

Using Cloud Computing in e-learning

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Abstract – Cloud computing is Internet-based computing, where data are stored online on one or more servers and provided to the computers and other devices on-demand. It is used to provide computer applications to users without the need for those users to install software on their computers. In other words, users can store files online and access them from anywhere and anytime using a device (computer or mobile device) connected to the internet. On the other side, e-learning has become so popular and has huge influence in educational process. But, it usually requires many software and hardware resources.

Viewed from several aspects, using cloud computing in e-learning will contribute to lower costs and more efficient use of e-learning.

Keywords – e-learning, cloud computing, education, remote, internet

I. INTRODUCTION

The benefits of cloud computing are largely financial, according to panelists: The organization pays according to how much and how often they need services. Software and storage are hosted and supported on the servers of the cloud computing provider, so, educational institutions don't buy software only one person uses, invest in technologies that are quickly outdated, or spend hours and hours on technical support. Cloud computing also offers a wider range of software than would be practical to purchase individually. Cloud Computing helps academia by:

- In the current tight funding situations, a low cost option to high end computing
- Offering an easy way to scale up and down based on their needs thereby conserving the tax payers money for more fruitful research a several fold increase in efficiency, thereby, helping scientists to get their results fast.

Cloud computing in education gives better choice and flexibility to education IT departments. The platform and applications you use can be on-premises, off-premises, or a combination of both, depending on your academic organization's needs. The advantages that come with cloud computing can help you resolve some of the common challenges you might have while supporting your education institution.

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- Cost. You choose a subscription or, in some cases, a pay-as-you-go plan—whichever works best with your organization's business model.
- Flexibility. Scale your infrastructure to maximize investments. Cloud computing allows you to dynamically scale as demands fluctuate.
- Accessibility. Help make data and services publicly available without jeopardizing sensitive information.

II. UNIVERSITIES IMPLEMENT CLOUD COMPUTING

Cloud computing remarkably boosts the learning ability of the students. With this technology, learning approaches and strategies unheard of before, or, at the very least, thought to be undoable, are now being used on a large scale.

The University's normally uses the cloud to effectively implement collaborative learning approaches where the students are able to work alongside students from other locations in order to achieve a common goal.

So, how do universities implement cloud computing? How do they effectively integrate it to their systems? Cloud computing services are categorized to three: infrastructure, platform, and software.

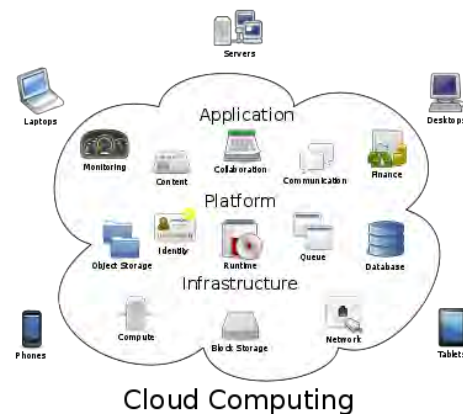


Fig.1 Cloud Computing infrastructure

1. *Infrastructure* - cloud can be used as a digital place where data, even servers, can be stored and protected. Indeed, cloud computing will allow university administrators to actually control much of their resources with more efficiency and with less cost
2. *Platform* - important application of cloud computing in the higher education sector is the PaaS, or Platform as Service. Basically, cloud computing will allow universities to use it as a platform where they will be able to access other services and more advanced and

more dedicated applications. As a matter of fact, PaaS will not merely allow one to access advanced services, it will also allow creation of unique services.

3. *Software as Service* - Basically, cloud computing allows users – in this case, universities and the learners in those universities – to actually utilize a wide range of applications and software online. As we all know, there are literally thousands of these useful applications in the internet, some of which are free while the others are not. At any rate, SaaS will allow users to access all of these.

This refers to a movement to turn computer terminals and notebooks into “client” machines that primarily (or only) execute applications running on servers somewhere out there on the Web. For example, instead of running Word from a notebook’s hard drive, you’d run a copy of the program that lives on a remote server...and perhaps even save your documents there.

This approach has advantages:

- Software use is monitored and controlled.
- Software version control is simplified.
- Virus dangers are minimized.
- Source data and resulting files may be stored, managed, and protected centrally, behind server firewalls.
 - Less advanced (and expensive) computers can be issued to employees.
 - A lost computer is less likely to compromise company or customer data.

Files can be stored online using Cloud computing. Cloud computing is Internet-based computing, where information is stored online on a server and provided to the computers and other devices on-demand.

Some of the major services providing cloud computing are:

- Windows Live SkyDrive
- iCloud from Apple
- Box.net,
- Drop box

One of the best technological advancements to come to eLearning is cloud-computing, which will significantly streamline the learning process and infrastructure, making it easier on students, teachers, and administrators as they strive towards academic excellence.

Cloud-computer essentially allows all members of an academic community to store information in a central cloud location; basically, they don’t keep separate files on their hard drives. Instead, the online program keeps them on a server to which all members have access. Users upload versions of the files to the shared server, and that server keeps the information secured based on what specific sharing settings

each person uses. Because the information is located on a central computer, it actually creates many more opportunities for others to use that information. Fortunately, this has some great benefits for eLearning practices.

III. E-LEARNING PROTOTYPE APPLICATION

The traditional e-learning platforms consist of the learning management system, learning content management system, assessment and communication modules (especially forum and messaging). The third generation of e-learning platforms provides with advanced services such as online courses, tutorials and webinars. The education process in engineering means theory and practice, individual study, team projects or experimental work and involves laboratory equipment, simulation/emulation software packages and applications.

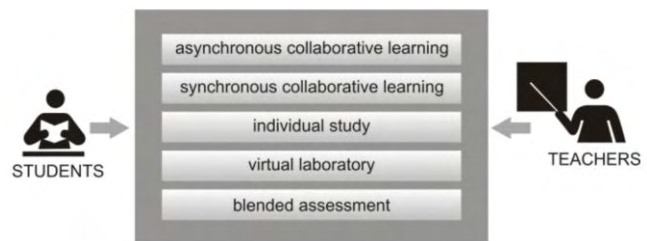


Fig.2 Blended Learning Model for Higher Education in Engineering.

The production of a prototype e-learning application affairs office was necessary in order to examine the functionalities of the services and the students in a real time. The structure of the application is separated into two larger parts introduced as: 1 part that provides the requirements of the students’ affairs office and the services for European ECTS, and 2. part that provides the requirements of the teaching staff and e-learning services for the students.

Case 1: hosting prototype application on local servers

Requirements:

- 1 – Server
- 1 – Backup Server
- 1 – License Windows 2008 Server Enterprise with IIS 7
- 1 – License MSSQL
- 1 – Antivirus System
- 1 – Router
- 1 – Internet Line with static IP address

Main advantages: application is host on local server and response time from our institution is faster than cloud hosted application.

Main disadvantages: application response time from Internet is slower than cloud hosted application, too much costs and too much worries (servers, software license, software upgrade etc.)

Case 2: hosting prototype application on Cloud

Requirements:

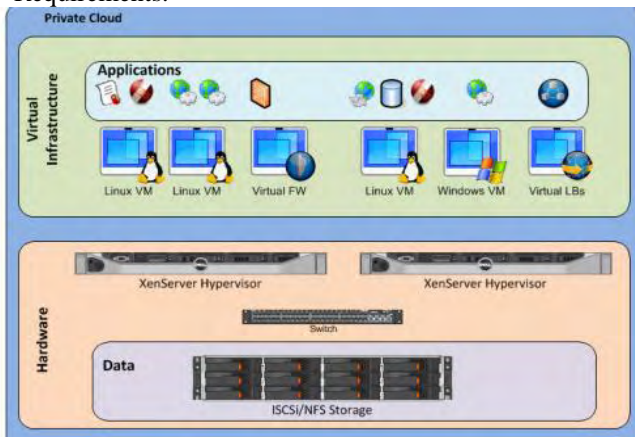
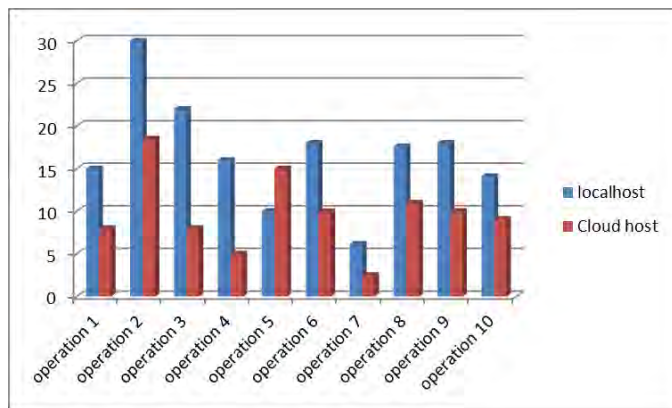


Fig.3 Cloud Setup.

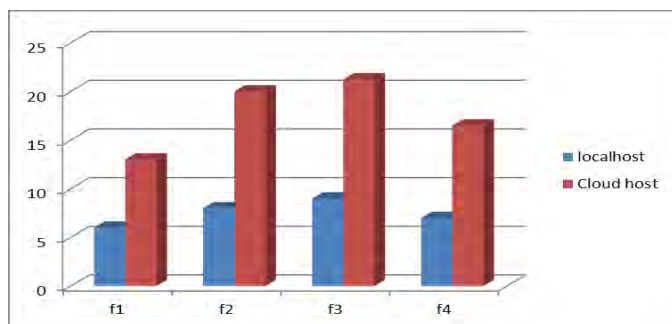
1 – Access on Go Daddy Hosting Cloud Servers

Main advantages: application has great response time from any location, no routers, no servers, no software updates, no software licenses, no viruses, coast benefits etc.



G1. Response time in (s) on same application host on "cloud" and "local host"

Main disadvantages: application has 180% lower response time from local hosted application.



G2. Response time in (s) on same application host on "cloud" and "local host"

Cloud hosting has desirable features including low up-front costs, elasticity of resources, and cost savings that result from economies of scale. Local host provides greater direct control over infrastructure than can be achieved when leasing shared infrastructure from the cloud. However, achieving the bents of

cloud infrastructure by transferring infrastructure control to a third party needn't necessarily result in a net loss of security may also Benet from scale economies. In particular, cloud providers security measures with up-front costs that would be able in local hosting environments, amortizing these costs over myriad machines or tenants.

IV. CONCLUSION

One of the best technological advancements to come to eLearning is cloud-computing, which will significantly streamline the learning process and infrastructure, making it easier on students, teachers, and administrators as they strive towards academic excellence.

Cloud-computer essentially allows all members of an academic community to store information in a central cloud location; basically, they don't keep separate files on their hard drives. Instead, the online program keeps them on a server to which all members have access. Users upload versions of the files to the shared server, and that server keeps the information secured based on what specific sharing settings each person uses. Because the information is located on a central computer, it actually creates many more opportunities for others to use that information.

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For the acknowledgement use the unnumbered section layout.

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