What is cloud computing?

flexible
accessible from anywhere
scale up or down
managed or serverless

offers strategic value
latest innovations
Competitive advantage
Higher ROI

*"Cloud computing is the **on-demand** availability of computing resources as **services** over the internet. It eliminates the need for enterprises to procure, configure, or manage resources themselves, and they **only pay for what they use.**"*

cost-effective
No need to overbuild
pay-as you go
committed pricing

Infrastructure scaling
Application development
Disaster recovery
Data storage
Big data analytics

Three types of cloud computing service models

- Infrastructure as a service(IaaS) offers compute and storage services.
- Platform as a service(PaaS) offers a develop-and-deploy environment to build cloud apps
- Software as a service(SaaS) delivers apps as services.

Source: https://cloud.google.com/docs, https://cloud.google.com/products

GCP: Services ecosystem

Compute


App Engine


Cloud Functions


Cloud Run


Compute Engine


Container-Optimized OS


GKE On-Prem


GPU


Kubernetes Engine

Data Analytics


BigQuery


Cloud Composer


Cloud Data Fusion


Data Catalog


Dataflow


Datalab


Dataprep


Dataproc


Pub/Sub


Genomics

Networking


Cloud Armor


Cloud CDN


Cloud DNS


Cloud External IP Addresses


Cloud Firewall Rules


Cloud Interconnect


Cloud Routes


Cloud Router


Cloud VPN


Partner Interconnect


Premium Network Tier


Standard Network Tier


Cloud Load Balancing


Cloud NAT


Cloud Network


Traffic Director


Virtual Private Cloud

Storage


Cloud Storage


Filestore


Persistent Disk

Databases


Cloud Bigtable


Cloud Spanner

Cloud SQL

Datastore

Firestore

Memorystore

API Management

API Analytics

API Monetization

Apigee API Platform

Apigee Sense

Cloud Endpoints

Developer Portal

Developer Tools

Cloud Build

Cloud Code

Cloud Code for IntelliJ

Cloud Scheduler

Cloud SDK

Cloud Source Repositories

Cloud Tasks

Container Registry

Gradle App Engine Plugin

IDE plugins

Maven App Engine Plugin

Tools for PowerShell

Tools for Visual Studio

Cloud Test Lab

AI and Machine Learning

AI Platform

AI Hub

AutoML Video Intelligence

AutoML

Dialog Flow Enterprise Edition

AutoML Tables

AutoML Translation

Speech-to-Text

Text-to-Speech

Video Intelligence API

Cloud Natural Language API

Cloud TPU

Cloud Translation API

Cloud Vision API

Data Labeling

Recommendations AI

Source: https://cloud.google.com/docs, https://cloud.google.com/products

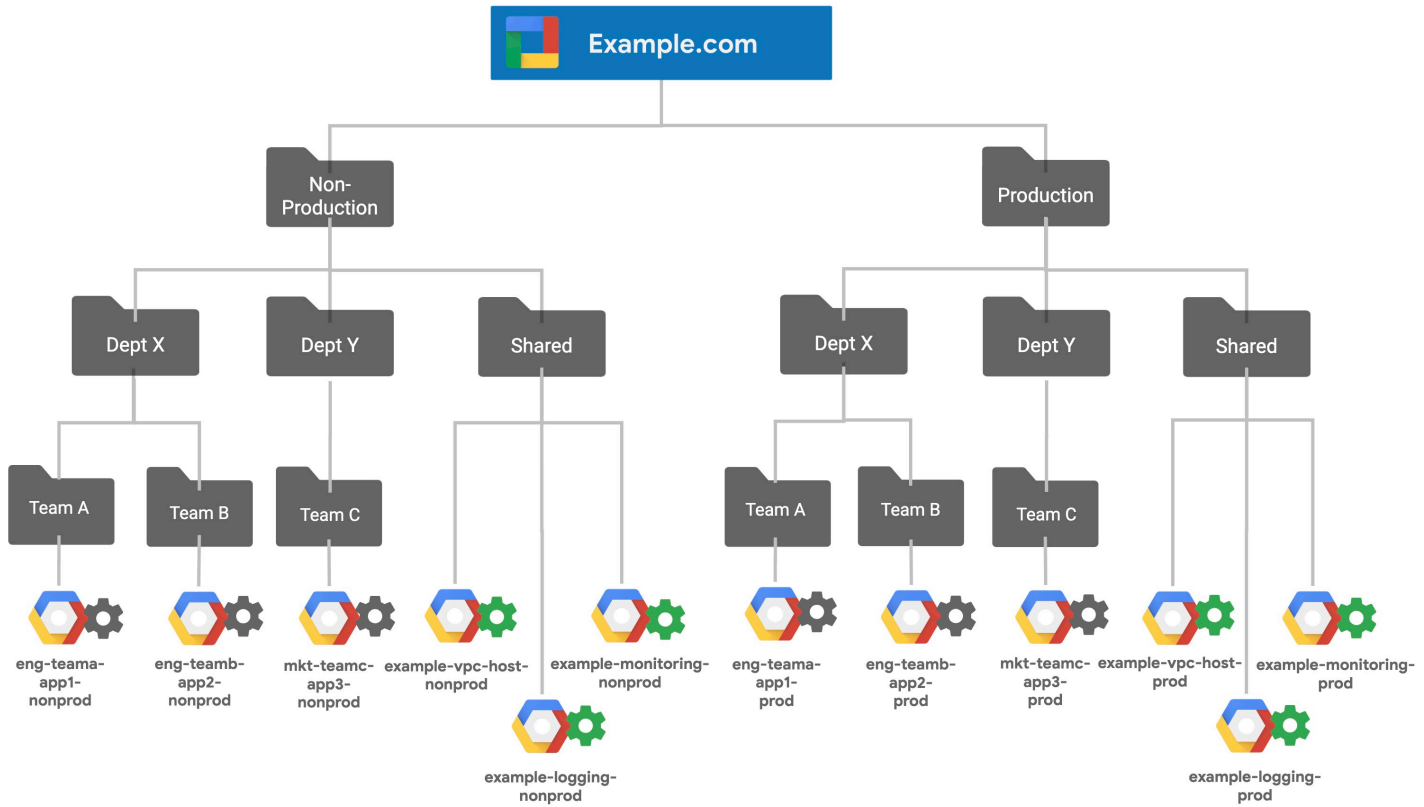
GCP: Cloud setup checklist

This checklist helps set up Google Cloud for scalable, production-ready enterprise workloads. The checklist is designed for administrators who are trusted with complete control over the company's Google Cloud resources.

- [ ] 1. Set up or confirm an identity account
- [ ] 2. Add users and groups to your identity account
- [ ] 3. Set up administrator access to your organization
- [ ] 4. Set up billing
- [ ] 5. Set up the resource hierarchy
- [ ] 6. Set up access control for your resource hierarchy
- [ ] 7. Set up support
- [ ] 8. Set up your networking configuration
- [ ] 9. Set up logging and monitoring
- [ ] 10. Configure organizational security settings

Folders

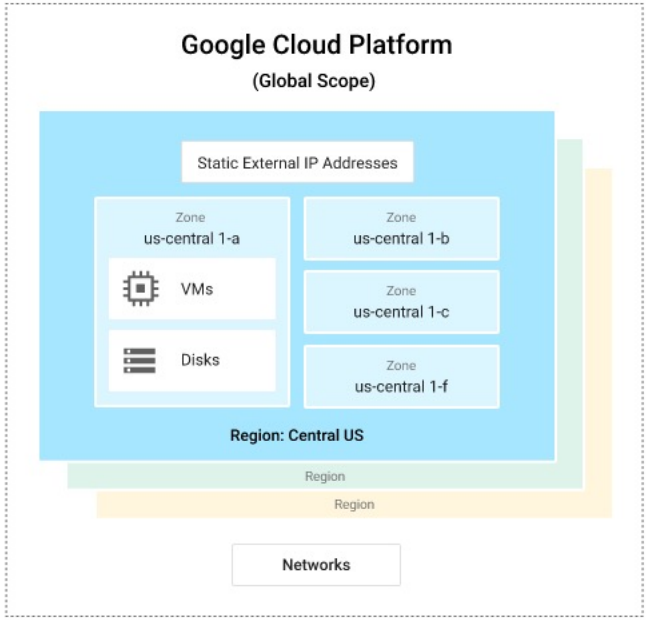
Organization
Environment
Business Unit
Teams
Projects

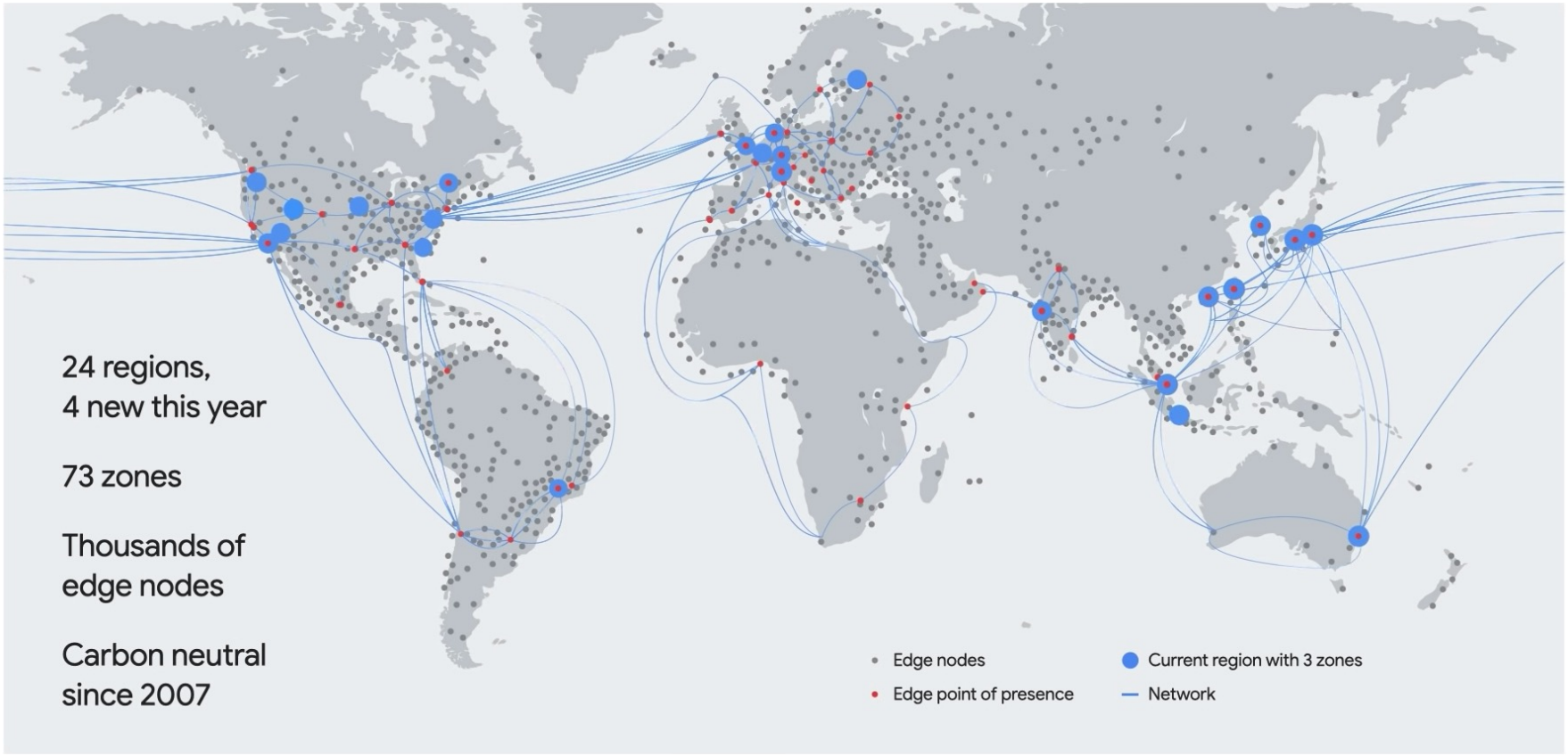


Source: https://cloud.google.com/docs, https://cloud.google.com/products

Network: Global Network Footprint

Global, regional, and zonal resources: Google Cloud consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are contained in Google's data centers around the globe. The resources are Global, Regional, Zonal or Multiregional depending upon the intended operations.

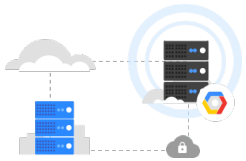




Source: https://cloud.google.com/docs, https://cloud.google.com/products

GCP: Network Primer

Connect



Hybrid connectivity

Cloud Interconnect, Cloud VPN, Carrier Peering, and Direct Peering provide connectivity solutions for Google Cloud.

Virtual Private Cloud (VPC)

VPC network includes granular IP address range selection, routes, firewall, Cloud VPN (Virtual Private Network), and Cloud Router.

Cloud DNS

Cloud DNS is a scalable, reliable, programmable, and managed authoritative domain naming system (DNS) service running on the same infrastructure as Google

Service Directory

Service Directory helps reduce the complexity of management and operations by providing a single place to publish, discover, and connect all applications services.

Scale

Cloud Load Balancing

Cloud Load Balancing can put resources behind a single anycast IP, scale resources up or down with intelligent autoscaling, and integrate with Cloud CDN.

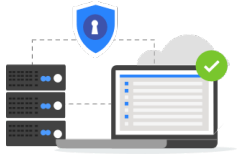
Cloud CDN

Cloud CDN leverages Google's globally distributed edge caches to accelerate content delivery for websites and applications served out of Compute Engine. Cloud CDN lowers network latency, offloads origins, and reduces serving costs

Secure

Cloud Armor

Google Cloud Armor works with an HTTP(S) load balancer to provide built-in defenses against infrastructure DDoS attacks



Cloud NAT

Cloud NAT enables provisioning application instances without public IP addresses while also allowing access to the internet in a controlled and efficient manner

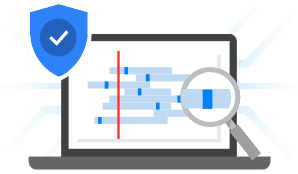
Network Telemetry

Network Telemetry provides both network and security operations with in-depth, responsive VPC flow logs for Google Cloud networking services.

VPC Service Controls

VPC Service Controls enables enterprises to keep their sensitive data private while leveraging Google Cloud's fully managed storage and data processing capabilities

Optimise



Network Intelligence Center

Network Intelligence Center provides unmatched visibility into your network in the cloud along with proactive network verification.

Network Service Tiers

Improve network experience performance and gain control over network costs with Network Service Tiers.

Source: https://cloud.google.com/docs, https://cloud.google.com/products

GCP: Authentication Overview

Principals:

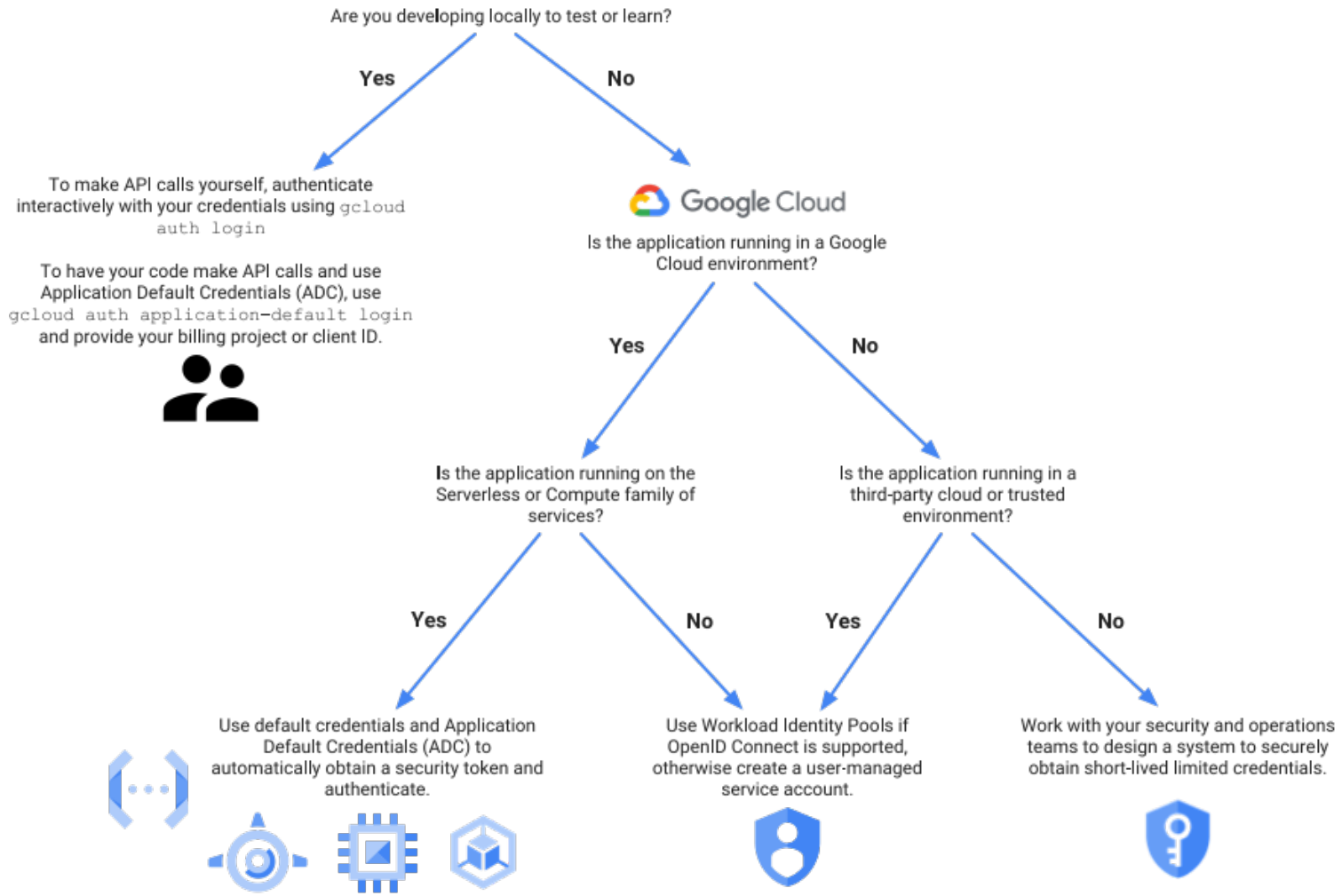
A principal is an entity, also known as an identity, that can be granted access to a resource.

- User accounts are managed as Google Accounts, and they represent a developer, administrator, or any other person who interacts with Google Cloud.
- Service accounts are managed by IAM, and they represent non-human users. They are intended for scenarios where your application needs to access resources or perform actions on its own

Application Default Credentials:

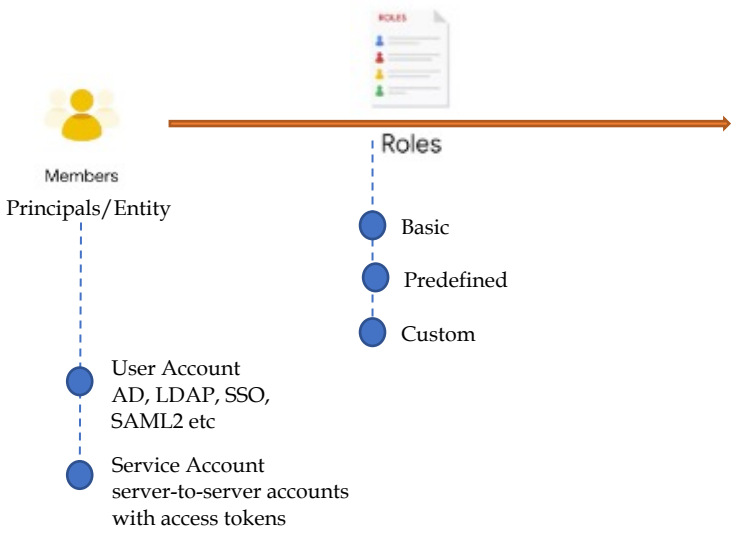
Google auth libraries use a strategy called *Application Default Credentials (ADC)* to detect and select credentials based on environment or context.

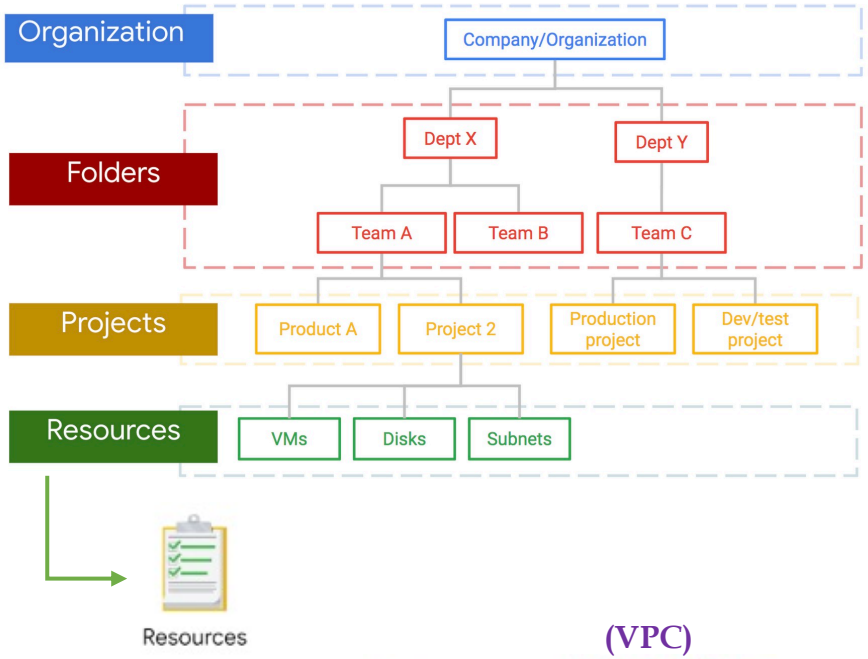
- **Gcloud Credential**: A credential provided by the Gcloud tool that identifies a human user that needs to authenticate to access Google APIs.
- **Service Account Key**: A credential that identifies a non-human user that needs to authenticate to access Google APIs.
- **OAuth Client ID**: A credential that identifies the client application which allows human users to sign-in through 3-legged OAuth flow, which grants the permissions to the application to access Google APIs on behalf of the human user.



Source: https://cloud.google.com/docs, https://cloud.google.com/products

GCP: The Full Picture



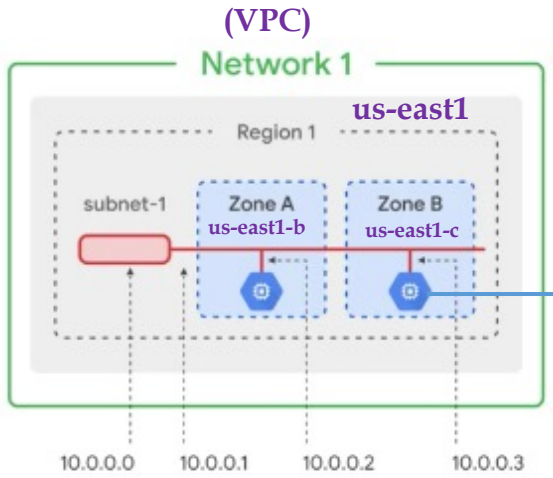


Root node for Google Cloud Resources
Roles – Organisation Admin, Project Creator

Grouping mechanism and isolation boundaries like different depts, legal entities, tribes.
Roles – Admin, Creator, Viewer

Trust boundary of a scope

Compute, Storage, Networking resources



- ✓ Principle of least privileges – identity, roles and privileges.
- ✓ Child policies cannot restrict access granted at the parent level

Cloud Platform Console
https://console.cloud.google.com/

Cloud Shell and Cloud SDK
- Prebuilt command-line tool with 5GB storage disk,
- gcloud, gsutil (Storage), bq (BigQuery), kubectl

RESTful API
https://developers.google.com/apis-explorer
OAuth2 used for authentication

Cloud Console Mobile App

Source: https://cloud.google.com/docs, https://cloud.google.com/products