



International Workshop on *Semantic Web And Reasoning for Cultural Heritage and Digital Libraries* (SWARCH-DL)

in conjunction with the

**4th IEEE International Conference on Semantic
Computing**

September 22-24, 2010

Carnegie Mellon University, Pittsburgh, PA, USA



Welcome to Pittsburgh!



Organization Committee

Workshop Chair

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Workshop's Aims and Scope

- ◎ How Semantic Web techniques apply to cultural heritage collections and digital libraries?

Need to:

- improve ***access, management*** and ***dissemination*** of world's cultural assets!
- tackle with the ***semantics*** of web knowledge-intensive systems and cultural applications
- provide ***knowledge-based*** management of information in digital libraries
- deploy “***intelligent***” search and navigation mechanisms
- produce knowledge through automated ***reasoning***

Areas of Interest

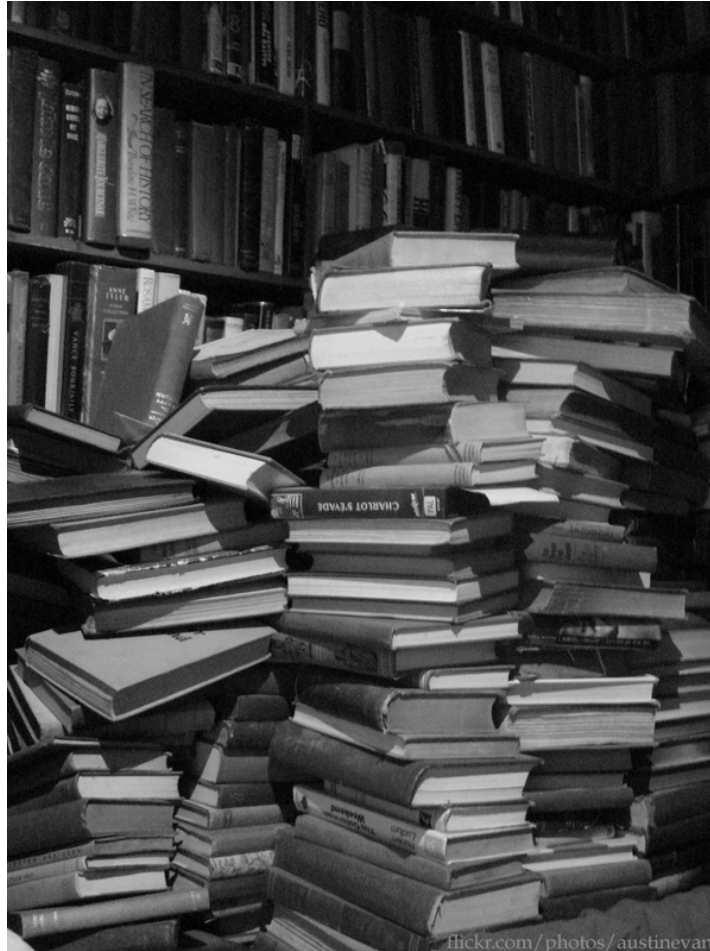
- ⊙ Use of ***semantically enriched metadata*** schemes
- ⊙ The role of ***ontologies***
- ⊙ ***Semantic-enabled*** search and browsing services in cultural heritage collections and digital libraries
- ⊙ Data integration and processing
 - Interoperability issues
- ⊙ ***Reasoning*** over cultural heritage information
- ⊙ Techniques for ***knowledge acquisition***

Areas of Interest

What else?

- ◎ ***Evaluation, scalability*** and ***performance*** issues
- ◎ Usability and interfaces
- ◎ Applications involving ***Linked Data***
- ◎ ***Semantic*** and ***mental maps*** of interlinked cultural information
- ◎ ***Experience reports*** from relevant projects, use-cases, examples,

The problem

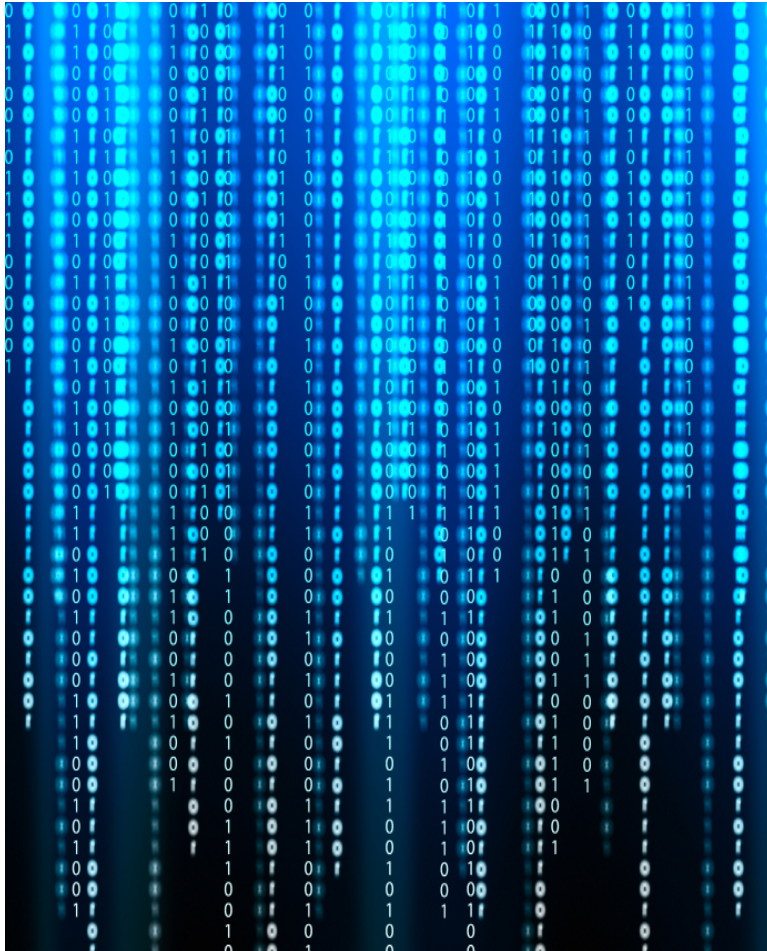


[flickr.com/photos/austinevan/](https://www.flickr.com/photos/austinevan/)

In facts...

- ◎ In Europe alone, **tens millions** of Euros invested in projects related to cultural heritage and digitization
- ◎ **Hundreds of institutions** (museums, archives, libraries, ...) participating in them
- ◎ **Millions of digital objects** already available through digital library infrastructures
 - *Millions of online visitors worldwide!*

Digitization



- Huge amount of digital information
- Available through multiple channels
 - The Web
 - e-media
- However...
 - Fragmentation!
 - Missing *links*
 - What about *semantics*?

Projects for Cultural Heritage

- ◎ **eCHASE** – electronic **C**ultural **H**eritage made **A**ccessible for **S**ustainable **E**xploitation
 - ...a follow up from **SCULPTEUR** (**S**emantic and **C**ontent-based **m**ULTimedia **e**xPloiTation for **EU**Ropean benefit)
- ◎ **AMA** - **A**rchive **M**apper for **A**rchaeology
- ◎ **Multimedia N9C Eculture**
- ◎ **MultiMatch** - Multilingual/Multimedia Access To Cultural Heritage
- ◎ **STAR** – **S**emantic **T**echnologies for **A**rcheological **R**esources
- ◎ **Smartmuseum**


Projects for Cultural Heritage



- ◎ **CultureSampo** (a follow up from *MuseumFinland*)
- ◎ **STITCH** - **S**eman**T**ic, **I**nteroperability **T**o access **C**ultural **H**eritage
- ◎ **Europeana** (*~ 10M € from 2009-2011*)
 - A multi-lingual online collection of millions of digitized objects from European museums, libraries and archives
⇒ *aims at 10 million records by the end of 2010!*
- **CARARE**
 - Special focus on 3D and virtual reality content
- ◎ **ATHENA** (*~ 5,2M € in 3 years*)
 - Provides tools and standards for Europeana

Digital Library Projects


- ◎ **DSpace**
 - A widely adopted digital repository system
- ◎ **SIMILE - Semantic Interoperability of Metadata and Information in unLike Environments**
 - **Longwell**
 - A web-based, configurable faceted browser for RDF data
 - **Dwell**
 - The DSpace version of *Longwell*
- ◎ **JeromeDL – Social Semantic Digital Library**
- ◎ **The Library of Congress National Digital Library Program**
- ◎ ... and *Fedora, DELOS, BRICKS, ...*

Semantic Search in Europeana


 europeana
think culture

keyword:Raphael  artefact 


▼ works created by matching person (33) Go to




Hoofd van een vrouw,...
Raphael




MUSICA
Raphael



Maria met kind
Raphael




L'Immaculée Conception
Anton Raphael MENGES




Germanicus, pl. I
Grandjean, Jean


▼ works showing (5)




RAPHAEL AU VATICAN
Horace VERNET




Etudes pour L'Apothé...
Jean Auguste Dominiq...



L'APOTHEOSE
D'HOMERE...




TOBIE ET L'ANGE
Salvatore ROSA




Jules II ordonnant l...
Horace VERNET

...


▼ works created by a teacher of matching person (14)



APOLLON ET MARSYAS
Pietro VANNUCCI




LE COMBAT DE
L'AMOUR...




SAINT
Pietro VANNUCCI



LA VIERGE ET L'ENFAN...
Pietro VANNUCCI




LA VIERGE ET L'ENFAN...
Pietro VANNUCCI




SAINT SEBASTIEN
Pietro VANNUCCI


▼ works created by a student of matching person (19)




Ontwerp voor een pen...
Perino del Vaga




Ontwerp voor de noor...
Perino del Vaga




LA SAINTE FAMILLE ; ...
Giulio PIPPI



Schenking van Consta...
Giulio Romano



LA NATIVITE DE L'ENF...
Giulio PIPPI



LE TRIOMPHE DE
TITUS...

Searching with
keyword **"Raphael"**

CultureSampo - Finnish Culture on the Semantic Web



Linked Data service by the Library of Congress

Semantic Web

From Library of Congress Subject Headings

Details Visualization Suggest Terminology

Semantic Web

URI
<<http://id.loc.gov/authorities/sh2002000569#concept>>

Type
Topical Term

Broader Terms

- > [Semantic integration \(Computer systems\)](#)
- > [Semantic networks \(Information theory\)](#)
- > [World Wide Web](#)

Related Terms

- > [Microformats](#)

Sources

- > Engr. index online, May 6, 2002 (identifier: Semantic Web)
- > ASTI on FirstSearch, May 6, 2002: in titles (semantic Web)
- > Work cat.: 2002070545: The Semantic Web--ISWC 20002, 2002.

LC Classification
TK5105.88815

Created
2004-04-07

Modified
2009-12-15 13:59:47

Instance Of

- > [SKOS Concept](#)

Semantic Web

From Library of Congress Subject Headings

Details **Visualization** Suggest Terminology

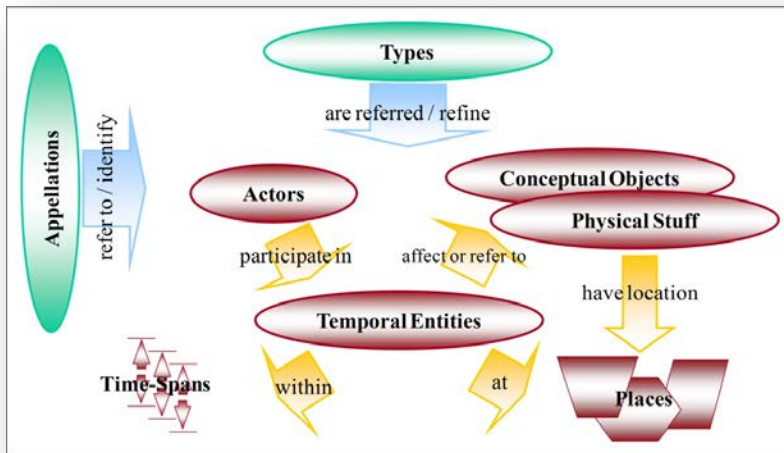
Semantic Web

```
graph TD; A((Semantic Web)) ---|broader| B((Semantic)); A ---|broader| C((World Wide Web)); A ---|related| D((Microformats)); A ---|broader| E((Semantic));
```

CIDOC-CRM

*“... a **high level ontology** to enable information integration for cultural heritage data ...”*

- ⇒ A reference model and information standard for providing **data integration** and **knowledge representation**
(Current official version: 5.0.2, January 2010)
- ⇒ CRM's RDFS implementation is also available!



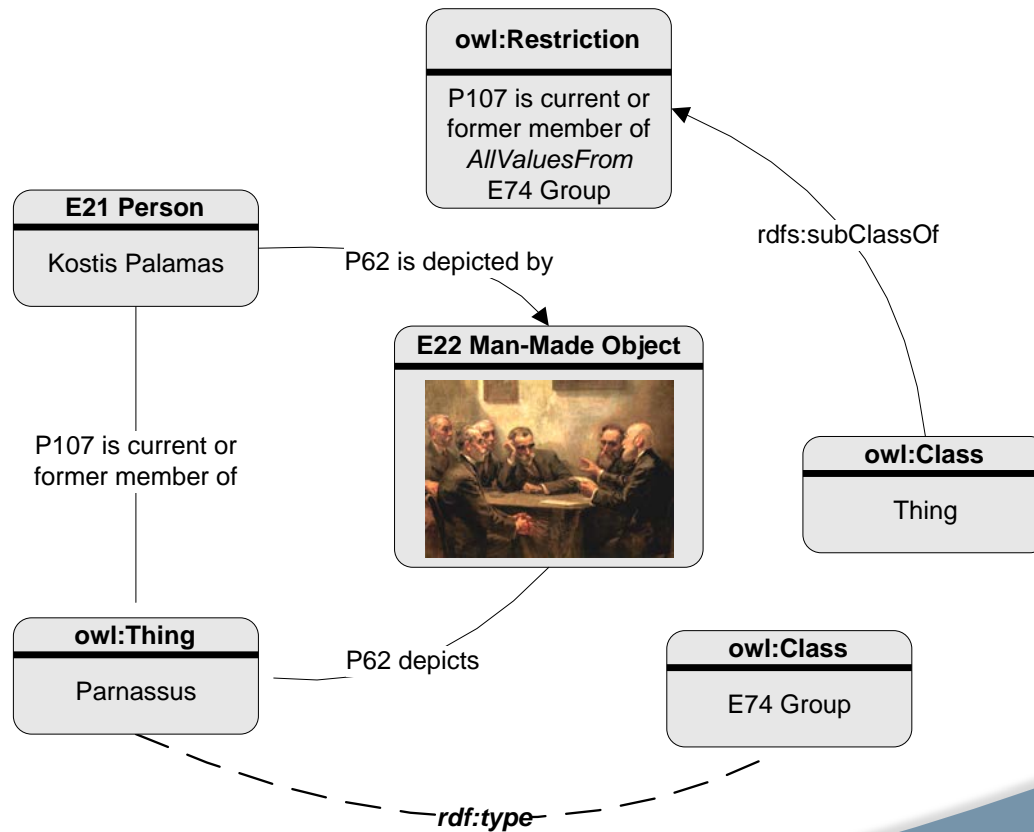
Why useful to have CRM ontology is a more expressive language (e.g., OWL)?

- ⇒ Enables **reasoning** on and **discovery** of cultural heritage information over **distributed** knowledge resources

LIDO, STAR, the Arachne project, SCULPTEUR, Museum of New Zealand, ... use CRM

CIDOC-CRM in OWL – An example

Using the CRM ontology: Disambiguation of the term “Parnassus” in an example about the poet Kostis Palamas




JeromeDL - Semantic Search Service

Browse e-Library

- This Digital Library's Homepage
- Technical reports(26)
- In books(11)
- Masters thesis(24)
- Articles(35)
- Books(11)
- Proceedings(10)
- In collections(1)
- In proceedings(289)
- PhD thesis(1)
- Deliverables(111)

Browse Collections

 **Publications from Corrib (86)**

Semantic browse

- Browse with Exhibit
- Filter with Tags

Search for Resources

- Simple search
- Advanced search
- Semantic search
- SQE search

DL Research

- JeromeDL project web page
- MarcOnt Initiative web page

Results of search for the resources with RDF and NL interface


























Natural Language Query

RDF Query

```
SELECT DISTINCT r FROM {r} marcont:hasCreator {c}, [{c} foaf:name {fname}] WHERE  
fname LIKE "*Kruk*" USING NAMESPACE marcont = <http://www.marcont.org/ontology#>,  
foaf = <http://xmlns.com/foaf/0.1/>
```

Query Language **SeRQL** Result Format **rdf+n3**

Search results Results 1 - 10 of 97

- ▶  **Hee-Chul Choi**,  **Sebastian Ryszard Kruk**,  **Slawomir Grzonkowski**,  **Stankiewicz Katarzyna**,  **Brian Davis**,  **John G. Breslin** : *Trust Models for Community-Aware Identity Management*
- ▶  **Vit Novacek**,  **Siegfried Handschuh**,  **Diana Maynard**,  **Loredana Laera**,  **Sebastian Ryszard Kruk**,  **Max Völkel**,  **Tudor Groza**,  **Valentina Tamma** : *D2.3.8v1 Report and Prototype of Dynamics in the Ontology Lifecycle*
- ▶  **Mateusz Marmołowski**,  **Maciej Dąbrowski**,  **Michał Nowacki**,  **Szymon Pająk**,  **Sebastian Ryszard Kruk** : *MarcOnt Portal User Guide*
- ▶  **Sebastian Ryszard Kruk**,  **Stefan Decker**,  **Bernhard Haslhofer**,  **Predrag Knezevic**,  **Sandy Payette**,  **Dean Krafft** : *Tutorial on Semantic Digital Libraries (WWW'2007)*

SIMILE

SIMILE'S Longwell - A web-based RDF faceted browser

The screenshot shows the Longwell web-based RDF faceted browser interface in Mozilla Firefox. The browser window title is "Longwell - Mozilla Firefox". The address bar shows the URL: <http://metaphor.mit.edu/repertoire/default?facadeURI=http%3A%2F%2Fsimile.mit.edu%2F2005%2F04%2Fflair%2Ffacades%23marais&command=browse&...>

The main content area displays the "Repertoire" (Faceted browsing prototype) for the "101, rue St-Antoine". The page shows 71 items, sorted by label [A to Z]. The current item is "101, rue St-Antoine" with the URI [\[URI\]](#). The item description includes a photo of the entrance to the Lycée Charlemagne, a text description, and a list of themes: Education. The item is dated 1990.

The right sidebar contains several faceted search filters:

- Social category**: Type here to filter. "Gens du Peuple" (16), "L'Aristocratie" (10), "La Royauté/Les Empereurs" (5), "Les Ecrivains" (3), "Les Philosophes" (3), "La Royauté" (2).
- Lieux**: Type here to filter. "Rues et Adresses" (16), "Places" (12), "Bâtiments civiques" (9), "La Seine" (9), "Monuments/Statues/Plaques" (7), "Eglise/cloître/monastère" (6).
- Era**: Type here to filter. "17e siècle" (21), "19e siècle" (17), "Moyen Ages" (12), "18e siècle" (9), "16e siècle" (7), "20e siècle" (6).
- Themes**: Type here to filter. "Scènes de rue" (18), "Architecture" (15), "Habillement" (15), "Cartographie" (8), "Loisirs" (8), "Gouvernement / La politique" (7).
- Type**: Type here to filter.

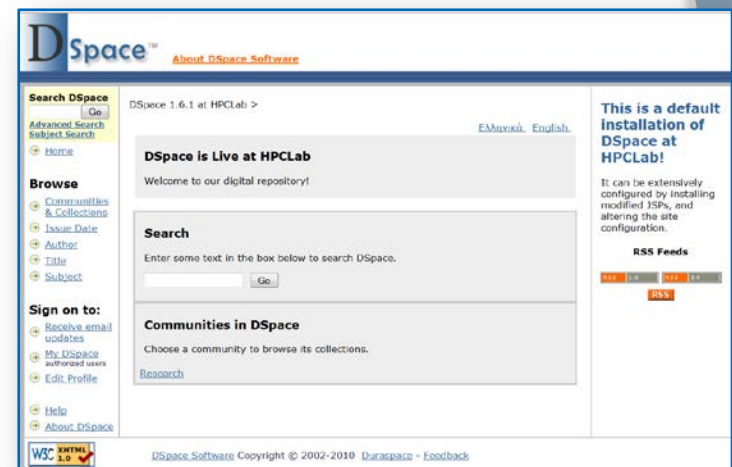
The bottom of the browser window shows the "Done" status bar and the "zotero" and "Adblock" extensions.

Semantic Search for DSpace

An advanced “semantic” search facility implemented for the DSpace digital repository system

<https://wiki.duraspace.org/display/DSPACE/Kotsomit>

- ◎ Semantics for DSpace metadata
 - Knowledge discovery (high, OWL 2 expressivity)
 - Automatic model population
 - Alleviate the “bootstrapping” problem
- ◎ Novel Semantic Services
 - Augment traditional search and navigation
 - Intelligent retrieval and discovery
 - “Plug-in” philosophy
- ◎ Interoperable design
 - Easy to integrate in any digital repository (OAI-PMH)
 - Straightforward integration with other schemata (e.g. IEEE-LOM)
 - Semantic interoperability



<http://www.dspace.org/>

Workshop Presentations

- ◎ Part I: *Cultural Heritage Ontologies and Applications*
 - Semantic collection management on the Web
 - Intelligent mash-ups
 - Applications of the CIDOC-CRM reference model

Workshop Presentations

◎ Part II: *Web-based Collections and Digital Libraries*

- Semantic metadata manipulation of bibliographic resources
- Data integration using well-recognized standards (RDF, SKOS, ...)
- Efficient data management and cataloguing
- Personalization techniques

Workshop Program

10:30-12:30	Session I: Cultural Heritage Ontologies and Applications
	Welcome and Workshop Opening
10:30-10:50	Semantic Web and Reasoning for Cultural Heritage and Digital Libraries: An Overview <i>Dimitrios A. Koutsomitropoulos</i>
10:50-11:15	Intelligent Book Mashup: Using Semantic Web Ontologies and Rules for User Personalisation <i>Aikaterini Kalou, Tzanetos Pomonis, Dimitrios Koutsomitropoulos, Theodore S. Papatheodorou</i>
11:15-11:40	Museum of London - Collections Information Integration Module <i>Alex Bromley, Rob Tice</i>
11:40-12:05	Toward a Novel Application of CIDOC CRM to Underwater Archaeological Surveys <i>Olivier Curé, Mariette Sérayet, Odile Papini, Pierre Drap</i>
12:05-12:30	Detecting Shape Similarities in 3D Pottery Repositories <i>Anestis Koutsoudis, George Pavlidis, Christodoulos Chamzas</i>
12:30-13:45	Lunch
13:45-15:45	Session II: Web-based Collections and Digital Libraries
13:45 - 14:10	A Bi-directional Semantic Framework for Bibliographic Metadata <i>John Del Corral, Benno Blumenthal</i>
14:10 - 14:35	The Use of SKOS Vocabularies in Digital Repositories: The DSpace Case <i>Georgia Solomou, Theodore S. Papatheodorou</i>
14:35 - 15:00	Proposal of a Goal-Oriented Shared Catalog Model <i>Alicia Sellès Carot, Enrique Orduna-Malea, Jorge Serrano-Cobos, Nuria Lloret Romero</i>
15:00 - 15:25	A Semantic Web Personalizing Technique: The Case of Bursts in Web Visits <i>Dimitris Antoniou, Mersini Paschou, Efrosini Sourla, Athanasios Tsakalidis</i>
15:25-15:45	Discussion - Closing

Program Committee

- *Andreas Andreou, Cyprus University of Technology, Cyprus*
- *Panayiotis Bozanis, University of Thessaly, Greece*
- *Christodoulos Chamzas, Democritus University of Thrace, Greece*
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Semantic Web Journal Special Issue

- ◎ **SWJ Special Issue on SWARCH-DL** (IOS Press)
 - <http://www.semantic-web-journal.net/>
- ◎ Call out in **October 2010**
- ◎ Editors:
 - *Dimitrios Koutsomitropoulos*, Univ. Patras
 - *Eero Hyvönen*, Aalto University
 - *Theodore Papatheodorou*, Univ. Patras
- ◎ **Open** review process
- ◎ Submissions until **end Jan. 2011**
 - 15-25 pages

Thank you for your participation to SWARCH-DL 2010!

Your feedback is welcome!

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