Documenting Argumentation supporting 3D reconstructions

DOCUMENTER LA RESTITUTION ARCHITECTURALE 3D EN ARCHÉOLOGIE

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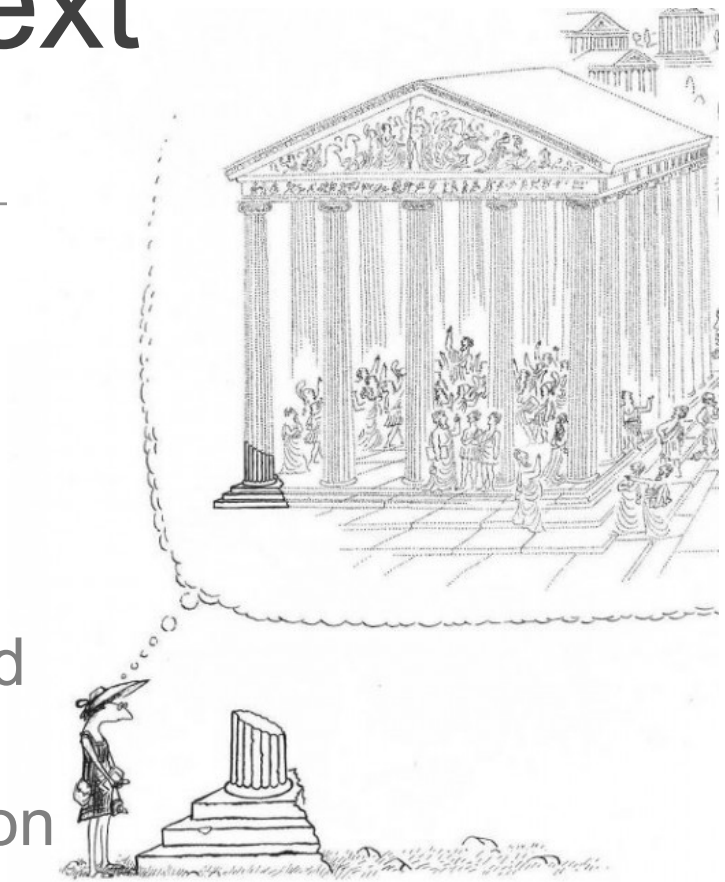
Digital 3D Objects in Arts and Humanities:
Challenges of creation, interoperability and preservation
Bordeaux, France, Nov 30 - Dec 2, 2016

What is the difference between:

a 3D Model of a Reconstruction and a 3D Model of a Video Game?

Background Context

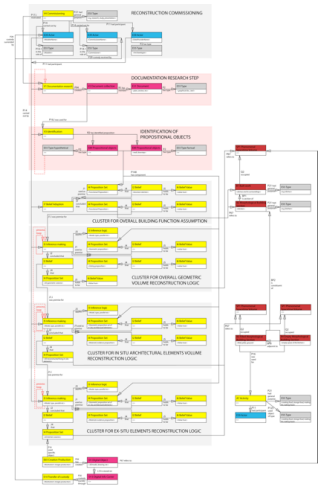
‘Using a **virtual model to visually recover a building or object** made by humans at a given moment in the past **from available physical evidence** of these building or objects, **scientifically reasonable comparative inferences** and in general all studies carried out by archaeologists and other experts in relation to archaeological and historical science’.



Lopez Menchero, V.M., Grande, A. (2011). The Principles of the Seville Charter.

Research Question & Method

- How to manage the data & metadata in order to support the scientific (re-)use of 3D Models and other digital documents of reconstruction?



1-Ontological Modeling → 2-Knowledge Provenance Model → 3/CMS Implementation

1-ONTOLOGICAL MODELING OF ARGUMENTATION PROVENANCE OF 3D RECONSTRUCTION

Documenting the 3D reconstruction with the CIDOC CRM

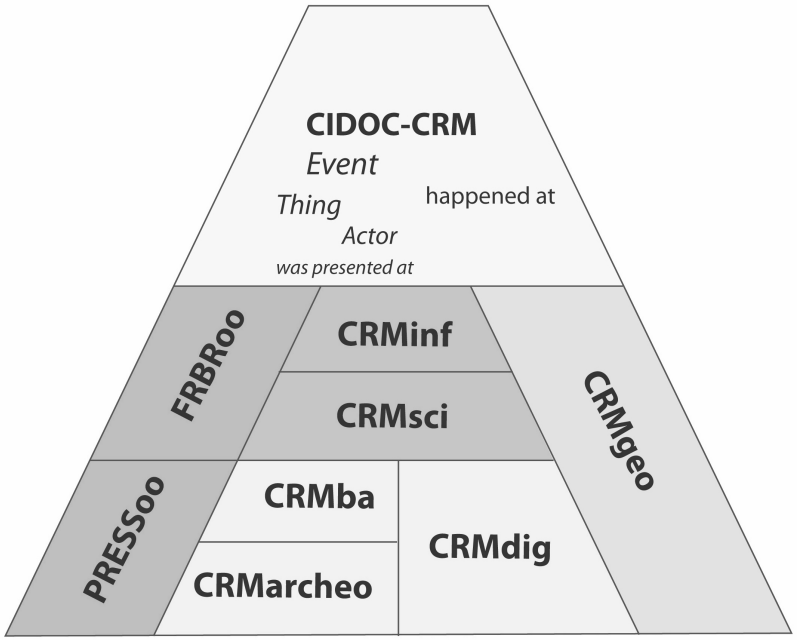
CIDOC-CRM Family:

CRM: Conceptual Reference Model

CRMinf: Argumentation Model

CRMdig: Digital Provenance Model

CRMarchaeo/ba: Excavation Model & Building Archaeology Model

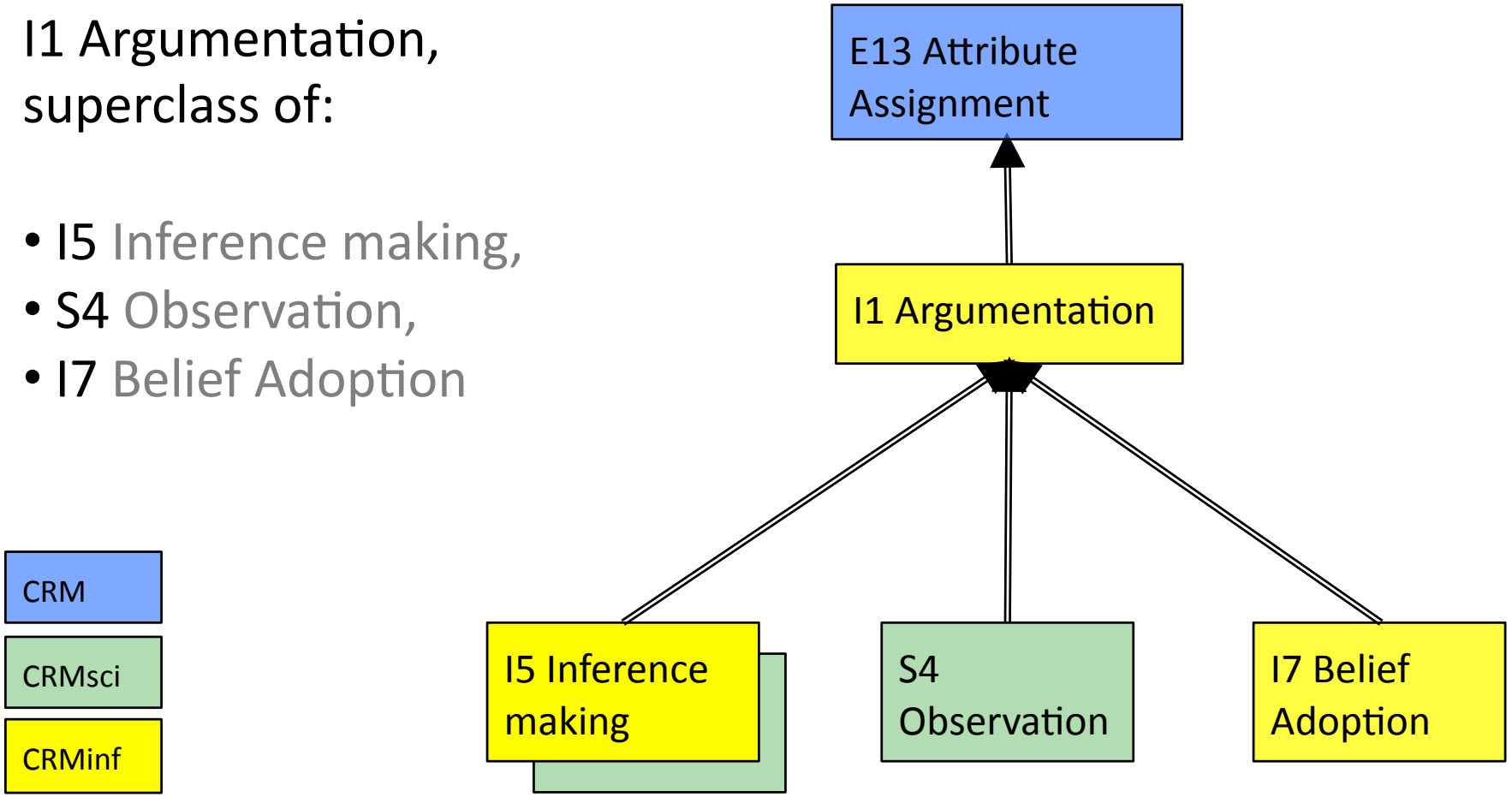


CRM family of extensions
(http://www.ics.forth.gr/isl/index_main.php?l=e&c=229)

What is CRMinf, Argumentation Model ?

I1 Argumentation, superclass of:

- I5 Inference making,
- S4 Observation,
- I7 Belief Adoption

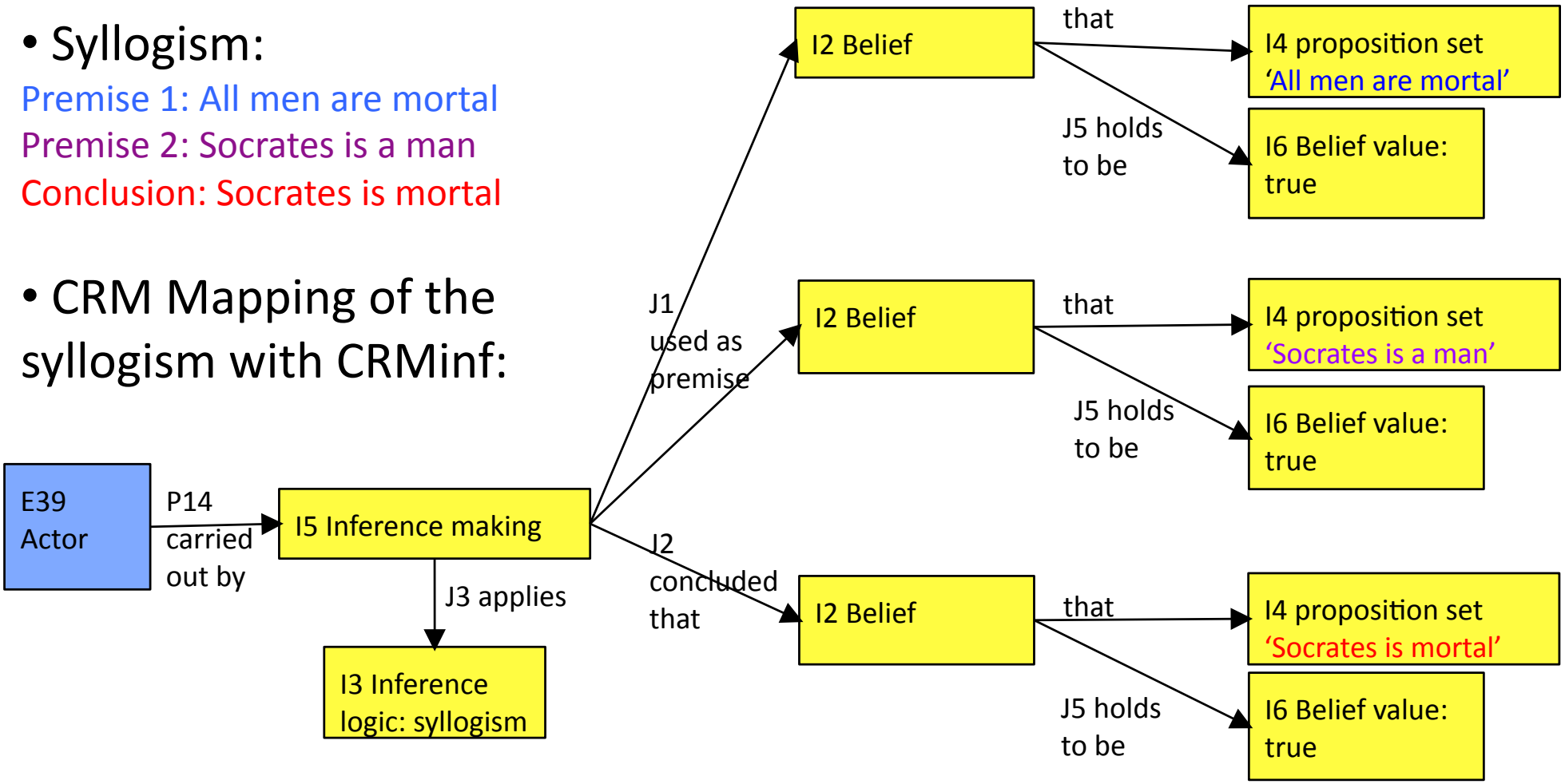


What is CRMinf, Argumentation Model ?

- Syllogism:

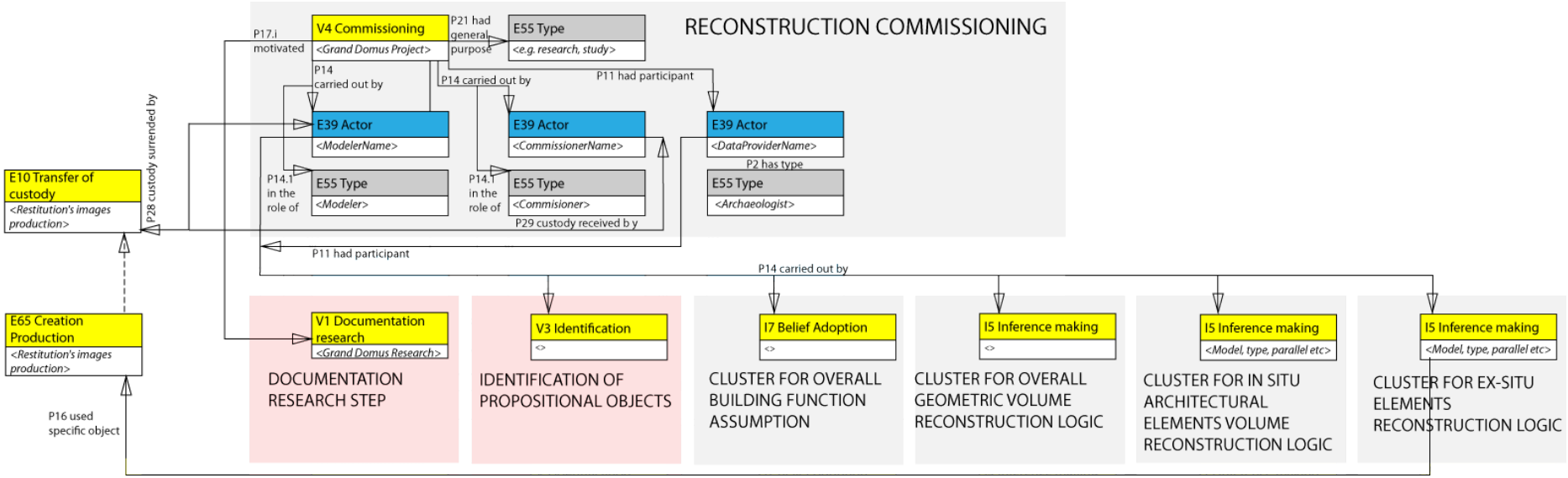
Premise 1: All men are mortal
Premise 2: Socrates is a man
Conclusion: Socrates is mortal

- CRM Mapping of the syllogism with CRMinf:



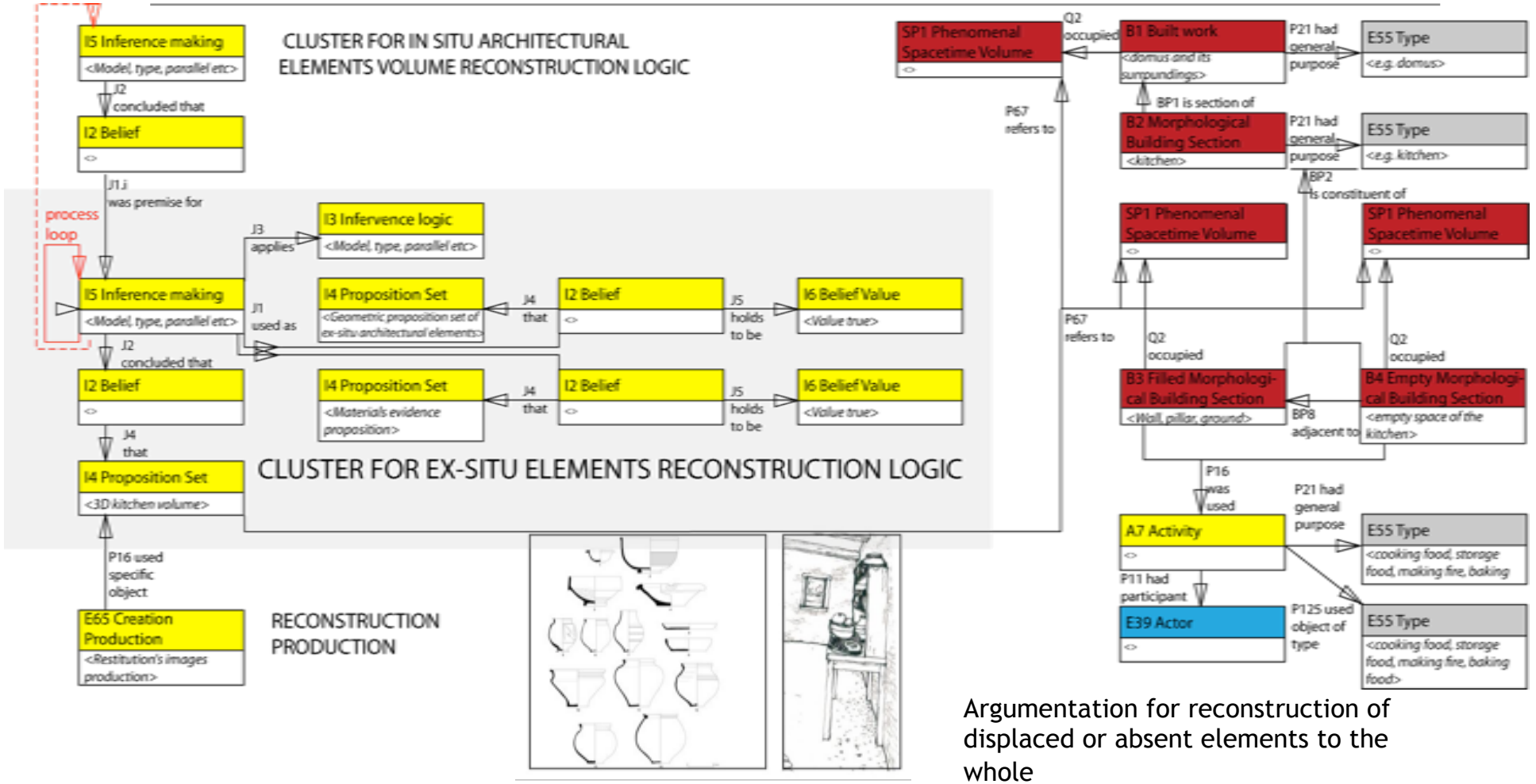
2- KNOWLEDGE PROVENANCE MODEL OF 3D RECONSTRUCTION

Reconstruction Argumentation in 8 steps:



1/Commissioning
2/Documentation research
3/Proposition identification
4/Building function assumption
5/Geometric volume reconstruction
6/In-situ element reconstruction
7/Ex-situ element reconstruction
8/Reconstruction production

Step 7: ex-situ Element Reconstruction

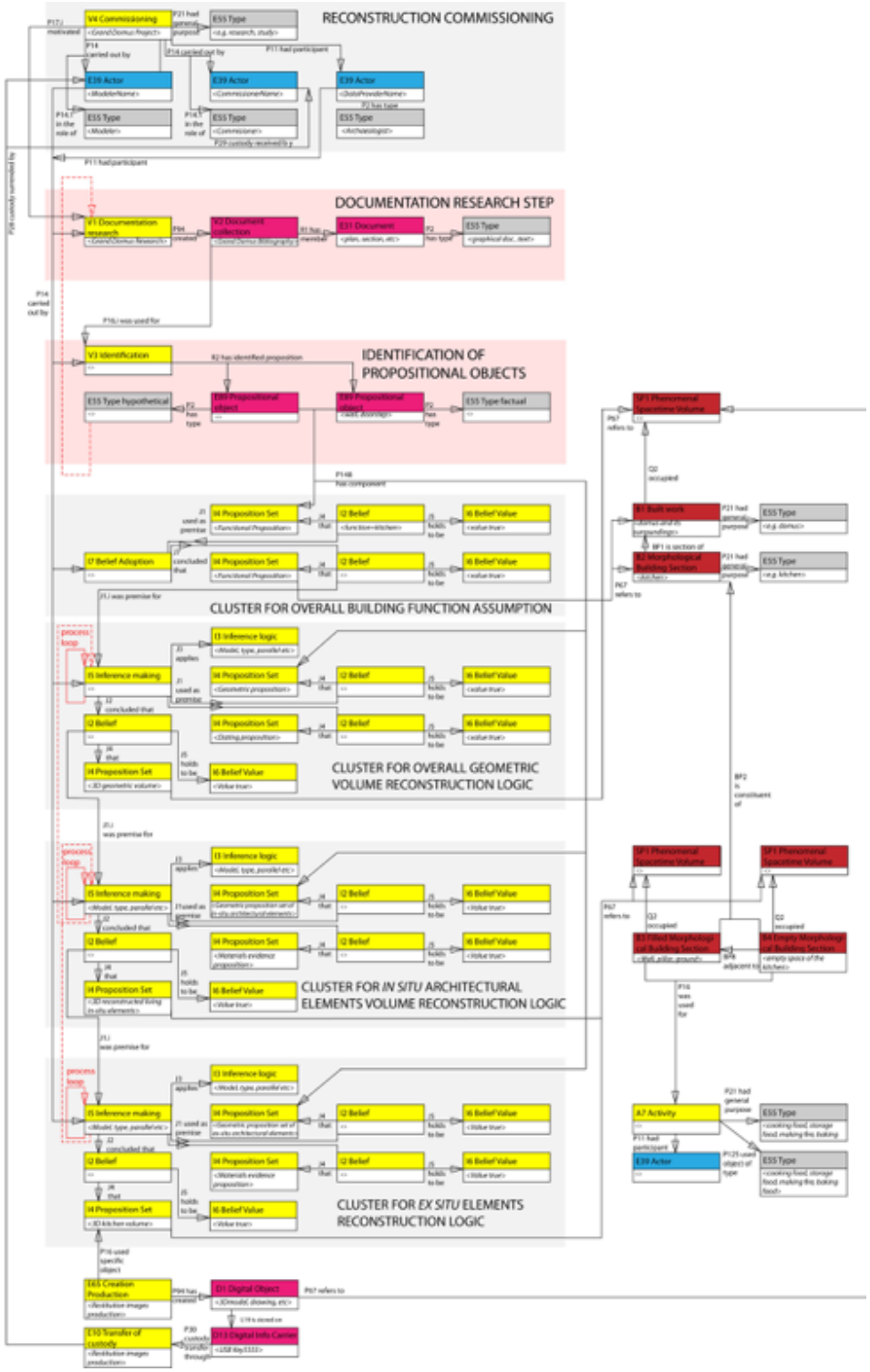


Argumentation for reconstruction of displaced or absent elements to the whole

Reconstruction Model Documents the Workflow of 3D reconstruction:

- Apply subset of CIDOC CRM for event modelling
- Apply CRMdig to account for digital processing
- Apply CRMba to have documentation of significant building parts to link models and arguments to

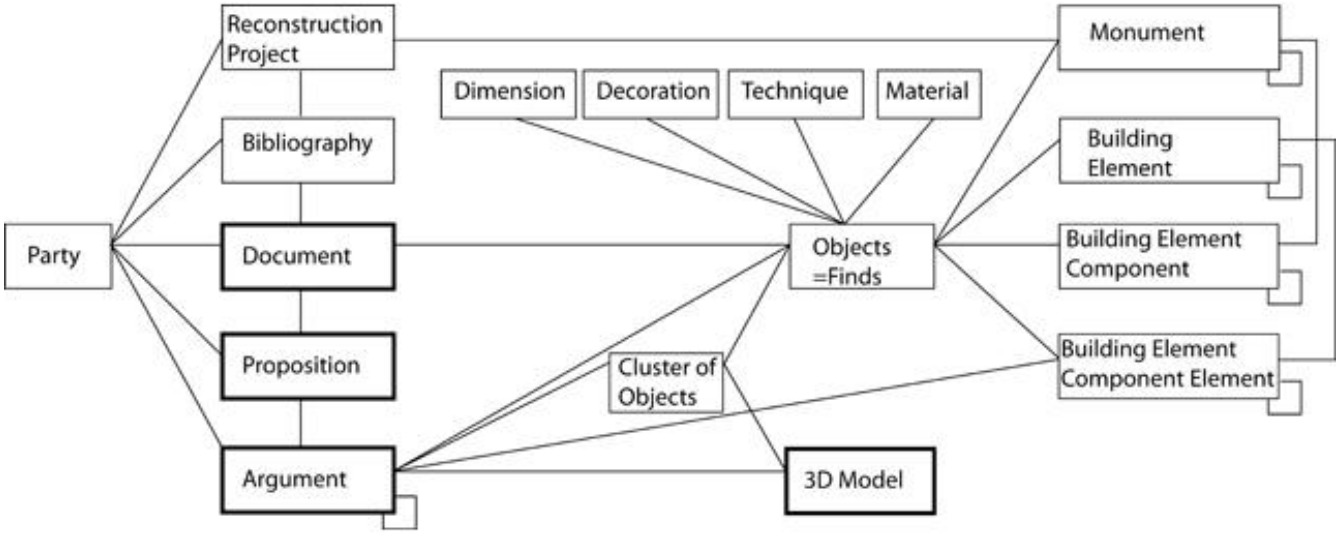
But how to put into action?



3- IMPLEMENTATION OF THE KNOWLEDGE PROVENANCE MODEL WITH DRUPAL

BEHIND THE LINES

Implementation Test:

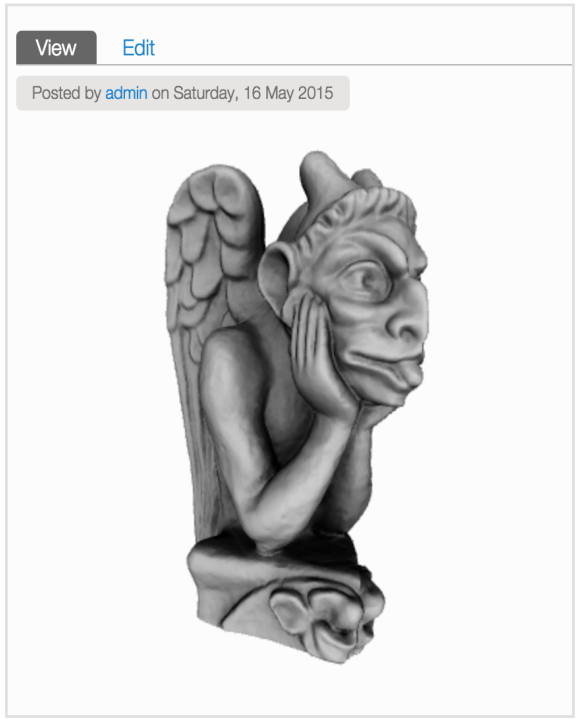


Advantages:

- Prototype
- Easily replicable
- Off-the-shelf
- Strong development community, re-use of existing modules
- 3D Model Viewer Support
- It can implement CIDOC-CRMinf

Drupal

Drupal Module Setup



3D Viewer Module

Label *

P110_augmented Machine name: p110_augmented

Display name of the relation type. This is also used as the predicate in natural language formatters (ie. if A is related to B, you get "A [label] B")

Reverse label *

P110i_was_augmented_by

Reverse label of the relation type. This is used as the predicate by formatters of directional relations, when you need to display the reverse direction (ie. from the target entity to the source entity). If this is not supplied, the forward label is used.

☑ Directional

A directional relation is one that does not imply the same relation in the reverse direction. For example, a "likes" relation is directional (A likes B does not neccesarily mean B likes A), whereas a "similar to" relation is non-directional (A similar to B implies B similar to A. Non-directional relations are also known as symmetric relations.

Available source bundles *

- **Node**
  - all Node bundles
  - 3D Model
  - 3D Model Elements
  - Acquisition Campaign
  - Argument
  - Article
  - Basic page
  - Belief
  - Biblio
  - Bibliographic Collection
  - Building
  - Building Component
  - Building Component Element
  - Building Element
  - Building Phase Addition
  - Building Phase Modification
  - Building Phase Original

Available target bundles *

- **Node**
  - all Node bundles
  - 3D Model
  - 3D Model Elements
  - Acquisition Campaign
  - Argument
  - Article
  - Basic page
  - Belief
  - Biblio
  - Bibliographic Collection
  - Building
  - Building Component
  - Building Component Element
  - Building Element
  - Building Phase Addition
  - Building Phase Modification
  - Building Phase Original

Relationship Module

Result: Integrated Metadata for:

Actions
Project
Documentation Research
Acquisition Campaign
Argumentation
Modelling

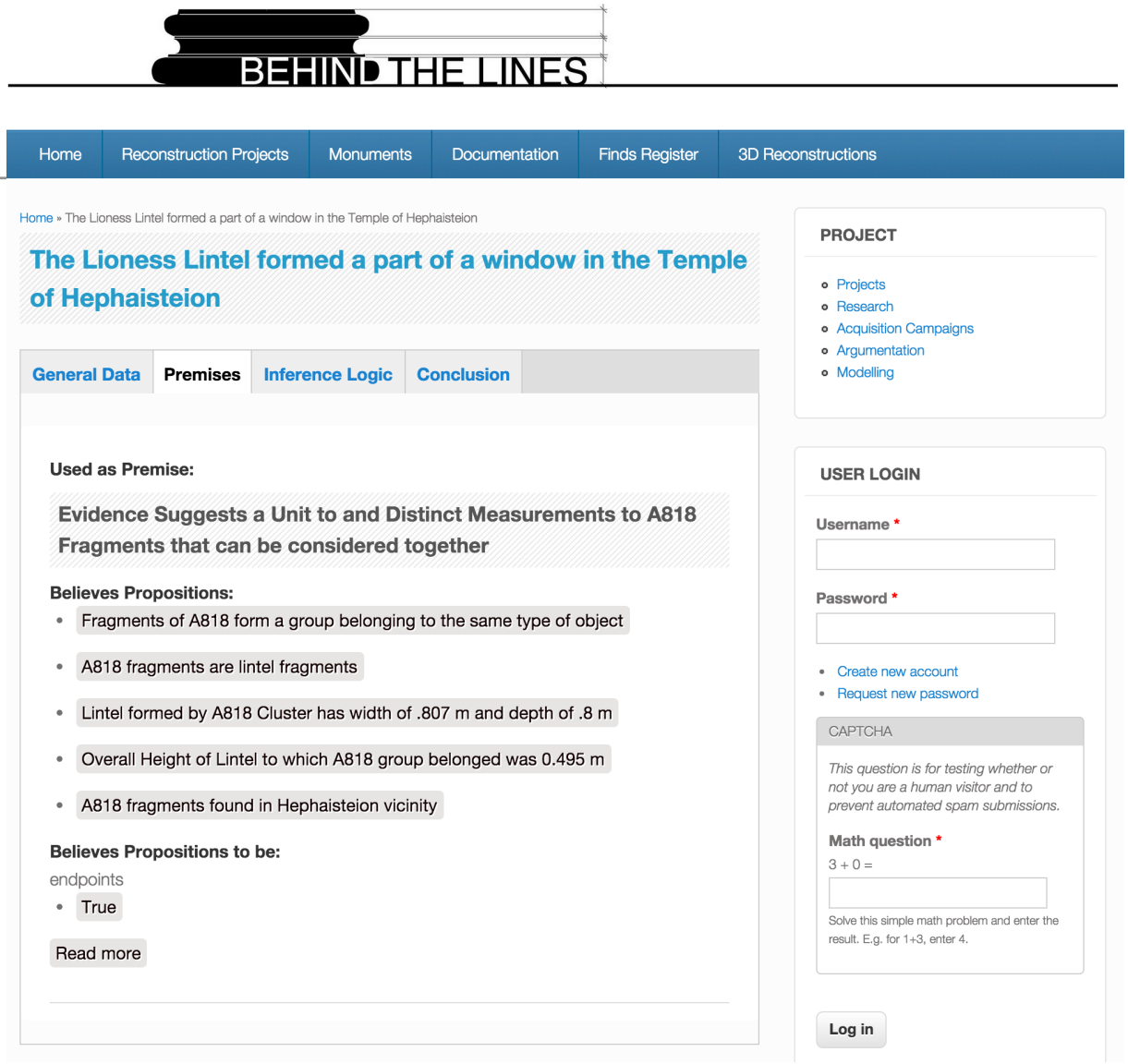
Documentation
Bibliographic Collections
Bibliography
Documents
Propositions

Buildings
Building
Building Element

Models
3D Model

Documenting Argumentation in action

Actions
Project
Documentation Research
Acquisition Campaign
Argumentation
Modelling



References

Behindthelines
http://behindthelines.eu/

CIDOC CRM
http://www.cidoc-crm.org/

CIDOC CRM Extensions
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Thank you !

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