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Course: DS561

Homework 1

Perform the following operations using the cloud console, gcloud and gsutil. If an operation does not apply to a particular say so and explain why.

- Make a storage bucket

Cloud Console:

Google Cloud | My Project 29272 | Search (/) for resources, docs, products, and more | Search

Cloud Storage | Create a bucket

- Get Started**
Pick a globally unique, permanent name. [Naming guidelines](#)
ds561
Tip: Don't include any sensitive information
Optimize storage for data-intensive workloads
Labels (optional)
[CONTINUE](#)
- Choose where to store your data**
Location: us (multiple regions in United States)
Location type: Multi-region
- Choose a storage class for your data**
Default storage class: Standard
- Choose how to control access to objects**
Public access prevention: On
Access control: Uniform
- Choose how to protect object data**
Soft delete policy: Default
Object versioning: Disabled
Bucket retention policy: Disabled
Object retention: Disabled
Encryption type: Google-managed

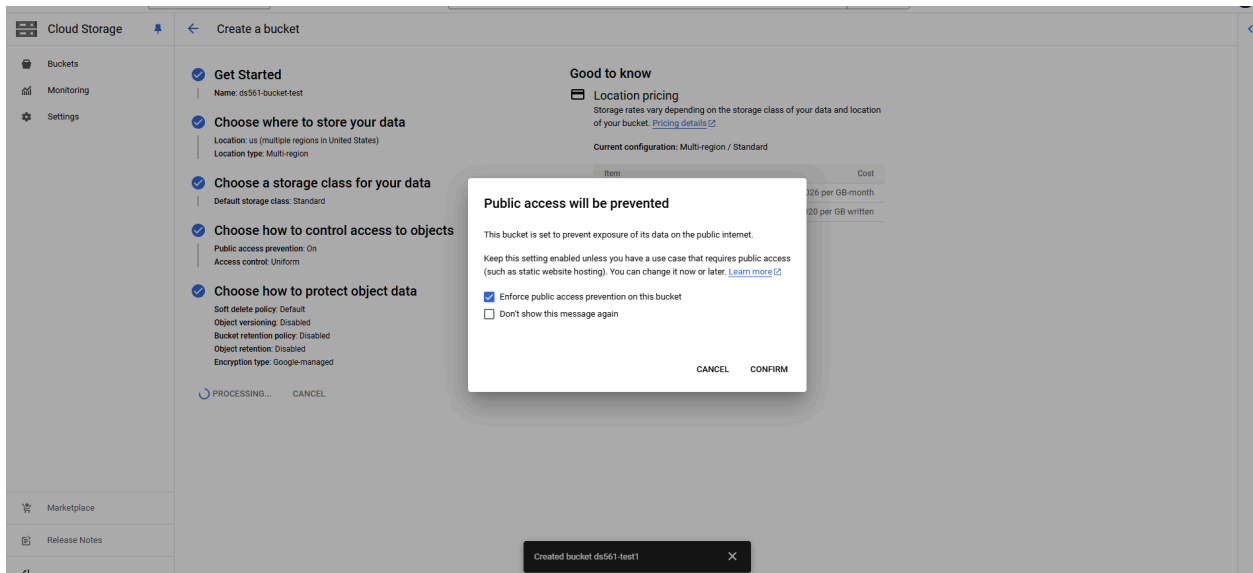
[CREATE](#) [CANCEL](#)

Good to know
Location pricing
Storage rates vary depending on the storage class of your data and location of your bucket. [Pricing details](#)
Current configuration: Multi-region / Standard

Item	Cost
us (multiple regions in United States)	\$0.026 per GB-month
With default replication	\$0.020 per GB written

ESTIMATE YOUR MONTHLY COST

Deleted 3 buckets



Filter Filter buckets								
<input type="checkbox"/>	Name ↑	Created	Location type	Location	Default storage class ?	Last modified	Public access ?	Access control
<input type="checkbox"/>	ds561-jeremy-test1	Sep 15, 2024, 1:26:35 PM	Multi-region	us	Standard	Sep 15, 2024, 1:26:35 PM	Subject to object ACLs	Fine-grained

Gcloud:

```
C:\Users\jerem>gcloud storage buckets create gs://ps1-gcloud
Creating gs://ps1-gcloud/...
```

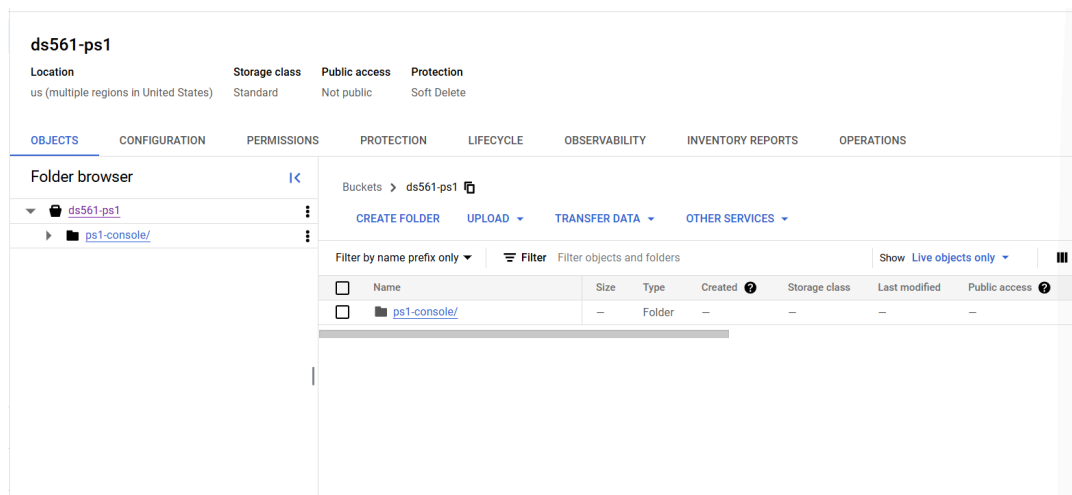
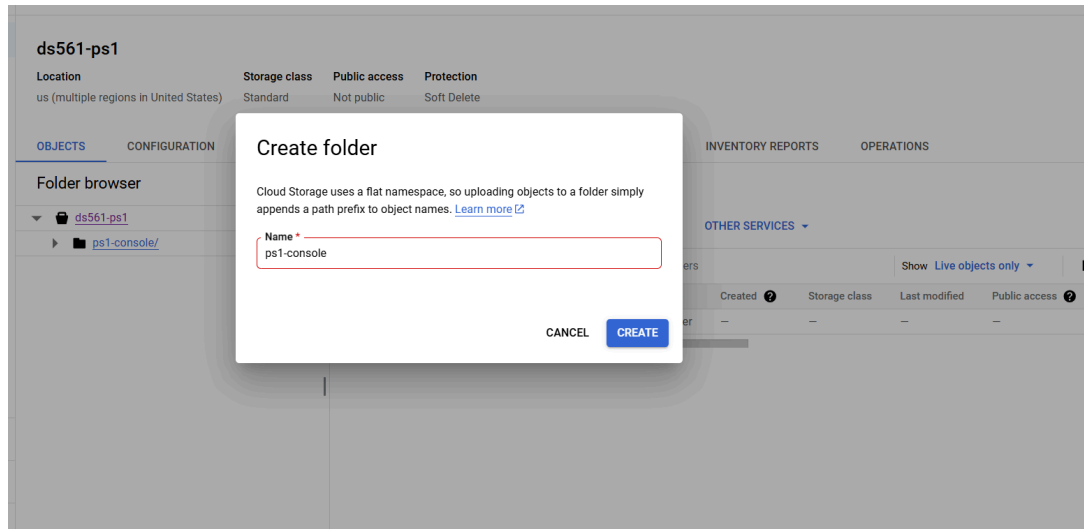
Gsutil:

```
PS C:\Users\jerem> gsutil mb gs://ds561-gsutil-create-bucket
Creating gs://ds561-gsutil-create-bucket/...
PS C:\Users\jerem>
```

Filter Filter buckets								
<input type="checkbox"/>	Name ↑	Created	Location type	Location	Default storage class ?	Last modified	Public access ?	Access control
<input type="checkbox"/>	ds561-gsutil-create-bucket	Sep 15, 2024, 1:28:17 PM	Multi-region	us	Standard	Sep 15, 2024, 1:28:17 PM	Subject to object ACLs	Fine-grained
<input type="checkbox"/>	ds561-jeremy-test1	Sep 15, 2024, 1:26:35 PM	Multi-region	us	Standard	Sep 15, 2024, 1:26:35 PM	Subject to object ACLs	Fine-grained

- Make a directory inside your bucket

Google Console:



Gcloud:

```
C:\Users\jerem>gcloud storage cp empty gs://ps1-gcloud/create-folder
Copying file:///empty to gs://ps1-gcloud/create-folder
Completed files 1/1 | 0B
```

Gsutil:

```
PS C:\Users\jerem> gsutil cp -r test gs://ds561-ps1
Copying file:///test/test.txt [Content-Type=text/plain]...
/ [1 files][ 0.0 B/ 0.0 B]
Operation completed over 1 objects.
PS C:\Users\jerem>
```

ds561-ps1

Location

us (multiple regions in United States)

Storage class

Standard

Public access

Not public

Protection

Soft Delete

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY

INVENTORY REPORTS

OPERATIONS

Folder browser

ds561-ps1

ps1-console/

test/

CREATE FOLDER

UPLOAD

TRANSFER DATA

OTHER SERVICES

Filter by name prefix only

Filter

Filter objects and folders

Show Live objects only

<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last modified	
<input type="checkbox"/>	ps1-console/	—	Folder	—	—	—	
<input type="checkbox"/>	ps1-gsutil	0 B	text/plain	Sep 15, 2024, 1:40:40 PM	Standard	Sep 15, 2024, 1:	
<input type="checkbox"/>	test/	—	Folder	—	—	—	

- Copy a file into your directory

Cloud console:

Buckets > ds561-ps1 > ps1-console

CREATE FOLDER UPLOAD TRANSFER DATA OTHER SERVICES

Filter by name prefix only Upload files Upload folder

No rows to display

OBJECTS CONFIGURATION PERMISSIONS PROTECTION LIFECYCLE OBSERVABILITY INVENTORY REPORTS OPERATIONS

Folder browser

Buckets > ds561-ps1 > ps1-console

CREATE FOLDER UPLOAD TRANSFER DATA OTHER SERVICES

Filter by name prefix only Filter objects and folders Show Live objects only

Name	Size	Type	Created	Storage class	Last modified	
emptyfile.txt	0 B	text/plain	Sep 15, 2024, 1:46:15 PM	Standard	Sep 15, 2024, 1:	Download

Uploads and ds561-bucs operations

emptyfile.txt Complete

Gcloud:

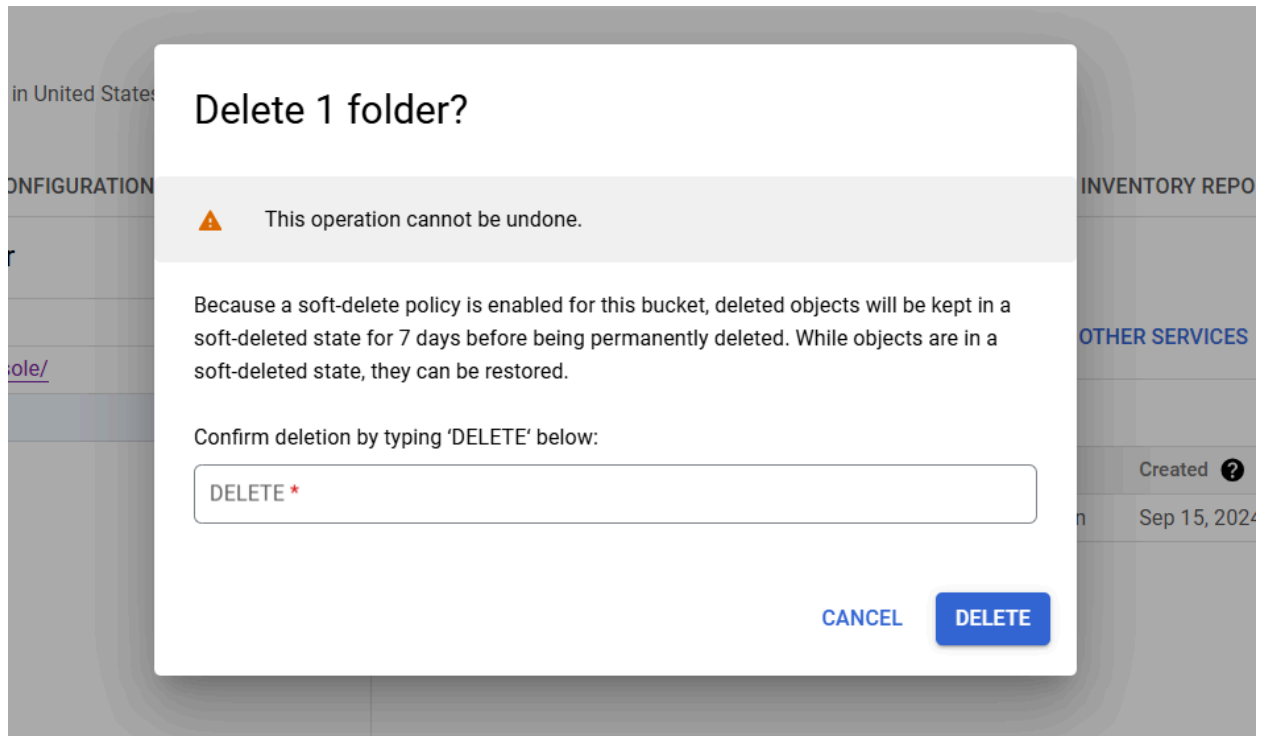
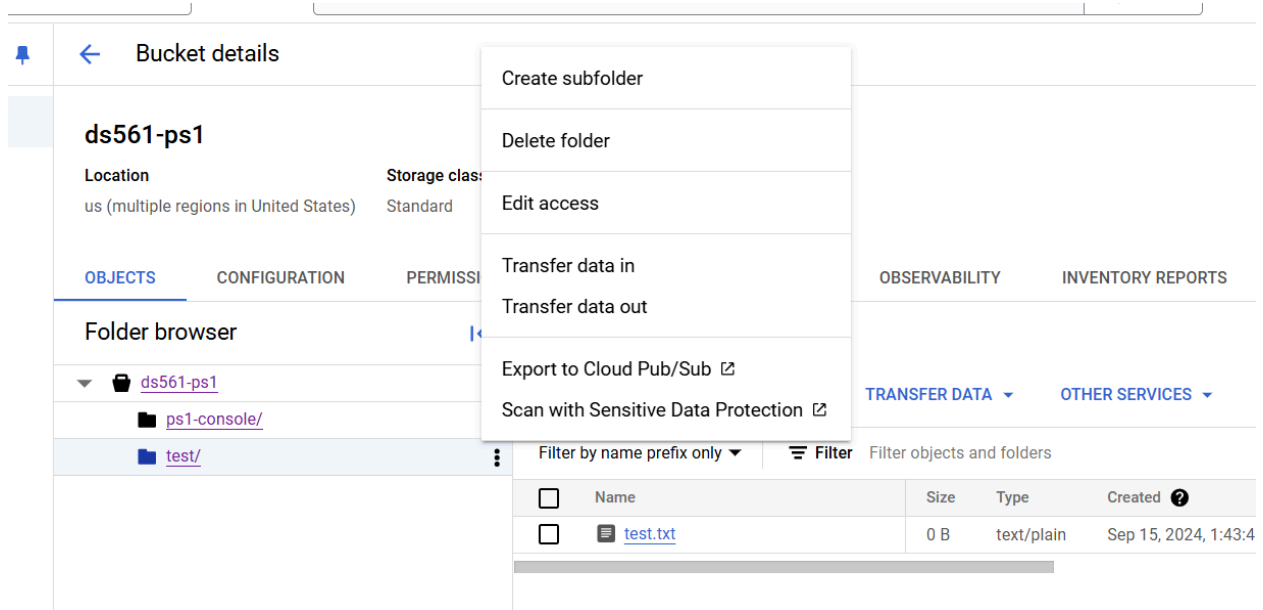
```
C:\Users\jerem>gcloud storage cp nothing.txt gs://ps1-gcloud/create-folder/
Copying file://nothing.txt to gs://ps1-gcloud/create-folder/nothing.txt
Completed files 1/1 | 0B
```

Gsutil:

```
PS C:\Users\jerem> gsutil cp ps1-gsutil/empty.txt gs://ds561-ps1/ps1-gsutil
Copying file://ps1-gsutil\empty.txt [Content-Type=text/plain]...
/ [1 files][ 0.0 B/ 0.0 B]
Operation completed over 1 objects.
PS C:\Users\jerem>
```

- Delete the directory (and the file inside it) in a single operation

Google console:



Gcloud:

```
C:\Users\jerem>gcloud storage rm --recursive gs://ps1-gcloud/create-folder/
Removing objects:
\Removing gs://ps1-gcloud/create-folder/nothing.txt#1726608840158033...
Completed 1/1
```

Gsutil:

```
PS C:\Users\jerem> gsutil rm -rf gs://ds561-ps1/test/
Removing gs://ds561-ps1/test/emptyfile.txt#1726423035730096...
/ [1 objects]
Operation completed over 1 objects.
```

- Make a VM

Cloud Console:

Google Cloud ds561-bucs Search (/) for resources, docs, products, and more Search

Create an instance CREATE VM FROM... EQUIVALENT CODE

- VM basics ps1-console, us-central1
- Machine configuration e2-medium
- OS and storage Debian GNU/Linux 12 (bookworm)
- Networking 1 network interface
- Observability
- Security
- Advanced

Identify your VM

Name * ps1-console

Region * us-central1 (Iowa) Zone * Any

Region is permanent. Google will choose a zone on your behalf, maximizing VM obtainability. Zone is permanent.

MANAGE TAGS AND LABELS

Availability policies

VM provisioning model Standard

Choose "Spot" to get a discounted, preemptible VM. Otherwise, stick to "Standard". [Learn more](#)

VM PROVISIONING MODEL ADVANCED SETTINGS

Monthly estimate

\$25.46
That's about \$0.03 hourly
Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Total	\$25.46

[Compute Engine pricing](#)
[LESS](#)

CREATE CANCEL EQUIVALENT CODE

Gcloud:

```
PS C:\Users\jerem> gcloud compute instances create ps1-gcloud --zone=us-central1-c
Created [https://www.googleapis.com/compute/v1/projects/ds561-bucs/zones/us-central1-c/instances/ps1-gcloud].
NAME        ZONE        MACHINE_TYPE  PREEMPTIBLE  INTERNAL_IP  EXTERNAL_IP  STATUS
ps1-gcloud  us-central1-c  n1-standard-1      10.128.0.3   34.171.19.59  RUNNING
PS C:\Users\jerem>
```

Gsutil:

It is not applicable because gsutil is a storage-specific tool and does not create VMs.

- Pause a VM

Cloud console:

The screenshot shows the Google Cloud Platform console interface. At the top, there is a 'Filter' bar with the text 'Enter property name or value'. Below this is a table of VM instances. The table has columns for Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect. One instance is listed: 'ps1-console' in the 'us-central1-c' zone, with internal IP '10.128.0.2' and external IP '34.44.100.146'. To the right of the table, a dropdown menu is open, showing options: Start / Resume, Stop, Suspend, Reset, Delete, Create a group based on this VM (with a 'PREVIEW' badge), View network details, Create new machine image, View logs, and View monitoring. Below the table, there are several 'Related actions' cards: 'Explore Backup and DR' (with a 'NEW' badge), 'View billing report', 'Monitor VMs', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'.

This screenshot shows the same Google Cloud Platform console interface, but with a modal dialog box open in the center. The dialog is titled 'Stop ps1-console?'. It contains the text: 'You'll be billed only for these preserved resources:'. Below this, there is a list of resources: 'Persistent disks' and 'Static IP addresses'. Further down, it states: 'The VM will gracefully shut down in 90 seconds. If processes are still running, the VM will be forced to stop and files may get corrupted.' At the bottom of the dialog, there are two buttons: 'CANCEL' and 'STOP'. In the background, the VM instances table is visible, showing two instances: 'ps1-console' and 'ps1-gcloud'. Below the table, there are more 'Related actions' cards: 'Explore Backup and DR', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'. At the bottom of the console, there is a status bar that says 'Stopping ps1-console...'.

Gcloud:

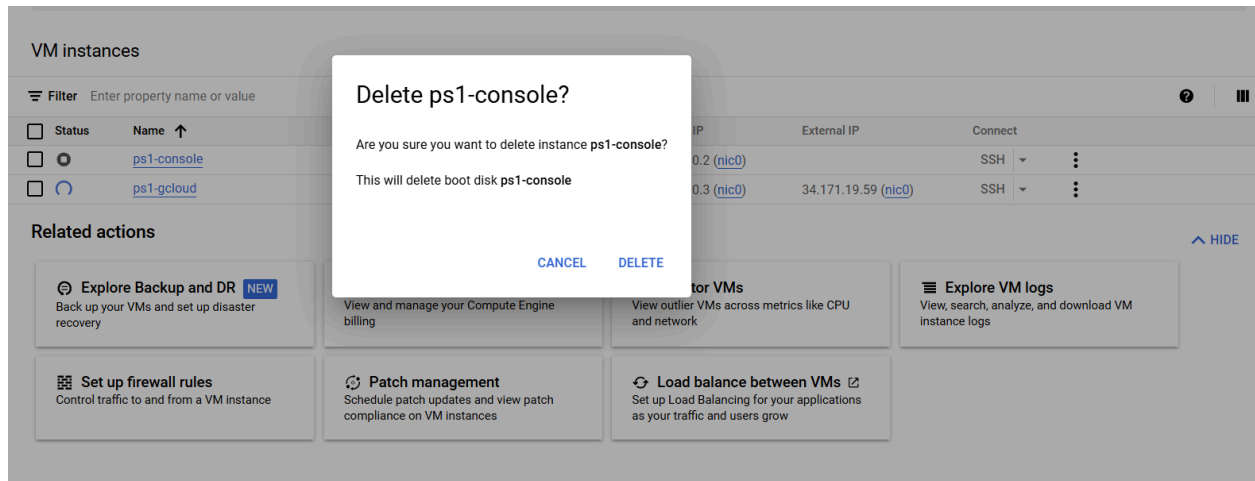
```
PS C:\Users\jerem> gcloud compute instances stop ps1-gcloud --zone=us-central1-c
Stopping instance(s) ps1-gcloud...done.
Updated [https://compute.googleapis.com/compute/v1/projects/ds561-bucs/zones/us-central1-c/instances/ps1-gcloud].
```

Gsutil:

It is not applicable because gsutil is a storage-specific tool and does not manage VMs. Therefore, it can not pause a VM.

- Delete a VM

Cloud Console:



Gcloud:

```
PS C:\Users\jerem> gcloud compute instances delete ps1-gcloud --zone=us-central1-c
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.
- [ps1-gcloud] in [us-central1-c]

Do you want to continue (Y/n)? y

Deleted [https://www.googleapis.com/compute/v1/projects/ds561-bucs/zones/us-central1-c/instances/ps1-gcloud].
```

Gsutil:

It is not applicable because gsutil is a storage-specific tool and does not manage VMs. Therefore, it can not delete a VM.

- Make a service account and give it permissions to access your storage bucket

Cloud console:

1 Service account details

Service account name

ds561-ps1-console

Display name for this service account

Service account ID *

ds561-ps1-console



Email address: ds561-ps1-console@ds561-bucs.iam.gserviceaccount.com



Service account description

Describe what this service account will do

CREATE AND CONTINUE

2 Grant this service account access to project (optional)

3 Grant users access to this service account (optional)

DONE

CANCEL

2

Grant this service account access to project (optional)

Grant this service account access to ds561-bucs so that it has permission to complete specific actions on the resources in your project. [Learn more](#)

Role

Storage Object Admin

IAM condition (optional) ?

+ ADD IAM CONDITION

Grants full control over objects, including listing, creating, viewing, and deleting objects.

+ ADD ANOTHER ROLE

CONTINUE

3

Grant users access to this service account (optional)

DONE

CANCEL

Gcloud:

```
PS C:\Users\jerem> gcloud iam service-accounts create ps1-gcloud
Created service account [ps1-gcloud].
```

```
PS C:\Users\jerem> gcloud projects add-iam-policy-binding ds561-bucs --member="serviceAccount:ps1-gcloud@ds561-bucs.iam.gserviceaccount.com" --role="roles/storage.objectAdmin"
Updated IAM policy for project [ds561-bucs].
bindings:
- members:
  - serviceAccount:service-844994497823@compute-system.iam.gserviceaccount.com
    role: roles/compute.serviceAgent
- members:
  - serviceAccount:844994497823-compute@developer.gserviceaccount.com
  - serviceAccount:844994497823@cloudservices.gserviceaccount.com
    role: roles/editor
- members:
  - user:jbui02@bu.edu
    role: roles/owner
- members:
  - serviceAccount:ps1-gcloud@ds561-bucs.iam.gserviceaccount.com
    role: roles/storage.objectAdmin
etag: BwYiLJM6c-M=
version: 1
```

Gsutil:

Not applicable because gsutil handles storage operations and can not handle IAM resources like creating a service account.

- Delete the service account

Cloud Console:

Service accounts [+ CREATE SERVICE ACCOUNT](#) [DELETE](#) [MANAGE ACCESS](#) [REFRESH](#) [LEARN](#)

Service accounts for project "ds561-bucs"

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

<input type="checkbox"/>	Email	Status	Name ↑	Description	Key ID	Key creation date	OAuth 2	
<input type="checkbox"/>	ps1-gcloud@ds561-bucs.iam.gserviceaccount.com	✓ Enabled			No keys		108089	
<input type="checkbox"/>	844994497823-compute@developer.gserviceaccount.com	✓ Enabled	Compute Engine default service account		No keys		102342	
<input type="checkbox"/>	ds561-ps1-console@ds561-bucs.iam.gserviceaccount.com	✓ Enabled	ds561-ps1-console		No keys		114349049338171715432	

Manage details

Manage permissions

Manage keys

View metrics

View logs

Disable

Delete

Delete service account "ds561-ps1-console"

Deleting this service account will delete all associated key IDs, and will prevent the account from authenticating to any API.

Deleting this service account will:

- Prevent any Google Cloud service from authenticating with it.
- Remove all key IDs associated with it.
- May cause unexpected interruptions.

You cannot restore or roll back this change easily. We highly recommend **disabling** the service account first, testing for any unexpected impact, and only then deleting.

[CANCEL](#) [DISABLE](#) [DELETE](#)

Gcloud:

```
PS C:\Users\jerem> gcloud iam service-accounts delete ps1-gcloud@ds561-bucs.iam.gserviceaccount.com
You are about to delete service account [ps1-gcloud@ds561-bucs.iam.gserviceaccount.com]

Do you want to continue (Y/n)? y

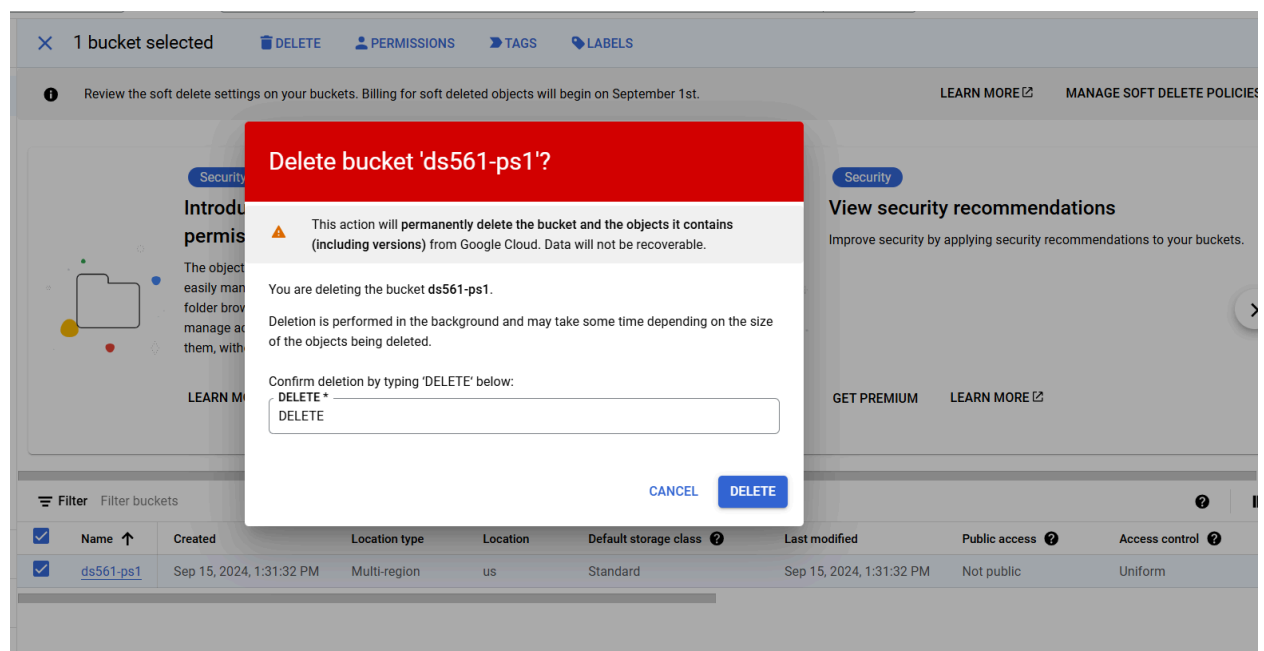
deleted service account [ps1-gcloud@ds561-bucs.iam.gserviceaccount.com]
```

Gsutil:

Not applicable because gsutil handles storage operations and can not handle IAM resources like deleting a service account.

- Delete the storage bucket

Cloud Console:



Gcloud:

```
PS C:\Users\jerem> gcloud storage rm -r gs://ds561-ps1
Removing objects:
\Removing gs://ds561-ps1/ps1-gsutil#1726422796226584...
Completed 1/1
Removing buckets:
\Removing gs://ds561-ps1/...
Completed 1/1
PS C:\Users\jerem> gcloud storage -rf buckets delete gs://ds561-ps1
```

Gsutil:

```
PS C:\Users\jerem> gsutil rm -r gs://ps1-gsutil  
Removing gs://ps1-gsutil/...
```

Turn in a pdf document with screenshots and/or command lines demonstrating your work.