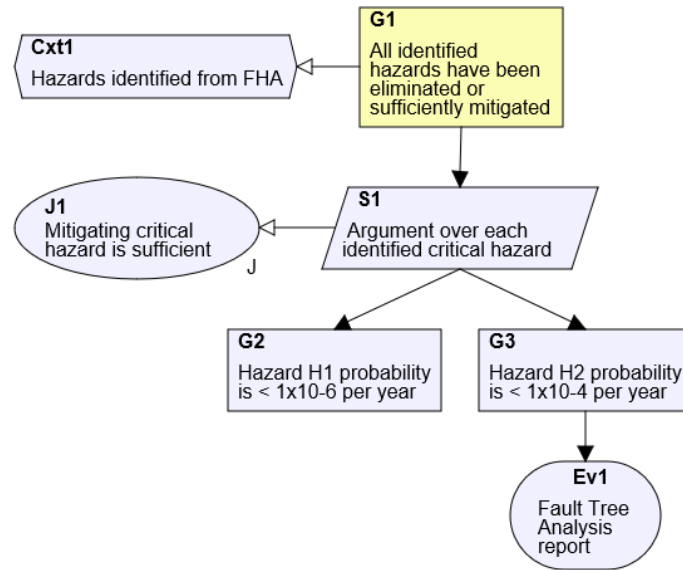ARGEVIDE

PREMIS is a software tool dedicated for construction, assessment and maintenance of assurance cases, and conformance arguments. To demonstrate this we will build a simple argument with PREMIS. Let's build an argument presented in the diagram below:

First of all **PREMIS is focused on the argument structure – it is not a graphics-oriented tool**. In PREMIS your work will be focused on logical structure of the argument. PREMIS provides features supporting effective management of large and complex assurance cases using modules and templates. Any time you need a GSN diagram it can be generated by PREMIS.

Argument structure is presented in PREMIS as a tree-like hierarchy with the root element on the left and supporting elements expanding down and to the right. Each PREMIS argument can be also represented in GSN diagram (presented below on the left).
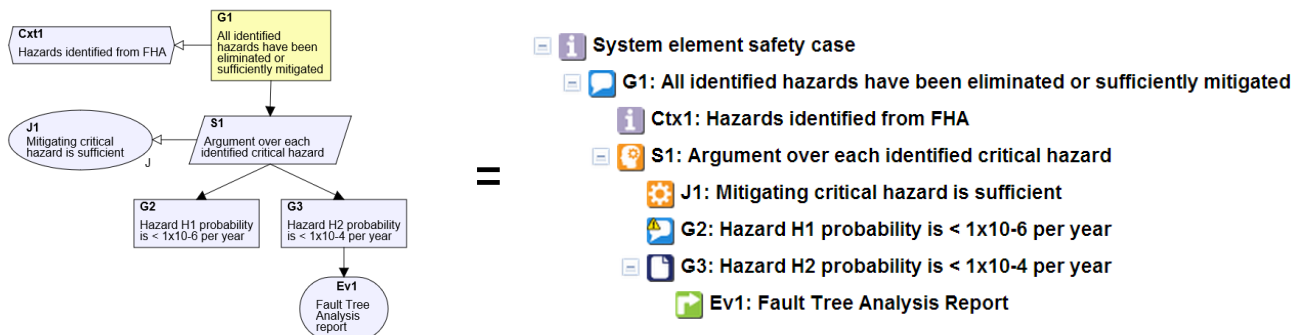

If you are not familiar with the concept of assurance cases or GSN notation you can refer to some other publications learn what are the elements and how to structure assurance case argument.

Now let's get to work and create the argument.

Step 1. Create your first claim

The argument consists a set of elements. You start a new assurance case with an information element. Its objective is to give context information. The top element (often called a "root") should give us name of the assurance case and other basic information. All the argument elements are specified below the root element. Each time you want to add an element to the argument you have to attach it to an existing element. This approach suggests top-down approach, however working bottom-up is also possible.

We will start with setting the assurance case name in the root element.
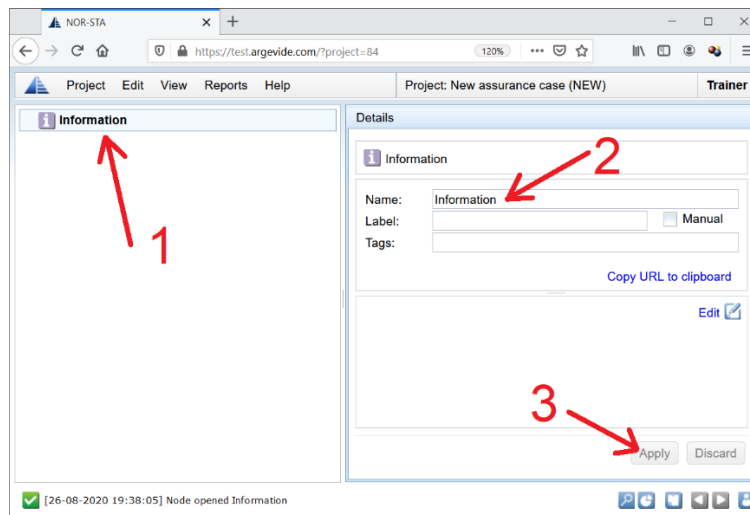
1) Click on the information element (follow action 1 on the screenshot above).
2) Click on the name field in the Details panel on the right and enter the assurance case name, for example "System element safety case".
3) Press enter or click on **Apply** button.

Now we are ready to create the first claim.

Right-click on the root element and select **Add new → Claim** action in the context menu:
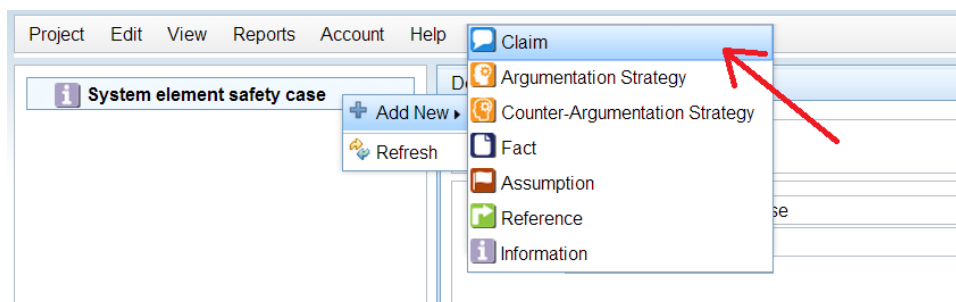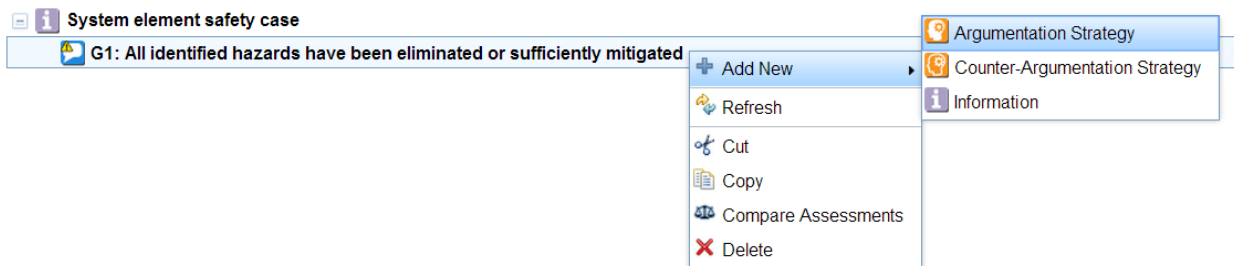

A new claim element will appear in the argument on the left. Give it a name and a label in the details panel on the right.
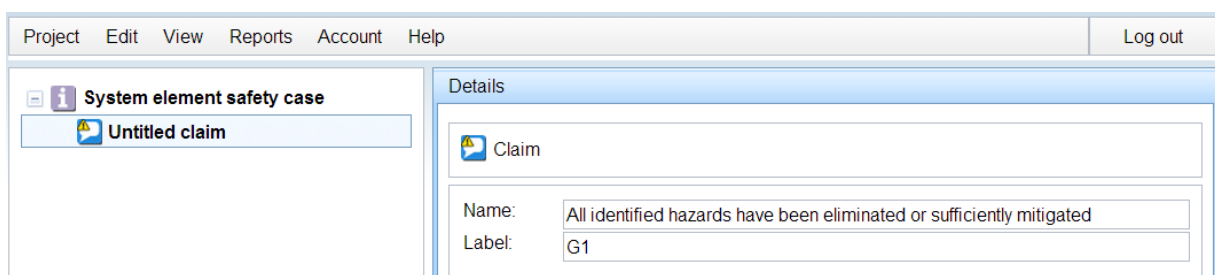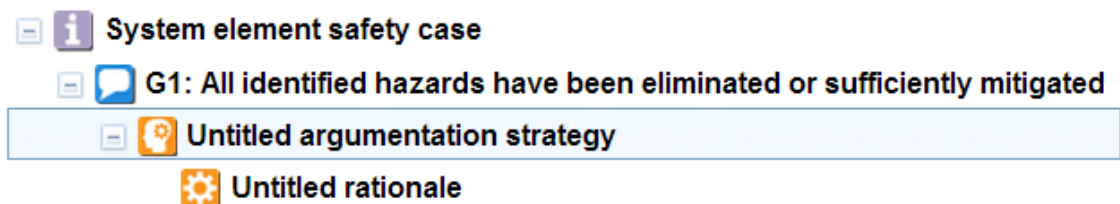
Step 2. Create argument

For now we have two element of our argument structure: the root element and the claim. Right-click on the claim and select `Add new → Argumentation strategy` action.


Please note that two new elements have been created: argumentation strategy and its justification (called "rationale").

 Justification (rationale) for an argumentation strategy is obligatory for each argumentation step in PREMIS.
In GSN you can develop an argument without any justification. .

We can give names and labels to the argumentation strategy and its justification to get argument like this:
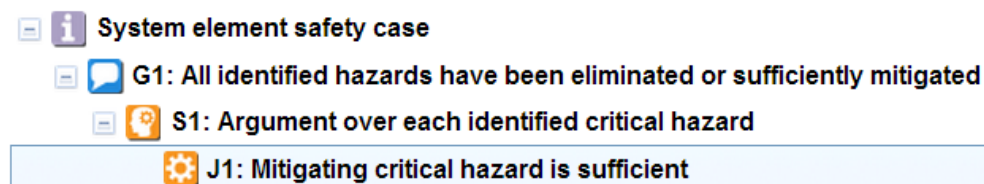
PREMIS argument tree has just one type of relation: ancestor-descendant. Each element (except the root element) has one parent. It is sufficient for representing any argument. GSN provides two types of links between elements: supported-by (rendered as a line with a solid arrowhead) and in-context-of (rendered as a line with a hollow arrowhead). The type of relation depends directly on the types of related elements. For any relation between elements in PREMIS you can precisely specify type of GSN relation.

Step 3. Add premises

When specifying premises in PREMIS you should be aware of strict distinction between two types of premises:

- **`fact`** is a premise supported directly by an evidence document and
- **`claim`** is a premise supported by its own argumentation strategy.

> (i) Premises supported directly by evidence are denoted as **`facts`** in PREMIS.
> **`Claims`** in PREMIS cannot be directly supported by evidence.

Let's assume that we have two hazards. One of them requires more complex argumentation and we will specify a claim supported by an argumentation strategy to how we mitigate it. We will add a new claim **G2: `Hazard H1 probability is less than 1×10⁻⁶ per year`**.

The second hazard is simpler and we decide to provide direct evidence for it. Let's say the FTA analysis report will be sufficient evidence for it. We will define the premise as a fact **`Hazard H2 probability is less than 1×10⁻⁴ per year`**.
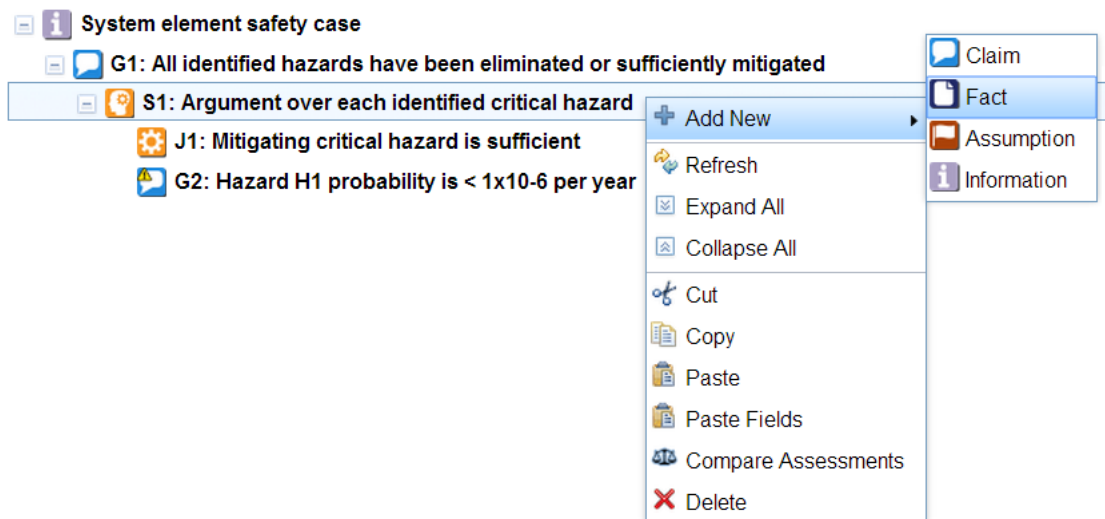
Now we have almost complete argument with two premises:
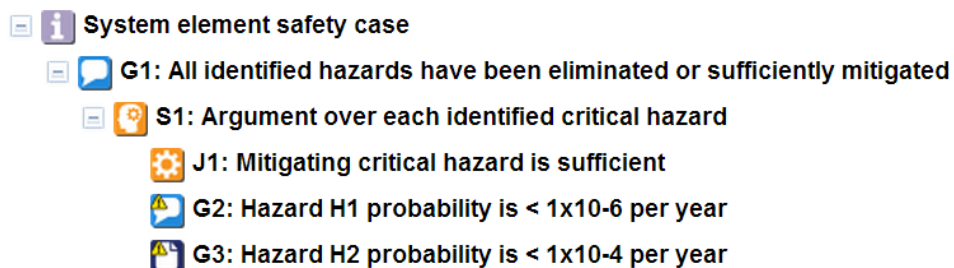
Please note yellow attention signs (⚠) displayed on two element icons to indicate that these two elements are not fully developed at the moment (evidence or argumentation strategy are still missing).

Step 4. Support premises with the evidence

We said that the report of Fault Tree Analysis should be used as evidence for G3. All the evidence is external to PREMIS argument and the connection is defined as a **reference**.

Right-click on G3 element and select **Add new → Reference**:
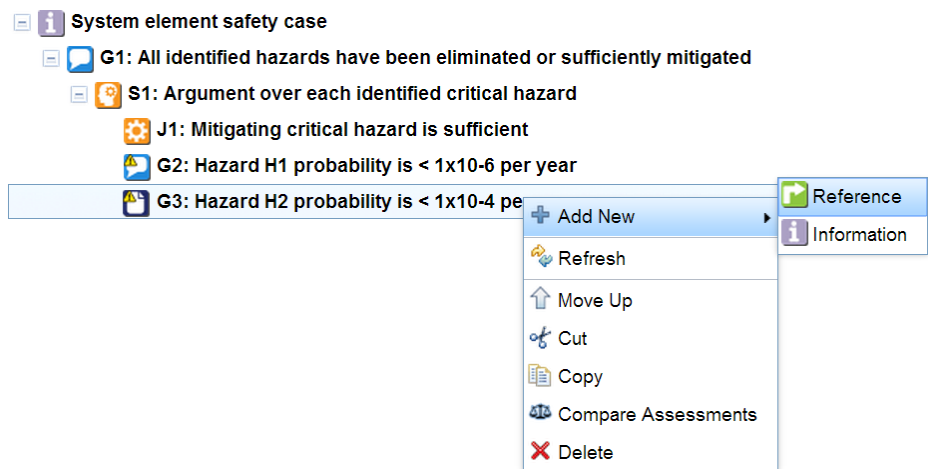
Evidence documents can be stored in various repositories. You can use PREMIS internal repository and put all the documents there. However, usually it is convenient to use references to documents in your own repository. This way you can be sure PREMIS will refer always to current version of the document.
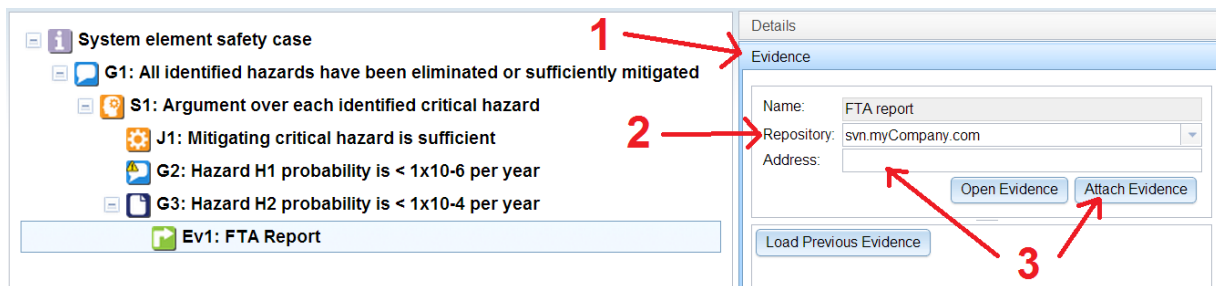
To set reference to the evidence document click on the element and follow action presented on the figure above:

1) Open **Evidence** panel on the right side (find the title bar of the panel and click on it).
2) Chose repository name. If you need access to any new repository contact the system administrator.
3) Enter direct address of the evidence document (any http address will work) or use **Attach Evidence** button to add the document to PREMIS repository manually.

> PREMIS argument can be supported by the evidence in:
> – PREMIS internal repository,
> – SharePoint repository,
> – Confluence Cloud,
> – Jira Cloud
> or any external web repository.

Step 5. Specify context

Our assurance case is still incomplete. The whole argument depends on the hazard list but it's missing in our argument. G1 claim refers to "all identified hazards" therefore the hazard log should be defined as a context for this claim. As the top claim context is inherited down the structure it will apply to all assurance case elements below the claim.

To add context to the claim right-click on the claim and select `Add new → Information` action. Then we define it as `Ctx1` named `Hazards identified from FHA`.
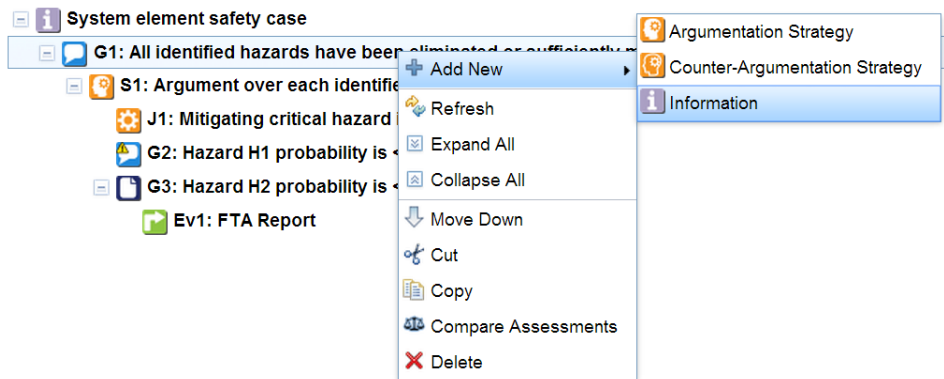
New element will be added at the bottom, below the existing elements. Context and argumentation strategy are linked directly to the claim. I want the context Ctx1 to be above the strategy S1. You can change the order of elements using `move down` and `move up` function in the context menu (right-click on the element to open the menu).
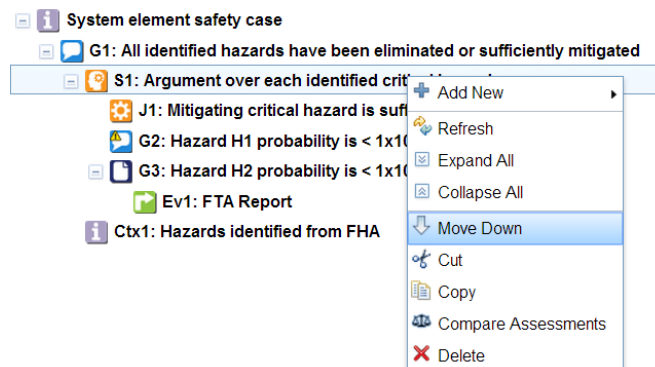
Now we have produced the final argument structure:
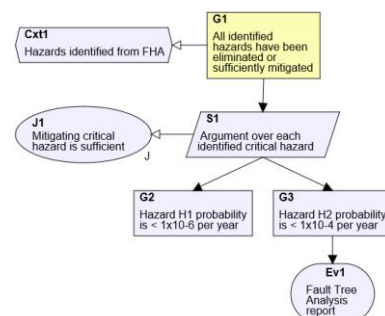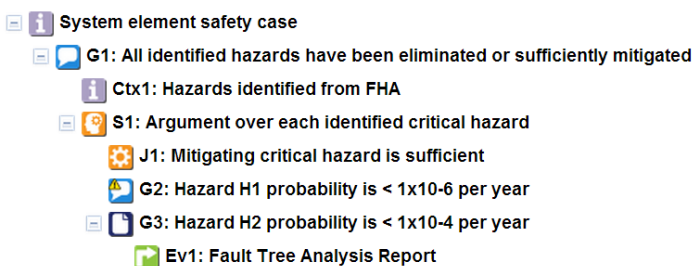
> You can generate
> - one-section base GSN diagram – select "GSN diagram" in the context menu
> - full argument diagram – select "Add new GSN diagram" in Diagram menu

You can find more information on our website: www.argevide.com.