Metropolitan State University
ICS 432 - 01: Distributed and Cloud Computing
Fall 2021

Lab 05: Networking and Load Balancing in GCP
Total points: 25
Out: Saturday, October 9, 2021
Due: 11:59 PM on Friday, October 15, 2021

What to submit?

The objective of this lab is to learn about Networking and Load Balancing in the GCP cloud. To complete this lab:

- Read this lab assignment carefully.
- At various parts of the lab, you are asked to take screen shots of your work. Open a word document and paste the screen shots in this document in the same order as mentioned in the lab. Make sure to highlight the screen shot number.
- After you complete all the lab exercises, upload the word document to the designated D2L folder by 11:59 PM on Friday, October 15, 2021.

NOTE: On Windows machines, you may consider using Snip & Sketch for screenshot handling.

> Make sure to include the final lab score in the last screenshot. I will also check your final lab score on the shared Qwiklab group.

> Make sure to include screenshot number in your report so that it is easier to write my feedback by referring to the screenshot.

Exercise 1: Multiple VPC Networks

In this exercise, you will complete the qwiklab titled Multiple VPC Networks. In this lab you create several VPC networks and VM instances and test connectivity across networks. Specifically, you create two custom mode networks (`managementnet` and `privatenet`) with firewall rules and VM instances

Recommended Reading: Networking 101:
https://run.qwiklabs.com/focuses/1743?catalog_rank=%7B%22rank%22%3A1%2C%22num_filters%22%3A0%2C%22has_search%22%3Atrue%7D&parent=catalog&search_id=11805450

1- Log in to your Qwiklab account and open the lab using the following link: https://www.qwiklabs.com/focuses/1230?parent=catalog

2- Click on Start Lab and follow the lab instructions and take screenshots as explained in the following steps. Take **Lab screenshot #1** show the lab credentials that are given to you.

Task: Create custom mode VPC networks with firewall rules

1- After step 8, take **Lab screenshot #2** to show the displayed command lines. Also, copy the command lines and paste them in your lab report.
2- Take **Lab screenshot #3** after your click on Check my progress.

Task: Create the privatenet network

3- After step 3, take **Lab screenshot #4** to show the command window after running the three commands.
4- Take **Lab screenshot #5** to show the green check mark after clicking on Check my progress.
5- After step 5, take one or **two Lab screenshots (6a and 6b)** to show the name of the subnets you created after running the subnet list command.

Task: Create the firewall rules for managementnet

6- After step 4, take **Lab screenshot #7** to show the command lines. Also, copy the command lines and paste them in your lab report.
7- Take **Lab screenshot #8** to show the green check mark after clicking on Check my progress.

Task: Create the firewall rules for privatenet

8- After step 1, wait until the network creation is completed, then Take **Lab screenshot #9** to show the green check mark after clicking on Check my progress.
9- After step 2, take **Lab screenshot #10** to show the list of firewall rules. Make sure the rule you created are listed.

Task: Create VM instances

10- After step 9, take **Lab screenshot #11** to show the displayed command. Also, copy the command and paste it in your lab report.
11- Take **Lab screenshot #12** to show the green check mark after clicking on Check my progress.

Task: Create the privatenet-us-vm instance

12- After step 1, take **Lab screenshot #13** to show the green check mark after clicking on Check my progress.
13- After step 2, take **Lab screenshot #14** to show the output of `compute instances list`.
14- After step 3, take **Lab screenshot #15** to show the list of instances as listed in the dashboard.

Task: Explore the connectivity between VM instances

15- After step 6, take **Lab screenshot #16** showing the SSH window with the output of three ping commands.

Task: Ping the internal IP addresses

16- Type `clear` in the SSH window to clear the screen.
17- After step 6, take **Lab screenshot #17** showing the SSH window with the output of the three ping commands.
18- Take **Lab screenshot #18** to show your answer to the multiple-choice questions.

Task: Create the VM instance with multiple network interfaces

Task: create the VM instance with multiple network interfaces

19- After step 15, take **Lab screenshot #19** to show the list of instances in the VM dashboard.
20- Take **Lab screenshot #20** to show the green check mark after clicking on Check my progress.

Task: Explore the network interface details
Task: Explore the network interface connectivity

21- After step 8, take **Lab screenshot #21** to show the SSH window with the output of all the ping commands.
22- After step 9, take **Lab screenshot #22** to show the SSH window with the output of all `ip route` command.

Take **Lab screenshot #23** to show the remaining time after you complete the lab. Make sure your login credentials and your final lab score appears in the screenshot. Finally, click on End Lab.

Exercise 2: Load Balancing

In this exercise, you will complete the qwiklab titled Create an Internal Load Balancer. In this lab you create two managed instance groups in the same region. Then, you configure and test an Internal Load Balancer with the instances groups as the backends.

1- Login to your Qwiklab account and go to the lab using the following link: https://run.qwiklabs.com/focuses/1250?catalog_rank=%7B%22rank%22%3A2%2C%22num_filters%22%3A0%2C%22has_search%22%3Atrue%7D&parent=catalog&search_id=11806901

2- Click on Start Lab and follow lab instructions and take screenshots as explained in the following steps.
3- Take **Lab screenshot #24** to show you lab credentials.

Task: Configure HTTP and health check firewall rules

Task: Explore the my-internal-app network

Task: Create the HTTP firewall rule

4- After step 5, take **Lab screenshot #25** with the list of firewall rules showing the newly created `app-allow-http` rule.

Task: Create the health check firewall rules

5- After step 5, take **Lab screenshot #26** with the list of firewall rules showing the `app-allow-health-check` rule.
6- After step 3, take **Lab screenshot #27** to show the green checkmark after clicking on Check my progress.

Task: Configure instance templates and create instance groups

Task: Configure the instance templates

Task: configure the next instance template

7- After step 5, take **Lab screenshot #28** to show the list of instance templates showing the two instance templates you created.

Task: Create the managed instance groups

8- After step 6, take **Lab screenshot #29** to show the list of instance groups showing the two instance groups you created.

Task: Verify the backends

9- After step 2, take **Lab screenshot #30** of VM dashboard showing the two instances that are created by instance groups.
10- After step 9, take **Lab screenshot #31** to show the green check mark after clicking on Check my progress.
11- After step 13, take **Lab screenshot #32** to show the output on the command window after running the two `curl` commands. Make sure the VM id appears clearly on prompt in the command window.
12- Take **Lab screenshot #33** to show the answer to the multiple choice question.

Task: Configure the internal load balancer

Task: Start the configuration
Task: Configure the regional backend service

13- After step 8, take **Lab screenshot #34** to show the load balancer details pages.

Task: configure the frontend
Task: Review and create the internal load balancer

14- After step 2, take **Lab screenshot #35** to show the load balancer details page.
15- After step 3, take **Lab screenshot #36** to show the green checkmark after clicking on Check my progress.

Task: Test the Internal Load Balancer

Task, Access the Internal Load Balancer

16- After step 4, take **Lab screenshot #37** to show the output of the command window after several execution of the curl command. Make sure there is at least one response from each instance group.

Take **Lab screenshot #38** to show the remaining time after you complete the lab. Make sure both your project credentials and score appear in the screenshot. Then, click on End Lab.