

## eCulture on the Semantic Web

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## Acknowledgement

- Guus Schreiber for most of the slides

## Talk overview

- What is eCulture?
- What is the Semantic Web?
- How can eCulture benefit from the Semantic Web?

3

## What is eCulture?

- Online descriptions of physical artefacts
  - library catalogues
  - museum archives
- Web accessible descriptions of exhibitions in musea
- Online representations of physical artefacts
- Online representations *are* the artefacts

4



## What is the Web?

A standard means of

- locating information (**URI**)
- describing documents (**HTML, XML**)
- transferring documents (**HTTP**)

## Semantic Web

A standard means of

- labelling connections (**RDF**) among objects (**URI**)
- categorising objects and their connections (**RDF Schema**)
- specifying constraints on the connections and the objects (**OWL**)

7

## Use cases for the Semantic Web

- Knowledge management
  - Search
- Personalisation and contextualization of information
- Web services
  - eCommerce
  - automated diary scheduling

8

# Semantic Web Ingredients

- ✓ Languages
- Vocabularies
- Annotations

9

# AAT description of chest of drawers

The screenshot shows an ontology browser window titled "Ontology browser" with a search bar containing "drawer". The left pane displays a hierarchical tree of classes under "Resource". The right pane shows the details for the class "chest of drawers".

**Class** [chest of drawers](#)

**Meta Class** [AATClass](#)

**Comment** *Type of case furniture usually having four drawers but sometimes made with three, five, or more; generally supported on feet and sometimes resting directly on the floor. Use "commodes (chests of drawers)" for similar case pieces generally supported on short legs. Use "chests with drawers" for chests with one or more tiers of drawers below a deep storage space.*

**Class Properties**

synonym	chest of drawers
	bureaus
	dressers
	beuros
	bureaus (chests of drawers)
	buros
	chests, dressing
	drawers, chests of
	dressers (chests of drawers)
	dressing chests

**Properties**

Name	Class	Range
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Found 1

## Resources for semantic annotation of art images

- **WordNet** general lexical database of nouns, verbs, adjectives and adverbs.
- **Iconclass** iconographic classification system for the content of visual resources.
- **AAT** hierarchically ordered thesaurus of terms relevant for the art domain.
- **ULAN** information about artists, including names and limited bibliographical information.

11

## Number of RDF statements (“triples”)

WordNet 1.5 (limited to hyponym relations)	280K
Iconclass (partial)	15K
Art and Architecture Thesaurus	179K
ULAN	100K
Total	574K

12

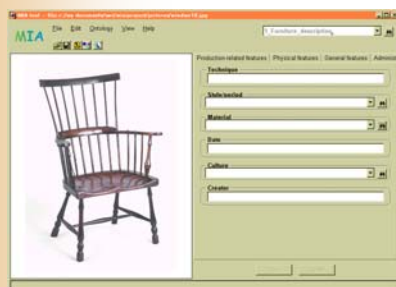
## Semantic Web Ingredients

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13

## Experiment: manual annotation of Windsor chair images

- Subjects: 2 art historians, 2 lay persons
- 3+5 images per subject
- Time needed, remarks during session, resulting annotations
- Ontology structure relatively easy to understand for all subjects
- Art historians used considerably more time and added more detail
- Art historians used the ontology to learn specifics of Windsor chairs
- Art historians were used to manual indexing



14

## Automated techniques

- Natural language processing
  - Preprocessing of existing informal index texts to (partial) annotation
- Image analysis
  - Segmentation
  - Color determination
- Audio and video analysis
- “Semantic gap” remains

15

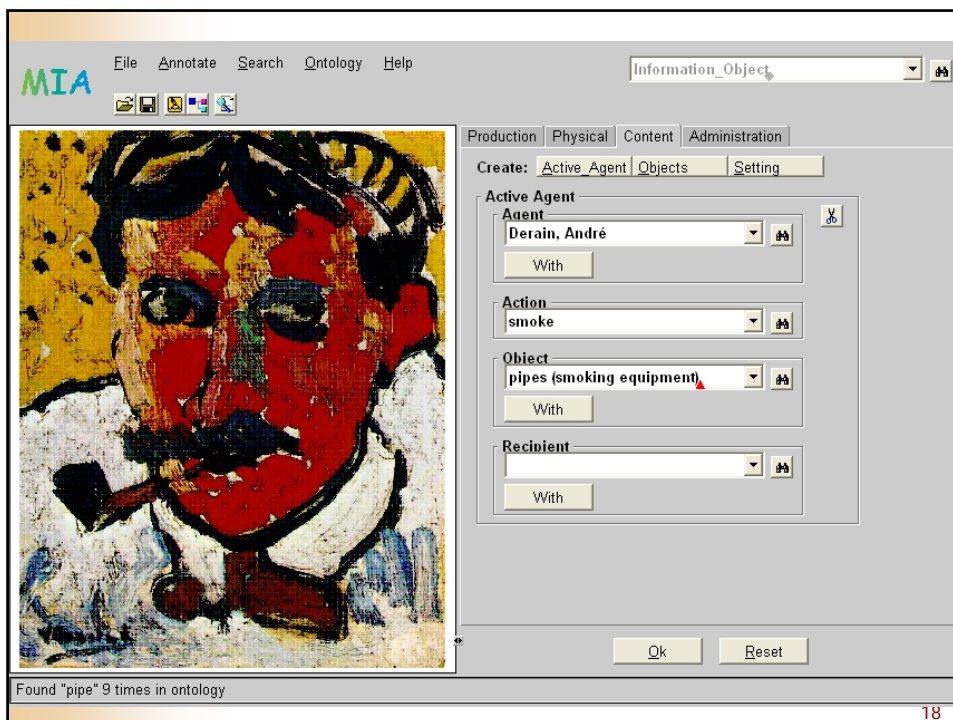
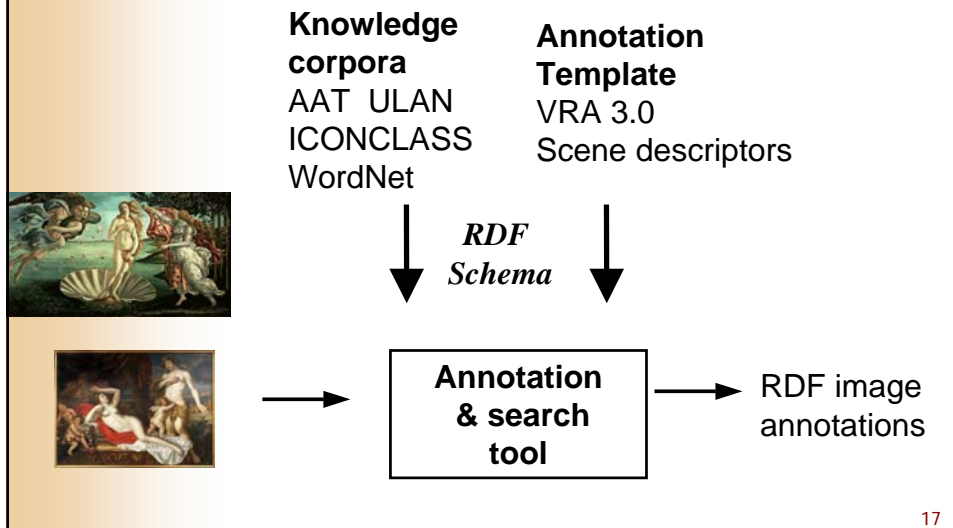
## Observation

- Semantic web applications typically use multiple semantic sources: thesauri, vocabularies, ontologies
- Semantic web languages solve the **syntactic** interoperability problem
- What remains is linking the semantics!

16



# Application scenario: Paintings



# Term disambiguation

Search in:  Label  Synonym  Comment For

pipe Substring Find Cancel

- <object genres by form>
  - pipes (conduits)
- Furnishings
  - furnishings
    - <furnishings by form or function>
      - coverings and hangings
        - <coverings and hangings by specific type>
          - <coverings and hangings by location or context>
            - <coverings and hangings for openings>
              - pipes (hangings)
- Tools and Equipment
  - equipment
    - <equipment by context>
      - <equipment for personal use>
        - <equipment for personal use: smoking and tobacco use>
          - pipes (smoking equipment)

- Containers

# Implicit meaning of term

Search in:  Label  Synonym  Comment For

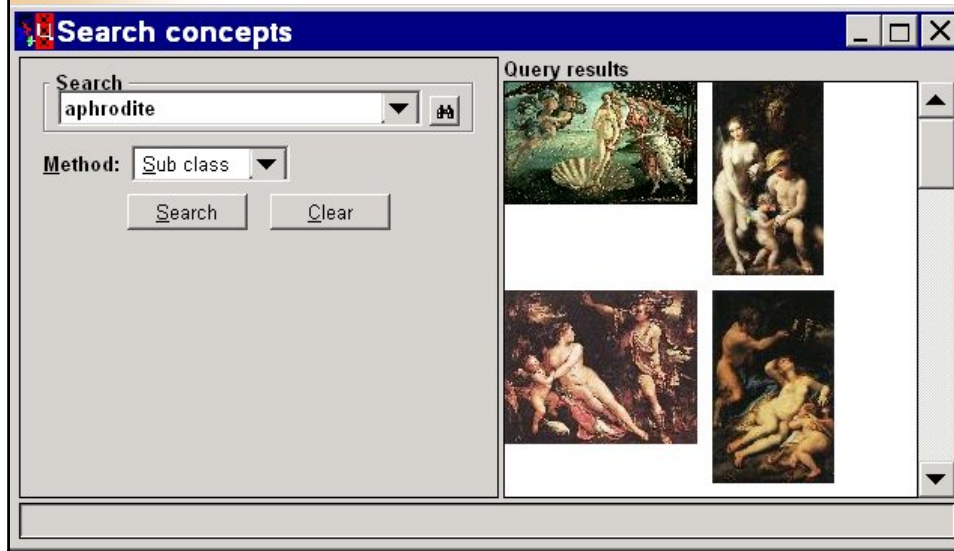
Substring Find Cancel

- WordNet Entity
  - phenomenon
    - process
      - action
        - biological\_process
          - activity
            - breathing
              - smoke
                - puffing

smoking

the act of smoking tobacco or other substances

## Using annotations for search



## Personalised Presentation

- [HTML presentation...](#)

## eCulture and the Semantic Web

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    - library catalogues
    - museum archives
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  - Online representations of physical artefacts
  - Online representations *are* the artefacts
- Semantic Web  
(Semantic) Web  
Web + Sem. Web  
future work...

23

## Will the Semantic Web succeed?

- There is a growing need for semantic search of information
- A little semantics goes a long way
- Availability of large amounts of semantically annotated content is essential
  - but: there is a lot of content already out there
- First applications are likely to be in area of large virtual collections
  - e.g., cultural heritage, medicine

24

## Resources

- Semantic Web at W<sup>3</sup>C  
<http://www.w3.org/2001/sw/>
- Semantic Web best practices  
<http://www.w3.org/2001/sw/BestPractices/>
- <http://www.semanticweb.org>
- Semantic Web applications  
<http://challenge.semanticweb.org>
- Museum Finland  
<http://www.cs.helsinki.fi/group/seco/museums/>