



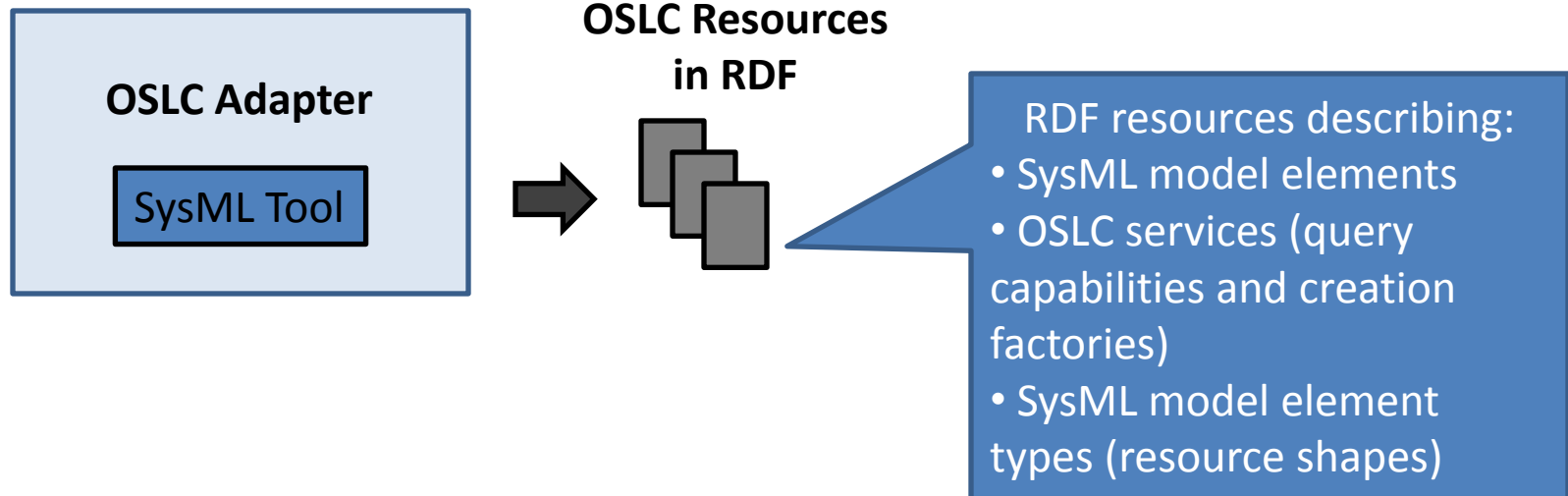
Conversion of SysML to OSLC Resource Shapes



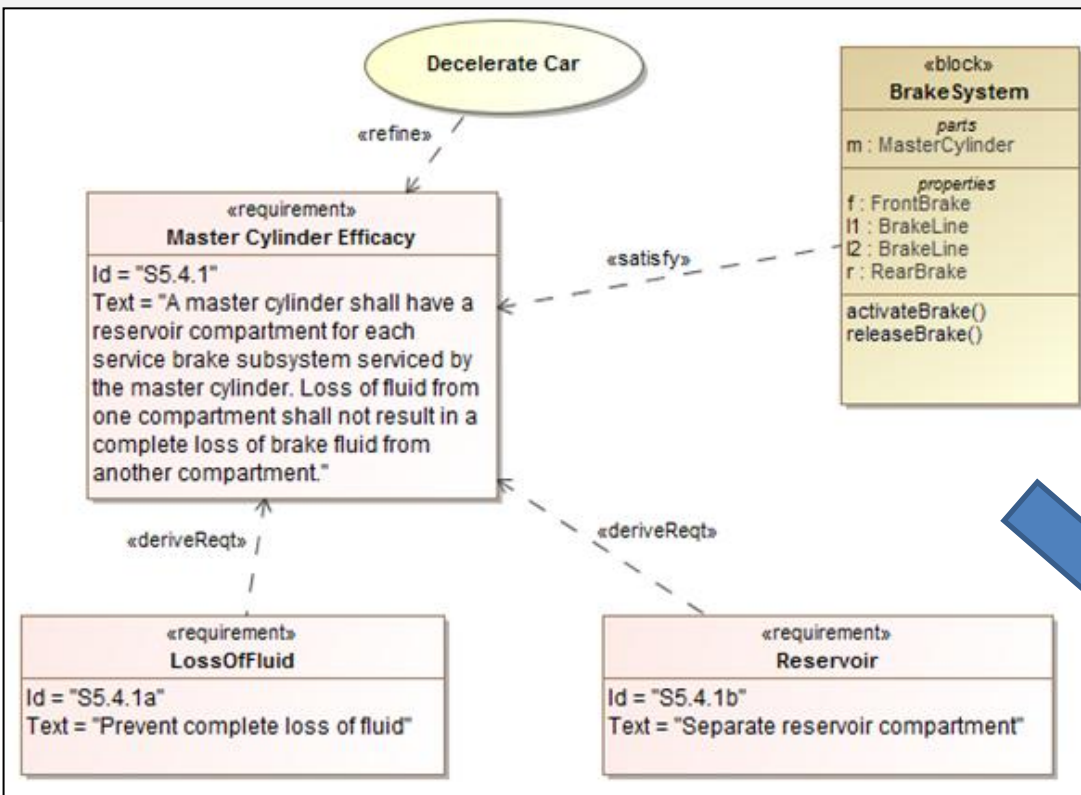
Axel Reichwein
October 31, 2013

OSLC Adapter for SysML Tool

- OSLC Adapter publishes OSLC resources in RDF (subject-predicate-object form)



Example OSLC Resource



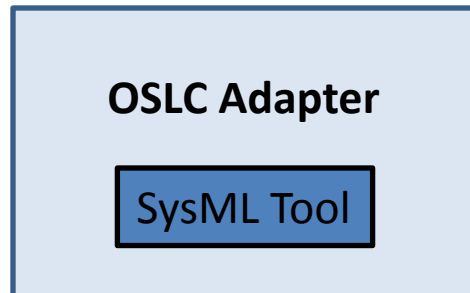
Subject: Requirement „Master Cylinder Efficacy“

Predicate	Object
elaboratedBy	Use Case „Decelerate Car“
satisfiedBy	Block „Brake System“
derivedRqt	Requirement „Loss of Fluid“
derivedRqt	Requirement „Reservoir“

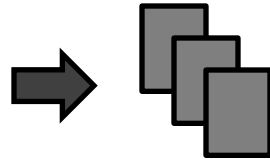
RDF = set of simple **subject-predicate-object statements (triples)**

OSLC Resource Properties

Standardized resource properties facilitate interoperability



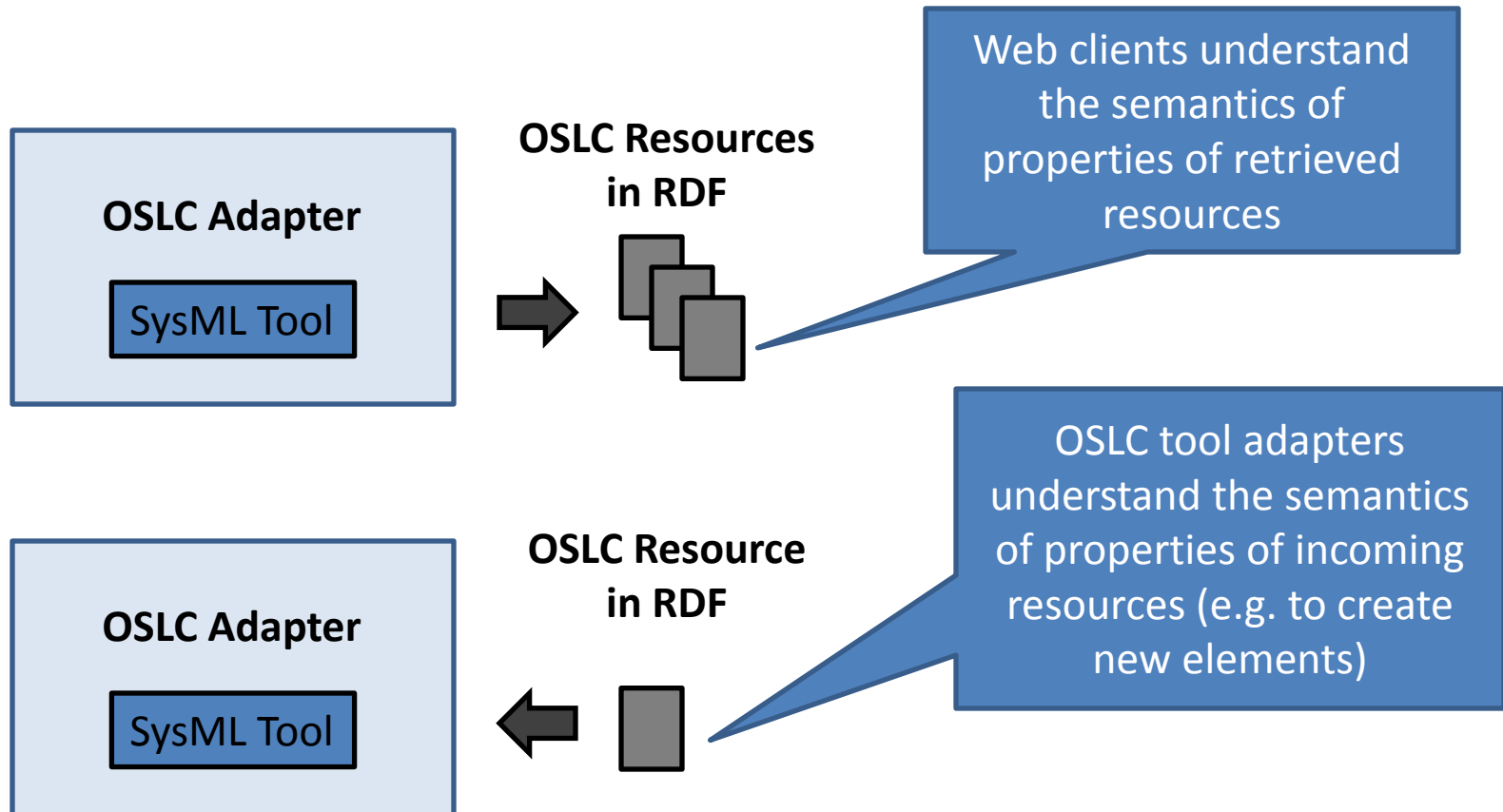
OSLC Resources
in RDF



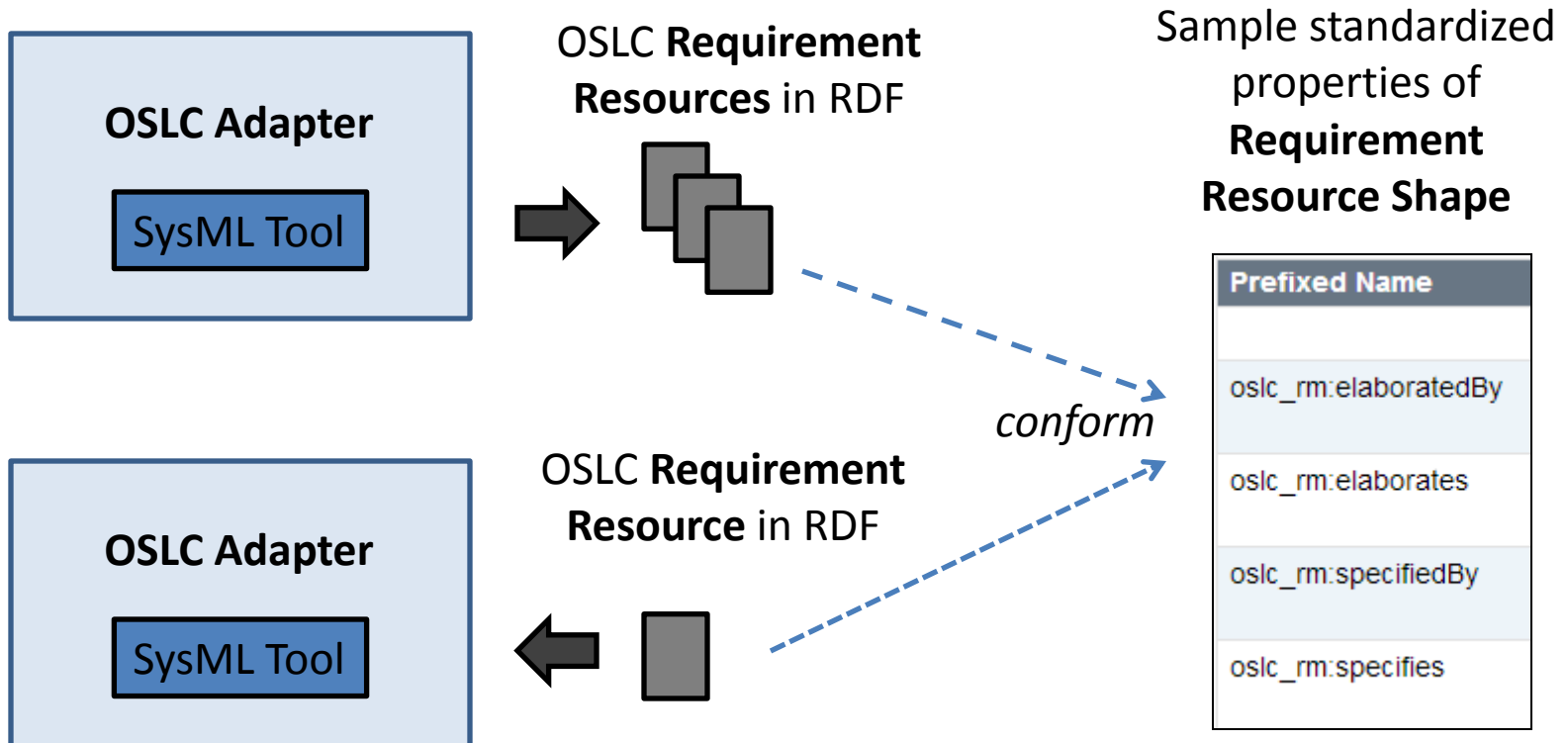
Subject: Requirement
„Master Cylinder Efficacy“

Predicate	Object
elaboratedBy	Use Case „Decelerate Car“
satisfiedBy	Block „Brake System“
derivedRqt	Requirement „Loss of Fluid“
derivedRqt	Requirement „Reservoir“

Advantages of Standardized Resources

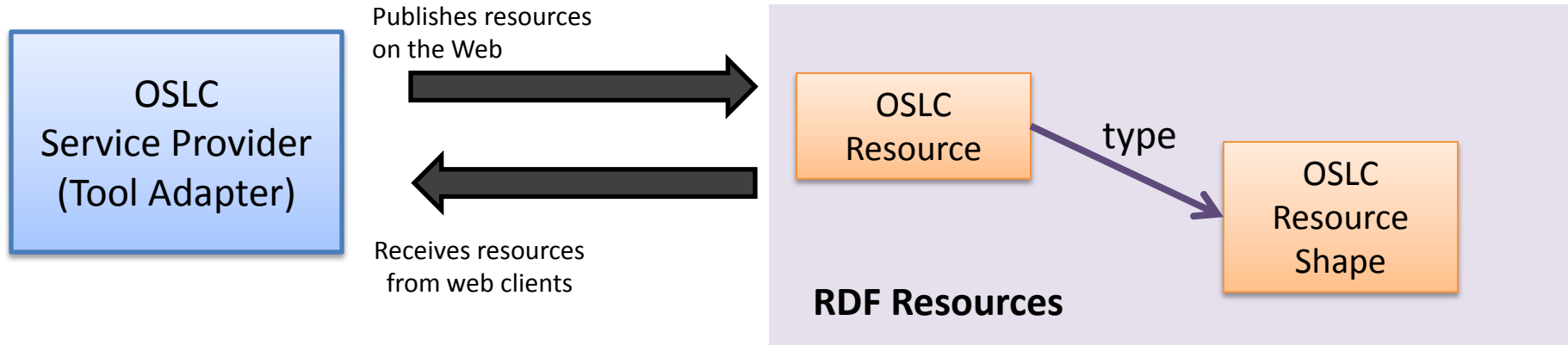


Standardized Resources



Note: OSLC resources do not have to conform to a resource shape!

OSLC Resource Shape = Type of OSLC Resource



Example OSLC Resource in RDF

```
<rdf:Description rdf:about="http://myDomain.com/myTool/services/myModel/requirements/Req1">  
  <rdf:type rdf:resource="http://open-services.net/ns/rm#Requirement"/>  
  <oslc_rm:satisfiedBy  
    rdf:resource="http://myDomain.com/myTool/services/myModel/blocks/BlockA "/>  
</rdf:Description>
```

OSLC Resource Shape Example

Example OSLC Requirement Resource in RDF

```
<rdf:Description      rdf:about="http://myDomain.com/myTool/services/myModel/requirements/Req1">
  <rdf:type rdf:resource="http://open-services.net/ns/rm#Requirement" />
  <oslc_rm:satisfiedBy
    rdf:resource="http://
myDomain.com/myTool/services/myModel/blocks/BlockA " />
</rdf:Description>
```

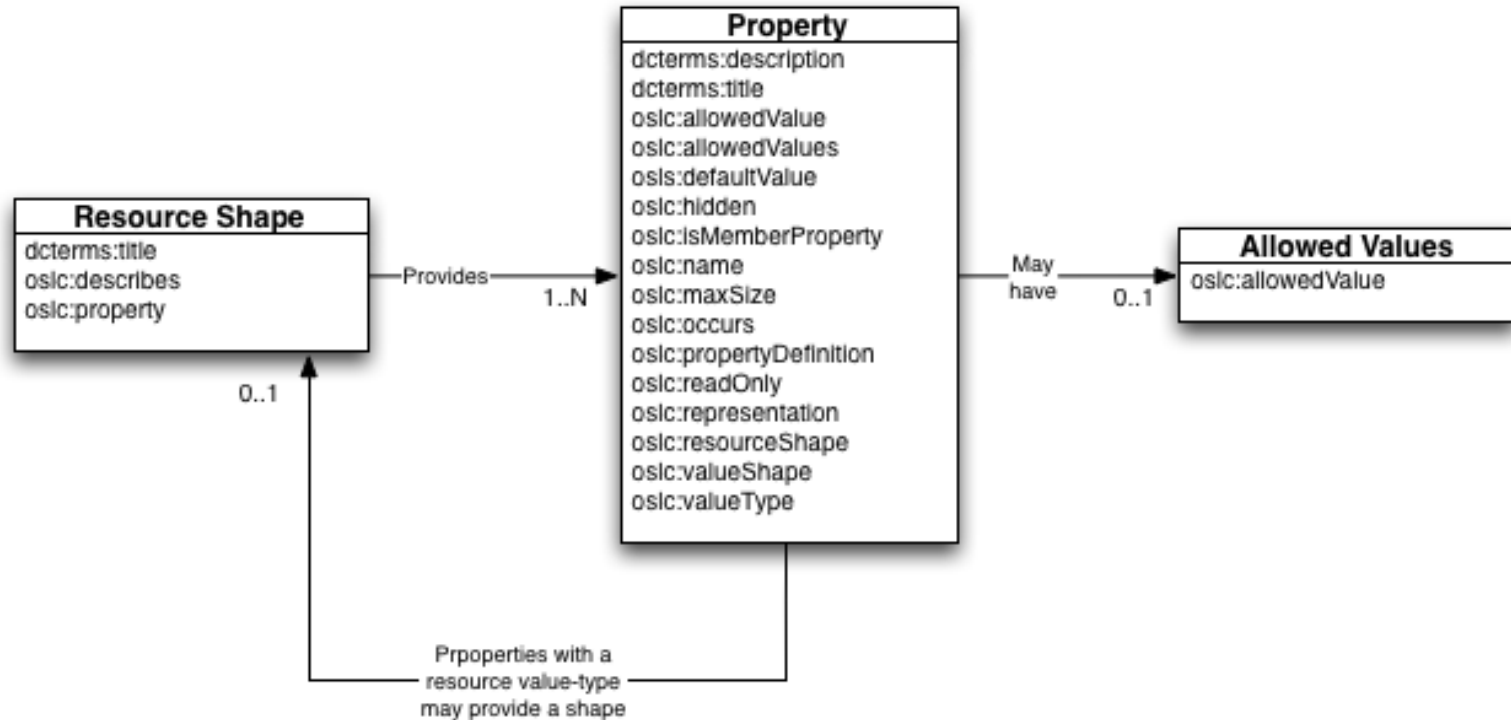
Example OSLC Requirement Resource Shape in RDF

```
<oslc:ResourceShape rdf:about="https://myDomain.com/myTool/shapes/ShapeID23">
  <oslc:describes rdf:resource="http://open-services.net/ns/rm#Requirement" />
  <oslc:property>
    <oslc:Property>
      <oslc:name>satisfiedBy</oslc:name>
      <oslc:propertyDefinition rdf:resource="http://open-
service.net/ns/rm#satisfiedBy" />
      <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-
many" />
      <oslc:range rdf:resource="http://open-services.net/ns/core#Any" />
    </oslc:Property>
  </oslc:property>
</oslc:ResourceShape>
```


OSLC Resource Shapes

- **OSLC Resource Shape = RDF vocabulary that can be used for specifying and validating constraints on OSLC resources**
- Various Resource Shapes have been developed for various domains (Change Request, Test Case, Requirement, Performance Monitoring Record)
- Arthur G. Ryman, Arnaud J Le Hors, Steve Speicher, ***OSLC Resource Shape, A language for defining constraints on Linked Data***, Rio de Janeiro, Brazil, LDOW2013
<http://events.linkedata.org/ldow2013/papers/ldow2013-paper-02.pdf>

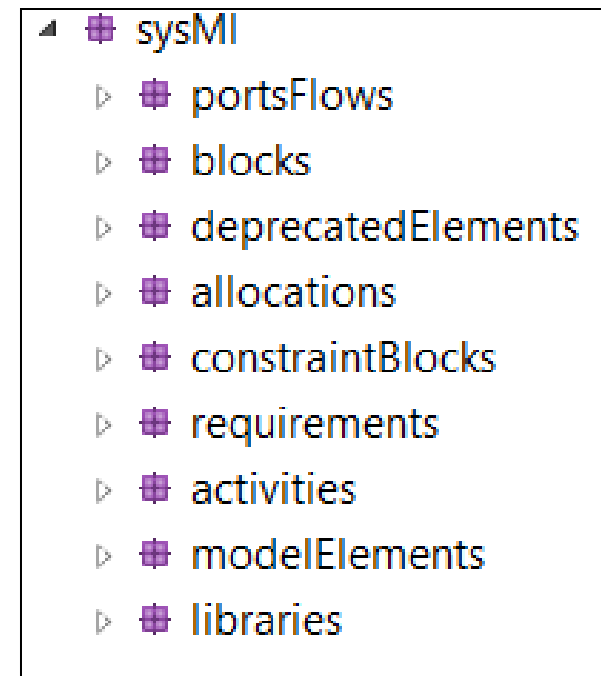
OSLC Resource Shape



See OSLC 2.0 Appendix A Common Properties for the complete specification: http://open-services.net/bin/view/Main/OSLCCoreSpecAppendixA?sortcol=table;up=#osc_ResourceShape_Resource

Systems Modeling Language (SysML)

- Defined by OMG as a UML profile (<http://www.omg.org/spec/SysML/1.3/>)
- SysML Profile available in XMI (<http://www.omg.org/spec/SysML/20120401/SysML.xmi>)
- After modifications, SysML Profile also available in Ecore
- Number of concepts: 47

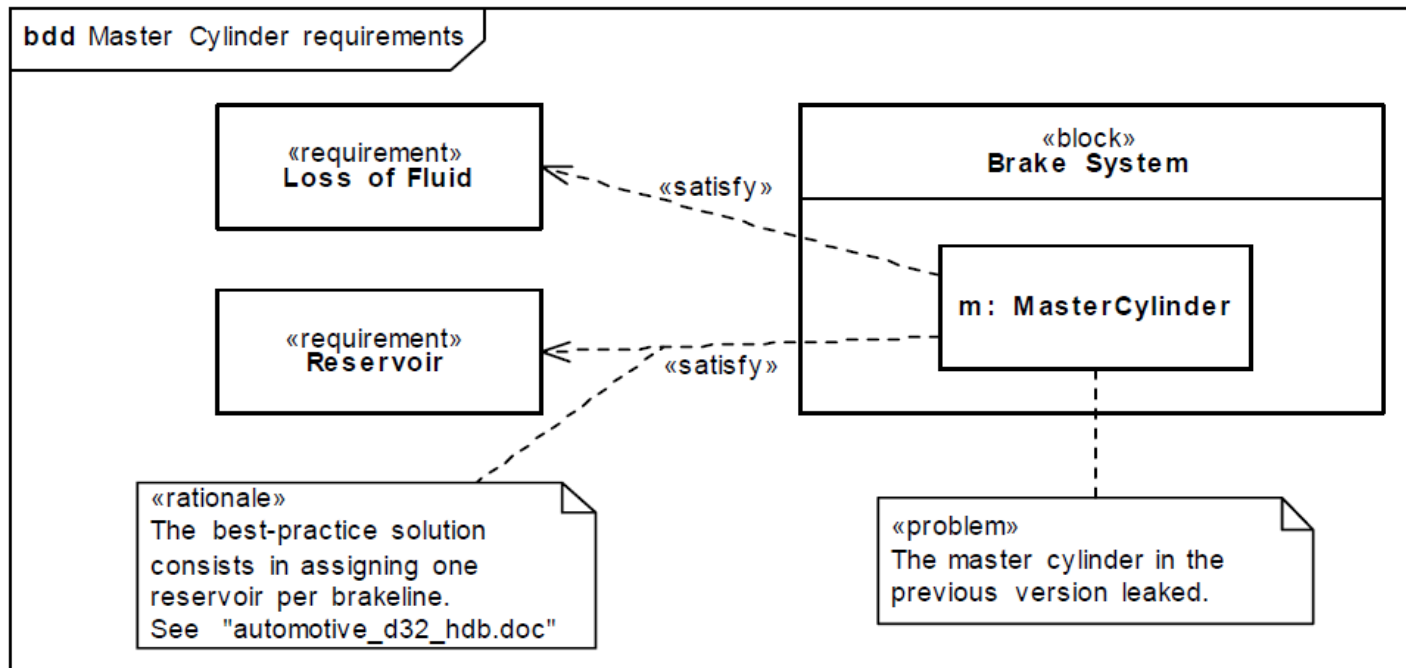


Example: SysML Rationale Stereotype

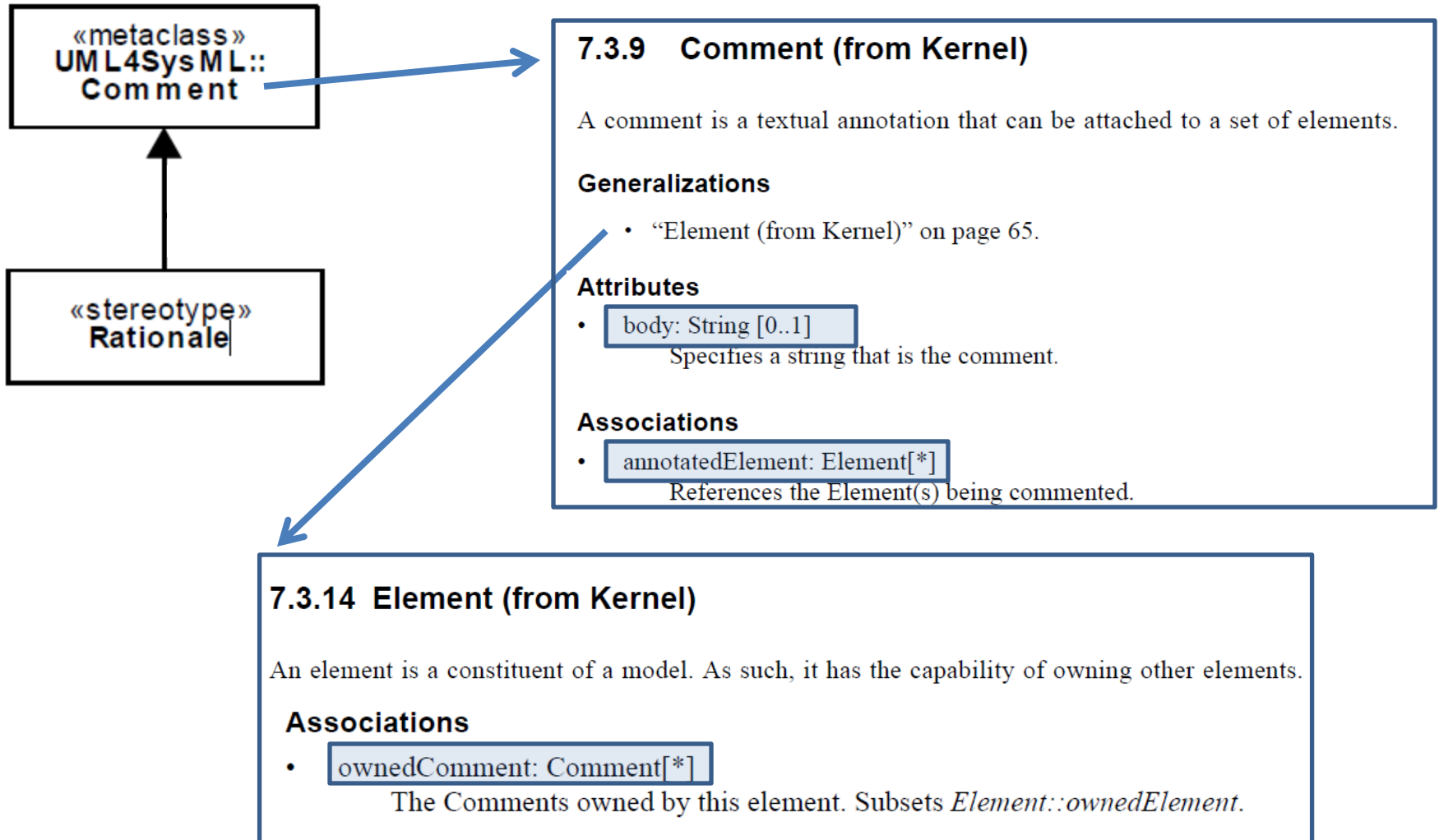
7.3.2.3 Rationale

Description

A Rationale documents the justification for decisions and the requirements, design, and other decisions. A Rationale can be attached to any model element including relationships. It allows the user, for example, to specify a rationale that may reference more detailed documentation such as a trade study or analysis report. Rationale is a stereotype of comment and may be attached to any other model element in the same manner as a comment.



SysML Rationale Properties



SysML Rationale Resource Shape

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:oslc="http://open-services.net/ns/core#"
  xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
  <oslc:ResourceShape rdf:about="http://myOSLCSERVICEProvider.com/sysml/RationaleResourceShape">
    <dcterms:title rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">
      Rationale Resource Shape</dcterms:title>
    <oslc:describes rdf:resource="http://omg.org/sysml#Rationale"/>
    <oslc:property>
      <oslc:Property>
        <oslc:name>ownedComment</oslc:name>
        <oslc:range rdf:resource="http://omg.org/sysml#Comment"/>
        <oslc:valueType rdf:resource="http://open-services.net/ns/core#Resource"/>
        <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-many"/>
      </oslc:Property>
    </oslc:property>
    <oslc:property>
      <oslc:Property>
        <oslc:name>annotatedElement</oslc:name>
        <oslc:range rdf:resource="http://omg.org/sysml#Element"/>
        <oslc:valueType rdf:resource="http://open-services.net/ns/core#Resource"/>
        <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-many"/>
      </oslc:Property>
    </oslc:property>
    <oslc:property>
      <oslc:Property>
        <oslc:name>body</oslc:name>
        <oslc:valueType rdf:resource="http://www.w3.org/2001/XMLSchema#string"/>
        <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one"/>
      </oslc:Property>
    </oslc:property>
  </oslc:ResourceShape>
</rdf:RDF>
```

Mapping Rules

- **Stereotype/MetaClass** => Resource Shape (only if MetaClass is not abstract)
- **Stereotype/MetaClass properties** => Resource Shape properties
 - Property name => name attribute
 - Property multiplicity => occurs attribute
 - Property type => range attribute
 - Property value type (e.g. literal or reference) => valueType attribute
- **Primitive data type** => not mapped to a resource shape. Only references to primitive data types are mapped
- **Enumeration** => not mapped to a resource shape. Only references to enumerations are mapped. If a stereotype/metaClass property type is an enumeration, the enumeration and its literals are mapped to an Allowed Values section within the resource shape describing the stereotype/metaClass

Example

- Stereotype/MetaClass => Resource Shape



```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:oslc="http://open-services.net/ns/core#"
  xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  <oslc:ResourceShape rdf:about="http://myOSLCServiceProvider.com/sysml/RationaleResourceShape">
    <dcterms:title rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">
      Rationale Resource Shape</dcterms:title>
    <oslc:describes rdf:resource="http://omg.org/sysml#Rationale"/>
    <oslc:property>
      <oslc:Property>
        <oslc:name>ownedComment</oslc:name>
        <oslc:range rdf:resource="http://omg.org/sysml#Comment"/>
        <oslc:valueType rdf:resource="http://open-services.net/ns/core#Resource"/>
        <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-many"/>
      </oslc:Property>
    </oslc:property>
    <oslc:property>
      <oslc:Property>
        <oslc:name>annotatedElement</oslc:name>
        <oslc:range rdf:resource="http://omg.org/sysml#Element"/>
        <oslc:valueType rdf:resource="http://open-services.net/ns/core#Resource"/>
        <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-many"/>
      </oslc:Property>
    </oslc:property>
    <oslc:property>
      <oslc:Property>
        <oslc:name>body</oslc:name>
        <oslc:valueType rdf:resource="http://www.w3.org/2001/XMLSchema#string"/>
        <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one"/>
      </oslc:Property>
    </oslc:property>
  </oslc:ResourceShape>
</rdf:RDF>
```


Example

- Stereotype/Metaclass property => Resource Shape property
 - Property name => name attribute
 - Property multiplicity => occurs attribute
 - Property type => range attribute
 - Property value type (literal or reference) => valueType attribute

Attributes

- body: String [0..1]
Specifies a string that is the comment.



```
<oslc:property>
  <oslc:Property>
    <oslc:name>body</oslc:name>
    <oslc:valueType rdf:resource="http://www.w3.org/2001/XMLSchema#string"/>
    <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one"/>
  </oslc:Property>
</oslc:property>
```

Allowed Property Value Types

Allowed values for `oslc:valueType`:

- **Literal value-types**

- **Boolean** - <http://www.w3.org/2001/XMLSchema#boolean>
- **DateTime** - <http://www.w3.org/2001/XMLSchema#dateTime>
- **Decimal** - <http://www.w3.org/2001/XMLSchema#decimal>
- **Double** - <http://www.w3.org/2001/XMLSchema#double>
- **Float** - <http://www.w3.org/2001/XMLSchema#float>
- **Integer** - <http://www.w3.org/2001/XMLSchema#integer>
- **String** - <http://www.w3.org/2001/XMLSchema#string>
- **XMLLiteral** - <http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral>

- **Resource value-types**

- **Resource** - <http://open-services.net/ns/core#Resource>
- **Local Resource** - <http://open-services.net/ns/core#LocalResource>
- **Either Resource or Local Resource** - <http://open-services.net/ns/core#AnyResource>

<http://open-services.net/bin/view/Main/OSLCCoreSpecAppendixA>

Primitive Value Types Mapping

- SysML::PrimitiveValueTypes::String
+ UML::PrimitiveTypes::String =>
<http://www.w3.org/2001/XMLSchema#string>
- SysML::PrimitiveValueTypes::Boolean+
UML::PrimitiveTypes::Boolean=>
<http://www.w3.org/2001/XMLSchema#boolean>
- SysML::PrimitiveValueTypes::Integer+
UML::PrimitiveTypes::Integer=>
<http://www.w3.org/2001/XMLSchema#integer>

- **Undecided:** SysML::PrimitiveValueTypes:: **Complex**,
SysML::PrimitiveValueTypes:: **Number**,
SysML::PrimitiveValueTypes:: **Real**, UML::PrimitiveTypes::Real,
UML::PrimitiveTypes:: **UnlimitedNatural**

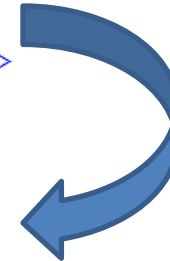
Enumeration Mapping Example

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:oslc="http://open-services.net/ns/core#"
  xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  <oslc:ResourceShape rdf:about="http://myOSLCSERVICEProvider:
    <dcterms:title rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#string">
    <oslc:describes rdf:resource="http://omg.org/sysml#BlockDefinition" />
    <oslc:property>
      <oslc:Property>
        <oslc:name>isEncapsulated</oslc:name>
        <oslc:valueType rdf:resource="http://www.w3.org/2000/01/rdf-schema#boolean" />
        <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one" />
      </oslc:Property>
    </oslc:property>
  </oslc:ResourceShape>
```

Enumeration => not mapped to a resource shape. Only references to enumerations are mapped. If a stereotype/metaclass property type is an enumeration, the enumeration and its literals are mapped to an Allowed Values section within the resource shape describing the stereotype/metaclass

```
<oslc:property>
  <oslc:Property>
    <oslc:name>visibility</oslc:name>
    <oslc:allowedValues rdf:resource="http://omg.org/sysml#VisibilityKind" />
    <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one" />
  </oslc:Property>
</oslc:property>
```

```
<oslc:AllowedValues rdf:about="http://omg.org/sysml#VisibilityKind">
  <dcterms:title rdf:parseType="Literal">VisibilityKind</dcterms:title>
  <oslc:allowedValue>public</oslc:allowedValue>
  <oslc:allowedValue>private</oslc:allowedValue>
  <oslc:allowedValue>protected</oslc:allowedValue>
  <oslc:allowedValue>package</oslc:allowedValue>
</oslc:AllowedValues>
```

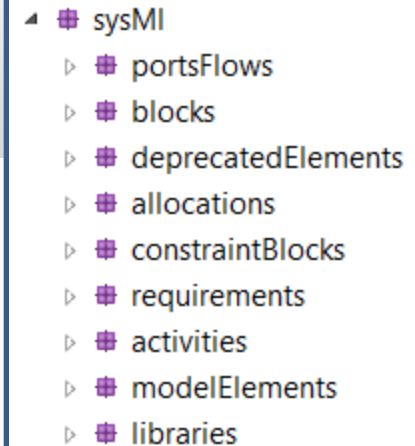


Implementation Approach

- Take SysML v1.3 from OMG in XMI
- Convert SysML v1.3 to Ecore
- Copy/paste the qualified names of UML4SysML concepts (UML concepts reused in SysML) from **SysML specification** in pdf into machine-processable **text file**
- Parse SysML Profile and UML metamodel in Ecore and create corresponding OSCI Resource Shapes in RDF (Apache Jena was not used for generating RDF files because of limited formatting options. RDF files were generated as simple text files. Apache Jena is only used to test that the generated RDF files are valid RDF files which can be read as RDF files)

SysML XMI to Ecore Transformation Instructions

```
<?xml version="1.0" encoding="UTF-8"?>
<xmi:XMI xmlns:xmi="http://www.omg.org/spec/XMI/20110701"
  xmlns:mofext="http://www.omg.org/spec/MOF/20110701"
  xmlns:uml="http://www.omg.org/spec/UML/20110701"
  xmlns:sysml="http://www.omg.org/spec/SysML/20120322/SysML">
  <uml:Profile URI="http://www.omg.org/spec/SysML/20120322/SysML" xmi:type="uml:Profile"
    xmi:id="_SysML__0"
    name="SysML"
    visibility="public">
    <metamodelReference xmi:idref="_SysML_packageImport__PackageImport__SysML__0__UML__0"/>
```



SysML v1.3 Profile available in XMI at <http://www.omg.org/spec/SysML/20120401/SysML.xmi>

1. Open the original SysML.xmi in Eclipse using the UML Model Editor. (This will report “Problems encountered”, but the file actually has been opened.)
2. Save the file as SysML.uml. (Even though there are problems with the XMI file, Save As will still successfully write out a converted .uml file.)
3. Open SysML.uml in the Text Editor and search for “_StandardProfileL2_Trace”. This will identify four “generalization” elements for which the “general” subelement is missing. Add the following subelement to each of these:

```
<general xmi:type="uml:Stereotype" href="pathmap://UML_PROFILES/StandardL2.profile.uml#Trace"/>
```

For example, the element

```
<generalization xmi:id="_SysML_Requirements_PackageableElement-Verify_PackageableElement-
  generalization__Generalization__SysML_Requirements_PackageableElement-
  Verify_PackageableElement__StandardProfileL2_Trace" isSubstitutable="false"/>
```

becomes

```
<generalization xmi:id="_SysML_Requirements_PackageableElement-Verify_PackageableElement-
  generalization__Generalization__SysML_Requirements_PackageableElement-
  Verify_PackageableElement__StandardProfileL2_Trace" isSubstitutable="false">
  <general xmi:type="uml:Stereotype" href="pathmap://UML_PROFILES/StandardL2.profile.uml#Trace"/>
</generalization>
```

4. Save SysML.uml in the Text Editor and open it in the UML Model Editor. Expand the top level element and select “<Profile> SysML”. From the menu bar, choose UML Editor > Convert To > Ecore Model... to generate the equivalent Ecore model.

Classifier	Kind
UML::Abstraction, UML::Action, UML::ActionExecutionSpecification, UML::Activity, UML::ActivityEdge, UML::ActivityFinalNode, UML::ActivityGroup, UML::ActivityNode, UML::ActivityParameterNode, UML::Actor, UML::AnyReceiveEvent, UML::Association, UML::Behavior, UML::BehaviorExecutionSpecification, UML::BehavioralFeature, UML::BehavioredClassifier, UML::CallAction, UML::CallBehaviorAction,	Metaclass

Table 5.2 - Elements available in SysML Compliance Level 2

Classifier	Kind
UML::ActionInputPin, UML::ActivityPartition, UML::AddStructuralFeatureValueAction, UML::AddVariableValueAction, UML::BroadcastSignalAction, UML::CentralBufferNode, UML::Clause, UML::ClearAssociationAction, UML::ClearStructuralFeatureAction, UML::ClearVariableAction, UML::CombinedFragment, UML::ConditionalNode, UML::ConnectionPointReference, UML::Connector, UML::ConnectorEnd (except for Constraint [3]), UML::ConsiderIgnoreFragment, UML::Continuation, UML::CreateLinkAction, UML::CreateObjectAction, UML::DecisionNode, UML::DestroyLinkAction, UML::DestroyObjectAction, UML::Duration, UML::DurationConstraint, UML::DurationInterval, UML::DurationObservation, UML::Extension, UML::ExtensionEnd, UML::FinalState, UML::FlowFinalNode, UML::ForkNode, UML::Gate, UML::Image, UML::InteractionConstraint, UML::InteractionOperand, UML::InteractionUse, UML::Interval, UML::IntervalConstraint, UML::JoinNode, UML::LinkAction, UML::LinkEndCreationData, UML::LinkEndData, UML::LinkEndDestructionData, UML::LoopNode,	Metaclass

Table 5.3 - Elements available in SysML Compliance Level 3

Classifier	Kind
UML::AcceptCallAction, UML::AcceptEventAction, UML::AssociationClass, UML::CreateLinkObjectAction, UML::DataStoreNode, UML::GeneralizationSet, UML::InformationFlow, UML::InformationItem, UML::InterruptibleActivityRegion, UML::Model, UML::ParameterSet, UML::ReadExtentAction, UML::ReadIsClassifiedObjectAction, UML::ReadLinkObjectEndAction, UML::ReclassifyObjectAction, UML::ReduceAction, UML::StartClassifierBehaviorAction, UML::StartObjectBehaviorAction, UML::UnmarshallAction	Metaclass

Created text file for automated processing of UML4SysML concepts

Copy/paste (one time effort)



```
UML4SysML.txt
1 UML::AggregationKind, UML::CallConcurrencyKind, UML::MessageKind, UML::MessageSort,
2 UML::ObjectNodeOrderingKind, UML::ParameterDirectionKind, UML::ParameterEffectKind, UML::VisibilityKind, Pr
3 PrimitiveValueTypes::Number, PrimitiveValueTypes::Real, PrimitiveValueTypes::String,
4 SysML::Activities::ControlValue, SysML::Ports&Flows::FeatureDirection, SysML::Requirements::VerdictKind, Pr
5 PrimitiveTypes::UnlimitedNatural, UML::Abstraction, UML::Action, UML::ActionExecutionSpecification, UML::Ac
6 UML::ActivityFinalNode, UML::ActivityGroup, UML::ActivityNode, UML::ActivityParameterNode, UML::Actor,
7 UML::AnyReceiveEvent, UML::Association, UML::Behavior, UML::BehaviorExecutionSpecification,
8 UML::BehavioralFeature, UML::BehavioredClassifier, UML::CallAction, UML::CallBehaviorAction,
9 UML::CallEvent, UML::CallOperationAction, UML::ChangeEvent, UML::Class, UML::Classifier, UML::Comment,
10 UML::ConnectableElement, UML::Constraint, UML::ControlFlow, UML::ControlNode, UML::DataType,
11 UML::Dependency, UML::DeployedArtifact, UML::DeploymentTarget, UML::DestructionOccurrenceSpecification,
12 UML::DirectedRelationship, UML::Element, UML::ElementImport, UML::EncapsulatedClassifier,
13 UML::Enumeration, UML::EnumerationLiteral, UML::Event, UML::ExecutableNode,
14 UML::ExecutionOccurrenceSpecification, UML::ExecutionSpecification, UML::Expression, UML::Extend,
15 UML::ExtensionPoint, UML::Feature, UML::FinalNode, UML::FunctionBehavior, UML::GeneralOrdering,
16 UML::Generalization, UML::Include, UML::InitialNode, UML::InputPin, UML::InstanceSpecification,
17 UML::InstanceValue, UML::Interaction, UML::InteractionFragment, UML::Interface, UML::InterfaceRealization,
18 UML::InvocationAction, UML::Lifeline, UML::LiteralBoolean, UML::LiteralInteger, UML::LiteralNull,
```

Conversion Code Available on GitHub

- Code for converting SysML to OSLC Resource Shapes available in a public GitHub repository under the permissive open-source MIT license:
<https://github.com/axelreichwein/SysML2OSLCResourceShapes>
- Main Java class for performing the conversion of SysML to OSLC ResourceShapes is ResourceShapeCreation.java:
<https://github.com/axelreichwein/SysML2OSLCResourceShapes/blob/master/SysMLProfileToOSLCResourceShapes/src/sysmlprofiletooslcresourceshapes/ResourceShapeCreation.java>
- Example OSLC Resource Shape for SysML Block:
<https://github.com/axelreichwein/SysML2OSLCResourceShapes/blob/master/SysMLProfileToOSLCResourceShapes/Resource%20Shapes/SysMLBlock.rdf>

Generated SysML Resource Shapes

- Resource Shapes
 - SysMLAcceptChangeStructuralFeatureEventAction.rdf
 - SysMLAllocate.rdf
 - SysMLAllocateActivityPartition.rdf
 - SysMLAllocated.rdf
 - SysMLBindingConnector.rdf
 - SysMLBlock.rdf
 - SysMLChangeStructuralFeatureEvent.rdf
 - SysMLConform.rdf
 - SysMLConnectorProperty.rdf
 - SysMLConstraintBlock.rdf
 - SysMLConstraintProperty.rdf
 - SysMLContinuous.rdf
 - SysMLControlOperator.rdf
 - SysMLCopy.rdf
 - SysMLDeriveReq.rdf
 - SysMLDirectedFeature.rdf
 - SysMLDiscrete.rdf
 - SysMLDistributedProperty.rdf
 - SysMLFlowPort.rdf
 - SysMLFlowProperty.rdf
 - SysMLFlowSpecification.rdf
 - SysMLFullPort.rdf
 - SysMLInterfaceBlock.rdf
 - SysMLInvocationOnNestedPortAction.rdf
 - SysMLItemFlow.rdf
 - SysMLNestedConnectorEnd.rdf

- SysMLNoBuffer.rdf
- SysMLOptional.rdf
- SysMLOverwrite.rdf
- SysMLParticipantProperty.rdf
- SysMLProbability.rdf
- SysMLProblem.rdf
- SysMLPropertySpecificType.rdf
- SysMLProxyPort.rdf
- SysMLQuantityKind.rdf
- SysMLRate.rdf
- SysMLRationale.rdf
- SysMLRequirement.rdf
- SysMLRequirementRelated.rdf
- SysMLSatisfy.rdf
- SysMLTestCase.rdf
- SysMLTriggerOnNestedPort.rdf
- SysMLUnit.rdf
- SysMLValueType.rdf
- SysMLVerify.rdf
- SysMLView.rdf
- SysMLViewpoint.rdf

Generated UML4SysML (subset of UML reused for SysML) Resource Shapes

- UMLAction.rdf
- UMLActivityEdge.rdf
- UMLActivityGroup.rdf
- UMLActivityNode.rdf
- UMLBehavior.rdf
- UMLBehavioralFeature.rdf
- UMLBehavioredClassifier.rdf
- UMLCallAction.rdf
- UMLClassifier.rdf
- UMLConnectableElement.rdf
- UMLControlNode.rdf
- UMLDeployedArtifact.rdf
- UMLDeploymentTarget.rdf
- UMLDirectedRelationship.rdf
- UMLElement.rdf
- UMLEncapsulatedClassifier.rdf
- UMLEvent.rdf
- UMLExecutableNode.rdf
- UMLExecutionSpecification.rdf
- UMLFeature.rdf
- UMLFinalNode.rdf
- UMLInteractionFragment.rdf
- UMLInvocationAction.rdf
- UMLLinkAction.rdf
- UMLLiteralSpecification.rdf
- UMLMessageEnd.rdf

- UMLMessageEvent.rdf
- UMLMultiplicityElement.rdf
- UMLNamedElement.rdf
- UMLNamespace.rdf
- UMLObjectNode.rdf
- UMLObservation.rdf
- UMLPackageableElement.rdf
- UMLParameterableElement.rdf
- UMLPin.rdf
- UMLRedefinableElement.rdf
- UMLRelationship.rdf
- UMLStructuralFeature.rdf
- UMLStructuralFeatureAction.rdf
- UMLStructuredClassifier.rdf
- UMLType.rdf
- UMLTypedElement.rdf
- UMLValueSpecification.rdf
- UMLVariableAction.rdf
- UMLVertex.rdf
- UMLWriteLinkAction.rdf
- UMLWriteStructuralFeatureAction.rdf
- UMLWriteVariableAction.rdf

SysMLBlock Resource Shape Example

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:oslc="http://open-services.net/ns/core#"
  xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  <oslc:ResourceShape rdf:about="http://myOSLCServiceProvider.com/sysml/BlockResourceShape">
    <dcterms:title rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">Block Resource
      Shape</dcterms:title>
    <oslc:describes rdf:resource="http://omg.org/sysml#Block"/>
    <oslc:property>
      <oslc:Property>
        <oslc:name>isEncapsulated</oslc:name>
        <oslc:valueType rdf:resource="http://www.w3.org/2001/XMLSchema#boolean"/>
        <oslc:occurs rdf:resource="http://open-services.net/ns/core#Zero-or-one"/>
      </oslc:Property>
    </oslc:property>
    ...
    <oslc:property>
      <oslc:Property>
        <oslc:name>attribute</oslc:name>
        <oslc:range rdf:resource="http://omg.org/sysml#Property"/>
        <oslc:valueType rdf:resource="http://open-services.net/ns/core#Resource"/>
        <oslc:occurs rdf:resource="http://open-service.net/ns/core#Zero-or-many"/>
      </oslc:Property>
    </oslc:property>
    ...
  </oslc:ResourceShape>
  <oslc:AllowedValues rdf:about="http://omg.org/sysml#VisibilityKind">
    <dcterms:title rdf:parseType="Literal">VisibilityKind</dcterms:title>
    <oslc:allowedValue>public</oslc:allowedValue>
    <oslc:allowedValue>private</oslc:allowedValue>
    <oslc:allowedValue>protected</oslc:allowedValue>
    <oslc:allowedValue>package</oslc:allowedValue>
  </oslc:AllowedValues>
</rdf:RDF>
```

These URIs need to be standardized

Any Questions?

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