

Impact of Cloud Computing in Education System

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Abstract— Revolution is necessary to drive the unavoidable flow of change and one such hot recent area of research in Information Technology is cloud computing. Cloud Computing is a distributed computing technology give away required software and hardware over Internet. Users can demand storage, computational platform and infrastructure from Cloud according to their requirements.

Education is one of the pillars of Society development and it shows an important role in maintaining the Economic growth of a Country. In this technology arenas, teaching methodology is varying and students are becoming more skill oriented therefore incorporation of newest technologies in the teaching and learning process is important.

One of the recent technology, we witness is Cloud Computing. Cloud Computing is a new computing paradigm that lets Education institutions are using a dynamic pools of resources and to reduce cost through improved utilization. This paper aims at the impact of Cloud Computing on the education system and analyses how to provide excellence education via Cloud.

Keywords— Cloud Computing; Higher Education; SaaS; PaaS; IaaS; Virtualization.

1. Introduction

‘Cloud’ is used as metaphor for Internet and its main objective is customization and user defined experience. That is cloud computing provides shared resources, software and information through Internet as a PAYGO (Pay-as-You-Go) basis.

Cloud computing can be a welcomed optioned in the universities and educational institutes for higher studies. The cloud helps students, teachers, faculty and parents have on-demand access to critical information using any device from anywhere. Both private and public institution can use the cloud to deliver better services even as they work with fewer resources.

At present, many universities are trying to update their IT infrastructure and data, but they are look onto some challenges. By using cloud computing that are resolved. The challenges are: [4]

- Cost: Choose the subscription or PAYGO plan
- Flexibility: Cloud Computing permits to scale up and scale down the investment in infrastructure as request vary

- Accessibility: generating the data and services available widely without losing the sensitive information

2. Cloud and its Services

Cloud Computing is an extension of the concept of distributed computing – which is the process of consecutively execute a program or application over many computers connected by a network. The internet makes this process easily achievable even for the general user.

Cloud Computing is internet-based computing in which shared resources, software and hardware are delivered as a facility that computers or mobile devices can access on demand. Cloud Computing is used widely in education. With the minimum cost cloud-based services are used daily by learners and educators to support learning, social interaction, content creation, publishing and collaboration. The various types of services provides by the cloud are: [1]

- Software as a Service (SaaS): This application can be used at anytime and anywhere else. This is currently of most interest in education. The user requiring only a web browser for data storage in cloud and cloud application. There are several cloud applications are provided by Google and Microsoft communication and office applications such as email and spreadsheets.
- Platform as a Service (PaaS): It is an operating environment in which applications run. With PaaS, customers can build their own applications or services in the cloud without the cost and platform independent to run and can make them widely available through the Internet. PaaS delivers cloud-based application development tools and facilities for testing, installing, pool resources on, hosting and maintaining applications. Examples of PaaS are Azure Services Platform, Force.com as development platform from Microsoft and Salesforce respectively and Google Apps Engine, Amazon’s Rackspace Cloud services and Relational Database Services .
- Infrastructure as a Service (IaaS): It is an on-demand data centers. Any customers can pay for their basic computing resource. For example they pay for processors and storage and use them to run their own operating systems and applications. You pay for only what you use and the service provides all the capacity you need, but you’re responsible for monitoring, managing and patching your on-demand infrastructure.

One big advantage of it is that it proposes a cloud-based data center without demanding to install new equipment and no need to wait for the hardware obtaining process. That is many students can get any resources at his school, college or university premises otherwise might not be available. For example Amazon's Elastic Compute cloud; organizations can use this infrastructure to run Linux servers on virtual machines and scale up usage as required.

Following figure shows how different categories of university users may consume cloud services.[2]

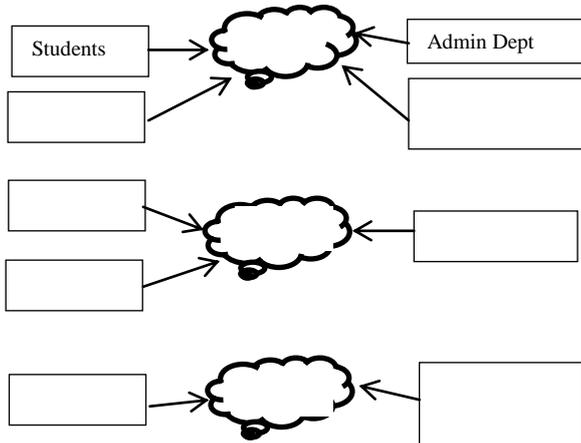


Fig.1: Users of an Education Cloud Computing System

3. Implementation of Cloud technology in Education System

Developing a cloud architecture for education can be distinct according to the purpose and infrastructure of the institution and can be challenging. The universities has to follow all the rules and regulations of the state and country for developing a cloud for education as many countries are very strict in cross border transfer of information. On agreement basis University establishes where their data will reside and gives the measure at what level their data are secured can be made with cloud service provider. It is called SLA (Service Level Agreement). It is a document which ensures the services provided by the cloud for educational cloud users. It tries to find the user's need, make things easier and retain a relationship between the user and the service provider. It helps to specify the privacy, consistency and integrity. [3]

Privacy is one of the important factors which have to be taken care for cloud computing, as the service provider may require some personal information which is related to the data on what the user is trying to store in the cloud. So the universities should be very careful while releasing the data and ensure the data integrity of educational data. There are many solutions that can ensure the security and protection of sensitive data in the cloud. These are:

- Mask or de-identify of the data
- Firewalls

- Encryption and decryption
- Authorization identity management.

Following figure shows the cloud architecture for education; [4], [5], [6]

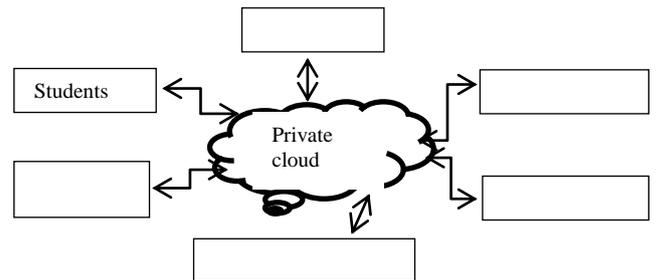


Fig.2: Private Cloud architecture for education

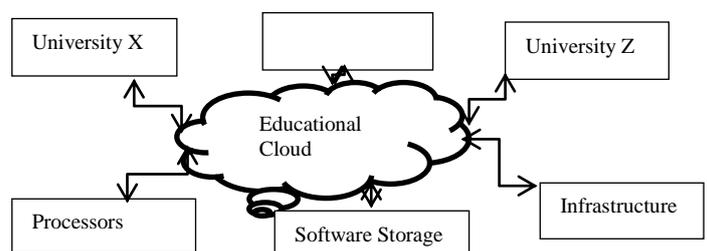


Fig.3: Educational Cloud Architecture

Fig. 2 and 3 shows the private and educational cloud architecture for education. Institutes can develop their own cloud by using their existing resources; can be called as 'Private Cloud'. In another way, several universities can join together and produce a hybrid cloud called as 'Educational Cloud', where all the resources can be shared by various universities. Private cloud uses the local network and the educational cloud use public network to access the services provided by the cloud. These two clouds are developed for education and specify the services provided for education institutions.

Table.1: Differences between private and educational cloud are depicted [7]

Cloud Features	Private Cloud	Educational Cloud
Owned and managed by	Single University	Service Provider (many universities)
Access	Restricted to employees and students of particular university	Through payment
Control and customization	Yes (by university)	None

4. Benefits of Cloud Computing for Institutions and Students

- Personalized Learning: Cloud Computing affords opportunities for greater taking choices of student in

learning. Using an internet connected device, students can access a wide array of resources and software tools that suit their learning styles and interests.

- **Reduced Costs:** Cloud based services can help institutes with minimum costs and rush the use of new technologies to meet evolving educational needs. Students can use free office applications and no need to purchase, install and keep these applications up to date in their computers. Also the students can pay per use for some applications.
- **Accessibility:** Availability of the services is the most significant and wanted by the user of education cloud. 24 x 7 is the availability that is needed by this system without failure. User can login and access the information from wherever they need.
- **No extra infrastructure:** Colleges and Universities are focused only on their goals that is making more research facilities available to the students and creating the atmosphere as global one instead of killing time on worrying about the buildings, labs, teachers, etc.
- **Go Green:** It will help to reduce carbon and make the green environment.
- **User friendly:** This new facility is user friendly and no need to worry about the complexity. It is easy to understand and easy to operate.

5. Security Issues

In cloud we are saving our important and crucial data in one place and it will be easy for hack. Protection of data is a major security issue. If the data is hosted within the institution then Educational Institutions may consider that their data is more secure. Transmitting data to a third party for hosting in a remote data Centre not under the control of the institution and the location of which may not be known presents a risk. Some cloud providers now provide guarantee in their contracts that personal data will only be stored in particular countries. It has been suggested that the cloud services delivered through a single provider is a single point of failure and in order to minimize the risk, it would be better to have agreement with more than one cloud provider. Another security issue is Unsolicited advertising in which cloud providers will target users with unsolicited email or advertising.

6. Conclusion

Cloud Computing is an evolving computing standard. In the next generation of technology platform that can provide tremendous value of information of any size. The transferal towards cloud computing would empower the universities and educational institutions to save money and take advantage of the emerging technology. Without any expenses private and educational cloud can provide the necessary computational facility on request of the user. It can create a common platform for sharing the various resources from the various institutions. In spite of the limitations of cloud computing and keeping in mind the present scenario of economic crisis many universities, educational institutions, organizations etc. are trying to develop technologies and reduce their expenses by adopting cloud computing as a solution.

The main objective of the paper was to identify the essentials of cloud computing which can be considered as a new beginning to the higher education and has the full probable to create a 'Revolution' in the field of education.

References

- [1] A.S. Dutta Use of Cloud Computing in Education
- [2] N.Sultan, "Cloud Computing for Education A new Dawn". International journal of Information Management.
- [3] B.R.Kandukuri, V.R.Paturi, and A.Rakshit "Cloud Security" in IEEE Computer Society, PP517-520.
- [4] J.L.Nicholson. Cloud computing: Top issues for higher Education
- [5] R.N.Katz, The Tower and the Cloud: Higher Education in the age of cloud computing 2008
- [6] T.Ercan, "Effective Use of Cloud Computing in Educational Institution" Procedia Social and Behavioral Science Vol 2.
- [7] M.Mircea and A.I Andrescu, "Using Cloud Computing in Higher Education: A strategy to Improve agility in Current Financial Crisis", IBIMA publishing 2011
- [8] D.Cattenddu and G.Hogben, Cloud Computing: Benefits, Risks and Recommendation for Information Security Agency, 2009.
- [9] Aqueel Ahmed A. Jalil, Dr. Santosh S. Lomte and Sanjay Y. Azade, "Cloud Computing Model for Accession of data Through Virtual Computing Lab: An Overview", International Journal of Linguistics and Computational Applications, .2(4), 2015, pp.78 -83.
- [10] Shweta A. Gode, "Cloud Virtualization: An Overview", Engineering and Scientific International Journal, 1(1), 2014, pp.5-9.
- [11] Sreela Sreedhar, Varghese Paul and A. S. Aneeshkumar, "Solitude Conserve Attribute Cryptographic CP-ABFE Data Protocols in Fuzzy Cloud Service Provider", Indian Journal of Science and Technology, Vol 8(25), 75227, October 2015, pp.1-5.