

To ISO/IEC JTC1 SC36 WG1

2008-06-09

CONCEPT MAPPING TOOLS

This short report addresses some aspects of concept mappings tools to be considered when choosing a tool for developing vocabularies in WG1. The report was requested at the Jeju meeting April 2008 and is focused on IHMC CmapTools as one candidate, bearing in mind that other tools will be evaluated by other members of the workgroup.

INTRODUCTION

Wikipedia has good introduction to concept maps and what sets concept maps apart from mind maps, UML, etc. A concept map is defined as “a diagram showing the relationships among concepts. Concepts are connected with labelled arrows, in a downward-branching hierarchical structure” (Wikipedia – http://en.wikipedia.org/wiki/Concept_map). An example of a concept map created using the IHMC CmapTools is copied from Wikipedia, below.

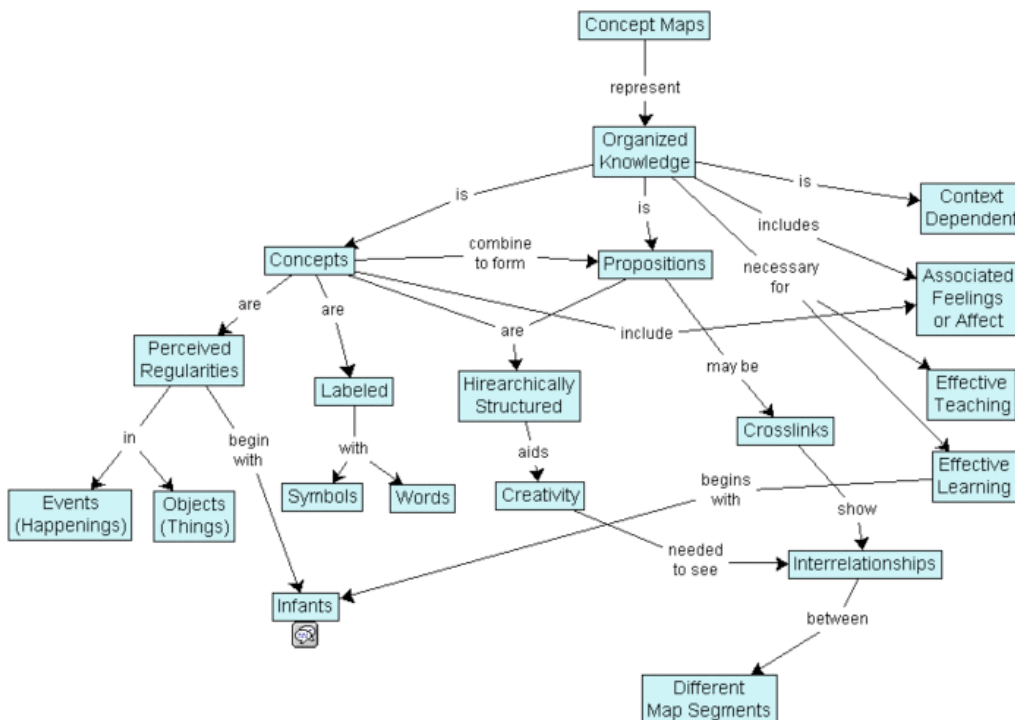


Figure 1 Example of concept map created with IHMC CmapTools (from Wikipedia)

ALTERNATIVE TOOLS

There are a number of diagram tools in the market. However, what we are looking for is a tool that allows diagramming *and* typing of the relations. This narrow down the variety of tools to the following Open Source tools that come to mind to us:

- IHMC CmapTools – <http://cmap.ihmc.us/>
- Conzilla – <http://www.conzilla.org/>
- Compendium – <http://compendium.open.ac.uk/>

A USE CASE

The best way to evaluate these tools would be against a use case covering the needs of vocabulary development in WG1. In lack of an agreed case, we would put up some bullet points describing the anticipated use of concept map tools in the Workgroup.

- WG1 member downloads the tool on his platform of choice and work on vocabularies individually or in group sessions.
- The tool is used for brainstorming concept definitions
- The tool is used for sorting definition candidates and for typing terms and concepts in ontology like structures
- Drafts and final parts of vocabularies are shared with members of the workgroup and others, who, depending on the access rights, are able to comment on the drafts and add terms and definitions.
- WG1 members are able to work on shared documents in a distributed and both synchronous and non-synchronous way
- Vocabularies developed with the tool should be easy to export in an open format suitable for import in more dedicated and permanent vocabulary systems

IHMC CMAP TOOLS – A SHORT EVALUATION

The Cmap Tools were developed at the Institute for Human and Machine Cognition (www.ihmc.us), a research institute of the Florida University System. The client is free for educational institutions and individual use, and available on a most system platforms (even OLPC XO). The current version is 4.17, and it seems that the software is both stable and mature. The Cmap client allows users “to construct, navigate, share and criticize knowledge models represented as concept maps”. These maps can be stored on the user’s personal computer or shared from a CmapServer.

CmapServers where one can store maps for collaboration are available at a number of institutions. However, if SC36 will start using this technology on a large scale, one should consider installing a dedicated server, as also the server software is free for educational institutions. The use of a server will enable an index for searching for Cmaps and resources; enable collaboration through Discussion Threads and Synchronous Collaboration during Cmap editing; and will automatically provide Web-page versions of the concept maps. The last feature makes collaboration with experts outside the core group of WG1 easy, e.g. by asking external domain experts for a quick comment on draft definitions, etc. by posting a URL and ask for an e-mail response.

Small scale testing during meetings has shown that collaborative writing with this tool would be an interesting activity for a WG1 meeting. The Chair could project the map in question drawn from a Cmap server, accessed both experts attending the meeting and others. The participants in the meeting will see the progress of work, both registered by the chair and other contributing experts. In this way we could imagine both brainstorming sessions with high input, and more in depth discussions on particular terms or definitions. Online discussions on map editing could be done by using the chat tool built into the Cmap client.

Asynchronous discussion is facilitated by a Discussion Thread mechanism that allows discussions on every concept and relation of the map.

The Cmap tool also allows for adding comments, links and different layouts to the parts of the maps. You can also add annotations to concepts or to relations to facilitate discussion and review of the work.

The Cmap Tools have also a way of aggregating maps and resources in a collection referred to as a *Knowledge Model*. Knowledge Models can be published and stored in different places. This feature could be used by WG1 to create and distribute vocabularies for use in SC36.

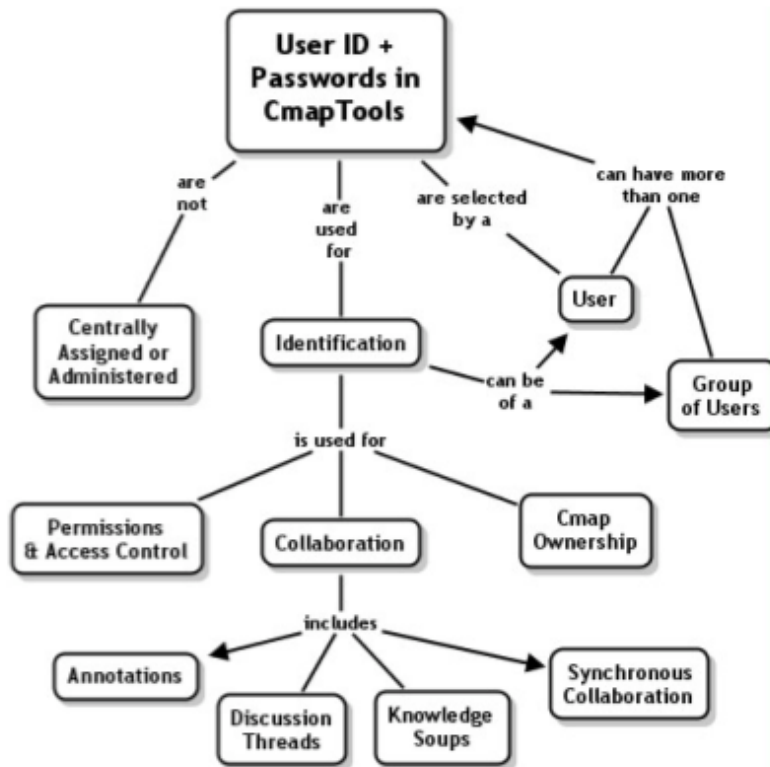


Figure 2 Concept Map on User IDs and Passwords in Cmap Tools (from the white paper on Permissions and Access control, see Reference)

IHMC Cmap Tools comes with a sophisticated permissions and access control system (figure 2) that will allow the Workgroup to stabilize the parts of the vocabulary where consensus is found, and let the rest be open to contributions.

Many tools of this category are just proof of concepts and therefore a pain to work with. Cmap gives a robust feeling and is of production quality. The permissions and access control, the support for knowledge construction and synchronous collaboration, as well as support for sharing and publishing within a web environment make IHMC Cmap Tools a good candidate for our Workgroup.

The question of integration with other systems has to be explored further to see how the different Cmap options fit with the plans WP1 might have for storing their published vocabularies. The Cmap Tools export web pages, in addition the tools export and import Outline, Tabbed-Text, Topic Maps, Inspiration, Life Map and XML.

CONCLUSION

We find Cmap Tools a very interesting alternative for ISO/IEC JTC1 SC36 Workgroup 1. The technology seems mature and stable, and the community behind the tools seem to have enough momentum to be able to develop the tools further. Especially, we find the Knowledge Exchange Architecture based on Web Services, Concept Maps and CmapTools as a promising path for further development. (A Cmap Server supporting web services is already available for testing by public users.)

We will recommend Cmap Tools as a candidate for further testing by the WG1 experts

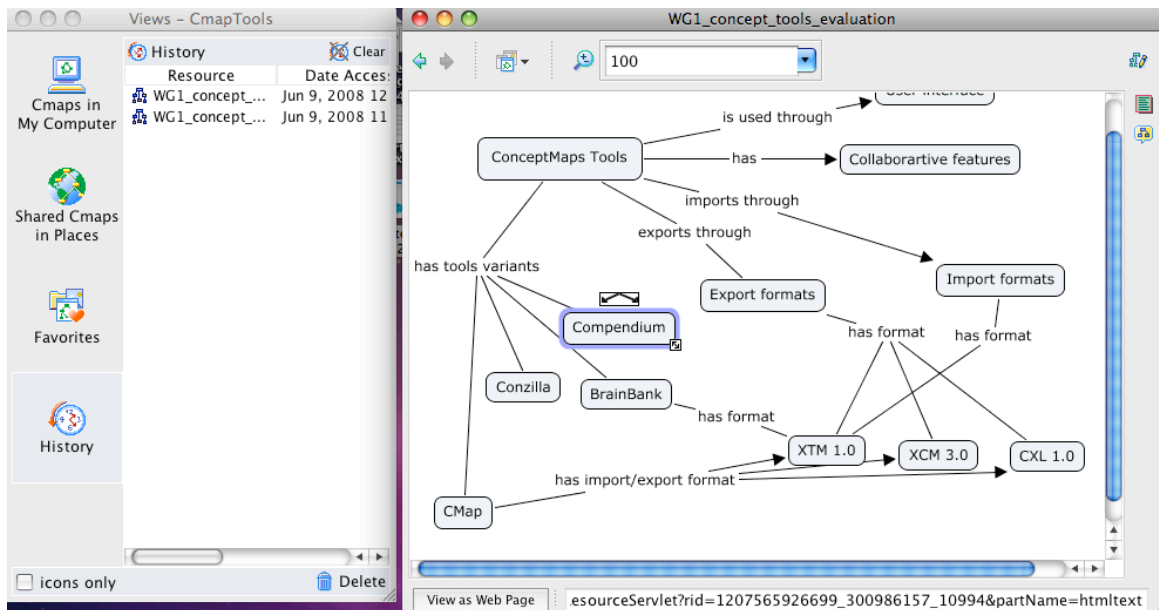


Figure 3 Screen dump of the two work areas of the concept map client tool, the Viewer and the Map window. Note the View as Web Page button at the bottom right.

MORE INFORMATION

For more information on the Cmap Tool we will direct colleagues to these papers found at <http://cmap.ihmc.us/Publications/WhitePapers.php>

- Permissions and Access Controls in CmapTools
- Support for Constructing Knowledge Models in CmapTools
- Synchronous Collaboration in CmapTools
- The Network Architecture of CmapTools
- CmapTools, Web Pages & Websites