



An OMG® Systems Modeling Publication



# OMG Systems Modeling Language™ (SysML®)

Version 2.0 Beta 2  
(Release 2024-03)

## Part 2: SysML v1 to SysML v2 Transformation

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**OMG Document Number:** None

**Date:** February 2024

**Standard document URL:** <https://www.omg.org/spec/SysML/2.0/Transformation/>

**Machine Readable File(s):** <https://www.omg.org/spec/SysML/20240201/>

**Normative:**

<https://www.omg.org/spec/SysML/20240201/SysMLv1Tov2.xmi>

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# 0 Preface

## OMG

Founded in 1989, the Object Management Group, Inc. (OMG) is an open membership, not-for-profit computer industry standards consortium that produces and maintains computer industry specifications for interoperable, portable, and reusable enterprise applications in distributed, heterogeneous environments. Membership includes Information Technology vendors, end users, government agencies, and academia.

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# 1 Scope

This specification describes a transformation for a semantic translation from SysML v1 [SysMLv1] to SysML v2 [SysMLv2] in a precise way. (In this document, "SysML v1" refers to SysML v1.7, the last version of SysML prior to v2.0, and "SysML v2" refers to SysML v2.0, or whatever version corresponds to the current version of this specification.)

The main intent is to provide the rules on which automated conversions of SysML v1 models to the SysML v2 standard can be developed. In addition, this annex can be considered an educational document that provides useful information for people who would like to compare using SysML v2 and using SysML v1.

More sophisticated applications of this transformation can also be envisaged. For instance, a SysML v1 conformant tool could use this transformation to implement a limited subset of the SysML v2 API that will provide "SysMLv2-like" read-only access to its SysMLv1 models for external applications.





## 2 Conformance

A tool shall demonstrate *conformance* with this specification by meeting all of the following requirements.

1. The tool shall implement the UML4SysML abstract syntax and SysML v1 profile conformant with [SysMLv1]. The tool should, but is not required, to provide the ability to import a SysML v1 model using standard XMI Model Interchange format [XMI].
2. The tool shall implement the SysML v2 abstract syntax conformant with [SysML v2]. The tool should, but is not required, to provide the ability to export a SysML v2 model KerML-standard model interchange project (see [KerML], Clause 10; see also [SysML v2], Clause 2).
3. The tool shall implement a transformation from an abstract syntax representation of an input SysML v1 model to the abstract syntax representation of an output SysML v2, as specified in view link does not exist of this specification.

A tool may claim *partial conformance* with this specification by satisfying the first two requirements above, but only implementing an identified subset of the mappings specified in view link does not exist and view link does not exist . (Note that care must also be taken that certain mappings depend on other mappings, and so cannot reasonably be implemented separately.)

**Note.** A tool that conforms to [SysMLv2] is not required to necessarily implement a transformation conformant with this specification, or it may implement a SysML v1 to v2 transformation that is not claimed to conform with the transformation defined in this specification.



## 3 Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this specification.

[KerML] *Kernel Modeling Language (KerML)*, Version 1.0  
<https://www.omg.org/spec/KerML/1.0>

[MOF] *Meta Object Facility*, Version 2.5.1  
<https://www.omg.org/spec/MOF/2.5.1>

[OCL] *Object Constraint Language*, Version 2.4  
<https://www.omg.org/spec/OCL/2.4>

[SysML v1] *OMG Systems Modeling Language (SysML)*, Version 1.7  
<https://www.omg.org/spec/SysML/1.7>

[SysML v2] *OMG Systems Modeling Language (SysML)*, Version 2.0  
<https://www.omg.org/spec/SysML/2.0>

[UML] *Unified Modeling Language (UML)*, Version 2.5.1  
<https://www.omg.org/spec/UML/2.5.1>

[XMI] *XML Metadata Interchange*, Version 2.5.1  
<https://www.omg.org/spec/XMI/2.5.1>



## 4 Terms and Definitions

Various terms and definitions are specified throughout the body of this specification.



## 5 Symbols

No special symbols are defined in this specification.





# 6 Introduction

## 6.1 Mapping Approach

The SysML v1 to v2 transformation is specified by directional mappings between UML metaclasses or stereotypes that are part of the SysML v1 specification [SysMLv1] (referenced below as the "SysML v1 scope") on the one hand, and the set of the metaclasses defined in the KerML [KerML] and SysMLv2 [SysMLv2] specifications (referenced below as "SysML v2") in the other hand. Some library classes are also involved.

Each mapping is a directed relationship that reifies a semantic link between a concept belonging to the SysML v1 scope on the source side and one concept belonging to SysML v2 (or one conforming library element) on the target side. As a set, those mappings constitute a declarative specification of a formal transformation that describes how the information encoded by the SysML v1 concepts can be reliably represented using constructs of SysML v2 metaclass instances.

In this approach, a mapping is represented by a UML class that has a pair of associations. One provides the `from` end that designates the source SysML v1 concept, while the other provides the `to` end that designates the target SysML v2 metaclass.

In addition to those associations, a mapping class provides a set of operations defining how the values of non-derived properties of the target metaclass instance have to be computed based on property values reachable from the source object. The computation algorithm is provided by the body condition of those operations and expressed using OCL code.

Note that the values assigned to the properties of the target object shall be instances of SysML v2 metaclasses, coming themselves from transformations of SysMLv1 objects to SysMLv2 objects. Since the specification is declarative, the order in which the individual transformations shall happen is not imposed. It is up to a conforming implementation to deal with this. Instead, the `getMapped` static operation is provided for referring to the result of a transformation from within an OCL rule. It returns a (possibly undefined) value, that is typed by the target metaclass of the mapping class from which it is invoked.

Each mapping class enables the transformation of any object that has the type specified by the `from` role to an object of the type specified by the `to` role, as long as it is not overloaded by a more specific mapping definition. In other words, assume a mapping is specified for the class `A` (i.e., it has `A` typing its `from` property), then it applies to any instance of a class `B` if `B` is a subclass of `A` and if there is no specialization of that mapping class specified for `B` (i.e., that has `B` typing its `from` property).

It is possible to restrict the applicability of a mapping specification to a specific subset of objects. This is achieved by the `filter` static operation that is evaluated against each candidate object. Only objects of the appropriate type for which this `filter` operation returns `true` shall be translated according to the specifications of that mapping class. The default `filter` operation always returns `true`.

Some mapping classes have one or more qualifiers for their `to` attribute. In such a case, each of those qualifiers reflects the specific property of the source type (i.e. the type of the `from` attribute) that has the same name and the same type. For those specific mappings, it is expected to get one instance of the target class (as specified by the type of the `to` attribute") for each actual combination of value of those properties for a given instance of object of the source type, assuming they pass the applicability filter as described above.

## 6.2 Acknowledgements

The primary authors of this specification document (and also developers of a proof-of-concept implementation of it) are:

- Yves Bernard, Airbus
- Tim Weilkiens, oose

The specification was formally submitted for standardization by the following organizations:

- 88solutions Corporation
- Dassault Systèmes
- GfSE e.V.
- IBM
- INCOSE
- Intercax LLC
- Lockheed Martin Corporation
- MITRE
- Model Driven Solutions, Inc.
- PTC
- Simula Research Laboratory AS
- Thematrix Partners LLC

However, work on the specification was also supported by over 200 people in over 80 organizations that participated in the SysML v2 Submission Team (SST), by contributing use cases, providing critical review and comment, and validating the language design. The following individuals had leadership roles in the SST:

- Manas Bajaj, Intercax LLC (API and services development lead)
- Yves Bernard, Airbus (v1 to v2 transformation co-lead)
- Bjorn Cole, Lockheed Martin Corporation (metamodel development co-lead)
- Sanford Friedenthal, SAF Consulting (SST co-lead, requirements V&V lead)
- Charles Galey, Lockheed Martin Corporation (metamodel development co-lead)
- Karen Ryan, Siemens (metamodel development co-lead)
- Ed Seidewitz, Model Driven Solutions (SST co-lead, pilot implementation lead)
- Tim Weilkiens, oose (v1 to v2 transformation co-lead)

The specification was prepared using CATIA No Magic modeling tools and the OpenMBEE system for model publication (<http://www.openmbec.org>), with the invaluable support of the following individuals:

- Tyler Anderson, No Magic/Dassault Systèmes
- Christopher Delp, Jet Propulsion Laboratory
- Ivan Gomes, Twingineer
- Doris Lam, Jet Propulsion Laboratory
- Robert Karban, Jet Propulsion Laboratory
- Christopher Klotz, No Magic/Dassault Systèmes
- John Watson, Lightstreet Consulting

# 7 Mappings

## 7.1 Overview

This Clause is organized in order to match the packages that subdivide the model of the transformation. The `Foundations` package gathers the abstract classes that represent the concepts on top of which the mapping approach is built. The next subclause presents a utility class named `Helper` that provides reusable operations that simplify the OCL statements defining the computation rules of target properties and make them more readable. Libraries play an important role in SysML v2, and a specific one has been created in order to represent semantics equivalent to those of UML/SysML concepts, where needed. It is presented in this subclause as well.

The three next subclauses are dedicated to initializers, factories and generic mappings, respectively. They do not specify mappings, strictly speaking. Instead, they factorize more or less advanced OCL code that will be reused by the actual mapping specifications that are contained in the two last subclauses. The first of them is dedicated to UML metaclass from the UML4SYSML scope, while the second deals with SysML stereotypes more specifically.

## 7.2 Foundations

### 7.2.1 Overview

The concepts defined by KerML/SysML v2 are relatively similar to those of UML/SysML v1, but the ways they are built are different. This makes the specification of the global transformation quite complex. In order to keep it manageable, specific kinds of foundational classes are provided. They represent concepts on which classical "model to model" transformation technologies rely:

- The mappings built on top of the abstract class `Mapping` shall be executed only when they are explicitly called. Each call shall produce a new target element, whatever the source element. It specifies a `from` property typed by the `UML::CommonStructure::Element` metaclass that shall be redefined by any of its subclass for specifying the convenient type of source element. Also it specifies a default (neutral) filter and a set of `getMapped` operations for various purposes: regular mapping result, qualified mapping result and mapping result for a collection of elements.
- The mappings built on top of the abstract class `UniqueMapping`, specified as a specialization of the `Mapping` class, shall produce only one target element for a given source element, whatever the number of time they are called.
- The mappings built on top of the abstract class `MainMapping`, specified as a specialization of the `UniqueMapping` class, shall be systematically executed (i.e. implicitly called) for all the elements that match both their source type and filter. There can be at most one main mapping for a given source type and only one target element shall be produced for a given source element.

The corresponding classes are located in the `Foundations` package.

Sometimes, it is necessary to be able to generate elements in the target model without having to provide an explicit link with a source element. In such a case, a mapping class is not appropriate. Instead the mapping framework provides the concept of a `Factory`.

Last, the concept of an `Initializer` allows the factorization of the specification of properties' default values that can be inherited by mappings and factories, as convenient.

In the model of the transformation that is specified here, all of the abstract classes of this `Foundations` package are subject to direct or indirect subclassing. In other words, this specification is built as a set of interrelated initializers, factories, regular, unique and main mappings, where the initializers' operation factorizes the specification of default

values for their target element, wherever possible. Those "default operations" are either used as-is or redefined by mappings or factories that can inherit for a specific initializer, as appropriate.

## 7.2.2 Foundational class specifications

### 7.2.2.1 UniqueMapping

#### Description

The mappings built on top of the abstract class UniqueMapping are a specific kind of Mappings that are intended to produce only one target element for a given source element, whatever the number of time they are called. If a getMapped is called several time with the same source element, the target element returned shall always be the same.

#### Generalizations

- Mapping (from Foundations)

### 7.2.2.2 Factory

#### Description

Similarly to the well-known to the homonyms software design pattern, a Factory can be used for specifying the production of a target element without any link with a source element. Factories have in common with mapping classes the operations that specify how the properties of the target element shall be computed and the "to" property that specifies the type of the target element. However factories do not define source element. Instead, they can have parameters. Those parameters, if any, shall be specified by properties with appropriate types and multiplicities. Factories are expected to provide a "create" operation with parameters matching in type and multiplicity the properties that are intended to specify them.

#### Generalizations

- Initializer (from Foundations)

### 7.2.2.3 Mapping

#### Description

This is the generic abstract class that provides the basic features of any mapping class mapping. The mappings built on top of the abstract class Mapping are intended to be executed only when explicitly called (e.g. by the rule of another mapping class). It specifies a "from" property typed by the UML::CommonStructure::Element metaclass that shall be redefined by any of its subclass for specifying the convenient type of source element. Also it specifies a default (neutral) filter and a set of getMapped operations for various purposes: regular mapping result, qualified mapping result and mapping result for a collection of elements. Each call to the getMapped operation shall produce a new target element, whatever the source element provided. Instances of Mapping class are represent a link between one source element and the target element produced by the transformation specified by that mapping class.

#### Generalizations

- Initializer (from Foundations)

#### Association Ends

- from : Element [1]

## Operations

- `filter (in src : Element) : Boolean [1]`  
returns "true" if the element provided as the actual parameter value can have a mapping to an instance of the type specified by the "to" attribute (i.e. can be used as a value for the "from" attribute)

```
true
```

- `getMapped (in fromVar : Element) : Element [1]`

### postConditions:

```
self.filter(fromVar) and
self.to.allFeatures()->selectByKind(UML::Property)->reject(isDerived)
->forAll(p | let ops: Operation = self.allFeatures()
    ->selectByKind(UML::Operation)->any(o | o.name = p.name) in
    p = ops()) and
result = self.to
```

- `getMapped (in fromVar : Element, in qual : Element) : Element [1]`

### postConditions:

```
self.filter(fromVar) and
self.to.allFeatures()->selectByKind(UML::Property)->reject(isDerived)
->forAll(p | let ops: Operation = self.allFeatures()
    ->selectByKind(UML::Operation)->any(o | o.name = p.name) in
    if ops.ownedParameter
        ->select(p | p.direction = UML::ParameterDirectionKind::_'in')
        ->size()=1 then
            p = ops(qual)
        else if ops.ownedParameter
            ->select(p | p.direction = UML::ParameterDirectionKind::_'in')
            ->size()=0 then
                p = ops()
            else
                invalid
            endif endif) and
result = self.to
```

- `getMappedColl (in fromColl : Element) : Element [0..*]`

### postConditions:

```
result = fromColl->collect(e | self.getMapped(e))
```

## 7.2.2.4 MainMapping

### Description

The mappings built on top of the abstract class MainMapping are a specific kind of UniqueMappings class that are always implicitly called for any element in the source model that match both their source type (as specified by their

"from" property) and their filter condition. If more than one main mapping is specified for a given source type, they shall have filters that specify mutually exclusive conditions. Also, as with any unique mapping, only one target element shall be produced for a given source element.

## Generalizations

- UniqueMapping (from Foundations)

### 7.2.2.5 Initializer

#### Description

The abstract class Initializer is the common ancestor of Mapping and Factory. It specifies a "to" property typed by the KerML::Root::Element metaclass that shall be redefined by any of its subclass for specifying the convenient type of target element. Initializers are intended to specify reusable properties' computation rules, mainly for initializing them with default values. Those rules will be inherited or redefined by the sub-classes, as appropriate.

#### Attributes

- /inputs [0..\*]

#### Association Ends

- to : Element [1]

## 7.3 Mapping Helper and Library

### 7.3.1 Helper

#### Description

The Helper class contains operations that are used by multiple mapping classes. The specification is in the bodyCondition.

#### Operations

- actionOwnedRelationship (in src : Element) : Relationship [0..\*]  
Reusable mapping rule for owned relationships of a UML4SysML::Action mapping.

```
let actionInputPin: Set(UML::Element) =
  src.ownedElement->select(e | e.ocIsTypeOf(UML::ActionInputPin)) in
let triggers: Set(UML::Element) =
  src.ownedElement->select(e | e.ocIsKindOf(UML::Trigger)) in
let toElementFMS: Set(UML::Element) =
  src.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in
let toElementOMS: Set(UML::Element) =
  (((src.ownedElement - toElementFMS) - actionInputPin) - triggers) in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
```

- activityOwnedRelationship (in src : Element) : Relationship [0..\*]  
Reusable mapping rule for owned relationships of a UML4SysML::Activity mapping.

```

let initialNodes : Set(UML::Element) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::InitialNode)) in
let flowFinalNodes : Set(UML::Element) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::FlowFinalNode)) in
let ignoreActivityFinalNodes : Set(UML::Element) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::ActivityFinalNode)) in
let ignoreEdgesToActivityFinalNodes : Set(UML::Element) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::ActivityEdge)
    and e.ocAsType(UML::ActivityEdge).target.ocIsTypeOf(UML::ActivityFinalNode)) in
let elementsFMS : Set(UML::Element) =
    (((src.ownedElement->select(e | e.ocIsKindOf(UML::ControlNode) or
    e.ocIsKindOf(UML::Action) or e.ocIsKindOf(UML::ControlFlow) or
    e.ocIsKindOf(UML::ObjectFlow) or e.ocIsKindOf(UML::Property))
    - initialNodes) - flowFinalNodes) - ignoreActivityFinalNodes)
    - ignoreEdgesToActivityFinalNodes in
let parameters : Set(UML::Parameter) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in
let ignoreParameterNodes : Set(UML::ActivityParameterNode) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::ActivityParameterNode)) in
let ignoreActivityPartition : Set(UML::ActivityPartition) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::ActivityPartition)) in
let ignoreInterruptibleActivityRegion : Set(UML::InterruptibleActivityRegion) =
    src.ownedElement
    ->select(e | e.ocIsKindOf(UML::InterruptibleActivityRegion)) in
let ownedClassifier : Sequence(UML::Classifier) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::Classifier)) in
let variables : Sequence(UML::Variable) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::Variable)) in
let parameterSets : Set(UML::ParameterSet) =
    src.ownedElement->select(e | e.ocIsKindOf(UML::ParameterSet)) in
let elementsOMS : Set(UML::Element) =
    (((((((((((src.ownedElement-initialNodes)-flowFinalNodes)-
    ignoreActivityFinalNodes)-ignoreEdgesToActivityFinalNodes)
    -elementsFMS)-parameters)-ignoreParameterNodes)-
    ignoreActivityPartition)-ignoreInterruptibleActivityRegion)-
    ownedClassifier)-variables)-parameterSets)-
    Set{from.classifierBehavior}) in
let memberships : Sequence(UML::Element) =
elementsOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(initialNodes->collect(e | InitialNodeMembership_Mapping.getMapped(e)))
->union(flowFinalNodes->collect(e | FlowFinalNodeMembership_Mapping.getMapped(e)))
->union(elementsFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(variables->collect(e | VariableMembership_Mapping.getMapped(e)))
->union(parameterSets->collect(e | ParameterSetMembership_Mapping.getMapped(e)))
->union(ownedClassifier
->collect(e | ElementOwningMembership_Mapping.getMapped(e))) in
if src.classifierBehavior.ocIsUndefined() then
    memberships
else
    memberships
    ->append(BehavoredClassifierFeatureMembership_Mapping.getMapped(src))
endif

```

- **createUUID () : String [1]**  
Creates a UUID. The specification is implementation-specific and therefore cannot be provided here.
- **excludedPin (in pin : Pin) : Boolean [1]**  
Checks if a pin is excluded from the transformation, because it is already defined as a parameter in the

SysMLv1Library.

```
if (pin.owner.ocIsTypeOf(UML::AddVariableValueAction) and
    (pin.name = 'value' or pin.name = 'insertAt')) then
    true
else if (pin.owner.ocIsTypeOf(UML::AddStructuralFeatureValueAction) and
    (pin.name = 'value' or pin.name = 'insertAt' or pin.name = 'object')) then
    true
else
    false
endif endif
```

- **getAppliedStereotypes (in element : Element) : Stereotype [0..\*]**  
Returns the list of applied stereotypes. The specification is implementation-specific and therefore cannot be provided here.
- **getEnumerationType (in t : Enumeration) : EnumerationDefinition [1]**  
Maps a given UML4SysM::Enumeration to the appropriate SysML v2 EnumerationDefinition.

```
let enum: SYSML2::EnumerationDefinition =
    Enumeration_Mapping.getMapped(t) in
if enum.ocIsKindOf(SYSML2::EnumerationDefinition) then
    enum
else if t.name = 'VerdictKind' then
    SYSML2::EnumerationDefinition.allInstances()
    ->any(e | e.qualifiedName = 'VerificationCases::VerdictKind')

    else if t = UML::ParameterDirectionKind then
        KerML::FeatureDirectionKind

        else if t.qualifiedName =
            'SysML::Libraries::ControlValues::ControlValueKind' then
            SYSML2::EnumerationDefinition.allInstances()
            ->any(e | e.qualifiedName =
                'SysMLv1Library::Enumerations::ControlValueKind')

            else
                SYSML2::EnumerationDefinition.allInstances()
                ->any(e | e.qualifiedName =
                    'SysMLv1Library::Enumerations::' + t.name)
            endif
        endif
    endif
endif
```

- **getFlowDirectionKind (in v : EnumerationLiteral) : FeatureDirectionKind [1]**  
Maps a given SysMLv1 feature direction enumeration literal to a SysML v2 FeatureDirectionKind enumeration literal.

```
if v.enumeration.qualifiedName =
    'SysML::Ports&Flows::FlowDirectionKind' then
    if v = SysML::FlowDirectionKind::_out' then
        KerML::FeatureDirectionKind::_out'
    else if (v = SysML::FlowDirectionKind::_in') then
```



```

        KerML::FeatureDirectionKind::_in'
    else if (v = SysML::FlowDirectionKind::inout) then
        KerML::FeatureDirectionKind::inout
    else
        invalid
    endif endif endif
else
    invalid
endif

```

- **getID (in src : Element) : String [1]**  
Returns the identifier of a UML4SysML::Element. The specification is implementation-specific and therefore cannot be provided here.
- **getKerMLFeatureDirectionKind (in v : EnumerationLiteral) : FeatureDirectionKind [1]**  
Maps a given SysMLv1 feature direction enumeration literal to a SysML v2 FeatureDirectionKind enumeration literal.

```

if v.enumeration.qualifiedName =
    'SysML::Ports&Flows::FeatureDirectionKind' or
    v.enumeration.qualifiedName = 'SysML::Ports&Flows::FeatureDirection' then
    if v = SysML::FeatureDirectionKind::provided then
        KerML::FeatureDirectionKind::_out'
    else if (v = SysML::FeatureDirectionKind::required) then
        KerML::FeatureDirectionKind::_in'
    else if (v = SysML::FeatureDirectionKind::providedRequired) then
        KerML::FeatureDirectionKind::inout
    else
        invalid
    endif endif endif
else
    invalid
endif

```

- **getKerMLParameterDirectionKind (in v : ParameterDirectionKind) : FeatureDirectionKind [1]**  
Maps a given SysMLv1 parameter direction enumeration literal to a SysML v2 FeatureDirectionKind enumeration literal.

```

if v = UML::ParameterDirectionKind::_in' then
    KerML::FeatureDirectionKind::_in'
else if (v = UML::ParameterDirectionKind::return) then
    KerML::FeatureDirectionKind::out
else if (v = UML::ParameterDirectionKind::out) then
    KerML::FeatureDirectionKind::out
else if (v = UML::ParameterDirectionKind::inout) then
    KerML::FeatureDirectionKind::inout
else
    invalid
endif endif endif endif

```

- **getKerMLVisibilityKind (in v : VisibilityKind) : VisibilityKind [1]**  
Maps a given UML4SysML::VisibilityKind enumeration literal to a SysML v2 VisibilityKind enumeration literal.

```

    if (v = UML::VisibilityKind::public) then
        KerML::VisibilityKind::public
    else if (v = UML::VisibilityKind::protected) then
        KerML::VisibilityKind::protected
    else if (v = UML::VisibilityKind::private) then
        KerML::VisibilityKind::private
    else if (v = UML::VisibilityKind::package) then
        KerML::VisibilityKind::public
    else
        invalid
    endif endif endif endif

```

- **getMetadataByName** (in mdName : String) : AttributeDefinition [1]  
Returns the metadata attribute definition element for a given metadata name.

```

SYSML2::AttributeDefiniton.allInstances()->any(e | e.name = mdName)

```

- **getRequirementStereotype** (in element : NamedElement) : Stereotype [0..1]  
Returns the requirement stereotype for a given element.

```

let stereotypes: Set(UML::Stereotype) =
    Helper.getAppliedStereotypes(element) in
stereotypes->any(s | s.general->collect(g | g.qualifiedName)
->includes('SysML::Requirements::AbstractRequirement'))

```

- **getScalarValueType** (in t : DataType) : DataType [1]  
Maps a given SysMLv1 primitive type to a SysMLv2 scalar value type.

```

if t.name = 'UnlimitedNatural' then
    SYSML2::DataType.allInstances()
    ->any(e | e.qualifiedName = 'ScalarValues::Natural')
else
    SYSML2::DataType.allInstances()
    ->any(e | e.qualifiedName = 'ScalarValues::' + t.name)
endif

```

- **getScalarValueTypeByName** (in ptName : String) : DataType [1]  
Maps a given SysMLv1 primitive type name string to a SysMLv2 scalar value type.

```

SYSML2::DataType.allInstances()
->any(e | e.qualifiedName = 'ScalarValues::' + ptName)

```

- **getTagValue** (in element : Element, in stereotypeName : String, in tagValueName : String) [1]  
Returns the value of a stereotype property. The specification is implementation-specific and therefore cannot provided here.
- **getTagValueAsElement** (in element : Element, in stereotypeName : String, in tagValueName : String) : Element [1]  
Returns the value of a stereotype property. The specification is implementation-specific and therefore cannot provided here.
- **getTagValueAsElementColl** (in element : Element, in stereotypeName : String, in tagValueName : String) : Element [0..\*]

Returns the value of a stereotype property as a collection. The specification is implementation-specific and therefore cannot be provided here.

- `getTagValueAsString (in element : Element, in stereotypeName : String, in tagValueName : String) : String [1]`  
Returns the value of a stereotype property as a string. The specification is implementation-specific and therefore cannot be provided here.
- `getTagValueAsStringColl (in element : Element, in stereotypeName : String, in tagValueName : String) : String [0..*]`  
Returns the value of a stereotype property as a string collection. The specification is implementation-specific and therefore cannot be provided here.
- `globalNamespace () : Namespace [1]`

```
KerML::Package.allInstances()->any(p | p.owningNamespace->isEmpty())
```

- `hasMainMapping (in element : Element) : Boolean [1]`
- `hasStereotypeApplied (in element : Element, in stereotypeName : String) : Boolean [1]`  
Returns true if the given stereotype is applied to the element. The specification is implementation-specific and therefore cannot be provided here.
- `isConnectionDef (in association : Association) : Boolean [1]`  
Checks if a UML4SysML::Association is mapped to a SysML v2 ConnectionDefinition.

```
-- Case 1: composite association with
-- multiplicity 1..1 on owner side
let case1: Boolean = association.memberEnd
->exists(e | not e.isComposite and e.lower=1) and
association.memberEnd->exists(e | e.isComposite) in

-- Case 2: association is not composite and
-- there is no owned end with multiplicity 0..*
let case2: Boolean = not association.memberEnd
->exists(e | e.isComposite) and
not association.ownedEnd
->exists(e | e.lower = 0 and e.upper = -1) in

association.oclIsTypeOf(UML::AssociationClass) or
case1 or
case2
```

- `isInScope (in element : Element) : Boolean [1]`  
The `isInScope` operation is intended to define the scope on which the transformation will apply. If the `isInScope` operation returns "true" for a given model element, this element shall be considered by the transformation. Especially, main mappings - if any - will apply to it. It shall be ignored otherwise.
- `isRequirement (in element : Element) : Boolean [1]`  
Checks whether the stereotype `AbstractRequirement` is applied to the given element.

```
let stereotypes: Set(UML::Stereotype) =
  Helper.getAppliedStereotypes(element) in
```

```

stereotypes->exists(s | s.general->collect(g | g.qualifiedName)
->includes('SysML::Requirements::AbstractRequirement'))

```

- **packageOwnedRelationship (in src : Element) : Relationship [0..\*]**  
Reusable mapping rule for owned relationships of a UML4SysML::Package mapping.

```

let useCaseAssociations : Set(UML::Association) =
    src.ownedType->select(e | e.ocIsKindOf(UML::Association))
    ->select(a | a.memberEnd->exists(e | e.type.ocIsKindOf(UML::UseCase))) in
let unmappedAssociations : Set(UML::Association) =
    src.ownedType->select(e | e.ocIsKindOf(UML::Association))
    ->reject(a | Helper.isConnectionDef(a)) in
let imports: Set(UML::PackageImport) =
    src.packageImport->select(pi | Helper.isInScope(pi.importedPackage)) in
let relationships: Set(SysMLv2::Relationship) =
    src.ownedComment->reject(c | c.annotatedElement->includes(src))->collect(c | CommentOwners
->union(((src.ownedType-useCaseAssociations)-unmappedAssociations)->collect(e | ElementOwning
->union(imports->collect(i | PackageImport_Mapping.getMapped(i))->asSet())
->union(src.ownedElement->select(e | e.ocIsKindOf(UML::Dependency) or
e.ocIsKindOf(UML::InformationFlow) or e.ocIsKindOf(UML::Package)
or (e.ocIsKindOf(UML::InstanceSpecification) and
e.ocIsType(UML::InstanceSpecification).classifier->notEmpty()))
->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()) in

if src.URI.ocIsUndefined() or src.URI = '' then
    relationships
else
    relationships->including(PackageURIMetadataMembership_Mapping.getMapped(src))
endif

```

- **stateOwnedRelationship (in src : Element) : Relationship [0..\*]**  
Reusable mapping rule for owned relationships of a UML4SysML::State mapping.

```

let initialState : Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pseudostate) and
    e.ocIsType(UML::Pseudostate).kind = UML::PseudostateKind::initial) in
let toElementOMS : Set(UML::Element) = from.ownedElement - initialState in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(initialState->collect(e | InitialStateMembership_Mapping.getMapped(e)))

```

### 7.3.2 SysML v1 Library

The SysML v1 library is a SysML v2 model library with metadata definitions for annotating some model elements resulting from a transformation from a SysML v1 model using the SysML v1 to SysML v2 transformation.

```

package SysMLv1Library {

    doc /*
    * The SysMLv1Library defines library elements and metadata for
    * SysML elements which cannot mapped to a SysML v2 element.
    */

    // Library elements

```

```

action def AddValueAction {
  in insertAt : ScalarValues::Natural [0..1];
  in value : ScalarValues::Integer;
  in isReplaceAll : ScalarValues::Boolean = false;
  in target;

  if not isReplaceAll {
    if insertAt == * {
      assign target := SequenceFunctions::including(target, value);
    }
    else {
      assign target :=
        SequenceFunctions::includingAt(target, value, insertAt);
    }
  } else {
    target := value;
  }
}

action def AddStructuralFeatureValueAction :> AddValueAction {
  in object;
}

action def RemoveVariableValueAction :> Actions::AssignmentAction {
  in removeAt: ScalarValues::Natural [0..1];
  in value : ScalarValues::Integer;
  in isRemoveDuplicates : ScalarValues::Boolean = false;
  in variable;

  // isRemoveDuplicates not covered yet

  if removeAt {
    assign variable :=
      SequenceFunctions::excludingAt(variable, value, removeAt);
  } else {
    assign variable := SequenceFunctions::excluding(variable, value);
  }
}

// Metadata

metadata def ActivityEdgeData {
  doc /* Metadata definition for UML::ActivityEdge::weight property */
  attribute weight : ScalarValues::Natural;
}

metadata def AssociationData {
  doc /* Metadata definition for
    * UML::StructuredClassifiers::Association::isDerived property mapping
    */
  attribute isDerived : ScalarValues::Boolean;
}

metadata def BlockData {
  doc /* Metadata definition for
    * SysML::Blocks::Block::isEncapsulated property
    */
  attribute isEncapsulated : ScalarValues::Boolean;
}

```

```

}

metadata def ElementGroupData {
    doc /* Metadata definition for the criterion
        * of a SysML::ModelElements::ElementGroup
        */
    attribute criterion : ScalarValues::String;
}

metadata def ModelData :> PackageData {
    doc /* Metadata definition for the UML::Model::viewpoint property */
    :> annotatedElement : SysML::Package;
    attribute 'viewpoint' : ScalarValues::String;
}

metadata def PackageData {
    doc /* Metadata definition for the UML::Package::URI property */
    :> annotatedElement : SysML::Package;
    attribute URI : ScalarValues::String;
}

    metadata def ParameterSetData {
        doc /* Metadata definition for tagging parameters
            * mapped from a UML::ParameterSet
            */
        attribute isParameterSet : ScalarValues::Boolean;
    }

metadata def PortData {
    doc /* Metadata definition for tagging SysML v2 ports
        * mapped from a SysML::Ports&Flows::FullPort element
        */
    :> annotatedElement : SysML::PartUsage;
    attribute isFullPort : ScalarValues::Boolean;
}

metadata def ProbabilityData {
    doc /* Metadata definition for SysML::Activities::Probability stereotype */
    attribute probability : ScalarValues::Real;
}

metadata def RateData {
    doc /* Metadata definition for SysML::Activities::Rate and
        * specialized Discrete and Continuous stereotypes
        */
    :> annotatedElement : SysML::PartUsage;
    part rate;
    attribute isDiscrete : ScalarValues::Boolean;
    attribute isConcrete : ScalarValues::Boolean;
}

metadata def RefineData {
    doc /* Metadata definition for tagging SysML v2 dependencies
        * mapped from a SysML::Requirements::Refine relationship
        */
    :> annotatedElement : SysML::Dependency;
    attribute isRefine : ScalarValues::Boolean;
}

metadata def StakeholderData {

```

```

        doc /* Metadata definition for tagging SysML v2 item definitions
           * mapped from a SysML::ModelElements::Stakeholder element
           */
        :> annotatedElement : SysML::ItemDefinition;
        attribute isStakeholder : ScalarValues::Boolean;
    }

    metadata def traceData {
        doc /* Metadata definition for tagging SysML v2 dependencies
           * mapped from a SysML::Requirements::Trace relationship
           */
        :> annotatedElement : SysML::Dependency;
        attribute isTrace : ScalarValues::Boolean;
    }

    metadata def ViewpointData {
        doc /* Metadata definition for SysML::ModelElements::Viewpoint properties */
        attribute languages [0..*] : ScalarValues::String;
        attribute presentations [0..*] : ScalarValues::String;
    }

    package Enumerations {
        enum def ControlValueKind {
            doc /* The ControlValueKind enumeration is a type for
               * treating control values as data and for UML control pins.
               */
            enum disable;
            enum enable;
        }
    }
}

```

## 7.4 Initializers

### 7.4.1 Overview

The classes presented in this subclause provide set of rules that provide default values for all non-derived features of their target metaclasses. Intentionally, initializers do not specify any "source" element. This makes them easier to specialize but prevents them from being able to provide a computation algorithm for some target features. In such a case, the operation matching the feature will be specified as abstract.

### 7.4.2 Mapping Specifications

#### 7.4.2.1 KerML Initializers

##### 7.4.2.1.1 AnnotatingElement\_Init

###### Description

Initializes the properties of the SysML v2 element AnnotatingElement.

###### Generalizations

- Element\_Init (from KerMLInitializers)

###### Association Ends

- to : AnnotatingElement [1]  
(redefines: Element\_Init::to)

### Operations

- annotation () : Annotation [0..\*]

Set { }

#### 7.4.2.1.2 Annotation\_Init

### Description

Initializes the properties of the SysML v2 element Annotation.

### Generalizations

- Relationship\_Init (from KerMLInitializers)

### Attributes

- to : Annotation [1]

### Operations

- annotatedElement () : Element [1] {redefines target, abstract}
- annotatingElement () : AnnotatingElement [1] {redefines source, abstract}
- owningAnnotatedElement () : Element [0..1]

null

#### 7.4.2.1.3 Association\_Init

### Description

Initializes the properties of the SysML v2 element Association.

### Generalizations

- Classifier\_Init (from KerMLInitializers)
- Relationship\_Init (from KerMLInitializers)

### Attributes

- to : Association [1]

#### 7.4.2.1.4 Behavior\_Init

### Description

Initializes the properties of the SysML v2 element Behavior.

### Generalizations



- Classifier\_Init (from KerMLInitializers)

#### Attributes

- to : Behavior [1]

#### 7.4.2.1.5 Classifier\_Init

##### Description

Initializes the properties of the SysML v2 element Classifier.

##### Generalizations

- Type\_Init (from KerMLInitializers)

#### Attributes

- to : Classifier [1]

#### 7.4.2.1.6 Comment\_Init

##### Description

Initializes the properties of the SysML v2 element Comment.

##### Generalizations

- AnnotatingElement\_Init (from KerMLInitializers)

#### Association Ends

- to : Comment [1]  
(redefines: AnnotatingElement\_Init::to)

#### Operations

- body () : String [1]{abstract}
- locale () : String [1]

null

#### 7.4.2.1.7 Conjugation\_Init

##### Description

Initializes the properties of the SysML v2 element Conjugation.

##### Generalizations

- Relationship\_Init (from KerMLInitializers)

#### Attributes

- to : Conjugation [1]

### Operations

- conjugatedType () : Type [1] {redefines source, abstract}
- originalType () : Type [1] {redefines target, abstract}

#### 7.4.2.1.8 Connector\_Init

### Description

Initializes the properties of the SysML v2 element Connector.

### Generalizations

- Feature\_Init (from KerMLInitializers)
- Relationship\_Init (from KerMLInitializers)

### Attributes

- to : Connector [1]

### Operations

- isDirected () : Boolean [1]

false

#### 7.4.2.1.9 Documentation\_Init

### Description

Initializes the properties of the SysML v2 element Documentation.

### Generalizations

- Comment\_Init (from KerMLInitializers)

### Attributes

- to : Documentation [1]

#### 7.4.2.1.10 Element\_Init

### Description

This is the general abstract class to be used as an ancestor for any class mapping specification.

### Generalizations

- Initializer (from Foundations)

### Association Ends

- to : Element [1]  
(redefines: Initializer::to)

### Operations

- aliasId () : String [0..\*]

Set{}

- declaredName () : String [0..1]

null

- elementId () : String [1]

Helper.createUUID()

- ownedRelationship () : Relationship [0..\*]

Set{}

- shortName () : String [0..1]

null

#### 7.4.2.1.11 EndFeatureMembership\_Init

##### Description

Initializes the properties of the SysML v2 element EndFeatureMembership.

##### Generalizations

- FeatureMembership\_Init (from KerMLInitializers)

##### Attributes

- to : EndFeatureMembership [1]

#### 7.4.2.1.12 Expression\_Init

##### Description

Initializes the properties of the SysML v2 element Expression.

##### Generalizations

- Step\_Init (from KerMLInitializers)

##### Attributes

- to : Expression [1]

#### 7.4.2.1.13 Feature\_Init

##### Description

Initializes the properties of the SysML v2 element Feature.

##### Generalizations

- Type\_Init (from KerMLInitializers)

##### Attributes

- to : Feature [1]

##### Operations

- direction () : FeatureDirectionKind [0..1]

null

- isComposite () : Boolean [1]

false

- isDerived () : Boolean [1]

false

- isEnd () : Boolean [1]

false

- isOrdered () : Boolean [1]

false

- isPortion () : Boolean [1]

false

- isReadOnly () : Boolean [1]

false

- isUnique () : Boolean [1]

true

#### 7.4.2.1.14 FeatureChainExpression\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureChainExpression.

##### Generalizations

- OperatorExpression\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureChainExpression [1]

#### 7.4.2.1.15 FeatureChaining\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureChaining.

##### Generalizations

- Relationship\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureChaining [1]

##### Operations

- chainingFeature () : Feature [1] {redefines target, abstract}

#### 7.4.2.1.16 FeatureMembership\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureMembership.

##### Generalizations

- OwningMembership\_Init (from KerMLInitializers)
- TypeFeaturing\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureMembership [1]

##### Operations

- ownedMemberFeature () : Feature [1] {redefines ownedMemberElement, abstract}
- ownedRelatedElement () : Element [0..\*] {redefines ownedRelatedElement}

```
Set{self.ownedMemberFeature() }
```

#### 7.4.2.1.17 FeatureReferenceExpression\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureReferenceExpression.

##### Generalizations

- Expression\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureReferenceExpression [1]

#### 7.4.2.1.18 FeatureTyping\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureTyping.

##### Generalizations

- Specialization\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureTyping [1]

##### Operations

- type () : Type [1] {redefines general, abstract}
- typedFeature () : Feature [1] {redefines specific, abstract}

#### 7.4.2.1.19 FeatureValue\_Init

##### Description

Initializes the properties of the SysML v2 element FeatureValue.

##### Generalizations

- OwningMembership\_Init (from KerMLInitializers)

##### Attributes

- to : FeatureValue [1]

##### Operations

- featureWithValue () : Feature [1] {redefines ownedMemberElement, abstract}
- isDefault () : Boolean [1]

false

- `isInitial () : Boolean [1]`

`false`

- `ownedRelatedElement () : Element [0..*]` {redefines `ownedRelatedElement`}

`Set {self.value () }`

- `value () : Expression [1]` {redefines `ownedMemberElement`, abstract}

#### 7.4.2.1.20 Function\_Init

##### Description

Initializes the properties of the SysML v2 element Function.

##### Generalizations

- `Behavior_Init` (from `KerMLInitializers`)

##### Attributes

- `to : Function [1]`

#### 7.4.2.1.21 Import\_Init

##### Description

Initializes the properties of the SysML v2 element Import.

##### Generalizations

- `Relationship_Init` (from `KerMLInitializers`)

##### Attributes

- `to : Import [1]`

##### Operations

- `importedMemberName () : String [0..1]`

`null`

- `isImportAll () : Boolean [1]`

`false`

- `isRecursive () : Boolean [1]`

`false`

- source () : Element [1] {redefines source, abstract}
- target () : Element [1] {redefines target, abstract}
- visibility () : VisibilityKind [1]

KerML::VisibilityKind::public

#### 7.4.2.1.22 Interaction\_Init

##### Description

Initializes the properties of the SysML v2 element Interaction.

##### Generalizations

- Association\_Init (from KerMLInitializers)
- Behavior\_Init (from KerMLInitializers)

##### Attributes

- to : Interaction [1]

#### 7.4.2.1.23 InvocationExpression\_Init

##### Description

Initializes the properties of the SysML v2 element InvocationExpression.

##### Generalizations

- Expression\_Init (from KerMLInitializers)

##### Attributes

- to : InvocationExpression [1]

#### 7.4.2.1.24 ItemFlow\_Init

##### Description

Initializes the properties of the SysML v2 element ItemFlow.

##### Generalizations

- Connector\_Init (from KerMLInitializers)

##### Attributes

- to : ItemFlow [1]

#### 7.4.2.1.25 Membership\_Init

##### Description

Initializes the properties of the SysML v2 element Membership.



## Generalizations

- Relationship\_Init (from KerMLInitializers)

## Attributes

- to : Membership [1]

## Operations

- memberElement () : Element [1] {redefines target, abstract}
- memberName () : String [0..1]

null

- memberShortName () : String [0..1]

null

- membershipOwningNamespace () : Element [0..\*] {redefines source, abstract}
- visibility () : VisibilityKind [1]

KerML::VisibilityKind::public

### 7.4.2.1.26 MembershipImport\_Init

#### Description

Initializes the properties of the SysML v2 element MembershipImport.

## Generalizations

- Import\_Init (from KerMLInitializers)

## Attributes

- to : MembershipImport [1]

## Operations

- importedMembership () : Namespace [1] {redefines target, abstract}

### 7.4.2.1.27 Namespace\_Init

#### Description

Initializes the properties of the SysML v2 element Namespace.

## Generalizations

- Element\_Init (from KerMLInitializers)

## Association Ends

- to : Namespace [1]  
(redefines: Element\_Init::to)

### 7.4.2.1.28 NamespaceImport\_Init

#### Description

Initializes the properties of the SysML v2 element NamespaceImport.

#### Generalizations

- Import\_Init (from KerMLInitializers)

#### Attributes

- to : NamespaceImport [1]

#### Operations

- importedNamespace () : Namespace [1] {redefines target, abstract}

### 7.4.2.1.29 OperatorExpression\_Init

#### Description

Initializes the properties of the SysML v2 element OperatorExpression.

#### Generalizations

- Expression\_Init (from KerMLInitializers)

#### Attributes

- to : OperatorExpression [1]

#### Operations

- operator () : String [1]{abstract}

### 7.4.2.1.30 OwningMembership\_Init

#### Description

Initializes the properties of the SysML v2 element OwningMembership.

#### Generalizations

- Membership\_Init (from KerMLInitializers)

#### Attributes

- to : OwningMembership [1]

## Operations

- `ownedMemberElement () : Element [1]` {redefines `memberElement`, abstract}
- `ownedRelatedElement () : Element [0..*]` {redefines `ownedRelatedElement`}

```
Set { self.ownedMemberElement () }
```

### 7.4.2.1.31 Package\_Init

#### Description

Initializes the properties of the SysML v2 element `Package`.

#### Generalizations

- `Namespace_Init` (from `KerMLInitializers`)

#### Attributes

- `to : Package [1]`

### 7.4.2.1.32 ParameterMembership\_Init

#### Description

Initializes the properties of the SysML v2 element `ParameterMembership`.

#### Generalizations

- `FeatureMembership_Init` (from `KerMLInitializers`)

#### Attributes

- `to : ParameterMembership [1]`

## Operations

- `ownedMemberParameter () : Feature [1]` {redefines `ownedMemberFeature`, abstract}
- `ownedRelatedElement () : Element [0..*]` {redefines `ownedRelatedElement`}

```
Set { self.ownedMemberParameter () }
```

### 7.4.2.1.33 Predicate\_Init

#### Description

Initializes the properties of the SysML v2 element `Predicate`.

#### Generalizations

- `Function_Init` (from `KerMLInitializers`)

### Attributes

- to : Predicate [1]

#### 7.4.2.1.34 Redefinition\_Init

### Description

Initializes the properties of the SysML v2 element Redefinition.

### Generalizations

- Subsetting\_Init (from KerMLInitializers)

### Attributes

- to : Redefinition [1]

### Operations

- redefinedFeature () : Feature [1] {redefines subsettedFeature, abstract}
- redefiningFeature () : Feature [1] {redefines subsettingFeature, abstract}

#### 7.4.2.1.35 ReferenceSubsetting\_Init

### Description

Initializes the properties of the SysML v2 element ReferenceSubsetting.

### Generalizations

- Subsetting\_Init (from KerMLInitializers)

### Attributes

- to : ReferenceSubsetting [1]

### Operations

- referencedFeature () : Feature [1] {redefines subsettedFeature, abstract}

#### 7.4.2.1.36 Relationship\_Init

### Description

Initializes the properties of the SysML v2 element Relationship.

### Generalizations

- Element\_Init (from KerMLInitializers)

### Association Ends

- to : Relationship [1]  
(redefines: Element\_Init::to)

## Operations

- `ownedRelatedElement () : Element [0..*]`

`Set {}`

- `source () : Element [0..*]`

`Set {}`

- `target () : Element [0..*]`

`Set {}`

### 7.4.2.1.37 ReturnParameterMembership\_Init

#### Description

Initializes the properties of the SysML v2 element ReturnParameterMembership.

#### Generalizations

- ParameterMembership\_Init (from KerMLInitializers)

#### Attributes

- `to : ReturnParameterMembership [1]`

#### Operations

- `isComposite (in src : Element) : Boolean [1]`  
returns "true" if the element provided as the actual parameter value can have a mapping to an instance of the type specified by the "to" attribute (i.e. can be used as a value for the "from" attribute)

`false`

### 7.4.2.1.38 Specialization\_Init

#### Description

Initializes the properties of the SysML v2 element Specialization.

#### Generalizations

- Relationship\_Init (from KerMLInitializers)

#### Attributes

- `to : Specialization [1]`

## Operations

- `general () : Type [1] {redefines target, abstract}`
- `specific () : Type [1] {redefines source, abstract}`

### 7.4.2.1.39 Step\_Init

#### Description

Initializes the properties of the SysML v2 element Step.

#### Generalizations

- `Feature_Init` (from `KerMLInitializers`)

#### Attributes

- `to : Step [1]`

### 7.4.2.1.40 Subclassification\_Init

#### Description

Initializes the properties of the SysML v2 element Subclassification.

#### Generalizations

- `Specialization_Init` (from `KerMLInitializers`)

#### Attributes

- `to : Subclassification [1]`

## Operations

- `subclassifier () : Classifier [1] {abstract}`
- `superclassifier () : Classifier [1] {abstract}`

### 7.4.2.1.41 Subsetting\_Init

#### Description

Initializes the properties of the SysML v2 element Subsetting.

#### Generalizations

- `Specialization_Init` (from `KerMLInitializers`)

#### Attributes

- `to : Subsetting [1]`

## Operations

- `subsettingFeature () : Feature [1] {redefines general, abstract}`

- `subsettingFeature () : Feature [1] {redefines specific, abstract}`

#### **7.4.2.1.42 Succession\_Init**

##### **Description**

Initializes the properties of the SysML v2 element Succession.

##### **Generalizations**

- `Connector_Init` (from `KerMLInitializers`)

##### **Attributes**

- `to : Succession [1]`

#### **7.4.2.1.43 SuccessionItemFlow\_Init**

##### **Description**

Initializes the properties of the SysML v2 element SuccessionItemFlow.

##### **Generalizations**

- `ItemFlow_Init` (from `KerMLInitializers`)
- `Succession_Init` (from `KerMLInitializers`)

##### **Attributes**

- `to : SuccessionItemFlow [1]`

#### **7.4.2.1.44 TextualRepresentation\_Init**

##### **Description**

Initializes the properties of the SysML v2 element TextualRepresentation.

##### **Generalizations**

- `AnnotatingElement_Init` (from `KerMLInitializers`)

##### **Attributes**

- `to : TextualRepresentation [1]`

##### **Operations**

- `body () : String [1]{abstract}`
- `language () : String [1]{abstract}`

#### **7.4.2.1.45 Type\_Init**

##### **Description**

Initializes the properties of the SysML v2 element Type.

## Generalizations

- Namespace\_Init (from KerMLInitializers)

## Attributes

- to : Type [1]

## Operations

- isAbstract () : Boolean [1]

false

- isSufficient () : Boolean [1]

false

### 7.4.2.1.46 TypeFeaturing\_Init

## Description

Initializes the properties of the SysML v2 element TypeFeaturing.

## Generalizations

- Relationship\_Init (from KerMLInitializers)

## Attributes

- to : TypeFeaturing [1]

## Operations

- featureOfType () : Feature [1] {redefines source, abstract}
- featuringType () : Type [1] {redefines target, abstract}

### 7.4.2.2 System Initializers

#### 7.4.2.2.1 ActionUsage\_Init

## Description

Initializes the properties of the SysML v2 element ActionUsage.

## Generalizations

- Step\_Init (from KerMLInitializers)
- Usage\_Init (from SystemInitializers)

## Attributes

- to : ActionUsage [1]



## Operations

- isComposite () : Boolean [1] {redefines isComposite}

true

### 7.4.2.2.2 ActorMembership\_Init

#### Description

Initializes the properties of the SysML v2 element ActorMembership.

#### Generalizations

- ParameterMembership\_Init (from KerMLInitializers)

#### Attributes

- to : ActorMembership [1]

### 7.4.2.2.3 AssignmentActionUsage\_Init

#### Description

Initializes the properties of the SysML v2 element AssignmentActionUsage.

#### Generalizations

- ActionUsage\_Init (from SystemInitializers)

#### Attributes

- to : AssignmentActionUsage [1]

### 7.4.2.2.4 ConjugatedPortDefinition\_Init

#### Description

Initializes the properties of the SysML v2 element ConjugatedPortDefinition.

#### Generalizations

- PortDefinition\_Init (from SystemInitializers)

#### Attributes

- to : ConjugatedPortDefinition [1]

### 7.4.2.2.5 ConjugatedPortTyping\_Init

#### Description

Initializes the properties of the SysML v2 element ConjugatedPortTyping.

### Generalizations

- FeatureTyping\_Init (from KerMLInitializers)

### Attributes

- to : ConjugatedPortTyping [1]

### Operations

- conjugatedPortDefinition () : ConjugatedPortDefinition [1] {redefines type, abstract}
- portDefinition () : PortDefinition [1]{abstract}

#### 7.4.2.2.6 ConnectionUsage\_Init

### Description

Initializes the properties of the SysML v2 element ConnectionUsage.

### Generalizations

- PartUsage\_Init (from SystemInitializers)

### Attributes

- to : ConnectionUsage [1]

#### 7.4.2.2.7 ConstraintDefinition\_Init

### Description

Initializes the properties of the SysML v2 element ConstraintDefinition.

### Generalizations

- Definition\_Init (from SystemInitializers)

### Attributes

- to : ConstraintDefinition [1]

#### 7.4.2.2.8 ConstraintUsage\_Init

### Description

Initializes the properties of the SysML v2 element ConstraintUsage.

### Generalizations

- Usage\_Init (from SystemInitializers)

### Attributes

- to : ConstraintUsage [1]

#### 7.4.2.2.9 Definition\_Init

##### Description

Initializes the properties of the SysML v2 element Definition.

##### Generalizations

- Classifier\_Init (from KerMLInitializers)

##### Attributes

- to : Definition [1]

##### Operations

- isVariation () : Boolean [1]

`false`

#### 7.4.2.2.10 EventOccurrenceUsage\_Init

##### Description

Initializes the properties of the SysML v2 element EventOccurrenceUsage.

##### Generalizations

- OccurrenceUsage\_Init (from SystemInitializers)

##### Attributes

- to : EventOccurrenceUsage [1]

#### 7.4.2.2.11 FlowConnectionUsage\_Init

##### Description

Initializes the properties of the SysML v2 element FlowConnectionUsage.

##### Generalizations

- ConnectionUsage\_Init (from SystemInitializers)

##### Association Ends

- to : FlowConnectionUsage [1]  
(redefines: ConnectionUsage\_Init::to)

#### 7.4.2.2.12 ItemDefinition\_Init

##### Description

Initializes the properties of the SysML v2 element ItemDefinition.

## Generalizations

- Definition\_Init (from SystemInitializers)

## Attributes

- to : ItemDefinition [1]

### 7.4.2.2.13 ItemFeature\_Init

## Description

Initializes the properties of the SysML v2 element ItemFeature.

## Generalizations

- Feature\_Init (from KerMLInitializers)

## Association Ends

- to : ItemFeature [1]  
(redefines: Feature\_Init::to)

### 7.4.2.2.14 MetadataUsage\_Init

## Description

Initializes the properties of the SysML v2 element MetadataUsage.

## Generalizations

- Usage\_Init (from SystemInitializers)

## Attributes

- to : MetadataUsage [1]

### 7.4.2.2.15 ObjectiveMembership\_Init

## Description

Initializes the properties of the SysML v2 element ObjectiveMembership.

## Generalizations

- FeatureMembership\_Init (from KerMLInitializers)

## Attributes

- to : ObjectiveMembership [1]

### 7.4.2.2.16 OccurrenceDefinition\_Init

## Description

Initializes the properties of the SysML v2 element OccurrenceDefinition.

#### Generalizations

- Definition\_Init (from SystemInitializers)

#### Attributes

- to : OccurrenceDefinition [1]

#### Operations

- isIndividual () : Boolean [1]

false

#### 7.4.2.2.17 OccurrenceUsage\_Init

##### Description

Initializes the properties of the SysML v2 element OccurrenceUsage.

#### Generalizations

- Usage\_Init (from SystemInitializers)

#### Attributes

- to : OccurrenceUsage [1]

#### Operations

- isIndividual () : Boolean [1]

false

- portionKind () : PortionKind [1]{abstract}

#### 7.4.2.2.18 PartUsage\_Init

##### Description

Initializes the properties of the SysML v2 element PartUsage.

#### Generalizations

- Usage\_Init (from SystemInitializers)

#### Attributes

- to : PartUsage [1]

#### 7.4.2.2.19 PortConjugation\_Init

##### Description

Initializes the properties of the SysML v2 element PortConjugation.

##### Generalizations

- Conjugation\_Init (from KerMLInitializers)

##### Attributes

- to : PortConjugation [1]

##### Operations

- originalPortDefinition () : PortDefinition [1] {redefines originalType, abstract}

#### 7.4.2.2.20 PortDefinition\_Init

##### Description

Initializes the properties of the SysML v2 element PortDefinition.

##### Generalizations

- Definition\_Init (from SystemInitializers)

##### Attributes

- to : PortDefinition [1]

#### 7.4.2.2.21 ReferenceUsage\_Init

##### Description

Provides the basic features to map to a ReferenceUsage element.

##### Generalizations

- Usage\_Init (from SystemInitializers)

##### Attributes

- to : ReferenceUsage [1]

#### 7.4.2.2.22 RequirementUsage\_Init

##### Description

Initializes the properties of the SysML v2 element RequirementUsage.

##### Generalizations

- Usage\_Init (from SystemInitializers)

### Attributes

- to : RequirementUsage [1]

#### 7.4.2.2.23 StateUsage\_Init

### Description

Initializes the properties of the SysML v2 element StateUsage.

### Generalizations

- ActionUsage\_Init (from SystemInitializers)

### Attributes

- to : StateUsage [1]

#### 7.4.2.2.24 SubjectMembership\_Init

### Description

Initializes the properties of the SysML v2 element SubjectMembership.

### Generalizations

- ParameterMembership\_Init (from KerMLInitializers)

### Attributes

- to : SubjectMembership [1]

#### 7.4.2.2.25 Usage\_Init

### Description

Initializes the properties of the SysML v2 element Usage.

### Generalizations

- Feature\_Init (from KerMLInitializers)

### Attributes

- to : Usage [1]

### Operations

- isVariation () : Boolean [1]

false

## 7.5 Factories

## 7.5.1 Overview

The classes presented in this subclause specify facilities for creating elements in the target model form an arbitrary set of zero to many input parameters. After the target element is created, no link between it and an the value of inputs parameter (if any) will be preserved.

## 7.5.2 Mapping Specifications

### 7.5.2.1 LiteralString\_Factory

#### Description

Factory class to create a LiteralString element.

#### Generalizations

- Expression\_Init (from KerMLInitializers)
- Factory (from Foundations)

#### Association Ends

- string : String [1]
- to : LiteralString [1]  
(redefines: Expression\_Init::to)

#### Operations

- create (in string : String) : LiteralString [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{ReturnParameterFeatureMembership_Factory.create() }
```

### 7.5.2.2 StringParameterFeature\_Factory

#### Description

Factory class to create a feature element representing a string.

#### Generalizations

- Factory (from Foundations)
- Feature\_Init (from KerMLInitializers)

#### Association Ends

- string : String [1]

#### Operations

- create (in string : String) : Feature [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{StringParameterFeatureValue_Factory.create(string) }
```



### 7.5.2.3 StringParameterFeatureValue\_Factory

#### Description

Factory class to create a string feature value relationship for a feature element.

#### Generalizations

- Factory (from Foundations)
- FeatureValue\_Init (from KerMLInitializers)

#### Association Ends

- string : String [1]

#### Operations

- create (in string : String) : FeatureValue [1]
- value () : Expression [1] {redefines value}

```
LiteralString_Factory.create(string)
```

### 7.5.2.4 StringParameterMembership\_Factory

#### Description

Factory class to create a parameter membership relationship for a feature element representing a string.

#### Generalizations

- Factory (from Foundations)
- ParameterMembership\_Init (from KerMLInitializers)

#### Association Ends

- string : String [1]

#### Operations

- create (in string : String) : ParameterMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
StringParameterFeature_Factory.create(string)
```

### 7.5.2.5 SubjectMembership\_Factory

#### Description

Factory class to create a subject membership relationship for a given subject.

#### Generalizations

- Factory (from Foundations)

- SubjectMembership\_Init (from SystemInitializers)

#### Association Ends

- subject : Type [1]

#### Operations

- create (in subject : Type) : SubjectMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

subject

### 7.5.2.6 AssignmentActionUsage\_Factory

#### Description

Factory to create an assignment action usage.

#### Generalizations

- AssignmentActionUsage\_Init (from SystemInitializers)
- Factory (from Foundations)

#### Operations

- create () : AssignmentActionUsage [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{AssignmentActionUsageParameterMembership_Factory.create(),
DirectedReferenceUsageParameterMembership_Factory.create(KerML::FeatureDirectionKind::_'in')}
```

### 7.5.2.7 AssignmentActionUsageFeatureMembership2\_Factory

#### Description

Factory class to create a feature membership relationship for a feature element created by the factory class AssignmentActionUsageTargetReferenceUsageIn2\_Factory.

#### Generalizations

- Factory (from Foundations)
- FeatureMembership\_Init (from KerMLInitializers)

#### Operations

- create () : FeatureMembership [1]
- ownedMemberFeature () : Feature [1] {redefines ownedMemberFeature}

```
AssignmentActionUsageTargetReferenceUsageIn2_Factory.create()
```

### 7.5.2.8 AssignmentActionUsageFeatureMembership3\_Factory

#### Description

Factory class to create a feature membership relationship for a feature element created by the factory class AssignmentActionUsageTargetReferenceUsageIn3\_Factory.

#### Generalizations

- Factory (from Foundations)
- FeatureMembership\_Init (from KerMLInitializers)

#### Operations

- create () : FeatureMembership [1]
- ownedMemberFeature () : Feature [1] {redefines ownedMemberFeature}

```
AssignmentActionUsageTargetReferenceUsageIn3_Factory.create()
```

### 7.5.2.9 AssignmentActionUsageOwningMembership\_Factory

#### Description

Factory class to create a owning membership relationship for an element created by the factory class AssignmentActionUsage\_Factory.

#### Generalizations

- Factory (from Foundations)
- OwningMembership\_Init (from KerMLInitializers)

#### Operations

- create () : OwningMembership [1]
- ownedMemberElement () : Element [1] {redefines ownedMemberElement}

```
AssignmentActionUsage_Factory.create()
```

### 7.5.2.10 AssignmentActionUsageParameterMembership\_Factory

#### Description

Factory class to create a parameter membership relationship for a feature element created by the factory class AssignmentActionUsageReferenceUsageIn1\_Factory.

#### Generalizations

- Factory (from Foundations)
- ParameterMembership\_Init (from KerMLInitializers)

#### Operations

- create () : ParameterMembership [1]

- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
AssignmentActionUsageReferenceUsageIn1_Factory.create()
```

#### 7.5.2.11 AssignmentActionUsageReferenceUsageIn1\_Factory

##### Description

Factory class creating a reference usage element with direction "in" as parameter of an assignment action usage.

##### Generalizations

- Factory (from Foundations)
- ReferenceUsage\_Init (from SystemInitializers)

##### Operations

- create () : ReferenceUsage [1]
- direction () : FeatureDirectionKind [0..1] {redefines direction}

```
KerML::FeatureDirectionKind::_in'
```

- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{AssignmentActionUsageFeatureMembership2_Factory.create() }
```

#### 7.5.2.12 AssignmentActionUsageTargetReferenceUsageIn2\_Factory

##### Description

Factory class creating a reference usage element as an owned feature of the reference usage of an assignment action usage.

##### Generalizations

- Factory (from Foundations)
- ReferenceUsage\_Init (from SystemInitializers)

##### Operations

- create () : ReferenceUsage [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{AssignmentActionUsageFeatureMembership3_Factory.create() }
```

#### 7.5.2.13 AssignmentActionUsageTargetReferenceUsageIn3\_Factory

##### Description

Factory class creating a reference usage element as an owned feature of the reference usage of an assignment action usage.

## Generalizations

- Factory (from Foundations)
- ReferenceUsage\_Init (from SystemInitializers)

## Operations

- create () : ReferenceUsage [1]

### 7.5.2.14 DirectedReferenceUsage\_Factory

#### Description

Factory class creating a reference usage element with a given direction and without owned relationships.

#### Generalizations

- Factory (from Foundations)
- ReferenceUsage\_Init (from SystemInitializers)

#### Association Ends

- featureDirectionKind : FeatureDirectionKind [1]

#### Operations

- create (in featureDirectionKind : FeatureDirectionKind) : ReferenceUsage [1]
- direction () : FeatureDirectionKind [0..1] {redefines direction}

```
featureDirectionKind
```

### 7.5.2.15 DirectedReferenceUsageParameterMembership\_Factory

#### Description

Factory class to create a parameter membership relationship for a feature element created by the factory class DirectedReferenceUsage\_Factory.

#### Generalizations

- Factory (from Foundations)
- ParameterMembership\_Init (from KerMLInitializers)

#### Association Ends

- featureDirectionKind : FeatureDirectionKind [1]

#### Operations

- create (in featureDirectionKind : FeatureDirectionKind) : ParameterMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
DirectedReferenceUsage_Factory.create(featureDirectionKind)
```

### 7.5.2.16 EmptyObjectiveMembership\_Factory

#### Description

Factory class to create an objective membership without a source in the SysML v1 model.

#### Generalizations

- Factory (from Foundations)
- ObjectiveMembership\_Init (from SystemInitializers)

#### Operations

- create () : ObjectiveMembership [1]
- ownedMemberFeature () : Feature [1] {redefines ownedMemberFeature}

```
EmptyRequirementUsage_Factory.create()
```

### 7.5.2.17 EmptyRequirementUsage\_Factory

#### Description

Factory class to create a requirement usage without a source in the SysML v1 model.

#### Generalizations

- Factory (from Foundations)
- RequirementUsage\_Init (from SystemInitializers)

#### Operations

- create () : RequirementUsage [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set{  
  EmptySubjectMembership_Factory.create(),  
  ReturnParameterFeatureMembership_Factory.create() }
```

### 7.5.2.18 EmptySubject\_Factory

#### Description

Factory class to create a reference usage representing a subject without a source in the SysML v1 model.

#### Generalizations

- Factory (from Foundations)
- ReferenceUsage\_Init (from SystemInitializers)

#### Operations

- create () : ReferenceUsage [1]
- direction () : FeatureDirectionKind [0..1] {redefines direction}

```
KerML::FeatureDirectionKind::_in'
```

### 7.5.2.19 EmptySubjectMembership\_Factory

#### Description

Factory class to create a membership relationship for a reference usage representing a subject without a source in the SysML v1 model.

#### Generalizations

- Factory (from Foundations)
- SubjectMembership\_Init (from SystemInitializers)

#### Operations

- create () : SubjectMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
EmptySubject_Factory.create()
```

### 7.5.2.20 FeatureTyping\_Factory

#### Description

Factory class to create a FeatureTyping relationship. The create parameter is set as the type.

#### Generalizations

- Factory (from Foundations)
- FeatureTyping\_Init (from KerMLInitializers)

#### Association Ends

- type : NamedElement [1]

#### Operations

- create (in type : NamedElement) : FeatureTyping [1]
- type () : Type [1] {redefines type}

```
type
```

### 7.5.2.21 FlowConnectionUsage\_Factory

#### Description

Factory class to create a FlowConnectionUsage as a target element for a UML4SysML::InformationFlow that is realized by a UML4SysML::Connector. The factory class only supports UML4SysML::InformationFlows which have exactly one source and one target element, which is implicitly assured since connectors in SysML may only ever have two ends.

#### Generalizations

- Factory (from Foundations)
- FlowConnectionUsage\_Init (from SystemInitializers)

#### Association Ends

- informationFlow : InformationFlow [1]

#### Operations

- create (in informationFlow : InformationFlow) : FlowConnectionUsage [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```

let relationships : Set(KerML::Relationship) =
    informationFlow.realizingConnector->collect(c|Subsetting_Factory.create(c))
->including (FeatureTyping_Factory.create(informationFlow))
->including (FlowEndParameterMembership_Factory.create(
    informationFlow,informationFlow.source.get(0)))
->including (FlowEndParameterMembership_Factory.create(
    informationFlow,informationFlow.target.get(0))) in
let itemProperty : UML::Property =
    if Helper.hasStereotypeApplied(informationFlow, 'SysML::Ports&Flows::ItemFlow') then
        Helper.getTagValueAsElement(informationFlow, 'SysML::Ports&Flows::ItemFlow', 'itemPro
    else
        invalid
    endif in

if itemProperty.oclIsUndefined() then
    relationships->union(informationFlow.conveyed->flatten()
        ->collect(i | FlowItemFeatureMembership_Factory.create(i)))
else
    relationships->including(
        FlowItemFeatureMembership_Factory.create(itemProperty))
endif

```

### 7.5.2.22 FlowConnectionUsageFeatureMembership\_Factory

#### Description

Factory class to create a FeatureMembership relationship for a FlowConnectionUsage as a target element for a UML4SysML::InformationFlow that is realized by a UML4SysML::Connector.

#### Generalizations

- Factory (from Foundations)
- FeatureMembership\_Init (from KerMLInitializers)

#### Association Ends

- informationFlow : InformationFlow [1]

#### Operations

- create (in informationFlow : InformationFlow) : FeatureMembership [1]



- ownedMemberFeature () : Feature [1] {redefines ownedMemberFeature}

```
FlowConnectionUsage_Factory.create(informationFlow)
```

### 7.5.2.23 FlowEndParameterMembership\_Factory

#### Description

Factory class to create a ParameterMembership relationship for an end of a FlowConnectionUsage as a target element for a UML4SysML::InformationFlow that is realized by a UML4SysML::Connector.

#### Generalizations

- Factory (from Foundations)
- ParameterMembership\_Init (from KerMLInitializers)

#### Association Ends

- end : NamedElement [1]
- informationFlow : InformationFlow [1]

#### Operations

- create (in informationFlow : InformationFlow, in end : NamedElement) : ParameterMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
InformationFlowEventOccurrenceUsage_Factory.create(informationFlow, end)
```

### 7.5.2.24 FlowItem\_Factory

#### Description

Factory class to create a ItemFeature element as a target element for the flowing entity specified by an UML4SysML::InformationFlow.

#### Generalizations

- Factory (from Foundations)
- ItemFeature\_Init (from SystemInitializers)

#### Association Ends

- item : NamedElement [1]

#### Operations

- create (in item : NamedElement) : ItemFeature [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
if item.ocIsKindOf(UML::Classifier) then
    Set{FeatureTyping_Factory.create(item)}
else if item.ocIsKindOf(UML::Property) then
```

```

        Set{ReferenceSubsetting_Factory.create(item)}
    else
        Set{}
    endif
endif

```

#### 7.5.2.25 FlowItemFeatureMembership\_Factory

##### Description

Factory class to create a FeatureMembership relationship for an ItemFeature as a target element for the flowing entity specified by an UML4SysML::InformationFlow.

##### Generalizations

- Factory (from Foundations)
- FeatureMembership\_Init (from KerMLInitializers)

##### Association Ends

- item : NamedElement [1]

##### Operations

- create (in item : NamedElement) : FeatureMembership [1]
- ownedMemberFeature () : Feature [1] {redefines ownedMemberFeature}

```

FlowItem_Factory.create(item)

```

#### 7.5.2.26 InformationFlowEventOccurrenceUsage\_Factory

##### Description

##### Generalizations

- EventOccurrenceUsage\_Init (from SystemInitializers)
- Factory (from Foundations)

##### Association Ends

- end : NamedElement [1]
- informationFlow : InformationFlow [1]

##### Operations

- create (in informationFlow : InformationFlow, in end : NamedElement) : EventOccurrenceUsage [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```

Set{InformationFlowReferenceSubsetting_Factory.create(informationFlow, end)}

```

#### 7.5.2.27 InformationFlowReferenceSubsetting\_Factory

##### Description

Factory class to create a ReferenceSubsetting relationship for an end of a FlowConnectionUsage subsetting the target element of an end element of an UML4SysML::InformationFlow.

#### Generalizations

- Factory (from Foundations)
- ReferenceSubsetting\_Init (from KerMLInitializers)

#### Association Ends

- end : NamedElement [1]
- informationFlow : InformationFlow [1]

#### Operations

- create (in informationFlow : InformationFlow, in end : NamedElement) : ReferenceSubsetting [1]
- referencedFeature () : Feature [1] {redefines referencedFeature}

```
InformationFlowEnd_Mapping.getMapped(informationFlow, end)
```

### 7.5.2.28 LiteralBoolean\_Factory

#### Description

Factory class to create a LiteralBoolean element.

#### Generalizations

- Expression\_Init (from KerMLInitializers)
- Factory (from Foundations)

#### Association Ends

- boolean : Boolean [1]
- to : LiteralBoolean [1]  
(redefines: Expression\_Init::to)

#### Operations

- create (in boolean : Boolean) : LiteralBoolean [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set {ReturnParameterFeatureMembership_Factory.create () }
```

### 7.5.2.29 LiteralNull\_Factory

#### Description

Factory class to create a LiteralNull element.

#### Generalizations

- Expression\_Init (from KerMLInitializers)

- Factory (from Foundations)

#### Association Ends

- to : NullExpression [1]  
(redefines: Expression\_Init::to)

#### Operations

- create () : NullExpression [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set {ReturnParameterFeatureMembership_Factory.create () }
```

### 7.5.2.30 LiteralRational\_Factory

#### Description

Factory class to create a LiteralRational element.

#### Generalizations

- Expression\_Init (from KerMLInitializers)
- Factory (from Foundations)

#### Association Ends

- real : Real [1]
- to : LiteralRational [1]  
(redefines: Expression\_Init::to)

#### Operations

- create (in real : Real) : LiteralReal [1]
- ownedRelationship () : Relationship [0..\*] {redefines ownedRelationship}

```
Set {ReturnParameterFeatureMembership_Factory.create () }
```

### 7.5.2.31 ObjectFlowItemFlowEndRedefinition\_Factory

#### Description

#### Generalizations

- Factory (from Foundations)
- Redefinition\_Init (from KerMLInitializers)

#### Association Ends

- feature : Feature [1]

## Operations

- create (in feature : Feature) : Redefinition [1]
- redefinedFeature () : Feature [1] {redefines redefinedFeature}

feature

### 7.5.2.32 ReferenceSubsetting\_Factory

#### Description

Factory class to create a ReferenceSubsetting relationship. The create parameter is set as the referenced feature.

#### Generalizations

- Factory (from Foundations)
- ReferenceSubsetting\_Init (from KerMLInitializers)

#### Association Ends

- property : Property [1]

## Operations

- create (in property : Property) : ReferenceSubsetting [1]
- referencedFeature () : Feature [1] {redefines referencedFeature}

property

### 7.5.2.33 ReturnParameterFeature\_Factory

#### Description

Factory class to create a feature element with direction 'out' representing a return parameter.

#### Generalizations

- Factory (from Foundations)
- Feature\_Init (from KerMLInitializers)

## Operations

- create () : Feature [1]
- direction () : FeatureDirectionKind [0..1] {redefines direction}

KerML::FeatureDirectionKind::\_out'

### 7.5.2.34 ReturnParameterFeatureMembership\_Factory

#### Description

Factory class to create a feature membership relationship for a feature element with direction 'out' representing a return parameter.

## Generalizations

- Factory (from Foundations)
- ReturnParameterMembership\_Init (from KerMLInitializers)

## Operations

- create () : ReturnParameterMembership [1]
- ownedMemberParameter () : Feature [1] {redefines ownedMemberParameter}

```
ReturnParameterFeature_Factory.create()
```

### 7.5.2.35 Subsetting\_Factory

#### Description

Factory class to create a Subsetting relationship. The create parameter is set as the subsetting feature.

#### Generalizations

- Factory (from Foundations)
- Subsetting\_Init (from KerMLInitializers)

#### Association Ends

- subsetting : NamedElement [1]

#### Operations

- create (in subsetting : NamedElement) : Subsetting [1]
- subsettingFeature () : Feature [1] {redefines subsettingFeature}

```
subsetting
```

## 7.6 Generic Mappings

### 7.6.1 Overview

Generic mappings are partial definitions of transformation rules that are intended to factorize reusable algorithms for making the global specification more compact and easier to read and maintain. Basically, they provide a default value for all the non-derived attributes of their target metaclass wherever possible, or declare an abstract operation for them otherwise. They are similar to initializers, except that they have a source element defined. The operations provided by the generic mappings can be redefined by their specialization, as appropriate according to the source type specified by the redefinition of their `from` attribute.

All of these generic mappings are abstract.

### 7.6.2 Common Mappings

#### 7.6.2.1 CommonFeatureReferenceExpression\_Mapping

##### Description

Common mapping class for a feature reference expression.

### General Mappings

GenericToFeatureReferenceExpression\_Mapping

### Mapping Source

TypedElement

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`  
`Set { CommonMembership_Mapping.getMapped (from) ,`  
`CommonReturnParameterFeatureMembership_Mapping.getMapped (from) }`

## 7.6.2.2 CommonMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToMembership\_Mapping

### Mapping Source

TypedElement

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
from

#### 7.6.2.3 CommonParameterReferenceUsageInMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
if not from.ocIsKindOf(UML::TypedElement) then  
CommonParameterReferenceUsageIn\_Mapping.getMapped(from)  
else if from.ocIsType(UML::TypedElement).type.ocIsUndefined() then  
CommonParameterReferenceUsageIn\_Mapping.getMapped(from)  
else  
CommonParameterReferenceUsageInUntyped\_Mapping.getMapped(from)  
endif  
endif

#### 7.6.2.4 CommonParameterReferenceUsageIn\_Mapping

##### Description



Common mapping class that creates a parameter reference usage element with direction 'in' and with a type.

### General Mappings

CommonParameterReferenceUsageInUntyped\_Mapping

### Mapping Source

Element

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
if from.ocIsKindOf(UML::TypedElement) then
Set{CommonParameterReferenceUsageInFeatureTyping_Mapping.getMapped(from)}
else Set{} endif
```

## 7.6.2.5 CommonParameterReferenceUsageInFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
if from.ocIsKindOf (UML::TypedElement)
then
if from.ocAsType (UML::TypedElement) .type.ocIsKindOf (UML::PrimitiveType) then
    Helper.getScalarValueType (from.ocAsType (UML::TypedElement) .type)
else
    from.ocAsType (UML::TypedElement) .type
endif
else invalid endif
```

#### 7.6.2.6 CommonParameterReferenceUsageInUntyped\_Mapping

##### Description

Common mapping class that creates a parameter reference usage element with direction 'in' and without a type.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

Element

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_in'
```

#### 7.6.2.7 CommonReturnParameterFeature\_Mapping

##### Description

Common mapping class that creates a parameter feature element with a type.

### General Mappings

CommonReturnParameterFeatureUntyped\_Mapping

### Mapping Source

Element

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  

```
if from.ocIsKindOf(UML::Property) then
    Set{CommonReturnParameterFeatureTyping_Mapping.getMapped(from) }
else
    Set{}
endif
```

## 7.6.2.8 CommonReturnParameterFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
if from.ocIsKindOf(UML::Property)
then
if from.ocAsType(UML::TypedElement).type.ocIsKindOf(UML::PrimitiveType) then
    Helper.getScalarValueType(from.ocAsType(UML::TypedElement).type)
else
    from.ocAsType(UML::TypedElement).type
endif
else invalid endif
```

### 7.6.2.9 CommonReturnParameterFeatureUntyped\_Mapping

#### Description

Common mapping class that creates a parameter feature element without a type.

#### General Mappings

GenericToFeature\_Mapping

#### Mapping Source

Element

#### Mapping Target

Feature

#### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_out'
```

### 7.6.2.10 CommonReturnParameterFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToReturnParameterMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

ReturnParameterMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReturnParameterMembership::ownedMemberParameter () : Feature [1]

```
if not from.ocIsKindOf(UML::TypedElement) then
    CommonReturnParameterFeatureUntyped_Mapping.getMapped(from)
else if from.ocIsType(UML::TypedElement).type.ocIsUndefined() then
    CommonReturnParameterFeatureUntyped_Mapping.getMapped(from)
else
    CommonReturnParameterFeatureUntyped_Mapping.getMapped(from)
endif
endif
```

### 7.6.2.11 CommonReturnParameterReferenceUsageMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToReturnParameterMembership\_Mapping

#### Mapping Source

Element

## Mapping Target

ReturnParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReturnParameterMembership::ownedMemberParameter () : Feature [0..1]

```
if not from.ocIsKindOf(UML::TypedElement) then
    CommonReturnParameterReferenceUsageUntyped_Mapping.getMapped(from)
else if from.ocIsType(UML::TypedElement).type.ocIsUndefined() then
    CommonReturnParameterReferenceUsageUntyped_Mapping.getMapped(from)
else
    CommonReturnParameterReferenceUsageUntyped_Mapping.getMapped(from)
endif
endif
```

### 7.6.2.12 CommonReturnParameterReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

CommonReturnParameterReferenceUsageUntyped\_Mapping

#### Mapping Source

Element

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
if from.ocIsKindOf(UML::TypedElement) then
Set{CommonReturnParameterReferenceUsageFeatureTyping_Mapping.getMapped(from)}
else Set{} endif
```

### 7.6.2.13 CommonReturnParameterReferenceUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
if from.ocIsKindOf(UML::TypedElement)
then
if from.ocAsType(UML::TypedElement).type.ocIsKindOf(UML::PrimitiveType) then
Helper.getScalarValueType(from.ocAsType(UML::TypedElement).type)
else
from.ocAsType(UML::TypedElement).type
endif
else invalid endif
```

### 7.6.2.14 CommonReturnParameterReferenceUsageUntyped\_Mapping

#### Description

Creates a reference usage.

## General Mappings

GenericToReferenceUsage\_Mapping

## Mapping Source

Element

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

`KerML::FeatureDirectionKind::_out'`

### 7.6.2.15 CommonReferenceUsageIn\_Mapping

#### Description

Common mapping class that creates a reference usage element with direction 'in'.

## General Mappings

CommonReferenceUsageInUntyped\_Mapping

## Mapping Source

TypedElement

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

Common mapping class that creates a reference usage element with direction 'in'.

```
Set { CommonReferenceUsageInFeatureTyping_Mapping.getMapped (from) }
```

#### 7.6.2.16 CommonReferenceUsageInFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

TypedElement

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
if from.type.ocliIsUndefined() then
    CommonReferenceUsageInUntyped_Mapping.getMapped (from)
else
    CommonReferenceUsageIn_Mapping.getMapped (from)
endif
```

#### 7.6.2.17 CommonReferenceUsageInFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

**Mapping Source**

TypedElement

**Mapping Target**

FeatureTyping

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
if from.type.ocliIsKindOf(UML::PrimitiveType) then
    Helper.getScalarValueType(from.type)
else
    from.type
endif
```

**7.6.2.18 CommonReferenceUsageInUntyped\_Mapping**

**Description**

Common mapping class that creates an untyped reference usage element with direction 'in'.

**General Mappings**

GenericToReferenceUsage\_Mapping

**Mapping Source**

TypedElement

**Mapping Target**

ReferenceUsage

**Owned Mappings**

(none)

**Applicable filters**

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`  
`KerML::FeatureDirectionKind::_'in'`
- `ReferenceUsage::declaredName () : String [0..1]`  
`from.name`

## 7.6.3 Generic Mappings To KerML

### 7.6.3.1 GenericToAnnotatingElement\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *AnnotatingElement*.

#### General Mappings

GenericToElement\_Mapping

#### Mapping Source

Element

#### Mapping Target

AnnotatingElement

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `AnnotatingElement::annotation () : Annotation [0..*]`  
`Set { }`

### 7.6.3.2 GenericToAnnotation\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Annotation*.

## General Mappings

GenericToRelationship\_Mapping

## Mapping Source

Element

## Mapping Target

Annotation

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Annotation::annotatedElement () : Element [1]  
*abstract rule*
- Annotation::owningAnnotatedElement () : Element [0..1]  
  
null
- Annotation::annotatingElement () : AnnotatingElement [1]  
*abstract rule*

### 7.6.3.3 GenericToAssociation\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Association*.

#### General Mappings

GenericToRelationship\_Mapping

GenericToClassifier\_Mapping

#### Mapping Source

Element

#### Mapping Target

Association

#### Owned Mappings

(none)

#### **7.6.3.4 GenericToBehavior\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *Behavior*.

##### **General Mappings**

GenericToClassifier\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

Behavior

##### **Owned Mappings**

(none)

#### **7.6.3.5 GenericToClassifier\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *Classifier*.

##### **General Mappings**

GenericToType\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

Classifier

##### **Owned Mappings**

(none)

#### **7.6.3.6 GenericToComment\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *Comment*.

##### **General Mappings**

GenericToAnnotatingElement\_Mapping

##### **Mapping Source**

Element

### Mapping Target

Comment

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Comment::locale () : String [1]  
`null`
- Comment::body () : String [1]  
*abstract rule*

## 7.6.3.7 GenericToConjugation\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *Conjugation*.

### General Mappings

GenericToRelationship\_Mapping

### Mapping Source

Element

### Mapping Target

Conjugation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Conjugation::conjugatedType () : Type [1]`  
*abstract rule*
- `Conjugation::originalType () : Type [1]`  
*abstract rule*

#### 7.6.3.8 GenericToConnector\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *Connector*.

##### General Mappings

GenericToFeature\_Mapping  
GenericToRelationship\_Mapping

##### Mapping Source

Element

##### Mapping Target

Connector

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Connector::isDirected () : Boolean [1]`  
*false*

#### 7.6.3.9 GenericToDocumentation\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *Documentation*.

##### General Mappings

GenericToComment\_Mapping

##### Mapping Source

Element

### Mapping Target

Documentation

### Owned Mappings

(none)

## 7.6.3.10 GenericToElement\_Mapping

### Description

This is the general abstract class to be used as an ancestor for any class mapping specification.

### General Mappings

Mapping

### Mapping Source

Element

### Mapping Target

Element

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Element::ownedRelationship () : Relationship [0..\*]

Set { }

- Element::aliasId () : String [0..\*]

Set { }

- Element::shortName () : String [0..1]

null

- Element::declaredName () : String [0..1]

null



- `Element::elementId () : String [1]`

`Helper.createUUID()`

### 7.6.3.11 GenericToEndFeatureMembership\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *EndFeatureMembership*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

EndFeatureMembership

#### Owned Mappings

(none)

### 7.6.3.12 GenericToExpression\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Expression*.

#### General Mappings

GenericToStep\_Mapping

#### Mapping Source

Element

#### Mapping Target

Expression

#### Owned Mappings

(none)

### 7.6.3.13 GenericToFeature\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Feature*.

#### General Mappings

GenericToType\_Mapping

### Mapping Source

Element

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isComposite () : Boolean [1]  
false
- Feature::isOrdered () : Boolean [1]  
false
- Feature::isEnd () : Boolean [1]  
false
- Feature::isReadOnly () : Boolean [1]  
false
- Feature::direction () : FeatureDirectionKind [0..1]  
null
- Feature::isDerived () : Boolean [1]  
false
- Feature::isPortion () : Boolean [1]  
false
- Feature::isUnique () : Boolean [1]  
true

#### 7.6.3.14 GenericToFeatureChainExpression\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *FeatureChainExpression*.

#### **General Mappings**

GenericToOperatorExpression\_Mapping

#### **Mapping Source**

Element

#### **Mapping Target**

FeatureChainExpression

#### **Owned Mappings**

(none)

### **7.6.3.15 GenericToFeatureChaining\_Mapping**

#### **Description**

Generic mapping class for mappings to the SysML v2 element *FeatureChaining*.

#### **General Mappings**

GenericToRelationship\_Mapping

#### **Mapping Source**

Element

#### **Mapping Target**

FeatureChaining

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

#### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]  
*abstract rule*

### **7.6.3.16 GenericToFeatureMembership\_Mapping**

#### **Description**

Generic mapping class for mappings to the SysML v2 element *FeatureMembership*.

### General Mappings

GenericToOwningMembership\_Mapping

GenericToTypeFeaturing\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
*abstract rule*
- FeatureMembership::ownedRelatedElement () : Element [0..\*]

```
Set { self.ownedMemberFeature () }
```

### 7.6.3.17 GenericToFeatureReferenceExpression\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *FeatureReferenceExpression*.

### General Mappings

GenericToExpression\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### 7.6.3.18 GenericToFeatureTyping\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *FeatureTyping*.

#### General Mappings

GenericToSpecialization\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::typedFeature () : Feature [1]  
*abstract rule*
- FeatureTyping::type () : Type [1]  
*abstract rule*

### 7.6.3.19 GenericToFeatureValue\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *FeatureValue*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::featureWithValue () : Feature [1]  
*abstract rule*
- FeatureValue::value () : Expression [1]  
*abstract rule*
- FeatureValue::isDefault () : Boolean [1]  
  
false
- FeatureValue::ownedRelatedElement () : Element [0..\*]  
  
Set { self.value () }
- FeatureValue::isInitial () : Boolean [1]  
  
false

### 7.6.3.20 GenericToFunction\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Function*.

#### General Mappings

GenericToBehavior\_Mapping

#### Mapping Source

Element

#### Mapping Target

Function

#### Owned Mappings

(none)

### 7.6.3.21 GenericToImport\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Import*.

#### General Mappings

GenericToRelationship\_Mapping

### Mapping Source

Element

### Mapping Target

Import

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Import::isImportAll () : Boolean [1]  
`false`
- Import::isRecursive () : Boolean [1]  
`false`
- Import::importedMemberName () : String [0..1]  
`null`
- Import::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::public`

## 7.6.3.22 GenericToInvocationExpression\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *InvocationExpression*.

### General Mappings

GenericToExpression\_Mapping

### Mapping Source

Element

### Mapping Target

InvocationExpression

## Owned Mappings

(none)

### 7.6.3.23 GenericToInteraction\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Interaction*.

#### General Mappings

GenericToBehavior\_Mapping  
GenericToAssociation\_Mapping

#### Mapping Source

Element

#### Mapping Target

Interaction

## Owned Mappings

(none)

### 7.6.3.24 GenericToItemFlow\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *ItemFlow*.

#### General Mappings

GenericToConnector\_Mapping

#### Mapping Source

Element

#### Mapping Target

ItemFlow

## Owned Mappings

(none)

### 7.6.3.25 GenericToMembership\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Membership*.

#### General Mappings



GenericToRelationship\_Mapping

### Mapping Source

Element

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberShortName () : String [0..1]  
`null`
- Membership::membershipOwningNamespace () : Element [0..\*]  
*abstract rule*
- Membership::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::public`
- Membership::memberElement () : Element [1]  
*abstract rule*
- Membership::memberName () : String [0..1]  
`null`

### 7.6.3.26 GenericToMembershipImport\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *MembershipImport*.

#### General Mappings

GenericToImport\_Mapping

### Mapping Source

Element

### Mapping Target

MembershipImport

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MembershipImport::importedMembership () : Namespace [1]  
*abstract rule*

### 7.6.3.27 GenericToNamespace\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Namespace*.

#### General Mappings

GenericToElement\_Mapping

#### Mapping Source

Element

#### Mapping Target

Namespace

#### Owned Mappings

(none)

### 7.6.3.28 GenericToNamespaceImport\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *NamespaceImport*.

#### General Mappings

GenericToImport\_Mapping

#### Mapping Source

Element

#### Mapping Target

NamespaceImport

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- NamespaceImport::importedNamespace () : Namespace [1]  
*abstract rule*

### 7.6.3.29 GenericToOperatorExpression\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *OperatorExpression*.

#### General Mappings

GenericToExpression\_Mapping

#### Mapping Source

Element

#### Mapping Target

OperatorExpression

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OperatorExpression::operator () : String [1]  
*abstract rule*

### 7.6.3.30 GenericToOwningMembership\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *OwningMembership*.

## General Mappings

GenericToMembership\_Mapping

## Mapping Source

Element

## Mapping Target

OwningMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  
*abstract rule*
- OwningMembership::ownedRelatedElement () : Element [0..\*]

```
Set { self.ownedMemberElement () }
```

### 7.6.3.31 GenericToPackage\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Package*.

## General Mappings

GenericToNamespace\_Mapping

## Mapping Source

Element

## Mapping Target

Package

## Owned Mappings

(none)

### 7.6.3.32 GenericToParameterMembership\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *ParameterMembership*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Element

### Mapping Target

ParameterMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedRelatedElement () : Element [0..\*]  
`Set { self.ownedMemberParameter () }`
- ParameterMembership::ownedMemberParameter () : Feature [1]  
`null`

## 7.6.3.33 GenericToPredicate\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *Predicate*.

### General Mappings

GenericToFunction\_Mapping

### Mapping Source

Element

### Mapping Target

Predicate

### Owned Mappings

(none)

#### 7.6.3.34 GenericToRedefinition\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *Redefinition*.

##### General Mappings

GenericToSubsetting\_Mapping

##### Mapping Source

Element

##### Mapping Target

Redefinition

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefiningFeature () : Feature [1]`  
*abstract rule*
- `Redefinition::redefinedFeature () : Feature [1]`  
*abstract rule*

#### 7.6.3.35 GenericToReferenceSubsetting\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *ReferenceSubsetting*.

##### General Mappings

GenericToSubsetting\_Mapping

##### Mapping Source

Element

##### Mapping Target

ReferenceSubsetting

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`  
*abstract rule*

### 7.6.3.36 GenericToRelationship\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Relationship*.

#### General Mappings

GenericToElement\_Mapping

#### Mapping Source

Element

#### Mapping Target

Relationship

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Relationship::target () : Element [0..*]`  
`Set { }`
- `Relationship::ownedRelatedElement () : Element [0..*]`  
`Set { }`
- `Relationship::source () : Element [0..*]`  
`Set { }`

### 7.6.3.37 GenericToReturnParameterMembership\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *ReturnParameterMembership*.

#### General Mappings

GenericToParameterMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

ReturnParameterMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReturnParameterMembership::isComposite (in src : Element) : Boolean [1]

returns "true" if the element provided as the actual parameter value can have a mapping to an instance of the type specified by the "to" attribute (i.e. can be used as a value for the "from" attribute)

false

### 7.6.3.38 GenericToSpecialization\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Specialization*.

#### General Mappings

GenericToRelationship\_Mapping

#### Mapping Source

Element

#### Mapping Target

Specialization



### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Specialization::general () : Type [1]  
*abstract rule*
- Specialization::specific () : Type [1]  
*abstract rule*

### 7.6.3.39 GenericToStep\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Step*.

#### General Mappings

GenericToFeature\_Mapping

#### Mapping Source

Element

#### Mapping Target

Step

#### Owned Mappings

(none)

### 7.6.3.40 GenericToSubclassification\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *Subclassification*.

#### General Mappings

GenericToSpecialization\_Mapping

#### Mapping Source

Element

#### Mapping Target

Subclassification

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subclassification::subclassifier () : Classifier [1]  
null
- Subclassification::superclassifier () : Classifier [1]  
null

## 7.6.3.41 GenericToSubsetting\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *Subsetting*.

### General Mappings

GenericToSpecialization\_Mapping

### Mapping Source

Element

### Mapping Target

Subsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::ownedRelatedElement () : Element [0..\*]

Set { }

- Subsetting::subsettingFeature () : Feature [1]  
*abstract rule*
- Subsetting::subsettingFeature () : Feature [1]

from

#### 7.6.3.42 GenericToSuccession\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *Succession*.

##### General Mappings

GenericToConnector\_Mapping

##### Mapping Source

Element

##### Mapping Target

Succession

##### Owned Mappings

(none)

#### 7.6.3.43 GenericToSuccessionItemFlow\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *SuccessionItemFlow*.

##### General Mappings

GenericToSuccession\_Mapping

GenericToItemFlow\_Mapping

##### Mapping Source

Element

##### Mapping Target

SuccessionItemFlow

##### Owned Mappings

(none)

#### 7.6.3.44 GenericToTextualRepresentation\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *TextualRepresentation*.

### General Mappings

GenericToAnnotatingElement\_Mapping

### Mapping Source

Element

### Mapping Target

TextualRepresentation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::language () : String [1]  
*abstract rule*
- TextualRepresentation::body () : String [1]  
*abstract rule*

## 7.6.3.45 GenericToType\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *Type*.

### General Mappings

GenericToNamespace\_Mapping

### Mapping Source

Element

### Mapping Target

Type

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Type::isAbstract () : Boolean [1]`  
`false`
- `Type::isSufficient () : Boolean [1]`  
`false`

### 7.6.3.46 GenericToTypeFeaturing\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *TypeFeaturing*.

#### General Mappings

GenericToRelationship\_Mapping

#### Mapping Source

Element

#### Mapping Target

TypeFeaturing

#### Owned Mappings

(none)

#### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `TypeFeaturing::featuringType () : Type [1]`  
*abstract rule*
- `TypeFeaturing::featureOfType () : Feature [1]`  
*abstract rule*

## 7.6.4 Generic Mappings to Systems

### 7.6.4.1 GenericToActionUsage\_Mapping

#### Description

Generic mapping class for mappings to the SysML v2 element *ActionUsage*.

### General Mappings

GenericToUsage\_Mapping

GenericToStep\_Mapping

### Mapping Source

Element

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::isComposite () : Boolean [1]

true

## 7.6.4.2 GenericToActorMembership\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *ActorMembership*.

### General Mappings

GenericToParameterMembership\_Mapping

### Mapping Source

Element

### Mapping Target

ActorMembership

### Owned Mappings

(none)

#### 7.6.4.3 GenericToAssignmentActionUsage\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *AssignmentActionUsage*.

##### General Mappings

GenericToActionUsage\_Mapping

##### Mapping Source

Element

##### Mapping Target

AssignmentActionUsage

##### Owned Mappings

(none)

#### 7.6.4.4 GenericToConnectionUsage\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *ConnectionUsage*.

##### General Mappings

GenericToPartUsage\_Mapping

##### Mapping Source

Element

##### Mapping Target

ConnectionUsage

##### Owned Mappings

(none)

#### 7.6.4.5 GenericToConjugatedPortDefinition\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *ConjugatedPortDefinition*.

##### General Mappings

GenericToPortDefinition\_Mapping

##### Mapping Source

Element

### Mapping Target

ConjugatedPortDefinition

### Owned Mappings

(none)

## 7.6.4.6 GenericToConjugatedPortTyping\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *ConjugatedPortTyping*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Element

### Mapping Target

ConjugatedPortTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConjugatedPortTyping::conjugatedPortDefinition () : ConjugatedPortDefinition [1]  
*abstract rule*
- ConjugatedPortTyping::portDefinition () : PortDefinition [1]  
*abstract rule*

## 7.6.4.7 GenericToConstraintDefinition\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *ConstraintDefinition*.

### General Mappings

GenericToDefinition\_Mapping



**Mapping Source**

Element

**Mapping Target**

ConstraintDefinition

**Owned Mappings**

(none)

**7.6.4.8 GenericToConstraintUsage\_Mapping****Description**

Generic mapping class for mappings to the SysML v2 element *ConstraintUsage*.

**General Mappings**

GenericToUsage\_Mapping

**Mapping Source**

Element

**Mapping Target**

ConstraintUsage

**Owned Mappings**

(none)

**7.6.4.9 GenericToDefinition\_Mapping****Description**

Generic mapping class for mappings to the SysML v2 element *Definition*.

**General Mappings**

GenericToClassifier\_Mapping

**Mapping Source**

Element

**Mapping Target**

Definition

**Owned Mappings**

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Definition::isVariation () : Boolean [1]  
`false`

#### 7.6.4.10 GenericToEventOccurrenceUsage\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *EventOccurrenceUsage*.

##### General Mappings

GenericToOccurrenceUsage\_Mapping

##### Mapping Source

Element

##### Mapping Target

EventOccurrenceUsage

##### Owned Mappings

(none)

#### 7.6.4.11 GenericToItemDefinition\_Mapping

##### Description

Generic mapping class for mappings to the SysML v2 element *ItemDefinition*.

##### General Mappings

GenericToDefinition\_Mapping

##### Mapping Source

Element

##### Mapping Target

ItemDefinition

##### Owned Mappings

(none)

#### **7.6.4.12 GenericToItemUsage**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *ItemUsage*.

##### **General Mappings**

GenericToOccurrenceUsage\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

ItemUsage

##### **Owned Mappings**

(none)

#### **7.6.4.13 GenericToMetadataUsage\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *MetadataUsage*.

##### **General Mappings**

GenericToUsage\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

MetadataUsage

##### **Owned Mappings**

(none)

#### **7.6.4.14 GenericToObjectiveMembership\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *ObjectiveMembership*.

##### **General Mappings**

GenericToFeatureMembership\_Mapping

##### **Mapping Source**

Element

### Mapping Target

ObjectiveMembership

### Owned Mappings

(none)

## 7.6.4.15 GenericToOccurrenceDefinition\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *OccurrenceDefinition*.

### General Mappings

GenericToDefinition\_Mapping

### Mapping Source

Element

### Mapping Target

OccurrenceDefinition

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OccurrenceDefinition::isIndividual () : Boolean [1]

false

## 7.6.4.16 GenericToOccurrenceUsage\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *OccurrenceUsage*.

### General Mappings

GenericToUsage\_Mapping

### Mapping Source

Element

### Mapping Target

OccurrenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OccurrenceUsage::isIndividual () : Boolean [1]  
`false`
- OccurrenceUsage::portionKind () : PortionKind [1]  
`invalid`

## 7.6.4.17 GenericToPartUsage\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *PartUsage*.

### General Mappings

GenericToUsage\_Mapping

### Mapping Source

Element

### Mapping Target

PartUsage

### Owned Mappings

(none)

## 7.6.4.18 GenericToPortConjugation\_Mapping

### Description

Generic mapping class for mappings to the SysML v2 element *PortConjugation*.

### General Mappings

GenericToConjugation\_Mapping

**Mapping Source**

Element

**Mapping Target**

PortConjugation

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PortConjugation::originalPortDefinition () : PortDefinition [1]  
*abstract rule*

**7.6.4.19 GenericToPortDefinition\_Mapping**

**Description**

Generic mapping class for mappings to the SysML v2 element *PortDefinition*.

**General Mappings**

GenericToDefinition\_Mapping

**Mapping Source**

Element

**Mapping Target**

PortDefinition

**Owned Mappings**

(none)

**7.6.4.20 GenericToReferenceUsage\_Mapping**

**Description**

Provides the basic features to map to a ReferenceUsage element.

**General Mappings**

GenericToUsage\_Mapping

**Mapping Source**

Element

**Mapping Target**

ReferenceUsage

**Owned Mappings**

(none)

**7.6.4.21 GenericToRequirementUsage\_Mapping**

**Description**

Generic mapping class for mappings to the SysML v2 element *RequirementUsage*.

**General Mappings**

GenericToUsage\_Mapping

**Mapping Source**

Element

**Mapping Target**

RequirementUsage

**Owned Mappings**

(none)

**7.6.4.22 GenericToStateUsage\_Mapping**

**Description**

Generic mapping class for mappings to the SysML v2 element *StateUsage*.

**General Mappings**

GenericToActionUsage\_Mapping

**Mapping Source**

Element

**Mapping Target**

StateUsage

**Owned Mappings**

(none)

#### **7.6.4.23 GenericToSubjectMembership\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *SubjectMembership*.

##### **General Mappings**

GenericToParameterMembership\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

SubjectMembership

##### **Owned Mappings**

(none)

#### **7.6.4.24 GenericToTransitionUsage\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *TransitionUsage*.

##### **General Mappings**

GenericToActionUsage\_Mapping

##### **Mapping Source**

Element

##### **Mapping Target**

TransitionUsage

##### **Owned Mappings**

(none)

#### **7.6.4.25 GenericToUsage\_Mapping**

##### **Description**

Generic mapping class for mappings to the SysML v2 element *Usage*.

##### **General Mappings**

GenericToFeature\_Mapping



## Mapping Source

Element

## Mapping Target

Usage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Usage::isVariation () : Boolean [1]

false

## 7.7 Mappings from UML4SysML metaclasses

### 7.7.1 Overview

UML4SysML is the subset of UML containing all model elements that are reused by SysML. The complete list of model elements is defined in [SysMLv1], subclause 4.1.

### 7.7.2 Actions

This chapter lists all mapping specifications of UML4SysML::Actions model elements.

#### 7.7.2.1 Overview

**Table 1. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
AcceptCallAction	AcceptActionUsage
AcceptEventAction	AcceptActionUsage
ActionInputPin	ReferenceUsage
AddStructuralFeatureValueAction	ActionUsage
AddVariableValueAction	ActionUsage
BroadcastSignalAction	ActionUsage
CallBehaviorAction	ActionUsage
CallOperationAction	ActionUsage
Clause	not mapped; see next section

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
ClearAssociationAction	ActionUsage
ClearStructuralFeatureAction	ActionUsage
ClearVariableAction	ActionUsage
ConditionalNode	not mapped; see next section
CreateLinkAction	ActionUsage
CreateLinkObjectAction	ActionUsage
CreateObjectAction	ActionUsage
DestroyLinkAction	ActionUsage
DestroyObjectAction	ActionUsage
InputPin	not mapped; see next section
LinkEndCreationData	not mapped; see next section
LinkEndData	not mapped; see next section
LinkEndDestructionData	not mapped; see next section
LoopNode	ActionUsage
OpaqueAction	ActionUsage
OutputPin	ReferenceUsage
RaiseExceptionAction	ActionUsage
ReadExtentAction	ActionUsage
ReadIsClassifiedObjectAction	ActionUsage
ReadLinkAction	ActionUsage
ReadLinkObjectEndAction	ActionUsage
ReadSelfAction	ActionUsage
ReadStructuralFeatureAction	ActionUsage
ReadVariableAction	ActionUsage
ReclassifyObjectAction	ActionUsage
ReduceAction	ActionUsage
RemoveStructuralFeatureValueAction	ActionUsage
RemoveVariableValueAction	ActionUsage
ReplyAction	ActionUsage
SendObjectAction	ActionUsage
SendSignalAction	ActionUsage
SequenceNode	ActionUsage
StartClassifierBehaviorAction	ActionUsage

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
StartObjectBehaviorAction	ActionUsage
StructuredActivityNode	ActionUsage
TestIdentityAction	CalculationUsage
UnmarshallAction	ActionUsage
ValuePin	ReferenceUsage
ValueSpecificationAction	ActionUsage

The following table gives an overview of which SysML v2 elements the UML4SysML::Actions elements are transformed with which mapping class. The mapping details are in [7.7.2.3](#).

The justifications for the elements without mapping are given in [7.7.2.2](#).

### 7.7.2.2 UML4SysML::Actions elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 2. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
AcceptCallAction	Since the CallEvent is not supported by SysML v2, the AcceptCallAction is also not covered. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.
ActionInputPin	The UML4SysML::ActionInputPin concept is not covered by SysML v2. The model element is mapped as a input or output pin, but without the special action input pin semantics.
Clause	Mapping is not specified yet.
ConditionalNode	Mapping is not specified yet.
LinkEndCreationData	Mapping is not specified yet.
LinkEndData	Mapping is not specified yet.
LinkEndDestructionData	Mapping is not specified yet.
ReclassifyObjectAction	The UML4SysML::ReclassifyObjectAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.
ReplyAction	The UML4SysML::ReplyAction is only used with UML4SysML::AcceptCallAction. Since we have no mapping of AcceptCallAction to SysML v2, there is also no mapping for ReplyAction. However, it is mapped to an empty action usage to keep the connections within the activity respectively action definition.

SysML v1 Concept	Rationale
StartClassifierBehaviorAction	The UML4SysML::StartClassifierBehaviorAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.
StartObjectBehaviorAction	The UML4SysML::StartObjectBehaviorAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.
UnmarshallAction	Mapping is not specified yet.

### 7.7.2.3 Mapping Specifications

#### 7.7.2.3.1 Accept Event Actions

##### 7.7.2.3.1.1 AcceptCallAction\_Mapping

###### Description

Since the CallEvent is not supported by SysML v2, the AcceptCallAction is also not covered. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.

###### General Mappings

AcceptEventAction\_Mapping

###### Mapping Source

AcceptCallAction

###### Mapping Target

AcceptActionUsage

###### Owned Mappings

(none)

##### 7.7.2.3.1.2 AcceptEventAction\_Mapping

###### Description

The UML4SysML::AcceptEventAction is mapped to a AcceptActionUsage element.

If the trigger is a signal, it is mapped to an accept parameter typed by the signal.

SysMLv2 does not support more than one trigger. Therefore only the first specified trigger of the action is transformed. All further triggers are ignored.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action acceptEventActionSignalEvent1 accept : SysMLv1Signal via sysMLv1Port;
action acceptEventActionChangeEvent1 accept when when changeExpression.result {
    calc changeExpression {

```

```

        return : ScalarValues::Boolean;
        language "OCL"
            /*
             * x > 0
             */
        }
    }
}

```

## General Mappings

CommonAction\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

AcceptActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- AcceptActionUsage::ownedRelationship () : Relationship [0..\*]

```

let relationships : Set(KerML::Relationship) = Helper.actionOwnedRelationship(from)
->including(AEAReceiverParameterMembership_Mapping.getMapped(from)) in
let relationshipsWithParameter : Set(KerML::Relationship) =
if (from.trigger.get(0).event.ocIsTypeOf(UML::SignalEvent) or
    from.trigger.get(0).event.ocIsTypeOf(UML::ChangeEvent)) then
    relationships->including(AEAParameterMembership_Mapping.getMapped(from))
else
    relationships
endif in
if from.trigger.get(0).event.ocIsTypeOf(UML::ChangeEvent) then
    relationshipsWithParameter
    ->including(ElementFeatureMembership_Mapping.getMapped(
        from.trigger.get(0).event.ocAsType(UML::ChangeEvent).changeExpression))
else relationshipsWithParameter
endif

```

### 7.7.2.3.1.3 AEChangeExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`from.trigger.get(0).event.oclassType(UML::ChangeEvent).changeExpression`

### 7.7.2.3.1.4 AEChangeParameter\_Mapping

## Description

The mapping class transforms the change event specified at the AcceptEventAction.

## General Mappings

GenericToReferenceUsage\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`  
`KerML::FeatureDirectionKind::_in'`
- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  
`Set{AEChangeParameterFeatureValue_Mapping.getMapped(from) }`

#### 7.7.2.3.1.5 AEChangeParameterFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`  
`AEChangeParameterTrigger_Mapping.getMapped(from)`

#### 7.7.2.3.1.6 AEChangeParameterTrigger\_Mapping

##### Description

The mapping class creates a `TriggerInvocationExpression` from the change event specified at the `AcceptEventAction`.

##### General Mappings

GenericToInvocationExpression\_Mapping

**Mapping Source**

AcceptEventAction

**Mapping Target**

TriggerInvocationExpression

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TriggerInvocationExpression::ownedRelationship () : Relationship [0..\*]  
`Set { AEChangeParameterFeatureMembership_Mapping.getMapped (from) }`

**7.7.2.3.1.7 AEChangeParameterTriggerExpression\_Mapping****Description**

The mapping class creates the trigger expression element for the change parameter of the SysML v2 AcceptActionUsage element.

**General Mappings**

GenericToExpression\_Mapping

**Mapping Source**

AcceptEventAction

**Mapping Target**

Expression

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Expression::ownedRelationship () : Relationship [0..*]`

```
Set{AEChangeParameterResultExpressionMembership_Mapping.getMapped(from)}
```

#### 7.7.2.3.1.8 AEChangeParameterResultExpressionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

ResultExpressionMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ResultExpressionMembership::ownedMemberFeature () : Feature [1]`

```
AEChangeParameterFeatureChainExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.1.9 AEChangeParameterFeatureChainExpression\_Mapping

##### Description

The mapping class creates the feature chain expression element for the change parameter of the SysML v2 `AcceptActionUsage` element.

##### General Mappings

GenericToInvocationExpression\_Mapping

##### Mapping Source

AcceptEventAction

## Mapping Target

FeatureChainExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChainExpression::ownedRelationship () : Relationship [0..\*]

```
Set { AEChangeParameterParameterMembership_Mapping.getMapped (from) }
```

### 7.7.2.3.1.10 AEChangeParameterFeature\_Mapping

## Description

The mapping class creates the feature for the feature chain expression element for the change parameter of the SysML v2 AcceptActionUsage element.

## General Mappings

GenericToFeature\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set { AEChangeParameterExpressionFeatureValue_Mapping.getMapped (from) }
```

#### 7.7.2.3.1.11 AEChangeParameterExpressionFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
AEChangeParameterFeatureReferenceExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.1.12 AEChangeParameterFeatureReferenceExpression\_Mapping

##### Description

The mapping class creates the feature reference expression for the feature chain expression element for the change parameter of the SysML v2 AcceptActionUsage element.

##### General Mappings

GenericToFeatureReferenceExpression\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

FeatureReferenceExpression

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`  
`Set { AEChangeParameterMembership_Mapping.getMapped (from) }`

#### 7.7.2.3.1.13 AEChangeParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

Membership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Membership::memberElement () : Element [1]`  
`from.trigger.get (0) .event.oclassType (UML::ChangeEvent) .changeExpression`

#### 7.7.2.3.1.14 AEChangeParameterParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

#### **Mapping Source**

AcceptEventAction

#### **Mapping Target**

ParameterMembership

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

#### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`AEChangeParameterFeature_Mapping.getMapped (from)`

### **7.7.2.3.1.15 AEAReceiverParameter\_Mapping**

#### **Description**

The mapping class creates the reference usage element for the receiver parameter of the SysML v2 AcceptActionUsage element.

#### **General Mappings**

GenericToReferenceUsage\_Mapping

#### **Mapping Source**

AcceptEventAction

#### **Mapping Target**

ReferenceUsage

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

#### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_in'
```

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
if from.trigger.get(0).port->size() > 0
then Set{AEARReceiverFeatureValue_Mapping.getMapped(from)}
else Set{}
endif
```

#### 7.7.2.3.1.16 AEARReceiverParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]

```
AEARReceiverParameter_Mapping.getMapped(from)
```

#### 7.7.2.3.1.17 AEARReceiverFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

**Mapping Source**

AcceptEventAction

**Mapping Target**

FeatureValue

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

`AEARceiverFeatureReferenceExpression_Mapping.getMapped (from)`

**7.7.2.3.1.18 AEASignalParameter\_Mapping**

**Description**

The mapping class creates the reference usage element for the signal parameter of the SysML v2 AcceptActionUsage element.

**General Mappings**

GenericToReferenceUsage\_Mapping

**Mapping Source**

AcceptEventAction

**Mapping Target**

ReferenceUsage

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]  
`KerML::FeatureDirectionKind::_in'`
- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  
`Set{AEASignalParameterFeatureTyping_Mapping.getMapped(from) }`

#### 7.7.2.3.1.19 AEASignalParameterFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  

```

let event : UML::Event = from.trigger.get(0).event in
if event.ocIsTypeOf(UML::SignalEvent) then
    event.ocAsType(UML::SignalEvent).signal
else invalid endif

```

#### 7.7.2.3.1.20 AEAParameterMembership\_Mapping

##### Description

The mapping class creates the parameter membership relationship for the element that can be received by the accept action. The source of the element is the trigger of the UML4SysML::AcceptEventAction.

Currently, more than one trigger is not supported by the transformation.



## General Mappings

GenericToParameterMembership\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

ParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  

```
if from.trigger.get(0).event.ocIsTypeOf(UML::SignalEvent) then
    AEASignalParameter_Mapping.getMapped(from)
else if from.trigger.get(0).event.ocIsTypeOf(UML::ChangeEvent) then
    AEASignalParameter_Mapping.getMapped(from)
else
    invalid
endif endif
```

### 7.7.2.3.1.21 AEASignalParameter\_Mapping

#### Description

The mapping class creates the feature reference expression for the reference usage element for the receiver parameter of the SysML v2 AcceptActionUsage element.

## General Mappings

GenericToFeatureReferenceExpression\_Mapping

## Mapping Source

AcceptEventAction

## Mapping Target

FeatureReferenceExpression

## Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set { AEAReceiverFeatureReferenceExpressionMembership_Mapping.getMapped (from) ,  
ReturnParameterFeatureMembership_Factory.create () }
```

#### 7.7.2.3.1.22 AEAReceiverFeatureReferenceExpressionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

Membership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

```
if from.trigger.get (0) .port->size () > 0 then  
    from.trigger.get (0) .port.get (0)  
else  
    invalid  
endif
```

#### **7.7.2.3.1.23 ReplyAction\_Mapping**

##### **Description**

The UML4SysML::ReplyAction is only used with UML4SysML::AcceptCallAction. Since we have no mapping of AcceptCallAction to SysML v2, there is also no mapping for ReplyAction. However, it is mapped to an empty action usage to keep the connections within the activity respectively action definition.

##### **General Mappings**

CommonAction\_Mapping

##### **Mapping Source**

ReplyAction

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

#### **7.7.2.3.1.24 UnmarshallAction\_Mapping**

##### **Description**

The mapping of UML4SysML::UnmarshallAction is not specified yet. It is currently mapped to an empty action usage to keep the connections within the activity respectively action definition.

##### **General Mappings**

CommonAction\_Mapping

##### **Mapping Source**

UnmarshallAction

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

#### **7.7.2.3.2 Actions**

##### **7.7.2.3.2.1 CommonAction\_Mapping**

##### **Description**

Base mapping class for model elements of kind UML4SysML::Action. The target element is a SysML v2 ActionUsage.

##### **General Mappings**

GenericToActionUsage\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

Action

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```
let actionInputPin: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsTypeOf(UML::ActionInputPin)) in
let triggers: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Trigger)) in
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - actionInputPin) - triggers) - from.ownedElement in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e))->asSet())
```

- ActionUsage::isComposite () : Boolean [1]

```
true
```

#### 7.7.2.3.2.2 OpaqueAction\_Mapping

##### Description

The UML4SysML::OpaqueAction is mapped to a SysML v2 ActionUsage with a textual representation.

The following shows an example of the expected SysMLv2 textual syntax of a UML4SysML::OpaqueAction.

```
action thisIsAOpaqueAction {
    in x : ScalarValues::Integer;
    in y : ScalarValues::Integer;
    out result : ScalarValues::Boolean;

    language "OCL"
```

```

/*
 * x = y + 1;
 */
}

```

## General Mappings

CommonAction\_Mapping

## Mapping Source

OpaqueAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```

if from.body->size() > 0 then
  Helper.actionOwnedRelationship(from)->append(OABodyMembership_Mapping.getMapped(from))
else
  Helper.actionOwnedRelationship(from)
endif

```

### 7.7.2.3.2.3 OABody\_Mapping

#### Description

The languages and bodies of a UML4SysML::OpaqueAction are mapped to SysMLv2 TextualRepresentations.

## General Mappings

GenericToAnnotatingElement\_Mapping

## Mapping Source

OpaqueAction

## Mapping Target

TextualRepresentation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::body () : String [1]  

```
if from.body.notEmpty() then from.body.first() else invalid endif
```
- TextualRepresentation::language () : String [1]  

```
if from.language.notEmpty() then from.language.first() else invalid endif
```

#### 7.7.2.3.2.4 OABodyMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

OpaqueAction

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

```
OABody_Mapping.getMapped(from)
```

#### 7.7.2.3.2.5 Pin\_Mapping

##### Description

Mapping class for model elements of kind UML4SysML::Pin. The operation `ownedRelationship()` makes a distinction between typed and untyped pins. The target element is a SysMLv2 `ReferenceUsage`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1Action {  
        in sysMLv1InputPin : ScalarValues::Integer;  
        out sysMLv1UntypedOutputPin;  
    }  
}
```

##### General Mappings

GenericToReferenceUsage\_Mapping  
NamedElementMain\_Mapping

##### Mapping Source

Pin

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not Helper.excludedPin(src)
```

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->including (MultiplicityMembership_Mapping.getMapped (from))
```
- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`

```

    if from.ocIsTypeOf(UML::InputPin) then
        KerML::FeatureDirectionKind::_'in'
    else if from.ocIsTypeOf(UML::OutputPin) then
        KerML::FeatureDirectionKind::_'out'
    else
        invalid
    endif endif

```

#### 7.7.2.3.2.6 ValuePin\_Mapping

##### Description

A UML4SysML::ValuePin is mapped to a SysML v2 ReferenceUsage with assigned value.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action sysMLv1Action {
    in sysMLv1ValuePin1 : ScalarValues::Integer = 42;
    in sysMLv1ValuePin2 = {
        return result;
        language "English"
        /*
         * this is a opaque expression
         */
    }.result;
}

```

##### General Mappings

No general mappings.

##### Mapping Source

ValuePin

##### Mapping Target

No target element.

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ownedRelationship () : Relationship [0..\*]



```
Set{PinFeatureTyping_Mapping.getMapped(from),
ValuePinFeatureValue_Mapping.getMapped(from),
MultiplicityMembership_Mapping.getMapped(from)}
```

#### 7.7.2.3.2.7 ValuePinFeatureValue\_Mapping

##### Description

The mapping class creates the value expression for the reference usage element.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

ValuePin

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]  

```
if from.value.oclIsUndefined() then invalid else from.value endif
```

#### 7.7.2.3.2.8 ValuePinUntyped\_Mapping

##### Description

Same as ValuePin\_Mapping, but for UML4SysML::ValuePins without a specified type.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action sysMLv1Action {
    in sysMLv1ValuePin1 = 42;
}
```

##### General Mappings

Pin\_Mapping

## Mapping Source

ValuePin

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType(Pin_Mapping).ownedRelationship()->including(ValuePinFeatureValue_Mapping.getM
```

### 7.7.2.3.3 Invocation Actions

#### 7.7.2.3.3.1 BroadcastSignalAction\_Mapping

##### Description

The UML4SysML::BroadcastSignalAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

BroadcastSignalAction

##### Mapping Target

ActionUsage

##### Owned Mappings

(none)

#### 7.7.2.3.3.2 CallBehaviorAction\_Mapping

##### Description

A UML4SysML::CallBehaviorAction is mapped to a SysML v2 ActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity1 {  
    action sysMLv1CallBehaviorAction : SysMLv1Activity2;  
}  
action def SysMLv1Activity2;
```

## General Mappings

CommonAction\_Mapping

## Mapping Source

CallBehaviorAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  

```
    Helper.actionOwnedRelationship(from)  
    ->append(CBAFeatureTyping_Mapping.getMapped(from))
```

### 7.7.2.3.3 CBAFeatureTyping\_Mapping

## Description

Creates a feature typing relationship owned by the element *typedFeature()*.

## General Mappings

GenericToFeatureTyping\_Mapping

## Mapping Source

CallBehaviorAction

## Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`from.behavior`

### 7.7.2.3.3.4 CallOperationAction\_Mapping

#### Description

A UML4SysML::CallOperationAction is mapped to a SysML v2 ActionUsage which calls the operation.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action sysMLv1CallOperationAction {  
  in paramIn;  
  in target : ThisIsABlock;  
  out paramReturn = target.sysMLv1Operation;  
}
```

## General Mappings

CommonAction\_Mapping

### Mapping Source

CallOperationAction

### Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```
Helper.actionOwnedRelationship(from)
->including(COAPerformActionFeatureMembership_Mapping.getMapped(from))
```

#### 7.7.2.3.3.5 COAOutputPinFeature\_Mapping

##### Description

The mapping class creates the feature element for the output parameter.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set{COAOutputPinFeatureFeatureValue_Mapping.getMapped(from),
COAOutputPinFeatureFeatureMembership_Mapping.getMapped(from)}
```

- Feature::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_in'
```

#### 7.7.2.3.3.6 COAOutputPinFeatureChainExpression\_Mapping

##### Description

The mapping class creates the feature chain expression for the output parameter feature value.

##### General Mappings

GenericToInvocationExpression\_Mapping

## Mapping Source

OutputPin

## Mapping Target

FeatureChainExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChainExpression::ownedRelationship () : Relationship [0..\*]  

```
Set { COAOutputPinParameterMembership_Mapping.getMapped (from) ,  
COAOutputPinFeatureChainExpressionMembership_Mapping.getMapped (from) ,  
ReturnParameterFeatureMembership_Factory.create () }
```

### 7.7.2.3.3.7 COAOutputPinFeatureChainExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

## Mapping Source

OutputPin

## Mapping Target

Membership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

```
from.owner.oclAsType(UML::CallOperationAction).operation
```

#### **7.7.2.3.3.8 COAOutputPinFeatureFeature\_Mapping**

##### **Description**

Creates a feature element for the UML4SysML::CallOperationAction mapping.

##### **General Mappings**

GenericToFeature\_Mapping

##### **Mapping Source**

OutputPin

##### **Mapping Target**

Feature

##### **Owned Mappings**

(none)

#### **7.7.2.3.3.9 COAOutputPinFeatureFeatureMembership\_Mapping**

##### **Description**

Creates a feature membership relationship for *ownedMemberFeature()*.

##### **General Mappings**

GenericToFeatureMembership\_Mapping

##### **Mapping Source**

OutputPin

##### **Mapping Target**

FeatureMembership

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`COAOutputPinFeatureFeature_Mapping.getMapped(from)`

#### 7.7.2.3.3.10 COAOutputPinFeatureFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`  
`COAOutputPinFeatureReferenceExpression_Mapping.getMapped(from)`

#### 7.7.2.3.3.11 COAOutputPinFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target



FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`COAOutputPinReferenceUsage_Mapping.getMapped(from)`

#### 7.7.2.3.3.12 COAOutputPinFeatureReferenceExpression\_Mapping

### Description

The mapping class creates the feature reference expression for the output parameter.

### General Mappings

GenericToFeatureReferenceExpression\_Mapping

### Mapping Source

OutputPin

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]  
`Set{COAOutputPinFeatureReferenceExpressionMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }`

#### 7.7.2.3.3.13 COAOutputPinFeatureReferenceExpressionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

Membership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
`from.owner.oclAsType (UML::CallOperationAction) .target`

#### 7.7.2.3.3.14 COAOutputPinParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::private`
- ParameterMembership::ownedMemberParameter () : Feature [1]  
`COAOutputPinFeature_Mapping.getMapped(from)`

### 7.7.2.3.3.15 COAOutputPinReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

OutputPin

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  
`Set{COAOutputPinReferenceUsageFeatureValue_Mapping.getMapped(from)}`

### 7.7.2.3.3.16 COAOutputPinReferenceUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

## General Mappings

GenericToFeatureValue\_Mapping

## Mapping Source

OutputPin

## Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
COAOutputPinFeatureChainExpression_Mapping.getMapped(from)
```

### 7.7.2.3.3.17 COAPerformAction\_Mapping

## Description

The mapping class creates the PerformActionUsage element.

## General Mappings

GenericToActionUsage\_Mapping

## Mapping Source

CallOperationAction

## Mapping Target

PerformActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `PerformActionUsage::ownedRelationship () : Relationship [0..*]`

```
Set { COAPPerformActionReferenceSubsetting_Mapping.getMapped (from) }
```

#### **7.7.2.3.3.18 COAPPerformActionFeatureMembership\_Mapping**

##### **Description**

Creates a feature membership relationship for *ownedMemberFeature()*.

##### **General Mappings**

GenericToEndFeatureMembership\_Mapping

##### **Mapping Source**

CallOperationAction

##### **Mapping Target**

EndFeatureMembership

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`

```
COAPPerformAction_Mapping.getMapped (from)
```

#### **7.7.2.3.3.19 COAPPerformActionReferenceSubsetting\_Mapping**

##### **Description**

Creates a subsetting relationship.

##### **General Mappings**

GenericToReferenceSubsetting\_Mapping

##### **Mapping Source**

CallOperationAction

##### **Mapping Target**

ReferenceSubsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::ownedRelatedElement () : Element [0..\*]  
`Set { COAPerformActionFeature_Mapping.getMapped (from) }`

#### 7.7.2.3.3.20 COAPerformActionFeature\_Mapping

### Description

The mapping class creates the feature element for the perform action usage.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

CallOperationAction

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  
`Set { COAPerformActionFeatureChainingTarget_Mapping.getMapped (from) ,  
COAPerformActionFeatureChainingOperation_Mapping.getMapped (from) }`

#### 7.7.2.3.3.21 COAPerformActionFeatureChainingOperation\_Mapping

##### Description

The mapping class creates the feature chaining element for the operation of the perform action usage.

##### General Mappings

GenericToFeatureChaining\_Mapping

##### Mapping Source

CallOperationAction

##### Mapping Target

FeatureChaining

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]

`from.operation`

#### 7.7.2.3.3.22 COAPerformActionFeatureChainingTarget\_Mapping

##### Description

The mapping class creates the feature chaining element for the target element of the perform action usage.

##### General Mappings

GenericToFeatureChaining\_Mapping

##### Mapping Source

CallOperationAction

##### Mapping Target

FeatureChaining

##### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]  
`from.target`

### 7.7.2.3.3.23 SendObjectAction\_Mapping

#### Description

A UML4SysML::SendObjectAction is mapped to a SysMLv2 ActionUsage that includes a SendActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action sysMLv1SendObjectAction {  
    in target : SysMLv1Block;  
    send SysMLv1Object1() to target;  
}  
part def SysMLv1Block;  
item def SysMLv1Object;
```

## General Mappings

SendSignalAction\_Mapping

### Mapping Source

SendObjectAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### 7.7.2.3.3.24 SendSignalAction\_Mapping

#### Description

A UML4SysML::SendSignalAction is mapped to a SysMLv2 ActionUsage that includes a SendActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action sysMLv1SendSignalAction {  
    in target : SysMLv1Block;
```



```

        send SysMLv1Signal() to target;
    }
    part def SysMLv1Block;
    item def SysMLv1Signal;

```

## General Mappings

CommonAction\_Mapping

## Mapping Source

SendSignalAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```

    Helper.actionOwnedRelationship(from)
    ->including(SSAFeatureMembership_Mapping.getMapped(from))

```

### 7.7.2.3.3.25 SSAFeatureMembership\_Mapping

## Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

InvocationAction

## Mapping Target

FeatureMembership

## Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`SSASendActionUsage_Mapping.getMapped(from)`

#### 7.7.2.3.3.26 SSAParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

InvocationAction

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`SSAReferenceUsage_Mapping.getMapped(from)`

#### 7.7.2.3.3.27 SSAReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

InvocationAction

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

`KerML::FeatureDirectionKind::_in'`

#### 7.7.2.3.3.28 SSAltParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

#### Mapping Source

InvocationAction

#### Mapping Target

ParameterMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]

```
SSAItemReferenceUsage_Mapping.getMapped(from)
```

#### 7.7.2.3.3.29 SSAItemReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

InvocationAction

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_in'
```

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set{SSAItemReferenceUsageFeatureValue_Mapping.getMapped(from) }
```

#### 7.7.2.3.3.30 SSAItemReferenceUsageFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

InvocationAction

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

`SSAItemReferenceUsageInvocationExpression_Mapping.getMapped (from)`

#### 7.7.2.3.3.31 SSAItemReferenceUsageFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

InvocationAction

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```

    if from.ocIsTypeOf(UML::SendSignalAction) then
        from.signal
    else if from.ocIsTypeOf(UML::SendObjectAction) then
        from.request
    else
        invalid
    endif endif

```

#### 7.7.2.3.3.32 SSASItemReferenceUsageInvocationExpression\_Mapping

##### Description

The mapping class creates the invocation expression for the SysML v2 SendActionUsage.

##### General Mappings

GenericToInvocationExpression\_Mapping

##### Mapping Source

InvocationAction

##### Mapping Target

InvocationExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- InvocationExpression::ownedRelationship () : Relationship [0..\*]  

```

Set { SSASItemReferenceUsageFeatureTyping_Mapping.getMapped (from) ,
ReturnParameterFeatureMembership_Factory.create () }

```

#### 7.7.2.3.3.33 SSATargetParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

InvocationAction

## Mapping Target

ParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`SSATargetReferenceUsage_Mapping.getMapped(from)`

### 7.7.2.3.3.34 SSATargetReferenceUsage\_Mapping

## Description

Creates a reference usage.

## General Mappings

GenericToReferenceUsage\_Mapping

## Mapping Source

InvocationAction

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]  
`KerML::FeatureDirectionKind::_in'`

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set { SSATargetReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

#### 7.7.2.3.35 SSATargetReferenceUsageFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

InvocationAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
SSATargetReferenceUsageFeatureValueExpression_Mapping.getMapped (from)
```

#### 7.7.2.3.36 SSATargetReferenceUsageFeatureValueMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

InvocationAction

##### Mapping Target

Membership



## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

`from.target`

### 7.7.2.3.3.37 SSATargetReferenceUsageFeatureValueExpression\_Mapping

#### Description

The mapping class creates the feature reference expression for the target reference usage element of the SysML v2 SendActionUsage.

#### General Mappings

GenericToFeatureReferenceExpression\_Mapping

#### Mapping Source

InvocationAction

#### Mapping Target

FeatureReferenceExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

`Set { SSATargetReferenceUsageFeatureValueMembership_Mapping.getMapped (from) ,  
ReturnParameterFeatureMembership_Factory.create () }`

### 7.7.2.3.3.38 SSASendActionUsage\_Mapping

#### Description

The mapping class creates the SysML v2 element SendActionUsage for the UML4SysML::SendSignalAction mapping.

### General Mappings

GenericToActionUsage\_Mapping

### Mapping Source

InvocationAction

### Mapping Target

SendActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SendActionUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { SSAItemParameterMembership_Mapping.getMapped (from) ,  
      SSAParame terMembership_Mapping.getMapped (from) ,  
      SSATargetParameterMembership_Mapping.getMapped (from) }
```

#### 7.7.2.3.39 StartClassifierBehaviorAction\_Mapping

### Description

The UML4SysML::StartClassifierBehaviorAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.

### General Mappings

CommonAction\_Mapping

### Mapping Source

StartClassifierBehaviorAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### **7.7.2.3.3.40 StartObjectBehaviorAction\_Mapping**

##### **Description**

The UML4SysML::StartObjectBehaviorAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.

##### **General Mappings**

CommonAction\_Mapping

##### **Mapping Source**

StartObjectBehaviorAction

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

#### **7.7.2.3.4 Link Actions**

##### **7.7.2.3.4.1 ClearAssociationAction\_Mapping**

##### **Description**

The UML4SysML::ClearAssociationAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### **General Mappings**

CommonAction\_Mapping

##### **Mapping Source**

ClearAssociationAction

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

##### **7.7.2.3.4.2 CreateLinkAction\_Mapping**

##### **Description**

The UML4SysML::CreateLinkAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not completely defined yet.

##### **General Mappings**

CommonAction\_Mapping

### Mapping Source

CreateLinkAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```
let linkEndCreationData : Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsTypeOf(UML::LinkEndCreationData)) in
let actionInputPin: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsTypeOf(UML::ActionInputPin)) in
let triggers: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Trigger)) in
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - actionInputPin)
    - triggers) - linkEndCreationData) in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
```

#### 7.7.2.3.4.3 CreateLinkObjectAction\_Mapping

### Description

A UML4SysML::CreateLinkObjectAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

### General Mappings

CreateLinkAction\_Mapping

### Mapping Source

CreateLinkObjectAction

### Mapping Target

ActionUsage

## Owned Mappings

(none)

### 7.7.2.3.4.4 DestroyLinkAction\_Mapping

#### Description

The UML4SysML::DestroyLinkAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not completely defined yet.

#### General Mappings

CommonAction\_Mapping

#### Mapping Source

DestroyLinkAction

#### Mapping Target

ActionUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  

```
let actionInputPin: Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsTypeOf(UML::ActionInputPin)) in  
let triggers: Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Trigger)) in  
let linkData: Set(UML::Element) =  
    from.ownedElement->select( e | e.ocIsKindOf(UML::LinkEndData) or  
    e.ocIsKindOf(UML::LinkEndDestructionData)) in  
let toElementFMS: Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in  
let toElementOMS: Set(UML::Element) =  
    (((from.ownedElement - toElementFMS) - actionInputPin)  
    - triggers) - linkData) in  
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))  
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
```

### 7.7.2.3.4.5 ReadLinkAction\_Mapping

#### Description

The UML4SysML::ReadLinkAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not completely defined yet.

### General Mappings

CommonAction\_Mapping

### Mapping Source

ReadLinkAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```
let actionInputPin: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsTypeOf(UML::ActionInputPin)) in
let triggers: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Trigger)) in
let linkData: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::LinkEndData)) in
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - actionInputPin)
    - triggers) - linkData in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
```

#### 7.7.2.3.4.6 ReadLinkObjectEndAction\_Mapping

### Description

The UML4SysML::ReadLinkObjectEndAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

### General Mappings

CommonAction\_Mapping

### Mapping Source

ReadLinkObjectEndAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.4.7 ReadLinkObjectEndQualifierAction\_Mapping

### Description

The UML4SysML::ReadLinkObjectEndQualifierAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

### General Mappings

CommonAction\_Mapping

### Mapping Source

ReadLinkObjectEndQualifierAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.5 Object Actions

##### 7.7.2.3.5.1 CreateObjectAction\_Mapping

### Description

A UML4SysML::CreateObjectAction is mapped to a SysML v2 ActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1CreateObjectAction {  
        out result : SysMLv1Block = SysMLv1Block();  
    }  
}  
part def SysMLv1Block;
```

### General Mappings

CommonAction\_Mapping

### Mapping Source

CreateObjectAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.5.2 COAInvocationExpressionFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

CreateObjectAction

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`from.classifier`

#### 7.7.2.3.5.3 COAInvocationExpression\_Mapping

### Description

The mapping class creates the invocation expression to create the object.

### General Mappings

GenericToInvocationExpression\_Mapping

### Mapping Source



CreateObjectAction

### Mapping Target

InvocationExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- InvocationExpression::ownedRelationship () : Relationship [0..\*]  

```
Set{COAInvocationExpressionFeatureTyping_Mapping.getMapped(from),  
CommonReturnParameterFeatureMembership_Mapping.getMapped(from.result)}
```

#### 7.7.2.3.5.4 COAPin\_Mapping

### Description

The mapping class creates the output parameter of the ActionUsage for the mapping of UML4SysML::CreateObjectAction.

### General Mappings

No general mappings.

### Mapping Source

OutputPin

### Mapping Target

No target element.

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.oclIsTypeOf(UML::CreateObjectAction)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ownedRelationship () : Relationship [0..*]`

```
Set{PinFeatureTyping_Mapping.getMapped(from),  
COAPinFeatureValue_Mapping.getMapped(from)}
```

#### 7.7.2.3.5.5 COAPinFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
COAInvocationExpression_Mapping.getMapped(from.owner)
```

#### 7.7.2.3.5.6 DestroyObjectAction\_Mapping

##### Description

The UML4SysML::DestroyObjectAction is conceptually mapped to the SysML v2 library function OccurrenceFunctions::destroy.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1DestroyObjectAction {  
        in target : SysMLv1Block;  
        action : OccurrenceFunctions::destroy {
```

```

        in occ = target;
    }
}
part def SysMLv1Block;

```

## General Mappings

CommonAction\_Mapping

## Mapping Source

DestroyObjectAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```

    Helper.actionOwnedRelationship (from)
    ->including (DOADestroyFeatureMembership_Mapping.getMapped (from) )

```

### 7.7.2.3.5.7 DOADestroyActionUsage\_Mapping

## Description

The mapping class creates the action usage for the destroy function.

## General Mappings

GenericToActionUsage\_Mapping

## Mapping Source

DestroyObjectAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActionUsage::ownedRelationship () : Relationship [0..*]`

```
Set { DOADestroyActionUsageFeatureTyping_Mapping.getMapped (from) ,  
      DOADestroyActionUsageFeatureMembership_Mapping.getMapped (from) }
```

#### 7.7.2.3.5.8 DOADestroyActionUsageFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

DestroyObjectAction

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
DOADestroyActionUsageReferenceUsage_Mapping.getMapped (from)
```

#### 7.7.2.3.5.9 DOADestroyActionUsageFeatureReferenceExpression\_Mapping

##### Description

The mapping class creates the feature reference expression for the `UML4SysML::DestroyObjectAction` mapping.

## General Mappings

GenericToFeatureReferenceExpression\_Mapping

## Mapping Source

DestroyObjectAction

## Mapping Target

FeatureReferenceExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]  

```
Set{DOADestroyActionUsageMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

### 7.7.2.3.5.10 DOADestroyActionUsageMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source

DestroyObjectAction

#### Mapping Target

Membership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

`from.target`

### 7.7.2.3.5.11 DOADestroyActionUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

DestroyObjectAction

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
SysMLv2::Function.allInstances(  
  )->any(e | e.qualifiedName = 'OccurrenceFunctions::destroy')
```

### 7.7.2.3.5.12 DOADestroyActionUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

DestroyObjectAction

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

`DOADestroyActionUsageFeatureReferenceExpression_Mapping.getMapped(from)`

#### 7.7.2.3.5.13 DOADestroyActionUsageReferenceUsage\_Mapping

### Description

Creates a reference usage.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

DestroyObjectAction

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set{DOADestroyActionUsageFeatureValue_Mapping.getMapped(from)}
```

#### 7.7.2.3.5.14 DOADestroyFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

DestroyObjectAction

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
DOADestroyActionUsage_Mapping.getMapped(from)
```

#### 7.7.2.3.5.15 ReadIsClassifiedObjectAction\_Mapping

##### Description

The UML4SysML::ReadIsClassifiedObjectAction is conceptually mapped to a SysML v2 ActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
  action sysMLv1ReadIsClassifiedObjectActionDirect {
    in object;
    out result : ScalarValues::Boolean =
      object istype ThisIsABlock;
  }

  action sysMLv1ReadIsClassifiedObjectActionNonDirect {
    in object;
    out result : ScalarValues::Boolean =
      object hastype ThisIsABlock;
  }
}
```



```
}  
}
```

### **General Mappings**

CommonAction\_Mapping

### **Mapping Source**

ReadIsClassifiedObjectAction

### **Mapping Target**

ActionUsage

### **Owned Mappings**

(none)

#### **7.7.2.3.5.16 RICOAFeatureValue\_Mapping**

### **Description**

Creates a feature value relationship.

### **General Mappings**

GenericToFeatureValue\_Mapping

### **Mapping Source**

ReadIsClassifiedObjectAction

### **Mapping Target**

FeatureValue

### **Owned Mappings**

(none)

### **Applicable filters**

(none)

### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
RICOAFeatureValueOperatorExpression_Mapping.getMapped (from)
```

#### 7.7.2.3.5.17 RICOAFeatureValueOperatorExpression\_Mapping

##### Description

The mapping class creates the operator expression for the UML4SysML::ReadIsClassifiedObjectAction mapping.

##### General Mappings

GenericToOperatorExpression\_Mapping

##### Mapping Source

ReadIsClassifiedObjectAction

##### Mapping Target

OperatorExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OperatorExpression::ownedRelationship () : Relationship [0..\*]  
`Set{RICOAFeatureValueOperatorParameterMembership_Mapping.getMapped(from) }`
- OperatorExpression::operator () : String [1]  
`if from.isDirect then 'istype' else 'hastype' endif`

#### 7.7.2.3.5.18 RICOAFeatureValueOperatorExpressionFeature\_Mapping

##### Description

The mapping class creates the feature for the operator expression of the UML4SysML::ReadIsClassifiedObjectAction mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

ReadIsClassifiedObjectAction

##### Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`  
`Set { RICOAFeatureValueOperatorExpressionFeatureValue_Mapping.getMapped (from) }`
- `Feature::direction () : FeatureDirectionKind [0..1]`  
`KerML::FeatureDirectionKind::_in'`

### 7.7.2.3.5.19 RICOAFeatureValueOperatorExpressionFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

ReadIsClassifiedObjectAction

#### Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`  
`RICOAFeatureValueOperatorFeatureReferenceExpression_Mapping.getMapped (from)`

#### 7.7.2.3.5.20 RICOAFeatureValueOperatorFeatureReferenceExpression\_Mapping

##### Description

The mapping class creates the feature reference expression for the UML4SysML::ReadIsClassifiedObjectAction mapping.

##### General Mappings

GenericToFeatureReferenceExpression\_Mapping

##### Mapping Source

ReadIsClassifiedObjectAction

##### Mapping Target

FeatureReferenceExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set { RICOAFeatureValueOperatorMembership_Mapping.getMapped (from) ,  
CommonReturnParameterFeatureMembership_Mapping.getMapped (from) }
```

#### 7.7.2.3.5.21 RICOAFeatureValueOperatorMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

ReadIsClassifiedObjectAction

##### Mapping Target

Membership

##### Owned Mappings

(none)

#### 7.7.2.3.5.22 RICOAFeatureValueOperatorParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

ReadIsClassifiedObjectAction

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`RICOAFeatureValueOperatorExpressionFeature_Mapping.getMapped(from)`
- ParameterMembership::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::private`

#### 7.7.2.3.5.23 RICOAOutputPin\_Mapping

##### Description

The mapping class creates the output parameter of the ActionUsage element for the UML4SysML::ReadIsClassifiedObjectAction mapping.

##### General Mappings

No general mappings.

##### Mapping Source

OutputPin

##### Mapping Target

No target element.

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.oclIsTypeOf(UML::ReadIsClassifiedObjectAction)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ownedRelationship () : Relationship [0..*]`  

```
Set{PinFeatureTyping_Mapping.getMapped(from),  
RICOAFeatureValue_Mapping.getMapped(from.owner),  
MultiplicityMembership_Mapping.getMapped(from)}
```

#### 7.7.2.3.5.24 ReadExtentAction\_Mapping

##### Description

A `UML4SysML::ReadExtentAction` is mapped to a SysML v2 `ActionUsage`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1ReadExtentAction {  
        out thisIsTheOutputPin : SysMLv1Block =  
            all SysMLv1Block;  
    }  
}  
part def SysMLv1Block;
```

### General Mappings

`CommonAction_Mapping`

### Mapping Source

`ReadExtentAction`

### Mapping Target

`ActionUsage`

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActionUsage::ownedRelationship () : Relationship [0..*]`  
`Helper.actionOwnedRelationship (from)`

#### 7.7.2.3.5.25 REAFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`  
`REAFeatureValueOperatorExpression_Mapping.getMapped (from)`

#### 7.7.2.3.5.26 REAFeatureValueOperatorExpression\_Mapping

##### Description

The mapping class creates the operator expression for the UML4SysML::ReadExtentAction mapping.

##### General Mappings

GenericToOperatorExpression\_Mapping

## Mapping Source

OutputPin

## Mapping Target

OperatorExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OperatorExpression::operator () : String [1]  
`'all'`
- OperatorExpression::ownedRelationship () : Relationship [0..\*]  
`Set { REAFeatureValueOperatorExpressionMembership_Mapping.getMapped (from) ,  
CommonReturnParameterFeatureMembership_Mapping.getMapped (from) }`

### 7.7.2.3.5.27 REAFeatureValueOperatorExpressionFeature\_Mapping

#### Description

The mapping class creates the feature for the operator expression for the UML4SysML::ReadExtentAction mapping.

#### General Mappings

GenericToFeature\_Mapping

#### Mapping Source

OutputPin

#### Mapping Target

Feature

#### Owned Mappings

(none)

#### Applicable filters

(none)



## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set { REAFeatureValueOperatorExpressionFeatureTyping_Mapping.getMapped (from) }
```

### 7.7.2.3.5.28 REAFeatureValueOperatorExpressionFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

OutputPin

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
from.owner.classifier
```

### 7.7.2.3.5.29 REAFeatureValueOperatorExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

OutputPin

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
REAFeatureValueOperatorExpressionFeature_Mapping.getMapped(from)
```

#### 7.7.2.3.5.30 REAOutputPin\_Mapping

### Description

The mapping class creates the output parameter of the ActionUsage for the mapping of UML4SysML::ReadExtentAction.

### General Mappings

Pin\_Mapping

### Mapping Source

OutputPin

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.oclIsTypeOf(UML::ReadExtentAction)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set {TypedElementFeatureTyping_Mapping.getMapped(from),  
    REAFeatureValue_Mapping.getMapped(from)}  
->union(self.oclassType(Pin_Mapping).ownedRelationship())
```

#### **7.7.2.3.5.31 ReadSelfAction\_Mapping**

##### **Description**

A `UML4SysML::ReadSelfAction` is mapped to a SysML v2 `ActionUsage`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1ReadSelfAction {  
        out : Base::Anything = this;  
    }  
}
```

##### **General Mappings**

`CommonAction_Mapping`

##### **Mapping Source**

`ReadSelfAction`

##### **Mapping Target**

`ActionUsage`

##### **Owned Mappings**

(none)

#### **7.7.2.3.5.32 RSAFeatureValue\_Mapping**

##### **Description**

Creates a feature value relationship.

##### **General Mappings**

`GenericToFeatureValue_Mapping`

##### **Mapping Source**

`OutputPin`

##### **Mapping Target**

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
RSAFeatureValueFeatureReferenceExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.5.33 RSAFeatureValueFeatureReferenceExpression\_Mapping

### Description

The mapping class creates the feature reference expression for the mapping of UML4SysML::ReadSelfAction.

### General Mappings

GenericToFeatureReferenceExpression\_Mapping

### Mapping Source

OutputPin

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set{RSAFeatureValueMembership_Mapping.getMapped(from),  
CommonReturnParameterFeatureMembership_Mapping.getMapped(from)}
```

#### 7.7.2.3.5.34 RSAFeatureValueMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

Membership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  

```
SysML2::Feature.allInstances()  
->any(e | e.qualifiedName = 'Occurrences::Occurrence::this')
```

#### 7.7.2.3.5.35 RSAOutputPin\_Mapping

##### Description

The mapping class creates the output parameter of the ActionUsage for the mapping of UML4SysML::ReadSelfAction.

##### General Mappings

Pin\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.ocIsKindOf(UML::ReadSelfAction)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::isUnique () : Boolean [1]

```
false
```

- ReferenceUsage::isAbstract () : Boolean [1]

```
true
```

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set{TypedElementFeatureTyping_Mapping.getMapped(from),  
RSAFeatureValue_Mapping.getMapped(from)}  
->union(self.ocAsType(Pin_Mapping).ownedRelationship())
```

#### 7.7.2.3.5.36 ReclassifyObjectAction\_Mapping

##### Description

The UML4SysML::ReclassifyObjectAction is not supported by SysML v2. It is mapped to an empty action usage to keep the connections within the activity respectively action definition.

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

ReclassifyObjectAction

##### Mapping Target

ActionUsage

##### Owned Mappings

(none)

#### 7.7.2.3.5.37 TestIdentityAction\_Mapping

##### Description

A UML4SysML::TestIdentityAction is mapped to a SysML v2 ActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
    action sysMLv1TestIdentityAction {
        in firstParameter;
        in secondParameter;
        out result : ScalarValues::Boolean =
            firstParameter == secondParameter;
    }
}
```

## General Mappings

CommonAction\_Mapping

### Mapping Source

TestIdentityAction

### Mapping Target

CalculationUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- CalculationUsage::ownedRelationship () : Relationship [0..\*]  

```
Helper.actionOwnedRelationship(from)
->including(TIAResultExpressionMembership_Mapping.getMapped(from))
```

### 7.7.2.3.5.38 TIAOperatorExpression\_Mapping

#### Description

The mapping class creates the operator expression for the UML4SysML::TestIdentityAction mapping.

## General Mappings

GenericToOperatorExpression\_Mapping

### Mapping Source

TestIdentityAction

### Mapping Target

OperatorExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OperatorExpression::operator () : String [1]  
`'=='`
- OperatorExpression::ownedRelationship () : Relationship [0..\*]  
`Set {EqualOperatorExpressionOperandParameterMembership_Mapping.getMapped(from.first),  
EqualOperatorExpressionOperandParameterMembership_Mapping.getMapped(from.second),  
CommonReturnParameterFeatureMembership_Mapping.getMapped(from.result)}`

#### 7.7.2.3.5.39 TIAResultExpressionMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

TestIdentityAction

### Mapping Target

ResultExpressionMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ResultExpressionMembership::ownedMemberFeature () : Feature [0..1]

`TIAOperatorExpression_Mapping.getMapped(from)`

#### 7.7.2.3.5.40 ValueSpecificationAction\_Mapping

##### Description

A UML4SysML::ValueSpecificationAction is mapped to a SysML v2 ActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Acticity {
  action sysMLv1ValueSpecificationAction1 {
    out result : ScalarValues::Integer = 42;
  }

  action sysMLv1ValueSpecificationAction2 {
    out result = sysMLv1OpaqueExpression.result;
    calc sysMLv1OpaqueExpression {
      language "Math"
      /*
      * 42 + 23
      */
    }
  }
}
```

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

ValueSpecificationAction

##### Mapping Target

ActionUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActionUsage::ownedRelationship () : Relationship [0..*]`

```
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Pin)) in
let toElementOMS: Set(UML::Element) =
    (from.ownedElement - toElementFMS) - Set{from.value} in
toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e))
->union(toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e)))
```

#### 7.7.2.3.5.41 VSAOutputPin\_Mapping

##### Description

The mapping class creates the output parameter of the ActionUsage for the mapping of UML4SysML::ValueSpecificationAction.

##### General Mappings

Pin\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.ocIsKindOf(UML::ValueSpecificationAction)
```

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
let relationships : Set(KerML::Relationship) = self.ocIsType(Pin_Mapping).ownedRelationship
->including(VSAOutputPinFeatureValue_Mapping.getMapped(from)) in
if from.type.ocIsUndefined() then
    relationships
else
    relationships->including(TypedElementFeatureTyping_Mapping.getMapped(from))
endif
```

#### 7.7.2.3.5.42 VSAOutputPinFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

OutputPin

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]  

```
if from.owner.value.ocliIsTypeOf(UML::OpaqueExpression) then
    OpaqueExpressionAsValue_Mapping.getMapped(from.owner.value)
else
    from.owner.value
endif
```

#### 7.7.2.3.6 Other Actions

##### 7.7.2.3.6.1 RaiseExceptionAction\_Mapping

##### Description

The UML4SysML::RaiseExceptionAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

RaiseExceptionAction

##### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.6.2 ReduceAction\_Mapping

##### Description

The UML4SysML::ReduceAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

ReduceAction

##### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.7 Structural Feature Actions

##### 7.7.2.3.7.1 AddStructuralFeatureValueAction\_Mapping

##### Description

A UML4SysML::AddStructuralFeatureValueAction is mapped to a SysML v2 ActionUsage defined by the SysML v1 library action definition SysMLv1Library::AddStructuralFeatureValueAction.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action thisIsAAddStructuralFeatureValueAction : SysMLv1Library::AddStructuralFeatureValueAction {
    :>> target := object.thisIsAnAttribute;
    :>> object : ThisIsABlock;
}
part def SysMLv1Block {
    attribute sysMLv1Property;
}
```

##### General Mappings

CommonAction\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  

```
Set {ASFVAFeatureTyping_Mapping.getMapped(from),  
    ASFVATargetFeatureMembership_Mapping.getMapped(from),  
    ASFVAObjectFeatureMembership_Mapping.getMapped(from)}
```

#### 7.7.2.3.7.2 ASFVAFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
SysML2::ActionDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AddStructuralFeatureValueAction')
```

#### 7.7.2.3.7.3 ASFVAObjectFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ASFVAObjectReferenceUsage_Mapping.getMapped(from)
```

#### 7.7.2.3.7.4 ASFVAObjectReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

UniqueMapping

GenericToReferenceUsage\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{ASFVAObjectReferenceUsageRedefinition_Mapping.getMapped(from) ,  
ASFVAObjectReferenceUsageFeatureTyping_Mapping.getMapped(from) }
```

### 7.7.2.3.7.5 ASFVAObjectReferenceUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

AddStructuralFeatureValueAction

#### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
from.structuralFeature.owner
```

### 7.7.2.3.7.6 ASFVAObjectReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

### General Mappings

GenericToRedefinition\_Mapping

### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Redefinition::redefinedFeature () : Feature [1]  

```
SYSMML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AddStructuralFeatureValueAction::object')
```

#### 7.7.2.3.7.7 ASFVATargetFeatureChainExpression\_Mapping

### Description

The mapping class creates the feature chain expression element for the target element of the UML4SysML::AddStructuralFeatureValueAction mapping.

### General Mappings

GenericToFeatureChainExpression\_Mapping

### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

FeatureChainExpression

### Owned Mappings

(none)

### Applicable filters



(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureChainExpression::ownedRelationship () : Relationship [0..*]`  

```
Set {ASFVATargetParameterMembership_Mapping.getMapped(from),  
ASFVATargetParameterFeatureExpressionMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

#### 7.7.2.3.7.8 ASFVATargetFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  

```
ASFVATargetReferenceUsage_Mapping.getMapped(from)
```

#### 7.7.2.3.7.9 ASFVATargetFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]  
`ASFVATargetFeatureChainExpression_Mapping.getMapped(from)`
- FeatureValue::isInitial () : Boolean [1]  
`true`

#### 7.7.2.3.7.10 ASFVATargetParameterExpressionFeature\_Mapping

##### Description

The mapping class creates the feature element of the feature reference expression for the target element of the UML4SysML::AddStructuralFeatureValueAction mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

Feature

##### Owned Mappings

(none)

#### 7.7.2.3.7.11 ASFVATargetParameterExpressionFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

AddStructuralFeatureValueAction

## Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`ASFVATargetParameterExpressionFeature_Mapping.getMapped(from)`

### 7.7.2.3.7.12 ASFVATargetParameterExpressionMembership\_Mapping

## Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToMembership\_Mapping

## Mapping Source

AddStructuralFeatureValueAction

## Mapping Target

Membership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

```
ASFVAObjectReferenceUsage_Mapping.getMapped(from)
```

#### 7.7.2.3.7.13 ASFVATargetParameterFeature\_Mapping

##### Description

The mapping class creates the feature element for the target element of the UML4SysML::AddStructuralFeatureValueAction mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set{ASFVATargetParameterFeatureValue_Mapping.getMapped(from),  
ASFVATargetParameterExpressionFeatureMembership_Mapping.getMapped(from)}
```

- Feature::direction () : FeatureDirectionKind [0..1]

```
KerML::FeatureDirectionKind::_in'
```

#### 7.7.2.3.7.14 ASFVATargetParameterFeatureExpressionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

**Mapping Source**

AddStructuralFeatureValueAction

**Mapping Target**

Membership

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

`from. structuralFeature`

**7.7.2.3.7.15 ASFVATargetParameterFeatureReferenceExpression\_Mapping****Description**

The mapping class creates the feature reference expression element for the target element of the UML4SysML::AddStructuralFeatureValueAction mapping.

**General Mappings**

GenericToFeatureReferenceExpression\_Mapping

**Mapping Source**

AddStructuralFeatureValueAction

**Mapping Target**

FeatureReferenceExpression

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`

```
Set{ASFVATargetParameterExpressionMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

#### 7.7.2.3.7.16 ASFVATargetParameterFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
ASFVATargetParameterFeatureReferenceExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.7.17 ASFVATargetParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

ParameterMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::private`
- ParameterMembership::ownedMemberParameter () : Feature [1]  
`ASFVATargetParameterFeature_Mapping.getMapped(from)`

#### 7.7.2.3.7.18 ASFVATargetReferenceUsage\_Mapping

### Description

Creates a reference usage.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

AddStructuralFeatureValueAction

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  

```
Set{ASFVATargetReferenceUsageRedefinition_Mapping.getMapped(from),
ASFVATargetFeatureValue_Mapping.getMapped(from),
AssignmentActionUsageOwningMembership_Factory.create() }
```

#### 7.7.2.3.7.19 ASFVATargetReferenceUsageRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

##### General Mappings

GenericToRedefinition\_Mapping

##### Mapping Source

AddStructuralFeatureValueAction

##### Mapping Target

Redefinition

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SysML2::ReferenceUsage.allInstances()
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction::target')
```

#### 7.7.2.3.7.20 ClearStructuralFeatureAction\_Mapping

##### Description

The UML4SysML::ClearStructuralFeatureAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### General Mappings

CommonAction\_Mapping

##### Mapping Source



ClearStructuralFeatureAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.7.21 ReadStructuralFeatureAction\_Mapping

### Description

A UML4SysML::ReadStructuralFeatureAction is mapped to a SysML v2 ActionUsage that returns the value of the specified structural feature of the given object.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    action sysMLv1ReadStructuralFeatureAction {  
        in object : SysMLv1Block;  
        out result = object.sysMLv1Property;  
    }  
}  
part def SysMLv1Block {  
    attribute sysMLv1Property;  
}
```

### General Mappings

CommonAction\_Mapping

### Mapping Source

ReadStructuralFeatureAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActionUsage::ownedRelationship () : Relationship [0..*]`

```
Helper.actionOwnedRelationship (from)
->including (RSFAReferenceUsageFeatureMembership_Mapping.getMapped (from) )
```

#### **7.7.2.3.7.22 RSFAReferenceUsage\_Mapping**

##### **Description**

Creates a reference usage.

##### **General Mappings**

GenericToReferenceUsage\_Mapping

##### **Mapping Source**

ReadStructuralFeatureAction

##### **Mapping Target**

ReferenceUsage

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`

```
KerML::FeatureDirectionKind::_out'
```

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set { RSFAReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

#### **7.7.2.3.7.23 RSFAReferenceUsageExpressionFeature\_Mapping**

##### **Description**

The mapping class creates the feature of the feature chain expression for the reference usage of the UML4SysML::ReadStructuralFeatureValueAction mapping.

##### **General Mappings**

GenericToFeature\_Mapping

### Mapping Source

ReadStructuralFeatureAction

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set { RSFAReferenceUsageExpressionFeatureValue_Mapping.getMapped (from) ,  
      RSFAReferenceUsageExpressionFeatureMembership_Mapping.getMapped (from) }
```

#### 7.7.2.3.7.24 RSFAReferenceUsageExpressionFeatureMembership\_Mapping

### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

ReadStructuralFeatureAction

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
RSFAReferenceUsageFeatureChainExpressionFeature_Mapping.getMapped(from)
```

#### 7.7.2.3.7.25 RSFAReferenceUsageExpressionFeatureReferenceExpression\_Mapping

##### Description

The mapping class creates the feature reference expression element for the UML4SysML::RemoveStructuralFeatureValueAction mapping.

##### General Mappings

GenericToFeatureReferenceExpression\_Mapping

##### Mapping Source

ReadStructuralFeatureAction

##### Mapping Target

FeatureReferenceExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set { RSFAReferenceUsageExpressionFeatureMembership_Mapping.getMapped(from) ,  
ReturnParameterFeatureMembership_Factory.create() }
```

#### 7.7.2.3.7.26 RSFAReferenceUsageExpressionFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

ReadStructuralFeatureAction

## Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

`RSFReferenceUsageExpressionFeatureReferenceExpression_Mapping.getMapped(from)`

### 7.7.2.3.7.27 RSFReferenceUsageFeatureChainExpression\_Mapping

## Description

The mapping class creates the feature chain expression element for the reference usage of the UML4SysML::ReadStructuralFeatureValueAction mapping.

## General Mappings

GenericToFeatureChainExpression\_Mapping

## Mapping Source

ReadStructuralFeatureAction

## Mapping Target

FeatureChainExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChainExpression::ownedRelationship () : Relationship [0..\*]

```

    Set { RSFAReferenceUsageParameterMembership_Mapping.getMapped(from) ,
    RSFAReferenceUsageMembership_Mapping.getMapped(from) ,
    ReturnParameterFeatureMembership_Factory.create() }

```

#### 7.7.2.3.7.28 RSFAReferenceUsageFeatureChainExpressionFeature\_Mapping

##### Description

The mapping class creates the feature element for the feature chain expression for the UML4SysML::RemoveStructuralFeatureValueAction mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

ReadStructuralFeatureAction

##### Mapping Target

Feature

##### Owned Mappings

(none)

#### 7.7.2.3.7.29 RSFAReferenceUsageFeatureChainExpressionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

ReadStructuralFeatureAction

##### Mapping Target

Membership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

`from.structuralFeature`

#### **7.7.2.3.7.30 RSFAReferenceUsageFeatureMembership\_Mapping**

##### **Description**

Creates a feature membership relationship for *ownedMemberFeature()*.

##### **General Mappings**

GenericToFeatureMembership\_Mapping

##### **Mapping Source**

ReadStructuralFeatureAction

##### **Mapping Target**

FeatureMembership

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

`RSFAReferenceUsageFeatureValue_Mapping.getMapped(from)`

#### **7.7.2.3.7.31 RSFAReferenceUsageFeatureValue\_Mapping**

##### **Description**

Creates a feature value relationship.

##### **General Mappings**

GenericToFeatureValue\_Mapping

##### **Mapping Source**

ReadStructuralFeatureAction

##### **Mapping Target**

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
RSFAReferenceUsageFeatureChainExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.7.32 RSFAReferenceUsageMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

##### Mapping Source

ReadStructuralFeatureAction

##### Mapping Target

Membership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

```
from.object
```

#### 7.7.2.3.7.33 RSFAReferenceUsageParameterMembership\_Mapping

##### Description



Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToParameterMembership\_Mapping

### Mapping Source

ReadStructuralFeatureAction

### Mapping Target

ParameterMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`RSFReferenceUsageExpressionFeature_Mapping.getMapped (from)`

#### 7.7.2.3.7.34 RemoveStructuralFeatureValueAction\_Mapping

### Description

The UML4SysML::RemoveStructuralFeatureValueAction is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

### General Mappings

CommonAction\_Mapping

### Mapping Source

RemoveStructuralFeatureValueAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

#### 7.7.2.3.8 Structured Actions

#### **7.7.2.3.8.1 LoopNode\_Mapping**

##### **Description**

The UML4SysML::LoopNode is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### **General Mappings**

StructuredActivityNode\_Mapping

##### **Mapping Source**

LoopNode

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

#### **7.7.2.3.8.2 SequenceNode\_Mapping**

##### **Description**

The UML4SysML::SequenceNode is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### **General Mappings**

CommonAction\_Mapping

StructuredActivityNode\_Mapping

##### **Mapping Source**

SequenceNode

##### **Mapping Target**

ActionUsage

##### **Owned Mappings**

(none)

#### **7.7.2.3.8.3 StructuredActivityNode\_Mapping**

##### **Description**

The UML4SysML::StructuredActivityNode is mapped to a SysML v2 ActionUsage. The details of the mapping are not defined yet.

##### **General Mappings**

CommonAction\_Mapping

## Mapping Source

StructuredActivityNode

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```
let initialNodes : Set(UML::Element) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::InitialNode)) in
let finalNodes : Set(UML::Element) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::FinalNode)) in
let objectFlowsWithGuard : Set(UML::ObjectFlow) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::ObjectFlow)
    and not e.ocIsType(UML::ObjectFlow).guard.ocIsUndefined()) in
let objectFlows : Set(UML::ObjectFlow) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::ObjectFlow)) in
let ignoreInterruptibleActivityRegion: Set(UML::InterruptibleActivityRegion) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::InterruptibleActivityRegion)) in
let elementsFMS : Set(UML::Element) =
  ((from.ownedElement->select(e | e.ocIsKindOf(UML::ControlNode) or
    e.ocIsKindOf(UML::Action) or (e.ocIsKindOf(UML::ControlFlow) or
    e.ocIsKindOf(UML::Pin))) - initialNodes) - finalNodes) in
let elementsOMS: Set(UML::Element) =
  (((((from.ownedElement-initialNodes)-finalNodes)-objectFlowsWithGuard)
    -objectFlows)-elementsFMS)-ignoreInterruptibleActivityRegion) in
elementsOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(elementsFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(initialNodes->collect(e | InitialNodeMembership_Mapping.getMapped(e)))
->union(finalNodes->collect(e | FlowFinalNodeMembership_Mapping.getMapped(e)))
->union(objectFlowsWithGuard
  ->collect(e | ObjectFlowGuardFeatureMembership_Mapping.getMapped(e)))
->union(objectFlows->collect(e | ObjectFlowFeatureMembership_Mapping.getMapped(e)))
```

### 7.7.2.3.9 Variable Actions

#### 7.7.2.3.9.1 AddVariableValueAction\_Mapping

##### Description

A UML4SysML::AddVariableValueAction is mapped to a SysML v2 ActionUsage defined by the SysML v1 library action definition SysMLv1Library::AddValueAction. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action def SysMLv1Activity {
    private attribute sysMLv1Variable1 : ScalarValues::Integer;
    private attribute sysMLv1Variable2 [0..*] : ScalarValues::Integer;

    action sysMLv1AddVariableValueAction1 : SysMLv1Library::AddValueAction {
        :>> target := sysMLv1Variable1;
    }

    action sysMLv1AddVariableValueAction1 : SysMLv1Library::AddValueAction {
        :>> target := thisIsAVariable;
        :>> isReplaceAll := true;
    }
}

```

## General Mappings

CommonAction\_Mapping

### Mapping Source

AddVariableValueAction

### Mapping Target

ActionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```

let relationships : Set(KerML::Relationship) =
Set{AVVAFeatureTyping_Mapping.getMapped(from)}
->including(AVVAVariableFeatureMembership_Mapping.getMapped(from)) in
if from.isReplaceAll then
    relationships->including(AVVAIsReplaceAllFeatureMembership_Mapping.getMapped(from))
else
    relationships
endif

```

#### 7.7.2.3.9.2 AVVAFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

AddVariableValueAction

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  

```
SysML2::ActionDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction')
```

#### 7.7.2.3.9.3 AVVAFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

AddVariableValueAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
AVVAValueFeatureReferenceExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.9.4 AVVAIsReplaceAll\_Mapping

##### Description

The mapping class creates a reference usage element as mapping target for the `AddVariableValueAction::isReplaceAll` property.

##### General Mappings

`GenericToReferenceUsage_Mapping`

##### Mapping Source

`AddVariableValueAction`

##### Mapping Target

`ReferenceUsage`

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{AVVAIsReplaceAllRedefinition_Mapping.getMapped(from),  
AVVAIsReplaceAllValue_Mapping.getMapped(from),  
AssignmentActionUsageOwningMembership_Factory.create() }
```

#### 7.7.2.3.9.5 AVVAIsReplaceAllFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

AddVariableValueAction

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`AVVAIsReplaceAll_Mapping.getMapped(from)`

#### 7.7.2.3.9.6 AVVAIsReplaceAllRedefinition\_Mapping

### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

### General Mappings

GenericToRedefinition\_Mapping

### Mapping Source

AddVariableValueAction

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction::isReplaceAll')
```

### 7.7.2.3.9.7 AVVAIsReplaceAllValue\_Mapping

#### Description

The mapping class maps the value of the `AddVariableValueAction::isReplaceAll` property.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

AddVariableValueAction

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
LiteralBoolean_Factory.create(from.isReplaceAll)
```

### 7.7.2.3.9.8 AVVAValueExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source



AddVariableValueAction

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
`from.variable`

#### 7.7.2.3.9.9 AVVAValueFeatureReferenceExpression\_Mapping

### Description

The mapping class creates the feature reference expression element for the UML4SysML::AddStructuralFeatureValueAction mapping.

### General Mappings

GenericToFeatureReferenceExpression\_Mapping

### Mapping Source

AddVariableValueAction

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set{AVVAValueExpressionMembership_Mapping.getMapped(from) ,
ReturnParameterFeatureMembership_Factory.create() }
```

#### 7.7.2.3.9.10 AVVAVariable\_Mapping

##### Description

The mapping class creates a reference usage element for the UML4SysML::AddVariableValueAction mapping.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

AddVariableValueAction

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set{AVVAVariableRedefinition_Mapping.getMapped(from) ,
AVVAFeatureValue_Mapping.getMapped(from) ,
AssignmentActionUsageOwningMembership_Factory.create() }
```

#### 7.7.2.3.9.11 AVVAVariableFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

AddVariableValueAction

##### Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
AVVAVariable_Mapping.getMapped(from)
```

### 7.7.2.3.9.12 AVVAVariableRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

AddVariableValueAction

#### Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction::target')
```

### 7.7.2.3.9.13 ClearVariableAction\_Mapping

#### Description

The UML4SysML::ClearVariableAction is mapped to a SysML v2 ActionUsage that sets the attribute usage representing the variable to null.

The expected SysML v2 textual notation of a SysMLv1::ClearVariableAction is as follows

```
action def SysMLv1Activity {
    private attribute sysMLv1Variable : ScalarValues::Integer;

    action sysMLv1ClearVariableAction {
        sysMLv1Variable := null;
    }
}
```

## General Mappings

CommonAction\_Mapping

## Mapping Source

ClearVariableAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  
    Helper.actionOwnedRelationship (from)  
    ->including (CVAFeatureMembership\_Mapping.getMapped (from) )

### 7.7.2.3.9.14 CVAFeatureMembership\_Mapping

## Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

ClearVariableAction

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`CVAReferenceUsage_Mapping.getMapped(from)`

#### 7.7.2.3.9.15 CVAReferenceUsage\_Mapping

### Description

Creates a reference usage.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

ClearVariableAction

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::declaredName () : String [0..1]  
`from.variable.name`

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set { CVAReferenceUsageFeatureValue_Mapping.getMapped(from),
AssignmentActionUsageOwningMembership_Factory.create() }
```

#### 7.7.2.3.9.16 CVAReferenceUsageFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

ClearVariableAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
LiteralNull_Factory.create()
```

#### 7.7.2.3.9.17 ReadVariableAction\_Mapping

##### Description

A `UML4SysML::ReadVariableValueAction` is mapped to a SysML v2 `ActionUsage` with an out parameter that returns the value of the attribute usage that is the transformation target of the `UML4SysML::Variable`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
  private attribute sysMLv1Variable : ScalarValues::Integer;

  action sysMLv1ReadVariableAction {
    out result : ScalarValues::Integer = sysMLv1Variable;
  }
}
```

## General Mappings

CommonAction\_Mapping

## Mapping Source

ReadVariableAction

## Mapping Target

ActionUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  
`Set{RVAFeatureMembership_Mapping.getMapped(from) }`

### 7.7.2.3.9.18 RVAFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ReadVariableAction

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`RVAReferenceUsage_Mapping.getMapped(from.result)`

### 7.7.2.3.9.19 RVAReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Pin

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
let featureTyping : Set(KerML::FeatureTyping) =  
  if from.type.ocIsUndefined() then  
    Set{}  
  else  
    Set{RVAReferenceUsageFeatureTyping_Mapping.getMapped(from)}  
  endif in  
featureTyping  
->including(RVAReferenceUsageFeatureValue_Mapping.getMapped(from))
```

### 7.7.2.3.9.20 RVAReferenceUsageFeatureReferenceExpression\_Mapping

#### Description

The mapping class creates the feature reference expression element for the UML4SysML::ReadVariableAction mapping.



## General Mappings

GenericToFeatureReferenceExpression\_Mapping

## Mapping Source

Pin

## Mapping Target

FeatureReferenceExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]

```
Set{RVAResponseUsageExpressionMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

### 7.7.2.3.9.21 RVAResponseUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

TypedElementFeatureTyping\_Mapping

#### Mapping Source

Pin

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

### 7.7.2.3.9.22 RVAResponseUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

Pin

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
RVAReferenceUsageFeatureReferenceExpression_Mapping.getMapped(from)
```

### 7.7.2.3.9.23 RVAReferenceUsageExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToMembership\_Mapping

### Mapping Source

Pin

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
`from.owner.oclAsType(UML::ReadVariableAction).variable`

### 7.7.2.3.9.24 RemoveVariableValueAction\_Mapping

#### Description

A UML4SysML::RemoveVariableValueAction is mapped to a SysML v2 ActionUsage defined by the SysML v1 library action definition SysMLv1Library::RemoveVariableValueAction.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    private sysMLv1Variable : ScalarValues::Integer;  
  
    action sysMLv1RemoveVariableValueAction  
        : SysMLv1Library::RemoveVariableValueAction {  
        :>> variable := sysMLv1Variable;  
    }  
}
```

#### General Mappings

CommonAction\_Mapping

#### Mapping Source

RemoveVariableValueAction

#### Mapping Target

ActionUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]

```

    Helper.actionOwnedRelationship(from)
->including(RVVAFeatureTyping_Mapping.getMapped(from))
->including(RVVAVariableFeatureMembership_Mapping.getMapped(from))

```

#### 7.7.2.3.9.25 RVVAFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

RemoveVariableValueAction

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type() : Type [1]
 

```

SYSML2::ActionDefinition.allInstances()
->any(m | m.qualifiedName = 'SysMLv1Library::RemoveVariableValueAction')

```

#### 7.7.2.3.9.26 RVVAVariable\_Mapping

##### Description

The mapping class creates a reference usage element for the UML4SysML::RemoveVariableValueAction mapping.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

RemoveVariableValueAction

##### Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{RVVAVariableRedefinition_Mapping.getMapped(from),  
RVVAVariableFeatureValue_Mapping.getMapped(from),  
AssignmentActionUsageOwningMembership_Factory.create() }
```

### 7.7.2.3.9.27 RVVAVariableExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source

RemoveVariableValueAction

#### Mapping Target

Membership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Membership::memberElement () : Element [1]`

```
from.variable
```

### 7.7.2.3.9.28 RVVAVariableFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

RemoveVariableValueAction

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`RVVAVariable_Mapping.getMapped(from)`

### 7.7.2.3.9.29 RVVAVariableFeatureReferenceExpression\_Mapping

#### Description

The mapping class creates the feature reference expression element for the UML4SysML::RemoveVariableValueAction mapping.

### General Mappings

GenericToFeatureReferenceExpression\_Mapping

### Mapping Source

RemoveVariableValueAction

### Mapping Target

FeatureReferenceExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`  

```
Set{RVVAVariableExpressionMembership_Mapping.getMapped(from) ,  
ReturnParameterFeatureMembership_Factory.create() }
```

#### 7.7.2.3.9.30 RVVAVariableFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

RemoveVariableValueAction

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`  

```
RVVAVariableFeatureReferenceExpression_Mapping.getMapped(from)
```

#### 7.7.2.3.9.31 RVVAVariableRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

##### General Mappings

GenericToRedefinition\_Mapping

## Mapping Source

RemoveVariableValueAction

## Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SysML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RemoveVariableValueAction::variable')
```

## 7.7.3 Activities

This chapter lists all mapping specifications of UML4SysML::Activities model elements.

### 7.7.3.1 Overview

Table 3. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Activity	ViewDefinition ActionDefinition RequirementUsage
ActivityFinalNode	not mapped; see next section
ActivityParameterNode	not mapped; see next section
ActivityPartition	not mapped; see next section
CentralBufferNode	ActionUsage
ControlFlow	TransitionUsage SuccessionAsUsage
DataStoreNode	ActionUsage
DecisionNode	DecisionNode
ExceptionHandler	not mapped; see next section
FlowFinalNode	not mapped; see next section
ForkNode	ForkNode



SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
InitialNode	not mapped; see next section
InterruptibleActivityRegion	not mapped; see next section
JoinNode	JoinNode
MergeNode	MergeNode
ObjectFlow	TransitionUsage SuccessionFlowConnectionUsage
Variable	not mapped; see next section

The following table gives an overview of which SysML v2 elements the UML4SysML::Activities elements are transformed with which mapping class. The mapping details are in [7.7.3.3](#).

The justifications for the elements without mapping are given in [7.7.3.2](#).

### 7.7.3.2 UML4SysML::Activities elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 4. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
ActivityFinalNode	Mapping is not specified yet.
ActivityParameterNode	The parameter of the activity is mapped from SysML v1 to SysML v2. The additional concept of the activity parameter node is necessary for the token semantic of SysML v1 activities, which is not part of SysML v2. Therefore, the additional concept of the activity parameter node is not mapped to SysML v2.
ActivityPartition	Mapping is not specified yet.
ExceptionHandler	Mapping is not specified yet.
InterruptibleActivityRegion	Mapping is not specified yet.

### 7.7.3.3 Mapping Specifications

#### 7.7.3.3.1 ActivityAsDefinition\_Mapping

##### Description

A UML4SysML::Activity is mapped to a SysMLv2 ActionDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action def SysMLv1Activity {
  in parIn : SysMLv1Block;
  out parOut;
  out parReturn;
}

```

```

}
part def SysMLv1Block;

```

## General Mappings

Behavior\_Mapping

## Mapping Source

Activity

## Mapping Target

ActionDefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionDefinition::ownedRelationship () : Relationship [0..\*]  

```

let relationships : Set(KerML::Relationship) =
  Helper.activityOwnedRelationship(from) in
let parameters : Set(UML::Paramter) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in
relationships->union(parameters
  ->collect(p | ParameterMembership_Mapping.getMapped(p))
)

```

### 7.7.3.3.2 ActivityEdgeInitialNodeFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToEndFeatureMembership\_Mapping

#### Mapping Source

InitialNode

#### Mapping Target

EndFeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`ActivityEdgeSourceInitialNode_Mapping.getMapped(from)`

### 7.7.3.3.3 ActivityEdgeMetadata\_Mapping

#### Description

Adds metadata to the transformation target elements of UML4SysML::ControlFlow and UML::ObjectFlow to map the UML4SysML::ActivityEdge::weight property which has no direct target in SysML v2.

#### General Mappings

GenericToMetadataUsage\_Mapping

#### Mapping Source

ActivityEdge

#### Mapping Target

MetadataUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::declaredName () : String [0..1]  
`'weight'`
- MetadataUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ActivityEdgeMetadataFeatureTyping_Mapping.getMapped(from),
ActivityEdgeMetadataFeatureMembership_Mapping.getMapped(from)}
```

#### 7.7.3.3.4 ActivityEdgeMetadataFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

ActivityEdge

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ActivityEdgeMetadataReferenceUsage_Mapping.getMapped(from)
```

#### 7.7.3.3.5 ActivityEdgeMetadataFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

ActivityEdge

##### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ActivityEdgeData')
```

### 7.7.3.3.6 ActivityEdgeMetadataFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

ActivityEdge

#### Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
from.weight
```

### 7.7.3.3.7 ActivityEdgeMetadataOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

ActivityEdge

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`ActivityEdgeMetadata_Mapping.getMapped(from)`

### 7.7.3.3.8 ActivityEdgeMetadataRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

### General Mappings

GenericToRedefinition\_Mapping

### Mapping Source

ActivityEdge

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ActivityEdgeData::weight')
```

### 7.7.3.3.9 ActivityEdgeMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

ActivityEdge

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{ActivityEdgeMetadataRedefinition_Mapping.getMapped(from),  
ActivityEdgeMetadataFeatureValue_Mapping.getMapped(from)}
```

### 7.7.3.3.10 ActivityEdgeSourceEndFeature\_Mapping

#### Description

Creates a SysML v2 feature for the source activity node of the SysML v1 activity edge which subsets the SysML v2 target element of the source activity node.

#### General Mappings

GenericToFeature\_Mapping

## Mapping Source

Element

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]  
`true`
- Feature::ownedRelationship () : Relationship [0..\*]  
`Set{ActivityEdgeSourceEndSubsetting_Mapping.getMapped(from) }`

### 7.7.3.3.11 ActivityEdgeSourceInitialNode\_Mapping

#### Description

The UML4SysML::InitialNode is mapped to a subsetted feature of the SysML v2 library element Actions::start.

#### General Mappings

GenericToFeature\_Mapping

## Mapping Source

InitialNode

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isEnd () : Boolean [1]`

`true`

- `Feature::ownedRelationship () : Relationship [0..*]`

`Set{ActivityEdgeSourceInitialNodeSubsetting_Mapping.getMapped(from)}`

#### 7.7.3.3.12 ActivityEdgeSourceEndFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToEndFeatureMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

EndFeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`

`ActivityEdgeSourceEndFeature_Mapping.getMapped(from)`

#### 7.7.3.3.13 ActivityEdgeSourceInitialNodeSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToReferenceSubsetting\_Mapping

##### Mapping Source

InitialNode

### Mapping Target

ReferenceSubsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::referencedFeature () : Feature [1]  

```
SysML2::ActionUsage.allInstances()  
->any(m | m.qualifiedName = 'Actions::Action::start')
```

## 7.7.3.3.14 ActivityEdgeSourceEndSubsetting\_Mapping

### Description

Creates a subsetting relationship.

### General Mappings

GenericToReferenceSubsetting\_Mapping

### Mapping Source

Element

### Mapping Target

ReferenceSubsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::referencedFeature () : Feature [1]

from

### 7.7.3.3.15 ActivityEdgeTransitionUsageSourceMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source

ActivityNode

#### Mapping Target

Membership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  

```
if from.ocIsTypeOf(UML::ActivityParameterNode) then
    from.parameter
else
    from
endif
```

### 7.7.3.3.16 CentralBufferNode\_Mapping

#### Description

The mapping of the UML4SysML::CentralBufferNode is not defined in detail yet. It will be an action usage which contains the behavior of a central buffer node.

#### General Mappings

GenericToActionUsage\_Mapping  
NamedElementMain\_Mapping

#### Mapping Source

CentralBufferNode

## Mapping Target

ActionUsage

## Owned Mappings

(none)

### 7.7.3.3.17 CommonActivityEdgeSuccessionAsUsage\_Mapping

#### Description

The mapping class provides a common mapping of a UML4SysML::ActivityEdge to a SysMLv2 SuccessionAsUsage. The mapping is used for UML4SysML::ControlFlows and UML4SysML::ObjectFlows.

#### General Mappings

GenericToConnector\_Mapping

#### Mapping Source

ActivityEdge

#### Mapping Target

SuccessionAsUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SuccessionAsUsage::ownedRelationship () : Relationship [0..\*]  

```
let relationships : Set(KerML::Relationship) = Set{
if from.source.ocIsKindOf(UML::InitialNode) then
    ActivityEdgeInitialNodeFeatureMembership_Mapping.getMapped(from.source)
else if from.source.ocIsKindOf(UML::ActivityParameterNode) then
    ActivityEdgeSourceEndFeatureMembership_Mapping.getMapped(from.source.parameter)
else
    ActivityEdgeSourceEndFeatureMembership_Mapping.getMapped(from.source)
endif
endif,
if from.ocIsKindOf(UML::ObjectFlow) then
    ObjectFlowGuardSuccessionTargetEndFeatureMembership_Mapping.getMapped(from)
else if from.target.ocIsKindOf(UML::FinalNode) then
    ControlFlowFinalNodeFeatureMembership_Mapping.getMapped(from.target)
else
    ControlFlowTargetFeatureMembership_Mapping.getMapped(from.target)
```

```

        endif
    endif} in
    if from.guard.oclIsUndefined() then
        relationships
    else
        relationships
        ->including (ElementFeatureMembership_Mapping.getMapped(from.guard))
    endif

```

### 7.7.3.3.18 CommonVariable\_Mapping

#### Description

Abstract mapping class for UML4SysML::Variable which is defined in the context of UML4SysML::Activity. A UML4SysML::Variable is mapped to a SysMLv2 AttributeUsage or SysMLv2 ItemUsage. See specialized mapping classes for the specific mapping rules.

#### General Mappings

PropertyCommon\_Mapping

#### Mapping Source

Variable

#### Mapping Target

Feature

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]

```
false
```

- Feature::isComposite () : Boolean [1]

```
false
```

- Feature::ownedRelationship () : Relationship [0..\*]

```

let typing: KerML::FeatureTyping =
    VariableFeatureTyping_Mapping.getMapped(from) in
if typing.oclIsUndefined() then
    Set{MultiplicityMembership_Mapping.getMapped(from)}

```

```

else
    Set{MultiplicityMembership_Mapping.getMapped(from), typing}
endif

```

- Feature::isDerived () : Boolean [1]

```

false

```

### 7.7.3.3.19 ControlFlowTransitionUsage\_Mapping

#### Description

A UML4SysML::ControlFlow with a guard condition is mapped to a SysMLv2 TransitionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action def SysMLv1Activity {
    action sysMLv1Action1;
    succession sysMLv1ControlFlow first sysMLv1Action1
        if guardCondition.result then sysMLv1Action2 {
            calc guardCondition {
                return : ScalarValues::Boolean;
                language "English"
            }
            /*
             * thisIsAGuard
             */
        }
    }
    action sysMLv1Action2;
}

```

#### General Mappings

GenericToTransitionUsage\_Mapping  
 NamedElementMain\_Mapping

#### Mapping Source

ControlFlow

#### Mapping Target

TransitionUsage

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

not src.guard.oclIsUndefined()

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `TransitionUsage::ownedRelationship () : Relationship [0..*]`

```
let relationships : Set(KerML::Relationship) = self.oclAsType(ElementMain_Mapping).ownedRelationships
->union(Set{ActivityEdgeTransitionUsageSourceMembership_Mapping.getMapped(from.source)
,CommonParameterReferenceUsageInMembership_Mapping.getMapped(from.source)
,ControlFlowTransitionUsageFeatureMembership_Mapping.getMapped(from)
,CommonActivityEdgeSuccessionAsUsage_Mapping.getMapped(from)
,CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)}) in
let relationshipsWithGuard : Set(KerML::Relationship) =
if from.guard.oclIsTypeOf(UML::OpaqueExpression) then
    relationships
->including(ElementFeatureMembership_Mapping.getMapped(from.guard))
else
    relationships
endif in
let relationshipsConsideringWeight : Set(KerML::Relationship) =
if from.weight.oclIsUndefined() then
    relationshipsWithGuard
else
    relationshipsWithGuard
->including(ActivityEdgeMetadataOwningMembership_Mapping.getMapped(from))
endif in
if Helper.hasStereotypeApplied(from, 'SysML::Activities::Probability') then
    relationshipsConsideringWeight
->including(ProbabilityOwningMembership_Mapping.getMapped(from))
else
    relationshipsConsideringWeight
endif
```

### 7.7.3.3.20 ControlFlowFinalNodeFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToEndFeatureMembership\_Mapping

#### Mapping Source

ActivityNode

#### Mapping Target

EndFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  
`ControlFlowTargetFinalNode_Mapping.getMapped(from)`

#### 7.7.3.3.21 ControlFlowTargetFinalNodeSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToReferenceSubsetting\_Mapping

##### Mapping Source

FinalNode

##### Mapping Target

ReferenceSubsetting

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`  
`SysML2::ActionUsage.allInstances()`  
`->any(m | m.qualifiedName = 'Actions::Action::done')`

#### 7.7.3.3.22 ControlFlowSuccessionAsUsage\_Mapping

##### Description

A `UML4SysML::ControlFlow` without a guard condition is mapped to a `SysMLv2 SuccessionAsUsage`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.



```

action def SysMLv1Activity {
    action sysMLv1Action1;
    succession sysMLv1ControlFlow
        first sysMLv1Action1 then sysMLv1Action2;
    action sysMLv1Action2;
}

```

## General Mappings

NamedElementMain\_Mapping  
CommonActivityEdgeSuccessionAsUsage\_Mapping

## Mapping Source

ControlFlow

## Mapping Target

SuccessionAsUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.guard.oclIsUndefined()
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SuccessionAsUsage::ownedRelationship () : Relationship [0..\*]  

```

let relationships : Set(KerML::Relationship) = Set{
if from.source.oclIsKindOf(UML::InitialNode) then
    ActivityEdgeInitialNodeFeatureMembership_Mapping.getMapped(from.source)
else
    ActivityEdgeSourceEndFeatureMembership_Mapping.getMapped(from.source)
endif,
if from.oclIsKindOf(UML::ObjectFlow) then
    ObjectFlowGuardSuccessionTargetEndFeatureMembership_Mapping.getMapped(from)
else if from.target.oclIsKindOf(UML::FinalNode) then
    ControlFlowFinalNodeFeatureMembership_Mapping.getMapped(from.target)
else
    ControlFlowTargetFeatureMembership_Mapping.getMapped(from.target)
endif
endif} in
let relationshipsWithGuard : Set(KerML::Relationship) =
if from.guard.oclIsUndefined() then
    relationships
else

```

```

        relationships
        ->including (ElementFeatureMembership_Mapping.getMapped(from.guard))
    endif in
    let relationshipsConsideringWeight : Set(KerML::Relationship) =
    if from.weight.oclIsUndefined() then
        relationshipsWithGuard
    else
        relationshipsWithGuard
        ->including (ActivityEdgeMetadataOwningMembership_Mapping.getMapped(from))
    endif in

    (if Helper.hasStereotypeApplied(from, 'SysML::Activities::Probability') then
        relationshipsConsideringWeight
        ->including (ProbabilityOwningMembership_Mapping.getMapped(from))
    else
        relationshipsConsideringWeight
    endif) ->union (self.oclAsType (ElementMain_Mapping).ownedRelationship())

```

### 7.7.3.3.23 ControlFlowTargetFinalNode\_Mapping

#### Description

The mapping class maps a UML4SysML::FinalNode to a Feature which will be subsetted by Actions::Action::done. The subsetting is created by the mapping class ControlFlowTargetFinalNodeSubsetting\_Mapping.

#### General Mappings

GenericToFeature\_Mapping

#### Mapping Source

FinalNode

#### Mapping Target

Feature

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]  

```
true
```
- Feature::ownedRelationship () : Relationship [0..\*]  

```
Set {ControlFlowTargetFinalNodeSubsetting_Mapping.getMapped(from) }
```

#### 7.7.3.3.24 ControlFlowTargetEndFeature\_Mapping

##### Description

The mapping class maps the UML4SysML::ActivityNode to a Feature which is subsetted by the mapping target of the UML4SysML::ActivityNode. The subsetting is created by the mapping class ControlFlowTargetEndSubsetting\_Mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

ActivityNode

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]  
`true`
- Feature::ownedRelationship () : Relationship [0..\*]  
`Set{ControlFlowTargetEndSubsetting_Mapping.getMapped(from)}`

#### 7.7.3.3.25 ControlFlowTargetFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToEndFeatureMembership\_Mapping

##### Mapping Source

ActivityNode

##### Mapping Target

EndFeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`ControlFlowTargetEndFeature_Mapping.getMapped(from)`

## 7.7.3.3.26 ControlFlowTargetEndSubsetting\_Mapping

### Description

Creates a subsetting relationship.

### General Mappings

GenericToReferenceSubsetting\_Mapping

### Mapping Source

ActivityNode

### Mapping Target

ReferenceSubsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::referencedFeature () : Feature [1]  
`from`

### 7.7.3.3.27 ControlFlowTransitionUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ControlFlow

#### Mapping Target

TransitionFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TransitionFeatureMembership::kind () : TransitionFeatureKind [1]  

```
KerML::TransitionFeatureKind::guard
```
- TransitionFeatureMembership::ownedMemberFeature () : Feature [1]  

```
if from.guard.ocIsKindOf(UML::OpaqueExpression) then
  OpaqueExpressionAsValue_Mapping.getMapped(from.guard)
else
  from.guard
endif
```

### 7.7.3.3.28 DataStoreNode\_Mapping

#### Description

The mapping of the UML4SysML::DataStoreNode is not defined in detail yet. It will an action usage which contains the behavior of a data store node.

#### General Mappings

CentralBufferNode\_Mapping

#### Mapping Source

DataStoreNode

## Mapping Target

ActionUsage

## Owned Mappings

(none)

### 7.7.3.3.29 DecisionNode\_Mapping

#### Description

The UML4SysML::DecisionNode is mapped to a SysMLv2 DecisionNode.

There is no suitable element in SysML v2 for the else condition of an outgoing UML4SysML::ActivityEdge. Therefore, it is mapped to a TextualRepresentation with language "SysML v1" and body "else" (see ExpressionElse\_Mapping class).

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
    action sysMLv1Action1;
    succession sysMLv1ControlFlow1 first sysMLv1Action1 then sysMLv1DecisionNode;
    decide sysMLv1DecisionNode;
    succession sysMLv1ControlFlow2 first sysMLv1DecisionNode if {
        return : ScalarValues::Boolean;
        // guard expression, for example, opaque expression
    }.result then sysMLv1Action2;
    succession flow2 first sysMLv1DecisionNode if {
        return : ScalarValues::Boolean;
        language "SysMLv1"
        /*
         * else
         */
    }.result then sysMLv1Action2;
    action sysMLv1Action2;
}
```

## General Mappings

GenericToUsage\_Mapping

NamedElementMain\_Mapping

## Mapping Source

DecisionNode

## Mapping Target

DecisionNode

## Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `DecisionNode::isComposite () : Boolean [1]`

`true`

#### 7.7.3.3.30 FlowFinalNodeMembership\_Mapping

##### Description

The mapping class creates a membership relationship to the action usage library element `Actions::Action::done`.

##### General Mappings

`GenericToMembership_Mapping`

##### Mapping Source

`FlowFinalNode`

##### Mapping Target

`Membership`

##### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Membership::memberElement () : Element [1]`

```
SysMLv2::ActionUsage.allInstances()  
->any(e | e.qualifiedName = 'Actions::Action::done')
```

#### 7.7.3.3.31 ForkNode\_Mapping

##### Description

The `UML4SysML::ForkNode` is mapped to a `SysMLv2 ForkNode`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    first start;  
    action sysMLv1Action1;  
  
    then fork sysMLv1ForkNode;  
  
    then sysMLv1Action2;  
    then sysMLv1Action3;  
    action sysMLv1Action2;  
    then sysMLv1JoinNode;  
    action sysMLv1Action3;  
    then sysMLv1JoinNode;  
  
    join sysMLv1JoinNode;  
  
    then done;  
}
```

### General Mappings

GenericToUsage\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

ForkNode

### Mapping Target

ForkNode

### Owned Mappings

(none)

### 7.7.3.3.32 InitialNodeMembership\_Mapping

#### Description

The mapping class creates a membership relationship to the action usage library element Actions::Action::start.

### General Mappings

GenericToMembership\_Mapping

### Mapping Source

InitialNode

### Mapping Target

Membership



## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberName () : String [0..1]  

```
if from.name = '' then null else from.name endif
```
- Membership::memberElement () : Element [1]  

```
SysMLv2::ActionUsage.allInstances()  
->any(e | e.qualifiedName = 'Actions::Action::start')
```

### 7.7.3.33 JoinNode\_Mapping

#### Description

The UML4SysML::JoinNode is mapped to a SysMLv2JoinNode.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    first start;  
    action sysMLv1Action1;  
  
    then fork sysMLv1ForkNode;  
  
    then sysMLv1Action2;  
    then sysMLv1Action3;  
    action sysMLv1Action2;  
    then sysMLv1JoinNode;  
    action sysMLv1Action3;  
    then sysMLv1JoinNode;  
  
    join sysMLv1JoinNode;  
  
    then done;  
}
```

## General Mappings

GenericToUsage\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

JoinNode

#### **Mapping Target**

JoinNode

#### **Owned Mappings**

(none)

### **7.7.3.3.34 MergeNode\_Mapping**

#### **Description**

The UML4SysML::MergeNode is mapped to a SysMLv2 MergeNode.

#### **General Mappings**

GenericToUsage\_Mapping

NamedElementMain\_Mapping

#### **Mapping Source**

MergeNode

#### **Mapping Target**

MergeNode

#### **Owned Mappings**

(none)

### **7.7.3.3.35 ObjectFlow\_Mapping**

#### **Description**

A UML4SysML::ObjectFlowFlow without a guard condition is mapped to a SysMLv2SuccessionFlowConnectionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Acticity {
    action sysMLv1Action1 {
        out outputValue;
    }
    succession flow sysMLv1ObjectFlow of ScalarValues::String
        from sysMLv1Action1.outputValue to sysMLv1Action1.inputValue;
    action sysMLv1Action2 {
        out inputValue;
    }
}
```

#### **General Mappings**

GenericToConnector\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

ObjectFlow

### Mapping Target

SuccessionFlowConnectionUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.guard.oclIsUndefined()  
and (not src.target.oclIsTypeOf(UML::ActivityFinalNode))
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SuccessionFlowConnectionUsage::ownedRelationship () : Relationship [0..\*]

```
let relationships : Set(KerML::Relationship) =  
let sourceFeatureMembership : KerML::FeatureMembership = ObjectFlowEndFeatureMembership_Mapping.getMapped(from)  
let targetFeatureMembership : KerML::FeatureMembership = ObjectFlowEndFeatureMembership_Mapping.getMapped(to)  
if from.source.oclIsKindOf(UML::ObjectNode) then  
    Set{ObjectFlowItemFeatureMembership_Mapping.getMapped(from),  
        sourceFeatureMembership, targetFeatureMembership}  
else  
    Set{sourceFeatureMembership, targetFeatureMembership}  
endif in  
  
let relationshipsConsideringWeight : Set(KerML::Relationship) =  
if from.weight.oclIsUndefined() then  
    relationships  
else  
    relationships  
    ->including(ActivityEdgeMetadataOwningMembership_Mapping.getMapped(from))  
endif in  
  
let relationshipsConsideringRate : Set(KerML::Relationship) =  
if (Helper.hasStereotypeApplied(from, 'SysML::Activities::Rate') or  
    Helper.hasStereotypeApplied(from, 'SysML::Activities::Discrete') or  
    Helper.hasStereotypeApplied(from, 'SysML::Activities::Continuous')) then  
  
    relationshipsConsideringWeight  
    ->including(RateOwningMembership_Mapping.getMapped(from))  
else  
    relationshipsConsideringWeight  
endif in
```

```

self.oclAsType(ElementMain_Mapping).ownedRelationship()->union(
  if Helper.hasStereotypeApplied(from, 'SysML::Activities::Probability') then
    relationshipsConsideringRate
    ->including(ProbabilityOwningMembership_Mapping.getMapped(from))
  else
    relationshipsConsideringRate
  endif
)

```

### 7.7.3.36 ObjectFlowFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ObjectFlow

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ObjectFlow_Mapping.getMapped(from)
```

### 7.7.3.37 ObjectFlowGuardFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ObjectFlow

## Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`ObjectFlowGuard_Mapping.getMapped(from)`

### 7.7.3.3.38 ObjectFlowGuard\_Mapping

#### Description

A UML4SysML::ObjectFlowFlow with a guard condition is mapped to a combined SysMLv2 TransitionUsage and SysMLv2 SuccessionFlowConnectionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
  action sysMLv1Action1 {
    out outputValue;
  }

  first sysMLv1Action1 if guardCondition.result then sysMLv1ObjectFlow {
    calc guardCondition {
      return : ScalarValues::Boolean;
      language "English"
    }
    /*
     * guard says ok
     */
  }
}

succession flow sysMLv1ObjectFlow of SysMLv1Block from
  sysMLv1Action1.outputValue to sysMLv1Action2.inputValue;

action sysMLv1Action2 {
  out inputValue;
}
}
```

## General Mappings

GenericToTransitionUsage\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

ObjectFlow

### Mapping Target

TransitionUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
(not src.guard.oclIsUndefined())  
and (not src.target.oclIsTypeOf(UML::ActivityFinalNode))
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TransitionUsage::ownedRelationship () : Relationship [0..\*]

```
Set{  
  ActivityEdgeTransitionUsageSourceMembership_Mapping.getMapped(from.source),  
  CommonParameterReferenceUsageInMembership_Mapping.getMapped(from.source),  
  ObjectFlowTransitionUsageFeatureMembership_Mapping.getMapped(from),  
  ObjectFlowGuardSuccessionTargetEndFeatureMembership_Mapping.getMapped(from),  
  CommonActivityEdgeSuccessionAsUsage_Mapping.getMapped(from),  
  CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)  
}->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())
```

#### 7.7.3.3.39 ObjectFlowGuardSuccessionTargetEndFeature\_Mapping

##### Description

Creates a feature element for the UML4SysML::ObjectFlow mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

ObjectFlow

##### Mapping Target

Feature

## Owned Mappings

- `objectFlowGuardSuccessionTargetEndSubsetting :`  
`ObjectFlowGuardSuccessionTargetEndSubsetting_Mapping`

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isEnd () : Boolean [1]`  
`true`
- `Feature::ownedRelationship () : Relationship [0..*]`  
`Set {objectFlowGuardSuccessionTargetEndSubsetting.to}`

### 7.7.3.3.40 ObjectFlowGuardSuccessionTargetEndFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

`GenericToEndFeatureMembership_Mapping`

#### Mapping Source

`ObjectFlow`

#### Mapping Target

`EndFeatureMembership`

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  
`ObjectFlowGuardSuccessionTargetEndFeature_Mapping.getMapped(from)`

#### 7.7.3.3.41 ObjectFlowGuardSuccessionTargetEndSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToSubsetting\_Mapping

##### Mapping Source

ObjectFlow

##### Mapping Target

Subsetting

##### Owned Mappings

- objectFlowGuardSuccessionTargetEndFeature : ObjectFlowGuardSuccessionTargetEndFeature\_Mapping

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::subsettingFeature () : Feature [1]  
`objectFlowGuardSuccessionTargetEndFeature.to`
- Subsetting::subsettingFeature () : Feature [1]  
`ObjectFlow_Mapping.getMapped(from)`

#### 7.7.3.3.42 ObjectFlowItemFeature\_Mapping

##### Description

The mapping class maps the source UML4SysML::ObjectNode to a ItemFeature which is typed by the UML4SysML::ObjectNode type.

##### General Mappings

ObjectFlowItemFeatureUntyped\_Mapping

##### Mapping Source

ObjectNode

##### Mapping Target



ItemFeature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ItemFeature::ownedRelationship () : Relationship [0..\*]  

```
Set {ObjectFlowItemFeatureTyping_Mapping.getMapped(from) }
```

#### 7.7.3.3.43 ObjectFlowItemFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

ObjectFlow

##### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  

```
if from.source.type.oclIsUndefined() then  
    ObjectFlowItemFeatureUntyped_Mapping.getMapped(from.source)  
else
```

```
        ObjectFlowItemFeature_Mapping.getMapped(from.source)
    endif
```

#### 7.7.3.3.44 ObjectFlowItemFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

TypedElementFeatureTyping\_Mapping

##### Mapping Source

ObjectNode

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

#### 7.7.3.3.45 ObjectFlowItemFeatureUntyped\_Mapping

##### Description

The mapping class maps the source UML4SysML::ObjectNode to a ItemFeature without a type.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

ObjectNode

##### Mapping Target

ItemFeature

##### Owned Mappings

(none)

#### 7.7.3.3.46 ObjectFlowEndFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToEndFeatureMembership\_Mapping

### Mapping Source

ActivityNode

### Mapping Target

EndFeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]

`ObjectFlowItemFlowEnd_Mapping.getMapped (from)`

#### 7.7.3.3.47 ObjectFlowItemFlowEnd\_Mapping

### Description

The mapping class maps a UML4SysML::ActivityNode to a ItemFlowEnd which is subsetted by the transformation target of the UML4SysML::ActivityNode.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

ActivityNode

### Mapping Target

ItemFlowEnd

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ItemFlowEnd::ownedRelationship () : Relationship [0..\*]  

```
Set{ObjectFlowItemFlowEndSubsetting_Mapping.getMapped(from) ,
ObjectFlowItemFlowEndFeatureMembership_Mapping.getMapped(from) }
```
- ItemFlowEnd::isEnd () : Boolean [1]  

```
true
```

### 7.7.3.3.48 ObjectFlowItemFlowEndReferenceUsage\_Mapping

#### Description

Creates a feature element for the UML4SysML::ObjectFlow mapping.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

ActivityNode

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
let redefinition : KerML::Redefinition =
if from.owner.ocliIsTypeOf(UML::AddVariableValueAction) or
from.owner.ocliIsTypeOf(UML::AddStructuralFeatureValueAction) then
if from.name = 'value' then
ObjectFlowItemFlowEndRedefinition_Factory.create(SYSML2::ReferenceUsage.allInstances
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction::value'))
else if from.name = 'insertAt' then
ObjectFlowItemFlowEndRedefinition_Factory.create(SYSML2::ReferenceUsage.allInstances
->any(m | m.qualifiedName = 'SysMLv1Library::AddValueAction::insertAt'))
else if from.owner.ocliIsTypeOf(UML::AddStructuralFeatureValueAction) and (from.name = 'ob
ObjectFlowItemFlowEndRedefinition_Factory.create(SYSML2::ReferenceUsage.allInstances
->any(m | m.qualifiedName = 'SysMLv1Library::AddStructuralFeatureValueAction::ob
```

```

        else
            ObjectFlowItemFlowEndRedefinition_Factory.create(ElementMain_Mapping.getMapped(from))
        endif endif endif
    else
        if from.ocliIsTypeOf(UML::ActivityParameterNode) then
            ObjectFlowItemFlowEndRedefinition_Factory.create(
                ElementMain_Mapping.getMapped(from.oclAsType(UML::ActivityParameterNode)).parameter
            )
        else if from.ocliIsTypeOf(UML::FlowFinalNode) then
            ObjectFlowItemFlowEndRedefinition_Factory.create(ElementMain_Mapping.getMapped(
                SysMLv2::ActionUsage.allInstances()->any(e | e.qualifiedName = 'Actions::Action::done')
            ))
        else
            ObjectFlowItemFlowEndRedefinition_Factory.create(ElementMain_Mapping.getMapped(from))
        endif endif
    endif in
    Set{redefinition}

```

### 7.7.3.3.49 ObjectFlowItemFlowEndFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ActivityNode

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ObjectFlowItemFlowEndReferenceUsage_Mapping.getMapped(from)
```

### 7.7.3.3.50 ObjectFlowItemFlowEndRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

## General Mappings

GenericToRedefinition\_Mapping

## Mapping Source

ActivityNode

## Mapping Target

Redefinition

## Owned Mappings

(none)

### 7.7.3.3.51 ObjectFlowItemFlowEndSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

## General Mappings

GenericToReferenceSubsetting\_Mapping

## Mapping Source

ActivityNode

## Mapping Target

ReferenceSubsetting

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::referencedFeature () : Feature [1]  

```
if from.ocIsKindOf(UML::ActivityParameterNode) then
    Parameter_Mapping.getMapped(from.parameter)
else if from.ocIsKindOf(UML::Pin) then
    CommonAction_Mapping.getMapped(from.owner)
else if from.ocIsKindOf(UML::InitialNode) then
    SysMLv2::ActionUsage.allInstances()
    ->any(e | e.qualifiedName = 'Actions::Action::start')
```

```

        else if from.ocIsKindOf(UML::FinalNode) then
            SysMLv2::ActionUsage.allInstances()
            ->any(e | e.qualifiedName = 'Actions::Action::done')
        else
            from
        endif
    endif
endif
endif
endif

```

### 7.7.3.3.52 ObjectFlowTransitionUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ObjectFlow

#### Mapping Target

TransitionFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TransitionFeatureMembership::ownedMemberFeature () : Feature [1]
 

```

            if from.guard.ocIsKindOf(UML::OpaqueExpression) then
                OpaqueExpressionAsValue_Mapping.getMapped(from.guard)
            else
                from.guard
            endif
            
```
- TransitionFeatureMembership::kind () : TransitionFeatureKind [1]
 

```

            KerML::TransitionFeatureKind::guard
            
```

### 7.7.3.3.53 VariableAttribute\_Mapping

#### Description

A UML4SysML::Variable is mapped to a SysML v2 AttributeUsage if the type of the variable is of kind UML4SysML::DataType.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    private attribute sysmlv1Variable : ScalarValues::Integer;  
}
```

### General Mappings

NamedElementMain\_Mapping  
CommonVariable\_Mapping

### Mapping Source

Variable

### Mapping Target

AttributeUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.type.ocIsKindOf(UML::DataType)
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.7.3.3.54 VariableFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

TypedElementFeatureTyping\_Mapping

### Mapping Source

Variable

### Mapping Target

FeatureTyping



## Owned Mappings

(none)

### 7.7.3.3.55 VariableItem\_Mapping

#### Description

A UML4SysML::Variable is mapped to a SysML v2 ItemUsage if the type of the variable is not of kind UML4SysML::DataType.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    private item sysmlv1Variable : SysMLv1Block;  
}  
part def SysMLv1Block;
```

## General Mappings

NamedElementMain\_Mapping  
CommonVariable\_Mapping

## Mapping Source

Variable

## Mapping Target

ItemUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not src.type.ocIsKindOf(UML::DataType)
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.3.3.56 VariableMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

ElementFeatureMembership\_Mapping

### Mapping Source

Variable

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::visibility () : VisibilityKind [1]

KerML::VisibilityKind::private

## 7.7.4 Classification

### 7.7.4.1 Overview

Table 5. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Generalization	Subclassification
GeneralizationSet	not mapped; see next section
InstanceSpecification	ConnectionUsage
InstanceValue	FeatureReferenceExpression
Operation	PerformActionUsage
Parameter	ReferenceUsage
ParameterSet	not mapped; see next section
Property	AttributeUsage
Slot	Feature
Substitution	SatisfyRequirementUsage AllocationDefinition

The following table gives an overview of which SysML v2 elements the UML4SysML::Classification elements are transformed with which mapping class. The mapping details are in [7.7.4.2](#).

### 7.7.4.2 Mapping Specifications

#### **7.7.4.2.1 BehavioralFeature\_Mapping**

##### **Description**

The mapping class is the abstract base class for UML4SysML::BehavioralFeature mappings.

##### **General Mappings**

GenericToUsage\_Mapping  
Namespace\_Mapping

##### **Mapping Source**

BehavioralFeature

##### **Mapping Target**

Usage

##### **Owned Mappings**

(none)

#### **7.7.4.2.2 Classifier\_Mapping**

##### **Description**

The mapping class is the abstract base class for all mapping classes that map specializations of UML4SysML::Classifier elements.

##### **General Mappings**

GenericToClassifier\_Mapping  
Namespace\_Mapping

##### **Mapping Source**

Classifier

##### **Mapping Target**

Classifier

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Classifier::isAbstract () : Boolean [1]

```
from.isAbstract
```

- Classifier::ownedRelationship () : Relationship [0..\*]

```
let generalizations : Set(UML::Generalization) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Generalization))->asSet() in
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Feature))->asSet() in
let toElementOMS: Set(UML::Element) =
    ((from.ownedElement - toElementFMS) - generalizations) - from.ownedComment in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e))->asSet())
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e))->asSet())
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
```

#### 7.7.4.2.3 DefaultLowerBound\_Mapping

##### Description

The mapping class creates the default lower bound of a multiplicity element.

##### General Mappings

GenericToExpression\_Mapping

##### Mapping Source

Element

##### Mapping Target

LiteralInteger

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralInteger::ownedRelationship () : Relationship [0..\*]

```
Set { CommonReturnParameterFeatureMembership_Mapping.getMapped(from) }
```

- LiteralInteger::value () : Integer [1]

#### 7.7.4.2.4 DefaultMultiplicityBoundFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::isComposite () : Boolean [1]

true

#### 7.7.4.2.5 DefaultMultiplicityElement\_Mapping

##### Description

The mapping class creates a feature element representing the default multiplicity.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

Element

##### Mapping Target

MultiplicityRange

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MultiplicityRange::declaredName () : String [0..1]  
`'defaultMultiplicity'`
- MultiplicityRange::isUnique () : Boolean [1]  
`true`
- MultiplicityRange::ownedRelationship () : Relationship [0..\*]  
`OrderedSet{DefaultMultiplicityLowerBoundFeatureMembership_Mapping.getMapped(from),  
DefaultMultiplicityUpperBoundFeatureMembership_Mapping.getMapped(from)}`

#### 7.7.4.2.6 DefaultMultiplicityLowerBoundFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

DefaultMultiplicityBoundFeatureMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : MultiplicityRange [1]

`DefaultLowerBound_Mapping.getMapped(from)`

#### 7.7.4.2.7 DefaultMultiplicityMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`DefaultMultiplicityElement_Mapping.getMapped(from)`

#### 7.7.4.2.8 DefaultMultiplicityUpperBoundFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

DefaultMultiplicityBoundFeatureMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : MultiplicityRange [1]`

`DefaultUpperBound_Mapping.getMapped(from)`

#### 7.7.4.2.9 DefaultUpperBound\_Mapping

##### Description

The mapping class creates the default upper bound of a multiplicity element.

##### General Mappings

`GenericToExpression_Mapping`

##### Mapping Source

`Element`

##### Mapping Target

`LiteralInteger`

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `LiteralInteger::value () : Integer [1]`

`1`

- `LiteralInteger::ownedRelationship () : Relationship [0..*]`

`Set { CommonReturnParameterFeatureMembership_Mapping.getMapped(from) }`

#### 7.7.4.2.10 DefaultValue\_Mapping

##### Description



The expected SysML v2 textual syntax of a mapped SysML v2 default value is as follows:

```
attribute sysMLv1Property : ScalarValues::String default := "default value";
```

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

Property

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::isDefault () : Boolean [1]

true

- FeatureValue::value () : Expression [1]

from.defaultValue

#### 7.7.4.2.11 ElementFeatureMembership\_Mapping

### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`NamedElementMain_Mapping.getMapped (from)`
- `FeatureMembership::visibility () : VisibilityKind [1]`  
`if from.ocIsKindOf (UML::NamedElement) then`  
`Helper.getKerMLVisibilityKind (from.ocAsType (UML::NamedElement).visibility)`  
`else KerML::VisibilityKind::public endif`

### 7.7.4.2.12 Generalization\_Mapping

#### Description

A `UML4SysML::Generalization` relationship is mapped to a SysML v2 Subclassification.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1BlockGeneral;  
part def SysMLv1BlockSpecial :> SysMLv1BlockGeneral;
```

## General Mappings

`GenericToSpecialization_Mapping`  
`ElementMain_Mapping`

## Mapping Source

Generalization

## Mapping Target

Subclassification

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subclassification::superclassifier () : Classifier [1]

```
if from.general.oclIsTypeOf(UML::PrimitiveType)
    and not (Helper.getScalarValueType(from.general)
        = invalid) then
    Helper.getScalarValueType(from.general)
else
    Classifier_Mapping.getMapped(from.general)
endif
```

- Subclassification::subclassifier () : Classifier [1]

```
Classifier_Mapping.getMapped(from.specific)
```

### 7.7.4.2.13 InstanceSpecificationLink\_Mapping

#### Description

The UML4SysML::InstanceSpecification that is a link is mapped to a SysMLv2 ConnectionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1;
part def SysMLv1Block2;
connection def SysMLv1Association {
    end : SysMLv1Block1[1];
    end : SysMLv1Block2[1];
}
part sysMLv1InstanceSpecification1 : SysMLv1Block1;
part sysMLv1InstanceSpecification2 : SysMLv1Block2;
connection sysMLv1Link : SysMLv1Association
    connect sysMLv1InstanceSpecification1 to sysMLv1InstanceSpecification2;
```

#### General Mappings

NamedElementMain\_Mapping  
GenericToConnectionUsage\_Mapping

#### Mapping Source

InstanceSpecification

#### Mapping Target

ConnectionUsage

#### Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.classifier->select( c | c.ocIsTypeOf(UML::Association))->size() > 0
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ConnectionUsage::ownedRelationship() : Relationship [0..*]`

```
self.ocIsType(ElementMain_Mapping).ownedRelationship()  
->union(SlotMembership_Mapping.getMappedColl(from.slot)->asSet())  
->union(from.classifier  
    ->collect(g | InstanceSpecificationFeatureTyping_Mapping.getMapped(from, g))->asSet())  
->asSet()
```

### 7.7.4.2.14 InstanceSpecification\_Mapping

#### Description

The UML4SysML::InstanceSpecification that is not a link is mapped to a SysMLv2 PartDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {  
    attribute sysMLv1ValueProperty : ScalarValues::String;  
}  
  
part sysMLv1InstanceSpecification : SysMLv1Block {  
    redefines sysMLv1ValueProperty = "Hello InstanceSpecification";  
}
```

#### General Mappings

NamedElementMain\_Mapping  
GenericToPartUsage\_Mapping

#### Mapping Source

InstanceSpecification

#### Mapping Target

PartUsage

#### Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.classifier->select( c | c.ocIsTypeOf(UML::Association))->size() = 0
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PartUsage::ownedRelationship () : Relationship [0..\*]

```
SlotMembership_Mapping.getMappedColl(from.slot)->asSet()
->union(from.classifier
    ->collect(g | InstanceSpecificationFeatureTyping_Mapping.getMapped(from, g))->asSet())
->union(self.ocIsType(ElementMain_Mapping).ownedRelationship())
->asSet()
```

- PartUsage::ownedFeatureMembership () : FeatureMembership [0..\*]

```
from.classifier
->collect(c | InstanceSpecificationToGeneralization_Mapping.getMapped(from, c))
```

### 7.7.4.2.15 InstanceSpecificationFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

InstanceSpecification

#### Mapping Target

FeatureTyping with qualifier: classifier:Classifier

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type (in classifier : Classifier) : Type [1]

```
Classifier_Mapping.getMapped(classifier)
```

#### 7.7.4.2.16 InstanceValue\_Mapping

##### Description

The UML4SysML::InstanceValue is mapped to a SysMLv2 FeatureReferenceExpression.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1;
part sysMLv1InstanceSpecification : SysMLv1Block1;
part def SysMLv1Block2 {
    part sysMLv1PartProperty : SysMLv1Block1
        = sysMLv1InstanceSpecification;
}
```

##### General Mappings

ValueSpecification\_Mapping

##### Mapping Source

InstanceValue

##### Mapping Target

FeatureReferenceExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureReferenceExpression::ownedRelationship () : Relationship [0..\*]  

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->including (InstanceValueMembership_Mapping.getMapped (from.instance))  
->including (ReturnParameterFeatureMembership_Factory.create ())
```

#### 7.7.4.2.17 InstanceValueMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

**Mapping Source**

InstanceSpecification

**Mapping Target**

Membership

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
from

**7.7.4.2.18 LowerBoundValueFeatureMembership\_Mapping****Description**

Creates a feature membership relationship for *ownedMemberFeature()*.

**General Mappings**

GenericToFeatureMembership\_Mapping

**Mapping Source**

MultiplicityElement

**Mapping Target**

FeatureMembership

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [0..1]`  
`LiteralInteger_Mapping.getMapped(from.lowerValue)`

#### 7.7.4.2.19 MultiplicityElement\_Mapping

##### Description

A `UML4SysML::MultiplicityElement` is mapped to a SysML v2 `MultiplicityRange`.

##### General Mappings

`GenericToFeature_Mapping`

##### Mapping Source

`MultiplicityElement`

##### Mapping Target

`MultiplicityRange`

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `MultiplicityRange::declaredName () : String [0..1]`  
`'multiplicity'`
- `MultiplicityRange::ownedRelationship () : Relationship [0..*]`  
`OrderedSet{MultiplicityLowerBoundOwningMembership_Mapping.getMapped(from), MultiplicityUpperBoundOwningMembership_Mapping.getMapped(from) }`
- `MultiplicityRange::isUnique () : Boolean [1]`  
`from.isUnique`

#### 7.7.4.2.20 MultiplicityLowerBoundOwningMembership\_Mapping

##### Description

Creates a owning membership relationship for *ownedMemberElement()*.



## General Mappings

GenericToOwningMembership\_Mapping

## Mapping Source

MultiplicityElement

## Mapping Target

OwningMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  

```
if from.lowerValue.ocIsUndefined() then
    DefaultLowerBound_Mapping.getMapped(from)
else
    from.lowerValue
endif
```
- OwningMembership::memberName () : String [0..1]  

```
'lowerBound'
```

### 7.7.4.2.21 MultiplicityMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

MultiplicityElement

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  
`MultiplicityElement_Mapping.getMapped(from)`

### 7.7.4.2.22 MultiplicityUpperBoundOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

MultiplicityElement

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  

```
if from.upperValue.oclIsUndefined() then
    DefaultUpperBound_Mapping.getMapped(from)
else
    from.upperValue
endif
```
- `OwningMembership::memberName () : String [0..1]`  
`'upperBound'`

### 7.7.4.2.23 Operation\_Mapping

#### Description

A UML4SysML::Operation is mapped to a SysML v2 PerformActionUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {  
    perform action sysMLv1Operation {  
        in parIn : ScalarValues::Boolean;  
        out result : ScalarValues::Integer;  
    }  
}
```

#### General Mappings

BehavioralFeature\_Mapping

GenericToActionUsage\_Mapping

#### Mapping Source

Operation

#### Mapping Target

PerformActionUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PerformActionUsage::ownedRelationship () : Relationship [0..\*]

```
let parameters: Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in  
let parameterSets: Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::ParameterSet)) in  
self.ocAsType(ElementMain_Mapping).ownedRelationship()  
->union(parameters->collect(e | ParameterMembership_Mapping.getMapped(e))->asSet())  
->union(parameterSets->collect(e | ParameterSetMembership_Mapping.getMapped(e))->asSet())
```

### 7.7.4.2.24 Parameter\_Mapping

#### Description

A UML4SysML::Parameter is mapped to a SysML v2 ReferenceUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {  
    in parIn : ScalarValues::Boolean;  
}
```

## General Mappings

GenericToReferenceUsage\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

Parameter

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

```
    Helper.getKerMLParameterDirectionKind(from.direction)
```

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
let typings: Set(KerML::FeatureTyping) =  
    if from.type.ocIsUndefined() then  
        Set{}  
    else  
        Set{ParameterToFeatureTyping_Mapping.getMapped(from)}  
    endif in  
let multiplicities: Set(KerML::Relationship) =  
    Set{MultiplicityMembership_Mapping.getMapped(from)} in  
let defaultValues: Set(KerML::Relationship) =  
    if from.defaultValue.ocIsUndefined() then  
        Set{}  
    else  
        Set{ParameterDefaultValue_Mapping.getMapped(from)}  
    endif in
```

```

self.oclAsType(ElementMain_Mapping).ownedRelationship()
->union(typings)
->union(multiplicities)
->union(defaultValues)

```

- ReferenceUsage::declaredName () : String [0..1]

```

if from.direction = UML::ParameterDirectionKind::return then 'result' else from.name endif

```

#### 7.7.4.2.25 ParameterDefaultValue\_Mapping

##### Description

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

attribute value : ScalarValues::String default := "default value";

```

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

Parameter

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```

from.defaultValue

```

- FeatureValue::isDefault () : Boolean [1]

```

true

```

#### 7.7.4.2.26 ParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToParameterMembership\_Mapping

## Mapping Source

Parameter

## Mapping Target

ParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]

```
Parameter_Mapping.getMapped(from)
```

### 7.7.4.2.27 ParameterSet\_Mapping

#### Description

A UML4SysML::ParameterSet is mapped to a SysML v2 ReferenceUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
  in parIn [0..1];
  inout parInOut [0..1];
  out parOut [0..1];
  out parReturn [0..1];

  sysMLv1ParameterSet1 [1] {
    ref parIn = SysMLv1Activity::parIn;
    assert constraint sysMLv1ParameterSet1Condition {
      language "English"
    /*
     * opaque expression parameter set 1
     */
    }
  }
  sysMLv1ParameterSet2 [1] {
    ref parInOut = SysMLv1Activity::parInOut;
    ref parOut = SysMLv1Activity::parOut;
    ref parReturn = SysMLv1Activity::parReturn;
  }
}
```

```
}  
}
```

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

ParameterSet

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
from.parameter  
->collect (p | ParameterSetParameterFeatureMembership_Mapping.getMapped (from, p))  
->asSet ()
```
- ReferenceUsage::declaredName () : String [0..1]  

```
from.name
```

#### 7.7.4.2.28 ParameterSetMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

ParameterSet

### Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

`ParameterSet_Mapping.getMapped(from)`

### 7.7.4.2.29 ParameterSetParameterFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ParameterSet

#### Mapping Target

FeatureMembership with qualifier: parameter:Parameter

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature (in parameter : Parameter) : Feature [1]`

`ParameterSetParameterReferenceUsage_Mapping.getMapped(parameter)`

### 7.7.4.2.30 ParameterSetParameterReferenceUsage\_Mapping

#### Description



The mapping class creates the reference usage element for the UML4SysML::ParameterSet mapping.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Parameter

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { ParameterSetParameterReferenceUsageFeatureValue_Mapping.getMapped(from) ,  
MultiplicityMembership_Mapping.getMapped(from) }
```

#### 7.7.4.2.31 ParameterSetParameterReferenceUsageFeatureValue\_Mapping

### Description

The mapping class creates the feature reference expression for the reference usage element of the UML4SysML::ParameterSet mapping.

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

Parameter

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
ParameterSetParameterReferenceUsageFeatureValueExpression_Mapping.getMapped(from)
```

#### 7.7.4.2.32 ParameterSetParameterReferenceUsageFeatureValueExpression\_Mapping

##### Description

The mapping class creates the feature reference expression for the UML4SysML::ParameterSet mapping.

##### General Mappings

GenericToFeatureReferenceExpression\_Mapping

##### Mapping Source

Parameter

##### Mapping Target

FeatureReferenceExpression

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`

```
Set { ParameterSetParameterReferenceUsageMembership_Mapping.getMapped(from) ,  
CommonReturnParameterFeatureMembership_Mapping.getMapped(from) }
```

#### 7.7.4.2.33 ParameterSetParameterReferenceUsageMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToMembership\_Mapping

### Mapping Source

Parameter

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]  
from

## 7.7.4.2.34 ParameterToFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

TypedElementFeatureTyping\_Mapping

### Mapping Source

Parameter

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::typedFeature () : Feature [1]`

```
parameter.to
```

#### 7.7.4.2.35 PropertyCommon\_Mapping

##### Description

The mapping class is the abstract base class for UML4SysML::Property mappings.

##### General Mappings

StructuralFeature\_Mapping

##### Mapping Source

Property

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isEnd () : Boolean [1]`

```
if from.association.oclIsUndefined() then
    false
else
    from.association.ownedEnd->includes(from)
endif
```

- `Feature::isComposite () : Boolean [1]`

```
from.isComposite
```

- `Feature::ownedRelationship () : Relationship [0..*]`

```
let typings: Set(KerML::FeatureTyping) = if from.type.oclIsUndefined() then
    Set{}
else
    Set{StructuralFeatureToFeatureTyping_Mapping.getMapped(from) }
```

```

endif in
let subsettings: Set(KerML::Subsetting) = from.subsettedProperty
->collect(p | PropertySubsetting_Mapping.getMapped(from, p))->asSet() in
let defaultValue: Set(KerML::OwningMembership) =
  if from.defaultValue.oclIsUndefined() then
    Set{}
  else
    Set{DefaultValue_Mapping.getMapped(from)}
  endif in
typings->union(subsettings)->union(defaultValue)
->including(MultiplicityMembership_Mapping.getMapped(from))->asSet()

```

- Feature::isDerived () : Boolean [1]

```
from.isDerived
```

#### 7.7.4.2.36 PropertySubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToSubsetting\_Mapping

##### Mapping Source

Property

##### Mapping Target

Subsetting with qualifier: subsettedProperty:Property

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::subsettedFeature (in subsettedProperty : Property) : Feature [1]

```
Property_Mapping.getMapped(subsettedProperty)
```

- Subsetting::subsettingFeature () : Feature [1]

```
Property_Mapping.getMapped(from)
```

#### 7.7.4.2.37 PropertyTypedByClassInterface\_Mapping

##### Description

A UML4SysML::Property typed by a UML4SysML::Class or UML4SysML::Interface is mapped to a SysML v2 OccurrenceUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {
    occurrence sysMLv1Property1 [0..1] : SysMLv1Class;
    ref occurrence sysMLv1ReferencedProperty [0..1] : SysMLv1Class;
    occurrence sysMLv1Property2 [0..1] : SysMLv1Interface;
}
```

## General Mappings

PropertyCommon\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

Property

## Mapping Target

OccurrenceUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.oclIsTypeOf(UML::Property) then
    let p: UML::Property = src.oclAsType(UML::Property) in
    if p.type.oclIsUndefined() then
        false
    else
        (p.type.oclIsTypeOf(UML::Class) or
         p.type.oclIsTypeOf(UML::Interface)) and
        not (p.name.indexOf('base_') > 0) and
        (p.association.oclIsUndefined() or p.association.ownedEnd->excludes(p))
    endif
else
    false
endif
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.4.2.38 PropertyUntyped\_Mapping

#### Description

A UML4SysML::Property is mapped to a SysML v2 Feature. The mapping class maps properties without a type.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {  
    attribute sysMLv1Property;  
}
```

## General Mappings

PropertyCommon\_Mapping  
GenericToReferenceUsage\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

Property

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.type.ocIsUndefined() and not  
Helper.hasStereotypeApplied(src.owner, 'SysML::ConstraintBlocks::ConstraintBlock')
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.4.2.39 Realization\_Mapping

#### Description

A UML4SysML::Realization relationship is mapped to a SysML v2 Dependency.

## General Mappings

Abstraction\_Mapping

## Mapping Source

Realization

## Mapping Target

Dependency

#### **Owned Mappings**

(none)

#### **7.7.4.2.40 Slot\_Mapping**

##### **Description**

A UML4SysML::Slot is mapped to a SysML v2 Feature.

##### **General Mappings**

GenericToFeature\_Mapping  
ElementMain\_Mapping

##### **Mapping Source**

Slot

##### **Mapping Target**

Feature

#### **Owned Mappings**

(none)

#### **7.7.4.2.41 SlotMembership\_Mapping**

##### **Description**

Creates a membership relationship for *memberElement()*.

##### **General Mappings**

GenericToFeatureMembership\_Mapping

##### **Mapping Source**

Slot

##### **Mapping Target**

FeatureMembership

#### **Owned Mappings**

(none)

##### **Applicable filters**

(none)



## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::memberName () : String [0..1]`  
`from.definingFeature.name`
- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`from`
- `FeatureMembership::isReadOnly () : Boolean [1]`  
`from.isReadOnly`

### 7.7.4.2.42 SlotFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Slot

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  
`ElementMain_Mapping.getMapped(from)`

### 7.7.4.2.43 SlotValue\_Mapping

#### Description

Issue here since a KerML feature cannot have more than one FeatureValue while a UML4SysML::Slot can. How to manage collection of values?

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

ValueSpecification

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.oclIsKindOf(UML::Slot)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::featureWithValue () : Feature [1]  

```
Slot_Mapping.getMapped(from.owner)
```
- FeatureValue::value () : Expression [1]  

```
from
```

#### 7.7.4.2.44 StructuralFeature\_Mapping

### Description

The mapping class is the abstract base class for all UML4SysML::StructuralFeature mappings.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

StructuralFeature

### Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isUnique () : Boolean [1]`  
`from.isUnique`
- `Feature::isAbstract () : Boolean [1]`  
`false`
- `Feature::ownedRelationship () : Relationship [0..*]`  

```
let typing: KerML::FeatureTyping =  
    StructuralFeatureToFeatureTyping_Mapping.getMapped(from) in  
if typing.oclIsUndefined() then  
    Set{MultiplicityMembership_Mapping.getMapped(from)}  
else  
    Set{MultiplicityMembership_Mapping.getMapped(from), typing}  
endif
```
- `Feature::isOrdered () : Boolean [1]`  
`from.isOrdered`
- `Feature::isReadOnly () : Boolean [1]`  
*abstract rule*

### 7.7.4.2.45 StructuralFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

StructuralFeature

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::visibility () : VisibilityKind [1]  

```
if (from.ocIsKindOf(UML::NamedElement)) then
    Helper.getKerMLVisibilityKind(from.ocAsType(UML::NamedElement).visibility)
else
    KerML::VisibilityKind::public
endif
```
- FeatureMembership::ownedMemberFeature () : Feature [0..1]  

```
NamedElementMain_Mapping.getMapped(from)
```

#### 7.7.4.2.46 StructuralFeatureToFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

TypedElementFeatureTyping\_Mapping

##### Mapping Source

StructuralFeature

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

#### 7.7.4.2.47 TypedElementFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

TypedElement

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not src.type.ocIsUndefined()
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
if from.type.ocIsKindOf(UML::PrimitiveType) then
    Helper.getScalarValueType(from.type)
else if from.type.ocIsKindOf(UML::Enumeration) then
    Helper.getEnumerationType(from.type)
else
    Classifier_Mapping.getMapped(from.type)
endif endif
```

#### 7.7.4.2.48 UpperBoundValueFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

MultiplicityElement

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [0..1]`

```
if from.upper <> -1 then
    LiteralUnlimitedToInteger_Mapping.getMapped(from.upperValue)
else
    LiteralUnlimitedToUnbounded_Mapping.getMapped(from.upperValue)
endif
```

This chapter lists all mapping specifications of UML4SysML::Classification model elements.

## 7.7.5 CommonBehavior

This chapter lists all mapping specifications of UML4SysML::CommonBehavior model elements.

### 7.7.5.1 Overview

**Table 6. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
AnyReceiveEvent	not mapped; see next section
CallEvent	not mapped; see next section
ChangeEvent	TextualRepresentation
FunctionBehavior	ViewDefinition RequirementUsage
OpaqueBehavior	ViewDefinition ActionDefinition RequirementUsage
SignalEvent	not mapped; see next section
TimeEvent	TextualRepresentation
Trigger	AcceptActionUsage

The following table gives an overview of which SysML v2 elements the UML4SysML::CommonBehavior elements are transformed with which mapping class. The mapping details are in [7.7.5.3](#).

The justifications for the elements without mapping are given in [7.7.5.2](#).

### 7.7.5.2 UML4SysML::CommonBehavior elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 7. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
CallEvent	The concept of a CallEvent is not supported by SysML v2.

### 7.7.5.3 Mapping Specifications

#### 7.7.5.3.1 Behavior\_Mapping

##### Description

The mapping class is the abstract base class for all UML4SysML::Behavior mappings.

##### General Mappings

GenericToBehavior\_Mapping  
Class\_Mapping

##### Mapping Source

Behavior

##### Mapping Target

Behavior

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Behavior::ownedRelationship () : Relationship [0..\*]

```
let parameters: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in
let parameterSets: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::ParameterSet)) in
let features: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Property)) in
let elementsOMS: Set(UML::Element) =
    (((from.ownedElement - parameters) parameterSets) - features) in
elementsOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(features->collect(e | PropertyMembership_Mapping.getMapped(e)))
->union(parameters->collect(e | ParameterMembership_Mapping.getMapped(e)))
->union(parameterSets->collect(e | ParameterSetMembership_Mapping.getMapped(e)))
```

### 7.7.5.3.2 ChangeEvent\_Mapping

#### Description

T#3 meeting, 2022-12-14: Do not use automatic rules! Events are not single elements in SysML v2. Consider it in the transformation for AcceptEventAction, Transition

#### General Mappings

GenericToTextualRepresentation\_Mapping

NamedElementMain\_Mapping

#### Mapping Source

ChangeEvent

#### Mapping Target

TextualRepresentation

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::body () : String [1]

```
if from.changeExpression.ocIsKindOf(UML::OpaqueExpression) then
  if from.changeExpression.
    ocAsType(UML::OpaqueExpression).body.ocIsUndefined() then
    invalid
  else
    from.changeExpression.ocAsType(UML::OpaqueExpression).body.get(0)
  endif
else
  invalid
endif
```

- TextualRepresentation::language () : String [1]

```
if from.changeExpression.ocIsKindOf(UML::OpaqueExpression) then
  if from.changeExpression.
    ocAsType(UML::OpaqueExpression).language->size() = 0 then
    invalid
  else
    from.changeExpression.ocAsType(UML::OpaqueExpression).language.get(0)
  endif
else
  invalid
endif
```



```

        invalid
    endif

```

### 7.7.5.3.3 OpaqueBehavior\_Mapping

#### Description

A UML4SysML::OpaqueBehavior is mapped to a SysML v2 ActionDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action def SysMLv1OpaqueBehavior {
    language "Built-in Math"
    /*
     * result = 42 + 23;
     */
}

```

#### General Mappings

Behavior\_Mapping

#### Mapping Source

OpaqueBehavior

#### Mapping Target

ActionDefinition

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.owner.ocIsKindOf(UML::Package)
```

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionDefinition::ownedRelationship () : Relationship [0..\*]

```

let parameters : Set(UML::Parameter) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in
let parameterSets : Set(UML::ParameterSet) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::ParameterSet)) in
let features : Set(UML::Property) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Property)) in

```

```

let elementsOMS: Set(UML::Element) =
    (((from.ownedElement - parameters) - parameterSets) - features) in
elementsOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(features->collect(e | PropertyMembership_Mapping.getMapped(e)))
->union(parameters->collect(e | ParameterMembership_Mapping.getMapped(e)))
->union(parameterSets->collect(e | ParameterSetMembership_Mapping.getMapped(e)))
->union(from.language
    ->collect(1 | OpaqueBehaviorMembership_Mapping.getMapped(from, 1)))

```

#### 7.7.5.3.4 OpaqueBehaviorMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

OpaqueBehavior

##### Mapping Target

OwningMembership with qualifier: language:String

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement (in language : String) : Element [1]

```
OpaqueBehaviorSpecification_Mapping.getMapped(from, language)
```

#### 7.7.5.3.5 OpaqueBehaviorSpecification\_Mapping

##### Description

The mapping class creates the SysML v2 TextualRepresentation elements from the languages and bodies properties of the given UML4SysML::OpaqueBehavior.

##### General Mappings

GenericToTextualRepresentation\_Mapping

##### Mapping Source

OpaqueBehavior

### Mapping Target

TextualRepresentation with qualifier: language:String

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::body () : String [1]  

```
let index:Integer = from.language->indexOf(language) in  
from._'body'->at(index)
```
- TextualRepresentation::language () : String [1]  

```
language
```

## 7.7.5.3.6 TimeEvent\_Mapping

### Description

T#3 meeting, 2022-12-14: Do not use automatic rules! Events are not single elements in SysML v2. Consider it in the transformation for AcceptEventAction, Transition

### General Mappings

NamedElementMain\_Mapping  
GenericToTextualRepresentation\_Mapping

### Mapping Source

TimeEvent

### Mapping Target

TextualRepresentation

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `TextualRepresentation::body () : String [1]`  
`'tbd timeevent'`

### 7.7.5.3.7 Trigger\_Mapping

## 7.7.6 CommonStructure

This chapter lists all mapping specifications of UML4SysML::CommonStructure model elements.

### 7.7.6.1 Overview

**Table 9. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Abstraction	SatisfyRequirementUsage AllocationDefinition
Comment	Package
Constraint	ConstraintDefinition
Dependency	Dependency
ElementImport	MembershipImport
PackageImport	NamespaceImport
Realization	Dependency
Usage	Dependency

The following table gives an overview of which SysML v2 elements the UML4SysML::CommonStructure elements are transformed with which mapping class. The mapping details are in [7.7.6.2](#).

### 7.7.6.2 Mapping Specifications

#### 7.7.6.2.1 Abstraction\_Mapping

##### Description

A UML4SysML::Abstraction relationship is mapped to a SysML v2 Dependency relationship.

##### General Mappings

Dependency\_Mapping

##### Mapping Source

Abstraction

##### Mapping Target

Dependency

## Owned Mappings

(none)

### 7.7.6.2.2 Comment\_Mapping

#### Description

A UML4SysML::Comment is mapped to a SysML v2 Comment.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1;
part def SysMLv1Block2;
action def SysMLv1Activity {
    comment about SysMLv1Activity, SysMLv1Block1
        /* comment body */
}
comment about SysMLv1Block1, SysMLv1Block /* comment body */
```

#### General Mappings

ElementMain\_Mapping

GenericToAnnotatingElement\_Mapping

#### Mapping Source

Comment

#### Mapping Target

Comment

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not Helper.hasStereotypeApplied(src, 'SysML::ModelElements::ElementGroup')
```

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Comment::ownedRelationship () : Relationship [0..\*]  

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->union (self.annotation () ->asSet ())
```

- `Comment::body () : String [1]`

```
if from.body->isEmpty() then '' else from.body endif
```

- `Comment::annotation () : Annotation [0..*]`

```
from.annotatedElement
->collect(e | CommentAnnotation_Mapping.getMapped(from, e))
```

### 7.7.6.2.3 CommentAnnotation\_Mapping

#### Description

The mapping class creates the annotation relationship for the UML4SysML::Comment mapping.

#### General Mappings

GenericToAnnotation\_Mapping

#### Mapping Source

Comment

#### Mapping Target

Annotation with qualifier: annotatedElement:Element

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Annotation::annotatedElement (in annotatedElement : Element) : Element [1]`

```
ElementMain_Mapping.getMapped(annotatedElement)
```

- `Annotation::annotatingElement () : AnnotatingElement [1]`

```
Comment_Mapping.getMapped(from)
```

- `Annotation::owningAnnotatedElement () : Element [0..1]`

```
null
```

### 7.7.6.2.4 CommentOwnership\_Mapping

#### Description

That mapping class creates an ownership relation that is convenient for a Comment. In SysMLv1/UML can be owned by any kind of element, including some that are not translated to SysMLv2 Namespaces.

### General Mappings

GenericToAnnotation\_Mapping  
UniqueMapping

### Mapping Source

Comment

### Mapping Target

Annotation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Annotation::annotatedElement () : Element [1]  
`ElementMain_Mapping.getMapped(from.owner)`
- Annotation::annotatingElement () : AnnotatingElement [1]  
`Comment_Mapping.getMapped(from)`
- Annotation::ownedRelatedElement () : Element [0..\*]  
`Set{self.annotatingElement() }`

#### 7.7.6.2.5 Constraint\_Mapping

##### Description

A UML4SysML::Constraint is mapped to a SysML v2 ConstraintDefinition and AssertConstraintUsages for the constrained elements.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {  
    constraint def SysMLv1Constraint {  
        calc sysMLv1Constraint {  
            language "English"  
            /*  
            * constraint specification
```

```

        */
    }
}
assert constraint assert_sysMLv1Constraint : SysMLv1Constraint;
}

```

## General Mappings

GenericToConstraintDefinition\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

Constraint

## Mapping Target

ConstraintDefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConstraintDefinition::ownedRelationship () : Relationship [0..\*]

```

self.oclAsType (ElementMain_Mapping).ownedRelationship ()
->union (Set {ElementFeatureMembership_Mapping.getMapped (from.specification),
CommonReturnParameterReferenceUsageMembership_Mapping.getMapped (from.specification)})

```

### 7.7.6.2.6 ConstrainedElementFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

Constraint

## Mapping Target

FeatureMembership



## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

`ConstraintUsage_Mapping.getMapped (from)`

### 7.7.6.2.7 ConstraintUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Constraint

#### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

`from`

### 7.7.6.2.8 ConstraintUsage\_Mapping

#### Description

The mapping class creates the SysML v2 AssertConstraintUsage elements for the constrained elements of the UML4SysML::Constraint mapping.

### General Mappings

GenericToUsage\_Mapping

### Mapping Source

Constraint

### Mapping Target

AssertConstraintUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- AssertConstraintUsage::declaredName () : String [0..1]

```
'assert_' + from.name
```

- AssertConstraintUsage::ownedRelationship () : Relationship [0..\*]

```
from.ownedComment->reject(c | c.annotatedElement->includes(from))->collect(c| CommentOwnership  
->union(Set{ConstraintUsageFeatureTyping_Mapping.getMapped(from),  
CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)}))
```

### 7.7.6.2.9 Dependency\_Mapping

#### Description

A UML4SysML::Dependency relationship is mapped to a SysML v2 Dependency relationship.

### General Mappings

DirectedRelationship\_Mapping

### Mapping Source

Dependency

### Mapping Target

Dependency

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Dependency::client () : Element [0..*]`  
`from.source->collect (e | ElementMain_Mapping.getMapped (e) )`
- `Dependency::declaredName () : String [0..1]`  
`from.name`
- `Dependency::supplier () : Element [0..*]`  
`from.target->collect (e | ElementMain_Mapping.getMapped (e) )`

### 7.7.6.2.10 DirectedRelationship\_Mapping

#### Description

The mapping class is the abstract base class for all `UML4SysML::DirectedRelationship` mappings.

#### General Mappings

Relationship\_Mapping

#### Mapping Source

DirectedRelationship

#### Mapping Target

Relationship

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Relationship::target () : Element [0..\*]

```
from.target->collect (e | ElementMain_Mapping.getMapped (e))
```

- Relationship::source () : Element [0..\*]

```
from.source->collect (e | ElementMain_Mapping.getMapped (e))
```

#### 7.7.6.2.11 ElementMain\_Mapping

##### Description

This is the general abstract class to be used as an ancestor for any class mapping specification.

##### General Mappings

GenericToElement\_Mapping  
MainMapping

##### Mapping Source

Element

##### Mapping Target

Element

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Element::ownedRelationship () : Relationship [0..\*]

```
from.ownedComment->reject (c | c.annotatedElement->includes (from)) ->collect (c| CommentOwnersh
```

- Element::elementId () : String [1]

```
Helper.getID (from)
```

#### 7.7.6.2.12 ElementMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToMembership\_Mapping

## Mapping Source

Element

## Mapping Target

Membership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::visibility () : VisibilityKind [1]  

```
if (from.ocIsKindOf(UML::NamedElement)) then
    from.ocAsType(UML::NamedElement).visibility
else
    KerML::VisibilityKind::public
endif
```
- Membership::membershipOwningNamespace () : Element [0..\*]  

```
Set{ElementMain_Mapping(from)}
-- will not be used since corresponding attribute is derived,
-- but required for redefinition
```
- Membership::memberElement () : Element [1]  

```
ElementMain_Mapping.getMapped(from)
```

### 7.7.6.2.13 ElementOwnership\_Mapping

#### Description

The mapping class is the abstract base class for mappings that target ownership relationships.

## General Mappings

GenericToRelationship\_Mapping

UniqueMapping

## Mapping Source

Element

## Mapping Target

Relationship

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Relationship::target () : Element [0..\*]  
`OrderedSet{ElementMain_Mapping.getMapped(from) }`
- Relationship::source () : Element [0..\*]  
`OrderedSet{ElementMain_Mapping.getMapped(from.owner) }`
- Relationship::ownedRelatedElement () : Element [0..\*]  
`self.target ()`

### 7.7.6.2.14 ElementOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

ElementMembership\_Mapping  
ElementOwnership\_Mapping

#### Mapping Source

Element

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedRelatedElement () : Element [0..*]`  
`Set{self.ownedMemberElement () }`
- `OwningMembership::membershipOwningNamespace () : Element [0..*]`  
`Set{ElementMain_Mapping(from) }`  
`-- will not be used since corresponding attribute is derived,`  
`-- but required for redefinition`
- `OwningMembership::ownedMemberElement () : Element [1]`  
`ElementMain_Mapping.getMapped (from)`

### 7.7.6.2.15 NamedElementMain\_Mapping

#### Description

The mapping class is the abstract base class for mappings of `UML4SysML::NamedElements`.

#### General Mappings

`ElementMain_Mapping`

#### Mapping Source

`NamedElement`

#### Mapping Target

`Element`

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Element::declaredName () : String [0..1]`  
`from.name`

### 7.7.6.2.16 Namespace\_Mapping

#### Description

The mapping class is the abstract base class for UML4SysML::Namespace mappings.

### General Mappings

GenericToNamespace\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

Namespace

### Mapping Target

Namespace

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Namespace::ownedImport () : Import [0..\*]  
Set { }

## 7.7.6.2.17 Relationship\_Mapping

### Description

The mapping class is the abstract base class for UML4SysML::Relationship mappings.

### General Mappings

GenericToRelationship\_Mapping  
ElementMain\_Mapping

### Mapping Source

Relationship

### Mapping Target

Relationship

### Owned Mappings

(none)

### Applicable filters



(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Relationship::ownedRelatedElement () : Element [0..\*]  

```
from.relatedElement->select(e | from.ownedElement->includes(e))  
->collect(e | ElementMain_Mapping.getMapped(e))
```
- Relationship::owningRelatedElement () : Element [0..1]  

```
ElementMain_Mapping.getMapped(from.owner)
```

### 7.7.6.2.18 Usage\_Mapping

#### Description

A UML4SysML::Usage relationship is mapped to a SysML v2 Dependency relationship.

#### General Mappings

Dependency\_Mapping

#### Mapping Source

Usage

#### Mapping Target

Dependency

#### Owned Mappings

(none)

## 7.7.7 InformationFlows

This chapter lists all mapping specifications of UML4SysML::InformationFlows model elements.

### 7.7.7.1 Overview

Table 10. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
InformationFlow	FlowConnectionDefinition
InformationItem	ItemDefinition

The following table gives an overview of which SysML v2 elements the UML4SysML::InformationFlows elements are transformed with which mapping class. The mapping details are in [7.7.7.2](#).

### 7.7.7.2 Mapping Specifications

### 7.7.7.2.1 InformationFlow\_Mapping

#### Description

A UML4SysML::InformationFlow is mapped to a FlowConnectionDefinition. If the UML4SysML::InformationFlow has defined realizingConnectors an additional FlowConnectionUsage element is created. The transformation rule is specified in the BehavioredClassifier::ownedRelationship operation. Then transformation also considers SysMLv1::ItemFlows which is handled by the factory class FlowConnectionUsage\_Factory.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {
    part partA : SysMLv1BlockA;
    part partB : SysMLv1BlockB;
    part itemC : SysMLv1BlockC;

    connection sysMLv1Connector connect partA to partB;
    message : SysMLv1InformationFlowB :> sysMLv1Connector of itemC from partA to partB;
}

part def SysMLv1BlockA;
part def SysMLv1BlockB;
part def SysMLv1BlockC;
part def SysMLv1BlockD;

connection def SysMLv1Association {
    end : SysMLv1BlockA;
    end : SysMLv1BlockB;
}

flow def SysMLv1InformationFlowA :> SysMLv1Association {
    item : SysMLv1BlockC;
    item : SysMLv1BlockD;
}
flow def SysMLv1InformationFlowB {
    end partA : SysMLv1BlockA;
    end partB : SysMLv1BlockB;
}
```

#### General Mappings

Relationship\_Mapping

#### Mapping Source

InformationFlow

#### Mapping Target

FlowConnectionDefinition

#### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FlowConnectionDefinition::ownedRelationship () : Relationship [0..\*]

```
from.source
  ->collect(s | InformationFlowEndFeatureMembership_Mapping.getMapped(from, s))->asSet()
->union(from.target
  ->collect(t | InformationFlowEndFeatureMembership_Mapping.getMapped(from, t))->asSet())
->union(from.conveyed
  ->collect(i | InformationFlowConveyedFeatureMembership_Mapping.getMapped(i))->asSet())
->union(from.realization->select( a | a.oclIsKindOf(UML::Association))
  ->collect(r | InformationFlowSubclassification_Mapping.getMapped(from, r))->asSet())
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())
->asOrderedSet()
```

### 7.7.7.2.2 InformationFlowConveyedFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Classifier

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
InformationItemFlowConveyedItemUsage_Mapping.getMapped(from)
```

### 7.7.7.2.3 InformationFlowEnd\_Mapping

#### Description

The mapping class creates the source feature of the FlowConnectionDefinition for the mapping of UML4SysML::InformationFlow.

#### General Mappings

GenericToFeature\_Mapping  
UniqueMapping

#### Mapping Source

InformationFlow

#### Mapping Target

Feature with qualifier: end:NamedElement

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]  
`true`
- Feature::ownedRelationship () : Relationship [0..\*]  
`Set{InformationFlowFeatureTyping_Mapping.getMapped(from, end)}`

### 7.7.7.2.4 InformationFlowEndFeatureMembership\_Mapping

#### Description

The mapping class creates the source and the target membership relationships of theFlowConnectionDefinition for the UML4SysML::InformationFlow mapping.

#### General Mappings

GenericToFeatureMembership\_Mapping  
UniqueMapping

#### Mapping Source

InformationFlow

## Mapping Target

FeatureMembership with qualifier: end:NamedElement

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature (in end : NamedElement) : Feature [1]  
`InformationFlowEnd_Mapping.getMapped(from, end)`

### 7.7.7.2.5 InformationFlowFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping  
UniqueMapping

#### Mapping Source

InformationFlow

#### Mapping Target

FeatureTyping with qualifier: element:NamedElement

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type (in source : NamedElement) : Type [1]  
`ElementMain_Mapping.getMapped(element)`

#### 7.7.7.2.6 InformationFlowSubclassification\_Mapping

##### Description

Creates a Subclassification relationship between the target element of the UML4SysML::InformationFlow mapping and the target element of the UML4SysML::Association which realizes the flow.

##### General Mappings

GenericToSubclassification\_Mapping

##### Mapping Source

InformationFlow

##### Mapping Target

Subclassification with qualifier: element:Relationship

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subclassification::subclassifier () : Classifier [1]  
from
- Subclassification::superclassifier () : Classifier [1]  
element

#### 7.7.7.2.7 InformationItem\_Mapping

##### Description

A UML4SysML::InformationItem is mapped to a SysML v2 ItemDefinition.

##### General Mappings

Classifier\_Mapping

##### Mapping Source

InformationItem

##### Mapping Target

ItemDefinition

### Owned Mappings

(none)

#### 7.7.7.2.8 InformationItemFlowConveyedItemUsage\_Mapping

##### Description

Creates an ItemUsage element representing the conveyed classifier of an UML4SysML::InformationFlow.

##### General Mappings

GenericToItemUsage

##### Mapping Source

Classifier

##### Mapping Target

ItemUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ItemUsage::ownedRelationship () : Relationship [0..\*]

```
Set { InformationItemFlowConveyedItemUsageFeatureTyping_Mapping.getMapped (from) }
```

#### 7.7.7.2.9 InformationItemFlowConveyedItemUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Classifier

##### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

from

## 7.7.8 Interactions

This chapter lists all mapping specifications of UML4SysML::Interactions model elements.

### 7.7.8.1 Overview

**Table 11. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
ActionExecutionSpecification	ActionUsage
BehaviorExecutionSpecification	ActionUsage
CombinedFragment	Interaction
ConsiderIgnoreFragment	not mapped; see next section
Continuation	not mapped; see next section
DestructionOccurrenceSpecification	not mapped; see next section
ExecutionOccurrenceSpecification	not mapped; see next section
Gate	not mapped; see next section
GeneralOrdering	not mapped; see next section
Interaction	ViewDefinition Interaction RequirementUsage
InteractionConstraint	not mapped; see next section
InteractionOperand	Interaction
InteractionUse	Step
Lifeline	PartUsage
Message	ItemFlow
MessageOccurrenceSpecification	not mapped; see next section



SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
OccurrenceSpecification	not mapped; see next section
PartDecomposition	not mapped; see next section
StateInvariant	Invariant

The following table gives an overview of which SysML v2 elements the UML4SysML::Interactions elements are transformed with which mapping class. The mapping details are in [7.7.8.3](#).

The justifications for the elements without mapping are given in [7.7.8.2](#).

### 7.7.8.2 UML4SysML::Interactions elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 12. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
ConsiderIgnoreFragment	Mapping is not specified yet.
Continuation	Mapping is not specified yet.
DestructionOccurrenceSpecification	Mapping is not specified yet.
ExecutionOccurrenceSpecification	Mapping is not specified yet.
Gate	Mapping is not specified yet.
GeneralOrdering	Mapping is not specified yet.
InteractionConstraint	Mapping is not specified yet.
MessageOccurrenceSpecification	Mapping is not specified yet.
OccurrenceSpecification	Mapping is not specified yet.
PartDecomposition	Mapping is not specified yet.

### 7.7.8.3 Mapping Specifications

#### 7.7.8.3.1 ActionExecutionSpecification\_Mapping

##### Description

A UML4SysML::ActionExecutionSpecification is mapped to a SysML v2 ActionUsage.

##### General Mappings

GenericToActionUsage\_Mapping  
NamedElementMain\_Mapping

##### Mapping Source

ActionExecutionSpecification

##### Mapping Target

ActionUsage

#### **Owned Mappings**

(none)

### **7.7.8.3.2 BehaviorExecutionSpecification\_Mapping**

#### **Description**

A UML4SysML::BehaviorExecutionSpecification is mapped to a SysML v2 ActionUsage.

#### **General Mappings**

GenericToActionUsage\_Mapping

NamedElementMain\_Mapping

#### **Mapping Source**

BehaviorExecutionSpecification

#### **Mapping Target**

ActionUsage

#### **Owned Mappings**

(none)

### **7.7.8.3.3 CombinedFragment\_Mapping**

#### **Description**

A UML4SysML::CombinedFragment is mapped to a SysMLv2 Interaction.

#### **General Mappings**

NamedElementMain\_Mapping

GenericToInteraction\_Mapping

#### **Mapping Source**

CombinedFragment

#### **Mapping Target**

Interaction

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Interaction::ownedRelationship () : Relationship [0..*]`

```
let operands: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::InteractionOperand)) in
let occurrencesSpecs: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::OccurrenceSpecification)) in
let elements: Set(UML::Element) =
    (from.ownedElement - operands) - occurrencesSpecs in
elements->collect(e | ElementOwningMembership_Mapping.getMapped(e)) ->asSet()
->union(operands->collect(e | InteractionOperandMembership_Mapping.getMapped(e)) ->asSet())
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
```

### 7.7.8.3.4 CombinedFragmentMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

CombinedFragment

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [0..1]`

```
self.memberFeature()
```

- `FeatureMembership::memberFeature () : Feature [1]`

```
ElementMain_Mapping.getMapped(from)
```

### 7.7.8.3.5 ExecutionSpecificationMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToEndFeatureMembership\_Mapping

#### Mapping Source

ExecutionSpecification

#### Mapping Target

EndFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::memberFeature () : Feature [1]  
`ElementMain_Mapping.getMapped(from)`
- EndFeatureMembership::ownedMemberFeature () : Feature [0..1]  
`self.memberFeature()`

### 7.7.8.3.6 Interaction\_Mapping

#### Description

A UML4SysML::Interaction is mapped to a SysMLv2 Interaction.

#### General Mappings

Namespace\_Mapping  
GenericToInteraction\_Mapping

#### Mapping Source

Interaction

#### Mapping Target

Interaction

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Interaction::ownedRelationship () : Relationship [0..\*]

```
let lifelines: Set(UML::Element) = from.lifeline in
let messageOccurrences: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::MessageOccurrenceSpecification)) in
let executionOccurrences: Set(UML::Element) =
    from.fragment->select(e | e.ocIsKindOf(UML::ExecutionSpecification)) in
let occurrencesSpecs: Set(UML::Element) =
    from.fragment->select(e | e.ocIsKindOf(UML::OccurrenceSpecification)) in
let messages: Set(UML::Element) = from.message in
let invariants: Set(UML::Element) =
    from.fragment->select(e | e.ocIsKindOf(UML::StateInvariant)) in
let interactionUsages: Set(UML::Element) =
    from.fragment->select(e | e.ocIsKindOf(UML::InteractionUse)) in
let combinedFragments: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::CombinedFragment)) in
let continuations: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Continuation)) in
let elements: Set(UML::Element) =
    (((((((from.ownedElement - lifelines) - messageOccurrences)
    - executionOccurrences) - occurrencesSpecs) - messages) -
    combinedFragments) - invariants) -
    interactionUsages) - continuations) - from.ownedComment in

elements->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()
->union(lifelines->collect(e | LifelineMembership_Mapping.getMapped(e))->asSet())
->union(executionOccurrences
    ->collect(e | ExecutionSpecificationMembership_Mapping.getMapped(e))->asSet())
->union(messages->collect(e | MessageMembership_Mapping.getMapped(e))->asSet())
->union(combinedFragments
    ->collect(e | CombinedFragmentMembership_Mapping.getMapped(e))->asSet())
->union(invariants
    ->collect(e | StateInvariantMembership_Mapping.getMapped(e))->asSet())
->union(interactionUsages
    ->collect(e | InteractionUseMembership_Mapping.getMapped(e))->asSet())
->union(self.ocIsType(ElementMain_Mapping).ownedRelationship())
```

### 7.7.8.3.7 InteractionOperand\_Mapping

#### Description

A UML4SysML::InteractionOperand is mapped to a SysML v2 Interaction.

## General Mappings

NamedElementMain\_Mapping  
GenericToInteraction\_Mapping

## Mapping Source

InteractionOperand

## Mapping Target

Interaction

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Interaction::ownedRelationship () : Relationship [0..\*]

```
let executionOccurrences: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::ExecutionSpecification)) in
let occurrencesSpecs: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::OccurrenceSpecification)) in
let continuations: Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Continuation)) in
let elements: Set(UML::Element) =
    (((from.ownedElement - executionOccurrences) - occurrencesSpecs) -
    continuations) - from.ownedComment in
elements->collect(e | ElementOwningMembership_Mapping.getMapped(e)) ->asSet()
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
->union(executionOccurrences
    ->collect(e | ExecutionSpecificationMembership_Mapping.getMapped(e)) ->asSet())
```

### 7.7.8.3.8 InteractionOperandMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

InteractionOperand

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]

```
self.memberFeature()
```

- FeatureMembership::memberFeature () : Feature [1]

```
ElementMain_Mapping.getMapped(from)
```

### 7.7.8.3.9 InteractionUse\_Mapping

#### Description

A UML4SysML::InteractionUse is mapped to a SysML v2 Step.

#### General Mappings

GenericToStep\_Mapping

Namespace\_Mapping

#### Mapping Source

InteractionUse

#### Mapping Target

Step

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Step::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType (ElementMain_Mapping).ownedRelationship () ->including (InteractionUseFeatureTyping_Mapping)
```

#### 7.7.8.3.10 InteractionUseMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

InteractionUse

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::memberFeature () : Feature [1]

```
ElementMain_Mapping.getMapped (from)
```

- FeatureMembership::ownedMemberFeature () : Feature [0..1]

```
self.memberFeature ()
```

#### 7.7.8.3.11 InteractionUseFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source



InteractionUse

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`ElementMain_Mapping.getMapped(from.refersTo)`

## 7.7.8.3.12 LifelineMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Lifeline

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]

```
self.memberFeature()
```

- FeatureMembership::memberFeature() : Feature [1]

```
ElementMain_Mapping.getMapped(from)
```

### 7.7.8.3.13 LifelinePartUsage\_Mapping

#### Description

A UML4SysML::Lifeline is mapped to a SysML v2 PartUsage.

#### General Mappings

GenericToPartUsage\_Mapping

NamedElementMain\_Mapping

#### Mapping Source

Lifeline

#### Mapping Target

PartUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PartUsage::ownedRelationship() : Relationship [0..\*]

```
self.oclAsType(ElementMain_Mapping).ownedRelationship()->including(LifelineFeatureTyping_Map
```

### 7.7.8.3.14 LifelineFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Lifeline

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`ElementMain_Mapping.getMapped(from.represents.type)`

#### 7.7.8.3.15 Message\_Mapping

##### Description

A UML4SysML::Message is mapped to a SysML v2 ItemFlow.

##### General Mappings

GenericToItemFlow\_Mapping  
NamedElementMain\_Mapping

##### Mapping Source

Message

##### Mapping Target

ItemFlow

##### Owned Mappings

(none)

#### 7.7.8.3.16 MessageMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Message

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]  
`self.memberFeature()`
- FeatureMembership::memberFeature () : Feature [1]  
`ElementMain_Mapping.getMapped(from)`

### 7.7.8.3.17 StateInvariant\_Mapping

#### Description

A UML4SysML::StateInvariant is mapped to a SysML v2 Invariant.

#### General Mappings

GenericToExpression\_Mapping  
Namespace\_Mapping

#### Mapping Source

StateInvariant

#### Mapping Target

Invariant

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Invariant::ownedRelationship () : Relationship [0..*]`

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->including (StateInvariantFeatureTyping_Mapping.getMapped (from))
```

#### 7.7.8.3.18 StateInvariantMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

StateInvariant

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [0..1]`

```
self.memberFeature()
```

- `FeatureMembership::memberFeature () : Feature [1]`

```
ElementMain_Mapping.getMapped (from)
```

#### 7.7.8.3.19 StateInvariantFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

## Mapping Source

StateInvariant

## Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  
`ElementMain_Mapping.getMapped(from.invariant)`

## 7.7.9 Packages

This chapter lists all mapping specifications of UML4SysML::Packages model elements.

### 7.7.9.1 Overview

Table 13. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Extension	not mapped; see next section
ExtensionEnd	not mapped; see next section
Image	not mapped; see next section
Model	Package
Package	Package
PackageMerge	not mapped; see next section
Profile	Package
ProfileApplication	not mapped; see next section
Stereotype	MetadataDefinition

The following table gives an overview of which SysML v2 elements the UML4SysML::Packages elements are transformed with which mapping class. The mapping details are in [7.7.9.3](#).

The justifications for the elements without mapping are given in [7.7.9.2](#).

### 7.7.9.2 UML4SysML::Packages elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 14. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
Extension	The mapping of the extension relationship is performed in the context of Stereotype_Mapping.
ExtensionEnd	The mapping of the extension end property is performed in the context of Stereotype_Mapping.
Image	Mapping is not specified yet.
PackageMerge	The concept of the PackageMerge relationship is not supported by SysML v2.

### 7.7.9.3 Mapping Specifications

#### 7.7.9.3.1 ElementImport\_Mapping

##### Description

A UML4SysML::ElementImport is mapped to a SysMLv2 MembershipImport. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
package SysMLv1Package1 {
    import SysMLv1Package2::SysMLv1Block;
    import SysMLv1Package2::SysMLv1ValueType;
}
package SysMLv1Package2 {
    part def SysMLv1Block;
    attribute def SysMLv1ValueType;
}
```

##### General Mappings

GenericToMembershipImport\_Mapping  
NamedElementMain\_Mapping

##### Mapping Source

ElementImport

##### Mapping Target

MembershipImport

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.oclIsKindOf(UML::ElementImport) then
    Helper.hasMainMapping(src.oclAsType(UML::ElementImport).importedElement)
else
    false
endif
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MembershipImport::importedMemberName () : String [0..1]  
`from.alias`
- MembershipImport::visibility () : VisibilityKind [1]  
`Helper.getKerMLVisibilityKind(from.visibility)`
- MembershipImport::importedMembership () : Namespace [1]  
`ElementOwningMembership_Mapping.getMapped(from.importedElement)`

### 7.7.9.3.2 Model\_Mapping

#### Description

SysMLv2 has no explicit model element for a model. The UML4SysML::Model element is mapped to a SysMLv2 Package. The property "viewpoint" is mapped to a metadata defined in the SysML v1 library. The expected SysML v2 textual notation of a UML4SysML::Model with URI and viewpoint is as follows. If URI or viewpoint are not set in the source model, the metadata is not generated.

```
package SysMLv1Model {
    @SysMLv1Library::PackageData {URI="https://omg.org";}
    @SysMLv1Library::ModelData {'viewpoint'="The viewpoint of the model element.";}
}
```

#### General Mappings

Package\_Mapping

#### Mapping Source

Model

#### Mapping Target

Package

#### Owned Mappings

(none)



### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Package::ownedRelationship () : Relationship [0..\*]  

```
let relationships : Set(KerML::Relationship) =  
    self.oclAsType(Package_Mapping).ownedRelationship() in  
if from.viewpoint.oclIsUndefined() or from.viewpoint = '' then  
    relationships  
else  
    relationships  
->including (ModelViewpointMetadataMembership_Mapping.getMapped(from))  
endif
```

#### 7.7.9.3.3 ModelViewpointMetadataUsage\_Mapping

#### 7.7.9.3.4 ModelViewpointMetadataFeatureMembership\_Mapping

### Description

The mapping class creates the feature membership relationship for the metadata feature to store the UML4SysML::Model::viewpoint property.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Model

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]  

```
ModelViewpointMetadataReferenceUsage_Mapping.getMapped(from)
```

### 7.7.9.3.5 ModelViewpointMetadataReferenceUsage\_Mapping

#### Description

The mapping class creates the MetadataFeature for the mapping of the property UML4SysML::Model::viewpoint.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Model

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { ModelViewpointMetadataRedefinition_Mapping.getMapped (from) ,  
      ModelViewpointMetadataFeatureValue_Mapping.getMapped (from) }
```

### 7.7.9.3.6 ModelViewpointMetadataFeatureTyping\_Mapping

#### Description

The mapping class creates the FeatureTyping relationship for the AnnotatingFeature for the metadata to store the UML4SysML::Model::viewpoint property.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Model

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysMLv2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ModelData')
```

### 7.7.9.3.7 ModelViewpointMetadataMembership\_Mapping

#### Description

The mapping class creates a membership relationship for the metadata feature value for the UML4SysML::Model::viewpoint property.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Model

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`

```
ModelViewpointMetadataUsage_Mapping.getMapped(from)
```

### 7.7.9.3.8 ModelViewpointMetadataFeatureValue\_Mapping

#### Description

The mapping class maps the value of the property UML4SysML::Model::viewpoint.

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

Model

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]  
`ModelViewpointValue_Mapping.getMapped(from)`

## 7.7.9.3.9 ModelViewpointMetadataRedefinition\_Mapping

### Description

The mapping class creates the redefinition of the attribute for the metadata UML4SysML::Model::viewpoint.

### General Mappings

GenericToRedefinition\_Mapping

### Mapping Source

Model

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
let m : SYSML2::Membership =
  SYSML2::AttributeUsage.allInstances()
->collect(dt | dt.owningRelationship)
->select(r | r.ocIsKindOf(SYSML2::Membership))
->any(m | m.memberName = 'viewpoint') in
if (m.ocIsUndefined()) then
  invalid
else
  m.memberElement
endif
```

### 7.7.9.3.10 ModelViewpointValue\_Mapping

#### Description

The mapping class maps the value expression of the property `UML4SysML::Model::viewpoint`.

#### General Mappings

`GenericToExpression_Mapping`

#### Mapping Source

`Model`

#### Mapping Target

`LiteralString`

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `LiteralString::value () : String [1]`

```
LiteralString_Factory.create(from.viewpoint)
```

### 7.7.9.3.11 Package\_Mapping

#### Description

A UML4SysML::Package is mapped to a SysML v2 Package. The property "URI" is mapped to a metadata if it has a value. The expected SysML v2 textual notation of a UML4SysML::Package is as follows:

```
package ThisIsAPackageWithURI {  
  metadata SysMLv1Library::PackageData {URI="https://omg.org";} }  
}
```

## General Mappings

Namespace\_Mapping

## Mapping Source

Package

## Mapping Target

Package

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Package::ownedRelationship () : Relationship [0..\*]

```
Helper.packageOwnedRelationship(from)
```

### 7.7.9.3.12 PackageImport\_Mapping

## Description

A UML4SysML::PackageImport is mapped to a SysML v2 NamespaceImport. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
import SysMLv1Package::*;
```

## General Mappings

GenericToNamespaceImport\_Mapping  
ElementMain\_Mapping

## Mapping Source

PackageImport

## Mapping Target

NamespaceImport

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.oclIsKindOf(UML::PackageImport) then
    Helper.isInScope(src.oclAsType(UML::PackageImport).importedPackage)
else
    false
endif
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- NamespaceImport::visibility () : VisibilityKind [0..1]  
`Helper.getKerMLVisibilityKind(from.visibility)`
- NamespaceImport::importedNamespace () : Namespace [1]  
`Namespace_Mapping.getMapped(from.importedPackage)`

### 7.7.9.3.13 PackageURIMetadataUsage\_Mapping

#### Description

The mapping class creates the annotating feature to annotate the generated Package element with metadata to store the UML4SysML::Package::URI property.

#### General Mappings

GenericToMetadataUsage\_Mapping

#### Mapping Source

Package

#### Mapping Target

MetadataUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { PackageURIFeatureTyping_Mapping.getMapped (from) ,  
PackageURIFeatureMembership_Mapping.getMapped (from) }
```
- MetadataUsage::declaredName () : String [0..1]  

```
'URI '
```

#### 7.7.9.3.14 PackageURIFeatureMembership\_Mapping

##### Description

The mapping class creates the feature membership relationship for the metadata feature to store the UML4SysML::Package::URI property.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Package

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  

```
PackageURIMetadataReferenceUsage_Mapping.getMapped (from)
```

#### 7.7.9.3.15 PackageURIFeatureTyping\_Mapping

##### Description



The mapping class creates the FeatureTyping relationship for the AnnotatingFeature for the metadata to store the UML4SysML::Package::URI property.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Package

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
let m: SysMLv2::Membership = SysMLv2::AttributeDefinition.allInstances()
->collect(dt | dt.owningRelationship)
->select(r | r.ocIsKindOf(SysMLv2::Membership))
->any(m | m.memberName = 'PackageData' ) in

if (m.ocIsUndefined()) then
    invalid
else
    m.memberElement
endif
```

### 7.7.9.3.16 PackageURIMetadataReferenceUsage\_Mapping

#### Description

The mapping class creates the MetadataFeature for the mapping of the property UML4SysML::Package::URI.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Package

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { PackageURIRedefinition_Mapping.getMapped(from),  
      PackageURIMetadataFeatureValue_Mapping.getMapped(from) }
```

### 7.7.9.3.17 PackageURIMetadataFeatureValue\_Mapping

#### Description

The mapping class maps the value of the property UML4SysML::Package::URI.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

Package

#### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::featureWithValue () : Feature [1]

```
packageURIMetadataReferenceUsage.to
```

- FeatureValue::value () : Expression [1]

```
PackageURIValue_Mapping.getMapped(from)
```

### 7.7.9.3.18 PackageURIMetadataMembership\_Mapping

#### Description

The mapping class creates a membership relationship for the metadata feature value for the UML4SysML::Package::URI property.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Package

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

```
PackageURIMetadataUsage_Mapping.getMapped(from)
```

### 7.7.9.3.19 PackageURIRedefinition\_Mapping

#### Description

The mapping class creates the redefinition of the attribute for the metadata UML4SysML::Package::URI.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Package

#### Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
let m : SysMLv2::Membership =
  SysMLv2::AttributeUsage.allInstances()
  ->collect(dt | dt.owningRelationship)
  ->select(r | r.ocIsKindOf(SYSML2::Membership))
  ->any(m | m.memberName = 'URI') in
if (m.ocIsUndefined()) then
  invalid
else
  m.memberElement
endif
```

### 7.7.9.3.20 PackageURIValue\_Mapping

#### Description

The mapping class maps the value expression of the property `UML4SysML::Package::URI`.

#### General Mappings

`GenericToExpression_Mapping`

#### Mapping Source

`Package`

#### Mapping Target

`LiteralString`

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `LiteralString::value () : String [1]`

`from.URI`

### 7.7.9.3.21 Profile\_Mapping

#### Description

A `UML4SysML::Profile` is mapped to a SysML v2 Package.

#### General Mappings

`Package_Mapping`

#### Mapping Source

`Profile`

#### Mapping Target

`Package`

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Package::ownedRelationship () : Relationship [0..*]`

```
self.oclAsType (Package_Mapping) .ownedRelationship ()  
->including (ProfileMetadataMembership_Mapping.getMapped (from) )
```

### 7.7.9.3.22 ProfileMetadataMembership\_Mapping

#### Description

The mapping class creates a membership relationship for the metadata feature value for the `UML4SysML::Model::viewpoint` property.

#### General Mappings

`GenericToOwningMembership_Mapping`

#### Mapping Source

Profile

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`ProfileMetadataUsage_Mapping.getMapped(from)`

## 7.7.9.3.23 ProfileMetadataUsage\_Mapping

### Description

The mapping class creates the annotating feature to annotate the generated Package element with metadata to store the UML4SysML::Model::viewpoint property.

### General Mappings

GenericToMetadataUsage\_Mapping

### Mapping Source

Profile

### Mapping Target

MetadataUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::declaredName () : String [0..1]

'Profile'

#### 7.7.9.3.24 StereotypeMetadataDefinition\_Mapping

##### Description

A UML4SysML::Stereotype is mapped to a SysML v2 MetadataDefinition.

##### General Mappings

Class\_Mapping

##### Mapping Source

Stereotype

##### Mapping Target

MetadataDefinition

##### Owned Mappings

(none)

#### 7.7.9.3.25 StereotypeMetadataDefinitionMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

ElementOwningMembership\_Mapping

##### Mapping Source

Stereotype

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [0..1]

```
ElementMain_Mapping.getMapped(from)
```

### 7.7.9.3.26 StereotypeOccurrenceUsage\_Mapping

#### Description

The mapping class maps the usage of a stereotype to a SysML v2 OccurrenceUsage.

#### General Mappings

GenericToOccurrenceUsage\_Mapping

#### Mapping Source

Stereotype

#### Mapping Target

OccurrenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OccurrenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { StereotypeOccurrenceUsageFeatureTyping_Mapping.getMapped(from) ,  
StereotypeOccurrenceUsageMultiplicityMembership_Mapping.getMapped(from) }
```

### 7.7.9.3.27 StereotypeOccurrenceUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Stereotype

#### Mapping Target

FeatureTyping



## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

`StereotypeOccurenceDefinition_Mapping.getMapped(from)`

### 7.7.9.3.28 StereotypeOccurenceUsageMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source

Stereotype

#### Mapping Target

Membership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Membership::memberElement () : Element [1]`

`StereotypeOccurenceUsage_Mapping.getMapped(from)`

### 7.7.9.3.29 StereotypeOccurenceUsageMultiplicityMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToMembership\_Mapping

### Mapping Source

Stereotype

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::ownedMemberElement () : Element [0..1]  
`StereotypeOccurenceUsageMultiplicityRange_Mapping.getMapped(from)`
- Membership::memberElement () : Element [1]  
`self.ownedMemberElement()`

#### 7.7.9.3.30 StereotypeOccurenceUsageMultiplicityRange\_Mapping

### Description

The mapping class creates the multiplicity range element for the UML4SysML::Stereotype mapping.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

Stereotype

### Mapping Target

MultiplicityRange

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MultiplicityRange::ownedRelationship () : Relationship [0..\*]

```
Set { StereotypeOccurenceUsageMultiplicityRangeMembership_Mapping.getMapped (from) }
```

#### 7.7.9.3.31 StereotypeOccurenceUsageMultiplicityRangeInfinity\_Mapping

##### Description

The mapping class creates the literal infinity element for the multiplicity range element for the UML4SysML::Stereotype mapping.

##### General Mappings

GenericToExpression\_Mapping

##### Mapping Source

Stereotype

##### Mapping Target

LiteralInfinity

##### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralInfinity::ownedRelationship () : Relationship [0..\*]

```
Set { StereotypeOccurenceUsageInfinityReturnParameterMembership_Mapping.getMapped (from) }
```

#### 7.7.9.3.32 StereotypeOccurenceUsageInfinityReturnParameter\_Mapping

##### Description

The mapping class creates the return parameter relationship for the literal infinity element for the multiplicity range element for the UML4SysML::Stereotype mapping.

## General Mappings

GenericToFeature\_Mapping

## Mapping Source

Stereotype

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::direction () : FeatureDirectionKind [0..1]

SysMLv2::FeatureDirectionKind::out

### 7.7.9.3.33 StereotypeOccurenceUsagelInfinityReturnParameterMembership\_Mapping

#### Description

## General Mappings

GenericToReturnParameterMembership\_Mapping

## Mapping Source

Stereotype

## Mapping Target

ReturnParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReturnParameterMembership::ownedMemberParameter () : Feature [0..1]`  
`StereotypeOccurenceUsageInfinityReturnParameter_Mapping.getMapped(from)`
- `ReturnParameterMembership::ownedRelatedElement () : Element [0..*]`  

```

let member: KerML::Element = self.ownedMemberParameter() in
if member.oclIsUndefined() then
  Set{}
else
  Set{self.ownedMemberParameter()}
endif

```
- `ReturnParameterMembership::memberParameter () : Feature [1]`  
`self.ownedMemberParameter()`

### 7.7.9.3.34 StereotypeOccurenceUsageMultiplicityRangeMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToMembership\_Mapping

#### Mapping Source

Stereotype

#### Mapping Target

Membership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Membership::ownedMemberElement () : Element [0..1]`  
`StereotypeOccurenceUsageMultiplicityRangeInfinity_Mapping.getMapped(from)`
- `Membership::memberElement () : Element [1]`

```
self.ownedMemberElement()
```

## 7.7.10 SimpleClassifiers

This chapter lists all mapping specifications of UML4SysML::SimpleClassifiers model elements.

### 7.7.10.1 Overview

**Table 15. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
DataType	AttributeDefinition
Enumeration	EnumerationDefinition
EnumerationLiteral	EnumerationUsage
Interface	PortDefinition
InterfaceRealization	SatisfyRequirementUsage AllocationDefinition
PrimitiveType	AttributeDefinition
Reception	ItemUsage
Signal	ItemDefinition

The following table gives an overview of which SysML v2 elements the UML4SysML::SimpleClassifiers elements are transformed with which mapping class. The mapping details are in [7.7.10.2](#).

### 7.7.10.2 Mapping Specifications

#### 7.7.10.2.1 Attribute\_Mapping

##### Description

An UML4SysML::Property is mapped to a SysMLv2 AttributeUsage.

##### General Mappings

PropertyCommon\_Mapping  
NamedElementMain\_Mapping

##### Mapping Source

Property

##### Mapping Target

AttributeUsage

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.ocIsKindOf(UML::Property) and not
    Helper.hasStereotypeApplied(src.owner,
        'SysML::ConstraintBlocks::ConstraintBlock') then
    let p: UML::Property = src.ocAsType(UML::Property) in
    if p.type.ocIsUndefined() then
        false
    else
        p.type.ocIsKindOf(UML::DataType) and
        (p.association.ocIsUndefined() or p.association.ownedEnd->excludes(p))
    endif
else
    false
endif
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.7.10.2.2 AttributeRedefined\_Mapping

##### Description

An UML4SysML::SimpleClassifiers::Property is mapped to a SysML v2 AttributeUsage.

##### General Mappings

PropertyCommon\_Mapping

##### Mapping Source

Property

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
let typing: KerML::FeatureTyping =
    AssociationToFeatureTyping_Mapping.getMapped(from) in
```

```

let subsetting: Set(KerML::Subsetting) =
  from.subsettedProperty
  ->collect(p | PropertySubsetting_Mapping.getMapped(from, p))->asSet() in
let subsettingMultiplicityTyping: Set(KerML::Relationship) =
  subsetting
  ->union(Set{AttributeRedefinedRedefinition_Mapping.getMapped(from)}->union(
    if typing.ocIsUndefined() then
      Set{MultiplicityMembership_Mapping.getMapped(from)}
    else
      Set{MultiplicityMembership_Mapping.getMapped(from), typing}
    endif)->asSet() in
if from.defaultValue.ocIsUndefined() then
  subsettingMultiplicityTyping
else
  subsettingMultiplicityTyping
  ->including(PropertyDefaultValue_Mapping.getMapped(from))
endif

```

### 7.7.10.2.3 AttributeRedefinedRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Property

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
from.redefinedProperty.get(0)
```

### 7.7.10.2.4 AttributeRedefinedMembership\_Mapping

#### Description



Creates a membership relationship for *memberElement()*.

### General Mappings

ElementFeatureMembership\_Mapping

### Mapping Source

Element

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.oclIsKindOf(UML::Property)
and (src.oclAsType(UML::Property).redefinedElement->size() > 0)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]  
`AttributeRedefined_Mapping.getMapped(from)`

#### 7.7.10.2.5 AttributeRedefinedFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

StructuralFeatureToFeatureTyping\_Mapping

### Mapping Source

StructuralFeature

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### 7.7.10.2.6 BehavioredClassifier\_Mapping

#### Description

The abstract mapping class maps the abstract metaclass UML4SysML::BehavioredClassifiers to a SysMLv2 Classifier. The mapping class is used by concrete mapping classes, for example, Block\_Mapping.

#### General Mappings

Classifier\_Mapping

#### Mapping Source

BehavioredClassifier

#### Mapping Target

Classifier

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Classifier::ownedRelationship () : Relationship [0..\*]

```
let toElementFMS: Set(UML::Element) =
    from.ownedElement->select(e | (e.ocIsKindOf(UML::Property) and
        (e.ocIsType(UML::Property).redefinedProperty->size() = 0)) or
        e.ocIsKindOf(UML::Operation) or e.ocIsKindOf(UML::Connector)) in
let redefinedAttributes: Set(UML::Element) =
    from.ownedElement->select(e | from.ocIsKindOf(UML::DataType) and
        (e.ocIsType(UML::Property).redefinedProperty->size() > 0)) in
let generalizations : Set(UML::Generalization) =
    from.ownedElement
    ->select(e | e.ocIsKindOf(UML::Generalization)) in
let constraints : Set(UML::Constraint) =
    UML::Constraint.allInstances()
    ->select( c | c.constrainedElement->includes(from)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - redefinedAttributes) -
        generalizations) - from.ownedComment in
let relationships: Sequence(KerML::Relationship) =
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e)) ->asSet()
->union(toElementFMS->collect(e |
    ElementFeatureMembership_Mapping.getMapped(e)) ->asSet())
->union(constraints->collect(e |
    ConstrainedElementFeatureMembership_Mapping.getMapped(e)) ->asSet())
```

```

->union(redefinedAttributes->collect(e |
    AttributeRedefinedMembership_Mapping.getMapped(e))->asSet())
->union(generalizations->collect(e |
    Generalization_Mapping.getMapped(e))->asSet())
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship()) in
if from.classifierBehavior.oclIsUndefined() then
    relationships
else
    relationships
->including(BehavioredClassifierFeatureMembership_Mapping.getMapped(from))
endif

```

### 7.7.10.2.7 BehavioredClassifierFeatureMembership\_Mapping

#### Description

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

BehavioredClassifier

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]  
 BehavioredClassifierActionUsage\_Mapping.getMapped(from)

### 7.7.10.2.8 BehavioredClassifierFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

**Mapping Source**

BehavioredClassifier

**Mapping Target**

FeatureTyping

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

from

**7.7.10.2.9 BehavioredClassifierActionUsage\_Mapping****Description**

The BehavioredClassifierToPerformActionUsage\_Mapping class creates a PerformActionUsage element to call the transformed SysML v1 classifier behavior.

**General Mappings**

GenericToActionUsage\_Mapping

**Mapping Source**

BehavioredClassifier

**Mapping Target**

ActionUsage

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActionUsage::declaredName () : String [0..1]`  
`'classifierBehavior'`
- `ActionUsage::ownedRelationship () : Relationship [0..*]`  
`Set{BehavioredClassifierFeatureTyping_Mapping.getMapped(from) }`

#### 7.7.10.2.10 DataType\_Mapping

##### Description

A `UML4SysML::SimpleClassifiers::DataType` is mapped to a SysML v2 `AttributeDefinition`. The mapping also cover the transformation of `UML4SysML::PrimitiveType` elements.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block {
    attribute sysMLv1Property : ScalarValues::Integer;
}
```

##### General Mappings

Classifier\_Mapping

##### Mapping Source

DataType

##### Mapping Target

AttributeDefinition

##### Owned Mappings

(none)

#### 7.7.10.2.11 Enumeration\_Mapping

##### Description

A `UML4SysML::Enumeration` is mapped to a SysML v2 `EnumerationDefinition`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
enum def SysMLv1Enumeration {
    enum sysMLv1Literal1;
    enum sysMLv1Literal2;
}
```

## General Mappings

DataType\_Mapping

## Mapping Source

Enumeration

## Mapping Target

EnumerationDefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EnumerationDefinition::isVariation () : Boolean [1]  
  
true
- EnumerationDefinition::ownedRelationship () : Relationship [0..\*]  
  
self.oclAsType(Classifier\_Mapping).ownedRelationship()  
->union(from.ownedLiteral->collect(e | EnumerationVariantMembership\_Mapping.getMapped(e)) ->as

### 7.7.10.2.12 EnumerationLiteral\_Mapping

#### Description

A UML4SysML::EnumerationLiteral is mapped to a SysML v2 EnumerationUsage.

## General Mappings

GenericToFeature\_Mapping

InstanceSpecification\_Mapping

## Mapping Source

EnumerationLiteral

## Mapping Target

EnumerationUsage

## Owned Mappings

(none)

#### 7.7.10.2.13 EnumerationVariantMembership\_Mapping

##### Description

The EnumerationVariantMembership\_Mapping class creates the variant membership relationship between the enumeration definition and a enumeration usage.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

EnumerationLiteral

##### Mapping Target

VariantMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- VariantMembership::ownedMemberElement () : Element [1]  
from

#### 7.7.10.2.14 Interface\_Mapping

##### Description

A UML4SysML::Interface is mapped to a SysMLv2 PortDefinition. The mapping also includes the generation of an appropriate ConjugatedPortDefinition. That mappings is performed by the mapping classes InterfaceConjugatedPortDefinitionMembership\_Mapping, InterfacePortConjugation\_Mapping, and InterfaceConjugatedPortDefinition\_Mapping.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
port def SysMLv1Interface {  
    attribute sysMLv1Property;  
}
```

##### General Mappings

GenericToPortDefinition\_Mapping  
Classifier\_Mapping

### Mapping Source

Interface

### Mapping Target

PortDefinition

### Owned Mappings

- conjugatedPortDefinitionMembership : InterfaceConjugatedPortDefinitionMembership\_Mapping

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PortDefinition::ownedRelationship () : Relationship [0..\*]  

```
self.oclAsType(Classifier_Mapping).ownedRelationship()  
->including(conjugatedPortDefinitionMembership)
```

## 7.7.10.2.15 InterfaceConjugatedPortDefinition\_Mapping

### Description

As part of the mapping from a UML4SysML::Interface to a SysMLv2 PortDefinition, this mapping class is used to create the appropriate ConjugatedPortDefinition.

### General Mappings

GenericToPortDefinition\_Mapping

### Mapping Source

Interface

### Mapping Target

ConjugatedPortDefinition

### Owned Mappings

(none)

### Applicable filters

(none)



## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ConjugatedPortDefinition::declaredName () : String [0..1]`  
`'~'+from.name`
- `ConjugatedPortDefinition::ownedRelationship () : Relationship [0..*]`  
`Set { InterfacePortConjugation_Mapping.getMapped (from) }`

### 7.7.10.2.16 InterfaceConjugatedPortDefinitionMembership\_Mapping

#### Description

As part of the mapping from a UML4SysML::Interface to a SysML v2 PortDefinition, this mapping class is used to create the membership relationship for the ConjugatedPortDefinition.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Interface

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  
`InterfaceConjugatedPortDefinition_Mapping.getMapped (from)`

### 7.7.10.2.17 InterfacePortConjugation\_Mapping

#### Description

As part of the mapping from a UML4SysML::Interface to a SysML v2 PortDefinition, this mapping class is used to create the appropriate PortConjugation relationship.

#### General Mappings

GenericToRelationship\_Mapping

### Mapping Source

Interface

### Mapping Target

PortConjugation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PortConjugation::conjugatedType () : Type [1]  

```
SysMLv2::ConjugatedPortDefinition.allInstances()  
->collect(cpd | cpd.owningRelationship)  
->select(r | r.ocIsKindOf(SysMLv2::Membership))  
->any(m | m.memberName = from.name)
```
- PortConjugation::originalPortDefinition () : PortDefinition [1]  

```
from
```

## 7.7.10.2.18 InterfaceRealization\_Mapping

### Description

A UML4SysML::InterfaceRealization is mapped to a SysMLv2 Subclassification relationship.

### General Mappings

GenericToSpecialization\_Mapping

### Mapping Source

InterfaceRealization

### Mapping Target

Subclassification

### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subclassification::subclassifier () : Type [1]  
`Classifier_Mapping.getMapped(from.specific)`
- Subclassification::superclassifier () : Type [1]  
`Classifier_Mapping.getMapped(from.general)`

### 7.7.10.2.19 PrimitiveType\_Mapping

#### Description

The PrimitiveType\_Mapping class maps a UML4SysML::PrimitiveType to a SysML v2 AttributeDefinition.

#### General Mappings

DataType\_Mapping

#### Mapping Source

PrimitiveType

#### Mapping Target

AttributeDefinition

#### Owned Mappings

(none)

### 7.7.10.2.20 Reception\_Mapping

#### Description

A UML4SysML::Reception is mapped to a SysML v2 AttributeUsage with feature direction "in".

#### General Mappings

BehavioralFeature\_Mapping

#### Mapping Source

Reception

#### Mapping Target

ItemUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ItemUsage::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType (ElementMain_Mapping) .ownedRelationship () ->including (ReceptionFeatureTyping_Ma
```

- ItemUsage::direction () : FeatureDirectionKind [0..1]

```
SysMLv2::FeatureDirectionKind::in
```

### 7.7.10.2.21 ReceptionFeatureTyping\_Mapping

#### Description

A UML4SysML::Reception is mapped to SysML v2 AttributeUsage. The ReceptionToFeatureTyping\_Mapping class creates the type of the AttributeUsage which is the Signal of the Reception.

#### General Mappings

TypedElementFeatureTyping\_Mapping

#### Mapping Source

Reception

#### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
Classifier_Mapping.getMapped (from.signal)
```

#### 7.7.10.2.22 Signal\_Mapping

##### Description

A UML4SysML::Signal is mapped to a SysML v2 AttributeDefinition.

##### General Mappings

Classifier\_Mapping

##### Mapping Source

Signal

##### Mapping Target

ItemDefinition

##### Owned Mappings

(none)

### 7.7.11 StateMachines

#### 7.7.11.1 Overview

Table 16. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
ConnectionPointReference	StateUsage
FinalState	StateUsage
Pseudostate	StateUsage
Region	StateUsage
State	StateUsage
StateMachine	ViewDefinition StateDefinition RequirementUsage
Transition	TransitionUsage

The following table gives an overview of which SysML v2 elements the UML4SysML::StateMachines elements are transformed with which mapping class. The mapping details are in [7.7.11.2](#).

#### 7.7.11.2 Mapping Specifications

##### 7.7.11.2.1 ConnectionPointReference\_Mapping

##### Description

A UML4SysML::ConnectionPointReference element is mapped to a SysML v2 StateUsage.

##### General Mappings

Namespace\_Mapping  
GenericToStateUsage\_Mapping

### Mapping Source

ConnectionPointReference

### Mapping Target

StateUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- StateUsage::isComposite () : Boolean [1]

```
false
```

- StateUsage::ownedRelationship () : Relationship [0..\*]

```
let toFeatureMS : Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Region)) in  
let toElementOMS : Set(UML::Element) =  
    (from.ownedElement - toFeatureMS) - from.ownedComment in  
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()  
->union(toFeatureMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e))->asSet())  
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
```

## 7.7.11.2.2 FinalState\_Mapping

### Description

A UML4SysML::FinalState is mapped to a SysML v2 StateUsage. The details of the mapping are not defined yet.

### General Mappings

State\_Mapping

### Mapping Source

FinalState

### Mapping Target

StateUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.oclIsTypeOf(UML::FinalState)
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.11.2.3 PseudoState\_Mapping

#### Description

A UML4SysML::PseudoState is mapped to a SysML v2 StateUsage.

#### General Mappings

Namespace\_Mapping

GenericToStateUsage\_Mapping

#### Mapping Source

Pseudostate

#### Mapping Target

StateUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- StateUsage::ownedRelationship () : Relationship [0..\*]

```
let toFeatureMS : Set(UML::Element) =  
    from.ownedElement->select(e | e.oclIsKindOf(UML::Region)) ->asSet() in  
let toElementOMS : Set(UML::Element) =  
    from.ownedElement - toFeatureMS in  
toElementOMS  
->collect(e | ElementOwningMembership_Mapping.getMapped(e)) ->asSet()  
->union(toFeatureMS)
```

```

->collect(e | ElementFeatureMembership_Mapping.getMapped(e)) ->asSet()
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())

```

#### 7.7.11.2.4 Region\_Mapping

##### Description

A UML4SysML::Region is mapped to SysML v2 StateUsage.

##### General Mappings

Namespace\_Mapping

GenericToStateUsage\_Mapping

##### Mapping Source

Region

##### Mapping Target

StateUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- StateUsage::ownedRelationship () : Relationship [0..\*]

```

let toFeatureMS : Set(UML::Element) =
    from.ownedElement
    ->select(e | e.oclIsKindOf(UML::State) or e.oclIsKindOf(UML::Transition)) in
let toElementOMS : Set(UML::Element) =
    (from.ownedElement - toFeatureMS) - from.ownedComment in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e)) ->asSet()
->union(toFeatureMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)) ->asSet())
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())

```

#### 7.7.11.2.5 State\_Mapping

##### Description

A UML4SysML::State is mapped to a SysML v2 StateUsage.

##### General Mappings



Namespace\_Mapping  
GenericToStateUsage\_Mapping

### Mapping Source

State

### Mapping Target

StateUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- StateUsage::ownedRelationship () : Relationship [0..\*]  

```
let toFeatureMS : Set(UML::Element) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Region))->asSet() in  
let toElementOMS : Set(UML::Element) =  
    (from.ownedElement - toFeatureMS) - from.ownedComment in  
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))->asSet()  
->union(toFeatureMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e))->asSet())  
->union(self.ocAsType(ElementMain_Mapping).ownedRelationship())
```

## 7.7.11.2.6 StateDefinition\_Mapping

### Description

A UML4SysML::StateMachine is mapped to a SysML v2 StateDefinition.

### General Mappings

Behavior\_Mapping

### Mapping Source

StateMachine

### Mapping Target

StateDefinition

### Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `StateDefinition::ownedRelationship () : Relationship [0..*]`

```
let initialState : Set(UML::Element) =
  from.ownedElement
  ->select(e | e.ocIsKindOf(UML::Pseudostate) and
    e.ocIsType(UML::Pseudostate).kind = UML::PseudostateKind::initial) in
let toParameterMS : Set(UML::Element) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter)) in
let parameterSets : Set(UML::Element) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::ParameterSet)) in
let toFeatureMS : Set(UML::Element) =
  from.ownedElement->select(e | e.ocIsKindOf(UML::Region)) in
let toElementOMS : Set(UML::Element) =
  ((from.ownedElement - toFeatureMS) - toParameterMS) - initialState in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toFeatureMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(toParameterMS->collect(e | ParameterMembership_Mapping.getMapped(e)))
->union(parameterSets->collect(e | ParameterSetMembership_Mapping.getMapped(e)))
->union(initialState->collect(e | InitialStateMembership_Mapping.getMapped(e)))
```

- `StateDefinition::isParallel () : Boolean [1]`

```
from.region->size() > 1
```

### 7.7.11.2.7 Transition\_Mapping

#### Description

A `UML4SysML::Transition` is mapped to a `SysML v2 TransitionUsage`.

#### General Mappings

Namespace\_Mapping

GenericToTransitionUsage\_Mapping

#### Mapping Source

Transition

#### Mapping Target

TransitionUsage

#### Owned Mappings

(none)

## Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `TransitionUsage::target () : ActionUsage [1]`

`from.target`

- `TransitionUsage::ownedRelationship () : Relationship [0..*]`

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->union((from.ownedElement - from.ownedComment)->collect(e | ElementOwningMembership_Mapping.  
->including(TransitionSuccession_Mapping.getMapped(from))
```

- `TransitionUsage::source () : ActionUsage [1]`

`from.source`

### 7.7.11.2.8 TransitionSuccession\_Mapping

#### Description

The mapping class creates the source Feature element of the Succession that is part of the TransitionUsage that is the target element of the UML4SysML::Transition mapping.

#### General Mappings

GenericToConnector\_Mapping  
GenericToMembership\_Mapping

#### Mapping Source

Transition

#### Mapping Target

Succession

#### Owned Mappings

(none)

#### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Succession::ownedRelationship () : Relationship [0..*]`

```
OrderedSet{TransitionSuccessionSourceMembership_Mapping.getMapped(from),
TransitionSuccessionTargetMembership_Mapping.getMapped(from)}
```

#### 7.7.11.2.9 TransitionSourceToSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToSubsetting\_Mapping

##### Mapping Source

Transition

##### Mapping Target

Subsetting

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::subsettingFeature () : Feature [1]  

```
TransitionSuccessionSource_Mapping.getMapped(from)
```
- Subsetting::subsettingFeature () : Feature [1]  

```
ElementMain_Mapping.getMapped(from.source)
```

#### 7.7.11.2.10 TransitionSuccessionSource\_Mapping

##### Description

The mapping class creates the Succession element that is part of the TransitionUsage that is the target element of the UML4SysML::Transition mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

Transition

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  
`Set { TransitionSourceToSubsetting_Mapping.getMapped (from) }`
- Feature::declaredName () : String [0..1]  
`'source'`
- Feature::isEnd () : Boolean [1]  
`true`

### 7.7.11.2.11 TransitionSuccessionSourceMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToEndFeatureMembership\_Mapping

#### Mapping Source

Transition

#### Mapping Target

EndFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  
`TransitionSuccessionSource_Mapping.getMapped(from)`

#### 7.7.11.2.12 TransitionSuccessionTarget\_Mapping

##### Description

The mapping class creates the target Feature element of the Succession that is part of the TransitionUsage that is the target element of the UML4SysML::Transition mapping.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

Transition

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isEnd () : Boolean [1]`  
`true`
- `Feature::declaredName () : String [0..1]`  
`'target'`
- `Feature::ownedRelationship () : Relationship [0..*]`  
`Set{TransitionTargetToSubsetting_Mapping.getMapped(from)}`

#### 7.7.11.2.13 TransitionSuccessionTargetMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToEndFeatureMembership\_Mapping

## Mapping Source

Transition

## Mapping Target

EndFeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`TransitionSuccessionTarget_Mapping.getMapped (from)`

### 7.7.11.2.14 TransitionTargetToSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToSubsetting\_Mapping

#### Mapping Source

Transition

#### Mapping Target

Subsetting

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::subsettingFeature () : Feature [1]  
`TransitionSuccessionTarget_Mapping.getMapped (from)`
- Subsetting::subsettingFeature () : Feature [1]  
`ElementMain_Mapping.getMapped (from.target)`

This chapter lists all mapping specifications of UML4SysML::StateMachines model elements.

## 7.7.12 StructuredClassifiers

This chapter lists all mapping specifications of UML4SysML::StructuredClassifiers model elements.

### 7.7.12.1 Overview

**Table 17. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Association	not mapped; see next section
AssociationClass	ConnectionDefinition
Class	ViewDefinition RequirementUsage
Connector	ConnectionUsage
ConnectorEnd	not mapped; see next section
Port	PartUsage

The following table gives an overview of which SysML v2 elements the UML4SysML::StructuredClassifiers elements are transformed with which mapping class. The mapping details are in [7.7.12.2](#).

### 7.7.12.2 Mapping Specifications

#### 7.7.12.2.1 AssociationClass\_Mapping

##### Description

A UML4SysML::AssociationClass is mapped to a SysML v2 ConnectionDefinition. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1;
part def SysMLv1Block2;
connection def SysMLv1AssociationBlock {
    end : SysMLv1Block1;
    end : SysMLv1Block2;
}
```

##### General Mappings

AssociationCommon\_Mapping



## Mapping Source

AssociationClass

## Mapping Target

ConnectionDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not Helper.hasStereotypeApplied(src, 'SysML::Blocks::Block')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConnectionDefinition::ownedRelationship () : Relationship [0..\*]

```
let nonOwnedEnds: OrderedSet(UML::Property) =  
    (from.memberEnd-from.ownedEnd)->asOrderedSet() in  
let generalizations : Set(UML::Generalization) =  
    from.ownedElement->select(e | e.ocIsKindOf(UML::Generalization)) in  
let others: OrderedSet(UML::Element) =  
    ((from.ownedElement-from.memberEnd)-generalizations)->asOrderedSet() in  
nonOwnedEnds->collect(e | NonOwnedEndMembership_Mapping.getMapped(e))  
->union(from.ownedEnd->collect(e | OwnedEndMembership_Mapping.getMapped(e)))  
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e)))  
->union(others->collect(e | ElementOwningMembership_Mapping.getMapped(e)))  
->asOrderedSet()
```

### 7.7.12.2 AssociationCommon\_Mapping

#### Description

A UML4SysML::Association is mapped to a SysML v2 ConnectionDefinition. This is the abstract base class of all concrete association mapping classes.

#### General Mappings

Classifier\_Mapping  
Relationship\_Mapping

#### Mapping Source

Association

#### Mapping Target

Association

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.memberEnd->select( m | m.type.ocIsKindOf(UML::UseCase))->isEmpty()
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Association::ownedRelationship() : Relationship [0..\*]

```
let nonOwnedEnds: OrderedSet(UML::Property) =  
    (from.memberEnd-from.ownedEnd)->asOrderedSet() in  
nonOwnedEnds->collect(e | NonOwnedEndMembership_Mapping.getMapped(e))->asOrderedSet()  
->union(self.oclAsType(Classifier_Mapping).ownedRelationship()->asOrderedSet())  
->asOrderedSet()
```

#### 7.7.12.2.3 AssociationMetadataUsage\_Mapping

##### Description

The mapping class creates the MetadataUsage element to annotate a ConnectionDefinition that its mapping source element is a derived association.

##### General Mappings

GenericToMetadataUsage\_Mapping

##### Mapping Source

Association

##### Mapping Target

MetadataUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `MetadataUsage::ownedRelationship () : Relationship [0..*]`

```
Set{AssociationToFeatureTyping_Mapping.getMapped(from) ,  
AssociationMetadataUsageFeatureMembership_Mapping.getMapped(from) }
```

#### 7.7.12.2.4 AssociationMetadataUsageFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Association

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
AssociationMetadataUsageFeature_Mapping.getMapped(from)
```

#### 7.7.12.2.5 AssociationMetadataUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Association

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::AssociationData')
```

## 7.7.12.2.6 AssociationMetadataUsageFeature\_Mapping

### Description

The mapping class creates the feature of the MetadataUsage.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

Association

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set{AssociationMetadataUsageRedefinition_Mapping.getMapped(from),  
AssociationMetadataUsageFeatureValue_Mapping.getMapped(from) }
```

#### 7.7.12.2.7 AssociationMetadataUsageFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

Association

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
LiteralBoolean_Factory.create(from.isDerived)
```

#### 7.7.12.2.8 AssociationMetadataUsageMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

Association

##### Mapping Target

OwningMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  
`AssociationMetadataUsage_Mapping.getMapped(from)`

### 7.7.12.2.9 AssociationMetadataUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Association

#### Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  
`SysML2::AttributeUsage.allInstances()`  
`->any(m | m.qualifiedName = 'SysMLv1Library::AssociationData::isDerived')`

### 7.7.12.2.10 Class\_Mapping

#### Description

A UML4SysML::Class is mapped to a SysML v2 OccurrenceDefinition. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
occurrence def UML4SysMLClass;
```

### General Mappings

BehavioeredClassifier\_Mapping

### Mapping Source

Class

### Mapping Target

OccurrenceDefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not Helper.isRequirement(src) and not src.oclIsTypeOf(UML::AssociationClass)
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

## 7.7.12.2.11 ConnectionEndToSubsetting\_Mapping

### Description

Creates a subsetting relationship.

### General Mappings

GenericToSubsetting\_Mapping

### Mapping Source

ConnectorEnd

### Mapping Target

Subsetting

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::ownedRelationship () : Relationship [0..\*]

```
let propertyPath: OrderedSet(UML::Property) =
  Helper.getTagValueAsElementColl
    (from, 'SysML::Blocks::NestedConnectorEnd', 'propertyPath')
  ->asOrderedSet() in
if propertyPath->notEmpty() then
  OrderedSet{ConnectorEndToSubsettedFeatureMembership_Mapping.getMapped(from)}
else
  OrderedSet{}
endif
```

- Subsetting::subsettedFeature () : Feature [1]

```
let propertyPath: OrderedSet(UML::Property) =
  Helper.getTagValueAsElementColl
    (src, 'SysML::Blocks::NestedConnectorEnd', 'propertyPath')
  ->asOrderedSet() in
if propertyPath->isEmpty() then
  ElementMain_Mapping.getMapped(from.role)
else
  ConnectorEndToSubsettedFeature_Mapping.getMapped(from)
endif
```

- Subsetting::subsettingFeature () : Feature [1]

```
ConnectorEndToOwnedFeature_Mapping.getMapped(from)
```

### 7.7.12.2.12 Connector\_Mapping

#### Description

A UML4SysML::Connector is mapped to a SysMLv2 ConnectionUsage. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block3 {
  part sysMLv1PartProperty1 : SysMLv1Block1;
  part sysMLv1PartProperty2 : SysMLv1Block2;
  connection sysMLv1Connector connect sysMLv1PartProperty1 to sysMLv1PartProperty2;
}
part def SysMLv1Block1;
part def SysMLv1Block2;
```

#### General Mappings

NamedElementMain\_Mapping  
GenericToConnector\_Mapping

#### Mapping Source



Connector

### Mapping Target

ConnectionUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ConnectionUsage::ownedRelationship () : Relationship [0..*]`

```
from.end->collect (e | ConnectorEndToMembership_Mapping.getMapped (e)) ->asSet ()  
->including (ConnectorMultiplicityMembership_Mapping.getMapped (from))  
->union (self.oclAsType (ElementMain_Mapping).ownedRelationship ())
```

#### 7.7.12.2.13 ConnectorEndToFeatureCommon\_Mapping

### Description

The mapping class is the abstract base class for UML4SysML::ConnectorEnd mapping classes.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

ConnectorEnd

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::isOrdered () : Boolean [1]`

`from.isOrdered`

#### **7.7.12.2.14 ConnectorEndToMembership\_Mapping**

##### **Description**

Creates a membership relationship for *memberElement()*.

##### **General Mappings**

GenericToFeatureMembership\_Mapping

##### **Mapping Source**

ConnectorEnd

##### **Mapping Target**

EndFeatureMembership

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`

`ConnectorEndToOwnedFeature_Mapping.getMapped (from)`

#### **7.7.12.2.15 ConnectorEndToOwnedFeature\_Mapping**

##### **Description**

The mapping class creates the SysML v2 Feature element for the UML4SysML::ConnectorEnd mapping.

##### **General Mappings**

ConnectorEndToFeatureCommon\_Mapping

ElementMain\_Mapping

##### **Mapping Source**

ConnectorEnd

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  

```
let subsetting: KerML::Subsetting =
  ConnectionEndToSubsetting_Mapping.getMapped(from) in
if subsetting.oclIsUndefined() then
  OrderedSet{MultiplicityMembership_Mapping.getMapped(from)}
else
  OrderedSet{MultiplicityMembership_Mapping.getMapped(from), subsetting}
endif
```

### 7.7.12.2.16 ConnectorEndToSubsettedFeature\_Mapping

#### Description

The mapping class maps UML4SysML::ConnectorEnd that are part of a SysML::Ports&Flows::NestedConnectorEnd.

#### General Mappings

ConnectorEndToFeatureCommon\_Mapping

#### Mapping Source

ConnectorEnd

#### Mapping Target

Feature

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
let propertyPath: OrderedSet(UML::Property) =
  Helper.getTagValueAsElementColl(src, 'SysML::Blocks::NestedConnectorEnd', 'propertyPath')
  ->asOrderedSet() in
  propertyPath->notEmpty()
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::declaredName () : String [0..1]

```
'featureChain'
```

- Feature::ownedRelationship () : Relationship [0..\*]

```
let propertyPath: OrderedSet(UML::Property) =
  Helper.getTagValueAsElementColl
    (from, 'SysML::Blocks::NestedConnectorEnd', 'propertyPath')
  ->asOrderedSet() in
let chain: OrderedSet(KerML::FeatureChaining) =
  propertyPath->collect(p | PropertyToFeatureChaining_Mapping.getMapped(p))
  ->asOrderedSet()
  ->including(PropertyToFeatureChaining_Mapping.getMapped(from.role)) in
chain->union(OrderedSet{MultiplicityMembership_Mapping.getMapped(from)})
```

### 7.7.12.2.17 ConnectorEndToSubsettedFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

ConnectorEnd

#### Mapping Target

EndFeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  
`ConnectorEndToSubsettedFeature_Mapping.getMapped(from)`

#### 7.7.12.2.18 ConnectorMultiplicityMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

DefaultMultiplicityMembership\_Mapping

##### Mapping Source

Connector

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::memberName () : String [0..1]`  
`from.name+'_Connector_multiplicity'`

#### 7.7.12.2.19 ConnectorType\_Mapping

##### Description

A `UML4SysML::Association` is mapped to a `SysML v2 ConnectionDefinition`.

##### General Mappings

AssociationCommon\_Mapping

##### Mapping Source

Association

## Mapping Target

ConnectionDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
let this: UML::Association = src.oclAsType(UML::Association) in
if this.oclIsUndefined() then
    false
else
    not src.memberEnd->exists( m | m.type.oclIsKindOf(UML::UseCase)) and
    not src.isDerived and
    not src.oclIsTypeOf(UML::AssociationClass) and
    Helper.isConnectionDef(src)
endif
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.12.2.20 ConnectorTypeDerived\_Mapping

#### Description

The mapping class is a concrete mapping class of the abstract AssociationCommon\_Mapping class for mappings of derived associations. The UML4SysML::Association::isDerived property is not supported in SysML v2. To preserve the information, it is stored in a metadata annotation.

#### General Mappings

AssociationCommon\_Mapping

#### Mapping Source

Association

#### Mapping Target

ConnectionDefinition

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

(src.memberEnd->select( m | m.type.ocIsKindOf(UML::UseCase)) ->isEmpty()) and
(let this: UML::Association = src.ocAsType(UML::Association) in
if this.ocIsUndefined() then
    false
else
    this.isDerived and
    not this.ocIsTypeOf(UML::AssociationClass) and
    Helper.isConnectionDef(this)
endif)

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConnectionDefinition::ownedRelationship () : Relationship [0..\*]

```

self.ocAsType(AssociationCommon_Mapping).ownedRelationship()
->including(AssociationMetadataUsageMembership_Mapping.getMapped(from))

```

### 7.7.12.2.21 End\_Mapping

#### Description

The mapping class is the abstract base class of mapping classes for properties that are defined by association ends.

#### General Mappings

PropertyCommon\_Mapping

#### Mapping Source

Property

#### Mapping Target

Feature

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

src.ocIsKindOf(UML::Property) and
not src.ocAsType(UML::Property).association.ocIsUndefined()

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::isEnd () : Boolean [1]

true

#### 7.7.12.2.22 EndMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

StructuralFeatureMembership\_Mapping

##### Mapping Source

Property

##### Mapping Target

EndFeatureMembership

##### Owned Mappings

(none)

#### 7.7.12.2.23 EndToSubsettedFeature\_Mapping

##### Description

The mapping class creates a feature element for the UML4SysML::ConnectorEnd mapping.

##### General Mappings

PropertyCommon\_Mapping

##### Mapping Source

Property

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
let property: UML::Property = src.oclAsType(UML::Property) in
not property.association.oclIsUndefined()
and property.association.ownedEnd->excludes(property)
```

##### Mapping rules



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
let chain: OrderedSet (KerML::FeatureChaining) =  
    OrderedSet { EndToSubsettedFeatureChaining_Mapping.getMapped (from) } in  
chain->including (MultiplicityMembership_Mapping.getMapped (from))
```

#### 7.7.12.2.24 EndToSubsettedFeatureChaining\_Mapping

##### Description

The mapping class creates a feature chaining element for the UML4SysML::ConnectorEnd mapping.

##### General Mappings

GenericToRelationship\_Mapping

##### Mapping Source

Property

##### Mapping Target

FeatureChaining

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::declaredName () : String [0..1]

```
'featureChain'
```

- FeatureChaining::chainingFeature () : Feature [1]

```
from
```

#### 7.7.12.2.25 NonOwnedEndSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToSubsetting\_Mapping

### Mapping Source

Property

### Mapping Target

Subsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Subsetting::subsettingFeature () : Feature [1]  
from

## 7.7.12.2.26 NonOwnedEndToSubsettingFeatureMembership\_Mapping

### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Property

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.oclIsKindOf(UML::Property) and  
not src.oclAsType(UML::Property).association.oclIsUndefined()
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`EndToSubsettedFeature_Mapping.getMapped(from)`

#### 7.7.12.2.27 NonOwnedEnd\_Mapping

##### Description

The mapping class maps `UML4SysML::Property` elements that are not owned by an association to a SysML v2 Feature element.

##### General Mappings

End\_Mapping

##### Mapping Source

Property

##### Mapping Target

Feature

##### Owned Mappings

- `nonOwnedEndTyping : NonOwnedEndFeatureTyping_Mapping`

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`  
`Set{MultiplicityMembership_Mapping.getMapped(from),`  
`nonOwnedEndTyping.to,`  
`NonOwnedEndSubsettingMembership_Mapping.getMapped(from),`  
`NonOwnedEndToSubsettedFeatureMembership_Mapping.getMapped(from) }`  
`->union(from.qualifier`  
`->collect(q | ElementFeatureMembership_Mapping.getMapped(q)) ->asSet())`
- `Feature::declaredName () : String [0..1]`  
`'nonOwnedEnd'`

#### 7.7.12.2.28 NonOwnedEndMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

EndMembership\_Mapping

## Mapping Source

Property

## Mapping Target

EndFeatureMembership

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.oclIsKindOf(UML::Property)
and not src.oclAsType(UML::Property).association.oclIsUndefined()
and src.oclAsType(UML::Property).association.ownedEnd->excludes(src)
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`NonOwnedEnd_Mapping.getMapped(from)`

### 7.7.12.2.29 NonOwnedEndSubsettingMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToOwningMembership\_Mapping

## Mapping Source

Property

## Mapping Target

OwningMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  
`NonOwnedEndSubsetting_Mapping.getMapped (from)`

### 7.7.12.2.30 NonOwnedEndFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

StructuralFeatureToFeatureTyping\_Mapping

#### Mapping Source

Property

#### Mapping Target

FeatureTyping

#### Owned Mappings

- `nonOwnedEnd : NonOwnedEnd_Mapping`

### 7.7.12.2.31 OwnedEnd\_Mapping

#### Description

The mapping class maps `UML4SysML::Property` elements that are owned by an association to a SysML v2 Feature element.

#### General Mappings

End\_Mapping  
NamedElementMain\_Mapping

#### Mapping Source

Property

#### Mapping Target

Feature

#### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
let p: UML::Property = src.oclAsType(UML::Property) in
not p.oclIsUndefined() and
(not p.association.oclIsUndefined()
 and p.association.ownedEnd->includes(p)) and
(not p.association.memberEnd
->select( m | (not m.type.oclIsUndefined())
 and m.type.oclIsTypeOf(UML::UseCase)) ->notEmpty())
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- **Feature::ownedRelationship () : Relationship [0..\*]**

```
let qualifiers: Set(KerML::FeatureMembership) =
  from.qualifier
  ->collect(q | ElementFeatureMembership_Mapping.getMapped(q)) ->asSet() in
let typing: KerML::FeatureTyping =
  StructuralFeatureToFeatureTyping_Mapping.getMapped(from) in
let subsetting: Set(KerML::Subsetting) =
  from.subsettedProperty
  ->collect(p | PropertySubsetting_Mapping.getMapped(from, p)) ->asSet() in
let subsettingMultiplicityTyping: Set(KerML::Relationship) =
  subsetting->union(if typing.oclIsUndefined() then
    Set{MultiplicityMembership_Mapping.getMapped(from)}
  else
    Set{MultiplicityMembership_Mapping.getMapped(from), typing}
  endif) ->asSet() in
let relationships: Set(KerML::Relationship) = qualifiers->union(
  if from.defaultValue.oclIsTypeOf(UML::OpaqueExpression) then
    subsettingMultiplicityTyping
    ->including(ElementOwningMembership_Mapping.getMapped(from.defaultValue))
  else
    subsettingMultiplicityTyping
  endif) in

if from.defaultValue.oclIsUndefined() then
  relationships
else
  relationships->including(
    if from.defaultValue.oclIsTypeOf(UML::OpaqueExpression) then
      DefaultValueOpaqueExpression_Mapping.getMapped(from.defaultValue)
    else
      DefaultValue_Mapping.getMapped(from.defaultValue)
    endif)
endif
```

#### 7.7.12.2.32 OwnedEndMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

EndMembership\_Mapping

### Mapping Source

Property

### Mapping Target

EndFeatureMembership

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.oclIsKindOf(UML::Property)
and not src.oclAsType(UML::Property).association.oclIsUndefined()
and src.oclAsType(UML::Property).association.ownedEnd->includes(src)
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
OwnedEnd\_Mapping.getMapped(from)

## 7.7.12.2.33 Port\_Mapping

### Description

A UML4SysML::Port that is typed by an interface block is mapped to a SysML v2 PortUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
port sysMLv1Port : SysMLv1InterfaceBlock;
port def SysMLv1InterfaceBlock
```

### General Mappings

PropertyCommon\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

Port

### Mapping Target

PortUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.oclIsTypeOf(UML::Port) and
not Helper.hasStereotypeApplied(src.owner,
'SysML::ConstraintBlocks::ConstraintBlock' ) then
    let p: UML::Port = src.oclAsType(UML::Port) in
        if p.type.oclIsUndefined() then
            false
        else
            true
        endif
    else
        false
    endif
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.7.12.2.34 PortUntyped\_Mapping

##### Description

A UML4SysML::Port that is untyped is mapped to a SysML v2 PortUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
port sysMLv1Port;
```

### General Mappings

PropertyUntyped\_Mapping

### Mapping Source

Port

### Mapping Target

PortUsage

### Owned Mappings



(none)

#### 7.7.12.2.35 PropertyToFeatureChaining\_Mapping

##### Description

The mapping class creates the SysML v2 FeatureChaining for the UML4SysML::Property mapping.

##### General Mappings

GenericToRelationship\_Mapping

##### Mapping Source

Property

##### Mapping Target

FeatureChaining

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]  
`ElementMain_Mapping.getMapped(from)`

#### 7.7.12.2.36 QualifierMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

StructuralFeatureMembership\_Mapping

##### Mapping Source

StructuralFeature

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

## 7.7.13 UseCases

This chapter lists all mapping specifications of UML4SysML::UseCases model elements.

### 7.7.13.1 Overview

**Table 18. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Actor	ItemDefinition
Extend	not mapped; see next section
ExtensionPoint	not mapped; see next section
Include	IncludeUseCaseUsage
UseCase	UseCaseDefinition

The following table gives an overview of which SysML v2 elements the UML4SysML::UseCases elements are transformed with which mapping class. The mapping details are in [7.7.13.3](#).

The justifications for the elements without mapping are given in [7.7.13.2](#).

### 7.7.13.2 UML4SysML::UseCases elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 19. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
Extend	The semantics of the UML4SysML::Extend relationship is not supported by SysML v2.
ExtensionPoint	The semantics of the UML4SysML::Extend relationship is not supported by SysML v2 Therefore, UML4SysML::ExtensionPoint is also not covered by the transformation.

### 7.7.13.3 Mapping Specifications

#### 7.7.13.3.1 Actor\_Mapping

##### Description

A UML4SysML::Actor is mapped to a SysML v2 ItemDefinition. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
item def SysMLv1Actor;
```

##### General Mappings

ElementMain\_Mapping  
BehavioeredClassifier\_Mapping

### Mapping Source

Actor

### Mapping Target

ItemDefinition

### Owned Mappings

(none)

## 7.7.13.3.2 Include\_Mapping

### Description

A UML4SysML::Include is mapped to a SysML v2 IncludeUseCaseUsage. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
use case def SysMLv1UseCase1 {  
    include use case : SysMLv1UseCase2;  
}  
use case def SysMLv1UseCase2;
```

### General Mappings

GenericToOccurrenceUsage\_Mapping  
NamedElementMain\_Mapping

### Mapping Source

Include

### Mapping Target

IncludeUseCaseUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- IncludeUseCaseUsage::ownedRelationship () : Relationship [0..\*]

```

    Set{IncludeFeatureTyping_Mapping.getMapped(from),
    ReturnParameterFeatureMembership_Factory.create(),
    EmptySubjectMembership_Factory.create()}
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())

```

### 7.7.13.3.3 IncludeFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Include

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
from.addition
```

### 7.7.13.3.4 UseCase\_Mapping

#### Description

A UML4SysML::UseCase is mapped to a SysML v2 UseCaseDefinition. The expected SysML v2 textual syntax of a mapped UML4SysML::UseCase with a defined subject is as follows.

```

use case def SysMLv1UseCase {
    subject subject_SysMLv1Block : SysMLv1Block;
}
part def SysMLv1Block;

```

Currently, only one use case subject is supported by the mapping class. Since the UML4SysML::Extend relationship is not considered by the SysML v1 to SysML v2 transformation, the extension points of a use case are also not mapped.

#### General Mappings

BehavioredClassifier\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

UseCase

## Mapping Target

UseCaseDefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- UseCaseDefinition::ownedRelationship () : Relationship [0..\*]

```
let properties : Set(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Property) and
        e.ocIsAsType(UML::Property).association.ocIsUndefined()) in
let actors : Set(UML::Property) =
    UML::Association.allInstances()
        ->collect(m | m.memberEnd)
        ->flatten()
        ->select(m | m.type = from)->collect(a | a.owningAssociation)
        ->collect(p | p.memberEnd->select(m | not (m.type = from)))->flatten() in
let extensionPoints : Sequence(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::ExtensionPoint)) in
let extend : Sequence(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Extend)) in
let include : Sequence(UML::Element) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Include)) in
let elements : Set(UML::Element) =
    (((from.ownedElement-properties) - extensionPoints) - extend) - include) in
let relationships : Sequence(KerML::Relationship) =
    elements->collect(e | ElementOwningMembership_Mapping.getMapped(e))
    ->union(properties->collect(e | PropertyMembership_Mapping.getMapped(e)))
    ->including(UseCaseSubjectMembership_Mapping.getMapped(from))
    ->including(UseCaseObjectiveMembership_Mapping.getMapped(from))
    ->including(CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from))
    ->union(actors->collect(e | UseCaseActorMembership_Mapping.getMapped(e))) in
if from.classifierBehavior.ocIsUndefined() then
    relationships
else
    relationships
    ->including(BehavioredClassifierFeatureMembership_Mapping.getMapped(from))
endif
```

#### 7.7.13.3.5 UseCaseActor\_Mapping

##### Description

The mapping class creates the PartUsage representing an actor of the use case.

##### General Mappings

GenericToPartUsage\_Mapping

##### Mapping Source

Property

##### Mapping Target

PartUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PartUsage::declaredName () : String [0..1]  
`from.name`
- PartUsage::ownedRelationship () : Relationship [0..\*]  
`Set{UseCaseActorFeatureTyping_Mapping.getMapped(from)}`

#### 7.7.13.3.6 UseCaseActorFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Property

##### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

`from.type`

### 7.7.13.3.7 UseCaseActorMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToActorMembership\_Mapping

#### Mapping Source

Property

#### Mapping Target

ActorMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ActorMembership::ownedMemberParameter () : Feature [1]`

`UseCaseActor_Mapping.getMapped(from)`

### 7.7.13.3.8 UseCaseEmptySubjectReferenceUsage\_Mapping

#### Description

The mapping class creates an "empty" ReferenceUsage for the subject, if the subject is not given at the SysML v1 UseCase element.

### **General Mappings**

GenericToReferenceUsage\_Mapping

### **Mapping Source**

UseCase

### **Mapping Target**

ReferenceUsage

### **Owned Mappings**

(none)

## **7.7.13.3.9 UseCaseObjectiveMembership\_Mapping**

### **Description**

Creates a membership relationship for *memberElement()*.

### **General Mappings**

GenericToObjectiveMembership\_Mapping

### **Mapping Source**

UseCase

### **Mapping Target**

ObjectiveMembership

### **Owned Mappings**

(none)

### **Applicable filters**

(none)

### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ObjectiveMembership::ownedMemberFeature () : Feature [1]  
`UseCaseObjectiveRequirementUsage_Mapping.getMapped(from)`



### 7.7.13.3.10 UseCaseObjectiveRequirementUsage\_Mapping

#### Description

The mapping class creates the RequirementUsage element for the use case objective. The element is not set by an element from the SysML v1 UseCase.

#### General Mappings

GenericToRequirementUsage\_Mapping

#### Mapping Source

UseCase

#### Mapping Target

RequirementUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RequirementUsage::ownedRelationship () : Relationship [0..\*]

```
Set { UseCaseObjectiveSubjectMembership_Mapping.getMapped(from) ,  
CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from) }
```

### 7.7.13.3.11 UseCaseObjectiveSubjectMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToSubjectMembership\_Mapping

#### Mapping Source

UseCase

#### Mapping Target

SubjectMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `SubjectMembership::ownedMemberParameter () : Feature [1]`  
`UseCaseEmptySubjectReferenceUsage_Mapping.getMapped(from)`

### 7.7.13.3.12 UseCaseSubjectFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

UseCase

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  
`if from.subject->size() > 0 then from.subject->get(0) else invalid endif`

### 7.7.13.3.13 UseCaseSubjectMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

## General Mappings

GenericToSubjectMembership\_Mapping

## Mapping Source

UseCase

## Mapping Target

SubjectMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SubjectMembership::ownedMemberParameter () : Feature [1]  

```
if from.subject->size() > 0 then
    UseCaseSubjectReferenceUsage_Mapping.getMapped(from)
else
    UseCaseEmptySubjectReferenceUsage_Mapping.getMapped(from)
endif
```

### 7.7.13.3.14 UseCaseSubjectReferenceUsage\_Mapping

#### Description

The mapping class creates the ReferenceUsage element for the subject.

## General Mappings

UseCaseEmptySubjectReferenceUsage\_Mapping

## Mapping Source

UseCase

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  
`Set { UseCaseSubjectFeatureTyping_Mapping.getMapped (from) }`
- `ReferenceUsage::declaredName () : String [0..1]`  
`'subject_' + from.subject->get (0) .name`

## 7.7.14 Values

This chapter lists all mapping specifications of UML4SysML::Values model elements.

### 7.7.14.1 Overview

**Table 20. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Duration	not mapped; see next section
DurationConstraint	ConstraintDefinition
DurationInterval	not mapped; see next section
DurationObservation	not mapped; see next section
Expression	OperatorExpression
Interval	not mapped; see next section
IntervalConstraint	not mapped; see next section
LiteralBoolean	LiteralBoolean
LiteralInteger	LiteralInteger
LiteralNull	NullExpression
LiteralReal	LiteralRational
LiteralString	LiteralString
LiteralUnlimitedNatural	LiteralInteger
OpaqueExpression	CalculationUsage
StringExpression	not mapped; see next section
TimeConstraint	ConstraintDefinition
TimeExpression	TriggerInvocationExpression
TimeInterval	not mapped; see next section
TimeObservation	not mapped; see next section

The following table gives an overview of which SysML v2 elements the UML4SysML::Values elements are transformed with which mapping class. The mapping details are in [7.7.14.3](#).

The justifications for the elements without mapping are given in [7.7.14.2](#).

### 7.7.14.2 UML4SysML::Values elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 21. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
Duration	Mapping is not specified yet.
DurationConstraint	Mapping is not specified yet.
DurationInterval	Mapping is not specified yet.
DurationObservation	Mapping is not specified yet.
Interval	Mapping is not specified yet.
IntervalConstraint	Mapping is not specified yet.
StringExpression	Mapping is not specified yet.
TimeConstraint	Mapping is not specified yet.
TimeInterval	Mapping is not specified yet.
TimeObservation	Mapping is not specified yet.

### 7.7.14.3 Mapping Specifications

#### 7.7.14.3.1 EqualOperatorExpressionFeature\_Mapping

##### Description

The mapping class creates the feature element for the equal operator.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

TypedElement

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set {EqualOperatorExpressionFeatureValue_Mapping.getMapped (from) }
```

#### 7.7.14.3.2 EqualOperatorExpressionFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

TypedElement

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
CommonFeatureReferenceExpression_Mapping.getMapped (from)
```

#### 7.7.14.3.3 EqualOperatorExpressionOperandParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

## Mapping Source

TypedElement

## Mapping Target

ParameterMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ParameterMembership::ownedMemberParameter () : Feature [1]  
`EqualOperatorExpressionFeature_Mapping.getMapped(from)`
- ParameterMembership::visibility () : VisibilityKind [1]  
`KerML::VisibilityKind::private`

### 7.7.14.3.4 Expression\_Mapping

#### Description

A UML4SysML::Expression element is mapped to a SysML v2 OperatorExpression element.

#### General Mappings

GenericToExpression\_Mapping  
NamedElementMain\_Mapping

## Mapping Source

Expression

## Mapping Target

OperatorExpression

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OperatorExpression::operator () : String [1]`

`from.symbol`

### 7.7.14.3.5 ExpressionElse\_Mapping

#### Description

A `UML4SysML::Expression` element with operator "else" is mapped to a SysML v2 `TextualRepresentation` element with language set to "SysMLv1" and body set to "else".

#### General Mappings

`Expression_Mapping`

#### Mapping Source

`Expression`

#### Mapping Target

`OperatorExpression`

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.symbol = 'else'
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OperatorExpression::ownedRelationship () : Relationship [0..*]`

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()->including(ExpressionElseMembership_
```

### 7.7.14.3.6 ExpressionElseMembership\_Mapping

#### Description

Creates the membership relationship for the textual representation for the else guard condition specification.

#### General Mappings



GenericToOwningMembership\_Mapping

**Mapping Source**

Expression

**Mapping Target**

OwningMembership

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  
`ExpressionElseSpecification_Mapping.getMapped(from)`

### 7.7.14.3.7 ExpressionElseSpecification\_Mapping

**Description**

Creates the textual representation for the else guard condition specification.

**General Mappings**

GenericToTextualRepresentation\_Mapping

**Mapping Source**

Expression

**Mapping Target**

TextualRepresentation

**Owned Mappings**

(none)

**Applicable filters**

(none)

**Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::body () : String [1]  
`'else'`
- TextualRepresentation::language () : String [1]  
`'SysMLv1'`

#### 7.7.14.3.8 LiteralBoolean\_Mapping

##### Description

The mapping class maps UML4SysML::LiteralBoolean to SysML v2 LiteralBoolean.

##### General Mappings

LiteralSpecificationCommon\_Mapping

##### Mapping Source

LiteralBoolean

##### Mapping Target

LiteralBoolean

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralBoolean::value () : Boolean [1]  
`from.value`

#### 7.7.14.3.9 LiteralInteger\_Mapping

##### Description

The mapping class maps UML4SysML::LiteralInteger to SysML v2 LiteralInteger.

##### General Mappings

LiteralSpecificationCommon\_Mapping

##### Mapping Source

LiteralInteger

### Mapping Target

LiteralInteger

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralInteger::value () : Integer [1]  
from.value

#### 7.7.14.3.10 LiteralNull\_Mapping

##### Description

The mapping class maps UML4SysML::LiteralNull to SysML v2 NullExpression.

##### General Mappings

LiteralSpecificationCommon\_Mapping

##### Mapping Source

LiteralNull

##### Mapping Target

NullExpression

##### Owned Mappings

(none)

#### 7.7.14.3.11 LiteralReal\_Mapping

##### Description

The mapping class maps UML4SysML::LiteralReal to SysML v2 LiteralRational.

##### General Mappings

LiteralSpecificationCommon\_Mapping

##### Mapping Source

LiteralReal

### Mapping Target

LiteralRational

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralRational::value () : Real [1]

from.value

## 7.7.14.3.12 LiteralSpecificationCommon\_Mapping

### Description

The mapping class is the abstract base class for all concrete UML4SysML::LiteralSpecification mappings.

### General Mappings

ValueSpecification\_Mapping

### Mapping Source

LiteralSpecification

### Mapping Target

LiteralExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralExpression::ownedRelationship () : Relationship [0..\*]

```

let ownerships: Set(SYSML2::Relationship) =
  self.oclAsType(ElementMain_Mapping).ownedRelationship()
  ->including(CommonReturnParameterFeatureMembership_Mapping.getMapped(from)) in
if from.type.oclIsUndefined() then
  ownerships
else
  ownerships->including(LiteralSpecificationTyping_Mapping.getMapped(from))
endif

```

### 7.7.14.3.13 LiteralSpecificationFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

TypedElementFeatureTyping\_Mapping

#### Mapping Source

LiteralSpecification

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

### 7.7.14.3.14 LiteralString\_Mapping

#### Description

The mapping class maps UML4SysML::LiteralString to the SysML v2 LiteralString.

#### General Mappings

LiteralSpecificationCommon\_Mapping

#### Mapping Source

LiteralString

#### Mapping Target

LiteralString

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralString::value () : String [1]

```
if from.value.oclIsUndefined() then '' else from.value endif
```

### 7.7.14.3.15 LiteralUnlimitedUnbounded\_Mapping

#### Description

The mapping class maps UML4SysML::LiteralUnlimited to SysML v2 LiteralInfinity if it is the unlimited value.

#### General Mappings

LiteralUnlimitedInteger\_Mapping

#### Mapping Source

LiteralUnlimitedNatural

#### Mapping Target

LiteralInfinity

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
(from.value = -1)
```

#### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.7.14.3.16 LiteralUnlimitedInteger\_Mapping

#### Description

The mapping class maps UML4SysML::LiteralUnlimited to SysML v2 LiteralInteger if it is not the unlimited value.

#### General Mappings

LiteralSpecificationCommon\_Mapping

#### Mapping Source

LiteralUnlimitedNatural

### Mapping Target

LiteralInteger

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- LiteralInteger::value () : Integer [1]

`from.value`

## 7.7.14.3.17 OpaqueExpressionAsValue\_Mapping

### Description

The mapping class maps a UML4SysML::OpaqueExpression if it is used as a value to a SysML v2 FeatureChainExpression.

### General Mappings

GenericToExpression\_Mapping

### Mapping Source

OpaqueExpression

### Mapping Target

FeatureChainExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChainExpression::ownedRelationship () : Relationship [0..\*]

```
Set{OpaqueExpressionParameterMembership_Mapping.getMapped(from),
CommonReturnParameterFeatureMembership_Mapping.getMapped(from)}
```

### 7.7.14.3.18 OpaqueExpression\_Mapping

#### Description

A UML4SysML::OpaqueExpression element is mapped to a SysMLv2 CalculationUsage element.. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
calc sysMLv1OpaqueExpression {
    return result : ScalarValues::Integer;
    language "Built-in Math"
    /*
    * result = 42 + 23;
    */
}
```

#### General Mappings

CommonAction\_Mapping  
ValueSpecification\_Mapping

#### Mapping Source

OpaqueExpression

#### Mapping Target

CalculationUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- CalculationUsage::ownedRelationship () : Relationship [0..\*]

```
Set{OpaqueExpressionMembership_Mapping.getMapped(from),
OpaqueExpressionReferenceUsageReturnParameterMembership_Mapping.getMapped(from)}
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())
```

### 7.7.14.3.19 OpaqueExpressionFeature\_Mapping

#### Description

The mapping class creates the feature of the FeatureChainExpression.



## General Mappings

GenericToFeature\_Mapping

## Mapping Source

OpaqueExpression

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  

```
Set { OpaqueExpressionFeatureValue_Mapping.getMapped (from) ,  
      OpaqueExpressionFeatureFeatureMembership_Mapping.getMapped (from) }
```

### 7.7.14.3.20 OpaqueExpressionFeatureFeature\_Mapping

#### Description

The mapping class creates the Feature of the FeatureReferenceExpression.

#### General Mappings

GenericToFeature\_Mapping

#### Mapping Source

OpaqueExpression

#### Mapping Target

Feature

#### Owned Mappings

(none)

### 7.7.14.3.21 OpaqueExpressionFeatureFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

OpaqueExpression

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`OpaqueExpressionFeatureFeature_Mapping.getMapped (from)`

## 7.7.14.3.22 OpaqueExpressionFeatureValue\_Mapping

### Description

Creates a feature value relationship.

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

OpaqueExpression

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
OpaqueExpressionFeatureValueExpression_Mapping.getMapped(from)
```

### 7.7.14.3.23 OpaqueExpressionFeatureValueExpression\_Mapping

#### Description

The mapping class creates the value of the `FeatureChainExpression` that is a `FeatureReferenceExpression`.

#### General Mappings

`GenericToExpression_Mapping`

#### Mapping Source

`OpaqueExpression`

#### Mapping Target

`FeatureReferenceExpression`

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`

```
Set { OpaqueExpressionFeatureValueExpressionMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

### 7.7.14.3.24 OpaqueExpressionFeatureValueExpressionMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

`GenericToMembership_Mapping`

#### Mapping Source

OpaqueExpression

### Mapping Target

Membership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Membership::memberElement () : Element [1]

from

## 7.7.14.3.25 OpaqueExpressionMembership\_Mapping

### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

OpaqueExpression

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`OpaqueExpressionSpecification_Mapping.getMapped(from)`

#### 7.7.14.3.26 OpaqueExpressionParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

OpaqueExpression

##### Mapping Target

ParameterMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ParameterMembership::ownedMemberParameter () : Feature [1]`

`OpaqueExpressionFeature_Mapping.getMapped(from)`

#### 7.7.14.3.27 OpaqueExpressionReferenceUsageReturnParameterMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToReturnParameterMembership\_Mapping

##### Mapping Source

OpaqueExpression

##### Mapping Target

ReturnParameterMembership

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReturnParameterMembership::ownedMemberParameter () : Feature [1]  

```
if from.type.ocliIsUndefined() then
  OpaqueExpressionReferenceUsageUntyped_Mapping.getMapped(from)
else
  OpaqueExpressionReferenceUsage_Mapping.getMapped(from)
endif
```

### 7.7.14.3.28 OpaqueExpressionReferenceUsage\_Mapping

#### Description

The mapping class creates the return parameter reference usage of the calculation usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

OpaqueExpression

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
Set{OpaqueExpressionReferenceUsageFeatureTyping_Mapping.getMapped(from) }
```
- ReferenceUsage::direction () : FeatureDirectionKind [0..1]  

```
KerML::FeatureDirectionKind::_out'
```

#### 7.7.14.3.29 OpaqueExpressionReferenceUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

TypedElementFeatureTyping\_Mapping

##### Mapping Source

OpaqueExpression

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

#### 7.7.14.3.30 OpaqueExpressionReferenceUsageUntyped\_Mapping

##### Description

The mapping class creates the return parameter reference usage of the calculation usage, if the UML4SysML::OpaqueExpression is untyped.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

OpaqueExpression

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::direction () : FeatureDirectionKind [0..1]

KerML::FeatureDirectionKind::\_'out'

#### 7.7.14.3.31 OpaqueExpressionSpecification\_Mapping

##### Description

The mapping class creates the specification of the calculation usage based on the language and body of the UML4SysML::OpaqueExpression.

##### General Mappings

GenericToTextualRepresentation\_Mapping

##### Mapping Source

OpaqueExpression

##### Mapping Target

TextualRepresentation

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TextualRepresentation::body () : String [1]  

```
if from.body->size() = 0 then invalid else from.body.get(0) endif
```
- TextualRepresentation::language () : String [1]  

```
if from.language->size() = 0 then invalid else from.language.get(0) endif
```

#### 7.7.14.3.32 TimeExpression\_Mapping

##### Description

A UML4SysML::TimeExpression is mapped to a SysML v2 TriggerInvocationExpression. The details of the mapping are not specified yet.

##### General Mappings

ValueSpecification\_Mapping

##### Mapping Source

TimeExpression



### Mapping Target

TriggerInvocationExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- TriggerInvocationExpression::kind () : TriggerKind [1]

SysMLv2::TriggerKind::at

### 7.7.14.3.33 ValueSpecification\_Mapping

#### Description

The mapping class is the abstract base class of all mapping classes for special value specifications.

#### General Mappings

NamedElementMain\_Mapping

GenericToExpression\_Mapping

#### Mapping Source

ValueSpecification

#### Mapping Target

Expression

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Expression::ownedRelationship () : Relationship [0..\*]

```

    (if from.type.ocIsUndefined() then
      Set{CommonReturnParameterFeatureMembership_Mapping.getMapped(from)}
    else
      Set{LiteralSpecificationTyping_Mapping.getMapped(from),
        CommonReturnParameterFeatureMembership_Mapping.getMapped(from)}
    endif) -> union(self.ocIsType(ElementMain_Mapping).ownedRelationship())

```

## 7.8 Mappings from SysML v1.7 stereotypes

### 7.8.1 Overview

The following subclauses of Mappings from SysML v1.7 stereotypes are organized according to the main packages of SysML v1.

### 7.8.2 Activities

This chapter lists all mapping specifications of SysML::Activities model elements.

#### 7.8.2.1 Overview

**Table 22. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Continuous	MetadataUsage
ControlOperator	
Discrete	MetadataUsage
NoBuffer	
Optional	
Overwrite	
Probability	MetadataUsage
Rate	MetadataUsage

The following table gives an overview of which SysML v2 elements the SysML::Activities elements are transformed with which mapping class. The mapping details are specified in [7.8.2.3](#).

The justifications for the elements without mapping are given in [7.8.2.2](#).

#### 7.8.2.2 SysML::Activities elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 23. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
ControlOperator	The concept that an action can control other actions is not supported by SysML v2.
NoBuffer	Mapping is not specified yet.

SysML v1 Concept	Rationale
Optional	The stereotype states that the lower multiplicity of the parameter is 0. Since the multiplicity of the parameter is transformed, the additional statement that the parameter is optional is redundant. Therefore, the stereotype is not considered in the transformation.
Overwrite	Mapping is not specified yet.

### 7.8.2.3 Mapping Specifications

#### 7.8.2.3.1 ProbabilityMetadataUsage\_Mapping

##### Description

A SysML::Activities::Probability is mapped to a SysML v2 MetadataUsage owned by the appropriate target element of the UML4SysML::ActivityEdge or UML4SysML::ParameterSet.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

action def SysMLv1Activity {
    action sysMLv1Action1;
    succession sysMLv1ControlFlow1 first sysMLv1Action1 then sysMLv1Action2 {
        @SysMLv1Library::ProbabilityData {probability = 0.42;}
    }
    action sysMLv1Action2;
}

```

##### General Mappings

GenericToMetadataUsage\_Mapping

##### Mapping Source

Element

##### Mapping Target

MetadataUsage

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ProbabilityMetadataUsageFeatureTyping_Mapping.getMapped(from),  
ProbabilityMetadataUsageFeatureMembership_Mapping.getMapped(from)}
```

### 7.8.2.3.2 ProbabilityMetadataUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ProbabilityMetadataUsageReferenceUsage_Mapping.getMapped(from)
```

### 7.8.2.3.3 ProbabilityMetadataUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Element

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ProbabilityData')
```

## 7.8.2.3.4 ProbabilityMetadataUsageReferenceUsage\_Mapping

### Description

Creates a reference usage.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Element

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{ProbabilityMetadataUsageReferenceUsageRedefinition_Mapping.getMapped(from) ,  
ProbabilityMetadataUsageReferenceUsageFeatureValue_Mapping.getMapped(from) }
```

### 7.8.2.3.5 ProbabilityMetadataUsageReferenceUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
let probability : OclAny =  
Helper.getTagValue(from, 'SysML::Activities::Probability', 'probability') in  
LiteralRational_Factory.create(probability)
```

### 7.8.2.3.6 ProbabilityMetadataUsageReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Element

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SYSMML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ProbabilityData::probability')
```

### 7.8.2.3.7 ProbabilityOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Probability')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`

```
ProbabilityMetadataUsage_Mapping.getMapped(from)
```

### 7.8.2.3.8 RateMetadataUsage\_Mapping

#### Description

A `SysML::Activities::Rate` and the specializations `SysML::Activities::Discrete` and `SysML::Activities::Continuous` are mapped to a SysML v2 `MetadataUsage` owned by the appropriate target element of the UML4SysML::ActivityEdge or UML4SysML::Parameter.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
succession flow sysMLv1ObjectFlow of SysMLv1Block
    from sysMLv1Action1.outputValue to sysMLv1Action1.inputValue {
        @SysMLv1Library::RateData {isDiscrete = true;}
    }
```

The mapping of the rate instance value is not supported yet.

#### General Mappings

GenericToMetadataUsage\_Mapping

#### Mapping Source

Element

#### Mapping Target

MetadataUsage

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:



```

Helper.hasStereotypeApplied(src, 'SysML::Activities::Rate')
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]

```

let relationships : Set(KerML::Relationship) =
  Set{RateMetadataUsageFeatureTyping_Mapping.getMapped(from)} in
if Helper.hasStereotypeApplied(from, 'SysML::Activities::Discrete') then
  relationships
->including(
  RateMetadataUsageDiscreteFeatureMembership_Mapping.getMapped(from))
else if Helper.hasStereotypeApplied(from, 'SysML::Activities::Continuous') then
  relationships
->including(
  RateMetadataUsageContinuousFeatureMembership_Mapping.getMapped(from))
else
  relationships
endif
endif

```

### 7.8.2.3.9 RateMetadataUsageContinuousFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
RateMetadataUsageContinuousReferenceUsage_Mapping.getMapped(from)
```

#### 7.8.2.3.10 RateMetadataUsageFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

Element

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Rate')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
LiteralBoolean_Factory.create(true)
```

#### 7.8.2.3.11 RateMetadataUsageContinuousReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

## Mapping Source

Element

## Mapping Target

ReferenceUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { RateMetadataUsageContinuousReferenceUsageRedefinition_Mapping.getMapped(from) ,  
RateMetadataUsageFeatureValue_Mapping.getMapped(from) }
```

### 7.8.2.3.12 RateMetadataUsageContinuousReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

## Mapping Source

Element

## Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RateData::isContinuous')
```

#### 7.8.2.3.13 RateMetadataUsageDiscreteFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Element

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
RateMetadataUsageDiscreteReferenceUsage_Mapping.getMapped(from)
```

#### 7.8.2.3.14 RateMetadataUsageDiscreteReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Element

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { RateMetadataUsageDiscreteReferenceUsageRedefinition_Mapping.getMapped(from) ,  
RateMetadataUsageFeatureValue_Mapping.getMapped(from) }
```

## 7.8.2.3.15 RateMetadataUsageDiscreteReferenceUsageRedefinition\_Mapping

### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

### General Mappings

GenericToRedefinition\_Mapping

### Mapping Source

Element

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RateData::isDiscrete')
```

### 7.8.2.3.16 RateMetadataUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Element

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Rate')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RateData')
```

### 7.8.2.3.17 RateOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Element

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Activities::Rate')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Continuous')  
or Helper.hasStereotypeApplied(src, 'SysML::Activities::Discrete')
```

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  

```
RateMetadataUsage_Mapping.getMapped(from)
```

### 7.8.2.3.18 Model Libraries

#### 7.8.2.3.18.1 ControlValues

##### 7.8.2.3.18.1.1 ControlValueKind

The enumeration ControlValueKind is mapped to the SysML v2 enumeration definition SysMLv1Library::Enumerations::ControlValueKind (see [7.3.2](#)).

## 7.8.3 Allocations

This chapter lists all mapping specifications of SysML::Allocations model elements.

### 7.8.3.1 Overview

**Table 24. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Allocate	AllocationUsage
AllocateActivityPartition	

The following table gives an overview of which SysML v2 elements the SysML::Allocations elements are transformed with which mapping class. The mapping details are in [7.8.3.3](#).

The justifications for the elements without mapping are given in [7.8.3.2](#).

### 7.8.3.2 SysML::Allocations elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 25. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
AllocateActivityPartition	Mapping is not specified yet.

### 7.8.3.3 Mapping Specifications

#### 7.8.3.3.1 Allocation\_Mapping

##### Description

A SysML::Allocations::Allocate is mapped to a SysML v2 AllocationDefinition if it is an allocation between definition elements.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
action def SysMLv1Activity {
    action sysMLv1Action;
}
part def SysMLv1Block {
    part sysMLv1PartProperty : AnotherSysMLv1Block;
}
part def AnotherSysMLv1Block;

// Allocation of definition
allocation def SysMLv1Allocation {
    end :>> source : SysMLv1Activity;
    end :>> target : SysMLv1Block;
}

// Allocation of usage
allocation def {
    end :>> source : SysMLv1Activity;
    end :>> target : SysMLv1Block;
    allocate source.sysMLv1Action to target.sysMLv1PartProperty;
}

// Allocation of usage to definition
```



```
allocation def {
    end :>> source : SysMLv1Activity;
    end :>> target : SysMLv1Block;
    allocate source.sysMLv1Action to target;
}
```

## General Mappings

Abstraction\_Mapping

## Mapping Source

Abstraction

## Mapping Target

AllocationDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
(Helper.hasStereotypeApplied(src, 'SysML::Allocations::Allocate'))
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- AllocationDefinition::ownedRelationship () : Relationship [0..\*]

```
let relationships : Set(KerML::Relationship) =
    Set{AllocationSourceFeatureMembership_Mapping.getMapped(from.client.get(0)),
        AllocationTargetFeatureMembership_Mapping.getMapped(from.supplier.get(0))}
    ->union(self.oclAsType(ElementMain_Mapping).ownedRelationship()) in
if from.client.get(0).oclIsKindOf(UML::Type) then
    relationships
else
    relationships->including(AllocationUsageFeatureMembership_Mapping.getMapped(from))
endif
```

### 7.8.3.3.2 AllocationFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

NamedElement

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`AllocationSourceReferenceUsage_Mapping.getMapped(from)`

### 7.8.3.3 AllocationFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

NamedElement

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  

```

if from.ocIsKindOf (UML::Type) then
    from
else
    from.owner
endif

```

#### 7.8.3.3.4 AllocationReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping  
UniqueMapping

##### Mapping Source

NamedElement

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::isEnd () : Boolean [1]`  

```

true

```
- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  

```

Set { AllocationFeatureTyping_Mapping.getMapped (from) ,
AllocationSourceReferenceUsageRedefinition_Mapping.getMapped (from) }

```

#### 7.8.3.3.5 AllocationSourceReferenceUsageRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

## General Mappings

GenericToRedefinition\_Mapping

## Mapping Source

NamedElement

## Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SYSMML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'Allocations::Allocation::source')
```

### 7.8.3.3.6 AllocationTargetFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

NamedElement

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
AllocationTargetReferenceUsage_Mapping.getMapped(from)
```

### 7.8.3.3.7 AllocationTargetReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping  
UniqueMapping

#### Mapping Source

NamedElement

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::isEnd () : Boolean [1]`

```
true
```

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{AllocationFeatureTyping_Mapping.getMapped(from),  
AllocationTargetReferenceUsageRedefinition_Mapping.getMapped(from)}
```

### 7.8.3.3.8 AllocationTargetReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

NamedElement

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SYSMML2::ReferenceUsage.allInstances()  
->any(m | m.qualifiedName = 'Allocations::Allocation::target')
```

### 7.8.3.3.9 AllocationUsage\_Mapping

#### Description

A SysML::Allocations::Allocate is mapped to a SysML v2 AllocationUsage owned by a AllocationDefinition if a usage element is source or target of the allocation relationship.

#### General Mappings

GenericToUsage\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

AllocationUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `AllocationUsage::ownedRelationship () : Relationship [0..*]`  

```
Set{AllocationUsageSourceEndFeatureMembership_Mapping.getMapped(from.client.get(0)),
AllocationUsageTargetEndFeatureMembership_Mapping.getMapped(from.target.get(0))}
```

#### 7.8.3.3.10 AllocationUsageEndFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToEndFeatureMembership\_Mapping

##### Mapping Source

NamedElement

##### Mapping Target

EndFeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  

```
AllocationUsageSourceFeature_Mapping.getMapped(from)
```

#### 7.8.3.3.11 AllocationUsageFeature\_Mapping

##### Description

Creates a feature element as an end of the allocation usage relationship.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

NamedElement

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set {AllocationUsageSourceFeatureSubsetting_Mapping.getMapped(from) }
```

### 7.8.3.3.12 AllocationUsageFeatureChaining\_Mapping

#### Description

Creates the first feature chaining element for the subsetting feature for the feature element which represents an end of the allocation usage relationship.

#### General Mappings

GenericToFeatureChaining\_Mapping

#### Mapping Source

NamedElement

#### Mapping Target

FeatureChaining

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureChaining::chainingFeature () : Feature [1]`

```
AllocationSourceReferenceUsage_Mapping.getMapped(from)
```



### 7.8.3.3.13 AllocationUsageFeatureChainingChainedFeature\_Mapping

#### Description

Creates the second feature chaining element for the subsetting feature for the feature element which represents an end of the allocation usage relationship.

#### General Mappings

GenericToFeatureChaining\_Mapping

#### Mapping Source

NamedElement

#### Mapping Target

FeatureChaining

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]  
from

### 7.8.3.3.14 AllocationUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
AllocationUsage_Mapping.getMapped(from)
```

### 7.8.3.3.15 AllocationUsageFeatureSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToReferenceSubsetting\_Mapping

#### Mapping Source

NamedElement

#### Mapping Target

ReferenceSubsetting

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::ownedRelatedElement () : Element [0..*]`

```
if from.ocIsKindOf(UML::Type) then
    Set{}
else
    Set{AllocationUsageSourceFeatureSubsettingFeature_Mapping.getMapped(from)}
endif
```

### 7.8.3.3.16 AllocationUsageFeatureSubsettingFeature\_Mapping

#### Description

Creates the subsetting feature for the feature element which represents an end of the allocation usage relationship.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

NamedElement

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]  

```
Set{AllocationUsageSourceFeatureChaining_Mapping.getMapped(from) ,  
AllocationUsageFeatureChainingChainedFeature_Mapping.getMapped(from) }
```

#### 7.8.3.3.17 AllocationUsageTargetEndFeatureMembership\_Mapping

### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToEndFeatureMembership\_Mapping

### Mapping Source

NamedElement

### Mapping Target

EndFeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `EndFeatureMembership::ownedMemberFeature () : Feature [1]`  
`AllocationUsageTargetFeature_Mapping.getMapped(from)`

#### 7.8.3.3.18 AllocationUsageTargetFeature\_Mapping

##### Description

Creates a feature element as an end of the allocation usage relationship.

##### General Mappings

GenericToFeature\_Mapping

##### Mapping Source

NamedElement

##### Mapping Target

Feature

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`  
`Set{AllocationUsageTargetFeatureSubsetting_Mapping.getMapped(from) }`

#### 7.8.3.3.19 AllocationUsageTargetFeatureChaining\_Mapping

##### Description

Creates the first feature chaining element for the subsetting feature for the feature element which represents an end of the allocation usage relationship.

##### General Mappings

GenericToFeatureChaining\_Mapping

### Mapping Source

NamedElement

### Mapping Target

FeatureChaining

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureChaining::chainingFeature () : Feature [1]`  
`AllocationTargetReferenceUsage_Mapping.getMapped (from)`

## 7.8.3.3.20 AllocationUsageTargetFeatureSubsetting\_Mapping

### Description

Creates a subsetting relationship.

### General Mappings

GenericToReferenceSubsetting\_Mapping

### Mapping Source

NamedElement

### Mapping Target

ReferenceSubsetting

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::ownedRelatedElement () : Element [0..*]`

```
if from.ocIsKindOf(UML::Type) then
    Set{}
else
    Set{AllocationUsageTargetFeatureSubsettingFeature_Mapping.getMapped(from)}
endif
```

#### **7.8.3.3.21 AllocationUsageTargetFeatureSubsettingFeature\_Mapping**

##### **Description**

Creates the subsetting feature for the feature element which represents an end of the allocation usage relationship.

##### **General Mappings**

GenericToFeature\_Mapping

##### **Mapping Source**

NamedElement

##### **Mapping Target**

Feature

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set{AllocationUsageTargetFeatureChaining_Mapping.getMapped(from),
AllocationUsageFeatureChainingChainedFeature_Mapping.getMapped(from)}
```

### **7.8.4 Blocks**

This chapter lists all mapping specifications of SysML::Blocks model elements.

### 7.8.4.1 Overview

**Table 26. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
AdjunctProperty	
BindingConnector	BindingConnectorAsUsage
Block	PartDefinition PartDefinition
BoundReference	
ClassifierBehaviorProperty	
ConnectorProperty	
DistributedProperty	
EndPathMultiplicity	
NestedConnectorEnd	
ParticipantProperty	
PropertySpecificType	
ValueType	AttributeDefinition

The following table gives an overview of which SysML v2 elements the SysML::Blocks elements are transformed with which mapping class. The mapping details are in [7.8.4.3](#)

SysML v1 defines special property concepts, but they are not stereotypes or metamodel elements and thus do not all have an explicit mapping class. The following table shows how they are mapped.

SysML v1 Property Concept	SysML v2 Element	Main Mapping Class
Property typed by a Class or Interface	OccurrenceUsage with isComposite=false	PropertyTypedByClassInterface_Mapping
Part Property	PartUsage with isComposite=true	PartProperty_Mapping
Value Property	AttributeUsage with isComposite=true	Attribute_Mapping
ConstraintProperty	AssertConstraintUsage	not defined yet
ReferenceProperty typed by a Block	PartUsage with isComposite=false	PartProperty_Mapping
ReferenceProperty typed by a ValueType	AttributeUsage with isComposite=false	Attribute_Mapping
ReferenceProperty typed by Class or Interface	OccurrenceUsage with isComposite=false	PropertyTypedByClassInterface_Mapping

The justifications for the elements without mapping are given in [7.8.4.2](#).

### 7.8.4.2 SysML::Blocks elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 27. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
AdjunctProperty	The concept of adjunct properties is not needed in SysML v2, where the principal of the adjunct property can be used directly in the appropriate place.
BoundReference	Mapping is not specified yet.
ClassifierBehaviorProperty	The classifier behavior is already mapped to a property which also plays the role of the classifier behavior property. Therefore, there is no explicit mapping of a classifier behavior property.
ConnectorProperty	The connector property is a special case of an adjunct property and is not mapped, just like the adjunct property.
DirectedRelationshipPropertyPath	The stereotype is abstract is therefore not mapped. The concept of the DirectedRelationshipPropertyPath is included in the SysML v2 language.
DistributedProperty	Mapping is not specified yet.
ElementPropertyPath	The stereotype is abstract is therefore not mapped. The concept of the ElementPropertyPath is included in the SysML v2 language.
EndPathMultiplicity	Mapping is not specified yet.
NestedConnectorEnd	The concept of NestedConnectorEnd is already included in the SysML v2 language. It is not required to do an explicit mapping.
ParticipantProperty	Mapping is not specified yet.
PropertySpecificType	Mapping is not specified yet.

### 7.8.4.3 Mapping Specifications

#### 7.8.4.3.1 AssociationBlock\_Mapping

##### Description

An AssociationBlock is mapped to a SysML v2 ConnectionDefinition.

The SysML::Blocks::ParticipantProperties transformation is not defined yet. Therefore, the mapping is currently identical with the mapping of UML4SysML::AssociationClass.

##### General Mappings

AssociationClass\_Mapping



## Mapping Source

AssociationClass

## Mapping Target

ConnectionDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Blocks::Block')
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.8.4.3.2 BindingConnector\_Mapping

#### Description

A SysML::Blocks::BindingConnector is mapped to a SysML v2 BindingConnectorAsUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1 {
    part sysMLv1PartProperty1 : SysMLv1Block2;
    part sysMLv1PartProperty2 : SysMLv1Block2;

    binding sysMLv1BindingConnector
        bind sysMLv1PartProperty1 = sysMLv1PartProperty2;
}
part def SysMLv1Block2;
```

## General Mappings

Connector\_Mapping

## Mapping Source

Connector

## Mapping Target

BindingConnectorAsUsage

## Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Blocks::BindingConnector')
```

#### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.8.4.3.3 Block\_Mapping

#### Description

A SysML::Blocks::Block is mapped to a SysML v2 PartDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part definition SysMLv1Block;
```

#### General Mappings

Class\_Mapping

#### Mapping Source

Class

#### Mapping Target

PartDefinition

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not src.ocIsTypeOf(UML::AssociationClass)
and Helper.hasStereotypeApplied(src, 'SysML::Blocks::Block')
and not Helper.hasStereotypeApplied(src, 'SysML::ConstraintBlocks::ConstraintBlock')
and not Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::InterfaceBlock')
```

#### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.8.4.3.4 EncapsulatedBlock\_Mapping

##### Description

A SysML::Block with *isEncapsulated=true* is mapped to a SysML v2 PartDefinition, and, additionally, gets a metadata feature defined by the SysML v1 library which represents the SysML v1 isEncapsulated property.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1EncapsulatedBlock {  
    @SysMLv1Library::BlockData {isEncapsulated = true;}  
}
```

##### General Mappings

Block\_Mapping

##### Mapping Source

Class

##### Mapping Target

PartDefinition

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
not src.oclIsTypeOf(UML::AssociationClass) and  
  Helper.hasStereotypeApplied(src, 'SysML::Blocks::Block') and  
  not Helper.hasStereotypeApplied(src, 'SysML::ConstraintBlocks::ConstraintBlock') and  
  not Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::InterfaceBlock') and  
  Helper.getTagValue(src, 'SysML::Blocks::Block', 'isEncapsulated')
```

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PartDefinition::ownedRelationship () : Relationship [0..\*]

```
let toElementFMS: Set(UML::Element) =  
    from.ownedElement->select(e | e.oclIsKindOf(UML::Property) and  
        (e.oclAsType(UML::Property).redefinedProperty->size() = 0)) in  
let redefinedAttributes: Set(UML::Element) =  
    from.ownedElement->select(e | from.oclIsKindOf(UML::DataType) and  
        (e.oclAsType(UML::Property).redefinedProperty->size() > 0)) in  
let generalizations : Set(UML::Generalization) =
```

```

        from.ownedElement->select(e | e.ocIsKindOf(UML::Generalization)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - redefinedAttributes) -
    generalizations) in
let relationships: Sequence(UML::Element) =
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS
    ->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(redefinedAttributes
    ->collect(e | AttributeRedefinedMembership_Mapping.getMapped(e)))
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e)))
->including(EncapsulatedBlockMetadataMembership_Mapping.getMapped(from)) in
if from.classifierBehavior.ocIsUndefined() then
    relationships
else
    relationships
    ->append(BehavioredClassifierFeatureMembership_Mapping.getMapped(from))
endif

```

#### 7.8.4.3.5 EncapsulatedBlockMetadataMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

Class

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement() : Element [1]  
EncapsulatedBlockMetadata\_Mapping.getMapped(from)

#### 7.8.4.3.6 EncapsulatedBlockMetadata\_Mapping

##### Description

The mapping class creates the metadata for the property SysML::Blocks::Block::isEncapsulated.

### General Mappings

GenericToMetadataUsage\_Mapping

### Mapping Source

Class

### Mapping Target

MetadataUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { EncapsulatedBlockMetadataFeatureTyping_Mapping.getMapped(from) ,  
      EncapsulatedBlockMetadataFeatureMembership_Mapping.getMapped(from) }
```

#### 7.8.4.3.7 EncapsulatedBlockMetadataFeatureMembership\_Mapping

### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Class

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [0..1]`  
`EncapsulatedBlockMetadataReferenceUsage_Mapping.getMapped(from)`

#### 7.8.4.3.8 EncapsulatedBlockMetadataFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Class

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  
`SysML2::MetadataDefinition.allInstances()`  
`->any(m | m.qualifiedName = 'SysMLv1Library::BlockData')`

#### 7.8.4.3.9 EncapsulatedBlockMetadataReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Class

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { EncapsulatedBlockMetadataRedefinition_Mapping.getMapped (from) ,  
      EncapsulatedBlockMetadataFeatureValue_Mapping.getMapped (from) }
```

#### 7.8.4.3.10 EncapsulatedBlockMetadataFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

Class

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
LiteralBoolean_Factory.create(true)
```

#### 7.8.4.3.11 EncapsulatedBlockMetadataRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

##### General Mappings

GenericToRedefinition\_Mapping

##### Mapping Source

Class

##### Mapping Target

Redefinition

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Redefinition::redefinedFeature () : Feature [1]

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::BlockData::isEncapsulated')
```

#### 7.8.4.3.12 PartProperty\_Mapping

##### Description

A UML4SysML::Property which is typed by a block is mapped to a SysML::PartUsage. The derived property Property::isComposite is directly mapped to PartUsage::isComposite.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part def SysMLv1Block1 {  
  part sysMLv1PartProperty1 : SysMLv1Block2;  
  ref part sysMLv1ReferencedPartProperty2 : SysMLv1Block2;
```



```
}  
part def SysMLv1Block2;
```

## General Mappings

PropertyTypedByClassInterface\_Mapping

## Mapping Source

Property

## Mapping Target

PartUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
if src.ocIsKindOf(UML::Property) and not src.ocIsKindOf(UML::Port) then  
    let p: UML::Property = src.ocAsType(UML::Property) in  
        not p.type.ocIsUndefined() and  
        Helper.hasStereotypeApplied(p.type, 'SysML::Blocks::Block') and  
        (p.association.ocIsUndefined() or p.association.ownedEnd->excludes(p))  
else  
    false  
endif
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.8.4.3.13 Model Libraries

#### 7.8.4.3.13.1 PrimitiveValueTypes

The SysML v1 model library PrimitiveValueTypes contains primitive types that are mapped to the appropriate scalar values in SysML v2.

##### 7.8.4.3.13.1.1 Boolean

The SysML v1 primitive type Boolean is mapped to the SysML v2 ScalarValues::Boolean element.

##### 7.8.4.3.13.1.2 Complex

The SysML v1 primitive type Complex is mapped to the SysML v2 ScalarValues::Complex element.

##### 7.8.4.3.13.1.3 Integer

The SysML v1 primitive type Integer is mapped to the SysML v2 ScalarValues::Integer element.

#### 7.8.4.3.13.1.4 Number

The SysML v1 primitive type Number is abstract. Therefore, no mapping is defined for it.

#### 7.8.4.3.13.1.5 Real

The SysML v1 primitive type Real is mapped to the SysML v2 ScalarValues::Real element.

#### 7.8.4.3.13.1.6 String

The SysML v1 primitive type String is mapped to the SysML v2 ScalarValues::String element.

#### 7.8.4.3.13.2 UnitAndQuantityKind

The SysML v1 model library UnitAndQuantityKind contains the blocks Unit and QuantityKind.

##### 7.8.4.3.13.2.1 QuantityKind

The mapping of the SysML v1 QuantityKind element is not specified yet.

##### 7.8.4.3.13.2.2 Unit

The mapping of the SysML v1 QuantityKind element is not specified yet.

#### 7.8.4.3.14 ValueType\_Mapping

##### Description

A SysML::Blocks::ValueType is mapped to a SysML v2 AttributeDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
attribute definition SysMLv1ValueType;
```

##### General Mappings

DataType\_Mapping

##### Mapping Source

DataType

##### Mapping Target

AttributeDefinition

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(from, 'SysML::Blocks::ValueType')
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

## 7.8.5 ConstraintBlocks

This chapter lists all mapping specifications of SysML::ConstraintBlocks model elements.

### 7.8.5.1 Overview

**Table 28. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
ConstraintBlock	ConstraintDefinition

The following table gives an overview of which SysML v2 elements the SysML::ConstraintBlocks elements are transformed with which mapping class. The mapping details are in [7.8.5.2](#).

### 7.8.5.2 Mapping Specifications

#### 7.8.5.2.1 ConstraintBlock\_Mapping

##### Description

A SysML::ConstraintBlocks::ConstraintBlock is mapped to a SysML v2 ConstraintDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
onstraint def SysMLv1ConstraintBlock {
  in attribute a : ScalarValues::Integer;
  in attribute b : ScalarValues::Integer;
  in attribute c : ScalarValues::Integer;

  constraint constraintExpression {
    language "OCL2.0"
    /*
     * c == a + b
     */
  }
}
```

## General Mappings

Class\_Mapping

### Mapping Source

Class

### Mapping Target

ConstraintDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::ConstraintBlocks::ConstraintBlock')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ConstraintDefinition::ownedRelationship () : Relationship [0..*]`

```
let generalizations : Set(UML::Generalization) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Generalization)) in
let toElementFMS : Set(UML::Element) =
    from.ownedElement
    ->select(e | e.ocIsKindOf(UML::Property) or e.ocIsKindOf(UML::Constraint)) in
let toElementOMS : Set(UML::Element) =
    (from.ownedElement - generalizations) - toElementFMS in
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e)))
->including(CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from))
```

### 7.8.5.2.2 ConstraintParameter\_Mapping

#### Description

The mapping class maps SysML v1 constraint parameter to SysML v2 attribute usages.

#### General Mappings

PropertyCommon\_Mapping  
NamedElementMain\_Mapping

#### Mapping Source

Property

#### Mapping Target

AttributeUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

if src.oclIsKindOf(UML::Property) and
Helper.hasStereotypeApplied(src.owner, 'SysML::ConstraintBlocks::ConstraintBlock') then
    let p: UML::Property = src.oclAsType(UML::Property) in
        if p.type.oclIsUndefined() then
            false
        else
            true
        endif
    else
        false
    endif
endif

```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

## 7.8.6 Model Elements

This chapter lists all mapping specifications of SysML::ModelElements model elements.

### 7.8.6.1 Overview

**Table 29. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Conform	
ElementGroup	Package
Expose	
Problem	Comment
Rationale	Comment
Stakeholder	ItemDefinition
View	
Viewpoint	

The following table gives an overview of which SysML v2 elements the SysML::ModelElements elements are transformed with which mapping class. The mapping details are in [7.8.6.3](#).

The justifications for the elements without mapping are given in [7.8.6.2](#).

### 7.8.6.2 SysML::ModelElements elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 30. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
Conform	Mapping is not specified yet.
Expose	Mapping is not specified yet.
View	Mapping is not specified yet.

### 7.8.6.3 Mapping Specifications

#### 7.8.6.3.1 ProblemRationaleMetadataFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Comment

##### Mapping Target

FeatureMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [0..1]  
`ProblemRationaleMetadataReferenceUsage_Mapping.getMapped(from)`

#### 7.8.6.3.2 ProblemRationaleMetadataFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Comment

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```
if Helper.hasStereotypeApplied(from, 'SysML::ModelElements::Problem') then
  SysML2::MetadataDefinition.allInstances()
  ->any(m | m.qualifiedName = 'ModelingMetadata::Issue')
else if Helper.hasStereotypeApplied(from, 'SysML::ModelElements::Rationale') then
  SysML2::MetadataDefinition.allInstances()
  ->any(m | m.qualifiedName = 'ModelingMetadata::Rationale')
else invalid endif endif
```

### 7.8.6.3.3 ProblemRationaleMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Comment

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ProblemRationaleMetadataRedefinition_Mapping.getMapped(from),
ProblemRationaleMetadataFeatureValue_Mapping.getMapped(from) }
```

#### 7.8.6.3.4 ProblemRationaleMetadataFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

##### Mapping Source

Comment

##### Mapping Target

FeatureValue

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]  
`LiteralString_Factory.create(from.body)`

#### 7.8.6.3.5 ProblemRationaleMetadataMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

Comment

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)



## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`  
`ProblemRationaleMetadataUsage_Mapping.getMapped(from)`

### 7.8.6.3.6 Concern\_Mapping

#### Description

The concern comments of a `SysML::ModelElements::Stakeholder` or a `SysML::ModelElements::Viewpoint` are mapped to SysML v2 `ConcernUsages`. The concern comments of the stakeholder are mapped to `ConcernUsages` which reference the stakeholder item definition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
item def SysMLv1Stakeholder {  
    @SysMLv1Library::StakeholderData {isStakeholder = true;}  
}  
concern concernCommentXMI_ID {  
    doc /* concern string */  
    stakeholder : SysMLv1Stakeholder;  
}
```

#### General Mappings

`Comment_Mapping`

#### Mapping Source

`Comment`

#### Mapping Target

`ConcernUsage`

#### Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
(not Helper.hasStereotypeApplied(src, 'SysML::ModelElements::ElementGroup')) and  
(UML::Classifier.allInstances())
```

```

->select(s |
    Helper.hasStereotypeApplied(s, 'SysML::ModelElements::Stakeholder'))
->collect(c |
    Helper.getTagValue(c, 'SysML::ModelElements::Stakeholder', 'concernList'))
->flatten()
->includes(src) or
(UML::Classifier.allInstances()
->select(s |
    Helper.hasStereotypeApplied(s, 'SysML::ModelElements::Viewpoint'))
->collect(c |
    Helper.getTagValue(c, 'SysML::ModelElements::Viewpoint', 'concernList'))
->flatten()->includes(src))

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConcernUsage::ownedRelationship () : Relationship [0..\*]

```

let toStakeholderMS : Set(UML::Classifier) =
    UML::Classifier.allInstances()
    ->select(s |
        Helper.hasStereotypeApplied(s, 'SysML::ModelElements::Stakeholder'))
    ->select(s |
        Helper.getTagValue(s, 'SysML::ModelElements::Stakeholder', 'concernList')
    ->flatten()->includes(from))->asSet() in
toStakeholderMS
->including(
    CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from))
->including(EmptySubjectMembership_Factory.create())
->union(self.oclAsType(Comment_Mapping).ownedRelationship())

```

### 7.8.6.3.7 ConcernDocumentation\_Mapping

#### Description

The mapping class creates the documentation element with the body string of the UML4SysML::Comment model element representing a concern.

#### General Mappings

GenericToDocumentation\_Mapping

#### Mapping Source

Comment

#### Mapping Target

Documentation

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Documentation::body () : String [1]

`from.body`

### 7.8.6.3.8 ConcernOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Comment

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`ConcernDocumentation_Mapping.getMapped(from)`

### 7.8.6.3.9 ConcernStakeholderMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToParameterMembership\_Mapping

### Mapping Source

Classifier

### Mapping Target

StakeholderMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- StakeholderMembership::ownedMemberParameter () : Feature [1]  
`ConcernStakeholderPartUsage_Mapping.getMapped(from)`

## 7.8.6.3.10 ConcernStakeholderPartUsage\_Mapping

### Description

In SysML v1, the stakeholder element has concerns. In SysML v2, the Concern element has stakeholders. This mapping class creates a PartUsage of the type of the stakeholder for the concern element.

### General Mappings

GenericToPartUsage\_Mapping

### Mapping Source

Classifier

### Mapping Target

PartUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `PartUsage::ownedRelationship () : Relationship [0..*]`

```
Set { ConcernStakeholderPartUsageFeatureTyping_Mapping.getMapped (from) ,  
      ConcernStakeholderPartUsageOwningMembership_Mapping.getMapped (from) }
```

#### 7.8.6.3.11 ConcernStakeholderPartUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Classifier

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
from
```

#### 7.8.6.3.12 ConcernStakeholderPartUsageOwningMembership\_Mapping

##### Description

Creates a owning membership relationship for *ownedMemberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

Classifier

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  
`ConcernStakeholderPartUsageFeature_Mapping.getMapped (from)`

### 7.8.6.3.13 ConcernStakeholderPartUsageFeature\_Mapping

#### Description

The mapping class creates a feature element for the concern stakeholder part usage.

#### General Mappings

GenericToFeature\_Mapping

### Mapping Source

Classifier

### Mapping Target

Multiplicity

### Owned Mappings

(none)

### 7.8.6.3.14 ElementGroup\_Mapping

#### Description

A SysML::ModelElements::ElementGroup element is mapped to a SysML v2 Package with membership import relationships representing the grouping.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

package ElementGroupModel {
    part def SysMLv1Block1;
    attribute def SysMLv1ValueType;
    part def SysMLv1Block2 {
        part sysMLv1PartProperty:SysMLv1Block1;
    }
}

package SysMLv1ElementGroup {
    import ElementGroupModel::SysMLv1Block1;
    import ElementGroupModel::SysMLv1ValueType;
    import ElementGroupModel::SysMLv1Block2::sysMLv1PartProperty;

    @SysMLv1Library::ElementGroupData {criterion = "criterion string";}
}

```

## General Mappings

Comment\_Mapping

## Mapping Source

Comment

## Mapping Target

Package

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::ModelElements::ElementGroup')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Package::declaredName () : String [0..1]`  

```
Helper.getTagValueAsString(from, 'SysML::ModelElements::ElementGroup', 'name')
```
- `Package::ownedRelationship () : Relationship [0..*]`  

```
let elements : Set(KerML::Relationahip) =
    Helper.getTagValueAsElementColl(from,
        'SysML::ModelElements::ElementGroup', 'member')
    ->collect(e | CommonElementImport_Mapping.getMapped(e)) in
elements->including(ElementGroupMetadaMembership_Mapping.getMapped(from))
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())
```

### 7.8.6.3.15 ElementGroupMetadaMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Comment

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  
`ElementGroupMetadataUsage_Mapping.getMapped (from)`

### 7.8.6.3.16 ElementGroupMetadataFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Comment

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)



### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`ElementGroupMetadataReferenceUsage_Mapping.getMapped(from)`

#### 7.8.6.3.17 ElementGroupMetadataFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Comment

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`  
`SysML2::MetadataDefinition.allInstances()`  
`->any(m | m.qualifiedName = 'SysMLv1Library::ElementGroupData')`

#### 7.8.6.3.18 ElementGroupMetadataFeatureValue\_Mapping

##### Description

Creates a feature value relationship.

##### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

Comment

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
let criterion: String = Helper.getTagValueAsString(from, 'SysML::ModelElements::ElementGroup')
LiteralString_Factory.create(criterion)
```

### 7.8.6.3.19 ElementGroupMetadataRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Comment

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- **Redefinition::redefinedFeature () : Feature [1]**

```
let m : SYSML2::Membership =
  SYSML2::AttributeUsage.allInstances()
  ->collect(dt | dt.owningRelationship)
  ->select(r | r.ocIsKindOf(SYSML2::Membership))
  ->any(m | m.memberName = 'criterion') in
if (m.ocIsUndefined()) then
  invalid
else
  m.memberElement
endif
```

### 7.8.6.3.20 ElementGroupMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Comment

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- **ReferenceUsage::ownedRelationship () : Relationship [0..\*]**

```
Set{ElementGroupMetadataRedefinition_Mapping.getMapped(from),
ElementGroupMetadataFeatureValue_Mapping.getMapped(from)}
```

### 7.8.6.3.21 ElementGroupMetadataUsage\_Mapping

#### Description

The mapping class creates the metadata usage element for the SysML::ModelElements::ElementGroup mapping.

## General Mappings

GenericToMetadataUsage\_Mapping

## Mapping Source

Comment

## Mapping Target

MetadataUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { ElementGroupMetadataFeatureTyping_Mapping.getMapped (from) ,  
      ElementGroupMetadataFeatureMembership_Mapping.getMapped (from) }
```

### 7.8.6.3.22 ProblemRationale\_Mapping

#### Description

The mapping class combines the mapping of SysML::ModelElements::Problem and SysML::ModelElements::Rationale. The SysML::ModelElements::Problem is mapped to the library element ModelingMetadata::Issue and the SysML::ModelElements::Rationale is mapped to ModelingMetadata::Rationale.

The expected SysML v2 textual syntax of the mapping is as follows.

```
@ModelingMetadata::Issue {text = "This is a problem statement";}
@ModelingMetadata::Rationale {text = "This is a rationale statement";}
```

## General Mappings

Comment\_Mapping

## Mapping Source

Comment

## Mapping Target

Comment

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
(not Helper.hasStereotypeApplied(src, 'SysML::ModelElements::ElementGroup')) and  
(Helper.hasStereotypeApplied(src, 'SysML::ModelElements::Problem') or  
Helper.hasStereotypeApplied(src, 'SysML::ModelElements::Rationale'))
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Comment::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType(ElementMain_Mapping).ownedRelationship()  
->including(ProblemRationaleMetadataMembership_Mapping.getMapped(from))
```

### 7.8.6.3.23 ProblemRationaleMetadataRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Comment

#### Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Redefinition::redefinedFeature () : Feature [1]

```

if Helper.hasStereotypeApplied(from, 'SysML::ModelElements::Problem') then
  SysML2::AttributeUsage.allInstances()
  ->any(m | m.qualifiedName = 'ModelingMetadata::Issue::text')
else if Helper.hasStereotypeApplied(from, 'SysML::ModelElements::Rationale') then
  SysML2::AttributeUsage.allInstances()
  ->any(m | m.qualifiedName = 'ModelingMetadata::Rationale::text')
else
  invalid
endif
endif

```

#### 7.8.6.3.24 ProblemRationaleMetadataUsage\_Mapping

##### Description

The mapping class creates the metadata usage element for the SysML::ModelElements::Problem and SysML::ModelElements::Rationale transformation target.

##### General Mappings

GenericToMetadataUsage\_Mapping

##### Mapping Source

Comment

##### Mapping Target

MetadataUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]

```

Set{ProblemRationaleMetadataFeatureTyping_Mapping.getMapped(from),
ProblemRationaleMetadataFeatureMembership_Mapping.getMapped(from)}

```

#### 7.8.6.3.25 Stakeholder\_Mapping

##### Description

A SysML::ModelElements::Stakeholder is mapped to a SysML v2 ItemDefinition with metadata to tag it as a stakeholder. The concern comments of the stakeholder are mapped to ConcernUsages which reference the stakeholder item definition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
item def SysMLv1Stakeholder {@SysMLv1Library::StakeholderData {isStakeholder = true;}}
concern concernCommentXMI_ID {
  doc /* concern string */
  stakeholder : SysMLv1Stakeholder;
}
```

## General Mappings

Class\_Mapping

### Mapping Source

Class

### Mapping Target

ItemDefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::ModelElements::Stakeholder')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ItemDefinition::ownedRelationship () : Relationship [0..\*]

```
let toElementFMS: Set(UML::Element) =
  from.ownedElement
  ->select(e | (e.ocIsKindOf(UML::Property) and
    (e.ocAsType(UML::Property).redefinedProperty->size() = 0)) or
    e.ocIsKindOf(UML::Operation)) in
let redefinedAttributes: Set(UML::Element) =
  from.ownedElement
  ->select(e | from.ocIsKindOf(UML::DataType) and
    (e.ocAsType(UML::Property).redefinedProperty->size() > 0)) in
let generalizations : Set(UML::Generalization) =
  from.ownedElement
  ->select(e | e.ocIsKindOf(UML::Generalization)) in
let constraints : Set(UML::Constraint) =
  UML::Constraint.allInstances()
  ->select( c | c.constrainedElement->includes(from)) in
let toElementOMS: Set(UML::Element) =
```

```

        (((from.ownedElement - toElementFMS) - redefinedAttributes) -
        generalizations) in
let relationships: Sequence(KerML::Relationship) =
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(constraints
        ->collect(e | ConstrainedElementFeatureMembership_Mapping.getMapped(e)))
->union(redefinedAttributes
        ->collect(e | AttributeRedefinedMembership_Mapping.getMapped(e)))
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e)))
->including(StakeholderMetadataOwningMembership_Mapping.getMapped(from)) in
if from.classifierBehavior.oclIsUndefined() then
    relationships
else
    relationships->append(BehavioredClassifierFeatureMembership_Mapping.getMapped(from))
endif

```

### 7.8.6.3.26 StakeholderMetadataUsage\_Mapping

#### Description

The mapping class creates the metadata usage element for the SysML::ModelElements::Stakeholder mapping.

#### General Mappings

GenericToMetadataUsage\_Mapping

#### Mapping Source

Classifier

#### Mapping Target

MetadataUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]

```

Set{StakeholderMetadataFeatureTyping_Mapping.getMapped(from),
StakeholderMetadataFeatureMembership_Mapping.getMapped(from)}

```

### 7.8.6.3.27 StakeholderMetadataFeatureMembership\_Mapping

#### Description



Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToFeatureMembership\_Mapping

### Mapping Source

Classifier

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`StakeholderMetadataReferenceUsage_Mapping.getMapped(from)`

## 7.8.6.3.28 StakeholderMetadataFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Classifier

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::StakeholderData')
```

### 7.8.6.3.29 StakeholderMetadataOwningMembership

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Classifier

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`

```
StakeholderMetadataUsage_Mapping.getMapped(from)
```

### 7.8.6.3.30 StakeholderMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Classifier

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { StakeholderMetadataReferenceUsageRedefinition_Mapping.getMapped (from) ,  
      StakeholderMetadataReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

## 7.8.6.3.31 StakeholderMetadataReferenceUsageFeatureValue\_Mapping

### Description

Creates a feature value relationship.

### General Mappings

GenericToFeatureValue\_Mapping

### Mapping Source

Classifier

### Mapping Target

FeatureValue

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
LiteralBoolean_Factory.create(true)
```

### 7.8.6.3.32 StakeholderMetadataReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Classifier

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Redefinition::redefinedFeature () : Feature [1]

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::StakeholderData::isStakeholder')
```

### 7.8.6.3.33 Viewpoint\_Mapping

#### Description

A SysML::ModelElements::Viewpoint is mapped to a SysML v2 ViewDefinition with an owned SysML v2 ViewpointUsage. In SysML v1, the viewpoint combines the purpose and stakeholder concerns as well as presentation information. This is covered by a SysML v2 ViewDefinition with owned SysML v2 ViewpointUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
view def SysMLv1Viewpoint {  
  viewpoint sysMLv1Viewpoint {  
    frame concern1XmiID1;  
    frame concern2XmiID2;  
    metadata SysMLv1Library::ViewpointData {  
      languages = ("language1", "language2");  
      presentations = ("presentation1", "presentation2");  
    }  
  }  
}
```

```

        require constraint {
            doc /* thisIsThePurpose */
        }
    }
    satisfy sysMLv1Viewpoint;
    rendering {
        action : SysMLv1ViewpointMethodBehavior1;
        action : SysMLv1ViewpointMethodBehavior2;
    }
}
action def SysMLv1ViewpointMethodBehavior1;
action def SysMLv1ViewpointMethodBehavior2;

item def SysMLv1Stakeholder {@SysMLv1Library::StakeholderData {isStakeholder = true;}}

concern concern1XmiID1 {
    doc /* Concern1 */
    stakeholder : SysMLv1Stakeholder;
}
concern concern2XmiID2 {
    doc /* Concern2 */
    stakeholder : SysMLv1Stakeholder;
}

```

## General Mappings

Class\_Mapping

### Mapping Source

Class

### Mapping Target

ViewDefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::ModelElements::Viewpoint')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ViewDefinition::ownedRelationship () : Relationship [0..\*]

```
let toElementFMS: Set(UML::Element) =
```

```

        from.ownedElement->select(e | (e.ocIsKindOf(UML::Property) and
            (e.ocIsType(UML::Property).redefinedProperty->size() = 0)) or
            e.ocIsKindOf(UML::Comment)) in
let redefinedAttributes: Set(UML::Element) =
    from.ownedElement->select(e | from.ocIsKindOf(UML::DataType) and
        (e.ocIsType(UML::Property).redefinedProperty->size() > 0)) in
let generalizations : Set(UML::Generalization) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Generalization)) in
let toElementOMS: Set(UML::Element) =
    (((from.ownedElement - toElementFMS) - redefinedAttributes) -
        generalizations) in
let relationships: Sequence(UML::Element) =
toElementOMS->collect(e | ElementOwningMembership_Mapping.getMapped(e))
->union(toElementFMS->collect(e | ElementFeatureMembership_Mapping.getMapped(e)))
->union(redefinedAttributes
    ->collect(e | AttributeRedefinedMembership_Mapping.getMapped(e)))
->union(generalizations->collect(e | Generalization_Mapping.getMapped(e)))
->including(ViewpointViewpointUsageFeatureMembership_Mapping.getMapped(from))
->including(ViewpointSatisfyFeatureMembership_Mapping.getMapped(from))
->including(ViewpointRenderingFeatureMembership_Mapping.getMapped(from))
->including(
    CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)) in
if from.classifierBehavior.ocIsUndefined() then
    relationships
else
    relationships
    ->append(BehavioredClassifierFeatureMembership_Mapping.getMapped(from))
endif

```

### 7.8.6.3.34 ViewpointConcernReferenceSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToReferenceSubsetting\_Mapping

#### Mapping Source

Comment

#### Mapping Target

ReferenceSubsetting

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceSubsetting::referencedFeature () : Feature [1]

from

### 7.8.6.3.35 ViewpointConcernUsage\_Mapping

#### Description

The mapping class creates the concern usage element for the SysML::ModelElements::Viewpoint mapping.

#### General Mappings

GenericToRequirementUsage\_Mapping

#### Mapping Source

Comment

#### Mapping Target

ConcernUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConcernUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ViewpointConcernReferenceSubsetting_Mapping.getMapped(from),  
EmptySubjectMembership_Factory.create(),  
CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)}
```

### 7.8.6.3.36 ViewpointConstraintUsage\_Mapping

#### Description

The mapping class creates the constraint usage element for the SysML::ModelElements::Viewpoint mapping.

#### General Mappings

GenericToConstraintUsage\_Mapping

#### Mapping Source

Class

### Mapping Target

ConstraintUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ConstraintUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ViewpointConstraintUsageOwningMembership_Mapping.getMapped(from),  
ReturnParameterFeatureMembership_Factory.create() }
```

## 7.8.6.3.37 ViewpointConstraintUsageDocumentation\_Mapping

### Description

The mapping class creates the documentation element for the SysML::ModelElements::Viewpoint mapping.

### General Mappings

GenericToDocumentation\_Mapping

### Mapping Source

Class

### Mapping Target

Documentation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Documentation::body () : String [1]



```
Helper.getTagValueAsString(from, 'SysML::ModelElements::Viewpoint', 'purpose')
```

### 7.8.6.3.38 ViewpointConstraintUsageOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

```
ViewpointConstraintUsageDocumentation_Mapping.getMapped(from)
```

### 7.8.6.3.39 ViewpointFramedConcernMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Comment

#### Mapping Target

FramedConcernMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FramedConcernMembership::ownedMemberFeature () : Feature [1]

`ViewpointConcernUsage_Mapping.getMapped(from)`

### 7.8.6.3.40 ViewpointLanguagesMetadataFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

`ViewpointLanguagesMetadataReferenceUsage_Mapping.getMapped(from)`

### 7.8.6.3.41 ViewpointLanguagesMetadataFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

## General Mappings

GenericToFeatureValue\_Mapping

## Mapping Source

Class

## Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
ViewpointLanguagesMetadataOperatorExpression_Mapping.getMapped(from)
```

### 7.8.6.3.42 ViewpointLanguagesMetadataRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

## General Mappings

GenericToRedefinition\_Mapping

## Mapping Source

Class

## Mapping Target

Redefinition

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()
->any(m | m.qualifiedName = 'SysMLv1Library::ViewpointData::languages')
```

#### 7.8.6.3.43 ViewpointLanguagesMetadataReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

Class

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{ViewpointLanguagesMetadataRedefinition_Mapping.getMapped(from),
ViewpointLanguagesMetadataFeatureValue_Mapping.getMapped(from) }
```

#### 7.8.6.3.44 ViewpointMetadataFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Class

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ViewpointData')
```

## 7.8.6.3.45 ViewpointLanguagesMetadataOperatorExpression\_Mapping

### Description

The mapping class creates the operator expression for the list of languages of the SysML::ModelElements::Viewpoint mapping.

### General Mappings

GenericToOperatorExpression\_Mapping

### Mapping Source

Class

### Mapping Target

OperatorExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OperatorExpression::operator () : String [1]`

`, '`

- `OperatorExpression::ownedRelationship () : Relationship [0..*]`

```
Helper.getTagValueAsStringColl(from, 'SysML::ModelElements::Viewpoint', 'language')
->collect(e | StringParameterMembership_Factory.create(e))
```

#### 7.8.6.3.46 ViewpointMetadataOwningMembership\_Mapping

##### Description

Creates a owning membership relationship for *ownedMemberElement()*.

##### General Mappings

GenericToOwningMembership\_Mapping

##### Mapping Source

Class

##### Mapping Target

OwningMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `OwningMembership::ownedMemberElement () : Element [1]`

```
ViewpointMetadataUsage_Mapping.getMapped(from)
```

#### 7.8.6.3.47 ViewpointMetadataUsage\_Mapping

##### Description

The mapping class creates the metadata usage element for the SysML::ModelElements::Viewpoint mapping.

##### General Mappings

GenericToMetadataUsage\_Mapping

## Mapping Source

Class

## Mapping Target

MetadataUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set{ViewpointMetadataFeatureTyping_Mapping.getMapped(from),  
ViewpointLanguagesMetadataFeatureMembership_Mapping.getMapped(from),  
ViewpointPresentationsMetadataFeatureMembership_Mapping.getMapped(from)}
```

### 7.8.6.3.48 ViewpointPresentationsMetadataFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

`ViewpointPresentationsMetadataReferenceUsage_Mapping.getMapped(from)`

#### **7.8.6.3.49 ViewpointPresentationsMetadataFeatureValue\_Mapping**

##### **Description**

Creates a feature value relationship.

##### **General Mappings**

`GenericToFeatureValue_Mapping`

##### **Mapping Source**

Class

##### **Mapping Target**

`FeatureValue`

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

`ViewpointPresentationsMetadataOperatorExpression_Mapping.getMapped(from)`

#### **7.8.6.3.50 ViewpointPresentationsMetadataOperatorExpression\_Mapping**

##### **Description**

The mapping class creates the operator expression for the list of presentations of the `SysML::ModelElements::Viewpoint` mapping.

##### **General Mappings**

`GenericToOperatorExpression_Mapping`

##### **Mapping Source**

Class



### Mapping Target

OperatorExpression

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OperatorExpression::ownedRelationship () : Relationship [0..\*]  

```
Helper.getTagValueAsStringColl(from,  
    'SysML::ModelElements::Viewpoint', 'presentation')  
->collect(e | StringParameterMembership_Factory.create(e))
```
- OperatorExpression::operator () : String [1]  

```
' , '
```

#### 7.8.6.3.51 ViewpointPresentationsMetadataRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

##### General Mappings

GenericToRedefinition\_Mapping

##### Mapping Source

Class

##### Mapping Target

Redefinition

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::ViewpointData::presentations')
```

#### 7.8.6.3.52 ViewpointPresentationsMetadataReferenceUsage\_Mapping

##### Description

Creates a reference usage.

##### General Mappings

GenericToReferenceUsage\_Mapping

##### Mapping Source

Class

##### Mapping Target

ReferenceUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set{ViewpointPresentationsMetadataRedefinition_Mapping.getMapped(from),  
ViewpointPresentationsMetadataFeatureValue_Mapping.getMapped(from) }
```

#### 7.8.6.3.53 ViewpointRenderingFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Class

### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`ViewpointRenderingUsage_Mapping.getMapped(from)`

## 7.8.6.3.54 ViewpointRenderingUsage\_Mapping

### Description

The mapping class creates the rendering usage element for the SysML::ModelElements::Viewpoint mapping class.

### General Mappings

GenericToPartUsage\_Mapping

### Mapping Source

Class

### Mapping Target

RenderingUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RenderingUsage::ownedRelationship () : Relationship [0..\*]

```

    from.ownedOperation
->select( o | Helper.hasStereotypeApplied(o, 'Create') )
->collect( e |
    ViewpointRenderingUsageActionUsageFeatureMembership_Mapping.getMapped(e) )

```

### 7.8.6.3.55 ViewpointRenderingUsageActionUsage\_Mapping

#### Description

The mapping class creates the action usage element for the rendering usage element for the SysML::ModelElements::Viewpoint mapping class.

#### General Mappings

GenericToActionUsage\_Mapping

#### Mapping Source

Class

#### Mapping Target

ActionUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ActionUsage::ownedRelationship () : Relationship [0..\*]  
Set{ViewpointRenderingUsageActionUsageFeatureTyping\_Mapping.getMapped(from) }

### 7.8.6.3.56 ViewpointRenderingUsageActionUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]  
`ViewpointRenderingUsageActionUsage_Mapping.getMapped(from)`

#### 7.8.6.3.57 ViewpointRenderingUsageActionUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Class

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

#### 7.8.6.3.58 ViewpointRequirementConstraintMembership\_Mapping

##### Description

Creates a membership relationship for *memberElement()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Class

##### Mapping Target

RequirementConstraintMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RequirementConstraintMembership::ownedMemberFeature () : Feature [1]

`ViewpointConstraintUsage_Mapping.getMapped(from)`

### 7.8.6.3.59 ViewpointSatisfyFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

`ViewpointSatisfyRequirementUsage_Mapping.getMapped(from)`

### 7.8.6.3.60 ViewpointSatisfyRequirementUsage\_Mapping

#### Description

The mapping class creates the satisfy requirement usage element for the SysML::ModelElements::Viewpoint mapping.

#### General Mappings

GenericToRequirementUsage\_Mapping

#### Mapping Source

Class

#### Mapping Target

SatisfyRequirementUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SatisfyRequirementUsage::ownedRelationship () : Relationship [0..\*]

```
Set{ViewpointSatisfyRequirementUsageReferenceSubsetting_Mapping.getMapped(from),  
EmptySubjectMembership_Factory.create(),  
ReturnParameterFeatureMembership_Factory.create() }
```

### 7.8.6.3.61 ViewpointSatisfyRequirementUsageReferenceSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToReferenceSubsetting\_Mapping

#### Mapping Source

Class

#### Mapping Target

ReferenceSubsetting

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`  
`ViewpointViewpointUsage_Mapping.getMapped(from)`

### 7.8.6.3.62 ViewpointViewpointUsage\_Mapping

#### Description

The mapping class creates the embedded viewpoint usage for the SysML::ModelElements::Viewpoint mapping.

#### General Mappings

GenericToUsage\_Mapping

#### Mapping Source

Class

#### Mapping Target

ViewpointUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ViewpointUsage::ownedRelationship () : Relationship [0..*]`  

```
Helper.getTagValueAsElementColl(  
    from, 'SysML::ModelElements::Viewpoint', 'concernList')  
->collect(e | ViewpointFramedConcernMembership_Mapping.getMapped(e))  
->including(ViewpointMetadataOwningMembership_Mapping.getMapped(from))  
->including(EmptySubjectMembership_Factory.create())  
->including(ViewpointRequirementConstraintMembership_Mapping.getMapped(from))
```



- ViewpointUsage::declaredName () : String [0..1]

```
from.name.substring(1,1).toLowerCase() + from.name.substring(2, from.name.size())
```

### 7.8.6.3.63 ViewpointViewpointUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Class

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureMembership::ownedMemberFeature () : Feature [1]

```
ViewpointViewpointUsage_Mapping.getMapped(from)
```

## 7.8.7 PortsAndFlows

This chapter lists all mapping specifications of SysML::PortsAndFlows model elements.

### 7.8.7.1 Overview

**Table 31. List of all mappings**

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
AcceptChangeStructuralFeatureEventAction	AcceptActionUsage
AddFlowPropertyValueOnNestedPortAction	
ChangeStructuralFeatureEvent	
DirectedFeature	PerformActionUsage
FlowProperty	

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
FullPort	PartUsage
InterfaceBlock	PortDefinition
InvocationOnNestedPortAction	
ItemFlow	
ProxyPort	
TriggerOnNestedPort	
~InterfaceBlock	PortDefinition

The following table gives an overview of which SysML v2 elements the SysML::Ports&Flows elements are transformed with which mapping class. The mapping details are in [7.8.7.3](#).

The justifications for the elements without mapping are given in [7.8.7.2](#).

### 7.8.7.2 SysML::Ports&Flows elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 32. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
AddFlowPropertyValueOnNestedPortAction	Mapping is not specified yet.
ChangeStructuralFeatureEvent	Mapping is not specified yet.
FlowProperty	Mapping is not specified yet.
InvocationOnNestedPortAction	Mapping is not specified yet.
TriggerOnNestedPort	Mapping is not specified yet.

### 7.8.7.3 Mapping Specifications

#### 7.8.7.3.1 AcceptChangeStructuralFeatureEventAction\_Mapping

##### Description

The SysML::PortsAndFlows::AcceptChangeStructuralFeatureEventAction element is mapped to SysML v2 AcceptActionUsage. The details of the mapping are not defined yet.

##### General Mappings

AcceptEventAction\_Mapping

##### Mapping Source

AcceptEventAction

##### Mapping Target

AcceptActionUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src,  
'SysML::Ports&Flows::AcceptChangeStructuralFeatureEventAction')
```

## Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

### 7.8.7.3.2 CommonFullPort\_Mapping

#### Description

The abstract mapping class is the base class of the mapping classes for the SysML::Ports&Flows::FullPort mappings.

#### General Mappings

PropertyCommon\_Mapping

#### Mapping Source

Port

#### Mapping Target

PartUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PartUsage::ownedRelationship () : Relationship [0..\*]

```
let typings: Set(KerML::FeatureTyping) = if from.type.oclIsUndefined() then  
    Set{}  
else  
    Set{StructuralFeatureToFeatureTyping_Mapping.getMapped(from)}  
endif in
```

```

let subsettings: Set(KerML::Subsetting) = from.subsettedProperty
  ->collect(p | PropertySubsetting_Mapping.getMapped(from, p))->asSet() in
let defaultValue: Set(KerML::OwningMembership) =
if from.defaultValue.oclIsUndefined() then
  Set{}
else
  Set{DefaultValue_Mapping.getMapped(from)}
endif in
typings->union(subsettings)->union(defaultValue)
->including(MultiplicityMembership_Mapping.getMapped(from))->asSet()
->including(FullPortMetadataOwningMembership_Mapping.getMapped(from))

```

### 7.8.7.3.3 FeatureDirectionKind

### 7.8.7.3.4 FlowDirectionKind

### 7.8.7.3.5 FullPort\_Mapping

#### Description

A SysML::Ports&Flows::FullPort element is mapped to a part usage in SysML v2 with metadata that marks the part usage as a full port. The metadata is defined in the SysML v1 library for SysML v2.

The mapping class FullPortUntyped\_Mapping does the same for full ports that have no type.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

part sysMLv1FullPort : SysMLv1Block {SysMLv1Library::PortData {isFullPort = true;}}

```

#### General Mappings

Port\_Mapping

CommonFullPort\_Mapping

#### Mapping Source

Port

#### Mapping Target

PartUsage

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

(not src.type.oclIsUndefined()) and
Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::FullPort')

```

#### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.8.7.3.6 FullPortMetadata\_Mapping

##### Description

Create the metadata usage element to annotate a port with the information that its SysML v1 mapping source element is a SysML v1 full port element.

##### General Mappings

GenericToMetadataUsage\_Mapping

##### Mapping Source

Port

##### Mapping Target

MetadataUsage

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { FullPortMetadataFeatureTyping_Mapping.getMapped (from) ,  
      FullPortMetadataFeatureMembership_Mapping.getMapped (from) }
```

#### 7.8.7.3.7 FullPortMetadataFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToFeatureMembership\_Mapping

##### Mapping Source

Port

##### Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`

```
FullPortMetadataReferenceUsage_Mapping.getMapped(from)
```

### 7.8.7.3.8 FullPortMetadataFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Port

#### Mapping Target

FeatureTyping

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::PortData')
```

### 7.8.7.3.9 FullPortMetadataOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

Port

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`FullPortMetadata_Mapping.getMapped (from)`

### 7.8.7.3.10 FullPortMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Port

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`

```
Set { FullPortMetadataReferenceUsageRedefinition_Mapping.getMapped (from) ,  
      FullPortMetadataReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

### 7.8.7.3.11 FullPortMetadataReferenceUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

Port

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
LiteralBoolean_Factory.create (true)
```

### 7.8.7.3.12 FullPortMetadataReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source



Port

### Mapping Target

Redefinition

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`  

```
SYSMML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::PortData::isFullPort')
```

#### 7.8.7.3.13 FullPortUntyped\_Mapping

##### Description

A `SysML::Ports&Flows::FullPort` element is mapped to a part usage in SysML v2 with metadata that marks the part usage as a full port. The metadata is defined in the SysML v1 library for SysML v2.

The mapping class `FullPort_Mapping` does the same for full ports with a type.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
part sysMLv1FullPort {SysMLv1Library::PortData {isFullPort = true;}}
```

##### General Mappings

PortUntyped\_Mapping

CommonFullPort\_Mapping

##### Mapping Source

Port

##### Mapping Target

PartUsage

##### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
src.type.oclIsUndefined() and  
Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::FullPort')
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.8.7.3.14 InterfaceBlock\_Mapping

##### Description

A SysML::Ports&Flows::InterfaceBlock element is mapped to a SysML v2 PortDefinition.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
port def SysMLv1InterfaceBlock;
```

### General Mappings

Block\_Mapping

### Mapping Source

Class

### Mapping Target

PortDefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::InterfaceBlock')
```

### Mapping rules

The mapping class only has inherited rules. See the mapping classes in the general mapping section for details.

#### 7.8.7.3.15 InterfaceBlockConjugated\_Mapping

##### Description

A SysML::Ports&Flows::~InterfaceBlock element is mapped to a SysML v2 PortDefinition. The SysML v1 constraints ensure that the port definition is compatible with the appropriate port definition, which is the target of the mapping of the original interface block. Instead of the special tilde symbol, the port definition name gets a "c" symbol as a prefix. The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
port def cSysMLv1InterfaceBlock;
```

## General Mappings

InterfaceBlock\_Mapping

## Mapping Source

Class

## Mapping Target

PortDefinition

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::~InterfaceBlock')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PortDefinition::declaredName () : String [0..1]  
`'c' + from.name.substring(2,from.name.size())`

### 7.8.7.3.16 OperationDirectedFeature\_Mapping

#### Description

The mapping class sets the direction of the perform action usage if the SysML v1 mapping source operation has the stereotype SysML::Ports&Flows::DirectedFeature applied.

## General Mappings

Operation\_Mapping

## Mapping Source

Operation

## Mapping Target

PerformActionUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Ports&Flows::DirectedFeature')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- PerformActionUsage::direction () : FeatureDirectionKind [0..1]  

```
Helper.getKerMLFeatureDirectionKind(  
  Helper.getTagValueAsElement(  
    from, 'SysML::Ports&Flows::DirectedFeature', 'featureDirection'  
  )  
)
```

## 7.8.8 Requirements

This chapter lists all mapping specifications of SysML::Requirements model elements.

### 7.8.8.1 Overview

Table 33. List of all mappings

SysML v1 Abstract Syntax/Stereotype	SysML v2 Abstract Syntax
Copy	
DeriveReq	ConnectionUsage
Refine	Dependency
Requirement	RequirementUsage
Satisfy	SatisfyRequirementUsage
TestCase	VerificationCaseDefinition
Trace	Dependency
Verify	RequirementVerificationMembership

The following table gives an overview of which SysML v2 elements the SysML::Requirements elements are transformed with which mapping class. The mapping details are in [7.8.8.3](#).

The justifications for the elements without mapping are given in [7.8.8.2](#).

### 7.8.8.2 SysML::Requirements elements not mapped

In this section, missing transformation rules of SysML v1 elements to SysML v2 are justified for each individual element in the following table.

**Table 34. List of SysML v1 elements not mapped of this section**

SysML v1 Concept	Rationale
Copy	The copy relationship is not covered by SysML v2.

### 7.8.8.3 Mapping Specifications

#### 7.8.8.3.1 DeriveReq Mapping

##### Description

A SysML::Requirements::DeriveReq relationship is mapped to a SysML v2 DerivationConnections::Derivation model library element.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
requirement <'id1'> SysMLv1Requirement {
    doc /*
        * requirement text
        */
}
requirement <'id2'> SysMLv1RequirementDerived {
    doc /*
        * requirement text
        */
}
connection : DerivationConnections::Derivation
    connect SysMLv1RequirementDerived to SysMLv1Requirement;
```

##### General Mappings

Abstraction\_Mapping  
GenericToConnectionUsage\_Mapping

##### Mapping Source

Abstraction

##### Mapping Target

ConnectionUsage

##### Owned Mappings

(none)

##### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Requirements::DeriveReq')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ConnectionUsage::ownedRelationship () : Relationship [0..*]`

```
Set{DeriveReqFeatureTyping_Mapping.getMapped(from),  
DeriveReqSourceEndFeatureMembership_Mapping.getMapped(from),  
DeriveReqTargetEndFeatureMembership_Mapping.getMapped(from)}  
->union(self.oclAsType(ElementMain_Mapping).ownedRelationship())
```

#### 7.8.8.3.2 DeriveReqFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Dependency

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::ConnectionDefinition.allInstances()  
->any(m | m.qualifiedName = 'DerivationConnections::Derivation')
```

#### 7.8.8.3.3 DeriveReqSourceEndFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

### General Mappings

GenericToEndFeatureMembership\_Mapping

### Mapping Source

Dependency

### Mapping Target

EndFeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`DeriveReqSourceFeature_Mapping.getMapped(from)`

## 7.8.8.3.4 DeriveReqSourceFeature\_Mapping

### Description

The mapping class creates the source feature of the ConnectionUsage relationship for the mapping of the SysML v1 deriveReq relationship.

### General Mappings

GenericToFeature\_Mapping

### Mapping Source

Dependency

### Mapping Target

Feature

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set { DeriveReqSourceFeatureReferenceSubsetting_Mapping.getMapped (from) }
```

#### 7.8.8.3.5 DeriveReqSourceFeatureReferenceSubsetting\_Mapping

##### Description

Creates a subsetting relationship.

##### General Mappings

GenericToReferenceSubsetting\_Mapping

##### Mapping Source

Dependency

##### Mapping Target

ReferenceSubsetting

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`

```
from.client->any (c | true)
```

#### 7.8.8.3.6 DeriveReqTargetEndFeatureMembership\_Mapping

##### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

##### General Mappings

GenericToEndFeatureMembership\_Mapping



## Mapping Source

Dependency

## Mapping Target

EndFeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- EndFeatureMembership::ownedMemberFeature () : Feature [1]  
`DeriveReqTargetFeature_Mapping.getMapped(from)`

### 7.8.8.3.7 DeriveReqTargetFeature\_Mapping

#### Description

The mapping class creates the target feature of the ConnectionUsage relationship for the mapping of the SysML v1 deriveReq relationship.

#### General Mappings

GenericToFeature\_Mapping

## Mapping Source

Dependency

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Feature::ownedRelationship () : Relationship [0..*]`

```
Set{DeriveReqTargetFeatureReferenceSubsetting_Mapping.getMapped(from)}
```

### 7.8.8.3.8 DeriveReqTargetFeatureReferenceSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToReferenceSubsetting\_Mapping

#### Mapping Source

Dependency

#### Mapping Target

ReferenceSubsetting

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`

```
from.supplier->any(c | true)
```

### 7.8.8.3.9 Refine\_Mapping

#### Description

A `SysML::Requirements::Refine` relationship is mapped to a SysML v2 Dependency relationship annotated with a metadata usage tagging it as a former SysML v1 refine relationship.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
requirement <'idl'> SysMLv1Requirement {
    doc /*
        * requirement text
        */
}
```

```

use case def SysMLv1UseCase;

dependency from SysMLv1UseCase to SysMLv1Requirement {
    @SysMLv1Library::RefineData {isRefine = true;}
}

```

## General Mappings

Abstraction\_Mapping

## Mapping Source

Abstraction

## Mapping Target

Dependency

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Requirements::Refine')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Dependency::ownedRelationship () : Relationship [0..\*]

```

self.oclAsType (ElementMain_Mapping).ownedRelationship()
->including (RefineAnnotation_Mapping.getMapped (from))

```

### 7.8.8.3.10 RefineAnnotation\_Mapping

#### Description

The mapping class creates the annotation relationship for the SysML::Requirements::Refine mapping.

## General Mappings

GenericToAnnotation\_Mapping

## Mapping Source

Abstraction

## Mapping Target

Annotation

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Annotation::annotatingElement () : AnnotatingElement [1]`  
`RefineMetadataUsage_Mapping.getMapped(from)`

### 7.8.8.3.11 RefineMetadataFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`RefineMetadataReferenceUsage_Mapping.getMapped(from)`

### 7.8.8.3.12 RefineMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]

```
Set { RefineMetadataReferenceUsageRedefinition_Mapping.getMapped (from) ,  
      RefineMetadataReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

### 7.8.8.3.13 RefineMetadataReferenceUsageFeatureValue\_Mapping

#### Description

Creates a feature value relationship.

#### General Mappings

GenericToFeatureValue\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureValue

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureValue::value () : Expression [1]`

```
LiteralBoolean_Factory.create(true)
```

### 7.8.8.3.14 RefineMetadataReferenceUsageRedefinition\_Mapping

#### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

#### General Mappings

GenericToRedefinition\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

Redefinition

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Redefinition::redefinedFeature () : Feature [1]`

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RefineData::isRefine')
```

### 7.8.8.3.15 RefineMetadataUsage\_Mapping

#### Description

Create the metadata usage element to annotate a dependency relationship with the information that its SysML v1 mapping source element is a SysML v1 refine relationship.

### General Mappings

GenericToMetadataUsage\_Mapping

### Mapping Source

Abstraction

### Mapping Target

MetadataUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { RefineMetadataUsageFeatureTyping_Mapping.getMapped (from) ,  
      RefineMetadataFeatureMembership_Mapping.getMapped (from) }
```

### 7.8.8.3.16 RefineMetadataUsageFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

#### Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureTyping::type () : Type [1]`

```
SysML2::MetadataDefinition.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::RefineData')
```

### 7.8.8.3.17 Requirement\_Mapping

#### Description

A `SysML::Requirement` is mapped to a SysML v2 `RequirementUsage`.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
requirement <'id1'> SysMLv1Requirement {  
    doc /*  
        * requirement text  
    */  
  
    requirement <'id2'> SysMLv1NestedRequirement {  
        doc /*  
            * requirement text  
        */  
    }  
}
```

#### General Mappings

NamedElementMain\_Mapping  
GenericToRequirementUsage\_Mapping

#### Mapping Source

Class

#### Mapping Target

RequirementUsage

#### Owned Mappings

(none)

#### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.isRequirement(src)
```



## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RequirementUsage::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType (ElementMain_Mapping).ownedRelationship()  
->including (CommonReturnParameterReferenceUsageMembership_Mapping.getMapped (from))  
->including (RequirementDocumentationMembership_Mapping.getMapped (from))  
->including (RequirementSubjectMembership_Mapping.getMapped (from))
```

- RequirementUsage::reqId () : String [1]

```
let stereotype: UML::Stereotype = Helper.getRequirementStereotype (from) in  
Helper.getTagValueAsString (from, stereotype.qualifiedName, 'id')
```

### 7.8.8.3.18 RequirementDocumentation\_Mapping

#### Description

The mapping class creates a Comment contained in a Requirement which contains the SysML::Requirements::AbstractRequirement::text property.

#### General Mappings

GenericToDocumentation\_Mapping

#### Mapping Source

Class

#### Mapping Target

Documentation

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Documentation::body () : String [1]

```
let stereotype: UML::Stereotype = Helper.getRequirementStereotype (from) in  
Helper.getTagValueAsString (from, stereotype.qualifiedName, 'text')
```

### 7.8.8.3.19 RequirementDocumentationMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

### General Mappings

GenericToOwningMembership\_Mapping

### Mapping Source

Class

### Mapping Target

OwningMembership

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]  
`RequirementDocumentation_Mapping.getMapped(from)`

## 7.8.8.3.20 RequirementSubject\_Mapping

### Description

The mapping class creates the subject reference usage element of the requirement. It is not used since the concept does not exist SysML v1.

### General Mappings

GenericToReferenceUsage\_Mapping

### Mapping Source

Class

### Mapping Target

ReferenceUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`  
`KerML::FeatureDirectionKind::_'in'`

#### 7.8.8.3.21 RequirementSubjectMembership\_Mapping

##### Description

The subject is not used, because it is not a SysML v1 concept, but must be created for a SysML v2 requirement.

##### General Mappings

GenericToParameterMembership\_Mapping

##### Mapping Source

Class

##### Mapping Target

SubjectMembership

##### Owned Mappings

(none)

##### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `SubjectMembership::ownedMemberParameter () : Feature [0..1]`  
`RequirementSubject_Mapping.getMapped(from)`

#### 7.8.8.3.22 Satisfy\_Mapping

##### Description

A SysML::Requirements::Satisfy relationship is mapped to a SysML v2 SatisfyRequirementUsage.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

// satisfy relationship from a block
part def SysMLv1Block {
    part sysMLv1PartProperty;
}
requirement <'ReqId1'> SysMLv1Requirement { doc /* requirement text */ }

ref :SysMLv1Block = all SysMLv1Block {
    satisfy requirement SysMLv1Requirement by self;
}

// satisfy relationship from a part property
satisfy SysMLv1Requirement by sysMLv1BlockUsage.sysMLv1PartProperty {
    sysMLv1BlockUsage : SysMLv1Block;
}

```

## General Mappings

GenericToOccurrenceUsage\_Mapping

Abstraction\_Mapping

## Mapping Source

Abstraction

## Mapping Target

SatisfyRequirementUsage

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```

let satisfy: UML::Abstraction = src.oclAsType(UML::Abstraction) in
    if satisfy.oclIsUndefined() then
        false
    else
        Helper.hasStereotypeApplied(satisfy, 'SysML::Requirements::Satisfy')
    endif

```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SatisfyRequirementUsage::ownedRelationship () : Relationship [0..\*]

```

let relationships : Set(KerML::Relationship) =
    self.oclAsType(ElementMain_Mapping).ownedRelationship()
->including(SatisfyFeatureTyping_Mapping.getMapped(from))
->including(SatisfySubjectSubjectMembership_Mapping.getMapped(from))

```

```

->including(CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from)) in
if from.client->any(c | true).oclIsKindOf(UML::Property) then
    relationships
->including(SatisfyReferenceUsageFeatureMembership_Mapping.getMapped(from))
else
    relationships
endif

```

### 7.8.8.3.23 SatisfyReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```

Set{SatisfyReferenceUsageFeatureTyping_Mapping.getMapped(from)}

```
- ReferenceUsage::declaredName () : String [0..1]  

```

from.client
->any(c | true).owner.name.substring(1,1).toLowerCase()
+ from.client
->any(c | true).owner.name.
substring(2,from.client->any(c | true).owner.name.size())
+ 'SatisfyClientUsage'

```

### 7.8.8.3.24 SatisfyReferenceUsageFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

## General Mappings

GenericToFeatureMembership\_Mapping

## Mapping Source

Abstraction

## Mapping Target

FeatureMembership

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`SatisfyReferenceUsage_Mapping.getMapped(from)`

### 7.8.8.3.25 SatisfySubjectReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

ReferenceUsage

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceUsage::direction () : FeatureDirectionKind [0..1]`  
`KerML::FeatureDirectionKind::_in'`
- `ReferenceUsage::ownedRelationship () : Relationship [0..*]`  
`Set{SatisfySubjectReferenceUsageFeatureValue_Mapping.getMapped(from) }`

### 7.8.8.3.26 SatisfySubjectReferenceUsageValue\_Mapping

#### Description

The mapping class create the feature reference expression for the subject of the SatisfyRequirementUsage element.

#### General Mappings

GenericToFeatureReferenceExpression\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureReferenceExpression

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureReferenceExpression::ownedRelationship () : Relationship [0..*]`  
`Set{SatisfySubjectReferenceUsageValueOwningMembership_Mapping.getMapped(from) ,  
ReturnParameterFeatureMembership_Factory.create() }`

### 7.8.8.3.27 SatisfySubjectReferenceUsageValueFeature\_Mapping

#### Description

The mapping class creates the feature element for the feature reference expression of the subject of the SatisfyRequirementUsage element.

#### General Mappings

GenericToFeature\_Mapping

## Mapping Source

Abstraction

## Mapping Target

Feature

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Feature::ownedRelationship () : Relationship [0..\*]

```
Set { SatisfySubjectReferenceUsageFeatureChaining_Mapping.getMapped (from) ,  
      SatisfySubjectReferenceUsageValueFeatureChainingProperty_Mapping.getMapped (from) }
```

### 7.8.8.3.28 SatisfySubjectReferenceUsageFeatureChaining\_Mapping

#### Description

The mapping class creates the feature chaining element from SysML v2 SatisfyRequirementUsage's reference usage element.

#### General Mappings

GenericToFeatureChaining\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureChaining

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules



In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]

```
SatisfyReferenceUsage_Mapping.getMapped(from)
```

#### **7.8.8.3.29 SatisfySubjectReferenceUsageValueFeatureChainingProperty\_Mapping**

##### **Description**

The mapping class creates the feature chaining element from the source element of the SysML v1 satisfy relationship.

##### **General Mappings**

GenericToFeatureChaining\_Mapping

##### **Mapping Source**

Abstraction

##### **Mapping Target**

FeatureChaining

##### **Owned Mappings**

(none)

##### **Applicable filters**

(none)

##### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureChaining::chainingFeature () : Feature [1]

```
from.client->any(c | true)
```

#### **7.8.8.3.30 SatisfySubjectReferenceUsageFeatureValue\_Mapping**

##### **Description**

Creates a feature value relationship.

##### **General Mappings**

GenericToFeatureValue\_Mapping

##### **Mapping Source**

Abstraction

## Mapping Target

FeatureValue

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

`SatisfySubjectReferenceUsageValue_Mapping.getMapped(from)`

### 7.8.8.3.31 SatisfySubjectReferenceUsageValueOwningMembership\_Mapping

#### Description

Creates a owning membership relationship for *ownedMemberElement()*.

#### General Mappings

GenericToOwningMembership\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

OwningMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- OwningMembership::ownedMemberElement () : Element [1]

`SatisfySubjectReferenceUsageValueFeature_Mapping.getMapped(from)`

### 7.8.8.3.32 SatisfySubjectSubjectMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

GenericToSubjectMembership\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

SubjectMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- SubjectMembership::ownedMemberParameter () : Feature [1]  
SatisfySubjectReferenceUsage\_Mapping.getMapped(from)

### 7.8.8.3.33 SatisfyFeatureTyping\_Mapping

#### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

#### General Mappings

GenericToFeatureTyping\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureTyping

#### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`from.supplier->any(s | true)`

#### 7.8.8.3.34 SatisfyReferenceUsageFeatureTyping\_Mapping

##### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

##### General Mappings

GenericToFeatureTyping\_Mapping

##### Mapping Source

Abstraction

##### Mapping Target

FeatureTyping

##### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]  
`from.client->any(c | true).owner`

#### 7.8.8.3.35 TestCaseActivity\_Mapping

##### Description

A SysML::Requirements::TestCase applied to an activity is mapped to a SysML v2 VerificationCaseDefinition element.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
verification def SysMLv1ActivityTestCase {
    return verdict : VerificationCases::VerdictKind;
}
```

## General Mappings

ActivityAsDefinition\_Mapping

### Mapping Source

Activity

### Mapping Target

VerificationCaseDefinition

### Owned Mappings

(none)

### Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Requirements::TestCase')
```

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- VerificationCaseDefinition::ownedRelationship () : Relationship [0..\*]

```
let relationships : Set(KerML::Relationship) =
    Helper.activityOwnedRelationship(from) in
let verdictParameter : Set(UML::Parameter) =
    from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter) and
    (e.ocAsType(UML::Parameter).type.name = 'VerdictKind')) in
let parameters : Set(UML::Parameter) =
    ((from.ownedElement->select(e | e.ocIsKindOf(UML::Parameter))) -
    verdictParameter) in
let verifyRelationships : Set(UML::Abstraction) =
    from.clientDependency
    ->select( v |
        Helper.hasStereotypeApplied(v, 'SysML::Requirements::Verify')) in
relationships
->union(parameters->collect(p | ParameterMembership_Mapping.getMapped(p)))
->union(verdictParameter
    ->collect(vp |
        TestCaseActivityReturnParameterMembership_Mapping.getMapped(vp)))
->including(EmptySubjectMembership_Factory.create())
```

```
->including(EmptyObjectiveMembership_Factory.create())
->union(verifyRelationships->collect(v | Verify_Mapping.getMapped(v)))
```

### 7.8.8.3.36 TestCaseActivityReturnParameterMembership\_Mapping

#### Description

Creates a membership relationship for *memberElement()*.

#### General Mappings

ParameterMembership\_Mapping

#### Mapping Source

Parameter

#### Mapping Target

ReturnParameterMembership

#### Owned Mappings

(none)

### 7.8.8.3.37 TestCaseVerifyObjectiveMembership\_Mapping

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ownedMemberFeature () : Feature [1]

```
TestCaseVerifyObjectiveRequirementUsage_Mapping.getMapped(from)
```

### 7.8.8.3.38 TestCaseVerifyObjectiveRequirementUsage\_Mapping

#### Description

The mapping class creates the objective requirements usage of the SysML v2 test case.

#### General Mappings

No general mappings.

#### Mapping Source

Abstraction

#### Mapping Target

No target element.

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ownedRelationship () : Relationship [0..*]`  
`Set{Verify_Mapping.getMapped(from) }`

### 7.8.8.3.39 TestCaseVerifyRequirementUsageReferenceSubsetting\_Mapping

#### Description

Creates a subsetting relationship.

#### General Mappings

GenericToSubsetting\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

ReferenceSubsetting

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `ReferenceSubsetting::referencedFeature () : Feature [1]`  
`from.supplier->get(0)`

### 7.8.8.3.40 TestCaseVerifyRequirementUsage\_Mapping

#### Description

The mapping class creates the requirements usage of the SysML v2 test case for the verify relationship.

## General Mappings

GenericToUsage\_Mapping

## Mapping Source

Abstraction

## Mapping Target

RequirementUsage

## Owned Mappings

(none)

## Applicable filters

(none)

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RequirementUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { TestCaseVerifyRequirementUsageReferenceSubsetting_Mapping.getMapped(from) ,  
EmptySubjectMembership_Factory.create() ,  
CommonReturnParameterReferenceUsageMembership_Mapping.getMapped(from) }
```

### 7.8.8.3.41 Trace\_Mapping

#### Description

A SysML::Requirements::Trace relationship is mapped to a SysML v2 Dependency relationship annotated with a metadata usage tagging it as a former SysML v1 trace relationship.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```
requirement <'id1'> SysMLv1Requirement1 {  
    doc /*  
        * requirement text  
    */  
}  
requirement <'id2'> SysMLv1Requirement2 {  
    doc /*  
        * requirement text  
    */  
}  
dependency from SysMLv1Requirement1 to SysMLv1Requirement2 {  
    @SysMLv1Library::TraceData {isTrace = true;}  
}
```



## General Mappings

Abstraction\_Mapping

## Mapping Source

Abstraction

## Mapping Target

Dependency

## Owned Mappings

(none)

## Applicable filters

This mapping applies only if the following (OCL) condition implemented by the operation *filter(src : Element) : Boolean* is verified:

```
Helper.hasStereotypeApplied(src, 'SysML::Requirements::Trace')
```

## Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Dependency::ownedRelationship () : Relationship [0..\*]

```
self.oclAsType(ElementMain_Mapping).ownedRelationship()  
->including(TraceAnnotation_Mapping.getMapped(from))
```

### 7.8.8.3.42 TraceAnnotation\_Mapping

#### Description

The mapping class creates the annotation relationship for the SysML::Requirements::Trace mapping.

## General Mappings

GenericToAnnotation\_Mapping

## Mapping Source

Abstraction

## Mapping Target

Annotation

## Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `Annotation::annotatingElement () : AnnotatingElement [1]`  
`TraceMetadataUsage_Mapping.getMapped (from)`

### 7.8.8.3.43 TraceMetadataFeatureMembership\_Mapping

#### Description

Creates a feature membership relationship for *ownedMemberFeature()*.

#### General Mappings

GenericToFeatureMembership\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

FeatureMembership

#### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- `FeatureMembership::ownedMemberFeature () : Feature [1]`  
`TraceMetadataReferenceUsage_Mapping.getMapped (from)`

### 7.8.8.3.44 TraceMetadataReferenceUsage\_Mapping

#### Description

Creates a reference usage.

#### General Mappings

GenericToReferenceUsage\_Mapping

#### **Mapping Source**

Abstraction

#### **Mapping Target**

ReferenceUsage

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

#### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- ReferenceUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { TraceMetadataReferenceUsageRedefinition_Mapping.getMapped (from) ,  
TraceMetadataReferenceUsageFeatureValue_Mapping.getMapped (from) }
```

### **7.8.8.3.45 TraceMetadataReferenceUsageFeatureValue\_Mapping**

#### **Description**

Creates a feature value relationship.

#### **General Mappings**

GenericToFeatureValue\_Mapping

#### **Mapping Source**

Abstraction

#### **Mapping Target**

FeatureValue

#### **Owned Mappings**

(none)

#### **Applicable filters**

(none)

#### **Mapping rules**

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureValue::value () : Expression [1]

```
LiteralBoolean_Factory.create(true)
```

#### 7.8.8.3.46 TraceMetadataReferenceUsageRedefinition\_Mapping

##### Description

Creates a redefinition relationship for the *redefiningFeature()* and the *redefinedFeature()*.

##### General Mappings

GenericToRedefinition\_Mapping

##### Mapping Source

Abstraction

##### Mapping Target

Redefinition

##### Owned Mappings

(none)

##### Applicable filters

(none)

##### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- Redefinition::redefinedFeature () : Feature [1]

```
SysML2::AttributeUsage.allInstances()  
->any(m | m.qualifiedName = 'SysMLv1Library::TraceData::isTrace')
```

#### 7.8.8.3.47 TraceMetadataUsage\_Mapping

##### Description

Create the metadata usage element to annotate a dependency relationship with the information that its SysML v1 mapping source element is a SysML v1 trace relationship.

##### General Mappings

GenericToMetadataUsage\_Mapping

##### Mapping Source

Abstraction

### Mapping Target

MetadataUsage

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- MetadataUsage::ownedRelationship () : Relationship [0..\*]  

```
Set { TraceMetadataUsageFeatureTyping_Mapping.getMapped (from) ,  
TraceMetadataFeatureMembership_Mapping.getMapped (from) }
```

## 7.8.8.3.48 TraceMetadataUsageFeatureTyping\_Mapping

### Description

Creates a feature typing relationship owned by the element *typedFeature()*.

### General Mappings

GenericToFeatureTyping\_Mapping

### Mapping Source

Abstraction

### Mapping Target

FeatureTyping

### Owned Mappings

(none)

### Applicable filters

(none)

### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- FeatureTyping::type () : Type [1]

```

SYSML2::MetadataDefinition.allInstances()
->any(m | m.qualifiedName = 'SysMLv1Library::TraceData')

```

### 7.8.8.3.49 Verify\_Mapping

#### Description

A SysML::Requirements::Verify relationship is mapped to a SysML v2 RequirementVerificationMembership relationship.

The following shows an example of what the textual SysML v2 syntax of the result of the transformation may look like.

```

requirement <'idl'> SysMLv1Requirement {
    doc /*
        * requirement text
        */
}
verification def SysMLv1TestCase {
    objective objective_SysMLv1TestCase {
        verify SysMLv1Requirement;
    }
    return verdict : VerificationCases::VerdictKind;
}

```

#### General Mappings

GenericToRelationship\_Mapping

#### Mapping Source

Abstraction

#### Mapping Target

RequirementVerificationMembership

#### Owned Mappings

(none)

#### Applicable filters

(none)

#### Mapping rules

In addition to the inherited rules, the following lists the mapping class specific mapping rules for the target element properties.

- RequirementVerificationMembership::ownedRelatedElement () : Element [0..\*]  
Set{TestCaseVerifyRequirementUsage\_Mapping.getMapped(from) }

### 7.8.8.3.50 Model Libraries

#### **7.8.8.3.50.1 Verdicts**

##### **7.8.8.3.50.1.1 VerdictKind**

The enumeration VerdictKind is mapped to the SysML v2 VerificationCases::VerdictKind model library element.