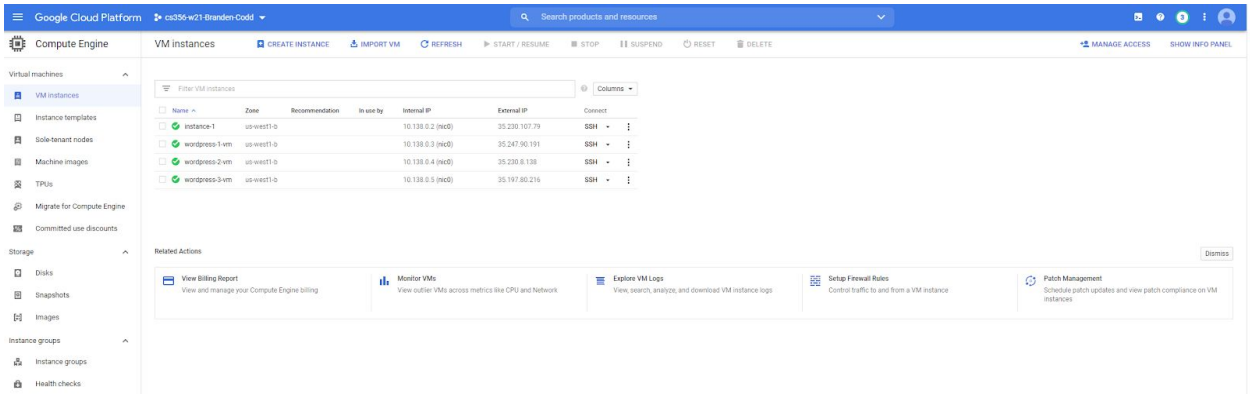
CS356-Lab01:3-Branden-Codd-940428984

Wordpress VM:



Nmap scan:

```
coddb@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
coddb@instance-1:~$
```

```
coddb@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks list
NAME     SUBNET_MODE  BGP_ROUTING_MODE  IPV4_RANGE  GATEWAY_IPV4
default  AUTO         REGIONAL
coddb@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
coddb@cloudshell:~ (cs356-w21-branden-codd)$
coddb@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 4069 hosts

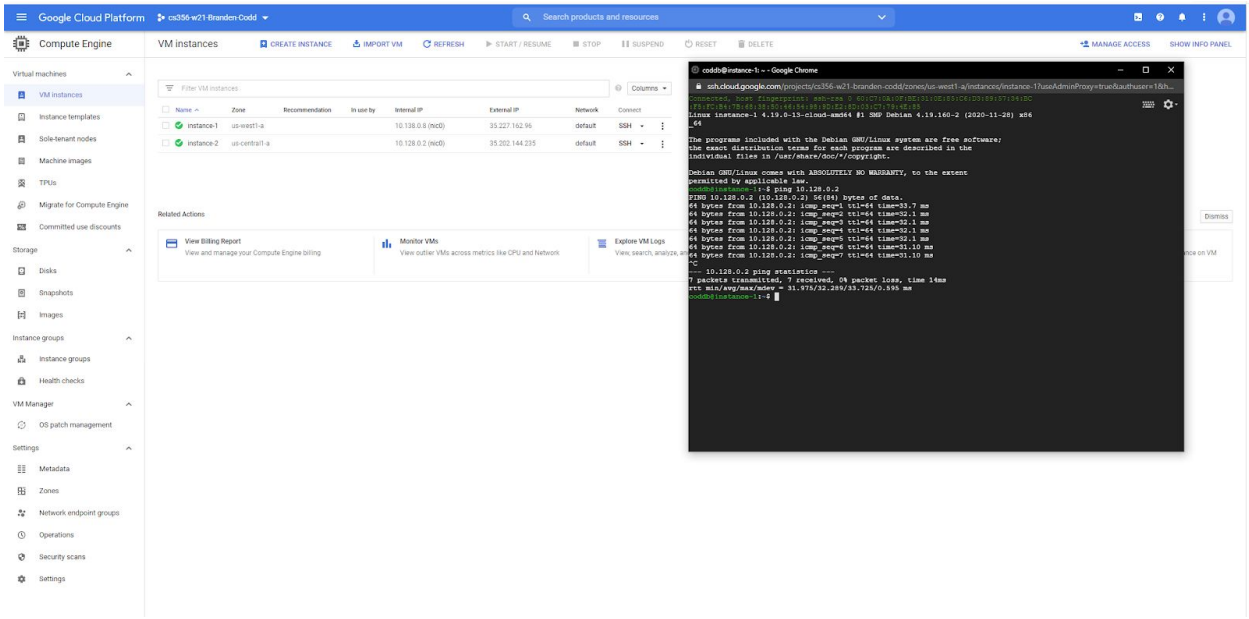
```
coddb@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute instances create instance-1 --zone us-west1-a
Created [https://www.googleapis.com/compute/v1/projects/cs356-w21-branden-codd/zones/us-west1-a/instances/instance-1].
NAME        ZONE        MACHINE_TYPE   PREEMPTIBLE  INTERNAL_IP  EXTERNAL_IP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

```
coddb@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               10.128.0.2   35.202.144.235  RUNNING
coddb@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:



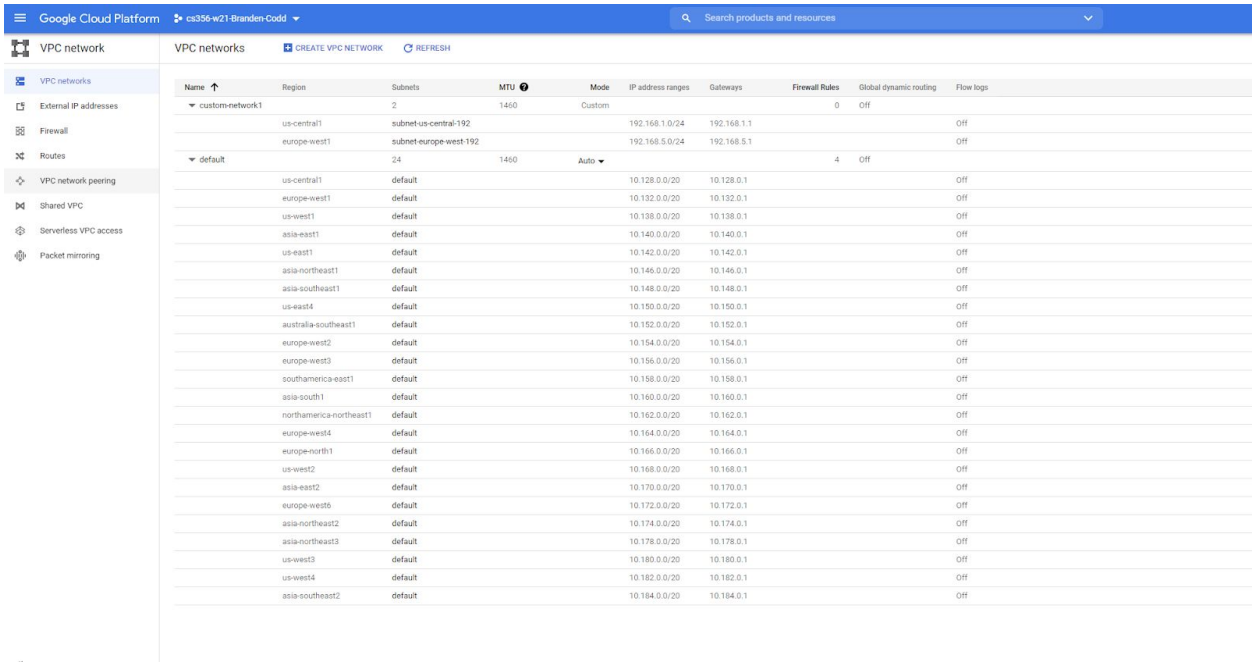
- From the figure in the previous step, what facilitates this connectivity, the virtual switch or the VPN Gateway?
  - Virtual switch

New subnets:

```
coddb@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
coddb@cloudshell:~ (cs356-w21-branden-codd)$
```

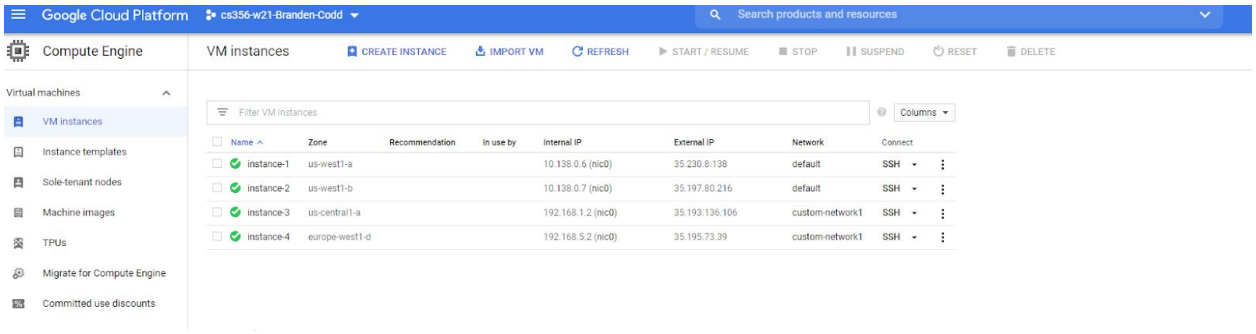
```
coddb@cloudshell:~ (cs356-w21-branden-codd)$ gcloud compute networks subnets list
NAME                     REGION                NETWORK          RANGE
default                  us-central1           default          10.128.0.0/20
subnet-us-central-192    us-central1           custom-network1  192.168.1.0/24
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
coddb@cloudshell:~ (cs356-w21-branden-codd)$
```

VPC networks:



- 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:



Subnetworks created: