Analysis of E-Learning System using cloud-based Technology

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Abstract

E-Learning is the topic related to the virtualized distance learning by means of electronic communication mechanisms, specifically the Internet. They are based in the use of approaches with diverse functionality (e-mail, Web pages, fo- rums, learning platforms, and so on) as a support of the process of teaching-learning. Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet) while E-Learning is the currently fashionable term used to describe the diverse use of information and communications technologies to support and enhance learning, teaching and assessment from resource based learning. The massive proliferation of affordable computers, Internet broadband connectivity and rich education content has created a global phenomenon in which information and communication technology (ICT) is being used to transform education. Therefore, there is a need to redesign the educational system to meet the needs better. The advent of computers with sophisticated software has made it possible to solve many complex problems very fast and at a lower cost. This paper introduces the analysis of the current E-Learning on the concept of cloud computing and describes the architecture of cloud computing platform by combining the features of E-Learning.

Keyword- Electronic, Information and Communication technology, Cloud Computing, E-learning, Information Technology.

I. INTRODUCTION

Cloud computing has become a research hotspot among modern technologies; researchers pay more attentions to its applications. As concerned as cloud computing applied in the field of education, a lot of problems had been studied, such as the technology for future distance education cloud [1], teaching information system [2] [3] [4], the integration of teaching resources[5], teaching systems development.

In integration of e-learning and network, emphasis is placed on building of software and hardware platform of e-learning system, functional structure, network security management and training, information technology integration to teaching[7], campus network environment [8], online education[9], semantic web technologies-based multi-agent system [10] [11].

From the above we can see that until now, scholars have made a lot of researches on the following two aspects: cloud computing used in the field of education, and integration of network and e-learning. The former places the emphasis on distance education, information system application, instructional system design, information resource development, online course-building, etc. The latter's emphasis is placed on construction of campus e-learning system, e-learning model on campus network, e-learning system based on agent model and e-learning grid and so on.

Development of very large computers and made affordable by the community users, by the existence of these developments create a rich educational content and create a global phenomenon in which information and communication technologies (ICT) that is used for transforming education. In the world of education in its development requires a medium used in dividing the material, communication from the teachers to the students being taught. In the implementation of an e-learning system design requires a good and fast. Therefore, gave rise to a need to redesign education systems that are used to meet those needs better. With the advent of computer technology with advanced software that has allowed solving many complex problems very quickly and at a lower cost. In this paper we focus on the concept of cloud computing and cloud computing platform architecture described by combining the features of E-Learning with a model service orientation architecture (SOA). With the development process requires a model of cloud computing and SOA which further evolved into a cloud computing Service orientation architecture. With these Models can have a system performance is good and fast.

II. CLOUD COMPUTING

Cloud computing has recently emerged as a new paradigm for hosting and delivering services over the Internet. Cloud computing is attractive to business owners as it eliminates the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand. However, despite the fact that cloud computing offers huge opportunities to the IT industry, the development of cloud computing technology is currently at its infancy, with many issues still to be addressed.

Cloud computing technologies although in their early stages, have managed to change the way applications are going to be developed and accessed. These technologies are aimed at running applications as services over the internet on a flexible infrastructure. Microsoft office applications, such as word processing, excel spreadsheet, access database and many more can be accessed through the internet, even though the files and applications are housed in the cloud. Cloud computing provides a low cost solution to academic institutions for their researchers, faculty and students. This setup provides an additional benefit because all these browser-based applications can also be accessed through mobile devices in addition to being available to a variety of laptop and desk top computers, provided internet access is available. In this paper we present a solution that is based on cloud computing and can be used for building a virtual environment both for teaching and learning. We present an interactive tool that can be used for science education; we combined various technologies to achieve this goal. The environment and the design proposed can also be used as a platform for exploring and sharing new ideas as well as for designing, modifying and monitoring educational or course contents. In our design under the same environment we also allow integration of different pedagogical approaches to both learning and teaching. Fig.1 shows the basic concept of cloud computing in E-learning system.
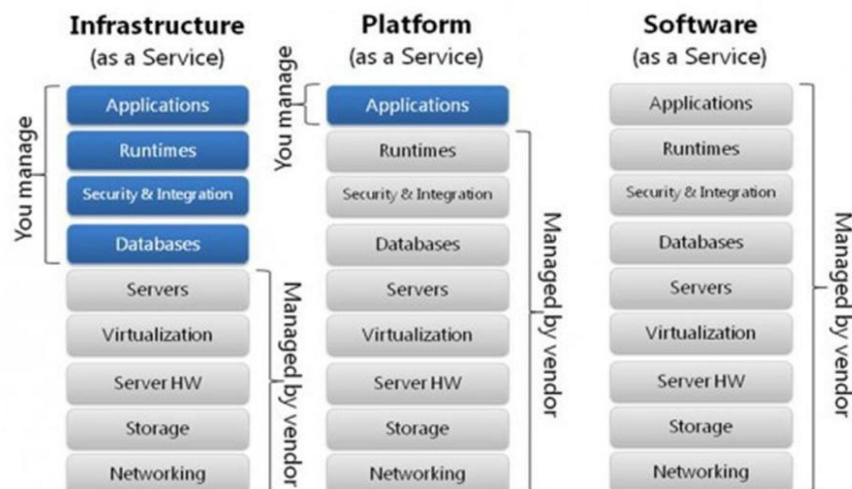

Fig.1 The base layer of e-learning cloud

III. CLOUD BASED E-LEARNING ARCHITECTURE

Cloud based e-learning architecture is mainly divided into five layers called hardware resource layer, software resource layer, resource management layer, server layer and business application layer. [5]

1) Hardware resource layer is the bottom most layer in the cloud service middleware where it handles the essential computing things like physical memory and CPU for the total system. This layer is most important for the total infrastructure of the system. With the help of virtualization, physical servers, network and storage are grouped and called it as upper software platform. To offer the uninterruptable power to the cloud middleware services for the cloud based e-learning systems, physical host pool is expanded dynamically and memory is scalable at any time to add additional memory.

2) Software resource layer is created with the help of operating systems and middleware. With the help of middleware technology, many software solutions combine to offer the grouped interface for the software developers.

So, software developers can create many applications for e-learning system and able to embed those in cloud, which helps the cloud users to compute those applications through cloud.

3) Resource management layer plays an important role on get loose coupling of software and hardware resources. With the help of virtualization and scheduling idea of cloud computing, it brings the uninterrupted on-demand software distribution for different hardware resources.

4) Service layer Service layer is divided into three levels namely IAAS, PAAS, and SAAS. These service layers help to cloud customers to use the various forms of cloud resources for their products like software resource, hardware resource, and infrastructure resource.

5) Business application layer Business application layer differs from all other layers in cloud based e-learning architecture, because this layer acts as important business logic of e-learning, and frames the expansion of group of components for e-learning. Business application layer mainly consists of content creation, content delivery, education platform, teaching evaluation and education management.
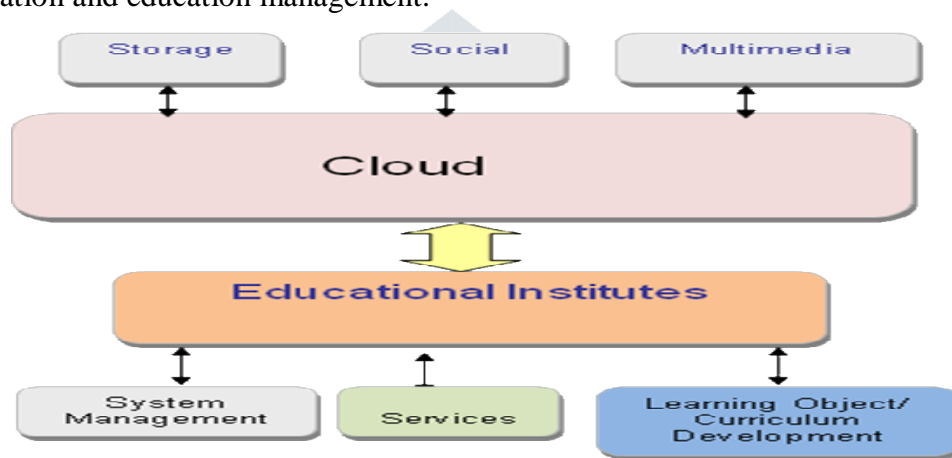

Fig.2 Cloud Based E-Learning Architecture

IV. E-Learning Cloud integration

In this case, a framework that can describe e Learning-Cloud integration implications is necessary. But there's few discussion directly on integrating conventional e Learning System and cloud services. Therefore, integrating about e Learning System and integrating about different cloud services are recounted respectively.

The E-Learning Framework Designing an e-learning framework needs careful analysis and investigation of the resources available to the institution. Asserts that design, development, implementation and evaluation of e-learning systems require thoughtful analysis and investigation of how to use the attributes and resources of the Internet and digital technologies. The following factors that cover various online learning issues; pedagogical, technological, interface design, evaluation, management, resource support, ethical and institutional. These factors discussed in the eight dimensions of the framework can provide guidance in the design, development, delivery and evaluation of e-learning environments. Another useful framework is a model for developing an integrated e-learning culture in a large organization.[3]The integration of e-learning is influenced by the various activities relating to e-learning. These are organizational priorities, learning environment, instructors' roles and learners' needs for developing an integrated e-learning culture in a large organization. All the four factors should be considered so that the extent of e-learning integration suits the organization that wants to embrace e-learning integration. This is important because different organizations have different priorities, different learning environments, different roles and different needs. In addition to the four factors of integrating e-learning, Newton and Ellis [4] suggest that the policy makers' views should also be considered. The above reviewed e-learning frameworks have been used to solve unique e-learning problems. Nevertheless, these frameworks do not address the issue of e learning integration with other teaching methods in its entirety. They mainly cover issues of e-learning systems development, application and adoption.

The framework for shifting e-learning systems onto Cloud has the potential to provide guidance in different aspects for e Learning, that will be used in the future as follows:

    i. Planning and designing e-learning materials,

ii. organizing resources for e-learning environment,

iii. Designing distributed learning systems, corporate universities, virtual universities and cyber schools,

iv. Designing LMS, LCMS and comprehensive authoring systems (e.g., Omni),

v. Evaluating e-learning courses, and programs.

vi. Evaluating e-learning authoring tools/systems, LMS and LCMS.

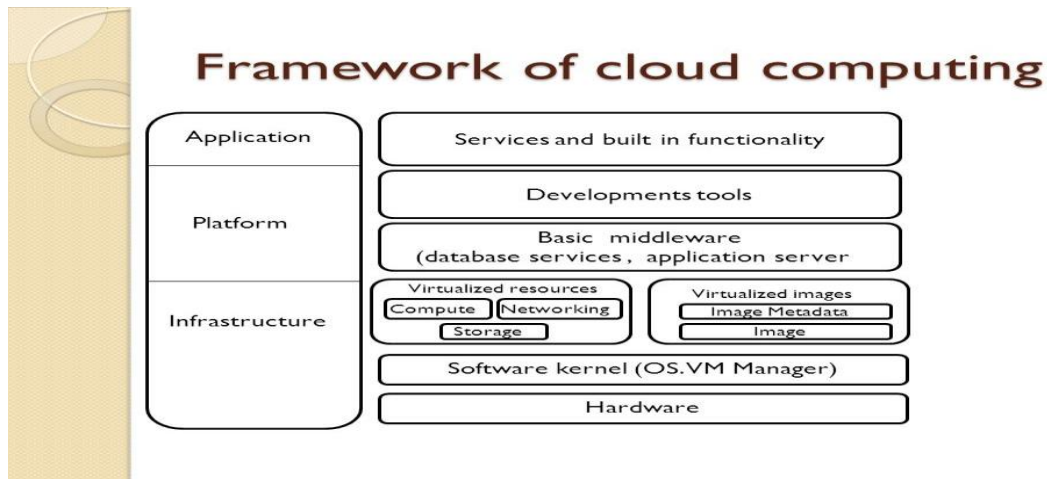vii. Designing and evaluating blended learning environments

Fig.3 Framework of cloud computing

V. ANALYSIS OF E-LEARNING SYSTEM

Cloud based e-learning is the sub division of cloud computing on educational field for e-learning systems. It is the future for e-learning technology and its infrastructure. Cloud based e-learning has all the provisions like hardware and software resources to enhance the traditional e-learning infrastructure. Once the educational materials for e-learning systems are virtualized in cloud servers these materials are available for use to students and other educational businesses in the form of rent base from cloud vendors.

The e-learning cannot completely replace teachers; 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. The blended learning strategy should improve the educational act. Moreover, the interactive content and virtual collaboration guarantee a high retention factor.

On the other hand, E-learning cloud is a migration of cloud computing technology in the field of e-learning, which is a future e-learning infrastructure, including all the necessary hardware and software computing resources engaging in e-learning. After these computing resources are virtualized, they can be afforded in the form of services for educational institutions, students and businesses to rent computing resources.

E-Learning implies the use of all forms of electronic media to support teaching-learning process. The concept of e-learning has significantly received research attentions as one innovation changing the patterns of teaching across the globe [6], [7] in support of, or partly replacing the traditional face to face approach to the delivery of knowledge and skills. E-Learning is a modern approach towards the delivery of well-designed and interactive learning environments that everyone could adopt in a learner-centered atmosphere [8] and continue to grow as an established method of learning. E-Learning involves the use of computer and network-enabled means of knowledge and skills transfer, through processes and applications such as Computer-Based Training (CBT), Web-Based Training (WBT), Virtual Learning Environments (VLEs) and digital collaborations. In e-learning approach to teaching and learning, educational contents are delivered over the Internet or in the form of text, audio and video available on CD-ROMs [9] and these contents may be delivered as learner-paced or instructor-led. In e-learning techniques to knowledge transfer, educational institutions are solely responsible for the construction and maintenance of all applications and tools used. An important feature of e-learning approach is that students are able to easily interact with learning environment and resources at their own convenience [10]. The emergence of e-learning provides prevalent as well as straightforward access to effective and qualitative education. The effectiveness of information and communications technologies depends on the way and purpose being used for. Educators [3], [10], [13] believed motivation is the key to success

and delivery of effective results, therefore e-learning usage in different settings and applications has its advantages as well as disadvantages and limitations.

VI. CONCLUSION

Development of a technology architecture in an e-learning using service orientated architecture approach using cloud computing. This technology architecture, data architecture and application architecture are the three main pillars of this architecture. All services can be done in a centralized service for easy access, monitoring and maintenance of an e-learning system. Our goal is to design a framework of services that will meet the requirements of the present and future of a system that is applied.

As cloud computing provides a super-computing power that is extent beyond a single company or enterprise. In this paper, we investigated the issue of how Cloud Computing technology can be employed in e-Learning systems. Cloud computing has recently emerged as a compelling paradigm for managing and delivering services over the internet. The rise of cloud computing is rapidly changing landscape of Information technology and ultimately turning to the long-held promise of utility computing into a reality. Cloud computing can help communities and nations, can transform education. An entire world of knowledge can now be made available to teachers and students through cloud-based services that can be accessed anytime, anywhere, from any device. By helping countries worldwide, lowering the cost and simplifying the delivery of educational services, cloud computing enables students across the globe to acquire the 21st-century skills and training they need to compete and succeed in the global information society.

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