

Task 1:**Create and Manage Cloud Resources**

- a) Tour of Google Cloud
- b) Creating a Virtual Machine
- c) Getting Started with Cloud Shell and g cloud

a) *Tour of Google Cloud*

Google Cloud Platform (GCP) is a suite of cloud computing services offered by Google. It provides a wide range of services, including computing, storage, networking, machine learning, and data analytics, all hosted on Google's infrastructure.

Key Features of Google Cloud Platform:**1. Compute Engine:**

- Provides scalable virtual machines (VMs) for running applications.
- Supports custom machine types and pre-configured templates.
- Offers automatic scaling and load balancing.

2. Cloud Storage:

- A highly durable and scalable object storage service.
- Ideal for storing unstructured data like images, videos, and backups.
- Supports multiple storage classes (e.g., Standard, Nearline, Coldline).

3. BigQuery:

- A fully managed, serverless data warehouse for running fast SQL queries.
- Enables real-time analytics on large datasets.
- Integrates with machine learning tools for advanced data analysis.

4. Cloud Functions:

- A serverless execution environment for running event-driven code.
- Automatically scales based on demand.
- Ideal for microservices and backend logic.

5. AI and Machine Learning:

- Offers pre-trained models for vision, speech, and natural language processing.
- Tools like AutoML allow users to build custom machine learning models without extensive coding.

6. Networking:

- Provides global load balancing and content delivery via Cloud CDN.
- Offers Virtual Private Cloud (VPC) for secure network isolation.
- Includes tools like Cloud DNS and Cloud Interconnect.

7. Security and Identity:

- Identity and Access Management (IAM) for granular access control.
- Data encryption at rest and in transit.

- Security tools like Cloud Security Command Center.

8. DevOps and Monitoring:

- Tools like Cloud Build, Cloud Deployment Manager, and Cloud Source Repositories for CI/CD pipelines.
- Monitoring and logging with Cloud Operations Suite (formerly Stackdriver).

Signup Process to create Free Tier Account:

1. Visit Google Cloud Platform:

- Go to the official Google Cloud website: <https://cloud.google.com/>.

2. Sign Up for a Free Account:

- Click on the **Get Started for Free** button.
- Sign in with your Google account. If you don't have one, create a new Google account.

3. Provide Account Information:

- Fill in the required details, such as your country, name, and payment information.
- It requires a credit card for identity verification, but it offers a **Free Tier** with \$300 in credits for new users, valid for 90 days.

4. Agree to Terms and Conditions:

- Read and accept the terms of service.
- Click **Agree and Continue**.

5. Complete the Signup Process:

- Once your account is verified, you'll be redirected to the **Google Cloud Console**.

6. Create a New Project:

- In the Cloud Console, click on the project dropdown at the top of the page.
- Select **New Project**.
- Give your project a name (e.g., my-first-project).
- Click **Create**.

7. Enable Billing (if required):

- If this is your first time using GCP, you may need to enable billing for your project.
- Go to **Billing** in the left menu and link a billing account.

Tour of Google Cloud Console

1. Access the Cloud Console:

- Log in to the [Google Cloud Console](#).

2. Explore the Dashboard:

- The dashboard provides an overview of your project's resources, including active VMs, storage usage, and billing.

3. Explore the Google Cloud Console

- **Navigation Menu:** Located on the top left (three horizontal lines), this menu gives you access to all GCP services such as Compute Engine, Cloud Storage, BigQuery, etc.
- **Dashboard:** The main dashboard provides an overview of your resources, billing information, and project information.
- **Projects:** GCP organizes resources under projects. You can create multiple projects to manage different environments or applications.
- **IAM & Admin:** Manage user permissions and access control here.
- **Billing:** Monitor your usage and costs associated with your projects.
- **APIs & Services:** Manage API usage, enable or disable APIs, and access API credentials.

4. Create a Virtual Machine:

- Go to **Compute Engine > VM Instances**.
- Click **Create Instance** and configure a VM with your desired specifications.

5. Use Cloud Shell:

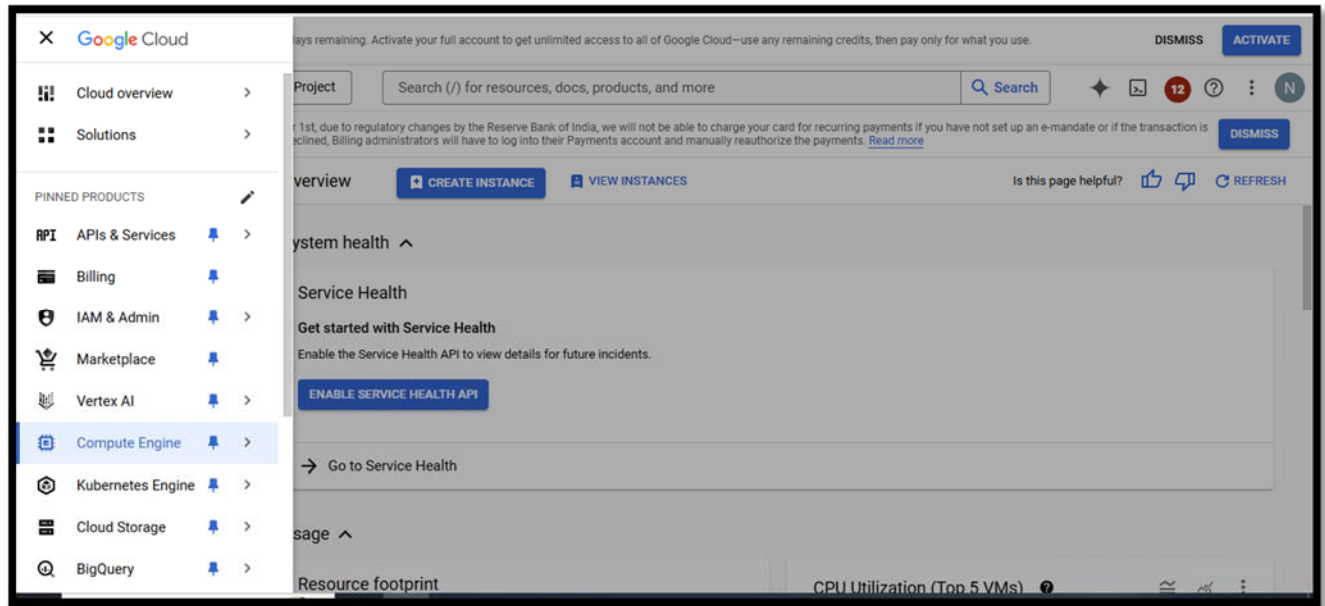
- Click the **Activate Cloud Shell** icon in the top-right corner.
- Use the terminal to run gcloud commands and manage resources.

6. Monitor Resources:

- Go to **Operations -> Monitoring** to view logs, metrics, and alerts for your resources.#

7. Explore Documentation and Support

- Access the documentation through the "Documentation" link in the console.
- This is a valuable resource for learning more about specific services.
- The "Help" option offers various support options, including community forums and direct support (depending on your support plan).



b) Creating a Virtual Machine

1. Navigate to Compute Engine

- In the Google Cloud Console, click on the **Navigation Menu** (top left).
- Select **Compute Engine** > **VM instances**.

2. Create a New VM Instance

- Click on the **Create Instance** button.
- **Name** your instance something identifiable (e.g., my-vm-instance).
- **Region and Zone**: Select a region close to your user base or requirements. The zone is a specific data center within a region.
- **Machine Configuration**:
 - Choose a **machine family** (e.g., General-purpose).
 - Select a **machine type** (e.g., e2-medium with 2 vCPUs and 4 GB RAM).
- **Boot Disk**:
 - The default is a Debian Linux image, but you can choose other operating systems.
 - Set the disk size (default is 10 GB).
- **Firewall**: You can allow HTTP and HTTPS traffic if you plan to run a web server.
- **Identity and API access**: Choose default service account or a specific service account for the VM.
- Click **Create** to launch your virtual machine.

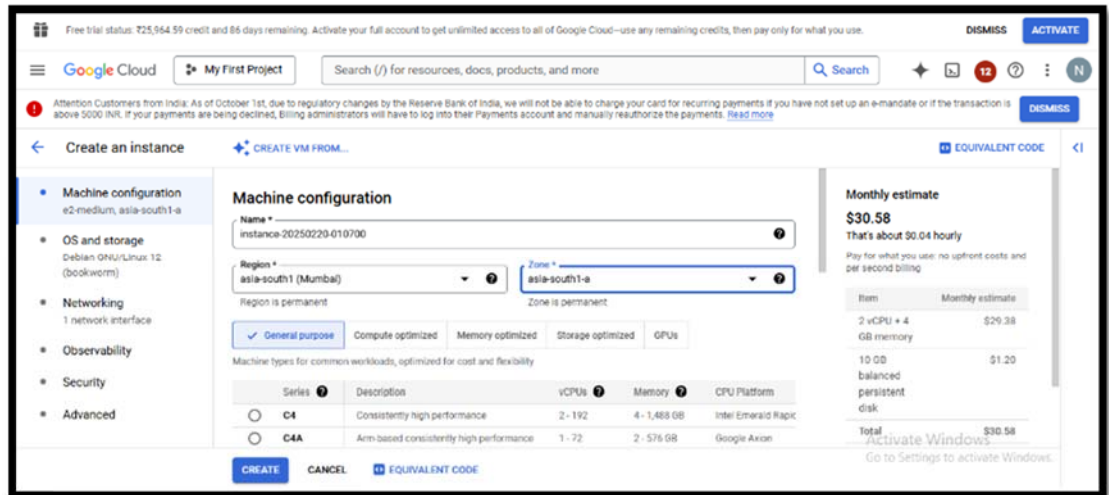
3. Accessing Your VM

- Once the VM is created, it will appear in the VM instances list.

- Click on the **SSH** button next to your VM to open a terminal session directly in your browser.

4. Stop/Delete VM (When Not in Use)

- To avoid charges, remember to stop or delete your VM when it's not needed. You can do this from the VM instances page by clicking on the three-dot menu next to your instance.



c) Getting Started with Cloud Shell and gcloud

1. Open Cloud Shell

- In the Google Cloud Console, look for the **Cloud Shell** icon in the upper right corner (a terminal icon).
- Click the icon to open a Cloud Shell session. This gives you access to a Debian- based shell with gcloud and other tools pre-installed.
- Cloud Shell is free to use, with a small amount of persistent storage.

2. Initialize the gcloud CLI

- Cloud Shell will automatically authenticate with your Google account and set up the **gcloud CLI**.
- Run the following command to check the version of the gcloud CLI:

```
gcloud --version
```

- You can check your gcloud configuration by running:

```
gcloud config list
```

- Set the project you're working on:

```
gcloud config set project [PROJECT_ID]
```

- Set the region or zone:

```
gcloud config set compute/region [REGION]  
gcloud config set compute/zone [ZONE]
```

3. Basic gcloud Commands

- **List Available Zones:**

```
gcloud compute zones
```

- **Create a VM Instance:**

```
gcloud compute instances create [INSTANCE_NAME] \  
  --zone=[ZONE] \  
  --machine-type=[MACHINE_TYPE] \  
  --image-family=[IMAGE_FAMILY] \  
  --image-project=[IMAGE_PROJECT] \  
  --boot-disk-size=[DISK_SIZE] \  
  --tags=[TAGS]
```

- **Example:**

```
gcloud compute instances create my-vm \  
  --zone=us-central1-a \  
  --machine-type=e2-micro \  
  --image-family=debian-11 \  
  --image-project=debian-cloud \  
  --boot-disk-size=10GB \  
  --tags=http-server
```

- **SSH into a VM:**

```
gcloud compute ssh my-vm --zone=us-central1-a
```

- **Stop a VM:**

```
gcloud compute instances stop my-vm --zone=us-central1-a
```

- **Delete a VM:**

```
gcloud compute instances delete my-vm --zone=us-central1-a
```

Task 5:

- a. Introduction to Amazon EC2
- b. Introduction to Amazon Simple Storage Service (S3)

a. Introduction to Amazon EC2

Description:

- **Amazon Elastic Compute Cloud (EC2)** is a web service that provides resizable compute capacity in the cloud. It allows you to launch and manage virtual servers (called instances) in AWS data centers.

Launch an EC2 Instance:

1. Sign in to AWS Management Console:

- Go to the [AWS Management Console](#).
- Sign in with your AWS account.

2. Navigate to EC2 Dashboard:

- In the AWS Management Console, search for **EC2** in the services menu and click on it.

3. Launch an Instance:

- Click the **Launch Instance** button.
- Choose an **Amazon Machine Image (AMI)** (e.g., Amazon Linux 2 or Ubuntu).
- Select an **Instance Type** (e.g., t2.micro for free-tier eligibility).
- Configure instance details (e.g., number of instances, network settings).
- Add storage (default is usually sufficient for basic tasks).
- Add tags (optional, e.g., Name: MyEC2Instance).
- Configure security groups (e.g., allow SSH access from your IP).
- Review and click **Launch**.

4. Create a Key Pair:

- When prompted, create a new key pair or use an existing one.
- Download the **.pem** file (required for SSH access).

5. Access the EC2 Instance:

- Once the instance is running, note its **Public IP**.
- Use SSH to connect to the instance:

```
ssh -i /path/to/key.pem ec2-user@[PUBLIC_IP]
```

- Replace /path/to/key.pem with the path to your key file and [PUBLIC_IP] with the instance's public IP.

6. Terminate the Instance (Optional):

- After completing the lab, terminate the instance to avoid unnecessary charges:
 - Go to the EC2 Dashboard.
 - Select the instance and click **Instance State > Terminate**.

b. Introduction to Amazon Simple Storage Service (S3)

Description:

- **Amazon S3 (Simple Storage Service)** is a scalable object storage service designed to store and retrieve any amount of data from anywhere.

Create an S3 Bucket and Upload a File

1. Sign in to AWS Management Console:

- Go to the [AWS Management Console](#).
- Sign in with your AWS account.

2. Navigate to S3 Dashboard:

- In the AWS Management Console, search for **S3** in the services menu and click on it.

3. Create a Bucket:

- Click the **Create Bucket** button.
- Enter a **Bucket Name** (must be globally unique).
- Choose a **Region** (e.g., us-east-1).
- Configure settings (e.g., versioning, encryption, tags).
- Click **Create Bucket**.

4. Upload a File:

- Select the bucket you just created.
- Click the **Upload** button.
- Add files from your computer and click **Upload**.

5. Set Permissions (Optional):

- To make the file publicly accessible:
 - Select the file and click **Actions > Make Public**.
- To restrict access:
 - Use bucket policies or IAM roles.

6. Access the File:

- Once uploaded, note the file's **Object URL**.
- Open the URL in a browser to access the file (if public).

7. Delete the Bucket (Optional):

- After completing the lab, delete the bucket to avoid charges:
 - Select the bucket and click **Delete**.
 - Confirm the deletion.