

CS 530 INTERNET WEB & CLOUD SYSTEMS

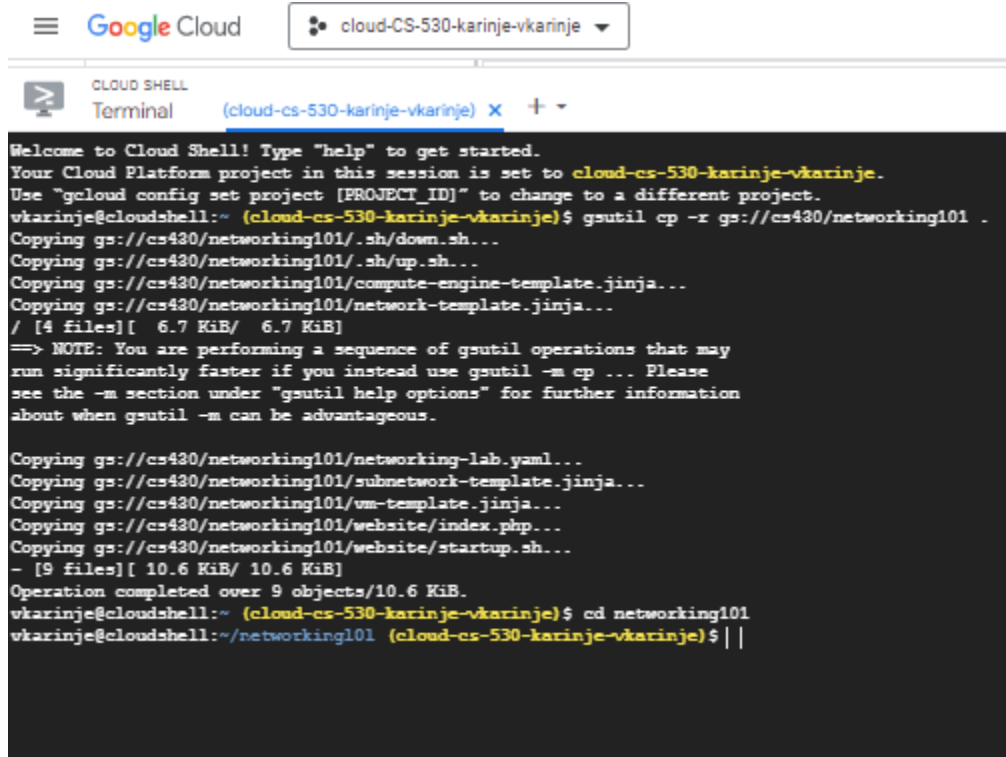
NAME: Varsha Karinje

PSU ID:925923534

Deployment specification	2
Deployment	2
Firewall deployment specification	6
Update deployment	8
Latency measurements	12
Firewall rule for HTTP	14
Instance templates	15
Health check	15
Managed Instance Group (europe-west1-mig)	16
Managed Instance Group (us-east5-mig)	16
Test groups	17
HTTP load balancer	21
Test load balancer	22
Siege! (Part 1)	23
Siege! (Part 2)	29
Clean-up	30

10.1g: CDN

Deployment specification



The screenshot shows a Google Cloud Shell terminal window for the project 'cloud-CS-530-karinje-vkarinje'. The terminal displays the following commands and output:

```

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to cloud-CS-530-karinje-vkarinje.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
vkarinje@cloudshell:~ (cloud-CS-530-karinje-vkarinje)$ gsutil cp -r gs://cs430/networking101 .
Copying gs://cs430/networking101/.sh/down.sh...
Copying gs://cs430/networking101/.sh/up.sh...
Copying gs://cs430/networking101/compute-engine-template.jinja...
Copying gs://cs430/networking101/network-template.jinja...
/ [4 files] [ 6.7 KiB/ 6.7 KiB]
=> NOTE: You are performing a sequence of gsutil operations that may
run significantly faster if you instead use gsutil -m cp ... Please
see the -m section under "gsutil help options" for further information
about when gsutil -m can be advantageous.

Copying gs://cs430/networking101/networking-lab.yaml...
Copying gs://cs430/networking101/subnetwork-template.jinja...
Copying gs://cs430/networking101/vm-template.jinja...
Copying gs://cs430/networking101/website/index.php...
Copying gs://cs430/networking101/website/startup.sh...
- [9 files] [ 10.6 KiB/ 10.6 KiB]
Operation completed over 9 objects/10.6 KiB.
vkarinje@cloudshell:~ (cloud-CS-530-karinje-vkarinje)$ cd networking101
vkarinje@cloudshell:~/networking101 (cloud-CS-530-karinje-vkarinje)$ |

```

Deployment

- Take a screenshot of the output to include in your lab notebook. How many networks, subnetworks, and VM instances have been created?

We have created 1 network, 5 subnetworks and 5 VM instances

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud deployment-manager deployments create networking101 --config networking-lab.yaml
The fingerprint of the deployment is b'YluDxjkEdxwWchlVMN11Ew=='
Waiting for create [operation-1669976095254-Seed59bf0e5fc-7927cala-918b30cd]...done.
Create operation operation-1669976095254-Seed59bf0e5fc-7927cala-918b30cd completed successfully.
NAME: asia-east1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: asia1-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: e1-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: eul-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: europe-west1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking101
TYPE: compute.v1.network
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-east5
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s2
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: w1-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: w2-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |


```

- Visit the web console for VPC network and show the network and the subnetworks that have been created. Validate that it has created the infrastructure in the initial figure. Note the lack of firewall rules that have been created.

cloud-CS-530-karinje-vkarinje
Search for resources, docs, products, and more (/)

VPC networks
CREATE VPC NETWORK
REFRESH

NETWORKS IN CURRENT PROJECT
SUBNETS IN CURRENT PROJECT
NEW




Get real-time analytics with Network Intelligence Center

Use Network Intelligence Center for comprehensive monitoring and troubleshooting. [Learn more](#)

- ✓ Visualize your network resources
- ✓ Diagnose and prevent connectivity issues
- ✓ View packet loss and latency metrics
- ✓ Keep your firewall rules strict and efficient

[GO TO NETWORK INTELLIGENCE CENTER](#)
[REMIND ME LATER](#)

 SMTP port 25 disallowed in this project

VPC networks

Filter Enter property name or value

Name ↑	Subnets	MTU	Mode	Internal IP ranges	Gateways	Firewall rules	Global dynamic routing
default	36	1460	Auto			7	Off
networking101	5	1460	Custom			0	Off

cloud-CS-530-karinje-vkarinje
Search for resources, docs, products, and more (/)
Search

VPC network details
EDIT
DELETE VPC NETWORK

Applying DNS server policies to the network requires DNS API. This is a one-time enablement per project and may take a few minutes to complete.

[ENABLE API](#)






None

Maximum transmission unit
1460

[SUBNETS](#)
[STATIC INTERNAL IP ADDRESSES](#)
[FIREWALLS](#)
[ROUTES](#)
[VPC NETWORK PEERING](#)
[PRIVATE SERVICE CONNECTION](#)

[ADD SUBNET](#)
[FLOW LOGS](#)

Filter Enter property name or value

<input type="checkbox"/> Name ↑	Region	Stack Type	Internal IP ranges	External IP ranges	Secondary IPv4 ranges	Gateway	Private Google Access	Flow logs
<input type="checkbox"/> asia-east1	asia-east1	IPv4	10.40.0.0/16	None	None	10.40.0.1	Off	
<input type="checkbox"/> europe-west1	europe-west1	IPv4	10.30.0.0/16	None	None	10.30.0.1	Off	
<input type="checkbox"/> us-east5	us-east5	IPv4	10.20.0.0/16	None	None	10.20.0.1	Off	
<input type="checkbox"/> us-west1	us-west1	IPv4	10.10.0.0/16	None	None	10.10.0.1	Off	
<input type="checkbox"/> us-west2	us-west1	IPv4	10.11.0.0/16	None	None	10.11.0.1	Off	

Reserved proxy-only subnets for load balancing

<input type="checkbox"/> Name	Region	IP address ranges	Gateway	Role	Purpose
No rows to display					

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

VPC networks

CREATE VPC NETWORK

REFRESH

NETWORKS IN CURRENT PROJECT

SUBNETS IN CURRENT PROJECT

default	europa-west8	default	10.198.0.0/20	None	None	10.198.0.1	Off
default	europa-west9	default	10.200.0.0/20	None	None	10.200.0.1	Off
default	me-west1	default	10.208.0.0/20	None	None	10.208.0.1	Off
default	northamerica-northeast1	default	10.162.0.0/20	None	None	10.162.0.1	Off
default	northamerica-northeast2	default	10.188.0.0/20	None	None	10.188.0.1	Off
default	southamerica-east1	default	10.158.0.0/20	None	None	10.158.0.1	Off
default	southamerica-west1	default	10.194.0.0/20	None	None	10.194.0.1	Off
default	us-central1	default	10.128.0.0/20	None	None	10.128.0.1	Off
default	us-east1	default	10.142.0.0/20	None	None	10.142.0.1	Off
default	us-east4	default	10.150.0.0/20	None	None	10.150.0.1	Off
default	us-east5	default	10.202.0.0/20	None	None	10.202.0.1	Off
default	us-east7	default	10.196.0.0/20	None	None	10.196.0.1	Off
default	us-south1	default	10.206.0.0/20	None	None	10.206.0.1	Off
default	us-west1	default	10.138.0.0/20	None	None	10.138.0.1	Off
default	us-west2	default	10.168.0.0/20	None	None	10.168.0.1	Off
default	us-west3	default	10.180.0.0/20	None	None	10.180.0.1	Off
default	us-west4	default	10.182.0.0/20	None	None	10.182.0.1	Off
asia-east1	asia-east1	networking101	10.40.0.0/16	None	None	10.40.0.1	Off
europa-west1	europa-west1	networking101	10.30.0.0/16	None	None	10.30.0.1	Off
us-east5	us-east5	networking101	10.20.0.0/16	None	None	10.20.0.1	Off
us-west-s1	us-west1	networking101	10.10.0.0/16	None	None	10.10.0.1	Off
us-west-s2	us-west1	networking101	10.11.0.0/16	None	None	10.11.0.1	Off

- Visit the web console for Compute Engine and show all VMs that have been created, their internal IP addresses and the subnetworks they have been instantiated on. Validate that it has created the infrastructure shown in the initial figure.

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

Search

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

START / RESUME

STOP

SUSPEND

RESET

DELETE

CREATE SCHEDULE

INSTANCES

INSTANCE SCHEDULES

Get monitoring and logging insights for your VMs by installing Ops Agent. [Learn more](#)

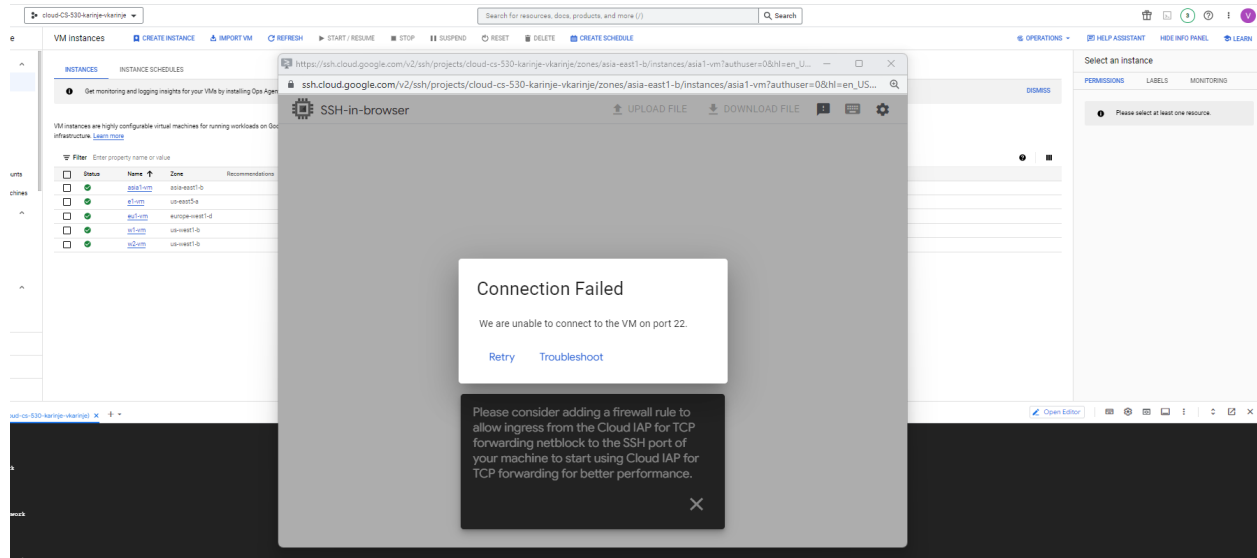
VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	✓	asia1-vm	asia-east1-b			10.40.0.2 (nic0)	35.234.21.185 (nic0)	SSH ▾ ⋮
<input type="checkbox"/>	✓	e1-vm	us-east5-a			10.20.0.2 (nic0)	34.162.164.10 (nic0)	SSH ▾ ⋮
<input type="checkbox"/>	✓	eu1-vm	europa-west1-d			10.30.0.2 (nic0)	35.205.123.153 (nic0)	SSH ▾ ⋮
<input type="checkbox"/>	✓	w1-vm	us-west1-b			10.10.0.2 (nic0)	35.230.22.133 (nic0)	SSH ▾ ⋮
<input type="checkbox"/>	✓	w2-vm	us-west1-b			10.11.0.100 (nic0)	34.168.122.245 (nic0)	SSH ▾ ⋮

- Click on the `ssh` button for one of the VMs and attempt to connect. Did it succeed?

No. It did not succeed.



Firewall deployment specification

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

View Go Run Terminal Help

model_datastore.py main.js firebase-config.json firebase-config.js index.js networking-lab.yaml index.html

networking101 > networking-lab.yaml > resources > ...

```

1  # Copyright 2016 Google Inc. All rights reserved.
2  #
3  # Licensed under the Apache License, Version 2.0 (the "License");
4  # you may not use this file except in compliance with the License.
5  # You may obtain a copy of the License at
6  #
7  # http://www.apache.org/licenses/LICENSE-2.0
8  #
9  # Unless required by applicable law or agreed to in writing, software
10 # distributed under the License is distributed on an "AS IS" BASIS,
11 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
12 # See the license for the specific language governing permissions and
13 # limitations under the License.
14
15 imports:
16 - path: vn-template.jinja
17 - path: network-template.jinja
18 - path: subnet-template.jinja
19 - path: compute-engine-template.jinja
20 - path: firewall-template.jinja
21
22
23 resources:
24 - name: compute-engine-setup
25   type: compute-engine-template.jinja
26 - name: networking-firewall
27   type: firewall-template.jinja
28   properties:
29     network: networking101
30

```

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

View Go Run Terminal Help

model_datastore.py main.js firebase-config.json firebase-config.js index.js networking-lab.yaml firewall-template.jinja (deleted) firewall-template.jinja x index.html

networking101 > firewall-template.jinja

```

1 resources:
2 - name: {{ env["name"] }}-allow-internal
3   type: compute.v1.firewall
4   properties:
5     network: $(ref.{{ properties["network"] }}.selfLink)
6     sourceRanges: ["10.0.0.0/8"]
7     allowed:
8       - IPProtocol: TCP
9         ports: ["0-65535"]
10      - IPProtocol: UDP
11        ports: ["0-65535"]
12      - IPProtocol: ICMP
13 - name: {{ env["name"] }}-allow-ssh
14   type: compute.v1.firewall
15   properties:
16     network: $(ref.{{ properties["network"] }}.selfLink)
17     sourceRanges: ["0.0.0.0/0"]
18     allowed:
19       - IPProtocol: TCP
20         ports: ["22"]
21 - name: {{ env["name"] }}-allow-icmp
22   type: compute.v1.firewall
23   properties:
24     network: $(ref.{{ properties["network"] }}.selfLink)
25     sourceRanges: ["0.0.0.0/0"]
26     allowed:
27       - IPProtocol: ICMP

```

Update deployment

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud deployment-manager deployments update networking101 --config networking-lab.yaml
The fingerprint of the deployment is b'X0y63weCWsWpYST0bc-pgQ='
Waiting for update [operation-1669977622837-Seed5f7969151-515759bb-61ee2dc9]...done.
Update operation operation-1669977622837-Seed5f7969151-515759bb-61ee2dc9 completed successfully.
NAME: asia-east1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: asial-um
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: e1-um
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: eul-um
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: europe-west1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-icmp
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-internal
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-ssh
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking101
TYPE: compute.v1.network
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-east5
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s2
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

```


CLOUD SHELL
Terminal (cloud-cs-530-karinje-vkarinje) X + ▾

```

TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: e1-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: eul-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: europe-west1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-icmp
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-internal
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking-firewall-allow-ssh
TYPE: compute.v1.firewall
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: networking101
TYPE: compute.v1.network
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-east5
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s1
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: us-west-s2
TYPE: compute.v1.subnetwork
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: w1-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

NAME: w2-vm
TYPE: compute.v1.instance
STATE: COMPLETED
ERRORS: []
INTENT:

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |

```


- Take a screenshot that indicates the new rules have been deployed

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

VPC networks [CREATE VPC NETWORK](#) [REFRESH](#)

NETWORKS IN CURRENT PROJECT SUBNETS IN CURRENT PROJECT



Get real-time analytics with Network Intelligence Center

Use Network Intelligence Center for comprehensive monitoring and troubleshooting. [Learn more](#)

- ✓ Visualize your network resources
- ✓ Diagnose and prevent connectivity issues
- ✓ View packet loss and latency metrics
- ✓ Keep your firewall rules strict and efficient

[GO TO NETWORK INTELLIGENCE CENTER](#) [REMIND ME LATER](#)

SMTP port 25 disallowed in this project

VPC networks

Filter Enter property name or value

Name	Subnets	MTU	Mode	Internal IP ranges	Gateways	Firewall rules	Global dynamic routing
default	36	1460	Auto			7	Off
networking101	5	1460	Custom			3	Off

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

Firewall [CREATE FIREWALL POLICY](#) [CREATE FIREWALL RULE](#)

to view the firewall policies inherited by this project.

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 in the [App Engine Firewall rules section](#).

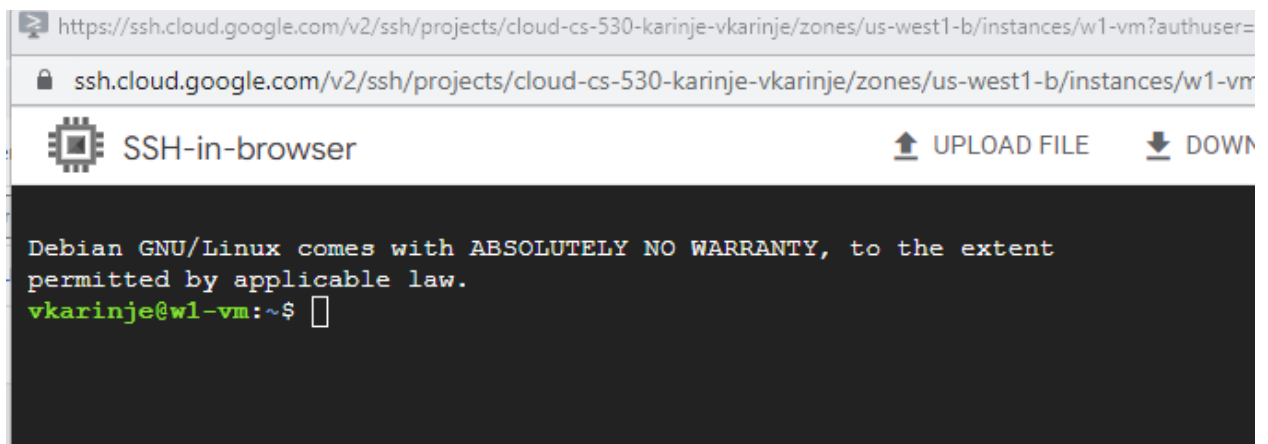
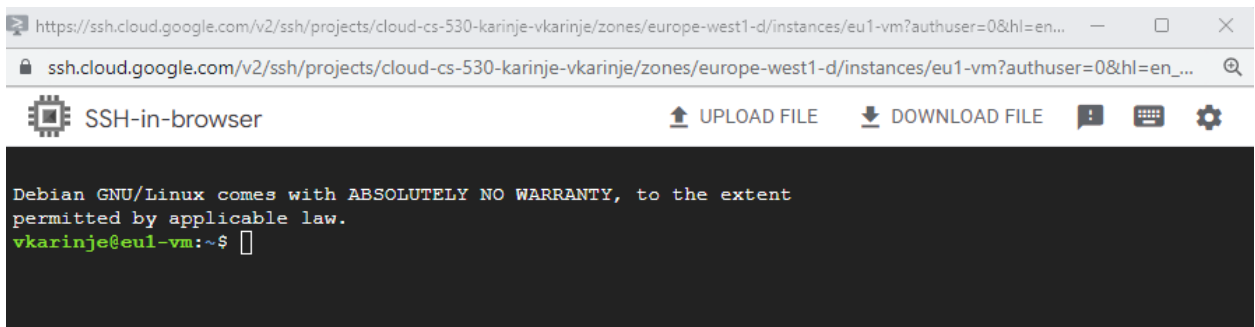
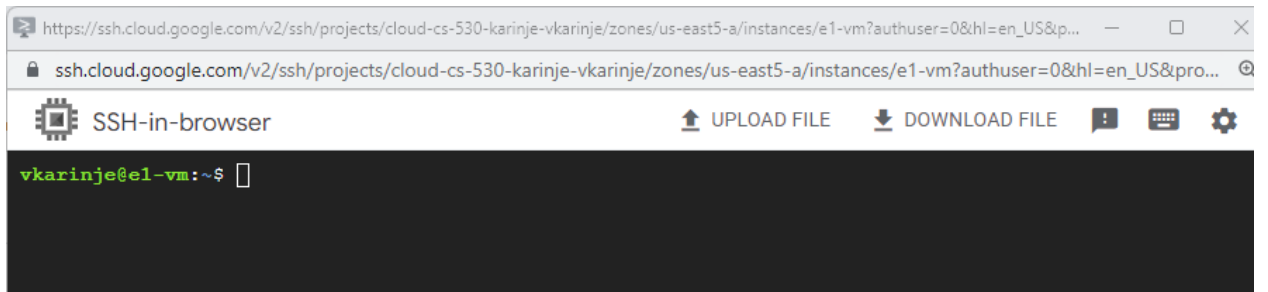
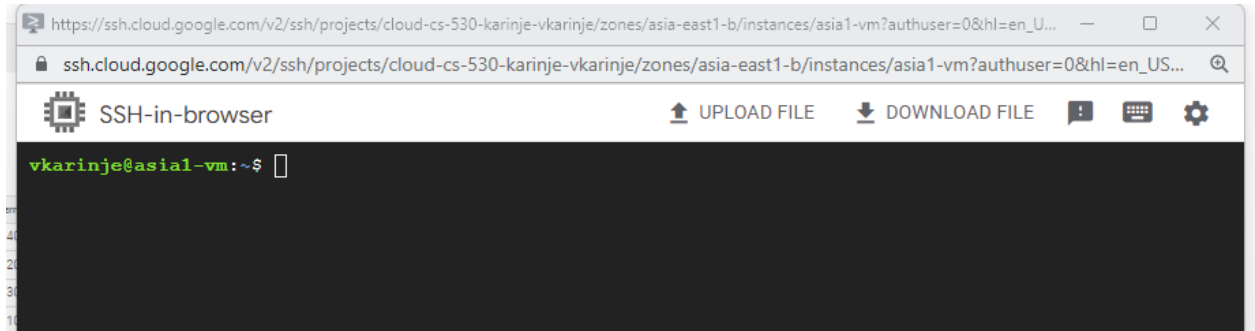
SMTP port 25 disallowed in this project

[REFRESH](#) [CONFIGURE LOGS](#) [DELETE](#)

Select at least one rule

Filter Enter property name or value

Name	Type	Targets	Filters	Protocols / ports	Action	Priority	Network	Logs	Hit count	Last hit	Insights
<input type="checkbox"/> default-allow-http	Ingress	http-server	IP ranges: 0.0.0.0/0	tcp:80	Allow	1000	default	Off	--	--	
<input type="checkbox"/> default-allow-https	Ingress	https-server	IP ranges: 0.0.0.0/0	tcp:443	Allow	1000	default	Off	--	--	
<input type="checkbox"/> top-allow-5000	Ingress	http-5000	IP ranges: 0.0.0.0/0	tcp:5000	Allow	1000	default	Off	--	--	
<input type="checkbox"/> default-allow-icmp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	icmp	Allow	65534	default	Off	--	--	
<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	Off	--	--	
<input type="checkbox"/> default-allow-rdp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:3389	Allow	65534	default	Off	--	--	
<input type="checkbox"/> default-allow-ssh	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:22	Allow	65534	default	Off	--	--	
<input type="checkbox"/> networking-firewall-allow-icmp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	icmp	Allow	1000	networking101	Off	--	--	
<input type="checkbox"/> networking-firewall-allow-internal	Ingress	Apply to all	IP ranges: 10.0.0.0/8	tcp:0-65535 udp:0-65535 icmp	Allow	1000	networking101	Off	--	--	
<input type="checkbox"/> networking-firewall-allow-ssh	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:22	Allow	1000	networking101	Off	--	--	





Latency measurements

Location pair	Ideal latency	Measured latency
us-west1 us-east5	~45 ms	50
us-west1 europe-west1	~93 ms	135
us-west1 asia-east1	~114 ms	115
us-east5 europe-west1	~76 ms	97
us-east5 asia-east1	~141 ms	170
europe-west1 asia-east1	~110 ms	251

```

vkarinje@w1-vm:~$ ping -c 3 e1-vm
PING e1-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.20.0.2) 56(84) bytes of data.
64 bytes from e1-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.20.0.2): icmp_seq=1 ttl=64 time=51.2 ms
64 bytes from e1-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.20.0.2): icmp_seq=2 ttl=64 time=49.7 ms
64 bytes from e1-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.20.0.2): icmp_seq=3 ttl=64 time=49.7 ms

--- e1-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 49.655/50.161/51.170/0.713 ms
vkarinje@w1-vm:~$

```

ssh.cloud.google.com/v2/ssh/projects/cloud-cs-530-karinje-vkarinje/zones/us-west1-b/instances/w2-vm?authuser=0&hl=en_US&pr...



SSH-in-browser

UPLOAD FILE

DOWNLOAD FILE



```

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Dec 2 10:55:28 2022 from 172.253.194.160
vkarinje@w2-vm:~$ ping -c 3 eul-vm
PING eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2) 56(84) bytes of data.
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=1 ttl=64 time=136 ms
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=2 ttl=64 time=134 ms
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=3 ttl=64 time=134 ms

--- eul-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 134.139/134.719/135.742/0.725 ms
vkarinje@w2-vm:~$

```

```

vkarinje@w2-vm:~$ ping -c 3 asial-vm
PING asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2) 56(84) bytes of data.
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=1 ttl=64 time=118 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=2 ttl=64 time=114 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=3 ttl=64 time=114 ms

--- asial-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 113.836/115.095/117.611/1.800 ms
vkarinje@w2-vm:~$

```

```

vkarinje@e1-vm:~$ ping -c 3 eul-vm
PING eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2) 56(84) bytes of data.
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=1 ttl=64 time=98
.0 ms
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=2 ttl=64 time=96
.7 ms
64 bytes from eul-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.30.0.2): icmp_seq=3 ttl=64 time=96
.7 ms

--- eul-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 96.714/97.139/97.976/0.692 ms
vkarinje@e1-vm:~$

```

```

vkarinje@e1-vm:~$ ping -c 3 asial-vm
PING asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2) 56(84) bytes of data.
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=1 ttl=64 time=
171 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=2 ttl=64 time=
169 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=3 ttl=64 time=
169 ms

--- asial-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 4ms
rtt min/avg/max/mdev = 168.992/169.609/170.829/0.925 ms
vkarinje@e1-vm:~$

```

https://ssh.cloud.google.com/v2/ssh/projects/cloud-cs-530-karinje-vkarinje/zones/europe-west1-d/instances/eu1-vm?authuser=0&hl=en... — □ ×

ssh.cloud.google.com/v2/ssh/projects/cloud-cs-530-karinje-vkarinje/zones/europe-west1-d/instances/eu1-vm?authuser=0&hl=en... 🔍

SSH-in-browser 📁 UPLOAD FILE 📄 DOWNLOAD FILE 💬 ⌨ ⚙

```

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Dec  2 10:52:25 2022 from 173.194.169.157
vkarinje@eul-vm:~$ ping -c 3 asial-vm
PING asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2) 56(84) bytes of data.
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=1 ttl=64 time=
252 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=2 ttl=64 time=
250 ms
64 bytes from asial-vm.c.cloud-cs-530-karinje-vkarinje.internal (10.40.0.2): icmp_seq=3 ttl=64 time=
250 ms

--- asial-vm.c.cloud-cs-530-karinje-vkarinje.internal ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 5ms
rtt min/avg/max/mdev = 249.921/250.580/251.790/1.033 ms
vkarinje@eul-vm:~$

```

Firewall rule for HTTP

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute firewall-rules create networking-firewall-allow-http \
--allow tcp:80 --network networking101 --source-ranges 0.0.0.0/0 \
--target-tags http-server
Creating firewall...working..Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/firewalls/networking-firewall-allow-http].
Creating firewall...done.
NAME: networking-firewall-allow-http
NETWORK: networking101
DIRECTION: INGRESS
PRIORITY: 1000
ALLOW: tcp:80
DENY:
DISABLED: False
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

Instance templates

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-templates create "us-east5-template" \
--image-project debian-cloud \
--image debian-10-buster-v20221102 \
--machine-type e2-micro \
--subnet "us-east5" \
--metadata "startup-script-url=gs://cs430/networking101/website/startup.sh" \
--region "us-east5" \
--tags "http-server"
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/instanceTemplates/us-east5-template].
NAME: us-east5-template
MACHINE_TYPE: e2-micro
PREEMPTIBLE:
CREATION_TIMESTAMP: 2022-12-02T03:44:51.544-08:00
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-templates create "europe-west1-template" \
--image-project debian-cloud \
--image debian-10-buster-v20221102 \
--machine-type e2-micro \
--subnet "europe-west1" \
--metadata "startup-script-url=gs://cs430/networking101/website/startup.sh" \
--region "europe-west1" \
--tags "http-server"
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/instanceTemplates/europe-west1-template].
NAME: europe-west1-template
MACHINE_TYPE: e2-micro
PREEMPTIBLE:
CREATION_TIMESTAMP: 2022-12-02T03:47:14.533-08:00
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

Then, see that both templates have been created by listing them.

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-templates list
NAME: europe-west1-template
MACHINE_TYPE: e2-micro
PREEMPTIBLE:
CREATION_TIMESTAMP: 2022-12-02T03:47:14.533-08:00

NAME: us-east5-template
MACHINE_TYPE: e2-micro
PREEMPTIBLE:
CREATION_TIMESTAMP: 2022-12-02T03:44:51.544-08:00
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

They should also show up in the web console of Compute Engine under "Instance Templates".

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

Q Search

Instance templates

CREATE INSTANCE TEMPLATE

REFRESH

CREATE VM

CREATE INSTANCE GROUP

COPY

DELETE

Instance templates are saved VM configurations used to create identical VMs, either individually or as part of managed instance groups. [Learn more](#)

Filter

Filter instance templates

<input type="checkbox"/>	Name	Machine type	Image	Disk type	Placement policy	In use by	Creation time	Actions
<input type="checkbox"/>	europe-west1-template	e2-micro	debian-10-buster-v20221102	--	No policy		Dec 2, 2022, 9:47:14 AM UTC-08:00	<div></div>
<input type="checkbox"/>	us-east5-template	e2-micro	debian-10-buster-v20221102	--	No policy		Dec 2, 2022, 9:44:51 AM UTC-08:00	<div></div>

Health check

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute health-checks create http instance-health-check \
--check-interval=10s \
--port=80 \
--timeout=5s \
--unhealthy-threshold=3
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/healthChecks/instance-health-check].
NAME: instance-health-check
PROTOCOL: HTTP
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

Managed Instance Group (europe-west1-mig)

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed create europe-west1-mig \
--size 3 \
--region europe-west1 \
--template europe-west1-template
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/europe-west1/instanceGroupManagers/europe-west1-mig].
NAME: europe-west1-mig
LOCATION: europe-west1
SCOPE: region
BASE_INSTANCE_NAME: europe-west1-mig
SIZE: 0
TARGET_SIZE: 3
INSTANCE_TEMPLATE: europe-west1-template
AUTOSCALED: no
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed create europe-west1-mig \
--size 3 \
--region europe-west1 \
--template europe-west1-template
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/europe-west1/instanceGroupManagers/europe-west1-mig].
NAME: europe-west1-mig
LOCATION: europe-west1
SCOPE: region
BASE_INSTANCE_NAME: europe-west1-mig
SIZE: 0
TARGET_SIZE: 3
INSTANCE_TEMPLATE: europe-west1-template
AUTOSCALED: no
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed update europe-west1-mig \
--health-check instance-health-check \
--initial-delay 120 \
--region europe-west1
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/europe-west1/instanceGroupManagers/europe-west1-mig].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups set-named-ports europe-west1-mig \
--named-ports=http:80 --region europe-west1
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/europe-west1/instanceGroups/europe-west1-mig].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

Managed Instance Group (us-east5-mig)

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed create us-east5-mig \
--size 1 \
--region us-east5 \
--template us-east5-template
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroupManagers/us-east5-mig].
NAME: us-east5-mig
LOCATION: us-east5
SCOPE: region
BASE_INSTANCE_NAME: us-east5-mig
SIZE: 0
TARGET_SIZE: 1
INSTANCE_TEMPLATE: us-east5-template
AUTOSCALED: no
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed update us-east5-mig \
--health-check instance-health-check \
--initial-delay 120 \
--region us-east5
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroupManagers/us-east5-mig].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```



```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups managed set-autoscaling us-east5-mig \
--mode on \
--region us-east5 \
--min-num-replicas=1 --max-num-replicas=5 \
--cool-down-period=45 \
--scale-based-on-load-balancing \
--target-load-balancing-utilisation=0.8
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/autoscalers/us-east5-mig-r5j4].
---
autoscalingPolicy:
  coolDownPeriodSec: 45
  loadBalancingUtilisation:
    utilisationTarget: 0.8
  maxNumReplicas: 5
  minNumReplicas: 1
  mode: ON
creationTimestamp: '2022-12-02T03:58:15.629-08:00'
id: '6085718406745839288'
kind: compute#autoscaler
name: us-east5-mig-r5j4
region: https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5
selfLink: https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/autoscalers/us-east5-mig-r5j4
status: PENDING
target: https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroupManagers/us-east5-mig
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

target: https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroupManagers/us-east5-mig
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups set-named-ports us-east5-mig \
--named-ports=http:80 --region us-east5
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroups/us-east5-mig].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

Test groups

Ensure that the groups and their associated instances have been created properly via:

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute instance-groups list
NAME: europe-west1-mig
LOCATION: europe-west1
SCOPE: region
NETWORK: networking101
MANAGED: Yes
INSTANCES: 3

NAME: us-east5-mig
LOCATION: us-east5
SCOPE: region
NETWORK: networking101
MANAGED: Yes
INSTANCES: 1
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ ||

```

cloud-CS-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

VM instances [CREATE INSTANCE](#) [IMPORT VM](#) [REFRESH](#) [START / RESUME](#) [STOP](#) [SUSPEND](#) [RESET](#) [DELETE](#) [CREATE SCHEDULE](#)

Get monitoring and logging insights for your VMs by installing Ops Agent. [Learn more](#)

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
✓	asia1-vm	asia-east1-b			10.40.0.2 (nic0)	35.234.21.185 (nic0)	SSH
✓	e1-vm	us-east5-a			10.20.0.2 (nic0)	34.162.164.10 (nic0)	SSH
✓	eu1-vm	eu-west1-d			10.30.0.2 (nic0)	35.205.123.153 (nic0)	SSH
✓	europe-west1-mig-3v1g	eu-west1-b	europe-west1-mig		10.30.0.5 (nic0)	34.78.44.16 (nic0)	SSH
✓	europe-west1-mig-8vj8	eu-west1-c	europe-west1-mig		10.30.0.4 (nic0)	34.76.76.25 (nic0)	SSH
✓	europe-west1-mig-90m2	eu-west1-d	europe-west1-mig		10.30.0.3 (nic0)	34.77.212.76 (nic0)	SSH
✓	us-east5-mig-hm02	us-east5-c	us-east5-mig		10.20.0.3 (nic0)	34.162.147.240 (nic0)	SSH
✓	w1-vm	us-west1-b			10.10.0.2 (nic0)	35.230.22.133 (nic0)	SSH
✓	w2-vm	us-west1-b			10.11.0.100 (nic0)	34.168.122.245 (nic0)	SSH

VM instances – Compute Engine x 34.162.147.240 x

Untitled document - Google Doc x +

Not secure | 34.162.147.240

Intro to Web Devel... Careers CADENCE Viasat | Careers Log In to Canvas aws Issues · AkhilaChilu... Spring 2023 Softwa... How to Use Termin...

Networking 101 Lab

Client IP

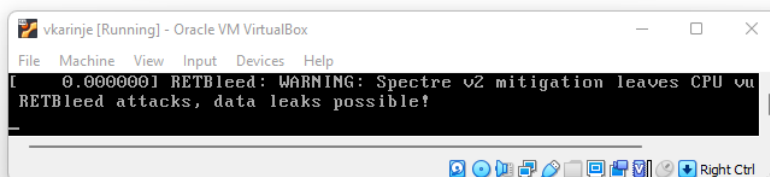
Your IP address : 73.11.13.21

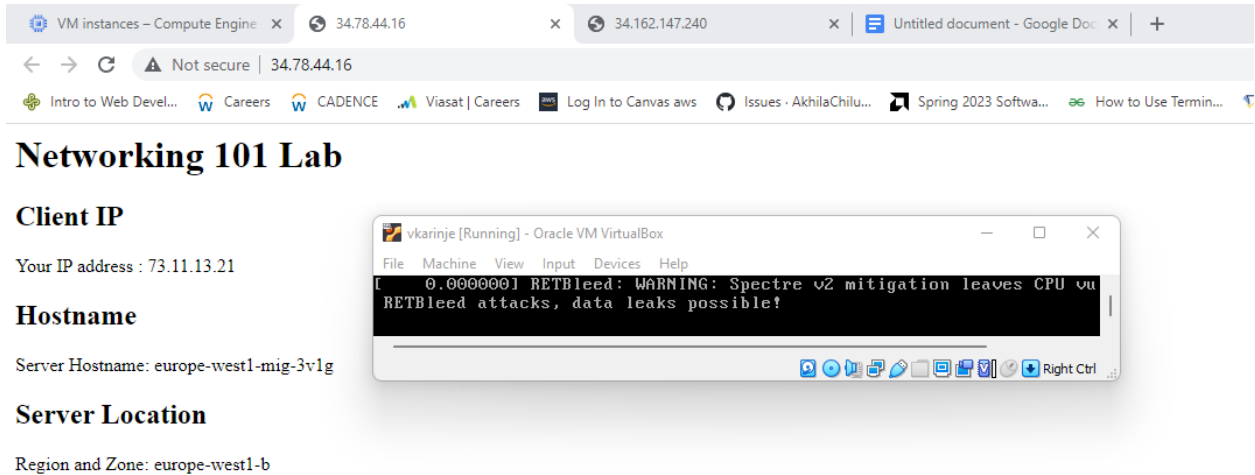
Hostname

Server Hostname: us-east5-mig-hm02

Server Location

Region and Zone: us-east5-c





VM instances – Compute Engine x 34.78.44.16 x 34.162.147.240 x | Untitled document - Google Doc x | +

← → ↻ Not secure | 34.78.44.16

Intro to Web Devel... Careers CADENCE Viasat | Careers Log In to Canvas aws Issues - AkhilaChilu... Spring 2023 Softwa... How to Use Termin...

Networking 101 Lab

Client IP

Your IP address : 73.11.13.21

Hostname

Server Hostname: europe-west1-mig-3v1g

Server Location

Region and Zone: europe-west1-b

vkarije [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

```
0.0000001 RETbleed: WARNING: Spectre v2 mitigation leaves CPU vul
RETbleed attacks, data leaks possible!
```

Right Ctrl

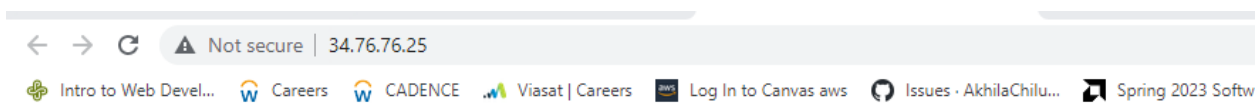
Answer the following questions for your lab notebook

- Are the instances in the same availability zone or in different ones?

The instances are in the different availability zones

- List all availability zones that your servers show up in for your lab notebook.

europe-west1-d, europe-west1-c, europe-west1-b, us-east5-c



Networking 101 Lab

Client IP

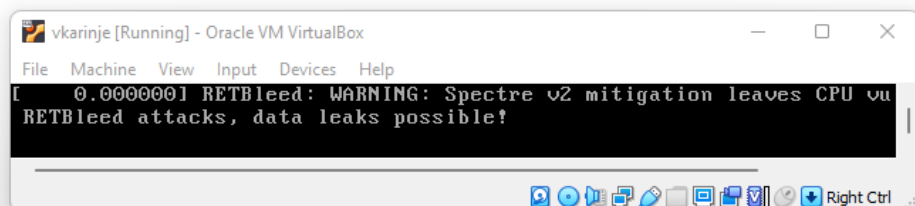
Your IP address : 73.11.13.21

Hostname

Server Hostname: europe-west1-mig-8xj8

Server Location

Region and Zone: europe-west1-c



Networking 101 Lab

Client IP

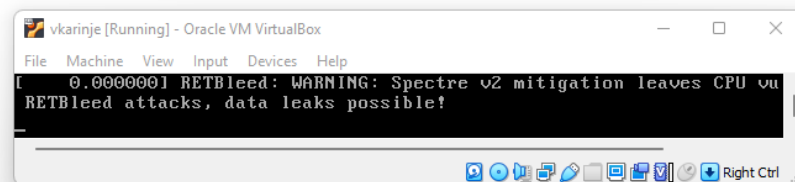
Your IP address : 73.11.13.21

Hostname

Server Hostname: europe-west1-mig-90m2

Server Location

Region and Zone: europe-west1-d



HTTP load balancer

```
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute backend-services create webserver-backend-migs \
--protocol=http --port-name=http --timeout=30s \
--health-checks=instance-health-check \
--global
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/backendServices/webserver-backend-migs].
NAME: webserver-backend-migs
BACKENDS:
PROTOCOL: HTTP
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |
```

```
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute backend-services add-backend webserver-backend-migs \
--instance-group=europe-west1-mig --instance-group-region=europe-west1 \
--balancing-mode=utilisation --max-utilisation=0.8 \
--global
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/backendServices/webserver-backend-migs].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |
```

```
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute backend-services add-backend webserver-backend-migs \
--instance-group=us-east5-mig --instance-group-region=us-east5 \
--balancing-mode=rate --max-rate-per-instance=50 \
--global
Updated [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/backendServices/webserver-backend-migs].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |
```

```
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute url-maps create webserver-frontend-lb \
--default-service webserver-backend-migs
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/urlMaps/webserver-frontend-lb].
NAME: webserver-frontend-lb
DEFAULT_SERVICE: backendServices/webserver-backend-migs
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |
```

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute target-http-proxies create webserver-proxy \
--url-map webserver-frontend-lb
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/targetHttpProxies/webserver-proxy].
NAME: webserver-proxy
URL_MAP: webserver-frontend-lb
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |

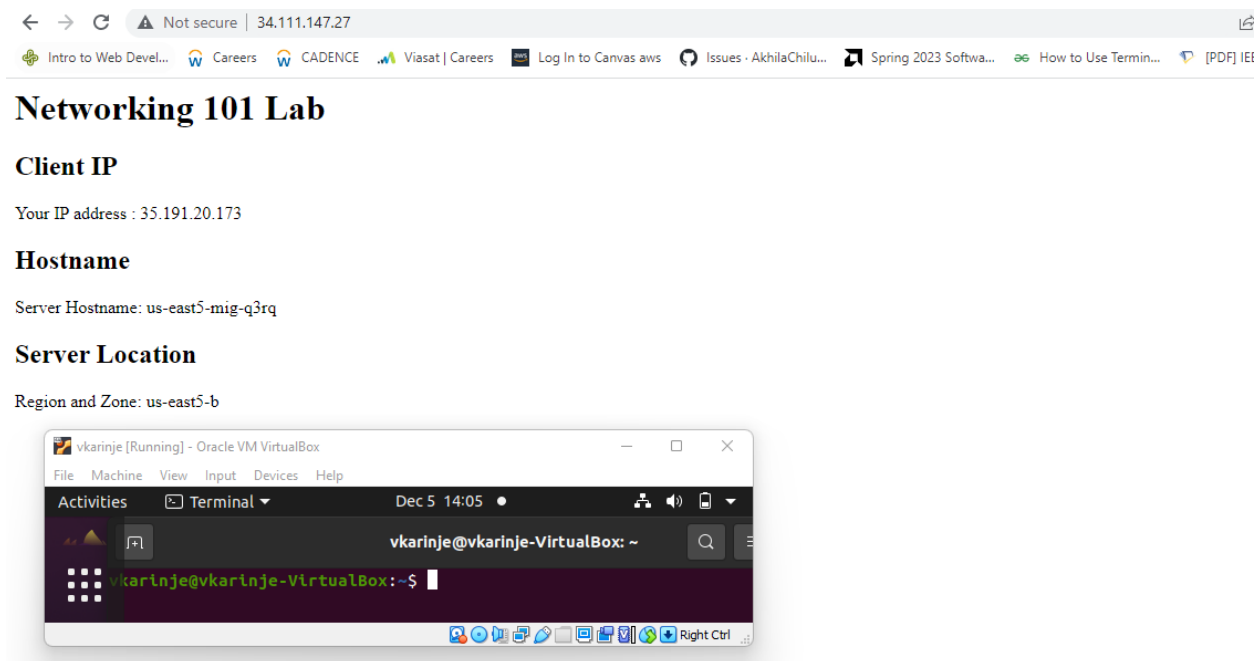
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute addresses create webserver-frontend-ip --ip-version=ipv4 --global
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/addresses/webserver-frontend-ip].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ gcloud compute forwarding-rules create webserver-frontend-fwrule \
--ip-protocol=tcp --ports=80 --address=webserver-frontend-ip \
--target-http-proxy webserver-proxy \
--global
Created [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/forwardingRules/webserver-frontend-fwrule].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje)$ |

```

Test load balancer


Show a screenshot of the page that is returned



- Which availability zone does the server handling your request reside in?

us-east5-b

Siege! (Part 1)


SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
!
☰
⚙️

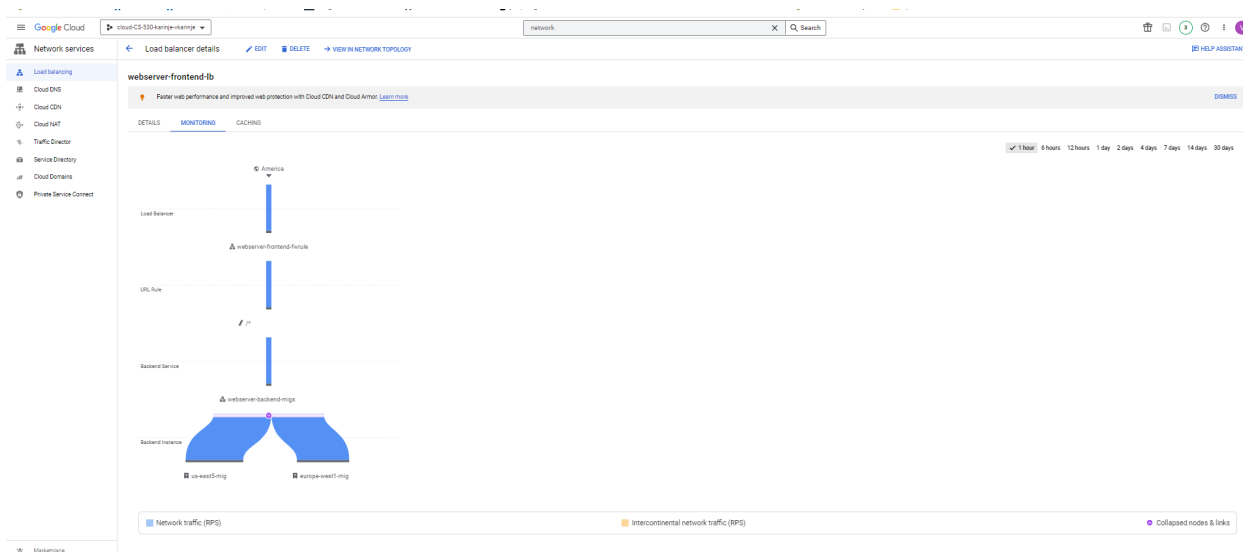
```

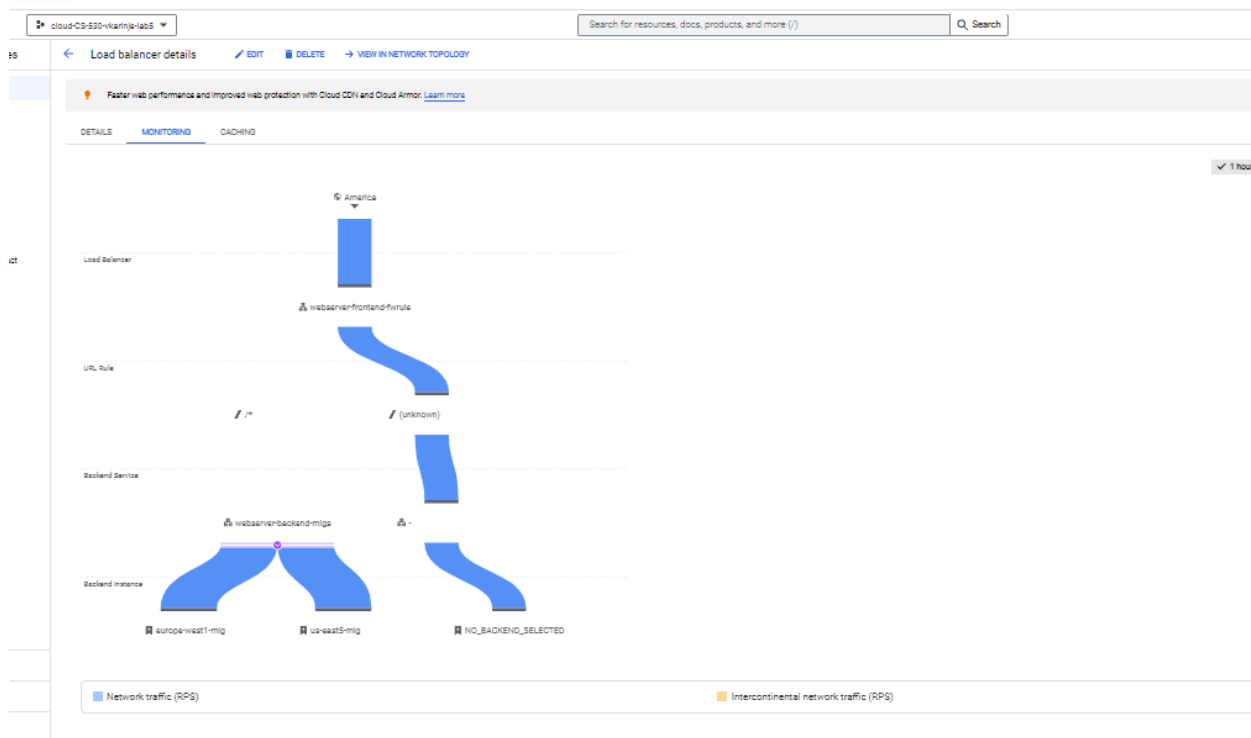
Linux wl-vm 4.19.0-22-cloud-amd64 #1 SMP Debian 4.19.260-1 (2022-09-29) x86_64

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.
Last login: Mon Dec  5 21:04:15 2022 from 35.235.241.65
vkarinje@wl-vm:~$ siege -c 200 http://34.111.147.27
** SIEGE 4.0.4
** Preparing 200 concurrent users for battle.
The server is now under siege...
  
```

- Take a screenshot of the initial traffic distribution







- Take a screenshot of the UI as additional instances are brought up and show that the traffic distribution shifts

cloud-CS-530-vkarinje-lab5

Search for resources, docs, products, and more (/)

VM instances

INSTANCES INSTANCE SCHEDULES

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
✓	asia1-vm	asia-east1-b			10.40.0.2 (nic0)	35.221.197.181 (nic0)	SSH ▾ ⋮
✓	e1-vm	us-east5-a			10.20.0.2 (nic0)	34.162.247.230 (nic0)	SSH ▾ ⋮
✓	eu1-vm	eu-west1-d			10.30.0.2 (nic0)	34.76.122.239 (nic0)	SSH ▾ ⋮
✓	europa-west1-mig-4q7g	europa-west1-d	europa-west1-mig		10.30.0.3 (nic0)	34.79.241.196 (nic0)	SSH ▾ ⋮
✓	europa-west1-mig-p8rq	europa-west1-b	europa-west1-mig		10.30.0.5 (nic0)	34.78.239.193 (nic0)	SSH ▾ ⋮
✓	europa-west1-mig-z810	europa-west1-c	europa-west1-mig		10.30.0.4 (nic0)	34.79.134.79 (nic0)	SSH ▾ ⋮
✓	us-east5-mig-54v6	us-east5-a	us-east5-mig		10.20.0.9 (nic0)	34.162.80.252 (nic0)	SSH ▾ ⋮
✓	us-east5-mig-jocs	us-east5-a	us-east5-mig		10.20.0.11 (nic0)	34.162.243.194 (nic0)	SSH ▾ ⋮
✓	us-east5-mig-q3rq	us-east5-b	us-east5-mig		10.20.0.6 (nic0)	34.162.79.198 (nic0)	SSH ▾ ⋮
✓	us-east5-mig-z55z	us-east5-b	us-east5-mig		10.20.0.10 (nic0)	34.162.88.180 (nic0)	SSH ▾ ⋮
✓	us-east5-mig-z56k	us-east5-c	us-east5-mig		10.20.0.8 (nic0)	34.162.81.188 (nic0)	SSH ▾ ⋮
✓	w1-vm	us-west1-b			10.10.0.2 (nic0)	34.83.134.225 (nic0)	SSH ▾ ⋮
✓	w2-vm	us-west1-b			10.11.0.100 (nic0)	34.168.118.166 (nic0)	SSH ▾ ⋮

console.cloud.google.com/net-services/loadbalancing/details/http/webserver-frontent-lb?project=cloud-cs-530-vkarinje-lab5

Load balancer details EDIT DELETE VIEW IN NETWORK TOPOLOGY

webserver-frontent-lb

Faster web performance and improved web protection with Cloud CDN and Cloud Armor. [Learn more](#)

DETAILS MONITORING CACHING

Frontend

Protocol	IP:Port	Certificate	SSL Policy	Network Tier
HTTP	34.111.147.27:80	-	-	Premium

Host and path rules

Hosts	Paths	Backend
All unmatched (default)	All unmatched (default)	webserver-backend-migs

Backend

Backend services

1. webserver-backend-migs

Endpoint protocol	Named port	Timeout	Health check	Cloud CDN	Logging
HTTP	http	30 seconds	instance-health-check	Disabled	Disabled

ADVANCED CONFIGURATIONS

Name	Type	Scope	Healthy	Autoscaling	Balancing mode	Selected ports	Capacity
europa-west1-mig	Instance group	europa-west1	3 of 3	No configuration	Max backend utilization: 80%	80	100%
us-east5-mig	Instance group	us-east5	5 of 5	On: Target LB capacity fraction 80%	Max RPS: 50 (per instance)	80	100%

cloud-cs-530-vkarinje-lab5 Search for resources, docs, products, and more (/) Search

Load balancer details EDIT DELETE VIEW IN NETWORK TOPOLOGY

webserver-frontend-lb

Faster web performance and improved web protection with Cloud CDN and Cloud Armor. [Learn more](#)

DETAILS MONITORING CACHING

Frontend

Protocol	IP:Port	Certificate	SSL Policy	Network Tier
HTTP	34.111.147.27:80	-	-	Premium

Host and path rules

Hosts	Paths	Backend
All unmatched (default)	All unmatched (default)	webserver-backend-migs

Backend

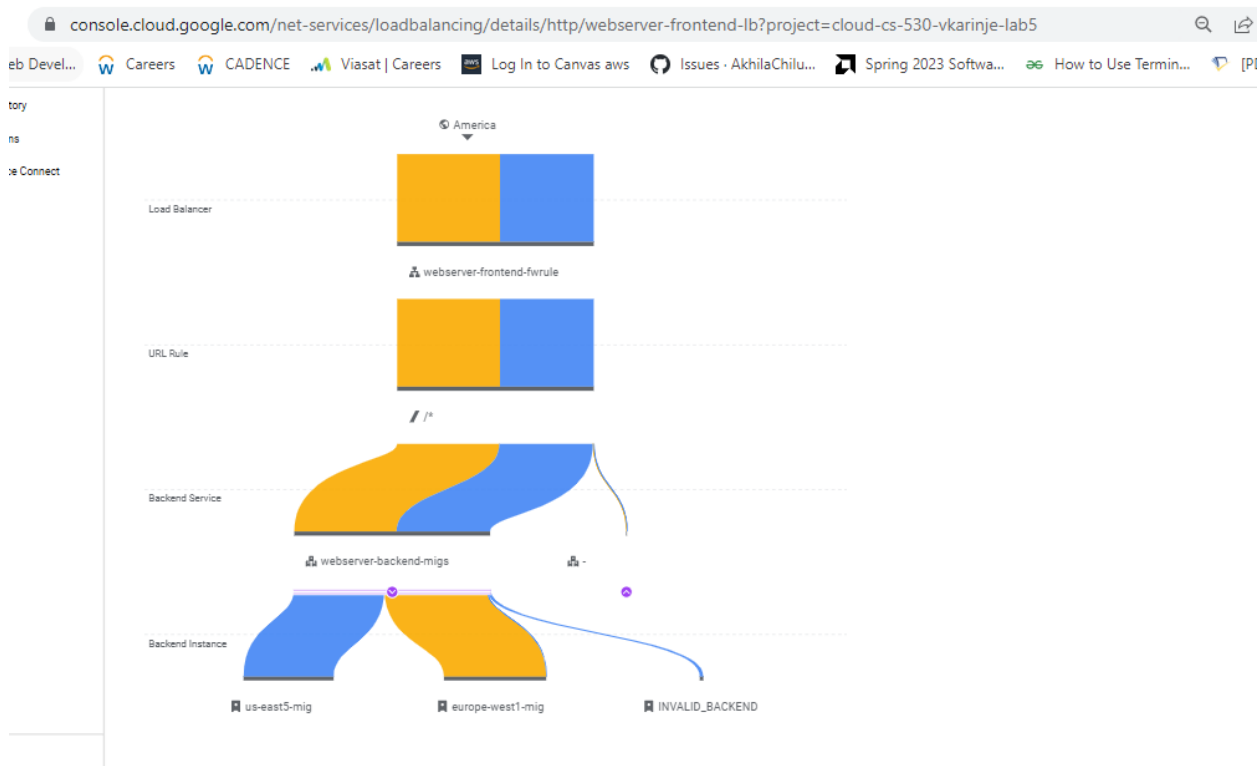
Backend services

1. webserver-backend-migs

Endpoint protocol	Named port	Timeout	Health check	Cloud CDN	Logging
HTTP	http	30 seconds	instance-health-check	Disabled	Disabled

ADVANCED CONFIGURATIONS

Name	Type	Scope	Healthy	Autoscaling	Balancing mode	Selected ports	Capacity
europe-west1-mig	Instance group	europe-west1	1 of 1	No configuration	Max backend utilization: 80%	80	100%
us-east5-mig	Instance group	us-east5	5 of 5	On: Target LB capacity fraction 80%	Max RPS: 50 (per instance)	80	100%



cloud-CS-530-vkarinje-lab5
Search for resources, docs, products, and more (/)

es
Load balancer details
EDIT
DELETE
VIEW IN NETWORK TOPOLOGY

webserver-frontend-lb
Faster web performance and improved web protection with Cloud CDN and Cloud Armor. [Learn more](#)

DETAILS
MONITORING
CACHING

Frontend

Protocol	IP-Port	Certificate	SSL Policy	Network Tier
HTTP	34.111.147.27:80	-	-	Premium

Host and path rules

Hosts	Paths	Backend
All unmatched (default)	All unmatched (default)	webserver-backend-migs

Backend
Backend services
1. webserver-backend-migs

Endpoint protocol	Named port	Timeout	Health check	Cloud CDN	Logging
HTTP	http	30 seconds	Instance health check	Disabled	Disabled

ADVANCED CONFIGURATIONS

Name	Type	Scope	Healthy	Autoscaling	Balancing mode	Selected ports	Capacity
europe-west1-mig	Instance group	europe-west1	0 of 1	No configuration	Max backend utilization: 80%	80	100%
us-east5-mig	Instance group	us-east5	3 of 5	On Target LB capacity fraction 80%	Max RPS: 50 (per instance)	80	100%





Siege! (Part 2)

```

https://ssh.cloud.google.com/v2/ssh/projects/cloud-cs-530-vkarinje-lab5/zones/europe-west1-d/instances/eu1-vm?authuser=0&hl=en_U...
ssh.cloud.google.com/v2/ssh/projects/cloud-cs-530-vkarinje-lab5/zones/europe-west1-d/instances/eu1-vm?authuser=0&hl=en_US...
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
Linux eu1-vm 4.19.0-22-cloud-amd64 #1 SMP Debian 4.19.260-1 (2022-09-29) 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.
vkarinje@eu1-vm:~$ siege -c 100 http://34.111.147.27
New configuration template added to /home/vkarinje/.siege
Run siege -C to view the current settings in that file
** SIEGE 4.0.4
** Preparing 100 concurrent users for battle.
The server is now under siege...

```

- Show a screenshot of the final traffic distribution.



Clean-up

```

vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute instance-groups managed delete us-east5-mig --region us-east5
The following region instance group managers will be deleted:
- [us-east5-mig] in [us-east5]

Do you want to continue (Y/n)? Y

Deleting autoscaler...working...Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/autoscalers/us-east5-mig-z5j4].
Deleting autoscaler...done.
Deleting Managed Instance Group...working...Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/us-east5/instanceGroupManagers/us-east5-mig].
Deleting Managed Instance Group...done.
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute instance-groups managed delete europe-west1-mig --region europe-west1
The following region instance group managers will be deleted:
- [europe-west1-mig] in [europe-west1]

Do you want to continue (Y/n)? Y

Deleting Managed Instance Group...working...Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/regions/europe-west1/instanceGroupManagers/europe-west1-mig].
Deleting Managed Instance Group...done.
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute health-checks delete instance-health-check
The following health checks will be deleted:
- [instance-health-check]

Do you want to continue (Y/n)? Y

Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/healthChecks/instance-health-check].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute instance-templates delete us-east5-template
The following instance templates will be deleted:
- [us-east5-template]

Do you want to continue (Y/n)? Y

Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/instanceTemplates/us-east5-template].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute instance-templates delete europe-west1-template
The following instance templates will be deleted:
- [europe-west1-template]

Do you want to continue (Y/n)? Y

Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/instanceTemplates/europe-west1-template].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud compute firewall-rules delete networking-firewall-allow-http
The following firewalls will be deleted:
- [networking-firewall-allow-http]

Do you want to continue (Y/n)? Y

Deleted [https://www.googleapis.com/compute/v1/projects/cloud-cs-530-karinje-vkarinje/global/firewalls/networking-firewall-allow-http].
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ gcloud deployment-manager deployments delete networking101
The following deployments will be deleted:
- networking101

Do you want to continue (y/N)? y

Waiting for delete [operation-1669987422494-Seed82fb17449-c21e5d0e-8a74fec9]...done.
Delete operation operation-1669987422494-Seed82fb17449-c21e5d0e-8a74fec9 completed successfully.
vkarinje@cloudshell:~/networking101 (cloud-cs-530-karinje-vkarinje) $ |

```

Google Cloud

cloud-cs-530-karinje-vkarinje

Search for resources, docs, products, and more (/)

Search

Compute Engine

Virtual machines

VM instances

Instance templates

Sole-tenant nodes

Machine images

TPUs

Committed use discounts

Migrate to Virtual Machines

Storage

Disks

Snapshots

Images

Instance groups

Instance groups

Health checks

VM Manager

OS patch management

OS configuration manage...

Bare Metal Solution

Servers

Networks

Volumes

NFS Shares

Settings

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

START / RESUME

STOP

SUSPEND

RESET

DELETE

CREATE SCHEDULE

INSTANCES

INSTANCE SCHEDULES

Get monitoring and logging insights for your VMs by installing Ops Agent [Learn more](#)

Filter: Enter property name or value

Status

Name

Zone

Recommendations

In use by

Internal IP

External IP

Connect

VM Instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or large instances running Debian, Windows, or other standard images. Create your first VM instance. Import it using a migration service, or try the quickstart to build a sample app.

CREATE INSTANCE

TAKE THE QUICKSTART

