



Implementation of Educational Cloud in Education Sector

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Abstract— *Cloud provides almost everything as service, and infrastructure provides resources as service over the Internet, and Storage cloud can provide storage as a service. These services can be used for storing and processing large data set over Internet. Due to the growth of educational institution all over the world there is a requirement of developing cloud architecture which can help storing and processing large information produced by these institutions. Cloud computing can be a solution for storing the educational data into more systematic manner. This paper is about implementing virtualization and cloud computing for educational data for high end processing. The paper also describes an architecture which helps understanding the need of implementing virtualization using cloud computing.*

Keywords — *Educational Cloud, Educational Data mining, Virtualization*

I. INTRODUCTION

This Cloud computing technology provides almost everything as service using Internet, and every resource is highly scalable. Resources in cloud computing are provided as service based on data centres. This data centres are sliced into several servers which communicate with each other and with other servers in the network to share, analyse and process information. Providing software as service via Internet was started in the middle of Internet generation, many companies have introduced various software services online, but due to increase in demand of various infrastructural resources, cloud computing is providing three basic components as services they are PaaS (Platform as Service), SaaS (Software as Service) and IaaS (Infrastructure as Service) [1]. Educational institutions are moving towards adopting new developing technology for providing the student new and faster means of resources through which they can adopt the higher level knowledge. Cloud computing might be an area for the educational institution to provide faster and much cheaper resources for students with globalization. This paper proposes an idea to develop various clouds for educational sectors which help different students and faculty to research on the various subjects globally. These clouds can help users from different regions to share their knowledge in a more appropriate manner. As these clouds can be accessed using Internet it works in a more flexible and reliable manner. The clouds developed for education can provide the three important services which are PaaS, IaaS, and SaaS. These services can change the way students interact with the computing resources and help them to understand more and more about the subject. Students can access the resources in a faster manner with time, place flexibility with the new cloud architecture. These architectures are more reliable with very huge data storage.

II. EDUCATION AND CLOUD

The educational sectors are looking for options which are cheaper and more convenient in terms of improving the performance and ranking of the students. Cloud computing data centres can be sliced into various servers and virtual machines which can be a solution to their problem, and these are easy to access to the computing services on demand [2]. Cloud computing can also be used for research work for various platforms. Almost every educational stream needs computing today for various purposes, these purposes can be solved by implementing different software services through which they can interact and perform tasks.

Educational institutions consist of a large IT infrastructure and for managing it requires many efforts, time and person power and money, still students are not able to get the complete benefits of the IT structure they have been provided. Students require software for simulation, experimental performance and manipulation of static data. These software's are high end software and require skilled people to work with, thus rather this software can be installed in the virtualized environment on the cloud data centre. Internet can be a medium to provide access to this software with high reliability. Virtualization technology helps creating multiple client nodes for students, these nodes can be easily accessed through Internet [3]. Although there are various companies which are adopting cloud computing to provide various applications as a service, Google has introduced Google Doc through which users can use the features of office applications online without installing them on the system but directly in the web browser, this software is useful and very flexible for working, the only need to gain access to Google Doc is to have an account with Gmail, a free mailing service provided by Google. Thus cloud and virtualization will change the way students' interaction with the resources.

III. PROPOSED ARCHITECTURE

The Cloud in cloud computing are categorized in three types they can be used in an educational environment as educational public cloud, educational private cloud and educational hybrid cloud. Public cloud provides services like

application, storage and makes resources available to public through the Internet. Private clouds are special infrastructure dedicated to a single educational organization for services, resources and data storage [4], [5]. On the other hand Hybrid clouds are combination of one or more public and private educational cloud. Thus the resources, services and data storage can be shared within organization through Internet with some privacy constraint in hybrid educational cloud.

The educational sector can be implemented using public cloud, as they are cheaper compare to private and hybrid, for some of the institution and university, which carry out the research work in depth, they can use the private and hybrid cloud after undergoing through the various terms.

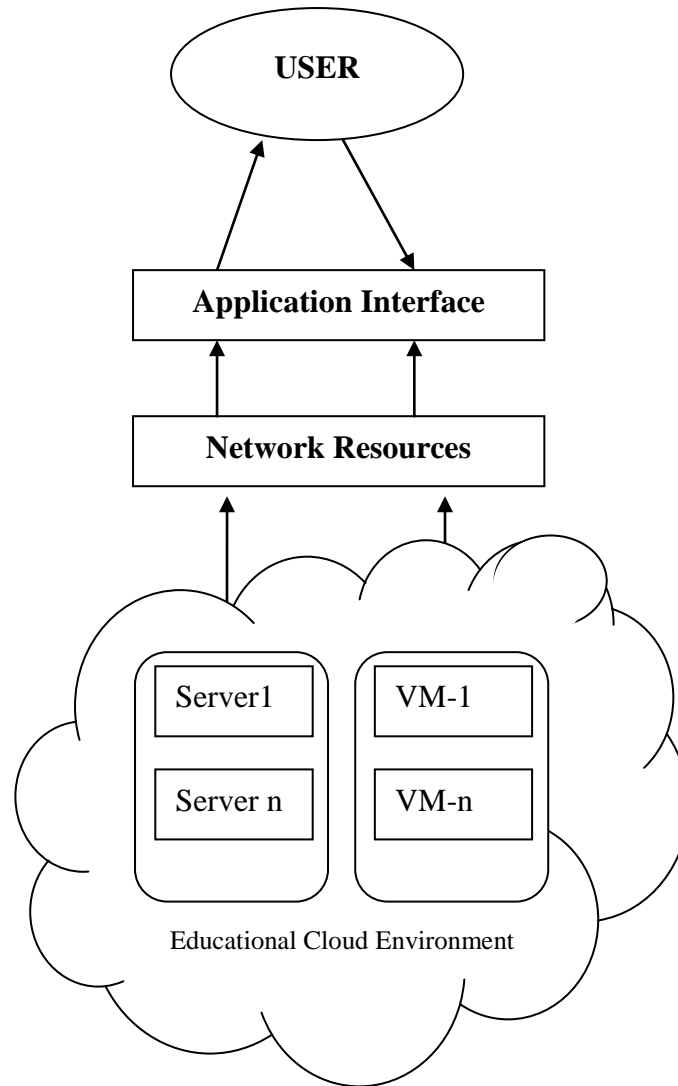


Fig. 1 Cloud Computing Architecture for Educational Environment

The components used in the architecture are as follows:

- **User:** Users are the one who use this architecture in the educational sector, such as student, staff member, faculties etc.
- **Application Interface:** application interface is a mediator, which act as an interface between user and cloud, is a GUI, through which user can have an easy interface.
- **Network Resource:** Cloud computing services are provided through networking resources, like Internet which is a medium to communicate with clouds. Network resources are general and high end network devices which provide the connectivity between clouds and users.
- **Data Centres (DC 1, DC 2):** Data centres are huge with large data storage capacity. Data centres stores, process and manipulate huge information.
- **Virtual Machine:** Virtual machine can act as node to the users, and provide services to users. The virtualized nodes provide separation of data between different users.
- **Servers :** servers are virtualized server which are assigned with different tasks this task are like application deployment , adding update can act as update server, etc. The servers and virtual machine in the architecture and

are connected with each other as data centre 1 and data centre 2 are connected with each other. The server configuration could be used as replica for each other.

IV. IMPLEMENTATION

The layered architecture for the proposed model is shown in the following figure 2, the figure gives a brief idea about for the implementation work, it consist of a thin client which act as node for the client to access and work with the services provided by the cloud computing model. A thin client is a low configuration computer system which consist hardware only to access information online. Secondly an application interface is required for working which act as GUI interface through which user can interact with cloud. The user interface will give a dashboard panel and a configuration window which help user to communicate and configure the services. Operating system and network management software are also required, this software are powerful enough to handle the connectivity and to provide a standard bandwidth through which the thin client can communicate with the cloud. The services are provided through Internet, this Internet connectivity and network device layer

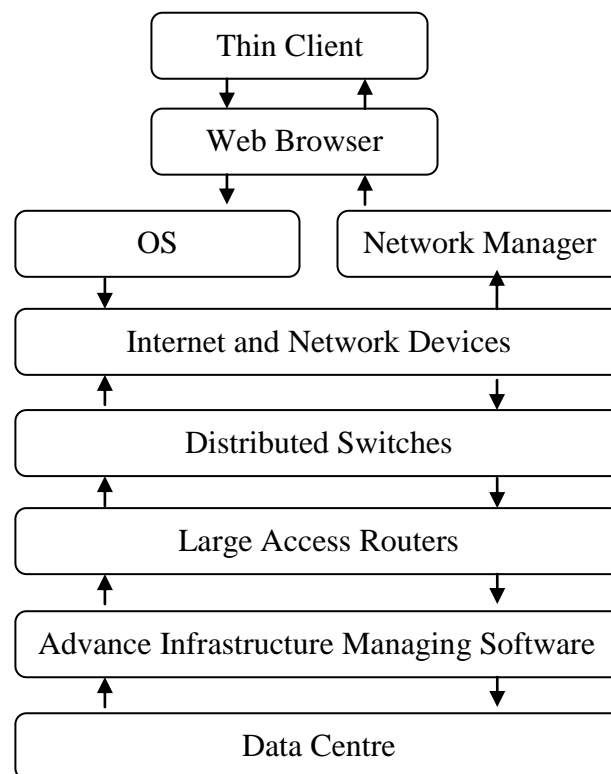


Fig. 2 Level Diagram for Proposed Model

The most important feature of the applications provided by cloud is their availability and storage. GUI interfaces of cloud based applications enable users successfully scale their computing environment. Cloud computing as an exciting development is a significant option for today's educational sector. Students, Faculties and Management personnel have the opportunity to fast and reliable access to various application platforms and resources through the web pages on-demand. Cloud provides the benefits of flexibility and adaptability to use the computing resources on-demand. Cloud environment is made up of shared resources, these shared resources are none other than the same computing resources which are used for computing, but with a slight change that the shared resources can be located at remote location and accessed using an Internet connection.

The resources can be software resources or hardware resources don't make any difference but cloud they both act as services which is being accessed by the client computers. The virtual resources are managed using some set of automated program and application which monitor the resources and its allocation in the network. Better resources management will lead to maximize the usability of cloud resources [6].

The advantages which are provided by the proposed architecture are as follow:

- **Virtualization:** Virtualization in educational sector helps in reducing the infrastructural cost. Virtualization creates virtual version of something such as an operating system, servers, a storage device, network resources etc. Implementation of virtualization are in two different level first is the hardware level that is the lower physical level in this level it allow abstraction and isolation of lower level physical components which helps decrease IT hardware cost for small and large organization. The second implementation of virtualization occurs

at the software layer. In software virtualization operating system and application software is, slice up for acting as multiple systems [7]. Cloud architecture adopts the virtualization nature in which resources get virtualized. The benefit of adopting virtualization technology lead to decrease power and money, it also reduces hardware cost.

- **Large Scale Management:** Dynamic nature of cloud computing, with high end application structure is well versed to manage large scale resources. Resources get automatically allotted and manipulated; it is also possible to scale down shared resources.
- **Pay per Use:** Cloud model is constructed on the basis of pay per use model. In such model the customers pay according to use. The customer has the rights to add or subtract a service as per his requirement.
- **High storage:** In educational huge data of student is generated every year. Cloud computing provides storage environment is highly scalable nature. Storage is under taken by every computing environment, as clouds are connected to data centre they can provide high storage as per the user requirement.

V. EDUCATIONAL DATA MINING

Web based educational system collects huge quantity of educational data. This data are being collected in a systematic manner for future reference. The field of data mining will explore in the way by studying the large data set which has been generated for the student [8], [9]. The process of educational data mining will help in evaluating student from different region. Analysis such data set will help in betterment of educational system. The data set can be generated as virtualized results; this virtualized data can be helpful to the human teacher. The data set which are generated by the educational system are increasing rapidly the need for analysing such data set is necessary to produce useful information. Several Online Education systems 1 such as Blackboard, WebCT, Virtual University (VU), and some other similar systems have been developed to focus on course management issues. The objectives of these systems are to present courses and instructional programs through the web and other technologically enhanced media. These new technologies make it possible to offer instruction without the limitations of time and place found in traditional university programs

The requirement to setup education data mining setup can be easily provided by cloud computing environment. The basic needs for setup are infrastructure, platform and software which are easy available by cloud environment. Clouds are based on data centre, this data centre are virtualized and sliced into different server. This server could be used for data mining. The storage clouds will help in achieving the objective of storing and processing the huge data set which are generated by various educational organizations.

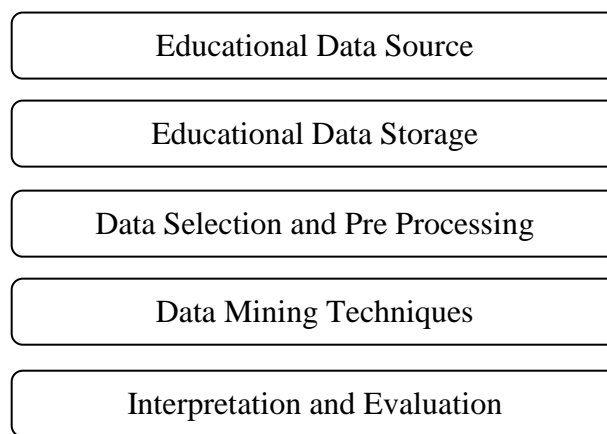


Fig. 3 Educational Data mining Process

VI. SCOPE AND FUTURE WORK

The proposed model will change student interaction with the computing needs of student in the education sector. Not only student form computer science and technology are facing problem with computational need but many interdisciplinary students can have a better computational model of cloud computing. Providing this need through Internet is best and flexible solution to the student, using these services they can also interact and have access to the huge data for fulfilling their learning need.

In future introduction to a social interface for student can be develop , which work like the other social networking website like face book , etc . This platform will help them to work in a more social manner compare to the existing model. The interaction with this model is more flexible and will have easy data sharing and storage.

VII. CONCLUSIONS

Cloud computing technology is a step ahead in handling computing resources. This technology provides a better, used in educational system much more reliable platform for handling computing resources. This paper has discussed about introducing cloud computing and virtualization in educational sector. The paper also describes the ability of cloud computing to scale and utilize the shared resources for educational computing. This provides a platform independent of

infrastructure with much more flexible model. Thus considering the educational cloud environment proposed model in terms educational sector will help in making a better model for student with powerful functional capabilities. There are of course some disadvantages too. The cloud computing services needed to deliver most IT services needed by customers do not yet exist. There are still problems and constraints with application offerings, service-level agreements, more importantly security issues. However after introducing such model, it will help in terms of data mining, student performance improvement and easy data sharing.

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REFERENCES

- [1] Anthony T. Velte ,Toby J. Velte, Robert Elsenpeter, ” Cloud Computing: A Practical Approach ”, The McGraw-Hill Companies 2010, [Book]
- [2] Nabil Sultan “Cloud computing for education: A new dawn?” International Journal of Information Management 2010
- [3] Tuncay Ercan “Effective use of cloud computing in educational institutions”, Science direct 2010
- [4] Brain Underdahl, Margaret Lewis and Tim mueting “Cloud computing clusters for dummies” Wiley Publication 2010, [Book]
- [5] Jinesh Varia, “Cloud Architectures”, Technology Evangelist, 2008.
- [6] Shujia Zhou, Ben Kobler,Dan Duffy, Tom McGlynn, “Case Study for Running HPC Applications in Public Clouds”, Qiming He Open Research, Inc. 2010.
- [7] Judith Hurwitz, Robin Bloor, and Marcia Kaufman, “Cloud computing for dummies” Wiley Publication 2010, [Book]
- [8] Kanhaiya Lal , N.C.Mahanti “A Novel Data Mining Algorithm for Semantic Web Based Data Cloud”, 2010.
- [9] Dr Mark I Williams “A quick start guide to cloud computing”, 2010.
- [10] Zenon Chaczko, Venkatesh Mahadevan, Shahrzad Aslanzadeh and Christopher Mcdermid,” Availability and Load Balancing in Cloud Computing” IPCSIT vol.14 2011.
- [11] Borko furht “Handbook of cloud computing”, Springer 2011.