KAZAKH KBTU BRITISH
TECHNICAL
UNIVERSITY

REPORT

CLOUD COMPUTING

ASSIGNMENT 2

Done by: Tolegen Ernazar
24MD0491
17.10.2024

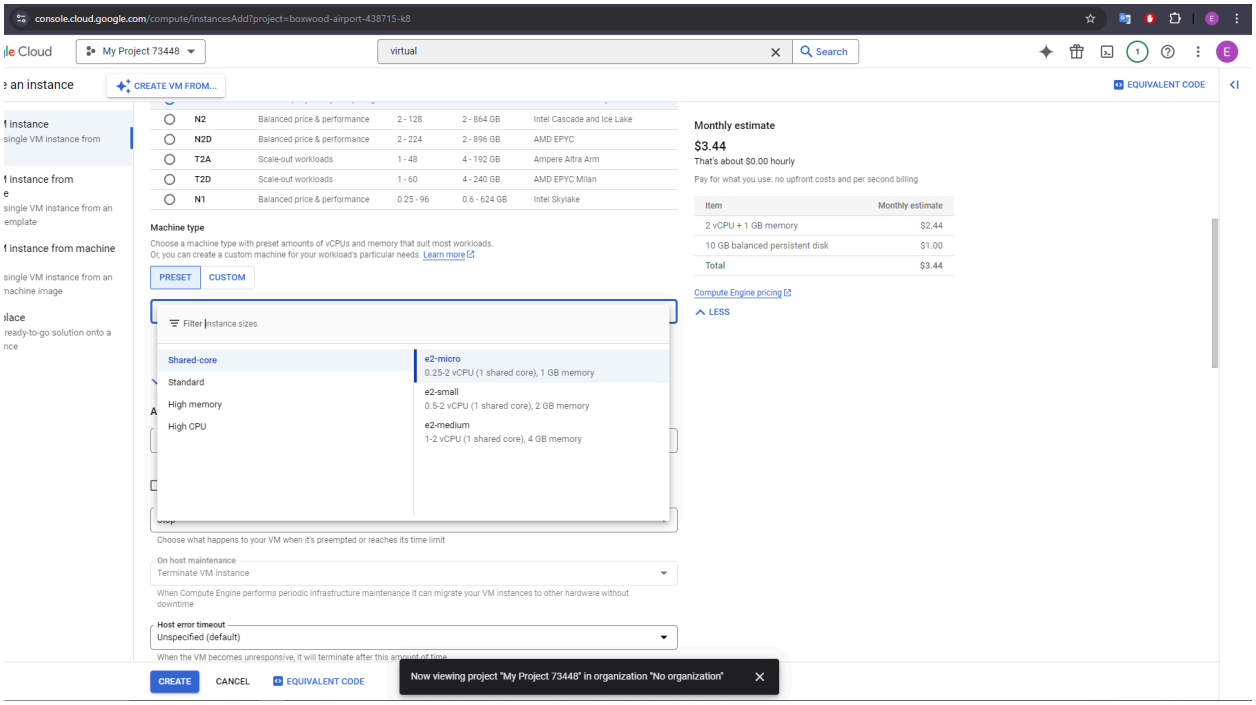
Introduction

The objective of this assignment is to set up and configure key networking and storage components in Google Cloud, including a Virtual Private Cloud (VPC), a Cloud Storage bucket, and a Virtual Machine (VM) instance. These tasks will help you understand how to create, configure, and manage cloud-based infrastructure, ensuring connectivity, security, and efficient storage management.

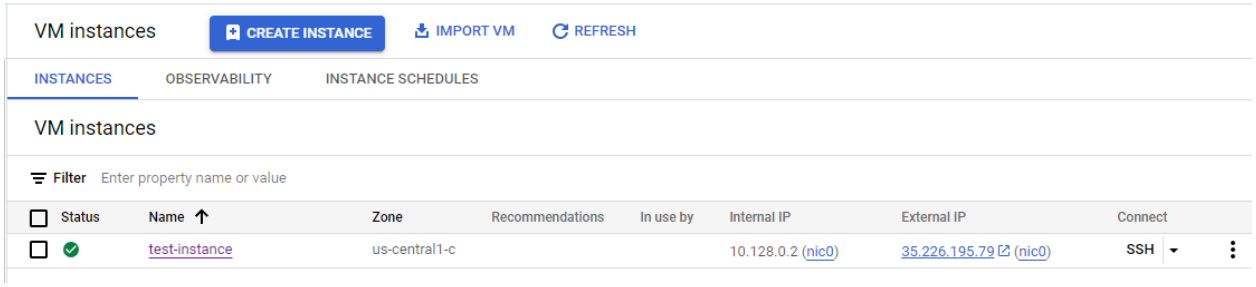
1. Virtual Machines in Google Cloud

1.1. VM Creation

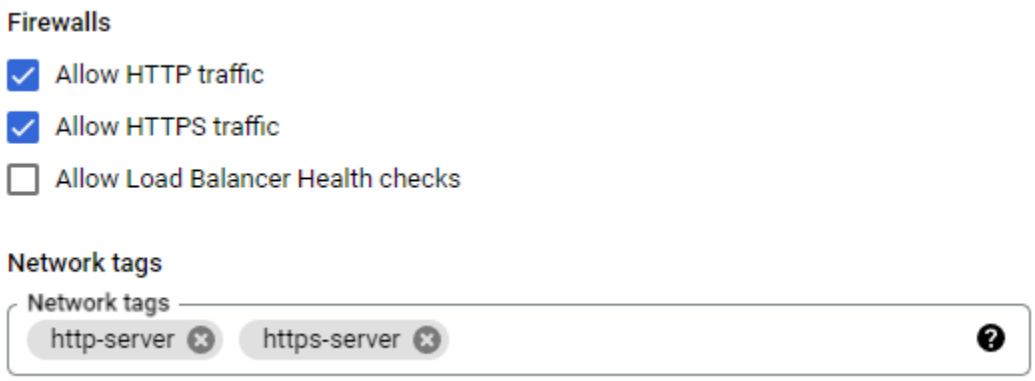
- **Machine Type**: I selected the **e2-micro** instance type to minimize costs, as it provides enough resources for a simple web server test.



- **Operating System**: I chose Ubuntu 20.04 LTS due to its stability, wide support, and easy compatibility with web server packages like Apache and Nginx.
- **Region**: I selected **us-central1-c**.

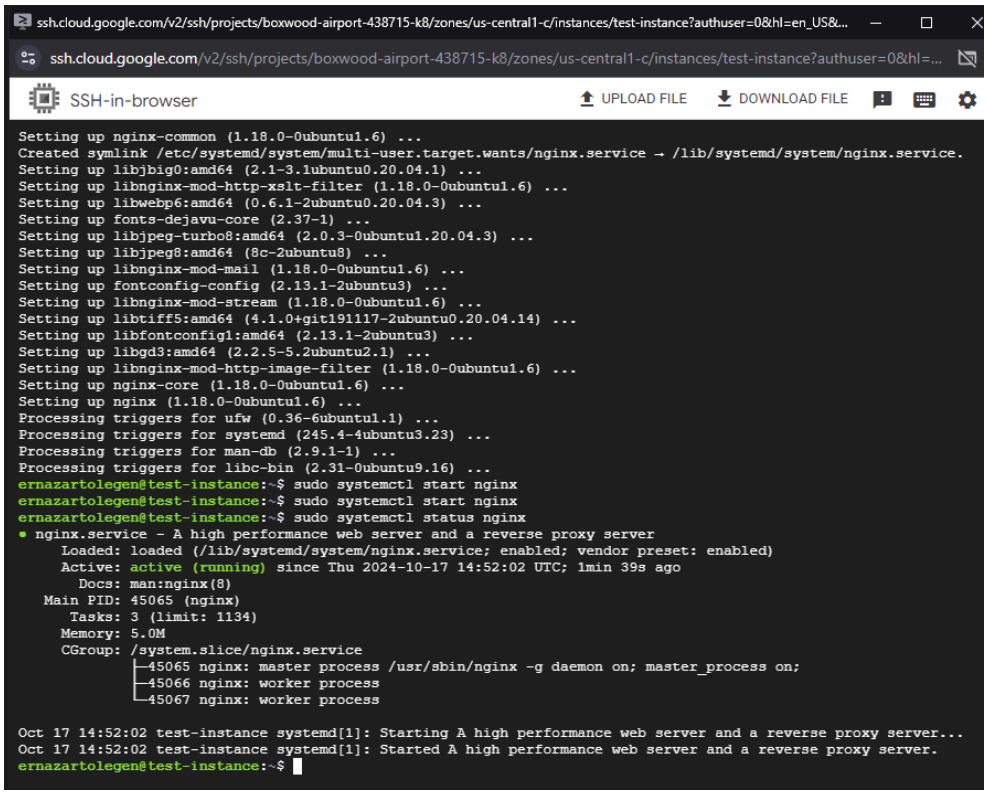


- **Firewall**: Enabled HTTP and HTTPS traffic to allow web traffic to the server.

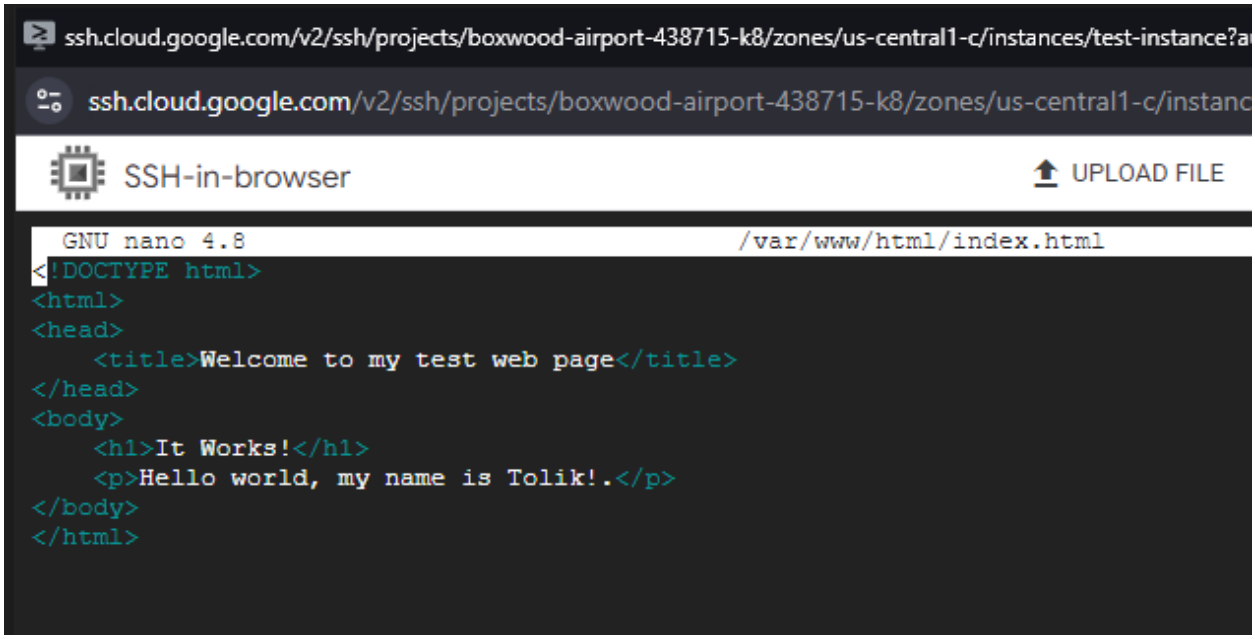


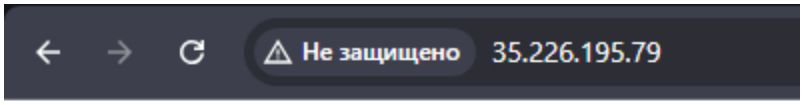
1.2. Connection

- Connected via SSH using the Cloud Console's built-in SSH option, which allows easy access without needing external SSH clients.
- I chose Nginx because it's a widely-used web server with a simple setup process. Installed it using **apt** and verified the service was running.



- Created a basic HTML file to confirm the web server was serving content correctly.





It Works!

Hello world, my name is Tolik!.

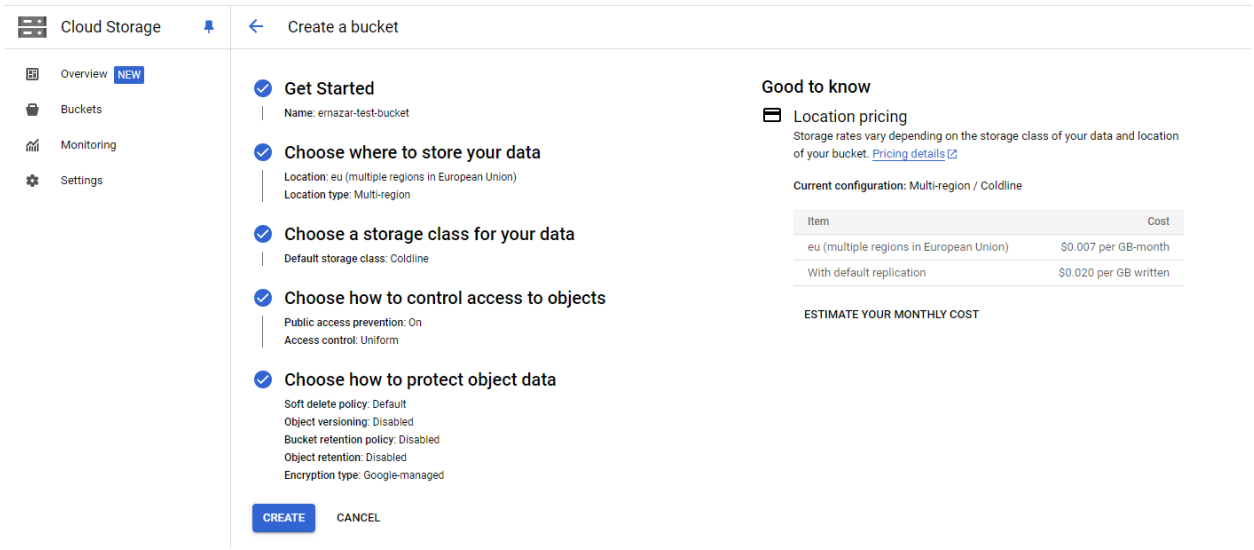
1.3. Findings

- Creating a Virtual Machine (VM) in Google Cloud was pretty straightforward using the Cloud Console. I was able to connect to the VM via SSH and install a web server without any major issues. One challenge I encountered was that once a VM is created, I couldn't change its network settings. To connect the VM to a new VPC, I had to create a new instance, which taught me the importance of planning the network configuration carefully from the beginning.

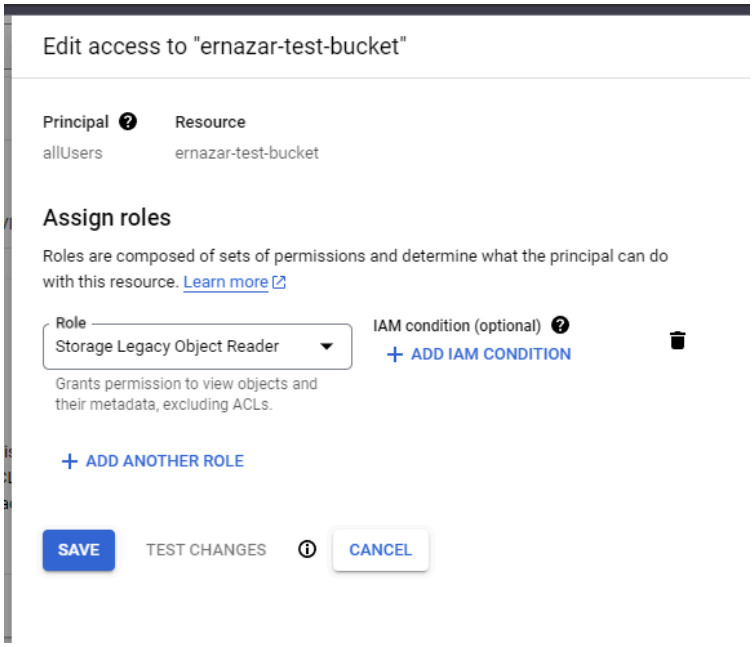
2. Storage Solutions in Google Cloud

2.1 Bucket Creation:

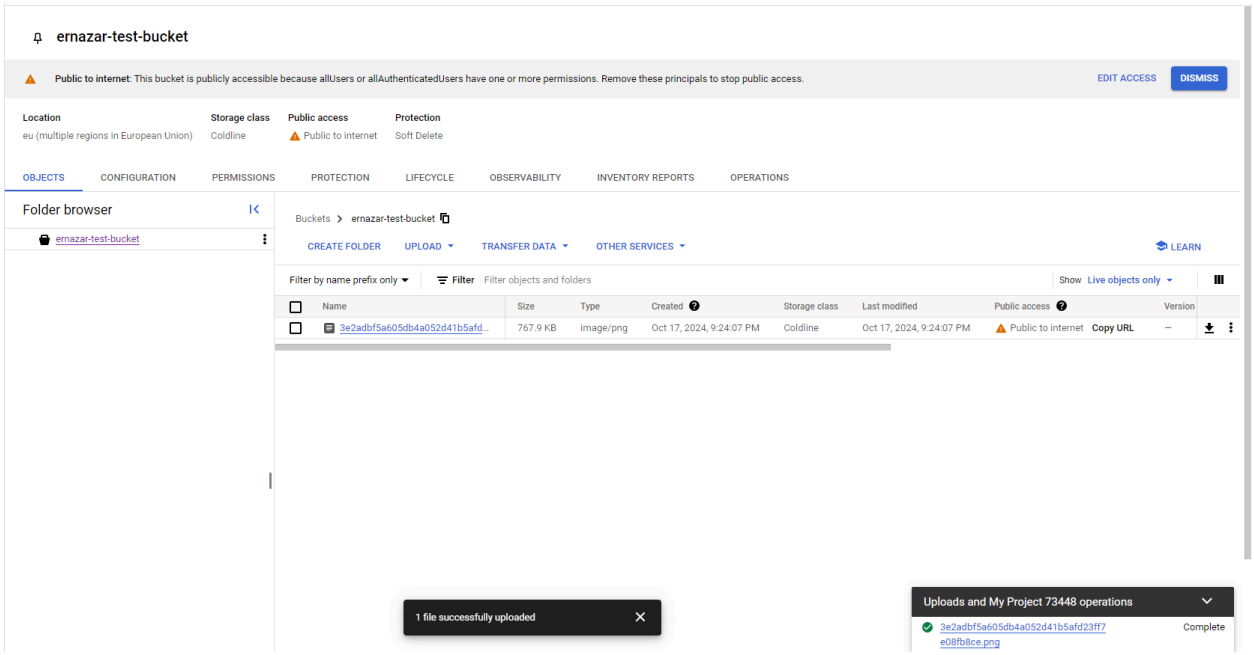
- **Bucket Name**: I named the bucket **ernazar-test-bucket** to ensure it was globally unique.



- **Region**: I chose **eu** for better latency in my region.
- **Storage Class**: I selected **Coldline** as I don't need quick access to files and more cost-efficient. However, for quick access, **Standard** class might be more appropriate.
- **Access Control**: I chose **Uniform** control for the private access, but then added principle to **allUsers**.



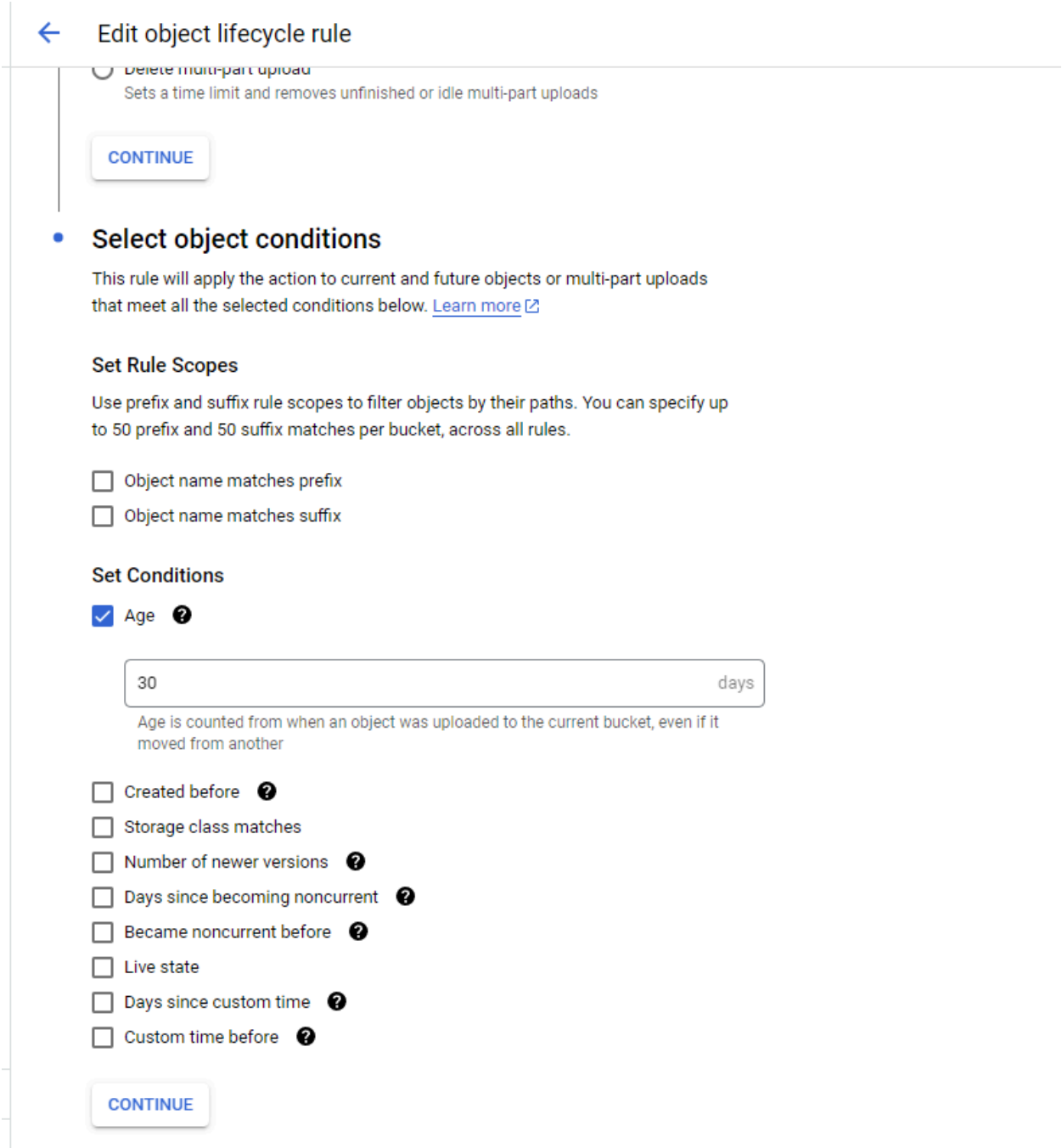
- Uploaded a sample image (sample.jpg) to test file storage. This could be useful for storing assets for a website, backups, or logs.



If you want to see what's inside, you can check it by following link below, but it will be accessible for only **30 days** from now, because of **lifecycle** rule: https://storage.googleapis.com/ernazar-test-bucket/3e2adbf5a605db4a052d41b5afd23ff7e08fb8ce.png

2.2 Lifecycle Management

- Configured a lifecycle rule to automatically delete files older than 30 days. This can help manage storage costs by ensuring that old files that are no longer needed are automatically removed, particularly in use cases such as log files or backups.



2.3. Findings

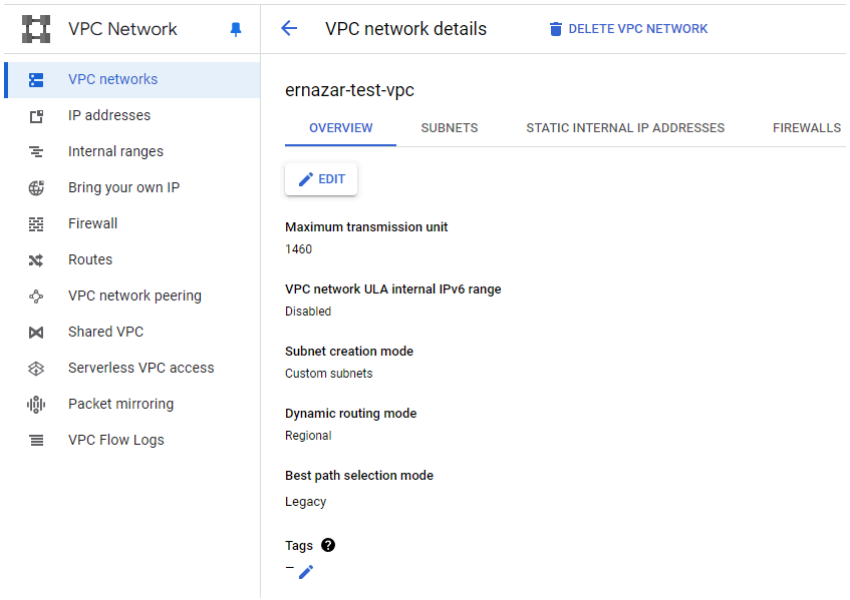
- Creating a Cloud Storage bucket and uploading files was easy to follow. I was able to set access controls (either public or private) and successfully uploaded a test file. Configuring lifecycle management was also simple, and I learned how lifecycle rules can help automate the deletion of

files after a certain time, which is really useful for managing costs and storage over time. Overall, it was a good lesson in how cloud storage can be managed efficiently.

3. Networking in Google Cloud

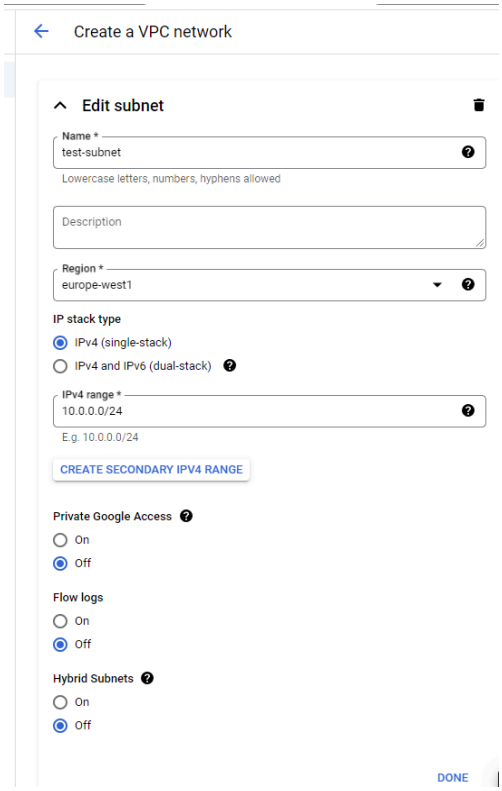
3.1. VPC Setup

- **VPC Name**: I named the VPC **ernazar-test-vpc** to easily identify it.

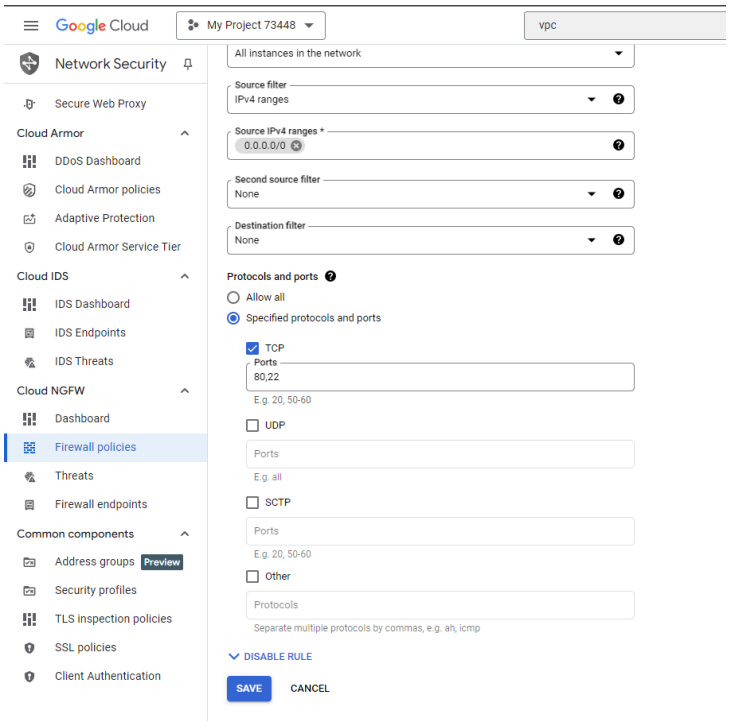


- **Subnets**: Created a subnet called **test-subnet** in the **europe-west1** region with the CIDR range 10.0.0.0/24. This allows for a flexible network architecture, and additional subnets can be added

for future scaling or isolation of resources.



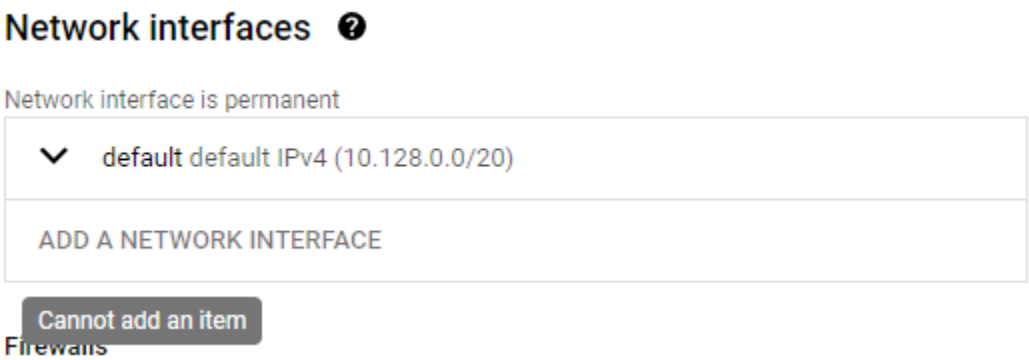
- **Use Case**: The VPC allows me to isolate my VM from other resources and networks in the cloud, ensuring security and performance.
- Created a firewall rule named **test-firewall** with SSH (TCP port 22) and HTTP (TCP port 80) traffic to the instances in the VPC.



- **Importance**: Firewall rules are critical for securing cloud resources, allowing only necessary traffic while blocking unauthorized access.

3.2. Connectivity

- I tried to connect VM to VPC, but could not do it due to some restrictions in adding **new Network Interface** in my VM instance. I try to describe the actions without screenshots.



- Reconfigured the VM network interface to ensure it is connected to the newly created VPC (**ernazar-test-vpc**).
- Ping Google's DNS server (8.8.8.8) from the VM to verify internet connectivity through the VPC.
- **Verification**: The successful ping confirms that the VM is connected to the internet and can communicate with external servers.

3.3. Findings

- Setting up a Virtual Private Cloud (VPC) and configuring subnets and firewall rules was a clear process. I learned how to connect my VM to the correct VPC, though I had to create a new VM to ensure it was attached to the proper network. I also tested connectivity by pinging an external server, which confirmed that the setup worked. This process showed me how critical VPCs and firewall rules are for securing resources and ensuring the VM can communicate with the internet properly.

Conclusion

Through this assignment, I gained valuable hands-on experience with essential Google Cloud services, including Virtual Machines, Cloud Storage, and networking via Virtual Private Clouds (VPCs). Key learnings include the importance of carefully planning network configurations from the start when setting up VMs, as network settings cannot be changed later without recreating the instance. I also learned how lifecycle management in Cloud Storage can optimize storage use and costs by automating file deletion. Setting up VPCs and firewall rules underscored the importance of networking in securing and managing cloud resources.

These Google Cloud services have a wide range of applications. VMs can be used for hosting websites, running applications, or even managing databases. Cloud Storage offers a scalable solution for storing and managing data, while lifecycle management helps with long-term data retention and cost efficiency. The ability to set up secure, isolated VPC networks is essential for any cloud-based infrastructure, especially for businesses looking to ensure secure and efficient communication between their resources and the internet. Overall, these tools provide the foundation for building and managing scalable, secure cloud environments.

References

Google Cloud. (n.d.). *VPC documentation*. Google Cloud. Retrieved from https://cloud.google.com/vpc/docs

Google Cloud. (n.d.). *VPC networking and security*. Google Cloud. Retrieved from https://cloud.google.com/networking/docs/vpc