Marathwada Mitra Mandal's

COLLEGE OF ENGINEERING

Karvenagar, PUNE – 411 052

Accredited with "A" Grade by NAAC // Accredited by NBA (Mechanical Engg. & Electrical Engg.)
Recipient of "Best College Award 2019" by SPPU // Recognized under section 2(f) and 12B of UGC Act 1956

DEPARTMENT OF INFORMATION TECHNOLOGY

LABORATORY MANUAL

TE (INFORMATION TECHNOLOGY)

(SEMESTER – II)

LABORATORY PRACTICE-II (CLOUD COMPUTING) LAB

(314458)

2019 Course

Preface

Cloud computing is a technology that enables on-demand access to computing resources, such as servers, storage, applications, and services, over the internet. The term cloud refers to the internet, and cloud computing allows users to access resources from anywhere in the world, at any time, without needing to invest in expensive hardware or software. Cloud computing offers several benefits, including scalability, flexibility, cost-effectiveness, and ease of management. With cloud computing, organizations can focus on their core business activities rather than spending time and resources on managing their IT infrastructure.

It provides various service model, such as software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS). As cloud computing continues to evolve, it is expected to play an increasingly important role in shaping the future of technology. Cloud computing labs provide learners with access to a variety of computing resources, such as virtual machines, storage, and network components, which are hosted in the cloud. This allows learners to experiment with different configurations and settings, and to test out various applications and services.

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Marathwada Mitra Mandal's
COLLEGE OF ENGINEERING
Karvenagar, Pune

Vision

To aspire for the Welfare of Society
through excellence in Science and Technology.

Mission

Our Mission is to

- **M**ould young talent for higher endeavours.
- **M**eet the challenges of globalization.
- **C**ommit for social progress with values and ethics.
- **O**rient faculty and students for research and development.
- **E**mphasize excellence in all disciplines.

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Department of Information Technology

Vision

- To emerge as a centre of excellence in Information Technology education for enrichment of society.

Mission

- To cater industry with engineers having theoretical & practical background and competent IT skills.
- To pursue advanced knowledge in the field of information technology.
- To inculcate budding IT engineers with professional and interpersonal skills.

Program Educational Objectives (PEOs)

The students of Information Technology Program after passing out will possess:

- Adequate knowledge and skills in Information Technology for implementation of complex problems with innovative approaches.
- Inclination and technical competency towards professional growth in the field of Information Technology.
- Ethics and value based interpersonal skills to facilitate lifelong learning and societal contributions.

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

Information Technology Graduates will be able to:

1. Demonstrate and apply data management, analytical and security skills to deliver software systems.
2. Design and develop interactive and intelligent systems using principles of human computer interaction and machine learning techniques.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Course Code: (314458)
Course Name: Laboratory Practice-II (Cloud Computing) Lab

Teaching Scheme: **Credits:** 02 **Examination Scheme:**

Practical: 4 hrs/week

TW: 50 Marks

Practical: 25 Marks

A. Course Outcome

Course Outcome	Statement
	At the end of the course, a student will be able to:
CO1	To design and develop cloud based applications
CO2	To Simulate a cloud scenario using CloudSim.
CO3	To design and deploy web applications in cloud environment

B. CO -PO Mapping

Course Outcome	Program outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
314458.1	1	1	2		2				2	1		2
314458.1	1	1	2	1	2				2	1		2
314458.1	1	1	2		2				2	1		2
Average	1	1	2	1	2				2	1		2

C. CO-PSO Mapping

Course Outcome	Program Specific Outcomes	
	1	**2**
303148.1	1	1
303148.2	1	1
303148.3	1	1
Average	1	1

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DEPARTMENT OF INFORMATION TECHNOLOGY

Sr. No.	Title of Assignment	PO Mapping	PSO Mapping
1	Install Google App Engine. Create hello world app and other simple web applications using python/java.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
2	Use GAE launcher to launch the web applications.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
3	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.	PO1,PO2,PO3,PO5,PO4,PO9,PO10,PO12	PSO1,PSO2
4	Find a procedure to transfer the files from one virtual machine to another virtual machine.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
5	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
6	Design and deploy a web application in a PaaS environment.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
7	Design and develop custom Application (Mini Project) using Salesforce Cloud.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2
8	Design an Assignment to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store.	PO1,PO2,PO3,PO5,PO9,PO10,PO12	PSO1,PSO2

EXPERIMENT NO. -1

Title: Install Google App Engine. Create hello world app and other simple web applications using python/java.

OBJECTIVE: To Learn Google app engine SDK and develop web applications in cloud.

Theory:

1. Installing Python 2.7

2. Installing Google App Engine

3. Deploying a "Hello, World" application using the command line

The App Engine SDK allows you to run Google App Engine Applications on your local computer. It simulates the run-time environment of the Google App Engine infrastructure.

Downloading Python

Before you get started, we need to install Python. The version you download will depend on whether or not your PC is 32 or 64bit.

If you have a 32bit system, click the x86 MSI Installer. For 64bit

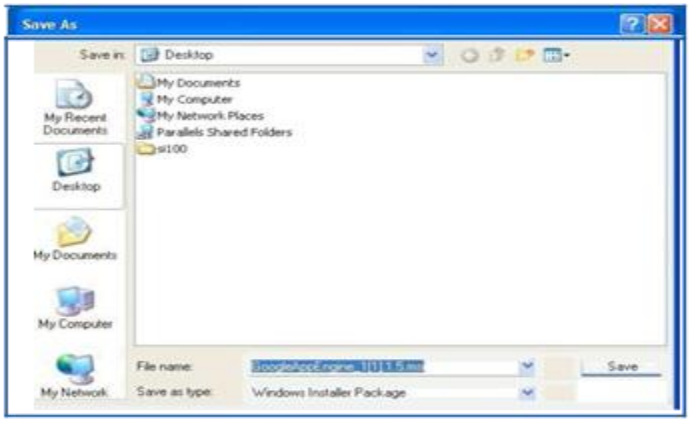
PCs, use the x8664 link. Clicking this link will start downloading the Python installer to your computer

Once Python is downloaded, open up the installer to begin. Run through the steps (leaving the defaults is okay). The only thing you're going to want to change is this: when you get to the screen asking you to "Customize Python", make sure you add Python to your system path by clicking the dropdown next to "Add python.exe to Path" and selecting the option to enable the entire feature. This will let us run Python from the command line easily. Once Python finishes installing, you can make sure that everything works by opening up PowerShell (a more advanced version of the Command Prompt) and typing "python".

Download the Google App Engine SDK

https://cloud.google.com/appengine/downloads

Select python from standard environment and download the installer.



Double Click on the GoogleApplicationEngine installer.

Click through the installation wizard, and it should install the App Engine.

FAQ :

1. What is the use of Google App Engine?

2. What is .yaml file

EXPERIMENT NO. -2

Title: Use GAE launcher to launch the web applications.

OBJECTIVE: To learn web application launching in GAE Launcher.

Theory:

Google App Engine is a web application hosting service. By "web application," we mean an application or service accessed over the Web, usually with a web browser: storefronts with shopping carts, social networking sites, multiplayer games, mobile applications, survey applications, project management, collaboration, publishing, and all the other things we're discovering are good uses for the Web. App Engine can serve traditional website content too, such as documents and images, but the environment is especially designed for real-time dynamic applications. Of course, a web browser is merely one kind of client: web application infrastructure is well suited to mobile applications, as well.

In particular, Google App Engine is designed to host applications with many simultaneous users. When an application can serve many simultaneous users without degrading performance, we say it scales. Applications written for App Engine scale automatically. As more people use the application, App Engine allocates more resources for the application and manages the use of those resources. The application itself does not need to know anything about the resources it is using

Google App Engine:
It is a platform-as-a-service (PaaS) Cloud computing platform that is fully managed and uses inbuilt services to run your apps. You can start development almost instantly after downloading the software development kit (SDK). You can go on to the developer's guide right away when you click on the language you wish to develop your app in. As soon as you have signed up for a Cloud account, you can build your app:

With the template/HTML package in Go
 With Jinja2 and webapp2 in Python

 With Cloud SQL in PHP
 With Maven in Java

Generally Available Features

These are covered by the depreciation policy and the service-level agreement of the app engine.

Any changes made to such a feature are backward-compatible and implementation of such a feature is usually stable. These include data storage, retrieval, and search; communications; process management; computation; app configuration and management.

Data storage, retrieval, and search include features such as HRD migration tool, Google Cloud SQL, logs, datastore, dedicated Memcache, blobstore, Memcache and search.

- Communications include features such as XMPP. channel, URL fetch, mail, and Google
- Cloud Endpoints.
- Process management includes features like scheduled tasks and task queue
- Computation includes images.
- App management and configuration cover app identity, users, capabilities, traffic splitting, modules, SSL for custom domains, modules, remote access, and multitenancy.

Advantages of Google App Engine:

- Infrastructure for Security

Around the world, the Internet infrastructure that Google has is probably the most secure.There is rarely any type of unauthorized access till date as the application data and code are stored in highly secure servers.

You can be sure that your app will be available to users worldwide at all times since Google has several hundred servers globally. Google's security and privacy policies are applicable to the apps developed using Google's infrastructure.

- Performance and Reliability

Google is among the leaders worldwide among global brands. So, when you discuss performance and reliability you have to keep that in mind. In the past 15 years, the company has created new benchmarks based on its services' and products' performance.

The app engine provides the same reliability and performance as any other Google product.

- Cost Savings

You don't have to hire engineers to manage your servers or to do that yourself. You can invest the money saved into other parts of your business.

- Platform Independence

You can move all your data to another environment without any difficulty as there is not many dependencies on the app engine platform.

FAQ:

1. What is GAE launcher?

2. Which server is used in GA to run web application?

3. What do you mean by PaaS?

EXPERIMENT NO. -3

Title: Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.

OBJECTIVE: To learn cloud scenario using CloudSim.

Theory:

CloudSim :

- A Framework for modeling and simulation of Cloud Computing Infrastructures and services
- Originally built at the Cloud Computing Distributed Systems (CLOUDS) Laboratory, The University of Melbourne, Australia
- It is completely written in JAVA

Main Features of CloudSiM:

- Modeling and simulation
- Data centre network topologies and message-passing applications
- Dynamic insertion of simulation elements
- Stop and resume of simulation
- Policies for allocation of hosts and virtual machines

Cloudsim – Essentials

• JDK 1.6 or above http://tinyurl.com/JNU-JAVA

• Eclipse 4.2 or above http://tinyurl.com/JNU-Eclipse

• Alternatively NetBeanshttps://netbeans.org/downloads

• Up & Running with cloudsim guide: https://goo.gl/TPL7Zh

Cloudsim-Directory structure

• cloudsim/ -- top level CloudSim directory

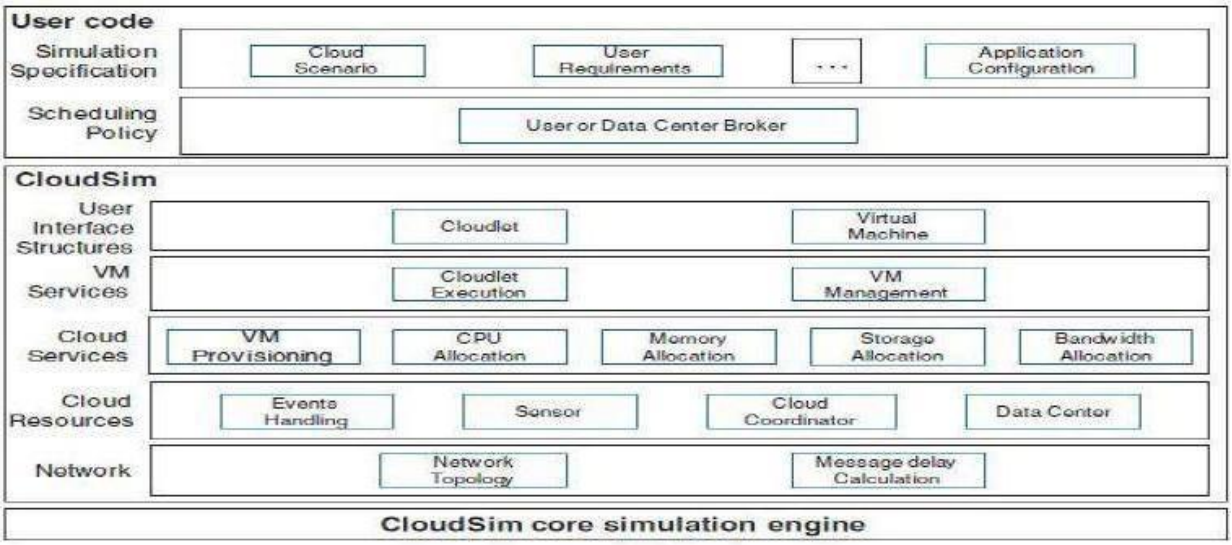
• docs/ -- CloudSim API Documentation

• examples/ -- CloudSim examples

• jars/ -- CloudSim jar archives

• sources/ -- CloudSim source code

Cloudsim - Layered Architecture:



Cloudsim - Component model classes

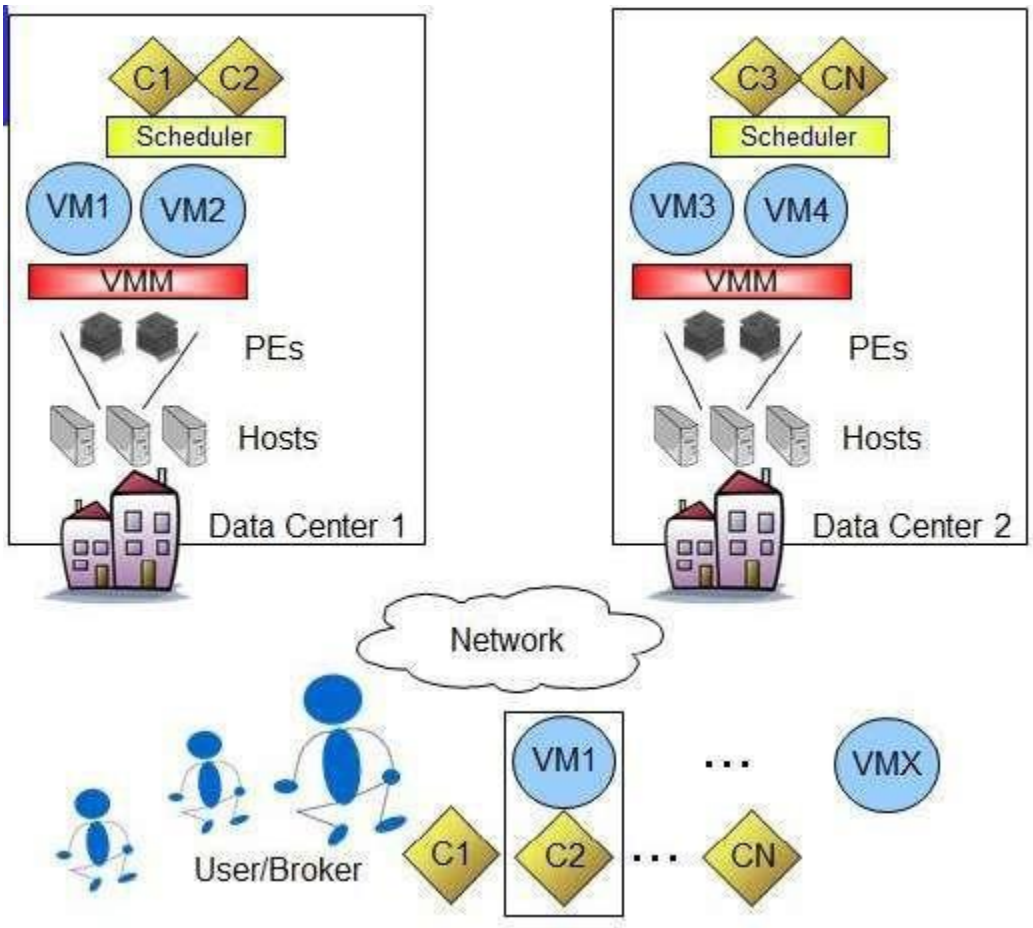
o CloudInformationService.java

o Datacenter.java,Host.java,Pe.java

o Vm.java,Cloudlet.java

o DatacenterBroker.java

o Storage.java,HarddriveStorage.java, SanStorage.java



CloudSim Elements/Components

Procedure to import Eclipse, Cloudsim in your system

Step 1: Link to download Eclipse and download Eclipse for Windows 64bit into your Local machine

https://www.eclipse.org/downloads/packages/release/kepler/sr1/eclipse-ide- java-developers

Step 2: Download cloudsim-3.0.3 from git hub repository in your local machine

https://github.com/Cloudslab/cloudsim/releases/tag/cloudsim-3.0.3

Step 3: Download commons-maths3-3.6.1 from git hub repository in your local machine

https://commons.apache.org/proper/commons-math/download_math.cgi

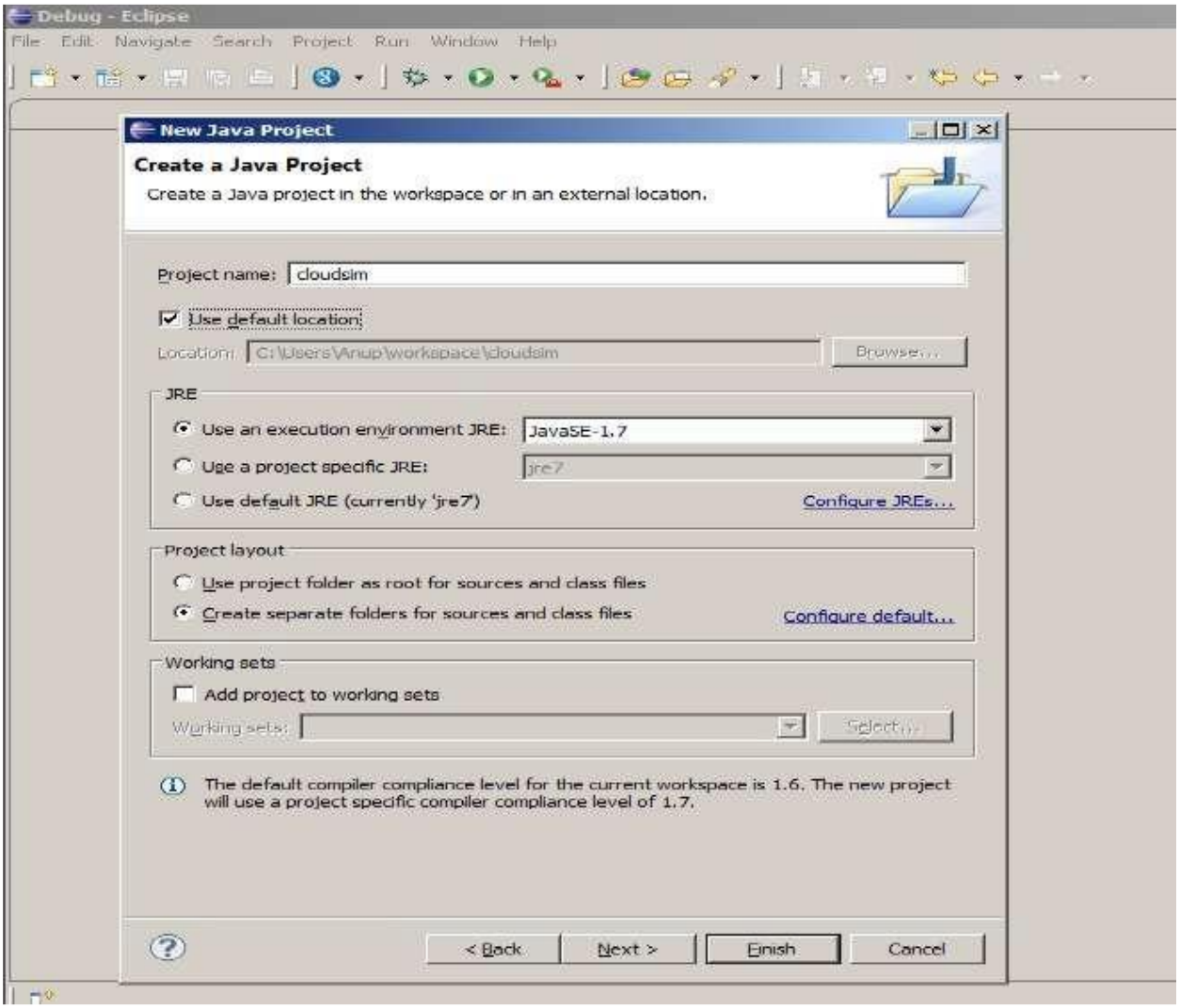
Step 4: Downloaded Eclipse, cloudsim-code-master and Apache Commons Math 3.6.1 in your local machine and extract cloudsim-3.0.3 and Apache Commons Math 3.6.1

Step 5: First of all, navigate to the folder where you have unzipped the eclipse folder and open Eclipse.exe

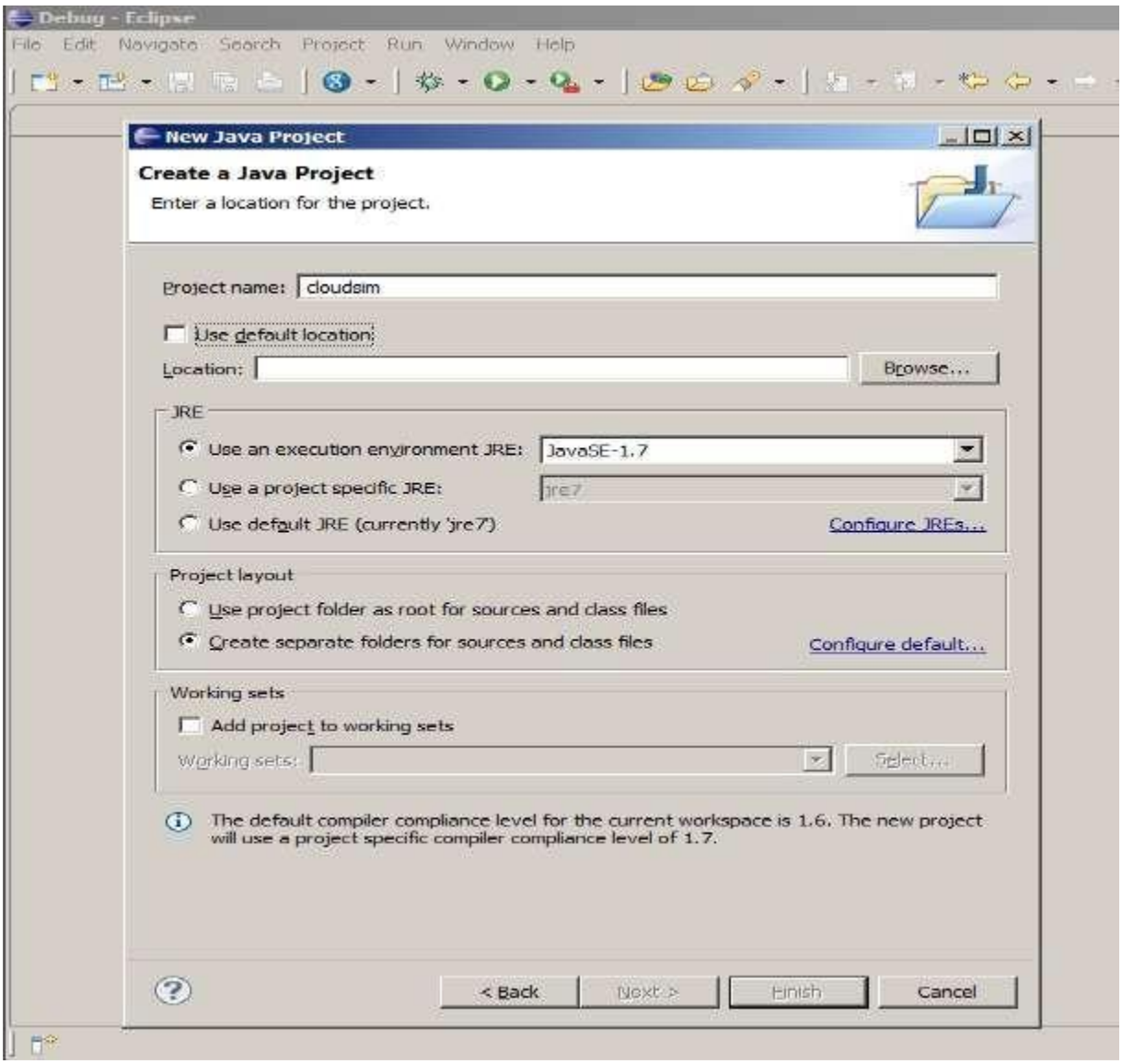
Step 6: Now within Eclipse window navigate the menu: *File -> New -> Project,* to open the new project wizard

Step 7: A *New Project* wizard should open. There are a number of options displayed and you have to find & select the *Java Project* option, once done click *'Next*

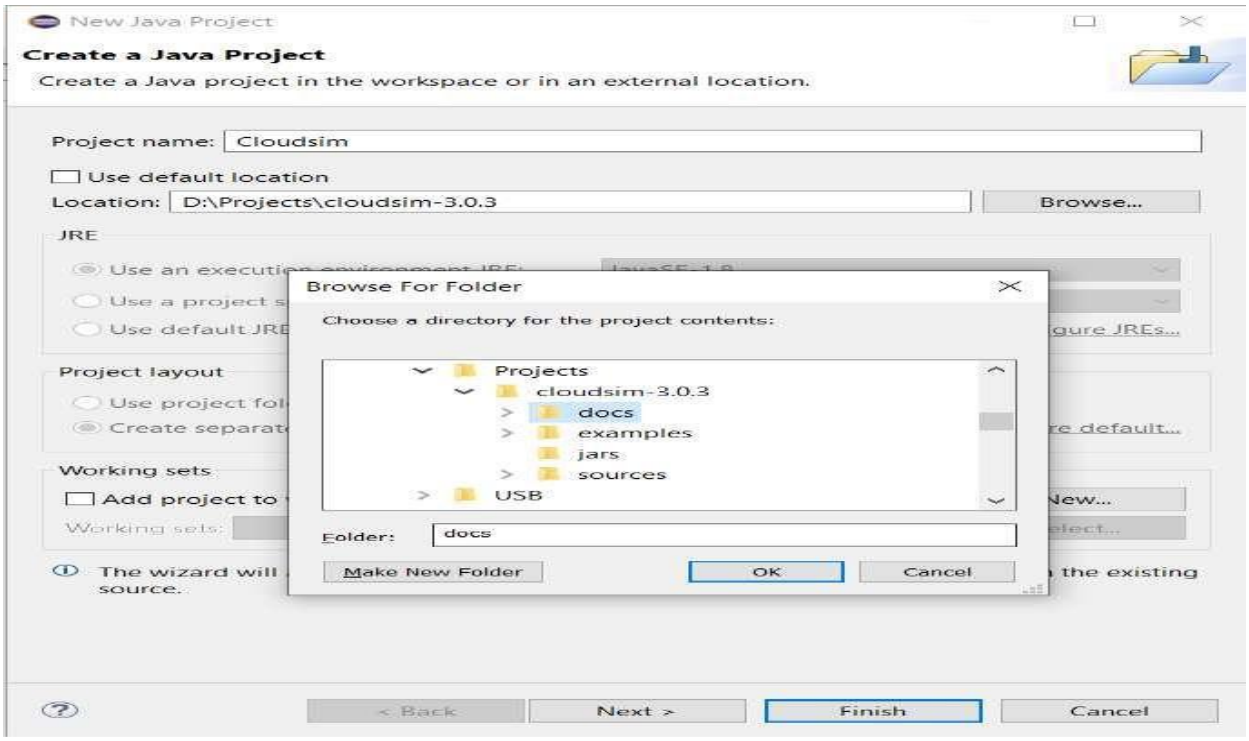
Step 8: Now a detailed new project window will open, here you will provide the project name and the path of CloudSim project source code, which will be done as follows:
Project Name: CloudSim.



Step 9: Unselect the *'Use default location'* option and then click on *'Browse'* to open the path where you have unzipped the Cloudsim project and finally click Next to set project settings.



Step 10: Make sure you navigate the path till you can see the bin, docs, examplesetc folder in the navigation plane.



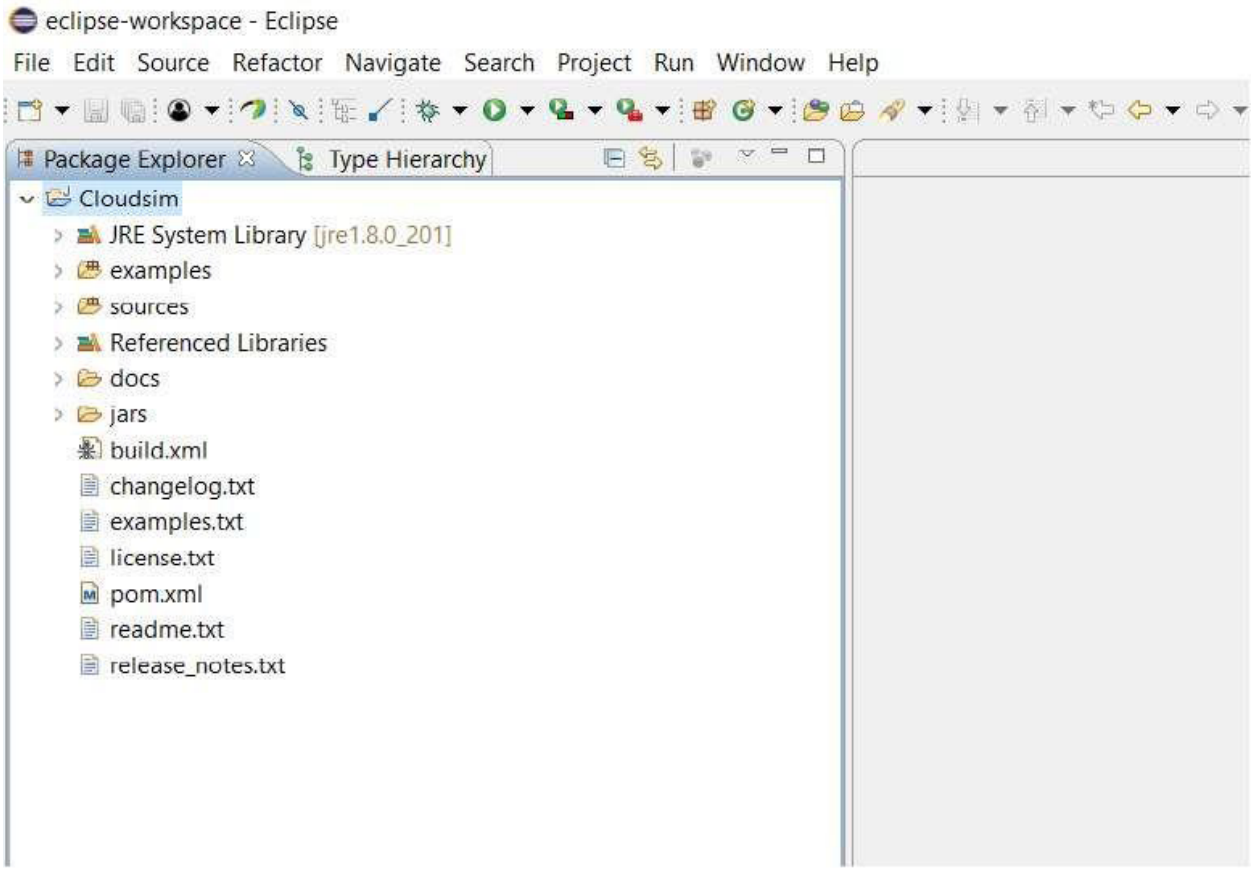
Step 11: Once done finally, click ‗Next' to go to the next step i.e. setting up of project settings

Step 12: Now open *'Libraries'* tab and if you do not find commons-math3-3.x.jar *(here 'x' means the minor version release of the library which could be 2 or greater*) in the list then simply click on ‗*Add External Jar'* (commons-math3-3.x.jar will be included in the project from this step)

Step 13: Once you have clicked on ‗*Add External JAR's*‗ Open the path where you have unzipped the commons-math binaries and select ‗*Commons-math3-3.x.jar*' and click on open.

Step 14: Ensure external jar that you opened in the previous step is displayed in the list and
then click on ‗*Finish*' (your system may take 2-3 minutes to configure the project)

Step 15: Once the project is configured you can open the ‗*Project Explorer*‗and start exploring the Cloudsim project. Also for the first time eclipse automatically start building the workspace for newly configured Cloudsim project, which may take some time depending on the configuration of the computer system.
Following is the final screen which you will see after Cloudsim is configured.



Step 16: Now just to check you within the _**Project Explorer**_, you should navigate to the _**examples**_ folder, then expand the package _*org.cloudbus.cloudsim.examples*_ and double click to open the _*CloudsimExample1.java*_

Step 17: Now navigate to the Eclipse menu _*Run ->Run*_ or directly use a keyboard shortcut *'Ctrl + F11'* to execute the _*CloudsimExample1.java*_.

Step 18: If it is successfully executed it should be displaying the following type to output in the console window of the Eclipse IDE.

Result:
Thus the cloudsim is simulated using Eclipse Environment successfully.

FAQ:

1. What is cloudSim?

2. What are the default scheduling policies in cloudsim?

3. What is DatacenterBroker in cloudsim?

EXPERIMENT NO. -4

Title: Find a procedure to transfer the files from one virtual machine to another virtual machine.

OBJECTIVE: To learn procedure File Transfer in Client & Server using virtual machine

Theory:

Steps-

1. Download and install Oracle's Virtual Box- https://www.virtualbox.org/wiki/Downloads

2. Download Ubuntu VMDK Image- https://app.vagrantup.com/bento/boxes/ubuntu-18.04

3. Launch Virtualbox and create a new VM

4. Click on new and mention the Name and the machine folder along with the Type and Version of the Machine to be created.

5. Assign memory size for our VM (1024 MB sufficient for now).

6. Select the option Use an existing virtual hard disk file and locate the downloaded VMDK image and create VM

7. Now we have to create a NAT Network so go to File -> Preferences -> Network -> Add a New NAT Network (Click on +)

8. Right click and edit the Network name and CIDR if needed.

9. Repeat the process of launching the VM for 2 instances

10. Now go to the setting, go to the network setting and change the adapter to NAT Network and select the NAT Network you made

11. Launch the VM now

12. Install the net-tools to know the IP's of the instance

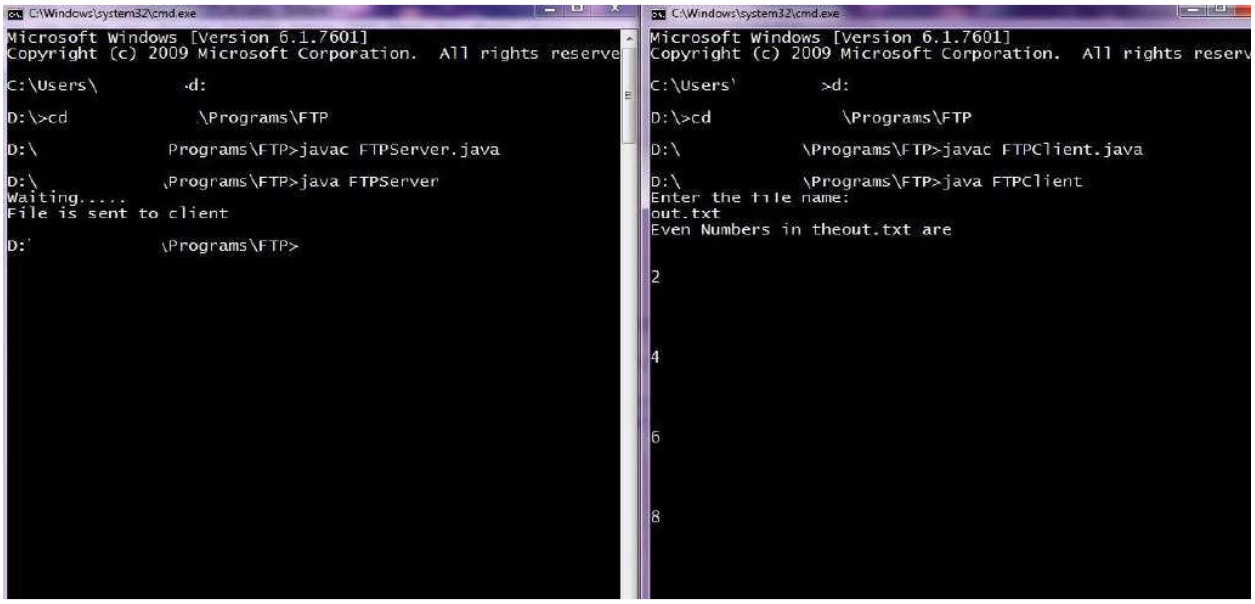
13. Create a file and write something into it

14. If your file is on the VM with IP **172.168.2.4** and the second VM's IP is **172.168.2.5**.

15. Transfer the file using **SCP**

    $ scp tranfer.txt vagrant@172.168.2.5:/home/vagrant

16. Check for the file in the Second VM under the **/home/vagrant** directory



FAQ:

1. What is Virtual Machine?

2. What are the different types of virtualization?

3. What is SCP command?

EXPERIMENT NO. -5

Title: Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version

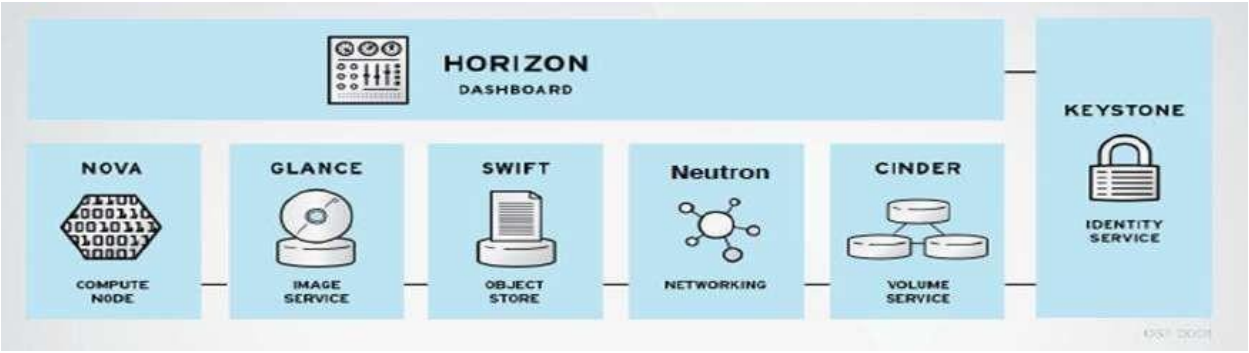
OBJECTIVE: To learn procedure to launch virtual machine using trystack

Theory:

Introduction:

- OpenStack was introduced by Rackspace and NASA in July 2010.
- OpenStack is an Infrastructure as a Service known as Cloud Operating System, that take resources such as Compute, Storage, Network and Virtualization Technologies and control those resources at a data center level
- The project is building an open source community - to share resources and technologies with the goal of creating a massively scalable and secure cloud infrastructure.
- The software is open source and limited to just open source APIs such as Amazon.

The following figure shows the OpenStack architecture



OpenStack architecture

1. It is modular architecture
2. Designed to easily scale out
3. Based on (growing) set of core services

The major components are

- **Keystone**
- **Nova**
- **Glance**
- **Swift**
- **Quantum**
- **Cinder**

The major components are

1. Keystone

2. Nova

3. Glance

4. Swift

5. Quantum

6. Cinder

NOVA

- Core compute service comprised of
- Compute Nodes – hypervisors that run virtual machines
- Supports multiple hypervisors KVM,Xen,LXC,Hyper-V and ESX
- Distributed controllers that handle scheduling, API calls, etc
- Native OpenStack API and Amazon EC2 compatible API

Steps in Installing Openstack

Step 1:

Download and Install Oracle Virtual Box latest version & Extension package

https://virtualbox.org/wiki/downloads

Step 2:

Download CentOS 7 OVA(Open Virtual Appliance) from
Link : https://linuxvmimages.com/images/centos-7
Import CentOS 7 OVA(Open Virtual Appliance) into Oracle Virtual Box

Step 3:Login into CenOS 7
• Login Details
User name : centos
Password : centos
• To change into root user in Terminal
#sudosu–

Step 4: Installation Steps for OpenStack
Step5: Command to disable and stop firewall

 # systemctl disable firewalld
#systemctl stop firewalld

Step 6: Command to disable and stop Network Manager
 # systemctl disable NetworkManager
 # systemctl stop NetworkManager

Step 7: Enable and start Network

#systemctl enable network
#systemctl start network

Step 8: OpenStack will be deployed on your Node with the help of **PackStack** package provided by **rdo** repository (**RPM Distribution of OpenStack**).In order to enable **rdo** repositories on Centos **7** run the below command

#yum install -y https://rdoproject.org/repos/rdo-release.rpm

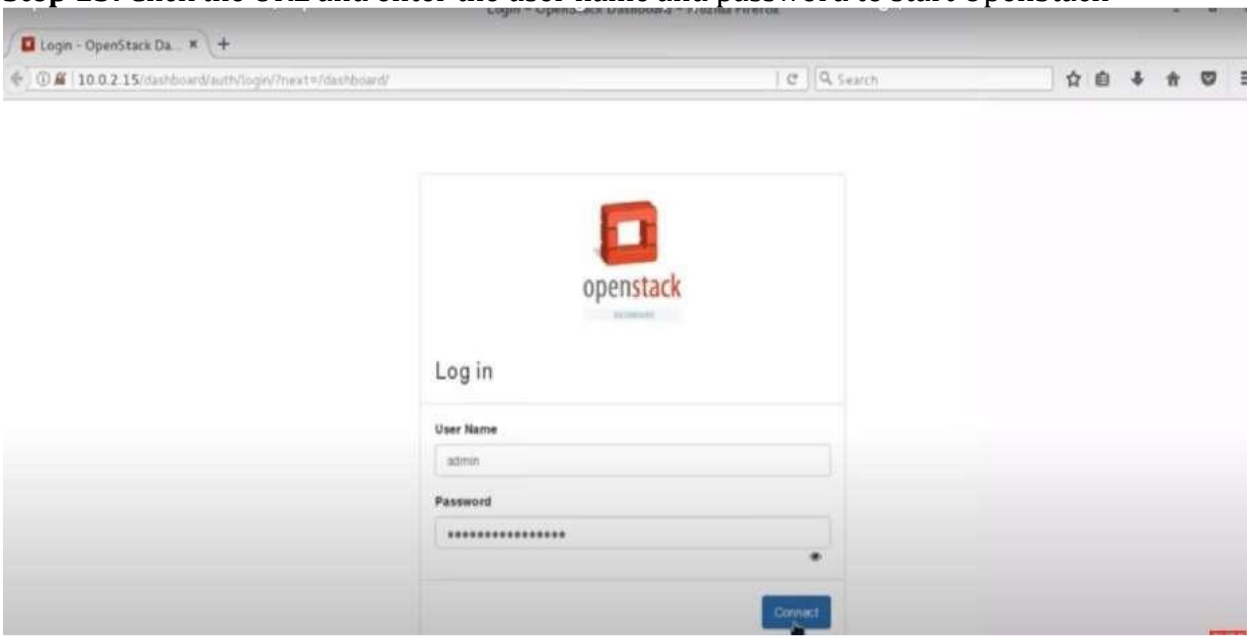
Step 9: Update Current packages
#yum update –y

Step 10: Install OpenStack Release for CentOS
#yum install –y openstack-packstack

Step 11: Start packstack to install OpenStack Newton
#packstak –allinone

Step 12: Note the user name and password from keystonerc_admin
#cat keystonerc_admin

Step 13: Click the URL and enter the user name and password to start OpenStack



OpenStack is successfully launched in your machine

Steps For AWS :

AWS

1. Launch an Amazon EC2 Instance :

- Open Amazon EC2 console and then click Launch Instance to create and configure your virtual machine.

2. Configure your Instance

- In this screen, you are shown options to choose an Amazon Machine Image (AMI). AMIs are preconfigured server templates you can use to launch an instance. Each AMI includes an operating system, and can also include applications and application servers.

- You will now choose an instance type. Instance types comprise of varying combinations of CPU, memory, storage, and networking capacity so you can choose the appropriate mix for your applications

- You can review the configuration, storage, tagging, and security settings that have been selected for your instance

- On the next screen you will be asked to choose an existing key pair or create a new key pair. A key pair is used to securely access your Linux instance using SSH. Amazon Web Services stores the public part of the key pair which is just like a house lock. You download and use the private part of the key pair which is just like a house key.

  Select Create a new key pair and give it the name MyKeyPair. Next click the Download Key Pair button.

  After you download the MyKeyPair key, you will want to store your key in a secure location. If you lose your key, you won't be able to access your instance. If someone else gets access to your key, they will be able to access your instance.

3. Connect to your Instance (either via SSH)
4. Terminate Your Instance (go to the console and select the VM under actions and terminate)

FAQ:

1. What is Amazon Elastic Compute Cloud (Amazon EC2)?

2. What is the difference between using the local instance store and Amazon Elastic Block Store (Amazon EBS) for the root device?

3. How many instances can I run in Amazon EC2?

EXPERIMENT NO. -6

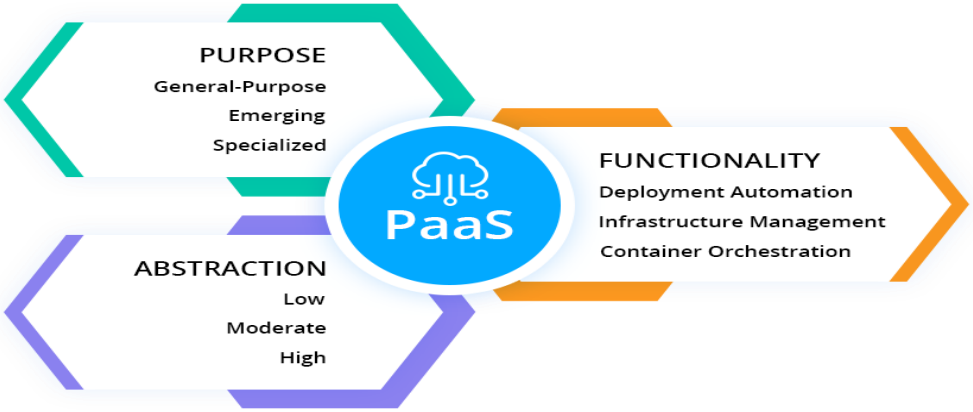
Title: Design and deploy a web application in a PaaS environment

OBJECTIVE: To learn procedure design and deploy a web application in a PaaS environment

Theory:

What is PaaS?

Platform as a service (PaaS) is a category of cloud computing services that provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure typically associated with developing and launching an app.



What AWS Amplify is?

AWS Amplify is a set of purpose-built tools and features that lets frontend web and mobile developers quickly and easily build full-stack applications on AWS, with the flexibility to leverage the breadth of AWS services as your use cases evolve. With Amplify, you can configure a web or mobile app backend, connect your app in minutes, visually build a web frontend UI, and easily manage app content outside the AWS console. Ship faster and scale effortlessly—with no cloud expertise needed.

Steps:

1. Login to the AWS console
2. Find for AWS Amplify in the services.
3. Get Started with Amplify service.
4. Click on Host a Web App.
5. Then choose to launch it with Github and authenticate your GitHub account for the same.
6. After that choose the Repository containing your source code (subfolder if needed)
7. Then Launch the application with the default configurations provided by AWS Amplify
8. Configurations may be different on type of framework / technology you are launching your application

FAQ:

1. What is AWS Amplify?

2. What does it cost to use AWS Amplify?

3. How does hosting with AWS Amplify relate to Amplify's open source framework?

EXPERIMENT NO. -7

Title: Design and develop custom Application (Mini Project) using Salesforce Cloud.

OBJECTIVE: To learn Salesforce cloud

Theory:

Introduction

Salesforce.com Inc. is an American cloud-based software company headquartered in San Francisco, California. Though the bulk of its revenue comes from a customer relationship management (CRM) product, Salesforce also sells a complementary suite of enterprise applications focused on customer service, marketing automation, analytics and application development.

Salesforce is the primary enterprise offering within the Salesforce platform. It provides companies with an interface for case management and task management, and a system for automatically routing and escalating important events. The Salesforce customer portal provides customers the ability to track their own cases, includes a social networking plug-in that enables the user to join the conversation about their company on social networking websites, provides analytical tools and other services including email alert, Google search, and access to customers' entitlement and contracts.

Lightning Platform

Lightning Platform (also known as Force.com) is a platform as a service (PaaS) that allows developers to create add-on applications that integrate into the main Salesforce.com application. These third-party applications are hosted on Salesforce.com's infrastructure.

Force.com applications are built using declarative tools, backed by Lightning and Apex (a proprietary Java-like programming language for Force.com) and Lightning and Visual force (a framework that includes an XML syntax typically used to generate HTML). The Force.com platform typically receives three complete releases a year. As the platform is

provided as a service to its developers, every single development instance also receives all these updates.

Community Cloud

Community Cloud provides Salesforce customers the ability to create online web properties for external collaboration, customer service, channel sales, and other custom portals in their instance of Salesforce. Tightly integrated to Sales Cloud, Service Cloud, and App Cloud, Community Cloud can be quickly customized to provide a wide variety of web properties

Salesforce Sales Cloud

Salesforce Sales Cloud is a customer relationship management (CRM) platform designed to support sales, marketing and customer support in both business-to-business (B2B) and business-to-customer (B2C) contexts. Sales Cloud is a fully customizable product that brings all the customer information together in an integrated platform that incorporates marketing, lead generation, sales, customer service and business analytics and provides access to thousands of applications through the AppExchange. The platform is provided as Software as a Service (SaaS) for browser-based access; a mobile app is also available. A realtime social feed for collaboration allows users to share information or ask questions of the user community.Salesforce.com offers five versions of Sales Cloud on a per-user, per month basis, from lowest to highest: Group, Professional, Enterprise, Unlimited and Performance. The company offers three levels of support contracts: Standard Success Plan, Premier Success Plan and Premier+ Success Plan

Create Custom Apps for Salesforce Classic

Create custom apps to give your Salesforce Classic users' access to everything they need all in one place.

If you're new to custom apps, we recommend using Lightning Platform quick start to create an app. With this tool, you can generate a basic working app in just one step.

If you've already created the objects, tabs, and fields you need for your app, follow these steps. With this option, you create an app label and logo, add items to the app, and assign the app to profiles.

1. From Setup, enter Apps in the Quick Find box, then select Apps.
2. Click New.
3. If the Salesforce console is available, select whether you want to define a custom app or a Salesforce console.
4. Give the app a name and description.
An app name can have a maximum of 40 characters, including spaces.
5. Optionally, brand your app by giving it a custom logo.
6. Select which items to include in the app.
7. Optionally, set the default landing tab for your new app using the Default Landing
Tab drop-down menu below the list of selected tabs. This determines the first tab a user sees when logging into this app.
8. Choose which profiles the app will be visible to.
9. Check the Default box to set the app as that profile's default app, meaning that new users with the profile see this app the first time they log in. Profiles with limits are excluded from this list.
10. Click Save

FAQ:
1. What is Salesforce?
2. What are the different features of Salesforce?
3. What is lightening features in Salesforce?
4. What is an app in Salesforce?

EXPERIMENT NO. -8

Title: Design an Assignment to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store

OBJECTIVE: user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store

Theory:

Firebase Authentication

Most apps need to know the identity of a user. Knowing a user's identity allows an app to securely save user data in the cloud and provide the same personalized experience across all of the user's devices.Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made

UI libraries to authenticate users to your app. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook and Twitter, and more.

Firebase Authentication integrates tightly with other Firebase services, and it leverages industry standards like OAuth 2.0 and OpenID Connect, so it can be easily integrated with your custom backend.

How does it work?

To sign a user into your app, you first get authentication credentials from the user. These credentials can be the user's email address and password, or an O Auth token from a federated identity provider. Then, you pass these credentials to the Firebase Authentication SDK. Our backend services will then verify those credentials and return a response to the client. After a successful sign in, you can access the user's basic profile information, and you can control the user's access to data stored in other Firebase products. You can also use the provided authentication token to verify the identity of users in your own backend services

Authenticating Users on App Engine Using Firebase:

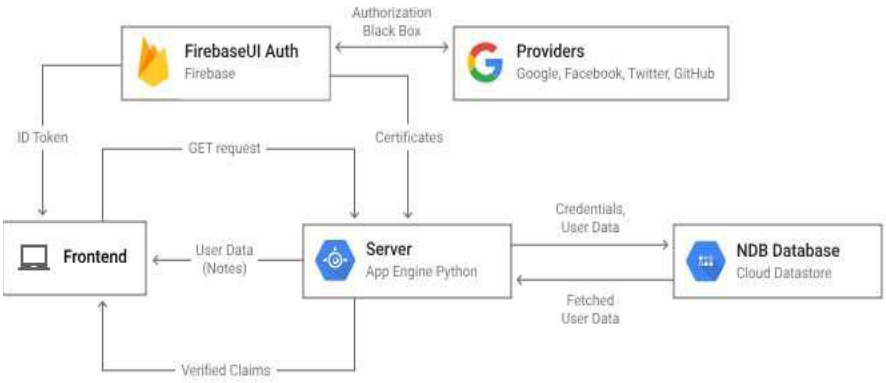
Now we show how to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store.

The document walks you through a simple note-taking application called Firenotes that stores users' notes in their own personal notebooks. Notebooks are stored per user, and identified by each user's unique Firebase Authentication ID. The application has the following components:

1. The frontend configures the sign-in user interface and retrieves the Firebase Authentication ID. It also handles authentication state changes and lets users see their notes.
2. FirebaseUI is an open-source, drop-in solution that handles user login, linking multiple providers to one account, recovering passwords, and more. It implements authentication best practices for a smooth and secure sign-in experience.
3. The backend verifies the user's authentication state and returns user profile information as well as the user's notes.

The application stores user credentials in Cloud Data store by using the NDB client library, but you can store the credentials in a database of your choice.

The following diagram shows how the frontend and backend communicate with each other and how user credentials travel from Firebase to the database.



FAQ:

1. What is firebase?
2. What are the features of Firebase?
3. What is Key Method in Firebase?
4. Which method is used to Sign-in the user in Firebase Email/Password authentication?