Assignment 2, Cloud Computing

Exploring Google Cloud Services

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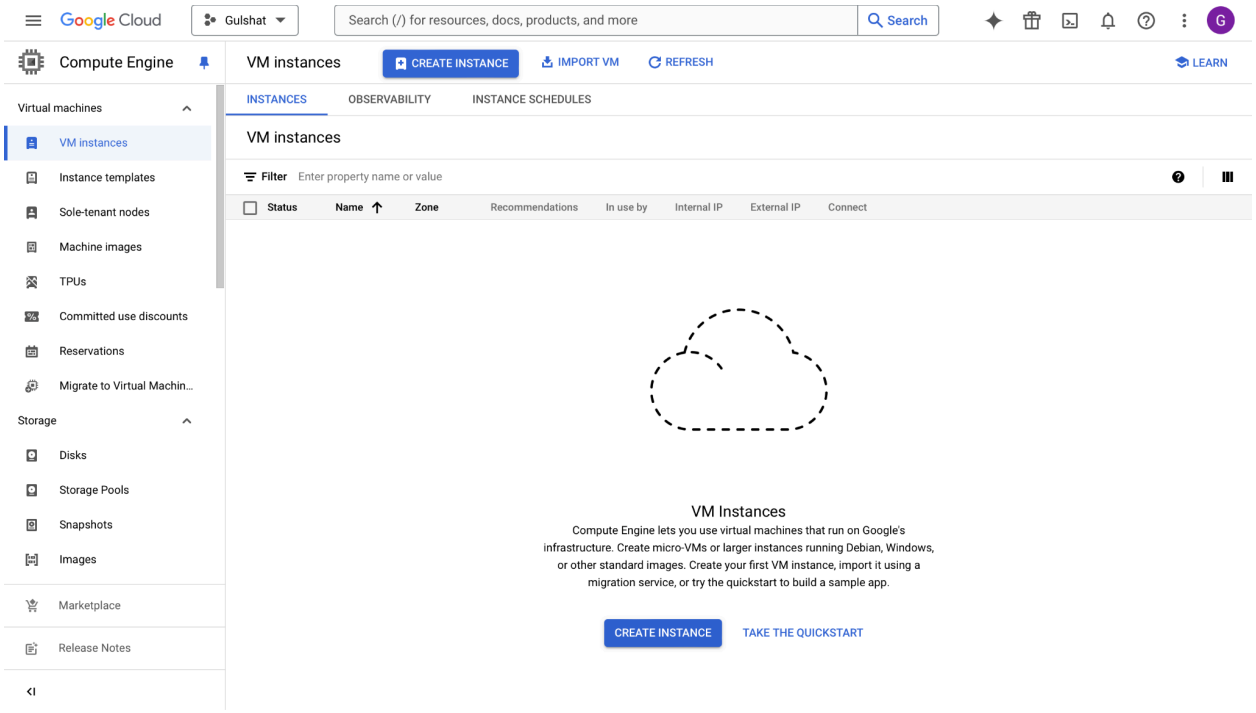
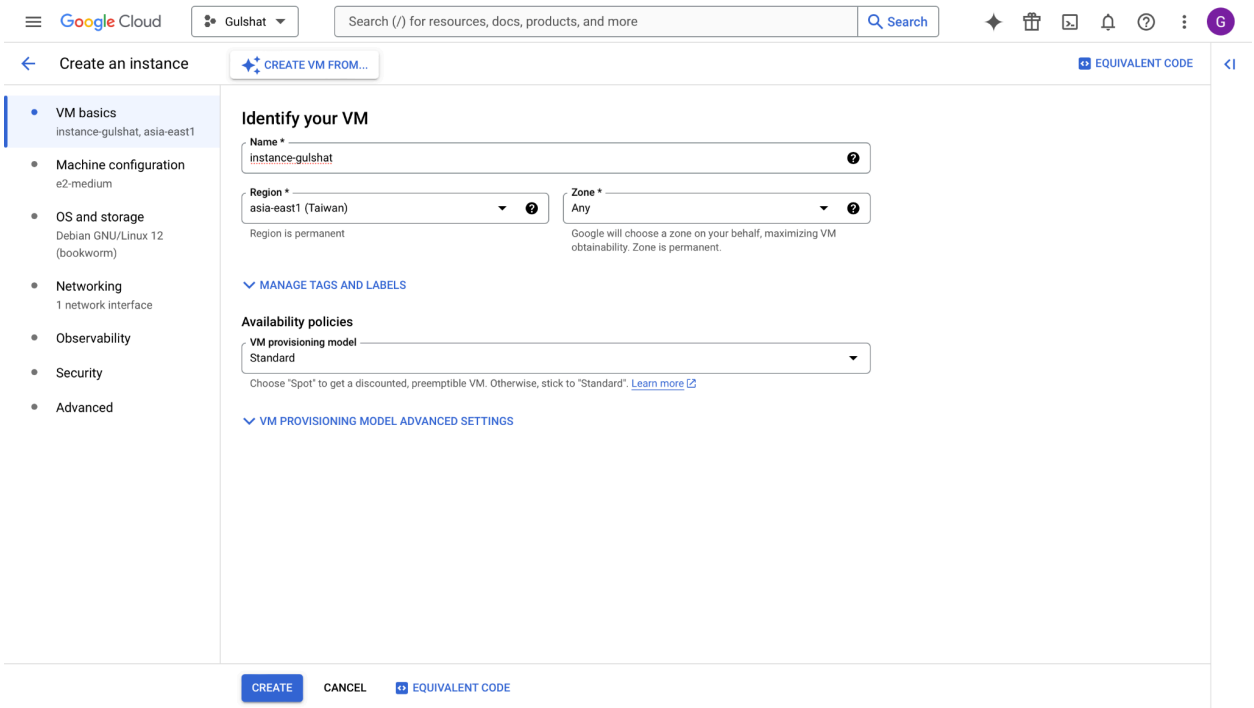
Virtual Machines in Google Cloud

Create a Virtual Machine (VM) Instance

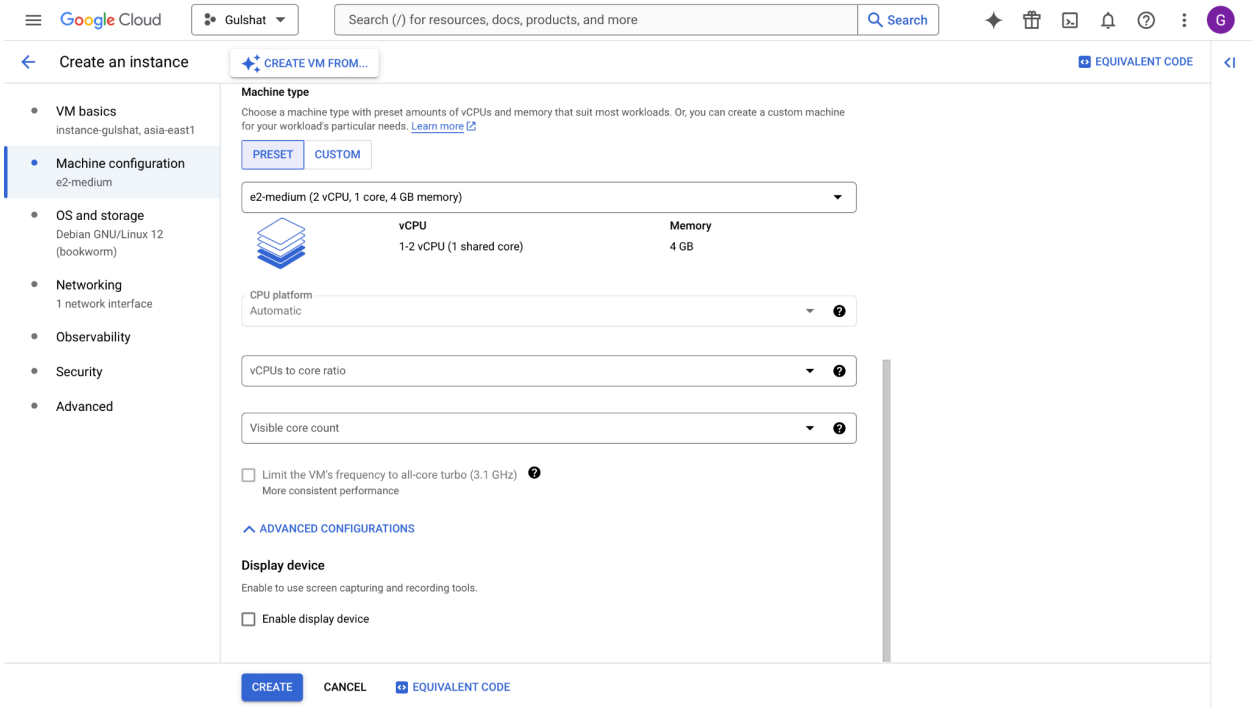
1. Clicked “Create instance”.



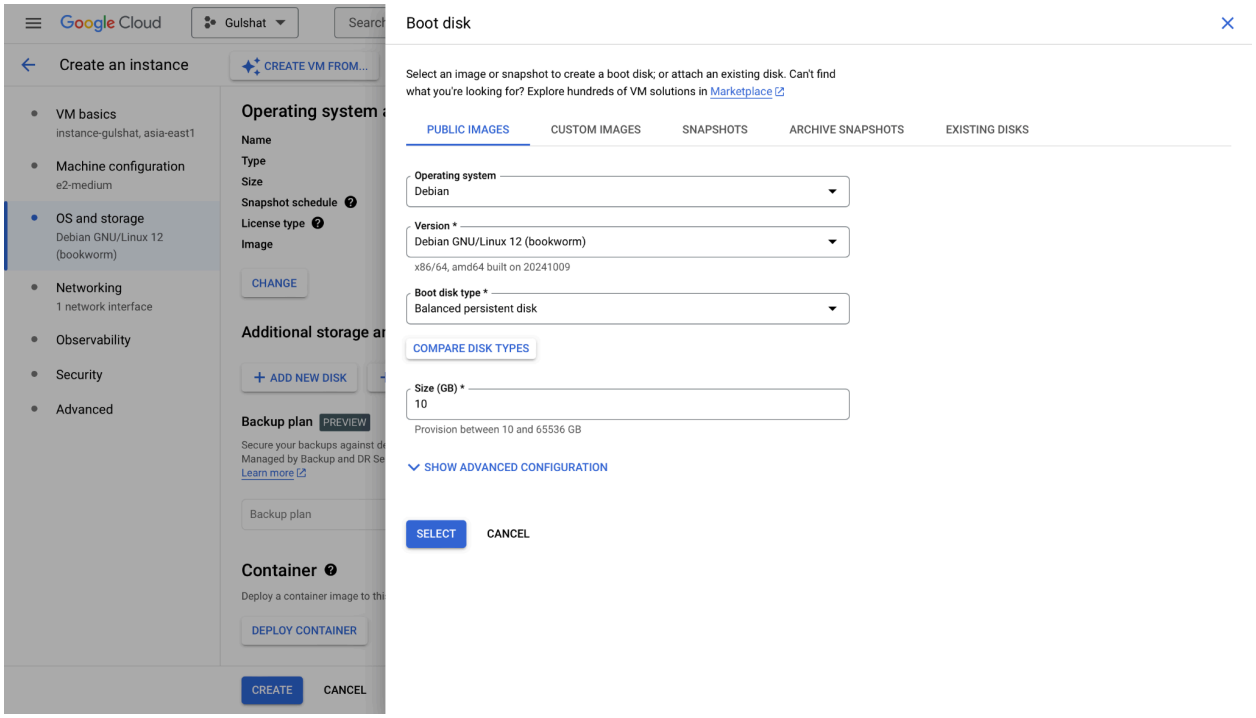
2. Created instance named “instance-gulshat” with region “asia-east1”



3. Chose e2-medium as a machine type, because it is good for development, testing, and small apps.

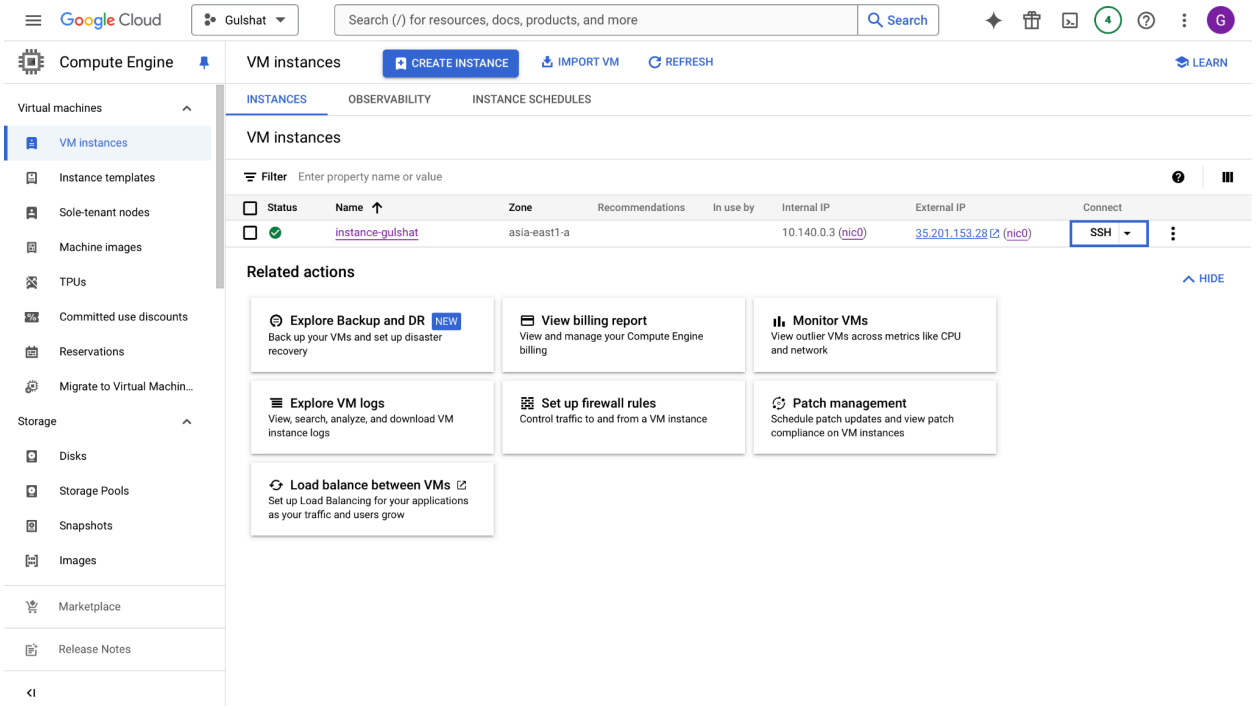


4. Chose Debian OS, because macOS is not available as an OS for GC, then created my instance.



Connect to the VM

1. Clicked SSH in column Connect to open a SSH terminal.



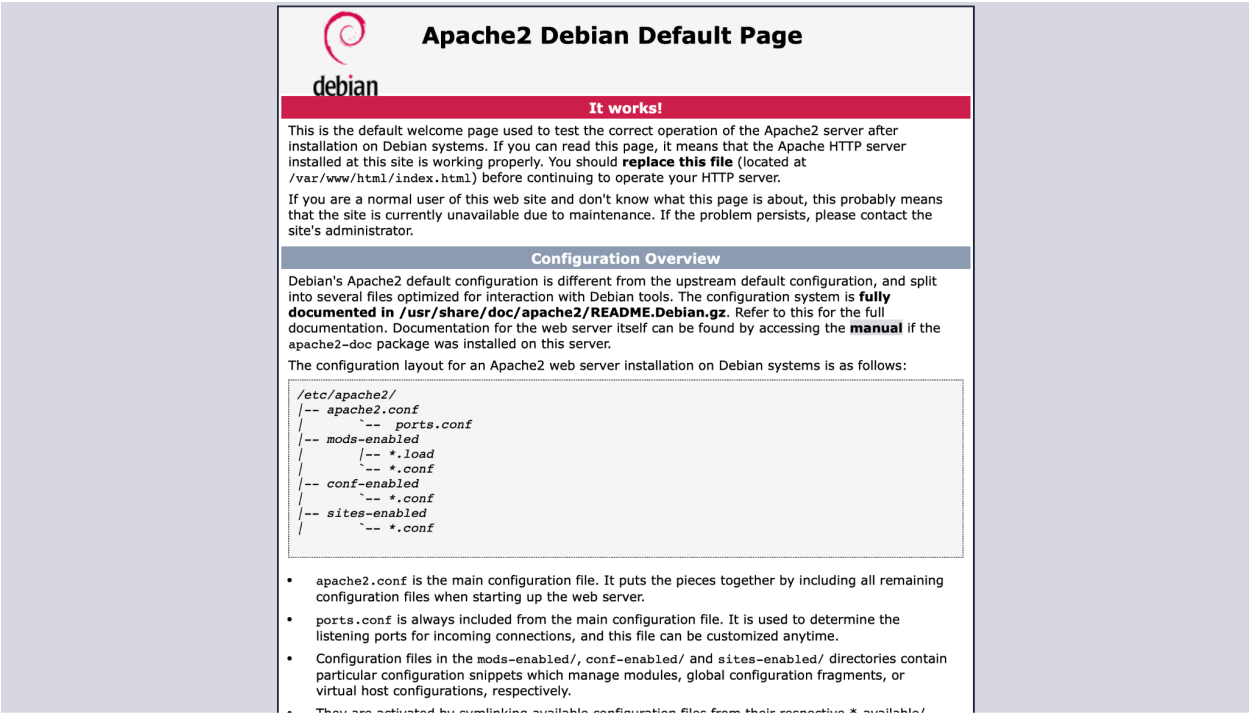
2. Run this code to install Apache.

```
gulshat_j_kh_03@instance-gulshat:~$ sudo apt install apache2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.3-0 ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.3-0 ssl-cert
0 upgraded, 11 newly installed, 0 to remove and 0 not upgraded.
Need to get 2379 kB of archives.
After this operation, 8468 kB of additional disk space will be used.
Get:1 file:/etc/apt/mirrors/debian.list Mirrorlist [30 B]
Get:2 file:/etc/apt/mirrors/debian-security.list Mirrorlist [39 B]
Get:3 https://deb.debian.org/debian bookworm/main amd64 libapr1 amd64 1.7.2-3 [102 kB]
Get:4 https://deb.debian.org/debian bookworm/main amd64 libaprutil1 amd64 1.6.3-1 [87.8 kB]
Get:5 https://deb.debian.org/debian bookworm/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.3-1 [13.6 kB]
Get:6 https://deb.debian.org/debian bookworm/main amd64 libaprutil1-ldap amd64 1.6.3-1 [11.8 kB]
Get:7 https://deb.debian.org/debian bookworm/main amd64 libjansson4 amd64 2.14-2 [40.8 kB]
Get:8 https://deb.debian.org/debian bookworm/main amd64 liblua5.3-0 amd64 5.3.6-2 [123 kB]
Get:9 https://deb.debian.org/debian-security bookworm-security/main amd64 apache2-bin amd64 2.4.62-1~deb12u2 [1386 kB]
Get:10 https://deb.debian.org/debian-security bookworm-security/main amd64 apache2-data all 2.4.62-1~deb12u2 [160 kB]
Get:11 https://deb.debian.org/debian-security bookworm-security/main amd64 apache2-utils amd64 2.4.62-1~deb12u2 [210 kB]
Get:12 https://deb.debian.org/debian-security bookworm-security/main amd64 apache2 amd64 2.4.62-1~deb12u2 [223 kB]
Get:13 https://deb.debian.org/debian bookworm/main amd64 ssl-cert all 1.1.2 [21.1 kB]
Fetched 2379 kB in 1s (3572 kB/s)
Preconfiguring packages ...
Selecting previously unselected package libapr1:amd64.
(Reading database ... 70354 files and directories currently installed.)
Preparing to unpack .../00-libapr1_1.7.2-3_amd64.deb ...
Unpacking libapr1:amd64 (1.7.2-3) ...
Selecting previously unselected package libaprutil1:amd64.
Preparing to unpack .../01-libaprutil1_1.6.3-1_amd64.deb ...
Unpacking libaprutil1:amd64 (1.6.3-1) ...
Selecting previously unselected package libaprutil1-dbd-sqlite3:amd64.
Preparing to unpack .../02-libaprutil1-dbd-sqlite3_1.6.3-1_amd64.deb ...
Unpacking libaprutil1-dbd-sqlite3:amd64 (1.6.3-1) ...
Selecting previously unselected package libaprutil1-ldap:amd64.
Preparing to unpack .../03-libaprutil1-ldap_1.6.3-1_amd64.deb ...
Unpacking libaprutil1-ldap:amd64 (1.6.3-1) ...
Selecting previously unselected package libjansson4:amd64.
Preparing to unpack .../04-libjansson4_2.14-2_amd64.deb ...
Unpacking libjansson4:amd64 (2.14-2) ...
Selecting previously unselected package liblua5.3-0:amd64.
Preparing to unpack .../05-liblua5.3-0_5.3.6-2_amd64.deb ...
Unpacking liblua5.3-0:amd64 (5.3.6-2) ...
Selecting previously unselected package apache2-bin.
Preparing to unpack .../06-apache2-bin_2.4.62-1~deb12u2_amd64.deb ...
Unpacking apache2-bin (2.4.62-1~deb12u2) ...
Selecting previously unselected package apache2-data.
Preparing to unpack .../07-apache2-data_2.4.62-1~deb12u2_all.deb ...
Unpacking apache2-data (2.4.62-1~deb12u2) ...
Selecting previously unselected package apache2-utils.
Preparing to unpack .../08-apache2-utils_2.4.62-1~deb12u2_amd64.deb ...
Unpacking apache2-utils (2.4.62-1~deb12u2) ...
```

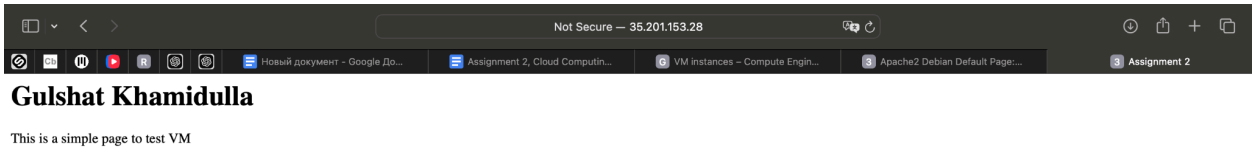
3. Run to start and enable Apache.

```
gulshat_j_kh_03@instance-gulshat:~$ sudo systemctl start apache2
sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable apache2
```

4. Went to my instance's External IPin web browser to check if Apache is running.



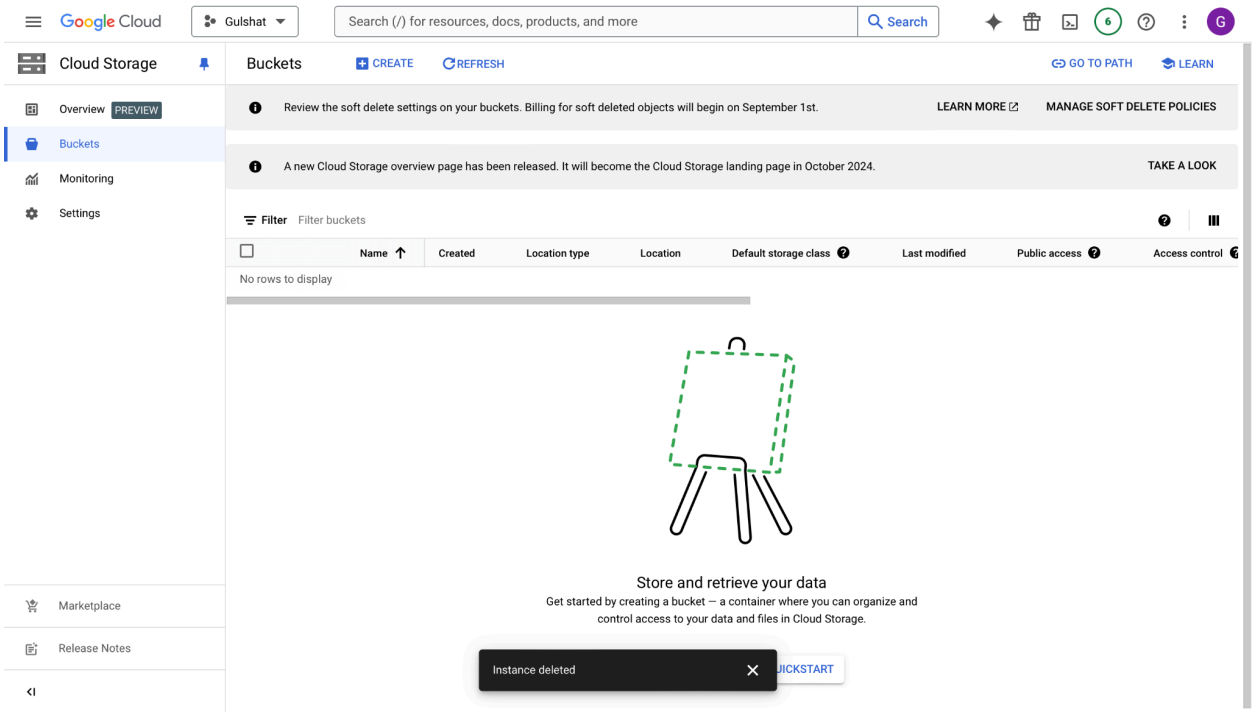
5. Created a simple HTML page with title "Assignment 2" (unfortunately forgot to take a screenshot of this process).



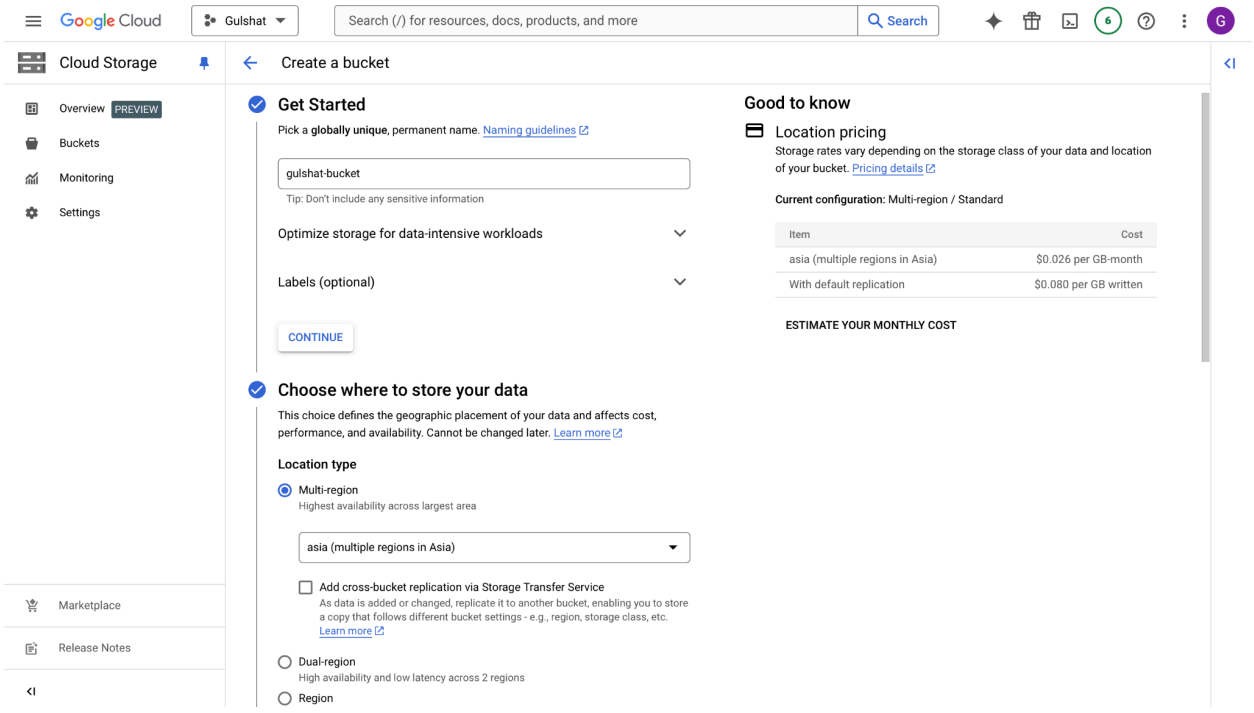
Storage Solutions in Google Cloud

Create a Cloud Storage Bucket

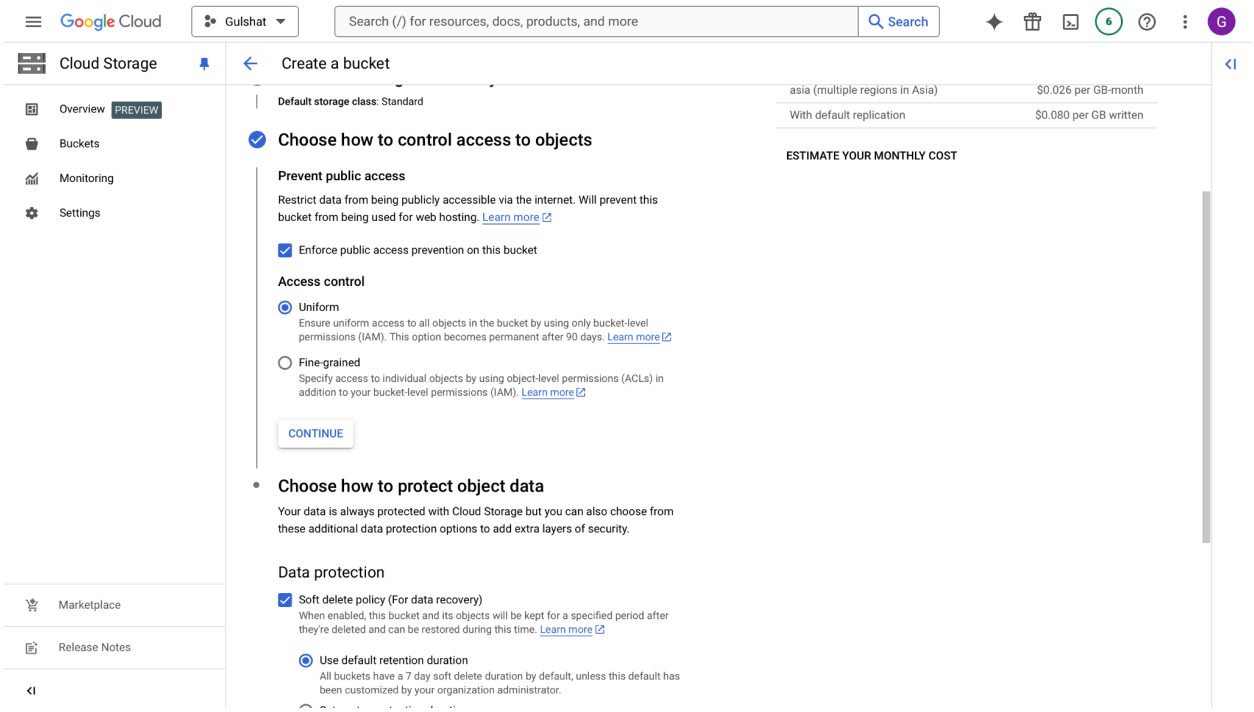
1. Clicked “Create bucket”.



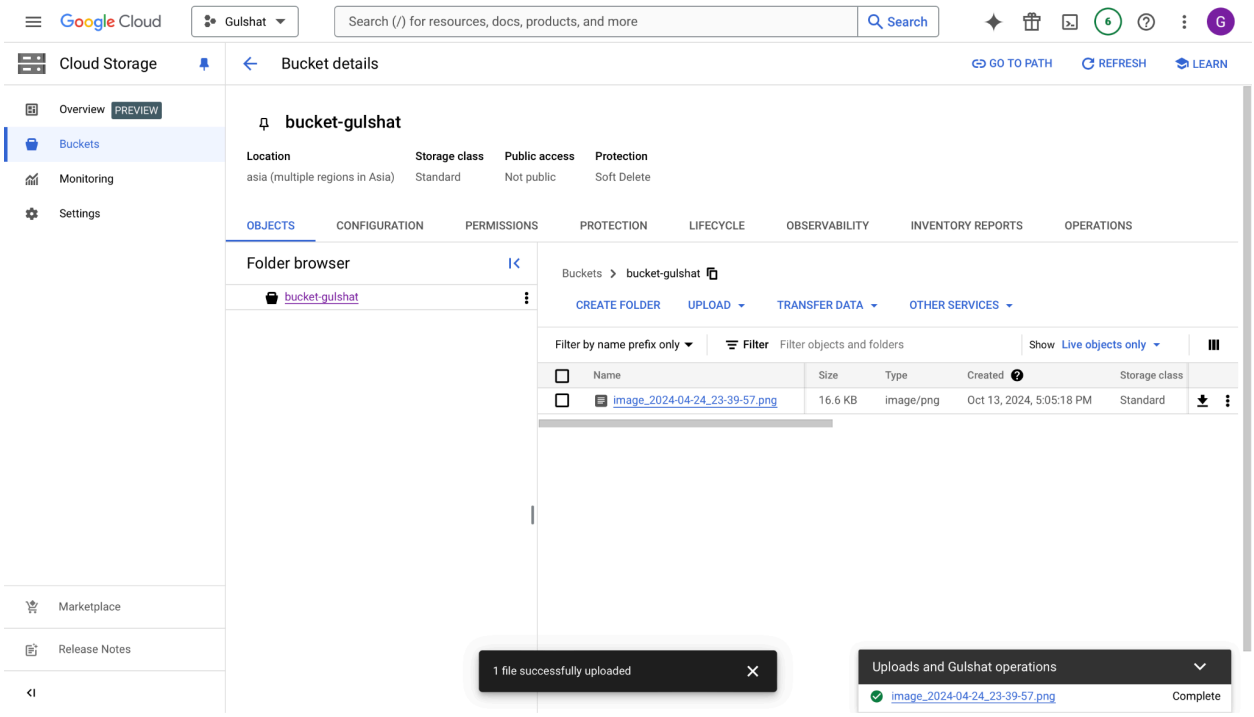
2. Created an instance named “bucket-gulshat” with the region “asia”.



3. Set the private access.

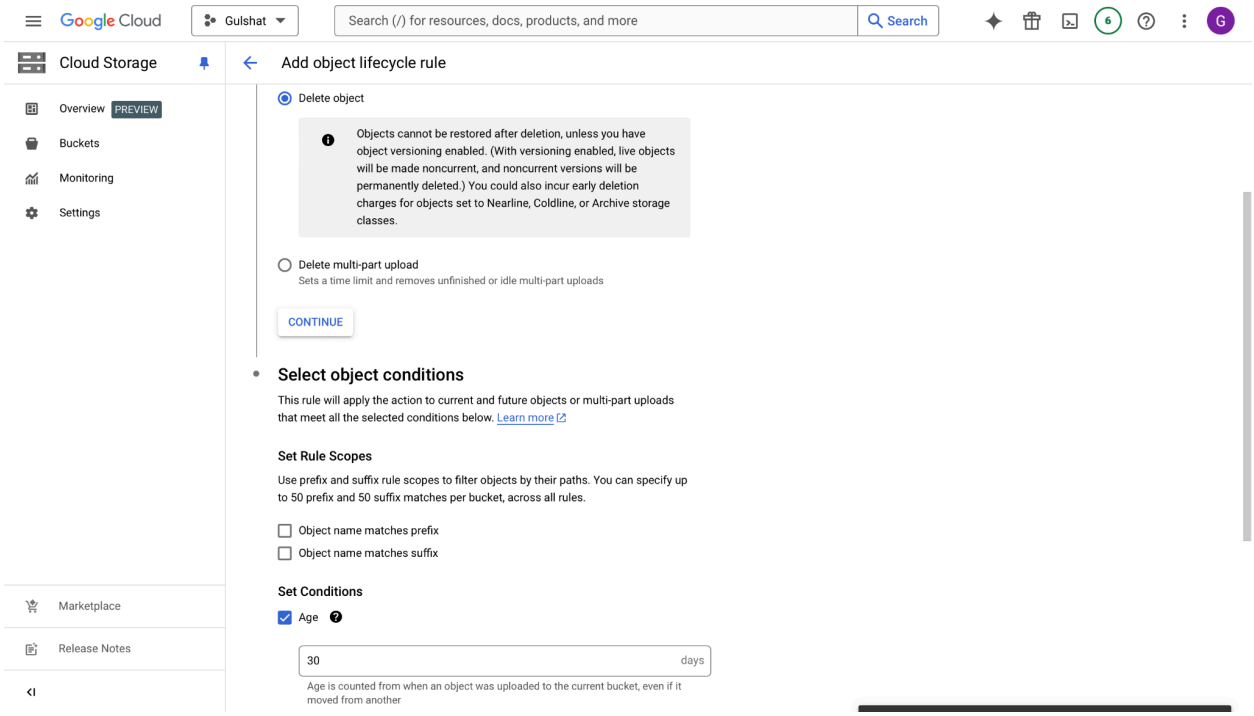


4. After creation a bucket uploaded an image file.

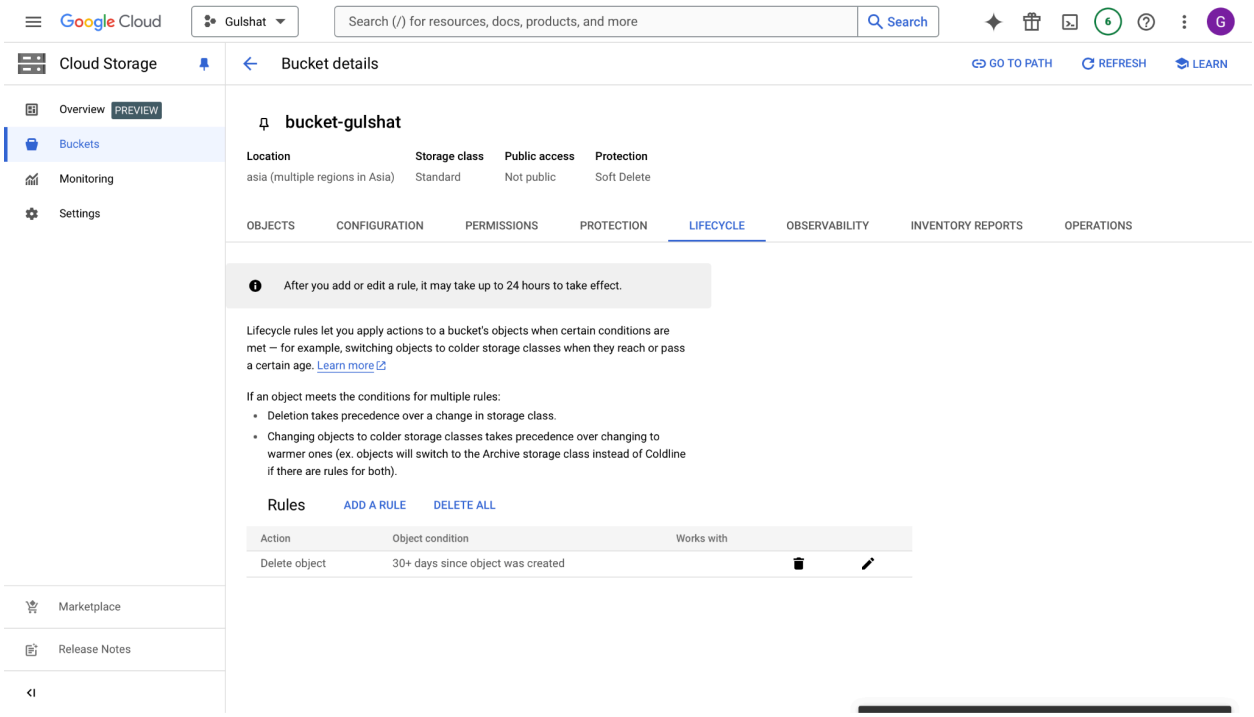


Implement Object Lifecycle Management

1. Clicked “Add a rule” and it opened a section where I found “Delete object”, then set the “Age” for 30 days.



2. The last step was “Create” and there is a final rule:



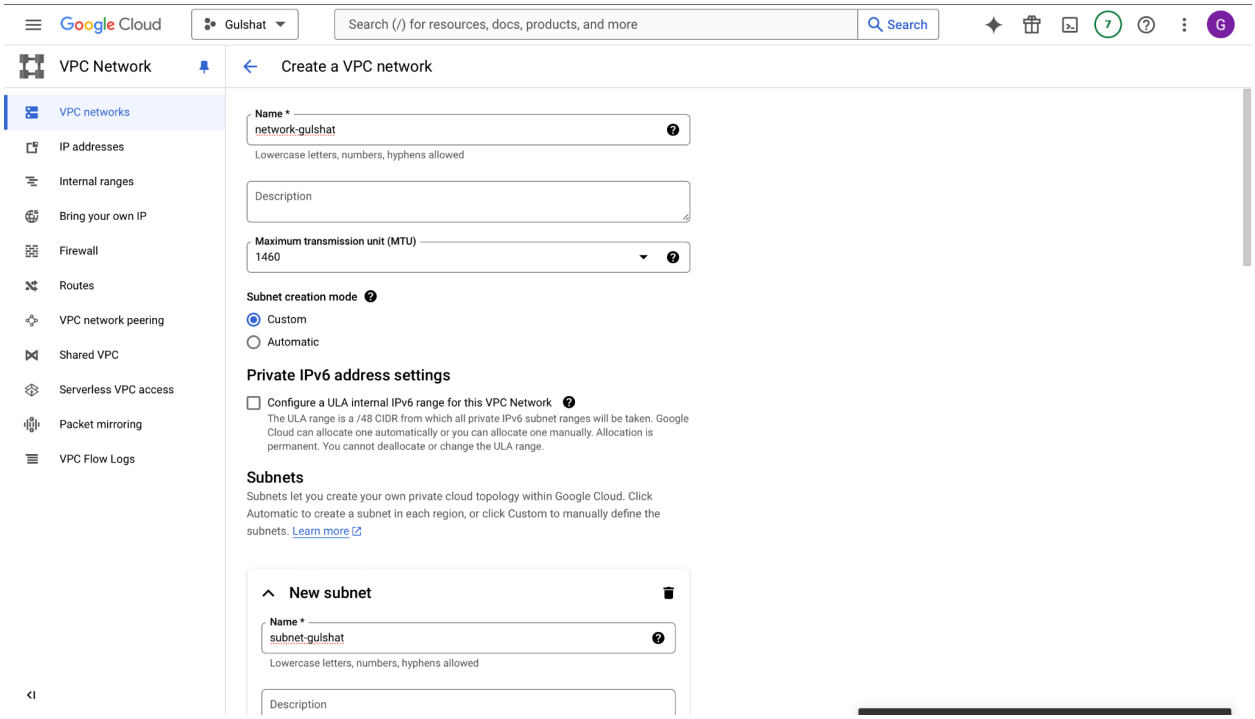
3. Cloud Storage provides a virtual drive where users can keep files like documents, photos, videos, and music and can help to backup them. For projects that involve big amounts of data, CS provides the necessary space without the hardware limitations of a personal computer. Also we can use it to host simple websites or applications. If we will talk about Lifecycle management, then it helps automate the organization and deletion of files based on added rules. For example, if someone forgets to delete a file by time, he/she doesn’t need to worry about it if he/she sets a rule.

By automating the management of files, users can reduce the time spent manually sorting, deleting, or moving files.

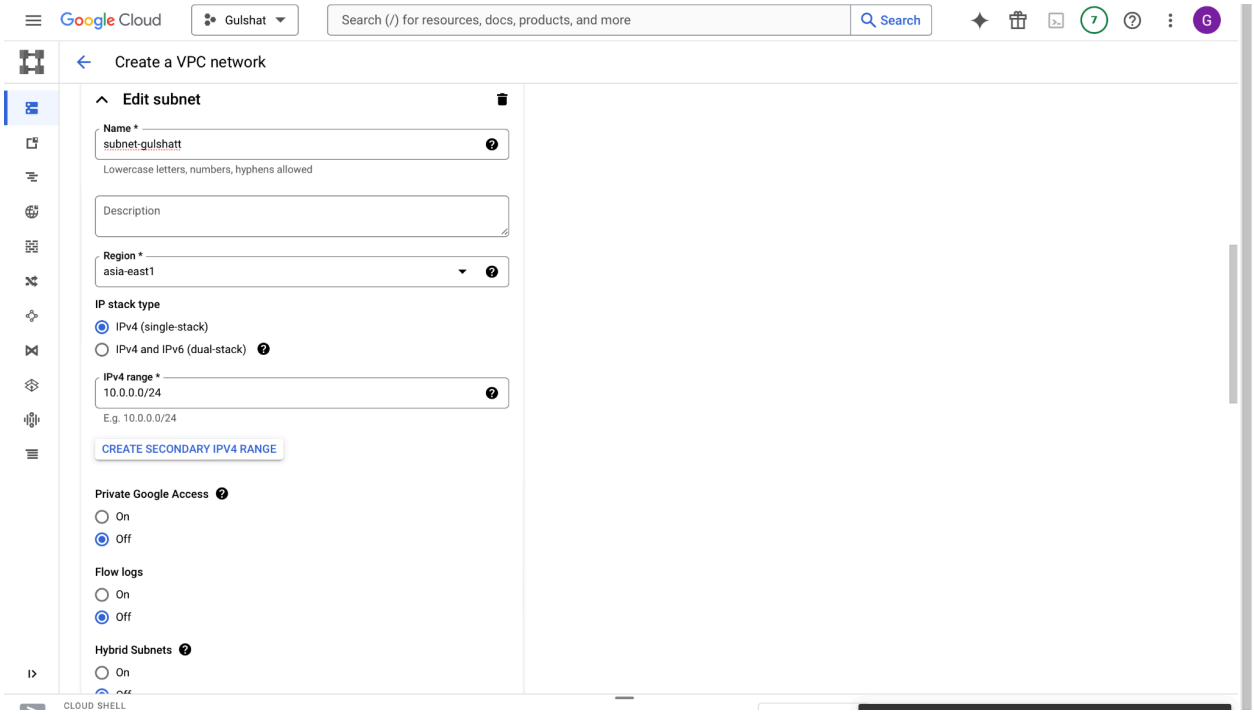
Networking in Google Cloud

Set Up a Virtual Private Cloud (VPC)

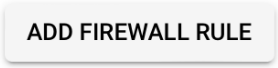
1. Created a VPC network named “instance-gulshat”.



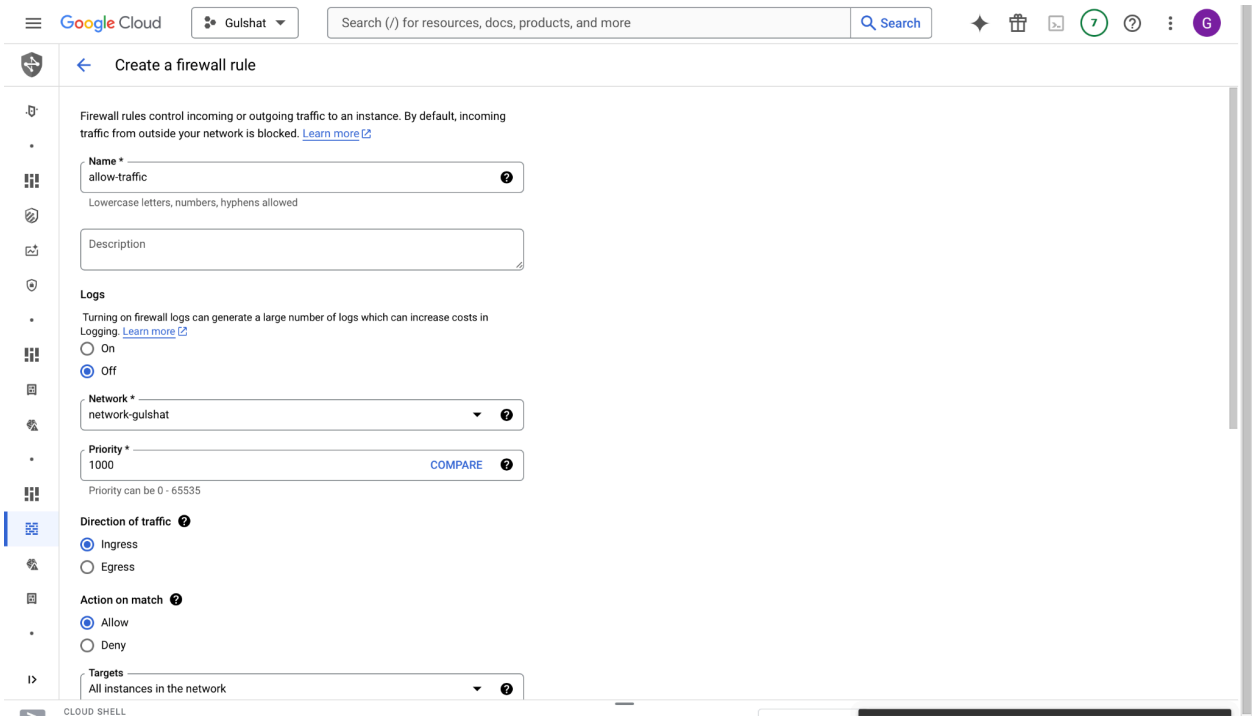
2. Created a subnet named “subnet-gulshatt”.



3. In the VPC network section, went to Firewall rules and clicked on "Add firewall rule".

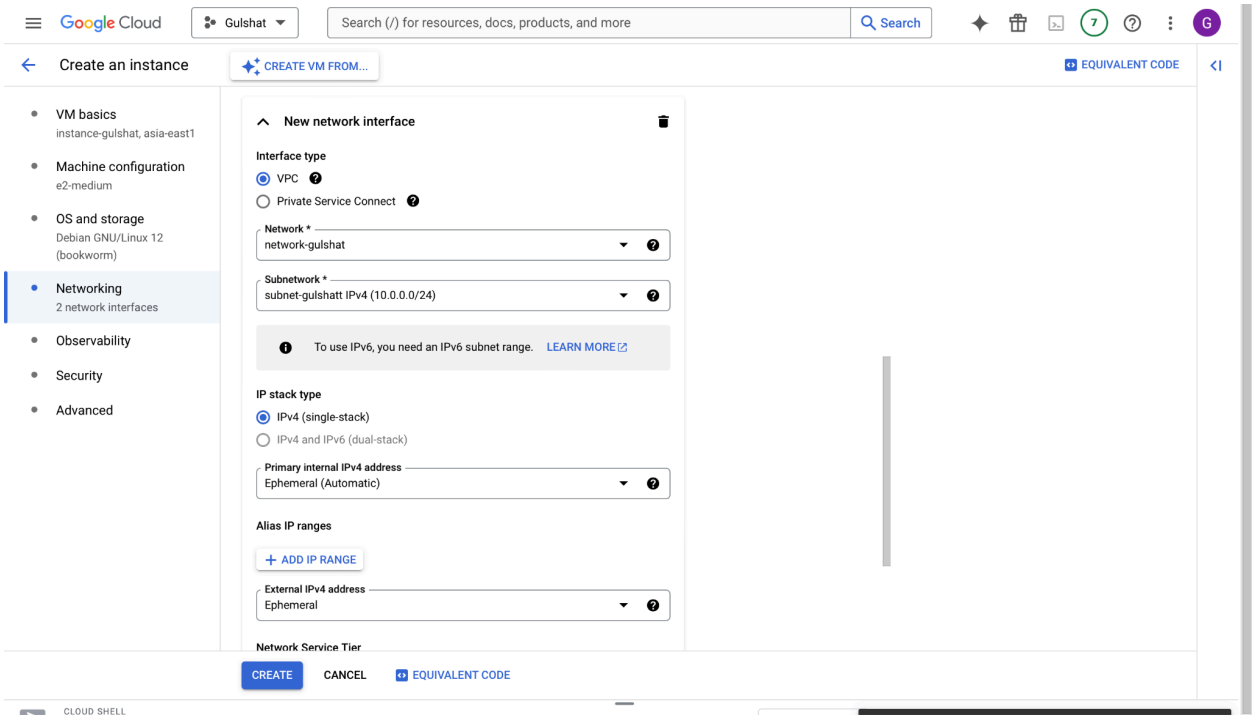


4. Created a firewall rule “allow-traffic”.



Connect VM to VPC

1. Went to the VM instance and connected the new VM to network-gulshat while creating an instance.



2. Used the VM SSH to ping an external server to verify connectivity.

3. In VPC we can deploy our resources. It provides complete control over the networking environment, including IP address ranges, subnets, routing, and gateways. Firewall rules in Google Cloud VPCs can help to defend, controlling the traffic allowed in and out of the network.

Conclusion

In this assignment I worked with the basics of operating virtual machines, using storage and networking features of Google Cloud products. I created a VM and configured a web server while we examined the firewall settings. Learned about Cloud Storage bucket more deeply like how to add files and perform cooldowns on files. Then, I created a VPC, added a VM into it and configured the firewall properly in order to have security policies for the network.
After these exercises, I got deep skills by using Google Cloud instruments.

References

https://cloud.google.com/compute/docs/access/create-enable-service-accounts-for-instances#changeserviceaccountandscopes
https://cloud.google.com/compute/docs/tutorials/basic-webserver-apache#:~:text=This%20tutorial%20shows%20you%20how%20to
https://cloud.google.com/vpc/docs/create-modify-vpc-networks#gcloud