



# Kubernetes: A Short Introduction

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1 March 2019



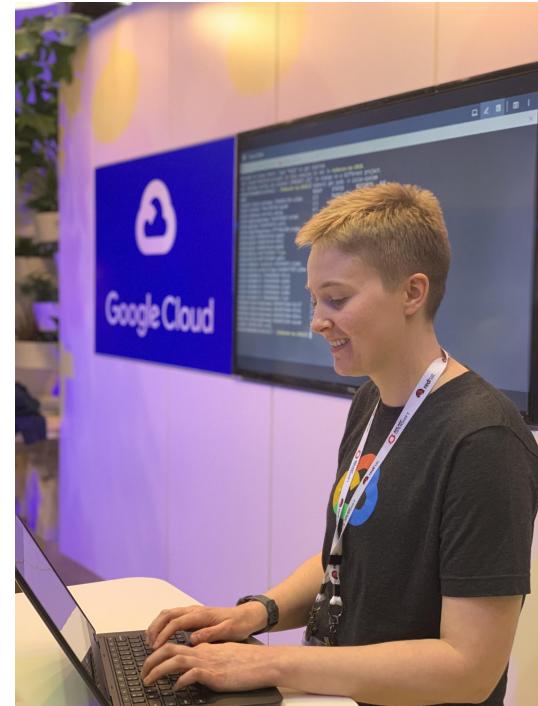
Google Cloud

# Hi!

☁️ I'm a Developer Programs Engineer.

💕 I work with users and our engineering teams  
to make our products better.

🌈 I work on Cloud platform infrastructure!





**kubernetes**



BLACKROCK



Goldman  
Sachs



The  
New York  
Times

NORDSTROM  
TECHNOLOGY

OpenAI

Pinterest



SQUARESPACE

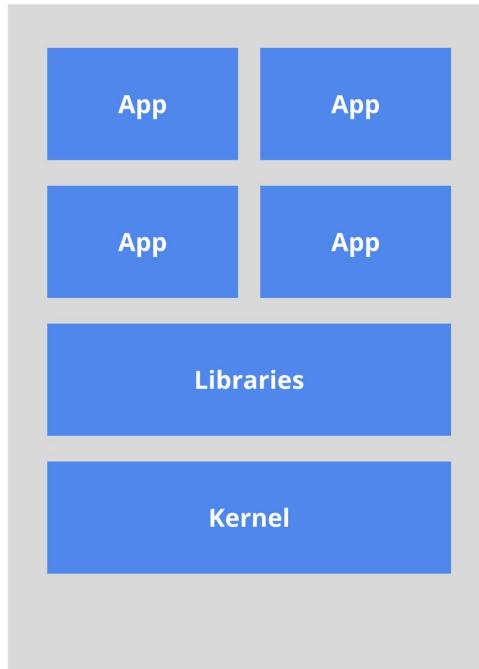


zalando

zulily

# Virtual Machines

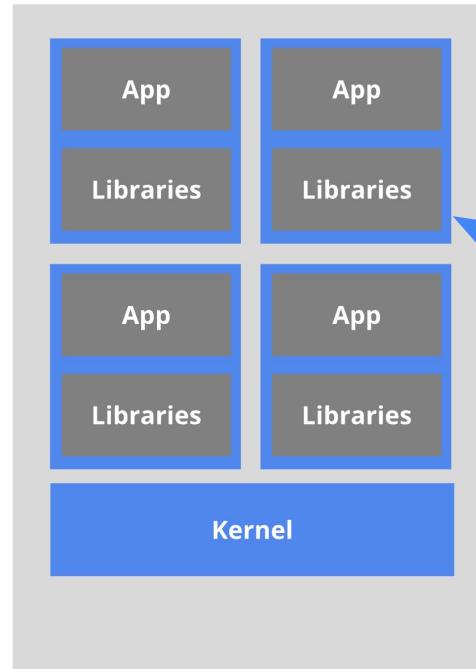
**The old way:** Applications on host



*Heavyweight, non-portable  
Relies on OS package manager*

# Containers

**The new way:** Deploy containers



*Small and fast, portable  
Uses OS-level virtualization*



# Google runs on containers

In any given week, we launch over **two billion** containers.

Gmail, Search, Maps, Docs...



source: Google

# Kubernetes

[godoc](#) [reference](#) [ci best practices](#) [passing](#)



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Kubernetes is an open source system for managing [containerized applications](#) across multiple hosts; providing basic mechanisms for deployment, maintenance, and scaling of applications.

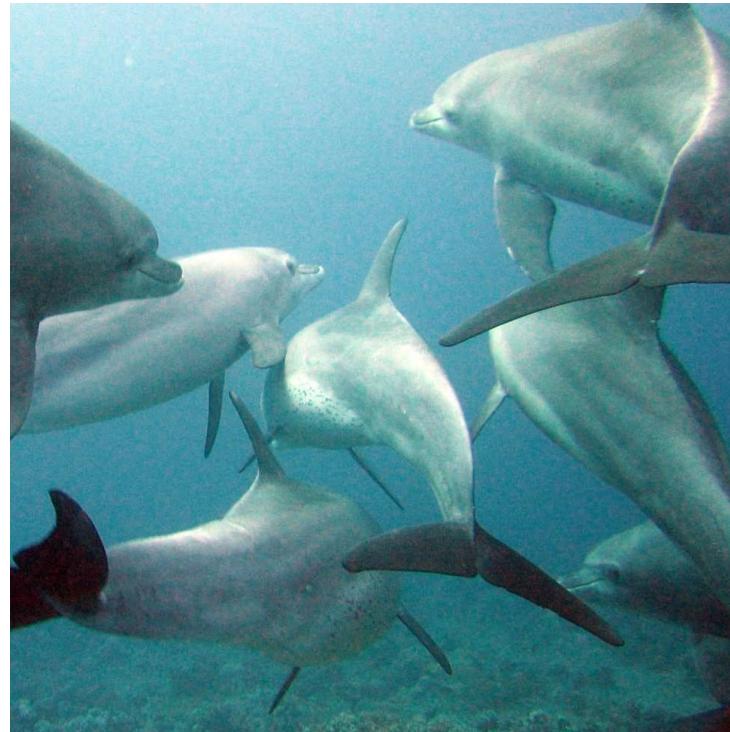
Kubernetes builds upon a decade and a half of experience at Google running production workloads at scale using a system called [Borg](#), combined with best-of-breed ideas and practices from the community.

Kubernetes is hosted by the Cloud Native Computing Foundation ([CNCF](#)). If you are a company that wants to help shape the evolution of technologies that are container-packaged, dynamically-scheduled and microservices-oriented, consider joining the CNCF. For details about who's involved and how Kubernetes plays a role, read the CNCF [announcement](#).

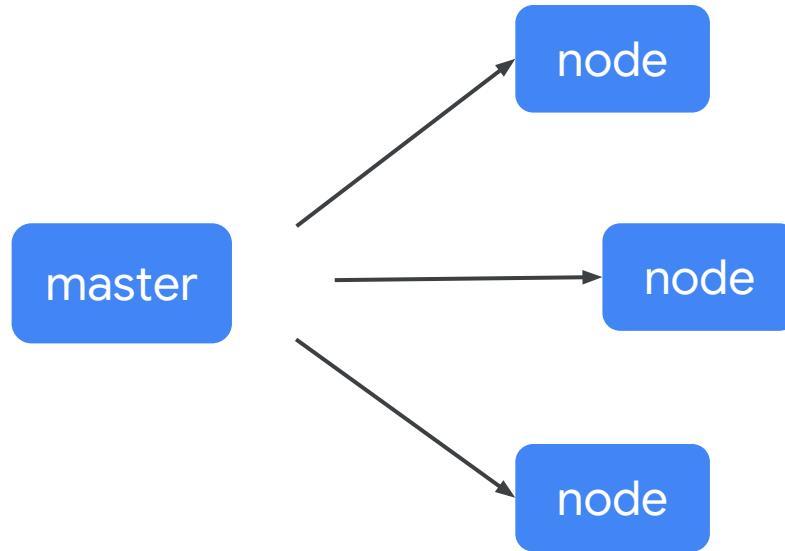
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**Kubernetes runs  
Applications in a  
Cluster.**

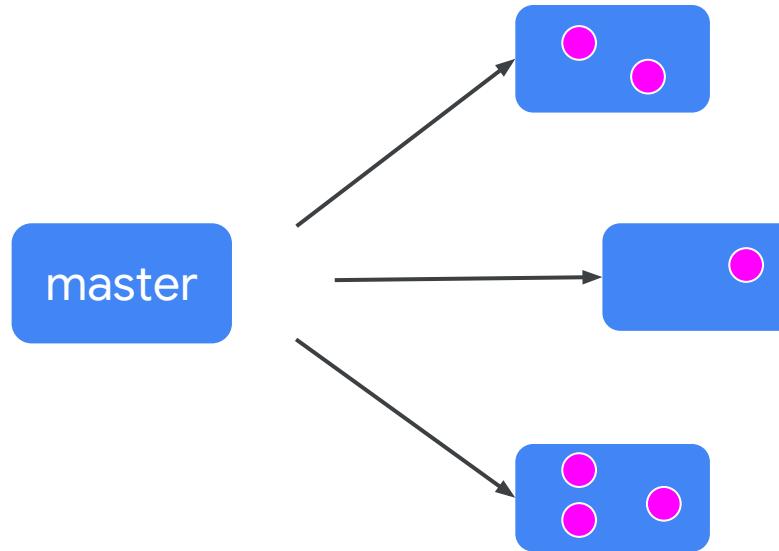
**Applications = Pods**



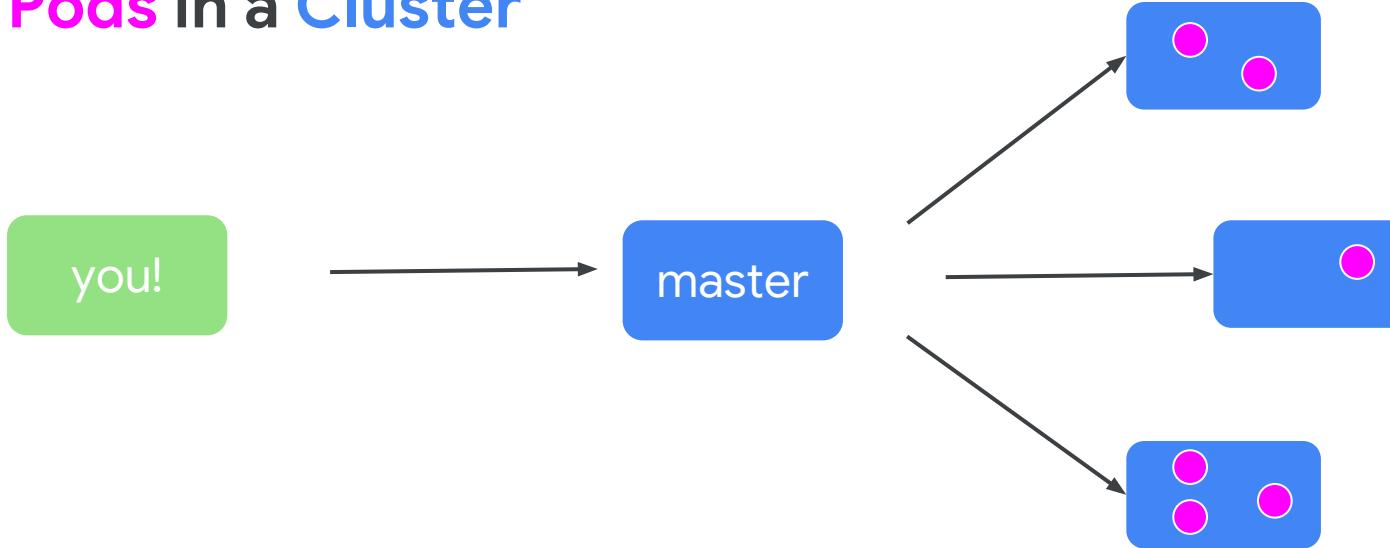
# Cluster



# Pods in a Cluster



# Pods in a Cluster





Kubernetes Engine

← Deployment details

REFRESH

EDIT

DELETE

ACTIONS ▾

KUBECTL ▾

SHOW INFO PANEL

Clusters

Workloads

Services

Applications

Configuration

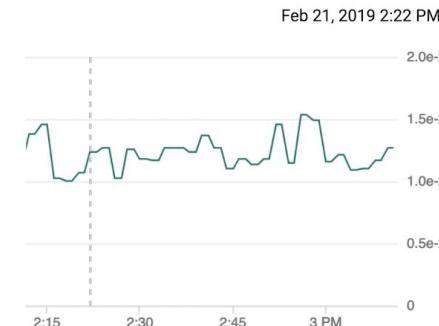
Storage

Marketplace

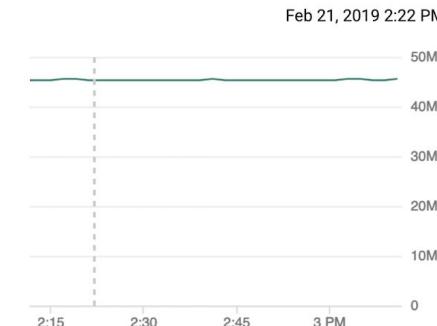
## ✓ checkoutservice

Overview Details Revision history Events YAML

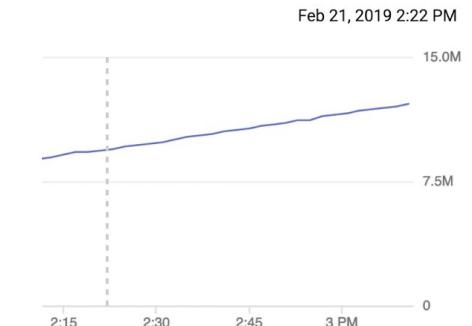
CPU



Memory



Disk



checkoutservice: 0.01

checkoutservice: 45.380M

checkoutservice: 9.470M

Cluster	redis-ssl
Namespace	default
Labels	app : checkoutservice
Logs	Container logs , Audit logs
Replicas	1 updated, 1 ready, 1 available, 0 unavailable

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: hello-world
spec:
  replicas: 1
  template:
    metadata:
      labels:
        app: hello-world
    spec:
      containers:
        - name: hello-world-server
          image: gcr.io/megangcp/helloworld:v0.0.1
          ports:
            - containerPort: 8080
```



Pod



Docker Image

```
apiVersion: v1
kind: Service
metadata:
  name: helloworld
spec:
  selector:
    app: hello-world
  ports:
  - name: http
    protocol: TCP
    port: 80
    targetPort: 8080
  type: LoadBalancer
```

Allow  
traffic in



```
→ kubectl apply -f deployment.yaml  
deployment.extensions/hello-world created
```

→ `kubectl get pods`

NAME	READY	STATUS	RESTARTS
hello-world-84c646556b-kn59b	1/1	Running	0

→ `kubectl get svc`

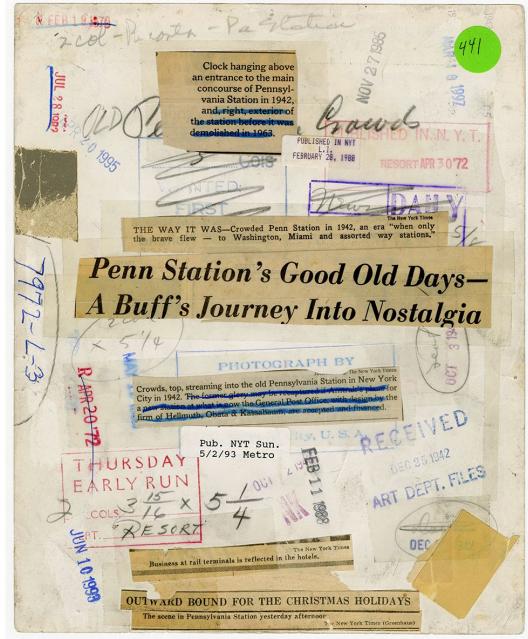
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP
helloworld	LoadBalancer	10.51.246.3	35.188.110.209

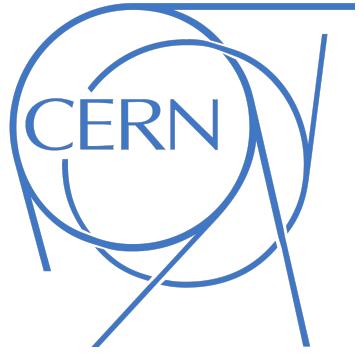
→ curl <http://35.188.110.209>

Hello world!

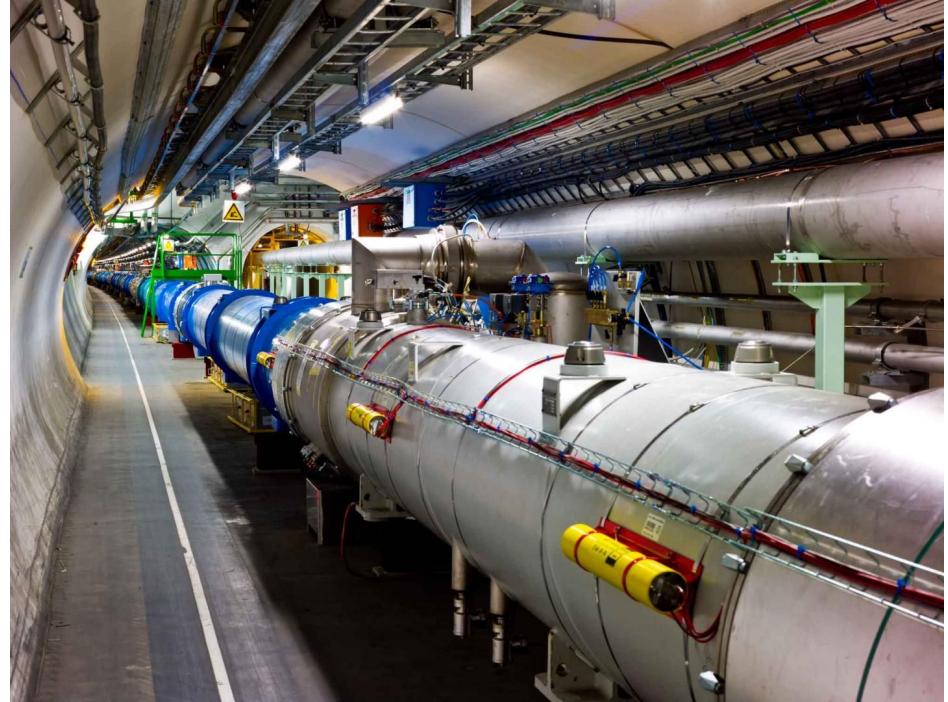
# The New York Times

Uses Kubernetes to process archived images (front and back!)





Runs Kubernetes at the Large Hadron Collider to analyze 40M particle interactions per second.





NIANTIC

2016: Pokémon Go was the largest deployment on Google Kubernetes Engine ever.



# Kubernetes is portable...



 Alibaba Cloud Container Service for Kubernetes Alibaba Cloud	 Amazon Elastic Container Service for Kubernetes (EKS) Amazon Web Services	 Azure (ACS) Engine Microsoft	 Azure Kubernetes Service (AKS) Microsoft	 Azure Stack (ACS) Engine Microsoft	 Baidu Cloud Container Engine Baidu	 BoCloud BeyondContainer Bocloud
 Catalyst Kubernetes Service Catalyst Cloud	 Cisco Container Platform Cisco	 DigitalOcean Kubernetes DigitalOcean	 EasyStack Kubernetes (EKS) EasyStack	 eBaoCloud® enable connected insurance eBaoCloud eBaoTech Corporation	 eKing Cloud Container Platform Hainan eKing Technology	 ELASTX Private Kubernetes ELASTX
 Google Kubernetes Engine Google	 HarmonyCloud Container Platform Hangzhou Harmony Technology	 Hasura Hasura	 Huawei Cloud Container Engine (CCE) Huawei Technologies	 IBM Cloud Kubernetes Service IBM	 intellect SEE C™ Intellect FABRIC Intellect Design Arena	 nirmata Nirmata Managed Kubernetes Nirmata
 Nutanix Karbon Nutanix	 Oracle Container Engine Oracle	 OVH Innovation for Freedom OVH.com	 Rackspace Kubernetes-as-a-Service Rackspace	 Samsung SDS Kubernetes Service Samsung SDS	 SAP Certified Gardener SAP	 SysEleven MetaKube SysEleven
 Tencent Cloud	 时速云 tenxcloud.com	 vexxhost	 vmware®	 ZTE		

**... and growing every day.**



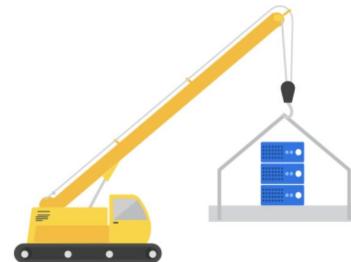
### Serverless Computing

Stateless functions,  
on Kubernetes.



### Hybrid Cloud

Many clusters,  
working together.



### Beyond Containers

Orchestrate VMs with  
Kubernetes

# Thank you!

Learn more:  
[kubernetes.io](https://kubernetes.io)



source: Google