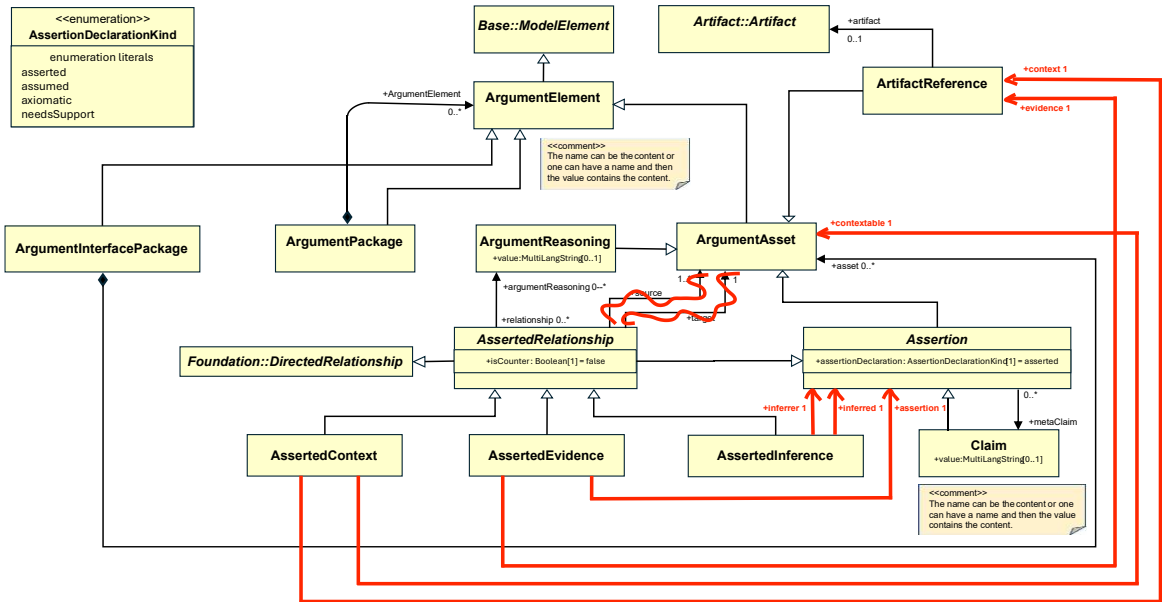


11 SACM Argumentation Metamodel

11.1 General

Argument

This chapter presents the normative specification for the SACM Argumentation Package. It begins with an overview of the metamodel structure followed by a description of each element.



Argument

Figure 11.1 - Argumentation Package Diagram

This portion of the SACM model describes and defines the concepts required to model structured arguments. Arguments are represented in SACM through explicitly representing the Claims and citation of artifacts (e.g., as evidence) (ArtifactReference), and the 'links' between these elements – e.g., how one or more Claims are asserted to infer another Claim, or how one or more artifacts (referenced by ArtifactReference) are asserted as providing evidence for a Claim (AssertedEvidence). In addition to these core elements, in SACM it is possible to provide additional description of the ArgumentReasoning associated with inferential and evidential relationships, represent counter-arguments and counter-evidence (through isCounter:Boolean), and represent how artifacts provide the context in which arguments should be interpreted (through AssertedContext).

The packaging of structured arguments into 'modular' argument packages is enabled through ArgumentPackages. Users are able to declare interfaces for their packages through the use of ArgumentPackageInterface. Within an ArgumentPackageInterface, users create citations of the argument elements they select to disclose to external parties. Users are able to integrate ArgumentPackages through the use of ArgumentPackageBinding. An ArgumentPackageBinding binds ArgumentPackages together by including the declared ArgumentPackageInterfaces for the ArgumentPackages, it may contain additional argument structures to provide the rationale of the binding. It is also possible within a package to cite elements contained within other argument packages (through ArtifactReference).

argument

ArgumentInterfacePackages
ArgumentPackageInterface
ArgumentPackageBinding
ArgumentBindingPackage

11 SACM Argumentation Metamodel

11.1 General

This chapter presents the normative specification for the SACM Argumentation Package. It begins with an overview of the metamodel structure followed by a description of each element.

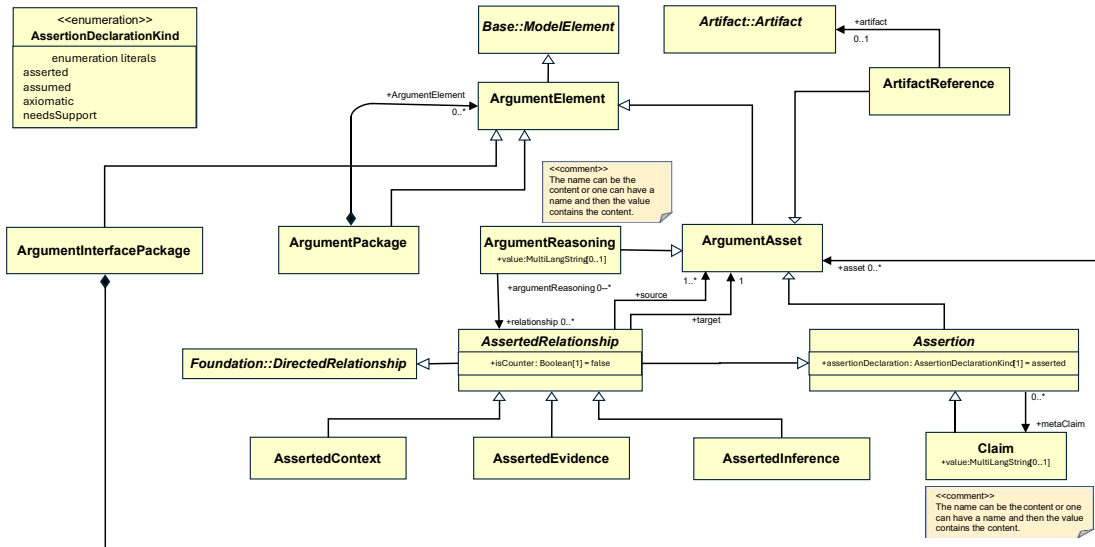


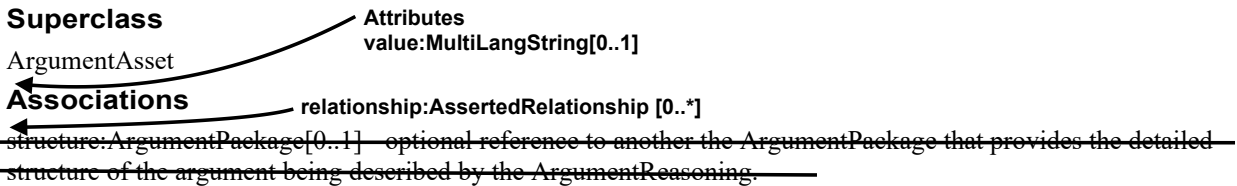
Figure 11.1 - Argumentation Package Diagram

This portion of the SACM model describes and defines the concepts required to model structured arguments. Arguments are represented in SACM through explicitly representing the Claims and citation of artifacts (e.g., as evidence) (*ArtifactReference*), and the 'links' between these elements – e.g., how one or more Claims are asserted to infer another Claim, or how one or more artifacts (referenced by *ArtifactReference*) are asserted as providing evidence for a Claim (*AssertedEvidence*). In addition to these core elements, in SACM it is possible to provide additional description of the *ArgumentReasoning* associated with inferential and evidential relationships, represent counter-arguments and counter-evidence (through *isCounter: Boolean*), and represent how artifacts provide the context in which arguments should be interpreted (through *AssertedContext*).

The packaging of structured arguments into 'modular' argument packages is enabled through *ArgumentPackages*. Users are able to declare interfaces for their packages through the use of *ArgumentPackageInterface*. Within an *ArgumentPackageInterface*, users create citations of the argumentation elements they select to disclose to external parties. Users are able to integrate *ArgumentPackages* through the use of *ArgumentPackageBinding*. An *ArgumentPackageBinding* binds *ArgumentPackages* together by including the declared *ArgumentPackageInterfaces* for the *ArgumentPackages*, it may contain additional argument structures to provide the rationale of the binding. It is also possible within a package to cite elements contained within other argument packages (through *ArtifactReference*).

11.12 ArgumentReasoning

ArgumentReasoning can be used to provide additional description or explanation of the asserted relationship. For example, it can be used to provide description of an AssertedInference that connects one or more Claims (premises) to another Claim (conclusion). ArgumentReasoning elements are therefore related to AssertedInferences, AssertedContexts, and AssertedEvidence. It is also possible that ArgumentReasoning elements can refer to other structured Arguments as a means of documenting the detail of the argument that establishes the asserted inferences, contexts, and evidence.



Semantics

The AssertedRelationship that relates one or more Claims (premises) to another Claim (conclusion), or evidence cited by an ArtifactReasoning to a Claim, may not always be obvious. In such cases ArgumentReasoning can be used to provide further description of the reasoning involved.

← The name can be the content or one can have a name and then the value contains the content.

11.13 AssertedRelationship (abstract)

AssertedRelationship is the abstract association class that enables the ArgumentAssets of any structured argument to be linked together. The linking together of ArgumentAssets allows a user to declare the relationship that they assert to hold between these elements.



Attributes

isCounter:Boolean[1] = false – a flag indicating whether the AssertedRelationship counters its declared purposes (e.g. setting isCounter = true for an AssertedEvidence indicates that the relationship is a counter-evidence).

Associations

~~source:ArgumentAsset[1..*] reference to the ArgumentAsset(s) that are the source (starting point) of the relationship.~~

~~target:ArgumentAsset[1] reference to the ArgumentAsset(s) that are the target (ending point) of the relationship.~~

~~reasoning:ArgumentReasoning[0..1] an optional reference to the a description of the reasoning underlying the AssertedRelationship.~~

Semantics

In SACM, the structure of an argument is declared through the linking together of primitive ArgumentAssets. For example, a sufficient inference can be asserted to exist between two claims (“Claim A implies Claim B”) or sufficient evidence can be asserted to exist to support a claim (“Claim A is evidenced by Evidence B”). An inference asserted between two claims (A – the source – and B – the target) denotes that the truth of Claim A is said to infer the truth of Claim B.

11.14 AssertedInference

AssertedInference association records the inference that a user declares to exist between one or more Assertion (premise) and another Assertion (conclusion). It is important to note that such a declaration is itself an assertion on behalf of the user.

Superclass

AssertedRelationship

Semantics

Associations

+inferred:Assertion [1] - the inferred must be undefeated in order for the inferred to be undefeated

+inferred:Assertion [1] - the inferred must be undefeated in order for the inferred to be undefeated

The core structure of an argument is declared through the inferences that are asserted to exist between Assertions (e.g., Claims). For example, an AssertedInference can be said to exist between two claims (“Claim A implies Claim B”). An

AssertedInference between two claims (A – the source – and B – the target) denotes that the truth of Claim A is said to infer the truth of Claim B.

11.15 AssertedEvidence

AssertedEvidence association records the declaration that one or more artifacts of Evidence (cited by ArtifactReference) provide information that helps establish the truth of a Claim. It is important to note that such a declaration is itself an assertion on behalf of the user. The artifact (cited by an ArtifactReference) may provide evidence for more than one Claim.

Superclass

AssertedRelationship

Associations

+assertion:Assertion [1] - the assertion is that the evidence for this Assertion is enough to make the AssertedEvidence undefeated.

+evidence:ArtifactReference [1] - the assertion is that the evidence for this Assertion is enough to make the AssertedEvidence undefeated.

Semantics

Where evidence (cited by ArtifactReference) exists that helps to establish the truth of a Claim in the argument, this relationship between the Claim and the evidence can be asserted by an AssertedEvidence association. An AssertedEvidence association between an artifact cited by an ArtifactReference and a Claim (A – the source evidence cited – and B – the target claim) denotes that the evidence cited by A is said to help establish the truth of Claim B.

Constraints

The source of AssertedEvidence relationships must be ArtifactReference.

OCL:

```
self.source->forall(s|s.ocllsTypeOf(ArtifactReference))
```

11.16 AssertedContext

AssertedContext can be used to declare that the artifact cited by an ArtifactReference(s) provides the context for the interpretation and scoping of a Claim or ArgumentReasoning element. In addition, the AssertedContext can be used to declare a Claim asserted as necessary context (i.e. a precondition) for another Assertion or ArgumentReasoning.

Superclass

AssertedRelationship

Associations

+context:ArtifactReference [1] - the context provides further clarification or constraint of the contexttable

+contexttable:ArgumentAsset [1] - the context provides further clarification or constraint of the contexttable

Semantics

Contextual information often needs to be cited in order to make clear the interpretation and scope of an Assertion and supporting argumentation. For example, a Claim can be said to be valid only in a defined context (“Claim A is asserted to be true only in a context as defined by the ArtifactReference B or conversely ArtifactReference B is the asserted context for Claim A”).

Contextual Claims often need to be cited as preconditions for an Assertion. For example, a Claim may be asserted only in the context of another claim (“Claim A is asserted to be true only in a context where Claim B is true”).

~~11.17 AssertedArtifactSupport~~

~~AssertedArtifactSupport records the assertion that one or more artifacts support another artifact.~~

~~Superclass~~

~~AssertedRelationship~~

~~Semantics~~

~~The truth of the assertions associated with an artifact are supported by the assertions that are associated with one or more other artifacts. Note: this can be an ambiguous relationship if the nature of these Assertions is unclear. In such cases, it would be clearer to declare explicit AssertedInferences between Claims drawn out from the ArtifactReference.~~

~~Constraints~~

~~The source and target of AssertedArtifactSupport must be of type ArtifactReference.~~

~~11.18 AssertedArtifactContext~~

~~AssertedArtifactContext records the assertion that one or more artifacts provide context for another artifact.~~