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Semester - 5<sup>th</sup>

Branch - Computer Science Engg.

Subject - Cloud Computing



## Practical :- 1

Aim: Introduction to cloud vendors : Amazon, Microsoft, IBM.

Cloud service providers (CSP) are organizations that offer network services, infrastructure, or business applications in the cloud.

There are several different forms of services that can be used in the cloud by CSP's, including Software, often referred to as Software as a Service (SaaS); a computing platform for developing or hosting applications, known as Platform as a Service (PaaS); or an entire networking or computing Infrastructure as a Service (IaaS).

### 1. Amazon :

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provide secure, resizable compute capacity in the cloud. It is designed to make web scale cloud computing easier for developers. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment.

Reliable, scalable, infrastructure on demand:

- Increase or decrease capacity within minutes, not hours or days.
- SLA commitment of 99.99% availability for each Amazon EC2 region. Each region consists of at least 3 availability zones.



Secure compute for your applications:

- With the AWS Nitro System Virtualization resources are offloaded to dedicated hardware and software minimizing the attack surface.
- Lockdown security model prohibits administrative access eliminating possibility of human error and tampering.

## 2. Microsoft:



Microsoft Azure, commonly referred to as Azure, is a cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through Microsoft-managed data centres. It provides software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS) and supports many different programming languages, tools and frameworks, including both Microsoft-specific and third-party software and systems.

Services provided by Azure :

- a) Computer Services
- b) Identity
- c) Mobile Services
- d) Storage Services
- e) Data management messaging
- f) Media Services
- g) Developer
- h) Management

3. IBM :

IBM cloud computing is a set of cloud computing services for business offered by the information technology company IBM. IBM cloud includes infrastructure as a service (IaaS), software as a service (SaaS) and platform as a service (PaaS) offered through public, private and hybrid cloud delivery models, in addition to the components that make up those clouds.

IBM offers three hardware platforms for cloud computing. These platforms offer built-in support for virtualization. IBM offers IBM websphere application infrastructure that supports programming models and open standards for virtualization.

The management layer of the IBM cloud framework includes IBM Tivoli middleware. Management tools provide capabilities to regulate

images with automated provisioning and de-provisioning, monitor operations and meter usage while tracking costs and allocating billing.

IBM also offers planning and consultation throughout the deployment process. IBM offers five cloud provision models :-

- Private cloud, owned and operated by the customer.
- Private cloud, owned by the customer, but operated by IBM (or another provider).
- Private cloud, owned and operated by IBM (or another provider).
- Virtual provider private cloud services (based on multi-tenanted support for individual enterprises).
- Public cloud services (based on the provision of functions to individuals).

## Practical - 2

Aim: Setting up virtualization using Virtual box/VMware Hypervisor.

1. Run Virtual Box and create a new virtual machine. Name it ESXi, select Linux as its type and other Linux (64-bit) as the version.
2. The virtual machine will need atleast 4GB of memory.
3. Create a new virtual hard disk; select VDI as its file type and fixed size as its storage type.
4. Right click on it and select settings (Ctrl+S) from the menu.
5. Select System → Processor and assign two CPUs.
6. Select the Network tab and configure Adapter 1 - Select Host-only adapter and one of the vboxnet networks, most likely vboxnet 0. Expand the advanced section and select Intel PRO/1000 MT server (82545 EM) as the adapter Type and Allow all for the promiscous Mode.
7. Finally, mount the Vsphere Hypervisor ISO in the

storage tab. Select the empty optical drive and choose the virtual optical disk file by clicking on the CD icon on the right.

8. Click OK to exit the Settings window and return to the Virtual Box main window. Start the VM. The installer will start and after a few seconds, you will be presented with a screen having a grey and yellow background.

## Practical - 3

Aim: Introduction to OwnCloud.

OwnCloud is an open source file sync and share software for everyone from individuals operating the free ownCloud Server edition, to larger enterprises and service providers operating the ownCloud Enterprise Subscription.

OwnCloud provides a safe, secure, and compliant file synchronization and sharing solution on servers that you control. You can share one or more files and folders on your computer, and synchronize with them with your ownCloud server.

Place files in your local shared directories, and these files are immediately synchronized to the server and to other devices using the ownCloud Desktop Sync Client, Android app, or iOS app.

## Practical - 4

Aim: Installation and configuration of ownCloud software for SaaS

Set-up and configuration :

The ownCloud server package is not available within Ubuntu's default repositories. However, ownCloud maintains a dedicated repository for Ubuntu 16.04. A release key should be specified in the sources.list file to install ownCloud and its dependencies.

- To add the release key, download it using wget and import it using the apt-key command, as follows -

```
$ wget -nv https://download.owncloud.org/download/repositories/9.1/Ubuntu-16.04/Release.key -O Release.key  
$ sudo apt-key add - < Release.key
```

- Use the apt-get update command to make apt aware of the change, as follows:

```
$ sudo apt-get update
```

- Install the LAMP (Linux, Apache, MySQL and PHP) server:

\$ sudo apt-get install lamp-server^

- You will be prompted with a window to create a password for the MySQL root user. Enter a secure password, use the tab key and the space bar to select the OK button.

### Add a MySQL database

The next step is to create a MySQL database for ownCloud. Log in to MySQL by using the following command:

mysql --defaults-file=/etc/mysql/debian.cnf

- This opens up the MySQL command line prompt. Enter the following SQL commands to create a user with the name 'ownCloud':

```
→ CREATE DATABASE ownCloud;  
→ CREATE USER owncloud@localhost IDENTIFIED BY  
'mysecurepassword';  
→ GRANT ALL PRIVILEGES ON owncloud.* TO  
owncloud@localhost;  
→ flush privileges;  
→ quit
```

- Install ownCloud using the apt-get install command. The 'owncloud' package will install all the required dependencies:

```
$ sudo apt-get install owncloud
```

- Restart the Apache server to update the changes made to Apache's config directory.

```
$ sudo service apache2 restart
```

## Practical - 5

Aim: Accessing Microsoft Azure cloud - services.

An Azure cloud service is the environment the application will run in.

1. In your browser, open the Azure portal (<https://login.microsoftonline.com>).
2. Click Create a resource > Compute > Cloud Service.
3. In the DNS name input box, enter a URL prefix for the cloud service.  
This URL has to be unique. You will get an error message if the prefix you choose is already in use.
4. Specify a new Resource group for the service.  
Click Create new and then type a name in the Resource group input box, such as CS-contobobadsRG.
5. Choose the region where you want to deploy the application.
6. Click create.

## Practical - 6

### Aim: Cloud Simulation Software Introduction : CloudSim

CloudSim is an open-source framework, which is used to simulate cloud computing infrastructure and services. It is developed by the CLOUDS Lab organization and is written already in Java.

It is used for modelling and simulating a cloud computing environment as a means for evaluating a hypothesis prior to software development in order to reproduce tests and results.

#### Benefits of CloudSim :

- No capital investment involved -  
With a simulation tool like CloudSim there is no installation or maintenance cost.
- Easy to use and Scalable -  
You can change the requirements such as adding or deleting resources by changing just a few lines of code.

- Risks can be evaluated at an earlier stage -  
In Cloud Computing utilization of real testbeds limits the experiments to the scale of the testbed and makes the reproduction of results an extremely difficult undertaking. With simulation, you can test your product against test cases and resolve issues that before actual deployment without any limitations.
- No need for try-and-error approaches -  
Instead of relying on theoretical and imprecise evaluations which can lead to inefficient service performance and revenue generation, you can test your services in a repeatable and controlled environment free of cost with CloudSim.