

Google Cloud Platform

Google Container Engine

Google Cloud Platform Fundamentals
V2.0

Agenda

1

Introduction to Containers

2

Kubernetes

3

Google Container Engine

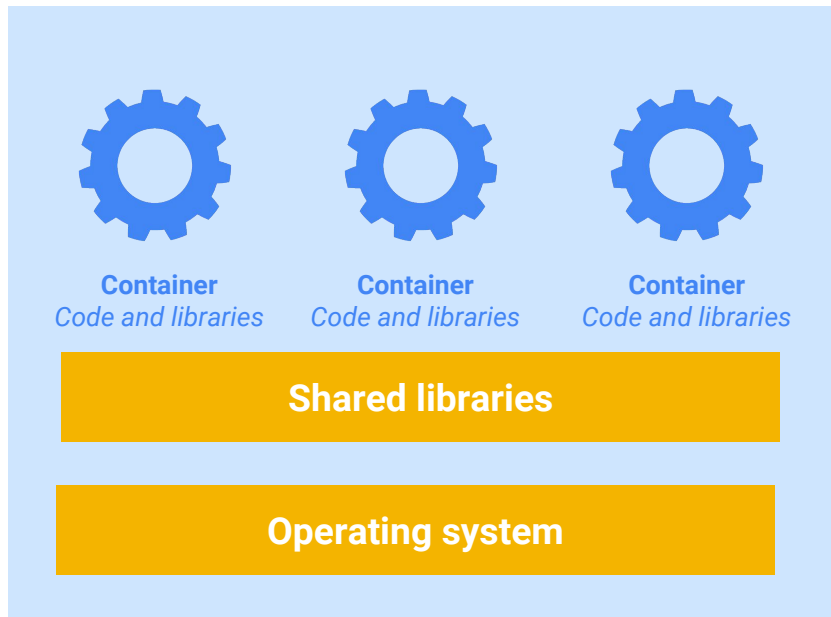
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Quiz & Lab

What is a Container?

- Virtualization at the operating system layer
- Separates operating system from application code and dependencies
- Isolates individual processes
- Popular implementations include [Docker](#) and [rkt](#)

Virtual Machine



Why Use Containers?

- Support **consistency** across **development**, **testing**, and **production** environments
- **Loose coupling** between application and operating system layers
- Much simpler to **migrate workloads** between on-premises and cloud environments
- Support **agile** development and operations

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Quiz & Lab

Kubernetes ('k8s')

- Open source container cluster orchestration system
 - Automates deployment, scaling, and operations for container clusters
- Based on Google's experience over 10+ years
- Built for a multi-cloud world:
 - Public, private, hybrid



Features of Kubernetes (1 of 2)

- *Workload portability*
 - Run in many environments, across cloud providers
 - Implementation is open and modular
- *Rolling updates*
 - Upgrade application with zero downtime
- *Autoscaling*
 - Automatically adapt to changes in workload



Features of Kubernetes (2 of 2)

- *Persistent storage*
 - Abstracts details of how storage is provided from how it is consumed
- *Multi-zone clusters*
 - Run a single cluster in multiple zones
 - **Alpha** on Google Cloud Platform
- *Load balancing*
 - External IP address routes traffic to correct port



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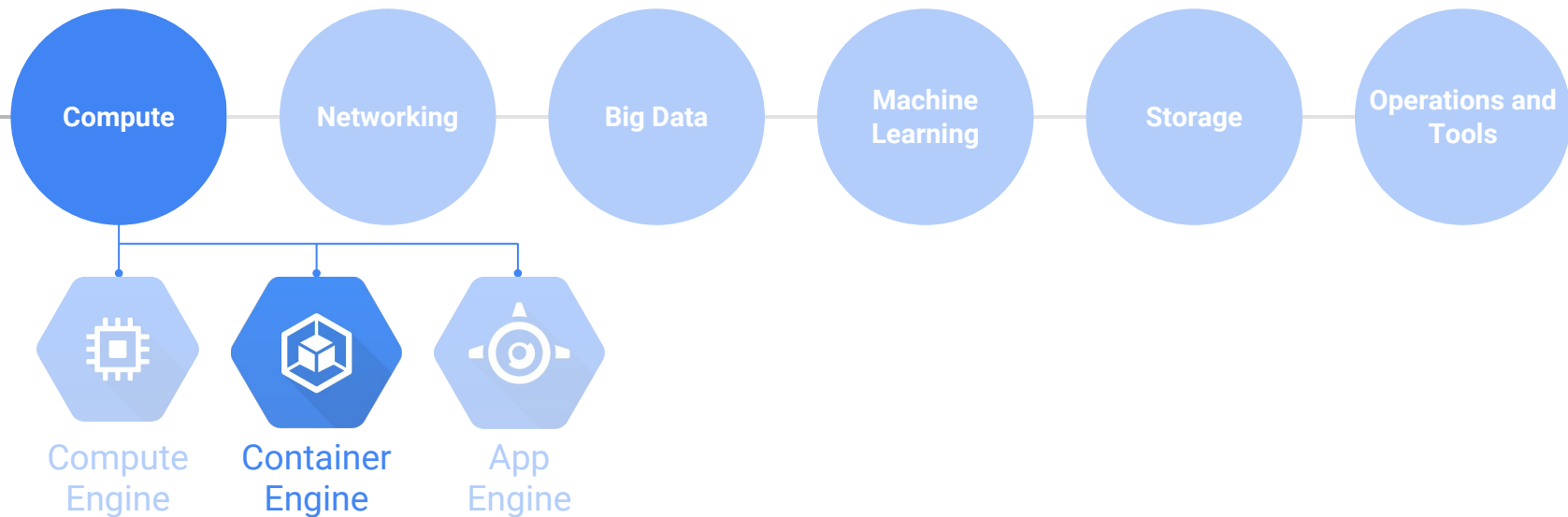
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Google Container Engine

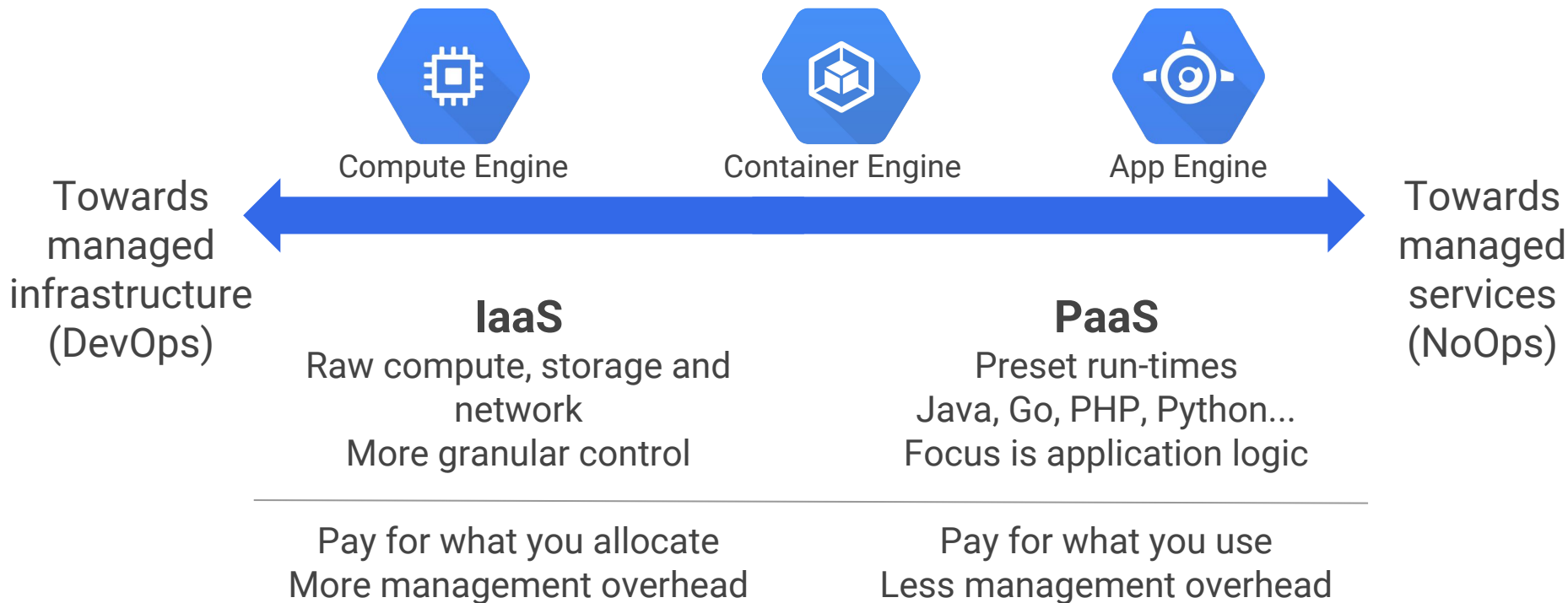
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Quiz & Lab

Google Cloud Platform



IaaS and PaaS



Google Container Engine (1 of 2)

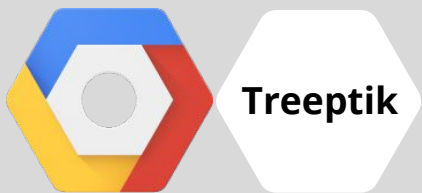
- Fully managed cluster management and orchestration system for running containers
 - Based on [Kubernetes](#)
 - Uses Compute Engine instances and resources
- Complimentary services:
 - [Google Cloud Container Builder](#) ^{Beta} - Create Docker container images from app code in Google Cloud Storage
 - [Google Container Registry](#) - Secure, private Docker image storage



Google Container Engine (2 of 2)

- Uses a declarative syntax to manage applications
 - Declare desired application configuration, Container Engine implements, manages
- Decouples operational, development concerns
- Manages and maintains
 - Logging, health management, monitoring
- Easily update Kubernetes versions as they are released





"Our platform sometimes has to be deployed on a cluster. How do we enable containers to communicate from different hosts? [Google has the answer: Kubernetes. This awesome tool helps us manage our clusters of containers](#) as if they were a single system."



scale

Docker containers automate scalability



speed

REST APIs speed provisioning of new instances; JAVA applications can be deployed in minutes



-30%

Administrative costs reduced by 30%

Deploying Apps: Container Engine vs App Engine

	Container Engine	App Engine Standard	App Engine Flexible
<i>Language support</i>	Any	Java, Python, Go & PHP	Any
<i>Service model</i>	Hybrid	PaaS	PaaS
<i>Primary use case</i>	Container-based workloads	Web and mobile applications	Web and mobile applications, container-based workloads

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Quiz & Lab

Quiz

1. Name two reasons for deploying applications using containers.
2. *True or False*: Kubernetes allows you to manage container clusters in multiple cloud providers.
3. *True or False*: Google Cloud Platform provides a secure, high-speed container image storage service for use with Container Engine.

Quiz Answers

1. Name two reasons for deploying applications using containers.

Answer: Consistency across development, testing, production environments; Simpler to migrate workloads; Loose coupling; Agility

2. *True:* Kubernetes allows you to manage container clusters in multiple cloud providers.
3. *True:* Google Cloud Platform provides a secure, high-speed container image storage service for use with Container Engine.

Lab (1 of 2)

Deploy the Bookshelf application to Container Engine.

1. Create a Container Engine cluster
2. Build and push a Bookshelf image to Google Container Registry
3. Use the kubectl command utility to deploy the Bookshelf container
4. Test the Bookshelf application in your browser

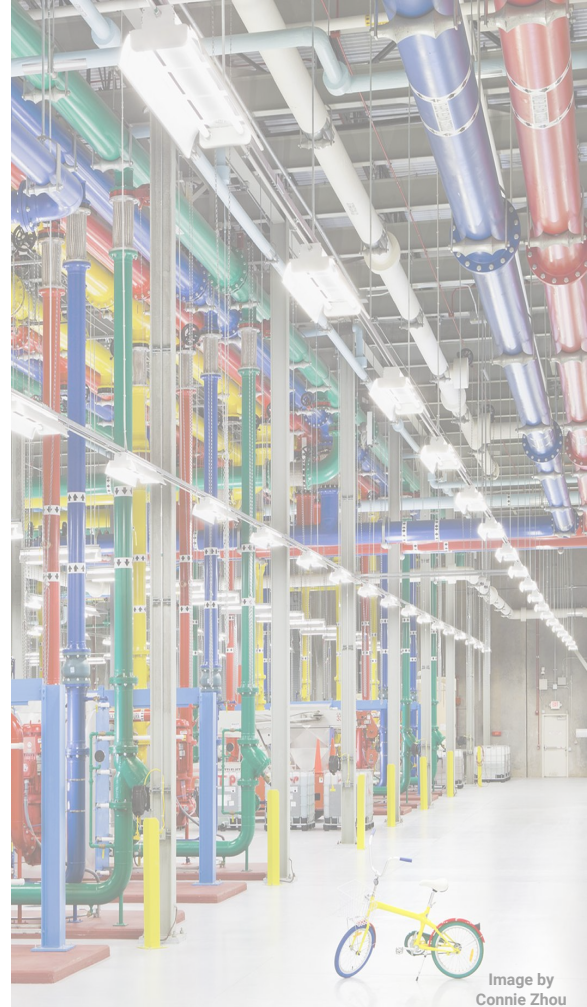
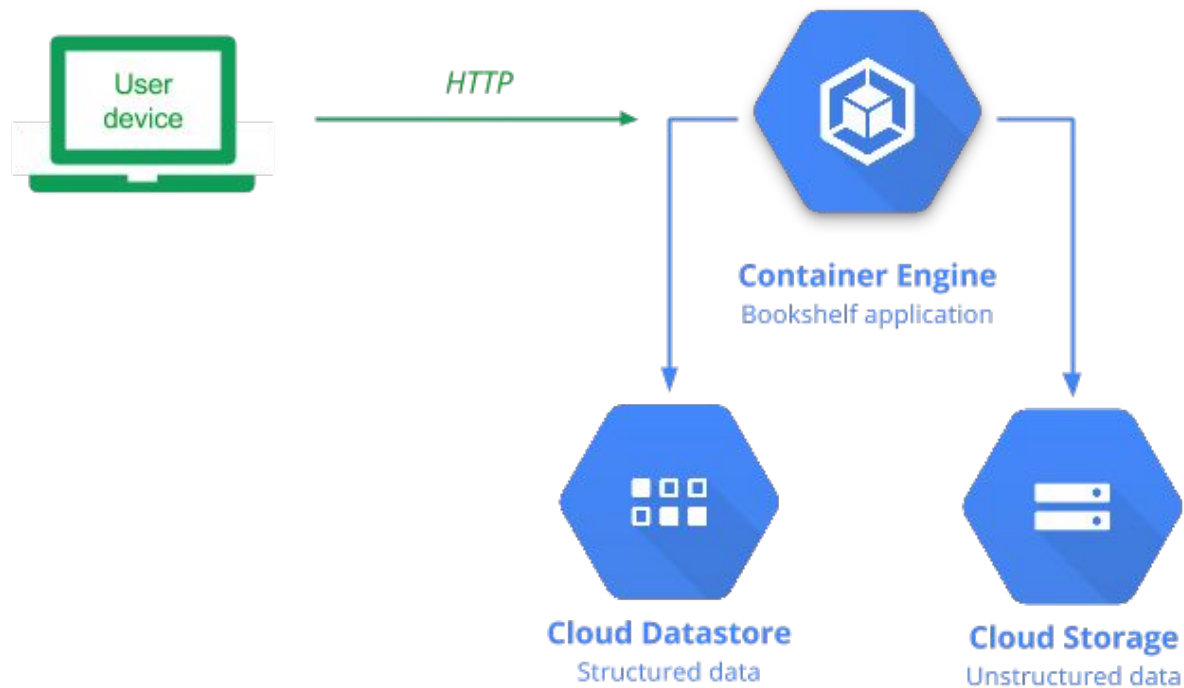


Image by
Connie Zhou

Lab (2 of 2)



Resources

- Container Engine Overview
<https://cloud.google.com/container-engine/>
- Container Engine tutorials
<https://cloud.google.com/container-engine/docs/tutorials>
- Kubernetes
<http://kubernetes.io/>
- An introduction to containers, Kubernetes, and the trajectory of modern cloud computing
<http://googlecloudplatform.blogspot.co.uk/2015/01/in-coming-weeks-we-will-be-publishing.html>



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