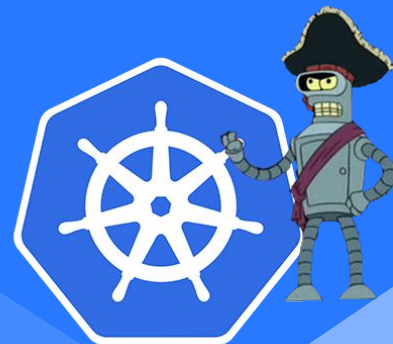


Kubernetes on Google Cloud

Łukasz Byjoś



Kubernetes

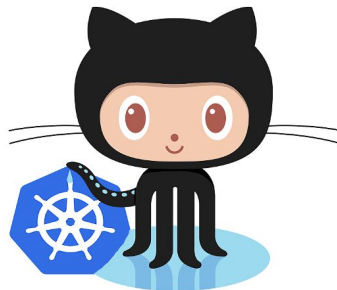
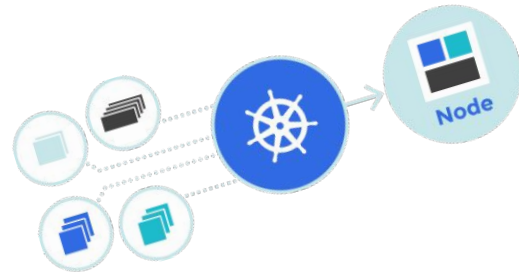
- First was Borg...
- ...then Omega
- Kubernetes



<http://queue.acm.org/detail.cfm?id=2898444>

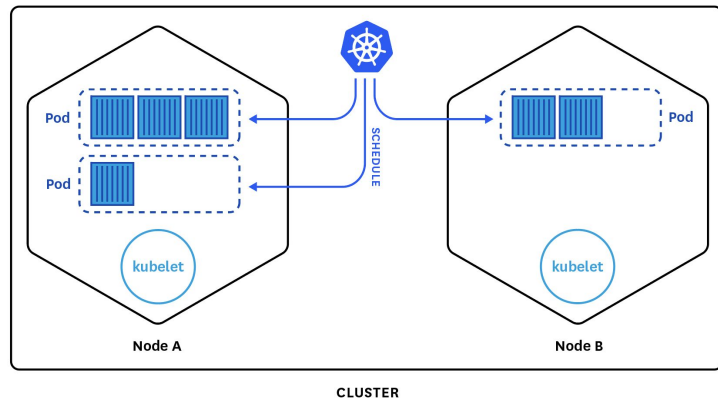
Kubernetes

- 100% opensource, written in Go
- Multiple environments (cloud, bare metal)
- Support different container runtimes
- Planet Scale



Kubernetes

- Horizontal scaling
- Automated rollouts and rollbacks
- Self-healing
- Service discovery and load balancing



Kubernetes terminology

Deployment

ReplicaSet

DaemonSet

Pod

Liveness Probe

Job

Volume

Readiness Probe

StatefulSet

Label

Service

ConfigMap

Selector

Secret

Kubernetes terminology

Deployment

ReplicaSet

DaemonSet

Pod

Liveness Probe

Job

Volume

Readiness Probe

StatefulSet

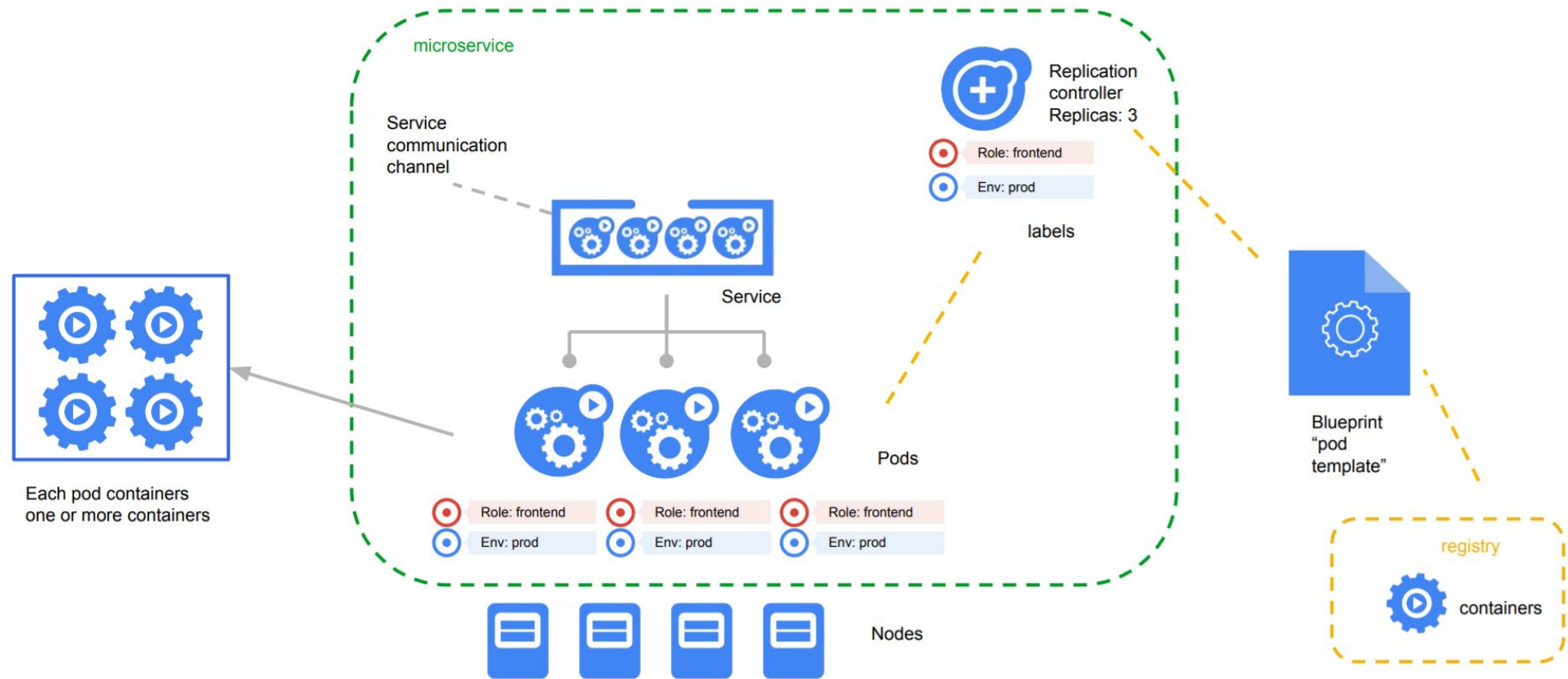
Label

Service

ConfigMap

Selector

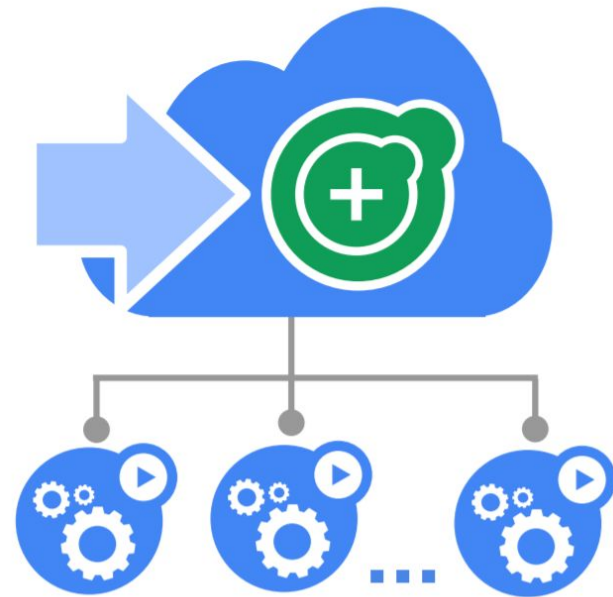
Secret



Deployment

Declarative updates of ReplicaSets and Pods

Desired state of deployed app
Easy to edit, *kubectl edit*

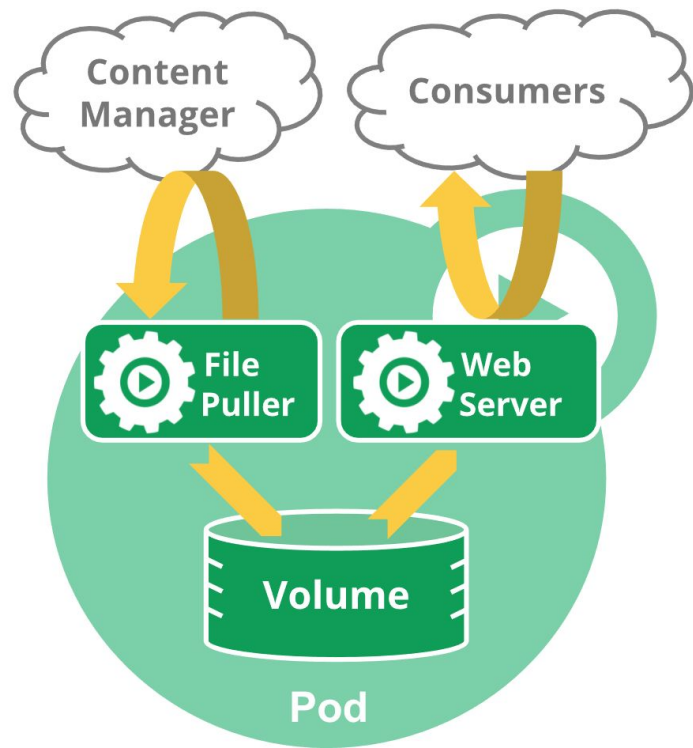


Pod

Group of one or more containers

Share IP address in namespace

Can die



Pod health

- Readiness Probes
Is pod ready for traffic?
- Liveness Probes
Is pod running?

```
readinessProbe:  
  httpGet:  
    path: /readiness  
    port: 8080  
  initialDelaySeconds: 20  
  timeoutSeconds: 5
```

```
livenessProbe:  
  httpGet:  
    path: /healthz  
    port: 8080  
  initialDelaySeconds: 15  
  timeoutSeconds: 1
```

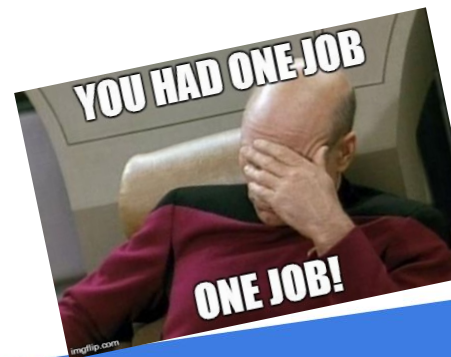
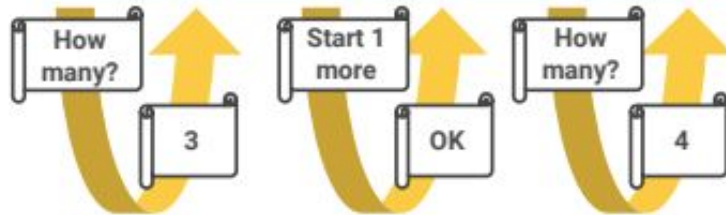
ReplicaSet

One job: ensure N copies of a pod

- Kill if too many
- Start if not enough

ReplicaSet

- name = "my-rc"
- selector = {"App": "MyApp"}
- template = { ... }
- replicas = 4

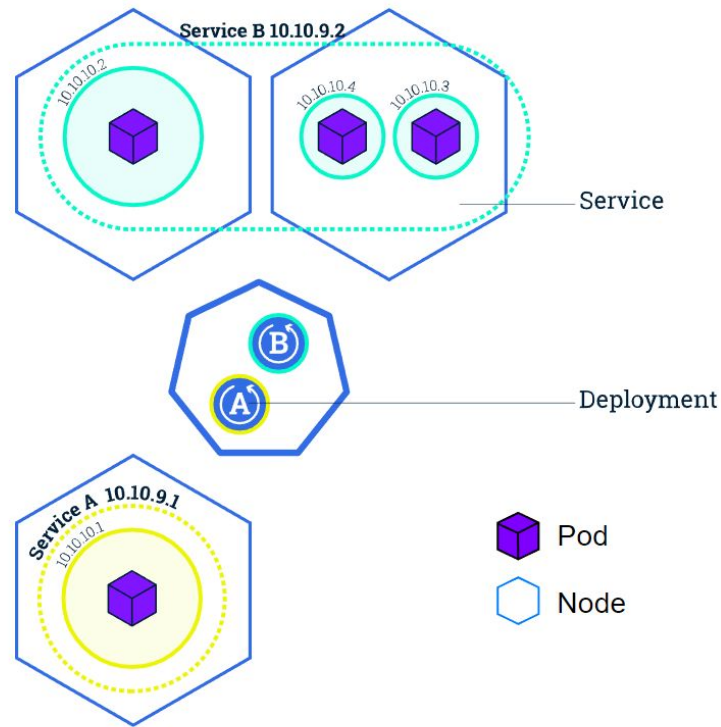


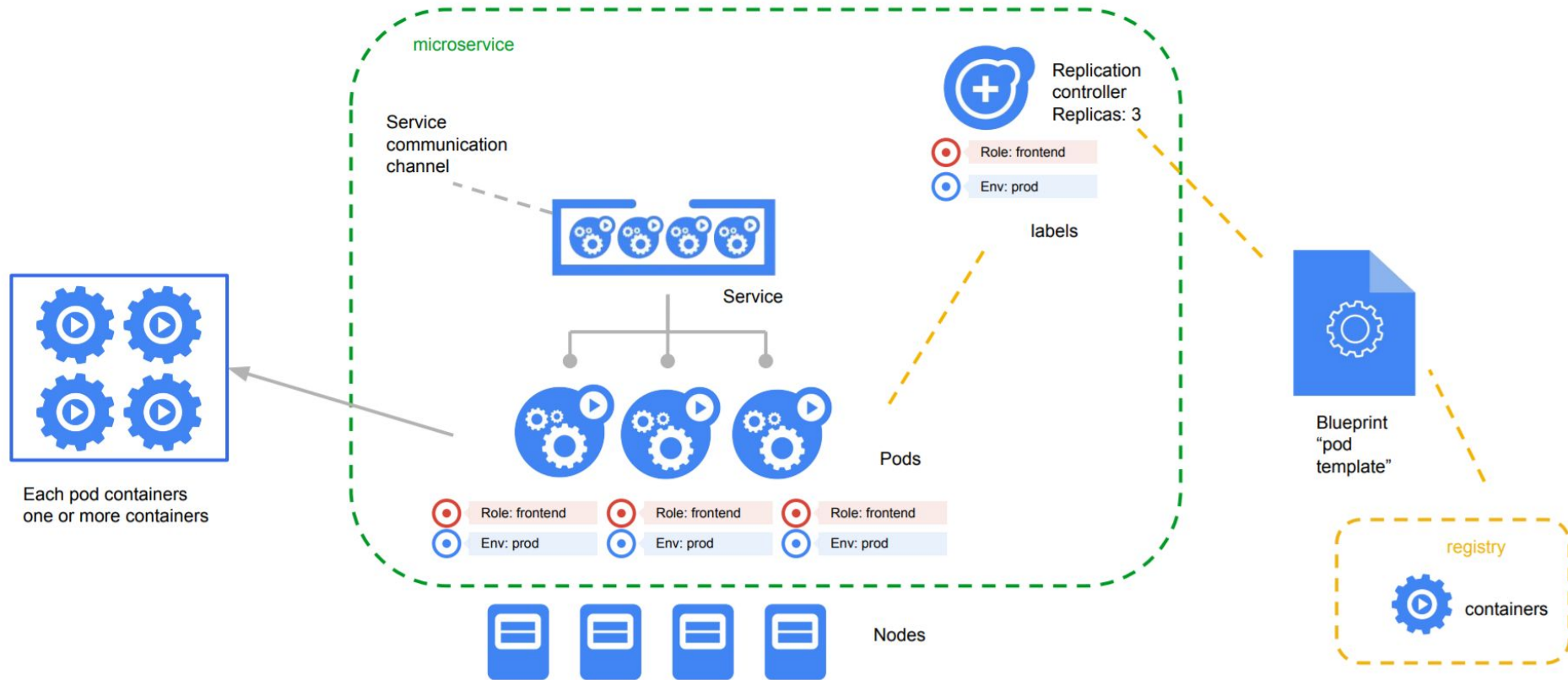
Service

Logical group of the same pods

Chose pod for traffic by random

Stable virtual IP and port





≡ Workloads

- Cluster
- Namespaces
- Nodes
- Persistent Volumes
- Roles
- Storage Classes
- Namespace
- default
- Workloads
- Daemon Sets
- Deployments
- Jobs
- Pods
- Replica Sets
- Replication Controllers
- Stateful Sets
- Discovery and Load Balancing
- Ingresses
- Services
- Config and Storage
- Config Maps
- Persistent Volume Claims
- Secrets
- About

CPU usage



Memory usage



Deployments

Name	Labels	Pods	Age	Images
✓ finisher	run: finisher	1 / 1	17 days	jetstack/finisher:0.1.0
✓ kube-lego-kube-lego	app: kube-lego, chart: kube-lego-0.1.11, heritage: Tiller, release: kube-lego	1 / 1	a month	jetstack/kube-lego:0.1.4
✓ vision-eu	run: vision-eu	1 / 1	2 months	jetstack/vision-eu:0.1.0
✓ backend-eu	run: backend-eu	2 / 2	2 months	jetstack/backend-eu:0.1.0

Pods

Name	Status	Restarts	Age	CPU (cores)	Memory (bytes)
✓ backend-eu-197904783-grbwj	Running	0	22 hours	0	278.875 Mi
✓ backend-eu-197904783-460gr	Running	0	22 hours	0.001	297.746 Mi
✓ finisher-1283789799-s0pcp	Running	0	a day	0	220.430 Mi
✓ vision-eu-1276181523-pxv6f	Running	3	2 days	0.002	298.563 Mi
✓ kube-lego-kube-lego-1239711165-v8b26	Running	0	4 days	0	5.070 Mi

Replica Sets

Name	Labels	Pods	Age	Images
------	--------	------	-----	--------

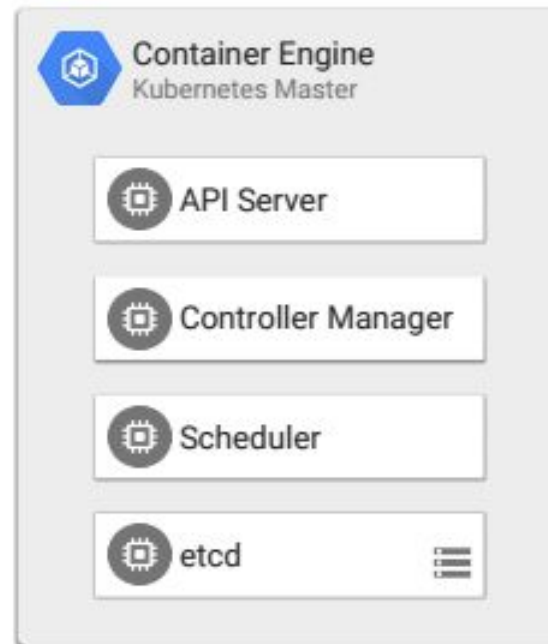


Google Cloud - Container Engine

- Backups
- Monitoring
- Restarts
- Resizing cluster

- **99,5% SLA**

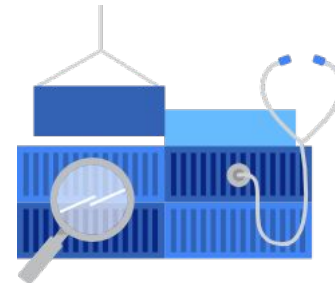
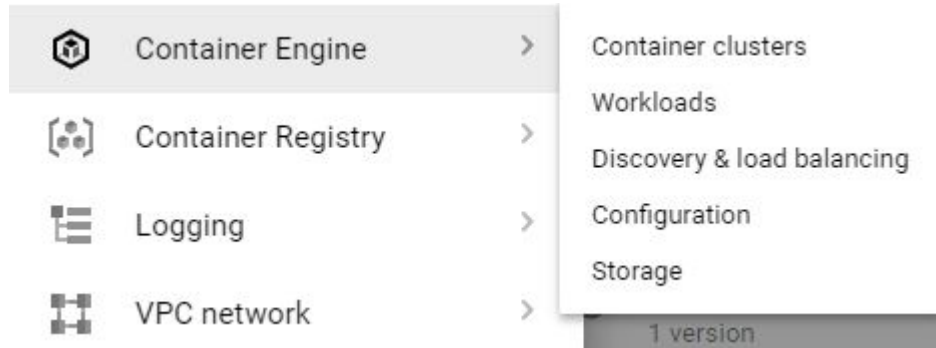
99,99% in High Availability Alpha







Kubernetes - Google Cloud


- Container Engine








- 

Container Engine
- 

Container clusters
- 

Workloads
- 

Discovery & load balancing
- 

Configuration
- 

Storage

Container clusters

[+ CREATE CLUSTER](#)
[REFRESH](#)
[DELETE](#)

Container clusters

<input type="checkbox"/> Name ^	Zone	Cluster size	Total cores	Total memory	
<input type="checkbox"/>   nd-eu	europe-west2-a	3	3 vCPUs	11,25 GB	1



A container cluster is a managed group of uniform VM instances for running Kubernetes. [Learn more](#)

Name [?]

cluster-1

Description (Optional)

Zone [?]

europa-west1-b

Cluster Version [?]

1.7.5-gke.1 (default)

Machine type

1 vCPU 3,75 GB memory [Customize](#)

No

cc

us

Ku

C

Size

1

1

1

Cl

yo

- micro (1 shared vCPU)
0,6 GB memory, f1-micro
- small (1 shared vCPU)
1,7 GB memory, g1-small

- ✓ 1 vCPU
3,75 GB memory, n1-standard-1
- 2 vCPUs
7,5 GB memory, n1-standard-2
- 4 vCPUs
15 GB memory, n1-standard-4
- 8 vCPUs
30 GB memory, n1-standard-8
- 16 vCPUs

but has limitations that may affect some limitations. Note that Ubuntu requires

s. You can attach a persistent disk to







Kubernetes - GCP Node Pools



Node Pools

Node pools are separate instance groups running Kubernetes in a cluster. You may add node pools in different zones for higher availability, or add node pools of different type machines. To add a node pool, click Edit. [Learn more](#)

Name	Size	Version	
eu-pool-1	1	1.7.3 Upgrade	▼
preempt-eu-pool-1	2	1.7.3 Upgrade	▼

-  Disks
-  Snapshots
-  Images
-  Committed use discounts

[CREATE INSTANCE GROUP](#) [REFRESH](#) [EDIT](#) [DELETE](#)

		Zone	Creation time	Instances
<input type="checkbox"/>	✓ gke-  -e-preempt-eu-pool--3bf5ccb8-grp	europe-west2-a	07.09.2017, 13:22:01	2
<input type="checkbox"/>	✓ gke-  -eu-eu-pool-1-23400d24-grp	europe-west2-a	07.09.2017, 13:20:09	1
<input type="checkbox"/>	✓ k8s-ig--4bf1209a6b3caa08	europe-west2-a	26.08.2017, 17:47:42	3



```
gcloud container clusters create super-cluster
```

...

Awesome, working cluster!

```
gcloud container clusters get-credentials super-cluster
```

...

Now we can use kubectl command to connect cluster

```
gcloud container clusters resize super-cluster --size 3
```

...

Aww, node pool resized to 3 machines in one line <3



Kubernetes - GCP Workloads

Container Engine

Container clusters

Workloads

Discovery & load balancing

Configuration

Storage

Workloads BETA

[REFRESH](#)

Workloads are deployable units of computing that can be created and managed in a cluster.

Is system object : False

Name ^	Status	Type	Pods	Namespace	Cluster
image-test-1	✓ Ok	Deployment	1/1	default	image-test-1 d-eu
image-test-2	✓ Ok	Deployment	1/1	default	image-test-2 d-eu
image-test-3	✓ Ok	Deployment	2/2	default	image-test-3 d-eu
kube-lego-kube-lego	✓ Ok	Deployment	1/1	default	image-test-3 d-eu



Kubernetes - ConfigMap



Container Engine



Klasy kontenerów



Obciążenia



Równoważenie obciążenia i ...



Konfiguracja



Przechowywanie danych

Konfiguracja BETA

ODŚWIEŻ

Obiekty tajne to poufne informacje, takie jak hasła, klucze i tokeny. Pliki ConfigMap opracowano, aby zapisywały dane, które nie są poufne, np. zmienne środowiskowe, argumenty wiersza poleceń i pliki konfiguracji.

Obiekty tajne są objęte kontrolą dostępu i nie są widoczne dla użytkowników bez uprawnień do odczytu

Zamknij



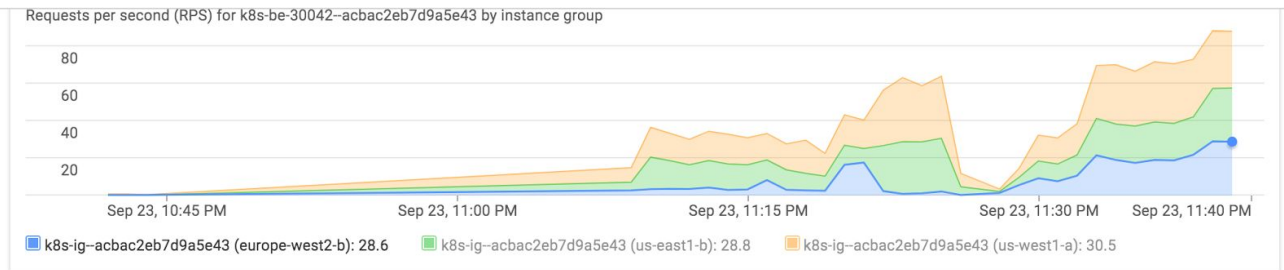
Jest obiektem systemowym : Falsz



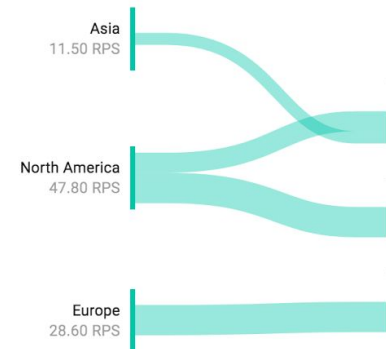
Nazwa ^	Typ	Przestrzeń nazw	Klaster
api-tls	Secret: kubernetes.io/tls	default	-eu
-backend	Config Map	default	-eu
-vision	Config Map	default	-eu
ingress-controller-leader-nginx	Config Map	default	-eu
kube-lego-account	Secret	default	-eu



Kubernetes - GCP LoadBalancing



Frontend Location (Total inbound traffic)



Backend (Just now)

<div></div> k8s-ig--acbac2eb7d9a5e43 us-west1-a	3 of 3 instances healthy	<div></div> CPU Utilization: Rate: 30.50 RPS
<div></div> k8s-ig--acbac2eb7d9a5e43 us-east1-b	3 of 3 instances healthy	<div></div> CPU Utilization: Rate: 28.80 RPS
<div></div> k8s-ig--acbac2eb7d9a5e43 eu-west2-b	3 of 3 instances healthy	<div></div> CPU Utilization: Rate: 28.60 RPS



Kubernetes - wat moar...

- ★ WTF at the beginning
- ★ Huge community
- ★ HELM package manager <3



Yyy, QA? Links?

- ★ <https://kubernetes.io/docs/home/>
- ★ <https://github.com/kubernetes/helm>
- ★ <https://cloud.google.com/container-engine/>
- ★ <https://medium.com/search?q=kubernetes>