Introduction to **Google Cloud**

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Ground **Rules**

Observe the following rules to ensure a supportive, inclusive, and engaging classes

Give full attention in class
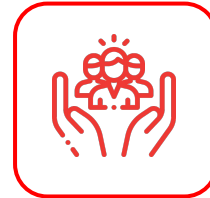

Mute your microphone when you're not talking

Keep your camera on

Turn on the CC Feature on Meet

Use raise hand or chat to ask questions

Make this room a safe place to learn and share

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What is Cloud?

There is no cloud, it's just someone else's computers

"**Cloud is about how you do computing, not where you do computing.**"

Paul Maritz, CEO of VMware
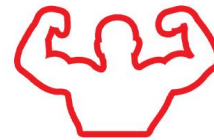
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Benefit of Cloud Computing

Cost

Speed

Scalability

Mobility

Productivity

Reliability

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Cloud
Characteristics

- On-demand self-service
  No human intervention needed

- Broad network access
  Accessible anywhere

- Resource pooling
  Cloud provider share resources
  to consumer

- Rapid elasticity
  Get more resources quickly

- Measured service
  Pay as you go

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Cloud **Model**

- Infrastructure as a Service (IaaS)

- Platform as a Service (PaaS)

- Software as a Service (SaaS)

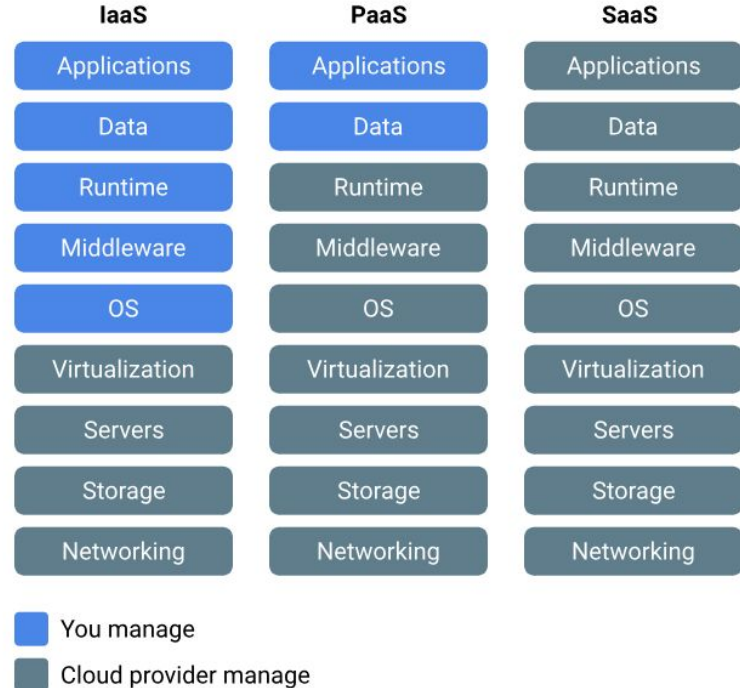bangk!t

Infrastructure as a Service (IaaS)

- CPU, memory, etc, are provided. User needs to manage the OS and the application. (ex: GCE)

Platform as a Service (PaaS)

- The platform is a managed service. All the user provides is the application. (ex: GAE)

Software as a Service (SaaS)

- The platform and software is provided as a service to the user. User supplies the data. (ex: Gmail)

IaaS	PaaS	SaaS
Applications	Applications	Applications
Data	Data	Data
Runtime	Runtime	Runtime
Middleware	Middleware	Middleware
OS	OS	OS
Virtualization	Virtualization	Virtualization
Servers	Servers	Servers
Storage	Storage	Storage
Networking	Networking	Networking

You manage
Cloud provider manage

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Deployment **Model**

- Private cloud
- Public cloud
- Hybrid cloud

History of The Cloud

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History of **The Cloud**

- **1980s : On-premise servers**
  - You own everything
- **2000 : Data centers**
  - Colocation center
  - You pay for the hardware
  - You manage
  - You rent the space
- **2006 : Virtualization**
  - You control & configure virtual machines
  - You rent hardware & space
  - Pay for what you provision
- **2009 : Managed service**
  - Completely managed by cloud provider
 - Pay for what you use

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GCP Essentials

Regions and Zones

Regions are independent geographic areas consist of zones. A zone is a deployment area for Google Cloud resources within a region. You can visualize zone as a data center, even though a zone is not necessarily a physical building.

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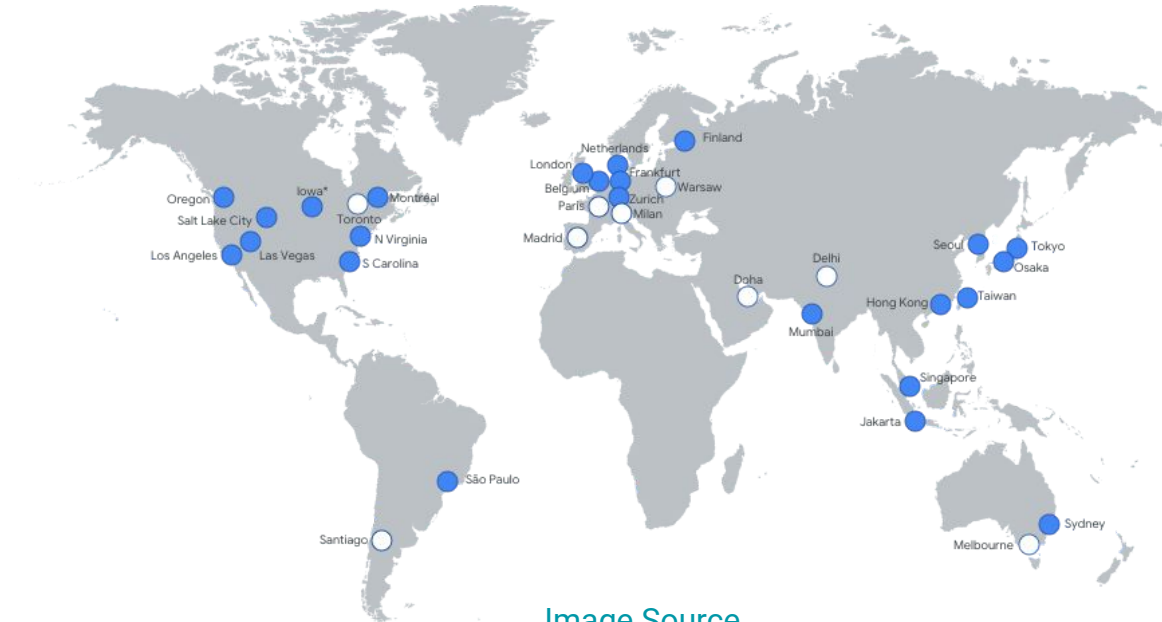
GCP **Resource Hierarchy**

- **Projects** : Base hierarchy level. Every resource is associated with a project.
- **Folders** : Provide additional grouping mechanism between projects. They can be nested.
- **Organization** : Represent an organization and the root node of Google Cloud resource hierarchy


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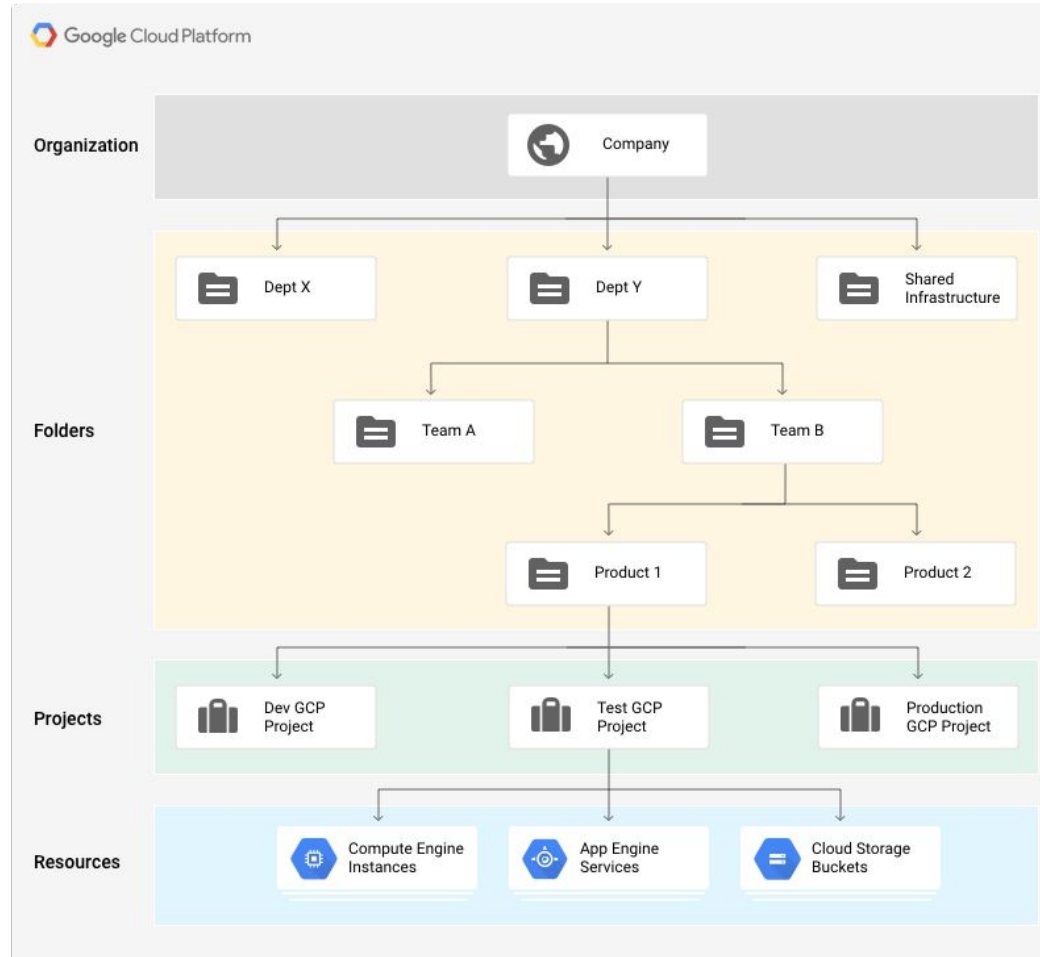
GCP **Billing Account**

- A Billing Account defines who pays for a given set of resources.
- Is a cloud-level resource managed in the cloud console.
- Tracks all of the costs incurred by your Google Cloud usage.
- Results in a single invoice per Cloud Billing account.
- Operates in a single currency.

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Interacting with GCP

- **Google Cloud Console**
  Web-based administrative service
- **Cloud SDK & Cloud Shell**
  Command-line interface to GCP
- **REST API**
  Access GCP resources through HTTP request
- **Cloud Console Mobile App**
  Mobile app for Android and iOS that lets you examine and manage the resources in GCP
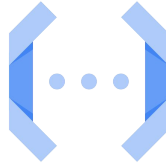
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Google Cloud Compute Options
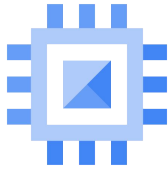
Compute
Engine

App
Engine

Cloud
Function

Kubernetes
Engine

Cloud Run

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Google Compute Engine

- Virtual machines with industry-leading price/performance
- Scalable, high-performance VMs
- Run any computing workload
- Predefined or custom machine types
- Windows or Linux
- No upfront investment required

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Virtual machine **types**

- General-purpose workloads
  - Cost-optimized
  - Balanced
  - Scale-out optimized
- Optimized workloads
  - Memory-optimized
  - Compute-optimized
  - Accelerator-optimized

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Google App Engine

- A flexible, zero ops platform for building highly available apps
- No need to buy, build, or operate hardware/infrastructure.
- No managing servers or configuring deployments.
- Focus on app development instead of operations.
- Use a range of languages and tools.
- Automatic scaling

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App Engine Environments

Standard environment	Flexible environment
- Fully-managed - Scale to zero - Specific versions of supported languages - Changes/configurations limited	- Docker container support - VMs exposed - Any language in your container - More options for infrastructure customization and configuration for performance

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Google Cloud Functions

- A lightweight and fully-managed serverless execution environment for building and connecting cloud services
- You write simple, single-purpose functions attached to events emitted from your cloud infrastructure and services.

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Events and **Triggers**

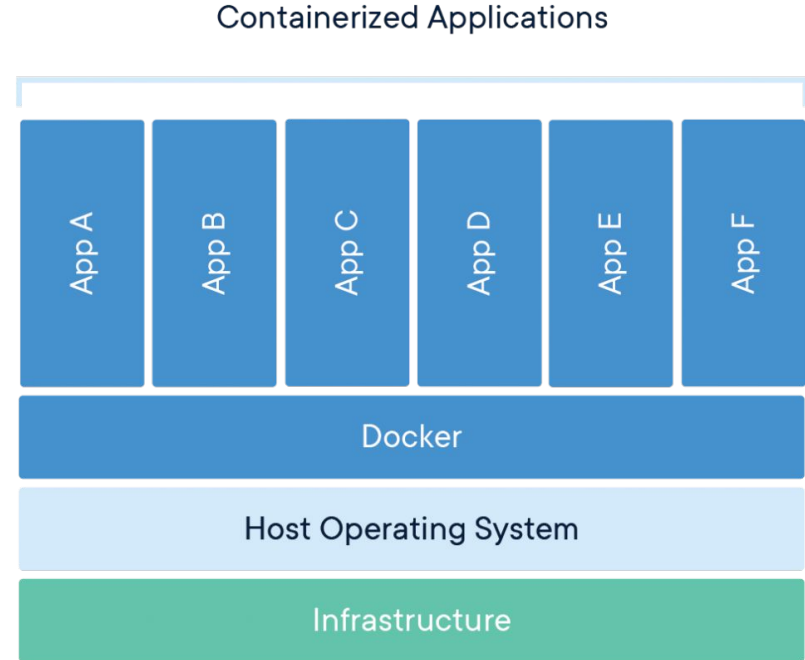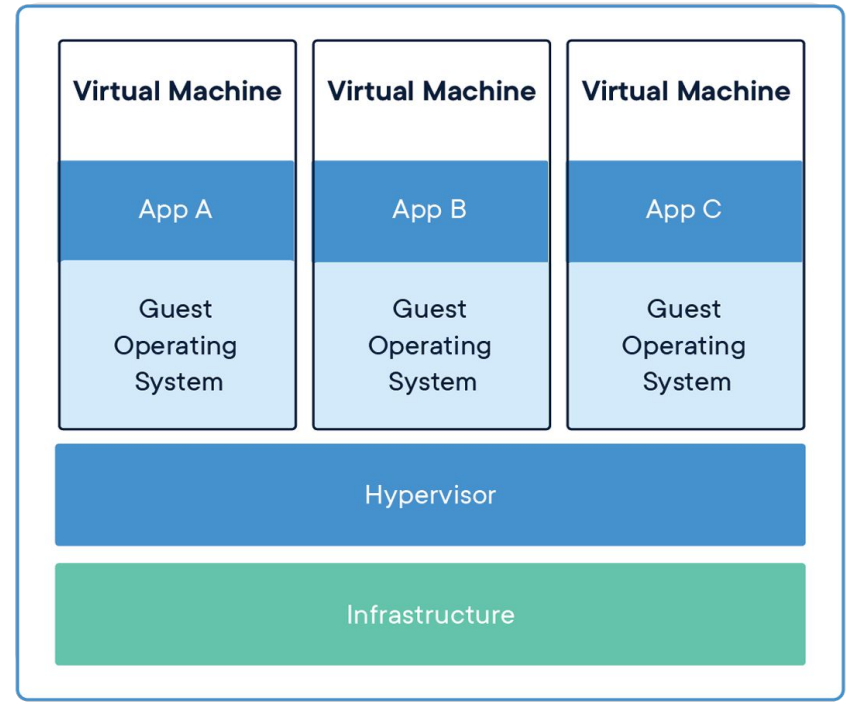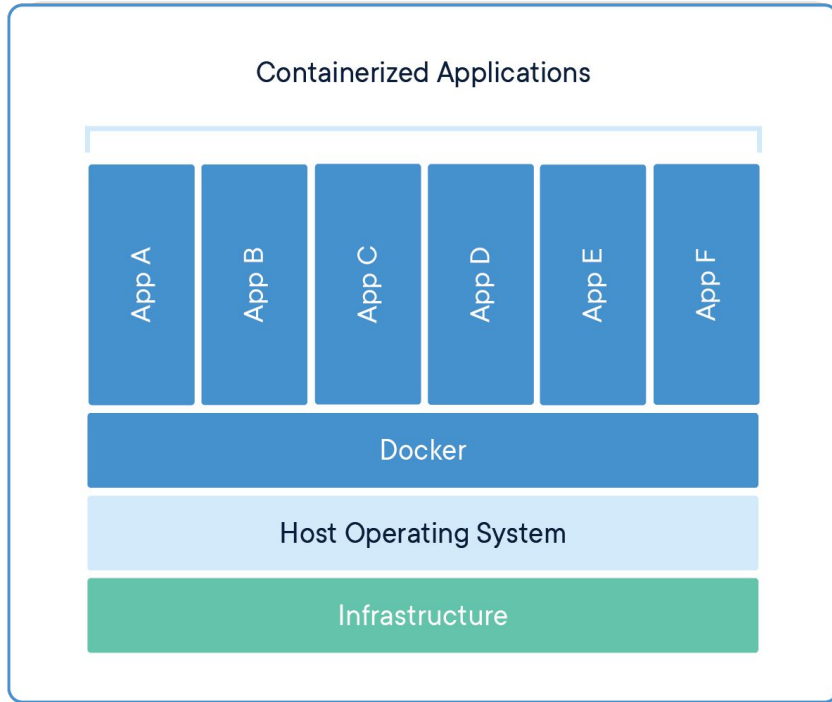| Events	Triggers
Events are things that happen within your cloud environment that you might want to take action on. These might be changes to data in a database, files added to a storage system, or a new virtual machine instance being created.	Creating a response to an event is done with a trigger. A trigger is a declaration that you are interested in a certain event or set of events.
- HTTP - Cloud Storage - Cloud Pub/Sub - Cloud Firestore - Firebase - Stackdriver Logging	- HTTP - Cloud Pub/Sub - Other sources (e.g. Firebase)

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Google Kubernetes Engine

Cluster manager and orchestration engine built on Google's container experience

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What is a Container?

A container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another.

Containerized Applications

App A	App B	App C	App D	App E	App F

Docker

Host Operating System

Infrastructure

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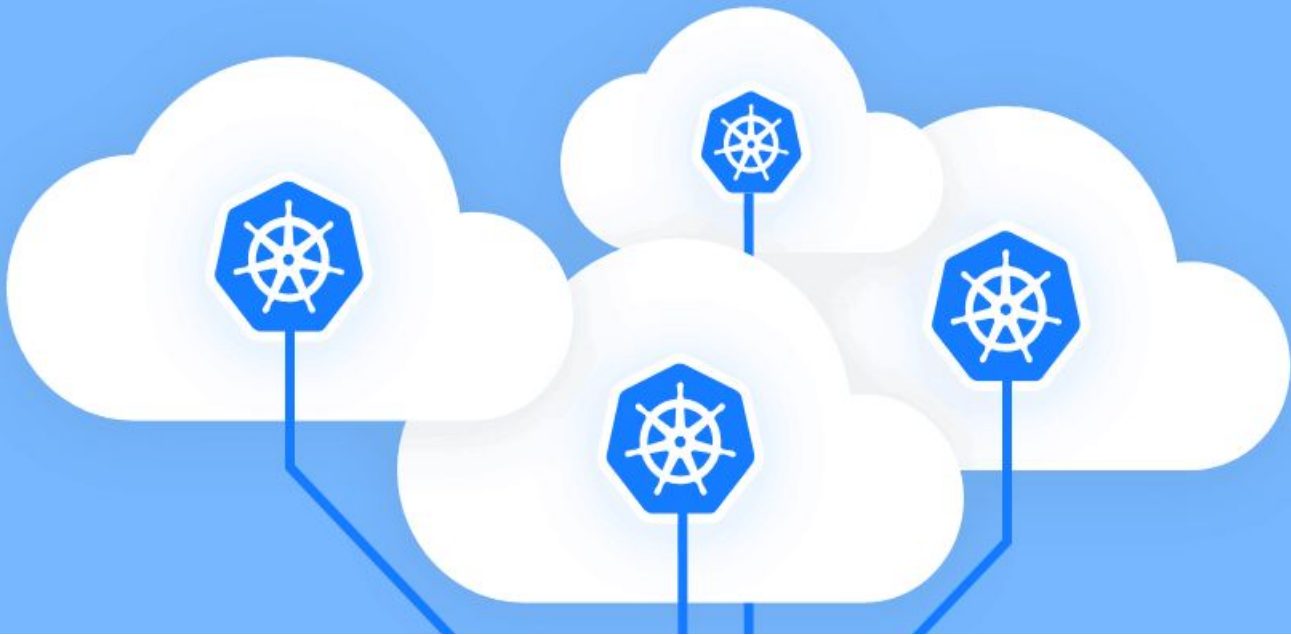
Containers and Virtual Machines

What is a **Kubernetes?**

Kubernetes is an open source orchestration system for automating the management, placement, scaling and routing of containers.

kubernetes

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Why use **Kubernetes?**

Kubernetes has become the standard orchestration platform for containers. All the major cloud providers support it, making it the logical choice for organizations looking to move more applications to the cloud.

Google Kubernetes Engine

Google Kubernetes Engine (GKE) provides a managed environment for deploying, managing, and scaling your containerized applications using Google infrastructure.

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GKE have some benefits:
- Speed up app development without sacrificing security
- Streamline operations with release channels
- Manage infrastructure with Google SREs

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Cloud Run

- Develop and deploy highly scalable containerized applications on a fully managed serverless platform
- Cloud Run allows you to deploy stateless containers
- Serverless
- Workloads are automatically scaled up or down to zero depending on the traffic
- Cloud Run (fully managed)
  - Fully serverless
  - No cluster to manage
  - Pay for what you use
- Cloud Run on GKE
  - Serverless developer experience
  - Runs in your GKE cluster

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Sharing Session

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Discussion

Quiz

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Thank You

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