Proposed Model of e-Learning using cloud technology

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Abstract
The present study investigates various issues involved in designing a new model of e-Learning using cloud technology with an aim to suggest solutions in the form of many measures and management standards. These will help to overcome the some major threats in cloud based e-learning technology. To achieve our thesis aim, we used theoretical and empirical studies. Empirical study is made through the information gathered through various cloud based e-learning solution vendors websites further the theoretical study is made through the text analysis on various research papers and articles related to our subject areas. And finally the constant comparative method is used to compare the empirical findings with the facts discovered from our theoretical findings. These analysis and research studies are leads to find various designing issues in cloud based e-learning technology and to propose our model. We proposed a prototype of cloud based e-learning model and will discuss the some practical implementation issues of our thesis approach for educational Institutes and Universities. As there is no limitation in technological developments, the new advances will come in light in the area of cloud computing which will give a better user experience to next generation in e-Learning process.

Keywords: E-Learning, Cloud Computing, Technological Developments, Management Standards

1 Introduction
In Cloud computing technology based e-Learning system all the academic institutions of a Country or State can be connected globally and they can share the resources and e-contents for e-learning process. To connect the academic institutes for e-Learning system we can think e-Cloud model. The proposed e-Cloud provides the opportunity of flexibility and adaptability to use the computing resources on-demand without physical purchasing or installation at user site. Contrary to having only one service provider in present e-Learning models where the software has to install on each system, different providers use different interfaces to their computing resources utilizing varied architectures and implementation technologies for customers (University or Institutes). Although this can creates a management problem, a common architecture facilitates the management of computing resources from different Cloud providers in a homogenous manner this research have a proposal to reengineer the existing learning architectures, and how educational institutions can manage the cloud computing resources. The researcher also brought reasonable explanations for the challenge of indexing web resources for optimum discoverability by students and educators. During the last five years, e-Shahbaz Zafar: - Proposed Model of e-Learning using cloud technology

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Learning courses were based on the Learning Management Systems in the browser. With new trends of Web 2.0 and e-Learning 2.0, the e-Learning developers have moved to Rich Internet Applications. The multimedia based e-Learning materials stay as backbone for several e-Universities like IBA e-University, Asia e-University, UK e-University and several other e-Universities. The UKEU (UK e-University) project was started with the idea of bringing the best of British Higher Education to students around the world. In 2003, only 900 out of 5000 students were expected to join this e-University, but unfortunately, the e-University was shut down due to lack of sufficient funds [5][6]. Similar to this project, there were several e-Learning programs not picked up due to huge cost involved in delivering the e-Learning contents to the learners. Even though, it is proved that simulations are increasingly being used as powerful and flexible educational devices [7], it is not yet fully successful because of the huge cost. It has been estimated that YouTube pays over 1 million dollars a month in bandwidth costs. These costs are expected to go up, as demand increases and higher-quality videos are made available.

2 Aim of study

This study aims to propose an ICT enable “e-Learning Service system based on cloud computing model”. It elaborates the workflow of the developed service and focuses on ‘e-Learning as an On Demand Service stored in cloud environment, thereby moving on to the new concept of ‘Cloud Learning’ which will benefit the learners worldwide. Thus, this concept would lead to a fundamental shift in the education sector of any country or state by providing a new way for storing and hosting the e-Learning materials in cloud environment, which gives a better opportunity for the learners to enhance their skills and to attain hands on experience in various fields in a cost effective way. For this study we choose Cloud computing as an emerging computing paradigm which provides the variety of services in such a way that has not been experienced before. E-Learning as a service (SaaS) can be one among them. The main aim of our study is to propose a cloud based e-Learning model with use the limited resources, and which is available in an efficient and effective way to balance the current institutional resources in a more economical way. The model proposed can be used by the developing country like India for improving their quality of higher education and to offer the good educational contents to a large number of users in a very cost effective manner. In our outcomes of thesis we proposed a prototype of cloud based e-learning model and will discuss the some practical implementation issues of our thesis approach for educational Institutes and Universities. As there is no limitation in technological developments, the new advances will come in light in the area of cloud computing which will give a better user experience to next generation in e-Learning process. The present study investigates various issues involved in designing a new model of e-Learning using cloud technology with an aim to suggest solutions in the form of many measures and management standards. These will help to overcome the some major threats in cloud based e-learning technology. To achieve our thesis aim, we used theoretical and empirical studies. Empirical study is made through the information gathered through various cloud based e-learning solution vendors websites further the theoretical study is made through the text analysis on various research papers and articles related to our subject areas. And finally the constant comparative method is used to compare the empirical findings with the facts discovered from our theoretical findings. These analysis and research studies
are leads to find various designing issues in cloud based e-learning technology and to propose our model.

3 Research Questions

Main Question
For this study, our endeavour is to highlight and bring out a new model of e-Learning where cloud computing may be utilized to offer a cost effective, easy operating and highly available platform.

Sub-Questions
1) What can be the Infrastructure related issues in cloud based e-learning?
2) What can be the Software or Applications services issues in cloud based e-learning?
3) What can be the Operating system and other software Platform related issues in cloud based e-learning?
4) What can be the other issues that need to addressed before designing the propose model?
5) How we can design such a cloud based e-Learning model,

4 Background to the study

There are a number of cloud-based applications available in the e-learning sector as well. Casquero et al. [18] presented a framework based on Google and using the Google Apps infrastructure for the development of a network of cooperative personal learning environments. They discussed the integration of institutional and external services in order to provide customized support to faculty members in their daily activities. They also take advantage of the framework as a test-bed for the research, implementation and testing of their educational purpose services. Marenzi et al. [19] investigated how educational software can be used in an academic or corporate learning environment. They integrated models and tools that they developed into an open source environment for the creation, storage and exchange of learning objects as well as learning experiences. They presented the “Learn Web 2.0” infrastructure to support lifelong learning and to enhance the learning experience. This infrastructure brings together information stored on institutional servers, centralized repositories, learners’ desktops, and online community—sharing systems like Flickr and YouTube. Sedayao [20] proposed an online virtual computing lab that offers virtual computers equipped with numerous applications such as Matlab, Maple, SAS, and many others that can be remotely accessed from the Internet. The adoption of cloud computing will have a profound effect on both the organization and the individuals (particularly the IT staff) at work. For example, Westmont College estimates that at least 80 percent of the time spent by its IT staff focuses on uptime-related work (Sheard, 2010). Now, keeping the applications and systems up and running (including monitoring, maintenance, upgrades, and troubleshooting) is now the responsibility of their cloud service partners. Moving uptime support to partners gave time back to Westmont’s IT staff members, who can now provide more time directed at instructional support to help instructors and students with their teaching and learning needs. However, this example also shows that the adoption of cloud computing changes the various roles of the IT staff (e.g., database administrator, operators, technicians, etc.) within an organization and changes their importance, relative to one another (Golden, 2011). In addition, the adoption of cloud
computing has implications for institutional IT funding practices, economic models, and budgets (Goldstein, 2010b). Therefore, DL administrators should use a holistic approach when considering cloud adoption instead of just focusing on moving the application x, y, or z (Gunson & Blasis, 2002) to the cloud. Top management support, careful planning, and a thorough education of all stakeholders are needed in order to identify the best cloud strategy.

5 Partnership with other e-Learning institutions

We as researchers feel that this should be an overarching goal, in order to build a distance learning community cloud that will offer the most benefits to both students and faculty. Such a shared distance learning community cloud, once established, would allow online learning resources and applications to be shared across the whole distance learning community. That also means that students and faculty (either at small community colleges or at large prestigious research universities) would have equal access to online learning and teaching resources. To that end, existing professional associations in distance learning should take a leadership role in working with their member institutions to set up cloud adoption, implementation, and evaluation standards and criteria, and should develop agreements and information policies for distance learning to address various shared issues such as educational resources, copyright, security, and the privacy protection of personal and financial information. Resources (such as forums and wikis) can be used to support and facilitate discussions among DL administrators and practitioners (Blanton & Schiller, 2010). A community cloud in distance learning will also make it easier to secure federal and state financing and grants, to reduce the overall cost of development and operation, and to avoid the wasting of costly resources.

6 Reasons to use Cloud in e-Learning

1. Provides a flexible, scalable, cost effective model that does not force the institute or university to use out-of-date infrastructure or software application.
2. Offers the flexibility to meet rapidly changing software requirements for today’s and tomorrow’s teachers and students.
3. Allows software standardization, a shared pool of applications for use in an e-learning system for school, college or university, and easier maintenance through centralized licensing and updates.
4. Enables rapid development and deployment of complex solutions without the need for in-house expertise
5. Can eliminate the upfront financial burden of deploying new technologies through a pay-as-you-go model.
6. Supports multiple client platforms both inside and outside the school infrastructure.

7 Cloud model Adoption Strategy in e-Learning (eLC) framework

Starting from the recent researches related to the transition to Cloud Computing and the experience of some institutes and universities in using it, we suggest a migrating strategy towards cloud, formed of the following stages (figure 5.1):

a) Developing the knowledge base about Cloud Computing;
b) Evaluating the present stage of the university from the point of view of the IT needs, structure and usage;

c) Experimenting the Cloud Computing solutions;

d) Choosing the Cloud Computing solution;

e) Implementation and management of the Cloud Computing solution.

a) Developing the knowledge base about Cloud Computing. The first step consists in developing the knowledge base by participating at seminars, conferences, discussions with the suppliers and consulting the most recent researches in the field. The success of the phase depends on the allocation of sufficient resources for research, for understanding how Cloud Computing functions in different organizational structures from universities and between institutions [6], the benefits and risks, policies and the best usage practices of Cloud Computing. The research is conducted by a team formed mainly of IT staff who permanently communicates with the users of the solution regarding the objectives, the progress, costs and benefits of the Cloud Computing solution.

b) Evaluating the present stage of the institute or university from the point of view of the IT needs, structure and usage. The first step consists in understanding the university IT infrastructure. The service oriented architecture represents the base for understanding the data, services, processes and applications that may be migrated or need to be maintained within the university, so as to observe the security policy. With respect to the IT needs, their structure and usage, the analysis may start from the categories of users who interact with the present IT infrastructure (figure 5.3) and their necessities.

c) Experimenting the Cloud Computing solutions. The transition to cloud may be achieved gradually, starting from testing a pilot project in cloud and then externalizing the applications chosen for cloud. The first step consists of settling some cloud targets, such as development and environment testing or storing some data inside the cloud. The next step may consist of the daily processing of the internal operations, addressing at the same time the components of public and private cloud in order to assure the security and protection policies. The maintenance of low costs for using the solution must be permanently taken into account.
d) **Choosing the Cloud Computing solution.** The first step consists of identifying the data and applications, functions and main processes within the university. These may be grouped according to the three large categories of activities from the university: teaching, research and administrative support for the first two activities. Step two is represented by the evaluation of the elements identified in the first step according to several criteria, such as mission, importance within the university, sensitivity, confidentiality, integrity, availability, in order to determine the candidate elements for cloud. As exemplification, we present an evaluation of the main elements within the university using an evaluation scale from 0 to 3, with the following meaning: 0 – none, 1- low, 2 - medium and 3 - high.

**8 Conclusion**

The concept of cloud computing has several key characteristics that provide users with a unique capability and niche among computational systems. Clouds can provide device independence from any particular hardware vendor and offer implementation of resource and cost sharing from among a large pool of users. Within this resource sharing concept, additional specific implementations help to enhance these general gains in technical performance, with potential follow-on economic savings. For example, technical efficiency and scalability is enhanced with centralization of infrastructure, location independence (as well as device independence), and efficiency in utilization through management of user demand load to the cloud system through implementation of software that controls simultaneous multi-user or project access. Beyond these general technical enhancements, the idea of individual cloud architecture designs, specific implementations, and usage profiles have the potential for additional technical and economic impacts that can lead to better performance, throughput, and reduced costs.

**9 References**


