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Lab Guide for Compute and Storage Services

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Context

This document contains assignments to be completed as part of the hands on session for the course

Guidelines

- The lab guide has been designed to give hands on experience to map the concepts learnt in the theory session with real life business oriented case studies/assignments.

Internal

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Day-2 Assignments

Introduction to GCP - Assignments

Assignment 1: Creating an account and logging to Google Cloud Platform

Objective: To setup and account with GCP in order to explore its various services.

Background:

GCP Description: Google Cloud Platform is cloud computing platform by Google.GCP can be divided into some categories like Database, Storage and CDN, Compute and Networking, Development and Management, App services, Analytics and Cross-Services.

We shall be focusing on Compute, Network Services and Database in our practice.

Problem Description:

Create a free tier account/ paid account and login to GCP at https://cloud.google.com/compute/

Estimated time: 10 minutes

Solution:

1. Go to the link- https://cloud.google.com/compute/ and create an account by using your existing Google account details or create a new one with your required details, along with a credit card number.
2. Minimal charge 1$ will be deducted.
3. Once you Sign up you are eligible for 300$ resource utilization over 12 months.
4. Sign in to access GCE(Google Compute Engine) Platform.

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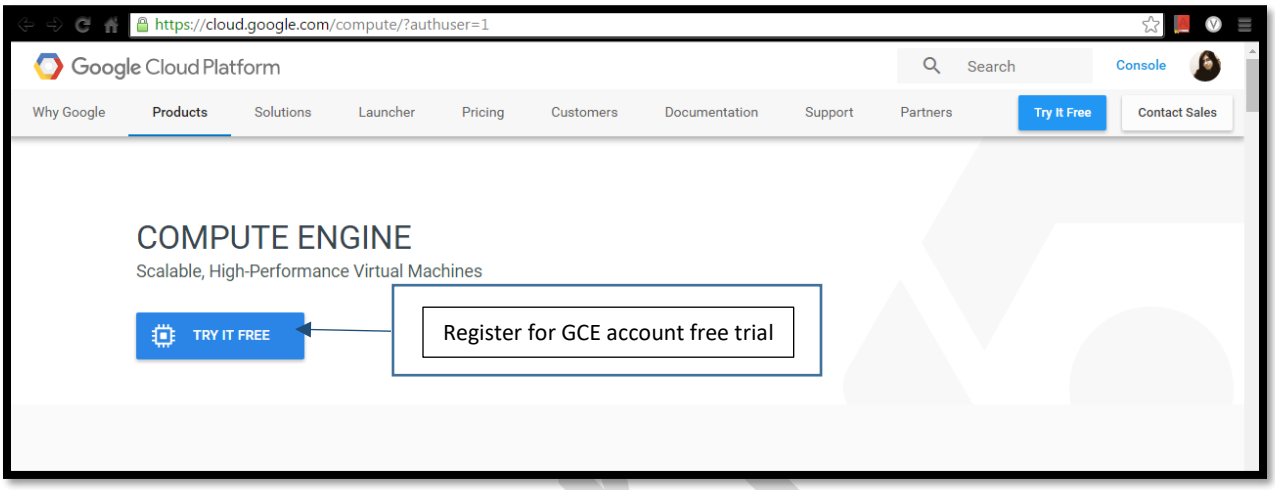
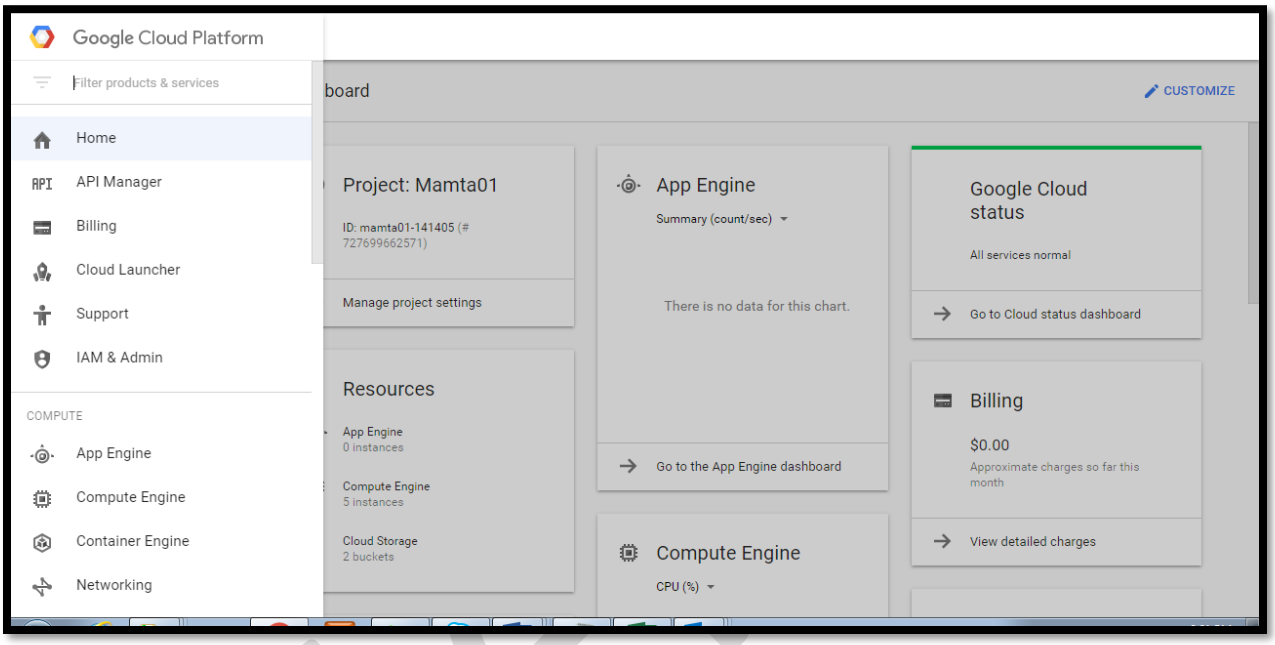


5. Once you log in, you would be redirected to the Google Developers console:



Summary of this assignment: In this assignment, you have created an account with GCP and logged in to the Google Developers console.

Assignment 2: Creating Project and launching an instance

Objective: To learn about creating project, selecting region, Images(OS) and instance type(Machine type), launching instances.

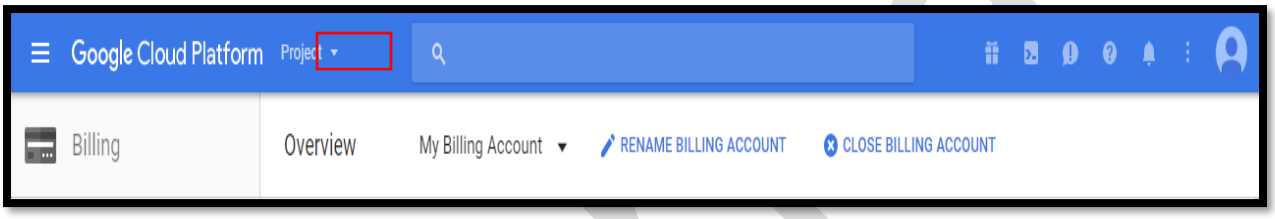
Problem Description: Before hosting your application or service on Google Compute engine (GCE), you need to create project and launch an instance.

Estimated time: 15 minutes

Solution:

1. Instances and Project:

Any instance in GCP belongs to a Project, a project can have one or more instances.



- Select project tab and select “create project” to create new project by providing following details :

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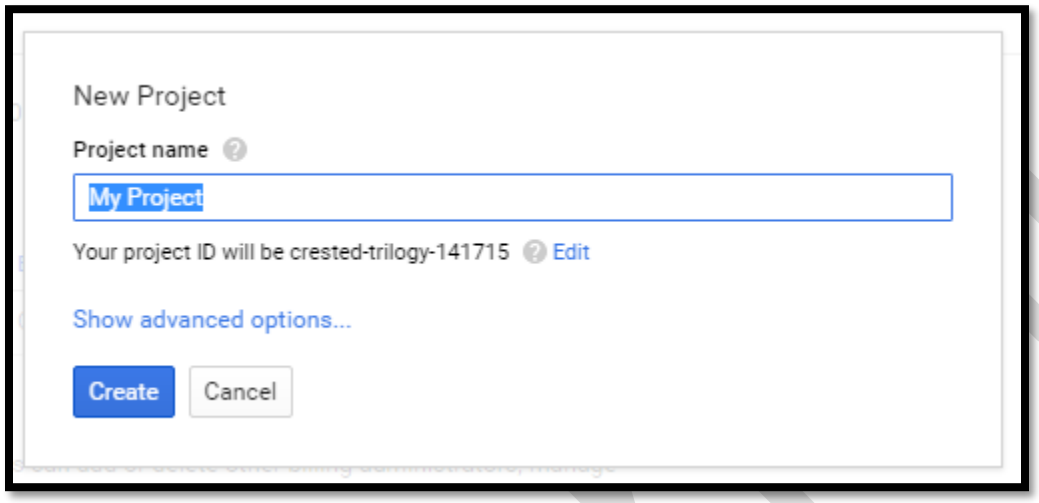


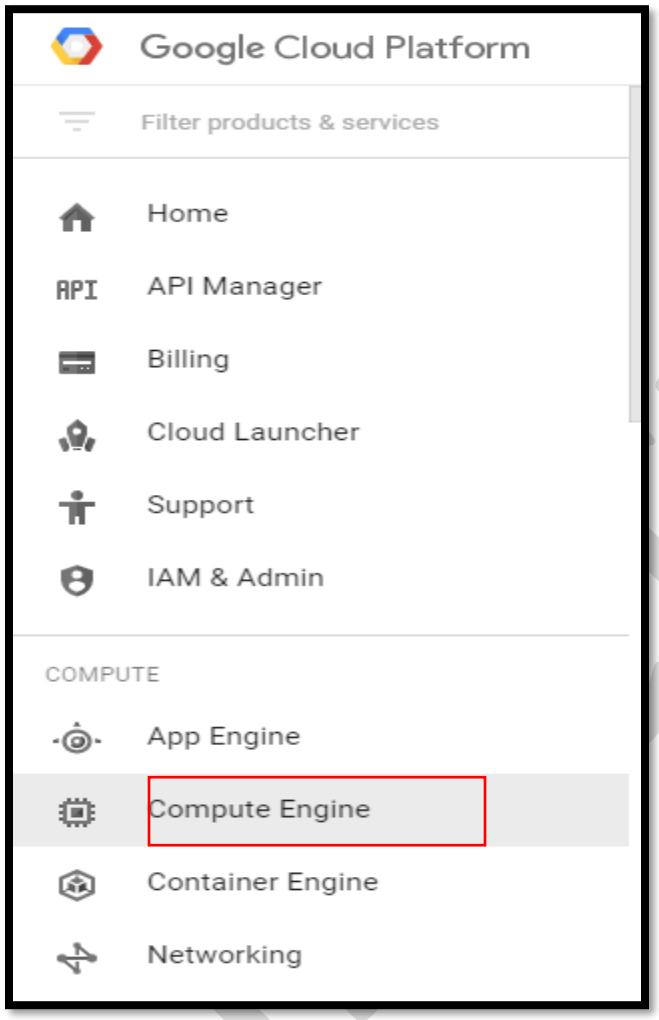
Project id will be auto created. Note the Id as it will required for configuration and deployment.

2. Creating Instance:

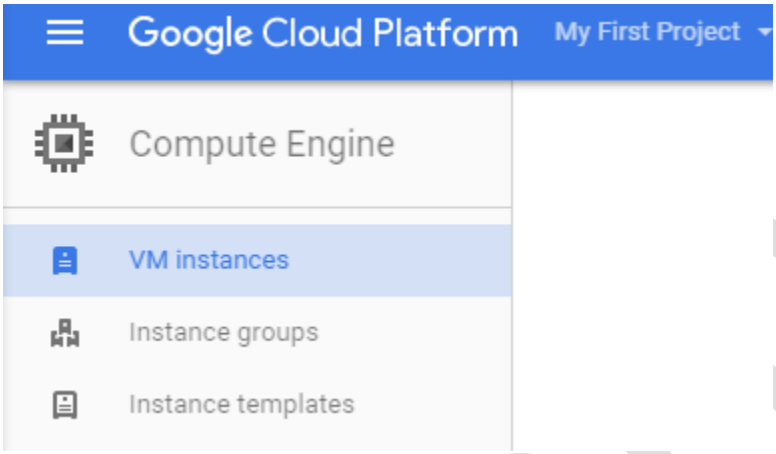
To create an instance in project one need to specify region, Images (OS) and instance type (Machine type).

- From the left panel select compute engine as shown below :

Intern


Google Cloud Platform
Filter products & services
Home
API Manager
Billing
Cloud Launcher
Support
IAM & Admin
COMPUTE
App Engine
Compute Engine
Container Engine
Networking

- On selecting Compute Engine different compute option list for IaaS will be displayed, select VM instances to launch Virtual machine instance.



- VM instance pops up to for creation of instances in same project.

Create new Instance:

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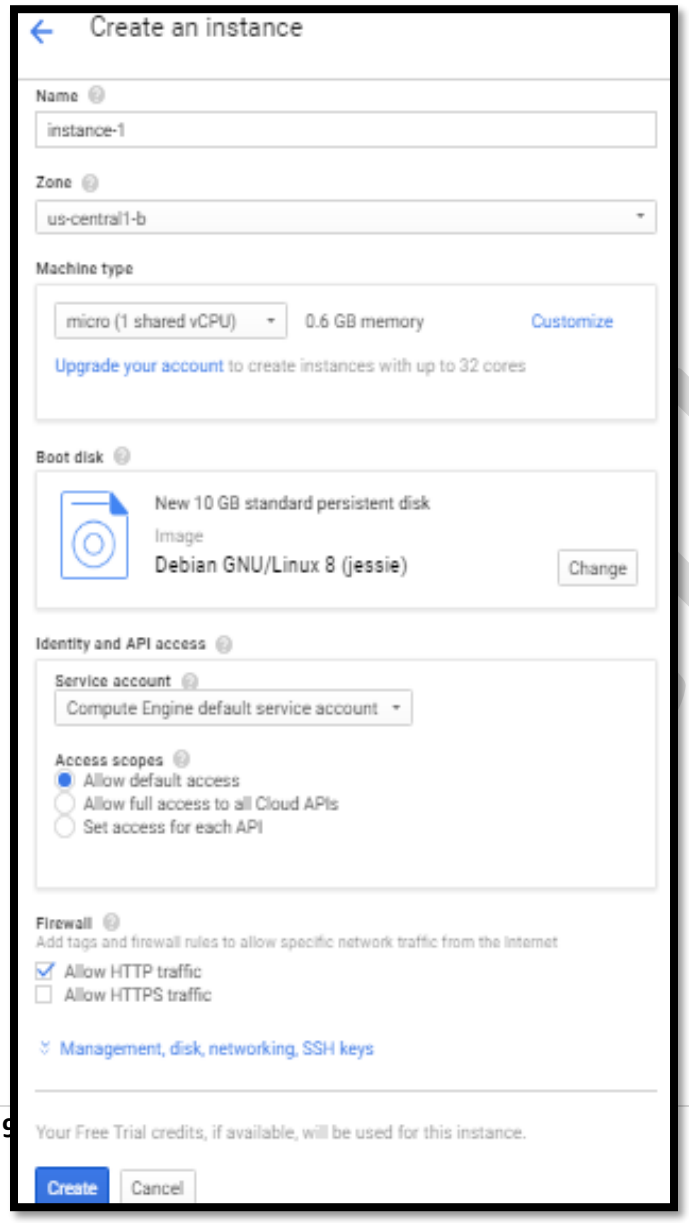

Create an instance
Name
instance-1
Zone
us-central1-b
Machine type
micro (1 shared vCPU)
0.6 GB memory
Customize
Upgrade your account to create instances with up to 32 cores
Boot disk
New 10 GB standard persistent disk
Image
Debian GNU/Linux 8 (jessie)
Change
Identity and API access
Service account
Compute Engine default service account
Access scopes
Allow default access
Allow full access to all Cloud APIs
Set access for each API
Firewall
Add tags and firewall rules to allow specific network traffic from the Internet
Allow HTTP traffic
Allow HTTPS traffic
Management, disk, networking, SSH keys
Your Free Trial credits, if available, will be used for this instance.
Create
Cancel

nal

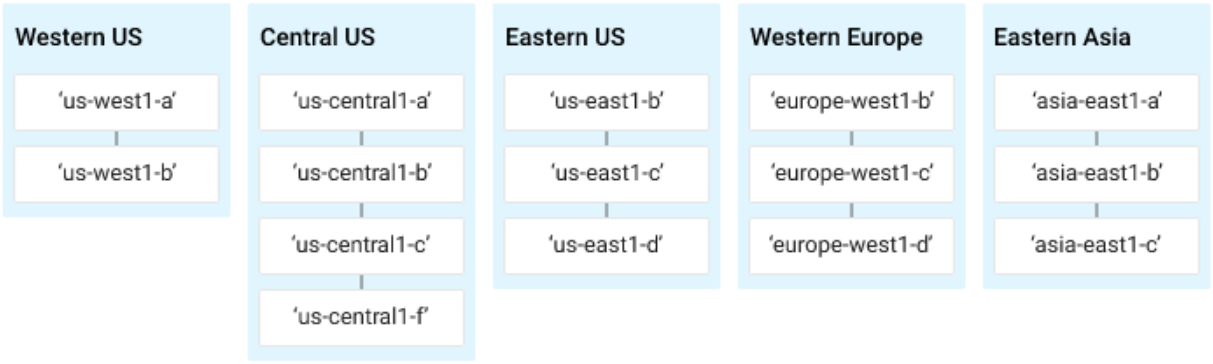
3. Region:

It is a collection of two or more zones in a particular geographic area. Zone is an isolated location within a region

Regions are entirely independent from another region, and the traffic between regions transfers over the public internet.

As instances are launched specific to region, first select a region of your choice out of:

Zones diagram describing zones available in each region



4. Images :

Instance is created from an image of a specific operating system. GCE uses this image to create root persistent disk for instance. It contains a root file system and OS that will run on your instances.

You can create an instance with an image in :

- Google cloud console.
- gcloud (Google CLI)
- REST API

In the Boot disk section click change to begin configuring.

Images can be either public (maintained by Google) or private (using existing persistent disk).

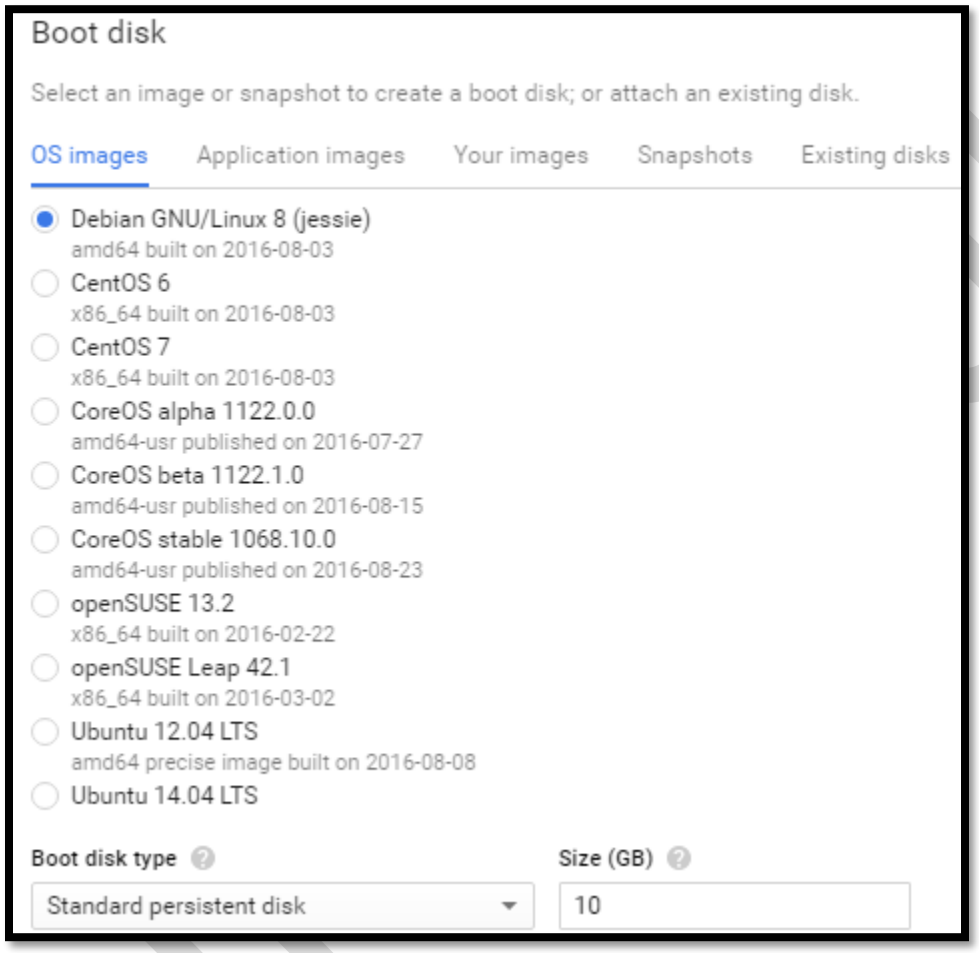
The virtual computing environments are called instances.

EC2 allows users to rent virtual computers on which they run their own applications.

Generally 1 instance means 1 machine/server (often a virtual machine).

You can have platform for your instance.

Internal


Boot disk
Select an image or snapshot to create a boot disk; or attach an existing disk.
OS images
Application images
Your images
Snapshots
Existing disks
Debian GNU/Linux 8 (jessie)
amd64 built on 2016-08-03
CentOS 6
x86_64 built on 2016-08-03
CentOS 7
x86_64 built on 2016-08-03
CoreOS alpha 1122.0.0
amd64-usr published on 2016-07-27
CoreOS beta 1122.1.0
amd64-usr published on 2016-08-15
CoreOS stable 1068.10.0
amd64-usr published on 2016-08-23
openSUSE 13.2
x86_64 built on 2016-02-22
openSUSE Leap 42.1
x86_64 built on 2016-03-02
Ubuntu 12.04 LTS
amd64 precise image built on 2016-08-08
Ubuntu 14.04 LTS
Boot disk type
Size (GB)
Standard persistent disk
10

5. Machine Type

Instance Types are categorized according to:

Different configurations of storage, CPU, memory, network capacity, clock speed etc.

Distinguished by families, e.g.f1, g1, n1, e.g. small, medium, large etc. Under which it is then categorized into:

- ➔ Standard machine type
- ➔ High memory machine type
- ➔ High-CPU machine type
- ➔ Shared-core machine type

The starting level instance is f1.micro which has bursting capabilities to use additional physical resources. It has 1 vCPU (virtual CPU), 0.60 GiB memory, and storage of upto 3PD (Persistent disk)

- If you have to perform some basic operations then a normal computer will be enough for you.
- In case of some big and critical operations you might need some high processing and storage capacity.

- ➢ Select “Standard Persistent disk”, this provides 10240 GB of PD storage.
- ➢ Enable firewall as desired, select “HTTP traffic rules”.
- ➢ Management:

Internal

Expand "Management, disk, networking, SSH keys" for additional configuration as shown below:

1. Description

Describe your instances that can be documented. Description can be related to application on top of which the instances are built on.

2. Label

It is the key value pair which can be used to group the instance based on staging, deployment and development separately.

3. Automation

a. Provide the configuration scripts in Automation: Start up section.

Below script updates the instance and install Apache server :

1. *#! /bin/bash*
2. apt-get update
3. apt-get install -y apache2

We have added the script in "Startup Script" to configure apache server in instance as shown below:

Internal

b. Metadata:

These are the unique information of an instance ex: External IP address, which exist in key:value pair. Metadata can be used in startup and shutdown script and are stored in metadata server that can queried within the instance. Google set default metadata entries, however in below screenshot we have set user defined metadata.

- Networking:

Navigate to "Networking" for additional configuration as shown below:

1.Network:

The network traffic that instance can access. GCP sets a default network .

2. Subnetwork:

An IPv4 address is assigned to the instance from subnetwork's range using which they can communicate with other instance. We will study in detail about subnetwork in subsequent modules.

3. Network tags:

Adding tag to the network is useful as the same tag can be used to applying firewall rules. We have added "server-1" for the tag value as shown below:

4. Internal IP:

Internal IP is automatically generated and assigned to an instance when created. It is unique to a virtual private network(VPN). VPN will be discussed in next section.

Internal

5. External IP:

External IPs are used to communicate with internet or services in other network. It is of two types:

- Static external IP: It is assigned to the project and remain attached to the stopped instance as well until released
- Ephemeral external IP: It remain attached to VM until it is stopped or restarted

6.IP forwarding:

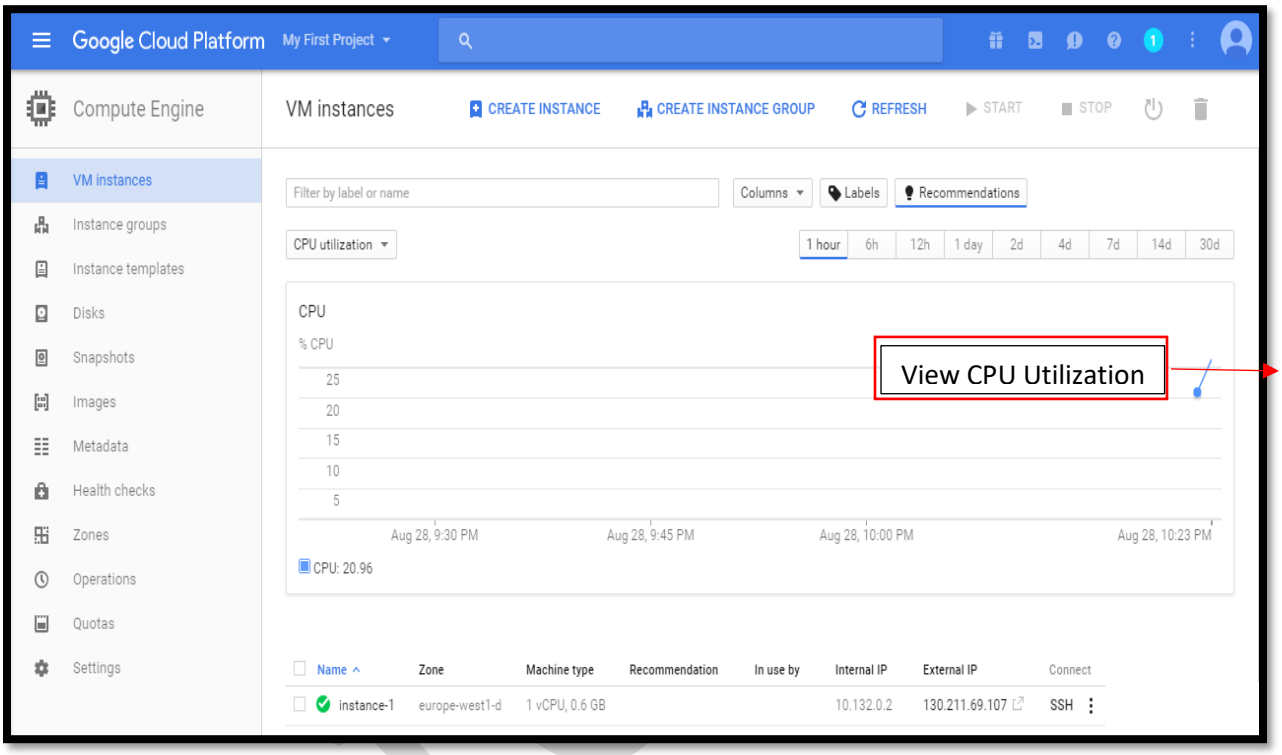
It lets the instance to route the packets. You can set it on to enable forwarding.

SSH Keys:

GCP creates a default key-pair for the instance, however if you wish to generate and apply for instance you can define it here. We will proceed with default key-pair.

Now click “Create”, it will open up below page:

Internal



Summary of this assignment: In this assignment, you have understood about the type of instances and to identify which instance will be suitable for which type of requirement.

Assignment 3: Connecting to instances

Objective: To connect to instances.

Problem Description: Connect to the installed instances.

Estimated time: 10 minutes

Solution:

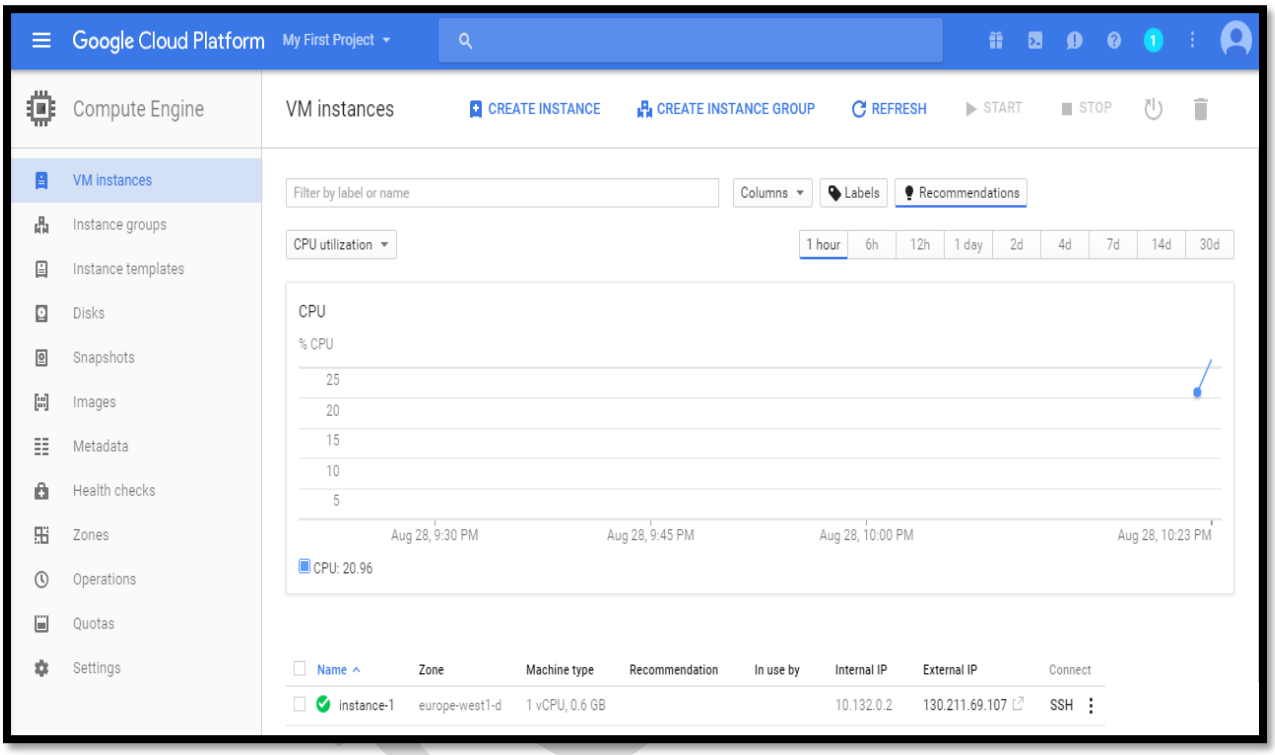
Using SSH from Browser one can connect to GCE VM instances. No additional software or extension require .

Connecting to your VM instance :

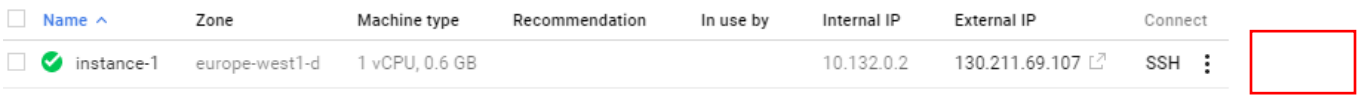
- Navigate your instances in the Cloud Platform Console.

Go to VM instance Page :

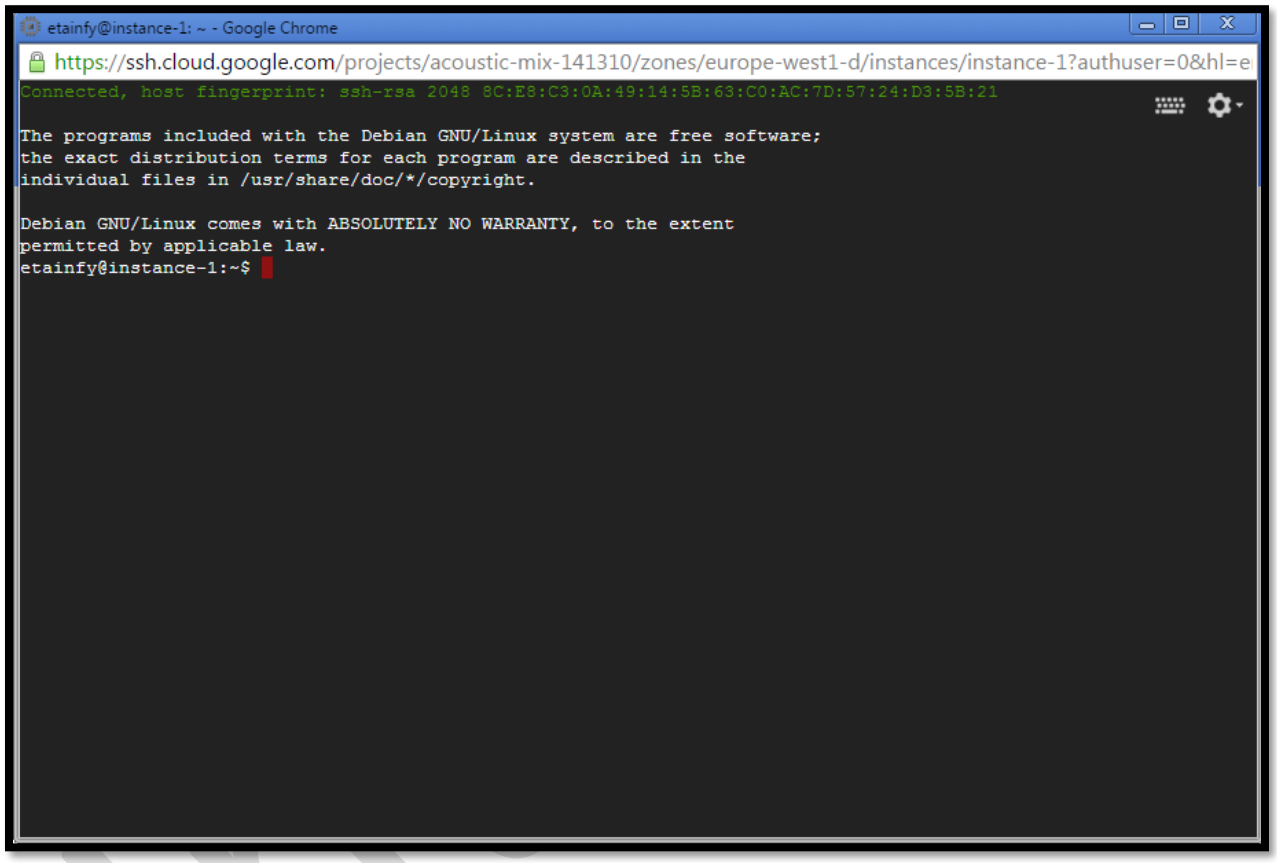
Internal



- In the list of VM instances , click the SSH button that appears next to the instances shown :



Select “Open in browser window”.



- You now have a terminal window to interact with your Linux Instances.

Summary of this assignment: In this assignment, you have understood to get connected to the instance created.

Assignment 4: Deploying sample application on GCE

Objective: To deploy sample application on GCE

Problem Description: Deploying sample application on GCE

Estimated time: 20 minutes

Solution:

Step 1: Once you have logged into the instance using SSH, switch user as shown below and execute the below set of commands.

Below commands will switch user to root , update current configuration, install php and mysql on VM.

1. sudo su -
2. apt-get update
3. apt-get install php5
4. apt-get install mysql-server php5-mysql php-pear

Step 2: Test the Apache and PHP

Get the external IP address and paste in browser to verify Apache using below format.

Internal

1. http:*//[INSTANCE_EXTERNAL_IP_ADDRESS]*

Step 3: Create and deploy a PHP application on the server using below command.

/var/www/html is the document root directory of Apache server where all applications are stored and executed.

1. cd /var/www/html

2. vi Welcome.php

Write your php script in 'Welcome.php' and execute.

Step 4: Test the application in the browser.

A PHP application is successfully deployed on VM with a LAMP stack .

Summary of this assignment: In this assignment, you have understood to get connected to the instance created.

Assignment 5: Deploy a sample application on Google App Engine

Objective: To deploy sample application on GAE

Solution:

Refer : Deploy Spring Boot Application in App Engine standard

(OR)

Deploy a simple Python web application on App engine

Internal

Summary of this assignment: In this assignment, you have understood to use App Engine to deploy a simple application

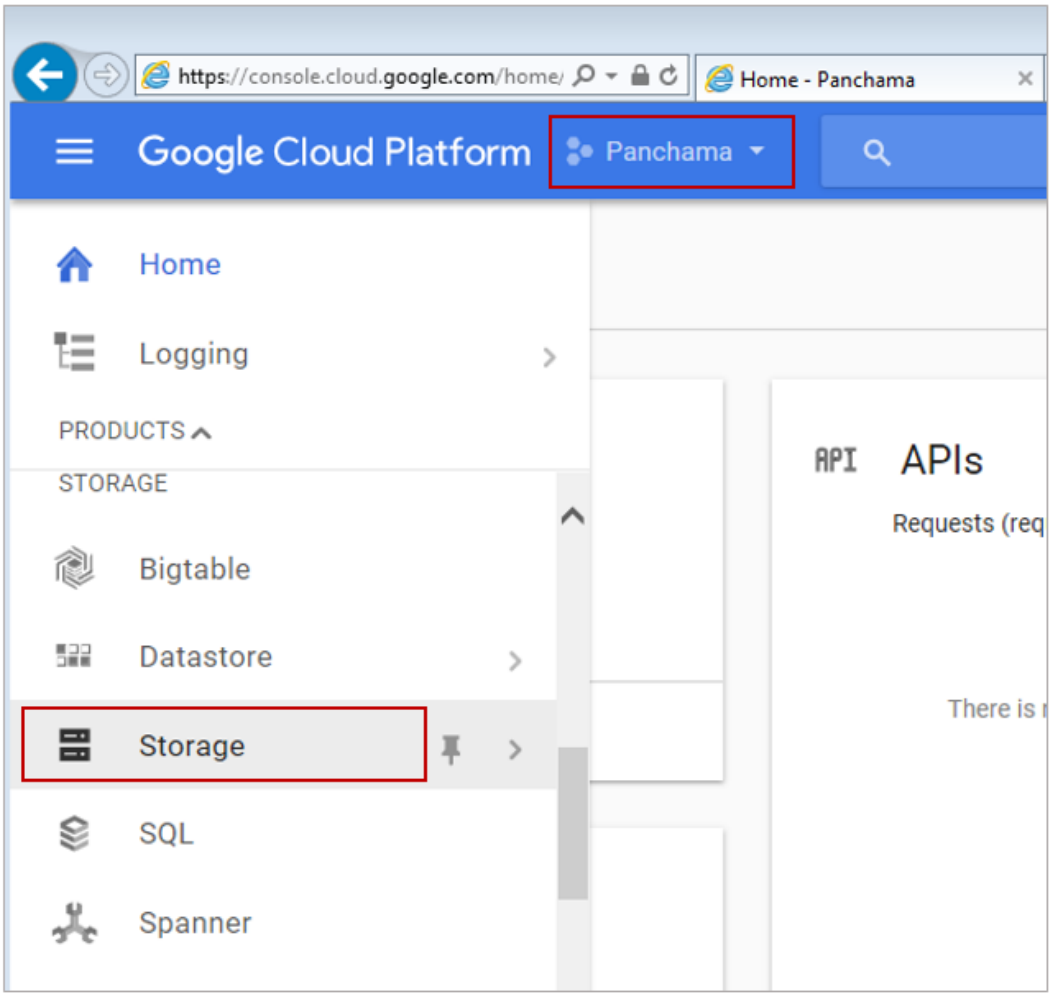
Assignment 6a: Creating a bucket in Cloud Storage

Objective: To create a bucket in Cloud Storage

Solution:

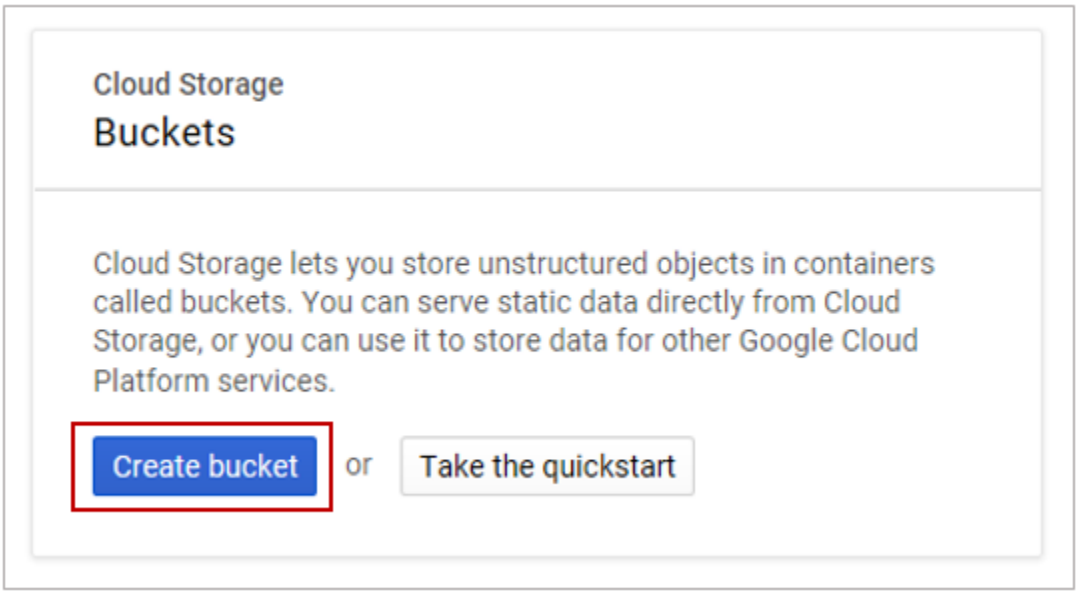
Step 1: Select the project in which storage has to be created. Browse to storage option from products and service list. Select storage.

Internal


https://console.cloud.google.com/home/
Home - Panchama
Google Cloud Platform
Panchama
Home
Logging
PRODUCTS
STORAGE
Bigtable
Datastore
Storage
SQL
Spanner
API
APIs
Requests (req
There is

Step 2 : Select create a bucket .

Bucket is a container to hold unstructured data in cloud storage. This can be used to serve static data directly or store data as a repository.



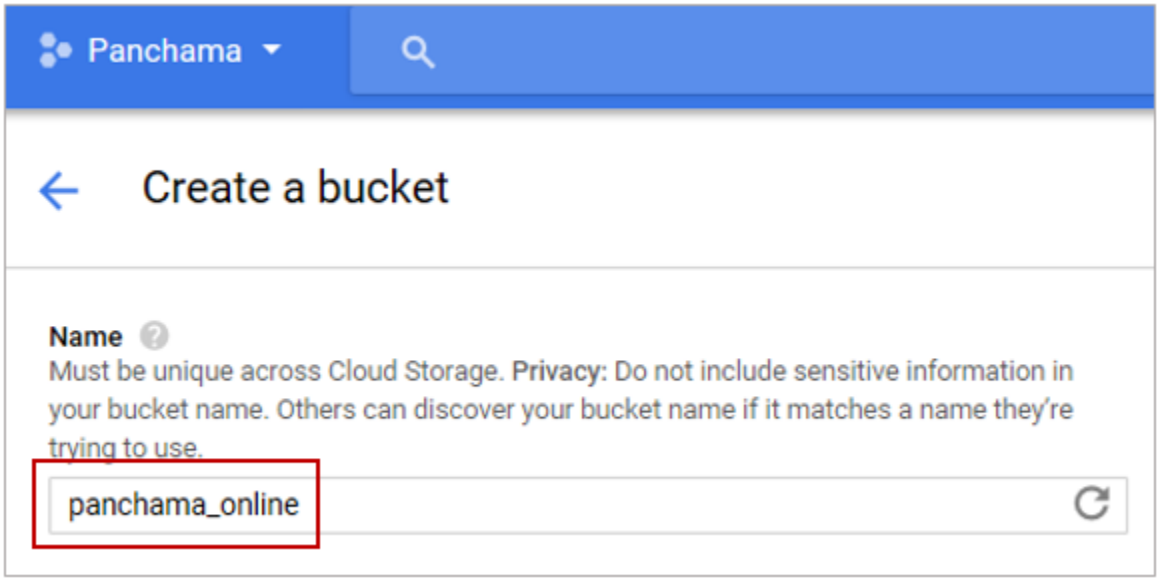
Step 3 : Name your bucket.

Bucket names are unique across universal namespace of cloud storage.

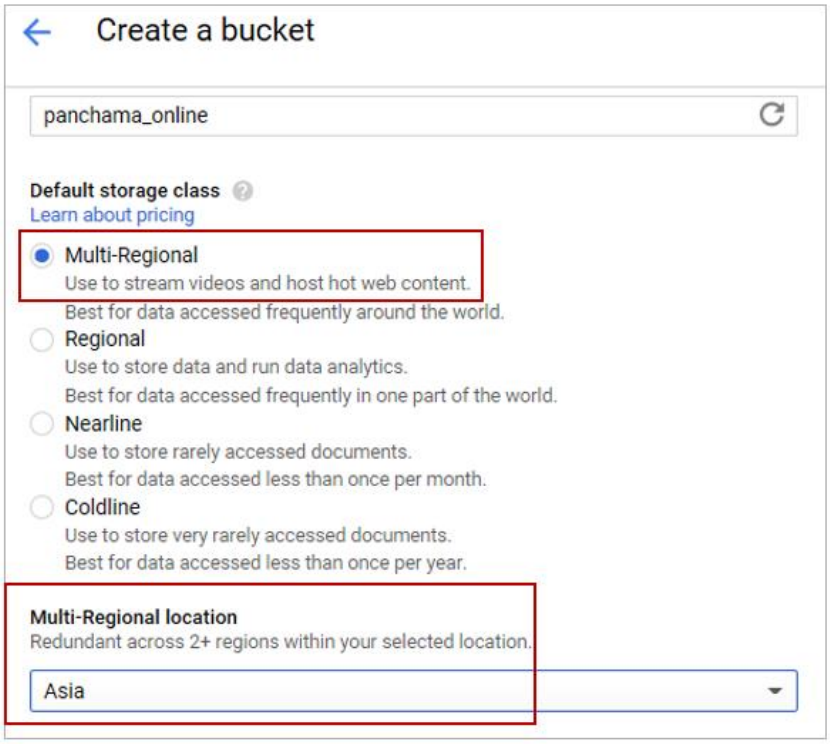
Naming conventions:

- A bucket name can contain lowercase alphanumeric characters, hyphens, and underscores.

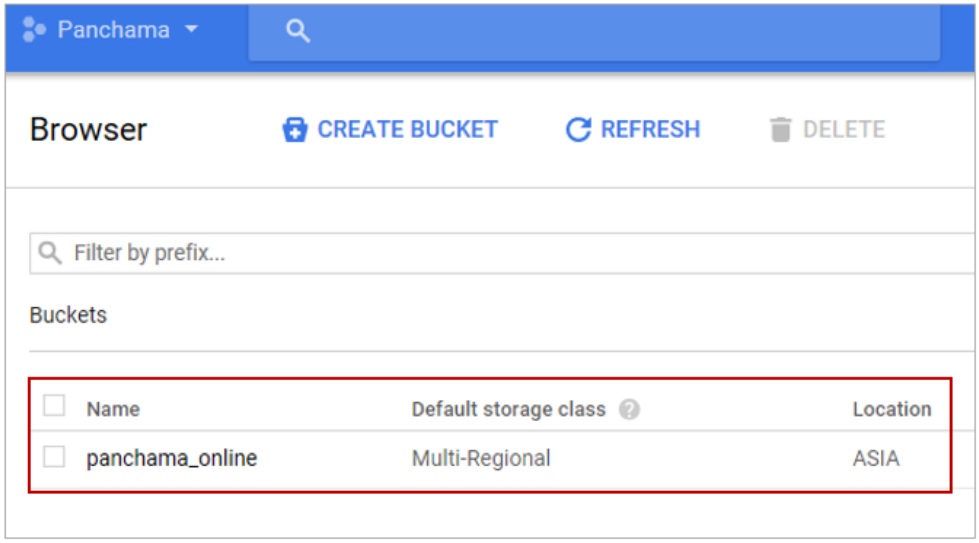
- It can contain dots (.) if it forms a valid domain name with a top-level domain (such as .com).
- Bucket names must start and end with an alphanumeric character



Step 4 : Select appropriate storage class . As Panchama wants global presence and host songs around the world, Multi-regional storage class is selected. This has a replication redundancy in 2+ regions for multi-regional location replication that can be selected in the same screen.



Click on create. Once the bucket is successfully created, it appears on storage dashboard.



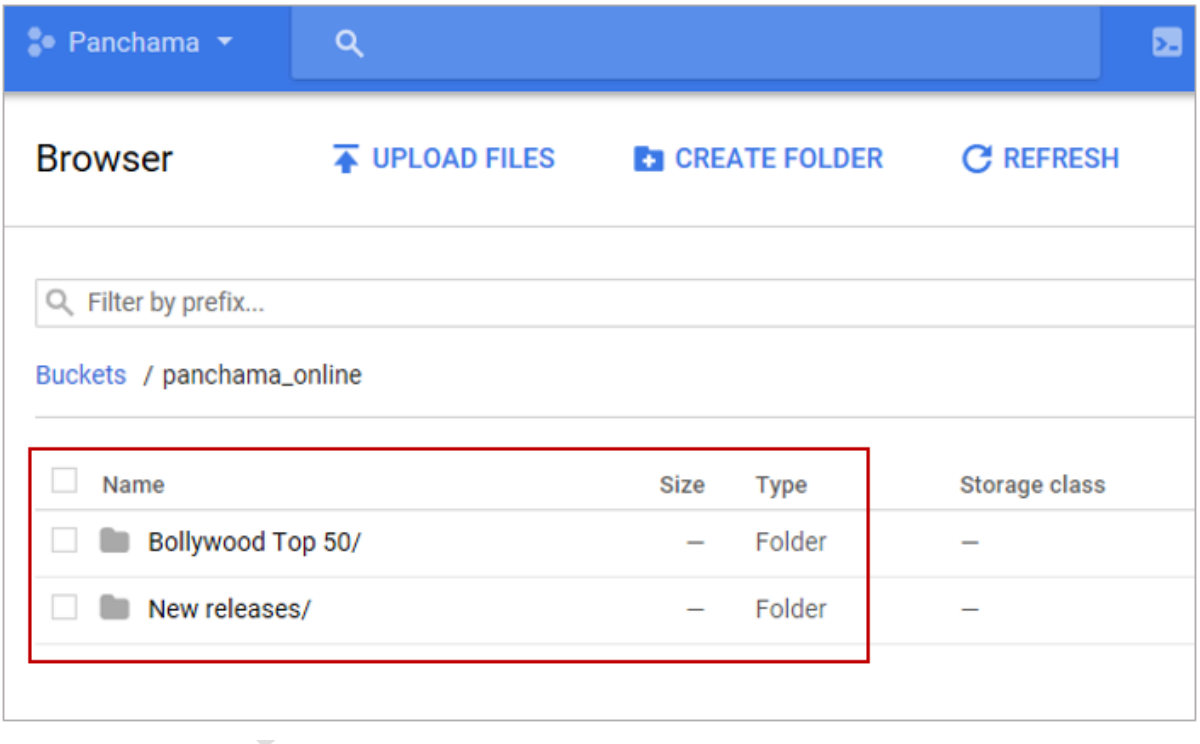
Summary of this assignment: In this assignment, you have learnt how to create a bucket in Cloud storage.

Assignment 6b: Upload objects in to a bucket in Cloud Storage

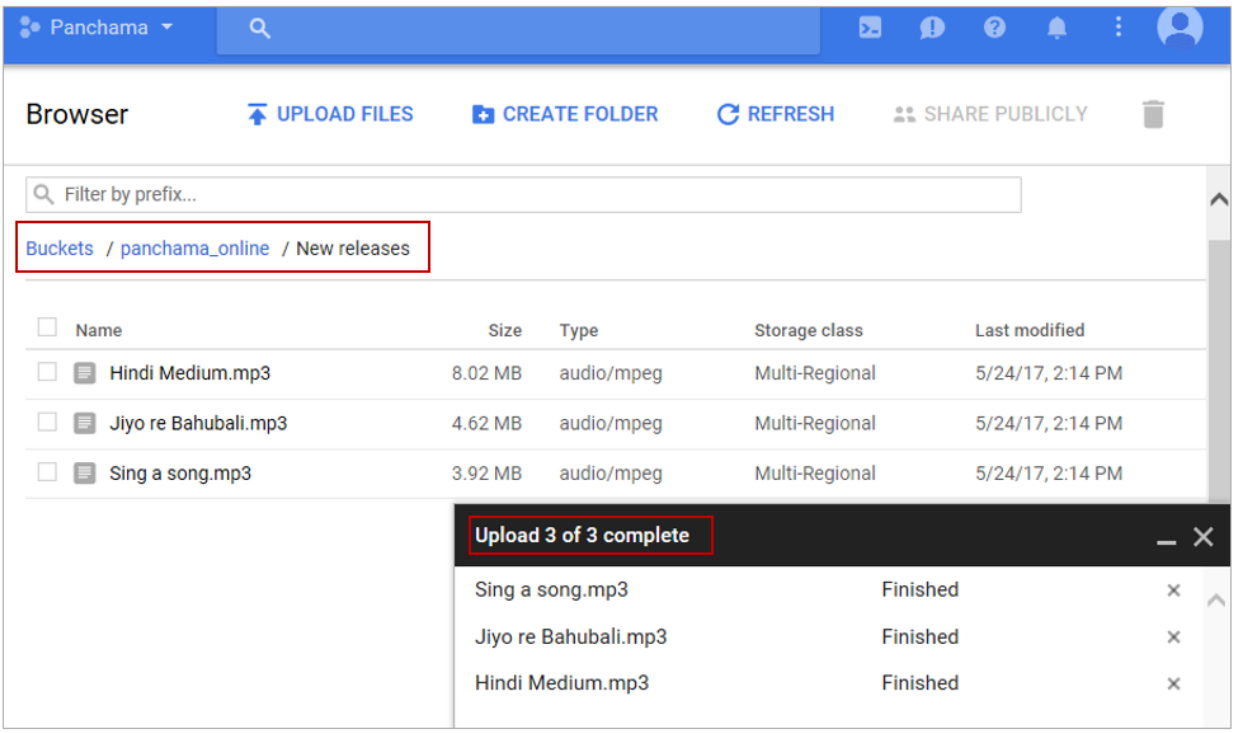
Objective: To upload objects in to a bucket in Cloud Storage

Solution:

Step 1: Click on create folder and create folders based on the need.



Step 2: Click on upload files and upload them.



Summary of this assignment: In this assignment, you have learnt to upload objects in to a Cloud storage bucket.