

1. NOR-STA assurance case mapping to OMG SACM 2.1

SACM is a Structured Assurance Case Metamodel published by Object Management Group. You can more information about SACM on page www.omg.org/spec/SACM.

NOR-STA arguments can be fully translated to SACM 2.1 using model-to-model transformation.









The table below describes the mapping from NOR-STA argument elements onto SACM elements.

TCL Element	SACM element	Notes
Argument node elements:		
TCL:Claim	SACM:Claim	Attribute <i>assertionDeclaration</i> = asserted
TCL:ArgumentationStrategy	SACM:ArgumentReasoning	Specified as <i>reasoning</i> attribute by AssertedInference
TCL:CounterStrategy	SACM:ArgumentReasoning	Specified as <i>reasoning</i> attribute by AssertedInference, where inference attribute <i>isCounter</i> = true
TCL:Rationale	SACM:Claim	Attribute <i>assertionDeclaration</i> = asserted
TCL:Fact	SACM:Claim	Attribute <i>assertionDeclaration</i> = asserted
TCL:Assumption	SACM:Claim	Attribute <i>assertionDeclaration</i> = assumed
TCL:Reference	SACM:ArtifactReference	ArtifactReference refers to SACM:Artifact
TCL:Information	SACM:ArtifactReference	It contains textual information (usually context) and optionally some references (associated artefacts)
TCL:Link	SACM:ArgumentationElement (concrete class depends on the link target class)	Attribute <i>citedElement</i> points to the linked argument element; for claims: attribute <i>assertionDeclaration</i> = asCited
Argument link elements:		
TCL:Supports	SACM:AssertedInference	<i>source</i> attribute denotes the list of premises, <i>target</i> points to the conclusion and <i>reasoning</i> to the strategy
TCL:IsContextFor	SACM:AssertedContext	
TCL:IsEvidenceFor	SACM:AssertedEvidence	<i>source</i> attribute denotes the list of evidence (TCL:Reference), <i>target</i> points to the conclusion (TCL:Fact)
Container elements:		
TCL:Folder	SACM:AssuranceCasePackage	
TCL:Module	SACM:ArgumentPackage	
TCL:ModuleInterface	SACM:ArgumentPackageBinding	
TCL:Template	SACM:ArgumentPackage	Attribute <i>isAbstract</i> = true
TCL:Repository	SACM:ArtifactPackage	
Evidence elements:		
TCL:Evidence	SACM:Artifact SACM:Activity	SACM class depends on evidence repository type

2. NOR-STA assurance case compliance with ISO/IEC 15026

ISO/IEC 15026-2 “Systems and Software Assurance — Part 2: Assurance Case” specifies minimum requirements for the structure and contents of an assurance case. It requires an assurance case to include unambiguous mapping to the elements and relationships in Clause 6 of the standard.

Mapping assurance case elements

ISO/IEC 15026-2		Corresponding NOR-STA assurance case element
Clause	Element	
6.3	Claim	 Claim – a true-false statement that requires argumentation and evidence to demonstrate that it is satisfied  Fact – a statement supported directly by the evidence
6.3.4	Justification of the choice of top-level claims	 Information labelled ‘Justification’
6.4	Argument	 Argumentation Strategy
6.4.2	Justification of an argument	 Rationale
6.5	Evidence	 Fact – a statement supported directly by the evidence  Reference to external evidence (documentation)
6.5	Assumption	 Assumption

Mapping assurance case structure

Notation “ $E1 \leftarrow E2$ ” denotes a relation when an argument element $E1$ is supported by element $E2$.

ISO/IEC 15026-2		Corresponding TCL assurance case relation
Clause	Relation	
6.2.a	One or more top-level claims	One or more top-level claims
6.2.c	Claim \leftarrow Argument	Claim \leftarrow Argumentation Strategy
	Claim \leftarrow Evidence, Claim(s), Assumption(s)	When a claim is supported by other claims or assumptions it has to be decomposed to show the argument to justify it: Claim \leftarrow Argumentation Strategy \leftarrow \leftarrow Fact(s), Claim(s), Assumption(s) A proposition supported directly by evidence is represented as a fact: Fact \leftarrow Reference(s)
6.2.b	Argument \leftarrow Evidence, Claim(s), Assumption(s)	Argumentation Strategy \leftarrow Fact(s), Claim(s), Assumption(s) where evidence is represented by Reference related to fact: Fact \leftarrow Reference(s)
6.4.2	Argument \leftarrow Justification	Argumentation Strategy \leftarrow Rationale
6.5.3	Evidence \leftarrow Assumption(s)	Assumptions are related to argument strategies. Any assumption that relates to an argument strategy is valid for its subordinate evidence: Argumentation Strategy \leftarrow Assumption(s) Argumentation Strategy \leftarrow Fact(s) \leftarrow Reference(s)
6.6.3	Assumption \leftarrow Evidence	Assumption \leftarrow Reference(s)
6.3.4	Top-level Claim \leftarrow Justification	Top-level Claim \leftarrow Information node labelled ‘Justification’
6.8	Combining assurance cases: <i>“incorporated assurance case's top-level claim or claims shall each be placed within the original assurance case's structure at points where claims are allowed”</i>	NOR-STA implements modular arguments. <ul style="list-style-type: none"> – Any claim in an argument may be supported by a claim in another argument. – Argument interfaces and bindings are used to manage references to other arguments.