

Assignment 2, Cloud Computing

- Title of the assignment - Exploring Google Cloud Services
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- Date of submission - 17.09.2024

Table of Contents

1. Introduction
2. Virtual Machines in Google Cloud
3. Storage Solutions in Google Cloud
4. Networking in Google Cloud
5. Conclusion
6. References

Introduction

The goal of this assignment is to gain hands-on experience with Google Cloud services, specifically focusing on virtual machines, storage solutions, and networking. Students will set up and configure different services within Google Cloud and document their findings.

1. Virtual Machines in Google Cloud

- Create a Virtual Machine (VM) Instance

The first step is to go to my project, then choose Compute engine- > VM instance on the navigation panel. Then I click to create the instance as “my-server-akma” then write the name, zone, machine type, OS and configure firewall settings.

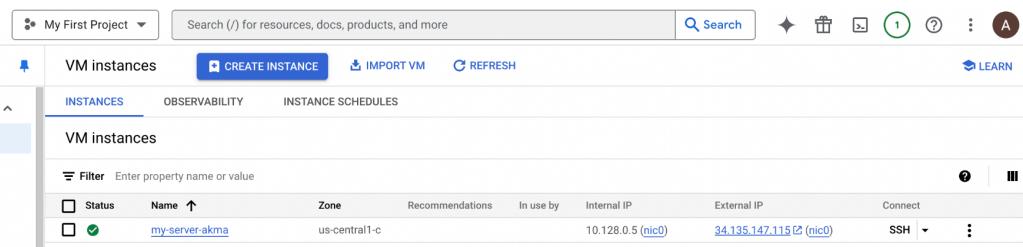


Fig 1.

- Connect to the VM

After that I connect to SSH clicking “SSH” button, and write some commands. For example,

-whoami to see my username

```
permitted by applicable law.  
akmaral_150400@my-server-akma:~$ whoami  
akmaral_150400  
akmaral_150400@my-server-akma:~$ sudo apt update && sudo apt upgrade -y  
Get:1 file:///etc/apt/mirrors/debian.list Mirrorlist [30 B]  
Get:5 file:///etc/apt/mirrors/debian-security.list Mirrorlist [39 B]  
Hit:7 https://packages.cloud.google.com/apt google-compute-engine-bookworm-stable InRelease  
Get:8 https://packages.cloud.google.com/apt cloud-sdk-bookworm InRelease [1654 B]  
Get:2 https://deb.debian.org/debian bookworm InRelease [151 kB]  
Get:3 https://deb.debian.org/debian bookworm-updates InRelease [55.4 kB]  
Get:4 http://deb.debian.org/debian bookworm-backports InRelease [59.0 kB]  
Get:6 https://deb.debian.org/debian-security bookworm-security InRelease [49.0 kB]  
Get:9 https://packages.cloud.google.com/apt cloud-sdk-bookworm/main all Packages [1573 kB]
```

Fig 2.

To install nginx and apache -sudo apt install apache2 -y -sudo apt install nginx -y

Fig 3.

To start and enable the service

```
-sudo systemctl start apache2  
-sudo systemctl enable apache2  
-sudo systemctl start nginx  
-sudo systemctl enable nginx
```

```
Synchronizing state of nginx service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nginx
akmaral 150400@my-server-akmaral:~$ sudo systemctl start apache2
akmaral 150400@my-server-akmaral:~$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable apache2
akmaral 150400@my-server-akmaral:~$ sudo systemctl start nginx
akmaral 150400@my-server-akmaral:~$ sudo systemctl enable nginx
Synchronizing state of nginx.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nginx
```

Fig 4.

Then I create an html file, to see the correctness i check with external IP and see my html file It's work!



Fig. 5.

• Document the Process

Bridged and Host-only were used with Allowed HTTP/HTTPS traffic to serve the Web Content and SSH traffic to manage the VM. As an HTTP server, installed Apache (or Nginx) which is quite easy to use, consumes fewer resources and is suitable for running small websites or test pages.

2. Storage Solutions in Google Cloud

- Create a Cloud Storage Bucket

Firstly, I go to In the left-hand navigation panel, go to Cloud Storage → Bucket.I selected the name “bucket-as15”,region,uniform and public settings.Then I uploaded jpg.



Fig 6.

- Implement Object Lifecycle Management

In my bucket, I click the lifecycle tab,then create a rule to delete an image after 30+ days and delete a file created before 10th october.

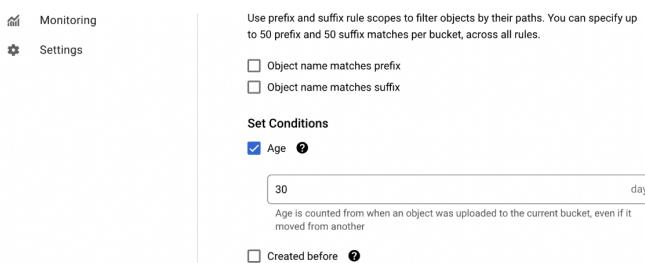


Fig 7.

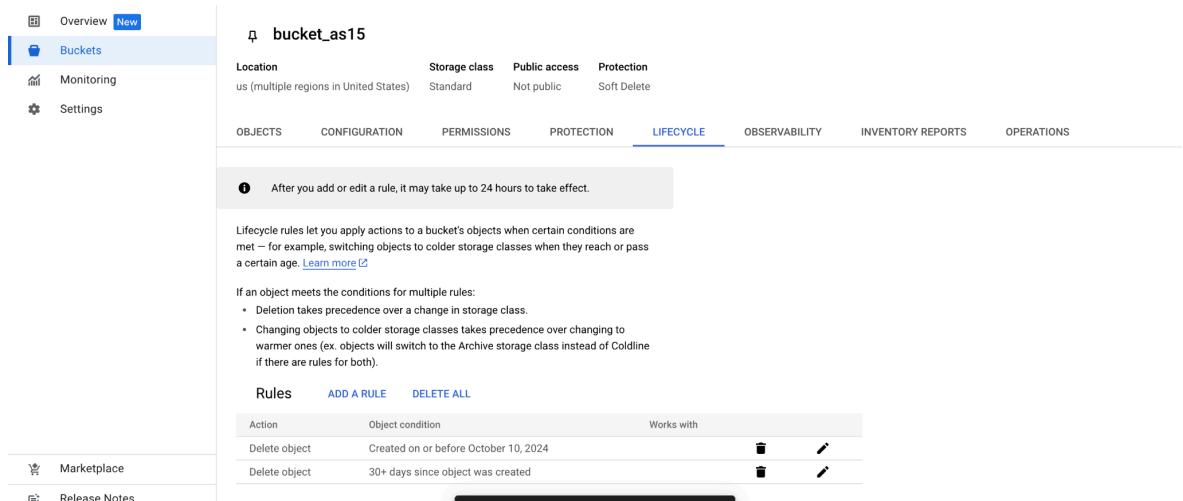


Fig 8.

- Document the Process

If you have old files that you no longer require, auto-deleting will help save valuable storage space because you can set a time limit on objects and they will be deleted automatically.In one’s environment it is common to work with voluminous datasets, lifecycle rules lower the number of inputs many individuals have to provide.

3. Networking in Google Cloud

- Set Up a Virtual Private Cloud (VPC)

I click the left-hand menu, go to VPC Network → VPC Networks. Click Create VPC Network to begin setting up a new VPC. I create VPC as my-custom-as-15. I choose a Subnet then specify a region and set an IP range 10.0.0.0/24.

The screenshot shows the 'VPC networks' section of the Google Cloud console. At the top, there is a search bar and a 'CREATE VPC NETWORK' button. Below the header, there are two tabs: 'NETWORKS IN CURRENT PROJECT' (which is selected) and 'SUBNETS IN CURRENT PROJECT'. A warning message states 'SMTP port 25 disallowed in this project.' A 'LEARN' button is also present. The main table lists existing VPC networks:

Name	Subnets	MTU	Mode	IPv6 ULA range	Gateways	Firewall rules	Global dynan
default	42	1460	Auto			10	Off
my-custom-as-15	1	1460	Custom			0	Off

Fig 9.

The screenshot shows the 'Create a firewall rule' page. The title is 'Create a firewall rule' with a back arrow. The form fields are as follows:

- Name ***: allow-internet-traffic
- Description**: (empty)
- Logs**:
Turning on firewall logs can generate a large number of logs which can increase costs in Logging. [Learn more](#).
 On
 Off
- Network ***: my-custom-as-15
- Priority ***: 1000
- Direction of traffic**:
 Ingress
 Egress
- Action on match**:
 Allow
 Deny
- Targets**: Specified target tags

Fig 10.

On a VPC network go to the firewall, then create a rule "allow-internet-traffic", complete all fields as targets, IPV4 ranges.

- Connect VM to VPC

Fig 11.

I click to SSH, then type -ping 8.8.8.8. This tests whether a VM has outbound access to the internet, I see the responses.

```

akmaral_1504008my-server-akma:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data
64 bytes from 8.8.8.8: icmp_seq=1 ttl=115 time=2.89 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=115 time=0.391 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=115 time=0.330 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=115 time=0.409 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=115 time=0.433 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=115 time=0.399 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=115 time=0.406 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=115 time=0.498 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=115 time=0.395 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=115 time=0.405 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=115 time=0.491 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=115 time=0.394 ms

```

Fig 12.

Conclusion

When attaching your VM to VPC and routing tentative ping to an external server, you check that your VM has the right network settings, and, therefore, the VPC configuration, as well as firewall rules, are correct. This makes access to cloud resources through managed and secure networks possible.

References

1. Google Cloud Documentation - VPC Overview:

This is the main reference for understanding and setting up VPCs in Google Cloud. It covers creating VPC networks, subnets, and configuring firewall rules.

Available at: <https://cloud.google.com/vpc/docs/overview>

2. Google Cloud Documentation - Creating and Managing Firewall Rules:

This document provides detailed instructions on how to create and manage firewall rules in Google Cloud, including allowing or restricting traffic between VMs and the internet.

Available at: <https://cloud.google.com/vpc/docs/firewalls>

3. Google Cloud Documentation - Connecting to Instances Using SSH:

Guidance on how to connect to a VM instance using SSH from the Google Cloud Console.

Available at: <https://cloud.google.com/compute/docs/instances/connecting-advanced>

4. Google Cloud Documentation - Testing Network Connectivity:

This document covers steps on testing network connectivity from your VM to external resources, including using ping.

Available at: <https://cloud.google.com/network-connectivity/docs/concepts/overview>