DevOps Lab

CLOUD COMPUTE - GCP

NETWORKING

Home tasks

It’s aiming to gain knowledge about Networking in Google Cloud.

TASK 1

Learn about two types of load balancers in Google Cloud Platform:

- a L3 Network Load Balancer and
- a L7 HTTP(s) Load Balancer.

Network Load Balancer

MINGW64:/c/ter/google-cloud-module

```
Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module (dmezhva)
$ gcloud compute forwarding-rules list
NAME      REGION        IP_ADDRESS     IP_PROTOCOL  TARGET
nginx-lb  europe-west1  34.77.75.177   TCP          europe-west1/targetPools/nginx-pool

Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module (dmezhva)
$ curl -Is 34.77.75.177
HTTP/1.1 200 OK
Server: nginx/1.14.2
Date: Wed, 02 Sep 2020 13:31:27 GMT
Content-Type: text/html
Content-Length: 786
Last-Modified: Wed, 02 Sep 2020 12:33:50 GMT
Connection: keep-alive
ETag: "5f4f912e-312"
Accept-Ranges: bytes
```

HTTP(s) Load Balancer

MINGW64:/c/ter/google-cloud-module

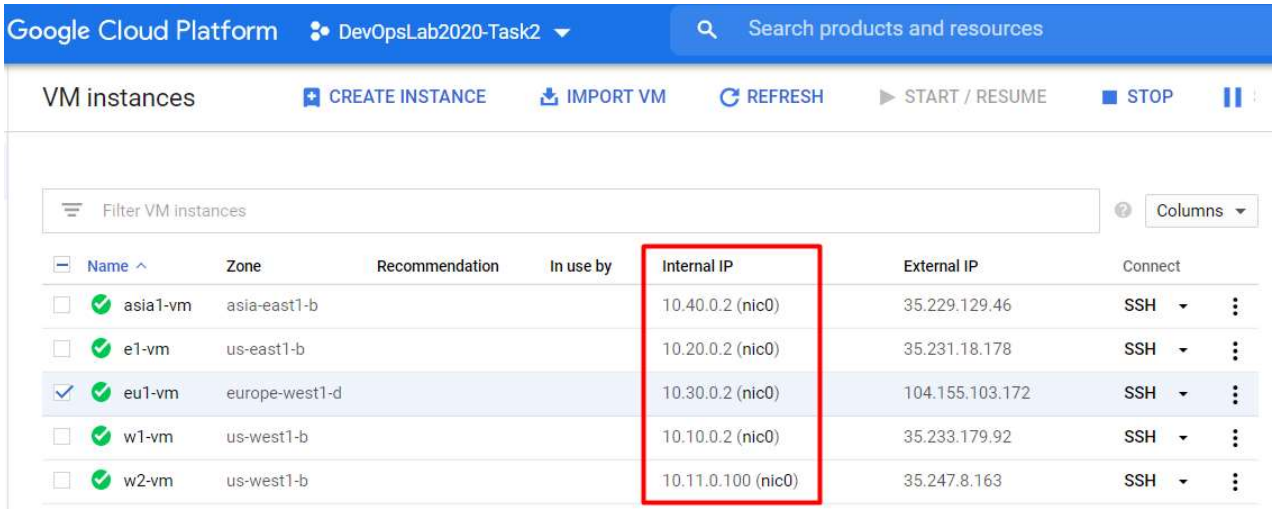
```
Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module (dmezhva)
$ gcloud compute forwarding-rules list
NAME                 REGION        IP_ADDRESS      IP_PROTOCOL  TARGET
http-content-rule                  34.120.215.200  TCP          http-lb-proxy
nginx-lb             europe-west1  34.77.75.177    TCP          europe-west1/targetPools/nginx-pool

Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module (dmezhva)
$ curl -s 34.120.215.200 | grep Platform
<title>Welcome to Google Cloud Platform - nginx-rjt3!</title>
<h1>Welcome to Google Cloud Platform - nginx-rjt3!</h1>
<p>If you see this page, the Google Cloud Platform - nginx-rjt3 web server is successfully installed and
<a href="http://Google Cloud Platform - nginx-rjt3.org/">nginx.org</a>.<br/>
<a href="http://Google Cloud Platform - nginx-rjt3.com/">nginx.com</a>.</p>
<p><em>Thank you for using Google Cloud Platform - nginx-rjt3.</em></p>

Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module (dmezhva)
$ curl -s 34.120.215.200 | grep Platform
<title>Welcome to Google Cloud Platform - nginx-91s6!</title>
<h1>Welcome to Google Cloud Platform - nginx-91s6!</h1>
<p>If you see this page, the Google Cloud Platform - nginx-91s6 web server is successfully installed and
<a href="http://Google Cloud Platform - nginx-91s6.org/">nginx.org</a>.<br/>
<a href="http://Google Cloud Platform - nginx-91s6.com/">nginx.com</a>.</p>
<p><em>Thank you for using Google Cloud Platform - nginx-91s6.</em></p>
```

Lab Link: codelabs: LoadBalancers

TASK 2

The Objectives are to learn:

- How to measure latency between Google Compute Engine regions and zones



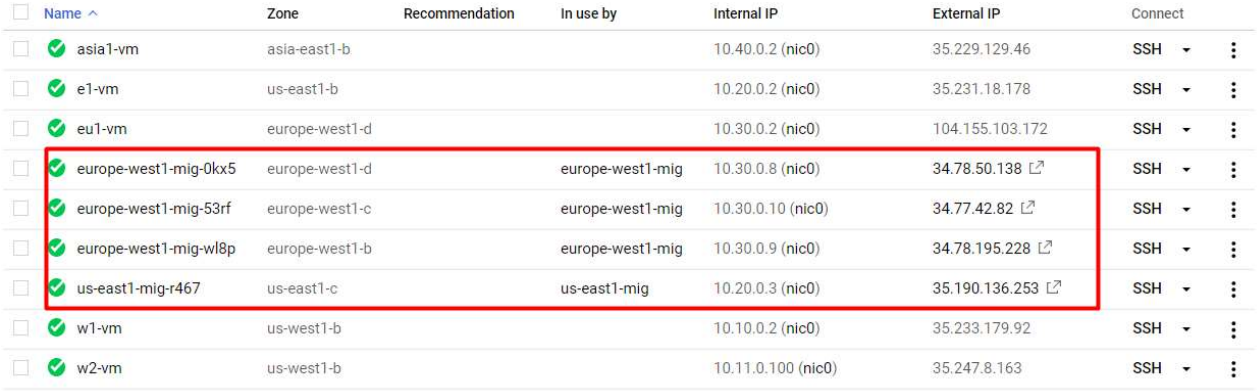
From e1-vm to eu1-vm

```
dzmitry_mezhva@e1-vm:~$ ping 10.30.0.2
PING 10.30.0.2 (10.30.0.2) 56(84) bytes of data.
64 bytes from 10.30.0.2: icmp_seq=1 ttl=64 time=96.4 ms
64 bytes from 10.30.0.2: icmp_seq=2 ttl=64 time=95.2 ms
64 bytes from 10.30.0.2: icmp_seq=3 ttl=64 time=95.1 ms
64 bytes from 10.30.0.2: icmp_seq=4 ttl=64 time=95.1 ms
^C
--- 10.30.0.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 95.176/95.511/96.414/0.566 ms
dzmitry_mezhva@e1-vm:~$
```

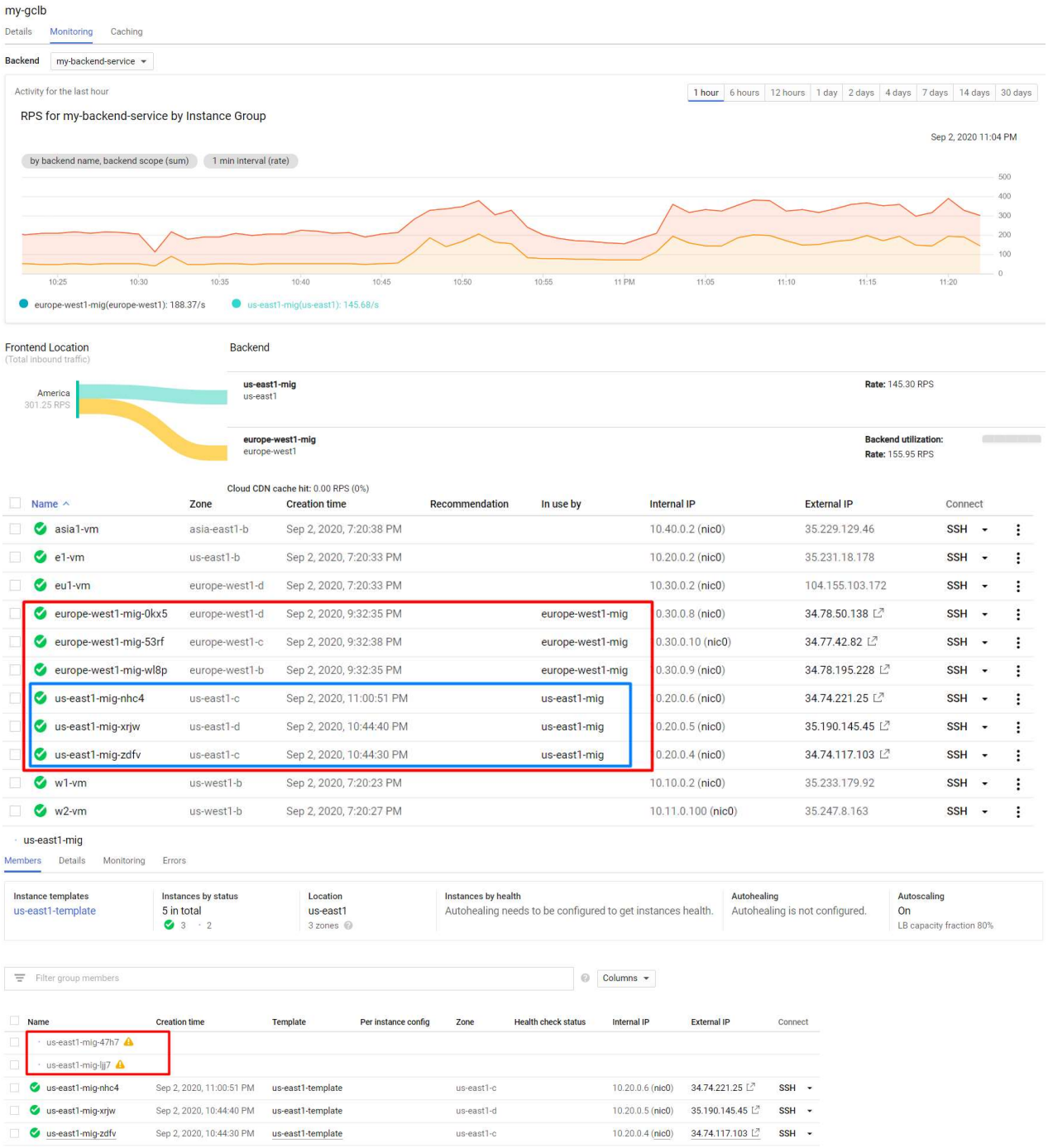
From eu1-vm to asia1-vm

```
dzmitry_mezhva@eu1-vm:~$ ping 10.40.0.2
PING 10.40.0.2 (10.40.0.2) 56(84) bytes of data.
64 bytes from 10.40.0.2: icmp_seq=1 ttl=64 time=260 ms
64 bytes from 10.40.0.2: icmp_seq=2 ttl=64 time=259 ms
64 bytes from 10.40.0.2: icmp_seq=3 ttl=64 time=259 ms
64 bytes from 10.40.0.2: icmp_seq=4 ttl=64 time=259 ms
^C
--- 10.40.0.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 259.307/259.676/260.587/0.638 ms
dzmitry_mezhva@eu1-vm:~$
```

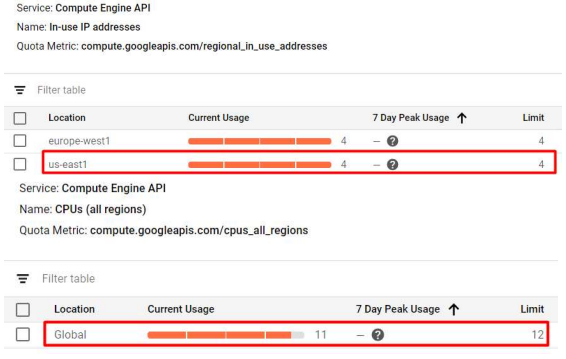
- How to test network connectivity and performance using open source tools
- How to set up basic firewalling to secure your networks
- How to set up a global HTTP Load Balancer with Managed Instance Groups to automatically scale your resources up and down based on request load



- How to test and monitor your HTTP Load Balancer setup



In my case I had two issues with autoscaling because of quotas. I have only free trial account and I couldn't change quotas such as «Quota 'CPUS_ALL_REGIONS' exceeded. Limit: 12.0 globally» and «Quota 'IN_USE_ADDRESSES' exceeded. Limit: 4.0 in region us-east1». Consequently I saw only three VMs in us-east1 region



These exercises are ordered to reflect a common cloud developer experience as follows:

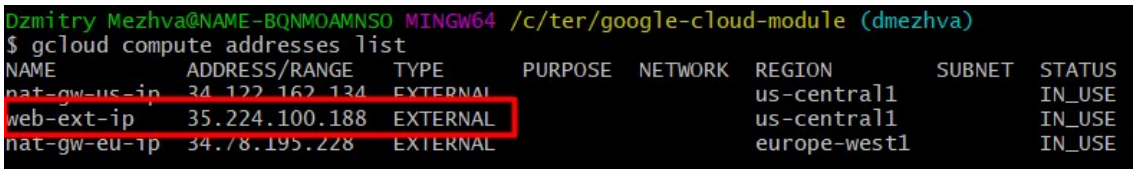
1. Set up your lab environment and learn how to work with your GCP environment.
2. Use of common open source tools to explore your network around the world.
3. Deploy a common use case: use of HTTP Load Balancing and Managed Instance Groups to host a scalable, multi-region web server.
4. Testing and monitoring your network and instances.
5. Cleanup.

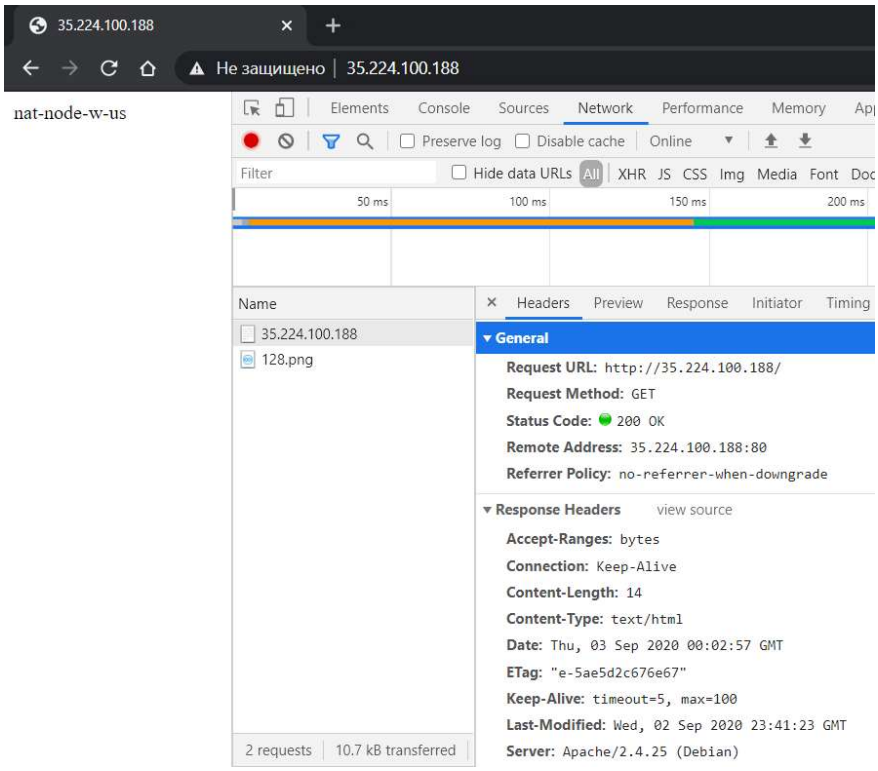
Lab Link: codelabs: Neworking 101

TASK 3

The Objectives are to learn:

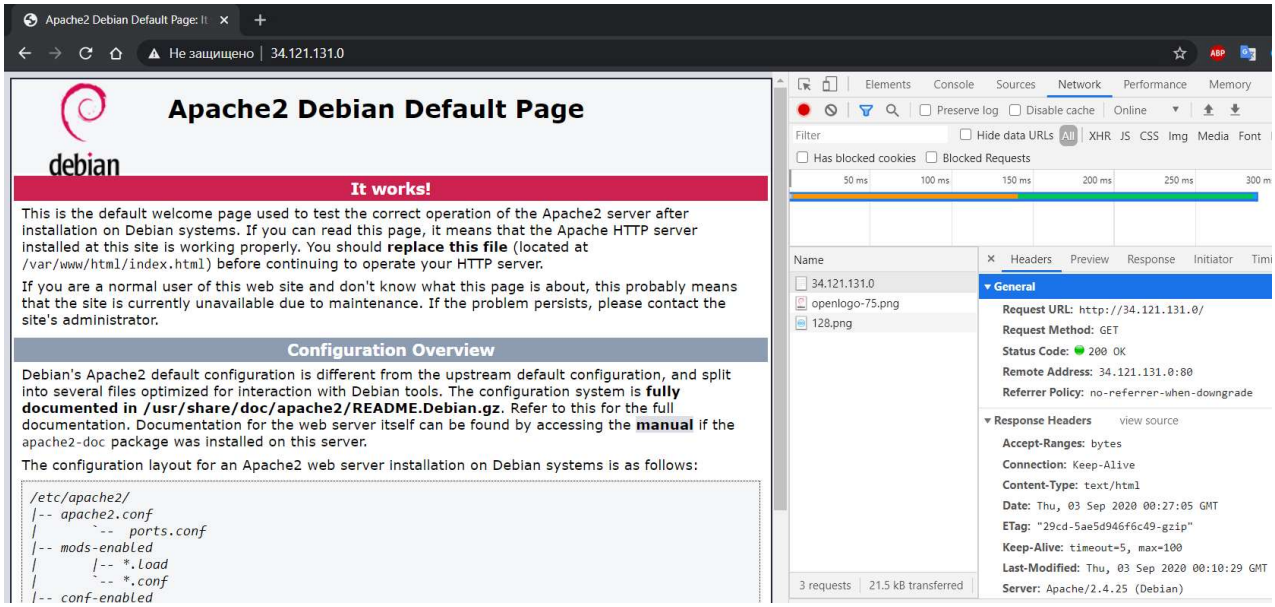
- Setting up NAT gateways
- How to restrict network traffic that certain tiers of an app cannot talk to each other
- Setting up alternate connectivity options to instances





- Map an external service to look like an internal service

faux-on-prem-svc	us-central1-f	Sep 3, 2020, 3:08:47 AM	10.128.0.2 (nic0)	34.121.131.0	SSH
nat-gw-eu	europe-west1-c	Sep 3, 2020, 12:19:29 AM	192.168.20.3 (nic0)	34.78.195.228	SSH
nat-gw-us	us-central1-f	Sep 3, 2020, 12:19:48 AM	192.168.10.3 (nic0)	34.122.162.134	SSH
nat-node-eu	europe-west1-c	Sep 3, 2020, 12:22:08 AM	192.168.20.4 (nic0)	None	SSH
nat-node-us	us-central1-f	Sep 3, 2020, 12:21:45 AM	192.168.10.4 (nic0)	None	SSH
nat-node-w-eu	europe-west1-c	Sep 3, 2020, 2:19:39 AM	192.168.20.5 (nic0)	None	SSH
nat-node-w-us	us-central1-f	Sep 3, 2020, 2:18:36 AM	192.168.10.5 (nic0)	None	SSH




```
dzmitry_mezhva_gmail_com@nat-node-us:~$ curl -Is nat-gw-us
HTTP/1.1 200 OK
Date: Thu, 03 Sep 2020 00:25:55 GMT
Server: Apache/2.4.25 (Debian)
Last-Modified: Thu, 03 Sep 2020 00:10:29 GMT
ETag: "29cd-5ae5d946f6c49"
Accept-Ranges: bytes
Content-Length: 10701
Vary: Accept-Encoding
Content-Type: text/html
```

- How to setup an Egress proxy limiting access to specific resources

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ curl -I www.google.com
HTTP/1.1 403 Forbidden
Server: squid/3.5.20
Mime-Version: 1.0
Date: Thu, 03 Sep 2020 01:00:51 GMT
Content-Type: text/html;charset=utf-8
Content-Length: 3522
X-Squid-Error: ERR_ACCESS_DENIED 0
Vary: Accept-Language
Content-Language: en
X-Cache: MISS from nat-gw-eu
X-Cache-Lookup: NONE from nat-gw-eu:3128
Via: 1.1 nat-gw-eu (squid/3.5.20)
Connection: keep-alive
```

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ curl -I https://www.google.com
HTTP/1.1 403 Forbidden
Server: squid/3.5.20
Mime-Version: 1.0
Date: Thu, 03 Sep 2020 01:01:52 GMT
Content-Type: text/html;charset=utf-8
Content-Length: 3512
X-Squid-Error: ERR_ACCESS_DENIED 0
Vary: Accept-Language
Content-Language: en
X-Cache: MISS from nat-gw-eu
```

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ curl -I www.iana.org
HTTP/1.1 403 Forbidden
Server: squid/3.5.20
Mime-Version: 1.0
Date: Thu, 03 Sep 2020 01:02:06 GMT
Content-Type: text/html;charset=utf-8
Content-Length: 3516
X-Squid-Error: ERR_ACCESS_DENIED 0
Vary: Accept-Language
Content-Language: en
X-Cache: MISS from nat-gw-eu
X-Cache-Lookup: NONE from nat-gw-eu:3128
Via: 1.1 nat-gw-eu (squid/3.5.20)
Connection: keep-alive
```

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ curl -I 34.121.131.0
HTTP/1.1 200 OK
Date: Thu, 03 Sep 2020 01:14:20 GMT
Server: Apache/2.4.25 (Debian)
Last-Modified: Thu, 03 Sep 2020 00:10:29 GMT
ETag: "29cd-5ae5d946f6c49"
Accept-Ranges: bytes
Content-Length: 10701
Vary: Accept-Encoding
Content-Type: text/html
X-Cache: MISS from nat-gw-eu
X-Cache-Lookup: MISS from nat-gw-eu:3128
Via: 1.1 nat-gw-eu (squid/3.5.20)
Connection: keep-alive
```

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ gsutil ls gs://
gs://nw102-mezhva-bucket/
```

```
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ gcloud compute instances list
ERROR: gcloud crashed (HTTPError): (403, 'Forbidden')

If you would like to report this issue, please run the following command:
  gcloud feedback

To check gcloud for common problems, please run the following command:
  gcloud info --run-diagnostics
```

```
Last login: Thu Sep  3 01:14:13 2020 from nat-gw-eu.europe-west1-c.c.devopslab2020-task2.internal
[dzmitry_mezhva_gmail_com@nat-node-gcp-eu ~]$ gcloud compute instances list
NAME              ZONE            MACHINE_TYPE   PREEMPTIBLE  INTERNAL_IP   EXTERNAL_IP     STATUS
nat-gw-eu         europe-west1-c  n1-standard-1               192.168.20.3  34.78.195.228   RUNNING
nat-node-eu       europe-west1-c  n1-standard-1               192.168.20.4                  RUNNING
nat-node-gcp-eu   europe-west1-c  n1-standard-1               192.168.20.6                  RUNNING
nat-node-w-eu     europe-west1-c  n1-standard-1               192.168.20.5                  RUNNING
faux-on-prem-svc  us-central1-f  n1-standard-1               10.128.0.2    34.121.131.0    RUNNING
nat-gw-us         us-central1-f  n1-standard-1               192.168.10.3  34.122.162.134  RUNNING
nat-node-us       us-central1-f  n1-standard-1               192.168.10.4                  RUNNING
nat-node-w-us     us-central1-f  n1-standard-1               192.168.10.5                  RUNNING
```

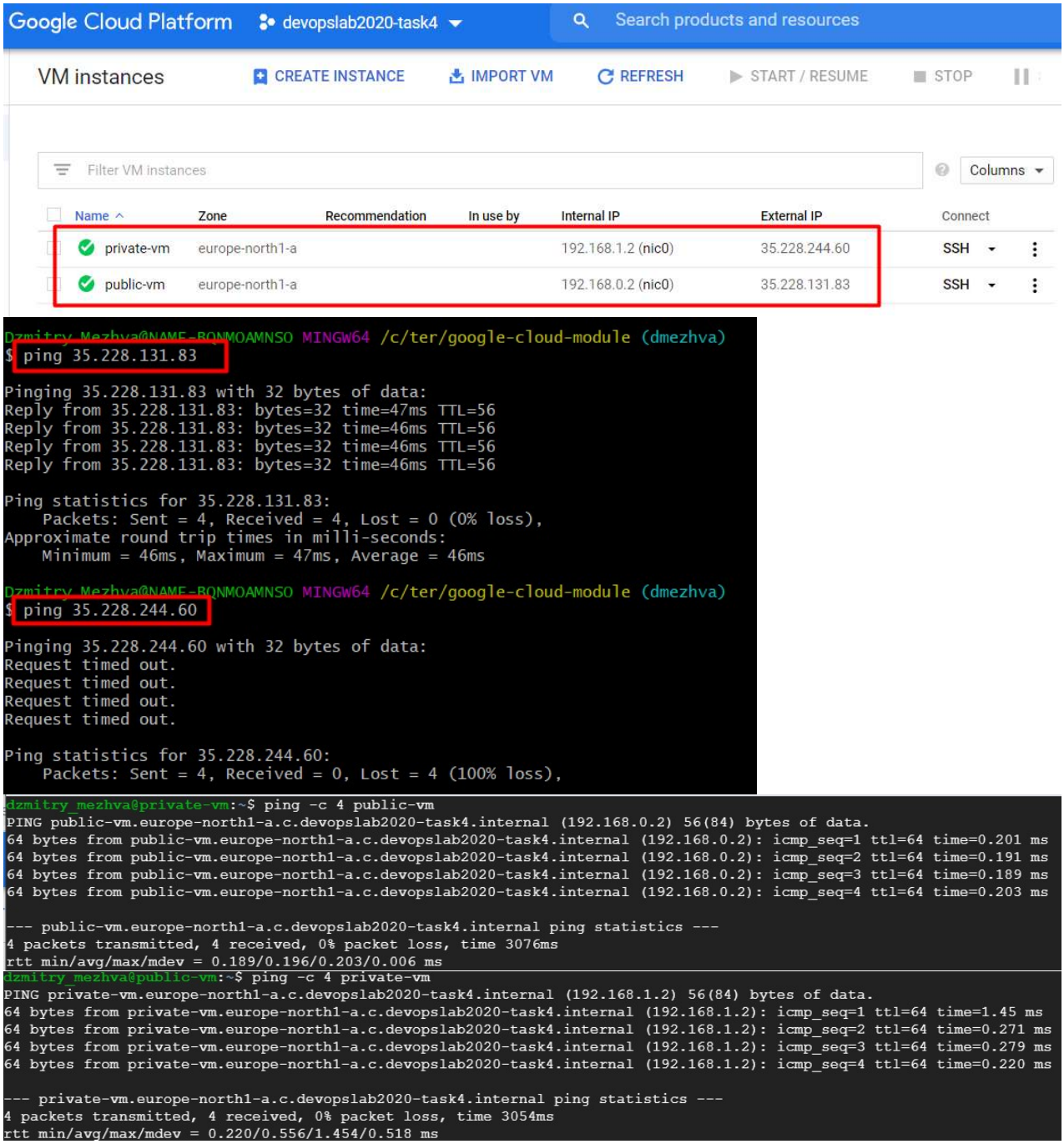
Lab Link: codelabs: Neworking 102

TASK 4

The Objectives are to learn:

- Secure app in custom network

Lab Link: codelabs: custom_network



TASK 5

Create network configuration via terraform.
Resources should be used:

1) **google_compute_network** (to create network)
   https://www.terraform.io/docs/providers/google/r/compute_network.html

   Network name: ${student_name}-vpc

2) **google_compute_firewall**
   (to create rules for external (allow 80,22) /internal access (allow 0-65535))
   https://www.terraform.io/docs/providers/google/r/compute_firewall.html

3) **google_compute_subnetwork**
   https://www.terraform.io/docs/providers/google/r/compute_subnetwork.html

ranges:

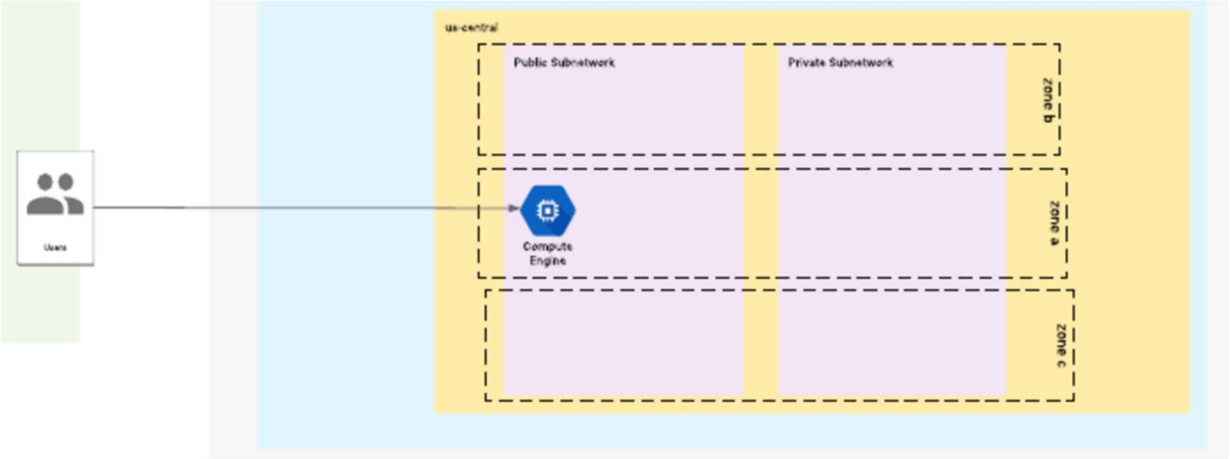
- Public range: 10.”${student_IDnum}”.1.0/24
- Private range: 10.”${student_IDnum}”.2.0/24

4) **google_compute_instance**
https://www.terraform.io/docs/providers/google/r/compute_instance.html

1. nginx with default page “Hello from ${student_name}”

All resources should contain description (where it’s possible)

Network topology.




```
Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module/Day3 (dmezhva)
$ curl -is 34.122.161.36
HTTP/1.1 200 OK
Server: nginx/1.16.1
Date: Thu, 03 Sep 2020 04:55:57 GMT
Content-Type: text/html
Content-Length: 19
Last-Modified: Thu, 03 Sep 2020 04:47:42 GMT
Connection: keep-alive
ETag: "5f50756e-13"
Accept-Ranges: bytes

Hello from dmezhva

Dzmitry Mezhva@NAME-BQNMOAMNSO MINGW64 /c/ter/google-cloud-module/Day3 (dmezhva)
$ ping 34.122.161.36

Pinging 34.122.161.36 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 34.122.161.36:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

All **reports**/code please place into repository:
https://github.com/MNT-Lab/google-cloud-module into appropriate branches: *first char of name + surname*.

For example:
Student: Siarhei Ivanou
Branch Name: **sivanou**

Format depends on case: README.md/scripts/terraform files

Email pattern: [MNT-CD-8.3]-FirstName-LastName

Email should contain the link to personalized branch.