

CS356-Lab01:3-Branden-Codd-940428984

Wordpress VM:

The screenshot shows the Google Cloud Platform console for the project 'cs356-w21-Branden-Codd'. The 'Compute Engine' section is active, displaying a list of VM instances. The instances are:

| Name | Zone | Recommendation | In use by | Internal IP | External IP | Connect |
|----------------|------------|----------------|-----------|------------------|---------------|---------|
| instance-1 | us-west1-b | | | 10.138.0.2 (HCO) | 35.230.107.79 | SSH |
| wordpress-1-vm | us-west1-b | | | 10.138.0.3 (HCO) | 35.247.90.191 | SSH |
| wordpress-2-vm | us-west1-b | | | 10.138.0.4 (HCO) | 35.230.8.138 | SSH |
| wordpress-3-vm | us-west1-b | | | 10.138.0.5 (HCO) | 35.187.80.216 | SSH |

Below the table, there are 'Related Actions' such as 'View Billing Report', 'Monitor VMs', 'Explore VM Logs', 'Setup Firewall Rules', and 'Patch Management'.

Nmap scan:

```
codd@instance-1:~$ nmap 10.138.03/24

Starting Nmap 7.60 ( https://nmap.org ) at 2021-01-13 02:35 UTC
Nmap scan report for instance-1.c.cs356-w21-branden-codd.internal (10.138.0.2)
Host is up (0.00018s latency).
Not shown: 999 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh

Nmap scan report for 10.138.03 (10.138.0.3)
Host is up (0.00040s latency).
rDNS record for 10.138.0.3: wordpress-1-vm.c.cs356-w21-branden-codd.internal
Not shown: 998 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http

Nmap scan report for wordpress-2-vm.c.cs356-w21-branden-codd.internal (10.138.0.4)
Host is up (0.00038s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http

Nmap scan report for wordpress-3-vm.c.cs356-w21-branden-codd.internal (10.138.0.5)
Host is up (0.00022s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http

Nmap done: 256 IP addresses (4 hosts up) scanned in 3.03 seconds
codd@instance-1:~$
```

```

codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks list
NAME      SUBNET_MODE  BGP_ROUTING_MODE  IPV4_RANGE  GATEWAY_IPV4
default   AUTO         REGIONAL
codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks subnets list

NAME      REGION      NETWORK_RANGE
default   us-central1  default 10.128.0.0/20
default   europe-west1  default 10.132.0.0/20
default   us-west1     default 10.138.0.0/20
default   asia-east1   default 10.140.0.0/20
default   us-east1     default 10.142.0.0/20
default   asia-northeast1  default 10.146.0.0/20
default   asia-southeast1  default 10.148.0.0/20
default   us-east4     default 10.150.0.0/20
default   australia-southeast1  default 10.152.0.0/20
default   europe-west2  default 10.154.0.0/20
default   europe-west3  default 10.156.0.0/20
default   southamerica-east1  default 10.158.0.0/20
default   asia-south1   default 10.160.0.0/20
default   northamerica-northeast1  default 10.162.0.0/20
default   europe-west4  default 10.164.0.0/20
default   europe-north1  default 10.166.0.0/20
default   us-west2     default 10.168.0.0/20
default   asia-east2   default 10.170.0.0/20
default   europe-west6  default 10.172.0.0/20
default   asia-northeast2  default 10.174.0.0/20
default   asia-northeast3  default 10.178.0.0/20
default   us-west3     default 10.180.0.0/20
default   us-west4     default 10.182.0.0/20
default   asia-southeast2  default 10.184.0.0/20
codd@cloudshell:~ (cs356-w21-branden-codd)$
codd@cloudshell:~ (cs356-w21-branden-codd)$

```

- How many subnetworks are created initially on the default network? How many regions does this correspond to? (Use a pipe to pass output to grep in order to return specific lines of output and then another to pass output to wc to count them: `| grep default | wc -l`)
 - There are 24 initially created, and 24 regions they correspond to.
- Given the CIDR prefix associated with each subnetwork, how many hosts does each subnetwork support?
 - Given each CIDR prefix of /20, each subnetwork supports 4096 hosts

```

codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute instances create instance-1 --zone us-west1-a
Created [https://www.googleapis.com/compute/v1/projects/cs356-w21-branden-codd/zones/us-west1-a/instances/instance-1].
NAME      ZONE      MACHINE_TYPE  PREEMPTIBLE  INTERNAL_IP  EXTERNAL_IP  STATUS
instance-1  us-west1-a  n1-standard-1  false        10.138.0.8    35.227.162.96  RUNNING

```

```

codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute instances create instance-2 --zone us-central1-a
Created [https://www.googleapis.com/compute/v1/projects/cs356-w21-branden-codd/zones/us-central1-a/instances/instance-2].
NAME      ZONE      MACHINE_TYPE  PREEMPTIBLE  INTERNAL_IP  EXTERNAL_IP  STATUS
instance-2  us-central1-a  n1-standard-1  false        10.128.0.2    35.202.144.235  RUNNING
codd@cloudshell:~ (cs356-w21-branden-codd)$

```

- Which CIDR subnetworks are these instances brought up in? Do they correspond to the appropriate region based on the prior commands?
 - Instance-1 is brought up on 10.138.0.0

- Instance-2 is brought up on 10.128.0.0
- These do match to the appropriate regions on the default networks subnet list.

Instance-1 ping to internal IP of instance-2:

The screenshot shows the Google Cloud Platform console for VM instances. In the 'VM instances' table, two instances are listed:

| Name | Zone | Recommendation | In use by | Internal IP | External IP | Network | Connect |
|------------|---------------|----------------|-----------|------------------|----------------|---------|---------|
| Instance-1 | us-west1-a | | | 10.128.0.8 (nxd) | 35.227.162.96 | default | SSH |
| Instance-2 | us-central1-a | | | 10.128.0.2 (nxd) | 35.202.144.235 | default | SSH |

Below the table, there are related actions like 'View Billing Report', 'Monitor VMs', and 'Explore VM Logs'. An overlay terminal window shows a successful ping from Instance-1 to Instance-2:

```
codd@instance-1:~$ ping 10.128.0.2
PING 10.128.0.2 (10.128.0.2) 64(64) bytes of data:
64 bytes from 10.128.0.2: icmp_seq=1 ttl=64 time=0.17 ms
64 bytes from 10.128.0.2: icmp_seq=2 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=3 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=4 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=5 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=6 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=7 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=8 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=9 ttl=64 time=0.1 ms
64 bytes from 10.128.0.2: icmp_seq=10 ttl=64 time=0.1 ms
^C
--- 10.128.0.2 ping statistics ---
10 packets transmitted, 9 received, 0% packet loss, time 1ms
rtt min/avg/max/mdev = 0.107/0.208/0.317/0.030 ms
codd@instance-1:~$
```

- From the figure in the previous step, what facilitates this connectivity, the virtual switch or the VPN Gateway?
 - Virtual switch

New subnets:

```
codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks list
NAME          SUBNET_MODE  BGP_ROUTING_MODE  IPV4_RANGE  GATEWAY_IPV4
custom-network1  CUSTOM      REGIONAL
default        AUTO        REGIONAL
codd@cloudshell:~ (cs356-w21-branden-codd)$
```

```

codd@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks subnets list
NAME                                REGION                                NETWORK                                RANGE
default                             us-central1                          default                             10.128.0.0/20
subnet-us-central-192               us-central1                          custom-network1                     192.168.1.0/24
default                             europe-west1                          default                             10.132.0.0/20
subnet-europe-west-192             europe-west1                          custom-network1                     192.168.5.0/24
default                             us-west1                             default                             10.138.0.0/20
default                             asia-east1                           default                             10.140.0.0/20
default                             us-east1                             default                             10.142.0.0/20
default                             asia-northeast1                      default                             10.146.0.0/20
default                             asia-southeast1                     default                             10.148.0.0/20
default                             us-east4                             default                             10.150.0.0/20
default                             australia-southeast1                default                             10.152.0.0/20
default                             europe-west2                         default                             10.154.0.0/20
default                             europe-west3                         default                             10.156.0.0/20
default                             southamerica-east1                  default                             10.158.0.0/20
default                             asia-south1                         default                             10.160.0.0/20
default                             northamerica-northeast1             default                             10.162.0.0/20
default                             europe-west4                         default                             10.164.0.0/20
default                             europe-north1                       default                             10.166.0.0/20
default                             us-west2                             default                             10.168.0.0/20
default                             asia-east2                           default                             10.170.0.0/20
default                             europe-west6                         default                             10.172.0.0/20
default                             asia-northeast2                     default                             10.174.0.0/20
default                             asia-northeast3                     default                             10.178.0.0/20
default                             us-west3                             default                             10.180.0.0/20
default                             us-west4                             default                             10.182.0.0/20
default                             asia-southeast2                     default                             10.184.0.0/20
codd@cloudshell:~ (cs356-w21-branden-codd)$

```

VPC networks:

| Google Cloud Platform cs356-w21-Branden-Codd Search products and resources | | | | | | | | | | |
|--|---|-------------------------|------------------------|------|--------|-------------------|-------------|----------------|------------------------|-----------|
| VPC network | VPC networks CREATE VPC NETWORK REFRESH | | | | | | | | | |
| VPC networks | | | | | | | | | | |
| External IP addresses | | | | | | | | | | |
| Firewall | | | | | | | | | | |
| Routes | | | | | | | | | | |
| VPC network peering | | | | | | | | | | |
| Shared VPC | | | | | | | | | | |
| Serverless VPC access | | | | | | | | | | |
| Packet mirroring | | | | | | | | | | |
| | Name | Region | Subnets | MTU | Mode | IP address ranges | Gateways | Firewall Rules | Global dynamic routing | Flow logs |
| | ▼ custom-network1 | | 2 | 1460 | Custom | | | 0 | Off | |
| | | us-central1 | subnet-us-central-192 | | | 192.168.1.0/24 | 192.168.1.1 | | | Off |
| | | europe-west1 | subnet-europe-west-192 | | | 192.168.5.0/24 | 192.168.5.1 | | | Off |
| | ▼ default | | 24 | 1460 | Auto | | | 4 | Off | |
| | | us-central1 | default | | | 10.128.0.0/20 | 10.128.0.1 | | | Off |
| | | europe-west1 | default | | | 10.132.0.0/20 | 10.132.0.1 | | | Off |
| | | us-west1 | default | | | 10.138.0.0/20 | 10.138.0.1 | | | Off |
| | | asia-east1 | default | | | 10.140.0.0/20 | 10.140.0.1 | | | Off |
| | | us-east1 | default | | | 10.142.0.0/20 | 10.142.0.1 | | | Off |
| | | asia-northeast1 | default | | | 10.146.0.0/20 | 10.146.0.1 | | | Off |
| | | asia-southeast1 | default | | | 10.148.0.0/20 | 10.148.0.1 | | | Off |
| | | us-east4 | default | | | 10.150.0.0/20 | 10.150.0.1 | | | Off |
| | | australia-southeast1 | default | | | 10.152.0.0/20 | 10.152.0.1 | | | Off |
| | | europe-west2 | default | | | 10.154.0.0/20 | 10.154.0.1 | | | Off |
| | | europe-west3 | default | | | 10.156.0.0/20 | 10.156.0.1 | | | Off |
| | | southamerica-east1 | default | | | 10.158.0.0/20 | 10.158.0.1 | | | Off |
| | | asia-south1 | default | | | 10.160.0.0/20 | 10.160.0.1 | | | Off |
| | | northamerica-northeast1 | default | | | 10.162.0.0/20 | 10.162.0.1 | | | Off |
| | | europe-west4 | default | | | 10.164.0.0/20 | 10.164.0.1 | | | Off |
| | | europe-north1 | default | | | 10.166.0.0/20 | 10.166.0.1 | | | Off |
| | | us-west2 | default | | | 10.168.0.0/20 | 10.168.0.1 | | | Off |
| | | asia-east2 | default | | | 10.170.0.0/20 | 10.170.0.1 | | | Off |
| | | europe-west6 | default | | | 10.172.0.0/20 | 10.172.0.1 | | | Off |
| | | asia-northeast2 | default | | | 10.174.0.0/20 | 10.174.0.1 | | | Off |
| | | asia-northeast3 | default | | | 10.178.0.0/20 | 10.178.0.1 | | | Off |
| | | us-west3 | default | | | 10.180.0.0/20 | 10.180.0.1 | | | Off |
| | | us-west4 | default | | | 10.182.0.0/20 | 10.182.0.1 | | | Off |
| | | asia-southeast2 | default | | | 10.184.0.0/20 | 10.184.0.1 | | | Off |

- Explain why the result is different from instance-2.
 - Instance-3 and instance-4 are on a separate network then instance-1 and instance-2. They are unable to communicate using just the internal ip address.

4 instances and the network they belong to:

Google Cloud Platform

cs356-w21-Branden-Codd

Search products and resources

Compute Engine

Virtual machines

VM instances

Instance templates

Sole-tenant nodes

Machine images

TPUs

Migrate for Compute Engine

Committed use discounts

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

START / RESUME

STOP

SUSPEND

RESET

DELETE

Filter VM instances

Columns

| <input type="checkbox"/> | Name ^ | Zone | Recommendation | In use by | Internal IP | External IP | Network | Connect |
|-------------------------------------|------------|---------------|----------------|-----------|--------------------|----------------|-----------------|---------|
| <input checked="" type="checkbox"/> | instance-1 | us-west1-a | | | 10.138.0.6 (nic0) | 35.230.8.138 | default | SSH |
| <input checked="" type="checkbox"/> | instance-2 | us-west1-b | | | 10.138.0.7 (nic0) | 35.197.80.216 | default | SSH |
| <input checked="" type="checkbox"/> | instance-3 | us-central1-a | | | 192.168.1.2 (nic0) | 35.193.136.106 | custom-network1 | SSH |
| <input checked="" type="checkbox"/> | instance-4 | eu-west-1-d | | | 192.168.5.2 (nic0) | 35.195.73.39 | custom-network1 | SSH |

Subnetworks created:

Google Cloud Platform

cs356-w21-Branden-Codd

Search products and resources

VPC network

VPC networks

External IP addresses

Firewall

Routes

VPC network peering

Shared VPC

Serverless VPC access

VPC networks

CREATE VPC NETWORK

REFRESH

| Name | Region | Subnets | MTU | Mode | IP address ranges | Gateways | Firewall Rules | Global dynamic routing | Flow logs |
|-----------------|--------------|------------------------|------|--------|-------------------|-------------|----------------|------------------------|-----------|
| custom-network1 | | | | | | | | | |
| | us-central1 | subnet-us-central-192 | 1460 | Custom | 192.168.1.0/24 | 192.168.1.1 | 0 | Off | Off |
| | europe-west1 | subnet-europe-west-192 | | | 192.168.5.0/24 | 192.168.5.1 | | | Off |
| default | | | | | | | | | |
| | | 24 | 1460 | Auto | | | 4 | Off | |
| | us-central1 | default | | | 10.128.0.0/20 | 10.128.0.1 | | | Off |
| | europe-west1 | default | | | 10.132.0.0/20 | 10.132.0.1 | | | Off |
| | us-west1 | default | | | 10.138.0.0/20 | 10.138.0.1 | | | Off |
| | asia-east1 | default | | | 10.140.0.0/20 | 10.140.0.1 | | | Off |
| | us-east1 | default | | | 10.142.0.0/20 | 10.142.0.1 | | | Off |