

Social e-Cloud

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Abstract - Today world is fast adapting to the internet paradigm may it be any field from business to providing services to people. E- Learning is not far behind. Various Universities around the globe have their own e-learning environment virtually setup to help the student fraternity to share and collaborate new things. But there are some hindrances on this path worth mentioning like e-learning itself could not gather enough momentum to be a widespread phenomenon like social networking platforms even though it shares some of its characteristics. The basic infrastructure of e-learning can be made interesting using some part of concept of cloud. Cloud is now a days a widespread phenomenon, having ability to provide various services on the go. Providing cloud services to attract the student fraternity has an inherent advantage as now a days people mostly students have their mobiles devices like laptops, smart phones ready to connect to internet at anytime, anywhere. So we here provide an interactive way to form a social network formed together for e-learning purposes, using attractive features of cloud computing.

Keywords

Ecosystem, JUJU, MaaS, IaaS.

I. INTRODUCTION

Quiet unbelievable is the fact that e-learning concept is not new to us. We may have heard this term many times but it does not gather as much attention as other terms get. Major reasons hindering the growth of e-learning environments can be [4]:

1. Isolation of learners, lack of educators' feedback, student. Collaboration and campus social context.
2. Uncertainty of costs for institutions and learners.
3. Uncertainty about e-learning quality (resources, technology and support services) and e-learning evaluation.
4. Shortage of competencies required for e-learning Implementation among teaching staff, technical staff, and students.
5. Domination of technology and market forces over educational aims and institutional development.

In order to change the mindset of people regarding e-learning, one can come up with a idea of mixing e-learning with social network. A word worth noticing used above is "social network" which may be confused with the word "social networking" by "social network" we address to a group which

has decide to come together based on certain common interests or likes for example a class. a class comprises of various students who like a common subject. Social networking on the other hand may refer to the very popular websites which provide with the service of interacting people with each other.

We might think what can the mixture of e-learning and social network do? We can answer that. Imagine the usefulness of a e-learning ecosystem to student fraternity and mix it with the immense popularity of social networking sites. and on the top of it there is cloud. Cloud Computing presents a new way of deploying applications.

There are elastic clouds where memory and processing power get allocated based on computing resources required at the time [4]. There is no doubt that the future belongs to the cloud computing. This new environment supports the creation of new generation of e-learning ecosystem that is able to run on a wide range of hardware devices, while storing data inside the cloud. Hence mixing some properties of social network e-learning and cloud computing can be used to:

1. Place learners at the Centre of online activities and facilitate supposedly new forms of creation, collaboration, and consumption [3].
2. Allow learners to personalize learning environments [1].
3. Allow learners to engage with new illiteracies and express themselves in different media.
4. Encourage a proficiency in the publication of content, which creates a sense of ownership, audience engagement, peer assessment, and informal learning.
5. Facilitate learning [2].
6. Use collaborative problem solving
7. Provide prompt feedback.
8. Offer learners unprecedented opportunities to create and share content and to interact with others[2].
9. Make e-learning environment more effective and successful.
10. Provide flexible and cost efficient e-learning ecosystem.
11. Offer very attractive capabilities for learners to collaborate and share learning contents (e.g. learning objects, drawings, animations, pictures, digital videos, texts etc.)

A. Infrastructure as a Service (IaaS)

It provides resources, such as servers, connections, storage and other necessary tools to construct an application design according to the need of organizations, making it quick, easy and economically viable [5].

B. Platform as a Service (PaaS)

Generates all facilities required to support the complete cycle of construction and delivery of web-based applications wholly available in Internet with built in services so there is no need of downloading software or special installations by developers.

C. Software as a Service (SaaS)

It is a model of Software deployment whereby according to the demand of the customer a provider provides licensed application for the specified time [8].

In the next section, we will discuss about basic cloud computing, its advantages and basic types.

II. CLOUD COMPUTING

Cloud computing is the new era of computing, the concept may be 1-2 years old but has picked up pace recently. Many big companies are providing storage facilities like (Give example) even the software's for normal word formatting. Many companies and institutions are rushing to define clouds and provide cloud solutions in various ways.

Cloud computing is Internet-based computing, whereby shared resources software and information are provided to computers and other devices on demand. Due to the fact that it involves the existence of data center's that are able to provide services; the cloud can be seen as unique access point for all request coming from the world wide spread client [4].

It allow users to use applications without, the need to purchase, install, or support software on their local computers and/or servers, worrying about how to maintain these applications, in addition to enable the users to access their personal files anywhere in the world, anytime, from any internet-enabled device, from their phones to their desktop computers, only the user pay according to how much and how often he need services.

New advances in processors, virtualization technology, disk storage, broadband internet access and fast, inexpensive servers have all combined to make cloud computing a compelling paradigm One of the most important featured ideas behind cloud computing is scalability, and the key technology which make it possible is virtualization. Virtualization breaks down the physical barriers inherent in isolated resources, and automates the management of these resources and automates the management of these resources as single entity through hypervisor technology such as VMs (Virtual Machines).

Cloud computing has critical impact on important areas of IT, like security, infrastructure, investments, and more. It away to increase capacity or add capabilities on the fly,

reduce enterprise IT costs & complexities while improving workload optimization and service delivery, allows for much more efficient computing by centralizing storage, memory, processing and bandwidth without investing in new infrastructure, training new personnel, purchase software, or licensing new software. So, cloud computing becomes an adaptable technology for many of companies and institutions with its dynamic scalability and use of virtualized resources as a service through the internet. Advances in technology offer new opportunities in enhancing teaching and learning so cloud computing has a significant impact on the educational environment.

Potential Values of Cloud computing for education are:

1. Provide opportunity for ubiquitous computing [6].
2. No need for backing up everything to a thumb drive and
3. Transferring it from one device to another.
4. No need to copy all stuff from one PC to another when buying a new one. It also means students can create a repository of information that stays with them and keeps growing as long as he wants them.
5. A convenient tool to engage in the scholarship of teaching and learning.
6. Crash recovery is nearly unneeded. If the client computer crashes, there are almost no data lost because everything is stored in the cloud.
7. Allows students to work from multiple Places (home, work, library, etc.) find their files and edit them through the cloud and browser-based applications can also be accessed through various devices (mobile, laptop and desktop computers, provided internet access is available).
8. Most software is free, available and ready-to-use.
9. Students can have a richer and more diverse learning
10. Experience, even outside standard school hours.
11. Allows students to create content through the browser,
12. Instead of only searching through the browser.
13. It provides a low cost solution to academic institutions for their researchers, faculty and students.
14. Accessibility Help make data and services publicly available without jeopardizing sensitive information.
15. Also cloud computing provides some major security benefits for individuals and educational institutions that are using/developing e-learning ecosystem, like the following:

- *Improved improbability :*

It is almost impossible for any interested person (thief) to determine where is located the machine that stores some wanted data (tests, exam questions, results) or to find out which is the physical component he needs to steal in order to get a digital asset.

- *Virtualization:*

Makes possible the rapid replacement of a compromised cloud located server without major costs or damages. It is very easy to create a clone of a virtual machine so the cloud downtime is expected to be reduced substantially.

- *Centralized data storage:*

Losing a cloud client is no longer a major incident while the main part of the applications and data is stored into the

cloud so a new client can be connected very fast. Imagine what is happening today if a laptop that stores the examination questions is stolen.

• *Monitoring of data access:*

Becomes easier in view of the fact that only one place should be supervised, not thousands of computers belonging to a university, for example. Also, the security changes can be easily tested and implemented since the cloud represents a unique entry point for all the clients.

In the next section, we will discuss about cloud setup for e-learning process.

III. DESIGN FEATURE OF E-LEARNING CLOUD SETUP

A college consists of various departments like information technology, computer, mechanical, automobile, etc. Each department has different computer labs. Each branch requires different software, platforms which are purchased by the college which needs to be installed on every computer of different labs according to the requirement. Thus by setting up the e learning environment there will be no need of doing so. All the software's need to be installed only once which will be stored on cloud server and accessed by students through interactive GUIs or the services can be used through a web browser, giving the address of server in the web browser and accessing it. The cloud storage (Drive) is used within Intranet by using LAN connection and can also be used via Wi-Fi if available. On the website there can be subgroups depending on mutual interests in there may be group admin who manage all data inflow and outflow taking place. There would be automatic notifications of any activity happening on the group to all the users. Teachers or professors can also login to spread information about any specific lecture or event.

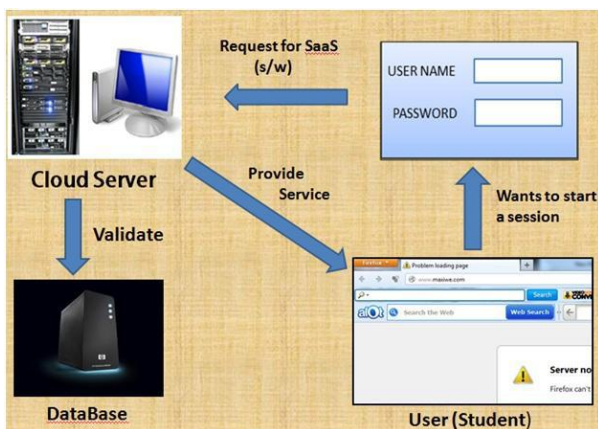


Fig 1: Working of cloud infrastructure after setup

The above figure shows that whenever a student request for a particular software or platform he has to login using his/her id Allocated to him/her. If he/her is a valid user then the request is forwarded to the Cloud server. The cloud server with the help of database server validates the user and provides services. All his/her activities are stored on the server which will be provided to him/her whenever he logins.

In the next section, we will discuss about the physical setup, hardware and software requirements for cloud based on Ubuntu Server.

IV. PHYSICAL SET UP OF CLOUD

a. *Prerequisite for setting up cloud*

i. *MASS (Metal as Service)*

MASS stands for Metal as a Service. Its major function is to bring language of the cloud to physical servers. It makes it easy to set up the hardware on which services are deployed that needs to be scaled up and down dynamically. This feature is important in cloud since cloud requirement can fluctuate dynamically [7]. Only With a simple web interface, we can add, commission, update and recycle servers at our will. As per requirements or needs change, we can respond rapidly, by adding new nodes and dynamically re-deploying them between services. MAAS can be freely downloaded from pre-installed Ubuntu desktop version or through specialized Ubuntu server (Multiserver with MAAS)

ii. *JUJU*

Cloud Computing is known for its agility (the ability to quickly 'switch on' or 'switch off' services in response to changes in demand, rather than weeks of planning and a complex process of testing and implementation.) which is provided with the help of juju. Juju provides a uniquely straightforward way to extend existing deployments. Juju deployments can be made to grow and shrink according to requirement or demand which is done with the help of juju charms. JUJU provides us with the facility of modifying services at real time.

b. *Hardware Requirements*

Hardware requirements are as follows:

Table 1. Hardware requirements for Ubuntu server

Elements	Server 1	Server 2	Clients
CPU	Processor Intel (R) Core(TM) i3-2120 CPU @ 3.30GHz, 3300 MHz, 2 Core(s), 4 Logical Processor	Processor Intel (R) Core(TM) i3-2120 CPU @ 3.30GHz, 3300 MHz, 2 Core(s), 4 Logical Processor	Processor Intel (R) Core(TM) i3-2120 CPU @ 3.30GHz, 3300 MHz, 2 Core(s), 4 Logical Processor
Memory	4GB Minimum	4GB Minimum	1GB Minimum
Disk Space	60GB	40GB	40GB
Networking	100Mbps	100Mbps	100Mbps

c. *Software Requirements*

Ubuntu Server 12.04, 64-bit Server CD with cloud edition.

d. Physical Setup

i. Two Servers

Server 1 i.e. Cloud server, Server 2 i.e. Node Controller.

ii. Multiple Clients

Users. The user will be communicates with server1 which is a cloud server with the help of public switch. The server 1 and server 2 will communicate with each other using private switch.

V. INSTALLATION

There are multiple ways to install Ubuntu Cloud Infrastructure:

a. Ubuntu cloud live image

A single node all in one cloud booting from the USB. Steps to perform are as given below.

1. Download the image from <http://cdimage.ubuntu.com/ubuntu-cloud-live/releases/12.04/>
2. Create a USB stick using USB Creator or any other software.
3. Boot from the created USB stick.
4. apt-get install juju.

b. Ubuntu cloud infrastructures with MAAS and Juju

This install is done in three steps.

1. Install the MAAS server
 - 1.1 Install the MAAS server
 - 1.2 Add enough nodes to support your Open stack
2. Install JUJU
 - 2.1 This can be done on the same server you have deployed Mass onto
3. Deploy Ubuntu cloud infrastructure with JUJU
 - 3.1 Create SSH keys Juju requires SSH keys to be able to access the deployed nodes. In case those keys do not exist, then we have to create them before we bootstrap our environment: `ssh-keygen -t rsa`
 - 3.2 Deploy juju
 - 3.2.1 Create a configuration file
 - 3.2.2 Deploy from local branches of charms (optional)
 - 3.2.3 Deploy the various services
 - 3.2.4 Establish relation between services
 - 3.2.5 Expose the services you want (optional)After following all steps we will done with setup of cloud infrastructure.

VI. CONCLUSION

In this paper we have discussed about basic setup of private cloud infrastructure which can act as the storage and service provider component for e-learning website. Further, improvements can be added with time like video chatting, conferencing. If this project is realized on large scale it could benefit various colleges or institutions by providing them with an e-learning platform for on the spot collaboration and creation.

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