



## **MDG Technology for DDS User Guide**

*Welcome to the MDG Technology for DDS User Guide. The MDG Technology for DDS enables you to work simultaneously with both Enterprise Architect and DDS and merge the changes with minimal effort.*



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# MDG Technology for DDS User Guide

**Introduction**

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*by Simon Zhang*

*MDG Technology for DDS provides a lightweight bridge between Enterprise Architect and DDS*

# MDG Technology for DDS User Guide

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## **Publisher**

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## **Managing Editor**

*Geoffrey Sparks*

## **Technical Editor**

*Simon Zhang*

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# Table of Contents

Foreword	1
<b>Welcome</b>	<b>2</b>
Copyright Notice .....	3
Software Product License Agreement .....	4
Acknowledgement of Trademarks .....	7
Support .....	8
System Requirements .....	9
<b>Getting Started</b>	<b>10</b>
<b>Using the MDG Technology for DDS</b>	<b>11</b>
DDS Technology Menu .....	12
Options Dialog .....	13
Qos Policy Specifications Dialog .....	15
Perspectives .....	16
DDS Toolboxes .....	18
DDS Domain .....	18
DDS Topic .....	19
DDS Application .....	20
DDS Types .....	20
DDS Qos Policies .....	21
Model Validation .....	24
Model Validation Rules for Elements .....	24
Create a DDS Project .....	26
Generate PSM and Code .....	29
DDS Example Model .....	33
DDS Diagram Types .....	34
<b>Index</b>	<b>35</b>

# Foreword

MDG Technology for DDS provides a light weight bridge between Enterprise Architect and DDS.

## 1 Welcome



Welcome to the *MDG Technology for DDS - Enterprise Architect MDG Add-In, Version 1.0*.

The Add-In extends the capability of Enterprise Architect to enable you to create Data Distribution Service (DDS) models. The language specification for DDS is available from the Object Management Group (OMG) website: [Data Distribution Service for Real-time Systems Specification](#)

### Getting Started

For instructions on how to install the MDG Technology for DDS, see [Getting Started](#)<sup>[10]</sup>.

#### See Also

- [Copyright Notice](#)<sup>[3]</sup>
- [Trademarks](#)<sup>[7]</sup>
- [Support](#)<sup>[8]</sup>
- [License Agreement](#)<sup>[4]</sup>
- [System Requirements](#)<sup>[9]</sup>

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#### **Sparx Systems Pty. Ltd.**

7 Curtis St,  
Creswick, Victoria 3363,  
AUSTRALIA

Phone: +61 (3) 5345 1140

Fax: +61 (3) 5345 1104

Support Email: [support@sparxsystems.com](mailto:support@sparxsystems.com)

Sales Email: [sales@sparxsystems.com](mailto:sales@sparxsystems.com)

Website: <http://www.sparxsystems.com>

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- Microsoft®
- Windows®

### **Trademarks of the OMG**

- OMG™
- Object Management Group™
- UML™
- Unified Modeling Language™

## 1.4 Support

Technical support for the MDG Technology for DDS is available to registered users of Enterprise Architect. Responses to support queries are sent by email. Sparx Systems endeavors to provide a rapid response to all product-related questions or concerns.

Registered users can lodge a support request, by visiting:  
[http://www.sparxsystems.com/registered/reg\\_support.html](http://www.sparxsystems.com/registered/reg_support.html).

Trial users can contact Sparx Systems with questions regarding their evaluation at:  
[support@sparxsystems.com](mailto:support@sparxsystems.com).

An online user forum is also available for your questions and perusal, at  
<http://www.sparxsystems.com/cgi-bin/yabb/YaBB.cgi>.

## 1.5 System Requirements

MDG Technology for DDS runs under the following environments:

### Windows Operating Systems

- Windows ME
- Windows NT® (SP5 or later)
- Windows XP Professional
- Windows XP Home
- Windows XP Media Edition
- Windows XP Tablet Edition
- Windows 2000 Professional (SP3 or later).

### Enterprise Architect

- Enterprise Architect Professional Version 6.5 (or later)
- Enterprise Architect Corporate Version 6.5 (or later).

### Microsoft.NET

Framework Version 2.0.

### RTI Data Distribution Service

NDDS 4.0g (or later).

#### Notes:

- While the MDG Technology for DDS isn't specifically blocked from executing with the Enterprise Architect Desktop Edition, be aware that the Desktop Edition cannot make use of some of the capabilities of the product, such as Model Validation.
- There is a known limitation with the OpenEdge repository that prevents loading data fields larger than 30,000 bytes. This means that the MDG Technology for DDS, which is larger than 30,000 bytes, cannot be loaded into a model that is stored in an OpenEdge repository. OpenEdge users are asked to use .EAP files for their DDS modeling.

## 2 Getting Started

The MDG Technology for DDS is available for download from the [Products](#) page on the Sparx Systems website. Once it has been downloaded, the program is in .exe format.

To install the MDG Technology for DDS follow the steps below:

1. Download the *EADDS.exe* file from the Sparx Systems website.
2. Ensure that you meet the [System Requirements](#) and have Enterprise Architect version 6.5 or higher.
3. To install the MDG Technology for DDS component, double-click on the *EADDS.exe* Installer executable. The **MDG Technology for DDS Installation Wizard** screen displays.



4. Read the licensing agreement and, if you accept the terms, click on the **Next** button.
5. Read the *Readme* information, and then click on the **Next** button.
6. In the **User name** and **Organization** fields, type your user and company names. Click on the **Next** button. (Optionally define the users who have access to this program by either choosing the **All users** option or registering specific users).
7. Choose an installation path for the program, and then click the **Next** button.
8. When installation is complete, click on the **Finish** button.

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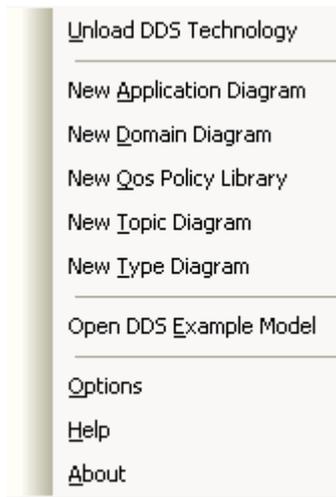
### 3 Using the MDG Technology for DDS

A DDS tutorial is outside the scope of this document. Rather, this document describes the following features of the MDG Technology for DDS:

- [DDS Diagram Types](#) <sup>34</sup>
- [DDS Technology Menu](#) <sup>12</sup>
- [DDS Toolboxes](#) <sup>18</sup>
- [Model Validation](#) <sup>24</sup>
- [DDS Example Model](#) <sup>33</sup>.

### 3.1 DDS Technology Menu

The **DDS Technology** sub-menu is available from the **Add-Ins** menu on the main menu bar.

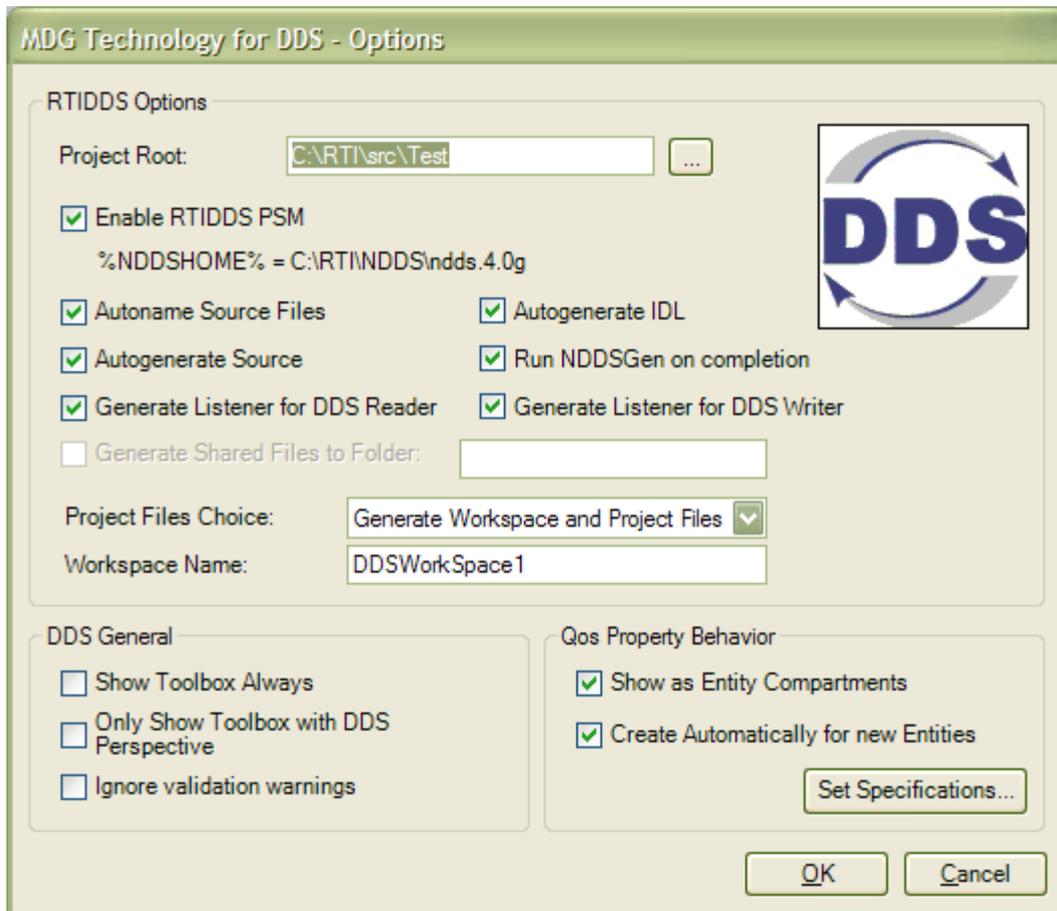


Menu Option	Description
<b>Load DDS Technology</b>	<ul style="list-style-type: none"> <li>• Loads the MDG Technology for DDS into the <b>Resources</b> window.</li> <li>• Displays the MDG Technology for DDS in the <b>Toolbox</b>.</li> </ul>
<b>Unload DDS Technology</b>	<ul style="list-style-type: none"> <li>• Removes the MDG Technology for DDS from the <b>Toolbox</b>.</li> <li>• Unloads the MDG Technology for DDS from the <b>Resources</b> browser.</li> </ul>
<b>New Application Diagram</b>	Creates a new DDS Application diagram in the currently selected package. The diagram is an extended UML Deployment diagram.
<b>New Domain Diagram</b>	Creates a new DDS Domain diagram in the currently selected package. The diagram is an extended UML Component diagram.
<b>New Qos Policy Library</b>	Creates a new DDS Qos policy library package in the model.
<b>New Topic Diagram</b>	Creates a new DDS Topic diagram in the currently selected package. The diagram is an extended UML Class diagram.
<b>New Type Diagram</b>	Creates a new DDS Type diagram in the currently selected package. The diagram is an extended UML Class diagram.
<b>Open DDS Example Model</b>	Opens the example DDS model.
<b>Options</b>	Opens the <a href="#">Options Dialog</a>  .
<b>Help</b>	Opens this help file.
<b>About</b>	Displays the version information for the MDG Technology for DDS.

#### Tip:

If the **Add-Ins** menu or the **DDS Technology** sub-menu are not visible after installing the DDS Add-In, try to reset Enterprise Architect's menus with the **View | Visual Layouts | Default Layout** menu option.

### 3.1.1 Options Dialog



#### RTIDDS Options Panel

The options in the **RTIDDS Options** panel are used to specify the behavior of the [PIM to PSM transformation](#) for RTIDDS implementations.

**Note:**

The version of RTIDDS used is specified by the %NDDSHOME% environment variable.

Field	Description
<b>Project Root:</b>	Root directory in which all the PSM output should be created.
<b>Enable RTIDDS PSM</b>	Select the checkbox to enable the transformer; deselect to disable the transformer.
<b>Autaname Source Files</b>	Select the checkbox to enable the RTIDDS transformer to automatically allocate filenames to the generated source code (recommended).
<b>Autogenerate Source</b>	Select the checkbox to enable the RTIDDS transformer to automatically invoke the code generation process to the PSM after it has been successfully generated.
<b>Generate Listener for DDS Reader</b>	Select the checkbox to enable the RTIDDS transformer to automatically generate a Listener for each DDS Reader.
<b>Autogenerate IDL</b>	Select the checkbox to enable the DDS Topic Type elements to automatically be generated to IDL code during the transformation process.
<b>Run NDDSGen on completion</b>	Select the checkbox to enable the RTIDDS transformer to automatically invoke the <b>NDDSGEN</b> command to the generated IDL, to automatically

Field	Description
	generate the type-specific DDS code for the implementation.
<b>Generate Listener for DDS Writer</b>	Select the checkbox to enable the RTIDDS transformer to automatically generate a Listener for the DDS Writer.
<b>Generate Shared Files to Folder:</b>	Select the checkbox to enable the RTIDDS transformer to generate the common shared files to a specific folder. The specific folder is a relative path to the <b>Project Root</b> folder.
<b>Project Files Choice</b>	Click on the drop-down arrow and select the type of project files for the RTIDDS transformer to generate. For Visual Studio .NET, the workspace file is the Solution file.
<b>Workspace Name</b>	The name of the workspace. For Visual Studio .Net, this is the name of the solution.

### DDS General Panel

The options in the **DDS General** panel are used to specify the general behavior of the MDG Technology for DDS.

Field	Description
<b>Show Toolbox Always</b>	Select the checkbox to always enable the DDS toolboxes, regardless of the selected toolbox perspective.  <b>Note:</b> When this option is enabled, the <b>Only Show Toolbox with DDS Perspective</b> checkbox is unchecked automatically.
<b>Only Show Toolbox with DDS Perspective</b>	Select the checkbox to enable the DDS toolboxes only when the DDS perspective is activated.  <b>Note:</b> When this option is enabled, the <b>Show Toolbox Always</b> checkbox is unchecked automatically.
<b>Ignore validation warnings</b>	Select the checkbox to ignore any DDS warning messages during the model validation process.

### Qos Property Behavior Panel

The options in the **Qos Property Behavior** panel are used to specify the behavior of Qos properties in the DDS model

Field/Button	Description
<b>Show as Entity Compartments</b>	Select the checkbox to enable the Qos Policies to be displayed on DDS entities using the compartment notation.
<b>Create Automatically for new Entities</b>	Select the checkbox to enable the Qos Policy properties to be automatically created when new DDS Entities are created in the model. Enabling this option requires the Qos Policy specifications to be defined using the <a href="#">Qos Policy Specifications</a> <sup>[15]</sup> dialog <sup>[15]</sup> .
<b>Set Specifications...</b>	Click on this button to open the <a href="#">Qos Policy Specifications</a> <sup>[15]</sup> dialog <sup>[15]</sup> .

### 3.1.2 Qos Policy Specifications Dialog



This dialog is used to specify which *Qos Policy Specifications* are to be used as the default classifiers for *QosProperty* elements when new DDS Entities are created. Each of the policies can be specified by any one Qos Policy Specification defined for that Policy.

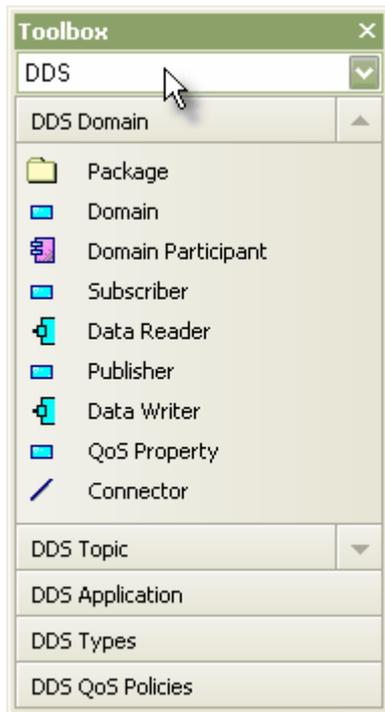
The **Defaults** button can be used to automatically enable the MDG Technology to allocate the specifications for this project.

## 3.2 Perspectives

Perspectives enable Enterprise Architect users to alter the contents of the UML Toolbox to suit their particular modeling role. The MDG Technology for DDS provides all the toolboxes necessary to create DDS models, and the perspective performs the useful task of removing clutter by hiding everything else.

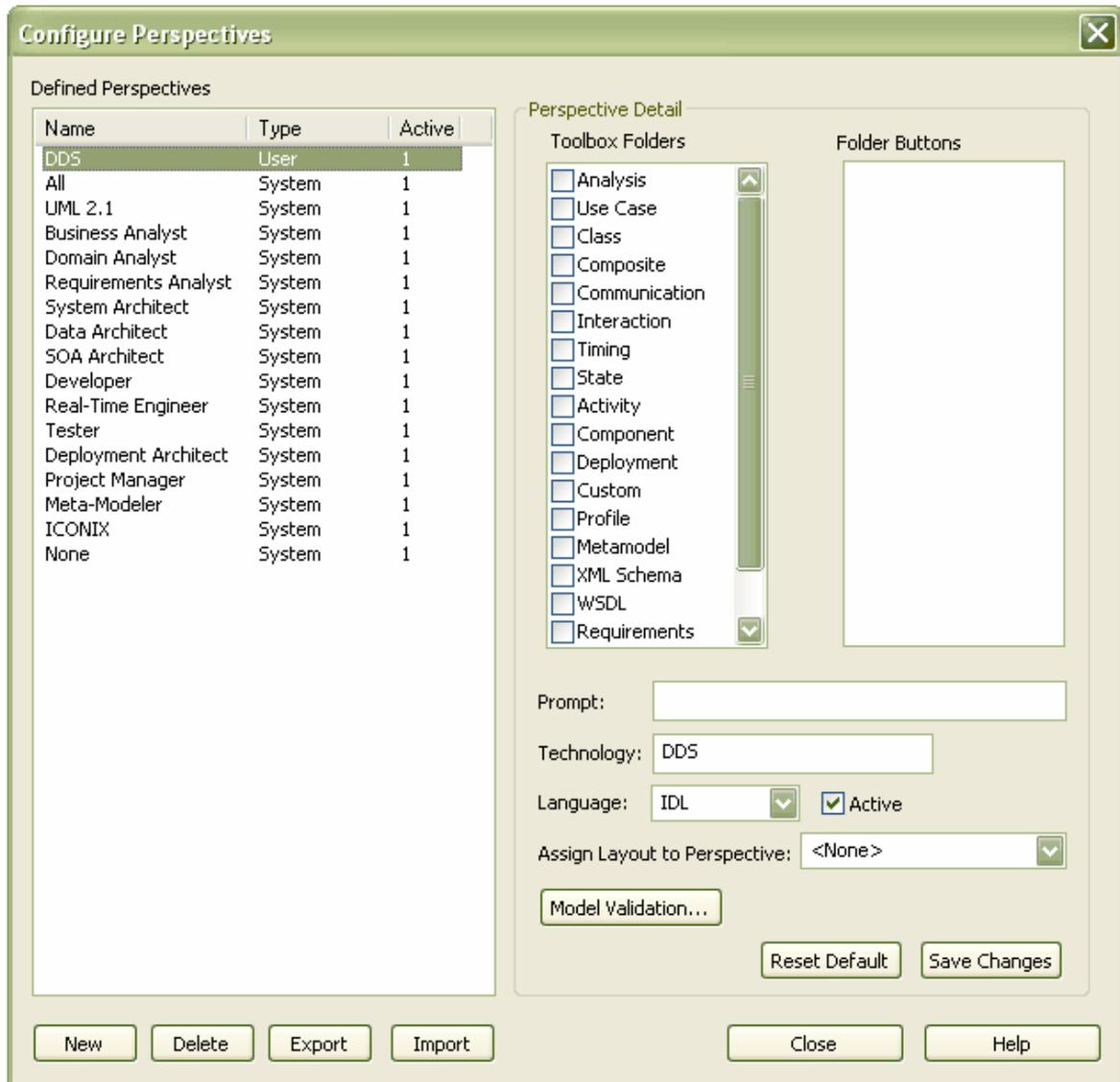
### Switching Perspectives

On loading the MDG Technology for DDS, the DDS perspective is imported and activated automatically. To switch to a different perspective, or to switch back to DDS from a different perspective, simply select the perspective name from the drop-down list at the top of the **Toolbox**.



### Customizing the DDS Perspective

The DDS perspective by default hides all non-DDS toolboxes. To make any of these non-DDS toolboxes available while the DDS perspective is active, select the **View | Perspectives** menu option; the **Configure Perspectives** dialog displays. Further help on using this dialog is available from the Enterprise Architect User Guide by pressing the **Help** button on the dialog.



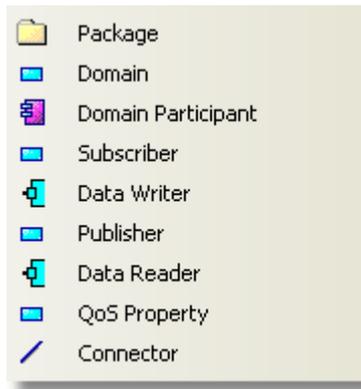
### 3.3 DDS Toolboxes

This section describes the toolboxes provided with the MDG Technology for DDS.

- [DDS Domain](#) <sup>[18]</sup>
- [DDS Topic](#) <sup>[19]</sup>
- [DDS Application](#) <sup>[20]</sup>
- [DDS Types](#) <sup>[20]</sup>
- [DDS Qos Policies](#) <sup>[21]</sup>

#### 3.3.1 DDS Domain

The **DDS Domain** toolbox provides elements and connectors for use on a DDS Domain diagram.



Element	Description
<b>Domain</b>	A stereotyped <i>Part</i> element that represents a DDS Domain.
<b>Domain Participant</b>	A stereotyped <i>Component</i> element that represents a DDS Domain Participant. It applies the following Tagged Value: <ul style="list-style-type: none"> <li>• <i>domain</i>: the DDS Domain that this DomainParticipant participates in.</li> </ul>
<b>Subscriber</b>	A stereotyped <i>Part</i> element that represents a DDS Subscriber. It is modeled as a child of a DomainParticipant and can contain one or more <i>DataReader</i> elements as its children.
<b>Data Writer</b>	A stereotyped <i>Port</i> element that represents a DDS DataWriter. It is modeled as a child of a Publisher and can be connected to the DDS Topic that it writes.
<b>Publisher</b>	A stereotyped <i>Part</i> element that represents a DDS Publisher. It is modeled as a child of a DomainParticipant and can contain one or more DataWriter elements as its children.
<b>Data Reader</b>	A stereotyped <i>Port</i> element that represents a DDS DataReader. It is modeled as a child of a Subscriber and can be connected to the DDS Topic that it reads.
<b>Qos Property</b>	A stereotyped <i>Part</i> element that represents a DDS Qos Policy for a DDS Entity. It can be modeled as a child element for any of the following Entities that can have Qos policies defined for it: <ul style="list-style-type: none"> <li>• DomainParticipant</li> <li>• Subscriber</li> <li>• Publisher</li> <li>• DataReader</li> <li>• DataWriter</li> <li>• Topic</li> <li>• Content Filtered Topic</li> <li>• Multi Topic.</li> </ul>

Element	Description
	<p>The name of the property specifies the Qos Policy defined by the property. It is also typed by a Qos policy specification, which defines the specific data for that policy.</p> <p><b>Note:</b></p> <p>A Qos Property must be typed by a Qos Policy Specification in order to have the correct Tagged Values for the Qos Policy.</p> <p>For more information about Qos Policy Specifications refer to <a href="#">DDS Qos Policies</a> <sup>[21]</sup>.</p>

**Note:**

*Package* and *Connector* are redefined from the standard Enterprise Architect toolset and are described in full in the *Enterprise Architect User Guide*.

### 3.3.2 DDS Topic

The **DDS Topic** toolbox provides elements and connectors for use on a DDS Topic diagram.



Element	Description
<b>Topic</b>	<p>A stereotyped <i>Part</i> element that represents a basic DDS Topic. DDS Topics can be connected to one or more DataReader and DataWriter elements that perform the role of reading or writing data to this topic. It applies the following Tagged Values:</p> <ul style="list-style-type: none"> <li>• <i>type</i>: a <a href="#">DDS type</a> <sup>[20]</sup> element used to describe the data structure for this topic. The type element is an IDL class.</li> </ul>
<b>Content Filtered Topic</b>	<p>A stereotyped <i>Part</i> element that represents a Content Filtered DDS Topic. It applies the following Tagged Values:</p> <ul style="list-style-type: none"> <li>• <i>filter_expression</i>: a string expression used as the filter to be applied to this topic</li> <li>• <i>type</i>: a <a href="#">DDS type</a> <sup>[20]</sup> element used to describe the data structure for this topic; the type element is an IDL class.</li> </ul>
<b>Multi Topic</b>	<p>A stereotyped <i>Part</i> element that represents a DDS MultiTopic. It applies the following Tagged Values:</p> <ul style="list-style-type: none"> <li>• <i>subscription_expression</i>: a string expression used as the subscription query to be applied to this topic</li> <li>• <i>type</i>: a <a href="#">DDS type</a> <sup>[20]</sup> element used to describe the data structure for this topic; the type element is an IDL class.</li> </ul>

**Note:**

*Connector* is redefined from the standard Enterprise Architect toolset and described in full in the *Enterprise Architect User Guide*.

### 3.3.3 DDS Application

The **DDS Application** toolbox provides elements and connectors for use on a DDS Application diagram.

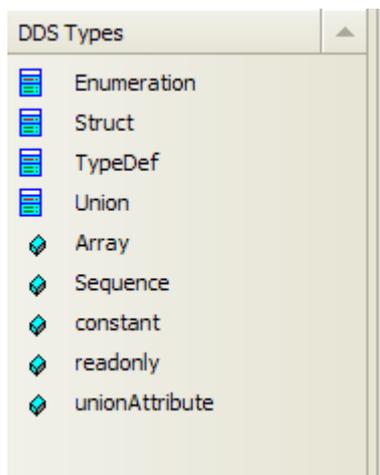


Element	Description
<b>Application Component</b>	<p>A stereotyped <i>Component</i> element that represents a DDS application. It is used to represent a compilable software artifact that represents a single DomainParticipant (using the Use relationship).</p> <p>Application Component is the DDS application used by the transformation process to specify the DDS implementation PSM generated by the transformation. It applies the following Tagged Values:</p> <ul style="list-style-type: none"> <li>• <i>language</i>: An enumeration representing the target software language for this application implementation - <b>C, C++, Java</b></li> <li>• <i>platform</i>: An enumeration representing the target implementation platform for this application implementation - <b>RTI_i86Win32VS2003, RTI_i86Win32j2sdk13.</b></li> </ul>

Connector	Description
<b>Use</b>	A stereotyped <i>Dependency</i> relationship that represents a use of a DDS DomainParticipant by an Application. Many Applications can use the same DomainParticipant as required to create a heterogeneous DDS design.

### 3.3.4 DDS Types

The **DDS Types** Toolbox provides elements and connectors for use on a DDS Types diagram.



Element	Description
<b>Enumeration</b>	A stereotyped <i>Class</i> element that represents an IDL Enumeration.
<b>Struct</b>	A stereotyped <i>Class</i> element that represents an IDL Struct.
<b>TypeDef</b>	A stereotyped <i>Class</i> element that represents an IDL TypeDef.
<b>Union</b>	A stereotyped <i>Class</i> element that represents an IDL Union.

Element	Description
<b>Array</b>	A stereotyped <i>Attribute</i> feature that represents an IDL Array.
<b>Sequence</b>	A stereotyped <i>Attribute</i> feature that represents an IDL Sequence.
<b>constant</b>	A stereotyped <i>Attribute</i> feature that represents an IDL Constant.
<b>readonly</b>	Another stereotyped <i>Attribute</i> feature that represents an IDL Constant.
<b>switch</b>	A stereotyped <i>Attribute</i> feature that represents an IDL Switch.
<b>unionAttribute</b>	A stereotyped <i>Attribute</i> feature that represents an attribute of an IDL Union.

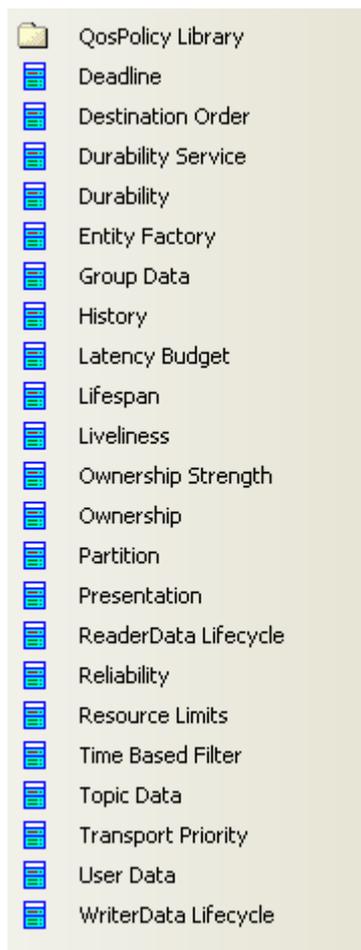
### DDS Types Conventions

The following conventions are used on a DDS Types diagram:

Tagged Value	Applies to	Corresponds To
<b>switchType</b>	Union	Switch type of an IDL Union.
<b>case</b>	unionAttribute	Case Label for each attribute in Union.

### 3.3.5 DDS Qos Policies

The **DDS Qos Policies** toolbox provides elements for use on a DDS Qos Policies Library diagram.

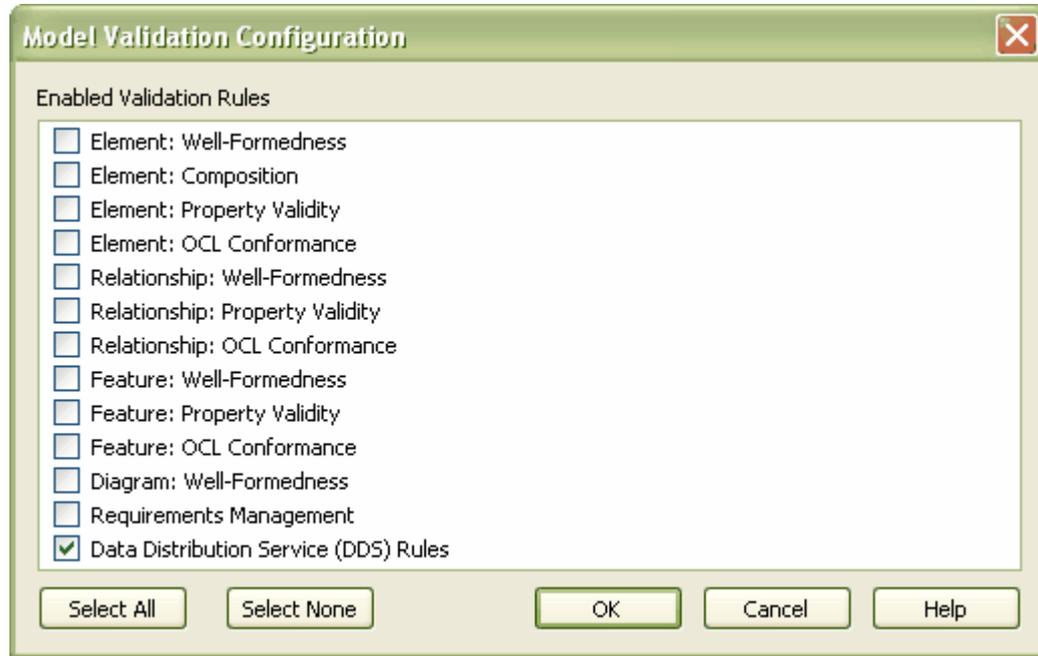


Element	Description
<b>QosPolicy Library</b>	A stereotyped <i>Package</i> element that represents a collection of Qos Policy Specifications.
<b>Deadline</b>	A stereotyped <i>Class</i> element that specifies the Deadline Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>period</i>: duration in nanoseconds (default <b>-1</b>).</li> </ul>
<b>Destination Order</b>	A stereotyped <i>Class</i> element that specifies the Destination Order Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>kind</i>: Enumeration: <b>BY_RECEPTION_TIMESTAMP</b> (default), <b>BY_SOURCE_TIMESTAMP</b>.</li> </ul>
<b>Durability Service</b>	A stereotyped <i>Class</i> element that specifies the Durability Service Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>history_depth</i>: Integer depth value (default <b>1</b>)</li> <li>• <i>history_kind</i>: Enumeration: <b>KEEP_LAST</b> (default), <b>KEEP_ALL</b></li> <li>• <i>max_instances</i>: Integer maximum value (default <b>-1</b> to keep all instances)</li> <li>• <i>max_samples</i>: Integer maximum samples (default <b>-1</b> to keep all samples)</li> <li>• <i>max_samples_per_instance</i>: Integer maximum samples per instance (default <b>-1</b> to keep all samples per instance)</li> <li>• <i>service_cleanup_delay</i>: duration in nanoseconds (default <b>0</b>).</li> </ul>
<b>Durability</b>	A stereotyped <i>Class</i> element that specifies the Durability Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>kind</i>: Enumeration: <b>TRANSIENT</b>, <b>TRANSIENT_LOCAL</b>, <b>VOLATILE</b> (default), <b>PERSISTENT</b>.</li> </ul>
<b>Entity Factory</b>	A stereotyped <i>Class</i> element that specifies the EntityFactory Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>autoenable_created_entities</i>: Boolean (default <b>true</b>).</li> </ul>
<b>Group Data</b>	A stereotyped <i>Class</i> element that specifies the Groupdata Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>datavalue</i>: String.</li> </ul>
<b>History</b>	A stereotyped <i>Class</i> element that specifies the History Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>depth</i>: Integer (default <b>1</b>)</li> <li>• <i>kind</i>: Enumeration: <b>KEEP_LAST</b> (default), <b>KEEP_ALL</b>.</li> </ul>
<b>Latency Budget</b>	A stereotyped <i>Class</i> element that specifies the LatencyBudget Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>duration</i>: duration in nanoseconds (default <b>0</b>).</li> </ul>
<b>Lifespan</b>	A stereotyped <i>Class</i> element that specifies the Liveliness Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>duration</i>: duration in nanoseconds (default <b>0</b>).</li> </ul>
<b>Liveliness</b>	A stereotyped <i>Class</i> element that specifies the Deadline Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>kind</i>: Enumeration: <b>AUTOMATIC</b> (default), <b>MANUAL_BY_PARTICIPANT</b>, <b>MANUAL_BY_TOPIC</b></li> <li>• <i>lease_duration</i>: duration in nanoseconds (default <b>-1</b>).</li> </ul>
<b>Ownership Strength</b>	A stereotyped <i>Class</i> element that specifies the Ownership Strength Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>value</i>: Integer (default <b>0</b>).</li> </ul>

Element	Description
<b>Ownership</b>	A stereotyped <i>Class</i> element that specifies the Ownership Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>kind</i>: Enumeration: <b>SHARED</b> (default), <b>EXCLUSIVE</b>.</li> </ul>
<b>Partition</b>	A stereotyped <i>Class</i> element that specifies the Partition Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>name</i>: String.</li> </ul>
<b>Presentation</b>	A stereotyped <i>Class</i> element that specifies the Presentation Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>access_scope</i>: Enumeration: <b>INSTANCE</b> (default), <b>TOPIC</b>, <b>GROUP</b></li> <li>• <i>coherent_access</i>: Boolean (default <b>false</b>)</li> <li>• <i>ordered_access</i>: Boolean (default <b>false</b>).</li> </ul>
<b>ReaderData Lifecycle</b>	A stereotyped <i>Class</i> element that specifies the ReaderData Lifecycle Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>autopurge_nowriter_samples_delay</i>: duration in nanoseconds (default <b>-1</b>).</li> </ul>
<b>Reliability</b>	A stereotyped <i>Class</i> element that specifies the Reliability Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>kind</i>: Enumeration: <b>BEST_EFFORT</b> (default), <b>RELIABLE</b></li> <li>• <i>max_blocking_time</i>: duration in nanoseconds (default <b>-1</b>).</li> </ul>
<b>Resource Limits</b>	A stereotyped <i>Class</i> element that specifies the Resource Limits Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>max_instances</i>: Integer maximum value (default <b>-1</b> to keep all instances)</li> <li>• <i>max_samples</i>: Integer maximum samples (default <b>-1</b> to keep all samples)</li> <li>• <i>max_samples_per_instance</i>: Integer maximum samples per instance (default <b>-1</b> to keep all samples per instance).</li> </ul>
<b>Time Based Filter</b>	A stereotyped <i>Class</i> element that specifies the Time Based Filter Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>minimum_separation</i>: duration in nanoseconds (default <b>0</b>).</li> </ul>
<b>Topic Data</b>	A stereotyped <i>Class</i> element that specifies the Topic Data Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>value</i>: String.</li> </ul>
<b>Transport Priority</b>	A stereotyped <i>Class</i> element that specifies the Transport Priority Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>value</i>: Integer (default <b>0</b>).</li> </ul>
<b>User Data</b>	A stereotyped <i>Class</i> element that specifies the User Data Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>value</i>: String.</li> </ul>
<b>WriterData Lifecycle</b>	A stereotyped <i>Class</i> element that specifies the WriterData Lifecycle Qos Policy. It applies the following Tagged Values: <ul style="list-style-type: none"> <li>• <i>autodispose_unregister_instances</i>: Boolean (default <b>true</b>).</li> </ul>

### 3.4 Model Validation

The MDG Technology for DDS registers with Enterprise Architect to receive model validation requests from users. To configure Enterprise Architect to perform DDS model validation, select the **Project | Model Validation | Configure** menu option from the Enterprise Architect main menu. The **Model Validation Configuration** dialog displays.



If you are only performing DDS validation, click on the **Select None** button, select the **Data Distribution Service (DDS) Rules** checkbox and click on the **OK** button. This is the default setting of the DDS Perspective. Note that DDS is strongly based on UML so it might be a useful exercise to perform the UML validation too.

#### Validate a DDS Model

To validate an element and any connectors attached to it, a diagram and all its elements, or a package and all its diagrams and elements against the DDS rules, select the **Project | Model Validation | Validate Selected** menu option.



For an explanation of the error and warning messages that might be returned when validating a DDS model, see the [Model Validation Rules for Elements](#) <sup>[24]</sup> topic.

#### 3.4.1 Model Validation Rules for Elements

The following messages might be output by the validation of a DDS element:

Message	Meaning
<p><i>DDS Entity missing data for Tagged Value:</i>  <i>&lt;domain   type   language   platform&gt;</i></p>	<p>A DDS <i>DomainParticipant</i>, <i>Topic</i> or <i>Application</i> is missing the Tagged Value specified by the message.</p>

Message	Meaning
<i>DDS Entity contains invalid data for Tagged Value:</i> <domain   type>	The DDS <i>DomainParticipant</i> or <i>Topic</i> refers to an invalid element in the specified Tagged Value.
<i>Missing QosPolicy:</i> <QOS property> <i>PSM Transform will use system default values for this policy</i>	The DDS <i>DomainParticipant</i> , <i>Topic</i> , <i>Subscriber</i> , <i>Publisher</i> , <i>DataReader</i> or <i>DataWriter</i> is missing the specified Qos Policy (specified by a <i>QosProperty</i> element). The <i>PSM transformation</i> process assumes the system default value for this Qos Policy.
<i>Missing child entity:</i> <Publisher or Subscriber   DataReader   DataWriter>	The DDS <i>DomainParticipant</i> , <i>Publisher</i> or <i>Subscriber</i> are missing any of their required children entities.
<i>Invalid children entities found of type:</i> <Any DDS Entity>	The given DDS entity contains other DDS entities as children, which it is not supposed to have.
<i>Missing or invalid usage relationship:</i> <other information>	The given DDS application is not bound to any <i>DomainParticipant</i> (or vice versa), or if an application attempts to use more than one <i>DomainParticipant</i> .
<i>Missing or invalid association:</i> <other information>	The given DDS topic is not associated with any <i>DataReaders</i> or <i>DataWriters</i> , or a <i>DataReader/DataWriter</i> is not associated with any topics.
<i>Duplicated DDS Entity Name:</i> <Any DDS Entity name>	The given DDS entity has the same name as another DDS entity.
<i>Unsupported type found in &lt;DDS Type&gt;</i> - <attribute> : <attribute type>	The type of attribute in the given <i>DDS Type</i> entity is neither an IDL primitive type, nor a user-defined DDS type.
<i>Missing DDS parent:</i> <Any DDS Entity type>	The given DDS entity does not belong to the specified parent type.
<i>Invalid DDS parent:</i> <Any DDS Entity type>	The given DDS entity belongs to the wrong parent type.

**Note:**

A DDS model might trigger additional UML validation messages, but these are outside the scope of this document. See the *Enterprise Architect User Guide*.

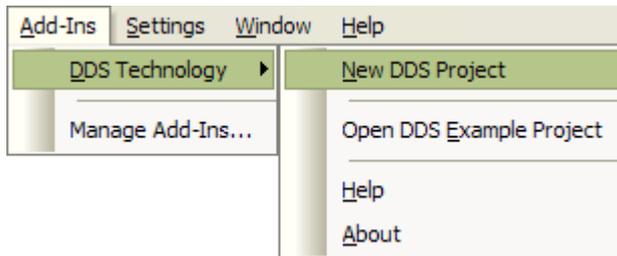
### 3.5 Create a DDS Project

There are two ways in which you can create a new DDS project:

- From a template
- From scratch

#### Create a DDS Project From a Template

Select the **Add-Ins | DDS Technology | New DDS Project** menu option.



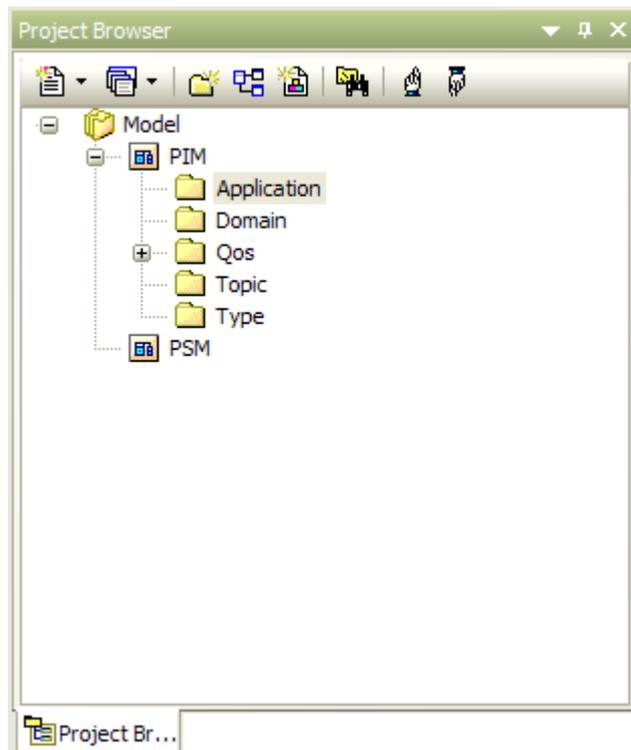
The new DDS project is generated from a DDS template project.

#### Create a New DDS Project From Scratch

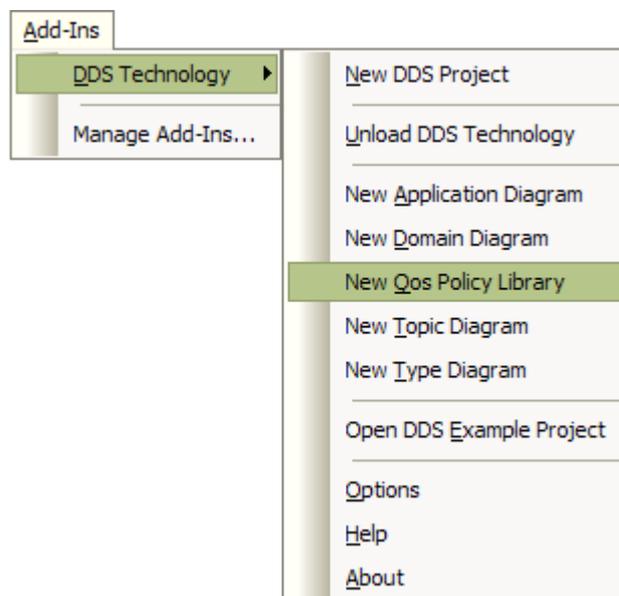
To create a new DDS project without reference to a template, follow the steps below.

1. Select the **File | New Project** menu option. In the **Name** field, type an appropriate name for the DDS project. Click on the **Save** button.
2. In the **Project Browser**, add two packages to the project. Give these packages names appropriate to the project and purpose:
  - A Platform Independent Model (PIM) package
  - An OMG IDL Platform Specific Model (PSM) package.
3. To the PIM package, add the following five child packages; again, give them names appropriate to the project and purpose:
  - A DDS Qos library package
  - A DDS Type package (for the *IDL type* items)
  - A DDS Topic package
  - A DDS Domain package (for the *Domain, DomainParticipant* and related items)
  - A DDS Application package (for the application components).

The project tree should, at this point, resemble the following:



- Right-click on the PIM package and select the **Add-In | DDS Technology | Load DDS Technology** menu option. After the DDS Technology has loaded successfully, the context menu should now appear as follows:

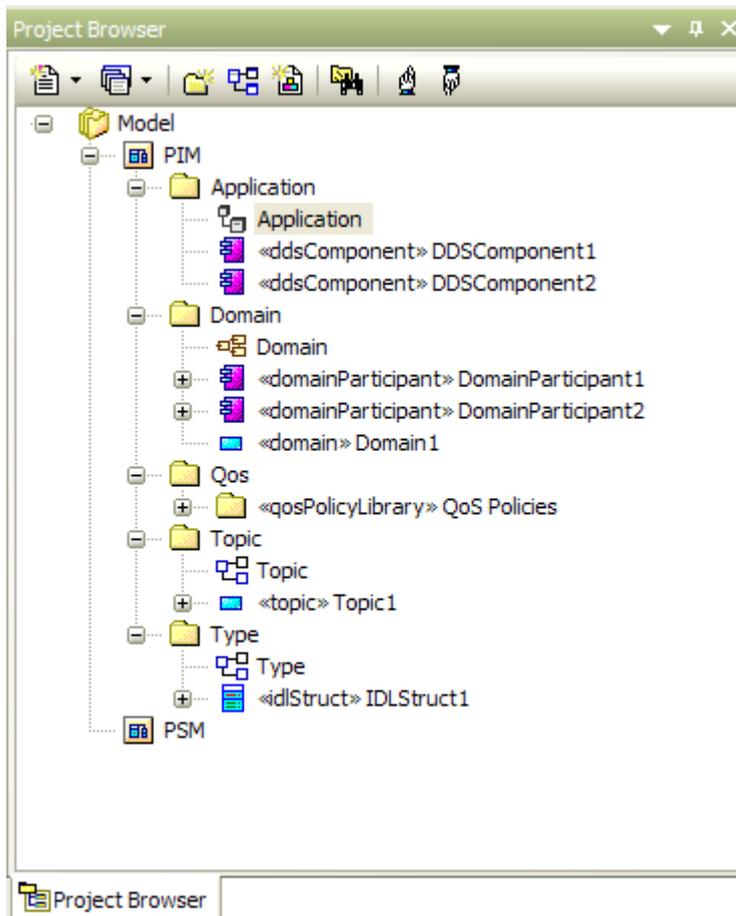


- Select the **Add-Ins | DDS Technology | New Qos Policy Library** menu option. The **Browse Project** dialog displays.
- Select the DDS Qos Library package as the location of the Qos Library. The **Qos Policy Specifications** dialog displays.
- Click on the **Defaults** button and the **Yes** button to assign a default value to all of the Qos Policy Specifications, then click on the **OK** button.
- Select the Type package and then select the **Add-Ins | DDS Technology | New Type Diagram** menu option, to create a *DDS Type diagram*. In the diagram, create some *DDS Type elements* and add attributes to the elements.
- Select the Topic package and then select the **Add-Ins | DDS Technology | New Topic Diagram** menu option, to create a *DDS Topic diagram*. In the diagram, create some *DDS Topic elements* and assign

the Tagged Value *Type* to the elements.

10. Select the Domain package and then select the **Add-Ins | DDS Technology | New Domain Diagram** menu option, to create a *DDS Domain diagram*. In the diagram, create a domain and some *DomainParticipant* elements, and assign the Tagged Value of *Domain* to the elements.
11. Within the *DomainParticipant* elements, create some *Publisher/Subscriber* items. Create *Data Writer* items for each Publisher item, and *Data Reader* items for each Subscriber. Drag a *Topic* element from the Topic package in the **Project Browser** into the diagram and create connectors between the Topic element and the Data Writer and Data Reader items.
12. Select the Application package and then select the **Add-Ins | DDS Technology | New Application Diagram** menu option, to create a *DDS Application diagram*. Drag the *DomainParticipant* elements from the *DDS Domain* package in the **Project Browser** onto the diagram. Create *Application Component* elements and then create *Usage* connectors between these and the *DomainParticipant* elements.

When you have saved these diagrams, you have created a basic DDS Platform Independent Model (PIM) having the following structure in the **Project Browser**.



You can validate the newly-created PIM by clicking on it and selecting the **Project | Model Validation | Validate Selected** menu option.

You can now go on to [generate the PSM and code](#) <sup>29</sup>.

### 3.6 Generate PSM and Code

This process follows on from [Create a DDS Project](#) <sup>[26]</sup>. Ensure that you have validated the PIM before starting to generate the PSM.

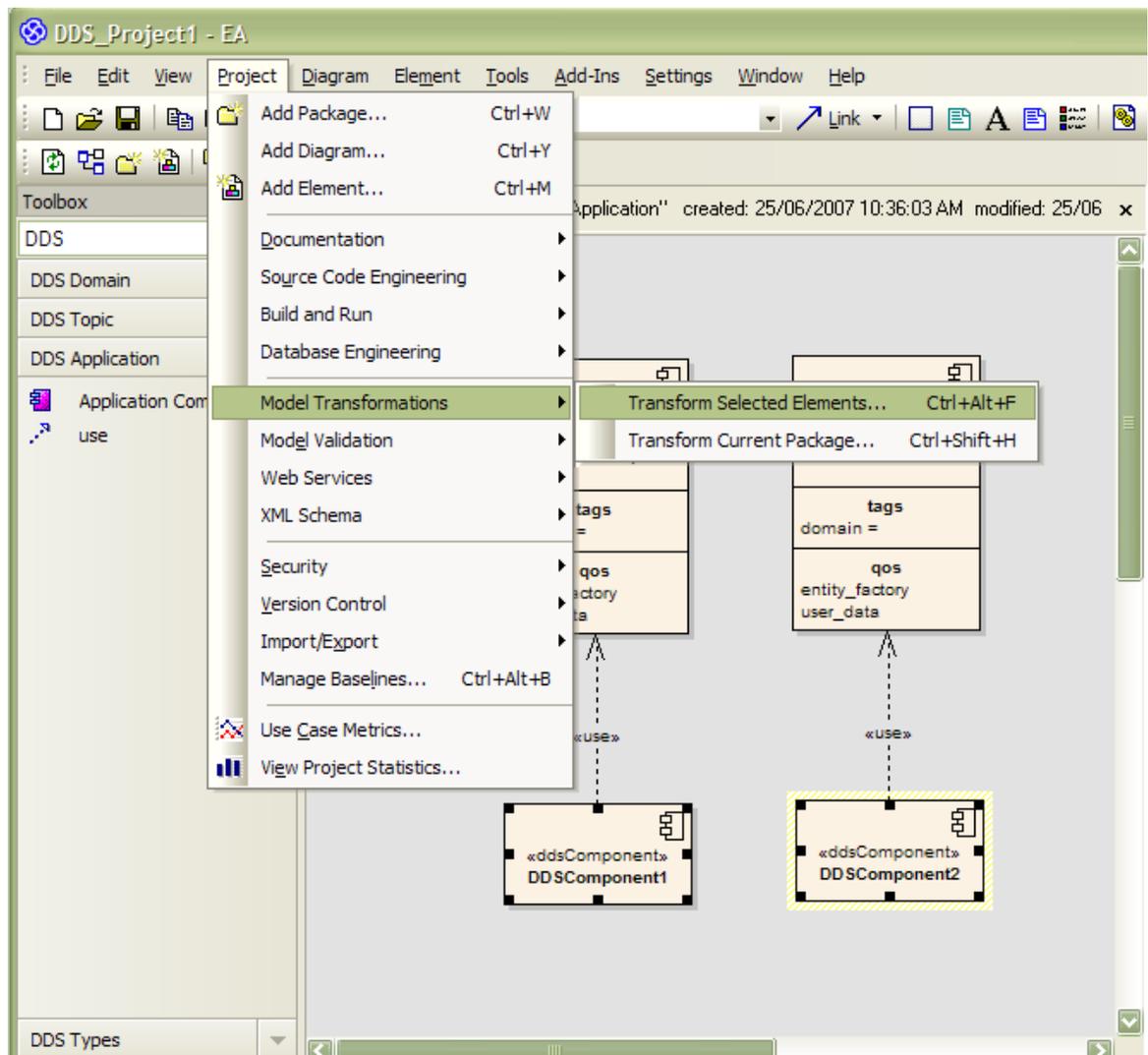
There are two Tagged Values for an Application Component - *Language* and *Platform*.

- The value of the *Language* Tagged Value defines the coding language to generate. For RTI NDDS, there are three possible values - **C**, **C++** and **Java**:
- The value of the *Platform* Tagged Value depends on the language defined. For:
  - C and C++, the value must be **RTI\_i86Win32VS2003**
  - Java, the value must be **RTI\_i86Win32j2sdk13**

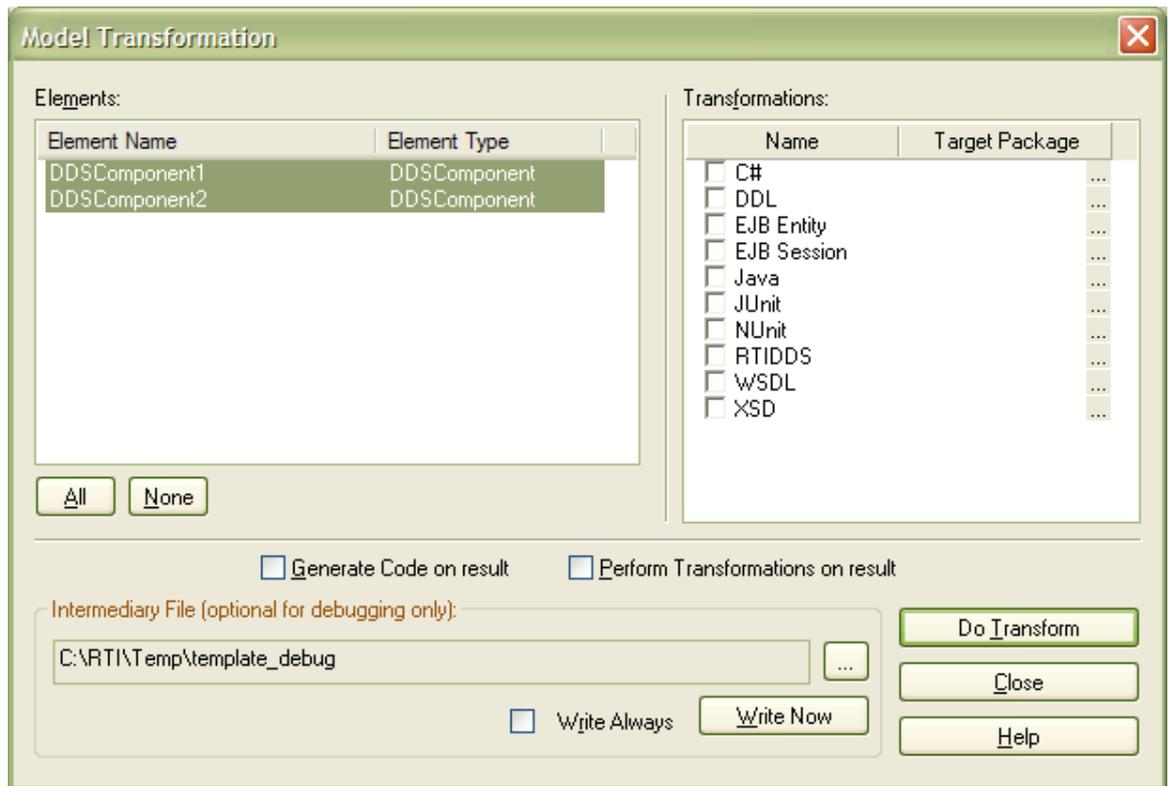
Before you generate the PSM and code, you might want to check and, if necessary, change the language and platform.

To generate the PSM and code, follow the steps below:

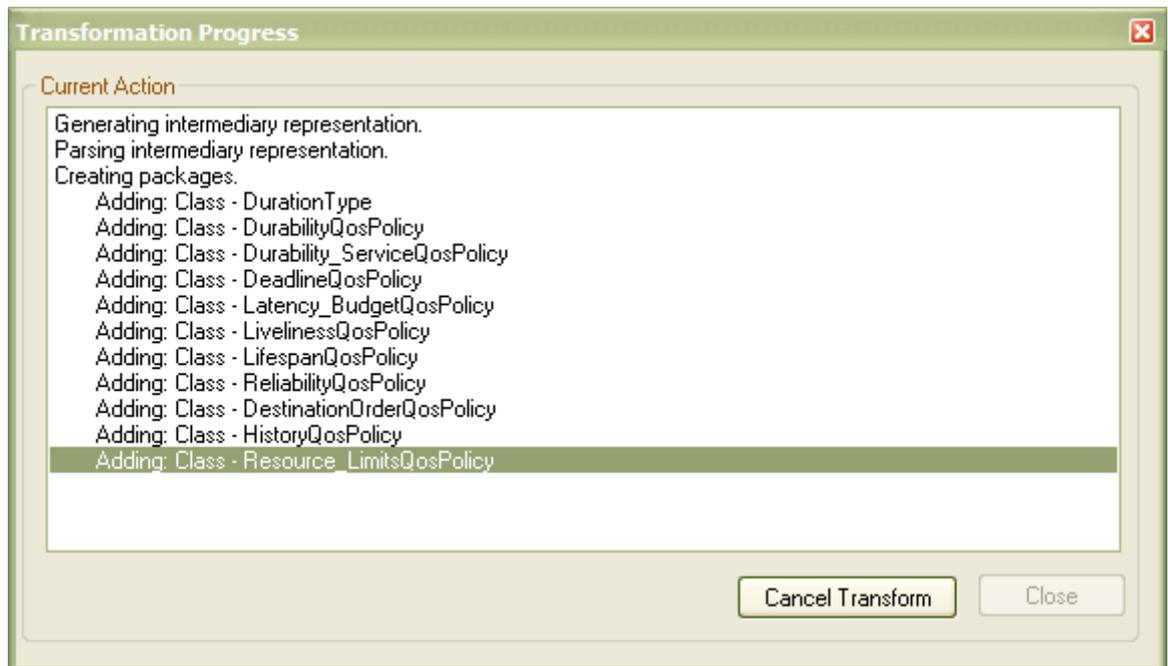
1. Open the DDS project and the PIM package, and then open the Application diagram in the Application package.
2. In the Application diagram, select the Application Components from which to generate the PSM and code.
3. Select the **Project | Model Transformations | Transform Selected Elements** menu option.



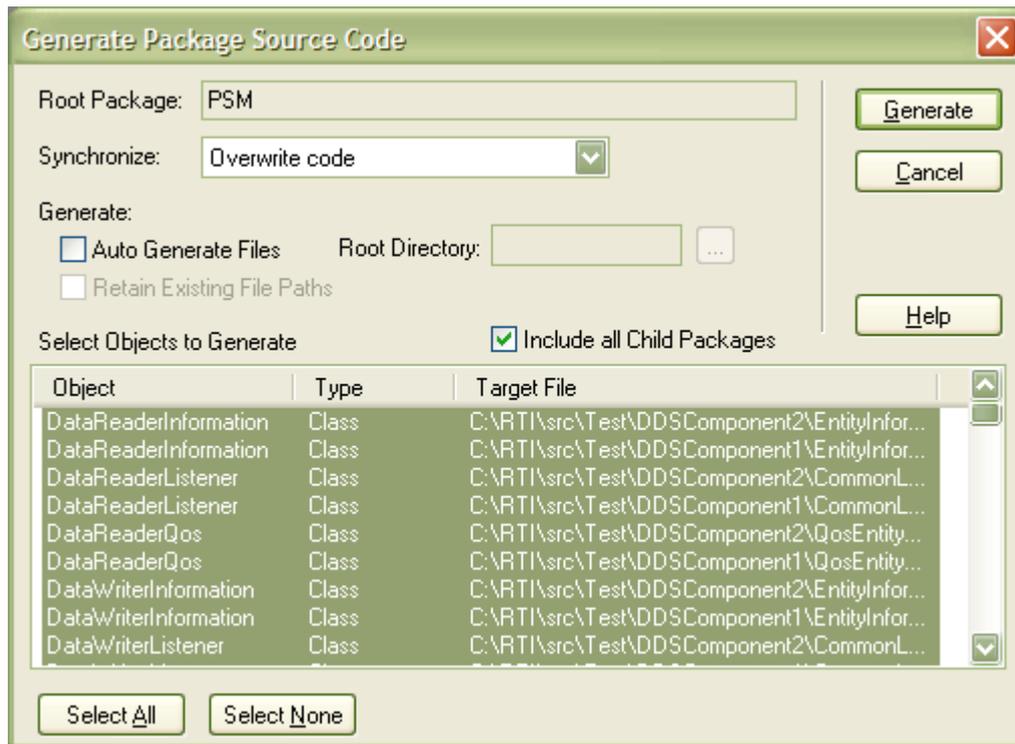
The **Model Transformation** dialog displays.



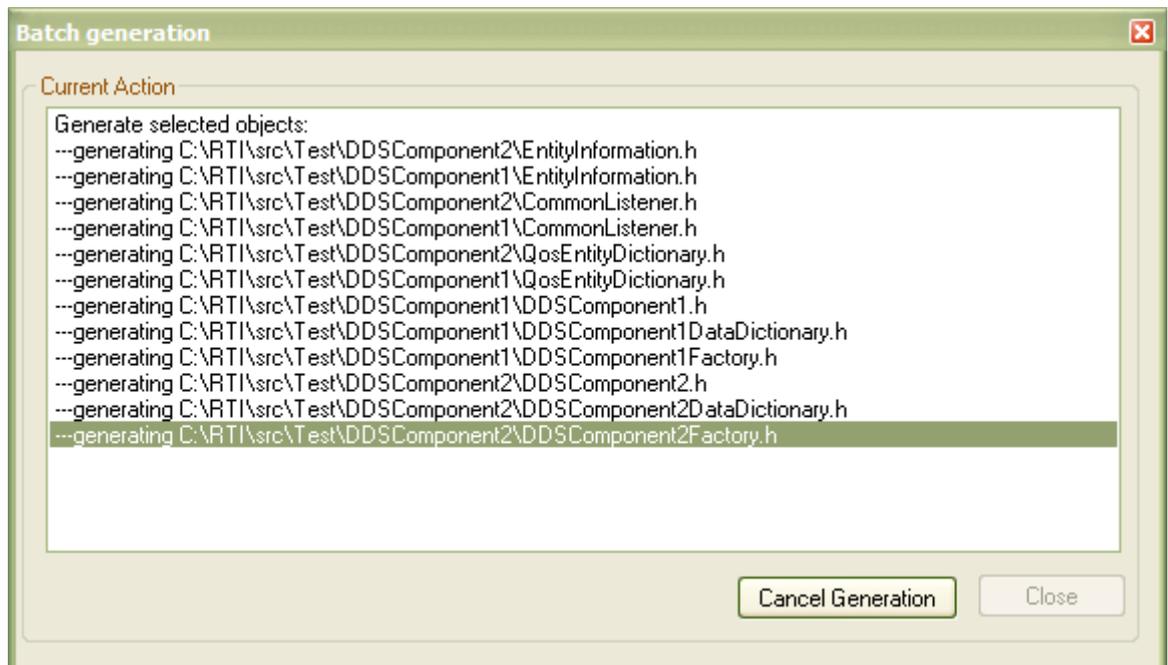
4. Select the **RTIDDS** checkbox. If the target package is not listed against the checkbox, the **Browse Project** dialog displays. Select the PSM package as the target for the generated PSM and click on the **OK** button.
5. On the **Model Transformation** dialog, click on the **Do Transform** button. (If you have not specified a project root folder in the **DDS Options** <sup>13</sup>, the system prompts you for the folder at this point.) The system starts to generate the PSM based on the selected DDS components; the progress of the transformation is shown in the **Transformation Progress** window.



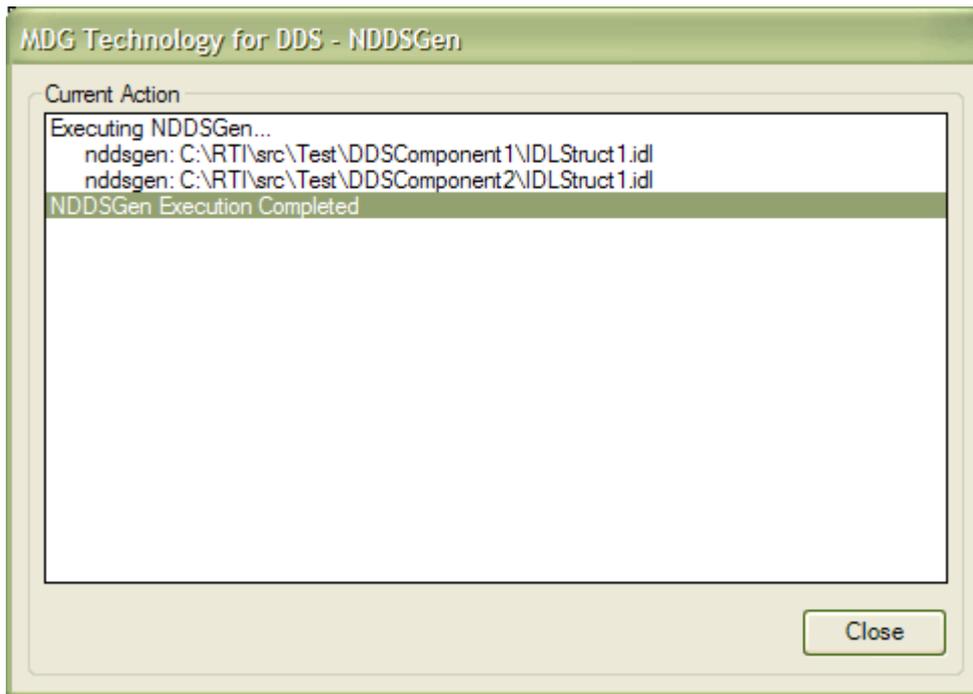
6. When the transformation is complete, the **Generate Package Source Code** dialog displays.



- In the **Synchronize** field, select **Overwrite code**, then select the **Include all Child Packages** checkbox. Click on the **Generate** button. The system starts to generate the source code for the specified language., in the project root file. The progress of the code generation is shown in the **Batch Generation** window.



- When code generation is complete, the system runs the NDDS generator to generate code from the IDL type.



When the NDDS generator has completed, you have finished generating the PSM and code.

---

### ***3.7 DDS Example Model***

To open the example model, select the **Add-Ins | DDS Technology | Open DDS Example Model** menu option from the Enterprise Architect main menu.

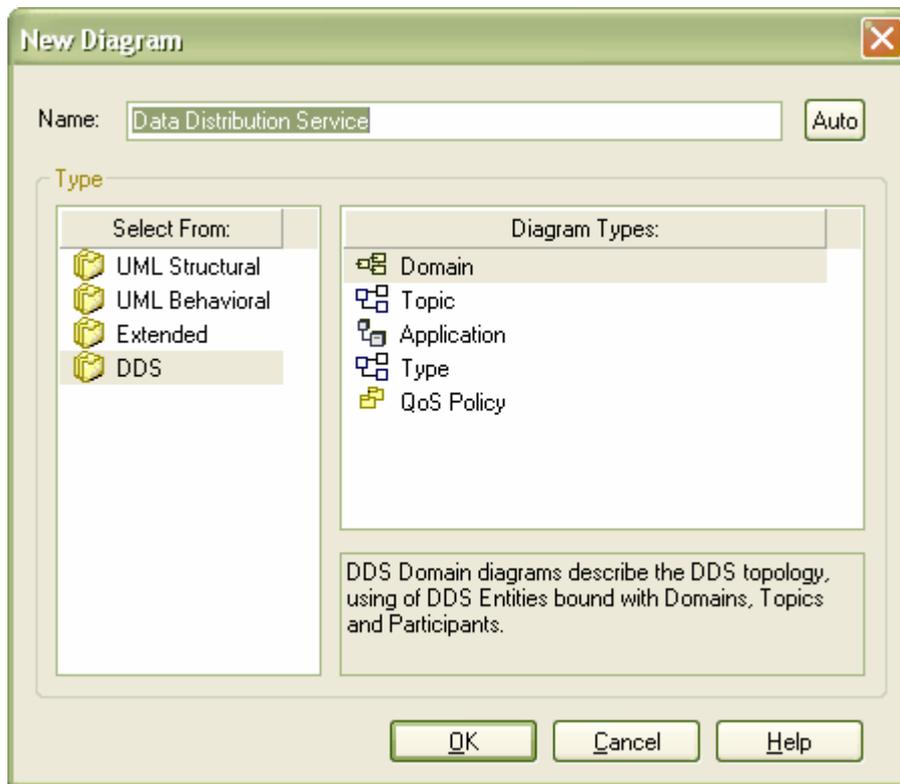
## 3.8 DDS Diagram Types

The MDG Technology for DDS introduces five new diagram types into Enterprise Architect. These are:

- Domain Diagrams
- Topic Diagrams
- Application Diagrams
- Type Diagrams
- QoS Policy.

### Create a DDS Diagram

DDS's specialized diagrams can be created in the same way as any other diagram in Enterprise Architect; see the Enterprise Architect documentation for further details. Loading the DDS add-in adds a DDS category of diagrams to the **New Diagram** dialog:



An alternative method for creating a DDS diagram is to use the [DDS Technology Menu](#) <sup>12</sup>.

# Index

## - C -

- Classifier
  - Default 15
- Code
  - C Generation 29
  - C++ Generation 29
  - Generate 29
  - Java Generation 29
- Compiled April 30 2008 2
- Copyright Notice 3
- Create
  - DDS Project 26

## - D -

- DDA Technology Menu 12
- DDS Options Dialog 13
- DDS Perspective
  - Customize 16
  - Switch 16
- DDS Project
  - Create From a Template 26
  - Create From Scratch 26
- DDS Toolbox
  - Application 20
  - Domain 18
  - Introduction 18
  - QoS Policies 21
  - Topic 19
  - Types 20
- DDS Type 34
- Default Classifiers 15
- Diagram
  - Application, Elements And Connectors 20
  - DDS Application 34
  - DDS Domain 34
  - DDS Policy Library 34
  - DDS Topics 34
  - Domain, Elements And Connectors 18
  - QoS Policies Library 21
  - Topic, Elements And Connectors 19
  - Types 34
  - Types, Elements And Connectors 20

## - E -

- Element
  - Model Validation Rules 24
  - QoS Policies 21
- End User Licensing Agreement 4
- Example Model
  - Open 33

## - G -

- Generate
  - C 29
  - C++ 29
  - Code 29
  - Java 29
  - PSM 29
- Getting Started 10

## - L -

- License Agreement 4

## - M -

- MDG Technology For DDS
  - Acknowledgement of Trademarks 7
  - Copyright Notice 3
  - DDS Technology Menu 12
  - Getting Started 10
  - License Agreement 4
  - Support 8
  - System Requirements 9
  - Using DDS 11
  - Welcome 2
- Model Validation
  - Configuration 24
  - Perform 24
  - Rules for Elements 24

## - N -

- NDDS Generator 29

## - O -

- Options
  - Set General 13
  - Set QoS Property Behavior 13

## Options

Set RTIDDS 13

**- P -**

## PIM

Create 26

## Platform Independent Model

Create 26

## Platform Specific Model

Generate 29

## PSM

Generate 29

**- Q -**

## Qos Policies

Elements 21

Library Diagram 21

Toolbox 21

QoS Policy Specifications Dialog 15

**- R -**

RTI NDDS 29

**- S -**

Support 8

System Requirements 9

**- T -**

Trademarks 7

**- U -**

Using DDS 11

**- V -**

## Validation

Of Model 24

Rules, For Elements 24

**- W -**

Welcome 2



MDG Technology for DDS User Guide

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