

Enterprise Architect

User Guide Series

Introducing the Metamodel Views

Author: Sparx Systems

Date: 26/07/2018

Version: 1.0



Table of Contents

Introducing the Metamodel Views	3
Built-in Metamodel Diagram View	5
Custom Metamodel Diagram View	9
Define Metamodel Constraints	15
Constraints on Meta-Constraint connector	19

Introducing the Metamodel Views

Enterprise Architect includes an extremely powerful and flexible Views system based on both system defined and user defined meta-models. The Views system provides highly focused diagrams that limit the number of elements and connections available to only the core required to achieve a specific task. For example, a Hierarchy View imposed on a Class diagram might limit the only element available to 'Class' and the only connector to 'Inheritance'.

Using the Views system to guide the modeling palette and relationships available, you will build tight and purposeful diagrams that use only the required elements within the current modeling context. Cutting out the noise and reducing the set of constructs available is a great way of making sure a design is addressing the intended purpose and avoiding extraneous elements that might negatively impact the readability and correctness of the model.

Metamodel Views

View	Description
System	Enterprise Architect provides a wide range of built-in Meta Model Views that address numerous modeling scenarios and domains. Many of the Model Wizard patterns are pre-set with a Meta Model View, and the 'New Diagram' dialog includes many derivative diagram views that extend and refine the capabilities of the base diagram types.
Custom	In addition to using the system-defined Meta-Model based views in Enterprise Architect, it is also possible to create your own Meta Models and easily add them to the current model, where you and other modelers can then apply them to various diagrams as needed. For example, you might define a specific Meta-Model set that addresses the needs of Requirements modeling in your organization, and then mandate that all Requirements diagrams use that Metamodel View.

View System Facilities

Facility	Description
Diagram Filter	In addition to limiting the available palette, the View system also allows the modeler to enable a diagram filter that will gray out any elements that are not part of the current view set. This allows the modeler to correct any parts of their model that don't meet the purpose of the selected View, or to filter out elements that are required to be there, but do not form part of the current modeling goal.
Diagram Properties	The Diagram Properties dialog now includes a new drop list of available Views for the currently selected diagram type. Selecting one of these Views will reduce the palette of constructs available and limit the entries in the Quicklinker. Modelers can easily activate a View or even remove one if necessary - the actual model content will not change.
Diagram Views	The 'New Diagram' dialog now includes a number of different Views that offer different palette sets and focus goals for diagram types such as UML, SysML, BPMN and UAF, amongst others. If you have the goal of modeling a simple Activity diagram with no advanced features, the Simple Activity View under the UML Activity Diagram section could be a better option than using the full Activity

diagram set.

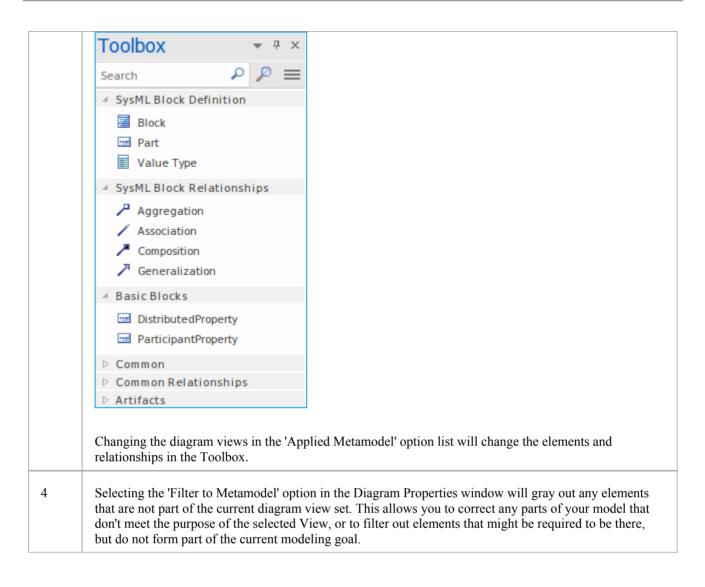
Built-in Metamodel Diagram View

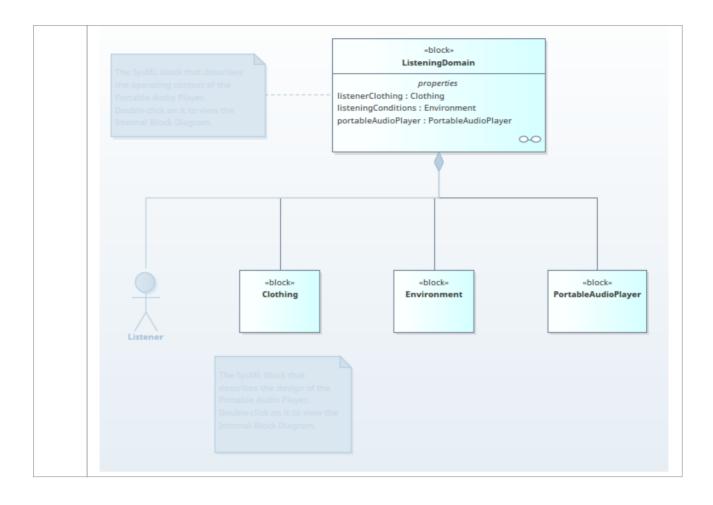
The 'New Diagram' dialog now includes a number of different Views that offer different palette sets and focus goals for diagrams types such as UML, SysML, BPMN and UAF, amongst others. As an example, if you have the goal of modeling a simple SysML Block Definition diagram with no advanced features, the 'Basic Blocks View' under the 'SysML 1.5 Block Definition Diagram' section might be a better option than using the full Block Definition Diagram set. This example is used to provide values in the procedures in this topic.

Working with Diagram Views

Step	Action
1	In the Project Browser, click on the Package or element under which to place the diagram. Open the 'New Diagram' dialog, select 'SysML 1.4 Views:: Basic Blocks' and click on the OK button to create the diagram.
	New Diagram X
	Package : Domain Model
	Diagram: Domain Model Auto
	Туре
	Select From: Image: Constraint Blocks Image: Cons
2	The 'Applied Metamodel' option, in the Diagram Properties window of the created diagram, will show the applied diagram view. You can also click on the drop-down arrow and select another of the available diagram views from the list.

Diagram Compartments Swimlanes an	nd Matrix
 General Settings 	
Name	Domain Model
Туре	SysML Block Definition
Stereotype	
Author	The Administrator2
Applied Metamodel	SysML 1.4 Views::Basic Blocks
Filter to Metamodel	SysML 1.4 Views::Basic Blocks
Filter to Context	SysML 1.4 Views::Constraint Blocks
Version	SysML 1.4 Views::Requirement Mappings
Version	UAF Actual Resources::Connectivity
Filter to Version	UAF Actual Resources::Structure
New to Version	UAF Actual Resources::Taxonomy
Appearance	UAF Dictionary::Dictionary
Display as	UAF Information::Information Model
Hand Drawn	UAF Operational::Connectivity
Whiteboard	UAF Operational::Constraints
Disable fully scoped object names	UAF Operational::Processes
Display Element Lock Status	UAF Operational::Structure
Theme	UAF Operational::Taxonomy
Advanced	UAF Operational::Traceability
MDG Technology	UAF Parameters::Environment
GUID	
WebEA	UAF Parameters::Measurements
Diagram Properties Diagram Notes Ta	UAF Personnel::Availability Roadmap
Diagram roperaes Diagram roces re	UAF Personnel::Competence Constraints

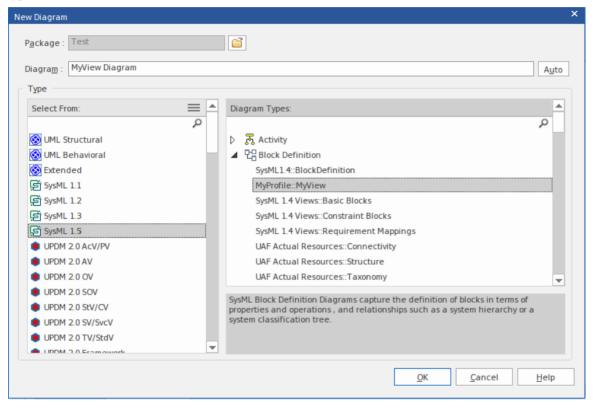




Custom Metamodel Diagram View

Enterprise Architect has a wide range of built-in diagram views, but you can also create your own metamodels that define custom diagram views. For example, you might define a specific metamodel that addresses the needs of Requirements modeling in your organization, and then mandate that all Requirements diagrams use that diagram view instead of the built-in Requirement diagram views. You can quickly add your diagram views to the current model, where you or other modelers can apply them to your diagrams.

As an illustration, suppose you decide to make available a new SysML 1.4 Block Definition diagram view in your project, called 'MyView'. Users will access it through the 'New Diagram' dialog, expanding the Block Definition diagram type.

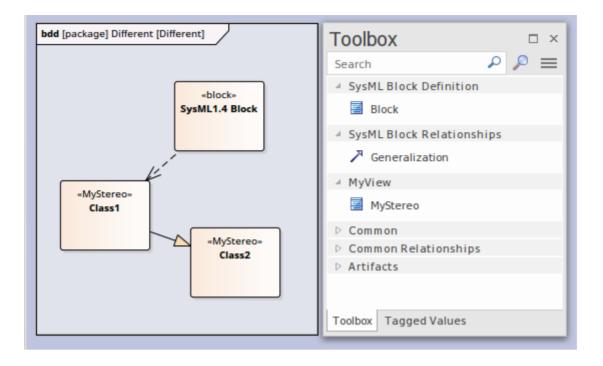


The fully extended name of the diagram view reflects the parent Profile name (MyProfile) and the view name (MyView) - hence 'MyProfile::MyView'. You could call the example view SysML 1.4 Views:: MyView to indicate that it is a member of the SysML 1.4 View suite.

If you are extending a UML base diagram type, with the Profile name 'UML', the equivalent view name could be something like 'UML::Full Class'.

The users select the example diagram view to create a very simple SysML 1.4 Block diagram that can have:

- Two types of element:
 - a SysML 1.4 Block element (an extended Class from the SysML 1.4 technology)
 - a MyStereo element that you are defining within your new metamodel 'MyView' as a Class with the stereotype MyStereo
- One type of connector a standard SysML Block Generalization (which is the same as a standard UML Generalization)



The diagram view makes the elements and connector available from the Toolbox, as shown, and from the Quicklinker. The *Create Custom Diagram View in a Profile* table explains how to create a metamodel that defines a new diagram view, finishing with the MyView example.

Access

Ribbon	Design > Diagram > Toolbox: => Profile > Metamodel
Keyboard Shortcuts	Alt+5: > Profile > Metamodel

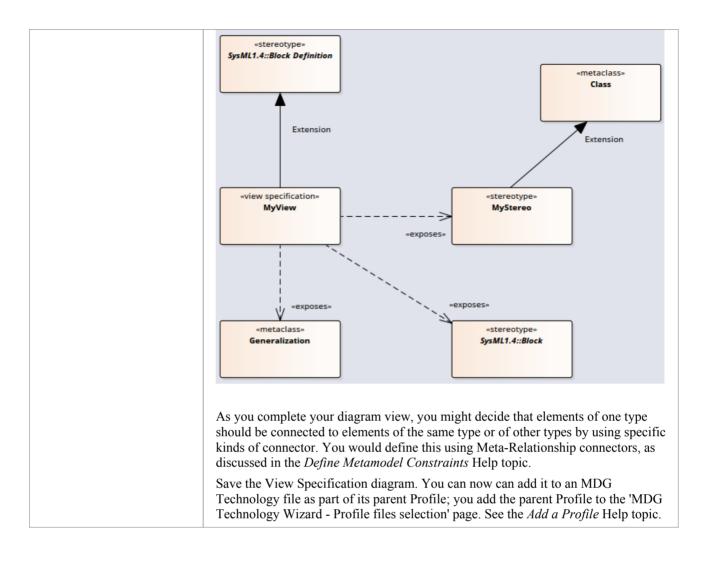
Create Custom Diagram View in a Profile

Operation	Action
Create the Profile diagram	In your profile Package, create a new Package diagram and, in the Diagram Toolbox, open the 'Profile' page (select the 'Design > Diagram > Toolbox' ribbon option, then click on and select 'Profile').
	Drag the 'Profile' icon onto the diagram and give it the name 'MyProfile', selecting to add a child Class diagram of the name 'MyView', which you open.
	Expand the 'Metamodel' page in the Toolbox and note the:
	 'View Specification' element, which you can use to create a custom diagram view
	• 'Exposes' connector, which you use to specify the contents of the Toolbox page associated with the custom diagram view
	Within a Profile, you use the 'View Specification' stereotyped element to identify

Add View Specification	the new custom diagram view as an extension of an existing built-in or stereotyped diagram.
	Drag the 'View Specification' icon onto the Profile diagram, and give the element a name; in our example, 'MyView'.
	The first thing to consider when defining a new view, is what diagram type or types it should be available for. The next two rows show how to define a view for a UML diagram and a Profile diagram.
	In both cases, click on the 'Extension' icon and drag from the view specification to the diagram-type element, to create the Extension connector.
Extending a UML Diagram Type	To extend a base UML diagram type, drag the 'Class' icon from the Toolbox onto the diagram and, on the element Properties window, give the element:
	• The exact name of the diagram type (as listed in the <i>Built-in Diagram Types</i> Help topic) such as 'Logical' (for a Class diagram), and
	• The stereotype < <metaclass>></metaclass>
	This example shows 'MyView' as previously created, extending the UML Component diagram.
	«view specification» «metaclass» MyView Component
	The result is that in the 'New Diagram' dialog, an extra view is added under the
	UML Component Diagram type.
Extending a Profile Diagram Type	To extend a profiled diagram type, such as a BPMN or SysML diagram type, drag the 'Stereotype' icon onto the diagram and give the Stereotype element the exact fully qualified name of the diagram type.
	Because this is a reference to an external stereotype, it should also be marked as Abstract to prevent it being exported into the profile. To do that, display the Properties window, expand the 'Advanced' section and select the 'Abstract' checkbox.
	This example shows 'MyView' as previously created, extending the GRA-UML Component Diagram type.
	«view specification» GRA-UML:: MyView GRA Component {abstract}
	The result is that the 'New Diagram' dialog will show the view we are defining under the GRA-UML component diagram.
	Note: If you do not know the fully qualified name of the diagram type you are extending, query the API to get the 'Metatype' field. In a Javascript console you can use:
	?GetCurrentDiagram().MetaType
Exposing Objects in the Diagram View Toolbox	An Exposes connector adds an object to the Toolbox page for the diagram view. For each element and connector to add to the diagram view's Toolbox page, you drag a 'definition element' onto the diagram and then click on the 'Exposes' icon in the Toolbox 'Profile' page and drag the cursor from the View Specification element

	The type of definition element depends on whether you are exposing a base UML element or a stereotyped element, as shown in the next two rows.
Exposing UML Element Types	If you are using base UML element or connectors in your custom diagram view, then for each element or connector:
	1. Drag the 'Metaclass' icon from the Toolbox 'Profile' page onto the diagram and give it the name of the base element or connector type it represents and
	2. Add the Exposes connector between the View Specification element and the Metaclass element
	For example:
	<pre>«exposes» «exposes» «metaclass» Component *view specification»</pre>
Exposing Profiled Element Types	If you are defining a new stereotyped object in the diagram view, or using stereotyped elements already defined in other profiles, then for each element or connector:
	1. Drag the 'Stereotype' icon from the Toolbox 'Profile' page onto the diagram, and give the element the name of the stereotyped element or connector it represents
	2. If the Stereotype is defined in another profile, expand the 'Advanced' section of the Properties window and select the 'Abstract' checkbox
	3. If the Stereotype is being defined here, add to the diagram the base element that the Stereotype extends, and create an Extension connector between the Stereotype and base element
	4. Add the Exposes connector between the View Specification element and the Stereotype element
	For example:

	<pre>«exposes» SysML1.4:: (>) block *view specification»</pre>
Completing the Example	With reference to the earlier rows in the table, on the MyView Class diagram (the child of the MyProfile diagram):
	1. Create the View Specification element MyView.
	 Create the Stereotype element SysML1.4::Block Definition and set it to Abstract.
	3. Connect the View Specification to the SysML1.4::Block Definition with an Extension connector.
	4. Create a Metaclass element called Generalization.
	5. Create a Stereotype element called SysML1.4::Block and set it to Abstract.
	 Create a Stereotype element called MyStereo and a Metaclass element called UML Class and connect the Stereotype to the Metaclass with an Extension connector.
	 Connect the View Specification element to the Generalization element, the SysML1.4::Block element and the MyStereo element, each with an Exposes connector.
	This illustration represents the diagram that you have created:



Define Metamodel Constraints

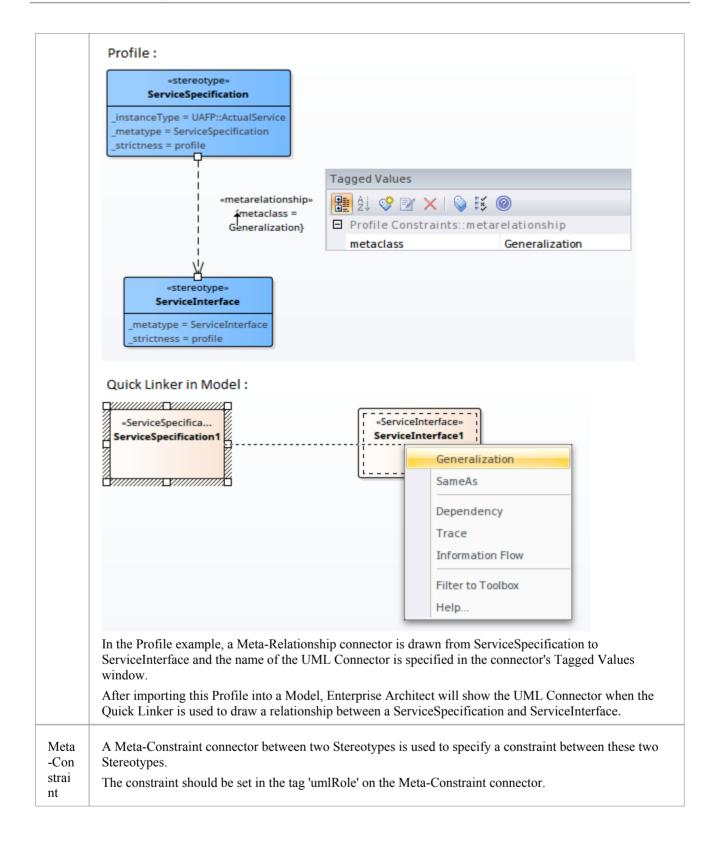
When extending UML to develop a domain-specific Profile, Enterprise Architect allows you to specify constraints that enable restricting the connectors that can be drawn from a Stereotype, either using the Quick Linker or from the Toolbox. These constraints are defined using the relationships under the 'Metamodel' page of the 'Profile' toolbox.

Access

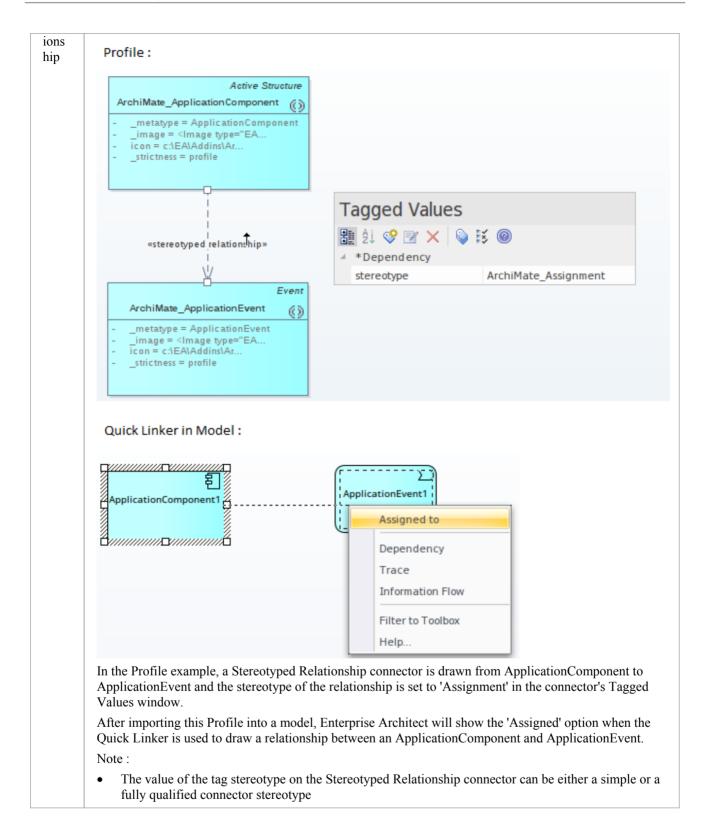
Ribbon	Design > Diagram > Toolbox: => Profile	
Keyboard Shortcuts	Alt+5	

Add Metamodel Constraints to a Profile

Item	Detail
Meta -Rel ation ship	A Meta-Relationship connector between two Stereotypes is used to specify a valid UML Connector between these two Stereotypes. The name of the UML Connector should be set in the tag 'metaclass' on the Meta-Relationship connector.



	«stereotype»			
	ActualProjectMilestone			
	_metatype = ActualProjectMi _strictness = profile			
	actualMilestoneKind: ActualMilestoneKind			
	Tagged Values			
	🚹 🔡 21 😵 📧 🗙 I 💊 🔣 🎯			
	<pre>«metaconstraint» {umlRole = classifier}</pre> Profile Constraints::metaconstraint			
	umIRole classifier			
	«stereotype»			
	ProjectMilestone			
	_instanceType = UAFP::ActualPro			
	_metatype = ProjectMilestone			
	_strictness = profile			
	In the Profile example, a Meta-Constraint connector is drawn from ActualProjectMilestone to ProjectMilestone and the constraint is specified as classifier on the tag 'umlRole' in the connector's Tagged Values window.			
	After importing this Profile into a model, Enterprise Architect will show only the ProjectMilestone stereotyped elements when assigning a classifier for ActualProjectMilestone element.			
	Constraint values for the tag 'umlRole' include:			
	• classifier - restricts the classifier for the source Stereotype element to the target Stereotype element			
	• type – restricts the type for the source Stereotype element to the target Stereotype element			
	• behavior - restricts the behavior for the source Stereotype element to the target Stereotype element			
	• conveyed - restricts the conveyed element for the source Stereotype element to the target Stereotype element			
	• slot - restricts the slot for the source Stereotype element to the target Stereotype element			
	• client/source/end[0].role/informationSource – restricts the source of a connector to the target Stereotype element			
	• supplier/target/end[1].role/informationTarget - restricts the target of a connector to the target Stereotype element			
	• realizingConnector/realizingActivityEdge/realizingMessage - restricts the relationship that can real an information flow			
	 typedElement/instanceSpecification – when dropping as classifier from the Project Browser, this constraint restricts the type to the target Stereotype element owner/class/activity/owningInstance – restricts the container of this element to the target Stereoty element; this constraint is used to create embedded element rules for the Quick Linker and valid nesting during Model Validation 			
	• ownedElement/ownedAttribute/ownedOperation/ownedParameter/ownedPort – restricts the element/attribute/operation/parameter/port that can be owned by the source Stereotype element; this constraint is typically used to validate nesting during Model Validation			
	• annotatedElement/constrainedElement – restricts the target of a Note Link connector to the target Stereotype element			
re D	A Stereotyped Relationship connector between two Stereotypes is used to specify a valid stereotyped connector between these two Stereotypes.			
	The Stereotype name should be set in the tag 'stereotype' on the Stereotyped Relationship connector.			



Constraints on Meta-Constraint connector

When creating a domain-specific Profile, Enterprise Architect allows you to specify constraints between related Stereotypes. As an example, you can restrict the element that can be set as a classifier on a Stereotyped element.

A Meta-Constraint connector, on the 'Metamodel' page of the 'Profile' toolbox, between two Stereotypes is used to specify the constraint between the two Stereotypes. The constraint should be set in the tag 'umlRole' on the Meta-Constraint connector.

Access

Ribbon	Design > Diagram > Toolbox: => Profile > Metamodel
Keyboard Shortcuts	Alt+5

Constraint values for tag 'umlRole'

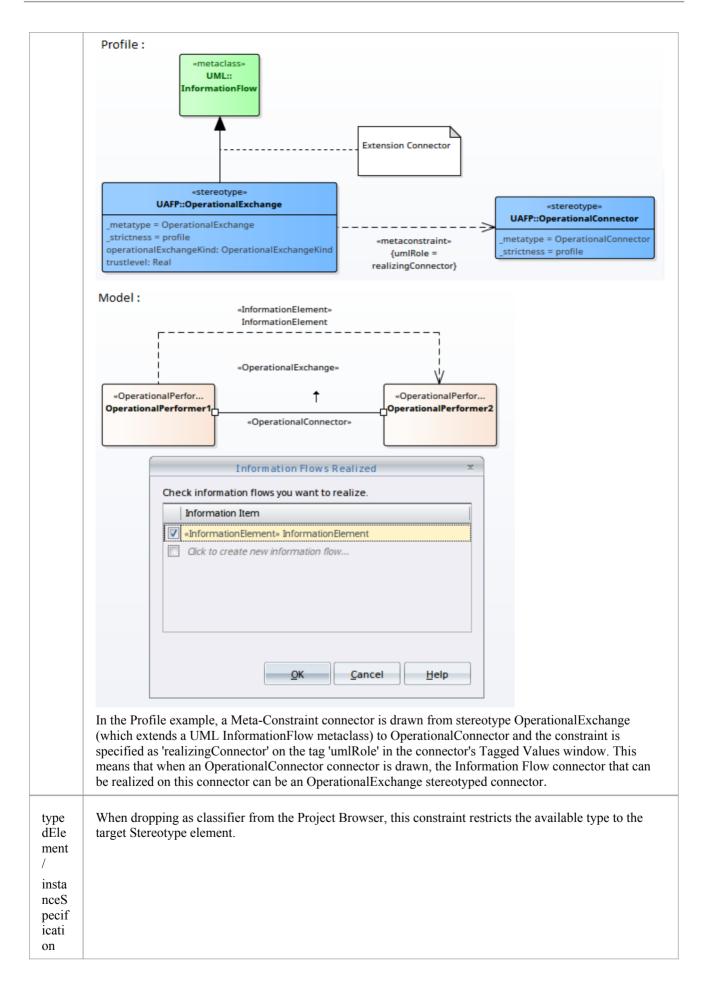
Constraint values for the tag 'umlRole' on the Meta-Constraint connector are:

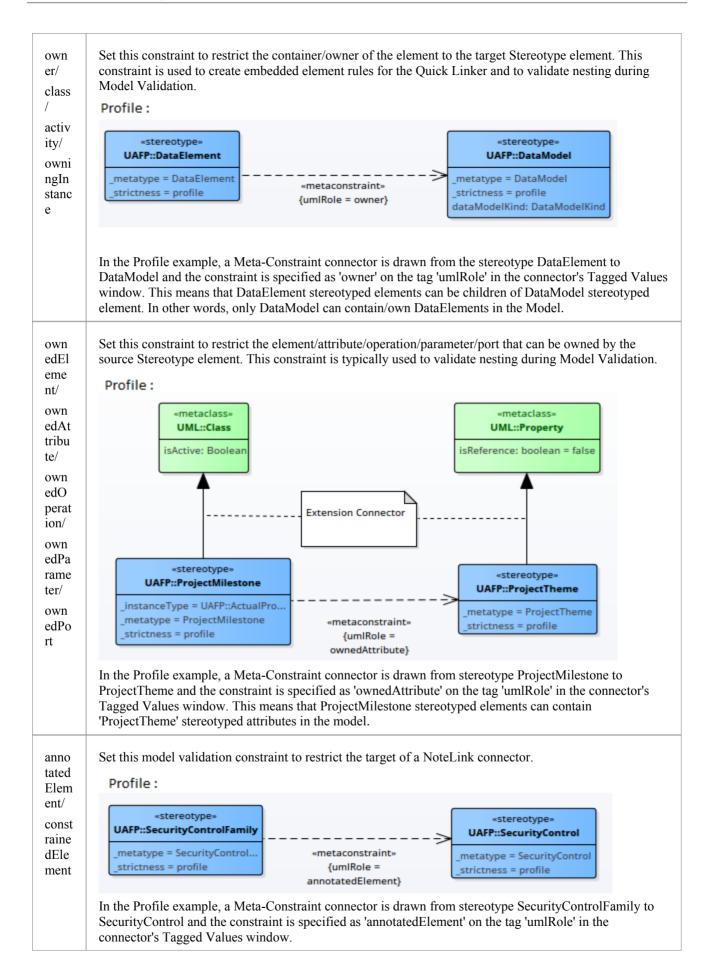
Constr aint	Description
class ifier	Set this constraint to restrict the classifier for the source Stereotype element as the target Stereotype element. Profile : *stereotype*
	stereotype UAFP::Condition UAFP::ActualCondition
	Model :
	ActualCondition ActualCondition1 C Go To Namespace: <any></any>
	Go To Namespace: <any></any>
	Model SysML Example
	Domain Model
	Condition Condition1
	<pre>// cone></pre>
	In the Profile example, a Meta-Constraint connector is drawn from the stereotype ActualCondition to Condition and the constraint is specified as 'classifier' on the tag 'umlRole' in the connector's Tagged Values window. This means that only a 'Condition' stereotyped element can be set as the classifier for an ActualCondition stereotyped element.
	After importing this Profile into a model, Enterprise Architect will show only Condition stereotyped elements in the 'Select DataType' dialog when setting the DataType for an ActualCondition stereotyped

	element.
type	Set this constraint to specify the type for the target Stereotype element when it is dropped from the Project Browser into a diagram while pressing and holding the Ctrl key. Profile :
	stereotype *stereotype* UAFP::CapabilityProperty
	Model :
	Paste Capability 🗶
	Drop as: Link Name: Link Instance (Object) Child (Generalization) Object Child (Generalization) UAFP::CapabilityProperty (Property)
	Copy connectors Save selection as default Hold Ctrl to Show this dialog
	In the Profile example, a Meta-Constraint connector is drawn from the stereotype CapabilityProperty to Capability and the constraint is specified as 'type' on the tag 'umlRole' in the connector's Tagged Values window. After importing this Profile into a model, when a Capability stereotyped element is dropped from the Project Browser into a diagram while pressing and holding the Ctrl key, the 'Paste <item>' dialog will display CapabilityProperty as one of the options in the 'Drop as' list.</item>
beha vior	Set this constraint to restrict the behavior for the source Stereotype element to the same as the target Stereotype element. Profile :
	stereotype UAFP::FunctionAction _metatype = FunctionAction _strictness = profile *metaconstraint* {umlRole = behavior}
	Model :
	Model Domain Model Gerona M
	In the Profile example, a Meta-Constraint connector is drawn from stereotype FunctionAction to Function and the constraint is specified as 'behavior' on the tag 'umlRole' in the connector's Tagged Values window. This means that only a 'Function' stereotyped element can be set as classifier for a FunctionAction stereotyped element.
	After importing this Profile into a model, Enterprise Architect will show only Function stereotyped

	elements in the 'Select Activity' dialog when setting the behavior for a FunctionAction stereotyped element.		
conv eyed	Set this constraint to restrict the Information Items that can be conveyed on a Stereotype that extends the Information Flow connector.		
	Profile :		
	«stereotype» UAFP::OperationalExchange		
	_metatype = OperationalExchange _strictness = profile operationalExchangeKind: OperationalExchangeKind trustlevel: Real		
	In the Profile example, a Meta-Constraint connector is drawn from stereotype OperationalExchange to OperationalExchangeItem and the constraint is specified as 'conveyed' on the tag 'umlRole' in the connector's Tagged Values window. This means that when an OperationalExchange connector is drawn, the Information Items that can be conveyed on the connector are restricted to OperationalExchangeItem stereotyped elements.		
slot	Set this constraint to restrict the slot for the Stereotype element as the target Stereotype element.		
	Profile : "metaclass" UML::Object UML::Siot		
	stereotype *metaconstraint* *stereotype* UAFP::Project {umlRole = classifier} UAFP::ActualProject _instanceType = UAFP::ActualProject _metatype = ActualProject _metaconstraint* _instanceType = Project _strictness = profile *metaconstraint* _strictness = profile rojectKind: ProjectKind *metaconstraint*		
	In the Profile example, a Meta-Constraint connector is drawn from the stereotype ActualProject to ActualProjectRole and the constraint is specified as 'slot' on the tag 'umlRole' in the connector's Tagged Values window. Note that the stereotype 'ActualProject' extends UML Object and can classify stereotype 'Project'. When an instance specification for the Project element is created (by dropping it from the Project Browser into a diagram while pressing and holding the Ctrl key) in the model: • The created instance specification will be stereotyped ActualProject		
	 Any Property in the 'Project' stereotyped element will be created as an 'ActualProjectRole' stereotyped Property in the instance specification 		
clien t/	Set this model validation constraint to restrict the start element of a Stereotyped connector.		
sour ce/			
end[0].ro le/			
infor			

	Profile :
	<pre>«stereotype» UAFP::FunctionControlFlow metatype = FunctionControlFlow _strictness = profile *metaconstraint» {umlRole = target} www. uAFP::FunctionAction metatype = FunctionAction metatype = FunctionAction _strictness = profile</pre>
	In the Profile example, a Meta-Constraint connector is drawn from stereotype 'FunctionControlFlow' to FunctionAction and the constraint is specified as 'source' on the tag 'umlRole' in the connector's Tagged Values window. This means that when a FunctionControlFlow connector is drawn, the source element should be a FunctionAction stereotyped element. Else, Enterprise Architect will flag an error when performing a Model Validation.
supp lier/ targe t/ end[1].ro le/ infor mati onTa rget	Set this model validation constraint to restrict the target element of a Stereotyped connector.
reali zing Con nect or/ reali zing Acti vity Edge / reali zing Mess age	Set this constraint to restrict the relationship that can realize an Information Flow connector.





When the Profile is imported into a model, the target of a NoteLink connector from a
SecurityControlFamily stereotyped element should be a SecurityControl stereotyped element. Else,
Enterprise Architect will flag an error when performing a Model Validation.