INFLUENCE OF CLOUD COMPUTING IN THE ADVANCEMENT OF EDUCATION SYSTEM

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Abstract:

As the education plays a key role in the development of a nation, technological advancements in an education system provides feasible ways to boost the national growth. These technological advancements attract students to learn by changing the traditional learning techniques to online based learning. These advancements giving rise to new technology deployment in the existing system to make teaching and learning more interesting. One such technology which enhances online learning is Cloud computing which in turn considered as Internet based computing. Cloud Services provides powerful computing resources over the internet by enhancing internet-based computing and online-learning techniques. Cloud based technologies in the classroom enhances students learning experience and nurture them to compete in the innovative economy. In this paper, we have focused on how the information and communicational technology advancements like cloud computing provides rapid growth for the development of education system in the current world scenario.

Keywords - Cloud Computing, Cloud services, Internet-Based Computing, Online-Learning, Education System

INTRODUCTION

The Era of Cloud Computing brought enormous advantages through the cloud services provided to the consumers over the internet. The rapid deployment of on-demand elastic cloud services provides the tremendous boost to the education world by allowing users to access wide range of services for a minimal cost. The cloud services accessed by cloud consumers are made available by service providers with a Service Level Agreement (SLA) to provide better performance and a good Quality of Service (QoS).

As the term cloud computing plays an important role in the world of Information Technology, it also reflects in the field of education by using its features in the automation of education management system. The advancement in cloud computing over education system provides transparent services to students and academicians with reduced risk. These stimulating developments in the field of education offers wide range of fast and economically affordable on-demand services with the features such as flexibility, scalability, availability, reliability and security.

In internet based computing, users initiate communication to exchange information with each other at the same time with the help of servers. [1] The cloud computing services offers great advantage in education system by considering the limited internal resources to access and utilize the services on rent for a minimum cost provided over the internet by service providers without investing on buying the resources. [2] Cloud computing offers better accessibility to the huge set of virtualized resources over internet by other organizations delivering cloud services which are associated with their software, data and computing resources without installing any application on user's device. These features of cloud computing provides a significant impact on teaching and learning environment by reducing the burden on education management system.
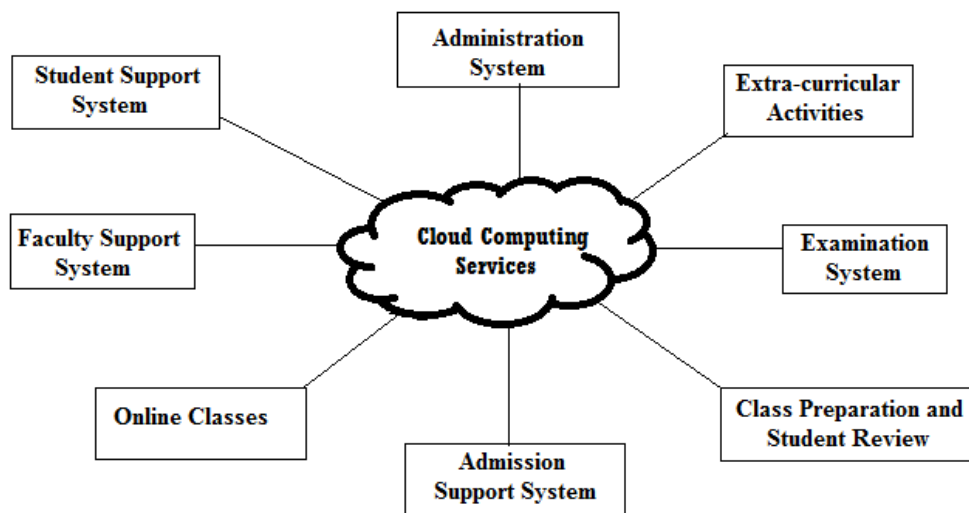
Administration System

Student Support System

Extra-curricular Activities

Faculty Support System

Cloud Computing Services

Examination System

Online Classes

Admission Support System

Class Preparation and Student Review

Figure-1: Cloud Services in Education System

EDUCATION SYSTEM AND E-LEARNING

The Modern Education system seeks innovative methods to enhance the experience of learning through Information and Communication Technology (ICT). In traditional technique, regular classroom based education involves physical appearance of teacher and students with the facilities such as classroom activities, reference materials, library facilities, group discussion and counseling etc. Now a day, education is made available to everyone through online as E-Learning for the people who are unable to join regular courses due to less marks, high fee structure, employment, time constraints or geographical conditions. In this mode of education, internet and computer plays a key role in providing resources through online where student can easily learn by accessing the features of computing tools, techniques and mechanism. The educational services offered online with high availability reduces the burden of high cost of computing resources, power consumption and number of employees. [3]

Students and Faculties can access learning resources quickly and economically by using enormous application platforms through E-Leaning. E-Learning employs a technique of educating via ICT by utilizing interactive presentations, educational videos, online discussions, study materials, Assessments through internet. The resources used in E-Learning are completely enriched with multimedia content providing the best experience of self learning. E-Learning techniques are most useful in the current world where students are prone to use ICT equipments in their daily life. In this technology enabled education, web sites, blogs, video streaming, social sharing and collaboration software are useful in offering powerful functional capabilities and reduces cost. [4]

GROWTH OF ICT AND E-LEARNING IN INDIA

In India, the education system and structure has been changed drastically to improve number of students and number of institutions to provide education in several approaches. These large numbers of students are benefitted by the initiation created by government bodies, education centers and government projects to setup distance or online learning programs in educating large number of population.

University Grants Commission (UGC) established in 1956 to coordinate and maintain the standard of university education including open universities such as Indira Gandhi National Open University (IGNOU) to offer distance education programs in various disciplines by providing rich set of study materials in textual or audio-visual format through its eGyankosh, sakshat, Gyandarshan etc programs. Government set up a national mission in education through ICT in its Eleventh Five Year plan (2007-12) to encourage technology-based education in India by launching a dedicated satellite called

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EDUSAT, a revolutionary step to enhance both quantitative and qualitative education through e-learning. [5]

In favor to this, many e-learning projects launched in India to support and motivate students to using computers. The eGyanKosh, Flexilearn, NPTEL, CEC, Institute of Lifelong Learning (ILLL), e-PG Pathshala are the major projects to promote learning environment through e-learning. Government also provides financial aid to various programs to cover the area of Research &Development technology projects, Faculty Training programs, Content development and Human Resource Development projects. [6]

IMPACT OF CLOUD COMPUTING IN EDUCATION SYSTEM

Cloud Computing plays a significant role in enriching internet based learning for online and distance education by simplifying the task with the help of various application programs to host e-learning and creating virtual learning environment. Cloud Computing enhances the experience of learners by enabling them to access internet resources through network connected computer. The cloud-oriented approaches such as Blackboard and Moodle, adopted through cloud computing, communication technology and mobile learning for continuous education, academic courses and company training programs. Cloud computing in education system eases students for E-Learning by offering the facilities such as registering to courses, taking assessments, providing feedback and also for developing project. In contrast, teachers can update learning materials, prepare study resources, conduct test and run projects and also open discussion forum and feedback to students.

Cloud Computing strengthens E-Learning platform by offering agile, flexible and friendly services which are available to anyone, anytime and anywhere to learn over internet. Cloud computing bypasses the cost by leveraging the services provided by the service providers instead of buying equipment, developing infrastructure and maintain them. This helps to avoid moving structure, provide support; development and manage users by allowing them to subscribe over the internet and use services on demand by paying according to the actual usage which helps in reducing expenses for the institution and to accomplish economies of scale to the user. [7] The development of E-Learning through cloud computing looks promising in terms of efficiency, delivery of service, reach and learn effectiveness. Institutions can focus more on research and learning instead of concentrating on implementing complex IT infrastructure while delivering educational services.

These developments in education system is achieved by utilizing the services offered by cloud computing in which enhancing the type of resources used for educational purposes, reducing operational cost, improving the security concerns over the information, meeting the need of energy efficiency and mitigating the difficulties in operation and maintenance of the system are focused.

Cloud computing also provides low cost and free products which are used for dynamic teams and interactive collaboration, publishing, social interaction; creating, editing and computing of content by easily accessing through web browsers. Cloud technology provides ability to access wide range of information with a few clicks over an internet instead of accessing limited resources like encyclopedias and textbooks.

EDUCATIONAL APPROACHES USING CLOUD COMPUTING

The perspective of cloud computing which improves efficiency and serviceability in education sector is identified by many institutions. Cloud features attracted many universities and institution to adopt cloud computing for paperless teaching learning process which also includes hosting Learning Management Systems (LMSs). Various Cloud users such as students, Faculty, administrative staff, Examination Branch and Admission Branch are facilitated with cloud features by accessing with an authorization of separate login to connect to the cloud and perform their respective activity. Faculty can provide class tutorials, projects, assignments and tests using the cloud server where students can access all the learning materials provided by faculty over internet from anywhere and at anytime. This

approach helps in identifying and analyzing the problems of students, where they tend to make mistake and teacher can evaluate those mistakes with an improved teaching materials and methods. [8]

Software as a Service (SaaS) applications in Cloud provides both teachers and students to access their individual data from anywhere for ensuring efficient and effective collaboration, good communication, sharing of resources and contacts among each other. This results in mobility meanwhile achieving their learning objectives by utilizing portable network connected devices. The applications on the cloud server remains at the remote location and can be accessed over network connection. Any additional hardware or storage space required, that are provided by service provider as Infrastructure as a Service (IaaS). The required software and hardware for the hosting applications of the developers are accessed as Platform as a Service (PaaS) online. In research and development activity, a researcher can access high processing power resources for the execution of project through IaaS.

The institutions and Universities can upgrade their IT resources to attract users by keeping them updated with the rapidly developing technological environment. The service provider like Google LLC offers various cloud services including Google App Engine (GAE) as platform for application development and also provides Talk, Mail and Docs as applications as a service. Similar benefits are provided by AWS, Microsoft, IBM, CoSo Cloud, Orbund SIS, ClearGov, SirsiDynix, etc are enhancing the learning experience, student collaboration and lower level cloud services to store data. [9] Thus, cloud Computing providing numerous features for institutions and universities to achieve their objectives at a reasonable cost.

BENEFITS OF CLOUD COMPUTING IN EDUCATION SYSTEM

a. Cloud computing provides flexibility in services by making space for the users to create & use innovative learning environment with reliable data services.

b. Accessibility of IT Resources like infrastructure, platform and software applications can be accessed from anywhere, anytime and from any devices which result in bridging the geo graphical distances.

c. Cloud computing services are made available 24x7 and new services are added without affecting existing services in a cloud model with the Pay-as-you-go or pay-as-you-use model.

d. Hardware/Software compatibility complication does not act as hurdle for any device from accessing cloud service resulting in Portability of services in cloud.

e. Based on the requirement of cloud services, additional resources can be made available to the existing system without affecting the existing services by rapid provisioning of resources resulting in upgrades and maintenance easier.

f. Creativity in education system can be employed by using cloud services to keep students involved in problem solving and to teach them in different ways by using innovative ideas and methodologies.

g. Keeping Policies and Regulations through cloud services helps in meeting institution's compliance requirements by proceeding carefully.

h. Cloud provides personalized learning environment with a wide range of resources and software tools which can be accessed by the students according to their interests and styles.

i. To meet evolving educational needs cloud based services helps institution to reduce costs and accelerate the students to use new technologies without having to purchase any products.

j. Cultivating energy efficient techniques and eliminating the over exploitation of natural resources can be done by educational cloud to reduce the carbon emission in the environment leading to green computing.

k. Cloud computing provides user friendly environment to access services without or with less complexity as it is easy to understand and operate.

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LIMITATIONS OF CLOUD COMPUTING IN EDUCATION SYSTEM

In spite of the benefits of cloud computing in education sector, some possible risk factors can be listed. [10]

Security and Privacy: Due to the involvement of the platform provider, who is a third party, there are issues of privacy and data security. This is a major factor making many institutions of higher learning holding back their wish to join cloud services.

Real Benefits: Many institutions of higher learning are yet to be convinced of the benefits of cloud computing. They are trying to adopt cloud computing maintaining their conventional IT portfolio. Thus indicators need to be set for comparing performance and availability versus service level agreements (SLA), utilization, as well as costs.

Service Quality: Many learning institutions argue that SLAs stipulated by cloud service providers don't provide sufficient guarantee of performance, availability and scalability. This is one of the reasons institutions shy away from cloud computing.

Lack of adequate network responsiveness: It is impossible to deliver complex services without adequate network bandwidth. As many institutions lack adequate network bandwidth they can't adopt cloud computing effectively.

Integration: In order to connect both to the available on-premise applications and cloud applications, different applications require complex integrations. This makes it imperative for existing university data structures and systems to integrate with cloud applications.

CONCLUSION

The present scenario of education sector can be improved with the technological advancements through the services available in cloud computing. Cloud computing technology plays an important role in the education system as one of the major innovations that entered worldwide classrooms in recent years. Educational organizations are benefitted by migrating to cloud computing with a wide range of services available. Cloud environment provides a reliable environment in accessing the services from anywhere, anytime and to anyone who is accessible to it through valid authorization. Introducing innovation in learning process and facilitating students with latest technologies in classroom enhances the learning ability of students resulting in developing their skills and required knowledge to achieve academic and professional excellence. From this point of view, it is clear that how cloud services are important in the education sector. Along with the various types of innovative services, cloud can significantly develops learning opportunities for students all over the world and eventually contribute to the development of learners with required skills and necessary competences for the professional advancements.

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