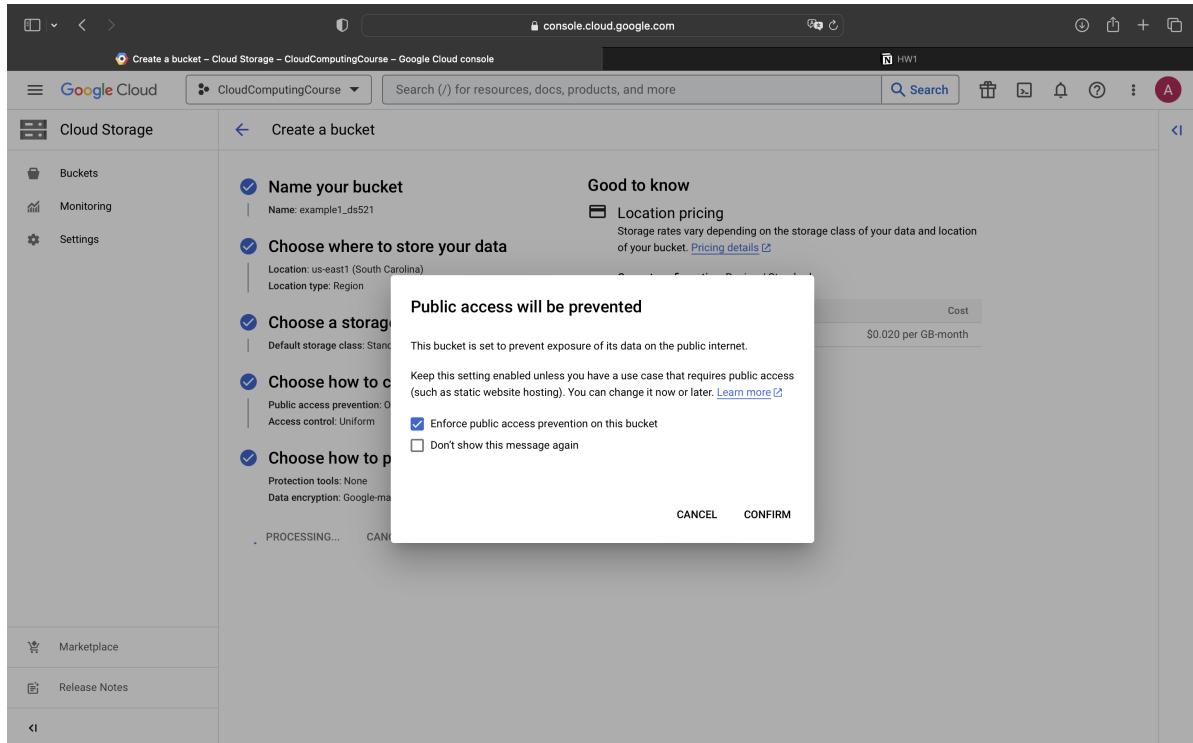


# HW1

## 1) Make a Storage Bucket

### ▼ Google Console



## ▼ GCloud

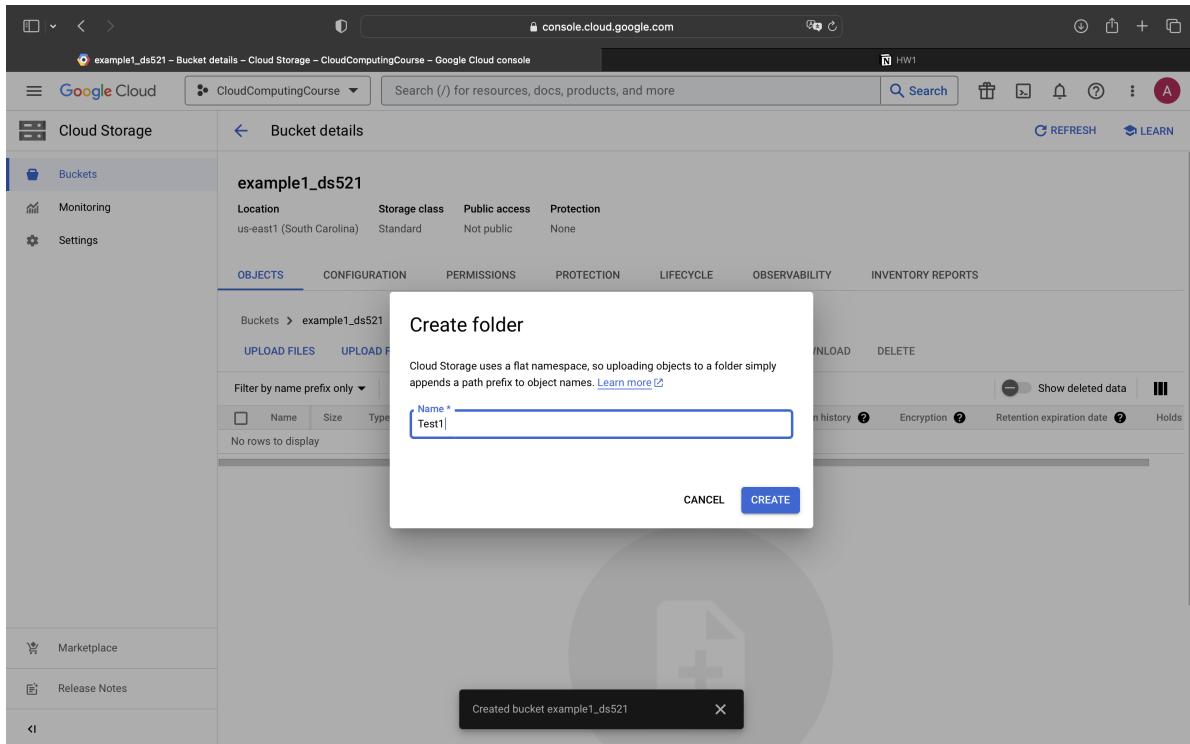
```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage buckets create gs://bu-ds561-arkash
Creating gs://bu-ds561-arkash/...
```

## ▼ Gsutil

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil mb gs://bu-ds561-arkjain
Creating gs://bu-ds561-arkjain/...
```

## 2) Make a directory inside your bucket

### ▼ Google Console



## ▼ GCloud

There is no way to make an empty folder in a bucket using gcloud or gsutil. However, I made a folder, and a file inside of it which I moved into the bucket

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ mkdir new_folder
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ ls
new_folder/ README-cloudshell.txt test/
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ ls
new_folder README-cloudshell.txt test
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ cd new_folder/
arkjain@cloudshell:~/new_folder (cloudcomputingcourse-398918)$ touch test_f.py
arkjain@cloudshell:~/new_folder (cloudcomputingcourse-398918)$ ls
test_f.py
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage mv new_folder gs://bu-ds561-arkash/
Copying file://new_folder/test_f.py to gs://bu-ds561-arkash/new_folder/test_f.py
Completed files 1/1 | 0B
```

## ▼ Gsutil

I did a similar thing for gsutil but

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil mv test2/test2.py gs://bu-ds561-arkjain
Copying file://test2/test2.py [Content-Type=text/x-python]...
Removing file://test2/test2.py...
Operation completed over 1 objects.
```

### 3) Copy a file into the directory

#### ▼ Google Console

Bucket details

**example1\_ds521**

Location	Storage class	Public access	Protection
us-east1 (South Carolina)	Standard	Not public	None

OBJECTS CONFIGURATION PERMISSIONS PROTECTION LIFECYCLE OBSERVABILITY INVENTORY REPORTS

Buckets > example1\_ds521 > Test1

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER TRANSFER DATA MANAGE HOLDS DOWNLOAD DELETE

Filter by name prefix only ▾ Filter Filter objects and folders Show deleted data

Name	Size	Type	Created	Storage class	Last modified	Public access	Version
Screenshot 2023-09-02 at 10.51.3...	84 KB	image/png	Sep 13, 2023, 7:44:11 PM	Standard	Sep 13, 2023, 7:44:11 PM	Not public	-

#### ▼ GCloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ mkdir new_folder
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ ls
new_folder/ README-cloudshell.txt test/
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ ls
new_folder README-cloudshell.txt test
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ cd new_folder/
arkjain@cloudshell:~/new_folder (cloudcomputingcourse-398918)$ touch test_f.py
arkjain@cloudshell:~/new_folder (cloudcomputingcourse-398918)$ ls
test_f.py
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage mv new_folder gs://bu-ds561-arkash/
Copying file://new_folder/test_f.py to gs://bu-ds561-arkash/new_folder/test_f.py
Completed files 1/1 | 0B
```

#### ▼ Gsutil

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil mv file_to_mv.py gs://bu-ds561-arkjain
Copying file://file_to_mv.py [Content-Type=text/x-python]...
Removing file://file_to_mv.py...
Operation completed over 1 objects.
```

### 4) Delete the directory

#### ▼ Google Console

(Made another directory cause I deleted the previous one without a screenshot)

The screenshot shows the Google Cloud Storage Bucket details page for 'bucket2\_test'. The left sidebar shows 'Cloud Storage' and 'Buckets'. The main area displays bucket information: Location (us-east1), Storage class (Standard), Public access (Not public), and Protection (None). Below this are tabs for 'OBJECTS', 'CONFIGURATION', 'PERMISSIONS', 'PROTECTION', 'LIFECYCLE', 'OBSERVABILITY', and 'INVENTORY REPORTS'. Under 'OBJECTS', there's a table showing a single folder named 'testf/'. A modal at the bottom left says 'Created bucket bucket2.test'. On the right, a sidebar shows 'Uploads and CloudComputingCourse operations' with a completed task for 'Screenshot 2023-09-02 at 10.51.32 AM.png'.

## ▼ Gcloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage ls --recursive gs://bu-ds561-arkash/
gs://bu-ds561-arkash/:

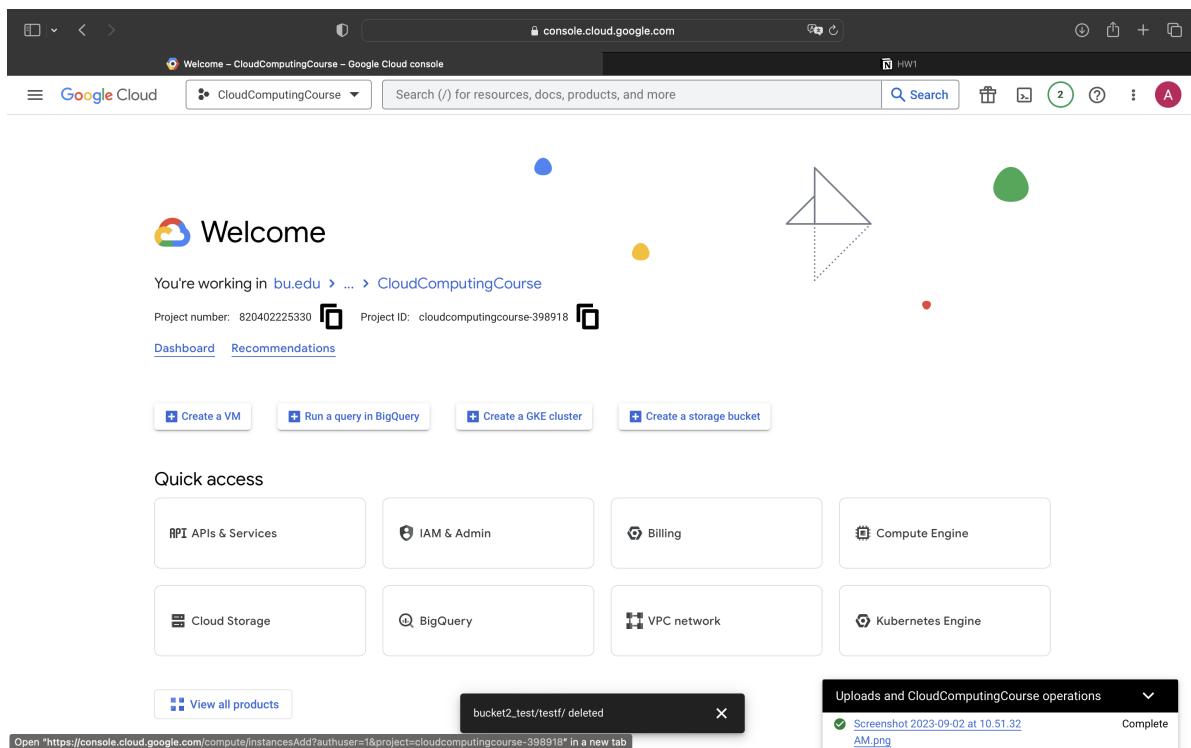
gs://bu-ds561-arkash/new_folder/:
gs://bu-ds561-arkash/new_folder/test_f.py
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage rm --recursive  gs://bu-ds561-arkash/new_folder
Removing objects:
Removing gs://bu-ds561-arkash/new_folder/test_f.py#1694652484265261...
Completed 1/1
```

## ▼ Gsutil

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil rm  gs://bu-ds561-arkjain/file_to_mv.py
Removing gs://bu-ds561-arkjain/file_to_mv.py...
/ [1 objects]
Operation completed over 1 objects.
```

## 5) Create a new VM

### ▼ Google Console



Welcome

You're working in [bu.edu](#) > ... > [CloudComputingCourse](#)

Project number: 820402225330 [Project ID: cloudcomputingcourse-398918](#)

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

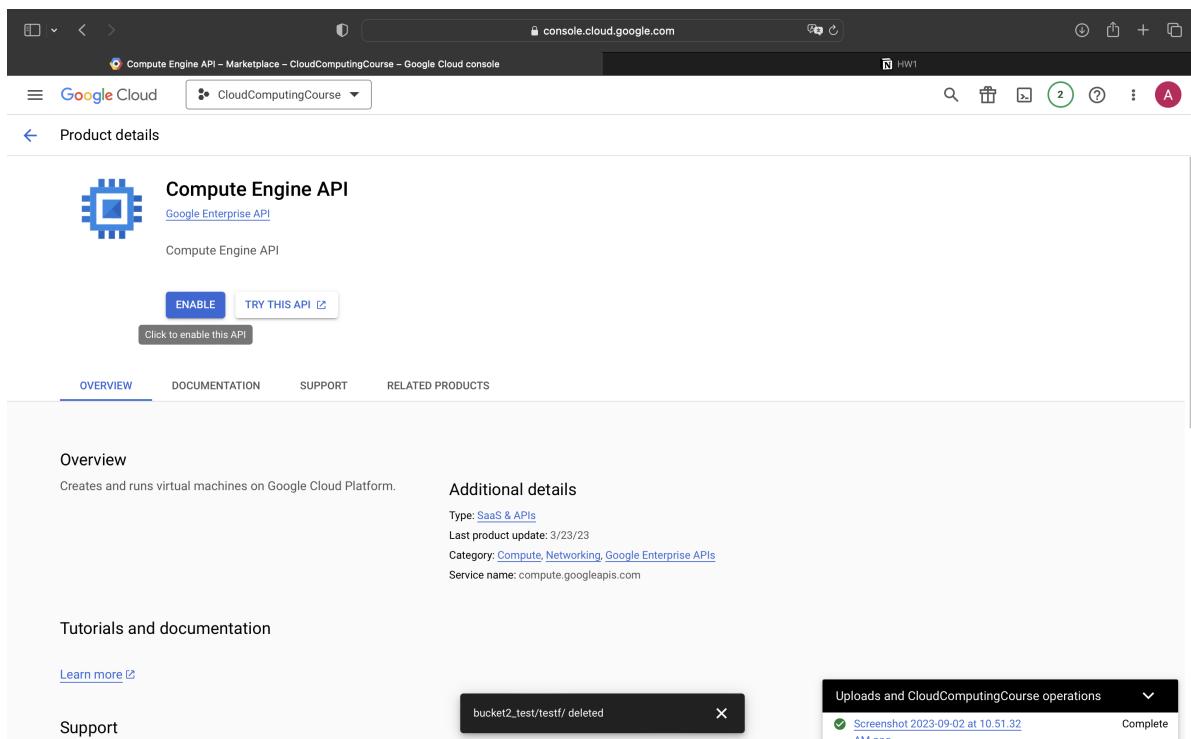
**Quick access**

- [API APIs & Services](#)
- [IAM & Admin](#)
- [Billing](#)
- [Compute Engine](#)
- [Cloud Storage](#)
- [BigQuery](#)
- [VPC network](#)
- [Kubernetes Engine](#)

[View all products](#)

bucket2\_test/testf/ deleted [X](#)

Uploads and CloudComputingCourse operations [Screenshot 2023-09-02 at 10.51.32 AM.png](#) Complete



Compute Engine API – Marketplace – CloudComputingCourse – Google Cloud console

Product details

## Compute Engine API

Google Enterprise API

Compute Engine API

[ENABLE](#) [TRY THIS API](#)

Click to enable this API

[OVERVIEW](#) [DOCUMENTATION](#) [SUPPORT](#) [RELATED PRODUCTS](#)

### Overview

Creates and runs virtual machines on Google Cloud Platform.

### Additional details

Type: [SaaS & APIs](#)  
Last product update: 3/23/23  
Category: [Compute](#), [Networking](#), [Google Enterprise APIs](#)  
Service name: compute.googleapis.com

### Tutorials and documentation

[Learn more](#)

Support [bucket2\\_test/testf/ deleted](#) [X](#)

Uploads and CloudComputingCourse operations [Screenshot 2023-09-02 at 10.51.32 AM.png](#) Complete

The screenshot shows the Google Cloud Compute Engine VM instances page. On the left, there's a sidebar with 'Compute Engine' selected under 'Virtual machines'. The main area shows a table of VM instances with one entry: 'instance-1' in 'us-central1-a' zone. Below the table, there are several related actions: 'Explore Backup and DR', 'View billing report', 'Monitor VMs', 'Explore VM logs', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'. A 'Related actions' section is also present.

The screenshot shows the 'Create an instance' dialog. It starts with a sidebar with options like 'New VM instance', 'New VM instance from template', 'New VM instance from machine image', and 'Marketplace'. The main form has fields for 'Name \*' (set to 'instance-1'), 'Region \*' (set to 'us-central1 (Iowa)'), 'Zone \*' (set to 'us-central1-a'), and 'Machine configuration' (set to 'H3'). It also includes sections for 'Manage tags and labels' (with 'Region is permanent' and 'Zone is permanent' dropdowns), 'Monthly estimate' (\$24.46), and a table of item details. At the bottom are 'CREATE' and 'CANCEL' buttons.

▼ Make a VM

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud compute instances create arkashtest \
--service-account=bu-ds-561-arkjain-bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com
Did you mean zone [us-east1-b] for instance: [arkashtest] (Y/n)? y

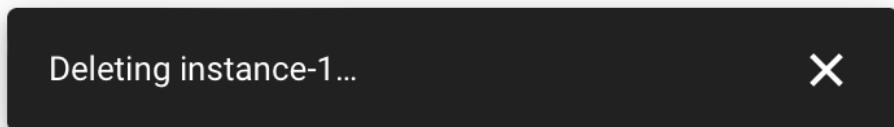
Created [https://www.googleapis.com/compute/v1/projects/cloudcomputingcourse-398918/zones/us-east1-b/instances/arkashtest].
NAME: arkashtest
ZONE: us-east1-b
MACHINE_TYPE: nl-standard-1
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.4
EXTERNAL_IP: 35.196.230.36
STATUS: RUNNING
```

## ▼ Gsutil

It seems like you cannot make a VM using *gsutil*

## 6) Delete a VM

### ▼ Google Console



### ▼ Gcloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud compute instances delete arkashtest
Did you mean zone [us-east1-b] for instance: [arkashtest] (Y/n)? y

The following instances will be deleted. Any attached disks configured to be auto-deleted will be deleted unless they are attached to any other instances or the `--keep-disks` flag is given and specifies them for keeping. Deleting a disk is irreversible and any data on the disk will be lost.
- [arkashtest] in [us-east1-b]

Do you want to continue (Y/n)? y
Deleted [https://www.googleapis.com/compute/v1/projects/cloudcomputingcourse-398918/zones/us-east1-b/instances/arkashtest].
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$
```

### ▼ Gsutil

It seems like you cannot work with a VM using *gsutil*

## 7) Pause a VM

### ▼ Google Console

## ▼ GCloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud compute instances suspend instance-1-test --zone=us-central1-a
Suspending instance(s) instance-1-test...done.
Updated [https://compute.googleapis.com/compute/v1/projects/cloudcomputingcourse-398918/zones/us-central1-a/instances/instance-1-test].
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$
```

## ▼ Gsutil

It seems like you cannot work with a VM using *gsutil*

## 8) Make a service account and give it permission to access the bucket

### ▼ Google Console

Service accounts – IAM & Admin – CloudComputingCourse – Google Cloud console

Google Cloud CloudComputingCourse Search (/) for resources, docs, products, and more

IAM & Admin Service accounts + CREATE SERVICE ACCOUNT DELETE MANAGE ACCESS REFRESH LEARN

Service accounts for project "CloudComputingCourse"

A service account represents a Google Cloud service identity, such as code running on Compute Engine VMs, App Engine apps, or systems running outside Google. [Learn more about service accounts](#)

Organization policies can be used to secure service accounts and block risky service account features, such as automatic IAM Grants, key creation/upload, or the creation of service accounts entirely. [Learn more about service account organization policies](#)

**Filter** Enter property name or value

Email	Status	Name ↑	Description	Key ID	Key creation date	OAuth 2 Client ID	Actions
bu-ds-561-arkjain@bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com	Enabled	bu_d...561_arkjain@bu.edu		No keys		10722899615579297	⋮
820402225330-compute@developer.gserviceaccount.com	Enabled	Compute Engine default service account		No keys		10045011489038818	⋮

Policy updated

bucket2\_test – Bucket details – Cloud Storage – CloudComputingCourse – Google Cloud console

Google Cloud CloudComputingCourse Search (/) for resources, docs, products, and more

Cloud Storage Bucket details

**Not public**

This bucket is not publicly accessible since public access is being prevented. Because of this restriction, objects cannot be publicly shared over the internet. [Learn more](#)

Principals restricted from bucket access:

- allUsers, allAuthenticatedUsers

[REMOVE PUBLIC ACCESS PREVENTION](#)

**Uniform: No object-level ACLs enabled**

90 days left to change this setting

All object access is controlled by bucket permissions and objects cannot have their own access control lists (ACLs). To allow per-object access, you can switch to fine-grained access within 90 days. [Learn more](#)

[SWITCH TO FINE-GRAINED](#)

**Permissions**

[VIEW BY PRINCIPALS](#) [VIEW BY ROLES](#)

[GRANT ACCESS](#) [REMOVE ACCESS](#)

**Filter** Enter property name or value

Type	Principal ↑	Name	Role	Inheritance
Editors of project: clouddcomputingcourse-398918		Storage Legacy Bucket Owner		Storage Legacy Object Owner
Owners of project: clouddcomputingcourse-398918		Storage Legacy Bucket Owner		Storage Legacy Object Owner
service-820402225330@compute-system.iam.gserviceaccount.com	Compute Engine Service Agent	Compute Engine Service Agent	CloudComputingCourse	
Viewers of project: clouddcomputingcourse-398918		Storage Legacy Bucket Reader		Storage Legacy Object Reader

## Grant access to "bucket2\_test"

Grant principals access to this resource and add roles to specify what actions the principals can take. Optionally, add conditions to grant access to principals only when a specific criteria is met. [Learn more about IAM conditions](#)

### Resource

bucket2\_test

### Add principals

Principals are users, groups, domains, or service accounts. [Learn more about principals in IAM](#)

New principals \*

820402225330-compute@developer.gserviceaccount.com 



### Assign roles

Roles are composed of sets of permissions and determine what the principal can do with this resource. [Learn more](#)

Role \*

Storage Admin

IAM condition (optional) 

 ADD IAM CONDITION



Grants full control of buckets and objects.

 ADD ANOTHER ROLE

 SAVE

 CANCEL

## ▼ GCloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts create new-test-service-account
Created service account [new-test-service-account].
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts list
DISPLAY NAME: puttingcourse-398918
EMAIL: new-test-service-account@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False

DISPLAY NAME: bu-ds-561-arkjain@bu.edu
EMAIL: bu-ds-561-arkjain-bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage buckets add-iam-policy-binding gs://bu-ds561-arkash --member=serviceAccount:new-test-service-acc@cloudcomputingcourse-398918.iam.gserviceaccount.com --role=roles/storage.objectAdmin
bindings:
- members:
  - projectEditor:cloudcomputingcourse-398918
  - projectOwner:cloudcomputingcourse-398918
  role: roles/storage.legacyBucketOwner
- members:
  - projectViewer:cloudcomputingcourse-398918
  role: roles/storage.legacyBucketReader
- members:
  - serviceAccount:new-test-service-acc@cloudcomputingcourse-398918.iam.gserviceaccount.com
  role: roles/storage.objectAdmin
etag: CAE=
kind: storage#policy
resourceId: /buckets/bu-ds561-arkash
version: 1
```

## ▼ Gsutil

So you cannot make the service account using *gsutil* but I tried to give permission to the bucket using *gsutil*

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts create gsutil-test2-service
Created service account [gsutil-test2-service].
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts list
DISPLAY NAME:
EMAIL: gsutil-test2-service@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False

DISPLAY NAME: bu_ds_561_arkjain@bu.edu
EMAIL: bu-ds-561-arkjain-bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False
```

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil iam ch serviceAccount:gsutil-test2-service@cloudcomputingcourse-398918.iam.gserviceaccount.com:roles/storage.objectAdmin
gs://bu-ds561-arkjain
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts list
DISPLAY NAME:
EMAIL: gsutil-test2-service@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False

DISPLAY NAME: bu_ds_561_arkjain@bu.edu
EMAIL: bu-ds-561-arkjain-bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com
DISABLED: False
```

## 9) Delete Service Account

### ▼ Google Console

Email	Status	Name	Description	Key ID	Key creation date	OAuth 2 Client ID	Actions
bu-ds-561-arkjain@bu-edu@cloudcomputingcourse-398918.iam.gserviceaccount.com	Enabled	bu_d...561_arkjain@bu.edu	No keys	10722899615579297			⋮
820402225330-compute@developer.gserviceaccount.com	Enabled	Compute Engine default service account	No keys	10045011489038818			⋮

## ▼ GCloud:

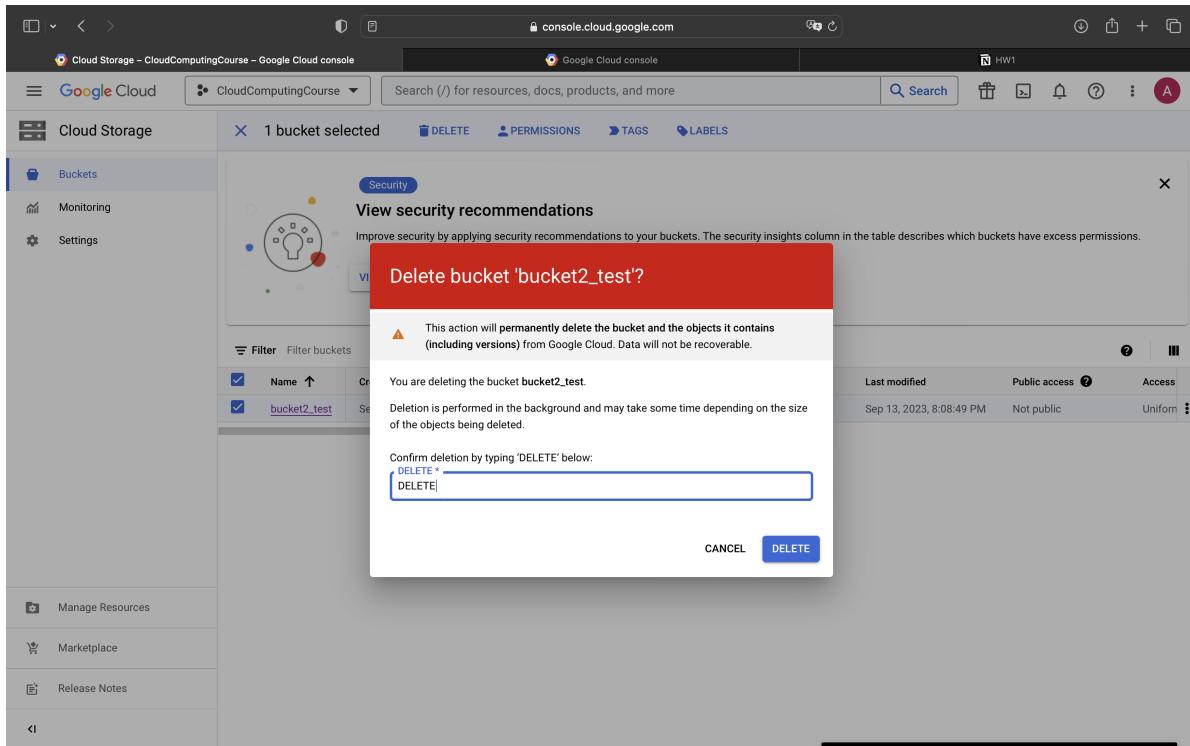
```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud iam service-accounts delete new-test-service-acc@cloudcomputingcourse-398918.iam.gserviceaccount.com
You are about to delete service account [new-test-service-acc@cloudcomputingcourse-398918.iam.gserviceaccount.com]
Do you want to continue (Y/n)? y
deleted service account [new-test-service-acc@cloudcomputingcourse-398918.iam.gserviceaccount.com]
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$
```

## ▼ Gsutil

*gsutil* cannot delete the service account

## 10) Delete the bucket

### ▼ Google Console



## ▼ GCloud

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gcloud storage buckets delete gs://bu-ds561-arkash
Removing gs://bu-ds561-arkash/...
Completed 1/1
```

## ▼ Gsutil

```
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$ gsutil rm -r gs://bu-ds561-arkjain
Removing gs://bu-ds561-arkjain/test2.py#1694657793908763...
/ [1 objects]
Operation completed over 1 objects.
Removing gs://bu-ds561-arkjain/...
arkjain@cloudshell:~ (cloudcomputingcourse-398918)$
```