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Creating an Educational the Private Cloud Based on Simulation and User Interaction in Solving Educational Problems

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Abstract

The authors proposes to create a single platform solution that combines social networking, crowdsourcing management system and knowledge management system and learning management. The optimal approach in this case may be private educational cloud deployments. In a study conducted information modeling the main processes of interaction between participants in the educational cloud. The authors also has been proposed criteria for evaluating the effectiveness of the resulting solutions, technological and organizational requirements.

Keywords: social networks, crowdsourcing management, knowledge management system, private educational cloud

Introduction

Due to the rapid innovative technologies and implementation of ICT in the educational process and the university management becomes obvious problem of interaction between the institutions of vocational training, participants in the educational process and the employing organization. Solving this problem requires the active cooperation of educational institutions for the expansion of educational space at the expense of the requirements for the competence obtained from business and society. Also important is to develop in educational institutions mechanisms of social performance assessment and their reflection in the mode of free access to information resources (CEPIS, 2011).

At the same time, there is no evidence-based approach to solve the problem. A reasonable solution to this problem by developing a virtual IT environments using cloud technologies and crowdsourcing, as well as an analysis of the content of the educational network.

Main part

The greatest synergistic effect in this case may be obtained by combining in a single platform models of social computing and crowdsourcing (collective

intelligence) to solve educational problems at the level of a single information-educational environment. The optimal approach in this case may be private educational cloud deployments. Toward the end, specifically state the objectives of the chapter.

Model of cloud technologies and benefits from using them in an educational institution

Currently there are three main types of cloud computing (technology) (NIST, 2011):

- Infrastructure as a Service, IaaS;
- Platform as a Service, PaaS;
- Software as a Service, SaaS.

Distinguish between public, private and hybrid clouds (Public Cloud/Private Cloud/Hybrid Cloud).

Public cloud involves the deployment of infrastructure with the necessary software (SW) and the provision of mechanisms to access them outside the infrastructure of educational institutions or companies – directly to the Internet for students and other clients.

Private cloud is created on the basis of its own IT-infrastructure to optimize its use within an educational institution or company.

As a rule, large providers are deploying cloud computing in the data center (DC). Cloud computing concept combines such famous models and technologies as on-demand computing (Computing On-Demand), resource model calculations (Utility Computing), Grid computing, and the provision of various elements of the information system as a service.

The advantages of using cloud computing for educational institutions, primarily in the possibility of switching to continuous education format to “learn anywhere, anytime”: cloud computing technology allow students to have access to your personally customizable work environment is always in the mode 24*7*365 and regardless of geographic location to any available devices (PC, laptop, PDA, etc.) if you have access to the Internet. How important advantage of the use of cloud computing, some authors point out cost reduction in staff. Due to the transfer of the services in the cloud, reducing the amount of IT staff of the institution, there is no need to improve the knowledge of experts in a narrow specialized software products and, therefore, staff development in this area.

Benefits from the implementation of the educational cloud at the university

Private cloud transforms the learning process in high school to a completely new level of quality, providing the following key benefits (Niall, 2010):

- Eliminating the digital divide – a gradual blurring and fundamental differences between full-time, correspondence and distance learning, integration of all forms of learning. There is a possibility of combining forms.

- Further personalization of learning. Providing individual program (path) for each student with individual accents and content (training materials, services, applications, etc.) with the highest quality to gain knowledge and practical skills at a convenient time and in a comfortable place for him, at the same time accessed from any device connected to the Internet.

- Ability to “lead” the student from the very beginning of the learning process, in the course of his studies and after graduation, enabling “instant access” to the accumulated information. Even after receiving the diploma young specialist will always be able to access the results of their research and practical training (laboratory, course, degree, lecture materials, etc.) at any time and from anywhere in the world.

The introduction of such an innovative approach in the process of training in universities provides:

- effective use of educational areas (there is no need to allocate separate and specially equipped rooms for traditional computer classes);

- drastic reduction of the expenditure required to establish and maintain computer classrooms and laboratories;

- obtain a qualitatively new level of current knowledge in the specialty – the students get the opportunity to be in the process of learning at any time and in any place where there is Internet access;

- more effective interactive learning process; the ability to use interactive technologies;

- ability to quickly create, adapt and replicate the educational services in the educational process;

- opportunity for students to provide feedback to the teacher by evaluating and commenting on its proposed educational service;

- guarantee the purity of the license used in the learning process of software (SW);

- reducing the cost of licensed software by creating a functional equivalent educational services based on open source software;

- minimize the number of licenses required due to their centralized use;

- centralized administration software and information resources used in the learning process;

- maximize the use of the university cluster computing systems.

The construction and analysis of models of interaction between participants of educational space using CASE-technologies

Modelling the interaction of participants in the educational process in a private cloud

To analyze the processes of interaction in the private education cloud and its structure was decided to use business models that comply with international standards ISO 9000: 2000, architecture and ARIS tool ARIS Toolset.

Use case diagram to create solutions is shown in Figure 1.

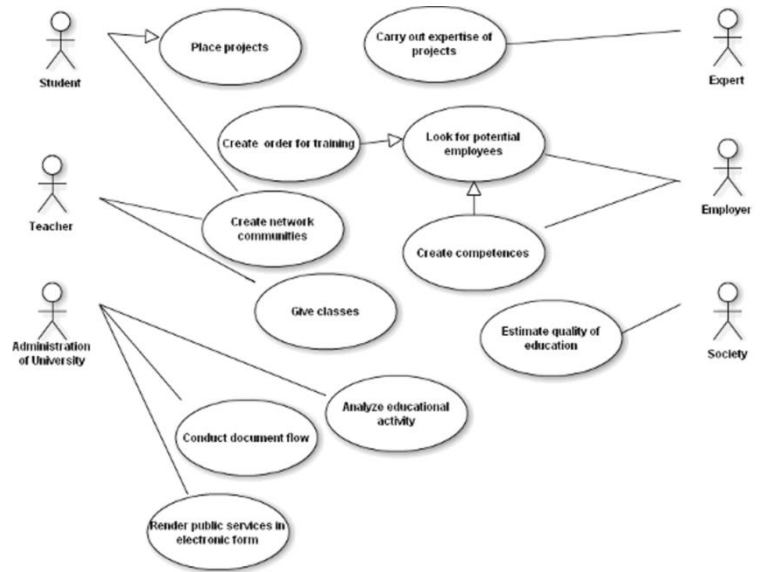


Fig. 1. Use case diagram of the private educational clouds

To simulate the interaction of participants in the educational process by using a private cloud identified the key business processes, focused on the solution of educational problems, as well as for the provision of electronic educational services, evaluating the effectiveness of the educational process.

The main methodological and technological aspects of the decision and evaluation of performance

The main methodological and technological aspects of the proposed solutions:

- the availability of educational resources in the 24*7, the implementation of training opportunities in a continuous mode using a variety of means of access to educational resources;
- development and support of the rating system for evaluating educational and administrative activities;
- support mechanisms for public evaluation of educational activities as an institution as a whole and the individual;
- information transparency of the learning process;
- set the system key performance indicators (KPI) to assess the effectiveness of the system as a whole and its individual components;
- socialization of students, social support user groups, project teams and temporary creative collectives;

- support tools informal (spontaneous) and non-formal education;
- support for templates and versions of documents, track the status of documents;
- the use of crowdsourcing technologies in addressing training and other tasks;
- the possibility of introducing Social Information Processing.

Among implemented private cloud innovative educational technologies should be highlighted:

- Informal learning.
- The transformation (transformation) educational space.
- Social learning.
- Lifelong learning.
- Personalized training.
- Interactive learning.
- Support and placement on network resources technology and storytelling gaming technology.

Among the technological evaluation criteria must be identified:

- Support for news from RSS-feeds. Can be easily connected to the existing site of the university, without requiring a separate filling News for mobile devices.
- The possibility of implementing a campus map with the ability to display it on the label (points of interest).
- Availability of contacts. Perhaps using QR-Code. Contact phone may contain a set of one-click quick transition to writing e-mail and the ability to find the building department of the university at stake.
- The presence of a video catalog of video files downloaded to the official channel of YouTube.
- Mobile applications. Including in development and test access by the laboratories of the university.
- Ability to connect to cloud storage.
- Interactive training schedule and rates, indicating at what time they pass and a link to a map in which the building is undergoing.
- Calendar of university events.
- Reference to any site, such as on the mobile site of the library.
- Photo Gallery.
- A template for creating custom applications based on existing IT infrastructure or with minor changes it.

Private cloud also enables the use of solutions based on the concept of BYOD (Bring Your Own Device). This makes it possible to reduce costs in the construction of educational information infrastructure and eliminate the digital divide. Among other advantages, should be noted:

- A variety of personal devices.
- User control on the side of the learner.
- Constant access to educational resources.
- Open and continuously scalable educational space.
- No additional costs.
- Control Training.

The effectiveness of the solutions should be evaluated based on:

- the presence of the development of guidelines for all participants in the virtual interaction,
- analysis of the effectiveness of their programs of study;
- the scope of the modernization of competence of specialists based on the requirements of business and society;
- analysis of the effectiveness of using crowdsourcing in solving professional tasks upon request.

Conclusion

The resulting decision to allow the use of modern ICT tools based on cloud technologies to improve the efficiency of the implementation of the tasks of the educational process, the organization of continuous information exchange between the participants of the educational environment and bring to building educational trajectories and assessment of the quality of education of potential employers.

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