

Application Study on Cloud Computing Based Virtual Campus

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Abstract- Cloud computing is growing rapidly, with applications in almost any area, 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-based applications offer better alternative to academic institutions with very less expenses by providing a new teaching solutions like efficiency of the teacher's classroom, the student's independent learning. In this paper, we emphasize more on how to model interactions between Teacher-Teacher, Teacher-Student, and Student-Student through Chat or Forums, online storage, sharing of resources, access previous classroom, video-on-demand services with better streaming support and so on over internet..

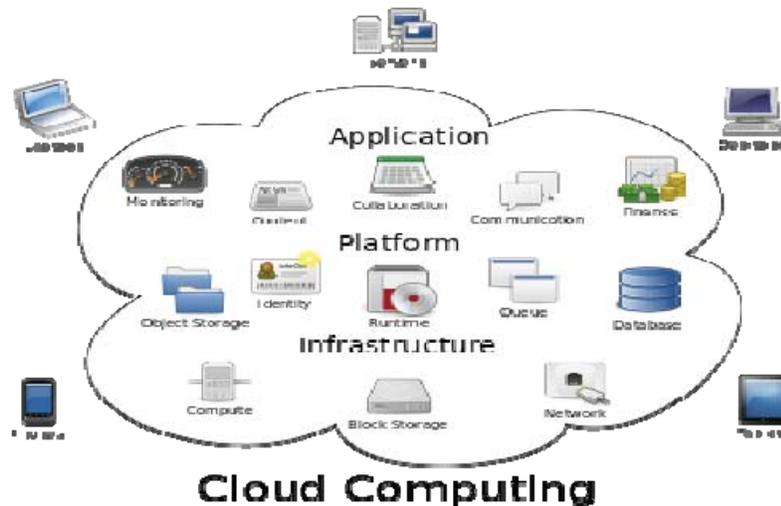
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I. INTRODUCTION

Cloud computing has become very popular because it moves the processing efforts from the local devices to the data centric facilities. Therefore, any Internet enabled devices like a smart phone, Tablets etc., could be able to solve complex operations like creating, editing files online by simply passing specific arguments to a service running at the data centers level that will be capable of giving back the results in a very short time. With the rapid development of technology, most of the colleges and universities offer onsite classes, courses, where in some cases the entire degree program through online as well as uses various other teaching and learning models. Most of these online offerings currently are at undergraduate level. But there is a growing trend in using similar models for graduate and postgraduate education too. There are many different technologies used in online teaching and learning arena, but to implement them in an efficient way to fulfil 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. The cloud services mainly include sharing, online storage, Web-based email and database processing. By adapting the Cloud computing, it becomes easy to share the virtualized resources. Here Users do not need any background knowledge of the services and it's very easy to maintain when compared to any traditional technologies.

II. BASIC ARCHITECTURE OF CLOUD PLATFORM

Cloud computing make possible the running of applications as services over the internet on a flexible infrastructure due to this the Cloud Computing can be rapidly increased. In the cloud computing platform, we can use the virtual machines on the cloud from a browser. By using internet any Cloud terminal machines (lightweight clients) such as

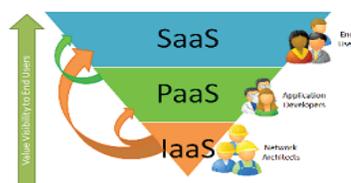


mobile phones, PDA, Laptop, Tablets using browser, etc., and they have the properties of low cost, portable, interactive and friendliness. Users can visit the cloud services at anytime and anywhere they want. Learners needn't care about their position, and they can just query the keywords to obtain educational resources from around the world, and then choose the learning content needed to learn. The cloud terminal learning machine and study cloud can achieve self-interactive learning.

III. CLOUD COMPUTING TYPES

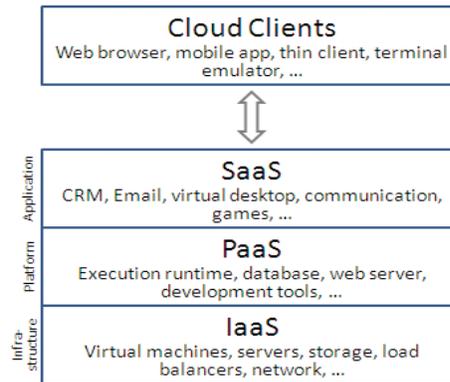
Cloud computing is of three types named Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). By these three, it is possible to make complex things very easy.

- Infrastructure as a Service (IaaS)** delivers basic storage and computing capabilities as standardized services over the network. Servers, storage systems, switches, routers, and other systems are pooled and made available to handle workloads that range from application components to high-performance computing applications. Amazon, IBM, Google, Microsoft are the best examples of IaaS.
- Platform as a Service (PaaS):** Encapsulates a layer of software and provides it as a service that can be used to build higher-level services.
 - PaaS for Producer:** Someone producing PaaS might produce a platform by integrating an OS, middleware, application software, and even a development environment that is then provided to a customer as a service.
 - PaaS for Consumer:** Someone using would see an encapsulated service that is presented to them through an API. The customer interacts with the platform through the API, and the platform does what is necessary to manage and scale itself to provide a given level of service. Azure, Google App Engine, NetSuite, Force.com, OpSource, NaviSite, AT&T are the best examples of PaaS.
- Software as a Service (SaaS)** features a complete application offered as a service on demand. A single instance of the software runs on the cloud and services multiple end users or client organizations. salesforce.com, Google Apps, Office Live, NetSuite, Ultimate Software, Ariba, Concur, intacct are the best examples of SaaS. The types of services provided in cloud computing are as shown in below figure diagrammatically.



IV. SERVICES CATEGORIZED BASED ON TYPE OF CLOUD COMPUTING

There are various services provided by cloud computing like storage, email, Virtual Machine, Virtual Desktop, Virtual Server, Development tools load balancing, etc. This classified based on type of cloud computing is shown in the below figure.



V. ADVANTAGES IN USING CLOUD COMPUTING

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

- *Powerful computing and storage capacity:* Cloud based architecture 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.
- *High availability.* 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.
- *High security.* 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.

VI. CLOUD COMPUTING FOR VIRTUAL CAMPUS

By considering all the above applications, in this paper we will try to offer a model which will 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 allows 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*. 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.

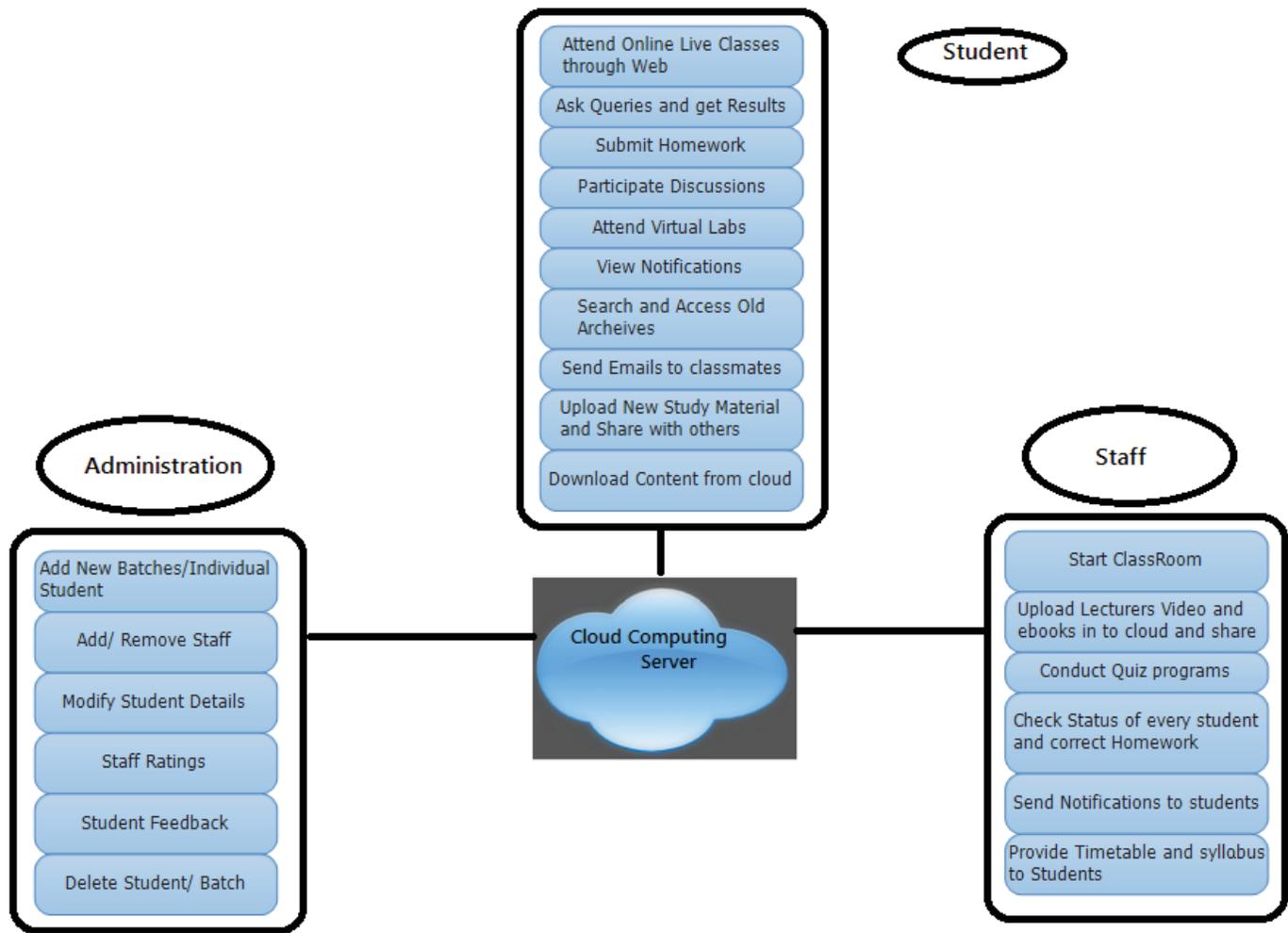
In the classic models the students attend the online autonomous learning and cooperative learning sessions, or accomplish teacher's assignments. But in the proposed architecture teachers also answer student's questions and offer essential teaching to major and difficult points. In addition, teachers 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.

In the proposed model integration the teaching resources in the cloud computing, including and all the teaching resources like lecturer videos, eBooks and other useful magazines other content for learning purpose. The interactive programs are mainly based on the needs of teaching and learners, taken full advantage of the underlying information resources after finishing made, and the course content as well as the progress may at any time adjust according to the feedback, and can be more effectiveness than traditional teaching. Sharing of teaching resources include teaching material resources, teaching information resources (such as digital libraries, information centers), as well as the full sharing of human resources.

VII. INTERFACE OF CLOUD COMPUTING FOR VIRTUAL CAMPUS

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.



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