

# CIDOC CRM interfacing risk assessment in conservation

Issue 482, CIDOC CRM SIG

#482

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[482-57th SIG; minutes+modifications](#)

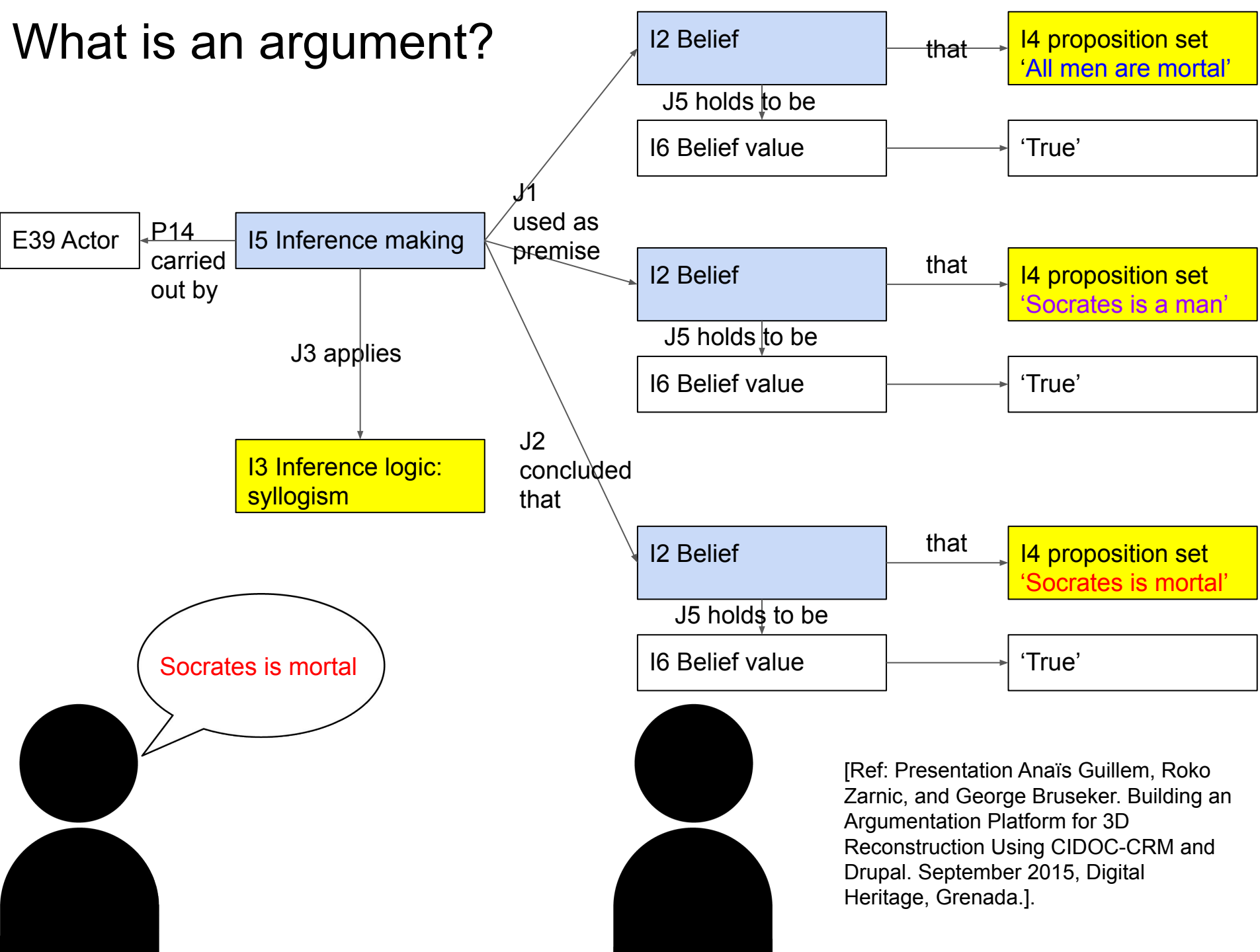
[CRM\\_Conservation.drawio](#)

# Proposal for the 57th SIG Meeting

The assessment of vulnerability, risk, exposure, and significance for built heritage for conservation falls **under the scope of CRMInf**. This modeling proposal is to use CRM inf modeling to the question of risk assessment:

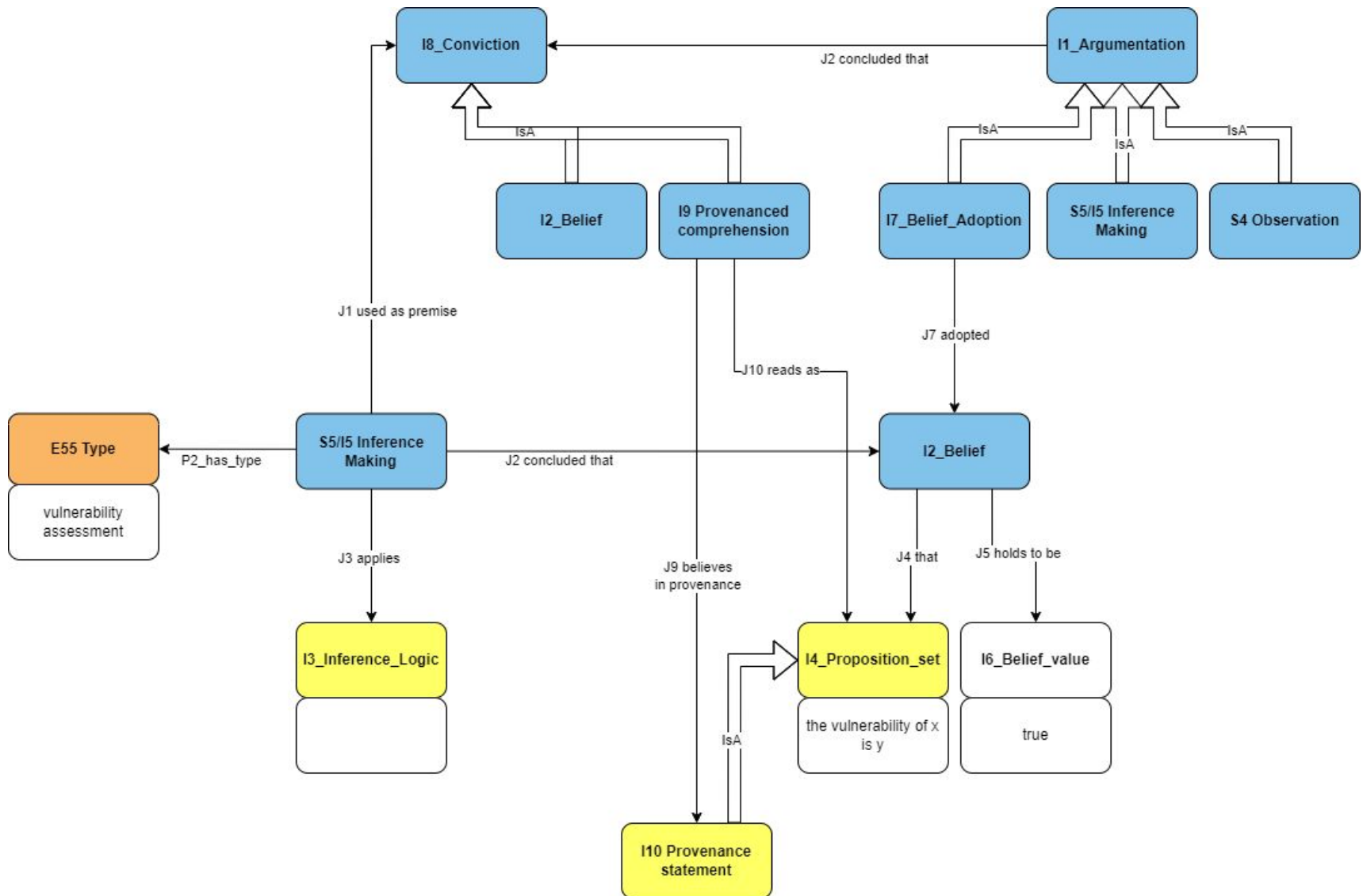
“It [CIDOC CRMInf v 0.10.1] is a formal ontology intended to be used as a global schema for integrating metadata about **argumentation and inference making in descriptive and empirical sciences** such as biodiversity, geology, geography, archaeology, cultural heritage, **conservation**, research IT environments and research data libraries. Its primary purpose is facilitating the management, integration, mediation, interchange and access to data about reasoning by a description of the semantic relationships between the premises, conclusions and activities of reasoning. [...] It takes further into account reasoning about facts in scientific data in the form of observation, measurement, data evaluation and citation in biodiversity, geology, archeology, **cultural heritage conservation** and clinical studies” (CRMInf, v. 0.10.1, introduction, pp3).

# What is an argument?



[Ref: Presentation Anaïs Guillem, Roko Zarnic, and George Bruseker. Building an Argumentation Platform for 3D Reconstruction Using CIDOC-CRM and Drupal. September 2015, Digital Heritage, Grenada.]

# Overview of CIDOC CRM inf classes and properties to model vulnerability assessment v.0.10.1



# Consequences of the modeling

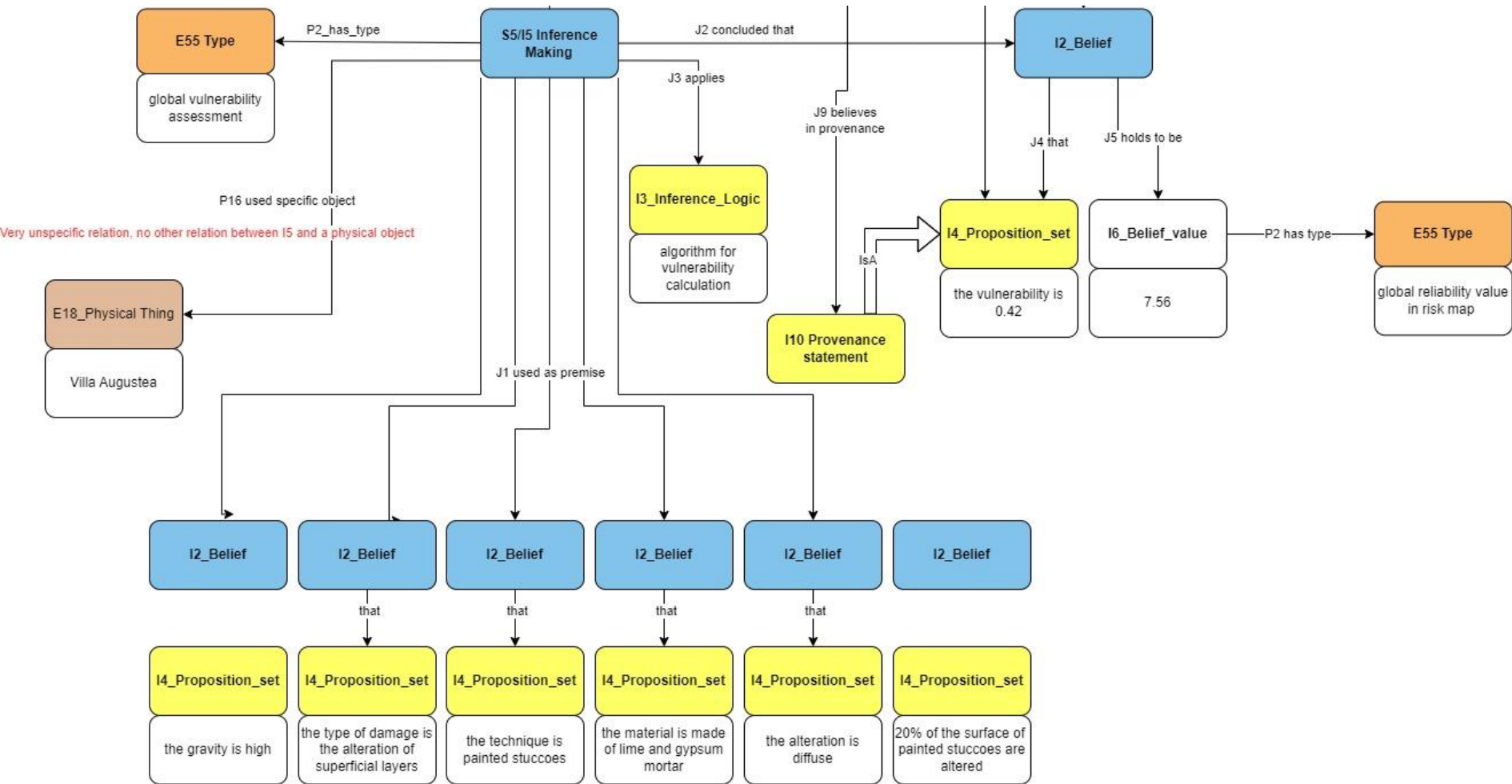
## Advantages:

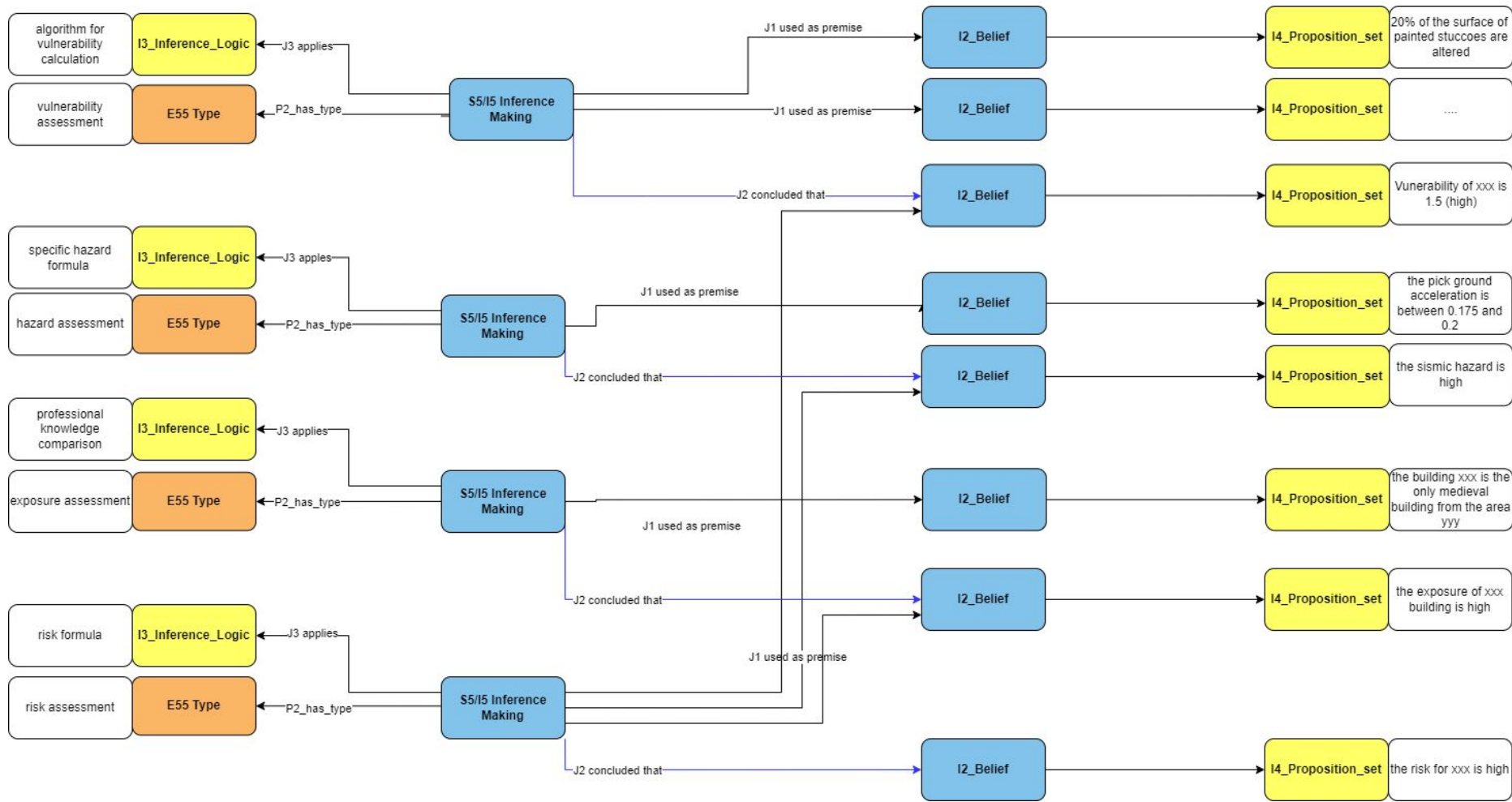
- integration and reuse of existing models;
- creation of an application profile for conservation rather than an ontological model.

## It ensues:

- 1/Deprecating of the class and use of I5 Inference Making with a Type (Vulnerability assessment).
- 2/Deprecating property assessed vulnerability of (had vulnerability assessed by) and
- 3/ Deprecating Vulnerability belief and the ascribed property.

# Applying CIDOC CRM inf model to the vulnerability assessment





1/Assessments are I5 Inference making with a specific type

2/Assessments produce beliefs (conclude) and reuse beliefs from other assessments as premise

3/The beliefs are formulated in proposition sets



# Defining types of assessments

Label	Definition	Scope
vulnerability assessment	Vulnerability assessment is the verification process used to identify construction issues in a historic building that may affect the level of risk of loss of the heritage in the presence of a given hazard. These issues may be related to original construction methods, transformations that occurred in later periods, material deterioration and/or structural failure. The identification of vulnerability in architecture, therefore, is linked to the study of the building in its present condition, the understanding of its history of transformations and existing conservation conditions. (Baldi et al., 1996; Accardo, 2003; Camuffo, 1997)	This type of vulnerability assessment applies to whole buildings, archaeological sites, and historical urban centers.  Example: Vulnerability assessment of the Pisa Tower.
global vulnerability assessment	Global vulnerability assessment defines the overall vulnerability level of the historic buildings, calculated in relation to its material, construction and structural characteristics. (Baldi et al., 1996; Accardo, 2003; Camuffo, 1997)	This type of global vulnerability assessment applies to the scale of building, built works, built structures, and built components.  Example: Global vulnerability assessment of the Pisa Tower.
surface vulnerability assessment	Surface vulnerability assessment defines the level of vulnerability of historic buildings with special reference to their material characteristics. (Baldi et al., 1996; Accardo, 2003; Camuffo, 1997)	This type of surface vulnerability assessment applies to the scale of building, built works, and built components.  Example: Surface vulnerability assessment of the Pisa Tower.

Label	Definition	Scope
structural vulnerability assessment	Structural vulnerability assessment defines the vulnerability level of the historic buildings with special reference to their constructive and structural features. (Baldi et al., 1996; Accardo, 2003; Camuffo, 1997)	This type of structural vulnerability assessment applies to the scale of building, built works, and built structures. Example: Structural vulnerability assessment of the Pisa Tower.
hazard assessment	Hazard assessment indicates the probability of occurrence of damaging events in a given area. This assessment varies depending on the type of hazard considered. For example, seismic hazard is expressed in terms of expected ground shaking following an earthquake and is expressed in terms of the probability of occurrence of an earthquake of particular intensity in the near future, while for pollution-related hazard different systems have been proposed that indicate the possibility of consumption of the material surface in the presence of a given amount of pollutant. (Baldi et al., 1996; Accardo, 2003; Camuffo, 1997; Michalski, 1994 ;Pedersoli, 2016; HES, 2017; Day et al., 2019; Ashley-Smith, 1999)	This type of hazard vulnerability assessment applies to the territory where the building, built works, archaeological site, or urban center is located. Example: Seismic hazard assessment in the area of Campi Flegrei (near Naples).
Exposure assessment	Exposure Assessment is the verification process used to express the levels of exposure (Day et al., 2019; HES, 2017; Vodopivec et al, 2014).	This type of exposure assessment applies to any kind of factors that might worsen the severity of loss for a heritage asset. Example: Assessment of the cultural significance for Notre-Dame.
Risk assessment	The risk assessment aims at assessing the possibility of the occurrence of an event considered disadvantageous for the heritage, characterized by its probability. It is produced by the combination of vulnerability, hazard and exposure assessments for a specific asset. (Michalski, 1994 ; Ravankhahand, 2014; Pedersoli, 2016; Ashley-Smith, 1999; HES, 2017; Day	This type of risk assessment applies to whole buildings, archaeological sites, and historical urban centers. Example: Seismic risk assessment of Pisa Tower combines the results of the vulnerability assessment, the local seismic hazard assessment, and the

# Next

Still refining definitions of risk, exposure, hazard, and vulnerability:

- **Question of significance/value and the types of significance:**
- **The definition of vulnerability is related to the definition of hazard.**
- Exposure depends on significance.
- And risk on a combination of all above.

# Thesaurus building and curation

- Thesaurus management platform: `Opentheso_Frollo`
- URL: `frollo.notre-dame.science/opentheso/?idt=th61`
  
- Project: conservation
- Thesaurus ID: Th61
- Thesaurus name: Conservation thesaurus
- Languages: En, It, Fr

# Thesaurus documentation

The screenshot shows the OpenAPI Thesaurus documentation interface. At the top, there is a navigation bar with 'All projects' and 'Conservation thesaurus (th61)' dropdown menus, along with refresh, edit, and home icons. On the right, there are notification, language (UK flag), and user profile (Anais.guillem) icons. Below the navigation bar is a search bar with 'English' selected and a search input field. A filter bar contains checkboxes for 'Start with', 'Exact word', 'Note', and 'Identifier', along with a menu icon. On the left, a sidebar menu shows 'Concept', 'Index', and 'Collection' tabs, with 'Concept' selected. Below the tabs are three expandable categories: 'Inference logic type', 'Inference making type', and 'object of study'. The main content area displays the 'Conservation thesaurus: 13 Concepts (Conservation)' entry, which includes the OpenAPI Initiative logo, a permanent link, and a list of last modified concepts. An 'Edit' button is visible in the top right of the main content area. The footer of the main content area contains a descriptive paragraph about the thesaurus.

All projects ▾ Conservation thesaurus (th61) ▾


English ▾ Search ... 🔍

Start with  Exact word  Note  Identifier ☰

**Concept** Index Collection


- > Inference logic type
- > Inference making type
- > object of study

**Conservation thesaurus: 13 Concepts (Conservation)** modified on: 2024-03-12

 [frollo.notre-dame.science/opentheso/openapi/doc/](https://frollo.notre-dame.science/opentheso/openapi/doc/)

Permanent link: [frollo.notre-dame.science/opentheso/?id=th61](https://frollo.notre-dame.science/opentheso/?id=th61)

last modified concepts: exposure assessment. global vulnerability assessment. hazard assessment. risk assessment. structural vulnerability assessment. superficial vulnerability assessment. Inference making type. aggregated urban unit

 **DublinCore** > [Dublin Core metadata](#)

This thesaurus is dedicated to the concepts of conservation, assessment, exposure and risk for cultural heritage domain and assets.

# Concept documentation example

The screenshot shows a web-based concept documentation interface. At the top, there are navigation elements: 'All projects' (dropdown), 'Conservation thesaurus (th61)' (dropdown), a refresh icon, a pencil icon, and a house icon. On the right, there is a notification bell, a UK flag, and a user profile for 'Anais.guillem'. Below this is a search bar with 'English' selected and a search icon. Filter options include 'Start with', 'Exact word', 'Note', and 'Identifier'. The main content area is divided into a left sidebar and a main panel. The sidebar shows a tree view of concepts, with 'risk assessment' highlighted. The main panel displays the details for 'risk assessment' under the 'Concept' tab. The breadcrumb path is 'Inference making type > risk assessment'. The details are organized into sections: 'Preferred term' (risk assessment (en)), 'Synonym', 'Collection', 'Facets', and 'Total for the branch'. Below this are 'Broader concept' (Inference making type), 'Narrower concept', and 'Related concept'. A 'Translation' section shows 'valutazione del rischio (it)'. The 'Notes' section includes a 'Definition' (The risk assessment aims at assessing the possibility of the occurrence of an event considered disadvantageous for the heritage, characterized by its probability. It is produced by the combination of vulnerability, hazard and exposure assessments for a specific asset. Michalski, 1994 ; Ravankhahand, 2014; Pedersoli, 2016; Ashley-Smith, 1999; HES, 2017; Day et al., 2019), an 'Example note' (Seismic risk assessment of Pisa Tower combines the results of the vulnerability assessment, the local seismic hazard assessment, and the exposure related to the artistic value of the building.), and a 'Scope note' (This type of risk assessment applies to whole buildings, archaeological sites, and historical urban centers.). At the bottom, there are sections for 'External resources' and 'Image'.

All projects ▾ Conservation thesaurus (th61) ▾

English ▾ Search ...

Start with  Exact word  Note  Identifier

**Concept** Index Collection

**Concept** Collection Alignment

Inference making type > risk assessment

**Preferred term** **risk assessment** (en)

**Synonym** .....

**Collection** .....

**Facets** .....

**Total for the branch**

**Broader concept** Inference making type

**Narrower concept** .....

**Related concept** .....

**Translation** valutazione del rischio (it)

**++ Notes**

**Definition** The risk assessment aims at assessing the possibility of the occurrence of an event considered disadvantageous for the heritage, characterized by its probability. It is produced by the combination of vulnerability, hazard and exposure assessments for a specific asset. Michalski, 1994 ; Ravankhahand, 2014; Pedersoli, 2016; Ashley-Smith, 1999; HES, 2017; Day et al., 2019

**Example note** Seismic risk assessment of Pisa Tower combines the results of the vulnerability assessment, the local seismic hazard assessment, and the exposure related to the artistic value of the building.

**Scope note** This type of risk assessment applies to whole buildings, archaeological sites, and historical urban centers.

**External resources** .....

**Image** .....

# Bibliography about conservation concepts

- References and bibliography as a shared resource for the conservation concepts documentation
- Syntheses for the definitions, scope of application, example (ongoing)

To do:

Check this modeling with CRM sci

Check overlap with issues:

- #349 (belief values) and
- #614 (proposition set),
- #663 (lxxx1 One-proposition set)
- #556 (minimum vocabulary)