

Computer Applications in Archaeology
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Documentation and Reasoning on
Parts and Potential Wholes

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Problem :

What we confronted with :

- Parts of an unknown whole
- Fitting parts to alternative wholes
- Searching for missing parts
- Rearranging parts for exhibition purposes
- Inventory control of parts and wholes

To accomplish

What we want to do :

- Classification
- Retrieval
- Dynamic regrouping
- Counting
- Reconstruction

Approach

Therefore:

Conceptual Model for:

- ❖ Collection Management Systems
- ❖ Scientific Documentation systems
- ❖ Data exchange & Communication

Serving:

- ❖ Method of reasoning
- ❖ Documentation method
- ❖ Implementation guides

Approach

Where from:

Based on:

- Extension of CLIO
- Requirements & experience from museum
- Conceptual analysis (Our & CIDOC group)
- Theory of KR

How:

We have implemented :

- An object-oriented Semantic Model
- Easy to understand
- Robust under change of knowledge
- Multiple classification (aspects, assumptions, facts)
- Transition between classes(types) and items

Definitions

➤ Types of parts

Structure – dependent parts and their wholes

- ❑ Components \Leftrightarrow Integral Objects
- ❑ Elements \Leftrightarrow Aggregates (“Collections”)
- ❑ [Quantity \Leftrightarrow Mass]

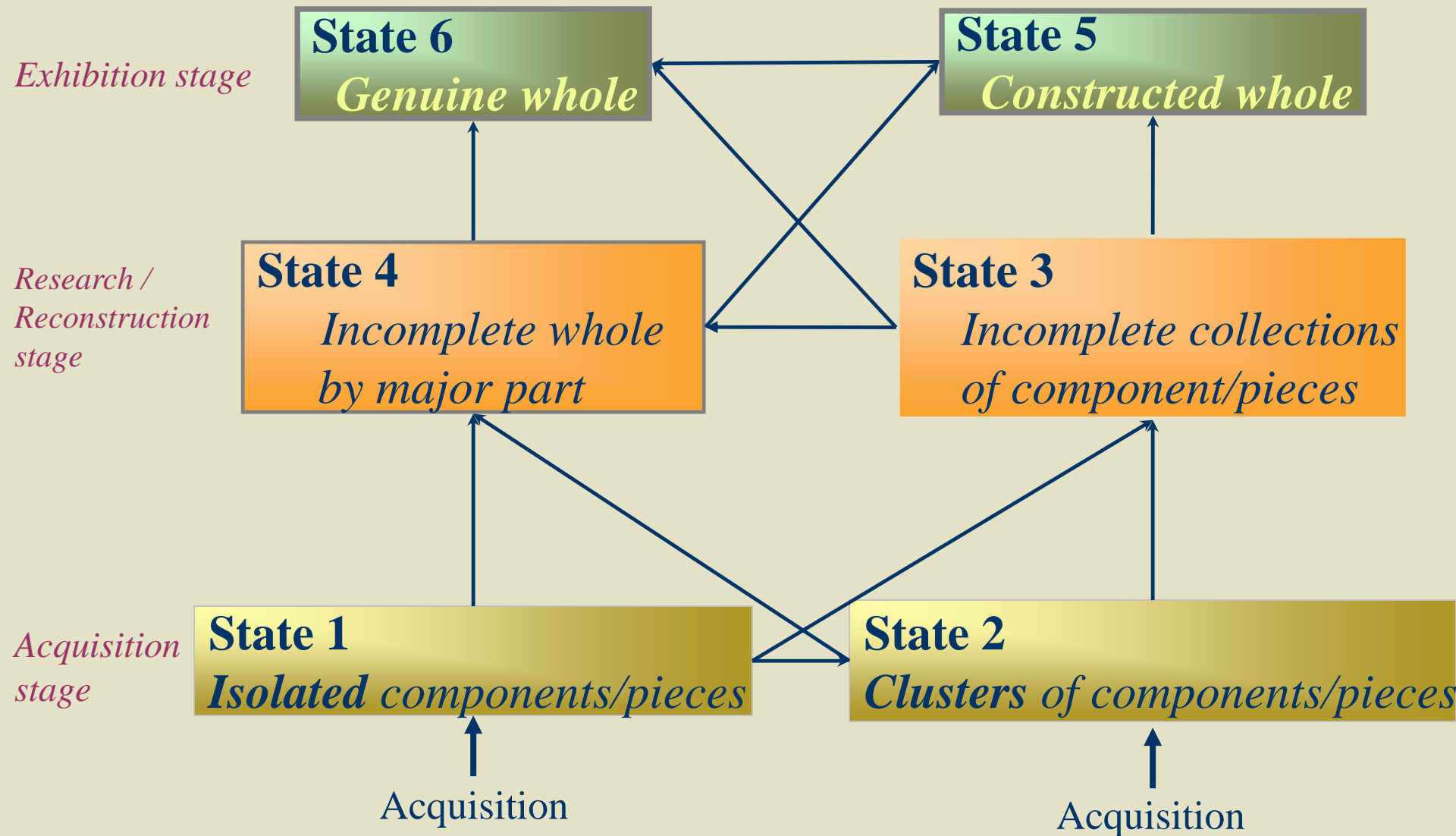
Temporarily constructed parts:

- ❑ Segments(object topology)
- ❑ Pieces(broken, arbitrarily, deliberately cut)
- ❑ [Portions]

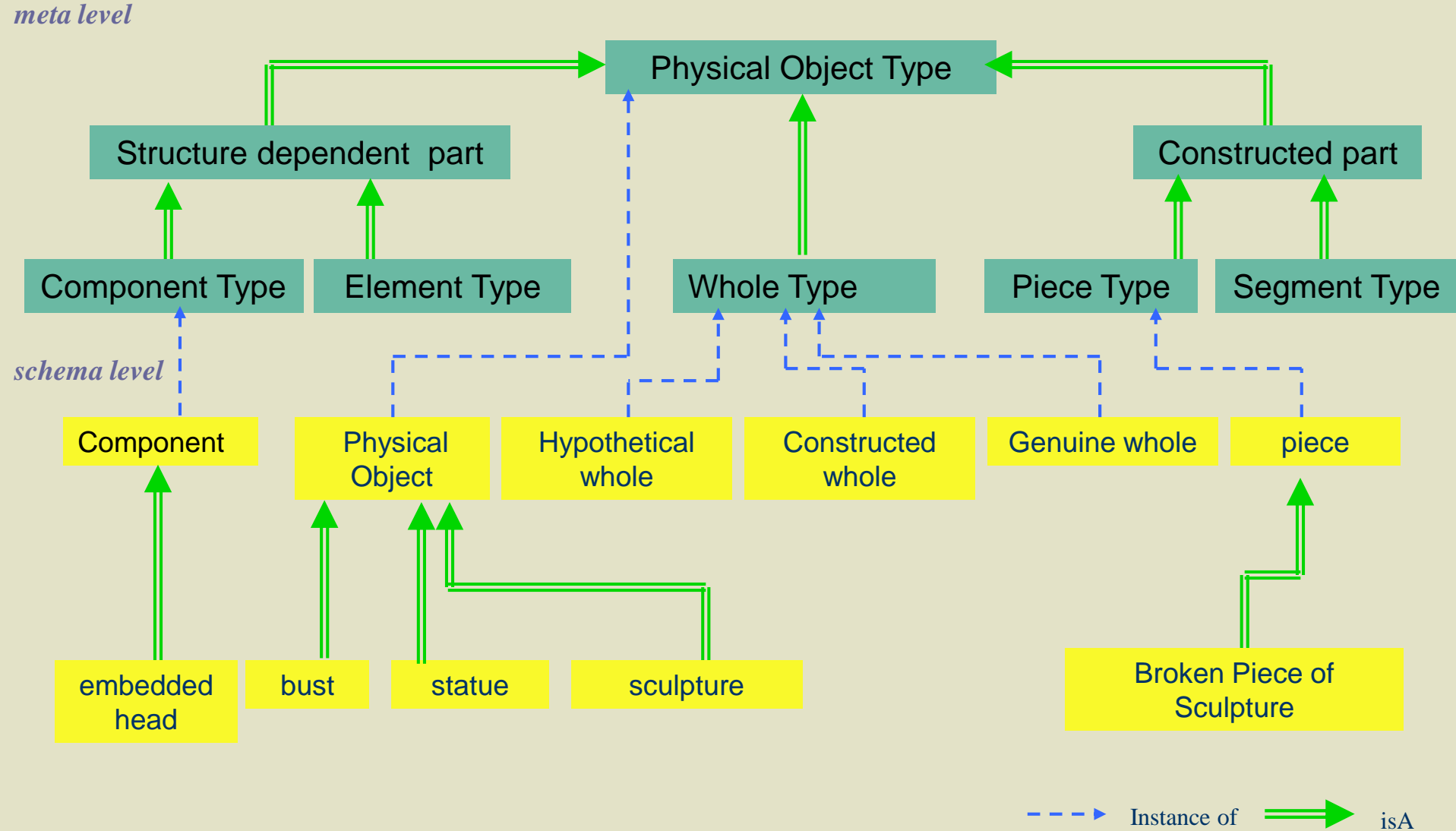
➤ Types of wholes

- Genuine
- Hypothetical
- Constructed

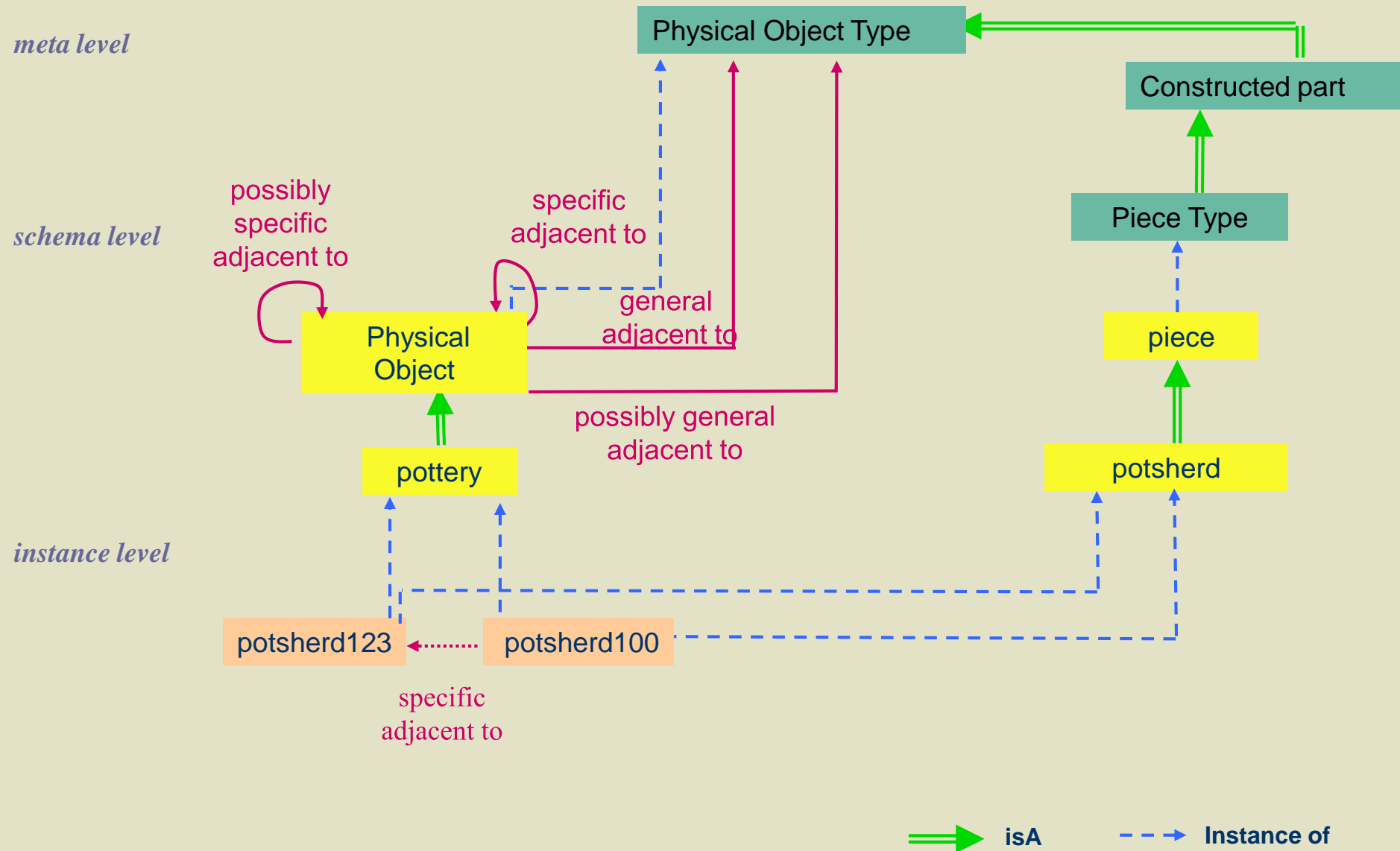
States and Stages of Wholes and their documentation



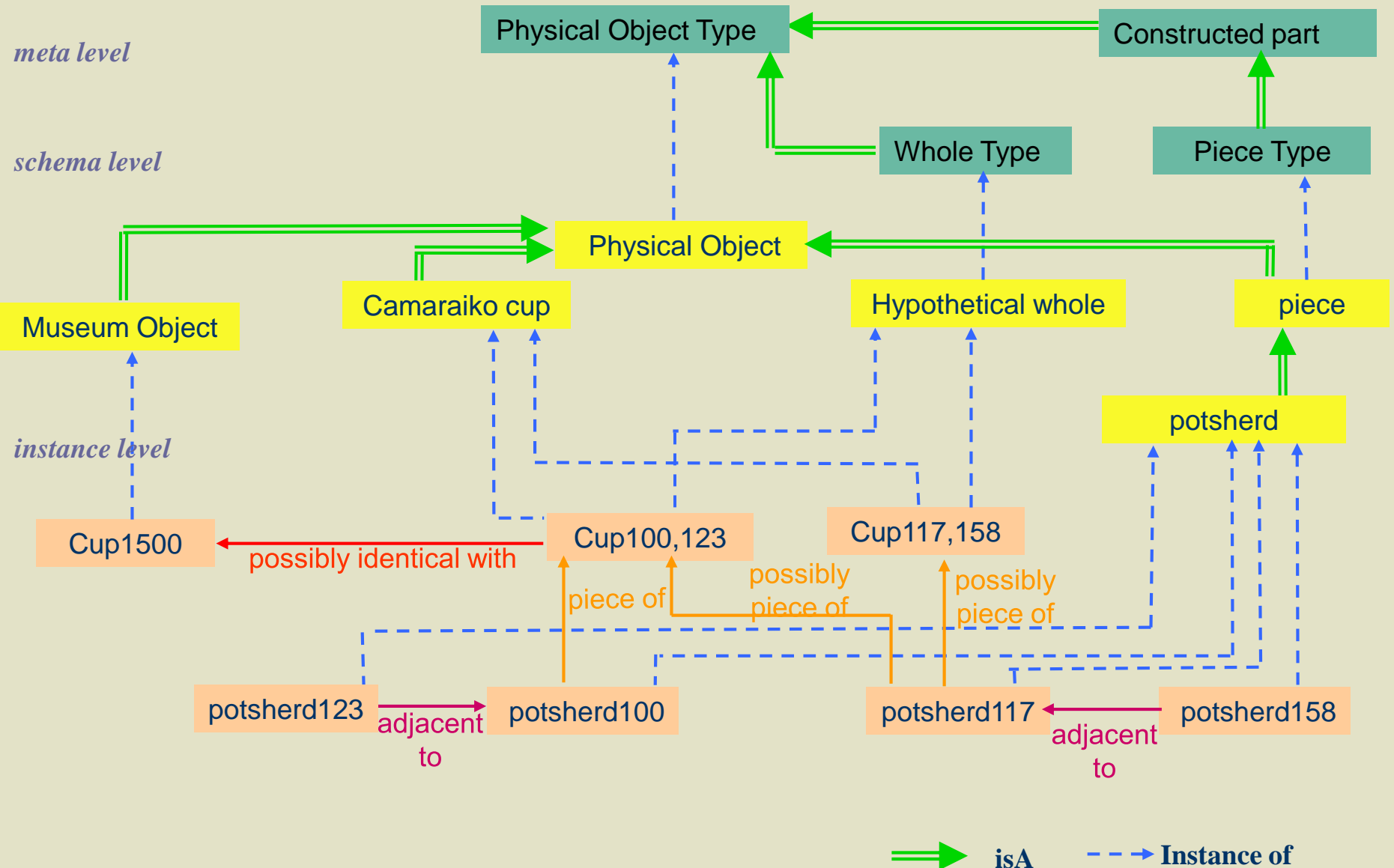
Entities definition



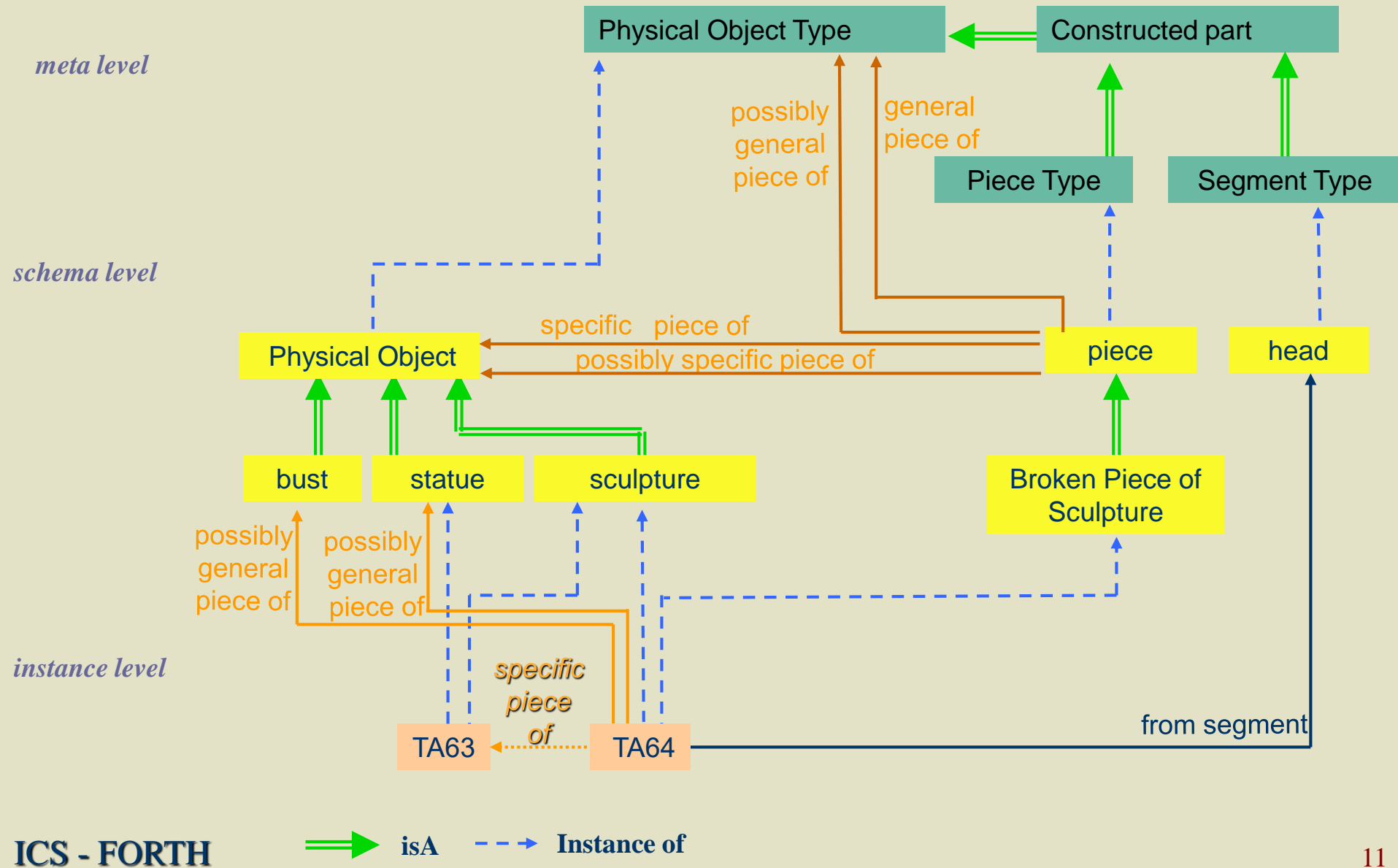
Documenting isolated pieces and clusters of pieces



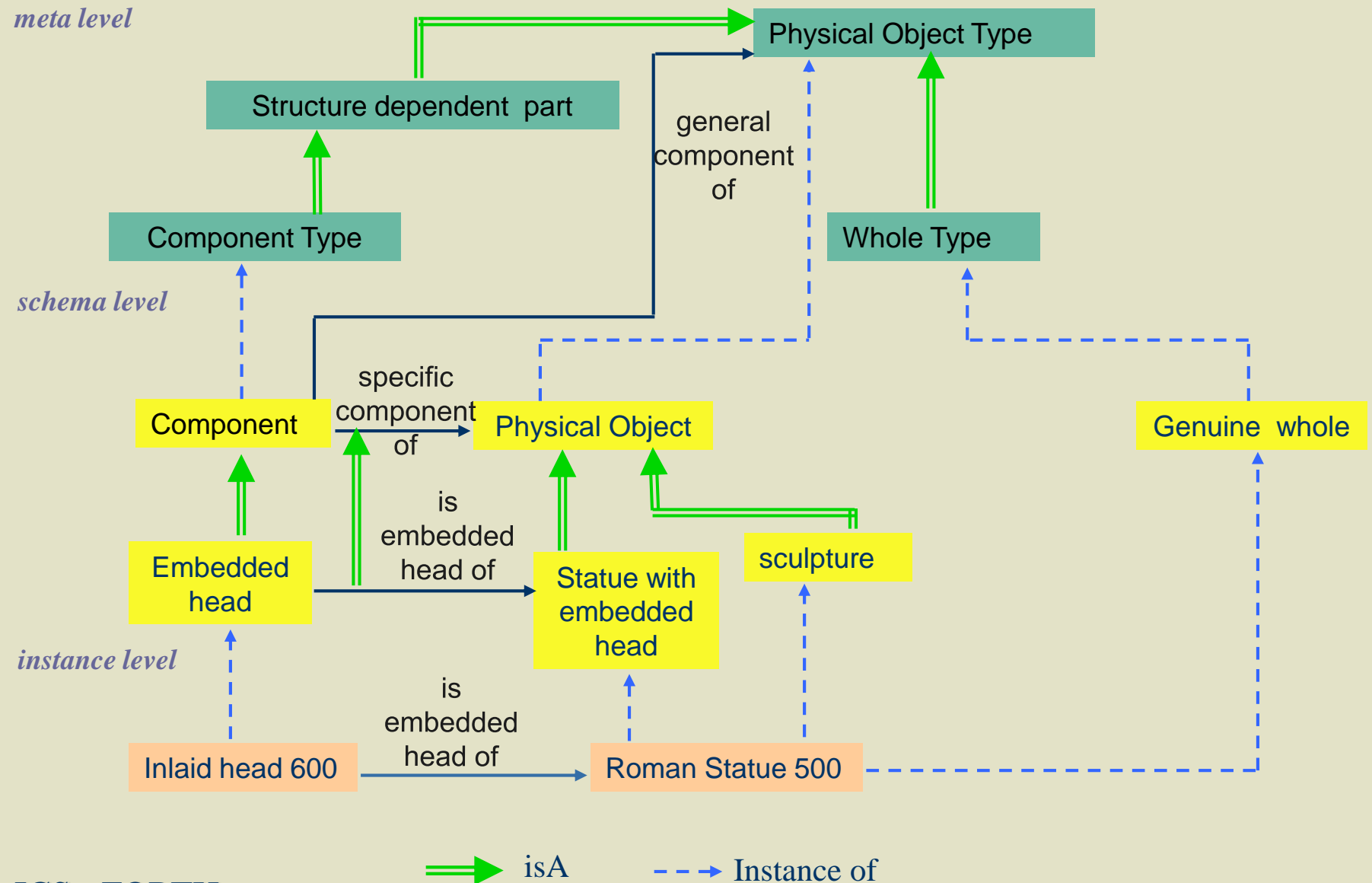
Documenting hypothetical wholes



Documenting objects and pieces



Documenting Components and Genuine Wholes



Summary

We propose :

16 relations from 8 categories

*general
specific*



*possible
real*



*piece of
component of
element of
to be together
(fits/adjacent)*

7 entities

component

element

piece

segment

hypothetical whole

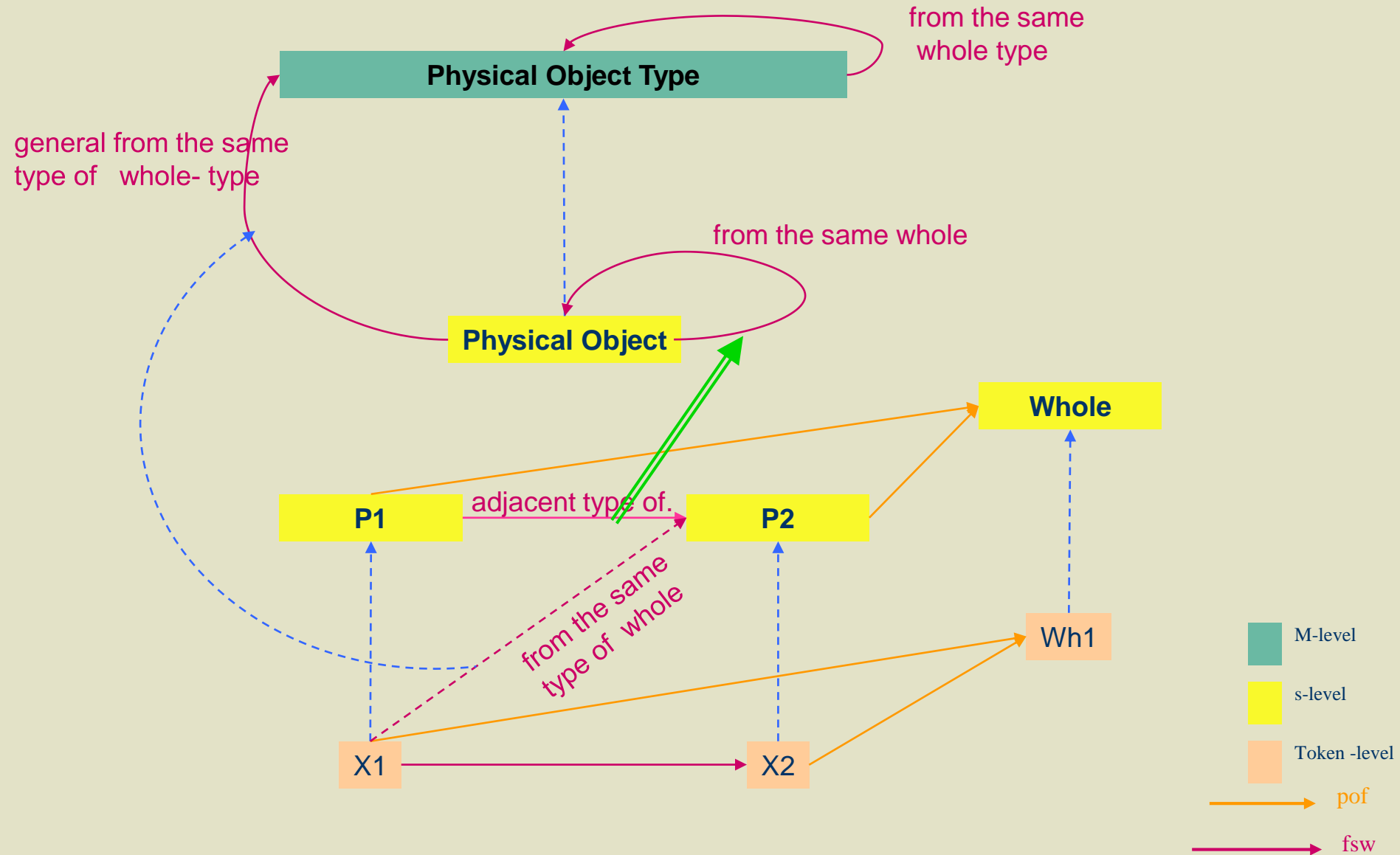
constructed whole

genuine whole

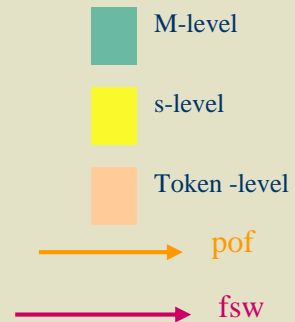
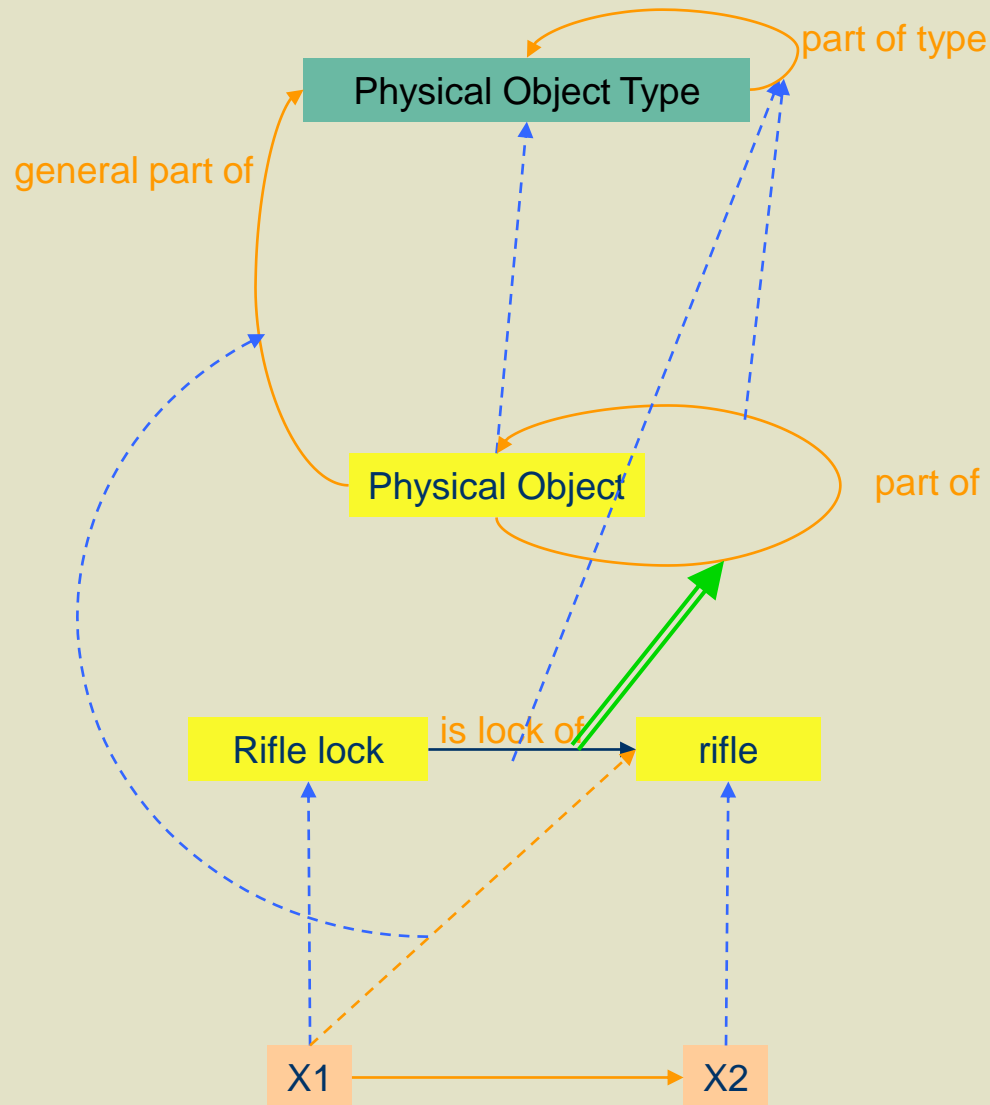
Conclusions

- ➔ *Model supports basic reasoning on parts & wholes in Museums and Archaeology*
- ➔ *Suitable algorithms and queries to be embedded in a real info system*
- ➔ *Testing underway*
- ➔ *Propose standardization for international co operation*

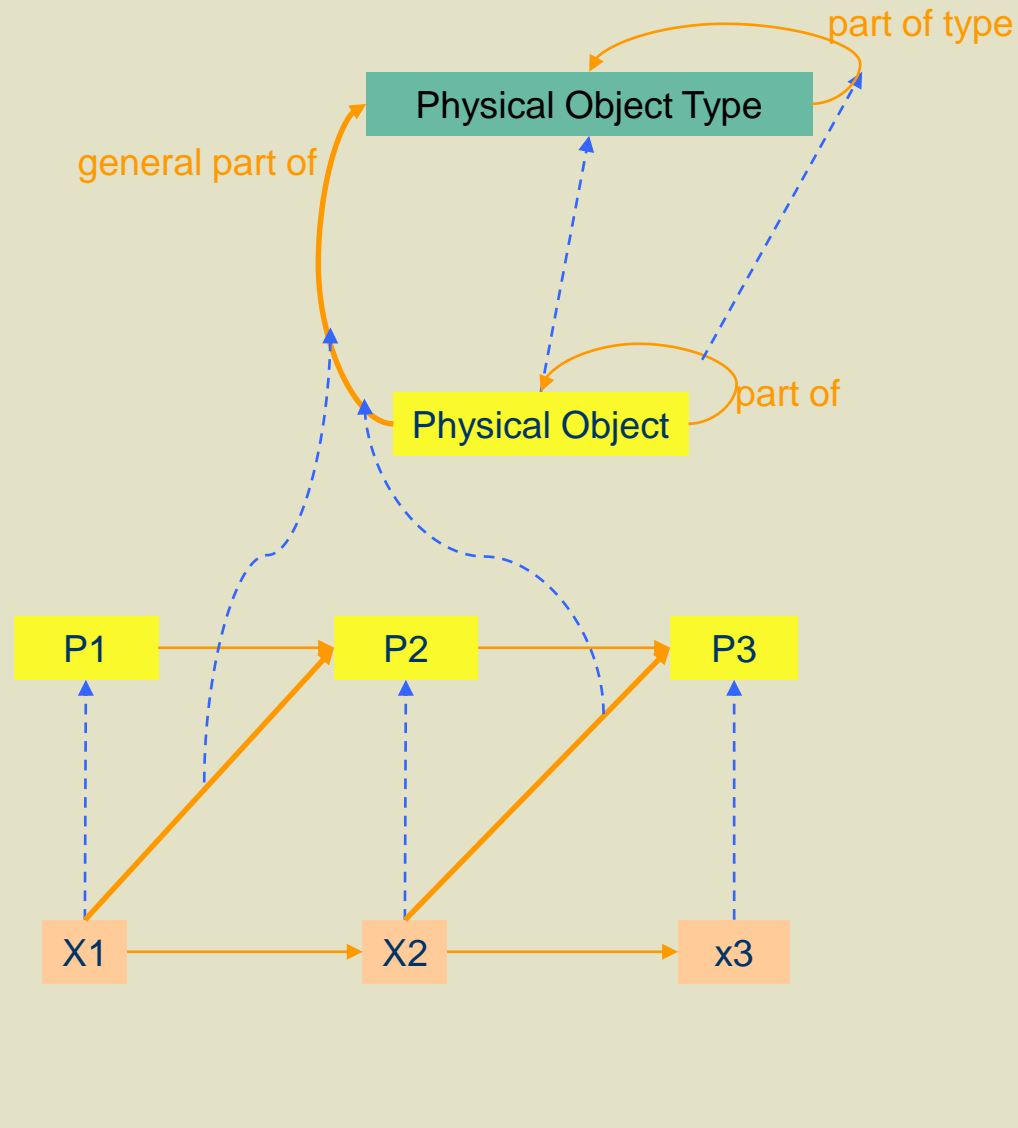
“from the same whole” attribute



“part of” attribute

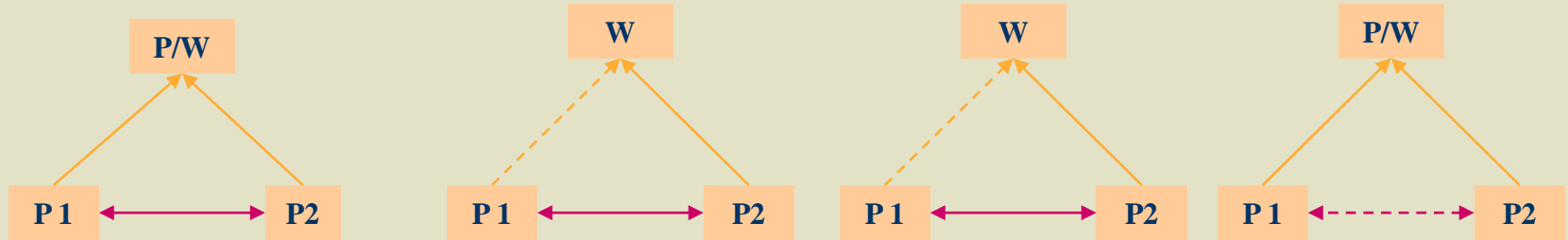


“part of” transitivity

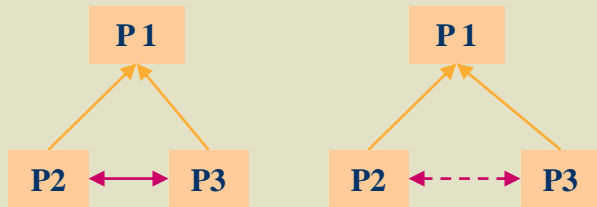


Reasoning in token level

Case 1:



Case 2:



Case 3:

