

Cloud Learning For Virtual Campus

Mr. Chayatanya N. Deshmankar , Mr. Anil O. Panchal , Mr. Amit Borye , Mr. Paresh Boraste ,
Prof. Mr. Veera Manickam

Abstract— Taking in mind the growing Cloud Computing technology in every field including education and it's becoming an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet on a flexible infrastructure. Cloud Learning provides a powerful and scalable tool for educational institutes as well as it provides a new approach from the students point of view for education. In the following paper we will explore various techniques for the interaction between Student , Teachers and Collage Authority with the help of chats , queries , forums , video conferencing and virtual labs video-on-demand services with better streaming support and so on over internet.

Key Words— Cloud Computing, e-learning , Video-on-demand , Virtual Labs.

I. INTRODUCTION

The concept of cloud computing was introduced back in 1960 by John McCarthy with saying "computation may someday be organized as a public utility". The term 'cloud computing' is confusing to many people as the term can be used to mean almost anything. 'Cloud' is used as a metaphor for Internet and its main objective is customization and user defined experience. In other words we can say that with the use of Cloud Computing we can provide shared resources, software and information through Internet as per our requirement. Cloud computing has become more popular because of its data centric approach rather than the processing efforts with the local devices.

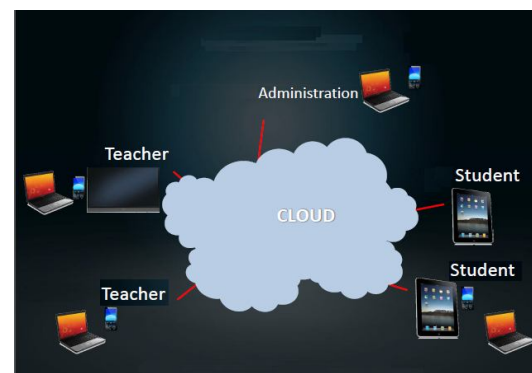
With time there has been a drastic change in the education system, many colleges and universities offer online education. There are many different technologies used in online teaching and learning arena, but to implement them in an efficient way to fulfill the needs of both the students and institutions it's better to adopt the

Cloud computing services to provide the uninterrupted, highly scalable and extreme qualitative services. With the help of cloud computing sharing of virtualized resources is easy. Interestingly with the use of this technology the interaction becomes easier between staff and students. It gives a better choice and flexibility to the college and the students by building a multipurpose computational infrastructure once and use it for more than one purposes as required by the users. By the help of this application the student as well as the faculty can be on-campus or off campus as per the college's requirement. Because of the evolution of cloud computing technology many traditional formats like manually attending of the class etc. have changed to online formats.

Many universities and colleges that have upgraded their systems online face some challenges and that challenges can be rectified with the use of cloud computing.

II. ARCHITECTURE OF CLOUD PLATFORM

Cloud computing makes it possible to run the application as a service over the internet on the infrastructure that is more flexible and more user friendly. We can use this platform as a virtual machine from any browser. With the use of internet any machine such as Tablet, Mobile, Laptop or Computer can be used as per requirement. Users can access the services without caring for the location and time the only thing that is to be kept in mind is that we should be in an area where we get access to the network.



Cloud Architecture

III. TYPES OF CLOUD SERVICES

There are following types of cloud that can be used in the application as per the requirement. This following three types of cloud make the complications in making the application very simple.

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Mr. Chayatanya N. Deshmankar, UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research, Pune, India. (e-mail-chayatanya.d@gmail.com).

Mr. Anil O. Panchal, UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research, Pune, India. (e-mail-undefined.anilpanchal@gmail.com).

Mr. Ameet Boryee, UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research, Pune, India. (e-mail-ameet.33@gmail.com)

Mr. Paresh Boreste, Computer Engineer, D.Y. Patil College Of Engineering & Research, Pune, India. (e-mail- borasteparesh@gmail.com)

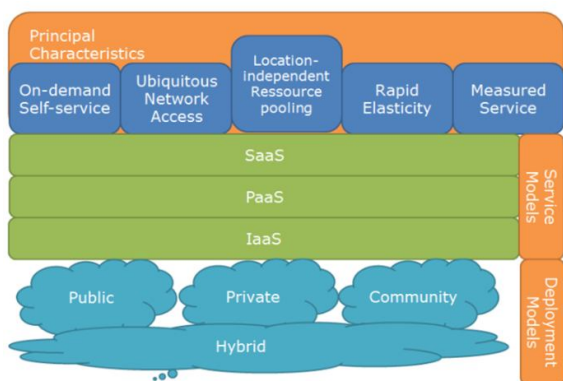
Prof Mr.M.R.M. Veera Manickam

Assistant Professor, Dept. of Information Technology, Trinity College of Engineering and Research, affiliated to University of Pune, Pune, , India. (e-mail-manic.veera@gmail.com)

IaaS - Infrastructure as a Service comprises the layer of storage, hardware, servers and networking components. The supplier maintains and upgrades these resources and the user pays for the service depending on the amount of usage. The major advantage is that users only pay for the exact amount of resources used, and resources available can be easily scaled to accommodate rapidly changing needs. Architecture scalability is achieved through Full- or Para-virtualization, such that multiple systems or operating systems can be run at the same time on a virtual machine or across multiple machines.

· *PaaS - Platform as a Service* can also be supplied by the Cloud and allows software and service development without downloading tools and software to client machines. Using the Cloud, large and complicated software packages can be developed, tested and disseminated, again leveraging the benefits of virtualization and scalability (for unforeseen development needs requiring more CPU hours).

· *SaaS - Software as a Service* is one of the most common uses of Cloud Computing, exemplified by Google’s Gmail. Clients access software services such as email, word processing, spreadsheets, etc. from the Cloud instead of running these applications directly on their client computers.



Types of Cloud

IV. ADVANTAGES AND LIMITATIONS OF CLOUD

There are a lot of advantages with the use of cloud computing as it does not require the background knowledge of the system. The working that is done too is user friendly. The use of cloud lowers the expense for start up companies, as they no longer need to buy their own software or servers. Costing for cloud would be as per the use. Vendors and Service providers claim costs by establishing an ongoing revenue stream. Data and services are stored centrally but accessible from any place at any time.

The advantages we have in using cloud computing are as follows:

_ *Computational Power:* The architecture that is used in the cloud based system locates the computing and data in a large number of distributed computers, the sea of clouds in the tens of thousands of computers to provide powerful

computing power and huge data storage space, puts the “cloud” as a service available to students via the Internet.

_ *Highly Available:* Through the integration of mass storage and high-performance computing power, this system can provide a higher quality of service. Cloud computing system can automatically detect the node failure and exclude it, do not affect the normal operation of the system.

_ *Highly Secure:* In the cloud computing model, data is storied intensively. Relying on one or more data center, the managers manage the unified data, allocate the resources, balance load, deploy the software, control security, and do the reliable real time monitoring, thus guarantee the users’ data security to the greatest possible degree.

_ *Virtualization:* Virtualization is the most important characteristics of this type of architecture. Each application deployment environment and physical platform is not related. It is managed, expensed, migrated, and backup through virtualization platform. It put the underlying hardware, including servers, storage and networking equipment, comprehensive virtualization, in order to build a resources pool of shared, distributed on-demand.

_ The major advantage of the proposal is that it aims at providing easy access to costly software running on high Performance processors to rural students at institutions which lack considerable facilities. Considerable investment would be required to implement this architecture, but the benefits would easily justify the cost.

The use of Cloud Computing in higher education must be analyzed both from the benefits point of view, as well as from that of the risks and limitations. It is still unclear how safe out-sourced data is and when using these services ownership of data is not always clear. In our project most of these issues have been tried to resolve.

V. ACTUAL IMPLEMENTATION

The main purpose of e-learning is to provide virtual class room to student. Once the student login to this portal, he can search whatever course he want to do and finish the same by going through various documents uploaded available. After the course is finished.

The basic system specification required for developing this application are as given below:

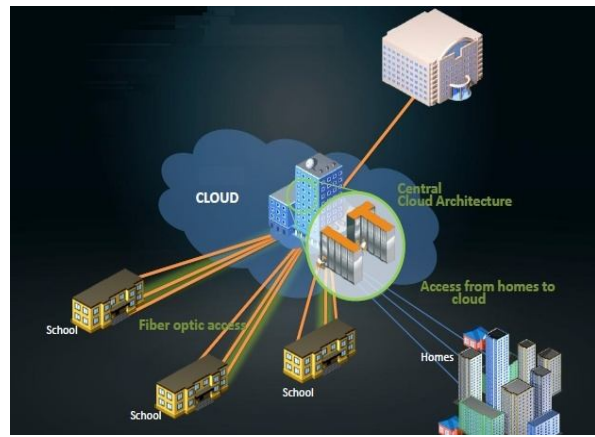
- Operating System : Windows XP/7
- Application Server : Tomcat5.0/6.X
- Front End : HTML, Java, JSP, AJAX
- Scripts : JavaScript.
- Server side Script : Java Server Pages.
- Editor : Eclipse
- JDK Version : JDK 1.6

By considering all the above applications, in this paper we will try to offer a model which will be like the classroom completely, it would easily meet the needs of the administrative staff, student affairs like education, training and research related needs of students and academic staff

who work especially in the educational institutions. Design of this infrastructure on cloud platform will optimize all the requirements like Computer resources (processors, memory, storage, bandwidth, etc.). Infrastructure scales up and down quickly to meet the demand. The most important feature of the applications offered by cloud is their availability and scalability. User friendly interfaces of cloud based applications enable users to successfully enlarge their computing environment. Cloud-based applications allow data to be planned at different places rather than the applications themselves. This enables users to rapidly build customized solutions around their content items. Cloud content (scientific and social subjects, art, opinions, textbooks, encyclopedias, etc.) is controlled by the institutions available to users whenever they need. Student's objectives are not limited to their courses hence existing content should be changed dynamically by adding new lecturer videos, eBooks etc. frequently in to cloud storage and it allows sharing of resources also. Custom services are combined with third party commercial services to create new applications like documents, spreadsheets and so on (by using *Google Docs*, *Microsoft Office WebApps*, etc.).

Through this application the Staff can broadcast their own classes by means of webcam with all those classes being broadcasted over internet to the website very easily. At the end of the class those videos will be saved and stored in the cloud storage automatically. Likewise each and every class will be broadcasted and saved to their website. Then the saved videos will be shared to all the students of that class automatically and then a notification will be issued to the students through email. And the staff can also upload new study materials and lecture videos and share all the materials and can give the homework to students and correct them after submission. Here a teaching Staff can provide a virtual lab to the students and monitor them by integrating third party services like *Google App Engine* and so on. Staff can update the syllabus too.

In this application Admin will have rights to create a new batch and add new students, staff individually and he has right to add any new resources like eBooks, lecturer videos, can post a new notification to particular batch, department, student and can always monitor the student status. Here a student can perform various operations like Watching Classroom, See Notifications, upload new materials, share the resources like books and videos, Video-On-Demand and can also ask any queries using a chat room in live, and can communicate with their classmates also by using that. After class it's possible to discuss about any further queries using Forums.



Actual Model

VI. MODULE WISE WORKING

A. Student :

Here a student can upload the files up to the given limit onto the cloud storage and send emails to friends within the application. A student can easily view the files and read them online without needing to download. Students can easily access the cloud content from their account without searching. This can be achieved in an easy way by using cloud computing only. In the classic models the students attend the online autonomous learning and cooperative learning sessions, or accomplish teacher's assignments.

Function:-

- Attend online live classes through web.
- Ask queries and get result.
- Submit homework.
- Participate in discussions.
- Attend virtual labs.
- View notification.
- Search and access old archives.
- Send e-mail to class mates.
- Upload new study materials and share it with other.
- Download contents from others.

B. Staff

In the architecture teachers answer student's questions and offer essential teaching to major and difficult points. In addition, teachers can also use multimedia to enhance teaching content. Teachers also encourage students to cooperate with each other to finish simple learning tasks or complex projects. Through cooperative Learning, students cannot only acquire knowledge, their team spirit and coordination will also be fostered, skills in dealing with people will be improved and abilities to express themselves will be enhanced. Thus the learning and teaching will be more interactive which the demand of the age is. The interactive mode of the proposed architecture is furnished in.

Function:-

- Start classroom.
- Upload online lectures, videos and e-book and share.

- *Conduct quiz program.*
- *Check status of every student and correct homework.*
- *Send notifications to students.*
- *Provide timetable and syllabus to students.*

C. Admin

Admin will have rights to create a new batch and add new students, staff individually and he has right to add any new resources like eBooks, lecturer videos, can post a new notification to particular batch, department, student and can always monitor the student status.

Function:-

- *Add new batches / students.*
- *Add or remove staff.*
- *Modify student details.*
- *Staff ratings.*
- *Student feedbacks.*
- *Delete student / batch.*

Cloud learning platform uses the interface of Web forms to provide students with learning resources service. The user interface for students include Live classroom and browse the archives, Syllabus and previous class videos, course reference eBooks and virtual labs services, and online communication among all the class members using chat room. The user interface for teachers include material information, academic reference management, syllabus management and other lab applications, homework correcting, video instruction, interactive communication and other necessary services.

By developing this model most of the complex problems raised in past will be eliminated and it is very easy to interact with it also. It provides the best opportunity for the students and Teaching staff in every aspect. The overall architecture of this Cloud Computing Based Virtual Campus is as shown in the below figure.

VII. SECURITY

By incorporating a robust and proven GQL into the system, reliable performance and integrity of data is ensured. Backup of the data must be taken to keep it stored in the server i.e., while performing the operation power failure data may corrupt.

A. Authentication:

Authentication is the process of determining whether someone or something is, in fact, who or what it is declared to be. In private and public computer networks (including the Internet), login Id and password are used to help keep the system authenticated. With the user entering his login Id and password the system knows that the user is authentic. Each user registers initially (or is registered by someone else), using an assigned or self-declared password. On each subsequent use, the user should know the previously declared password and use it whenever required. The weakness in this system for transactions that are significant (such as the exchange of money) is that passwords can often be stolen, accidentally revealed, or forgotten.

For the same reason, Internet Transactions that has money Involved should be more stringent authentication process. The use of digital certificates issued and verified by a Certificate Authority (CA) as part of a public key infrastructure is considered likely to become the standard way to perform authentication on the Internet.

B. Authorization:

The process of granting or denying access to a network resource. Most computer security systems are based on a two-step process. The first stage is authentication, which ensures that a user is who he or she claims to be. The second stage is authorization, which allows the user access to various resources based on the user's identity.

VIII. CONCLUSION

Cloud computing is an emerging computing paradigm and next generation platform that can provide tremendous value of information of any size. The shift towards cloud computing would enable the universities and educational institutions to save money and take benefit of the developing technology. Both private and educational cloud can provide the necessary computational facility on demand of the user without any expense and can create a common platform for sharing the various resources from the various institutions. In spite of limitations of cloud computing and keeping in mind the present scenario of economic crisis many universities, educational intuitions, organizations etc. are trying to adopt cloud computing as a solution to the developing technologies and try to reduce their expenses. The main objective of the paper was to identify the essentials of cloud computing which can be considered as anew dawn to the higher education and has the full potential to make a 'revolution' in the field of education.

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Mr. Chayatanya N. Deshmankar

UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research,Pune, India.

Mr. Anil O. Panchal

UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research,Pune, India.

Mr. Ameet Boryee

UG Students, Dept. Of Information & Technology, Trinity College Of Engineering & Research, Pune, India.

Mr. Paresh Boreste

Computer Engineer,D.Y. Patil College Of Engineering & Research.
Pune , India.

Prof Mr.M.R.M. VeeraManickam

Assistant Professor in Dept. of Information Technology, Trinity College of Engineering and Research, affiliated to University of Pune, Pune.
Working as part time Research Scholar in Dept. of Computer Science and Engineering at Karpagam University, Coimbatore, India. His research work focuses on E-Learning, Social Network and Cloud Application.