



## Deploying Cloud applications in Educational Organizations

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**Abstract**— *Cloud computing is becoming an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. It will likely have a significant impact on the educational environment in the future. Cloud computing is an excellent alternative for educational organizations which are especially under budget shortage in order to operate their information systems effectively without spending any more capital for the computers and network devices. Universities can take advantage of available cloud-based applications offered by service providers and enable their students to perform academic tasks. In this paper, we will review what the cloud computing infrastructure will provide in the educational environment, especially in the organizations where the use of computers are more intensive and what are various challenges that organizations has to face for deploying cloud application.*

**Keywords**— *Cloud computing, cloud service providers, IaaS, PaaS, SaaS, security, encryption, cryptography*

### I. INTRODUCTION

Cloud Computing is the use of common software, functionality or business applications from a remote server that is accessed via the Internet. Basically, the Internet is the "cloud" of applications and services that are available for access by subscribers utilizing a modem from their computer. With Cloud Computing, one simply logs into desired computer applications - office automation programs, data storage services. Generally, access to such programs is by monthly or annual paid subscription. Through Cloud Computing, businesses may prevent financial waste, better track employee activities.

The high rate at which IT technology changes will continue to place a great deal of pressure on organizations' budgets. Continuous upgrades of software and hardware have become important items on many of those organizations' resource meetings and will continue to put pressure on the budgets of those organizations. However, cloud computing services could provide many of those organizations with the opportunity to continue to take advantage of new developments in IT technologies at affordable costs. Cloud computing is likely to be an attractive proposition to startup and small to medium enterprises and educational establishments [1].

To safely assess cloud computing options, evaluate vendors, and implement service agreements, colleges and universities should define their requirements and pay close attention to critical privacy and security issues[2]. They should also look carefully at critical contract terms and conditions in this emerging and fast-moving field.

### II. RELATED WORK

Cloud computing is an approach to IT where many users, some even from different companies get access to shared IT resources such as servers, routers and various file extensions, instead of each having their own dedicated servers. This offers many advantages like lower costs and higher efficiency. Unfortunately there have been some high profile incidents where some of the largest cloud providers have had outages and even lost data, and this underscores that it is important to have backup, security and disaster recovery capabilities. In education field, it gives better choice and flexibility to IT departments than others. The platform and applications you use can be on premises, off-premises, or a combination of both, depending on your academic organization's needs. With cloud computing in education, you get powerful software and massive computing resources where and when you need them [3].

### III. NEED OF DEPLOYING CLOUD COMPUTING IN EDUCATIONAL ORGANIZATIONS

Educational organizations continue to seek opportunities to rationalize the way they manage their resources. Cloud computing is an emerging new computing paradigm for delivering computing services. This computing approach relies on a number of existing technologies, e.g., the Internet, virtualization, grid computing, Web services, etc.

Cloud computing can transform the IT infrastructure to closely resembled social public infrastructures like water and electricity [4]. As we pay for the electricity according to our monthly usage. We never ask electricity supplier board to install big transformers at our home by investing huge sum of money. In the similar way nobody says water supplier bodies to install big tanks of water at their place as paying monthly for required usage is more beneficial. Then why one pay large sum of money for establishing IT infrastructure. When cloud can provide IT infrastructure in the same way by paying as per usage. In this way cloud can provide higher efficiency while reducing IT infrastructure costs.

Educational organizations need to store huge amount of student's data. This data needs to be stored for long period of time at least during their degree period or even few years after it. The various ways of available storage techniques are even secure but suffered from drawbacks like huge storage space requires big investment, some natural disaster like earthquake or flood etc. can damage this sensitive data. Data at Cloud does not face such type of problems as data is replicated at different sites. It only require some effective security techniques to maintain the confidentiality of precious data.

The major software and hardware requirements of educational organization can be almost fulfilled by Services provided by cloud as discussed below.

#### **IV. SERVICES OFFERED BY CLOUD IN EDUCATIONAL INSTITUTIONS**

**IaaS (Infrastructure as a Service):** IaaS provides remote servers and storage for which Education organizations have to pay some rent and access it through the Internet. Here there is no maintenance cost and no wastage of space, they can run applications and access it anytime remotely.

**PaaS (Platform as a Service):** It provides various solution for Development and Deployment of different application over the internet such as Virtual servers and Operating Systems which saves a lots of Money and hard work and also makes easier to collaborate different workforces.

**SaaS (Software as a Service).** Software as a Service (SaaS) is where a user no longer owns the software that is required but instead uses it when required via cloud computing. The software remains the property of the service provider and the user pays for access either by annual subscription or on a pay-per-usage basis. In order to fulfil the software requirements of educational organizations needs to buy large servers and other costly hardware's but using SaaS this problem is eradicated.

**Daas (Data as a Service):** Data as a service, or DaaS, is a cousin of software as a service. Like all members of the "as a Service" (aaS) family, DaaS is based on the concept that, data can be provided on demand to the user regardless of geographic or organizational Separation of provider and consumer.[5].As the amount of data possessed by the educational organizations increases, it forces them to take some decision regarding their storage. Basically there are two methods of storing data. They can store data locally or in a cloud. Data may be stored locally using hard drives or CDs. Its advantage are that one has full control over data. It is cost efficient as hard drives are quite cheap. One needs no internet connection to access one's data. However, there are some disadvantages of storing data locally. The probability of losing the data through breakdown or theft is high. Data stored on local hard drives can be damaged by exposure to water or fire. Besides that the usage of data on different devices at different places is also hardly possible. Other alternative to data storage is through a cloud.

#### **IV. CLOUD DEPLOYMENTS MODELS**

In the cloud deployment model, networking, platform, storage, and software infrastructure are provided as services that scale up or down depending on the demand as depicted in figure The Cloud Computing model has three main deployment models which are [6].

**Private cloud:** Private cloud is a new term that some vendors have recently used to describe offerings that emulate cloud computing on private networks. It is set up within an organization's internal enterprise datacenter. In the private cloud, scalable resources and virtual applications provided by the cloud vendor are pooled together and available for cloud users to share and use. It differs from the public cloud in that all the cloud resources and applications are managed by the organization itself, similar to Intranet functionality. Utilization on the private cloud can be much more secure than that of the public cloud because of its specified internal exposure. Only the organization and designated stakeholders may have access to operate on a specific Private cloud.

**Public cloud:** Public cloud describes cloud computing in the traditional mainstream sense, whereby resources are dynamically provisioned on a fine-grained, self-service basis over the Internet, via web applications/web services, from an off-site third-party provider who shares resources and bills on a fine-grained utility computing basis. It is typically based on a pay-per-use model. Public clouds are less secure than the other cloud models because it places an additional burden of ensuring all applications and data accessed on the public cloud are not subjected to malicious attacks.

**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 also has an open architecture that allows interfaces with other management systems. Hybrid cloud can describe configuration combining a local device, such as a Plug computer with cloud services. It can also describe configurations combining virtual and physical, collocated assets. For example, a mostly virtualized environment that requires physical servers, routers, or other hardware such as a network appliance acting as a firewall or spam filter.

#### **V. Hybrid Cloud For Educational Organization**

Education organizations should deploy private as well as public cloud. For example in the main governing body (like University) should deploy a private cloud. The institutions and schools running under that governing body should use services provided by this external cloud.

#### **VI. Benefits Of Storing Organizations Data In Cloud**

With the help of cloud computing educational organizations can resolve some of the common challenge that they have to face while supporting their organizations. With cloud computing in education, organizations can get powerful software and massive computing resources where and when you need them. [7]

**Cost:** Deploying Cloud applications in educational organizations helps in saving large sum of money. As they have not to invest a lot on IT infrastructure.

**Flexibility:** Cloud applications can scale organizations infrastructure to maximize investments. Cloud computing allows you to dynamically scale as demands fluctuate.

**Accessibility:** Cloud helps in making data and services publicly available without exposing sensitive information.

In many cases, cloud computing providers can provide better security than the educational institutions can.

#### **VII. Challenges In Adopting Cloud Computing In Educational Organization**

The major challenge that educational organizations has to face while implementing cloud is the security of stored data. Security issue plays an important role in obstructing in Cloud computing acceptance. Security issues such as data loss, and phishing, pose serious threats to organization's data and software. Moreover, the multi-tenancy model and the pooled computing resources in cloud computing has introduced new security challenges that require novel techniques to tackle with. To ensure the security of organizations data in cloud the basic security services should be satisfied.

**Data Confidentiality:** Confidentiality of data in cloud means that the data stored in cloud must make sense to intended client. To all others the data must be garbage. Only the intended user at organization can understand the data stored in cloud, the unauthorized user if access data accidentally, must not make any sense to him.

**Data Integrity:** Integrity means data must arrive at data centre exactly as the client sent. There must be no change during the transmission.

**Data Authentication:** Authentication means the cloud service provider needs to be sure of the sender's identity and that an imposter has not sent the data.

**Data Nonrepudiation:** Nonrepudiation means that client (cloud user) must not be able to deny sending a data that they in fact send.

The various security mechanism are used to ensure the security. Data can be encrypted before storing in the cloud by using suitable cryptography algorithm. Cryptography enables two parties to communicate confidentially over a nonphysical; secured medium.

#### **VIII. CONCLUSIONS**

Cloud Computing can provide schools, colleges and universities with good education technology at an affordable price because they don't have to purchase software only for single user, invest on a technology that possible will be outdated in time to come, or spend money on technical support. Furthermore, cloud computing service is flexible as it is scalable this is because Cloud computing allows you to extent as demands come and go or increase. Students and teachers are able to easily access and store data or any applications easily from anywhere as in cloud computing services are made publicly available.

#### **REFERENCES :**

- [1] Nabil Sultan," Cloud computing for education: A new dawn?" International Journal of Information Management.
- [2] ]<http://www.universitybusiness.com/article/cloud-computings-top-issues-higher-education>
- [3] Nidhi Bansal, Amit Awasthi," Accomplish the application area in Cloud computing"
- [4] Archana Sharma," Data Management and Deployment of Cloud Applications in Financial Institutions and its Adoption Challenges", International Journal of Scientific & Technology Research Volume 1, Issue1, Feb, 2012
- [5] S.Rajesh, S.Swapna & P.Shylender Reddy," Data as a Service (Daas) in Cloud Computing [Data-As-A-Service in the Age of Data]", Global Journal of Computer Science and Technology Cloud & Distributed Volume 12 Issue 11 Version 1.0 Year 2012.
- [6] Kuyoro S. O, Ibikunle F., Awodele O.,"Cloud Computing Security Issues and Challenges", International Journal of Computer Networks (IJCN), Volume (3): Issue (5): 2011.
- [7] [http://www.microsoft.com/education/enus/solutions/Pages/cloud\\_computing.asp](http://www.microsoft.com/education/enus/solutions/Pages/cloud_computing.asp)