

SysML v1.4 Updates

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Topics

- **SysML v1.4 Status**
- **Change Summaries**
 - New/Modified Features
 - Notation Changes
 - Other Changes

SysML v1.4 Revision Task Force Status

- Chair(s): Conrad Bock, Roger Burkhart
- Chartered: 23 September 2011
- Documents published 09 December 2013
 - SysML 1.4 RTF Report (ptc/2013-12-08)
 - SysML 1.4 Specification with change bars (ptc/2013-12-09)
- Status: Technical Committee Recommended SysML v1.4 for Approval as of January 6, 2014

Issue Disposition Status

Resolved	61	The RTF/FTF agreed that there is a problem that needs fixing, and has proposed a resolution (which may or may not agree with any resolution the issue submitter proposed)
Deferred	87	The RTF/FTF agrees that there is a problem that needs fixing, but did not agree on a resolution and deferred its resolution to a future RTF/FTF.
Transferred	0	The RTF/FTF decided that the issue report relates to another specification, and recommends that it be transferred to the relevant RTF.
Closed, no change	17	The RTF/FTF decided that the issue report does not, in fact, identify a problem with this (or any other) OMG specification.
Closed, Out of Scope	0	The RTF/FTF decided that the issue report is an enhancement request, and therefore out of scope for this or any future FTF or RTF working on this major version of the specification. The RTF/FTF has closed the issue without making any specification changes, but RFP or RFC submission teams may like to consider these enhancement requests when proposing future new major versions of the specification.
Duplicate or merged	6	This issue is either an exact duplicate of another issue, or very closely related to another issue: see that issue for disposition.

Source: SysML v1.4 RTF Report

Summary of Changes (Partial)

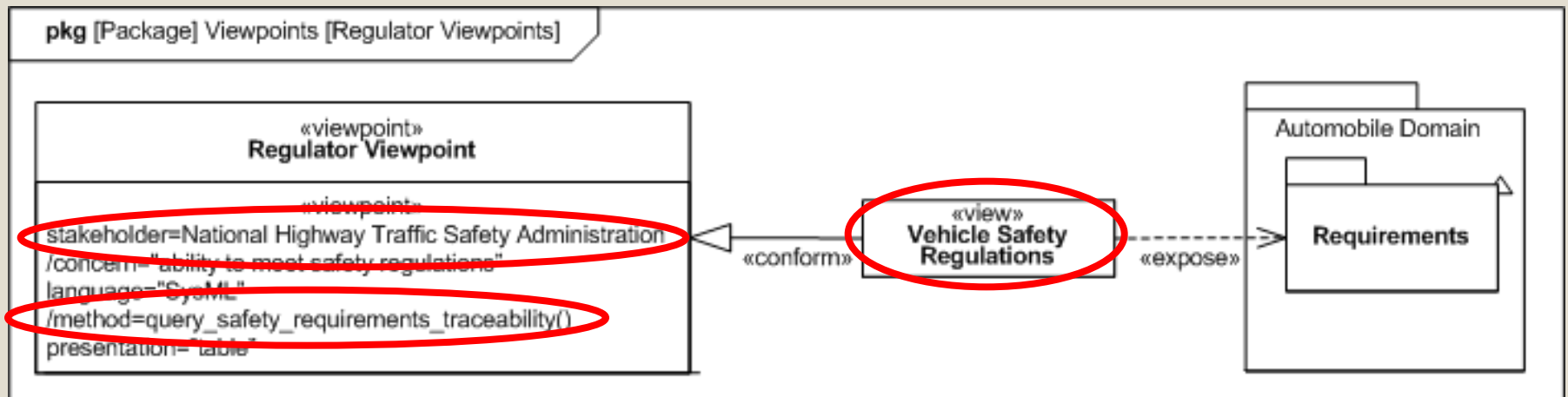
- **New/Modified Features**
 - View/Viewpoint changes
 - Element Group
 - Property Path
 - Directed Relationship Property Path extensions
 - Bound Reference
 - Adjunct property
 - Unit and Quantity Kind changes
- **Notation Changes**
 - Notation for inherited features
 - Behavior compartment
 - Port compartment
- **Other Changes**
 - Language compliance
 - Diagram interchange
 - Architecture changes

New/Modified Features

View/Viewpoint Changes

Issues 18653, 18719, 18988, 19078

- Viewpoint specifies method to address stakeholder concerns
 - Viewpoint method is a behavior to query model and present results
 - Stakeholder is a classifier
- View is a representation of the artifact presented to stakeholder
 - Presented in diagrams, tables, documents, ...
 - View can be composed of other views



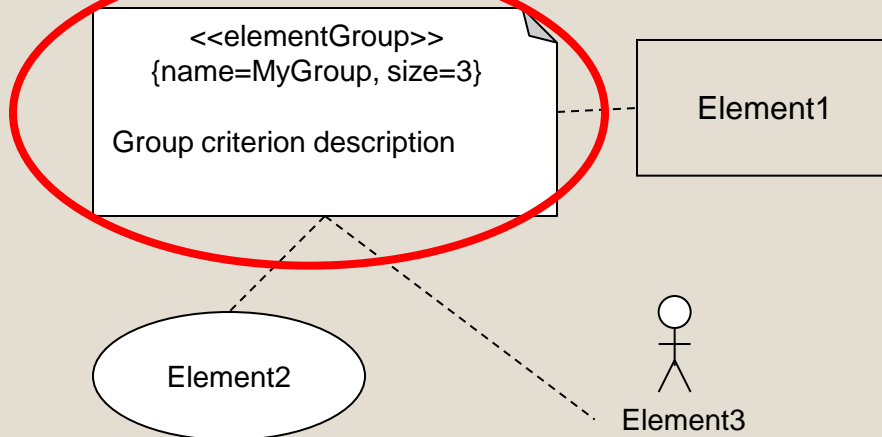
View/Viewpoint Transition from SysML v1.3 to v1.4

- **Conform**
 - Replace v1.3 Conform with v1.4 Conform. The conform target in 1.3 becomes the general classifier in 1.4.
- **View**
 - Replace 1.3 **View package** with 1.4 **View class**
- **Viewpoint**
 - For each **Stakeholder string**, create a **stakeholder** with the string as the name
 - Update the stakeholder property on the new viewpoint with the created stakeholder
 - For each **method string** of the 1.3 viewpoint, create the **operation «create»View()** and append the string to the body of a comment that annotates the operation.
- **Element and package import**
 - Replace each **package and element import** with an **expose relationship**.

Element Group

Issue 13928

- Light weight mechanism to group any kind of model element based on some criteria without implying any ownership or modifying the element
 - Example criteria: legacy components, high risk, ...
 - Elements can be a member of multiple groups
 - Tool vendors expected to provide additional grouping notation such as colors, tabular views,



Element Group (cont.)

Issue 13928

Attributes

- name: name of the element group
- /criterion: specifies the rationale for being member of the group. Derived from Comment::body.
 - Adding an element to the group asserts that the criterion applies to this element.
- /size: number of members in the group. Derived.
- /member: specifies the members of the group. Derived from Comment::annotatedElement.
- orderedMember: for organizing members according to an arbitrary order. Optional. Ordered, subsets member.

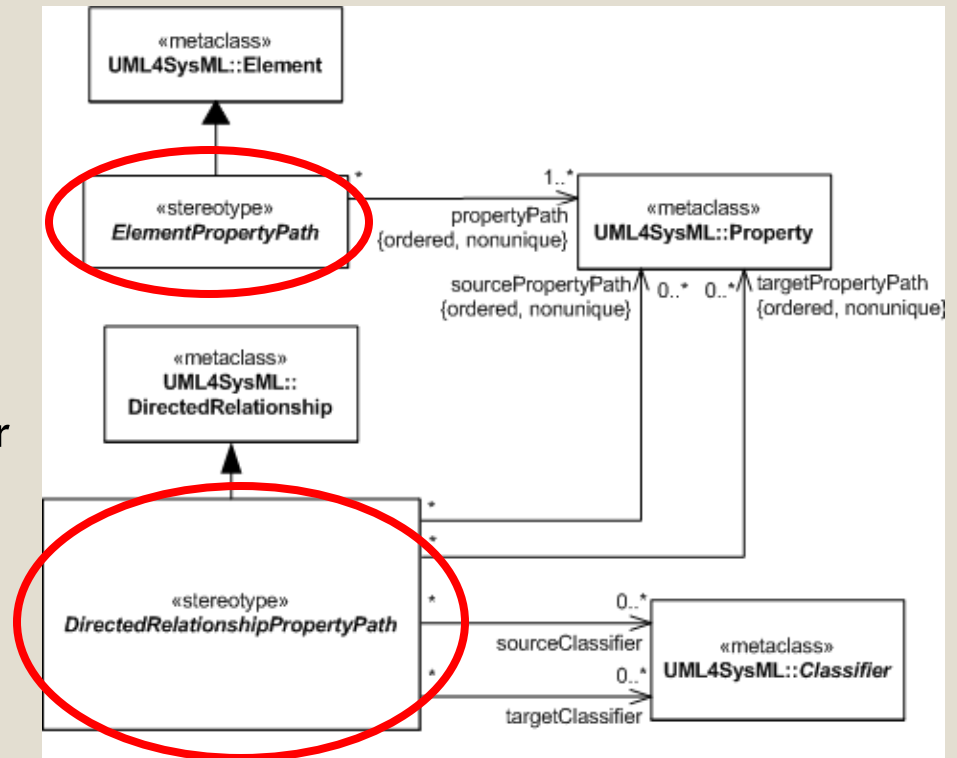
Operations

- The static query AllGroups() returns the set of all the groups an element is member of.

Property Path

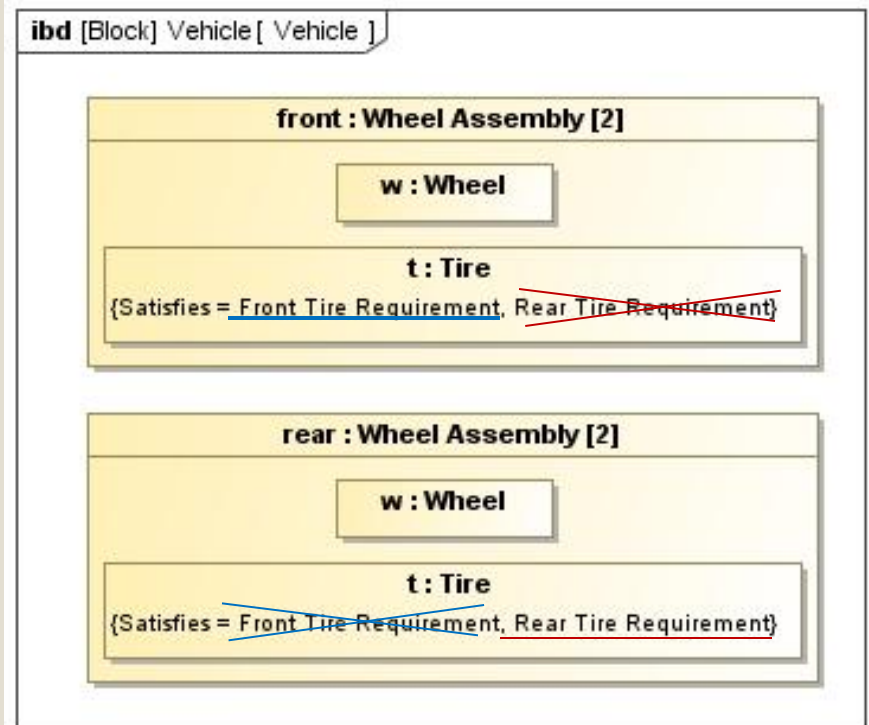
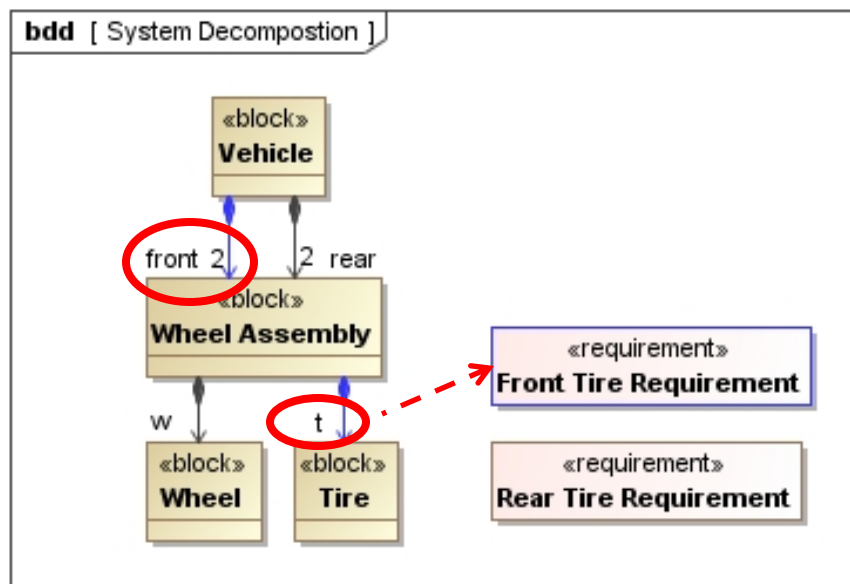
Issue 14447, 18407

- The *ElementPropertyPath* stereotype enables elements to identify other elements by a multi-level path of properties accessible from a context block.
- The *DirectedRelationshipPropertyPath* stereotype includes a property path for the source and target of a relationship.



Directed Relationship Property Path Extensions

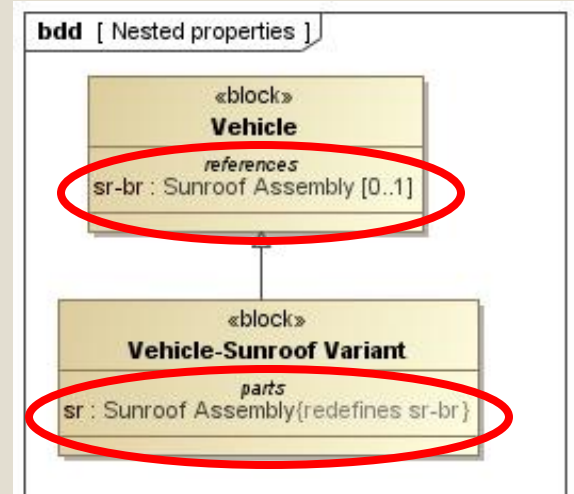
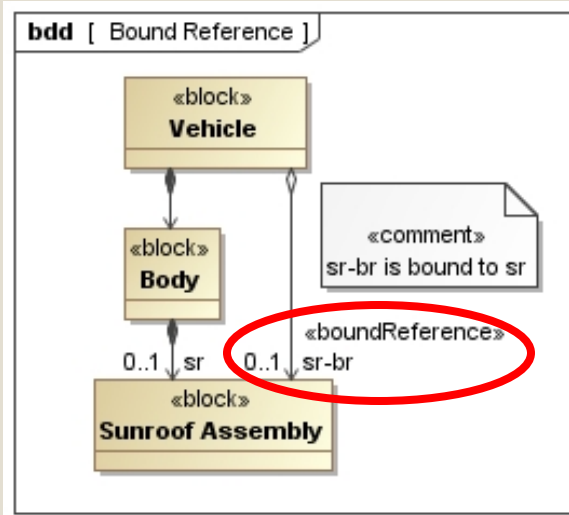
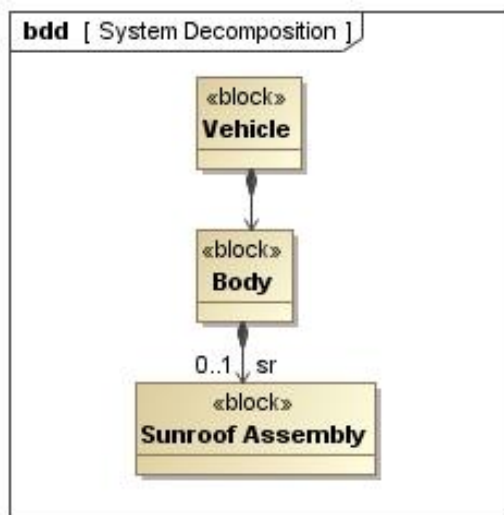
- Requirements relationships and allocation relationships extend the *DirectedRelationshipPropertyPath* to disambiguate relationship to nested properties.



Bound Reference

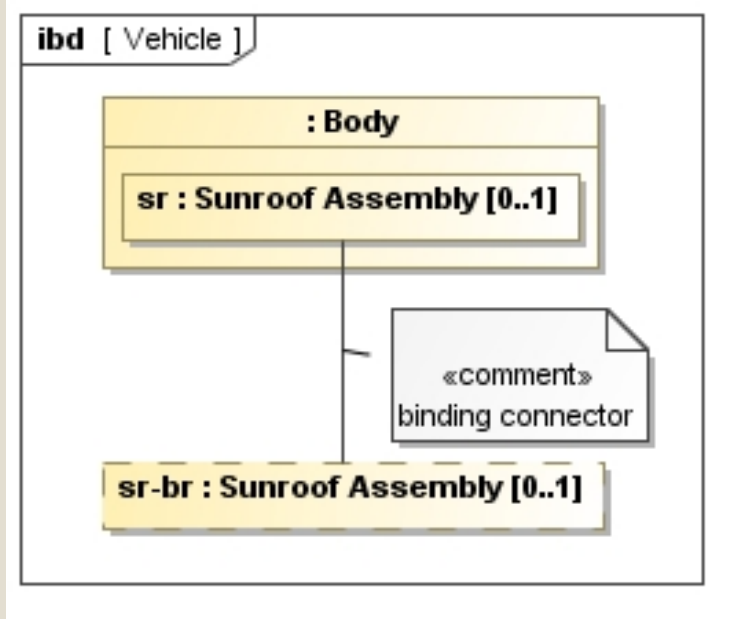
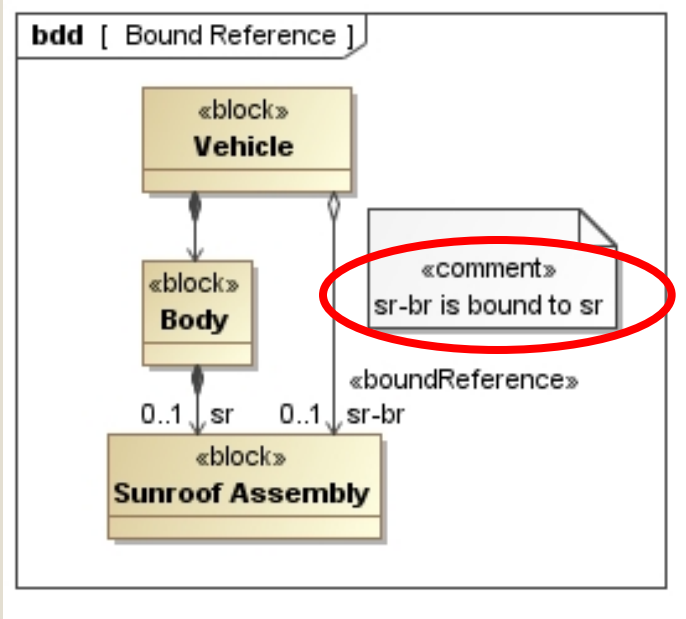
Issue 15077

- Bound reference stereotype designates a property at context level that is bound to a nested property
 - Enables identification of deeply nested properties at context level
 - Redefine sr-br to represent Variants



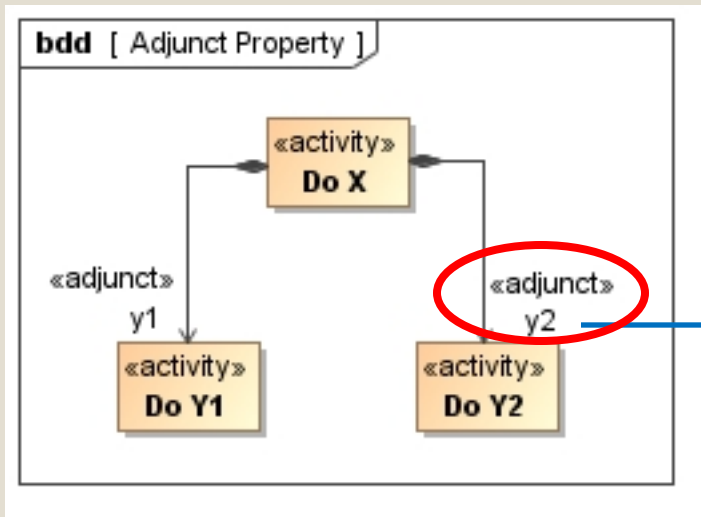
Bound Reference (cont.)

- Binding connector binds bound reference to nested property

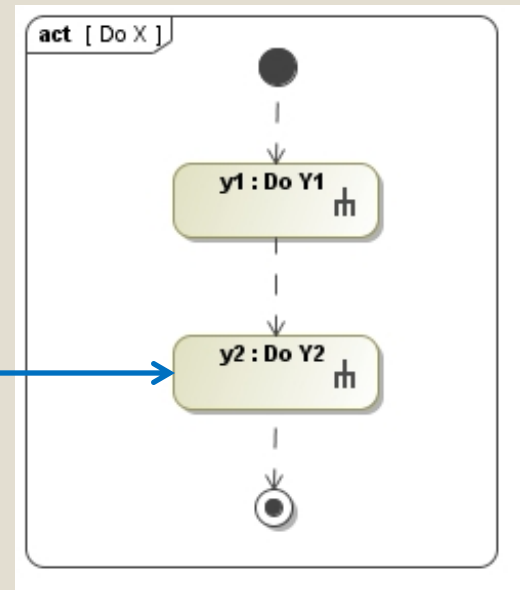


Adjunct Property Issue 18704

- Applying the adjunct stereotype to a property enables it to reference another model element and its associated semantics.
 - Example: the properties in an activity decomposition on a bdd reference the actions in an activity diagram and the action semantics



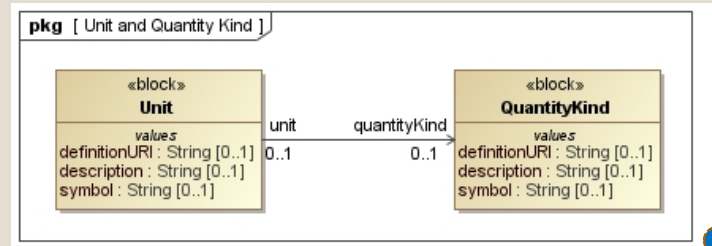
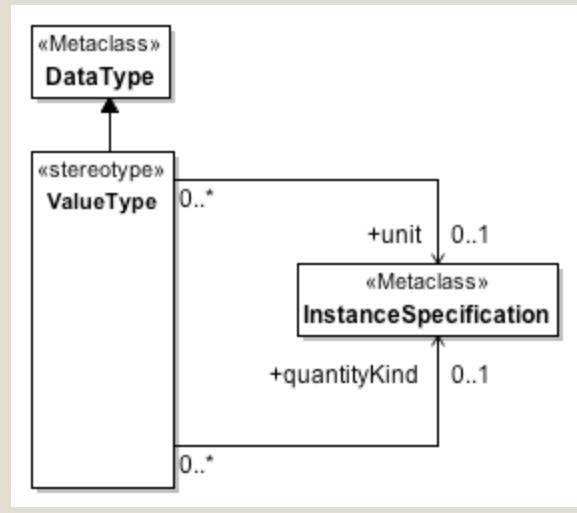
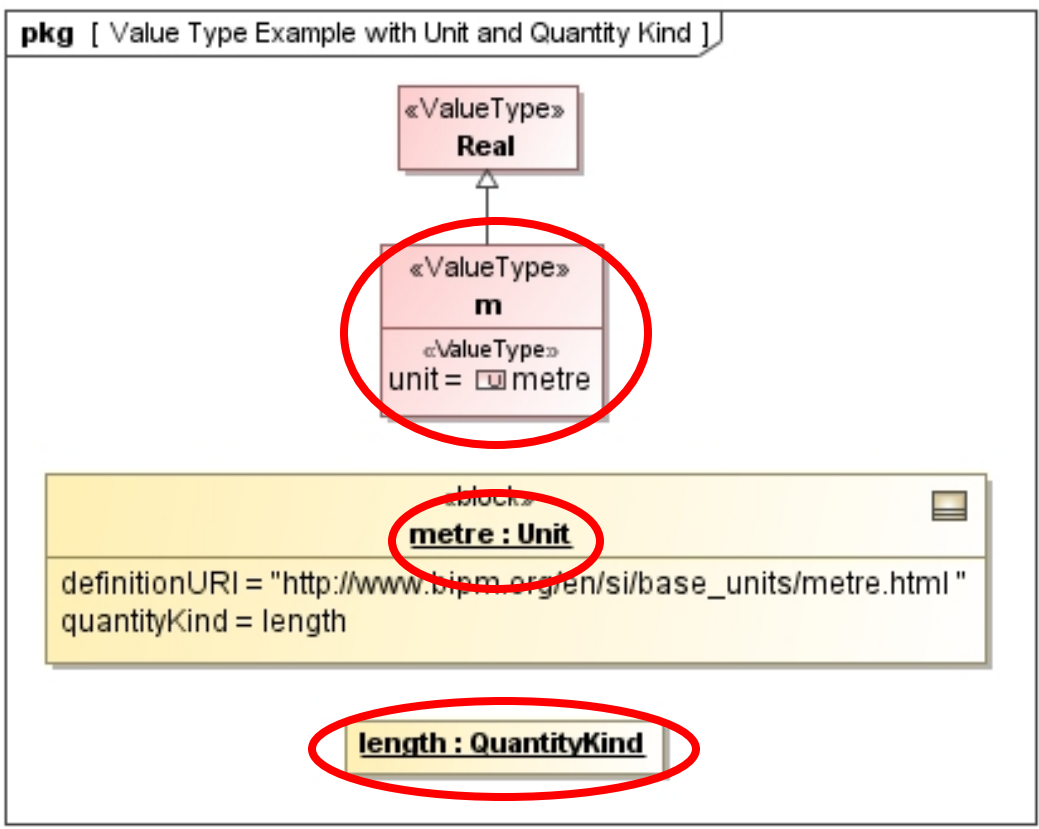
Adjunct property y2
references action y2



Unit and Quantity Kind Changes

Issue 18269

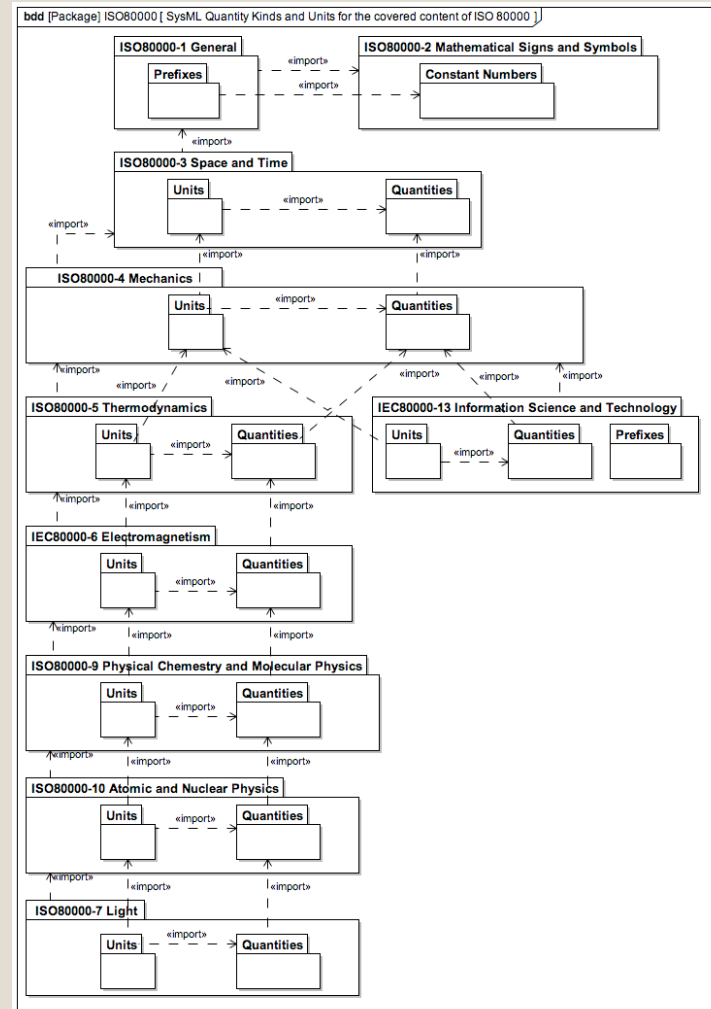
- Specify units and quantity kinds as instances of blocks in model library (unit and quantity kind were stereotypes in v1.3)



Units and Quantity Library from ISO 80000

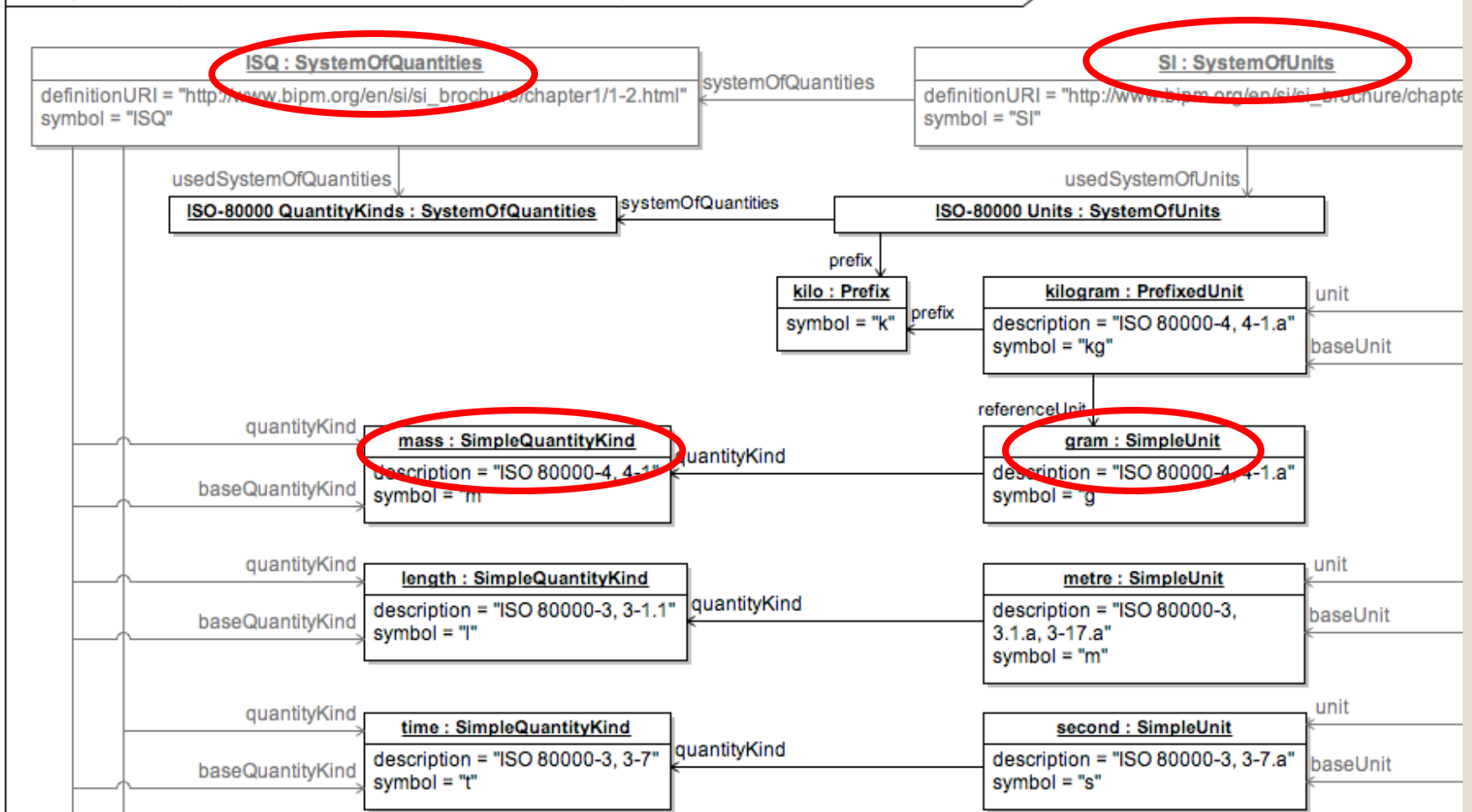
- Organization of the definitions of units and quantities from the normative parts of ISO 80000 covered in SysML 1.4, which includes all the normative content of parts 3,4,5,6; the subset of parts 7,9,10 corresponding to the content from SysML 1.3 and the subset of part 13 pertaining to commonly used units of information.
- Parts 8,11 and 12 are not covered because none of their units and quantities were referenced in previous versions of SysML nor in the summary tables in ISO 80000-1.

Reference Figure E-11



Units and Quantities Library from ISO 80000 - Example

bdd SysML Quantity Kinds and Units for the covered content of ISO 80000 [Table 1: SI base units for the ISQ base quantities]

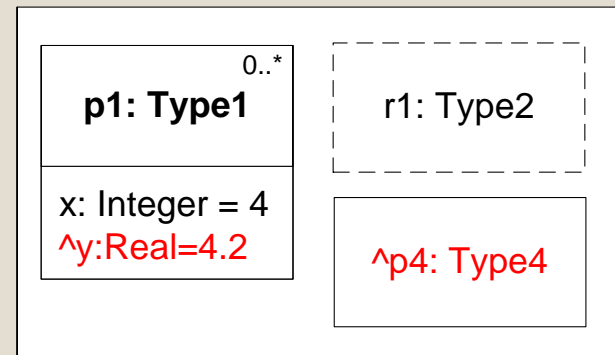


Notation Changes

Notation for Inherited Features

- Inherited features preceded by carrot symbol per UML 2.5

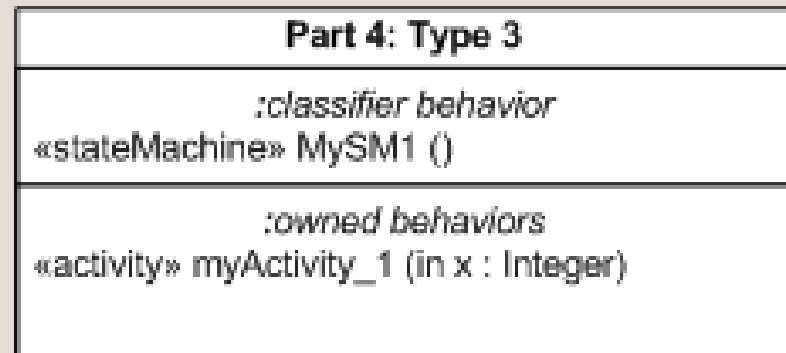
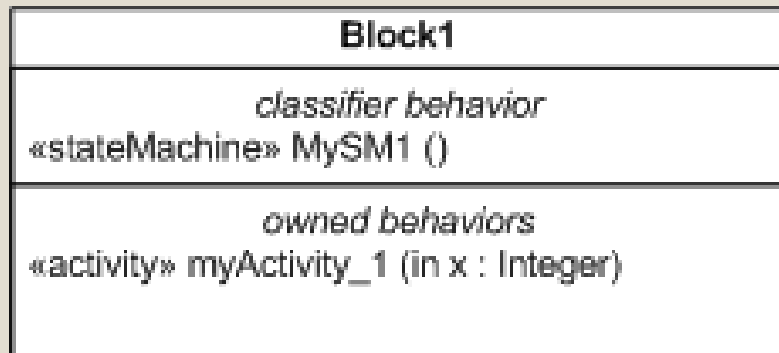
<p>«block» {encapsulated} Block1</p>
<p><i>constraints</i></p> <p>{ x > y}</p>
<p><i>operations</i></p> <p>operation1(p1: Type1): Type2 operation2(q1: Type 1): Types {redefines operation2} op3(q1: Type 1): Type2 {redefines Block0::op3} [^]op4()</p>
<p><i>parts</i></p> <p>property1: Block1 property2: Block2 {subsets Block0::property1} prop3: Block3 {redefines property0}</p>
<p><i>references</i></p> <p>property4: Block1 [0..*] {ordered} property5: Block2 [1..5] {unique, subsets property4} /prop6: Block3 {union}</p>
<p><i>values</i></p> <p>property7: Integer = 99 {readOnly} property8: Real = 10.0 prop9: Boolean {redefines property00}</p>
<p><i>properties</i></p> <p><u>property5</u>: Block3 [^]property6:Block4</p>



Behavior Compartment

Issue 1889

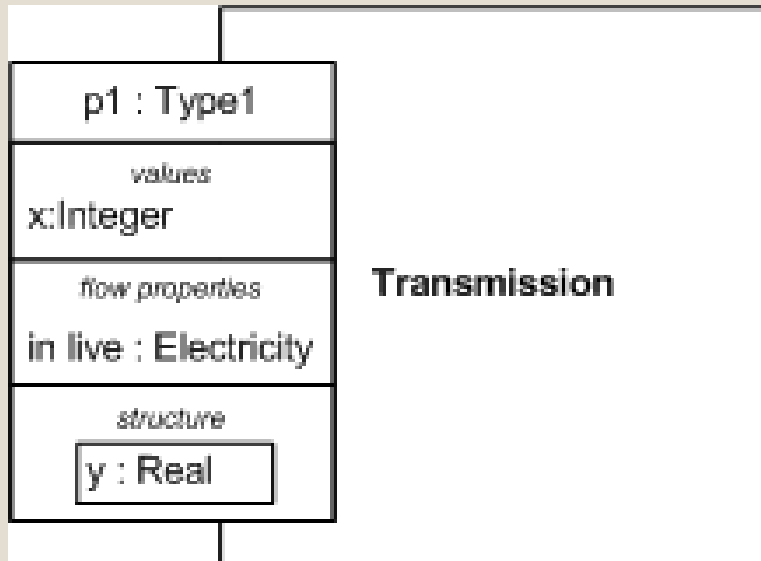
- Added behavior compartment to blocks and parts to represent classifier and owned behaviors



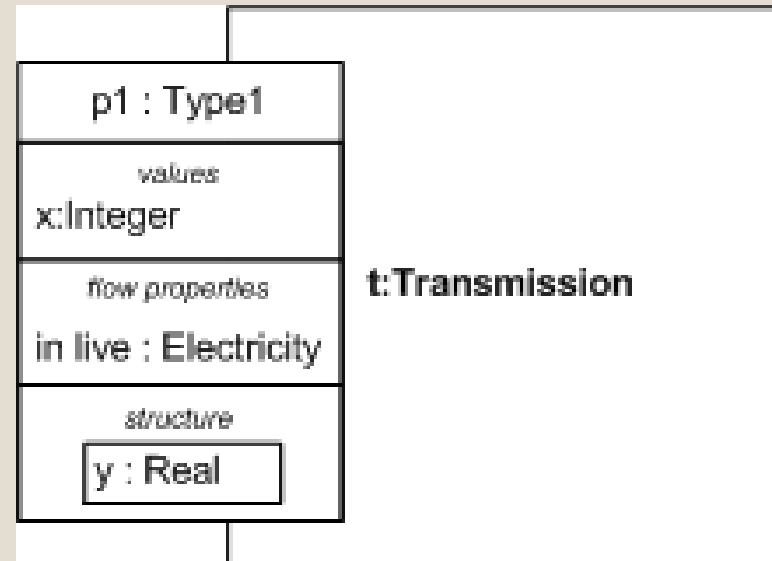
Port Compartments

Issue 18949

- Added notation to ports, nested ports, and their definitions to be consistent with other property and type notations, that includes compartments with graphical and textual representations of structure and behavior.



Block



Part

Other Changes

Language Conformance

Issue 19077

- Extends ‘conformance’ types used in UML 2.5

An implementation of SysML must comply with both the subset of UML4SysML and the SysML extensions.

Abstract syntax conformance.

A tool demonstrating abstract syntax conformance provides a user interface and/or API that enables instances of concrete SysML stereotypes (which are applications of stereotypes to instances of UML metaclasses) and model library elements to be created, read, updated, and deleted. The tool must also provide a way to validate the wellformedness of models that corresponds to the constraints defined in SysML.

Concrete syntax conformance.

A tool demonstrating concrete syntax conformance provides a user interface and/or API that enables instances of SysML notation to be created, read, updated, and deleted. This includes conformance to the notation defined in the “Diagram Elements” tables and diagrams extension sub clauses in each clause of this specification. Note that a conforming tool may provide the ability to create, read, update and delete additional diagrams and notational elements that are not defined in SysML.

Model interchange conformance.

A tool demonstrating model interchange conformance can import and export conformant XML for all valid SysML models, including models with profiles defined and/or applied. Model interchange conformance implies abstract syntax conformance. See more information in Annex G.

Clause 5.2 of SysML v1.4 specification

Diagram Interchange (DI)

Issue 18983

- Extends UML 2.5 DI to enable exchange of SysML diagram information

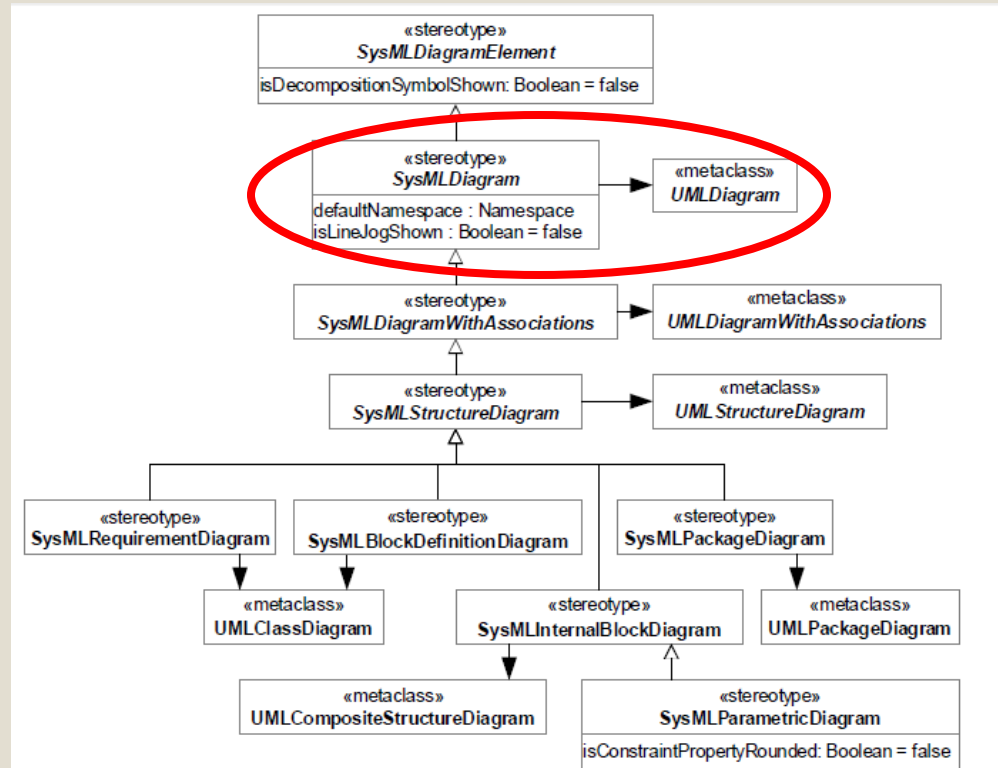
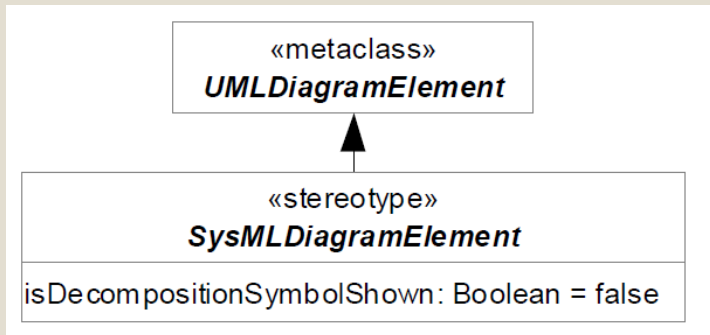
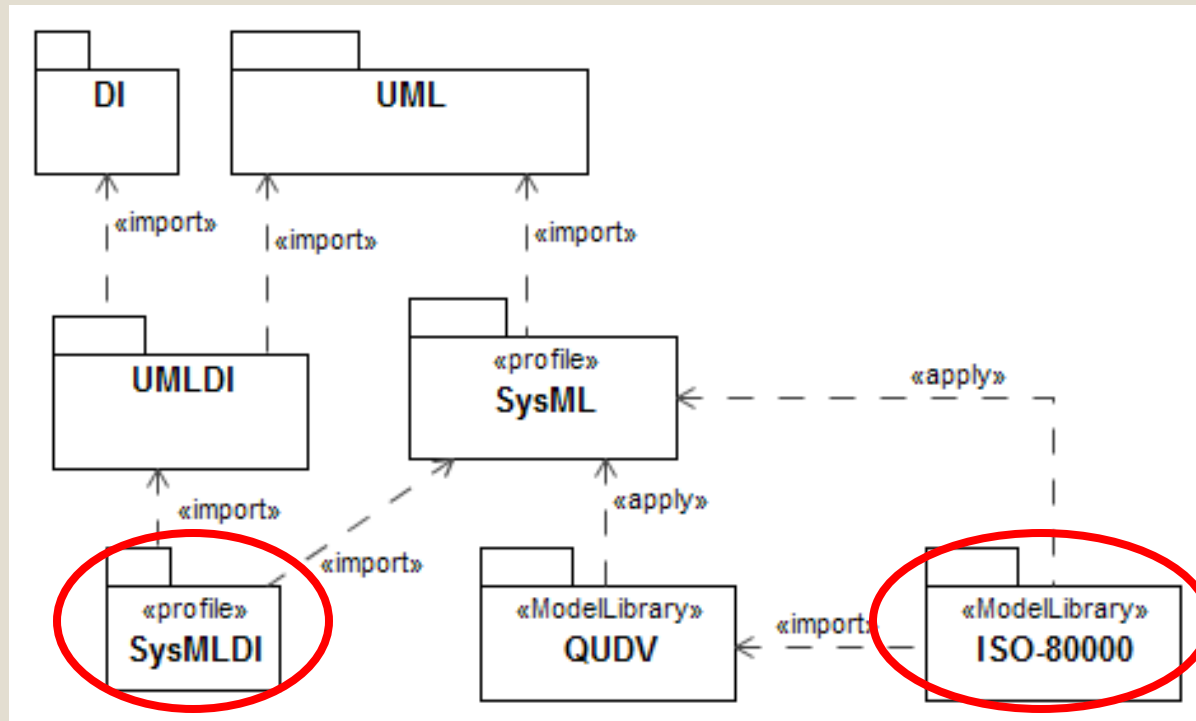


Figure B.3 - Abstract syntax extensions for SysML diagrams (1)

Language Architecture Changes

Issue 19077

- Added SysML Diagram Interchange and ISO-80000 Model Library for systems of units and quantity kinds



Questions?