



Significance of Cloud Computing in Distance Learning

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ABSTRACT

As we are aware of the fact that this era is technology driven. In this era nobody can survive without the knowledge of computer. Due to computers coming the use of distance courses in learning is growing exponentially. To better support faculty and students for teaching and learning, distance learning programs need to constantly innovate and optimize their IT infrastructures. The new IT paradigm called “cloud computing” has the potential to transform the way that IT resources are utilized and consumed in education and is expected to have a large impact on educational computing during the next few years. It is a paradigm shift in terms of scalability of computing power, economy of operations, efficient use of computing resources, and green computing. It is the only possible way forward as it is going to democratize and harmonize the computing and IT based services and access. This Cloud is not only going to shower applications but also reduce & remove the dependence on the resources to run them as per need while also make all constrains of hardware ownership & software license a matter of bygone era. The paper titled “Significance of Cloud Computing in Distance Learning” is divided into four major parts, i.e. (Meaning of Cloud Computing, Cloud Deployments Models, Using cloud computing in Distance Learning, Selecting the appropriate strategies for adopting a cloud computing for any Distance institution) each part is discussed independently followed by the conclusion.

Keywords: Knowledge, distance courses, teaching, cloud computing, green computing

As we are aware of the fact that this era is technology driven. In this era nobody can survive without the knowledge of computer. When this technology combines with our educational system it gives birth to educational technology, which is used everywhere today. The modern use of electronic educational technology (also called e-learning) facilitates distance learning and independent learning by the extensive use of Information and Communications Technology (ICT), replacing traditional content delivery by postal correspondence. The use of distance

courses in learning is growing exponentially. To better support faculty and students for teaching and learning, distance learning programs need to constantly innovate and optimize their IT infrastructures.

The new IT paradigm called “cloud computing” has the potential to transform the way that IT resources are utilized and consumed in education and is expected to have a large impact on educational computing during the next few years. While Internet and World Wide Web brought in a revolution in the way we work, live and communicate today, similarly the “Cloud Computing” is going to be a game changer in the way we will do computing and use computers for providing services in the future. It is a paradigm shift in terms of scalability of computing power, economy of operations, efficient use of computing resources, and green computing.

It is the only possible way forward as it is going to democratize and harmonize the computing and IT based services and access. This Cloud is not only going to shower applications but also reduce & remove the dependence on the resources to run them as per need while also make all constrains of hardware ownership & software license a matter of bygone era. The paper is divided into four major parts, each part is discussed independently followed by the conclusion.

Meaning of Cloud Computing

According to Eric Griffith (2015) in the simplest terms, “Cloud computing means storing and accessing data and programs over the Internet instead of your computer’s hard drive. The cloud is just a metaphor for the Internet. It goes back to the days of flowcharts and presentations that would represent the gigantic server-farm infrastructure of the Internet as nothing but a puffy, white cumulonimbus cloud, accepting connections and doling out information as it floats”. The origin of the term cloud computing is unclear. The expression cloud is commonly used in science to describe a large agglomeration of objects that visually appear from a distance as a cloud and describes any set of things whose details are not inspected further in a given context. Another explanation is that the old programs that drew network schematics surrounded the icons for servers with a circle, and a cluster of servers in a network diagram had several overlapping circles, which resembled a cloud. *Cloud computing*, also known as on-demand computing, is a kind of internet-based computing, where shared resources and information are provided to computers and other devices on-demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers. It relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network.

Cloud Deployments Models

In providing a secure Cloud computing solution, major decision is to decide on the type of cloud to be implemented. Currently, there are three types of cloud deployment models offered, namely, a public, private and hybrid cloud. These, together with their security implications are being discussed below.

Private cloud

Private cloud is set up within an organization's internal enterprise data centre. It is easier to align with security, compliance, and regulatory requirements, and provides more enterprise control over deployment and use.

Public Cloud

Public cloud is a model which allows users' access to the cloud via interfaces using mainstream web browsers. It is typically based on a pay-per-use model, similar to a prepaid electricity metering system which is flexible enough to cater for spikes in demand for cloud optimization.

Hybrid cloud

Hybrid cloud is a private cloud linked to one or more external cloud services, centrally managed, provisioned as a single unit, and circumscribed by a secure network. It provides virtual IT solutions through a mix of both public and private clouds. Hybrid Cloud provides more secure control of the data and applications and allows various parties to access information over the Internet. It can also describe configurations combining virtual and physical, collocated assets .

Community Cloud

Several organization of same group shares their cloud resources and jointly constructs the policies and requirements. The infrastructure of the cloud can be hosted by a third-party vendor or within one of the organizations in the community.

Using cloud computing in Distance Learning

Benefits:

- ❖ Cost Saving
- ❖ Access to applications from anywhere
- ❖ Support for teaching and learning
- ❖ Software free or use as you pay on

- ❖ Increased openness of students to new technologies
- ❖ Increasing functional capabilities
- ❖ Rapid elasticity and scalability
- ❖ Reallocation of resources
- ❖ 24 hours access (infrastructure and content)
- ❖ Opening to business environment and advanced research
- ❖ Protection of the environment by using green technologies
- ❖ Offline usage.

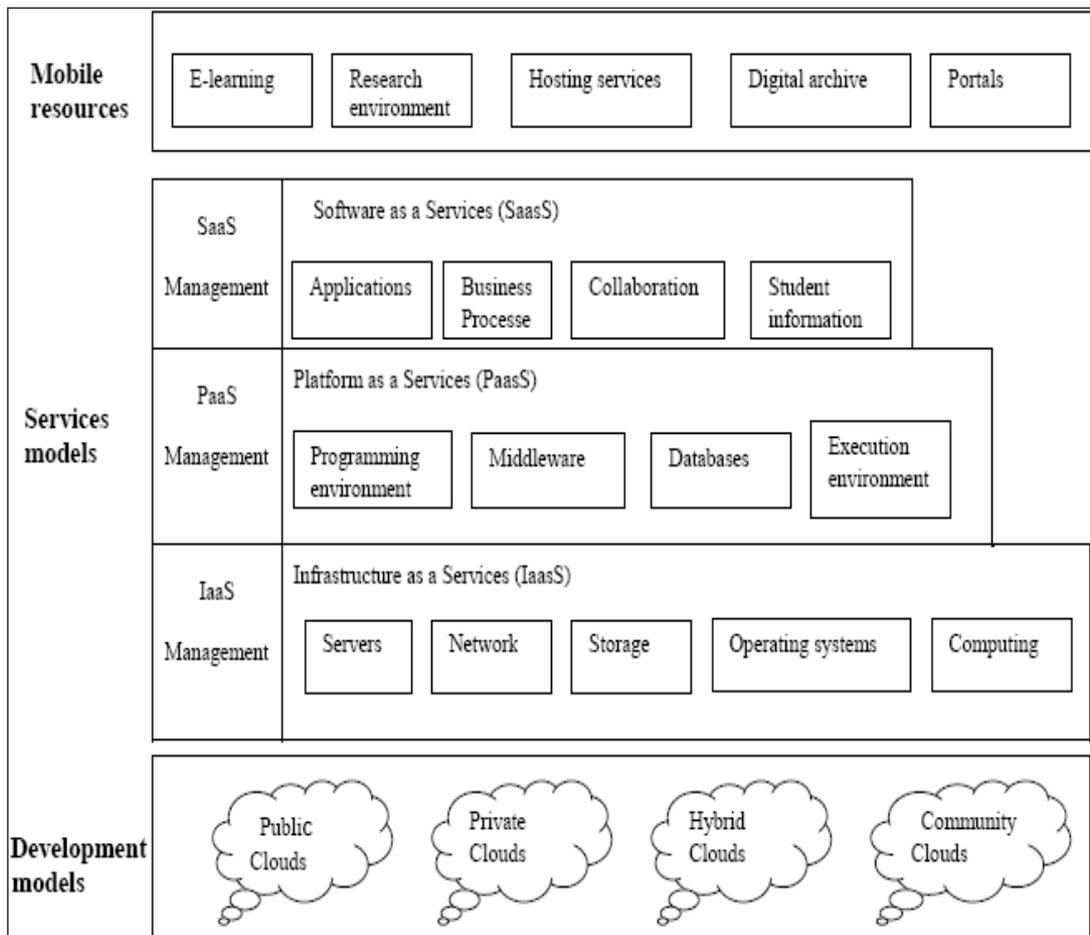


Fig. 1: Shows service model for cloud architecture for Distance education

The Risk and Limitations:

- ❖ Not all applications run in cloud
- ❖ Risks related to data protection and security
- ❖ Organizational support
- ❖ Dissemination politics, intellectual property
- ❖ Security and protection of sensitive data
- ❖ Maturity of solutions
- ❖ Lack of confidence
- ❖ Standards adherence
- ❖ Speed/lack of Internets can affect work methods.

Now it is clear that these cloud computing have certain limitations which have a significant impact on our decision for adopting it. Security, Monitoring, policies, regulations types solution are being developed for mitigating the challenges of cloud computing risks. For successful adoption of cloud computing in distance learning, cooperation among DL administrators and practitioners, other campus personnel, cloud users (instructors and students), and cloud service providers is needed. It is also important to note that the migration of IT applications and systems to the cloud takes time.

Selecting the appropriate strategies for adopting a cloud computing for any Distance institution

For selecting an appropriate strategy for adopting a cloud computing for any distance institution consists of five stages.

Stage I : Planning and Selection

This stage starts after the decision to adopt the cloud technology has been taken, the first step after this is to arrange seminars, panel discussions, between every employee of the institution so that the concept of cloud and its utility should be clear in everybody minds, then a planning team should be constituted to plan and oversee the cloud project. The team should consists of staff of the institution, IT expert who will offer advise based on what is currently going in the institution and one external cloud expert who will give professional, expert, and practical advice as that is their area of expertise. At the planning stage, the team should do a background study, identify the advantages and possible disadvantages of adopting cloud computing to the institution along with readiness to move to the cloud based on available infrastructure, and any other factors that may be considered important. Second

part of this stage is Selecting the right model. Presently there are four models present each of the four models of cloud computing have their strengths and weaknesses. For instance, the public cloud model offers full utilization of computing resources; it is more cost efficient and scalable than the other models but has greater security concerns whereas the private cloud though not as cost efficient as the public cloud offers better security. Therefore, to enjoy the full benefits and promises of adopting cloud computing, the hybrid model is recommended as the best deployment model because it combines the strengths of the public and private clouds and handles their weaknesses more efficiently.

Stage II: Choosing the most suitable service models

After selection of the model it is important to know which of the service models is most suitable to meet the needs and achieve the objectives of migrating to the cloud. At present there are three delivery models SaaS, PaaS, IaaS, each of having its own pros and cons For instance, using IaaS delivers everything: servers, storage, space, and networking equipments as a service. PaaS provides the platform for application developers to build and host their applications whereas SaaS provides complete applications to the end user of the cloud service; it only requires that the user has a web browser. In My opinion a distance learning unit can focus initially on Software as a Service (e.g., moving applications such as Blackboard and syllabus creation system to clouds), and then move on to Platform as a Service and to Infrastructure as a Service. By evolving the cloud services gradually, these larger distance learning units will have time to see the benefits and to get buy-in throughout the organization.

Stage III : Vendor selection

This stage begins with the search of right Vendor for Cloud Computing because the success or failure of the cloud project lies strongly with the vendor delivering the service; hence, it is extremely important to select right vendor before outsourcing. There are a variety of cloud service providers in the marketplace. Careful evaluation is needed to compare these cloud service providers' capabilities. The purpose of the evaluation is to choose a cloud service provider which can provide a cloud designed to meet each specific distance learning unit's needs and requirements. Many cloud service providers have teams of developers who can provide customized services to meet the specific needs of their clients. After investigating the reliability of the service provider, the next line of consideration is the location where the data will be stored; this is important because of legal compliance that comes with different locations.

Stage IV: Signing of Service Level Agreements

The Service Level Agreement is a very important document; it is a binding contract between the Institution and the cloud service provider. The terms of the SLA should be negotiated and

agreed upon by the Institution and chosen vendors before the deal is signed. While signing the SLA one should keep remember the following points in mind:

- ❖ Regular checking by vendor to check bugs.
- ❖ Maintenance at scheduled time.
- ❖ Regular updates.
- ❖ Avoid Vendor Lock in i.e. in case of vendor shutting its service to another vendor transfer should be safe (without data loss) and seamless without delay.
- ❖ No Hidden cost, everything should in black and white on paper (SLA).
- ❖ Immediate recovery plan of data in case of disaster.

Stage V: Use a holistic approach:

This is the last stage of adoption, basically this stage refers to the integration of all the efforts done above and working in a holistic manner .After adoption of cloud computing becoming operational, roles of all the members changes drastically now they can provide more time directing at instructional support to help instructors and students with their teaching and learning needs instead of wasting it on uploading the data. So careful planning should be done by administrators and expert.

CONCLUSION

Distance education institutions of education seek to understand why and how to deploy cloud platforms efficiently and securely. Ultimately, their choices regarding opportunities, approaches, and partners have the promise to transform the role of IT in universities everywhere. According to govt. sources, in the next five years, institutions of higher education expect to cut 20 percent of their IT budget by moving applications to the cloud. That represents a major shift in approach across the industry and a major opportunity to increase organizational efficiency, improve agility, and stimulate innovation. However, to support a smooth transition and optimal outcomes, all distance educational institutes, college and university, IT organizations must first develop a comprehensive cloud-computing strategy that addresses the challenges unique to each institution.

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