Impact of Cloud Computing in E-Learning

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Abstract- E-learning as an important approach for today's education system used is one of the effects of new technologies. These types of training, suggests the use of information and communication technologies to improve the quality of teaching and learning through easy access to educational resources and services. Cloud computing is becoming an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. Cloud computing is growing rapidly, with applications in almost any area, including education. Now a day, e-learning is also becoming very popular and powerful trend, which is also broad. E-learning systems usually require many hardware and software resources. Many educational institutions, does is not have. E-learning platforms, resources and infrastructure necessary to implement this type of training, the need for high cost of basic infrastructure and applications challenges related projects with which it has to face. The use of cloud computing can help to significantly reduce the cost of infrastructure, software and human resources. In the cloud computing resources and services are as a service over the internet, and easily available to fulfill the needs of the consumers. This technology for dynamic scalability and efficient use of resources has become an attractive technology. In this paper, we describe the concept of e-learning and cloud computing, how to implement e-learning system based on cloud computing, the efficient utilization of hardware resources and software in a learning environment.

Keywords- Cloud Computing, E-learning, Software life cycle, SaaS, PaaS, IaaS

I. INTRODUCTION

Cloud Computing is a new paradigm that provides an appropriate pool of computing resources with its dynamic scalability and usage of virtualized resources as a service through the Internet. The resources can be network servers, applications, platforms, infrastructure segments and services. Cloud computing deliver services autonomously based on demand and provides sufficient network access, data resource environment and effectual flexibility. This technology is used for more efficient and cost effective computing by centralizing storage, memory, computing capacity of PC's and servers. With the tremendous advantages of cloud computing, we expect this technology to revolutionize the field of e-learning education. Cloud computing

applications provide flexibility for all

Education or Learning is an important component of life and No human beings are able to survive properly without education. Now a days, there are lots of paradigms for getting knowledge or learn something. One of the most promising paradigms for education is e-learning. E-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning. Some other terms are also used to describe this mode of teaching and learning including online learning, virtual learning, distributed learning, network and web-based learning. The growth of e-learning is directly related to the increasing access to information and communications technology, as well as its decreasing cost. The capacity of information and communications technology to support multimedia resource-based learning and teaching is also relevant to the growing interest in e-learning. Poor or insufficient technology infrastructure can cause more damage than good to teachers, students and the learning experience. While the costs of the hardware and software are falling, often there are other costs that have not been factored into the deployment of e-learning items. The most important of these include the costs of infrastructure support and its maintenance and the appropriate training of staff to enable them to make the most of the technology.

II. E-LEARNING

E-learning is the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.

E-learning includes all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. This often involves both out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.

Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to e-learning.

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. Some benefits of e-learning are discussed below:

Time: One of the key benefits of online study is that one can learn or take a course through e-learning at any time as it is convenient for them. Podcasts and downloadable lectures mean that students are no longer constricted by a conventional timetable of lectures.

Location: Neither are students restricted by their physical location. With an Internet connection, they can attend live online tutorials, participate in dedicated discussion forums or download course material and notes regardless of where they are.

Communication: Another key advantage of online study is that it encourages and enables students to collaborate and communicate with their fellow students as well as their tutors.

III. CLOUD COMPUTING

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth.

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network . The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation.

According to the official National Institute of Standards and Technology definition, "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources e.g., networks, servers, storage, applications and services that can be rapidly provisioned and released with minimal management effort or service provider interaction."

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Cloud offers services that can be grouped into the following categories:

a) **Infrastructure as a service (IaaS):** Hardware resources (such as storage) and computing power (CPU and memory) are offered as services to customers. This enables businesses to rent these resources rather than spending money to buy dedicated servers and networking equipment.. As examples in this category, Amazon1 offers S3 for storage, EC2 for computing power, and SQS for network communication for small businesses and individual consumers.

b) **Software as a service (SaaS):** In this model, software applications are offered as services on the Internet rather than as software packages to be purchased by individual customers. One of the pioneering providers in this category is Salesforce.com offering its CRM application as a service. Other examples include Google web-based office applications (word processors, spreadsheets, etc.),

c) **Platform as a service (PaaS):** This refers to providing facilities to support the entire application development lifecycle including design, implementation, debugging, testing, deployment, operation and support of rich Web applications and services on the Internet. Most often Internet browsers are used as the development environment. Examples of platforms in this category are Microsoft Azure Services platform6, Google App Engine7, Salesforce.com Internet Application Development platform8 and Bungee Connect platform9. PaaS enables SaaS users to develop add-ons, and also develop standalone Web based applications, reuse other services and develop collaboratively in a team.

Different types of Cloud

a) **Private Cloud:** The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

b) **Public Cloud:** Public cloud applications, storage, and other resources are made available to the general public by a service provider. These services are free or offered on a pay-per-use model. Generally, public cloud service providers like Amazon AWS, Microsoft and Google own and operate the

infrastructure and offer access only via Internet (direct connectivity is not offered).

c) **Community Cloud:** Community cloud **shares** infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized**.**

d) **Hybrid cloud:** Hybrid cloud is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models.

III. E-LEARNING BENEFIT

a) **Lower cost in the long run-**The cloud is a onetime investment with excellent returns in terms of computing capabilities and maintenance costs. The end user reaps the benefit of all the applications without having to spend on huge computing infrastructure and data storage space.

b) **Updated software-**Since the cloud vendor is responsible for handling all the software – often for multiple clients, it is their job to keep the software updated to the latest standards at all times – something which may take a back seat if applications are in-house. And since the client's devices are connected to the main cloud, any updates to the latter will automatically be applied.

c) **Improved performance-**Since e-learning relies on PCs, laptops, etc., device performance is a big concern. Often, applications which are located in a local server may suffer from low speeds, crashes and poor performance because of inadequate computing infrastructure. e-learning overcomes these drawbacks.

d) **Support to asynchronous learning-**E-learning is gaining popularity because of its flexibility and asynchronous nature that lets learners access courses wherever and whenever they want. Cloud computing allows learners to take courses, assessments, webcasts as well as get feedback online.

e) **Benefits to instructors-**Cloud based e-learning transforms the role of an instructor to a facilitator and ultimately results in better learning as the instructor spends less time in direct lectures and more on engaging learners through different media. He/she can update courses online, create a repository of high quality instruction material and manage multiple types of content to suit different types of learners.

f) **Better file compatibility-**Employee training content can often be sensitive in terms of formatting and appearance. Cloud based files and documents open from the cloud there by eliminating any risks of distortion.

g) **Improved security-**System crashes and resultant data losses can cause huge setback to business by impairing the L & D department. Moreover, training may include confidential enterprise data that can be vulnerable to theft. Cloud based e-learning is a safer option as both the software and the data are located on remote servers that are well protected against security breaches.

IV. CONCLUSION

Cloud computing is becoming an attractive technology due to its dynamic scalability and effective usage of the resources; it can be utilized under circumstances where the availability of resources is limited. Cloud computing as an exciting development is a significant alternative today's educational perspective. Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand. This automatically reduces the cost of organizational expenses and offers more powerful functional capabilities. There will be an online survey to collect the required data for the use of cloud computing in the universities and other governmental or private institutions in the region. This will help us review the current status and probable considerations to adopt the cloud technology. Beginning with the outsourcing of email service seems attractive. The gradually removal of software license costs, hardware costs and maintenance costs respectively provides great flexibility to the university/corporate management. In this paper we discuss the various impacts of cloud computing based e-learning. Describe its type's

benefits and definition. Even governments can take initiatives to implement this system in schools and colleges in future and we believe that this will happen soon. Educational universities, schools and institutions. The cloud platform in institutions' campuses provides effective infrastructure and deployment model for their dynamic demands. The benefits of cloud computing can support education institutions to resolve some of the common challenges such as cost reduction, quick and effective communication, security, privacy, flexibility and accessibility. "Cloud computing" is the next accepted action in the evolution of on-demand information technology services and products. Cloud computing allows to move the processing effort from the local devices to the data center facilities. cloud computing has many advantages such as expected performance, reduced upfront investment (i.e., software, hardware, and professional staff to maintain servers and upgrade software), high availability, reduced launching time, infinite scalability, tremendous fault-tolerance capability, and accessibility, enhanced collaboration, and mobility, allow users to use any device, such as a mobile phone, personal computer etc.. This paper presents the impact of using cloud computing upon e-learning solutions development.

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