

# E-learning in Distance Education using Cloud Computing

Arshad Ali<sup>1</sup>, Amit Bajpeye<sup>2</sup>, Amit Kumar Srivastava<sup>3</sup>

<sup>1</sup>( Assistant Professor Dept. of Computer Application Integral University Lucknow, U.P., India)

<sup>2</sup>(Programme Incharge IGNOU Lucknow, U.P., India)

<sup>3</sup>( Dept. of Information Technology Integral University Lucknow, U.P., India )

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## Abstract:

In present scenario learning, teaching and trainings are online. In this regard the role of E-learning system architecture based on Cloud computing is very important. Low cost computers, Internet connectivity and rich education content has created a global phenomenon in which information and communication technology (ICT) is being used to transform education. Now the requirement of enhance the education system for good result. This paper introduces the characteristics of the current E-Learning and then analysis the concept of cloud computing and describes the architecture of cloud computing platform by combining the features of E-Learning. This research paper is focus on the importance of cloud computing.

**Keywords — Architecture, Cloud Computing, E-learning, Information Technology, SaaS, PaaS, IaaS, Distance Learning.**

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## INTRODUCTION

In modern era assesses education is compulsory and the distance learning is one of the growing potential methods of education. For institutions to provide information technology that supports research and development cloud computing models have to be mingled to accommodate mobile devices, service models and development models. Cloud computing presents itself as an on- demand computing with which users are allowed to have access to data, applications and services anywhere. This is distinguished using private and public clouds which can present services inside and outside the organization. To accelerate the access of educational computing to each and every corner of this world, the use of performance tools, which allows users to use applications without installation of personal files is promoted. While the traditional client- servers models relied on dispatching requests and response, the cloud computing model represents high powerful computing, dynamic virtualized resource. Mobility paradigms plays a vital role in

trying to access educational computing, the Information and Communication technologies provides an infrastructure that acts as a paradigm in defining services anywhere and anytime. SaaS provides a realistic approach in using different services. Distance learning is the modest and effective way of realizing that goal. Distance learning, sometimes called e-learning, is a formalized teaching and learning system specifically designed to be carried out remotely by using electronic communication. Because distance learning is less expensive to support and is not constrained by any other. In present time The educational institutes, businesses and many other

### **Industries are adopting the services of cloud computing because of the following reasons:**

**Low Cost:** One of the most appealing reasons to switch to the cloud is the cost savings feature. With the cloud, the user will pay for applications only when needed and many applications are included free of charge.

**Scalability:** One of the major reasons for using cloud computing is its scalability. Cloud computing allows universities, colleges and IT industries to easily upscale or downscale IT requirements as and when required.

**Ease of access:** Quite simply, cloud computing is easy to get up and running. Instead of having to download and/or install software yourself, in the cloud it is all done for you.

**No Time boundation:** This allows for on-demand analysis of study material instantly.

**High Performance:** For using the cloud computing the performance could be enhanced.

### **Cloud based Computing Architecture**

#### **Cloud-Based Learning Architecture:**

The concept of Cloud computing architecture in distance learning is a method that can be implemented to enhance the performance and quality and as well as flexibility, however this model will integrate the traditional classroom to become more dynamic and operational. To implement this model the cloud service act as a middleware, computer physical memory and a processor. All these units needs to be integrated with more flexible tools that a set up for educational institutes, campus network architectures and web based technologies at very less cost and improve the knowledge and increase the qualification . The proposed model will cover numerous advantages like powerful computing methods and large storage capability, high security and virtualization, The proposed architecture uses very limited resources. Learners and practitioners can interact by first by sending REQUEST to the server, the server will then authenticate the user request and providing the service, after sending an acknowledgement to the user.

### **Interconnection between cloud computing and Educational Institutes**

#### **Implementing Cloud Computing In Distance Learning.**

Vital concern shared by practitioners, learners and institutes in implementing cloud

computing services is how well they integrate into their systems. Cloud computing relies on subsisting technologies like grid computing, virtualization, web services and of course the Internet, to provide on-demand services. These technologies must work harmoniously. Essentially there are three foundations upon which universities can implement cloud computing. These have been variously mentioned as Infrastructure as a Service, Platform as a Service (PaaS) and Software as a Service (SaaS). Infrastructure as a Service (IaaS) allows the cloud to be used as a digital site where data can be stored and protected. It permits university administrators to more efficiently control their resources at much reduced costs. With IaaS, universities can avail access to enormous processing power, voluminous storage space as well as networking components and middleware. Platform as a Service allows the cloud to be used as a platform where access to other services, and more advanced and more dedicated applications, can be made. Indeed, PaaS not only allows users to access advanced services but also allow creation of unique and new services which can in turn be hosted on the platform themselves. It is this very concept that makes cloud computing extremely versatile allowing users to use the cloud as a spring board where users can either use it to access other services, create that application or service, or both. Software as a Service allows cloud computing users to make use of a wide range of applications and software online. Typically, the Internet hosts thousands of applications online some of which are free while others are not. SaaS gives users access to all these. To implement cloud computing, the educational institutes will have to conduct business analysis, build a business case, source a cloud service provider (CSP), plan and implement the solution, possibly with the assistance of a third-party system integrator. The main concerns during the implementation phase is to ensure that the cloud meets business requirements in terms of functionality and performance, provide the expected high quality and benefits, adequately protect institutional information, comply with legislative and regulatory requirements and integrate with existing processes and systems.

The business analysis will lead to the creation of a business model will help universities determine factors such as performance and resource requirements, lifecycle cost estimation, and required risk treatment measures. The Institute should consider how they would counter cloud service disruption or cancellation. Towards this end, they should put in place robust business continuity and disaster recovery procedures. During this analysis stage a number of other considerations should also be understood. These include the user characteristics, the data characteristics in terms of size and quantity, the average usage rates or transactions per second, usage changes for the various system actors and scaling over time in terms of number of users.

The other concern is an assessment of risks and how they impact on the value proposition This will enable the institutions to ascertain the quality of the cloud solution, its value for money, its ability to seamlessly integrate without business or technical difficulties and its ability to enable business continuity after a disaster.

The business analysis and the risk assessment provide a basis for determining requirements in terms of functionality, industry-recognised standards, performance, manageability, security and compliance with legislative and regulatory obligations. Functional requirements for IaaS, will relate to the provision of processing speeds, memory, storage and operating systems. Those for PaaS, will specify the development and operating environment SaaS requirements will be specified in the same manner as those of non-cloud solutions. Performance is mainly examined from the user's perspective and metrics of interest from this perspective include availability, reliability, responsiveness and throughput. Manageability is considered mainly from the point of its ability to configure and manage cloud-based services. A security assessment should consider confidentiality, integrity, authentication, authorisation and threat management.

Institutions must also build a business case that provides justification for cloud solution weighed against other alternatives such as non-cloud solutions. The business case will also provide a reference point for re-evaluation in future. The next

step would be to prepare an exit strategy which documents the institutions contingency plan to migrate records securely from one solution to another while maintaining business continuity. The migration may be

from a non-cloud to a cloud platform or vice versa. Also to be prominently included is how data stored by the cloud service provider will be archived, where it will be archived, the method to transfer it, how it will be destroyed and how destruction will be verified together with the security requirements associated with these processes. Liabilities on either party should be clearly specified in the contract stipulations and cover breaches beyond the life of the agreement. It cannot be overstated that before a binding contract is signed, prior understanding of the institute's terms will provide a basis to ensure its business and security requirements are adequately met and perhaps exceeded. With the foregoing settled, the institution should then determine the most appropriate model. Options for consideration include managed services, outsourcing, in-house delivery, cloud computing or a hybrid of either. The final decision depends on the business problem being addressed. With this done the institution will then proceed to put in place internal capabilities and resources needed to manage the cloud service on a daily basis. These operations include monitoring performance and service levels, responding to incidents and service disruption managing configuration documentation and coordinating planned upgrade and system outages.

#### **Conclusion and Future Work.**

Learners and practitioners experience the benefits of distributed systems on the internet around the world. Futuristic advancement of cloud computing will aim at attaining integrated multi-core processors and powerful implementation of virtualization thus leveraging the powerful hardware, expandable bandwidth for communication, which will further realize explosion of distance learning application domains. This will be adequate in resource contribution to distance learning. The architecture of Cloud

computing reflects diversity, flexibility and scalability. In its implementation cloud computing will be effective in educational computing at a lower cost.

## REFERENCES

- J.Cappos I.Beschastnikh, A.Krishnamurthy, T.Anderson. Se attle: A Platform for Educational Cloud Computing.
- ajaei , A.Aldakheel, 2012. “Cloud computing in computer science and engineering education” American Society for Engineering.
- Armbrust, A Fox,R Griffith,A.Joseph,R.Katz,A.Konwinski,G.Lee,D.Patterson,A.Rabkin,I.Stoika,M.Zaharia., Above the clouds: A Berkeley view of Cloud Computing, UC Berkeley EECS, (2009).
- K..Verma, S.Dubey, M.Rizvi,”Mobile Cloud A New Vehicle For Learning: m-Learning Its Issues And Challenges”. International Journal of Science and Applied Information Technology (2012).Vol 1.No.3.
- Madan, A.Pant, S.Kumar A.Arora“E-learning based on Cloud Computing” International Journal of Advanced Research in Computer Science and Software Engineering.2012 Vol 2(2)
- S.Vitkar,cloud based model for e-learning in higher education. International Journal of Advanced Engineering Technology vol 9(3) 2012.pp.38-42.
- A.Masud, X.Huang. “An E-learning System Architecture based on Cloud Computing” World Academy of Science, Engineering and Technology2012.
- M. Al-Zoube,S.El-Seoud, M. Wyne. Cloud Computing based E-learning system. International Journal of Distance Education Technologies, Vol 8(2), 2010.pp 58-71.
- S. Noor, G.Mustafa, S.Chowdhury, M.Hossain, J.Fariha.A Proposed Architecture of Cloud Computing for Education System in Bangladesh and the Impact on Current Education System. International Journal of Computer Science and Network Security, 2010 VOL.10 No.10.
- T.Govindasamy, Successful Implementation of e-Learning Pedagogical Considerations. Internet and Higher Education, Vol 4, 287- 299.
- N. Sultan, “Cloud computing for education: A new dawn?” International Journal of Information Management, vol. 30, pp. 109-116 2010.
- Wu, C. Dan, A. M'hammed, “Exploring Cloud Computing for Distance Learning”, Online Journal of Distance Learning Administration, vol. 14, 2011.
- A. Fernández, D. Peralta, F. Herrera, and J.M. Benítez “An Overview of E-Learning in Cloud Computing”, Workshop on Learning
- Technology for Education in Cloud (LTEC'12), pp 35-46, 2012.
- M. Jalgaonkar, A. Kanojia, “Adoption of Cloud Computing in Distance Learning”, International Journal of Advanced Trends in Computer Science and Engineering, Vol.2 , No.1, pp 17-20, 2013.
- S.Satpute, B.Deora,” Cloud-Based Storage for Education. Journal of Advanced Research in Computer Science and Software Engineering Vol 4 is 3 pp 77-80.