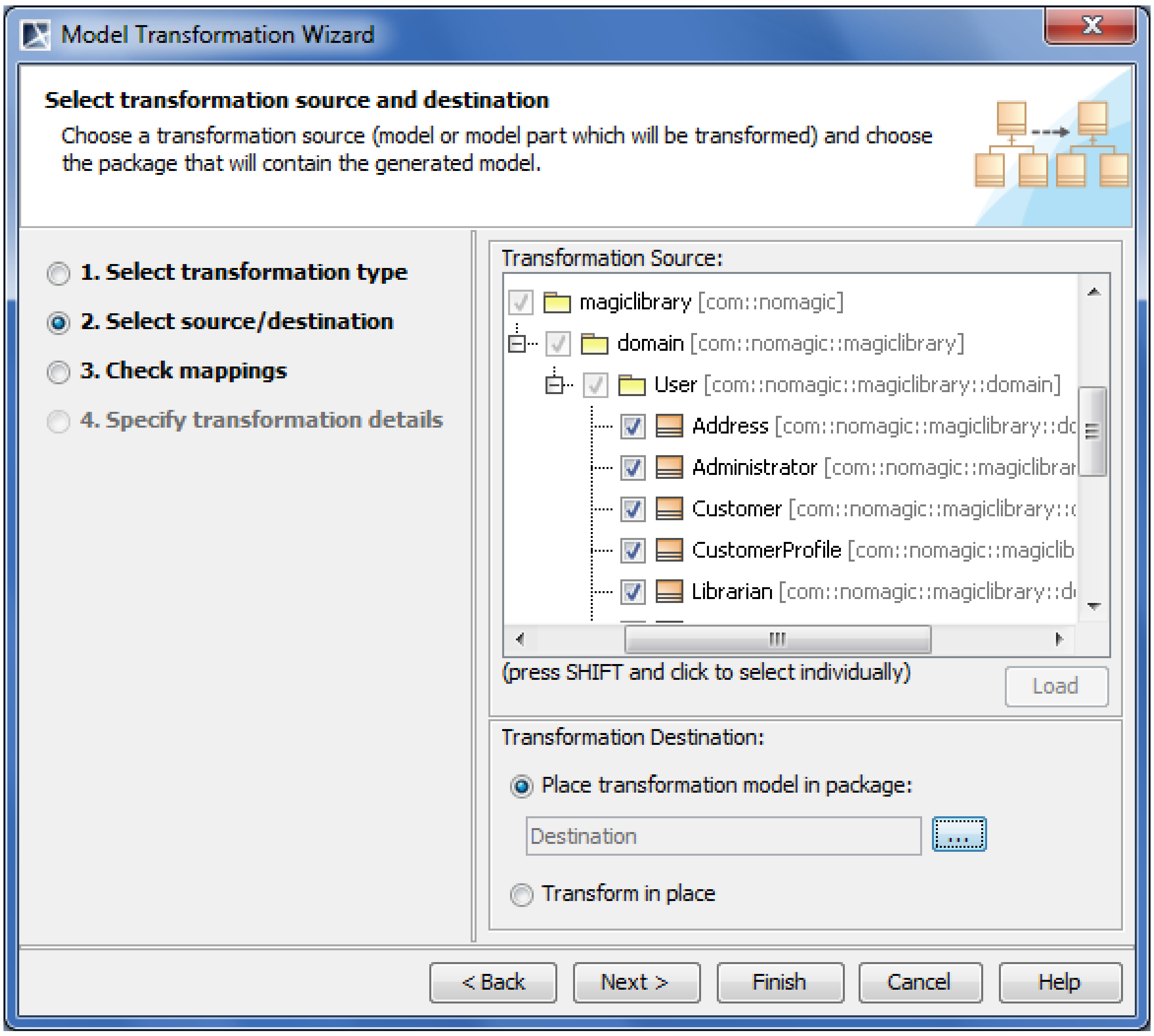
Transformation types are displayed in the list window.

The following operations are available in the **Select transformation type** window:

Button	Function
Next >	Proceed to the next step (in this case, Select source/destination).
Cancel	Cancel the wizard.
Help	Display the MagicDraw Help.

Selecting source and destination models

In the second step of the wizard, the **Transformation Source** tree displays all project data, i.e. the packages and their inner elements, that can be selected as a transformation source. Transformation will take the selected elements as input data.


Model Transformation Wizard

Select transformation source and destination

Choose a transformation source (model or model part which will be transformed) and choose the package that will contain the generated model.

1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details

Transformation Source:

- magiclibrary [com::nomagic]
  - domain [com::nomagic::magiclibrary]
    - User [com::nomagic::magiclibrary::domain]
      - ✓ Address [com::nomagic::magiclibrary::dc
      - ✓ Administrator [com::nomagic::magiclibrar
      - ✓ Customer [com::nomagic::magiclibrary::
      - ✓ CustomerProfile [com::nomagic::magiclib
      - ✓ Librarian [com::nomagic::magiclibrary::d

(press SHIFT and click to select individually)

Transformation Destination:

● Place transformation model in package:

Destination

○ Transform in place

Figure 242 -- Model Transformation Wizard. Select source/destination

Select the **Place transformation model in package** option button to specify the package into which the source will be transformed. Click the **"..."** button to display the **Destination Package** dialog. Select an existing package from the **Packages** tree or create a new one.

Select the **Transform in place** option button, if you want the source model to be edited.

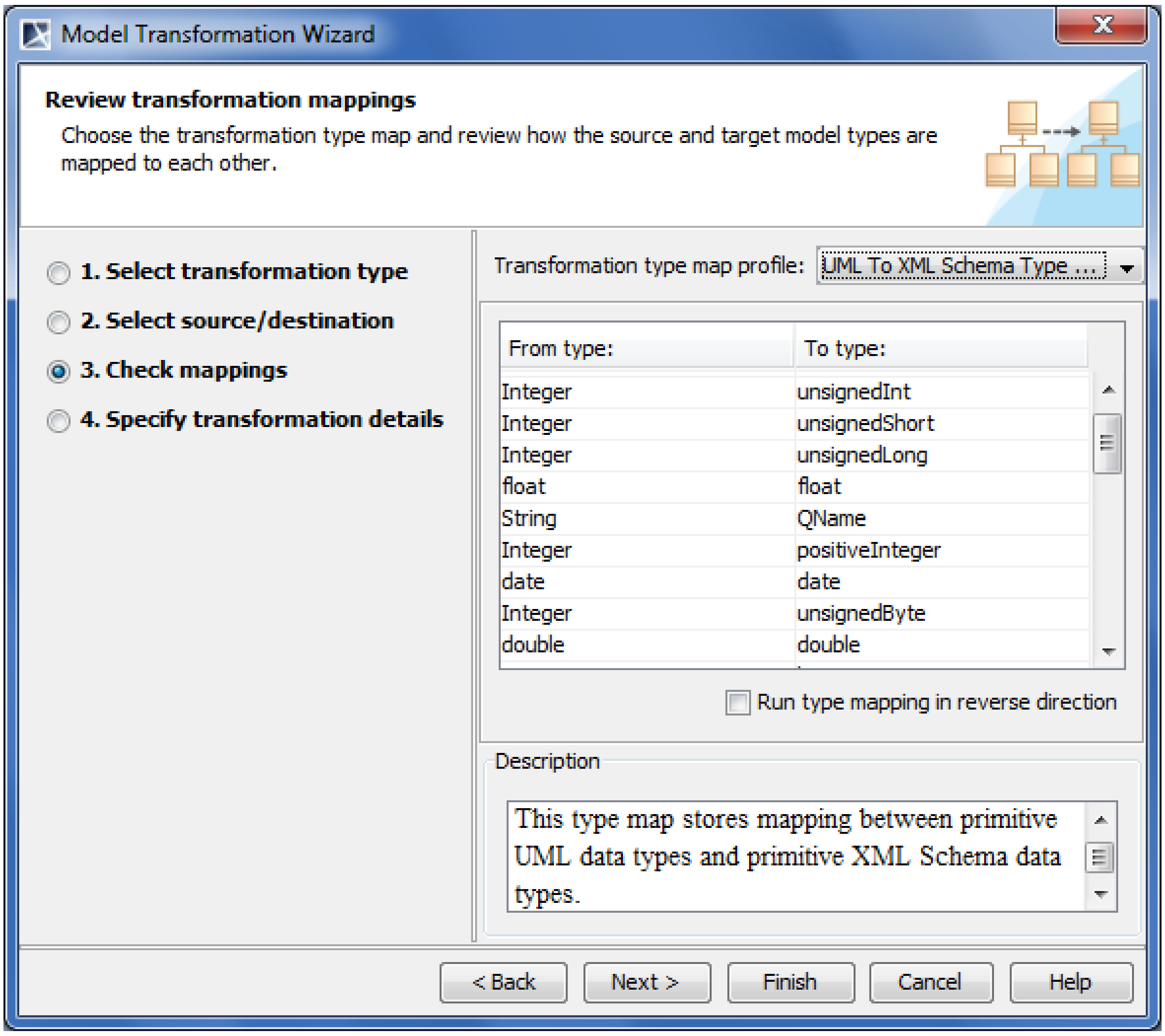
IMPORTANT!	If you choose the in-place transformation, the model part selected as the transformation source, will be edited directly, and you will not retain your original model. So, please, be careful with this option. If you choose the destination package, the source model will be copied to it and the transformation will be performed on this copy. Hence you will retain your source model and get a resulting model and traces will be established between elements in these model parts.

The following operations are available in the **Select source/destination** window:

Button	Function
< Back	Return to the previous dialog box.
Next >	Proceed to the next step (in this case, Select type mappings).
Finish	Finish the transformation configuration. All other options will be set by default. The **Model Transformations Wizard** exits and transformation results appear in the project.
Cancel	Cancel the wizard.
Help	Display the MagicDraw Help.

Selecting type mappings

The third step in the wizard allows for selecting a type map that will be applied during the transformation. Usually transformation has and brings in some predefined type map, but if you want, you can specify another type map.


Model Transformation Wizard
Review transformation mappings
Choose the transformation type map and review how the source and target model types are mapped to each other.
1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details
< Back
Next >
Finish
Cancel
Help

Transformation type map profile: UML To XML Schema Type ...

From type:	To type:
Integer	unsignedInt
Integer	unsignedShort
Integer	unsignedLong
float	float
String	QName
Integer	positiveInteger
date	date
Integer	unsignedByte
double	double

☐ Run type mapping in reverse direction

Description

This type map stores mapping between primitive UML data types and primitive XML Schema data types.

Figure 243 -- Model Transformation Wizard. Select type mappings

A type map can be regarded as a collection of rules of the form “Replace the usage of type X in the module with the usage of type Y”.

A type map is a model object, i.e. a package with a collection of dependencies (for the details about modeling type maps, see section “Transformation Type Mapping” on page 358), hence all model manipulation operations can be performed on it. In particular, it can be refactored into a module and mounted into any project, which needs it. It can be a simple package in your project as well, if you need a custom, one-off type map. A pre-defined type map can be taken from the MagicDraw module and edited.

To see a list of the type maps available in your model, click the down arrow in the **Transformation type map** combo box. These type maps specify the mapping rules that will be applied to the model during the transformation.

When you select a particular map, its contents are displayed in a table below. Each row in the table is a rule to remap one particular type to another. The **From type** and **To type** columns in the table show the source and target types.

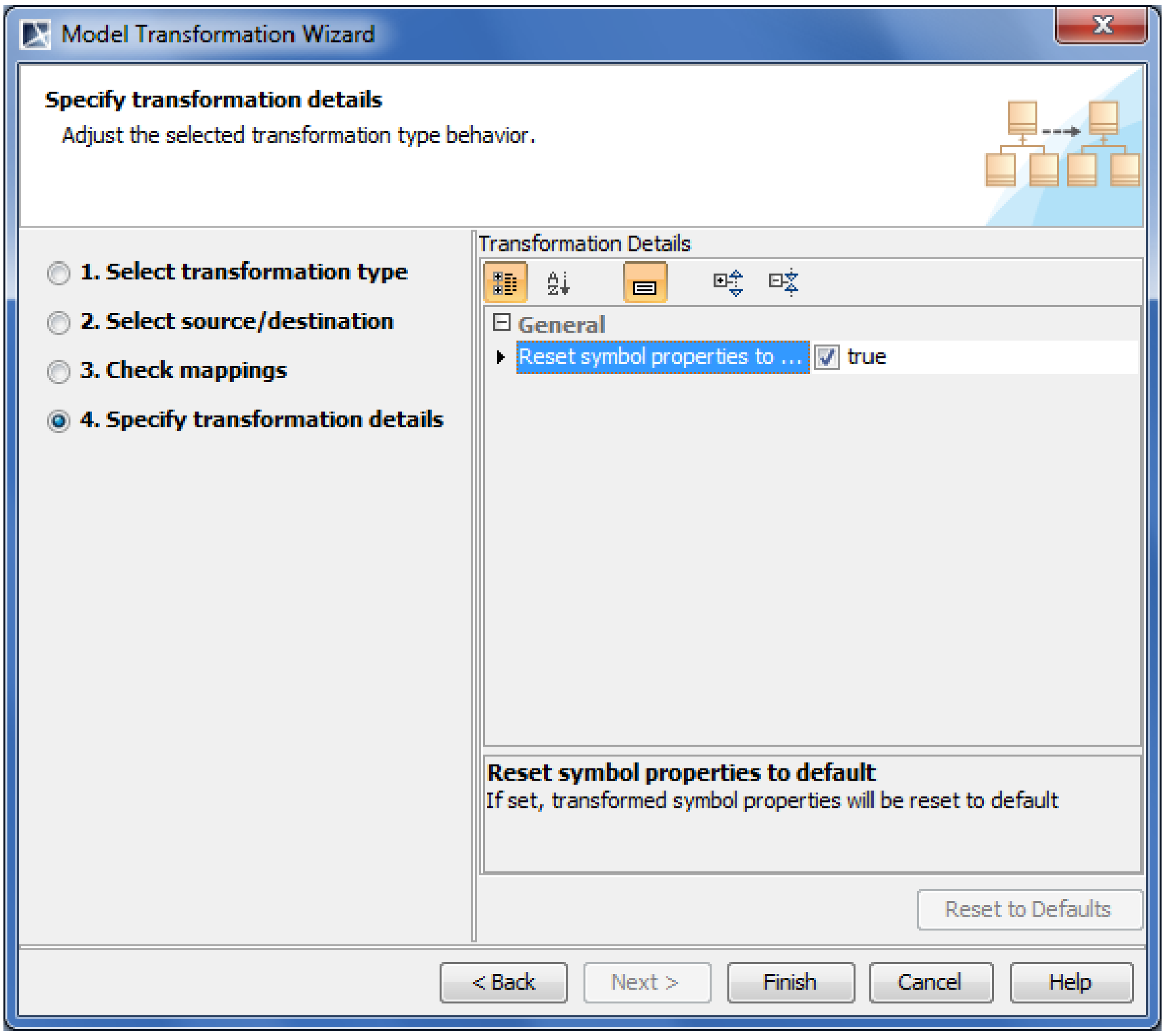
The **Run type mapping in reverse order** check box creates the opposite type mapping. Type maps can be bidirectional, e.g., the same type map is reused both in the UML to XML schema and XML schema to UML transformations. This checkbox governs the direction in which the type map should be used.

The following operations are available in the **Select type mapping** window:

Button	Function
< Back	Return to the previous dialog box.
Next >	Proceed to the next step (in this case, Specify transformation details). **NOTE:** This button is disabled during the **Any to Any** transformations.
Finish	Finish the configuration of the transformation. The **Model Transformations Wizard** exits and the transformation results appear in the project.

Setting custom transformation properties

The **Transformation Details** table displays the various properties of a specific transformation, selected in the first step of the **Model Transformation Wizard.** Each transformation type has its own set of options, which govern functionality of that transformation.


Model Transformation Wizard

Specify transformation details
Adjust the selected transformation type behavior.

1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details
Transformation Details
General

Reset symbol properties to ... ☑ true

Reset symbol properties to default
If set, transformed symbol properties will be reset to default

Figure 244 -- Model Transformation Wizard. Specify transformation details

To change the transformation properties to the default values, click **Reset to Defaults**.

The following operations are available in the **Specify transformation details** window:

Button	Function
< Back	Return to the previous dialog box.
Finish	Finish the transformation configuration. The **Model Transformations Wizard** exits and the transformation results appear in the project.

Transformation Type Mapping

During the transformation between the different modeling domains, such as UML and SQL, it is necessary to go through data types used in the source model and change the types from the source domain into the equivalent types in the target domain, for example, changing String type usages in the UML model into varchar type usages in the SQL model. This is achieved by establishing a type map and then supplying it for the transformation (many transformations have default, predefined type maps).

A type map can be regarded as a collection of rules of the form "Replace the usage of type X with the usage of type Y". A type map is created by modeling means and is a model object, hence all model manipulation operations can be performed on it. In particular - it can be refactored into a module and mounted into any project, that needs it. It can be a simple package in your project as well, if you need a custom, one-off type map. Predefined type map can be taken from the MagicDraw module and edited.

A type map is a stereotyped package, holding a collection of stereotyped dependencies. Stereotypes for building type maps are stored in the *Model Transformation Profile*.

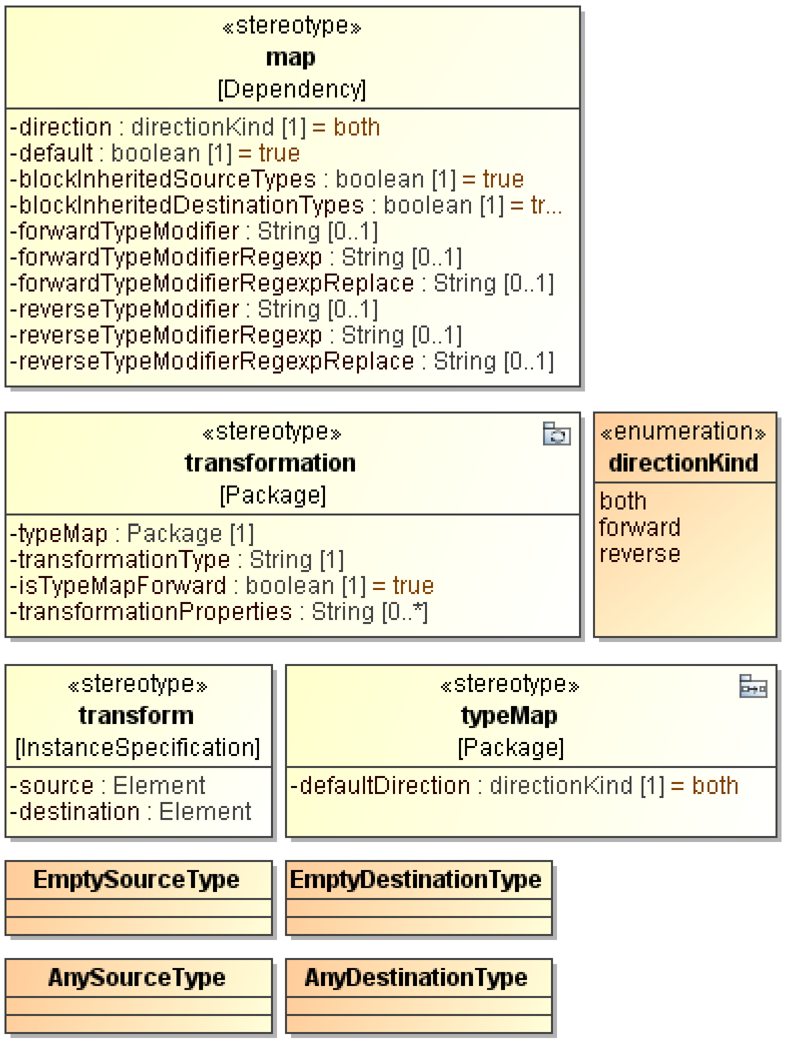
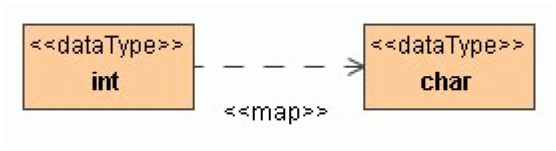

«stereotype»
map
[Dependency]
-direction : directionKind [1] = both
-default : boolean [1] = true
-blockInheritedSourceTypes : boolean [1] = true
-blockInheritedDestinationTypes : boolean [1] = tr...
-forwardTypeModifier : String [0..1]
-forwardTypeModifierRegexp : String [0..1]
-forwardTypeModifierRegexpReplace : String [0..1]
-reverseTypeModifier : String [0..1]
-reverseTypeModifierRegexp : String [0..1]
-reverseTypeModifierRegexpReplace : String [0..1]
«stereotype»
transformation
[Package]
-typeMap : Package [1]
-transformationType : String [1]
-isTypeMapForward : boolean [1] = true
-transformationProperties : String [0..*]
«enumeration»
directionKind
both
forward
reverse
«stereotype»
transform
[InstanceSpecification]
-source : Element
-destination : Element
«stereotype»
typeMap
[Package]
-defaultDirection : directionKind [1] = both
EmptySourceType
EmptyDestinationType
AnySourceType
AnyDestinationType

Figure 245 -- Stereotypes used for creating mapping rules

To create a transformation type map

1. Use or import *Model_Transformation_Profile.xml.zip.*
2. Create a package, which will represent your type map. Apply a stereotype «*typeMap*» to it.
3. Choose types (data types, classes, enumerations) in your source domain and their corresponding types in your target domain. Create the desired dependency relationships between the corresponding types. Apply a stereotype named «*map*» to these dependencies.



IMPORTANT! Be sure to place dependencies in the type map package (MagicDraw is prone to placing dependencies in or near the dependent model element, so you may need to relocate them)

In the example above, after the transformation, all *int* types will be transformed to *char*.

Each of the thus created dependencies represents one type remapping rule. The package represents the complete type map.

Type mapping rule behavior can be further customized by setting various tags on the rules (see “Controlling Type Mapping Rule Behavior” on page 360).

NOTE Transitive type mapping (of the form type1->type2->type3) is not supported.

Controlling Type Mapping Rule Behavior

There are several different tags that can be set on a type map or an individual rule to change its behavior slightly.

Controlling direction

By default, the same type map can be applied in two directions: forward and backward. The backward direction can be set by selecting the **Run type mapping in reverse order** check box in the third step of the Model Transformation Wizard. This is useful, when there are two related opposite transformations for some domain; for example, the same type map is used for both UML to XML schema and XML schema to UML transformations.

If you want to limit the directions, in which type map can be used, you can set the **defaultDirection** tag for your type map package. Possible values are **forward**, **reverse**, and **both** (default).

The direction can also be limited on a per-rule basis. This is controlled by setting the **direction** tag on the type map dependency. Then the mapping rule is excluded from the rule set when the type map is run in a different direction than specified for this rule.

Multiple rules for the same source type

There can be multiple mapping rules for the same source type. For example, String -> varchar and String -> nvarchar. In this case, one of the rules must be marked as default by setting the **default** tag value on it to true.

IMPORTANT! The type map having several rules for the same type and without any one set as default cannot be used.

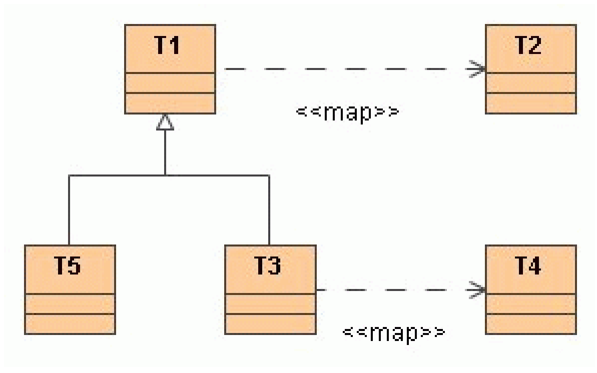
During the initial transformation, only the default rules for each source type come into play. E.g., if the user has a property with the String type, this will be transformed to property having the varchar type set.

However, during the transformation update, all rules come into play. If the destination type is one of the acceptable types according to the map, it is not changed. Otherwise it is replaced with the default mapping.

Regarding the example above, let’s say that after the initial transformation, the user changes the type of the property in the destination model from varchar to nvarchar (as a post-transformation refinement process). If the user now runs a transformation update, this change will not be overwritten, since nvarchar is an acceptable type as there is a String -> nvarchar mapping in the type map as well. If on the other hand the user sets the type of this property to number, this would be reset the during transformation update, and the type will be forced back to varchar, as there is no String -> number mapping.

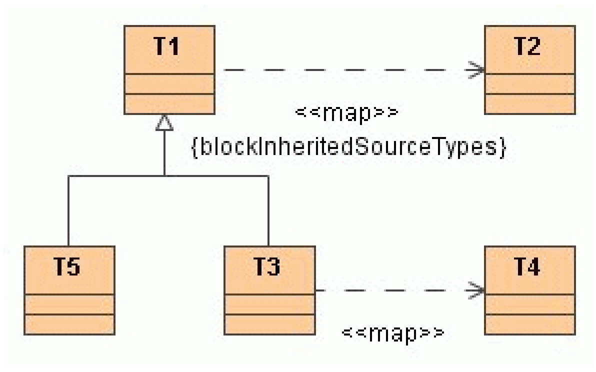
Controlling type inheritance, any, and empty types

You can also control mapping behavior for the type inheritance. By default, derived subtypes are also mapped by the rule governing the parent type (unless, of course, they have their own rules for mapping). If the **blockInheritedSourceTypes** tagged value is set, derived types are not affected by this rule. Let's review the following example:



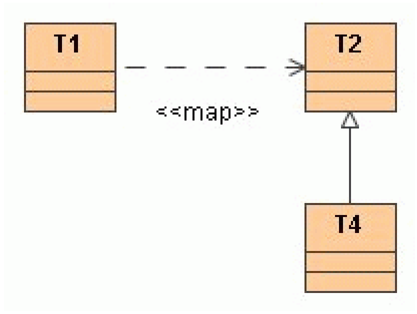
Here T1, T2, and T5 are types in the source domain, while T2 and T4 are types in the destination domain. Given these two mappings (T1 -> T2 and T3 -> T4), the following statement is true: T1, and all types derived from it (such as T5), are mapped to the T2 type, except T3 and any of the types derived from it. These types are mapped to T4.

Now consider an example where blockInheritedSourceTypes is set:



In this case, T3, along with the types derived from it, are still mapped to T4. T1 is still mapped to T2. However, unlike the previous example, T5 and all the types inherited from T1 are NOT mapped to T2.

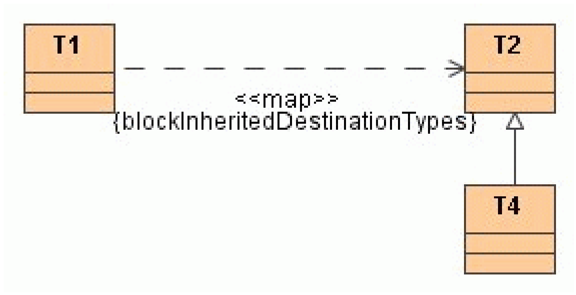
You can also control the mapping behavior of the type inheritance in the destination model. This is only effective on the transformation updates, the second (and successive) reapplications of the transformation. By default, derived subtypes in the destination model are not overwritten, since they are considered suitable substitutes of their parent. Let's review the following example:



Here T1 is a type in the source domain, while T2 and T4 are types in the destination domain. Given this mapping (T1 -> T2), on the first application of the transformation, type T1 residing in the source model will be mapped to type T2 in the destination model.

Now let us look at a case, where the user refines the destination model by changing the type on the destination model attribute from T2 to T4. This situation is quite common, for example, the user refines an attribute type from string to basic URI in the XML schema, or from Integer to nonNegativeInteger, and so forth. The essence is that the mapping for inherited types of T2 is performed as if there was a mapping T1 -> T2 (default), T1 -> T4, T1 -> <any_other_type_inherited_from_T2>.

Now consider what happens, when we apply the **blockInheritedDestinationTypes** tagged value:



In this case, type T4 has no special treatment. If the user applies the transformation, T1 is mapped to T2. Afterwards the user refines the destination model, changing the attribute type from T2 to T4. If the user now updates the transformation, the attribute type is overwritten: T4 is reset back to T2.

When the user loads the type map in the reverse direction, the roles of the **blockInheritedSourceTypes** and **blockInheritedDestinationTypes** are transposed (unless of course the **direction** tag mandates that this mapping is not used in the reverse direction).

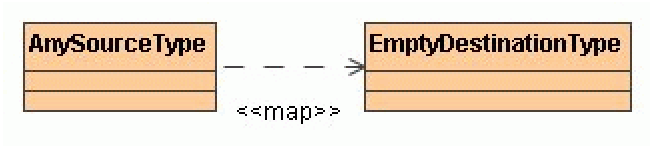
The special type **EmptySourceType** (residing in the *Model_Transformation_Profile.xml.zip*) is used in type maps to indicate that the attributes with no type should be mapped with this dependency.

The special type **EmptyDestinationType** (residing in the *Model_Transformation_Profile.xml.zip*) is used to indicate that the attributes in the destination classes should have no type after remapping (type removal).

The special type **AnySourceType** is a template that matches any type in the source model (see mapping rules for type inheritance). By using this type, together with the inheritance mapping rules, the user can specify that any other types not defined by the mapping should be interpreted by this mapping.

The special type **AnyDestinationType** is a template that matches any type in the destination model (see mapping rules for type inheritance).

.Here is an example of template type usage:



According to this rule, any types in the source model for which there are no other mapping rules should be stripped in the destination model.

Type modifiers

Type mapping rules can also affect type modifiers during the type replacement. Type modifier is a small string, which modifies type usage in the typed element. They are used, for example, for specifying arrays during the modeling (e.g., property type = char and type modifier = [30] gives property:char[30]). Type modifiers are extensively used in SQL models for specifying number field widths and varchar field lengths. For example, phone:varchar"(100)", where varchar is a type of phone property and "(100)" is a type modifier.

Each type mapping rule can carry a triple <modifier, regexp, replacementregexp> for setting type modifiers during the type replacement. These are specified in the tags on the mapping rule <**forwardTypeModifier**, **forwardTypeModifierRegexp**, **forwardTypeModifierRegexpReplace**> triple for controlling modifiers during the forward application of type map and correspondingly the <**reverseTypeModifier**, **reverseTypeModifierRegexp**, **reverseTypeModifierRegexpReplace**> triple for controlling modifiers during reverse application of type map.

Any of the components of the triple can be missing, i.e., not specified.

If no tags are specified, then type modifiers are not changed during the type remapping operation (whatever modifier was in the source model, it will be copied into the target model)

If just the modifier is specified for the mapping rule, then modifiers are set during the application of this type rule. This can be used for setting the fixed type modifiers. For example, mapping boolean in the UML model to number(1) in the SQL models (in this case the modifier="(1)" is used in the type map).

If all three are specified, a modifier, regexp, and regexp replacement, modifier remapping is performed as follows: during the transformation, the existing type modifier is matched against the given regexp. If it does not match, the type modifier is overwritten with the value, specified in the modifier field of the rule. If it does match regexp, the replacement is run on the match result and produces a type modifier to be set as a result. This allows quite complex rules to be written and executed, however this mandates good knowledge of regexp.

Let's review the following live example: in the char -> varchar type mapping rule for the UML to SQL transformation, the following triple can be used: modifier="(255)", modifierRegexp="^[\(\[]([0-9]*)[\)\]]$", and modifierRegexpReplace="($1)". This causes the char[20] type usages (type=char, modifier="[20]") in the source be changed to varchar(20); char (without modifier) would be remapped to varchar(255).

If regexp replacement is not specified, it is treated as if "$0" was specified: the type modifier is copied from the source, if it does match the regexp.

Transformation Traces and Update

When a transformation is performed, it establishes traces between the transformation source model elements and the transformation result model elements. These traces carry information of what was transformed into what. Traces are stored in an auxiliary package under the transformation destination package carrying the «transformation» stereotype and containing a lot of instance specifications (since this is implementation specific data, please, do not edit the internals). If you want to remove trace information, simply delete this package.

Trace information can be used for navigating between the model layers. This is done with the traceability features of MagicDraw. To navigate in the forward direction, i.e., from the transformation source model element to the destination model element, right-click that element and choose **Go To** > **Traceability** > **Model Transformations** > **Transformed To** > <element>. To navigate in the backward direction, i.e., from the transformation destination model element to the source model element, right-click that element and choose **Go To** > **Traceability** > **Model Transformations** > **Transformed From** > <element>.

Traceability information is also visible in the element's Specification window, the **Traceability** tab; in the Properties panel, **Traceability** tab; it can also be depicted in the Relation Map diagram or in the custom dependency matrix.

Traces can be used for running the transformation update. The transformation update reapplies the transformation with the same source and target for the purpose of carrying additional changes from the source (which occurred after transformation was made) into the destination.

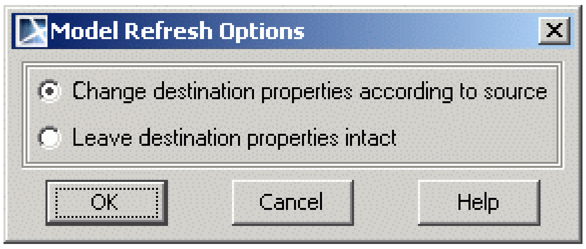
During the transformation update, presence of unmapped model elements in the source model indicates that these are newly added elements. Usual rules and the same behavior for the transformation are used for these elements as if this were the first application of the transformation.

During the transformation update, if model elements already contain mapping, and the source and destination does not match, the question arises - which properties to use. This is fundamental problem for all updating operations. The general solution is to have some kind of merge between the source and target. But merge is clumsy and expensive. MagicDraw implements a simplistic approach meaning that during the transformation update a user can choose, wherever he/she wants thesource model element properties to win (destination model element properties are overwritten) or wherever he/she wants the destination model properties to win (destination model properties are not changed).

To update a transformed model

- Right-click the destination package and select **Tools** > **Update Transformed Model**.

The **Model Refresh Options** dialog box opens.



(● Change destination properties according to source)
○ Leave destination properties intact

Figure 246 -- Model refresh options dialog box

The **Change destination properties according to source** option causes overwriting of element properties in the destination model with properties from the source model (only for the elements connected with mapping dependencies).

The **Leave destination properties intact** option leaves the destination model properties unchanged but different from the source model, in other words retains changes made to the destination model while it ignores changes made to the source model.

NOTE	If new elements are added to the source, once the update occurs, copies of the new elements will be created in the destination model. If an element is deleted from the source, it will not be removed from the destination after the update.

Profile Migration Transformation

Transformation provides a way to migrate your model according specified mapping rules.

Profile migration transformation search-and-replaces the following elements:

- Applied stereotypes
- Tagged values
- Usages of one type with another type

Element symbols are updated according to model changes.

Before starting transformation you have to define transformation mapping.

Profile Migration Transformation mapping

Before starting transformation you have to create transformation mapping rules.

To create mapping rules you need to create Dependency relationship between elements you want to transform. Mapping rules can be created (dependency relationship can be created) between the following elements:

1. Stereotypes
2. Tags
3. Types

Creating mapping rules for Stereotype transformation

This type of transformation is used to replace Stereotype. To create Stereotype transformation mapping rule:

1. Create Dependency relationship between Stereotypes which you want to transform.
2. Apply *ReplaceStereotype* stereotype to Dependency.
3. Perform transformation.

Tag values of old stereotype are preserved when tag name and type of tag value is the same. For tag values with different names create mapping rule for tag transformation.

ReplaceStereotype stereotype has the following tags:

- **disableNewTypeCreation** tag. By default false. Set this tag to true if you do not want to perform transformation when target and source metaclasses are not compatible. For example, if you do not want that Class would be changed to Use Case.
- **disableReplaceWhereSaveAsElementValue** tag. By default false. Set this tag to true if you do not want that stereotype would be changed where it is used as Tag value (tag value is stereotype itself, for which you perform transformation).

Creating mapping rules for Tag transformation

This type of transformation is used to replace Tag (when tag names differs). For example, source stereotype has *author* Tag and target stereotype has *name* Tag.

To create Tag transformation mapping rule:

1. Create Dependency relationship between Tags which you want to transform.
2. Apply *ReplaceTaggedValue* stereotype to Dependency.
3. Perform transformation.

NOTE To create mapping rule correctly, you have to create Dependency relationship not only between Tags, but also between Stereotypes of these tags (see mapping between stereotypes, which is described above).

Creating mapping rules for types transformation

This type of transformation is used to replace type. For example, to replace type of Attribute.

To create types transformation mapping rule:

1. Create Dependency relationship between Types which you want to transform.
2. Apply *ReplaceType* stereotype to Dependency.
3. Perform transformation.

Starting Profile Migration Transformation

To start the **Model Transformation Wizard**:

Do either:

- From the **Tools** menu, choose **Model Transformations**.

- Right-click one or more packages and select **Tools** > **Transform**.

To start the Profile Migration Transformation

- In the Model Transformation Wizard, select the **Profile Migration** transformation.

NOTE The **Next** step is disabled in the wizard, if there are no mapping defined.

Sample of the Profile Migration Transformation

This sample describes step-by-step instructions how to create profile migration mapping rules and perform transformation. In this sample we will change one stereotype to other.

1. Create *Book* stereotype with Class metaclass.
2. Create your model, for example, create *Source* package with *Source* Class diagram. Draw *Sample* Class and apply *Book* stereotype.

To change *Book* stereotype to other, for example to *Magazine* stereotype, you have to create profile migration transformation mapping rules. Follow next steps for creating mapping.

3. Create stereotype *Magazine* with Class metaclass.
4. From the *Magazine* stereotype to *Book* stereotype draw Dependency relationship.
5. To the Dependency relationship apply *ReplaceStereotype* stereotype (see Figure 1).

Profile Migration transformation mapping rule is created. Now you can start transformation.

6. To start transformation select **Model Transformations** from the **Tools** menu. The **Model Transformation Wizard** will open.
7. Select the **Profile Migration** transformation and click **Next**.
8. Select the *Source* package in the *Select source/destination* step (Figure 3). Click **Next**.
9. The **From** and **To** fields display the mappings of the selected transformation profile in the *Check mappings* step (Figure 4). Click **Finish**.

After this transformation stereotype of *Sample* Class will be changed to *Magazine* stereotype.

For more information about Model Transformation Wizard, see “Working with Model Transformation Wizard” on page 353.

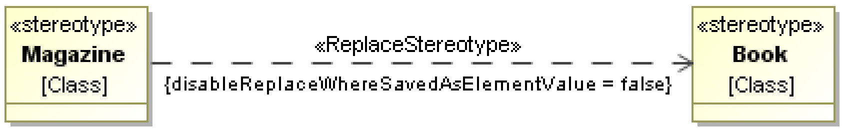
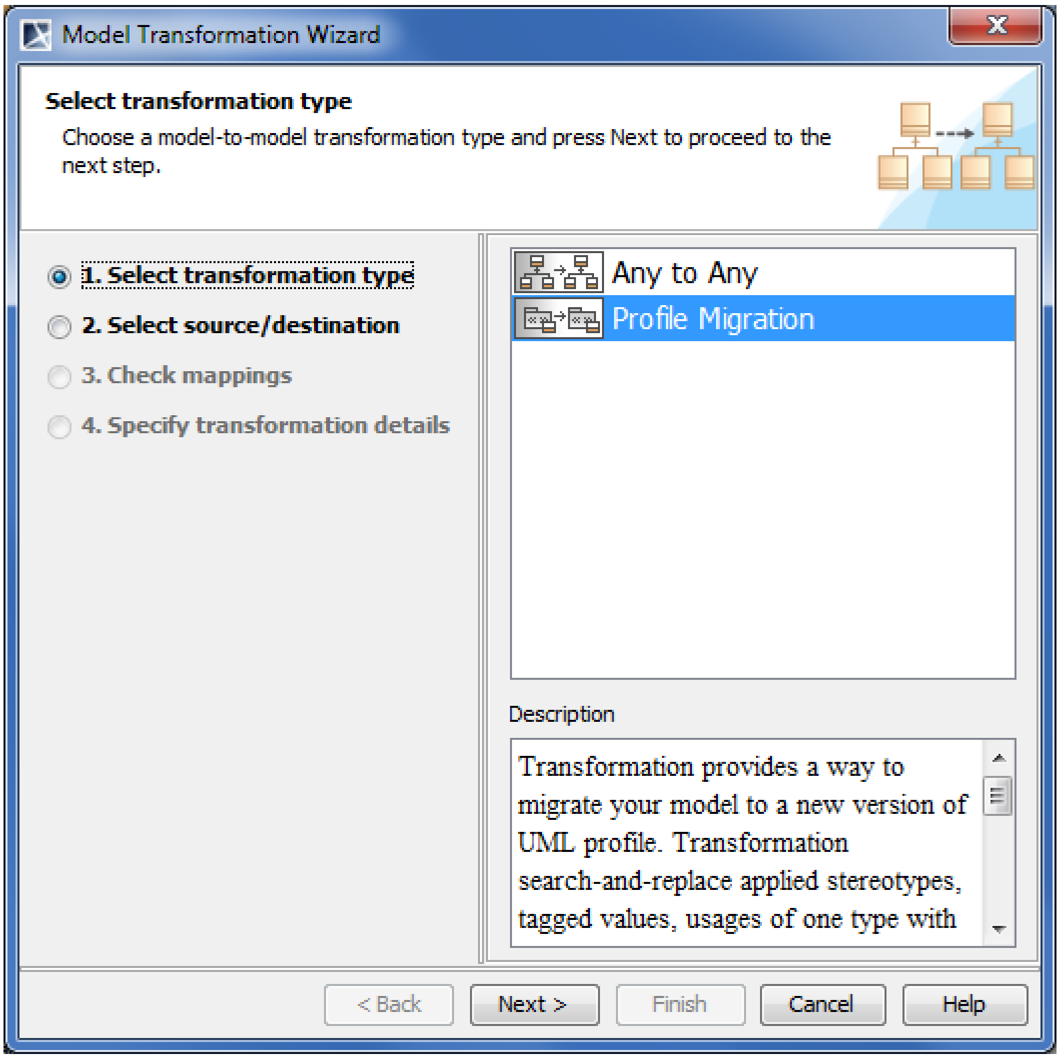
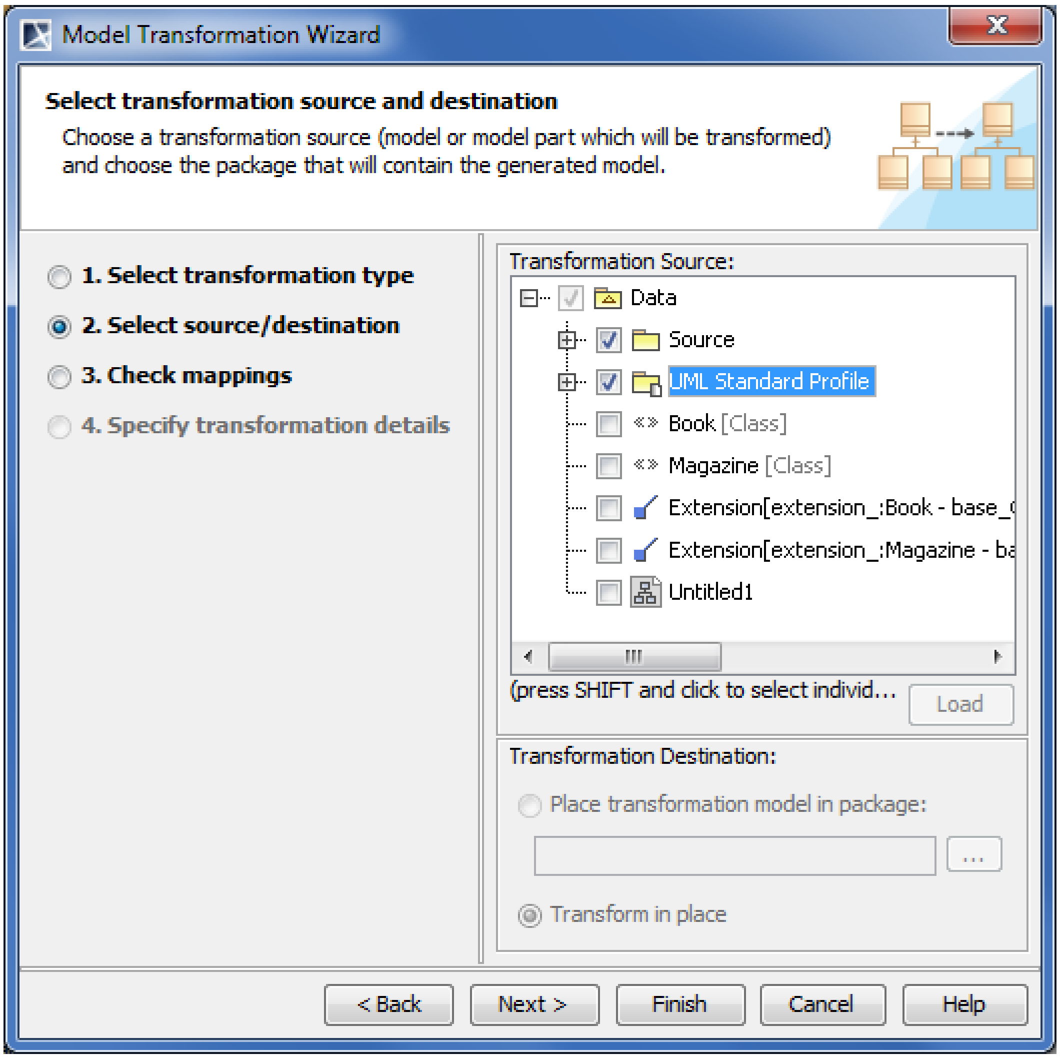


Figure 247 -- Profile Migration Transformation mapping


Model Transformation Wizard
Select transformation type
Choose a model-to-model transformation type and press Next to proceed to the next step.
1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details
Any to Any
Profile Migration
Description
< Back
Next >
Finish
Cancel
Help

Transformation provides a way to migrate your model to a new version of UML profile. Transformation search-and-replace applied stereotypes, tagged values, usages of one type with

Figure 248 -- The Model Transformation Wizard, the Select transformation type step


Model Transformation Wizard

Select transformation source and destination

Choose a transformation source (model or model part which will be transformed) and choose the package that will contain the generated model.

1. Select transformation type
[✓ 2. Select source/destination]
3. Check mappings
4. Specify transformation details

Transformation Source:

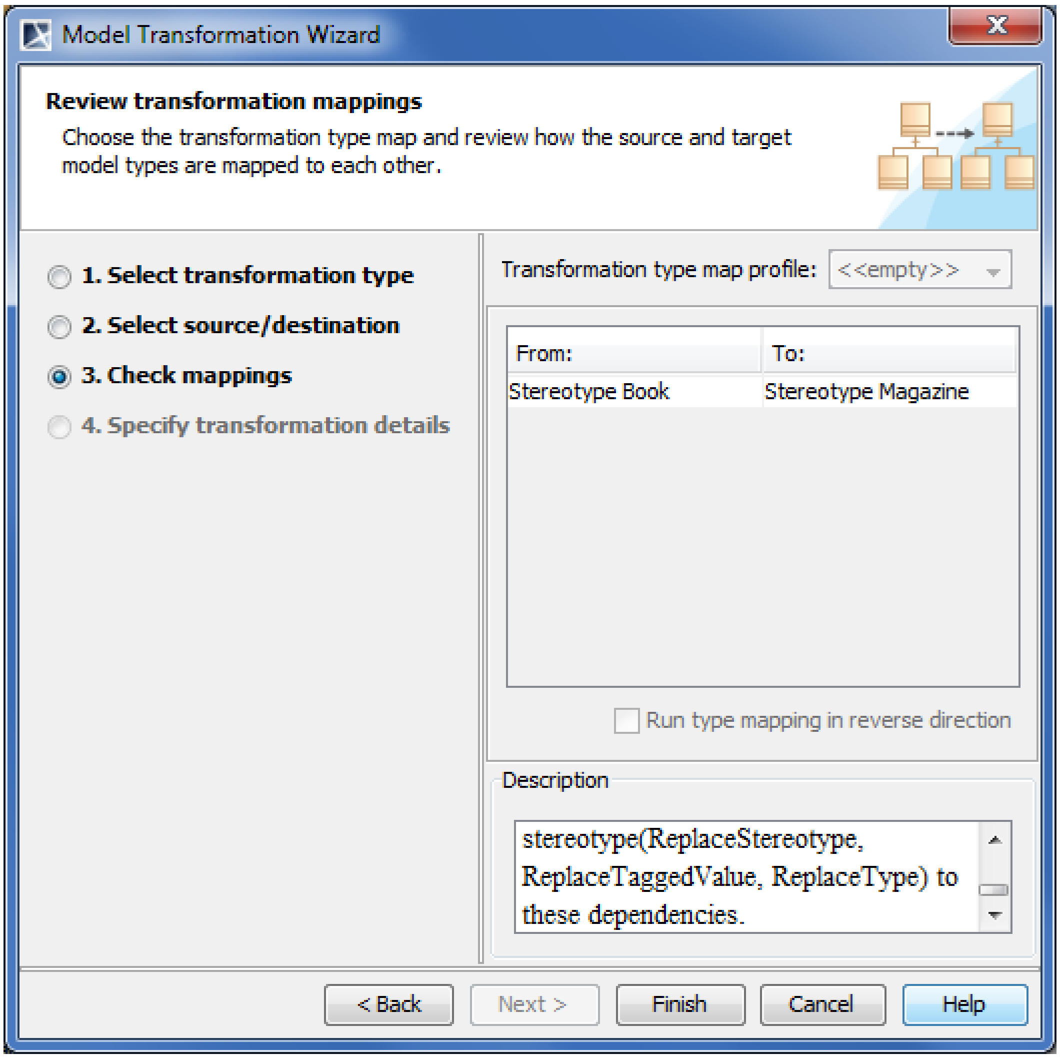
- [✓] Data
  - [✓] Source
  - [✓] UML Standard Profile
  - [ ] Book [Class]
  - [ ] Magazine [Class]
  - [ ] Extension[extension_:Book - base_
  - [ ] Extension[extension_:Magazine - ba
  - [ ] Untitled1

(press SHIFT and click to select individ...

Transformation Destination:

Place transformation model in package: [✓ Transform in place]

Figure 249 -- The Model Transformation Wizard, the Select source/destination step


Model Transformation Wizard
Review transformation mappings
Choose the transformation type map and review how the source and target model types are mapped to each other.
1. Select transformation type
2. Select source/destination
3. Check mappings
4. Specify transformation details
< Back
Next >
Finish
Cancel
Help

Transformation type map profile: <<empty>>

From:	To:
Stereotype Book	Stereotype Magazine

[ ] Run type mapping in reverse direction

Description

stereotype(ReplaceStereotype, ReplaceTaggedValue, ReplaceType) to these dependencies.

Figure 250 -- The Model Transformation Wizard, the Check mappings step

Resource Manager

MagicDraw Resource Manager functionality allows you to manage local resources (installed with MagicDraw, downloaded) and resources available on the web.
With RM (Resource Manager) you can manage different types of resources (Profiles, Plugins, Templates, Language resources, Case studies/examples, Custom diagrams, and others).
RM allows:

- Review
- Remove (delete)
- Import, download
- Update resources.

The following are benefits of the Resource Manager functionality:

Benefits:

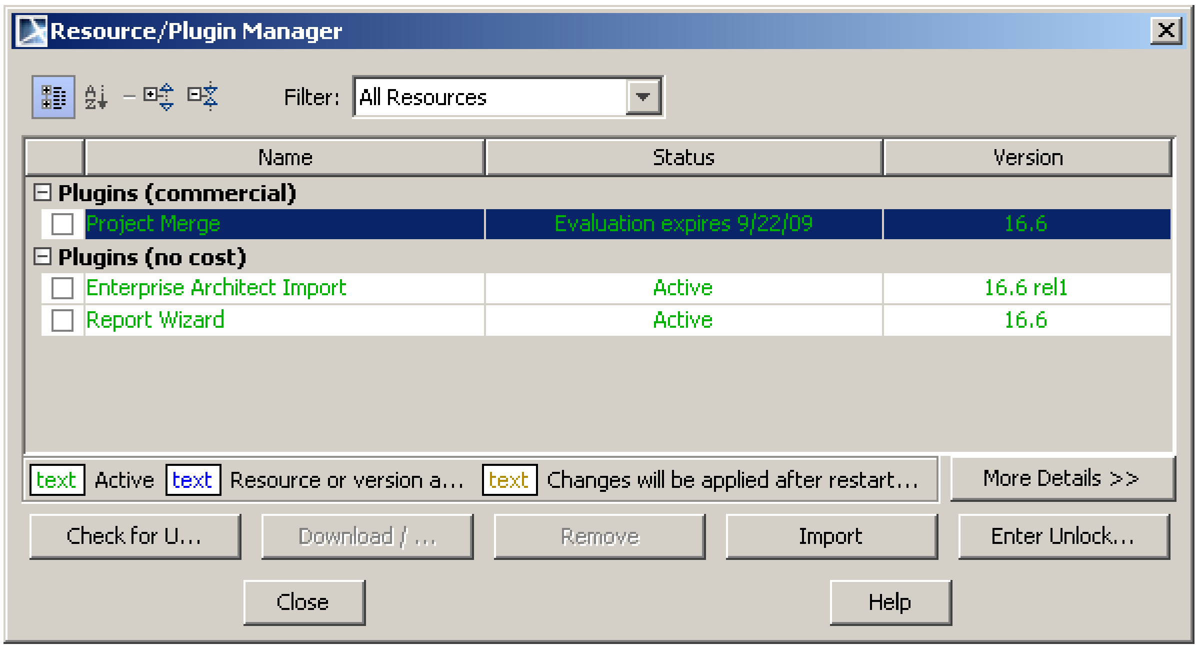
- Easier to find needed resources and download them.

- More informative resource descriptions.
- The possibility to create your own resources and share them.
- The possibility to check resource dependency in the required table.

The Resource Manager functionality is included in all MagicDraw editions, except, Reader.

To open the Resource Manager:

From the Help main menu, select the **Resource/Plugin Manager** command. The Resource / Plugin Manager window opens.


Resource/Plugin Manager

Filter: All Resources

	Name	Status	Version
⊟	**Plugins (commercial)**		
☐	Project Merge	Evaluation expires 9/22/09	16.6
⊟	**Plugins (no cost)**		
☐	Enterprise Architect Import	Active	16.6 rel1
☐	Report Wizard	Active	16.6

text Active text Resource or version a... text Changes will be applied after restart...

The table below lists items of the Resource Manager window.

Element Name	Function
Name	Different types of resources are listed in separate nodes. There are the following resources types: examples, templates, languages, and profiles. In front of each resource is a check box. Select this check box to manage this resource. If the resource is unavailable, it is impossible to select the check box in front of it (checkbox is grey). The required table rows contain information about why it is not available.
ID	Resource ID.
Category	Resource type.
State	The following states of resources are possible: • Not installed (downloaded) • Will be installed after restart • Installed • Will be removed after restart • Not downloaded • removed (if resource does not exist on the web).

Ver Obtained	The **Version Obtained** column indicates the version for a resources and the state: installed, not installed, and removed.
Ver Available	The Version Available Column indicates the newest resource version on the web. • Does not exist on the web. If the resource does not exist on the web. • Check for updates. If the resource list has not been downloaded from the web.
Date	Resource creation date.
Size	Size of the particular resource.
Meaning of text colors	One row lists the meanings of the text colors: • Green - installed resources are marked green. • Blue - not downloaded resources are marked blue. If the resources are already installed or downloaded and the newer version is available, the resources are marked blue. • Black - changes will be fully applied after restarting MagicDraw.
More>>/<<Less	Expands / Collapses the main Resource Manager window with additional fields. The following fields list all data of the selection in the resource list: • Name, Resource home page, Provider, Description • Required table (with Name, Required, Status columns). If a resource is installed but a newer version is available on the web, the required table shows the newest version requirements.
Check for Updates	The **Check for Updates** button is inactive if the resource list has already been successfully downloaded.
Download/Install	Downloads the selected resources and installs. The Download/Install button is inactive if no resources have been selected.
Remove	Button is active if at least one resource is selected with states “not installed” or “installed”. The resources of other states may not be removed from the RM list. The remove functionality is not available for required resources.
Import	The **Open** dialog is opened. Import the resource you need.

NOTE If the resource requires payment, the **Price** of the particular resource is displayed in the **Resource Manager** window under the **Price** column.

Spelling Checker

Spelling Checker enables you to:

- Check spelling as you type. A shortcut menu provides spelling options. Right click the word underlined in red to enter the shortcut menu. Spelling options will be displayed. Words can also be entered into a customized dictionary using **Add to Dictionary** (see “Spell checking as you type” on page 372).
- Check the spelling of a whole project or of a selected part. You can list all the spelling errors found in a project and correct them easily (see “Spell checking for the whole project or the selected scope” on page 374).
- Set Spelling Checker options. You can set spelling checker options, such as skipping numbers, upper case words in the **Environment Options** dialog box (**Spell Check** option) (see “Setting the spell checking options” on page 378).

- Add a spell checking dictionaries. All "Open Office" supportive spelling languages can be added additionally to the existing ones (see “Spell checking dictionaries” on page 380).

Spell checking as you type

On typing spell checker checks if typed word is correct. In case the word is incorrect it is underlined with red winding line. Right-click on underlined word invokes context menu with suggested editions and capability to add word to dictionary.

Spell checking as you type is performed in the following locations in MagicDraw:

- symbol names on diagram pane,
- for properties in the specification dialog boxes,
- in the documentation pane,
- in the Containment tree,
- In various location on log messages, names, typing and comment fields.

Right-click on underlined word to invoke the shortcut menu in the following MagicDraw window locations:

1. Diagram pane (see Figure 251 on page 372).
2. Containment tree (see Figure 252 on page 373).
3. Dialog boxes (see Figure 253 on page 374).

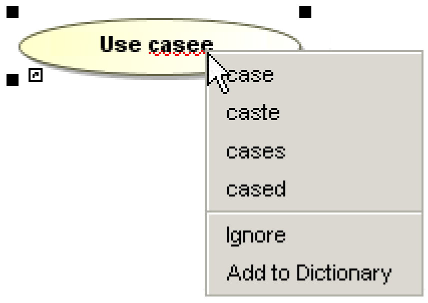


Figure 251 -- Shortcut menu of the spelling error on the diagram pane

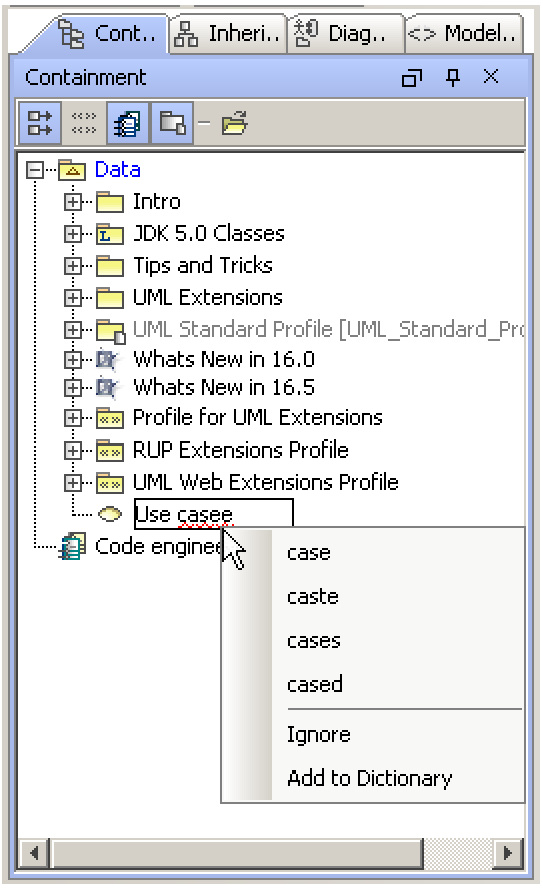
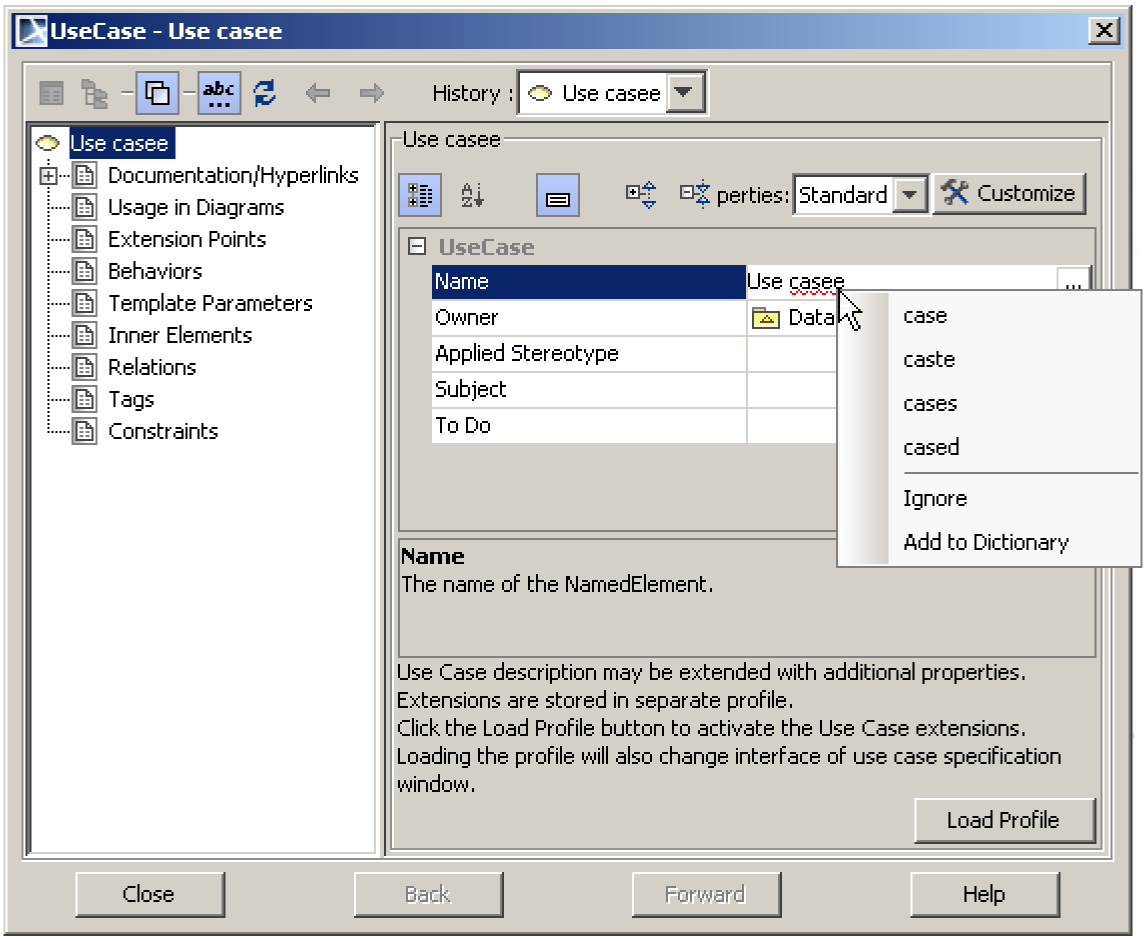


Figure 252 -- Shortcut menu of the spelling error in the Containment tree



Name	Use casee
Owner	Data
Applied Stereotype	
Subject	
To Do	

Name
The name of the NamedElement.

Use Case description may be extended with additional properties. Extensions are stored in separate profile. Click the Load Profile button to activate the Use Case extensions. Loading the profile will also change interface of use case specification window.

Figure 253 -- Shortcut menu of the spelling error in the dialog box

There are three ways to correct the spelling error:

1. Wrongly typed word can be changed by typing or by selecting provided suggestion that is always correct syntactically, but not always correct semantically.
2. The **Ignore** command. Select the **Ignore** menu item and the wrongly spelled word is treated as correct for this time, but will be discovered as wrongly spelled in the other case.
3. The **Add to dictionary** command. Select the **Add to dictionary** menu item in pop-up menu. By pressing this item the wrongly spelled word will be added to custom dictionary. Next time it will not be treated as wrongly typed.

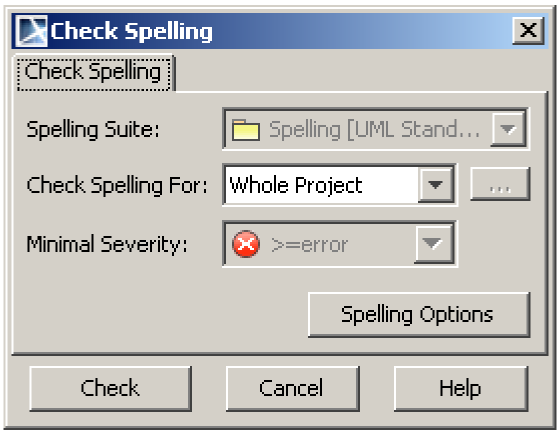
NOTE: Wrongly spelled words are underlined only in edit mode of particular component. If edit mode has been left, underline disappears and vice versa.

Spell checking for the whole project or the selected scope

Checking spelling for the whole project

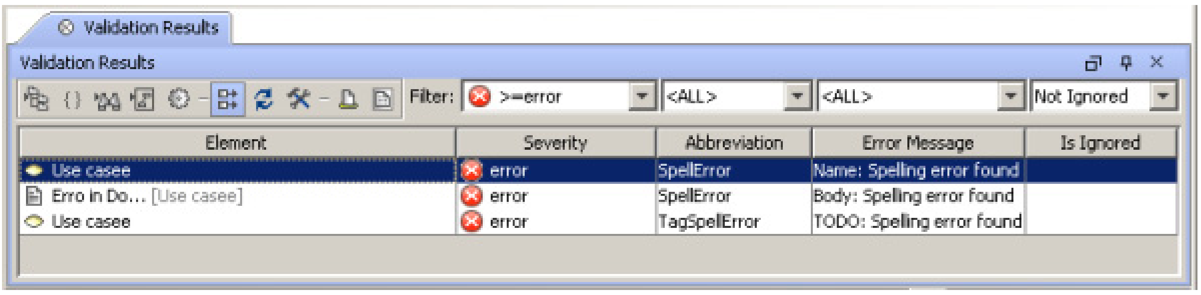
1. From the **Tools** main menu, select the **Check Spelling** command or press the **Check Spelling** button in the main toolbar. The **Check Spelling** dialog box opens.

2. Click the **Check** button. The **Validation Results** dialog box opens.



Spelling Suite: Spelling [UML Stand...
Check Spelling For: Whole Project
Minimal Severity: >=error

Figure 254 -- The Check Spelling dialog box



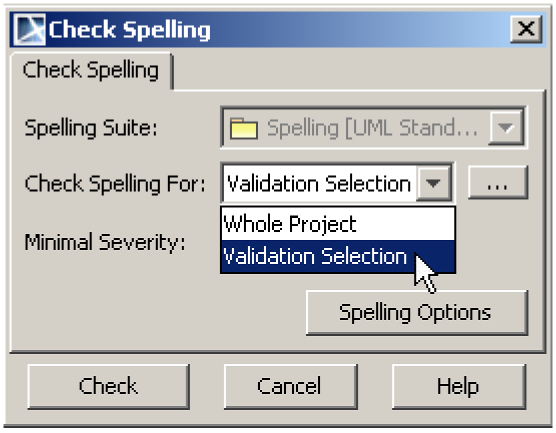
Filter: >=error <ALL> <ALL> Not Ignored

Element	Severity	Abbreviation	Error Message	Is Ignored
Use casee	error	SpellError	Name: Spelling error found	
Erro in Do... [Use casee]	error	SpellError	Body: Spelling error found	
Use casee	error	TagSpellError	TODO: Spelling error found	

Figure 255 -- The Validation Results dialog box

Checking spelling for the selected scope

1. From the **Tools** main menu, select the **Check Spelling** command. The **Check Spelling** dialog box opens.
2. In the **Check Spelling For** combo box select the **Validation Selection** option.
3. Click the "…" button. In the element Selection dialog, select the scope to check spelling.
4. Click **OK**.
5. In the **Check Spelling** dialog box, click **Check**. The **Validation Results** dialog box opens.



Spelling Suite: Spelling [UML Stand...
Check Spelling For: Validation Selection
Minimal Severity:

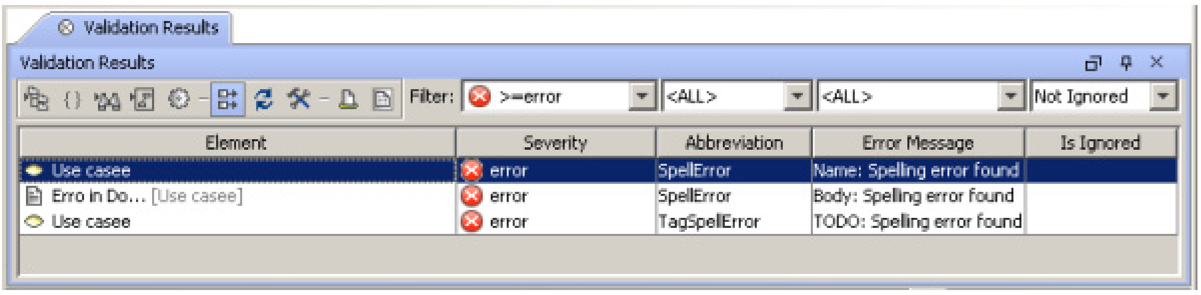
Figure 256 -- The Check Spelling dialog box, the Check Spelling For option

Analyzing the Check Spelling (the Validation Results window)

The **Validation Results** window provides with all spelling errors. You can choose either to correct particular error or to ignore it. For more information about correcting the spell checking error, “Solving the spell checking errors” on page 376.

Spelling error in the **Validation Results** window has description of construct as follows:

Column title	Description
Element	Element with contains spelling error. Spelling error can be found in the element name, or inner properties, such as documentation, the To Do property and others.
Error Message	<Element property name>: <Spelling error found>


Validation Results

Validation Results

Filter: >=error <ALL> <ALL> Not Ignored

Element	Severity	Abbreviation	Error Message	Is Ignored
Use casee	error	SpellError	Name: Spelling error found	
Erro in Do... [Use casee]	error	SpellError	Body: Spelling error found	
Use casee	error	TagSpellError	TODO: Spelling error found	

Figure 257 -- The Validation Results window

For more information about validation functionality, see “Validation” on page 449. Here the **Validation Results** window is described in more details.

Solving the spell checking errors

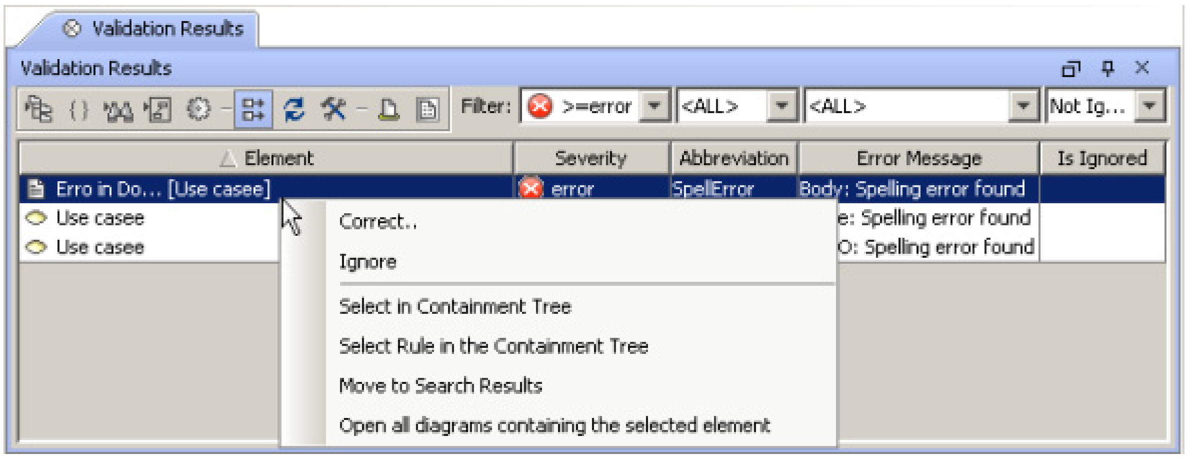
To solve the error:

1. In the **Validation Results** window select the error and with right click invoke its shortcut menu.
2. In the Containment Tree select the element with error (marked with red circle and white cross inside) and with right-click invoke its shortcut menu.
3. On the diagram pane, select the element with error (highlighted with red border) and with right-click invoke its shortcut menu.

In the shortcut menu of element with error, select the **Correct** command to invoke the **Spell Checker** dialog box.

In the **Spell Checker** dialog box the **Element** property shows the name of the element. The **Property** shows the name of the element's property that has spelling error in its value. In the **Value** property all wrongly spelled words are underlined.

Press the **Next** button to go to the next spelling error found during validation. To close spelling dialog and save changes press **OK**. To close dialog without saving changes press **Cancel**.


Validation Results
Validation Results
Filter: >=error <ALL> <ALL> Not Ig...
Correct..
Ignore
Select in Containment Tree
Select Rule in the Containment Tree
Move to Search Results
Open all diagrams containing the selected element

Element	Severity	Abbreviation	Error Message	Is Ignored
Erro in Do... [Use casee]	error	SpellError	Body: Spelling error found	
Use casee			e: Spelling error found	
Use casee			O: Spelling error found	

Figure 258 -- Solving the spell checking errors in the Validation Results window

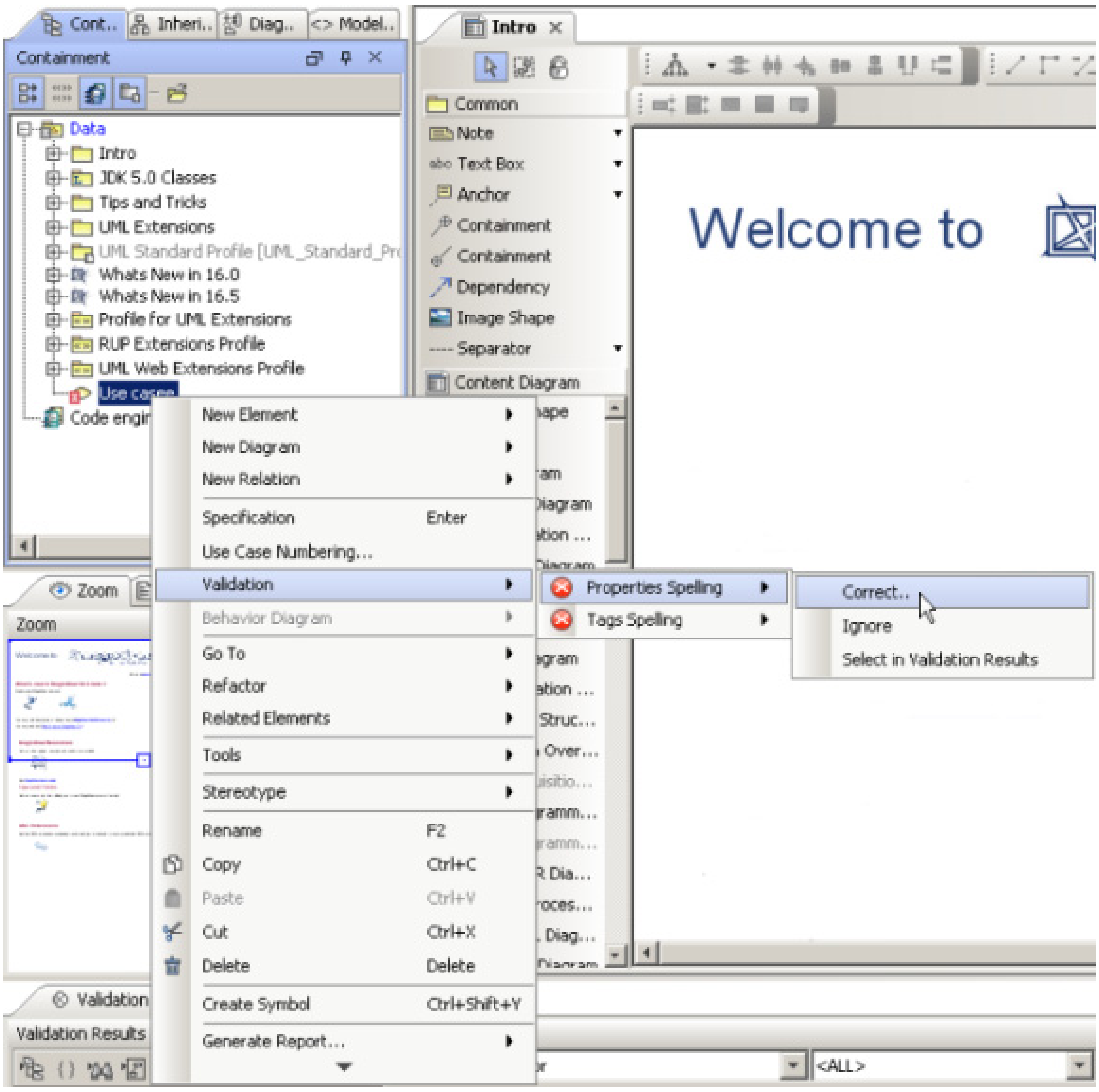


Figure 259 -- Solving spell checking errors in the Containment tree

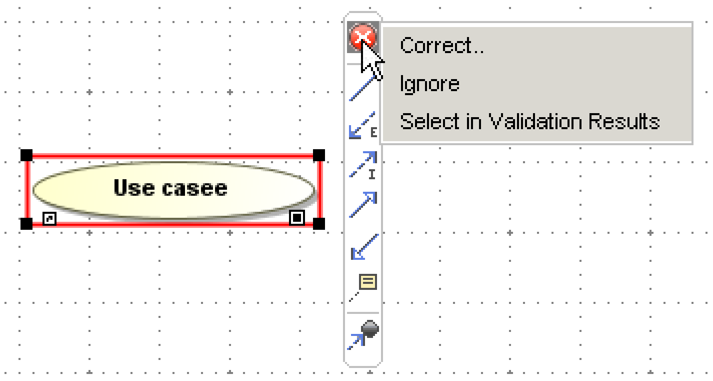
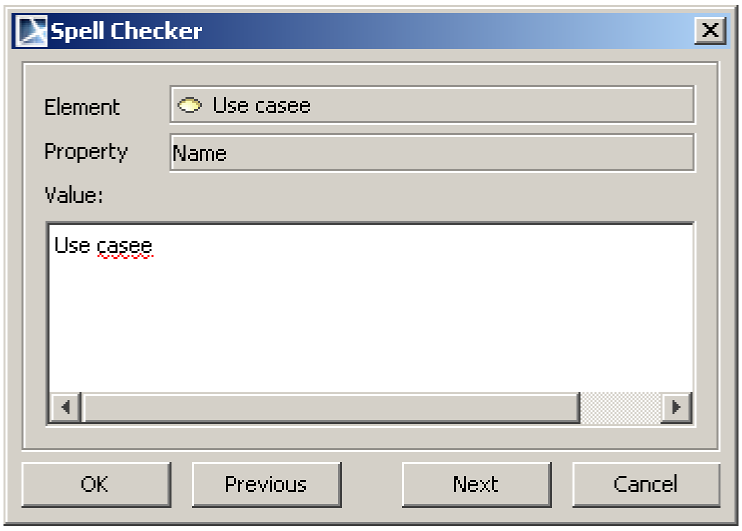


Figure 260 -- Solving spell checking errors in the diagram pane

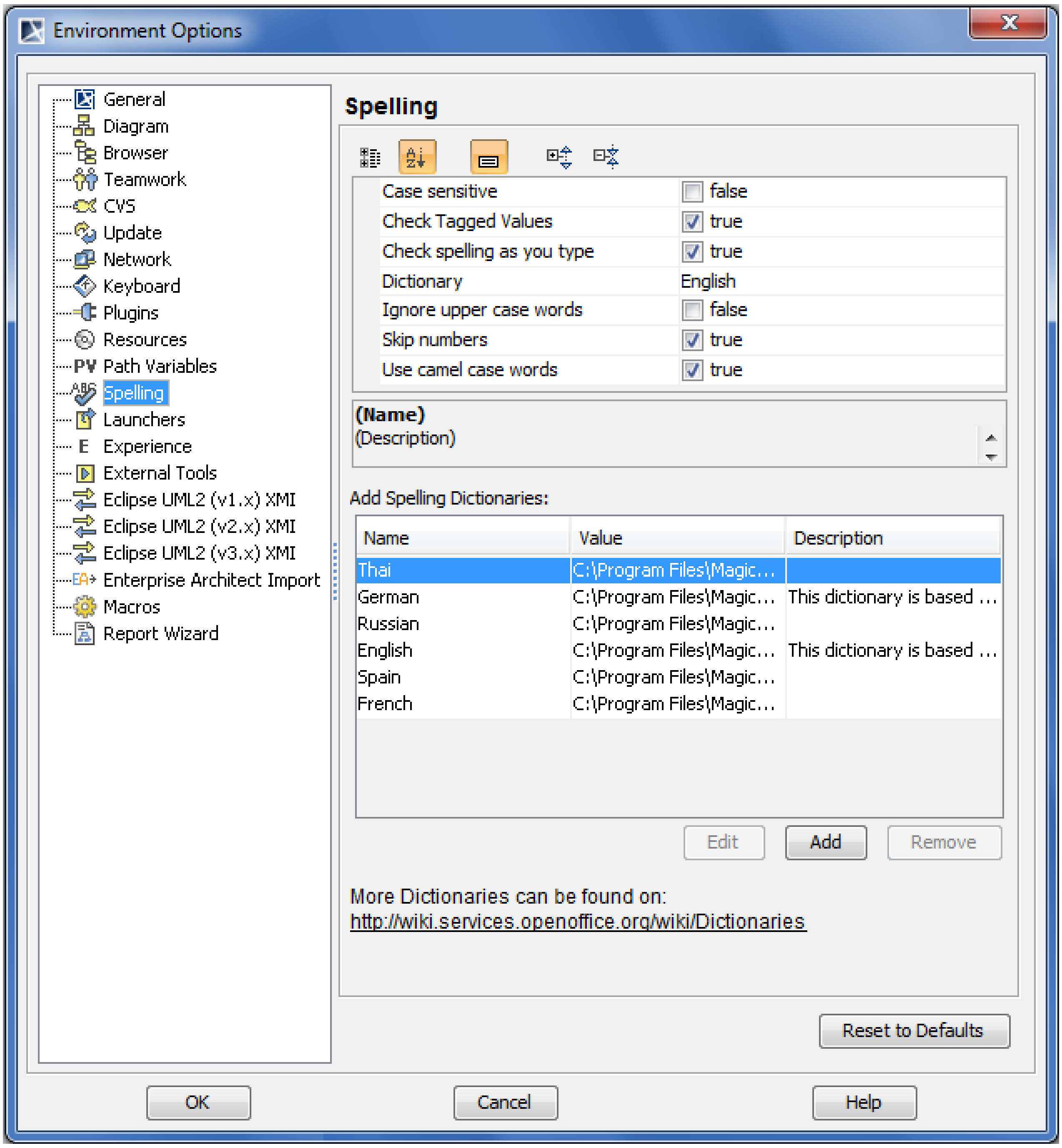


Element: Use casee
Property: Name
Value:
Use casee

Figure 261 -- The Spell Checker dialog box

Setting the spell checking options

1. From the **Options** main menu, select **Environment**. The **Environment Options** dialog box opens.
2. Select the **Spelling** branch. Define the spelling options.



Case sensitive	false
Check Tagged Values	true
Check spelling as you type	true
Dictionary	English
Ignore upper case words	false
Skip numbers	true
Use camel case words	true

(Name)
(Description)

Add Spelling Dictionaries:

Name	Value	Description
Thai	C:\Program Files\Magic...	
German	C:\Program Files\Magic...	This dictionary is based ...
Russian	C:\Program Files\Magic...	
English	C:\Program Files\Magic...	This dictionary is based ...
Spain	C:\Program Files\Magic...	
French	C:\Program Files\Magic...	

More Dictionaries can be found on:
http://wiki.services.openoffice.org/wiki/Dictionaries

Figure 262 -- The Environment Options dialog box, the Spelling branch

Spell checking options

See the spelling options in the table below.

Property name	Function
Check Spelling as you type	Underlines wrongly spelled words and provide the suggestions list of possible corrections in context menu. For more information about spell check on type, see “Spell checking as you type” on page 372.

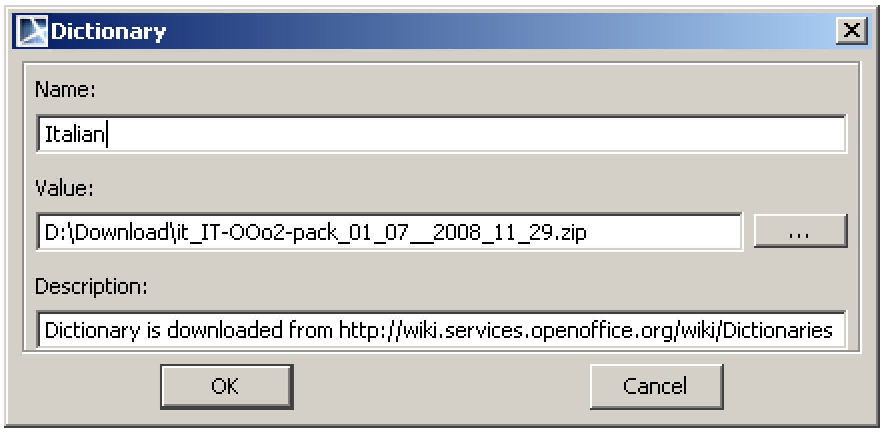
Check Tagged Values	Checks all tagged values that is Type of string.
Dictionary	Select language for spelling. All "Open Office" supportive spelling languages can be added additionally to the existing ones. For more information about spelling dictionaries, see “Spell checking dictionaries” on page 380.
Case Sensitive	If true, words will differ in meaning based on differing use of uppercase and lowercase letters.
Use camel case words	If true, compound words or phrases in which the words are joined without spaces and are capitalized within the compound-as in BackColor, will be spelled as separate words.
Ignore upper case words	If true, words with uppercase words only are not to be spell checked.
Skip numbers	If true, numbers are not to be spell checked.

Spell checking dictionaries

All "Open office" supportive spelling languages are available.

To import spelling dictionaries:

1. Click the **Add** button in the **Environment Options** dialog box > the **Spelling** branch > the **Add Spelling Dictionaries** group. The **Dictionary** dialog box opens.
2. Type the name of a new spelling dictionary in the **Name** text box.
3. Click the "…" button and select the OpenOffice zip file location.
4. Type the description of a new spelling dictionary in the **Description** text box.



Name: Italian

Value: D:\Download\it_IT-OOo2-pack_01_07__2008_11_29.zip

Description: Dictionary is downloaded from http://wiki.services.openoffice.org/wiki/Dictionaries

Figure 263 -- The Dictionary dialog box

NOTE	More dictionaries can be found at http://wiki.services.openoffice.org/wiki/Dictionaries

Defining properties of the customized element to be spell checked

DSL customization classes and their properties can be checked either. You can choose what properties of the customized element (Class with «Customization» stereotype) you want to be spelling checked.

Defining customization class tag "checkSpelling" value can do it. "checkSpelling" tag can be found in properties tag group. By creating value for this tag you can choose String properties to check spelling for. By default there are no properties marked as checkable.

For more information about DSL, see UML Profiling and DSL UserGuide.pdf.

Import Data to MagicDraw

Import data from Rational Software Architect/Modeler using MagicDraw RSXConverter

MagicDraw RSXConverter provides a seamless way to convert IBM® Rational® Software Architect (RSA) or IBM® Rational® Software Modeler (RSM) file format (*.emx, epx and efx) to MagicDraw-supported file format (*.mdxml).

For more information about MagicDraw RSXConverter see:

MagicDraw RSXConverter

Import data from Rational Rose using MagicDraw RConverter

MagicDraw RConverter provides a seamless way to convert Rational Rose Model file format (*.mdl) to MagicDraw-supported file format (*.xmi).

For more information about MagicDraw RConverter, see:

MagicDraw RConverter plugin

Import data from other tools

1. MagicDraw can import most of the model data from the latest Enterprise Architect version. Enterprise Architect does not export 100% standard UML 2.1.1 XMI and this causes some data loss on import. Diagramming information is not imported.
2. XDE model import is not available.
3. Rational Software Architect/Modeler 6.x model files (not diagrams) can be imported with Eclipse UML2 1.x import.
4. Rational Software Architect/Modeler 7.x model files (not diagrams) can be imported with MagicDraw RSXConverter (see “Import data from Rational Software Architect/Modeler using MagicDraw RSXConverter” on page 381) or Eclipse UML2 2.x import could be used.
5. Rational Rose model files can be imported with MagicDraw RConverter (see “Import data from Rational Rose using MagicDraw RConverter” on page 381).
6. Together 2006 model files (not diagrams) can be imported with Eclipse UML2 1.x import.
7. Visio model files can be imported using a XMI exporter. Most of the static structure elements (not diagrams) can be imported. XMI plugin for Visio can be found:

Executable file of the XMI plugin	**Visio versions**	**Link**

XMIExport.exe	Microsoft Visio 2002 Professional, Microsoft Visual Studio .NET Enterprise Architect (Visio for Enterprise Architects)	http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=BE6D20EF-36BA-4ABF-A26F-91434C7E7B7
XMIExprt.exe	Microsoft Visio 2003	http://www.microsoft.com/downloads/details.aspx?familyid=3DD3F3BE-656D-4830-A868-D0044406F57D&displaylang=en#Overview

8 MODEL ANALYSIS

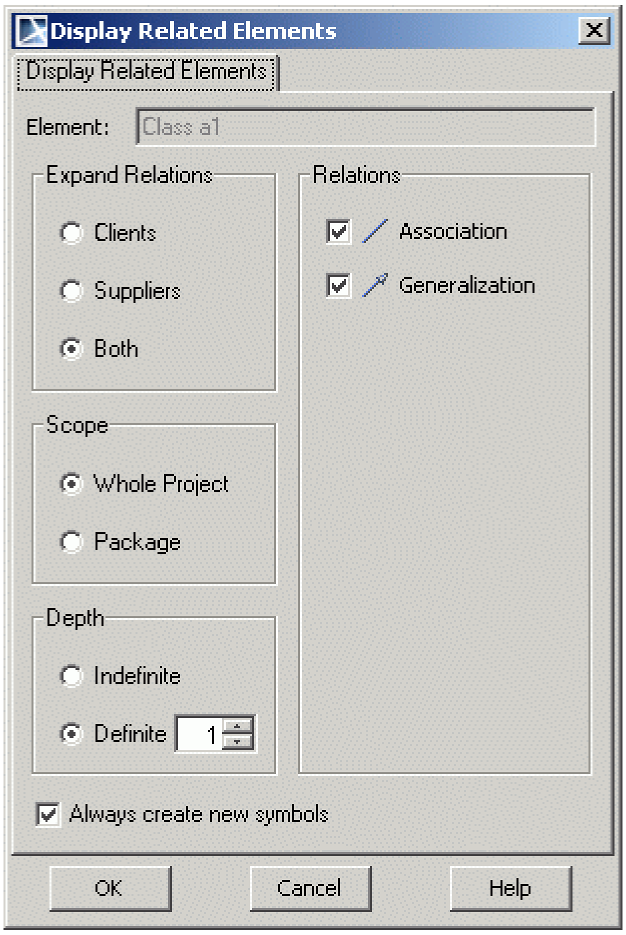
MagicDraw provides the following capabilities to help you analyze your model:

- "Displaying Related Elements" - displays paths among shapes that have already been created in the model data, use the quick and simple Display related elements functionality.
- "Analyzing Usages and Dependencies" - the MagicDraw Usages and Dependencies feature enables you to track and view element dependencies in UML models, explore how model elements are used by other elements, and understand the relationships between used and dependent elements.
- "Traceability" - allows you to track, visualize, navigate, and analyze the elements involved in traceability relations.
- "Relation Map" - the Relation Map diagram enables you to rapidly review and analyze relations between the elements of the whole model.
- "Symbol Usage in Diagrams" - displaying the list of diagrams in which symbol of current element is represented.
- "Projects Comparison" - compares two MagicDraw UML local projects or teamwork project versions, as well as diagrams.
- "Metrics" - allows measuring a project by different viewpoints.
- "Dependency Matrix" - is a method of visualizing and representing dependency criteria.
- "Analyzing Package Dependencies" - checks and analyzes package dependencies of the whole project or when exporting and sharing packages.
- "Validation" - a facility for evaluating completeness and correctness of the models created by the user.
- "Active Validation" - instantly checks model for correctness and completeness, displays errors in the model and suggests solutions.
- "Model Visualizer":
    - "Class Diagram Wizard" – helps to create and customize new class diagrams.
    - "Package Overview Diagram Wizard" – generates the package dependency diagram for packages in your project.
    - "Package Dependency Wizard"- generates diagrams containing packages (created within a project) and shows the relationships between them.
    - "Hierarchy Diagram Wizard" and "Realization Diagram Wizard" – prepares diagrams and report documents of the relationships between classes in the UML model.
    - "Activity Decomposition Hierarchy Wizard" - converts activity into class and/or SysML Block Definition Diagram.
    - "Content Diagram Wizard" - generates content of diagrams that are used in the project.
    - "Sequence Diagram from Java Source Wizard" - creates a sequence diagram of Java method implementation.

Displaying Related Elements

To display elements related to the selected element

1. From the **Edit** menu, **Symbol** submenu or from the shape shortcut menu, select **Related Elements** and then select **Display Related Elements**.
2. The **Display Related Elements** dialog box opens.



Display Related Elements

Element: Class a1

Expand Relations: Clients / Suppliers / [✓ Both]

Scope: [✓ Whole Project] / Package

Depth: Indefinite / [✓ Definite] 1

Relations: ✓ Association, ✓ Generalization

✓ Always create new symbols

Figure 264 -- Display Related Elements dialog box

3. Select the desired options for displaying the related elements:

Option name	Function
Expand Relations	Select what kind of elements should be displayed on the diagram: • Clients • Suppliers • Both
Scope	Select in what scope the elements related to the selected model element will be found: • Whole Project • Package

Option name	Function
Depth	Specify the range for searching for selected relationships: ● **Indefinite**. All possible relationships are involved. ● **Definite**. Specify the level of hierarchy for the relationships involved.
Relations	Select the relationships you want to display on the diagram.
Always create new symbols	When this check box is selected, a new symbol is created even if a related element already has a symbol in the diagram.

To display paths among shapes that already exist in the model data

- From the shape shortcut menu, select **Related Elements** and then **Display Paths**.
- Select a symbol and from the **Edit** menu, select **Symbol,** then **Related Elements,** and then select **Display Paths**.

Analyzing Usages and Dependencies

NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions.

The MagicDraw Used By and Depends On features enables you to track and view element dependencies in UML models, explore how model elements are used by other elements, and understand the relationships between used and dependent elements.

It is also useful for analyzing associations between elements or searching for diagrams where these elements are represented.

Understanding Used By

If you want to find all the elements that reference the current element, use the Used By functionality.

For example: If element1 references element2, this means that element1 uses element2. Conversely, element2 is also used by element1. In the **Attribute Specification** dialog box, add class2 in the **Type** box. This means that class2 is used by that attribute.

Containing other elements is not considered usage. For example, when a package contains an inner element class, this does not mean that the package uses the class. The class is categorized as only a container of the package.

Understanding Depends On

If you want to find all elements that current element depends on, use the Depends On functionality.

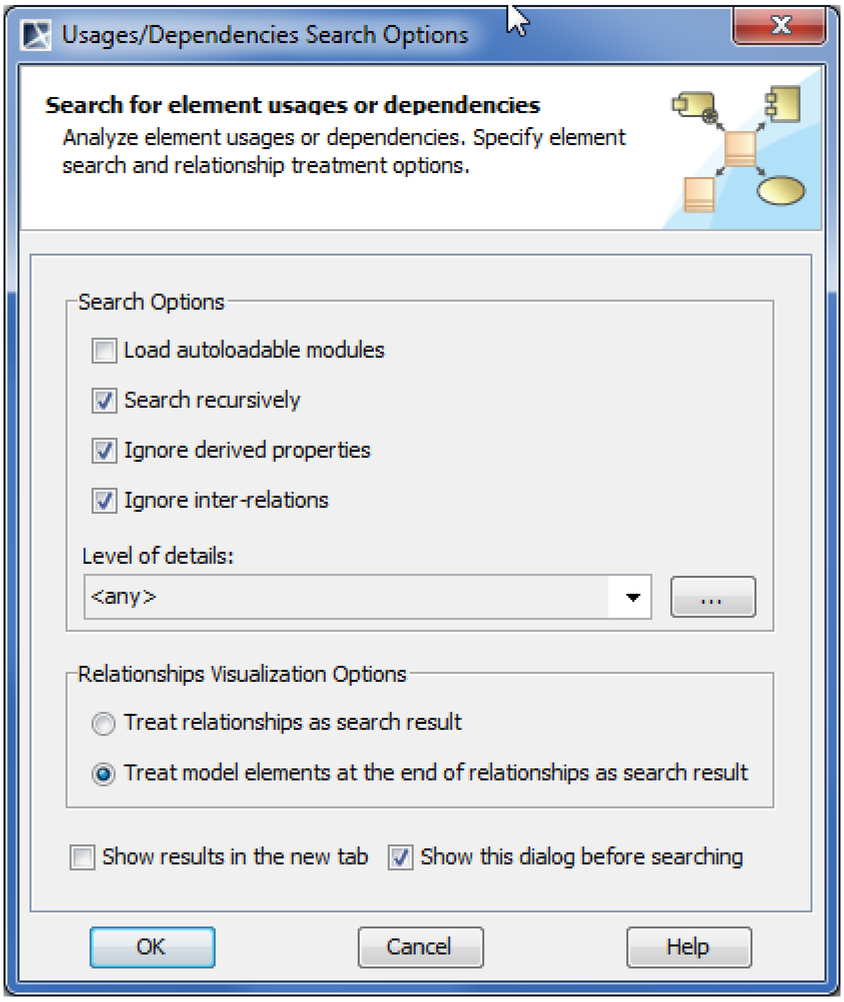
For example: If element1 contains a reference to element2, this means that element1 depends on element2.

Searching for Usages / Dependent Elements

To search for usages / dependent elements

1. Select an element in the Model Browser or on the Diagram pane.
2. From the element shortcut menu, select the **Related Elements** command and then select either the **Used By** or **Depends On** command.
3. The **Usages/Dependencies Search Options** dialog appears.

   The **Usages/Dependencies Search Options** dialog covers the spectrum of usages and dependent element functionality. This means that if you clear or select any check boxes in the **Usages/Dependencies Search Options** dialog, the next time you search for dependencies, the values for these check boxes remain the same.



Usages/Dependencies Search Options

Search for element usages or dependencies

Analyze element usages or dependencies. Specify element search and relationship treatment options.

Search Options

☐ Load autoloadable modules

☑ Search recursively

☑ Ignore derived properties

☑ Ignore inter-relations

Level of details: <any>

Relationships Visualization Options

○ Treat relationships as search result

● Treat model elements at the end of relationships as search result

☐ Show results in the new tab ☑ Show this dialog before searching

Element	Description
Load autoloadable modules	If the model has unloaded modules, select this check box to load all elements to be included in performing the usages / dependencies search. **NOTE:** This element is available if the **Used By** command was selected.

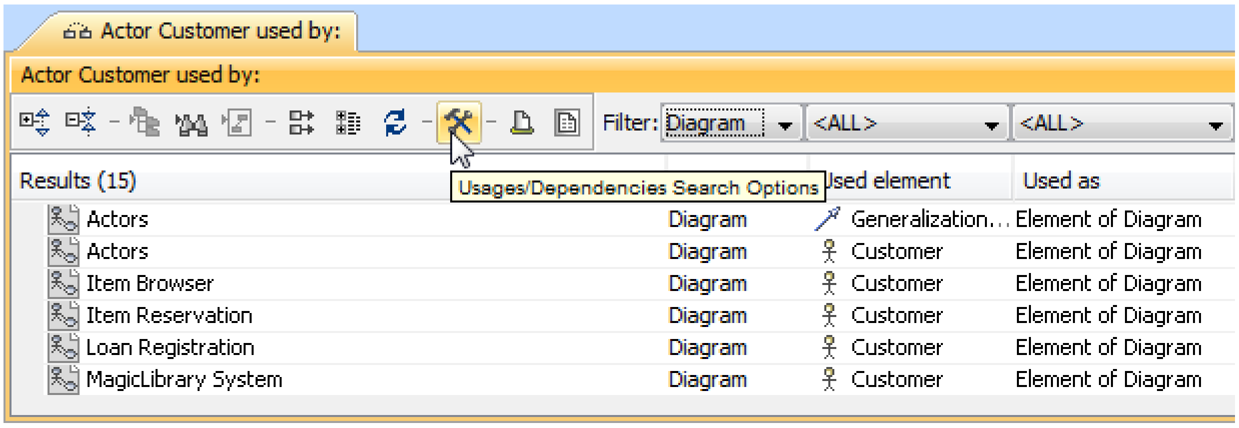
Element	Description
Search recursively	If selected, usages / dependencies of inner elements (beneath the level of the current element) are listed in the search result list. If unselected (default value), the usages / dependencies table lists these elements that are using the current element. **For example:** let's say, element1 contains element2. When you search non-recursively, only elements that use element1 are listed. When you search recursively, elements using element1 are listed, while the other branch lists these elements that use element2.
Ignore derived properties	If selected, derived properties of the element are not included when searching for elements usages / dependencies. A derived property is the one that is automatically calculated from the other properties. **NEW! NOTE:** It is strongly recomended to keep this option selected. Otherwise all derived properties will be included into the usages / dependencies searching scope, and this may cause a severe performance downgrade when searching for usages / dependencies.
Ignore inter-relations	If unselected, only usages / dependencies outside the current element (above the level of current element and in the same level) are listed. You may use this option when you export the package as modules. You may analyze the dependencies of a package inner element to its outer elements (note that you cannot export a package that contains inner elements with dependencies to the outer elements according to this package). **For example:** let's create package p1 and package p2. Connect these packages using the dependency relationship. In the Model Browser, drag this dependency to p1. In the **Usages/Dependencies Search Options** dialog, select the **Ignore inter-relations** check box. Search for the p1 dependency. The dependency to the dependency relationship will not be found because this element is a child of p1.
Level of details	Select predefined types (Classifiers, Packages) from the combo box or click the "**...**" button, which opens **Select Element/Symbol Type** dialog and allows the selection of custom types. Only elements of these types will be displayed in the search results. For example, *Package* selected as "level of details". Class B depends on Class A (owned in package p2), because it uses A as type of one operation parameter. In this case package p2 will be displayed as a result, class A will be added under p2 node.
Treat relationships as search result	If selected, search results provide a complete list of used or dependent relationships together with other results.
Treat model elements at the end of relationships as search results	If selected, relationships are skipped and only usages / dependent elements between the model elements connected with these relationships are displayed.
Show results in the new tab	If selected, a new Element Usages / Dependencies window is displayed for every new search.

Element	Description
Show this dialog before searching	If selected, the **Usages/Dependencies Search Options** dialog will open before searching for element usages or dependencies next time. If unselected, the dialog will not open before searching for element usages or dependencies next time. **TIP!** You can open the **Usages/Dependencies Search Options** dialog by clicking the Usages / Dependencies Search Options button on the toolbar in the Element Usages / Dependencies window.

4. Depending on which command you selected on the shortcut menu, either the Element Usages or Dependencies window opens.

   The Elements Using / Dependencies window lists the results of the usages / dependencies. In the Elements Using / Dependencies window you can analyze results, search for an element location (in a diagram, for example, or in a browser), and filter results.

   Because the Usages / Dependent Elements Results window is not synchronized with the model, any changes made to the model elements will not show in the results window until you click Refresh.



Results (15)		Used element	Used as
Actors	Diagram	Generalization...	Element of Diagram
Actors	Diagram	Customer	Element of Diagram
Item Browser	Diagram	Customer	Element of Diagram
Item Reservation	Diagram	Customer	Element of Diagram
Loan Registration	Diagram	Customer	Element of Diagram
MagicLibrary System	Diagram	Customer	Element of Diagram

Figure 265 -- Fragment of Actor Customer used by window

Element	Description
Expand	Expands records listed in groups. Click the plus sign next to the group name to display the contents.
Collapse	Collapses records listed in groups.
Select in Containment Tree	In the usages/dependencies table, select the record. Click the **Select in Containment Tree** button. The Element is selected in the Browser, and the **Containment tree,** and the symbol of this element is selected in the diagram pane. Click the **Select in Containment Tree** button to open any closed and previously loaded diagrams. You can also select the element in the Containment Tree by double clicking it. **NOTE:** The **Select in Containment Tree** button is not available for multiple element selections.
Move to Search Results	In the usages/dependencies table, select the record. Click the **Move to Search Results** button. In the usages/dependencies table results are moved to the Browser, Search Results tree. In the Search Results tree, you will see all the results in one list and organized in two groups: From diagram and From model.

Element	Description
Open all diagrams that contain current Usages/Dependencies	Diagrams, which are referenced in the usages/dependencies table, are opened. In the open diagrams, the view is focused on used/ dependent elements. **NOTE:** The **Open all diagrams that contain current Usages/ Dependencies** button is inactive when there are no elements that are used in diagrams.
Show/hide the Full Path Names	The full path is displayed next to the element name. **NOTE:** For a symbol this button is not valid.
Refresh	The usages/dependencies table should be refreshed after: • Elements or symbols are deleted. • New dependencies/usages are created for the particular model element.
Show Usages/Dependencies Search Options	The **Find Usages/Dependent Elements Options** dialog box opens.
Filter	**Filter** boxes in the **Elements used by and depends on** windows are placed above the column, which will be filtered. In the **used by** window, you can filter by element type or usage type. In the **depends on** window, you can filter according to element type and dependency type. When you expand the **Filter** box, you will see items listed in the usages/dependencies columns. **NOTE:** In the **Element Type Filter** box within the **used by** window, combo box, additional **Show All but Symbols** filtering options is added.

Traceability

View Online Demo	Traceability

NOTE	The traceability solution is available in Architect and Enterprise editions.

TIP!	You can also read about the traceability feature and analyze the examples in the Traceability sample. To open the sample, do any of the following: • On the Welcome screen, select **Samples** > **Product Features** > **Traceability**. • Go to the folder <MagicDraw installation directory>\samples\product features and open the *Traceability.mdzip* file. All the examples, given in this section, are based on the data from this sample.

As of version 16.8, MagicDraw supports the traceability feature that allows you to track, visualize, navigate, and analyze the elements involved in the traceability relations.

The traceability relations are used to relate the elements representing the same concept in different UML models at different levels of abstraction or from different viewpoints. Different levels of abstraction may contain, include, or even correspond to different stages of system development process (starting from requirements analysis and finishing with implementation). The higher level of abstraction (e.g., requirements analysis), contains models with specifying elements, and the lower level of abstraction (e.g., implementation) includes models with realizing ones.

The traceability relations help to determine how your requirements or the other model artifacts are satisfied. As they may change, you can use traceability relations to monitor the impact of these changes.

Multiple types of custom and extended UML relationships (e.g., realization, abstraction), tags (e.g., **Alternative Flow of Events Diagrams**), and properties (e.g., **Owned Behavior**) are used to represent traceability relations between the specifying and realizing elements for showing traceability from requirements analysis to implementation and deployment models.

Relation Map and Dependency Matrix

You can visualize the traceability relations of your project in order to analyze them using the MagicDraw features such as Relation Map (for the analysis of traces among multiple levels of abstraction) and Dependency Matrix (for the analysis of traces between any two levels of abstraction).

Element's Specification window, Properties panel, Go To, and Notes

You may track and navigate the elements, that are directly or indirectly related to a specific element through the traceability properties that will be represented in a special tab of the element's Specification window and **Properties** panel, or on the element's shortcut menu under the **Go To** menu. The traceability properties can also be visualized on a diagram using the standard MagicDraw mechanism for displaying property values in notes.

Traceability Report

A Traceability Report is particularly useful when there is a need to visualize and verify that requirement analysis, design, and implementation model elements are all covered in higher or lower levels of abstraction, for example, all use cases should be covered with design classes realizing them.

For more detailed information about the MagicDraw traceability solution, read the following subsections:

1. "Creating Traceability Relations" on page 390.
2. "Traceability Relations Representation" on page 391.
3. "Navigating between Different Levels of Abstraction" on page 397.
4. "Analyzing Traceability Relations" on page 398.
5. "Predefined Traceability Rules" on page 400.

Creating Traceability Relations

Multiple relations can be used for traceability representation, depending on the element type and method used.

The traceability relations can be represented by the following types of element dependencies:

- UML relationships (such as abstraction, realization, derivation)
- UML properties (such as **Owned Behavior**)
- UML tags (such as **Alternative Flow of Events Diagrams**)

The traceability relations can be **single level** and **multilevel**.

- When elements are related directly by using a custom UML relationship, property, or tag, the traceability relation is considered to be a single level relation.
- When elements are related indirectly by usually using multiple types of the above mentioned dependencies, the traceability relation is considered to be a multilevel relation.

The traceability relations can be **specifying**, **realizing**, or **other**. This depends on which direction a relation is analyzed and which element is considered as a basis.

- A relation between a specific element and an element that is the realization of this specific element, from the point of view of the specific element, is considered to be **realizing traceability** (for forward traceability).
- A relation between a specific element and an element that is the specification of this specific element, from the point of view of the specific element, is considered to be **specifying traceability** (for backward traceability).
- All other traceability relations.

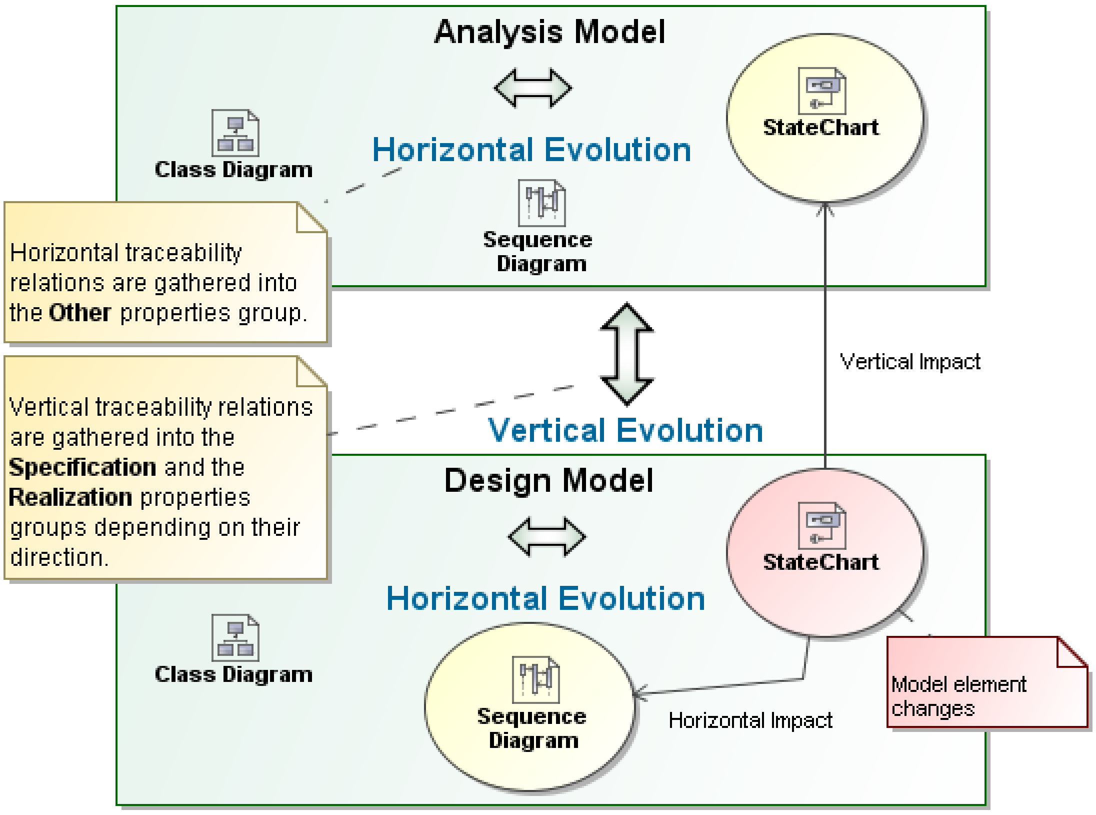


Figure 266 -- Horizontal and vertical traceability representation through the realizing, specifying, and other traceability relations

For more information about the traceability feature, see section “Traceability” on page 389.

Traceability Relations Representation

The traceability relations are represented through the so-called traceability properties that have been predefined for each element type according to the traceability method supported in MagicDraw.

A single traceability property shows an element or a set of elements that are related to a particular element through the relations which are specified by some traceability rule. The predefined traceability rules are stored in the Traceability customization profile used by the MagicDraw Profile.

The properties for the traceability relations are grouped into the realization, specification, and other groups, owning both direct (single level) and indirect (multilevel) traceability relations. The indirect traceability relations are represented by the so-called **All** properties, for example, **All Specifying Elements**, **All Realizing Elements**, and **All Specific Classifiers**.

The relations for traceability creation, visualization and navigation is also possible without using traceability properties. However, the customizable model driven traceability properties, which represent the traceability relations in a single place, can greatly help in traceability information visualization and access.

TIP!	You can customize the predefined traceability properties according to your needs or create your own traceability properties and specify your own rules. You can also customize the grouping of the traceability properties according to your needs. For more information, please, refer to the sections “Extending metamodel with derived properties” and “Creating your own property groups and subgroups” from the chapter “DSL Customization engine” in “UML Profiling and DSL UserGuide.pdf”.

Element’s traceability properties are represented in the following places:

• Specification window	See section “Traceability properties in Specification window” on page 392.
• **Properties** panel	See section “Traceability properties in Properties panel” on page 395.
• Note on a diagram	See section “Traceability properties in notes” on page 395.
• **Go To** submenu	See section “Traceability properties in Go To submenu” on page 396.
• Traceability Report	See section “Traceability properties in Traceability Report” on page 396.

For a list of the predefined traceability rules, see section “Predefined Traceability Rules” on page 400.

For more information about traceability feature, see section “Traceability” on page 389.

Traceability properties in Specification window

The Traceability tab in element’s Specification window is one of the places, wherein the element’s traceability properties, showing its realizing and/ or more specific elements, are represented.

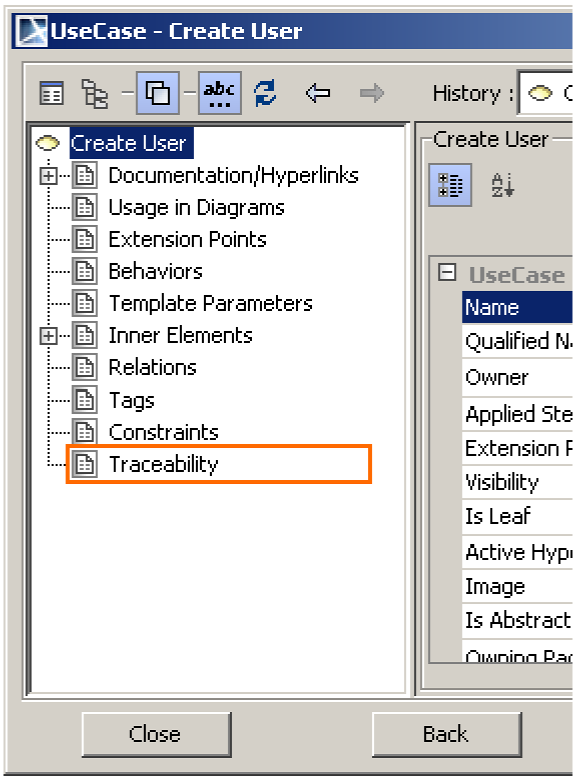


Figure 267 -- Traceability tab in the tab tree of Specification window

To view an element's traceability properties in its Specification window

1. Select an element and open the element's Specification window by using one of the ways given in section "Specification Window" on page 219.
2. Click the **Traceability** tab. Now you can view element's traceability properties.

The following picture gives an example of the traceability relations between the elements from different abstraction levels of the same project.

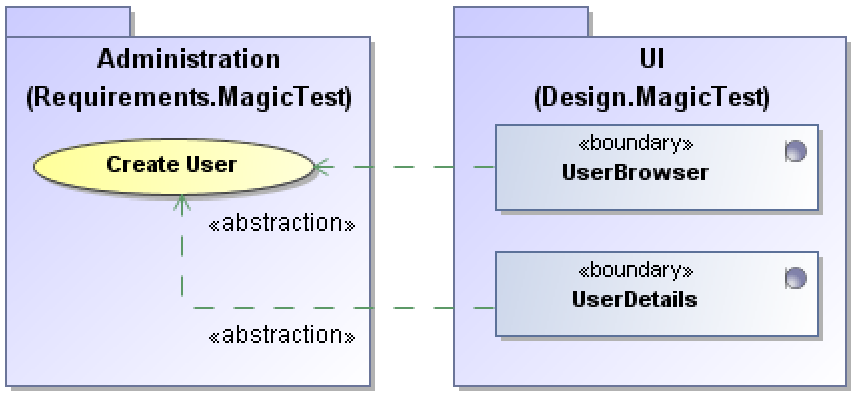
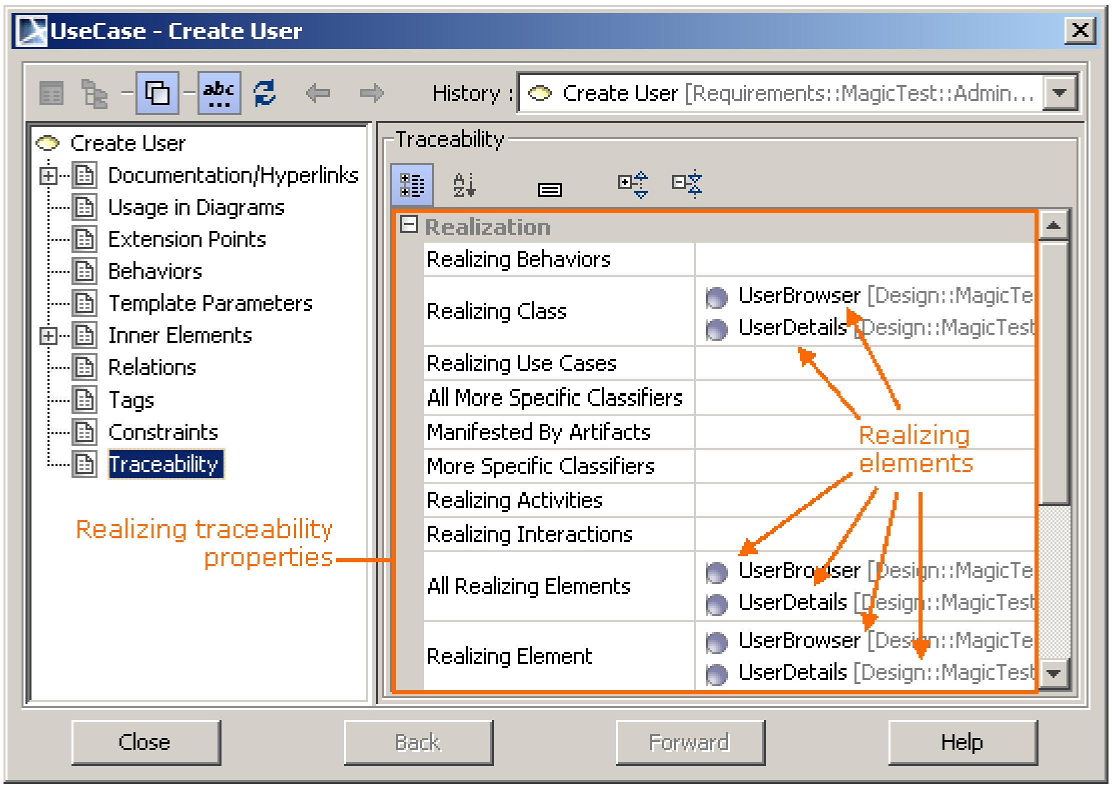


Figure 268 -- An example of single level traceability relations

As you see, the "Create User" use case from the "Requirements" package is covered by two design classes, and these classes are accordingly specified by this particular use case.

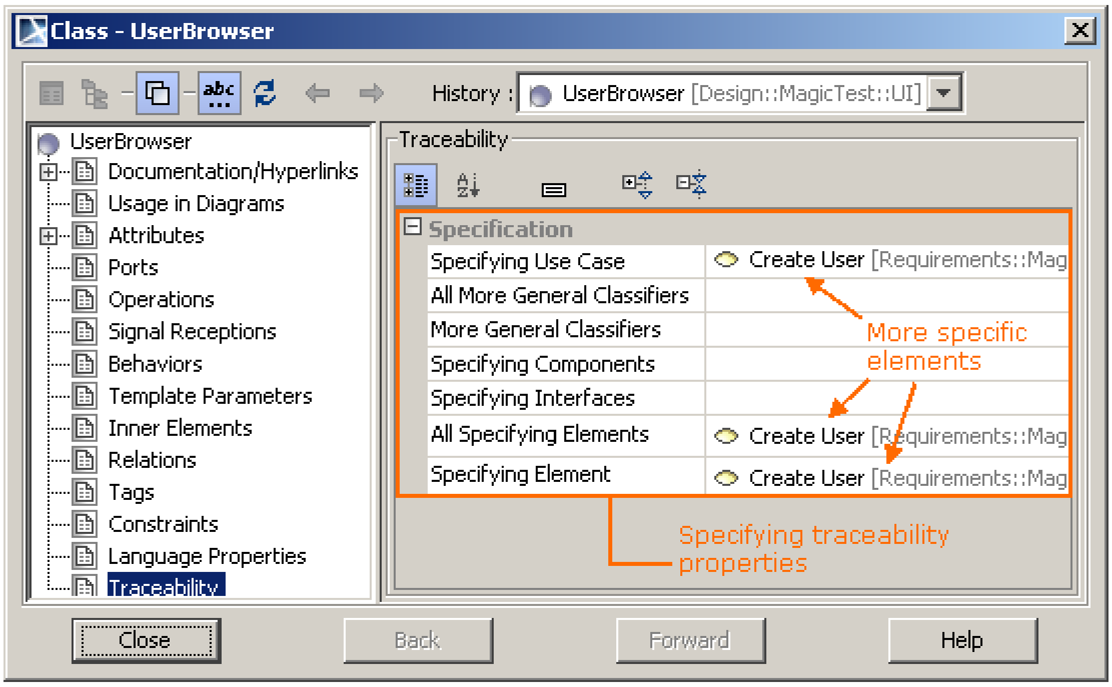
Therefore, the traceability properties such as **Realizing Class** and **Realizing Element** represent both design classes as realizing elements of this use case (see Figure 269 on page 394). Accordingly the traceability properties such as **Specifying Use Case** of each design class represent the “Create User” use case as a more specific element (see Figure 270 on page 394).

Note that the same related element can be represented through different traceability properties.



Traceability	
Realization	
Realizing Behaviors	
Realizing Class	UserBrowser [Design::MagicTe UserDetails [Design::MagicTest
Realizing Use Cases	
All More Specific Classifiers	
Manifested By Artifacts	
More Specific Classifiers	
Realizing Activities	
Realizing Interactions	
All Realizing Elements	UserBrowser [Design::MagicTe UserDetails [Design::MagicTest
Realizing Element	UserBrowser [Design::MagicTe UserDetails [Design::MagicTest

Figure 269 -- Realizing traceability properties in Specification window



Traceability	
Specification	
Specifying Use Case	Create User [Requirements::Mag
All More General Classifiers	
More General Classifiers	
Specifying Components	
Specifying Interfaces	
All Specifying Elements	Create User [Requirements::Mag
Specifying Element	Create User [Requirements::Mag

Figure 270 -- Specifying traceability properties in Specification window

For more information about element’s Specification window, see “Specification Window” on page 219.

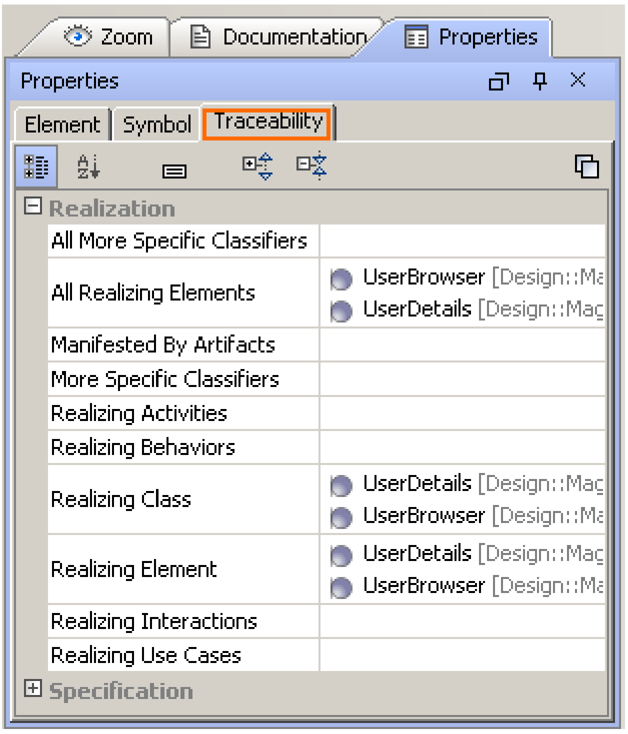
For more information about traceability properties representation, see “Traceability Relations Representation” on page 391.

Traceability properties in Properties panel

The Traceability tab in the element’s **Properties** panel (at the bottom of the Browser window) is one of the places, wherein the element’s traceability properties, showing its realizing and/ or more specific elements, are represented.

To view an element’s traceability properties in its **Properties** panel

1. Select the element in the Containment tree or its shape on the diagram.
2. In the Model Browser, click on the **Properties** panel > **Traceability** tab. Now you can view element’s traceability properties.



Realization	
All More Specific Classifiers	
All Realizing Elements	UserBrowser [Design::Ma UserDetails [Design::Mac
Manifested By Artifacts	
More Specific Classifiers	
Realizing Activities	
Realizing Behaviors	
Realizing Class	UserDetails [Design::Mac UserBrowser [Design::Ma
Realizing Element	UserDetails [Design::Mac UserBrowser [Design::Ma
Realizing Interactions	
Realizing Use Cases	
Specification	

Figure 271 -- Traceability tab in Properties panel

For more information about element’s **Properties** panel, see “Properties panel” on page 88.

For more information about traceability properties representation, see “Traceability Relations Representation” on page 391.

Traceability properties in notes

The traceability properties can be visualized on a diagram using the standard MagicDraw mechanism displaying the property values in notes.

To visualize an element’s traceability with other elements in the note on a diagram

1. Create a note for the element, whose traceability properties you want to visualize.
2. From the note’s shortcut menu, select **Edit Compartment** > **Element Properties**.
3. In the list on the left-hand side, click the traceability property of you choice (e.g., **Realizing Class** or **Specifying Use Cas**) and then click the **>** button.

4. Click **OK**. Now you can view the element's traceability with other elements.

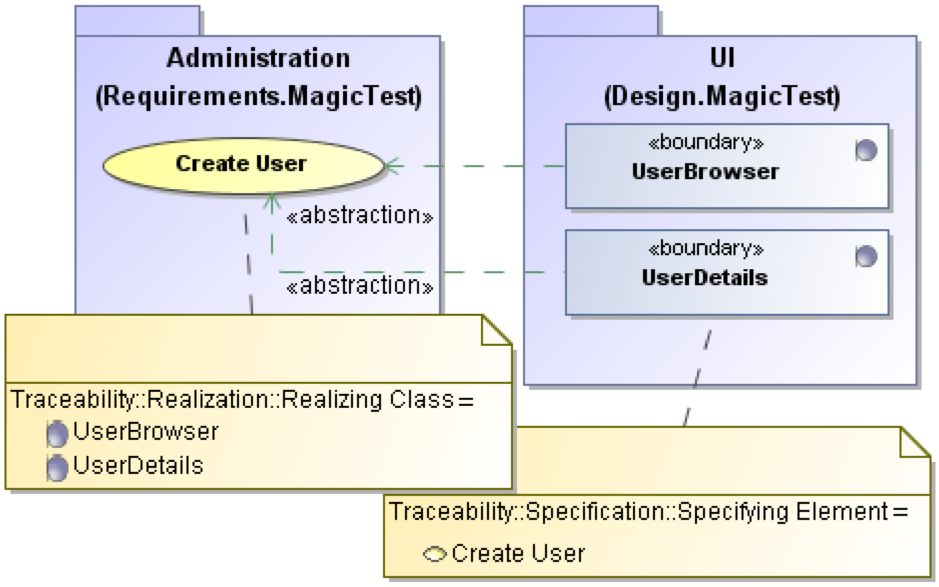


Figure 272 -- Traceability properties in the notes on a diagram

For more information about notes and comments on a diagrams, see "Note, Comment" on page 623.

For more information about traceability properties representation, see "Traceability Relations Representation" on page 391.

Traceability properties in Go To submenu

The submenu of the **Go To** menu on the element's shortcut menu enables you to easily find and navigate to the related elements through the traceability relations.

To select an element from the higher/ lower level of abstraction in the Containment tree

1. Select the element in the Containment tree or its shape on the diagram.
2. From the element's shortcut menu, select **Go To** > **Traceability** > **Specification/ Realization/ Other**, choose a property, and then select an element. The element will be selected in the Containment tree.

TIP!	If there are more than 10 values, the scroll bar is shown and the text box for typing the keyword is available.

For more information about traceability properties representation, see "Traceability Relations Representation" on page 391.

Traceability properties in Traceability Report

The Traceability Report feature supports the coverage analysis and publishes elements that are related to the selected elements through the traceability relations. You can generate a report either for the whole project or for a selected part of the project. This feature is the output of the coverage analysis.

Coverage analysis provides the visibility of each element's related artifacts, indicated as realizing (lower level of abstraction) and/ or specifying (higher level of abstraction) ones.

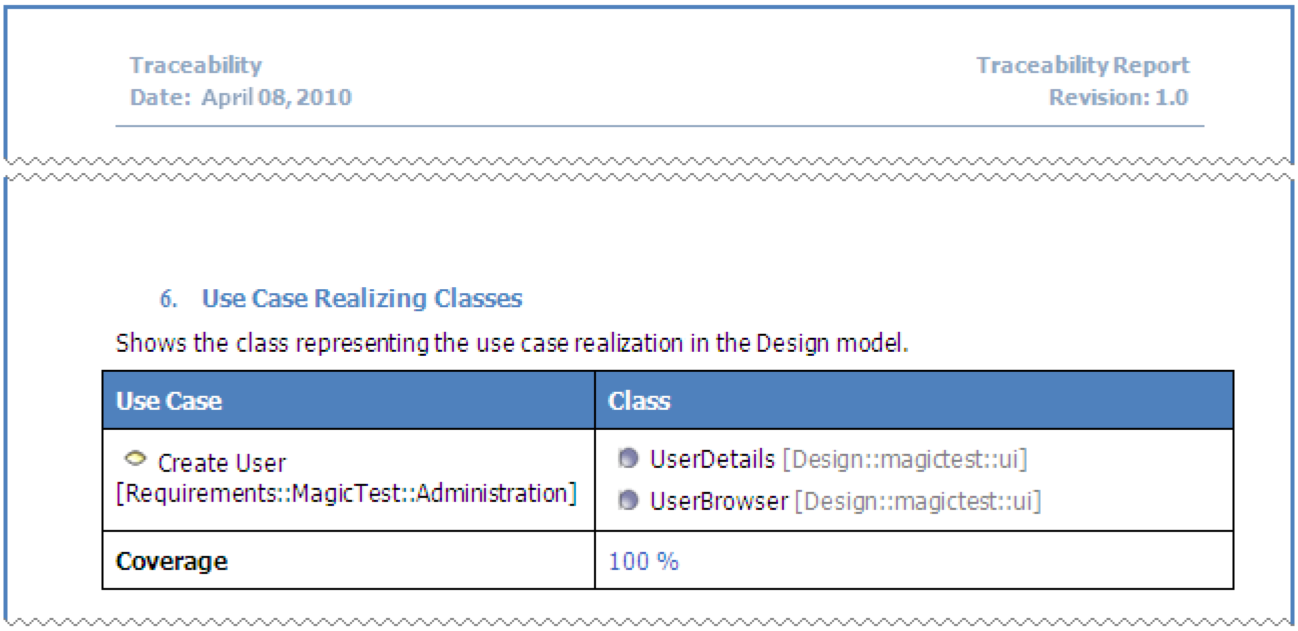
The main objective of the Traceability Report is to visualize and verify that Analysis, Design, and Implementation model elements are all covered.

The Traceability Report provides the ability to:

- Find the areas of uncovered parts.
- According to the report information, create additional artifacts to increase coverage.
- Measure the coverage quantitatively.
- Identify the redundant artifacts.

To generate a traceability report of the selected scope

1. On the **Tools** menu, click **Report Wizard**.
2. In the **Select Template** area, select **Traceability** > **Traceability** and then click **Next >**.
3. Click **Next >**.
4. In the **Select Element Scope** area, define the scope of the report by using the buttons placed between two lists, and then click **Next >**.
5. In the **Output Options** area, define the appropriate options.
6. Click **Generate**. Your traceability report will be generated (generation time depends on the selected scope).



Traceability
Date: April 08, 2010

Traceability Report
Revision: 1.0

6. Use Case Realizing Classes

Shows the class representing the use case realization in the Design model.

Use Case	Class
Create User [Requirements::MagicTest::Administration]	UserDetails [Design::magictest::ui] UserBrowser [Design::magictest::ui]
Coverage	100 %

Figure 273 -- A fragment of Traceability Report

For more information about traceability properties representation, see “Traceability Relations Representation” on page 391.

Navigating between Different Levels of Abstraction

During the development process and in order to understand the system fast, navigating between elements from different levels of abstraction is necessary. Navigating from one element to another is easy using the MagicDraw GUI capabilities of the traceability feature, if there is at least one traceability relation between them.

To navigate between different levels of abstraction, use the following features

• Element's Specification window	Open the element's Specification window and select the **Traceability** tab, and then right-click on the property. Choose **Open Specification** and select an element (if there is more than one related element) as it is depicted in Figure 274 on page 398. The Specification window of this element will be opened.
• Element's **Properties** panel	Open the element's **Properties** panel and select the **Traceability** tab, and then right-click on the property. Choose **Open Specification** and select an element (if there is more than one related element) as it is depicted in Figure 274 on page 398. The Specification window of this element will be opened.
• **Go To** submenu on element's shortcut menu	From the element's shortcut menu, select **Go To** > **Traceability** > **Specification/ Realization/Other**. Choose a property and then select an element. The element will be selected in the Containment tree.

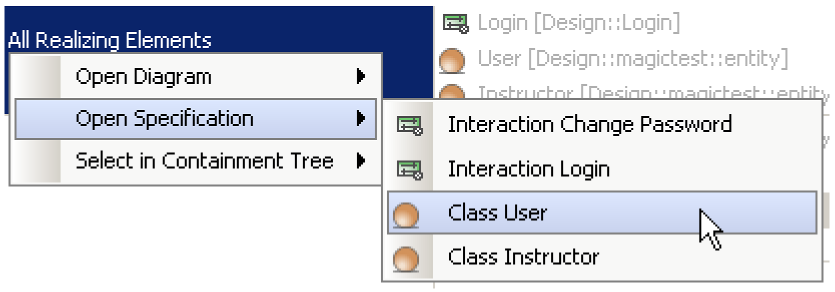

All Realizing Elements
Open Diagram
Open Specification
Select in Containment Tree
Login [Design::Login]
User [Design::magictest::entity]
Instructor [Design::magictest::entity
Interaction Change Password
Interaction Login
Class User
Class Instructor

Figure 274 -- Selecting an element to open specification

Analyzing Traceability Relations

You can visualize the traceability relations among the elements in your project in order to analyze them, using the following MagicDraw features:

- **Relation Map** (for the analysis of traces among multiple levels of abstraction). See section "Analysis using Relation Map" on page 398.
- **Dependency Matrix** (for the analysis of traces between any two levels of abstraction). See section "Analysis using Dependency Matrix" on page 398.

Analysis using Relation Map

The Relation Map feature enables you to rapidly review and analyze multilevel relations among elements starting from the requirements to implementation all the way through different levels of abstraction (analysis, design, and so on).

For more information about the Relation Map feature, see "Relation Map" on page 401.

Analysis using Dependency Matrix

You can perform the impact and/ or gap analysis in your project using the Dependency Matrix feature, which is a powerful way for representing traceability relations between multiple elements from different packages, levels of abstraction, views, or other relations that cannot be represented on diagrams, for example, relations through UML tags.

You can create your own dependency matrices or use the special **matrix templates**, each customized for one predefined traceability property. These templates allow the appropriate realizing/ specifying traceability relations be represented in the Dependency Matrix diagram.

For a list of the predefined traceability rules, see section “Predefined Traceability Rules” on page 400.

For the detailed information about loading and using matrix templates, see “Working with a Dependency Matrix Template” on page 435.

When creating your own dependency matrices to represent traceability relations, you can define the traceability properties as **dependency criteria**.

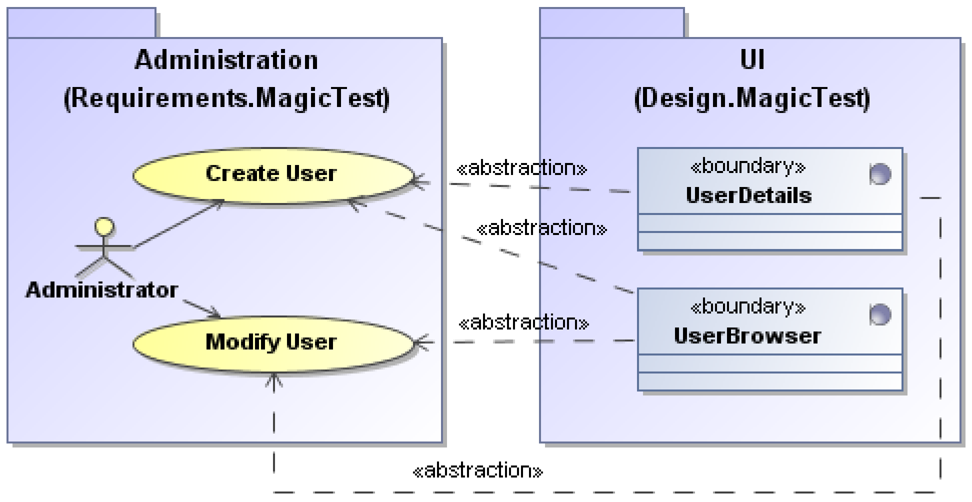


Figure 275 -- An example of traceability relations

The figure above depicts an example of traceability relations between the elements. These relations can be represented by the following traceability properties:

1. **Realizing relations (use cases -> classes):**
   - Realizing Class
   - Realizing Element
   - All Realizing Elements
2. **Specifying relations (classes <- use cases):**
   - Specifying Use Case
   - Specifying Element
   - All Specifying Elements

You can create a dependency matrix using a template suitable for each of these traceability properties.

The following steps will show you how to create a dependency matrix for the **Realizing Class** property using a predefined matrix template.

To create a dependency matrix on the template, predefined for the **Realizing Class** property

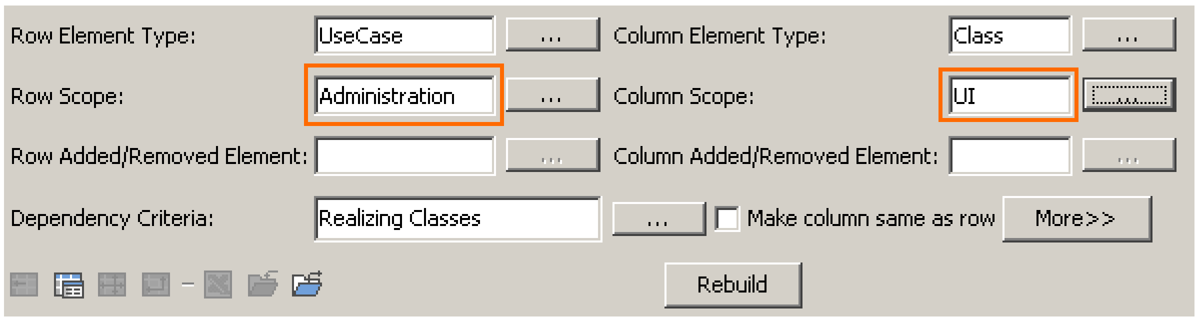
1. Create a Dependency Matrix diagram.
2. Apply the **Traceability Realization Use Case Realizing Classes** template.
3. Define new row and column scopes:

3.1 For the row scope, expand **Data** > **Requirements** > **MagicTest** and select **Administration**.

3.1 For the column scope, expand **Data** > **Design** > **MagicTest** and select **UI**.

4. Rebuild the matrix.

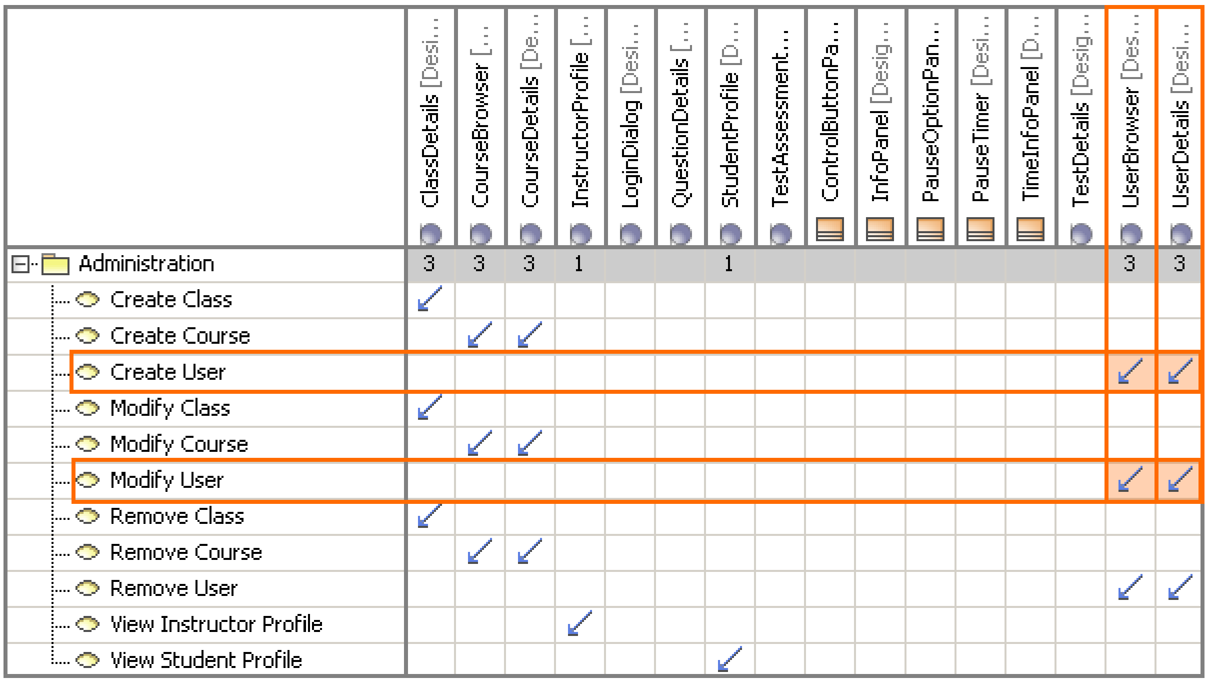
NOTE See the related sections:
- “Creating Dependency Matrix” on page 429.
- “Working with a Dependency Matrix Template” on page 435.
- “Dependency Matrix View” on page 430.



Row Element Type:	UseCase	Column Element Type:	Class
Row Scope:	Administration	Column Scope:	UI
Row Added/Removed Element:		Column Added/Removed Element:	
Dependency Criteria:	Realizing Classes	☐ Make column same as row	More>>

Figure 276 -- Defining row and column scopes

The picture below depicts the created dependency matrix showing the traceability relations between use cases and the realizing design classes (the highlighted intersections mark the traceability relations depicted in Figure 275 on page 399).



	ClassDetails [Desi…	CourseBrowser […	CourseDetails [De…	InstructorProfile […	LoginDialog [Desi…	QuestionDetails […	StudentProfile [D…	TestAssessment…	ControlButtonPa…	InfoPanel [Desig…	PauseOptionPan…	PauseTimer [Desi…	TimeInfoPanel [D…	TestDetails [Desig…	UserBrowser [Des…	UserDetails [Desi…
Administration	3	3	3	1			1								3	3
Create Class	↙															
Create Course		↙	↙													
Create User															↙	↙
Modify Class	↙															
Modify Course		↙	↙													
Modify User															↙	↙
Remove Class	↙															
Remove Course		↙	↙													
Remove User															↙	↙
View Instructor Profile				↙												
View Student Profile							↙									

Figure 277 -- An example of dependency matrix created on traceability template

For more information about the Dependency Matrix feature, see “Dependency Matrix” on page 428.

Predefined Traceability Rules

Besides allowing you to create your own traceability rules, MagicDraw enables you to use a set of predefined element properties for traceability purposes.

For detailed information about the up-to-date traceability rules, visit the following link:

http://www.magicdraw.com/show_content/new_and_noteworthy/?content=traceability_rules_16.9

Relation Map

NOTE	The Relation Map feature is available in the Standard, Professional, Architect, and Enterprise editions.

A Relation Map diagram enables you to rapidly review and analyze relations between the elements of the whole model.

The model structure in the diagram can be overviewed in two different layouts: tree (see Figure 278 on page 401) or radial (see Figure 279 on page 401).

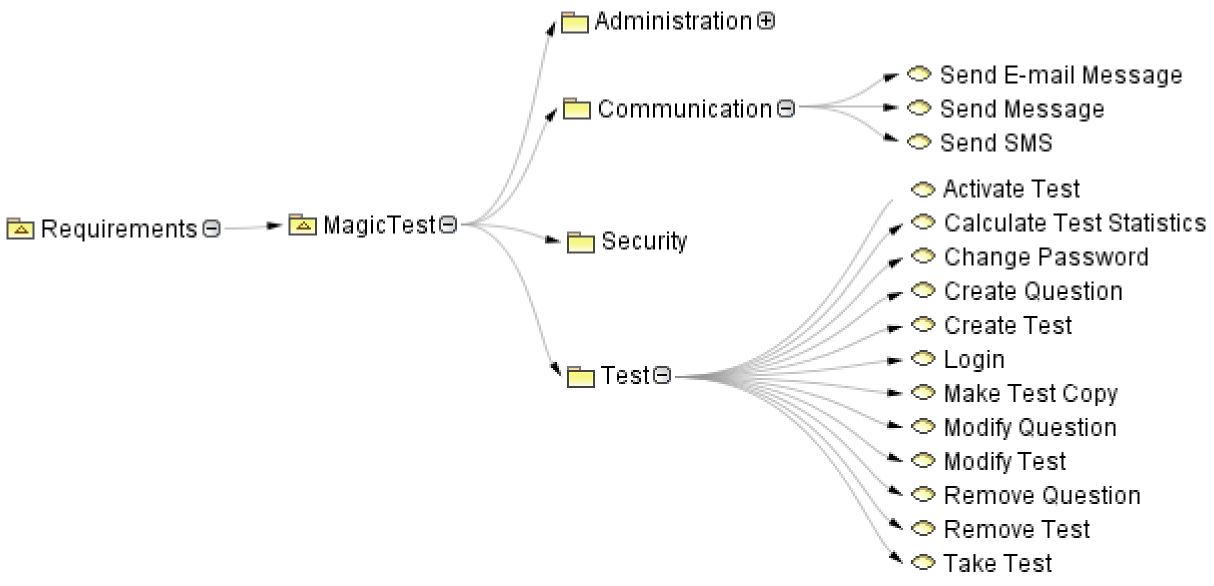


Figure 278 -- The Tree Layout of the Relation Map

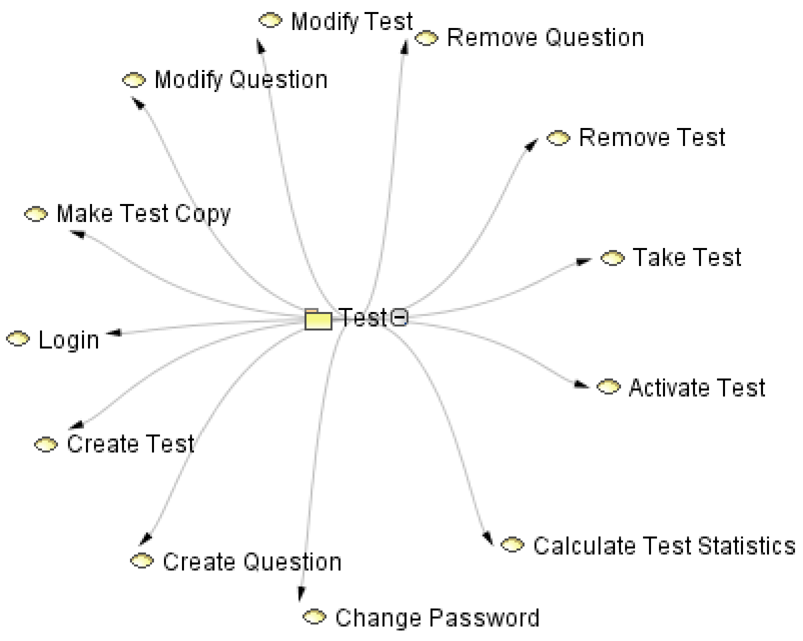


Figure 279 -- The Radial Layout of the Relation Map

Relation Map makes it easier for you to:

- Discover the existing relations of the nodes (elements) in a unique and highly usable feature giving a fast project overview in two different rendering types:
  - Dynamic – holding only needed information at a time by centering the diagram to the selected node and visualizing related elements to the set depth.
  - Static – representing and holding all the step-by-step discovered structure in a diagram. This rendering type is good for publishing, viewing structure and presentation purposes.
- Have a radial or tree layouts for visualizing multilevel relations that are suitable for hierarchical and compact representation of structures.
- Observe traceability from requirements to implementation all the way through different levels of abstraction (analysis, design, and so on).
- Have a visualized representation of relations between elements from different views.
- Have a usable and good-looking project context map.
- Make fast analysis of UML model.

Creating the Relation Map

In MagicDraw, a Relation Map is similar to a diagram element. A newly created Relation Map will appear in the Browser as a model element and you can open the Relation Map pane by double-clicking the Relation Map name. The same actions, which are relevant for diagrams, are valid for Relation Maps.

To create a relation map for a selected element

- Drag and drop an element from the Containment Tree on the created Relation Map (the structure will be created according to filters configuration).
- On the element shortcut menu in the Browser, click **Related Elements**> **Create Relation Map**

To create a relation map for any element

- On the **Analyze** menu, click **Create Relation Map.** Search for a context element for which you want to create a relation map and click **OK**.

NOTE	The same element will be the owner of the created relation map diagram.

- From the package shortcut menu in the Browser, select **New Diagram** > **Analysis Diagrams** > **Relation Map Diagram**. Type a name and select a package where you want to save the project and then click **OK**.
- On the Analysis diagrams toolbar, click the **Relation Map Diagram** button. Type a name and select the package where you want to save the project and then click **OK**.
- In the **Diagrams** menu, click **Analysis Diagrams** > **Relation Map Diagram.** The **Relation Map Diagrams** dialog box opens. Click **Add** to create a new relation map and then click **Open**.

Defining Relation Map filters, layout, and depth

After creating a relation map, you need to specify filters, layout, and depth of the diagram.

To change the relation map properties

- On the diagram shortcut menu, choose **Specification** or click the **Relation map specification** icon on the diagram toolbar. Modify the properties in the **Relation Map Diagram** Specification window.
- Define the properties on the Relation Map toolbar.

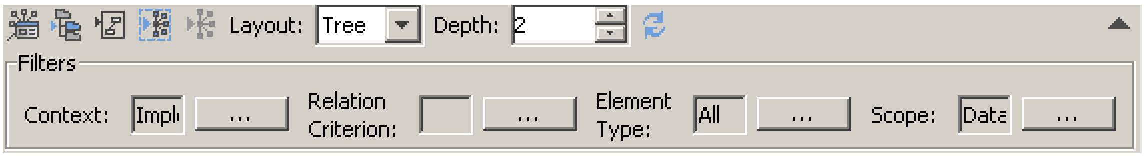

Layout: Tree
Depth: 2
Filters
Context: Impl
Relation Criterion:
Element Type: All
Scope: Data

Figure 280 -- Relation Map Toolbar

Element Name	Function
Context	To select the main element from which the structure is started. For more information about the element Selection dialog, see section “Selecting an Element” on page 279.
Relation Criterion	To select relations that will be displayed on the relation map. Relation criteria can be relationships from diagrams, properties, custom Tag definitions, OCL expressions, Meta chain expressions, or references to the code classes. For more information, see Section “Choosing the relation criterion” on page 404.
Element Type	To select element types that will be shown on the relation map.
Scope	To select packages from which the relation map structure will be shown.
▲ **Suppress/Expand filters area**	To suppress or expand the filters area on the toolbar.
Layout	To select a the relation map layout: • **Tree** - see the example in Figure 278 on page 401. • **Radial** - see the example in Figure 279 on page 401.
Depth Depth: 2	To select the level of the relation map branches that will be automatically expanded.

Choosing and changing context element

A context is an element from which a relation map is drawn and analysis is started. You can set any element as a context.

To set an element as a context

- Drag and drop the selected element from the Browser to the relation map diagram.
- Use the following diagram Toolbar commands:

Set selected element as context	Set the selected element as a context element from which the relation map structure will be started.

▦	**Make element as context on selection**	If selected, the context element will be changed dynamically on the new Node selection.

- From the Node shortcut menu on the diagram pane, choose **Set Element as Context**.

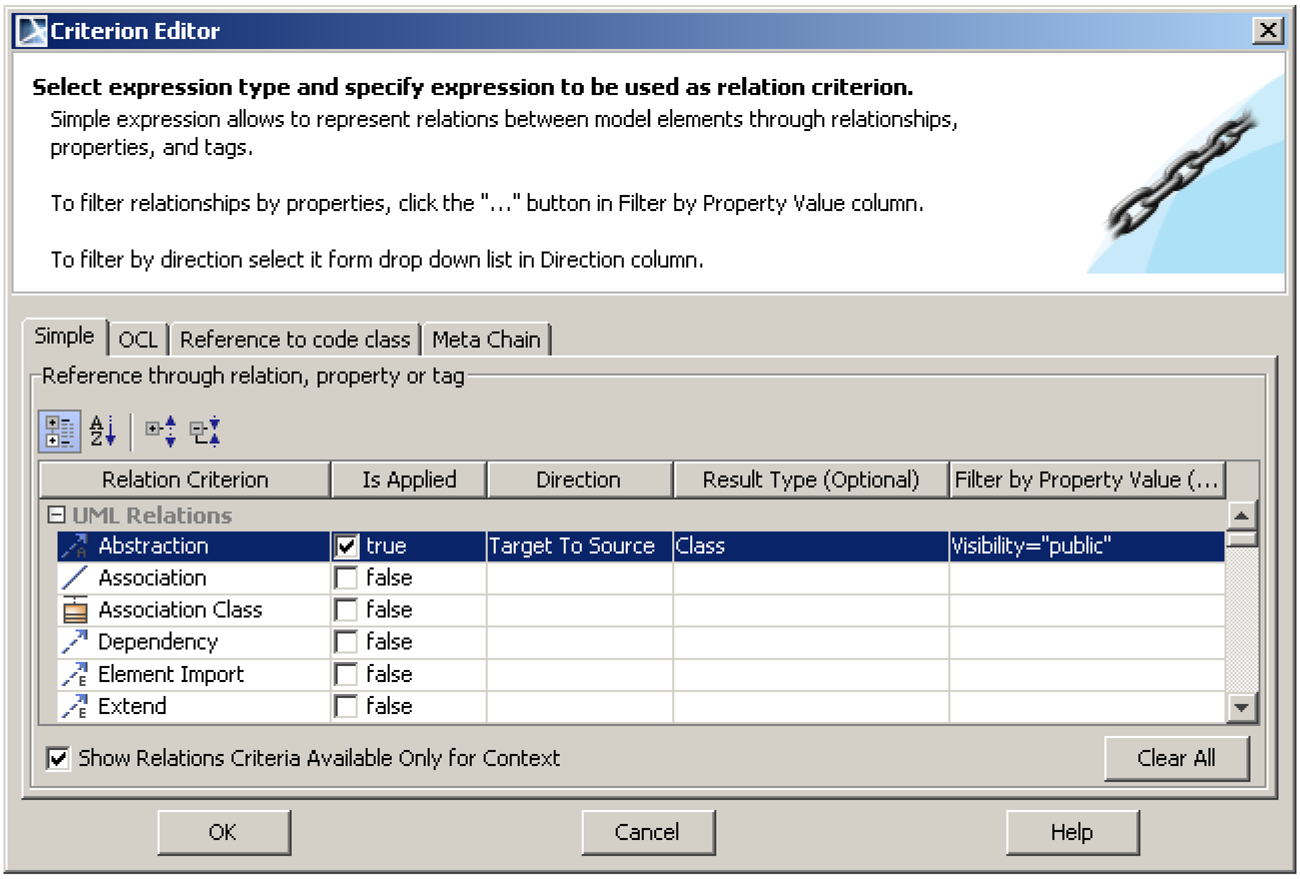
Choosing the relation criterion

The **Criterion Editor** dialog contains four tabs, each dedicated for one expression type:

- **Simple** (for the detailed information, see section “Simple expressions” on page 404)
- **OCL** (for the detailed information, see section “OCL expressions” on page 406)
- **Reference to code class** (for the detailed information, see section “Binary expressions” on page 407)
- **Meta Chain** (for the detailed information, see section “Meta Chain expressions” on page 408)

Simple expressions

Simple expressions editor, depicted in the figure below, allows expressing direct dependencies between the elements through the custom UML relations, properties, and tags, with some extra options to select the result element type, link direction, and additional filters (for relations only).



Select expression type and specify expression to be used as relation criterion.

Simple expression allows to represent relations between model elements through relationships, properties, and tags.

To filter relationships by properties, click the "..." button in Filter by Property Value column.

To filter by direction select it form drop down list in Direction column.

Reference through relation, property or tag

Relation Criterion	Is Applied	Direction	Result Type (Optional)	Filter by Property Value (...
⊟ UML Relations				
Abstraction	✓ true	Target To Source	Class	Visibility="public"
Association	false			
Association Class	false			
Dependency	false			
Element Import	false			
Extend	false			

✓ Show Relations Criteria Available Only for Context

Figure 281 -- Criterion Editor dialog for defining simple expressions

Column	Description
Relation Criterion	A list of UML relations, properties and tags. To manipulate the values display mode in the list, you can use the **Show Relations Criteria Available Only for Context** checkbox.

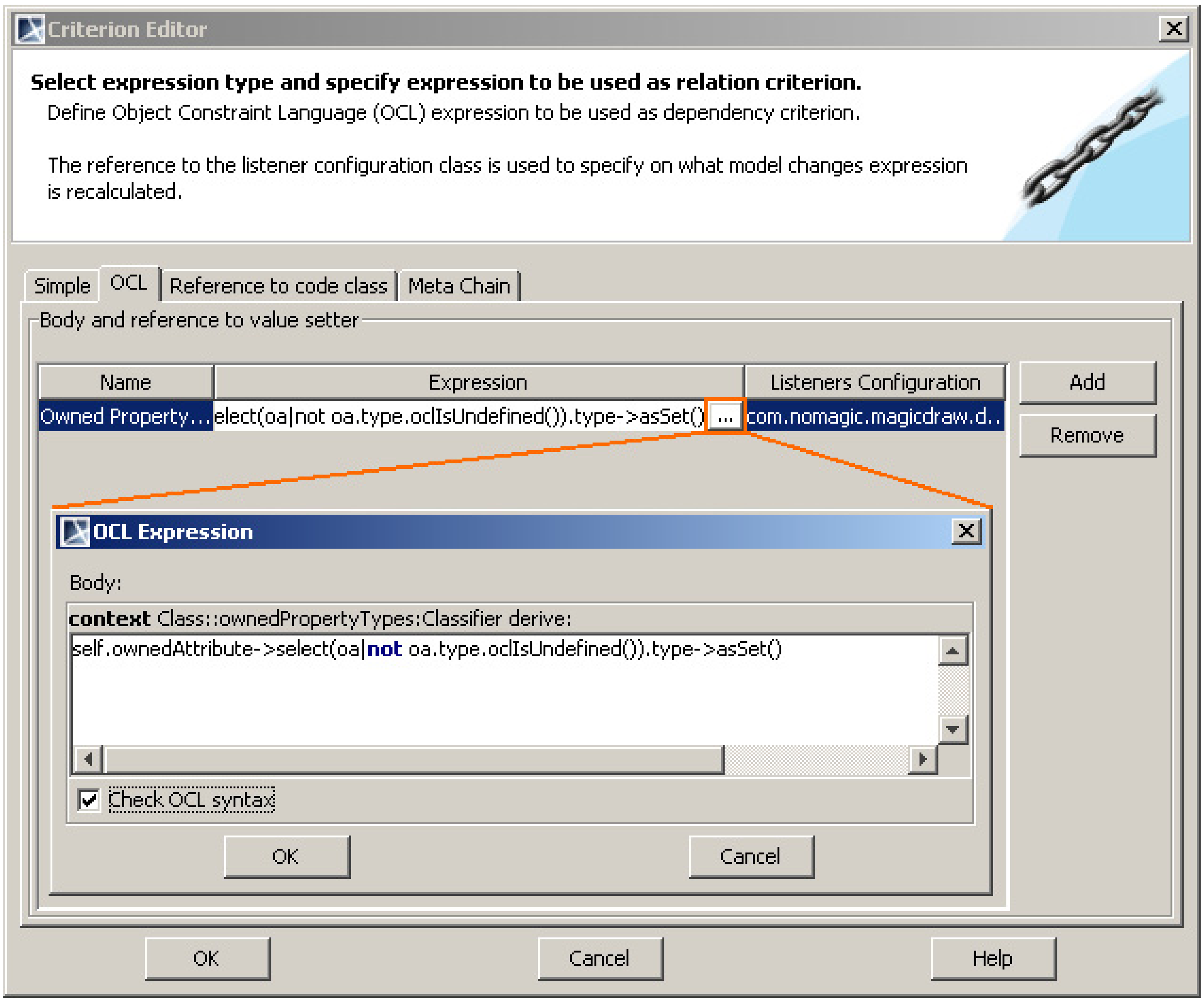
Column	Description
Is Applied	If selected, an appropriate relation criterion will be applied. The multiple selection is allowed. To clear the selections in this column, click the **Clear All** button. **NOTE:** Clicking this button will not clear the other settings (direction, result type, and filter by property) for an appropriate relation criterion.
Direction	A direction for the expression analysis applied for relations, properties, and tags. Select one of the following values: • Source To Target (default) • Target To Source • Any A source is an element, from which the expression calculations are started (a context element). A target is an element, which is a result of the defined expression. If the direction is defined for relations: • The **Source To Target** direction means that only the outgoing relations, which are pointing from the source element to the target element, will be treated as a result of this criterion. • The **Target To Source** direction means that only the incoming relations, which are pointing from the target element to the source element, will be treated as a result of this criterion. • If the **Any** direction is chosen, the both above described cases will be treated as a valid result. If the direction is defined for properties or tags: • The **Source To Target** direction means that only the properties, which exist in the source element, will be treated as a result of this criterion. • The **Target To Source** direction means that only the properties, which exist in the target element, will be treated as a result of this criterion. • If the **Any** direction is chosen, the both above described cases will be treated as a valid result.
Result Type	A result elements type. It is allowed to select more than one result type for a relation criterion. To open the dialog for selecting the result element types, click the "..." button.
Filter by Property	A property of the selected relation criterion used as a more specific filter. It is allowed to select more than one property. To open the dialog for selecting the properties as filters, click the "..." button, which is available for relations criteria only. **NOTE:** Only primitive enumeration properties and the **Applies Stereotype** property can be used as more specific filters for criteria.

The description of the check box in the **Criterion Editor** dialog for the simple expressions is as follows:

Show Relations Criteria Available Only for Context	If selected, there will be shown only these relation criteria that are available for the UML element, which is set as a customization target. If cleared, all the properties' tags and relationships will be shown as possible criteria.

OCL expressions

OCL expressions editor, depicted in the figure below, allows defining an OCL expression for gathering the collections of the result elements.


Criterion Editor

Select expression type and specify expression to be used as relation criterion.
Define Object Constraint Language (OCL) expression to be used as dependency criterion.

The reference to the listener configuration class is used to specify on what model changes expression is recalculated.

Name	Expression	Listeners Configuration
Owned Property...	elect(oa|not oa.type.oclIsUndefined()).type->asSet() ...	com.nomagic.magicdraw.d..

```
context Class::ownedPropertyTypes:Classifier derive:
self.ownedAttribute->select(oa|not oa.type.oclIsUndefined()).type->asSet()
```

☑ Check OCL syntax

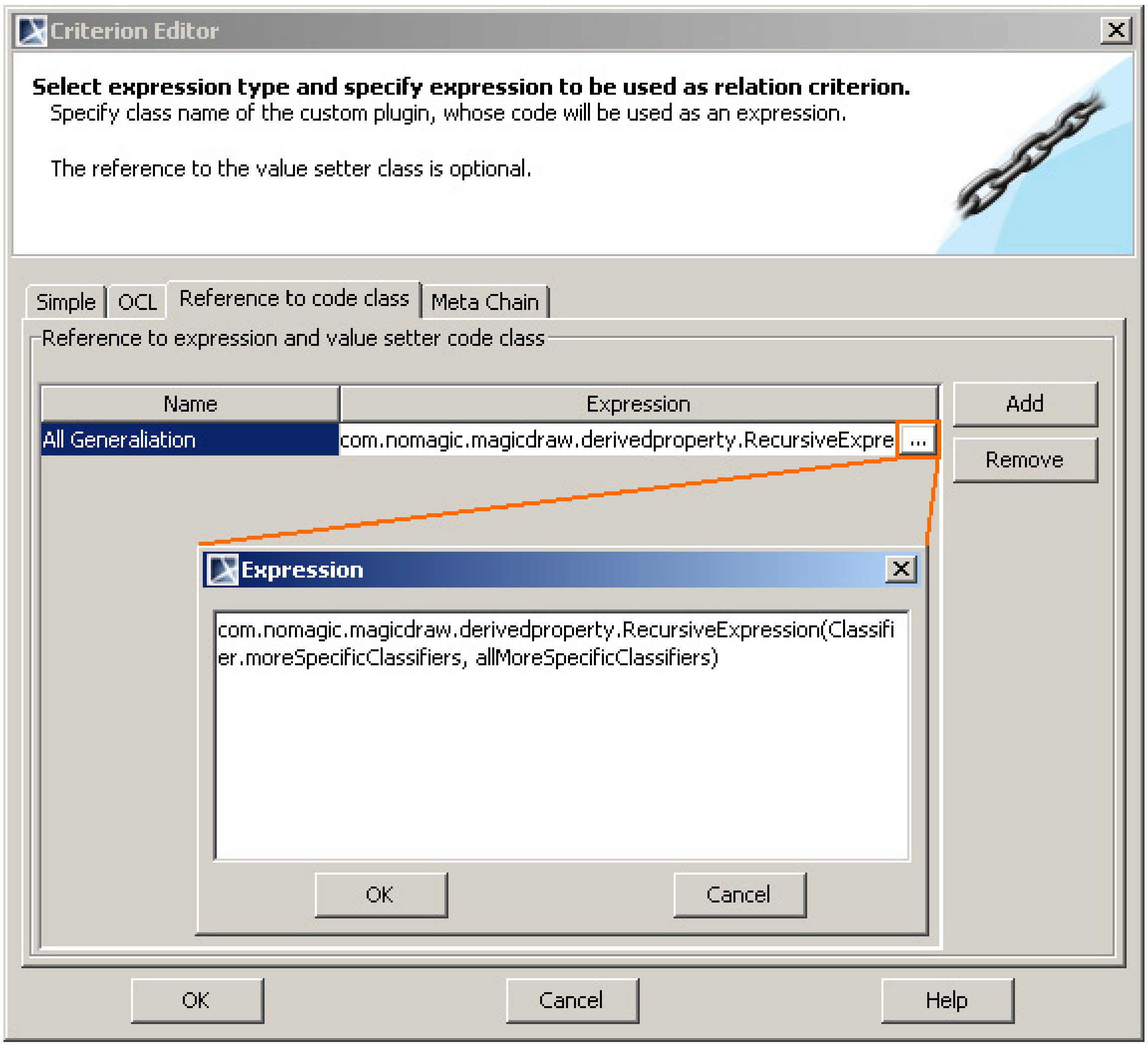
Figure 282 -- Criterion Editor dialog for defining OCL expressions

Column	Description
Name	A name of an OCL expression. It is mandatory and has a default value “Untitledn”, where “n” stands for the expression sequence number. You can edit the name either directly in a cell, or in the **Name** dialog, opened by clicking the “...” button in this cell. To create an expression, click **Add**. To remove an expression, click **Remove**.
Expression	An OCL expression. You can edit the expression either directly in a cell, or in the **OCL Expression** dialog, opened by clicking the “...” button in this cell. **NOTE:** You can check the OCL syntax of your expression, when writing the expression in the **OCL Expression** dialog. To enable the OCL syntax checking mode in the dialog, select the **Check OCL syntax** box.

Column	Description
Listeners Configuration	A reference to a java class, the so-called diagram event listener, which specifies when the OCL expression results must be recalculated. **NOTE:** For the instructions how to create your own listener using MagicDraw API, please, refer to the chapter "Diagram Events" in "MagicDraw OpenAPI UserGuide.pdf".

Binary expressions

Binary expressions editor, depicted in the figure below, allows defining a string reference to a java class, which searches for the result elements according to the given parameters.


Criterion Editor

Select expression type and specify expression to be used as relation criterion.
Specify class name of the custom plugin, whose code will be used as an expression.

The reference to the value setter class is optional.

Reference to expression and value setter code class

Name	Expression
All Generaliation	com.nomagic.magicdraw.derivedproperty.RecursiveExpre

Expression

com.nomagic.magicdraw.derivedproperty.RecursiveExpression(Classifier.moreSpecificClassifiers, allMoreSpecificClassifiers)

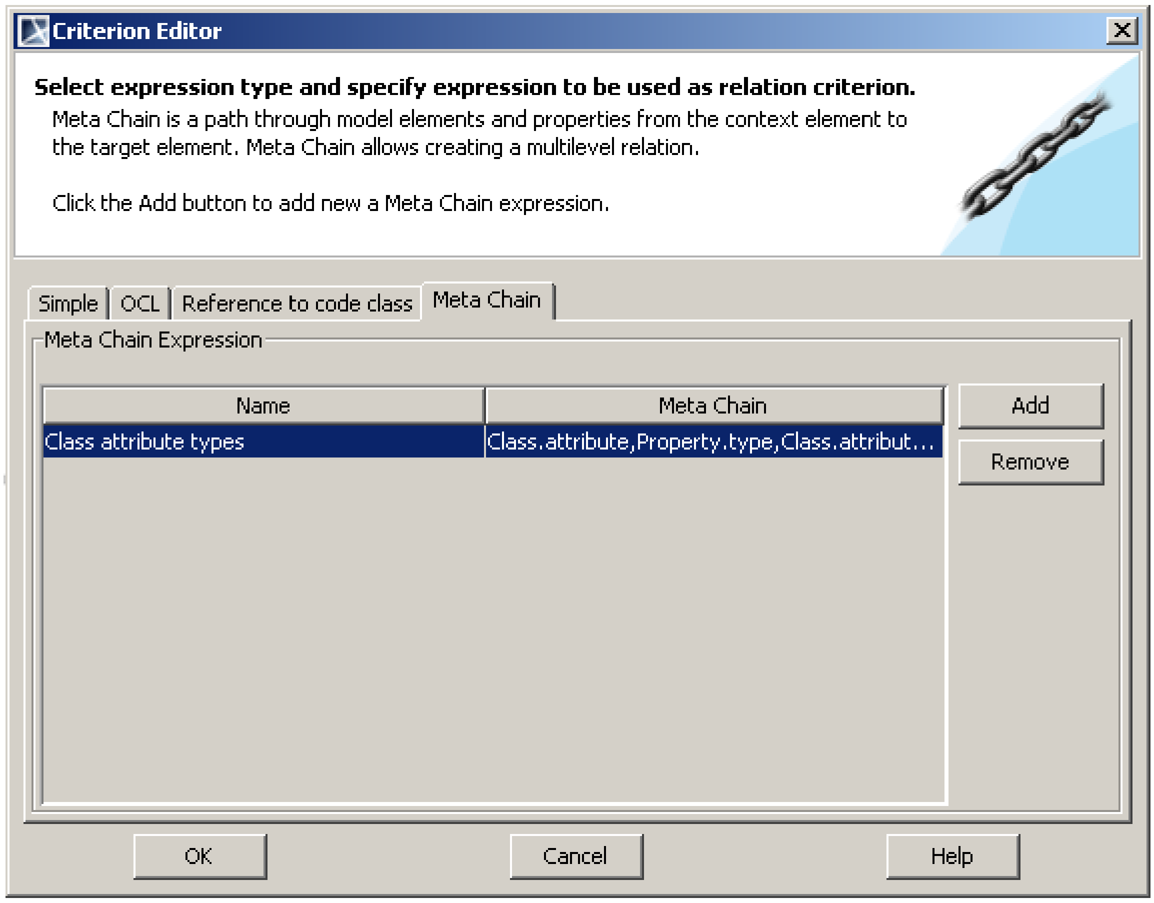
Figure 283 -- Criterion Editor dialog for defining binary expressions

Column	Description
Name	A name of a binary expression. It is mandatory and has a default value "Untitledn", where "n" stands for the expression sequence number. You can edit the name either directly in a cell, or in the **Name** dialog, opened by clicking the "..." button in this cell. To create an expression, click **Add**. To remove an expression, click **Remove**.
Expression	A reference to a java class, which specifies the element search results.

Meta Chain expressions

Meta Chain expressions editor, depicted in the figure below, allows defining a multi properties chain navigating from a context element to a final link property for gathering the result elements.

IMPORTANT! Though the meta chain expressions allow searching for the indirectly related elements, they do not support loops and recursions.



Criterion Editor

Select expression type and specify expression to be used as relation criterion.
Meta Chain is a path through model elements and properties from the context element to the target element. Meta Chain allows creating a multilevel relation.

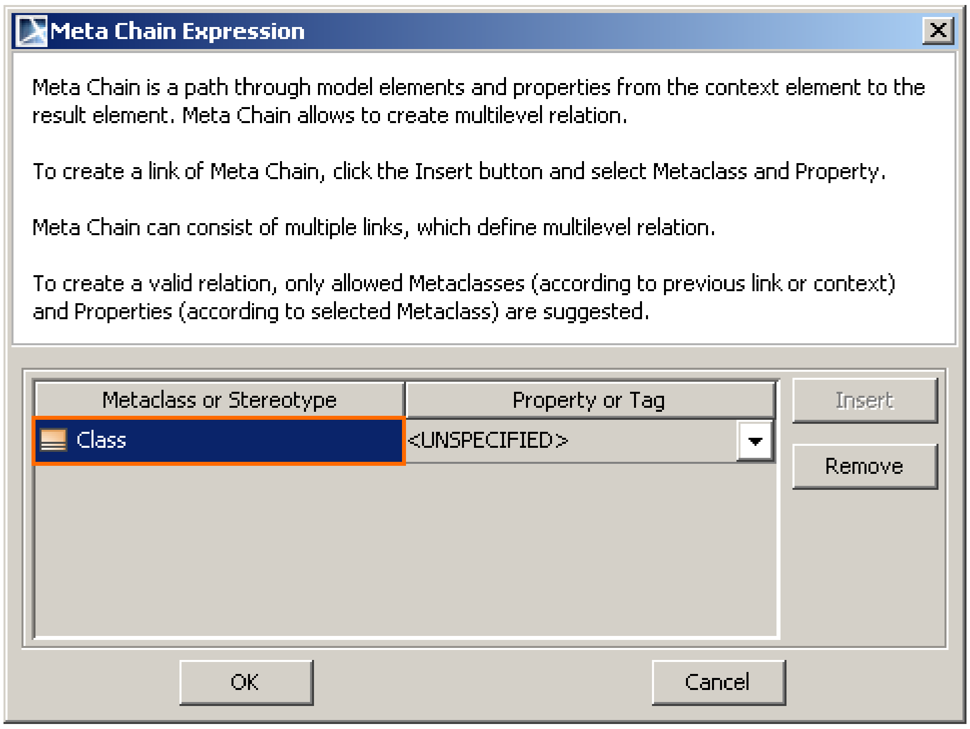
Click the Add button to add new a Meta Chain expression.

Meta Chain Expression

Name	Meta Chain
Class attribute types	Class.attribute,Property.type,Class.attribut...

Figure 284 -- Criterion Editor dialog for defining multi properties chain expressions

Column	Description
Name	A name of a meta chain expression. It is mandatory and has a default value “Untitledn”, where “n” stands for the expression sequence number. You can edit the name either directly in a cell, or in the **Name** dialog, opened by clicking the “...” button in this cell. To create an expression, click **Add**. To remove an expression, click **Remove**.
Meta Chain	A meta chain expression, containing the so-called links, i.e., pairs of a metaclass/ stereotype and a property/ tag. You can edit the expression either directly in a cell, or in the **Meta Chain Expression** dialog (see Figure 285 on page 409), opened by clicking the “...” button in this cell.


Meta Chain Expression

Meta Chain is a path through model elements and properties from the context element to the result element. Meta Chain allows to create multilevel relation.

To create a link of Meta Chain, click the Insert button and select Metaclass and Property.

Meta Chain can consist of multiple links, which define multilevel relation.

To create a valid relation, only allowed Metaclasses (according to previous link or context) and Properties (according to selected Metaclass) are suggested.

Metaclass or Stereotype	Property or Tag
Class	<UNSPECIFIED>

Figure 285 -- Meta Chain Expression dialog for defining links of a meta chain expression

Column	Description
Metaclass or Stereotype	A metaclass or a stereotype of a link, contained in a meta chain expression. To create a link in a meta chain expression, click **Add**. To remove a link from a meta chain expression, click **Remove**. The first link, when created, already has a metaclass or a stereotype selected by default as it is shown in Figure 285 on page 409. This value is the context element's type. The default metaclass or stereotype of the first link can be changed. The second link is more specific: the values suggested for selection are limited according to the values selected in the first link, since you will not be able to add a new link until the current link is not specified. The same rule is valid for the subsequent links.
Property or Tag	A property or a tag of a link, contained in a meta chain expression. You can choose a value from the list, which contains properties (including the derived ones) and tags specified for the link's metaclass or stereotype.

Manipulation of Relation Map

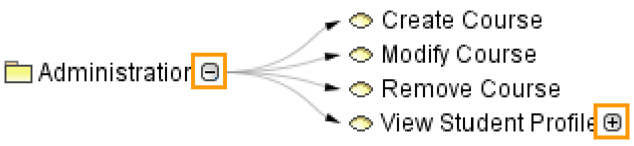
You can manipulate and analyze your relation map diagram in the following ways:

- Expand/suppress branches according to the current filters configuration.
- Restore the layout of manual suppressed/expanded branches, moved, removed and hidden symbols.
- See invalid elements marked by on demand or active validation (more information about validation you may find in Sections “Validation” on page 449 and “Active Validation” on page 467).
- Move the whole structure.

- Move the selected Node.
- Zoom in/ zoom out.
- Select an element in the Containment tree.
- Open all diagrams containing the selected element.
- Remove an element from the model.
- Hide an element in the diagram.

To expand/suppress branches

- Click the smart manipulation button near the Node.



To move the relation map structure

- Click on an empty place in the Relation Map and drag it. The whole structure will be moved.
- Click a Node and drag it. The selected Node will be moved.

To zoom in or zoom out the relation map structure

- Press Ctrl + mouse wheel scroll up to zoom in.
- Press Ctrl + mouse wheel scroll down to zoom out.

NOTE	The traditional Zoom In, Zoom Out, Fit in Window, Zoom 1:1 actions are available. For more information on zooming, see Section "Zooming" on page 196.

To remove/hide an existing element

- Element removing and hiding will be initiated and work in same way as for other diagrams. Press Delete, to hide an element. Press Ctrl+D, to delete and element from the model.

To restore the layout of the manual suppressed/expanded branches, moved, removed and hidden symbols

- Click the **Restore Layout** button**.**

NOTE	If the **Preserve manually suppressed/expanded branches and hidden elements** option in the **Environment Options** dialog > **Diagrams** > **Relation Map**, is selected, the layout of moved elements will be restored.

To see invalid elements marked by on demand or active validation

1. Run validation against model. On the **Analyze** menu, click **Validation** > **Validation**.
2. In the **Validation** dialog, select **Validation Suite** and click **Validate**.
3. Invalid elements will be marked on the Relation Map.

To select an element in the Browser, Containment tree

- Select an element and click the **Select in containment tree** icon on the relation map toolbar.
- On the selected element shortcut menu, click **Select in Containment Tree.**

To open all diagrams containing the selected element

- Select an element and click the **Open all diagrams containing the selected element** icon on the relation map toolbar

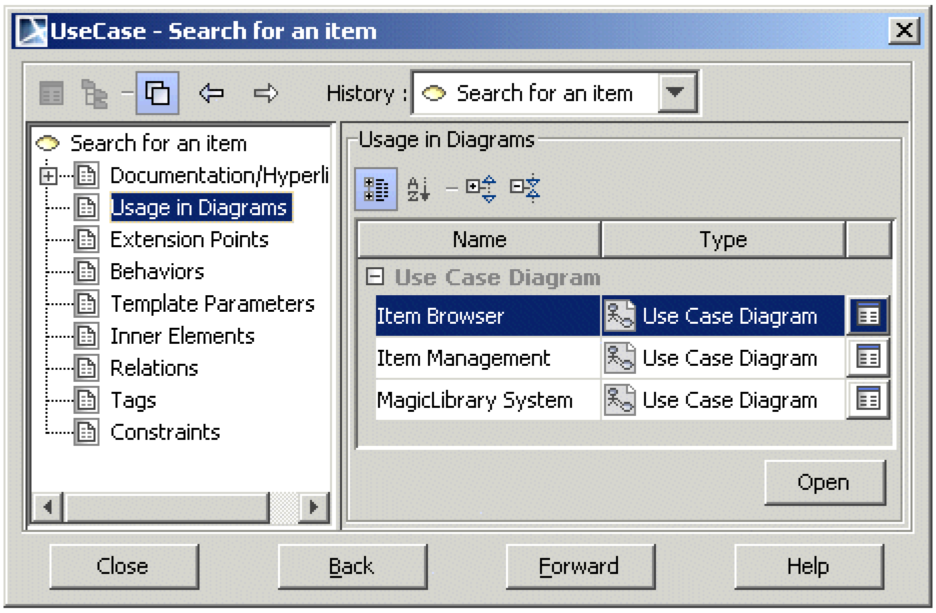
Symbol Usage in Diagrams

Definition The term "*symbol*" means a visual representation of some model element in the diagram. Symbols are further subdivided into shapes and paths (paths are lines used in the model for representing various relationships).

The symbol usage in diagrams functionality allows the user to see the usage of a symbol throughout the diagrams of a project. You may search for symbol usage in diagrams from the element Specification window and from element shortcut menu.

To search for diagrams in which symbol is used from the element Specification window

1. Open the element specification dialog box and select **Usage in Diagrams**. The table shows all diagrams in which the symbol is represented.
2. Select the diagram you want to open.
3. Press the **Open** button. The diagram is opened and the symbols of the element are selected. If the diagram includes more than one of the same element symbol, all symbols of the same element are selected in the diagram.



Name	Type
Use Case Diagram	
Item Browser	Use Case Diagram
Item Management	Use Case Diagram
MagicLibrary System	Use Case Diagram

Figure 286 -- The element specification dialog box, the Usage in Diagrams branch

To open the diagram specification dialog box, press the button near the diagram in the list.

For more information about working with the element's Specification window, see "Specification Window" on page 219.

To search for diagrams in which symbol is used from the element shortcut menu

1. Select the element in the Browser or select the symbol in the diagram.
2. From the element shortcut menu, select **Go To** and then **Usage in Diagrams**.
3. Select the diagram that you want to see the particular element symbol. The diagram is opened and symbols of the current element are selected on the diagram.

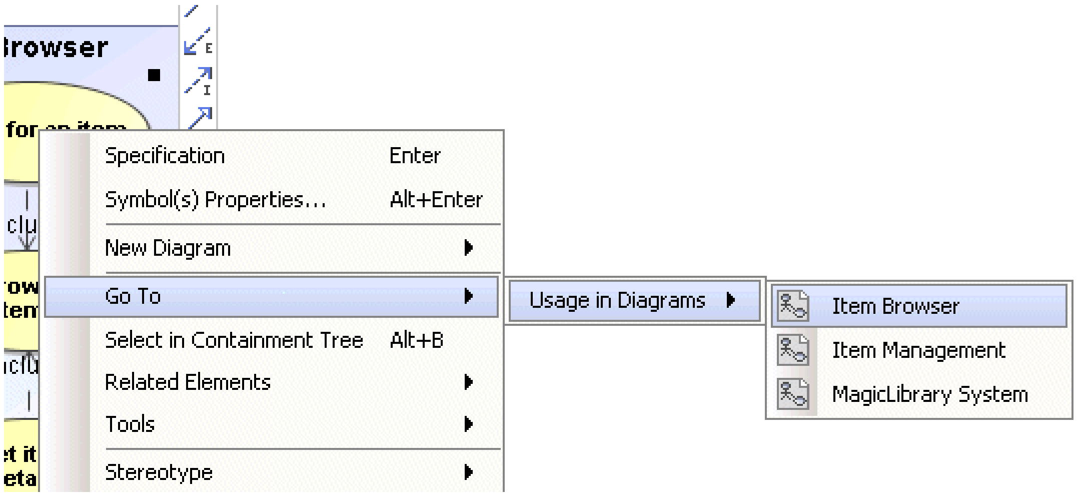


Figure 287 -- Searching for symbol usage in diagrams from the element shortcut menu

TIP!	You can also search for symbols usages in diagrams in the following way: 1. Select the symbol on the diagram. 2. From the **Analyze** main menu, select the **Go To** command and then **Usage in Diagrams.**

NOTES	• All symbols of the same element are selected in the opened diagram. • If more than one symbol exists in the same diagram, then the diagram is zoomed out, to fit the view in screen.

For information about the Usages /Dependencies functionality for analyzing associations between elements, see "Analyzing Usages and Dependencies" on page 385.

Projects Comparison

View Online Demo	Visual Model Differencing

NOTE	This functionality is available in Architect, and Enterprise editions only.

The use of projects comparison functionality allows you to compare two MagicDraw UML local projects or teamwork project versions, as well as diagrams. Model elements are compared by the element ID.

You can compare:

- current project with locally saved project.
- current project with open project.
- two teamwork project versions.
- current project with teamwork project version.
- local project and teamwork project version.
- diagrams.

Comparing Projects

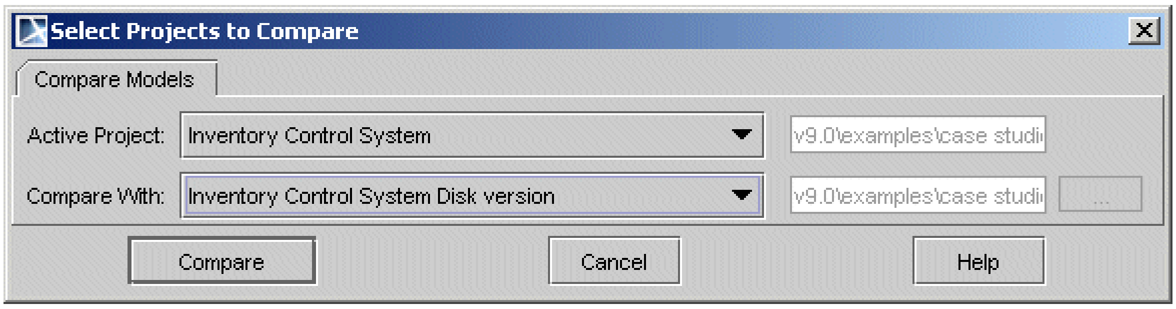
First of all you have to select the projects you want to compare. Differences of the compared projects will be displayed as two model trees. Differences are marked using colors and highlighting.

When comparing two projects the following data changes will be reflected:

- New model elements.
- Deleted model elements.
- Model elements with modified data.
- Model elements that changed location.
- Inner elements changes.

To select the projects you want to compare

1. Open a project you want to compare and from the **Analyze** menu, select **Compare Projects**.
2. The **Compare Projects** dialog box appears.


Select Projects to Compare

Compare Models

Active Project: Inventory Control System — v9.0\examples\case studi

Compare With: Inventory Control System Disk version — v9.0\examples\case studi

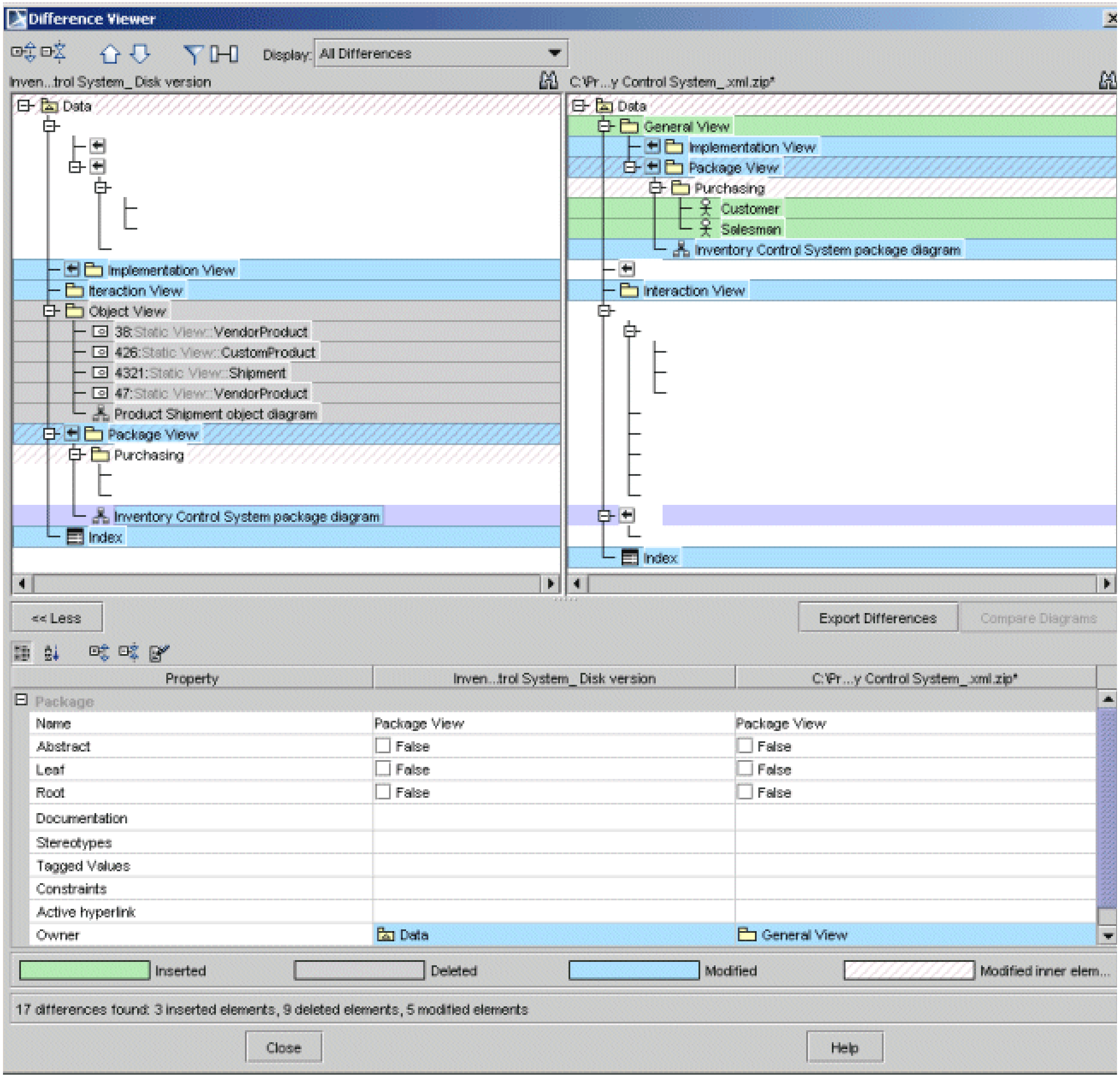
Figure 288 -- Select Projects to Compare dialog box

3. From the **Active Project** box, select a project you want to compare with another project. The list contains names of all open projects in MagicDraw.
4. From the **Compare With** box, select a project with which you want to compare the first project. The following options are available:
   - open project names are listed, except the project, which is selected in the **Active Project** box.
   - **Local Project**. Click the "..." button and select a project version you want to compare the current project with.
   - **Server Project**. Click the “...” button and from the **Open Server Project** dialog, select a project and its version you want to compare with.
   - <current project>Disk version. By selecting this option you will be able to compare currently changed project version with the unchanged project version on the disc without current changes.

By default the first opened project should be selected. If there are no more projects open, Local Project is selected as the value.

Understanding model differences

All differences of the compared projects are displayed in the **Difference Viewer** dialog box.



Display: All Differences

Inven...trol System_Disk version
- Data
  - Implementation View
  - Iteraction View
  - Object View
    - 38:Static View::VendorProduct
    - 426:Static View::CustomProduct
    - 4321:Static View::Shipment
    - 47:Static View::VendorProduct
    - Product Shipment object diagram
  - Package View
    - Purchasing
    - Inventory Control System package diagram
  - Index

C:\Pr...y Control System_xml.zip*
- Data
  - General View
    - Implementation View
    - Package View
      - Purchasing
        - Customer
        - Salesman
      - Inventory Control System package diagram
  - Interaction View
  - Index

Property	Inven...trol System_Disk version	C:\Pr...y Control System_xml.zip*
Package		
Name	Package View	Package View
Abstract	☐ False	☐ False
Leaf	☐ False	☐ False
Root	☐ False	☐ False
Documentation		
Stereotypes		
Tagged Values		
Constraints		
Active hyperlink		
Owner	Data	General View

🟩 Inserted ⬜ Deleted 🟦 Modified ▨ Modified inner elem...

17 differences found: 3 inserted elements, 9 deleted elements, 5 modified elements

Figure 289 -- Difference Viewer dialog box

In the **Difference Viewer** dialog box, two compared projects are displayed. The number of differences is displayed at the bottom of the dialog box. The number of differences number includes inserted, deleted, and modified elements. The number does not include elements with changes to inner elements. Differences number is displayed in following order:

To mark changes in the model elements several colors are used:

- *Elements that do not exist in the other model (inserted elements)*. Element is displayed only in the right-hand tree. New element is highlighted in light green.

- *Elements that exist in the other model, but do not exist in current model (deleted elements)*. Elements are always displayed in the left-hand tree. The deleted element is highlighted in grey.
- *Elements with modified element data (modified elements)*. The modified element is highlighted as changed in both trees. The modified element is highlighted in light blue.
- *Elements that changed location (parent has changed)*. Element is marked as a modified element. Empty nodes are displayed in the opposite tree where the element does not exist. On the moved element and on its former position, a button is displayed. Pressing the button on the former position, selects the place where the element has moved to. Pressing the button on the moved element position, selects the former element place. Also, you can perform these operations using the shortcut menu commands **Go to former position** or **Go to moved element**.
- *Elements that have inner elements that changed*. The element is marked in both trees and is highlighted in light grey dashes. An element with modified element data and changed inner elements is marked as modified and as element with changed inner elements. Element is marked as modified when:
    - Element specification properties have changed. Element specification properties include all properties, which are not displayed in the Browser as separate elements. Model element specification properties are treated as changed only if the element property can be changed from the element specification. If an element specification has changed because of changes made to other elements, the element should not be treated as changed. Example: typed values in the tagged values specification, attribute links in an object and instance specification, etc.
    - Element parent has changed.
    - Path is drawn from/to element.

Buttons available in the **Difference Viewer** dialog box:

Button	Function
Expand All	Both trees are expanded.
Collapse All	Both trees are collapsed.
Go to Previous Difference	Select the difference listed prior to the current one.
Go to Next Difference	Select the difference listed next from the current one.
Filter	The **Filter** dialog box opens. Show/hide the elements you want to analyze.
Include Relation Ends	Relations are displayed in the elements specifications. A relation added to the element means that the element is marked as modified.

Button	Function
Display:	**All -** Shows all elements of the projects.
	All Differences - Shows only differences made between the projects.
	Deleted Elements - Shows only elements that were deleted from the projects.
	Inserted Elements - Shows only elements that were inserted in the projects.
	Modified Elements - Shows only elements that were modified.
Find Next Element	The **Find** dialog box opens. Search for elements within the corresponding project.
More>> / <<Less	**More**/**Less** button shows/hides the element properties table. By default, the properties table is hidden.
Export Differences	Creates .html or .txt differences report. In the **Save Difference Report As** dialog box, select the directory where you want to save this report. **NOTE:** *.html format is suitable for viewing the difference report. If you want to copy this report to another program, use of the *.txt format is recommended.

The first column of the Property window contains the same properties as the Quick Properties tab in the Browser. The second column title is the left-hand project name (with path) for local projects, and teamwork project name and version number for teamwork projects. The third column title is the right-hand project name (with path) for local projects, and teamwork project name and version number for teamwork projects. Modified properties are marked with the same color as in the model element tree.

Diagrams Comparison

To compare diagrams

1. In the **Difference Viewer** dialog box, select the diagram you want to compare and click the **Compare Diagrams** button.

2. The **Diagrams Difference Viewer** dialog box opens, which displays both diagrams with changes made in them.

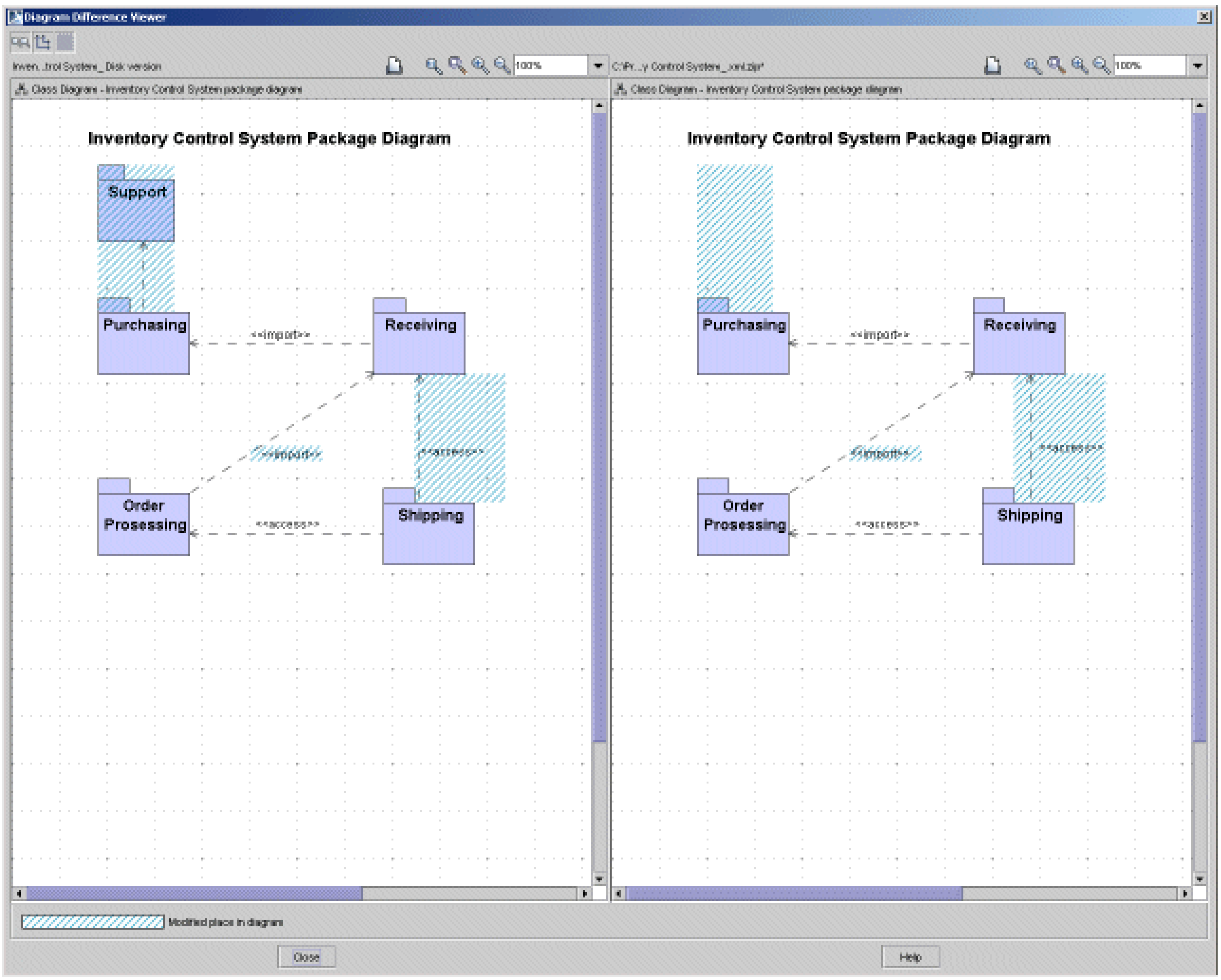


Diagram Difference Viewer
Inven...trol System_Disk version
100%
C:\Pr...y Control System_.xml.zip*
Class Diagram - Inventory Control System package diagram
Inventory Control System Package Diagram
Support
Purchasing
Receiving
Order Prosessing
Shipping
<<import>>
<<access>>
Modified place in diagram
Close
Help

Figure 290 -- Diagram Difference Viewer dialog box

Diagrams Difference Viewer displays two diagrams:

- Current (or first opened) project diagram is displayed at the right-hand side.
- Diagram that is compared with is displayed at the left-hand side.

Symbol changes that are reflected in the diagram:

- Modified symbol properties
- New symbol creation
- Symbol deletion
- Symbol bound changes (resize, bound changes because of element properties changes)

All changes are highlighted in light blue dashes.

Buttons available in the **Diagrams Difference Viewer** dialog box:

Button	Function
Synchronize Zooming	If pressed, zooming affects both diagrams: zooming one diagram causes zooming of the other diagram.
Synchronize Scrolling	If pressed, scrolling one diagram causes scrolling of the other diagram.
Mark Changes	If pressed, places where diagram has changed are marked on both diagrams.
Print Diagram	Prints the corresponding diagram together with marked changes.
Zoom 1:1	Zooms the corresponding diagram(s) to the original size.
Fit in Window	Zooms the corresponding diagram(s) to the size that fits the window.
Zoom In	Zooms the corresponding diagram(s) in.
Zoom Out	Zooms the corresponding diagram(s) out.
100%	Select the percentage for zooming the corresponding diagram(s).

Metrics

NOTE	This functionality is available in Architect and Enterprise editions only.

MagicDraw metrics functionality, which is implemented as a plugin and accessible through the Open API, enables you to measure your project from three different viewpoints:

- UML model metrics
- System metrics
- Requirements metrics.

Using UML model metrics, you can measure your project using package, class, and diagram measurements (for example, measuring the number of classes, inheritance tree depth, and so on).

System metrics analyze models using the most popular object oriented project metrics: Halstead, McCabe, Chidamber, and Kemerer defined metrics (for example, cyclomatic complexity and weighted methods per class).

Requirement metrics consist of function points and use case metrics. These two metrics groups are so structurally similar that use case metrics are regarded as a subset of function point metrics. Use case metrics measure both the number of use cases in a project and the user case analysis through selected tagged values (priority, for example).

The results of these analyses are displayed in a table, where you can select which metric you would like displayed. You can also export the metrics to a separate file.

Metrics are implemented as a plugin and are accessible through the Open API.

A metric is a numeric value that measures a model or is counted according to model measuring. Each metric has both a lowest and highest limit specified. Metrics that fall outside of this range are marked:

- Values that are too low are displayed in a blue font.
- Values that are too high are displayed in a red font. **Note:** if the highest limit equals zero, the metric is never marked as too high.

Metric Suites

In MagicDraw, you can create your own metric suites or use one of the three predefined metric suites: *System Metrics*, *UML Model Metrics*, or *Requirements Metrics*.

The metric suites contain a list of metrics that will be counted and the properties specified for each selected metric.

To create your own metric suites, clone an existing suite and specify the suite properties. You can edit the predefined metrics suites, and all metric suites can be imported or exported, facilitating the exchange of ideas with other users.

Displaying Metrics

Metrics are counted according to properties defined in a selected metric suite and can be counted for an entire project or just the selected packages, classes, interfaces, or diagrams. The results are displayed in the Metrics window, which opens at the bottom of the MagicDraw application window.

The Metrics window contains two tabs:

- **Data** tab. The counted metrics of the selected suite are displayed in a metrics table, which includes counted metrics only.
- **Graphics** tab. The selected metric is displayed as a graphic.

Metrics tables display packages, classes, interfaces, and diagrams. Additionally, elements that contain packages, classes, interfaces, and diagrams, which are displayed using a tree structure, are not counted for these elements.

The following is an example of a metrics table structure:

Model Element	**Metric1**	**Metric2**	**Metric3**	**…**	**….**	**MetricN**

The following is an example of a metrics table structure:

PackageA	value	value	value	value	value	value
Inner class1	value	value	value	value	value	value
Inner class2	value	value	value	value	value	value

If a value is not counted for a class, interface, package, or diagram, the cell is left empty.

You can apply the following filters to the metrics table:

- All
- Packages
- Classes (classes and interfaces are displayed)
- Diagrams
- Package Violations (only rows that contain package violations are displayed)
- Class Violations (only rows that contain class or interface violations are displayed)

When the Classes, Diagrams, or Class Violations filters are selected, the owner is displayed next to the following element: c1 (Classes::Package1)

Starting Metrics

To start Metrics:

Click **Metrics** on the **Analyze** menu, or on the class/package/interface/diagram shortcut menu, click **Tools** and then click **Metrics**.

The **Metrics** dialog box opens.

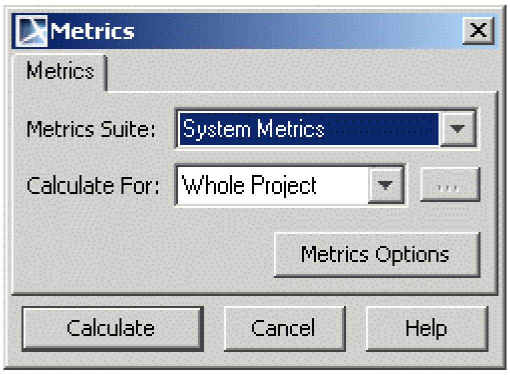

Metrics Suite: System Metrics
Calculate For: Whole Project

Figure 291 -- Metrics dialog box

Element	Description
Metrics Suite	Lists all the available metrics suites.
Calculate For	Lists two values: • **Whole Project** – calculates metrics for the entire project. • **Selection** – calculates metrics for selected items only. Click the "**…**" button to open the **Select Elements** dialog box.
Metrics Options	Opens the **Metrics Options** dialog box.
Calculate	Opens the **Metrics** window.

To set element options for Metrics, click the "…" button to open the **Select Elements** dialog box:

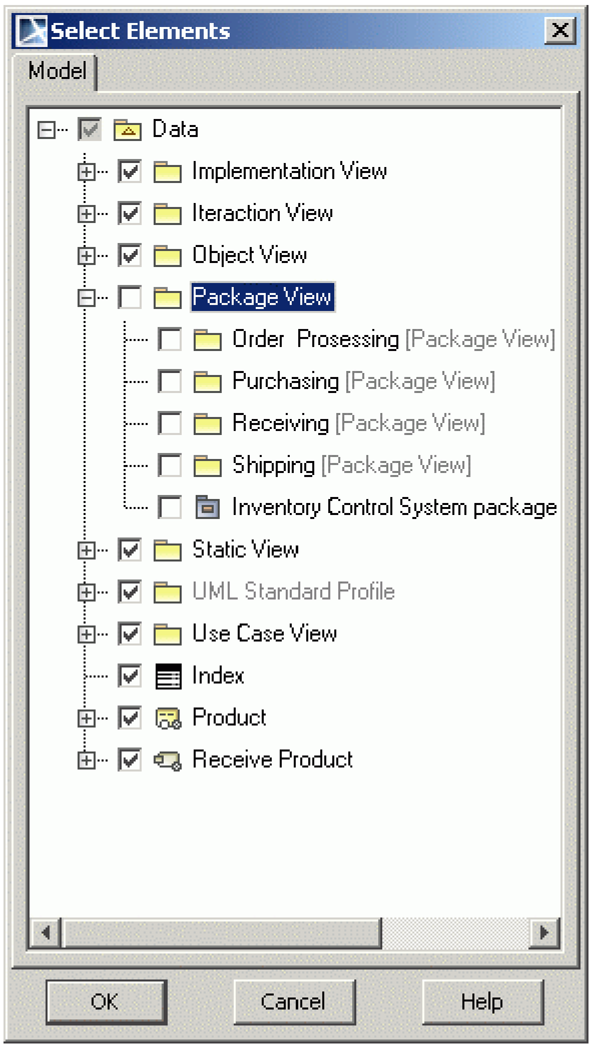


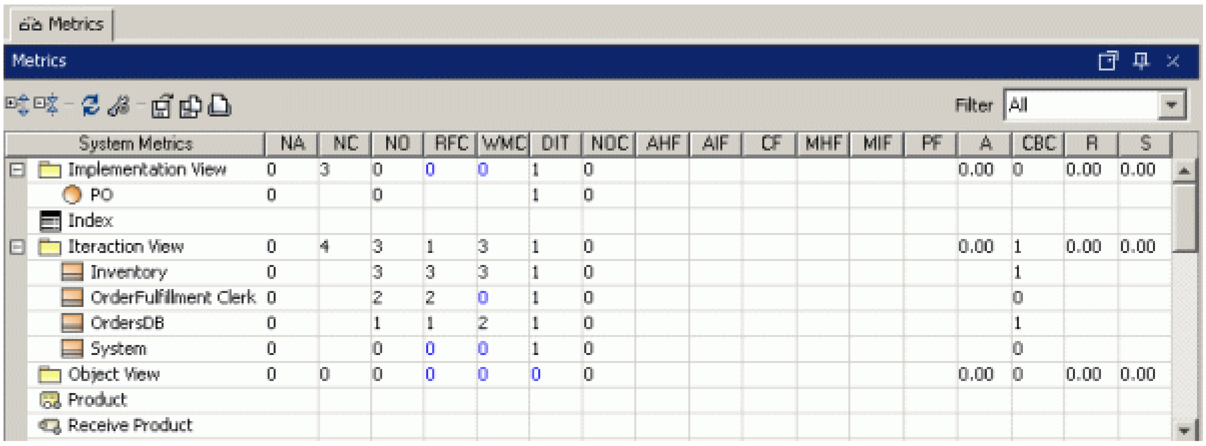
Figure 292 -- Select Elements dialog box

Packages, classes and diagrams are displayed in the **Select Elements** dialog box. If you select the box next to a parent element (for example, the *Data* check box in the image above), all its related child elements are automatically selected. Conversely, clearing the box next to a parent element clears all its related child elements.

If you clear the box next to a child element, the parent box is also cleared. For example, if the *Data* box is selected, all its related child elements are selected. If you then clear the *Package View* box, its child elements are also cleared, as is the box next to *Data*, but all the other boxes remain selected.

Metrics window

The **Metrics** window is implemented as a JIDE GUI window. Like the **Messages** window, it is available at the bottom of the MagicDraw application window.



System Metrics	NA	NC	NO	RFC	WMC	DIT	NOC	AHF	AIF	CF	MHF	MIF	PF	A	CBC	R	S
Implementation View	0	3	0	0	0	1	0							0.00	0	0.00	0.00
PO	0		0			1	0										
Index																	
Iteraction View	0	4	3	1	3	1	0							0.00	1	0.00	0.00
Inventory	0		3	3	3	1	0								1		
OrderFulfillment Clerk	0		2	2	0	1	0								0		
OrdersDB	0		1	1	2	1	0								1		
System	0		0	0	0	1	0								0		
Object View	0	0	0	0	0	0	0							0.00	0	0.00	0.00
Product																	
Receive Product																	

Figure 293 -- Metrics window

Element name	**Description**
Expand Current Branch	Expands all elements in the selected branch within the results table.
Collapse Current Branch	Collapses all elements in the selected branch within the results table.
Refresh	Recalculates metrics results according to the current model.
Metrics Options	Opens the **Metrics Options** dialog box.
Export	Opens the **Export Metrics** dialog box.
Compare Metrics With…	Opens the **Open** dialog box, where you can select a text file to compare with the currently open metric set.
Print	Prints the metrics table. The **Print** dialog opens.
Filter	Contains these values: • All • Packages • Classes • Diagrams • Package Violations • Class Violations

The selected metrics rows or cells can be copied to the clipboard by clicking **Copy** on the shortcut menu or by **Ctrl+C** on your keyboard.

Exporting Metrics

You can export the selected metrics rows and columns, or the entire metrics table, to a metrics results file. Metrics results can be exported using *.txt and *.html formats.

In the following example, metrics are presented in *.txt format and are separated by tabs:

```
Element                          Metric1 Metric2 Metric3 ….      MetricN
```

Package Package1	value	value	value	….	Value
Class class1 (Package1::class1)	value	value	value	….	Value
Class class2 (Package2::class2)	value	value	value	….	Value

Here *Metric1* .. *MetricN* – the metric name abbreviation.

Technical information is displayed at the bottom of the file. Text "Element IDs" are added after the metrics of an element and are also printed. This information is needed for metrics comparison.

In the following example, information is presented in *.html format:

Metrics Report

Element	**Metric1**	**Metric2**	**Metric3**	**….**	**Metric N**
Package Package1 *(Package1)*	value	value	value	….	Value
Class class1 *(Package1::class1)*	value	value	value	….	value

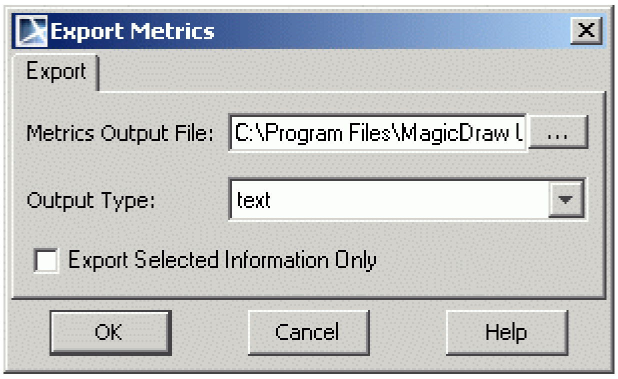
Here *Metric1* .. *MetricN* – the metric name abbreviation.

Each metric name is hyperlinked with its metric description. Metric descriptions can be opened in a separate window after clicking the hyperlink.

NOTE	*.html format is best suited for viewing metrics. If you want to copy the metrics table to another program, use of the *.txt format.

To export **Metrics**

Click the **Export Metrics** button in the **Metrics** window. The **Export Metrics** dialog box opens:



Metrics Output File: C:\Program Files\MagicDraw L
Output Type: text
☐ Export Selected Information Only

Figure 294 -- Export Metrics dialog box

Element	**Description**
Metrics Output File:	Displays the path and file names of the metrics results output file. Click the "**…**" button to select the location and file.
Output Type:	Contains these values: • Text (*.txt) • HTML (*.html)

Element	Description
Export Selected Rows Only	When selected, only the selected table rows and the header row are exported. When cleared, the entire metrics table is exported.

Comparing metrics

Counted metrics can be compared with metrics that are saved in a *.txt file. Metrics can be compared only when the metrics window is open.

Comparison results are displayed in the same metrics table. If a cell contains a metric that has increased, it has a red fill color. If the metric has decreased, a blue fill color is used. Metrics that are not found in other file cells have a grey fill color.

The metrics comparison can be canceled using the ESC key.

Metrics Options

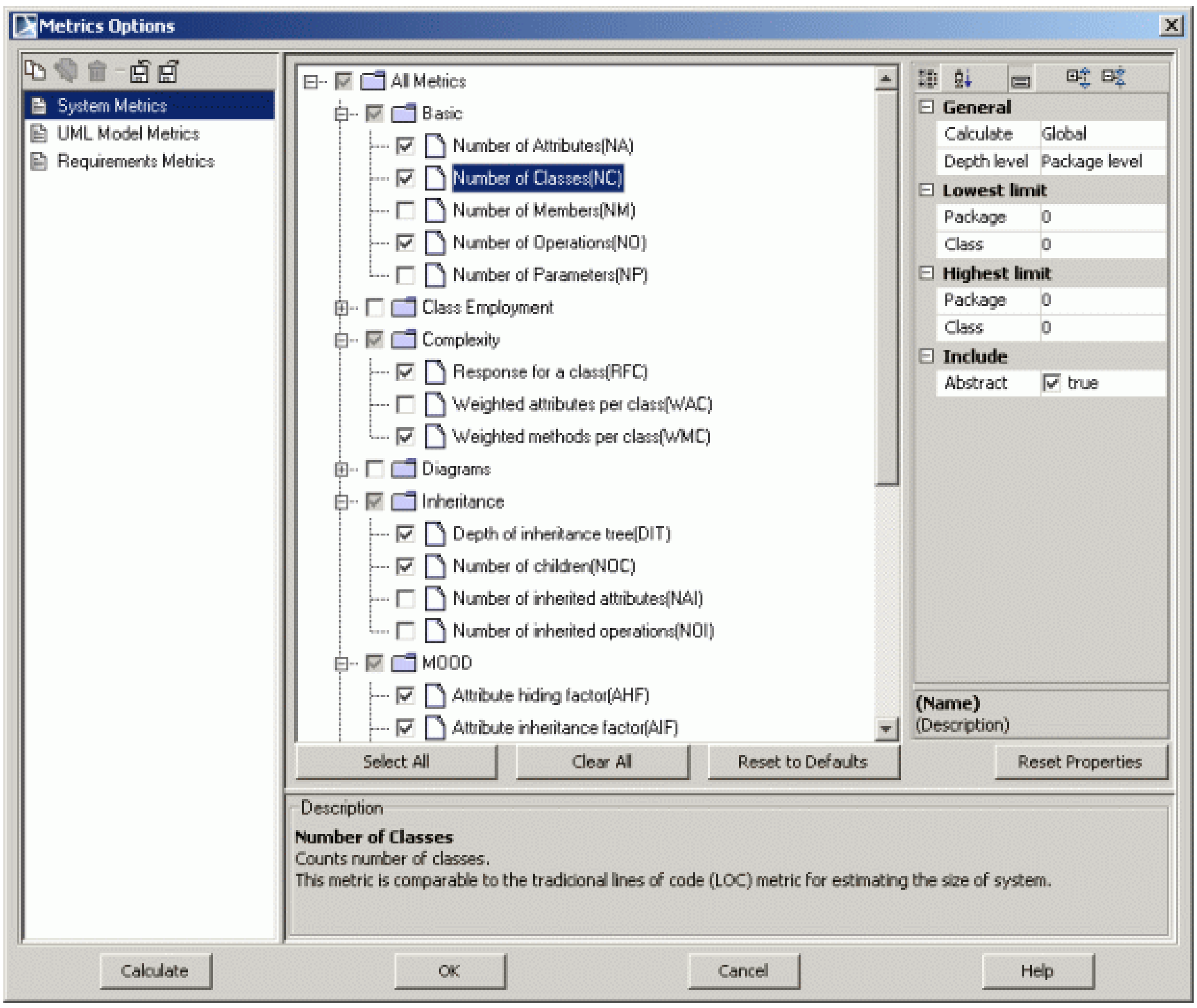
Metrics suites are managed in the **Metrics Options** dialog box.

To open the **Metrics Options** dialog box:

- From the **Analyze** menu, select **Metrics** and then **Metrics Options**
- In the Metrics dialog box, click **Metrics Options**.

The left pane of the **Metrics Options** dialog box displays the defined metrics suites. Using the buttons or shortcut menu, metrics suites can be cloned, renamed, removed, exported, and imported. Predefined metrics sets cannot be renamed or removed.

The suite properties are displayed in the right pane:



System Metrics
UML Model Metrics
Requirements Metrics

- [✓] All Metrics
  - [✓] Basic
    - [✓] Number of Attributes(NA)
    - [✓] Number of Classes(NC)
    - [ ] Number of Members(NM)
    - [✓] Number of Operations(NO)
    - [ ] Number of Parameters(NP)
  - [ ] Class Employment
  - [✓] Complexity
    - [✓] Response for a class(RFC)
    - [ ] Weighted attributes per class(WAC)
    - [✓] Weighted methods per class(WMC)
  - [ ] Diagrams
  - [✓] Inheritance
    - [✓] Depth of inheritance tree(DIT)
    - [✓] Number of children(NOC)
    - [ ] Number of inherited attributes(NAI)
    - [ ] Number of inherited operations(NOI)
  - [✓] MOOD
    - [✓] Attribute hiding factor(AHF)
    - [✓] Attribute inheritance factor(AIF)

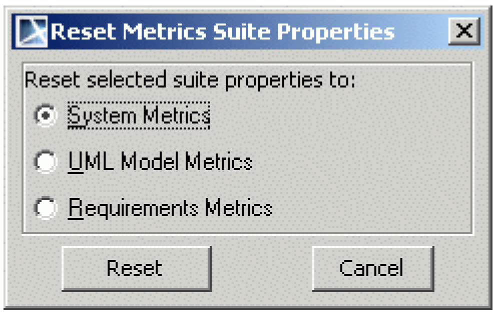
General	
Calculate	Global
Depth level	Package level
Lowest limit	
Package	0
Class	0
Highest limit	
Package	0
Class	0
Include	
Abstract	✓ true

(Name)
(Description)

Description
Number of Classes
Counts number of classes.
This metric is comparable to the tradicional lines of code (LOC) metric for estimating the size of system.

Figure 295 -- Metrics Options dialog box

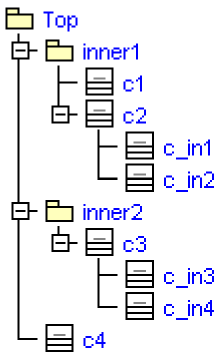
Element	Description
Metrics suites list	Displays all created metrics suites in a list.
Metrics suites list buttons: **Clone** **Rename** **Remove** **Import** **Export**	• **Clone** – clone the selected suite. • **Rename** – rename the selected suite. • **Remove** – remove the selected suite. • **Import** – import a new suite. The **Open** dialog box opens. • **Export** – export the selected suite. The **Save** dialog box opens. All these commands are available from each metric suite shortcut menu.
Metrics tree	Use this tree to select the metrics you want to include in your metrics suite. All metrics are displayed in the metrics tree.
Properties list	Metrics properties are displayed individually for each property.
Select All	Selects all metrics.
Clear All	Clears all metrics.

Element	Description
Reset to Default	Predefined MagicDraw metrics are reset to the default metrics suite. User-created metrics suites are reset to the selected predefined metrics suite. The **Reset Metrics Suite Properties** dialog box opens:  Reset Metrics Suite Properties — Reset selected suite properties to: [✓ System Metrics] UML Model Metrics Requirements Metrics
Description	Displays the selected metric description.
OK	Saves all changes and closes the dialog box.

Metrics Properties

Properties Group	Property	Description
General	Calculate	Defines what will be counted: • **Local** – inside package (class). • **Global** - inside package (class) recursively. • **Average** – metrics will be counted from the lowest level of the elements tree. Each upper level metric will be counted as an average of the current object metric and all lower level metrics: Average_element_metric = (Element_metric_value (if counted separately) + sum (inner_elements_metrics_values)) / (1 (if element_metric_value was counted) + count_of_inner_elements_that_have_metrics_counted) Average metric value should be rounded down to the lower value (for example, 1.5 = 1, 1.6 =2) • **Min** – lowest level metrics will be counted. Each upper level metric will be set to the minimum of the current object metric and all lower level metrics (except the metrics that are equal 0). Min_element_metric = min (Element_metric_value, min (inner_elements_metrics_values)) Here metric_value > 0 • **Max** – lowest level metrics will be counted. Each upper level metric will be set to the maximum of the current object metric and all lower level metrics. Max_element_metric = max (Element_metric_value, max (inner_elements_metrics_values)) Here metric_value > 0
Lowest limit	Package	Recommended lowest metric value for the package. Editable.
	Class	Recommended lowest metric value for class and interface. Editable.
	Diagram	Recommended lowest metric value for the diagram. Editable.
Highest limit	Package	Recommended highest metric value for package. Editable. **Note**: if the highest limit is equal to 0, the metric is never marked as too high (in red font color).
	Class	Recommended highest metric value for class and interface. Editable. **Note**: if the highest limit is equal to 0, the metric is never marked as too high (in red font color).
	Diagram	Recommended highest metric value for diagram. Editable. **Note**: if the highest limit is equal to 0, the metric is never marked as too high (in red font color).
Include		This properties group specifies whether the information is included when counting metrics.
Weight		This properties group specifies whether the information is included when counting metrics.

The following is an example of a metrics calculation used for calculating the number of classes (NC) in this tree:



Calculated metric values with a different aggregation:

Element	Local	Global	Average	Min	Max
Top	1	8	1	1	2
Inner1	2	4	1	2	2
C1	0	0	0	0	0
C2	2	2	1	2	2
c_in1	0	0	0	0	0
c_in2	0	0	0	0	0
Inner2	1	3	1	1	2
C3	2	2	1	2	2
c_in3	0	0	0	0	0
c_in4	0	0	0	0	0
C4	0	0	0	0	0

Dependency Matrix

View Online Demo	Dependency Matrix

NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The Dependency Matrix is a method of visualizing and representing dependency criteria. Diagrams, UML, and extended UML elements serve as row and columns entries. The cells in the matrix show where these elements are associated - related.

Dependency matrixes include different dependency criteria: UML relations, extended UML relations, semantic dependencies (dependency through property), and relationships through tags.

Relationship through tags is a relationship where a cell represents a relation that is implemented as a tag added to the element with a reference to another element. A relation through tags allows relate UML element of any type. Tags are one of the methods for relating elements that cannot be represented on the same diagram.

The Dependency Matrix fulfills the feature, which helps visualize the many-to-many traceability from elements not from the same diagrams. The Dependency Matrix also provides the visualization of many-to-many for large interconnected system elements. The most usefulness is complete the lack of functionality to support different domains - DoDAF.

Dependency Matrix functionality is useful for:

- Quickly visualizing dependency criteria.
- Compactly visualizing relations of a big system. Such system relations cannot be represented by a diagram on a single sheet of paper, as the diagram is very big.
- Creating a matrix template for domains and supporting domain specific element relation visualizations.
- Studying relations from a particular scope and type of element by filtering the unimportant.
- Showing relations that cannot be represented in diagrams: representation (class by lifeline); behavior representation in other diagrams, operation representation by Call Behavior Action, Use Case relations with describing activities through property Owned Behavior, etc. The Semantic dependency matrix is needed for deeper model analysis. The Matrix allows the representation of any kind of relations through the element property.
- Another method of showing custom relations - through tags.
- **NEW!** Creating or removing relations between model elements.

Creating Dependency Matrix

The matrix element in the model is similar to the diagram element. After creating a new matrix, it appears in the Browser as a model element and the matrix pane can be opened by double-clicking on the matrix name. The same actions, which can be performed with diagrams, are valid for matrixes.

To open the Matrix Dependency View

- From the **Diagrams** menu, select **Analysis Diagrams** > **Dependency Matrixes.** Click **Add** to create a new dependency matrix and then click **Open**.
- From the **Analyze** menu, select **Dependency Matrix** and then **Create Blank Matrix.** Type a name and select the package where you want to save it in the project and click **OK**.
- From the package shortcut menu in the Browser, select **New Diagram** and then **Dependency Matrix**.
- In the Analysis diagrams toolbar, click the **Dependency Matrix** button. Type a name and select the package where you want to save it in the project and click **OK**.

Using Dependency Matrixes

You can modify a dependency matrix after it is created. The dependecy matrix using and modification features are described in the following subsections:

- Dependency Matrix View
- Dependency Matrix Pane
- Modifying Dependency Matrix

Dependency Matrix View

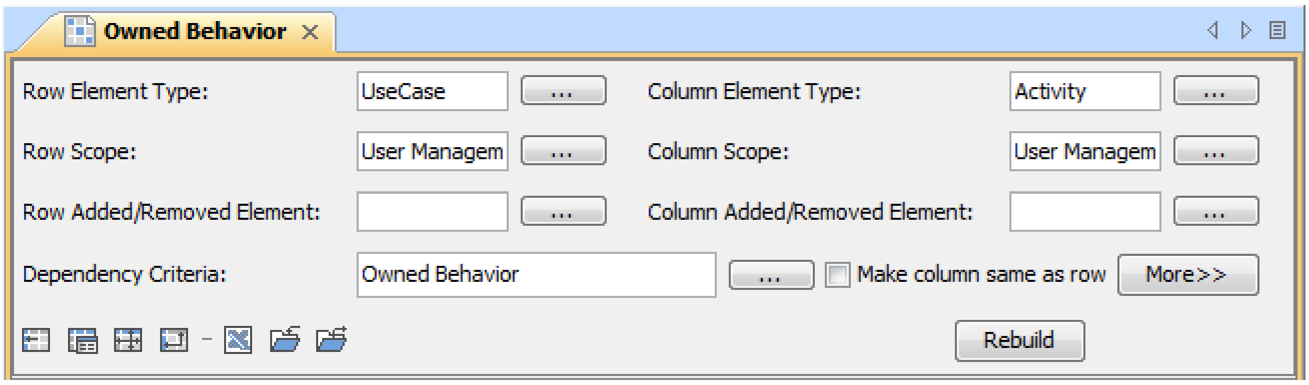


Figure 296 -- Dependency Matrix View

Element Name	Description
Row Element Type	Click the "**...**" button to select an element or multiple element types to show in rows of the dependency matrix.
Column Element Type	Click the "**...**" button to select an element or multiple element types to show in columns of the dependency matrix.
Row Scope	Click the "..." button to define a scope of the model (packages/profiles) from which elements should be displayed in rows of the dependency matrix.
Column Scope	Click the "..." button to define a scope of the model (packages/profiles) from which elements should be displayed in columns of the dependency matrix.
Row Added / Removed Element	+*<owner>::<element>* value shows the row that is added to the matrix. -*<owner>::<element>* value shows the row that is removed from the matrix. Click "..." button to add or remove row from the dependency matrix table. The **Add/Remove Elements** dialog opens. For more information about this dialog, see "The Add / Remove Elements dialog" on page 439.
Column Added / Removed Element	+*<owner>::<element>* value shows the column that is added to the matrix. -*<owner>::<element>* value shows the column that is removed from the matrix. Click "..." button to add or remove column from the dependency matrix table. The **Add / Remove Elements** dialog opens. For more information about this dialog, see "The Add / Remove Elements dialog" on page 439.
Dependency Criteria	Click the "..." button to define what relations between row and column elements to display in the matrix cells. • **UML Relations**. The matrix cells will display the existence of relationships between row elements and column elements. • **Tagged Value**. The matrix cells will display relations through tags if matrix row elements have tagged values pointing to matrix column elements or vice versa. • **Properties.** The matrix rows will display relations through properties if matrix row elements have properties pointing to column elements or vice versa.
Make column same as row	If selected, sets the column filter setting to the same as row.
More>>	Click the **More** button to expand the toolbar and find advanced matrix filters areas.

Element Name	Description
Row Property/ Column Property	Select an item from the combo box to select row/column elements, filtered by some property. Only entries that meet selected property values will be displayed in the rows/columns. Possible choices: • Applied stereotype; • Visibility; • Tagged Value; • To Do.
Row Property Value **Column Property Value**	The "..." button is enabled only when some Property is selected. The corresponding dialog with available property values opens. Multiple property value selections are available.
Rebuild	Columns and rows rebuild action, which rebuilds element lists according to the filters configuration.
Add / Remove Elements	Add / remove elements and diagrams from/to Matrix rows or columns independently from the filter settings. Click the button to open the **Add Remove Elements** dialog. For more information about this dialog, see "The Add / Remove Elements dialog" on page 439.
Matrix Properties	Click the button to open the **Dependency Matrix** Specification window.
Quick Diagram Layout	Click the button to automatically layout the matrix cells to default width and height.
Change Axes	Click the button. Columns and rows will be exchanged with each other.
Save as *.csv	Click the button. The **Save** dialog opens. Select location for a file and enter a file name (default name will be set the same as Matrix Name). The file will be saved in Comma Separated Values (*.csv) format. The file can be opened with MS Excel, Open Office, MC Excel imported into databases.
Safe Configuration As Template	Click the button to save the filters configuration as a matrix template. The saved template can be imported into the **Dependency Matrix Template** dialog and used in other projects.
Load Matrix Template	Click the button to open the **Load Matrix Template** dialog. Select a template from the list and click **OK**.

Dependency Matrix Pane

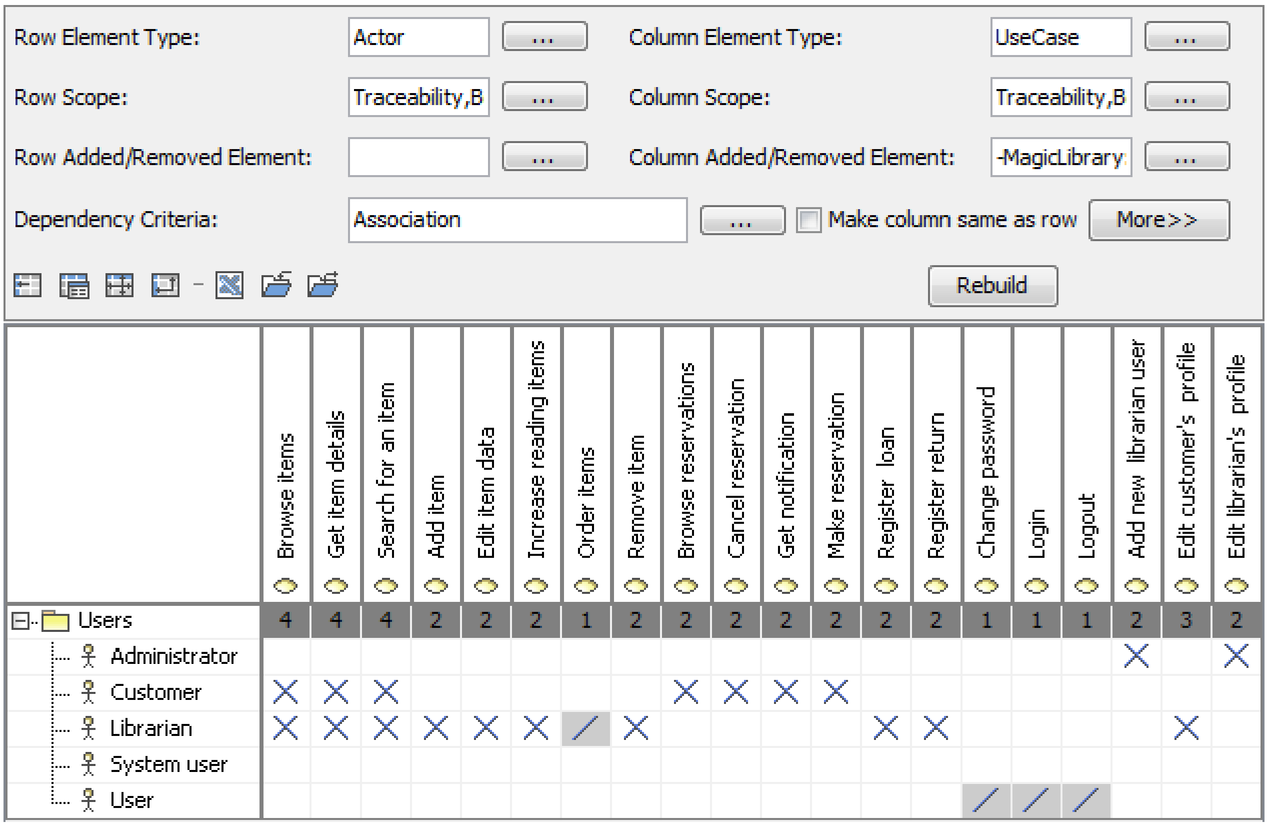
The Dependency Matrix pane opens after building the matrix.

To build a dependency matrix

1. Select the **Row Element Type**.
2. Select the **Column Element Type**.

3. Specify the **Row Scope**.
4. Specify the **Column Scope**.
5. Select the **Dependency Criteria**.
6. Click **Rebuild**.

Dependencies between elements are displayed in cells. Rows and columns display elements, which were specified in the Matrix View fields.



Row Element Type:	Actor	Column Element Type:	UseCase
Row Scope:	Traceability,B	Column Scope:	Traceability,B
Row Added/Removed Element:		Column Added/Removed Element:	-MagicLibrary
Dependency Criteria:	Association	☐ Make column same as row	More>>

	Browse items	Get item details	Search for an item	Add item	Edit item data	Increase reading items	Order items	Remove item	Browse reservations	Cancel reservation	Get notification	Make reservation	Register loan	Register return	Change password	Login	Logout	Add new librarian user	Edit customer's profile	Edit librarian's profile
Users	4	4	4	2	2	2	1	2	2	2	2	2	2	2	1	1	1	2	3	2
Administrator																		X		X
Customer	X	X	X						X	X	X	X								
Librarian	X	X	X	X	X	X	/	X					X	X					X	
System user																				
User															/	/	/			

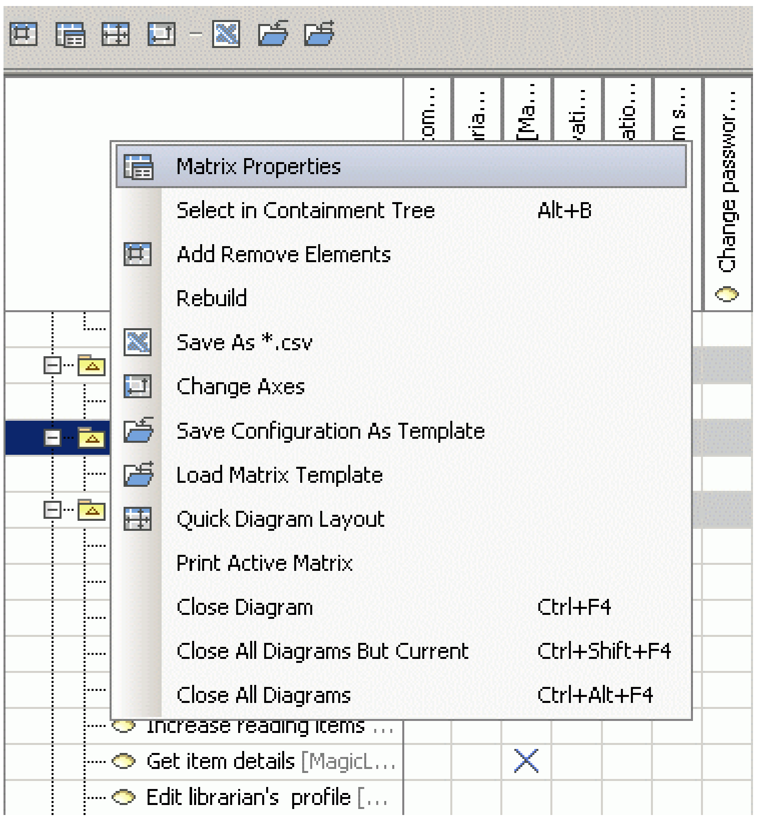
Figure 297 -- Dependency Matrix Pane

An Icon with dependency direction representation is displayed in a cell if the single dependency is presented in this cell. Arrows can be:

- One directional arrow. The direction shows that element is dependent on the element, to which direction it points;
- Line. It shows that elements depend on each other;
- "X" icon. It appears when multiple dependencies are presented in the cell.

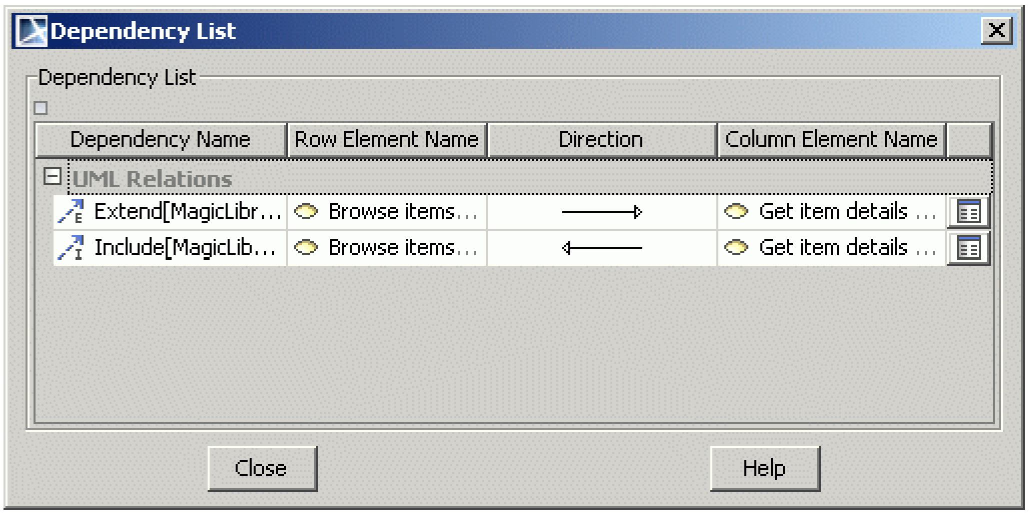
The number of dependencies between package elements is displayed in a cell where packages are intersecting with any element.

Right-click on the empty space in the Dependency Matrix pane to open the shortcut menu:


Matrix Properties
Select in Containment Tree Alt+B
Add Remove Elements
Rebuild
Save As *.csv
Change Axes
Save Configuration As Template
Load Matrix Template
Quick Diagram Layout
Print Active Matrix
Close Diagram Ctrl+F4
Close All Diagrams But Current Ctrl+Shift+F4
Close All Diagrams Ctrl+Alt+F4
Change passwor...
Increase reading items ...
Get item details [MagicL...
Edit librarian's profile [...

To open the relation specification dialog of the dependent element

1. Double click a cell that is not empty or select it and from the shortcut menu, select **Dependency List**. The **Dependency List** dialog opens.



Dependency Name	Row Element Name	Direction	Column Element Name
UML Relations			
Extend[MagicLibr...	Browse items...	→	Get item details ...
Include[MagicLib...	Browse items...	←	Get item details ...

2. Click the button near the selected dependency to open the corresponding dependency Specification dialog.

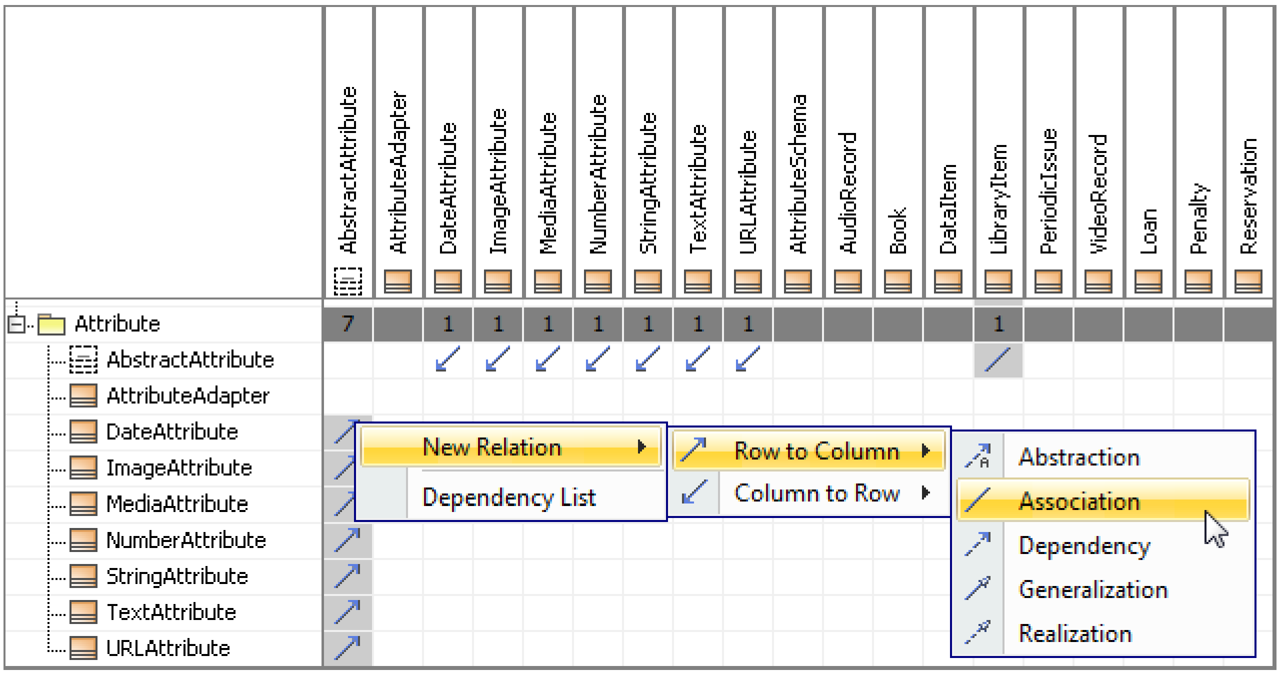
Modifying Dependency Matrix

NEW! To create the relations between model elements

1. In the opened matrix, do one of the following:

- Double-click the cell. If only one type of relations is available, the relation is created. If several types of relations are available, the shortcut menu opens.
- Right click the cell. The shortcut menu opens.

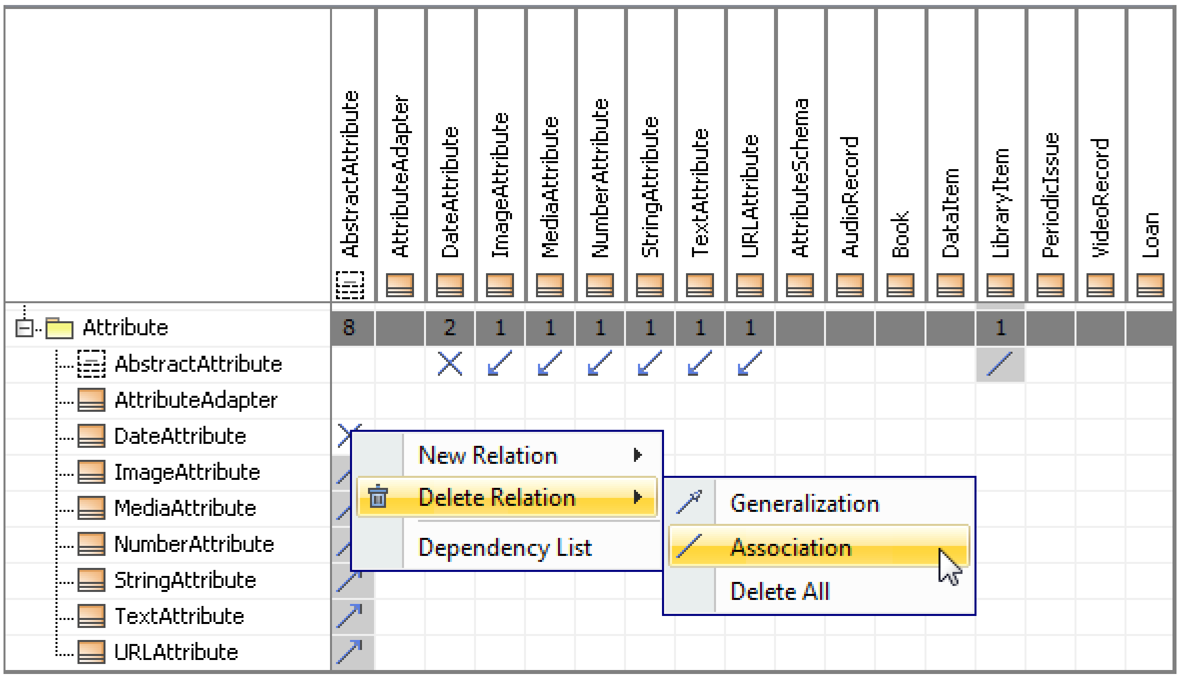
2. On the shortcut menu, point to **New Relation**, select the relation direction, and click the relation type you need.



NEW! To remove the relations between model elements

1. In the opened matrix, do one of the following:
   - Double-click the cell. If only one type of relations is available, the relation is removed. If several types of relations are available, the shortcut menu opens.
   - Right click the cell. The shortcut menu opens.
2. On the shortcut menu, point to **Delete Relation**, select the relation direction, and click the relation type you need.

i



Working with a Dependency Matrix Template

Matrix properties and filter configurations are stored in MagicDraw. The matrix configuration is called the matrix template. The matrix template is used to save a matrix independently of a project and to share them with other users. The user can create a matrix based on a predefine template.

The matrix template can be imported and exported as a file. Filters and Matrix properties will be saved as a matrix template.

To create a Dependency Matrix from a Template

1. From the **Analyze** menu, select **Dependency Matrix** and then **Matrix Templates**. The **Dependency Matrix Templates** dialog box opens.
2. Select the template from the list and click **Create Matrix**, or click **OK.** After closing the dialog box, click **Rebuild** in the Matrix View.

To load a Dependency Matrix Template

1. In the Matrix View, click the **Load Matrix Template** button . The **Load Matrix Template** dialog opens.
2. Select a template from the list and click **OK**. The dialog is closed and template values appear in the rows/columns filter fields in the Matrix View.
3. Click **Rebuild** in order to apply the template filter for the dependency matrix**.**

To save a configuration as a Dependency Matrix Template

1. Specify the desired filter values for rows and columns.

2. In the Matrix View, click the **Save Configuration As Template** button . The **Save** dialog opens.

3. Type a name for the template, select a location and click **Save**.

To export a Dependency Matrix Template

1. In the **Dependency Matrix Templates** dialog, click the **Export Selected Matrix template** button . The **Save** dialog opens.
2. Type a name for the template, select a location and click **Save**.

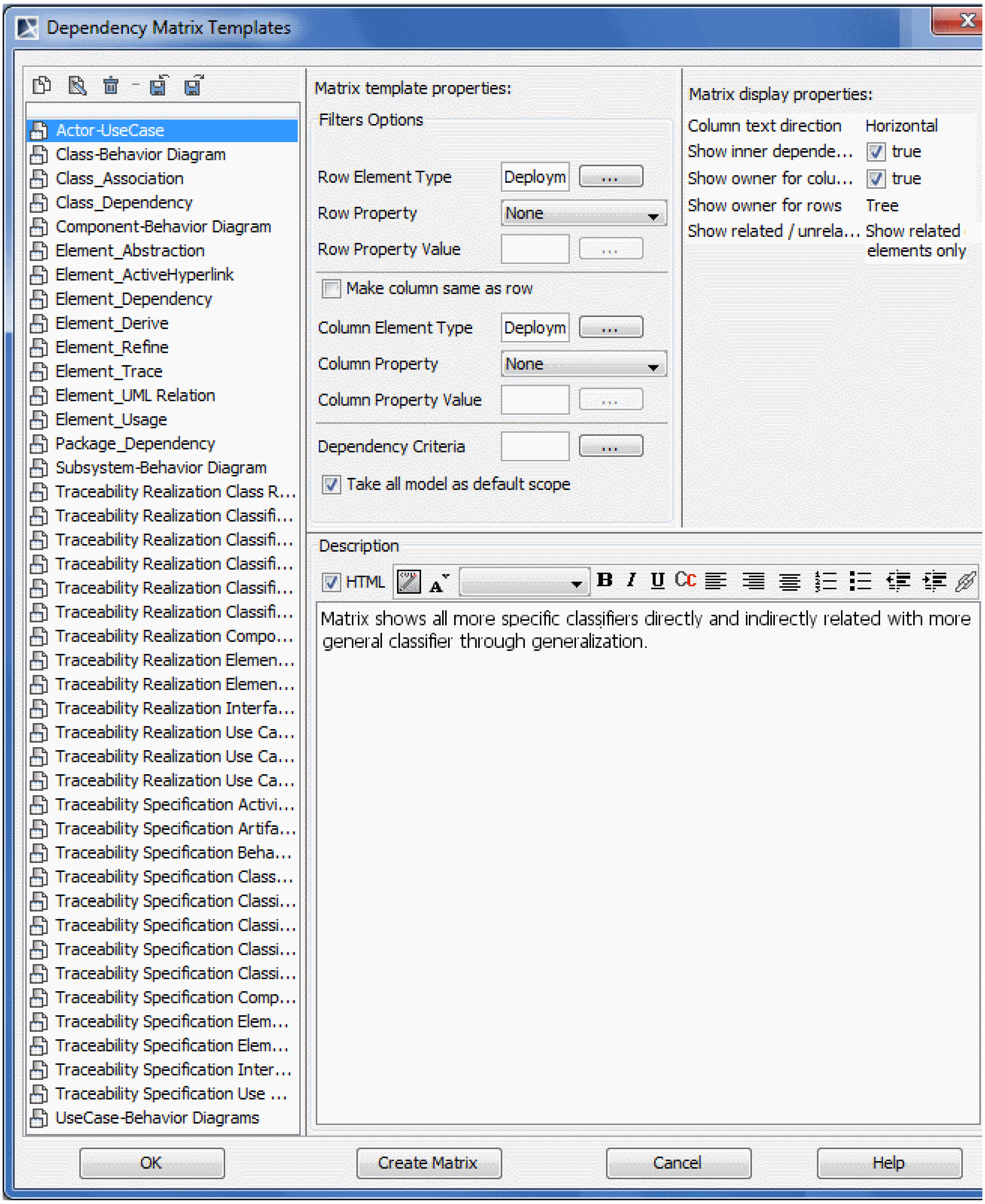
To import a Dependency Matrix Template

1. In the **Dependency Matrix Templates** dialog, click the **Import New Matrix template** button . The **Open** dialog opens.
2. Select a matrix template and click **Open**. The template with defined properties will be added to the templates list.

Dialog boxes in Dependency Matrix functionality

Dependency Matrix Templates dialog

From the **Analyze** menu, select **Dependency Matrix** and then **Matrix Templates**. The **Dependency Matrix Templates** dialog opens.


Dependency Matrix Templates

Actor-UseCase
Class-Behavior Diagram
Class_Association
Class_Dependency
Component-Behavior Diagram
Element_Abstraction
Element_ActiveHyperlink
Element_Dependency
Element_Derive
Element_Refine
Element_Trace
Element_UML Relation
Element_Usage
Package_Dependency
Subsystem-Behavior Diagram
Traceability Realization Class R...
Traceability Realization Classifi...
Traceability Realization Classifi...
Traceability Realization Classifi...
Traceability Realization Classifi...
Traceability Realization Classifi...
Traceability Realization Compo...
Traceability Realization Elemen...
Traceability Realization Elemen...
Traceability Realization Interfa...
Traceability Realization Use Ca...
Traceability Realization Use Ca...
Traceability Realization Use Ca...
Traceability Specification Activi...
Traceability Specification Artifa...
Traceability Specification Beha...
Traceability Specification Class...
Traceability Specification Classi...
Traceability Specification Classi...
Traceability Specification Classi...
Traceability Specification Classi...
Traceability Specification Comp...
Traceability Specification Elem...
Traceability Specification Elem...
Traceability Specification Inter...
Traceability Specification Use ...
UseCase-Behavior Diagrams

Matrix template properties:
Filters Options

Row Element Type	Deploym ...
Row Property	None
Row Property Value	...

Make column same as row

Column Element Type	Deploym ...
Column Property	None
Column Property Value	...
Dependency Criteria	...

✓ Take all model as default scope

Matrix display properties:

Column text direction	Horizontal
Show inner depende...	✓ true
Show owner for colu...	✓ true
Show owner for rows	Tree
Show related / unrela...	Show related elements only

Description
✓ HTML

Matrix shows all more specific classifiers directly and indirectly related with more general classifier through generalization.

OK | Create Matrix | Cancel | Help

Figure 298 -- The Package Dependencies dialog

Element name	Function
Clone Selected Matrix template	Select the template and click the button. A copy of the existing matrix template will be created with the same properties and filter options.
Rename Selected Matrix template	Select the template and click the button. The template name will be set to editable mode for renaming.
Remove Selected Matrix template	Select the template and click the button. The template will be removed from the templates list.
Import New Matrix template	Click the button to import a template. The **Open** dialog opens.
Export Selected Matrix template	Click the button to export a template. The **Save** dialog box opens.
Filters Options	For more information, see "Dependency Matrix View" on page 430.
Take all model as default scope	If selected, upon matrix creation, the whole model will be taken as the scope (later scope can be changed in Dependency Matrix View). If cleared, matrix will be empty until specifying scope.
Matrix Properties	
Columns text direction	Changes text direction in column headers. Possible choices: • Horizontal • Vertical
Show inner dependencies	If selected, the number of dependencies among container elements will be shown in the cell where the container is intersecting with other elements.
Show owner for columns	If selected, displays the element owners in the column headers.
Show owner for rows	Displays the element owner in the row headers. Possible choices: • Full qualified name • Hide • Tree
Show related/unrelated elements	Allows showing elements with or without their dependency criteria. Possible choices: • Show all; • Show related elements only; • Show unrelated elements only.
Description	Displays the matrix template description. Select the HTML check box to edit text using the advanced style.

Element name	Function
Change Exports	The **Export Module** dialog box opens. You can change the package set, selected for export.
OK	Closes the dialog box and adds changes to the Matrix View fields according to the selected template.
Create Matrix	Closes the dialog box and creates the dependency matrix, applying filters and options from the selected template.
Cancel	Exits the dialog box without saving changes.
Help	Displays MagicDraw Help.

The Add / Remove Elements dialog

In the Dependency Matrix View, click the button to open the **Add Remove Elements** dialog.

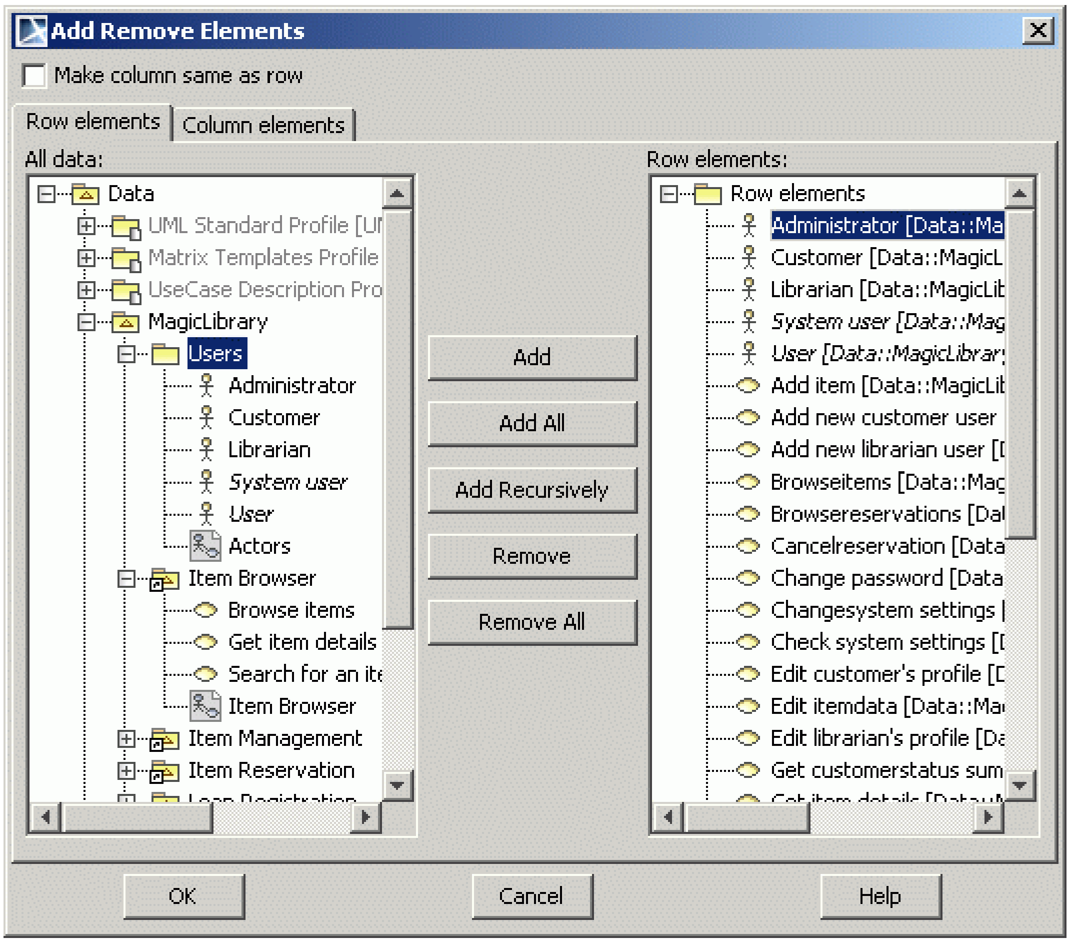


Figure 299 -- The Add / Remove Elements dialog

Element name	Function
Make column same as row	If selected, applies the same element combination that was set for row, to column.
Row elements	Displays a list of all model elements and chosen elements to display in the matrix rows.

Element name	Function
Column elements	Displays a list of all model elements and chosen elements to display in the matrix columns.
Add	Adds the selected element from the **All data** list to **Row (Column) elements** list without adding its inner elements.
Add All	Adds all model elements from the **All data** list to **Row (Column) elements** list.
Add Recursively	Adds the selected element from the **All data** list to **Row (Column) elements** list together with its inner elements.
Remove	Removes the selected element from the **Row (Column) elements** list.
Remove All	Removes all elements from the **Row (Column) elements** list.
OK	Saves changes and closes dialog.
Cancel	Closes dialog box without saving changes.
Help	Displays the MagicDraw help.

Analyzing Package Dependencies

An element depends on the module when at least one of its metaproperties reference elements from at least one share of that module. In such a case the element has a dependency from the module.

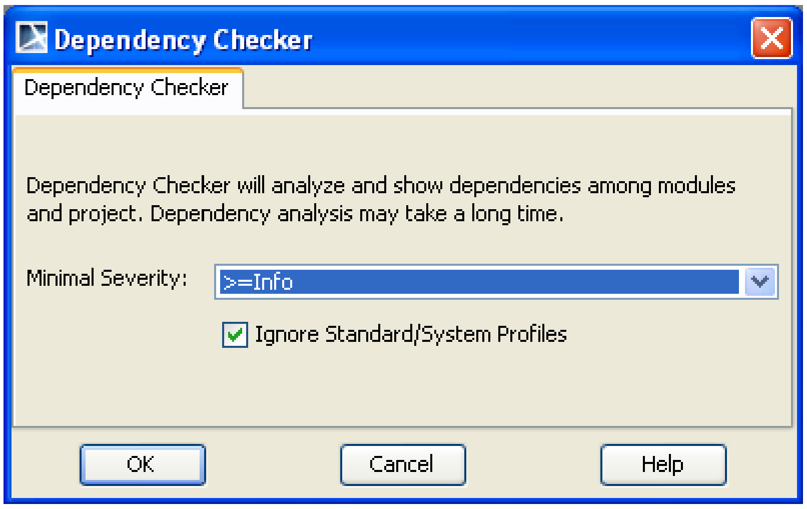
NOTE You may define options for the dependency checking in the in **Project Options** dialog > **General Project Options** > **Dependency Checker** options group.

To analyze package dependencies of the whole project or between the selected package/model and shared packages

1. Choose one of the following:

To analyse package dependencies of the whole project,	On the **Analyze** menu, click **Dependency Checker.**
To analyze dependencies between the selected package/model and shared packages	Right click the package or model in Browser or in diagrams, point to **Tools** and then click **Dependency Checker.**

2. The **Dependency Checker** dialog box appears. Click **OK.**



Dependency Checker will analyze and show dependencies among modules and project. Dependency analysis may take a long time.

Minimal Severity: >=Info

✓ Ignore Standard/System Profiles

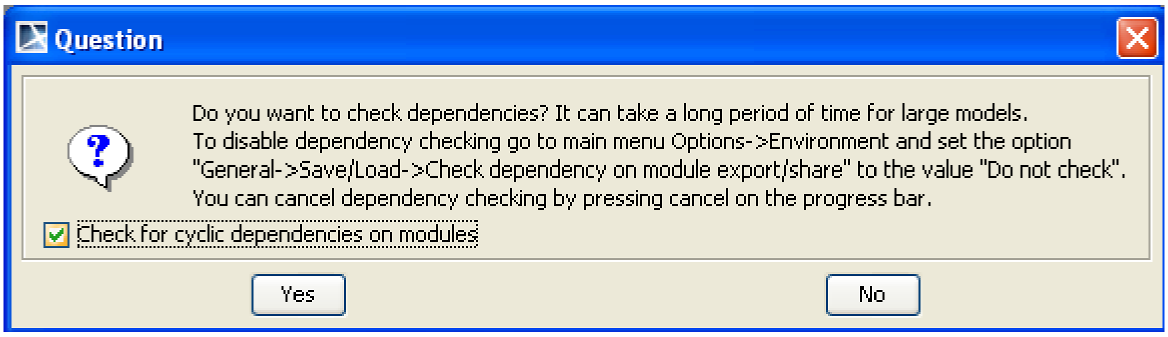
3. Dependencies between the selected package/model and shared packages will be analyzed and shown in the opened **Package Dependency** panel. The detailed description of the Package **Dependency** panel, see in Section "Package Dependencies panel" on page 443.

To analyze package dependencies while exporting modules or sharing packages

1. Choose one of the following:

To analyze package dependencies while exporting modules	From the package/model shortcut menu, choose **Modules** > **Export Module.** The **Export Module** dialog box appears. Select the modules you want to export (more information about exporting modules you may find in section "Exporting the module of a project" on page 117.
To analyze package dependencies while sharing packages	From the package/model shortcut menu, choose **Modules** > **Share Packages.** The **Shared Packages** dialog box appears. Select the packages you want to share (more information about sharing packages you may find in section "Sharing the module of a project" on page 118).

2. The question dialog box appears asking for your confirmation to start dependency checking between the exported package/model and the rest of the project (including shared packages that belong to the project and used modules).



Do you want to check dependencies? It can take a long period of time for large models.
To disable dependency checking go to main menu Options->Environment and set the option "General->Save/Load->Check dependency on module export/share" to the value "Do not check".
You can cancel dependency checking by pressing cancel on the progress bar.

✓ Check for cyclic dependencies on modules

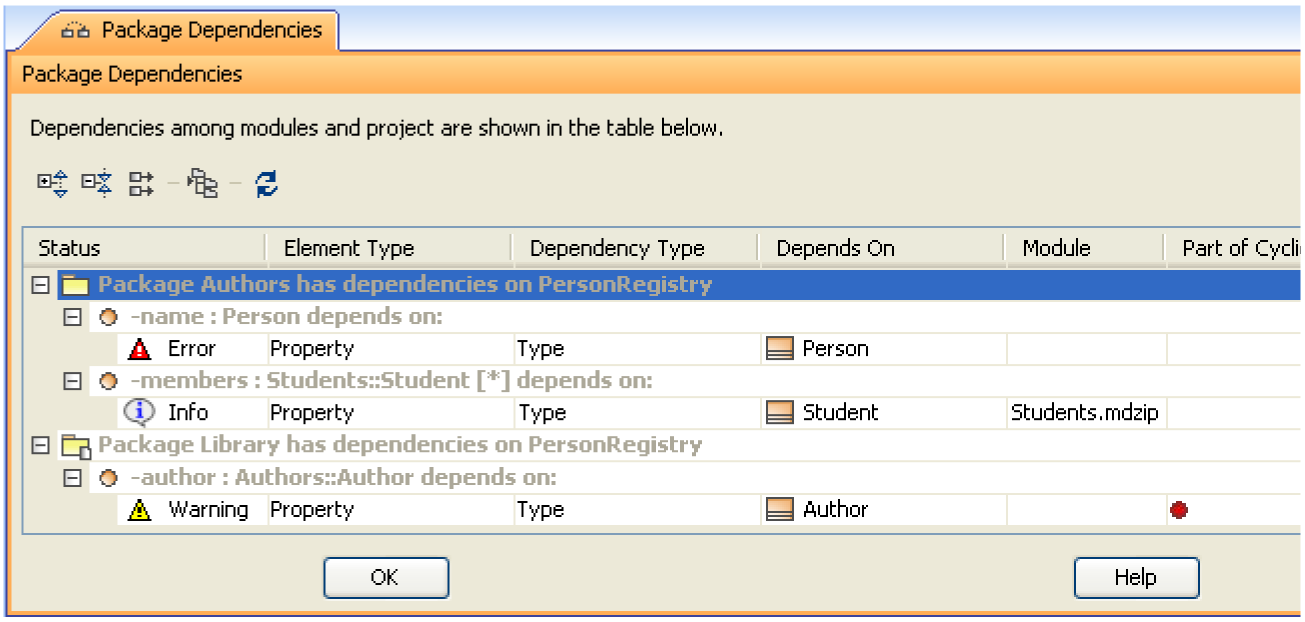
3. If you want to discover cyclic dependencies*, select the **Check for cyclic dependencies on modules** check box.. Press **Yes** to start dependency analysis. If the **Check for cyclic**

dependencies on modules check box is selected, only dependencies which have **Error** and **Warning** severity levels are displayed..

NOTE	If there is a chain of dependencies such that: A->M(1), M(1)->M(2), M(2)->M(3), ..., M(X)->M(A), where: • A is an element from the module M(A) • M(1..X) are other modules • A->M(x) is element A dependency on module M(x) • M(y)->M(x) is a dependency of at least one element in module M(y) on module M(x), then this chain is called a cyclic dependency and every atomic dependency in this chain is considered as part of cyclic dependency.

4. Dependencies between the selected package/model and shared packages will be analyzed and shown in the opened **Package Dependency** panel. The detailed description of the Package **Dependency** panel, see in Section “Package Dependencies panel” on page 443.

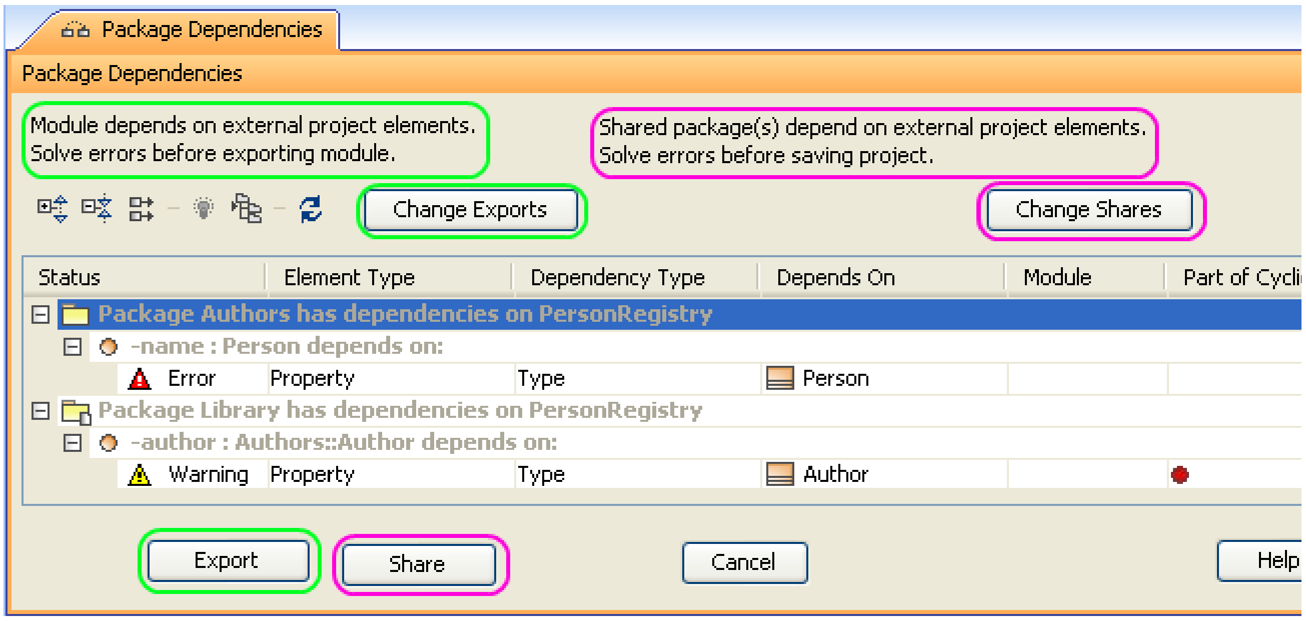
Package Dependencies panel



Dependencies among modules and project are shown in the table below.

Status	Element Type	Dependency Type	Depends On	Module	Part of Cycli
Package Authors has dependencies on PersonRegistry					
-name : Person depends on:					
Error	Property	Type	Person		
-members : Students::Student [*] depends on:					
Info	Property	Type	Student	Students.mdzip	
Package Library has dependencies on PersonRegistry					
-author : Authors::Author depends on:					
Warning	Property	Type	Author		●

Figure 300 -- The Package Dependencies panel, opened independently



Module depends on external project elements. Solve errors before exporting module.

Shared package(s) depend on external project elements. Solve errors before saving project.

Status	Element Type	Dependency Type	Depends On	Module	Part of Cycli
Package Authors has dependencies on PersonRegistry					
-name : Person depends on:					
Error	Property	Type	Person		
Package Library has dependencies on PersonRegistry					
-author : Authors::Author depends on:					
Warning	Property	Type	Author		●

Figure 301 -- The Package Dependencies panel, opened when exporting (GUI elements, highlighted in green) or sharing a package (GUI elements, highlighted in pink)

The **Package Dependencies** panel has a table which shows the list of dependencies and buttons for managing data displayed in this table.

Button	Description
Expand All Tree Branches	Expands all nodes in the package dependencies tree.
Collapse All Tree Branches	Collapses all nodes in the package dependencies tree.
Show/hide the Full Path Names	Displays the element full path next to the element name.

Button	Description
Solve	The button is enabled, when a dependency whose status is **Error** is selected in the table and a solution for the problem can be found. Clicking the button opens the dialog box for choosing the solution for a specific dependency problem. This button is only visible when exporting or sharing a package.
Select in Containment Tree	Shows the selected element in the Browser. The button is enabled, when a dependency is selected in the table.
Refresh	Performs dependency analysis and refreshes the dependency table with the new analysis results.
Change Shares	Opens the **Shared Packages** dialog window for reselecting the packages to be shared. This button is visible only when sharing a module.
Change Exports	Opens the **Export Module** dialog window for reselecting the packages to be exported. This button is visible only when exporting a module.
OK	Closes the **Package Dependencies** panel. This button is available when the dependency checker is opened independently by selecting **Analyze** > **Dependency Checker** from the main menu or **Tools** > **Dependency Checker** from the package or model shortcut menu.
Share	Closes the **Package Dependencies** panel and makes the package shared. The button is enabled, when the environment option **Check dependency on module export/share** is set to **Allow dependencies** (**Options** > **Environment** from the main menu, **General** section). Environment options are detailed in section “Customizing Environment Options” on page 90. This button is visible only when sharing a module.
Export	Closes the **Package Dependencies** panel and opens the **Save as…/ Commit Settings** dialog window for saving/committing the package as separate module. The button is enabled, when the environment option **Check dependency on module export/share** is set to **Allow dependencies** (**Options** > **Environment** from the main menu, General section). Environment options are detailed in section “Customizing Environment Options” on page 90. This button is visible only when exporting a module.
Cancel	Cancels package sharing or exporting. This button is visible only when exporting or sharing a module.
Help	Displays MagicDraw Help.

Column	Description
Status	Shows severity of the element dependency problem. The status can be **Error**, **Warning**, or **Info**. Dependencies that have **Error** status: • module dependencies on the project Dependencies that have **Warning** status: • cyclic module dependencies on other modules Dependencies that have **Info** status: • project element dependencies on elements from shared packages (shared packages can belong both to the project and come from an external project)
Element Type	Displays element type.
Dependency Type	Displays dependency type.
Depends On	Displays the model element, on which the package/model element is dependent.
Module	Displays the name of the module file that owns the model element, on which the package/model element depends.
Part of Cycling Dependency	● indicates that the element is a part of the cycling dependency.

Analyzing Dependencies Among Elements

A package can be exported to an independent module only if it does not depend on external elements (except other modules). Cyclical dependencies between several modules are not allowed.

There are three types of dependencies:

- Dependency by relationship
- Dependency by reference
- Diagram dependencies

Package dependencies by relationship

The module depends on external elements

If a module element has a relationship with an external element and this relationship is contained in the module package, an error message appears when exporting the module.

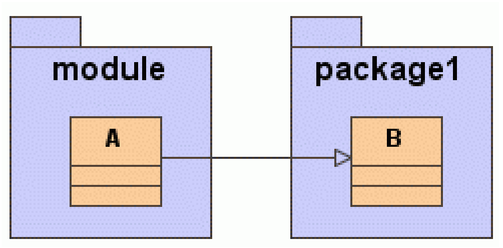


Figure 302 -- Example of a module dependency on an external element

Such dependencies on external elements are displayed in the Browser tree:

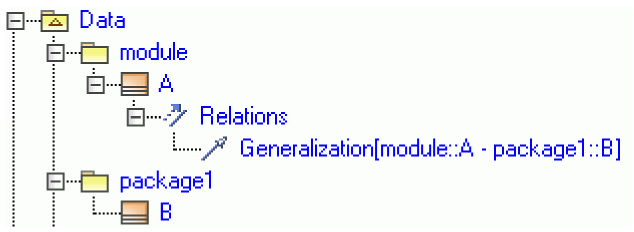
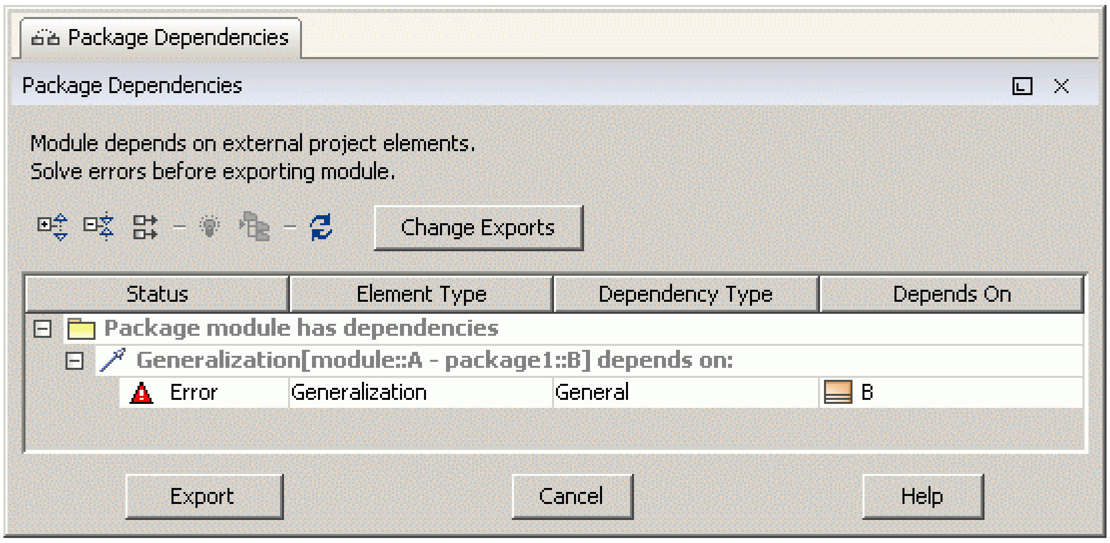


Figure 303 -- Package has a dependency on an external element



Package Dependencies

Module depends on external project elements.
Solve errors before exporting module.

Status	Element Type	Dependency Type	Depends On
Package module has dependencies			
Generalization[module::A - package1::B] depends on:			
Error	Generalization	General	B

Figure 304 -- Error in the Package Dependencies dialog box

In this situation, MagicDraw can suggest moving the relationship into the parent package of this external element. For example, **package1** is a parent of class **B**, so the relationship can be moved from the **module** into **package1**:

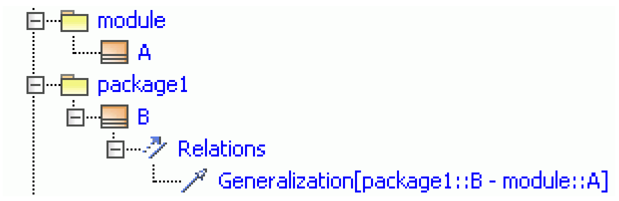


Figure 305 -- Resolved package dependency on an external element

Some movements can be achieved by clicking **Solve** in the **Package Dependencies** dialog box. For a detailed description of this dialog box, see “The module package can now be exported into an independent module.” on page 448.

You can also drag-and-drop the relationship from one package to another in the Browser tree.

The module depends on an external element, but can be exported (with warning)

Though the module element has a relationship with an external element, this relationship is contained in an external package:

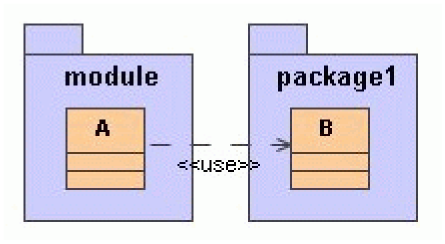


Figure 306 -- Example of a "legal" module dependency on an external element

In this case, the dependency on an external element is displayed in the Browser tree:

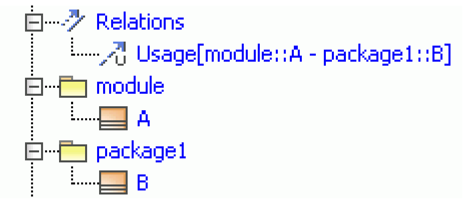


Figure 307 -- "Legal" module dependency on an external element in the data model browser

The package can be exported as a module because the relationship is contained in an external package.

The module does not depend on an external element

If the module element has a relationship with an external element is irrelevant in the context of UML (for instance, the external model uses the module, but not vice versa) and this relationship is contained in an external model, the package can be exported into an independent module:

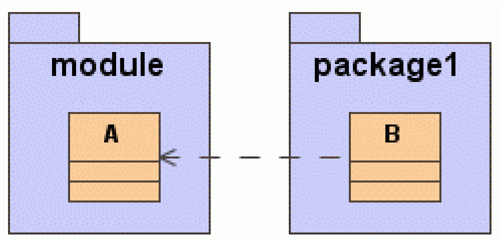


Figure 308 -- Example of a relationship when the module does not depend on an external element

Dependencies by reference

The module depends on external elements when the model elements from the module packages have references to external elements.

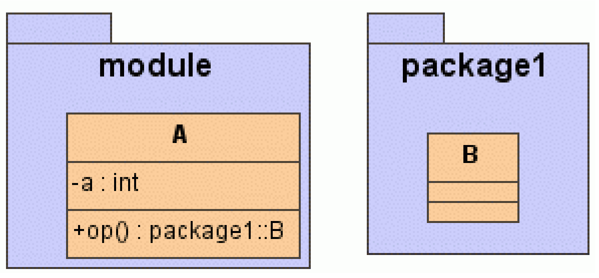


Figure 309 -- Example of a dependency by reference

In this case, the **module** package cannot be exported to an independent module.

Diagram dependencies

The diagram depends on all model elements displayed within it.

If the diagram is contained in a **module** package and depends on external elements, this package cannot be exported to a module.

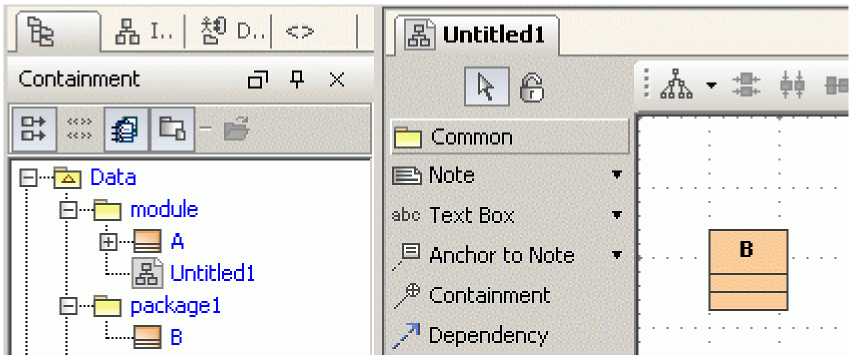


Figure 310 -- Example of the relationship when a diagram depends on an external element

For more information about the package dependencies on external elements, see “The module depends on external elements” on page 445.

In this case, if the diagram is not important to the module, it can be moved from the **module** package into any external package by dragging and dropping it within the Browser tree:

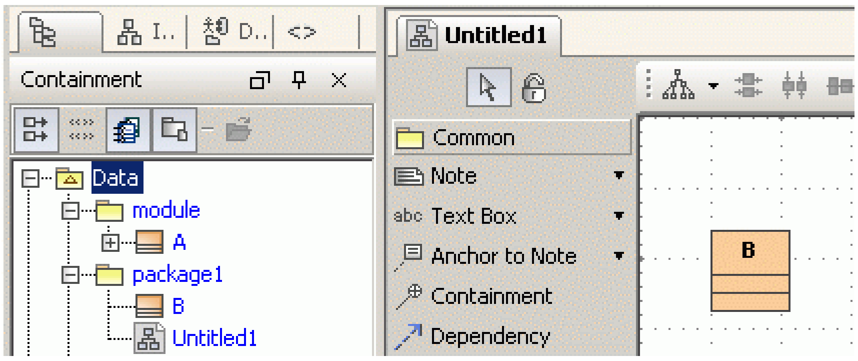


Figure 311 -- Diagram is moved from the module package to the package1 package.

The **module** package can now be exported into an independent module.

MagicDraw Teamwork Server is an ideal solution for group work on the same project. For more information about the Teamwork Server, see the MagicDraw Teamwork System User’s Guide.

Unresolved dependencies

When a model part is exported to a separate module, if there are dependencies from the module back to the project, you are asked to resolve them (dependencies in the opposite direction - elements in project depending on elements in module - are OK).

The same situation occurs when you edit the module inside the project (when the module is mounted read-write on the project) and introduce dependencies from the module back to the project. In this case, you will be asked to resolve these dependencies on module save.

However, it might be inconvenient to resolve these dependencies at that moment (perhaps you have finished work for today and you will resolve dependencies tomorrow, and now you just want to save the project and leave; perhaps the particular dependency resolution is not a trivial task, which will take some time).

MagicDraw allows you to continue without resolving these dependencies. The elements, which were referenced, but are missing in the module will be shown as missing proxy elements (see “Missing elements for the proxies (orphaned proxies)” on page 127).

This is one more improvement - in previous versions MagicDraw was strict in checking dependencies and did not allow dangling references. Now more flexibility is allowed.

This behavior is controlled by the **Check dependency on module export/share** environment option (from the **Options** menu, select **Environment**, **General** section).

There are three choices:

- **Do not allow dependencies** setting restores previous, strict checking.
- **Allow dependencies** is the default setting, described above.

Do not check setting is an even more lax setting; it does not prompt the user to resolve dependencies at all. If you are not careful, this can lead to the proliferation of missing proxy elements, hence proceed with care.

Validation

View Online Demo	Validation

NOTE	This functionality is available in Architect and Enterprise editions only.

Introduction

MagicDraw has the functionality to check the created models. It consists of:

- A set of validation rules. Each validation rule captures some imperative conditions, which must be checked against the model. Validation rules are specified as invariant constraints in the model.
- One or more validation suites (modeled as packages). A validation suite is a simple concept of grouping the validation rules into meaningful groups, so that the collection of rules can be applied.

To run the validation, select some suites and validation scope - either the entire model or some part of it. When the validation is run, each rule from the suite is evaluated for each suitable element in the validation scope. Each element that violates the rule (constraint evaluates to false) is reported in the results table.

Since rules and suites are model elements, they can be manipulated using the standard MagicDraw modeling means - they can be copied, moved, and edited in the model; they can be refactored into modules, to facilitate reuse in other projects, placed in the Teamwork Server for exchange, etc. And of course this approach allows editing predefined rules and defining new, custom rules for models and profiles.

Constraint Types

Each validation rule, modeled as a constraint has a target classifier property. This property determines on what type of element this rule applies. Thus the usual level - metalevel separation appears. Constraints that are defined on some particular classifiers are evaluated on the instances of these particular classifiers when validating. Inheritance is taken into account - instances of the subclasses of the class are also validated.

Thus there are 3 types of constraints that MagicDraw can evaluate:

- **Classifier level constraints.** Constraints that are placed on the classes, datatypes and other classifiers of the model are evaluated on all the instances of these classifiers - i.e. those InstanceSpecifications that have the particular classifier set as their type.
- **Constraints on metaclasses.** When a constraint is placed on a metaclass (one of the classes in the *UML Standard Profile::UML2 Metamodel*), this constraint is evaluated on all the model elements of that kind. E.g. if the constraint is placed on Actor metaclass, then this constraint applies to all the actor elements in the model. The following is an example of rule (specified in OCL2.0), which mandates that all actor names in the model must be capitalized:

```
context Actor inv capitalize:
let startswith:String = name.substring(1,1) in
startswith.toUpper() = startswith
```

These constraints are useful for specifying generic rules, which must apply on all the model elements of particular kind.

- **Constraints on stereotypes.** When a constraint is placed on some stereotypes of the profile, that constraint applies to all the model elements that have these stereotypes applied to them. These constraints are useful when creating domain specific profiles. When adapting UML to some specific modeling domain, a profile is usually created with extensions for that domain - stereotypes, tags etc. The constraints on these stereotypes allow enforcing the rules of that domain.

It is advisable not to mix the constraints from different metalevels into one suite (constraints on classifiers versus constraints on stereotypes and metaclasses).

Predefined Validation Suites

There are several validation suites (collections of validation rules) predefined in the profiles that come with MagicDraw. Since validation rules and validation suites are concepts, stored in the model, the availability of list of validation suites for validating depends on what profiles the model includes.

UML Standard Profile brings two predefined suites with it. These two suites are present in all models:

- UML completeness constraints;
- UML correctness constraints.

Completeness suite has a collection of rules, which check if a model is complete, that there are no gaps, and the essential information fields in the elements have been filled in (e.g. checks that all the properties have type specified etc.).

Correctness suite has a collection of rules, which check common mistakes while modeling in UML2 (NOTE: this collection is not exhaustive).

Additionally, there are validation suites for each of these modeling domains - XML schemas, DDL, Java, C++ plus DoDAF and SysML, if any. These validation suites are defined in the corresponding profiles of these modeling domains, hence they are included automatically when you start modeling in that domain.

For example - if you create a new XML schema diagram, XML schema profile will be automatically included in your model and this profile brings in XML schema validation suite with it. So, from that moment, XML schema validation suite is available in the project.

Validating

To run the validation, you have to select a group of rules to be validated (validation suite) and indicate which part of the model to check (validation scope - either the entire model or some part of it).

To validate UML model for correctness

1. Open the **Validation** dialog box. Do one of the following:
   - From the **Analyze** menu, select **Validation** and then click **Validate**.
   - On the **Validation** toolbar, click **Validate** .

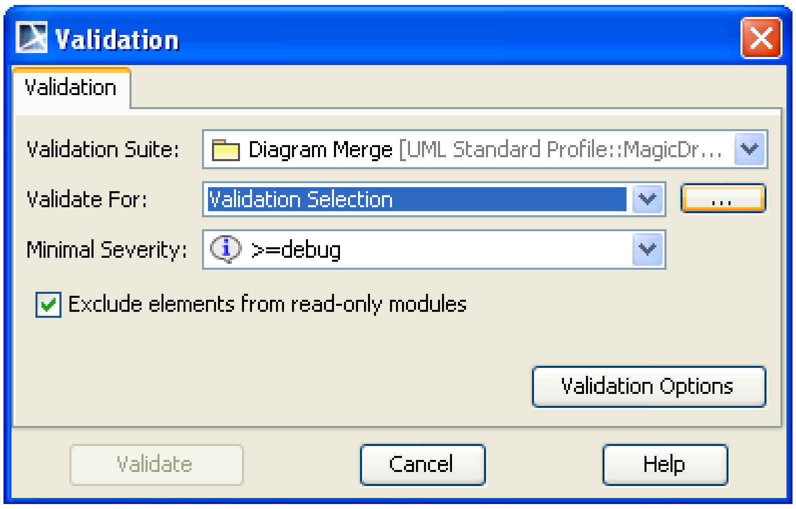
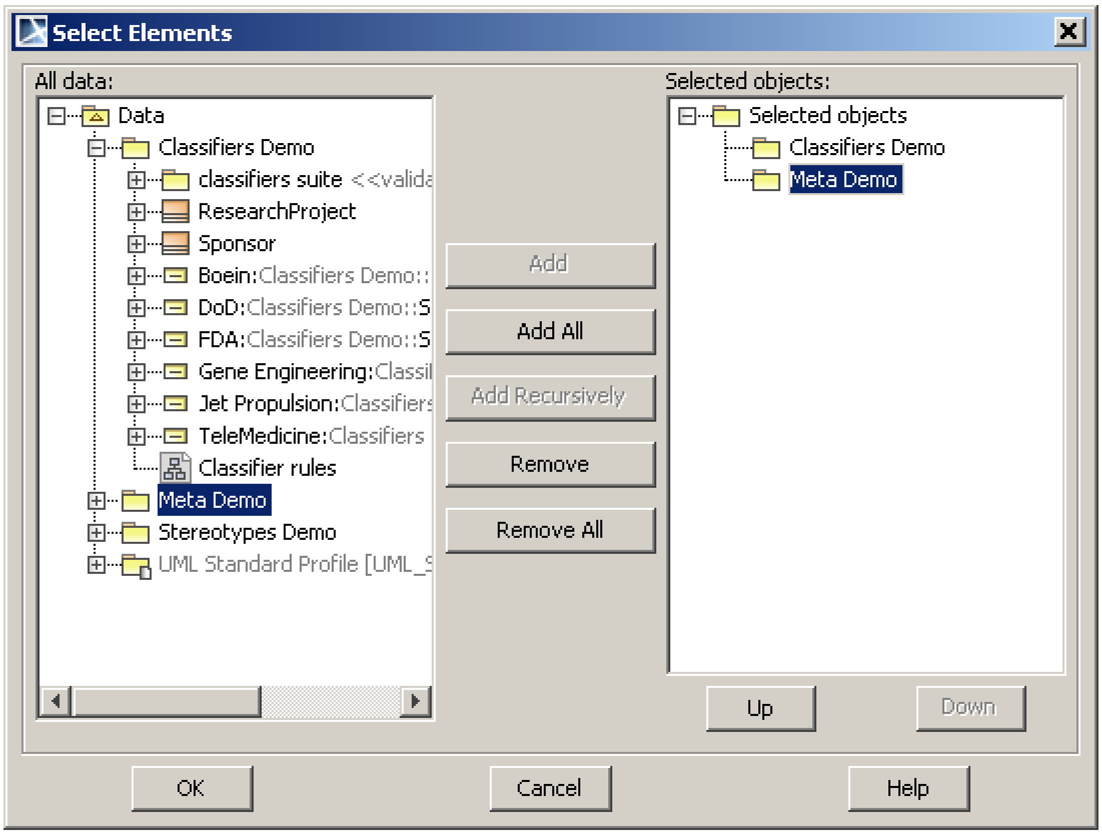

Validation
Validation Suite: Diagram Merge [UML Standard Profile::MagicDr...
Validate For: Validation Selection
Minimal Severity: >=debug
[✓] Exclude elements from read-only modules

Figure 312 -- Validation dialog box

2. In the **Validation Suite** box, select the UML correctness constraints. All available validation suites are listed here.
   The list of available validation suites depends on the opened project - the validation suites and validation rules are stored in the model as normal model elements. By default, a project has two suites - UML completeness constraints and UML correctness constraints - defined in the Standard profile.

   If a project uses other profiles/modules - such as Java/XML schema/DDL profile, these profiles bring in their own predefined suites. You can also create your own validation rules and group them into a suite and this suite will be available in this box.
3. In the **Validate For** box, choose the validation target:
   - To run validation on the entire model, choose the **Whole Project**.
   - To run validation on the special packages and/or elements, choose the **Validation Selection,** then click the "..." button and select the scope for validation. The **Select Elements** dialog box appears.



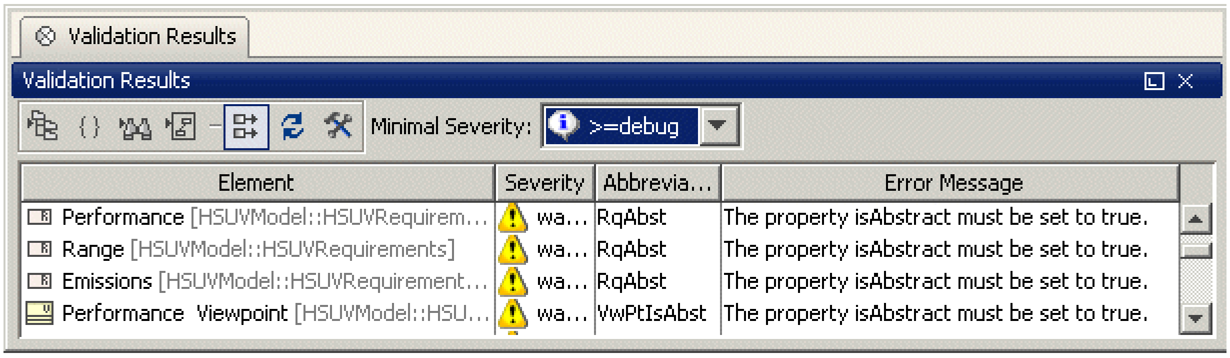
4. *Select Elements dialog* In the **Select Elements** dialog box, select packages and/or elements for validation. Select the **Minimal Severity** level. Debug is the lowest possible severity level, all validation rules will be run.

NOTE	Validation is always recursive, hence if you select a package for validation, you do not need to select its inner elements (no need of the **Add Recursively** button). In the case depicted above, all model elements in the *Classifiers Demo* and *Meta Demo* packages will be validated. Adding *Data* package is equivalent to validating the entire model.

5. If you want to run validation on the read-only modules and the elements that exist in those modules, clear the **Exclude elements from read-only modules** check box (by default it is selected).
6. Click **Validate**. Validation results are displayed in the **Validation Results** window.

Validation Results Window

Validation results are displayed in the **Validation Results** window.



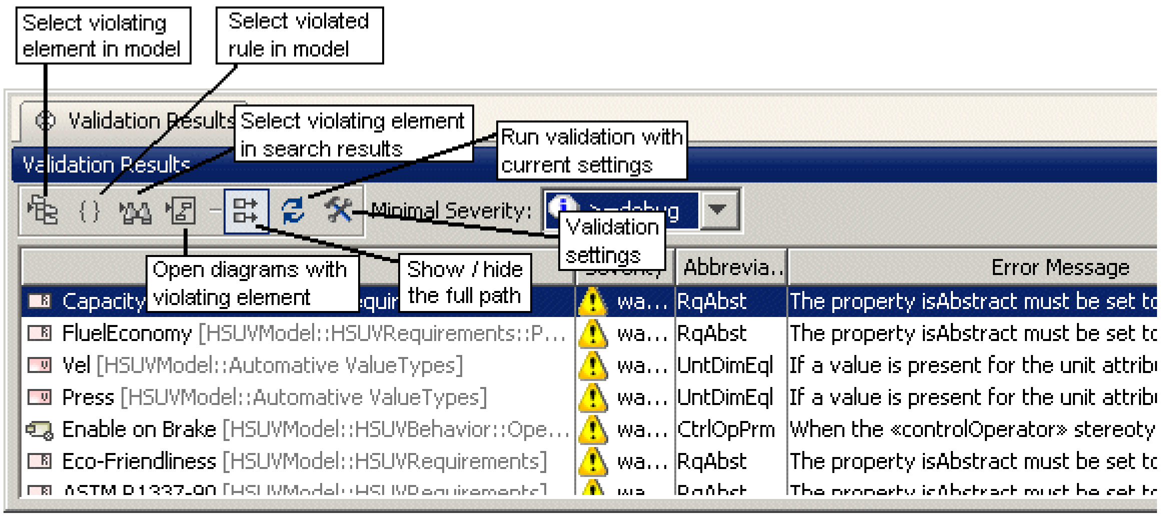
Element	Severity	Abbrevia...	Error Message
Performance [HSUVModel::HSUVRequirem...	wa...	RqAbst	The property isAbstract must be set to true.
Range [HSUVModel::HSUVRequirements]	wa...	RqAbst	The property isAbstract must be set to true.
Emissions [HSUVModel::HSUVRequirement...	wa...	RqAbst	The property isAbstract must be set to true.
Performance Viewpoint [HSUVModel::HSU...	wa...	VwPtIsAbst	The property isAbstract must be set to true.

Figure 313 -- Validations Results window.

Window opens automatically after the validation has ended. The **Validation Results** window has the following columns:

Column name	Description
Element	Elements, which violate the constraint rule are shown here.
Severity	Rule severity violations.
Abbreviation	Simple short strings showing the abbreviation of the violated constraint. Mostly used for sorting/grouping.
Error Message	Error texts of the violated constraints.

If the validation rule is incorrect, **Validations Results** view will show the reason. This rule is then excluded from checking models.


Select violating element in model
Select violated rule in model
Select violating element in search results
Run validation with current settings
Validation settings
Open diagrams with violating element
Show / hide the full path
Validation Results
Validation Results
Minimal Severity: >=debug

Element	Severity	Abbrevia...	Error Message
Capacity ... quir	wa...	RqAbst	The property isAbstract must be set to
FlueIEconomy [HSUVModel::HSUVRequirements::P...	wa...	RqAbst	The property isAbstract must be set to
Vel [HSUVModel::Automative ValueTypes]	wa...	UntDimEql	If a value is present for the unit attrib
Press [HSUVModel::Automative ValueTypes]	wa...	UntDimEql	If a value is present for the unit attrib
Enable on Brake [HSUVModel::HSUVBehavior::Ope...	wa...	CtrlOpPrm	When the «controlOperator» stereoty
Eco-Friendliness [HSUVModel::HSUVRequirements]	wa...	RqAbst	The property isAbstract must be set to
ASTM D1337-90 [HSUVModel::HSUVRequirements]	wa...	RqAbst	The property isAbstract must be set to

Figure 314 -- Buttons of Validation Results view.

Model Validation Example

We will validate SysML model - SysML.mdzip for correctness and completeness. The model is located in MagicDraw installation directory / samples. This model requires that SysML plugin would be installed. This can be done from **Help** menu **Resource / Plugin Manager**.

1. Open model. From the **Analyze** menu, select **Validation** command, and then **Validation**. The **Validation** dialog box opens.
2. Select **SysML Validation Constraints suite** and click **Validate**. The **Validations Results** view opens.
3. Narrow the validation scope. Click the **Run validation with a new settings** button, the **Validation** dialog box opens. Change the scope to validation selection and select **SI Value Types** package, click **Validate**. The **Validations Results** view is refreshed with new options.
4. Double click the violating element *kg* in the results view or click **Select in Containment Tree** button. The element is selected in the model.
5. Fix the problem and click the **Refresh** button to rerun the validation suite with the same options and refresh validation results. Refreshed results do not include element kg.
6. Select other violating element N in the results view and click **Open all Diagrams Containing the Selected Elements** button to open all the diagrams, containing the selected model elements.

When the validation result view is opened and diagrams are shown on the screen, elements and links of the diagram, which have at least one result in the validation result view, are highlighted:

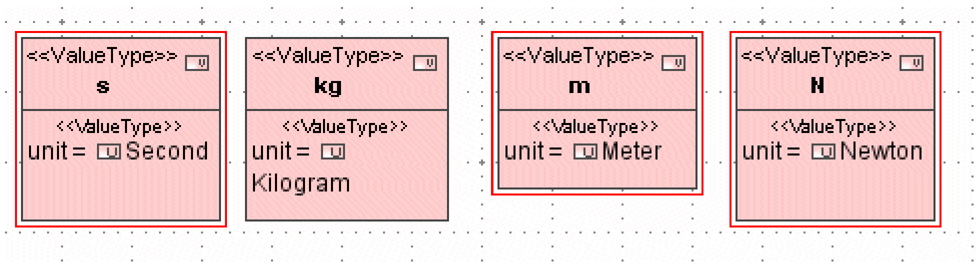


Figure 315 -- "N" element violating validation rule is highlighted.

In general, highlighting depends on the validation rule severity:

- Error - red
- Warning - yellow
- Debug - gray

- Info - black

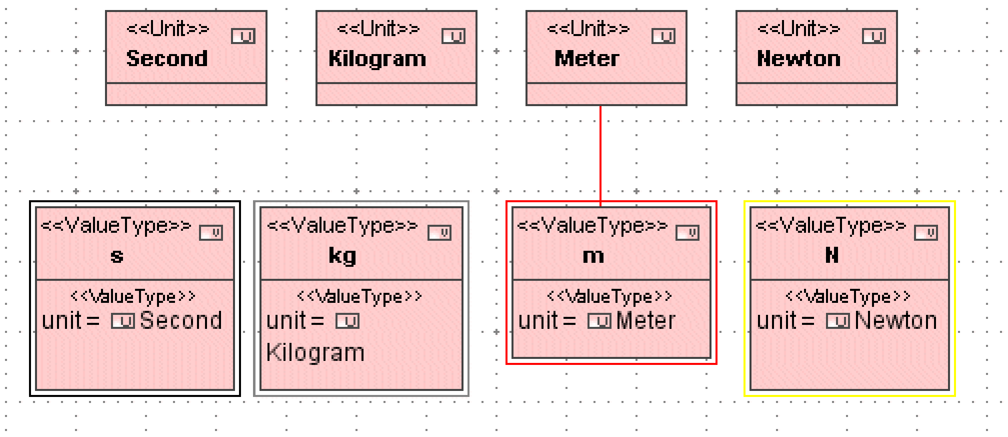


Figure 316 -- Elements and links violating constraints are highlighted.

If the element violates multiple rules, the color of the most severe rule is used.

Highlighting is shown until the rule is violated or the Validations Results view is not closed.

Other features available for the Validations Results view:

- By clicking the **Select Rule in Containment Tree** button, you may select rule in the model.
- You may move the selected results of the validation to the search result window by clicking the **Move to Search Results** button.
- The **Open all Diagrams Containing the Selected Elements** button opens all the diagrams, containing the selected model element.
- The Show / hide the Full Path names button shows element location in the model path.

Validation Rules

The validation rules are modeled as UML2 constraints. This approach allows treating the validation rules as simple model elements. They can be handled using usual modeling mechanisms. They can be copied, moved around in the model, refactored into a separate module, stored in the teamwork server for easy information exchange, etc.

Since constraints can have different semantic meanings in UML2, a special type of the constraint – invariant constraint is used for modeling validation rules.

To distinguish these constraints from the other types of constraints, *«invariant»* stereotype should be applied to them.

Additionally, validation rules require other pieces of information – severity level (for sorting/filtering), abbreviation string (a short string, for easy recognition) and error message (complete description of error explanation). This information is displayed in the validation result view.

For storing this information, a special stereotype *«validationRule»*, derived from the *«invariant»,* is used. If you want to run this constraint as validation rule, use the former stereotype. If you have created the constraint just for documentation purposes and do not intend to run it, the latter constraint is sufficient.

Validation rules can be placed anywhere in the model (where UML2 constraint can be placed), however, usually they are stored in the classifier, which is constrained – classes, datatypes, etc. (for classifier level constraints), stereotypes (for meta-classifier level constraints). This convention breaks down for the constraints, placed on metaclasses (since these classes are stored in read only profile). In this case, place constraints wherever you like (e.g. group them into a package).

To create a validation rule on a metaclass

1. Select a package where you want to place the rule.
2. Right-click this package, select *New Element*, and then *Constraint*.

To create a validation rule on a classifier or stereotype

1. Open their specification, select *Constraints* section, and click **Create**.

Example:

Let’s say we have 2 stereotypes - «*product*» and «*part*». We want to place a validation rule, that products must have at least one part in them.

1. Open the product stereotype specification, select *Constraints* section, and click **Create**.

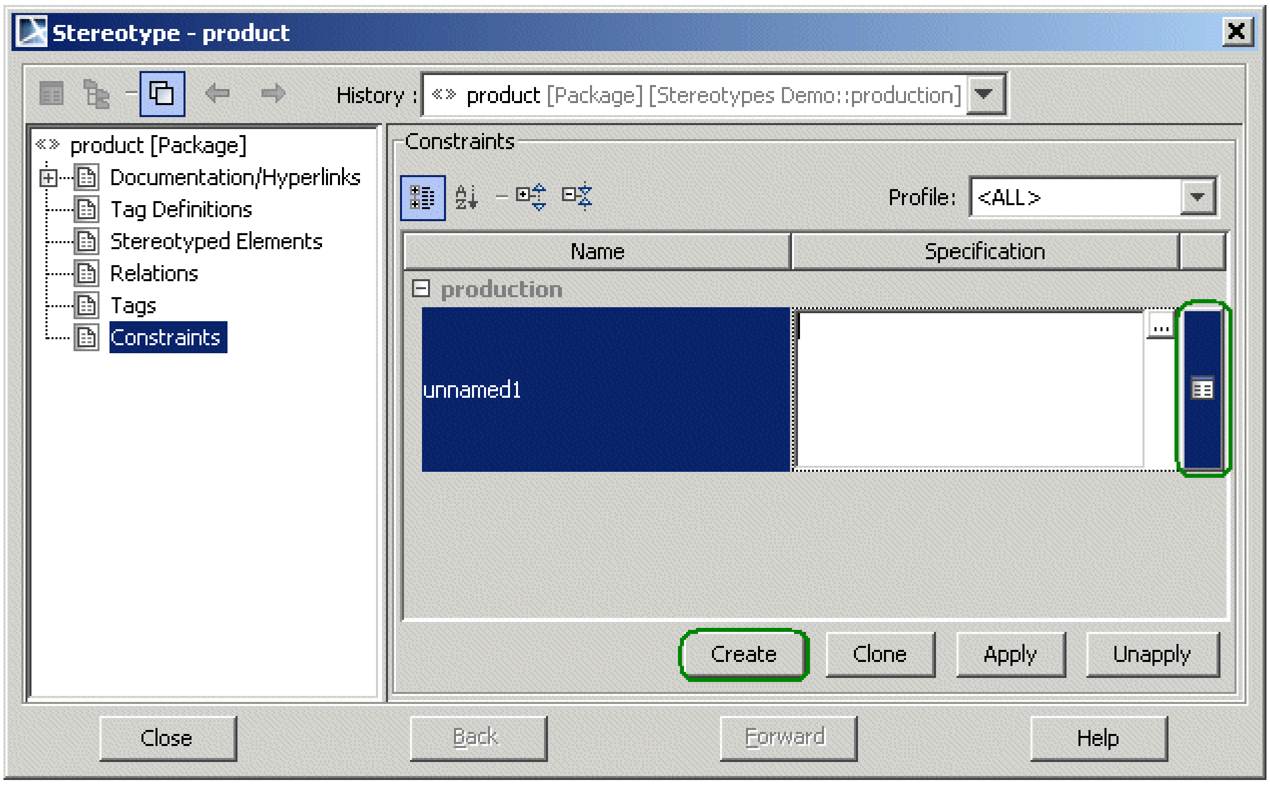
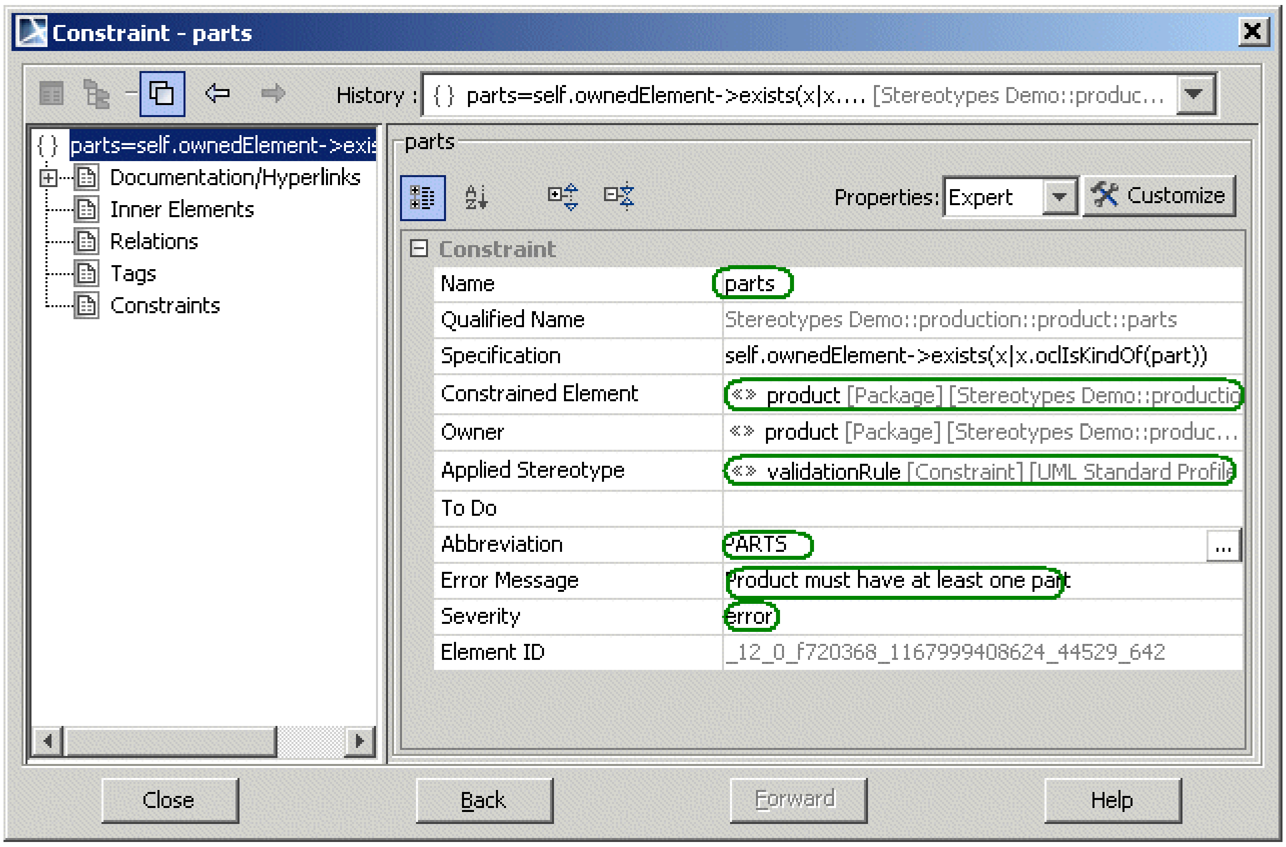


Figure 317 -- Creating constraints

2. The name of the constraint and the expression can be specified right away, but since we want to specify more information, we need to open the specification of a newly created constraint (press the button on the right of the constraint).



Name	parts
Qualified Name	Stereotypes Demo::production::product::parts
Specification	self.ownedElement->exists(x|x.oclIsKindOf(part))
Constrained Element	«» product [Package] [Stereotypes Demo::productio
Owner	«» product [Package] [Stereotypes Demo::produc...
Applied Stereotype	«» validationRule [Constraint] [UML Standard Profile
To Do	
Abbreviation	PARTS
Error Message	Product must have at least one part
Severity	error
Element ID	_12_0_f720368_1167999408624_44529_642

Figure 318 -- Specifying details of the constraint

3. In the specification panel of the constraint, specify the constraint name. Then ensure that the *Constrained Element* field points to the necessary classifier (*product* stereotype in our case). If we have created the constraint as described here, this field will be filled automatically. If we have created the constraint through the right-click, *Create Element*, *Constraint* route (e.g. constraint for metaclasses), we will need to specify the constrained element manually. For constraints on metaclasses select the appropriate element from the *UML Standard Profile::UML2 Metamodel*. In UML2 the constrained element field is multivalued, but only single value is supported for validation rules.
4. Now apply the «*validationRule*» stereotype on this constraint. Additional fields will open on the pane (*Abbreviation*, *Error Message* and *Severity*). If these fields do not open automatically, click **Customize** and then **Reset to Defaults** in the open customization dialog box (you can also access these fields in the Tags section of the specification).
5. Fill in the values for those fields.

Usage of the *Severity* levels (approximate guidelines):

- **DEBUG**. This severity level should be assigned only to those validation rules, which fit the description of INFO, but are too numerous and annoying to constantly bother the user.
- **INFO**. Situations, which might be interesting to the user.
- **WARNING**. Used for less severe situations than ERROR, which are not errors per se, but have a high probability of causing errors. A good example would be – In Java model user redefines equals() method of the class, but does not redefine hashCode(). This is a dangerous coding situation.
- **ERROR**. Normal error message. For ordinary, run-of-the-mill errors.

- **FATAL**. Used for the errors, which lead to model corruption or are not valid from the UML metamodel structure viewpoint. There should be few or no validation rules of this level since MagicDraw automatically precludes such situations. This level is mostly reserved for future use.

Abbreviation is a simple (and preferably short) string, for quickly distinguishing the validation rules among other rules and sorting. Acronyms and short forms, used in the domain of this validation rule can be used here (e.g. NPE for hypothetical NullPointerException check).

Error Message is a longer string, fully describing the invalid situation.

Now that we have all the peripheral information about the validation rule, let's specify the actual validation rule expression. Validating expression is stored in the *Specification* field. UML2 expression has 2 fields – *Language* and *Body*.

MagicDraw supports 2 languages for expressions, that can be evaluated:

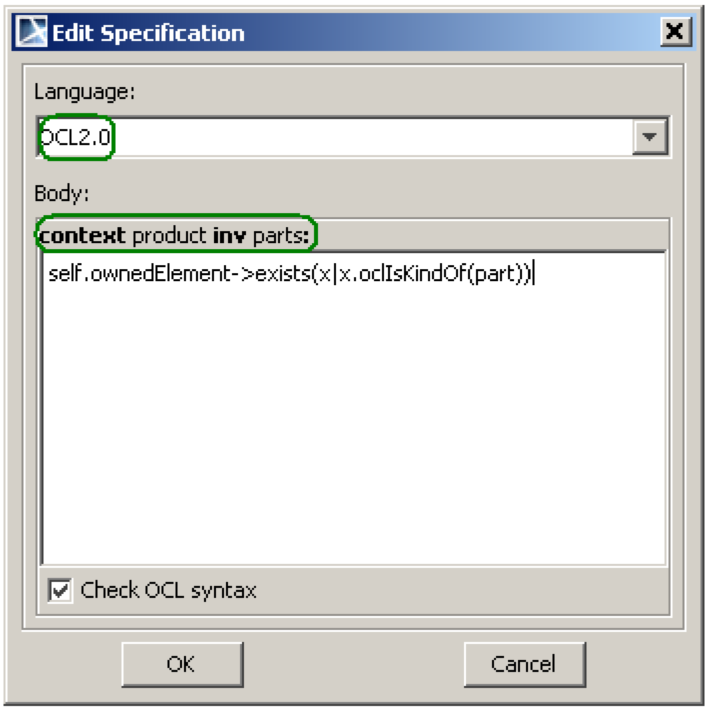
- **OCL2.0** is used for validation rules, specified in OCL language (version 2.0 of the spec - 06-05-01 specification document from OMG).
- **Binary** is used for more advanced expressions, which are not easily expressed in OCL.

These expressions are written in Java, compiled, specified in the MagicDraw classpath. Then these expressions can be specified as validation rule expressions

.

Other languages are not evaluatable (OCL1.5, English and others). They can be used for documentation purposes.

OCL Constraints



Language: OCL2.0

Body:

context product **inv** parts:

```
self.ownedElement->exists(x|x.oclIsKindOf(part))
```

☑ Check OCL syntax

Figure 319 -- validation rule in OCL

Continuing our example, in the constraint **Specification** dialog box, click the button near the *Specification* field and open the **Edit Specification** dialog box. Select **OCL2.0** language. Observe that MagicDraw has automatically generated the header of the expression from the constraint information, and we only need to specify the body of expression. The expression header is generated according to the following rules:

context <constrained element> <constraint type> <constraint name if any>:

Constraint type is one of the types, defined in the OCL2.0 spec:

- **inv** - when the expression is placed in the constraint with *«invariant»* stereotype applied.
- **def** – when the expression is placed in the constraint with *«definition»* stereotype applied.
- **init**, **derive** when the expression is placed in the default value of the property.
- **pre**, **post**, **body** when the expression is placed in the appropriate fields of operation.

Since our constraint is stereotyped with «*validationRule*» stereotype (derived from *invariant* stereotype), inv is shown in the header. Only invariant stereotype is used for the validation rules and are executed (plus derive expressions, when referenced from invariants – see “Advanced Topics” on page 463), other types of constraints can be used for documentation purposes.

MagicDraw checks the syntax of expression as you type. However this syntax check is not enough to catch all the errors. When the validation rule is run, additional checks are performed (semantic checks – such as checks for the existence of appropriate properties, type checks, multiplicity checks, etc.) to ensure that the expression can be evaluated correctly (internally, MagicDraw generates Java code from the expressions and then compiles it for execution).

Binary Constraints

For more information about Binary Constraints, see MagicDraw OpenAPI UserGuide.pdf.

Validation Suites

In MagicDraw, you can create your own validation suites or use one of the predefined ones as: *UML completeness constraints* and *UML correctness constraints*.

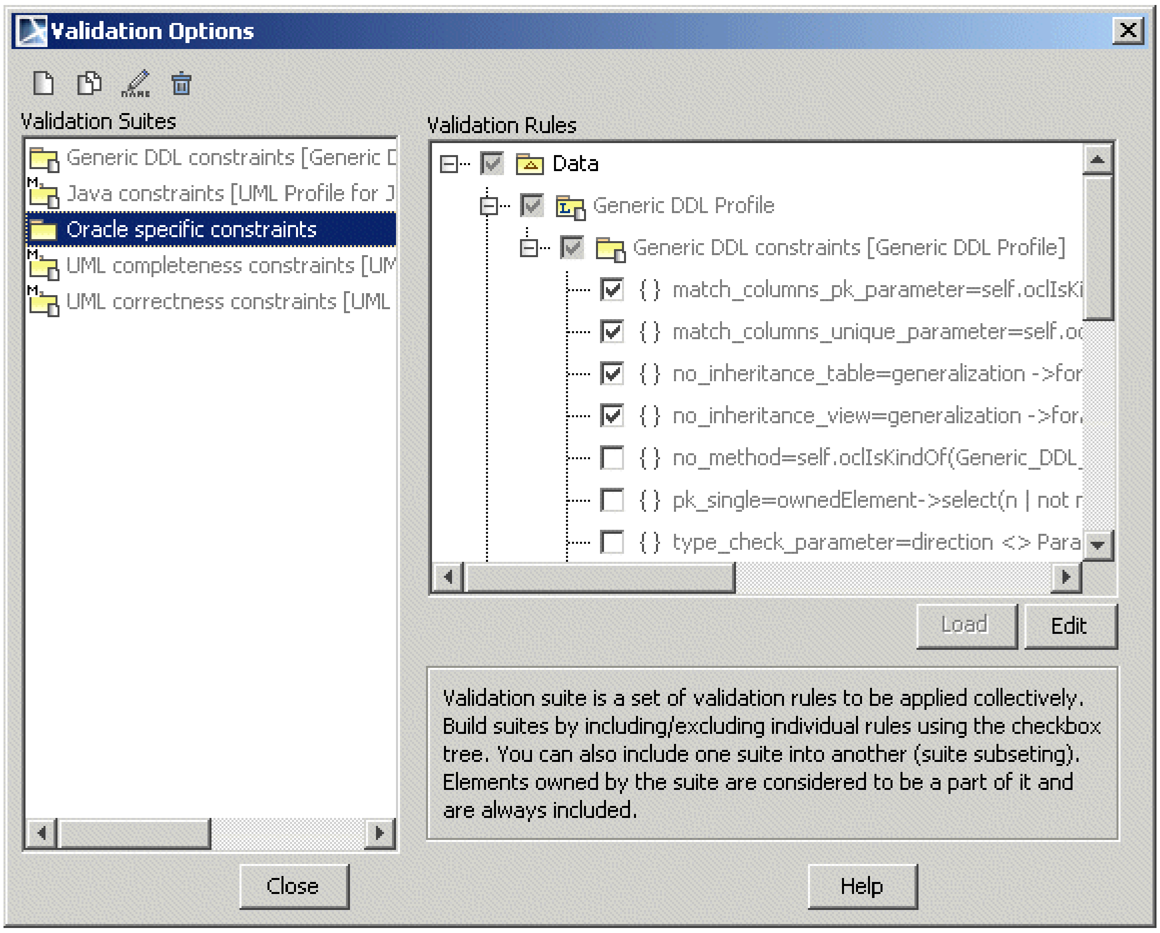
The validation suite defines the set of validation rules, which will be applied when validating. The purpose of the validation suites is to group constraints without duplicating them.

To create a new validation suite

We need to check the Oracle model for correctness, but not all constraints in *Generic DDL constraints* suite are suitable for our Oracle model. We will create a new suite with a narrow constraint collection.

1. From the **Analyze** menu, choose **Validation** command, and then **Validation Options**. The **Validation Options** dialog box opens.
2. Click the **Create New Validation Suite** button and name it *Oracle specific constraints*.

3. Define the validation rules in the **Validation Rules** pane.


Validation Options
Validation Suites
Generic DDL constraints [Generic D
Java constraints [UML Profile for J
Oracle specific constraints
UML completeness constraints [UM
UML correctness constraints [UML
Validation Rules
Data
Generic DDL Profile
Generic DDL constraints [Generic DDL Profile]
{ } match_columns_pk_parameter=self.oclIsKi
{ } match_columns_unique_parameter=self.oc
{ } no_inheritance_table=generalization ->for
{ } no_inheritance_view=generalization ->for
{ } no_method=self.oclIsKindOf(Generic_DDL_
{ } pk_single=ownedElement->select(n | not r
{ } type_check_parameter=direction <> Para
Load
Edit
Close
Help

Validation suite is a set of validation rules to be applied collectively. Build suites by including/excluding individual rules using the checkbox tree. You can also include one suite into another (suite subseting). Elements owned by the suite are considered to be a part of it and are always included.

Figure 320 -- Parts of Generic DDL constraints suite are included into Oracle specific constraints suite.

The validation suite is stored in a model as a package, to which «*ValidationSuite*» stereotype is applied. The **Validation Suites** pane lists all such packages of the entire model as suites. So, the alternative method to create the validation suite is to apply «*ValidationSuite*» stereotype for a package.

When the user includes / excludes the constraint, the appropriate element import link is created/deleted in the model.

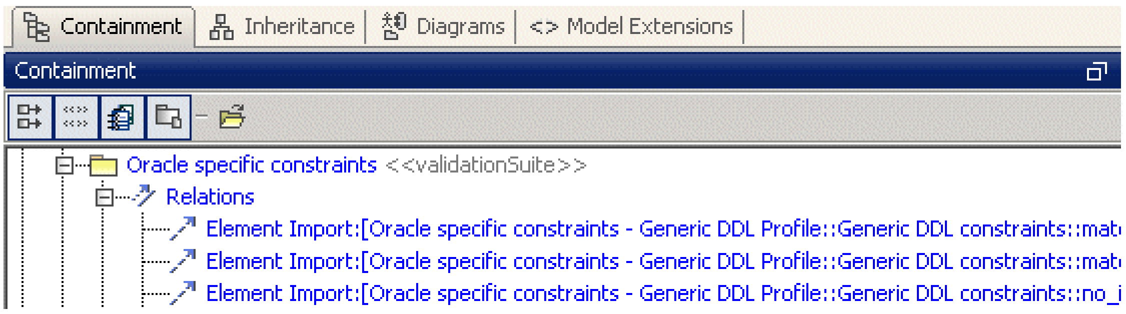

Containment
Inheritance
Diagrams
<> Model Extensions
Containment
Oracle specific constraints <<validationSuite>>
Relations
Element Import:[Oracle specific constraints - Generic DDL Profile::Generic DDL constraints::mat
Element Import:[Oracle specific constraints - Generic DDL Profile::Generic DDL constraints::mat
Element Import:[Oracle specific constraints - Generic DDL Profile::Generic DDL constraints::no_i

Figure 321 -- Element import relation showing in model that Oracle specific constraints suite includes other constraints.

Also, there can be constraints that are stored directly in the suite package - they are also considered as contained in this suite, and because they are physical in package those constraints can not be excluded from the suite through **Validation Options** dialog box. Typically, validation rules should be stored in a constrained element, but in cases when the constrained element is read-only, for example it is stored in a read-only profile, adding constraints to it requires profile editing and a separate constraints grouping is easier.

Constraint Tree

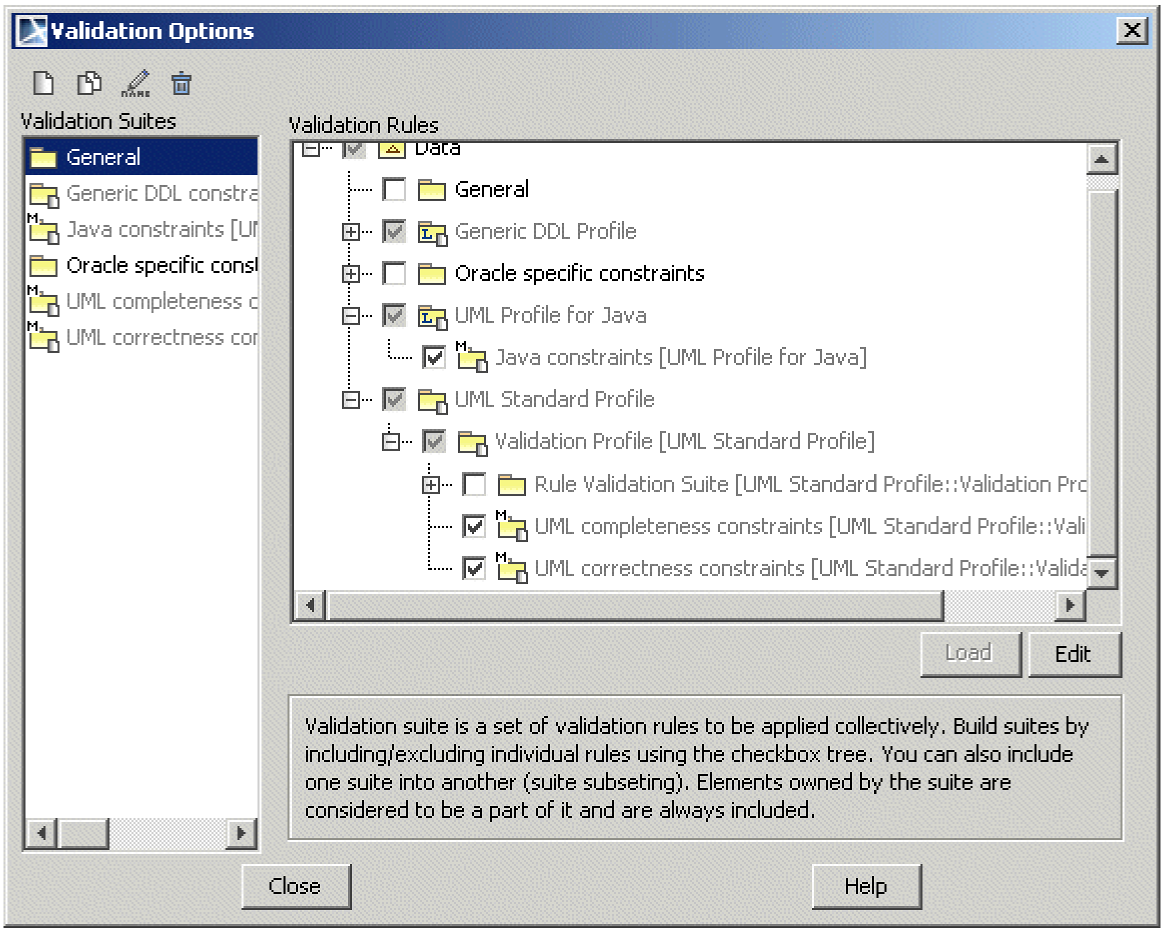
The constraint tree is shown in the right **Validation Options** pane. This tree shows all the constraints with «*invariant*» or «*validationRule*» stereotype applied, presented in the model, together with the appropriate grouping elements. Each item has a check box, indicating inclusion or exclusion of the constraint in the selected validation suite.

The constraint tree contains packages and other model elements. If it contains constraints, they are arranged according to their containment in a model. Additionally, this tree contains other validation suites. The user can include / exclude rules and these rules must suit the selected validation suite by selecting / unselecting these check boxes in the tree.

To group two or more suites into one

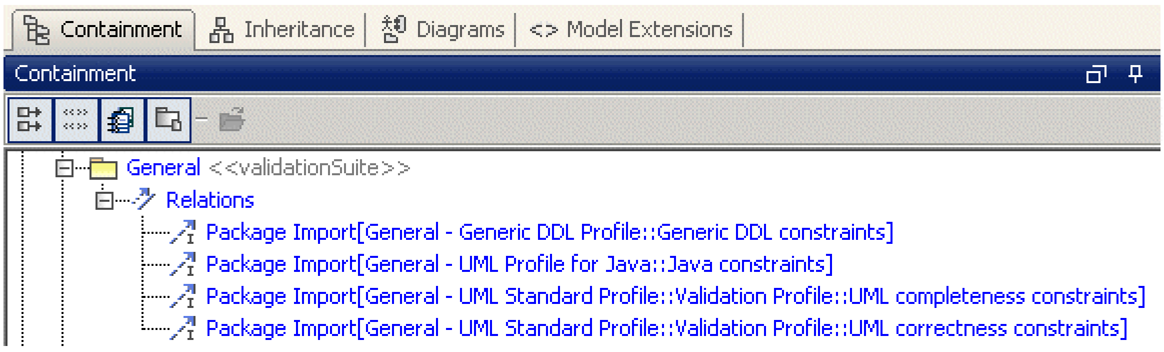
We have created an abstract system model, and modeled its implementation with Java specific classes. To check this model completeness, correctness, and conformity to Java language by using three suites. We will combine all these suites to one in order to simplify the model checking.

1. From the **Analyze** menu, choose **Validation** command, and then **Validation Options**. The **Validation Options** dialog box appears.
2. Create a new suite, name it *General,* and select it.
3. Include the existing validation suites: *Java constraints, UML completeness constraints* and *UML correctness constraints* in the suite by selecting the check box in front of the packages in the **Validation Rules** panel.


Validation Options
Validation Suites
General
Generic DDL constra
Java constraints [UI
Oracle specific cons
UML completeness c
UML correctness cor
Validation Rules
Data
General
Generic DDL Profile
Oracle specific constraints
UML Profile for Java
Java constraints [UML Profile for Java]
UML Standard Profile
Validation Profile [UML Standard Profile]
Rule Validation Suite [UML Standard Profile::Validation Pro
UML completeness constraints [UML Standard Profile::Vali
UML correctness constraints [UML Standard Profile::Valida
Load
Edit
Close
Help

Validation suite is a set of validation rules to be applied collectively. Build suites by including/excluding individual rules using the checkbox tree. You can also include one suite into another (suite subseting). Elements owned by the suite are considered to be a part of it and are always included.

Figure 322 -- UML correctness, UML completeness, and Java validation suites included in the General validation suite



General <<validationSuite>>
Relations
Package Import[General - Generic DDL Profile::Generic DDL constraints]
Package Import[General - UML Profile for Java::Java constraints]
Package Import[General - UML Standard Profile::Validation Profile::UML completeness constraints]
Package Import[General - UML Standard Profile::Validation Profile::UML correctness constraints]

Figure 323 -- Package import is signifying in the model that one General suite includes the other as a subset.

To share constraints

Let’s say we have created a validation suite with constraints and need to share it for other group members for their models validation. Validation rules/suites sharing is available through standard MagicDraw module mechanism. Package with constraints might be exported as module and used by any other project.

Another way of sharing constrains is copying them between projects. Since validation rules are simple model elements, any mechanism can be used on them.

1. From the model select *Java constraints* package to which «*ValidationSuite*» stereotype is applied.
2. From the package context menu select **Modules** and select **Export module.**
3. Save the exported package as *Java constraints.mdzip*.

Only constraints that are stored physically in the *Java constraints* package are exported together with the package.

Now the exported package can be used by other users and projects.

1. From the **File** menu, select **Use Module.** The **Use Module** dialog appears.
2. Select path to *Java constraints.mdzip* and select it to use.
3. Specify module import options.
4. Module is added into a project and the constraints can be used for validation.

The validation suite can be defined in the module, which is mounted as *read-only* in the project. **Read-only** and **Autoload** module will not be loaded into the project, but will be visible through validations dialog box if «*ValidationSuite*» stereotype was applied to the exported package.

In this way the model and the profile will be smaller. And the validation suite is still visible through validation dialog box.Java constraint validation suite module is mounted onto the project as Read-only and Autoload. In this way constraints are not added into project by default, until the validation suite is used.

.

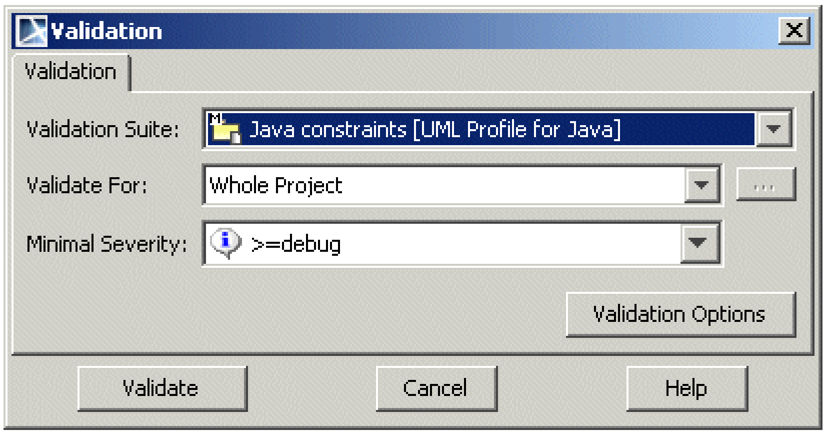

Validation Suite: Java constraints [UML Profile for Java]
Validate For: Whole Project
Minimal Severity: >=debug

Figure 324 -- Unloaded module with Java constrains validation suite is avaialable through Validation dialog.

Advanced Topics

Global validation rules

Some of the validation rules, specified in OCL, do not refer to the current element (*self*). Such rules are often encountered when using allInstances() method to refer to all instances of a particular classifier. Such validation rules are called global validation rules in MagicDraw terminology. Evaluating these rules for each model element is pointless, hence they are evaluated only once per entire validation run. When reporting violations, such rules have a string <model> in the column of violating model elements. This means that it is not the concrete element that violates the rule, but the entire model itself.

Here is an example of such a rule (always fails):

```
context anything inv:
false
```

Such a rule is not very useful indeed. The following is another example:

```
context SomeSingletonClass inv:
SomeSingletonClass::allInstances()->size() <= 1
```

This rule checks that there is at most one instance of the *SomeSingletonClass* in the model. The following is a more complex example:

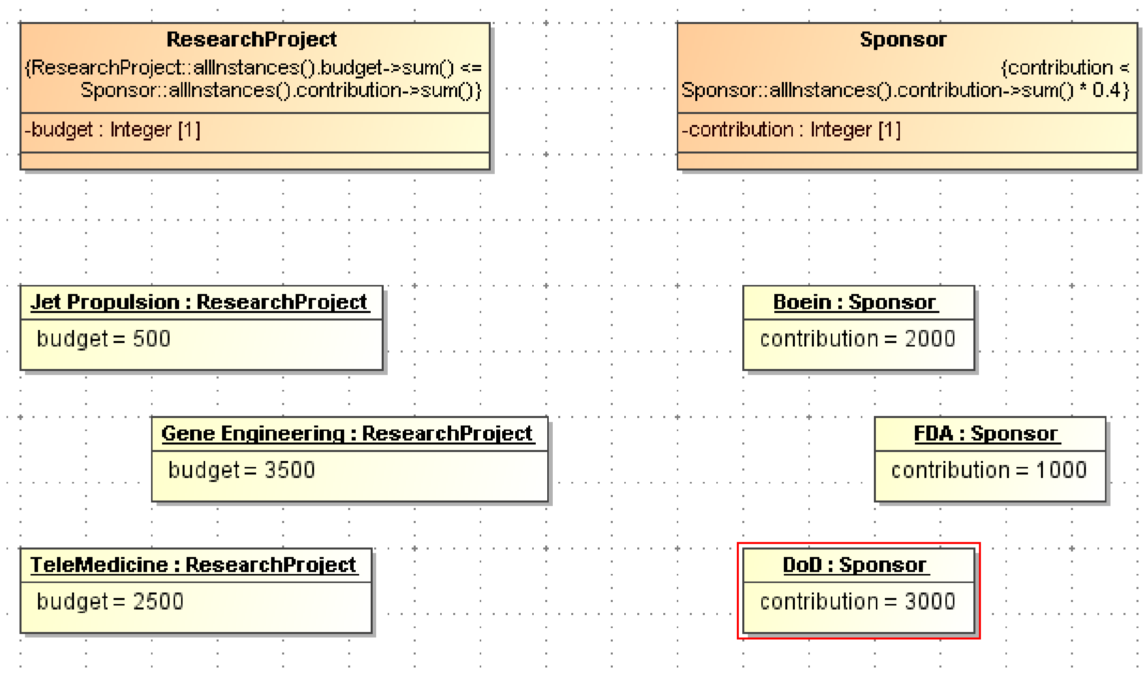

ResearchProject
{ResearchProject::allInstances().budget->sum() <= Sponsor::allInstances().contribution->sum()}
-budget : Integer [1]
Sponsor
{contribution < Sponsor::allInstances().contribution->sum() * 0.4}
-contribution : Integer [1]
Jet Propulsion : ResearchProject
budget = 500
Boein : Sponsor
contribution = 2000
Gene Engineering : ResearchProject
budget = 3500
FDA : Sponsor
contribution = 1000
TeleMedicine : ResearchProject
budget = 2500
DoD : Sponsor
contribution = 3000

Figure 325 -- example of global validation rule

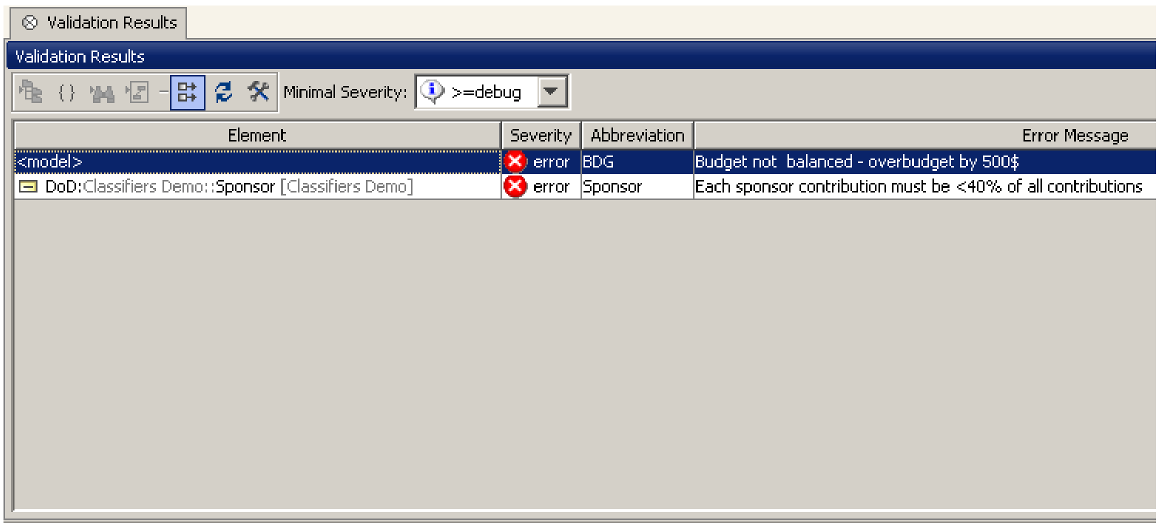
Here, *ReseachProject* class has a following validation rule (budget must be balanced – sum of expenses of all projects must be less than sum of all sponsor contributions):

context ResearchProject inv balanced_budget:
ResearchProject::allInstances().budget->sum() <=
Sponsor::allInstances().contribution->sum()

Sponsor class has a following rule (anticorruption rule - each sponsor can not contribute more than 40% of the funds):

context Sponsor inv anticorruption_law:
contribution < Sponsor::allInstances().contribution->sum() * 0.4

Now look at the results of applying these rules:



Element	Severity	Abbreviation	Error Message
<model>	error	BDG	Budget not balanced - overbudget by 500$
DoD:Classifiers Demo::Sponsor [Classifiers Demo]	error	Sponsor	Each sponsor contribution must be <40% of all contributions

Figure 326 -- results of running the global validation rule

We see that budget balancing rule is a global rule – it is not the concrete instance of *ResearchProject* that violates the rule, but the entirety of instances in the model. Hence the string <model> in the column of that offending elements.

However, note that anticorruption rule is not a global rule - it refers to *contribution* field, which is really a shorthand for *self.contribution*, hence this rule refers to self variable and therefore, is not global and is evaluated for each instance of the *Sponsor* class separately.

MagicDraw has no means to determine if the binary validation rules are global, hence all binary rules are treated as local.

Expressions in error messages

When specifying error messages, more than a simple error string can be entered. Error messages can have template areas, which hold expressions, that will be evaluated and expanded when displaying validation results. Refer to the *ResearchProject*/*Sponsor* example above. The validation result shows:

Budget not balanced – overbudget by 500$

Where does the number 500 come from? It is not directly specified in the error message string (since it is different for different models) but a calculated value of the expression, embedded in an error string. This error string in this case is:

Budget not balanced - overbudget by {
ResearchProject::allInstances().budget->sum() -
Sponsor::allInstances().contribution->sum()}$

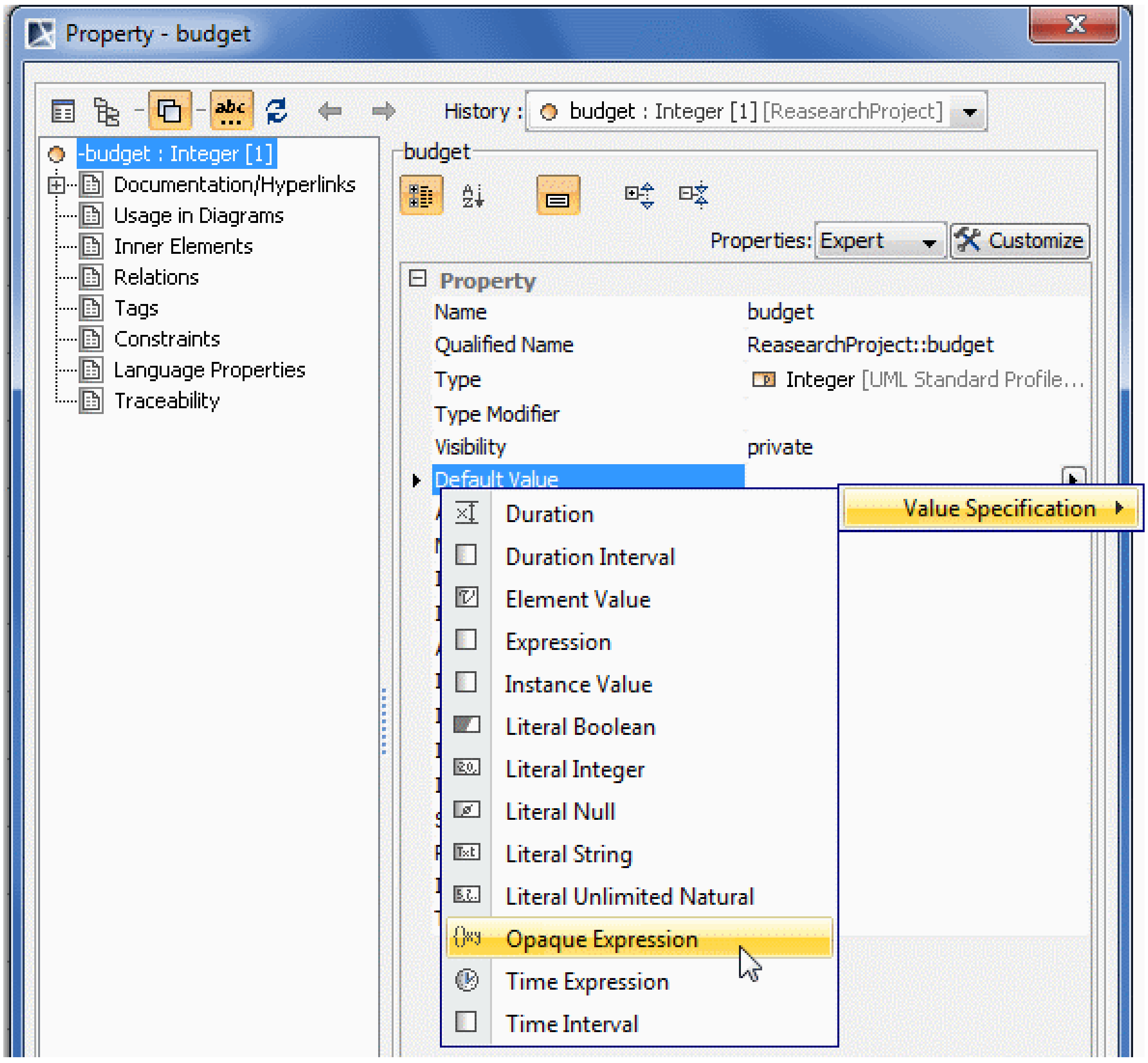
Expressions are embedded in the error messages by using curly brackets - {}. Everything between them is treated as an expression and evaluated for each validation result. Expressions are treated as OCL2.0 expression by default, however you can also use binary expressions. In this case use {bin: <binary expression>} syntax.

Modeling other types OCL2.0 constraints/expressions

Only **inv** constraints can be evaluated in MagicDraw. However, there are more constraint types defined in the OCL2.0 specification. There are also **def**, **init**, **derive**, **pre**, **post**, **body** constraints. These constraints are not evaluated, but can be modeled for documentation purposes. Here is how to model them:

- **def** – create a usual constraint, but apply *«definition»* stereotype, instead of *«invariant»* or *«validationRule»*.
- **init** – place an opaque expression in the defaultValue field of the property.

.


Property - budget

History : budget : Integer [1] [ReasearchProject]

budget

Properties: Expert

Name	budget
Qualified Name	ReasearchProject::budget
Type	Integer [UML Standard Profile...
Type Modifier	
Visibility	private
Default Value	

Figure 327 -- setting the expression as a default value of property

To place an opaque expression in the default value of the property, click the button with a small black arrow pointed to the right or right click on the default value field in the specification of the property and from the shortcut menu select **Value Specification** > **Opaque Expression**.

- **derive** when the expression is placed in the default value of the property (the same as for **init** expressions) but the property is marked as derived in the specification.
- **pre**, **post**, **body** when constraints are placed in the appropriate fields of operation (precondition, postcondition and body condition respectively).

Note that **derive** expressions can be evaluated indirectly, when the validation rule (**inv** constraint) is referencing the property and the validation rule is evaluated.

Unsupported OCL2.0 features

Not all OCL2.0 features are supported in the current release of MagicDraw.

In particular these features are not supported:

- Distinction between null values and undefined values.
- Tuples.

- All the operations, defined in the UML2 superstructure specification on the metaclasses are not present and are not callable.
- Defining and calling operations on classifiers.

There may be some other features that are not working properly. These issues can be reported to https://support.nomagic.com. MagicDraw uses external library – Dresden OCL Toolkit for constraint evaluation.

Adding/customizing severity levels

If the default severity level choice, provided by MagicDraw is not enough for you, new severity levels can be added. This can be done by editing the *SeverityKind* enumeration in the *UML Standard Profile::Validation Profile* package. Each enumeration literal in this enumeration corresponds to available severity levels. Severity levels in this enumeration should be sorted in ascending order.

If you need to specify a new icon for your custom severity level:

1. Create stereotype, derived from the *imaged* stereotype, with the *EnumerationLiteral* as base class.
2. Set the necessary icon on this stereotype.
3. Apply this stereotype on your custom severity level enumeration literal.
4. Additionally, specify the *highlightColor* tagged value on the literal. This field (of the *String* type) determines how the offending elements will be highlighted in the diagrams. The string format is the same as for the specifying colors in HTML pages (as described in http://www.w3.org/TR/html4/types.html#h-6.5). Simple string constraints (such as *highlightColor="red"*) or numeric values (such as *highlightColor="#FF0000"*) can be used here.

Performance Issues

When validation rules, written in OCL are evaluated, MagicDraw generates Java source for them and invokes Java compiler to compile them into an executable form. Hence, on the first run of validation there is usually a delay of 20-30 seconds (depending on the computer performance) while Java compiler is loading. Subsequent runs will be faster that the first one.

Also, this process consumes some amount of RAM. If the validation process is run heavily on medium-large projects, increasing the default Java VM size is advisable. By default, VM size is set to 400MB in MagicDraw; increasing this to 600 (or 800 if the computer has sufficient RAM) might improve the performance.

Active Validation

View Online Demo	Active Validation

NOTE	This functionality is available in all MagicDraw editions.

Active Validation instantly checks the accuracy, completeness, and correctness of a model, displays errors in the model, and suggests solutions.

The following modeling cases are validated with the Active Validation:

- Parameters and arguments synchronization validation
- Correct ownership validation

- Orphaned proxies' validation.

Active Validation is an extendable mechanism that identifies common problems and solutions. Custom validation suites and constraints can be created using binary or OCL constraint. Invalid symbols are marked on diagrams and elements in the model.

Errors in the model are represented in the following ways:

- If an invalid or incomplete model is created, an error indicator will appear in the bottom right corner of MagicDraw.
- Invalid elements are marked in the Browser and Diagram.

From the invalid element/symbol shortcut menu, you can analyze incorrect elements, and solve problems, resulting from the errors, through the **Active Validation Results** window.

Model is validated with three predefined validation suites and the Validation is performed for the parameters and arguments synchronization, correct ownership, and orphaned proxies. You can modify these suites and create your own through the **Validation Options** dialog box.

Detecting errors in the model

When Active Validation detects errors in the model, errors will be revealed in the following ways:

- the failure indicator
- in the Browser, an invalid element is marked with little cross an x symbol.
- on the diagram, invalid symbol is highlighted.

Failure indicator

If an error occurs, the failure indicator will appear in the bottom right corner of MagicDraw (see Figure 328 on page 469). Click this indicator and the **Active Validation Results** window will open.

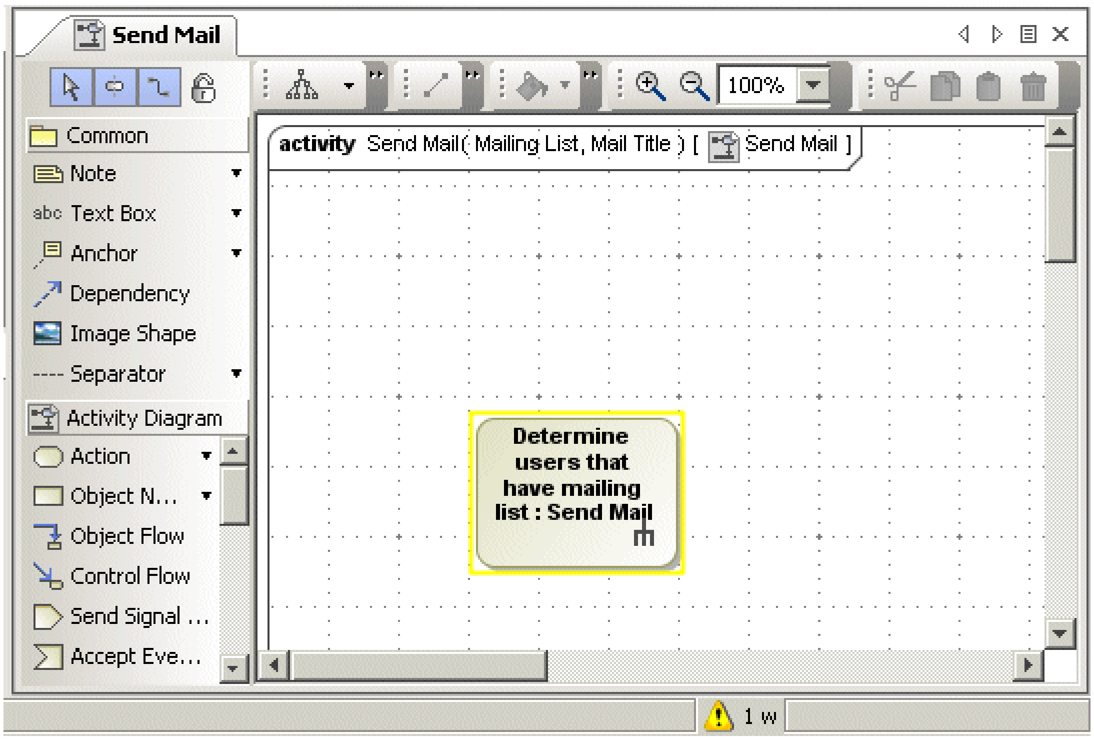


Figure 328 -- General validation notification in MagicDraw

See the parts of the failure indicator in the figure bellow.

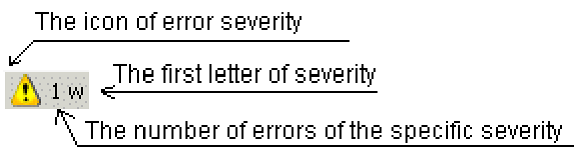

The icon of error severity
1 w
The first letter of severity
The number of errors of the specific severity

Figure 329 -- The failure indicator

Example of the failure indication	**Explanation**	**Possible values**
⚠	Error symbol showing the level of severity.	⚠ - indicating warning ✖ - indicating error or fatal error. ⓘ - indicating debug error or info.
1	Number of errors of that specific severity	1, 2, 3 ...
w	First letter of the error severity	F - fatal error E - error W - warning D - debug I - info

TABLE 1. **Parts of the failure indicator**

Marking errors in the Browser

An invalid model element is marked in the Browser with a small x symbol (see Figure 330 on page 470). The owner of this element is marked with a small grey symbol.

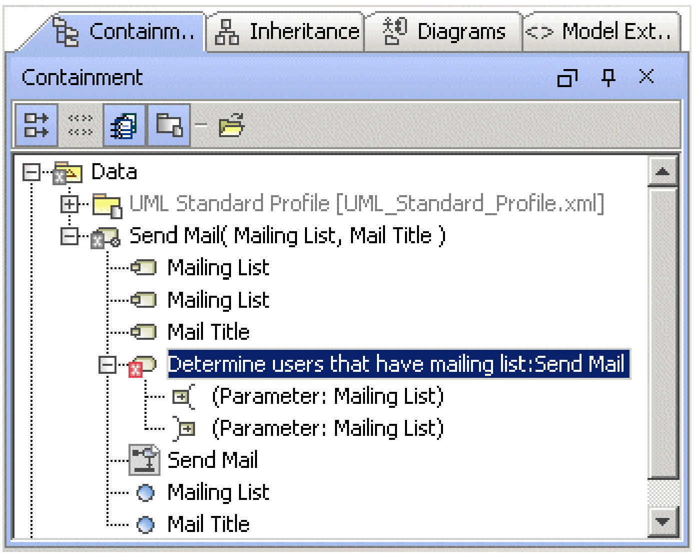

Containm..
Inheritance
Diagrams
<> Model Ext..
Containment
Data
UML Standard Profile [UML_Standard_Profile.xml]
Send Mail(Mailing List, Mail Title)
Mailing List
Mailing List
Mail Title
Determine users that have mailing list:Send Mail
(Parameter: Mailing List)
(Parameter: Mailing List)
Send Mail
Mailing List
Mail Title

Figure 330 -- Invalid elements marking in browser

Highlighting errors on the diagram

The element symbol is colored according to the severity of the error on the diagram.

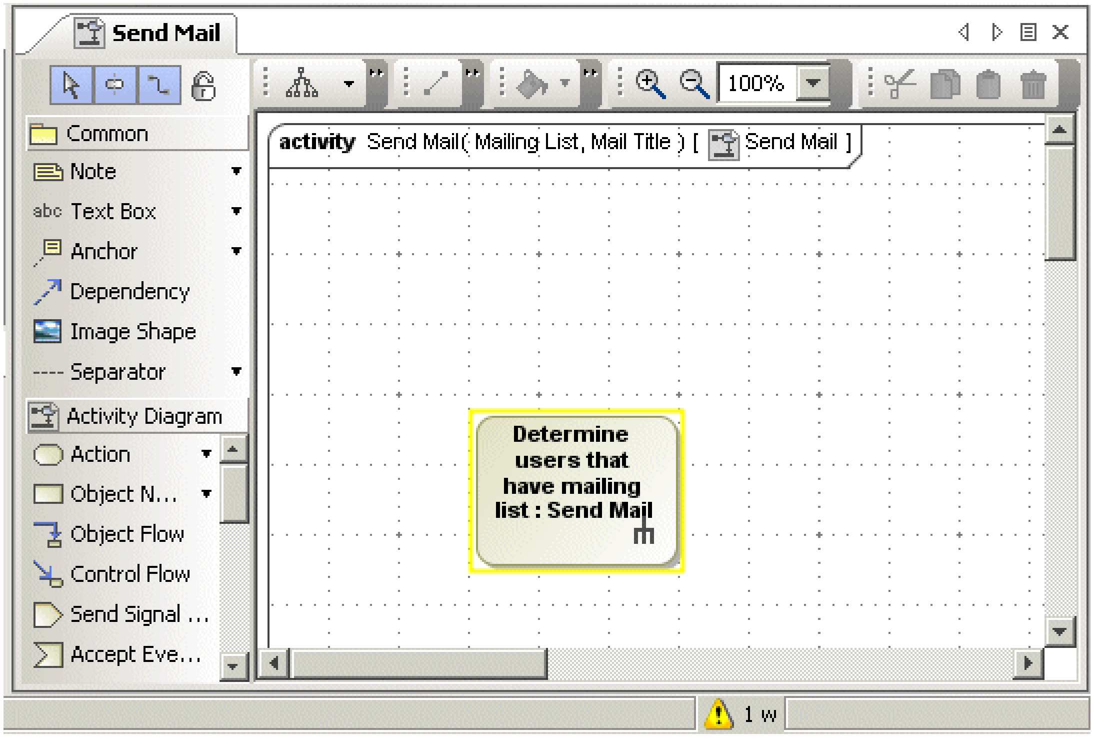
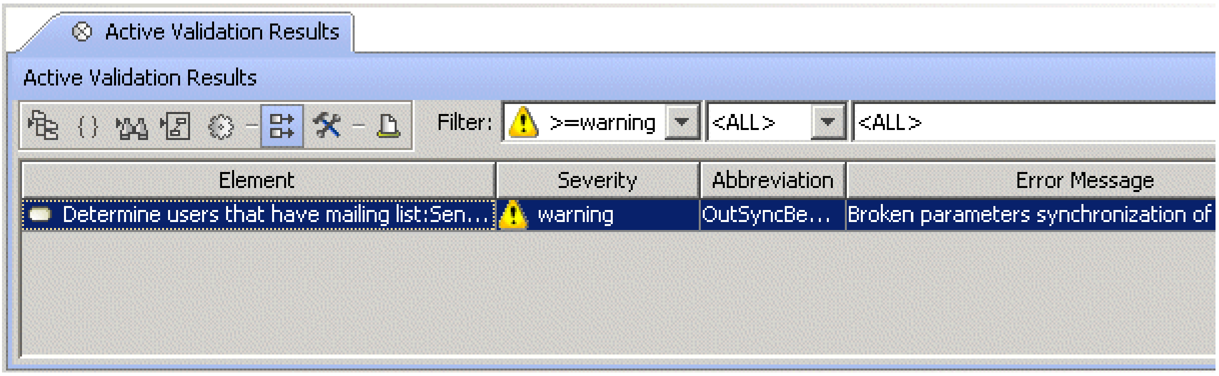


Figure 331 -- Invalid symbols marking in diagram

Handling incorrect model

The **Active Validation Results** window lists the active validation results. It can navigate users to have ability not only to navigate to constraints and invalid elements or symbols, correct errors, filter, and ignore problems.



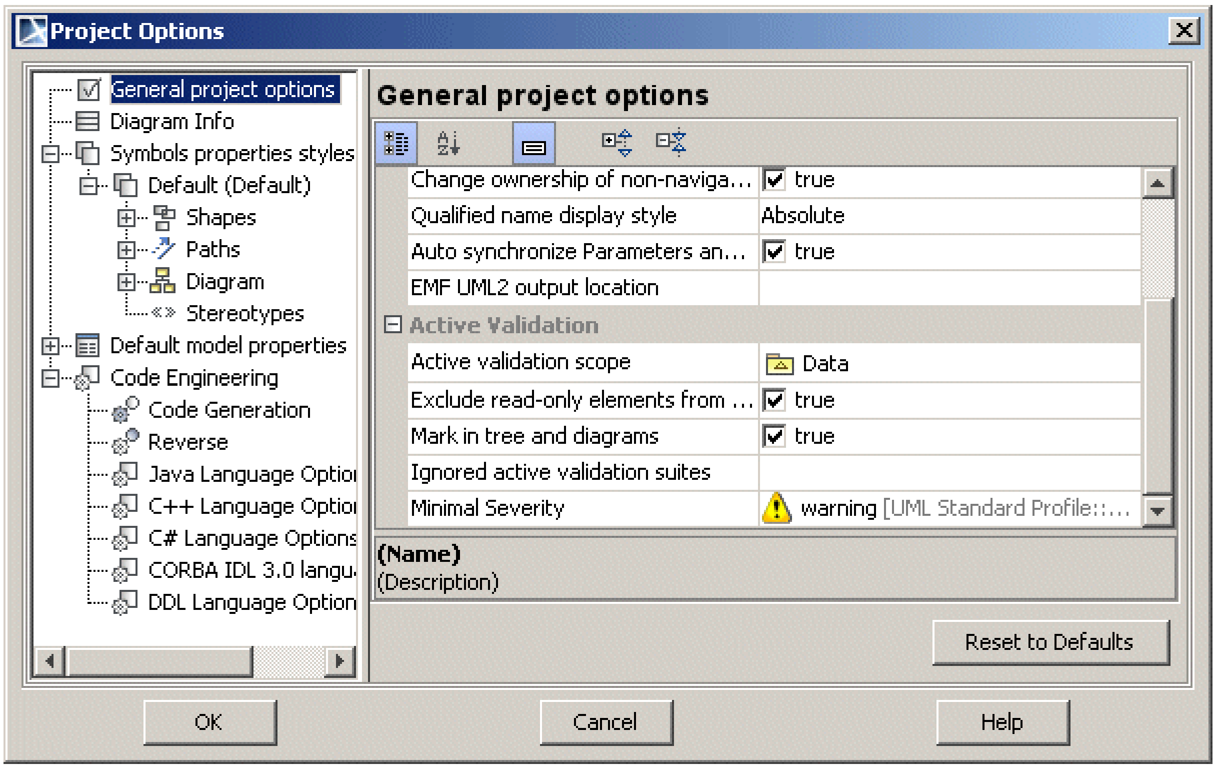
Element	Severity	Abbreviation	Error Message
Determine users that have mailing list:Sen...	warning	OutSyncBe...	Broken parameters synchronization of

Figure 332 -- The Active Validation Results window

Changing the Active Validation Options

To change the active validation options:

1. From the **Options** main menu, select **Project**.
2. In the **Project Options** dialog box, select the **General project options** group.
3. In the **Active Validation** group, specify the active validation options.


Project Options

General project options
Diagram Info
Symbols properties styles
Default (Default)
Shapes
Paths
Diagram
Stereotypes
Default model properties
Code Engineering
Code Generation
Reverse
Java Language Optio
C++ Language Optio
C# Language Options
CORBA IDL 3.0 langu
DDL Language Option

General project options

Change ownership of non-naviga...	✓ true
Qualified name display style	Absolute
Auto synchronize Parameters an...	✓ true
EMF UML2 output location	
Active Validation	
Active validation scope	Data
Exclude read-only elements from ...	✓ true
Mark in tree and diagrams	✓ true
Ignored active validation suites	
Minimal Severity	warning [UML Standard Profile::...

(Name)
(Description)

Reset to Defaults

OK Cancel Help

Figure 333 -- The Project Options dialog box, Active Validation group

The Active Validation Suites

Validating Parameters and Arguments Synchronization

More information about Parameter Synchronization can be found here "Parameters synchronization with Arguments" on page 736.

In most cases the parameters and arguments synchronization is not visible. Automation and synchronization between Parameters and Arguments (for example Operation parameters and Call Behavior Action Pins) increase modeling speed and helps avoid modelling errors.

Arguments should always in sync with Parameters. But in cases when synchronization is not possible or corrupted, the active validation will notify the user by highlighting the symbols on the diagrams.

Shape Ownership

The term "symbol" means a visual representation of some model elements in the diagram. Symbols are further subdivided into shapes and paths (lines in the model, for displaying various relationships).

When drawing UML diagrams, the element ownership is not easily visible. One diagram can contain symbols for elements from several different packages. Element rearrangements in the model may lead to situations where the element ownership in the model does not match the symbol ownership as displayed in the diagram. Such situations are not easy to detect from diagram view.

MagicDraw version 15.0 has a built-in validation code to detect this mismatch. This feature is enabled by default and run unnoticed without requiring any additional input from the user.

When the symbol ownership on the diagram pane does not match the actual element ownership in the model, the symbol is highlighted with red. So, you will easily see it on the diagram and will be able to correct the problem (problem correction hints are also suggested).

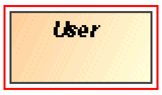


Figure 334 -- Class symbol highlighted with red border

When the mismatch is resolved, the highlighted symbol will return to normal.

The symbol ownership validation feature uses the same mechanism for problem highlighting as the generic validation feature available in MagicDraw Enterprise edition. If you run some validation suites against the model, the element can be highlighted due to any of the validations failures:

- either validation rule(s) from that suite,
- or this automatic symbol ownership checking rule(s).

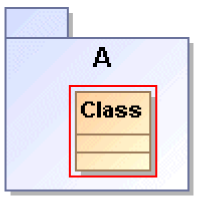
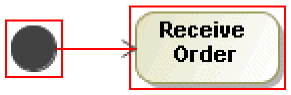
For more information about validation, see "Validation" on page 449.

Symbol ownership validation covers two cases:

- Class diagram and its derivatives (use case, implementation, composite structure diagrams etc.) can display elements from many model locations and show their ownership. If shape owner is incorrect (not the same as the element owner in the model), this shape will be highlighted.
- Dynamic diagrams (state machine, activity and interaction diagrams) have a restriction that only elements from one definite state machine, activity or interaction can occur in each concrete diagram. Validation rule checks for these diagrams that only elements from correct state machine, activity, or interaction appear in the diagram. All foreign elements are highlighted as erroneous.

These cases are summarized in the table below

	Validation of ownership on the diagram pane	**Validation of diagram owner, on which element is drawn**
Validation rule	Check if the symbol owner on the diagram correctly reflects the element owner in the model.	Check if the element and the diagram on which the symbol is drawn belong to the same owner. This is valid for dynamic diagrams. The checking is performed according to the context of the diagram.
What is checked	Shapes are checked, excluding paths.	Validation works for shapes, including paths.

	Validation of ownership on the diagram pane	**Validation of diagram owner, on which element is drawn**
Cases	Check is performed: • if the element symbol is draw on the same package/model/profile to which it actually belongs; • if the element symbol is drawn on the same component/node to which it actually belongs; • if the element symbol is drawn on the same state to which it actually belongs; and other similar cases.	Check is performed: • if the communication diagram and elements from the communication diagram are in the same interaction; • if the sequence diagram and its elements are in the same interaction; • if the state diagram and its elements are in the same state machine; • if the protocol state machine diagram and its elements are in the same protocol state machine. • if the activity diagram and its elements are in the same activity.
Examples	For example, on the diagram pane, an element shape is nested in package A, but actually the element is in package B.	For example, a diagram belongs to activity A, but elements of this diagram belong to activity B.
		

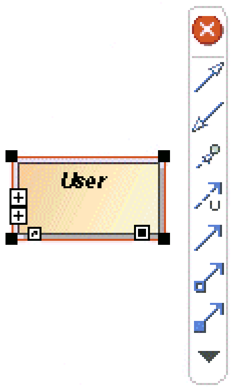
TIP! To locate the actual owner of an element:

- Right-click the element on the diagram pane. On the shortcut menu click **Select in Containment Tree**. The element will be selected in the Containment tree. The element's parent in the tree is its actual owner.
- In the element's Specification window, find the **Owner** property.

Solving the detected symbol ownership problems

In this section you will find out the reasons why an element is highlighted in red and how to solve symbol ownership problems quickly.

Select the highlighted element on the diagram pane. The Smart Manipulator toolbar opens. Notice the red button on the top of Smart Manipulator toolbar.



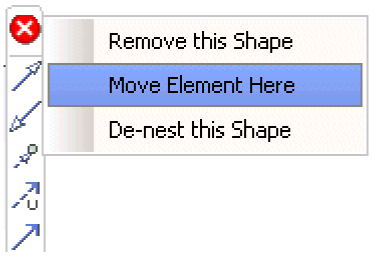
To see the reason why a shape is highlighted, move the mouse pointer over the red button in the Smart Manipulator toolbar. You will see a tool tip that explains why the element is highlighted. For example: "Shape ownership in the diagram does not correspond to the element ownership in the model".

You may either solve the problem yourself or choose one of the suggested solutions. To select an available solution, click the red button in the Smart Manipulator toolbar. A menu with the following commands will open (note that some items might not be included depending on the situation in the model):

- **Remove this Shape**. Symbol is deleted from the diagram pane.
- **Move Element Here**. Element is moved to the new owner in the model, so that the element ownership in the model corresponds to the present shape ownership in the diagram.

NOTE	When a symbol is deleted, the element is not deleted from the project.

- **De-nest this Shape**. Shape (not element!) will be extracted from the current owner and placed directly on the diagram. This solution is applicable only for some cases (e.g. De-nest, this Shape command is not available for shape, placed in the incorrect state machine, activity, interaction diagrams).



To turn the ownership validation on/off

- Select/clear the **Validate Shape Ownership** check box in the **Analyze** menu.
- Select/clear the **Validate Shape Ownership** check box in the **Environment Options** dialog box, **Diagram** branch, **Display** options group.

To define the ownership checking period

1. Open the **Environment Options** dialog.
2. Click the **Diagram** tab.
3. In the **Display** options group, **Diagram Checking Period** text box, type the diagram checking period in seconds.

Related Topics

- "Customizing Environment Options" on page 90.
- "Smart Manipulation" on page 184.

UML model correctness

Active validation instantly check the most important correctness rules of UML model. The following validation rules are checked: Ports compatibility, Pin types compatibility, Slot and Tags multiplicity correctness and others. Automated solutions are suggested for solving the model errors.

Validating the Orphaned Proxies (OP)

Checking for OP moved from a separate feature into one unified validation mechanism that identifies problems and solutions.

During model editing there is possibility can happen that an element is referenced using proxy, but the real element is not shared or does not exist in the module. After the modules that load such proxies are detected, they are called Orphaned Proxies. These proxies are marked by a validation sign in the browser. Actions to clean such proxies are added.

Customizing the Active Validation

Any constraint (binary or OCL), additionally optimized, can be used to validate models in real-time. MagicDraw provides predefined suites for validation of: Correct ownership in the model and on the diagram, Parameters and arguments synchronization, missing referenced elements (Orphaned Proxies) in the modules, and others.

A model is validated automatically without any additional input. Additional constraints can be added or properties can be customized from **Analyze** (main menu)-> **Validation**.

Validate element that has no representation in diagram

Element or its symbol is highlighted in diagram pane and in Browser if it is owner of element that can not be represented in diagram and has validation error.

See the examples of the spelling error in the table below:

Sample description	Representation in Diagram	Representation in Containment Tree	Notes
Use Case documentation (comment owned by Use Case and annotating Use Case) has a spelling error	Use Case symbol is highlighted with red dashed border (see Figure 335 on page 477).	The owner of the hidden element with error is marked with white x in red quadrant in the Containment tree as itself would have error (see Figure on page 477).	To the symbol smart manipulator toolbar there is added additional button (grey circle with cross inside) that presents the errors solving solutions.
Use Case extension point name has a spelling error	Use Case symbol is highlighted with red dashed border (see Figure 336 on page 477).	The owner of the corrupted and not represented in diagram element is marked with white X in grey quadrant in the Containment tree (see Figure 337 on page 477).	

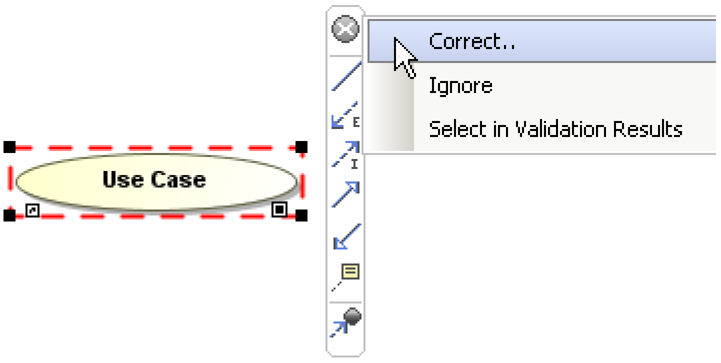
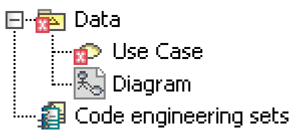


Figure 335 -- The Use Case is highlighted with red dashed border, because it has documentation with spelling error



The Use Case is highlighted with white X in red quadrant in the Containment tree, because it has documentation has a spelling error

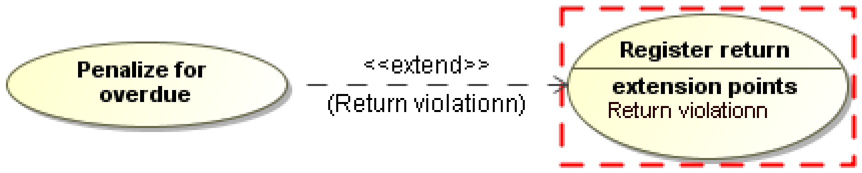


Figure 336 -- The "Register return" Use Case is highlighted with red dashed border, because the "Return violationn" Extension Point has a spelling error

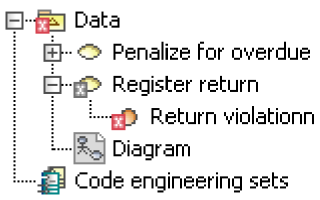


Figure 337 -- The “Register return” Use Case is highlighted with white X in grey quadrant in the Containment tree, because the “Return violationn” Extension Point has a spelling error

Model Visualizer

NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

MagicDraw contains tools that help to create elements from existing data and analyze the relationships between elements created in the UML model. It is also possible to analyze the inheritance and dependency relationships between classes.

All model visualizing and analyzing tools are presented in MagicDraw as Wizards with several steps that should be followed in order to accomplish the desired operation.

All Wizards have several common buttons:

- **Add** – add selected model elements from the **All** list to the **Selected** list.
- **Add All** – add all elements to the **Selected** list that are located in the same hierarchy level as the selected element.
- **Add Recursively** – add all elements in the selected packages and all elements from nested packages to the **Selected** list.
- **Remove** – remove the selected element from the **Selected** list.
- **Remove All** – remove all selected elements.
- **< Back** – return to the previous dialog box.
- **Next >** – proceed to the next step.
- **Finish** – finish the configuration. All other options will be set by default. The **Wizard** exits and results are displayed.
- **Cancel** – cancel the wizard.
- **Reset To Defaults** - if changes were made to the element properties, values will be set to default.

Class Diagram Wizard

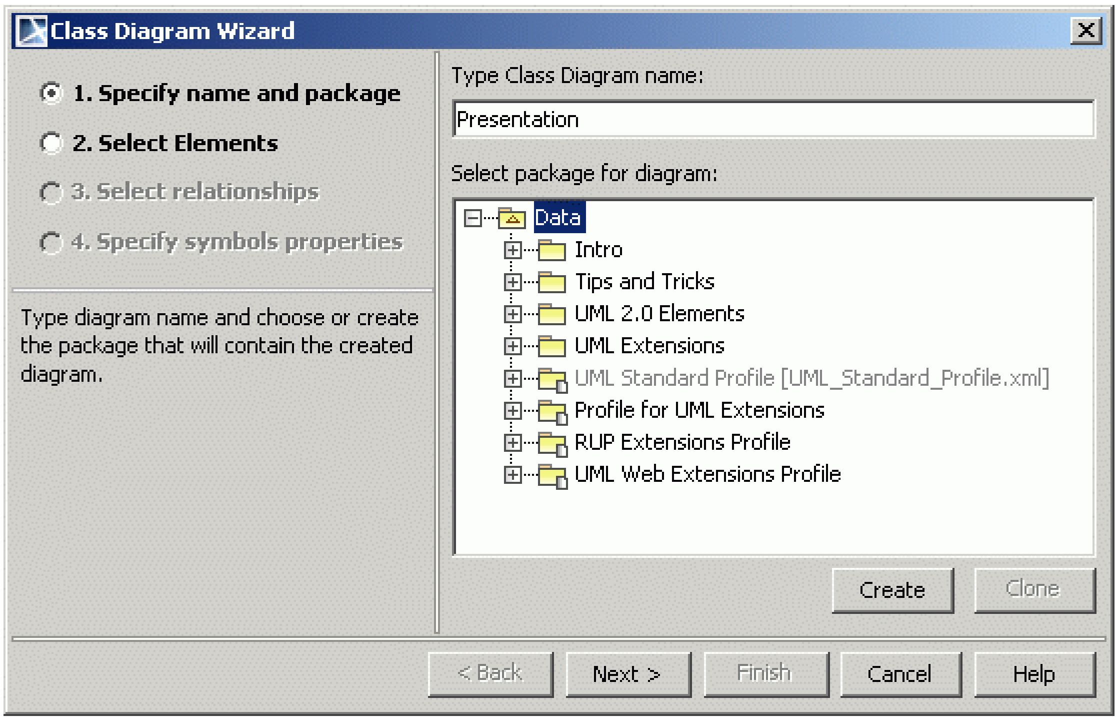
NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The **Class Diagram Wizard** helps you create a new class diagram when all classes and their relationships are already created and specified. You can select which classes, packages, and relationships will be included in a new class diagram and the details of the class representation to be configured (attributes, operations, accessibility). The **Class Diagram Wizard** frees you from creating the class diagram manually. The **Class Diagram Wizard** guides you through several steps and collects information along the way. It will automatically create a new class diagram and all the necessary elements.

To start the **Class Diagram Wizard**

1. From the **Analyze** menu, select **Model Visualizer.** The **Model Visualizer** dialog box opens.
2. From the wizards list, select the **Class Diagram Wizard**.

3. Click **Start**. The **Class Diagram Wizard** opens.



Type diagram name and choose or create the package that will contain the created diagram.

Type Class Diagram name: Presentation

Select package for diagram:

- Data
  - Intro
  - Tips and Tricks
  - UML 2.0 Elements
  - UML Extensions
  - UML Standard Profile [UML_Standard_Profile.xml]
  - Profile for UML Extensions
  - RUP Extensions Profile
  - UML Web Extensions Profile

Figure 338 -- Class Diagram Wizard. Diagram name

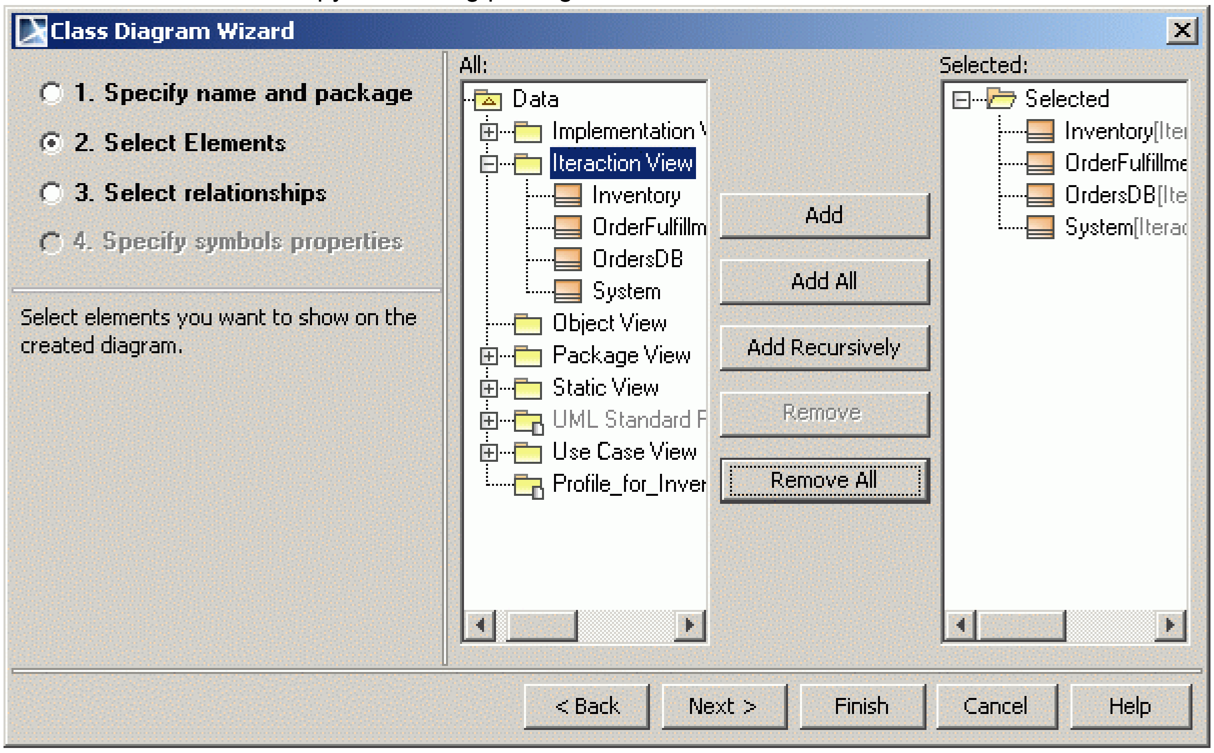
Type the name of the new diagram in the **Type Class Diagram name** text box or leave the default name.

Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select package for diagram** list window. Select the package from the data tree that will be the parent for the newly created diagram or create a new package by clicking the **New** button.

When you select the **Specify name and package** option, the following functions are available:

- **Create** - create a new package.

- **Clone** - copy an existing package to a new one.


Class Diagram Wizard

[○ 1. Specify name and package] [● 2. Select Elements] [○ 3. Select relationships] [○ 4. Specify symbols properties]

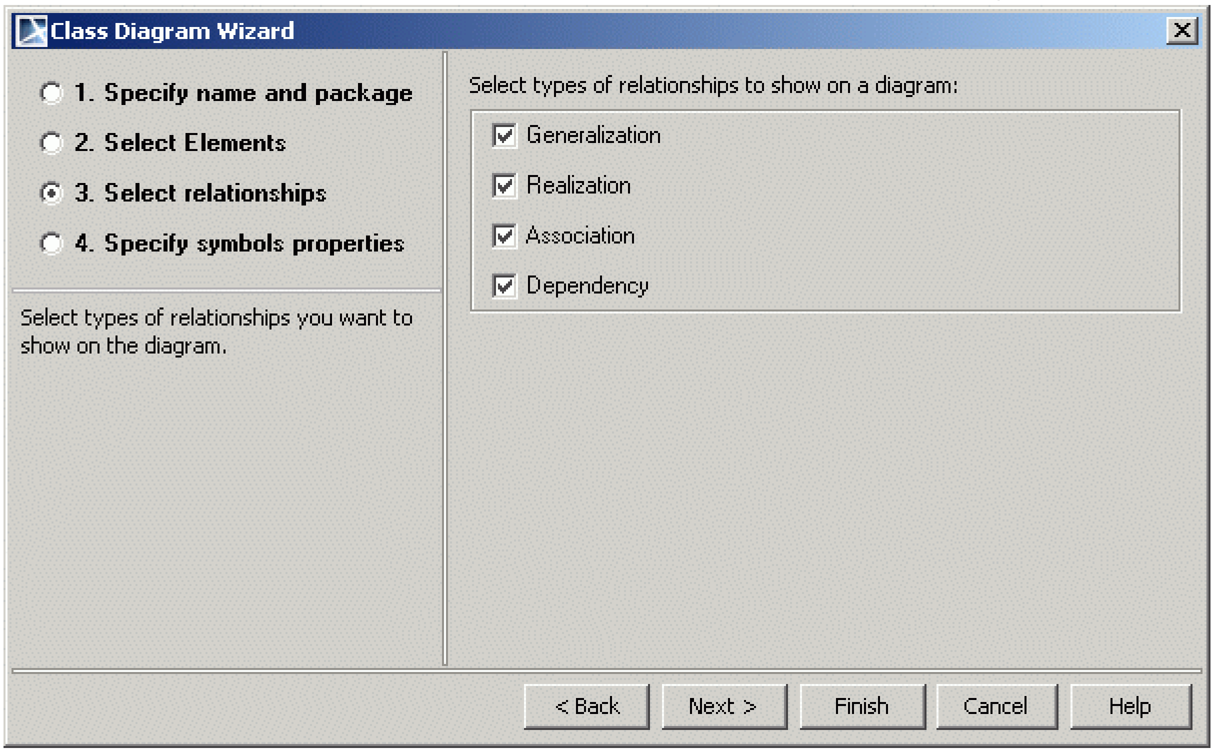
Select elements you want to show on the created diagram.

All:
- Data
  - Implementation \
  - Iteraction View
    - Inventory
    - OrderFulfillm
    - OrdersDB
    - System
  - Object View
  - Package View
  - Static View
  - UML Standard F
  - Use Case View
  - Profile_for_Inver

Selected:
- Selected
  - Inventory[Ite
  - OrderFulfillme
  - OrdersDB[Ite
  - System[Iterac

Figure 339 -- Class Diagram Wizard. Select Elements

- **All** list – contains all model elements.
- **Selected** list – contains the elements that are added to the class diagram.


Class Diagram Wizard

[○ 1. Specify name and package] [○ 2. Select Elements] [● 3. Select relationships] [○ 4. Specify symbols properties]

Select types of relationships you want to show on the diagram.

Select types of relationships to show on a diagram:

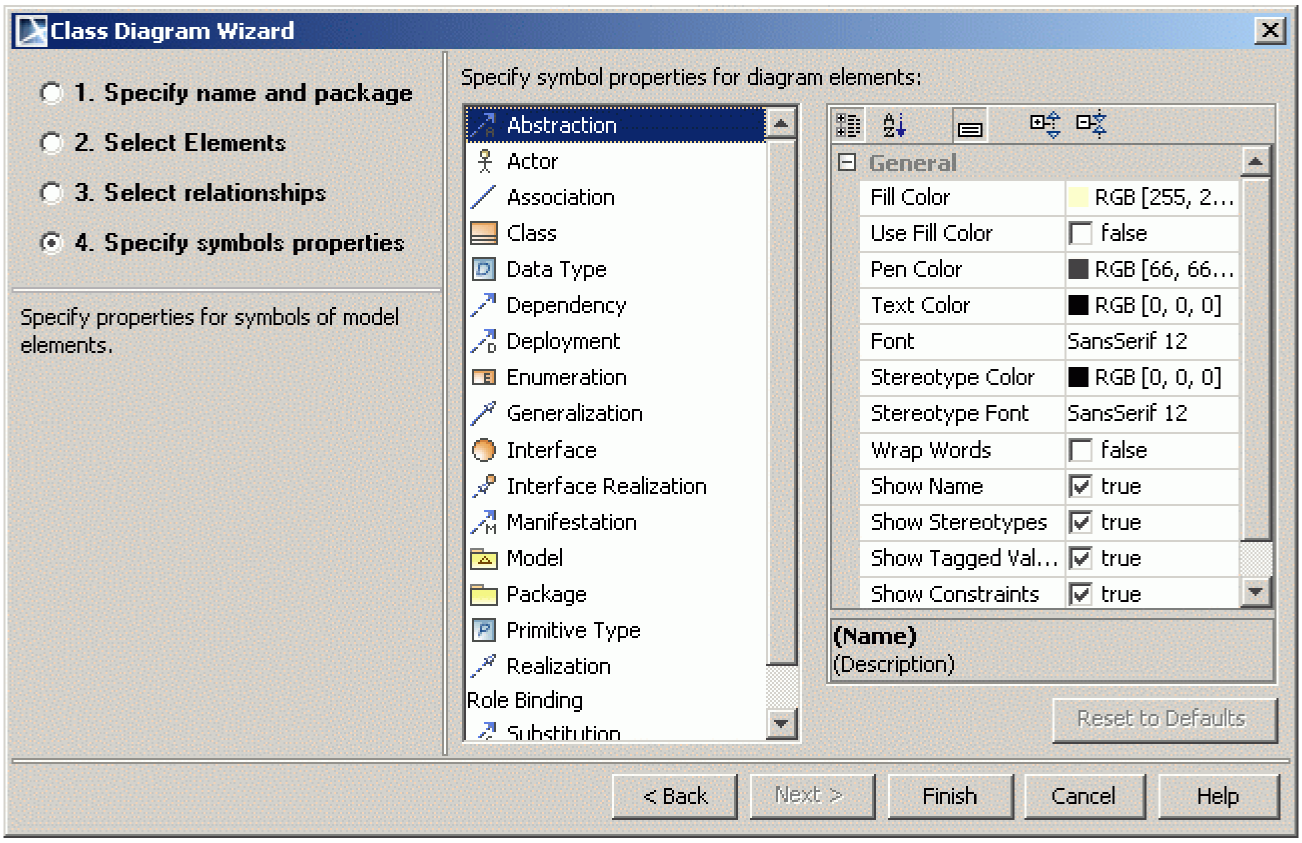
- [✓] Generalization
- [✓] Realization
- [✓] Association
- [✓] Dependency

Figure 340 -- Class Diagram Wizard. Select Relationships

Select relationships to include in the class diagram:

- **Generalization** – relationship between a general element and a more specific element (inheritance, extension).

- **Realization** – relationship between model elements where one of the elements implements the interface defined by the other model element.
- **Association** – semantic relationship between classes.
- **Dependency** – usage relationship between UML model elements.



Class Diagram Wizard

- ○ 1. Specify name and package
- ○ 2. Select Elements
- ○ 3. Select relationships
- ◉ 4. Specify symbols properties

Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

- Abstraction
- Actor
- Association
- Class
- Data Type
- Dependency
- Deployment
- Enumeration
- Generalization
- Interface
- Interface Realization
- Manifestation
- Model
- Package
- Primitive Type
- Realization
- Role Binding
- Substitution

General	
Fill Color	RGB [255, 2...
Use Fill Color	☐ false
Pen Color	RGB [66, 66...
Text Color	RGB [0, 0, 0]
Font	SansSerif 12
Stereotype Color	RGB [0, 0, 0]
Stereotype Font	SansSerif 12
Wrap Words	☐ false
Show Name	☑ true
Show Stereotypes	☑ true
Show Tagged Val...	☑ true
Show Constraints	☑ true

(Name)
(Description)

Figure 341 -- Class Diagram Wizard. Specify Symbols Properties

Select options for representing elements in the class diagram.

NOTE	If the **Suppress Attributes** and the **Suppress Operations** check boxes are selected, the class is displayed only as a rectangle with the class name in it.

Package Dependency Wizard

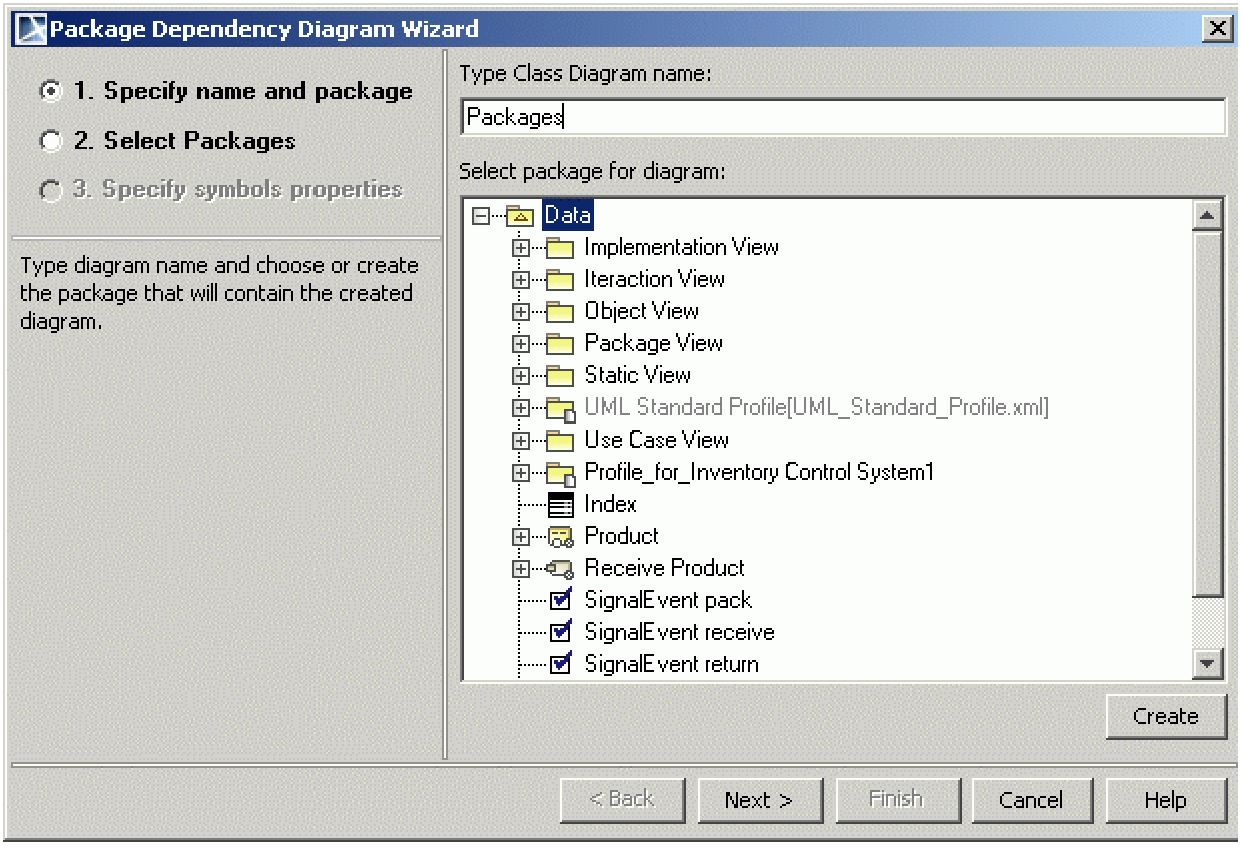
NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The **Package Dependency Diagram Wizard** generates diagrams containing packages (created within a project) and shows the relationships between them. The diagram may reflect all packages in the project, or just those selected. The **Package Dependency Diagram Wizard** collects all the information needed to both analyze dependencies and generate a new diagram.

To start the **Package Dependency Diagram Wizard**

1. From the **Analyze** menu, select **Model Visualizer.** The **Model Visualizer** dialog box opens.
2. From the wizards list, select the **Package Dependency Diagram Wizard**.

3. Click **Start**. The **Package Dependency Diagram Wizard** opens.


Package Dependency Diagram Wizard
1. Specify name and package
2. Select Packages
3. Specify symbols properties
Create
< Back
Next >
Finish
Cancel
Help

Type diagram name and choose or create the package that will contain the created diagram.

Type Class Diagram name:

Packages

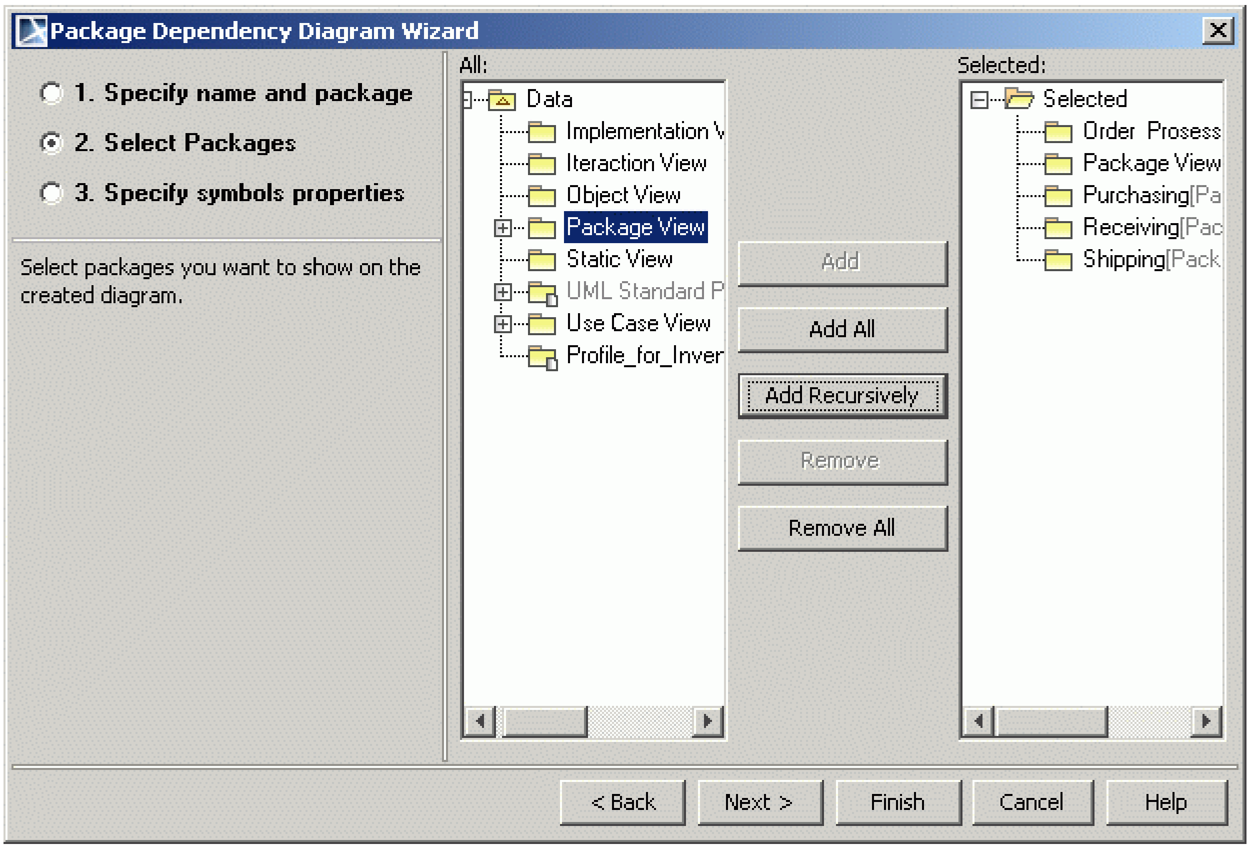
Select package for diagram:

- Data
  - Implementation View
  - Iteraction View
  - Object View
  - Package View
  - Static View
  - UML Standard Profile[UML_Standard_Profile.xml]
  - Use Case View
  - Profile_for_Inventory Control System1
  - Index
  - Product
  - Receive Product
  - SignalEvent pack
  - SignalEvent receive
  - SignalEvent return

Figure 342 -- Package Dependency Diagram Wizard. Diagram name

Type a name for the newly created diagram in the **Type Class Diagram name** text box.

Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select package for diagram** list window. Select the package from the data tree that will be the parent for the newly created diagram or create a new package by clicking the **Create** button.

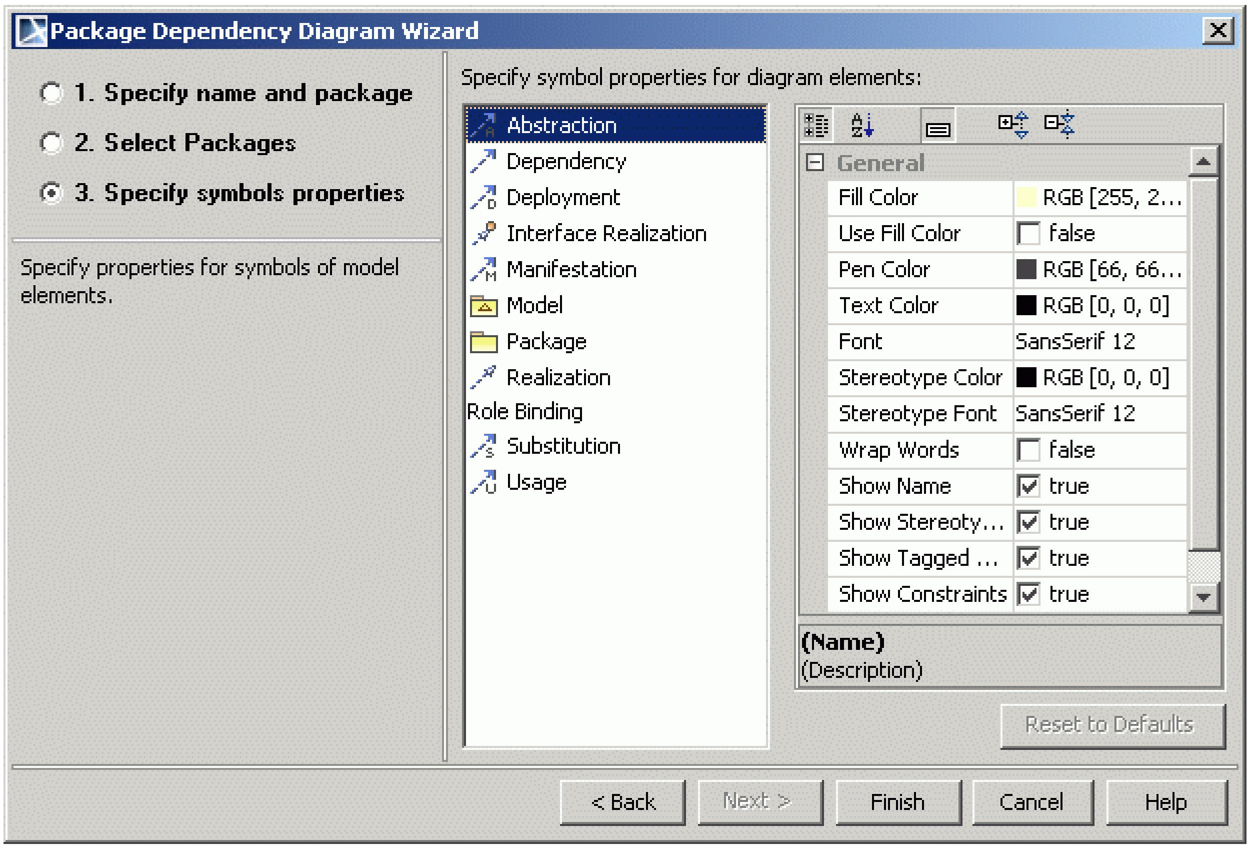


Select packages you want to show on the created diagram.

Figure 343 -- Package Dependency Diagram Wizard. Select Package.

- **All** list – contains all packages.

- **Selected** list – contains all packages that are added to the diagram.


Package Dependency Diagram Wizard

1. Specify name and package
2. Select Packages
3. Specify symbols properties

Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

- Abstraction
- Dependency
- Deployment
- Interface Realization
- Manifestation
- Model
- Package
- Realization
- Role Binding
- Substitution
- Usage

General

Fill Color	RGB [255, 2...
Use Fill Color	☐ false
Pen Color	RGB [66, 66...
Text Color	RGB [0, 0, 0]
Font	SansSerif 12
Stereotype Color	RGB [0, 0, 0]
Stereotype Font	SansSerif 12
Wrap Words	☐ false
Show Name	✓ true
Show Stereoty...	✓ true
Show Tagged ...	✓ true
Show Constraints	✓ true

(Name)
(Description)

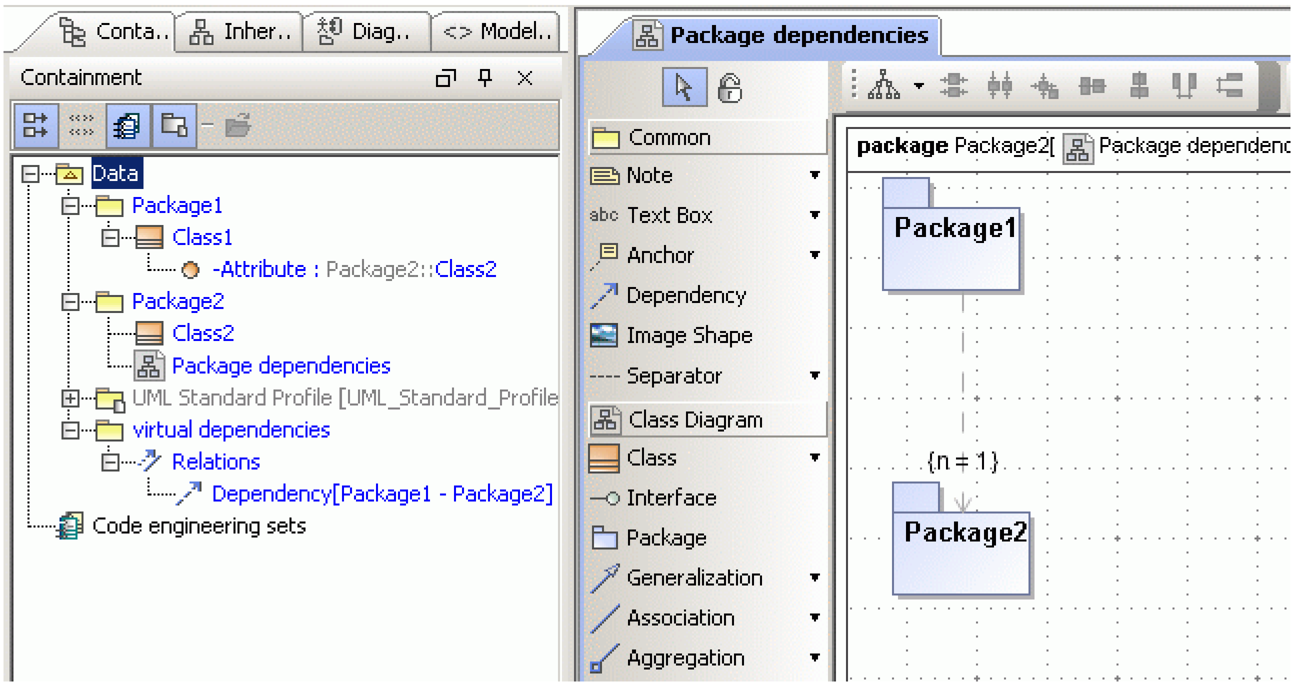
Figure 344 -- Package Dependency Diagram Wizard. Specify Symbols Properties

Select options for representing elements in the class diagram.

Displaying package dependencies

If a package has inner elements used by or dependent on other package elements, the Package Dependencies Wizard will analyze dependencies and create “virtual” relations between dependent packages.

For example:



The **Virtual dependencies** package containing dependency links is created after finishing the wizard. If there is more than one dependency between the package inner elements, then the tagged value number **{n=...}** on the virtual dependency will be changed according to the number of dependencies.

Package Overview Diagram Wizard

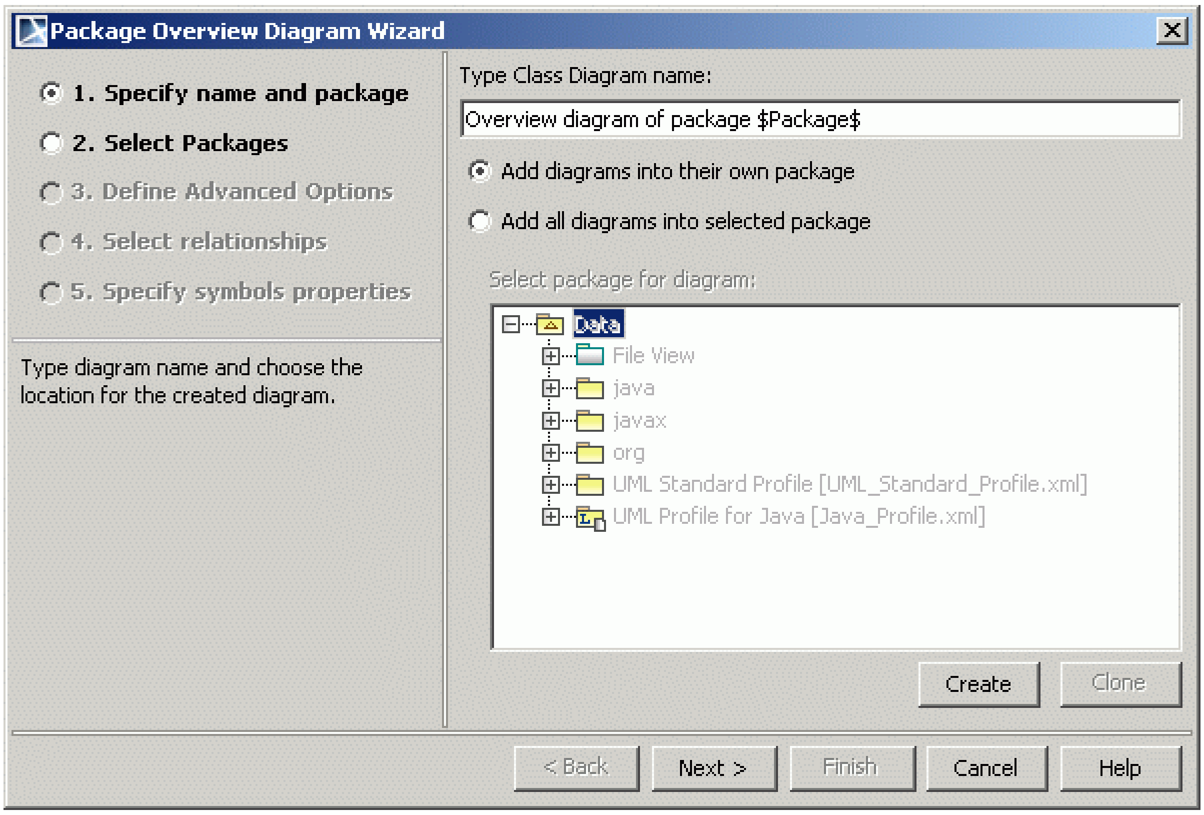
NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The **Package Overview Diagram Wizard** allows the creation of a diagram for every package from the selected scope (reversed packages). The created diagram displays the content of the packages – inner packages with inner elements connected with available relations.

To start the **Package Overview Diagram Wizard**

- Select the **Package Overview Diagram Wizard** from the **Diagrams** menu, **Diagram Wizards** submenu.
- Open the package shortcut menu, select **Tools** and then **Package Overview Diagram Wizard**.

- From the **Analyze** menu, select the **Model Visualizer** command. The **Model Visualizer** dialog box opens. In the wizards list, select the **Package Overview Diagram Wizard**. Click the **Start** button.


Package Overview Diagram Wizard
1. Specify name and package
2. Select Packages
3. Define Advanced Options
4. Select relationships
5. Specify symbols properties
Create
Clone
< Back
Next >
Finish
Cancel
Help

Type diagram name and choose the location for the created diagram.

Type Class Diagram name: Overview diagram of package $Package$

[✓ Add diagrams into their own package] Add all diagrams into selected package

Select package for diagram:

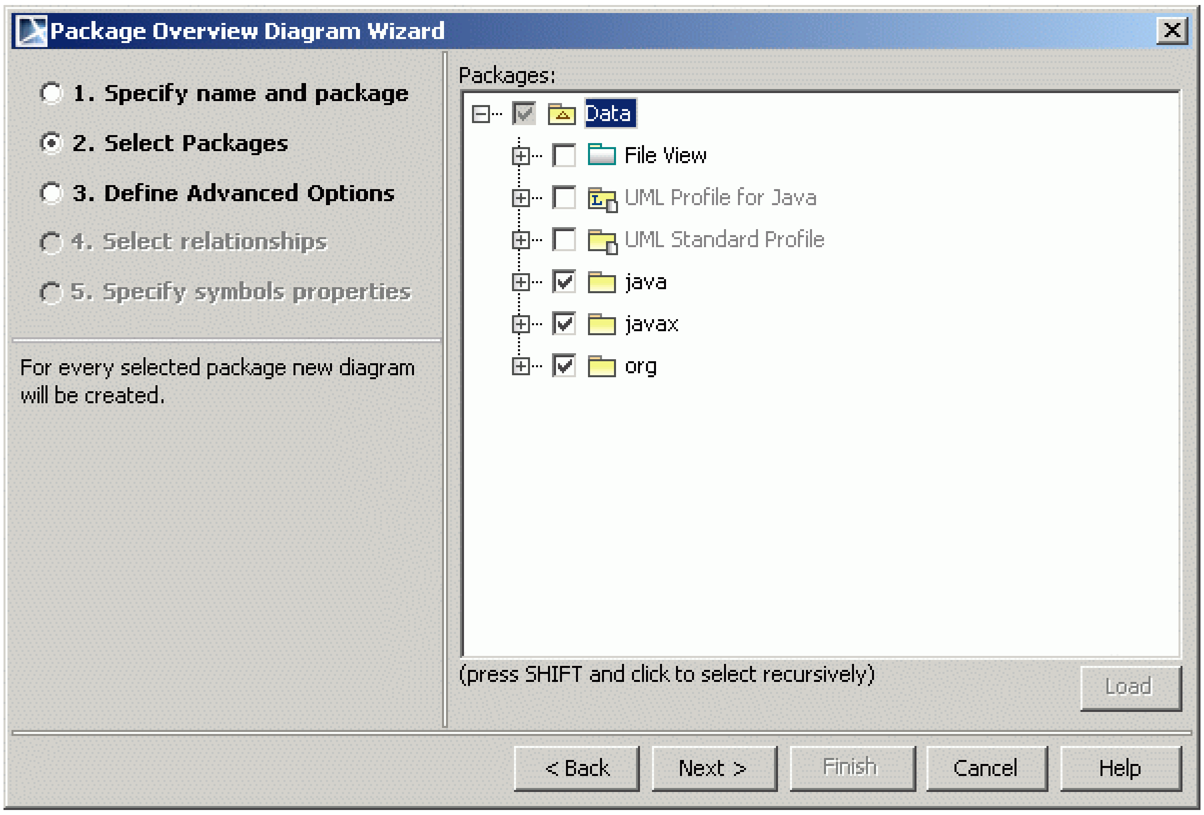
- Data
  - File View
  - java
  - javax
  - org
  - UML Standard Profile [UML_Standard_Profile.xml]
  - UML Profile for Java [Java_Profile.xml]

Figure 345 -- Package Dependency Diagram Wizard. Diagram name

Type a name for the newly created diagram in the **Type Class Diagram name** text box.

The **Add diagrams into their own package** option button - adds diagrams in the same package they are created.

The **Add all diagrams into selected package** - while creating new package overview diagrams, adds diagrams in the selected package. Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select package for diagram** list window. Select the package that will be the parent for the newly created diagram from the Data tree or create a new package by clicking the **New** button.


Package Overview Diagram Wizard

[ ] 1. Specify name and package
[✓ 2. Select Packages]
[ ] 3. Define Advanced Options
[ ] 4. Select relationships
[ ] 5. Specify symbols properties

For every selected package new diagram will be created.

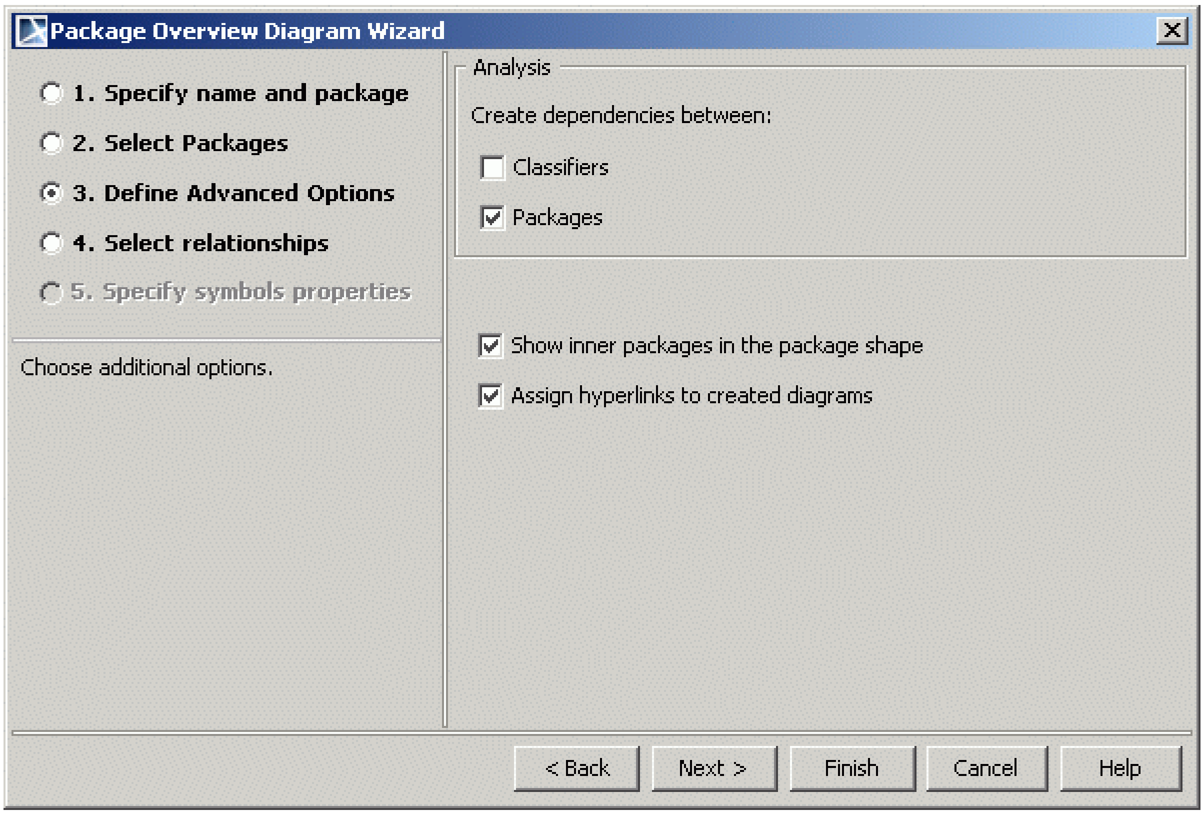
Packages:
- [✓] Data
  - [ ] File View
  - [ ] UML Profile for Java
  - [ ] UML Standard Profile
  - [✓] java
  - [✓] javax
  - [✓] org

(press SHIFT and click to select recursively)

Figure 346 -- Package Overview Diagram Wizard. Select Package.

Select the packages, which will be represented in the new diagram. For every selection, a package diagram will be created.

If the selected package is read-only and the package for the diagrams is not specified, a warning will be displayed when the **Next** button is pressed.


Package Overview Diagram Wizard

( ) 1. Specify name and package
( ) 2. Select Packages
(•) 3. Define Advanced Options
( ) 4. Select relationships
( ) 5. Specify symbols properties

Choose additional options.

Analysis
Create dependencies between:
[ ] Classifiers
[✓] Packages

[✓] Show inner packages in the package shape
[✓] Assign hyperlinks to created diagrams

Figure 347 -- Package Overview Diagram Wizard. Define Advanced Options

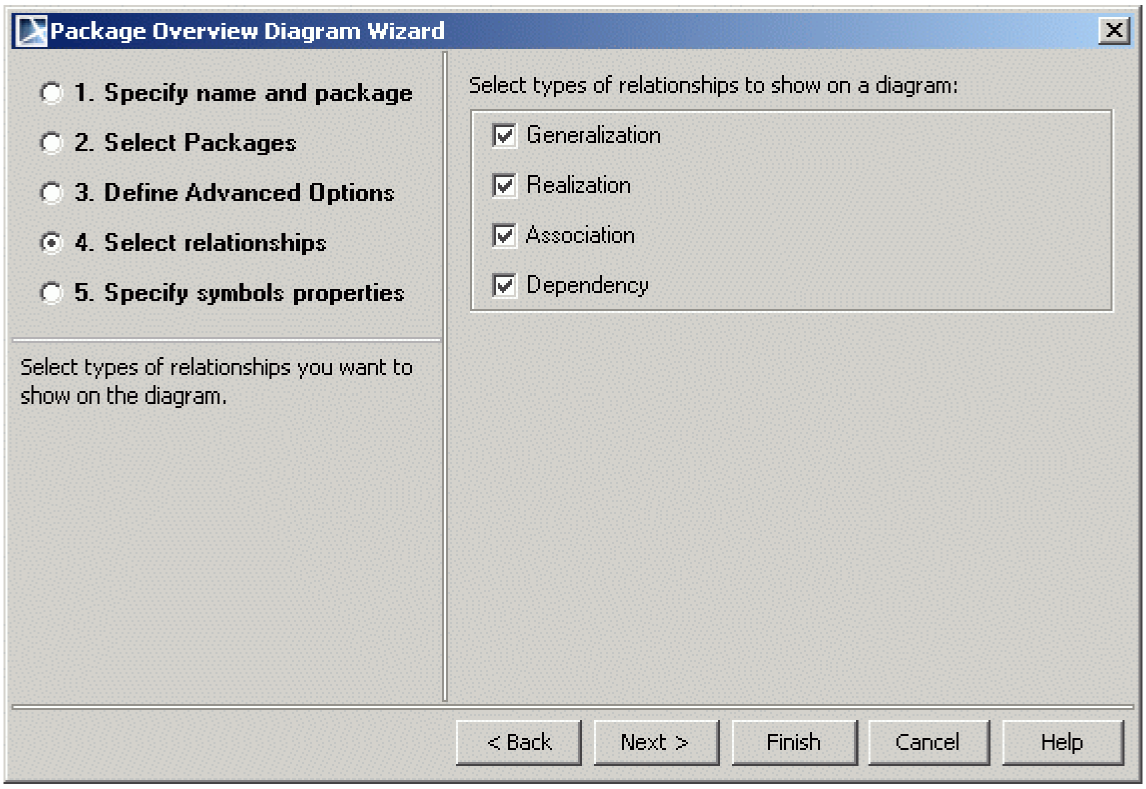
Set the advanced properties for elements to be represented in the diagrams.

If you want to see the classifiers structure in the created class diagram, then select the create dependencies between **Classifiers** check box in the Analysis options group.

If create dependencies between **Packages** check box is selected, then only the package content class diagram will be created. Analyzes are performed of all inner elements, recursively by all criteria.

The **Show inner packages in the package shape** check box - displays one level of inner packages in every package shape, connected with dependencies.

The **Assign hyperlinks to created diagrams** check box - adds an active hyperlink to every package, referenced to the inner diagram of this package.



Package Overview Diagram Wizard

- 1. Specify name and package
- 2. Select Packages
- 3. Define Advanced Options
- [✓ 4. Select relationships]
- 5. Specify symbols properties

Select types of relationships you want to show on the diagram.

Select types of relationships to show on a diagram:

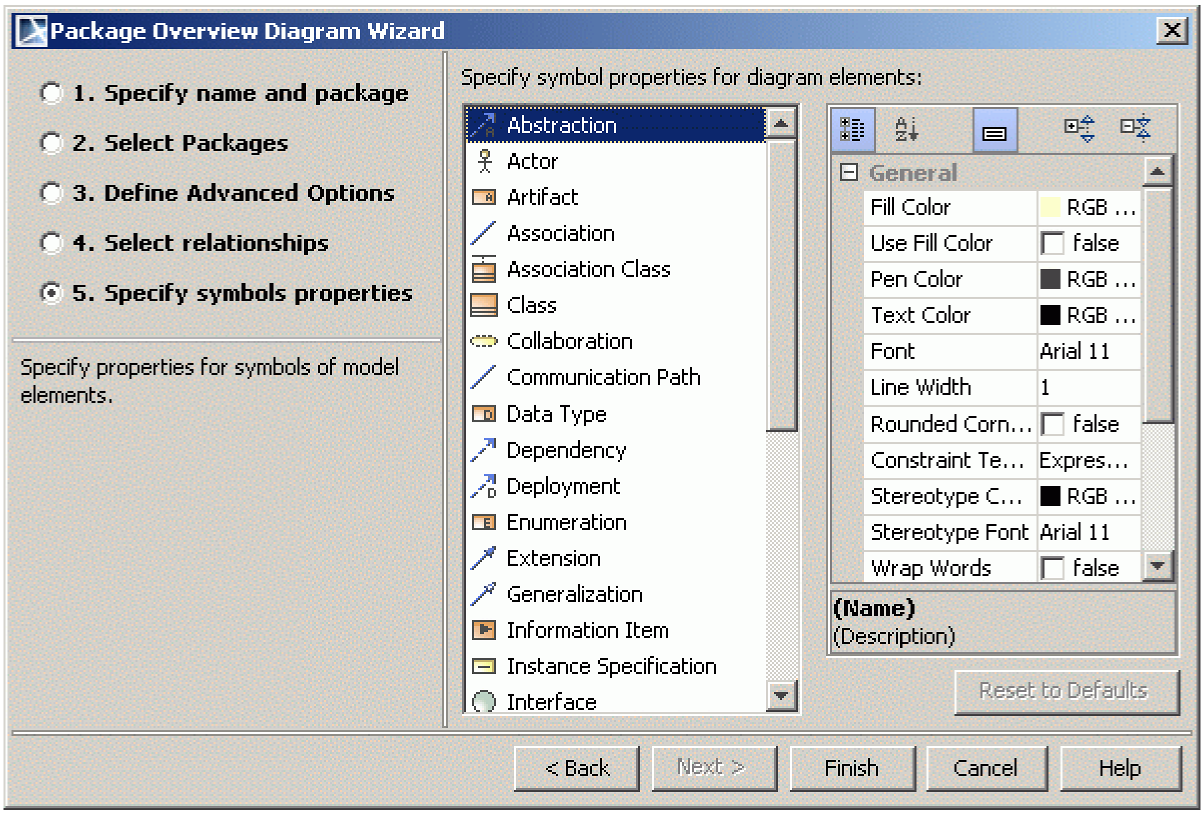
- [✓] Generalization
- [✓] Realization
- [✓] Association
- [✓] Dependency

Figure 348 -- Package Overview Diagram Wizard. Select Relationships

Select the relationships you wish to include in the class diagram:

- **Generalization** – relationship between a general element and a more specific element (inheritance, extension).
- **Realization** – relationship between model elements where one of the elements implements the interface defined by the other model element.
- **Association** – semantic relationship between classes.

- **Dependency** – usage relationship between UML model elements.


Package Overview Diagram Wizard

1. Specify name and package
2. Select Packages
3. Define Advanced Options
4. Select relationships
5. Specify symbols properties

Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

Abstraction, Actor, Artifact, Association, Association Class, Class, Collaboration, Communication Path, Data Type, Dependency, Deployment, Enumeration, Extension, Generalization, Information Item, Instance Specification, Interface

General	
Fill Color	RGB ...
Use Fill Color	☐ false
Pen Color	RGB ...
Text Color	RGB ...
Font	Arial 11
Line Width	1
Rounded Corn...	☐ false
Constraint Te...	Expres...
Stereotype C...	RGB ...
Stereotype Font	Arial 11
Wrap Words	☐ false

(Name)
(Description)

Figure 349 -- Package Overview Diagram Wizard. Specify symbols properties

Select options for representing elements in the diagram.

Hierarchy Diagram Wizard

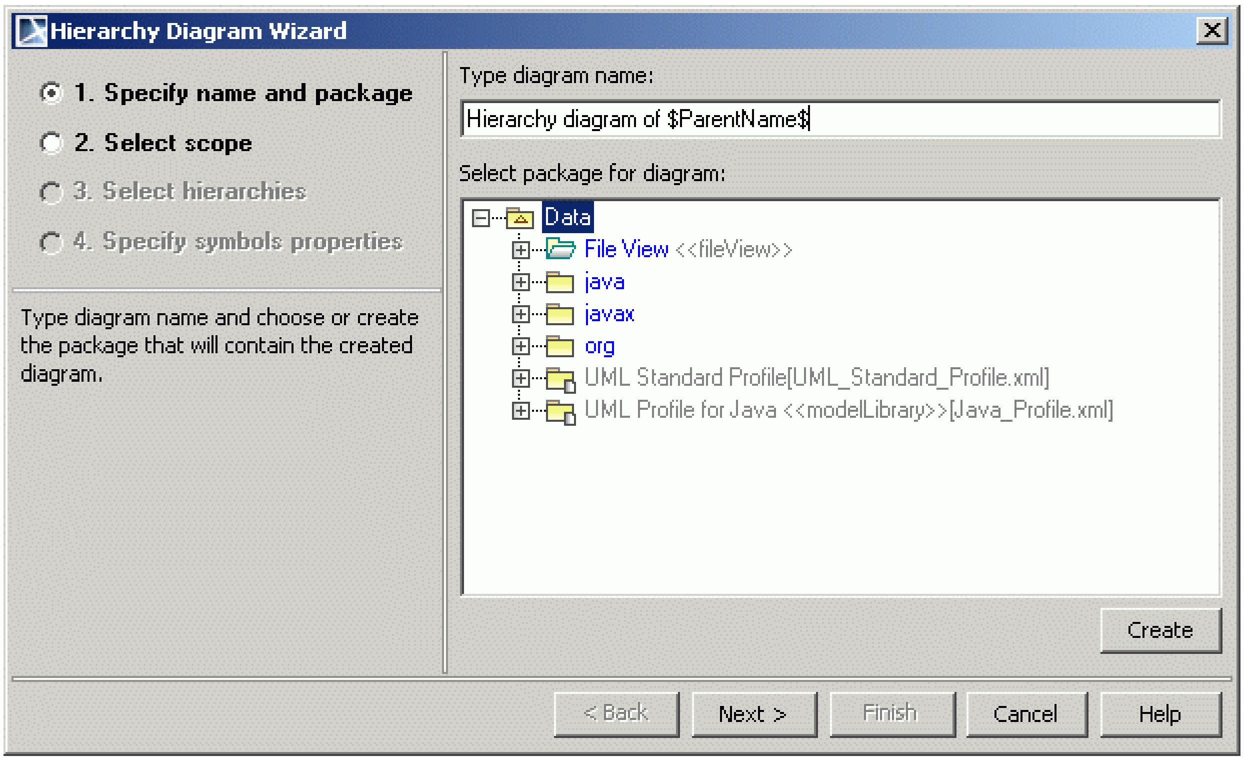
NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The **Hierarchy Diagram Wizard** collects the largest hierarchies and allows every of them to be displayed as separate diagrams or all in one diagram.

To start the **Hierarchy Diagram Wizard**

- From the **Diagrams** main menu, select the **Diagram Wizards** command and then **Hierarchy Diagram Wizard**.
- From the **Analyze** menu, select the **Model Visualizer** command. The **Model Visualizer** dialog box opens. From the wizards list, select the **Hierarchy Diagram Wizard**.

- From the model element shortcut menu, select **Tools** and then **Hierarchy Diagram Wizard**.


Hierarchy Diagram Wizard
1. Specify name and package
2. Select scope
3. Select hierarchies
4. Specify symbols properties
Data
File View <<fileView>>
java
javax
org
UML Standard Profile[UML_Standard_Profile.xml]
UML Profile for Java <<modelLibrary>>[Java_Profile.xml]
Create
< Back
Next >
Finish
Cancel
Help

Type diagram name and choose or create the package that will contain the created diagram.

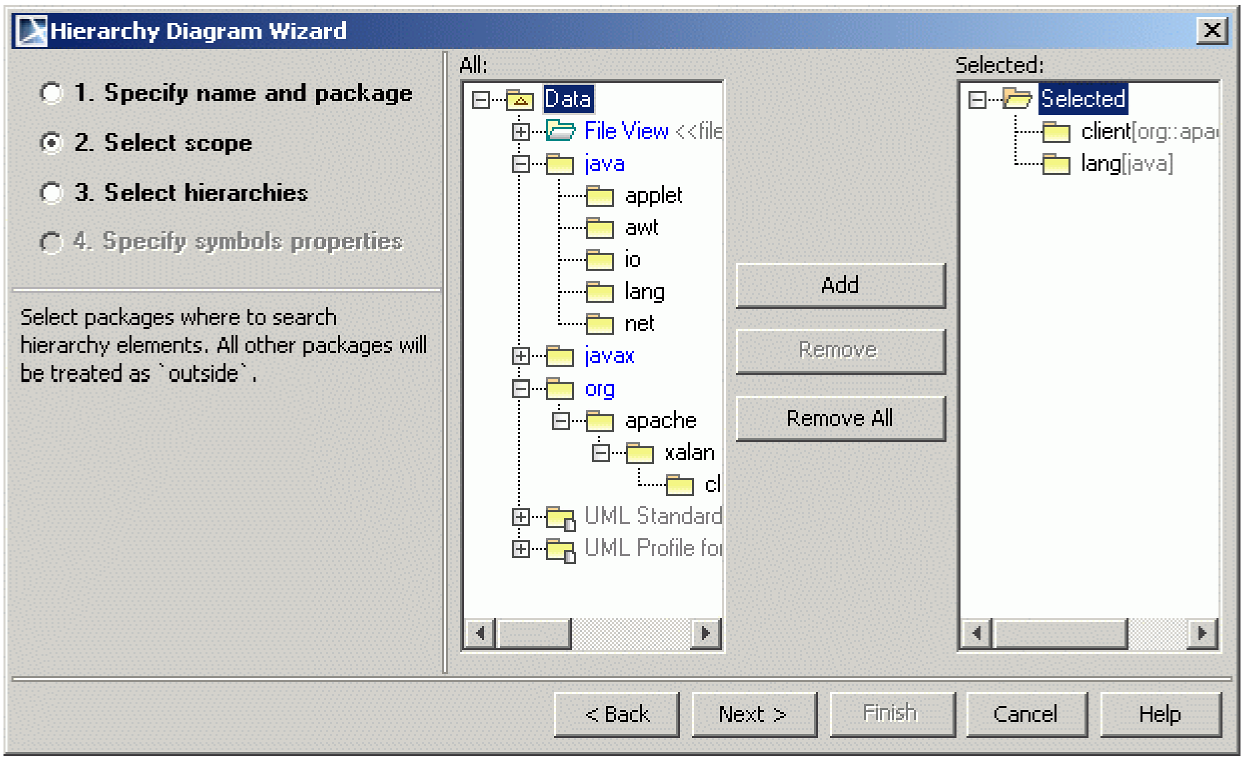
Type diagram name: Hierarchy diagram of $ParentName$

Select package for diagram:

Figure 350 -- Hierarchy Diagram Wizard. Specify Name and Package

Type a name for the new diagram in the **Type diagram name** field.

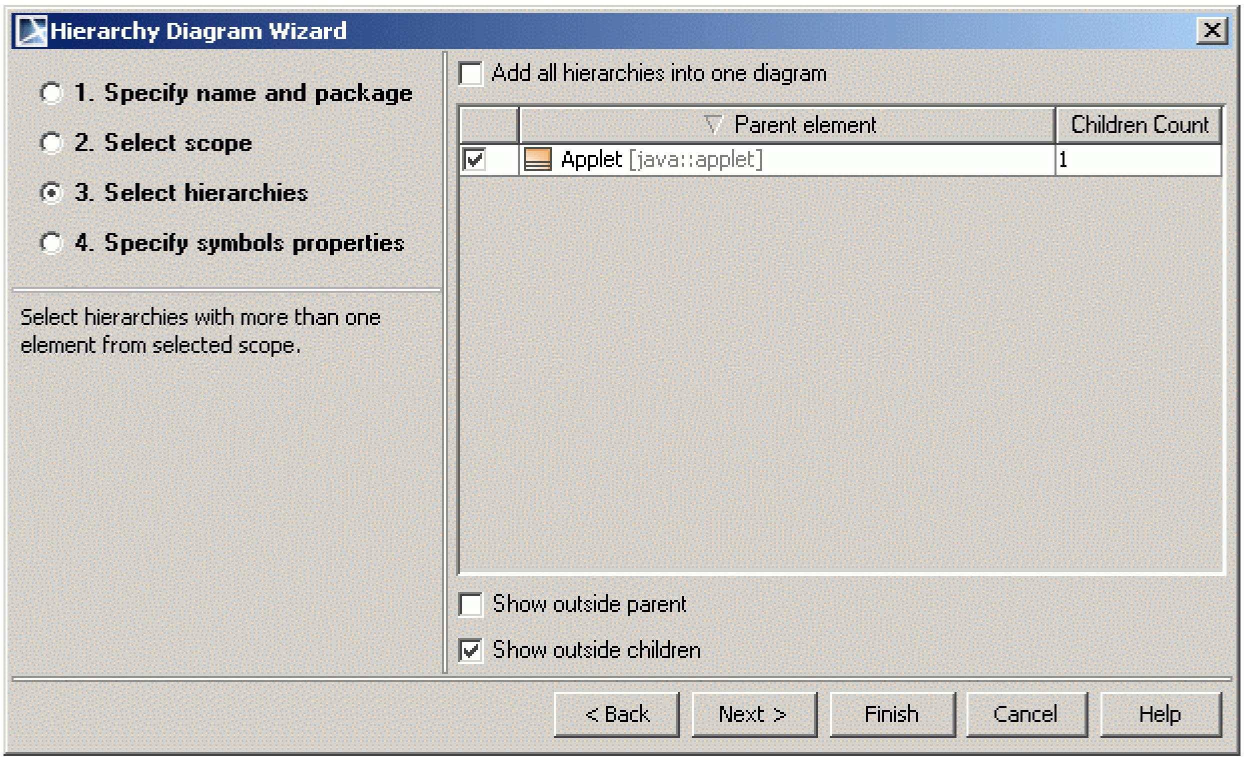
Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select package for diagram** list window. Select the package that will be the parent for the newly created diagram from the Data tree or create a new package by clicking the **Create** button.



Select packages where to search hierarchy elements. All other packages will be treated as `outside`.

Figure 351 -- Hierarchy Diagram Wizard. Select Scope

Select packages from the **All** list to the **Selected** list.


Hierarchy Diagram Wizard

- 1. Specify name and package
- 2. Select scope
- [✓ 3. Select hierarchies]
- 4. Specify symbols properties

Select hierarchies with more than one element from selected scope.

☐ Add all hierarchies into one diagram

	Parent element	Children Count
✓	Applet [java::applet]	1

☐ Show outside parent

☑ Show outside children

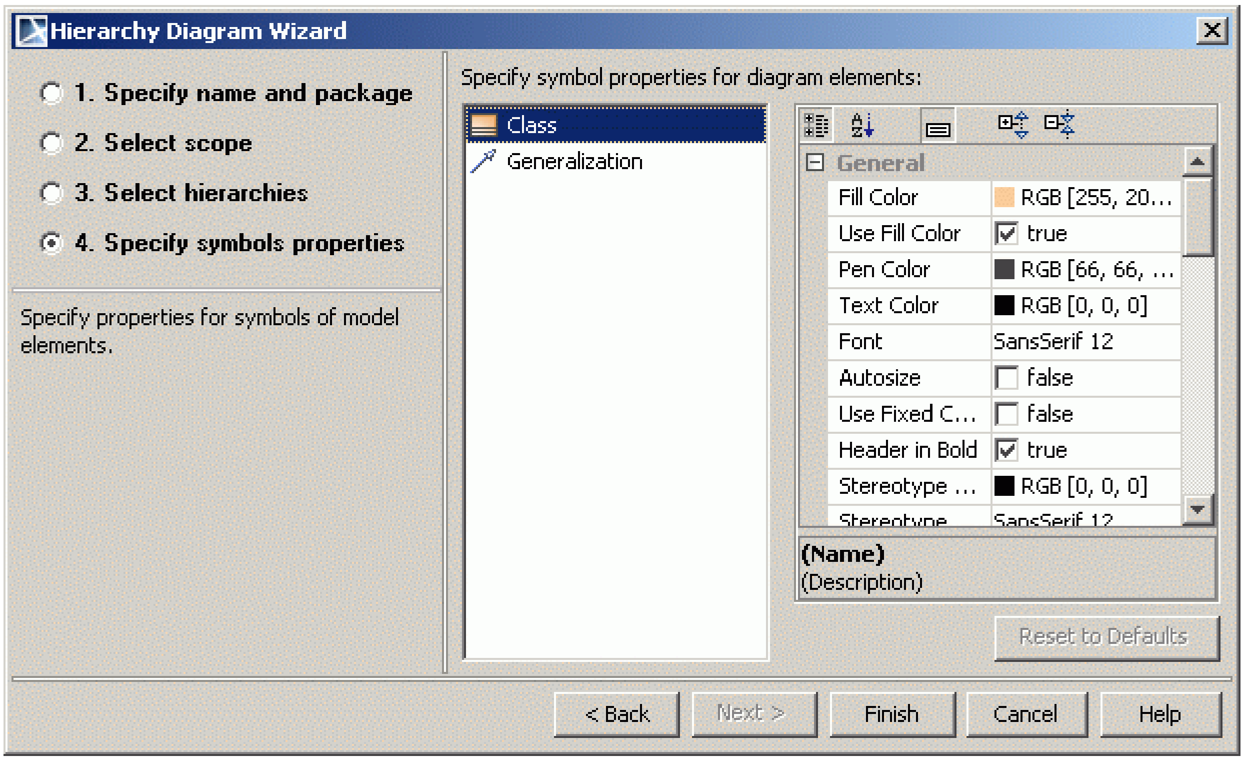
Figure 352 -- Hierarchy Diagram Wizard. Select Hierarchies.

The **Add all hierarchies into one diagram** check box creates only one diagram for all selected hierarchies. This option is enabled only if the selected hierarchies can be added into one diagram (the same diagram type).

All available hierarchies are listed in the **Parent Element** column. In the **Children Count** column, the number of model elements is presented.

The **Show outside parent** check box shows hierarchies, when derived packages are in the scope, but specializations is from outside the scope.

The **Show outside children** check box counts outside derived elements from the displayed hierarchies. Otherwise the hierarchy will not be fully displayed and the diagram may be not valid.



Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

- Class
- Generalization

General	
Fill Color	RGB [255, 20...
Use Fill Color	✓ true
Pen Color	RGB [66, 66, ...
Text Color	RGB [0, 0, 0]
Font	SansSerif 12
Autosize	false
Use Fixed C...	false
Header in Bold	✓ true
Stereotype ...	RGB [0, 0, 0]
Stereotype	SansSerif 12

(Name)
(Description)

Figure 353 -- Hierarchy Diagram Wizard. Specify Symbols Properties

Select options for representing elements in the diagram.

Realization Diagram Wizard

NOTE	This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

The **Realization Diagram Wizard** shows a table of the largest element groups that realize some interface.

To start the **Realization Diagram Wizard**

- From the **Diagrams** main menu, select the **Diagram Wizards** command and then **Realization Diagram Wizard.**
- From the **Analyze** menu, select the **Model Visualizer** command. The **Model Visualizer** dialog box opens. From the wizards list, select the **Realization Diagram Wizard**.

- From the model element shortcut menu, select **Tools** and then **Realization Diagram Wizard**.

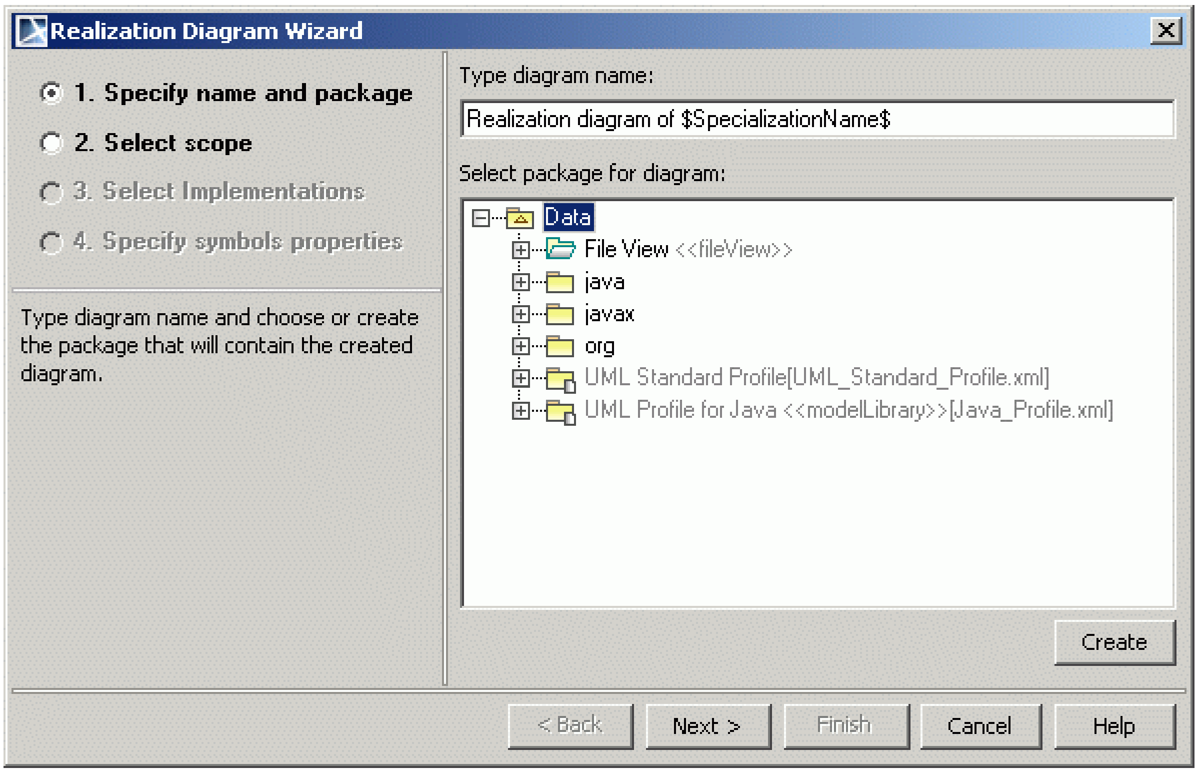

Realization Diagram Wizard
1. Specify name and package
2. Select scope
3. Select Implementations
4. Specify symbols properties
Type diagram name and choose or create the package that will contain the created diagram.
Type diagram name:
Realization diagram of $SpecializationName$
Select package for diagram:
Data
File View <<fileView>>
java
javax
org
UML Standard Profile[UML_Standard_Profile.xml]
UML Profile for Java <<modelLibrary>>[Java_Profile.xml]
Create
< Back
Next >
Finish
Cancel
Help

Figure 354 -- Realization Diagram Wizard. Specify Name and Package

Type a name for the new diagram in the **Type diagram name** field.

Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select package for diagram** list window. Select the package that will be the parent for the newly created diagram from the Data tree or create a new package by clicking the **Create** button.

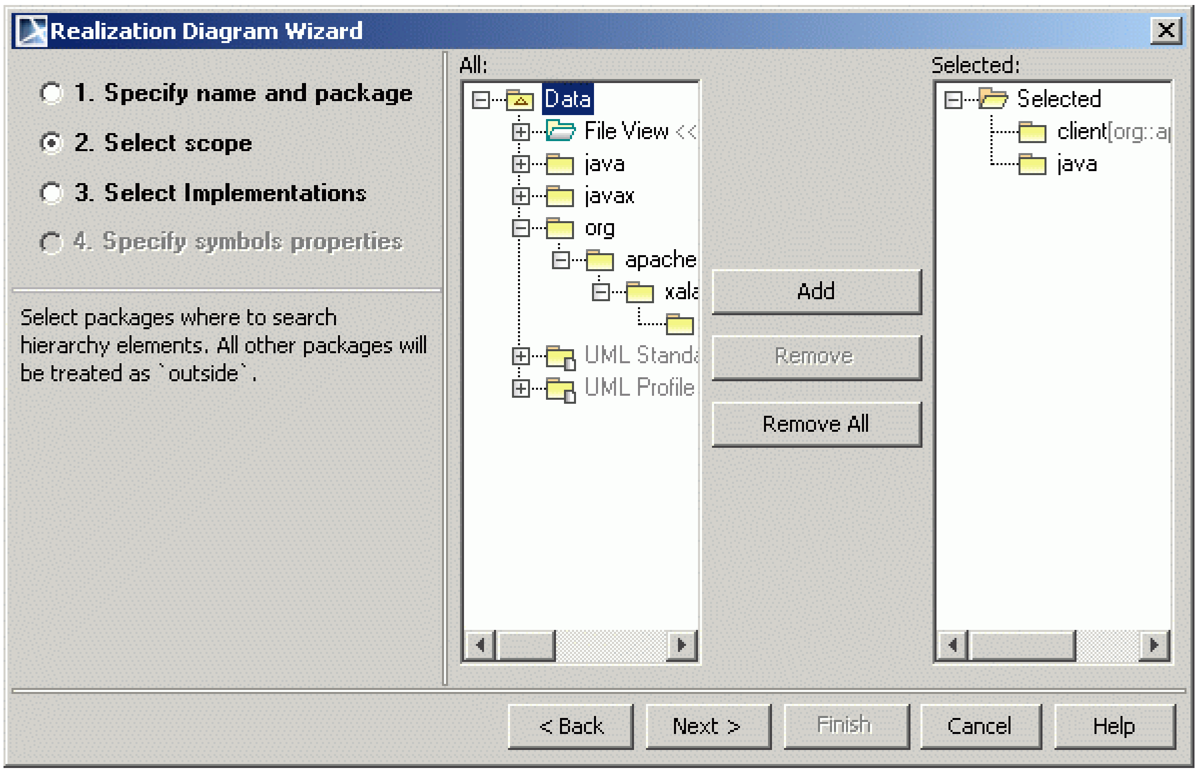
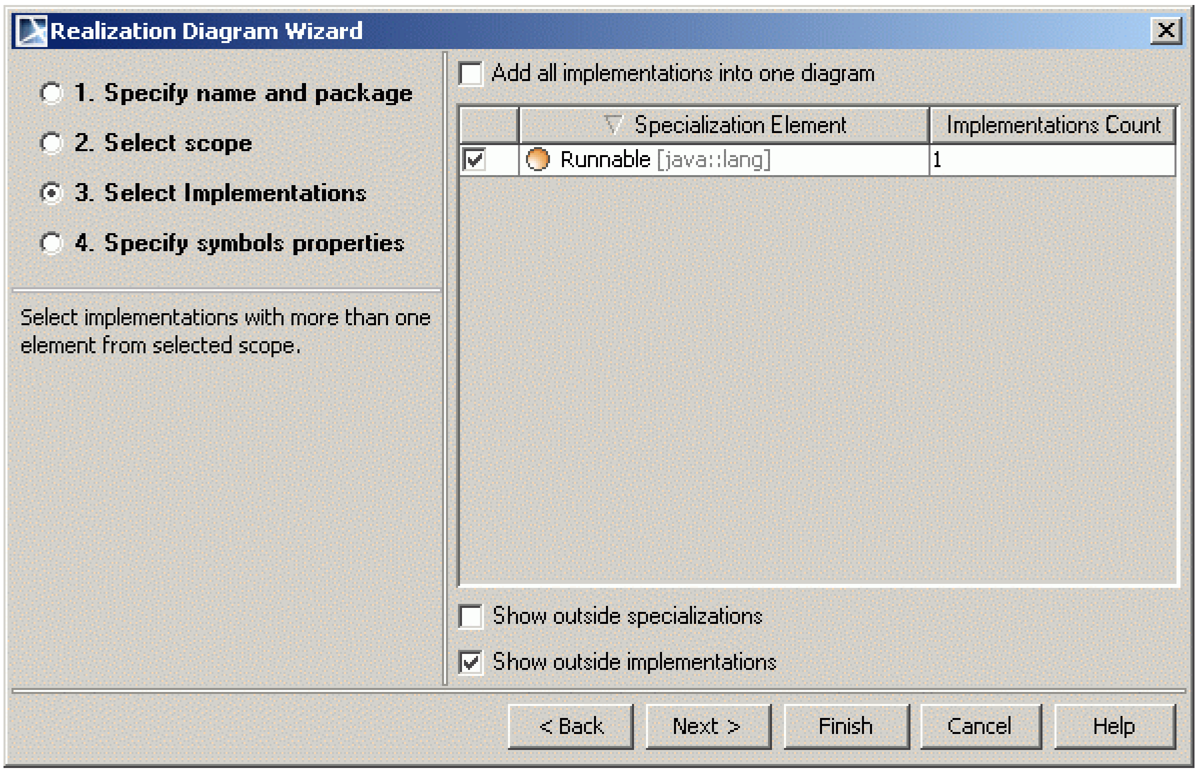

Realization Diagram Wizard
1. Specify name and package
2. Select scope
3. Select Implementations
4. Specify symbols properties
Select packages where to search hierarchy elements. All other packages will be treated as `outside`.
All:
Data
File View <<
java
javax
org
apache
xala
UML Standa
UML Profile
Add
Remove
Remove All
Selected:
Selected
client[org::a
java
< Back
Next >
Finish
Cancel
Help

Figure 355 -- Realization Diagram Wizard. Select Scope

Select packages from the **All** list and add them to the **Selected** list to search for hierarchy elements.



Realization Diagram Wizard

( ) 1. Specify name and package
( ) 2. Select scope
(•) 3. Select Implementations
( ) 4. Specify symbols properties

Select implementations with more than one element from selected scope.

☐ Add all implementations into one diagram

	Specialization Element	Implementations Count
✓	Runnable [java::lang]	1

☐ Show outside specializations
☑ Show outside implementations

< Back | Next > | Finish | Cancel | Help

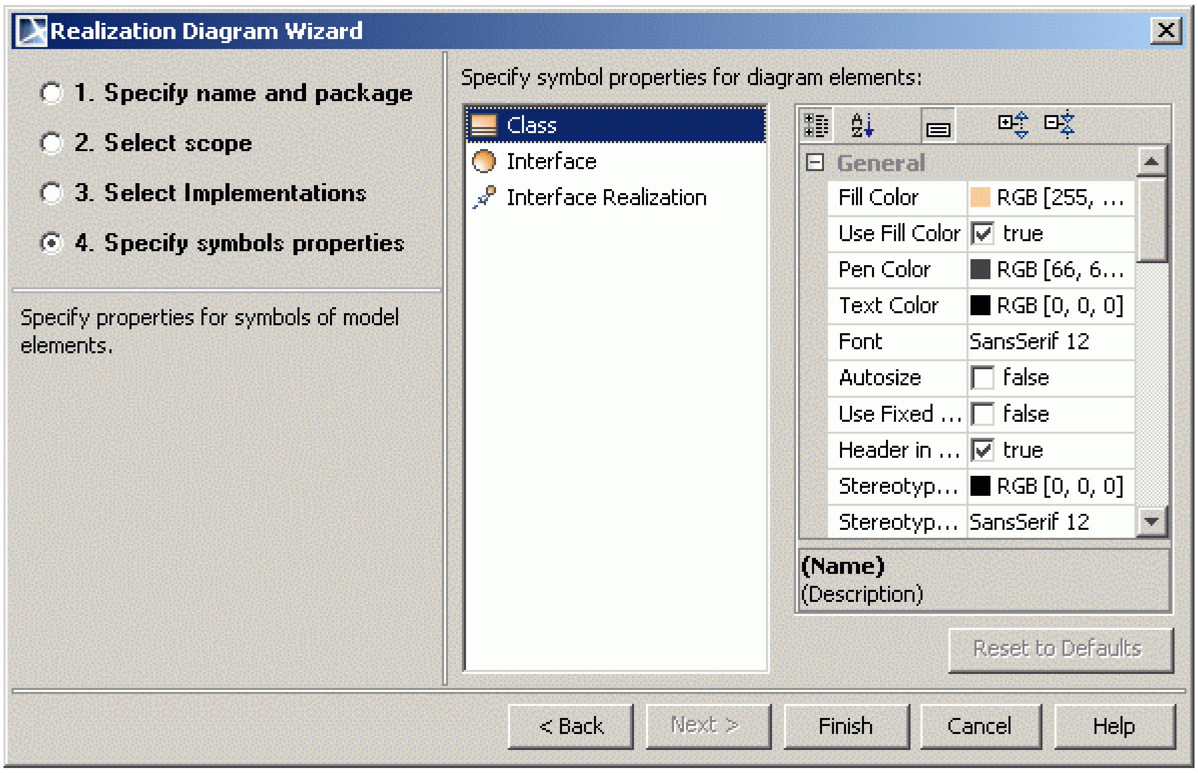
Figure 356 -- Realization Diagram Wizard. Select Implementations

The **Add all implementations into one diagram** check box creates only one diagram for all selected realizations. This option is enabled only if the selected realizations can be added into one diagram (the same diagram type).

All available implementations are listed in the **Specialization Element** column. In the **Implementations Count** column, the number of model elements is presented.

The **Show outside specializations** check box show realizations, when derived interfaces are in the scope, but specializations is from outside the scope.

The **Show outside implementations** check box count outside derived elements from displayed realizations. Otherwise realization will not be fully displayed and the diagram cannot be valid.


Realization Diagram Wizard
1. Specify name and package
2. Select scope
3. Select Implementations
4. Specify symbols properties
< Back
Next >
Finish
Cancel
Help
Reset to Defaults

Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

Class
Interface
Interface Realization

General

Fill Color	RGB [255, ...
Use Fill Color	✓ true
Pen Color	RGB [66, 6...
Text Color	RGB [0, 0, 0]
Font	SansSerif 12
Autosize	false
Use Fixed ...	false
Header in ...	✓ true
Stereotyp...	RGB [0, 0, 0]
Stereotyp...	SansSerif 12

(Name)
(Description)

Figure 357 -- Realization Diagram Wizard. Specify Symbols Properties

Select options for representing elements in the diagram.

Activity Decomposition Hierarchy Wizard

NOTE This functionality is available in Standard, Professional, Architect, and Enterprise editions only.

Activity Decomposition Hierarchy Wizard allows converting activity into class and SysML Block Definition Diagram. This gives the capability to represent, analyze, and document activity hierarchies in the structure diagrams.

Diagram generation rules:

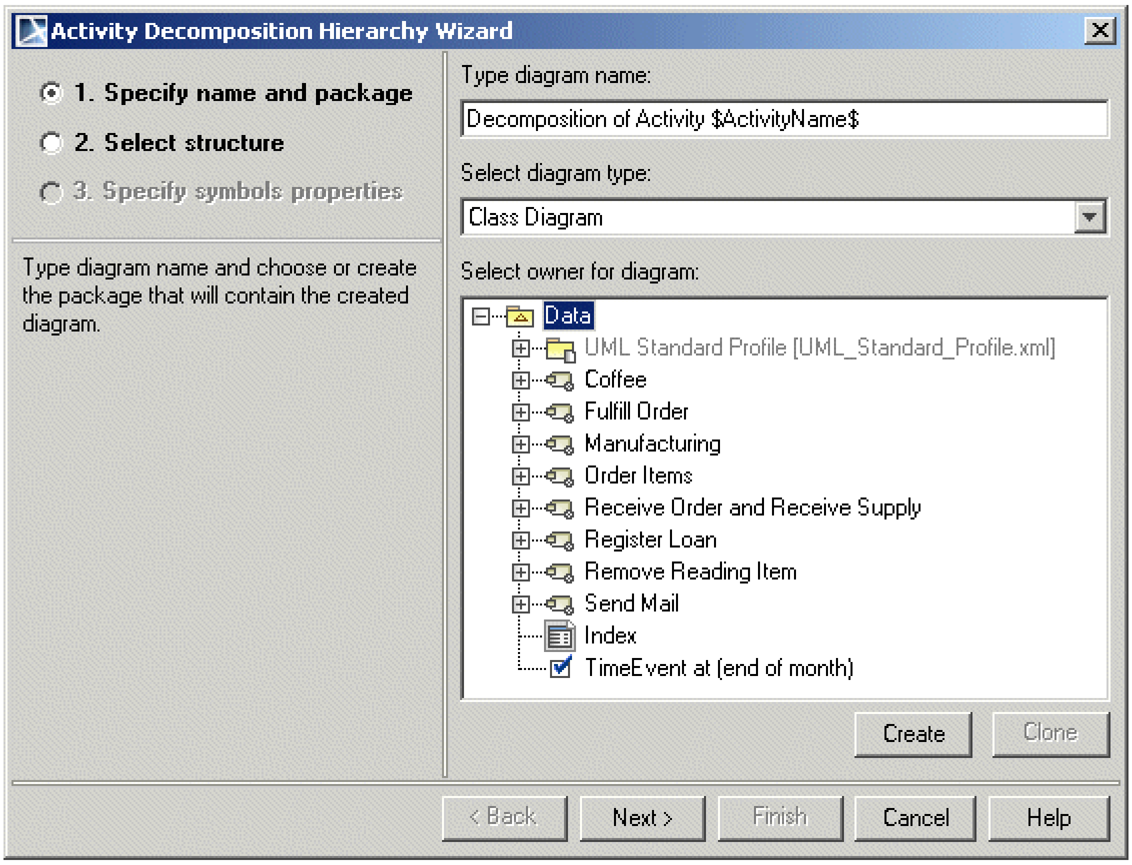
- Behaviors will be connected with contained object node types by compositions. The name of the object node that corresponds to the composition will be used as the end name of the association on the end towards the object node type.
- Pins are not included in the calculation.
- CallBehaviorActions that are not directly in the Activity, but are in the Structured Activity Nodes contained by the Activity, for example, are also included in the calculation.
- Activity will be connected by composition association with other behaviors that are called by CallBehaviorActions. The part end name must be the same as the name of a CallBehaviorAction in the composing activity. If the action has no name, then the end name is as same as that of the invoked activity.
- Hierarchical layout - Top to Bottom is used to arrange the generated diagram.
- If CallBehaviorAction calls the same activity, the composition to self will be displayed on the generated diagram.

Recursive structure analysis will be stopped after reaching the same behavior, which has already been analyzed. This requirement prevents an endless cycle.

- In such a case, the composition will be created in a previously analyzed activity in the diagram. The new behavior symbol will not be created.
- There will be as many compositions from one activity into another as different CallBehaviorActions call this activity.

To start the **Activity Decomposition Hierarchy Wizard**

- From the **Diagrams** main menu, select the **Diagram Wizards** command and then **Activity Decomposition Hierarchy Wizard**.
- From the **Analyze** menu, select the **Model Visualizer** command. The **Model Visualizer** dialog box opens. From the wizards list, select the **Activity Decomposition Hierarchy Wizard**.



Activity Decomposition Hierarchy Wizard

1. Specify name and package
2. Select structure
3. Specify symbols properties

Type diagram name and choose or create the package that will contain the created diagram.

Type diagram name: Decomposition of Activity $ActivityName$

Select diagram type: Class Diagram

Select owner for diagram:

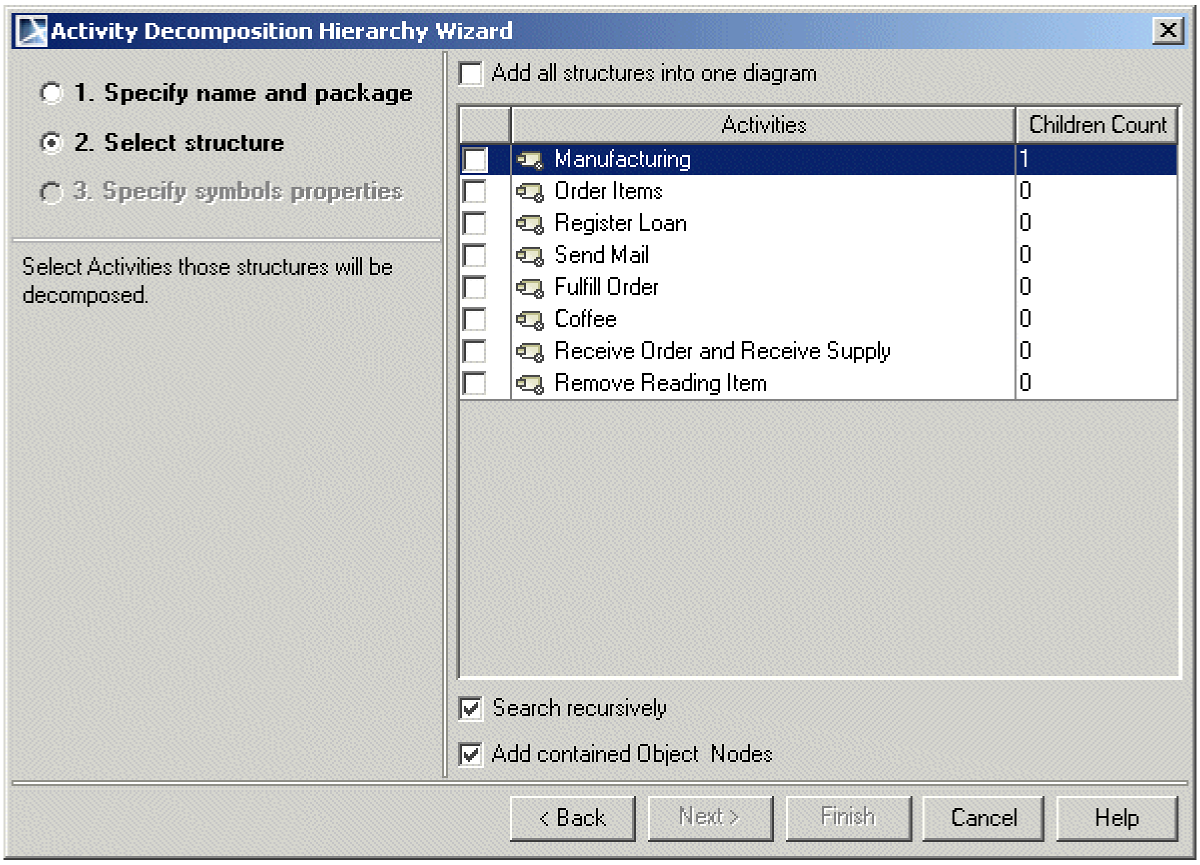
- Data
  - UML Standard Profile [UML_Standard_Profile.xml]
  - Coffee
  - Fulfill Order
  - Manufacturing
  - Order Items
  - Receive Order and Receive Supply
  - Register Loan
  - Remove Reading Item
  - Send Mail
  - Index
  - TimeEvent at (end of month)

Figure 358 -- Activity Decomposition Hierarchy Wizard. Specify name and package tab

In the **Specify name and package** tab, type the diagram name, select the diagram type the activity will be converted and select or create a package that will contain the desired activity diagram.

NOTE	If you are using the SysML plugin, SysML Block Definition and Class diagrams are available as diagram types. For other domains this list depends on a plug-in of those domains.

.


Activity Decomposition Hierarchy Wizard

( ) 1. Specify name and package
(●) 2. Select structure
( ) 3. Specify symbols properties

Select Activities those structures will be decomposed.

☐ Add all structures into one diagram

	Activities	Children Count
☐	Manufacturing	1
☐	Order Items	0
☐	Register Loan	0
☐	Send Mail	0
☐	Fulfill Order	0
☐	Coffee	0
☐	Receive Order and Receive Supply	0
☐	Remove Reading Item	0

☑ Search recursively

☑ Add contained Object Nodes

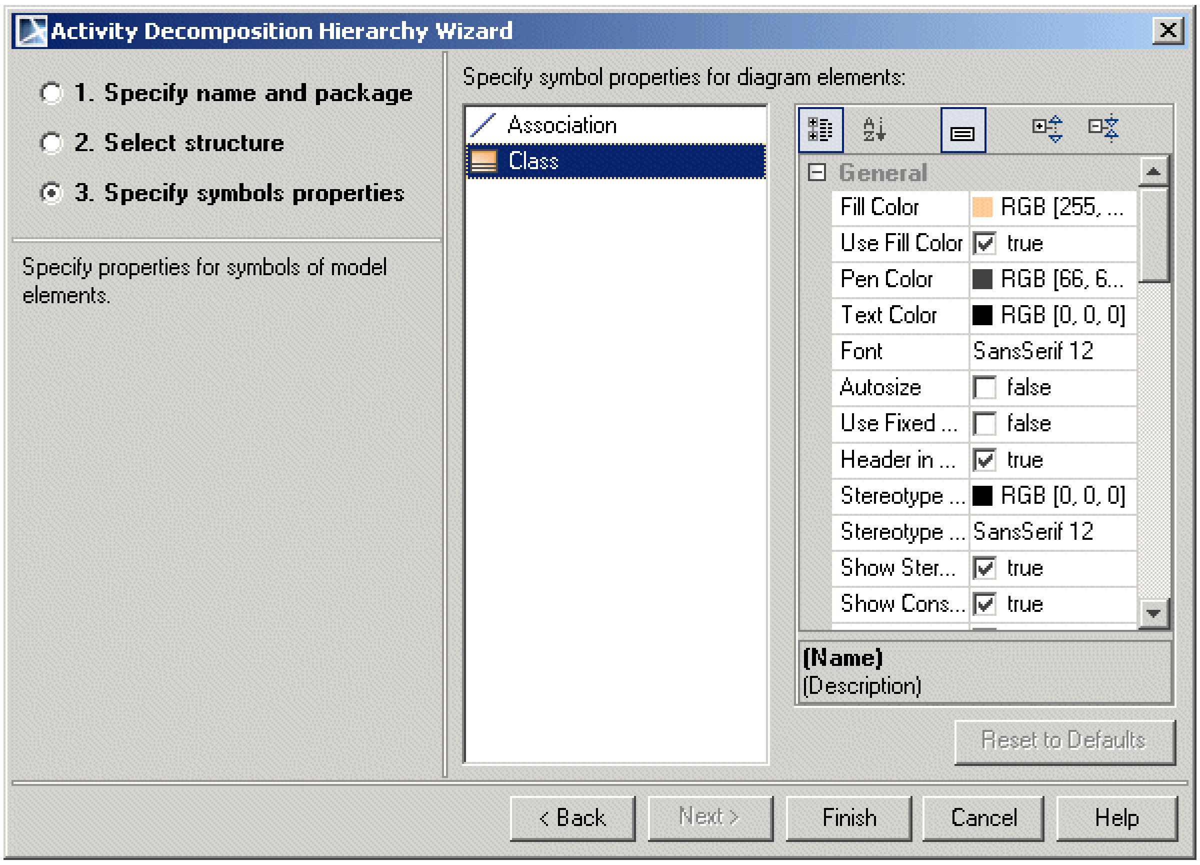
Figure 359 -- Activity Decomposition Hierarchy Wizard. Select structure tab

In the **Select structure** tab, select Activities structures that will be decomposed.

To add all activity structures into one diagram, select **Add all structures into one diagram** check box.

Select check boxes of the desired activity structures. The **Children Count** column shows the number of included behaviors (also owned object nodes if the **Add contained Object Nodes** check box is selected). The number also depends on the option **Search recursively**.

- The **Add contained Object Nodes** check box is selected by default. If selected, types of object nodes are displayed and connected to the composition with activities containing object nodes.
- The **Search recursively check box** is selected by default:
  - If not selected, the search will be conducted in only one level of the selected activity.
  - If selected, the search will be conducted in the selected activity and those activities that are invoked by CallBehaviorActions that are in the selected activity. This search is recursive.


Activity Decomposition Hierarchy Wizard

1. Specify name and package
2. Select structure
[✓ 3. Specify symbols properties]

Specify properties for symbols of model elements.

Specify symbol properties for diagram elements:

Association
Class

General

Fill Color	RGB [255, ...
Use Fill Color	✓ true
Pen Color	RGB [66, 6...
Text Color	RGB [0, 0, 0]
Font	SansSerif 12
Autosize	false
Use Fixed ...	false
Header in ...	✓ true
Stereotype ...	RGB [0, 0, 0]
Stereotype ...	SansSerif 12
Show Ster...	✓ true
Show Cons...	✓ true

(Name)
(Description)

Figure 360 -- Activity Decomposition Hierarchy Wizard. Specify symbols properties tab

Specify properties for symbols for model elements.

Content Diagram Wizard

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

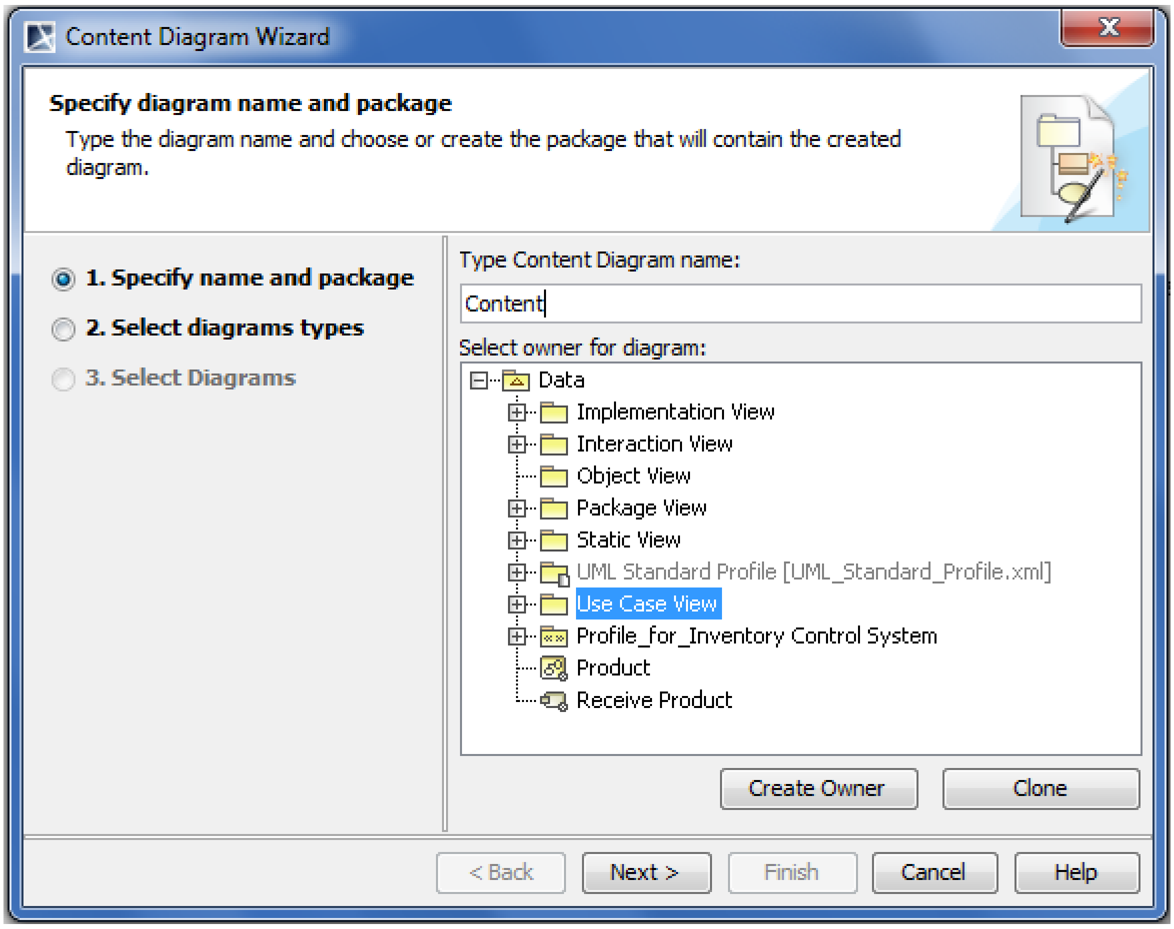
The **Content Diagram Wizard** generates content of diagrams that are used in the project.

To start the **Content Diagram Wizard**

Do one of the following:

- On the main menu select **Diagrams** > **Diagram Wizards** > **Content Diagram Wizard**.

- On the main menu select **Analyze** > **Model Visualizer**. The **Model Visualizer** dialog opens. Click **Content Diagram Wizard** in the wizards list and then click the **Start** button.


Content Diagram Wizard

Specify diagram name and package
Type the diagram name and choose or create the package that will contain the created diagram.

Type Content Diagram name: Content

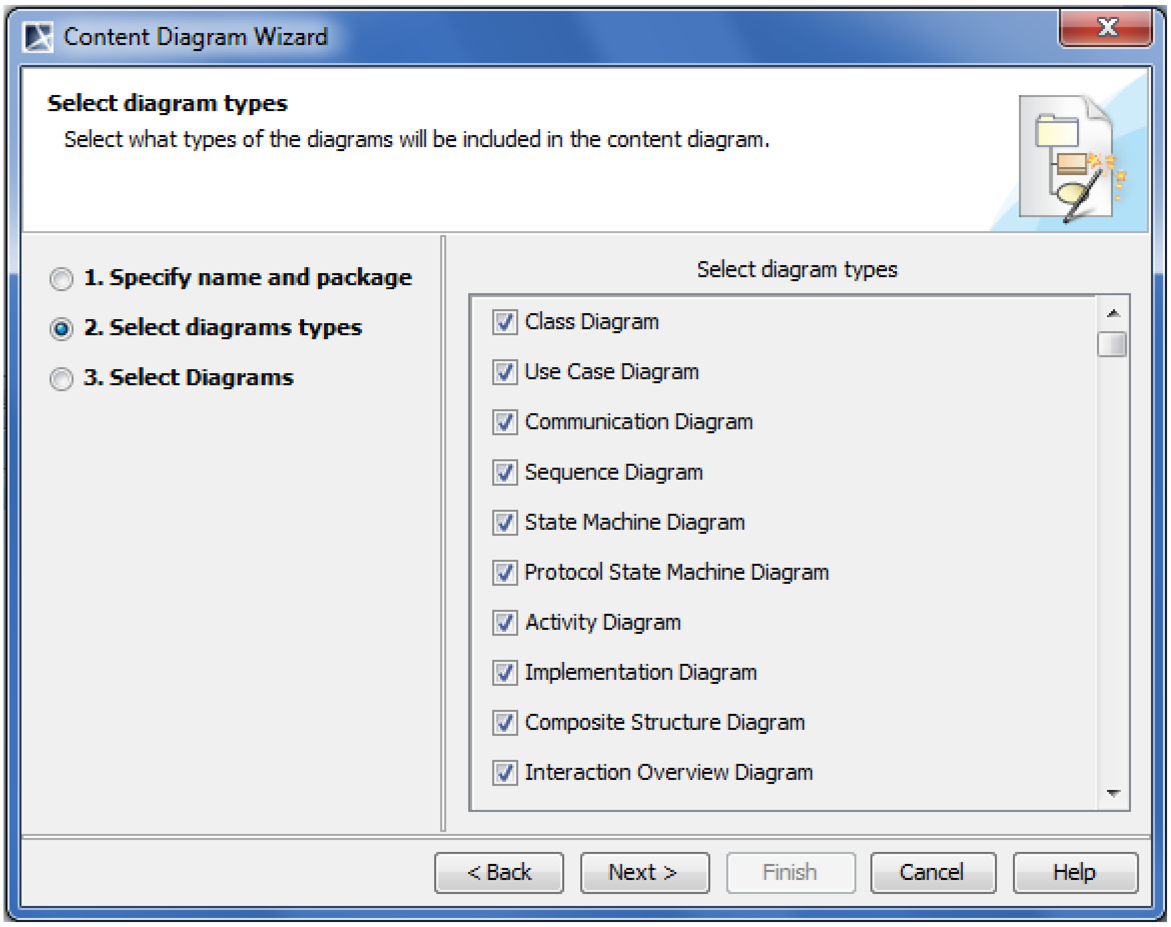
Select owner for diagram:
Data
Implementation View
Interaction View
Object View
Package View
Static View
UML Standard Profile [UML_Standard_Profile.xml]
Use Case View
Profile_for_Inventory Control System
Product
Receive Product

Figure 361 -- Content Diagram Wizard. Specifying name and package

Type a name for the new diagram in the **Type Content Diagram name** box.

Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select owner for diagram** tree. You can select the existing package or create a new one by clicking the **Create Owner** button, or copy the selected package with all its content by clicking the **Clone** button.

Click **Next** or choose the **Select diagram types** option for futher steps.


Content Diagram Wizard

Select diagram types

Select what types of the diagrams will be included in the content diagram.

- ○ 1. Specify name and package
- ● 2. Select diagrams types
- ○ 3. Select Diagrams

Select diagram types

- ✓ Class Diagram
- ✓ Use Case Diagram
- ✓ Communication Diagram
- ✓ Sequence Diagram
- ✓ State Machine Diagram
- ✓ Protocol State Machine Diagram
- ✓ Activity Diagram
- ✓ Implementation Diagram
- ✓ Composite Structure Diagram
- ✓ Interaction Overview Diagram

Figure 362 -- Content Diagram Wizard. Selecting diagram types

Select the types of diagrams to be included in the content diagram. Then click **Next** or choose the **Select Diagrams** option.

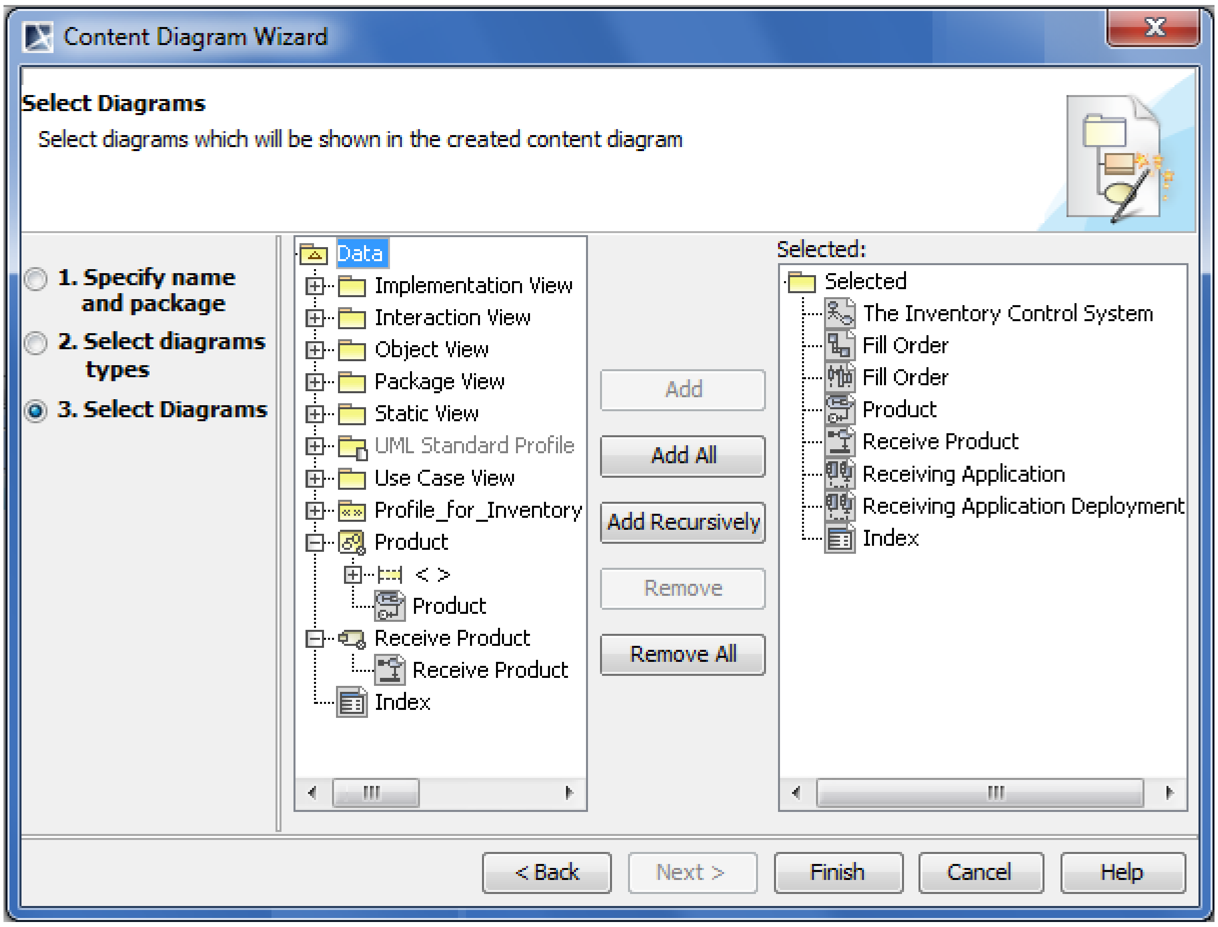


Figure 363 -- Content Diagram Wizard. Selecting diagrams

Select diagrams to be included in the content diagram and click **Finish**. The content diagram is now created.

Sequence Diagram from Java Source Wizard

NOTE	This feature is available only in the Enterprise edition.

The **Sequence Diagram from Java Source Wizard** allows for visualizing Java method implementation within UML Sequence diagrams. Though UML Sequence diagrams cannot show Java code with 100% accuracy yet, MagicDraw provides a mechanism for generating a diagram that reflects the essence of Java method content.

If you want to create a sequence diagram from the Java source, first of all you need to reverse the Java source code to a model. For the reverse procedure please refer to Section “Reverse” in “MagicDraw Code Engineering UserGuide.pdf”.

You can also to create a model corresponding to your Java code structure manually.

IMPORTANT!	Be sure, the model you use to create a sequence diagram fully corresponds the Java source code you want to represent in the diagram.

One sequence diagram can represent one method in a Java code. Classes are represented as lifelines, and method calls are represented as messages in the diagram. The sequence diagram can also be used to visualize dependencies for all classes used in this method.

To open the **Sequence Diagram from Java Source Wizard**

- Via the **Model Visualizer** dialog:
    1. From the main menu, select **Analyze** > **Model Visualizer**. The **Model Visualizer** dialog opens.
    2. In the dialog, select **Sequence Diagram from Java Source Wizard**.
    3. Click **Start**. The **Sequence Diagram from Java Source Wizard** opens.
- Via the **Diagram Wizards** submenu:
    1. From the main menu, select **Diagrams** > **Diagram Wizards** > **Sequence Diagram from Java Source Wizard**.
- In a manually created model:
    1. Create a class with an operation.
    2. Create a new Java code engineering set and drag the class to this set.
    3. Select the operation in any of the following places: the Containment tree, the Code engineering sets tree, or a message on a diagram pane with that operation assigned. How to assign an operation to a message, see Section "Assigning operations to messages" on page 711.
    4. Right-click the selected operation and, from the shortcut menu, select **Reverse Implementation**.

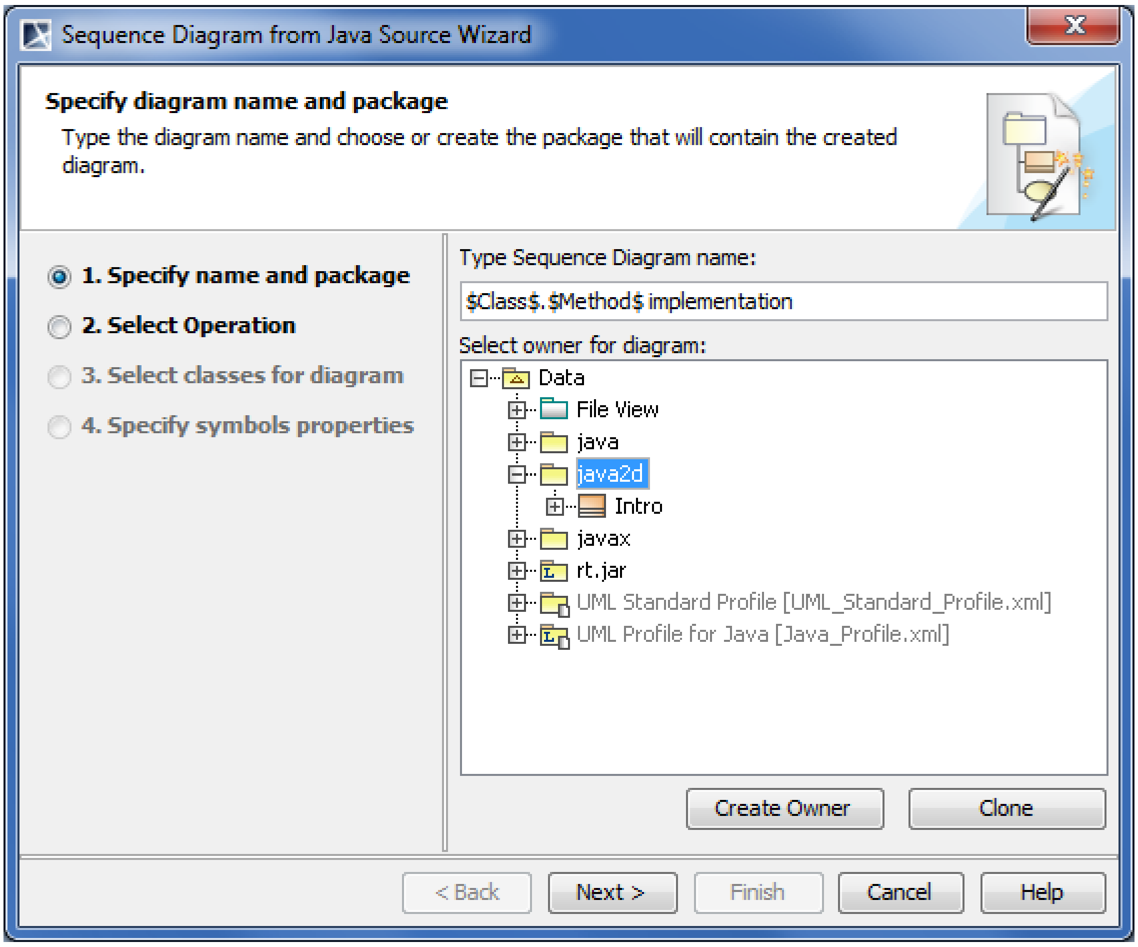
Creating sequence diagram from Java source

The **Sequence Diagram from Java Source Wizard** consists of these four steps:

- The diagram name and package specification
- The selection of an operation
- The selection of classes for the diagram
- The symbol properties specification

STEP #1: The diagram name and package specification

This step allows for specifying diagram name and selecting or creating a new owning package for the diagram.



Sequence Diagram from Java Source Wizard

Specify diagram name and package

Type the diagram name and choose or create the package that will contain the created diagram.

- [● 1. Specify name and package]
- 2. Select Operation
- 3. Select classes for diagram
- 4. Specify symbols properties

Type Sequence Diagram name: $Class$.$Method$ implementation

Select owner for diagram:

```
Data
  File View
  java
  java2d
    Intro
  javax
  rt.jar
  UML Standard Profile [UML_Standard_Profile.xml]
  UML Profile for Java [Java_Profile.xml]
```

Selected: java2d

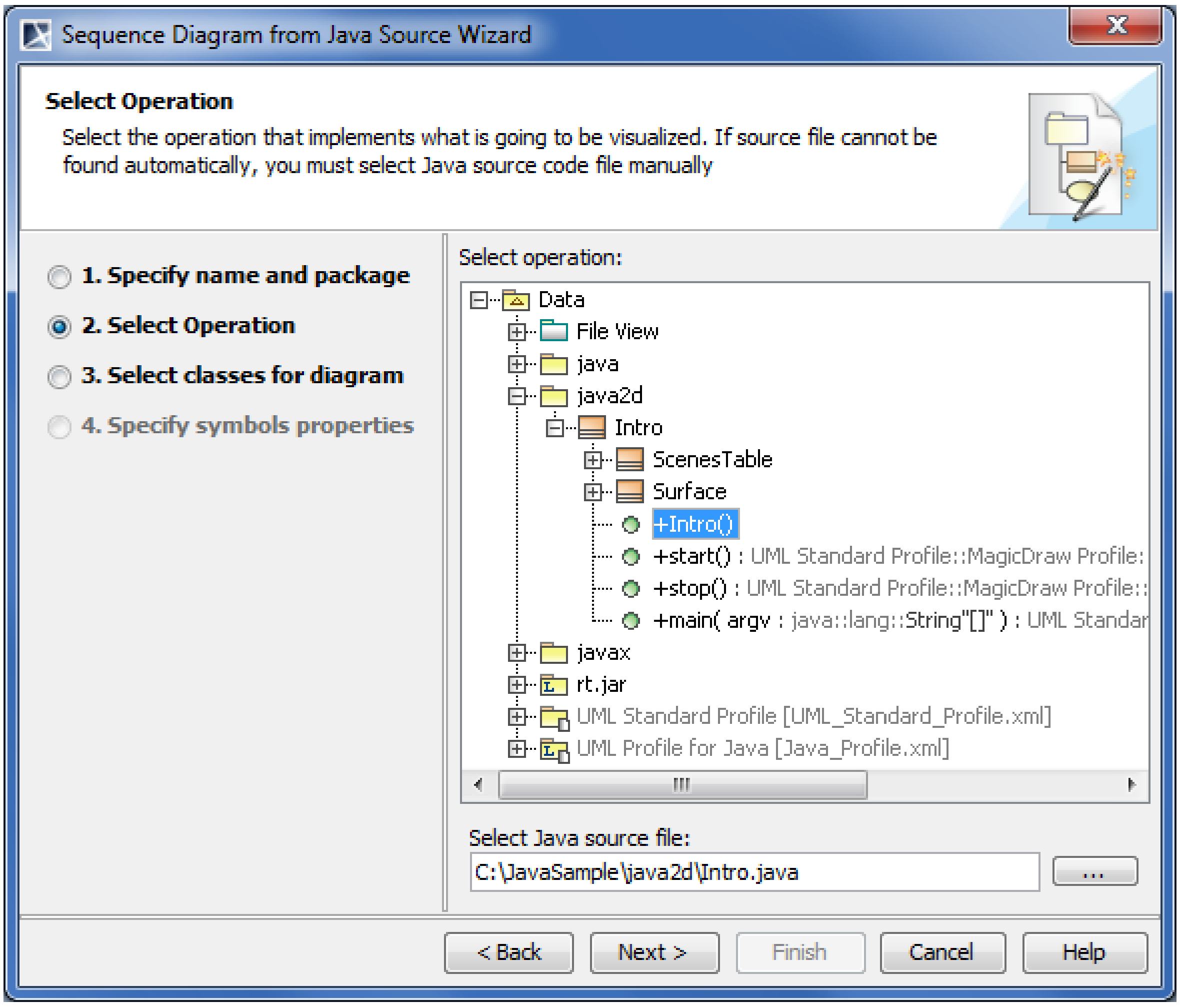
Figure 364 -- Sequence Diagram from Java Source Wizard. Specifying name and package

In the **Type Sequence Diagram name** box, type a name for the new sequence diagram.

Select the package that will contain the created diagram. The hierarchy of UML model packages is displayed in the **Select owner for diagram** dialog. Select the package that will be the owner for the newly created diagram, or create a new package by clicking **Create Owner** or **Clone**. For more information about an element creation refer to Section "Element creation mode" on page 281.

STEP #2: The selection of an operation

This step is designed to select the operation that will be displayed in the sequence diagram and the Java source file for constructing the diagram.


Sequence Diagram from Java Source Wizard

Select Operation

Select the operation that implements what is going to be visualized. If source file cannot be found automatically, you must select Java source code file manually

1. Specify name and package
2. Select Operation
3. Select classes for diagram
4. Specify symbols properties

Select operation:

```
Data
  File View
  java
  java2d
    Intro
      ScenesTable
      Surface
      +Intro()
      +start() : UML Standard Profile::MagicDraw Profile:
      +stop() : UML Standard Profile::MagicDraw Profile::
      +main( argv : java::lang::String"[]" ) : UML Standar
  javax
  rt.jar
  UML Standard Profile [UML_Standard_Profile.xml]
  UML Profile for Java [Java_Profile.xml]
```

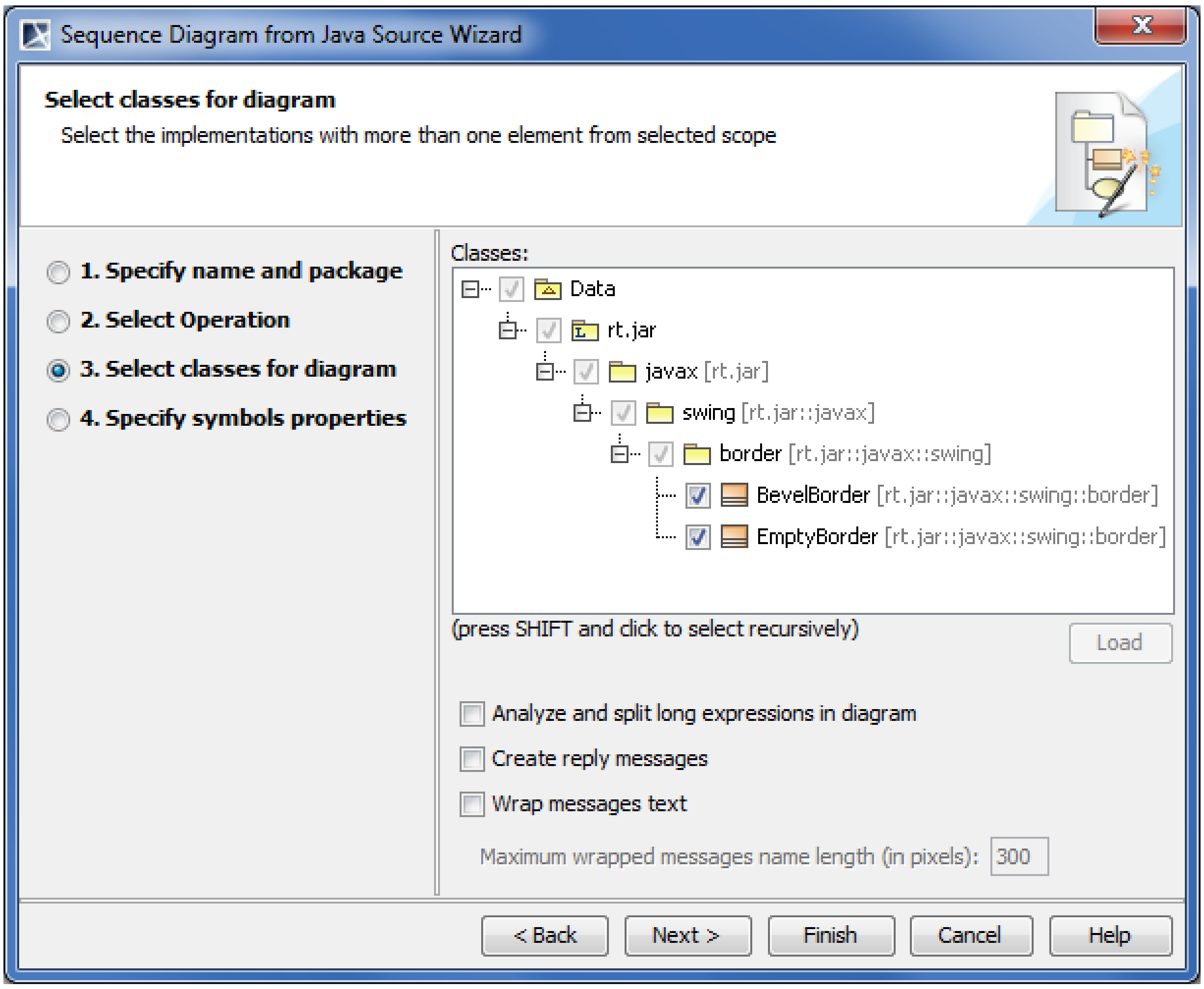
Select Java source file: C:\JavaSample\java2d\Intro.java

Figure 365 -- Sequence Diagram from Java Source Wizard. Selecting operation

When you start the wizard from either the operation shortcut menu or the Sequence diagram, both the operation and the Java source file are selected by default. If the Java source file cannot be found automatically, specify it in the **Select Java source file** box.

STEP #3: The selection of classes for the diagram

This step allows for selecting classes to represent them in a diagram.



Sequence Diagram from Java Source Wizard

Select classes for diagram

Select the implementations with more than one element from selected scope

1. Specify name and package
2. Select Operation
3. Select classes for diagram
4. Specify symbols properties

Classes:

- Data
  - rt.jar
    - javax [rt.jar]
      - swing [rt.jar::javax]
        - border [rt.jar::javax::swing]
          - [✓] BevelBorder [rt.jar::javax::swing::border]
          - [✓] EmptyBorder [rt.jar::javax::swing::border]

(press SHIFT and click to select recursively)

[ ] Analyze and split long expressions in diagram

[ ] Create reply messages

[ ] Wrap messages text

Maximum wrapped messages name length (in pixels): 300

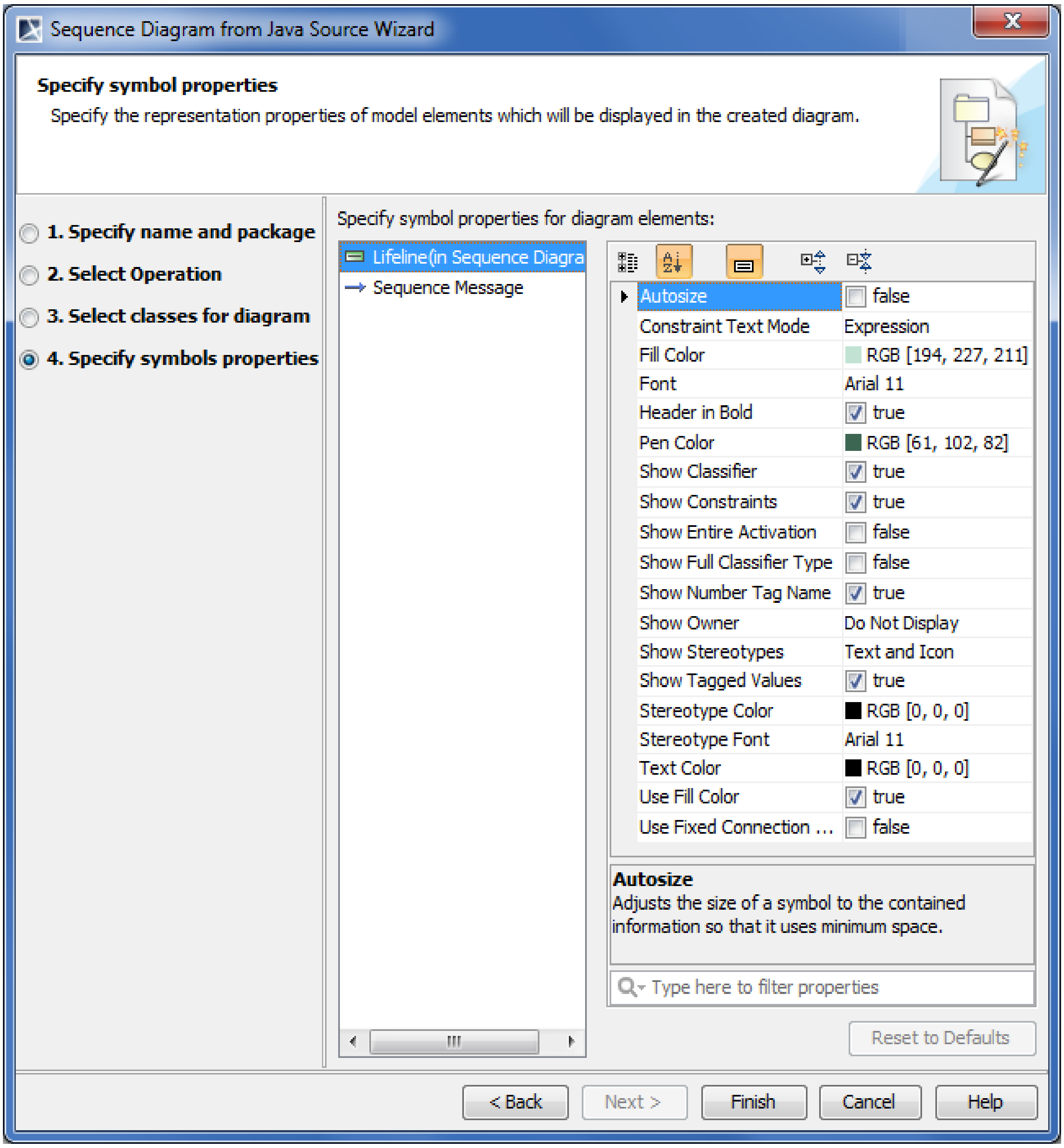
Figure 366 -- Sequence Diagram from Java Source Wizard. Selecting classes for diagram

Check boxes used in this step are described in the following table.

Check box	Description
Analyze and split long expressions in diagram	Select to display every call as a separate call message with a temporary variable initialization, if the expression containing calls cannot be displayed as a call message. In the final expression message, these calls are replaced with appropriate temporary variable names.
Create reply message	Select to display the return message for every call message.
Wrap message text	Select to wrap message text in the diagram. In the **Maximum wrapped messages name length (in pixels)** box, specify the maximum message text length in pixels.

STEP #4: The symbol properties specification

You can select properties for the elements that will be represented in your sequence diagram.



Sequence Diagram from Java Source Wizard

Specify symbol properties
Specify the representation properties of model elements which will be displayed in the created diagram.

1. Specify name and package
2. Select Operation
3. Select classes for diagram
4. Specify symbols properties [✓]

Specify symbol properties for diagram elements:

- Lifeline(in Sequence Diagra
- Sequence Message

Autosize	false
Constraint Text Mode	Expression
Fill Color	RGB [194, 227, 211]
Font	Arial 11
Header in Bold	true
Pen Color	RGB [61, 102, 82]
Show Classifier	true
Show Constraints	true
Show Entire Activation	false
Show Full Classifier Type	false
Show Number Tag Name	true
Show Owner	Do Not Display
Show Stereotypes	Text and Icon
Show Tagged Values	true
Stereotype Color	RGB [0, 0, 0]
Stereotype Font	Arial 11
Text Color	RGB [0, 0, 0]
Use Fill Color	true
Use Fixed Connection ...	false

Autosize
Adjusts the size of a symbol to the contained information so that it uses minimum space.

Figure 367 -- Sequence Diagram from Java Source Wizard. Specifying symbol properties

Extending sequence diagrams

Creating a sequence diagram from a Java code allows for analyzing dependencies between the methods represented on the diagram and the classes they are referencing to and / or the other methods they call for. This means that you can create a sequence diagram for any method selected in the already created sequence diagram.

To create a new sequence diagram for a selected method

1. Select the method (call message with an operation assigned), whose details you want to see.
2. Right-click the message and, from the shortcut menu, select **Reverse Implementation**. The **Sequence Diagram from Java Source Wizard** opens to create a sequence diagram for the selected method.

NOTE	If you have started the wizard via the operation assigned to the message, be aware that in this case the first step of the wizard will be skipped, and the wizard will start from the step #2.

All selected method dependencies will be represented in a newly created diagram.

9 UML DIAGRAMS

In software development, the diagram is the equivalent of a blueprint. To meet the various needs of many parties, we often need several different "blueprints" of the same system. Furthermore, every system is described by many different aspects. For example:

- Functional (static structure and dynamic interactions)
- Nonfunctional (timing requirements, reliability, and deployment)
- Organizational (work organization and mapping to code modules)

MagicDraw supports the following diagrams that are defined in UML 2:

Use Case Diagram
Class Diagram
NEW! Object Diagram
State Machine Diagram
Protocol State Machine Diagram
Activity Diagram
Interaction Overview Diagram
Sequence Diagram
Communication Diagram
NEW! Component Diagram
NEW! Deployment Diagram
NEW! Package Diagram
NEW! Profile Diagram

NEW!
IMPORTANT!

Since MagicDraw version 17.0.1, Component and Deployment diagrams are created instead of the Implementation diagram.

From now on, Implementation diagrams created with earlier MagicDraw versions are realized as the following diagrams:

- Deployment diagram, if node shapes were used in the Implementation diagram.
- Component diagram, if node shapes were not used in the Implementation diagram.

Customized diagrams based on the Implementation diagram are based on the Component diagram now.

Architectural Views

UML defines 13 diagrams that describe 4+1 architectural views:

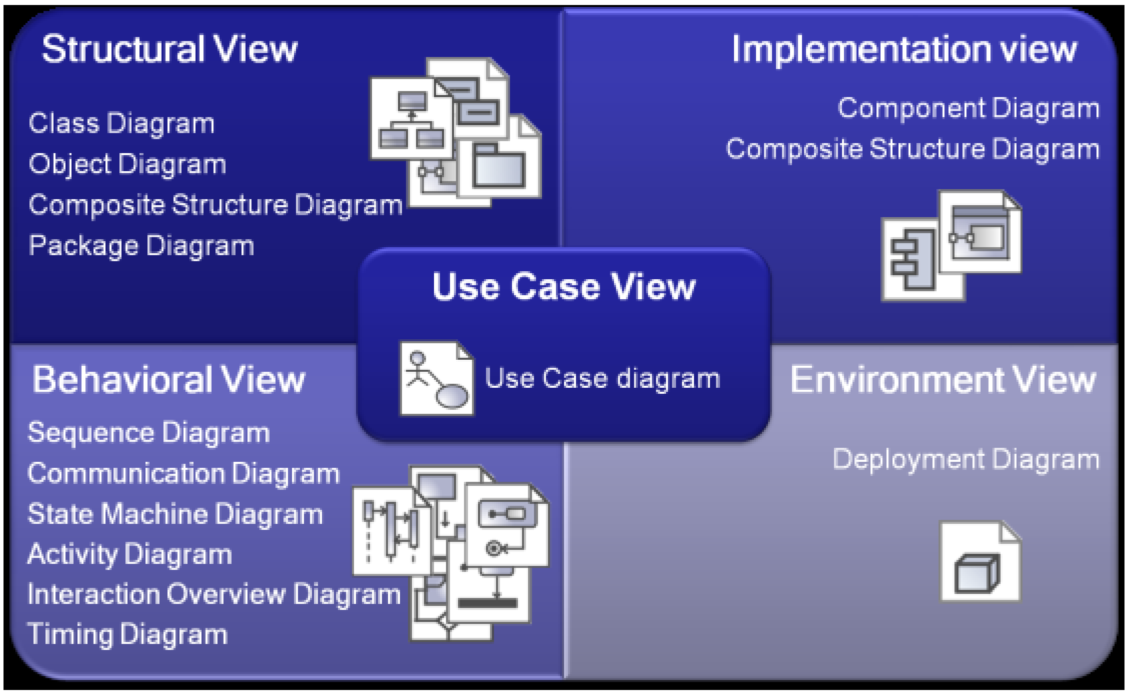


Figure 368 -- Architectural views

Several kinds of diagrams provide a visual notation for the concepts in each view.

Use Case View

The use case view represents the functionality and behavior of a system or subsystem as it is perceived by external users. This view is targeted mainly at customers, designers, developers, and testers.

The use case view usually is presented as a number of use cases and actors in Use Case diagrams. Occasionally it is used in Activity and Sequence diagrams.

The use case view is central because the contents drive the development of the other views. It is also used for project planning. Every single use case unit is deemed as a manageable unit during the project execution.

Structural View

The structural view represents structural elements for implementing a solution for defined requirements. It identifies all of the business entities and how these entities are related to each other. Usually entities are represented as classifiers and their instances in class and object diagrams in multiple abstraction levels. System decomposition to different layers can be displayed using Package diagrams. A Composite structure diagram can be used to represent the classifier inner structure. The system structural view artifacts are created by software architects and represent the system implementation design solutions.

Behavioral View

The dynamic behavior of the system is displayed on the Interaction (sequence and collaboration), State, Activity, Interaction overview, and Timing diagrams. It focuses mainly on the interactions that occur between objects inside a system, activities and work performed by the various parts of a system, and state changes within a particular object or collaboration. Rather than defining the participants of the system, it defines how particular use cases are executed, which provides value for the external user. The dynamic view is concerned about what is happening inside the system and how those actions impact other participants.

Implementation View

The implementation view describes the implementation artifacts of logical subsystems defined in the structural view. It may include the intermediate artifacts used in a system construction (code files, libraries, data files, etc.) This view defines dependencies between the implementation components and their connections by the required and provided interfaces. Components and their relationships are displayed on the Component diagram. Inner parts of the component can be represented with the Composite structure diagrams. The implementation view helps analyze system parts and their dependencies in a higher component level.

Environment View

The environment view represents the physical arrangement of a system, such as computers and devices (nodes) and how they are connected to each other. In contrast to the component view, the deployment view is concerned with the physical structure of the system and the location of the software modules (components) manifested by artifacts within the system.

The environment view is displayed on the deployment diagram.

Class Diagram

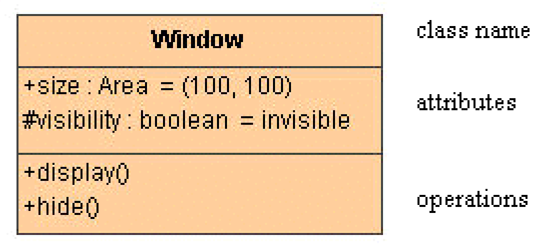
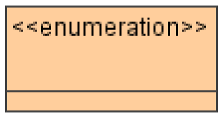
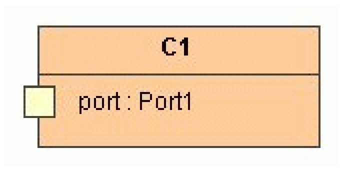
A class diagram is a graphic representation of the static structural model. It shows classes and interfaces, along with their internal structure and relationships. The classes represent types of objects that are handled in a system. A class diagram does not show temporal information, it describes only the classification. The instances of those types (objects) are instantiated only on the runtime and are represented by an object and the interaction diagrams.

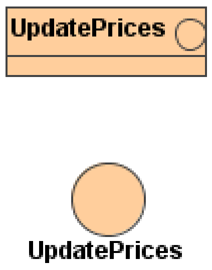
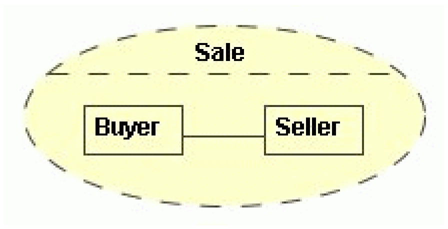
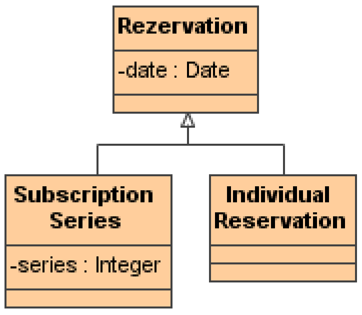
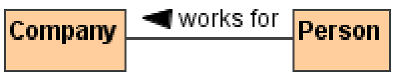
The classes can be related to each other in a number of ways: associated (connected to each other), dependent (one class depends/uses another class), specialized (one class is a subtype of another class), or packaged (grouped together as a unit – package). A class diagram does not express anything specific about the relationships of a given object, but it does abstractly describe the potential relationships of one object with other objects.

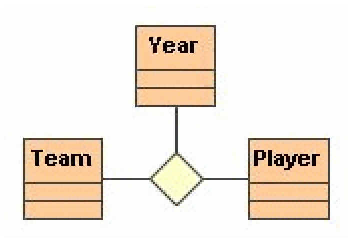
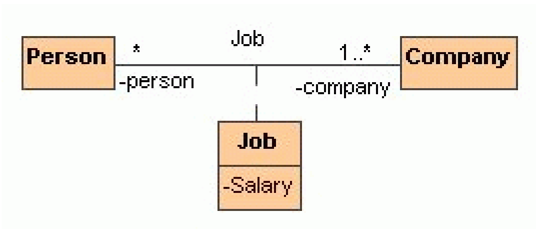
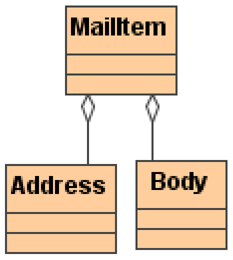
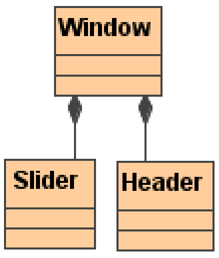
A system typically has a number of class diagrams – not all classes are inserted into a single class diagram. A class may have multiple levels of meaning and participate in several class diagrams.

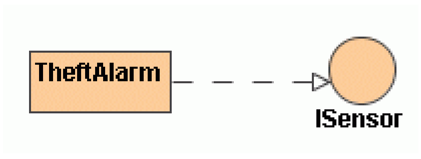
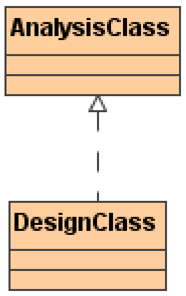
A class diagram is the logical map of an existing or future source code.

Class Diagram Elements

Model element	Button (hot key)	Notation
Class A descriptor for a set of objects with similar structures, behaviors, and relationships.	(C)	 Window +size : Area = (100, 100) #visibility : boolean = invisible +display() +hide() class name attributes operations
Structured Class		
Class by Pattern	(SHIFT+P)	
Signal		
Data Type		
Primitive Type		
Enumeration A user-defined data type whose instances are a set of user-specified named enumeration literals. The literals have a relative order but no algebra is defined on them.	(K)	
Port A port is a property of a classifier that specifies a distinct interaction point between that classifier and its environment or between the (behavior of the) classifier and its internal parts.	(SHIFT+R)	

Model element	Button (hot key)	Notation
Interface The description of a visible behavior of a class, a component or a package. Attributes and operations inside the Interface can be suppressed.	(I)	
Collaboration A collaboration is represented as a kind of classifier and it defines a set of cooperating entities to be played by instances (its roles) as well as a set of connectors that define communication paths between the participating instances.	(Q)	
Generalization A relationship between a more general and a more specific element. **Note:** Choose a different Generalization direction from the toolbar to draw a line with an opposite arrow end.	(G)	 Rezervation -date : Date Subscription Series -series : Integer Individual Reservation
Association A connection among classes, which also means a connection among objects of those classes.	(S)	
Directed Association		
Non-navigable Association		

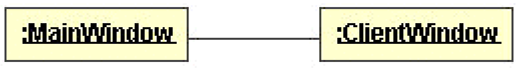
Model element	Button (hot key)	Notation
N-ary association An association among two or more classes (a single class may appear more than once).	(O)	
Association Class The Association Class is a declaration of a semantic relationship between Classifiers. The Association Class, which has a set of features of its own, is both an Association and a Class.		 Person * -person Job 1..* -company Company Job -Salary
Aggregation An aggregation is an association that represents a whole-part relationship.	(A)	
Directed Aggregation		
Composition A composition is a form of aggregation with a stronger ownership and coincident lifetime of part with the whole.	(F)	
Directed Composition		

Model element	Button (hot key)	Notation
Interface Realization A relationship is usually used between an interface and an implementation class. **Note:** Choose a different Interface Realization direction from the toolbar to draw a line with an opposite arrow end.	(R)	
Realization A relationship between a specification and its implementation.	(E)	
Substitution A substitution is a relationship between two classifiers.		
Usage A usage is a relationship in which one element requires another element (or set of elements) for its full implementation or operation. **Note:** Choose a different Usage direction from the toolbar to draw a line with an opposite arrow end.		
Template Binding A binding is a relationship between a template and a model element generated from the template.	(B)	

NEW! Object Diagram

The Object diagram displays instances of classifiers and links (instances of associations) between them.

Object Diagram Elements

Model element	Button (hot key)	Notation
Instance	(SHIFT+O)	
Link A connection between two or more objects.	(SHIFT+L)	

Use Case Diagram

A use case is a description of the functionality (a specific usage of a system) that a system provides. The use case descriptions may exist in a textual form (a simple table), where the use case diagram provides additional information about the relationship between the use cases and the external users. The diagram also allows a definition of the system's boundary.

The Use cases are described only in terms of how they appear when viewed externally by the user (a system's behavior as the user perceives it), and do not describe how the functionality is provided inside the system. The Use cases are not object-oriented, but they are included in the UML to simplify the approach of the project's lifecycle -- from the specification to the implementation.

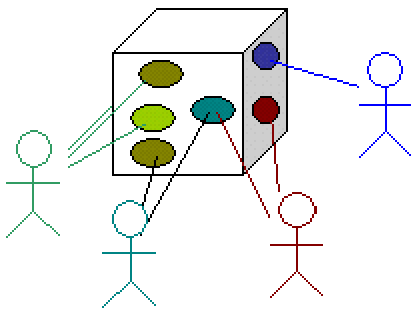
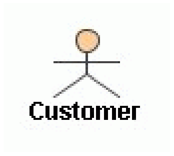
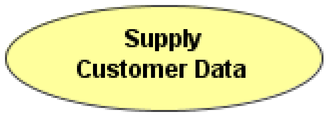
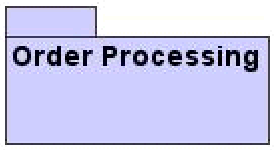
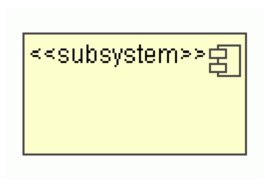
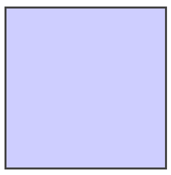
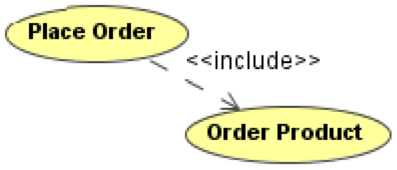
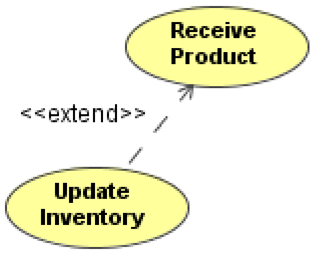
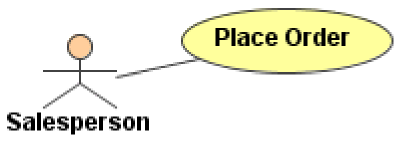
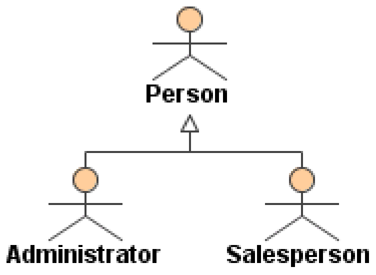
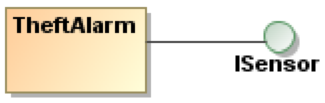


Figure 369 -- The schematic view of the use cases in the system.

Use Case diagram elements

Model element	Button (hot key)	Notation
Actor Actors represent roles played by human users, external hardware, and other subjects. An actor does not necessarily represent a specific physical entity but merely a particular facet (that is, "role") of some entities that is relevant to the specification of its associated use cases.	(A)	
Use Case A use case is a kind of behavior-related classifier that represents a declaration of an offered behavior. Each use case specifies a particular behavior, possibly including the variants that the subject can perform in collaboration with one or more actors. The subject of a use case could be a physical system or any other element that may initiate a behavior, such as a component, a subsystem, or a class.	(U)	
Package A group of classes and other model elements. A package may contain other packages.	(P)	
Subsystem A subsystem is treated as an abstract single unit. It groups model elements by representing the behavioral unit in a physical system.	(Y)	
System Boundary Another representation of a package. A system boundary element consists of use cases related by Exclude or Include (uses) relationships, which are visually located inside the system boundary rectangle.	(B)	

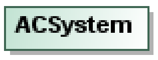
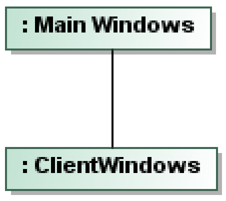
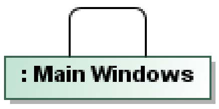
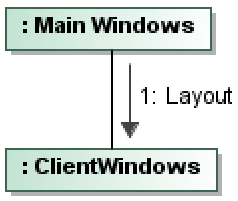
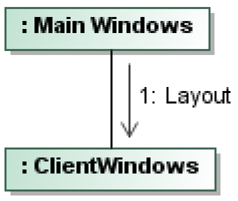
Model element	Button (hot key)	Notation
Include An include (uses) relationship from use case A to use case B indicates that an instance of the use case A will also contain the behavior as specified by B.	(C)	
Extend A relationship from an extending use case to an extended use case that specifies how and when the behavior defined in the extending use case can be inserted into the behavior defined in the extended use case. The extension takes place at one or more specific extension points defined in the extended use case. **Note:** Choose a different Extend direction from the toolbar to draw a line with an opposite arrow end.	(E)	
Association The participation of an actor in a use case, i.e. instances of the actor and instances of the use case communicate with each other. This is the only relationship between actors and use cases.	(S)	
Generalization A relationship between a more general and a more specific element. **Note:** Choose a different Generalization direction from the toolbar to draw a line with an opposite arrow end.	(G)	
Interface Realization The classifier at the tail of the arrow implements the interface that is located at the arrow head or uses that interface. **Note:** Choose a different Interface Realization direction from the toolbar to draw a line with an opposite arrow end.	(R)	

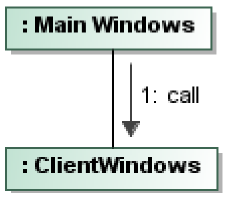
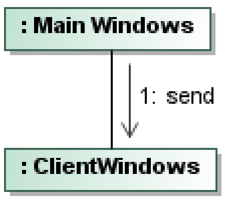
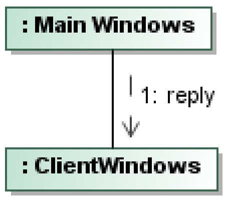
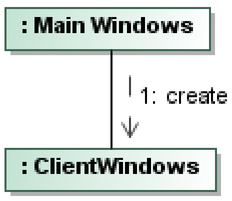
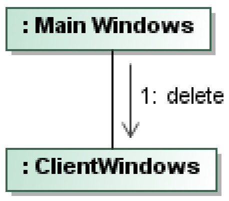
Communication Diagram

The Communication diagram illustrates the various static connections between objects, and models their interactions. It also presents a collaboration that contains a set of instances as well as their required relationships given in a particular context, and includes an interaction that defines a set of messages. These messages specify the interaction between the classifier roles within a collaboration that will serve to achieve the desired result.

A Communication diagram is given in two different forms: at the instance level or at the specification level.

Communication Diagram elements

Model element	Button (hot key)	Notation
Lifeline A lifeline represents an individual participant in the Interaction. The Lifelines represent only one interacting entity.	(O)	
Connector Specifies a link that enables communication between two or more lifelines. Each connector may be attached to two or more connectable elements, each representing a set of lifelines.	(C)	
Connector to Self Self connector for self-calls. It begins and ends on the same lifeline.	(S)	
Message to Right **Message to Left** A Message defines a particular communication between the Lifelines of an Interaction. It implies that one object uses the services of another object, or sends a message to that object. A communication can be formed by e.g., raising a signal, invoking an Operation, creating or destroying an Instance. Messages can be synchronous and asynchronous. Syncrnous messages are used when the operation should be completed before the caller resumes the execution. Asynchronous messages are used when the sender is not waiting for the recipient's acceptance.		**Synchronous message**  **Asyncronous message** 

Model element	Button (hot key)	Notation
Call Message to Right **Call Message to Left** A call message represents the request to invoke a specific operation.	()→ ←()	 **NEW!** Since the version 17.0.1 brackets "()" are not added to message names anymore.
Send Message to Right **Send Message to Left** A send message specifies the sending of a request to invoke a specific operation.	→ ←	
Reply Message to Right **Reply Message to Left** A reply message returns the values to the caller of the previous call, completing the execution of the call.	⇢ ⇠	
Create Message to Right **Create Message to Left** A create message specifies the creation of a specific operation.	⇢🟩 🟩⇠	
Delete a Message to Right **Delete Message to Left** A delete message represents the destruction of the instance described by the lifeline.	→✕ ✕←	

NOTE When an operation or a signal is assigned to a message, the name of the operation or the signal appears instead of the message name.

Sequence Diagram

The Sequence diagram focuses on the Message interchange between a number of Lifelines.

A sequence diagram shows the interaction information with an emphasis on the time sequence. The diagram has two dimensions: the vertical axis that represents time and the horizontal axis that represents the participating objects. The time axis could be an actual reference point (by placing the time labels as text boxes). The horizontal ordering of the objects is not significant to the operation, and you may rearrange them as necessary.

In the tables below you will find the description and notation of all the elements available in the Sequence diagram.

Related sections

"Message"

Sequence diagram elements

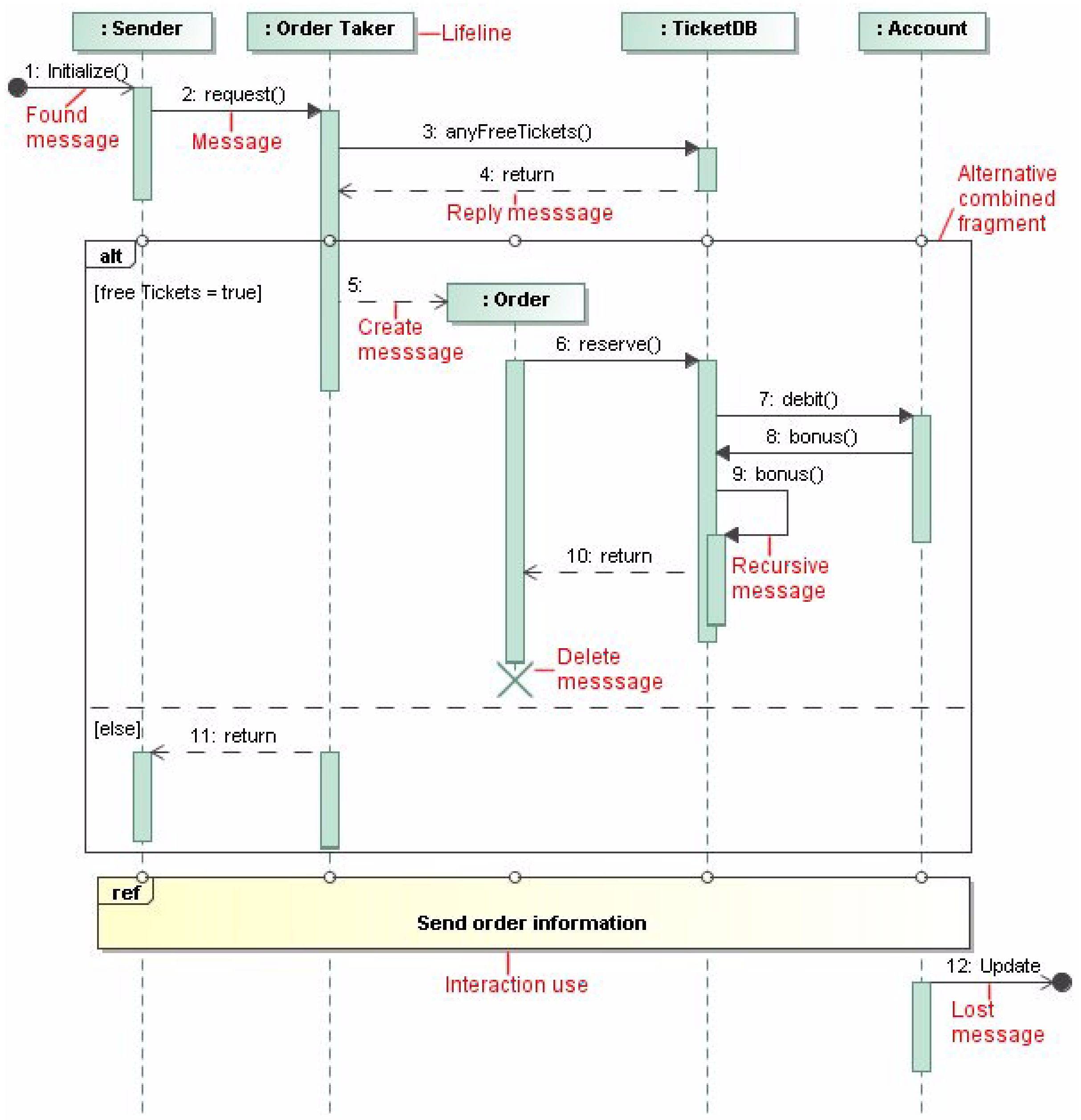
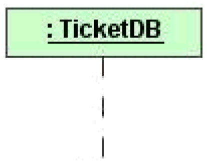
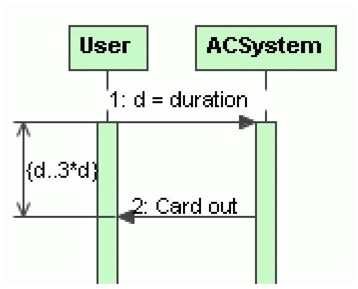
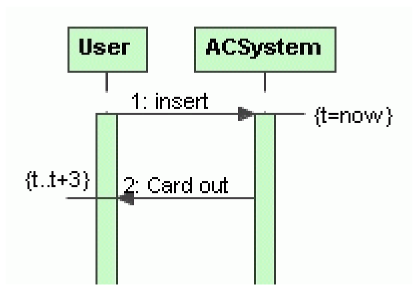
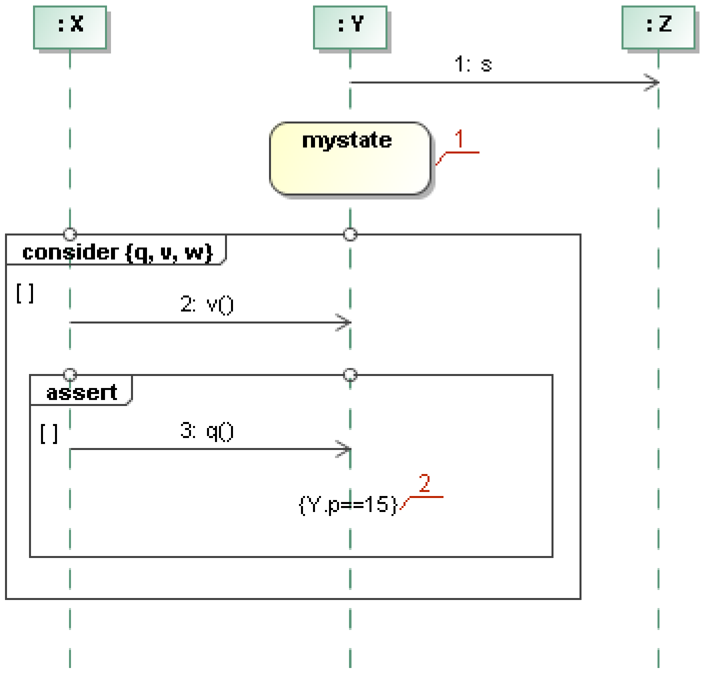


Figure 370 -- Elements in sequence diagram

Model element	Button (hot key)	Notation
Lifeline Represents the existence of an object at a particular time.	(O)	
Activation Bar Focus of control. Shows the period during which an object is performing an action either directly or through a subordinated procedure.		
Interaction Use A reference to interactions, communication diagram, sequence diagram, and time diagram can be created.	(SHIFT+T)	See Figure 370 on page 522.
Duration Constraint A duration defines a value specification that specifies the temporal distance between two time instants.		 User ACSystem 1: d = duration {d..3*d} 2: Card out
Time Constraint Specifies the combination of min and max timing interval values.		 User ACSystem 1: insert {t=now} {t..t+3} 2: Card out

Model element	Button (hot key)	Notation
State Invariant A StateInvariant is a runtime constraint on the participants of the interaction. It may be used to specify a variety of different kinds of constraints, such as values of attributes or variables, internal or external states, and so on.	(SHIFT+V)	1. State Invariant with a assigned “mystate” State. 2. State Invariant with a defined constraint Y.p=15.  :X :Y :Z 1: s mystate 1 consider {q, v, w} [ ] 2: v() assert [ ] 3: q() {Y.p==15} 2

Combined fragments

A combined fragment defines an expression of interaction fragments. A combined fragment is defined by an interaction operator and corresponding interaction operands. Through the use of combined fragments you will be able to describe a number of traces in a compact and concise manner.

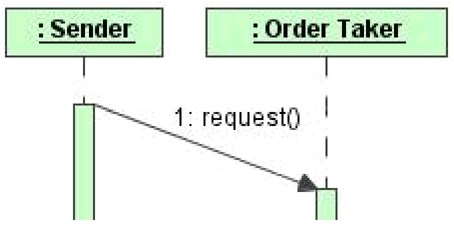
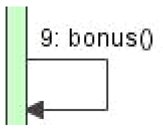
Interaction operands can be of the following types and are described in the table below.

Interaction operand name and description	Button (hot key)
Alternatives The alternative combined fragment **alt** represents a choice of behavior. Alternative combined fragment has several operands. At most one of the operands has to be chosen. Using alternative combined fragment you can model if-then-else statement.	(SHIFT+A)
Loop The loop combined fragment represents that the **loop** operand will be repeated a number of times. If the loop contains a separate interaction constraint with a specification, the loop will only continue if that specification evaluates to true during execution regardless of the minimum number of iterations specified in the loop.	(SHIFT+L)
Option The option combined fragment **opt** represents a choice of behavior where either the (sole) operand happens or nothing happens. An option combined fragment is used to model "if-then" construct.	(SHIFT+O)

Interaction operand name and description	Button (hot key)
Parallel The interaction operator **par** designates that the combined fragment represents a parallel merge between the behaviors of the operands. A parallel merge defines a set of traces that describes all the ways that occurrence specifications of the operands may be interleaved without obstructing the order of the occurrence specifications within the operand.	par (SHIFT+P)
Break The interaction operator **brk** designates that the combined fragment represents a breaking scenario in the sense that the operand is a scenario that is performed instead of the remainder of the enclosing interaction fragment. A break operator with a guard is chosen when the guard is true and the rest of the enclosing interaction fragment is ignored. When the guard of the break operand is false, the break operand is ignored and the rest of the enclosing interaction fragment is chosen. A combined fragment with interaction operator break should cover all Lifelines of the enclosing interaction fragment.	brk (SHIFT+B)
Negative The interaction operator **neg** designates that the combined fragment represents traces that are defined to be invalid. The set of traces that defined a combined fragment with interaction operator negative is equal to the set of traces given by its (sole) operand, only that this set is a set of invalid rather than valid traces. All interaction fragments that are different from Negative are considered positive meaning that they describe traces that are valid and should be possible.	neg (SHIFT+G)
Critical Region The interaction operator **crt** designates that the combined fragment represents a critical region. A critical region means that the traces of the region cannot be interleaved by other occurrence specifications (on those Lifelines covered by the region). This means that the region is treated atomically by the enclosing fragment when determining the set of valid traces.	crt (SHIFT+R)
Consider The interaction operator **con** designates which messages should be considered within this combined fragment. This is equivalent to defining every other message to be ignored.	con (SHIFT+C)
Ignore The interaction operator **ign** designates that there are some message types that are not shown within this combined fragment. These message types can be considered insignificant and are implicitly ignored if they appear in a corresponding execution. Alternatively, one can understand ignore to mean that the message types that are ignored can appear anywhere in the traces.	ign (SHIFT+I)
Weak Sequencing The interaction operator **seq** designates that the combined fragment represents a weak sequencing between the behaviors of the operands. It is the same as parallel execution, except that event on the same lifeline from different subfragments are ordered in the same order as the subfragments within the enclosing weak sequencing fragment.	seq (SHIFT+W)
Strict Sequencing The interaction operator **str** designates that the combined fragment represents a strict sequencing between the behaviors of the operands. The semantics of strict sequencing defines a strict ordering of the operands on the first level within the combined fragment with interaction operator strict.	str (SHIFT+S)

Interaction operand name and description	**Button (hot key)**
Assertion The interaction operator **asr** designates that the combined fragment represents an assertion. The sequences of the operand of the assertion are the only valid continuations. All other continuations result in an invalid trace.	(SHIFT+R)

Messages

Model element	Button (hot key)	Notation
Message A communication between objects that conveys information with the expectation that an action will ensue. The receipt of a message is one type of event. Messages can be synchronous and asynchronous. Synchrnous messages are used when the operation should be completed before the caller resumes the execution. Asynchronous messages are used when the sender is not waiting for the recipient's acceptance.	(M)	See Figure 370 on page 522.
Call Message A call message represents the request to invoke a specific operation.	(A)	See Figure 370 on page 522. **NEW!** Since the version 17.0.1 brackets "()" are not added to message names anymore.
Send Message A send message specifies the sending of a request to invoke a specific operation.	(E)	See Figure 370 on page 522.
Reply Message The reply message returns the values to the caller of the previous call, completing the execution of the call.	(R)	See Figure 370 on page 522.
Create Message A create message specifies the creation of a specific operation.	(C)	The message is connected directly to an object (not lifeline).
Delete Message Destroy message represents the destruction of the instance described by the lifeline.	(T)	A large X mark is displayed on the object's lifeline in the message's destination.
Diagonal Message Requires some time to arrive, during which another action occurs.	(D)	
Message to Self	(S)	

Model element	Button (hot key)	Notation
Recursive message A connected set of messages can be enclosed and marked as iteration.	(U)	See Figure 370 on page 522.
Lost Messages A lost message is a message where the sending event occurrence is known, but there is no receiving event occurrence. We interpret this to be because the message never reached its destination.	(L)	See Figure 370 on page 522.
Found Messages A found message is a message where the receiving event occurrence is known, but there is no (known) sending event occurrence. We interpret this to be because the origin of the message is outside the scope of the description. This may for example be noise or other activity that we do not want to describe in detail.	(F)	See Figure 370 on page 522.

State Machine Diagram

The behavior of objects of a class can be described in terms of states and events, using a state machine connected to the class under construction.

The state machine is a specification of the sequence of states through which an object or an interaction goes in response to events during its life, together with its responsive actions. The state machine may represent the sequence of states of a particular collaboration (e.g., collection of objects) or even the whole system (which is also considered as a collaboration). The abstraction of all possible states defined in a state machine is similar to the way class diagrams are abstracted: all possible object types (classes) of a particular system are described.

Objects that do not present a very pronounced reactive behavior may always be considered to stay in the same state. In such a case, their classes do not possess a state machine.

State diagrams (also called Statechart diagrams) represent the behavior of entities capable of dynamic behavior by specifying its response to the receipt of event instances. Typically, the state diagrams describe the behavior of classes, but the statecharts may also describe the behavior of other model entities such as use-cases, actors, subsystems, operations, or methods.

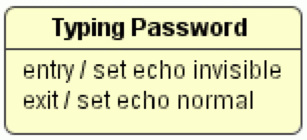
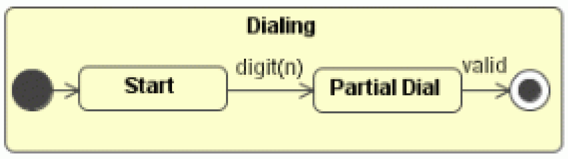
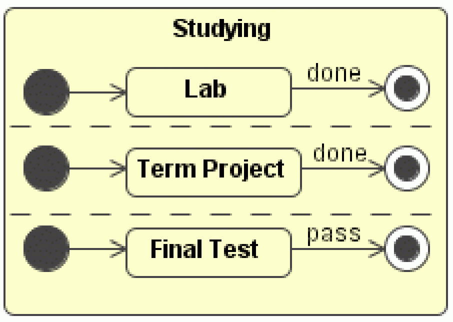
A state diagram is a graph that represents a state machine. States and various other types of vertices (pseudostates) in the state machine graph are rendered by the appropriate state and pseudostate symbols, while transitions are generally rendered by directed arcs that inter-connect them. The states may also contain subdiagrams by a physical containment or tiling. Note that every state machine has a top state, which contains all the other elements of the entire state machine. The graphical rendering of this top state is optional.

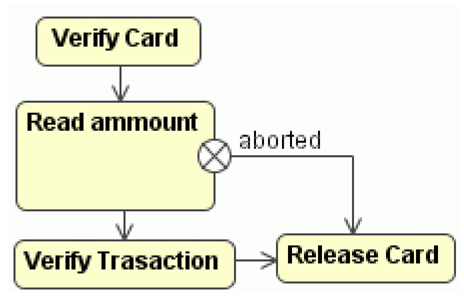
The states are represented by the state symbols, while the transitions are represented by arrows connecting the state symbols.

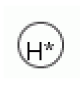
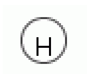
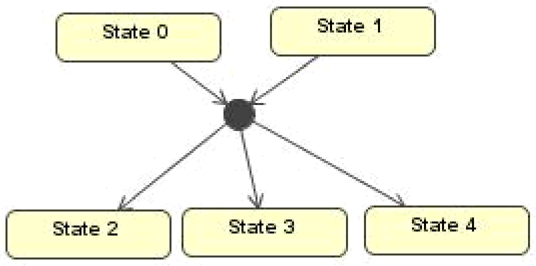
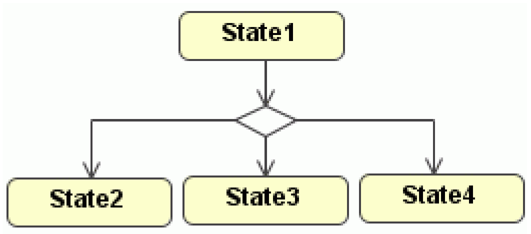
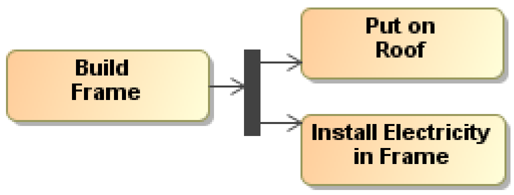
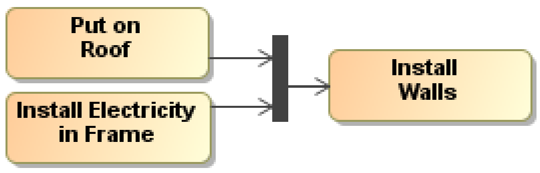
The state diagram concerns with an internal object changes (as opposed to the external object interaction in a collaboration). Do not attempt to draw them for all classes in the system, because they are used only for modeling a complex behavior. The state diagram shows all the possible states that objects or collaborations may have, and the events that cause the state to change. An event can be another object that sends a message to it announcing for example that a specified time has elapsed or that some conditions have been fulfilled. A change of a state is called a transition. A transition may also have a connected to it action that specifies what should be done in connection with the state transition.

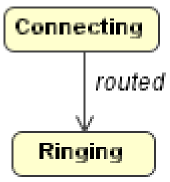
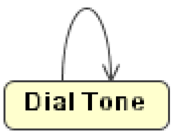
State Machine Diagram elements

NOTE	If the black arrow button is placed near a button, either right-click the button or click the black arrow button to open other available buttons.

Model element	Button (hot key)	Notation
State A state models a situation during which some (usually implicit) invariant conditions holds. The invariant may represent a static situation such as an object waiting for some external events to occur. However, it can also model dynamic conditions such as the process of performing some behavior.	(SHIFT+S)	 Typing Password entry / set echo invisible exit / set echo normal
Composite State A composite state either contains one region or is decomposed into two or more orthogonal regions. Each region has a set of mutually exclusive disjoint subvertices and a set of transitions.	(SHIFT+C)	
Orthogonal State An orthogonal state is a composite state with at least 2 regions.	(C)	 Studying Lab done Term Project done Final Test pass

Model element	Button (hot key)	Notation
Submachine State The submachine state specifies the insertion of the specification of a submachine state machine. The submachine state is a decomposition mechanism that allows factoring of common behaviors and their reuse.	(A)	 Verify Card Read ammount aborted Verify Trasaction Release Card
Initial Pepresents a default vertex that is the source for a single transition to the *default* state of a composite state. There can be at most one initial vertex in a region.	● (I)	●
Final State A special kind of state signifying that the enclosing region is completed. If the enclosing region is directly contained in a state machine and all other regions in the state machine also are completed, then it means that the entire state machine is completed.	◉ (F)	◉
Terminate Implies that the execution of this state machine by means of its context object is terminated.	✕ (R)	✕
Entry Point The entry point connection points a reference as the target of a transition. This implies that the target of the transition is the entry point pseudostate as defined in the submachine of the submachine state.	○ (Y)	○
Exit Point The exit point connection points a reference as the source of a transition. This implies that the source of the transition is the exit point pseudostate as defined in the submachine of the submachine state that has the exit point connection point defined.	⊗ (U)	⊗
Connection Point Reference The Connection point references of a submachine state can be used as the sources/targets of the transitions. They represent entries into or exits out of the submachine state machine referred by the submachine state.	(Z)	

Model element	Button (hot key)	Notation
Deep History Represents the most recent active configuration of the composite state that directly contains the pseudostate (e.g., the state configuration that was active when the composite state was last exited).	(P)	
Shallow History Represents the most recent active substate of its containing state (but not the substates of that substate). A composite state can have at most one shallow history vertex.	(SHIFT+R)	
Junction The junction vertices are semantic-free vertices that are used to chain together multiple transitions. They are used to construct the compound transition paths between states.	(J)	
Choice The choice points are used to split transition paths. In the dynamic choice point, a decision corncerning which branch to take is only made after the transition from State1 is taken and the choice point is reached.	(O)	
Fork Vertical/Horizontal Serves to split an incoming transition into two or more transitions terminating on orthogonal target vertices (i.e., vertices in different regions of a composite state).	(G) (D)	
Join Vertical/Horizontal Serves to merge several transitions emanating from source vertices in different orthogonal regions.	(G) (D)	 Put on Roof Install Electricity in Frame Install Walls

Model element	Button (hot key)	Notation
Transition A directed relationship between a source vertex and a target vertex. It may be part of a compound transition, which takes the state machine from one state configuration to another, representing the complete response of the state machine to an occurrence of an event of a particular type.	(T)	
Transition to Self When an object returns to the same state after the specified event occurs.	(E)	

Protocol State Machine Diagram

A protocol state machine is always defined in the context of a classifier. It specifies which operations of the classifier can be called, in which state, and under which condition, thus specifying the allowable call sequences on the classifier's operations.

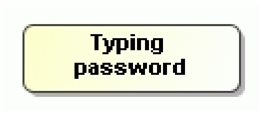
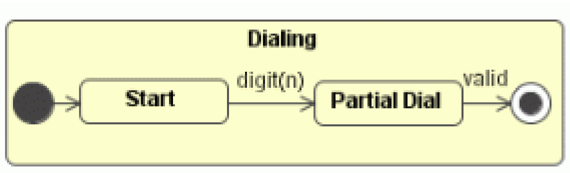
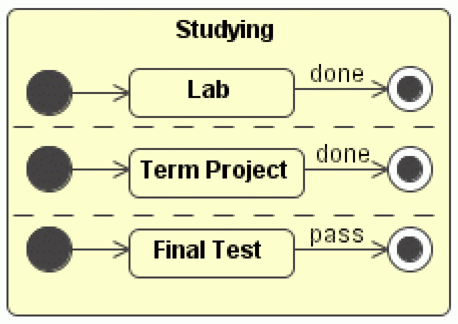
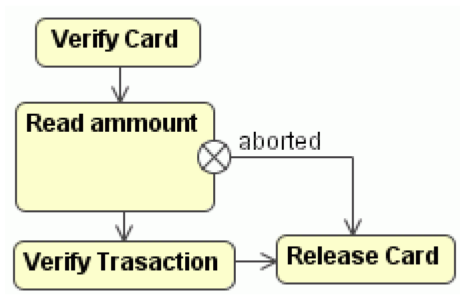
The protocol state machine presents the possible and permitted transitions on the instances of its context classifier, together with the operations that carry the transitions.

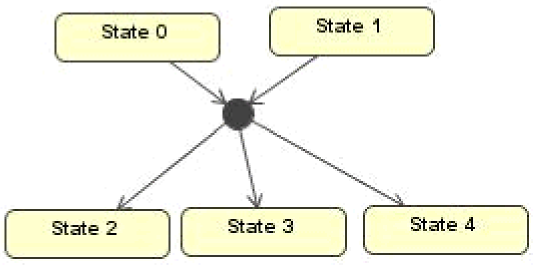
In this manner, an instance lifecycle can be created for a classifier, by specifying the order in which the operations can be activated and the states through which the instance progresses during its existence.

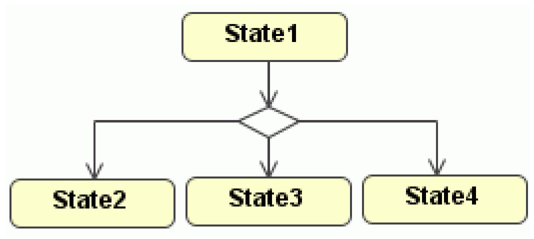
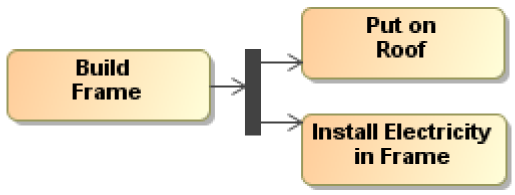
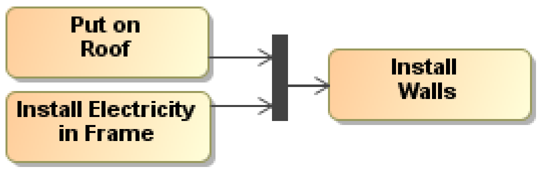
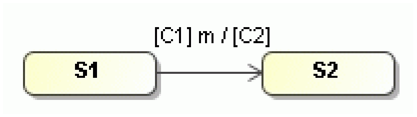
The Protocol State Machine Diagram is created for use with the Protocol State Machine and the Protocol Transitions.

Protocol State Machine Diagram elements

NOTE	If the black arrow button is placed near a button, either right-click the button or click the black arrow button to open other available buttons.

Model element	Button (hot key)	Notation
State The states of the protocol state machines are exposed to the users of their context classifiers. A protocol state represents an exposed stable situation of its context classifier: When an instance of the classifier is not processing any operation, the user of this instance can always know its configuration state.	(SHIFT+S)	
Composite State A composite state either contains one region or is decomposed into two or more orthogonal regions. Each region has a set of mutually exclusive disjoint subvertices and a set of transitions.	(SHIFT+C)	
Orthogonal State An orthogonal state is a composite state with at least 2 regions.	(C)	 Studying Lab done Term Project done Final Test pass
Submachine State A submachine state specifies the insertion of the specification of a submachine state machine. The submachine state is a decomposition mechanism that allows factoring of common behaviors and their reuse.	(A)	 Verify Card Read ammount aborted Verify Trasaction Release Card
Initial Pepresents a default vertex that is the source for a single transition to the *default* state of a composite state. There can be at most one initial vertex in a region.	(I)	●

Model element	Button (hot key)	Notation
Final State A special kind of state signifying that the enclosing region is completed. If the enclosing region is directly contained in a state machine and all other regions in the state machine also are completed, then it means that the entire state machine is completed.	◉ (F)	◉
Terminate Implies that the execution of this state machine by means of its context object is terminated.	✕ (R)	✕
Entry Point The entry point connection points a reference as the target of a transition. This implies that the target of the transition is the entry point pseudostate as defined in the submachine of the submachine state.	○ (Y)	○
Exit Point The exit point connection points a reference as the source of a transition. This implies that the source of the transition is the exit point pseudostate as defined in the submachine of the submachine state that has the exit point connection point defined.	⊗ (U)	⊗
Connection Point Reference The connection point references of a submachine state that can be used as the sources/targets of the transitions. They represent entries into or exits out of the submachine state machine referenced by the submachine state.	(Z)	
Junction The junction vertices are semantic-free vertices that are used to chain together multiple transitions. They are used to construct the compound transition paths between states.	● (J)	

Model element	Button (hot key)	Notation
Choice The choice points are used to split transition paths. In the dynamic choice point, a decision on which branch to take is only made after the transition from State1 is taken and the choice point is reached.	(O)	
Fork Vertical/Horizontal Serves to split an incoming transition into two or more transitions terminating on orthogonal target vertices (i.e., vertices in different regions of a composite state).	(G) (D)	
Join Vertical/Horizontal Serves to merge several transitions emanating from source vertices in different orthogonal regions.	(G) (D)	 Put on Roof Install Electricity in Frame Install Walls
Protocol Transition A protocol transition (transition as specialized in the ProtocolStateMachines package) specifies a legal transition for an operation. Transitions of the protocol state machines have the following information: a pre condition (guard), on trigger, and a post condition. Every protocol transition is associated to zero or one operation that belongs to the context classifier of the protocol state machine.	(T)	
Protocol Transition to Self When an object returns to the same state after the specified event occurs.	(E)	

Activity Diagram

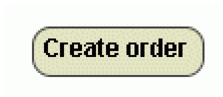
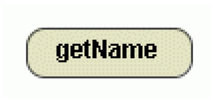
An activity graph is a variation of a state machine. In the state machine, the states represent the performance of actions or subactivities, while the transitions are triggered by the completion of the actions or subactivities. It represents a state machine of a procedure itself. The entire activity diagram is attached (through the model) to a class, such as a use case, or to a package, or to the implementation of an operation. The purpose of this diagram is to focus on flows driven by the internal processing (as opposed to external events). You should use the activity diagrams in situations where all or most of the events represent the completion of internally-generated actions (that is, procedural flow of control). You should use the ordinary state diagrams in situations where asynchronous events occur. An activity diagram is a variant of a state diagram. Organized according to actions, the activity diagrams are mainly targeted towards the representation of the internal behavior of a method (the implementation of an operation) or a use case.

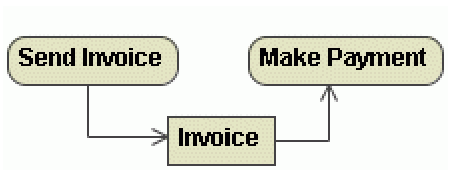
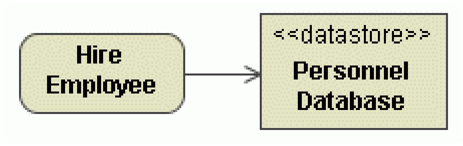
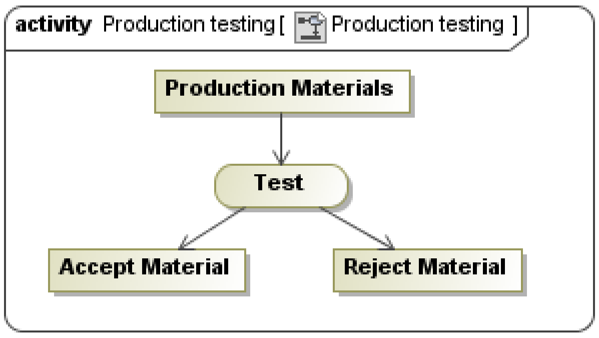
Though activity diagrams are often classified alongside the interaction diagrams, they actually focus on the work performed by a system instead of an object interaction. An activity diagram captures actions and displays their results.

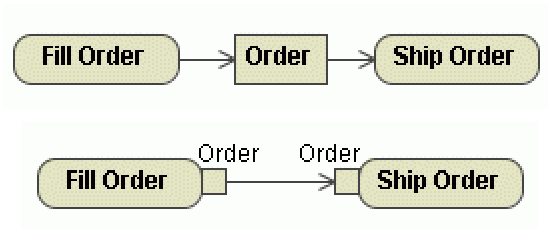
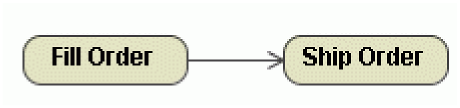
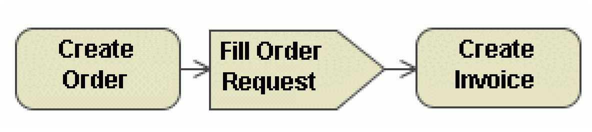
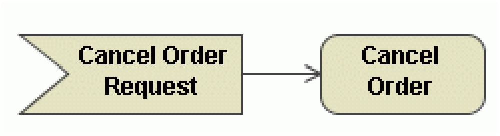
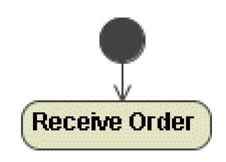
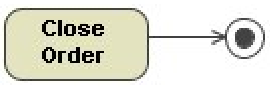
A state diagram may also represent this sequencing of steps. However, given the procedural nature of the implementation of the operations – in which most events simply correspond to the end of the preceding activity – it is not necessary to distinguish states, activities, and events systematically (i.e. state changes and external events have less importance inside the method). It is therefore beneficial to have a simplified representation for directly displaying activities.

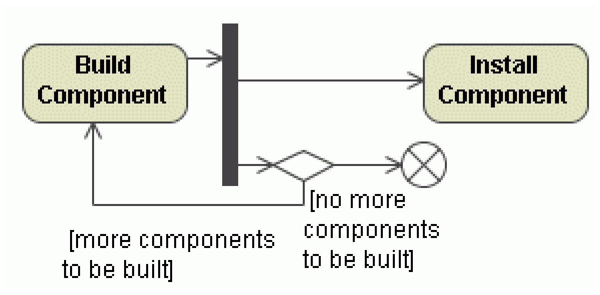
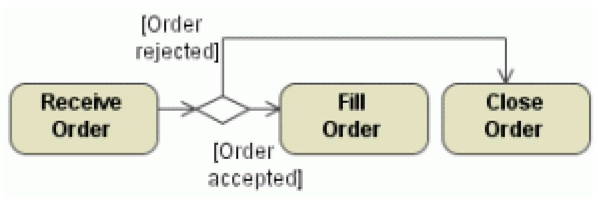
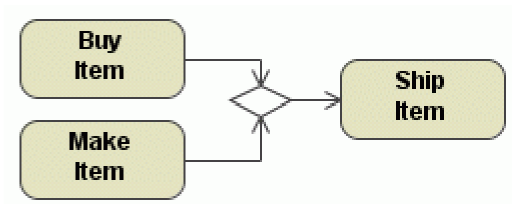
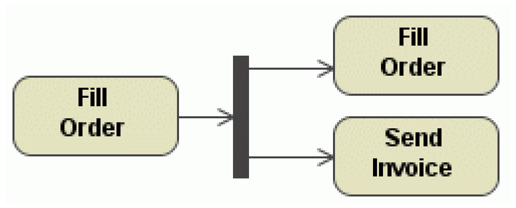
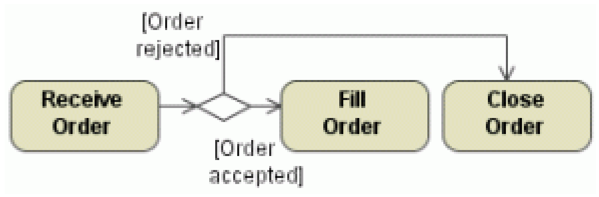
The activity diagram provides a convenient way to describe complex algorithms, parallel operations, and business processes. Together with the collaboration and sequence diagrams, they are used to relate use cases.

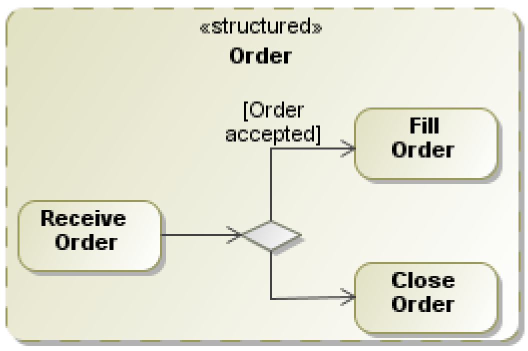
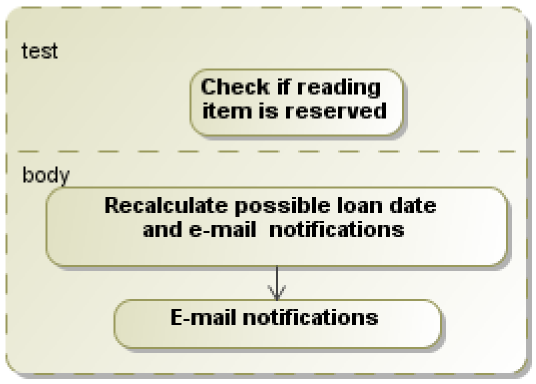
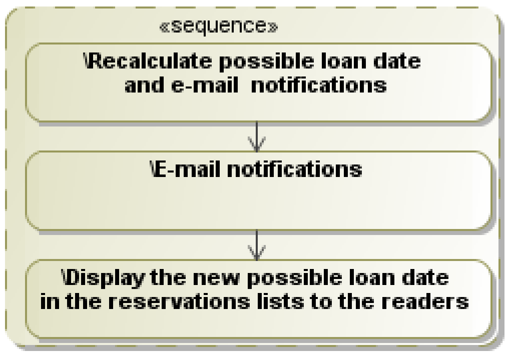
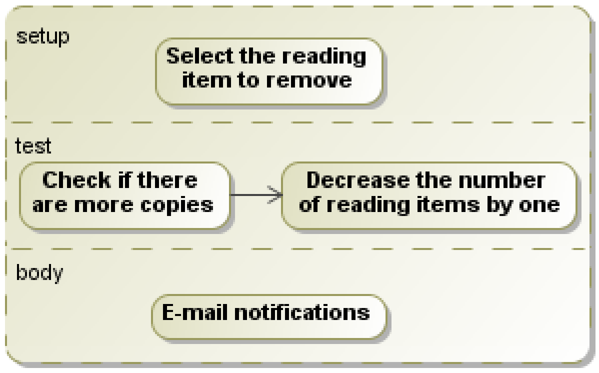
Activity Diagram elements

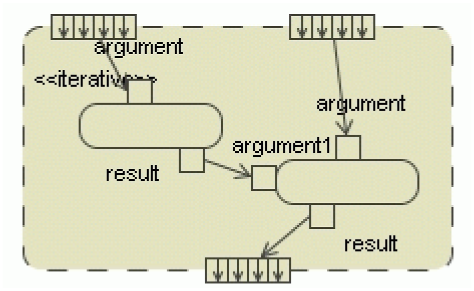
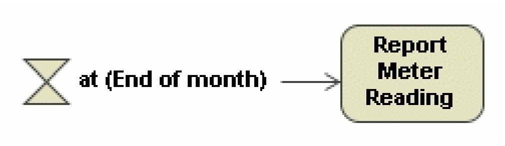
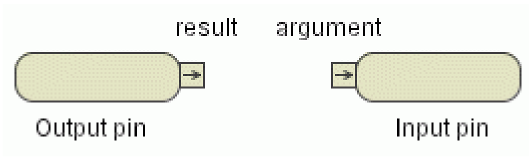
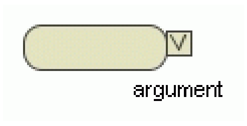
Model element	Button (hot key)	Notation
Action An action is a named element that is the fundamental unit of an executable functionality. The execution of an action represents some transformations or processing in the modeled system. When the action is to be executed or what its actual inputs are is determined by the concrete action and the behaviors in which it is used.	(B)	
Call Operation Action An action that transmits an operation call request to the target object, where it may cause the invocation of the associated behavior. The argument values of the action are available to the execution of the invoked behavior.	(O)	
Opaque Action An opaque action is introduced for implementing specific actions or for use as a temporary placeholder before some other actions are chosen.		
Any Action This element is introduced in order to maintain any other desirable action element with an appropriate metaclass stereotype applied.		

Model element	Button (hot key)	Notation
Object Node The Activity nodes are introduced to provide a general class for the nodes connected by activity edges. The ActivityNode replaces the use of the StateVertex and its children for activity modeling in UML.	(SHIFT+B)	
Data Store A data store node is a central buffer node for a non-transient information. A data store keeps all tokens that enter it, copies them when they are chosen to move downstream. Incoming tokens containing a particular object replace any tokens in the object node containing that object.	(SHIFT+D)	
Activity Parameter Node It is an object node for inputs and outputs to the activities. The Activity parameters are object nodes at the beginning and end of the flows, to accept inputs to an activity and provide outputs from it.		 activity Production testing [Production testing] Production Materials Test Accept Material Reject Material
Input Expansion Node An expansion node is an object node used to indicate a flow across the boundary of an expansion region. A flow into a region contains a collection that is broken into its individual elements inside the region, which is executed once per element.		
Output Expansion Node A flow out of a region combines individual elements into a collection for use outside the region.		

Model element	Button (hot key)	Notation
Object Flow Is an activity edge that can have objects or data passing along it. An object flow models the flow of values to or from the object nodes.	(SHIFT+F)	 Fill Order Order Ship Order Fill Order Order Order Ship Order
Control Flow Is an edge that starts an activity node after the previous one is finished. Objects and data cannot pass along the control flow edge.	(F)	
Send Signal Action Is an action that creates a signal instance from its inputs, and transmits it to the target object, where it may trigger the state machine transition or the execution of an activity.	(SHIFT+S)	
Accept Event Action Is an action that waits for the occurrence of an event that meets the specified conditions. The Accept event actions handle event occurrences detected by the object owning the behavior.	(E)	
Initial Node An initial node is a starting point for executing an activity. It has no incoming edges.	(T)	
Activity Final An activity final node is a final node that stops all flows in an activity.	(D)	

Model element	Button (hot key)	Notation
Flow Final The Final node that terminates a flow and destroys all tokens that arrive at it. It has no impact on other flows in the activity.	⊗ (L)	 Build Component Install Component [no more components to be built] [more components to be built]
Decision Decision is a control node that chooses between outgoing flows. A decision node has one incoming edge and multiple outgoing activity edges.	◇ (G)	 [Order rejected] Receive Order Fill Order Close Order [Order accepted]
Merge A merge node is a control node that brings together multiple alternate flows. It is not used to synchronize concurrent flows but it is used to accept one among several alternate flows.	● (G)	
Fork/Join Horizontal Helps to control parallel actions.	▬ (K)	
Fork/Join Vertical Helps to control parallel actions.	▮ (SHIFT+K)	
Exception Handler An exception handler is an element that specifies a body to execute in case the specified exception occurs during the execution of the protected node.	↯ (P)	 [Order rejected] Receive Order Fill Order Close Order [Order accepted]

Model element	Button (hot key)	Notation
Structured Activity Node A structured activity node is an executable activity node that may have an expansion into the subordinate nodes. The structured activity node represents a structured portion of the activity that is not shared with any other structured node, except for nesting.		 «structured» Order [Order accepted] Fill Order Receive Order Close Order
Conditional Node A conditional node is a structured activity node that represents an exclusive choice among alternatives.		 test Check if reading item is reserved body Recalculate possible loan date and e-mail notifications E-mail notifications
Sequence Node A sequence node is a structured activity node that executes its actions in order.		 «sequence» \Recalculate possible loan date and e-mail notifications \E-mail notifications \Display the new possible loan date in the reservations lists to the readers
Loop Node A loop node is a structured activity node that represents a loop with the setup, test, and body sections.		 setup Select the reading item to remove test Check if there are more copies Decrease the number of reading items by one body E-mail notifications

Model element	Button (hot key)	Notation
Expansion Region An expansion region is a structured activity region that executes multiple times corresponding to the elements of an input collection.		 argument <<iterative>> argument argument1 result result
Time Event A time event specifies a point of time by an expression. The expression might be absolute or might be relative to some other points of time.		
Input Pin An input pin is a pin that holds input values to be consumed by an action. They are object nodes that receive values from other actions through object flows.	(SHIFT+I)	
Output Pin A pin that holds output values produced by an action. Output pins are object nodes that deliver values to other actions through object flows.	(SHIFT+O)	
Value Pin A value pin is an input pin that provides a value to an action that does not come from an incoming object flow edge.		
Swimlanes Swimlanes are used to organize responsibility for actions and subactivities according to the class, dividing an activity diagram.	(SHIFT+V) (SHIFT+W)	

TIP!	You can create a new Activity diagram under the following elements: • Action • **NEW!** Structured Activity Node • Expansion Region • Conditional Node • Loop Node • Sequence Node

Smart Activity Diagram layout

Dynamic centerlines

The centerlines are displayed only when a center of the shape that was moved or newly drawn is located near the center of another shape that already exists in the diagram. These lines help to draw diagram with aligned shapes easily.

When the center of the shape that was moved coincides with a center of any shape that is placed to its right or left, a horizontal centerline is displayed. When the center of the shape is close to any center of a shape that is located above or below it, a vertical centerline is displayed.

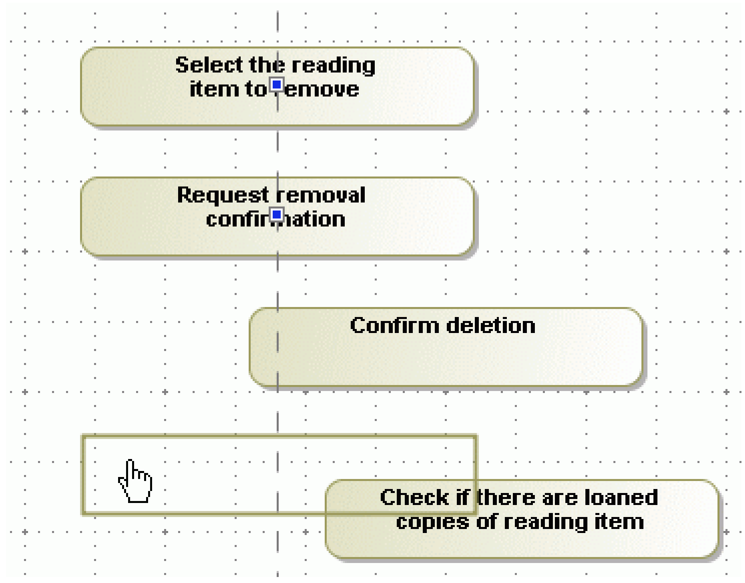

Select the reading item to remove
Request removal confirmation
Confirm deletion
Check if there are loaned copies of reading item

Figure 371 -- Dynamic vertical centerline

To switch off the dynamic centerlines

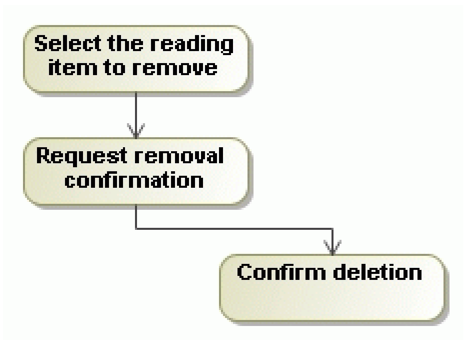
- Click the **Show Centerlines** button in the diagram toolbar or press **C**.
- From the **Options** main menu, select **Environment**. In the open dialog box, click the **Diagram** node and clear the **Show centerlines in flow diagrams** check box in the **Display** properties group.

Diagram orientation

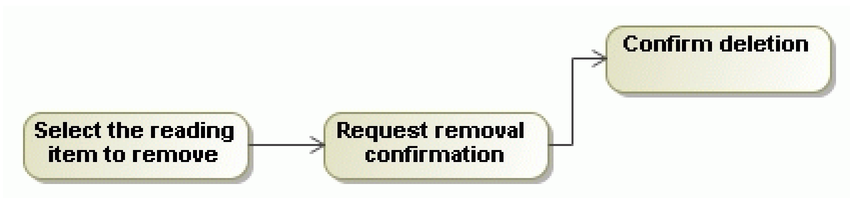
The diagram orientation is used to assign the correct rectilinear path breaks and draw paths betweenthe activity diagram shapes. The paths can be drawn from from side to side, or from the lower to the upper shape borders.

Example:

For a vertical diagram orientation - in this case if two shapes are not in the same centerline, the paths will be connected from the lower border of the first shape to the upper border of the next shape, adding break points:


Select the reading item to remove
Request removal confirmation
Confirm deletion

For a horizontal diagram orientation - in this case the paths will be connected from the side border of the first shape to the next side border of the second shape, adding break points:


Confirm deletion
Select the reading item to remove
Request removal confirmation

To change the diagram orientation

- From the **Options** main menu, select **Project**. In the open dialog box, expand **Diagram** group and in the right side properties list, change the value for the **Diagram Orientation** property.
- From the diagram pane shortcut menu, select **Diagram Properties** and change the value for the **Diagram Orientation** property.

For applying the Activity diagram layout tool, see “Activity Diagram Layout Tool” on page 205.

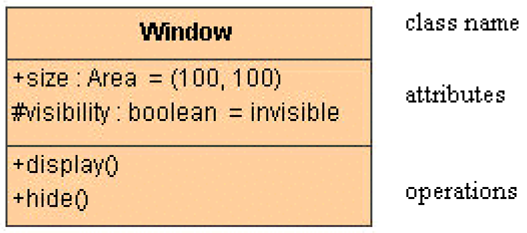
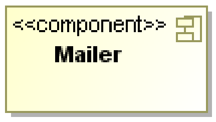
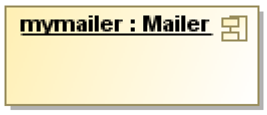
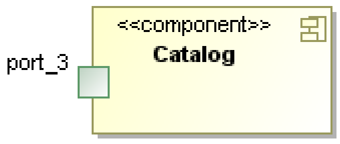
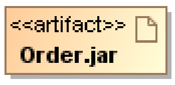
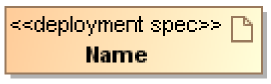
NEW! Component Diagram

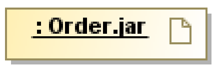
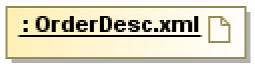
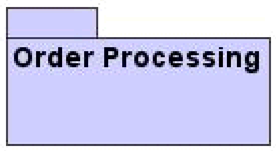
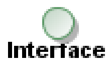
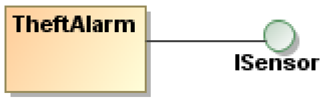
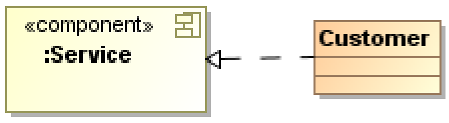
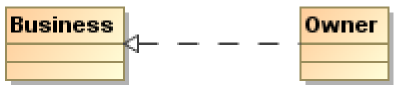
A component diagram represents a physical structure of a code (as opposed to the class diagram, which portrays the logical structure) in terms of code components and their relationships within the implementation environment. A component can be a source code component, a binary component, or an executable component.

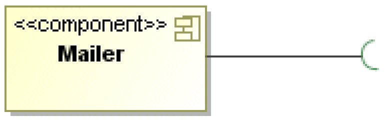
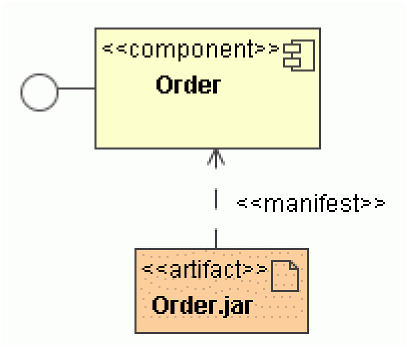
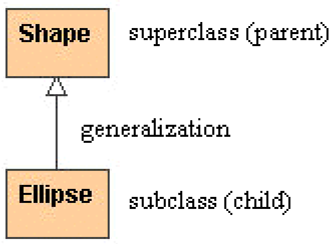
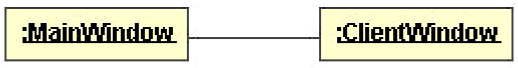
A component contains information about the logical class or classes that it implements, thus creating a mapping from a logical view to a component view. Dependencies between the components are shown, making it easy to analyze how a change in one component affects the others. The components may also be shown with any of the interfaces that they expose. They, as with almost any other model elements, can be grouped into packages, much like classes or use cases.

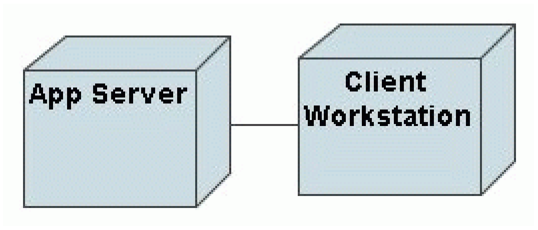
The component diagrams are used in the later phases of the software development, when there is a need to divide up classes among different components. When working with the CASE facilities, the components are used for file-class mapping during code generation, reverse engineering, and round-trip engineering operations.

Component Diagram elements

Model element	Button (hot key)	Notation
Class A descriptor for a set of objects with similar structures, behaviors, and relationships.	(C)	 Window +size : Area = (100, 100) #visibility : boolean = invisible +display() +hide() class name attributes operations
Component The Component may be used to define the requirements for each physical software element.	(K)	
Component Instance An instance of a component.	(A)	
Port Ports represent interaction points between a classifier and its environment. A port has the ability to specify that any requests arriving at this port are handled.	(SHIFT+R)	
Artifact An artifact represents a physical piece of information that is used or produced by a software development process. Examples of Artifacts include models, source files, scripts, and binary executable files. An Artifact may constitute the implementation of a deployable component.	(B)	
Deployment Specification It indicates a set of properties that defines how a component should be deployed.		

Model element	Button (hot key)	Notation
Artifact Instance		
Deployment Specification Instance An instance of a deployment specification element.		
Package A group of classes and other model elements.	(P)	
Interface All functionalities implemented by a particular component.	(F)	
Interface Realization The classifier at the tail of the arrow implements the interface that is located at the arrow head or uses that interface. **Note:** Choose a different Interface Realization direction from the toolbar to draw a line with an opposite arrow end.	(R)	
Component Realization A component realization concept is specialized in the Components package to (optionally) define the Classifiers that realize the contract offered by a component in terms of its provided and required interfaces.		
Realization A realization signifies that the client set of elements are an implementation of the supplier set, which serves as the specification.	(E)	

Model element	Button (hot key)	Notation
Usage A usage is a relationship in which one element requires another element (or set of elements) for its full implementation or operation. Usage is also used to create required interface. **Note**: Choose a different Usage direction from the toolbar to draw a line with an opposite arrow end.	(U)	
Manifestation A manifestation is the concrete physical rendering of one or more model elements by an artifact.		 <<component>> Order <<manifest>> <<artifact>> Order.jar
Generalization	(G)	 Shape superclass (parent) generalization Ellipse subclass (child)
Link A relationship between a specification element and an implementation element.	(L)	

Model element	Button (hot key)	Notation
Communication Path A communication path is an association between two DeploymentTargets, through which they are able to exchange signals and messages.		

NEW! IMPORTANT!

Since MagicDraw version 17.0.1, Component and Deployment diagrams are created instead of the Implementation diagram.

From now on, Implementation diagrams created with earlier MagicDraw versions are realized as the following diagrams:

- Deployment diagram, if node shapes were used in the Implementation diagram.
- Component diagram, if node shapes were not used in the Implementation diagram.

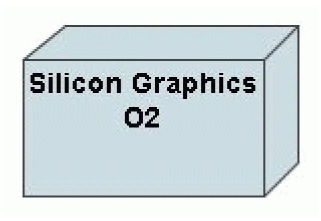
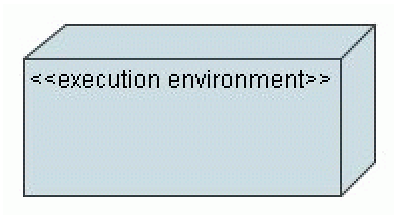
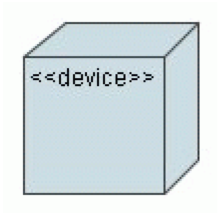
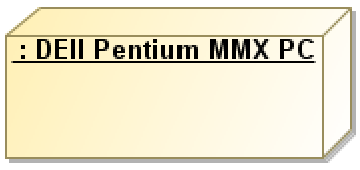
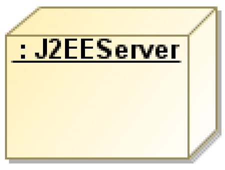
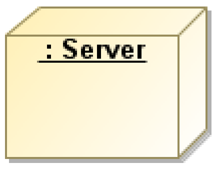
Customized diagrams based on the Implementation diagram are based on the Component diagram now.

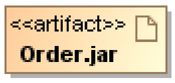
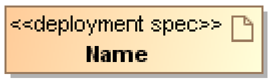
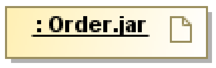
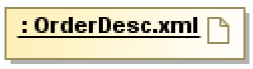
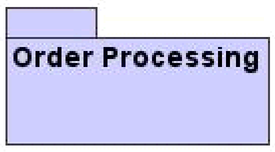
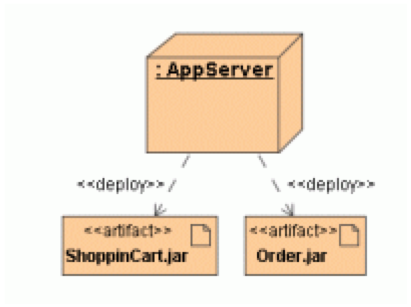
NEW! Deployment Diagram

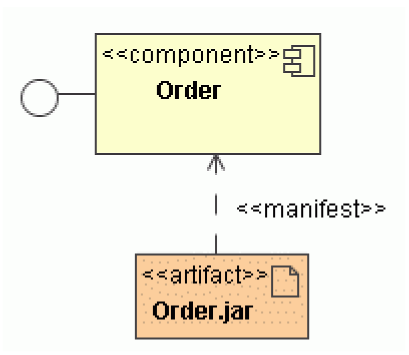
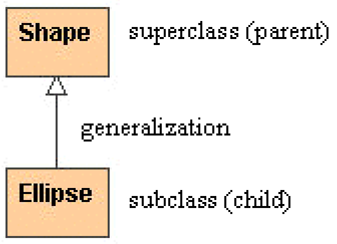
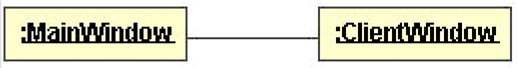
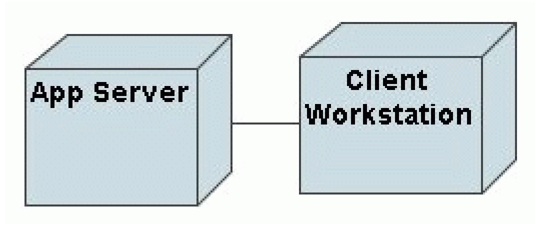
Deployment diagrams show the physical layout of various hardware components (nodes) that compose a system as well as the distribution of executable programs (software components) on this hardware.

Deployment diagrams are crucial when dealing with distributed systems. You may show the actual computers and devices (nodes), along with the connections they have to each other, thus specifying a system topology. Inside the nodes, executable components and objects are located in a way that it shows where the software units are residing and on which nodes they are executed. You may also show dependencies between components.

Deployment Diagram elements

Model element	Button (hot key)	Notation
Node A Node is a physical object that represents a processing resource, generally having at least a memory and often the processing capability as well.	(O)	
Execution Environment The element that is used to indicate that a node is the execution environment.		
Device A physical computational resource with the processing capability upon which artifacts may be deployed for an execution.		
Node Instance An instance of a node.	(T)	
Execution Environment Instance The element that is used to indicate that a node is an instance of the execution environment.		
Device Instance		

Model element	Button (hot key)	Notation
Artifact An artifact represents a physical piece of information that is used or produced by a software development process. Examples of Artifacts include models, source files, scripts, and binary executable files. An Artifact may constitute the implementation of a deployable component.	(B)	
Deployment Specification It indicates a set of properties that defines how a component should be deployed.		
Artifact Instance		
Deployment Specification Instance An instance of a deployment specification element.		
Package A group of classes and other model elements.	(P)	
Deployment A deployment is the allocation of a deployment target to an artifact or artifact instance.		 : AppServer <<deploy>> <<deploy>> <<artifact>> ShoppinCart.jar <<artifact>> Order.jar

Model element	Button (hot key)	Notation
Manifestation A manifestation is the concrete physical rendering of one or more model elements by an artifact.		 <<component>> Order <<manifest>> <<artifact>> Order.jar
Generalization	(G)	 Shape superclass (parent) generalization Ellipse subclass (child)
Link A relationship between a specification element and an implementation element.	(L)	
Communication Path A communication path is an association between two DeploymentTargets, through which they are able to exchange signals and messages.		

NEW!
IMPORTANT!

Since MagicDraw version 17.0.1, Component and Deployment diagrams are created instead of the Implementation diagram.

From now on, Implementation diagrams created with earlier MagicDraw versions are realized as the following diagrams:

- Deployment diagram, if node shapes were used in the Implementation diagram.
- Component diagram, if node shapes were not used in the Implementation diagram.

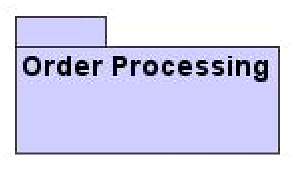
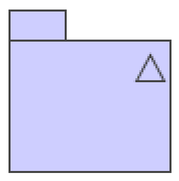
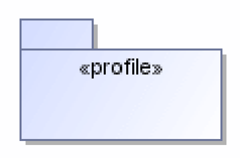
Customized diagrams based on the Implementation diagram are based on the Component diagram now.

NEW! Package Diagram

Package diagram shows packages and dependencies between the packages.

The classes can be grouped into packages. The packages can be nested within other packages. A package, as an entity, may have all the relationships that can be drawn for a class. Those relationships are derived from the classes or packages that are nested within two particular packages (i.e., the relationship between packages reflects a set of relationships between classes placed in those packages).

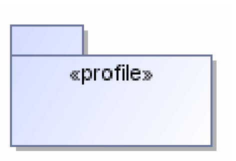
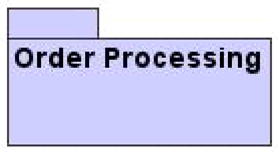
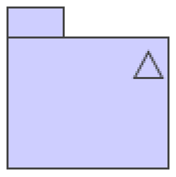
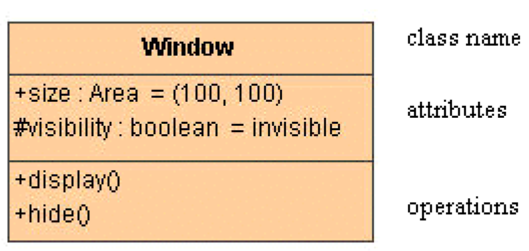
Package Diagram elements

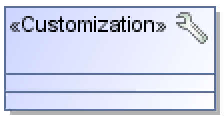
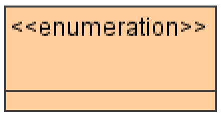
Element	Button (hot key)	Notation
Package A group of classes and other model elements.	(P)	
Model A model is an abstraction of a physical system from a particular point of view. A model contains a hierarchy of packages/subsystems and other model elements that describe the system.	(M)	
Profile A Profile is a kind of Package that extends a reference metamodel.		
Package Merge A package merge is a directed relationship between two packages that indicates that the contents of the two packages are to be combined.		
Package Import A package import is defined as a directed relationship that identifies a package whose members are to be imported by a namespace.		
Element Import An element import is defined as a directed relationship between an importing namespace and a packageable element.		

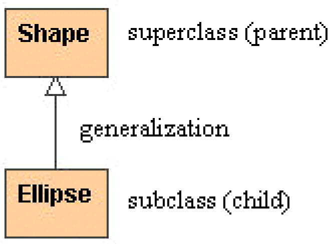
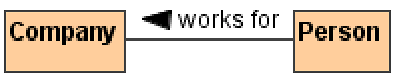
NEW! Profile Diagram

The Profiles package contains mechanisms that allow metaclasses from existing metamodels to be extended to adapt them for different purposes.

Profile Diagram elements

Model element	Button (hot key)	Notation
Stereotype A stereotype is an extension mechanism that defines a new and more specialized element of the model based on an existing element.	(SHIFT+S)	
MetaClass A class whose instances are classes. Metaclasses are typically used to construct metamodels.		
Profile A Profile is a kind of Package that extends a reference metamodel.		
Package A group of classes and other model elements.	(P)	
Model A model is an abstraction of a physical system from a particular point of view. A model contains a hierarchy of packages/subsystems and other model elements that describe the system.	(M)	
Class	(C)	 Window +size : Area = (100, 100) #visibility : boolean = invisible +display() +hide() class name attributes operations

Model element	Button (hot key)	Notation
Customization		
Data Type		
Primitive Type		
Enumeration A user-defined data type whose instances are a set of user-specified named enumeration literals. The literals have a relative order but no algebra is defined on them.	(K)	
Profile Application A profile application is used to show which profiles have been applied to a package.		
Extension An extension is used to indicate that the properties of a metaclass are extended through a stereotype, and gives the ability to flexibly add (and later remove) stereotypes to classes.		
Package Merge A package merge is a directed relationship between two packages that indicates that the contents of the two packages are to be combined.		

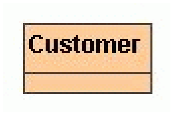
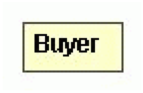
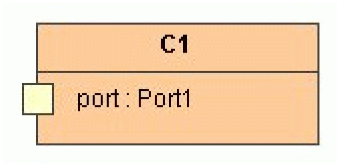
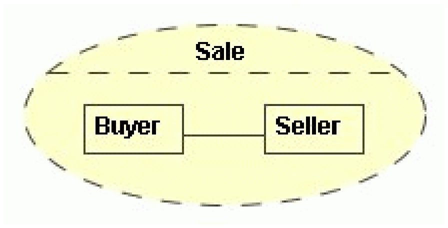
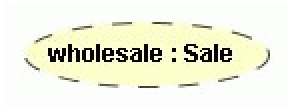
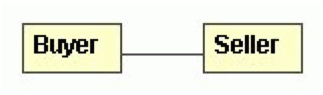
Model element	Button (hot key)	Notation
Package Import A package import is defined as a directed relationship that identifies a package whose members are to be imported by a namespace.		
Generalization	(G)	 Shape superclass (parent) generalization Ellipse subclass (child)
Association A connection among classes, which also means a connection among objects of those classes.	(S)	
Direct Association A directed relationship represents a relationship between a collection of source model elements and a collection of target model elements.		

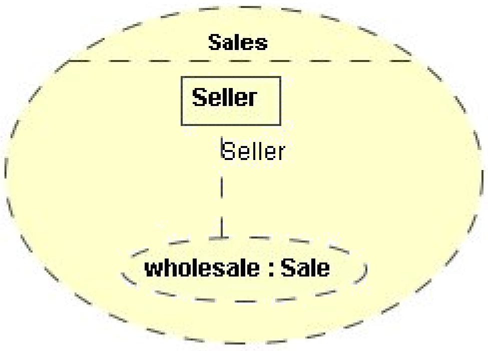
TIP!	If the Class, Data Type, Primitive Type, Enumeration, Association, Direct Association, Generalization are not available on the diagram pallete, make sure you are working in the Expert mode.

Composite Structure Diagram

The Composite Structure diagram allows a decomposition and modeling of the internal structure of the classifiers.

Composite Structure Diagram elements

Model element	Button (hot key)	Notation
Classifier Is extended with the capability to own collaboration uses. These collaboration uses link a collaboration with the classifier to give a description of the works of the classifier.	(SHIFT+G)	
Part	(P)	
Port A port may appear either on a contained part representing a port on that part, or on the boundary of the class diagram, representing a port on the represented classifier itself.	(SHIFT+R)	
Collaboration A collaboration describes a structure of collaborating elements (roles), each performing a specialized function, which collectively accomplishes some desired functionalities. Its primary purpose is to explain how a system works and, therefore, it typically only incorporates those aspects of reality that are deemed relevant to the explanation.	(Q)	
Collaboration Use A collaboration use represents one particular use of a collaboration to explain the relationships between the properties of a classifier. The collaboration use shows how the pattern described by a collaboration is applied in a given context, by binding specific entities from that context to the roles of the collaboration.	(U)	
Connector Each connector may be attached to two or more connectable elements, each representing a set of instances. Each connector end is distinct in the sense that it plays a distinct role in the communication realized over the connector.	(C)	

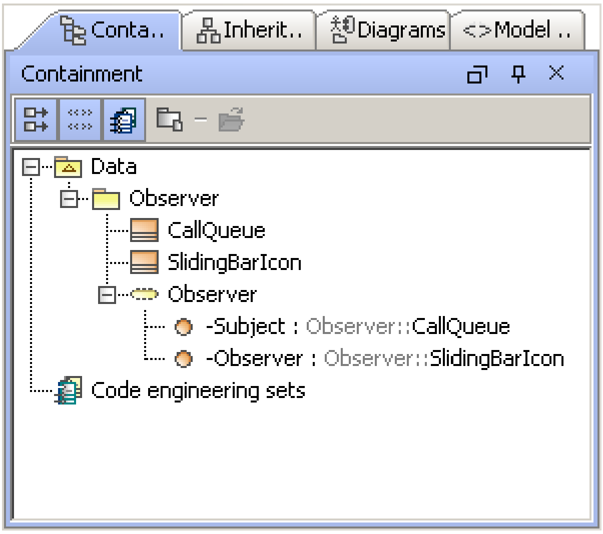
Model element	Button (hot key)	Notation
Role Binding Is a relationship from parts to the Collaboration Use (in diagram).	(B)	

Displaying existing Parts on the Composite Structure diagram creation

On a new Composite Structure diagram creation, if context classifier has properties, the **Select Part** dialog will open. Select Parts to be drawn automatically in the Composite Structure diagram.

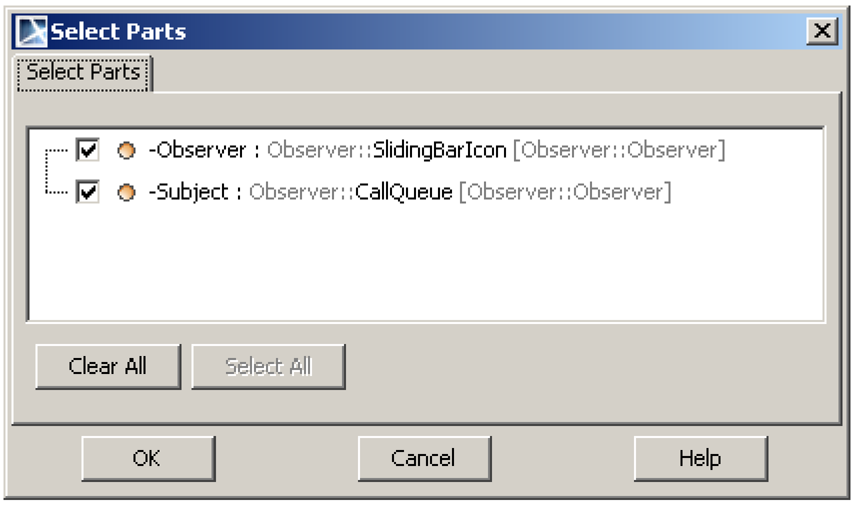
Case study to display existing parts on the Composite Structure diagram [Example is taken from UML 2 Superstructure Specification]:

1. Create the *Observer* package with *CallQueue*, *SlidingBarIcon* classes inside and *Observer* collaboration.
2. To the *Observer* collaboration add *Subject* property (*CallQueue* type) and *Observer* property (*SlidingBarIcon* type)..



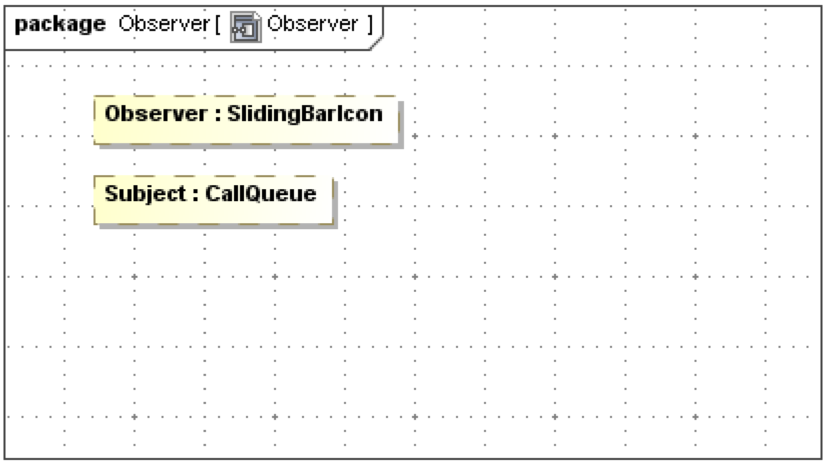
```
Data
  Observer
    CallQueue
    SlidingBarIcon
    Observer
      -Subject : Observer::CallQueue
      -Observer : Observer::SlidingBarIcon
  Code engineering sets
```

Create a composite structure diagram inside the collaboration. The **Select Parts** dialog will open.



☑ -Observer : Observer::SlidingBarIcon [Observer::Observer]
☑ -Subject : Observer::CallQueue [Observer::Observer]

3. Select properties (parts) to display them in a diagram. Click OK.
4. Parts are displayed in a diagram.



Interaction Overview Diagram

The Interaction Overview diagram focuses on the overview of the flow of control between Interactions. It is based on the Activity diagram notation. Interactions in the Interaction Use diagram are represented using the Interaction Use element. See the sample of the Interaction Overview diagram in Figure 372 on page 561.

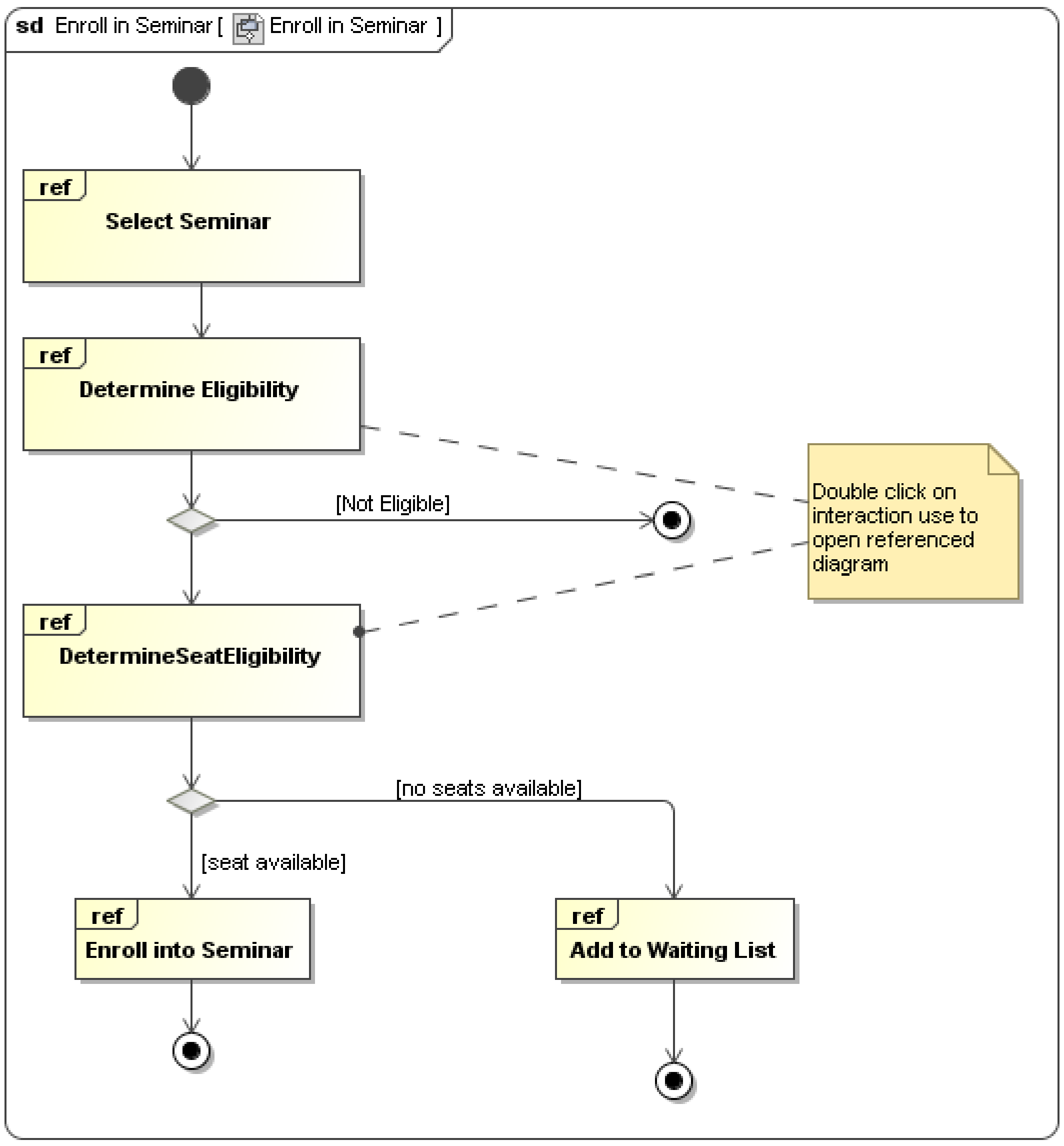
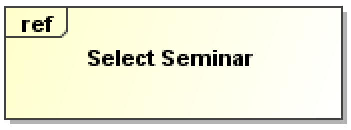


Figure 372 -- Sample of the Interaction Overview diagram

Element	Button (hot key)	Notation
Interaction Use Represents interactions.	(Shift-T)	

Other elements of the Interaction Overview diagram are the same as in the Activity diagram. For more information about the Activity diagram, see “Activity Diagram elements” on page 537.

10 EXTENSION DIAGRAMS

MagicDraw supports these extensions of UML diagrams:

- "Content Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 586.
- "Robustness Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 592.
- "User Interface Modeling Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 564.

Moreover MagicDraw provides various types of other diagrams:

- "Web Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 593.
- "CORBA IDL Diagram" (Architect and Enterprise editions), see page 597.
- "WSDL Diagram" (Architect and Enterprise editions), see page 599.
- "Time Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 601.
- "Struts Diagram" (Professional, Architect, and Enterprise editions), see page 601.
- "Networking Diagram" (Standard, Professional, Architect, and Enterprise editions), see page 603.
- "Free Form Diagram" (Standard, Professional, Architect and Enterprise editions).
- "Relation Map Diagram" (Standard, Professional, Architect and Enterprise editions), see page 606.
- "Dependency Matrix" (Standard, Professional, Architect and Enterprise editions), see page 606.
- "Generic Table" (Standard, Professional, Architect and Enterprise editions), see page 606.

Working with Diagrams

For the general information about working with diagrams see chapter “Diagramming” on page 149.

If there is a need, you can enable or disable a plugin that allows to create the appropriate extension diagram in the **Plugins** tab of the **Environment Options** dialog. For more information see "Customizing Environment Options" on page 90.

Patterns

Various types of classes can be created in every class diagram using a **Pattern Wizard**. It contains GOF, Java, Junit, CORBA IDL, XML Schema, and WSDL design patterns.

New patterns and modifications of the existing ones can also be created using Java code or JPython scripts. For the detailed description see “MagicDraw OpenAPI UserGuide.pdf”.

For a detailed description of the **Pattern Wizard**, see section “Controlling Merge memory usage” on page 342.

To open the Pattern Wizard

- In the class diagram, click the **Class by Pattern** button.
- From the class shortcut menu, select **Tools** and then select the **Apply Pattern** subcommand.
- Select a class and select **Apply Pattern** from the **Tools** main menu.

Common Elements

Toolbar Button	Button (Hot key)	
Selection	(Escape)	
Sticky Button	(Z)	
Text Box	abc (X)	
Text Box (HTML Text)	abc HTML (SHIFT+X)	
Note	(N)	
Note (HTML Text)	(SHIFT+N)	
Comment		
Comment (HTML Text)		
Anchor	(H)	
Constraint	(SHIFT+H)	
Containment	(SHIFT+C)	

Toolbar Button	Button (Hot key)	
Dependency	(SHIFT+D)	
Separator	(W)	
Rectangular Shape	(SHIFT+Q)	

User Interface Modeling Diagram

View Online Demo	User Interface Modeling

TIP!	Web UI sample project, which represents the UI Modelling Diagram usage for the web based interface modelling is available at <MagicDraw installation directory>\samples\diagrams\User Interface Modeling.

User Interface (UI) Modeling diagram makes it possible to build prototypes of user interfaces, connect UI mock-ups with whole Architectural model, export them as images, and create browsable reports for presentations. In short, they help gather information faster and thus save time and money.

The merits of User Interface Modeling lies in its ability to:

- Create WYSIWYG User Interface prototypes rapidly.
- Integrate User Interface development with UML specifications.
- Get immediate feedback from prospective users on real situations and reuse it for next designs.
- Create browsable reports with the **MagicDraw Report Wizard** (for more information about report generation see "MagicDraw ReportWizard UserGuide.pdf").

The Reasons Why Prototyping is so Important?

Various versions of user interfaces need to be tested in order to see how clients respond. This is especially true if you work on key dialogs like for example a sign up screen for a website or an e-commerce application. Working with User Interface prototypes instead of "real" user interfaces will thus enable you to work with small details such as color and the position of a button and substantially reduce designer and programmer overhead in the design phase.

You can build up mock-ups or prototypes, get quick feedback from prospective users, and take and reuse the feedback for future designs. All this is possible with User Interface prototyping. The feedback loop makes for quicker mature designs that work for everybody, which is what really matters.

You can build mock-ups or prototypes to meet following objectives:

- **Integrate GUI development with UML specifications** since this is a new field with increased design capability and since it is easier to see missing parts in UML or User Interface modeling.
- **Help business analysts gather requirements** because of the permanent feedback from prospective users, which makes it easier for them to get all the information needed.
- **Create browsable User Interface prototypes / GUI simulation / Story boarding** since several prototypes can be connected via hyperlinks with one another and then be presented together in a report and simulate the workflow of an application.
- **Resolve flow issues** as it is easier to think through a problem when a user-related interface can be changed quickly.
- **Get "buy-in" from stakeholders** as it can be shown more rapidly how a particular user interface will look like.
- **Run a usability test before full production** so that potential errors in usability like overfilled screens or a usage too complicated can be avoided.
- **Test a series of interaction widgets**. You may think, for example, that another text field or button would be good on a screen. Since modifying a prototype is so easy, it is not a problem to present these suggestions to others.

For more information about prototyping, go to:

http://today.java.net/pub/a/today/2005/08/23/prototyping.html

http://www.scottberkun.com/essays/12-the-art-of-ui-prototyping/

Working with User Interface Modeling Diagrams

To start working with a User Interface Modeling diagram

Do either one of the following:

- Click the **User Interface Diagram** button in the Diagram toolbar.
- Select **New Diagram > Other Diagrams > User Interface Modeling Diagram** from the Package or Model shortcut menu in Browser.

After a project is loaded and a diagram is created, UI modeling elements can be added to the diagram pane.

To add new elements to the User Interface Modeling diagram

- Simply drag and drop them out of the Diagrams modeling elements toolbar.

For further information, see “User Interface Modeling” on page 566 and “Case Studies for User Interface Modeling” on page 578.

To load a sample with an already created User Interface model

1. Open either the **UI Modeling Samples.mdzip** or **UI Modeling in System Development.mdzip** projects which you will find in the <MagicDraw installation folder>/ samples/diagrams/User Interface Modeling directory.
2. After loading the sample, select the models from the **Index-Diagram** by clicking the hyperlinks.

User Interface Modeling

This section gives the basic information you need to know about user interface modeling in MagicDraw. It includes the following sub-sections:

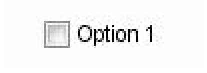
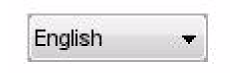
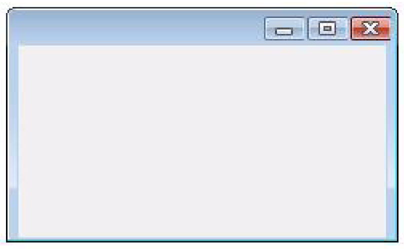
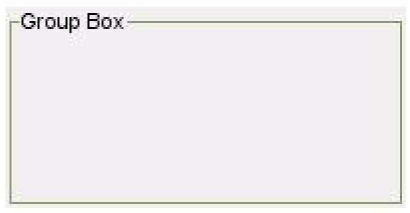
- "User Interface Modeling diagram elements" on page 566.
- "Modifying a table" on page 571
- "Modifying a tree" on page 573.
- "Nesting" on page 573.
- "Reusability" on page 574.
- "Specifying elements" on page 574.
- "Icon usage" on page 576.
- "Using symbol properties" on page 577.
- "User interface prototyping" on page 578.

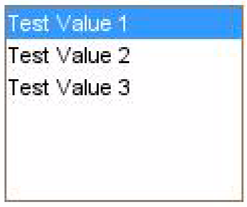
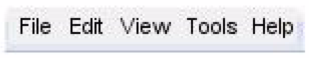
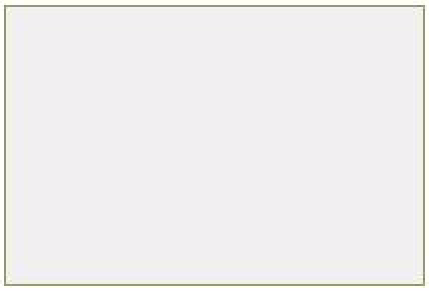
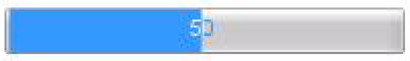
For User Interface Modeling, see "Case Studies for User Interface Modeling" on page 578. Three case studies will provide step-by-step instructions how to build user interfaces and create browsable reports.

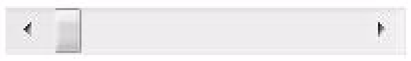
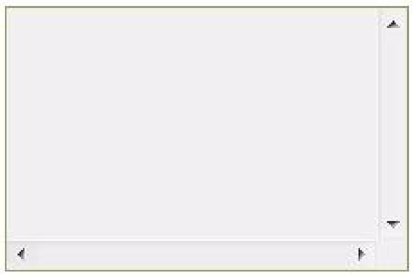
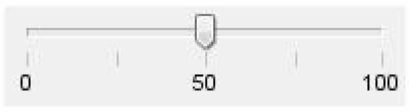
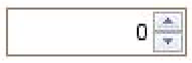
User Interface Modeling diagram elements

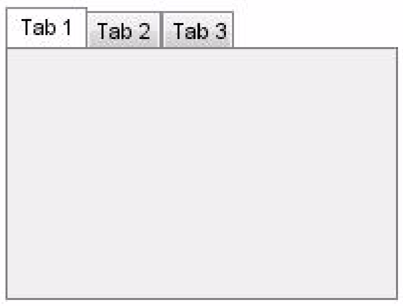
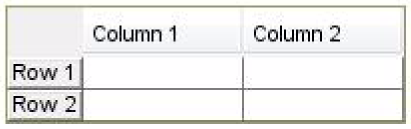
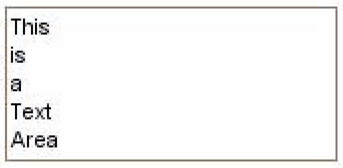
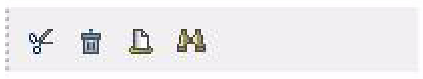
The following table lists all available User Interface modeling elements and their properties.

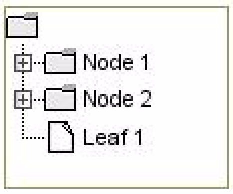
Element	Description	Properties	Example
Button	A regular button with the possibility to add text, icon or both.	- **Icon**: select one of the available icons or choose your own. - **Inactive**: activates/ deactivates the button. - **Text**: displays text on the button on the diagram pane. - **Selected**: sets the button as selected or not.	
Toolbar button with Icon	Small sized button with predefined icon (close, copy, cut, delete, new, open, paste, print, redo, save, search, undo, zoom in, zoom out).	- same as for regular buttons.	
Button with Text	Button with predefined text (Back, Cancel, Close, Finish, Next, OK).	- same as for regular buttons.	

Element	Description	Properties	Example
Check Box	Check box with text.	- **Inactive**: activates/ deactivates the box. - **Text**: displays text next to the check box on the diagram pane. - **Selected**: marks/ unmarks the check box.	
Combo Box	Regular combo box in non-editable style with possibility to show a value.	- **Inactive**: activates/ deactivates the box. - **Text**: displays text in the combo box.	
Frame*	Main container component represented by a regular Internal Frame. Any other component can be nested inside.	- **Icon**: select one of the available icons or choose your own. - **Inactive**: activates/ deactivates the frame. - **Maximize**: defines if the maximize-icon should be visible or hidden. - **Minimize**: defines if the minimize-icon should be visible or hidden. - **Title**: displays the title of the frame.	
Group Box*	A panel with a titled border. Any other component can be nested inside.	- **Border Type**: defines the style of the border. - **Title**: displays the title of the border. - **Titled**: defines whether border text should be shown or not.	
Hyperlink	A blue colored and underlined item for showing some text or an icon or both.	- **Icon**: select one of the available icons or choose your own. - **Inactive**: activates/ deactivates the link. - **Text**: displays the text of the hyperlink.	
Label	Item with ability to present a text, an icon or both.	- **Icon**: select one of available icons or choose your own. - **Inactive**: activates/ deactivates the label. - **Text**: displays the text in the label.	

Element	Description	Properties	Example
List	Bordered item which stores and shows numerous values. Values can be shown as selected.	- **Horizontal Scroll Bar**: defines the visibility of the horizontal bar. - **Inactive**: activates/ deactivates the list. - **Selected Value**: defines which value should be shown as selected. - **Values**: add/remove values to/from the list. - **Vertical Scroll Bar**: defines the visibility of the vertical bar.	
Menu Bar	A bar that can present several text items.	- **Values**: add/remove menus to/from the bar.	
Panel*	A bordered panel.		
Password Field	A bordered field with a text which is hidden through symbols.	- **Hidden**: decides whether the text should be shown as text or symbolized. - **Inactive**: activates/ deactivates the field. - **Text**: displays the text of the password field.	
Progress Bar	A bar which presents the state of progress.	- **Maximum Value**: sets the maximum value of the bar. - **Minimum Value**: sets the minimum value of the bar. - **Value**: sets the display text on the bar. - **Vertical**: switches between horizontal and vertical orientation.	
Radio Button	A radio button with possibility to present some text.	- **Inactive**: activates/ deactivates the button. - **Text**: displays text next to the radio button. - **Selected**: marks/ unmarks the button.	

Element	Description	Properties	Example
Scroll Bar	Item which represents regular scroll bar.	- **Inactive**: activates/deactivates the bar. - **Vertical**: switches between horizontal and vertical orientation.	
Scroll Pane*	A panel which can contain a vertical and/or a horizontal scroll bar.	- **Horizontal Scroll Bar**: defines the visibility of the horizontal bar. - **Vertical Scroll Bar**: defines the visibility of the vertical bar.	
Separator	A line with ability to split up a component.	- **Vertical**: switches between horizontal and vertical orientation.	
Slider	An item for presenting a range of several values. The knob of this item can be moved to these values.	- **Inactive**: activates/deactivates the slider. - **Invert**: switches maximum and minimum values. - **Knob Position**: defines the location of the knob. - **Maximum Value**: sets the maximum value of the slider. - **Minimum Value**: sets the minimum value of the slider. - **Spacing**: sets the space between two markings. - **Values**: defines at which position the slider should be a text. - **Vertical**: switches between horizontal and vertical orientation.	
Spinner	Regular spinner that can show a value.	- **Inactive**: activates/deactivates the spinner. - **Text**: displays value on the spinner.	

Element	Description	Properties	Example
Tabbed Pane*	Item which represents a panel with tabs.	- **Active Tab**: sets which tab should be shown as selected. - **Tab Position**: selects the placement of the tabs. - **Tabs**: add/remove tabs to/from the pane.	
Table	A table item with the ability to add and/or remove columns and/or rows. See section “Modifying a table” on page 571 for more information.	- **Column Header**: defines whether the column header should be visible or not. - **Row Header**: defines whether the row header should be visible or not.	
Text Area	A multi-line bordered item to present long text.	- **Horizontal Scroll Bar**: defines the visibility of the horizontal bar. - **Inactive**: activates/ deactivates the area. - **Text**: displays text in the text area. - **Vertical Scroll Bar**: defines the visibility of the vertical bar.	
Text Field	A single-line bordered item to present some text.	- **Inactive**: activates/ deactivates the field. - **Text**: displays text in the text field.	
Tool Bar*	A bar which can consist of any other component. Usually used to nest buttons or labels with icons.		

Element	Description	Properties	Example
Tree	An item to present a tree structure. It can add numerous nodes and/or leaves to it. For information on how to do this, see section “Modifying a tree” on page 573.	- **Expand**: defines whether the whole tree should be expanded or not. - **Horizontal Scroll Bar**: defines the visibility of the horizontal bar. - **Icon**: select one of available icons or choose your own. - **Text**: displays the text of the root node. - **Vertical Scroll Bar**: defines the visibility of the vertical bar.	

* NOTE	The elements marked with an asterisk (*) are the **Container** elements and can nest other components.

Modifying a table

You can add columns and rows to a table, order and name them. When expanding a table in the Browser tree, the structure of the table will be displayed. Rows are added directly to the model element of the table. Columns are stored in the Columns Enumeration. For every new column a new Cell will automatically be added to every row. To add a value to the table, you need to edit the name of the Cell.

You can edit a table in the following ways:

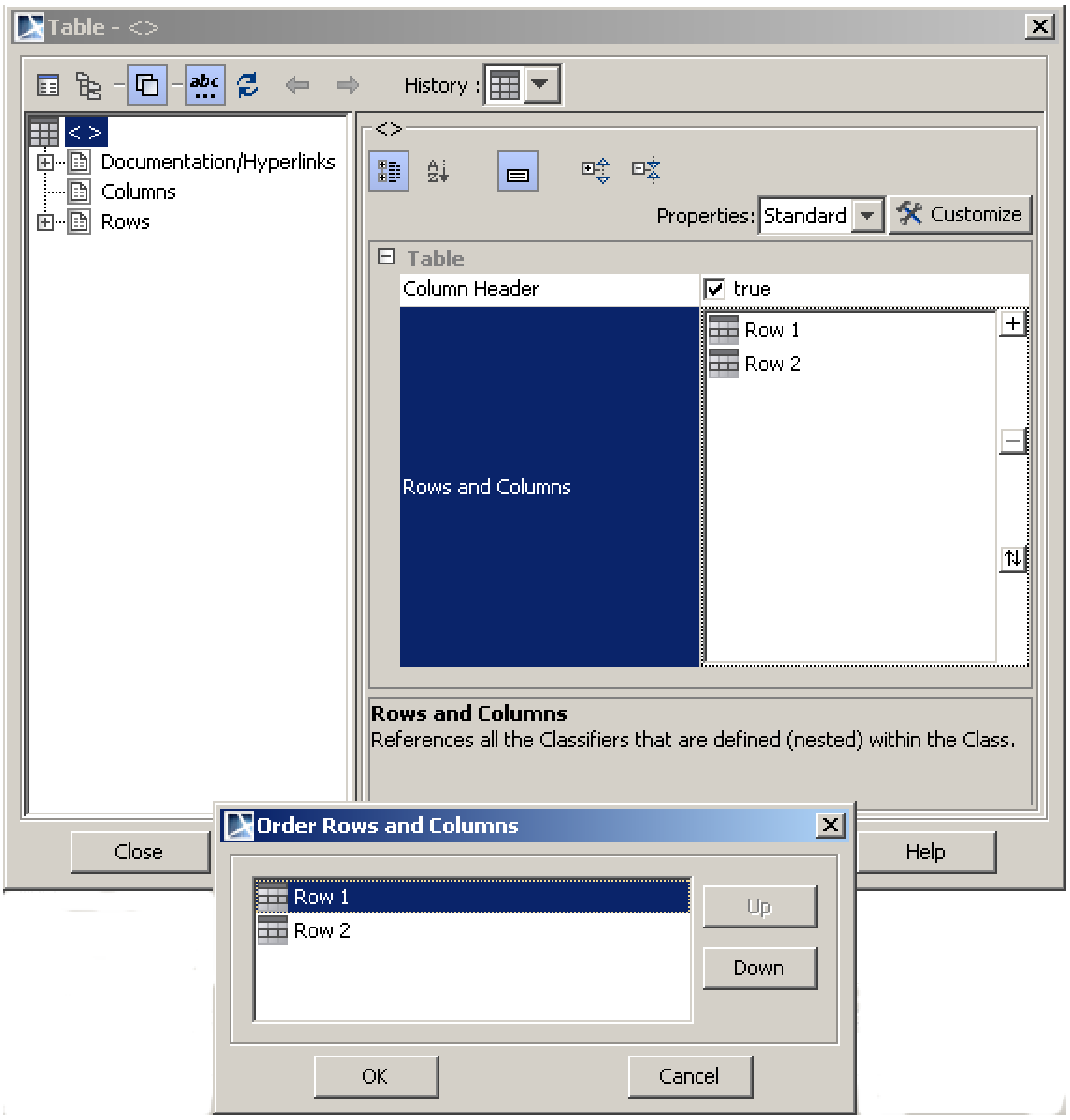
- Add a row to the table.
- Change the order of the rows.
- Add a column to the table.
- Change the order of the columns.
- Add a value to the table.

To add a row to a table

1. Right-click on the table element in the Browser tree to open the shortcut menu.
2. Select **New Element** and then **Row**. New row will be added to the table.
3. Type in a title for the new row.

To change the order of the rows

1. Select the table in the diagram.
2. Right-click on it and select **Specification** in the shortcut menu.
3. Go to the Rows node - all rows are listed there.
4. Select one row. You can move it to another position in the list by clicking **Up** or **Down** buttons.



Column Header	✓ true
Rows and Columns	Row 1 Row 2

Rows and Columns
References all the Classifiers that are defined (nested) within the Class.

Figure 373 -- Example of row ordering in a table

To add a new column to a table

1. Select the table in the diagram.
2. Right-click on it and select **Specification** in the shortcut menu.
3. Go to **Columns** node - all columns are listed there.
4. You can add new column to the table and also one new cell to every row by clicking **Create** button.
5. Type in a title for the new column.

To change the order of the columns

1. Select the table in the diagram.
2. Right-click on it and select **Specification** in the shortcut menu.
3. Go to **Columns** node - all columns are listed there.
4. Select one column. By clicking **Up** or **Down** buttons, you can move it to another position in the list.

To change the cell name

1. Expand the Table element in Browser. You will see the Cell elements listed under the Table elements.
2. Change the name of the Cell:
3. Select a Cell element in Browser and press **F2**. The Cell text area will turn to editable.
4. Slowly double-click on the Cell in Browser. The Cell text area will turn to editable.
5. Right-click on the Cell element and select **Specification**. The **Cell** specification dialog box will open. Specify the **Text** property and click **Close**.

To add a value to the table, you need to edit the text property of the cell.

Modifying a tree

You can add as many nodes and leaves as you need to a tree and to any node in that tree and also change the order of the elements of a tree.

To add a node or a leaf to the tree or to another node

1. Right click on the tree or a node element in the model browser.
2. Select **New Element** and then **Node** or **Leaf**.
3. Type in a text property for the element. This will define the text of the node or the leaf in the diagram.

To change the order of the elements of a tree

1. Select the table in the diagram.
2. Right-click on it and select **Specification** in the shortcut menu.
3. Go to Nodes and Leafs node - all rows are listed there.
4. Click the small button for Alphabetical View.
5. Select one row. You can move it to another position in the list by clicking **Up** or **Down** buttons. Click **OK.** The order will then be changed.

Nesting

You can move and arrange user interface modeling elements, since they nest each other, and thus create deep structured User Interface models. However, not all elements have the nesting ability: only **Container** elements can nest other elements (these elements are marked with an asterisk (*) in the section “User Interface Modeling diagram elements” on page 566).

As Figure 374 on page 574 shows, all frames nest in each others and, as a result, if you were to move the element with title *Frame 1*, all other elements would stay in position within this element.

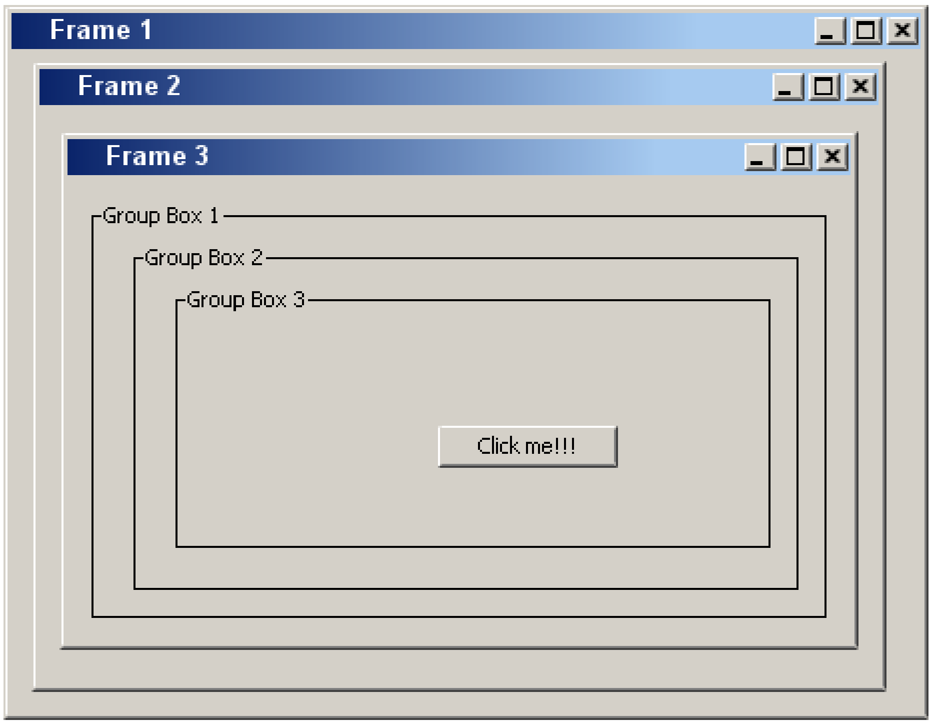


Figure 374 -- Example of a deep structure that was created using containers

Reusability

If you have created a complex model and need to use it again, you do not have to create a new one. All you need to do is select the elements, copy them and then paste them into the same diagram or in any other diagram. You can also reuse just a single element by copying and pasting it or by dragging it from the Browser onto the diagram pane.

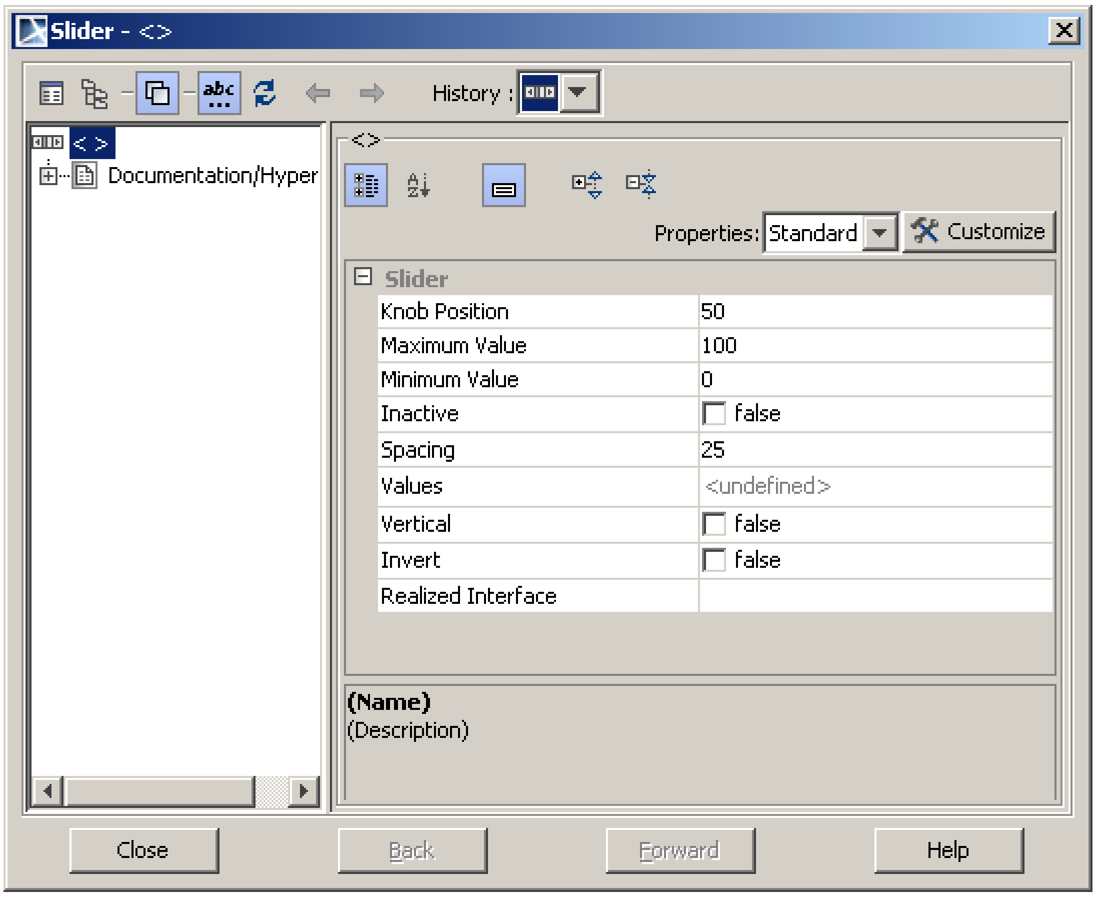
Specifying elements

You can modify UI modeling elements by editing their properties in the following three ways:

- Via the **Specification** dialog box.
- Via the shortcut menu.
- On a diagram pane.

To edit properties via the **Specification** dialog box

1. Select an element on the diagram.
2. Right-click on it and select **Specification** on the shortcut menu (Figure 375 on page 575).
3. Edit one of the properties to modify the element (for the effects of editing properties, see section “User Interface Modeling diagram elements” on page 566).



Properties: Standard Customize

Slider	
Knob Position	50
Maximum Value	100
Minimum Value	0
Inactive	☐ false
Spacing	25
Values	<undefined>
Vertical	☐ false
Invert	☐ false
Realized Interface	

(Name)
(Description)

Figure 375 -- Specification dialog box of the Slider element

The so called boolean properties that have only two values can also be edited via the shortcut menu.

To edit properties via the shortcut menu

NOTE This is possible for the boolean properties only.

1. Select an element on the diagram.
2. Right-click on it. The shortcut menu will appear and the properties which can be edited will be displayed at its bottom (Figure 376 on page 576).
3. Select the property you want to change.

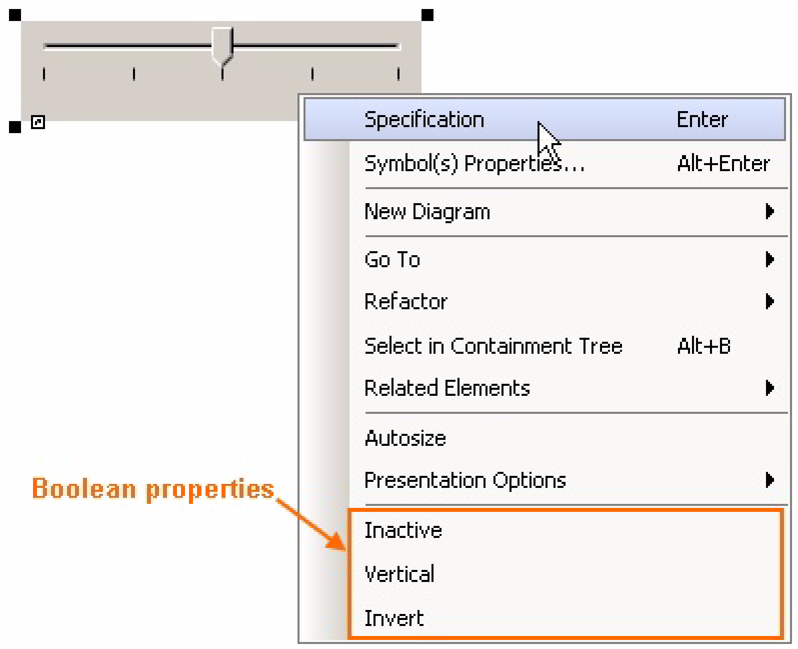


Figure 376 -- Shortcut menu of the Slider element with boolean properties

For the elements that own a text or a title, for example a button or a frame, it is also possible to edit the appropriate properties straight on a diagram.

To edit properties on a diagram

NOTE	This is possible for the text or title properties only.

1. Select an element on the diagram.
2. Click on the selected element.
3. Type the text on the element (Figure 377 on page 576).
4. Click on the free space of the diagram pane. The text you have typed will appear on the element and in the **Text/Title** property of the element as well.

Figure 377 -- Editing a title of an element

Icon usage

Some elements are capable of owning an icon. User Interface Modeling provides a number of frequently-used icons such as cut, delete, undo/redo, etc. Of course, it is also possible to use any images from your computer as icons.

To add an icon

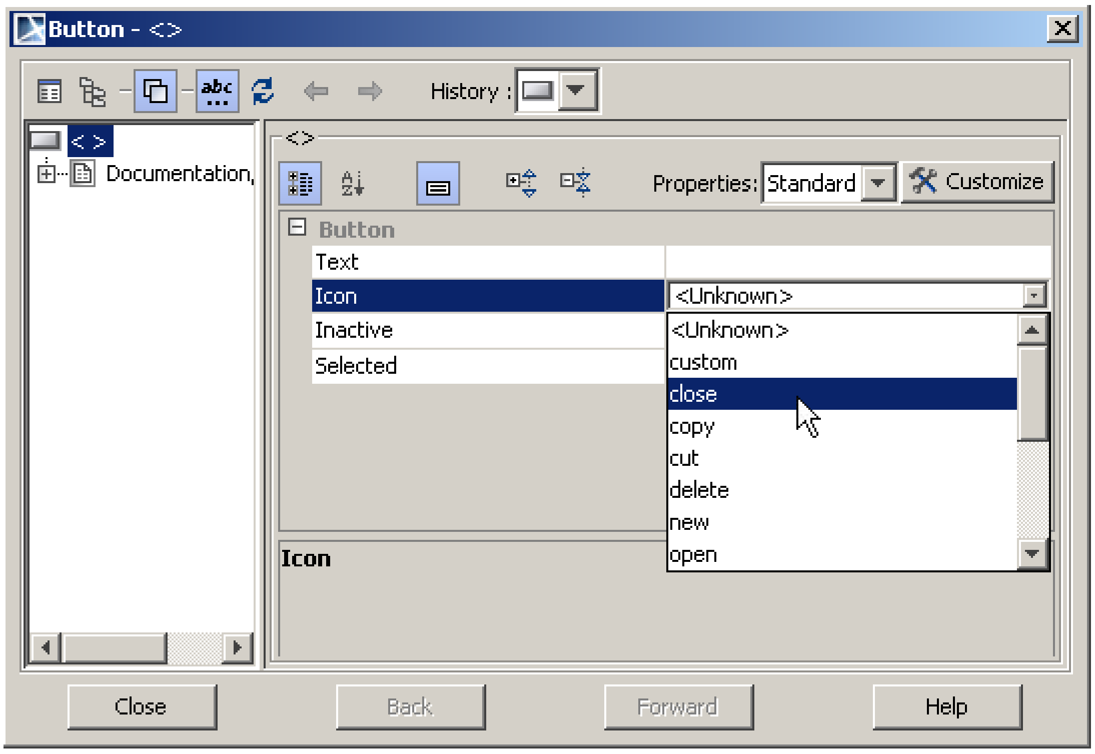
1. Select an element which can own an icon, for example a button..

NOTE	To find out which elements can have an icon, see “User Interface Modeling diagram elements” on page 566.

2. Right click on the element and select **Specification** in the shortcut menu.

3. In the **Icon** list, select an icon you want to appear on the element (Figure 378 on page 577).

NOTE	If you want to use any image from your computer as an icon, click **custom**.



Text	
Icon	<Unknown>
Inactive	
Selected	

<Unknown>
custom
close
copy
cut
delete
new
open

Icon

Figure 378 -- Setting an icon for a button

Using symbol properties

User Interface Modeling also enables you to modify user interface elements via symbol properties.

To edit an element via symbol properties:

1. Select an element on the diagram.
2. Right-click and select **Symbol(s) Properties** on the shortcut menu.
3. Change one of the properties listed in the table below.

TIP!	If you want to set, for example, the same background color to more than one UI modeling element, you can select all these elements in the diagram and then change the required property for all of them in the same way.

The following table lists the supported symbol properties:

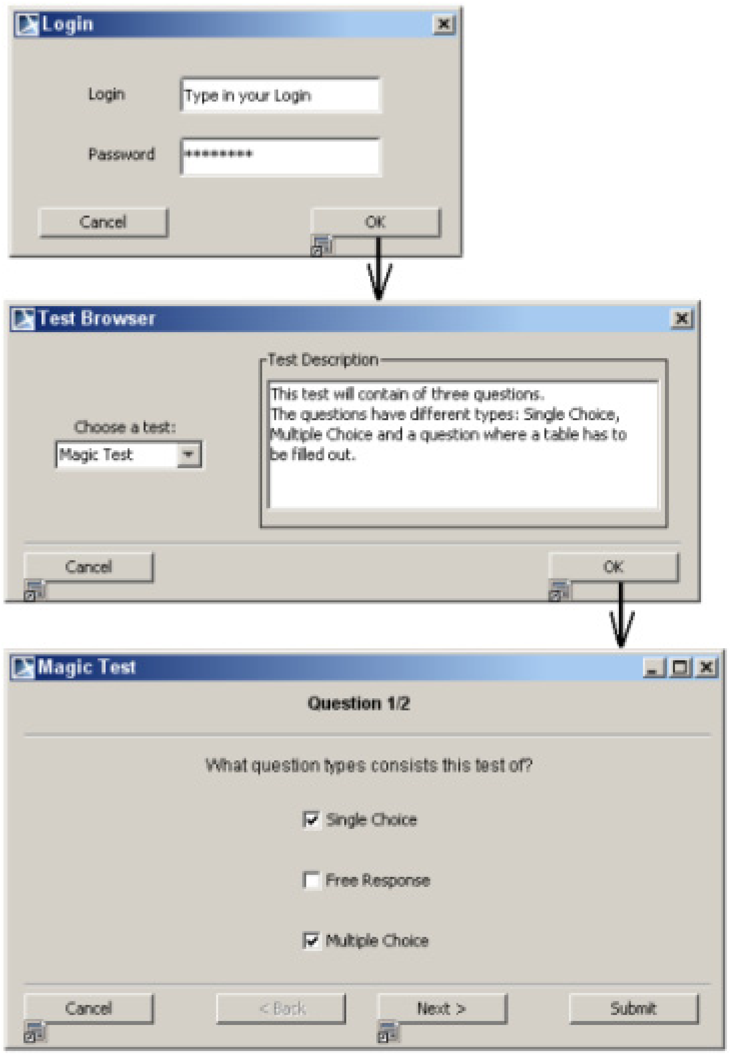
Symbol Property	Effect
Fill Color	Sets the background color of the component to the chosen one, property **Use Fill Color** must be marked.
Font	Sets the font if there is any text in the component.
Text Color	Sets the text color of the component to the chosen one.
Pen Color	Sets the color of the border for components that have one.

User interface prototyping

User Interface Modeling enables you to create browsable reports. All you need to do, when creating a breath-able report, is add a hyperlink to the UI model element, is to and link it to the other one. Once a report of these models has been created, click on any element in the report. You will then be directed to the other diagram.

As Figure 380 on page 580 shows, when you click **OK** in the upper left-hand frame you will be directed to the next frame. And using the **OK** of this frame you can get to a couple of frames in which you can step forward and backward as you want since they are all linked to one another.

"Case Study 3 - User Interface Prototyping Example" on page 584 provides an example of how this feature works and explains how to add hyperlinks and create browsable reports.



This test will contain of three questions.
The questions have different types: Single Choice, Multiple Choice and a question where a table has to be filled out.

Question 1/2

What question types consists this test of?

- [x] Single Choice
- [ ] Free Response
- [x] Multiple Choice

Figure 379 -- Example of User Interface Models and their Workflow

Case Studies for User Interface Modeling

This section includes three case studies on how to create User Interface models:

- "Case Study 1 - Modelling User Interface for the Report Wizard Window" on page 579.
- "Case Study 2 - Slider Example" on page 582.
- "Case Study 3 - User Interface Prototyping Example" on page 584.

Full detailed samples can be found in “<MagicDraw installation folder>\samples\diagrams\User Interface Modeling\UI Modeling Samples.mdzip”.

Case Study 1 - Modelling User Interface for the Report Wizard Window

This case study provides step-by-step instructions for modeling the MagicDraw Report Wizard window.

Step #1 Create a new Project

1. Choose **New Project** from the **File** menu.
2. Name it *Report Wizard*.

Step #2 Create a new Diagram

1. Click the **User Interface Diagram** button in the main diagram toolbar.
2. Name the new diagram *Report Wizard*.

Step #3 Create Container components

1. Click the **Frame** button in the User Interface diagram toolbar and drag-drop it on the diagram pane. A Frame component will be created.
2. Name the Frame component. Select Frame on the diagram and type its name *Report Wizard.* Or you can define the Frame component name in the **Frame** specification dialog box:
   - 2.1 Double-click the Frame component on diagram to open the Frame specification dialog box.
   - 2.2 Type *Report Wizard* in the Title field.
3. Uncheck properties **Maximize** and **Minimize** of the Frame in the **Frame** specification dialog box.
4. Define Icon for the Frame component:
   - 4.1 Select the **custom** option in the **Icon** property in the **Frame** dialog box. The **Open** dialog box will open.
   - 4.2 Browse to the "<MagicDraw installation>\plugins\com.nomagic.magicdraw.uimodeling" folder, and select the *nomagic.png* image to set the frame icon.
5. Create two **Group Boxes** and one **Separator**.
   - 5.1 Name one **Group Box** as *Select Template*
   - 5.2 For the other Group Box uncheck property **Titled**.
   - 5.3 Drag all three components to the **Frame** and arrange everything like in Figure 381 on page 581.

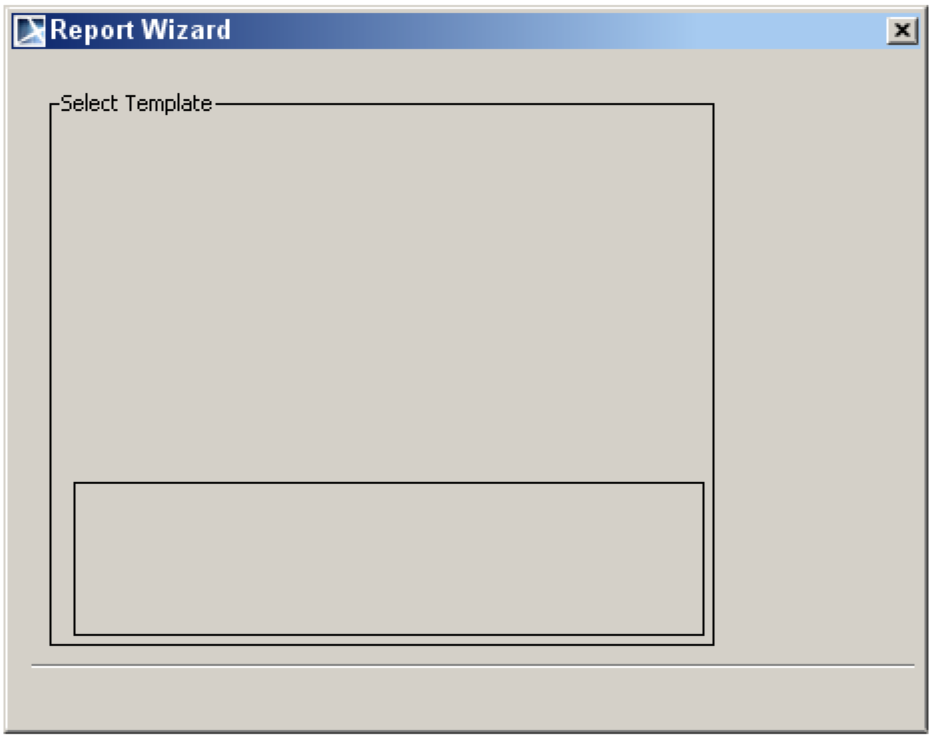


Figure 380 -- Report Wizard Frame with Group Boxes and Separator

Step #4 Create a Tree

1. Create a new Tree component:
   1.1 Click the **Other** group in the diagram toolbar to expand the toolbar.
   1.2 Click the **Tree** button in the diagram toolbar and drag-drop it on the *Select Template* Group Box on diagram pane.
2. Delete old nodes from the Tree component.
3. Create new nodes to the Tree component.
   3.1 Right-click on the Tree in the Containment tree to invoke its shortcut menu and choose **New Element** > **Node**.
   3.2 Create five new **Nodes** in this way and name them as shown in Figure 382 on page 582.
4. Add Leaves to Nodes.
   4.1 You can add a **Leaf** by right-clicking on a **Node** in the containment tree and then choose **New Element > Leaf**.
   4.2 Add at least one **Leaf** to every **Node** to indicate that the nodes have internal elements.

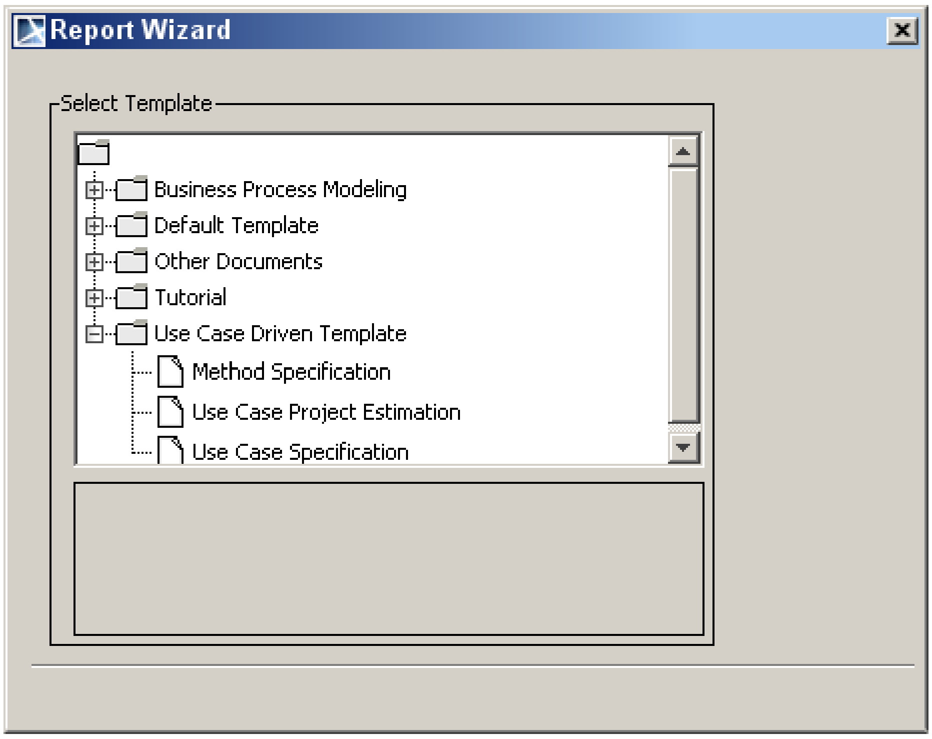


Figure 381 -- The Report Wizard Window with Added Tree

Step #5 Add Buttons

1. Create predefined text buttons.
   1.1 Click the **Buttons** group in the diagram toolbar to expand the toolbar.
   1.2 Right-click the **Back** button to expand the text buttons group. Create **Back**, **Next** and **Cancel** buttons (Figure 383 on page 583).
2. Create regular buttons.
   2.1 Click the **Button** button in the toolbar and drag it to the pane.
   2.2 Select the created button in the diagram and type in *New.*
   2.3 Create remaining buttons by repeating steps 2.1 and 2.2.
3. Check property **Inactive** for all buttons, except **Next>**, **Cancel**, **New** and **Import**.

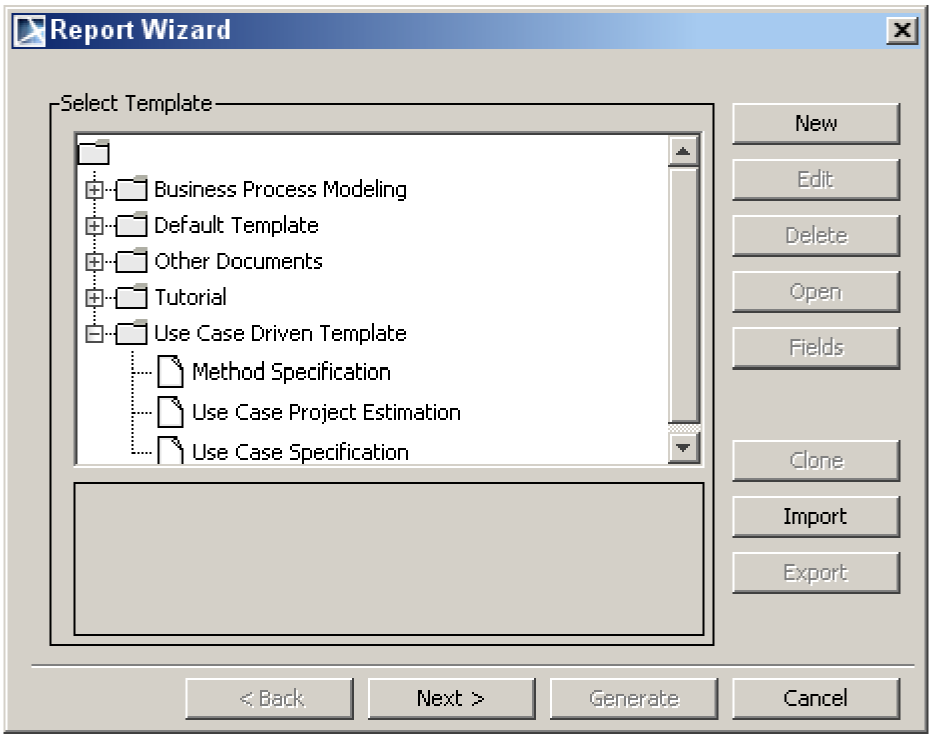


Figure 382 -- Sample of the Report Wizard window

Step #6 Using the Report Wizard window

For example this user interface model could now be exported as an image. The steps to do this are as follows:

1. Select **Save As Image** from the **File** menu.
2. In a new dialog mark **Active Diagram**.
3. In **Image File** define the location where the image should be placed.
4. Select *Joint Photographic Experts Group (*.jpg)* in **Image Format** and then press the **Save-**Button. Of course you can also take another format if you want to.

Case Study 2 - Slider Example

This case study contains step-by-step instructions showing how to create a User Interface model with Sliders. It also shows how to customize the symbol properties of User Interface components. It does not explain, however, how to create a new project and a new diagram since those are explained in "Case Study 1 - Modelling User Interface for the Report Wizard Window" on page 579.

Step #1 Create a Frame, Labels and Sliders

1. Create a new **Frame** and add title *Symbol Properties Customization.*
2. Add new **Label** to the **Frame**.
   - 2.1 Click the **Text** group in the diagram toolbar to expand the toolbar.
   - 2.2 Click the **Label** button and place the label on the diagram. Name it *Fill Color.*
   - 2.3 Create the remaining two labels.
3. Add **Sliders** to the **Frame.**
   - 3.1 Click the **Slider** button in the **Other** toolbar.
   - 3.2 Set property **Spacing** to 50 so as to just have three values marked in the slider.
   - 3.3 Set property **Knob Position** to 0 to move the knob to the left position.

3.4 Select given value *0 0* out of property **Values** and rename it to *0 Red*. Rename the other two given values to *50 Blue* and *100 White*.*

3.5 Draw two more sliders and repeat last steps setting values as shown in Figure 383 on page 583.

*** NOTE**	With regard to setting the values of a slider it is important to know that there is no empty space between 0. 0, for example, represents a new line. So, in this case, when entering a value, it should look like this: 0 0

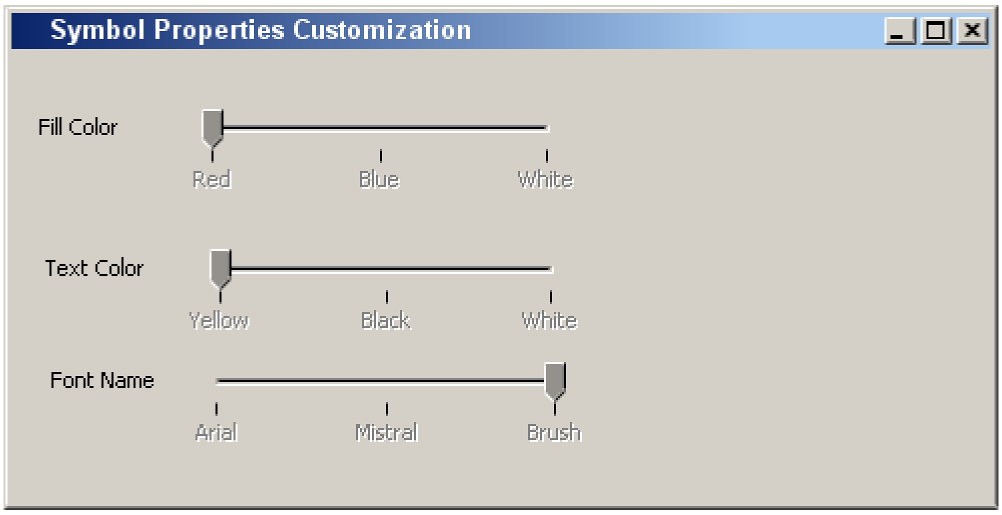


Figure 383 -- Symbol Properties Customization Frame with Added Labels and Sliders

Step #2 Add Text Fields

1. Create four **Text Fields.**

   1.1 Click the **Text Field** button in the **Text** toolbar.

   1.2 Name it *Red Background*.

   1.3 Repeat the previous two steps for the remaining two text fields (Figure 384 on page 584).

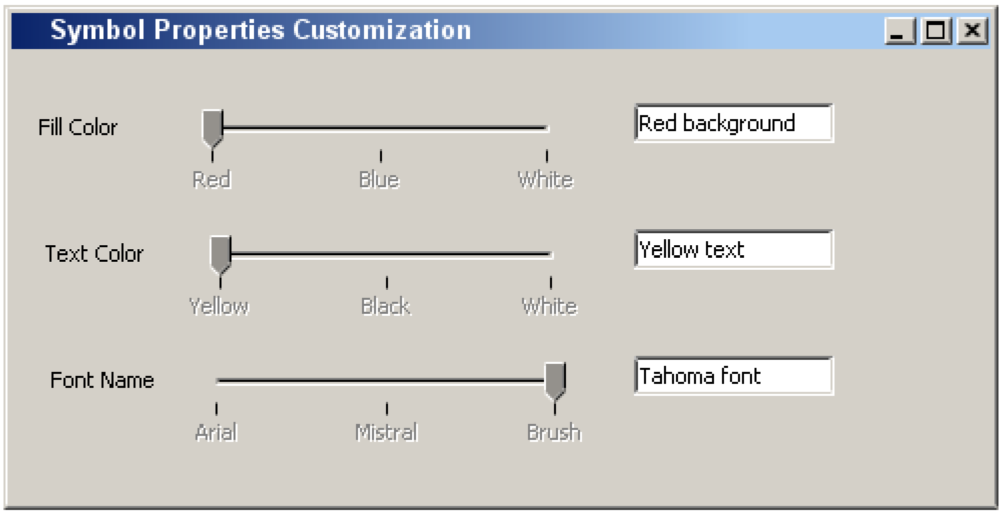


Figure 384 -- Added Text Fields to the Frame

Step #3 Edit Symbol Properties for the Text Fields

1. Edit Symbol Properties for the first text field.
    1.1 Select the first text field on the diagram surface.
    1.2 Right click and select **Symbol(s) Properties** in the shortcut menu.
    1.3 Check property **Use Fill Color** and change **Fill Color** to red.
2. Edit Symbol Properties for the remaining fields.
    2.1 For the second text field, select yellow in **Text Color**.
    2.2 For the third one, select the font name Tahoma in **Font** (Figure 385 on page 584).

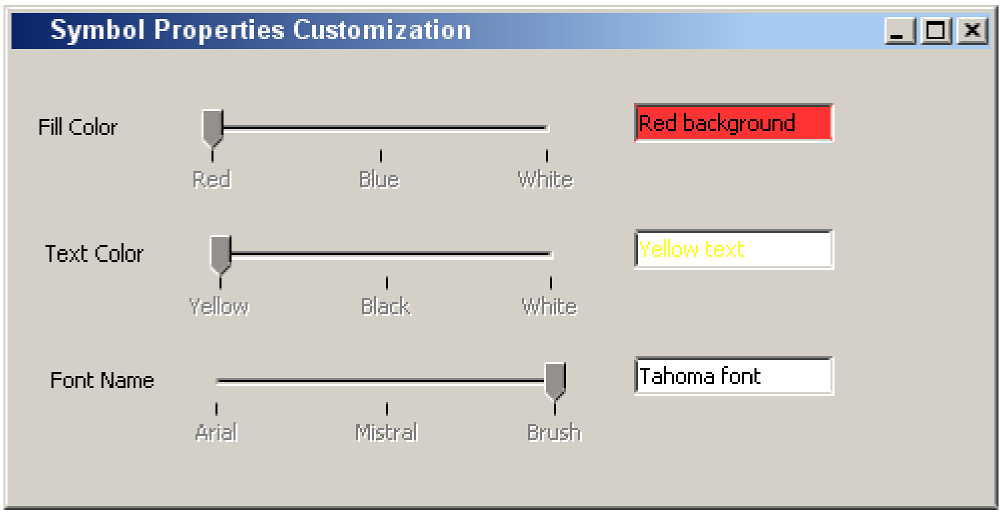


Figure 385 -- Finalized Slider Example

Case Study 3 - User Interface Prototyping Example

This case study shows how to connect several user interface models with one another and create a browsable report out of them to display the wildfowl of an application. The models should represent a test application with a Login Dialog, a Test Browser and a test with several questions. Here are step-by-step instructions for adding hyperlinks and creating browsable reports.

Step #1 Create first Model

1. Create a new **Package** for the model.

2. Create a model similar to the one in Figure 386 on page 585.

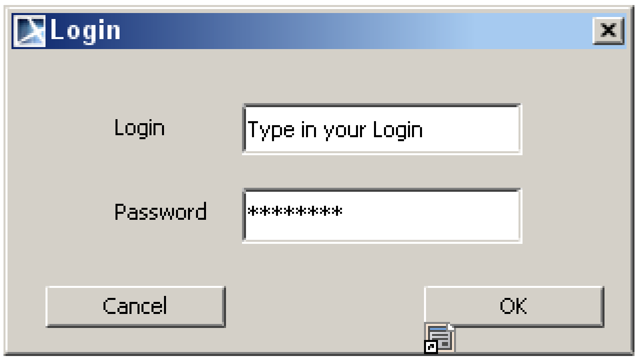
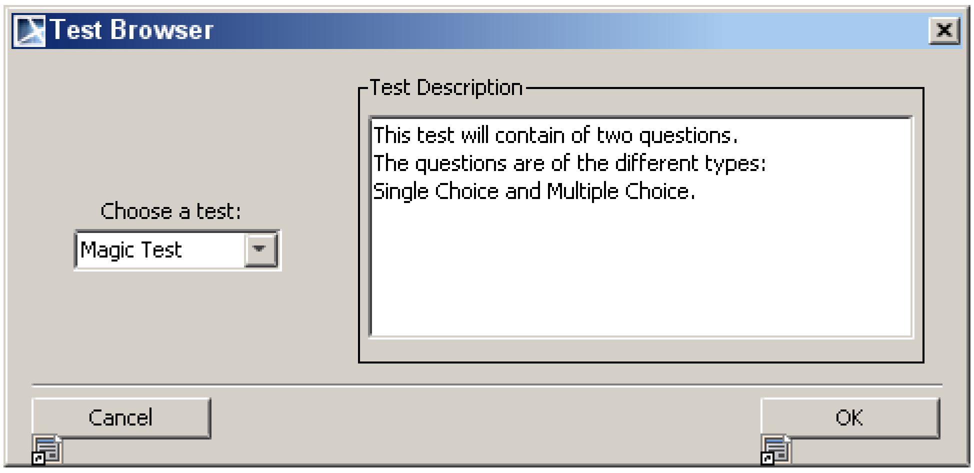


Figure 386 -- First Model of Prototyping Example - Login Dialog

Step #2 Create second Model

1. Create again a new **Package** for this model.
2. Create a model similar to the one in Figure 387 on page 585.



This test will contain of two questions.
The questions are of the different types:
Single Choice and Multiple Choice.

Figure 387 -- Second Model of Prototyping Example - Test Browser

Step #3 Create remaining Models

1. Create a separate **Package** for every model.
2. Build models similar to the ones shown in the full detailed sample which was mentioned in the beginning of this chapter. Or create models for questions on your own.

Step #4 Add Hyperlinks

1. Add a hyperlink.
   1.1 Open model with **Login Dialog**.
   1.2 Select the **OK** button.
   1.3 Click on smart manipulator **Hyperlinks/Go To** and select **Add Hyperlink** in the popup menu.
   1.4 Select **Element/Symbol** and click the **"..."** button. Browse to the **Package Test Browser**, select the **User Interface Diagram** in it and confirm two times with OK - a diagram symbol will appear next to the **OK** button. Double clicking on the **OK** button will lead to the other diagram.
2. Connect now all the buttons in the other diagrams with hyperlinks - you will see which component has an hyperlink because of the diagram symbol next to it.

Step #5 Create a browsable Report

1. Create a new report.
   - 1.1 Select **Report Wizard** from the **Tools** menu.
   - 1.2 Open the node **Default Template** in the tree and select **Web Publisher 2.0**.
   - 1.3 Confirm three times by clicking **Next** until dialog appears where to add data to the report. Add then all **Packages** that contain the created diagrams and click **Next**.
   - 1.4 Give a name to the output file by entering **Report file** and check the box **Display in viewer after generating report**. After clicking **Generate**, report will be built and shown in your default browser.

Content Diagram

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

The content diagram is an extension of UML notation. The purpose of the content diagram is to generate or represent a project structure (diagrams) and relations between them. The content table works as a table of contents for a project.

All content diagrams have their own specifications, wherein you can specify their name, documentation, and view the relationships in which they participate. You can also add stereotypes, tagged values, and constraints.

Buttons for creating diagram shapes are grouped into categories in the content diagram pallet.

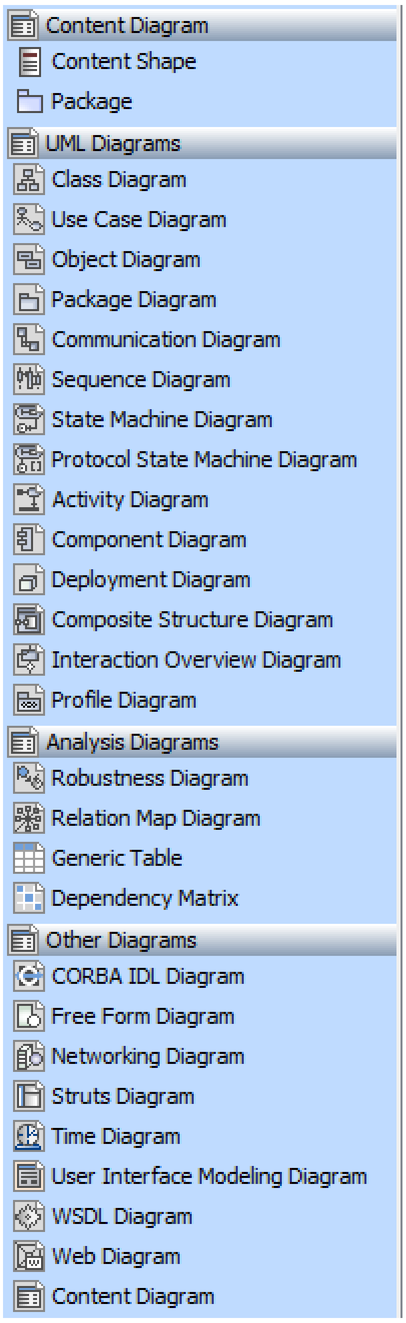


Figure 388 -- Content diagram pallet. Buttons grouped into categories

Content Diagram Elements

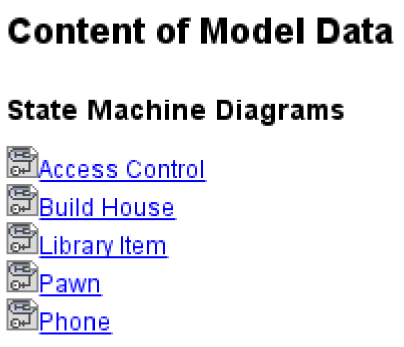
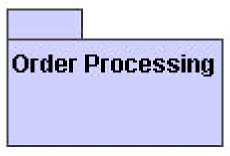
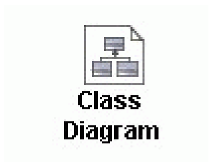
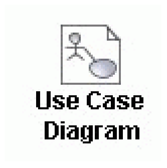
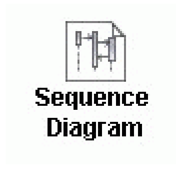
Diagram Pallet Button	Button (Hot key)	Notation
Content Shape Creates a table of contents of all diagrams of the project.	(C)	 **Content of Model Data** **State Machine Diagrams** Access Control Build House Library Item Pawn Phone
Package	(P)	
UML Diagrams		
Class Diagram Creates a class diagram.		
Use Case Diagram Creates a use case diagram.		
Communication Diagram Creates a communication diagram.		Communication Diagram
Sequence Diagram Creates a sequence diagram.		

Diagram Pallet Button	Button (Hot key)	Notation
State Machine Diagram Creates a state diagram.		State Machine Diagram
Protocol State Machine Diagram Creates a protocol state machine diagram.		Protocol State Machine Diagram
Activity Diagram Creates an activity diagram.		Activity Diagram
Component Diagram Creates a component diagram		Component Diagram
Object Diagram Creates an object diagram		Object Diagram
Package Diagram Creates a package diagram		Package Diagram
Deployment Diagram Creates a deployment diagram		Deployment Diagram
Profile Diagram Creates a profile diagram		Profile Diagram

Diagram Pallet Button	Button (Hot key)	Notation
Composite Structure Diagram Creates a composite structure diagram.		Composite Structure Diagram
Interaction Overview Diagram Creates an interaction overview diagram.		Interaction Overview Diagram
Other Diagrams		
CORBA IDL Diagram Creates a CORBA IDL diagram.		CORBA IDL Diagram
Free Form Diagram Creates a free form diagram.		Free Form Diagram
Networking Diagram Creates a networking diagram		Networking Diagram
Struts Diagram Creates a struts diagram.		Struts Diagram
Time Diagram Creates a time diagram.		Time Diagram
User Interface Modeling Diagram Creates an user interface modeling diagram.		User Interface Modeling Diagram

Diagram Pallet Button	Button (Hot key)	Notation
WSDL Diagram Creates a WSDL diagram.		WSDL Diagram
Web Diagram Creates a web diagram.		Web Diagram
Content Diagram Creates a content diagram.		Content Diagram
Analysis Diagrams		
Relation Map Diagram Creates a relation map diagram.		Relation Map Diagram
Dependency Matrix Creates a dependency matrix.		Dependency Matrix
Robustness Diagram Creates a robustness diagram.		Robustness Diagram
Generic Table Creates a generic table.		Generic Table

Robustness Diagram

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

The Robustness Analysis involves analyzing the narrative text of use cases, identifying a first-guess set of objects that will participate in those use cases, and classifying these objects based on the roles they play.

- Boundary or Interface objects are what actors use in communicating with the system.
- Entity objects are usually objects from the domain model.
- Control objects (are usually called controllers because they often are not real objects), serve as the “glue” between boundary objects and entity objects.

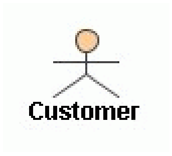
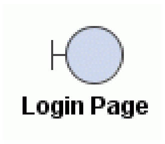
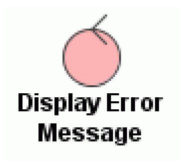
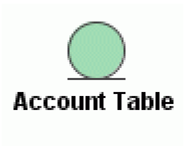
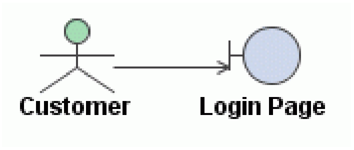
The Robustness analysis serves as a preliminary design within the project life cycle and provides the missing link between an analysis and a detailed design.

Four basic rules apply:

1. Actors can only talk to the boundary objects.
2. The boundary objects can only talk to the controllers and actors.
3. The entity objects can only talk to the controllers.
4. The controllers can talk to the boundary objects and entity objects, and to other controllers, but not to the actors.

Both the boundary objects and entity objects are nouns, and the controllers are verbs. Nouns cannot talk to other nouns, but verbs can talk to either nouns or verbs.

Robustness Diagram Elements

Diagram Pallet Button/Model Element	Button (Hot key)	Notation
Actor An actor represents a role played by an external person, a process or a thing interacting with a system. One physical object may play several roles.	(A)	
Boundary Actors use the boundary objects to communicate with the system (sometimes called the interface objects). A class with a stereotype “boundary”	(B)	
Control Serves as the “glue” between the boundary objects and the entity objects. A class with a stereotype “control”	(C)	
Entity The entity objects usually are objects from the domain model. A class with a stereotype “entity”	(E)	
Robustness Association The Association with a default Association End A navigability = false and Association End B navigability = true values.	(S)	

Web Diagram

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

The web system consists of server applications, network, communicating protocol, and the browser. Basically, a user’s requests begin from starting the browser and requesting a document through a network from the server (host computer). The web server running on the host computer, catches the user’s request, locates the document and delivers it to the user.

UML is a standard language for modeling software. However, modeling specific web components cannot be done by using just a standard UML. The Web-UML diagram provides an extension to the UML model, which enables developers to model web applications.

The MagicDraw Web-UML diagram includes Web-UML elements (stereotyped UML elements) for modeling: client, server pages, web form, frame classes, java script class representation and target class, and web page component.

Reference: Building Web Applications with UML by Jim Conallen Copyright ©2000 by Addison Wesley Longman, Inc.

Web Diagram Elements

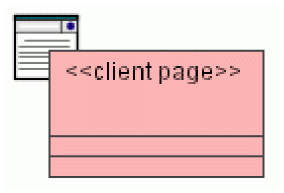
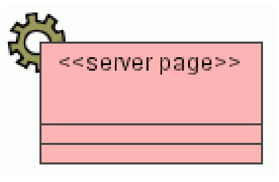
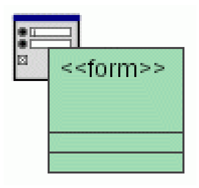
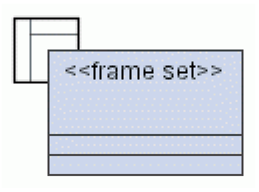
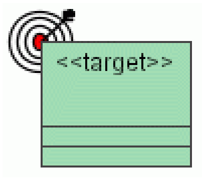
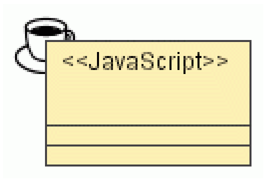
Diagram Pallet Button/Model Element	Button (Hot key)	Some examples
Client Page	(SHIFT+G)	
Server Page	(SHIFT+S)	
Form	(SHIFT+F)	
Frame	(SHIFT+E)	
Target	(SHIFT+T)	
Java Script	(SHIFT+J)	

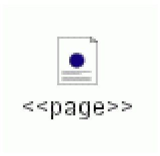
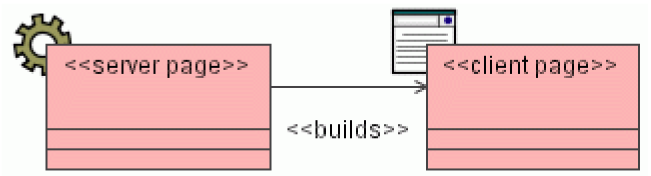
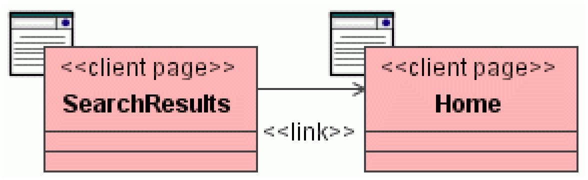
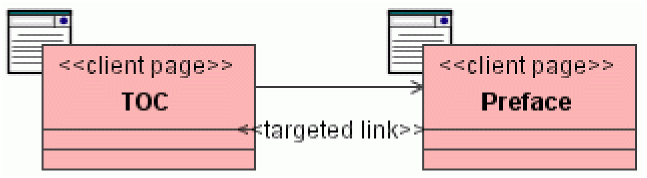
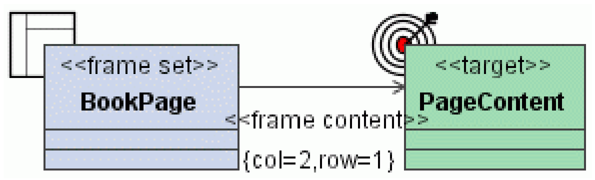
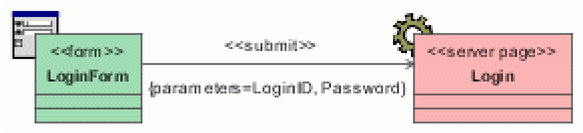
Diagram Pallet Button/Model Element	Button (Hot key)	Some examples
Page	(SHIFT+P)	
Builds	(B)	
Link	(L)	
Redirect	(T)	
Targeted Link	(SHIFT+L)	 <<client page>> TOC <<targeted link>> <<client page>> Preface
Frame Content	(SHIFT+O)	 <<frame set>> BookPage <<frame content>> {col=2,row=1} <<target>> PageContent
Submit	(U)	 <<form>> LoginForm <<submit>> {parameters=LoginID, Password} <<server page>> Login
Object	(O)	

Diagram Pallet Button/Model Element	Button (Hot key)	Some examples
RMI	(SHIFT+R)	
IIOP	(SHIFT+I)	

CORBA IDL Diagram

NOTE This feature is available in Architect and Enterprise editions.

The CORBA IDL diagram facilitates the creation of CORBA IDL elements. The following patterns are also available for CORBA IDL: Interface, Value Type, Type Definition, Sequence, Array, Fixed, Union, Enumeration, Struct, and Exception.

For more information about CORBA IDL usage in MagicDraw, see "MagicDraw Code Engineering UserGuide.pdf", chapter "CORBA IDL Mapping to UML".

Reference: UML^{TM} Profile for CORBA^{TM} Specification, Version 1.0, April 2002. http://www.omg.org/technology/documents/formal/profile_corba.htm.

CORBA IDL Diagram Elements

Diagram Pallet Button/ Model Element	Button (Hot key)
CORBAModule	(M)
CORBA IDL Interface	(U)
CORBA IDL Value	(V)
Class by Pattern	SHIFT+P
Generalization	(G)
Truncatable Generalization	
Value Supports Generalization	
CORBA IDL Association	
Interface	(I)

You can select either the UML Interface or the UML Class as a base element for the CORBA Interface. For more information about the CORBA IDL Interface implementation, see "CORBA Interface Implementation" in " agicDraw Code Engineering UserGuide.pdf".

WSDL Diagram

NOTE	This feature is available in Architect and Enterprise editions.

The WSDL diagram is used to draw WSDL elements. It allows the creation of all elements used in the wsdl file, except schema. The schema elements can be created using the XMLSchema diagram. WSDL plugin provides patterns to create binding elements. The WSDL plugin requires XMLSchema plugin.

WSDL Diagram Elements

Diagram Pallet Button/Model Element	Button (Hot key)
WSDLmessage	(M)
WSDLporttype	(T)
WSDLbinding	(B)
WSDLport	(SHIFT+P)
WSDLservice	(S)
WSDLdefinitions	(D)
WSDLtypes	(Y)
WSDLimport	(I)
Xmlns	(SHIFT+L)
XSDnamespace	(P)

Time Diagram

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

A Time Diagram is an extension of UML notation. The time diagram is similar to a sequence diagram, but the model elements of the time diagram have the predefined stereotypes.

Time Diagram Elements

Diagram Pallet Button/ Model Element	Button (Hot key)
Lifeline «CRconcurrent»	▭
Lifeline «SAshedRes»	▭ S
Message «RTevent», «CRimmediate»	→ EI
Message «CRimmediate»	→ I
Message «SAtrigger»	→ T)

Struts Diagram

NOTE	This feature is available in Professional, Architect, and Enterprise editions.

A Struts Diagram is an extension of UML notation.

Struts Diagram Elements

Diagram Pallet Button/ Model Element	Button (Hot key)
Class	(C)
Class by Pattern	(SHIFT+P)
Interface	(I)
ActionForm class for struts	(G)
Action class for struts	
JavaServer Page for use with struts	
Package	(P)
Model	(M)
Interface Realization	(R)
Realization	(E)
Abstraction	(T)

Diagram Pallet Button/ Model Element	Button (Hot key)
Usage	(U)
Generalization	(G)
Association	(S)
Aggregation	(A)
Composition	(F)

Networking Diagram

NOTE This feature is available in Standard, Professional, Architect, and Enterprise editions.

This diagram allows a visual display of the network topology. The *Networking Profile* contains stereotypes for the network description. Elements with icons can be drawn on the Diagram pane.

The Networking Diagram is commonly used to depict hardware nodes as well as the connections between them.

Networking Diagram Elements

Diagram Pallet Button/ Model Element	Button (Hot key)
Server	🗄
Application Server	🗄
DB Server	🗄
File Server	🗄
Proxy Server	🗄
Web Server	🗄
PC	🖥
Laptop	💻
Monitor	🖥
Fax	📠
Plotter	🖨
Printer	🖨
Scanner	🖨
Modem	📟
Router	📟

Diagram Pallet Button/ Model Element	Button (Hot key)
Switch	▭
Firewall	🧱
Database	🛢
Program	🗔
Internet Browser	🗔
Document	📄
File	🗎
Wireless Network	📡
Internet	☁
Building	🏢
City	🏙
Actor	🧍
User	👤
HTTP	∕
Ethernet	∕
RMI	∕

Diagram Pallet Button/ Model Element	Button (Hot key)
Communication Path	╱

Free Form Diagram

Free form diagram allows to draw various geometrical shapes. The diagram also includes shapes for drawing business flowcharts.

Relation Map Diagram

For more information about the relation map diagram, see section“Relation Map” on page 401.

Dependency Matrix

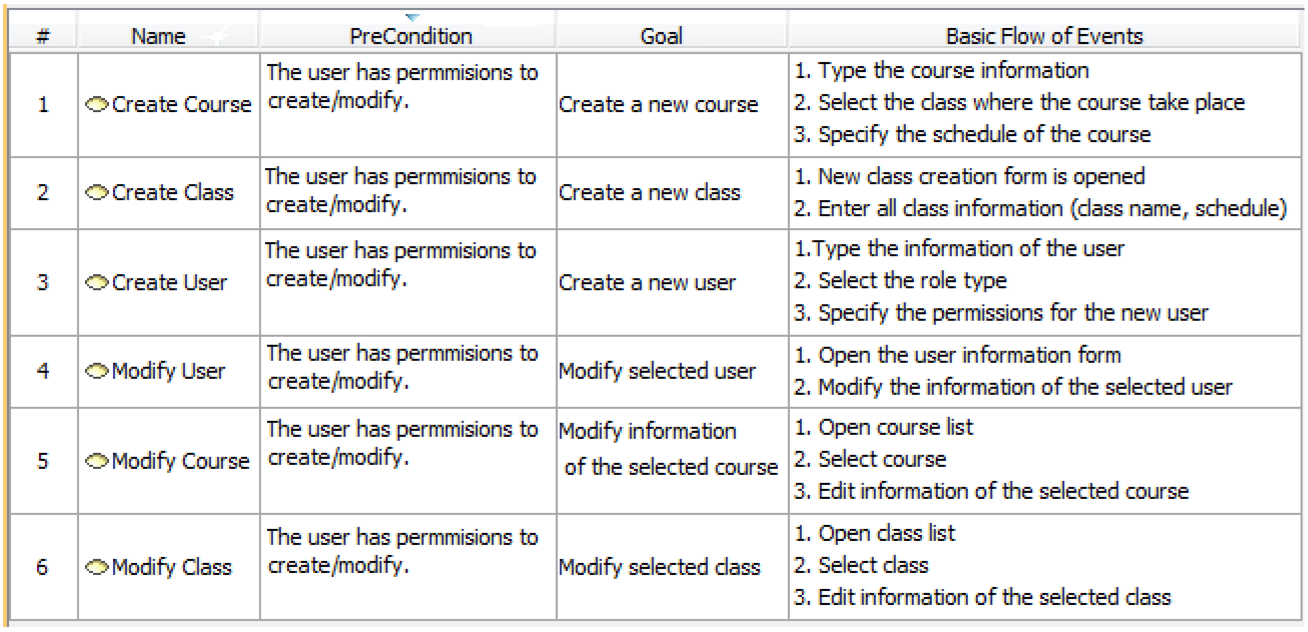
For more information about the dependency matrix, see section “Dependency Matrix” on page 428.

Generic Table

NOTE	This feature is available in Standard, Professional, Architect, and Enterprise editions.

As of version 17.0 a generic table feature is introduced. The purpose of generic table is enabling the user to review the group of elements as one set in the same place. With the help of generic table you can do the following:

- Review and edit specifications of model elements in a tabular form.
- Modify selected group of element properties at once.
- Create elements of the selected types in the one table.



#	Name	PreCondition	Goal	Basic Flow of Events
1	Create Course	The user has permmisions to create/modify.	Create a new course	1. Type the course information 2. Select the class where the course take place 3. Specify the schedule of the course
2	Create Class	The user has permmisions to create/modify.	Create a new class	1. New class creation form is opened 2. Enter all class information (class name, schedule)
3	Create User	The user has permmisions to create/modify.	Create a new user	1.Type the information of the user 2. Select the role type 3. Specify the permissions for the new user
4	Modify User	The user has permmisions to create/modify.	Modify selected user	1. Open the user information form 2. Modify the information of the selected user
5	Modify Course	The user has permmisions to create/modify.	Modify information of the selected course	1. Open course list 2. Select course 3. Edit information of the selected course
6	Modify Class	The user has permmisions to create/modify.	Modify selected class	1. Open class list 2. Select class 3. Edit information of the selected class

Figure 389 -- An example of generic table

TIP! You can also read about the generic table feature and analyze given examples within the Generic table project sample.

To open the sample, do either:

- On the Welcome screen, select **Samples** > **Diagrams** > **Generic table**.
- Go to <MagicDraw installation directory>\samples\diagrams and open the *generic table.mdzip* file.

All the examples given in this section are based on the data from this sample.

Creating Generic Tables

You could create a generic table in one of the ways that are suitable for creating any diagram in MagicDraw (see the procedure "To create a new diagram" that is described in the section “Diagram Basics” on page 149).

Moreover, this section describes several ways for creating a generic table in more detail. They are as follows:

- **Creating an empty generic table without using any wizard.** Once created the table can be filled with data using the generic table environment capabilities. For more information see procedure “To create an empty generic table” on page 608.
- **Creating a generic table using the diagram creation wizard.** Once created the table is already filled with data. For more information see “To create a generic table using the diagram creation wizard” on page 610.
- **Creating a generic table for a set of selected elements using the diagram creation wizard.** Note that element types, elements, and columns for the generic table will be selected automatically according to the set of selected elements. For more information see “To create a new generic table for a set of selected elements” on page 612.

When creating a generic table you should specify the following:

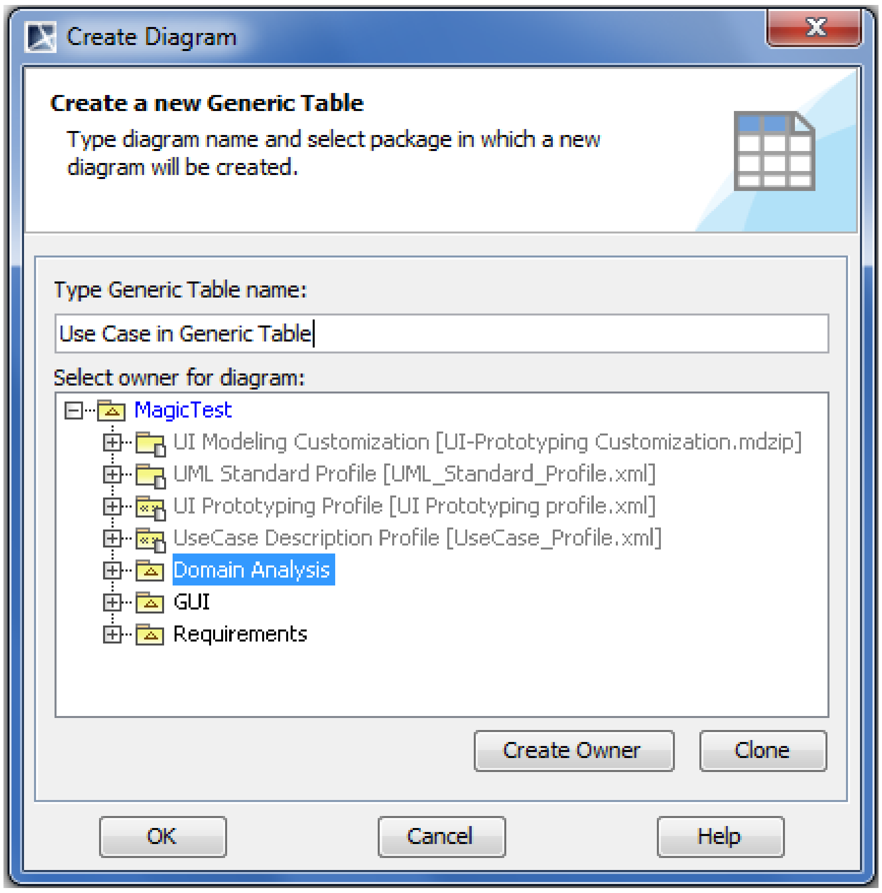
1. The name of a table and the owner package should be denoted first of all. This is mandatory.
2. Element types that will be used in the table should be defined. This is optional.
3. Elements corresponding to the element types should be selected. This is optional.

4. Table columns should be specified. Columns represent element properties. This action is also optional. The creation of the table could be finished without specifying columns.

You can modify the table after it is created. For more information see “Modifying generic table” on page 613.

To create an empty generic table

1. Open the **Create Diagram** dialog. It could be done in one of the following ways:
   - On the **Analysis diagrams** toolbar, click the ! button.
   - From the main menu, select **Diagrams** > **Analysis Diagram** > **Generic Table** and click **Add**.
   - On the content diagram pallet, click the **Generic Table** button.
   - Right-click the element or its symbol, that is a possible diagram owner, and from the shortcut menu select **New Diagram** > **Analysis Diagram** > **Generic Table.**
2. Type the name of the table and select the owner for it.



Create Diagram

Create a new Generic Table

Type diagram name and select package in which a new diagram will be created.

Type Generic Table name: Use Case in Generic Table

Select owner for diagram:

- MagicTest
  - UI Modeling Customization [UI-Prototyping Customization.mdzip]
  - UML Standard Profile [UML_Standard_Profile.xml]
  - UI Prototyping Profile [UI Prototyping profile.xml]
  - UseCase Description Profile [UseCase_Profile.xml]
  - Domain Analysis
  - GUI
  - Requirements

Figure 390 -- Specifying name for a new generic table and selecting the owner

The owner for the generic table could be one of the following:
- Selected in the presented model tree.
- Created as a new owner by clicking the **Create Owner** button on the **Create Diagram** dialog (the list of available elements will be provided).
- Cloned as a copy of the possible diagram owner with all its content by clicking the **Clone** button on the **Create Diagram** dialog.

NOTE If a generic table is created using the element’s shortcut menu in the Model Browser, the element in which it has been created is automatically assigned as the owner of this table.

3. Select element types.

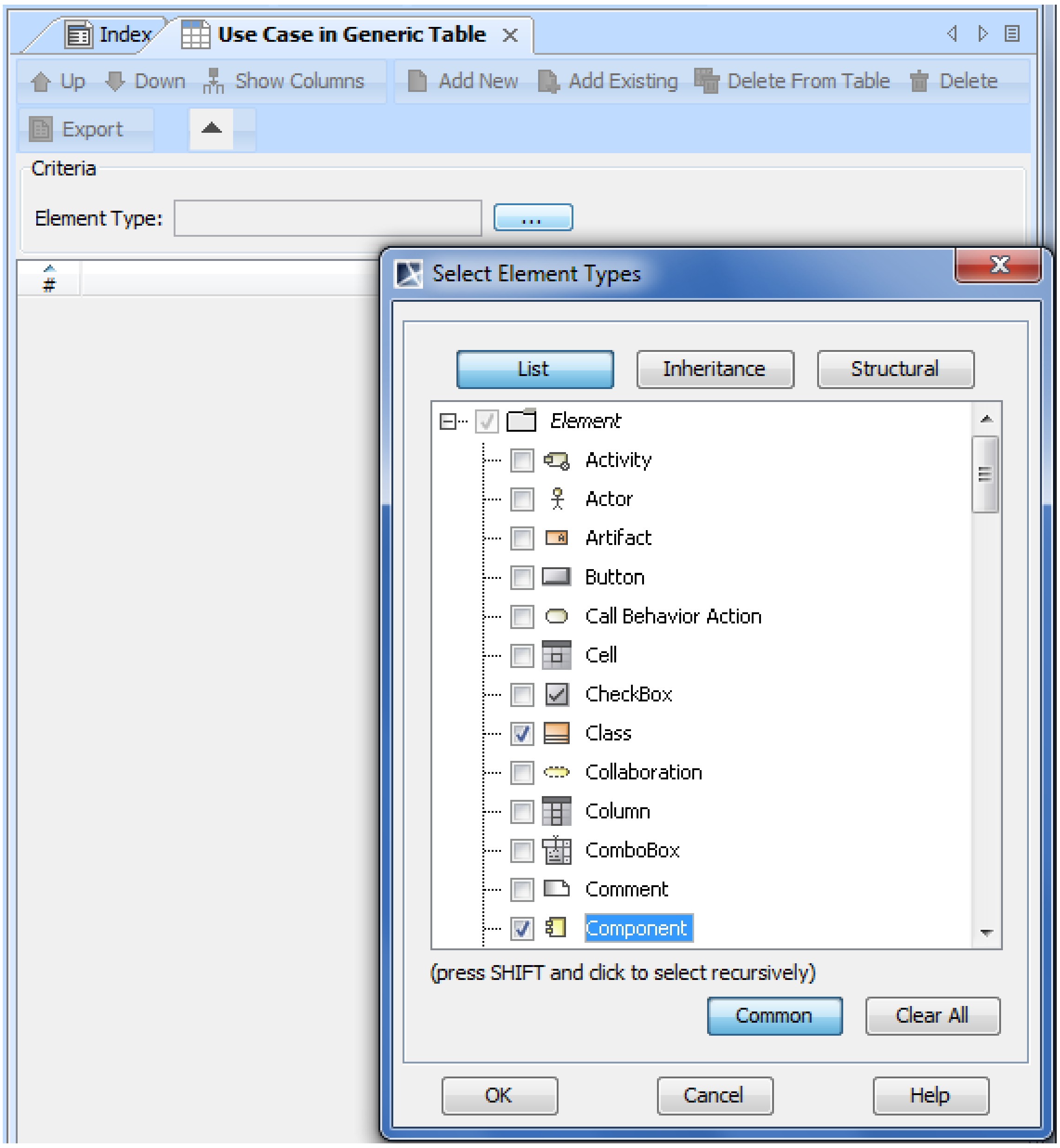


Figure 391 -- Selecting element types for the general table

The list of elements and stereotypes is presented in the **Select Element Types** dialog. Select desired element types and/or stereotypes. This action is optional, thus you can continue the creation without selecting any type or stereotype. You will be able to modify selected element types when the generic table is created.

Selected element types will be display in the **Element Type** box in the diagram pane.

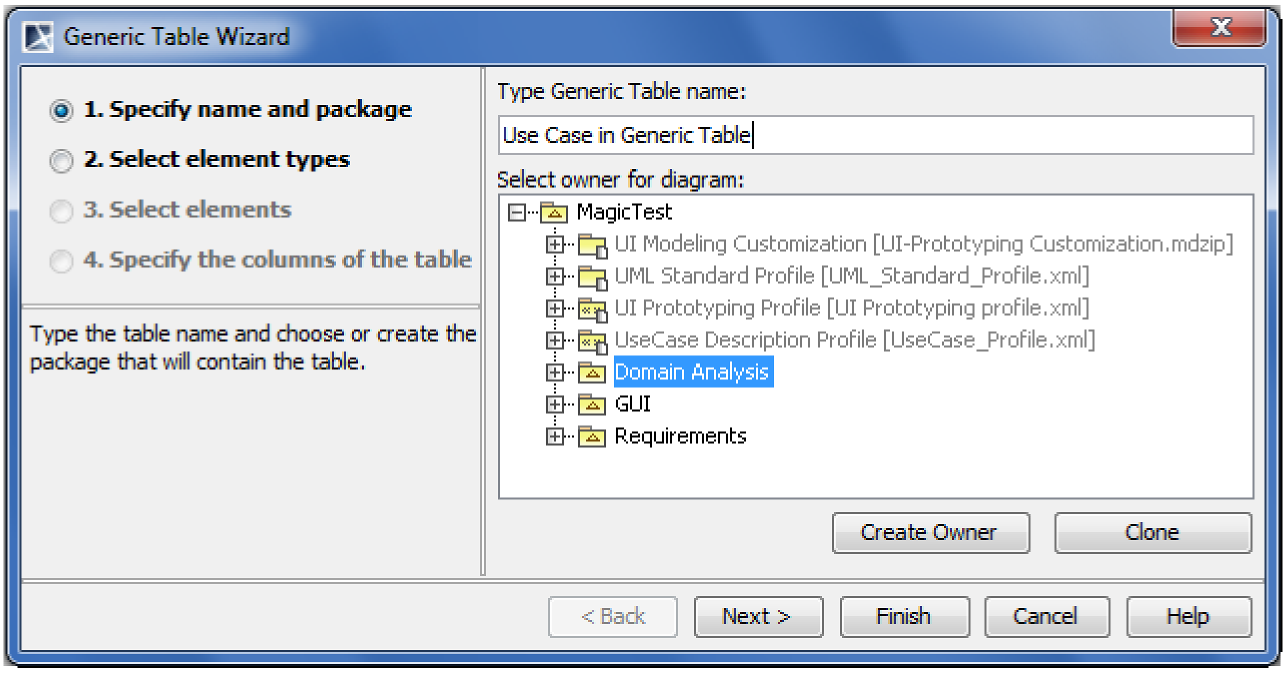
The **Select Element Types** dialog contains the following buttons:

Button name	Function
List	Lists types in alphabetical order.
Inheritance	Lists types according to inheritance.
Structural	Lists types in structural way.
Common	Lists only common types.
Clear All	Clears all selections.

4. Add elements to the table using the **Add New** or **Add Existing** buttons. For more information about adding elements to a generic table, refer to the procedure "To add a new element" on page 614.
5. Specify columns for the table using the **Show Columns** button. For more information about specifying columns, refer to the procedure "To add or remove columns" on page 615.

To create a generic table using the diagram creation wizard

1. Open the **Generic Table Wizard** dialog. It could be done in one of the following ways:
   - On the **Diagrams** menu, click **Diagram Wizards** > **Generic Table Wizard**.
   - On the **Analyze** menu, click **Model Visualizer**.
2. Type the name of the table and select the owner for it.



Type the table name and choose or create the package that will contain the table.

Type Generic Table name:

Use Case in Generic Table

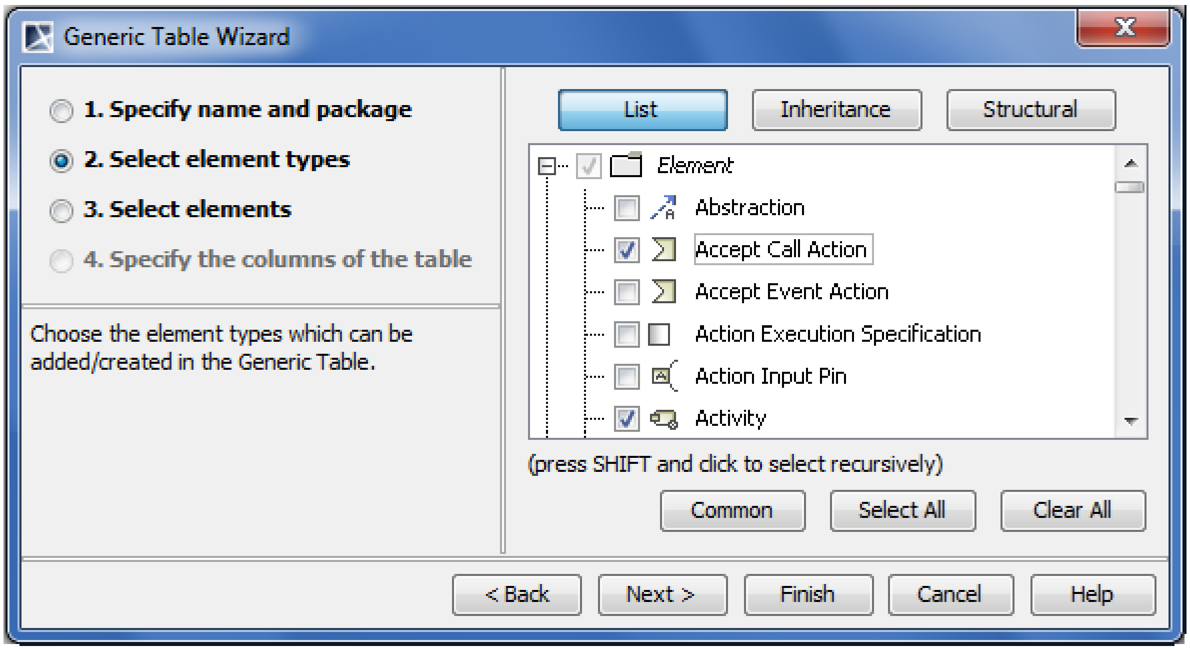
Select owner for diagram:

- MagicTest
  - UI Modeling Customization [UI-Prototyping Customization.mdzip]
  - UML Standard Profile [UML_Standard_Profile.xml]
  - UI Prototyping Profile [UI Prototyping profile.xml]
  - UseCase Description Profile [UseCase_Profile.xml]
  - Domain Analysis
  - GUI
  - Requirements

Figure 392 -- Generic table creation wizard. Specifying name for a new generic table and selecting its owner

For the instructions on how to select the generic table owner see step #2 of the procedure "To create an empty generic table" on page 608.

3. Select element types.



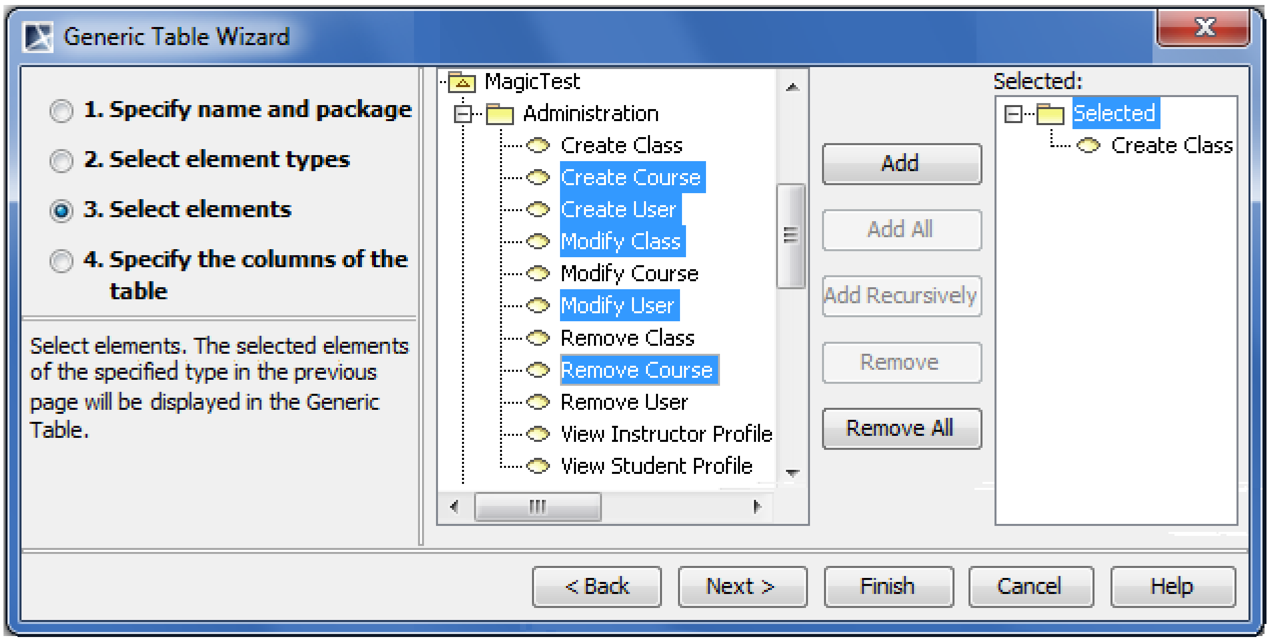
Choose the element types which can be added/created in the Generic Table.

(press SHIFT and click to select recursively)

Figure 393 -- Generic table creation wizard. Selecting element types

For the instruction on how to select element types see step #3 of the procedure “To create an empty generic table” on page 608.

4. Select elements.



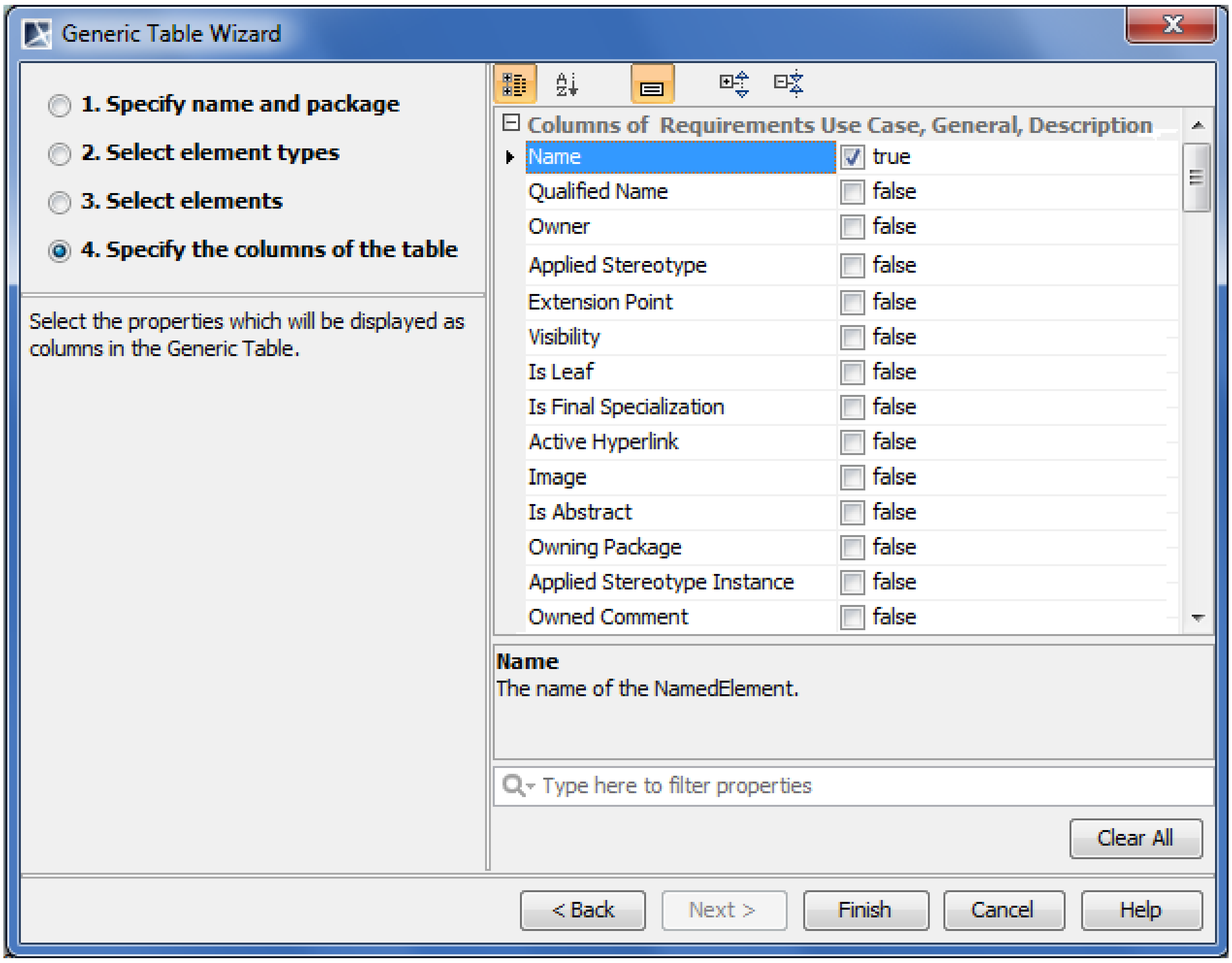
Select elements. The selected elements of the specified type in the previous page will be displayed in the Generic Table.

Figure 394 -- Generic table creation wizard. Selecting elements

Select elements from the model tree and add them into the **Selected** list. For more information about the element selection and dialog buttons see the section “Elements multiple selection” on page 282.

NOTES	You may select any element from the model tree, though only elements of selected types will be added into the generic table. If the generic table creating wizard is opened from one or more elements’ shortcut menu, the element or the set of elements will be added to the **Selected** list automatically.

5. Specify the columns of the table.


Generic Table Wizard

- 1. Specify name and package
- 2. Select element types
- 3. Select elements
- 4. Specify the columns of the table

Select the properties which will be displayed as columns in the Generic Table.

Columns of Requirements Use Case, General, Description

Name	✓ true
Qualified Name	false
Owner	false
Applied Stereotype	false
Extension Point	false
Visibility	false
Is Leaf	false
Is Final Specialization	false
Active Hyperlink	false
Image	false
Is Abstract	false
Owning Package	false
Applied Stereotype Instance	false
Owned Comment	false

Name
The name of the NamedElement.

Figure 395 -- Generic table creation wizard. Selecting columns

The list of all available properties corresponding to selected element types is presented in the dialog. If selected element types have tags, they are also displayed in the list. All selected properties will be displayed as columns in the generic table. The **Name** property is selected automatically, all other properties should be selected by the user.

Select properties you need to see as columns to finish the table.

To create a new generic table for a set of selected elements

1. Select a set of elements you want to add to the generic table.
2. From the shortcut menu select **Tools** > **Generic Table Wizard**.
3. Follow steps described in section “To create a generic table using the diagram creation wizard” on page 610 but note that element types, elements, and columns will be selected automatically according to the set of selected elements.

Using Generic Tables

There is an ability to modify a generic table after it is created. Features for a table modification and working with a generic table are described in the following subsections:

- “Setting detailed column names” on page 613
- “Modifying generic table” on page 613
- “Manipulations in generic table” on page 616

Setting detailed column names

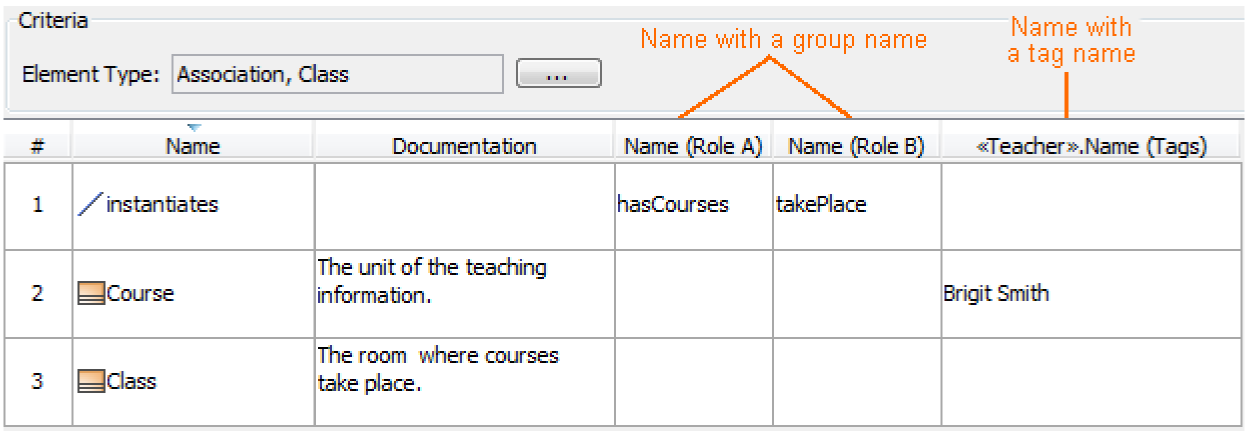
Column names in the generic table heading are set automatically, and they are element property names. You can not change column names.

If an element has some properties with the same names in a heading (for example, in associations or if a tag of stereotypes is selected as a column), the detailed column names could provide more precise information.

To see detailed column names

- In the generic table from the table shortcut menu, select **Table Options** > **Show Detailed Column Name.** The group name (between brackets), to which the selected property belongs, and/or the stereotype name (just before the property name) will be displayed in the column heading.

The following picture gives the example of three different columns with the same name for the association element: **Name**, **Name** (Role of A), and **Name** (Role of B) and a column for the class element with the stereotype «Teacher».**Name** (Tags). If the command **Show Detailed Column Name** were not selected, there would be four columns with same headings, i.e., **Name**.



Element Type: Association, Class

#	Name	Documentation	Name (Role A)	Name (Role B)	«Teacher».Name (Tags)
1	instantiates		hasCourses	takePlace	
2	Course	The unit of the teaching information.			Brigit Smith
3	Class	The room where courses take place.			

Figure 396 -- An example of detailed column names in a generic table

Modifying generic table

To sort data

- Click the header of the column by which you want to sort table data. A small arrow appears on that column header. This arrow shows, how records are sorted: ascending or descending.

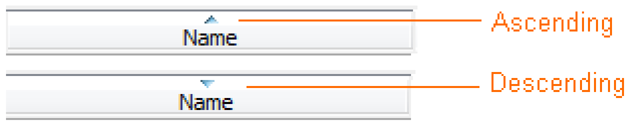


Figure 397 -- Table sorting

Rows are renumbered automatically after the sorting.

To add or remove element types

1. Click the **...** button in the **Criteria** area (see the picture below). The dialog with the element and stereotype list will open.

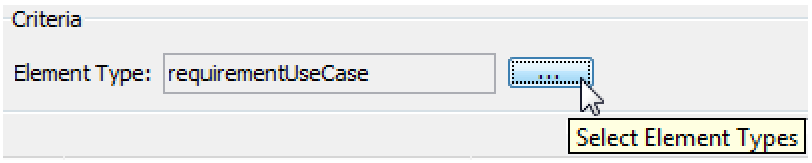


Figure 398 -- Selecting element types

2. Do one of the following:
   - To add element types select the appropriate check boxes in the list.

IMPORTANT!	Properties corresponding to the selected types will be added to the list of available columns.

   - To remove element types click to clear appropriate check boxes in the list.

IMPORTANT!	Properties corresponding to the unselected types will be removed from the list of available columns.

To add a new element

IMPORTANT	There should be at least the one element type selected in the **Element Type** box to add a new element.

1. In the generic table toolbars, click the **Add New** button. If there is more than the one element type selected, a submenu with the list of available element types will open.

NOTE	Only element types available to create in a possible diagram owner which contains the generic table will be displayed in the submenu.

2. Select an element type. The element of the selected type will be added to the last row of the table and to the model.
3. Name the new element in the table.

To add an existing element from the model

1. In the generic table toolbars, click the **Add Existing** button. The **Select Element** dialog will open.

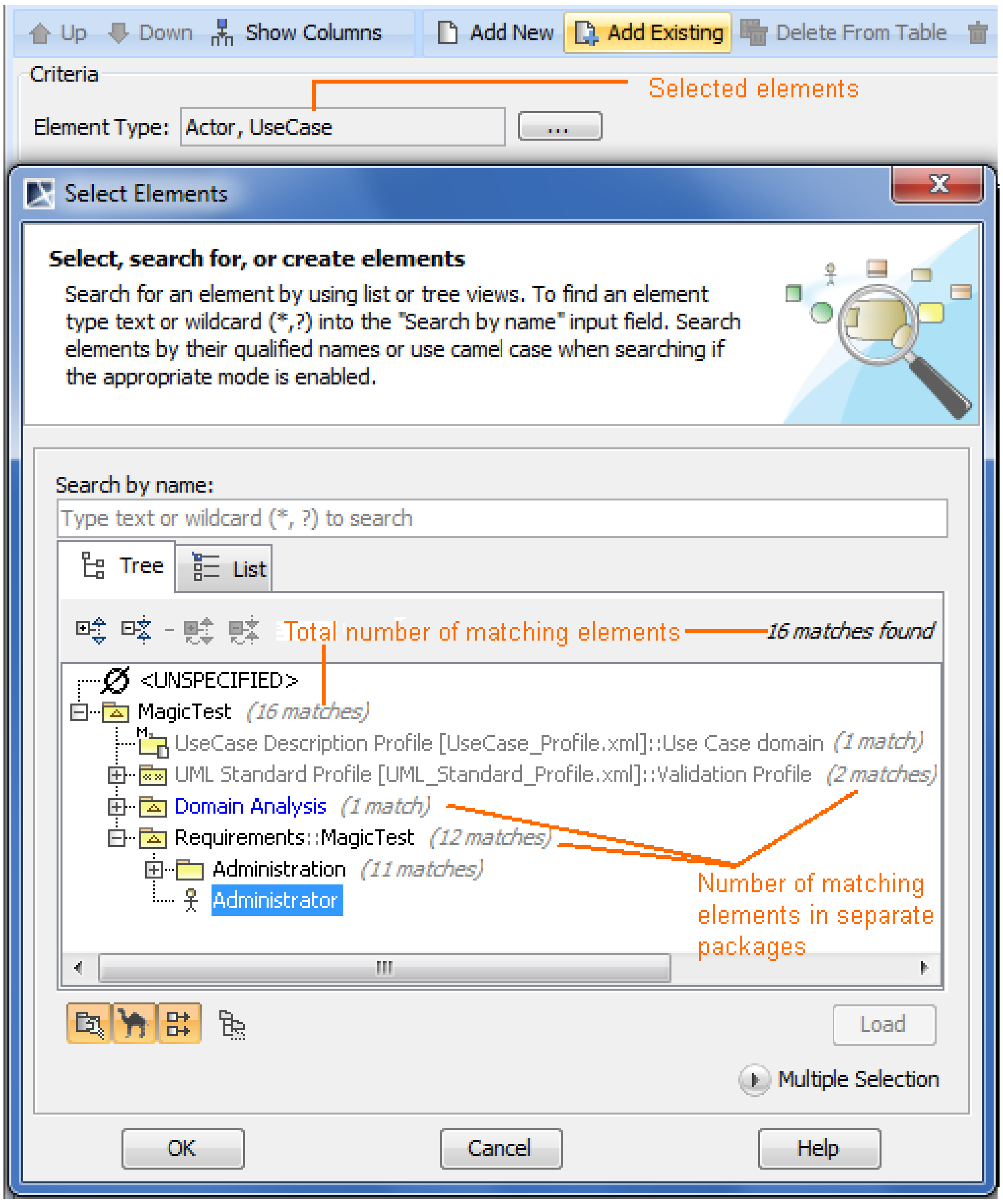

Up
Down
Show Columns
Add New
Add Existing
Delete From Table
Criteria
Element Type:
Actor, UseCase
Selected elements
Select Elements
Select, search for, or create elements
Search for an element by using list or tree views. To find an element type text or wildcard (*,?) into the "Search by name" input field. Search elements by their qualified names or use camel case when searching if the appropriate mode is enabled.
Search by name:
Type text or wildcard (*, ?) to search
Tree
List
Total number of matching elements
16 matches found
<UNSPECIFIED>
MagicTest (16 matches)
UseCase Description Profile [UseCase_Profile.xml]::Use Case domain (1 match)
UML Standard Profile [UML_Standard_Profile.xml]::Validation Profile (2 matches)
Domain Analysis (1 match)
Requirements::MagicTest (12 matches)
Administration (11 matches)
Administrator
Number of matching elements in separate packages
Load
Multiple Selection
OK
Cancel
Help

Figure 399 -- Adding existing elements to generic table

2. Select the element you want to add to the generic table. This element and its name will be added to the table as the last row.

TIP!	Use the **Multiple Selection** mode to add more than one element at a time.

To add or remove columns

1. To open the available columns list:
   - On the generic table toolbars, click **Show Columns** to open the submenu with common properties corresponding to element types that have been selected for the generic table.

- On the generic table toolbars, click **Show Columns** > **Select Columns** to open the dialog with all properties, including tags of stereotypes corresponding to selected element types.

2. Do either:
   - Select the properties you want to see as columns in the table.
   - Unselect the properties you do not want to see as columns is the table.

To edit element's property in a cell

NOTE The property can be editable if it is editable in the element's Specification window and if it not locked in teamwork project.

1. Click a cell you want to edit. The edit mode is turns in the cell.

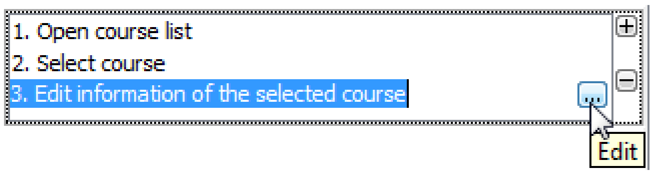

1. Open course list
2. Select course
3. Edit information of the selected course

Figure 400 -- Editing element properties in cell

2. Do one of the following:
   - Edit the value directly in the selected cell.
   - Click the **...** button. The property value editor opens. For more information about various property value editors, see "Editing Property Values" on page 237.

IMPORTANT! All changes made in the generic table are saved in the model.

Manipulations in generic table

To open the element's Specification window, do either

- Double-click a non-editable cell in the element's row, if there is such cell.
- Right-click on a cell and from the shortcut menu select **Open Specification**. Then:
  - If the selected cell does not refer to any element, the Specification window of the element in the row will open.

- If the selected cell refers to some elements, the submenu with the list of appropriate elements will open. Choose the element whose Specification window you want to open,

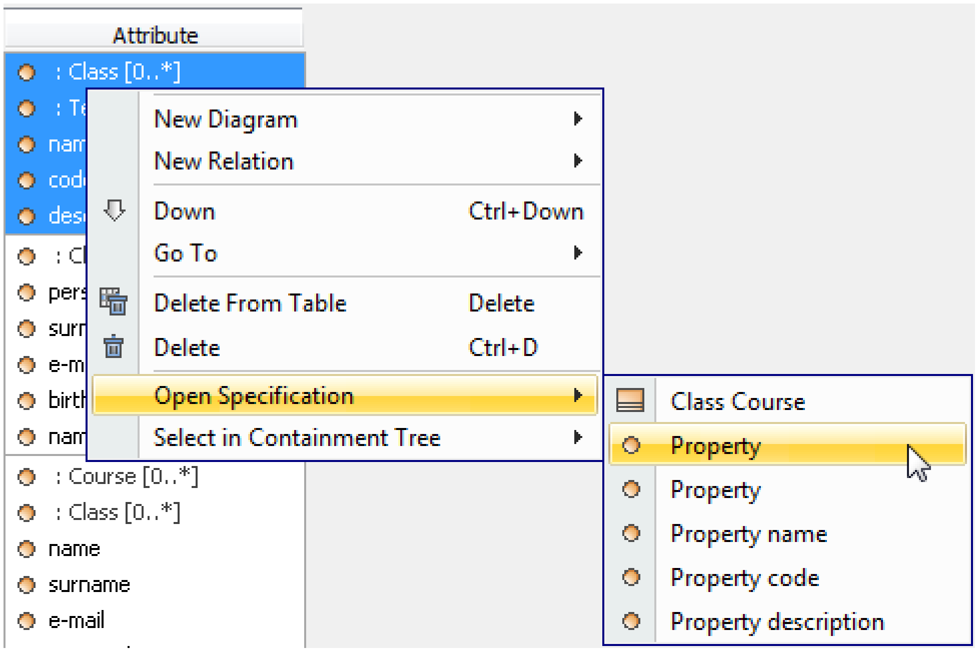


Figure 401 -- The Open Specification submenu

To add an element using the drag-and-drop feature

IMPORTANT!	Elements you want to add should correspond to selected element types.

- Select an element in the Model Browser and drag it to the generic table. The element will be added to the generic table recursively.

NOTE	If you drag a package, all its content will be added to the generic table.

To order columns using the drag-and-drop feature

- Click the column header and drag it to a desired place. Only the first column can not be moved.

Generic Table Environment

The generic table environment elements such as toolbars and shortcut menus are described in this section. There are the following subsections:

- "Generic table toolbars" on page 617
- "Generic table shortcut menu" on page 618
- "Element row shortcut menu" on page 620

Generic table toolbars

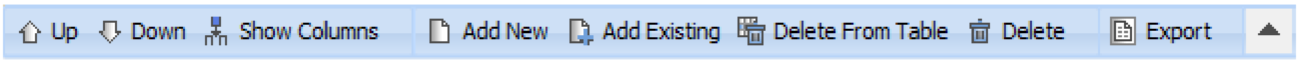


Figure 402 -- Generic table toolbars

Buttons displayed in Figure 402 on page 617 are intended to be used for editing the generic table.

NOTE	If generic table toolbars are inactive within a teamwork project, try to lock the table for edit (make sure you have the right to edit model of this project).

Icon (Hot key)	**Name**	**Function**
(INSERT)	Add New	Creates a new element in the table. This element will be added to the model also. If there are available several element types, a shortcut menu with available types will open. You will be able to select an element of the type you need.
(CTRL+INSERT)	Add Existing	Adds an element from a model. The **Select Element** dialog will open. Only elements of the type defined in a generic table will be listed.
(DELETE)	Delete From Table	Removes the selected element from the table.
(CTRL+D)	Delete	Removes the selected element from both the table and the model.
⇧ (CTRL+UP)	Up	Moves the selected element up one row. All elements are renumbered automatically after the moving is done.
⇩ (CTRL+DOWN)	Down	Moves the selected element one row. All elements are renumbered automatically after the moving is done.
	Show Columns	Opens the list of available columns. You can select columns either to show or to hide in the table.
	Export	Exports the content of the table in the **.html* or **.csv* formats.
▲ ▼	Suppress/ expand filter area	Hides or shows the **Criteria** area.

Generic table shortcut menu

To open the table shortcut menu, do either

- Right-click the empty space of the table.
- Right-click the empty space of the generic table toolbar.

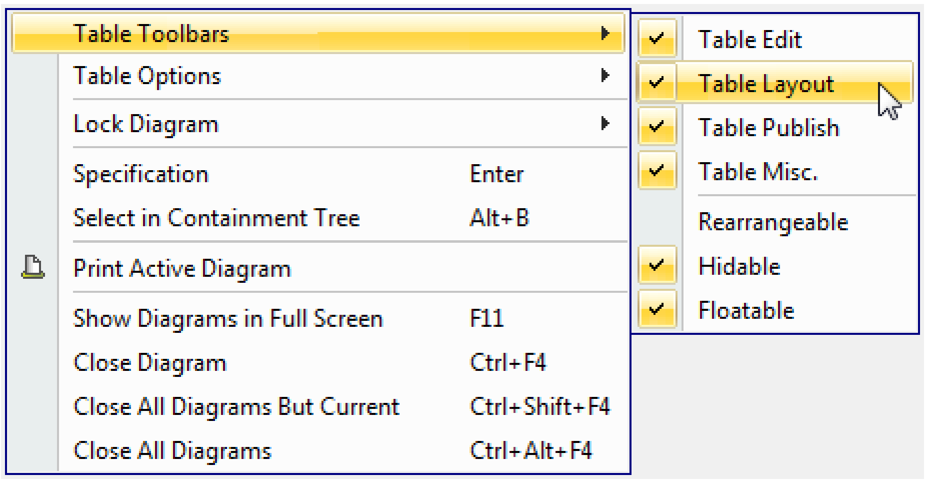


Figure 403 -- Generic table shortcut menu

Command (Hot Keys)	Description
Table Toolbars	
Table Edit	Select to display or clear to hide these generic table toolbar buttons: • **Add New** • **Add Existing** • **Delete From Table** • **Delete**
Table Layout	Select to display or clear to hide these generic table toolbar buttons: • **Up** • **Down** • **Show Columns**
Table Publish	Select to display or clear to hide the **Export** button in the generic table toolbar.
Table Misc.	Select to display or clear to hide the ▲ Suppress/ ▼ Expand filters area button in the generic table toolbar.
Rerrangeable	Select to make generic table toolbars rearrangeable or clear the selection to lock toolbars in their current position.
Hidable	Select to make available or clear the selection to make unavailable the following commands in the generic table shortcut menu: • **Table Edit** • **Table Layout** • **Table Publish** • **Table Misc.**
Floatable	Select to allow toolbar dragging to any desirable position within the application window. Clear the selection to forbid toolbar dragging outside the generic table toolbars area.
Table Options	
Show Detailed Column Name	Select to show the detailed information such as stereotype or group name in a column heading. Clear the selection to hide the detailed information.

Command (Hot Keys)	Description
Lock Diagram / Unlock Diagram	
NEW! Lock / Unlock Diagram Content for Edit	Locks / unlocks the table and all elements represented in the table for editing. **NOTE:** This command is available when working on a teamwork project. For more information about locking elements please refer to the section "Locking Model Elements and Diagrams for Editing") in "MagicDraw Teamwork UserGuide.pdf".
NEW! Lock / Unlock Diagram for Edit	Locks / unlocks the table for editing. **NOTE:** This command is available when working on a teamwork project. For more information about locking elements please refer to the section "Locking Model Elements and Diagrams for Editing") in "MagicDraw Teamwork UserGuide.pdf".
Specification (ENTER)	Opens the table's Specification window.
Select in Containment Tree (ALT+B)	Selects the table in the Containment tree of the Model Browser.
Print Active Diagram	Prints a table.
Show Diagrams in Full Screen (F11)	Shows a table in the full screen mode. Click **Close Full Screen** to return to the previous view.
Close Diagram (CTRL+F4)	Closes an active table.
Close All Diagrams But Current (CTRL+SHIFT+F4)	Closes all diagrams except an active one.
Close All Diagrams (CTRL+ALT+F4)	Closes all opened diagrams.

Element row shortcut menu

To open the element shortcut menu

- Right-click the element row in the generic table.

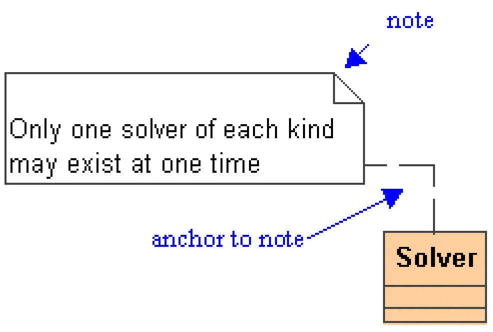
Command (Hot Keys)	Description
New Diagram	Opens the list of available diagrams to create a new diagram for the selected element. The new diagram will be created in the selected element.
New Relation	Opens the list of available relations to create a new relation for the selected element.
Up (CTRL+UP)	Moves the selected element up one row. All elements are renumbered automatically after moving is done.
Down (CTRL+DOWN)	Moves the selected element down one row. All elements are renumbered automatically after moving is done.
Go To	Finds and navigates either to a diagram, wherein the element shape is drawn, or to a hyperlinked object.
Delete From Table (DELETE)	Removes the selected element from the table.

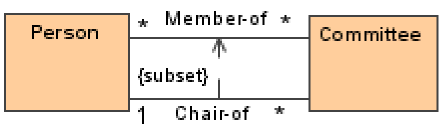
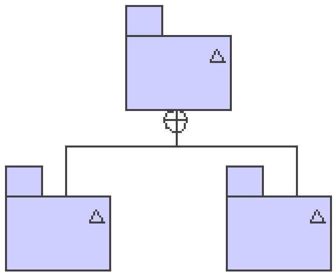
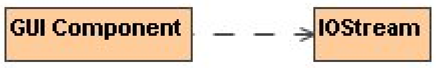
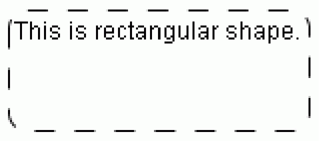
Command (Hot Keys)	Description
Delete (CTRL+D)	Removes the selected element from both the table and the model.
Open Specification	Opens the element’s Specification window.
Select in Containment Tree (ALT+B)	Selects the element in the Containment tree of the Model Browser.

11 MODEL ELEMENTS

Common Model Elements in the Diagrams

The following symbols are only graphical symbols. They do not possess any data.

Model elements	Button	Function	Notation
Text Box **Text Box (HTML text)**	abc (X) abc HTML (SHIFT+X)	Type texts directly on the diagram.	This is a **text box**.
Note **Note (HTML text)**	(N) (SHIFT+N)	A graphical symbol containing a textual information. Use a note to add any information needed for your diagram. Usually the note is connected to another symbol using an anchor line.	 note Only one solver of each kind may exist at one time anchor to note Solver
Comment **Comment (HTML text)**		A graphical symbol, which gives an ability to display different remarks on the diagrams.	
Anchor	(H)	Relates symbols and notes. Use an anchor to relate any symbol to a note or comment. The style of the anchor can be changed to rectilinear, oblique, or bezier. For a detailed description on editing the appearance of paths, see "Working with Paths and Relationships" on page 180.	

Model elements	Button	Function	Notation
Constraint NOTE To select a constraint, right-click the **Note Anchor** button.	(SHIFT+H)	The presentation of a constraint between two graphical symbols.	 Person Committee * Member-of * {subset} 1 Chair-of *
Containment	SHIFT+C	Shows a class, package or other model elements declared within another model element.	
Dependency	(SHIFT+D)	Indicates a semantic relationship between two or more model elements.	
Image Shape	(I)	Provides a simple and quick way to insert pictures into a diagram. They can be logo, graph, table, etc.	
Separator	(W)	Separates different parts of a diagram with a horizontal line.	This is a separator.
Rectangular Shape		Separates different parts of a diagram with a rectangular shape.	

Note, Comment

A note is a graphical symbol containing a textual information. It is used to add any information needed for your diagram. A note is usually connected to another element symbol using an anchor line.

A comment is a graphical symbol used to display different remarks on the diagrams.

To change the text display mode

1. Connect a note to an element symbol with an anchorlink.
2. From the note shortcut menu, select **Text Display Mode** and then **Show Text**, to display the text that is added to the note. Select **Show Documentation**, to display a documentation of the element on the note.

To show the constraints and/or tagged values on the note

1. Connect a note to an element, the constraint and/or tagged value of which is specified, by an anchor link.
2. From the note shortcut menu, select **Show Constraint** and/or **Show Tagged Value.** Separate compartments with the constraint and tagged values will be displayed on the note.

To remove a line between the compartments on the note

1. From the note shortcut menu, select **Symbol(s) Properties**.
2. Clear the **Show Line Between Compartments** check box in the open dialog.

Anchor

Use anchors to relate symbol to a note or comment. You can change the anchor style to rectilinear, oblique, or bezier.

To delete an anchor to the comment together with the annotated element

- Select the anchor and press CTRL+D. The attached model element will be removed from Annotated Element property.

Constraint Path

The constraint for two graphical symbols (such as two classes or two associations) is shown as a dashed arrow from one element to the other. The constraint is labeled by the constraint string (in braces {}). The direction of the arrow represents a relevant information within the constraint. The client (the tail of the arrow) is mapped to the first position and the supplier (arrowhead) is mapped to the second position in the constraint.

To add a constraint expression to the constraint path

From the constraint path shortcut menu, choose **Select Constraint** and select one of the following:

- Select **<new>**. The **Select Extension Element Storage** dialog box opens. Select the folder where the constraint will be stored and click **OK.** The constraint Specification window opens. In this window, specify desired property values.
- Select an already created constraint from the list.

Image Shape

The Image Shape provides a simple and quick way to insert a picture into a diagram. This can be logo, graph, table, etc. The preferred shape size after the insertion is the actual image size.

To insert a picture on the Diagram pane

1. Click the **Image Shape** button on the Common toolbar. The **Open** dialog box opens.
2. Select an image in *.gif, *.jpg, *.jpeg, *.svg, or *.png format and click **Open**.

Separator

You may use a horizontal separator to rule off different parts of a diagram.

To set the text position of a separator name

- From the separator shortcut menu, select **Text Position**, and then select the text position you need: **Left** (default), **Center**, or **Right**.
- Set the text position in the **Project Options** dialog box.

To set a separator line style (dashed or solid)

- From the separator shortcut menu, select **Line Style**, and then select the style you need: **Dashed** (default) or **Solid**.

Documentation

Define a documentation for various documents in the comment Specification window. You can also define a comment stereotypes, tagged values, and constraints.

To open the comment Specification window

1. In the element Specification window, click **Documentation/Hyperlinks**.
2. Expand the **Documentation/Hyperlinks** branch in the Specification tree and double click **Comment**.

To display the documentation on the Diagram pane

1. Draw a note on the Diagram pane.
2. Using an Anchor to Note, connect the note to the model element containing the documentation you want to display.
3. From the note shortcut menu, select **Text Display Node** and then **Show Documentation**.

TIP!	If a comment contains stereotypes, tagged values, and/or constraints, you can choose to display them in the content of the note.

UML Extension Elements

UML is a general purpose visual modeling language for specifying, constructing and documenting the artifacts of systems that can be used with all major application domains and implementation platforms. It has been widely adopted by both industry and academia as the standard language for describing software systms. However, the fact that UML is a general purpose notation may limit its suitability for modeling some particular specific domains (e.g., web applications or business processes), for which specialized languages and tools may be more appropriate.

UML provides a set of extension mechanisms (stereotypes, tag definitions, and constraints) for specializing its elements, allowing customized extensions of UML for particular application domains. These customizations are sets of UML extensions grouped into UML profiles.

There are several reasons why you may want to extend a metamodel:

- Assign a terminology that is adapted to a particular platform or domain (such as capturing EJB terminology like home interfaces, enterprise java beans, and archives).
- Assign a syntax for constructs that do not have a notation (such as in the case of actions).
- Assign a different notation for the existing symbols (such as being able to use a picture of a computer instead of the ordinary node symbol to represent a computer in a network).

- Add semantics that is left unspecified in the metamodel (such as how to deal with priority when receiving signals in a state machine).
- Add semantics that does not exist in the metamodel (such as defining a timer, clock, or continuous time).
- Add constraints that restrict the way you may use the metamodel and its constructs (such as disallowing actions from being able to execute in parallel within a single transition).
- Add information that can be used when transforming a model to another model or code (such as defining mapping rules between a model and Java code).

MagicDraw goes beyond the traditional profiling. It allows developers to create a new modeling tool based on their UML profile. In the following sections, you will find information about how to work with profiles, stereotypes, and tags.

For a detailed description of UML Profiling and DSL in MagicDraw, see the UML Profing and DSL User's Guide.

Stereotype

A stereotype defines how an existing metaclass may be extended. It enables the use of platform or domain specific terminology or notation in place of, or in addition to, the ones used for the extended metaclass.

Just like a class, a stereotype may have properties, which may be referred to as tag definitions. When a stereotype is applied to a model element, the values of the properties may be referred to as tagged values.

Any model element from the reference metamodel (any UML model element) can be extended by a stereotype. For example in UML, States, Transitions, Activities, Use cases, Components, Attributes, Dependencies, etc. can all be extended with the stereotypes.

The stereotypes are created as separate model elements and can be drawn in the Class diagrams. According to UML, the stereotypes have to be stored in the Profiles (a subtype of Package), so the Class diagram for the stereotypes should be created in the Profile instead of the Package.

For more information about working with symbols, see Chapter “Diagramming” on page 149.

To create a new stereotype

To create a new stereotype it is recommended to first create a profile (see the Section above).

- Use the **Stereotype** button on the class diagram toolbar, **Profiling Mechanism** group. The **Select Metaclass** dialog box opens. Specify the metaclass that you want to extend and click **OK.** Double-click to open the stereotype Specification window. For a detailed description of this dialog box, see Section “Stereotype properties” on page 629.
- From the Profile or Package shortcut menu in the Browser, select **New**, and then select **Stereotype**.

To create a stereotype with an image

1. Open the stereotype Specification window.
2. Click the **Icon** “**...**” button and from the **Open** dialog, select an image you want to place for the stereotype. Click the **Open** button.

NOTE For more information about displaying stereotype icon on shape, see “Displaying icon or image” on page 258.

To view assigned image properties

1. In the stereotype Specification window, right-click the **Icon** property or the image assigned to the property to open the shortcut menu.
2. On the shortcut menu, click **Open Specification**. The **Image** specification window opens wherein you can see and specify image properties.

To display a stereotype icon as a main shape on the diagram pane

From the shape that has an assigned stereotype with an icon, select **Presentation Options** and then **Shape Image** from the **Shape Shortcut menu**. Note that all compartments must have been suppressed before.

To order stereotypes

Stereotypes can be ordered. Symbol style of the first in the list stereotype will by applied to the symbol on diagram and in Browser.

To order stereotypes:

1. Invoke symbol shortcut menu, select the **Stereotype** command. The list of stereotypes opens (see Figure 404 on page 628).
2. Click the **Order** button. The **Order Stereotypes** dialog box opens (see Figure 405 on page 628).
3. Click **Up** or **Down** buttons to order stereotypes.

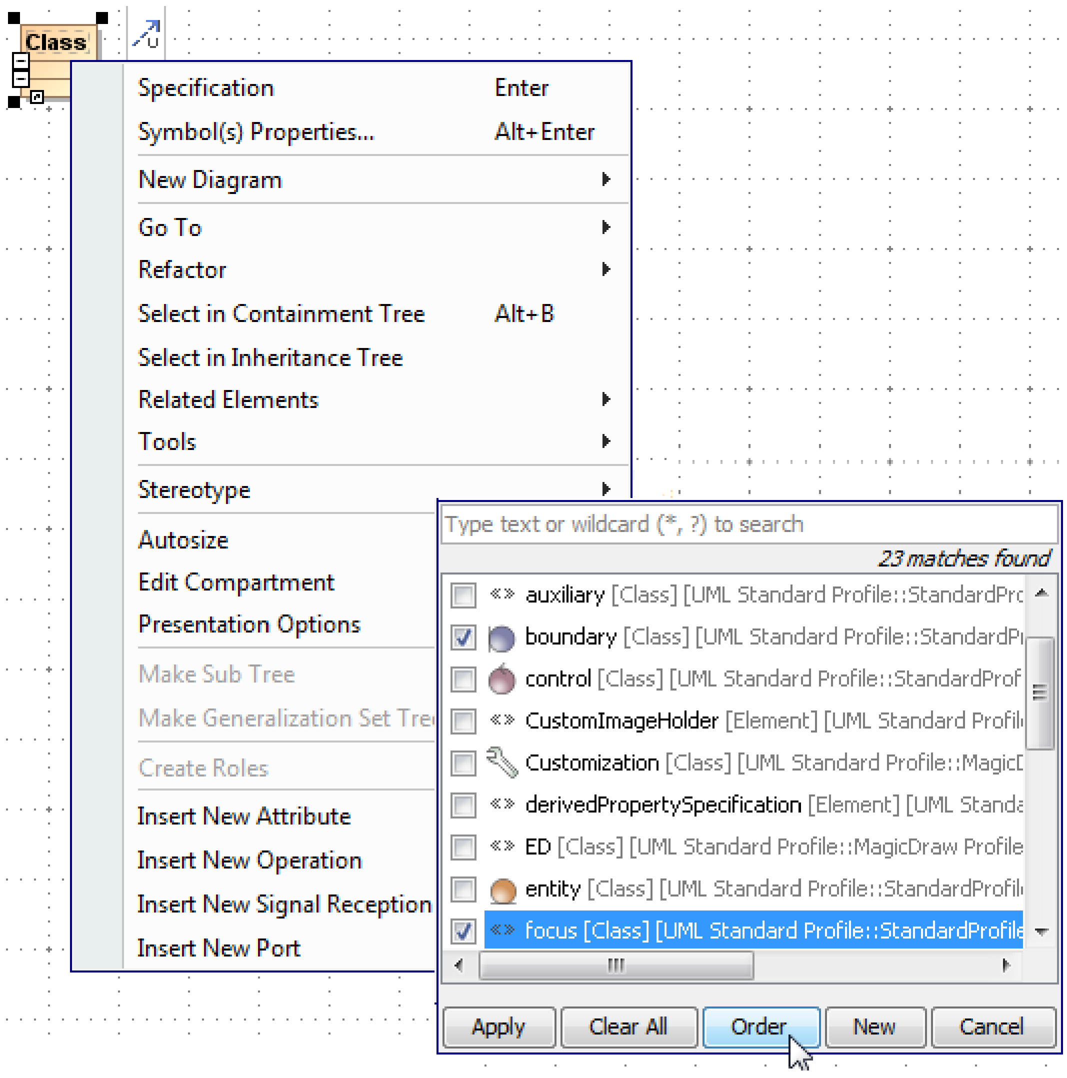

Class
Specification Enter
Symbol(s) Properties... Alt+Enter
New Diagram
Go To
Refactor
Select in Containment Tree Alt+B
Select in Inheritance Tree
Related Elements
Tools
Stereotype
Autosize
Edit Compartment
Presentation Options
Make Sub Tree
Make Generalization Set Tree
Create Roles
Insert New Attribute
Insert New Operation
Insert New Signal Reception
Insert New Port
Type text or wildcard (*, ?) to search
23 matches found
auxiliary [Class] [UML Standard Profile::StandardPro
boundary [Class] [UML Standard Profile::StandardPr
control [Class] [UML Standard Profile::StandardProf
CustomImageHolder [Element] [UML Standard Profil
Customization [Class] [UML Standard Profile::MagicD
derivedPropertySpecification [Element] [UML Standa
ED [Class] [UML Standard Profile::MagicDraw Profile
entity [Class] [UML Standard Profile::StandardProfil
focus [Class] [UML Standard Profile::StandardProfile
Apply
Clear All
Order
New
Cancel

Figure 404 -- The Order button in the Stereotypes list, in the Class symbol shortcut menu

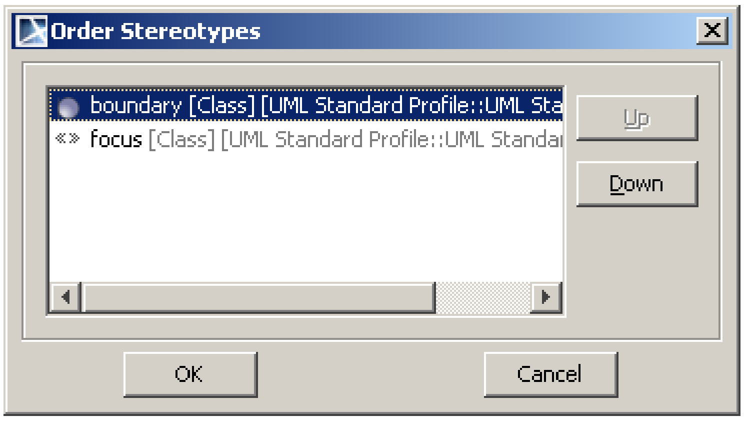

Order Stereotypes
boundary [Class] [UML Standard Profile::UML Sta
focus [Class] [UML Standard Profile::UML Standar
Up
Down
OK
Cancel

Figure 405 -- The Order Stereotypes dialog box

Saving of stereotype information in XMI

Ability to choose options where to save applied stereotype information in XMI file. Information can be saved at the end of the file or inside the element information.

By default stereotype information is stored at the end of XMI file. To store information inside element, open **Environment Options** dialog (choose **Options** - **Environment** command from main menu), and in **General** - **Save/Load** section select property **Save** stereotype information within element.

Stereotype properties

You can specify stereotype properties in the stereotype Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

Applying a stereotype

You may assign a stereotype to an element in the following ways:

- Open the corresponding element Specification window. Click the “...” button in the general pane, next to the **Applied Stereotype** property. Select one or more available stereotypes from the open list and click **Apply**. Or you may create a new stereotype by clicking **New**.
- You may apply a stereotype to a model element easily from the model element shortcut menu. To do this, follow these steps:

1. Select the model element on the diagram pane or in the Browser. Open its shortcut menu by right-clicking the mouse.
2. From the model elements shortcut menu, select the **Stereotype** command. The stereotype menu opens.
3. The list of all stereotypes is seen. You can type the name of the stereotype for which you are searching in the text box, above the list. Or, you can create a new stereotype by clicking the **New** button.
4. When you find the stereotype that you want, or create a new one, select the check boxes of those stereotypes to add to the model element.
5. Click the **Apply** button.

- On the diagram pane in the element name area, type two open angle brackets «», type the stereotype name and type two close angle brackets. Then you may type the element name itself. For example: if you want to name element Books and assign «table» stereotype, in the element name area type the following: «table» Books. The name completion for the stereotypes works in the name editing mode, press the CTRL+SPACE or CTRL+BACKSPACE to get a list of possible to apply stereotypes.

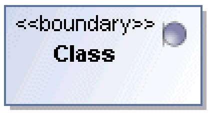
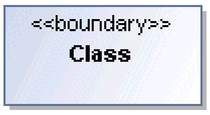
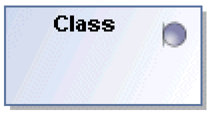
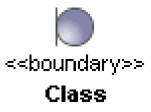
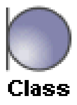
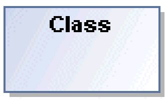
Changing the stereotype display mode

As of MagicDraw version 15.0 you can change the stereotype name and its icon visibility on an element shape.

To change the stereotype display mode on the element shape

- On the element shape shortcut menu, point to **Presentation Options** > **Show Stereotypes**, and then select a desired stereotype display mode.
- In the **Symbol Properties** dialog select a new value for the **Show Stereotypes** property.

The stereotype display modes are described in the following table.

Show Stereotypes Property Value	Shape	Icon of the stereotype on the shape	Name of the stereotype	Image of the stereotype instead of the element shape
Text and icon		displayed	displayed	-
Text		not displayed	displayed	-
Icon		displayed	not displayed	-
Shape Image and Text		-	displayed	displayed*
Shape Image		-	not displayed	displayed*
Do Not Display		not displayed	not displayed	-

* - To display the image of a stereotype instead of the element shape all element compartments should be suppressed.

NOTE **Shape Image and Text** and **Shape Image** properties are not included in the Relationships, Roles and Diagram Frame element property list.

Parent topic:

"Stereotype" on page 626.

Related topics:

"Applying a stereotype" on page 629.

Stereotype notation

Since v 16.6 MagicDraw supports standard stereotype notations. Stereotype notations in diagrams use the guillemets « » instead of symbols «» (see the following figure).

However, when editing elements in a diagram, you can still enter the stereotype names between the «» symbols.

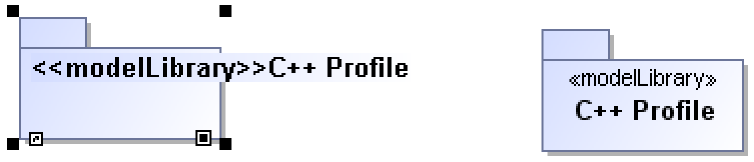


Figure 406 -- Stereotype Notation

Tag

Just like a class, a stereotype may have properties, which may be referred to as tag definitions. When a stereotype is applied to a model element, the values of the properties may be referred to as tagged values.

The tag definitions are used to define new meta attributes of the extended metaclass, they are used as regular class attributes. For more information about working with class attributes, see Section “Drag and drop the selected Opaque Behavior element from the Browser tree on the Diagram pane.” on page 727.

An actual instance of the tag definition is a tagged value (tag).

A tag holds extra information like:

- additional information that does not come with UML, for example Precondition for Use Cases.
- management data about the state and progress of the project such as author, status, and tested.
- language specific data for code generation tools.

A tagged value consists of two parts: name and value (example: Author = Joe).

To create a new tag definition

1. Create a new stereotype.
2. Open the stereotype Specification window.
3. Click the **Tag Definitions** tab and use the **Create** button to add a new tag definition for stereotype. Select the type of this property. It may be a standard UML data type or another user defined Stereotype. Regular classes should not be used as types of tag definition.
4. In the stereotype Specification window, click **Close** to save changes.

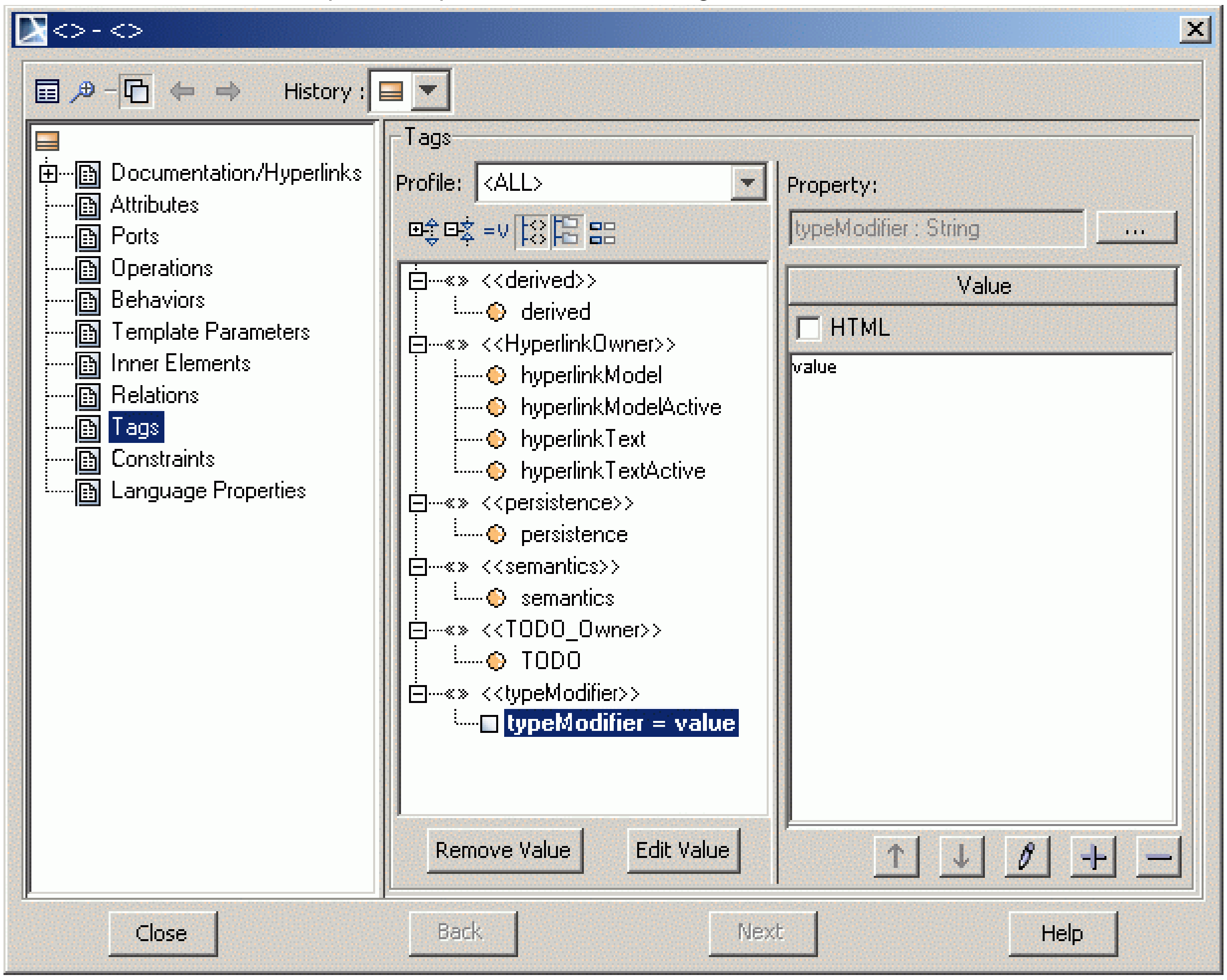
For more information about stereotype properties, refer to “Stereotype properties” on page 629 f .

Editing tagged value

To create a new tagged value

- In the element Specification window, **Tags** group, select an available tag definition and click the **Create Value** button.

- Set the tag value using drag and drop. Now you can drag an element from the Containment tree and drop in the Specification window tag value area.



Profile: <ALL>

Property: typeModifier : String

Figure 407 -- Tags dialog box

Button		Description
Up	↑	Moves the created value to an upper position in the list.
Down	↓	Moves the created value to a lower position in the list.
Edit	✎	Opens an editable window for value.
Add	+	Adds a new tagged value to the list.
Remove	−	Removes a tagged value from the list.

To create default tag values

1. In the stereotype Specification window, expand the **Tag Definitions** branch and select the tag definition.
2. Assign a value forthe **Default Value** property.
3. Create an element and assign a stereotype for this element. The element will have tags with assigned default values.

To set a default tag value to tag with empty value

MagicDraw version 15.0 and later allows setting default tag values to tag with empty value. This functionality is needed when a stereotype is already assigned to an element and a new mandatory tag definition with a default value is created for the stereotype. After creating such a tag definition, the model elements that have the modified stereotype applied will have the newly created tags unset.

To set default values instead of empty values:

1. From the **Tools** main menu, select the **Set Empty Tags to Defaults** command. The **Select Package** dialog box opens.
2. Select the scope of elements to which you want to set the default tag values.
   Note If you want to assign default values to all project tags, in the *All data tree* select the *Data* model and click the **Add All** button. *Data* package is added to the *Selected objects* list. Click OK.
3. The **Question** dialog box opens informing you that this action will set the mandatory tags without values to defaults.
   If you do not want to see this message again next time, clear the **Show this message next time** check box.
4. Click **Yes**. Now, the element with stereotype tags has been assigned default values.

The following conditions are required to set the default tag values:

1. The element should have an assigned stereotype with a specified default value property.
2. The tag definition, to which you want to assign a default value, should contain no value.

NOTE The default tag values are not set when the stereotype property (tag definition) multiplicity is equal to 0.

Parent Topic: “UML Extension Elements” on page 625.

Related topics

Stereotype

Attribute

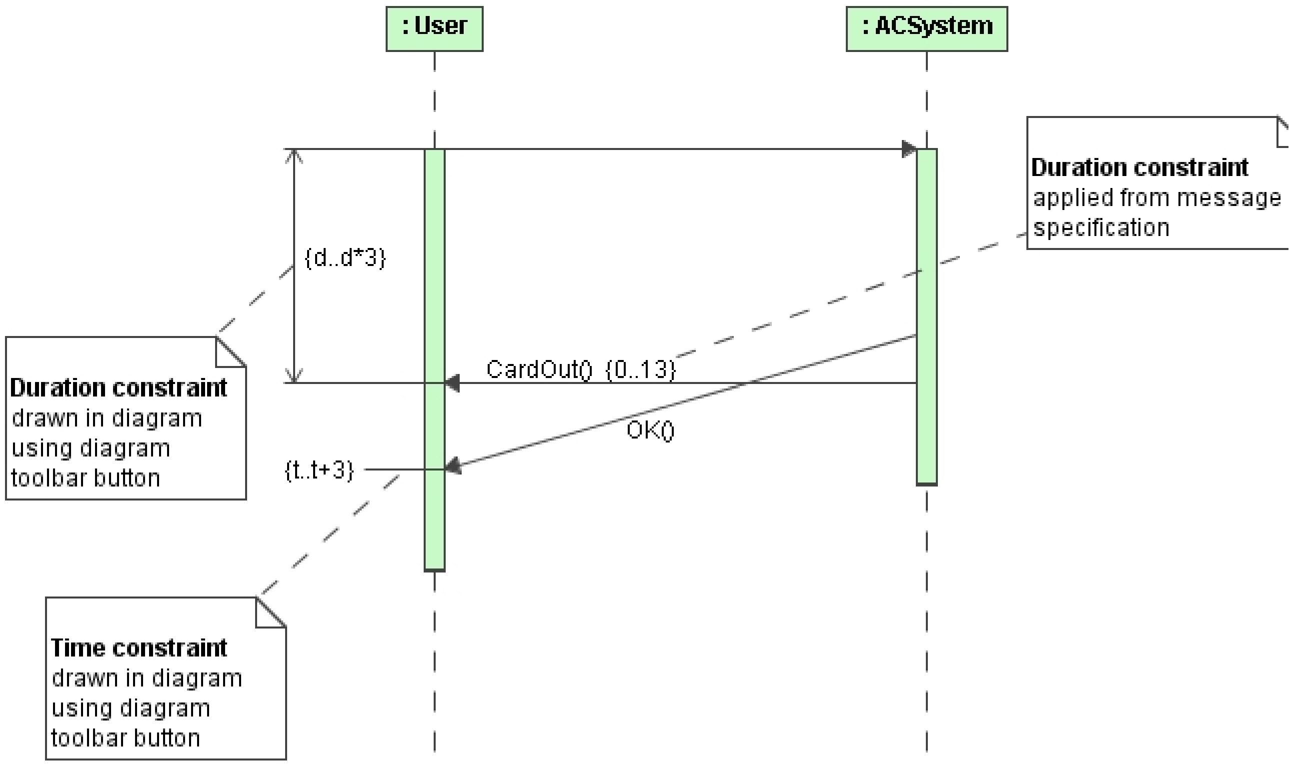
Constraint

A Constraint represents additional semantic information attached to the constrained elements. It is an assertion that indicates a restriction that must be satisfied by a correct design of the system. The constrained elements are those elements required to evaluate the constraint specification. In addition, the context of the Constraint may be accessed, and may be used as the namespace for interpreting names used in the specification.

A Constraint is represented as a linguistic, enclosed in braces ({}), statement in some formal (OCL, C++, and other), or a natural language. There are 14 standard constraints in UML such as association, global, and parameter. You may also define your own constraints.Time and duration constraints

The Time Constraint specifies the combination of min and max timing interval values.

The Duration Constraint defines a value specification that specifies the temporal distance between two time instants.


: User
: ACSystem
Duration constraint applied from message specification
{d..d*3}
Duration constraint drawn in diagram using diagram toolbar button
CardOut() {0..13}
OK()
{t..t+3}
Time constraint drawn in diagram using diagram toolbar button

Working with Constraints

Edit constraints in the Constraints tab of the Model Element Specification window.

To define a new constraint

- From the element shortcut menu in the Browser, select **New Element** > **Constraint**.
- Click the **Inner Elements** tab in the Specification window for each model element and click the **Create** button (select **Constraint** from the open list, if needed). Specify the information about the constraint in the constraint Specification window.
- Click the **Constraints** tab in the Specification window for each model element and click the **Create** button. Type the name and specification of the constraint.

NOTE	If a constraint is displayed in the **Constraints** tab of the element Specification window, it means this constraint is valid and applied for the element. If it is displayed in the **Inner Elements** list, this constraint is only owned by the element.

To apply a constraint to an element

1. Click the **Constraints** tab in the Specification window for each model element and click the **Apply** button.
2. The **Select Elements** dialog opens. Select a constraint existing in the model from the **All Data** tree and click the **Add** button to move it to the **Selected Objects** list.
3. Click **OK** when you are done.

The Constraint properties

You can specify constraint properties in the constraint Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

OCL

Object Constraint Language (OCL) is a formal language used to express constraints. These typically specify the invariant conditions that must hold for the system being modeled.

Expressions can be used in a number of places in a UML model:

- To specify the initial value of an attribute or association end.
- To specify the derivation rule for an attribute or association end.
- To specify the body of an operation.
- To indicate an instance in a dynamic diagram.
- To indicate a condition in a dynamic diagram.
- To indicate the actual parameter values in a dynamic diagram.

There are four types of constraints:

- An *invariant* is a constraint that states a condition that must always be met by all instances of the class, type, or interface. The invariant is described using an expression that evaluates to true if the invariant is met. Invariants must be true all the time.
- A *precondition* to an operation is a restriction that must be true at the moment the operation is going to be executed. The obligations are specified by the postconditions.
- A *postcondition* to an operation is a restriction that must be true at the moment the operation has just been executed.
- A *guard* is a constraint that must be true before a state transition discharged.

Invariants on attributes

The simplest constraint is an invariant on an attribute. Suppose a model contains a class *Customer* with an attribute age, then the following constraint restricts the value of the attribute:

```
context Customer inv:
age >= 18
```

Invariants on associations

One may also put constraints on the associated objects. Suppose a model contains the class *Customer* that has an association to the class *Salesperson* with the role name *salesrep* and multiplicity 1, then the following constraint restricts the value of the attribute knowledge level of the associated instance of *Salesperson*:

```
context Customer inv:
salesrep.knowledgelevel >= 5
```

Collections of objects

In most cases the multiplicity of an association is not 1, but more than 1. Evaluating a constraint in these cases will result in a collection of instances of the associated class. Constraints can be put on either the collection itself, e.g. limiting the size, or on the elements of the collection. Suppose in a model the association between *Salesperson* and *Customer* has the role name *clients* and multiplicity 1..* on the side of the *Customer* class, then we might restrict this relationship by the following constraints:

```
context Salesperson inv:
clients->size() <= 100 and clients->forAll(c: Customer | c.age >= 40)
```

Pre- and postconditions

In the pre- and postconditions the parameters of the operation may be used. Furthermore, there is a special keyword result which denotes the return value of the operation. It can be used in the postcondition only. For example an operation *sell* was added to the *Salesperson* class.

```
context Salesperson::sell( item: Thing ): Real
pre: self.sellableItems->includes( item )
post: not self.sellableItems->includes( item ) and result = item.price
```

Derivation Rules

Models often define derived attributes and associations. A derived element does not stand alone. The value of a derived element must always be determined from other (base) values in the model. Omitting the way to derive the element value results in an incomplete model. Using OCL, the derivation can be expressed in a derivation rule. In the following example, the value of a derived element *usedServices* is defined to be all services that have generated transactions on the account:

```
context LoyaltyAccount::usedServices : Set(Services)
derive: transactions.service->asSet()
```

Initial Values

In the model information, the initial value of an attribute or association role can be specified by an OCL expression. In the following examples, the initial value for the attribute points is 0, and for the association end transactions, it is an empty set:

```
context LoyaltyAccount::points : Integer
init: 0
context LoyaltyAccount::transactions : Set(Transaction)
init: Set{}
```

Body of Query Operations

The class diagram can introduce a number of query operations. The query operations are operations that have no side effects, i.e. do not change the state of any instance in the system. The execution of a query operation results in a value or set of values without any alterations in the state of the system. The query operations can be introduced in the class diagram, but can only be fully defined by specifying the result of the operation. Using OCL, the result can be given in a single expression, called a body expression. In fact, OCL is a full query language, comparable to SQL. The use of body expressions is an illustration thereof.

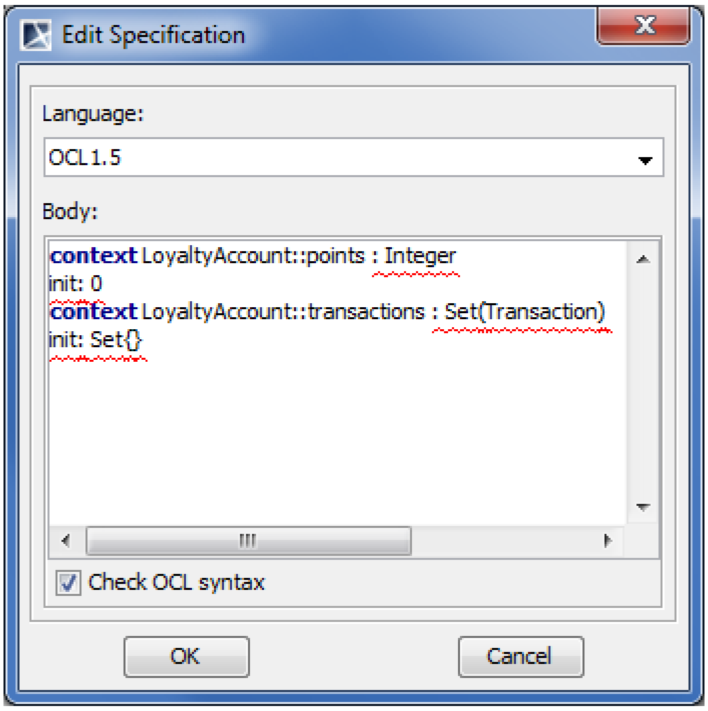
The next example states that the operation *getCustomerName* will always result in the name of the card owner associated with the loyalty account:

```
context LoyaltyAccount::getCustomerName() : String
body: Membership.card.owner.name
```

To check OCL syntax according to OCL grammar

1. Open the constraint Specification window.
2. Click the **Specification** property value.
3. Click the “...” button in the property value cell. The **Edit Specification** dialog opens.

4. In the **Language** list, click **OCL** and select the **Check OCL syntax** check box. In the **Body** box, incorrect expression will be underlined in red.



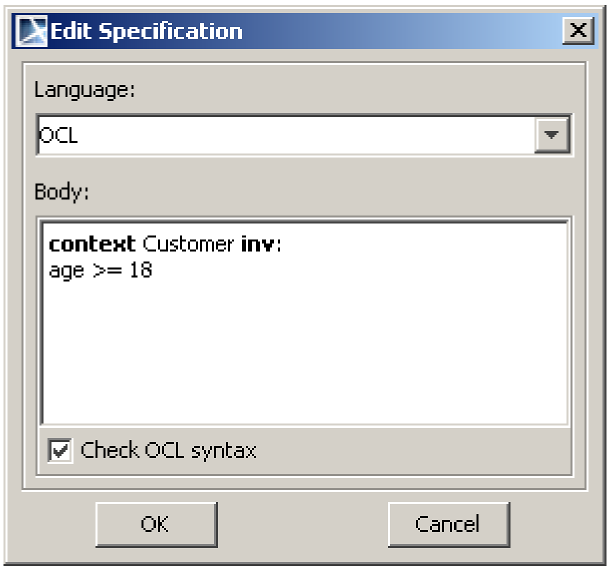
OCL 1.5

Body:

```
context LoyaltyAccount::points : Integer
init: 0
context LoyaltyAccount::transactions : Set(Transaction)
init: Set{}
```

☑ Check OCL syntax

Figure 408 -- Checking OCL syntax



OCL

Body:

```
context Customer inv:
age >= 18
```

☑ Check OCL syntax

Profile

A profile is a kind of a package that extends a reference metamodel. The primary extension construct is a stereotype. Stereotypes are defined as a part of profiles.

A profile introduces several constraints or restrictions to ordinary metamodeling. Constraints and restrictions are realized using metaclasses defined in the package. It is a restricted form of a metamodel that always must be related to a reference metamodel, such as UML, as it is described below. It cannot be used without its reference metamodel, and it defines a limited capability to extend metaclasses of the reference metamodel. The extensions are defined as stereotypes that apply to the existing metaclasses.

Each profile contains a set of stereotypes. Profiles are defined as separate modules. Profiles are loaded on demand, that is, when you start or open your project only profiles used in that project are loaded.

Profiles are defined using the UML extensibility mechanisms that allow modelers to customize UML for specific domains, for example, for software development processes. In MagicDraw, the mechanism of the profile is similar to the functionality of modules.

MagicDraw comes with a number of predefined profiles: UML Standard Profile, DDL, EDOC, and other. All MagicDraw profiles are stored in <MagicDraw installation directory>\profiles.

Profile properties

The profile is defined as a package, that is, it has package properties. For the detailed description of packages, see "Package" on page 732.

You can specify profile properties in the profile Specification window. You can also find descriptions of each property in this window. Descriptions are provided in the description area below the property list. For more information about using the Specification window, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

Creating profiles

You can create a profile in one of the following ways:

- Using the shortcut menu of a package, model, or other profile.
- **NEW!** Using the profile diagram pallet.
- **NEW!** Using the package diagram pallet.
- Using the class diagram pallet.

To create a profile using the package / model / profile shortcut menu

1. In the Containment tree, select a package, a model, or another profile, wherein you want to create the new profile.
2. From the shortcut menu of the selected package, model, or profile, select **New Element** > **Profile**.

NEW! To create a profile using the profile diagram pallet

1. Either create a new profile diagram or open an existing one.
2. On the diagram pallet, click the **Profile** button.
3. Click a free space of the diagram pane.

NEW! To create a profile using the package diagram pallet

1. Either create a new package diagram or open an existing one.
2. On the diagram pallet, click the **Package** arrow to see more buttons.
3. Click the **Profile** button.
4. Click a free space of the diagram pane.

To create a profile using the class diagram pallet

1. Either create a new class diagram or open an existing one.
2. On the class diagram pallet, do one of the following:

- Expand the **Profile Diagram** button group and click the **Profile** button.
- Expand the **Package Diagram** button group, click the **Package** arrow to see more buttons, and then click the **Profile** button.

3. Click a free space of the diagram pane.

Action

An action is a named element that is the fundamental unit of an executable functionality. The execution of an action represents some transformations or processing in the modeled system, be it a computer system or otherwise. An action execution represents the run-time behavior of executing an action within a specific behavior execution. As action is an abstract class, all action executions will be the executions of a specific kind of action. When the action will be executed and what its actual inputs will be are determined by the concrete action and the behaviors in which it is used.

The following are types of actions:

- "Accept Event Action" on page 639.
- "Call Behavior Action" on page 642.
- "Call Operation Action" on page 643.
- "Opaque Action" on page 644.
- "Send Signal Action" on page 645.
-

Action Properties

You can specify action properties in the action Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

See also: "Working with Actions" on page 648.

Usage in diagrams: "Activity Diagram" on page 535.

Parent topic: "Model Elements" on page 622.

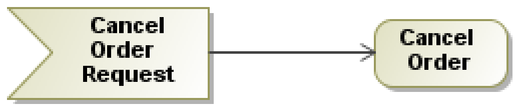
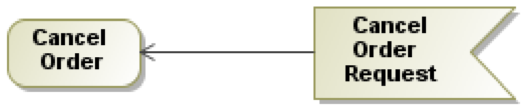
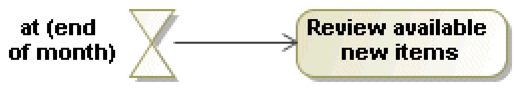
Related topics

"Specification Window" on page 219.

"Formatting Symbols" on page 257.

Accept Event Action

The Accept event action is an action that waits for the occurrence of an event that meets specified conditions. If an accept event action has no incoming edges, then the action starts when the containing activity or structured node starts, whichever most immediately contains the action. In addition, an accept event action with no incoming edges remains enabled after it accepts an event. It does not terminate after accepting an event and outputting a value, but continues to wait for other events. An accept event action with no incoming edges and contained by a structured node is terminated when its container is terminated.

Notation	Description
Accept event action 	The *Order cancel request* accept event action is connected to *Cancel order* with the exception handler relationship.
Rotated accept event action 	The symbol of accept event action is rotated.
Accept time event action 	The time event is connected to the call behavior action.

Assigning signals

To assign a signal to an accept event action you can use any of the following features:

- Drag-and-drop operation
- Accept event action's shortcut menu

To assign a signal using a drag-and-drop operation

IMPORTANT! To assign a signal to an accept event action, at least the one signal element should exist in the project.

1. Select the signal in the Containment tree.
2. Drag the signal to the accept event action as it is shown in the following picture.

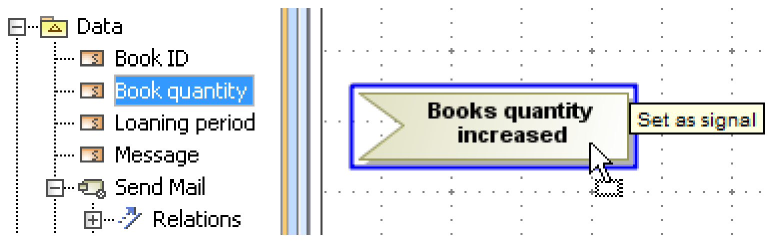


Figure 409 -- Signal dragging to accept event action

To assign a signal using the accept event action's shortcut menu

1. Right-click the accept event action to open the shortcut menu.
2. Click **Signal**. The list of signals available in the project will open. The example of the dialog is shown in the following picture.

3. Select the signal from the list or click **New Signal** and create a new one. For more information about creating a new element see Section "Element creation mode" on page 281.

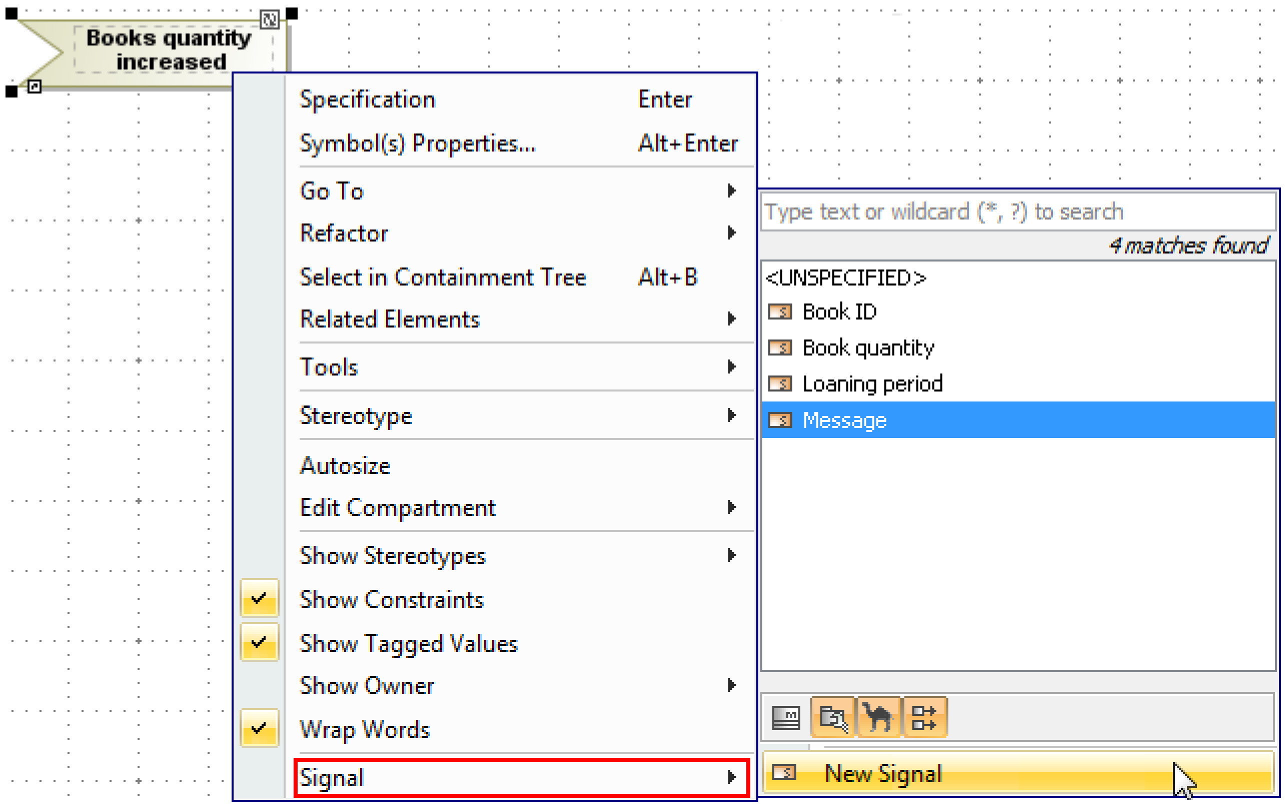


Figure 410 -- Signal selection using action shortcut menu

Once the signal is assigned to the accept event action, a signal event and a trigger for this action are created automatically. If you change the signal, the signal event and the trigger will change accordingly to a new signal. The following figure shows the signal event and the trigger positions in the Containment tree.

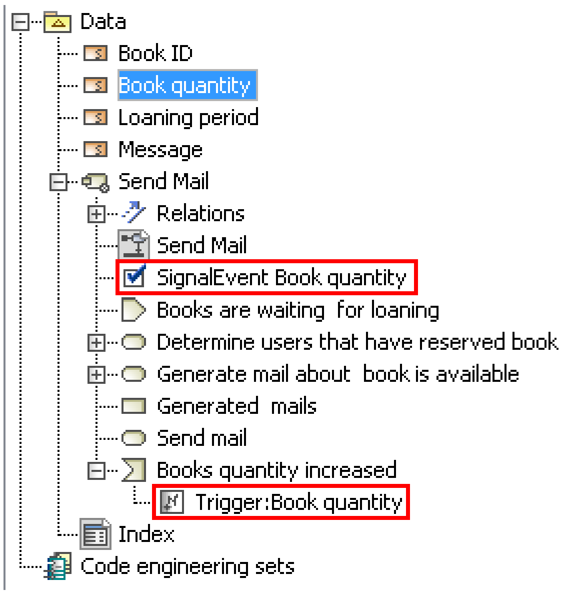


Figure 411 -- Signal event and trigger in the Containment tree

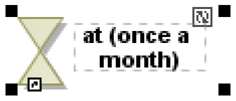
Using Time Event Shape

To draw the accept event action with the time event shape

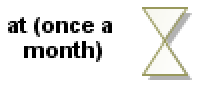
- In the activity diagram panel select the **Time Event** button and then click the diagram pane.

To change the position of the accept event action name

1. Select the accept event action shape on the diagram pane.



2. Click the **Rotate State** button on the upper-right side of the shape. The name of the accept event action will appear on the opposite side of the shape.



You can specify for an accept event action, whether there is a single output pin for the event, or multiple output pins for the attributes of the event.

Specifying the Is Unmarshall property

To specify the **Is Unmarshall** property

1. Select the accept event action and open its Specification window.
2. Select or clear the **Is Unmarshall** check box. If the value is set to:
   - *false*, then there is a single output pin for the event, and a real-world instance of the signal is placed on this output pin.
   - *true*, then there are multiple output pins for the attributes of the event, and feature values of the signal instance are placed on the corresponding output pins.

Call Behavior Action

The call behavior action invokes a behavior directly rather than invoking a behavioral feature that, in turn, causes the behavior. The argument values of the action are available to the execution of the invoked behavior. The execution of the call behavior action waits until the execution of the invoked behavior completes and a result is returned on its output pin. In particular, the invoked behavior may be an activity.

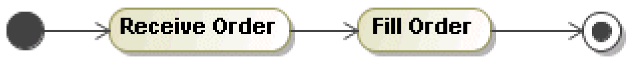
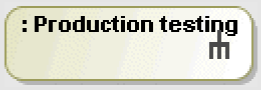


Figure 412 -- The Receive Order and Fill Order call behavior actions

To assign a behavior to the call behavior action

- From the call behavior action shortcut menu select the **Behavior** command.
- In the **Call Behavior Action** specification dialog box, modify the **Behavior** field.

NOTES
- Double click the call behavior action with the assigned behavior - the behavior specification dialog box is opened or if the assigned behavior is a diagram, the diagram will be opened.
- After the behavior is assigned to the call behavior action, a rake symbol is displayed on the action shape.



To create a new diagram for the call behavior action

From the call behavior action symbol's shortcut menu, select **New Diagram** and then diagram from the list. This accelerates the creation of behavior diagrams.

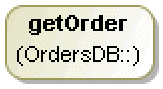
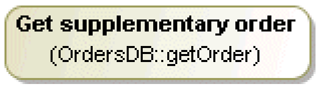
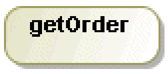
To select the name display mode on the call behavior action

Stereotypes from the behavior can be visible on the call behavior action. You can select to show an action name, a behavior name or both by changing the **Name Display Mode** property in the call behavior action symbol **Properties** dialog box.

Call Operation Action

The call operation action transmits an operation call request to the target object, where it may cause the invocation of an associated behavior.

You can display an action name and/or name of the operation on the call operation action shape. For example, if you have two call operation action elements calling the same operation, you may specify their names to distinguish which action means what.

Notation	Description
The call operation action with *getOrder* operation 	In this example the call operation action has been assigned *getOrder* operation whose type is *OrdersDB* class.
The call operation action named Get supplementary order 	In this example the call operation action is named *Get supplementary order.* It has been assigned *getOrder* operation whose type is *OrdersDB* class.
Call operation action with hidden classified name 	The classified name of operation is hidden from the call operation action shape.

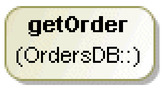
To assign an operation for the call operation action

From the action shortcut menu, select the **Operation** command or set an operation in the **Call Operation Action** specification dialog box, **Operation** field.

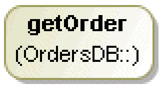
MagicDraw version 15.0 and later allows the display of operation name and class of operation on the call operation action shape.

When an operation is assigned to the call operation action, there are three name/operation display options available:

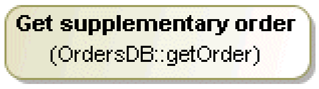
- If the call operation action is not named, the name of the class is displayed under the operation name.



- If the name of the call operation action is the same as the assigned operation name, then the name of the class is displayed under the operation name.



- If the call operation action name differs from the assigned operation name, then <*class of the operation*>::<*operation name*> is displayed under the call operation action name.



To hide the operation name and class of the operation from the call operation action shape

From the call operation action shortcut menu, clear the **Show Qualified Name for Operation** check box. You may also customize this property in the call operation action **Properties** dialog box.

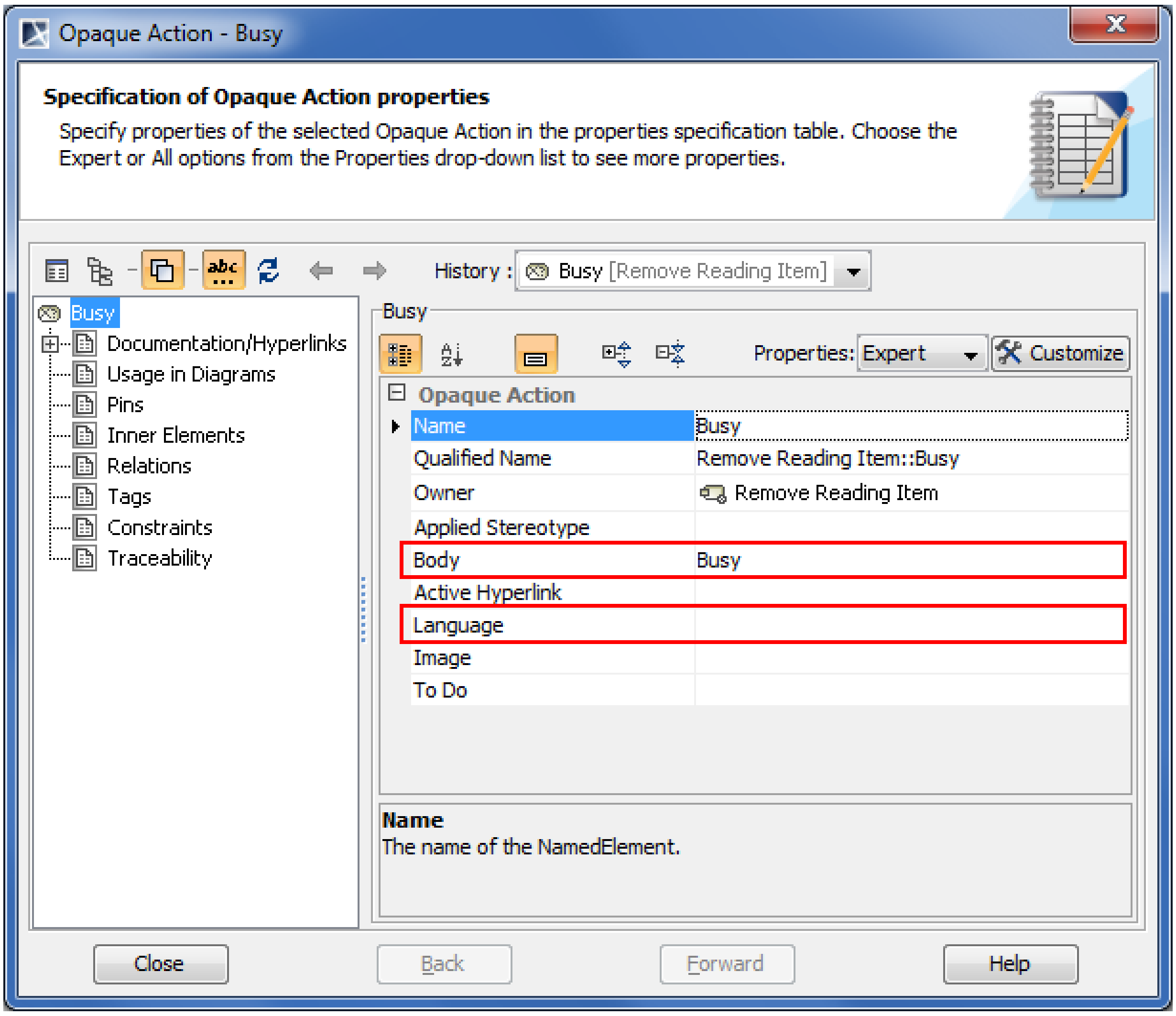
NOTE When loading a project from a version older than MagicDraw version 15.0, by default the class of the operation is not displayed on the diagram pane. The **Show Qualified Name for Operation** option is unchecked.

Opaque Action

The opaque action is introduced for implementation-specific actions or for use as a temporary placeholder before some other actions are chosen.

The opaque action has no specific notation.

There are additional **Body** and **Language** text fields in the **Opaque Action** Specification window.



Opaque Action - Busy

Specification of Opaque Action properties

Specify properties of the selected Opaque Action in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Busy [Remove Reading Item]

- Busy
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Pins
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability

Busy

Properties: Expert — Customize

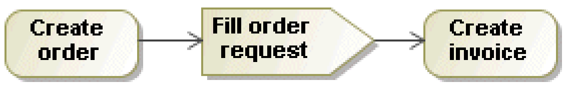
Opaque Action	
Name	Busy
Qualified Name	Remove Reading Item::Busy
Owner	Remove Reading Item
Applied Stereotype	
Body	Busy
Active Hyperlink	
Language	
Image	
To Do	

Name
The name of the NamedElement.

Figure 413 -- Opaque Action's Specification window

Send Signal Action

The send signal actions creates a signal instance from its inputs and transmits it to the target object, where it may cause the start of a state machine transition or the execution of an activity. The argument values are available to the execution of associated behaviors. The requester continues the execution immediately. Any reply message is ignored and is not transmitted to the requester. If the input is already a signal instance, use the Send object action.

Notation	Description
Send signal action 	This example describes an order process. 1. First, an order is created (*Create order* call behavior action). 2. Then, a signal to fill the order request is sent to the warehouse (*Fill order request* send a signal action). 3. Finally, an invoice is created (*Create invoice* call behavior action). The relationships are represented with control flow paths.

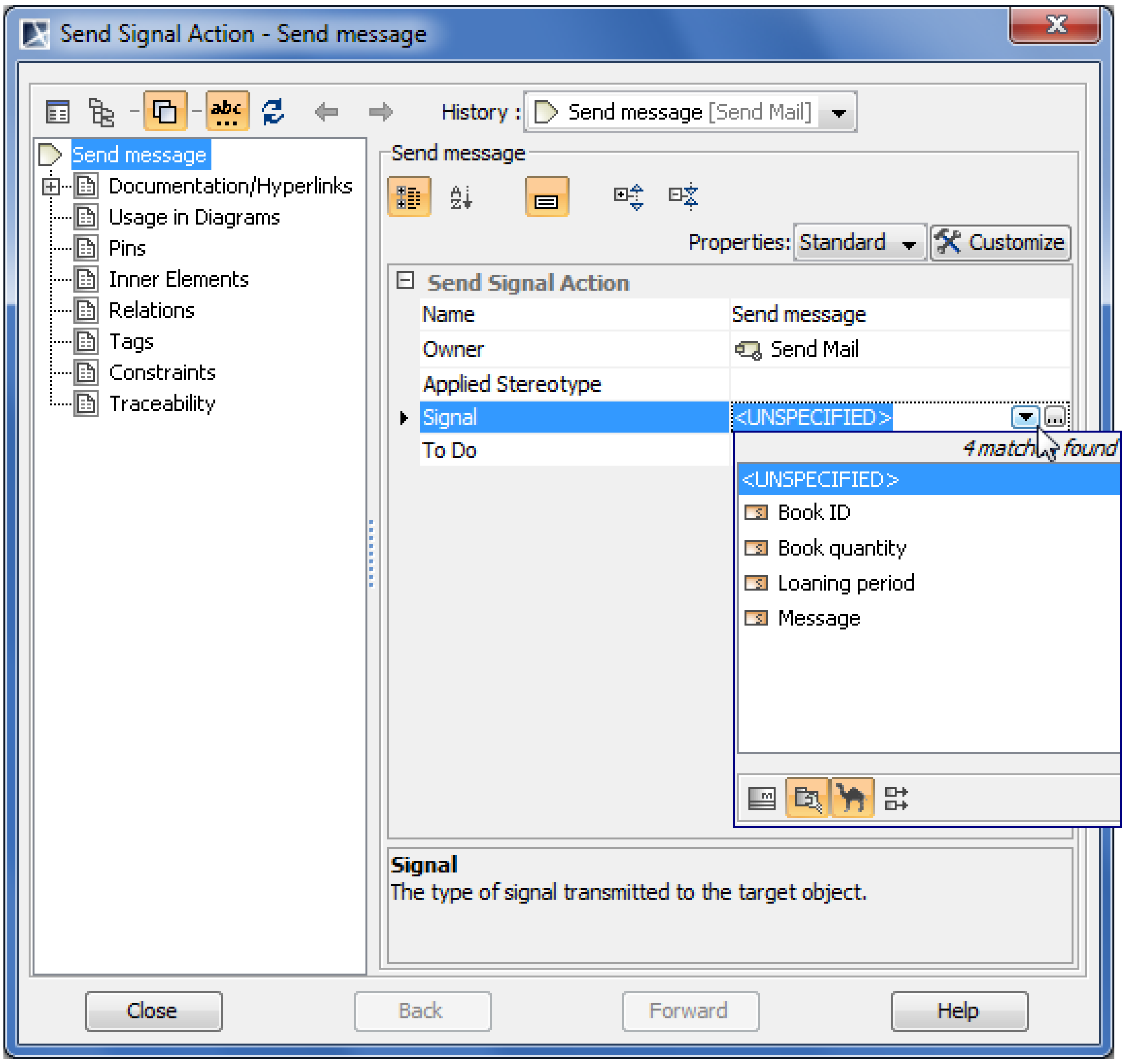
Assigning signals

To assign a signal to a send signal action you can use any of the following features:

- Send signal action's Specification window
- Drag-and-drop operation
- Send signal action's shortcut menu

To assign a signal via the send signal action's Specification window

1. Open the Specification window for the send signal action.
2. In the **Signal** property value cell do any of the following:
    - Click the "..." button. The **Select Signal** dialog will open. Select the signal from the list or create a new one. For more information about creating a new element see Section "Element creation mode" on page 281.
    - Click the ▾ button to open the list of signals available in the project. Select the signal from the list. The example of the signal list is shown in the following picture.
3. Click **Close** once the signal is selected.



Send Signal Action

Name	Send message
Owner	Send Mail
Applied Stereotype	
Signal	<UNSPECIFIED>
To Do	

4 matches found

<UNSPECIFIED>
Book ID
Book quantity
Loaning period
Message

Signal
The type of signal transmitted to the target object.

Figure 414 -- Send signal action's Specification window. Signal selection

To assign a signal using a drag-and-drop operation

1. Select the signal in the Containment tree.
2. Drag the signal to the send signal action as it is shown in the following picture.

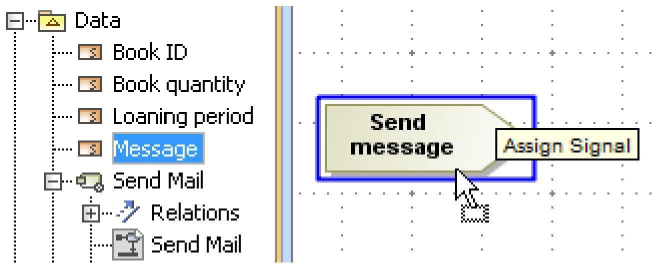


Figure 415 -- Signal dragging to send signal action

To assign a signal using the send signal action shortcut menu

1. Right-click the send signal action to open the shortcut menu.
2. Click **Signal**. The list of signals available in the project will open. The example of the dialog is shown in the following picture.
3. Select the signal from the list or click **New Signal** and create a new one. For more information about creating a new element see Section "Element creation mode" on page 281.

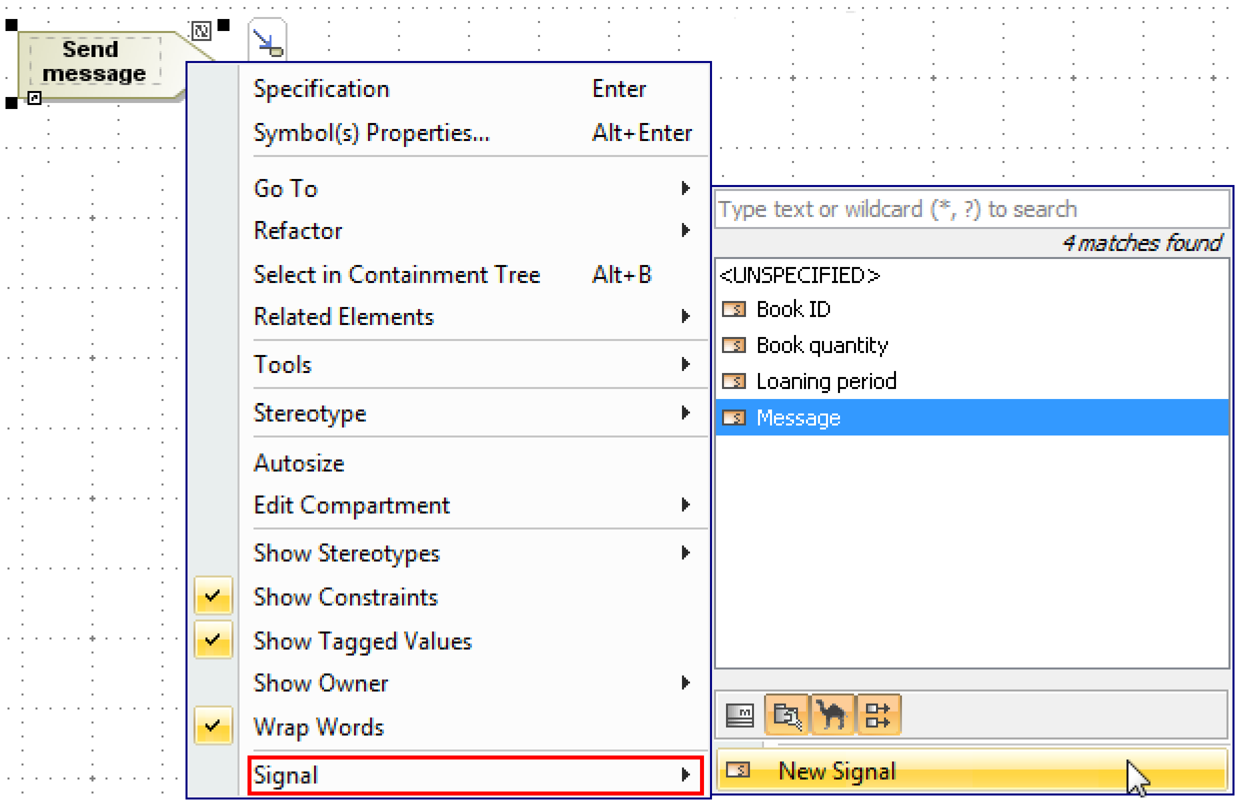
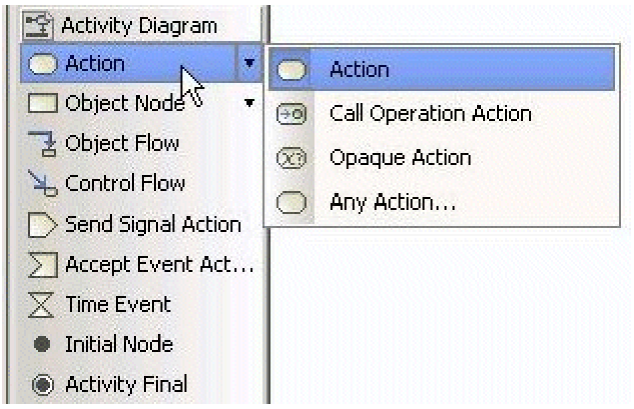


Figure 416 -- Signal selection using shortcut menu

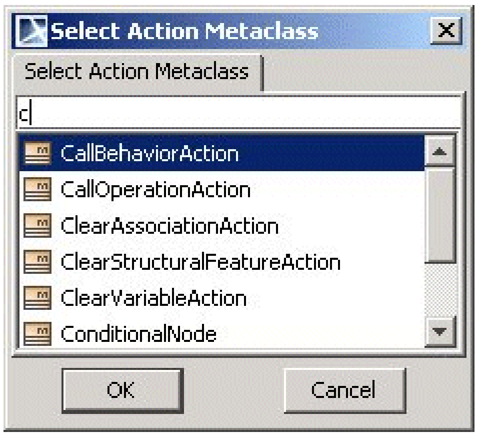
Working with Actions

To quickly create any action

1. In the activity diagram toolbar, right-click the **Action** button. The menu opens.



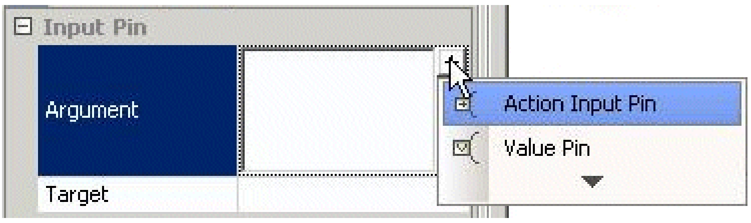
2. Select the **Any Action** command. The **Select Action Metaclass** dialog opens.



3. Select an action metaclass from the list or type the first letter of the metaclass. Click **OK**. The action is created.
4. Click on the diagram pane. An action symbol is drawn.

To assign pins for an action

1. In the action specification dialog box, select the **Pins** branch.
2. In the right window size, in the **Input Pin** field, select the **Argument** box. Click '+' button. A



menu with input pin, action input pin, or value pin opens.

3. Select the pin from the list. The pin specification dialog box opens.

- In the **Output Pin** field, select the **Result** box and click '+' button. The **Output Pin** specification dialog box opens.

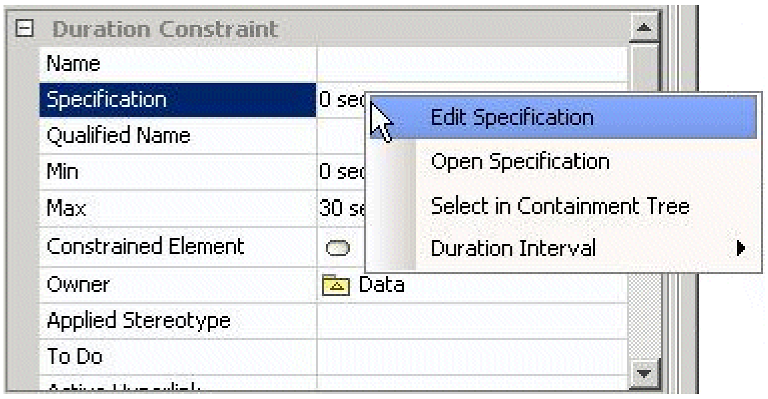
NOTES	●The Output pin is not included when selecting the send signal action. ●The Input pin is not included when selecting the accept event action.

Advancing actions: applying duration constraint

You can create and apply a time duration constraint on an action that states that the output must occur after delay from the input.

To create and apply a time duration constraint

1. Select an action and create the input and output pins to specify the events.
2. Create a duration constraint for the action:
   - 2.1. In the **Call Behavior Action** specification dialog box, select the **Constraints** branch. At the bottom of the right side pane, click the **Apply** button. The **Select Elements** dialog opens.
   - 2.2. Select the constraint storage place and click the **Create** button. In the menu that opens, select the **Duration Constraint** command. The **Duration Constraint** specification dialog box opens.
3. Specify a duration interval. In the **Duration Constraint** dialog box, select the **Expert** property display mode. Type the minimum and maximum duration for holding an activity in the **Min** and **Max** fields, e.g. type the following values: *0 sec* and *30 sec*.
4. Assign the events for the input and output pins:
   - 4.1. In the open **Duration Constraint** specification dialog box, right-click the **Specification** field. The following menu opens:



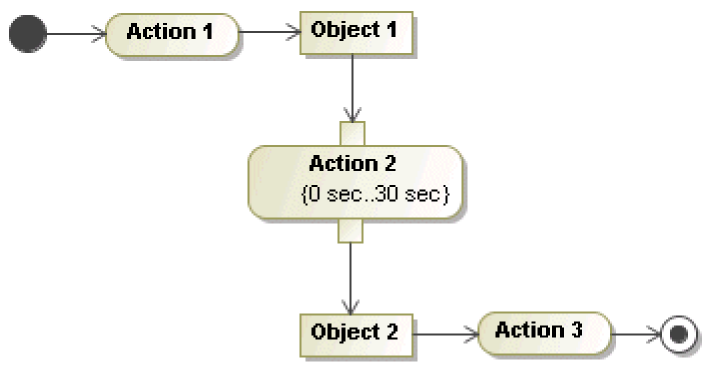
Duration Constraint

Name	
Specification	0 se
Qualified Name	
Min	0 se
Max	30 s
Constrained Element	
Owner	Data
Applied Stereotype	
To Do	

   - 4.2. Select the **Open Specification** command. The **Duration Interval** specification dialog box opens.
   - 4.3. Right-click the **Min** property and select the **Open Specification** command. The **Duration** specification dialog box opens.
   - 4.4. In the **Event** field, click the "..." button. The **Select Element** dialog box opens. Select the activity input pin.
   - 4.5. Repeat steps c and d for the **Max** property - select the action output pin as an event.
5. Apply the created duration constraint on the action.

TIP!	To return to the former dialog box in the specification dialog box, click the **Back** button.

The sample below depicts an activity diagram with a duration constraint applied on an action.



Actor

Actors represent roles played by human users, external hardware, and other subjects. An actor does not necessarily represent a specific physical entity but merely a particular facet (that is, "role") of some entities that is relevant to the specification of its associated use cases.

An actor requires task solutions from a system. This task is represented as a use case.

An actor is shown as a “stick man” figure with the name below the figure.

For general information about working with shapes, see "Diagramming" on page 149.

Actor Properties

You can specify actor properties in the actor Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

To define an actor as abstract

1. Open the actor Specification window.
2. Select the **Is Abstract** check box in the general properties group.

To draw an actor icon in the sequence diagram

1. Drag an actor from the Browser and drop it on the diagram pane.
2. From the classifier shortcut menu, select the **Suppress Content** command.

Association

An association in the class diagrams represents the semantic relationship between two or more classifiers, which specifies connections between their instances. An association relationship is the most general of all relationships and the most semantically weak.

An association in the use case diagrams represents the participation of an actor in a use case, i.e., when instances of the actor and instances of the use case communicate with each other. This is the only relationship between actors and use cases. Sometimes an association relationship is called communication association.

An association is drawn as a solid path connecting two classifier symbols.

For a general information about working with symbols, see "Diagramming" on page 149.

Working with Associations

Association Properties

You can specify association properties in the association Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

To show the direction arrow near the association name

From the association shortcut menu, select the **Show Direction Arrow** check box.

Default Direction Arrow direction is displayed according path creation direction. To change the Direction Arrow direction from the association shortcut menu, select the **Reverse Direction Arrow** command.

The Direction Arrow is graphical display most often used in top level domain class diagrams. The Direction Arrow helps to read diagram and explain diagram semantics. The Direction Arrow has no meaning in a model.

Usually Direction Arrow is used in diagram where navigability is not defined yet. Direction Arrows are usually displayed for named associations. When you move on with your modeling and create mode detail diagrams with specified navigability, direction arrows and associations names usually are not displayed in this type of diagrams.

See an example in Figure 417 on page 651 and Figure 418 on page 651. *User* and *Account* classes are connected with association. Navigation arrow may be displayed to either side, depending on the association name. If association name is “*belongs to*” - Direction Arrow should point from *Account* class to *User* class. If association name is “*has*” - Direction Arrow should point from *User* class to *Account* class.

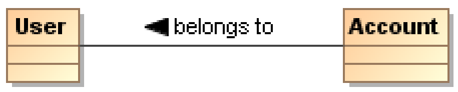


Figure 417 -- The Direction Arrow points from Account class to User class

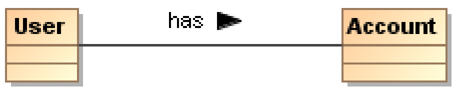


Figure 418 -- The Direction Arrow points from User class to Account class

To draw an association class

In the class diagram, you may add attributes to an association using an association class. The association class is a simple class that has a dashed line connected to the association.

1. Draw two classes.

2. Click the **Association Class** button on the diagram toolbar.
3. On the diagram pane click the first class shape (path source).
4. Drag the path to the second class (path destination) and drop it there.

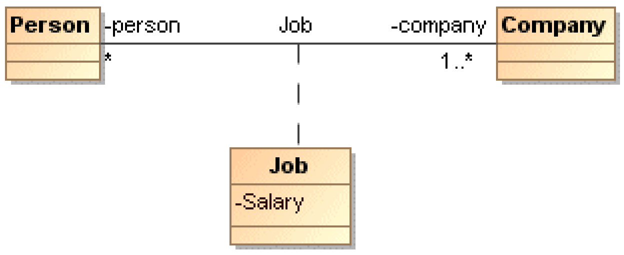


Figure 419 -- Sample of the association class

NOTE	If you need to model a relationship among a number of classes, N-ary association is used.

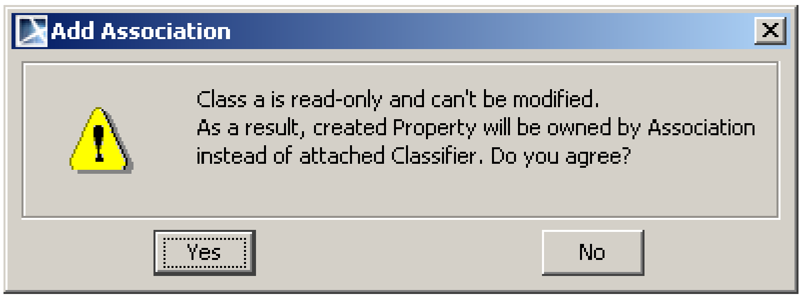
To draw an N-ary association class

The N-ary association is drawn as a big diamond with all the associations attached to its points. Every involved class may have a role name and multiplicity.

1. Draw three classes on the Diagram pane.
2. Draw the N-ary association connector icon.
3. Connect all classes and the N-ary association connector icon using an association path.

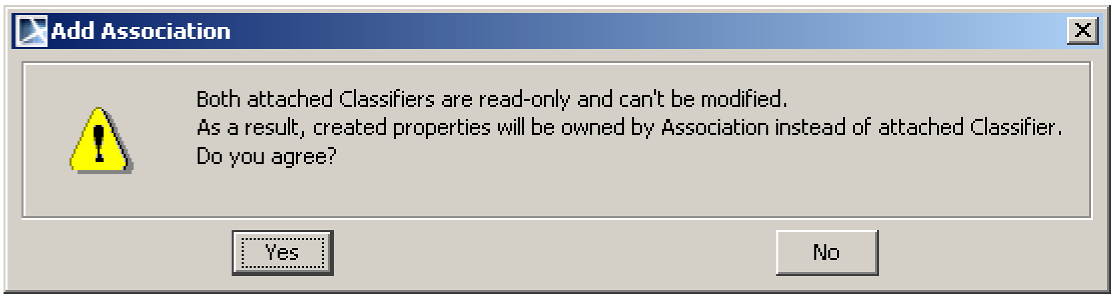
Adding Association between Read-only Classifiers

Adding new Association always creates two roles or properties at both ends that are owned by the attached Classifier by default. However, when one or both ends of the Association is or are not editable for some reasons, for example, locked in Teamwork Server or located in a read-only profile/module), the properties will be owned by the Association itself. In this case, MagicDraw will display a warning informing you about the sometimes-unexpected issue of model creation (Figure 420 on page 652, Figure 421 on page 652).



Class a is read-only and can't be modified.
As a result, created Property will be owned by Association instead of attached Classifier. Do you agree?

Figure 420 -- The Add Association Dialog for a Read-Only Classifier



Both attached Classifiers are read-only and can't be modified.
As a result, created properties will be owned by Association instead of attached Classifier.
Do you agree?

Figure 421 -- The Add Association Dialog for Both Read-Only Classifiers

Association End

The associations ends are represented by properties, each of which is connected to the type of the end. When a property is an association end, the value or values are related to the instance or instances at the other end(s) of the association.

An association end is the connection between the lines depicting an association and the icon (often a box) depicting the connected classifier.

Association end properties

A role indicates a role played by the class in terms of an association. The role name is placed at the association end, near the class playing that role. The role name at the implementation level maps into the reference name to the opposite class. Roles may have visibility (public, package, protected, and private). See the procedure "To define the association end visibility" on page 653.

The association end multiplicity describes how many entities are participating at each association end:

- 0 – zero and only zero.
- 1 – one and only one.
- 0..1 – zero or one.
- 0..* – from zero to any positive integer.
- 1..* – from one to any positive integer.
- * – any positive integer.

See the procedure "To place multiplicity values in the association path ends" on page 654.

A qualifier is an attribute or list of attributes whose values serve to partition the set of instances associated with an instance across an association. The qualifiers are attributes of the association. It is shown as a small rectangle attached to the end of an association path between the final path segment and the symbol of the classifier that it connects to. The qualifier rectangle is part of the association path, not part of the classifier. The qualifier rectangle drags with the path segments. The qualifier is attached to the source end of the association. See the procedure "To add, edit, or remove a qualifier to/from an association end" on page 654.

If two classes are linked with an association path, both classes have a property created with an opposite class assigned as the property type in them. This property can be displayed on the class shape as well as an association link. See the procedure "To show the association ends as attributes on linked class shapes" on page 654.

An association end is defined as a property. It has attribute properties defined in the Specification window.

You can specify association end properties in the association end Specification window. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window. For more information about the Specification window usage, see "Specification Window" on page 219.

For more information about specifying property values, see "Editing Property Values" on page 237.

To define an association end name

- Select **Role A (<class name>)** or **Role B (<class name>)** from the association shortcut menu, and then select the **Edit Name** subcommand, then type or edit the name directly on the Diagram pane.
- Perform the following steps:
  1. Open the selected association end Specification window.
  2. Type an association end name in the **Name** property value cell.

To make a special case of an association path (aggregation/composition)

- From the association shortcut menu, select **Role A (<class name>)** or **Role B (<class name>)**, and then select **None, Shared**, or **Composite**.
- Click the **Composition** or **Aggregation** button and draw an appropriate path on the diagram.
- Right click the association path end and select **Shared** or **Composite** command from the shortcut menu.
- Perform the following steps:
    1. Open the selected association Specification window.
    2. Click the desired option button for an aggregation kind (**None**, **Shared** or **Composite**).

To define the association end visibility

1. Open the association end Specification window.
2. From the **Visibility** list, select one of the visibility type.

To place multiplicity values in the association path ends

- Open the **Association Specification** dialog box and from the **Multiplicity** drop-down list box, select or type the multiplicity value for the desired association end.
- From the association shortcut menu, select **Role A (<class name>)** or **Role B (<class name>)**, then select the multiplicity value (1, *, 0..*, etc.).
- Perform the following steps:
    1. Open the association end Specification window.
    2. In the **Multiplicity** property value cell, type or select from the list a multiplicity value.

To add, edit, or remove a qualifier to/from an association end

1. Open the association end Specification window.
2. In the **Qualifiers** group, click the **Create** button. The Specification window opens.
3. Define a qualifier.
4. To remove the qualifier, click the **Delete** button.

To show the association ends as attributes on linked class shapes

1. From the class shortcut menu, select **Symbol(s) Properties**. The **Symbol Properties** dialog opens.
2. In the **Attribute** group, click the **Show Association End** property value cell.
3. In the **Show Association End** list, click one of the following options:
    - **All**. Property and association paths will be displayed on the diagram pane.
    - **Without Association Symbol**. If an association symbol is deleted, the property will be displayed on the class shape.
    - **Do Not Show**. Neither property, nor association path will be displayed on the diagram pane.

Association navigability

The association navigability indicates whether it is possible to traverse an association within an expression of a classifier to obtain the object or set of objects associated with the instances. The navigability is shown as an arrow that can be attached to the end of the path to indicate that the navigation is supported toward the classifier attached to the arrow.

NOTE	By default, an association is navigable on both sides and its navigability is not visible.

A role indicates the role played by the class in terms of an association. The role name is placed at the association end, near the class playing that role. The role name at the implementation level maps into the reference name to the opposite class. Roles may have visibility (public, package, protected, and private).

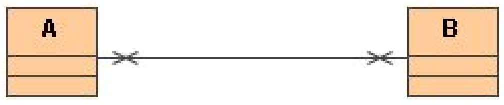
To change the association navigability

- Open the association end Specification window and select or clear the **Navigable** check box.
- From the association shortcut menu, select **Role A (<class name>)** or **Role B (<class name>)**, and then select or clear the **Navigable** check box.

To display the association navigability

- From both association ends shortcut menu, select the **Show Navigability** check boxes.

In the following figure, the association is navigable on both sides and its navigability is visible.



NOTEs	●To open the association ends shortcut menu, right-click on the end of the association (on the association end area) on the diagram pane. ●Open the association shortcut menu and select the Role A (<class name>) or Role B (<class name>).

Advancing actions: navigable owned association ends

Navigability describes the need for an object to access another object by navigating across the link. According to the UML 2 specification, the association ends owned by the classes and associations navigable. This improved functionality allows a proper management of the navigableOwnedEnd property for associations:

1. Able to manually change the ownership of an association end.

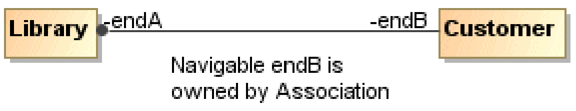


Figure 422 -- Sample of navigable endB, which is owned by association

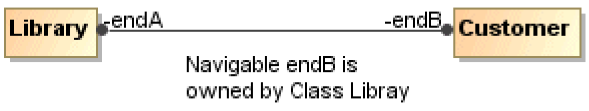


Figure 423 -- Sample of navigable endB, which is owned by Class Library

To change the ownership of an association end, select the **Owned By** command from the **Association End** shortcut menu and then select the desired owner.

2. Set the navigability for the association ends owned by the associations while keeping the ownership.

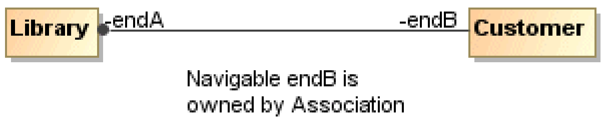


Figure 424 -- Sample of navigable endB, which is owned by Association

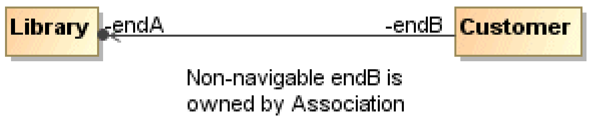


Figure 425 -- Sample of Non-navigable endB, which is owned by Association

3. Support the dot notation.

The ownership of association ends by an associated Classifier is now indicated graphically.

The following example shows that endA is owned by the Customer class and endB is owned by the association.

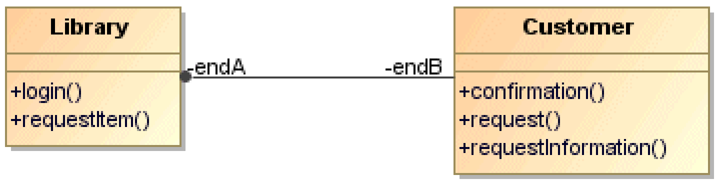


Figure 426 -- Sample of endA owned by class and endB owned by association

To enable the dot notation from the **Options** menu select the **Project** command and then select the **General project options** branch. Next, select the **Enable dot notation for associations** check box.

Association in Use Case Diagrams

The participation of an actor in a use case, for example, instances where an actor and a use case communicate with each other. This is the only relationship between actors and use cases. The association relationships are also known as communication associations.

For more information on defining associations, see "Realization" on page 755.

Attribute

An attribute is a named property of a class that describes a range of values that can be held by the instances of that class.

To create a new attribute

- Double-click the selected class or select **Specification** from the class shortcut menu. The **Class Specification** dialog box opens. Click the **Attributes** tab and then click the **Create** button. The **Property Specification** dialog box opens. Define a new attribute and click **OK.**
- Select the **Insert New Attribute** from the class shortcut menu. Type the attribute name directly on the class shape.
- In the Browser tree, select an already created class. From the class item shortcut menu, select **New** and then **Property**.
- Press CTRL+ALT+A shortcut key and type the attribute name on the Diagram pane.
- Select a class shape and click the small orange **Insert New Attribute** smart manipulation button.

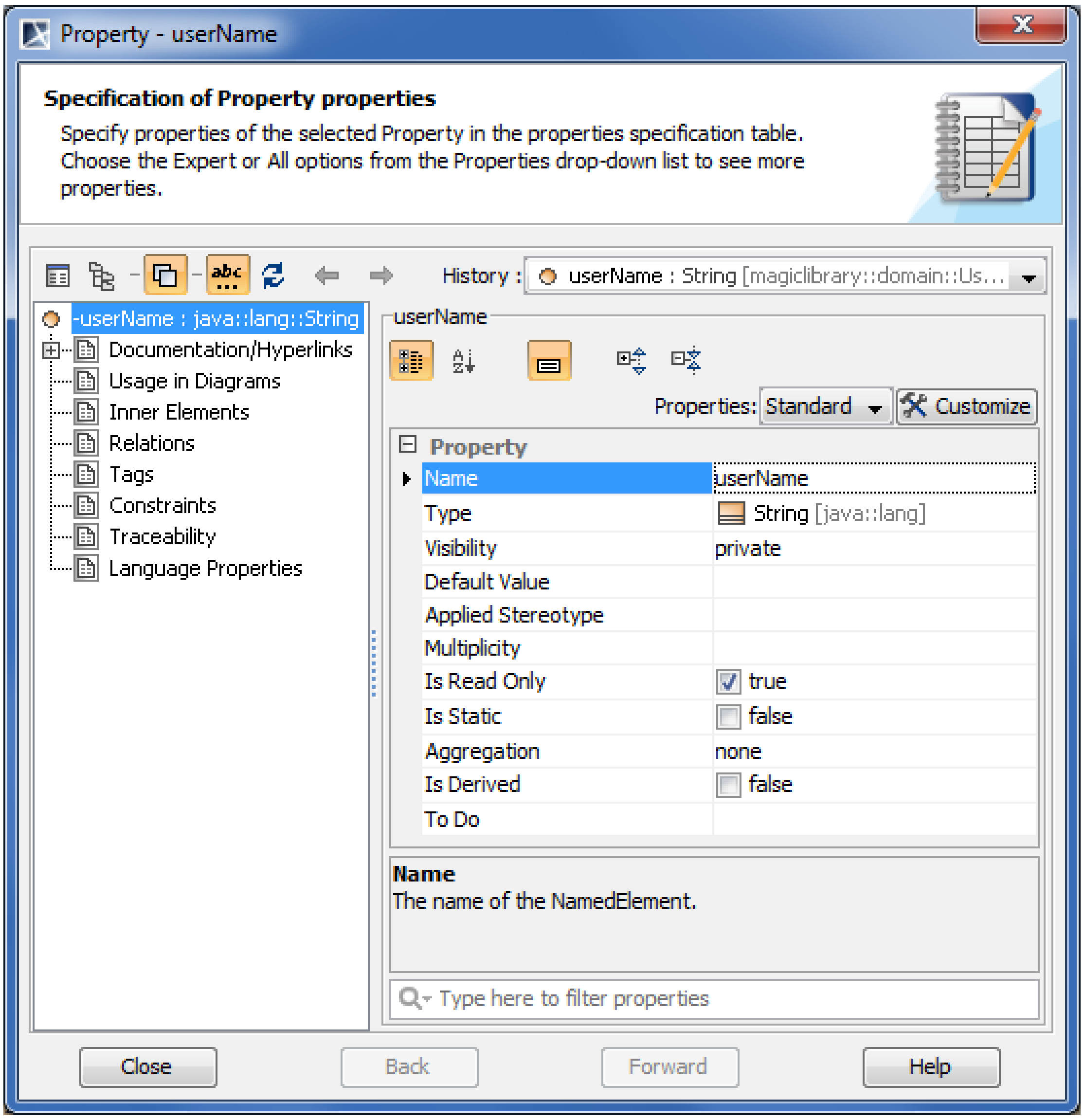
Define an attribute in the **Property Specification** dialog.

To open the **Property Specification** dialog

1. Open the **Class Specification**, **Actor Specification**, or **Interface Specification** dialog.
2. In the **Attributes** tab, double-click the desired attribute in the tree, or click the **Create** button.

- Draw an association path and click on the association end.

- Double-click the desired attribute directly on the diagram.


Property - userName

Specification of Property properties

Specify properties of the selected Property in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : userName : String [magiclibrary::domain::Us...

-userName : java::lang::String
- Documentation/Hyperlinks
- Usage in Diagrams
- Inner Elements
- Relations
- Tags
- Constraints
- Traceability
- Language Properties

userName

Properties: Standard | Customize

Property	
Name	userName
Type	String [java::lang]
Visibility	private
Default Value	
Applied Stereotype	
Multiplicity	
Is Read Only	☑ true
Is Static	☐ false
Aggregation	none
Is Derived	☐ false
To Do	

Name
The name of the NamedElement.

Type here to filter properties

Figure 427 -- Property Specification dialog box

Click the **Expert** in the **Properties** field for showing more properties of the attribute.

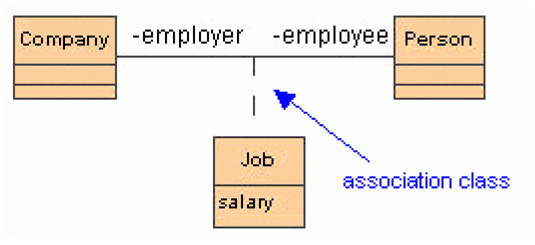
Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Property name	Description
General Set a general information for the attribute.	**Type**	Shows an attribute type. It can be another project class or primitive type such as int or double or other. Select a type from drop-down combo box or click "**...**" button and select the type from the **Select Element** tree.
	Default Value	Type a value for an attribute or click "**...**" button and enter it in the **Default Value** dialog box.
	Type Modifier	Additional information about the type. ● **&** - one class has a reference to other model element. ● ***** - one class has a pointer to other model element. ● **[]** – one class has an array of other model elements.
	Navigable	Indicates whether it is possible to navigate across the property.
	Multiplicity	The multiplicity value of an attribute.
	Is Read Only	If *true*, the property may only be read, and not written.
	Is Static	This property scope means that the values returned by the property have no duplicates.
	Aggregation	When placed on a target end, specifies whether the target end is an aggregation with respect to the source end. Only one end can be an aggregation. ● **None.** The end is not an aggregate. ● **Shared.** The end is an aggregate; therefore, the other end is a part and must have the aggregation value of none. The part can be contained in other aggregates. ● **Composite.** The end is a composite; therefore, the other end is a part and must have the aggregation value of none. The part is strongly owned by the composite and may not be part of any other composite.
	Is Derived	Specifies whether the property is derived, i.e., whether its value or values can be computed from other information.
	Is Ordered	If the multiplicity is greater than one, then the set of related elements can be ordered or unordered. ● *False* - the elements form an unordered set. This is the default and need not be shown explicitly. ● *True* - the elements of the set are ordered, but duplicates are still prohibited. This generic specification includes all ordering types.
	Is Unique	If *true*, the collection of values may not contain duplicates.

To create an association class

1. Draw two classes (for example A and B).
2. From the class diagram toolbar, expand the **Association** elements group and select the **Association Class** to draw.

3. Link the previously drawn classes with this path. An additional class with a dashed line will be created on the association between classes.



If an attribute type is another model class, this attribute can be represented as an association with a role (attribute name) between the owner class and the class of attribute type

Select **Create Roles** from the class shortcut menu. A list of available attributes opens. Select all or only one and an association relationship with a role is created.

NOTE	This command is visible only if one or more attribute types are other model classes.

To change an attribute name

The attribute name must be unique in the class scope.

1. Click the attribute in the selected class on the diagram pane or in the Browser tree.
2. Type a new name.

- Change an attribute name in the **Attribute Specification** dialog.

To define the type of an attribute

The attribute type can be of the other class, interface, or a primitive class, such as int or double.

- Select the type of an attribute from the **Type** drop-down list box in the **Attribute Specification** dialog.
- Type a colon ":" and the name of the attribute type just after the attribute name on the diagram pane. If you specify a nonexistent type of an attribute, a new class is created.
- Click the "**...**" button in the **Type** field and select they type from the **Select Elements** tree.

To add additional information about the type of an attribute

1. Open the **Attribute Specification** dialog.
2. Click the **Show Expert Properties** button to enlarge a list of general available attribute properties.
3. Select a sign in the **Type Modifier** drop-down list:
   - & - one class has a reference to other model elements.
   - * - one class has a pointer to other model elements.
   - [] - one class has an array of other model elements.

To set the attribute visibility

Visibility Name	Function
Public '+'	an attribute can be accessed by any other elements.
Package '~'	an attribute can be accessed by elements from the same package.
Protected '#'	an attribute can be accessed from the inside of the selected class and classes derived from that class.
Private '-'	an attribute can be accessed only from inside of that class.

- Type '+', '~', '-', or '#' visibility marks just before an attribute name directly on a diagram.

1. Open the **Attribute Specification** dialog box.
2. From the **Visibility** drop-down list box, select the desired item (public, package, protected, and private.).

NOTE	The attribute visibility is shown at the attribute signature.

To set an attribute scope

1. Open the **Attribute Specification** dialog.
2. Click the **Show Expert Properties** button to enlarge the list of available attribute properties.
3. Select the **Is Static** check box.

To set the attribute multiplicity

1. Open the **Attribute Specification** dialog box (see above).
2. Click the **Show Expert Properties** button to enlarge the list of available attribute properties.
3. Select or set the multiplicity value in the **Multiplicity** drop-down box.

To set the attribute changeability

The attribute changeability controls the access by operations on the class on the opposite end.

Name	Function
Is Read Only	When *false* - no restrictions on modifications. When *true* - the value may not be altered after the object is instantiated and its values initialized. No additional values can be added to a set.

1. Open the **Attribute Specification** dialog box (see above).
2. Click the **Show Expert Properties** button to enlarge the list of available attribute properties.
3. Select/clear the **Is Read Only** check box.

Class

A class is drawn as a solid-outline rectangle with three compartments separated by horizontal lines. The top name compartment holds the class name and other general properties of the class (including stereotype); the middle list compartment holds a list of properties; the bottom list compartment holds a list of operations. The property and operation compartments are optional and you may suppress them.

A class is the descriptor for a set of objects with similar structure, behavior, and relationships. The model is concerned with describing the intention of the class, that is, the rules that define it. The run-time execution provides its extension, that is, its instances.

Classes are declared in the class diagrams and used in most of other diagrams. UML provides a graphical notation for declaring and using these classes as well as a textual notation for referencing classes within the descriptions of other model elements.

A class represents a concept within the system being modeled. It has a data structure, behavior, and relationships to other elements. The name of a class has a scope within the package in which it is declared and the name must be unique (among class names) within its package.

Working with classes

A general information about working with shapes is offered in section "Diagramming" on page 149.

All options associated with a class can be set in the **Class Specification** dialog.

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set general information about the class	**Base Classifiers**	Click "..." and assign an existing class from a model in the **Select Elements** dialog box or create a new one.
	Realized Interfaces	Click "..." and assign an existing interface from a model in the **Select Elements** dialog box or create a new one.
Ports	**Name**	Name of the class port.
	Type	Type, assigned to the port.
	Provided	Provided classifier is displayed.
	Required	Required classifier is displayed.
	Classifier	Name of classifier, owning port.
	Create	Creates a new port.
	Delete	Removes an existing port from the class.
Signal Receptions		Manage the receptions of a class. For more information about receptions, see "Reception" on page 757.
Behaviors	**Name**	Name of the behavior.
	Type	Type, assigned to the behavior.
	Create	Choose item from the list - activity, interaction, state machine.
	Delete	Removes a behavior from the class.
Inner Elements Add another element.	**Name**	Model element name.
	Type	Model element type.
	Create	The corresponding specification dialog box opens. Define the selected model element in the dialog.

Tab name	Box	Function
	Delete	Removes the selected model element from the class.

To insert an inner element in the selected class

1. Double-click the selected class or select **Specification** from the class shortcut menu. The **Class Specification** dialog box opens.
2. Click the **Inner Elements** tab and then click the **Create** button or press Insert. Select the element you wish to add from the list.
3. Click the selected element.
4. The corresponding **Specification** dialog box opens. Define the class, use case or interface, and click **OK**.

To show an inner element on the diagram

1. Select a created inner element in the Browser.
2. From the element shortcut menu, select **Create Symbol**.

To generate operations for setting or getting private data to the selected class

From the class shortcut menu, select **Tools** and then **Create Setters/Getters**. For a detailed description, see "Creating Setters / Getters" on page 349.

To control a list of operations and attributes that are visible on a diagram

Select **Edit Compartment** from the class shortcut menu. The **Compartment Edit** dialog opens.

A class can be defined as active (a border to the class shape is added). An active class specifies whether an object of the class maintains its own thread of control.

A class is a generalizable element and can be defined as Abstract.

To define a class as abstract and/or active

1. Double-click the selected class or select **Specification** from the class shortcut menu. The **Class Specification** dialog box opens.
2. Select the **Is Abstract**, and/or **Is Active** check box in the **General** tab.

To show members (attributes and operations) on the classifier shape according to the visibility

From the shape shortcut menu, point to **Presentation Options**, and then select one of the check boxes in the **Show Members** subcommand. Possible choices:

- All;
- Only Public;
- Not Private.

Creating A Structured Class

There is a way to create a piece of model with a single click: class, with a composite structure diagram inside it and hyperlink them. It may be useful for architects and system engineers.

The same applies to SysML Block and IBD.

To create a structured class:

1. Create a class diagram.
2. In the class diagram toolbar, right-click the **Class** button. A menu with available options opens. Select the **Structured Class** element.
3. Click on the diagram. The class element with a hyperlink to a composite structure diagram is created.
4. Select the class in the Browser to see its structure. To do this, choose **Select in Containment Tree** on the diagram from the class shortcut menu.

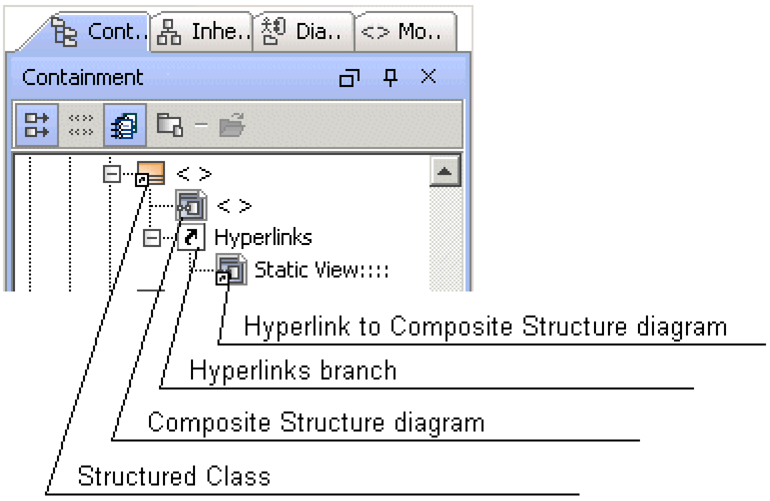


Figure 428 -- Example of structured class

See the above example of a structured class. In the Browser you may see the created class with the composite structure diagram inside it. The class is linked with the diagram. It means that after double click the diagram, or the Browser, the composite structure diagram will be opened.

For more information about hyperlink, see "Defining Hyperlinks Between Elements" on page 271.

The names of the class and the composite structure diagram are synchronized. Type a name for the class, for example, Order, and the name of the diagram is automatically changed to Order and vice versa. This is synchronization of a diagram name and its context name.

For more information about diagram name and its context synchronization, see "Diagram Name and its Context Name Synchronization" on page 155.

Design Patterns

In MagicDraw, you may create and edit the design patterns for the selected class. A detailed description of templates can be found in the Design Patterns of Reusable Object-Oriented Software.

To create the design pattern for the selected class

1. From the class shortcut menu, select **Tools**, and then **Apply Pattern**. The **Pattern Wizard** dialog opens.
2. Select the design pattern you want to apply and select the desired options. Click **OK**.

- Select the class and then **Apply Pattern** from the **Tools** menu.

For a detailed description of this dialog, see "Controlling Merge memory usage" on page 342.

Class presentation options

To organize a class data on the class shape

- Select **Presentation Options** from the class shortcut menu. The following choices are available in the **Presentation Options** submenu.
- The class presentation options can also be defined in the **Project Options** dialog box. For a detailed description of this dialog, see "Setting Project Options" on page 107.

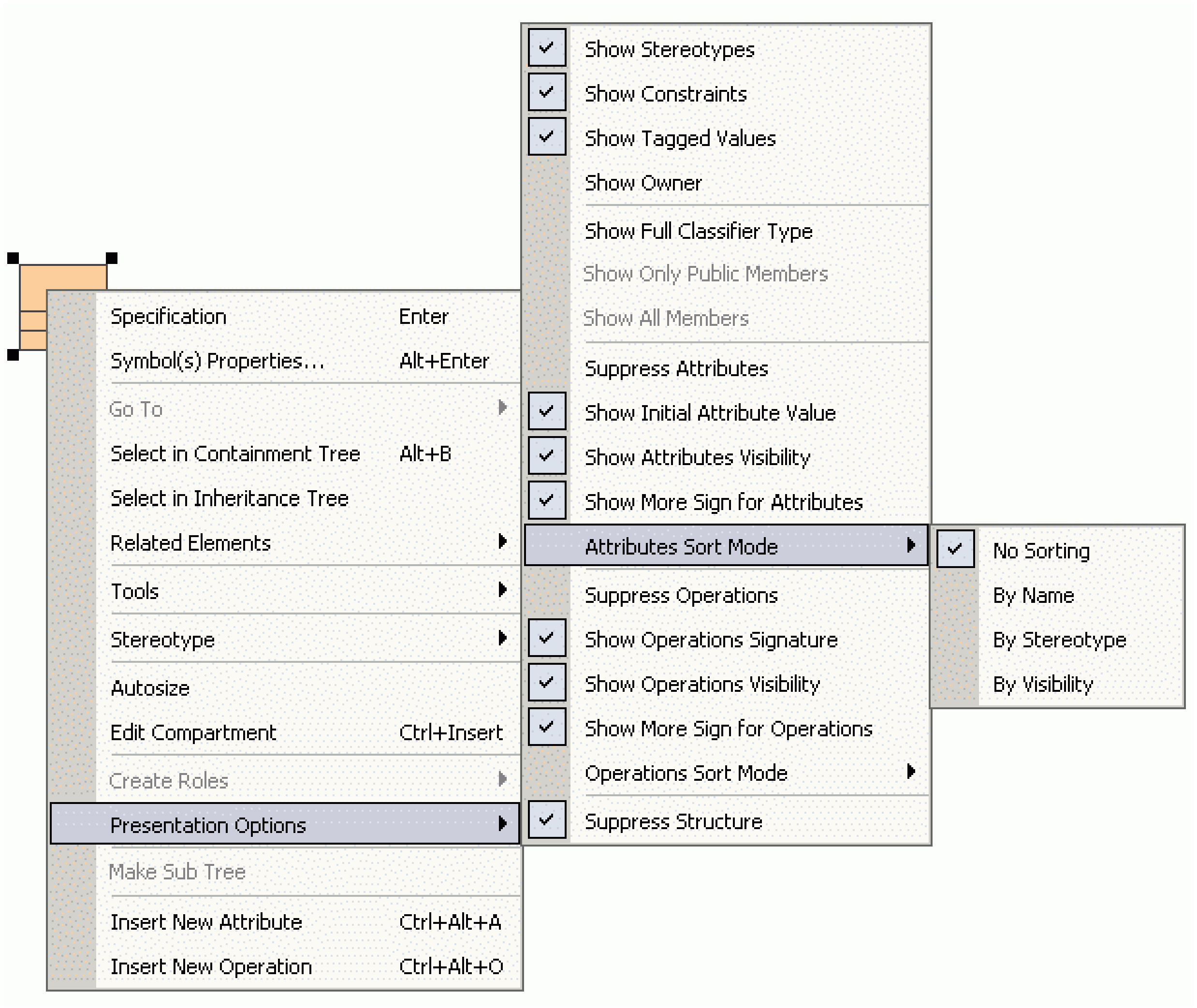

Specification Enter
Symbol(s) Properties... Alt+Enter
Go To
Select in Containment Tree Alt+B
Select in Inheritance Tree
Related Elements
Tools
Stereotype
Autosize
Edit Compartment Ctrl+Insert
Create Roles
Presentation Options
Make Sub Tree
Insert New Attribute Ctrl+Alt+A
Insert New Operation Ctrl+Alt+O
✓ Show Stereotypes
✓ Show Constraints
✓ Show Tagged Values
Show Owner
Show Full Classifier Type
Show Only Public Members
Show All Members
Suppress Attributes
✓ Show Initial Attribute Value
✓ Show Attributes Visibility
✓ Show More Sign for Attributes
Attributes Sort Mode
Suppress Operations
✓ Show Operations Signature
✓ Show Operations Visibility
✓ Show More Sign for Operations
Operations Sort Mode
✓ Suppress Structure
✓ No Sorting
By Name
By Stereotype
By Visibility

Figure 429 -- Presentation Options submenu

Command	Function (when selected)
Show Operations Signature	Shows the operation signature (arguments, return value, etc.).
Show Full Classifier Type	Shows the full track of the type of an attribute from the root package.
Show Initial Attribute Value	Shows the initial attribute value.
Show Attributes Visibility	Shows the attribute visibility (public, package, private, or protected).

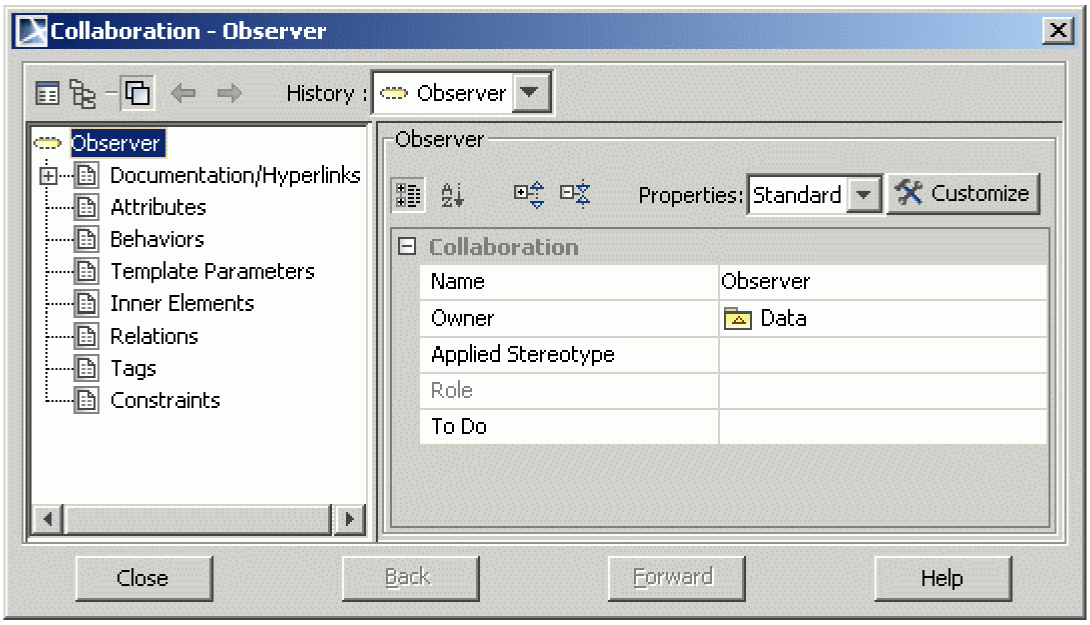
Command	Function (when selected)
Show Operations Visibility	Shows the operation visibility (public, package, private, or protected).
Suppress Attributes	Attributes compartment is suppressed.
Suppress Operations	Operations compartment is suppressed.
Show Only Public Members	Shows only the public attributes and operations.
Show all Members	The default settings are restored and shows all attributes and operations.
Attributes Sort Mode • By Name • By Stereotype • By Visibility • No Sorting	Choose the sorting parameter: • Sort attributes by name. • Sort attributes by stereotype • Sort attributes by visibility (public, package, private, or protected) • No sorting is executed.
Operations Sort Mode • By Name • By Stereotypes • By Visibility • No Sorting	Choose the sorting parameter: • Sort operations by name. • Sort operations by stereotype. • Sort operations by visibility (public, package, private, or protected) • No sorting is executed.
Show More Sign For Attributes	Additional information sign '…' in the class attributes list, when a portion of attributes are omitted by editing a class compartment.
Show More Sign For Operations	Additional information sign '…' in the class operations list, when a portion of operations are omitted by editing a class compartment.
Show Stereotypes	Shows the stereotypes on a class.
Show Constraints	Shows the constraints on a class.
Show Tagged Values	Shows the tagged values on a class.
Show Owner	Shows the owner’s (package, subsystem, or model) name on a class.

Collaboration

A collaboration is represented as a kind of classifier. It defines a set of cooperating entities to be played by instances (its roles) as well as a set of connectors that define the communication paths between the participating instances. The cooperating entities are the properties of the collaboration.

A collaboration specifies a view (or projection) of a set of cooperating classifiers. It describes the required links between instances that play the roles of the collaboration as well as the required features of the classifiers that specify the participating instances. Several collaborations may describe different projections of the same set of classifiers.

Define a collaboration in the **Collaboration Specification** dialog box.



Name	Observer
Owner	Data
Applied Stereotype	
Role	
To Do	

Figure 430 -- Collaboration Specification dialog box

Refer to the “Specification Window” on page 219 for the information of the specification elements not covered in this section.

Tab name	Box	Function
Behaviors Any behavior attached to the collaboration type applies to the set of roles and connectors bound within a given collaboration use.	**Name**	Name of the added behavior.
	Type	Type of the behavior
	Create	Select the kind of behavior you want to create - Activity, Interaction, or State Machine. The corresponding **Specification** dialog box opens.
	Delete	Remove the selected behavior from the collaboration.
Inner Elements	**Name**	Name of the inner collaboration element.
	Type	Type of the inner collaboration element.
	Create	Select an element from the list. The corresponding **Specification** dialog box opens. Define the element and click **Back** to return to **Collaboration Specification**.
	Delete	Remove the inner element from the collaboration.

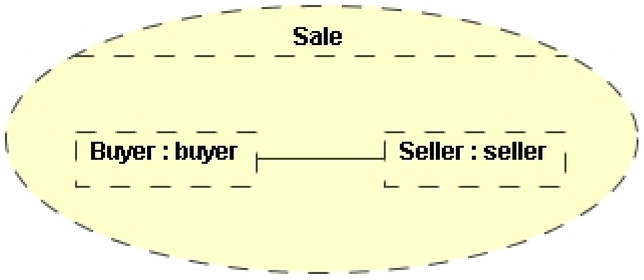
To assign a new behavior to the collaboration

- In the **Collaboration Specification** dialog box, **Behaviors** tab, click the **Create** button. Define a behavior in the open **Specification** dialog box.
- From the collaboration shortcut menu in the Browser, select **New**, and then **Activity, Interaction,** or **State Machine**. Type the name of the behavior and modify it in the open **Specification** dialog box.

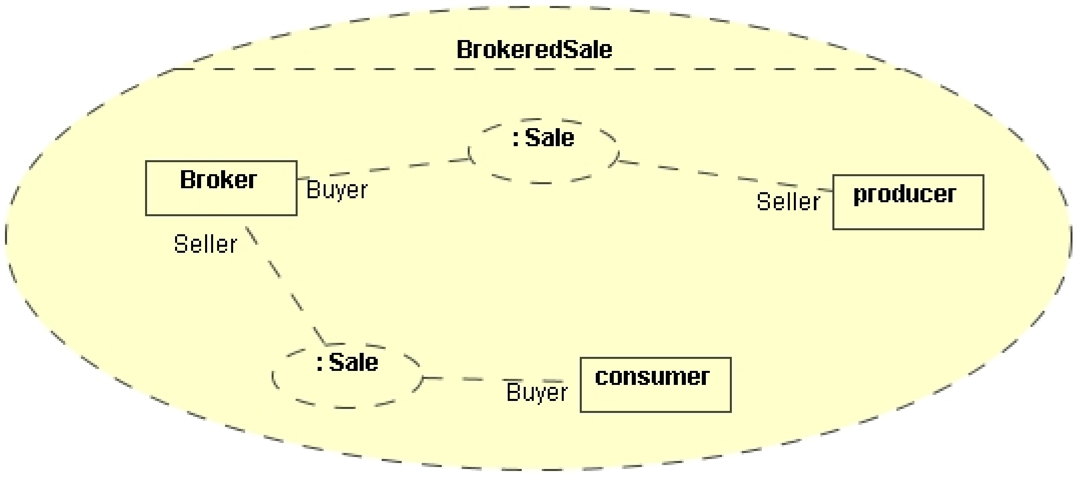
NOTE	You can edit the assigned classifier role in the **Collaboration Specification** dialog box, **Behaviors** tab.

To draw the Collaboration

1. From the Composite Structure diagram toolbar, select the Collaboration to draw on the diagram pane and type the collaboration name.
2. Draw Part from the Composite Structure diagram toolbar and from the shortcut menu, **Type** submenu, select an already existing (or create a new) classifier as the part type.
3. From the Composite Structure diagram toolbar, select the Connector to connect the parts.



4. From the Composite Structure diagram toolbar, select the Collaboration Use element to draw on the collaboration. Select an already existing, or create new collaboration for the Collaboration Use.
5. From the Composite Structure diagram toolbar, select the Role Binding path to connect the parts and Collaboration Use role, which can be selected in the **Select Role** dialog box.



Combined Fragment

A fragment is an abstract notion of the most general interaction unit. It is a piece of an interaction. Each interaction fragment is conceptually like an interaction by itself. Using the Combined Fragment, a fragment of a sequence diagram can be separated.

MagicDraw represents twelve kinds of fragments: Alternatives, Loop, Option, Parallel, Break, Negative, Critical Region, Consider, Ignore, Weak Sequencing, Strict Sequencing, and Assertion.

Tab name	Property	Function
General	**Interaction Operator**	Select an operator for the fragment. Available options: seq, alt, opt, break, par, strict, loop, critical, neg, assert, ignore, consider.

Tab name	Property	Function
Formal Gates Actual Gates		In the Formal Gates and Actual Gates panes are listed inside or outside combined fragment created gates. For more information about gates, see “Gate” on page 687.
Operands	**Guard**	Separated alternative parts of the interaction fragment.
	Create	Creates a new guard value.
	Delete	Removes a value from the list.
	Up	Moves an item to an upper position in the list.
	Down	Moves an item to a lower position in the list.

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Component

A component represents all kinds of elements pertaining to piecing together software applications. A component can always be considered as an autonomous unit within a system or subsystem.

According to UML it is possible to list component properties. The following compartments are available for the component:

- Provided/required interfaces.
- Realizations.

Artifacts.

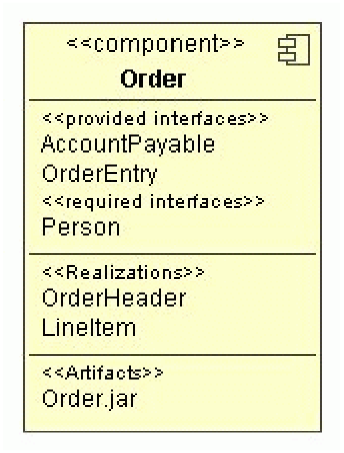
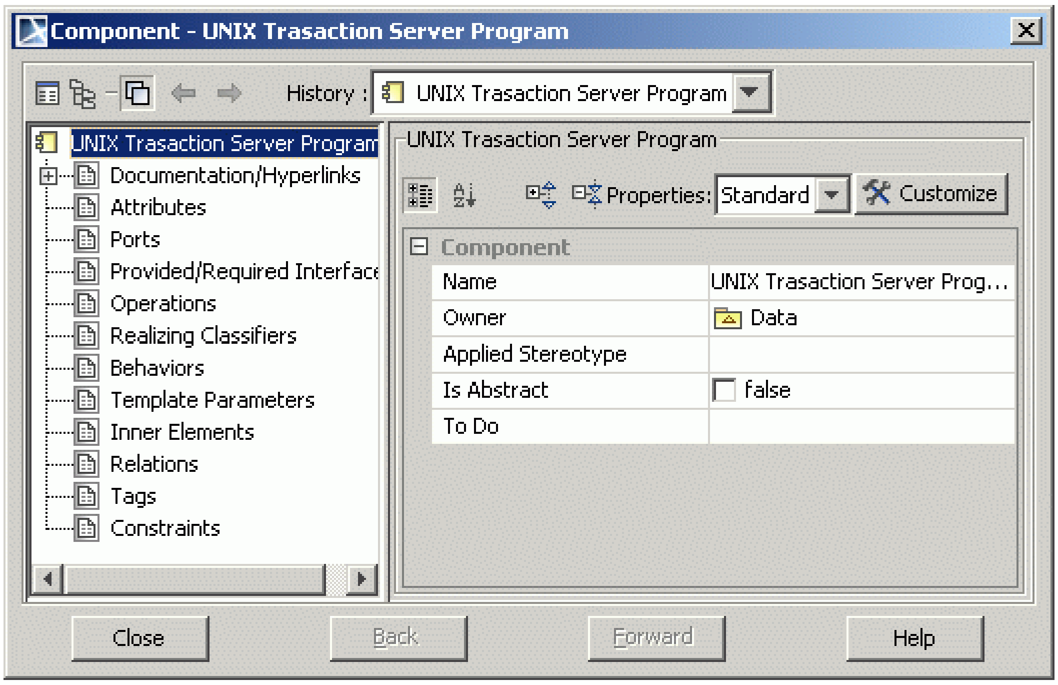


Figure 431 -- An example of a component

For more information about working with symbols, see “Diagramming” on page 149.

Define the selected component in the component's Specification window.


Component - UNIX Trasaction Server Program

History : UNIX Trasaction Server Program

UNIX Trasaction Server Program
- Documentation/Hyperlinks
- Attributes
- Ports
- Provided/Required Interfaces
- Operations
- Realizing Classifiers
- Behaviors
- Template Parameters
- Inner Elements
- Relations
- Tags
- Constraints

UNIX Trasaction Server Program

Properties: Standard — Customize

Component	
Name	UNIX Trasaction Server Prog...
Owner	Data
Applied Stereotype	
Is Abstract	false
To Do	

Figure 432 -- Component's Specification window

For information about the Specification window elements, which are not covered in this section, refer to the "Specification Window" on page 219.

Tab name	Element	Description
Ports	**Name**	Name of the port.
	Type	Type, assigned to the port.
	Provided	The provided classifier is displayed.
	Required	The required classifier is displayed.
	Classifier	Name of the classifier, owning a port.
	Create	Creates a new port.
	Delete	Removes an existing port from the component.
Provided/ Required Interfaces	**Name**	Name of the provided/required interface.
	Type	Possible values - provided or required.
	Add	Adds the provided/required interface.
	Remove	Removes the provided/required interface from the list.
Realizing Classifiers	**Name**	Name of the realizing classifier
	Type	Type of the classifier (class, interface, etc.)
	Owner	The model element name, owning a classifier.
		Click button to open the classifier's Specification window.
	Add	The **Select Elements** dialog box opens. Select an element from the model element tree.
	Remove	Removes a realizing classifier from the list.

Tab name	Element	Description
Behaviors	**Name**	Name of the behavior.
	Type	Type, assigned to the behavior.
	Create	Select an item from the list - activity, interaction, state machine.
	Delete	Removes a behavior from the class.
Inner Elements Add another element to a component.	**Name**	The model element name.
	Type	The model element type.
	Create	Select an element from the list. The corresponding specification dialog box opens. Define the selected model element in the dialog box.
	Delete	Removes the selected model element from the component.

To show/hide the interfaces, realizations, and artifacts on the component’s shape

- From the component’s shape shortcut menu, select **Presentation Options** and then clear/ select **Suppress Interfaces**, **Suppress Realizations**, or **Suppress Artifacts** check box.
- From the component’s shape shortcut menu, select **Symbol(s) Properties**. In the opened component’s **Symbol Properties** dialog, change the same check box values.

Connector

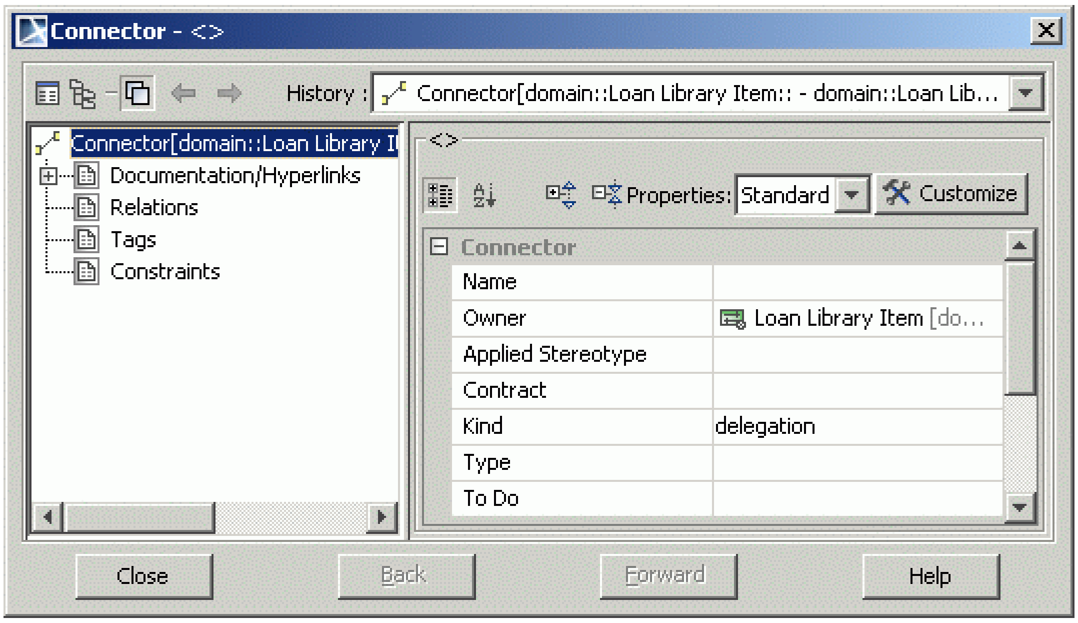
Specifies a link that enables communication between two or more instances. This link may be an instance of an association, or it may represent the possibility of the instances being able to communicate because their identities are known by virtue of being passed on as parameters, held in variables or slots, or because the communicating instances are the same instance.

The link may be realized by something as simple as a pointer or by something as complex as a network connection. In contrast to the associations, which specify the links between any instance of the associated classifiers, the connectors specify the links between instances playing the connected parts only.

Each connector may be attached to two or more connectable elements, each representing a set of instances.

For more information about working with symbols, see "Diagramming"

Define the selected connector in the **Connector** Specification window.


Connector - <>

History : Connector[domain::Loan Library Item:: - domain::Loan Lib...

Connector[domain::Loan Library I
- Documentation/Hyperlinks
- Relations
- Tags
- Constraints

<>

Properties: Standard

Connector

Name	
Owner	Loan Library Item [do...
Applied Stereotype	
Contract	
Kind	delegation
Type	
To Do	

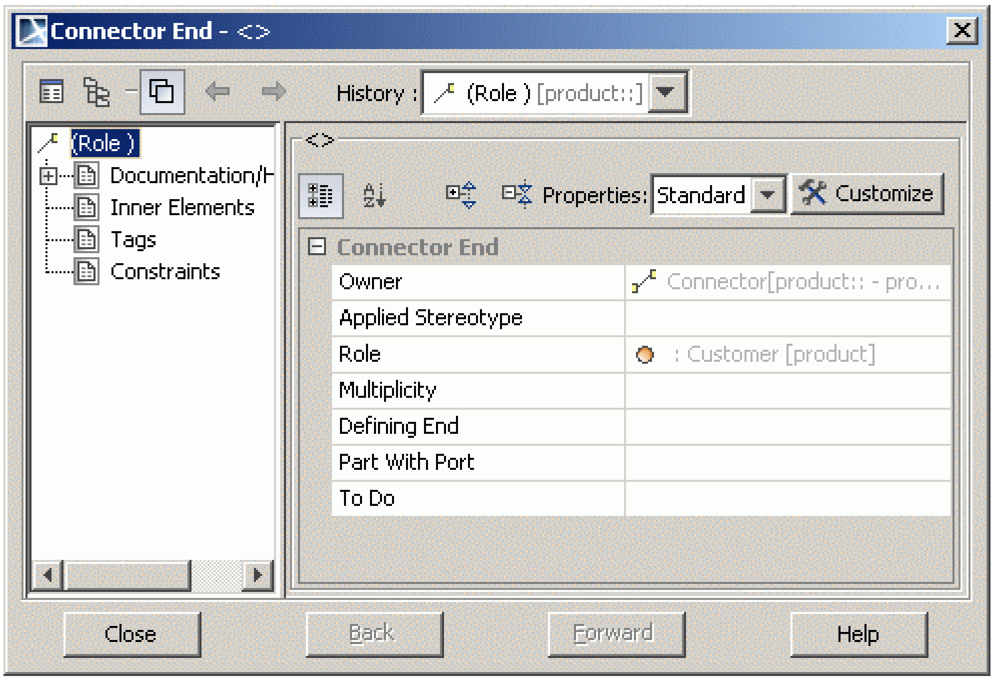
Figure 433 -- the Connector Specification dialog box

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set a general information about the include relationship.	**Owner**	The name of the element, which owns a connector.
	Contract	Assign an activity, interaction, or state machine to a connector. Click the ‘...’ button and select the elements in the **Select Elements** dialog box.
	Kind	Possible choices: • delegation (default) • assembly

To open the **Connector End Specification** dialog box

1. In the Browser tree, expand Interaction, **Relations** branch and in the Connector group, select one of the roles. Select **Specification** from the shortcut menu, or double-click the role. The **Connector End Specification** dialog box opens.



Owner	Connector[product:: - pro...
Applied Stereotype	
Role	: Customer [product]
Multiplicity	
Defining End	
Part With Port	
To Do	

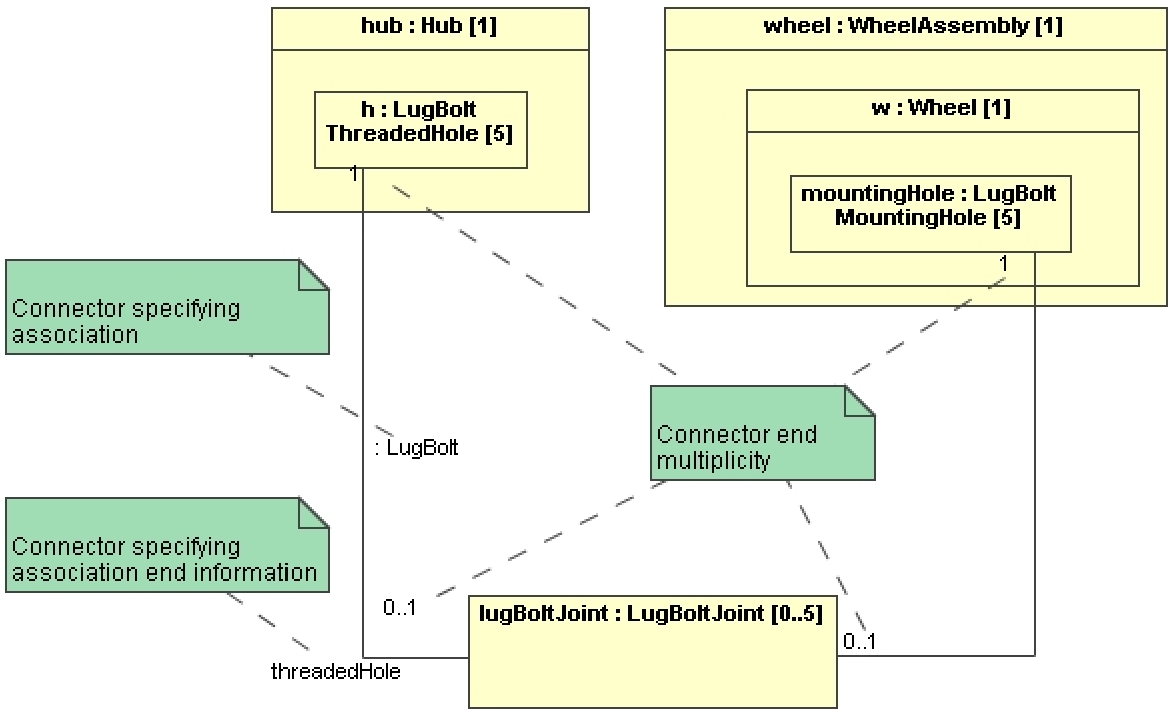
Figure 434 -- the Connector End Specification dialog box

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

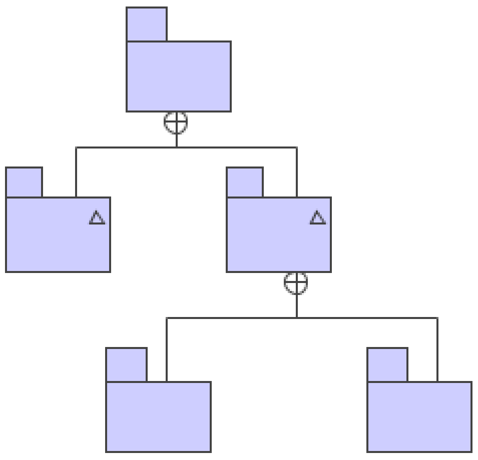
Tab name	Box name	Function
General Set general information about the link end	**Owner**	The name of the connector, which owns the connector end.
	Role	The name of the property, representing a lifeline.
	Multiplicity	The multiplicity value of the connector end.
	Defining End	When a connector has an association specifying the type of the connector, connector end, this property refers to the appropriate association end.
	Part With Port	Refers to the part containing the port that the connector is attached to.

Drawing a connector end

The connector end information can be displayed on the diagram.


hub : Hub [1]
h : LugBolt ThreadedHole [5]
1
wheel : WheelAssembly [1]
w : Wheel [1]
mountingHole : LugBolt MountingHole [5]
1
Connector specifying association
: LugBolt
Connector end multiplicity
Connector specifying association end information
0..1
lugBoltJoint : LugBoltJoint [0..5]
0..1
threadedHole

Containment



A containment shows a class, package or other model element declared within another model element. Such a declared class is not a structural part of the enclosing class but merely has scope within the namespace of the enclosing class, which acts like a package toward the inner class.

Data type

A data type is a type whose values have no identity; that is, they are pure values. It is a classifier and inherits the general features of the classifier: visibility, generalizable element properties, and operations.

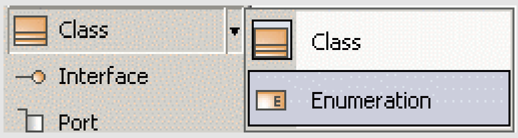
MagicDraw provides the following predefined data types: boolean, byte, char, date, double, float, int, Integer, **NEW!** Real, long, short, void, and String.

You may also create Enumeration or Primitive data types.

To create a new Data Type, including Enumeration or Primitive

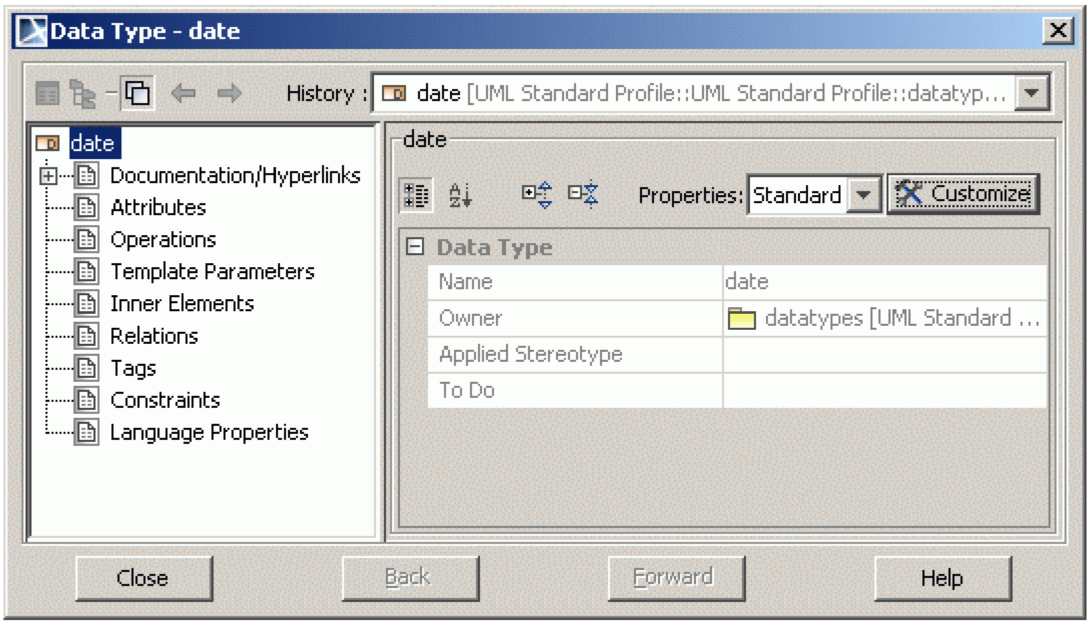
- From the Browser, select **New** from the class or **New Element** from the package, subsystem, or model shortcut menu, and then select **Data Type**, **Enumeration**, or **Primitive**.
- In the **Class**, **Package**, **Subsystem**, and **Model Specification** dialog boxes, **Inner Elements** tab, click **Create** and select a data type.

NOTE: You may create an enumeration by clicking the **Enumeration** button from the class diagram toolbar:



To create a symbol of the created data type

From the created data type shortcut menu in the Browser, select the **Create Symbol** command.



Data Type	
Name	date
Owner	datatypes [UML Standard …
Applied Stereotype	
To Do	

Properties: Standard

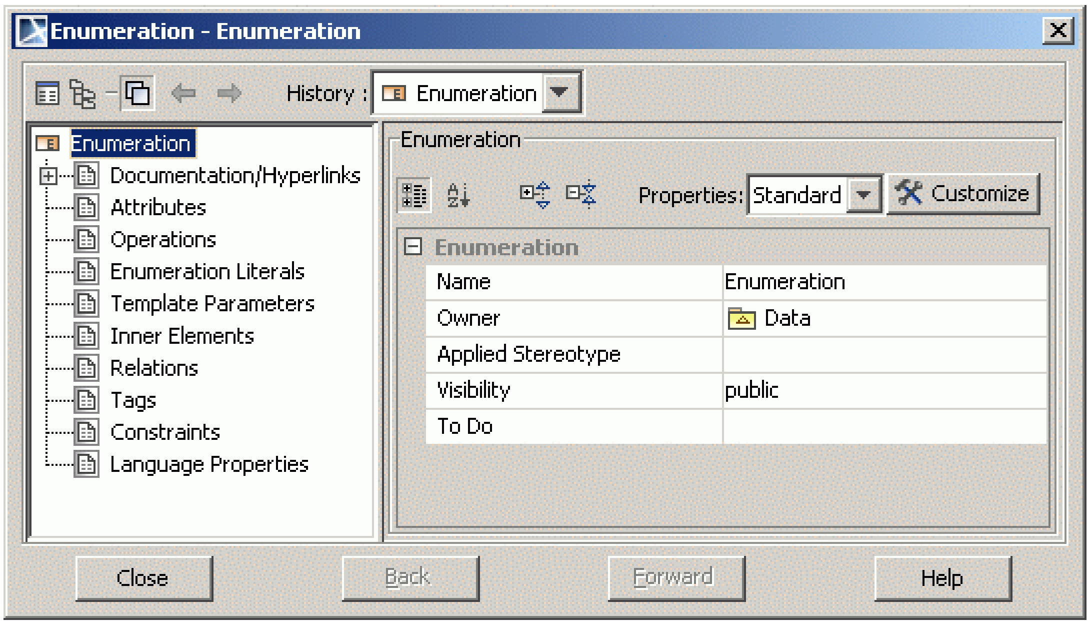
Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set general information about the data type	**Owner**	Shows an element, which contains the data package. The default data packages contain the *UML Standard Profile*.
Inner Elements Add constraint to data type.	**Name**	Displays a constraint name.
	Type	Shows an item type, in this case Constraint. Click the button to open the **Constraint Specification** dialog box.
	Create	The **Constraint Specification** dialog box opens. Define the constraint.
	Delete	Removes the selected constraint from the inner elements list.

Enumeration

The enumeration defines a kind of data type whose range is a list of predefined values, called enumeration literals. An Enumeration may contain operations, but they must be pure functions (this is the rule for all data type elements).

Define an enumeration in the **Enumeration Specification** dialog box.



Enumeration

Name	Enumeration
Owner	Data
Applied Stereotype	
Visibility	public
To Do	

Figure 435 -- Enumeration Specification dialog box

For more information about elements in the Specification window refer to "Specification Window" on page 219 .

To add an enumeration literal

An enumeration literal defines an element of the run-time extension of an Enumeration data type. It has no relevant substructure, therefore, it is atomic.

1. Open the **Enumeration Specification** dialog box.

2. In the **Enumeration Literals** tab, click **Create** button.
3. The **Enumeration Literal Specification** dialog box opens. Define an enumeration literal. Click **Back** to return to **Enumeration Specification** dialog box.

- Choose the **Insert New Enumeration Literal** command from the **Enumeration** shortcut menu.

To suppress the enumeration literals

1. From the enumeration shortcut menu, select **Presentation Options**.
2. Select the **Suppress Enumeration Literals** check box.

- Use the smart manipulation button with minus sign on the diagram pane, enumeration symbol.

To open the **Enumeration Literal Specification** dialog box

1. Open the **Enumeration Specification** dialog box.
2. In the **Enumeration Literals** tab expand tree, double-click the desired literal, or click the **Edit**, or **Create** button.

Primitive

A primitive defines a predefined data type without possessing any relevant UML substructure; that is, it has no UML parts. A primitive data type may have an algebra as well as operations defined outside of UML (for example, mathematically). The primitive data types used in UML include Integer, Unlimited Integer, **NEW!** Real, and String.

Decision Node

Decisions are made using guard conditions. They help protect transitions that depend on a guarding condition. The symbol used for the decision is a large diamond shape, which may have one or more incoming transitions and two or more outgoing transitions.

A decision in an activity diagram is used much like a choice or junction point in the state diagrams. Decision points allow to separate the transition paths. Merges allow to merge the transition paths back together. The symbol used for the merge is the same as for the decision.

Dependency

A dependency is a relationship signifying that a single or a set of model elements requires other model elements for their specification or implementation. This means that the complete semantics of the depending elements is either semantically or structurally dependent on the definition of the supplier element(s).

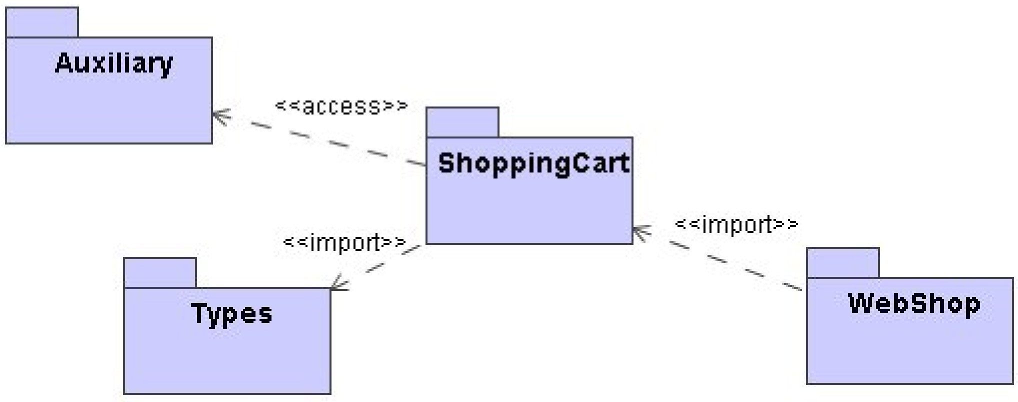
A dependency is shown as a dashed arrow between classes or packages. The model element at the tail of the arrow (the client element) depends on the model element at the arrowhead (the supplier element). The arrow can be labeled with an optional stereotype and an optional individual name.

NOTE	You may also draw a dependency between a class and other class elements, such as attributes and operations.

For more information about working with the symbols, see "Diagramming" on page 149.

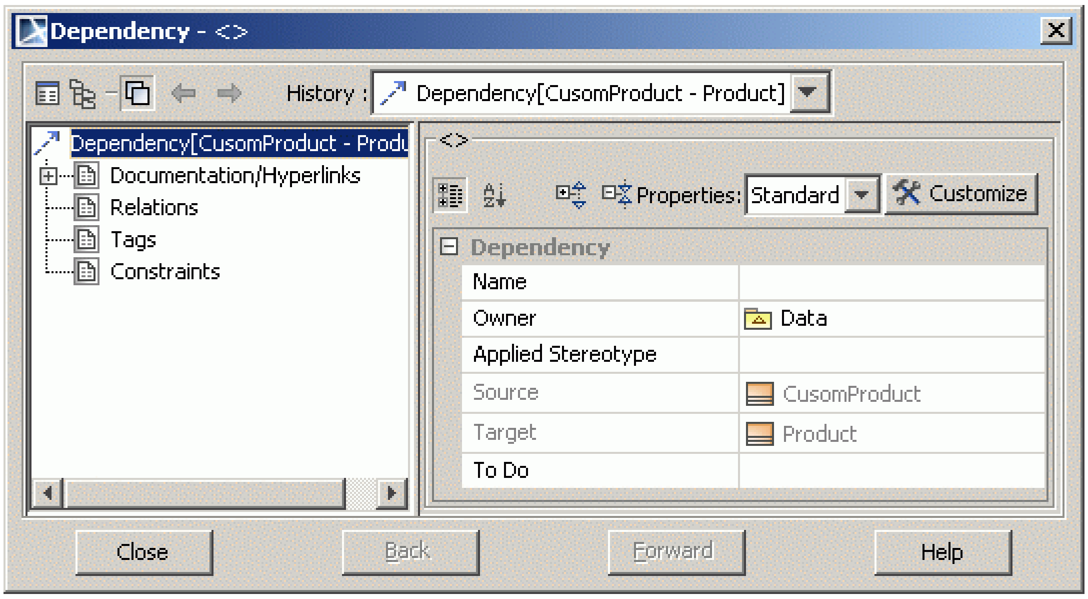
Example of the dependency relationships

See the example of dependency relationships in the Figure below.



The Dependency and Its Kinds Specification dialog boxes

Dependency, abstraction, and usage relationships defined in the dialog box of the same structure. They differ from one another only by the corresponding Specification name.



Dependency	
Name	
Owner	Data
Applied Stereotype	
Source	CusomProduct
Target	Product
To Do	

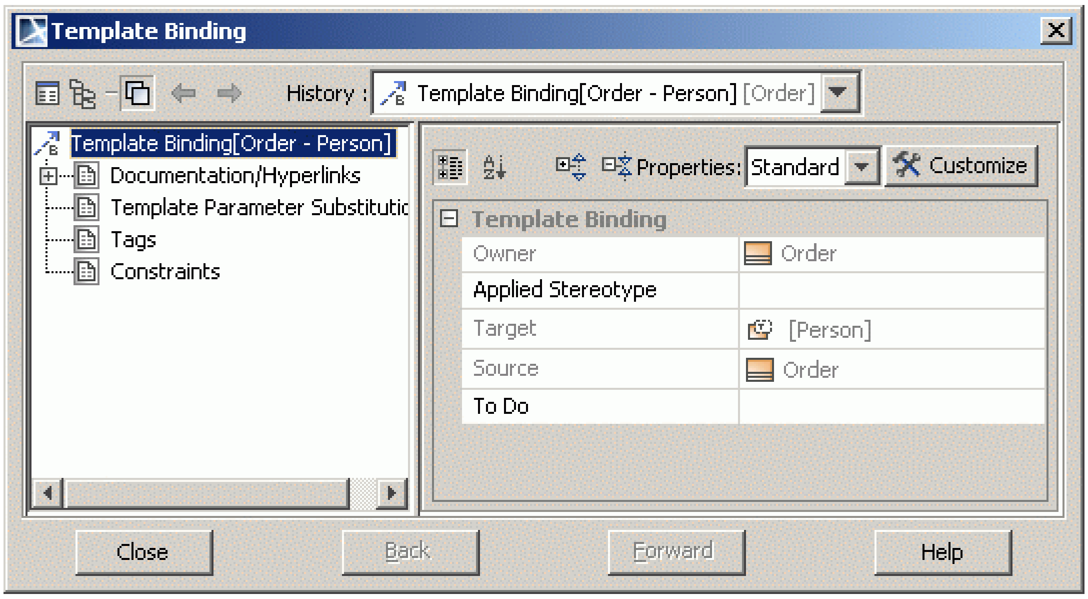
Figure 436 -- Dependency Specification dialog

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General	**Source**	Shows the name of the dependency's supplier element.
	Target	Shows the name of the dependency's client element.

Template Binding dependency

Define a binding dependency in the **Template Binding Specification** dialog.


Template Binding
History : Template Binding[Order - Person] [Order]
Template Binding[Order - Person]
Documentation/Hyperlinks
Template Parameter Substitutic
Tags
Constraints
Properties: Standard
Customize
Close
Back
Forward
Help

Template Binding

Property	Value
Owner	Order
Applied Stereotype	
Target	[Person]
Source	Order
To Do	

Figure 437 -- Binding Specification dialog box

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General	**Source**	Shows the name of the dependency's supplier element.
	Target	Shows the name of the dependency's client element.
Template Parameter Substitutions The parameter substitutions owned by this template binding.	**Name**	The name of the template parameter.
	Type	The type of the template parameter.
	Actual	A reference to a formal template parameter of the target template signature.
	Create	The **Select Template Parameter** dialog box opens. Select the item from the list and click **OK.**
	Delete	Removes the template parameter substitution.

Abstraction

An abstraction is a relationship that relates two elements or sets of elements that represent the same concept at different levels of abstraction or from different viewpoints. In the metamodel, an abstraction is a dependency in which there is a mapping between the supplier and the client.

Define an abstraction relationship in the **Abstraction Specification** dialog box. For a detailed description of this dialog box, see "The Dependency and Its Kinds Specification dialog boxes" on page 678.

Usage

A usage is a relationship in which one element requires another element (or set of elements) for its full implementation or operation. In the metamodel, a usage is a dependency in which the client requires the presence of the supplier.

Define a usage relationship in the **Usage Specification** dialog box. For a detailed description of this dialog box, see "The Dependency and Its Kinds Specification dialog boxes" on page 678.

Package Merge

A package merge is a directed relationship between two packages, that indicates that the contents of the two packages are to be combined. It has a dependency relation with the applied stereotype <<*merge*>>.

Define a merge relationship in the **Dependency Specification** dialog box. For a detailed description of this dialog box, see "The Dependency and Its Kinds Specification dialog boxes" on page 678.

Package Import

A package import is defined as a directed relationship that identifies a package whose members are to be imported by a namespace. It is a relationship between an importing namespace and a package, indicating that the importing namespace adds the names of the members of the package to its own namespace. It is dependency relation with applied stereotype «*import*».

Define an import relationship in the **Dependency Specification** dialog box. For a detailed description of this dialog box, see "The Dependency and Its Kinds Specification dialog boxes" on page 678.

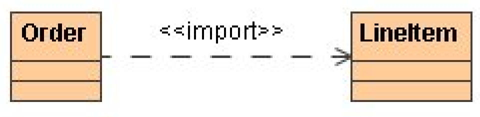
To draw the Package Import link, select the Package Import path to draw in the Class diagram toolbar, from the Abstraction group.

Element Import

An element import is defined as a directed relationship between an importing namespace and a packageable element. The name of the packageable element or its alias is to be added to the namespace of the importing namespace. It has a dependency relation with the applied stereotype «*import*».

Define an import relationship in the **Dependency Specification** dialog box. For a detailed description of this dialog box, see "The Dependency and Its Kinds Specification dialog boxes" on page 678.

To draw the Element Import link, select the Element Import path to draw in the Class diagram toolbar, from the Abstraction group.



Access

An access relationship shows that elements can only be accessed from a package, and it cannot be referenced.

To draw an Access link:

3. In the Class diagram toolbar, from the Abstraction group, select the Package Import path to draw.
4. Open the **Package Import Specification** dialog box and set the **Visibility** property to *private.*

Deployment

To draw a deployment link

1. In the Deployment diagram toolbar, click the Deployment button and draw a deployment link from a node to an artifact.
2. From the node shortcut menu, Presentation Options submenu, clear the Suppress Deployment check box to display the deployed artifacts on the node instance shape.

Deployment Specification

The Deployment Specification is a type of Artifact.

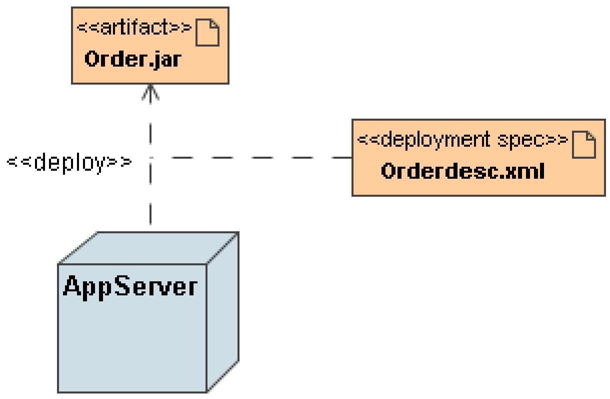
To draw the Deployment Specification on the diagram pane

In the Component (or Deployment) diagram toolbar, right-click the Artifact button group. In the open list, select the Deployment Specification to draw.

The Deployment Specification is a general mechanism to parameterize a Deployment relationship.

To specify the Deployment relationship

1. Create the Deployment Specification.
2. Between the Deployment relationship and Deployment Specification draw the Dependency relationship. The Dependency is drawn without an arrow.



Events

An event is the specification of some occurrence that may potentially trigger effects by an object, i.e., an event shows what should happen to change a particular state in a system.

Event types

Name	Description
Any Receive Event	A trigger for an AnyReceiveEvent is triggered by the receipt of any message that is not explicitly handled by any related trigger.
Call Event	A call event represents the *reception* of a request to invoke a specific operation. A call event is distinct from the call action that caused it. A call event may cause the invocation of a behavior that is the method of the operation referenced by the call request, if that operation is owned or inherited by the classifier that specified the receiver object.
Change Event	A change event occurs when a Boolean-valued expression becomes true. For example, as a result of a change in the value held in a slot corresponding to an attribute, or a change in the value referenced by a link corresponding to an association. A change event is raised implicitly and is *not* the result of an explicit action.
Signal Event	A signal event represents the *receipt* of an asynchronous signal. A signal event may cause a response, such as a state machine transition as specified in the classifier behavior of the classifier that specified the receiver object, if the signal referenced by the send request is mentioned in a reception owned or inherited by the classifier that specified the receiver object.
Time Event	A time event specifies a point in time by an expression. The expression might be absolute or might be relative to some other point in time.

Usability

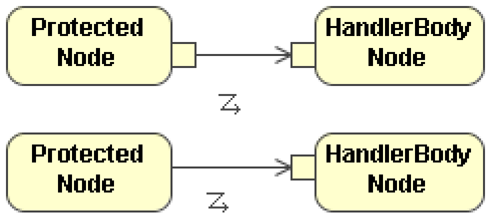
Events may trigger the change of a particular state. Events are important in diagrams which represent a behavior of a system. These diagrams are listed in the following table.

Diagram name	Usage description
Activity Diagram	To define an Accept Event Action.
State Machine Diagram	To define a Transition, a transition to self.
Protocol State Machine Diagram	To define a protocol transition, a protocol transition to self.

Exception Handler

An Exception Handler is an element that specifies a body to execute in case the specified exception occurs during the execution of the protected node.

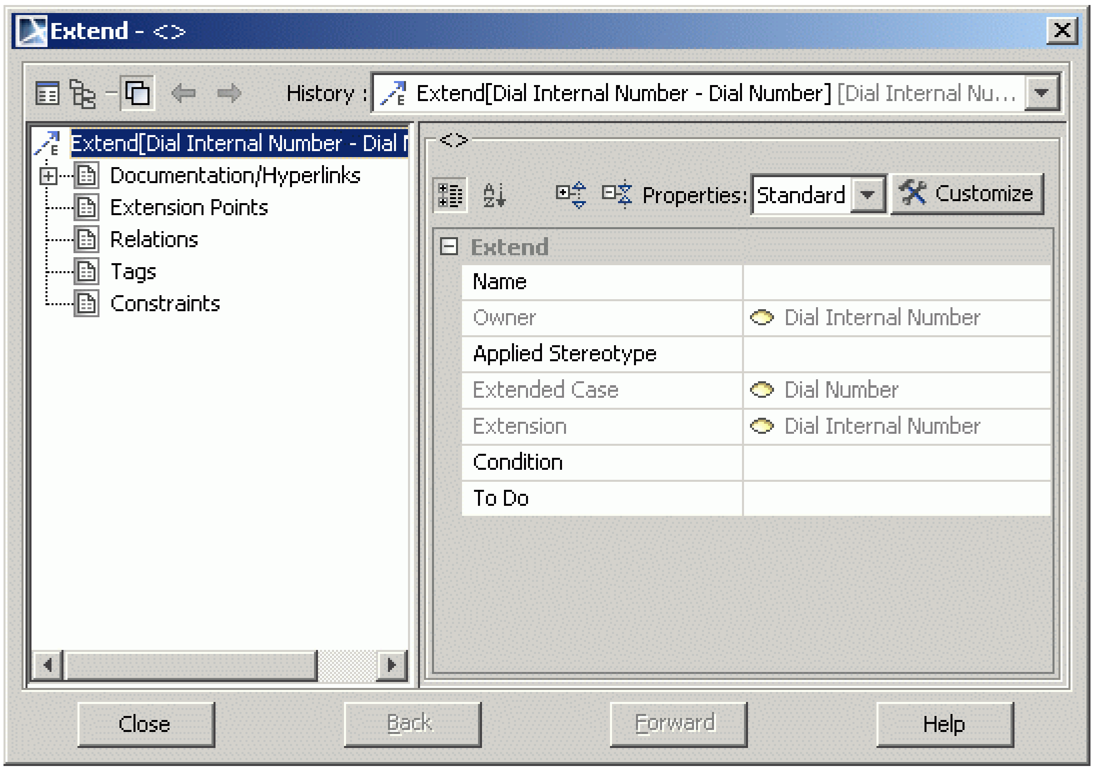
The Exception Handler may be drawn from an Output Pin to an Input Pin or from an Action to an Input Pin:



Extend

A relationship from an extending use case to an extended use case that specifies how and when the behavior defined in the extending use case can be inserted into the behavior defined in the extended use case. The extension takes place at one or more specific extension points defined in the extended use case.

Define the extend relationships in the **Extend Specification** dialog box.



Extend	
Name	
Owner	Dial Internal Number
Applied Stereotype	
Extended Case	Dial Number
Extension	Dial Internal Number
Condition	
To Do	

Figure 438 -- the Extend Specification dialog box

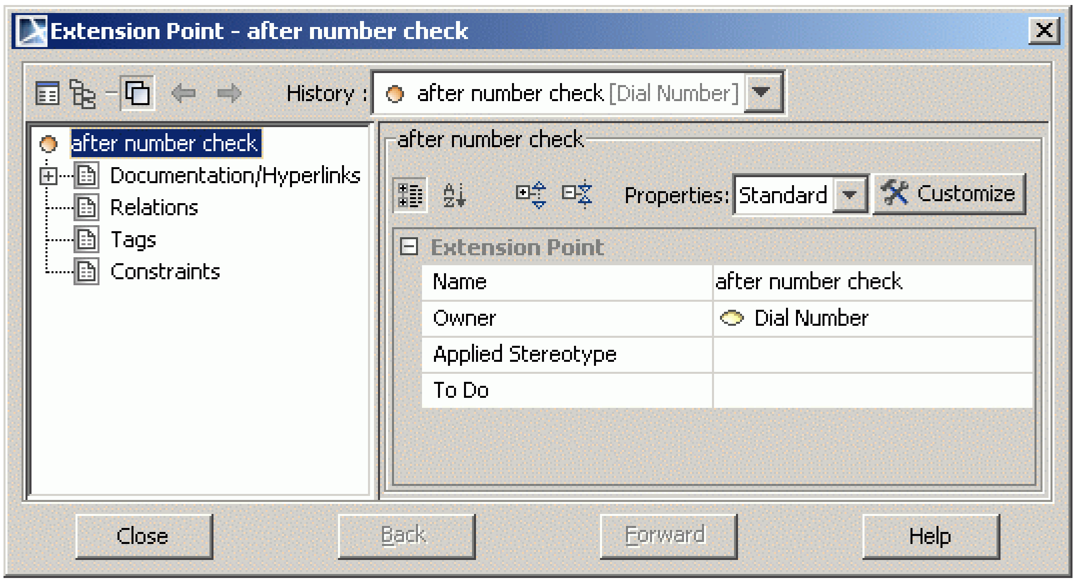
Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Group name	Box	Function
General Set general information about the extend relationship	**Condition**	An expression specifying the condition, which must be fulfilled if the extension is to take place.

Group name	Box	Function
Extension Points Select the extension points to be assigned to the extend relationship	**Assign**	Select predefined extension points you wish to assign to the extend relationship in the **Extension Points** dialog box.
	Unassign	Remove an already created extension point from the use case.
	Up	Move the selected extension point to an upper position.
	Down	Move the selected extension point to a lower position.

To open the **Extension Point Specification** dialog box

1. Select **Specification** from the use case shortcut menu, or double-click the use case shape. The **Use Case Specification** dialog box opens.
2. Expand the **Extension Points** group and then click on the created extension point. (Double-clicking opens an independent **Extension Points Specification** window).


Extension Point - after number check

History : after number check [Dial Number]

after number check
Documentation/Hyperlinks
Relations
Tags
Constraints

Properties: Standard

Extension Point

Name	after number check
Owner	Dial Number
Applied Stereotype	
To Do	

Figure 439 -- Extension Point Specification dialog box

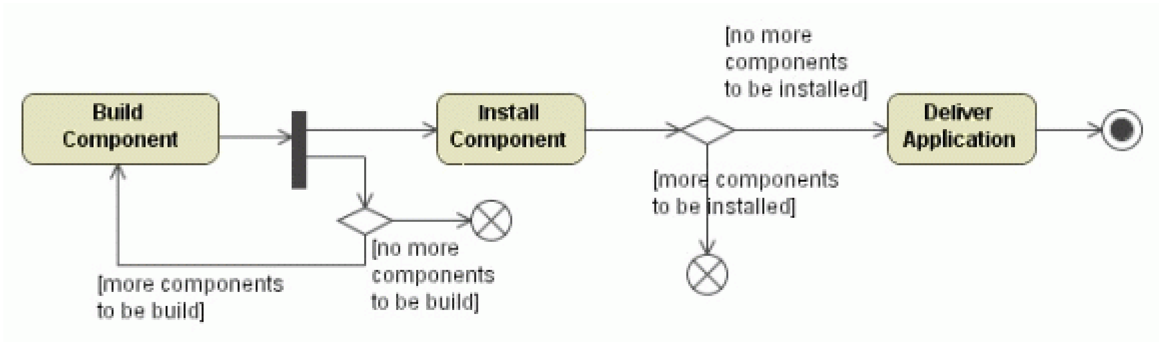
Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General A general information about the extension point is displayed.	**Owner**	The name of the use case, which owns the extension point.

Flow Final Node

It is a final node that terminates a flow and destroys all tokens that arrive at it. It has no effect on other flows in the activity.

See the following example for the flow final element notation in a MagicDraw project.


Build Component
Install Component
[no more components to be installed]
Deliver Application
[more components to be installed]
[no more components to be build]
[more components to be build]

For more information about defining the flow final node, see “Containment” on page 674.

Fragment

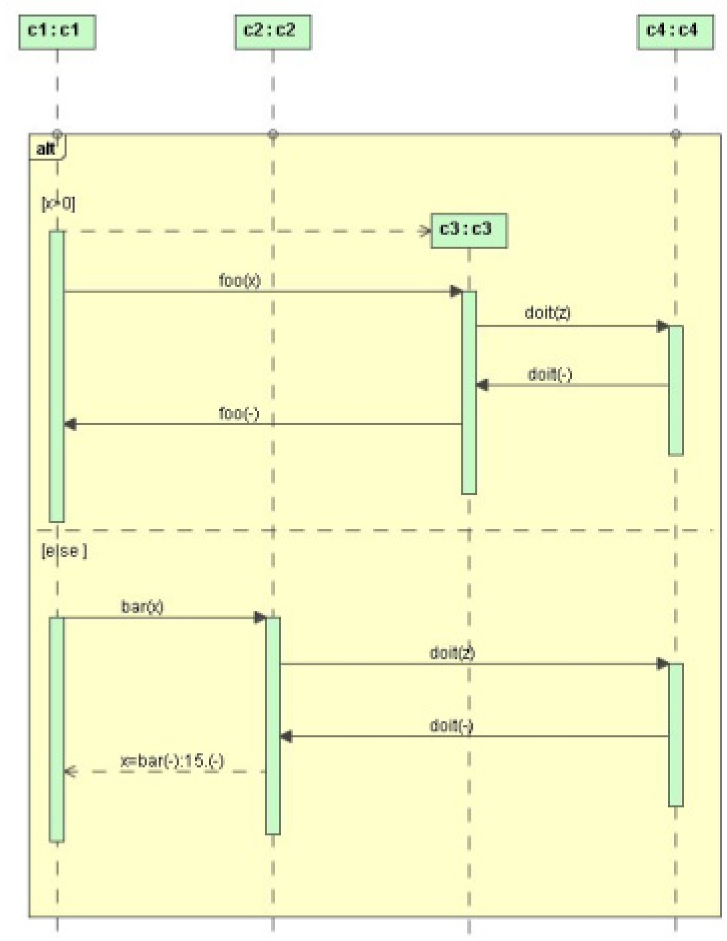
MagicDraw represents twelve kinds of fragments: Alternatives, Loop, Option, Parallel, Break, Negative, Critical Region, Consider, Ignore, Weak Sequencing, Strict Sequencing, and Assertion.

Alternative Fragment

The alternative fragment models *if…then…else* constructions.

To draw an Alternative Fragment

- In the Sequence diagram toolbar, select the Alternatives element to draw.



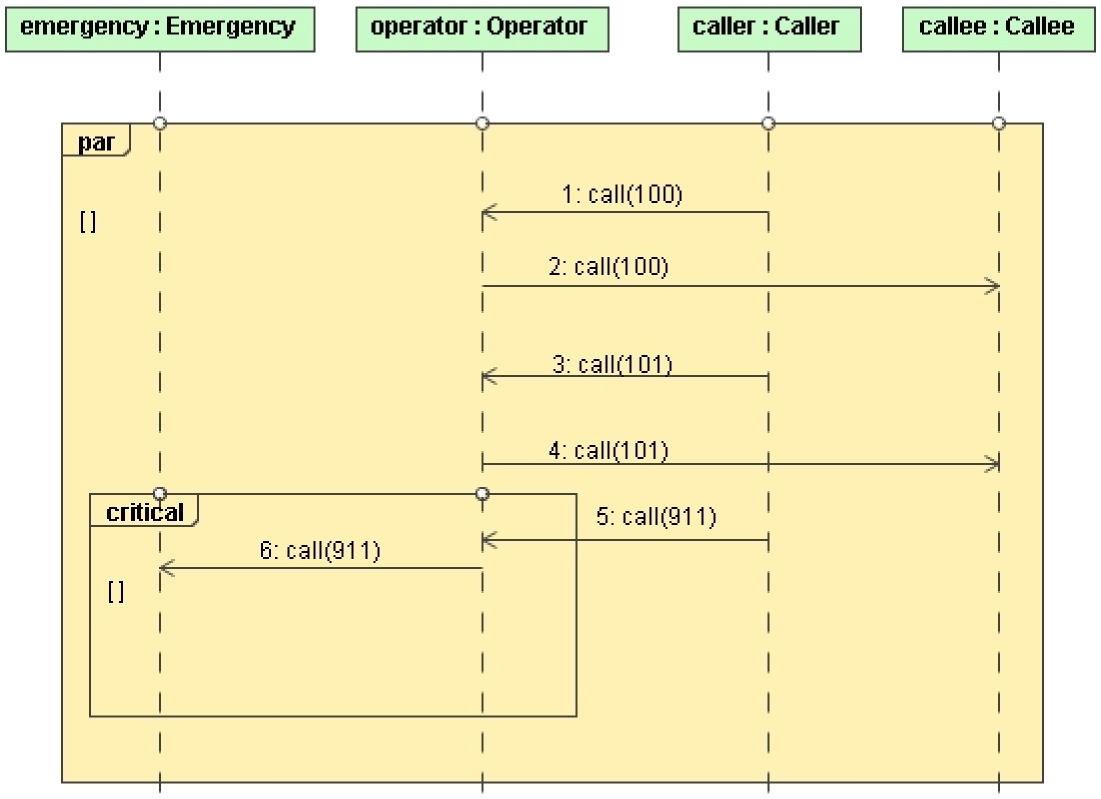
Combined Fragment

The UML Combined Fragment element allows the expressions of interaction fragments to be defined in the sequence diagram. The combined fragments provide a means to define special conditions and subprocesses for any sections of lifelines in the sequence diagram by specifying an area where the conditions or subprocesses apply. Using the Combined Fragment, a fragment of the sequence diagram can be separated.

To draw a Combined Fragment

- In the Sequence diagram toolbar, select the Alternatives element to draw.
- From the combined fragment shortcut menu select the **Covered Lifelines** command and in the **Covered Lifelines** dialog box, select the lifelines to display.
- In the Sequence diagram toolbar, **Options** group, select the Parallel combined fragment to draw.

- Draw the Critical Region combined fragment from the Sequence diagram toolbar, **Option** button group.



Function Behavior

The function behavior allows modeling external functions that take only inputs and produce outputs. It has no effect on the specified system.

To create the function behavior

In the Browser tree, right-click the Data package. In the shortcut menu, select the **New Element** command and then select Function Behavior .

Parent topic: "Model Elements" on page 622.

Gate

MagicDraw version 15.0 and later allows the display of messages leaving or entering a sequence diagram, interaction use, or combined fragment. The Gate is a connection point for representing a message from the outside to the current sequence diagram, interaction use, or combined fragment.

Gates can be used in three cases:

- For passing and returning arguments to InteractionUse, which calls some Interaction.

- For displaying “exceptions“ as messages that stops an interaction execution and leaves it.
- For “calling“ sequence blocks represented as CombinedFragments.

Gate has no notation. Gates are created as message ends when drawing messages to/from a diagram frame, an interaction use, or a combined fragment.

Parent topic: "Model Elements" on page 622.

Usage in diagrams: "Sequence Diagram" on page 521.

Related topics:

"Model" on page 720.

"Lifeline in the Sequence Diagram" on page 708.

"Combined Fragment" on page 668.

"Interaction Use" on page 702.

To create a formal gate

- Draw a call, send, create, or delete a message from the diagram frame.
- Draw a reply message to the diagram frame.
- Draw a call, send, create, or delete a message from the combined fragment (inside combined fragment).

NOTES
- You can view the created gates of message in the **Message** specification dialog box. In the **Send Event** list box you may see formal gate and the **Receive Event** lists the actual gate.
- The Gate uses text from the message as an identification name. For example, a message name or a message operation.

To draw create an actual gate of the formal gate

- Draw a call, send, create, or delete a message to the interaction use, which refers to the diagram with the formal gates. The **Select Formal Gate** dialog box opens.
- Draw a reply message from the interaction use, which refers to the diagram with the formal gates. The **Select Formal Gate** dialog box opens.
- Draw a call, send, create, or delete a message to the combined fragment (outside combined fragment). The **Select Formal Gate** dialog box appears.

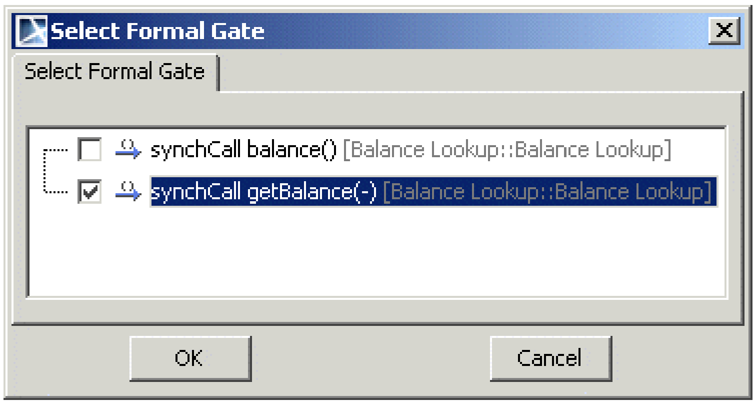
NOTE You can also view the formal and actual gates in the gates **Interaction** specification dialog box, **Interaction Use** dialog box, **Combined Fragment** dialog box, and the **Actual Gates** and **Formal Gates** panes.

To select a formal gate for the actual gate

1. Draw a message to invoke the **Select Formal Gate** dialog box (see "To draw create an actual gate of the formal gate" on page 688).
2. Select one of the listed formal gates and click OK. An actual gate is created.

- Or from the message shortcut menu, select the **Select Formal Gate** command. The **Select Formal Gate** dialog box opens.

NOTE The **Select Formal Gates** command exists only if there are formal gates.



- [ ] synchCall balance() [Balance Lookup::Balance Lookup]
- [x] synchCall getBalance(-) [Balance Lookup::Balance Lookup]

Figure 440 -- The Select Formal Gate dialog box

The formal gate and actual gate usage in the sequence diagram

See the following figure where the *getBalance* message is drawn from the diagram frame to the *theirBank* life-line. The *getBalance* message has a gate.

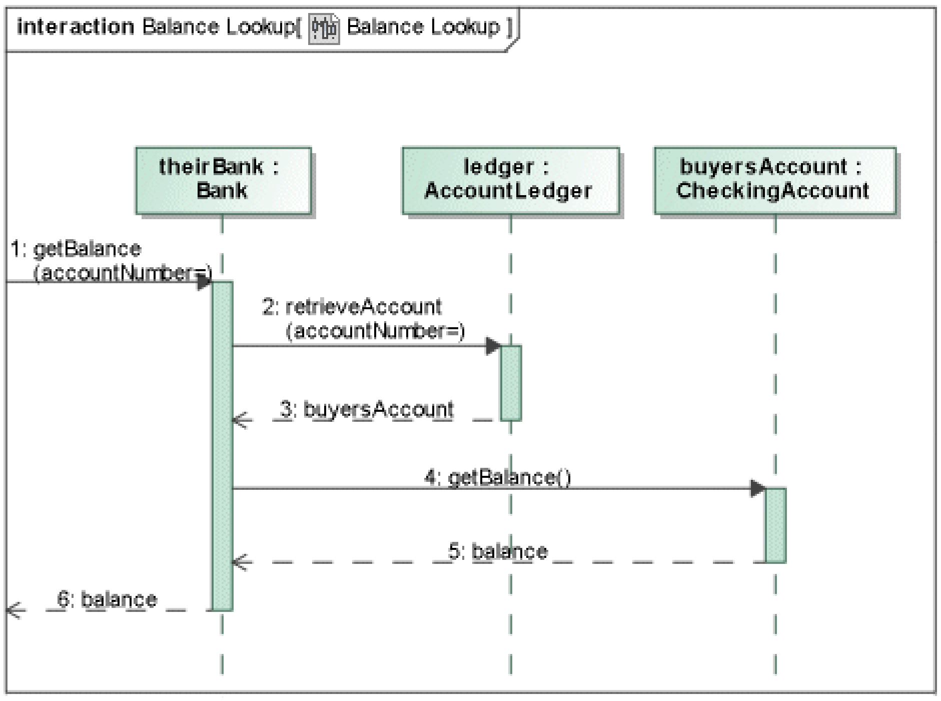

interaction Balance Lookup[Balance Lookup]
theirBank : Bank
ledger : AccountLedger
buyersAccount : CheckingAccount
1: getBalance (accountNumber=)
2: retrieveAccount (accountNumber=)
3: buyersAccount
4: getBalance()
5: balance
6: balance

Figure 441 -- Formal gates usage in Sequence diagram

See the following figure where the actual gate is presented. The *Balance Lookup* interaction use refers to the *Balance Lookup* sequence diagram. The *getBalance* message (see the 2nd message) has selected the formal gate and automatically repeats the data of the *getBalance* message from the *Balance Lookup* diagram.

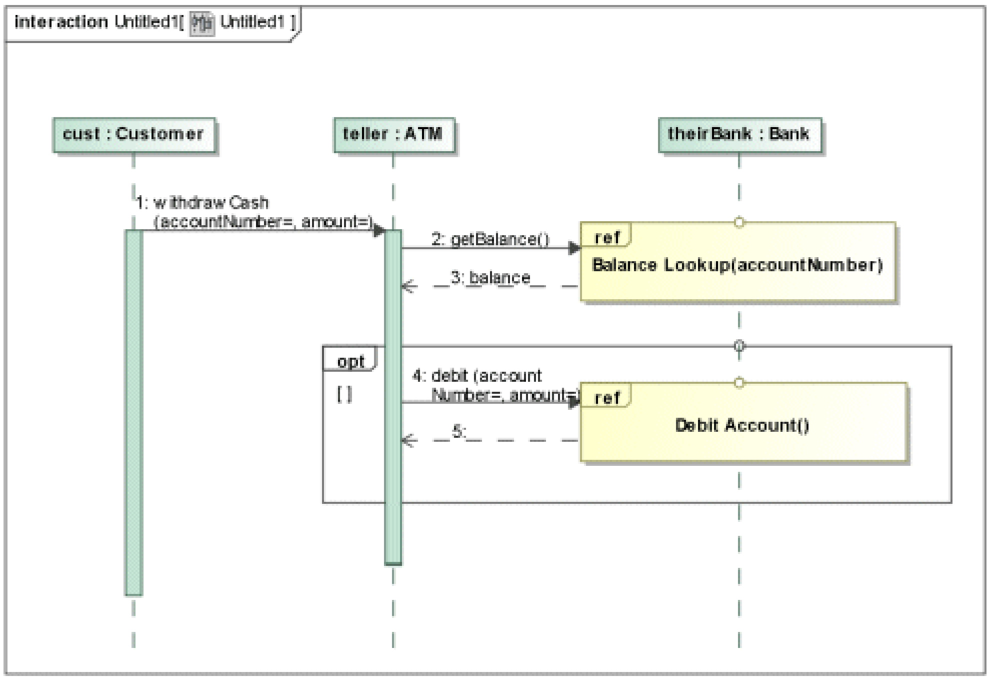

interaction Untitled1[Untitled1]
cust : Customer
teller : ATM
theirBank : Bank
1: withdraw Cash (accountNumber=, amount=)
2: getBalance()
3: balance
ref
Balance Lookup(accountNumber)
opt
[ ]
4: debit (account Number=, amount=)
5:
ref
Debit Account()

Figure 442 -- Actual gates usage in sequence diagram

Generalization

For more information about working with symbols, see "Diagramming" on page 149.

Define the generalization in the **Generalization Specification** dialog box.

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set a general information about the generalization relationship.	**General**	The name of the parent element.
	Specific	The name of the child element.

To group generalization paths into a tree

1. Draw a generalization path between the child element and the parent element.
2. Click the generalization path button on the diagram toolbar.
3. Click the other child shape.
4. Drag the path to the other generalization path and drop it there.
- Select **Make Sub Tree** from the parent class shortcut menu.
- Select **Make Sub Tree** from the parent package shortcut menu.

To ungroup a generalization tree

1. Click the generalization tree's hollow triangle pointing to a parent element.
2. From the tree shortcut menu, select **Ungroup Tree**.

To separate the generalization path from the generalization tree

- From the generalization path shortcut menu, select **Remove From Tree**.
- Drag one generalization path to another class.

NOTE	This command is available if the same tree contains the selected generalization path.

Generalizable elements

A generalizable element is a model element that may participate in a generalization relationship.

Name	Function
Is Abstract	Specifies whether the generalizable element may or may not have a direct instance. True indicates that an instance of the generalizable element must be an instance of a child of the generalizable element. False indicates that there may be an instance of the generalizable element that is not an instance of a child. An abstract generalizable element cannot be instantiated since it does not contain all the necessary information.
Is Leaf	Specifies whether the generalizable element is with descendants. True indicates that it may not have any descendant. False indicates that it may have some descendants (whether or not it actually has any descendants at the moment.)

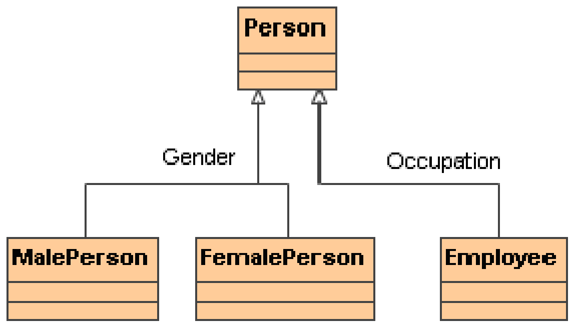
To define a generalizable model element (class, package, use case, etc.) as abstract or leaf

1. Open the corresponding **Specification** dialog box.
2. Select the **Is Abstract** or **Is Leaf** check box(es) in the **General** tab.

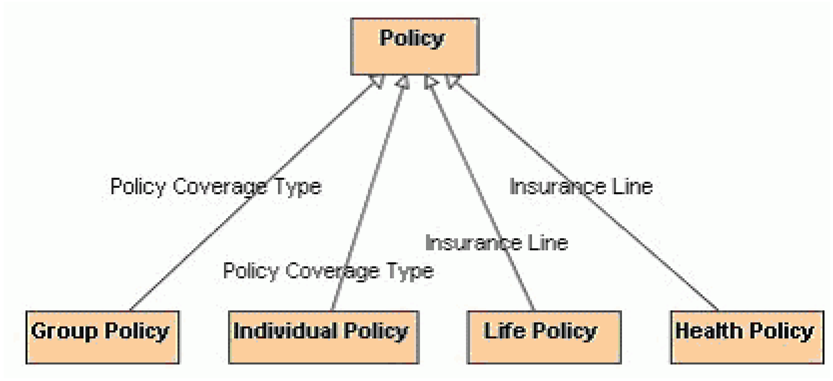
Generalization sets

Each generalization is a binary relationship that relates classifier to a more specific classifier. The Generalization Set defines a particular set of generalization relationships that describes the way in which a general classifier may be divided using specific types.

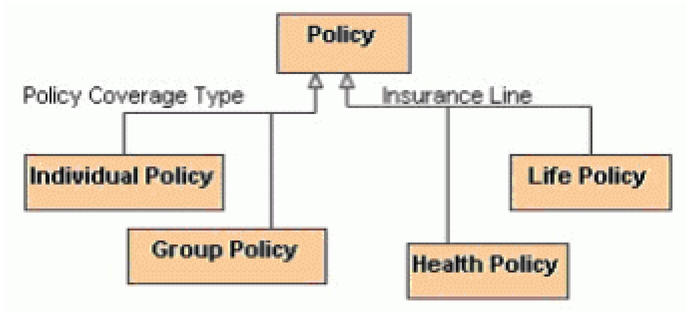
For example: the Person class can be specialized as either a Male Person or a Female Person. Furthermore, the Person may be specialized as an employee. The Female Person and Male Person constitute one Generalization Set and the Employee another:



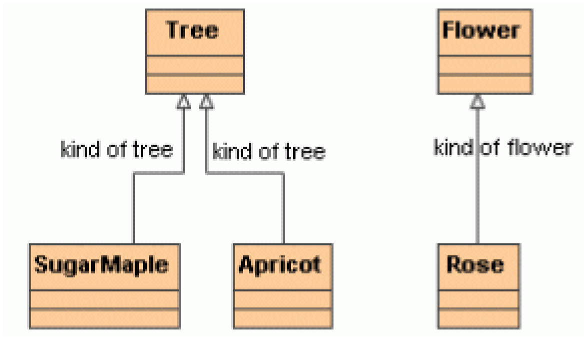
The label next to the generalization designates the name of the Generalization Set to which the generalization belongs.



The generalization set may be drawn as two or more generalization lines drawn to the same arrowhead. In this case it is labeled once. Drawing such a tree helps to understand the grouping of generalizations sets quickly.



The generalization set may contain only generalizations that have the same General element. The following is the example of generalizations, which may not have the same generalization set:



From the above example, the generalization, which is between the *Flower* and *Rose* classes, may not belong to the kind of tree generalization set, because its general element is *Flower* and the general element for the kind of tree generalizations is *Tree*. MagicDraw only lists all generalization sets that are allowed to assign. If a generalization set created in project does not have any generalizations, it may contain any generalization sets.

To create a new or assign an existing generalization set

- In the **Generalization Specification** dialog box, near the **Generalization Set** box click "..." button. In the open **Select Elements** dialog box assign an existing generalization set or click the **Create** button to create new generalization set.

NOTE In the Generalization Set list many generalization sets can be listed, but in this case on the diagram pane, near the generalization, only the first in the list is displayed.

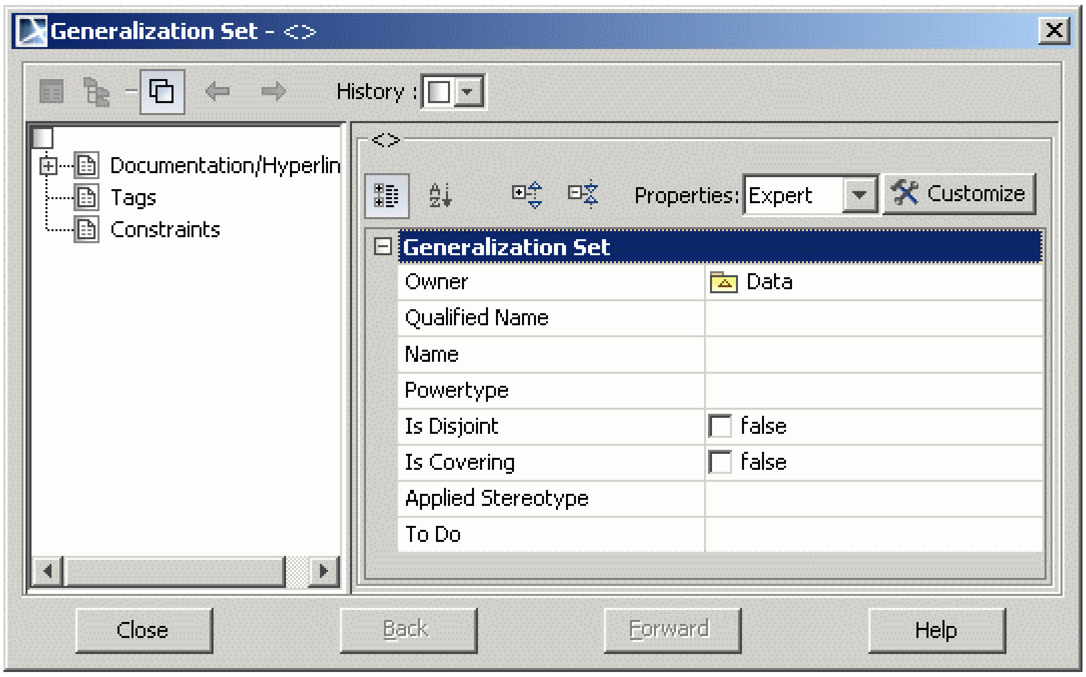
- On the diagram pane, select a generalization. From the generalization shortcut menu, select the **Generalization Set** command. In the opened list, select the generalization set or click the **New** button and in the indicated place create a new Generalization Set to which the current generalization is assigned.
- On the diagram pane select some generalizations, which you want to assign to the generalization set. From the shortcut menu, select the **Generalization Set** command.

NOTE The Generalization Set command is enabled only if all selected generalizations have the same general element.

- Draw or move a generalization line to a generalization set tree or to a generalization that belongs to a generalization set. The newly created generalization is assigned to the same generalization set.

The Generalization Set dialog box

Specify the Generalization set in the **Generalization Set** dialog box.



Generalization Set	
Owner	Data
Qualified Name	
Name	
Powertype	
Is Disjoint	☐ false
Is Covering	☐ false
Applied Stereotype	
To Do	

Figure 443 -- the Generalization Set dialog box

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set a general information about the generalization relationship.	**Is Disjoint**	Indicates whether or not a set of specific Classifiers in a Generalization relationship has a common instance. If the value is *true*, the Classifiers for a particular GeneralizationSet have no members in common; that is, their intersection is empty. The default value of the Is Disjoint property is false.
	Is Covering	Indicates whether or not a set of specific Classifiers is covering for a particular general classifier. When the value is *true*, every instance of a particular general Classifier is also an instance of at least one of its specific Classifiers for the Generalization Set.

In the **Generalization Set** dialog box, the **Generalization** list box lists the generalizations which are assigned to the current generalization set.

To assign a generalization:

1. Near the Generalization list click the "..." button. The list of available generalizations opens.
2. Near the generalization you want to assign to the generalization set, select the check box.
3. Click the **Apply** button.

NOTE	The generalizations that belong to other sets are allowed to be selected. Selecting such a generalization removes it from the previous set and adds it to the current one.

To open the Generalization Set symbol properties

On the diagram pane select the generalization set name and from its shortcut menu, select the **Symbol(s) Properties** command.

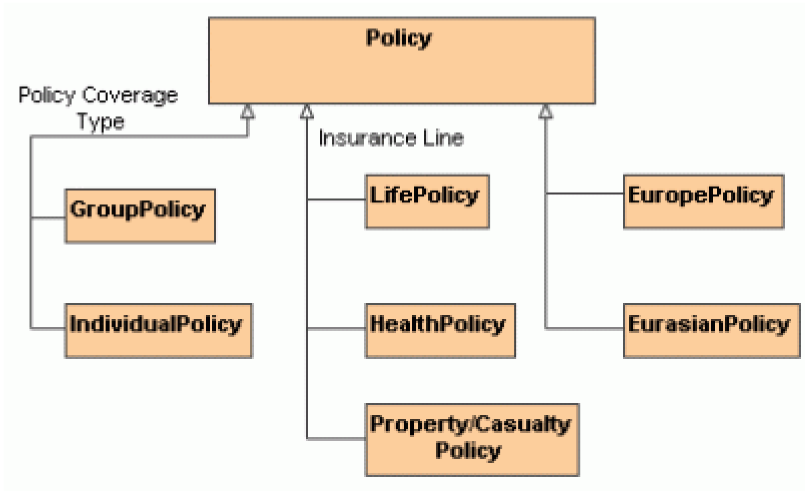
If the **Show Powertype** check box is selected, on the diagram pane, next to the generalization, the label of Powertype of Generalization Set is displayed instead of the Generalization Set name. The default **Show Powertype** property value is *false*.

If the **Show Complete/Disjoint** check box is selected, on the diagram pane, next to the generalization, the values of **Is Covering** and **Is Disjoint** properties are displayed on the diagram. The default **Show Complete/Disjoint** property value is *false*.

To group the generalizations to the generalization set trees

1. Select a general classifier on the diagram pane.
2. From the classifier shortcut menu, select the **Make Generalization Set Tree** command. The generalizations are grouped to trees, according to the generalization sets.

When the **Make Generalization Set Tree** command is selected, a tree is created for each generalization set. The generalizations, which do not belong to any generalization set, are grouped to a separate tree. For example:

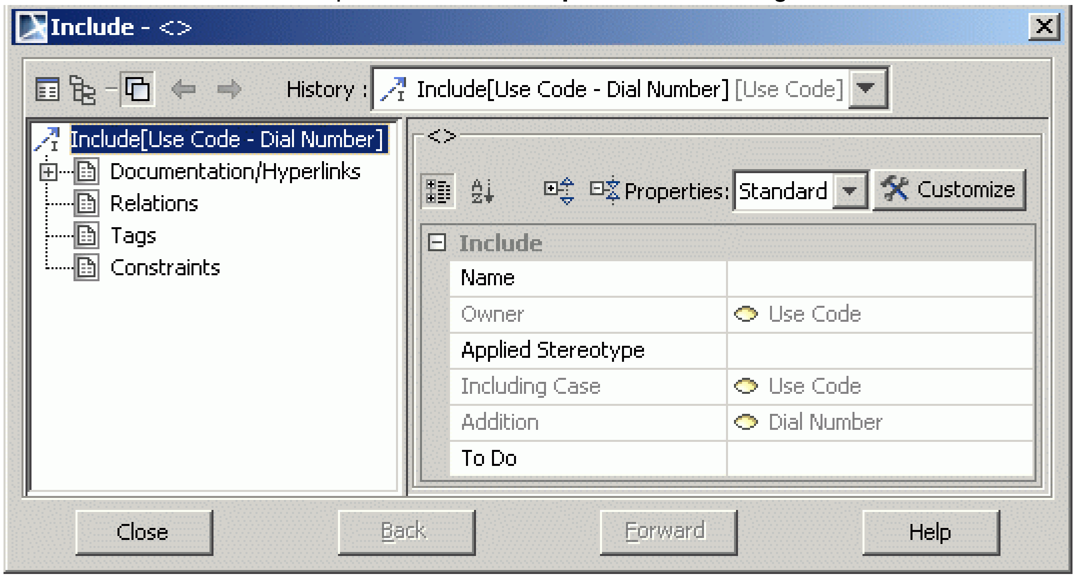


Include

An include (uses) relationship from the use case A to the use case B indicates that an instance of the use case A will also contain the behavior as specified by B.

The include relationship is used when there are common parts of the behavior among two or more use cases. Each common part is then extracted to a separate use case, to be included by all base use cases having this part in common. Since the primary use of the include relationship is to reuse the common parts, what is left in the base use case is usually not complete in itself but dependent on the included parts for meaning and context. This is reflected in the direction of the relationship, indicating that the base use case depends on the addition but not vice versa.

Define the extend relationships in the **Include Specification** dialog box.



Include	
Name	
Owner	Use Code
Applied Stereotype	
Including Case	Use Code
Addition	Dial Number
To Do	

Figure 444 -- Include Specification dialog box

Refer to the "Specification Window" on page 219 for information about specification elements not covered in this section.

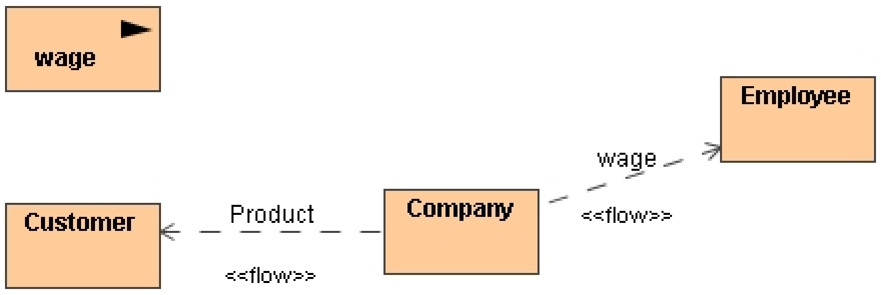
Tab name	Box	Function
General Set a general information about the include relationship.	**Owner**	The name of the use case, which owns the include relationship.
	Including Case	Name of the use case to where the relationship goes.
	Addition	Name of the use case from where the relationship comes.

Information Flow

An Information Flow specifies that one or more information items circulates from its sources to its targets. Information flows require some kind of “information channel” for transmitting information items from the source to the destination.

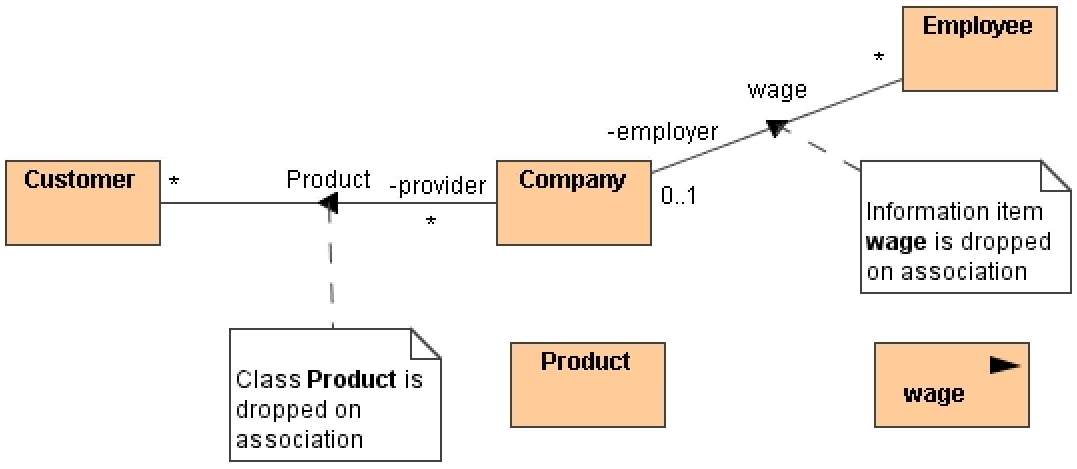
An information channel is represented in various ways depending on the nature of its sources and targets. It may be represented by connectors, links, associations, or even dependencies. For example, if the source and destination are parts in some composite structure diagrams such as a collaboration, then the information channel is likely to be represented by a connector between them. Or, if the source and target are objects (which are a kind of InstanceSpecification), they may be represented by a link that joins the two, and so on.

The information flow and the information item notation are added. You may draw them using the Information Flows toolbar in the class or composite structure diagram:



You can also create information flows in the associations in the class diagram and on the connectors in the composite structure diagrams:

3. Draw classes and associations.
4. From the association shortcut menu select command **Symbol(s) Properties** and select the **Show conveyed information A** and **Show conveyed information B** check boxes.
5. Drag the class or information item on an association. An information flow is created.


Employee
*
wage
-employer
Customer
*
Product
-provider
*
Company
0..1
Information item wage is dropped on association
Class Product is dropped on association
Product
wage

Information Item

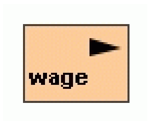
The Information Flows package provides mechanisms for specifying the exchange of information between entities of a system at a high level of abstraction.

The Information flows describe a circulation of information in a system in a general manner. They do not specify the nature of the information nor the mechanisms by which this information is conveyed (message passing, signal, common data store, parameter of operation, etc.). They also do not specify sequences or any control conditions. It is intended that, while modeling in detail, representation and realization links will be able to specify which model element implements the specified information flow, and how the information will be conveyed.

An information item is an abstraction of all kinds of information that can be exchanged between objects. It is a kind of classifier intended for representing information in a very abstract way, the one which cannot be instantiated.

One purpose of information items is to be able to define preliminary models, before making a detailed modeling decisions on types or structures. Another purpose of information items and information flows is to abstract complex models by using a less specific but more general representation of the information exchanged between entities of a system.

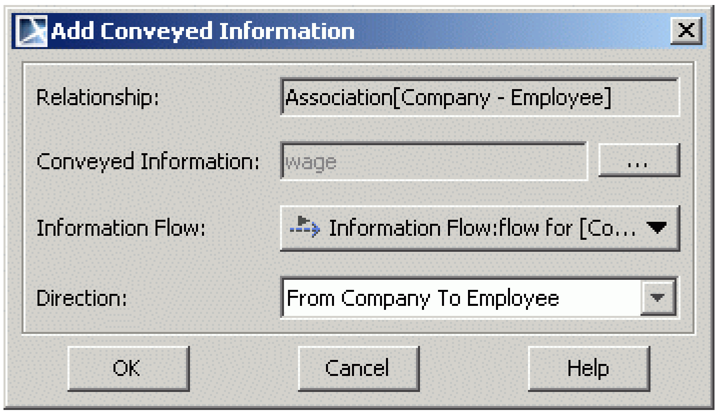
In a classifier, the information item can be represented as a name inside a rectangle. The black triangle icon on top of this rectangle indicates that it is an information item.



Information Items (or any conveyed classifiers) can be displayed on any relationship.

To display information Items on relationships:

1. Select the information item on the diagram pane and drag it on the relationship shape. The **Add Conveyed Information** dialog box opens.



Relationship: Association[Company - Employee]
Conveyed Information: wage
Information Flow: Information Flow:flow for [Co...
Direction: From Company To Employee

2. After specifying information flow and direction arrow, click **OK**.

Instance

An instance specification specifies the existence of an entity in a modeled system and completely or partially describes the entity.

The description may include:

- The classification of an entity by one or more classifiers of which the entity is an instance. If the only classifier specified is abstract, then the instance specification only partially describes the entity.
- A kind of instance based on its classifier or classifiers - for example, an instance specification whose classifier is a class describes an object of that class, while an instance specification whose classifier is an association describes a link of that association.
- A specification of values of structural features of the entity. Not all structural features of all classifiers of the instance specification need to be represented by slots, in which case the instance specification is a partial description.
- A specification of how to compute, derive, or construct the instance (optional).

MagicDraw allows you to create the instances of classifiers – class, interface, enumeration, use case, actor, node, component, artifact, and other classifiers.

The instances are shown using a rectangle by underlining the name string of an instance element. The instance of an actor is shown as an actor “stick man” figure with the actor’s name string below the symbol.

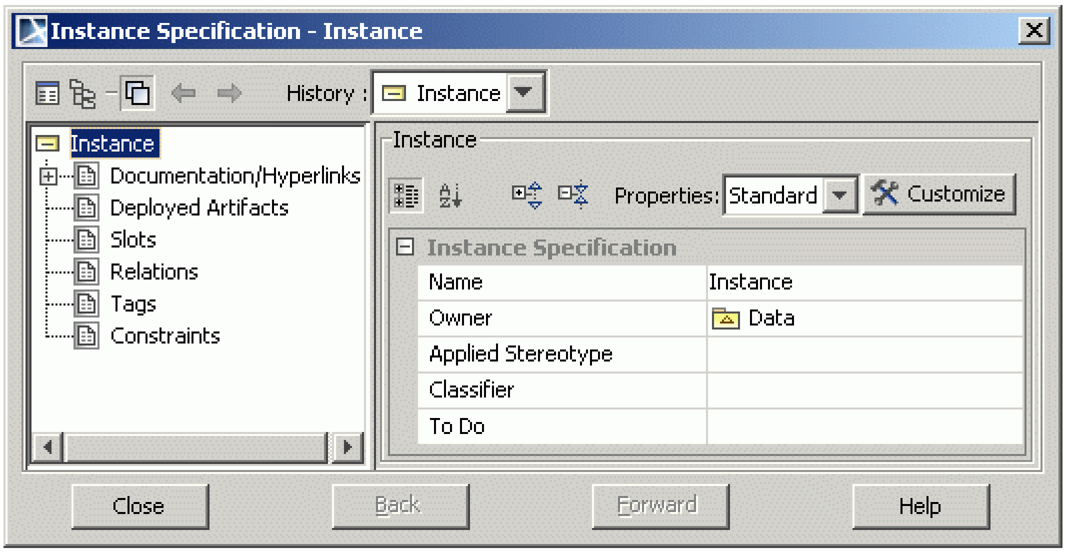
For more information about working with symbols, see "Diagramming" on page 149.

Define the selected instance in the **Instance Specification** dialog box.

An instance is an individual unit with its own identity and value. Each instance has a descriptor – model element.

To open the **Instance Specification** dialog box

Select **Specification** from the instance shortcut menu or double-click the instance shape.



Instance

Instance Specification	
Name	Instance
Owner	Data
Applied Stereotype	
Classifier	
To Do	

Figure 445 -- Instance Specification dialog box

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General Set general options for the instance.	**Owner**	The name of the element, containing an instance.
	Classifier	The name of the assigned classifier.
Deployed Artifacts List of an artifacts or artifact instances that has been deployed to a deployment target.	**Name**	The name of the artifact or instance.
	Type	An element, which appears as a type of deployed artifact.
	Owner	The name of the element, containing deployed artifact.
Slots A named slot in an instance, which holds the value (the instance that is the value of the AttributeLink) of an attribute (the attribute from which the AttributeLink originates).	**Type**	The name, which is the owner of the attribute.
	Attribute	The name of the attribute.
	Instance	The name of an instance, to which the current instance is set as a default value.

To assign an already existing classifier to an instance

1. Right-click the instance shape and select **Type** from the instance shortcut menu.
2. Select the classifier you wish to assign to an instance.

- Open the **Instance Specification** dialog box and in the **Classifiers** field, click the '**...**' button. The **Select Elements** dialog box opens. Move the classifier from **All** to the **Selected** list and click **OK**.

To assign / unassign an existing classifier for an instance in the Instance Specification window

1. Double-click an instance shape or select **Specification** from the shape shortcut menu.
2. The **Instance Specification** dialog box appears. Click the '...' button in the **Classifiers** property.
    - To assign a new classifier, select an element in **All** and click the **Add** button to move it to the **Selected** list.
    - To unassign the assigned classifier, select an element in the **Selected** list and click the **Remove** button.

To hide/show an assigned classifier

From the instance shortcut menu, select/clear the **Show Classifier** check box.

To set the initial value to an attribute of the assigned classifier

1. Double-click an instance shape or select **Specification** from the shape shortcut menu.
2. The **Instance Specification** dialog box opens. Click the **Slots** tab.
3. Click the **Edit Value** button and type the name of the value.

To show/hide slots of the assigned classifier

Clear/select **Suppress Slots** check box in the instance shortcut menu.

NOTE	By default slots of the classifier are suppressed.

To display slot type on the instance symbol

Slot type can be optionally displayed on Instance or Part shapes.

Property **Show Slot Type** is added to slot symbol properties (select command **Symbol(s) Properties** from instance shortcut menu to invoke **Properties** dialog). Slot type name (see Figure 446 on page 700), slot type qualified name (see Figure 447 on page 701) or no slot type (see Figure 448 on page 701) may be displayed next to slot.

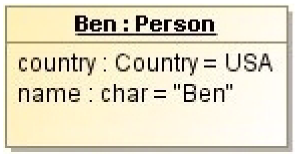


Figure 446 -- Slot type name is displayed next to slot

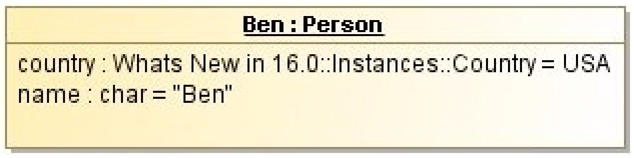


Figure 447 -- Slot type qualified name is displayed next to slot

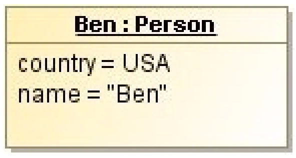


Figure 448 -- No slot type is displayed

To select slot in a diagram

Slot can be selected in a diagram. This allows the deletion of a slot straight from the diagram and to attach a note to a slot.

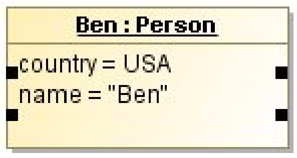


Figure 449 -- Slot selected in a diagram

Instance Specification

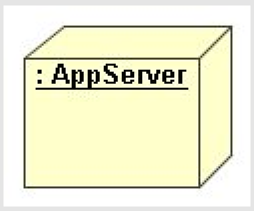
An instance specification represents an instance in a modeled system.

In the Component (or Deployment) diagram Node Instance, Component Instance, Artifact Instance elements are the same Instance Specification elements with an assigned component, node or artifact.

To create a Component Instance

1. In the Component (or Deployment) diagram toolbar, click the Component Instance button. The **Select Components** dialog box opens.
2. Select a component from the list or click the **Create** button to create a new one. Click **OK**.

The same is valid for the Node Instance and Artifact Instance creation.

TIP!	Use the Node Instance button to create the Instance Specification with assigned Node and the Node Instance will have a Node shape. 

To display specification value on the Instance Specification symbol

Specification value can be optionally displayed on the Instance Specification symbol. Check box **Show Specification Value** is added to Instance Specification properties (select command Symbol(s) Properties from instance shortcut menu to invoke **Properties** dialog).

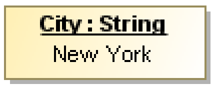


Figure 450 -- Specification value is displayed on the Instance Specification symbol

Assigning Instance Specification as Default Value quickly

You can drag Instance Specification element on Classifier property on a diagram to assign it as default value. Drag and drop is available only if Instance Specification classifiers are compatible with Property type and if Property is editable.

Interaction Use

Interactions are units of behavior of an enclosing Classifier. They focus on the passing of information with Messages between the Connectable Elements of the Classifier.

A reference to the interaction can be created.

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

To add a reference to an element

- In the **Interaction Use** specification dialog box, click the **Refers To** drop down list. A list of interactions, created in the project, opens. Click the "**...**" button, to add the interaction from the **Select Element** tree. Click the **Create** button to create a new interaction.
- From the interaction use shortcut menu select the **Refers To** command. In the appeared list select the interaction or create a new one.

To add an actual gate

1. Add a reference to the diagram, from which the diagram frame formal message is created.
2. To the current interaction use draw an actual message with the selected formal gate.

For more information about working with gates, see "Gate" on page 687.

Interface

An interface is a specifier for the externally-visible operations of a class, component, or other classifiers (including subsystems) without a specification of the internal structure. Each interface often specifies only a limited part of the behavior of an actual class.

The set of interfaces realized by a classifier is its provided interfaces, which represent the obligations that instances of that classifier have to their clients. They describe the services that the instances of that classifier offer to their clients.

All options associated with an interface can be set in the **Interface Specification** dialog box.

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
Signal Receptions		Manage the receptions of an interface in the **Signal Receptions** pane. For more information about signal receptions, see “Reception” on page 757.
Inner Elements Add class, use case, interface, enumeration, data type, primitive, collaboration, or constraint to an interface	**Name**	The model element name.
	Type	The model element type.
	Create	Select an element from the list. The corresponding (class, use case, interface, enumeration, data type, primitive, collaboration, or constraint) Specification window opens. Define the selected model element in the dialog box.
	Delete	Remove the selected model element from an interface.

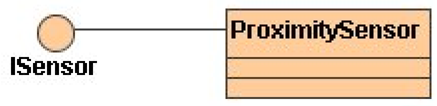
Provided and Required Interfaces

The set of interfaces realized by a classifier is its provided interfaces, which represent the obligations that instances of that classifier have to their clients. They describe the services that the instances of that classifier offer to their clients.

The interfaces may also be used to specify required interfaces, which are specified by a usage dependency between the classifier and the corresponding interfaces. Required interfaces specify services that a classifier needs in order to perform its function and fulfill its own obligations to its clients.

To draw a Provided Interface

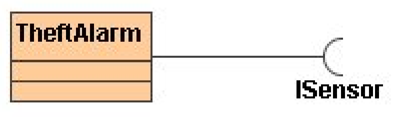
1. In the Class diagram toolbar, select the Interface Realization path to draw from a class to an interface.
2. Suppress the attributes and operations of the interface (from the interface shortcut menu, **Presentation Options** submenu, select the **Suppress Attributes** and **Suppress Operations** check boxes).



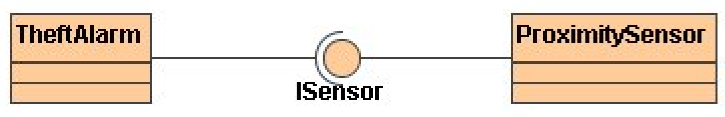
To draw a Required Interface

1. In the Class diagram toolbar, select the Usage path to draw from a class to an interface.

2. Suppress the attributes and operations of the interface (from the interface shortcut menu, **Presentation Options** submenu, select the **Suppress Attributes** and **Suppress Operations** check boxes).



To draw both Provided and Required Interfaces together



Working with s is similar to working with classes. For more information, see "Working with classes" on page 662.

A general information about working with shapes is offered in "Diagramming" on page 149.

Provided and Required Interfaces in the Composite Structure diagram

Information about provided and required interfaces is crucial in the assembly stage of complex internal structures. It helps to decide where connectors should be attached.

Provided and required interfaces are valuable parts of the UML Composite Structure Diagram and SysML Internal Block Diagram.

A provided interface is shown using the "lollipop" notation attached to the port and required interface is shown using the "fork" notation attached to the port (see the following figure).

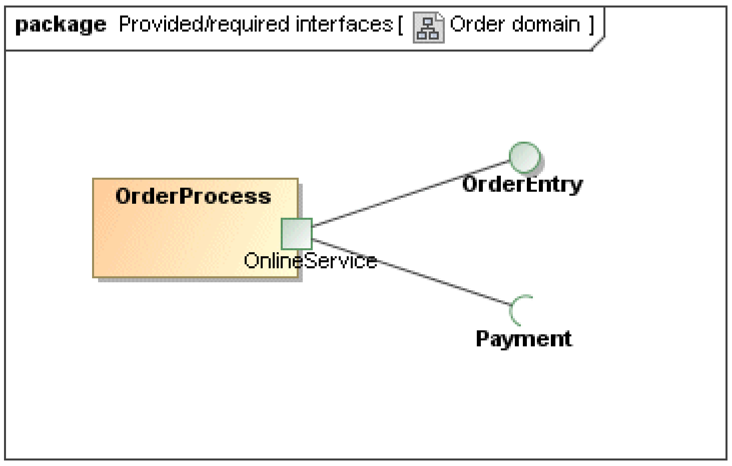


Figure 451 -- Provided and Required interface

In the Composite Structure diagram you cannot draw provided and required interfaces itself, but with the new functionality of MagicDraw you can display preexisting port with the required and provided interfaces as images.

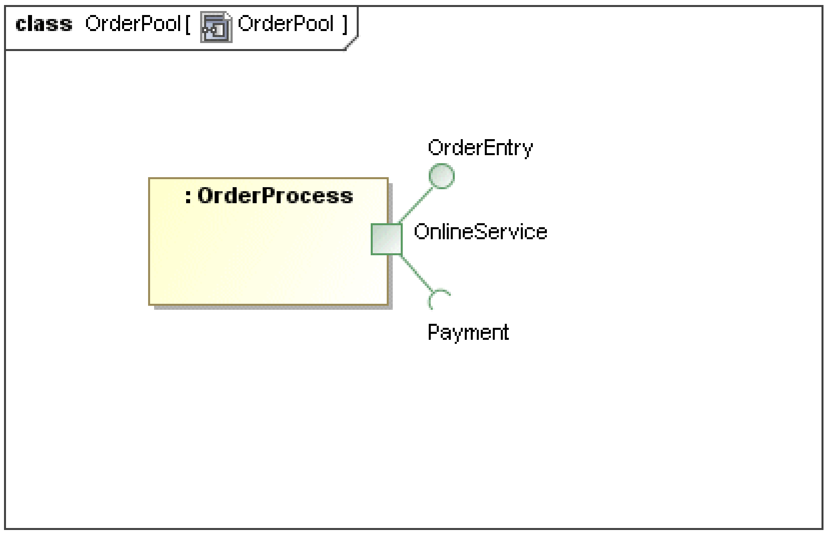


Figure 452 -- Provided and required interface in the Composite Structure diagram

Lollipop and fork symbols in the Composite Structure diagram are implemented as small attachments to a Port symbol (like name label). It is not the same as the independent standalone notation of the interface, it is only part of port symbol. It is important for Composite Structure diagrams where real Interfaces (as Classifiers) can not be used.

It is an optional notation, a port does not display provided or required interfaces by default.

Displaying provided/required interfaces in the Composite Structure diagram

1. Create provided and required interfaces in the Class diagram. See procedures "To draw a Provided Interface" on page 703 and "To draw a Required Interface" on page 703.
2. In the Composite Structure diagram, select **Related Elements** from the port shortcut menu and then **Display Provided/Required Interfaces**. Or, in the individual Port symbol **Properties** dialog, select the **Show Provided Interfaces** and **Show Required Interfaces** check boxes.

As Port can provide or require many interfaces, displayed or hidden interfaces can be managed in the **Edit Compartment** dialog box.

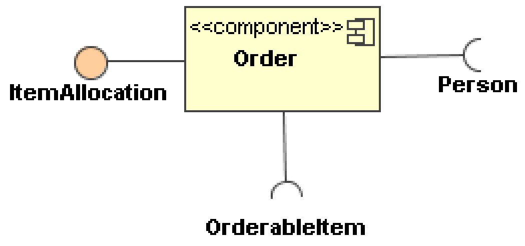
Provided/required interfaces in the Component diagram

A component specifies a formal contract of the services that it provides to its clients and those that it requires from other components or services in the system in terms of its provided and required interfaces.

The required and provided interfaces may optionally be organized through ports.

To add and manage the added provided and required interfaces quickly, in the **Component Specification** dialog box, select the **Provided/Required Interfaces** pane.

For more information about provided and required interfaces, see the procedure "Provided and Required Interfaces" on page 703.



Internal transition

In all other cases, the action label identifies the event that triggers the corresponding action expression. These events are called internal transitions and are semantically equivalent to self transitions except that the state is not exited or re-entered. This means that the corresponding exit and entry actions are not performed.

For more information on defining transitions, see "Fork and Join" on page 755.

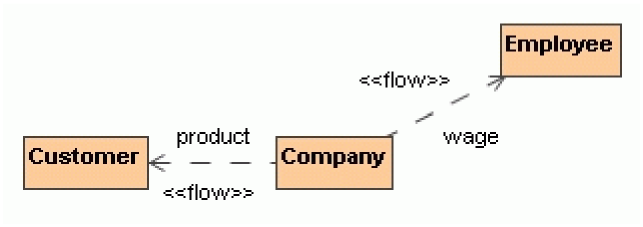
Specify the internal transition in the **Transition Specification** dialog box. For a detailed description of this dialog box, see "Transition" on page 769.

To define an internal transition

1. Double-click the state or select **Specification** from the state shortcut menu. The **State Specification** dialog box opens.
2. Click the **Internal Transitions** group.
3. Click the **Create** button. The **Transition Specification** dialog box opens. Specify an internal transition.

To remove the internal transition, click the **Delete** button.

The Information Flow can be related to any relationship.



Lifeline

A lifeline represents an individual participant in the Interaction. The lifeline represents only one interacting entity. It is shown using a rectangle symbol.

For more general information about working with symbols, see "Diagramming" on page 149.

To assign a type (classifier) to a lifeline

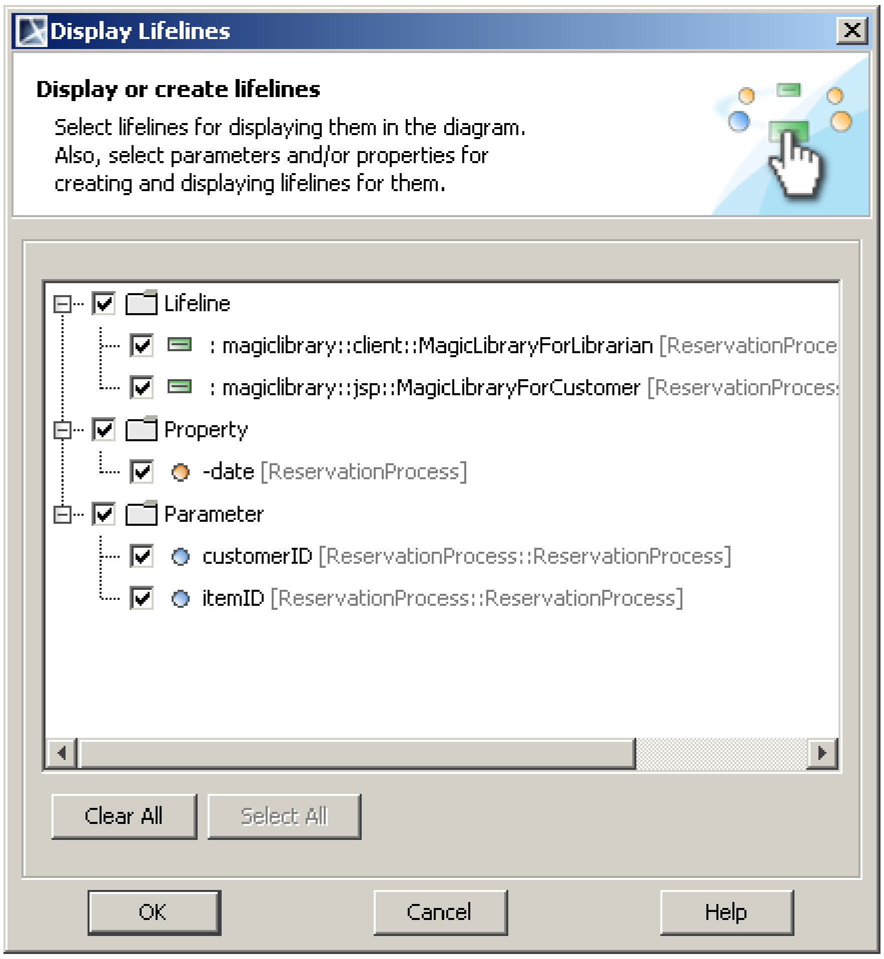
1. Right-click the lifeline shape and select **Type** from the shortcut menu.
2. Select the classifier you wish to assign to a classifier role or click **New** and select the element from the list.

To hide/show a base classifier

Select the **Show Classifier** check box from the lifeline shortcut menu.

To create lifelines for existing data (the interaction properties and parameters) or display all lifelines of the interaction which are not displayed in the diagram

- Drag and drop the selected element from the Browser to the diagram pane.
- On the diagram shortcut menu, click **Related Elements** > **Display Lifelines** and, in the **Display Lifelines** dialog, choose the required elements you want to display or create.


Display Lifelines

Display or create lifelines

Select lifelines for displaying them in the diagram.
Also, select parameters and/or properties for creating and displaying lifelines for them.

- [✓] Lifeline
  - [✓] : magiclibrary::client::MagicLibraryForLibrarian [ReservationProce
  - [✓] : magiclibrary::jsp::MagicLibraryForCustomer [ReservationProces
- [✓] Property
  - [✓] -date [ReservationProcess]
- [✓] Parameter
  - [✓] customerID [ReservationProcess::ReservationProcess]
  - [✓] itemID [ReservationProcess::ReservationProcess]

*Figure 453 -- The **Display Lifelines** dialog*

Related sections

Communication Diagram
Sequence Diagram
Lifeline in the Sequence Diagram
Message

Lifeline in the Sequence Diagram

A lifeline represents the existence of the object at a particular time. It stretches from the top to the bottom of the diagram. In the sequence diagram, an object lifeline denotes an Object playing a specific role.

To destroy a sequence object - a large “X” at the end of its lifeline marks its destruction

- Select **Delete Mark** from the lifeline shortcut menu.
- Set a message as delete message.

When an object receives a message, an activity starts in that object. An activation (focus of control) shows the period during which an object is performing an action either directly or through a subordinate procedure. The activation bar is used to denote that activity.

To change the activation bar size

1. Click the desired activation bar on the Diagram pane.
2. Drag the activation bar to the desired direction.

NOTE After resizing, the lines on the activation bar are thickened, but the size may not change automatically.

To add a recursive message to a lifeline

Click the **Recursive Message** button on the diagram toolbar and click the lifeline on the desired place where you wish to draw this message.

Related sections

Lifeline

Sequence Diagram

Message

Link

Link is instance specification with assigned classifier - association.

An instance specification whose classifier is an association represents a link and is shown using the same notation as for an association, but the solid path or paths connect instance specifications rather than classifiers.

End names can adorn the ends. Navigation arrows can be shown, but if shown, they must agree with the navigation of the association ends.

You can show role names and navigability on the link symbol (see the following figure). Properties **Show End A**, **Show End B**, and **Show Navigability** are added to link shortcut menu and symbol properties. These properties are displayed according classifier association.

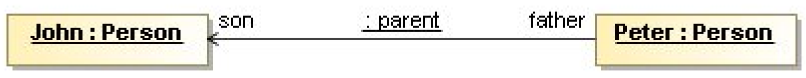


Figure 454 -- Role names displayed on the link symbol

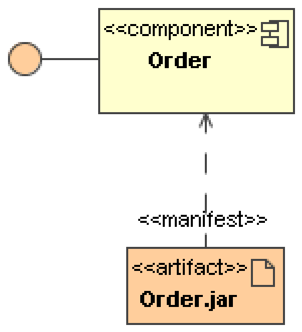
Manifestations

An artifact embodies or manifests a number of model elements. It owns the manifestations, each representing the utilization of a packageable element.

To create the manifestations, simply draw the Manifestation link from an artifact to a component.

To display the manifested artifacts on the component shape

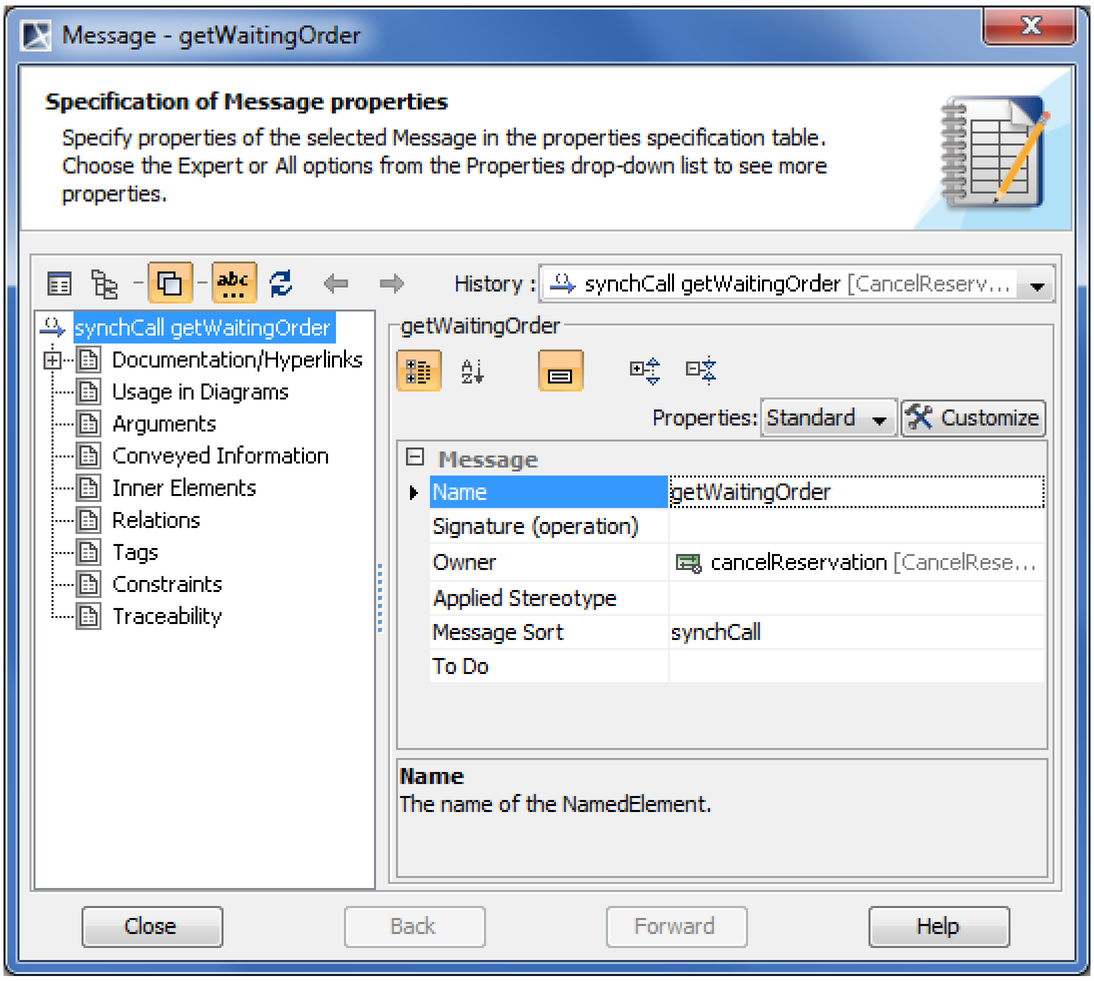
From the component shortcut menu select **Presentation Options** and then clear the **Suppress Artifacts** check box.



Message

A Message is an element that defines one specific kind of communication in an Interaction. A communication can be, for example, raising a signal, invoking an Operation, creating or destroying an Instance. The Message specifies not only the kind of communication given by the dispatching Execution Specification, but also the sender and the receiver.

A message is shown as a line from the sender message end to the receiver message end. The form of the line or arrowhead reflect the properties of the message.


Message - getWaitingOrder
Specification of Message properties
Specify properties of the selected Message in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.
History : synchCall getWaitingOrder [CancelReserv...
synchCall getWaitingOrder
Documentation/Hyperlinks
Usage in Diagrams
Arguments
Conveyed Information
Inner Elements
Relations
Tags
Constraints
Traceability
getWaitingOrder
Properties: Standard
Customize
Close
Back
Forward
Help

Message	
Name	getWaitingOrder
Signature (operation)	
Owner	cancelReservation [CancelRese...
Applied Stereotype	
Message Sort	synchCall
To Do	

Name
The name of the NamedElement.

Figure 455 -- Message Specification window

You can see the description of a selected property in the description area of the Specification window. To see descriptions, be sure the Show Description option is turned on. For detailed information about using the Specification window, refer to "Specification Window" on page 219.

For information about the properties editing, refer to "Editing Property Values" on page 237.

Related sections

Communication Diagram

Sequence Diagram

Time Diagram

Common Actions with Messages

To set an action type for a message

Do one of the following:

- In the message Specification window, click the **Message Sort** property value cell and select the action type from the drop-down list.
- Right-click the message and select a desired action type from the shortcut menu.

For more information about message action types in Sequence and Time diagrams see "Sequence diagram elements" on page 522.

For more information about message action types in a Communication diagram see "Communication Diagram elements" on page 519.

To show / hide message numbers

1. Right-click the diagram pane to open its shortcut menu.
2. Then:
   - If it is a Sequence or Time diagram, select / clear **Show Message Numbers**.
   - If it is a Communication diagram, select / clear **Numbering** > **Show Message Numbers**.

Assigning operations to messages

A model conventionally is created in the following order:

1. A class diagram with classes is created.
2. A sequence diagram uses these classes and their operations to represent the call order.

MagicDraw provides a faster way of assigning and creating operations than it is allowed in the traditional model creation process:

1. A sequence diagram is created to represent both classes and messages.
2. You can convert a message into a call message as well as create operations for classes in a single click.

You can assign operations only to call (synchronous and asynchronous) messages. Furthermore, only one operation can be assigned to a message.

To assign an operation to a message

1. Draw a call message between two lifelines or select an existing message on a diagram pane.
2. Open the message Specification window (see the procedure "To open the corresponding Specification window" on page 221).
3. Click the **Signature (operation)** property value cell and then select an operation in the drop-down list.

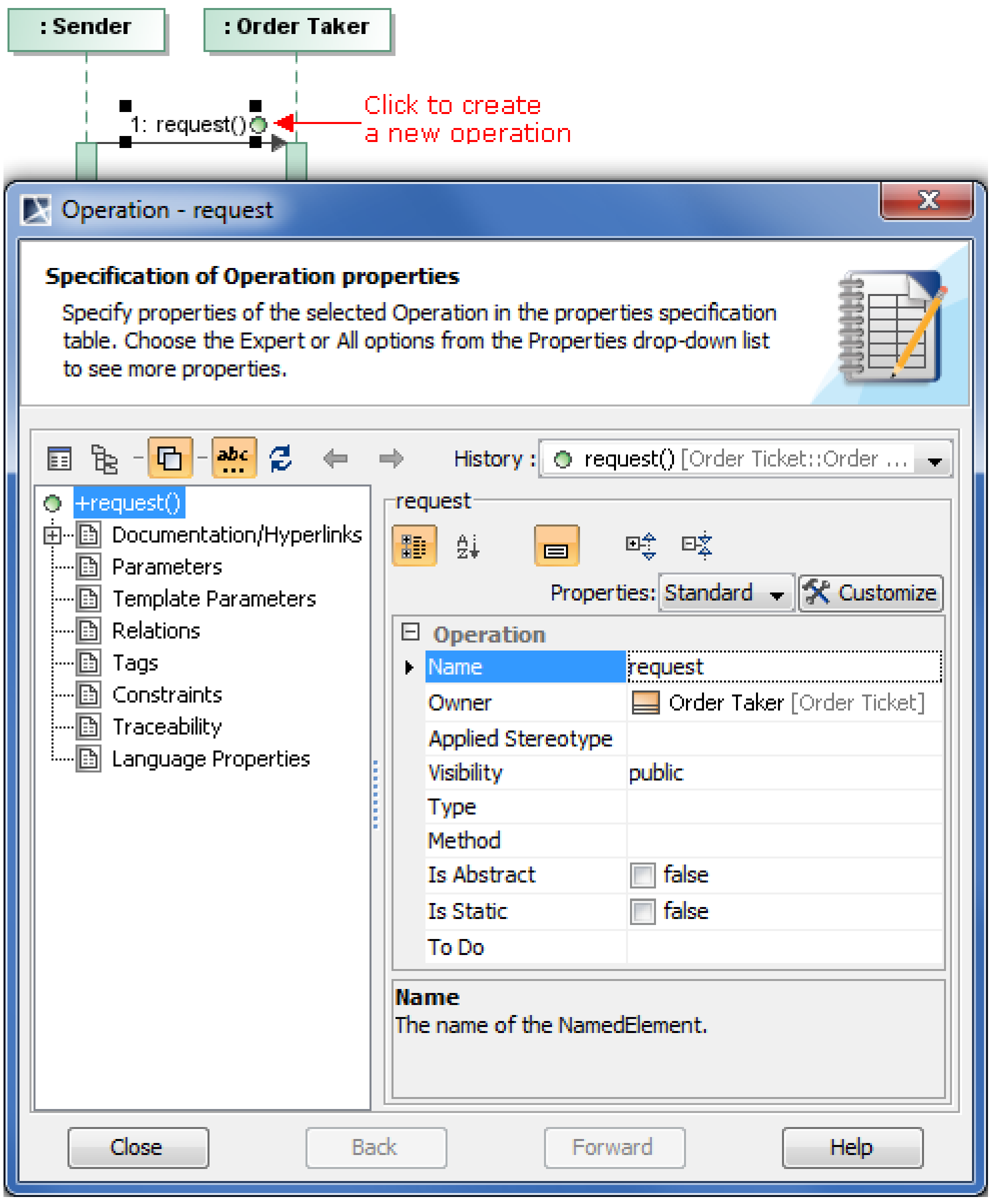
NOTE	In the **Signature (operation)** drop-down list, both operations and signals of your project are listed. Make sure you have selected an operation. If you assign a signal to a call message, the message will automatically be converted to a send message.

To create a new operation for a message

IMPORTANT!	You can create a new operation only if the lifeline to which the message is drawn has a type assigned.

1. Draw a call message between two lifelines or select an existing message on a diagram pane.
2. Do one of the following:
   - Click the button in the shape of a small green circle at the end of the message name (see the following figure). Define operation property values in the operation Specification window. The default name of the operation is the name of the

message for which the operation is being created. For more information about operations see "Operation" on page 727.



Operation - request

Specification of Operation properties

Specify properties of the selected Operation in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : request() [Order Ticket::Order ...

- +request()
  - Documentation/Hyperlinks
  - Parameters
  - Template Parameters
  - Relations
  - Tags
  - Constraints
  - Traceability
  - Language Properties

request

Properties: Standard · Customize

Operation	
Name	request
Owner	Order Taker [Order Ticket]
Applied Stereotype	
Visibility	public
Type	
Method	
Is Abstract	☐ false
Is Static	☐ false
To Do	

Name
The name of the NamedElement.

- From the message shortcut menu, select **Create New Operation** (the command with the icon representing a small green circle). Define operation property values in the operation Specification window. The default name of the operation is the name of the message for which the operation is being created.For more information about operations see "Operation" on page 727.

Assigning signals to messages

You can assign signal only to send or call (synchronous or asynchronous) messages. Furthermore, only one signal can be assigned to a message.

NOTE If a signal is assigned to a call message, the message is automatically converted to a send message.

To assign a signal to a message using a drag-and-drop operation

1. Select a signal in the Containment tree.

2. Drag the selected signal to a desired message.

To assign a signal to a message via the message Specification window

1. Draw a send message between two lifelines or select an existing one on a diagram pane.
2. Open the message Specification window (see the procedure "To open the corresponding Specification window" on page 221).
3. Click the **Signature (signal)** property value cell and then select a signal in the drop-down list.

Creating signal receptions for messages

Assigning a signal reception to a message is very similar to the procedure of assigning an operation to a message.

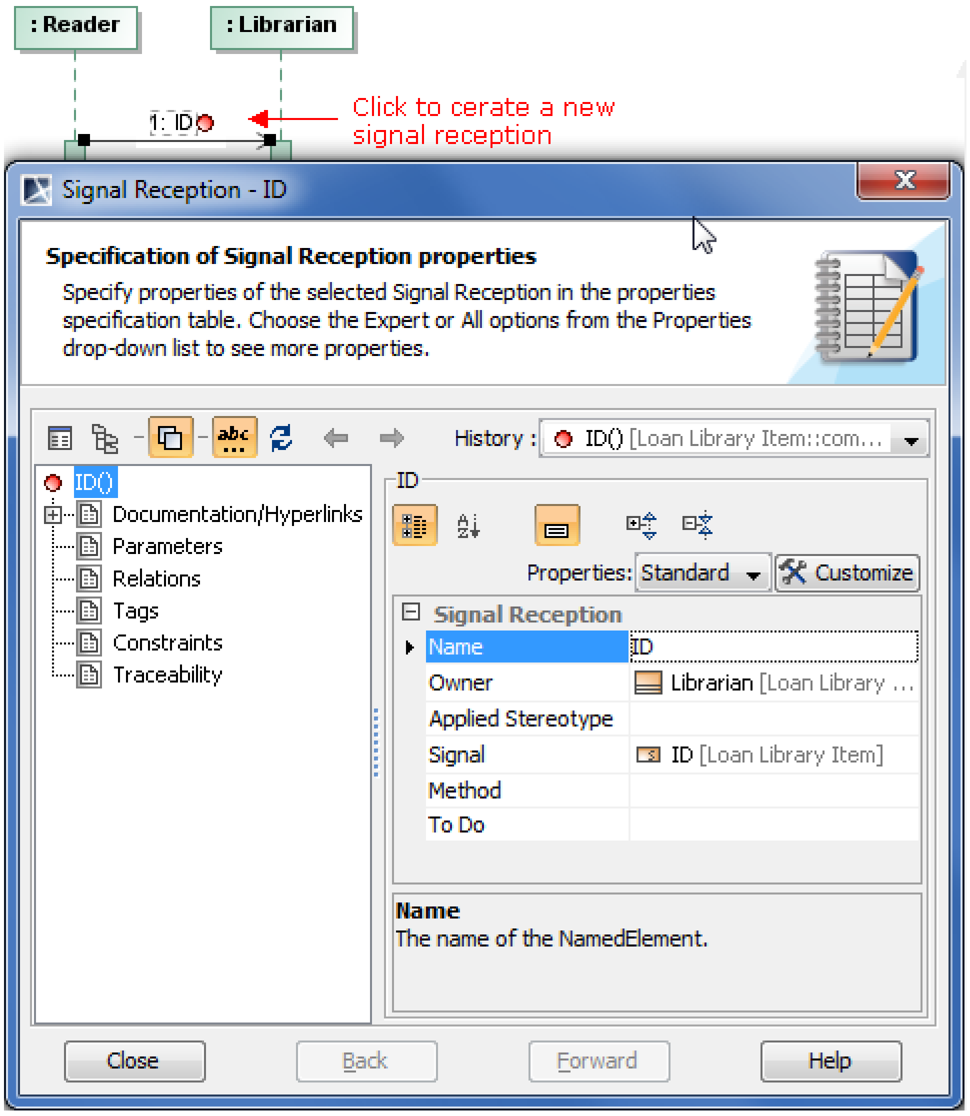
IMPORTANT! There are two conditions that must be satisfied when creating a new signal reception. They are as follows:

- At least one signal must exist in your project.
- A possible signal reception receiver (an activation to which the message points) must have a type assigned.

To create a new signal reception for the message

1. Draw a send message between the lifelines or select an existing one on a diagram pane.
2. Assign a signal to the message (see the procedure "To assign a signal to a message using a drag-and-drop operation" on page 712).
3. Do one of the following:
   - Click the button in the shape of a small red circle at the end of the message name (see the following figure). Define signal reception property values in the signal

reception Specification window. The default name of the signal reception is the name of the message for which the signal reception is being created.



Signal Reception - ID

Specification of Signal Reception properties

Specify properties of the selected Signal Reception in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : ID() [Loan Library Item::com...

Signal Reception

Name	ID
Owner	Librarian [Loan Library ...
Applied Stereotype	
Signal	ID [Loan Library Item]
Method	
To Do	

Name
The name of the NamedElement.

- From the message shortcut menu, select the **Create New Signal Reception** (the command with the icon representing a small red circle). Define signal reception property values in the signal reception Specification window.The default name of the signal reception is the name of the message for which the signal reception is being created.

Messages in Sequence and Time Diagrams

Messages allow for displaying an interaction between objects. A message is labeled with either the message name or the assigned operation (signal) name and its arguments.

Related sections

Message

Sequence Diagram

Creating nested activation

Nested activations allow you to model:

- A parallel execution of operations that belong to a single class.
- Callback messages.

The nested activation can be created between at least two messages that point to the same activation.

Nested activations can be created for the following message sorts:

1. Synchronous Call Message (synchCall)
2. Asynchronous Call Message (asynchCall)
3. Asynchronous Signal Message (asynchSignal)

To create a nested activation

NOTE	Be sure, you have at least two messages pointing to the same activation in your model.

1. Select any subsequent message.
2. Do one of the following:
    - From the message shortcut menu, select **Create Nested Activation**.
    - On the message Smart Manipulator toolbar, click the Create Nested Activation button.

The message will be connected to the nested activation.

To merge a nested activation with a parent activation

1. Select a message that has a nested activation.
2. Do one of the following:
    - From the message shortcut menu, select **Reduce Nesting Level**.
    - On the message Smart Manipulator toolbar, click the Reduce Nested Activation button.

The message will be connected to the parent activation.

Nested activations can be used in the following cases:

- To model parallel executions for a non-active lifeline
- To model parallel executions for an active lifeline
- To model a callback message

To model parallel executions for a non-active lifeline

NOTE	A non-active lifeline is the one that has a non-active class as a type assigned. The non-active class is the one whose Is Active property is set to false. This property is available in the Expert mode.

This is the case of creating a simple nested activation, described in the procedure "To create a nested activation" on page 715.

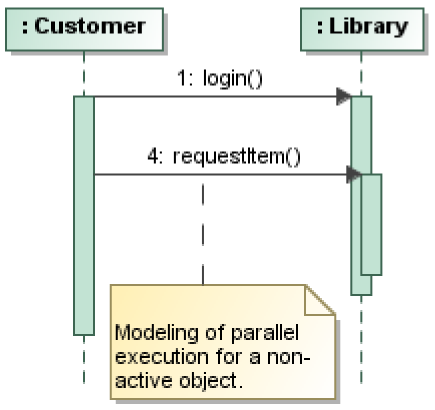


Figure 456 -- Parallel executions for non-active object

To model parallel executions for an active lifeline

NOTE	An active lifeline is the one that has an active class as a type assigned. The active class is the one whose Is Active property is set to true. This property is available in the Expert mode.

1. Select a lifeline and from its shortcut menu, select **Show Entire Activation**. All activations of the selected lifeline becomes all-in-one.
2. Create an outgoing message or select an existing message pointed to active object. Be sure this is not the first one for the outgoing activation.
3. From the message shortcut menu, select **Create Nested Activation**.

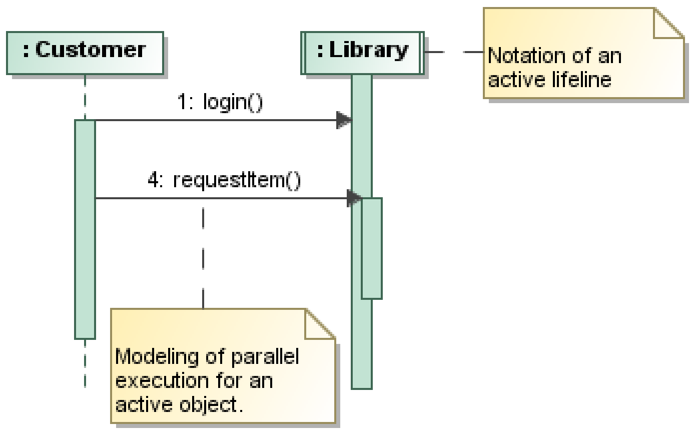

: Customer
: Library
Notation of an active lifeline
1: login()
4: requestItem()
Modeling of parallel execution for an active object.

Figure 457 -- Parallel executions for active object

To model a callback message

1. Create or select an incoming message that is modeled as a callback message.
2. From the message shortcut menu, select **Create Nested Activation**.

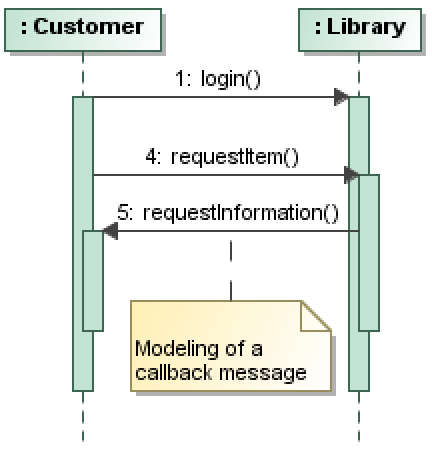


Figure 458 -- Callback messages

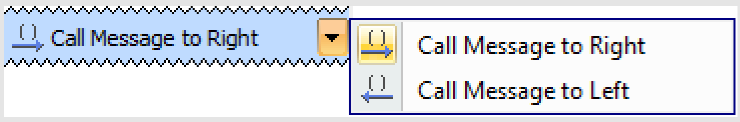
Messages in Communication Diagrams

Messages in communication diagrams can only be depicted on connectors. Therefore, you should draw a connector first and then assign a message to it.

To assign a message to a connector

1. On the diagram pallet, click the button corresponding a desired message type.
2. Click a desired connector on the diagram pane. A message arrow will be placed on the selected connector.

NOTE A message flow has two directions: right and left. Choose one of them by clicking the associated button on the diagram pallet.



To set the advanced numbering of messages

1. From the diagram shortcut menu, select **Numbering**.
2. Select the **Use Advanced Numbering**.

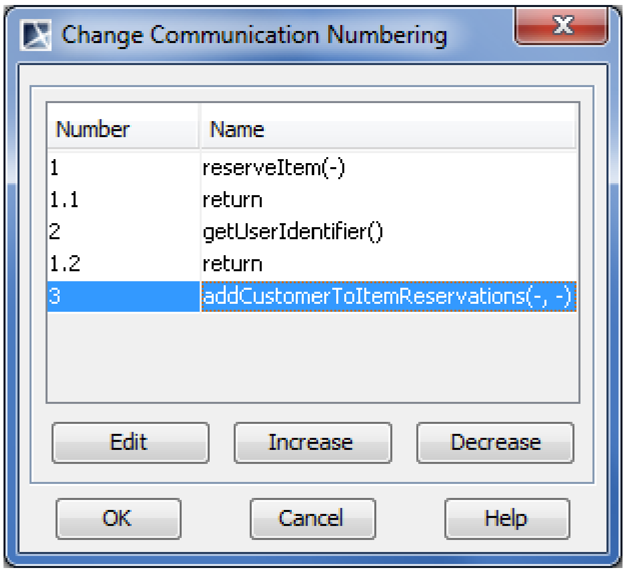
To remove the advanced numbering of messages

1. From the diagram shortcut menu, select **Numbering**.
2. Clear the **Use Advanced Numbering** selection.

To change a current message numbering

1. From the diagram shortcut menu, select **Numbering** > **Change Numbering**.

2. Increase, decrease, and / or change the level of numbering in the **Change Communication Numbering** dialog.



Number	Name
1	reserveItem(-)
1.1	return
2	getUserIdentifier()
1.2	return
3	addCustomerToItemReservations(-, -)

Figure 459 -- Change Communication Numbering dialog

Column	Description
Number	Message number.
Name	Message name.

Button	Description
Edit	Opens the **Type Number** dialog. Type the number of the message. **NOTE:** If the **Edit** button is inactive, remove the automatic advanced numbering of messages (see the procedure "To remove the advanced numbering of messages" on page 717).
Increase	Increases the selected number by one.
Decrease	Decreases the selected number by one.

Activators and predecessors

The predecessor denotes the set of messages. The completion of these messages enables the execution of the current message. The meaning of the predecessor is that the execution of a message is not enabled until all of the communications of which the sequence numbers appeared in the list have occurred. Therefore, the list of predecessors represents a synchronization of threads. The message corresponding to the numerically preceding sequence number is an implicit predecessor and does not need to be explicitly listed.

All of the sequence numbers with the same prefix form a sequence. The numerical predecessor is the one in which the final term is one less. That is, number 6.4 is the predecessor of 6.5, where the number "6" is an activator (see example in the following figure).

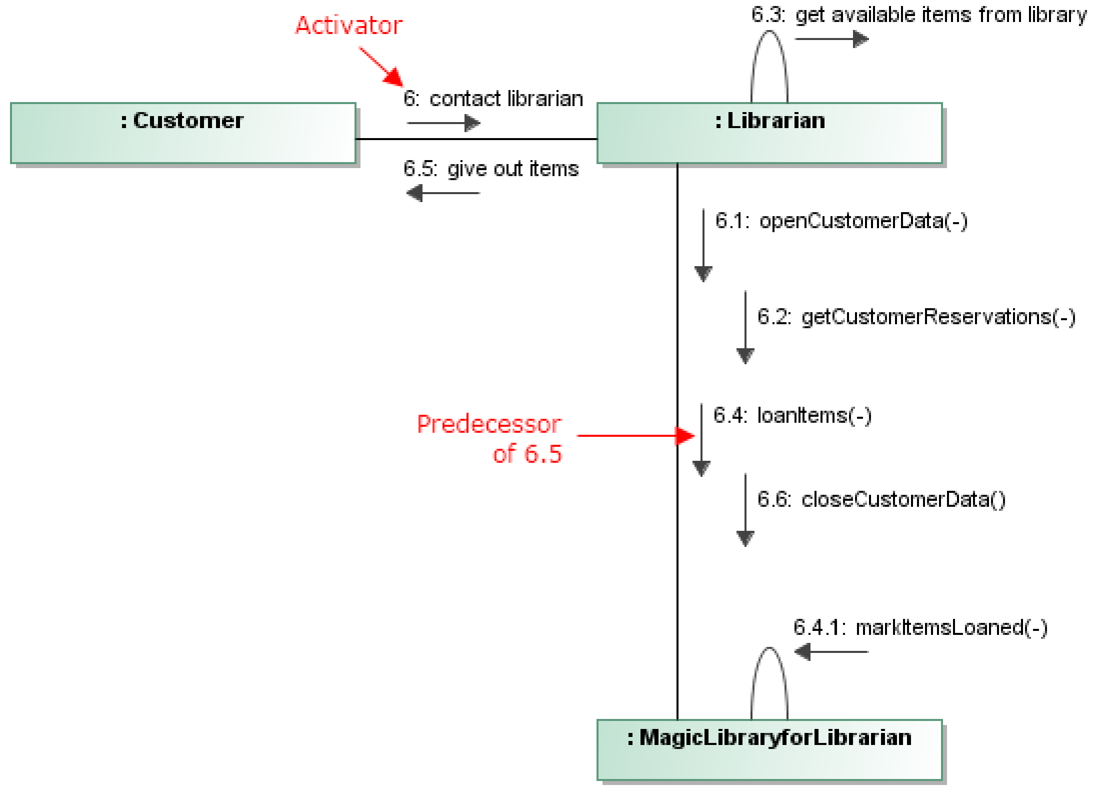


Figure 460 -- Message numbering with activators and predecessors

To show predecessors beside the message number

NOTE Make sure the **Use Advanced Numbering** is selected (see the procedure "To set the advanced numbering of messages" on page 717).

Do one of the following:

- From the message shortcut menu, select **Show Predecessors**.
- In the message **Symbol(s) Properties** dialog, set **Show Predecessors** to *true*.

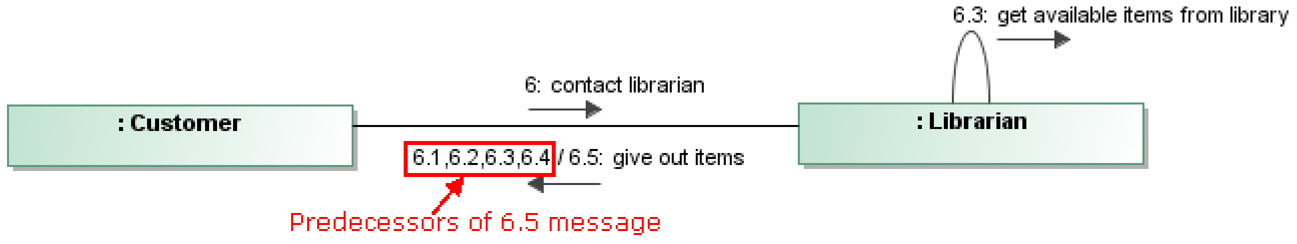

6.3: get available items from library
6: contact librarian
: Customer
: Librarian
6.1,6.2,6.3,6.4 / 6.5: give out items
Predecessors of 6.5 message

Figure 461 -- Predecessors displayed beside message number

To change an activator number of messages

NOTE Make sure the **Use Advanced Numbering** is selected (see the procedure "To set the advanced numbering of messages" on page 717).

1. From the message shortcut menu, select **Activator**.

2. Select the activator that you want to assign to the selected message. Numbering of the selected message and subsequent messages decreases by one level. The first level number is the number of an activator message (see the following figure).

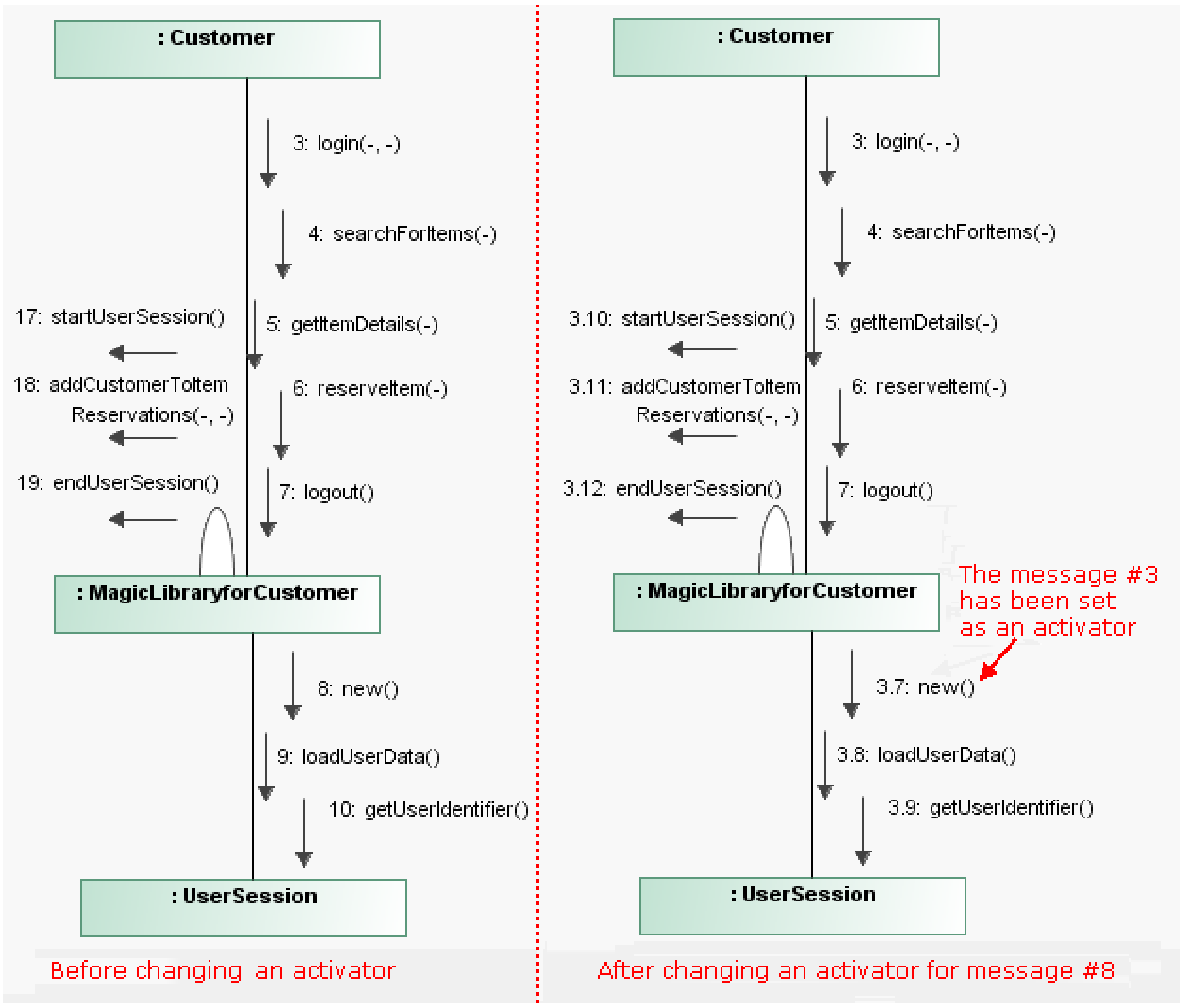


Figure 462 -- Changing activator

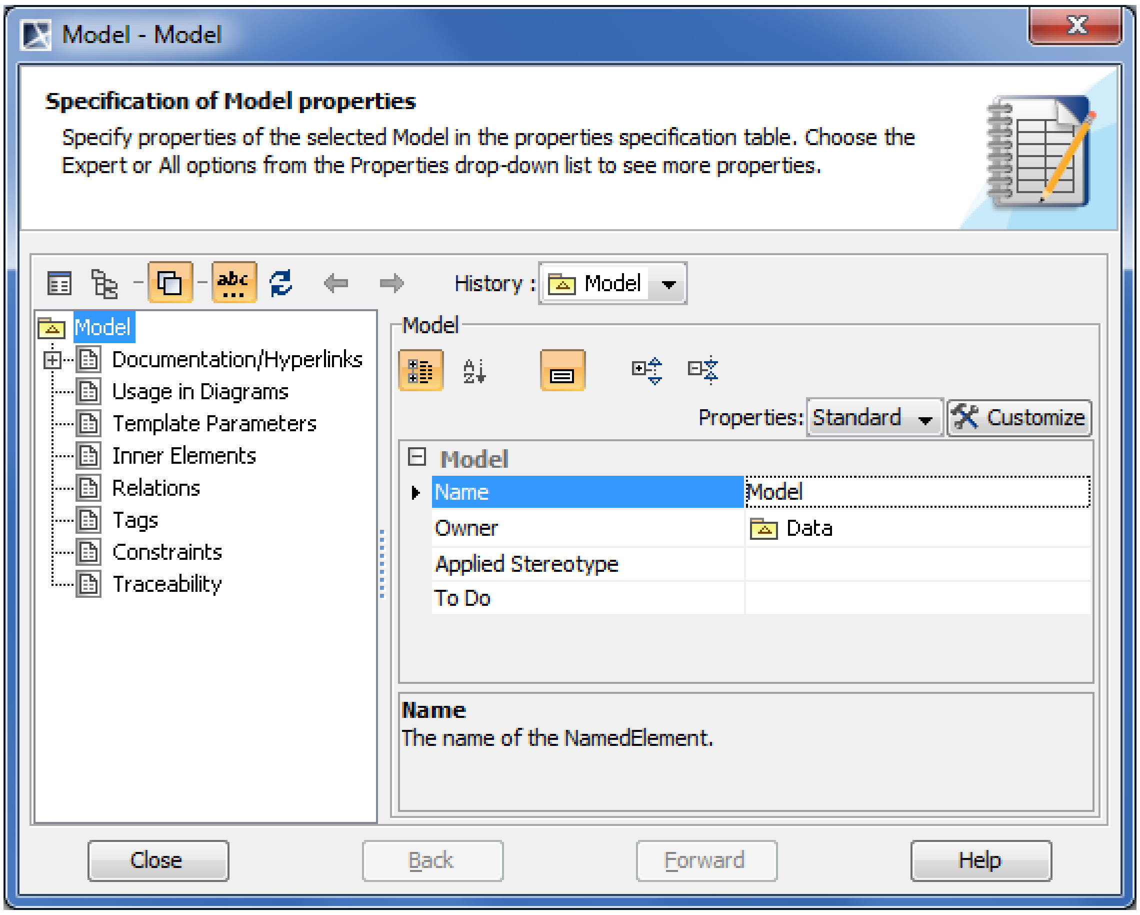
IMPORTANT! If you change the activator number to a predecessor message, this number will change for subsequent predecessors.

Model

A model contains a (hierarchical) set of elements that together describe the physical system being modeled. It may also contain a set of elements that represents the environment of the system, typically Actors together with their interrelationships, such as Associations and Dependencies.

A model is presented as a package with a small triangle in the upper right corner of the large rectangle. The triangle can be shown in the tab.

The model is defined as a package, that is, it has package properties in the **Model** Specification window. For a detailed description of packages, see Section “Package” on page 732.



Specification of Model properties

Specify properties of the selected Model in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

- Model
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Template Parameters
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability

Properties: Standard

Model	
Name	Model
Owner	Data
Applied Stereotype	
To Do	

Name
The name of the NamedElement.

Figure 463 -- Model Specification dialog box

For information about the specification properties not covered in this section, refer to "Specification Window" on page 219.

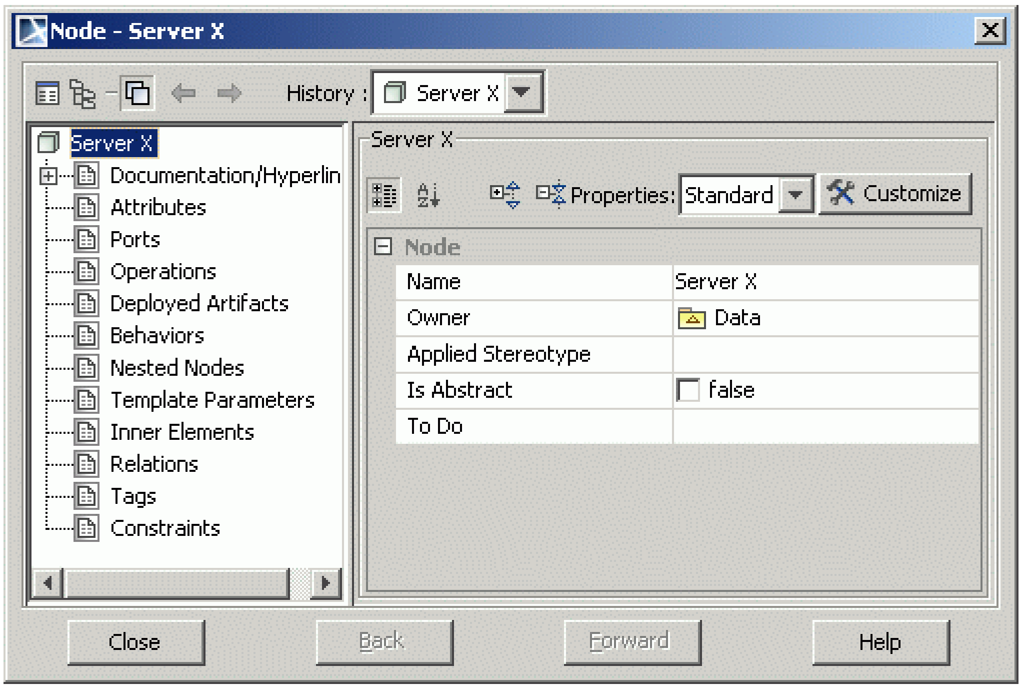
Node

Any computer or device that is relevant to the implemented system can be shown as a node. The node is drawn as a three-dimensional cube with a name inside it. Devices in a system are typically represented with a stereotype that specifies the device type. The nodes can be represented as types and as instances.

It is shown as a figure that looks like a 3-dimensional view of a cube.

For more information about working with symbols, see "Diagramming" page 149.

Define the selected node in the **Node Specification** dialog box.



Node

Name	Server X
Owner	Data
Applied Stereotype	
Is Abstract	false
To Do	

Figure 464 -- Node Specification dialog box

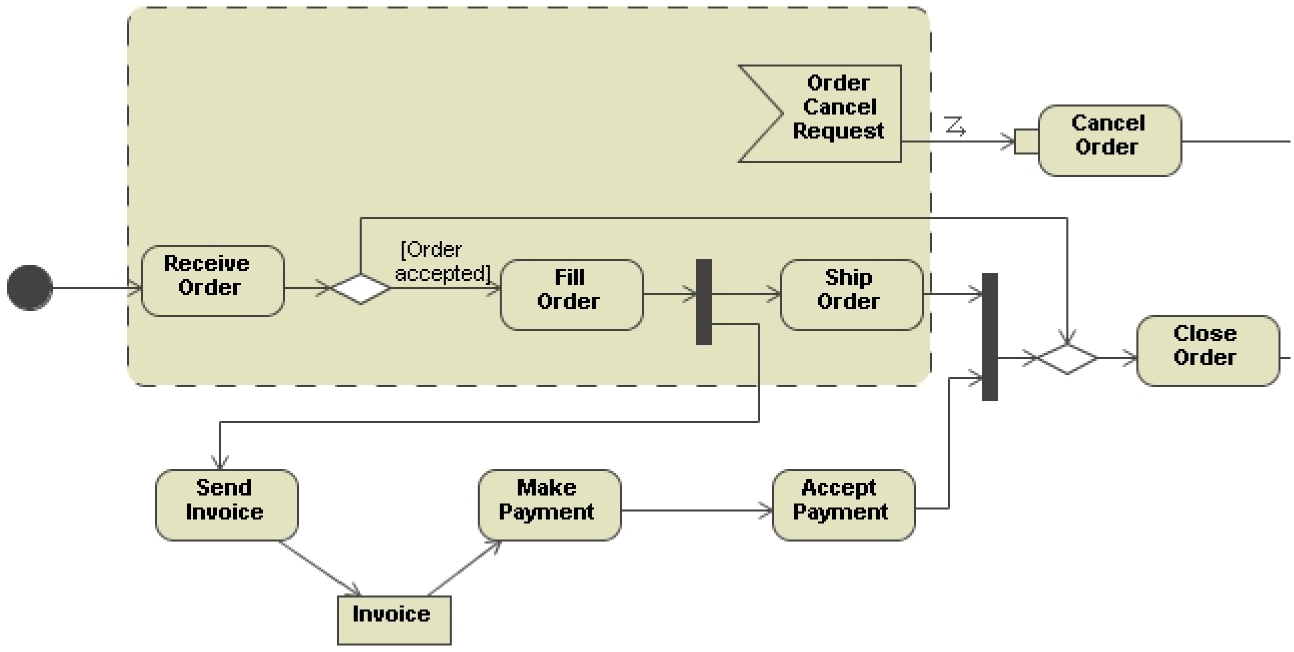
Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
Ports	**Name**	Name of the port.
	Type	Type, assigned to the port.
	Provided	The provided classifier is displayed.
	Required	The required classifier is displayed.
	Classifier	The name of classifier, owning a port.
	Create	Create a new port.
	Delete	Remove an existing port from the node.
Deployed Artifacts	**Name**	Name of the deployed artifact.
	Type	Type of the item - artifact.
	Add	Add an artifact to the list.
	Remove	Remove an artifact from the list.
Behaviors	**Name**	Name of the behaviors.
	Type	Type, assigned to the behavior.
	Create	Select an item from the list - activity, interaction, and state machine.
	Delete	Remove a behavior from the class.

Tab name	Box	Function
Nested Nodes	**Name**	Name of the nested node.
	Type	Type of the classifier (class, interface, etc.).
		Click button to open the classifier **Specification** dialog box.
	Create	Select a node, device, or execution environment from the list. The element **Specification** dialog box opens.
	Remove	Remove a node from the list.
Inner Elements Add another element to a node.	**Name**	The model element name.
	Type	The model element type.
	Create	Select an element from the list. The corresponding Specification window opens. Define the selected model element in the dialog box.
	Delete	Remove the selected model element from the node.

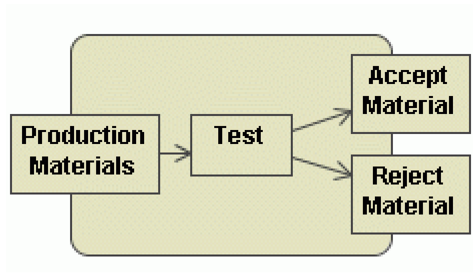
Structured activity node

A structured activity node is an executable activity node that may have an expansion into the subordinate nodes. It represents a structured portion of the activity that is not shared with any other structured node, except for nesting.



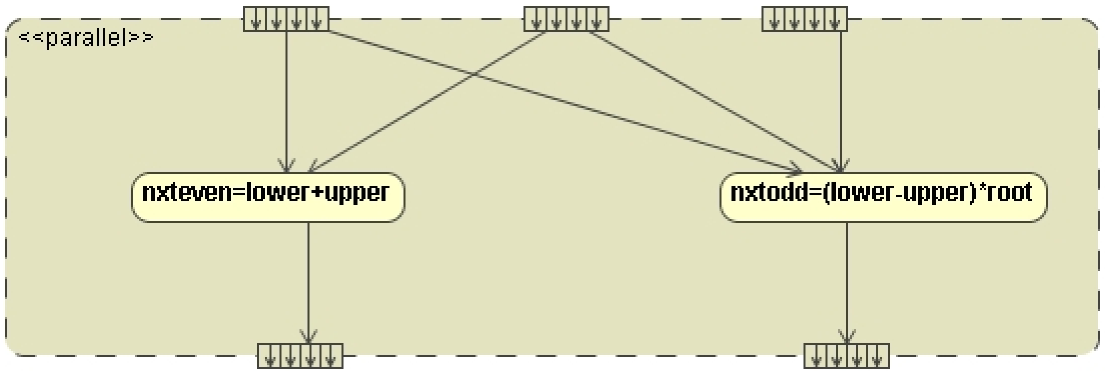
Activity parameter node

It is an object node for inputs and outputs to activities. The activity parameters are object nodes at the beginning and end of the flows, to accept inputs to an activity and provide outputs from it.



Expansion Region and Expansion Nodes

The Expansion Region and Expansion Nodes may be drawn in the activity diagram (the Input and Output Expansion Nodes may be found in the diagram toolbar Object Node button group):

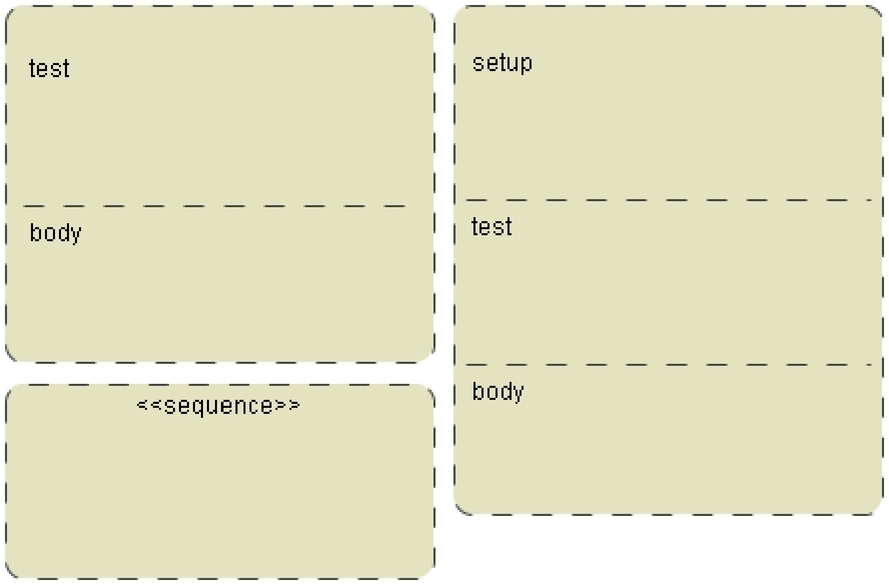


If, Loop and Sequence Conditional Nodes

A conditional node is a structured activity node that represents an exclusive choice among some number of alternatives.

A sequence node is a structured activity node that executes its actions in order.

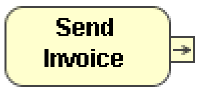
A loop node is a structured activity node that represents a loop with the setup, test, and body sections.



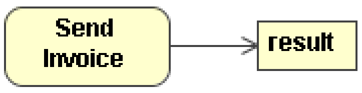
Object

To convert a pin to an object

1. Draw an Input, Output, or Value Pin on the Action:



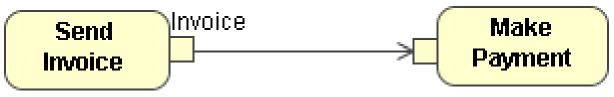
2. Select an Output, Input or Value Pin on the diagram pane and from its shortcut menu select **Convert to Object**. The Pin is converted to an Object:



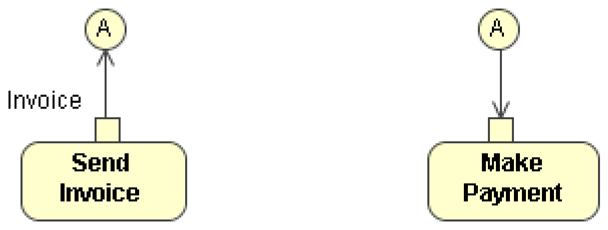
Object Flow

To split an Object Flow

1. Draw an Object Flow relation between two Actions.



2. From the Object Flow shortcut menu, select the **Split Object Flow** command.

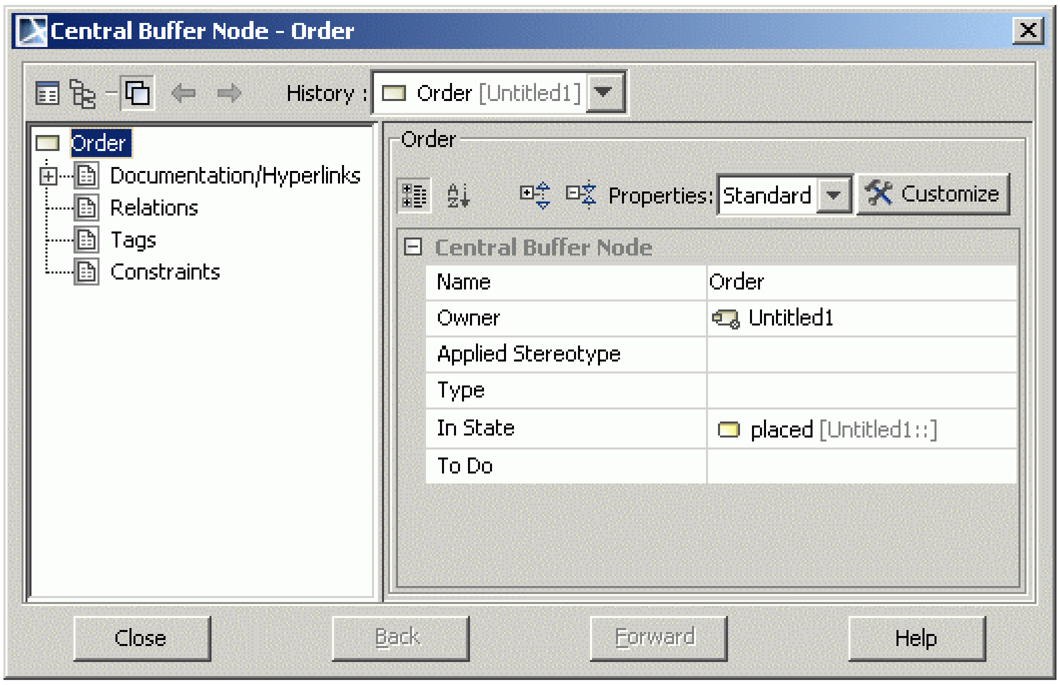


Object Node

An object node is an activity node that indicates an instance of a particular classifier, possibly in a particular state, may be available at a particular point in the activity. It can be used in a variety of ways, depending on where the objects are flowing from and to, as described in the semantics section.

For more information about working with symbols, see "Diagramming" page 149.

Define the selected object node in the **Central Buffer Node Specification** dialog box.


Central Buffer Node - Order

History : Order [Untitled1]

Order
Documentation/Hyperlinks
Relations
Tags
Constraints

Order

Properties: Standard
Customize

Central Buffer Node

Name	Order
Owner	Untitled1
Applied Stereotype	
Type	
In State	placed [Untitled1::]
To Do	

Figure 465 -- Central Buffer Node Specification dialog box

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General Set a general information about the object node	**Type**	A list of classifiers. Select a classifier you wish to assign to an object node shape. Click the "…" button to open the **Select Element** dialog box for selecting the type from the elements tree.

Tab name	Box name	Function
	In State	Click the "..." button to assign an existing final state or state from the model in the **Select Elements** dialog box, or click **Create** for defining a new one.

To set a classifier to an object node

1. Double-click the object node or select **Specification** from the shape shortcut menu. The **Central Buffer Node Specification** dialog box opens.
2. Select a classifier you wish to assign to an object node from the **Type** drop-down list.

To assign a state or final state to an object node

1. Click the **"..."** button in the **Central Buffer Node Specification** dialog box, **In State** field. The **Select Elements** dialog box opens.
2. Select a state from the existing model elements, or click **Create**. The **State Specification** dialog box opens. Specify a new state, which will be assigned to an object node.

Opaque Behavior

A behavior with implementation-specific semantics. The Opaque Behavior is introduced for implementation-specific behavior or for use as a place-holder before one of the other behaviors is chosen.

To create a new Opaque Behavior:

1. In the Browser, select a package.
2. From the package shortcut menu, select **New Element** and then **Opaque Behavior**. Enter the name for a newly created element.

To create an Opaque Behavior symbol

Drag and drop the selected Opaque Behavior element from the Browser tree on the Diagram pane.

Operation

Entries in the operation compartment are strings that show the operations defined on classes as well as those that are supplied by the classes. An operation is a service that can be requested to perform by an instance of the class. It has a name and a list of arguments.

Usually class attributes are accessed through the operations. The operations are used to perform specific actions, such as system calls, utility functions, and queries. The operation signature provides all information needed to use that operation.

To create a new operation

- Double-click the selected class or select **Specification** from the class shortcut menu. The **Class Specification** dialog box opens. Click the **Operations** tab and then click the **Create** button. The **Operation Specification** dialog box opens. Define a new operation and click **OK**.

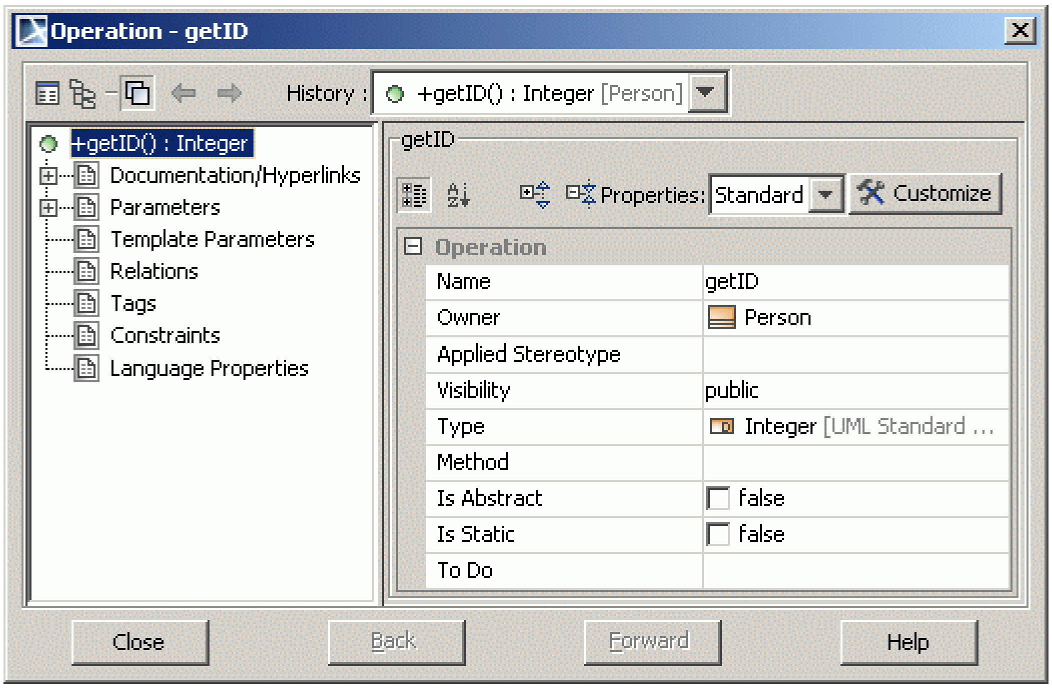
- Select **Insert New Operation** from the class shortcut menu. Type an operation name directly on the class shape.
- In the Browser tree, select an already created class. From the class item shortcut menu, choose **New** and then **Operation**.
- Select a class shape, press CTRL+ALT+O shortcut key and type the operation name on the Diagram pane.
- Select the class shape and click the small green **Insert New Operation** smart manipulation button.

Define an operation in the **Operation Specification** dialog box.

To open the **Operation Specification** dialog box

1. Double-click the class /actor or select **Specification** from the class/actor shortcut menu. The **Class Specification** / **Actor Specification** dialog box opens.
2. Click the **Operations** tab. Double-click the desired operation in the tree, or click the **Create** button. The **Operation Specification** dialog box opens.

- Double-click an operation on the Diagram pane or in the Browser.


Operation - getID

History : +getID() : Integer [Person]

- +getID() : Integer
  - Documentation/Hyperlinks
  - Parameters
  - Template Parameters
  - Relations
  - Tags
  - Constraints
  - Language Properties

getID

Properties: Standard

Operation

Name	getID
Owner	Person
Applied Stereotype	
Visibility	public
Type	Integer [UML Standard ...
Method	
Is Abstract	false
Is Static	false
To Do	

Figure 466 -- Operation Specification dialog box

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set a general information for the operation	**Owner**	Shows a class, which contains the current operation. The value of the **Owner** field cannot be changed. It is automatically defined when an operation is created.
	Type	Shows an operation type. It can be another project class or primitive type such as int or double. Select the type from the list or create a new one by clicking “**...**” button.
	Method	Click the “...” button to open the **Select Elements** dialog box. The Activity, Interaction, or State Machine elements can be assigned from the model.

Tab name	Box	Function
Parameters A parameter is an unbound variable that can be changed, passed, or returned.	**Name**	Shows the parameter name.
	Type	Shows the parameter type. It can be a classifier or a data type.
	Default Value	An expression whose evaluation yields a value to be used when no argument (operation) is supplied for the parameter.
	Direction	Specifies what kind of parameter is required: ● **return** - return parameter. ● **in** - an input parameter (may not be modified). ● **out** - an output parameter (can be modified to communicate information to the caller). ● **inOut** - an input parameter that can be modified.
	Up	Move the list up.
	Down	Move the list down.
	Create	The **Parameter Specification** dialog box opens.
	Delete	Removes the parameter.

To change an operation name

1. Click the operation in the selected class on the diagram pane or in the Browser tree.
2. Type a new name.

- Change an operation name in the **Operation Specification** dialog box.

To define the type of an operation

- In the **Operation Specification** dialog box, the **Type** drop-down list box, select the operation type.
- Type a colon ":" and the name of the operation type just after the operation name on the diagram pane. If you specify a nonexistent type of an operation, a new class is created.

To edit / add an operation parameter

1. Open the **Operation Specification** dialog box.
2. Click the **Parameters** tab.
3. Double click on the existing parameter name in the expanded tree or click the **Create** button. The **Parameter Specification** dialog box opens.

- Type a parameter text (in parenthesis) directly on a diagram.
- Select an operation in the Browser tree, select **New** from its shortcut menu and select **Parameter**. The **Parameter Specification** dialog box opens.

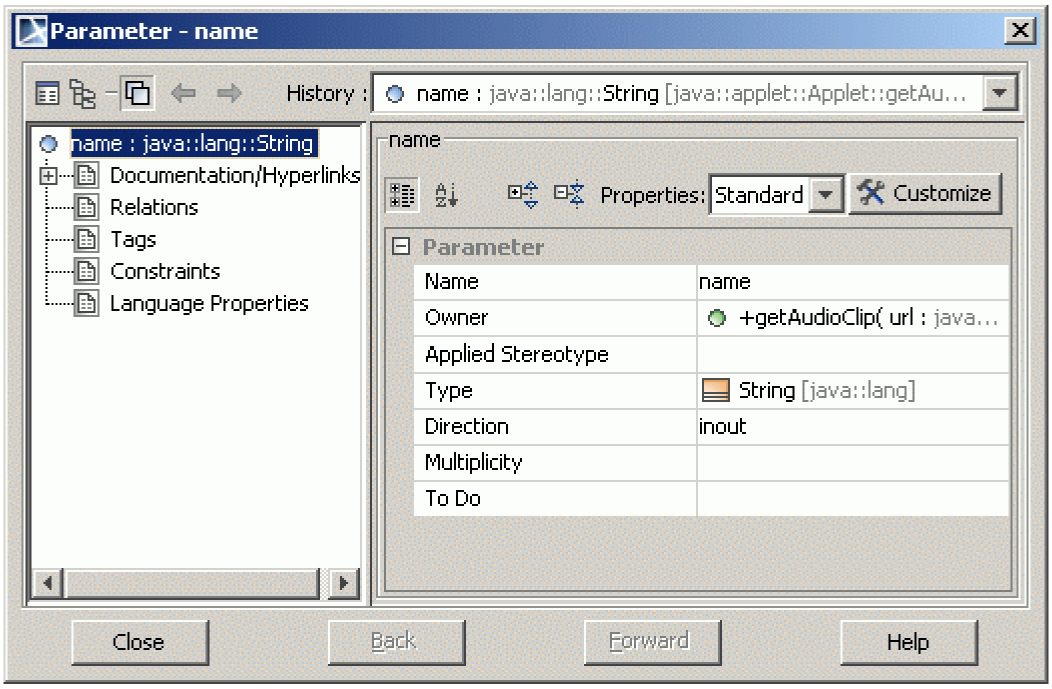
The Parameter Specification dialog box

The **Parameter Specification** dialog box defines an operation argument.

To open the **Parameter Specification** dialog box

1. Open the **Operation Specification** dialog box.

2. Click the **Parameters** tab, expand tree, and then double-click the desired parameter. Or click the **Create** button.



Parameter	
Name	name
Owner	+getAudioClip(url : java...
Applied Stereotype	
Type	String [java::lang]
Direction	inout
Multiplicity	
To Do	

Figure 467 -- Parameter Specification dialog box

Click the **Show Expert Properties** button for showing more properties of the parameter.

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set general information about the parameter	**Owner**	The name of the operation, which contains the parameter.
	Type	Shows the parameter type. It can be a classifier or a data type. Select a type from the list or create a new one by clicking the “**...**” button.
	Type Modifier	Additional information about the type. • **&** - a parameter is a reference to other model element. • ***** - a parameter is a pointer to other model element. • **[]** - a parameter is a an array of other model elements.
	Default Value	An expression whose evaluation yields a value to be used when no argument (operation) is supplied for the parameter.
	Direction	Select the direction kind: • **return** - return parameter. • **in** - an input parameter (may not be modified). • **out** - an output parameter (can be modified to communicate information to the caller). • **InOut** - an input parameter that can be modified.

To add additional information about the return type of an operation

1. Open the **Operation Specification** dialog box.

2. Click the **Show Expert Properties** button. More properties for the operation show.
3. Select a sign from the **Type Modifier** drop-down list box:
    - & - one class has a reference to other model element.
    - * - one class has a pointer to other model element.
    - [] - one class has an array of other model elements.

An operation can be defined as:

Name	Function
Is Abstract	The operation does not have an implementation, and one must be supplied by a descendant.
Is Static	This operation scope means that the values returned by the parameter have no duplicates.
Is Query	The operation does not change the state of the system.

To define an operation as abstract, static, or query

1. Open the **Operation Specification** dialog box.
2. Select the **Expert** mode from the **Properties** field. More properties for the operation show.
3. Select the Is **Abstract**, **Is Static**, and/or **Is Query** check box(es) in the **General** tab.

To set the operation visibility

Visibility name	Function
Public '+'	The operation can be accessed by any other object from the outside.
Package '~'	The operation can be accessed by an element from the same package.
Private '-'	The operation can be accessed only from that class.
Protected '#'	The operation can be accessed from the inside of that class and the classes derived from that class.

1. Open the **Operation Specification** dialog box.
2. From the **Visibility** drop-down list box, select **Public**, **Package**, **Private**, or **Protected**.

NOTE	The operation visibility is shown in the operation signature.

To set an operation Concurrency: sequential, guarded or concurrent

Name	Function
Sequential	The callers must coordinate, so that only one call to an Instance (on any sequential Operation) is made at a time. If simultaneous calls occur, then the semantics and the integrity of the system can not be guaranteed.
Guarded	Multiple calls from concurrent threads may occur simultaneously to one Instance (on any guarded Operation), but only one is allowed to commence. The others are blocked until the performance of the first Operation is complete. It is the responsibility of the system designer to ensure that deadlocks do not occur due to simultaneous blocks. The Guarded Operations must perform correctly (or block themselves) in case a simultaneous sequential Operation or guarded semantics cannot be claimed.
Concurrent	Multiple calls from concurrent threads may occur simultaneously to one Instance (on any concurrent Operation). All of them may proceed concurrently with correct semantics. The Concurrent Operations must perform correctly in case a simultaneous sequential or the guarded Operation, or concurrent semantics cannot be claimed.

1. Open the **Operation Specification** dialog box.
2. Select the **Expert** mode from the **Properties** field. More properties for the operation show.
3. Select the concurrency type in the **Concurrency** drop-down list box.

Package

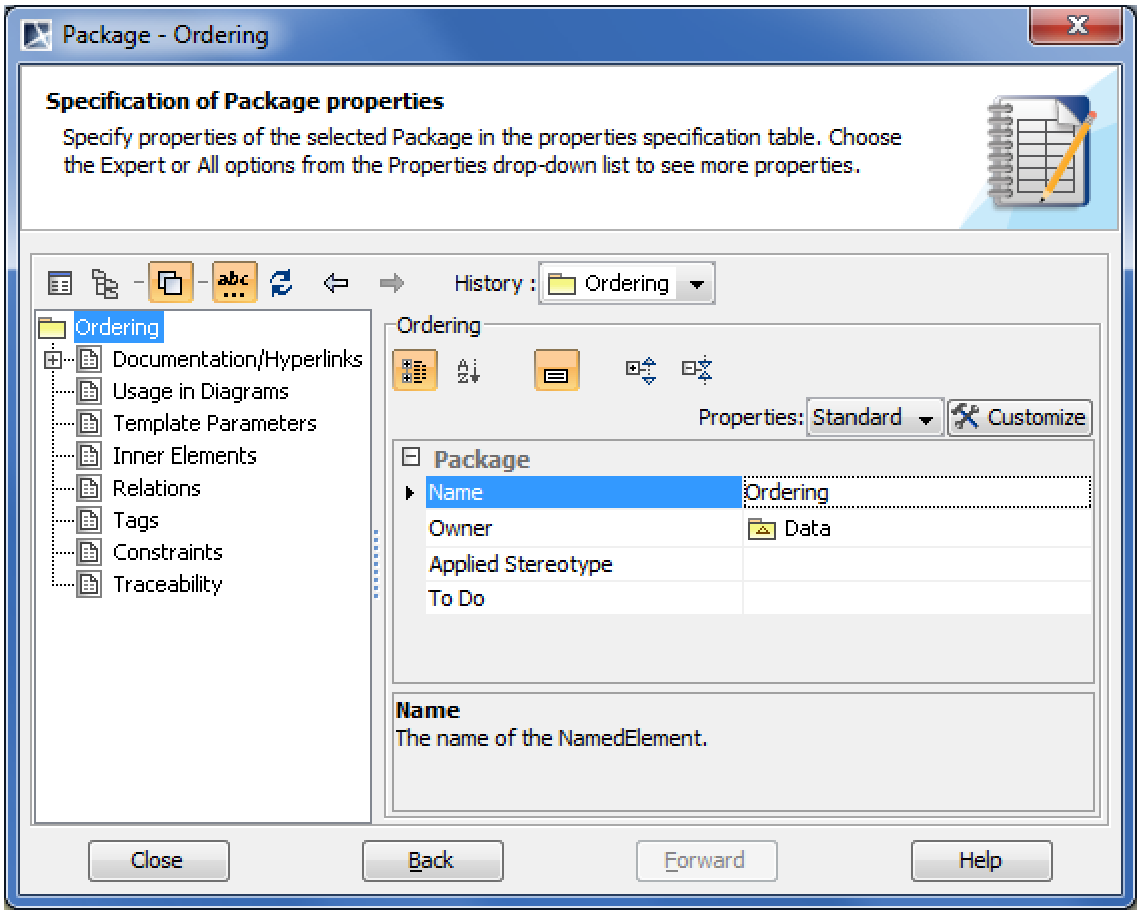
A package groups classes and other model elements together. All types of UML model elements can be organized into packages. Each diagram must be owned by one package and the packages themselves can be nested within other packages. Subsystems and models are special kinds of packages.

The packages may have dependency, generalization, realize, containment, and association relationships. These relationships are usually derived from the relationships between the classes inside those packages.

Working with packages

For more information about working with symbols, see "Diagramming" on page 149.

Define the selected package in the **Package** Specification window.



Package - Ordering

Specification of Package properties

Specify properties of the selected Package in the properties specification table. Choose the Expert or All options from the Properties drop-down list to see more properties.

History : Ordering

- Ordering
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Template Parameters
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability

Ordering

Properties: Standard | Customize

Package	
Name	Ordering
Owner	Data
Applied Stereotype	
To Do	

Name
The name of the NamedElement.

Figure 468 -- Package Specification window

For more information about properties not covered in this section, refer to "Specification Window" on page 219.

To add inner elements to the selected package

1. Open the **Package** Specification window.
2. Click the **Inner Elements** tab.
3. Click the **Create** button, and then select an element you wish to add.
4. The selected element Specification window will open. If you selected a diagram, the **Diagram** Specification window will open.
5. Define properties you need and click **Back** to return to **Package** Specification window.

To change the package header (name, stereotypes, tagged values, and constraints) position

- From the package shortcut menu, select **Header Position:**
  - Select **Top** to place a package header at the top of a package shape.
  - Select **In Tab** to place a package header in a package tab.
- Open **Symbol(s) Properties** dialog:
  - Set the **Header Position** property to **Top** to place a package header at the top of a package shape.

- Set the **Header Position** property to **In Tab** to place a package header in a package tab.

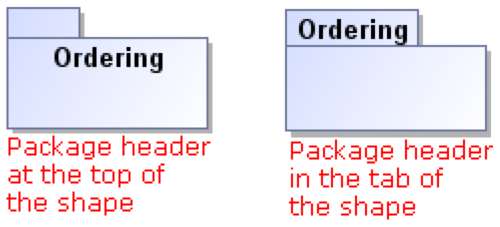

Ordering
Package header at the top of the shape
Ordering
Package header in the tab of the shape

Figure 469 -- Position of a package header

To show the list of elements assigned to a package on the package shape

1. Open the package shortcut menu.
2. Select **Show Inner Elements List**.

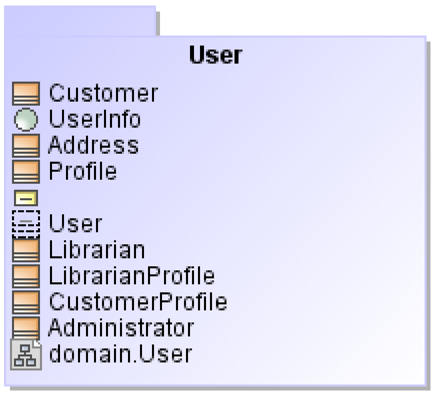
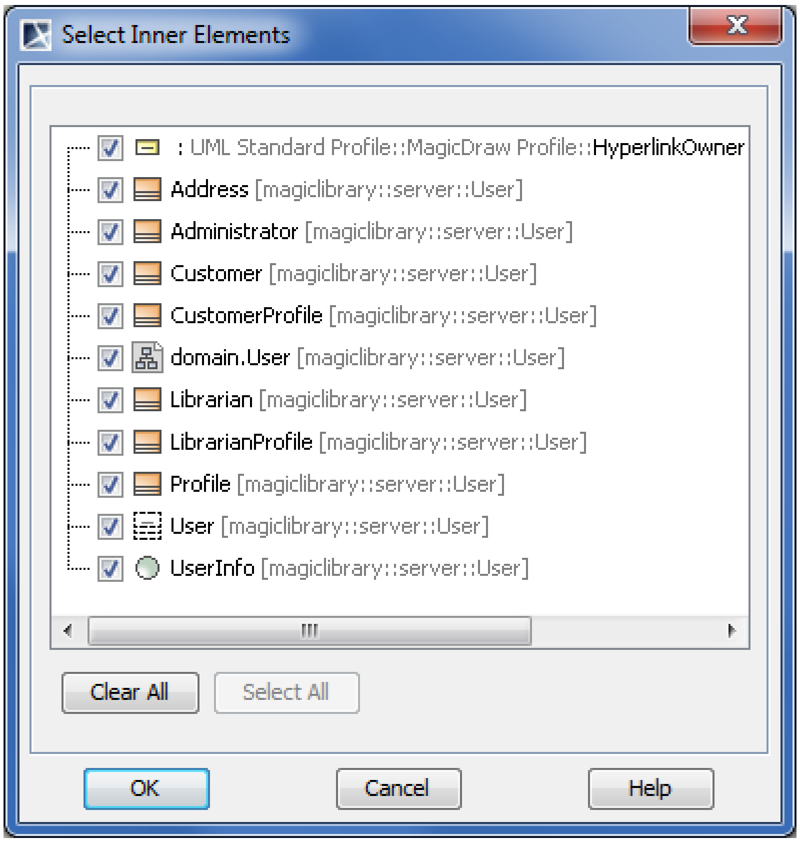


Figure 470 -- Package inner elements displayed in a package shape

To display inner elements of the package in a diagram:

1. Right-click a package in a diagram to open the package shortcut menu.
2. Select **Related Elements** > **Display Inner Elements** The **Select Inner Elements** dialog will open).

Figure 471 --


Select Inner Elements

- ☑ : UML Standard Profile::MagicDraw Profile::HyperlinkOwner
- ☑ Address [magiclibrary::server::User]
- ☑ Administrator [magiclibrary::server::User]
- ☑ Customer [magiclibrary::server::User]
- ☑ CustomerProfile [magiclibrary::server::User]
- ☑ domain.User [magiclibrary::server::User]
- ☑ Librarian [magiclibrary::server::User]
- ☑ LibrarianProfile [magiclibrary::server::User]
- ☑ Profile [magiclibrary::server::User]
- ☑ User [magiclibrary::server::User]
- ☑ UserInfo [magiclibrary::server::User]

Figure 472 -- The Select Inner Elements dialog

3. Select the elements to be displayed and click **OK**. The selected elements will be displayed in the diagram's package.

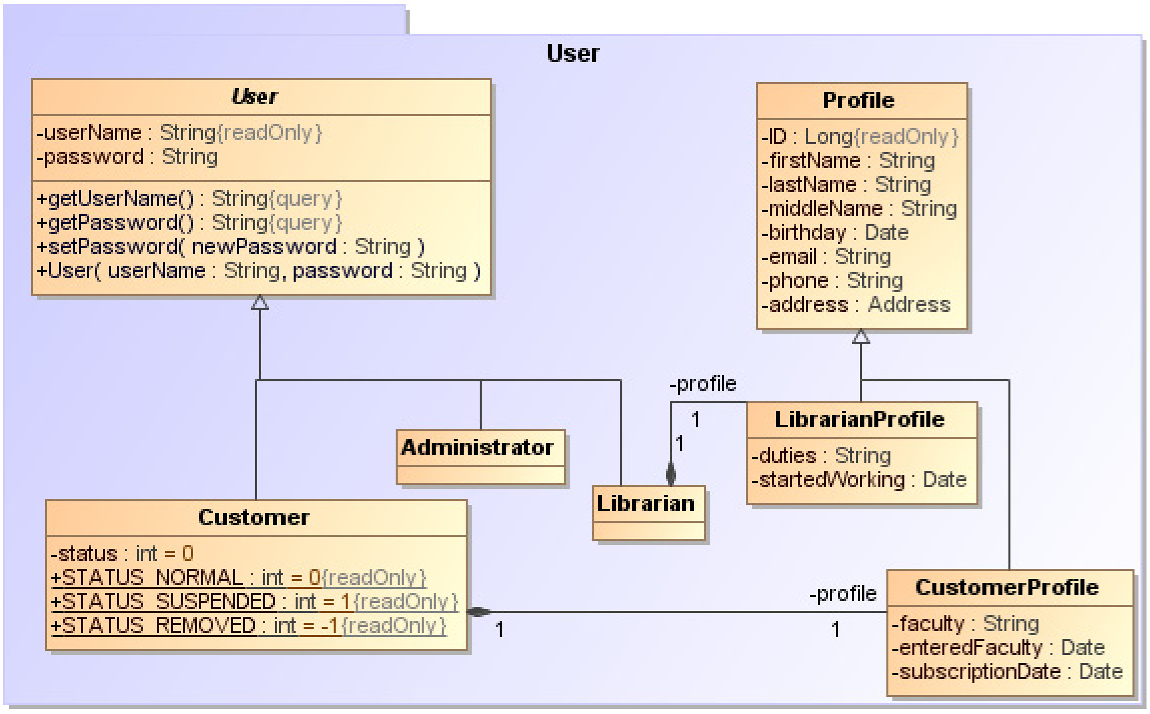


Figure 473 -- Package with inner elements displayed

Parameter

Parameters synchronization with Arguments

After you have modeled certain references between elements, arguments will be created automatically according to the parameters. Such synchronization increases modeling speed and helps to avoid invalid models.

The table below lists parameter and argument synchronizations.

	Link to synchronization description	**Parameter**	**Argument**	**Paired elements**
1	"Synchronization between Operation parameters and Behavior parameters"	Operation parameter	Behavior parameter	Parameter and parameter
2	"Synchronization between Activity parameters and Activity Parameter Nodes"	Activity parameter	Activity Parameter Node	Parameter and activity parameter node
3	"Synchronization between Operation parameters and pins on Call Operation Action"	-Operation parameter -Behavior parameter	- Pin of Call Operation Action - Pin of Call Behavior Action	Parameter and Pin
4	"Synchronization between parameters and arguments".	Interaction parameter Operation parameter	- Argument of Interaction Use - Argument of Message	Parameter and Argument
5	"Synchronization between Interaction Parameters and Lifelines"	Interaction parameter	Lifeline	Parameter and Lifeline

Created arguments have the same number, order, and name as the parameters. Some properties of the parameters are cloned to argument properties, such as name, type, direction, and multiplicity for a particular argument.

Changes made in parameters are reflected in arguments. Changes to arguments are not reflected in parameters. Exception: synchronization between Activity Parameters and Activity Parameter Node.

When synchronization case is removed, arguments created on synchronization are not removed, but synchronization between parameters and arguments is not working anymore.

For synchronization to work it should match criteria, such as number, order, or other criteria that should be the same for the parameter and argument.

To turn on/off the parameters and arguments synchronization for the whole project, select or clear the **Auto synchronize Parameters and Arguments** check box in the **Project Options** dialog box. After the synchronization is turned off, arguments will not be created and modified on parameters creation and modification. By default the **Auto synchronize Parameters and Arguments** check box is selected.

The new in MagicDraw 15.5 Active Validation functionality improves the parameters and arguments synchronization. Active Validation functionality displays unsynchronized elements on diagram pane and in Browser. You can also use the **Parameters Synchronization** dialog for automatic and manual synchronization solving. For more information about the active validation see Active Validation.

Rules of synchronization between parameters and arguments

In this section you will find information about rules for making the synchronization between parameter and argument function properly. If parameters and arguments do not match rules, they are not synchronized and no changes to arguments will be performed when parameters change.

The general rules of synchronization are:

4. The number of parameters and arguments should be the same.
5. The order of parameters should be the same as order of arguments. If the order of parameters is changed, the order of Arguments is changed too. This is valid if arguments have ordering possibility.
6. The same properties. The parameter properties should be the same as the argument properties. Such as name, type, multiplicity, direction.
7. Properties change. Change the parameter property and the argument property changes. Some of the properties are changed only the first time and after the second change the parameter property is not changed and synchronization is not performed anymore.
8. Each couple of parameters and arguments should be synchronized. If one of them is not synchronized, the other is not synchronized as well. Note that synchronization is checked in element scope.

Synchronization between Operation parameters and Behavior parameters

Synchronization between operation parameters and behavior parameters works in the following way: after you have assigned a behavior to the operation with parameters, arguments to the behavior will be created automatically.

How synchronization works

After the operation parameters have been modified, arguments change in the following way:

- Create operation parameter - argument is created and properties cloned according to the parameter properties.
- Edit operation parameter - argument properties change. Argument name changes according to parameter properties only on the first parameter name change. For example, for operation create not named parameter. Assign behavior as method to the operation. To behavior not named parameter is created. Now name the operation parameter. Behavior parameter name automatically changes to the operation parameter name. Change the operation parameter the second time. The title of behavior parameter is not changed.
- Remove operation parameter - behavior argument is removed if it does not have links or values. For example, operation parameter is synchronized with activity parameter. Activity parameter is included to other synchronization - activity parameter is synchronized with activity parameter node (see “Synchronization between Activity parameters and Activity Parameter Nodes” on page 739). In this case, after the operation parameter is removed, the activity parameter is not removed, because it has link.

Validation of Synchronization

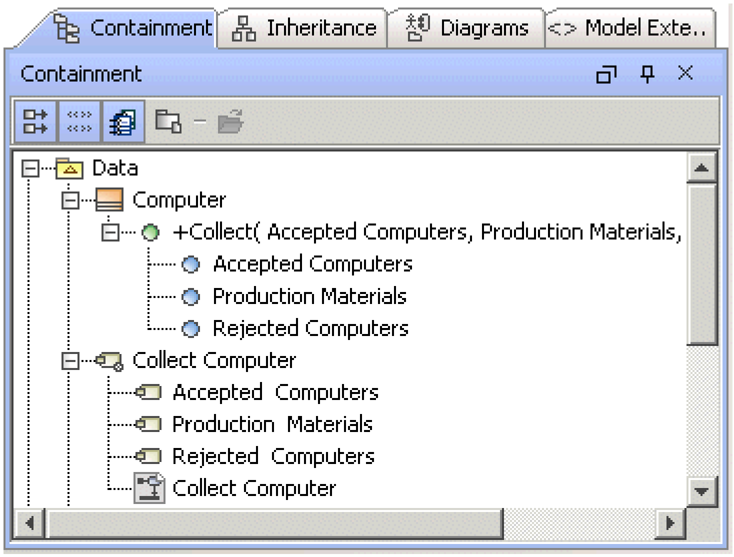
Synchronization between Parameter and Argument is valid when:

- The type is compatible. The type of parameter and behavior parameter should be compatible. This means that the type of operation parameter and the type of behavior parameter should be the same or inherited.
- The direction is the same. The direction of the operation parameter and the behavior parameter should be the same.
- The multiplicity is the same. The multiplicity of the operation parameter and the behavior parameter should be the same.

If one of the rules is not valid, operation parameters and behavior parameters will not be synchronized any-more.

Sample

1. Create a class named *Computer,* with an operation called *Collect,* and with parameters *Accepted Computers*, *Production Materials*, and *Rejected Computers*.
2. Create Activity diagram *Collect Computer.*

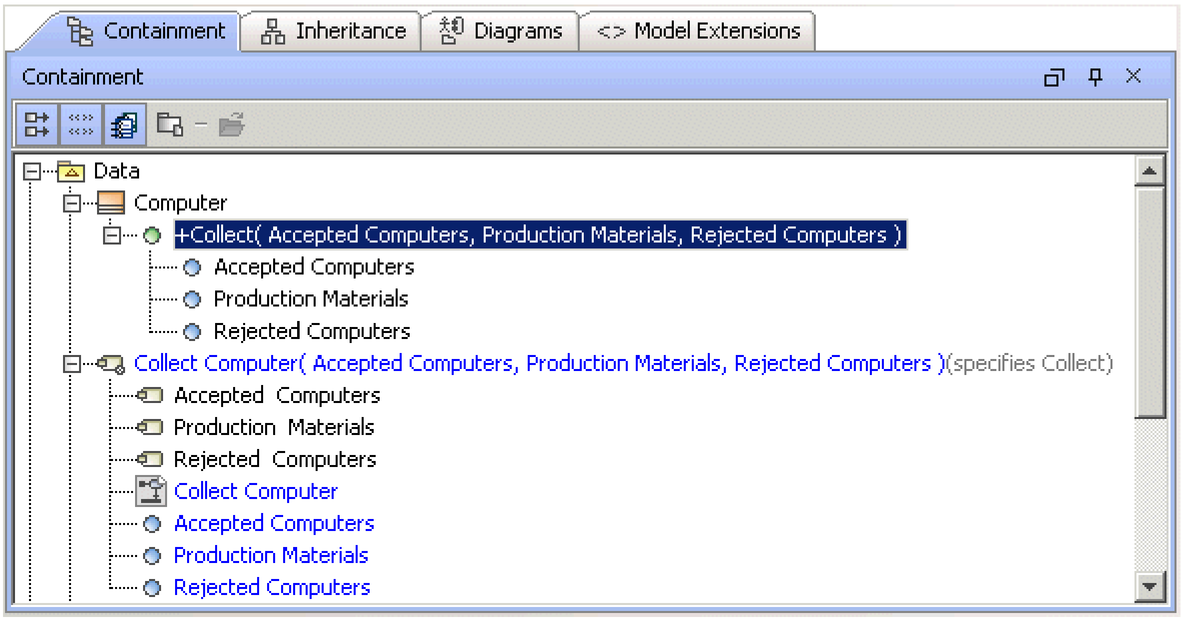


```
Data
  Computer
    +Collect( Accepted Computers, Production Materials,
      Accepted Computers
      Production Materials
      Rejected Computers
  Collect Computer
    Accepted  Computers
    Production  Materials
    Rejected  Computers
    Collect Computer
```

Figure 474 -- Project before synchronization

3. Assign activity diagram *Collect Computer* to the operation *Collect* as behavior. To do this from the operation shortcut menu in the Browser, select the **Behavior Diagram** and then **Assign**.

Activity of activity diagram is assigned as a method to the operation automatically. The text after the name of activity will appear in the Browser: *specifies Collect*.



```
Data
  Computer
    +Collect( Accepted Computers, Production Materials, Rejected Computers )
      Accepted Computers
      Production Materials
      Rejected Computers
  Collect Computer( Accepted Computers, Production Materials, Rejected Computers )(specifies Collect)
    Accepted  Computers
    Production  Materials
    Rejected  Computers
    Collect Computer
    Accepted Computers
    Production Materials
    Rejected Computers
```

Figure 475 -- Project after synchronization between Operation Parameters and Behavior Parameters

4. The following operation parameters are created to the activity of activity diagram automatically: *Accepted Computers, Production Materials, Rejected Computers*. The *Collect* operation parameters are synchronized with *Collect Computer* activity parameters.

Synchronization between Activity parameters and Activity Parameter Nodes

Synchronization between activity parameters and activity parameter nodes works in the following way: after you have created a parameter to the activity, an activity parameter node of the activity will be created automatically.

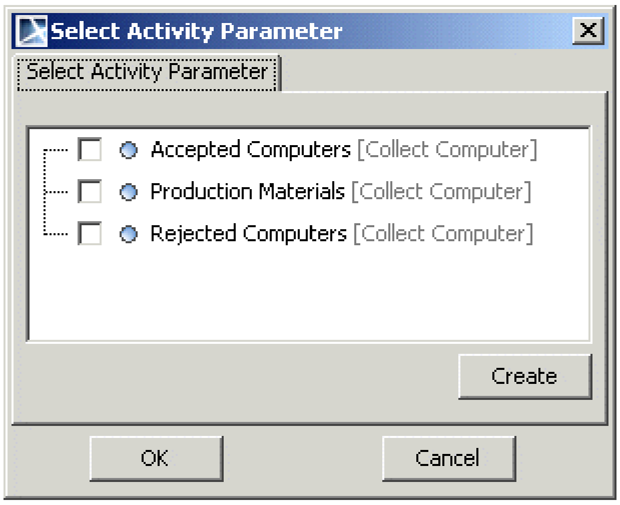
How synchronization works

How synchronization works on parameter edit:

- Create a parameter in the activity. After you have created the parameter, the argument for parameter will be created automatically. If the parameter direction is *inout* - two activity parameter nodes will be created.
- Remove a parameter from the activity. After you have removed the parameter from the activity, the argument will be removed as well. If two arguments were created for one *inout* parameter, both arguments will be removed.

How synchronization works on argument edit:

- Create an activity parameter node in the activity. The **Select Activity Parameter** dialog box appears. Select the existing activity parameter or click the **Create** button to create a new one.


Select Activity Parameter

Select Activity Parameter

- [ ] Accepted Computers [Collect Computer]
- [ ] Production Materials [Collect Computer]
- [ ] Rejected Computers [Collect Computer]

Create

OK Cancel

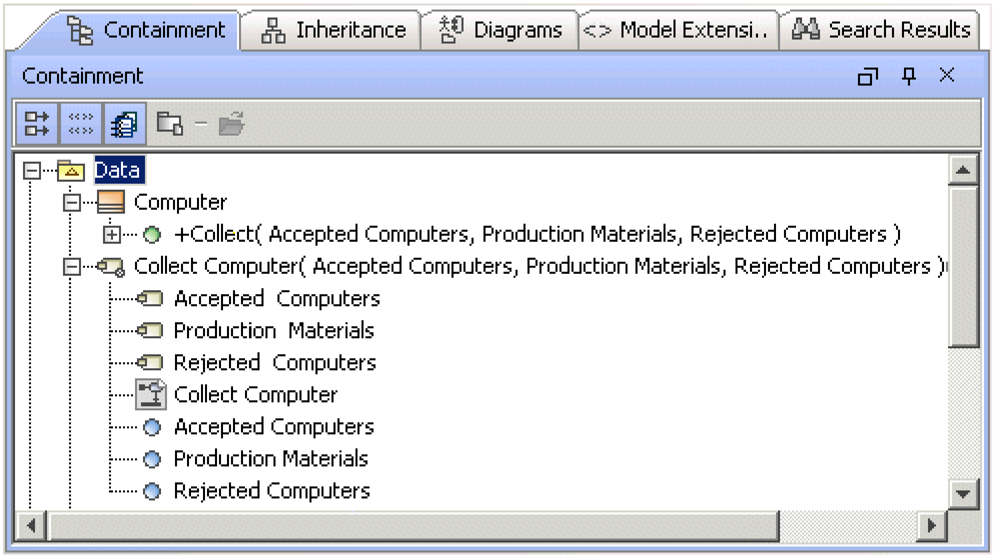
Figure 476 -- Select Activity Parameter dialog box

- Remove synchronized activity parameter node. After you have removed the activity parameter node from the activity, the assigned activity parameter will be removed as well.

NOTES In the **Select Activity Parameters** dialog box, the following activity parameters are not displayed:
- Inherited parameters
- Parameters which already have Activity Parameter Nodes.

Sample

1. In the *Collect Computer* activity create *Accepted Computer*s parameter.
2. The *Accepted Computers* activity parameter node is created in activity automatically. Properties of the parameter and activity parameter node are synchronized.



```
Data
  Computer
    +Collect( Accepted Computers, Production Materials, Rejected Computers )
  Collect Computer( Accepted Computers, Production Materials, Rejected Computers )
    Accepted Computers
    Production Materials
    Rejected Computers
    Collect Computer
    Accepted Computers
    Production Materials
    Rejected Computers
```

Figure 477 -- Synchronization of Activity Parameters with Activity Parameter Nodes

Synchronization between Operation parameters and pins on Call Operation Action

And

Synchronization between Behavior parameters and pins of Call Behavior Action

How synchronization works

How synchronization works on parameter edit:

- Create parameter. After you have created a parameter, pins to the Call Operation Action or to the Call Behavior Action will be created automatically. If parameter direction is *inout*, two Pins to one parameter will be created.
- Remove parameter. After parameter is removed, the argument is removed automatically if it does not have links or values.

How synchronization works on argument edit:

- Create pin. Create to the Call Operation Action or the Call Behavior Action input or output pin. The **Select Operation Parameter** dialog box appears for the Call Operation Action element and the **Select Behavior Parameter** dialog box appears for the Call Behavior Action.

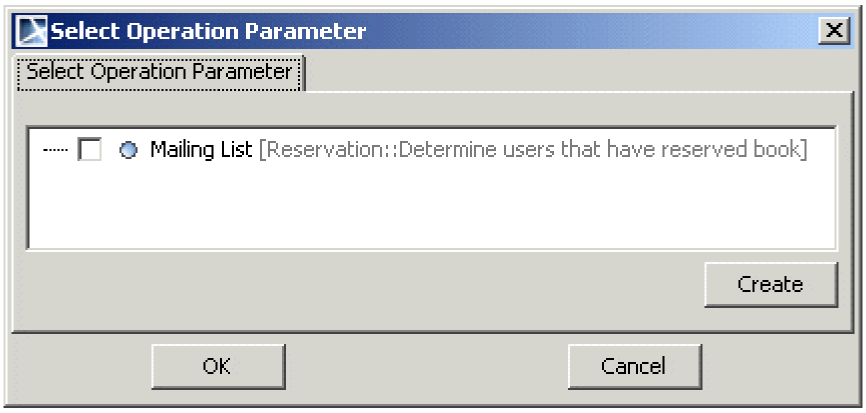

Select Operation Parameter
Select Operation Parameter
Mailing List [Reservation::Determine users that have reserved book]
Create
OK
Cancel

Figure 478 -- Select Operation Parameter dialog box

- Remove pin. After you have removed the pin, the parameter will not be removed.
- The order change and the properties change. After you have changed the order of arguments and after you have changed properties, no changes will be done to the parameters.

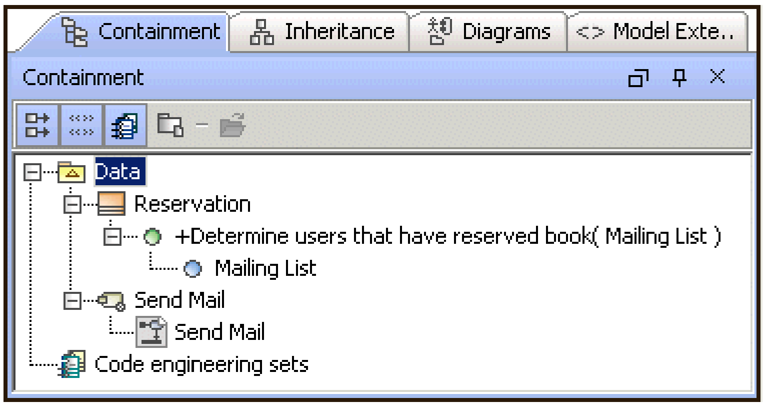
Synchronization validation

Synchronization between Parameters and Argument is valid if:

- The direction is compatible. The parameter direction and the pin direction should be compatible.
- The types are compatible. The parameter type and the pin type should be the same or inherited.

Sample

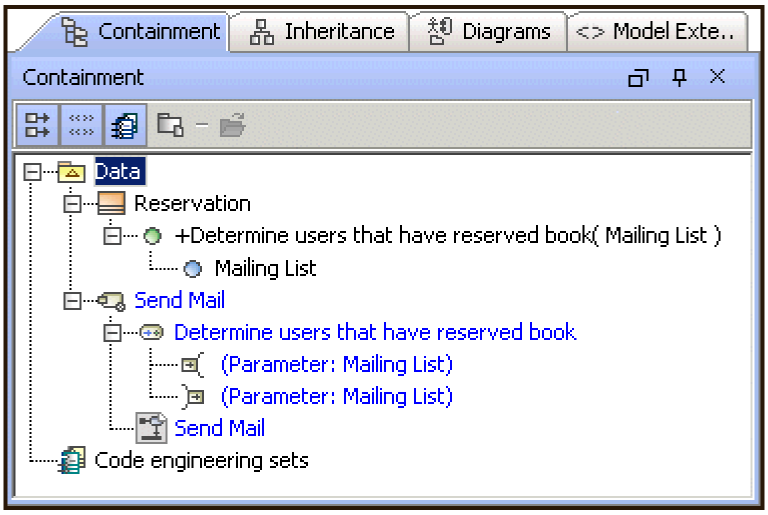
1. Create the *Mailing List* parameter to operation.



```
Data
  Reservation
    +Determine users that have reserved book( Mailing List )
      Mailing List
  Send Mail
    Send Mail
Code engineering sets
```

Figure 479 -- Project before synchronization

2. Create the call operation action named *Determine users that have reserved book*.
3. Assign an operation to the call operation action. Pins to the call operation action will be created automatically.



```
Data
  Reservation
    +Determine users that have reserved book( Mailing List )
      Mailing List
  Send Mail
    Determine users that have reserved book
      (Parameter: Mailing List)
      (Parameter: Mailing List)
    Send Mail
Code engineering sets
```

Figure 480 -- Project after synchronization between Operation Parameter and Pin of Call Operation Action

Synchronization between parameters and arguments

Synchronization between interaction parameters and interaction use arguments works in the following way: after you have referred an interaction use to the interaction with parameter, an argument to the interaction use will be created automatically. The parameter of interaction is synchronized with interaction use argument.

Synchronization between operation parameter and message arguments works in the following way: after you have created the message with an assigned operation, the arguments to the message will be created automatically.

How synchronization works

How synchronization works on parameter edit:

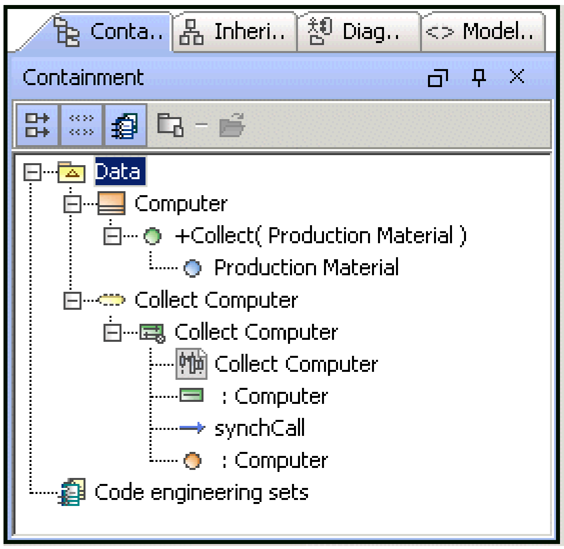
- Create. After you have created interaction use or message, arguments will be created automatically according to parameters.

- Remove parameter. After you have removed the parameter, the synchronized argument will be removed as well.
- The order change. After you have changed the parameters order, arguments order will be changed automatically.
- The property change. After you have changed parameter properties, this change will not affect the argument.

IMPORTANT! Changes in arguments are not reflected in parameters.

Sample

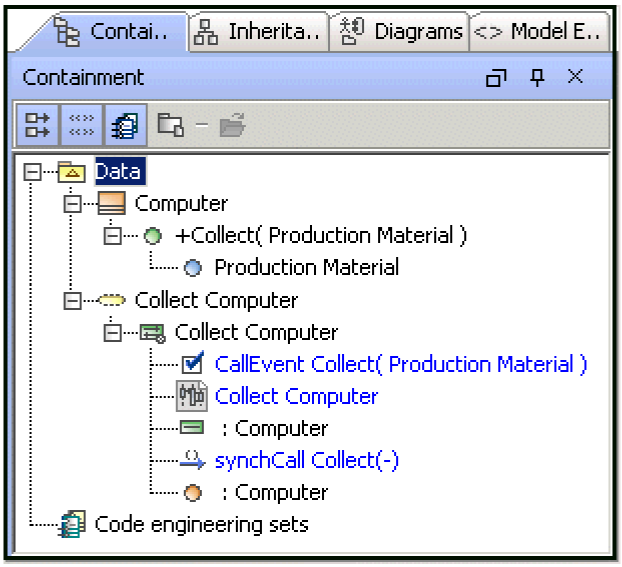
1. Create a class with *Collect* operation and with *Production Material* parameter. Create the sequence diagram. Draw a lifeline with assigned type - *Computer* class. To the lifeline, draw a call message.



```
Data
  Computer
    +Collect( Production Material )
      Production Material
  Collect Computer
    Collect Computer
      Collect Computer
      : Computer
      synchCall
      : Computer
Code engineering sets
```

Figure 481 -- Project before synchronization

2. Assign the *Collect* operation to the call message. An argument will be added to the message automatically. To see the created argument, open the **Message** specification dialog box and select the **Arguments** branch. In the sequence diagram on the message, you can see the parameter name with argument name (in this example, the argument is not named).



```
Data
  Computer
    +Collect( Production Material )
      Production Material
  Collect Computer
    Collect Computer
      CallEvent Collect( Production Material )
      Collect Computer
      : Computer
      synchCall Collect(-)
      : Computer
Code engineering sets
```

Figure 482 -- Project after synchronization

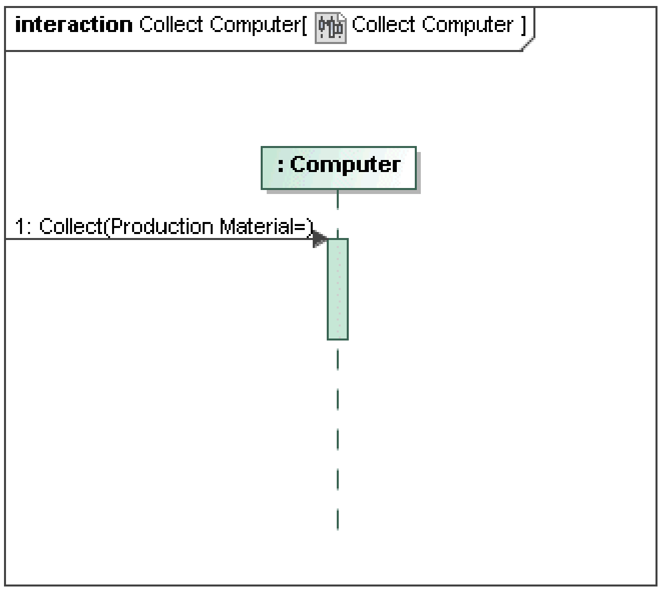

interaction Collect Computer[Collect Computer]
: Computer
1: Collect(Production Material=)

Figure 483 -- Sequence diagram with message with argument

Synchronization between Interaction Parameters and Lifelines

Synchronization between Interaction Parameters and Lifelines works in the following way: after you have created the sequence diagram in interaction with parameters, lifelines for the chosen parameters will be created in the sequence diagram.

This is not the same synchronization as in other cases, because this gives automated lifelines creation from parameters only.

How synchronization works

After you have created, edited, or removed parameters, arguments will be unchanged. Conversely, after you have created, edited, or removed arguments - parameters will be unaffected.

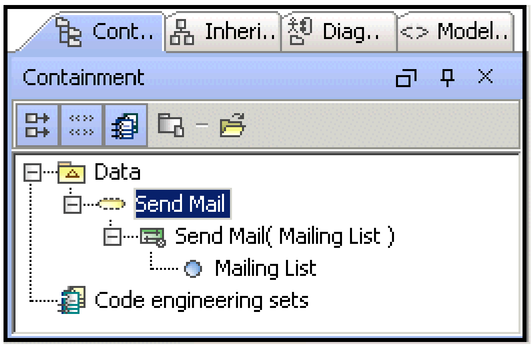
Displaying parameters as lifelines in already existing sequence diagram

You can also display parameters as lifelines in already existing sequence diagram:

1. From the sequence diagram shortcut menu, select **Related Elements** and then select **Display Parameters as Lifelines**. The **Display Parameters as Lifelines** dialog box appears.
2. Select parameters and click **OK**.
3. Lifelines for the selected parameters are created.

Sample

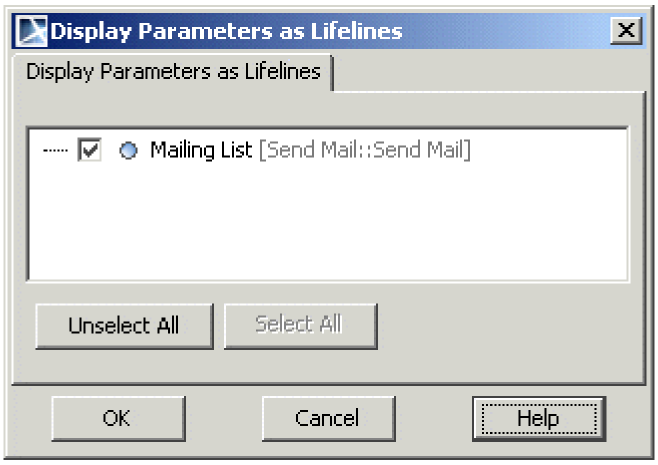
1. Create an interaction with a parameter.



Data
Send Mail
Send Mail(Mailing List)
Mailing List
Code engineering sets

Figure 484 -- Project before synchronization

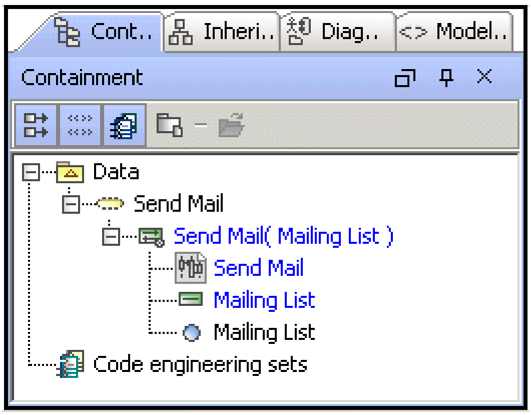
2. In the Interaction, create the sequence diagram. The **Display Parameters as Lifelines** dialog box appears.


Display Parameters as Lifelines
Display Parameters as Lifelines
Unselect All
Select All
OK
Cancel
Help

✓ Mailing List [Send Mail::Send Mail]

Figure 485 -- The Display Parameters as Lifelines dialog box

3. Select parameters, which will be created as lifelines in the sequence diagram. Click OK.
4. Lifelines are created in the interaction, which is drawn on the sequence diagram.

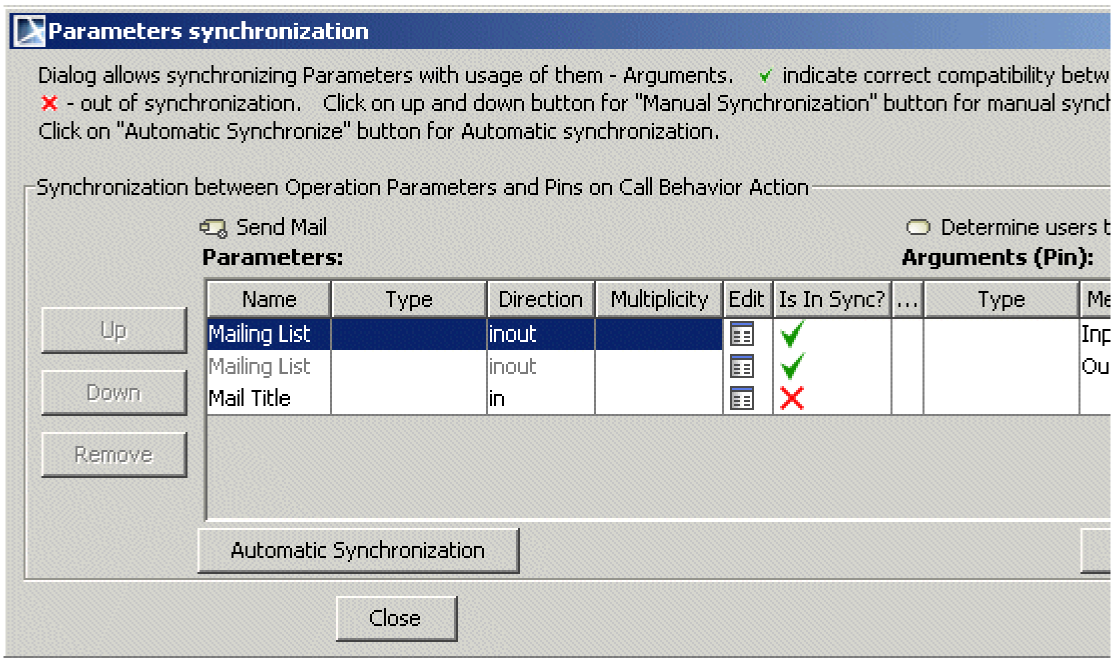


Data
Send Mail
Send Mail(Mailing List)
Send Mail
Mailing List
Mailing List
Code engineering sets

Figure 486 -- Project after synchronization

The Parameters Synchronization dialog box

The **Parameters Synchronization** dialog box is shown in the following figure. It provides useful Parameters and Arguments synchronization options: not synchronized notification, automatic synchronization restoration algorithms, and manual synchronization abilities.



Parameters synchronization

Dialog allows synchronizing Parameters with usage of them - Arguments. ✓ indicate correct compatibility betw
✗ - out of synchronization. Click on up and down button for "Manual Synchronization" button for manual synch
Click on "Automatic Synchronize" button for Automatic synchronization.

Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail
Parameters:

Determine users t
Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	...	Type	Me
Mailing List		inout		▤	✓			Inp
Mailing List		inout		▤	✓			Ou
Mail Title		in		▤	✗			

Figure 487 -- The Parameters Synchronization dialog box

There are two ways to open the **Parameter Synchronization** dialog box:

- Select the not synchronized element in the Browser. From the shortcut menu, select the **Validation** > validation group > **Parameter Synchronization** dialog opens.
- Select the invalid element on the diagram. In the symbol smart manipulator, click the invalid element indicator. From the menu that open, select the **Parameter Synchronization dialog** (see the following figure).

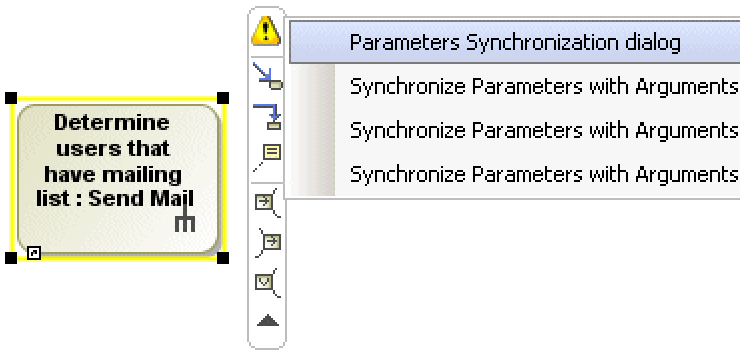
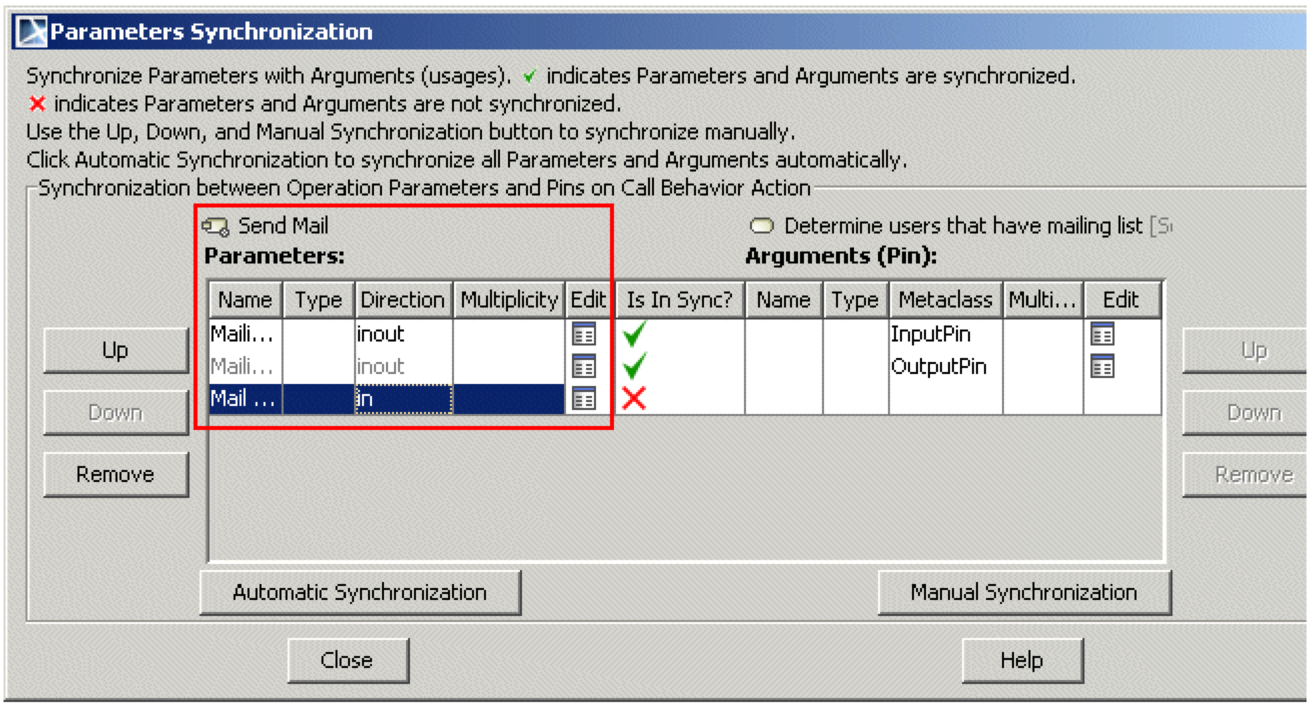

Determine users that have mailing list : Send Mail
Parameters Synchronization dialog
Synchronize Parameters with Arguments
Synchronize Parameters with Arguments
Synchronize Parameters with Arguments

Figure 488 -- Smart Manipulator of the Invalid element

The parameters synchronization dialog box presents the elements those parameters and arguments are not synchronized and provides the possibility to restore the synchronization.

In the **Parameters Synchronization** dialog box, the parameters with arguments are synchronized according to the general synchronization rules, which are described in "Rules of synchronization between parameters and arguments" on page 737.

The **Parameters** group presents information about particular element parameters and the **Arguments** group presents information about particular element arguments (see the following figures). To edit the parameter or argument, click on the ▤ icon in the **Edit** column (see Figure 491 on page 748). The **Is In Synch?** column displays if parameter and argument are synchronized (see Figure 492 on page 748). Green tick indicates that parameter and argument are synchronized. Red cross indicates that parameter and argument are not synchronized.



Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

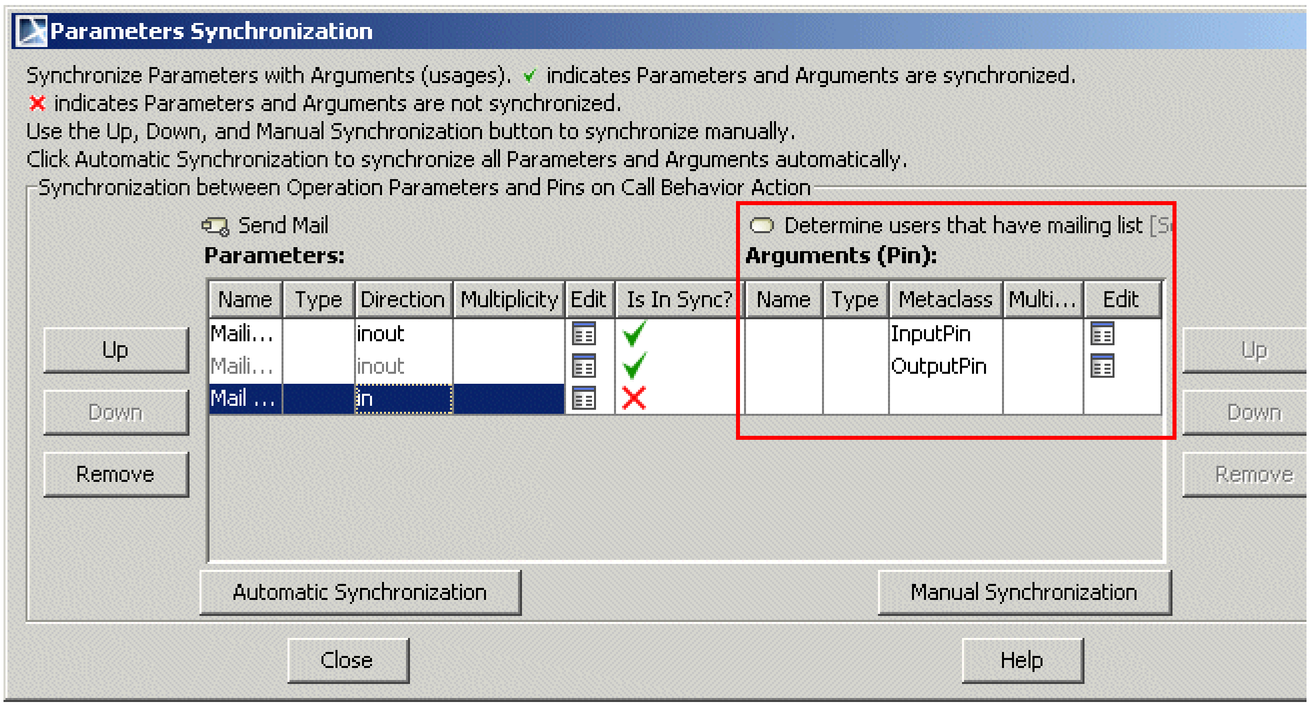
Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail
Parameters:

Determine users that have mailing list [S
Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 489 -- The Parameters Synchronization dialog box, Parameters group



Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

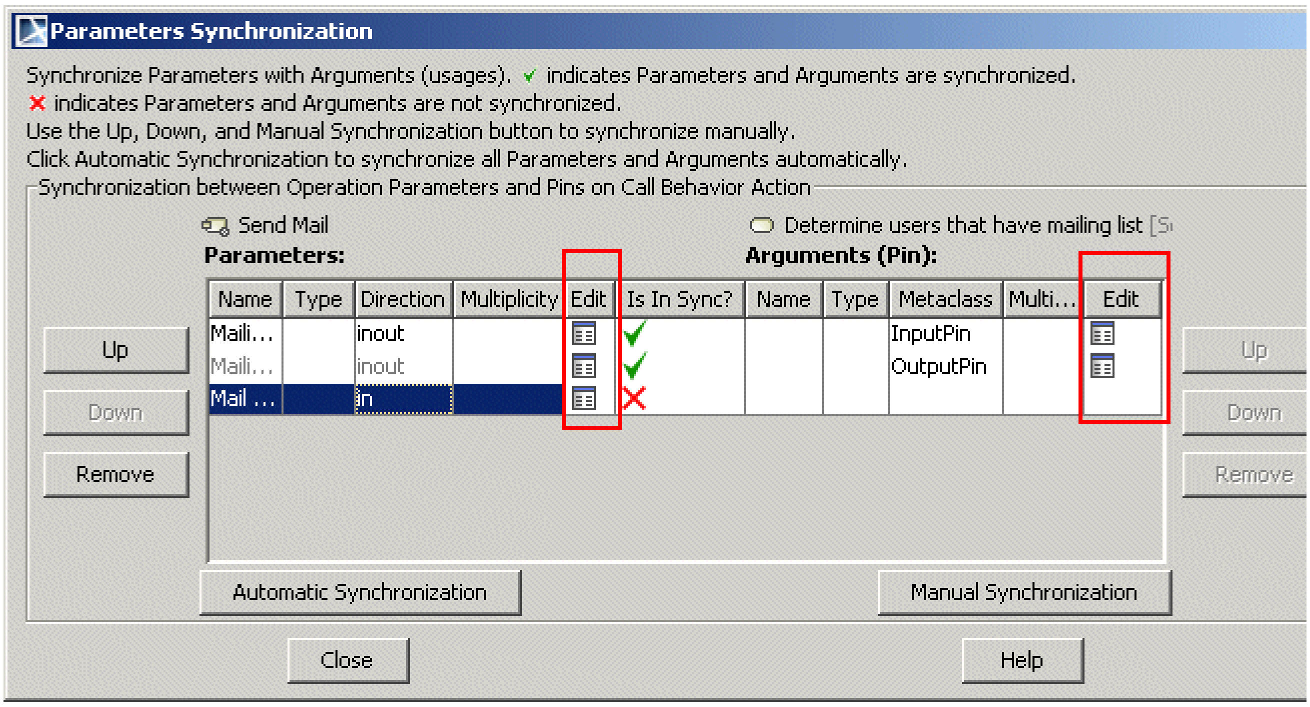
Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail
Parameters:

Determine users that have mailing list [S
Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 490 -- The Parameters Synchronization dialog box, Arguments group


Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

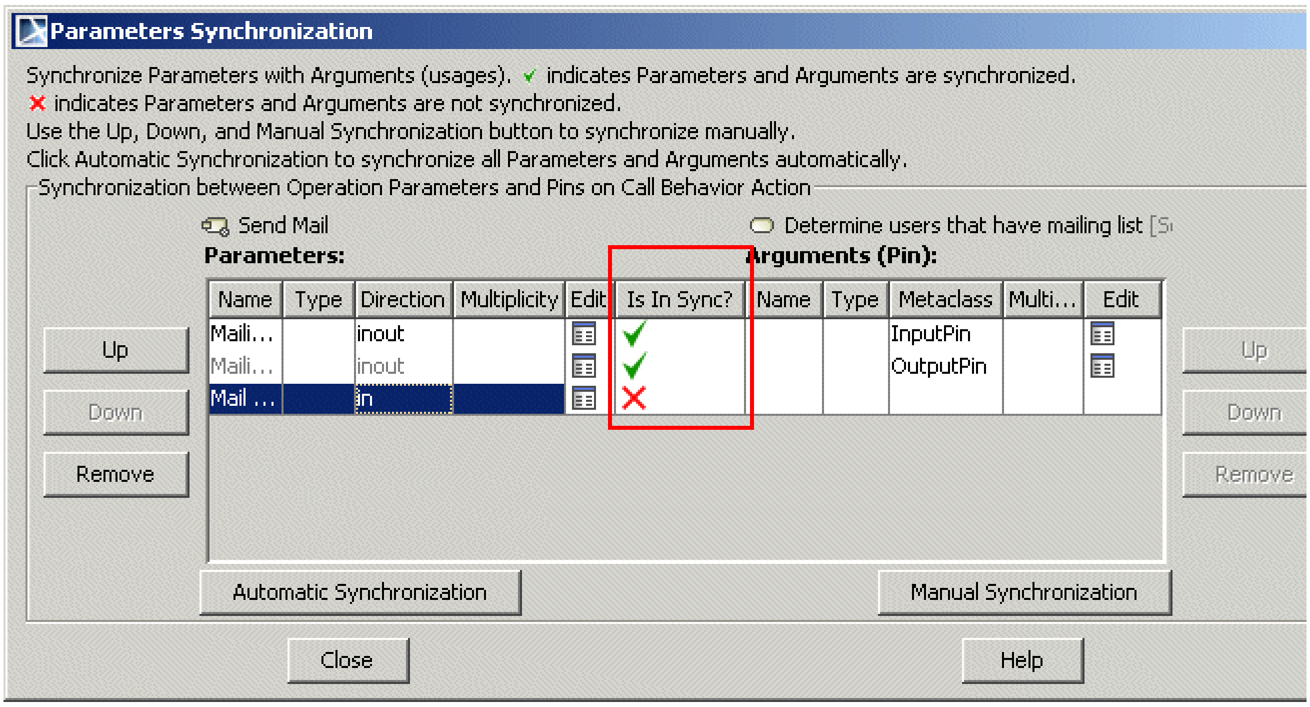
Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail — Determine users that have mailing list [S

Parameters: — Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 491 -- The Parameters Synchronization dialog box, Edit column


Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail — Determine users that have mailing list [S

Parameters: — Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 492 -- The Parameters Synchronization dialog box, Is In Sync? column

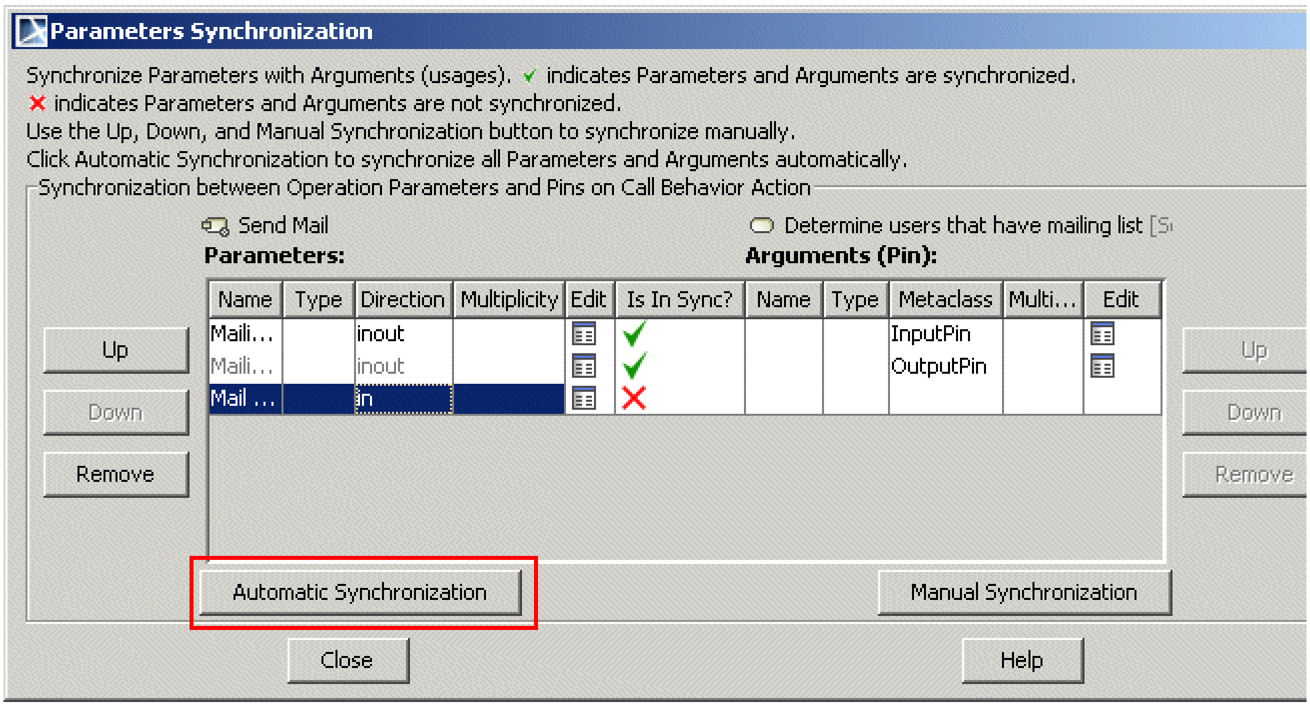
Automatic Synchronization

To synchronize parameters with arguments automatically, in the **Parameters Synchronization** dialog box, click the **Automatic Synchronization** button (see the following figure). According to the available synchronization the following available commands appears:

1. Synchronize Parameters with Arguments by restoring initial order and creating missing ones.

- Missing arguments will be created.
- Not synchronized Arguments order will be changed and not synchronized properties will be changed according reference.

2. Synchronize Parameters with Arguments by reordering and creating missing ones.
    - Not synchronized arguments order will be changed to fit properties.
    - Missing arguments will be created automatically.
    - If reference between parameters and arguments existed, but hey are not synchronized or reference will be removed.
3. Synchronize Parameters with Arguments by updating and creating missing ones.
    - Not synchronized arguments not synchronized properties according to parameter will be changed and missing arguments will be created.
4. Synchronize Parameters with Arguments by creating missing ones.
    - Missing arguments will be created.


Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail — Parameters:
Determine users that have mailing list [S — Arguments (Pin):

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 493 -- The Parameters Synchronization dialog box, Automatic Synchronization

Manual Synchronization

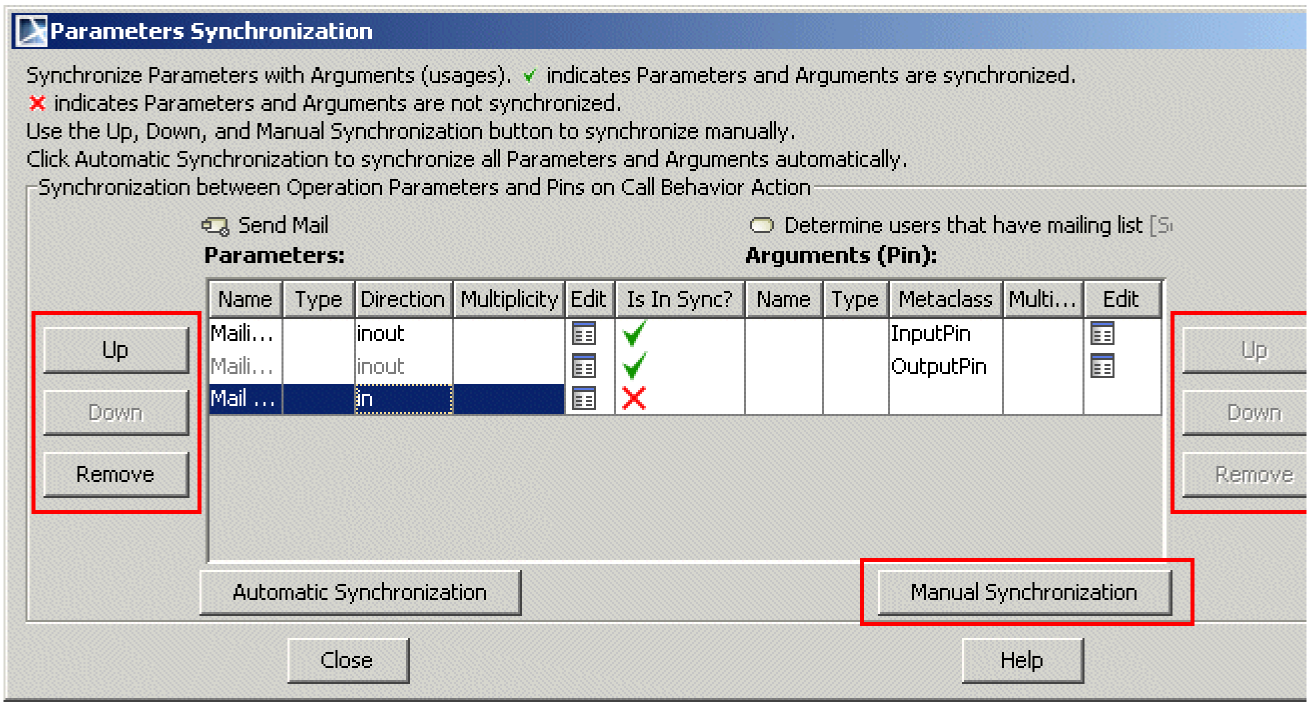
You can manually synchronize parameters with arguments using the **Up**/**Down**/**Remove** buttons or click the **Manual Synchronization** button (see the following figure).

Click the **Up**/**Down**/**Remove** buttons to move up/down or remove parameters or arguments.

In the **Parameters Synchronization** dialog box table select not synchronized parameter/ argument and click the **Manual Synchronization** button to synchronize manually. See the description of the manual synchronization commands in the following table:

Command	Description
<-Clone	Select the <-**Clone** command to create parameter with the same properties.
Clone->	Select the **Clone->** command to create parameter with the same properties.

Command	Description
<-Update	Select the **<-Update** command to update parameter not synchronized properties in order to be synchronized. The Update item is available if argument exist and there are properties to update.
Update->	Select the **<-Update** command to update argument not synchronized properties in order to be synchronized. The Update item is available if parameter exist and there are properties to update.


Parameters Synchronization

Synchronize Parameters with Arguments (usages). ✓ indicates Parameters and Arguments are synchronized.
✗ indicates Parameters and Arguments are not synchronized.
Use the Up, Down, and Manual Synchronization button to synchronize manually.
Click Automatic Synchronization to synchronize all Parameters and Arguments automatically.

Synchronization between Operation Parameters and Pins on Call Behavior Action

Send Mail — **Parameters:**
Determine users that have mailing list [S — **Arguments (Pin):**

Name	Type	Direction	Multiplicity	Edit	Is In Sync?	Name	Type	Metaclass	Multi...	Edit
Maili...		inout		▤	✓			InputPin		▤
Maili...		inout		▤	✓			OutputPin		▤
Mail ...		in		▤	✗					

Figure 494 -- The Parameters Synchronization dialog box, Manual Synchronization

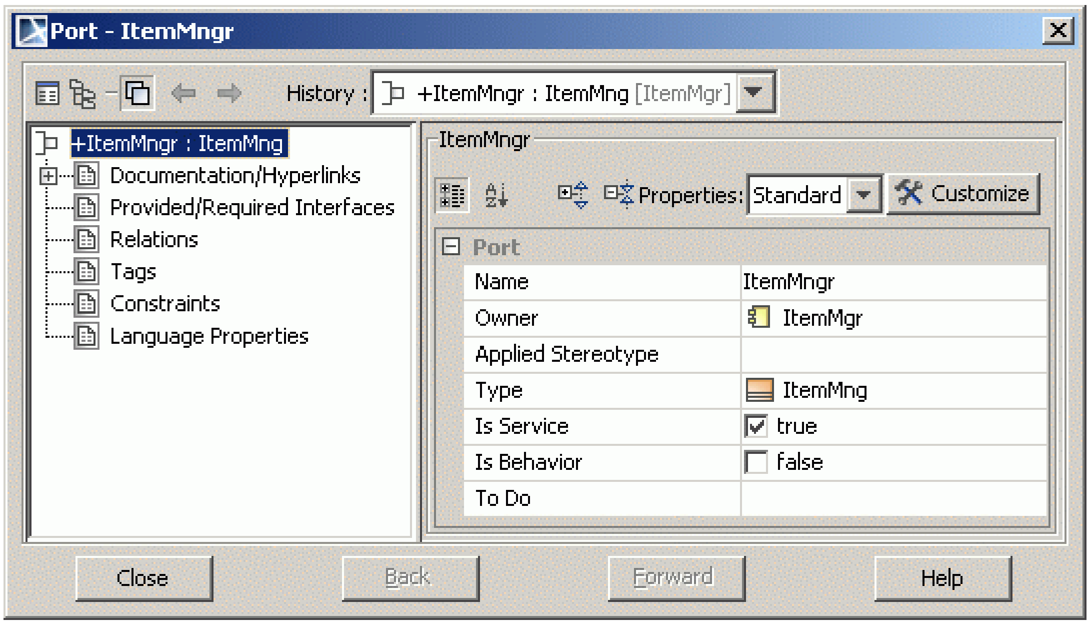
Port

A port is a property of a classifier that specifies a distinct interaction point between that classifier and its environment, or between the (behavior of the) classifier and its internal parts. Ports are connected to the properties of the classifier by connectors through which requests can be made to invoke the behavioral features of the classifier.

A Port may specify the services a classifier provides (offers) to its environment as well as the services that a classifier expects (requires) from its environment. It has the ability to specify that any requests arriving at this port are handled.

The Class model element and Component model elements may have any number of Ports.

Define a port in the **Port Specification** dialog box.



Port	
Name	ItemMngr
Owner	ItemMgr
Applied Stereotype	
Type	ItemMng
Is Service	✓ true
Is Behavior	false
To Do	

Figure 495 -- Port Specification dialog box

Refer to the "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set a general information for the port.	**Owner**	The name of a class or component, which contains the port.
	Is Behavior	Specifies whether requests arriving at this port are sent to the classifier behavior of this classifier. Such a port are referred to as a behavior port. Any invocation of a behavioral feature targeted at a behavior port will be handled by the instance of the owning classifier itself, rather than by any instances this classifier may contain.
	Is Service	If the value of the **Is Service** check box is true, it indicates that this port is used to provide the published functionality of a classifier. If the value of the **Is Service** check box is false, it indicates that this port is used to implement the classifier but is not part of the essential externally.
Provided/ Required Interfaces	**Name**	Shows the name of the provided/required interface.
	Type	Shows the type of the interface that specifies a port.
	Add	Drop down menu opens. Select the *Provided* or *Required* item and select an interface in the open **Select Interface** dialog box.
	Remove	Removes an item from the Provided/Required Interfaces list.

To customize ports list

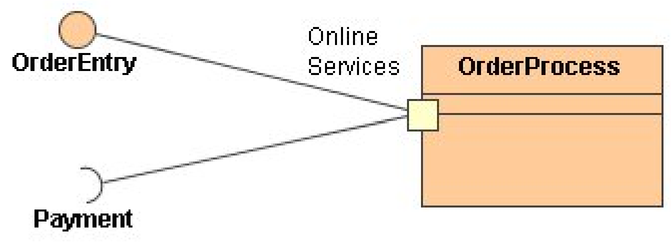
The ports list can be displayed in a separate compartment on the element shape when the **Suppress Ports** check box is cleared from the element shortcut menu, **Presentation Options** submenu.

1. From the element shortcut menu, select **Edit Compartment** and then **Ports**.

2. In the open **Compartment Edit** dialog box, **Ports** tab, add the desired ports to display from **All** to the **Selected** list.

To draw a Port

In the Component diagram toolbar, select a Port element to draw on a class shape.



Draw a Realize path from a port to an interface to depict the Provided Interface.

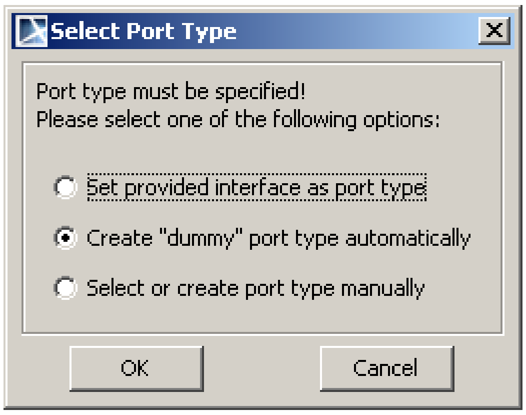
Draw Usage path from port to interface to depict Required Interface.

NOTE	When a Part symbol is created (also when dropping classifiers on composite structure diagrams), all its ports are displayed on the diagram.

To specify the Provided/Required Interfaces for a Port even if the Port type is not specified

When you add a Provided or Required Interface to a Port, the **Select Port Type** dialog will open (Figure 496 on page 752) with the following options:

- **Set Provided Interface as Port Type** (available on Provided Interface creation only). The Provided Interface will be suggested as the Port Type.
- **Create "dummy" port type automatically**. Create a dummy port type and relations between the type and interface.
- **Select or create a port type manually**. The **Select Port Type** dialog will open to allow you to select or create a Port.


Select Port Type

Port type must be specified!
Please select one of the following options:

○ Set provided interface as port type
● Create "dummy" port type automatically
○ Select or create port type manually

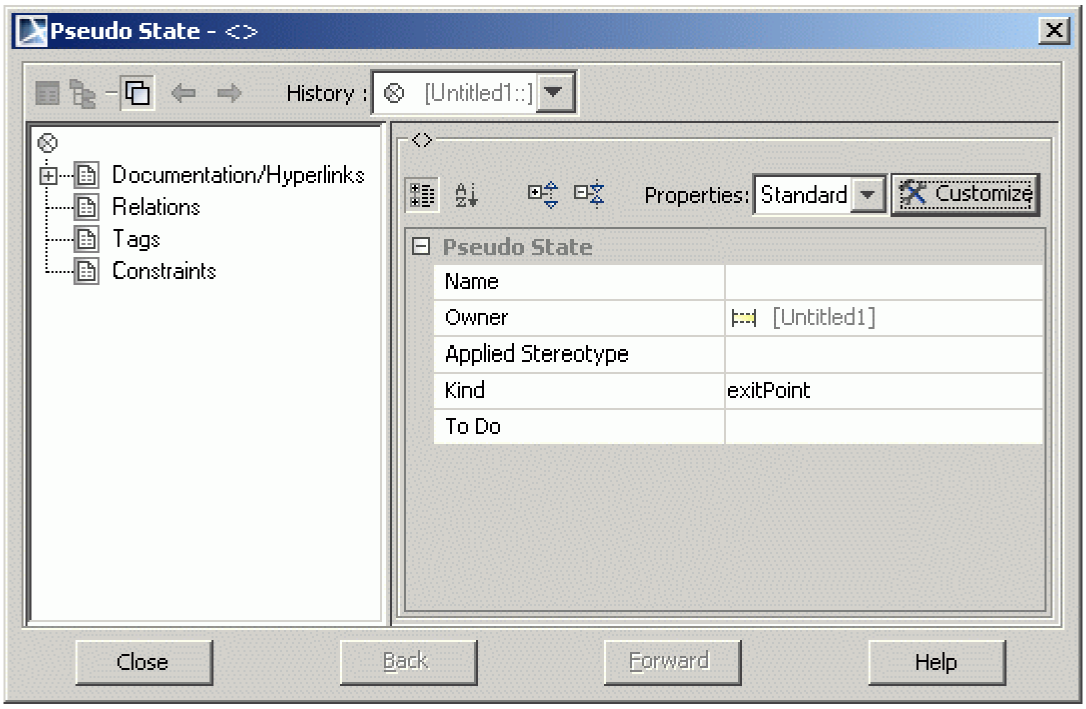
Figure 496 -- The Select Port Type Dialog

Pseudo State

The Pseudo state is typically used to connect multiple transitions into more complex state transitions paths. For example, by combining a transition entering a fork pseudo state with a set of transitions exiting the fork pseudo state, we get a compound transition that leads to a set of orthogonal target states.

For more information about working with symbols, see "Diagramming" on page 149.

Specify the pseudostates in the **Pseudo State Specification** dialog box.



Pseudo State

Name	
Owner	[Untitled1]
Applied Stereotype	
Kind	exitPoint
To Do	

Figure 497 -- Pseudo State Specification dialog box

Tab name	Property	Function
General	**Owner**	The region, containing a pseudo state.
	Kind	The kind, showing the purpose of the pseudo state.

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Initial

Every object belongs to a particular state as soon as it is created. So, it is useful to explicitly show that particular state. A solid filled circle represents the initial state of an object. There can only be one initial state for an object. The initial state denotes the starting place for a transition, the target of which is a composite state.

Final state

The final state symbol (a circle surrounding a smaller solid circle) is used to represent the object destruction. The final state is optional in the diagram because there is a system that runs without interruption after the start of the activities. Also, there can be several final states in the same state diagram, denoting that the life of the object may finish depending on several conditions.

Terminate

Entering a terminate pseudo state implies that the execution of the state machine by means of its context object is terminated. The state machine does not exit any states nor does it perform any exit actions other than those associated with the transition leading to the terminate pseudo state.

Entry Point

An entry point connection point reference as the target of a transition implies that the target of the transition is the entry point pseudo state as defined in the submachine of the submachine state. As a result, the regions of the submachine state machine are entered at the corresponding entry point pseudo states.

Exit Point

An exit point connection point reference as the source of a transition implies that the source of the transition is the exit point pseudo state as defined in the submachine of the submachine state that has the exit point connection point defined. When a region of the submachine state machine has reached the corresponding exit points, the submachine state exits at this exit point.

Deep History

The Deep History represents the most recent active configuration of the composite state that directly contains this pseudo state; e.g. the state configuration that was active when the composite state was last exited. A composite state can have at most one deep history vertex.

Shallow History

The Shallow History represents the most recent active substate of its containing state (but not the substates of that substate). A composite state can have at most one shallow history vertex. A transition coming to the shallow history vertex is equivalent to a transition coming to the most recent active substate of a state.

Junction

The junction vertices are semantic-free vertices that are used to chain multiple transitions together. They are used to construct the compound transition paths between states. For example, a junction can be used to combine multiple incoming transitions into a single outgoing transition representing a shared transition path (this is known as merge). Conversely, it can be used to split an incoming transition into multiple outgoing transition segments with different guard conditions.

Choice

The choice vertices, when reached, result in the dynamic evaluation of the guards or the triggers of its outgoing transitions. This realizes a dynamic conditional branch. It allows splitting of transitions into multiple outgoing paths such that the decision on which path to take may be a function of the results of prior actions performed in the same run-to-completion step.

Fork and Join

The fork vertices are used to split an incoming transition into two or more transitions terminating on the orthogonal target vertices (i.e., vertices in different regions of composite state). The segments going out of a fork vertex must not have guards or triggers.

The join vertices are used to merge several transitions emanating from the source vertices in different orthogonal regions. The transitions entering a join vertex cannot have guards or triggers.

Realization

The realization is a specialized abstraction relationship between two sets of model elements, one represents a specification (the supplier) and the other represents an implementation of the latter (the client). The realization can be used to model stepwise refinement, optimizations, transformations, templates, model synthesis, framework composition, etc.

The realization relationship is drawn as a dashed line with a solid triangular arrowhead (a "dashed generalization symbol"). The client (the one at the tail of the arrow) supports at least all of the operations defined in the supplier (the one at the arrowhead), but not necessarily the data structure of the supplier (attributes and associations).

For more information about working with symbols, see "Diagramming" on page 149.

The realization paths can be grouped in a tree. This feature makes the appearance of the diagram more structural and understandable.

NOTE In MagicDraw, you will find three kinds of a realization relationship:

- **Interface Realization**. A dashed line with a solid triangular arrowhead. An Interface Realization is a specialized Realization relationship between a Classifier and an Interface. This relationship signifies that the realizing classifier conforms to the contract specified by the Interface.
- **Realization**. A solid line that represents a relationship between a classifier and an interface.
- **Substitution.** A dashed line with an arrowhead and <<*substitute*>> stereotype. A substitution is a relationship between two classifiers. It signifies that the substituting classifier complies with the contract specified by the contract classifier. This implies that instances of the substituting classifier are runtime substitutable where instances of the contract classifier are expected.

To create a realization tree if a class or an interface already has a number of realization paths attached to it

Select the **Make Sub Tree** command from the class or the interface shortcut menu.

To remove a realization from the tree or to ungroup a tree

- Select the realization and select the **Remove From Tree** command from the path shortcut menu.

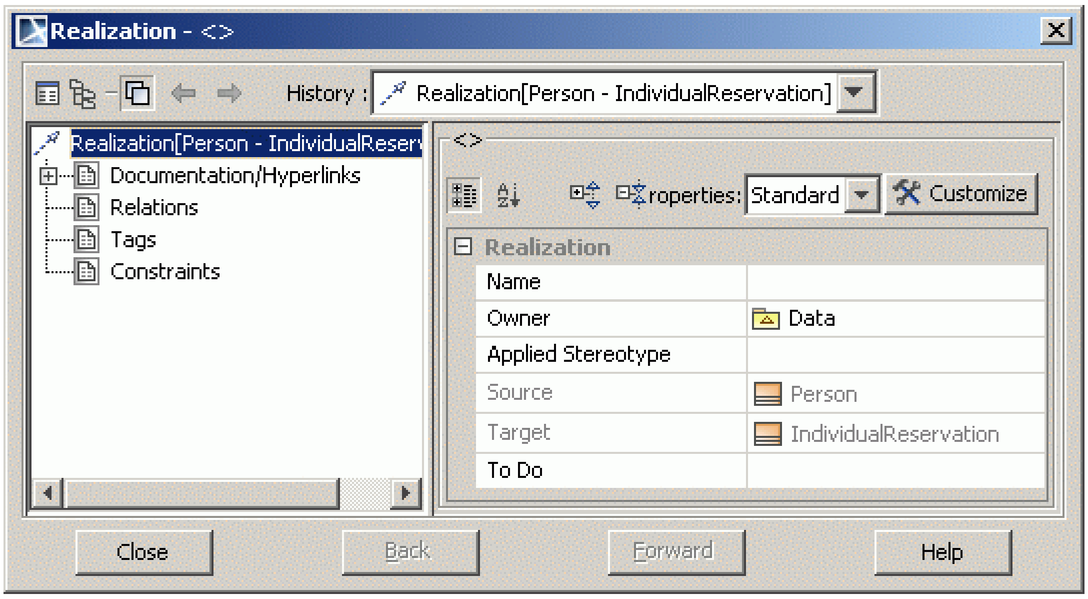
- Select a tree head and select the **Ungroup Tree** command from the tree shortcut menu.

To specify the selected realization path in the **Specification** dialog box

- Double-click the path.
- Select **Specification** from the path shortcut menu.
- Select the path and press ENTER.

Realization and its kinds Specification dialog boxes

The realization, interface realization, and substitution relationships are defined in the dialog box of the same structure. They differs from one another only by the corresponding Specification name.


Realization - <>

History : Realization[Person - IndividualReservation]

Properties: Standard

Realization	
Name	
Owner	Data
Applied Stereotype	
Source	Person
Target	IndividualReservation
To Do	

Figure 498 -- Realization Specification dialog box

Refer to the “Specification Window” on page 219 for information about the specification elements not covered in this section.

Tab name	Box	Function
General Set general information about the realization relationship	**Source**	The name of the child element.
	Target	The name of the parent element.
	Mapping	Type a value, or click the ‘...’ button and edit the value in the Edit Mapping dialog box. **NOTE:** Available in the **Substitution Specification** dialog box only.

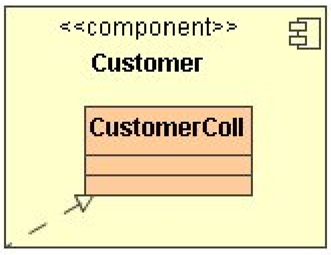
Creating the realizing classifiers

The realizing classifiers are a set of Realizations owned by the Component. The Realizations reference the Classifiers of which the Component is an abstraction (i.e., that realize its behavior).

To create a Realization relationship between a component and a classifier:

1. Drag the classifier shape to the component shape.

2. Select a classifier or component and select **Related Elements** from its shortcut menu, then select the **Display Paths** command. The realization relationship will be displayed on the diagram pane.



Reception

Signal receptions can be specified for classes or interfaces.

Parent topic: "Model Elements" on page 622.

Related topics:

"Specification Window" on page 219.

"Formatting Symbols" on page 257.

"Class" on page 661.

"Interface" on page 702.

To create a new reception

- Double-click the selected class or select **Specification** from the class shortcut menu. The **Class** specification dialog box opens. Click the **Signal Receptions** tab and then click the **Create** button. The **Select Signal** dialog box opens. Select a signal or create a new one. Click **OK**. The **Signal Reception** specification dialog box opens. Specify a new reception and click **OK**.
- Select a class in the Browser tree. From the class item shortcut menu, select **New** and then select **Signal Reception**.
- Select a class shape and click the small red **Insert New Signal Reception** smart manipulation button.

NOTE	The signal reception compartment is suppressed and the smart manipulator button is not visible by default.

- Drag-and-drop the signal symbol on the class or interface shape in the diagram pane. The signal reception with the assigned signal is created. You may also drag a signal from the Browser to the class or interface shape on the diagram pane.

To open the **Signal Reception** specification dialog box

1. Open the **Class** specification, or the **Interface** specification dialog box.
2. In the **Signal Receptions** tab do one of the following:
   - Double-click the desired signal reception in the tree or click the **Create** button.

- Double-click the desired signal reception directly on the diagram.

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

To set the signal for a signal reception

- Create a signal reception. The **Select Signal** dialog box opens. Select an existing or create a new signal for the signal reception.
- In the **Signal Reception** specification dialog box, in the **Signal** drop down menu, select a signal. You may also click the "..." button. In the **Select Element** dialog box, select a signal or click the **Create** button to create a new one.

To display the signal reception on the diagram pane

The signal reception compartment is added to the class and interface shape. This compartment is hidden by default. To show the signal reception compartment:

- From the symbol shortcut menu, select the **Presentation Options** command, then select the **Suppress Signal Receptions** command.
- From the symbol shortcut menu, select the **Symbol(s) Properties** command. In the element **Properties** dialog box, clear the **Suppress Signal Receptions** command.

To show/hide the signal receptions in the Signal Reception compartment

Select the **Edit Compartment** command from the symbol shortcut menu. Select the **Signal Reception command**. The **Edit Compartment** dialog box opens. Only those signal receptions will be displayed in the Signal Reception compartment that are displayed in the **Selected** list.

To change the order of the signal receptions

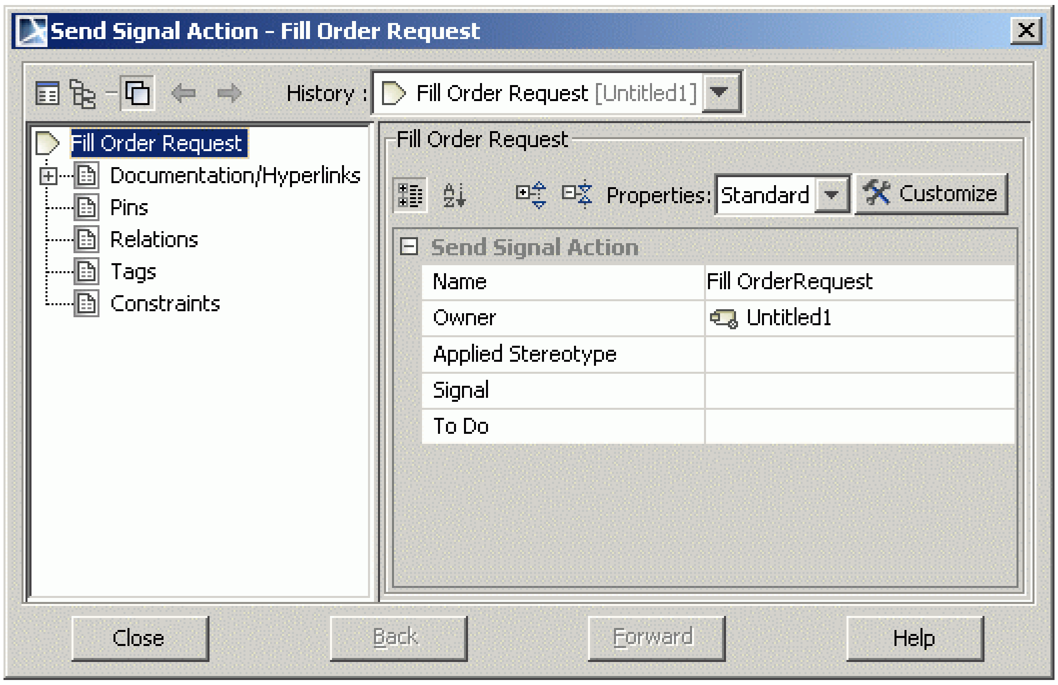
- From the symbol shortcut menu, select the **Presentation Options** command, then select the **Signal Receptions Sort Order** command.
- From the symbol shortcut menu, select the **Symbol(s) Properties** command. In the element **Properties** dialog box, clear the **Suppress Signal Receptions** check box.

Send Signal Action

The Send Signal Action is an action that creates a signal instance from its inputs and transmits it to the target object, where it may cause the start of the state machine transition or the execution of an activity. The argument values are available to the execution of associated behaviors. The requester continues the execution immediately. Any reply message is ignored and is not transmitted to the requester.

For more information about working with symbols, see "Diagramming" on page 149.

Define the selected send signal action in the **Send Signal Action Specification** dialog box.



Send Signal Action

Name	Fill OrderRequest
Owner	Untitled1
Applied Stereotype	
Signal	
To Do	

Figure 499 -- Send Signal Action Specification dialog box

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General Set a general infor-mation about the object node.	**Signal**	Click the "..." button to assign an existing signal from the model in the **Select Elements** dialog box, or click **Cre-ate** to assign a new one.

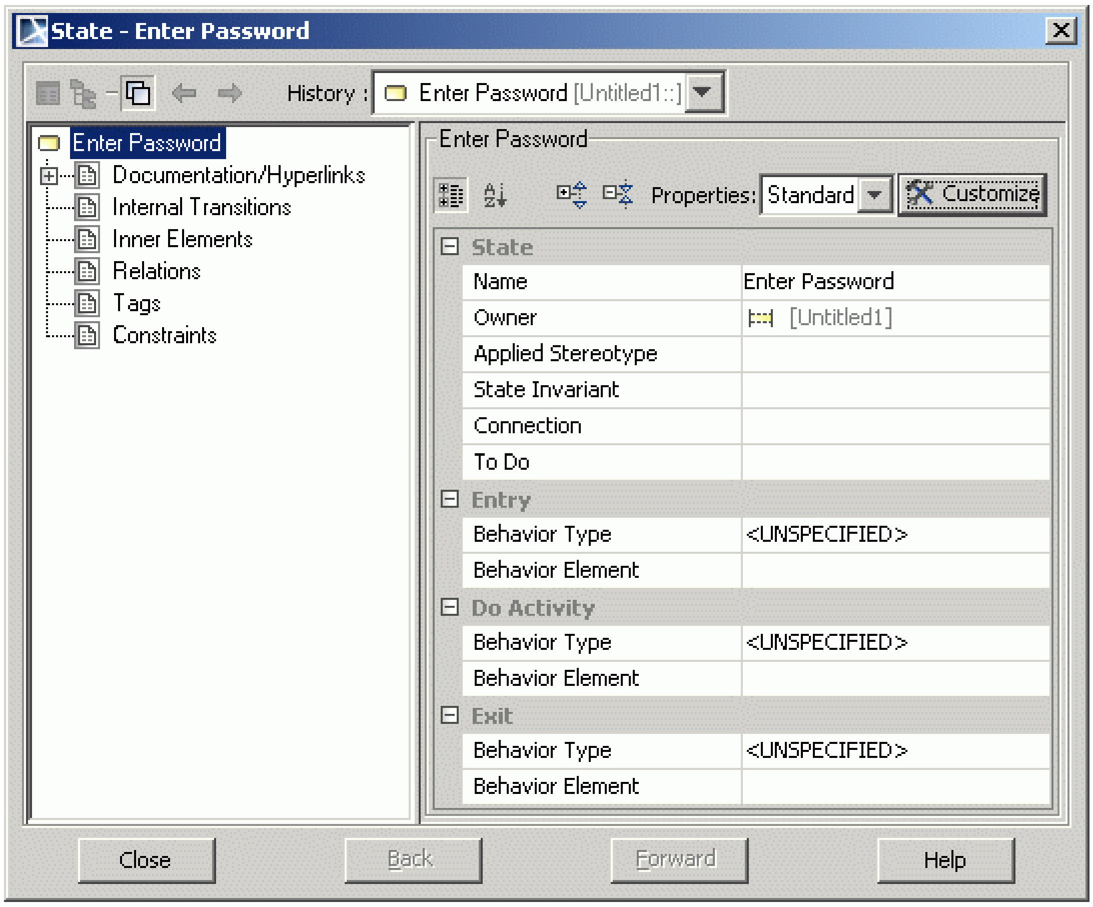
State

A state is a condition during the lifetime of an object or an interaction during which the object meets certain con-ditions, performs an action, or waits for an event. The state is defined by the concepts of duration and stability. An object may not be in an unknown or undefined state. A state may have two compartments to provide more information about that state:

- The first compartment is the name compartment, it contains the state name, for example: running, going up.
- The second compartment is the activity compartment, it contains the events and actions of the state.

For more information about working with symbols, see "Diagramming" on page 149.

MagicDraw supports four types of states: State, Composite State, Orthogonal State, and Submachine State. Define the selected state in the **Composite State Specification** dialog box.



Enter Password

State	
Name	Enter Password
Owner	[Untitled1]
Applied Stereotype	
State Invariant	
Connection	
To Do	
Entry	
Behavior Type	<UNSPECIFIED>
Behavior Element	
Do Activity	
Behavior Type	<UNSPECIFIED>
Behavior Element	
Exit	
Behavior Type	<UNSPECIFIED>
Behavior Element	

Figure 500 -- State Specification dialog box

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General Contains the state actions, events and buttons for editing the list.	**State Invariant**	Type text or click '...' to open the **Edit State Invariant** dialog box.
	Connection	Click "+" to open the **Connection Point Reference** dialog box. Specify the information for the connection.
	Actions group box	
	Entry	
	Behavior Type	Select a type from the activity, interaction, or state machine items list.
	Behavior Element	Click '...' and select an element from the activity, interaction, or state machine items list. The corresponding dialog box opens.
	Do Activity	
	Behavior Type	Select a type from the activity, interaction, or state machine items list.
	Behavior Element	Click '...' and select an element from the activity, interaction, or state machine items list. The corresponding dialog box opens.
	Exit	

Tab name	Box name	Function
	Behavior Type	Select a type from the activity, interaction, or state machine items list.
	Behavior Element	Click '...' and select an element from the activity, interaction, or state machine items list. The corresponding dialog box opens.
Inner States The list of inner states and buttons for editing them	**Name**	The name of the inner state.
	Type	The type of the inner state.
	Region	The region, to which an inner state was added.
Internal Transitions A set of transitions that, if triggered, occurs without exiting or entering the state.	**Name**	The name of the internal transition.
	Create	The **Transition Specification** dialog box opens. Define the transition.
	Delete	Remove the selected transition from the state.

To suppress / unsuppress the actions compartment

In the state shortcut menu, select/clear the **Suppress Actions** check box.

To insert a new region to the state

- In the state shortcut menu, select **Insert New Region.**

To insert a new inner state to the state

- In the Browser, drag and drop the selected state to a Region.
- On the diagram pane, select the state and drag and drop it on the state symbol.

To display region name on the state symbol

Region name can be optionally displayed on the State symbol on a diagram.

To display or hide region name

- On a diagram from the State symbol shortcut menu check or clear the **Show Region Name** check box.

- In the State **Properties** dialog box select or clear the **Show Region Name** check box.

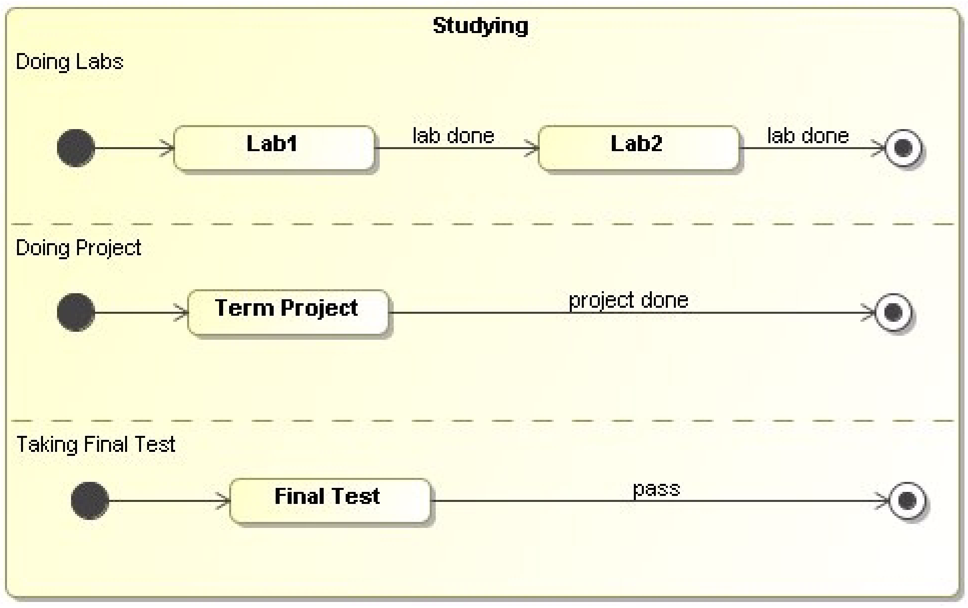


Figure 501 -- Displaying region name on the State symbol

Changing State to Composite/submachine/orthogonal State

You can change your current state to a simple state, composite state, orthogonal state, and submachine state.

To change the state to the composite state

1. From the State diagram toolbar, select the State to draw on the diagram pane.
2. From the state shortcut menu, select the **Add New Region** command. The region is added and the state shape enlarges.

To change the state to the orthogonal state

1. From the State diagram toolbar, select the State to draw on the diagram pane.
2. From the state shortcut menu, select the **Add New Region** command. The region is added and the state shape enlarges.
3. Open the state shortcut menu again and add the second region to the state.

To change the state to the submachine state

1. From the State diagram toolbar, select the State to draw on the diagram pane.
2. From the state shortcut menu, select the **Submachine** command and select an existing State Machine from the list, or click **New** to create a new one.

NOTE	To change the state to the submachine state, all regions from the state should be removed. To do this, select the state on the diagram pane and from the shortcut menu, select the **Remove Region** command.

Composite State

A composite state either contains one region or is decomposed into two or more orthogonal regions. Each region has a set of mutually exclusive disjoint subvertices and a set of transitions. A given state may only be decomposed in one of these two ways.

Any state enclosed within a region of the composite state is called a substate of that composite state. It is called a direct substate when it is not contained by any other state; otherwise it is referred to as an indirect substate.

Each region of the composite state may have an initial pseudostate and a final state. A transition to the enclosing state represents a transition to the initial pseudostate in each region.

For more information about working with symbols, see "Diagramming" on page 149.

Define the selected composite state in the **State Specification** dialog box. For a detailed description of this dialog box, see figure "State Specification dialog box" on page 760.

For more information on working with states, see "State" on page 759.

To add a new region to the composite state

Select **Add New Region** from the composite state shortcut menu.

To remove a region from the composite state (at least two regions have to be left)

Select **Remove Region** from the composite state shortcut menu and select a region you want to remove.

Submachine

A submachine state specifies the insertion of the specification of a submachine state machine. The state machine that contains the submachine state is called the containing state machine. The same state machine may be a submachine more than once in the context of a single containing state machine.

The submachine state is semantically equivalent to a composite state. The regions of the submachine state machine are the regions of the composite state. The entry, exit, behavior actions, and internal transitions, are defined as part of the state. The submachine state is a decomposition mechanism that allows factoring of the common behaviors and their reuse.

For more information about working with symbols, see "Diagramming" page 149.

Define the selected submachine in the **State Specification** dialog box. For a detailed description of this dialog box, see figure "State Specification dialog box" on page 760.

For more information on working with states, see "State" on page 759.

Adding connection point reference

The connection point reference represent an entry to or exit from the submachine state. It can be used as the source or target of a transition.

To draw the connection point reference on the submachine state

1. In the state diagram toolbar, click the **Connection Point Reference** button. Click on the diagram pane on the submachine state shape. The **Select Entry/Exit Point** dialog box opens.
2. Select *entry point* to define the entry into the submachine state or *exit point* to define the exit from the submachine state. The Connection Point Reference is drawn on the submachine state with a defined entry or exit point.

To see the assigned entry/exit point, open the **Connection Point Reference** dialog box. The **Entry** or **Exit** properties will display the defined entries.

To assign the entry/exit points to the Connection Point Reference

Select the Connection Point Reference on the diagram pane. Open the shortcut menu and select the **Select Entry/Exit Point** command.

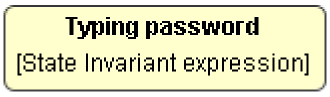
NOTE	In the **Select Entry/Exit Point** dialog box, only these entry and exit points are listed, which are created at the same State Machine as the submachine state. If there are no entry/exit points at the same state machine, the **Select Entry/Exit Point** dialog box is not opened when drawing the Connection Point Reference.

Defining State Invariant

To define a state condition

- Double-click on the state to open the **State Specification** dialog box and in the **State Invariant** field, type an condition and submit changes.
- Near the **State Invariant** field, click "**...**" button. The **Edit State Invariant** dialog box opens. Type the condition and close the dialog box by submitting changes.

The State Invariant value is displayed on the diagram pane on the state shape in brackets:



Assigning behavior to state

You may define a behavior to be executed correspondingly to the listed events while being in the state whenever the state is entered and exited.

To assign a behavior to a state

1. Double-click the state to open the **State Specification** dialog box.

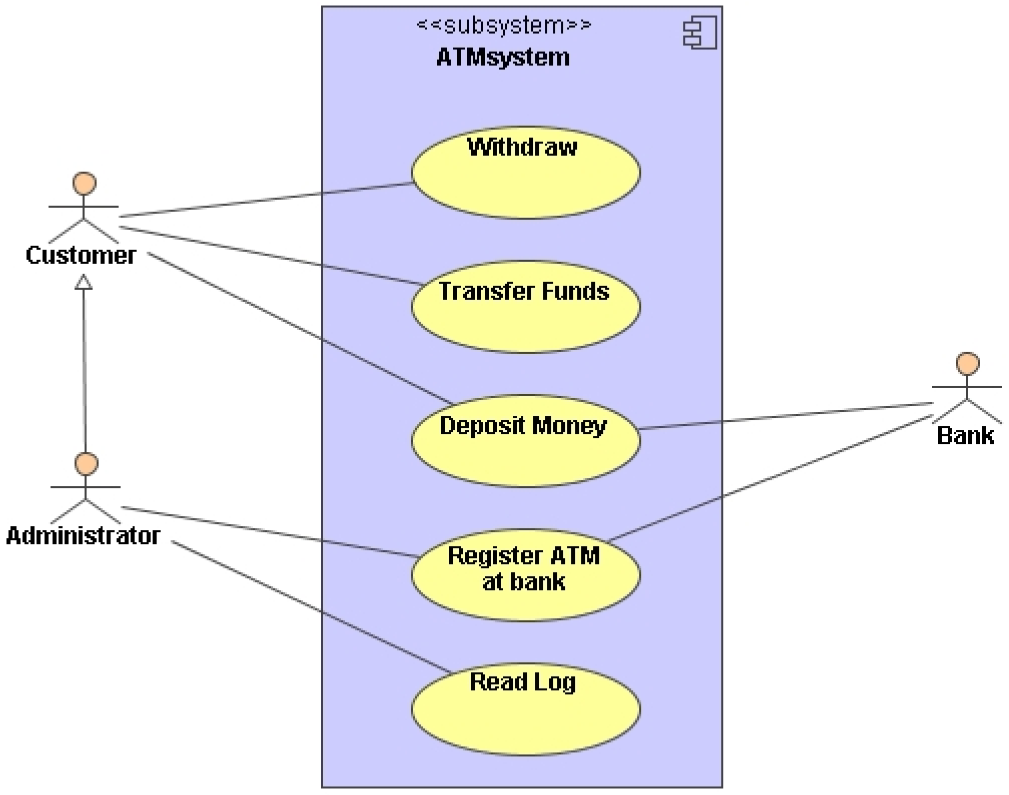
In the Do Activity, Entry or Exit group, the Behavior Type combo box, assign one of the behaviors: Activity, Interaction, or State Machine.

Subsystem

A subsystem is treated as an abstract single unit. It groups model elements by representing the behavioral unit in a physical system.

To draw a subsystem

1. In the Use Case diagram toolbar, select the Subsystem element to draw.



Swimlane

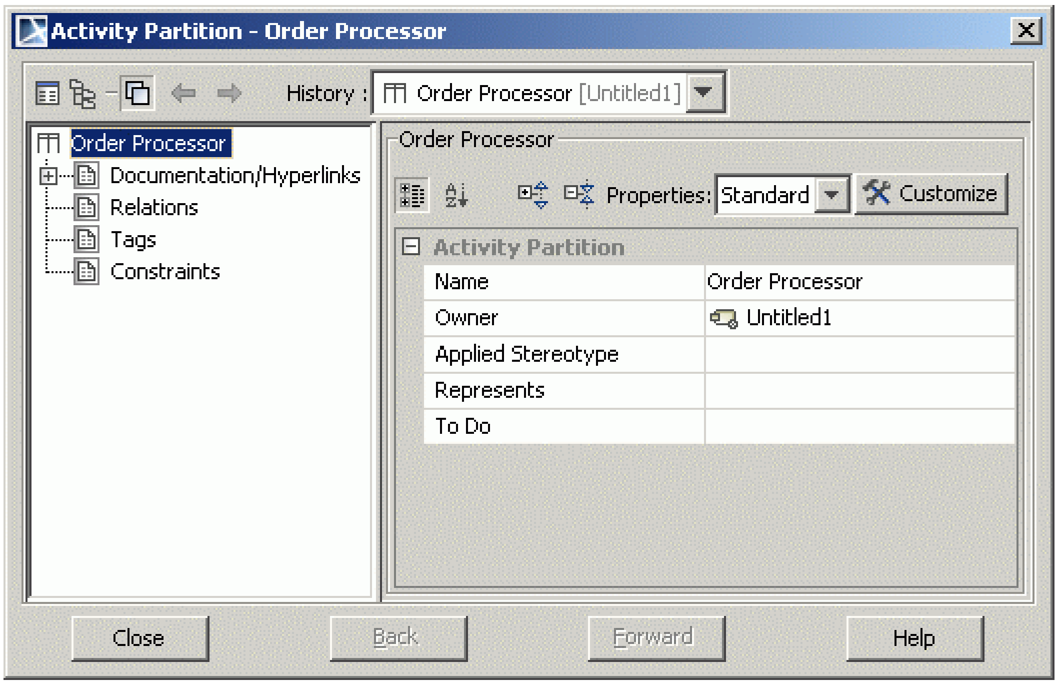
Actions and subactivities can be organized into swimlanes in the activity diagrams. The swimlanes are used to organize responsibility for actions and subactivities according to the class. They often correspond to the organizational units in a business model.

The swimlanes limit and provide a view on the behaviors invoked in the activities. They consist of one or more partitions. They may be vertical and horizontal.

An activity diagram can be divided visually into “swimlanes”, each separated from the neighboring swimlanes by vertical or horizontal solid lines on both sides. Each swimlane represents a responsibility for part of the overall activity, and may eventually be implemented by one or more objects. The relative ordering of the swimlanes has no semantic significance, but may indicate some affinity. Each action is assigned to one swimlane. Transitions may cross lanes. There is no significance to the routing of a transition path.

To open the **Activity Partition Specification** dialog box

Select **Specification** from the partition (swimlane) shortcut menu, or double-click the partition line.



Order Processor

Activity Partition	
Name	Order Processor
Owner	Untitled1
Applied Stereotype	
Represents	
To Do	

Figure 502 -- Activity Partition Specification dialog box

Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section.

Tab name	Box name	Function
General Set general information about the partition	**Owner**	Shows the name of the activity diagram where the partition is placed.
	Represents	Click the "..." button to open the **Select Elements** dialog box. Assign a model element that represents the partition.

To draw a swimlane on the diagram

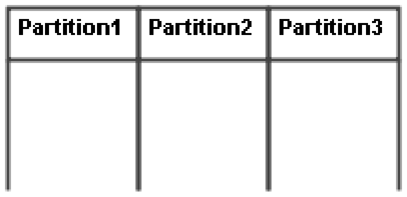
Click the **Swimlane** button on the diagram toolbar and click the diagram.

To set a name for a swimlane

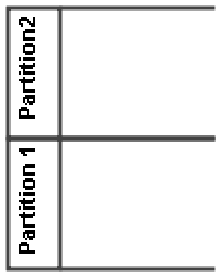
1. Double-click the swimlane line or select **Specification** from the line shortcut menu.
2. The **Activity Partition Specification** dialog box opens. Type a name in the **Name** box.
- Type the name directly on the Diagram pane.

The Horizontal and Vertical Swimlanes

The following is an example of vertical swimlanes:



The following is an example of horizontal swimlanes:



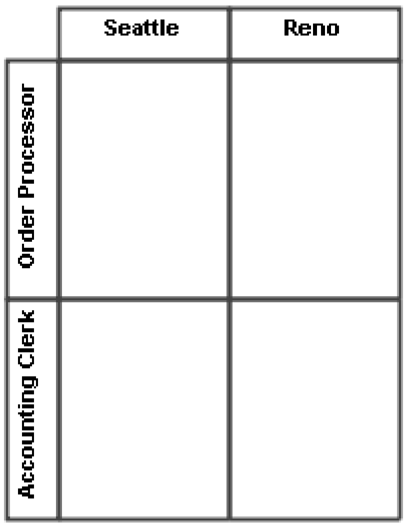
To add an additional partition

Select a swimlane on the diagram pane and from the shortcut menu, select **Insert Vertical Swimlane** or **Insert Horizontal Swimlane**.

To draw multidimensional swimlanes

1. Draw a vertical swimlane.
2. From the swimlane shortcut menu, select the **Insert Horizontal Swimlane** command.
3. Insert as many horizontal and vertical swimlanes as you need.

The following is an example of the multidimensional swimlanes:

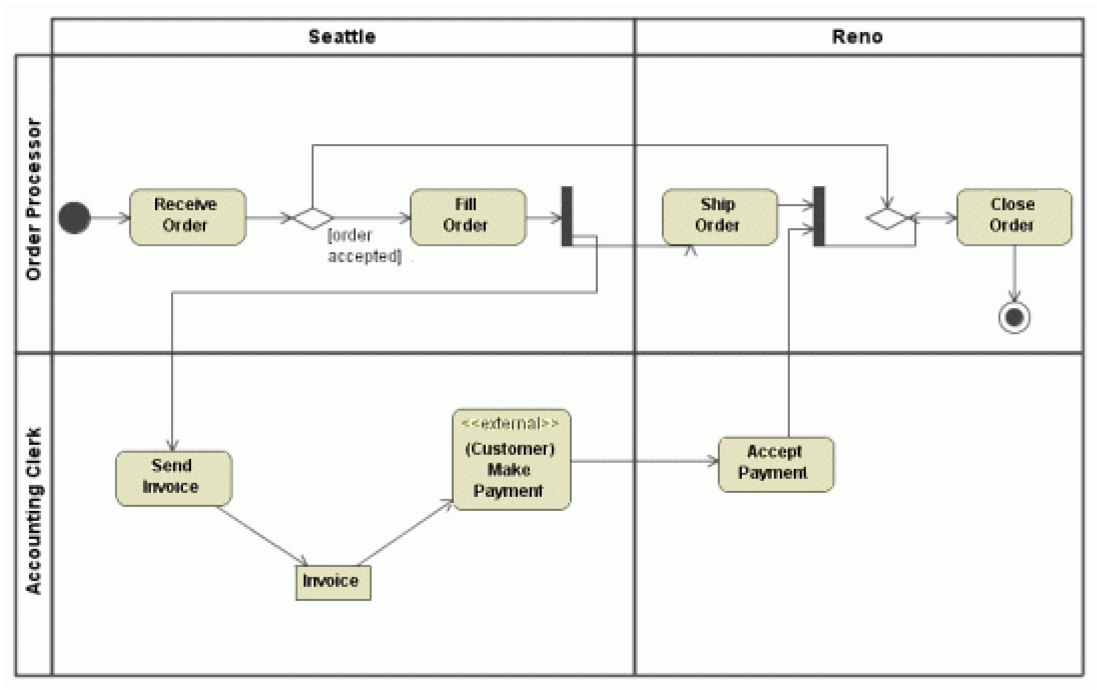


To add model elements to a swimlane

If a swimlane is already drawn in the activity diagram, drawing an action (or any other element) will highlight the swimlane in blue. This means that the action shape will depend on the swimlane symbol.

NOTE	If the model elements depend on a swimlane symbol, they will be deleted if the swimlane symbol is deleted.

The multidimentional swimlanes with elements added are shown in the following figure:



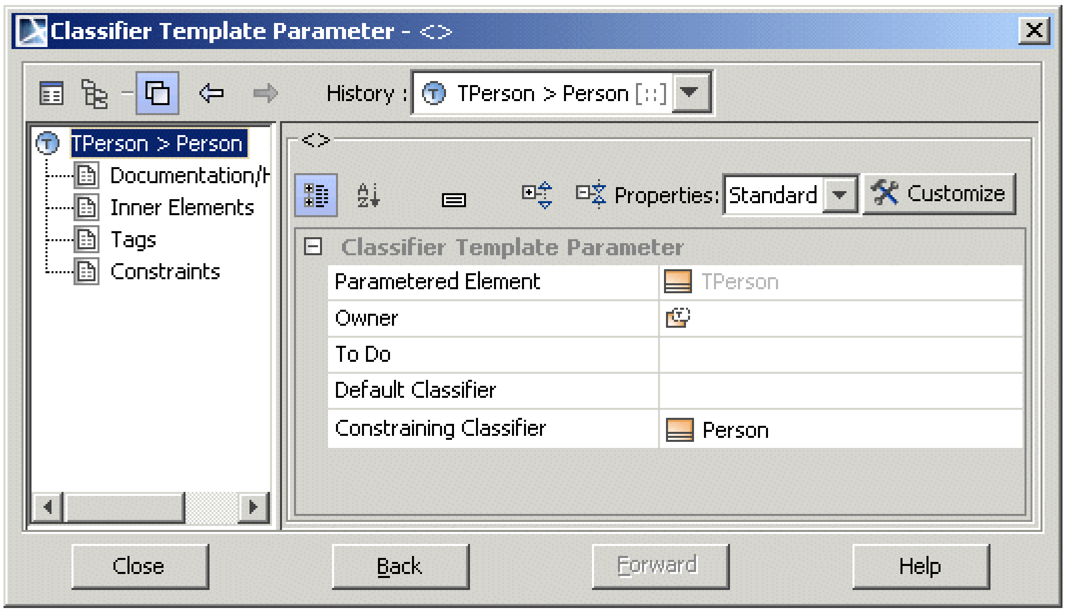
Template / Parameterized class

To define a parameterized class

1. Double-click the class shape or select **Specification** from the class shape shortcut menu. The **Class Specification** dialog box opens. Click the **Template Parameters** tab.
2. To add or edit a parameterized class, click the **Create** button. The **Select Template Parameter Type** dialog box opens. Select the type from the model tree and click **OK.**
3. To remove the selected parameterized class, click the **Delete** button.

To open the **Classifier Template Parameter Specification** window

In the element **Specification** dialog box tree, expand the **Template Parameters** tab and double click the selected template.



Classifier Template Parameter

Parametered Element	TPerson
Owner	
To Do	
Default Classifier	
Constraining Classifier	Person

Figure 503 -- Classifier Template Parameter Specification dialog box

Select the **Expert** mode from the **Properties** field to show more properties of the template parameter.

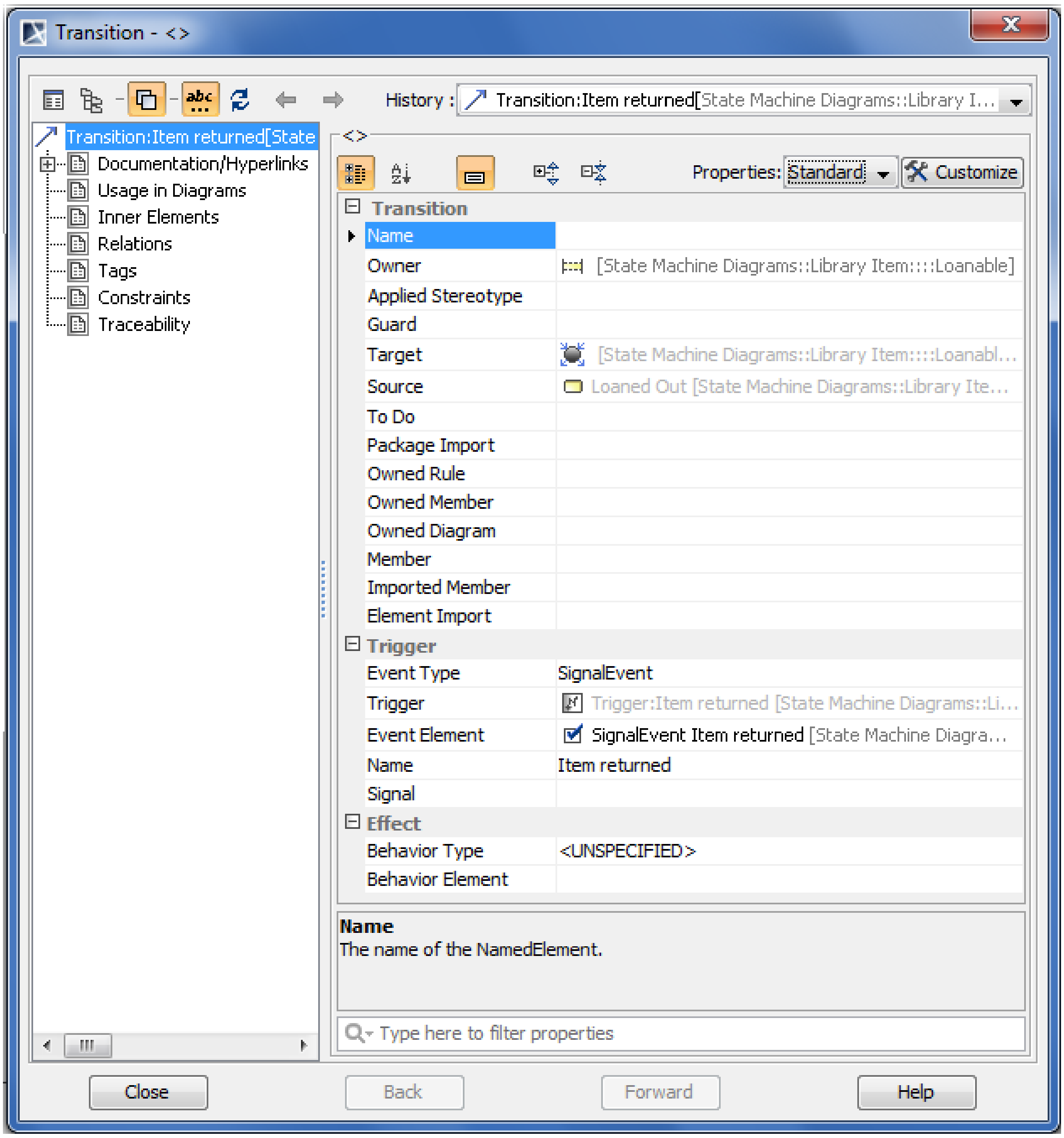
Refer to "Specification Window" on page 219 for information about the specification elements not covered in this section

Tab name	Box name	Function
General	**Parametered Element**	The name of the element, which was parametered by a template parameter.
	Owner	The name of the element, which contains the template parameter.

Transition

A transition is a directed relationship between a source vertex and a target vertex. It may be part of a compound transition, which takes the state machine from one state configuration to another, representing the complete response of the state machine to an occurrence of an event of a particular type.

The selected transition could be defined in the transition’s Specification window.


Transition - <>

History : Transition:Item returned[State Machine Diagrams::Library I...

- Transition:Item returned[State
  - Documentation/Hyperlinks
  - Usage in Diagrams
  - Inner Elements
  - Relations
  - Tags
  - Constraints
  - Traceability

<>

Properties: Standard | Customize

Transition	
Name	
Owner	[State Machine Diagrams::Library Item:::Loanable]
Applied Stereotype	
Guard	
Target	[State Machine Diagrams::Library Item:::Loanabl...
Source	Loaned Out [State Machine Diagrams::Library Ite...
To Do	
Package Import	
Owned Rule	
Owned Member	
Owned Diagram	
Member	
Imported Member	
Element Import	
Trigger	
Event Type	SignalEvent
Trigger	Trigger:Item returned [State Machine Diagrams::Li...
Event Element	SignalEvent Item returned [State Machine Diagra...
Name	Item returned
Signal	
Effect	
Behavior Type	<UNSPECIFIED>
Behavior Element	

Name
The name of the NamedElement.

Type here to filter properties

Close | Back | Forward | Help

Figure 504 -- Transition’s Specification window

For more information about the specification elements not covered in this section, refer to "Specification Window" on page 219.

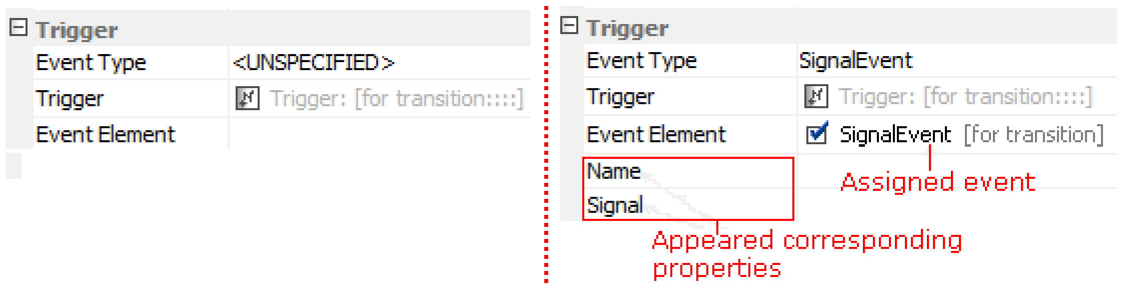
Tab name	Property name	Description
General Set a general information about the transition.	**Guard**	A guard is an expression that is attached to a transition as a fine-grained control over its execution. The guard is evaluated when an event instance is dispatched by the state machine.
	Target	The name of the model element, which is the target of the transition.
	Source	The name of the model element, which is the source of the transition.
	Trigger property group	
	Event Type	The type of the event.
	Trigger	The trigger that specifies the event that causes the transition.
	Event Element	The particular event that causes a trigger.
	Effect property group	
	Behavior Type	The type of the affected action.
	Behavior Element	The optional behavior that is performed when the transition fires.

To assign an event type

1. Open the transition's Specification window.
2. In the **General** tab, click the **Event Type** property value cell. The list of available event types will open. For more information about event types, refer to "Events" on page 681.

NOTE	The **Event Type** property belongs to the **Trigger** group. If you do not see this property, click the **+** button near the **Trigger** property group to expand its content.

3. Select the event type from the list.
4. According to the selected event type, the **Event Element** property value will be defined as well as additional corresponding properties will appear in the **Trigger** property group.
5. Click the **Close** button.



Trigger	
Event Type	<UNSPECIFIED>
Trigger	Trigger: [for transition::::]
Event Element	

Trigger	
Event Type	SignalEvent
Trigger	Trigger: [for transition::::]
Event Element	✓ SignalEvent [for transition]
Name	
Signal	

Figure 505 -- Trigger group before assigning event type (on the left) and after assigning event type (on the right)

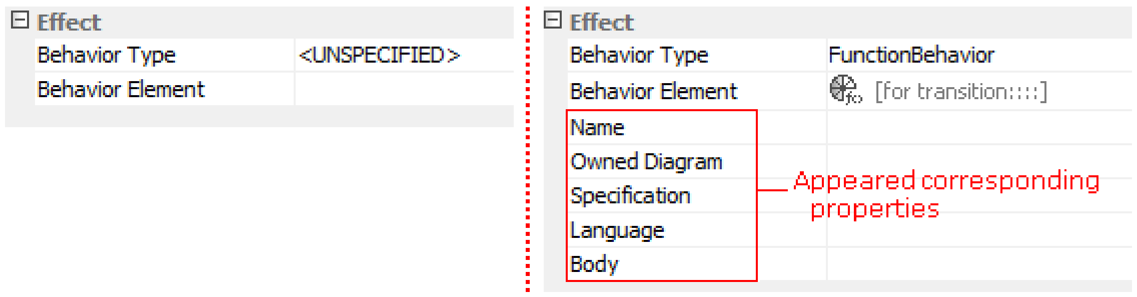
To assign a behavior type

1. Open the transition's Specification window.

2. In the **General** tab, click the **Behavior Type** property valuecell. The list of available behaviors will open. For more information about event types, refer to "Event types" on page 682.

NOTE	The **Behavior Type** property belongs to the **Effect** property group. If you do not see this property, click the **+** button near the **Effect** property group to expand its content.

3. Select the behavior from the list.
4. According to the selected behavior, additional corresponding properties will appear in the **Effect** property group.
5. Click the **Close** button.



Effect	
Behavior Type	<UNSPECIFIED>
Behavior Element	

Effect	
Behavior Type	FunctionBehavior
Behavior Element	[for transition::::]
Name	
Owned Diagram	
Specification	
Language	
Body	

Figure 506 -- Effect group before assigning behavior type (on the left) and after assigning behavior type (on the right)

Easier way of event type assigning

You can assign an event type to a transition by typing an appropriate command on a selected transition path. The event type can be one of the following:

- AnyReceiveEvent
- CallEvent
- ChangeEvent
- TimeEvent

To assign an event type by typing an appropriate command

1. Select a transition.
2. Type a command. The commands that can be used are listed in the following table.

Event Type	**Command Syntax**
AnyReceiveEvent	**all**
ChangeEvent	**when (***expression***)**
SignalEvent	*signal name*
TimeEvent	**at (***time)*, if time is specified as relative
	after (*time*), if time is specified as absolute

NOTE	You should specify arguments in brackets according to your project needs.

The typed command with the argument will be displayed on the transition path.

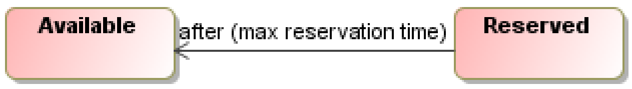


Figure 507 -- Time event assigned to transition

Transition properties, such as **Event Type**, **Trigger**, and **Event Element**, will be speciefied automatically after the event is assigned to the transition. To see these properties, open the transition's Specification window.

There is an exception for the event type named Call Event. If an event of this type has an operation defined, the name of the operation will be displayed on the transition path. Use the procedure "To assign an event type" on page 771 to assign this type of event.

IMPORTANT!	The event type assignment by typing commands is also available for transitions to self in State Diagrams as well as for protocol transitions and protocol transition to self in Protocol State Diagrams.

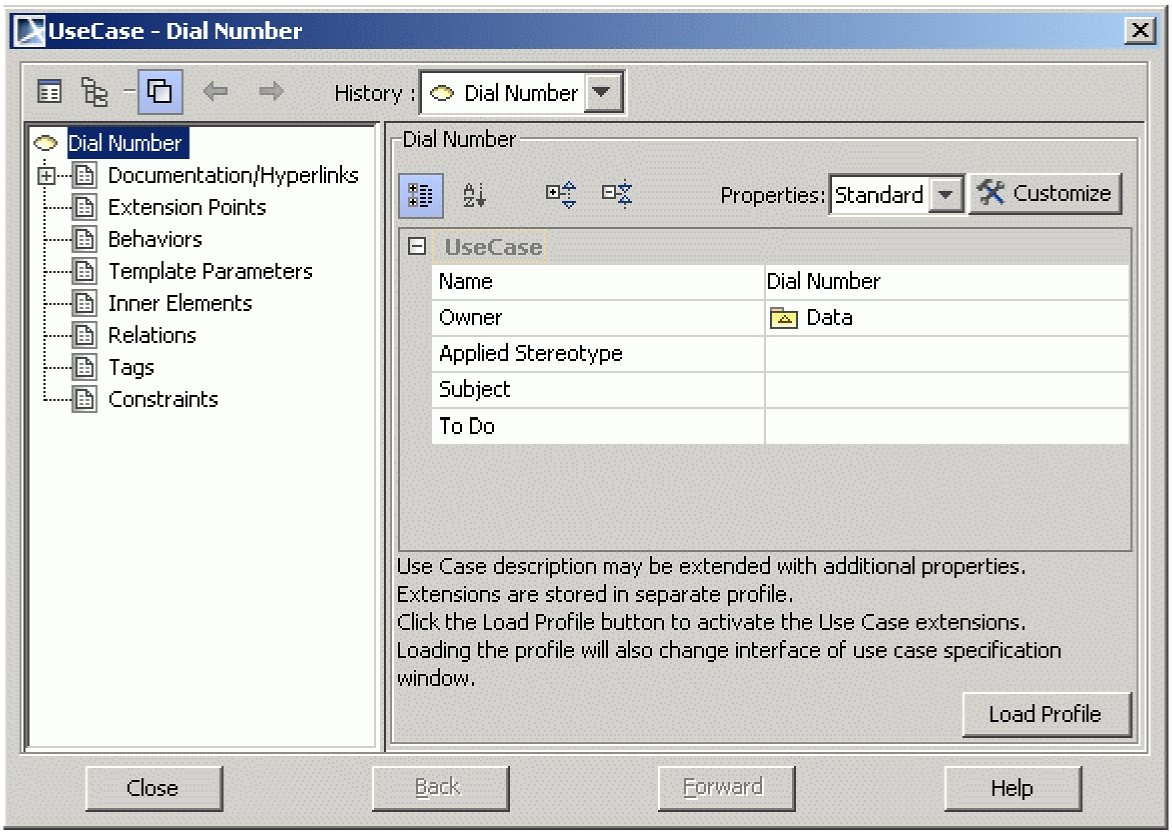
Use Case

A use case represents a typical interaction between a user and a system. It captures some of the functionalities and data that the user works with. It is a type of behavioral classifier that represents a declaration of an offered behavior. Each use case specifies a type of behavior, including the variants, that the subject can perform in collaboration with one or more actors. The subject of a use case could be a physical system or any other element that may have the behavior, such as a component, a subsystem, or a class.

An extension point is a reference to one location within a use case where an action sequences from other use cases can be inserted. Each extension point has a unique name within the use case and a description of the location within the behavior of the use case.

A use case is shown as an ellipse with the the name inside it. The extension points are listed in the Extension Points compartment of the use case.

Define the selected use case in the **Use Case Specification** dialog box.



Dial Number

UseCase

Name	Dial Number
Owner	Data
Applied Stereotype	
Subject	
To Do	

Use Case description may be extended with additional properties. Extensions are stored in separate profile. Click the Load Profile button to activate the Use Case extensions. Loading the profile will also change interface of use case specification window.

Figure 508 -- Use Case specification dialog box

Refer to the “Specification Window” on page 219 for information about specification elements..

Group name	Box	Function
General	**Load Profile**	Loads the Use Case description profile that contains specific extensions. **NOTE** This functionality is available in Standard, Professional, Architect, and Enterprise editions only.
Behaviors From the drop down list, select an activity, state machine, or interaction to create within a use case.	**Type**	The type of the created element.
	Name	The name of the created element.
	Create	The list of elements to create opens. Select the element and define the properties in the open properties list.
	Delete	Remove the selected diagram from the use case.
Extension Points	**Create**	Define a new extension point.
	Delete	Remove the selected extension point from the use case.
Inner elements From the drop down list, choose diagrams or constraints to create as an inner element of the use case.	**Name**	Type the name for a newly created diagram.
	Type	The type of the created diagram.
	Create	The list of diagrams opens. Select a diagram or constraint and define properties in the open properties list.
	Delete	Remove the selected inner element from the use case.

For more information about working with symbols, see "Diagramming" on page 149.

To add an extension point for the use case

1. Open the **Use Case Specification** dialog box.
2. Click the **Extension Points** group.
3. Click **Create**. The **Extension Point** properties window opens. Here you may specify the extension point.

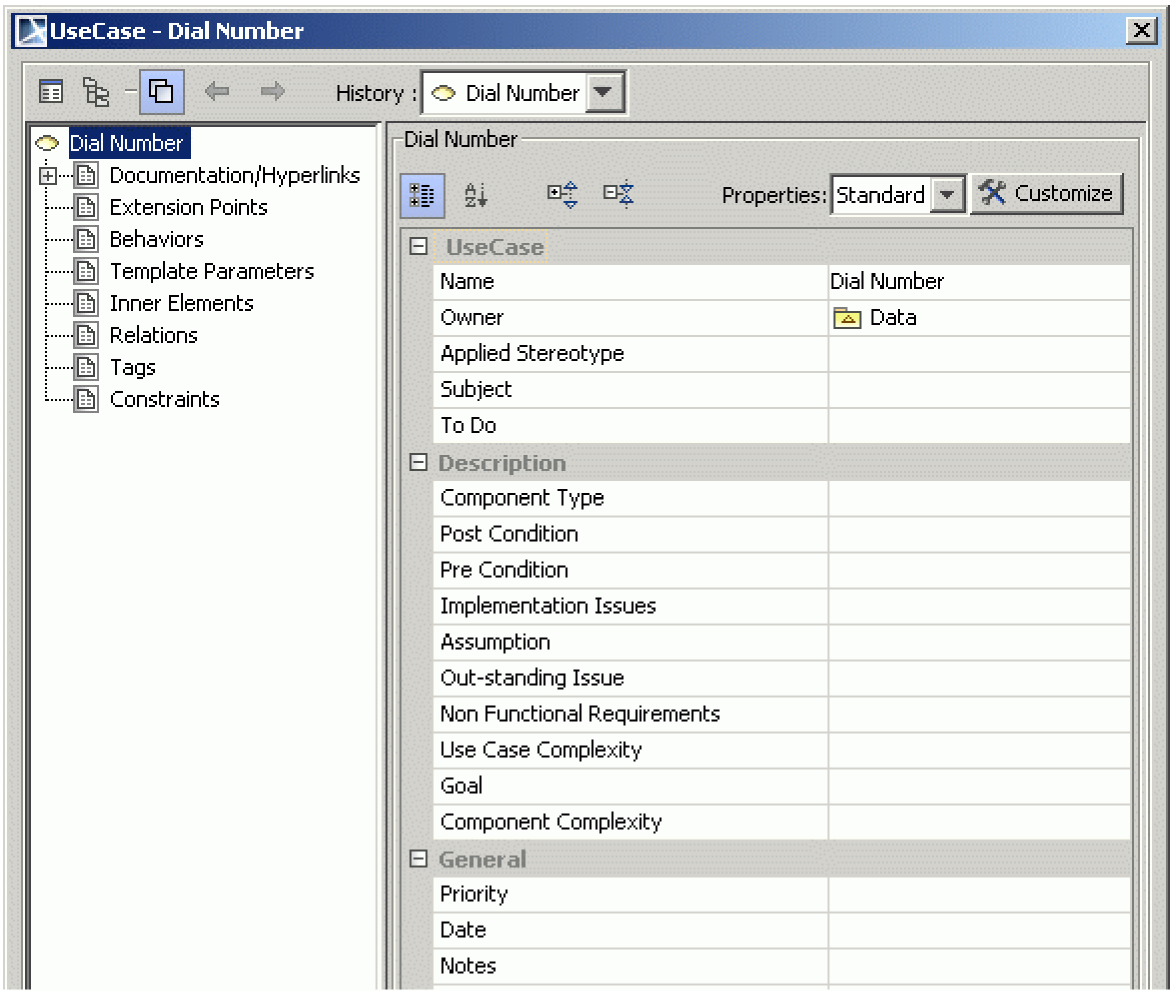
- Press CTRL+ALT+E.
- From the use case shortcut menu, select **Insert New Extension Point**.
- From the use case shortcut menu in the Browser, select **New Element**, and then **Extension Point**. Type the name of the extension point.

TIPS! You may create an extension point directly on a diagram: Draw an extension path between two use cases. Then click **YES** in the message window. Once it is created, specify its name.

You may define a use case as abstract (for the detailed description, see "Generalizable elements" on page 691).

Use Case Extension

MagicDraw provides the UseCase description extensions. Now you may define the pre-conditions and post-conditions for the use cases and other extensions, which are implemented as properties and tags in the **Use Case Specification** dialog box. MagicDraw contains the UseCase Description profile, which can be loaded from the **Use Case Specification** dialog box. The properties are available in the **Use Case** Specification window:


UseCase - Dial Number

History : Dial Number

Dial Number
- Documentation/Hyperlinks
- Extension Points
- Behaviors
- Template Parameters
- Inner Elements
- Relations
- Tags
- Constraints

Dial Number

Properties: Standard Customize

UseCase	
Name	Dial Number
Owner	Data
Applied Stereotype	
Subject	
To Do	
Description	
Component Type	
Post Condition	
Pre Condition	
Implementation Issues	
Assumption	
Out-standing Issue	
Non Functional Requirements	
Use Case Complexity	
Goal	
Component Complexity	
General	
Priority	
Date	
Notes	

The properties are mapped to tags, which can be listed in the **Specification** dialog box, **Tags** group. If the tags cannot be seen, apply <<*requirementUseCase*>> stereotype to the use case.

IMPORTANT The tag definitions from the UseCase Description profile are only visible in generated reports, not on the diagrams. For a detailed description about reports, see in “Controlling Merge memory usage” on page 342. For a detailed description of working with tag definitions, see in “Specification Window” on page 219.

To display the tag definitions from the UseCase Description profile on the diagram

1. Open the UseCase Description profile UseCase_Profile.xml as a project (this profile is located in the <MagicDraw installation directory>/profiles folder).
2. In the Browser tree select the property, which represents the tag definition and open its **Specification** dialog box.
3. In the **Applied Stereotype** field, remove «*InvisibleStereotype*».
4. Save the project.
5. Reload the profile in the project you are working: from the UseCase Description Profile shortcut menu in the Browser tree, select **Modules**, and then **Reload Module**.

Value Specification

You can create a standalone value specification in a model using the appropriate element shortcut menu.

NEW! As of version 17.0.1, MagicDraw supports a new primitive type - Real. The **Literal Real** specification has been added to the Value Specification list.

You can use any of the following ways to create a value specification:

- Via the element’s shortcut menu.
- Via the element’s Specification window.
- By defining a default value to an element.

You can also change an assigned value specifcation after it has been created.

To create a value specification from the element's shortcut menu

1. Select an appropriate element in the Model Browser.
2. Right-click the element. On the shortcut menu point to **New Element** > **Value Specification** and then select a suitable value specification.

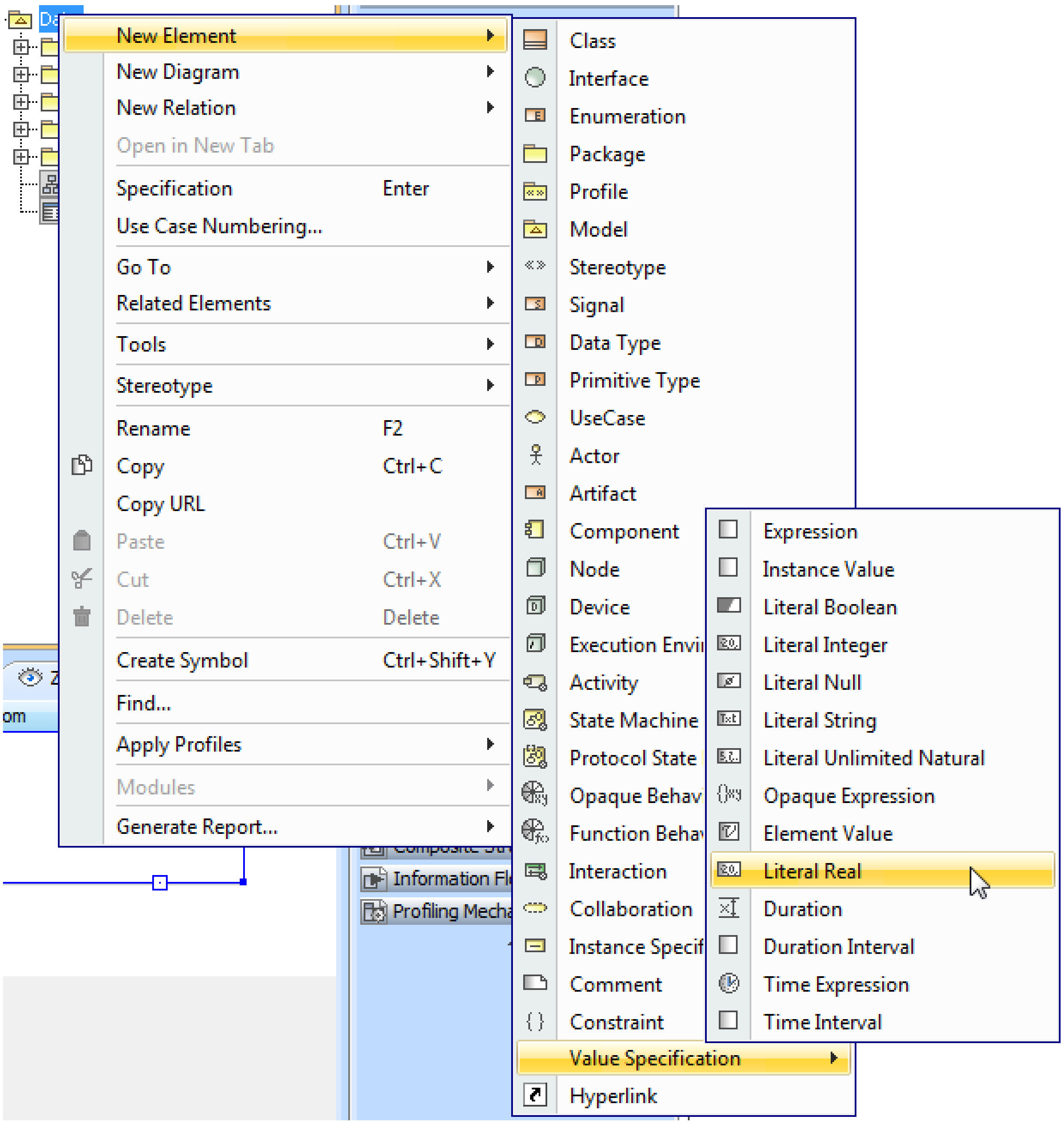


Figure 509 -- Creating value specification from element's shortcut menu

NOTE	Since version 16.0, Value Specifications are displayed in the Containment tree.

To assign a value specification in the element's Specification window

1. Open the Specification window of the selected element.
2. Click an appropriate property value cell.
3. Click the Show Shortcut Menu button (the black arrow).
4. On the shortcut menu, click **Value Specification** and then select a value specification.

To create a value specification automatically

1. Assign a default value to a property for which you want to create a value specification.
2. The value specification of the corresponding type will be assigned automatically according to the assigned default value in your model.

To change an assigned value specification

1. Open the Specification window of the selected element.
2. Click an appropriate property value cell.
3. Click the Show Shortcut Menu button (the black arrow).
4. From the shortcut menu, select **Value Specification** > **Delete** <value specification>.
5. Assign a new value specification.

12 APPENDIX I: MENUS, BUTTONS, AND ICONS

This chapter includes the descriptions of the menu system, the toolbar buttons and the Browser window buttons of the MagicDraw graphical user interface (GUI), and also the descriptions of the icons used in modules and profiling mechanism.

Menu System

File menu

Command	Button / Hot keys	Function
New Project	🗋 CTRL+N	Creates a new project. Choose an icon to create a new Blank Project, create a Project from an Existing Source, or create a Project from a Template. A project is nameless until you close or save it by choosing the **Save Project** or **Save Project As** commands. You may simultaneously create as many new projects as you wish, without saving and closing the previously created or open projects. You may work on only one open or created project at a time. If you wish to work with another project, select the project name in the **Projects** list on the main window toolbar.
Open Project	📂 CTRL+O	Opens an existing project. The **Open** dialog box appears. Select a project you wish to open. You may open as many projects as you wish. If you wish to work with another project, select the project name in the **Projects** list on the main window toolbar.
Save Project	💾 CTRL+S	Saves the open project. To save the current project for the first time, type the name of the project and select the format of the file you wish to save.
Save Project As		Saves the project giving it a name. Use this command to save the current project for the first time or under a different name, the **Save** dialog box appears. Type the name of the project and select the format of the file you wish to save.
Close Project		Closes an open project. If the open project has unsaved changes, MagicDraw displays a dialog box asking whether the changes should be saved before the project is closed.
Close All Projects		Closes all open projects. If the open projects have unsaved changes, MagicDraw displays a dialog box asking whether the changes should be saved before the each project is closed.
Open Element from URL		You can open any elements through their URLs by clicking the **Open Element from URL** command and the element will be highlighted in the Containment tree or in the diagram. For more information about element URL, see “Copying/Opening Element URLs” on page 292.
Use Module		The **Use Module** dialog box appears. Choose profile or module for use in the project.

Command	Button / Hot keys	Function
Import From		Imports data from: ● Another project - The **Import** dialog appears. Select the project you wish to import. You may import as many projects as you wish. Imports an existing project to a previously open project. This is the recommended command for importing an existing project to the teamwork server. ● CSV file ● UML XMI 1.0, 1.1, 1.2, 2.1, **NEW!** 2.4 file ● MagicDraw Native XML file ● MOF XMI File ● CA ERwin Data Modeler 7.x file ● Eclipse UML 2 (v1.x, v2.x, v3.x) XMI file ● Enterprise Architect 2.1 XMI 2.1, **NEW!** 2.4 file ● Rational Software Architect/Modeler project ● Rational Rose *.mdl project file
Export To		Exports the project to: ● Module. The content of the selected objects is saved in a separate file. ● Template. The project is saved as a template project. ● UML XMI 2.1, **NEW!** 2.4 file ● MagicDraw Native XML file ● EMF Ecore file ● MOF XMI file ● Eclipse UML2 (v1.x, v2.x, v3.x) XMI file. Exports the model to EMF based UML 2 compatible XMI file.
Share Packages		Saves the package as a separate module.
Save As Image		Saves the open diagram as an image of in the selected formats. The **Save As Image** command is used for saving any item or group of items selected in the diagram pane, in one of the various image file formats.
Print	CTRL+P	The **Print** dialog box appears. Printing of active diagram, selected symbols, or selected diagrams is available. Select the printer, set the options for the printer, specify the number of copies, and select the specific pages to be printed.
Print Preview		Preview the diagram before printing. The **Print Preview** screen opens.
Print Options		The **Print Options** dialog box opens.

Command	Button / Hot keys	Function
Project Properties		The **Project Properties** dialog box opens. This dialog box contains the following information: project location, file size, date created, date modified for the last time, and number of diagrams in the project. In the **Description** tab, type the description of the project or other important information. The **Modules** tab shows a list of modules the project is using. The list shows a specified number of recent project files. Specify the number of files in the **Recent Files List Size** property in the **Environment Options** dialog box.
Opened Projects		A list of open projects.
Exit		Exits the application. All open projects are closed. If an open project has unsaved changes, the MagicDraw displays a dialog box asking whether the changes should be saved before closing the project.

The **File** menu contains a list of recent projects. The shortcuts with numbers to recent projects are displayed. If the shortcut is selected from the **File** menu, the recent project will open instantly.

Edit menu

MagicDraw allows you to use the **Edit** menu commands while drawing the diagrams on the Diagram pane. The commands allow selecting, cutting, copying, and pasting of items and entire diagrams, reversing the actions you have taken while drawing, and finding an item in the current project.

Command	Button/ Shortcut keys	Function
Undo	↶ CTRL+Z	Reverses the last action you have performed while drawing the diagram on the Diagram pane (moving, dragging, resizing, cutting, copying, pasting, deleting, selecting, editing shapes, setting project and shape properties, etc.). Actions are reversed in the opposite order you have performed them, starting with the most recent. By default, the limit of the undo mechanism is 100 steps backwards. To change the limit, choose **Environment** from the **Options** menu. The **Environment Options** dialog box appears. Change the **Undo List Size** property. The **Undo** command is unavailable until you perform any action after loading an the existing project or creating a new project. Each command has an easily recognized name. You will be able to see the command history and undo or redo one action or a group of actions. The main window will have two lists of commands: one for the undo commands, another one for the redo commands.

Command	Button/ Shortcut keys	Function
Redo	↷ CTRL+Y	Reverses the action of the **Undo** command (moving, dragging, resizing, cutting, copying, pasting, deleting, selecting, etc.). The **Redo** command is unavailable until you use the **Undo** command.
Cut	✂ CTRL+X	Cuts the selected items or group of items on the Diagram pane. The cut items are placed in the clipboard. Later they can be pasted back to the Diagram pane of the current or to another project. The **Cut** command is unavailable until you select any item or any group of items on the Diagram pane of the current project.
Copy	⧉ CTRL+C	Copies the selected items or group of items on the Diagram pane. The copied items are placed in the clipboard. The cut items can be pasted back to the Diagram pane or to another project. The **Copy** command is unavailable until you select any item or any group of items on the Diagram pane of the current project.
Copy URL		Copy a project element URL to a clipboard and share it with other as a quick reference to model elements. For more information about copying element URL, see “Copying/ Opening Element URLs” on page 292.
Paste	📋 CTRL+V	Pastes the cut or copied items or group of items from the clipboard to the Diagram pane of the current project. MagicDraw creates shapes for items, or a group of items, in the current project. You will see the data and shapes of the pasted items and diagrams in the Browser window.
Paste With New Data	CTRL+E	Pastes the cut or copied items or groups of items from the Clipboard to the Diagram pane of the current project. MagicDraw creates new data and data shapes in the current project.
Delete	🗑 CTRL+D	Deletes data together with symbol. It is unavailable until you select any item or group of items in the current project.
Delete Symbol(s)	DELETE	Deletes a symbol of model element from the diagrams, by leaving it in the model.
Select All	CTRL+A	Selects all items on the Diagram pane of a particular project.
Select All of the Same Type	CTRL+ALT+A	Selects all shapes of the selected types in active diagram. Enabled, when one or more shapes are selected in active diagram.

Command	Button/ Shortcut keys	Function
Copy as BPM	CTRL+SHIFT +B	Copies the selected model elements to the system clipboard. If no model elements are selected, the active diagram is copied.
Copy as EMF	CTRL+SHIFT +E	Copies the selected model elements to the system clipboard. If no model elements are selected, the active diagram is copied. **NOTE** Copying as EMF is available only under Windows system.
Copy as JPG	CTRL+SHIFT +J	Copies the selected model elements to the system clipboard as a JPG image. If no model elements are selected, the active diagram is copied. **NOTE** Copying as JPG is available only under Windows system.
Copy as PNG	CTRL+SHIFT +P	Copies the selected model elements to the system clipboard as a PNG image. If no model elements are selected, the active diagram is copied. **NOTE** Copying as PNG is available only under Windows system.
Find	CTRL+F	Opens the **Find** dialog box.
Quick Find	CTRL+ALT+F	Performs a quick search of class/interface, classifier, or diagram.
Find TODO		Performs a search for the TODO tagged value. Results are displayed in the Browser, **Search Results** tab.
Paths		• **Path Style** - choose the line style for drawing a path. • **Rectilinear** – drawing rectilinear lines. • **Oblique** - drawing free form lines. • **Bezier** - in computer graphics, a curve that is calculated mathematically to connect separate points in smooth, free-form curves. • **Change Path Style** – switches in series between rectilinear, oblique, and bezier path line style. Shortcut is CTRL+L. • **Reset Labels Positions** – resets the changed path labels (name, roles, etc.) to the default position. • **Remove Break Points** – removes the break points of the path and makes the path a line straight.
Symbol		All commands that are available through the shortcut menu for a particular symbol.

View menu

Command	Button / Hot keys	Function
Fit In Window	CTRL+W	Reduces the size of the whole diagram to fit in the Diagram pane.
Zoom In	CTRL+NUMPAD PLUS SIGN (+)	To change the zoom step size choose **Environment** from the **Options** menu and set the **Zoom Step Size** property in the **Environment Options** dialog box.
Zoom Out	CTRL+NUMPAD MINUS SIGN (-)	Decreases the size of the selected objects in the diagram pane by x percent. To change the zoom step size, choose **Environment** from the **Options** menu and set the **Zoom Step Size** property in the **Environment Options** dialog box.
Zoom 1:1	CTRL+NUMPAD SLASH MARK (/)	Restores the original size of the selected diagram symbols.
Zoom To Selection	CTRL+NUMPAD ASTERICS MARK (*)	Increases the size of the selected model element on the Diagram pane to the maximum visible size.
Refresh	CTRL+R	Repaints all diagram shapes.
Grid		Set grid options. Every diagram may have its own grid settings: • **Show Grid** - show/hide grid • **Snap Paths to Grid** - use/do not use grid for drawing paths. • **Snap Shapes to Grid** - use/do not use grid for drawing shapes. • **Grid Size -** change the grid size. Type the number.
Recently Closed Diagrams	F12	Opens a list of diagrams that were last closed.

Command	Button / Hot keys	Function
Main Toolbars: • Menu Bar • File • Diagrams • Analysis Diagrams • Other Diagrams • Diagrams Navigation • Opened Projects • Perspectives • Collaboration • External Tools • Validation • Rearrangable • Hidable • Floatable • Expert Menu Mode • Expert Toolbar Mode • Customize		Clear the check boxes of the toolbars you want to hide or select/clear check boxes to rearrange toolbar modes.
Diagram Toolbars: • Symbol Editing • Path Editing • Edit • View • Layout • Rearrangable • Hidable • Floatable • Expert Mode • Customize		Clear the check boxes of the toolbars you want to hide or select/clear check boxes to rearrange toolbar modes.
Status Line		Select the check box of **Show Status Bar** or **Show Memory Monitor** to display this info on the status line.

Layout menu

Use the commands of the **Layout** menu for managing the layout of the shapes on the current Diagram pane. You must select more than one shape for other Layout menu commands. A class diagram should be open and activate before using the **Class Diagram** command in this menu.

Command	Function
Layout Options	Opens the **Diagram Layout Options** dialog box. Layout options for the diagram can be set.
Quick Diagram Layout (CTRL+Q)	Applies recommended layout with default options on the active diagram.

Command	Function
Layout Class Diagram Style	Applies layout, which uses specific layout algorithms to improve class diagram readability.
Layout Activity Diagram Style	Applies layout, which uses specific layout algorithms to improve activity diagram readability.
Layout Business Process Diagram Style	Applies layout, which uses specific layout algorithms to improve business process diagram readability.
Layout Hierarchic Style	Applies layout that portrays the main direction or flow of directed graphs. It is ideal for many application areas, especially for Workflow, Software Engineering, Customer relationship management, Configuration management, Process modeling, Database Modeling, and Bio informatics.
Layout Tree Style	Applies layout, which specializes in the layout of tree-structured graphs. The need to visualize directed or undirected trees arises in many application areas, e.g. Dataflow analysis, Software Engineering, Network management, Bio informatics.
Layout Orthogonal Style	Applies layout that is well suited for medium sized sparse diagrams. It produces compact drawings with no overlapping shapes, few crossings, and few bends. All edges will be routed in an orthogonal style, i.e. only rectilinear style links will be used.
Layout Organic Style	Applies layout of the organic style graph.
Layout Circular Style	Applies layout of the algorithm that portrays interconnected ring and star topologies. It is excellent for applications in social networking (criminology, economics, ...), network management, WWW visualization, and eCommerce.
Route Paths Orthogonal Style	Applies layout, which routes the links of a diagram using only vertical and horizontal line segments, while keeping the positions of the shapes in the diagram fixed. The routed links will usually not cross through any shapes and not overlap any other links.
Route Paths Organic Style	Applies layout, which routes the links of a diagram using oblique link style, while keeping the positions of the shapes in the diagram fixed. The routed links will usually not cross through any shapes and not overlap any other links.
Make Same Width	Applies layout to the selected shapes according to their width. After the layout, the width of the shapes is equal (according to the widest).
Make Same Height	Applies layout to the selected shapes according the their height. After the layout, height of the shapes is equal (according to the tallest).

Command	Function
Align	Aligns the selected shapes:
• Right	• Aligns the selected shape(s) vertically, starting with the rightmost shape(s).
• Left	• Aligns the selected shape(s) vertically, starting with the leftmost shape(s).
• Top	• Aligns the selected shape(s) across from the uppermost shape(s).
• Bottom	• Aligns the selected shape(s) across from the lowermost shape(s).
Center	Centers the selected shapes:
• Horizontally	• Centers the selected shape(s) on a horizontal line.
• Vertically	• Centers the selected shape(s) on a vertical line.
Space Evenly	Sets spaces among the selected shapes evenly.
• Horizontally	• Spaces between the selected shapes becomes even on a horizontal line.
• Vertically	• Spaces between the selected shapes becomes even on a vertical line.

Diagrams menu

Command	Hot keys	Function
Diagrams		Select the required diagram in the list to edit, create, remove, or open it.
Customize		The **Customize Diagrams** dialog opens.
Diagram Wizards		Wizards for creating diagrams may be opened: • Class Diagram Wizard • Package Dependency Diagram Wizard • Package Overview Diagram Wizard • Activity Decomposition Hierarchy Wizard • Hierarchy Diagram Wizard • Realization Diagram Wizard • Sequence Diagram from Java Source Wizard • Content Diagram Wizard
Previous Diagram	CTRL+0	Activates the previously open diagram.
Next Diagram	CTRL+9	Activates the next diagram.
Load All Diagrams		If there are unloaded diagrams in the project, this command loads all diagrams.

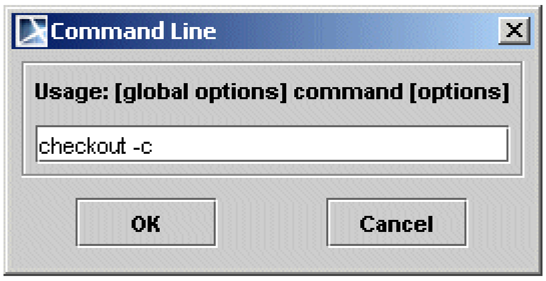
Options menu

Command	Function
Project	The **Project Options** dialog box opens.
Modules	The **Modules** dialog box opens.
Environment	The **Environment Options** dialog box opens.
Perspectives	Choose a command from the submenu - to switch to different **Perspective** or to **Customize**.

Command	Function
Look and Feel	Choose a style for the MagicDraw (GUI) from the following list: ● Metal. ● CDE/Motif. ● Vsnet (Windows). ● Office 2003 (Windows). ● Office 2007 (Windows) ● Eclipse (Windows). ● Xerto. The **Look and Feel Themes** command allows you to personalize the GUI: set your favorite colors and fonts.
Interface Style	**Single Window,** or **Multiple Windows** interface style.

Tools menu

Command	Hot key	Function
Apply Pattern		The **Pattern Wizard** dialog box appears. Create the design pattern for the selected class, interface.
Model Transformations		Opens the **Model Transformations Wizard** dialog box with a list of all available transformations.
Hyperlinks		Opens the **Hyperlink** dialog where you can add hyperlinks to any model elements.
Report Wizard		The Report Wizard is the new report engine for MD 14.0 and above. It is designed to solve the several problems of the old engines (XSL/XSLT and JPython). It supports text based templates to generate the output file. The format of output file depends on the type of the template file. The type of template files that the Report Wizard supports are normal text, RTF, HTML, Spreadsheet template (need to be saved as HTML format), and XML template (DocBook or FO). All commercial MagicDraw editions will have full use of all features within the Report Wizard. For more details, see the "*MagicDraw ReportWizard UserGuide.pdf*", which is located in the MagicDraw installation directory, Manual folder.
Quick Reverse		Choose the language you need (Java, Java Bytecode, C++, C#, CIL, CIL Disassembler, IDL, CORBA IDL, DDL, EJB, EJB 2.0, XML Schema, WSDL). Opens the **Round Trip Set** dialog box. (For more details, see Code Engineering User's Guide).
Generate Code Framework	CTRL+G	Generates code for the selected items in the current diagram. Opens the **Message Window** with the information appears (For more details, see Code Engineering User's Guide).
Check Syntax	CTRL+T	Checks syntax in the model according to the default code engineering language. Opens the **Message Window** with the information.
Set empty tags to defaults		Set default tag value to tag with empty value. This functionality is needed when the stereotype is already assigned to an element and the new mandatory tag definition with default value is created for the stereotype. After creating such a tag definition, the model elements that have the modified stereotype applied will have newly created tags unset. For more information see "To create default tag values" on page 633.
Integrations		Opens the **Integrations** dialog box with a list of tools for possible integration with MagicDraw.

Command	Hot key	Function
Requirements		
• **CaliberRM**		Integration with CaliberRM. • Opens the **Login** dialog box for login to CaliberRM server. • Logs out from CaliberRM server. • Launches CaliberRM Client application. • Opens the **CaliberRM Requirement**s window in MagicDraw.
	CTRL+ SHIFT+R	
• **DataHub**		• Starts Cameo DataHub, if it is enabled. More information about Cmaeo DataHub at http:// www.magicdraw.com/cameodatahub.
• **MagicRq**		• Starts MagicRq plugin, if it is enabled. More infomation about MagicRq plugin at http:// www.magicdraw.com/magicrq.
CVS		Performs operations with CVS (for detailed description of integration with CVS, see MagicDraw Integrations User's Guide)
• Command Line		• Allows the user to enter a CVS command line (like "checkout -c") whenever the CVS command is not available through the menus. The **Command Line** dialog box opens.  Command Line; Usage: [global options] command [options]; checkout -c; OK; Cancel. *Figure 1 -- Command Line dialog box*
• Checkout Module		• Use this option to checkout a new module on your disk. The **Checkout Module** dialog box opens.
• Add Project to CVS		• Adds a new project to CVS. The **Add Project** to CVS dialog box opens. **NOTE:** You can add, update or commit projects to CVS only if they are saved in some checked out directory or subdirectory.
• Commit Project to CVS		• Commits a project to CVS. The **Commit Project to CVS** dialog box opens.
• Update CVS Project		• Updates the current project by loading the latest project version from CVS.

Command	Hot key	Function
ProActivity ● Import		The **Import ProActivity Files** dialog box opens. Specify ProActivity files to start the import process. The UML diagrams will be generated depending on the input files.
● Export		The **Export to ProActivity** wizard guides the MagicDraw model export process to ProActivity.
Check Spelling		Checks spelling for the whole project or for the selection. The **Check Spelling** dialog opens.
Scripts		Runs the selected script. Select the script from the **Scripts** dialog.
ParaMagic Plugin		Starts ParaMagic Plugin, if it is enabled. More about ParaMagic Plugin at http://www.magicdraw.com/paramagic.
MDA		Starts CameoMDA plugin, it is enabled. More about CameoMDA Plugin at http://www.magicdraw.com/cameomda.

Analyze menu

Command	Shortcut keys	Function
Model Visualizer		Opens the **Model Visualizer** dialog box with a list of all available wizards.
Metrics		Metrics feature allows the measurement of a project by different viewpoints. Specify the metrics scope in the **Metrics Options** dialog box.
Compare Projects		Opens the **Compare Projects** dialog box, where you can choose projects to perform model differencing.
Dependency Matrix		Dependency Matrix is a method of visualizing and representing dependency criteria. Diagrams, UML, and extended UML elements serve as row and column entries. The cells in the matrix show where these elements are associated - related. Choose the **Create Blank Matrix** command to open the Matrix Dependency View. Choose the **Matrix Templates** command to open the Dependency Matrix Templates dialog box.
Dependency Checker		Opens the **Dependency Checker** dialog box to configure the options for the dependency analysis of the whole project.
Validation		Validation functionality allows the completeness and correctness evaluation of the models, created by the user, according to constraints defined in Object Constraint Language (OCL) or java code. For more information about validation, see “Validation” on page 449.
Display Paths		Displays paths among shapes that are already created in the model data.
Display Related Elements		Displays elements related to the selected element.
Create Relation Map		Creates the Relation Map for the selected element. More information about relation map, see “Relation Map” on page 401.
Used By	CTRL+ALT+U	Finds a list of all elements that reference the current element.
Depends On	CTRL+ALT+D	Finds a list of the elements that depend on the current element.
Go To		This is a feature that allows you to find model elements associated with the selected model element. Enabled when a selected element is related to another model element.

Collaborate menu

For a detailed description about Teamwork Server, see MagicDraw Teamwork System User's Guide.

Window menu

You may use commands of the **Window** menu to manage the layout of the windows.

Command	Hot key	Function
Containment		Opens the **Containment Tree** tab in the Browser window.
Inheritance		Opens the **Inheritance Tree** tab in the Browser window.
Diagrams		Opens the **Diagrams Tree** tab in the Browser window.
Model Extensions		Opens the **Model Extensions Tree** tab in the Browser window.
Search Results		Opens the **Search Results** tab in the Browser window.
Documentation		Opens the **Documentation** tab in the Browser window.
Zoom		Opens the **Zoom** tab in the Browser window
Properties		Opens the **Properties** tab in the Browser window
Messages Window	CTRL+M	Opens the **Messages Window**. The **Messages Window** is used for displaying the warnings and errors that may appear in the project. It appears automatically and is intended to display the warnings and errors after saving, loading, exporting and importing the project.
Reset Windows Configuration		All Browser tabs are placed in their default position.
List of opened diagrams		Displays a list of open diagrams.
Close All Diagrams But Current	CTRL+ SHIFT+ F4	Closes all open diagrams except the one you currently being used.
Close All Diagrams	CTRL+ ALT+F4	Closes all open diagrams.

The **Window** menu contains a list of open diagrams in the project. The list shows the specified number of the recent diagrams. This number can be customized in the **Recent Windows List Size** property in the **Environment Options** dialog box. For a detailed description on this dialog box, see the Section "Customizing Environment Options" on page 90.

Help menu

Command	Function
Help Contents	Displays a table of contents for the MagicDraw Help.
User Manual	Opens the MagicDraw User Manual.
Plugins User Manuals	Dislpays the list of all available user's guides and user's manuals.
Tip of the Day	Displays the **Tip of the Day** screen.
Report an Issue	The MagicDraw team always welcomes your initiative. Submit bugs, suggestions, and new feature requests through the **Report an Issue** dialog directly to Online Support System.
View and Submit Internal Errors	View errors received during work with MagicDraw. Send a bug report to the MagicDraw support team. For more information about submitting a bug see "Reporting issues directly from MagicDraw" on page 37.
Check for Updates	Opens The HTTP Proxy Server Connection dialog box. Set the data for connection to start the MagicDraw UML update.
<Procuct Name> License Manager	Select evaluation key, activate commercial license, or use the floating license.
Finish Offline Floating Session	If you are using offline Floating License, finish the offline session.
Show Welcome Screen	If no project is open, you may choose this command to open the Welcome screen.
What's New	Opens the New and Noteworthy section: http://www.magicdraw.com/newandnoteworthy
News Reader	Read the latest news about new updates, products, resources, and No Magic Inc. events.
Resource/Plugin Manager	Check for available updates and new resources in the **Resource/Plugin Manager** window.
MagicDraw on the Web • Online Support • Online Demo • New and Noteworthy • MagicDraw Home Page • UML Stuff • No Magic Home Page	The WWW pages where you can find additional information about MagicDraw and UML. Get online support.
Entertainment with UML	• **Memory** game. Open pictures to find pairs with as few tries as possible. • **Puzzle** game. Transpose the separate parts to get the whole picture.
About MagicDraw	Displays the information screen about the MagicDraw tool.

Main Toolbars

The main toolbars are located at the top of the MagicDraw window, below the main menu. They contain the commands for commonly used tasks, so helping to speed up your work with MagicDraw.

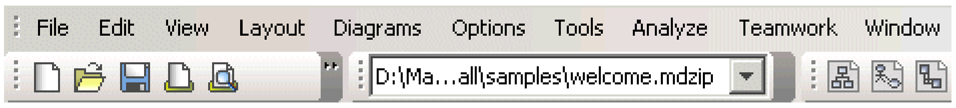


Figure 2 -- The fragment of the Main toolbars

For more information about customizing toolbars, see “Customizing toolbars” on page 72.

File Toolbar

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Button	Title (shortcut keys)	Description
	New Project (Ctrl+N)	To create a new blank project, press the **New Project** button: • The **New Project** dialog box opens. Select the **Blank Project** icon. • Specify the file name in the Name text box. • Click the "..." button to select a location to store the newly created project in your computer. Click OK.
	Open Project (Ctrl+O)	To open an existing project, press the **Open Project** button.
	Save Project (Ctrl+S)	To save the current project.
	Print Active Diagram (Ctrl+P)	To print an open diagram.
	Print Preview	The **Print Preview** dialog box opens showing how your diagram looks before printing.
	Find (Ctrl+F) Find TODO Quick Find (Ctrl+Alt+F)	Search for an element, symbol or diagram in the project according to your selected criteria.
	Undo action (Ctrl+Z)	Undo the last action you performed while drawing the diagram on the Diagram pane (moving, dragging, resizing, cutting, copying, pasting, deleting, selecting, editing shapes, setting project and shape properties, etc.). Actions are reversed in the order you have performed them. The **Undo** command is unavailable until you perform an action after loading an existing project or creating a new project. By default, the limit of the undo mechanism is 100 steps backwards. To change the limit, select **Environment** from the **Options** menu. The **Environment Options** dialog box opens. Change the **Undo List Size** property. Each command has an easily recognized name. You will be able to see the command history and undo or redo action history. The main window will have two lists of commands: one for the undo commands, another one for the redo commands.
	Redo action (Ctrl+Y)	Restore the Undo action (moving, dragging, resizing, cutting, copying, pasting, deleting, selecting, etc.). The **Redo** command is unavailable until you use the **Undo** command.

Diagrams Toolbar

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Toolbar button	**Title (shortcut keys)**	**Description**
	Class Diagram (Ctrl+Shift+1)	A class diagram is a graphic representation of the static structural model. It shows classes and interfaces, along with their internal structure and relationships. The classes represent the types of objects that are handled in a system.[a]
	Use Case Diagram (Ctrl+Shift+2)	A use case is a description of the functionality (a specific usage of a system) that a system provides.
	Communication Diagram (Ctrl+Shift+3)	A communication diagram illustrates the various static connections between objects and it models their interactions.
	Sequence Diagram (Ctrl+Shift+4)	A sequence diagram is a time-oriented view of the interaction between objects.
	State Diagram (Ctrl+Shift+5)	A state diagram describes the lifecycle of an object and its behavior (such as a procedure or operation), or a behaviored feature (such as a use case).
	Protocol State Machine Diagram (Ctrl+Shift+6)	A protocol state machine is always defined in the context of a classifier. It specifies which operations of the classifier can be called in which state and under which condition, thus specifying the allowed call sequences on the classifier operations.*
	Activity Diagram (Ctrl+Shift+7)	The purpose of an activity diagram is to focus on flows driven by the internal processing (as opposed to external events).
	Component Diagram	A component diagram represents a physical structure of a code (as opposed to the class diagram, which portrays the logical structure) in terms of code components and their relationships within the implementation environment.
	Deployment Diagram	The Deployment diagrams show the physical layout of the various hardware components (nodes) that compose a system as well as the distribution of executable programs (software components) on this hardware.
	Object Diagram	Object diagram display instances of classifiers and links (instances of associations) between them.
	Profile Diagram	The Profiles package contains mechanisms that allow metaclasses from existing metamodels to be extended to adapt them for different purposes.
	Package Diagram	Package diagram shows packages and dependencies between the packages.

Toolbar button	Title (shortcut keys)	Description
	Composite Structure Diagram (Ctrl+Shift+9)	A composite structure diagram allows a decomposition and modeling of the internal structure of classifiers.
	Interaction Overview Diagram (Ctrl+Shift+0)	The interaction overview diagrams define interactions through a variant of the activity diagrams in a way that promotes the overview of the control flow.

a. Material from the OMG UML Specification has been duplicated with permission.

Other Diagrams Toolbar

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Toolbar button	Title	Description
	CORBA IDL Diagram	CORBA IDL diagram facilitates the creation of CORBA IDL elements. Also the following patterns are available for CORBA IDL: Interface, Value Type, Type Definition, Sequence, Array, Fixed, Union, Enumeration, Struct, and Exception.
	Free Form Diagram	In the free form diagram you may draw all types of element shapes and also describe the business workflow.
	Networking Diagram	A networking diagram allows a visual display of a network topology. The Networking Profile contains stereotypes for a network description.
	Struts Diagram	A struts diagram is an extension of the UML notation. It contains the same model elements which belong to the class diagram, except they have predefined stereotypes.
	Time Diagram	A time diagram is similar to a sequence diagram, except the model elements of the time diagram have predefined stereotypes.
	User Interface Modeling Diagram	The user interface modeling diagrams makes it possible to build prototypes of user interfaces, connect UI mock-ups with the whole architectural model, export them as images, and create browsable reports for presentations.
	WSDL Diagram	A WSDL diagram is used to draw WSDL elements. It enables you to create all the elements used in a wsdl file.
	Web Diagram	A web system consists of server applications, network, communicating protocol, and the browser.
	Content Diagram	The purpose of the content diagram is to generate or represent a project structure (diagrams). The relations between diagrams are represented. The content table works as a table of contents of a project.

Analysis Diagrams Toolbar

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

	Relation Map Diagram	The relation map diagrams enables reviewing and analyzing relations between the elements of the whole model rapidly.
	Dependency Matrix	The Dependency Matrix is a method of visualizing and representing dependency criteria. Diagrams, UML and extended UML elements serve as row and column entries. The cells in the matrix show where these elements are associated or related.

	Generic Table	A Generic Table allows you to organize your elements in tabular form. This table provides a convenient way to fill in information using a spreadsheet-like tabular format instead of the limited-size fields in the element specification dialog.
	Robustness Diagram	The robustness diagram represents robustness analysis. It includes elements from the class diagram and actors from the use case diagram with predefined stereotypes.

Diagrams Navigation Toolbar

To work with diagram windows and tooltips of model elements, use the buttons on the **Diagrams Navigation** toolbar.

IMPORTANT!	If you don't see some buttons, please, check the perspective and the mode you are working on.

Toolbar button	Title (shortcut keys)	Description
	Previous Diagram (Alt+Left)	Opens the previously opened diagram.
	Next Diagram (Alt+Right)	Opens the next diagram.
	ToolTips Style button	Click the **ToolTips Style** button and select the style of tool tips you wish to display in symbols on the diagram pane: • **Do not show** – do not show tips (default). • **Object name** – show the symbol name and location path from the Data package in the following style: <Element Name> [<path>] • **Object Documentation** – show the documentation associated with the desired symbol. **Note:** To see the tool tips, drag the cursor over the desired symbol on the diagram.

Opened Projects Toolbar

To swich quickly from one recently opened project to the other, use the **Opened Projects** toolbar.

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Toolbar button	Title (shortcut keys)	Description
D:\Ma...\welcome.mdzip	List of the opened projects	You will see the name and location of the currently open project. To see a list of all open projects, click the small arrow on the right side of the drop-down list box.

Perspectives Toolbar

To change the MagicDraw user perspective, use the **Perspectives** toolbar.

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Toolbar button	Title (shortcut keys)	Description
Full Featured ▾	List of the available MagicDraw user perspectives	Click to change the MagicDraw user perspective.

Validation Toolbar

To validate the created models, use the buttons on the **Validation** toolbar.

IMPORTANT!	If you cannot see some of the buttons, please, check the perspective and the mode you are working on.

Toolbar button	Title	Description
✓	Validate	Click to open the **Validation** dailog box.
✓	Run Last Validation	Click to run the model validation on options saved in the **Validation** dialog box.

Diagram Toolbars

The diagram toolbar contains buttons for working with symbols on the diagram pane. Select any symbol or path on the diagram pane and the required buttons from the diagram main toolbar become active.

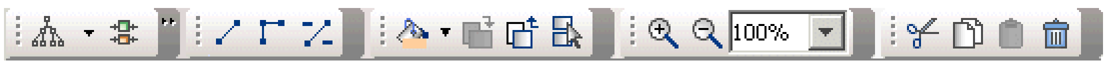


Figure 3 -- The fragment of the Diagram toolbars

Use the diagram main toolbar to change the symbol layout, path style, symbol properties style, diagram zoom as well as symbol copy/paste, cut, or delete actions.

Button	Title	Description
<u>Layout</u> group		
	Quick diagram layout	Apply the recommended layout tool with default options to the active diagram. Press the small arrow near the Quick Diagram Layout button to see other available layouts.

	Make same width	Layout the selected shapes according to their width. After the layout, the same width will be apply to the shapes (according to the widest).
	Make same height	Layout the selected shapes according the their height. After the layout, the same height will be applied the the shapes (according to the highest).
	Make same size	Layout the selected shapes according to their width and height. After the layout, the same width and height will be applied to the shapes according to the widest and highest shape.
	Center Horizontally	Center the selected shapes on a horizontal line.
	Center Vertically	Center the selected shapes on a vertical line.
	Space Evenly Horizontally	Space the selected shapes evenly. The space between the selected shapes is equally distributed on a horizontal line.
	Space Evenly Vertically	Space the selected shapes evenly. The space between the selected shapes is equally distributed on a vertical line.
Paths Editing group		
	Remove Break Points	To remove all angles of a path, press the Remove Break Points button.
	Rectilinear	To change a path style to rectilinear lines, press the Rectilinear button.
	Reset Labels Positions	To reset the path labels to the default position, press the **Reset Labels Position** button.
Symbol Editing group		
	Fill Color	Press the button to apply the selected fill color or press the small arrow near the button to select another color.
	Set Selected Symbol Style as Default	If a new style was set, it will be applied for all newly created elements after drawing them on the diagram pane.

	Apply Default Symbol Style	The selected symbol style will be changed to it's default style. (The default symbol style is defined in the **Project Options** dialog box, **Symbol property styles** branch).
	Select All of the Same Type	All shapes of the same style are selected, for example, all classes will be selected.
<u>View</u> group		
100%	Zoom In, Zoom Out, and Percentage drop down box	Using the view group buttons, you can change the view of the diagram by zooming it in and out. **NOTE** You can also change the diagram view in the Browser, Zoom panel.
<u>Edit</u> group		
	Cut, Copy, Paste and Delete	Using the Edit group buttons, you can copy or delete symbols from the diagram pane. **NOTE** After a symbol is deleted from the diagram pane, it does not mean that the element is deleted from the project.

Browser Window

The Browser is a hierarchical navigational tool that allows you to manage your model data, including packages, components, classes, all UML diagrams, extension mechanisms, and other data.

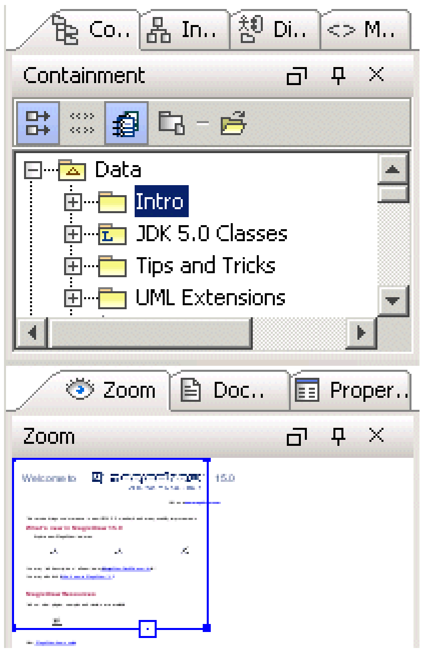
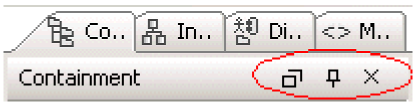


Figure 4 -- Browser window

Floating, Auto-hide and Close Buttons

To each Browser window there are added Toggle Floating, Toggle auto-hide, and Close buttons. You can move or hide a window using these buttons. See the circled buttons in the image below.



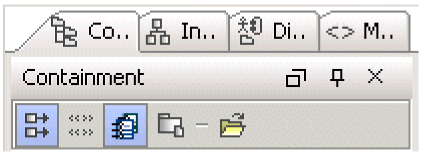
Icon	Title	Description
	Toggle Floating	Press the **Toggle Floating** button, the window is split and you can move the window to any desired position.
	Toggle auto-hide	Press the **Toggle auto-hide** button, the current Browser window is hidden. The tab of the hidden window is displayed on the left side of MagicDraw (in vertical position). Bring the mouse over the hidden window tab and the window is displayed.
×	Close	Close the current window.
	Toggle Floating	The floating window is docked again.
	Toggle auto-hide	The auto-hide enabled window is displayed again.

The browser consists of two parts:

1. Containment tree/Inheritance tree/Diagrams tree/Model Extensions tree/Search Results part.
2. Zoom/Documentation/Properties window.

Buttons from the Containment Tree

In the Browser, the Containment tree is active by default. To open the Containment tree, click the Containment Tree tab at the top of the Browser. The Containment tree displays a model data, and groups it in logical sets.

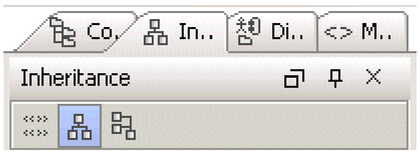


Icon	Title	Description
	Show Full Types in Browser	To show/hide full information of the operations, attributes, and relationships in the Containment Tree.
«»	Show Stereotypes	To show/hide stereotypes near the element name.

Icon	Title	Description
	Show Code Engineering Sets	To show/hide Code Engineering Sets branch in the Browser.
	Show Auxiliary Resources	To show/hide modules and profiles in the Browser.
	Open in New Tab	A new tab with a package name and tree content will be opened in the Browser.

Buttons from the Inheritance Tree

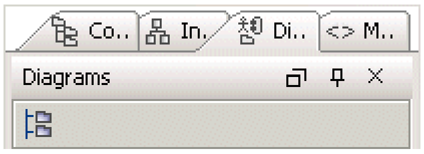
To open the Inheritance tree , click the Inheritance Tree tab at the top of the Browser. The Inheritance tree represents the classifiers, packages, data types, stereotypes hierarchy of your project. The inheritance according to the UML Specification is shown using a generalization relationship.



Icon	Title	Description
	Show only hierarchies	The generalization hierarchies are displayed in the tree. If a classifier has no generalization relationship, it will not be visible on the tree.
	Invert Tree	The hierarchy of general classifiers and children is displayed in the Inheritance tree. After inverting the tree, the classifier tree view will be changed, making the child a root classifier.

Buttons from the Diagrams Tree

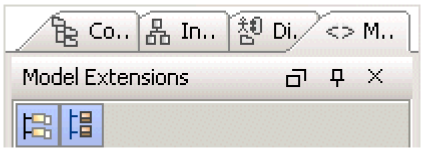
To open the Diagram tree , click the Diagram Tree tab at the top of the Browser. The Diagram tree in the Browser represents the external structure of a diagram.



Icon	Title	Description
	Group by Diagram Type	If the **Group by Diagram Type** button is pressed, diagrams are listed in the packages by diagram type.

Buttons from the Model Extensions Tree

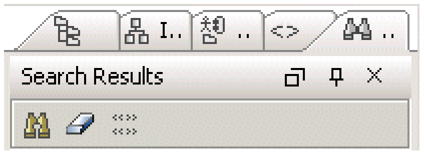
To open the Model Extensions tree <> , click the Model Extensions tree tab at the top of the Browser. The Model Extensions Tree contains all Stereotypes that are predefined and created manually in the project.



Icon	Title	Description
	Group by Profiles	If the Group by Profiles button is pressed, groups of profiles and the elements inside them are listed.
	Group by Metaclass	If the group by Metaclass button is pressed, groups of Metaclasses are displayed as packages and the elements are listed inside them.

Buttons from the Search Results Tree

To open the Search Results tree, click the from the **Edit** main menu, select the **Find** command. The **Search Results** tree shows results of the search.



Icon	Title	Description
	Find	Press the **Find** button and the **Find** dialog box opens.

Icon	Title	Description
	Clear Results	Press the **Clear Results** button to remove elements from the Search Results tree.
	Show Stereotypes	Press the **Show Stereotypes** button to display stereotypes beside the element.

Icons of general elements

This section lists all element icons displayed in the MagicDraw Browser window. To make your icons search easier, the icons of relationships are listed in the next section “Icons of relationships” on page 818, and the icons used in modules/profiling mechanism are listed in the section “Icons from Modules and Profile mechanism” on page 821.

All descriptins are duplicated from the OMG UML Specification with permission.

Icon	Title	Description
	Abstract class	An abstract class is a class, which represents the conceptual set of the classifiers. In the **Class** specification dialog box select the **Is Abstract** option and a class icon changes to the icon of the abstract class.
	Accept Event Action	An accept event action is an action that waits for the occurrence of an event that meets the specified conditions.
	Action	An action is a named element that is the fundamental unit of an executable functionality. The execution of an action represents some transformation or processing in the modeled system, be it a computer system or otherwise.
	Activity	An activity element is created on the activity diagram creation.
	Activity Parameter Node	An activity final node is a final node that stops all flows in an activity.
	Actor	An actor represents the roles played by the human users, external hardware, and other subjects.
	Artifact	An artifact represents a physical piece of information that is used or produced by a software development process.
	Artifact Instance	An instance of an artifact.

Icon	Title	Description
▤	Association Class	An Association Class can be seen as an association that also has class properties, or as a class that also has association properties. Not only it connects a set of classifiers, but also defines a set of features that belong to the relationship itself, not to any of the classifiers.
●	Attribute	An attribute is a named property of a class that describes a range of values that can be held by instances of that class.
▭	Call Operation Action	The call operation action transmits an operation call request to the target object, where it may cause the invocation of an associated behavior.
▭	Central Buffer Node (Object Node)	An object node is an activity node that indicates an instance of a particular classifier, possibly in a particular state, may be available at a particular point in the activity.
◇	Choice	The choice vertices, when reached, result in the dynamic evaluation of the guards of the triggers of its outgoing transitions.
▤	Class	A class is the descriptor for a set of objects with similar structure, behavior, and relationships.
⬭	Collaboration	A collaboration is represented as a kind of classifier and it defines a set of cooperating entities to be played by instances (its roles) as well as a set of connectors that define communication paths between the participating instances.
⬭	Collaboration Use	A collaboration use represents a particular use of collaboration to explain the relationships between the properties of a classifier.
▭	Combined Fragment	A combined fragment defines an expression of interaction fragments. It is defined by an interaction operator and the corresponding interaction operands.
🗎	Comment	A comment gives an ability to display different remarks on diagrams. It may be attached to multiple elements.
▯	Component	A component represents all kinds of elements that pertain to piecing together software applications. They can be simple files, such as DLLs or executables.
▯	Component Instance	An instance of a component that may reside on a node instance.
▭	Composite State	A composite state is a state with one region. There is a set of two or more states placed within a region. These are known as substates. The substates describe states within a state.
▭	Orthogonal State	An orthogonal state is a state with two or more regions. In each region, you may draw one life cycle with both a beginning and an end.

Icon	Title	Description
	Conditional Node	A conditional node is a structured activity node that represents an exclusive choice among some number of alternatives.
	Connection Point Reference	A connection point reference represents the use of entry/exit points.
{ }	Constraint	A constraint is a condition or restriction expressed in a natural language text or in a machine readable language for the purpose of declaring some of the semantics of an element.
	Data Store	A data store keeps all tokens that enter it, copies them when they are chosen to move downstream. Incoming tokens containing a particular object replace any tokens in the object node containing that object.
	Data Type	A data type is a type whose instances are identified only by their value.
	Deep History	A deep history represents the most recent active configuration of the composite state that directly contains this pseudostate.
	Decision Node in activity diagram	A decision node is a control node that chooses between outgoing flows. Each token arriving at a decision node can traverse only one outgoing edge. Decisions are made using guard conditions. They help protect transitions that depend on a guarding condition.
	Merge Node in activity diagram	A merge node has multiple incoming edges and a single outgoing edge. It is not used to synchronize concurrent flows but to accept one among several alternate flows.
	Deployment	A node deploys and provides a place to store and/or execute an artifact.
	Deployment Specification Instance	An instance of a deployment specification element.
	Device	A device is a physical computational resource. For example; a piece of hardware such as a desktop computer, a processor, a server, or a human work unit such as a department or team.
	Device Instance	An device instance is an instance of a device.
	Duration	A duration defines a value specification that specifies the temporal distance between two time instants.
	Duration Constraint	A duration constraint defines a constraint that refers to a duration interval.

Icon	Title	Description
☑	Element Value	A value specification is an abstract metaclass used to identify a value or values in a model. It may make reference to an instance or it may be an expression denoting an instance or instances when evaluated.
○	Entry Point	An entry point connection point reference as the target of a transition implies that the target of the transition is the entry point pseudostate as defined in the submachine of the submachine state.
▭	Enumeration	An enumeration is a kind of data type, whose instances may be any of a number of user-defined enumeration literals.
●	Enumeration Literal	An enumeration literal defines an extension element of an enumeration data type.
☑	Event (all type of events)	An event is the specification of some occurrences that may potentially trigger effects by an object.
▣	Execution Environment	An execution environment is a node that offers an execution environment for specific types of components that are deployed on it in the form of executable artifacts.
▣	Execution Environment Instance	An instance of execution environment.
⊗	Exit Point	An exit point connection point reference as the source of a transition implies that the source of the transition is the exit point pseudostate as defined in the submachine of the submachine state that has the exit point connection point defined.
▥	Expansion Node	An expansion node is an object node used to indicate a flow across the boundary of an expansion region.
▢	Expansion Region	An expansion region is a structured activity region that executes multiple times corresponding to the elements of an input collection.
◉	Final State	A special kind of state signifying that the enclosing region is completed. If the enclosing region is directly contained in a state machine and all other regions in the state machine also are completed, then it means that the entire state machine is completed.
	Activity Final	An activity may have more than one activity final node. The first one reached stops all flows in the activity.
⊕	Function Behavior	A function behavior is an opaque behavior that does not access or modify any objects or other external data.
⧉	Hyperlink	An icon with a small arrow image on the left-bottom side indicates that element has a hyperlink to another element/symbol, file, or web page. For more information about hyperlinks, see “Defining Hyperlinks Between Elements” on page 271.

Icon	Title	Description
	Information Flows	The InformationFlows package provides mechanisms for specifying the exchange of information between entities of a system at a high level of abstraction.
	Information Item	An information item is an abstraction of all kinds of information that can be exchanged between objects.
●	Initial Node	An initial node is a control node at which a flow starts when the activity is invoked.
	Input Pin Output Pin	An input pin is a pin that holds input values to be consumed by an action. An output pin is a pin that holds output values produced by an action.
	Instance	An instance specification is a model element that represents an instance in a modeled system.
	Interaction	An interaction is a unit of behavior that focuses on the observable exchange of information between connectable elements.
	Interaction Operand	An interaction operand is contained in a combined fragment. It represents one operand of the expression given by the enclosing combined fragment.
	Interaction Use	An interaction use refers to an Interaction. The InteractionUse is a shorthand for copying the contents of the referred Interaction where the interaction use is.
	Interface	An interface is a specifier for the externally-visible operations of a class, component, or other classifier (including subsystems) without a specification of the internal structure.
	Interruptible Region	An interruptible region contains activity nodes. When a token leaves an interruptible region via edges designated by the region as the interrupting edges, all tokens and behaviors in the region are terminated.
	Junction	The junction pseudo state corresponds to the merge and the static conditional branch.
	Lifeline	A lifeline represents an object. The lifeline runs from the beginning of the interaction, at the top of the diagram, to the end of the interaction at the bottom of the line.
	Literal Boolean	A literal boolean is a specification of a boolean value.
	Literal Integer	A literal integer is a specification of an integer value.
	Literal Null	A literal null specifies the lack of value.

Icon	Title	Description
	NEW! Literal Real	A literal real is a specification of a real value.
	Literal String	A literal string is a specification of a string value.
	Literal Unlimited Natural	A literal unlimited natural is a specification of an unlimited natural number.
	Loop Node	A loop node is a structured activity node that represents a loop with the setup, test, and body sections.
	MetaClass	A class whose instances are classes. Metaclasses are typically used to construct metamodels.
●	Method (Operation)	An operation is a behavioral feature of a classifier that specifies the name, type, parameters, and constraints for invoking an associated behavior.
	Model	A model is an abstraction of a physical system from a particular point of view.
	System Boundary	A system boundary element consists of use cases related by the exclude or include (uses) relationships.
	Model Library	This icon depicts Model with applied Model Library stereotype. The model library is a package that contains model elements that are intended to be reused by other packages.
	N-ary Association	An n-ary association is an association among two or more classes (a single class may appear more than once).
	Node	A node is a computational resource upon which artifacts may be deployed for execution. The nodes can be interconnected through communication paths to define the network structures.
	Node Instance	A node instance is an instance of a node where the component instances may reside.
	Opaque Action	An opaque actions is an action with implementation-specific semantics.
	Opaque Behavior	A behavior with implementation-specific semantics. The Opaque Behavior is introduced for implementation-specific behavior or for use as a place-holder before one of the other behaviors is chosen.
	Opaque Expression	An opaque expression is an uninterpreted textual statement that denotes a (possibly empty) set of values when evaluated in a context.

Icon	Title	Description
	Package Model Library	This icon depicts a Package with applied Model Library stereotype. The model library is a package that contains model elements that are intended to be reused by other packages.
	Package	A package groups classes and other model elements together.
	Parameter	A parameter is a specification of an argument used to pass the information on to or out of an invocation of a behavioral feature.
	Port	A port is a property of a classifier that specifies a distinct interaction point between that classifier and its environment or between the (behavior of the) classifier and its internal parts.
	Primitive Type	A primitive type defines a predefined data type, without any relevant substructure.
	Protocol State Machine	A protocol state machine is always defined in the context of a classifier. It specifies which operations of the classifier can be called in which state and under which condition, thus specifying the allowed call sequences on the classifier’s operations.
	Signal Reception (Reception)	A reception is a declaration stating that a classifier is prepared to react to the receipt of a signal.
	Region	A region is an orthogonal part of either a composite state or a state machine. It contains states and transitions.
	Send Signal Action	A send signal action is an action that creates a signal instance from its inputs, and transmits it to the target object, where it may cause the discharge of a state machine transition or the execution of an activity.
	Sequence Node	A sequence node is a structured activity node that executes its actions in order.
	Shallow History	A shallow history represents the most recent active substate of its containing state.
	Shared Package	Not all module contents are visible in the using project. A module has a shared part and a private part. Only the contents of the shared part are visible in the working project. The shared packages are marked with a hand image. For more information about project partitioning, see “Project Partitioning” on page 116.
	Signal	A signal is a specification of send request instances communicated between objects.

Icon	Title	Description
	Slot	A slot specifies that an entity modeled by an instance specification has a value or values for a specific structural feature.
	State Machine	A state machines can be used to express the behavior of part of a system.
	State	A state specifies how the object reacts to events occurring around it.
«»	Stereotype	A stereotype is an extension mechanism that defines a new and more specialized element of the model based on an existing element.
	Structured Activity Node	A structured activity node is an executable activity node that may have an expansion into the subordinate nodes as an activity group.
	Submachine State	A submachine state specifies the insertion of the specification of a submachine state machine.
	Subsystem	A subsystem is a unit of hierarchical decomposition for large systems.
	Subsystem Instance	An instance of the subsystem.
	Swimlane	Actions and subactivities can be organized into a Swimlane in the activity diagrams. The swimlanes are used to organize responsibility for actions and subactivities according to a class.
▬	Fork Horizontal or Vertical	A fork node is a control node that splits a flow into multiple concurrent flows.
▬	Join Horizontal or Vertical	A join node is a control node that synchronizes multiple flows.
	Template Parameter	A template parameter exposes a parameterable element as a formal template parameter of a template.
X→T	Template Parameter Substitution	A template parameter substitution relates the actual parameter(s) to a formal template parameter as part of a template binding.
	Template Parameter Signature	A template signature bundles the set of formal template parameters for a templated element.
	Time Constraint	A time constraint specifies the combination of min and max timing interval values.

Icon	Title	Description
	Time Expression	A time expression defines a value specification that represents a time value.
	Time Observation	An time observation is a reference to a time instant during an execution. It points out the element in the model to observe and whether the observation is made when this model element is entered or when it is exited.
	Time Event	A time event specifies a point of time by an expression. The expression might be absolute or might be relative to some other point of time.
	Trigger	A trigger specification may be qualified by the port on which the event occurred. A trigger relates an event to a behavior that may affect an instance of the classifier.
	Use Case Instance	A use case instance is an instance of a use case.
	Use Case	A use case is a kind of behavior-related classifier that represents a declaration of an offered behavior.
	Value Pin	A value pin is an input pin that provides a value by evaluating a value specification.
	Variable	A variable is considered as a connectable element.

Icons of relationships

Icon	Title	Description
	Relations branch	Most of the relationships are included in the Relations branch in the Browser.
	Abstraction	An abstraction is a dependency relationship that relates two elements or sets of elements that represent the same concept at different levels of abstraction or from different viewpoints.
	Aggregation association	An aggregation describes a special type of association designed to help cope with complexity.
	Assembly Connector	An assembly connector is a connector between two components that defines that one component provides the services that another component requires.
	Association	An association answers to the question why two classes of objects need to know about one another.
	Communication Path	The communication path is a subclass of association. It specifies the relationship between nodes by defining the number of nodes that may be connected (multiplicity), and the nature of the connection, via the name of the path or a stereotype.
	Association Class	An association class can be seen as an association that also has class properties, or as a class that also has association properties. Not only it connects a set of classifiers, but also defines a set of features that belong to the relationship itself, not to any of the classifiers.
	Call Message	A call message represents the request to invoke a specific operation.
	Composition	A composition is used for aggregations where the life span of the member object depends on the life span of the aggregate.
	Connector	A connector specifies a link that enables communication between two or more instances.
{ }	Constraint	A constraint is a condition or restriction expressed in a natural language text or in a machine readable language for the purpose of declaring some of the semantics of an element.
	Control Flow	A control flow is an edge that starts an activity node after the previous one is finished.
	Create Message	A create message is message designating the creation of another lifeline object.
	Delegation Connector	A delegation connector is a connector that links the external contract of a component (as specified by its ports) to the internal realization of that behavior by the component parts.

Icon	Title	Description
↗	Dependency	A dependency indicates a semantic relationship between two model elements (or two sets of model elements).
↗	Deployment	A deployment is a relationship between the location and the artifact.
→×	Delete Message	A delete message is message designated to terminate another lifeline.
↗	Direct Association	A directed relationship represents a relationship between a collection of source model elements and a collection of target model elements.
↗	Directed Aggregation Association	An aggregation describes a special type of association designed to help cope with the complexity. A directed relationship represents a relationship between a collection of source model elements and a collection of target model elements.
↗	Direct Composition Association	A composition is used for aggregations where the life span of the member object depends on the life span of the aggregate. A directed relationship represents a relationship between a collection of source model elements and a collection of target model elements.
↗	Element Import	An element import is defined as a directed relationship between an importing namespace and a packageable element.
↯	Exception Handler	An exception handler is an element that specifies a body to execute in case the specified exception occurs during the execution of the protected node.
↗	Extend	A relationship from an extending use case to an extended use case that specifies how and when the behavior defined in the extending use case can be inserted into the behavior defined in the extended use case.
↗	Extension	An extension point identifies a point in the behavior of a use case where that behavior can be extended by the behavior of some other (extending) use case, as specified by an extend relationship.
↗	Generalization	A generalization is the relationship from the child element (the more specific element, such as a subclass) to the parent (the more general element, such as a super class) that is fully consistent with the first element and that provides additional information.
⊥	Generalization Set	A generalization set defines a particular set of generalization relationships that describe the way in which a general classifier may be divided using specific types.

Icon	Title	Description
↗	Include	An include (uses) relationship from the use case A to the use case B indicates that an instance of the use case A will also contain the behavior as specified by B. The behavior is included at the location which is defined in A.
⇢	Information Flow	An information flow specifies that one or more information items circulates from its sources to its targets.
↗	Interface Realization	An interface realization is a specialized realization relationship between a behavioral classifier and an Interface.
╱	Link	An instance specification whose classifier is an association represents a link and is shown using the same notation as for an association, but the solid path or paths connect the instance specifications rather than the classifiers.
↗	Manifestation	A manifestation is the concrete physical rendering of one or more model elements by an artifact.
↗	Package Merge	A package merge is a directed relationship between two packages that indicates that the contents of the two packages are to be combined.
→	Message	A message is a named element that defines one specific kind of communication in an Interaction. A communication can be, for example, raising a signal, invoking an operation, creating or destroying an Instance. The message specifies not only the kind of communication given by the dispatching execution specification, but also the sender and the receiver.
	Send Message	The message was generated by an asynchronous send action.
↗	Non-navigable Association	An association with non-navigable association ends.
↴	Object Flow	An object flow is a technique used to capture how objects participate in activities and how they are affected by the activities.
↗	Package Import	A package import is defined as a directed relationship that identifies a package whose members are to be imported by a namespace.
↗	Profile Application	A profile application is used to show which profiles have been applied to a package.
↗	Protocol Transition	A protocol transition specifies a legal transition for an operation.

Icon	Title	Description
	Realization	A realization is a specialized abstraction relationship between two sets of model elements, one representing a specification (the supplier) and the other represents an implementation of the latter (the client).
	Component Realization	A component realization concept is specialized in the Components package to (optionally) define the Classifiers that realize the contract offered by a component in terms of its provided and required interfaces.
	Reply Message	A reply message is a reply message to an operation call.
	Role Binding	A role binding is a mapping between features of the collaboration type and features of the classifier or operation. This mapping indicates which connectable element of the classifier or operation plays which role(s) in the collaboration.
	Substitution	A substitution is a relationship between two classifiers which signifies that the substitutingClassifier complies with the contract specified by the contract classifier.
	Template Binding	A template binding represents a relationship between a templateable element and a template.
	Transition	A state transition usually has an event attached to it, but it is not necessary to attach one. If an event is attached to a state transition, the state transition will be performed when the event occurs.
	Usage	A usage is a relationship in which one element requires another element (or set of elements) for its full implementation or operation.

Icons from Modules and Profile mechanism

Module, Profile, and Shared package model elements have their own icons, which are represented in the MagicDraw Browser. You may see the icons, their titles, and descriptions in the following table.

Icon	Title	Description
	Module	If you have (or developing) a large model, which has several weakly dependent parts, it is advisable to split it into several module files. Partitioning has a package level granularity.
	Profile	A Profile is a kind of Package that extends a reference metamodel. The primary extension construct is the Stereotype, which is defined as part of Profiles.
	Profile Model Library exported as module	This icon depicts a profile with applied Model Library stereotype. A package that contains model elements that are intended to be reused by other packages.

Icon	Title	Description
📁	Shared Package	Not all module contents are visible in the working project. A module has a shared part and private part. Only the contents of the shared part are visible in the working project. The shared packages are marked with a hand image.

For more information about working with modules and profiling mechanism, see “Project Partitioning” on page 116.

13 NEW! APPENDIX II: UML 2.4.1 SUPPORT

Introduction

MagicDraw always supports the latest versions of UML standards, and the newest version of MagicDraw is no exception.

MagicDraw version 17.0.1 supports the changes in the UML specification from version 2.3 to 2.4.1. These changes, including metamodel changes and notation changes, are introduced in this appendix.

For the summary of the UML metamodel changes, see "Metamodel Changes" on page 823. This section also gives a brief description of each change and also provides the list of event types that are not supported in UML 2.4.1.

For the UML notation changes, see "Notation Changes" on page 826.

For information about opening models created in any version older than MagicDraw 17.0.1, see "Opening Older Models" on page 827.

Metamodel Changes

The following table summarizes the UML metamodel changes from version 2.3 to 2.4.1 supported in MagicDraw, starting with version 17.0.1, and gives some brief information about the impact of each change.

Metamodel Change	Description / Comment
DATA TYPES ADDED	
Real	Added to the PrimitiveTypes package. You can now use values of a real type in your models.
METACLASSES ADDED	
LiteralReal	Specifies the real value.
METACLASSES CHANGED	
DestructionEvent --> DestructionOccurrenceSpecification	The DestructionEvent class has been renamed to DestructionOccurrenceSpecification. It represents the destruction of an instance described by the lifeline that contains this instance. DestructionOccurrenceSpecification is a specialization of MessageOccurrenceSpecification.
METACLASSES REMOVED	
ExecutionEvent	These metaclasses have been removed from the Interactions package due to unsupported event types.
CreationEvent	
ReceiveOperationEvent	
ReceiveSignalEvent	
SendOperationEvent	
SendSignalEvent	

Metamodel Change	Description / Comment
PROPERTIES ADDED	
Package::URI:String[0..1] {id}	Provides the package with an identifier that can be used for many purposes. URI is the universally unique identification of the package following the IETF URI specification, RFC 2396 http://www.ietf.org/rfc/rfc2396.txt and it must comply with those syntax rules. You can now specify this property for packages, profiles, and models. For the notation of the URI property, see "Notation Changes" on page 826.
Property::isID:Boolean=False	Indicates that the property can be used to uniquely identify an instance of the containing class, when the value is set to *true*. The default value is *false.* For the notation of the isID property modifier, see "Notation Changes" on page 826.
InteractionUse::returnValue:ValueSpecification [0..1]	Specifies the value returned by the executed interaction.
InteractionUse::returnValueRecipient:Property [0..1]	Specifies the recipient of the value which is returned by the executed interaction.
EnumerationLiteral::/classifier:Enumaration[1]	The classifier of this EnumerationLiteral should now be equal to the enumeration that contains this enumeration literal. Redefines *InstanceSpecification::classifier*.
ASSOCIATIONS REMOVED	
ExecutionOccurrenceSpecification::event: ExecutionEvent[1]	The association from ExecutionOccurrenceSpecification to ExecutionEvent has been removed, as the ExecutionEvent metaclass does not exist in the UML 2.4.1.
OccurenceSpecification::event:Event[1]	The specification of the occurring event is not referenced any more.
BehavioredClassifier::ownedTrigger:Trigger[0..*]	Trigger descriptions owned by a classifier are not referenced any more.
SUBSETTING CHANGES	
Interface::redefinedInterface {subsets *redefinedElement* --> *redefinedClassifier*}	An interface now references all the interfaces that are redefined by this interface.

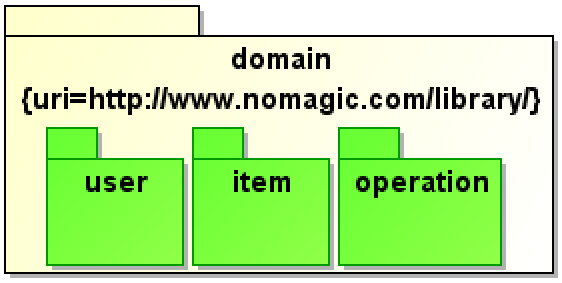
Metamodel Change	Description / Comment
SUBSETTING ADDED	
NOTE: These features were already available in earlier versions of MagicDraw.	
Duration::expr:ValueSpecification[0..1] {subsets *Element::ownedElement*}	Element or elements can be selected or created only under the owned element's scope.
LinkEndData::qualifier:QualifierValue[*] {subsets *Element::ownedElement*}	
LinkAction::endData:LinkEndData[2..*] {subsets *Element::ownedElement*}	
CreateLinkAction::endData:LinkEndCreationData[0..*] {subsets *Element::ownedElement*}	
DestroyLinkAction::endData:LinkEndDestructionData[2..*] {subsets *Element::ownedElement*}	
TimeExpression::expr:ValueSpecification[0..1] {subsets *Element::ownedElement*}	
ValuePin::value:ValueSpecification[1] {subsets *Element::ownedElement*}	
State::deferrableTrigger:Trigger[0..*] {subsets *Element::ownedElement*}	
StructuredActivityNode::edge:ActivityEdge[0..*] {subsets *Element::ownedElement*}	
StructuredActivityNode::node:ActivityNode[0..*] {subsets *Element::ownedElement*}	
ValueSpecificationAction::value: ValueSpecification[1] {subsets *Element::ownedElement*}	
AcceptEventAction::trigger:Triger[1..*] {subsets *Element::ownedElement*}	
Stereotype::icon:Image[0..*] {subsets *Element::ownedElement*}	
TimeEvent::when:TimeExpression[1] {subsets *Element::ownedElement*}	
InteractionUse::argument:ValueSpecification[*] {subsets *Element::ownedElement*}	
StructuredActivityNode::node:ActivityNode [0..*] {subsets *Element::ownedElement*}	
SequenceNode::executableNode: ExecutableNode[0..*] {subsets *Element::ownedElement*}	
Transition::trigger:Trigger[0..*] {subsets *Element::ownedElement*}	
Classifier::/feature {subsets *Namespace::member*}	The /feature property of Classifier is now included as a part of the member property.
Feature::/featuringClassifier {subsets *NamedElement::memberNamespace*}	The /featuringClassifier property of Feature is now included as a part of the memberNamespace property.
Property::owningAssociation {subsets *RedefinableElement::redefinitionContext*}	A property now references the owning association of this property.

Metamodel Change	Description / Comment
DEFAULT VALUE CHANGES	
DurationObservation::firstEvent:Boolean[0..2] ~~=True~~	The default value has been removed. In effect, the value of the firstEvent property is now by default empty.
DurationConstraint::firstEvent:Boolean[0..2] ~~=True~~	
PackageableElement::visibility:VisibilityKind[1] =False --> Public	The default value of this property has been changed to *Public*.This means that packageable elements are now by default public.
MULTIPLICITY CHANGES	
EnumerationLiteral::enumeration:Enumeration [0..1] --> [1]	The Enumeration must now be specified. It has become *mandatory*.
Multiplicity of ExecutionSpecification association with ExecutionOccurrenceSpecification: [1] --> [0..2]	ExecutionSpecification is now associated with two ExecutionOccurrenceSpecifications: • The start ExecutionOccurrenceSpecification that designates the start of an action or behavior. • The finish ExecutionOccurrenceSpecification that designates the finish of an action or behavior.
DERIVATION CHANGES	
Constraint::/context --> context	The context property of the constraint is no longer derived. It is now a settable property.
Message::/signature --> signature	The signature of the message is no longer derived. However, it remains read-only.

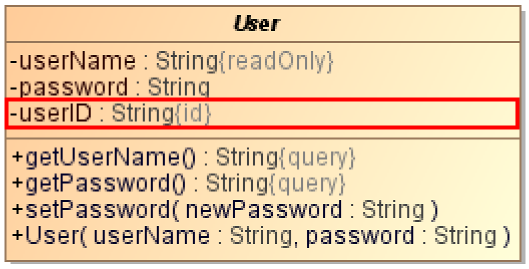
Notation Changes

The changes in the UML notation from version 2.3 to 2.4.1 supported in MagicDraw are as follows:

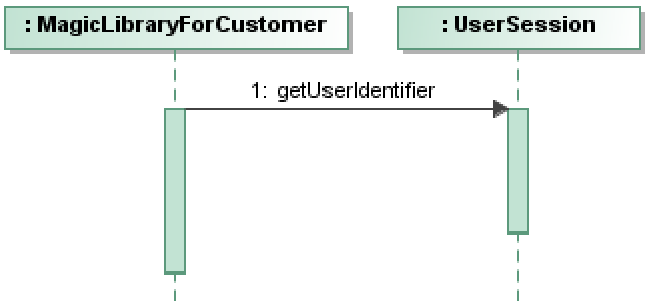
1. If there is a value defined for the URI property of a package, model, or profile, it is automatically displayed on the corresponding shape. The following figure depicts an example of the package notation with the URI property value defined:



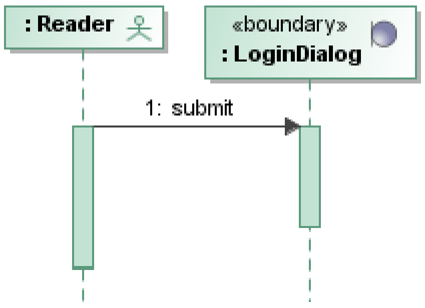
2. If the isID property is set to *true* for the selected attribute, the {id} modifier is displayed in the property modifiers group on the class shape. The following figure depicts an example of the attribute notation, when the isID property is set to *true*:


User
-userName : String{readOnly}
-password : String
-userID : String{id}
+getUserName() : String{query}
+getPassword() : String{query}
+setPassword(newPassword : String)
+User(userName : String, password : String)

3. The name of a synchronous message is now displayed on a diagram pane, even if the message does not have a signal or an operation assigned. The following figure depicts an example of the synchronous message name notation:



4. Brackets "()" are no more added to a call message name, if the message does not have a signal or an operation assigned. The following figure depicts an example of the call message name notation:



Opening Older Models

Models that were created with any MagicDraw version prior to 17.0.1 can be opened with this version.

To update older models, simply open them with the MagicDraw version 17.0.1 and then save them. Models will be automatically converted and next time will be opened as UML 2.4.1 models. After the conversion to UML 2.4.1, all property values of these models will be persisted.

INDEX

INDEX