![ARGEVIDE]

PREMIS implements GSN Community Standard Version 3 to the following extent, as described in this document:

- Core GSN: full implementation of the argument element types and relations, argument diagrams
- Modular Extension: all three types of argument interfaces are supported, architecture diagrams
- Argument Pattern Extension: partial implementation of pattern functionality, no graphical representation of pattern operators
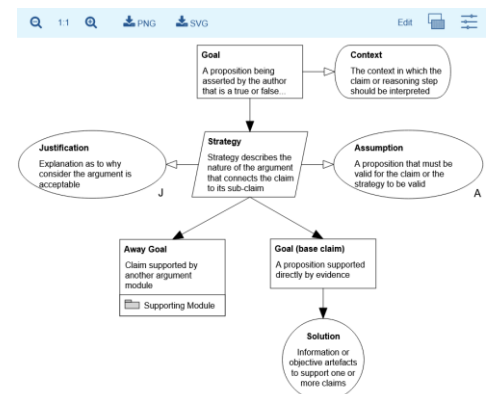
1 Representing GSN arguments in PREMIS

You can work with GSN arguments in the following views in PREMIS:

- **GSN diagram view**

  You can control the layout of the argument, as well as the paging of the argument sections.

  The diagram implements navigation between diagram pages and between argument modules bound by interfaces.

- **Argument tree view (Full view)**

  You can edit the structure of GSN assurance cases in the argument tree view. You can add, modify, edit, search and delete goals, strategies, justifications, solutions and context elements as well as perform an assessment.

  PREMIS ensures the correct structure of the argument. Illegal argument structures are not accepted.
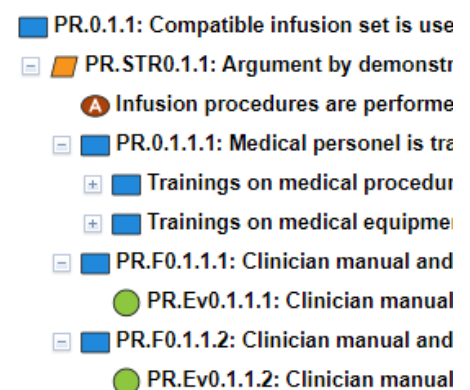
- **Module diagram view (Architecture view)**

  The diagram presents the architecture view of connected assurance case modules. The diagram includes arguments modules and bindings, including contracts (when this type of interfaces is used).
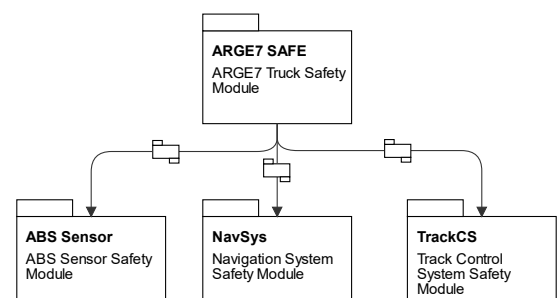
2 Core GSN

PREMIS implements all types of GSN argument elements and all relations between them. Core GSN is fully implemented in PREMIS:

- Goal (Claim)
- Strategy
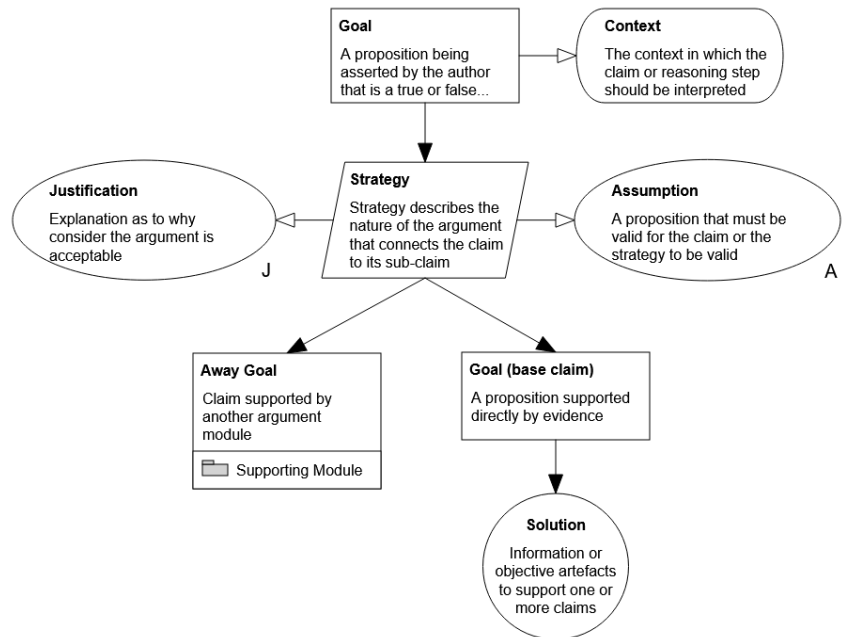- Justification
- Assumption
- Solution
- Context

The hierarchical view used in PREMIS is a tree of elements. If any element supports more than one element, the argument tree is extended with links to implement all relations.

Figure 1. GSN diagram produced in PREMIS presenting types of argument elements

2.1 Pages of assurance case diagrams

PREMIS supports the development of large assurance cases. As such assurance cases can be difficult to visualise in one GSN diagram, it is possible to split the diagram into several pages. The user can decide whether to present the argumentation on one large page or on several pages. PREMIS still maintains the consistency of an assurance case no matter how its GSN representation has been split into pages.

PREMIS implements 'Off-Page' decorators. By clicking on a decorator you can navigate to the other page of the diagram.
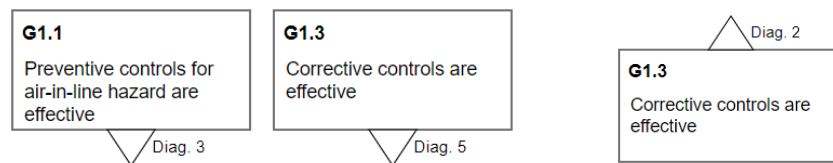

Figure 2. 'Off-Page decorators for assurance case diagrams divided into pages

Elements on the boundaries of diagram pages are claims. It is required that a reasoning step is presented on one page and cannot be split between different pages. A single reasoning step is a claim, its context, supporting strategy and premises.

3 Modular Extension

PREMIS implements modular arguments and binding of different argument modules through their interfaces. This includes three types of interfaces specified in GSN Modular Extension:

▶ **Away element** – citation of an element in another module. This is simply a link to a claim in another module. When you use away elements, the names and descriptions of the claims from the supporting module will appear in your argument. It works like a link, but to another module.

> **C10 (G7)**
> Claim in the supporting module
> ▭ SuppModule

▶ **Supported by another module** – an element is supported by another element in a supporting module.

> **C17**
> Claim supported by a module
> ▭ SuppModule

▶ **Supported by a contract** – an element is supported by another element in a supporting module through an intermediary contract. The contract requires the user to assess whether the supporting claim sufficiently supports a given claim in all its context.

> **C13**
> Claim supported by a contract
> ▭ SuppModule
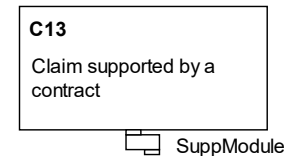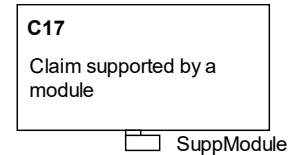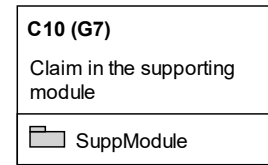
Another element of GSN Modular extension is the **architecture view**:

- **Argument modules** are represented as rectangles with a smaller rectangles adjoining at the top left,
- **ModuleSupportedBy** relationship is represented as a line with a solid arrowhead.
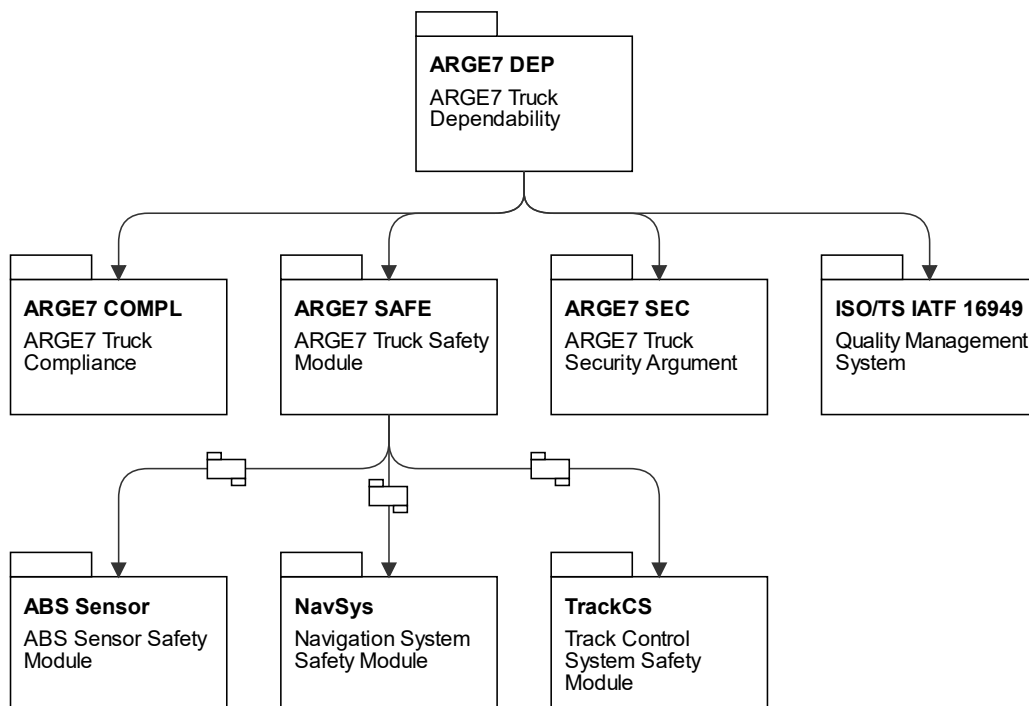- Depending on the interface type, some connections between modules can use **contracts**.

Figure 3. Architecture view in PREMIS

The scope of argument binding in PREMIS is limited to claims. No other types of away elements are implemented in the current version of PREMIS.

4 Argument Pattern Extension

PREMIS features include argument templates and a synchronization mechanism which implements some elements of GSN Argument Pattern Extension:

- **Optional instantiation**
  PREMIS implements optional instantiation with the use of tags. Users may use tags to denote branches of the argument in the template and then for each implementation argument they can specify branches applicable for a given instantiation. The same parameters can be used to control a number of optional branches of the template.

- **Choice instantiation**
  PREMIS implements optional instantiation with the use of tags. Users may use tags to denote sets of branches of the argument in the template. For each implementation argument the user can specify parameters to control sets of applicable branches.

- **Multiple instantiations**
  Multiple instantiations are managed manually at the instantiation time. By default PREMIS creates one instantiation and the user can perform multiplication with copy/paste operation.

PREMIS implements the pattern mechanisms described above, however, the graphical symbols of patterns defined in GSN Standard are not implemented in the current version of PREMIS.

5 PREMIS Extensions – Argument assessment

PREMIS implements argument assessment and allows the presentation of GSN diagrams coloured according to the assessment results. A sample diagram is presented in Fig. 5.
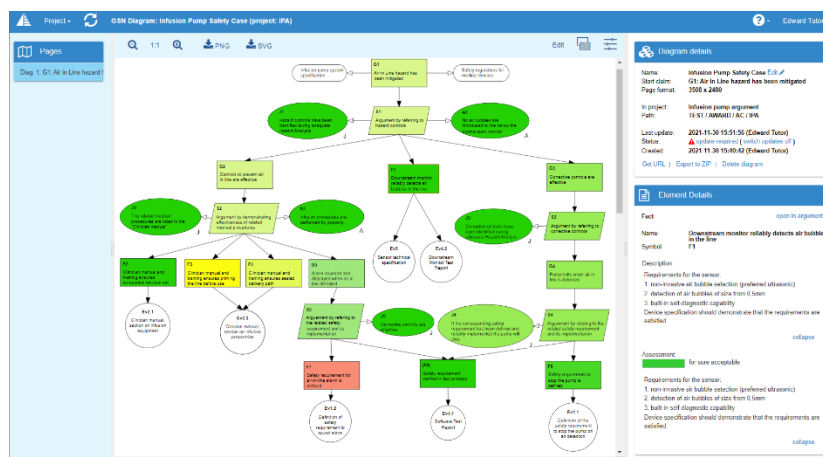

Figure 4. PREMIS extension: presenting assurance case assessment

When you need more information about PREMIS please visit our website www.argevide.com or contact us at office@argevide.com