

# STELLAR

## STAR/STELLAR Case Study: Complementary use of ontologies and (other) KOS

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Arts & Humanities  
Research Council



# Presentation

- Differences between thesauri and ontologies?
- STAR/STELLAR project case study  
Linked data project with archaeological excavation datasets  
Produced tools for non-experts to map/extract RDF
- Possibilities for interoperability
- How to consider typical purpose of a KOS?

# Factors governing types of KOS (from NKOS 2006)

## (AI) Ontology – revisited on *purpose*

### ***Entities***

Concepts, terms, strings,

Atomic - Composite (attributes)

Enumerative - Synthetic

Low – medium - high degree precombination (coordination in KOS itself)

Size: small – large

Depth: small – medium - large

### ***Relationships (internal)***

Types / expressivity of relationships:

low (core set) – medium – high (definable)

concept-concept, concept-term, term-term

monohierarchies - polyhierarchies

Formality: low – medium – high

### ***Typical application to objects in domain of interest***

Metadata element: subject, various elements, general

Granularity of application objects: un/structured; discrete individual / general (document)

Relationship applying concepts to objects in domain

Extent of Interactive/automatic use -- information seeking tactics/logical inferencing

about (fuzzy), instance

Exhaustivity: low - high

Specificity: low - high

Coordination: low – high - expressivity and formality of relationships in coordination

# STELLAR

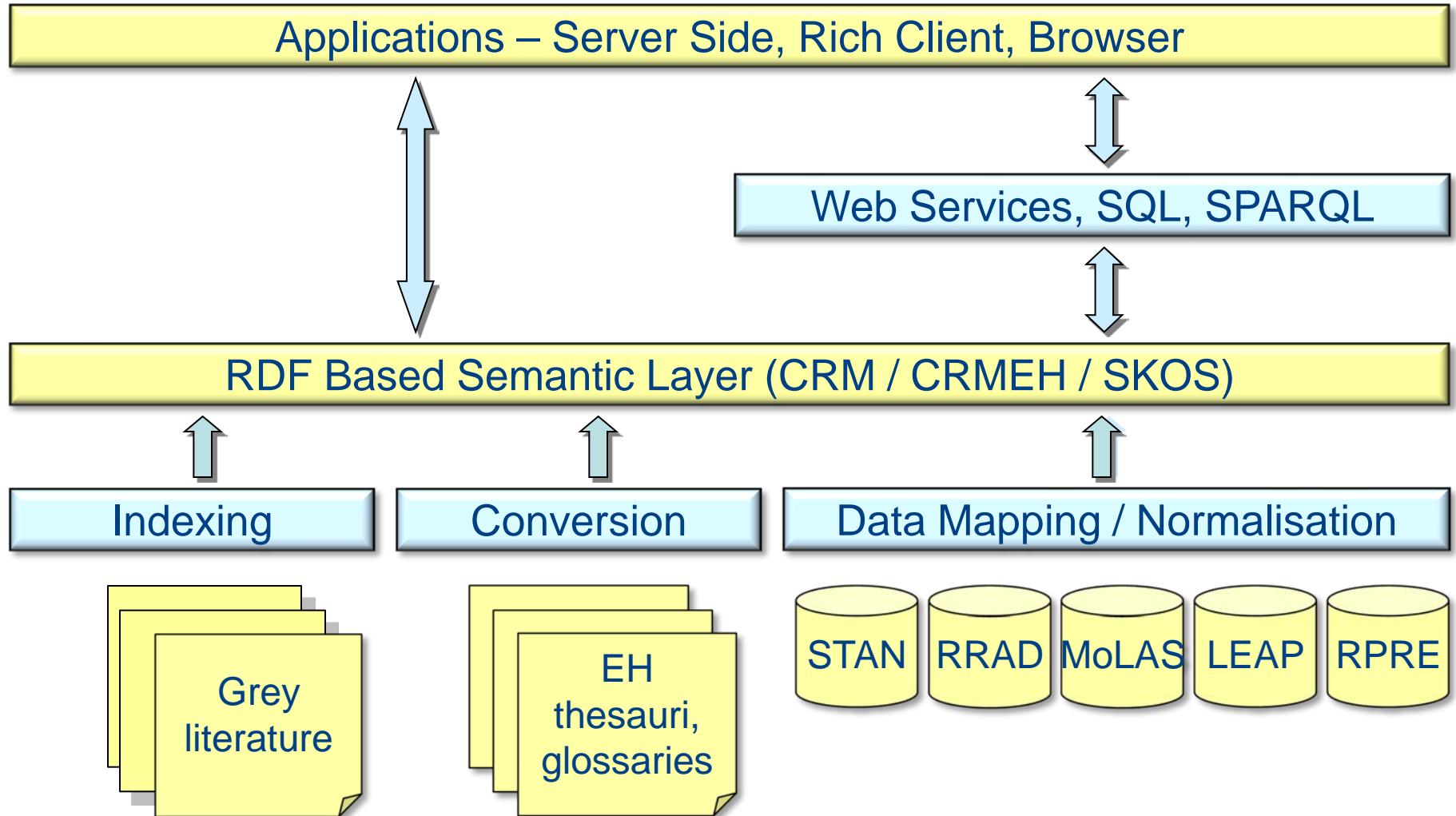
- 12 month AHRC funded project
  - Hypermedia Research Unit, University of Glamorgan
  - Archaeology Data Service, University of York
  - English Heritage Centre for Archaeology, Portsmouth
- Builds on previous 3 year AHRC funded STAR Project
- Acknowledgments

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Keith May, English Heritage (EH)  
Stuart Jeffrey, Julian Richards,  
    Archaeology Data Service (ADS)  
    Archaeology Department, University of York

# STAR – Aims and background

- *Investigate semantic technologies for integrating and cross searching datasets and associated grey literature*
- Current situation - fragmented datasets with different terminology
- Lack of semantic interoperability and cross search
- Need for integrative metadata framework  
CIDOC CRM (ISO standard) as high level, core ontology  
together with the CRM-EH archaeological extension of the CRM  
  
along with relevant EH thesauri and glossaries

# STAR Project - General Architecture



## EH Monuments Type Thesaurus

# Knowledge Organization Systems

- English Heritage thesauri
- Reengineering to ontology would be significant effort (and would change them)
- STAR holds thesauri in SKOS

Applies concepts to instances of CRM classes via E55 Type

- [WORKHOUSE](#)
- [RUBBISH PIT](#)
- [SADDLERY](#)
- [SERGEANTS MESS](#)
- [SERVANTS HALL](#)
- [SERVICE WING](#)
- [SETTLEMENT](#)
  - [CONSTRUCTION CAMP](#)
  - [CRANNOG](#)
  - [DESERTED SETTLEMENT](#)
  - [DISPLACED PERSONS CAMP](#)
  - [ENCLOSED SETTLEMENT](#)
    - [BURH](#)
    - [CLOTHES LINE ENCLOSURE](#)
    - [ENCLOSED HUT CIRCLE SETTLEMENT](#)
    - [ENCLOSED OPPIDUM](#)
    - [HILLFORT](#)
      - [BIVALLATE HILLFORT](#)
      - [MULTIPLE ENCLOSURE FORT](#)
      - [MULTIVALLATE HILLFORT](#)
      - [UNIVALLATE HILLFORT](#)
    - [HILLTOP ENCLOSURE](#)
      - [PALISADED HILLTOP ENCLOSURE](#)
    - [OPPIDUM](#)
      - [ENCLOSED OPPIDUM](#)
    - [PALISADED ENCLOSURE](#)
    - [PALISADED HOMESTEAD](#)
    - [PALISADED SETTLEMENT](#)
    - [PROMONTORY FORT](#)
      - [CLIFF CASTLE](#)
    - [ROUND](#)
  - [EXTRA MURAL SUBURB](#)
  - [HAMLET](#)
  - [HOMESTEAD](#)
  - [HOUSING ESTATE](#)

# Natural Language Processing (NLP)

of archaeological grey literature

Extract key concepts in same semantic representation as for data.

Allows unified searching of different datasets and grey literature  
in terms of same underlying conceptual structure

**“ditch containing prehistoric pottery dating to the Late Bronze Age”**

---

EHE1002.ContextFindProductionEvent

---

prehistoric pottery dating to the Late Bronze Age

EHE0009.ContextFind

EHE0039.TimeSpanAppellation

pottery [#ehg027.2]

Late Bronze Age [#134734]

EHE1004.ContextFindDepositionEvent

---

ditch containing prehistoric pottery

EHE0007.Context

EHE0009.ContextFind

ditch [#ehg003.20]

pottery [#ehg027.2]

---



# Information extraction is context dependent

Annotation terms – ontology **not an instance relationship**  
but a less certain relationship

form of ring ditches or ploughed out barrows, to the south of the study area.

1.15 A number of stray finds of Mesolithic, Neolithic and Bronze Age stone and flint implements have been recorded within 1km to the north and east of the present site (SMR nos 6531, 6591, 6595 and 6598). No evidence of settlements of these dates has been recovered from the vicinity of the study area.

## 1 Roman

1.16 Evidence for Roman activity in the immediate vicinity of the study area is relatively sparse. No settlement of this period has yet been identified nearby, but an archaeological evaluation on land at Tunbridge Lane, approximately 700m to the north-east, revealed a number of ditched enclosures, possibly agricultural in purpose (Seddon, 2000). The fact that modern field boundaries follow the alignment of the Roman enclosure ditches suggests that the basic layout of the landscape may have changed very little since then. The quantity of pottery sherds and other finds recovered from the ditches suggest occupation in the vicinity. Pottery sherds were also recovered by a metal detectorist on a building site, approximately 550m to the north of the study area (SMR no 6586).

Land off Bell Road, Bottisham, Cambs Evaluation Report

HN310\dba.sam Page 5

1.17 The remains of a large building were discovered in Swaffham Bulbeck at NGR TL 559 613, approximately 2.5km to the north-east of the present site. The evidence included ceramic roofing tile and opus signinum.

1.18 The lodes, or canals, running south-east from the river Cam to Swaffham Bulbeck and Lode were originally thought to date to the Roman period. The lack of major Roman occupation sites close to the lodes makes this unlikely. David Hall (Hall, 1996, p112) has demonstrated that they are much more likely to be Saxon or early medieval in date. The southern end of the canal into Lode is approximately 3km north-west of the present site.

## 1 Anglo-Saxon

1.19 Although no finds of Saxon date have been recovered from the vicinity of the present site, the Domesday Survey apparently records a sizeable and well established village, which

# STAR Demonstrator – search for a conceptual pattern

An research publication on one of the (Silchester Roman) datasets we used in STAR discusses the finding of a *coin* within a *hearth*.  
-- does the same thing occur in any of the grey literature reports?

Requires comparison of extracted data with NLP indexing in terms of the ontology and the vocabularies.

The screenshot displays the STAR Demonstrator interface, which is divided into several panels. On the left, a sidebar contains a tree view of the ontology, with nodes such as Site, Context ID, Context Type, Context Notes, Within Group, Within Context, Contains Context, Contains Context Find, Contains Context Sample, Stratigraphically Above Context, Stratigraphically Below Context, and Stratigraphically Equal To Context. Below this tree is a 'Run Query' button. The main area of the interface is divided into four panels: 'Group Details', 'Context Details', 'Context Sample Details', and 'Context Find Details'. Each panel displays a hierarchical tree diagram and a list of attributes. The 'Group Details' panel shows a tree with a green root node and two orange child nodes, with attributes Site, Group ID, Location, and Group Type. The 'Context Details' panel shows a tree with a green root node and three orange child nodes, with attributes Site, Context ID, Context Type, and Context Notes. The 'Context Sample Details' panel shows a tree with an orange root node and a red child node, with attributes Site, Sample ID, Sample Type, and Sample Notes. The 'Context Find Details' panel shows a tree with an orange root node and a blue child node, with attributes Site, Find ID, Find Type, Find Dating, and Material.

# STAR Demonstrator – search for a conceptual pattern

## Research paper reports finding a *coin in hearth* – exist elsewhere?

Groups

Contexts

Finds

Samples

+

 Site

+

 Context ID

-

 Context Type

hearth

+

 Context Notes

+

 Within Group

+

 Within Context

+

 Contains Context

-

 Contains Context Find

+

 Find ID

-

 Find Type

COIN

+

 Find Material

+

 Find Notes

+

 Contains Context Sample

+

 Stratigraphically Above Context

Run Query

#archaeol8-6428.134861

#archaeol8-6428.134875

6637

3 results

Group Details



#ehe0001.leap

Group ID

50033

Location

Group Type

Group Notes

Timber building pre-dating circular structure

<http://tempuri/star/base#ehe0005.leap.objects.object.50033>

Context Details

Hierarchy

Stratigraphy



Site

#ehe0001.leap

Context ID

6637

Context Type

Hearth

<http://tempuri/star/base#ehe0007.leap.contexts.context.6637>

Context Sample Details



Site

[not set]

Sample ID

[not set]

Sample Type

[not set]

Sample Notes

<http://tempuri/star/base#ehe0009.leap.finds.id.sf4077>

Context Find Details



Find Type

Coin Illegible

Find Dating

1st C BC, 1st C AD

Material

Silver

Find Notes

<http://tempuri/star/base#ehe0009.leap.finds.id.sf4077>

# STELLAR outcomes

- Make it easier to map and extract datasets to CIDOC CRM ontology
- Generalise the data extraction tools produced by STAR so third party data providers can use them
- Develop methods for mapping and extraction of archaeological datasets into RDF/XML conforming to CIDOC CRM and CRM-EH ontology with unique global identifiers for entities and concepts (http URIs) for publication as linked data
- Resulting linked data available from ADS website  
<http://data.archaeologydataservice.ac.uk>
- Freely available tools and guidelines/tutorials

# STELLAR outcomes


- In practice mapping to CRM has tended to require specialist knowledge of the ontology and been resource intensive
- STELLAR tools convert archaeological data to CRM/RDF in a consistent manner, without requiring detailed knowledge of the underlying ontology
- User chooses a template for a particular data pattern and supplies the corresponding input from their database (combination of optional elements with a mandatory ID)
- STELLAR templates for
  - CRM-EH archaeological extension to the CIDOC CRM
  - Some more general CIDOC CRM templates conforming to the CLAROS Project format
  - SKOSifying a glossary/thesaurus connected with the dataset

# STELLAR applications


<http://hypermedia.research.glam.ac.uk/resources/STELLAR-applications/>


# STELLAR


An application for converting delimited (CSV) format data to valid RDF data conforming to a chosen 'template'.

Delimited Data File 


test\_crneh\_contexts\_strat\_lower\_id.csv


Template name 

CRMEH\_CONTEXTS 


Namespace prefix 


<http://stellar/>

Validator 



Type the two words:  
absolown regard



**Results** 

[uis33qv1.rdf](#)  
(the download link will remain available on the server for 30 minutes, after which it will be automatically deleted)

-----  
Statistics  
-----  
5 unique subject URIs  
8 unique object URIs  
1 unique literals using 1 languages  
3 unique class URIs:  
<[http://purl.org/crmeh#EHE0007\\_Context](http://purl.org/crmeh#EHE0007_Context)> [1]  
<[http://purl.org/crmeh#EHE0061\\_ContextUID](http://purl.org/crmeh#EHE0061_ContextUID)> [1]  
<[http://purl.org/crmeh#EHE1001\\_ContextEvent](http://purl.org/crmeh#EHE1001_ContextEvent)> [2]  
14 statements, using 9 predicate URIs:  
<<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>> [4]  
<<http://www.w3.org/2000/01/rdf-schema#label>> [1]  
<<http://www.w3.org/1999/02/22-rdf-syntax-ns#value>> [1]  
<[http://purl.org/NET/crm-ow#P87\\_is\\_identified\\_by](http://purl.org/NET/crm-ow#P87_is_identified_by)> [1]  
<[http://purl.org/NET/crm-ow#P87i\\_identifies](http://purl.org/NET/crm-ow#P87i_identifies)> [1]  
<[http://purl.org/NET/crm-ow#P7\\_took\\_place\\_at](http://purl.org/NET/crm-ow#P7_took_place_at)> [2]  
<[http://purl.org/NET/crm-ow#P7i\\_witnessed](http://purl.org/NET/crm-ow#P7i_witnessed)> [2]  
<[http://purl.org/NET/crm-ow#P120\\_occurs\\_before](http://purl.org/NET/crm-ow#P120_occurs_before)> [1]  
<[http://purl.org/NET/crm-ow#P120i\\_occurs\\_after](http://purl.org/NET/crm-ow#P120i_occurs_after)> [1]

```
STELLAR.Console v1.0
(type HELP for instructions)

STELLAR.Console>help
For information on a particular command type HELP command
DBNAMES      List databases in a directory
DBTABLES     List tables in a database
DBCOLUMNS   List columns in a database table
DBROWCOUNT  Count rows in a database table
TAB2DB       Import tab delimited file to database table
CSU2DB       Import comma delimited file to database table
SQL2CSU      Run SQL, export result to CSU file
SQL2TAB      Run SQL, export result to tab delimited file
CSU2RDF      Convert comma delimited file to RDF file (via template)
TAB2RDF      Convert tab delimited file to RDF file (via template)
SQL2RDF      Run SQL, export result to RDF file (via template)
TEMPLATES    Display list of possible templates to use
CSU2STATS    Display statistics for comma delimited file
RDF2STATS    Display statistics for RDF file
EXIT         Exit the application

STELLAR.Console>
```

## STELLAR.Console

## STELLAR.Web



# Machine readable vs machine understandable



## What we say to the machine:

<h1>The Cat in the Hat</h1>

<ul>

<li>ISBN: 0007158440</li>

<li>Author: Dr. Seuss</li>

<li>Publisher: Collins</li>

</ul>

## What the machine understands:

<h1>ασδ πλυ βγ ιτη μψσ</h1>

<ul>

<li>φωφρ: 0007158440</li>

<li>τυψροκ: Δρ. Σευσσ</li>

<li>Πυβλισηερ: Χολλινσ</li>

</ul>

## (more) machine understandable



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# (getting more) machine understandable



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<li>Πυβλισηερ: Χολλινσ</li>

</ul>

Book

ID



Author

Publisher

metadata

structure

(ontology)

# (getting more) machine understandable



What we say to the machine:

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<ul>

<li>**ISBN:** 0007158440</li>

<li>**Author:** Dr. Seuss</li>

<li>**Publisher:** Collins</li>

</ul>

**Theodor  
Geisel**

What the machine understands:

<h1>ασδ πλν βγ ιτη μψ</h1>

<ul>

<li>φωφρ: 0007158440</li>

<li>ψυψροκ: Δρ. Σευσσ</li>

<li>Πυβλισηερ: Χολλινσ</li>

</ul>

Book

ID



Author

Publisher

metadata

structure

(ontology)

vocabularies for  
terminology and  
knowledge  
organization

# (getting more) machine understandable

## Complementary use?



What we say to the machine:

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<ul>

<li>ISBN: 0007158440</li>

<li>Author: Dr. Seuss</li>

<li>Publisher: Collins</li>

</ul>

What the machine understands:

<h1>ασδ πλυ βγ ιτη μψ</h1>

<ul>

<li>φωφρ: 0007158440</li>

<li>ψυψροκ: Δρ. Σευσσ</li>

<li>Πυβλισηερ: Χολλινσ</li>

</ul>

Book ID  
Author Publisher

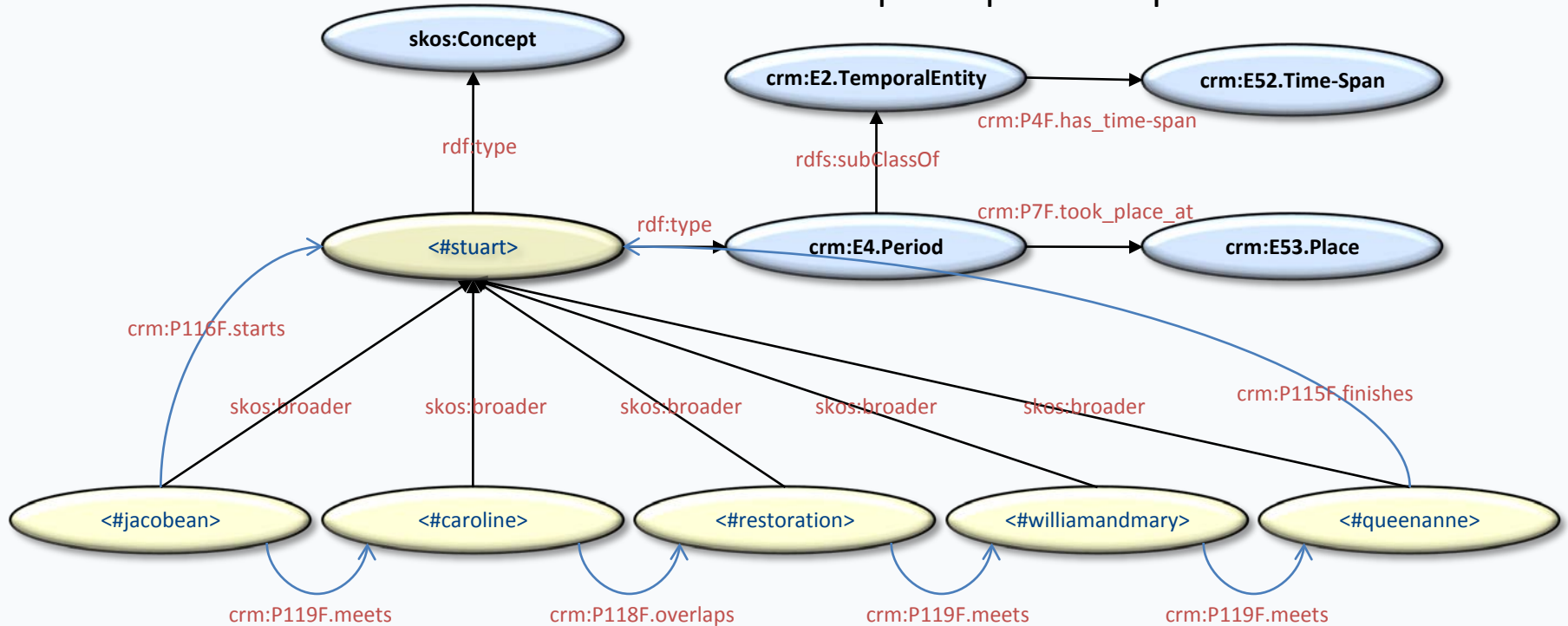
metadata  
element sets

(ontology)

Value  
vocabularies  
(KOS)

# Combining SKOS Concepts + CRM Classes

Time period concepts have  
implicit spatio-temporal context



# Complementary use?

search - Mozilla Firefox

File Edit View History Bookmarks Tools Help

search

http://eculture.cs.vu.nl/europeana/session/search?query=berlin&type=http%3A%2F%2Ffe-culture.multimedian.nl%2Fns%2

Europeana think culture

login | help | feedback | admin | English

keyword: berlin artefact

works created by matching person (10)

Amphore à col à figu...  
Peintre de Berlin

Stamnos à figures ro...  
Peintre de Berlin

Amphore à figures ro...  
Peintre de Berlin

Amphore à col à figu...  
Peintre de Berlin

Cratère en cal...  
Peintre de B

works showing Resource (6)

Gevel met ramen van ...  
Fastenaekens, Gilbert

Kriegsmarine  
Anonymous

Leden van de FDJ, de...  
ADN-Zentralbild

Erich Honecker  
ADN-Zentralbild

Herdenking aan gesne...  
ADN-Zentralbild

works related to Resource (23)

humboldt

artefact

portret Alex von Humboldt  
carte-de-visite Linde, E.

concept view all 7 results

Humboldt  
philologist

Humboldt  
natural scientist

Humboldt current  
ocean current

location

Humboldt (Canada)

person

Humboldt

Humboldt, Alexander von  
German draftsman

Humboldt, Friedrich Wilhelm  
Hein...  
1769 1859

metadata  
element sets  
(ontology)

Value vocabularies  
(KOS)



# Complementary use?

search - Mozilla Firefox

File Edit View History Bookmarks Tools Help

search +

http://eculture.cs.vu.nl/europeana/session/search?query=berlin&type=http%3A%2F%2Fculture.multimedien.nl%2Fns%2

europaana  
think culture

login | help | feedback | admin | English

humboldt

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concept view all 7 results

Humboldt  
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German draftsman

Humboldt, Friedrich Wilhelm  
Hein...  
1769 1859

Cratère en cal  
Peintre de B

Herdenking aan gesne...  
ADN-Zentralbild

works created by matching person (10)

via

Upper ontology explicitly linked  
to reengineered thesauri?

Lot of work to 'clean' structure?

or

Leaf node mapping?

Does that help logical reasoning?

or

Connected via instance attributes?

works showing Resource (6)

works related to Resource (23)

Gevel met ramen van ...  
Fastenaekens, Gilbert

Kriegsmarine  
Anonymous

Leden van de FDJ, de...  
ADN-Zentralbild

Erich Honecker  
ADN-Zentralbild

metadatas  
element sets  
(ontology)

Value vocabularies  
(KOS)

# Complementary use?

search - Mozilla Firefox

File Edit View History Bookmarks Tools Help

search

http://eculture.cs.vu.nl/europeana/session/search?query=berlin&type=http%3A%2F%2Fculture.multimedien.nl%2Fns%2F...

europeana think culture

login | help | feedback | admin | English

humboldt

artefact

portret Alex von Humboldt  
carte-de-visite Linde, E.

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Humboldt  
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location

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Hein...  
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Amphore à col à figu...  
Peintre de Berlin

Stamnos à figures ro...  
Peintre de Berlin

Amphore à figures ro...  
Peintre de Berlin

Amphore à col à figu...  
Peintre de Berlin

Cratère en cal...  
Peintre de B

Herdening aan gesne...  
ADN-Zentralbild

ADN-Zentralbild

**Metadata elements - logical reasoning**  
**Value vocabularies - retrieval**

**Can we distinguish different types of use cases for logical reasoning for retrieval oriented applications?**

**How much to express in ontology (metadata) and how much in value thesaurus (KOS)?**

**How best to combine the two modes in a retrieval/integration application?**

**metadata element sets (ontology)**

**Value vocabularies (KOS)**

# Contact Information

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<http://hypermedia.research.glam.ac.uk/kos/STAR/>

<http://hypermedia.research.glam.ac.uk/kos/STELLAR/>

<http://data.archaeologydataservice.ac.uk>



# 5 sets of interactions

between information-seeking factors (Marchionini 1995)

a) External representation of info item's sought

can be well-defined or poorly defined and difficult to recognise.

This is influenced mainly by knowledge domain and system.

eg Discrete item or large composite multi-faceted item (article, book)?

b) Mental representation of item sought

Can be well known or fuzzy - influenced mainly by task and user's knowledge of domain

c) Organisation of info in the DBs examined

Can be highly organised or unstructured - influenced mainly by system and setting

d) How *interactive* are the browsing strategies

influenced mainly by system, setting and user's mental models

e) The cognitive effort involved in browsing

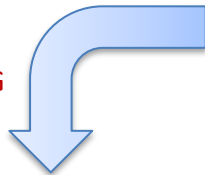
influenced mainly by setting and user's experience and current mental and emotional states

# Purpose?

- Thesauri
  - Assist humans and machines in retrieval
  - Tactics/moves to support
    - Indexing for search of documents
    - Classification for browsing and search
  - Built on aboutness relationship for subject metadata
    - only partial agreement indexers and relevance judgments
- Ontologies
  - Model a world with precise relationships – tends towards high degree of specificity?
  - Classes and instances – definition by extension, possibly also categorical
  - Individual objects are instances of classes
  - Affordance of general logic based reasoning - Declarative
  - Constancy of concept meaning
  - Agreement in precise meaning

# User defined templates

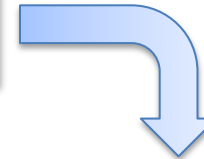
CSV2STG



isbn,title,author  
1234567890, Winnie the Pooh, A.A. Milne  
2345678901, Alice in Wonderland, Lewis Carrol  
3456789012, The Cat in the Hat, Dr. Seuss

Delimited (CSV) data file

CSV2STG



```
group books_to_html;  
  
HEADER() ::= <<  
  <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">  
  <html>  
  <head>  
    <title>List of books</title>  
  </head>  
  <body>  
  
>>  
  
FOOTER() ::= "</body></html>"  
  
MAIN(data) ::= <<  
  $HEADER()$  
  
  <h1>List of books:</h1>  
  <table border=1>  
    $data:{ record |  
      <tr>  
        <td>$record.isbn$</td>  
        <td>$record.title$</td>  
        <td>$record.author$</td>  
      </tr>  
    }$  
  </table>  
  
  $FOOTER()$  
>>
```

Template  
to convert  
the data  
to HTML

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">  
<html>  
<head>  
  <title>List of books</title>  
</head>  
<body>  
  
<h1>List of books:</h1>  
<table border=1>  
  
  <tr>  
    <td>1234567890</td>  
    <td>Winnie the Pooh</td>  
    <td>A.A. Milne</td>  
  </tr>  
  
  <tr>  
    <td>2345678901</td>  
    <td>Alice in Wonderland</td>  
    <td>Lewis Carrol</td>  
  </tr>  
  
  <tr>  
    <td>3456789012</td>  
    <td>The Cat in the Hat</td>  
    <td>Dr. Seuss</td>  
  </tr>  
</table>  
</body></html>
```

## List of books:

1234567890	Winnie the Pooh	A.A. Milne
2345678901	Alice in Wonderland	Lewis Carrol
3456789012	The Cat in the Hat	Dr. Seuss

```
group books_to_rdf;  
  
HEADER() ::= <<  
  <?xml version="1.0" encoding="UTF-8"?>  
  
  <rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" xmlns:xsd="http://www.w3.org/2001/XMLSchema#" xmlns:dc="http://purl.org/dc/elements/1.1/">  
  
>>  
  
FOOTER() ::= "</rdf:RDF>"  
  
MAIN(data) ::= <<  
  $HEADER()$  
  
  $data:{ record |  
    <rdf:Description rdf:about="http://tmp/$record.isbn$">  
      <dc:identifier>ISBN $record.isbn$</dc:identifier>  
      <dc:title>$record.title$</dc:title>  
      <dc:creator>$record.author$</dc:creator>  
      <dc:format>Book</dc:format>  
    </rdf:Description>  
  }$  
  
  $FOOTER()$  
>>
```

Template  
to convert  
the data  
to RDF

```
<?xml version="1.0" encoding="UTF-8"?>  
  
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" xmlns:xsd="http://www.w3.org/2001/XMLSchema#" xmlns:dc="http://purl.org/dc/elements/1.1/">  
  
  <rdf:Description rdf:about="http://tmp/1234567890">  
    <dc:identifier>ISBN 1234567890</dc:identifier>  
    <dc:title>Winnie the Pooh</dc:title>  
    <dc:creator>A.A. Milne</dc:creator>  
    <dc:format>Book</dc:format>  
  </rdf:Description>  
  
  <rdf:Description rdf:about="http://tmp/2345678901">  
    <dc:identifier>ISBN 2345678901</dc:identifier>  
    <dc:title>Alice in Wonderland</dc:title>  
    <dc:creator>Lewis Carrol</dc:creator>  
    <dc:format>Book</dc:format>  
  </rdf:Description>  
  
  <rdf:Description rdf:about="http://tmp/3456789012">  
    <dc:identifier>ISBN 3456789012</dc:identifier>  
    <dc:title>The Cat in the Hat</dc:title>  
    <dc:creator>Dr. Seuss</dc:creator>  
    <dc:format>Book</dc:format>  
  </rdf:Description>  
</rdf:RDF>
```