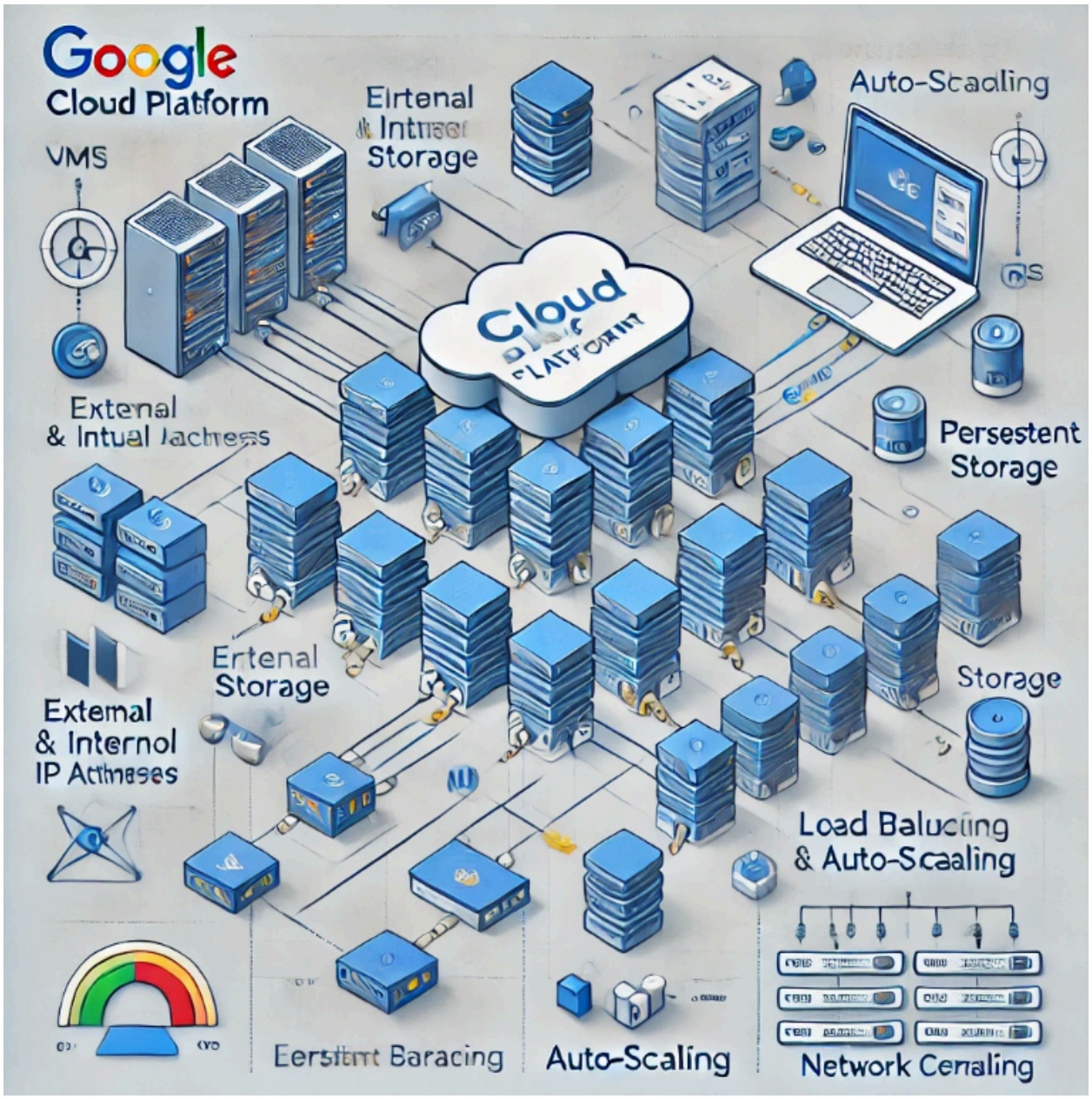
GCP Compute Engine



In traditional corporate data centers, physical servers are required to deploy applications. However, in the cloud, Google Cloud Platform (GCP) offers Compute Engine for deploying applications, which provides:

- Rental virtual servers
- Virtual machines within GCP

Features of Compute Engine:

1. **Create and manage virtual machines**
2. **Load balancing and auto-scaling**
3. **Attach storage**
4. **Manage network connections and configurations for VMs**

Compute Engine Machine Families:

1. **General Purpose (E2, N2, N1, N2D):** Ideal for web application servers, small databases, and development environments.
2. **Memory Optimized (M2, M1):** Suitable for large databases and in-memory analytics.
3. **Compute Optimized (C2):** Designed for gaming applications.

Customizing Your Virtual Machine:

- Choose the amount of CPU, memory, and disk space needed.
- Various machine types are available. For example, "e2-standard-2" refers to:
    - **e2:** The machine family
    - **standard:** The type of workload
    - **2:** The number of CPUs

As the number of vCPUs increases, memory, disk, and networking capabilities also scale up.

Images:

- **Operating System:** Select the operating system for your VM.
- **Types of Images:**
    - **Public Images:** Provided by Google or open-source communities.
    - **Custom Images:** Created by you for your specific projects.

Internal and External IP Addresses:

- **External (Public) IP Address:** This type of IP address is accessible over the internet. It allows external users or services to connect to your virtual machine (VM) from outside your network.
- **Internal (Private) IP Address:** This IP address is used within a corporate network. It is not accessible from the internet and is typically used for communication between resources within the same network.

Key Points:

- **Unique External IPs:** Two resources cannot share the same external IP address. Each resource with internet access must have a unique external IP.
- **Shared Internal IPs:** Different networks can use the same internal IP addresses, as they are isolated from each other.
- **IP Assignment for VMs:**
    - Every VM is assigned at least one internal IP address.
    - If you stop a VM, it will lose its external IP address. Upon restarting, a new external IP address will be assigned.

Static IP Address:

- To create and attach a static IP to your VM, use the VPC Network > External IP Address option in the Google Cloud Console.
- A static IP can be reassigned to another VM instance within the same project.
- A static IP remains attached to your VM even if you stop the machine. To release it, you must manually detach it.
- You will continue to be billed for a static IP address even when it is not in use.

You can provide a startup script while creating the VM Instance, this script will run first when Instance created.
For example, Installing apache server through startup script.