

# Annex F: SACM UML profile

(normative)

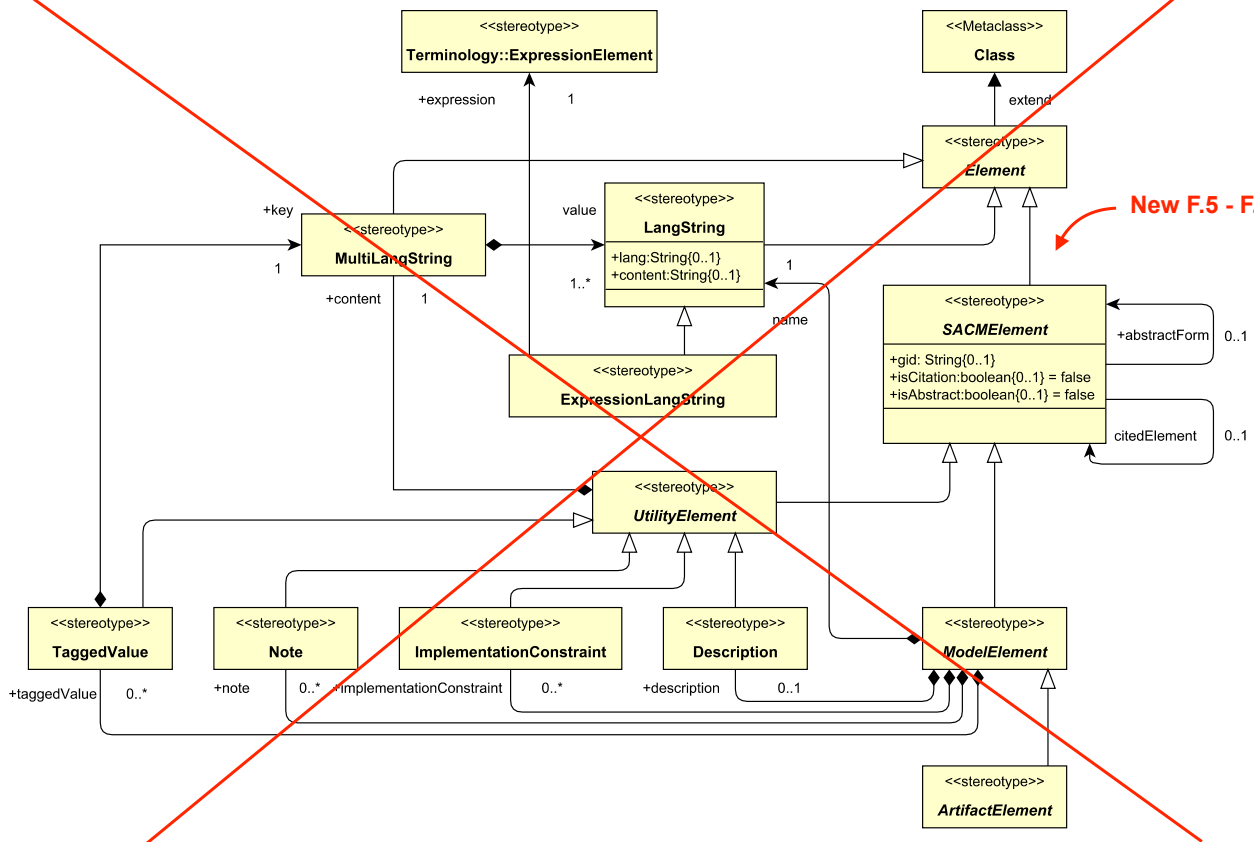
The SACM UML profile is created by extending meta-element Class and Association from standard UML.

## F.2 Assurance case component

Base section

F.5 - F.8

The base component of the SACM profile is shown in F.1. In this component, the metaclass Class from the standard UML is imported and is generalized by Element of SACM, which is defined as a stereotype. Other elements of SACM are generalizations of Element and are also defined as stereotypes. The descriptions of the elements in SACM can be found in the specification. This section includes the abstract SACMElement and all of its structure and ModelElement. In addition, BaseElements which can be used anywhere in AssuranceCases are defined.



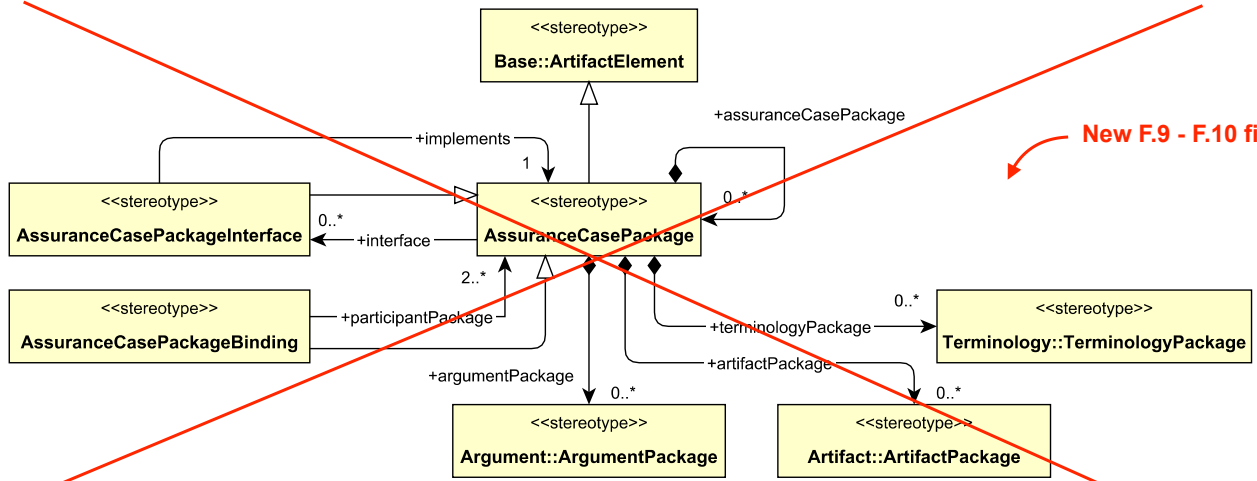
F.1 Base component of the SACM profile.

## F.3 Assurance case component

Packaging section

F.9 - F.10

The assurance case component of the SACM profile is shown in F.2. In this component, all elements are defined as stereotypes, the descriptions of which can be found in the specification. In particular, stereotype **AssuranceCasePackage** is defined as a generalization of stereotype **ArtifactElement**, which is defined in the base component. This section includes an abstract notion of **SACMPackage** as well as defining the **AssuranceCasePackage** and its possible ownership of other Packages.

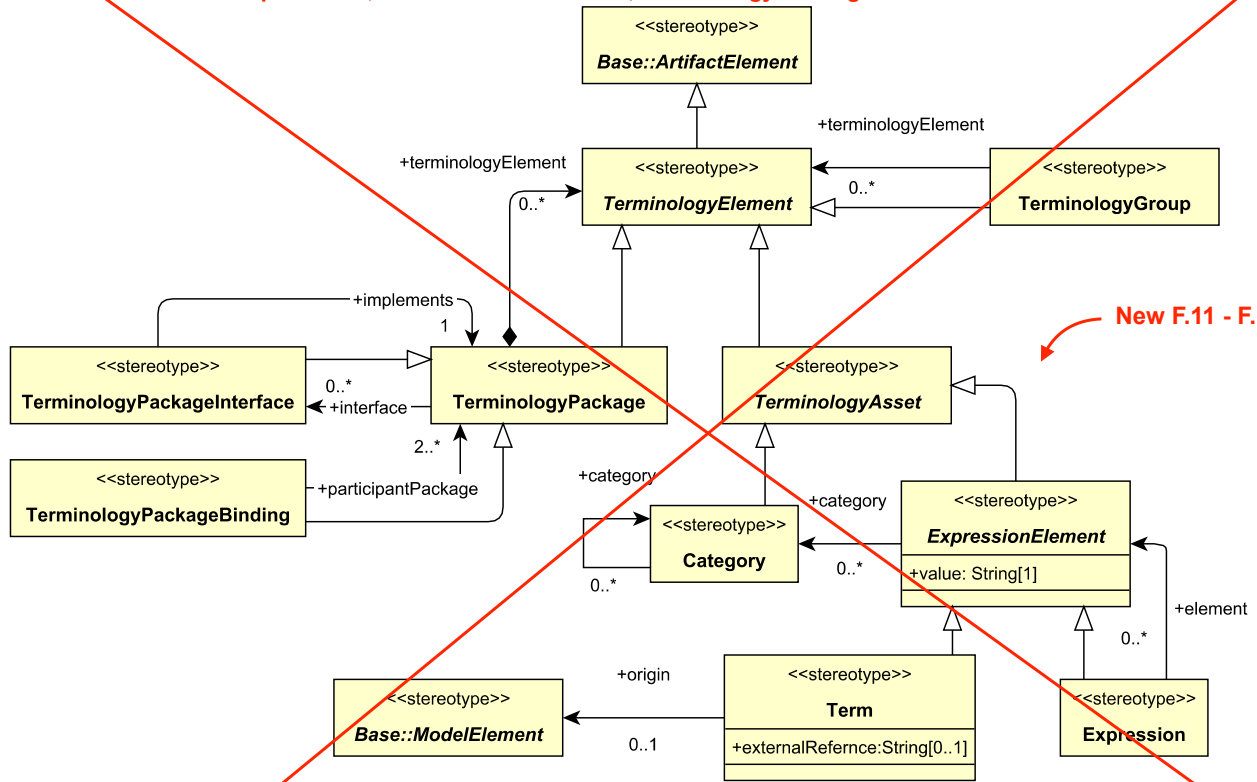


F.2 Assurance case component of the SACM profile.

~~F.4~~  
~~F.3 Terminology component~~ section

The terminology section component of the SACM profile is Shown in ~~F.3~~. F.11 - F.12 In this component, all elements are defined as stereotypes, the descriptions of which can be found in the specification. In particular, stereotype TerminologyElement is a generalization of stereotype ArtifactElement, which is defined in the base component.

This section includes the notion of a MultiLangString as well as Category, Expressions, and Terms. In Addition, Terminology Package kinds are defined.



F.3 Terminology component of the SACM profile.

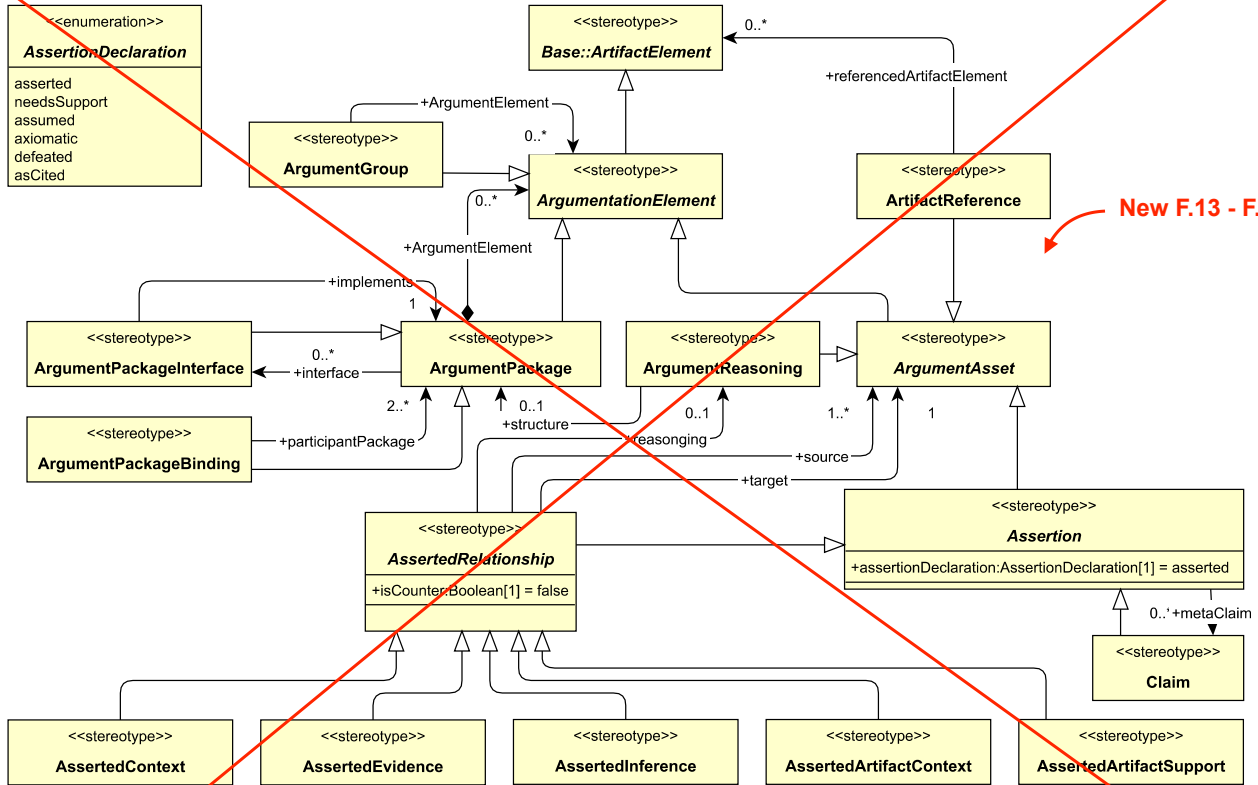
**F.5** Argument section  
~~**F.4** Argumentation component~~

Argument section

F.13 - F.17

The ~~argumentation component~~ of the SACM profile is Shown in F.4. In this component, all elements are defined as ~~stereotypes~~, the descriptions of which can be found in the specification. In particular, stereotype ~~ArgumentationElement~~ is a generalization of stereotype ~~ArtifactElement~~, which is defined in the base component. It is to be noted that ~~stereotype AssertedRelationship~~ does not import ~~Association~~ from the standard UML package, it is due to the fact that ~~AssertedRelationship~~ acts as an object in SACM's concrete syntax, although it has a notion of source and target.

This section includes all the elements that are needed to build an argument in SACM. Included are all the Asserted Relationships used for Argumentation. In addition, Artifact Package kinds are defined.



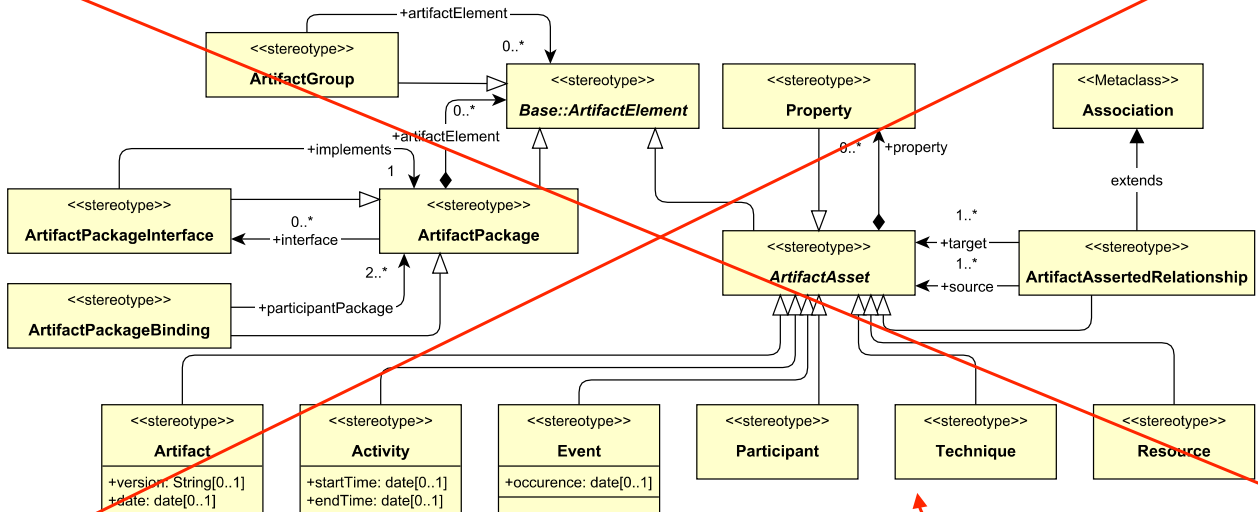
New F.13 - F.17 figures

F.4 Argumentation component of the SACM profile.

# F.6 section F.5 Artifact component

The artifact component of the SACM profile is shown in F.5. In this component, all elements are defined as stereotypes, the descriptions of which can be found in the specification. In particular, stereotype *ArtifactElement* is a generalization of stereotype *ArtifactElement*, which is defined in the base component. It is to be noted that stereotype *ArtifactAssertedRelationship* extends metaclass *Association* from the standard UML package, its defines additional source and target features which are both navigable

This section includes the elements needed to define the pedigree and provenance of the Artifacts used in arguments. In addition, Artifact Package kinds are defined.



F.5 Artifact component of the SACM profile.

New F.18 - F.19 figures

## F.7 Advanced Argument section (informative)

The Non-Normative sections of the SACM profile is shown in F.20 - F.28. This section includes all of the elements that are non-normative.

New F.20 - F.28 figures

## Annex F: SACM UML profile

(normative)

The SACM UML profile is created by extending from standard UML

### F.1 meta Profile section

The meta Profile section of the SACM profile contains two stereotypes that can be placed on dependencies. These two stereotypes allow for more precise definition of profiles. This technique is also used in OMG's Unified Architecture Framework (UAF), section 2.3.1 Metaconstraint dependency and the examples more fully explain the concept being used.

#### F.1.1 metaconstraint

A metaconstraint on a dependency defines a UML Role that can be fulfilled between two Base UML Elements that the stereotypes are applied to.

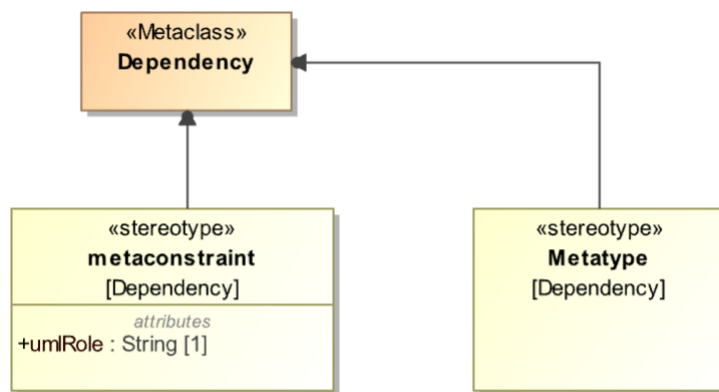


Figure F.1 – SACM metaconstraint

metaconstraint

#### Extends

Dependency

#### Attribute

umlRole : String [1]

For example, in Figure F.2, between SACMAssuranceCasePackage stereotype on one Package and SACMTerminologyPackage on another Package, there may be a UML Role for "owningPackage" on one side and "packageableElement" on the other side as reflected in the UML metamodel as illustrated in this snippet from UML v. 2.5.1 in Figure F.3 below.

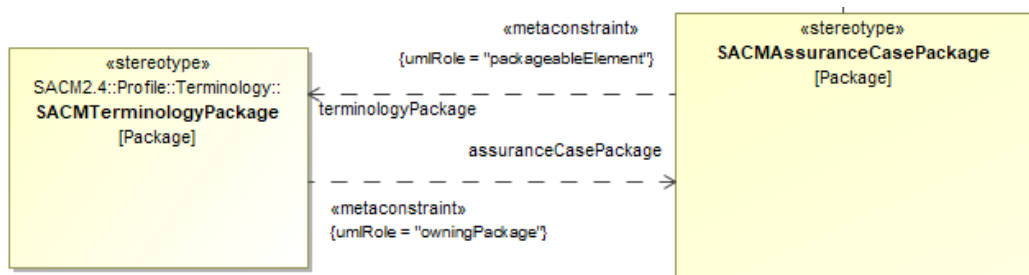


Figure F.2 – UML role in a profile

This can be reflected in a profile as shown in Figure F.3, below.

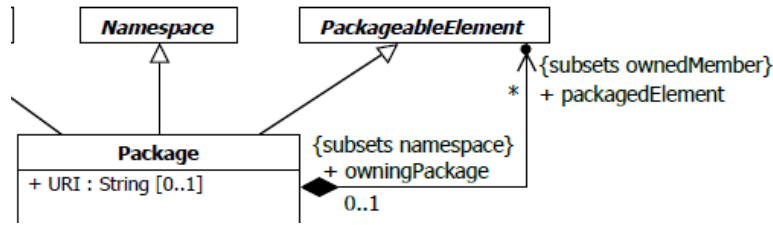


Figure F.3 – UML role snippet from UML v. 2.5.1

### F.1.2 Metatype

Metatype stereotype on a dependency specifies what Metaclass should be used as a base when constructing something from the Palette of a Tool. For example, an SACMArtifact can extend any NamedElement in UML (to allow for maximum flexibility) as shown in the profile diagram shown in Figure F.4 below, but if one creates an SACMArtifact from a Palette, then the Metaclass used will be a Class (i.e., something that is concrete and not abstract). Metatype was not named "metaclass" to avoid conflicts with its other uses in the language.

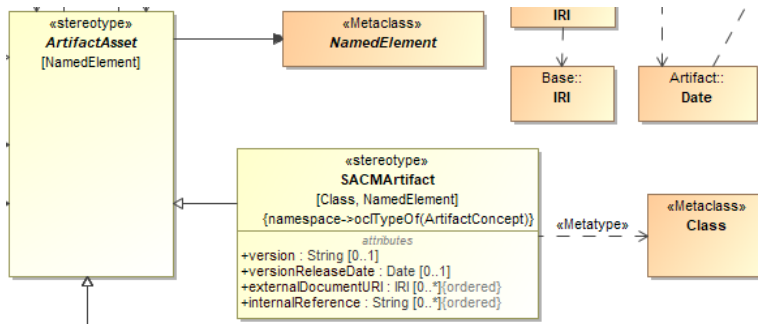


Figure F.4 – Metatype to Class

Metatype

Extends

Dependency

### F.2 Base section

The Base section of the SACM profile is Shown in F.5 – F.8. This section includes the abstract SACMElement and all of its structure and ModelElement. In addition, BaseElements which can be used anywhere in AssuranceCases are defined.

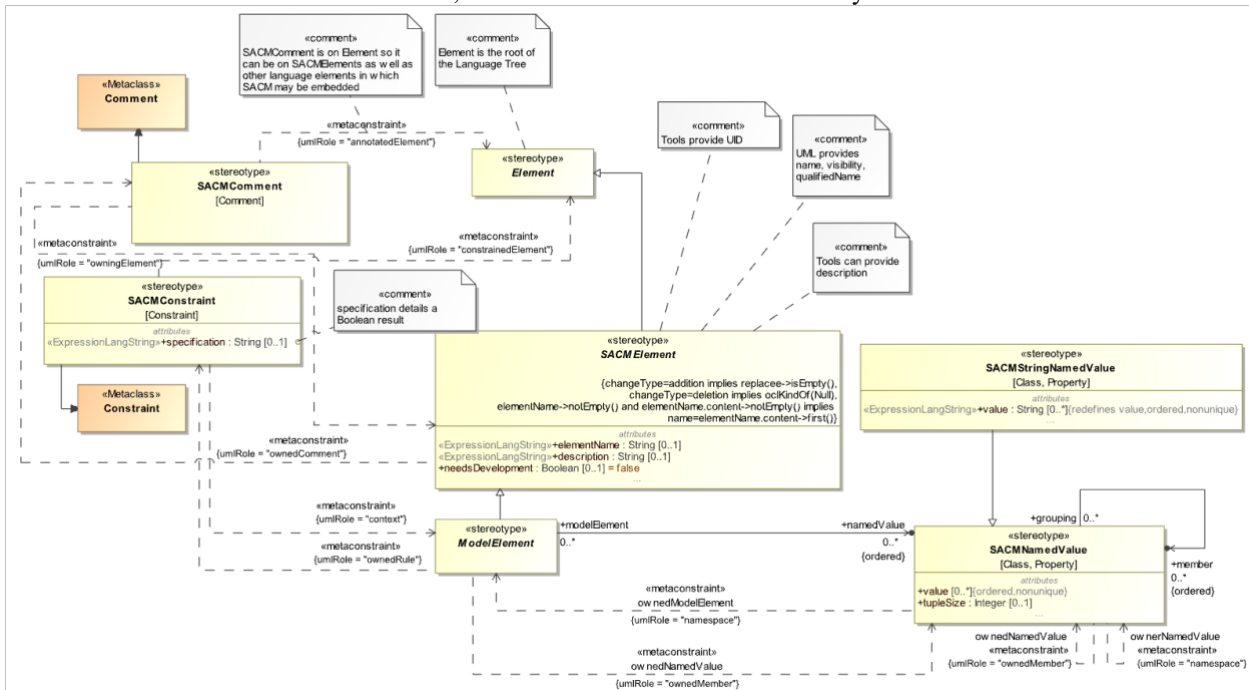


Figure F.5 – Base section of the SACM profile.

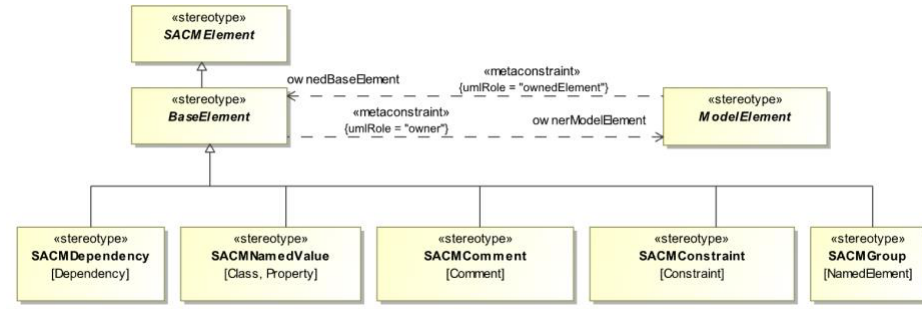


Figure F.6 – BaseElement section of the SACM profile.

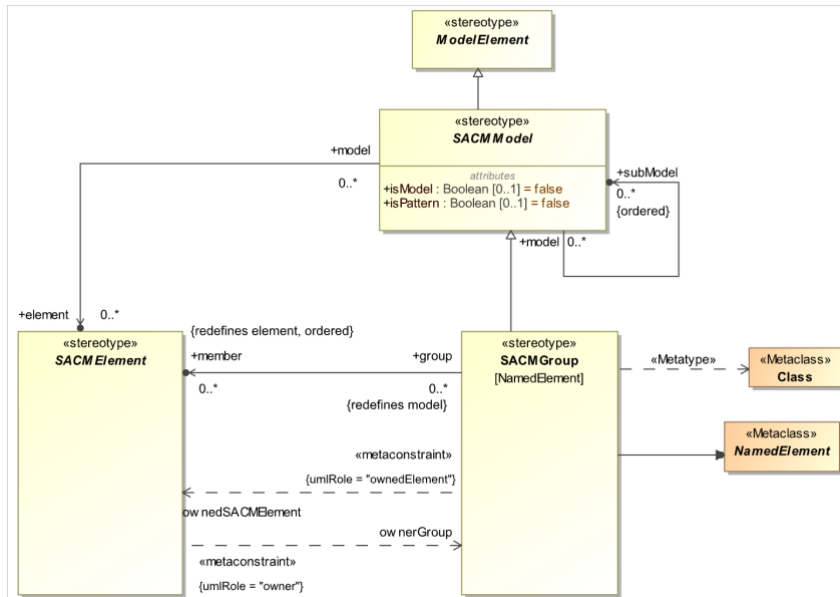


Figure F.7 – Group section of the SACM profile.

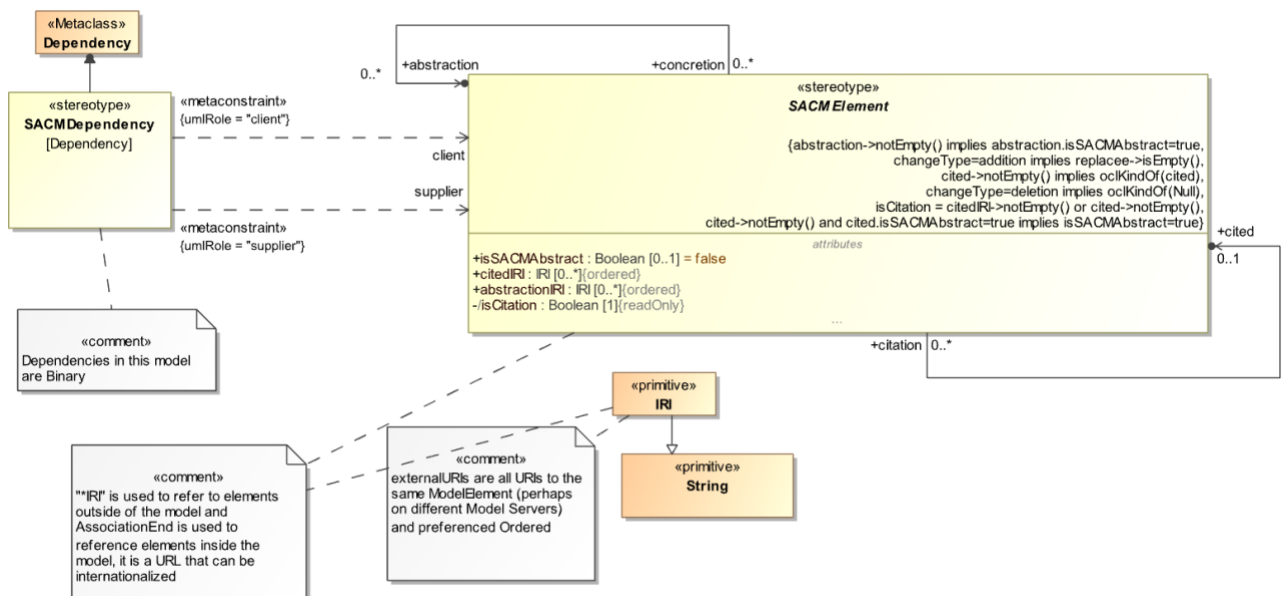


Figure F.8 – References and Dependencies section of the SACM profile.



## F.4 Terminology section

The terminology section of the SACM profile is shown in F.11 - F.12. This section includes the notion of a MultiLangString as well as Category, Expressions, and Terms. In addition, Terminology Package kinds are defined.

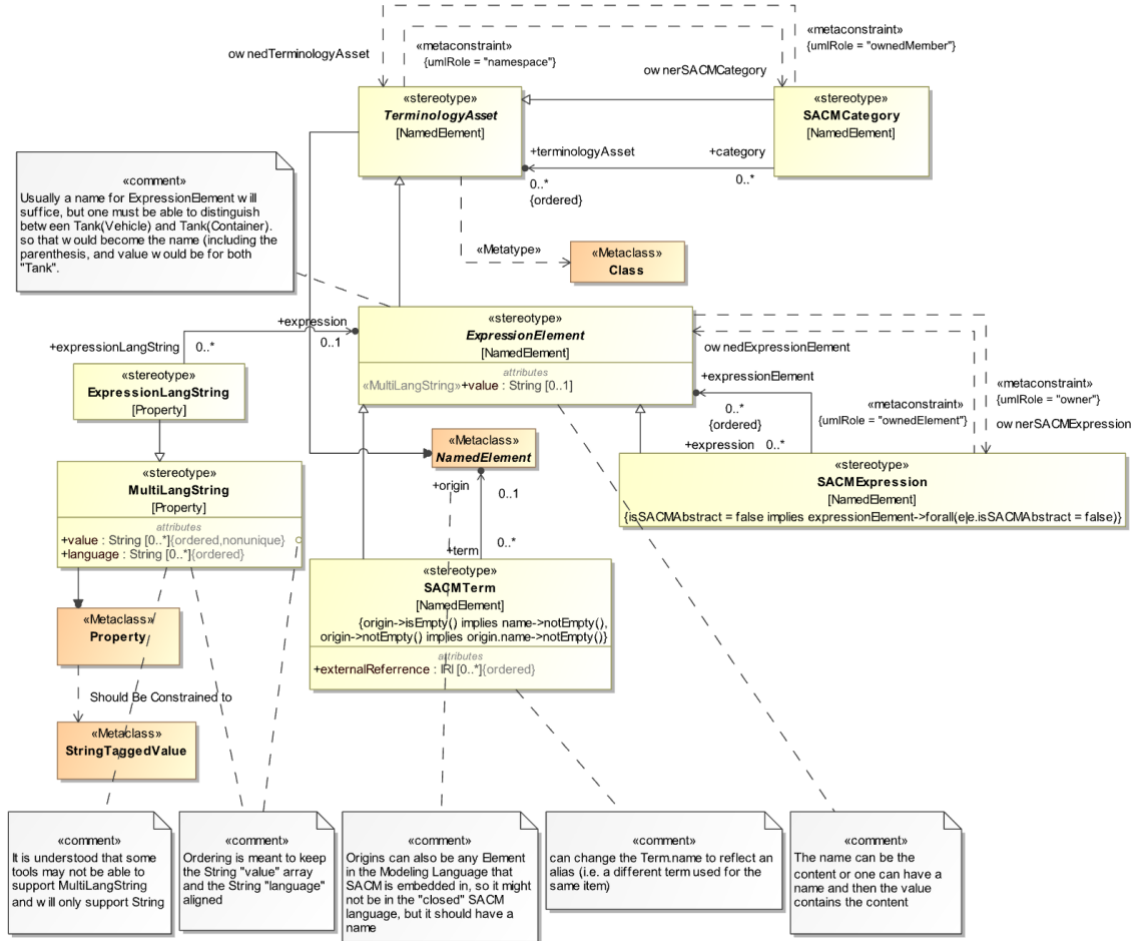


Figure F.11 – Terminology section of the SACM profile.

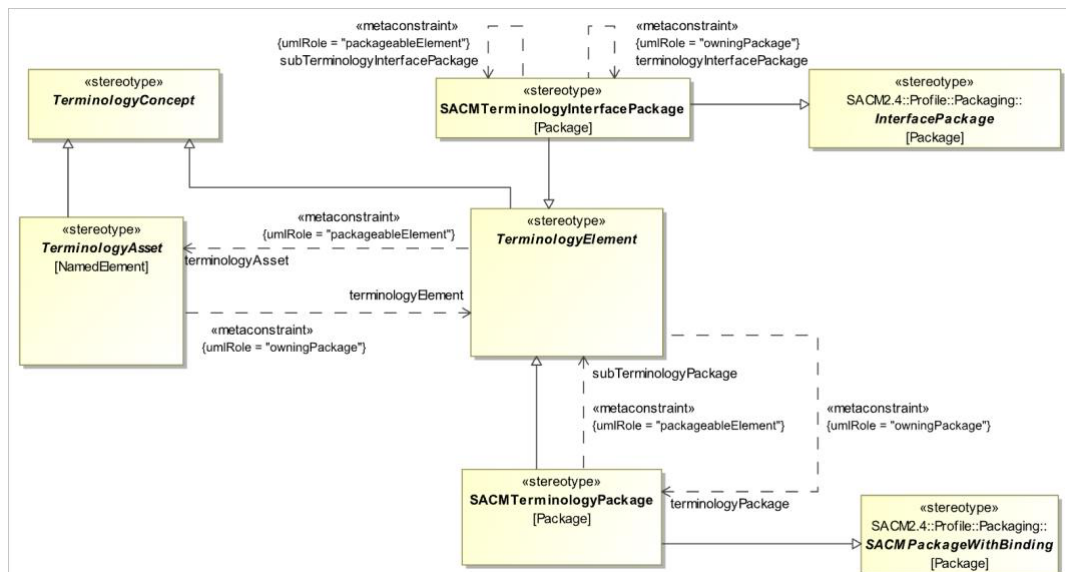


Figure F.12 – TerminologyPackage section of the SACM profile.

## F.5 Argument section

The argument section of the SACM profile is Shown in F.13 - F.17. This section includes all the elements that are needed to build an argument in SACM. Included are all the Asserted Relationships used for Argumentation. In addition, Artifact Package kinds are defined.

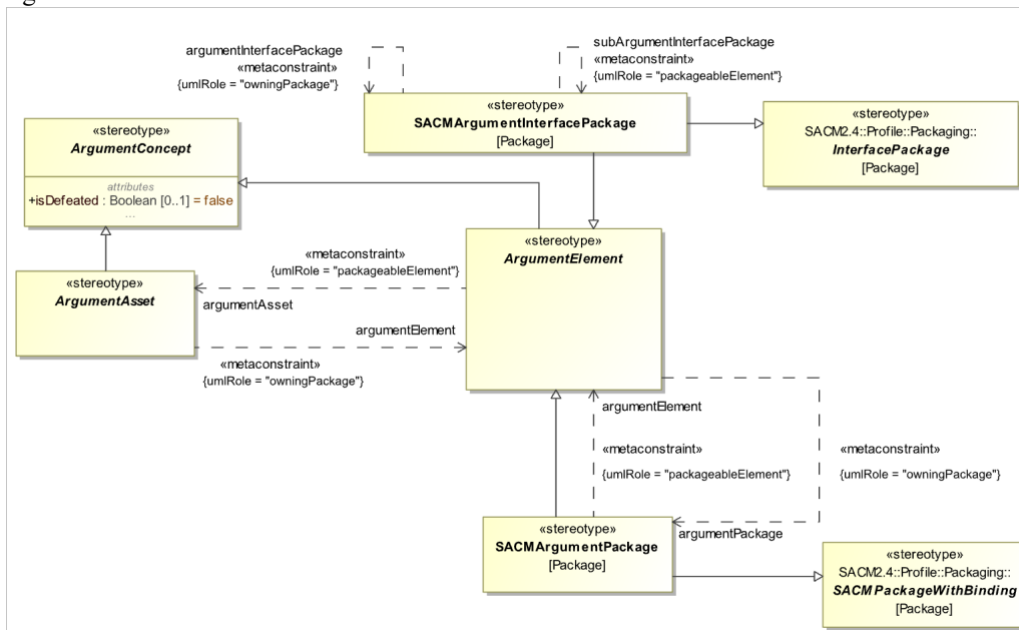


Figure F.13 – ArgumentPackages section of the SACM profile.

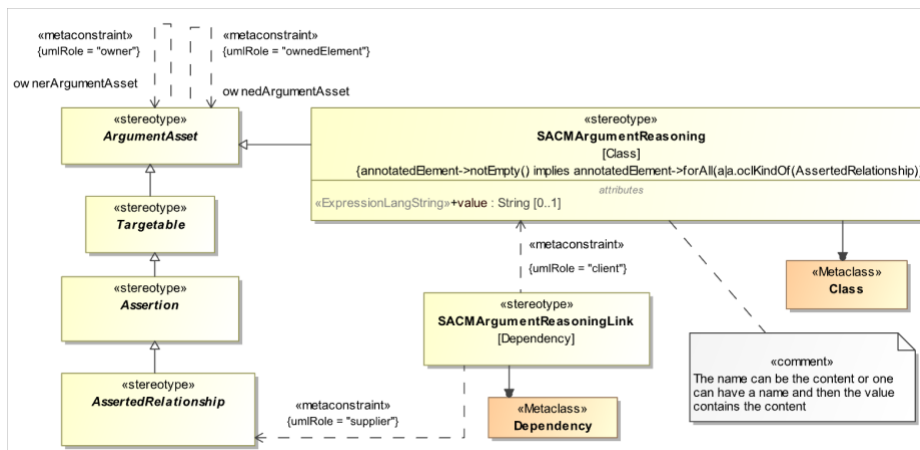


Figure F.14 – ArgumentReasoning section of the SACM profile.

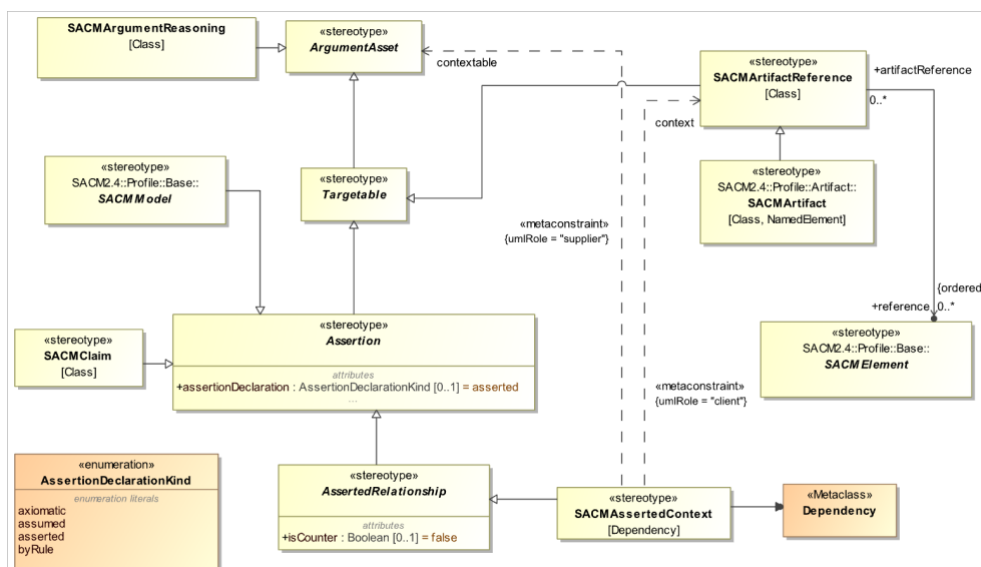


Figure F.15 – AssertedContext section of the SACM profile.

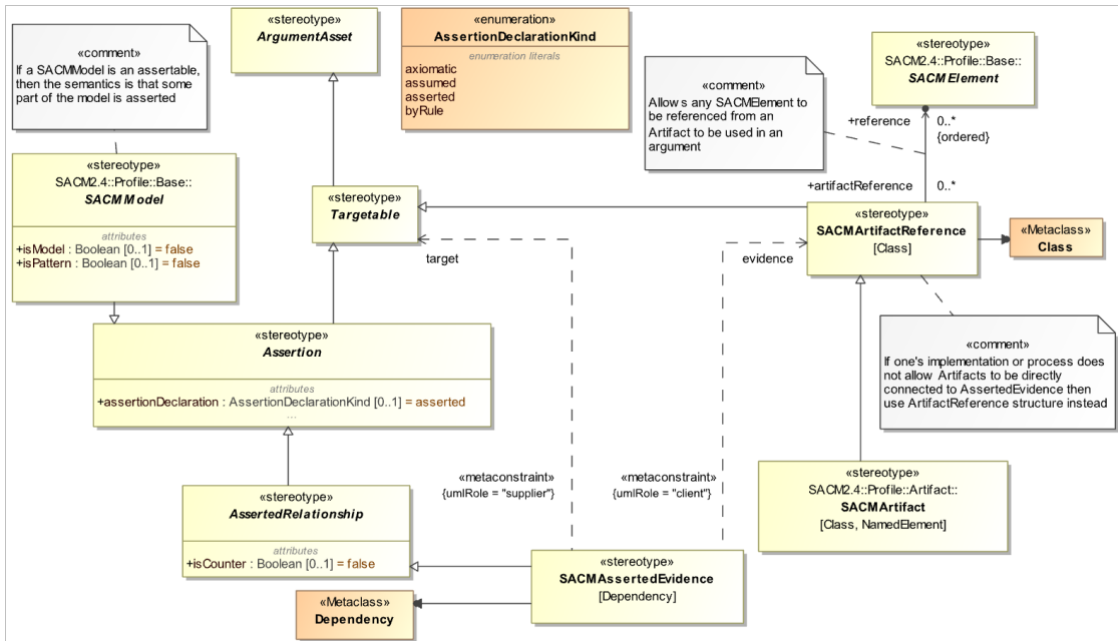


Figure F.16 – AssertedEvidence section of the SACM profile.

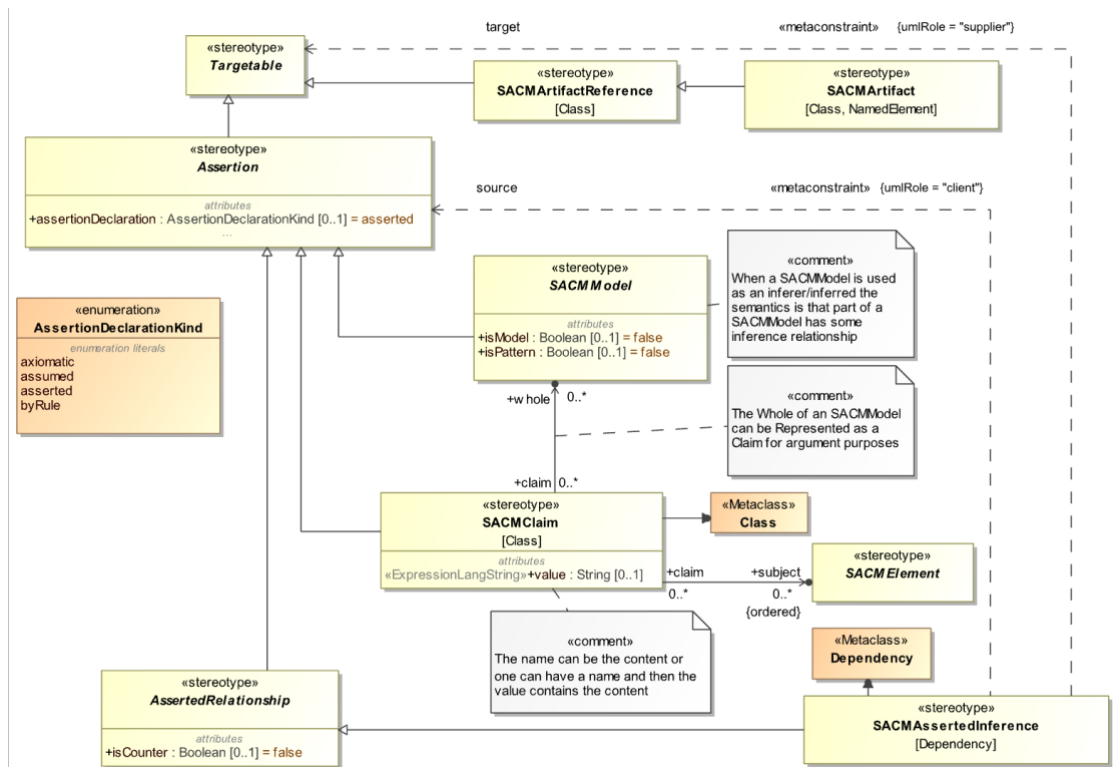


Figure F.17 – AssertedInference section of the SACM profile.

## F.6 Artifact section

The artifact component of the SACM profile is Shown in F.18 - F.19. This section includes the elements needed to define the pedigree and provenance of the Artifacts used in arguments. In addition, Artifact Package kinds are defined.

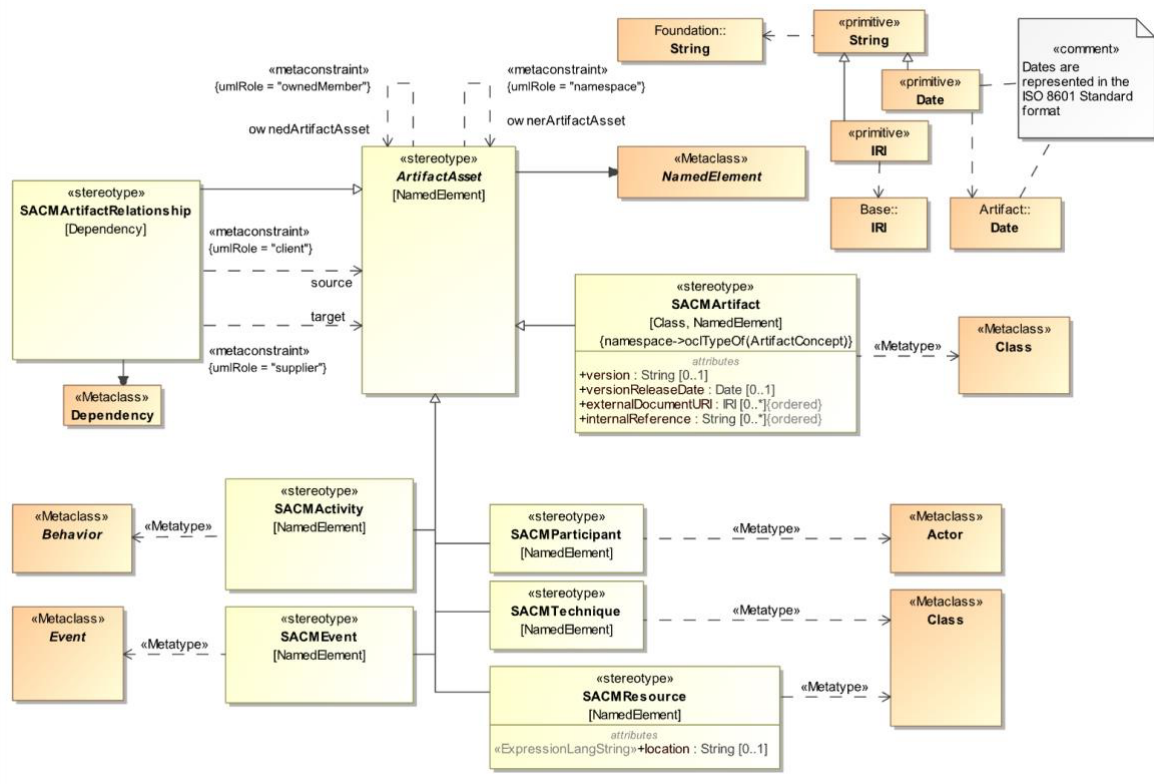


Figure F.18 – Artifact section of the SACM profile.

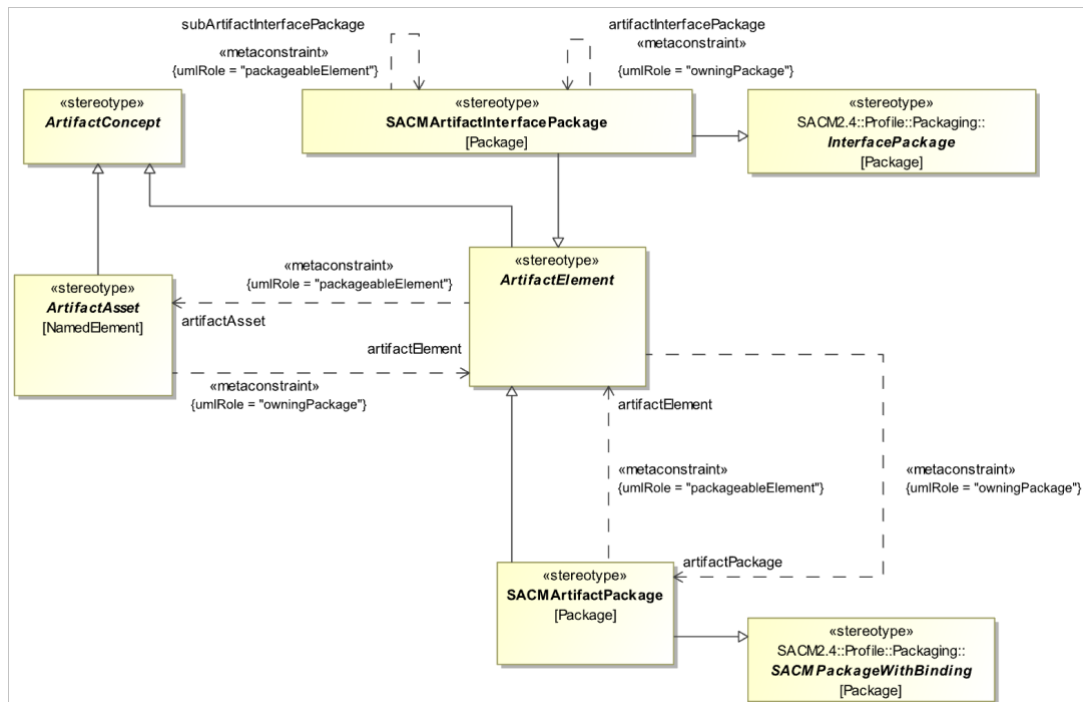


Figure F.19 – ArtifactPackage section of the SACM profile.



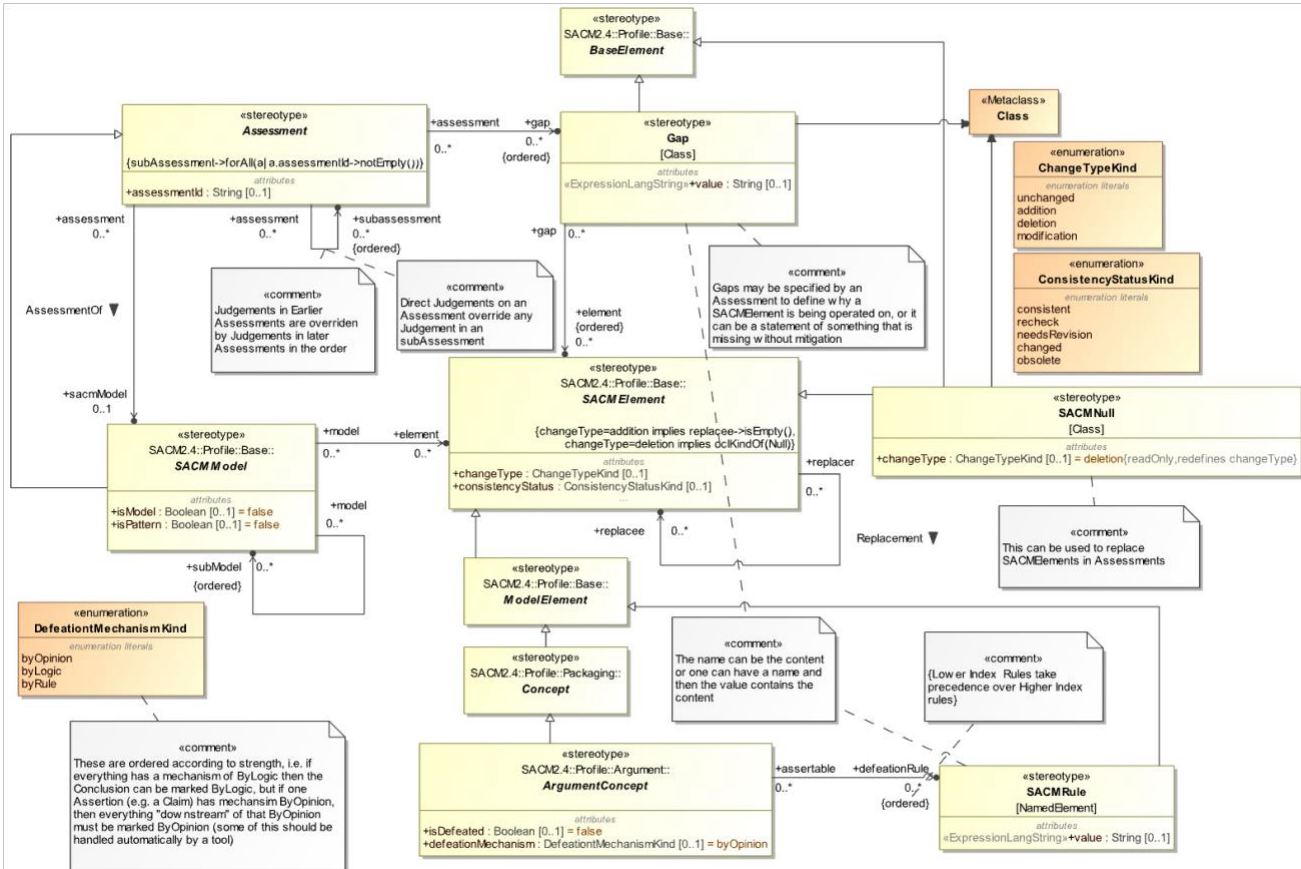


Figure F.22 – Assessment section of the SACM profile.

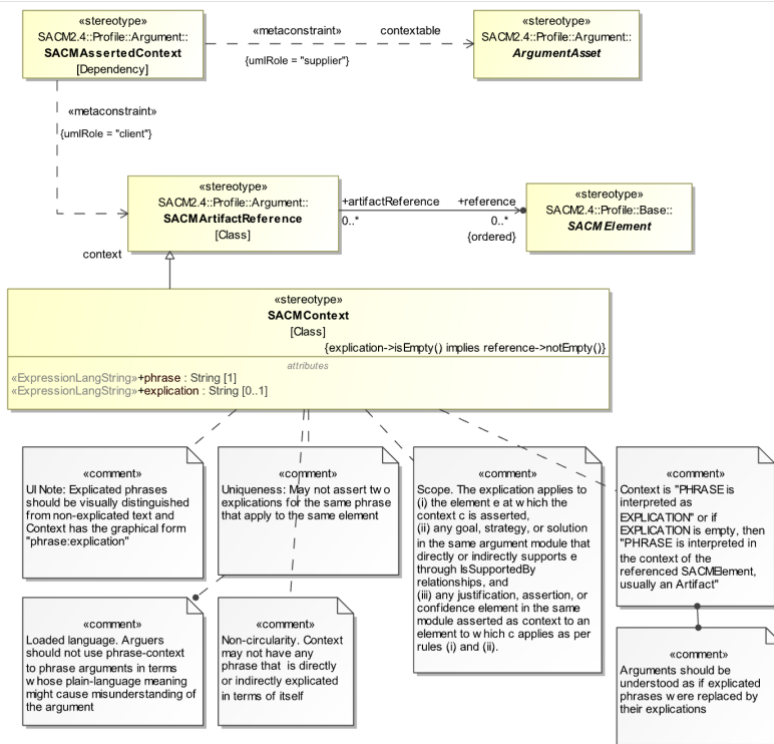


Figure F.23 – Context section of the SACM profile.

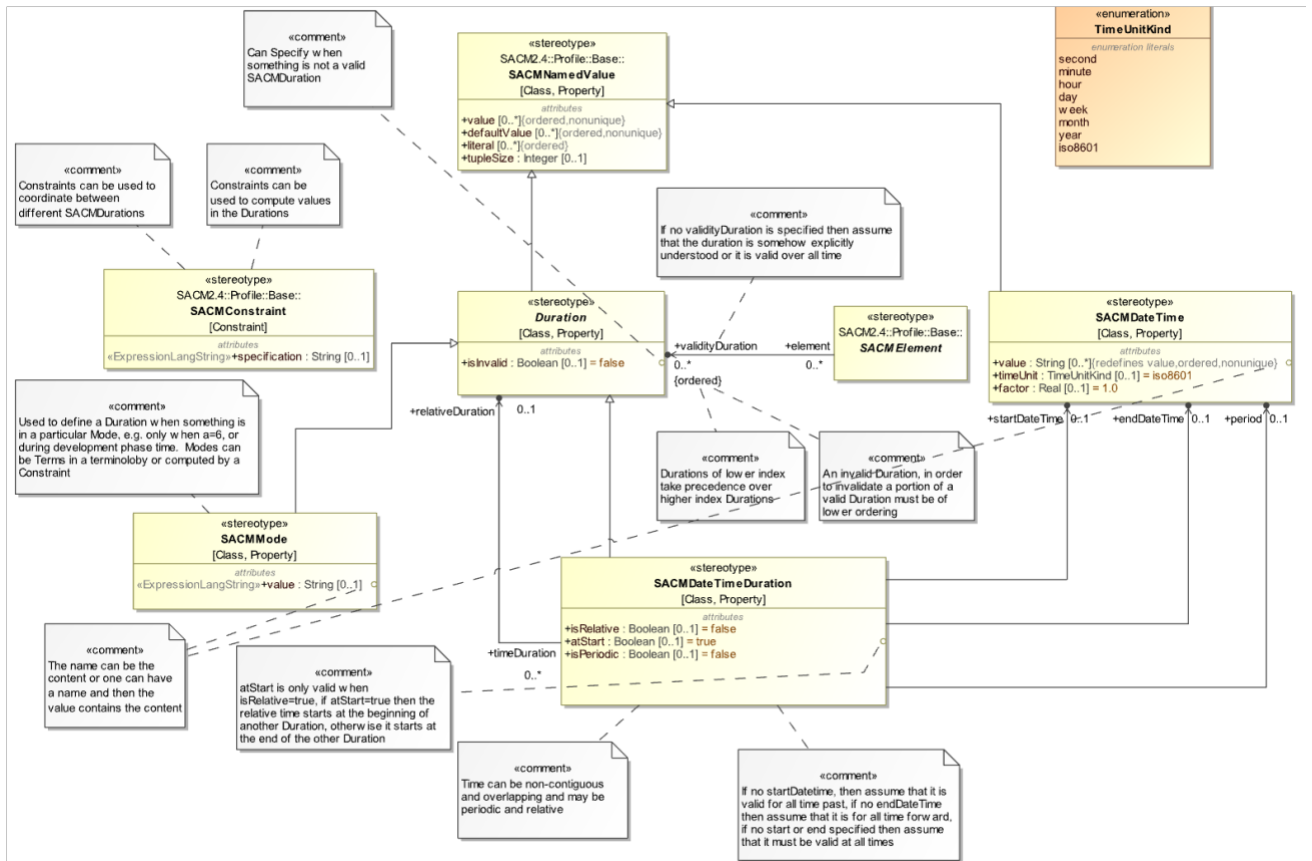


Figure F.24 – Date/Time section of the SACM profile.

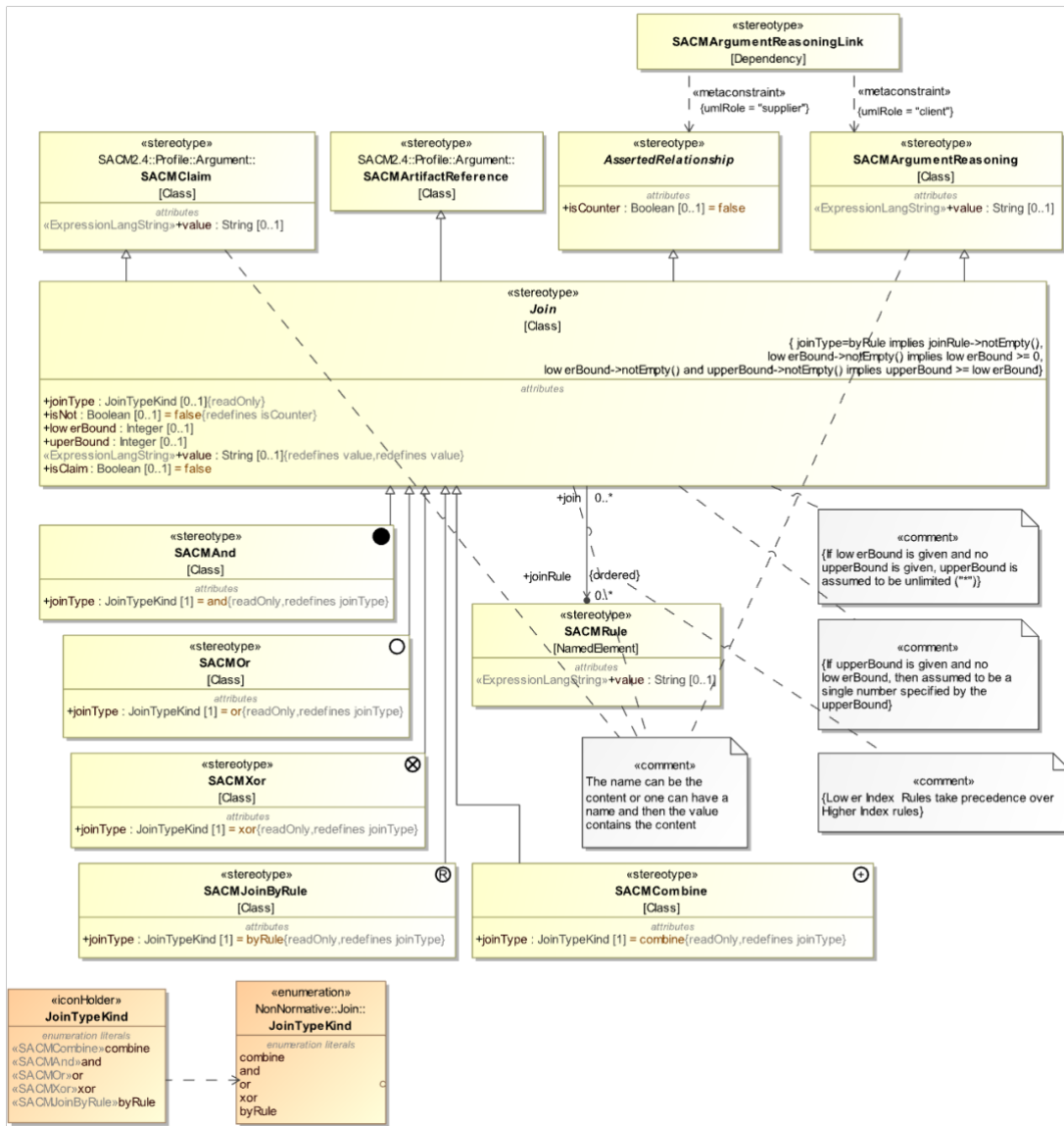


Figure F.25 – Join section of the SACM profile.

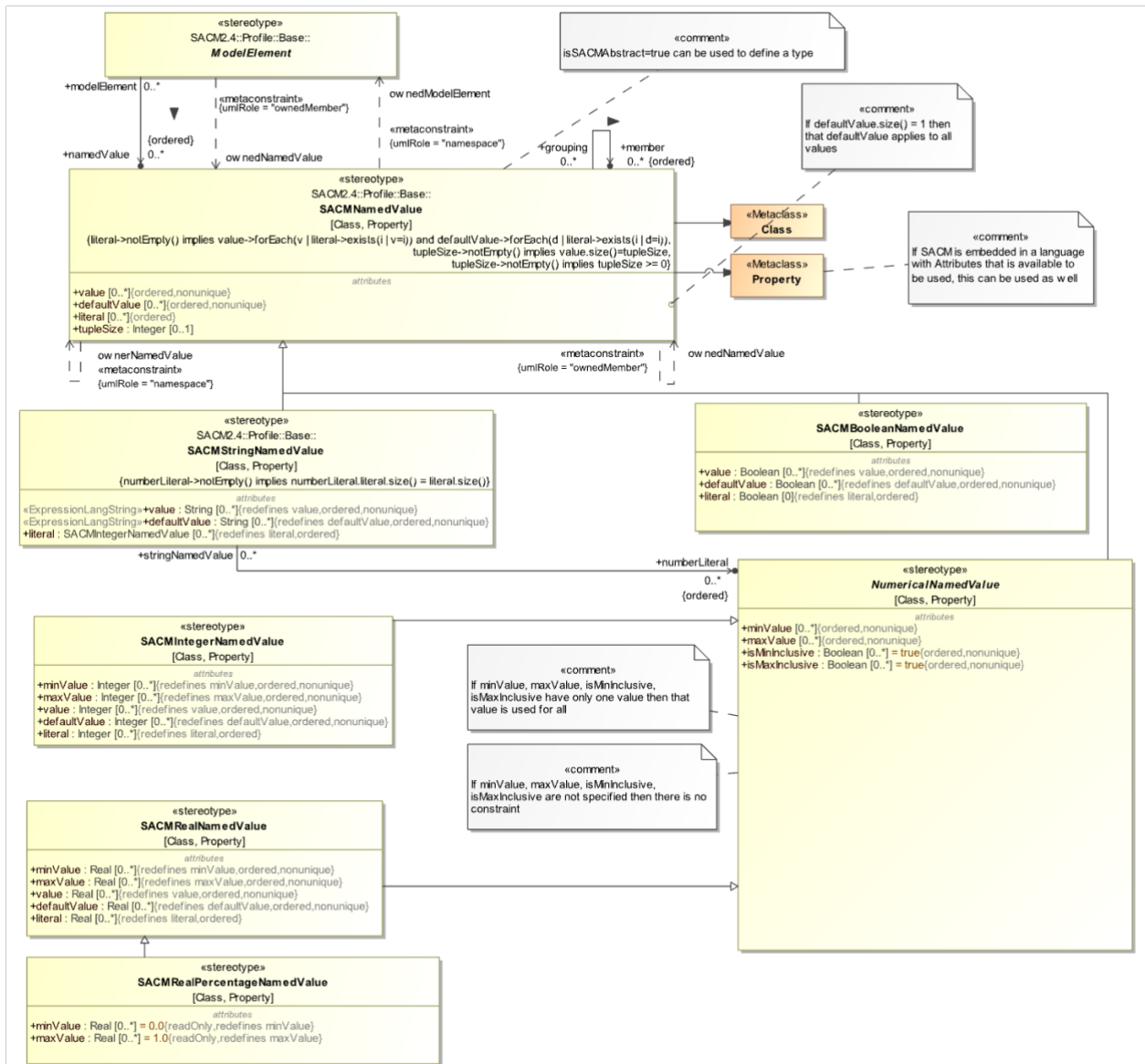


Figure F.26 – NamedValue section of the SACM profile.

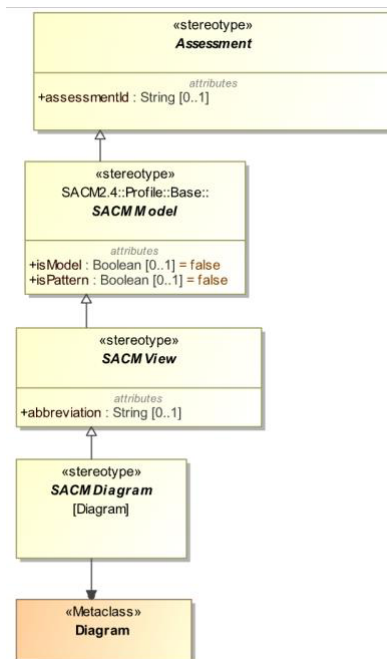


Figure F.27 – SACMDiagram section of the SACM profile.

