

Cloud Computing

Cloud Build / Cloud Run

CIS437

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Adapted from Google Cloud Computing Foundations, Overview of Cloud Computing (Wufka & Canonico)



A bit of an interim step

These two resources seem to have very few "official" documentation resources outside of Google's doc pages

- Yet, they make up a good portion of things behind the scenes
- Let's talk about them!

Cloud Build / Cloud Run

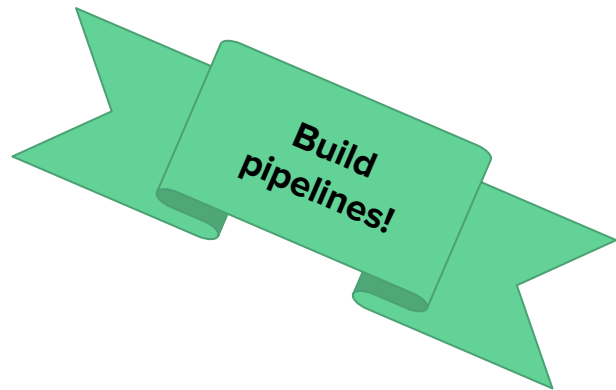
Analogue: AWS CodeBuild / AWS App Runner

Cloud Build:

- Build
- Test
- Deploy

Cloud Run:

- Run <previously built> application via containers
 - Frontend/backend
 - LLMs
 - Workloads
 - ...



Cloud Build

Extensive overview:

<https://medium.com/@williamwarley/guide-for-gcp-cloud-build-c2ea264a7f97>

"Fully managed CI/CD platform"

- Integrates with all the Google Cloud services
- Essentially, setup a push and auto-build/test pipeline via config (YAML) files

```
Add to cloudbuild.yaml in Automate:  
options:  
  logging: CLOUD_LOGGING_ONLY
```

Cloud Build

Create containerized application with Docker

- Ensure it runs first!
- Push to Artifact Registry and build

Application is now ready to be deployed!

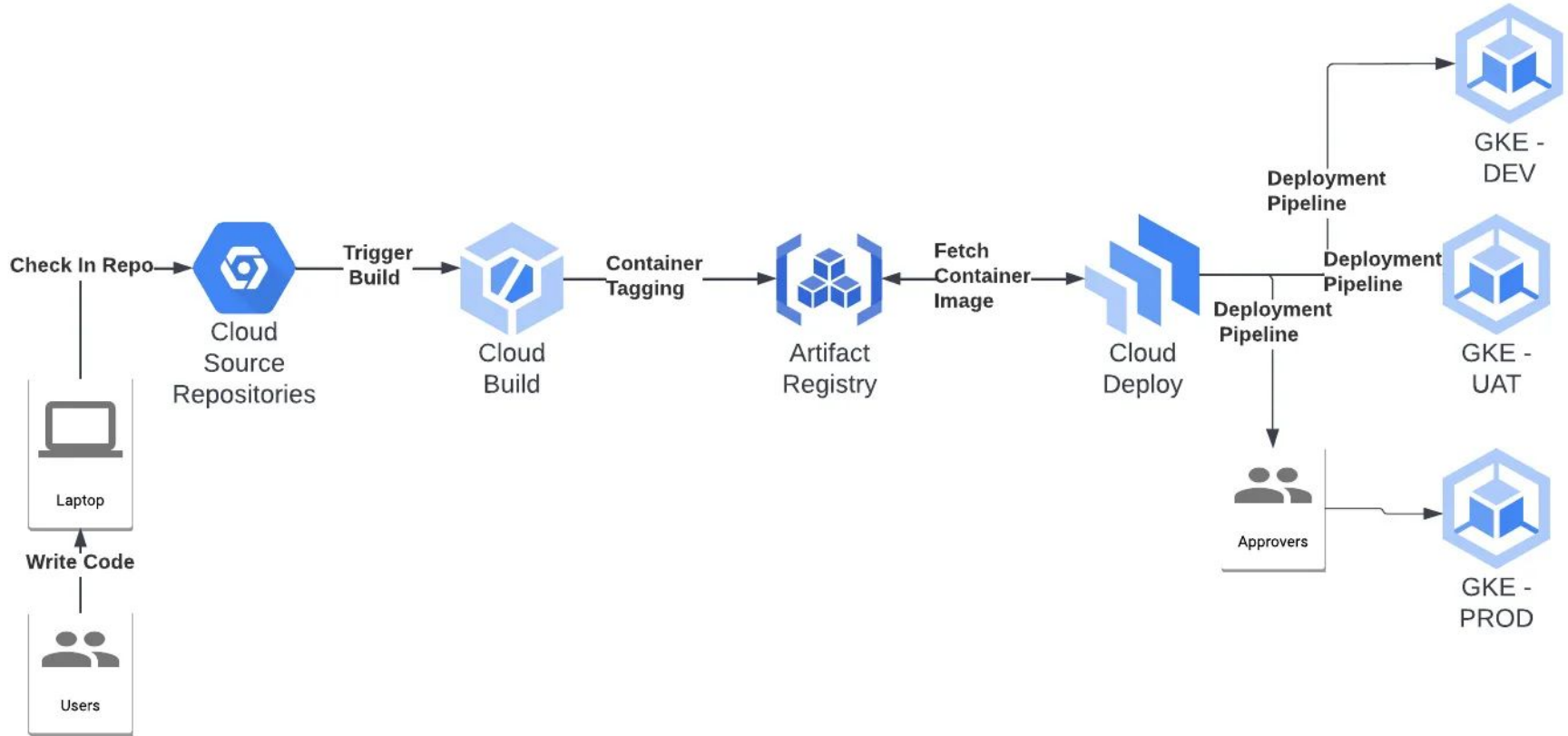
To where?

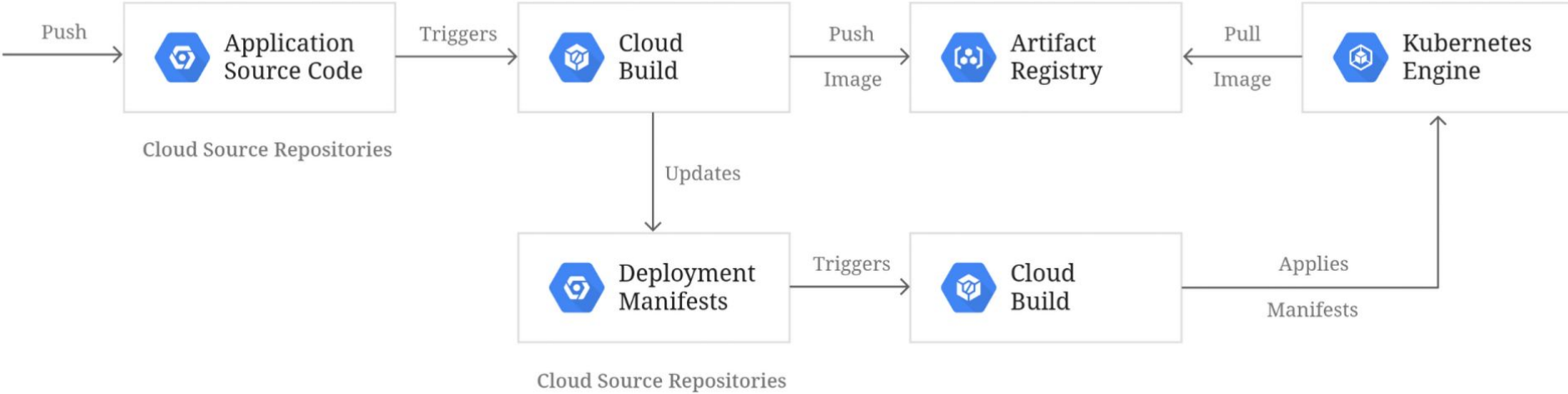
- Cloud Run...
- App Engine, Cloud Functions, GKE, Compute,
 - Anywhere that can take a Docker image, really



CAN WE FIX IT?

<https://cloud.google.com/build/docs/build-push-docker-image>

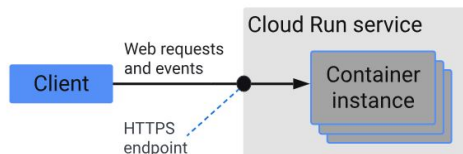




Cloud Run

Service to run/deploy jobs in the Artifact Registry

- Or whatever it is eventually replaced with



<https://www.youtube.com/watch?v=1t94tdyojs0>

Cloud Run *services*

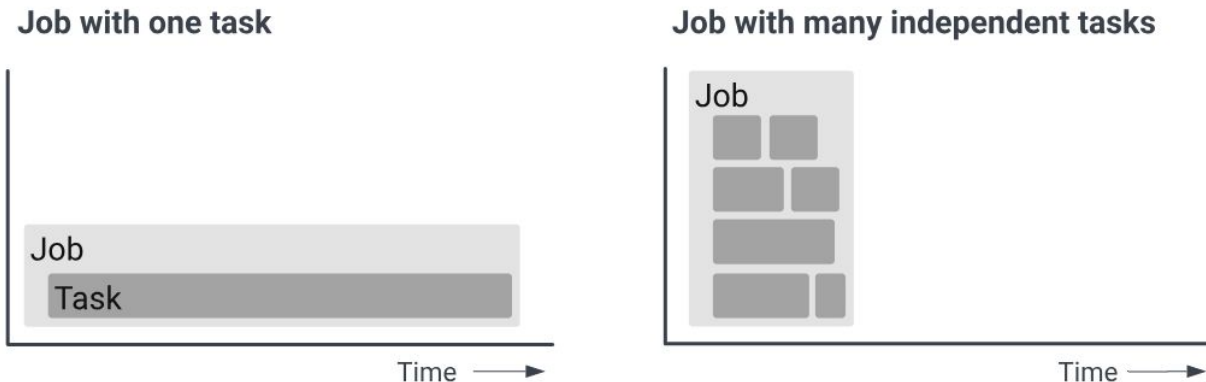
Use when:

- Website/web app
- API/microservices
- Streaming data processing
- Asynchronous workloads
- AI inference

Cloud Run *jobs*

Use when:

- Scripts/tools
- Array jobs (think - high-performance computing)
- Scheduled jobs



Limitations

<https://cloud.google.com/run/docs/fit-for-run>

"In order to be a good fit for Cloud Run, your app needs to meet all of the following criteria.

- Serves requests, streams, or events delivered via HTTP, HTTP/2, WebSockets, or gRPC, or executes to completion.
- Does not require a local persistent file system, but either a local ephemeral file system or a network file system.
- Is built to handle multiple instances of the app running simultaneously.
- Does not require more than 8 CPU and 32 GiB of memory per instance."

And don't forget

Cloud Functions → Cloud *Run* Functions

Serverless now part of the Cloud Run ecosystem

- Still transitioning, however



Demo - CI/CD

Push to GitHub

Notification to Google Cloud

Auto build/deploy

<https://cloud.google.com/run/docs/continuous-deployment-with-cloud-build>

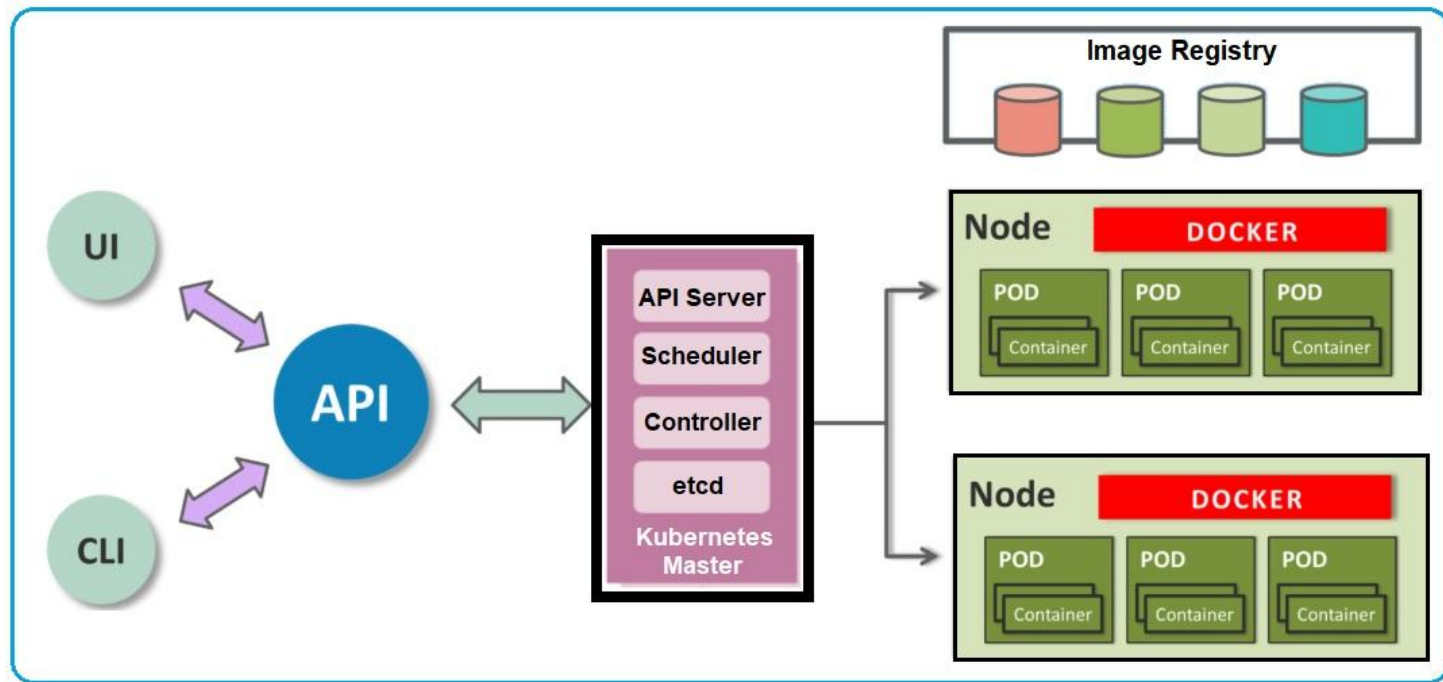
→ <https://cloud.google.com/run/docs/quickstarts/deploy-continuously> ←

A full course on Cloud Run

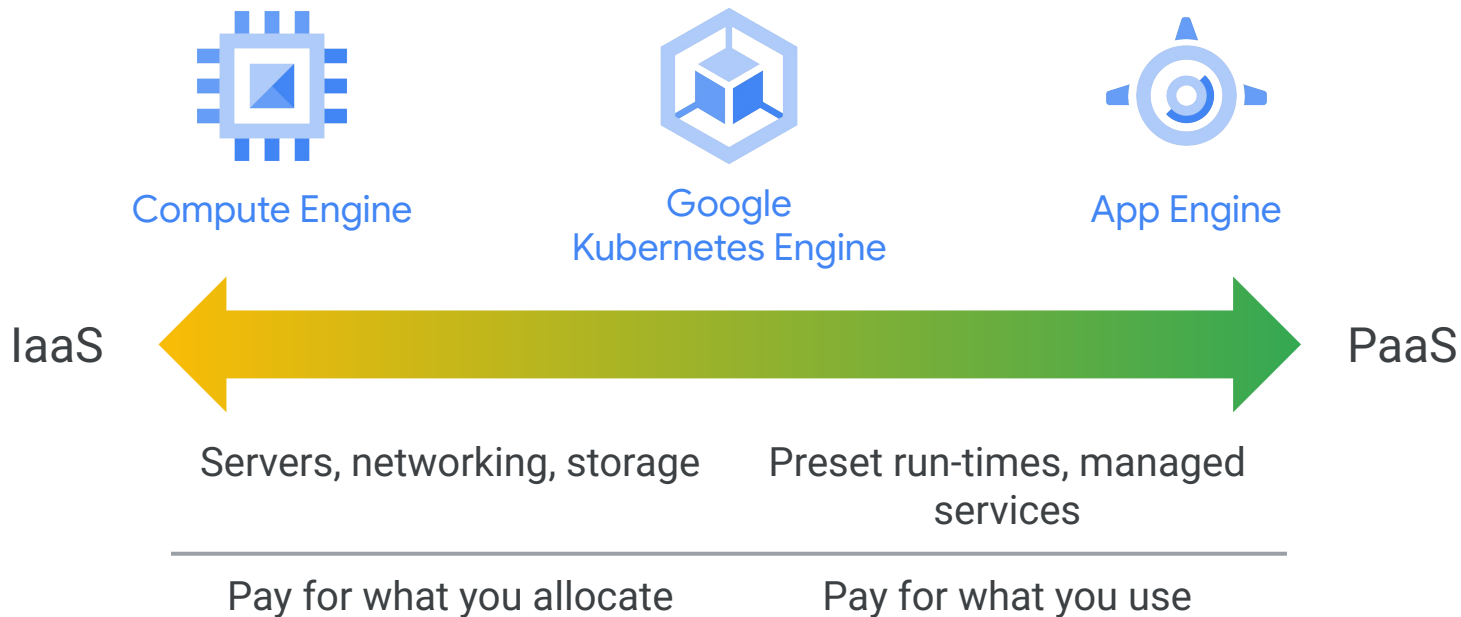
https://www.cloudskillsboost.google/course_templates/371

https://www.skills.google/course_templates/559?catalog_rank=%7B%22rank%22%3A3%2C%22num_filters%22%3A1%2C%22has_search%22%3Atrue%7D&search_id=59145636





Kubernetes



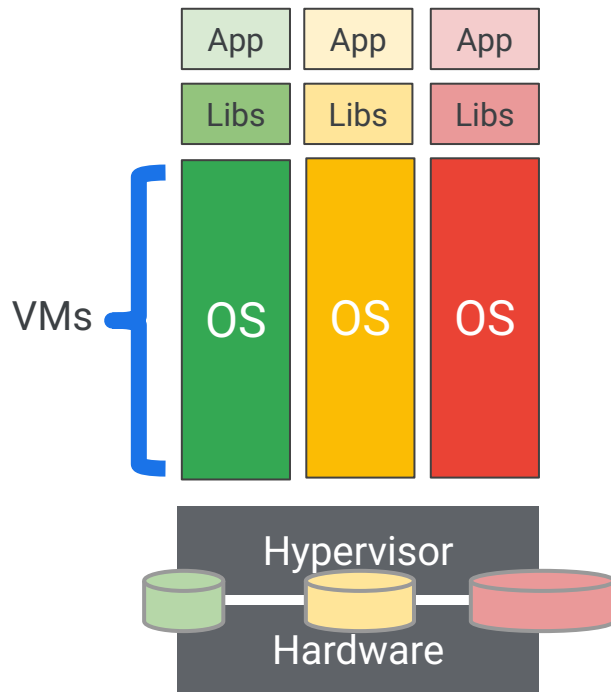
IaaS to PaaS comparison



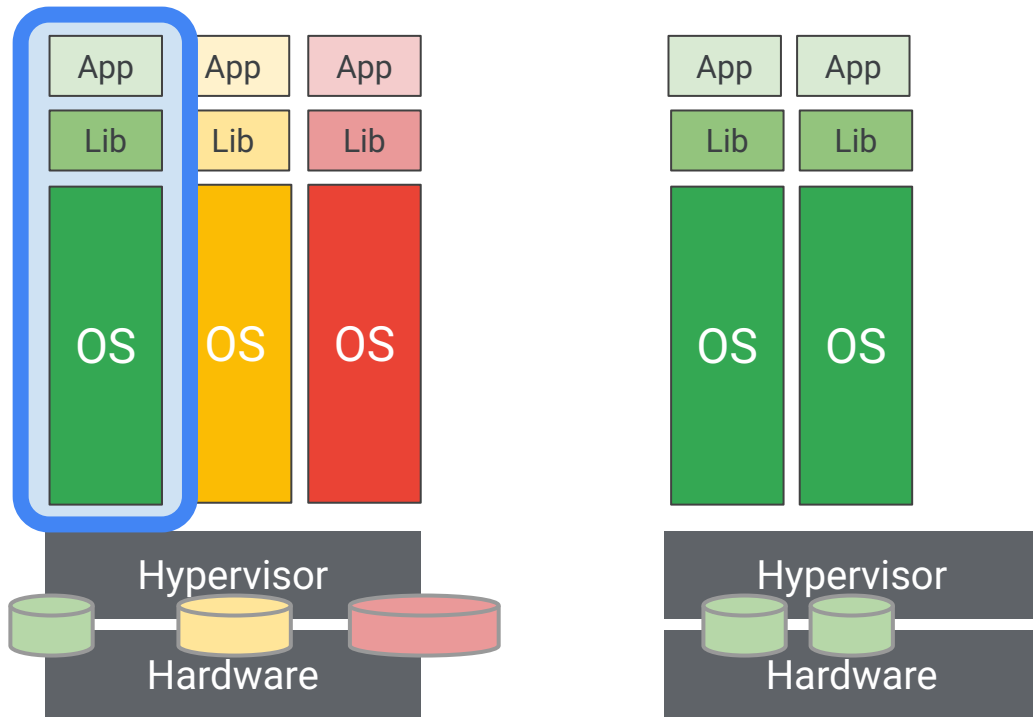
Where GKE fits within Google Cloud

			
Compute Engine	App Engine	Cloud Functions	Google Kubernetes Engine
IaaS	PaaS	Serverless logic	Hybrid
Virtual machines with industry-leading price/performance	A flexible, zero ops platform for building highly available apps	A lightweight fully managed serverless execution environment for building and connecting cloud services	Cluster manager and orchestration engine built on Google's container experience

IaaS virtualizes the hardware



Virtualizing the hardware costs time and resources



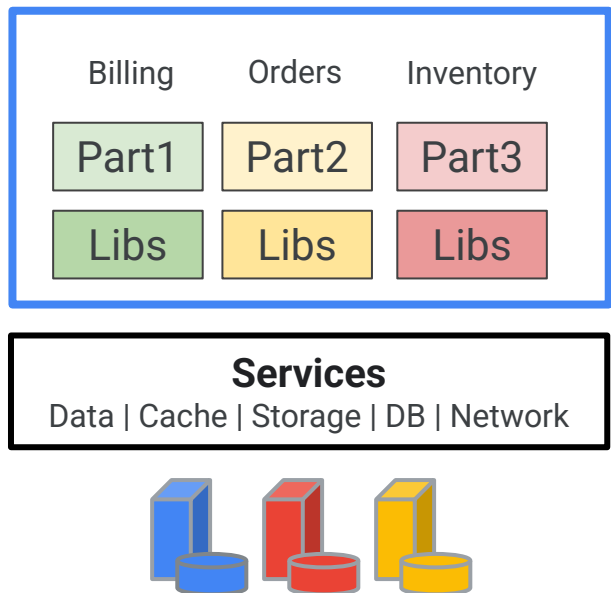
Using PaaS provides hosted services and an environment that can scale workloads independently



Write code in self-contained workloads and include any libraries.



Decouple code easily.



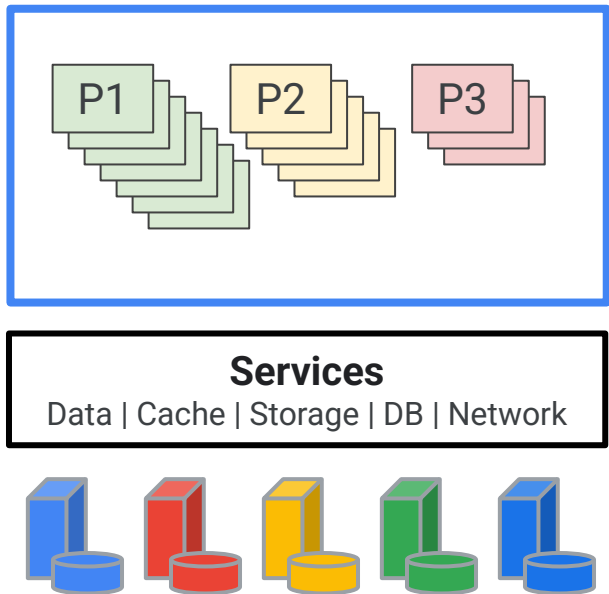
The platform scales to meet demand



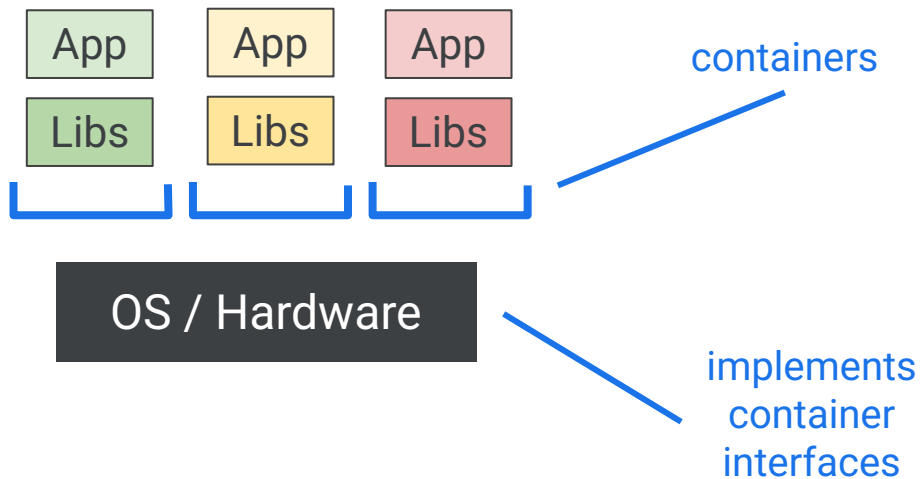
Build your apps as decoupled microservices.



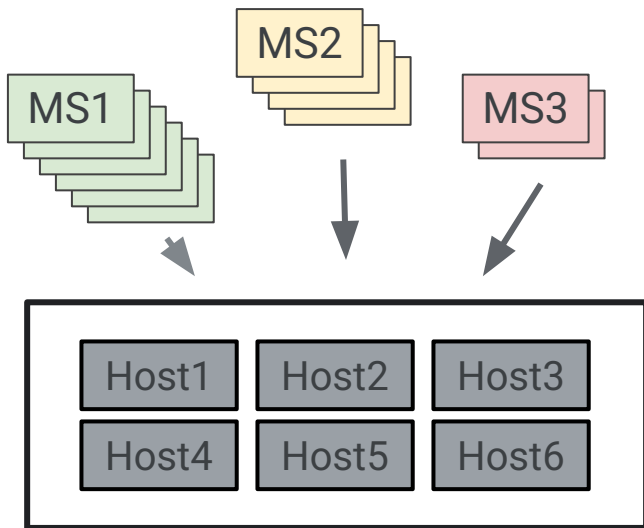
You may not be able to fine-tune the underlying architecture to save cost.



Leveraging containers offer the IaaS flexibility with PaaS scalability

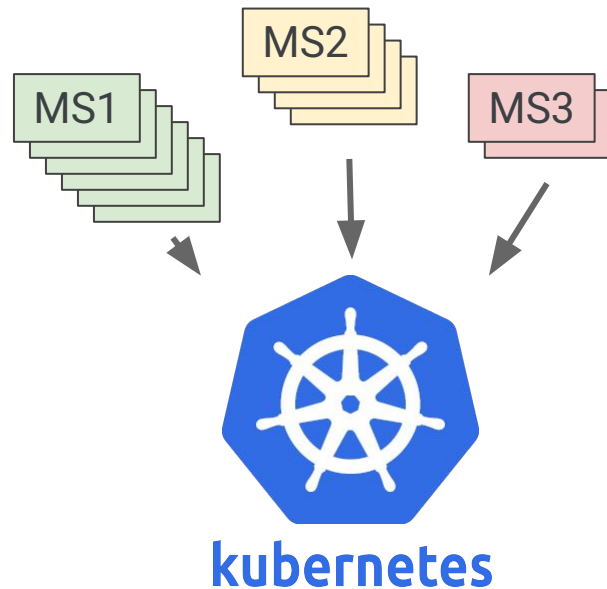


Using a common host configuration, you can deploy hundreds of containers on a group of servers

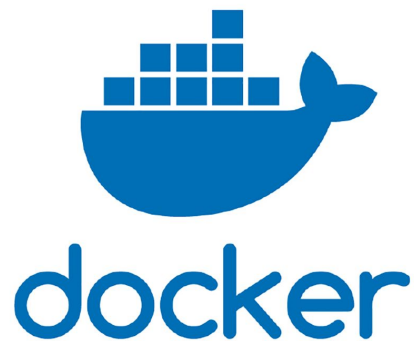
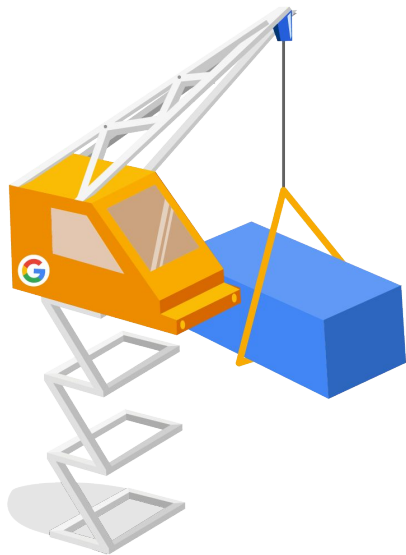


Kubernetes makes it easy to orchestrate many containers on many hosts

An open-source container management platform



The relationship between containers, Docker, and Kubernetes



GKE is a managed environment for deploying containerized apps



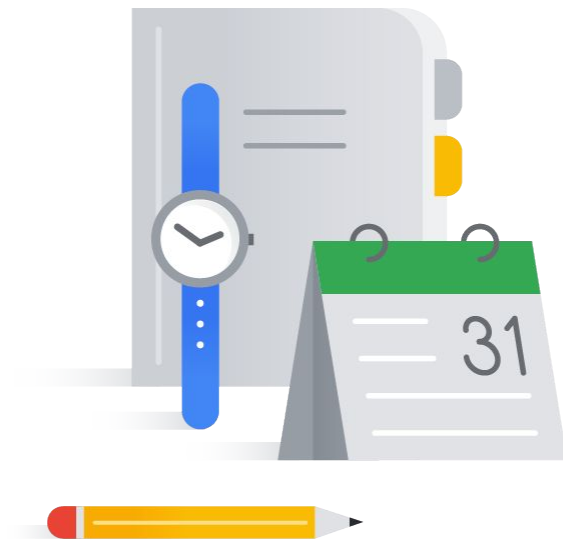
Agenda

Event Driven Programs with Cloud Functions

Lab: Cloud Functions: Qwik Start - Command Line

Containerizing and Orchestrating Apps with GKE

Lab: Kubernetes Engine: Qwik Start



Lab Intro

Kubernetes Engine: Qwik Start

Get hands on practice with container creation and application deployment with GKE.

The lab can be found [here](#).



works but has some issues with the github part...

~~Google Kubernetes Engine Pipeline using Cloud Build~~

https://www.cloudskillsboost.google/focuses/52829?catalog_rank=%7B%22rank%22%3A1%2C%22num_filters%22%3A0%2C%22has_search%22%3Atrue%7D&parent=catalog&search_id=39619962

Managing Deployments Using Kubernetes Engine

https://www.skills.google/course_templates/744/labs/582695

