A survey on Effective use of cloud computing in educational institutions

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Abstract- Technology evolution has always had an important impact on industry development, affecting even the most important system of the country, the education system. Education plays an important role in maintaining the economic growth of a country. Now a days the classroom teaching is changing and students are attracted more towards technology. Therefore in this changing environment, it's important that we think about the latest technologies which will help the society with better teaching and learning process. One of such trending technology is Cloud Computing. It primarily refers to technology that delivers powerful computing resources via the web. Cloud computing is an excellent alternative for educational institutions which are especially under budget shortage in order to operate their information systems effectively without spending any more capital for the computers and network devices. Universities take advantage of available cloud-based applications offered by service providers and enable their own users/students to perform business and academic tasks. In this paper, we will review what the cloud computing infrastructure will provide in the educational arena, especially in the universities where the use of computers are more intensive and what can be done to increase the benefits of common applications for students and teachers.

Keywords: Cloud computing, education system, trending technology, effectively, computing infrastructure, cloud-based applications

INTRODUCTION

To achieve human goals one of the prerequisite is education. From various researches it is clear that the human welfare developments are associated with Information and Communication Technologies commonly known as ICT [1]. A relevant education is more important today than ever, because today's Networked World demands a workforce that understands how to use technology as a tool to increase productivity and creativity. With the demand for the needs of infrastructure, software and platform the need for a technology is required by the institution.

Cloud computing is a model for enabling 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. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models [2]. The usage of information technology by the universities, colleges and schools for imparting the training programs are gradually increasing. The need for the networks, servers, storage, applications and services are drastically growing. Educational Institutions have started investing on the infrastructure, platform and software. Educational Institutions demand for the computing needs keep on changing from time to time. The student expectation is to view the information in his PDA, Tablets and Mobile Phones. A solution which maps the needs of educational institution is Cloud Computing. The Characteristics of Cloud Computing is on-demand Self-Service, Broad Network Access, Resource Pooling, Rapid Elasticity and Measured Service.

The Service Models are Cloud Software as a Service, Cloud Platform as a Service and Cloud Infrastructure as a Service. The deployment models are Private Cloud, Community Cloud, Public Cloud and Hybrid Cloud [2].

WHAT IS CLOUD COMPUTING?

It's a network of computing resources—located just about anywhere—that can be shared. They bring to education a range of options not found in traditional IT models.

What's in the cloud? Much of what's on our desktop or in our data centre right now. For example, e-mail in the cloud is, in many cases, free

for schools and universities that need to upgrade legacy systems and expand services. The cloud helps ensure that students, teachers, faculty, parents, and staff have on-demand access to critical information using any device from anywhere. Both public and private institutions can use the cloud to deliver better services, even as they work with fewer resources. By sharing IT services in the cloud, education institution can outsource noncore services and better concentrate on offering students, teachers, faculty, and staff the essential tools to help them succeed.[6]

There are many definitions of Cloud Computing but the broad scope of cloud computing is broadly summarized in: Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction‖. Cloud computing involves the existence of data centers that are able to provide services, the cloud can be seen as software applications (like web browsers, for example Google Chrome) which can successfully play the role of a cloud client.

Teaching Activities

In developing countries, universities are the main source of highly trained and skilled work forces. Therefore, teaching is often considered as the main activity in most universities. Although there are research oriented universities or specialized research institutions, their numbers are much smaller than teaching oriented universities. In

terms of teaching, computing facilities are necessary for student laboratories and libraries. Computing resources for teaching are commonly constrained by financial issues and characterized by the following properties:

The student-resource ratio is very high, as, due to limitations in resources (finance and expertise), the number of universities is usually small, compared to the population.

As a result, so many high school stu¬dents have to compete with each other for places at universities, such as in the cases of China and Vietnam. Once they get into universities, they have to share the very limited resources, such as computer labo¬ratories for practical courses.Typically student laboratories are only open at scheduled class hours. Out of the class hours access to laboratory facility is rather

Cloud Service Models	Teaching Activities	Research Activities
SaaS	Need to run standardized/known educational applications (such as simulation, accounting, business process) Need to share educational applications among institution	Need to perform research applications (such as computational simulations, scientific workflows, high performance data visualization)
PaaS	Need PaaS for students to learn how to write applications. This is mostly for students in computer science, computational science and engineering, and economics.	Need PaaS for developing research applications and algorithms.
IaaS	Need to provide machines for basic courses, such as operating systems and basic IT skills.	Machines provisioning based on application requirements.
DaaS (Data-as-a-Service)	Need data services for storing lectures, papers, dataset for testing algorithm, presentations, etc. Most data is free and open.	Data for research purposes. Information security concerns are important as many data are sensitive.

limited.Investment for dedicated, expensive

re¬sources is also limited. Access to these rarely expensive resources is very restrict¬ed, leading to low utilization of rarely ex¬pensive resources.Resource usage pattern is repeated and predictableDue to these properties, academic institutions in developing countries need a lot of resources in short and fixed time periods. However, the institutions know in advance when and how much resource should be required. Furthermore, due to a large number of students, they would like to minimize computing laboratory facilities to reduce costs and but still to increase the access to laboratories.

Cloud computing requirements for research and educational groups in developing countries

Cloud Service ModelsTeaching Activities

Research Activities

SaaS

Need to run standardized/known educational applica¬tions (such as simulation, accounting, business process)

Need to share educational applications among institu¬tion Need to perform research applications (such as computational simulations, scientific workflows, high performance data visualization)

PaaS

Need PaaS for students to learn how to write applica¬tions. This is mostly for students in computer science, computational science and engineering, and economics. Need PaaS for developing research applications and algorithms.

IaaS

Need to provide machines for basic courses, such as operating systems and basic IT skills.

Machines provisioning based on application requirements.

DaaS (Data-as-a-Service)

Need data services for storing lectures, papers, dataset for testing algorithm, presentations, etc. Most data is free and open.

Data for research purposes. Information security concerns are important as many data are sensitive.

OFF THE SHELF EDUCATIONAL CLOUD APPLICATIONS

Cloud can provide suitable and sufficient resources to be used with ease. In this section, the
Existing Educational Cloud applications are discussed.

Amazon Education Cloud

Amazon Education Cloud provides Amazon Web Services (AWS). AWS provides scalable,
accessible, reliable, and flexible solutions for schools and universities. Furthermore, AWS can beused as (IaaS). This way, AWS provides basic computing competence of virtual machines to provide high performance, reliable networking as well as redundant storage. Examples ofUniversities that have moved to AWS are University of San Francisco, University of California atBerkeley, and Harvard Medical School [3].

Microsoft Education Cloud

Microsoft Education Cloud Computing (MECC) is a giant model of resources that enables theStudents

and researcher to migrate to the cloud. It enables the researchers to get rid of tasks of Infrastructure administration. In addition, other tasks are easy to do over its Web-based services.All MECC services offer great financial flexibility for educational institutions with low costs of development, scalability, operation and migration. MECC offer a service called MicrosoftLive@edu, which includes many services such as On-Line Document Sharing, Enterprise ClassTools, Cloud Based E-Mail, Alumni Communication, and On-Line Document Storage [2].

Microsoft's cloud as (IaaS) is called Windows Azure. Windows Azure is an operating system that allows the higher educational institutions to run operating system applications and store data byMicrosoft server [2]. Actually, Microsoft is offering a wide range of applications for education tofulfill various educational tasks such as Communication and Collaboration, Web Portals, DeviceManagement, Educational Analytics (for Schools only), Financial management, InstitutionalEffectiveness(for Higher Education only), relationship management, and server and cloudplatform for IT efficiency. Such variations of services enable full or partial immigration to cloudfor educational institutions [4].

Google Applications for Educational Cloud
Google App Education (GAE) is a cloud based Web application operated on the GoogleInfrastructure. It enables educational users of different levels such as faculty, researchers or Students to use Web applications with no cost. The users can share ideas more quickly, do tasks effectively, have competent communication, and share tools. Google Apps Education includes a collection of Web-based messaging tools such as Google Talk, Google Mail, Google Sites,Google Video, and Google Calendar, as well as Google Docs Package for free [1].

IBM Cloud Services to Education

IBM Smart Cloud for Education introduces cloud services to distribute computer lab contents,programs, and services to the educational entities without the need for advanced IT proficiency. Itoffers self-service reservation such as student achievement, graduation rates, scholarship funding,and demands for IT resources for research that can be accessed anytime from anywhere [5].

EDUCATIONAL CLOUD
In this area, there is an attitude to improve the educational systems and services in universitiesand academic institutes. Consequently, there is a huge competition among the universities on thequality of education they provide. However, the educational institutions face a stressing challengeof funding [2]. Cloud Education can be a solution to improve educational services.Recognizing problems and needs, defining the services, design for using Cloud in Education, application,testing, and assessment.

The findings conclude:
• Services needed are e-Library, e-Course, e-Academic, e-Learning, and e-Lab.

• The data to manage include library collections, learning materials, scientific publications,
student IDs, professor's profile, and education profile.
• Infrastructure services needed are storage.
Benefits of cloud in education are:

• All the educational related knowledge is accessed via devices such as computers, tablet computers, and mobile phones.
• Using this method of education reduces the time and cost.
• Accessibility is gained by using several types of devices.
• Knowledge sharing is encouraged.

IMPLEMENTING CLOUD COMPUTING IN EDUCATION SYSTEM

• To implement the Cloud on the education we first build the system to create the cloud and upload the documents, files, images, videos on the cloud. Then we can access it from anywhere. In schools and colleges, teachers, students can prepare their own documents and share it with the others[9]. Also by creating the dynamic changes in the documents or in the presentations we can show animations or perform experiments on the documents. This will increase the imagination and will make the learning process creative. The following figure shows how the School Education System can use the Cloud Computing:
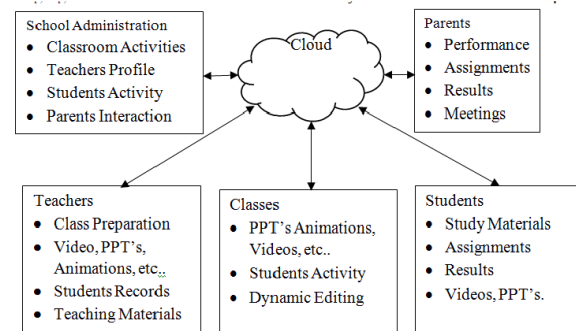
Education System using Cloud Computing

CONCLUSION AND RESULTS

This paper introduces the benefit of could computing in educational organizational to provided by cloud, there is a great advantage for university IT staff to take them away the responsibility of the maintenance burden in the university.The students' expectations can be satisfied with the rising demand for the latest technology on the campus. Sharing content is as simple as granting someone access, which facilitates collaboration without having to transfer files or worry about software compatibility.Organizations like Microsoft, Google and Amazon are providing grants and free access for Universities, Colleges, Researcher and students and the educational institutions can use the services with less effort.

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