

A New Paradigm of E-Learning Using Educational Clouds in India

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ABSTRACT

Cloud computing has a benefit to share various computer resources which can be provided rapidly and elastically to users as per demands. Due to this benefit, cloud computing technology is demanding and implementing in various sectors like government, business and education. In this paper we study how cloud computing is beneficial in education sector in India. We also discuss educational environment of cloud computing and look how various universities and institutions are taking advantage of this technology in terms of not only costs but also efficiency, reliability, portability, flexibility and security. This paper also presents some case studies for educational cloud proposed by various cloud providers which creates interest in this new paradigm. We will discuss educational cloud challenges which may arise in future.

KEYWORDS: Cloud Computing, E-learning, Online Learning, Web-based Learning, Utility Computing, Learning Management Systems, Distance Learning, Education Systems.

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I. INTRODUCTION

Education is the most integral part of human beings. It adorns us with all the needs which help to become successful in life. In education, E-Learning is the most promising paradigm now days. E-Learning uses network information and communication technology (ICT) for teaching and learning. There are some other technical terms includes in E-Learning like virtual learning, distributed learning and web-based learning. Distance education is somehow logical extension of E-Learning. Residential campus educational institutions can use E-Learning for improving access to their educational programs to cover more and more students [1-4]. A more demand of E-Learning is also increase in demand of ICT and at the same time decrease in cost. ICT enabled multimedia resource-based learning and teaching

growing interest in E-Learning. Educational institutions have lot of advantages by making curriculum accessible through distributed locations, including institute campus, residence and other learning centers. In India, there are various barricades in the growth of E-Learning viz., lack of access to required technology and poor infrastructure. At the same time, the cost of hardware and software are going down, but the costs of other aspects are increasing. The most important barrier is the cost of infrastructure support and its maintenance and superior training staff [3].

This paper shows how cloud based E-Learning education is beneficial in India. The structure of this paper is organized as follows: in section 2 we explore the current status of e-learning usability in KSA. In section 3 we discuss the educational cloud computing environment. Section 4 presents some

case studies of educational clouds provided by the most popular cloud providers. Challenges associated with cloud computing education are discussed in section 5. Finally, section 6 concludes the paper.

II. CURRENT E-LEARNING IN INDIA

E-Learning is nothing but the electronic aids supported for teaching and learning. It combines various fields of thoughts and practice of training and education, learning and knowledge and technology including web-based learning, computer-based learning and virtual education opportunities. There are two types of E-Learning; synchronous and asynchronous [5]. In synchronous, students participate in an online course with teachers through continuous audio and video streaming at a specified time interval. The major drawback of synchronous E-Learning is to meet specific timing. In asynchronous, students can participate in online course on his/her suitability but it may be possible that teachers will not avail at that time but teachers can reply later on. In this E-Learning process, a specific tool called Learning Management System (LMS) is used. Some LMS variants are commercial. One of the most popular one is Blackboard (<http://blackboard.com>) and others are open-source such as Moodle (<http://moodle.org>).

According to Albalawi [6], the use of information technology in distance learning, E-learning or Web-Based Instruction (WBI) can be one of the best ways to deal with the challenging situation in countries that provide technology access to all citizens. He stated that the role of the higher education teachers around the globe is rapidly changing as technology become more advance. He also stated that various factors like attitudes, incentives, training, support, time and duration of course can create conflicts in promoting teachers in India to participate in E-Learning. He strongly believes that online learning is the future in higher studies in India. E-Learning will encourage students to become learning more interesting and create various challenges for teachers. He mentioned various barriers for Web-based education in India which are lack of knowledge, lack of time to develop WBI applications, WBI ownerships, lack of technical support, lack of monetary incentive, and lack of government support.

III. EDUCATIONAL ENVIRONMENT USING CLOUD COMPUTING

Educational cloud is one of the most interesting applications of cloud computing [7 - 10]. Educational cloud can concentrate the power of thousands of computers on one problem and allowing developers to develop advance models to make smart E-Learning tools. Indian universities can provide their technology resources to private, public sectors for more advancement [11]. Students are expecting to connect their personal mobile with campus services for education. Faculty members demands for fast access of integrated technology into classes. Research students also expecting instant access of high computing service performances without taking care of large server and storage media. Educational cloud is providing a variety of services which are beneficial to teachers, staff and students [12]. The role of cloud computing is important in university education since it provides direct access to wide range of academic resources, application and educational tools [13]. Some students have already using cloud based educational applications. Such applications are the future of the academic learning in cloud [14].

Cloud computing is providing different kind of platforms for education. Justin et al. [15] has proposed one application named Seattle which is educational networking, free, portable and lightweight using cloud. Using this application, students are learning the concept of networking and distributed systems through internet. Seattle provides access to thousand computers worldwide for academics. Al Noor et al. [16] have suggested one architecture which gives flexibility of resources with the present economical situation by use of unused resources and without involvement of third party. In this architecture, clients can provide own security policy. Sultan [17] has shown how institutes and universities can come together in cloud computing as many of them are suffering from global economic crises.

IV. CASE STUDIES

Many IT companies has been adopted the trend of educational cloud. Microsoft has proposed a hybrid model that enables students and researchers to use as much as or as small as they want the educational cloud. Google Apps education in cloud computing is an open-source application for colleges, universities and institutes. HP Cloud Computing provides an technology to share best

practices, ideas and technology regarding the use of cloud computing in education. There are various educational clouds. The following are some case studies for educational clouds provided by some popular providers.

A. Microsoft Educational Cloud

Using Microsoft educational cloud, researchers can streamline workloads across the infrastructure and integrate their existing IT resources with web-based services [20]. Microsoft educational cloud offers various programs like Microsoft Live@edu without any cost to educational institutions. It enables lower cost to develop, operate and integrate the systems distributed among clouds and the data centers [21]. Figure 1 shows features of Microsoft Live@edu. Institutes prepares workforce with Microsoft which will give rapid access to MicroSoft Live@edu. It is an application provided to students, researchers and teacher with long term offering flexibility, collaboration and online communication without any cost to institutions. Following Figure 1 gives features of this application

Microsoft Live@edu
❖ Website Creation
❖ File Sharing
❖ Word Processing and Presentation
❖ Desktop Sharing
❖ Resource Scheduling
❖ VOIP

Fig. 1 Features of Microsoft Live@edu

Microsoft applications can be used by the students for finding jobs after their college completion [20]. Microsoft educational clouds are requires to institutions for following needs:

- Instant Message, Email and academic Calendar
- Creation and sharing of academic documents.
- Flexibility and collaboration
- Providing free resources on demand.
- Identity and relationship management
- Coordinating multiple departments for project development
- Creating multi-user applications for many students.
- Developing on-premise software to the cloud
- Testing Web services quickly
- Providing Mashups of data to meet accountability and assessment needs
- Hosting public web sites
- Risk evaluation and decisions making about the use of educational cloud computing.
- Developing and implementing large-scale

applications in different environment

B. IBM and Google University Academic Initiative

IBM and Google University has integrated cloud computing, hardware, software and services provided to schools, institutions and universities. This initiative facilitates students to use modern computer and companies provides services for advance training. The main purpose of this initiative is to reduce cost for academic institutes and their students. A bunch of hundred computers are provided by IBM and Google to exceed 1,600 processors. Concurrently, the Linux-based servers run open source software systems and Hadoop [22].

C. Salesforce.com Education Cloud Platform

The Salesforce.com provides all the services required for the educational institutes. It enables students, researchers and teachers to track, evaluate and clarify each aspects of their efforts. The SalesForce.com can assist educational institutions to manage their services efficiently for tracking individual details, study groups and other operations [23]. It is capable of sharing and mobilizes student's information between academic departments and housing. It also supports services to enhance the educational experience and support student's success. The Salesforce Foundation's products provide opportunity for teachers to organize information that allows the alumni and admissions. Salesforce provide various services for Educational institutions including: recruitment of students, information management, alumni and applicant portals, student tracking and faculty collaboration.

V. CHALLENGES TO EDUCATIONAL CLOUD

Cloud computing is a new paradigm and feels threatening by some users in universities and institutes. Some personnel may fear the consequences of their jobs being outsourced. In addition, some institutions might feel uncomfortable about sharing business data and services with outside. But, still there are some challenges to do with attention as compare to reality [24]. These challenges include:

A. Security Hazard

Security hazard is one of the main challenges to cloud computing. It includes modification of confidential information on the cloud, loss of privacy and the unauthorized access of the data by cloud providers [25 - 30]. Therefore, several

measures should be taken by educational cloud computing systems to protect data from these threats [31, 32]. These measures are [33]:

- *Identification and Authentication:* Educational cloud providers should have separate account for teachers, students and staff and must be verified and validated by user name and password to protect their accounts.
- *Authorization:* Cloud should control the priorities, resource ownerships and permissions. Each member of institutions must have granted privileges as per their account or job profile.
- *Integrity and Confidentiality:* Various cryptography methodologies must be implemented to protect confidential data like exams.
- *Non-repudiation:* It ensures that transaction done by institutions cannot be denied. Various non-repudiation techniques like digital signatures, timestamps must be deployed by educational cloud.
- *Availability:* Data must be available and accessible at 24 x 7 on the educational cloud. Denial of Service (DoS) is a great source of hazard.

B. Lock-in

Google and Microsoft allow companies to collaborate on their cloud products. There is also the risk of associating a company with these popular people with students, researchers, or faculty. However, universities and institutes are "locked-in" to specific provider products. There are significant costs involved in migrating from any widely used system. Organizations beginning to integrate educational processes with cloud systems are more difficult to test, implement, and integrate.

C. Unwanted Advertising

Cloud providers will focus on users who have unwanted advertisements. The accumulation of usage data by providers may be of value to sell to third parties, although this may be unknown. The inclusion of appropriate clauses in the contract reduces the risk of misuse

VI. CONCLUSION

The population of India is growing rapidly and the Government of India has made it mandatory for universities to provide education to all citizens. The Government of India has made a lot of efforts in the last five years to improve the education system by launching development programs and building

many universities. Therefore, the Ministry of Human Resources Development (MHRD) works to penetrate, regulate and implement the higher education system. According to the Ministry of Human Resources Development, the current number of students at Indian universities this year is about 10 million. LMS / CMS are an e-learning platform that is considered an important part of the e-learning solution from the university's perspective, while LMS is the software that automates the management of training programs. This paper focuses on educational cloud computing e-learning in India and universities and institutions can show how the cloud can be impacted not only in terms of costs, but also in efficiency, security, reliability and portability. Several examples of educational clouds, such as Microsoft, Google App, and IBM, have been provided and the application case study is presented in more detail and explored. Future challenges of this new trend, including issues and risks, are also discussed. We believe that cloud computing opens up a new era in education and e-learning, as universities and institutions provide their faculty, staff and students with the most convenient, cost-effective and efficient infrastructure to do their work better than ever and may allow for faster completion.

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