

Second year Edutella proposal - contributions from KMR/CID/KTH

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Background and related work

From the perspective of the KMR-group at CID/KTH, the Edutella project is part of our overall vision to develop a set of tools that help to create a public service e-learning platform which is freely available, complies to international e-learning standards and takes advantage of the capabilities of the emerging semantic web. Two of these tools are SCAM and Conzilla, which will be described briefly below.

SCAM – the learning component archive

The SCAM system is developed under the coordination of the KMR-group at CID/KTH to be a general base for constructing general, standardised learning component archives for several different purposes. This means that the use of international learning technology standards (as well as other technology standards) is vital. SCAM implements the IEEE LOM metadata via the IMS metadata specification¹. In order to define structure and to package learning component for distribution the IMS Content Packaging specification has been implemented.

SCAM is intended to be used as a basis for implementing sophisticated learning component archives. SCAM is only addressing the learning component archive and metadata catalogue features. Hence, SCAM implements metadata models- and structures for describing and structuring learning material. This incorporates the use of advanced metadata technologies. Tools, such as metadata editors etc. is not a part of SCAM, but will be developed in related research projects.

The first version of SCAM (SCAM v1) was released in March 2002 at Source Forge². SCAM is licensed under a combined GPL/MPL open source license. The SCAM v1 release is a working prototype and was released in order to “prove the concept”. Version 1 implements the parts of the IMS metadata that corresponds to the Dublin Core³ metadata set. This implementation is a full RDF implementation of the DC metadata⁴.

SCAM v1 was implemented using a PostgreSQL object-relational database management system and TomCat Java Servlets/JSP technology in the application- and web layers. The architecture is based on modularised thinking, which means that new functionality can be added gradually, without affecting the overall architecture.

¹ <http://www.imsproject.org/>

² <https://sourceforge.net/projects/scam/>

³ <http://www.dublincore.org/>

⁴ <http://www.w3.org/TR/2000/CR-rdf-schema-20000327/>

One application has been built using SCAM v1. This is an application for teacher and student portfolios called APE Portfolio⁵. The portfolio was developed using SCAM v1 as a basis and by the adding of a simple, form-based metadata editor and a web-based user interface containing the portfolio metaphors. The portfolio can be used for organising and storing metadata and resources used for learning. A minor test bed and evaluation project has been initiated at the teacher education at Uppsala University in Sweden.

Ongoing work and the future of SCAM

There are a number of problems to solve before SCAM can live up to our vision of a general, standardized basis for learning component archive. Some of the problems addressed in version 2 of SCAM are:

- *More extensive RDF implementations of IMS metadata and content packaging.* Based on the ongoing work in the KMR group at the Swedish Royal Institute of Technology, CID and in the IMS Project.
- *Mechanisms for using multiple metadata models, vocabularies and taxonomies.* This is addressed by the implementation of a new, RDF based metadata model.
- *Annotation of metadata.* Mechanisms for annotation of resources and metadata resources, by other than the “resource owner”. This feature will be supported by the use of the described multiple metadata models. This feature is, for example, very useful in the portfolio application built on top of SCAM.
- *Connecting several archives for distributed metadata searches and metadata interchange.* This is accomplished by the implementation of an Edutella⁶ interface for SCAM, which makes SCAM an Edutella peer.

At the same time as we are addressing those problems, SCAM will undergo re-factoring and a thorough architecture revision. The most significant, architectural change in SCAM v2 will be the change to an Enterprise Java (J2EE) based architecture. SCAM v2 is planned to be released in September 2002. Currently there are a number of applications planned to be based on SCAM v2, some of which are listed under “deliverables” below.

Conzilla – the ConceptBrowser

A *concept browser* [2] is a new type of knowledge management tool that was invented by Ambjörn Naeve in 1997. A first prototype of a concept browser, called *Conzilla* has been developed by the KMR-group⁷ at CID over the past 4 years⁸. Conzilla is written in Java and uses XML as the underlying format for exchanging information. Since the program is carefully designed with a clear object-oriented structure that separates the underlying logic from the presentational graphics, it can easily be adapted to different presentational styles and cognitive profiles⁹.

⁵ developed with partial support from WGLN within the so called APE-project.

⁶ <http://edutella.jxta.org>

⁷ <http://kmr.nada.kth.se>

⁸ with partial support from WGLN within the so called APE-project.

⁹ Conzilla is presently being developed as an open source project at SourceForge and can be downloaded from <http://www.conzilla.org>

Conzilla has recently been equipped with an RDF back-end in order to be useful as a presentation tool for the *conceptual web* [1], which the KMR-group envisions as a humanly understandable layer on top of the semantic web. One such “semantic function” of Conzilla will be to serve as a query- and presentation-interface to Edutella, formulating questions in terms of “query-graphs” and presenting the results of the corresponding Edutella queries as content-components on the corresponding concepts. A first (primitive version) of this Conzilla-Edutella connection has already been implemented and was demonstrated at the second PADLR workshop in Uppsala, March 9-10, 2002 and on May 11 at WWW2002 on Hawaii.

Publications and Presentations

ISWWS-2001

[1] Naeve, A., Nilsson, M., Palmér, M. (2001), *The Conceptual Web - our Research Vision*, Proceedings of the First Semantic Web Working Symposium, Stanford University.
<http://kmr.nada.kth.se/papers/SemanticWeb/pospaper.pdf>

WBLE-2001

[2] Naeve, A., *The Concept Browser - a new form of Knowledge Management Tool*, Proc. of the 2nd European Web-based Learning Environments Conference, Oct 24-26, 2001, Lund, Sweden, <http://kmr.nada.kth.se/papers/ConceptualBrowsing/ConceptBrowser.pdf>.

[3] Palmér, M., Naeve, A., Nilsson, M. (2001), *E-learning in the Semantic Age*, Proc. of the 2nd European Web-based Learning Environments Conference (WBLE 2001), Lund, Sweden, <http://kmr.nada.kth.se/papers/SemanticWeb/e-Learning-in-The-SA.pdf>.

WWW2002

[4] Nilsson, M., Palmér, M., Naeve, A. (2002), *Semantic Web Meta-data for e-Learning - Some Architectural Guidelines*, Proceedings of the 11th World Wide Web Conference (WWW2002), Hawaii, USA. <http://kmr.nada.kth.se/papers/SemanticWeb/p744-nilsson.pdf>.

Invited international keynotes

Conference: Nordic conference on the impact of net-based e-learning on higher education.

Organizer: SOFF (Norwegian Central Board for Flexible Learning in Higher Education)

Place & Time: Svalbard, May 6-9, 2002.

Keynote speaker: Ambjörn Naeve, KMR/CID/KTH

Title: *Cultural Manifold or Globalized Unifold – challenges of the emerging global education market.*

Organizer: New media and innovation center (<http://www.newmic.com>)

Place & Time: Vancouver, April 30, 2002

Invited speaker: Mikael Nilsson, KMR/CID/KTH

Title: *E-learning technologies for the next generation Internet*

Invited national keynotes

Conference: Flexible meetings 2002

Organizer: CFL (Swedish National Centre for Flexible Learning)

Place & Time: Härnösand, May 13-15, 2002.

Keynote speaker: Ambjörn Naeve, KMR/CID/KTH

Title: *Search where you are – possibilities and limitations of net-based e-learning.*

Deliverables

Apart from the above mentioned publications and presentations, the following deliverables are directly connected to the Edutella project:

Public Service E-Learning Platform (PSELP)

A Swedish PSELP based on SCAMv2, Edutella and Conzilla is presently being developed under the coordination of the KMR-group. Presently, the main stakeholders are:

- The Swedish National Agency for Education (Skolverket)¹⁰, which will base their *Learning component broker service* on SCAM v2. The Learning component broker service is a service for combined searches in multiple learning components archives. The target group for the service is Swedish teachers.
- The National Centre for Flexible learning (CFL)¹¹, which will base their *CFL Learning Component archive* on SCAM v2. The first version will be delivered in September 2002.
- The Swedish Educational Radio & Television (UR)¹², which will base their new *digital media library* on SCAM v2 and Conzilla. UR's entire production will be searchable and the programs which have been cleared with respect to digital rights will be streamable across the web. The first version will be delivered during July-September 2002.

Personal Learning Portfolios

Beginning in September 2002, two testbeds for the WGLN project *Personal Learning Portfolios – Folio Thinking* will base their portfolio systems on SCAM v2.

- The APE-portfolios will be upgraded to SCAM v2, and used in the teacher education programme at ILU, Uppsala University in Sweden.
- The Media Technology programme at KTH will use SCAM v2 and Conzilla as the basis for the PLPs of the students.

IEEE-LOM RDF-binding

In the context of the PADLR project, the KMR group has initiated and lead the development of a standardized RDF binding of IMS metadata. The availability of such a standard binding is of fundamental importance for the implementation of learning object metadata in the Edutella network. The binding was published in the IMS metadata v1.2 specification¹³. This work is now being continued within IEEE, in order to publish an IEEE-approved version of the binding.

¹⁰ <http://www.skolverket.se>

¹¹ <http://www.cfl.se>

¹² <http://www.ur.se>

¹³ <http://imsproject.org/metadata>, <http://imsproject.org/rdf>

