

Project id: cdsds561-project-1

Bucket Name: hw2nirbhgsutil

Bucket-2 Name:hw4nirbhgsutil

Directory Name: test-dir

Github Link:[CDS-DS-561-hw2/hw4 at master · nirbhay221/CDS-DS-561-hw2 \(github.com\)](https://github.com/nirbhay221/CDS-DS-561-hw2)

Topic name : projects/cdsds561-project-1/topics/hw3nirbhgsutil

Topic Id: hw3nirbhgsutil

Subscription Id: hw3nirbhgsutil-sub

Service Account email for pub sub:

pubsubserviceacc-hw3-nirbh@cdsds561-project-1.iam.gserviceaccount.com

Service Account for pub sub: pubsubServiceAcc-hw3-nirbh

Reserved IP : 35.237.59.39

For your first app write a web server in python that can accept HTTP GET requests from web clients. The app should be able to respond to requests for the files in your bucket that you created in homework 2 and return the contents of the requested file along with a 200-OK status. You should run this webserver on a VM instance for which you have configured a static IP address. You should start this web server automatically upon VM creation.

For the following first app, I created the python flask application. And I stored the key for the topic, startup script (bash file) and the main.py file in the “hw4nirbhgsutil” bucket:

The screenshot shows the Google Cloud Storage console interface for the 'hw4nirbhgsutil' bucket. At the top, there's a warning about public access and buttons for 'EDIT ACCESS' and 'DISMISS'. Below that, the bucket's location is listed as 'us-east1 (South Carolina)', storage class as 'Standard', and public access as 'Public to internet'. The protection level is 'None'. The 'OBJECTS' tab is selected, showing a list of four objects:

Name	Size	Type	Created	Storage class	Last modified	Public access	Version history
key.json	2.3 KB	application/json	Oct 17, 2023, 1:58:27 AM	Standard	Oct 17, 2023, 1:58:27 AM	Public to internet	Copy URL
main.py	4.3 KB	application/octet-stream	Oct 18, 2023, 12:25:57 AM	Standard	Oct 18, 2023, 12:25:57 AM	Public to internet	Copy URL
startup-script.sh	1.1 KB	application/x-sh	Oct 17, 2023, 4:29:54 PM	Standard	Oct 17, 2023, 4:29:54 PM	Public to internet	Copy URL

and then we create the vm (f1 - micro) using the startup script using the following command on gcloud cli:

```

gcloud compute instances create instance-1 ^
--project=cdsds561-project-1 ^
--machine-type=f1-micro ^
--network-interface=network-tier=PREMIUM,stack-type=IPV4_ONLY,subnet=default ^
--min-ionization-mode=STANDARD ^
--service-account=pubsubserviceacc-hw3-nirbh@cdsds561-project-1.iam.gserviceaccount.com ^
--scopes=https://www.googleapis.com/auth/cloud-platform ^
--tags=http-server,https-server,lb-health-check ^
--notebooks=allow-yes,boot-yes,device-name=instance-5,image=projects/debian-cloud/global/images/debian-11-bullseye-v20231010,mode=rw,size=10,type=projects/cdsds561-project-1/zones/us-central1-a/diskTypes/pd-balanced ^
--no-shielded-secure-boot ^
--shielded-vtpm ^
--enable-integrity-monitoring ^
--label=team=ai,stage=cloud ^
--reservation-affinity=any ^
--metadata startup-script-url=gs://hw4nirbhgsutil/startup-script.sh ^
--format="value(networkInterfaces[0].accessConfigs[0].natIP)"

```

Once the following vm is created we can ssh the vm instance from the vm instances page:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	instance-1	us-east1-b			10.142.0.50 (nic0)	34.139.185.19 (nic0)	SSH
<input type="checkbox"/>	instance-2	us-east1-b			10.142.0.17 (nic0)	34.139.10.96 (nic0)	SSH
<input type="checkbox"/>	instance-3	us-east1-b			10.142.0.18 (nic0)	34.139.20.171 (nic0)	SSH
<input type="checkbox"/>	instance-4	us-east1-b			10.142.0.19 (nic0)	34.74.120.241 (nic0)	SSH

After ssh, you can use instance 4 and start the http-client script for sending the request to instance 1 for testing if the following server has started or not. Well the server started and we get the following response on the instance 4:

```
nmalhotr@instance-4:~$ python3 http-client.py -d 34.139.20.171 -b /hw2nirbhgsutil -w test-dir -n 1  
-i 1000 -v  
Requesting /hw2nirbhgsutil/test-dir/665.html from 34.139.20.171 80  
403 FORBIDDEN  
Server: Werkzeug/3.0.0 Python/3.9.2  
Date: Wed, 18 Oct 2023 04:30:06 GMT  
Content-Type: text/html; charset=utf-8  
Content-Length: 13  
Connection: close  
  
b'Access Denied'  
nmalhotr@instance-4:~$ python3 http-client.py -d 34.139.20.171 -b /hw2nirbhgsutil -w test-dir -n 1  
-i 1000 -v  
Requesting /hw2nirbhgsutil/test-dir/221.html from 34.139.20.171 80  
200 OK  
Server: Werkzeug/3.0.0 Python/3.9.2  
Date: Wed, 18 Oct 2023 04:30:14 GMT  
Content-Type: text/html; charset=utf-8  
Content-Length: 82697  
Connection: close  
  
b'<!DOCTYPE html>\r\n<html>\r\n<body>\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit,  
sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\r\nminim veniam, qui  
s nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure do  
lor in reprehenderit in voluptate velit esse\r\nncillum dolore eu fugiat nulla pariatur. Excepteur  
sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laboru  
m.\r\n<p>\r\n<a href="7561.html"> This is a link </a>\r\n<p>\r\nLorem ipsum dolor sit amet, consec  
tetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim  
ad\r\nminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo conse  
uat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\nncillum dolore eu fugiat nul  
la pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mo  
llit anim id est laborum.\r\n<p>\r\n<a href="5607.html"> This is a link </a>\r\n<p>\r\nLorem ipsum  
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magna aliqua. Ut enim ad\r\nminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\nncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa  
qui officia deserunt mollit anim id est laborum.\r\n<p>\r\n<a href="515.html"> This is a link </a>\r\n<p>\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididu  
nt ut labore et dolore magna aliqua. Ut enim ad\r\nminim veniam, quis nostrud exercitation ullamco  
laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in volunt
```

And the bash script for running a webserver at the vm creation is as follows:

```

C:\Users\nirbh\AppData\Local\Google\Cloud SDK>cat startup-script.sh
#!/bin/bash
mkdir -p ./tmp
cd ./tmp/
echo "Updating package list..."
sudo apt update -y
echo "Installing Python 3..."
sudo apt install -y python3
echo "Installing Python 3 pip..."
sudo apt install -y python3-distutils python3-lib2to3
curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
python3 get-pip.py

python3 get-pip.py

echo "Installing Google Cloud Python libraries..."
python3 -m pip install google-cloud-storage
python3 -m pip install google-cloud-logging
python3 -m pip install google-cloud-pubsub
python3 -m pip install google-auth
python3 -m pip install google-auth-oauthlib
python3 -m pip install google-cloud-storage

python3 -m pip install flask
echo "Installing Google Cloud SDK..."
sudo apt-get install -y google-cloud-sdk

GCS_BUCKET="hw4nirbhgsutil"
OBJECT_NAME="key.json"
gsutil cp gs://$GCS_BUCKET/$OBJECT_NAME .
GCS_BUCKET="hw4nirbhgsutil"
OBJECT_NAME="main.py"
echo "Copying $OBJECT_NAME from Google Cloud Storage..."
gsutil cp gs://$GCS_BUCKET/$OBJECT_NAME .
echo "Executing main.py..."

python3 -m pip install gunicorn
gunicorn -w 4 -b 0.0.0.0:80 main:app

```

We can also run the following without the gunicorn since gunicorn is basically used for creating multiple worker threads to handle concurrent request so without that we can use the following startup script:

```

#!/bin/bash
mkdir -p ./tmp
cd ./tmp/
echo "Updating package list..."
sudo apt update -y
echo "Installing Python 3..."
sudo apt install -y python3
echo "Installing Python 3 pip..."
sudo apt install -y python3-distutils python3-lib2to3
curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
python3 get-pip.py

python3 get-pip.py

echo "Installing Google Cloud Python libraries..."
python3 -m pip install google-cloud-storage
python3 -m pip install google-cloud-logging
python3 -m pip install google-cloud-pubsub
python3 -m pip install google-auth
python3 -m pip install google-auth-oauthlib
python3 -m pip install google-cloud-storage

python3 -m pip install flask
echo "Installing Google Cloud SDK..."
sudo apt-get install -y google-cloud-sdk

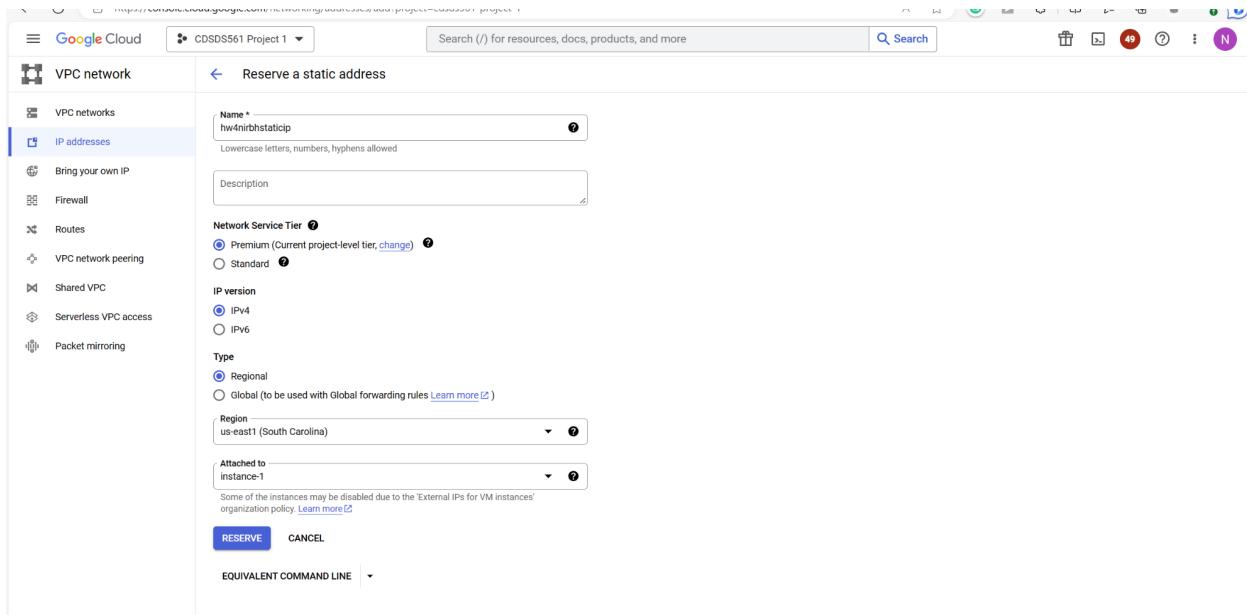
GCS_BUCKET="hw4nirbhgsutil"
OBJECT_NAME="key.json"
gsutil cp gs://$GCS_BUCKET/$OBJECT_NAME .
GCS_BUCKET="hw4nirbhgsutil"
OBJECT_NAME="main.py"
echo "Copying $OBJECT_NAME from Google Cloud Storage..."
gsutil cp gs://$GCS_BUCKET/$OBJECT_NAME .
echo "Executing main.py..."

python3 main.py

```

This was the process for using the vm creation startup script. Now we can reserve the following ip address for further checks

We can do this by heading to the VPC networks option and selecting the IP addresses under it. And then we can head on to the option of reserve external static address and then fill up the following form :



Then we can check the following result: in the external ip addresses and find the instance-1's external ip address as static

IP addresses										RESERVE EXTERNAL STATIC IP ADDRESS	RESERVE INTERNAL STATIC IP ADDRESS	REFRESH	RELEASE STATIC ADDRESS		
ALL		INTERNAL IP ADDRESSES		EXTERNAL IP ADDRESSES		IPv4 ADDRESSES		IPv6 ADDRESSES							
<input type="text"/> Filter Enter property name or value										?		☰			
<input type="checkbox"/>	Name	IP address	Access type	Region	Type	Version	In use by	Subnetwork	VPC Network						
<input type="checkbox"/>	hw4nirbhstaticip	34.139.6.169	External	us-east1	Static	IPv4	VM instance instance-1 (Zone us-east1-b)								
<input type="checkbox"/>	-	10.142.0.17	Internal	us-east1	Ephemeral	IPv4	VM instance instance-2 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	10.142.0.18	Internal	us-east1	Ephemeral	IPv4	VM instance instance-3 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	10.142.0.19	Internal	us-east1	Ephemeral	IPv4	VM instance instance-4 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	10.142.0.51	Internal	us-east1	Ephemeral	IPv4	VM instance instance-1 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	34.74.120.241	External	us-east1	Ephemeral	IPv4	VM instance instance-4 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	34.139.10.96	External	us-east1	Ephemeral	IPv4	VM instance instance-2 (Zone us-east1-b)	default	default						
<input type="checkbox"/>	-	34.139.20.171	External	us-east1	Ephemeral	IPv4	VM instance instance-3	default	default						

Browser Requests:

GET REQUEST:

Not secure | 34.139.6.169/hw2nirbhgutil/test-dir/102.html

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Request URL: http://34.139.6.169/hw2nirbhgutil/test-dir/102.html
 Request Method: GET
 Status Code: 200 OK
 Remote Address: 34.139.6.169:80
 Referrer Policy: strict-origin-when-cross-origin

Response Headers: Raw
 Connection: close
 Content-Length: 86706
 Content-Type: text/html; charset=utf-8
 Date: Wed, 18 Oct 2023 04:48:07 GMT
 Server: gunicorn

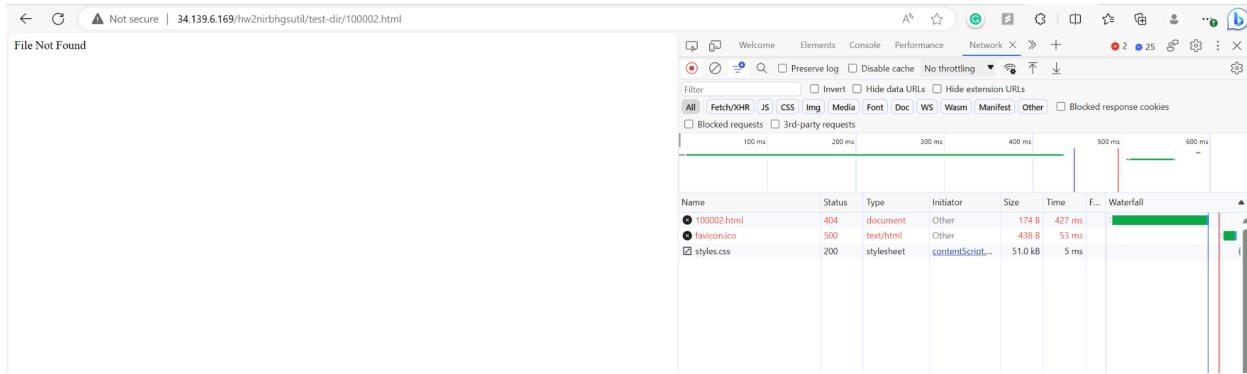
Request Headers: Raw
 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/*,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7

2 requests: 87.3 kB transferred 87.0

Console Issues +

Once we request using the following reserved static external ip address of the vm on the browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 200 OK status for the following request.

File Not Found Error:



Once we request using the following reserved static external ip address of the vm on the browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/100002.html>) we get the 404 File Not Found error status for the following request for requesting the file not found in the bucket.

Cloud Logging Result:

```

  * 2023-10-18 00:57:32.950 [instance-1] Error while fetching file: 404 GET https://storage.googleapis.com/download/storage/v1/b/hw2nirbhgsutil/o/test-dir%2F100002.html?alt=media: No such object: hw2nirbhgsutil/test-dir/100002.html: ('Request failed with status code', 404, 'Expected one of', <HTTPStatus.OK: 200>, <HTTPStatus.PARTIAL_CONTENT: 206>)
    Copy ⚡ Similar entries ⌂ Expand nested fields ⌂ Hide log summary
  {
    insertId: "1nxqqegg1iqiljj"
    logName: "projects/cdsds561-project-1/logs/get-func-log"
    receiveTimestamp: "2023-10-18T04:57:32.950162911Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  textPayload:
  "Error while fetching file: 404 GET https://storage.googleapis.com/download/storage/v1/b/hw2nirbhgsutil/o/test-dir%2F100002.html?alt=media: No such object: hw2nirbhgsutil/test-dir/100002.html: ('Request failed with status code', 404, 'Expected one of', <HTTPStatus.OK: 200>, <HTTPStatus.PARTIAL_CONTENT: 206>)"
  timestamp: "2023-10-18T04:57:32.950162911Z"
}

  !! 2023-10-18 00:57:33.041 [instance-1] File Not Found. Error 404
    Copy ⚡ Similar entries ⌂ Expand nested fields ⌂ Hide log summary
  {
    insertId: "1m02b2cg1ipnfgy"
    logName: "projects/cdsds561-project-1/logs/my-function-log"
    receiveTimestamp: "2023-10-18T04:57:33.041720148Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "File Not Found. Error 404"
  timestamp: "2023-10-18T04:57:33.041720148Z"
}

```

PUT REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following put request.

HEADER RESULT:

The screenshot shows the Firefox Developer Tools Network tab. A PUT request is made to <http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>. The response details show a status of 501 NOT IMPLEMENTED. The Headers section includes the following:

```

Status: 501 NOT IMPLEMENTED
Version: HTTP/1.1
Transferred: 188 B (22 B size)
DNS Resolution: System
Response Headers (166 B):
Connection: close
Content-Length: 22
Content-Type: text/html; charset=utf-8
Date: Wed, 18 Oct 2023 05:15:56 GMT
Server: gunicorn
Request Headers (357 B):
Accept: */*
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.5
Cache-Control: no-cache
Connection: keep-alive
Content-Length: 0
Host: 34.139.6.169
Origin: http://34.139.6.169
Pragma: no-cache
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:118.0) Gecko/20100101 Firefox/118.0
  
```

RESPONSE RESULT:

The screenshot shows the Firefox Developer Tools Network tab. A PUT request is made to <http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>. The response details show a status of 501 NOT IMPLEMENTED. The Headers section includes the following:

```

Status: 501 NOT IMPLEMENTED
Version: HTTP/1.1
Transferred: 188 B (22 B size)
DNS Resolution: System
Response Headers (166 B):
Connection: close
Content-Length: 22
Content-Type: text/html; charset=utf-8
Date: Wed, 18 Oct 2023 05:15:56 GMT
Server: gunicorn
Request Headers (357 B):
Accept: */*
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.5
Cache-Control: no-cache
Connection: keep-alive
Content-Length: 0
Host: 34.139.6.169
Origin: http://34.139.6.169
Pragma: no-cache
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:118.0) Gecko/20100101 Firefox/118.0
  
```

Cloud Logging Result

The screenshot shows a log entry from Google Cloud Logging. The log message is:

```

{
  insertId: "1plw1hhg11es1nc"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T05:42:23.131741174Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: PUT"
  timestamp: "2023-10-18T05:42:23.131741174Z"
}
  
```

Details about the log entry include:

- Timestamp: 2023-10-18 01:42:23.131741174Z
- Log ID: instance-1
- Message: Unsupported HTTP method: PUT
- Severity: ERROR
- Type: gce_instance
- Labels: 3

POST REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following post request.

HEADER RESULT:

Status	Method	Domain	File	Initiator	Type	Transferred	Size
200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
200	GET	34.139.6.169	favicon.ico	Favicon.loader.sys.mjs[176]	html	438 B	265 B
501	HE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	DE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

RESPONSE RESULT:

Status	Method	Domain	File	Initiator	Type	Transferred	Size
200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
200	GET	34.139.6.169	favicon.ico	Favicon.loader.sys.mjs[176]	html	438 B	265 B
501	HE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	DE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

CLOUD LOGGING RESULT:

```

{
  insertId: "gxdgpvfaaz2uw"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T05:52:37.295160402Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: POST"
  timestamp: "2023-10-18T05:52:37.295160402Z"
}

```

DELETE REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following delete request.

HEADER RESULT:

Request	Status	Method	Domain	File	Initiator	Type	Transferred	Size
DELETE	200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
	501	GET	34.139.6.169	favicon.ico	FavIconLoader.sys.mjs[176] (img)	html	438 B	265 B
	501	HE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
	501	DEL...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	DEL...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

RESPONSE RESULT:

Request	Status	Method	Domain	File	Initiator	Type	Transferred	Size
DELETE	200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
	501	GET	34.139.6.169	favicon.ico	FavIconLoader.sys.mjs[176] (img)	html	438 B	265 B
	501	HE...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
	501	DEL...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
	501	DEL...	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

CLOUD LOGGING RESULT:

```

{
  insertId: "wr99trg1ci2y0p"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T05:57:09.755376417Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: DELETE"
  timestamp: "2023-10-18T05:57:09.755376417Z"
}

```

HEAD REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following head request.

HEADER RESULT:

NetworkMiner tool interface showing network traffic. The main pane displays a list of requests and responses. A detailed view of the selected request (HEAD to /test-dir/102.html) shows the following details:

- Request Headers:**
 - Accept: */*
 - Accept-Encoding: gzip, deflate
 - Accept-Language: en-US;q=0.5
 - Cache-Control: no-cache
 - Connection: keep-alive
 - Host: 34.139.6.169
 - Pragma: no-cache
 - User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/100.0.4896.127 Safari/537.36
- Response Headers (Raw):**

```
HTTP/1.1 501 NOT IMPLEMENTED
Content-Type: text/html; charset=UTF-8
Date: Wed, 18 Oct 2023 06:04:05 GMT
Server: unicorn
```

RESPONSE RESULT:

NetworkMiner tool interface showing network traffic. The main pane displays a list of requests and responses. A detailed view of the selected request (HEAD to /test-dir/102.html) shows the following details:

- Request Headers (Raw):**

```
Accept: */*
Accept-Encoding: gzip, deflate
Accept-Language: en-US;q=0.5
Cache-Control: no-cache
Connection: keep-alive
Host: 34.139.6.169
Pragma: no-cache
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/100.0.4896.127 Safari/537.36
```
- Response Headers (Raw):**

```
HTTP/1.1 501 NOT IMPLEMENTED
Content-Type: text/html; charset=UTF-8
Date: Wed, 18 Oct 2023 06:04:05 GMT
Server: unicorn
```

No response data available for this request

CLOUD LOGGING RESULT:

Cloud Logging interface showing a log entry for the date 2023-10-18 at 02:04:06.343. The log message is:

```
!! 2023-10-18 02:04:06.343 instance-1 Unsupported HTTP method: HEAD
```

The log entry details are as follows:

- insertId: "h7f4p7f96iwb3"
- logName: "projects/cdsds561-project-1/logs/my-function-log"
- receiveTimestamp: "2023-10-18T06:04:06.343943008Z"
- resource:
 - labels: {3}
 - type: "gce_instance"
- severity: "ERROR"
- textPayload: "Unsupported HTTP method: HEAD"
- timestamp: "2023-10-18T06:04:06.343943008Z"

CONNECT REQUEST:

OPTIONS REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following options request.

HEADER RESULT:

The screenshot shows the NetworkMiner tool interface. The left pane displays a list of network requests and responses. The right pane provides detailed information about a selected item, which is a 501 NOT IMPLEMENTED response. Key details include the status code, method, URL, and raw response content.

RESPONSE RESULT:

This screenshot is similar to the previous one, showing the NetworkMiner tool interface. It displays network traffic and focuses on a 501 NOT IMPLEMENTED response, providing detailed analysis of the response headers and content.

CLOUD LOGGING RESULT:

The screenshot shows a log entry from Google Cloud Logging. The log entry details an error occurring on 2023-10-18 at 02:06:54.202 UTC. The log message is "Unsupported HTTP method: OPTIONS". The log entry includes fields such as insertId, logName, receiveTimestamp, resource (with labels and type), severity (ERROR), textPayload, and timestamp.

TRACE REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following trace request.

HEADER RESULT:

Network Request: http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html

Status	Method	Domain	File	Initiator	Type	Transferred	Size
200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
501	GET	34.139.6.169	favicon.ico	FaviconLoader.sys.mjs[176]	(img)	438 B	265 B
501	HEAD	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	DELETE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	DELETE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	HEAD	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	OPTIONS	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	TRACE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

Response Headers (166 B):

- Connection: close
- Content-Length: 22
- Content-Type: text/html; charset=utf-8
- Date: Wed, 18 Oct 2023 06:13:47 GMT
- Server: unicorn

Request Headers (340 B):

- Accept: */*
- Accept-Encoding: gzip, deflate
- Accept-Language: en-US,en;q=0.5
- Cache-Control: no-cache
- Connection: keep-alive
- Host: 34.139.6.169
- Origin: http://34.139.6.169
- Pragma: no-cache
- User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/116.0.5845.141 Safari/537.36

RESPONSE RESULT:

Network Request: http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html

Status	Method	Domain	File	Initiator	Type	Transferred	Size
200	GET	34.139.6.169	102.html	document	html	86.86 kB	86.71 kB
501	GET	34.139.6.169	favicon.ico	FaviconLoader.sys.mjs[176]	(img)	438 B	265 B
501	HEAD	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	DELETE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	PUT	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	POST	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	DELETE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	HEAD	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	166 B	0 B
501	OPTIONS	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B
501	TRACE	34.139.6.169	102.html	NetUtil.sys.mjs[144] (other)	html	188 B	22 B

Method Not Implemented

CLOUD LOGGING RESULT:

```

{
  insertId: "qwycd3g1ci35ui"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:13:47.398453175Z"
  resource: {
    labels: {}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: TRACE"
  timestamp: "2023-10-18T06:13:47.398453175Z"
}

```

PATCH REQUEST:

Once we request using the following reserved static external ip address of the vm on the firefox browser(<http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html>) we get the 501 METHOD NOT IMPLEMENTED status for the following patch request.

HEADER RESULT:

The screenshot shows the Network tab in Chrome DevTools. A PATCH request is made to `http://34.139.6.169/hw2nrbhgsql/test-dir/102.html`. The response status is 501 NOT IMPLEMENTED. The response headers include:

- Status: 501 NOT IMPLEMENTED
- Version: HTTP/1.1
- Transfered: 188 B (22.8 size)
- DNS Resolution: System
- Response Headers (166 B):
 - Connection: close
 - Content-Length: 22
 - Content-Type: text/html; charset=utf-8
 - Date: Wed, 18 Oct 2023 06:16:42 G MT
 - Server: unicorn
- Request Headers (340 B):
 - Accept: */*
 - Accept-Encoding: gzip, deflate
 - Accept-Language: en-US;q=0.5
 - Cache-Control: no-cache
 - Connection: keep-alive
 - Host: 34.139.6.169
 - Origin: <http://34.139.6.169>
 - Pragma: no-cache
 - User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/118.0

RESPONSE RESULT:

The screenshot shows the Network tab in Chrome DevTools. A PATCH request is made to `http://34.139.6.169/hw2nrbhgsql/test-dir/102.html`. The response status is 501 NOT IMPLEMENTED. The response headers include:

- Status: 501 NOT IMPLEMENTED
- Version: HTTP/1.1
- Transfered: 188 B (22.8 size)
- DNS Resolution: System
- Response Headers (166 B):
 - Connection: close
 - Content-Length: 22
 - Content-Type: text/html; charset=utf-8
 - Date: Wed, 18 Oct 2023 06:16:42 G MT
 - Server: unicorn
- Request Headers (340 B):
 - Accept: */*
 - Accept-Encoding: gzip, deflate
 - Accept-Language: en-US;q=0.5
 - Cache-Control: no-cache
 - Connection: keep-alive
 - Host: 34.139.6.169
 - Origin: <http://34.139.6.169>
 - Pragma: no-cache
 - User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/118.0

CLOUD LOGGING RESULT:

The screenshot shows the Cloud Logging interface. A log entry is displayed for the timestamp `2023-10-18 02:16:42.409` from `instance-1`. The log message is `Unsupported HTTP method: PATCH`. The log entry details are as follows:

```

{
  insertId: "1b6p3akg1cc319h"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:16:42.409473968Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: PATCH"
  timestamp: "2023-10-18T06:16:42.409473968Z"
}

```

CURL COMMAND REQUESTS:

GET REQUEST:

We can run the curl get request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

SSH-in-browser

```
malhotr@instance-2:~$ curl -X GET http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
<!DOCTYPE html>
<html>
<body>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#2729.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#8430.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#3505.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#5385.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#5096.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#523.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#4045.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#8559.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.</p>
    <p><a href="#4034.html"> This is a link </a></p>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad

```

File Not Found REQUEST:

We can run the curl get request on another instance than on which the webserver is running.

Curl Command and the result achieved from the curl command is as follows:

```
malhotr@instance-2:~$ curl -X GET http://34.139.6.169/hw2nirbhgsutil/test-dir/100002.html
File Not Foundmalhotr@instance-2:~$ 
```

Cloud Logging Result:

The screenshot shows a log entry from October 18, 2023, at 02:39:21.006. The log message is: "Error while fetching file: 404 GET https://storage.googleapis.com/download/storage/v1/b/hw2nirbhgsutil/o/test-dir%2F100002.html?alt=media: No such object: hw2nirbhgsutil/test-dir/100002.html: ('Request failed with status code', 404, 'Expected one of', <HTTPStatus.OK: 200>, <HTTPStatus.PARTIAL_CONTENT: 206>)". Below the main message, there is a detailed JSON payload:

```
{
  "insertId": "ut91j4g1bolv4k",
  "logName": "projects/cdsds561-project-1/logs/get-func-log",
  "receiveTimestamp": "2023-10-18T06:39:21.006322854Z",
  "resource": {
    "labels": {
      "type": "gce_instance"
    }
  },
  "textPayload": "Error while fetching file: 404 GET https://storage.googleapis.com/download/storage/v1/b/hw2nirbhgsutil/o/test-dir%2F100002.html?alt=media: No such object: hw2nirbhgsutil/test-dir/100002.html: ('Request failed with status code', 404, 'Expected one of', <HTTPStatus.OK: 200>, <HTTPStatus.PARTIAL_CONTENT: 206>)"
}
```

A screenshot of the Google Cloud Logging interface. The log entry is for a file not found error (HTTP 404) on October 18, 2023, at 02:39:21.092. The log is associated with instance-1 and has the following details:

```
2023-10-18 02:39:21.092 instance-1 File Not Found. Error 404
{
  insertId: "1orrnv5g1bxls0q"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:39:21.092340500Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950" (instance_name: instance-1)
      project_id: "cdsds561-project-1"
      zone: "projects/494559990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "File Not Found. Error 404"
  timestamp: "2023-10-18T06:39:21.092340500Z"
}
```

PUT REQUEST:

We can run the curl put request on another instance than on which the webserver is running.
Curl Command and the result achieved from the curl command is as follows:

```
Method Not Implementednmalhotr@instance-2:~$ ^C
nmalhotr@instance-2:~$ curl -X PUT http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implementednmalhotr@instance-2:~$ 
```

Cloud Logging Result:

A screenshot of the Google Cloud Logging interface. The log entry is for an unsupported HTTP method (PUT) on October 18, 2023, at 02:30:26.035. The log is associated with instance-1 and has the following details:

```
2023-10-18 02:30:26.035 instance-1 Unsupported HTTP method: PUT
{
  insertId: "k9mnf8g1iw9po9"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:30:26.035428392Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: PUT"
  timestamp: "2023-10-18T06:30:26.035428392Z"
}
```

POST REQUEST:

We can run the curl post request on another instance than on which the webserver is running.
Curl Command and the result achieved from the curl command is as follows:

```
Method Not Implementednmalhotr@instance-2:~$ curl -X POST http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implementednmalhotr@instance-2:~$ 
```

Cloud Logging Result:

The screenshot shows a log entry from Cloud Logging. The timestamp is 2023-10-18 02:35:58.973. The log is associated with instance-1 and has an error severity. The text payload is "Unsupported HTTP method: POST". The log includes fields like insertId, logName, receiveTimestamp, resource (with type "gce_instance"), and labels.

```
2023-10-18 02:35:58.973 instance-1 Unsupported HTTP method: POST
{
  insertId: "15wp91nf4jzeca"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:35:58.973396024Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: POST"
  timestamp: "2023-10-18T06:35:58.973396024Z"
}
```

DELETE REQUEST:

We can run the curl delete request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```
nmalhotr@instance-2:~$ curl -X DELETE http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implementednmalhotr@instance-2:~$
```

Cloud Logging Result:

The screenshot shows a log entry from Cloud Logging. The timestamp is 2023-10-18 02:52:08.569. The log is associated with instance-1 and has an error severity. The text payload is "Unsupported HTTP method: DELETE". The log includes fields like insertId, logName, receiveTimestamp, resource (with type "gce_instance"), and labels.

```
2023-10-18 02:52:08.569 instance-1 Unsupported HTTP method: DELETE
{
  insertId: "1aw94oifw28ghd"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:52:08.569730951Z"
  resource: {
    labels: {3}
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: DELETE"
  timestamp: "2023-10-18T06:52:08.569730951Z"
}
```

HEAD REQUEST:

We can run the curl head request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```

nmalhotr@instance-2:~$ curl -I HEAD http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
curl: (6) Could not resolve host: HEAD
HTTP/1.1 501 NOT IMPLEMENTED
Server: gunicorn
Date: Wed, 18 Oct 2023 06:54:41 GMT
Connection: close
Content-Type: text/html; charset=utf-8
Content-Length: 22

nmalhotr@instance-2:~$ 

```

Cloud Logging Result:



The screenshot shows a log entry from Cloud Logging. The log entry details an error where an unsupported HTTP method (HEAD) was received by instance-1. The log includes fields such as insertId, logName, receiveTimestamp, resource (with labels for instance_id, project_id, and zone), severity (ERROR), textPayload (the unsupported method), and timestamp.

```

{
  insertId: "7hpox1g1bbjpjw"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:54:40.837795777Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950" (instance_name: instance-1)
      project_id: "cdsds561-project-1"
      zone: "projects/49455990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: HEAD"
  timestamp: "2023-10-18T06:54:40.837795777Z"
}

```

CONNECT REQUEST:

We can run the curl connect request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```

nmalhotr@instance-2:~$ curl -X CONNECT http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implemented

```

Cloud Logging Result:

```

2023-10-18 02:58:20.109 instance-1 Unsupported HTTP method: CONNECT
Copy Similar entries Collapse nested fields Hide log summary
{
  insertId: "ofi0gjfhazmf"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T06:58:20.109568540Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950" (instance_name: instance-1)
      project_id: "cdsds561-project-1"
      zone: "projects/494559990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: CONNECT"
  timestamp: "2023-10-18T06:58:20.109568540Z"
}

```

OPTIONS REQUEST:

We can run the curl options request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```

Method Not Implementedcurl -X CONNECT http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
nmalhotr@instance-2:~$ curl -X OPTIONS http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implementednmalhotr@instance-2:~$ 

```

Cloud Logging Result:

```

2023-10-18 03:01:41.574 instance-1 Unsupported HTTP method: OPTIONS
Copy Similar entries Collapse nested fields Hide log summary
{
  insertId: "1wt7nifg1bs6c8x"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T07:01:41.574489568Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950" (instance_name: instance-1)
      project_id: "cdsds561-project-1"
      zone: "projects/494559990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: OPTIONS"
  timestamp: "2023-10-18T07:01:41.574489568Z"
}

```

TRACE REQUEST:

We can run the curl trace request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```

Method Not Implementedcurl -X OPTIONS http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
nmalhotr@instance-2:~$ curl -X TRACE http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
Method Not Implementednmalhotr@instance-2:~$ 

```

Cloud Logging Result:

The screenshot shows a log entry from Cloud Logging. The log entry details an error where an unsupported HTTP method (TRACE) was received by instance-1. The log includes fields such as insertId, logName, receiveTimestamp, resource (with labels for instance_id, project_id, and zone), severity (ERROR), textPayload (the unsupported method), and timestamp.

```

{
  insertId: "1lq14g0g1nssxjz"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T07:02:58.597786313Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950",
      project_id: "cdsds561-project-1",
      zone: "projects/494559990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: TRACE"
  timestamp: "2023-10-18T07:02:58.597786313Z"
}

```

PATCH REQUEST:

We can run the curl patch request on another instance than on which the webserver is running. Curl Command and the result achieved from the curl command is as follows:

```

Method Not Implemented nmalhotr@instance-2:~$ curl -X PATCH http://34.139.6.169/hw2nirbhgsutil/test-dir/102.html
nmalhotr@instance-2:~$ 
Method Not Implemented nmalhotr@instance-2:~$ 

```

Cloud Logging Result:

The screenshot shows a log entry from Cloud Logging. The log entry details a PATCH request received by instance-1. The log includes fields such as insertId, logName, receiveTimestamp, resource (with labels for instance_id, project_id, and zone), severity (ERROR), textPayload (the unsupported method), and timestamp.

```

{
  insertId: "suxguug1eqr6qd"
  logName: "projects/cdsds561-project-1/logs/my-function-log"
  receiveTimestamp: "2023-10-18T07:05:27.821404960Z"
  resource: {
    labels: {
      instance_id: "4576652566045318950" (instance_name: instance-1)
      project_id: "cdsds561-project-1"
      zone: "projects/494559990174/zones/us-east1-b"
    }
    type: "gce_instance"
  }
  severity: "ERROR"
  textPayload: "Unsupported HTTP method: PATCH"
  timestamp: "2023-10-18T07:05:27.821404960Z"
}

```

Now we can demonstrate the functionality of my webserver running on instance-1 by using the provided http-client on instance-2 to request for a few hundred of your storage files from the bucket “hw2nirbhgsutil”. We can use the following command to run the following http-client:

```

nmalhotr@instance-2:~$ python3 http-client.py -d 34.139.6.169 -b /hw2nirbhgsutil -w test-dir -n 1000 -i 1000 -v

```

```

python3 http-client.py -d 34.139.6.169 -b /hw2nirbhgsutil -w test-dir -n 1000 -i 1000 -v

```

You can change the ip in the domain section depending upon the vm's ip address.

Using the following command, we get the following result:

```
Requesting /hw2nrbhgutil/test-dir/557.html from 34.139.6.169 80
200 OK
Server: gunicorn
Date: Wed, 18 Oct 2023 16:28:59 GMT
Connection: close
Content-Type: text/html; charset=utf-8
Content-Length: 19586
```

This is the http client requesting for just one file here. You can also not use the -v argument to not see the text result of the following files in the bucket.

Now for testing the second application, we can use the web server on instance-1, http-client on instance-3 and the app-2 created in homework 3 on instance-2

When we run the application 2 on the instance-2 we can detect the forbidden request as the following is a subscriber to the topic “”.

```
nmalhotr@instance-2:~/s$ python3 app2.py
Listening for messages on projects/cdsds561-project-1/subscriptions/hw3nirbhgsutil-sub..

```

Then we can run the http-client on instance-3 and then we can request the webserver running on instance-1 and the following client will then send the forbidden request to the topic which will be acknowledged by the application 2.

```
nmalhotr@instance-3:~$ python3 http-client.py -d 34.73.126.203 -b /hw2nirbhgsutil -w test-dir -n 10000 -i 1000 -v
```

Application-2 receives the following forbidden request messages showcasing the countries that were listed in the forbidden countries.

```

nmalhotr@instance-2:~$ python3 app2.py
Listening for messages on projects/cdsds561-project-1/subscriptions/hw3nirbhgsutil-sub..

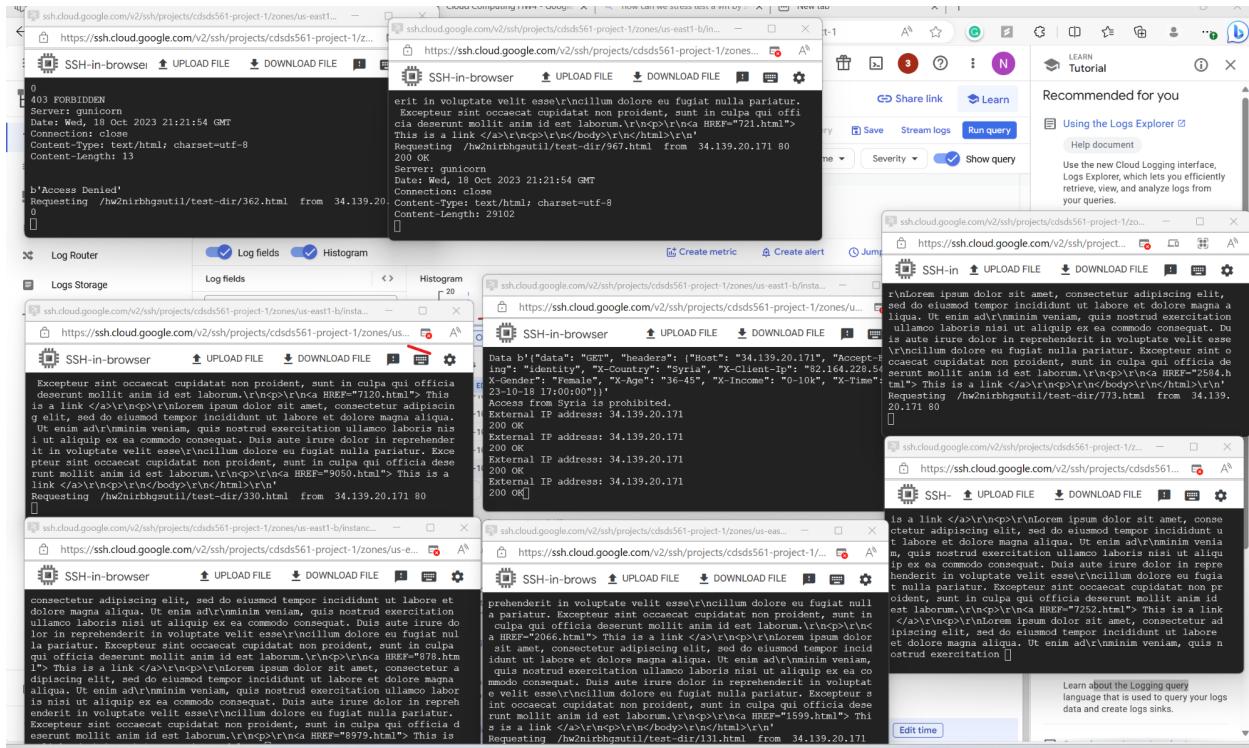
Received forbidden request from country: Iraq
Error: Access is prohibited. Error 403
Received forbidden request from country: Zimbabwe
Error: Access is prohibited. Error 403
Received forbidden request from country: Myanmar
Error: Access is prohibited. Error 403
Received forbidden request from country: Syria
Error: Access is prohibited. Error 403
Received forbidden request from country: Zimbabwe
Error: Access is prohibited. Error 403

```

Stress Test:

For the following stress test we can use the following http-client script on multiple instances like we can run the web server on instance 3 and then check the incoming requests by running the http-client on various other vms since we have a limit of just 4 vms so the other 3 vms can be sshed multiple times and then we can run the following http-client code on them.

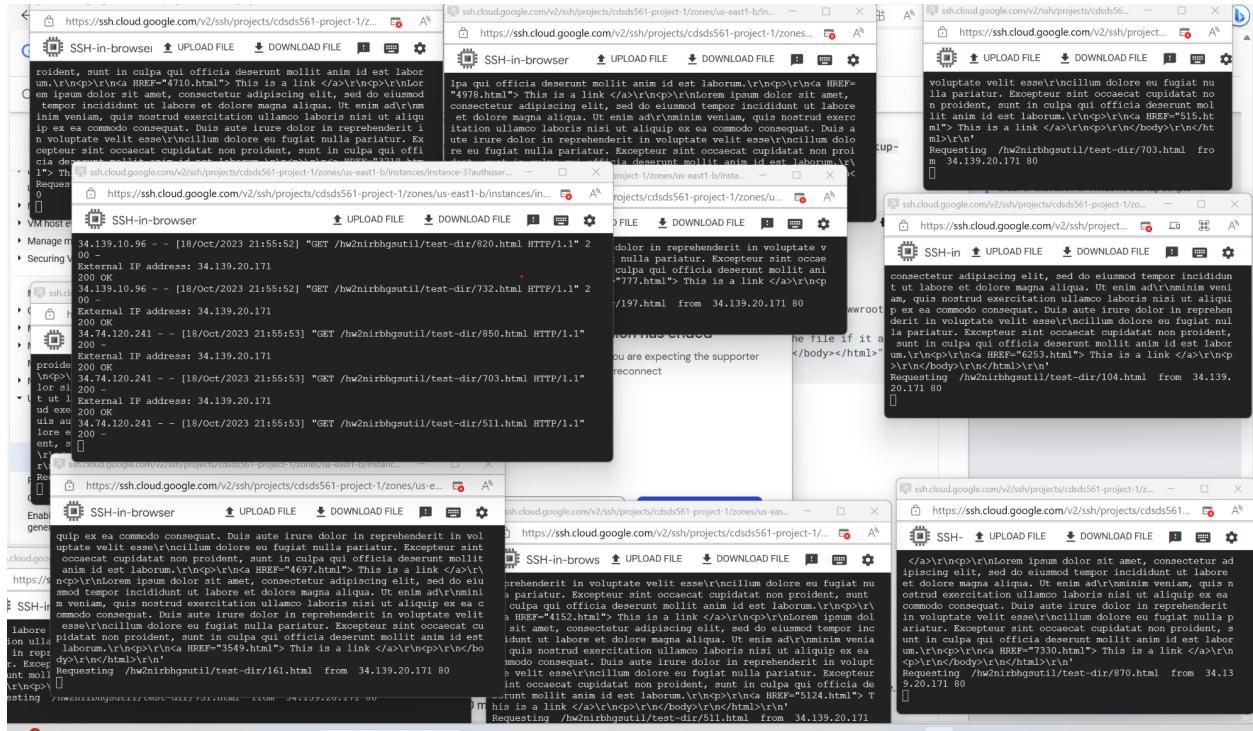
I tried using the different vm instances, and the web server freezes for a bit:



Similarly if i use without gunicorn for not receiving concurrent requests i receive the freeze up similar to this one. The freezing up starts with 5 clients making the request concurrently. And

when I keep on increasing the number of clients, at 9 clients I receive significantly higher response time from the web server, making the vm's CPU utilization go up to 200 %.

Other than this without using gunicorn I get a freeze up starting from 8 http-client requests and starts to freeze more as the http-client increases.



Other than just checking on the http-client running on various instances of other vms. I tried to modify the http-client with a certain time out of 5 seconds to provide me with the internal server error and I added a thread pool executor for controlling the concurrent requests. Through this using one instance we can send concurrent requests to the server from 10 clients while specifying how many requests each client would send.

```
socket.timeout: timed out
nmalhotr@instance-4:~$ python3 http-client.py -d 35.237.59.39 -b /hw2nirbhgsutil -w test-dir -n 1000 -i 100 --max_workers 10
```

At 10 concurrent clients the following web server running on instance-1 throws an internal server error message when sending 1000 requests.

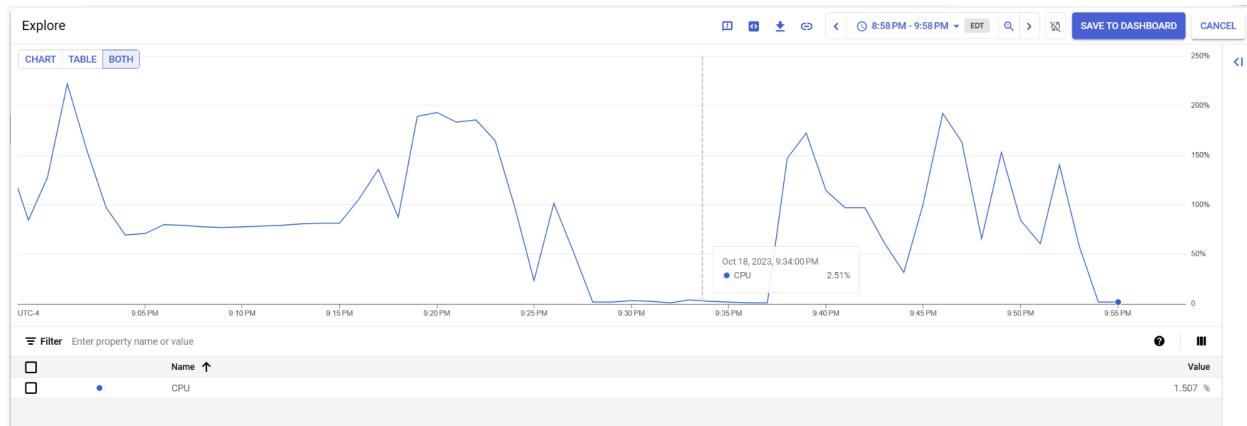
```
Internal Server Error: Timeout
nmalhotr@instance-4:~$ python3 http-client.py -d 35.237.59.39 -b /hw2nirbhgsutil -w test-dir -n 1000 -i 1000 --max_workers 10
Status: 200 OK
```

As we increase the number of requests and worker threads we will receive higher internal server errors.

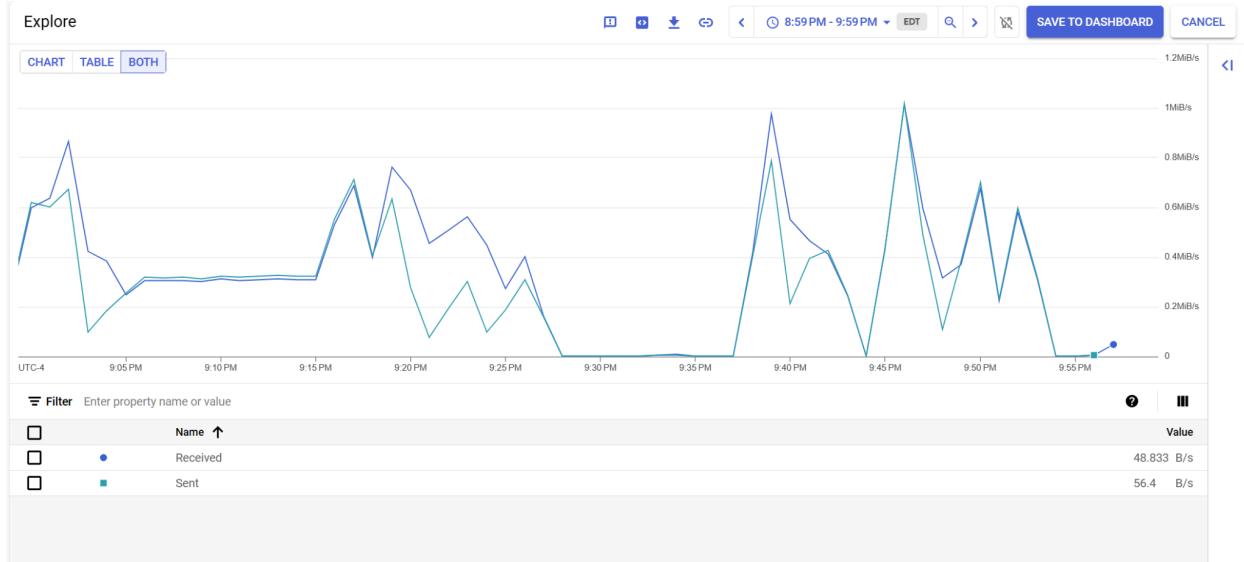
200 OK
200 OK
200 OK
200 OK
200 OK
500 INTERNAL SERVER ERROR
200 OK
500 INTERNAL SERVER ERROR
200 OK
500 INTERNAL SERVER ERROR
200 OK
200 OK
200 OK
200 OK
200 OK
500 INTERNAL SERVER ERROR
200 OK
200 OK
200 OK
200 OK
200 OK

```
Status: 200 OK
Status: 200 OK
Internal Server Error: Timeout
Status: 200 OK
Internal Server Error: Timeout
Status: 200 OK
Internal Server Error: Timeout
Status: 200 OK
```

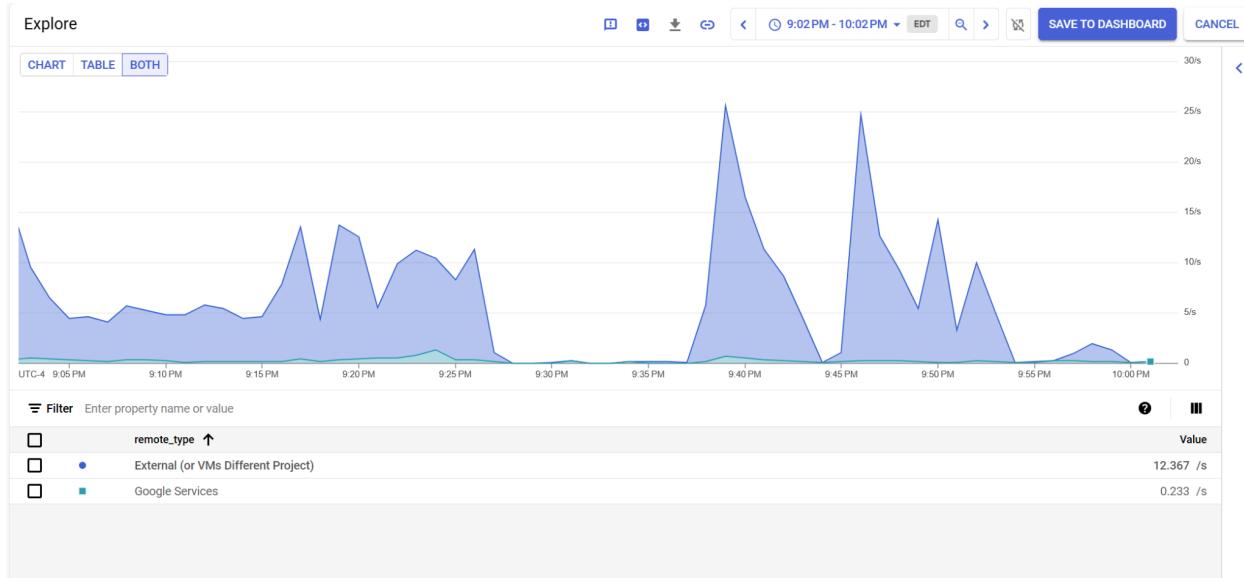
CPU Utilization:



Network Traffic:



New Connections:



I uploaded two http clients one which catches internal server timeout and one with just concurrent requests. Also we can increase the timeout to measure the server overload. The code uses ThreadPoolExecutor for managing a pool of worker threads. The number of worker threads is controlled by the max_workers parameter. The script creates a list of tasks, each representing an HTTP request. It generates these tasks in a loop based on the specified num_requests. These tasks are submitted to the thread pool for execution. The ThreadPoolExecutor automatically manages the execution of the following tasks across multiple threads. It also allows for multiple requests to be sent simultaneously, effectively achieving

concurrency. This can be useful for sending multiple requests in parallel, such as when simulating multiple clients accessing a server. The script does not explicitly detect server overload, but it can contribute to server overload detection in the following ways:

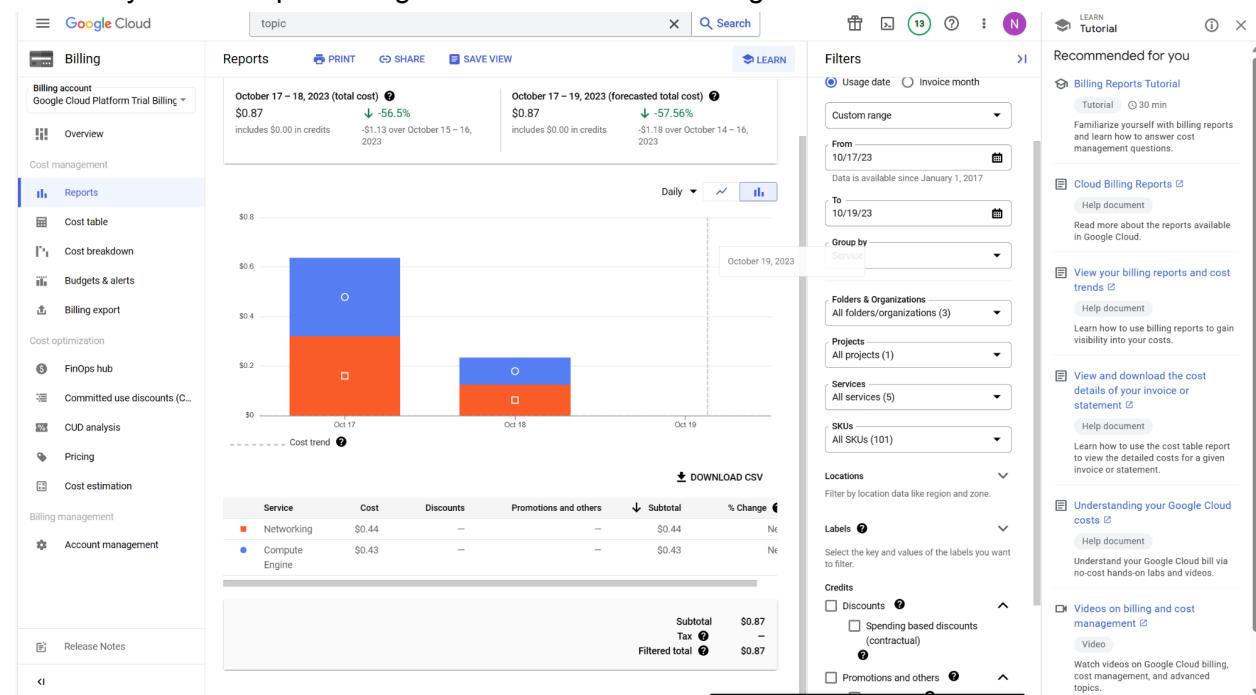
When the server becomes overloaded, it might take longer to respond to requests. If the responses are delayed, you'll see increased response times in the results, which can be an indicator of server load and server timed out messages.

The code checks the HTTP status codes of the responses. If the server is overloaded and struggling to handle requests, you might start seeing HTTP status codes like 500 (Internal Server Error) or 503 (Service Unavailable).

The script has basic error handling. If a request times out or if the server returns an error response, it prints an error message.

Billing:

Since the cost is dependent on the number of vms used and not the number of request made, that's why we are experiencing lower cost for the following homework.



For the following stress test it cost me 0.87 dollars where I might have used a lot of vm instances, and for today it cost me 0.23 dollars.

Google Cloud

topic X Search

Billing Reports PRINT SHARE SAVE VIEW LEARN

Billing account
Google Cloud Platform Trial Billing

Overview

Cost management

Reports

Cost table

Cost breakdown

Budgets & alerts

Billing export

Cost optimization

FinOps hub

Committed use discounts (CUD analysis)

CUD analysis

Pricing

Cost estimation

Billing management

Account management

Release Notes

Filters

Usage date Invoice month

Custom range From 10/18/23 Data is available since January 1, 2017 To 10/19/23

Group by Service

Folders & Organizations All folders/organizations (3)

Projects All projects (1)

Services All services (5)

SKUs All SKUs (101)

Locations Filter by location data like region and zone.

Labels Select the key and values of the labels you want to filter.

Credits

Discounts Spending based discounts (contractual) Promotions and others

October 18, 2023 (total cost) \$0.23 ↓ -64.06%
includes \$0.00 in credits -\$0.40 over October 17, 2023

October 18 – 19, 2023 (forecasted total cost) \$0.23 ↓ -75.79%
includes \$0.00 in credits -\$0.71 over October 16 – 17, 2023

Daily

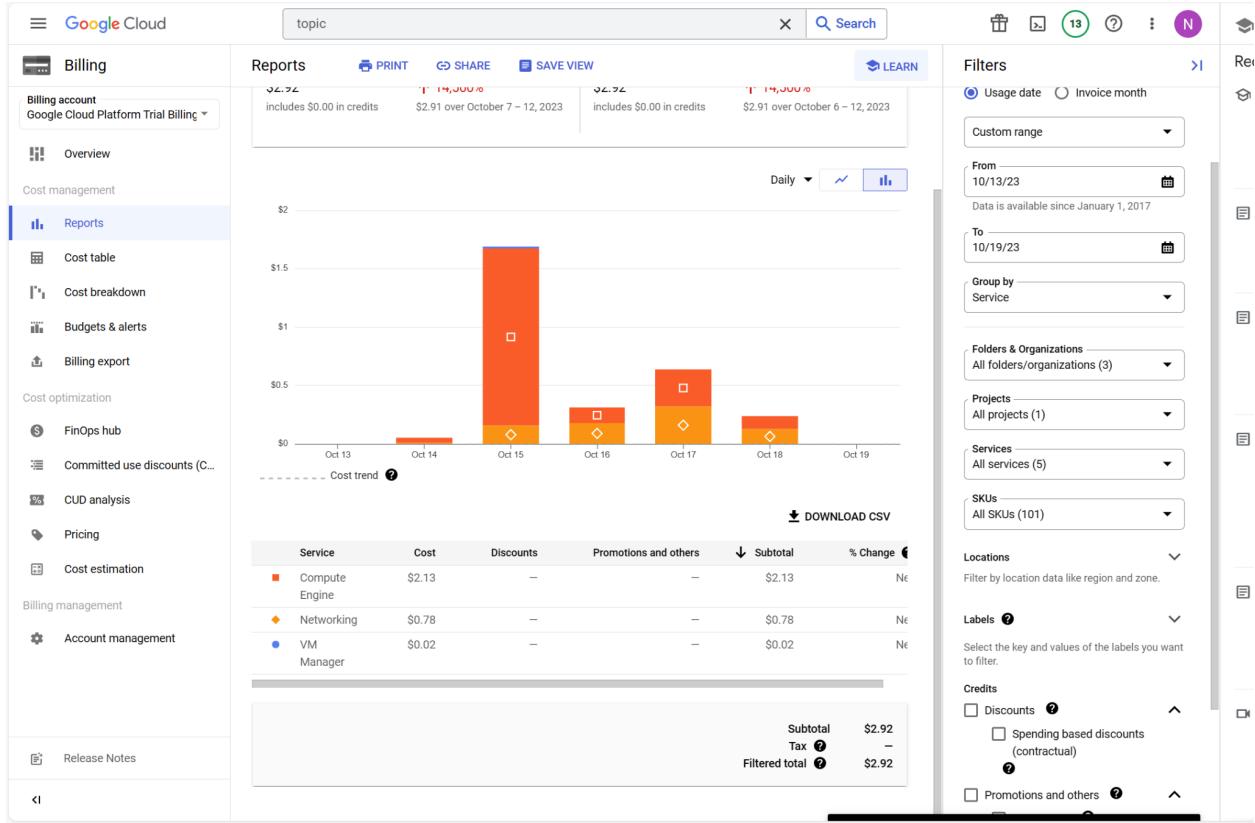
Cost trend

DOWNLOAD CSV

Service	Cost	Discounts	Promotions and others	Subtotal	% Change
Networking	\$0.12	—	—	\$0.12	N/A
Compute Engine	\$0.11	—	—	\$0.11	N/A

Subtotal \$0.23
Tax —
Filtered total \$0.23

And for the entire hw the billing charges are as follows:



It cost me 2.92 dollars for the entire homework.

Also you can use the key.json with the app-2 so that we get not errors.