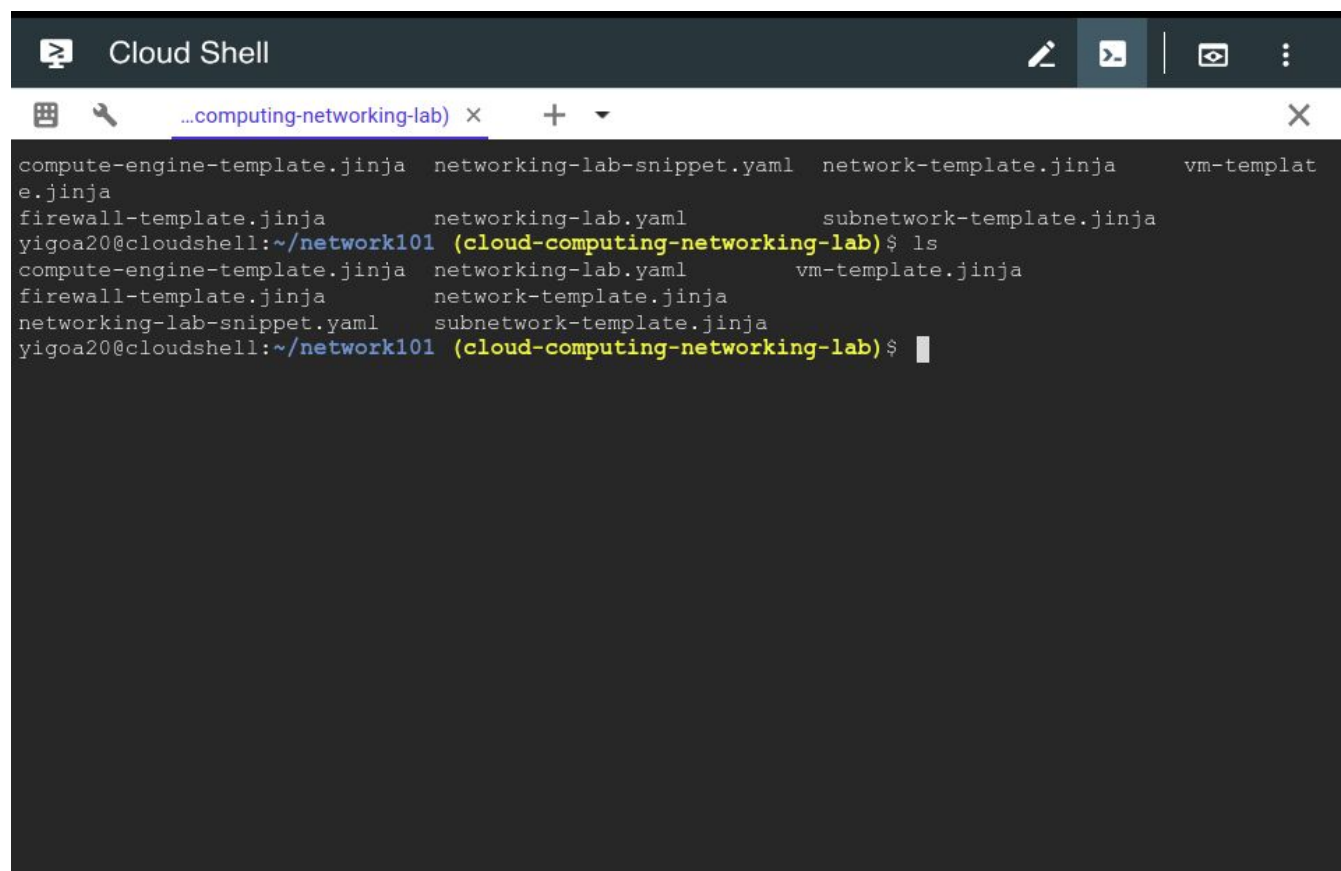


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Cloud Computing
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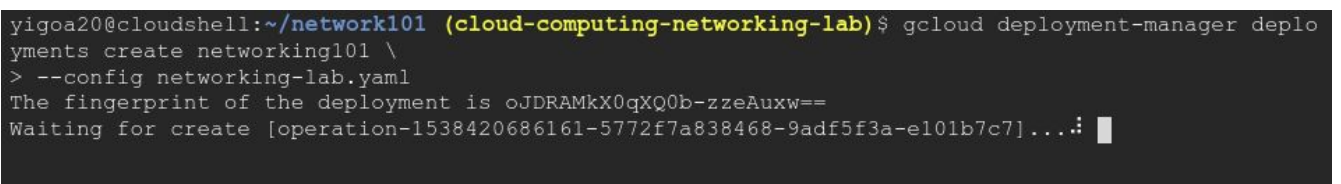
Assignment 2: Google cloud Report

These are the procedures followed in the Google Cloud platform:

The first process is to set up the instances on the platform, so the following picture illustrates this procedure:




The screenshot shows a Cloud Shell terminal window with the title bar "Cloud Shell". The terminal prompt is "yigoa20@cloudshell:~/network101 (cloud-computing-networking-lab)". The user has run the command "ls", and the output lists several files: "compute-engine-template.jinja", "firewall-template.jinja", "networking-lab-snippet.yaml", "networking-lab.yaml", "network-template.jinja", "subnetwork-template.jinja", "vm-template.jinja", and "e.jinja".




The screenshot shows a Cloud Shell terminal window with the title bar "Cloud Shell". The terminal prompt is "yigoa20@cloudshell:~/network101 (cloud-computing-networking-lab)". The user has run the command "gcloud deployment-manager deployments create networking101 \> --config networking-lab.yaml". The output shows the fingerprint of the deployment and the operation ID: "The fingerprint of the deployment is oJDRAMkX0qXQ0b-zzeAuxw==. Waiting for create [operation-1538420686161-5772f7a838468-9adf5f3a-e101b7c7]...".

Filter VM instances						Columns
<input type="checkbox"/> Name ^	Zone	Recommendation	Internal IP	External IP	Connect	
<input type="checkbox"/> <input checked="" type="checkbox"/> asia1-vm	asia-east1-b		10.40.0.2 (nic0)	35.236.134.19	SSH	


The following is the firewall rules from the console and the terminal:




VPC network




VPC networks




External IP addresses




Firewall rules



Routes





VPC network peering




Shared VPC

Firewall rules










Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. [Learn more](#)

Note: App Engine firewalls are managed [here](#).

 Filter resources

 Columns ▾

<input type="checkbox"/> Name	Type	Targets	Filters	Protocols / ports	Action	Priority	Network 
<input type="checkbox"/> default-allow-icmp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	icmp	Allow	65534	default
<input type="checkbox"/> default-allow-internal	Ingress	Apply to all	IP ranges: 10.128.0.0/9	tcp:0-65535 udp:0-65535 icmp	Allow	65534	default
<input type="checkbox"/> default-allow-rdp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:3389	Allow	65534	default
<input type="checkbox"/> default-allow-ssh	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:22	Allow	65534	default

```
{#
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    http://www.apache.org/licenses/LICENSE-2.0

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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
#}

resources:
- name: {{ env["name"] }}-allow-internal
  type: compute.v1.firewall
  properties:
    network: $(ref.{{ properties["network"] }}.selfLink)
    sourceRanges: ["10.0.0.0/8"]
    allowed:
      - IPProtocol: TCP
        ports: ["0-65535"]
      - IPProtocol: UDP
        ports: ["0-65535"]
      - IPProtocol: ICMP
- name: {{ env["name"] }}-allow-ssh
  type: compute.v1.firewall
  properties:
    network: $(ref.{{ properties["network"] }}.selfLink)
    sourceRanges: ["0.0.0.0/0"]
    allowed:
      - IPProtocol: TCP
        ports: ["22"]
- name: {{ env["name"] }}-allow-icmp
  type: compute.v1.firewall
  properties:
    network: $(ref.{{ properties["network"] }}.selfLink)
```

After all the configuration setup I was able to login in the instance using the SSH command illustrates by the following picture:

```
Warning: Permanently added host-fra-2044 104.196.215.210 (SSH) fingerprint: 3e9:65:c8:cf:7b:6c:aa
3e9:65:c8:cf:7b:6c:aa
Linux asia1-vm 4.9.0-8-amd64 #1 SMP Debian 4.9.110-3+deb9u4 (2018-08-21) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
yigoa20@asia1-vm:~$ ls
yigoa20@asia1-vm:~$
```

The next step was to use a ping command between two different instances to observe the latency:

This following illustration is showing a time between an instance from the US and Asia.

```
https://ssh.cloud.google.com/projects/cloud-computing-networking-lab/zones/asia-east1-b/instances/asia1-vm?authuser=0&hl=en_US&projectNumber=51
yigoa20@asia1-vm:~$ ping 104.196.215.210
PING 104.196.215.210 (104.196.215.210) 56(84) bytes of data.
64 bytes from 104.196.215.210: icmp_seq=1 ttl=55 time=185 ms
64 bytes from 104.196.215.210: icmp_seq=2 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=3 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=4 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=5 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=6 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=7 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=8 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=9 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=10 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=11 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=12 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=13 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=14 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=15 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=16 ttl=55 time=202 ms
64 bytes from 104.196.215.210: icmp_seq=17 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=18 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=19 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=20 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=21 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=22 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=23 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=24 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=25 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=26 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=27 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=28 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=29 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=30 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=31 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=32 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=33 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=34 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=35 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=36 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=37 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=38 ttl=55 time=184 ms
64 bytes from 104.196.215.210: icmp_seq=39 ttl=55 time=183 ms
64 bytes from 104.196.215.210: icmp_seq=40 ttl=55 time=183 ms
```



I have also performed a test within the US instances, so the following picture is a test on those instances (us-east1-b to us-west1-b):

```
yigoa20@e1-vm:~$ ping 35.233.180.195
PING 35.233.180.195 (35.233.180.195) 56(84) bytes of data.
64 bytes from 35.233.180.195: icmp_seq=1 ttl=57 time=68.4 ms
64 bytes from 35.233.180.195: icmp_seq=2 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=3 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=4 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=5 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=6 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=7 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=8 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=9 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=10 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=11 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=12 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=13 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=14 ttl=57 time=67.1 ms
64 bytes from 35.233.180.195: icmp_seq=15 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=16 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=17 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=18 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=19 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=20 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=21 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=22 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=23 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=24 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=25 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=26 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=27 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=28 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=29 ttl=57 time=66.8 ms
64 bytes from 35.233.180.195: icmp_seq=30 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=31 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=32 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=33 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=34 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=35 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=36 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=37 ttl=57 time=66.6 ms
64 bytes from 35.233.180.195: icmp_seq=38 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=39 ttl=57 time=66.7 ms
64 bytes from 35.233.180.195: icmp_seq=40 ttl=57 time=66.7 ms
```

The last test was from my machine to another instance:


```
nouroudine@nouroudine-HP-PAVILION-Notebook:~$ ping 104.196.215.210
PING 104.196.215.210 (104.196.215.210) 56(84) bytes of data.
64 bytes from 104.196.215.210: icmp_seq=1 ttl=50 time=50.1 ms
64 bytes from 104.196.215.210: icmp_seq=2 ttl=50 time=50.7 ms
64 bytes from 104.196.215.210: icmp_seq=3 ttl=50 time=49.2 ms
64 bytes from 104.196.215.210: icmp_seq=4 ttl=50 time=271 ms
64 bytes from 104.196.215.210: icmp_seq=5 ttl=50 time=192 ms
64 bytes from 104.196.215.210: icmp_seq=6 ttl=50 time=114 ms
64 bytes from 104.196.215.210: icmp_seq=7 ttl=50 time=51.3 ms
64 bytes from 104.196.215.210: icmp_seq=8 ttl=50 time=49.3 ms
64 bytes from 104.196.215.210: icmp_seq=9 ttl=50 time=76.8 ms
64 bytes from 104.196.215.210: icmp_seq=10 ttl=50 time=50.3 ms
64 bytes from 104.196.215.210: icmp_seq=11 ttl=50 time=84.8 ms
64 bytes from 104.196.215.210: icmp_seq=12 ttl=50 time=262 ms
64 bytes from 104.196.215.210: icmp_seq=13 ttl=50 time=49.3 ms
64 bytes from 104.196.215.210: icmp_seq=14 ttl=50 time=89.4 ms
64 bytes from 104.196.215.210: icmp_seq=15 ttl=50 time=320 ms
64 bytes from 104.196.215.210: icmp_seq=16 ttl=50 time=51.1 ms
64 bytes from 104.196.215.210: icmp_seq=17 ttl=50 time=295 ms
64 bytes from 104.196.215.210: icmp_seq=18 ttl=50 time=290 ms
64 bytes from 104.196.215.210: icmp_seq=19 ttl=50 time=49.5 ms
64 bytes from 104.196.215.210: icmp_seq=20 ttl=50 time=49.7 ms
64 bytes from 104.196.215.210: icmp_seq=21 ttl=50 time=50.4 ms
64 bytes from 104.196.215.210: icmp_seq=22 ttl=50 time=50.9 ms
64 bytes from 104.196.215.210: icmp_seq=23 ttl=50 time=290 ms
64 bytes from 104.196.215.210: icmp_seq=24 ttl=50 time=312 ms
64 bytes from 104.196.215.210: icmp_seq=25 ttl=50 time=290 ms
64 bytes from 104.196.215.210: icmp_seq=26 ttl=50 time=53.0 ms
64 bytes from 104.196.215.210: icmp_seq=27 ttl=50 time=50.7 ms
64 bytes from 104.196.215.210: icmp_seq=28 ttl=50 time=82.2 ms
64 bytes from 104.196.215.210: icmp_seq=29 ttl=50 time=122 ms
64 bytes from 104.196.215.210: icmp_seq=30 ttl=50 time=257 ms
64 bytes from 104.196.215.210: icmp_seq=31 ttl=50 time=51.2 ms
64 bytes from 104.196.215.210: icmp_seq=32 ttl=50 time=324 ms
64 bytes from 104.196.215.210: icmp_seq=33 ttl=50 time=304 ms
64 bytes from 104.196.215.210: icmp_seq=34 ttl=50 time=52.7 ms
64 bytes from 104.196.215.210: icmp_seq=35 ttl=50 time=49.4 ms
64 bytes from 104.196.215.210: icmp_seq=36 ttl=50 time=294 ms
64 bytes from 104.196.215.210: icmp_seq=37 ttl=50 time=316 ms
64 bytes from 104.196.215.210: icmp_seq=38 ttl=50 time=50.5 ms
64 bytes from 104.196.215.210: icmp_seq=39 ttl=50 time=49.2 ms
64 bytes from 104.196.215.210: icmp_seq=40 ttl=50 time=50.3 ms
64 bytes from 104.196.215.210: icmp_seq=41 ttl=50 time=50.8 ms
```

The next step is to create a load balancer to manage traffic from in the backend and frontend using the HTTP protocol. Therefore, the following illustration is showing then configuration interface.


Network services

Load balancing

Cloud DNS

Cloud CDN

Load balancer details

EDIT

DELETE

my-gclb

Details

Monitoring

Caching

Frontend

Protocol ^	IP:Port	Certificate	Network Tier ?
HTTP	35.201.79.151:80	—	Premium

Host and path rules

Hosts ^	Paths	Backend
All unmatched (default)	All unmatched (default)	my-backend-service

Backend

Backend services

1. my-backend-service

Endpoint protocol: HTTP

Named port: http

Timeout: 30 seconds

Cloud CDN: disabled

Health check: my-http-hc

Advanced configurations

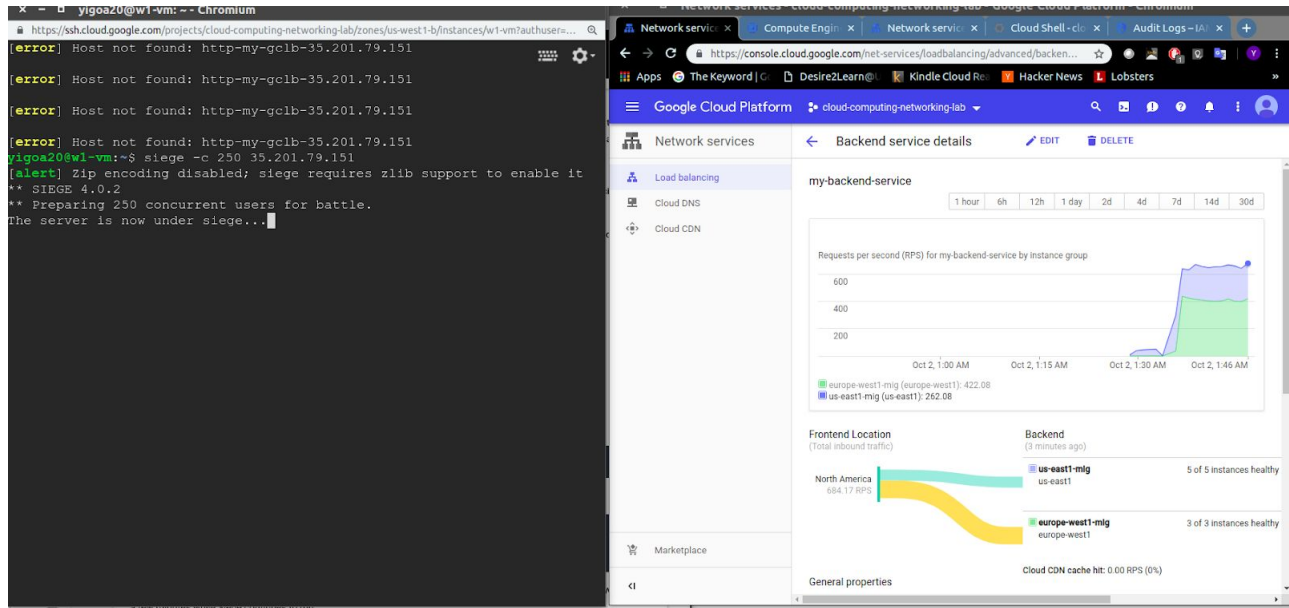
Instance group ^	Zone	Healthy	Autoscaling	Balancing mode	Capacity
europe-west1-mig	europe-west1	0 / 0	Off	Max CPU: 80%	100%
us-east1-mig	us-east1	0 / 0	Target LB capacity fraction 80%	Max RPS: 50 (per instance)	100%

I have tried to ping the load balancer and this is the result:

```
nouroutine@nouroutine-HP-PAVILION-Notebook:~$ ping 35.201.79.1
PING 35.201.79.151 (35.201.79.151) 56(84) bytes of data.
64 bytes from 35.201.79.151: icmp_seq=1 ttl=50 time=116 ms
64 bytes from 35.201.79.151: icmp_seq=2 ttl=50 time=16.0 ms
64 bytes from 35.201.79.151: icmp_seq=3 ttl=50 time=46.3 ms
64 bytes from 35.201.79.151: icmp_seq=4 ttl=50 time=15.6 ms
64 bytes from 35.201.79.151: icmp_seq=5 ttl=50 time=16.0 ms
64 bytes from 35.201.79.151: icmp_seq=6 ttl=50 time=15.7 ms
64 bytes from 35.201.79.151: icmp_seq=7 ttl=50 time=15.9 ms
64 bytes from 35.201.79.151: icmp_seq=8 ttl=50 time=50.7 ms
64 bytes from 35.201.79.151: icmp_seq=9 ttl=50 time=21.0 ms
64 bytes from 35.201.79.151: icmp_seq=10 ttl=50 time=15.9 ms
64 bytes from 35.201.79.151: icmp_seq=11 ttl=50 time=16.6 ms
64 bytes from 35.201.79.151: icmp_seq=12 ttl=50 time=15.7 ms
64 bytes from 35.201.79.151: icmp_seq=13 ttl=50 time=16.6 ms
64 bytes from 35.201.79.151: icmp_seq=14 ttl=50 time=15.4 ms
64 bytes from 35.201.79.151: icmp_seq=15 ttl=50 time=17.6 ms
64 bytes from 35.201.79.151: icmp_seq=16 ttl=50 time=15.3 ms
64 bytes from 35.201.79.151: icmp_seq=17 ttl=50 time=18.8 ms
64 bytes from 35.201.79.151: icmp_seq=18 ttl=50 time=21.8 ms
64 bytes from 35.201.79.151: icmp_seq=19 ttl=50 time=15.6 ms
64 bytes from 35.201.79.151: icmp_seq=20 ttl=50 time=16.4 ms
64 bytes from 35.201.79.151: icmp_seq=21 ttl=50 time=16.1 ms
64 bytes from 35.201.79.151: icmp_seq=22 ttl=50 time=15.4 ms
64 bytes from 35.201.79.151: icmp_seq=23 ttl=50 time=17.0 ms
64 bytes from 35.201.79.151: icmp_seq=24 ttl=50 time=18.7 ms
64 bytes from 35.201.79.151: icmp_seq=25 ttl=50 time=20.7 ms
64 bytes from 35.201.79.151: icmp_seq=26 ttl=50 time=16.5 ms
64 bytes from 35.201.79.151: icmp_seq=27 ttl=50 time=16.0 ms
64 bytes from 35.201.79.151: icmp_seq=28 ttl=50 time=16.0 ms
64 bytes from 35.201.79.151: icmp_seq=29 ttl=50 time=15.9 ms
64 bytes from 35.201.79.151: icmp_seq=30 ttl=50 time=15.8 ms
64 bytes from 35.201.79.151: icmp_seq=31 ttl=50 time=15.3 ms
64 bytes from 35.201.79.151: icmp_seq=32 ttl=50 time=17.9 ms
64 bytes from 35.201.79.151: icmp_seq=33 ttl=50 time=15.2 ms
```

The following step, I am using Siege to test the load balancer performance:

Stimulation with 250 concurrent users:



I have tried to push the stimulation to 500, but the maximum number of users is 255 according to the warning message:

```
https://ssh.cloud.google.com/projects/cloud-computing-networking-lab/zones/us-west1-b/instances/w1-vm?authuser=...
yigoa20@w1-vm:~$ siege -c 500 35.201.79.151
[alert] Zip encoding disabled; siege requires zlib support to enable it.

=====
WARNING: The number of users is capped at 255. To increase this
        limit, search your .siegerc file for 'limit' and change
        its value. Make sure you read the instructions there...
=====
** SIEGE 4.0.2
** Preparing 255 concurrent users for battle.
The server is now under siege...[]
```

