

Lab Guide for GCP IAM, Management services

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Day-4 Assignments

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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.

Day-4 Assignments

Assignment 1: Managing roles and permissions

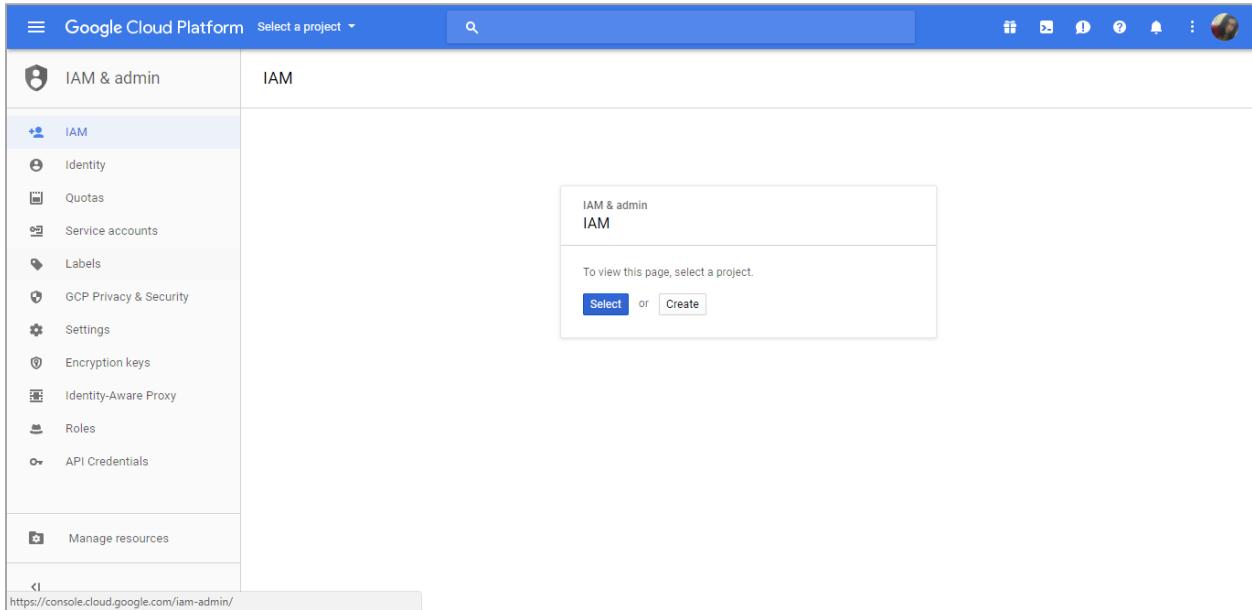
Objective: To create and manage permissions for Google Cloud Platform resources

Problem Description:

Step 1: Granting, changing and revoking access

Granting access to team members:

Open the IAM console and select a project.



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. The left sidebar is titled "IAM & admin" and contains the following navigation links:

- IAM
- Identity
- Quotas
- Service accounts
- Labels
- GCP Privacy & Security
- Settings
- Encryption keys
- Identity-Aware Proxy
- Roles
- API Credentials

Below the sidebar, there is a "Manage resources" section with a "View" button.

The main content area is titled "IAM & admin" and "IAM". It displays the message: "To view this page, select a project." with "Select" and "Create" buttons.

The URL in the browser bar is <https://console.cloud.google.com/iam-admin/>.

Select

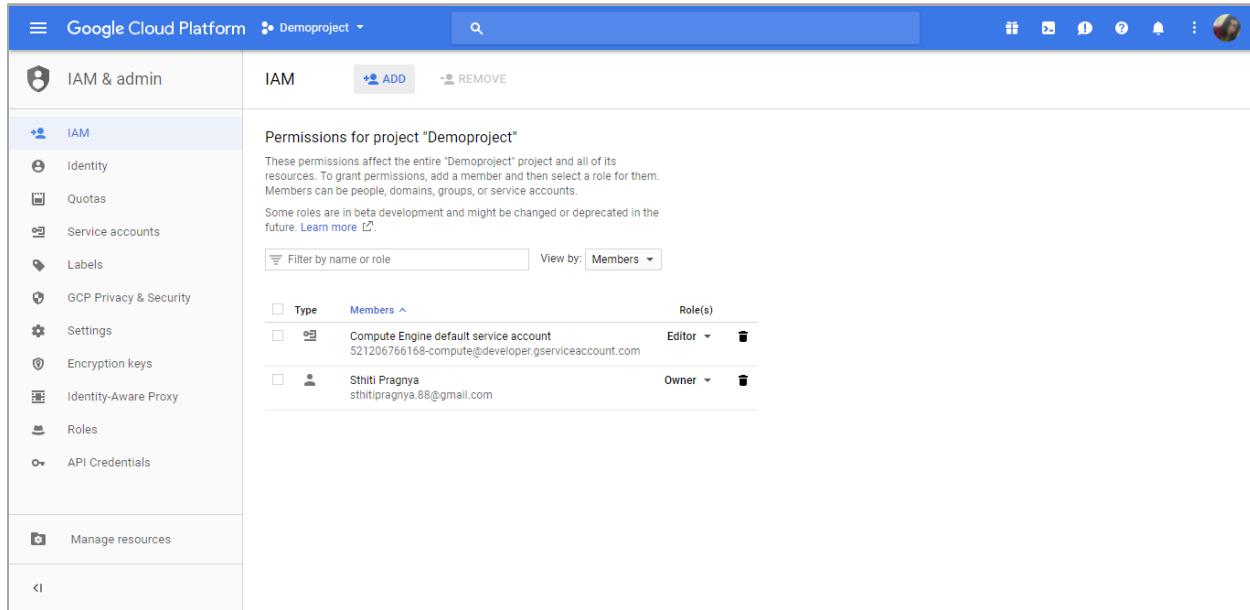
[Recent](#) [All](#)

Name	ID
OSCE	osce-159707
OSFP	osfp-159706
Firebase Demo Project	fir-demo-project
Mysessiondemo	mysessiondemo
Demoproject	demoproject-163505

[CANCEL](#) [OPEN](#)

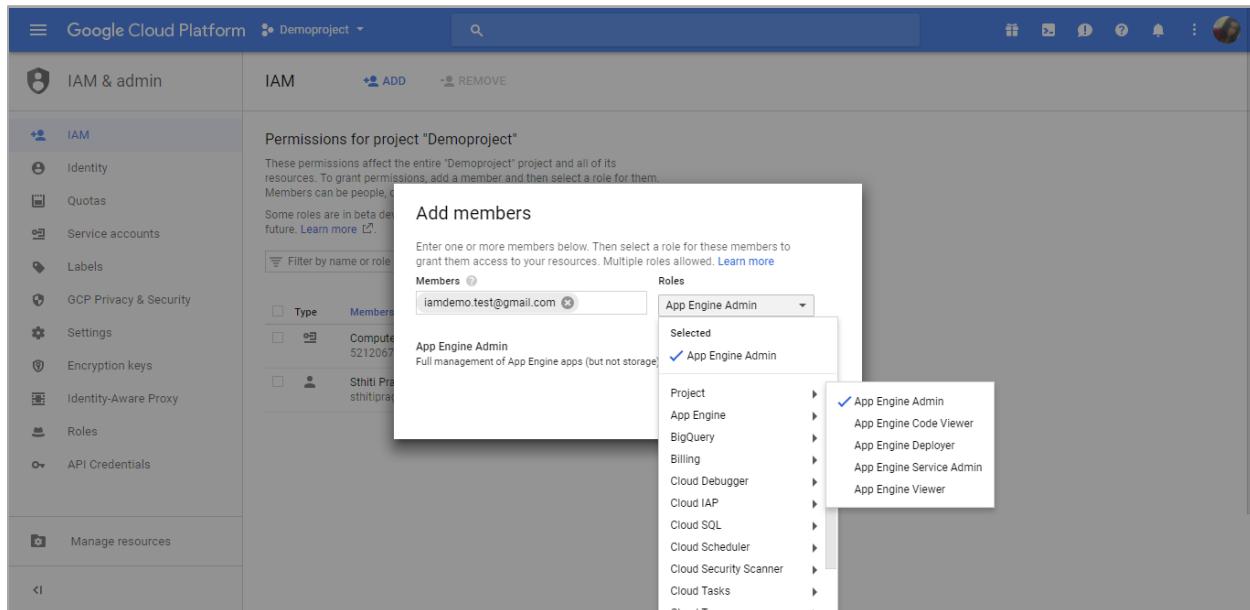
Click Add to add new member and set it's permission.



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface for the project "Demoproject". The left sidebar lists various IAM-related options: IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles, API Credentials, Manage resources, and Help.

The main pane displays the "Permissions for project 'Demoproject'" screen. It includes a note about permissions affecting the entire project and its resources, mentioning service accounts and members. A search bar and a "View by" dropdown set to "Members" are present. The table lists two members:

Type	Members	Role(s)
Compute Engine default service account	521206766168-compute@developer.gserviceaccount.com	Editor
User	Stuti Pragnya sthitipragnya.88@gmail.com	Owner



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. The left sidebar is titled 'IAM & admin' and contains the following menu items:

- IAM** (selected)
- Identity
- Quotas
- Service accounts
- Labels
- GCP Privacy & Security
- Settings
- Encryption keys
- Identity-Aware Proxy
- Roles
- API Credentials

Below the sidebar, the main area displays the 'Permissions for project "Demoproject"' page. It includes a note about permissions affecting the entire project and instructions for adding members and selecting roles. A modal window titled 'Add members' is open, showing a list of members and a dropdown menu for selecting roles. The 'App Engine Admin' role is selected.

Type	Members
Compute	5212067
User	Shiti Pra... sthitipra...

Roles

Selected

App Engine Admin

Project

App Engine Admin

App Engine Code Viewer

App Engine Deployer

App Engine Service Admin

App Engine Viewer

App Engine

BigQuery

Billing

Cloud Debugger

Cloud IAP

Cloud SQL

Cloud Scheduler

Cloud Security Scanner

Cloud Tasks

Cloud Trace

Google Cloud Platform Demoproject ▾

IAM & admin

IAM ADD REMOVE

IAM

Permissions for project "Demoproject"

These permissions affect the entire "Demoproject" project and all of its resources. To grant permissions, add a member and then select a role for them. Members can be people, domains, groups, or service accounts.

Some roles are in beta development and might be changed or deprecated in the future. [Learn more](#) ↗

Filter by name or role View by: Members

Type	Members	Role(s)
<input type="checkbox"/>	 Compute Engine default service account 521206766168-compute@developer.gserviceaccount.com	Editor
<input type="checkbox"/>	 iamdemo.test@gmail.com	App Engine Admin
<input type="checkbox"/>	 Shiti Pragnya shiti.pragnya.88@gmail.com	Owner

Manage resources

Grant a role to a member for more than one project.

The screenshot shows the Google Cloud Platform 'Manage resources' page. On the left, a list of projects is displayed:

Project name	Project ID	⋮
<input checked="" type="checkbox"/> Demoproject	demoproject-163505	⋮
<input type="checkbox"/> Firebase Demo Project	fir-demo-project	⋮
<input checked="" type="checkbox"/> Mysessiondemo	mysessiondemo	⋮
<input type="checkbox"/> OSCE	osce-159707	⋮
<input type="checkbox"/> OSFP	osfp-159706	⋮

Below the table, it says 'Resources pending deletion'. On the right, the 'PERMISSIONS' tab is selected, showing the following details:

- Add members:** iamdemo.test@gmail.com (with a remove icon)
- Search members:** A dropdown menu listing various Google Cloud roles:
 - Project
 - App Engine Admin
 - App Engine Code Viewer
 - App Engine Deployer
 - App Engine Service Admin
 - App Engine Viewer
- Selected:** A list of roles:
 - App Engine Admin (1 member)
 - Full management of App Engine apps

Google Cloud Platform Mysessiondemo

IAM & admin IAM ADD REMOVE

IAM

Permissions for project "Mysessiondemo"

These permissions affect the entire "Mysessiondemo" project and all of its resources. To grant permissions, add a member and then select a role for them. Members can be people, domains, groups, or service accounts.

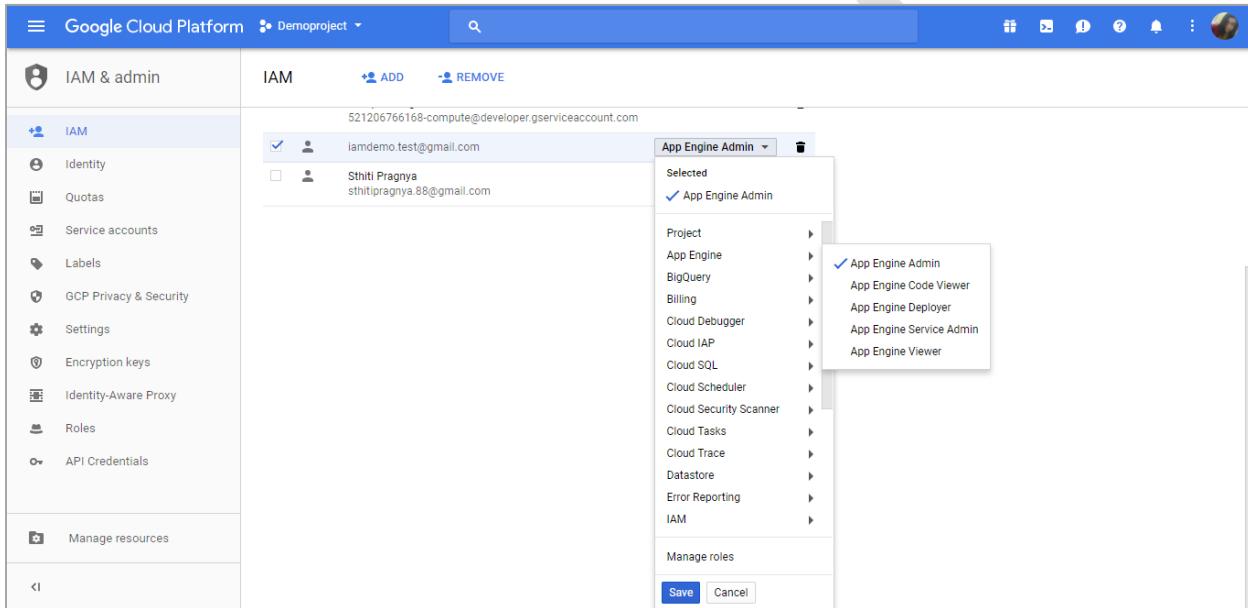
Some roles are in beta development and might be changed or deprecated in the future. [Learn more](#).

Filter by name or role View by: Members

Type	Members	Role(s)
<input type="checkbox"/>	 Compute Engine default service account 420768504169-compute@developer.gserviceaccount.com	Editor
<input type="checkbox"/>	 iamdemo.test@gmail.com	App Engine Admin
<input type="checkbox"/>	 App Engine default service account mysessiondemo@appspot.gserviceaccount.com	Editor
<input type="checkbox"/>	 Google APIs service account  service-420768504169.firebaseio.googleapis.com.iam.gserviceaccount.com	Firebase Rules System
<input type="checkbox"/>	 sthitipragnya.88@gmail.com	Owner

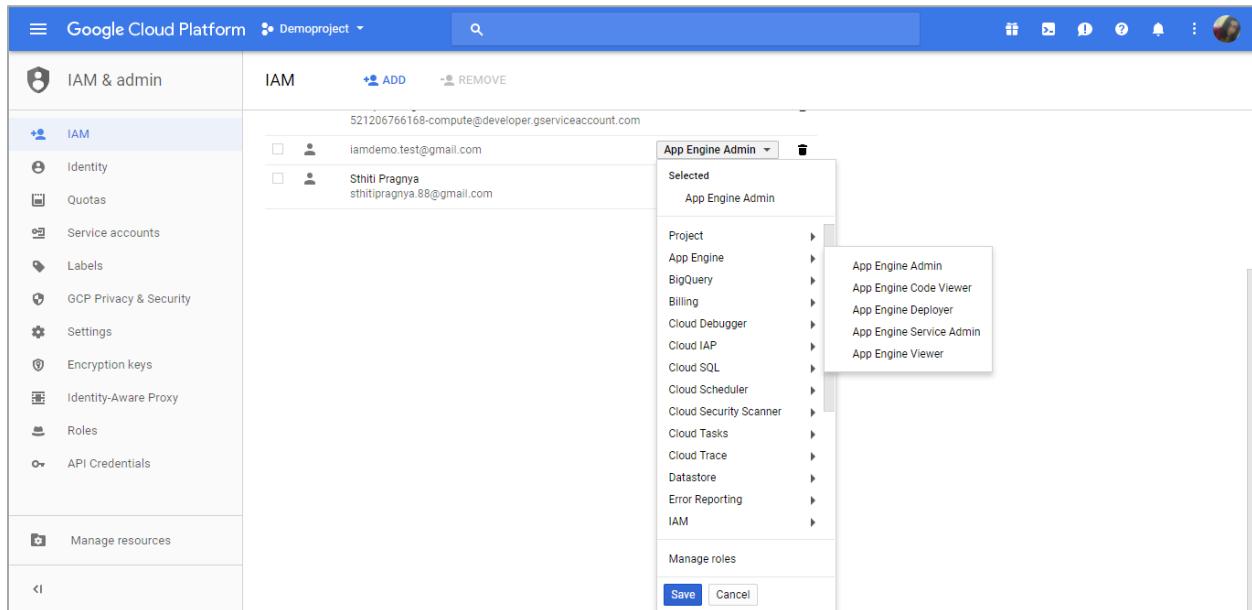
To change or revoke the to team member's

Select the member from whom you want to change or revoke the access.



The screenshot shows the Google Cloud Platform IAM & admin interface. On the left, there's a sidebar with options like IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles, and API Credentials. Below that is a 'Manage resources' section. The main area shows a list of members: 'iamdemo.test@gmail.com' (selected) and 'Shiti Pragnya' (not selected). A dropdown menu for 'App Engine Admin' is open, showing a hierarchy of roles under 'Project'. Under 'Project', 'App Engine Admin' is checked. Other roles listed under 'Project' include App Engine Code Viewer, App Engine Deployer, App Engine Service Admin, and App Engine Viewer. At the bottom of the dropdown are 'Save' and 'Cancel' buttons.

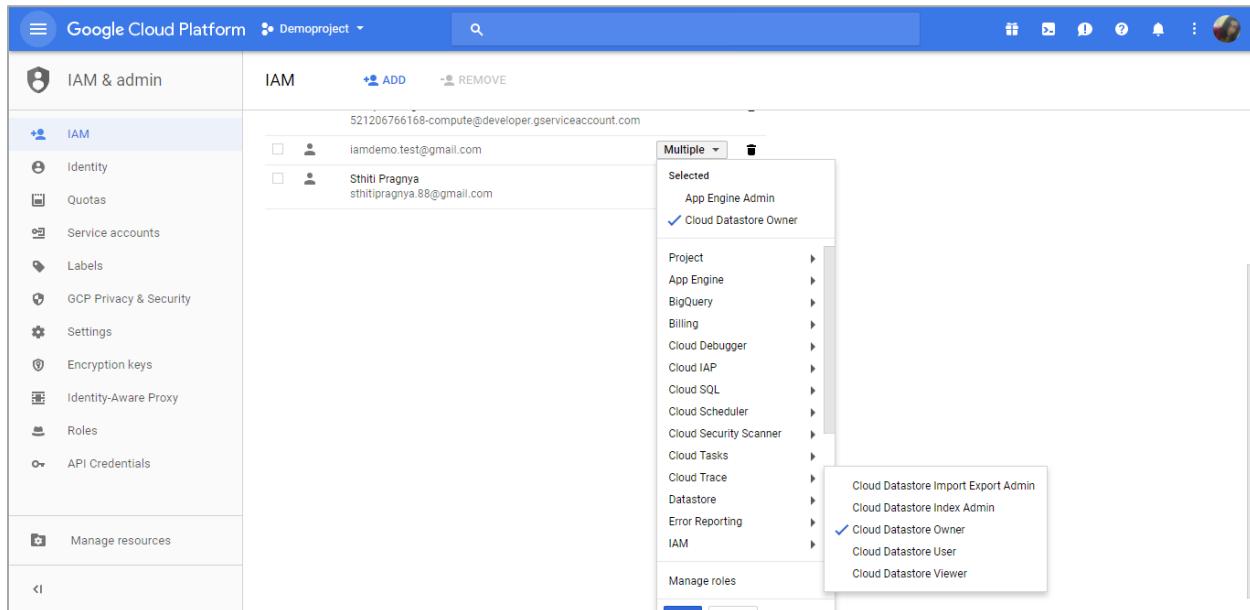
In the Roles dropdown uncheck the roles and save.



The screenshot shows the Google Cloud Platform IAM & admin interface. On the left, the sidebar includes options like IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles, API Credentials, Manage resources, and Help. The main area shows two users: iamdemo.test@gmail.com and Sthit Pragnya (sthitpragnya.88@gmail.com). A dropdown menu for 'App Engine Admin' is open, listing various roles under 'Selected'. The 'Selected' section contains 'App Engine Admin'. The full list of roles includes:

- Project
- App Engine
- BigQuery
- Billing
- Cloud Debugger
- Cloud IAP
- Cloud SQL
- Cloud Scheduler
- Cloud Security Scanner
- Cloud Tasks
- Cloud Trace
- Datastore
- Error Reporting
- IAM

At the bottom of the dropdown are 'Save' and 'Cancel' buttons.



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. On the left, the sidebar is titled 'IAM & admin' and contains the following menu items:

- IAM
- Identity
- Quotas
- Service accounts
- Labels
- GCP Privacy & Security
- Settings
- Encryption keys
- Identity-Aware Proxy
- Roles
- API Credentials

Below the sidebar, the main area is titled 'IAM' and shows two users listed:

- iamdemo.test@gmail.com
- Sthiti Pragnya sthitipragnya.88@gmail.com

To the right of the users, there is an 'ADD' button and a 'REMOVE' button. A dropdown menu is open for the user 'Sthiti Pragnya', showing a list of roles under 'Selected'. The 'Cloud Datastore Owner' role is checked. The dropdown also lists other roles grouped by service, such as Project, App Engine, BigQuery, etc., and a 'Manage roles' option at the bottom.

- Selected
- Cloud Datastore Owner
- Project
- App Engine
- BigQuery
- Billing
- Cloud Debugger
- Cloud IAP
- Cloud SQL
- Cloud Scheduler
- Cloud Security Scanner
- Cloud Tasks
- Cloud Trace
- Datastore
- Error Reporting
- IAM
- Manage roles

- Cloud Datastore Import Export Admin
- Cloud Datastore Index Admin
- Cloud Datastore Owner
- Cloud Datastore User
- Cloud Datastore Viewer

Type	Members	Role(s)
<input type="checkbox"/>	Compute Engine default service account 521206766168-compute@developer.gserviceaccount.com	Editor
<input type="checkbox"/>	iamdemo.test@gmail.com	Cloud Datastore Owner
<input type="checkbox"/>	Shiti Pragnya shiti.pragnya.88@gmail.com	Owner

Source: google cloud platform

Step 2: Creating and managing custom roles.

Go to Roles and click on CREATE ROLE.

Google Cloud Platform OSCE

IAM & admin

Roles BETA

+ CREATE ROLE

No roles selected

This space is empty
Select one or more roles to create a new role and assign permissions

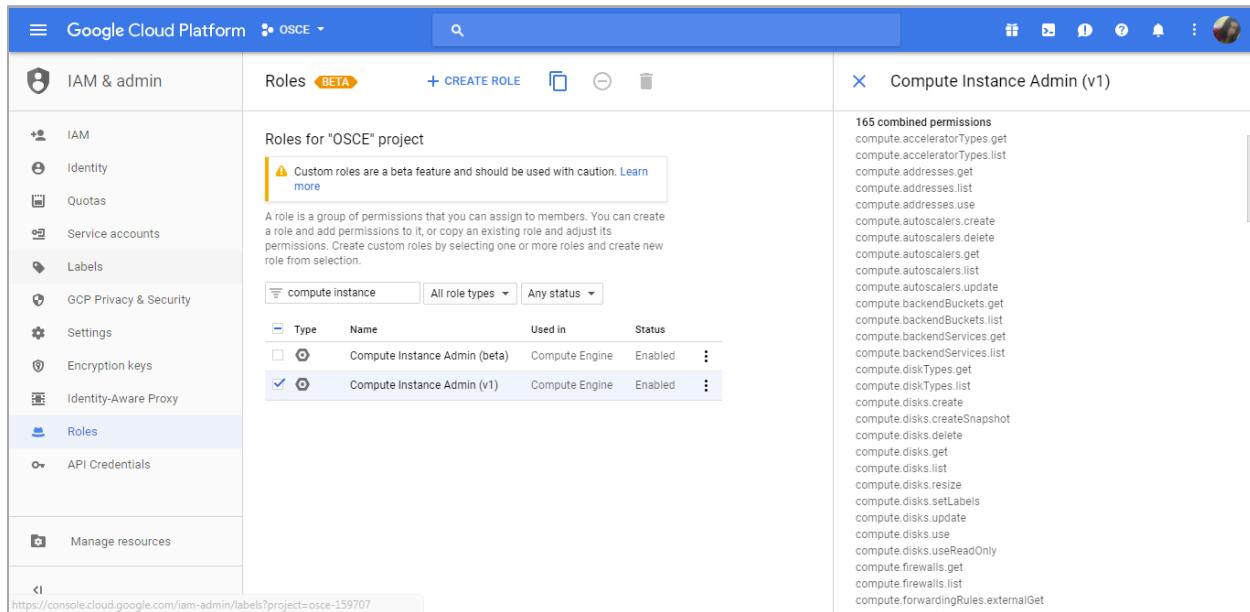
Roles for "OSCE" project

Custom roles are a beta feature and should be used with caution. [Learn more](#)

A role is a group of permissions that you can assign to members. You can create a role and add permissions to it, or copy an existing role and adjust its permissions. Create custom roles by selecting one or more roles and create new role from selection.

Filter by name and permis All role types Any status

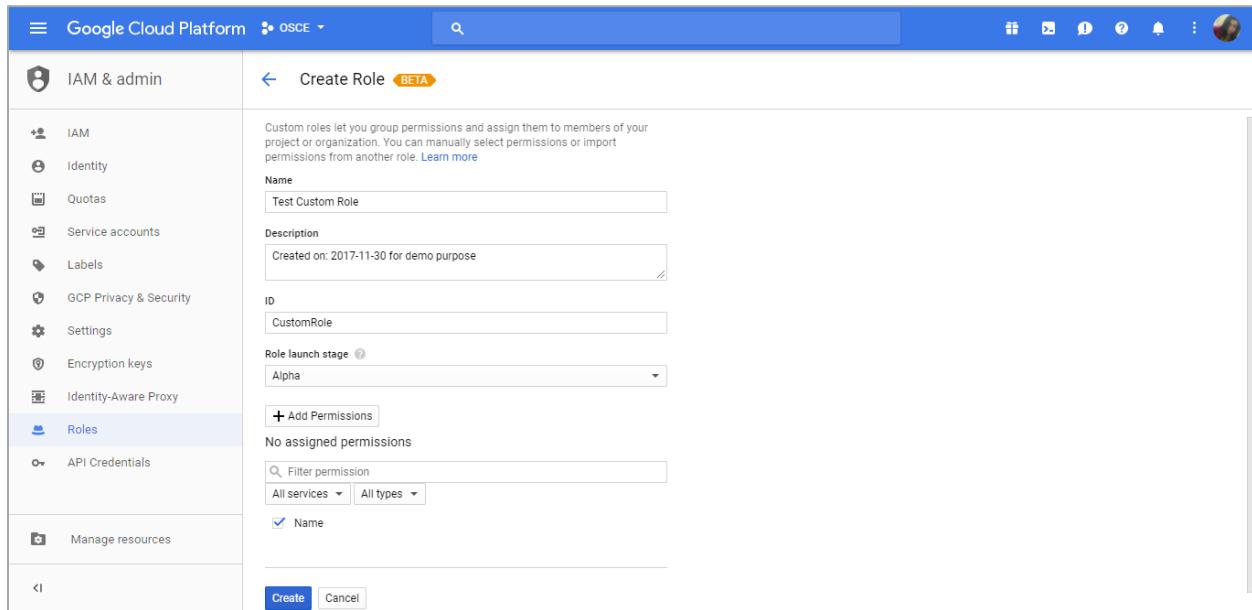
Type	Name	Used in	Status
<input type="checkbox"/>	App Engine Admin	App Engine	Enabled
<input type="checkbox"/>	App Engine Code Viewer	App Engine	Enabled
<input type="checkbox"/>	App Engine Deployer	App Engine	Enabled
<input type="checkbox"/>	App Engine Service Admin	App Engine	Enabled
<input type="checkbox"/>	App Engine Viewer	App Engine	Enabled
<input type="checkbox"/>	BigQuery Admin	BigQuery	Enabled
<input type="checkbox"/>	BigQuery Data Editor	BigQuery	Enabled
<input type="checkbox"/>	BigQuery Data Owner	BigQuery	Enabled
<input type="checkbox"/>	BigQuery Data Viewer	BigQuery	Enabled



The screenshot shows the Google Cloud Platform IAM & Admin interface. On the left sidebar, under the 'Roles' section, the 'Compute Instance Admin (v1)' role is selected. The main pane displays the permissions for this role, which includes 165 combined permissions related to Compute Engine resources like instances, disks, and snapshots.

Type	Name	Used in	Status
<input type="checkbox"/>	Compute Instance Admin (beta)	Compute Engine	Enabled
<input checked="" type="checkbox"/>	Compute Instance Admin (v1)	Compute Engine	Enabled

Add a new role and assign permissions to it.



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. On the left, a sidebar lists various services: IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles (which is selected), API Credentials, and Manage resources. The main area is titled "Create Role (BETA)". It contains fields for "Name" (set to "Test Custom Role"), "Description" (set to "Created on: 2017-11-30 for demo purpose"), "ID" (set to "CustomRole"), and "Role launch stage" (set to "Alpha"). A button labeled "+ Add Permissions" is present, along with a section for "No assigned permissions" and a "Filter permission" search bar. At the bottom are "Create" and "Cancel" buttons.

Add permissions

Display permissions from

Available Permissions ▾

Filter permission All services ▾ All types ▾

Name

appengine.applications.create

appengine.applications.disable

appengine.applications.get

appengine.applications.list

appengine.applications.update

appengine.instances.delete

appengine.instances.get

appengine.instances.list

appengine.instances.update

...

[CANCEL](#) [ADD PERMISSIONS](#)

Add permissions

Display permissions from

Available Permissions ▾

Filter permission All services ▾ All types ▾

Name

bigquery.tables.create

bigquery.tables.delete

bigquery.tables.export

bigquery.tables.get

bigquery.tables.getData

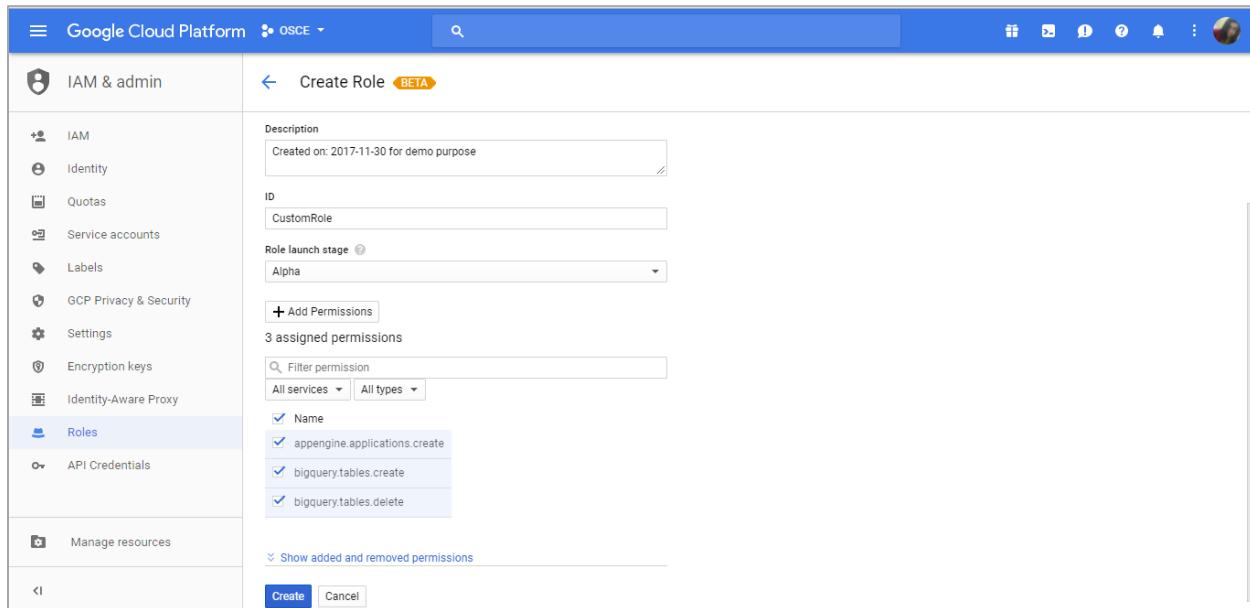
bigquery.tables.list

bigquery.tables.update

bigquery.tables.updateData

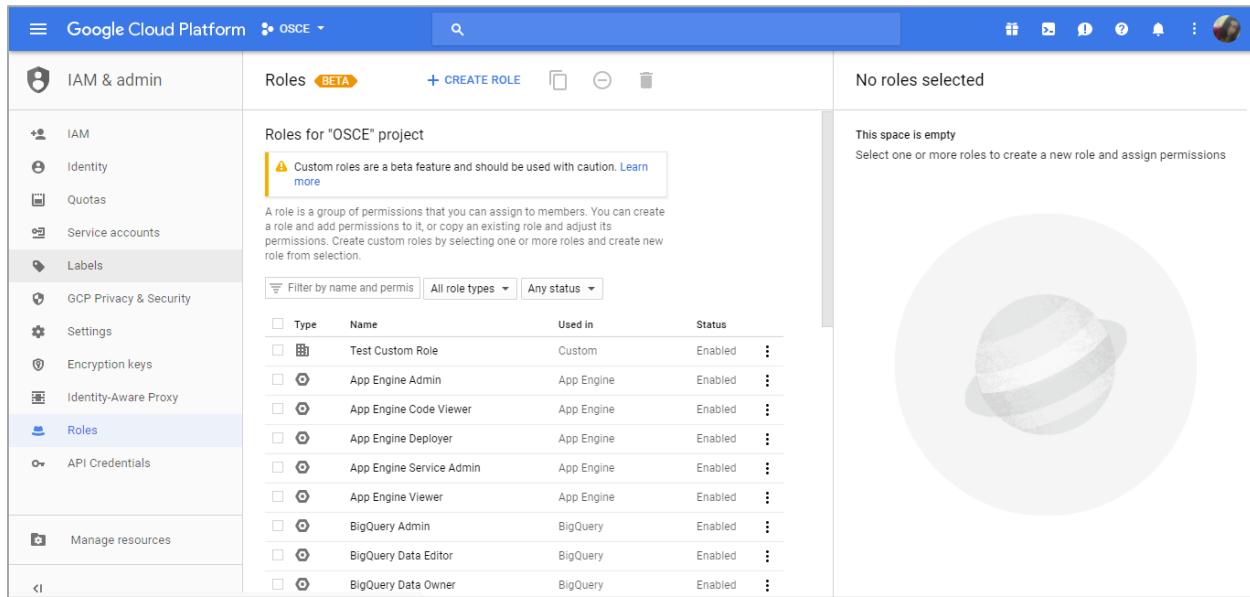
bigquery.transfers.get

CANCEL ADD PERMISSIONS



The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. On the left, there's a sidebar with various options like IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles (which is selected), API Credentials, and Manage resources. The main area is titled 'Create Role (BETA)'. It has fields for 'Description' (containing 'Created on: 2017-11-30 for demo purpose'), 'ID' (containing 'CustomRole'), 'Role launch stage' (set to 'Alpha'), and a 'Permissions' section. Under 'Permissions', there's a list of three assigned permissions: 'Name', 'appengine.applications.create', 'bigquery.tables.create', and 'bigquery.tables.delete'. At the bottom, there are 'Create' and 'Cancel' buttons.

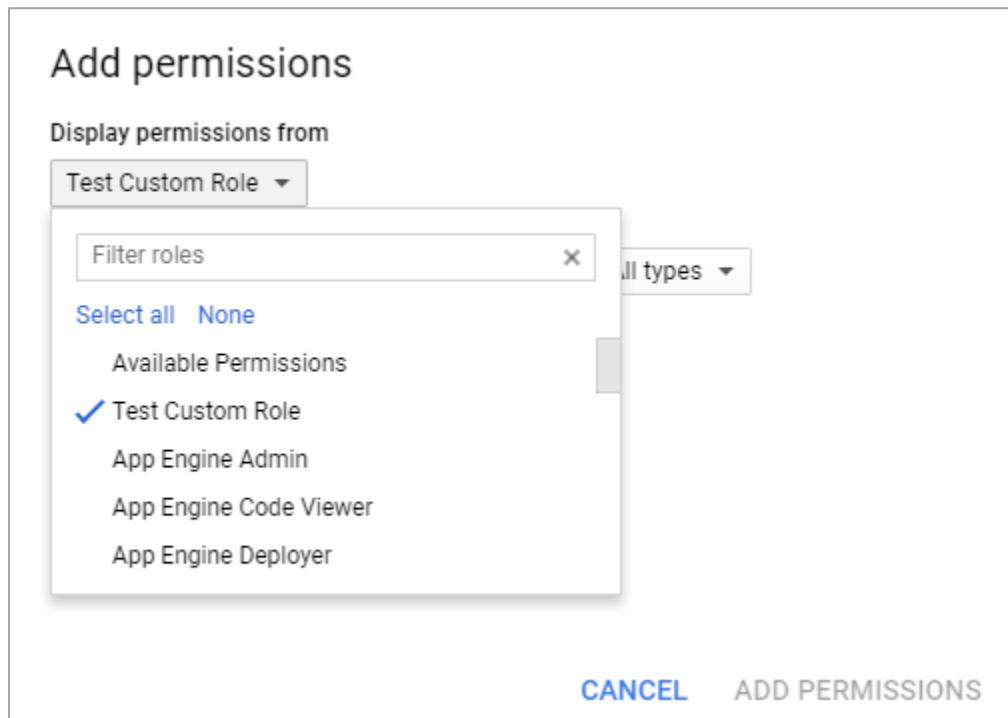
Go back to the Roles page and check for the new role you have created.



The screenshot shows the Google Cloud Platform IAM & admin Roles page. The left sidebar is titled 'IAM & admin' and includes options like IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles (which is selected), API Credentials, and Manage resources. The main content area is titled 'Roles for "OSCE" project'. It features a beta warning about custom roles and a table listing various roles with their types, names, used-in services, and statuses. A message on the right says 'No roles selected' and 'This space is empty. Select one or more roles to create a new role and assign permissions'.

Type	Name	Used in	Status
Custom	Test Custom Role	Custom	Enabled
App Engine	App Engine Admin	App Engine	Enabled
App Engine	App Engine Code Viewer	App Engine	Enabled
App Engine	App Engine Deployer	App Engine	Enabled
App Engine	App Engine Service Admin	App Engine	Enabled
App Engine	App Engine Viewer	App Engine	Enabled
BigQuery	BigQuery Admin	BigQuery	Enabled
BigQuery	BigQuery Data Editor	BigQuery	Enabled
BigQuery	BigQuery Data Owner	BigQuery	Enabled

Follow the above steps and create another role. Assign Test Custom Role as a permission to the new role.



Add permissions

Display permissions from

Test Custom Role ▾

Filter permission

Name
 appengine.applications.create
 bigquery.tables.create
 bigquery.tables.delete

[CANCEL](#) [ADD PERMISSIONS](#)

Go back to the Roles console and check for the new role.

Google Cloud Platform OSCE

IAM & admin

Roles BETA

+ CREATE ROLE

No roles selected

Custom roles are a beta feature and should be used with caution. [Learn more](#)

A role is a group of permissions that you can assign to members. You can create a role and add permissions to it, or copy an existing role and adjust its permissions. Create custom roles by selecting one or more roles and create new role from selection.

Filter by name and permis All role types Any status

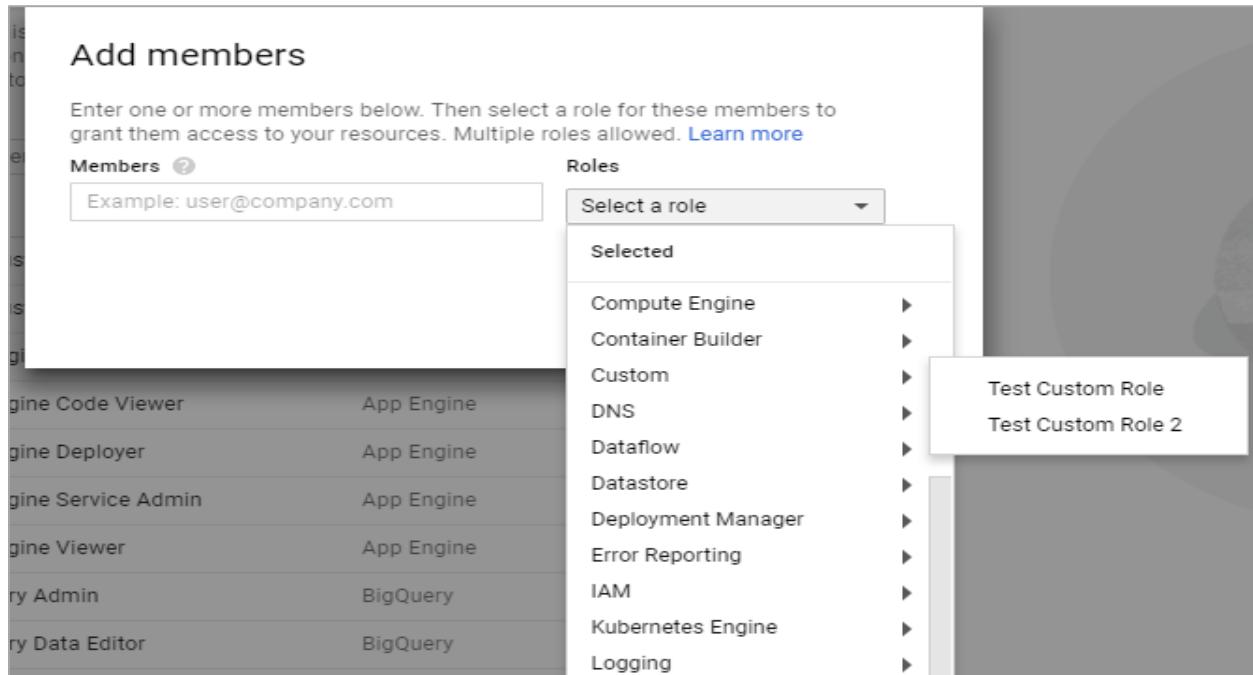
Type	Name	Used in	Status
	Test Custom Role	Custom	Enabled
	Test Custom Role 2	Custom	Enabled
	App Engine Admin	App Engine	Enabled
	App Engine Code Viewer	App Engine	Enabled
	App Engine Deployer	App Engine	Enabled
	App Engine Service Admin	App Engine	Enabled
	App Engine Viewer	App Engine	Enabled
	BigQuery Admin	BigQuery	Enabled
	BigQuery Data Editor	BigQuery	Enabled

This space is empty
Select one or more roles to create a new role and assign permissions

The screenshot shows the Google Cloud Platform (GCP) IAM & admin interface. On the left, the navigation menu includes options like IAM, Identity, Quotas, Service accounts, Labels, GCP Privacy & Security, Settings, Encryption keys, Identity-Aware Proxy, Roles (which is selected), API Credentials, and Manage resources. The main content area displays a list of roles for the "OSCE" project. A modal window titled "Test Custom Role" is open, showing details about a custom role named "Test Custom Role". The modal includes fields for ID (projects/osce-159707/roles/CustomRole), Role launch stage (Alpha), and Description (Created on: 2017-11-30 for demo purpose). It also lists combined permissions: appengine.applications.create, bigquery.tables.create, and bigquery.tables.delete. The modal also contains a table of roles, with the "Test Custom Role" row selected and a context menu open over it, showing options: Create role from this role, Disable, Delete, and Edit.

Type	Name	Used in	Status
<input checked="" type="checkbox"/>	Test Custom Role	Custom	Enabled
<input type="checkbox"/>	Test Custom Role 2	Custom	
<input type="checkbox"/>	App Engine Admin	App Engine	
<input type="checkbox"/>	App Engine Code Viewer	App Engine	
<input type="checkbox"/>	App Engine Deployer	App Engine	
<input type="checkbox"/>	App Engine Service Admin	App Engine	Enabled
<input type="checkbox"/>	App Engine Viewer	App Engine	Enabled
<input type="checkbox"/>	BigQuery Admin	BigQuery	Enabled
<input type="checkbox"/>	BigQuery Data Editor	BigQuery	Enabled

Add members and assign the new roles to them.



Add members

Enter one or more members below. Then select a role for these members to grant them access to your resources. Multiple roles allowed. [Learn more](#)

Members [?](#)

Example: user@company.com

Roles

Select a role

Selected

- Compute Engine
- Container Builder
- Custom
- DNS
- Dataflow
- Datastore
- Deployment Manager
- Error Reporting
- IAM
- Kubernetes Engine
- Logging

Test Custom Role

Test Custom Role 2

Member	Role
Engine Code Viewer	App Engine
Engine Deployer	App Engine
Engine Service Admin	App Engine
Engine Viewer	App Engine
ry Admin	BigQuery
ry Data Editor	BigQuery

Delete the new custom roles.

		Filter by name and permis	All role types	Any status
Type	Name	Used in	Status	
<input type="checkbox"/>	Test Custom Role	Custom	Deleting	⋮
<input checked="" type="checkbox"/>	Test Custom Role 2	Custom	Deleting	⋮

		Filter by name and permis	All role types	Any status
Type	Name	Used in	Status	
<input checked="" type="checkbox"/>	Test Custom Role	Custom	Deleting	⋮
<input checked="" type="checkbox"/>	Test Custom Role 2	Custom		<ul style="list-style-type: none">Create role from this roleEnableUndeleteEdit
<input type="checkbox"/>	App Engine Admin	App Engine		Enabled
<input type="checkbox"/>	App Engine Code Viewer	App Engine		⋮
<input type="checkbox"/>	App Engine Deployer	App Engine		⋮

Step 3: Enter the gmail username and password when prompted and click on Login.

Estimated time: 5 minutes

Summary: You have learnt:

- *how to grant, change, and revoke access to Project members*
- *how to create and manage a custom role*

Day-4 Assignments

Assignment 2 : Create persistent disk

Highlights:

PD helps in increasing the storage capacity of instances

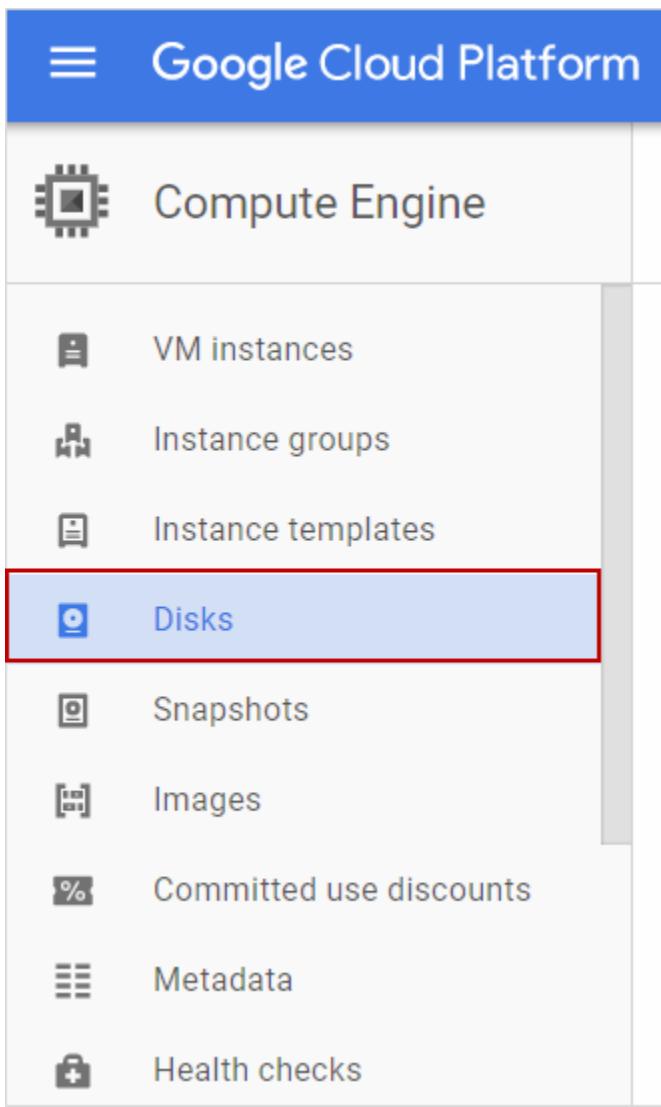
PD are available as either Standard HDD or SSD

Demosteps:

For personal computers, you can use external hard disks to increase the total storage capacity. PD helps in increasing the storage capacity of instances. You can create PD and customize according to the storage requirements of instances. You will now see the demo on how to create a standard PD:

Step 1:

To create a PD, navigate to disks and click create disks



The image shows a screenshot of the Google Cloud Platform Compute Engine interface. At the top, there's a blue header bar with the text "Google Cloud Platform". Below it is a sidebar with the title "Compute Engine". The sidebar contains several items: "VM instances", "Instance groups", "Instance templates", "Disks" (which is highlighted with a red border), "Snapshots", "Images", "Committed use discounts", "Metadata", and "Health checks". A large, semi-transparent watermark reading "Final" diagonally is overlaid on the right side of the screen.

- VM instances
- Instance groups
- Instance templates
- Disks**
- Snapshots
- Images
- Committed use discounts
- Metadata
- Health checks

Compute Engine

Disks

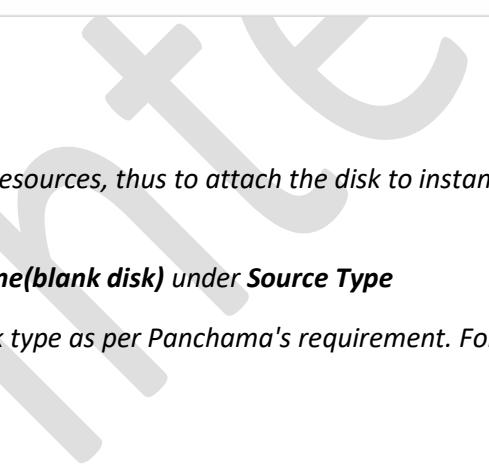
Every Compute Engine VM instance is attached to at least one disk as a boot disk and for persistent storage. A persistent disk can be a standard (HDD) or a solid-state (SSD) drive. You can also attach an ephemeral local SSD for high-performance I/O.

[Learn more](#)

[Create disk](#)

Step 2:

Provide the name to the disk



Name 	<input type="text" value="panchama-disk1"/>
Description (Optional)	<input type="text"/>
Zone 	<input type="text" value="us-central1-c"/>
Disk Type 	<input type="text" value="Standard persistent disk"/>

Step 3:

As disk are zonal resources, thus to attach the disk to instance select the zone in which your instance are placed.

- Select **None(blank disk)** under **Source Type**
- Select disk type as per Panchama's requirement. For standard, we can create disk upto 64TB

Source type ?

Image Snapshot None (blank disk)

Size (GB) ?

10

 You have entered a volume size of under 200 GB. This may result in reduced performance. [Learn more](#)

Estimated performance ?

Operation Type	Read	Write
Sustained random IOPS limit	7.50	15.00
Sustained throughput limit (MB/s)	1.20	1.20

Encryption ?

Automatic (recommended)

Create

Step 4:

Click on **Create** and a new PD will be created as shown below:

Disks					 CREATE DISK	 REFRESH	 DELETE
<input type="text" value="Filter by label or name"/>					<input type="button" value="Columns ▾"/>		
<input type="checkbox"/> Name ^	Type	Size	Zone	In use by			
<input checked="" type="checkbox"/> panchama-disk-1	Standard persistent disk	10 GB	us-central1-c				

PD are available as either Standard HDD (hard disk drives) or SSD (solid state drives). You can understand more [storage options to add to your instance](#) in GCP documentation.

Next, you will see how to attach this EBS volume to an EC2 instance to increase its storage capacity.

Assignment 3 : Add PD to instances

Highlights:

- PDs are zonal resources
- Multiple disks can be attached to the instance while creation

Demosteps:

Once PD is created, it will be in available state. You can attach them to instances to configure as a storage device. As the first step, you will create an instance, so that the PD can be attached to it.

Step 1: Create an instance

- Navigate to GCP console and launch an instance from a Debian GNU image. You can proceed with micro (f1-micro) machine type*
- Select the zone corresponding to the zone that you selected during PD creation*

[←](#) Create an instance

Name  panchama-instance-1

Zone  us-central1-c

Machine type

micro (1 shared...  0.6 GB memory [Customize](#)

Boot disk 

New 10 GB standard persistent disk
 Image
Debian GNU/Linux 9 (stretch) [Change](#)

You can verify the instance created below:

<input type="checkbox"/> Name ^	Zone	Recommendation	Internal IP	External IP	Connect
<input checked="" type="checkbox"/> panchama-instance-1	us-central1-c		10.128.0.2	35.192.64.238	SSH <input type="button" value="..."/>

Step 2: Add PD to instance

- Select **Disks** by expand the **Management tab**

Management
Disks
Networking
SSH Keys

Deletion rule

Delete boot disk when instance is deleted

Encryption ?

Automatic (recommended)

Additional disks ? (Optional)

+ Add item

- Click **Add Item** to add the additional disk created for instance
- Select the PD created from the drop down list in Name

Management **Disks** Networking SSH Keys

Deletion rule

Delete boot disk when instance is deleted

Encryption 

Automatic (recommended) 

Additional disks  (Optional)

Name	Mode	When deleting instance
<input type="button" value="Create disk"/>	Read/write	Keep disk 
panchama-disk-1	Standard persistent disk, 10 GB, unmounted	

Click Create to launch the instance with disk attached to it

Once the volume is attached, you can connect to the instance, format the PD as per Panchama's requirement and make it available for use.

For more information, see [Formatting and mounting a non-boot persistent disk](#) from GCP documentation.

In the next section, you will see how to reuse existing PD to create replicas of it and use for data restoration.

Assignment 4 : Create PD from snapshots

Highlights:

- Snapshots are global resources
- Multiple disks can be created from single snapshot

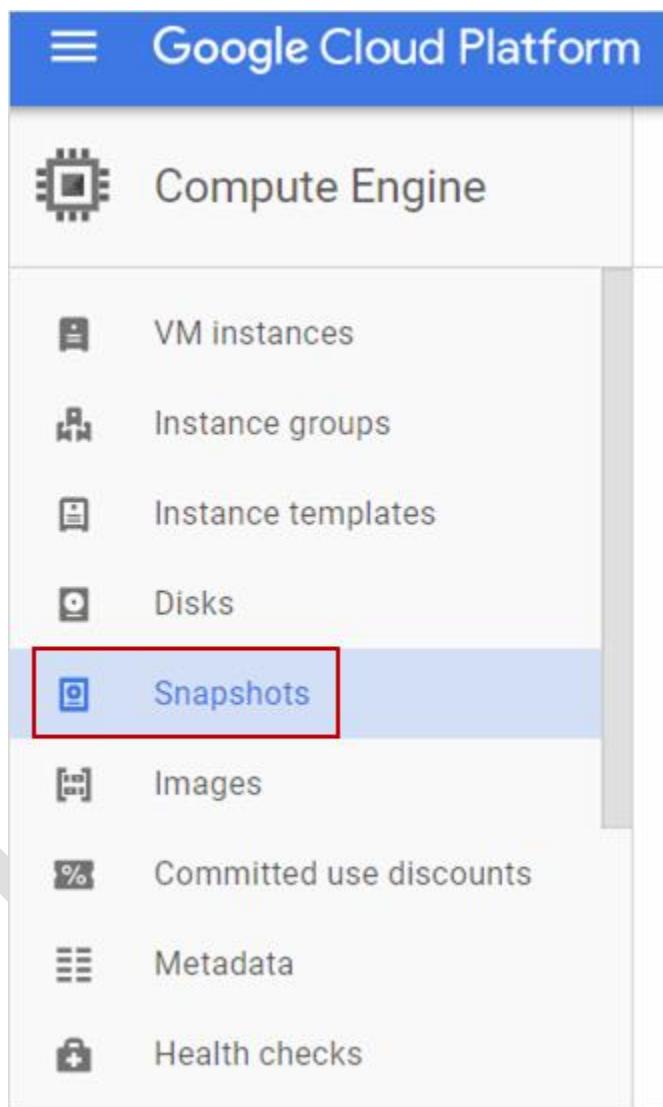
Demosteps:

Snapshots are useful to create periodic backup from PD to use as baseline for new volumes or for backup of data. The snapshots are incremental which makes regular snapshots on a PD faster at a much lower rate. Snapshot process takes place asynchronously and the data will be stored into storage buckets owned by GCP.

You will now see the demo on how to take snapshot and restore PD from it:

Step 1: Create a snapshot

- To create a snapshot, navigate to Compute Engine dashboard and click Snapshots



Compute Engine Snapshots

You can take a snapshot of a Compute Engine persistent disk to quickly back up the disk so you can recover lost data, transfer contents to a new disk, or make static data available to multiple nodes. [Learn more](#)

[Create snapshot](#)

Select the required PD from the list Source Disk

[!\[\]\(4d33da7629a5a39548ac503eca45f6d0_img.jpg\) Create a snapshot](#)

Name 

Description (Optional)

Snapshot to create backup of disk.

Source disk 

Encryption 

Automatic (recommended)

Integrate volume shadow copy service 

Enable VSS

Create Cancel

The list of completed snapshots can be seen in the **Snapshots** dashboard.

<input type="checkbox"/> Name ^	Source disk	Creation time	Disk size	Snapshot size
<input checked="" type="checkbox"/> panchama-disk-snapshot-1	panchama-disk-1	Oct 18, 2017, 3:35:05 PM	10 GB	0 B

You can also create snapshot of a disk by selecting **Create snapshot** as shown:

<input type="checkbox"/> Name ^	Type	Size	Zone	In use by	⋮
<input checked="" type="checkbox"/> panchama-disk-1	Standard persistent disk	10 GB	us-central1-c	panchama-instance-1	
<input checked="" type="checkbox"/> panchama-instance-1	Standard persistent disk	10 GB	us-central1-c	panchama-disk-1	

Snapshots that are taken from encrypted volumes are automatically encrypted. Volumes that are created from encrypted snapshots are also automatically encrypted.

Taking a snapshot will not impact any ongoing read/write operations into the PD. The data blocks till the point-in-time of initiating snapshot will be considered. Hence you can take a snapshot of an attached volume that is in use.

Step 2: Restore PD from snapshot

- To create an PD out of an existing snapshot, navigate to **Disks**

Name 

Description (Optional)
Restored disk from snapshot.

Zone 

Disk Type 

Provide disk details as per Panchama's requirement and select **Snapshots** under Source type

Image **Snapshot** None (blank disk)

Source snapshot  panchama-disk-snapshot-1

Size (GB)  (Optional)
10

Estimated performance 

Operation Type	Read	Write
Sustained random IOPS limit	7.50	15.00
Sustained throughput limit (MB/s)	1.20	1.20

Encryption 

Automatic (recommended)

Create **Cancel**

- You can see a new disk created from the snapshot provided

Name ^	Type	Size	Zone	In use by	
<input type="checkbox"/> panchama-disk-1	Standard persistent disk	10 GB	us-central1-c	panchama-instance-1	
<input type="checkbox"/> panchama-disk-2	Standard persistent disk	10 GB	us-central1-c		
<input type="checkbox"/> panchama-instance-1	Standard persistent disk	10 GB	us-central1-c	panchama-instance-1	

In the next section, you will see how to detach and delete an PD if it is no longer required.

Assignment 5: Detach and delete PD

You can detach a GCP PD from an instance explicitly or by terminating the instance. However, if the instance is running, you must first unmount the volume from the instance.

If PD is the root device of an instance, you must stop the instance before you can detach the volume.

Use the following command to unmount the disk mounted on location '/mnt/disks/PD1'.

`sudo umount /mnt/disks/PD1`

- To detach a disk, first stop the instance so that any data can be saved.
- Select the instance of which disk needed to be detached.
- Click EDIT, cancel the attached disk under Additional disks.

 **VM instance details**  EDIT  RESET  CLONE

Delete boot disk when instance is deleted

Additional disks  (Optional)

Name	Mode	When deleting instance
panchama-disk-1	Read/write	Keep disk 
 Add item		

Once a disk is deleted, the data stored will also be gone and the volume cannot be attached to any instance. You need to make sure that the data is properly backed up as snapshots so that this can be re-used at any point of time.

Assignment 6 : Host a static website

Highlights:

Upload static web files in cloud storage and server website through HTTPS

Registered domain can be used to create bucket and server through HTTP

Demosteps:

Panchama wants measure the performance of static web hosting in cloud storage bucket, as per requirement it will then register the domain. You will now see the demo on host static website in cloud storage:

Step 1:

Navigate to cloud storage and create the bucket in a specific region as per Panchama's requirement.

panchama

Default storage class 

Multi-Regional
Use to stream videos and host hot web content.
Best for data accessed frequently around the world.

Regional
Use to store data and run data analytics.
Best for data accessed frequently in one part of the world.

Nearline
Use to store rarely accessed documents.
Best for data accessed less than once per month.

Coldline
Use to store very rarely accessed documents.
Best for data accessed less than once per year.

Regional location
Redundant within a single region.

us-central1

Specify labels

Create **Cancel**

Step 2:

Upload required static files in bucket, as shown below static html files, image and an error file is uploaded.

Buckets / panchama					
	Name	Size	Type	Storage class	Last modified
<input type="checkbox"/>	bimag4.png	504.05 KB	image/png	Regional	10/20/17, 3:14 PM
<input type="checkbox"/>	error.html	267 B	text/html	Regional	10/20/17, 3:14 PM
<input type="checkbox"/>	Panchama.html	883 B	text/html	Regional	10/20/17, 3:14 PM

Step 3:

Make sure the file is made publicly accessible to serve it on HTTPS.

Buckets / panchama					
	Name	Size	Type	Storage class	Last modified
					Share publicly
<input type="checkbox"/>	bimag4.png	504.05 KB	image/png	Regional	10/20/17, 3:14 PM <input checked="" type="checkbox"/> Public link
<input type="checkbox"/>	error.html	267 B	text/html	Regional	10/20/17, 3:14 PM <input checked="" type="checkbox"/> Public link
<input type="checkbox"/>	Panchama.html	883 B	text/html	Regional	10/20/17, 3:14 PM <input checked="" type="checkbox"/> Public link

Step 4:

Copy the URL in browser in below format by specifying the bucket and object name as shown.

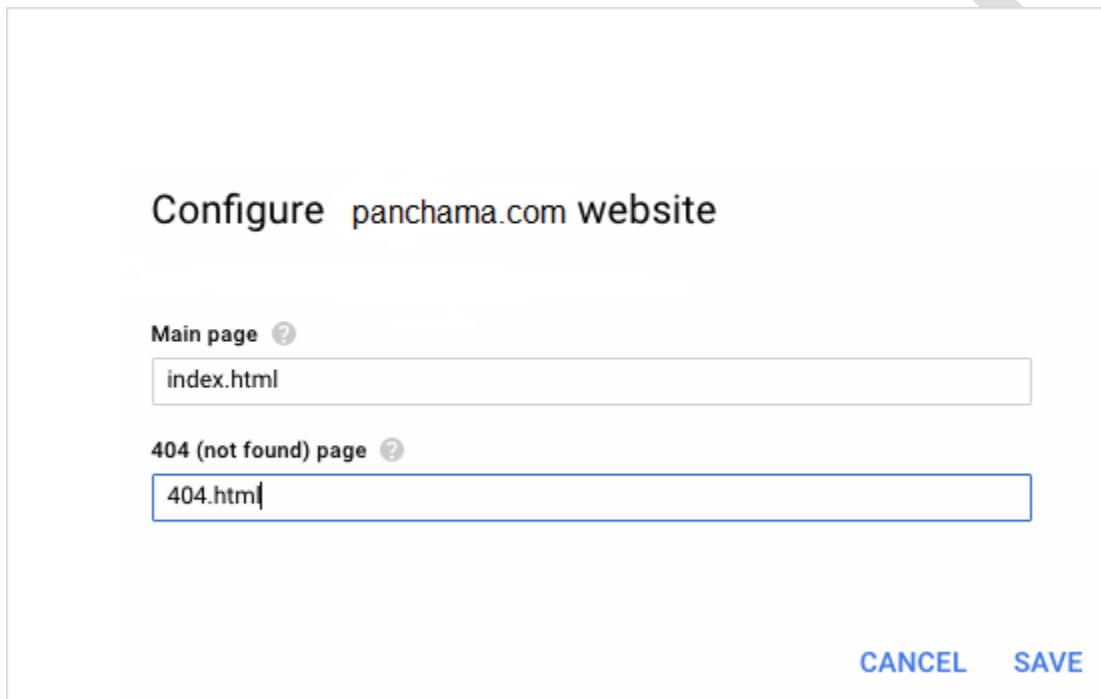
<https://storage.googleapis.com/panchama/Panchama.html>

Step 5:

Verify the output of the static html you uploaded in bucket.



If you created the bucket with verified domain, you can specify the index and error html files by clicking settings icon and edit website configuration as shown below.



Assignment 7 : Creating data transfers

Highlights:

Use the Google Cloud Platform Console to set up and manage transfer jobs

Demosteps:

Setting up a transfer job

1. Open the Transfer page in the Google Cloud Platform Console. Click **Create transfer job**.
2. Let's select **GOOGLE CLOUD STORAGE**
3. Then select **Google Cloud Storage bucket** and enter source bucket name.
4. Under **Select destination**, choose a sink bucket or create a new one. To transfer files to a new bucket, click **Browse** and then click the **New bucket** icon.
5. Enable overwrite/delete options if needed. By default, Storage Transfer Service overwrites an object if the source version is different from the sink version. No other objects are overwritten or deleted. You can enable additional overwrite/delete options under **Transfer options**.
6. Under **Configure transfer**, schedule your transfer job to **Run now** (one time) or **Run daily** at a time in your local timezone.
7. Click **Create**.

Internal