Cloud Computing: Promoting Sharing of Resources among Educational Institutions

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ABSTRACT

The era of technology has changed the way to impart education now days. Most of the developed as well as rapidly developing nations have now moved towards the innovative use of technology to make education less expensive and easily and equally accessible to all its citizens. Cloud computing is the combination of the internet with outsourcing of the information technology. The education systems of many countries are not aware about the potential use of cloud computing in attaining its aims of providing various resources of knowledge to the whole world at a low cost, high quality in minimum time. A little number of them is utilizing it to its optimum level. As per the need all the selected services or applications like storage, database, web services, e-mail can be approached through cloud using different devices. To make the education world aware about the potential use of cloud computing we have to understand the concept first. Thus this paper focuses on concept, features and potential use of cloud computing with special reference to education sector.

Keywords: Cloud computing, technology, internet, education, sharing

The era of technology has changed the way to impart education now days. Most of the developed as well as rapidly developing nations have now moved towards the innovative use of technology to make education less expensive and easily and equally accessible to all its citizens. But there are several obstacles come across the way providing the resources of knowledge to the common people with the help of technology. One of the important factors is the cost and the availability of modern hardware devices and software applications that comes as a hindrance in connecting people with technology. Internet is a wonderful innovation of this technological age which has proved its efficiency to connect people worldwide, for exchanging their opinions through social networking, blogging and various such activities. It is

also rapidly used in providing access to education for various deprived sections of the society for free so that one of the very important millennium development goals of universalization of education can be made easily achievable. Internet has also innovate the concept of cloud computing which is rapidly attracting most of the people worldwide engaged in activities of spreading the resources of knowledge breaching the barrios of cost and availability of technical resources. Cloud computing is actually the result of getting more people on internet these days. People mostly access the internet through mobile devices, I-pads etc. Very often people would like to keep store their files like the word files, the power point files, pictures, videos etc. As you are aware of the storage capacity of these devices is much less to store a large amount of data on it. Cloud computing provides the option of storing the data on the cloud service provider's device with or without saving it on the clients own device as per their choice. At any time that saved data can be retrieved from the service provider's device to the user's device at any location and on any device just by having an internet connection. This is not the only feature of cloud computing. Cloud computing is the combination of the internet with outsourcing of the information technology. The education systems of many countries are not aware about the potential use of cloud computing in attaining its aims of providing various resources of knowledge to the whole world at a low cost, high quality in minimum time. A little number of them is utilizing it to its optimum level. To make the education world aware about the potential use of cloud computing we have to understand the concept first.

WHAT IS CLOUD COMPUTING?

The word cloud computing is the combination of two words; Cloud & Computing. To understand the concept we have to elaborate both the terms. In IT industry the word 'cloud' is used to denote a network and the user is mostly unknown to its internal setup as the internet service provider's network . But in network pictures and topology pictures the service provider's network is denoted by the shape of cloud. Next term is computing and it means to calculate. Performing calculations and processing data using computers is called computing. This data processing can be performed either on personal desktop or laptop or in office. In office also this computing can be performed on a single computer or on a centralized computer (server) or on both in distributed form according to the setup.

To provide services in a network there may be a single server or a group of servers. According to the network size different systems may be allotted for storage and database. On these servers according to the need of consumers various services and applications may be available like mail.

It means on these servers the client devices like computers and laptops are engaged in computing for using an application or services and network servers and other devices do computing to provide these mail and other such services. So the concept of cloud computing

depicts a picture showing that the processing and calculations related to our data are performed on cloud. It means now all that computing is available on cloud or on a network without knowing its internal setup for which a person used to be dependent on his own or office computer or laptop. As per the need all the selected services or applications like storage, database, web services, e-mail can be approached through cloud using different devices. So here computing is used here as a service.

ESSENTIAL FEATURES OF CLOUD COMPUTING

❖ *Specified Data Centres:* The cloud service providers have a proper set up of highly advanced data centres aiming to provide the shared spaces to its users. These spaces are provided online via the internet to the end users. These are highly specified data centres having all the advanced facilities such as the latest cooling systems and service optimization techniques etc. which are generally out of the budget of at the institutional level or sometimes for entrepreneurs also. A huge amount of electricity consumption is need for the data centres like this and separate staffs skilled in all the services provided by these data centres are required. The locations of these data centres are not each time known to the end users as all the services provided online so no matter the end user may be present at thousands of kilometres distance the quality of service remains same.

❖ *Shared resources:* In cloud services, the resources are designed in a manner to be shared among the users without compromising the quality aspect. A single resource serves a number of users at the same time. The data storage, bandwidth, memory, and processing etc might be using by various users as per their requirements. Individual hardware components can be replaced without impacting on performance or availability. Resources may even be spread across multiple data centres to provide better security and resilience.

❖ *Infinite Scalability:* in a traditional set up it becomes quite difficult to meet the sudden requirements of the services by an institution or in a company. As the cloud service provider are in this particular business having mostly a lot of space available all the time to fulfil the sudden demands by the users giving the customer the impression that the services are infinitely scalable.

❖ *Pay per use***:** This feature of cloud computing services attract most of the users as the customers simply pay for the services they use while providers bear the costs of hardware and software. So it becomes quite fair deal for the institutions using the services only not investing in the hardware, the staff cost and various other costs also. One important point here is that the prices of the services may vary according to the demand on peak therefore it is advised to carry out certain activities when costs are cheaper. However distributed cloud networks may enable providers to smooth out demand globally and offer uniform pricing strategies not dependent on timing.

❖ *Self-service*: The services are highly customizable for the customers as they can decide what resources they wish to use and increase or decrease these without discussion with the provider. Reporting facilities are provided so that customers can monitor resource usage.

CLOUDING POSSIBILITIES IN EDUCATION SYSTEM

Cloud computing has a major scope in the growth of education system of a nation. All the IT industry is already using this technology to obtain its objective of maximum growth in minimum time and cost. Across the world, the benefits of cloud computing are being recognized in businesses and institutions as almost 90 percent of organizations using some kind of cloud-based application currently because of its immediate benefit like reduction in infrastructure and IT costs, increase accessibility, enable collaboration etc. But there are other features also which have the potential to change the ways to impart education. The possibilities of cloud computing in bringing a new shift in the education system are discussed as follows:

1. Hardware and Software cost reduction

To create a digitalized setup in a school various hardware devices and software applications are some extremely important requirements. The setup is no doubt costly and also need the man power to be managed. As far as hardware costs concern, schools don't need to afford a very expensive hardware setup in a huge quantity as cloud-based applications can be run on Internet browsers and most are compatible with mobile devices as well. The institutions also don't need to purchase external storage devices as there are plenty of companies, like Google, that offer free cloud-based storage.

Another advantage of cloud computing is here software is provided as a service. Various software programs are available online either free or on a low-cost subscription basis. It means instead of purchasing single software from a dealer paying a heavy amount, institutions can purchase a cloud-based subscription for more than one computer at unbelievable lowered price. Student can also use Google Docs for free. Even the institutions can also establish a cloud based learning management systems instead of a traditional setup by using SaaS applications.

2. Textbooks cost reduction

Text books costs very much at each stage of education. Especially at higher level, books costs are significantly high and quality books are not easily available. So many students can't afford these essential learning materials. Digital content is less expensive than the printed content so cloud-based textbooks can solve this problem. An important advantage of this approach is that the lower-income students can have the same access to quality learning materials as their higher-income counterparts. Currently, higher education institutions across the United States are piloting an e-textbook program involving 50 publishers and close to 30,000 textbooks.

3. Updated learning material

The cost of learning material also affects its quality. In India the education system is facing the problem of the outdated curriculum or its course material which directly has an adverse effect on its quality. Since many years students are using the outdated learning material or stuck to the curriculum not relevant to present situation. Many schools, especially in some deprived areas, simply can't afford to replace these outdated learning materials. Cloud computing provides a solution in this area to update the learning content easily and frequently. It provides access to various authentic online educational resources, which are mostly updated by the experts worldwide. The materials available online are very easy to update in real time so that students always have access to the most current learning resources.

4. Access to diverse students

There are various students having diverse intelligence levels. Some students don't get satisfied with the traditional system of education as it is unable to fulfil their needs. Cloud computing opens the window of new possibilities for such students. For example, until education moved online, the options for adult students who didn't finish their studies were very limited but now these students can complete their studies online through various MOOCs. There are many other types of students for whom a traditional school environment simply doesn't work, and these students now have many options for pursuing alternative forms of education using the cloud computing with a great ease.

5. Collaborative teaching learning environment

With the help of Cloud computing it becomes easy to create a collaborative learning environment inside or outside of a classroom. Actually it allows using applications without installing them on computers and also allows access to saved files from any computer only having an Internet connection. To enhance collaborative learning it enables a number of individuals to simultaneously work on a project—regardless of their location. For example, a student in India could be collaborating with a student in China on a presentation that they share with a student in England by using the cloud computing services. Thus it helps to promote the concept of collaborative learning in education system.

Thus one can say that cloud computing is not just about minimizing costs, but also helpful in creating an environment where all students can have access to high-quality education and resources. At the same time it is equally helpful for an administrator, a teacher, a student, or the parent of a student. Just elaborating the ways to explore the applications of cloud computing in education is the need of the hour.

CHALLENGES TO INTEGRATE CLOUD COMPUTING IN EDUCATION

There are several advantages of integrating Cloud computing in education but a few challenges and issues also which are essential to take care. Some issues are discussed as follows:

1. On one hand it is possible to conduct examination with grate ease but in the matters like examination it is must to ensure its confidentiality. At this point it might be risky to approach a public cloud system. So it is suggested here to afford the private cloud system.

2. It seems difficult to ensure the use of cloud computing in all the institutes due to lack of infrastructure and technical as well as financial support in a country like India.

3. Cloud computing allows to create a cooperative learning environment in or outside of an institution. But the major issue is the lack of awareness in students, teachers as well as management. In our daily life all of us are using cloud computing as we are using mail services or doing online shopping etc. all these are very general examples of cloud computing. Due to lack of awareness the institutions are not encouraging the initiatives to be taken in the field of education.

4. Some cloud computing software and tools are costly enough to be purchased by a small or medium size institution. Here it limits the possibilities of establishing the setup of cloud computing.

5. Availability of software and systems which supports educational programme is also an important issue of concern.

6. Need of reliable cloud service provider is also an issue of concern because at institution level there are various confidential data which cannot be shared with anyone situated at a distance.

7. A healthy broad band service is a must to work properly with cloud.

8. To integrate cloud computing in the education system awareness campaigns and proper training programs at each level of education should be initiated by some centrally funded and controlled agencies like UGC; as well as by private NGOs.

UNESCO guidelines for Institutions for the selection of cloud services

UNESCO has also provided some guidelines for the institutions they need to focus to avail the cloud services.

❖ *Functionality:* The institutions should use the cloud services as per the functionality. In the case of email for example this may include the use of a POP client instead of the web based software or out of office messages for display when on holiday. This mean to say that before availing any cloud service the institution should estimate per user requirement

and the file compatibility must also be concerned, particularly if documents created using the cloud software may later be viewed using different providers' applications. It is also helpful to assess the level of integration between the different applications provided within a product suite.

❖ *Platform***:** Sometimes it may be the issue of the platform not supported on particular devices. Some devices like a computer, a mobile phone or a tablet, operating systems and web browsers may not be supporting the software provided by the service provider. Although it is less likely to happen but before availing any cloud service it should be properly assessed. This is also the duty of the service provide to advice the users to use particular platforms.

❖ *Technical issues*: There are some technical concerns which the institutions have to manage themselves like distribution of the allocated space for the employees as per their job. They must manage some technical integration work such as automating the creation of user accounts on the cloud system based on data held in student information systems or facilitate single sign-on across systems. To monitor the usage ratio, to remove the unnecessary accounts out of usage and other managerial duties needed to be regulated time to time by the institutions.

❖ *User experience and accessibility*: Organizations wishing to deploy cloud services should ensure that the software conforms with web accessibility guidelines and standards. Some systems may provide a better overall user experience than others. Use by disabled users is one issue that requires to be considered for ethical and legal reasons.

❖ *Contract*: Before availing any cloud service the institutions must read all the terms and conditions very carefully. Especially the large institutions must seek for legal advice before signing any contract to avoid risk factors. The provisions for compensations in case if the company breaches the terms should be noticed carefully. Some free cloud service providers restrict the compensation rights to the provision of extensions to the contract and consequently may provide little reassurance to customers who may be advised to consult with other users of the services in advance of deployment. Most high level cloud services are however easy to use and either require minimal support.

❖ *Costs*: Some cloud service providers offer some services for free of cost and some may charge a minimal amount. While costs for cloud services may appear minimal or even non-existent, the real costs to institutions can be considerable. It is helpful to estimate costs for any legal advice associated with the contractual negotiations, project and change management and technical integration and staffing an institutional helpdesk.

CONCLUSION

There would be a major difference in the job of present and future. To prepare today's

generation for the future jobs we shall have to change the present education system so that they would be able to survive well in that time. Cloud computing provides a chance to step into the future of education where students need not to confined to the four walls of class room. They will study from where ever they want. Cloud is able to do all this by providing a new model for hosting resources and provisioning of services to the students. It provides a convenient, on-demand access to a centralized shared pool of computing resources that can be deployed by a minimal management overhead with a great efficiency. Cloud environment resources are available to the students with no need of having deep knowledge about the cloud computing concepts. It also doesn't require a heavy IT setup at educational institutes. The students can start using the cloud environment resources as soon as connecting to the server where applications have been installed to them but a basic infrastructure is an important challenge at present.

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