

Project id: cdsds561-project-1
 Bucket Name: hw2nirbhgsutil , gcf-check-files
 Bucket-2 Name:hw4nirbhgsutil
 Directory Name: test-dir , gcf-check-files/test-dir
 Github Link:[CDS-DS-561-hw2/hw8 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
 Service Account for SQL:
 cloud-sql-authorize-vm@cdsds561-project-1.iam.gserviceaccount.com
 Reserved IP : 34.75.102.252
 Sql database instance: my-database
 Sql database: First-Trial , Second-Trial
 Sql Tables : Clients, main_table, error_logs.
 Vm-instance : 5 - directory - model-1 - main.py , main-1.py , 6 - main.py , main-1.py,
 Server VM - instance wser1, wser2, instance5 -> vm-check ->http-client.py

So for the following homework, I created two vm instances that will run the backend server, mainly wser1 and wser2 using the following commands on cloud shell:

For wser1 I used the following command, keeping the tag as loadbalancer for both of the instances for the firewall rules:

```

nmalhotra@cloudshell: ~(cdsds561-project-1)$ gcloud compute instances create wser1 --zone=us-east1-b --tags=loadbalancer --machine-type=f1-micro --image-family=debian-11 --image-project=debian-cloud --m
etadata startup-script-url=https://hw4nirbhgsutil/startup-script-1.sh
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/zones/us-east1-b/instances/wser1].
NAME: wser1
ZONE: us-east1-b
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.55
EXTERNAL_IP: 34.148.170.224
STATUS: RUNNING
nmalhotra@cloudshell: ~(cdsds561-project-1)$

```

For wser2 I used the following command, keeping the tag as loadbalancer for both of the instances for the firewall rules:

```

nmalhotra@cloudshell: ~(cdsds561-project-1)$ gcloud compute instances create wser2 --zone=us-east1-c --tags=loadbalancer --machine-type=f1-micro --image-family=debian-11 --image-project=debian-cloud --m
etadata startup-script-url=https://hw4nirbhgsutil/startup-script-1.sh
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/zones/us-east1-c/instances/wser2].
NAME: wser2
ZONE: us-east1-c
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.56
EXTERNAL_IP: 34.148.212.217
STATUS: RUNNING
nmalhotra@cloudshell: ~(cdsds561-project-1)$

```

Both of the following instances are running in the same region but different zones. wser1 and wser2, both of them run in the us-east1 region, but wser1 runs in us-east1-b and wser2 runs in us-east1-c which can be seen on the vm-instances page:

VM instances [CREATE INSTANCE](#) [IMPORT VM](#) [REFRESH](#)

[INSTANCES](#) [OBSERVABILITY](#) [INSTANCE SCHEDULES](#)

ⓘ Your project's VMs use global DNS names by default. To reduce the risk of cross-regional outages, we recommend you use zonal DNS instead. [Learn more](#) ⓘ

VM instances

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	●	instance-5	us-east1-b			10.142.0.59 (nic0)		SSH ▼ ⋮
<input type="checkbox"/>	●	instance-6	us-east1-b			10.142.15.229 (nic0)		SSH ▼ ⋮
<input type="checkbox"/>	✓	wser1	us-east1-b			10.142.0.55 (nic0)	34.148.170.224 (nic0)	SSH ▼ ⋮
<input type="checkbox"/>	✓	wser2	us-east1-c			10.142.0.56 (nic0)	34.148.212.217 (nic0)	SSH ▼ ⋮

You can also see the following instances created using the following command on the cloud shell as follows:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute instances list
NAME: instance-5
ZONE: us-east1-b
MACHINE_TYPE: n1-standard-1
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.59
EXTERNAL_IP:
STATUS: TERMINATED

NAME: instance-6
ZONE: us-east1-b
MACHINE_TYPE: e2-standard-2
PREEMPTIBLE:
INTERNAL_IP: 10.142.15.229
EXTERNAL_IP:
STATUS: TERMINATED

NAME: wser1
ZONE: us-east1-b
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.55
EXTERNAL_IP: 34.148.170.224
STATUS: RUNNING

NAME: wser2
ZONE: us-east1-c
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.56
EXTERNAL_IP: 34.148.212.217
STATUS: RUNNING
```

Now if we used the following curl command mentioned below to get the response of the requested file, there won't be any response since we haven't added the firewall rule right now.

Curl command won't return anything as follows:

```
curl -X GET http://34.148.170.224/hw2nirbhgsutil/test-dir/102.html
```

Now, we will set the firewall rules and set the tag to loadbalancer which is the tag that we used while creating the vm instances : wser1 and wser2.

Firewall command:

```
gcloud compute firewall-rules create www-firewall-network-lb --target-tags loadbalancer --allow tcp:80
Creating firewall...done.
NAME: www-firewall-network-lb
NETWORK: default
DIRECTION: INGRESS
PRIORITY: 1000
ALLOW: tcp:80
DENY:
DISABLED: False
```

Now we can use the following command : gcloud compute instances list for getting the ip address of the vm-instances to see if they work.

List Command:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute instances list
NAME: instance-5
ZONE: us-east1-b
MACHINE_TYPE: n1-standard-1
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.59
EXTERNAL_IP:
STATUS: TERMINATED

NAME: instance-6
ZONE: us-east1-b
MACHINE_TYPE: e2-standard-2
PREEMPTIBLE:
INTERNAL_IP: 10.142.15.229
EXTERNAL_IP:
STATUS: TERMINATED

NAME: wser1
ZONE: us-east1-b
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.55
EXTERNAL_IP: 34.148.170.224
STATUS: RUNNING

NAME: wser2
ZONE: us-east1-c
MACHINE_TYPE: f1-micro
PREEMPTIBLE:
INTERNAL_IP: 10.142.0.56
EXTERNAL_IP: 34.148.212.217
STATUS: RUNNING
```

Now if we used the following curl command, it will provide us with the accurate response with the requested file composed of the html content as follows:

```
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -X GET http://34.148.170.224/hw2nirbhgsutil/test-dir/l02.html
<!DOCTYPE html>
<html>
<body>


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><a href="2729.html"> This is a link </a></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><a href="8430.html"> This is a link </a></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><a href="3505.html"> This is a link </a></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><a href="5355.html"> This is a link </a></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><a href="5096.html"> This is a link </a></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><a href="523.html"> This is a link </a></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.


```

Now, we can create the load balancer. First, we will configure the network load balancer using the following command:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute addresses create network-lb-ip-4 --region us-east1
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/addresses/network-lb-ip-4].
```

After configuring the load balancer, we can create health checker as follows:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute http-health-checks create basic-check-4
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/global/httpHealthChecks/basic-check-4].
NAME: basic-check-4
HOST:
PORT: 80
REQUEST_PATH: /
```

Now, we will create a pool that the healthchecker will check using the following command:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute target-pools create www-pool-4 --region us-east1 --http-health-check basic-check-4
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/targetPools/www-pool-4].
NAME: www-pool-4
REGION: us-east1
SESSION AFFINITY: NONE
BACKUP:
HEALTH_CHECKS: basic-check-4
```

Now, we will add the following vm instances to the pool as follows:

For adding wser1 instance:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute target-pools add-instances www-pool-4 --instances wser1 --zone=us-east1-b
WARNING: The --zone flag is deprecated. Use equivalent --instances-zone=us-east1-b flag.
Updated [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/targetPools/www-pool-4].
nmalhotr@cloudshell:~ (cdsds561-project-1)$
```

For adding wser2 instance:

```
nmalhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute target-pools add-instances www-pool-4 --instances wser2 --zone=us-east1-c
WARNING: The --zone flag is deprecated. Use equivalent --instances-zone=us-east1-c flag.
Updated [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/targetPools/www-pool-4].
nmalhotr@cloudshell:~ (cdsds561-project-1)$
```

We add them separately as they both reside in different zones.

Now, we will add the forwarding rule that will tell the load balancer to forward to the instances, if those instances are healthy.

```
nmailhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute forwarding-rules create www-rule-4 --region us-east1 --ports 80 --address network-lb-ip-4 --target-pool www-pool-4
Created [https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/forwardingRules/www-rule-4].
```

Now we can find the external IP address of the load balancer as follows:

```
nmailhotr@cloudshell:~ (cdsds561-project-1)$ gcloud compute forwarding-rules describe www-rule-4 --region us-east1
IPAddress: 104.196.54.22
IPProtocol: TCP
creationTimestamp: '2023-11-16T12:23:08.863-08:00'
description: ''
fingerprint: msjwMwLc3Y=
id: '3786118866916852931'
kind: compute#forwardingRule
labelFingerprint: 42WnSpBBrSM-
loadBalancingScheme: EXTERNAL
name: www-rule-4
networkTier: PREMIUM
portRange: 80-80
region: https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1
selfLink: https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/forwardingRules/www-rule-4
target: https://www.googleapis.com/compute/v1/projects/cdsds561-project-1/regions/us-east1/targetPools/www-pool-4
nmailhotr@cloudshell:~ (cdsds561-project-1)$
```

Now we can use the following external IP address for the curl command, we can see the whole html content response but instead we extract the zone so we can identify which zone which handled the following request providing us with the hint about which vm-instance provided the response.

Curl Command to check the requested file:

```
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -X GET http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html
<!DOCTYPE html>
<html>
<body>


Lore 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>
<a href="2729.html"> This is a link </a>
<p>
<a href="8430.html"> This is a link </a>
<p>
<a href="3505.html"> This is a link </a>
<p>
<a href="5355.html"> This is a link </a>
<p>
<a href="5096.html"> This is a link </a>
<p>
<a href="523.html"> This is a link </a>
<p>
<a href="4045.html"> This is a link </a>
<p>
< Lore ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad
```

Curl command for extracting the gcp zone and output for the following curl command is as follows:

```
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://35.231.119.97/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-c  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-c  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-c  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-c  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-c  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Zone:/ {print $2}'  
us-east1-b  
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>
```

So in the following output we can determine from which instance the reply came from based on the zones of the following regions. Both of the instances reside in the “us-east1” region and if the response was provided by the wser1 then the “us-east1-b” zone was displayed and if the response was provided by the wser2 then the “us-east-c” zone was displayed.

Other than this you can use instance-5 for using the http-client for checking the response and the gcp zone header extracted as follows:

At the end of the following requested file response, we can see the gcp zone of the web server that responded as follows:

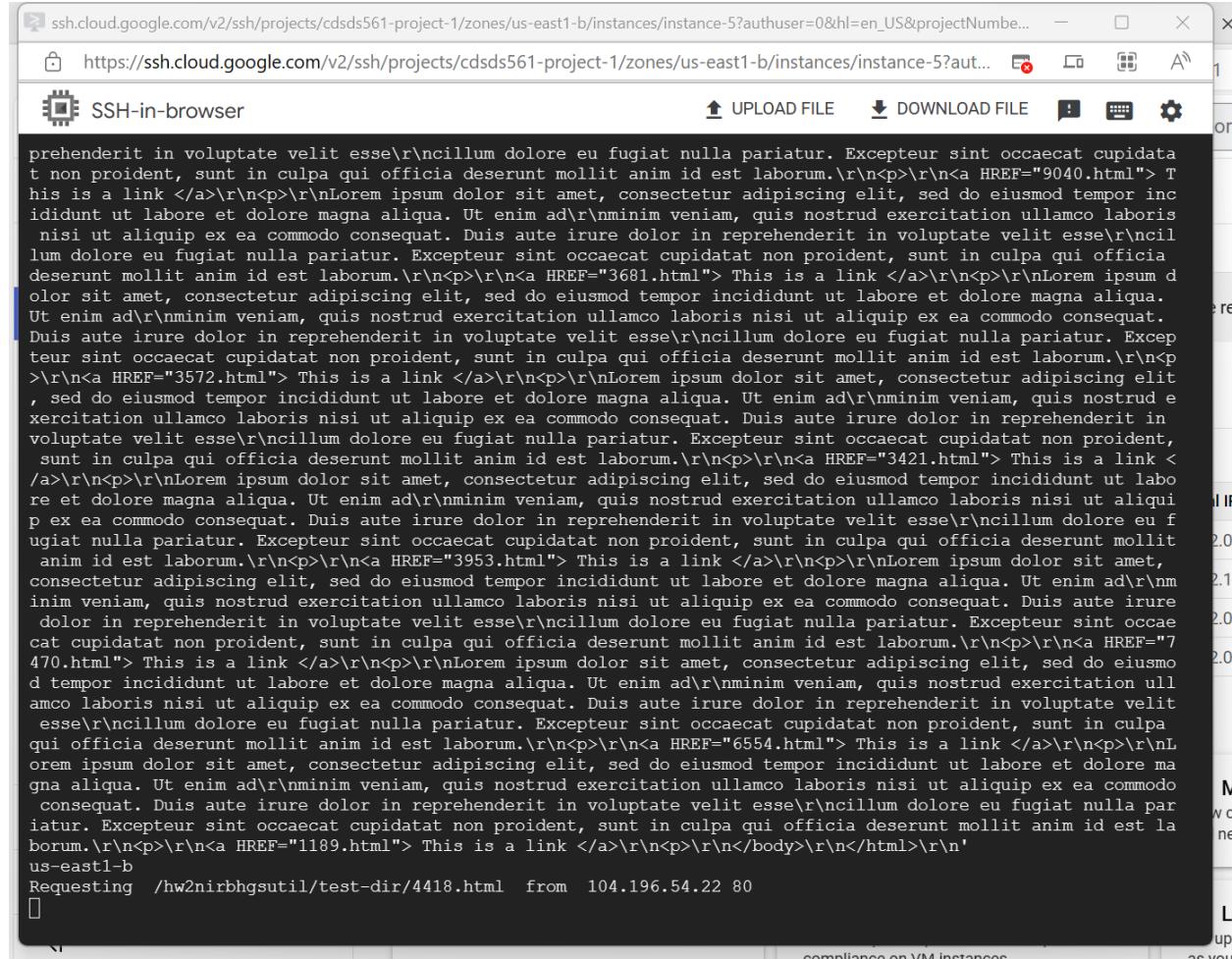
At last we can see the web server that provided the response is running in zone “us-east1-b” which is wser1. Following http-client.py resides in the vm-check directory of the instance - 5.

When I start the following http client for 10,000 requests using the following command:

```
nmalhotr@instance-5:~/vm-check$ python3 http-client.py -d 104.196.54.22 -b /hw2nirbhgsutil -w test-dir -n 10000  
-i 10000 -v
```

And when I stop one of the backend servers , mainly wser1 , the client gets stuck for requesting one of the files. I think it gets stuck as the client must have sent the request and the request went over the the backend server wser1 but since it closed at that moment it wasn't able to provide any response and the http-client waited for receiving the response of the request made.

Client Stuck at the following request :

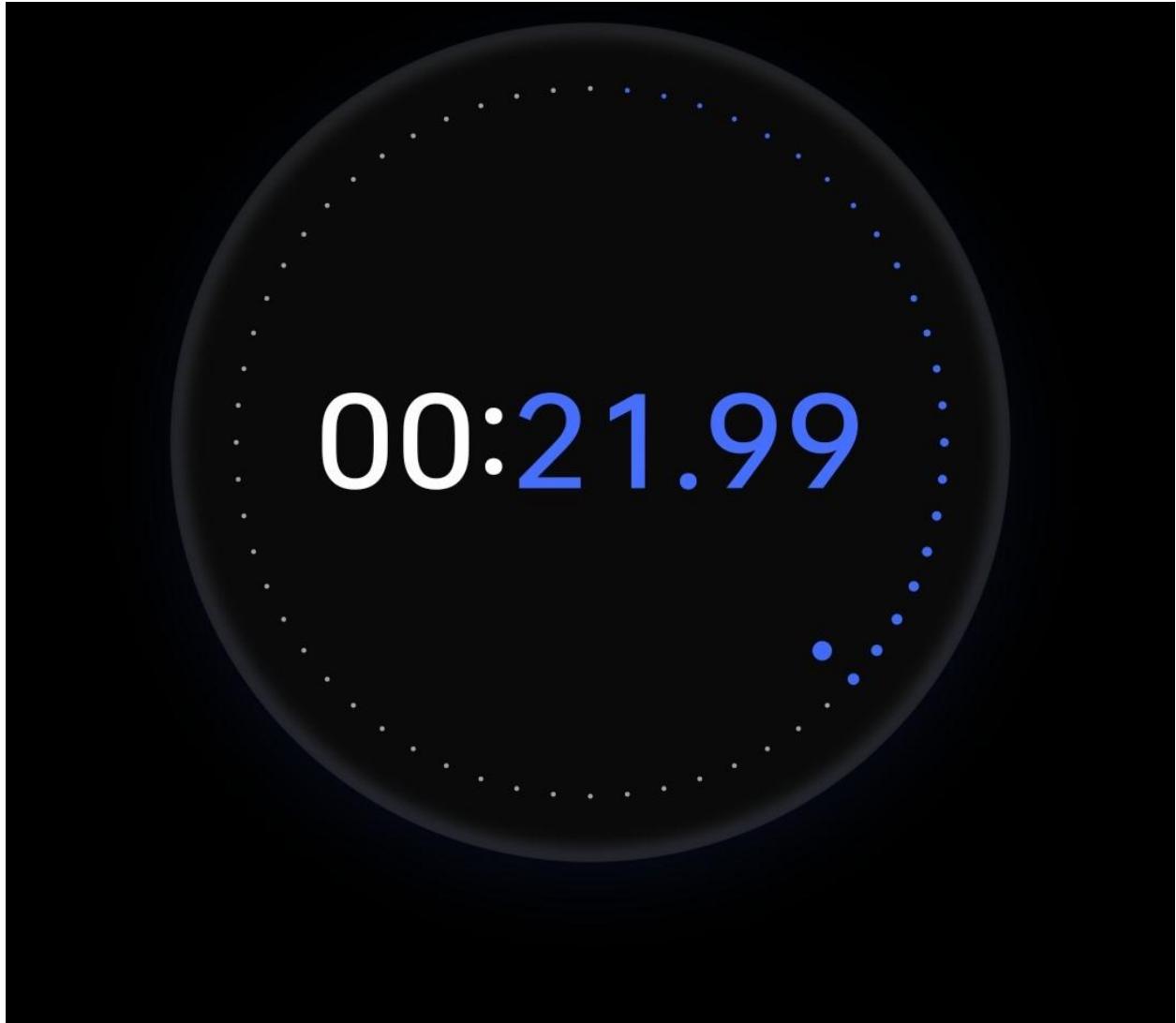


Client was started before one of the backend servers was stopped. So the time taken from when the backend server was killed and the client got stuck is as follows:



8.57 seconds is the total time from the time I stopped the wser1 server instance till the point the following client requesting for a specific file got stuck.

But there are several cases. In one of the other case, the time when we stop the wser1 server's instance, we get a short pause when requesting for one of the files which is as follows:



21.99 seconds is recorded from the point we press the stop button for stopping the instance, to the point we resolve the first pause and we have no pauses further while requesting for files. For the following case we don't get any pauses when the instance is stopped so that would be 0 seconds for the load balancer to realize when one of the server instances were killed.

Also the pause for this case starts in about 6.96 seconds when we click on stop the wser1 instance which is displayed in the following way:



Now, We can also see also notice the output below where i stopped the wser1 vm instance which provides us with low requests of wser1 vm instance, which we can see below:

```

```
sectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n

\r\nThis is a link

\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n

\r\nThis is a link

\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo co nsequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariat ur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est labor um.\r\n

\r\nThis is a link

\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n

\r\nThis is a link

\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserent mollit anim id est laborum.\r\n

\r\nThis is a link

\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad\rlminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\rlncillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n

\r\nThis is a link

\r\nbody>\r\n


```

us-east1-c

Requests served by each VM instance:

|                                          |
|------------------------------------------|
| us-east1-b: 20 requests, Ratio: 0.21%    |
| us-east1-c: 9506 requests, Ratio: 99.79% |

malhotr@instance-5:~/vm-check\$

Now, we can again start the http-client to request more file contents, and then start the following wser1 backend server to check how quickly load balancer notices its presence.

Command to start the http-client:

```
malhotr@instance-5:~/vm-check$ python3 http-client.py -d 104.196.54.22 -b /hw2nirbhgsutil -w test-dir -n 10000 -i 10000 -v[]
```

I get the following error once I restart/resume the server:

```
scing 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 consequat. Duis aute irure dolor in repreh
enderit 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

\r\n6496.html

This i
s a link \r\n

\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, quis nostrud exercitation ullamco laboris nisi
ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\nncillum d
olare eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deser
unt mollit anim id est laborum.\r\n

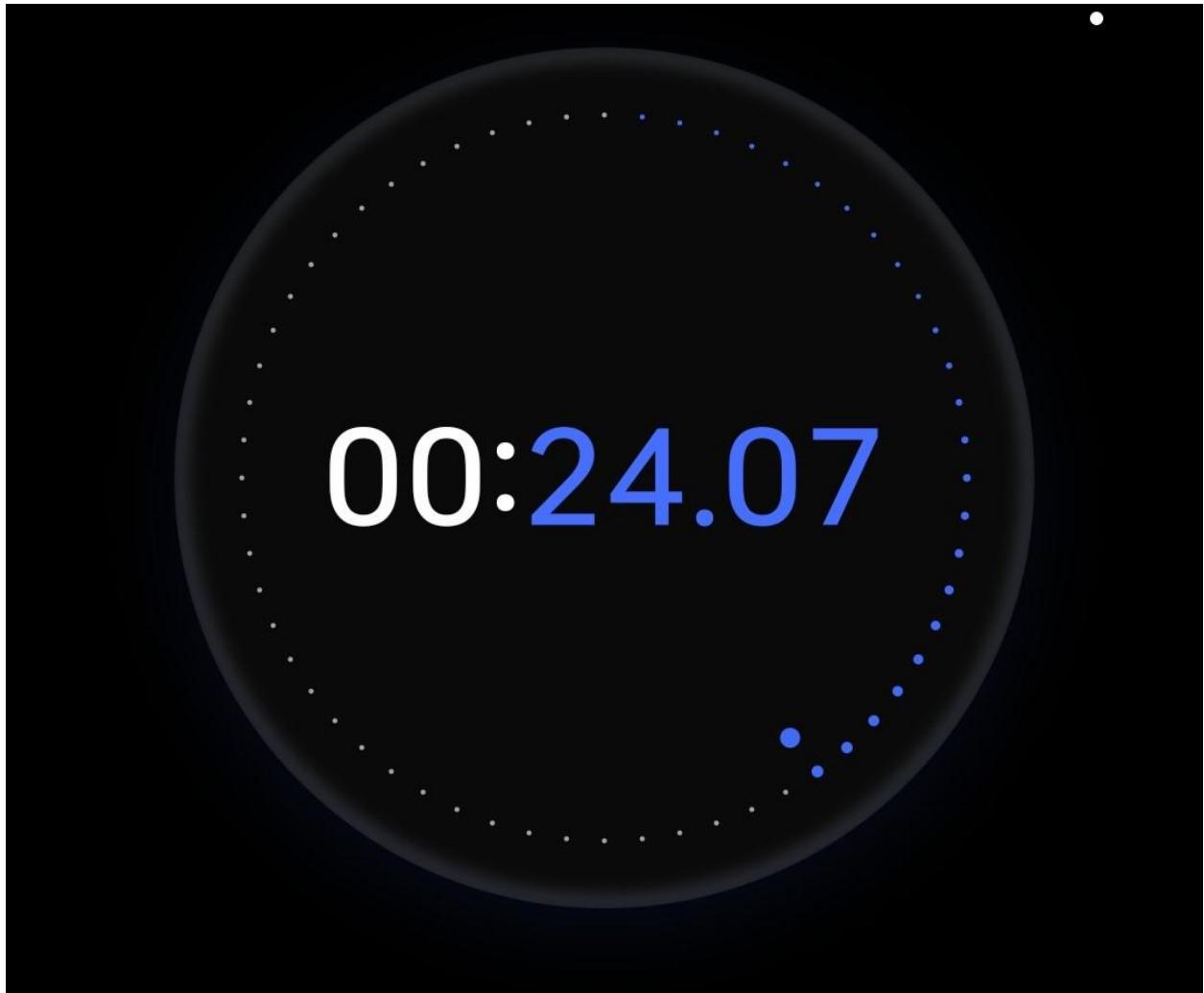
\r\n3173.html

This is a link \r\n

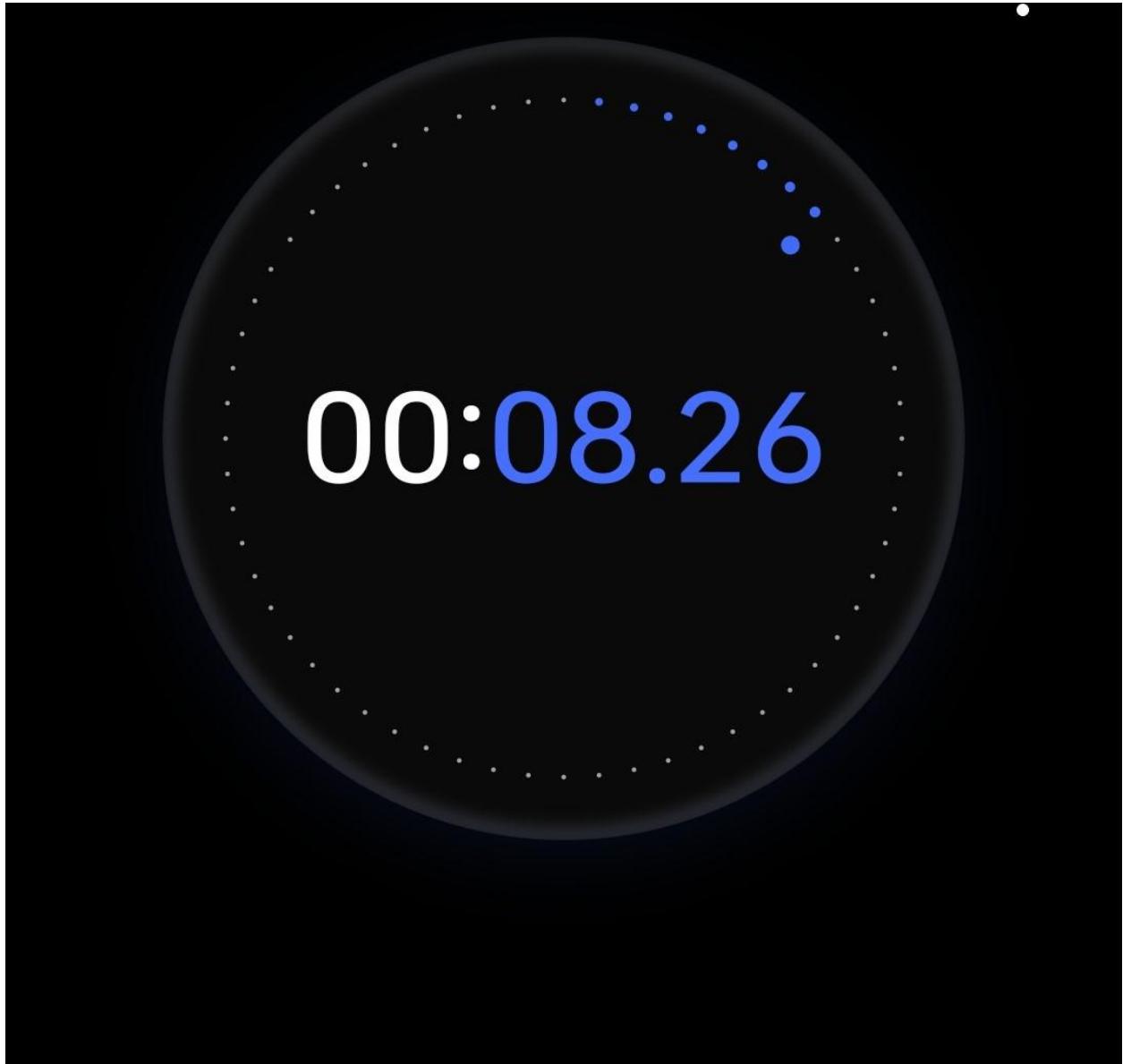
\r\n</body>\r\n</html>\r\n\r\n'
us-east1-c
Requesting /hw2nirbhgsutil/test-dir/4145.html from 104.196.54.22 80
Traceback (most recent call last):
 File "/home/nmalhotra/vm-check/http-client.py", line 194, in <module>
 main()
 File "/home/nmalhotra/vm-check/http-client.py", line 191, in main
 make_request(args.domain, args.port, country, ip, filename, args.ssl, ssl_context, args.follow, args.verbos
e)
 File "/home/nmalhotra/vm-check/http-client.py", line 142, in make_request
 conn.request("GET", filename, headers=headers)
 File "/usr/lib/python3.9/http/client.py", line 1255, in request
 self._send_request(method, url, body, headers, encode_chunked)
 File "/usr/lib/python3.9/http/client.py", line 1301, in _send_request
 self.endheaders(body, encode_chunked=encode_chunked)
 File "/usr/lib/python3.9/http/client.py", line 1250, in endheaders
 self._send_output(message_body, encode_chunked=encode_chunked)
 File "/usr/lib/python3.9/http/client.py", line 1010, in _send_output
 self.send(msg)
 File "/usr/lib/python3.9/http/client.py", line 950, in send
 self.connect()
 File "/usr/lib/python3.9/http/client.py", line 921, in connect
 self.sock = self._create_connection()
 File "/usr/lib/python3.9/socket.py", line 843, in create_connection
 raise err
 File "/usr/lib/python3.9/socket.py", line 831, in create_connection
 sock.connect(sa)
ConnectionRefusedError: [Errno 111] Connection refused


```

The 24.07 seconds taken for the following error to show up once we click to start the wser1 server's instance is as follows:



The 8.26 seconds taken for the following error to show up once the wser1 server's instance is started is as follows:



Now we use the curl command to see if the load balancer notices the web server's demise and quickly routes the request to the remaining healthy instance by monitoring the errors seen by the client.

When we stop the wser1 instance and check the curl command constantly, we should notice that when there is a sudden stop or a pause for the response and I noticed the following for the second us-east1-c provided to me in the following list of commands and responses:

Wser1 instance killing:

VM instances

**INSTANCES**

| Status | Name       | Zone       | Recommendations | In use by  | Internal IP          | External IP           | Connect |
|--------|------------|------------|-----------------|------------|----------------------|-----------------------|---------|
| Green  | instance-5 | us-east1-b |                 |            | 10.142.0.59 (nic0)   | 34.75.13.177 (nic0)   | SSH     |
| Grey   | instance-6 | us-east1-b |                 |            | 10.142.15.229 (nic0) |                       | SSH     |
| Green  | wuser1     | us-east1-b |                 | www-pool-4 | 10.142.0.55 (nic0)   | 34.148.53.209 (nic0)  | SSH     |
| Green  | wuser2     | us-east1-c |                 | www-pool-4 | 10.142.0.56 (nic0)   | 34.148.212.217 (nic0) | SSH     |

**Related actions**

- Explore Backup and DR
- View billing report
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

CLOUD SHELL Terminal (cdsds561-project-1) + -

The connection to your Google Cloud Shell was lost.

Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to `cdsds561-project-1`.  
Use "gcloud config set project [PROJECT\_ID]" to change to a different project.  
nmalhotra@cloudshell:~ (cdsds561-project-1)\$

Stopping wuser1...

## Wuser1 instance killed:

VM instances

**INSTANCES**

| Status | Name       | Zone       | Recommendations | In use by  | Internal IP          | External IP           | Connect |
|--------|------------|------------|-----------------|------------|----------------------|-----------------------|---------|
| Green  | instance-5 | us-east1-b |                 |            | 10.142.0.59 (nic0)   | 34.75.13.177 (nic0)   | SSH     |
| Grey   | instance-6 | us-east1-b |                 |            | 10.142.15.229 (nic0) |                       | SSH     |
| Green  | wuser1     | us-east1-b |                 | www-pool-4 | 10.142.0.55 (nic0)   |                       | SSH     |
| Green  | wuser2     | us-east1-c |                 | www-pool-4 | 10.142.0.56 (nic0)   | 34.148.212.217 (nic0) | SSH     |

**Related actions**

- Explore Backup and DR
- View billing report
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

CLOUD SHELL Terminal (cdsds561-project-1) + -

The connection to your Google Cloud Shell was lost.

Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to `cdsds561-project-1`.  
Use "gcloud config set project [PROJECT\_ID]" to change to a different project.  
nmalhotra@cloudshell:~ (cdsds561-project-1)\$

Instance stopped

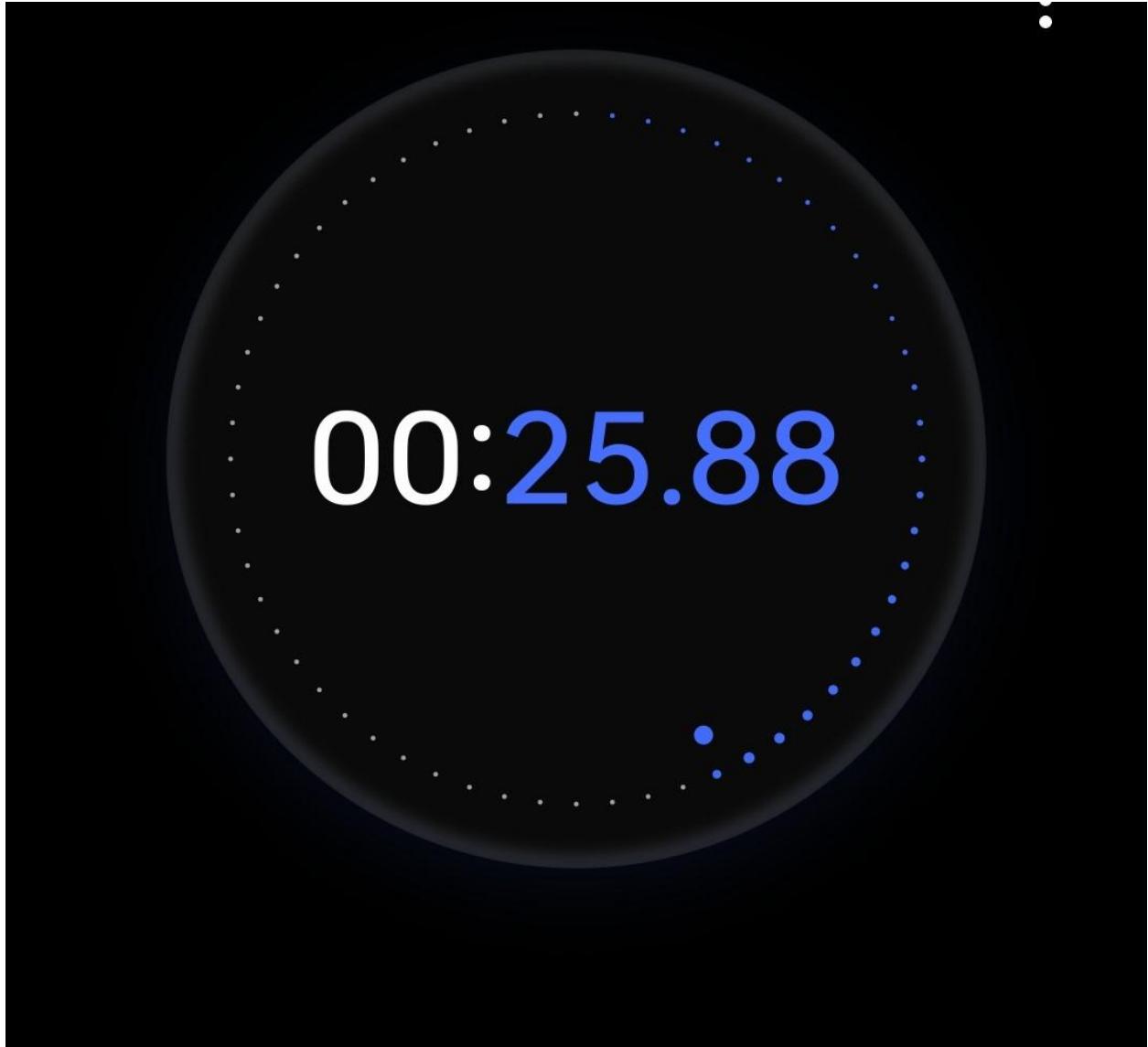
```

[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-b
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c
[nmalhotr@instance-5:~/vm-check$ curl -i http://104.196.54.22/hw2nirbhgsutil/test-dir/102.html -s | awk '/^GCP-Z
one:/ {print $2}'
us-east1-c

```

It took about 25.88 seconds for the load balancer to realize that the web server was killed and the load balancer routed the following request to the wser2 which resides in the us-east1-c zone and therefore, that's why see the us-east1-c afterwards. Following time is recorded from the point the webserver (wser1) gets killed till the point we see no pauses or stops.

Time taken for the load balancer to realize that the web server was killed and the load balancer routed the following request to the wser2 (Following time is recorded when the stop is pressed for the vm till the time the curl command show no pauses or stops) is as follows:



Also when we record the time, once the web server(wser1) is stopped, we don't usually get to see any pauses or stops that would indicate that the load balancer has realized about the webserver status of being killed since it always shows us-east1-c from the point web server gets stopped. We can call that 0 seconds.

Now we can start the wser1 vm instance again so that we can see if the load balancer notices the wser1's presence and starts routing requests to it by monitoring the responses your client is getting.

wser1 instance started:

The screenshot shows the Google Cloud Platform Compute Engine interface. On the left, there's a sidebar for 'Virtual machines' with options like VM instances, Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed use discounts, Reservations, and Migrate to Virtual Machines. Below that is a 'Storage' section with Marketplace and Release Notes. At the bottom, there's a 'CLOUD SHELL' tab and a 'Terminal' window showing a Cloud Shell session.

**VM instances**

**INSTANCE SCHEDULES**

**1 instance selected**

| Status                              | Name       | Zone       | Recommendations | In use by  | Internal IP          | External IP           | Connect |
|-------------------------------------|------------|------------|-----------------|------------|----------------------|-----------------------|---------|
| <input type="checkbox"/>            | instance-5 | us-east1-b |                 |            | 10.142.0.59 (nic0)   | 34.75.13.177 (nic0)   | SSH     |
| <input type="checkbox"/>            | instance-6 | us-east1-b |                 |            | 10.142.15.229 (nic0) |                       | SSH     |
| <input checked="" type="checkbox"/> | wuser1     | us-east1-b |                 | www-pool-4 | 10.142.0.55 (nic0)   | 34.148.53.209 (nic0)  | SSH     |
| <input type="checkbox"/>            | wuser2     | us-east1-c |                 | www-pool-4 | 10.142.0.56 (nic0)   | 34.148.212.217 (nic0) | SSH     |

**Related actions**

- Explore Backup and DR
- View billing report
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

**CLOUD SHELL**

Terminal

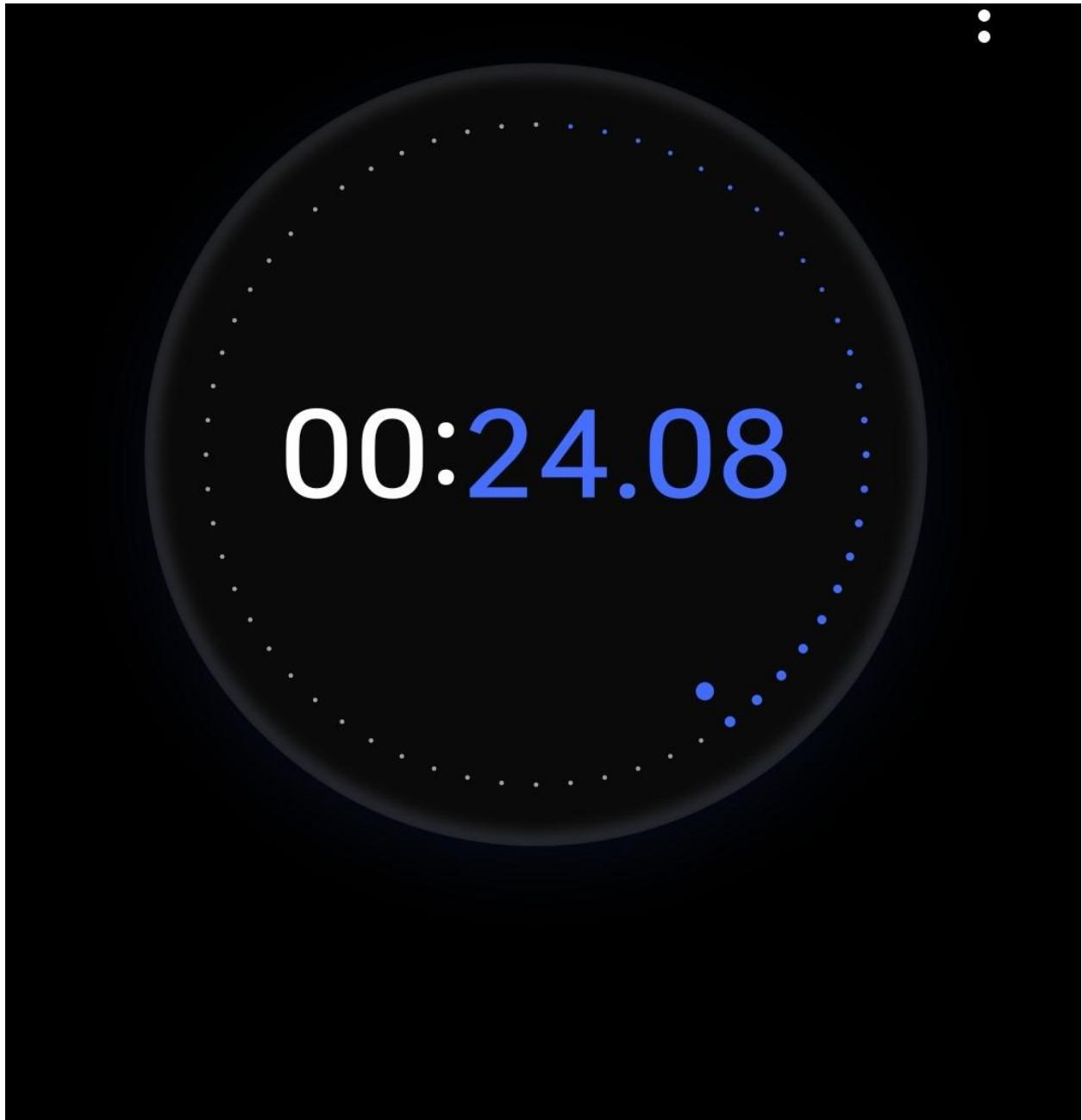
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to `cdsds561-project-1`.  
Use "cloud config set project <PROJECT\_ID>" to change to a different project.  
mario@CloudShell:~ (cdsds561-project-1)~

Instance started

Once the instance starts, we constantly use the curl command to notice the appearance of the first “us-east1-b” zone print which provides the indication that the load balancer noticed the wuser1’s presence and started routing requests to it by monitoring the responses the client is getting.

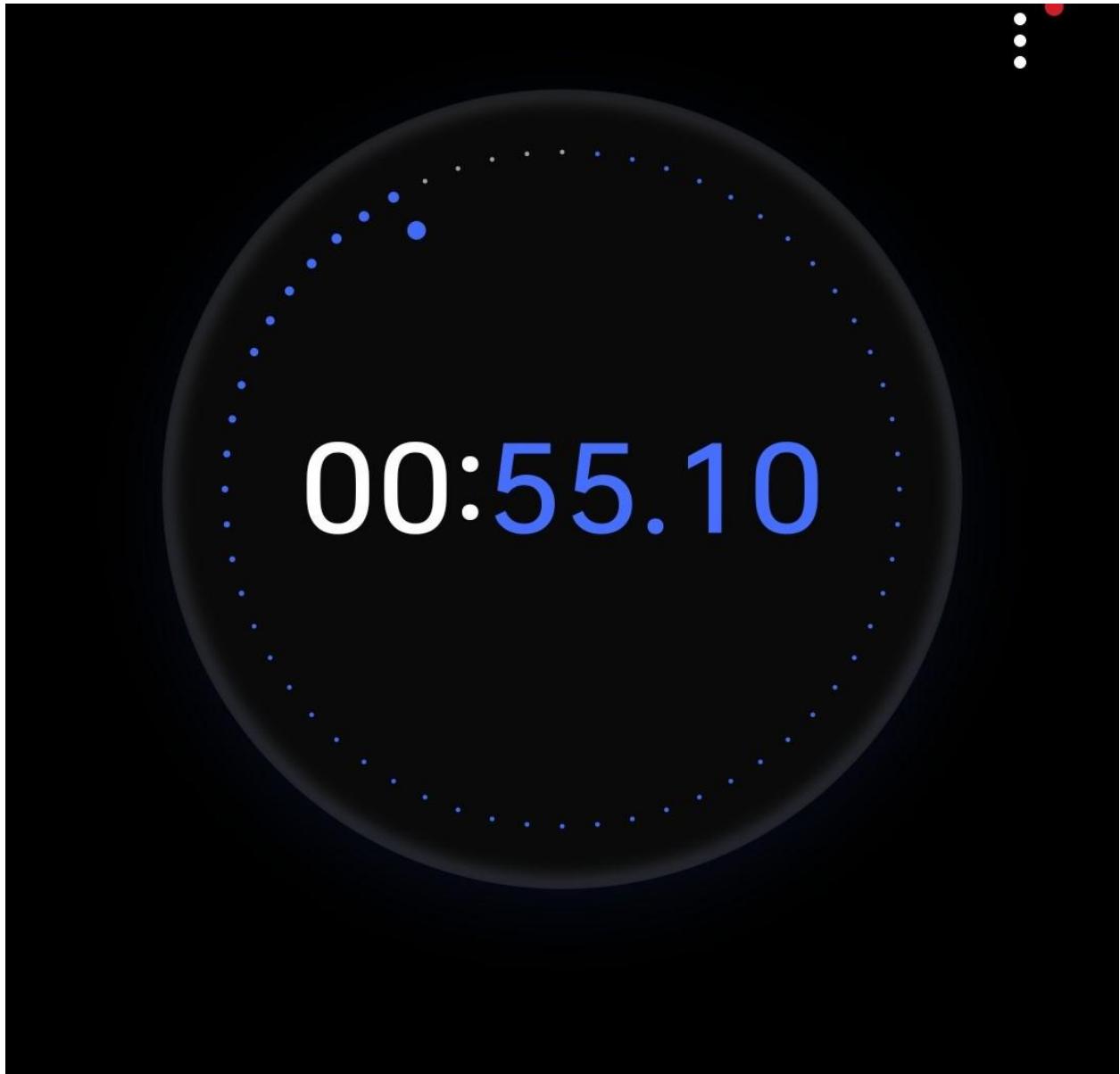
Curl commands are as follows:

The time taken by the load balancer to notice the wser1's presence and starts routing requests to it by monitoring the responses your client is getting, once the wser1 instance started is as follows:



24.08 seconds were taken by the load balancer to notice the wser1's presence and start routing requests to it by monitoring the responses your client is getting, once the wser1 instance started.

The time taken by the load balancer to notice the wser1's presence and starts routing requests to it by monitoring the responses your client is getting, once we start the wser1 instance(Following is the total amount from when we click on the start and till we find the us-east1-b) is as follows:



55.10 seconds were taken by the load balancer to notice the wser1's presence and start routing requests to it by monitoring the responses your client is getting, once we start the wser1 instance(Following is the total amount from when we click on the start and till we find the us-east1-b).

When I run the modified http-client, I get the following ratio of requests served by each backend VM, mainly wser1 and wser2:

```
tate velit esse\r\nillum 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 This is a link \r\n<p>\r\nLorem ips
um dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut en
im ad\r\nminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irur
e dolor in reprehenderit in voluptate velit esse\r\nillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupi
datat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n<p>\r\n This i
s a link \r\n<p>\r\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut lab
ore 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 voluptate velit esse\r\nillum dolore eu fugiat nulla paria
tur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n<p>
\r\n This is a link \r\n<p>\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, quis nostrud exercitation ullam
co laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\nnci
lum 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 This is a link \r\n<p>\r\nLorem ipsum dolor sit amet, co
nsectetur 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 consequat. Duis aute irure dolor in reprehende
rit in voluptate velit esse\r\nillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, s
unt in culpa qui officia deserunt mollit anim id est laborum.\r\n<p>\r\n This is a link \r\n<p>\r
\nLorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna a
liqua. Ut enim ad\r\nminim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Du
is aute irure dolor in reprehenderit in voluptate velit esse\r\nillum dolore eu fugiat nulla pariatur. Excepteur sint o
ccaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.\r\n<p>\r\n<a href="8281.h
tml"> This is a link \r\n<p>\r\n</body>\r\n<html>\r\n<p>\r\nus-east1-c
```

Requests served by each VM instance:

|                                          |
|------------------------------------------|
| us-east1-b: 4808 requests, Ratio: 50.44% |
| us-east1-c: 4725 requests, Ratio: 49.56% |

When i run the following command:

```
C:\Users\nirbh\AppData\Local\Google\Cloud SDK>python http-client-1.py -d 104.196.54.22 -b /hw2nirbhgsutil -w test-dir -n
10000 -i 10000 -v
```

We can also use the following command on the vm instance as follows:

Http-Client - Launch Command :

```
nmalhotr@instance-5:~/vm-check$ python3 http-client.py -d 104.196.54.22 -b /hw2nirbhgsutil -w test-dir -n 100
00 -i 10000 -v
```

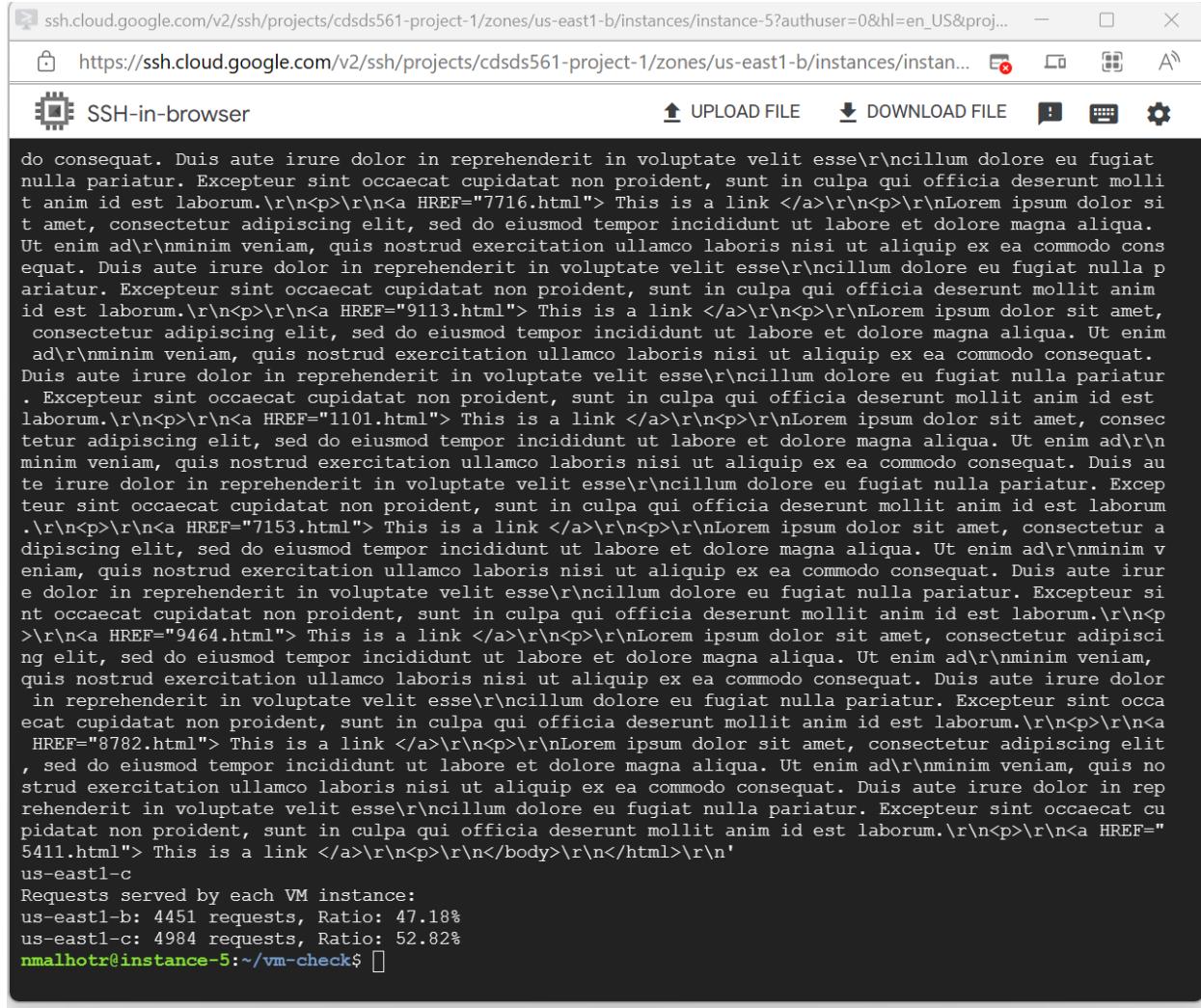
Output:

```

a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\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, 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 This is a link \r\n<p>\r\n</body>\r\n</html>\r\nus-east1-c
Requests served by each VM instance:
us-east1-b: 4712 requests, Ratio: 49.48%
us-east1-c: 4811 requests, Ratio: 50.52%
malhotr@instance-5:~/vm-check$

```

Also, I modified the following http-client so that it can handle the connection refused request and we get the following result of request served by each vm instance when i stop the wser1 instance and start it again while the http client continues to make requests:



The screenshot shows a browser-based terminal window titled "SSH-in-browser". The URL is [https://ssh.cloud.google.com/v2/ssh/projects/cdsds561-project-1/zones/us-east1-b/instances/instance-5?authuser=0&hl=en\\_US&proj...](https://ssh.cloud.google.com/v2/ssh/projects/cdsds561-project-1/zones/us-east1-b/instances/instance-5?authuser=0&hl=en_US&proj...). The terminal content is a large block of placeholder text from a Lorem ipsum generator, followed by the command "Requests served by each VM instance:" and the results:

```

do consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\ncccum ipsum dolor sit amet, consectetur 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 consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse\r\ncccum 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 This is a link \r\n<p>\r\n</body>\r\n</html>\r\nus-east1-c
Requests served by each VM instance:
us-east1-b: 4451 requests, Ratio: 47.18%
us-east1-c: 4984 requests, Ratio: 52.82%
nmalhotr@instance-5:~/vm-check$
```

I also logged the downtime between requests to determine the failover time measurements. When I stop the vm instance, wser1, I get the following failover time for handling errors for stopping the vm is as follows:



Other than this, when I start the vm instance, wser1 again , I get the following failover time for handling the connection refused errors for starting the vm which are as follows:

