



Running Python Applications on Kubernetes

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<https://github.com/cleberwarmling/python-joinville>

What does “Kubernetes” mean?



Greek for “pilot” or “helmsman of a ship”

Agenda

- History of Kubernetes
- “*X-ray*” of Kubernetes
- Running a Python application on Kubernetes
- Pros and cons
- Hands-on

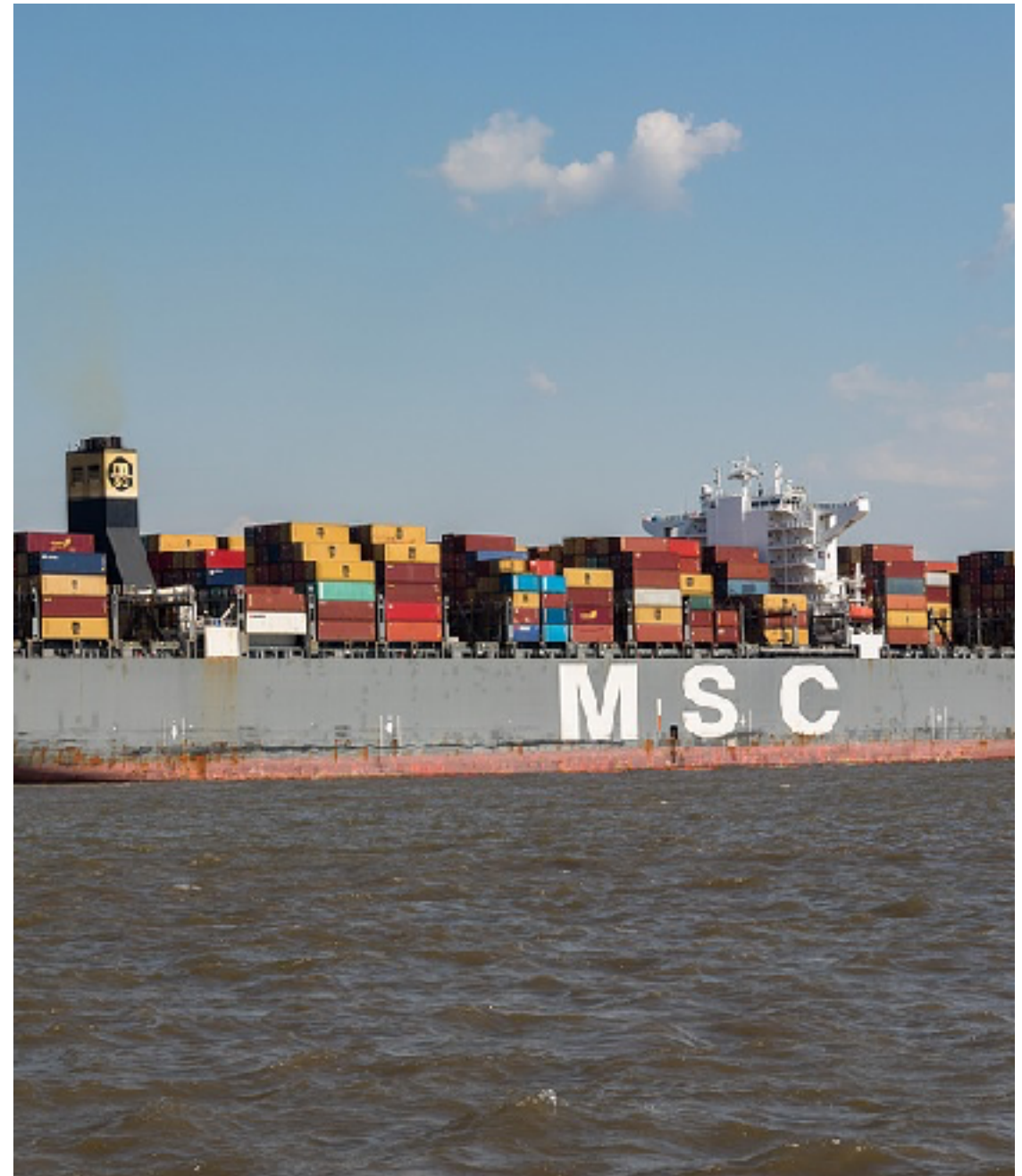
History of Kubernetes

- Based on Google's Borg
- Development started at 2014
- First production ready version released at 2015
- Nowadays one of the most active open source project
- Cloud Native Computing Foundation (CNCF)

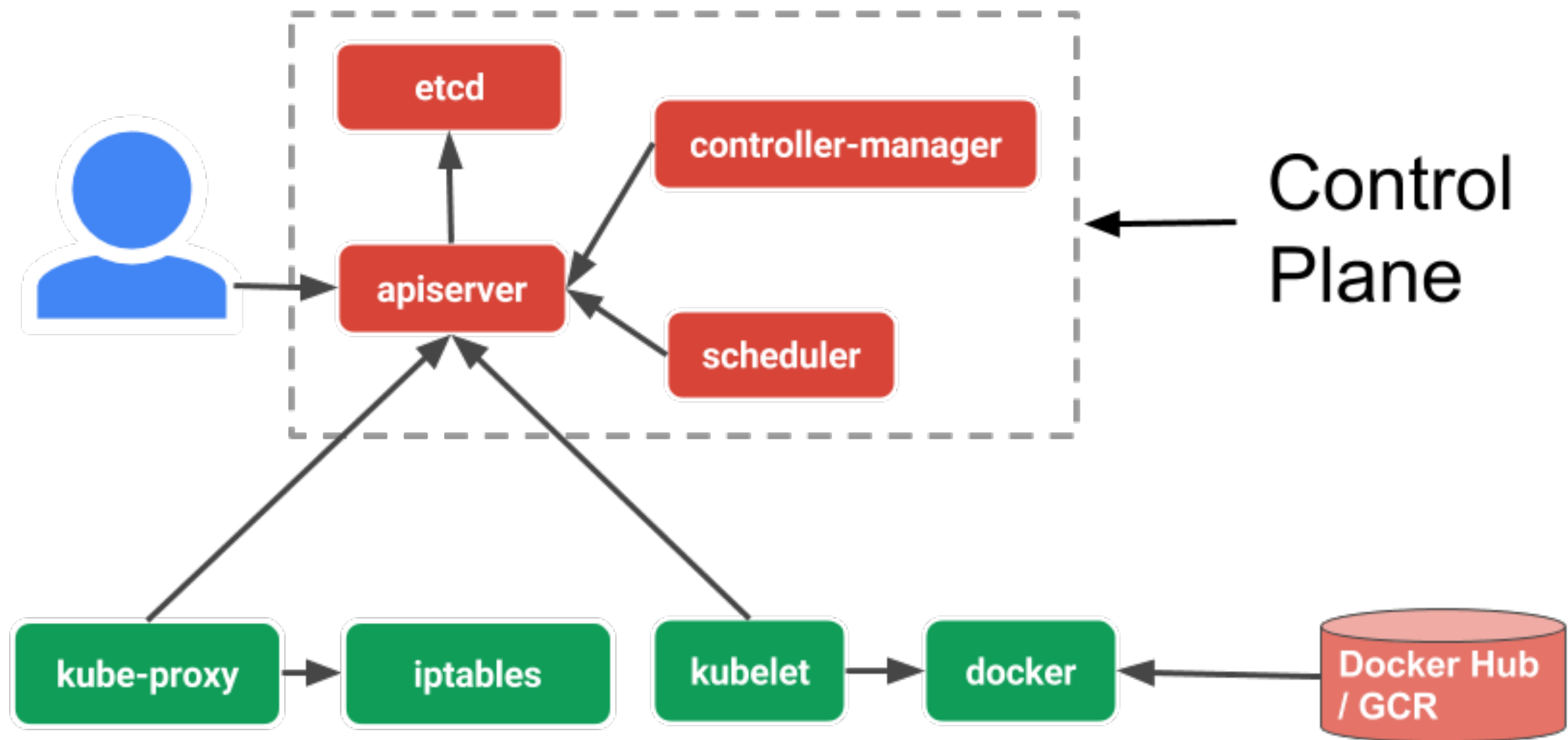


What does Kubernetes do?

- Container Orchestrator or Cluster Manager
- Places containers on nodes
- Enable containers to find each other
- Auto recovering, logging and health-checking
- Support multiple clouds and bare-metal environments



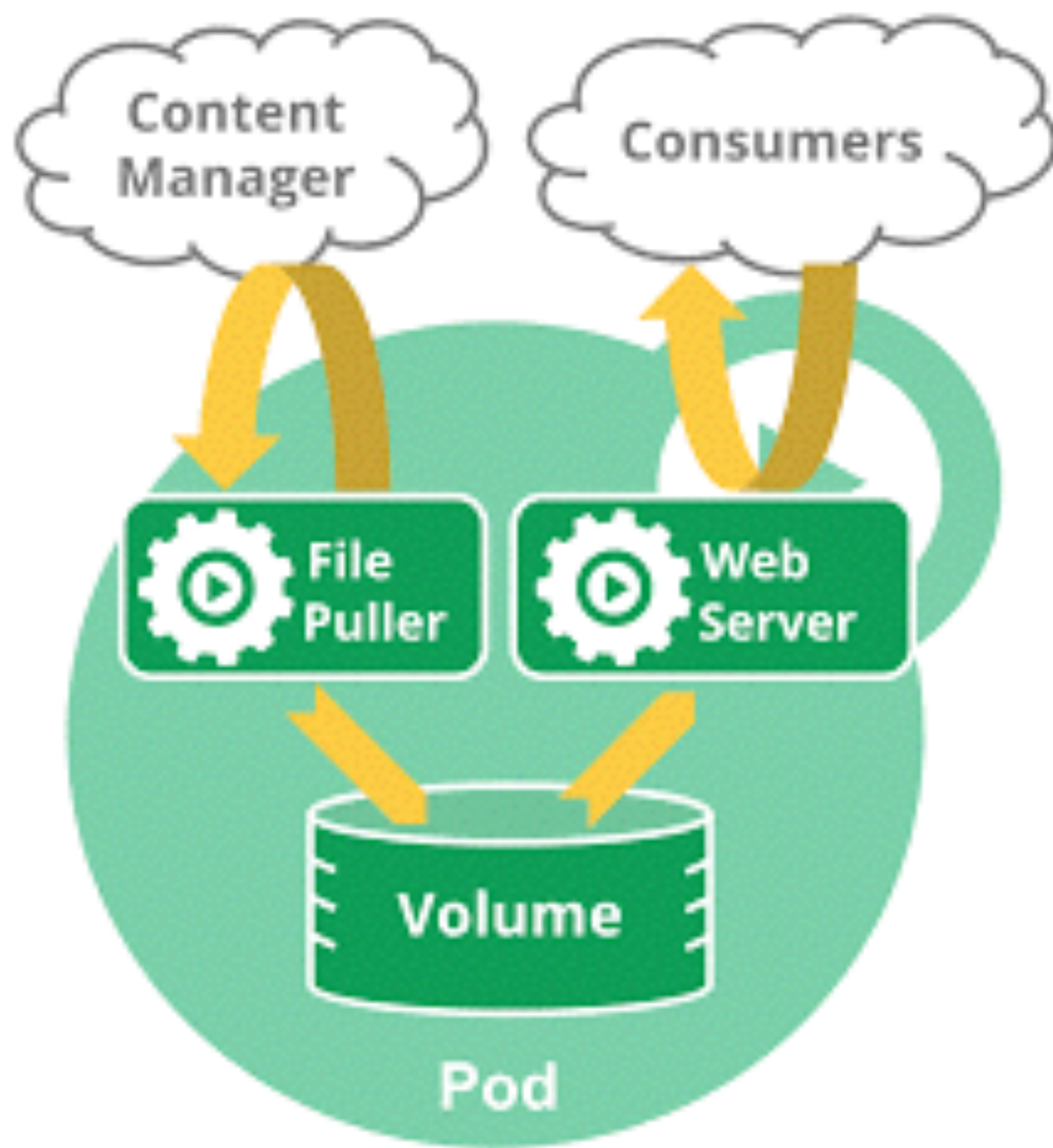




PODs

- Smallest deployable object
- Group of one or more containers





```
apiVersion: v1
kind: Pod
metadata:
  name: nginx
spec:
  containers:
  - name: nginx
    image: nginx:1.7.9
    ports:
    - containerPort: 80
```

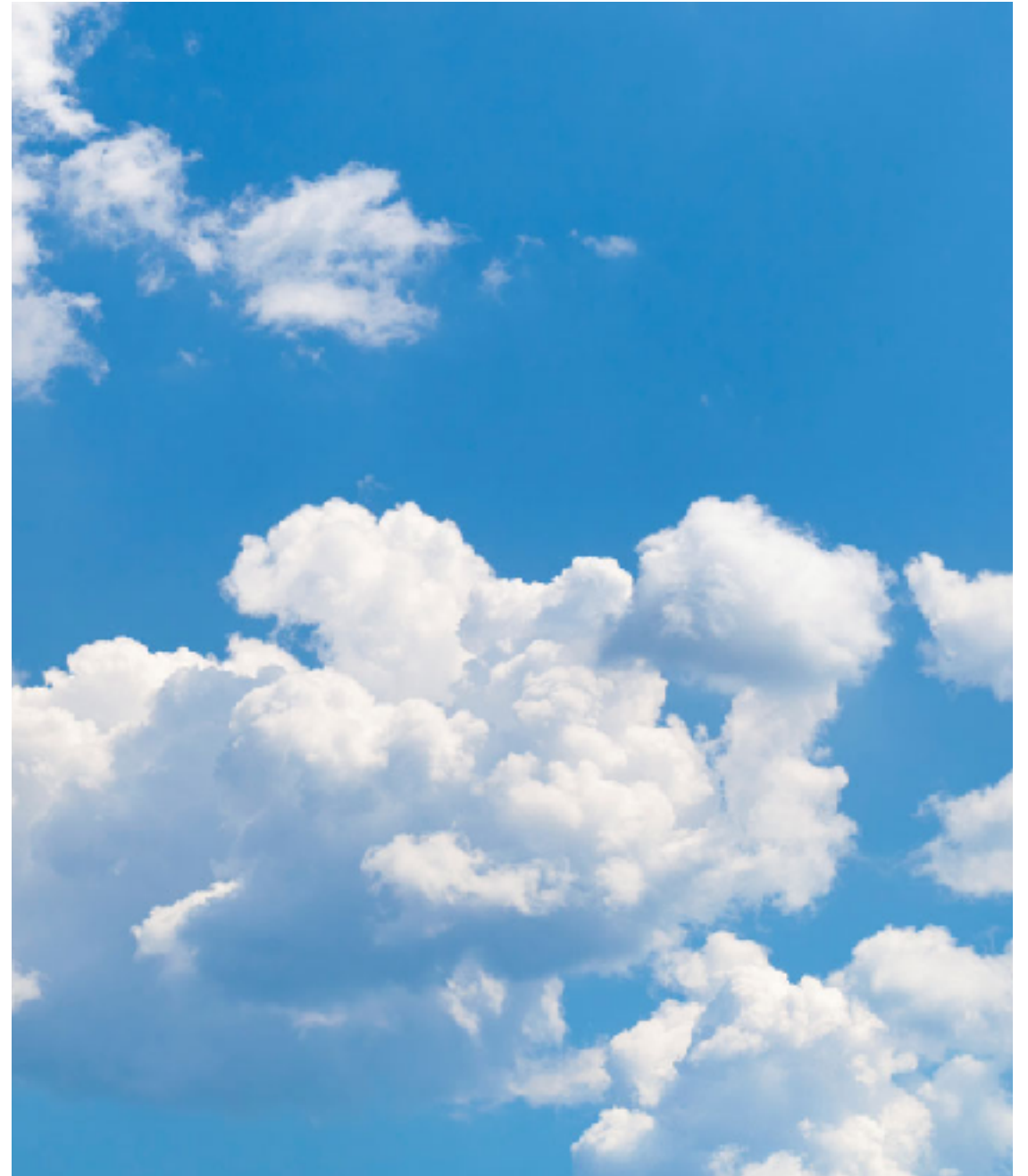
Kubernetes Controllers

- ReplicaSet
- ReplicationController
- Deployments
- StatefulSets
- DaemonSet
- Garbage Collection
- Jobs - Run to Completion
- CronJob


```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  selector:
    matchLabels:
      app: nginx
  replicas: 2
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

Exposing Services

- Services
 1. ClusterIP
 2. NodePort
 3. LoadBalancer
- Ingress/IngressController



```
kind: Service
apiVersion: v1
metadata:
  name: nginx
  labels:
    app: nginx
  annotations:
    service.beta.kubernetes.io/aws-load-balancer-cross-zone-load-
balancing-enabled: "true"
spec:
  type: LoadBalancer
  selector:
    app: nginx
  ports:
    - name: http
      port: 80
      targetPort: http
    - name: https
      port: 443
      targetPort: http
```

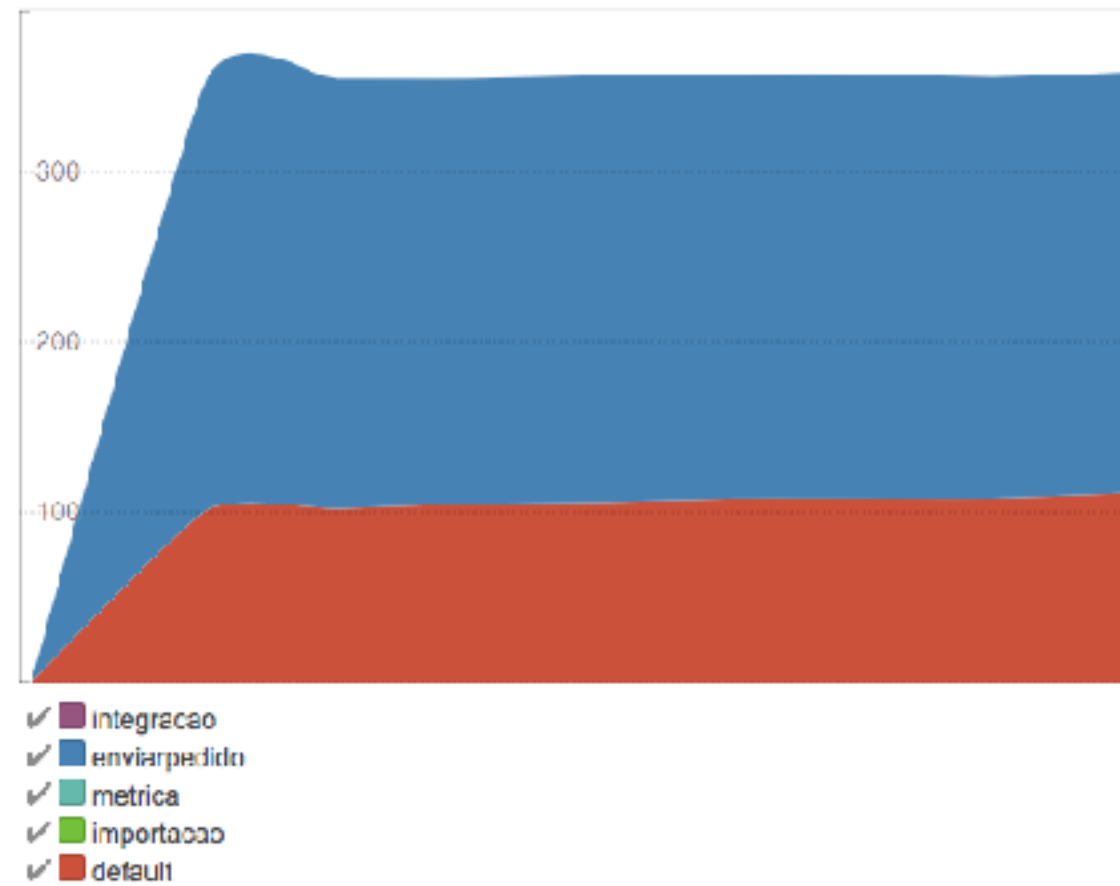

What is important to a App to run on Kubernetes?

- Read config from VARs
- Log to STDOUT STDERR
- Handle SIGTERM
- Readiness/Liveness
- Resource limits

A background image showing two hands, one from the left and one from the right, reaching towards each other over a surface of light-colored sand. The hands are slightly out of focus, creating a soft, artistic effect. The text is overlaid in the center of the image.

Hands-on Time: Running a Python App on Kubernetes

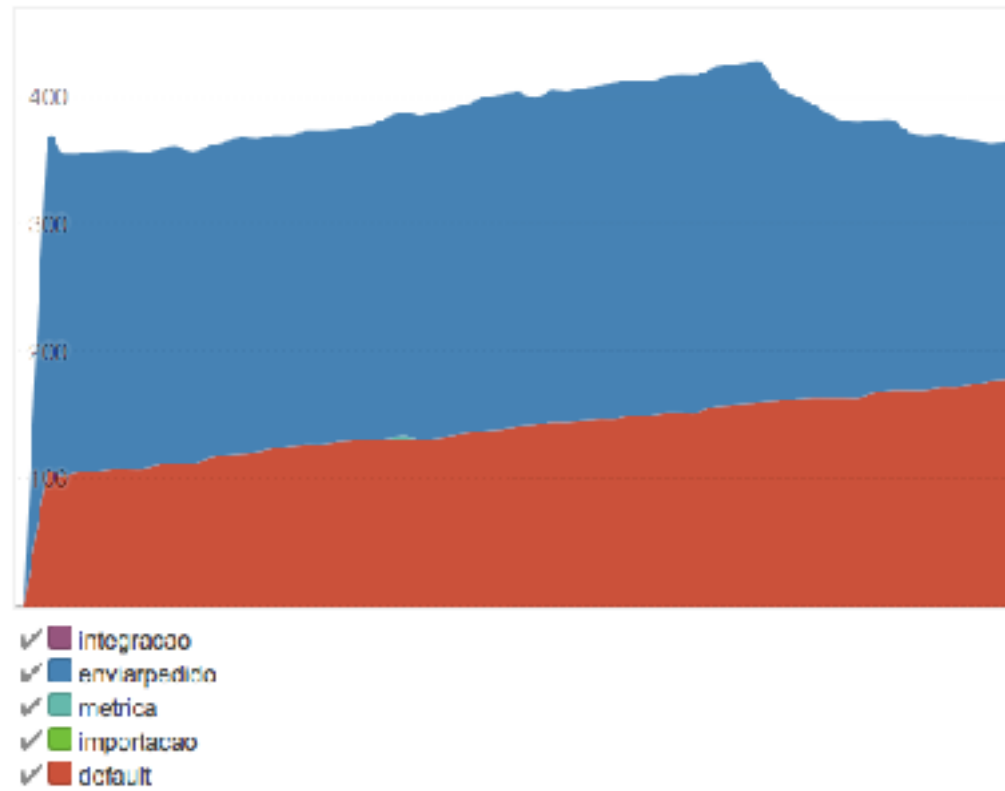
Queued tasks



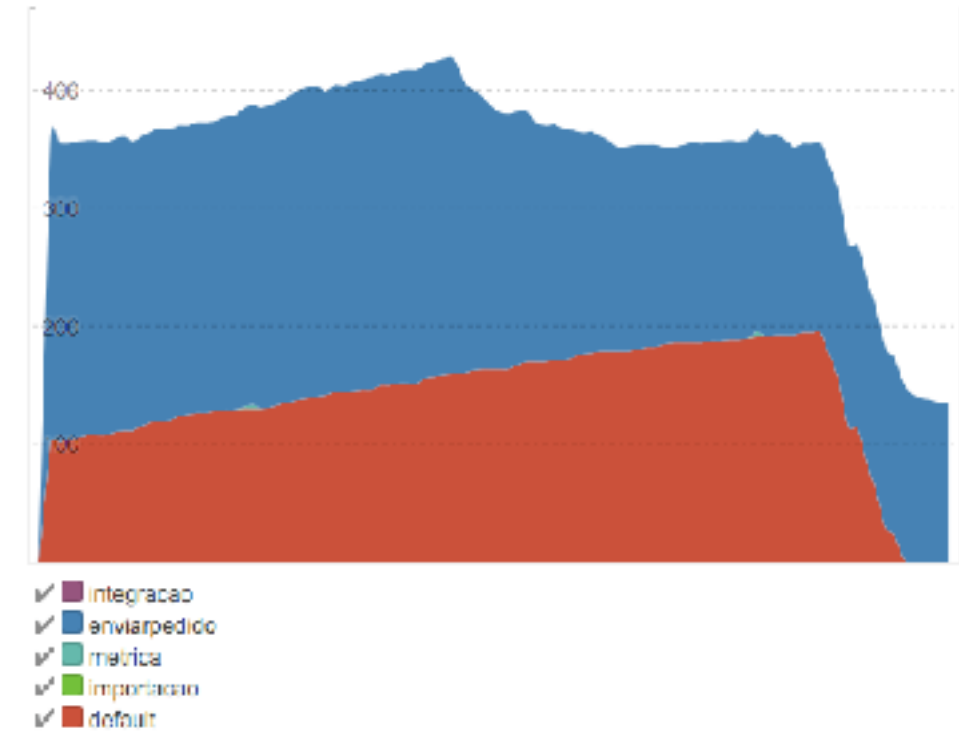
```
kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
meuspedidos-worker-autoscaler-fb559d654-6z8ws	1/1	Running	0	1d
meuspedidos-worker-default-58ffcd76f4-hz9x8	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-7ncp6	1/1	Running	0	21h
meuspedidos-worker-enviarpedido-5554b96686-87bpc	1/1	Running	0	1m
meuspedidos-worker-enviarpedido-5554b96686-9jn8x	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-fknfq	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-vxdts	1/1	Running	0	1d
meuspedidos-worker-importacao-5ccc7885b7-86bx8	1/1	Running	0	1h
meuspedidos-worker-integracao-65cccb494-hng56	1/1	Running	0	21h
meuspedidos-worker-metrica-5459f99fb4-f2glj	1/1	Running	0	23h

Queued tasks



Queued tasks



```
kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
meuspedidos-worker-autoscaler-fb559d654-6z8ws	1/1	Running	0	1d
meuspedidos-worker-default-58ffcd76f4-hz9x8	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-7ncp6	1/1	Running	0	21h
meuspedidos-worker-enviarpedido-5554b96686-87bpc	1/1	Running	0	2m
meuspedidos-worker-enviarpedido-5554b96686-9jn8x	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-brdms	1/1	Running	0	15s
meuspedidos-worker-enviarpedido-5554b96686-fknfq	1/1	Running	0	1d
meuspedidos-worker-enviarpedido-5554b96686-vxdts	1/1	Running	0	1d
meuspedidos-worker-importacao-5ccc7885b7-86bx8	1/1	Running	0	1h
meuspedidos-worker-integracao-65cccb494-hng56	1/1	Running	0	21h
meuspedidos-worker-metrica-5459f99fb4-f2glj	1/1	Running	0	23h