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1   EXECUTIVE SUMMARY

One of the objectives of WP4 (Terminology and Semantic Enrichment) is to provide the community with a web service where terminologies can be consulted, created or uploaded, mapped and exported in SKOS/RDF and where mapped terminologies can be published and eventually become part of the linked data web.

The Terminology Management Platform (TMP) was created in order to achieve this goal. The tool is available by URL (http://athenaplus.thesaurus.condillac.org) and can be consulted freely by registered and non-registered users. However only registered users can make full usage of the tool. Accounts can be obtained by contacting the administrator.

The TMP is structured both terminologically (linguistically dependent, no relations) and conceptually (semantically enriched), conform latest ISO-norms. It provides the user with training material accessible on the homepage : an introductory leaflet, a user manual, a newsletter with latest developments, a lexicon and a F.A.Q.

The Terminology Management Platform offers users a range of thesaurus management functionalities, including :

- ✓ Scrolling and searching thesauri and concepts
- ✓ Creating and editing thesauri
- ✓ Importing thesauri as CSV or SKOS (via administrator)
- ✓ Exporting thesauri in SKOS, Json, CSV or OTe (Onto-terminology RDF)
- ✓ Mapping concepts between (multilingual) thesauri
- ✓ (Automatic) Link to external data sets or sources published as SPARQL-endpoint

D4.5 describes these functionalities of the TMP[2] in detail below.

INTRODUCTION

The deliverable contains specifications for the production release of the Terminology Management Platform (TMP).

Deliverable D4.3 (2014), the previous deliverable dedicated to the TMP, describes the theoretical requirements based on an ontology-oriented approach, as well as the implementation requirements based on SKOS. These requirements are still valid and we refer to D4.3 for further reading.

D4.5 describes the functionalities of the production version of the TMP[2]. Since its initial development in the Linked Heritage project (2011-2013), the technical basis, the functionalities and the lay-out have improved. A roadmap was launched to ensure an efficient development of TMP². The " ² " was added to the TMP to make the distinction between the prototype and the production version.

In March 2014, specific development principles were installed to ensure an efficient workflow. The application is now structured in MVC (Model-View-Controller) with a strong division of components. The model is specified in UML, the user interfaces are client light and the communication will follow the recommendations of RESTFUL.

The document describes the interface and functionalities of the TMP[2]. For the theoretical and technical requirements we refer to D4.3.

1.1 Background

The described specifications rely on a prototype of the TMP developed in the Linked Heritage project (see the Linked Heritage Deliverable D3.2 *Functional and technical specifications of the terminology platform[1]*).

D4.3 took into account returns on experience of TMP use, from a theoretical point of view as well as from an empirical and practical point of view[2].

D4.5 describes the second release of the TMP, i.e. the production version of the tool. The TMP is always open to technological, functional or ergonomic improvements based on user feedback and continuous technical developments. This means that, even though the basic functionalities of the tool are persistent, the tool can undergo changes in the future.

1.2 Role of this Deliverable in the Project

The TMP is an important feature in the project scope of AthenaPlus. Using the TMP will:

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[1]   http://www.linkedheritage.com/index.php?en/142/documents-and-deliverables
[2]   E.g. Seminar on multilingualism in Paris, April 18 2013; Workshop TMP, organized by PACKED, September 5 2013

- Allow a semantic mapping of terminologies with SKOS to achieve interoperability on the web, and thus greater visibility and valorisation of collections or data sets
- Allow the reuse of the mapped terminologies in applications, linking with other relevant sources etc.
- Allow the creation of micro-thesauri for implementation in the MINT-tool, which will enhance multilingual search functionalities in the online catalogue Europeana

The TMP^2 is a key element in the completion of Task 4.3 in WP4 on semantic enrichment of cultural metadata with Linked Open Data (see also D4.2). The mapped terminologies can also be of importance in WP5 *Creative applications for the re-use of cultural resources* and WP6 *Pilots for testing the creative use of cultural contents*.

2   STRUCTURE AND REPRESENTATION FORMAT

2.1   Structure

The TMP^2 terminology-editing interface follows the architecture of the TMP^2 model. A clear separation is done between the *conceptual dimension* and the *terminological dimension*. The figure below illustrates this structure. The main TMP-editing interface displays:

- the "terminological" dimension of the terminology in a frame (Term) dedicated to SKOS relationships, i.e. the labels (skos:prefLabel, skos:altLabel, skos:hiddenLabel) and the documentary notes (skos:note, skos:scopeNote, skos:definition, skos:example, skos:historyNote, skos:editorialNote, skos:changeNote);

- the "conceptual" dimension of the terminology in a frame (Concept) dedicated to the SKOS semantic relationships, i.e. the hierarchical relationships (broader and narrower) and the associate relationship (related).
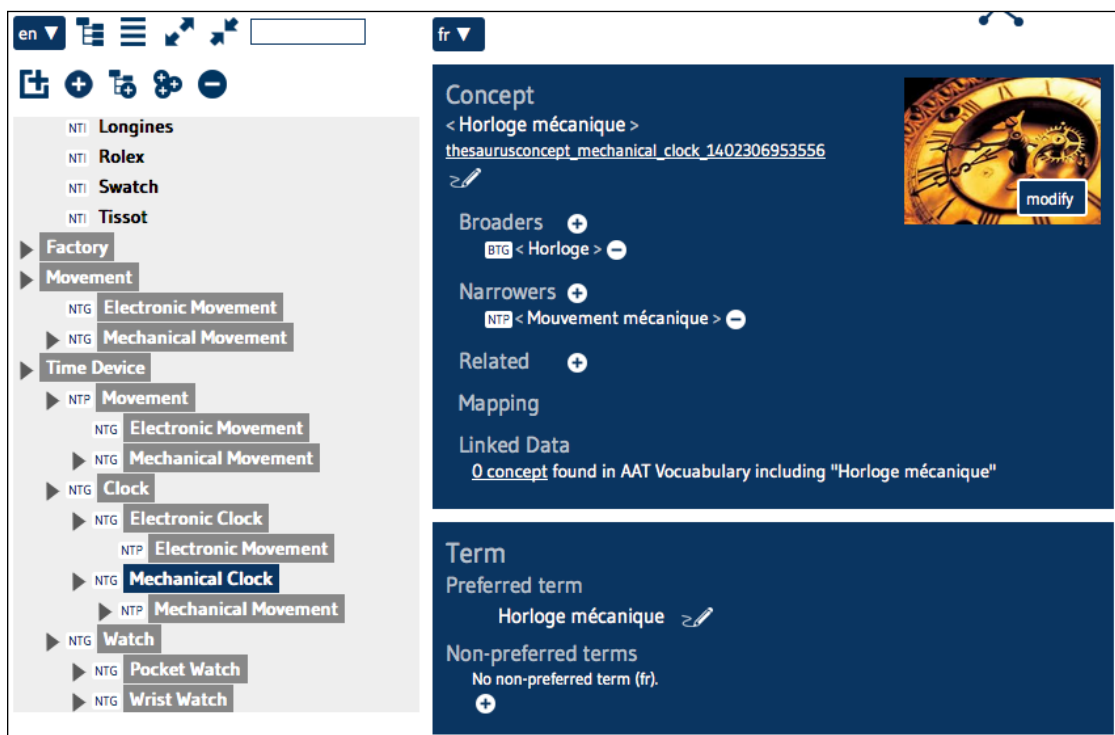
The structure of the TMP : on the left side thesaurus terms in tree-view with editing symbols. On the right side the hierarchical, associative and equivalent relations and links to external resources (linked data) ; preferred and non-preferred terms are shown below.

Insofar as the TMP[2] is concept-oriented, the main access point to the terminology for editing, creating, etc. is the *hierarchical structure of concepts* (left frame of the interface) displayed through a Tree view interface.

Notice that the language used for displaying the concept names *can be different from the language used for editing the attached labels*. Such a feature allows to define labels in a different language from the language used for the ontology building. The latter is called the *preferred* language.

The logical properties of the TMP[2] are incorporated as useful guidelines for terminology building. They are integrated into the TMP[2] interface. For example, the irreflexive and acyclic properties of the semantic relationships integrated in the TMP, make sure that users are only proposed with concepts where these properties have been verified.

2.2 Representation

The internal representation of the thesauri is done in RDF and takes into account the logical properties of the conceptual model following the principles of the ISO 25964-1 Standard on Thesauri.

3   TMP^2 IN A NUTSHELL

On the homepage of the TMP^2 you can also download a short introduction of the TMP^2 in the form of a PDF-leaflet. The introduction contains information about:

- The meaning and relations of terms and concepts
- The different kind of mapping possibilities
- The structure of the TMP and explanation of symbols
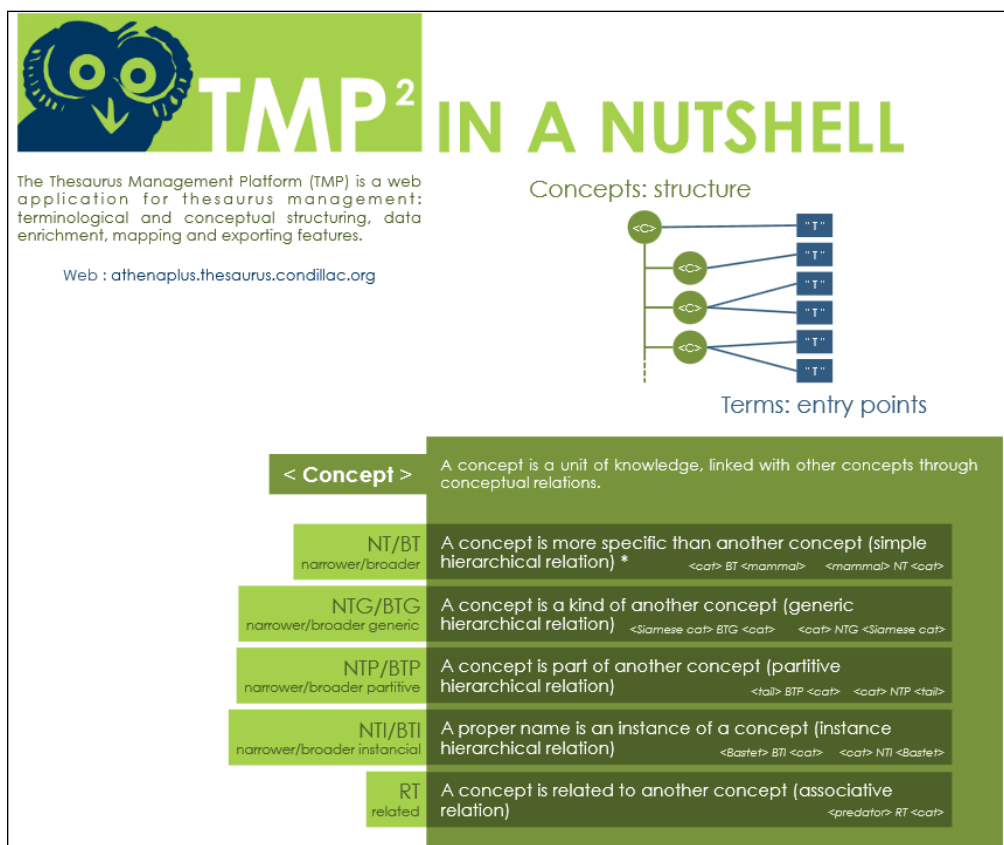
First page of the "TMP in a Nutshell"-leaflet with concept structure and possible relation types.

4   TMP² USER MANUAL

The homepage offers a TMP² manual that can be downloaded as a PDF. The user manual includes users detailed information with definitions and examples. It also presents some technical background information, as well as practical data about accounts and contact information.

The manual will be updated regularly.

5   TMP² NEWSLETTER

A TMP² Newsletter has been set up since February 2015. Its main objective is to present every 3 months some relevant features of the TMP². The TMP² Newsletters can be downloaded in PDF from the TMP² Homepage.

The first Newsletter presents the software environment as well as the technical principles on which the TMP² relies (the OTe engine) :
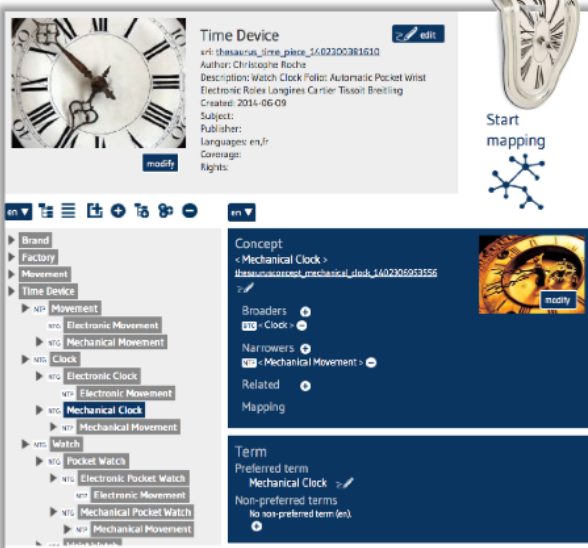
6   LEXICON and F.A.Q.

Two other tools that provide users with helpful information are displayed on the homepage : a lexicon and a frequently asked questions (F.A.Q.)-page. The lexicon presents a list of technical terms with explanation and/or examples. The F.A.Q. includes practical and technical issues about the TMP that users have been informing about.

The list of terms and questions will be updated regularly.

7   CREATING AND EDITING FUNCTIONALITIES

7.1   URL

The TMP is accessible on: http://athenaplus.thesaurus.condillac.org

7.2   Logo

The new logo of the TMP² combines the AthenaPlus logo and the text "TMP²".

The TMP-logo combines the owl of AthenaPlus and TMP²

7.3   Homepage

The homepage displays following logos: the logo of the TMP², OTeforThesaurus, Europeana and the logo of AthenaPlus. The OTeforThesaurus stands for the Onto-terminology for Thesaurus-approach of the Condillac-research group of the University of Savoie.

It displays the version number (e.g. V2.0.12 2014-06-19) and a link to the site of the Condillac Research Group (University of Savoie) in charge of the development of the TMP².

When you are not logged in, the homepage displays all imported and created thesauri set as public. Each thesaurus is described in three metadata types. Two are obligatory when importing or creating a thesaurus: the title (defined by the creator) and the author (automatically set as the creator of the thesaurus, but can be altered). The thesaurus can be illustrated with an image.

The thesauri can be displayed on the homepage as a grid with images or as a flat list, organised alphabetically according to title.
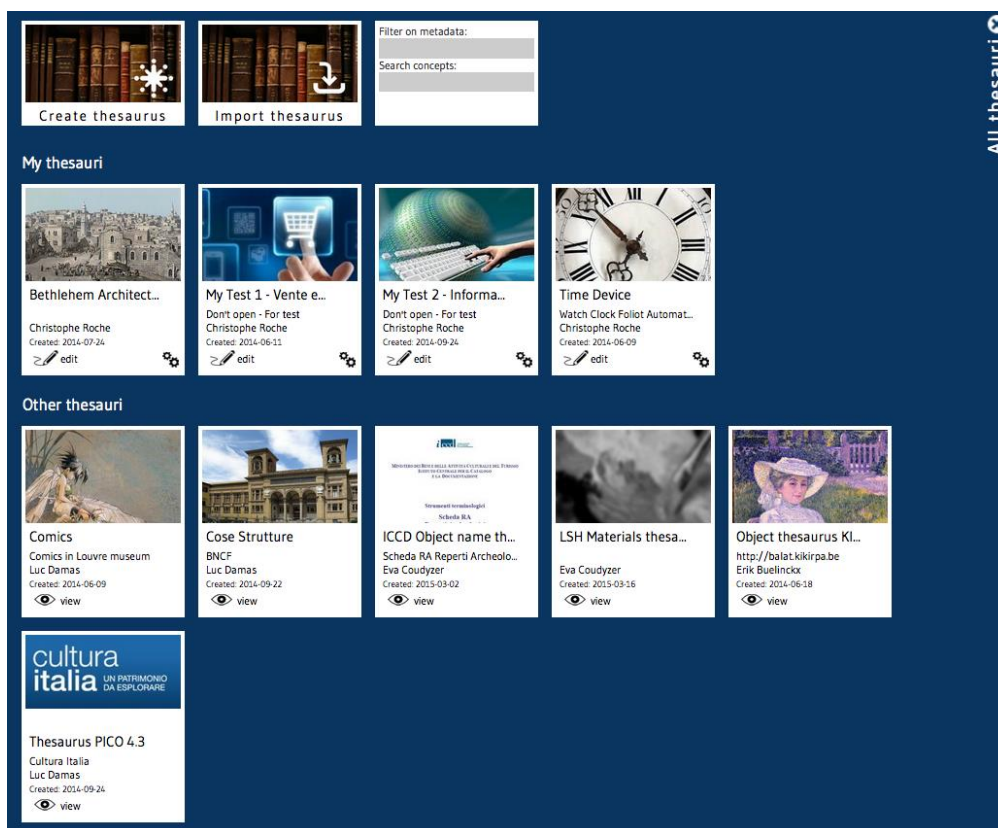
The TMP² homepage : overview of thesauri displayed as a grid with separation of "My thesauri" and "Other thesauri" after login.

When you are not logged in, the only functionalities available are "view" (represented by a button with a symbol of an eye) and "search". Clicking the eye-symbol allows you to view the editing page of the thesaurus and to scroll through the concepts. To go back to the homepage, you can click on the "homepage"-tab.

You can search for public thesauri displayed on the homepage in the "search"-field. You can search the thesaurus metadata (title, author, description, coverage, subject, publisher and language) and you can also search for thesaurus concepts.

The homepage also displays a tab "Create thesaurus" and "Import Thesaurus".

7.4   Creating and Editing

In the right corner you can enter a login and password to access the TMP. When you scroll over the "connect"-button a message for an account request appears: "Login request? Send a message to [administrator].

7.5   My Thesauri vs Other Thesauri

Once logged in you can see a change in the layout of the homepage. Instead of showing all public thesauri in one frame, there is now a separation between "My thesauri" and "Other thesauri". "My thesauri" displays the thesauri that were created or uploaded by yourself (all rights). "Other thesauri" all the other thesauri that are in the TMP. You have full user rights in "My thesauri" and limited rights in "Other thesauri".

"My thesauri" comes with two buttons represented by a symbol: a pencil and a cogwheel. The pencil with "edit" leads you to the editing page; when you select the cogwheel you are able to export (in SKOS, Json, PDF, CSV), to manage you rights and to delete. At the moment only the editing and delete functions are developed.

7.6   Editing page

The left pane displays the complete thesaurus and all the concepts it contains in a specific language (in tree view or in an alphabetical list). Here you can add or delete concepts. The right pane displays the translations, the preferred and non-preferred terms, the hierarchical and mapping relations, the scope notes, links to external resources etc.

You can edit the terminological and conceptual dimension of the thesauri (concepts, images, relations etc.).

7.7   Creating a thesaurus

A tab "Create thesaurus" allows you to create a thesaurus. When clicking it, a field with "Thesaurus title?" must be filled in, then click the OK-button. The new thesaurus appears immediately on the homepage. Click on the "edit"-button and you can edit your metadata and start creating your thesaurus. The metadata in the metadata box are listed below. Reference for some metadata and definitions is the DC Metadata Element Set (06/2014) :

Metadata	Definition	Remarks / Example
Author	Creator or importer of the thesaurus	Automatically set when user is creating or importing a thesaurus.
Coverage	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.	A geographical location, specific time frame or historical period, e.g. "Applied arts in Victorian period", "Prehistoric vessels from Mesopotamia".
Description	An account of the resource	Free-text account of the resource, a table of contents etc.
Languages	A language of the resource.	Free-text account of the resource, a table of contents etc.
Publisher	An entity responsible for making	E.g.: ICCU, The National Library of France, Library of Congress.

	the resource available.	
Rights	Information about rights held in and over the resource.	Description of the propriety rights claimed for using the resource.
Subject	The topic of the resource.	E.g. Applied arts, archaeology, art and art history, biology, information sciences.
Creation date	Date of the creation of the thesaurus or when the thesaurus was uploaded	

You can add an image by clicking the "modify"-button under the image box and by selecting a JPEG-image in your folders.

7.8 Editing a thesaurus

The editing page shows two panes on the left and on the right. The left pane shows the thesaurus with the terms it contains in a specific language. The right pane shows some conceptual elements of the concept: the hierarchical, associative and equivalent relations, the links to external resources etc. The right pane also contains information about the language and the preferred and non-preferred terms and the notes.
In the left pane terms can be added by clicking the "+"-button ("new root concept") and can be deleted by clicking the "-"-button ("delete concept"). You can also immediately add a narrower term (generic narrower term) by clicking the appropriate symbol. A list of new root concepts can also be added to the thesaurus by entering a range of concepts separated by a comma.

*Language tag, editing symbols
and search field*

You can change the language by scrolling the drop-down list.

To add a concept, enter a concept name by clicking "+" and click the OK-button. In the right pane you can see that the new concept is regarded as the "Preferred term". If this is not correct you can change it with the editing-button. You can also insert a "Non-preferred term".

Preferred	Descriptor, represents a concept when indexing	E.g. Mammalia (class)
Non-preferred term	Non-descriptor, not assigned to documents but simple entry point	E.g. Mammals

ISO-preferred and non-preferred terms with definition and example.

To add a translation of a concept you will have to select the target language in the right pane and add the concept to the "preferred term"-field. E.g. My thesaurus has the concept "book" and I want to translate this concept into Spanish. I select "es" in the drop-down list in the right pane and add "libro" in the "preferred term"-field.

Both in the left and in the right pane it is possible to change the language by selecting a language in a drop-down list (UN country codes). When the left pane displays terms in italic, this means that the concept has not yet been translated in the selected language.
Each concept can be illustrated by a JPEG-format image.

7.9   Defining hierarchical relations

In the left panel you can add relations to the concept. You can add "broader" and "narrower" relations. If you want to add a simple broader relation to your concept: choose "BT" from the drop-down list. The concepts that can be selected as BT are ordered alphabetically in the pop-up box. The concepts can be alphabetically filtered in the "Filter-" field. Choose one and click the "OK"-button. The relation between the selected concepts is automatically defined as BT or NT.

ISO 25964 Standards define different types of hierarchical relations: generic ("sort of / type of"), whole-part ("is part of") and instance ("is instance of"). These relations can also be captured in the TMP by selecting the correct BT (BTI, BTG or BTP) in the drop down list. Concepts are linked following the ISO-norms, e.g. "KMKG" BTI Museums teams – and KMKG is defined as a "proper name".

Hierarchical relation	Acronym	Description	Example
Broader simple relation	BT	A concept is more specific then another.	cat BT mammal
Narrower simple relation	NT		mammal NT cat
Generic hierarchical relation	BTG	A concept is a type of / a sort of another concept.	Siamese cat BTG cat
	NTG		cat NTG Siamese cat
Whole-part hierarchical relation	BTP	A concept is part of another concept.	tail BTP cat
			cat NTP tail
Instantial hierarchical relation	BTI NTI	A proper name is an instance of a concept.	Bastet BTI cat
			cat NTI Bastet

Overview of simple (SKOS) and detailed (ISO / RDF) hierarchical relations in the TMP² with abbreviation, definition and example.

Associative relations can be added by selecting the correct concept from your thesaurus. Concepts can be alphabetically filtered.

Associative relation	Acronym	Description	Example

| Related terms | RT | A concept is not hierarchically, but semantically related to another concept in the same thesaurus. | predator RT cat |

Associative relations in TMP² with abbreviation, definition and example.

7.10 Adding notes

You can also add notes to the concepts in your thesaurus. All the documentation properties supported by SKOS are available in the TMP[2]. To add a note, click on the "+"-sign next to "note" and choose the preferred note type. Notes can be added, altered and deleted at any time.

| Type of note	Description (SKOS-primer)	Example
Change note	Documents fine-grained changes to a concept, for the purposes of administration and maintenance	"cat" moved from "mammals"- to "feline"-category.
Definition	Supplies a complete explanation of the intended meaning of a concept.	*Felis catus, family Felidae* (the cat family); it was probably domesticated in ancient Egypt from the local race of wildcat. The cat family also includes the ocelot, serval, margay, lynx, and the big cats (Oxford Dictionary)
Editorial note	Supplies information that is an aid to administrative housekeeping, such as reminders of editorial work still to be done, or warnings in the event that future editorial changes might be made.	Check with curator if "Sjabti" or "Ushabti" is the correct spelling.
Example	Supplies an example of the use of a concept.	"Felines" such as panthers, cats, tigers etc.
History note	Describes significant changes to the meaning or the form of a concept.	"Bastet": used to be "Bast", goddess of warfare in Lower Egypt.
Scope note	Supplies some, possibly partial, information about the intended meaning of a concept, especially as an indication of how the use of a concept is limited in indexing practice.	"Vase": Vessels of varying shape and size but which are usually taller than they are wide and which are often cylindrical. Used mainly to hold flowers or for ornamental purposes.

Types of notes as defined by SKOS, with definition and example.

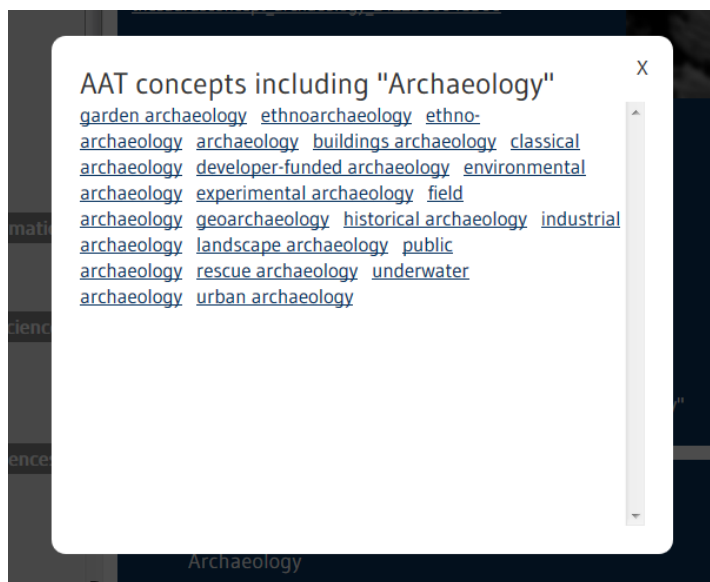## 7.11 Linking with external resources (linked data)

It is possible to add URIs from external resources to concepts in thesauri maintained in the TMP.
An automatic request is made to DBPedia, a knowledge base that presents the information on Wikipedia to the community in an exchange format where it can be retrieved by other instances. This means that it is possible to directly link with Wikipedia data sets. If a concept in a TMP thesaurus can be matched to a concept in DBPedia, the extract from this source is automatically published in the editing page of the TMP.

It is possible to include external mappings to the TMP. Equivalent relations between concepts in the TMP and concepts from published thesauri maintained on a server with a SPARQL-endpoint, such as the *Art and Architecture Thesaurus* (www.getty.edu), can be automatically defined. A mapping user interface for such external data is in progress.
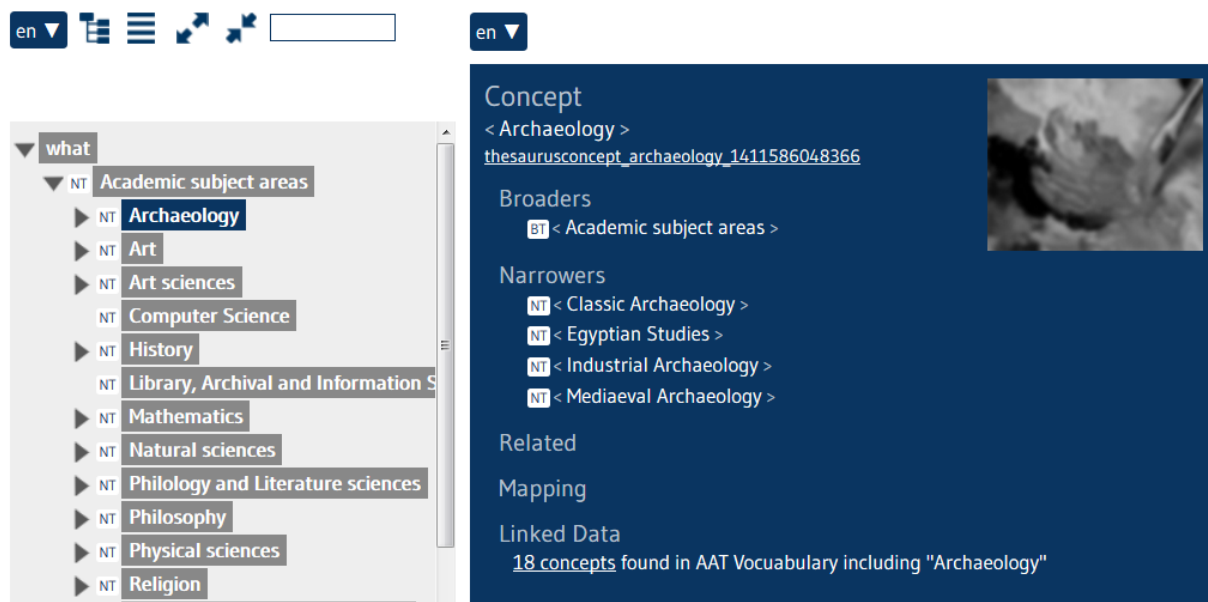
The "linked data" field has found 18 matches between "Archaeology" in the TMP and "Archaeology" in the Art and Architecture Thesaurus.

Clicking on the concepts gives you direct access to the AAT-data se

Editing page of the TMP² : scope note and DBPedia extract for the concept "clock"

8   MAPPING FUNCTIONALITIES

The "start mapping" symbol in the editing page allows you to define relations between different thesauri. When you click on it, a tab opens with an overview of all public thesauri. Choose the thesauri you want to link with by clicking the "map"-button shown in every thesaurus box.
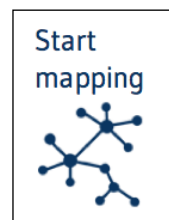
The mapping page then displays the proprietor thesaurus on the left side and the other thesaurus on the right side. To set the link: click on a concept on the left side and click on the equivalent concept on the right side, e.g. "Germany" with "Deutschland". A list appears with ISO Standard symbols for equivalences: =EQ (exact equivalence) and ~EQ (inexact equivalence). =EQ and ~EQ correspond respectively to skos:exactMatch and skos:closeMatch. You can also map concepts by defining them as broader match (BM), narrower match (NM) and related match (RM).

Equivalence relation	Acronym	Description	Example
Exact equivalence	=EQ	Exact simple equivalence (SKOS exact match)	Mammal [EN] *=EQ* mammifère [FR]
Inexact equivalence	~EQ	Inexact simple equivalence (SKOS close match)	Cat [EN] *~EQ* félin [FR]
Broader mapping	BM	Hierarchical mapping : narrower to broader (SKOS broader match)	Cat [EN] *BM* mammifère [FR]
Narrower mapping	NM	Hierarchical mapping : broader to narrower (SKOS narrower match)	Chat [Fr] *NM* tomcat [EN]
Related mapping	RM	Associative mapping: related concepts (SKOS related match)	tomcat RM predator

Overview of available equivalence relations and mappings as defined by ISO.

To delete a mapping select the mapped concepts in the two thesauri. A pop-up "remove" will appear. Click on the "remove"-button and the mapping is deleted.

9   USER RIGHTS MANAGEMENT FUNCTIONALITIES

Initially, the creator of a thesaurus is its owner. He is the only one with modification access the thesaurus. He can change this by clicking the menu item "Manage rights".

The following screenshot shows the available rights for each user, and a button to add an delete users (selection in list of all users registered in the TMP^2) :
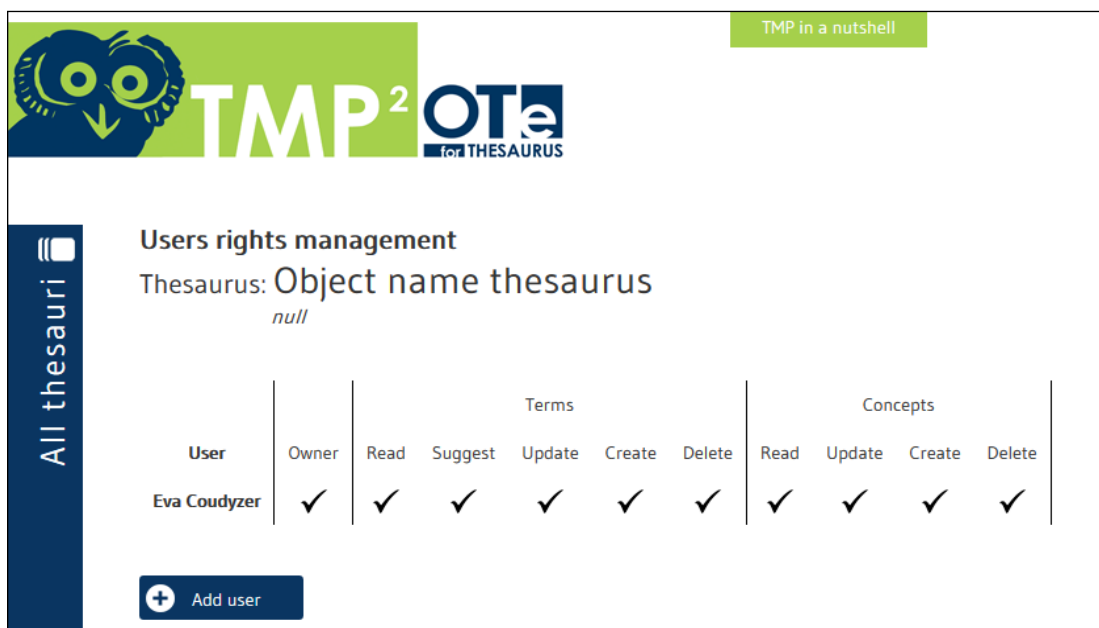
Description of rights:

- Owner: all rights + add/remove users
- Terms read: always on, allows every users to see terms
- Terms suggest: displays a field to suggest alternative terms
- Terms update: can change terms
- Terms create: can add terms for concepts
- Terms delete: can delete a term
- Concepts read: always on, allows every users to see concepts
- Concepts update: allows to modify concept hierarchy and relations
- Concepts create: can create a new concept
- Concepts delete: can delete a concept

10   IMPORTING FUNCTIONALITIES

The RDF/SKOS importer parses a file and imports each element in the TMP^2. The TMP^2 verifies the information, such as relation validity or URI existence.

For two important reasons, imports are performed in batch mode (i.e. by the administrator) :

- Semantic verification takes a long time : several minutes of processing ;
- Available SKOS files are often structurally diverse : RDFS fields, literals as resource etc. The parser has to be adapted to manage all the expressions formulated in the file.

The TMP^2 model includes different kinds of relations : BTG, BTP, BTI, … However, SKOS does not include these specificities and all hierarchical relations between concepts are simple BT or NT.

The CSV importer parses a well-defined CSV file, batched for the same reasons as previously. The column of the CSV must be well named (SKOS vocabulary: altLabel@en, scopeNode@en, ...) and all internal references are verified by the TMP semantic engine. A template is available to partners who wish to import their thesaurus as a CSV file.

11   EXPORTING FUNCTIONALITIES

Exporting is possible in four formats :

- SKOS : The generated file is SKOS compliant but loses some TMP specificities, such as the different kind of relations (BTG, BTP, BTI) between concepts. Metadata are exported in DC vocabulary.

- JSON : The generated file contains all information in the TMP model, including specifications. It is structured as a concept list with related terms, relations, mapping and notes.

- CSV : The CSV file matches the SKOS file and uses the same format than the imported file.

- OTE Ad-hoc : OTE Ad-hoc is the internal RDF format used in the TMP, with the OTE semantic engine. This format contains all information.

12   URI FUNCTIONALITIES

Each concept is available with its URI, displayed under the concept name in the TMP user interface.
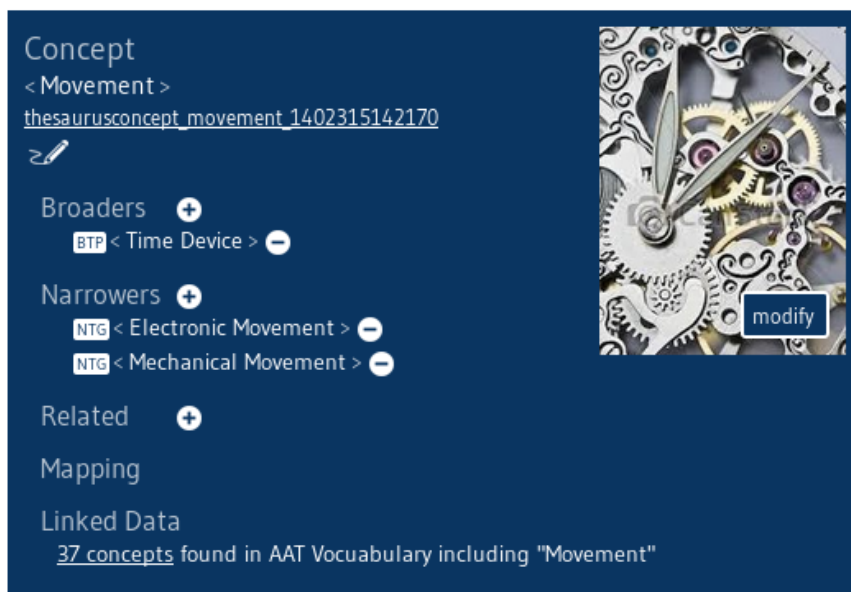
Example of a concept with URI in the TMP².

This URI is available without user interface. The URI displays a page with main information about the current concept.

"http://athenaplus.thesaurus.condillac.org/thesaurusconcept_movement_1402315142170"
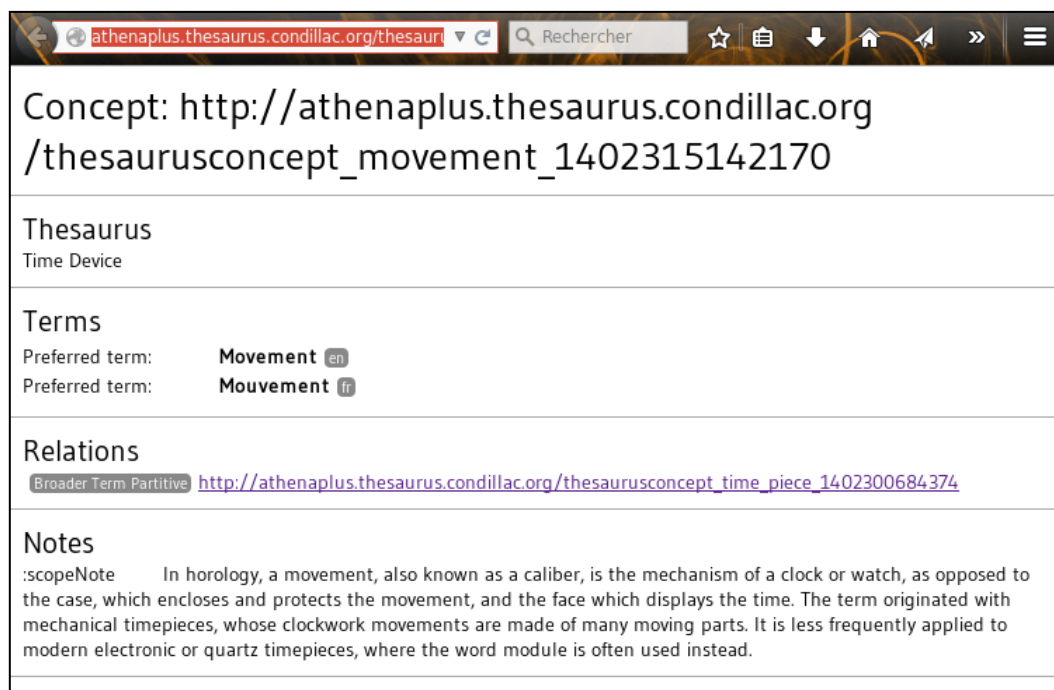
This page is the default display in HTML format. It is available in JSON by just adding the format to the URI (available also in post method) :

http://athenaplus.thesaurus.condillac.org/thesaurusconcept_movement_1402315142170?**type=json**

Result:

{"content":{"uri":"http://athenaplus.thesaurus.condillac.org/thesaurusconcept_movement_140 2315142170","name":"Movement","terms":{"http://athenaplus.thesaurus.condillac.org/term_ movement_1402315142278":{"name":"Movement","lang":"en","role":"2"},"http://athenaplus.t hesaurus.condillac.org/term_mouvement_1402316964327":{"name":"Mouvement","lang":"fr", "role":"2"}},"notes":{"scopeNote":"In horology, a movement, also known as a caliber, is the mechanism of a clock or watch, as opposed to the case, which encloses and protects the movement, and the face which displays the time. The term originated with mechanical timepieces, whose clockwork movements are made of many moving parts. It is less frequently applied to modern electronic or quartz timepieces, where the word module is often used instead."},"relations":{"http://athenaplus.thesaurus.condillac.org/tuple_broader_term_partitive movement_time_piece_1402415548973":{"to":"http://athenaplus.thesaurus.condillac.org/thes aurusconcept_time_piece_1402300684374","relation":"http://athenaplus.thesaurus.condillac.o rg/relation_broader_term_partitive_1401896257139","label":"BroaderTermPartitive"}},"thesau rus":{"uri":"http://athenaplus.thesaurus.condillac.org/thesaurus_time_piece_1402300381610", "label":"Time Device"}},"type":"concept"}

The JSON formation is not user friendly, but can be accessed from any web application (Server side or client side with AJAX). This makes TMP^2 accessible as a service for external applications.

The URI of the concepts are editable. The TMP^2 engine checks uniqueness (in all TMP^2, independently from thesaurus). When a URL is edited, the change is reverberate on all concepts of TMP to maintain the consistency of relationships. Each mapping remains valid.

Be aware that this feature should be used with caution. The URI change may affect the external tools that have accessed the TMP. Ideally, no URI change should be carried out on a public thesaurus.

13 EVOLUTION OF TMP AND SUSTAINABILITY

The TMP is worked on and improved on a regular basis in response to user-feedback and technical developments. At the moment, some functionalities (such as export to CVS and individual user management) are being updated and temporarily unavailable.

In order to guarantee the sustainability of the TMP2, the next version will migrate from a RDF database to a NoSQL database. The new version of the semantic engine is currently under development.

New and/or improved functionalities will be announced in the TMP Newsletter.

14   CONTACT

Feedback, questions etc. can be obtained by contacting the AthenaPlus WP4 coordinators and technical partners (TMP developers):

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