CLOUD COMPUTING AND BENEFITS OF PRIVATE CLOUD IN E-LEARNING SOLUTIONS

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ABSTRACT

The use of learning through internet is growing rapidly. To better support faculty and students for teaching and learning, E-Learning programs need to constantly innovate and optimize their IT infrastructures. The new IT paradigm called “cloud computing” has the potential to transform the way that IT resources are utilized and consumed in education and is expected to have a large impact on educational field during the next few years. Cloud computing is growing rapidly, with applications in almost any area, including education. Such new technology can be utilized in managing all the educational activities using IT for modernization and development of educational systems with increased data volume. The implementation of cloud computing will help the institutions by reducing the expenditure with decreasing their demand for software licensing and it has operational benefits, and provides research facilities at the institutions. Cloud computing services can provide inter-organizational collaborations and thus they will enhance the research level of the country. E-learning systems usually require many hardware and software resources. There are many educational institutions that cannot afford such investments, and cloud computing is the best solution. This paper presents the positive impact of applying private cloud & its benefits upon e-learning solutions. The new IT paradigm called “cloud computing” has the potential to transform the way that IT resources are utilized and consumed in education and is expected to have a large impact on educational computing during the next few years.

Key words: Information Technology (IT); Higher Education; Cloud Computing; Mobile learning, Private cloud

1. INTRODUCTION

Cloud computing allows to move the processing effort from the local devices to the data center facilities. The software is seen as a service and the applications and data are stored on multiple servers that can be accessed from the Internet. The current cloud computing architecture involves the existence of data centers that are able to provide services to the clients located all over the world. In this context, the cloud can be seen as a unique access point for all the requests coming from the customers/clients. E-learning and mobile learning have joined the main stream of learning platforms among educational institutions. More and more courses are offered online, even those lab intensive courses. Many of the educational institutions are under pressure to support a variety of online courses with the limited resources. On the other hand, cloud computing has become the new computing platform to improve availability and reduce IT expenditures for a large number of organizations whether it is big or small.

The need for education is increasing constantly and the development & improvement of the e-learning solutions is necessary. Also, the e-learning systems need to keep the pace with the technology, so the new direction is to use cloud computing. The advantages offered by cloud computing have gained attention from educational Institutions in recent years. The universities or institutions all over the world are under increasing pressure to employ the Information Technology (IT) for the welfare of faculty members, students, operational staff and management. The different stakeholders of a university like students, parents, employees, management, and administrators are continuously engaged in the process of educational planning, growth and other activities. The modern age of educational scenario has lead to the growth in data as the quantity of information and data collected and processed for the planning and management of educational activities has
been constantly increasing. In order to provide various facilities to the students, faculty, management and for the operation, the university needs storage and computing system that would integrate multiple services and receive multiple requests. However, the universities which are in India are facing number of challenges related to their management due to increased number of students. When it comes to implementations of information technology, the universities in India have taken up a steady growth. With reference to this, the network information storage system has become key component to the university infrastructure. The information systems of universities are critical because they generally throw huge amount of data and centrally store these data generated from office, students, teaching faculty members, financial records, scientific research etc. Use of IT requires strong financial readiness and competent human resource.

Most of the educational institutions are looking for the improvement of affordability, availability, flexibility, and efficiency of their IT infrastructure. There are several cloud computing services providers that offer support for educational systems. Among them are Amazon, Google, Yahoo, Microsoft etc. Cloud computing has the potential to meet these demands. Therefore, the cloud should be designed to speed up the implementation of new course deployment and dramatically reduce the cost.

2. CLOUD COMPUTING

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 common use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams (Fig.1).

Cloud computing entrusts remote services with a user's data, software and computation. The cloud computing is considered as fifth generation of computing with reference to mainframe, personal computer, client server computing, and the web. In essence, cloud computing is a construct that allow you to access applications that actually reside at a location other than your computer or other Internet–connected device; most often, this will be a distant data center (Fig.2).
It allows the viewers like student, faculties and staffs to use applications and access the information from anywhere with internet access. Cloud computing as a model for enabling on demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management efforts or service provider interaction. Cloud computing involves the existence of data centers that are able to provide services, the cloud can be seen as a or software applications (like web browsers, for example Google Chrome) can successfully play the role of a cloud client(Fig.3)

(i) Infrastructure as a Service (IaaS): Cloud service provider offer different resources such as servers, network and storage from a shared facility managed by the provider to cloud user on demand basis.

(ii) Platform as a Service (PaaS): Cloud service provider provides application development platform for certain class of applications.

(iii) Storage as a Service (SaaS): Cloud storage involves storing data with a cloud service provider rather than a local system. The term storage as a service means that a third party provider rents space on their storage to end users who are incapable to bear the budget on their own. It is equally applicable when technical personnel are not available or have inadequate knowledge to implement and maintain storage infrastructure. This is an ideal solution for all the stated above problems in various universities in India.

3. PRIVATE CLOUD

Cloud-based environment supports the creation of new generation of e-learning systems, able to run on a wide range of devices, while storing data inside the cloud (Fig.5). Private cloud is one of the cloud computing platform which helps in hosting services to a particular number of peoples that are specified behind a firewall. All the resources can only be accessed by an individual organization thereby providing them with more privacy and control. Private cloud provides service in virtualized way. Private cloud serve for only single college/university. The model of private cloud is closer to the LAN models that have been used by many organizations.

Fig.5 Architecture of private cloud in E-Learning
4. PRIVATE CLOUD BENEFITS FOR E-LEARNING SOLUTIONS

Cloud oriented-learning is widely used today on different educational levels: continuous education, company trainings, academic courses, etc. There are various e-learning solutions from open source to commercial.

Using cloud computing in E- Learning:

Benefits:
- Significant Cost Reduction
- Access to applications from anywhere
- Supports in interactive teaching and learning
- Software free or pay per use
- Opening to business environment and advanced research
- Protection of the environment by using green technologies
- Increased openness of students to new technologies
- Increasing functional capabilities

There are at least two entities involved in an e-learning system: the students and the trainers.

The students:
- Can take online course
- Can write online exams
- Give online feedback
- Able to send assignments

The trainers:
- Deal with content management
- Preparation of test papers
- Assess tests, assignments, projects taken by students
- Send feedback
- Communicate with students through forums

The e-learning cannot completely replace faculties it is only an updating for technology, concepts and tools, giving new content, concepts and methods for education, so the roles of teachers cannot be replaced. The teachers will still play leading roles and participate in developing and making use of e-learning cloud. Usually, e-learning systems are developed as distributed applications, but this is not necessary so. The architecture of a distributed e-learning system includes software components, like the client application, an application server and a database server and the necessary hardware components (client computer, communication infrastructure and servers). The client hardware could be a mobile device or a desktop computer. The client application can be a simple web browser. Even with the current hardware and software limitations, mobile devices are supporting multimedia based applications. Compared with desktop applications, nowadays mobile applications, especially multimedia-based applications, have serious limitations due to the processing power and memory constraints. Due the fact that the data processing is on the server side, the use of mobile devices for learning is growing fast. Still, the mobile applications need to be optimized to be used for e-learning. The e-learning server will use cloud computing, so all the required resources will be adjusted as needed. A big concern is related to the data security because both the software and the related data are located on remote servers that can get crash or disappear without any warnings. Even if it seems not very reasonable, the cloud computing provides some major security benefits for individuals and companies that are using/developing e-learning solutions, like the following:
• Improved improbability – it is almost impossible for any outsiders to determine where is located the machine that stores some important data related to test papers, results etc or to find out which is the physical component he needs to steal in order to get a digital asset.

• Virtualization – makes possible the rapid replacement of a compromised cloud located server without major costs or damages. By creating clone of a virtual machine through which cloud downtime is expected to be reduced substantially.

• Centralized data storage – losing a cloud client is no longer a major incident while the main part of the applications and data is stored into the cloud so a new client can be connected very fast.

• Higher Privacy and security- The private cloud provides distinct pool of resources that have restricted access to certain connections behind the firewall of organizations on/in-site internal hosting and dedicated leased lines. This techniques ensure that the operations of the organizations are kept away from intruders and prying eyes

• More scalable
Given the fact that a private cloud is only available by one organization, it will have the ability to manage and configure it according to their in house needs.

• Flexible and cost efficient
The implementation of a private cloud improves the way resources are allocated in an organization as it ensures that the resources required are available to the different departments and flexible enough to respond to the demand.

• Improved reliability
Even with internal networks and servers, the creation of virtual environments mean that the networks are much more resilient to failures of individual physical infrastructure. The virtual partitions that are created for instance during failure, will transfer resources from the other servers that are unaffected. In situations that the cloud is just a third party, you still can benefit from the physical security provided.

5. CONCLUSION

Cloud computing has recently emerged as a major paradigm for managing and delivering services over the internet. The rise of cloud computing is rapidly changing the use of Information technology and ultimately turning to the long-held promise of utility computing into a reality. Cloud computing can help different organizations, can transform education. An entire world of knowledge can now be made available to faculties and students through cloud based services that can be accessed anytime, anywhere, from any device. By helping countries worldwide, it lowers the cost and simplifying the delivery of educational services, cloud computing enables students across the globe to acquire the different skills and training they need to compete and succeed in the global information society. Present economic situation will force different educational institutions and organizations to consider adopting a cloud solution. This article also suggests how the implementation of private cloud technology helps in effective learning in educational institutions. The technology of cloud computing allows us much more efficient computing by means of centralizing storage, memory, processing, and bandwidth. Looking into the benefits of private cloud computing and storage services, universities of India should pool resources. This will help the universities in cutting down the cost by reducing their need for software licensing providing security & offer the operational benefits. After detailed analysis, the IT heads of the universities and research institutes should show concur for cloud computing to make the model for future of information technology utilization. Despite the security risks of cloud services, one can argue that cloud computing provides more security than on campus solutions. Furthermore, cloud computing services can
facilitate inter-organizational collaborations as they are easily accessible by different stakeholders at disparate institutions, and they can help in making research.

REFERENCES


