



## Superclass

~~ArgumentAsset~~ **Targetable**

~~Associations~~ reference:SACMElement [0..\*] {ordered} - artifactReference to the SACMElement

~~referencedArtifactElement:Base::ArtifactElement[0..\*] - reference to a collection of ArtifactElements.~~

## Semantics

reference SACMElement(s) to

referencing

It is necessary to be able to cite artifacts that provide supporting evidence, context, or additional description within an argument structure. ArtifactReferences allow there to be an objectified citation of this information within the structured argument, thereby allowing the relationship between this artifact and the argument to also be explicitly declared.

## 13 12 11.10 Assertion (abstract)

Assertions are used to record the propositions of Argumentation (including both the Claims about the subject of the argument and the structure of the Argumentation being asserted). Propositions can be true or false, but cannot be true and false simultaneously.

## Superclass

~~ArgumentAsset~~ **Targetable**

## Attributes

AssertionDeclarationKind[0..1]

assertionDeclaration:AssertionDeclaration[1] = asserted - the declaration indicating the state of the Assertion.

## Associations

~~metaClaim:Claim[0..\*] - references Claims concerning (i.e., about) the Assertion (e.g., regarding the confidence in the Assertion)~~

## Semantics

Structured arguments are declared by stating claims, citing evidence and contextual information, and asserting how these elements relate to each other.

## 13 12 11.11 Claim

Claims are used to record the propositions of any structured argument contained in an ArgumentPackage. Propositions are instances of statements that could be true or false, but cannot be true and false simultaneously.

## Superclass

Assertion

## Attributes

value:MultiLangString[0..1]

## Association Ends

whole:SACMModel [0..\*] - the whole structure that this Claim is about

## Semantics

The core of any argument is a series of claims (premises) that are asserted to provide sufficient reasoning to support a (higher-level) claim (a conclusion). The name can be the content or one can have a name and then the value contains the content.

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A Claim that is intentionally declared without any supporting evidence or argumentation can be declared as being assumed (i.e., assertionDeclared = assumed). It is an assumption. However, it should be noted that a Claim that is not 'assumed' (i.e., assertionDeclared = asserted) is not being declared as false. However, there is the expectation of the provision of a supporting argument structure (e.g., it may represent part of an incomplete structure).

A Claim that is intentionally declared as requiring further evidence or argumentation can be denoted by setting +assertionDeclaration to "needsSupport".

A Claim that is being declared as axiomatically true can be denoted by setting +assertionDeclaration to "axiomatic".

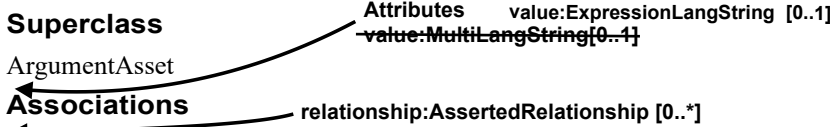
A Claim that is defeated by counter evidence or counter argument can be denoted by setting +assertionDeclaration to "defeated".

A Claim which cites another claim and supported by the cited claim can be denoted by setting +assertionDeclaration to "asCited".

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

13 11  
~~12~~ ~~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.



~~structure:ArgumentPackage[0..1] optional reference to another the ArgumentPackage that provides the detailed structure of the argument being described by the ArgumentReasoning.~~

**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.

13 12  
~~12~~ ~~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.~~

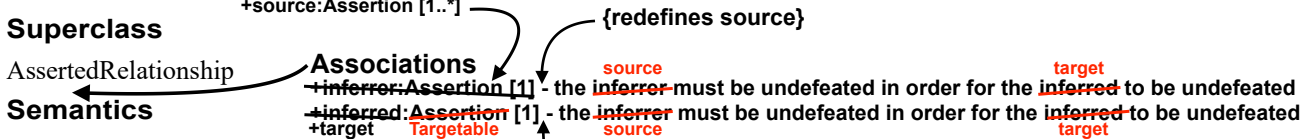
~~reasoning:ArgumentReasoning[0..1] an optional reference to the a description of the reasoning underlying the AssertedRelationship.~~

**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.

13 13  
~~12~~ ~~11~~ ~~14~~ **AssertedInference**

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



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

If AssertedInference has isCounter=false, then it should be interpreted as "if the <sup>source</sup>inferred is undefeated then the <sup>target</sup>inferred is defeated". If AssertedInference has isCounter=true, then it should be interpreted as "If the <sup>source</sup>inferred is undefeated then the <sup>target</sup>inferred is defeated".

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.

13 14  
12 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

**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**

If AssertedEvidence has isCounter=false, then it should be interpreted as "the evidence undefeats the Assertion". If AssertedEvidence has isCounter=true, then it should be interpreted as "the evidence defeats the Assertion".

**OCL:**

self.source > forall(s|s.oelsTypeOf(ArtifactReference))

AssertedContext can be used to declare that the Artifact or ArtifactReference provides the context for the interpretation and scoping of an ArgumentAsset (ArtifactReference, Artifact, Claim, ArgumentReasoning, or any AssertedRelationship specialization element).

13 15  
12 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

**Semantics**

**Associations**

+context:ArtifactReference [1..\*] - the context provides further clarification or constraint of the contextable  
+contextable:ArgumentAsset [1] - the context provides further clarification or constraint of the contextable {redefines target}

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").

16  
12 11.17 **AssertedArtifactSupport**

AssertedArtifactSupport records the assertion that

Contextual information often needs to be cited in order to make clear the interpretation and scope of an ArgumentAsset. 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").

**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 used to declare that a Claim is supported by other Claims. In some cases, it would be clearer to declare that a Claim is supported by other Claims.

**Constraints**

If AssertedContext has isCounter=false, then it should be interpreted as "the contextable must be interpreted in the context". If AssertedContext has isCounter=true, then it should be interpreted as "the contextable must not be interpreted in the context".

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

13 17  
12 11.18 **AssertedArtifactContext**

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

Structured Assurance Case Metamodel, v2.3  
Attributes isDefeated : Boolean [0..1] = false - specified whether this ArgumentConcept is defeated or not (or with cardinality 0, has not been determined yet).

13.18 **ArgumentConcept (abstract)**

ArgumentConcept is an abstraction of all the packaging and elements in the argument domain.

Superclass Packaging::Concept

### 13.19 Targetable (abstract)

Targetable is an abstraction to support non-assertions as targets of assertable relationships.

Superclass

ArgumentAsset