Cloud Computing in Education System

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Abstract— Technology advancements have 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. Currently, every instructor in education has turned to cloud-based technologies in the classroom to enhance students in learning and be able to compete in the innovative economy. Actually, the word 'cloud' is used to refer to internet which has currently eased and revolutionized education. The term cloud-based technologies refers to the act of storing and accessing information and various programs over the internet. This paper focuses on the importance of cloud computing in education system.

Keywords— Cloud Computing, Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS), Education System.

I.　INTRODUCTION

In this modernized generation, learning in schools and institutions also advance with the advanced technology. Unlike the past generation where one had to attend classes with piles of books everywhere, currently things have changed especially with the introduction of e-learning where you can access your syllabus via internet. It only requires you to be computer literate which in this new generation is amongst the easiest things and most common things to know, and then everything else will flow. We all understand the great impact these new technology has had on the field of business, homes and entertainment. But think of its impact on education. The benefits of cloud computing are being recognized in almost all kinds of institutions across the board, with 90 percent of organizations currently using some kind of cloud-based application. For instance, the immediate benefits of cloud computing in business are obvious: cloud-based applications reduce infrastructure and IT costs, increase accessibility, enable collaboration, and allow organizations more flexibility in customizing their products both for their brand and for their audience. But cloud computing is having other effects as well, which have the potential to greatly change how education works, both in online courses and in traditional classrooms. First, let us understand what exactly cloud computing is and what services it provides.

II.　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.

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 centres 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.

III.　VARIOUS TYPES OF SERVICES PROVIDED BY CLOUD

A cloud service is any resource that is provided over the Internet. The most common cloud service resources are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

A. SaaS (Anytime Anywhere apps)

It describes any cloud service where consumers are able to access software applications over the internet. The applications are hosted in "the cloud" and can be used for a wide range of tasks for both individuals and organizations. Google, Twitter, Facebook and Flickr are all examples of SaaS, with users able to access the services via any internet enabled device. SaaS is beneficial to organizations in many ways like no additional hardware costs, no initial setup costs, usage is scalable, updates are automated, accessible from any location etc. This cloud service allows educational institutions to subscribe to online software hosted by a cloud provider. If proprietary software is used, educational institutions need to pay for the usage of the software. Some of the well-known software packages provided by SaaS are Google Apps and Microsoft Office 365. IT courses that require hands-on practice on certain computer software, such as programming or multimedia development software, SaaS is adequate to get the job done.

B. PaaS (the operating environment in which applications run)

It is a category of cloud computing that provides a platform and environment to allow developers to build applications and services over the internet. PaaS services are hosted in the cloud and accessed by users simply via their web browser (ex: Google App Engines etc.).Platform as a Service allows users to create software applications using tools supplied by the provider. Services are constantly updated, with existing features upgraded and additional features added. It supplies an operating environment for developing applications. In other words, it provides the architecture as well as the overall infrastructure to support application development. This includes networking, storage, software support and management services. Some of the benefits of PaaS are: they don't have to invest in physical infrastructure, flexibility, adaptability, teams in various locations can work together, security etc. IT courses that require hands-on practice on a client-server structure, such as database systems or application development courses, PaaS is the one to use. The PaaS service provided by Windows Azure is suitable for the database systems and application development courses. In addition, Microsoft provides a free solution development kit for developing database applications. Education institutions can also provide PaaS through a private cloud. PaaS provides an ideal platform for group projects. It enhances interaction among students and instructors.

C. IaaS (the on-demand data centres)

It provides access to computing resource in a virtualized environment, "the Cloud", across a public connection, usually the internet. In the case of IaaS the computing resource provided is specifically that of virtualized hardware, in other words, computing infrastructure. The definition includes such offerings as virtual server space, network connections, bandwidth, IP addresses and load balancers. Physically, the pool of hardware resource is pulled from a multitude of servers and networks usually distributed across numerous data centres, all of which the cloud provider is responsible for maintaining. The client, on the other hand, is given access to the virtualized components in order to build their own IT platforms. Some benefits of IaaS are: scalability, no investment in hardware, utility style costing, location independence, physical security of data centre locations etc. Microsoft Windows Azure and Amazon Web Service (AWS) provide IaaS. This service can mainly be used to satisfy the infrastructure needs of the students, faculties or researcher globally or locally with some specific hardware configuration for a specific task.

IV. 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. 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 1 shows how the School Education System can use the Cloud Computing:
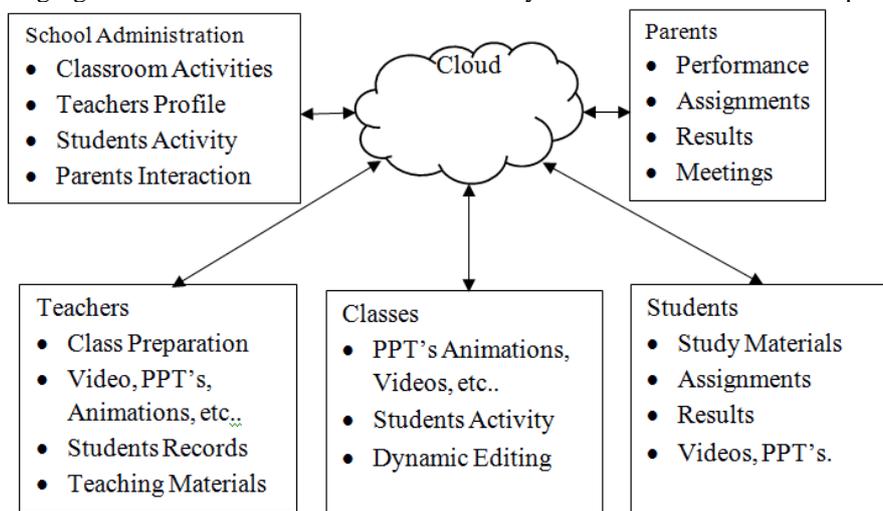

Fig. 1 School Education System using Cloud Computing.

For instance, School Administration will manage teacher's profiles, creating account, assign the classes to them. Create and manage the timetable. Keep activity of the students in classroom as well as on grounds based on the teachers engaging them. He can submit the results and activity of the students to their parents and also call for Meetings and many more.

Teacher will prepare the class and upload the power points and videos for the next class in home using the account created by administration. They can maintain the records of the students for the subject. Teacher can upload the study materials which can be accessed by the students in home as well as in classroom. Teachers can give them the online presentations or change the content of the any image dynamically during teaching, students can submit their assignments online etc. This sounds very tedious but not impossible.

Parents will get to know what all things his child in doing in the school. What are the improvements he/she has achieved from the past? Parents will get to know what are the assignments/homework given to them during that day. They can easily see the results and can attend the meetings and many more.

Students will login based on their authentication given to them and access Power Points, Study Materials, Results and Assignment assigned to them, Video Lectures (this will be helpful for those students who couldn't attend classes for some reason, for slow learners and also for revision purpose).This will improve interactive learning. The advantage of cloud service is particularly useful for supporting lab activities in the teaching and learning process. In classroom students can even able to do some activity based on the teachers instructions. Hence improving their skills and knowledge.

A. Benefits of Cloud Computing in Education System

- No more carrying around devices, such as thumb drives or CDs.
- Easy access: Lesson plans, labs, grades, notes, PowerPoint slides – just about anything digital that we use in teaching is easily uploaded and accessed anytime.
- Stability: Cloud computing is now to the point of being a very stable technology that we can rely on.
- Security: Data, content, information, images – anything we store in the cloud usually requires authentication (ID and password, for example) – so it is not easily accessible by anyone. This security is provided by Cloud but there are some issues regarding security as we are saving our important and crucial data in one place and it will be easy to hack.
- We can share some or all of the files that we have stored in the cloud
- Cloud computing will save multiple revisions and versions of a document so that we can chronologically trace back the evolution of an item.
- Collaboration: We can set-up various student groups to work on projects and assignments in the cloud.
- With cloud computing, the amount of photocopying is reduced. Hence we can go green as it will surely reduce the carbon footprint. Quizzes, tests, assignments all can be taken, scored, shared with student and parents, and stored.
- With cloud computing redundancy, there is no longer the need to both save files digitally as well as in paper format. Cloud computing systems are regularly backed-up, so the chances of losing content are quite small
- Reliability: With a managed service platform, cloud computing is much more reliable and consistent.
- Manageability: Cloud computing provides enhanced and simplified management and maintenance capabilities.
- Cloud computing enables schools, colleges and higher institutions of higher learning to cut down on their expenses. It allows for a low cost computing system.
- There are many other benefits like personalized learning, user friendly etc.

B. Some of drawbacks of Cloud Computing in Education System which can be overcome with proper application

- Cloud computing depends on the availability of high speed internet access and reliability of the cloud. Without it students cannot access their files or applications.
- If proper authentication is not available then anyone will access to files anywhere, anytime, this is the security concern which must be handled.

V. CONCLUSION

Role of cloud in education plays a vital role in improving the present status of education sector. Although still quite a vague term for some, cloud computing is definitely one of the major innovations that entered worldwide classrooms in recent years. Educational institutions can see some important benefits from moving to the cloud. The cloud allows us to access our work anywhere, anytime and share it with anyone. Modernizing learning processes and introducing the latest technologies in classrooms encourage students to develop skills and knowledge necessary for achieving their academic and professional goals. From this perspective, it is obvious how valuable a resource the cloud is in the education sector. Together with other forms of technology implementation, the cloud can substantially increase learning opportunities for students all over the world, and eventually contribute to equipping future generations with skills and competences necessary for career advancements.

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