

Assignment 2

GCP Cloud Computing Assignment: VM Auto-Scaling and Security

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Course: Cloud Computing

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1. Introduction

In this assignment, we set up a virtual machine (VM) in Google Cloud Platform (GCP), configured auto-scaling to manage workload efficiently, and applied security measures to protect the setup. This document walks through each step in a simple and easy-to-follow way.

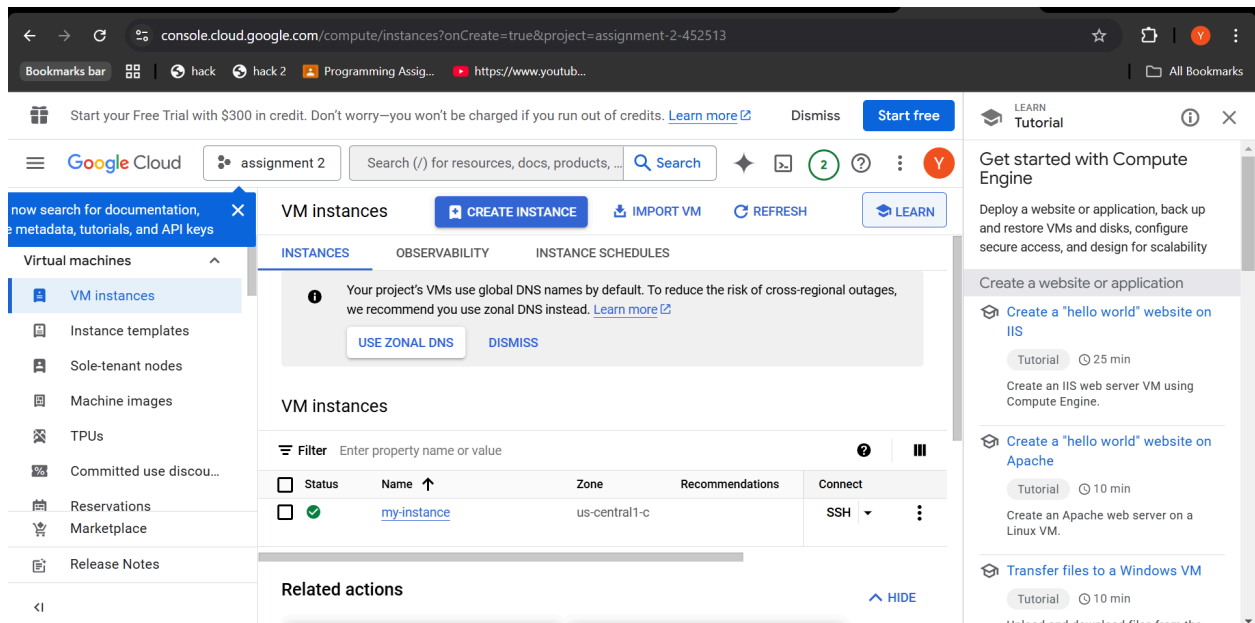
2. Creating a VM in GCP

Steps to Create a VM Instance:

First, we created a VM instance to serve as the base for our setup. Here's how we did it:

1. Open [Google Cloud Console](#).
2. Go to **Compute Engine > VM Instances**.
3. Click **Create Instance**.
4. We configured the VM with the following settings:
 - Name: **my-instance**
 - Machine Type: **e2-micro** (free-tier eligible)
 - Boot Disk: **Ubuntu 20.04**
 - Network Settings: Allowed HTTP and HTTPS traffic.

5. Finally, we clicked Create, and our VM was ready.



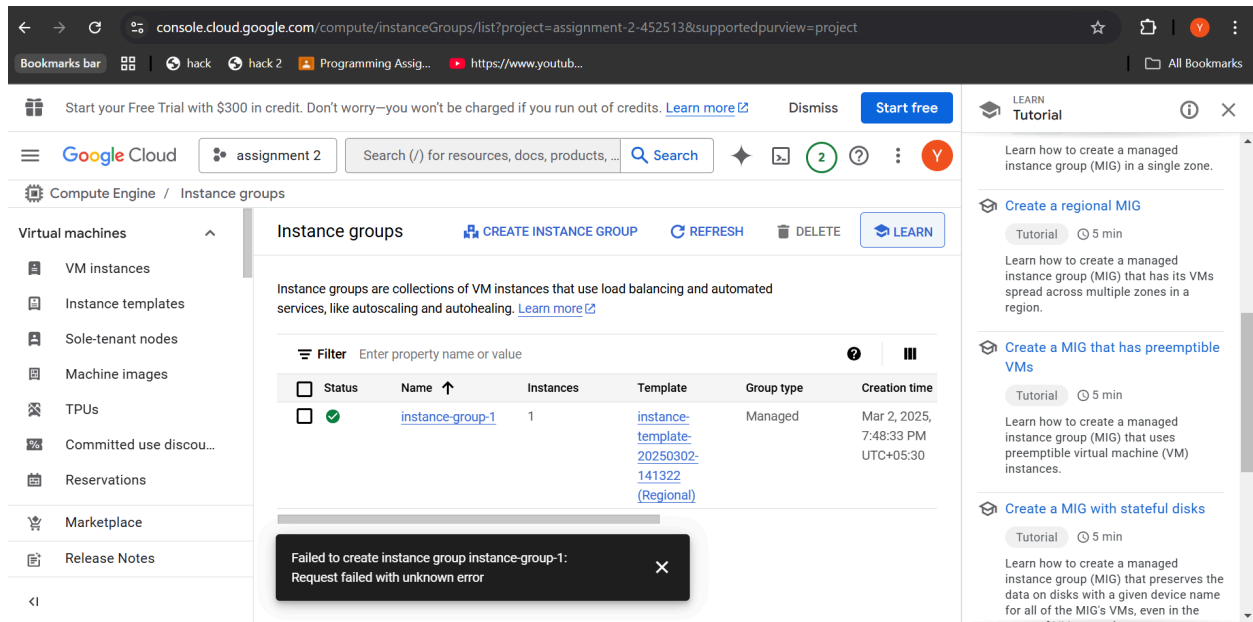
3. Setting Up Auto-Scaling

Next, we enabled auto-scaling to automatically adjust the number of instances based on CPU usage.

Steps to Enable Auto-Scaling:

1. Went to Compute Engine > Instance Templates.
2. Clicked Create Instance Template and set it up using the same settings as our VM.
3. Then, we navigated to Instance Groups and clicked Create Instance Group.
4. We selected Managed Instance Group (MIG) and chose our instance template.
5. Enabled Auto-Scaling with these settings:
 - CPU Utilization Target: 70%
 - Minimum Instances: 1
 - Maximum Instances: 3

- Clicked **Create**, and auto-scaling was successfully configured.



4. Implementing Security Measures

To secure our setup, we configured IAM roles and firewall rules.

(a) Setting Up IAM Roles

- Went to **IAM & Admin > IAM**.
- Clicked **Add** and assigned these roles:
 - Viewer**: Can only view resources.
 - Editor**: Can make changes but with limited permissions.
 - Owner**: Has full control.

(b) Configuring Firewall Rules

- Went to **VPC Network > Firewall**.
- Clicked **Create Rule** and set up these rules:

- Allowed HTTP (80) & HTTPS (443) traffic.
- Restricted SSH access so only our IP address could connect.

The screenshot displays the Google Cloud IAM console interface. The main window is titled "Grant access to 'assignment 2'" and shows a list of roles assigned to the principal "b22cs067@iitj.ac.in". The roles listed are Owner, Editor, and Viewer. Each role has a description of its permissions and a link to "ADD IAM CONDITION". The sidebar on the right contains a "LEARN Tutorial" section with links to "Create an instance template", "Overview of instance groups", "Create a managed instance group (MIG)", and "Create a zonal MIG".

Grant access to "assignment 2"

New principals *

b22cs067@iitj.ac.in

Assign roles

Roles are composed of sets of permissions and determine what the principal can do with this resource. [Learn more](#)

Role *	IAM condition (optional) ?	
Owner	+ ADD IAM CONDITION	
Full access to most Google Cloud resources. See the list of included permissions.		
Editor	+ ADD IAM CONDITION	
View, create, update, and delete most Google Cloud resources. See the list of included permissions.		
Viewer	+ ADD IAM CONDITION	
View most Google Cloud resources.		

SAVE CANCEL

LEARN Tutorial

Instance template

Create an instance template

Tutorial 5 min

Learn how to create a new instance template.

Instance groups

Overview of instance groups

Help document

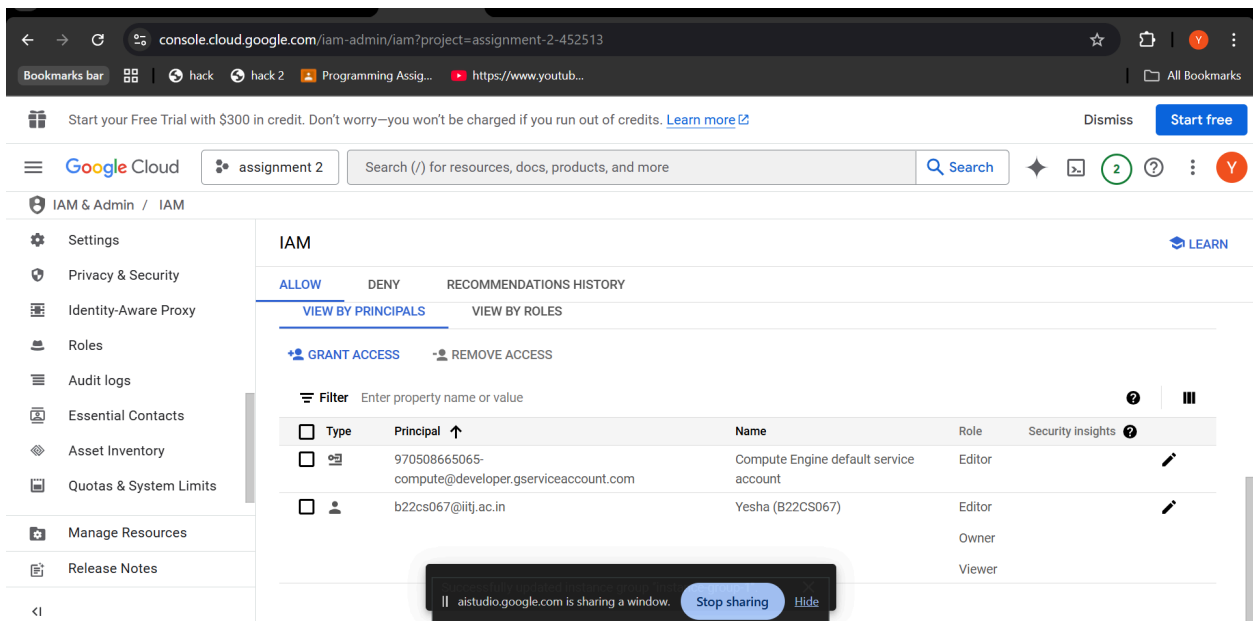
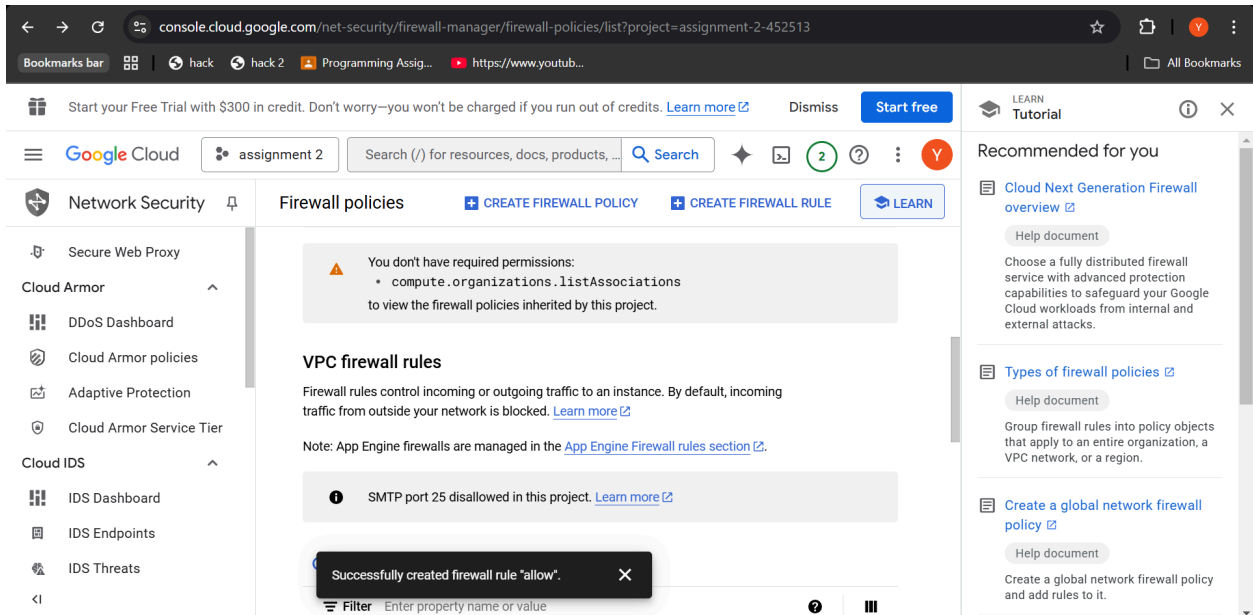
Learn about instance groups, collections of virtual machine (VM) instances that you can manage as a single entity.

Create a managed instance group (MIG)

Tutorial

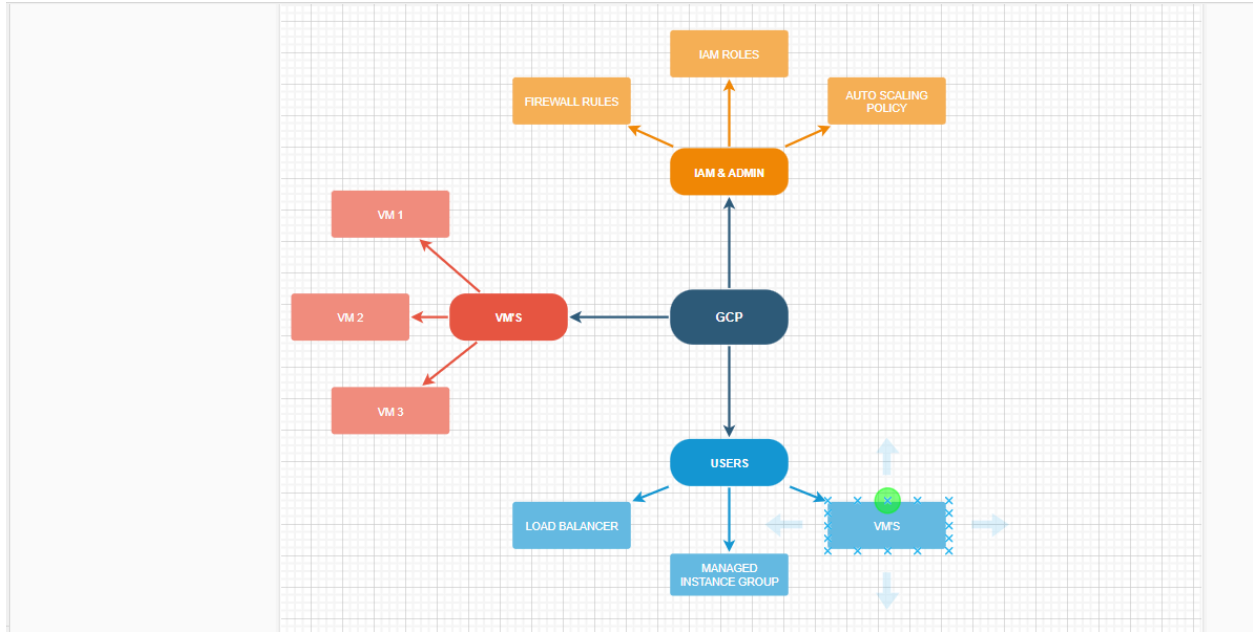
Learn how to create a managed instance group (MIG) using an instance template.

Create a zonal MIG



5. Architecture Design Diagram

We created an architecture diagram to visually represent our setup, including the VM, auto-scaling configuration, and security policies.



DESIGN DIAGRAM

6. GitHub Repository

All deployment scripts and configuration files are stored in our GitHub repository: [🔗 GitHub Repository Link](#) *(Replace with actual link)*

7. Video Demonstration

A recorded video demonstrating our setup is available [here](#)

8. Conclusion

In this assignment, we successfully created a VM, set up auto-scaling to optimize resources, and implemented security best practices. These steps ensure better performance and security in a cloud environment.

