Managing e-Learning using Clouds: A cost-effective boon in 21st century

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ABSTRACT
This paper introduces the characteristics of the current E-Learning system and then analyses the concept of cloud computing eco-system, its solutions, pros and cons and its compatibility with Moodle and also describes the optimized educational collaboration, efficiency, and instructor-student interaction. Whether students choose to learn over distance or in person at a traditional campus, the power of e-learning and virtual collaboration is growing fast in education and the global economy. That power is best realized with a well planned cloud computing and e-learning strategy. This paper focuses on what instructors can do to encourage best practices at their institution and adopt them in their classroom. The massive proliferation of affordable computers, Internet broadband connectivity and rich education content has created a global phenomenon in which information and communication technology (ICT) is being used to transform education. Therefore, there is a need to redesign the educational system to meet the needs better. The advent of computers with sophisticated software has made it possible to solve many complex problems very fast and at a lower cost.

General Terms
Cloud Computing, ICT, E-learning

Keywords
Cloud computing, Moodle, E-learning, Education

1. INTRODUCTION
The cloud computing is a collection of server delivering resources that can be accessed remotely via the Internet in real-time. These servers are housed in a bunker like structure called a Data Centre and our data, our software applications are not housed on your computer; they’re on a service’s cloud of web servers (often virtual servers) usually accessed by users via the Internet using a browser like Chrome or IE. They are renting the use of the software and storage space. For example, if we have ten Dell servers each at 10% utilization we will have ten physical pieces of equipment to maintain and upgrade or using the cloud we can have only one server at 100% utilization. Typically cloud servers cost out per hour. This can be more economical than keeping all of your web servers running all of the time. [1]

A cloud can be defined as a place for users to create or store files. Services now deliver software such as Microsoft Office from the cloud. This means a computer user is renting the use of the software- usually via a monthly payment automatically deducted from a credit card. Software as a service (SaaS) is one type of computing that is almost always in the cloud and delivers a single application through the browser to thousands of customers using a multitenants architecture.

The biggest change in attitude towards the cloud has come over time as Chief Technology Officers realize they do not have to maintain software and services within their own buildings and can maintain the same control via renting the software and server capacity as in figure 1.

![Figure 1](image-url)

Several eLearning pundits predicted that 2012 will be “the year of the cloud” for those delivering education over the Internet. The term has only recently become popular, but the concept of “the cloud” has been around much longer and is often used to describe software delivered to users as a service.
via the Internet Browser. The idea is that the guts of the software you are using lives in the cloud, not on your personal computer. Software as a Service has been with us for some time. This is a decades old concept. What is different is the acceptability of housing personal files and company data files in the cloud. Educators, for example, have been using cloud hosted services to deliver education for over a decade.

2. E-LEARNING ECO-SYSTEM

There is a complex situation for learning in environments of the 21st century by applying the ecosystem concept and identify high level requirements for our proposed flexible learning environment. Today’s educators have access to new technologies such as cloud computing and Web 2.0 and they should capitalize on this advantage to facilitate learning and make learning environment more successful and effective [2].

In recent years, we have witnessed significant growth and massive changes in the e-learning industry. Some problems have been witnessed in India and some other countries as follows:

- Isolation of learners, lack of educators' feedback, student collaboration and campus social context.
- Uncertainty of costs for institutions and learners.
- Uncertainty about e-learning quality (resources, technology and support services) and e-learning evaluation.
- Shortage of competencies required for e-learning implementation among teaching staff, technical staff, and students.
- Domination of technology and market forces over educational aims and institutional development strategies.

In Cloud computing, resources can be either externally owned (public Cloud – as provided by Google and Amazon) or internally owned (private Cloud). Public Clouds offer access to external users who are typically billed on a pay-as-you-use basis. The private Cloud is built for the access within the enterprise where the users can utilize the facility without any charge. It has been assessed the current state of enterprise knowledge management and how it would turn into a more global, dependable and efficient infrastructure with Cloud computing. Cloud computing attributes can be visualized from the following comparison (see Figure 2).

![Figure 2](image-url)

3. E-LEARNING GOOD OR BAD

Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. So how does a cloud affect what we do as educators and facilitators? According to Twine.com cloud computing is simpler, faster, and cheaper for organizations to implement.

Most of the people just want to use technology tools and resources; they don’t care where these resources are located or who is delivering them. Cloud computing makes it easy for them to do so. Faculty members simply go to the web to request the IT services they need for themselves or their students. From a menu, they can choose the operating system, the software applications, and the server capacity they need, and then they can schedule this request to repeat for the entire semester, or as needed. [3]

Cloud computing, in education, is able to be both good and bad. It is good if:

- It allows you to work from multiple PCs (home, work, library, etc), find your files, and edit them through the cloud.
- It can be used to support teaching and learning experiences.
- Most software is free, available, and ready-to-use.
- Students can have a richer and more diverse learning experience, even outside standard school hours.
- Schools and jurisdictions can minimize costs; e.g. outsource Institution email to Google or Microsoft.
- It allows users to create content through the browser, instead of only searching through the browser.

While cloud computing and storage is a great innovation in the field of computing, however, there are certain things that you need to be cautious about too. Some may say that there are no down sides to cloud computing, but users should not depend too heavily on these services. Although you may find some drawbacks using clouds as follows:

- Not all applications run in the public cloud.
- Sensitive student data is no longer completely controlled by the school or the teachers.
- Internal networks are still needed for disseminating policies, printing, grouping students, web filtering, and local storage.
- Who owns the intellectual property rights over some things you posted on cloud services?
- A deleted account does not mean deleted content.
- Can you truly rely on the cloud to correctly and accurately filter (adult) content?

4. E-LEARNING SOLUTIONS

Many education institutions do not have the resources and infrastructure needed to run top e-learning solution. This is
why Blackboard and Moodle, the biggest players in the field of e-learning software, have now versions of the base applications that are cloud oriented.

E-learning is widely used today on different educational levels: continuous education, company trainings, academic courses, etc. There are various e-learning solutions from open source to commercial. There are at least two entities involved in an e-learning system: the students and the trainers.

The students can take online course, take exams, send feedback, and send homework/projects. On the other hand, the trainers can deal with content management, prepare tests, assess tests, homework, projects taken by students, send feedback and communicate with students [4].

The development of e-learning solution cannot ignore the cloud computing trends. There are many benefits from using the cloud computing for e-learning systems. Also, there are some disadvantages that have to be taken into account.

5. MOODLE AND THE CLOUD

Moodle is one of the biggest players in software and platforms for e-learning (online seminars, webinars and the like) and it's also free and open source. Now, Infinity Learning Solutions has announced a cloud computing solution for Moodle leveraging the Amazon Web Services (AWS) platform. Many universities that use Moodle--deliver high-end e-learning content, such as streaming video classes. They're also likely to be able to deliver such content without facing high costs. Educators and businesses interested in providing e-learning coursework can use it to deliver courses, downloadable materials, and online learning communities. Over 40,000 web sites use Moodle for e-learning purposes. On top of that, leading universities such as U.C. Berkeley offer free webcasts and podcasts to the public using Moodle. In Sant Baba Bhag Singh Institute of Engineering and Technology located near Jalandhar in Punjab, a totally Moodle based local cloud system for e-learning has been set up. Many other community colleges and universities lack the resources and infrastructure to rapidly roll out a full featured Moodle solution. Taking the advantage of cloud computing opens up new possibilities for these institutions.

The United States is the single largest e-learning market worldwide with revenues exceeding $17.5 billion in 2007, according to a report from Global Industry Analysts. Businesses have lots to gain from investigating this space, along with academia. There are many videos online that are good for getting to know Moodle. [5]

6. CONCLUSIONS

Using cloud computing for e-learning solutions influences the way the e-learning software projects are managed. The rise of cloud computing is rapidly changing landscape of Information technology and ultimately turning to the long-held promise of utility computing into a reality. Cloud computing can help communities and nations, can transform education. An entire world of knowledge can now be made available to teachers and students through cloud based services that can be accessed anytime, anywhere, from any device. By helping countries worldwide, lowering the cost and simplifying the delivery of educational services, cloud computing enables students across the globe to acquire the 21st-century skills and training they need to compete and succeed in the global information society. Present economic situation will force different educational institutions and organizations to consider adopting a cloud solution. Universities have begun to adhere to this initiative and there are proofs that indicate significant decreasing of expenses due to the implementation of cloud solutions.

6. REFERENCES


