

## 1. PREMIS assurance case mapping to OMG SACM 2.3

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](http://www.omg.org/spec/SACM).

PREMIS arguments can be fully translated to SACM 2.3 using model-to-model transformation.

The table below describes the mapping from PREMIS argument elements onto SACM elements.

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

## 2. PREMIS assurance case compliance with ISO/IEC 15026

ISO/IEC 15026-2:2022 “Systems and Software Assurance — Part 2: Assurance Case” specifies minimum requirements for the structure and contents of an assurance case. Clause 4.2 specifies the rules of the standard application and Clause 5 specifies formal requirements for the assurance case structure.

PREMIS meets the requirements of Clause 5 in the following way:

### Clause 5.1 General

The clause refers to:

- The top-level argument structure (Clause 5.2) – see the next section for details.
- The use of identifiers for all assurance case elements. PREMIS supports the use of identifiers for all argument elements. Element identifier has to be unique in a given argument module. Additionally PREMIS is using GUIDs that are automatically assigned when an element is created. GUIDs are not presented to users in the application user interface. They are used internally in the application and in the XML export/import actions. Each GUID is a 36-character text.
- The use of a defined argument structure terminology compliant with the standard requirements. PREMIS compliance is presented in the following table based on table C.1 in Annex C of the standard:

No.	ISO 15026	PREMIS (TRUST-IT terminology)	GSN (*)	SAM (*)	CAE (*)
1	Context	Information	Context	ArtifactReference	N/A
		Rationale	Justification	Claim (assertionDeclaration: axiomatic)	
		Assumption	Assumption	Claim (assertionDeclaration: assumed)	
2	Evidence Item	Evidence item	Evidence item	Artifact	N/A
3	Claim	Claim Fact (Base Claim)	Claim	Claim (assertionDeclaration: asserted)	Claim
4	Inference	Argumentation Strategy	Strategy	ArgumentReasoning	Argument
5	Argument	Argument subtree	N/A	N/A	N/A
6	Supported Claim	<Claim, Argument subtree, Context> (**)	Argument	ArgumentPackage	N/A
7	Narrative Introduction	Information	N/A	N/A	N/A
8	Reference to an evidence item	Reference	Solution	ArtifactReference	N/A

(\*) The content of this column is based on ISO 15026-2:2022 and may not describe the current state of a given standard.

(\*\*) This is implemented as ArgumentGroup, a set of interrelated argument elements

### Clause 5.2. Top-level structure

The standard requires that an assurance case contains three fields:

- a) Main field – the top claim and its supporting argument
- b) Evidence fields – a set of evidence items
- c) Report field – a narrative introduction that constitute the assurance case report

All three fields are implemented in PREMIS.

### **Clause 5.3.1. Context type**

The context type is the following assurance case elements:

- a) definitions of terms or identifiers – implemented in PREMIS as Information elements;
- b) assumptions on the terms defined in the assurance case – implemented in PREMIS as Assumption elements;
- c) references to documents – implemented in PREMIS as Reference elements.

### **Clause 5.3.2. Evidence type**

Evidence items are implemented in PREMIS as information assets stored internally in PREMIS repositories or in external repositories identified by an address (URL) and additional access information.

Evidence item description allows to add related information including the scope of applicability, uncertainty and credibility of its source, measurement accuracy and associated assumptions.

### **Clause 5.3.3. Claim type**

Claims are implemented in PREMIS.

### **Clause 5.3.4. Inference type**

Inferences are implemented in PREMIS as Argumentation Strategies elements.

### **Clause 5.3.5. Supported claim type and argument type**

A supported claim consists of a claim, an argument that supports it and the list of context elements (this can be empty). All these elements are implemented in PREMIS. They form a branch of the argument that supports a given claim.

### **Clause 5.3.6. Narrative introduction type**

Information elements are used in PREMIS to include the information required for the narrative introduction, including the description of the system and service, its environment, life cycle and related information.