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A Review on Role of Cloud Computing in Educational Organizations

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Abstract: For economical growth, educational organization plays a vital role by preparing the future generation with advance technology. This can be possible by using a trending technique cloud computing which connects educational institutes, students, parents with the entire world at low cost. . In the present paper a cloud education system is introduced and efforts have been made to understand the role of cloud computing for providing quality education.

Keywords: Information technology, cloud computing, educational institutes, infrastructure, teaching, revolution, Cloud computing, higher education, SaaS, PaaS, IaaS, virtualization, Cloud Computing, Web service, Virtualization, Grid Computing, Virtual Computing Lab, Higher education institutions, education in remote areas.

I. INTRODUCTION

Education is a key factor for the economical growth of every country. Educational organizations are giving their full contribution in transforming the society and the entire world economy. Being a vast expansion of social media and internet during last few years it is also required to adopt latest technologies in teaching and learning process for the development of the society. For adopting these emerging technologies, many education institutions are facing the problems like infrastructure, skilled faculties, software or hardware; advanced labs etc. Organizations have to spend a large amount of money on their infrastructure, training of faculties, purchase of software, hardware etc to fulfill the needs and demands of the users without compromising the quality of services. To overcome the problems of education institutions, a new trending technology has been introduced named as Cloud Computing [1]. The term cloud-based technology refers to the act of storing and accessing information and various programs (software and hardware) over the internet. It also provides computational platform and infrastructure which are demanded by the user according to their requirement [2]. Cloud computing is a next generation platform that allows institutions and organizations (both public and private) with a dynamic pools of resource with high quality service regardless of the minimal resources available and to reduce cost through improved utilization [3].

II. CLOUD COMPUTING

Cloud computing is a Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It takes into account all applications, networks, as well as servers. Thus, the end user is able to access all these elements using the internet. Cloud computing provides shared resources, software and information through Internet as a PAYGO (Pay-as-you-go) basis [4]. Many companies are delivering services from the cloud have their own cloud solutions to their users. For example, Google has its own cloud and providing services like Google drive, Google documents etc, to the user [5-6].

III. TYPES OF SERVICES PROVIDED BY CLOUD COMPUTING

A. *Services provided by cloud Computing can be classified as [7-8]*

- 1) *Software as a Service (SaaS) (Anytime Anywhere apps):* This model helps the students or staffs for using various types of applications from all the feasible location through various devices available like laptops, mobiles and tablets to meet their requirements. Most of the institutes are using this service to facilitate the students, staff and academics.
- 2) *Platform as a Service (PaaS) (the operating environment in which Applications run):* This model is used for coding and implementing the applications in a simple and an efficient way. This model is cost effective and simple. In this model, PaaS is attached with dedicated APIs for monitoring and controlling all the activities of main server. The user send the request to the server and server takes action on all requests and process it gently after executing the server to give the output to the user.
- 3) *Infrastructure as a Service (IaaS) (the on-Demand data Centres):* It is a self service model which provides various services to users for controlling and managing data center infrastructure. It is called resource clouds which provide different types of resources according to the user requirement.

IV. TYPE OF CLOUD MODELS

A. *Different types of cloud models can be classified as [9]*

- 1) **Public Cloud:** In this type of cloud hosting, the cloud services are provided through a network that is accessible by the public. This model is perceived to be the ideal illustration of cloud hosting. In this type of hosting the provider offers infrastructure and services to a wide range of clients.
- 2) **Private Cloud:** This is also regarded as an internal cloud. The environment on which the cloud computing platform lies is protected by a firewall that is monitored by the information technology department which belongs to the particular organization and can only be used by the authorized clients only.
- 3) **Community Cloud:** This denotes a cloud hosting that is mutual and is shared among many organizations of a specific community including trading firms, banks, or gas stations among others. The group of users must have computing apprehensions that are similar.
- 4) **Hybrid Cloud:** This is an integrated model of cloud computing environment. It may consist of two cloud servers or more, which may either be public, communal or private. The servers are interconnected though each remains as a separate entity. A hybrid cloud is advantageous because it can overcome boundaries and cross isolation by the provider, but cannot be categorized among the public, communal or private clouds.

V. CHARACTERISTICS OF CLOUD COMPUTING[10-15]:

- A. Cloud computing allows the consumer to pay for only those applications which they want to use and hence, save the money for the users.
- B. Cloud computing provides services and solutions with the required skills for running and maintaining them, hence reducing the risk and requirement of highly skilled staff.
- C. End users neither have to purchase any equipment & hardware nor to buy license and update software as clouds service includes all of them.
- D. Cloud Computing services can be accessed from anywhere, anytime and from any device.
- E. Cloud computing delivers as well as retrieves the data and applications with less time and hence, it is an efficient system.
- F. Cloud computing ensures that servers are optimally utilized & hence, makes the system economical.
- G. Using cloud computing, user may access various applications with devices like mobile phones, laptops at any location where internet is easily available.
- H. Cloud computing is inexpensive as many applications are freely available and pre-installed which reduce the cost of educational institute. It also provides the facility of Pay per use for some applications.
- I. There is no need of backups to store information since it is stored in the cloud.
- J. Institutions of higher learning can allow their technological infrastructure to be used by other firms as a way of enhancing research.
- K. Cloud computing has an extended reach which enables universities to teach students in different and new ways, as well as ensure they can manage massive workloads and projects better. In this way, it ensures that the learning & teaching becomes more interactive.
- L. It helps students appreciate new technology better when they join the global workforce.
- M. It provides services and online tools that ensure collaboration capabilities and secure communication.
- N. Problems including insufficient infrastructure, lack of teachers, low rates of graduation, as well as tiny classrooms can be addressed by use of cloud computing.
- O. Upgrades and maintenance ought to be easier. This is because the cloud enables rapid provision, acquiring, as well as deployment of new IT services, platforms, as well as applications.
- P. IT capital expenditure is eliminated, hence a reduction in the overall cost outlay.
- Q. It is user friendly and can be used to manage large data quantity.
- R. **No Extra Infrastructure:** Colleges and governments are now free to focus on their goals that is making more research facilities available to the students and making the environment global in spite wasting time on worrying about the buildings, labs, teachers etc.
- S. Education cloud helps to reduce use of paper and hence, environment friendly.
- T. Cloud allows the users to use their personal workspace and lesson plans, notes etc. can easily be uploaded and accessed anytime.

VI. SHORTCOMINGS OF CLOUD COMPUTING

- A. Cloud computing requires high speed internet access. Without it cloud data can not be accessed [16].
- B. Unauthorized users can access cloud data easily in the absence of proper authentication. So, there is a risk related to privacy and security of data [17].
- C. Due to presence of different types of clouds, networking becomes complex. Hence, a fast & cost effective system is required to connect institutes with the cloud applications [18].
- D. Due to gradually increment of users, cloud computing requires rules and regulations for providing an efficient and a transparent system.
- E. All required applications cannot run on cloud.

VII. CLOUD COMPUTING IN EDUCATIONAL ORGANIZATIONS [19-25]

To implement the Cloud computing in educational organization, firstly a cloud has to be create in which files, documents, images, videos are to be uploaded on the cloud so that it can be accessed from anywhere. In educational organizations, faculties as well as students can prepare their own creative documents and share it with the others. Hence, the main users of a typical higher education cloud include students, Faculty, administrative staff, Examination Branch and Admission Branch as shown in Fig. 1 [26]. All the main users of the institution are connected to the cloud with separate login for their respective work. School administration can manage faculties' profiles, time tables, assignments, results, etc on the cloud which can easily be accessed by the faculties, students and parents at their own local end. Teachers can upload their class tutorials, assignments, and tests on the cloud server which the students can be able to access anytime all the teaching material provided by the teachers via Internet using computers and other electronic devices both at institute or home. Through cloud platforms, teachers have better communication with parents and students regarding assignments, tests and projects. Parents are in a position to keep an eye over the activities related to the studies of their kids through phone networks. Teachers can post important messages and keep an archive of completed work. Students can also submit their assignments online etc. This will improve interactive learning. The advantage of cloud service is particularly useful for supporting lab activities in the teaching and learning process. In classroom students can even able to do some activity based on the teachers instructions [27]. Institutes can develop their own cloud as private cloud by using their existing resources and can share all the resources from the various universities to develop a hybrid cloud called as educational cloud, in which private cloud can use the local network whereas the educational cloud can use the public network to access the services provided by the cloud. Hence, utilization of cloud computing systems will reduce the cost of operation because servers and learning materials are shared with other institutes.

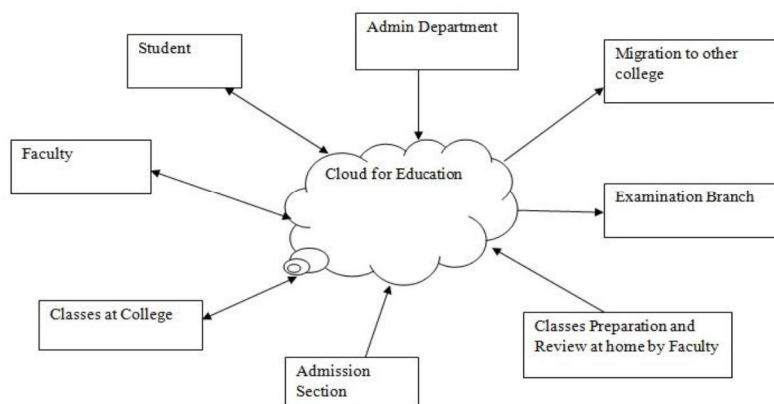


Fig.1. Cloud for Education

VIII. CONCLUSION

In the present scenario of economic, educational institutes must adopt cloud computing as a solution to reduce their expenses and take benefit of the developing technologies. Both private and educational cloud can provide valuable information & services of any size on demand and can create a common platform for sharing the various resources from the various institutions. The cloud allows accessing data anywhere, anytime and sharing it with anyone. Cloud computing encourages students to develop skills and

knowledge necessary for achieving their academic and professional goals. Cloud computing helps the students to increase the learning opportunities by sharing advance technologies and prepare their career to cope with the foreign students.

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