ELMSET PROJECT

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The ELMSET project, currently in implementing stage, aims to develop a Learning Management System, an editor for Sharable Content Objects (SCO) development for student teaching/learning/training and research at "Transilvania" University of Brasov, and a testing tool for SCORM conformance, all of them parts of an e-Learning platform. They are all developed and integrated using Eclipse environment. Eclipse is the best environment for us to aggregate different products entirely developed separately at some moments in time.

Keywords: Eclipse, SCORM 2004, LMS, SCO Editor, Testing tool, Repository

1. INTRODUCTION

The growing importance and necessity to implement electronic learning environments has been recognized in "Transilvania" University of Brasov, Romania, and its implementation is one of the priorities. In this frame, some projects having the aim to develop e-learning platforms were developed. From these projects, lessons about e-learning system and e-learning platform design and development were learned. Currently, in the university there are two e-learning platforms, but they are not full compliant with SCORM standards, especially with SCORM 2004 standard. This means that not every developed SCO can be used on them. An example for this is the LEONARDO DA VINCI PROGRAMME Pilot Project RO/02/B/F/PP 141053 WBT WORLD where the platform is a proprietary product developed by a software company. This is a major inconvenient because it cannot be tailored to users' needs and requests and also to comply with continuous evolving technology of e-learning standards. For this reason it is expensive to buy every time another proprietary product. The lessons learned both during the life cycle of the Leonardo project, and after it, allowed the development of a new concept. The aim of this paper is to present this concept as it has been introduced in the ELMSET project.

As it will be presented in the followings, the project is mainly meant for the students from Transilvania University of Brasov, but it creates the opportunity for collaboration with other similar projects world wide to provide pieces of information to be reused in proper courses.

2. ELMSET PROJECT OBJECTIVES AND GOALS

The goal of ELMSET project is to develop a platform aimed to provide a flexible and interactive learning environment for students from the "Transilvania" University of Brasov. In order to fulfill the project goal, the following objectives were proposed:

(1) designing and implementing a Learning Management System (LMS) at "Transilvania" University of Brasov using Open-Source solutions;

(2) creating, adapting and reusing the Sharable Content Objects (SCOs) among academic groups in a high network for collaborative courses development;

(3) creating a test tool for evaluation SCO's compatibility with SCORM Standards;

(4) developing an e-learning network for Distance Learning Department of the university;

(5) developing a repository for SCOs to be used in the wide world.

The project envisaged outcomes are: the LMS, the SCO editor and the Test tool parts of the e-learning ELMSET platform addressed to the students of Transilvania University of Brasov (almost 22.000) involved in different forms of the higher educational system: undergraduate, postgraduate (Master, doctoral studies), adults learning programs, in-service training.

3. THE ELMSET PROJECT CONTEXT

The project allows collecting and integrating SCOs from various sources, providing high-reliability access and usage. The ELMSET product is operational for hands-on training, development and usage for academic applications involving the students' participation. In the same time it is intended the development of a SCOs repository both for our university and for world wide access. The use of SCORM standard can manage such situations. A methodology is developed to design an optimal database and a generic technique for rapid and efficient transfer among database and client application. All Java code was developed using Eclipse for the following functionalities [1]:

- Building integrated web and application development tooling.
- Integrate all tools, move data among applications, and simplify programming.
- Creating projects, generating Java source code, performing builds, or detecting problems in code in programmable mode.
- Add new functions and extensions to the Java IDE itself.
- Create an open environment for a collaborative network

The last statement is considered to be the most important feature of the Eclipse in the frame of this project. The objects are tracked using an Application Programming Interface (API), the method by which data transfers between content and a LMS (or any other system hosting the content) is performed. The project envisages the standardized element names, vocabularies and best practices that are available for content. The LMS could also launch multimedia assets. As above mentioned, data transfer is accomplished using a LMS provided API. This API could be a Java or ActiveX applet, or even a JavaScript object. Content talks to the API using JavaScript. It is well known that most of the developers implement API with Java applet, this raising some platform and compatibility issues. While the only data model the SCORM requires LMSs to implement is the CMI, the SCORM allows for customized data models to be created and implemented by LMSs and SCOs (both would need to be data model aware), [2]. There exist currently several different Learning Management Systems, each with its own strengths and weaknesses. These

systems could be used to present any type of web content on any subject with many different design possibilities, but things start to fall apart when someone wants to share the content or get it to work with a different LMS. Because the content was written specifically for a proprietary LMS, it usually won't work properly with another LMS. SCORM conformance enables capabilities as the ability to use standard "packages" of learning content, the ability to recognize individual students and collect information about their progress, and knowing important details about a piece of content through metadata. Therefore, even if existing Learning Management Systems and Learning Content Management Systems can offer different feature sets, have different strengths, and appear very different in look and feel, as long as they follow the SCORM, SCORM content should work well with any of them. In the same time SCOs can contain any type of information, have any instructional design, can be of many different sizes, and can be various types of digital content. All that matters is that they fit with conforming Learning Management Systems. This is the reason why the ELMSET project aims to develop a standard conformant editor for SCOs. This editor is designed to create SCOs using two possibilities. One of them starts from the Word document. The provided Word document is imported, saved as HTML files and converted into simple SCOs. The other possibility involves a complex Java editor developed by us in a previous Java project that creates directly HTML files. Thereafter, simple SCOs could be provided with different behaviors by the wish of the courseware authors using the SCO editor. By using a SCORM conformant Learning Management System, an instructor could conduct a search of multiple linked archives. A suitable module is retrieved as a content package and added to the instructor's course. Because both the content and the LMS are SCORM conformant, advanced features such as student progress tracking and score reporting work transparently in conjunction with the rest of the course. The completed course, composed of accessible Sharable Content Objects (SCOs) from several sources, is delivered to multiple remote locations. Because rich, standardized meta-data is associated with the content, sophisticated searches across distributed repositories are enabled.

4. CONCEPTUAL PLAN OF THE E-LEARNING PLATFORM

In the ELMSET project the Eclipse environment is used to develop the LMS, the editor for SCOs, and the tool for testing the SCORM conformance for every future version due to user's requirements or SCORM version changing of:

- LMS;
- Content package;
- SCO Run-Time Environment;
- Metadata;
- Manifest file;

Development of LMS is based on:

- An API Adapter implemented as a Java Applet.
- A module for full implementation of the SCORM Run-time Environment Data Model.
- A module for full implementation of the SCORM Navigation Data Model.

- Support for importing SCORM Conformant Content Aggregation Packages.
- A Sequencing Engine based on the IMS Simple Sequencing Specification and SCORM 2004.

In the LMS are implemented functions for:

- register for a course;
- user's login/logout;
- make up profiles for learners;
- import and manage courses;

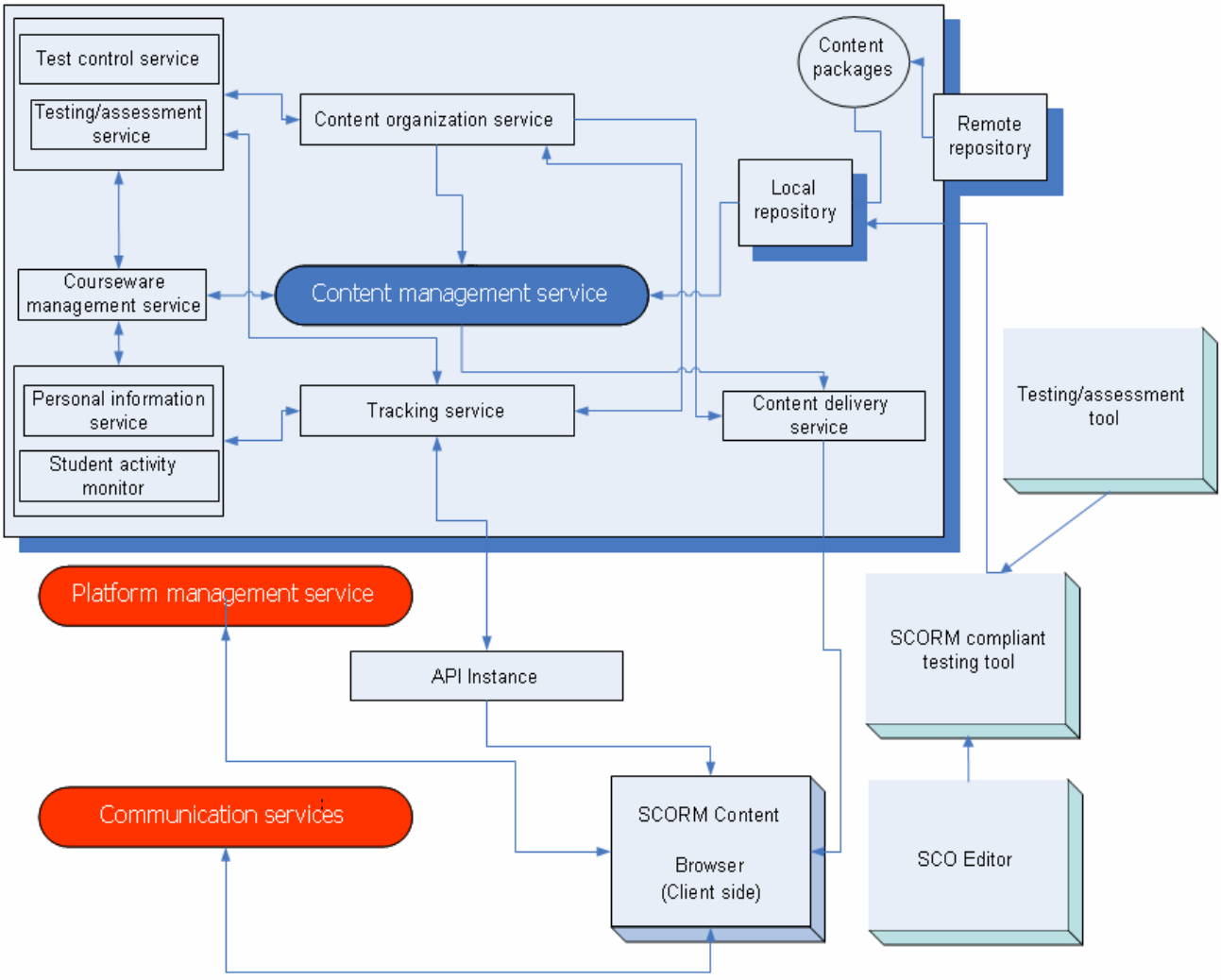

Fig. 1. Conceptual plan of the e-learning platform

Development of SCO Editor is based on:

- A JavaScript file for editing to customize SCOs. It contains a series of variables and function definitions. This file will be periodically updated to reflect changes in SCORM standard and users requirements.
- A set of templates provided for authoring SCOs.
- A collection of JavaScript functions used to implement advanced tracking functionality in SCOs.
- A module to collect SCOs in a package.
- A module to change properties of SCOs to provide different functionalities of SCOs.

- A tool for HTML files creation and editing (go into the HTML pages that were created and edit the content to conform to a specified version of SCORM standard, see Figure 1).

5. LONG TERM IMPACT TO THE INFORMATION/COMPUTING INDUSTRY

The main interested partner of the project results is Transilvania University of Brasov and can be easily extended to other institutions with educational activity. The focus is on the course delivery, especially for Distance Learning and Lifelong Learning Departments from Transilvania University of Brasov. Learners, educators, content producers will all benefit from the existence of such effective objects. This project is a real help for teachers involved in the new learning technologies research. In the future is planned to implement a solution involving GRID computing technology to spread over the world the repository resources (the SCO and assets that will be created) and to integrate idle computer resources into e-learning platforms, thus eliminating the need to purchase costly high-level servers and other equipment.

6. CONCLUSIONS

The project is considered innovative both from the technical and from the educational point of view. There is a real need to improve the Romanian educational system. This project brings new opportunities that can face to the growing number of students, to their different needs and aspirations. The valorization of the project results will be oriented to the Instructional Design and Learning Technology aspects to improve the quality of learning objects. There will be developed some educational models for an efficient Instructional Design of SCOs. Research will be performed to obtain good performances in communication with any other Learning Management System, regardless of the context and programming environment used for the application, so that it can be used other repositories or provide "chunk of information" for others to contribute to the collaborative course materials development. Other research tasks are oriented to data transfer area among client interface and database to avoid problems produced by a large amount of data that tend to lead to a very high response time.

7. ACKNOWLEDGEMENT

The ELMSET project was awarded in the frame of 2006 IBM Eclipse Innovation Award program.

8. REFERENCES

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