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Cloud Computing – Present Trends in Education

Education

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ABSTRACT

Cloud computing is becoming an adoptable technology in the field of education with its active scalability and usage of virtualized resources as a service through the Internet. Students and administrative personnel have the prospect to quickly and economically access various application platforms and resources through the web pages on-demand. The need for servers, storage and software are highly demanding in the universities, colleges and schools. Cloud Computing is an Internet based computing, whereby shared resources, software and information, are provided to computers and devices on-demand, like the electricity grid. Currently, IaaS (Infrastructure as a Service), PaaS (Platform as a Service) and SaaS (Software as a Service) are used as business model for Cloud Computing. One of the latest technologies prevailing now days is Cloud Computing. By sharing IT services in the cloud, educational institution can outsource noncore services and better concentrate on offering students, teachers, faculty, and staff the essential tools to help them succeed. This paper focuses on the impact of cloud computing on the education system and how we can provide the quality education by using the above technology

INTRODUCTION

Speaking of cloud computing we should distinguish three different service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). The scope of this work is a model of Software as a Service. This represents the lease of computing resources on a network of remote servers where applications are executed and data is stored. The application of cloud computing is very broad and growing daily because of many advantages to the users, and is driven by the increasing use of various mobile devices (laptops, tablets and smart phones) and mobile Internet access being more available. Cloud computing is applicable in education, but it implies the acceptance of these services by all involved in the educational process. Therefore, the aim of this paper is to investigate whether there is a need between our students for applications and services in the "cloud" (SaaS), the extent to which theyuse them and what types of applications and services are leading.

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 . 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. Cloud computing is Internet-based computing in which shared resources, software and information are delivered as a service that computers or mobile devices can access on demand. Cloud computing is already used extensively in education. Free or low-cost cloud-based services are used daily by learners and educators to support learning, social interaction, content creation, publishing and collaboration. Examples of cloud-based services include Google Apps, YouTube, Twitter and Drop box.

As per NIST (National Institute of Standards and Technology) definition cloud technology is divided among three services and four deployment model. Following are the three services and four deployment model required for discussing the education model.

CLOUD SERVICES MODEL

1. Software as a Service (SaaS): Anytime Anywhere apps. This is currently of most interest in education. Not only is the data stored in the cloud but the application too, with the user requiring only a web browser. The best known examples are Google Apps for Education and MicrosoftLive@ edu which provide communication and office applications such as email and spreadsheets.

2. Platform as a Service (PaaS): The operating environment in which applications run. With PaaS, one can develop new applications or services in the cloud that do not depend on a specific platform to run, and can make them widely available to users through the Internet. PaaS delivers cloud-based application development tools in addition to services for testing, deploying, collaborating on, hosting, and maintaining applications. Examples of PaaS include Microsoft's Azure Services Platform, Salesforce's Force.com development platform, Google Apps Engine, Amazon's Relational Database Services and Rackspace Cloud services.

3. Infrastructure as a Service (IaaS): The on-demand data centers. Here customers can rent basic computing resources such as processors and storage, and use them to run their own operating systems and applications. You pay for only what you use, and the service provides all the capacity you need, but you're responsible for monitoring, managing, and patching your on-demand infrastructure. One big advantage of IaaS is that it offers a cloud-based data center without requiring you to install new equipment or to wait for the hardware procurement process. This means one can get IT resources at his school, college, or university that otherwise might not be available. For example Amazon's Elastic Compute Cloud; organizations can use this infrastructure to run Linux servers on virtual machines and scale up usage as required.

CLOUD DEPLOYMENT MODEL

1. Private Cloud: The cloud developed as per the rules of single organization is known as Private Cloud. This cloud could be developed for specified premises. This cloud could be used as per our security requirements i.e. mostly dedicated to a single organization. Multi-tenant and Scalability are some feature of this model. For e.g. Rackspace and VMware are the companies providing private cloud facility.

2. Public Cloud: Cloud which shares all its resources among the public is known as Public cloud for e.g. using

of resources over Internet. Most of the public cloud deployment models are used by the organizations where security or confidentiality of information is not a major issue. It works in a multi-tenant environment where a single service could be shared by multiple users. This deployment model reduces the costs and increases the use of technology. Using of google is one of the examples.

3. Hybrid Cloud: This framework is developed by combining private and public cloud as per the requirements. One special aspect about this cloud is that it could be managed by more than one service providers as compare to other models i.e. private or public cloud. This architecture is use to provide more and better deployment opportunities to our organizations. It is mostly helpful for the organizations where highly changeable environment is present. BIG data processing is the major area of hybrid cloud computing where data analysis could be performed.

4. Community Cloud: Sharing of infrastructure between organizations about a specific community is done under this cloud deployment model. This model may be deployed on/ off the premises both. Education portal/ Hospital portal development is the best example of community cloud deployment model.

CLOUD COMPUTING PROVIDERS

1. Microsoft Live@edu for Education

Microsoft Live@edu is intended for educational needs. It provides a set of hosted collaboration services for the educations institutions. The hosted service includes collaboration services, communication tools, mobile, desktop, and web-based applications. It has the feature of data storage capabilities. Office Live Workspace, Windows Live SkyDrive, Windows Live Spaces, Microsoft Shared View Beta, Microsoft Outlook Live, Windows Live Messenger and Windows Live Alerts are the part of Live@edu suite. By means of free registration process universities, colleges and schools can enroll in the program. Microsoft Live@edu is mainly for the institutions for enabling facilities for their academic activities.

2. Google Apps for Education

Google Apps is a collection of web-based programs and file storage that run in a web browser, without requiring users to buy or install software. Users can simply log in to the service to access their files and the tools to manipulate them. An Education Edition includes most of the extras in the Premium Edition and is offered at no cost to K–12 (designation for the sum of primary and secondary education and higher education). Google Apps allows institutions to use their own domain name with the service and to customize the interface to reflect the branding of that institution. In this way, a college or university can offer the functionality of Google Apps in a package.

3. Amazon Web Services for Education (AWS)

Amazon Web Services provides the cloud services in categories of Compute, Software, Content Delivery, Database, Storage, Deployment & Management, Application Services and Workforce. As for as education, educators, academic researchers, and students can apply to obtain free usage credits and can utilize on-demand infrastructure. With the grants, educational institutions have made advances in research, enable High-Performance Computing and tackled Big Data.

PRESENT EDUCATION SYSTEM

Most of the private educational institutions have become highly dependent on information technology to service their requirements. These services are increasingly provided using Internet technologies to faculty and students and accessed from web browsers. The services are offered cheaply or freely to education, often with much higher availability than can be provided by the educational institution. Are we therefore facing a future where the majority of educational services will be hosted in the cloud and institutions no longer host their own data centers with expensive hardware, power bills, staff salaries and computing resources which are rarely fully utilized? This policy brief has analyzed some of the emerging benefits and challenges of cloud computing for the educational sector. But in most of the government schools and colleges in India IT plays very limited role. Most of the work is done manually from attendance to classroom teaching to examination system.

CLOUD COMPUTING IN EDUCATION IN INDIA

For improving the education services in India government has taken the serious steps towards the development of basic infrastructure. Therefore, by improved infrastructure, use of Cloud computing in education sector has to be promoted as it offers infrastructure, softwares and platforms at lower costs. Cloud computing offers services like student information system etc. The SaaS model of cloud could enables the use of school management softwares at low costs, presently these softwares requires a very high license fees. Various research departments could be benefited by implementation of cloud in their respective departments as sharing of data/information could be done easily. Using of Private cloud in confidential departments like exam etc. at university/college level could help in secure access of that data through web browsers. Getting of the low cost infrastructure at school or college level through IaaS layer of a cloud also helps in encouraging the use of cloud computing in education sector in India.

IMPLEMENTATION OF CLOUD TECHNOLOGY IN EDUCATION SYSTEM

Cloud computing technology can provide solutions for the above mentioned problems in education system. Cloud computing enables users to control and access data via the Internet. The main users of a typical higher education cloud include students, Faculty, administrative staff, Examination Branch and Admission Branch as shown in Figure 1. All the main users of the institution are connected to the cloud .Separate login is provided for all the users for their respective work. Teachers can upload their class Tutorials, assignments, and tests on the cloud server which students will be able to access all the teaching material provided by the teachers via Internet using computers and other electronic devices both at home and college and 24X7. The education system will make it possible for teachers to identify problem areas in which students tend to make mistakes, by analyzing students' study records. In doing so, it will also allow teachers to improve teaching materials and methods. This will not only make it possible for students to use online teaching materials during class but they will also be able to access these materials at home, using them to prepare for and review lessons. Utilization of cloud computing systems will reduce the cost of operation because servers and learning materials are shared with other colleges. This policy brief has analyzed some of the emerging benefits and challenges of cloud computing for the educational sector. But in most of the government schools and colleges in India IT plays very limited role.

MERITS OF CLOUD COMPUTING

Major benefits of cloud computing for educational institutes and students are explained as follows,

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1. Personalized Learning: Cloud computing affords opportunities for greater student choice in learning. Using an Internet-connected device, students can access a wide array of resources and software tools that suit their learning styles and interests.

2. Reduced Costs: Cloud-based services can help institutes reduce costs and accelerate the use of new technologies to meet evolving educational needs. Students can use office applications for free without having to purchase, install and keep these applications up to date on their computers. It also provides the facility of Pay per use for some applications.

3. Accessibility: Availability of the services is the most important and desired by the user using the education cloud.24 X7 is the availability that is needed by this system without failure. From anywhere one can login and access the information.

4. No Extra Infrastructure: Colleges and governments are now free to focus on their goals that is making more research facilities available to the students and making the environment global in spite wasting time on worrying about the buildings, labs, teachers etc.

5. Go Green: Education cloud will surely reduce the carbon footprint.

6. User Friendly: This new facility is user friendly and no need to worry about the complexity. It is easy to understand and easy to operate.

CONCLUSION

The students' expectations can be satisfied with the rising demand for the latest technology on the campus. 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. It is necessary to educate and motivate them about cloud applications and services to make them become aware of the benefits. Cloud computing is the better ICT utilization mechanism for educational institutions teaching, learning and a service delivery requirement, for it enables wise and strategic use of technology that significantly reduces the cost. After implementing the proposed model in education sector we are in a position to get the reliable and effective results of cloud computing. 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. Role of cloud in education plays a vital role in improving the present status of education sector of India. The cloud allows us to access our work anywhere, anytime and share it with anyone.

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