ASSIGNMENT-4

Q) Give a detailed discussion for the following.

1) Open Source Iaas Software (any one software with architecture).

→ Infrastructure as a Service also known as Iaas is a combination of all the necessary machines presents on your organization's premises be it your computers, your on-premises servers, or any other physical or virtual machine.

→ Iaas is very helpful for business as it helps in reducing the expenses which usually are spent by an organization on any hardware systems and then their maintenance.

→ IaaS is nothing but a cloud computing platform that helps an organization by providing services over the internet.

→ The Iaas service provider helps in providing all the necessary services like server hosting, storage, application support, etc.

→ Moreover, they donot need to focus on the security of its data centers as all things are hosted over the

cloud.

* Following are the top 7 Open Source IaaS Platforms:

  o OpenStack
  o Eucalyptus
  o CloudStack
  o CloudForms
  o OpenQRM
  o Nset
  o Nimbus

* CloudForms:-

→ CloudForms is an open-source IaaS platform that is designed for managing small as well as large business environments.

→ This platform also provides support to various infrastructure providers, be it public or private cloud. Also, this IaaS platform can help you in automating the tasks and meeting.

→ The platform also helps you in accessing and managing the server with a single interface. This will eventually help you in the development of an efficient process which will save you some money.

→ Here, a user can also do segmentation of the environment into different zones, ensuring data redundancy.

→ Moreover, the IT infrastructure management of the platform is centralized. This can be made possible through a single web interface.

2) Open Source PaaS software (any one software with architecture)

→ Platform as a Service (PaaS) is a cloud computing offering where the service provider provides a platform for application development and deployment. Often, developers leverage PaaS's power, which helps them focus on building their application and not wasting their time creating a platform for creating and running the application

→ Obviously, big players like AWS, Azure, Google Cloud, etc, have amazing PaaS solutions But it's not required to always be with them. If you have a small business, many mini PaaS solutions can run smaller application with ease on a single or few servers. This will do the job and save a lot of costs for you. More importantly, it will save time, which is money!
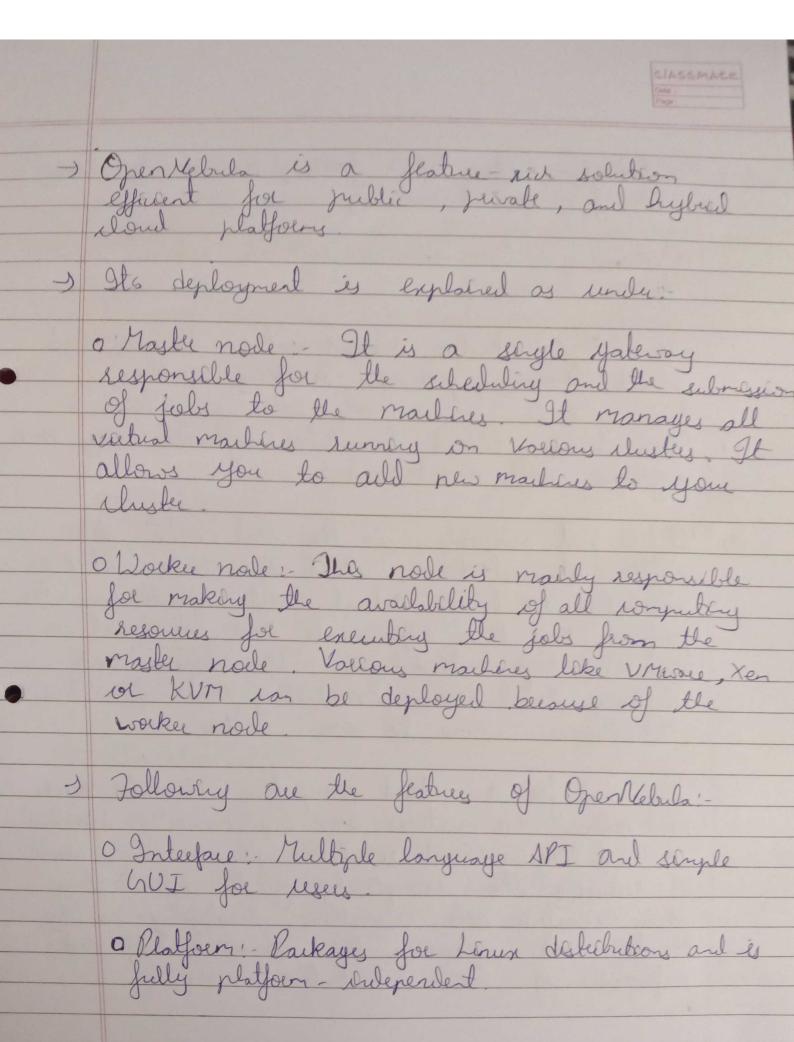
→ There is a list of the most popular PaaS software to create your own platform to run smaller applications.

- o Dokku
- o Jelastic - Lite Edition
- o Flynn
- o Hephy Workflow
- o Laphover
- o Tsuru
- o Piku

* Hephy Workflow :-

→ Hephy Workflow makes it easy to deploy and manage applications on a Kubernetes cluster. It is a fork of Deis Workflow, which was started in 2017. In 2018, the Deis workflow team stopped working on it and moved on to Microsoft Azure projects.

→ There are small and independent services in the Hephy workflow that combine to create a distributed PaaS. These components are deployed as a service on the Kubernetes cluster. The workflow has two classes of users : normal users and administrators.

→ Normal user has features for developing and deploying the application. The administrator can do everything that a normal user can, plus he/she will have the owner access to the application.

→ Following are the Hephy Workflow features:-

o Image builder to compile code from dockerfiles and buildpacks.

o HTTP / HTTPS edge routing for the application.

o Application release and rollback

o REST API for CLI and integrations

o Authentication and Authorization for securing the applications.

3) Open Source SaaS software (any one software with architecture.

→ SaaS is a distribution model wherein the third party is trusted with the responsibility of hosting applications and makes them available for the customers with the help of the internet.
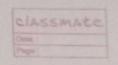
→ Open Source solutions are opted by software businesses for their specific tasks, which are not the primary businesses of software developers.

→ Other reasons for opting open source solutions are mentioned as under:-

i) Flexibility :- Open Source solutions help in customization of codes.

ii) Improved Quality :- Communities help in improving the bugs in codes.

iii) Reducing Risks :- Elimination of opting for the heavy investments for buying software.

→ Following are the best Open Source SaaS Solutions

o OpenStack
o OpenNebula
o Cloudify
o OpenShift
o CloudStack

* OpenNebula :-

→ It is a Cloud computing platform mainly used for the management of data centres.

→ OpenNebula is a feature-rich solution efficient for public, private, and hybrid cloud platforms.

→ Its deployment is explained as under:-

○ Master node :- It is a single gateway responsible for the scheduling and the submission of jobs to the machines. It manages all virtual machines running on various clusters. It allows you to add new machines to your cluster.

○ Worker node :- This node is mainly responsible for making the availability of all computing resources for executing the jobs from the master node. Various machines like VMware, Xen or KVM can be deployed because of the worker node.

→ Following are the features of OpenNebula :-

○ Interface :- Multiple language API and simple GUI for users.

○ Platform :- Packages for Linux distributions and is fully platform-independent.

o Security: Login token facility availability along with fine-grained auditing.

o Licensing :- Open-Source software released under Apache License

o Virtual infrastructure management :- Fine-grained multi-tenancy, powerful hooking system.

4) Open Source Cloud Simulator software (any one software with architecture)

→ It is not possible, in the real world, for system administrators, cloud specialists and even researchers to have actual cloud infrastructure to perform real-time experiments and implement new algorithms and methodologies. To address such challenges and issues, modelling and simulation technologies come to our rescue.

s The need for a cloud computing simulator arises in order to witness an implementation scenario in real time. Cloud simulators play a crucial role in reducing the complexity of the infrastructure, in executing new algorithms, analysing security threats and measuring the overall quality and performance of the infrastructure.

→ Some simulators are free and open source, while others are commercial. As free and open source simulators provide an environment for deep learning and experimentation, the trend is to specifically work on these simulators for all types of complex and real world problems of cloud computing.

→ Following are the some cloud computing simulators:-

  o CloudSim
  o CloudAnalyst
  o GreenCloud
  o iCanCloud
  o EMUSIM
  o GroudSim
  o DCSim (Data Centre Simulation)

* CloudAnalyst:-

→ CloudAnalyst, a GUI based simulator derived from CloudSim, has some extended features and capabilities. CloudAnalyst was proposed by Bhathiya Wickremasinghe and Rajkumar Buyya at the CLOUDs Laboratory of the Computer Science and Software Engineering Department of the University of Melbourne, Australia.

→ The simulator supports the evaluation of social network tools according to the geographical distribution of users and data centers.

→ It can be applied to determine the behaviour of large scale Internet application in the cloud, and also enables a modeller for looping simulation and to conduct a series of simulations with slight variations in parameters.

→ CloudAnalyst is regarded as a powerful simulation framework for deploying real-time data centers and monitoring load balancing, cloud cluster monitoring and data centre data flow in real-time. It allows users to save simulation configurations as XML files and exports live results in PDF format.

→ The features of CloudAnalyst are listed below:-

o Graphical User Interface :- Easy-to-use GUI for setting up and viewing results of all sorts to of cloud computing experiments.

o Simulation definition via a high degree of configuration and flexibility :- CloudAnalyst is equipped with modellers that have a high degree of control over the experiment by modelling entities such as data centers, virtual machines, memory, storage and bandwidth.

o Experiment looping :- CloudAnalyst can save simulation scenarios and loop them again and again via simulation variations. It can save the results as XML files and even save PDF files of the results.

o Efficient output :- CloudAnalyst provides graphical output of simulation results in the form of tables and charts, apart from a large amount of statistical data.

5) Write down the steps for # to create EC2 instance.

→ Step 1: Launch an instance :-

→ You can launch a Linux instance using the AWS Management console as described in the following procedure.

→ To launch an instance :

i) Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/

ii) From the console dashboard, choose Launch Instance

iii) The choose an Amazon Machine Image (AMI) page displays a list of basic configurations, called

Amazon Machine Images (AMIs), that serve as templates for your instance. It Select an HVM version of Amazon Linux 2. Notice that these AMIs are marked "Free tier eligible".

iv) On the choose an Instance Type page, you can select the hardware configuration of your instance. Select the t2.micro instance type, which is selected by default. The t2.micro instance type is eligible for the free tier. In Regions where t2.micro is unavailable, you can use a t3.micro instance under the free tier. ~~For~~

v) On the choose an Instance Type page, choose Review and Launch to let the wizard complete the other configuration settings for you.

vi) On the Review Instance Launch page, under Security Groups, you'll see that the wizard created and selected a security group for you. You can use this security group, or alternatively you can select the security group that you created when getting set up using the following steps:

a) choose Edit Security Groups.

b) On the Configure Security Group page, ensure that Select an existing security group is selected.

c) Select your security group from the list of existing security groups, and then choose Review and Launch.

vii) On the Review Instance Launch page, choose Launch.

viii) When prompted for a key pair, select choose an existing key pair, then select the key pair that you created when getting set up.

When you are ready, select the acknowledgement check box, and then choose Launch Instances.

ix) A confirmation page lets you know that your instance is launching. Choose View Instances to close the confirmation page and return to the console.

x) On the Instances screen, you can view the status of the launch. It takes a short time for an instance to launch. When you launch an instance, its initial state is pending. After the instance starts, its state changes to running and it receives a public DNS name. (If the Public IPv4 DNS column is hidden, choose the setting icon is the top-right corner, toggle on Public IPv4 DNS, and choose confirm.

xi) It can take a few minutes for the instance to be ready so that you can connect to it. Check that your instance has passed its status checks, you can view this information in the

status check column.

6) Write the steps to create S3 Bucket.

→ Step 1:- Sign in to the preview version of the AWS Management console

Step 2:- Under Storage & Content Delivery, choose S3 to open the Amazon S3 console

Step 3:- From the Amazon S3 console dashboard, choose create Bucket.

Step 4:- In create a Bucket, type a bucket name in Bucket Name

→ The bucket name you choose must be globally unique across all existing bucket names in Amazon S3.

Step 5:- In Region, choose Oregon.

Step 6:- choose create

→ When Amazon S3 successfully creates your bucket, the console displays your empty bucket in the Buckets pane.