



Linked Heritage, Terminologies & Multilingualism

The development of a Terminology Management Platform

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I/ The Linked Heritage project – Coordination of standards and technologies for the enrichment of Europeana

- Linked Heritage at a glance
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Linked Heritage at a glance



- ❑ **Best Practice Network started on 1st of April 2011**
- ❑ **38 partners from 24 countries and 5 external contributors (such as Russia & Israel)**
- ❑ **Objectives**
 - To contribute large quantities of new content to Europeana (3 millions objects) – cross domain
 - To experiment with the enhancement of the quality of both new and existing Europeana content
 - To demonstrate improved search, retrieval and use of Europeana content
 - For the first time, the private publishing sector is involved to provide content to Europeana

Linked Heritage at a glance



Linked Heritage Work Packages (WP)

WP1 Project Management and Coordination [ICCU]

WP2 Linking Cultural Heritage Information [CT]

WP3 Terminology [KMKG & MCC]

WP4 Public Private Partnership [Editeur]

WP5 Technical Integration [NTUA]

WP6 Coordination of Content [CyI]

WP7 Dissemination & Training [UniPD & ICCU]

Linked Heritage at a glance



Linked Heritage thematic working groups (TWG)

WP2 Linking Cultural Heritage Information

WP3 Terminology

WP4 Public-Private Partnership

WP7 E-learning

Open to both consortium partners and external people

Linked Heritage strengths



- ❑ **LIDO:** Interchange standard format elaborated within ATHENA, widely adopted across Europe, allows to transfer rich data (WP2)
- ❑ **PIDs:** Essential for the sustainability of Europeana (WP2)
- ❑ **Terminology:** Experimental work on semantic interoperability of multilingual terminologies (WP3)
- ❑ **Private-public partnership:** Unique case in the EU project landscape (WP4)
- ❑ **MINT:** Aggregation tool for the integration of different standards and harvesting formats, focus on semantic interoperability (WP5)
- ❑ **Millions of items to Europeana:** Linked Heritage contribution to Europeana (WP6)
- ❑ **Dissemination and training:** At national and international level (WP7)

Linked Heritage strengths



Linked Heritage capitalises on the lessons learnt in previous projects to innovate in new projects





II/ Work Package 3: Terminologies & Multilingualism

- Organisation & collaboration
- WP3 objectives

Organisation & collaboration



❑ **WP leaders:** KMKG & MCC

- Coordination of the work, deliverables, training and dissemination

❑ **Technical partners:** Univ. of Savoie, IST, DigiCult, NTUA

- Development of the Terminology Management Platform (TMP)

❑ **Thematic Working Group (TWG):** + 50 members (internal & some external)

- To contribute to WP3 documents & deliverables
- To create, edit, map thesauri using the TMP
- To test and provide feedback on the functionalities of the TMP

WP3 general objectives



- ❑ WP3 will develop a prototype of a **Terminology Management Platform (TMP)** to allow a collaborative creation of a network of multilingual cross-domain thesauri and controlled vocabularies
- ❑ WP3 will experiment in the creation of a **network of multilingual cross-domain Linked Heritage Thesauri** using existing or within the project developed tools
- ❑ WP3 aims to **reduce the gap in terminology management skills** that exists in cultural heritage institutions and the private sector by providing not only tools, but also **guidelines, recommendations and training (materials)**



III/ Development of the Terminology Management Platform (TMP)

- Identification of needs in terminology management
- From theory to practice
- Architectural schema of the TMP
- Prototype version (www.culture-terminology.org)

Identification of needs in terminology management



Athena and Linked Heritage defined that

- ❑ Many museums use an **in-house non-standard terminology**
- ❑ Reason: **Costs** to use a reference terminology (e.g. AAT) or **specific needs** (language, domain...)
- ❑ Often these vocabularies are **only exportable in CSV**, not in XML and not in a standard interoperability schema like SKOS
- ❑ However, these vocabularies could be very useful for:
 - **Alignment of concepts** used in content brought together from different sources and domains
 - **Multilingual access**
 - **Improved search** and **retrieval** of content

From theory to practice



How to create a network of interlinked multilingual vocabularies?

Functional needs identified by Athena WP4 - Benchmark

1. Registration of a terminology in a repository
2. SKOSification of a terminology
3. Search and navigation into a network of vocabularies
4. Mapping of the terminology to another terminology resource
5. Enrichment of a thesaurus
6. Collaborative moderation of an update of the terminology



From theory to practice



WP3 is developing a prototype of a Terminology Management Platform to deal with these needs

The TMP is

- ❑ To be a **web service**: For collaborative work online
- ❑ To have a **user-friendly GUI**: Adapted for a non-expert use in European museums, libraries and archives
- ❑ To combine **open-source** components: Such a service must stay independent of proprietary codes and formats
- ❑ To be **logically** structured with an **intuitive** workflow: The user must find out easily which actions to do according to his/her needs
- ❑ To be **flexible** enough to be adapted to new standards and versions

Architectural schema of the TMP



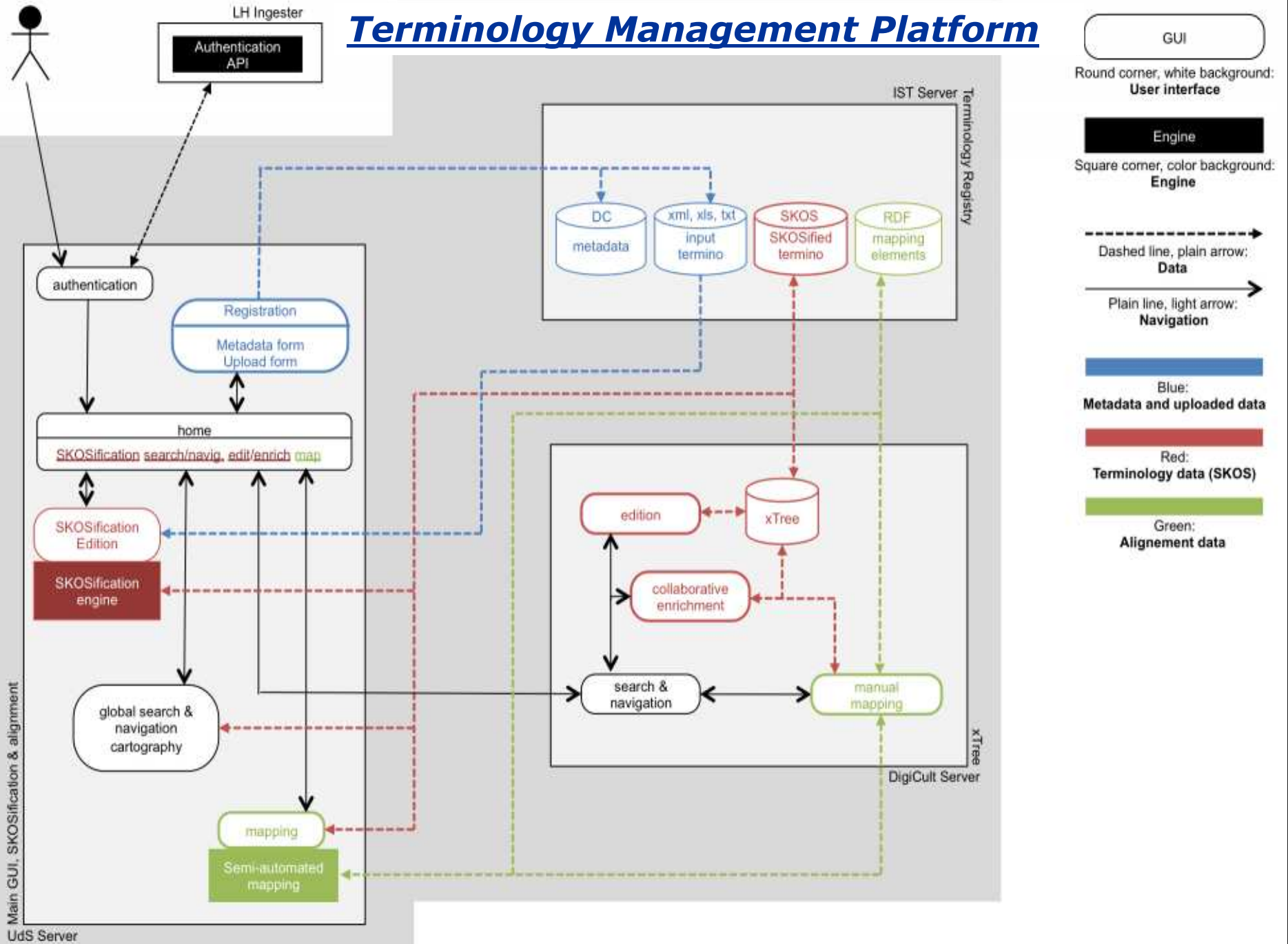
Architectural schema of the TMP

- ☐ Authentication API (NTUA)
- ☐ Terminology registry (IST server)
- ☐ Main GUI, SKOSification & alignment module (UdS server)
- ☐ Editing & mapping module (DigiCult-xTree server)

Beta version on

<http://www.culture-terminology.org/>

Terminology Management Platform



Terminology Management Platform (TMP)



Coordination
of standards and technologies
for the enrichment
of EUROPEANA



Welcome on the Culture Terminology Website, an ongoing effort under the linkedHeritage project.

This website aims to provide a service that allow any cultural institution to import and store his thesaurus.

This service will also allow Institution to map this thesaurus to others thesaurus already imported in the service.

Thesaurus contained in the Culture Terminology will be publicly exposed.

This website is actually an alpha release for testing purpose.

Until this service is under alpha version, be aware that datas you put now can be deleted at anytime.

Stay tuned this situation will change soon !

1) Information

2) Upload datas

3) Modify and map

New Thesaurus form

Please fill this fields in order to import a new Thesaurus

Required Field

Optional Field

Title

A name given to the resource. Typically, a Title will be a name by which the resource is formally known

RMAH Object Name Thesaurus

Type

The nature or genre of the resource. The recommended best practice is to select a value from a controlled vocabulary.

Thesaurus

Subject

The topic of the resource.

other...

Describe

Describe the Subject of the resource

Archaeology, Architecture

Edition

Semantic versioning of the resource (http://semver.org/)

1

Language

A language of the resource.

French x

Creator

An entity primarily responsible for making the resource. This may be a person, organisation or a service.

RMAH ICT Team 3

Publisher

An entity responsible for making the resource available.

RMAH ICT Team 3

Rights

Information about rights held in and over the resource.

Attribution Non-Commercial

Format

The file format, physical medium or dimensions of the resource.

CSV

Import file

Terminology Registry



SKOSification tool

CSV configuration

Choose your field delimiter :

Semicolon
Comma
Tab
Colon
Space

text delimiter :

Use this para

LINKED HERITAGE
Coordination of standards for the enrichment of EUROPEAN

3

1) Information 2) Upload datas 3) Modify

1) Upload your datas

D:\r.wyns\01_LINKED H Bladeren...

2) Configure your import

3) Import !

Bestand uploaden

Zoeken in: KMKG thesauri

Onlangs geopend
Bureaublad
Mijn documenten
Deze computer
Mijn netwerklocaties

KMKG_ClassificationMIM_FR_20120919.xls
KMKG_ClassificationMIM_FR_20120919_1.csv
KMKG_Matière-Technique_FR_20120919.xls
KMKG_Nom de l'objet_FR_20120919.xls
KMKG_Nom de l'objet_FR-NL-EN_20120919.xls
KMKG_Référence Géographique_FR_20120919.xls
Nom de L'objet_KMKG_v1.csv
Nom de L'objet_KMKG_v1.xls
RMAH_ObjectNameThesaurus_Hierarchical with ID.xls
RMAH_ObjectNameThesaurus_Hierarchical with ID_Architecture.csv
RMAH_ObjectNameThesaurus_Hierarchical with ID_Architecture.xls
RMAH_ObjectNameThesaurus_Hierarchical with ID_Architecture_3levels.csv
RMAH_ObjectNameThesaurus_Hierarchical with ID_Architecture_3levels.xls

Bestandsnaam: RMAH_ObjectNameThesaurus_Hierarchical with ID_/_
Bestandstypen: Alle bestanden

Openen
Annuleren

2) Configure your import

Does your import look good? **No**

Map you data on the underlying table with drop-down lists and when you mapping is OK click here.

This col is: Not mapped

ID	"prefLabel@fra"	"prefLabel@nl"	"prefLabel@eng"	"broader"	"SN@nld"	"SN@eng"	"SN@fra"
41875	"Nom de l'objet"	"Objectnaam"	"Object name"				
41877	"Architecture"	"Architectuur"	"Architecture"	41875	"Topterm voor architecturale elementen en onderdelen van architecturale eler"		
41879	"Construction"	"Bouwwerk"	"Single built work"	41877	"Algemene benaming voor alle soorten van (in aanbouw zijnde) gebouwen"		
45278	"Composant de bâtiment"	"Deel van een gebouw"	"Building division"	41879	"Wordt gebruikt voor het benoemen van afzonderlijk gebouw"		
46319	"Construction funéraire"	"Funerair bouwwerk"	"Funerary structure"	41879	"Wordt gebruikt voor gebouwen die betrekking hebbe"		
42134	"Monument"	"Monument"	"Monument"	41879	"Bouwwerken die getuigen van een (vroegere) cultuur, kunst, nijverheid of wetensc"		

SKOSification tool

1) Information

2) Upload datas

3) Modify and map

▶ 1) Upload your datas

▶ 2) Configure your import

▶ 3) Import !

Your data is now ready to be import ?
Click on the button wait a minute and you can edit and map your thesaurus.

Query verzenden

2) Configure your import

Does your import look good ? [No](#)
Map you data on the underlying table with drop-down lists and when you mapping is OK click here 5

This col is :
A local ID

☒ Unique ?

This col is :
A property

Of type: prefLabel

Language: French

This col is :
A property

Of type: prefLabel

Language: Dutch

This col is :
A property

Of type: prefLabel

Language: English

This col is :
A reference

Of type: broader

To column: ID

This col is :
A property

Of type: scopeNote

Language: Dutch

ID	prefLabel@fra	prefLabel@nl	prefLabel@eng	broader	SN@nld
41875	Nom de l'objet	Objectnaam	Object name		
41877	Architecture	Architectuur	Architecture	41875	Topterm voor architecturale elementen en onderdelen van architecturale elementen
41879					Algemene benaming voor alle soorten van

3) Import !

Your data is now ready to be import ?
Click on the button wait a minute and you can edit and map your thesaurus.

New Edit Map Search / browse

Select the thesaurus to edit : http://www.culture-terminology.org/thesaurus/florent/florent2

Thesaurus: **testimport florent2**

Tree Search List

- C Equipment for costume (en) (ID: da08ac8e-3)
- C Equipment for personal use (en) (ID: cc28fb)
- C Fishing equipment (en) (ID: 57f3fc54-c3d2-4)
- C Hardware (en) (ID: 6c54e21b-495b-401f-a8)
- C Kitchenware (en) (ID: 5a07dce2-a244-4ea4)
- C Measuring device (en) (ID: 410ab149-a8dc-)
- C Object name (en) (ID: 540b90de-9878-4681-)
- C Animal equipment (en) (ID: b3b7e92a-4dcf-4e8e-9ca9-bd28244a7cdd)
 - C Animal equipment (en) (ID: eb3190cc-)
 - C Blinding cap (en) (ID: 5d200927-0b)
 - C Currycomb (en) (ID: 557a123b-812)
 - C Driving whip (en) (ID: cae892de-06)
 - C Horse armor (en) (ID: f0703789-7c)
 - C Horse blanket (en) (ID: 893e0a86-t)
 - C Horse harness (en) (ID: 2340afa5-)
 - C Horse racing outfit (en) (ID: fb8e53)
 - C Horseshoe (animal equipment) (en)
 - C Saddle blanket (en) (ID: d0a68b77-)
 - C Toeing knife (en) (ID: 41831bc9-ea)

Basic data
Relations
Notes
Forum

Id: b3b7e92a-4dcf-4e8e-9ca9-bd28244a7cdd

Label: **Animal equipment (en)**

Type: Concept

Label	Language	Role	Numerus	Variety
Animal equipment	en	preferred		► Sources (0)
Équipement pour animal	fr	preferred		► Sources (0)
Dierenuitrusting	nl	preferred		► Sources (0)

URI: http://www.culture-terminology.org/thesaurus/florent/florent2/b3b7e92a-4dcf-4e8e-9ca9-bd28244a7cdd

Source:

ID

source:

Creator:

Creation

Date:

Editing (xTree module)

Graphical mapping

Choose your graph :

Choose the graph you want to map to.

http://www.culture-terminology.org/thesaurus/digiCULT/Style%20voc
 http://www.culture-terminology.org/thesaurus/axelv/Musikinstrumente
 http://www.culture-terminology.org/thesaurus/MICHAEL4/MICHAEL4
 http://www.culture-terminology.org/thesaurus/DEMODEMO/DEMO3
 http://www.culture-terminology.org/thesaurus/RMAH/RMAH%20Object%20Name%20Thesaurus

New Edit **Map** Search / browse Delete

Title : demo1 - Author : florent

Title : florent2 - Author : florent

Abbigliamento e oggetti personali
 Pittura
 Termini generali
 Edilizia
 Serramenti e infissi
 Rivestimenti e pavimentazione
 Elementi architettonici
 Elementi strutturali
 Elementi decorativi e di arredo
 Carpenteria
 Impianti idraulici
 Materiali da costruzione
 Impianti per riscaldamento
 Armature
 Arredi
 Mezzi di trasporto
 Scultura
 Strumenti utensili e oggetti d'uso

Villeggi
 ---undefined---
 Meestinstrument
 Systeem
 Objectnaam
 Speelgoed en s
 Houder
 Toiletgerel en
 Beestrijding
 Meubelen en m
 Verlichtingame
 Onbepaald obje
 Dierenhulstrij
 Musikinstrument
 Objectvorm en
 Stenen verduig
 Architectuur
 Architectu
 C
 H
 Z
 K
 H
 C
 K
 N
 S
 F
 L
 Boog en boogonderdeel
 Onderdeel van een pyramide
 Sieutestuk
 Bak (bouwlement)
 Entablement en entablementonderdeel
 Antefix
 Bouwwerk

Select a value
 broader
 broadMatch
 broaderTransitive
 closeMatch
exactMatch
 hasTopConcept
 inScheme
 mappingRelation
 narrowMatch
 narrower
 narrowerTransitive
 related
 relatedMatch
 semanticRelation
 topConceptOf
 member
 memberList
 Select a value

Save changes Cancel



IV/ The semantic web, SKOS & recommendations for improved interoperability

- The Semantic web and Linked Data
- Semantic data formats
- SKOS tutorial

The Semantic web and Linked Data



The Semantic web or Web 3.0

- ❑ Concept introduced by Sir Tim Berners-Lee (W3C)
- ❑ Proposed as the solution for the current problems in sharing and retrieving relevant data on the current Web where
 - Content is not well structured, has inexplicit semantics, is not interoperable (HTML, URLs to link)
 - Expressive questions cannot be asked by the user
 - Multiple data queries, human interpretation and knowledge is needed to retrieve relevant and “complete” results

*"The Semantic Web is **not a separate Web but an extension** of the current one, in which **information is given well-defined meaning**, better enabling computers and people to work in cooperation." (Tim Berners-Lee)*

The Semantic web and Linked Data



The semantic web is an extension of the current Web

- ❑ It includes semantic information (context and meaning!) in web pages
- ❑ This meaning allows both people and machines to better interpret the data
- ❑ It creates links so that a person or machine can explore the web of "related" data via these links

These links are at the heart of the Semantic web and are needed for integration and reasoning of data on the Web = **Linked Data**

*"The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With **linked data**, when you have some of it, you can find other, related, data."* (Sir Tim Berners-Lee)

The Semantic web and Linked Data



Vocabularies play an important role in the Semantic Web and Linked Data world

- ❑ They are the basic building blocks for linking data
- ❑ They help with the interpretation and integration of data between different datasets
- ❑ And so may lead to the discovery of new relationships between information expressed in a different natural language

Semantic data formats



The **Simple Knowledge Organisation System** or **SKOS** format is generally used to share, group, align and link vocabularies in an interoperable environment

First a general understanding of some **other semantic web formats** is required to better understand the SKOS format

- XML
- RDF
- OWL
- SKOS

All of these are **W3C standards**

Semantic data formats



Extensible Mark-up Language (XML)

- ❑ A set of rules for encoding documents in machine-readable format
- ❑ Simple, general, usable to exchange data on the internet

```
- <lido:lido>
  <lido:lidoRecID lido:type="local">RMAH-94399-FR</lido:lidoRecID>
  - <lido:descriptiveMetadata xml:lang="fr">
    - <lido:objectClassificationWrap>
      - <lido:objectWorkTypeWrap>
        - <lido:objectWorkType>
          <lido:conceptID lido:type="MuseumPlusThiID">47324</lido:conceptID>
          <lido:term>Likembe</lido:term>
        </lido:objectWorkType>
      - <lido:objectWorkType>
        <lido:term xml:lang="en">musical instruments</lido:term>
      </lido:objectWorkType>
    </lido:objectWorkTypeWrap>
```

Semantic data formats



Resource Description Framework (RDF)

- ❑ Forms the basis of Semantic web technologies
- ❑ Universal language to describe the characteristics of resource on the web
- ❑ Using XML for syntax and URIs for naming
- ❑ Makes statements about resources in the form of **subject-predicate-object triples**
- ❑ RDF triples provides a labelled connection using URIs to make it possible to link data with one another
- ❑ In this way a machine is able to find the semantic relations between data

Semantic data formats



❑ The different parts of a triple are

- **Subject** – the thing being described
- **Predicate** – a trait, aspect, or property of the thing, which expresses a relationship between the subject and object
- **Object** – the thing that is the value of the predicate (trait, aspect or property) of the object thing

❑ So in the statement “The Kiss was created by Gustav Klimt”

- **Subject** – The Kiss
- **Predicate** – Created by
- **Object** – Gustav Klimt

❑ In terms of representation:

- **Subject** – must be a URI
- **Predicate** – must be a URI
- **Object** – may be a URI or a constant value or “literal” (e.g. “oil on canvas”)

Semantic data formats



Web Ontology Language (OWL)

- ❑ A family of knowledge representation languages for authoring ontologies
- ❑ Characterised by formal semantics and RDF/XML-based serializations
- ❑ Provides a more expressive language than SKOS to enhance the exchange of information

The word “ontology” is usually used for a more complex and formal representation of a set of concepts, whereas “vocabulary” is used for less complex and formal lists of terms

But for the semantic representation of the later, a simpler formal language will often do...

Semantic data formats



Simple Knowledge Organisation System (SKOS)

- ❑ Solution for converting a “classic” thesaurus or vocabulary managed in a local database into a terminology compliant with the 4 Linked Data principles being
 - Use URIs as names for things
 - Use HTTP URIs so that people can look up those names
 - When someone looks up a URI, provide useful semantic information
 - Include links to other URIs, so that they can discover more things
- ❑ Based on the RDF specification, enables a migration towards OWL
- ❑ Ideal compromise for modelling controlled vocabularies such as thesauri and classifications
- ❑ “Low-cost” migration path to Semantic web interoperability

Semantic data formats



- ❑ Structured according to the **ISO 25964 norm** which is dedicated to thesauri and interoperability with other vocabularies and is divided in two parts
 - **Part 1:** Thesauri for information retrieval
 - **Part 2:** Interoperability with other vocabularies
- ❑ The **ISO norm and SKOS model are useful guidelines** to follow when conceiving or adapting a terminology as a preparative step towards later interoperability

Semantic data formats



Something **Kool** **Original** and **Sexy**?

- ☐ More and more required by web services
- ☐ The format recommended and used by **Europeana** for sharing terminology resources
- ☐ Captures much of the similarity of organisation systems such as thesauri and classifications
- ☐ Comprehensible format for the non-expert user to map to
- ☐ Adopted by Linked Heritage WP3 as the central pivot format for the resources uploaded, stored, edited and mapped in the TMP
- ☐ Important role in the linking data process, but can also be of great use in Europeana (multilingual access, navigation tool...)

SKOS tutorial



SKOS classes

□ Concept (*skos:Concept*)

- An idea, notion or unit of thought
- Unique → 1 concept, can be expressed with multiple lexical labels

□ Concept scheme (*skos:ConceptScheme*)

- Groups of concepts, micro-thesaurus
- The same concept can be part of more than one concept scheme

□ Collection (*skos:Collection*)

- Thematic group of concepts
- Different from concept scheme → the thesaurus as a whole could be considered as a concept scheme where several thematic groups of concepts could be designed as collections

SKOS tutorial



Identifiers

- ❑ Each concept must be identified in a unique way in order to avoid any ambiguity
- ❑ Use HTTP URIs to identify concepts according to the RDF, Semantic web and Linked Data principles
- ❑ Identifiers are introduced as ***rdf:resource*** properties for
 - Each new concept being introduced
 - Semantic relations or mappings to other concepts

```
<rdf:Description rdf:about="http://iaaa.cps.unizar.es/thesaurus/HYDROBIOLOGY">  
  <rdf:type rdf:resource="http://www.w3.org/2004/02/skos/core#Concept"/>  
  <skos:related rdf:resource="http://iaaa.cps.unizar.es/thesaurus/AQUACULTURE"/>  
  <skos:prefLabel xml:lang="fr">HYDROBIOLOGIE</skos:prefLabel>
```

SKOS tutorial



Labels

- ❑ Distinction between the concept itself and the terms used to express this concept
- ❑ Terms referring to a concept are expressed via lexical labels
- ❑ Allows you to have a term in any natural language with or without Latin characters
- ❑ SKOS defines 3 types of lexical labels
 - **Preferred Label**
 - **Alternative label**
 - **Hidden Label**

SKOS tutorial



❑ Preferred label (*skos:preflabel*)

- Preferred lexical label assigned to a concept for a specific natural language
- Only one preferred label is allowed in the same language

❑ Alternative label (*skos:altlabel*)

- For synonyms, different spellings and acronyms of the preferred label
- For each preferred label you can have many alternative labels

❑ Hidden label (*skos:hiddenlabel*)

- For mentioning misspellings or obsolete forms of a term (UF-Used For)
- Not visible, useful for retrieval

All can be provided in different languages by using language tags with the *xml:lang* attribute (e.g. *skos:prefLabel@en*)

SKOS tutorial



Documentation properties

- ❑ Different types of notes can be used to provide more information on the concept (e.g. ***skos:note***, ***skos:definition***...)
- ❑ Can be provided in different languages by using language tags with the *xml:lang* attribute (e.g. ***skos:note@en***)

SKOS tutorial



Semantic relationships and mapping

- ❑ Feature that enables **interoperability between vocabularies**
- ❑ Consisting of semantic relationships and mapping properties to connect between different concepts
- ❑ 2 semantic relationships play a crucial role in defining the concepts
 - **Hierarchical relationship**
 - **Associative relationship**

SKOS tutorial



❑ Hierarchical properties

- ***skos:broader*** : The concept has a more general meaning
- ***skos:narrower*** : The concept has a more specific meaning
- The concept can have more than one broader and more than one narrower concept
- To be used for direct hierarchical links between 2 concepts
- For non-immediate links, use transitive properties ***skos:BroaderTransitive*** and ***skos:narrowerTransitive***

❑ Associative properties

- ***skos:related*** : For associative links between 2 concepts without hierarchical relation
- The ***skos:related*** property is symmetric
- Associative and semantic relations should not be mixed

SKOS tutorial



Interoperability

- ❑ In this context it is mainly about **mapping** concepts of one vocabulary to the concepts of another, thus **creating a network of interlinked terminologies**
- ❑ A mapping is a relationship between a concept in one vocabulary and one or more concepts in another
- ❑ There are 3 mapping types defined
 - **Equivalence**
 - **Hierarchical**
 - **Associative**

SKOS tutorial



□ Equivalence

- A concept in the terminology 'A' is **equivalent** to a concept in terminology 'B'
- E.g. "**Architecture@en**" of terminology 'A' is **equivalent** "**Architectura@it**" of terminology 'B'
- The equivalence mapping is expressed by
 - **Use (USE):** For specifying the preferred term
 - **Used For (UF):** For specifying the non-preferred term

SKOS tutorial



❑ Hierarchical

- A concept in the terminology 'A' is **narrower or broader** than a concept in terminology 'B'
- E.g. “**Buildings@en**” of the terminology 'A' can be mapped as **narrower** in **hierarchical relation** “**Architecture@en**” from the terminology 'B'
- The hierarchical mapping relation is expressed by
 - **Broader term (BT):** This relationship comprises broader concepts with a more generic meaning in relation to a narrower concept that has a more specific meaning
 - **Narrower term (NT):** This relationship comprises narrower concepts with a more specific meaning in relation to a broader concept that has a more generic meaning

SKOS tutorial



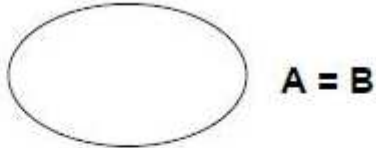
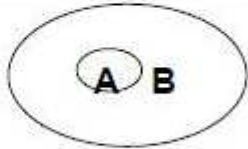
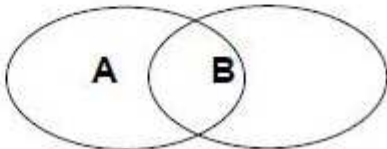
❑ Associative

- A concept in terminology 'A' is **related to a concept** in the terminology 'B'.
- E.g. “**Villas@en**” in the terminology 'A' is **related** to the concept “**Houses@en**” in the terminology 'B'.
- The associative mapping is expressed by
 - **Related Term (RT):** This relationship comprises related concepts and see-also-references

SKOS tutorial



Diagram of the different mapping cases

Case	Diagrammatic Representation
1. Equivalence The diagram implies equivalent sets. Circle A and B overlap. Example: ancient monuments USE monuments (A) (B) monuments UF ancient monuments (B) (A)	
2. Hierarchical The diagram implies class inclusion Example: mammals NT dogs	
3. Associative The diagram implies semantic overlap, ie. there is an element of meaning common to both terms Example: gold RT money	

Source: A. d'Andrea, *Introduction to SKOS. Power Point Presentation 2009-07-16, Rome*)
www.athenaeurope.org/getFile.php?id=287



V/ Linked Heritage semantic mapping experiment

- Creating a network of object name thesauri
- Editing tool of the TMP (xTree module)
- Mapping concepts (xTree module)

Creating a network of object name thesauri



Semantic mapping experiment

- ❑ Creation of a network of LH terminologies
- ❑ Using the TMP in an early stage
 - Work on object name thesauri
 - Start small – having the network grow over time
 - British museum object name thesaurus + 2 partner terminologies imported in TMP

Status

- Semantic mapping: 4 terminologies & 5000 concepts mapped together, 4 languages (FR, EN, IT, NL)
- New LH partners invited to join in second stage using the TMP prototype



Editing tool of the TMP (xTree module)



Open a vocabulary



Editing tool of the TMP (xTree module)



Search for a concept (Tree, Search, List)

The screenshot shows the XTREE - Linked Heritage application. The 'Tree' view on the left lists various concepts, with 'C Architectural element (en) (ID: 41878)' selected. The right pane displays the details for this concept.

Id: 41878
Label: Architectural element (en)
Type: Concept

Basic data | Relations | Mappings | Notes | Forum

i	Id:	41878																				
i	Type:	Concept																				
i	Label:	<table border="1"><thead><tr><th>Label</th><th>Language</th><th>Role</th><th>Numerus</th><th>Variety</th></tr></thead><tbody><tr><td>Architectural element</td><td>en</td><td>preferred</td><td></td><td>> Sources (0)</td></tr><tr><td>Élément d'architecture</td><td>fr</td><td>preferred</td><td></td><td>> Sources (0)</td></tr><tr><td>Architecturaal element</td><td>nl</td><td>preferred</td><td></td><td>> Sources (0)</td></tr></tbody></table>	Label	Language	Role	Numerus	Variety	Architectural element	en	preferred		> Sources (0)	Élément d'architecture	fr	preferred		> Sources (0)	Architecturaal element	nl	preferred		> Sources (0)
Label	Language	Role	Numerus	Variety																		
Architectural element	en	preferred		> Sources (0)																		
Élément d'architecture	fr	preferred		> Sources (0)																		
Architecturaal element	nl	preferred		> Sources (0)																		
i	URI:	http://kmkg.vocnet.org/41878																				
i	Source:	KMKG																				
i	ID source:																					
i	Creator:																					

Editing tool of the TMP (xTree module)



Basic data

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus Vocabulary ICCU-ICCD nom de l'objet thesaurus

Tree Search List

- C Object name (en) (ID: 41875)
 - C Animal equipment (en) (ID: 41931)
 - C Applied decoration and motives (en) (ID: 41932)
 - C Architecture (en) (ID: 41877)
 - C Arm and armour (en) (ID: 41955)
 - C Ceremonial object (en) (ID: 41881)
 - C Container (receptacle) (en) (ID: 41922)
 - C Costume and costume accessory (en) (ID: 41943)
 - C Fastener and closure (en) (ID: 41940)
 - C Furniture and furniture accessory (en) (ID: 41941)
 - C Lighting device (en) (ID: 41930)
 - C Means of communication (en) (ID: 41885)
 - C Means of exchange (en) (ID: 41927)
 - C Musical instrument (en) (ID: 42040)
 - C Object form and derivated object (en) (ID: 41942)
 - C Object material (en) (ID: 41941)
 - C Restraining and punishment equipment (en) (ID: 41944)
 - C Sign and symbol (en) (ID: 41884)
 - C Stone tool (en) (ID: 41939)
 - C Toiletry and medical instrument (en) (ID: 41945)
 - C Tools and equipment (en) (ID: 41946)

Id: 41877
Label: **Architecture (en)**
Type: Concept

Basic data Relations Mappings Notes Forum

i Id: 41877
i Type: Concept
i Label:

Label	Language	Role	Numerus	Variety
Architecture	en	preferred		> Sources (0)
Architecture	fr	preferred		> Sources (0)
Architectuur	nl	preferred		> Sources (0)

i URI: <http://kmg.vocnet.org/41877>
i Source: KMKG
i ID source:
i Creator:
i Creation Date:
i Last Change: Thursday, 2 February 2012, 13:11:20
i Status: approved

Editing tool of the TMP (xTree module)



Relations to other concepts

The screenshot displays the TMP xTree module interface. The top navigation bar includes 'Vocabulary', 'Media', 'Sources', and 'log off'. Below it, a breadcrumb trail shows 'Welcome', 'Vocabulary KMKG Nom de l'objet thesaurus', and 'Vocabulary ICCU-ICCD nom de l'objet thesaurus'. The left sidebar contains a tree view with a search bar and a list of concepts. The main panel shows the 'Relations' tab for the concept 'Architecture (en)' (ID: 41877). The 'Relations' tab is highlighted with a red box. The 'Relations' section displays three types of relationships: 'superordinate', 'subordinate', and 'associate with'. Each relationship is represented by a small diagram and a list of related concepts with their IDs and language codes. The 'superordinate' relationship shows 'C Object name (41875) (en)' with ID 'xt00291: BTG/NTG'. The 'subordinate' relationship shows 'C Architectural element (41878) (en)' and 'C Single built work (41879) (en)' both with ID 'xt00291: BTG/NTG'. The 'associate with' relationship shows a diagram of two concepts connected by a line. The 'assigned to' relationship is also listed but is currently empty.

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus Vocabulary ICCU-ICCD nom de l'objet thesaurus

Tree Search List

C Object name (en) (ID: 41875)

- C Animal equipment (en) (ID: 41931)
- C Applied decoration and motives (en) (ID: 41932)
- C Architecture (en) (ID: 41877)
- C Arm and armour (en) (ID: 41955)
- C Ceremonial object (en) (ID: 41881)
- C Container (receptacle) (en) (ID: 41922)
- C Costume and costume accessory (en) (ID: 41940)
- C Fastener and closure (en) (ID: 41940)
- C Furniture and furniture accessory (en) (ID: 41930)
- C Lighting device (en) (ID: 41930)
- C Means of communication (en) (ID: 41885)
- C Means of exchange (en) (ID: 41927)
- C Musical instrument (en) (ID: 42040)
- C Object form and derivated object (en) (ID: 41941)
- C Object material (en) (ID: 41941)
- C Restraining and punishment equipment (en) (ID: 41884)
- C Sign and symbol (en) (ID: 41884)
- C Stone tool (en) (ID: 41939)
- C Toiletry and medical instrument (en) (ID: 41939)
- C Tools and equipment (en) (ID: 41880)

Id: 41877
Label: **Architecture (en)**
Type: Concept

Basic data **Relations** Mappings Notes Forum

superordinate:

- C Object name (41875) (en) xt00291: BTG/NTG

subordinate:

- C Architectural element (41878) (en) xt00291: BTG/NTG
- C Single built work (41879) (en) xt00291: BTG/NTG

associate with:

assigned to:

Editing tool of the TMP (xTree module)



Mappings

The screenshot displays the TMP xTree module interface. On the left, a tree view lists various object categories, with 'Architecture (en) (ID: 41877)' selected. The main panel on the right shows the details for this concept. The 'Mappings' tab is active, displaying the following information:

- Id:** 41877
- Label:** Architecture (en)
- Type:** Concept
- Basic data** | **Relations** | **Mappings** | **Notes** | **Forum**
- identifier:** <http://iccu.vocnet.org/3>
- Identifier type:** URI
- Mapping type:** exact match
- source:**
- label:**

Editing tool of the TMP (xTree module)



Notes

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus Vocabulary ICCU-ICCD nom de l'objet thesaurus

Tree Search List

- C Object name (en) (ID: 41875)
 - C Animal equipment (en) (ID: 41931)
 - C Applied decoration and motives (en) (ID: 41932)
 - C Architecture (en) (ID: 41877)
 - C Arm and armour (en) (ID: 41955)
 - C Ceremonial object (en) (ID: 41881)
 - C Container (receptacle) (en) (ID: 41922)
 - C Costume and costume accessory (en) (ID: 41941)
 - C Fastener and closure (en) (ID: 41940)
 - C Furniture and furniture accessory (en) (ID: 41942)
 - C Lighting device (en) (ID: 41930)
 - C Means of communication (en) (ID: 41885)
 - C Means of exchange (en) (ID: 41927)
 - C Musical instrument (en) (ID: 42040)
 - C Object form and derived object (en) (ID: 41943)
 - C Object material (en) (ID: 41941)
 - C Restraining and punishment equipment (en) (ID: 41944)
 - C Sign and symbol (en) (ID: 41884)
 - C Stone tool (en) (ID: 41939)
 - C Toiletry and medical instrument (en) (ID: 41945)
 - C Tools and equipment (en) (ID: 41946)

Id: 41877
Label: **Architecture (en)**
Type: Concept

Basic data Relations Mappings **Notes** Forum

Note type: Scope Note
regarding term:
Text: Topterm voor architecturale elementen en onderdelen van architecturale elementen
source:
Creating date:
Text type: literal
Text language: Dutch

Editing tool of the TMP (xTree module)



Collaboration platform - Forum

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus

Tree Search List

- [-] C Object name (en) (ID: 41875)
 - [+] C Animal equipment (en) (ID: 41931)
 - [+] C Applied decoration and motives (en) (ID: 41932)
 - [-] C Architecture (en) (ID: 41877)
 - [+] C Architectural element (en) (ID: 41878)
 - [+] C Single built work (en) (ID: 41879)
 - [+] C Arm and armour (en) (ID: 41955)
 - [+] C Ceremonial object (en) (ID: 41881)
 - [+] C Container (receptacle) (en) (ID: 41922)
 - [+] C Costume and costume accessory (en) (ID: 41923)
 - [+] C Fastener and closure (en) (ID: 41940)
 - [-] C Furniture and furniture accessory (en) (ID: 41918)
 - [+] C Furniture accessory (en) (ID: 41919)
 - [+] C Furniture and furniture accessory component (en) (ID: 41920)
 - [+] C Piece of furniture (en) (ID: 41918)
 - [+] C Lighting device (en) (ID: 41930)
 - [+] C Means of communication (en) (ID: 41885)
 - [+] C Means of exchange (en) (ID: 41927)
 - [-] C Musical instrument (en) (ID: 42040)

Id: 41877
Label: **Architecture (en)**
Type: Concept

Basic data Relations Mappings Notes **Forum**

+ Additional forum entry

i user: axelv

i created at: Thursday, 19 January 2012, 19:26:46

i title: mapping to iccu-iccd

i theme: semantic mapping

i text: mapping to <http://iccu.vocnet.org/3> > [architecture:](#)
[closeMatch](#) or [exactMatch](#)?






Delete

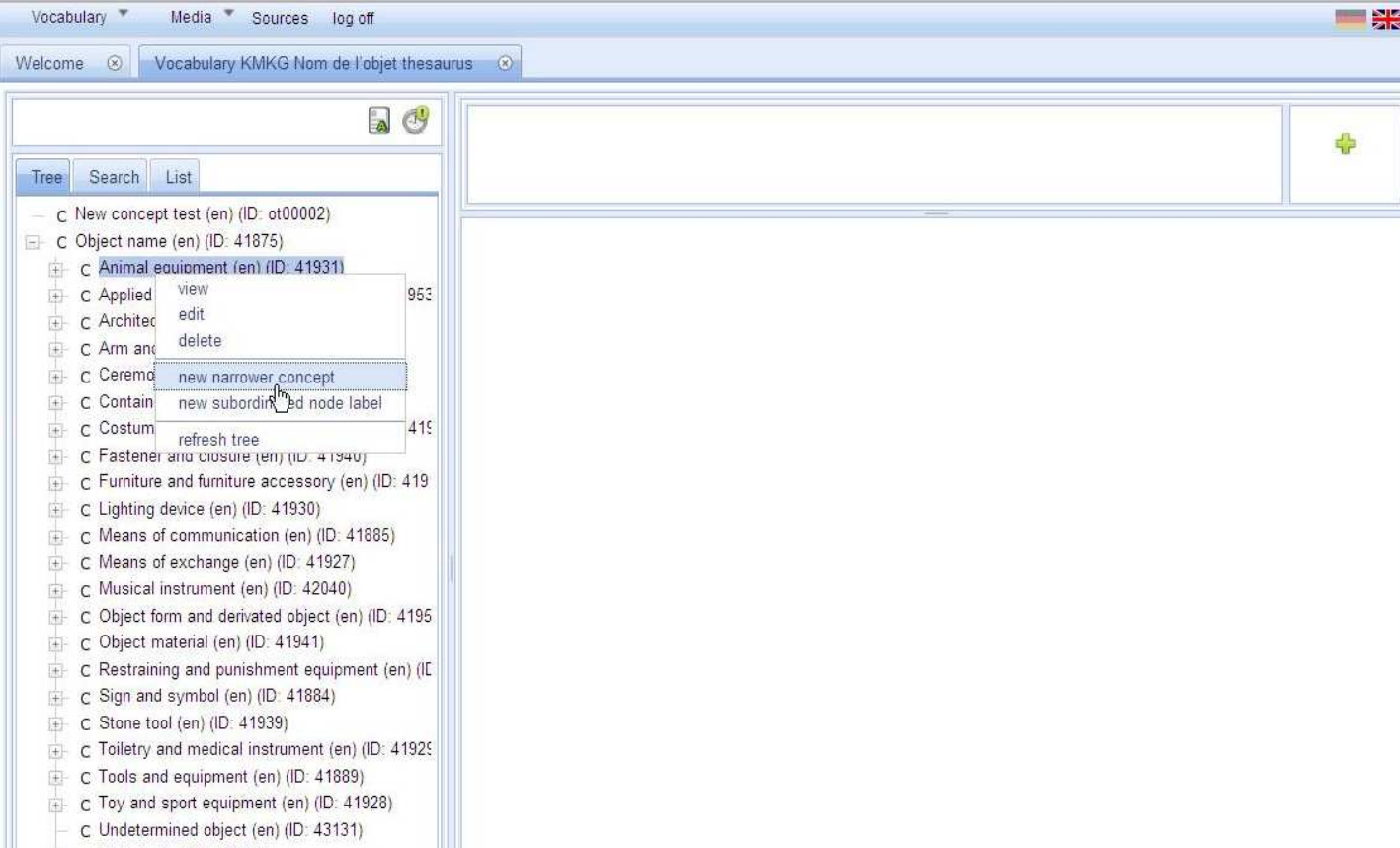
Editing tool of the TMP (xTree module)



Edit a terminology: Add a new concept

Main symbols

- Add 
- Edit 
- Delete 
- Cancel 
- Save 



Editing tool of the TMP (xTree module)



Edit a terminology: Enrich a concept

The screenshot displays the TMP xTree module interface. On the left, a tree view shows a hierarchy of architectural elements, with 'C Antefix (en) (ID: 45650)' selected and highlighted with a red box. The main panel on the right shows the details for this concept. At the top, it displays 'Id: 45650', 'Label: Antefix (en)', and 'Type: Concept'. Below this, a tabbed interface shows the 'Basic data' tab selected, which contains a table of labels for the concept. The table has columns for 'Label', 'Language', 'Role', 'Numerus', and 'Variety'. The data rows show 'Antefix' in English (preferred), 'Antefix' in German (preferred, singular, standard), 'Stimziegel' in German (alternative, singular, standard), 'Antéfixe' in French (preferred), and 'Antefix' in Dutch (preferred). Each row has a 'Sources' link. Below the table, the 'URI' is listed as 'http://www.culture-terminology.org/kmkg/45650' and the 'Source' as 'KMKG'. The interface also includes a top navigation bar with 'Vocabulary', 'Media', 'Sources', and 'log off' options, and a bottom status bar.

Label	Language	Role	Numerus	Variety	Sources
Antefix	en	preferred			> Sources (1)
Antefix	de	preferred	singular	standard	> Sources (0)
Stimziegel	de	alternative	singular	standard	> Sources (0)
Antéfixe	fr	preferred			> Sources (0)
Antefix	nl	preferred			> Sources (0)

Editing tool of the TMP (xTree module)



Edit a terminology – Add multiple lexical labels...

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus

Tree Search List

- C Object name (en) (ID: 41875)
 - C Animal equipment (en) (ID: 41931)
 - C Applied decoration and motives (en) (ID: 41932)
 - C Architecture (en) (ID: 41877)
 - C Architectural element (en) (ID: 41878)
 - C Antefix (en) (ID: 45650)
 - C Arch and arch component (en) (ID: 41879)
 - C Barrier and barrier element (en) (ID: 41880)
 - C Beam (structural element) (en) (ID: 41881)
 - C Bracket (structural element) (en) (ID: 41882)
 - C Column and column component (en) (ID: 41883)
 - C Corbel (en) (ID: 44698)
 - C Entablature and entablature component (en) (ID: 41884)
 - C Hearth and hearth component (en) (ID: 41885)
 - C Lintel (en) (ID: 43068)

Id: 45650
Label: **Antefix (en)**
Type: Concept

Basic data Relations Mapping

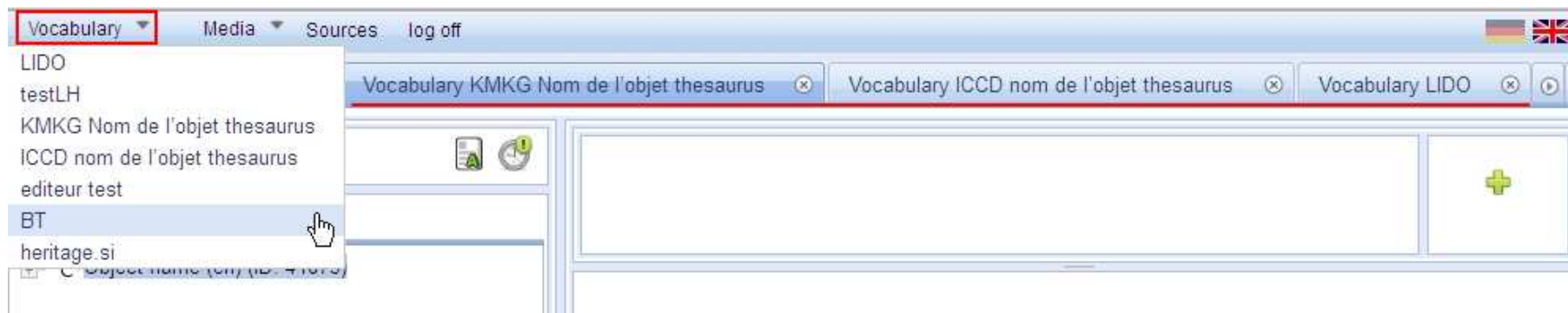
+ New term

Label	Role	Numerus	Variety
<input type="text"/>	English	alternative	singular
Antefix	English	preferred	

Mapping concepts (xTree module)



Semantic mappings between vocabularies: Open multiple vocabularies



Mapping concepts (xTree module)



Select concept from own vocabulary

The screenshot displays the xTree module interface. At the top, there are tabs for 'Vocabulary', 'Media', 'Sources', and 'log off'. Below these, there are two tabs: 'Welcome' and 'Vocabulary KMKKG Nom de l'objet thesaurus'. The 'Vocabulary KMKKG Nom de l'objet thesaurus' tab is active, showing a tree view of concepts. The tree view is expanded to show the 'Piece of furniture (en) (ID: 41918)' concept, which is highlighted. To the right of the tree view, there is a panel showing the details of the selected concept. The details panel has tabs for 'Basic data', 'Relations', 'Mappings', 'Notes', and 'Forum'. The 'Basic data' tab is active, showing the following information:

- Id: 41918
- Label: **Piece of furniture (en)**
- Type: Concept

Below this, there is a table showing the concept's details:

Label	Language	Role	Numerus	Variety
Piece of furniture	en	preferred		> Sources (0)
Meuble	fr	preferred		> Sources (0)
Meubel	nl	preferred		> Sources (0)

Below the table, there are fields for 'URI', 'Source', 'ID source', 'Creator', 'Creation Date', and 'Last Change'.

Mapping concepts (xTree module)



Search for matching concept in other vocabulary

Vocabulary Media Sources log off

Welcome Vocabulary KMG Nom de l'objet thesaurus Vocabulary ICCU-ICCD nom de l'objet thesaurus

Tree Search List

- + C Abbigliamento e oggetti personali (it) (ID: 1)
- + C Arredi (it) (ID: 2)
 - + C Arredi funerari (it) (ID: 15)
 - + C Arredi sacri e votivi (it) (ID: 14)
 - C Arredi stradali e urbani (it) (ID: 16)
 - C **Mobili (it) (ID: 17)**
 - C Tessili e tappeti (it) (ID: 18)
- + C Mezzi di trasporto (it) (ID: 4)
- C Pittura (it) (ID: 5)
- + C Scultura (it) (ID: 6)
- + C Strumenti utensili e oggetti d'uso (it) (ID: 7)
 - C Termini generici (it) (ID: 8)
- + C architecture (en) (ID: 3)

Id: 17
Label: **Mobili (it)**
Type: Concept

Basic data Relations Mappings Notes Forum

i Id:	17															
i Type:	Concept															
i Label:	<table><thead><tr><th>Label</th><th>Language</th><th>Role</th><th>Numerus</th><th>Variety</th></tr></thead><tbody><tr><td>furniture/furnishings</td><td>en</td><td>alternative</td><td></td><td>> Sources (0)</td></tr><tr><td>Mobili</td><td>it</td><td>preferred</td><td></td><td>> Sources (0)</td></tr></tbody></table>	Label	Language	Role	Numerus	Variety	furniture/furnishings	en	alternative		> Sources (0)	Mobili	it	preferred		> Sources (0)
Label	Language	Role	Numerus	Variety												
furniture/furnishings	en	alternative		> Sources (0)												
Mobili	it	preferred		> Sources (0)												
i URI:	http://iccu.vocnet.org/17															
i Source:	ICCD															
i ID source:																
i Creator:																
i Creation Date:																
i Last Change:	Friday, 3 February 2012, 15:07:35															

Mapping concepts (xTree module)



When finding a matching concept, copy URI

The screenshot shows the xTree module interface. The top navigation bar includes 'Vocabulary', 'Media', 'Sources', and 'log off'. Below this, there are tabs for 'Welcome', 'Vocabulary KMKG Nom de l'objet thesaurus', and 'Vocabulary ICCU-ICCD nom de l'objet thesaurus'. The left sidebar has a 'Tree' view and a 'Search' button. The search input field contains '*furniture*' and a search button. Below the search input, a list of results is shown: '• C furniture/furnishings (17) (en)'. The main content area displays the details for the selected concept, 'Mobilia (it)'. The 'URI' field is highlighted with a red box, and a context menu is open over it, showing options like 'Kopiëren', 'Alles selecteren', 'Zoeken bij Google naar "http://iccu.vocnet.org/17"', and 'Bron van selectie bekijken'.

Vocabulary Media Sources log off

Welcome Vocabulary KMKG Nom de l'objet thesaurus Vocabulary ICCU-ICCD nom de l'objet thesaurus

Tree Search List

Search for terms or Id:

all types

furniture

• C furniture/furnishings (17) (en)

Navigation:

number back next

1 - 1 (1)

Id: 17

Label: **Mobilia (it)**

Type: Concept

Basic data Relations Mappings Notes Forum

i Id: 17

i Type: Concept

i Label: Label Language Role Numerus Variety

furniture/furnishings en alternative

Mobilia it preferred

URI: <http://iccu.vocnet.org/17>

i Source: ICCD

i ID source:

i Creator:

i Creation Date:

i Last Change: Friday, 3 February 2012, 15:07:35

i Status: approved

Kopiëren

Alles selecteren

Zoeken bij Google naar "http://iccu.vocnet.org/17"

Bron van selectie bekijken

Mapping concepts (xTree module)



To map, add URI to own vocabulary

Vocabulary KMKG Nom de l'objet thesaurus

Vocabulary ICCU-ICCD nom de l'objet thesaurus

Id: 41918
Label: **Piece of furniture (en)**
Type: Concept

Tree Search List

- C Object name (en) (ID: 41875)
 - + C Animal equipment (en) (ID: 41931)
 - + C Applied decoration and motives (en) (ID: 41932)
 - + C Architecture (en) (ID: 41877)
 - + C Arm and armour (en) (ID: 41955)
 - + C Ceremonial object (en) (ID: 41881)
 - + C Container (receptacle) (en) (ID: 41922)
 - + C Costume and costume accessory (en) (ID: 41940)
 - + C Fastener and closure (en) (ID: 41940)
 - + C Furniture and furniture accessory (en) (ID: 41919)
 - + C Furniture accessory (en) (ID: 41919)
 - + C Furniture and furniture accessory compo
 - + **C Piece of furniture (en) (ID: 41918)**
 - + C Lighting device (en) (ID: 41930)
 - + C Means of communication (en) (ID: 41885)
 - + C Means of exchange (en) (ID: 41927)
 - + C Musical instrument (en) (ID: 42040)
 - + C Object form and derived object (en) (ID: 41930)

Basic data Relations **Mappings** Notes Forum

+ Weiteres Mapping

/ identifier: Delete
/ Identifier type:
/ Mapping type:
/ source:
/ label:

save

Concept “Piece of Furniture” (KMKG) is mapped to concept “Mobilia” (ICCD)



VI/ Perspective

Perspective



- ❑ Continue the collaborative development of Linked Heritage terminologies
 - Enlargement of the network of interlinked object name thesauri
 - LIDO terminologies
 - Events <http://terminology.lido-schema.org/eventType>
 - Actor roles
 - Start work on new domains & subject thesauri (e.g. Geography)
- ❑ Finalise the TMP prototype (D3.3, Month 24-March 2013)
- ❑ Organise training workshops and provide additional manuals
- ❑ Work towards a productive version of the TMP → AthenaPlus

Interoperability?

Thesauri?

SKOSification?

QUESTIONS?





THANK YOU!

Roxanne Wyns
Royal Museums of Art and History (Belgium)

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Linked Heritage website: <http://www.linkedheritage.eu>