

<https://github.com/dk-davidekim/Google-Cloud-Computing.git>

- *Creating a storage bucket 'bu-ds561-dk98' with 'standard' class and 'us-east1' location*

```
dk98@cloudshell:~ (ds-561)$ gsutil mb -c standard -l us-east1 gs://bu-ds561-dk98
- Creating gs://bu-ds561-dk98/...
```

```
dk98@cloudshell:~ (ds-561)$ gcloud storage buckets create gs://bu-ds561-dk98 --location=us-east1
Creating gs://bu-ds561-dk98/...
```

Create a bucket

✓

Name your bucket

Name: bu-ds561-dk98

✓

Choose where to store your data

Location: us-east1 (South Carolina)
Location type: 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

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: Region / Standard

Item	Cost
us-east1 (South Carolina)	\$0.020 per GB-month

ESTIMATE YOUR MONTHLY COST

Result:	<input type="checkbox"/>	Name ↑	Created	Location type	Location	Default sto
	<input type="checkbox"/>	bu-ds561-dk98	Sep 15, 2023, 11:03:34 PM	Region	us-east1	Standard

2. Make a directory inside your bucket

- With command lines, you cannot create an empty directory without copying an object
- *Creating an empty directory 'hwdirectory' with an empty object*
- `gsutil cp /dev/null gs://bu-ds561-dk98/hwdirectory/`

```
dk98@cloudshell:~ (ds-561)$ gsutil cp /dev/null gs://bu-ds561-dk98/hwdirectory/  
Copying file:///dev/null [Content-Type=application/octet-stream]...  
/ [1 files] [ 0.0 B/ 0.0 B]  
Operation completed over 1 objects.
```

- `gcloud storage cp /dev/null gs://bu-ds561-dk98/hwdirectory/`

```
dk98@cloudshell:~ (ds-561)$ gcloud storage cp /dev/null gs://bu-ds561-dk98/hwdirectory/  
Copying file:///dev/null to gs://bu-ds561-dk98/hwdirectory/null  
Completed files 1/1 | 0B
```

- GCloud Console

Create folder

Cloud Storage uses a flat namespace, so uploading objects to a folder simply appends a path prefix to object names. [Learn more](#)

Name *

CANCEL

CREATE

bu-ds561-dk98

Location	Storage class	Public access	Protection
us-east1 (South Carolina)	Standard	Subject to object ACLs	None

< **OBJECTS** CONFIGURATION PERMISSIONS PROTECTION LIFECYCLE >

Buckets > bu-ds561-dk98

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

<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last m
<input type="checkbox"/>	hwdirectory/	—	Folder	—	—	—

Result:

3. Copy a file into your directory

- Copy file 'homework.rtf' from local machine to the directory in google cloud bucket

- `gsutil cp ~/Desktop/homework.rtf gs://bu-ds561-dk98/hwdirectory/`

```
~ (1.751s)
gsutil cp ~/Desktop/homework.rtf gs://bu-ds561-dk98/hwdirectory/
Copying file:///Users/davidekim/Desktop/homework.rtf [Content-Type=application/rtf]...
- [1 files][ 395.0 B/ 395.0 B]
Operation completed over 1 objects/395.0 B.
```

- `gcloud storage cp ~/Desktop/homework.rtf gs://bu-ds561-dk98/hwdirectory/`

```
~ (2.054s)
gcloud storage cp ~/Desktop/homework.rtf gs://bu-ds561-dk98/hwdirectory/
Copying file:///Users/davidekim/Desktop/homework.rtf to gs://bu-ds561-dk98/hwdirectory/homework.rtf
Completed files 1/1 | 220.0B/220.0B
```

- GCloud Console

The screenshot shows the Google Cloud Console interface for a bucket named 'bu-ds561-dk98'. The 'hwdirectory' folder is selected, and a table lists the contents. The 'homework.rtf' file is visible with a size of 220 B and a type of 'text/rtf'. A notification at the bottom right indicates that the upload of 'homework.rtf' is complete.

Name	Size	Type	Created	Storage class	Last modified	Public access	Version
homework.rtf	220 B	text/rtf	Sep 19, 2023, 5:27:17 PM	Standard	Sep 19, 2023, 5:27:17 PM	Not public	—
placeholder	0 B	application/octet-stream	Sep 19, 2023, 1:24:20 PM	Standard	Sep 19, 2023, 1:24:20 PM	Not public	—

bu-ds561-dk98

Location	Storage class	Public access	Protection
us-east1 (South Carolina)	Standard	Subject to object ACLs	None

OBJECTS | CONFIGURATION | PERMISSIONS | PROTECTION | LIFECYCLE

Buckets > bu-ds561-dk98 > hwdirectory

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
homework.rtf	395 B	application/rtf	Sep 16, 2023
placeholder	1 B	application/octet-stream	Sep 15, 2023

Result:

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

- Remove the directory through 'gsutil rm' and remove the files through '-r' or '--recursive'

- `gsutil rm -r gs://bu-ds561-dk98/hwdirectory/`


```
dk98@cloudshell:~ (ds-561)$ gsutil rm -r gs://bu-ds561-dk98/hwdirectory/  
Removing gs://bu-ds561-dk98/hwdirectory/homework.rtf#1694886000533343...  
Removing gs://bu-ds561-dk98/hwdirectory/placeholder#1694836150193496...  
/ [2 objects]  
Operation completed over 2 objects.
```

- `gcloud storage rm -r gs://bu-ds561-dk98/hwdirectory/`

```
dk98@cloudshell:~ (ds-561)$ gcloud storage rm -r gs://bu-ds561-dk98/hwdirectory/  
Removing objects:  
Removing gs://bu-ds561-dk98/hwdirectory/homework.rtf#1695165284953297...  
Removing gs://bu-ds561-dk98/hwdirectory/null#1695165241103841...  
Completed 2/2
```

- GCloud Console

Delete 1 folder?

 This action will permanently delete the selected folder and the objects it contains (including versions) from Google Cloud. Data will not be recoverable.

hwdirectory/ and all of its contents will be permanently deleted from Cloud Storage. Deletion is performed in the background and may take some time depending on the folder's size.

Confirm deletion by typing 'DELETE' below:

CANCEL

DELETE

bu-ds561-dk98

Location	Storage class	Public access	Protection
us-east1 (South Carolina)	Standard	Subject to object ACLs	None

<

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

>

Buckets > bu-ds561-dk98

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

<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last modified	Public access
No rows to display							

Result:

5. Make a VM

- VM is only created through the gcloud commands or the GCloud Console
- Create VM 'vm-dk98' with the selection of image, zone, and machine type
- gcloud compute instances create vm-dk98 --image-family=sql-web-2022-win-2022

--image-project=windows-sql-cloud --zone=us-east1-b --machine-type=f1-micro

```
dk98@cloudshell:~ (ds-561) $ gcloud compute instances create vm-dk98 --image-family=sql-web-2022-win-2022 --image-proj
ect=windows-sql-cloud --zone=us-east1-b --machine-type=f1-micro
Created [https://www.googleapis.com/compute/v1/projects/ds-561/zones/us-east1-b/instances/vm-dk98].
NAME: vm-dk98
ZONE: us-east1-b
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.2
EXTERNAL_IP: 34.138.9.207
STATUS: RUNNING
```

GCloud Console

Create an instance

To create a VM instance, select one of the options:

New VM instance

New VM instance from template

New VM instance from machine image

Marketplace

Name *
vm-dk98

MANAGE TAGS AND LABELS

Region *
us-east1 (South Carolina)

Zone *
us-east1-b

Machine configuration

Try the new H3 machine series, optimized for HPC.

General purpose

Compute optimized

Memory optimized

GPUs

Series	Description	vCPUs	Memory	Platform
C3	Consistently high performance	4 - 176	8 - 1,408 GB	Intel Sapphire Rapids
E2	Low cost, day-to-day computing	0.25 - 32	1 - 128 GB	Based on availability
N2	Balanced price & performance	2 - 128	2 - 864 GB	Intel Cascade and Ice Lake
N2D	Balanced price & performance	2 - 224	2 - 896 GB	AMD EPYC
T2A	Scale-out workloads	1 - 48	4 - 192 GB	Ampere Altra Arm
T2D	Scale-out workloads	1 - 60	4 - 240 GB	AMD EPYC Milan
N1	Balanced price & performance	0.25 - 96	0.6 - 624 GB	Intel Skylake

Machine type

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

CREATE

CANCEL

EQUIVALENT CODE

Result:

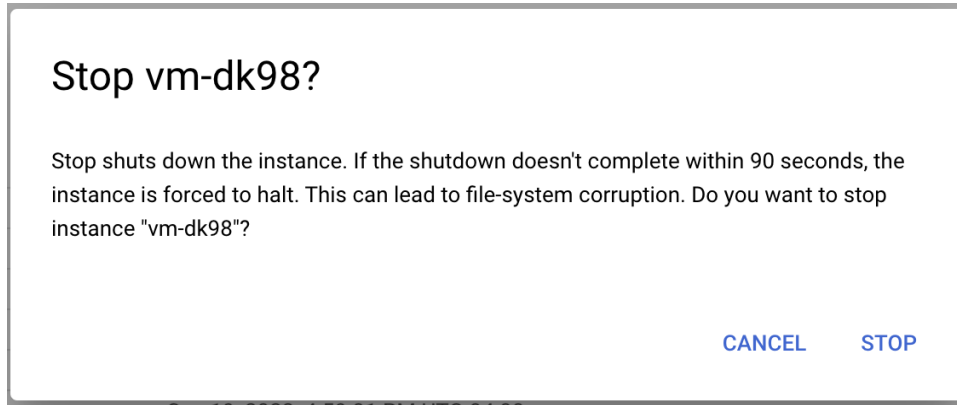
VM instances						
Filter Enter property name or value						
<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Connect
<input type="checkbox"/>	✓	vm-dk98	us-east1-b			RDP

6. Pause a VM

- VM is only controlled through the gcloud commands or the GCloud Console
- *Stop the VM 'vm-dk98' in zone 'us-east1-b'*
- `gcloud compute instances stop vm-dk98 --zone=us-east1-b`

```
dk98@cloudshell:~ (ds-561) $ gcloud compute instances stop vm-dk98 --zone=us-east1-b
Stopping instance(s) vm-dk98...done.
Updated [https://compute.googleapis.com/compute/v1/projects/ds-561/zones/us-east1-b/instances/vm-dk98].
```

- GCloud Console



Result:	<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Connect
	<input type="checkbox"/>		vm-dk98	us-east1-b			RDP ▼ ⋮

7. Delete a VM

- VM is only deleted through the gcloud commands or the GCloud Console
- *Delete VM 'vm-dk98' in zone 'us-east1-b'*
- `gcloud compute instances delete vm-dk98 --zone=us-east1-b`

```
dk98@cloudshell:~ (ds-561)$ gcloud compute instances delete vm-dk98 --zone=us-east1-b
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.
- [vm-dk98] in [us-east1-b]

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

Deleted [https://www.googleapis.com/compute/v1/projects/ds-561/zones/us-east1-b/instances/vm-dk98].
```

- GCloud Console

Delete vm-dk98?

Are you sure you want to delete instance "vm-dk98"? (This will also delete boot disk "vm-dk98")

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

Result:

VM instances

CREATE INSTANCE

LEARN

HELP ASSISTANT

INSTANCES

OBSERVABILITY

INSTANCE SCHEDULES

VM instances

Filter

Enter property name or value

?

|||

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Connect
--------------------------	--------	--------	------	-----------------	-----------	---------

8. Make a service account and give it permission to access your storage bucket

- Service accounts can only be created through the gcloud commands and GCloud console
- Create a service account 'sa-dk98' with description and display name

- `gcloud iam service-accounts create sa-dk98 --description="hw service account" --display-name="service-account-dk98"`

```
dk98@cloudshell:~ (ds-561) $ gcloud iam service-accounts create sa-dk98 --description="hw service account" --display-name="service-account-dk98"
Created service account [sa-dk98].
```

- Give access to storage bucket 'bu-ds561-dk98' (gsutil and gcloud command)

- `gsutil iam ch`

serviceAccount:sa-dk98@ds-561.iam.gserviceaccount.com:roles/storage.objectViewer
gs://bu-ds561-dk98

```
dk98@cloudshell:~ (ds-561) $ gsutil iam ch serviceAccount:sa-dk98@ds-561.iam.gserviceaccount.com:roles/storage.objectViewer gs://bu-ds561-dk98
```

- `gcloud storage buckets add-iam-policy-binding gs://bu-ds561-dk98 \`

`--member="serviceAccount:sa-dk98@ds-561.iam.gserviceaccount.com" \`

`--role="roles/storage.objectViewer"`

```
dk98@cloudshell:~ (ds-561) $ gcloud storage buckets add-iam-policy-binding gs://bu-ds561-dk98 \
--member="serviceAccount:sa-dk98@ds-561.iam.gserviceaccount.com" \
--role="roles/storage.objectViewer"
bindings:
- members:
  - projectEditor:ds-561
  - projectOwner:ds-561
  role: roles/storage.legacyBucketOwner
- members:
  - projectViewer:ds-561
  role: roles/storage.legacyBucketReader
- members:
  - projectEditor:ds-561
  - projectOwner:ds-561
  role: roles/storage.legacyObjectOwner
- members:
  - projectViewer:ds-561
  role: roles/storage.legacyObjectReader
- members:
  - serviceAccount:sa-dk98@ds-561.iam.gserviceaccount.com
  role: roles/storage.objectViewer
etag: CAI=
kind: storage#policy
resourceId: projects/_/buckets/bu-ds561-dk98
version: 1
```



sa-dk98@ds-561.iam.gserviceaccount.com



Enabled

service-
account-
dk98

hw s
acco



- GCloud Console

1 Service account details

Service account name

sa-dk98

Display name for this service account

Service account ID *

sa-dk98

X

↺

Email address: sa-dk98@ds-561.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)

Grant this service account access to DS 561 so that it has permission to complete specific actions on the resources in your project. [Learn more](#)

Role

Storage Object Viewer

▼

IAM condition (optional) ?

+ ADD IAM CONDITION

Grants access to view objects and their metadata, excluding ACLs. Can also list the objects in a bucket.

+ ADD ANOTHER ROLE

CONTINUE

Result:

←	Bucket details		↺ REFRESH	💬 HELP ASSISTANT	🎓 LEARN
🗑️ 👤	Editors of project: ds-561		Storage Legacy Bucket Owner		✎
🗑️ 👤	Owners of project: ds-561		Storage Legacy Bucket Owner		✎
🗑️ 📧	sa-dk98@ds-561.iam.gserviceaccount.com	service-account-dk98	Storage Object Viewer		✎

9. Delete the service account

- Service accounts can only be deleted through the gcloud commands and GCloud console
- Delete service account 'sa-dk98@ds-561.iam.gserviceaccount.com'
- `gcloud iam service-accounts delete sa-dk98@ds-561.iam.gserviceaccount.com`

`--project=ds-561`

```
dk98@cloudshell:~ (ds-561)$ gcloud iam service-accounts delete sa-dk98@ds-561.iam.gserviceaccount.com --project=ds-561
You are about to delete service account [sa-dk98@ds-561.iam.gserviceaccount.com]

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

deleted service account [sa-dk98@ds-561.iam.gserviceaccount.com]
```

GCloud Console

Delete service account "sa-dk98"

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](#)

Service accounts

+ CREATE SERVICE ACCOUNT

?

HELP ASSISTANT

LEARN

Service accounts for project "DS 561"

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	Actions
<input type="checkbox"/>	ds-561@appspot.gserviceaccount.com	Enabled	App Engine default service account		No key	<div></div>
<input type="checkbox"/>	634775913953-compute@developer.gserviceaccount.com	Enabled	Compute Engine default service account		No key	<div></div>

Result:

10. Delete the storage bucket

- Remove storage bucket and the files (maybe) inside

- `gsutil rm -r gs://bu-ds561-dk98`


```
dk98@cloudshell:~ (ds-561) $ gsutil rm -r gs://bu-ds561-dk98
Removing gs://bu-ds561-dk98/...
```

- `gcloud storage buckets delete gs://bu-ds561-dk98`

```
dk98@cloudshell:~ (ds-561) $ gcloud storage buckets delete gs://bu-ds561-dk98
Removing gs://bu-ds561-dk98/...
Completed 1/1
```

- GCloud Console


Delete bucket 'bu-ds561-dk98'?

 This action will permanently delete the bucket and the objects it contains (including versions) from Google Cloud. Data will not be recoverable.

You are deleting the bucket bu-ds561-dk98.
Deletion is performed in the background and may take some time depending on the size of the objects being deleted.

Confirm deletion by typing 'DELETE' below:

DELETE *
bu-ds561-dk98

 Enter DELETE to confirm

CANCEL

DELETE

Buckets

HELP ASSISTANT

LEARN

Filter

Filter buckets

?

<div><input type="checkbox"/></div> <div>Name ↑</div>	Created	Location
<div><input type="checkbox"/></div> <div>ds-561.appspot.com</div>	Sep 12, 2023, 11:48:29 AM	Region: <div></div>
<div><input type="checkbox"/></div> <div>staging.ds-561.appspot.com</div>	Sep 12, 2023, 11:48:29 AM	Region: <div></div>

Result: