**VPC NETWORKING LAB**

Create VPC

Task 1: Explore the Default Network

1. First check the subnetes

* gcloud compute networks subnets list

1. check the routes

* gcloud compute routes list

1. check the rules

* gcloud compute firewall-rules list

1. Remove firewall rules

* gcloud compute firewall-rules delete default-allow-icmp
* gcloud compute firewall-rules delete default-allow-internal
* gcloud compute firewall-rules delete default-allow-rdp
* gcloud compute firewall-rules delete default-allow-ssh

1. Remove Default Network

* gcloud compute networks delete default

1. Try to create a VM instance

* gcloud beta compute instances create test --zone=us-central1-c --machine-type=n1-standard-1 --image=debian-9-stretch-v20200902 --image-project=debian-cloud --boot-disk-size=10GB --boot-disk-type=pd-standard --boot-disk-device-name=test --reservation-affinity=any

As expected, you cannot create a VM instance without a VPC network.

Task 2: Create a network in automatic mode

1. Create an automatic mode VPC network with firewall rules

gcloud compute networks create mynetwork --project=vpc-networking-lab-288608 --subnet-mode=auto --bgp-routing-mode=regional

Allow icmp, RDP, SSH, Internal

1. Create a VM instance in the us-central1 region
2. Create a VM instance in the europe-west1 region
3. Check connectivity of VM instances

* Connection with ssh to mynet-us-vm
* Internal ping 10.132.0.2
* external ping 35.240.42.221

1. Convert network to network in custom mode

Task 3: Create Networks in Custom Mode

1. Create the managementnet network and managementnet-us subnet
2. Create the privatenet network

* Create the privatesubnet-us subnet and privatesubnet-eu subnet
* To get a list of available VPC networks
* To get a list of available VPC subnets (sorted by VPC network)

1. Create the firewall rules for managementnet and for privatenet

* To get a list of firewall rules (sorted by VPC network)

1. Create the managementnet-us-vm instance
2. Create the privatenet-us-vm instance

* To get the list of VM instances (sorted by zone)

Task 4: Explore connectivity between networks

1. Pinging external IP addresses

* Connection with ssh to mynet-us-vm
* Ping external mynet-eu-vm
* Ping external managementnet-us-vm
* Ping external privatenet-us-vm

1. Pinging Internal IP addresses

* Connection with ssh to mynet-us-vm
* Ping internal mynet-eu-vm
* Ping external managementnet-us-vm
* Ping external privatenet-us-vm

NB: This shouldn't work either (as indicated by the 100% packet loss). You cannot ping the internal IP address of managementnet-us-vm or privatenet-us-vm, because they are on different VPC networks from the ping source (mynet-us-vm). although all instances are in the same us-central1-c zone.