Kubernetes: The Basics

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@thoughtworks

agenda

the why

the how (ish)

the what

the relevant

not on the agenda

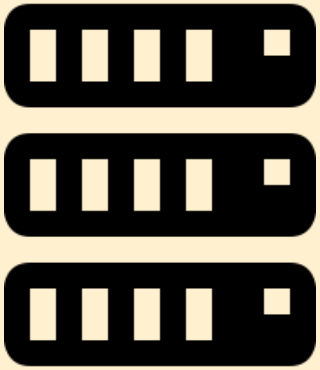
k8s by the bits

docker

new features

ecosystem

the why

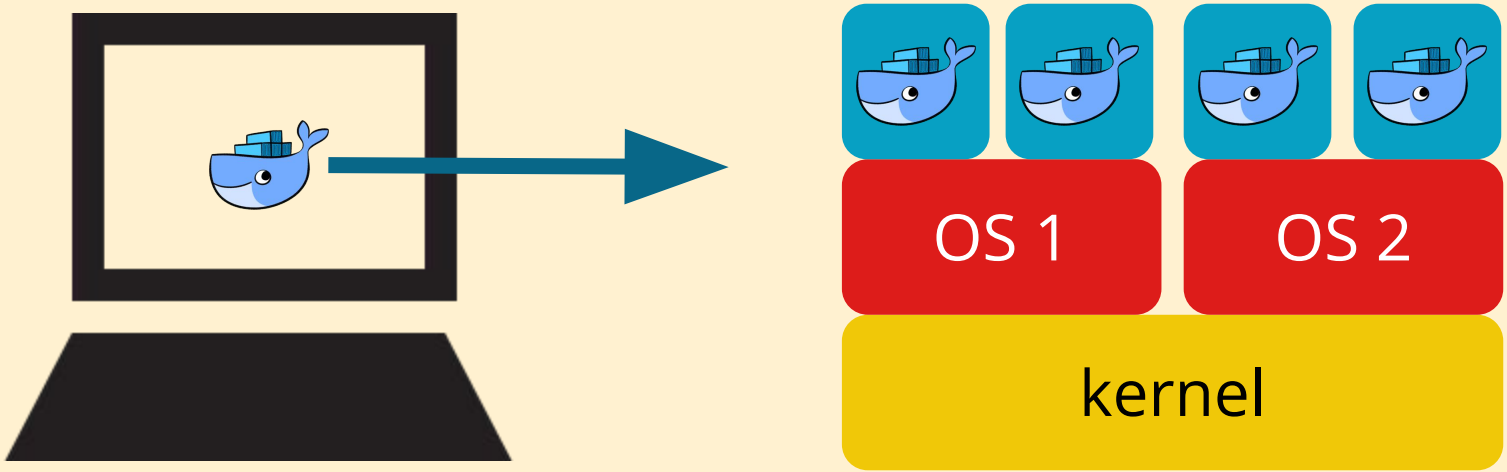


Borg

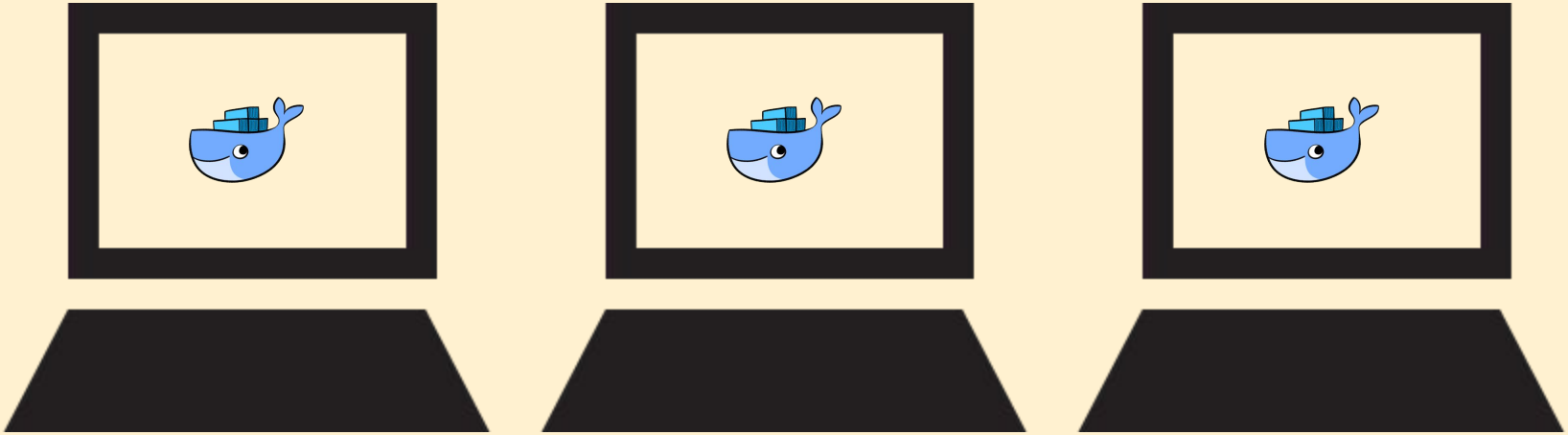
http://blog.kubernetes.io/2015/04/borg-predecessor-to-kubernetes.html


TERMINAL BURCHARDKAI
HHLA
Hapag-Lloyd
HOUSTON EXPRESS
HAMBURG

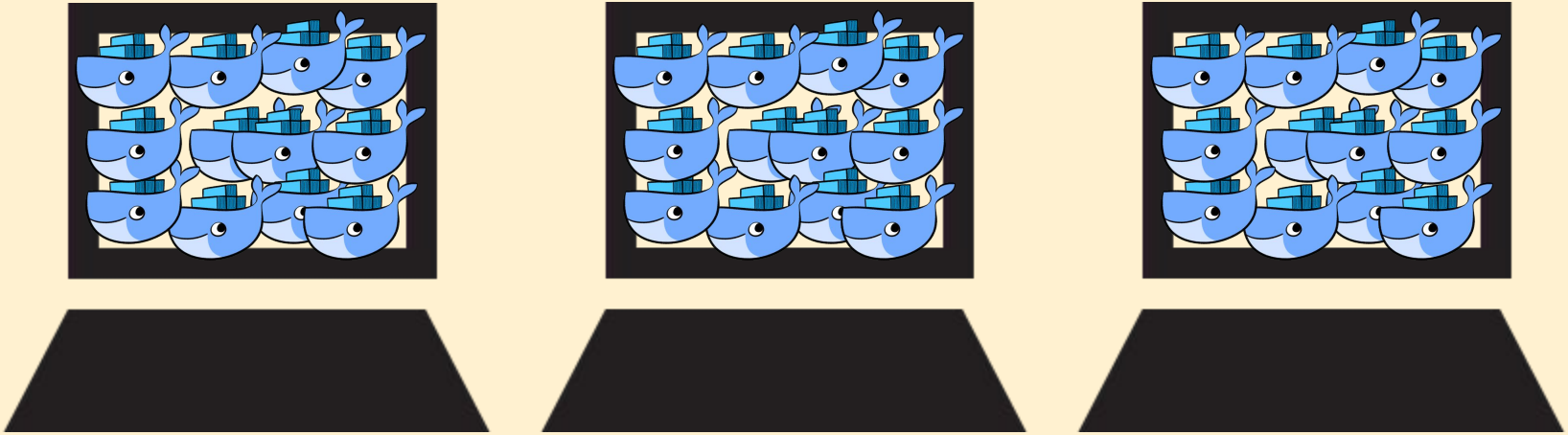
the why



the why



the why



quiz!

How do we manage these containers?

a. Group them.
b. Write some code to schedule them on resources.
c. Build some connectivity to bridge them all together.
d. Identify them in a human-friendly way.

quiz!

How do we manage these containers?

a. Group them.
b. Write some code to schedule them on resources.
c. Build some connectivity to bridge them all together.
d. Identify them in a human-friendly way.
e. All of the above!

the how (ish)

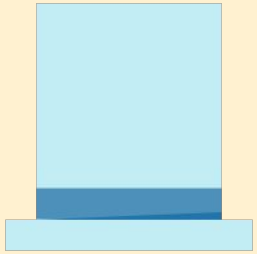
k8s components

are hosted on

servers.

virtual machines, bare metal, etc.

k8s components



kube-apiserver
etcd
kube-scheduler
kube-controller-manager

The Master

kubelet
kube-proxy
container runtime
(docker)

Node 1

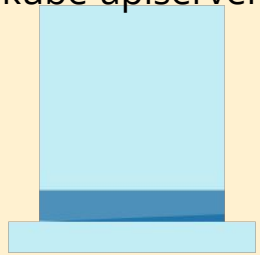
Node 2

Node N

https://kubernetes.io/docs/concepts/overview/components/#master-components

“Here’s my app.”

kube-apiserver

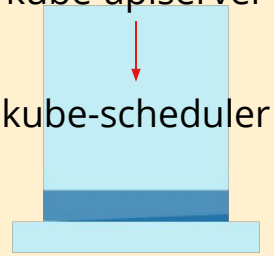


...

*AKA Worker

kube-apiserver

kube-scheduler



“Hmm...who has room to run this?”

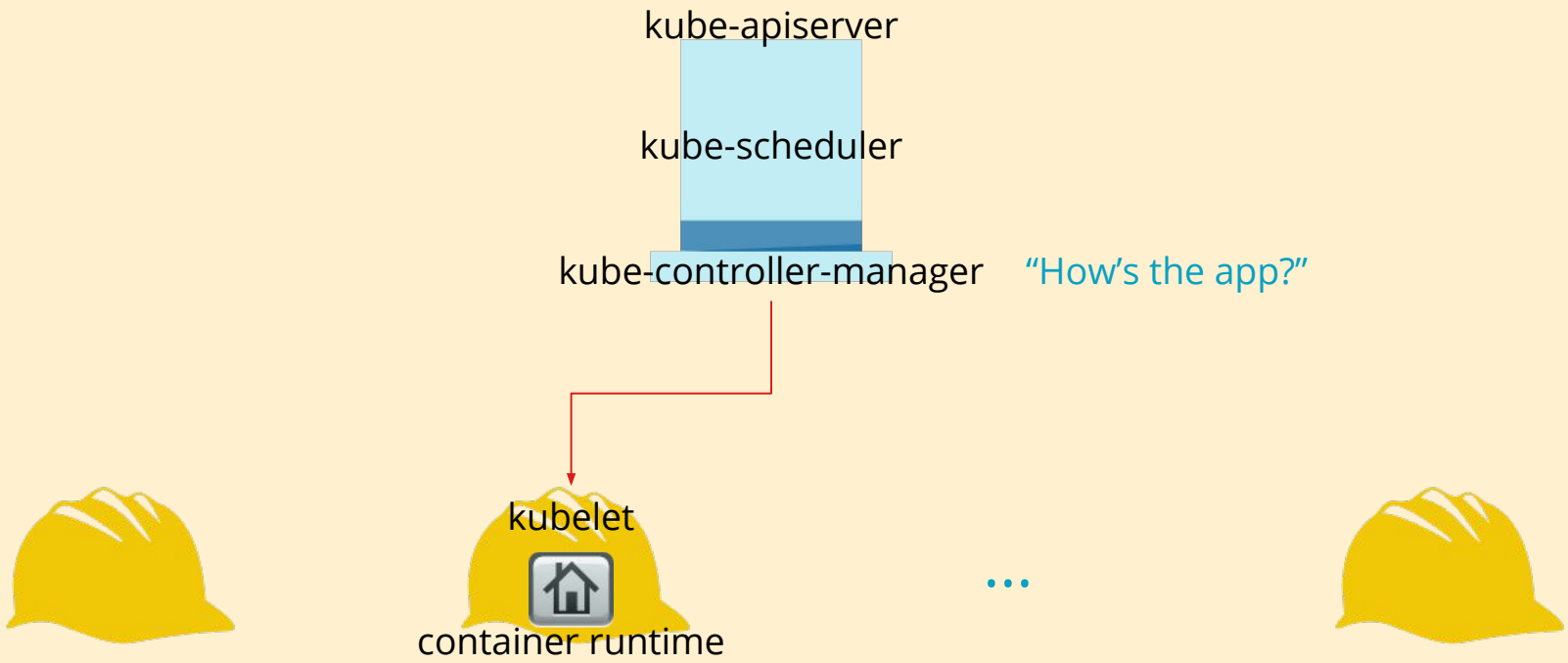
...

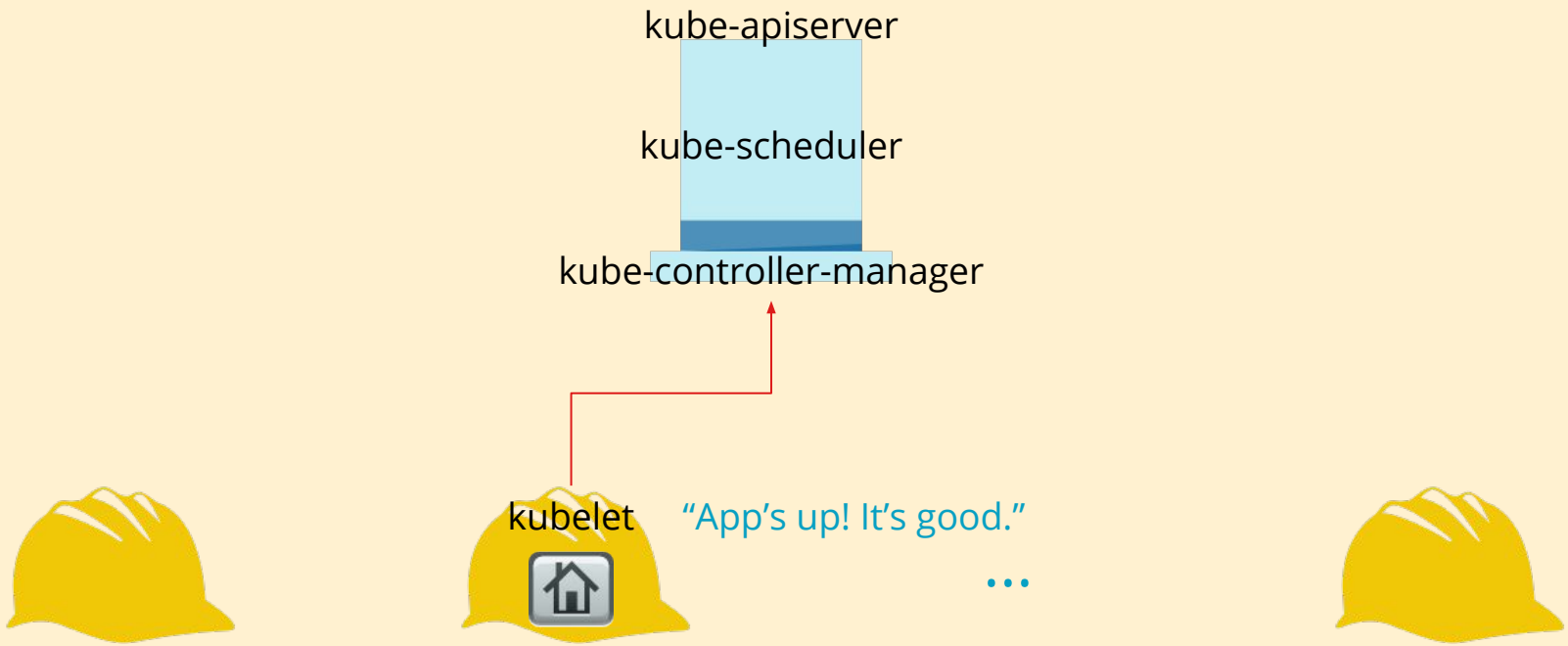
kube-apiserver

kube-scheduler “Node 2 has room!”

kubelet “Cool, I’ll tell Docker to run the app.”

container runtime


kube-apiserver
kube-scheduler
kube-controller-manager
“How’s the app?”
kubelet
container runtime
...


kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
“App’s up! It’s good.”
...

“Back up that config!”

kube-apiserver

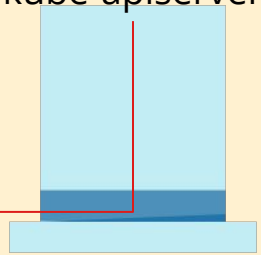
kube-scheduler

kube-controller-manager

...

“Let me hit my app’s endpoint!”

kube-apiserver



kube-proxy “I’ll pass the message.”

…

quiz!

Which of the following is **not** a K8s component?

a. deployment
b. etcd
c. kubelet
d. cloud-controller-manager

quiz!

Which of the following is **not** a K8s component?

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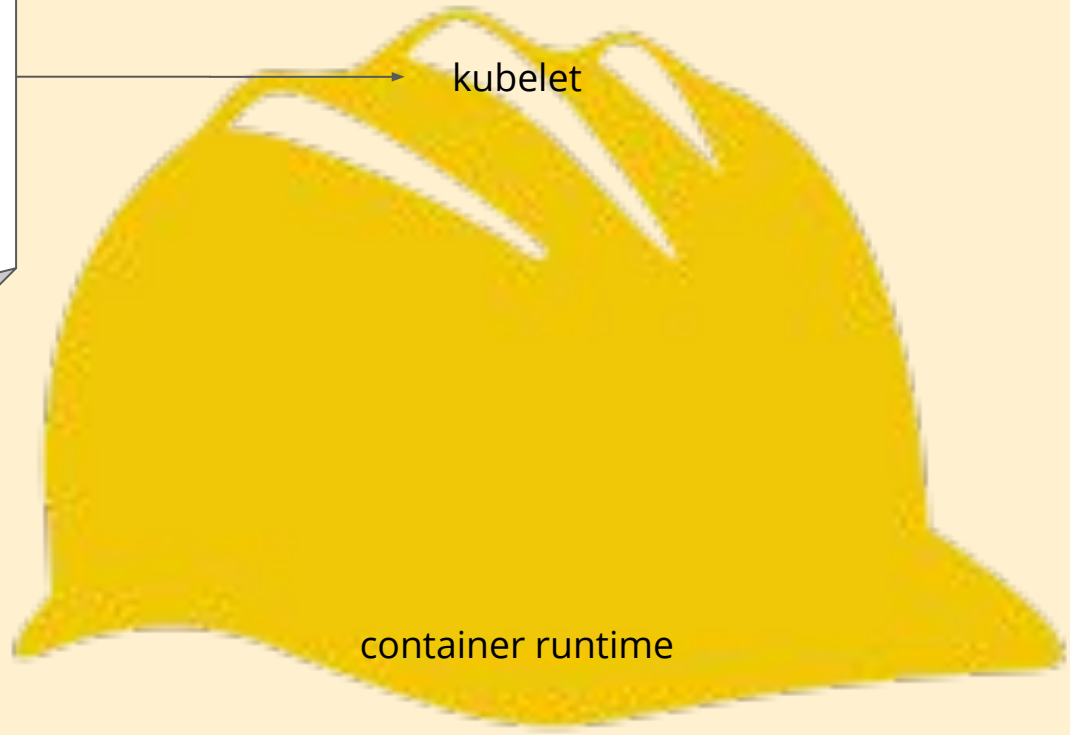
the what

PodSpec

I want container xyz on port 123 & container abc with ports 456.

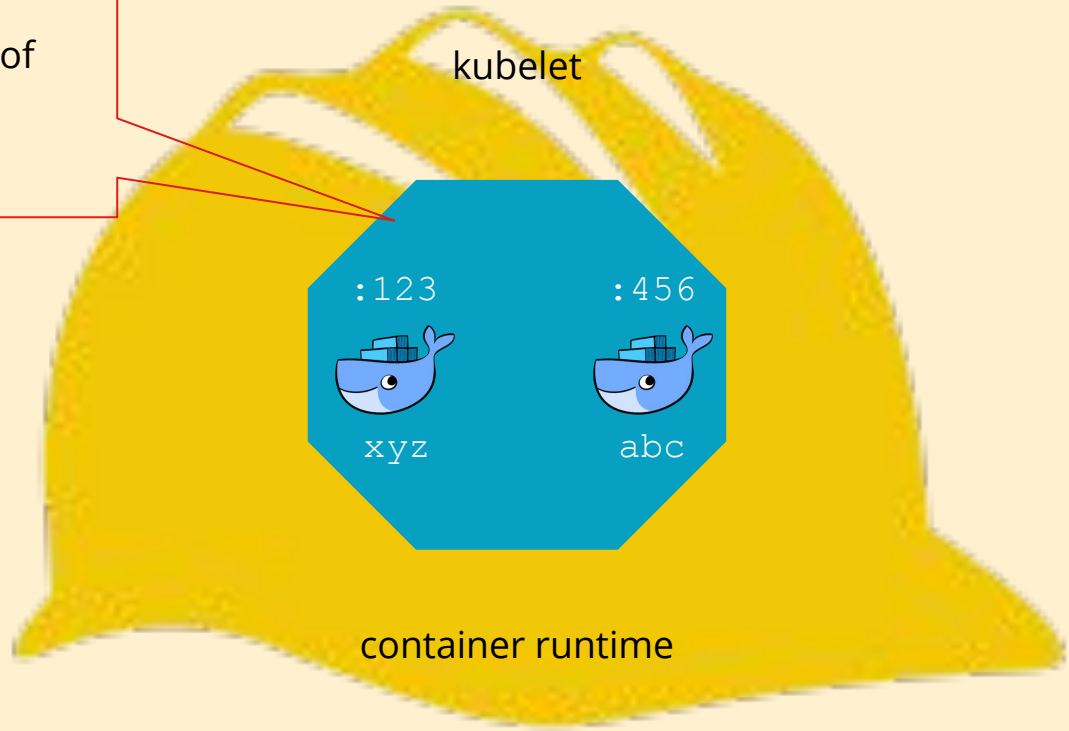


quiz!

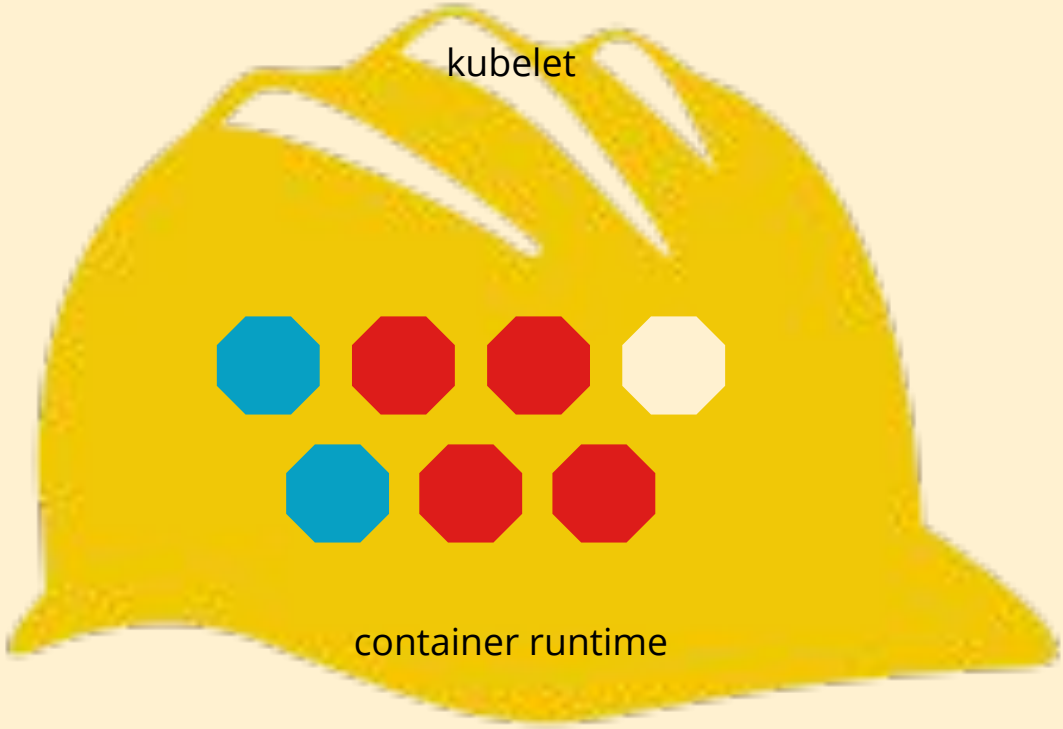
Which container technology are we using?

pod

What's a group of whales?
A POD!



a worker can have multiple pods...

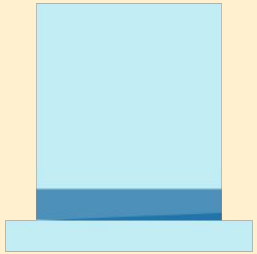


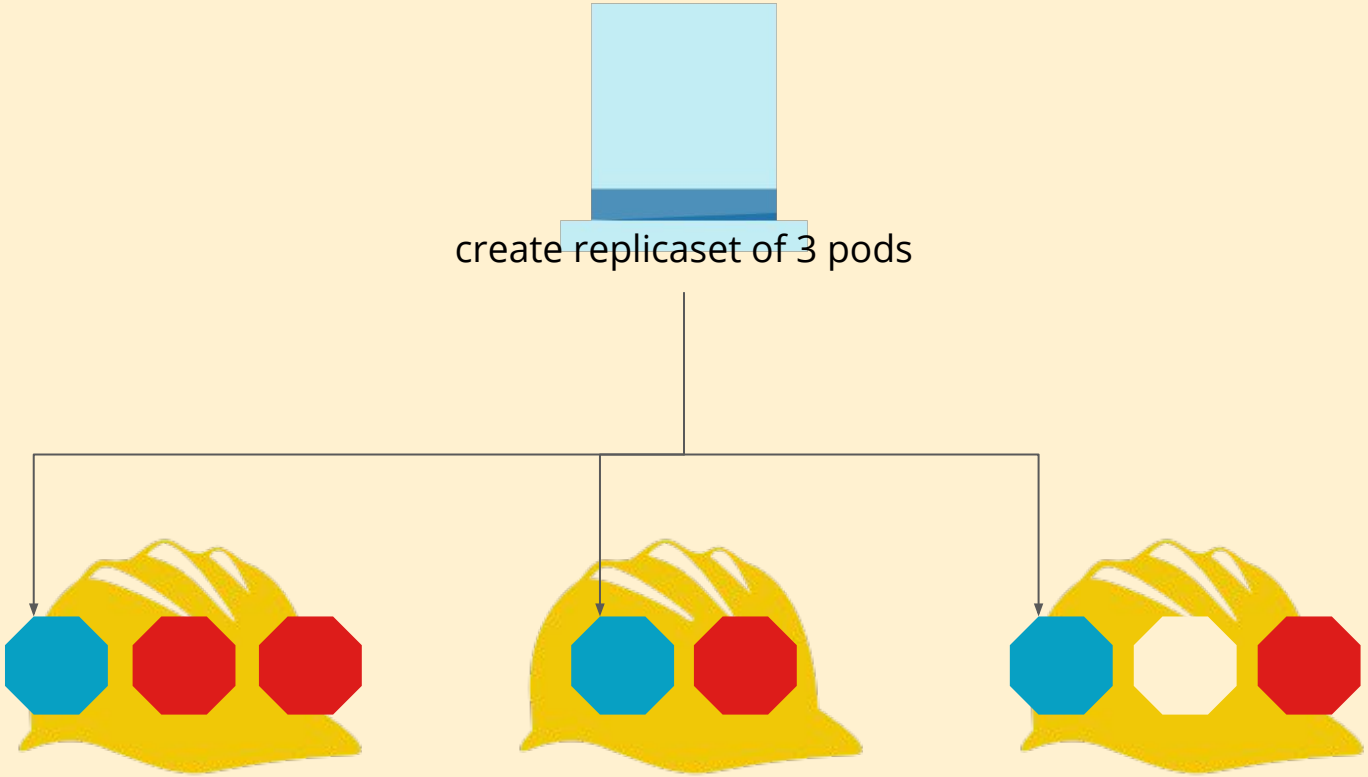
How do we tell k8s
how many pods
we want for our app?

Deployment

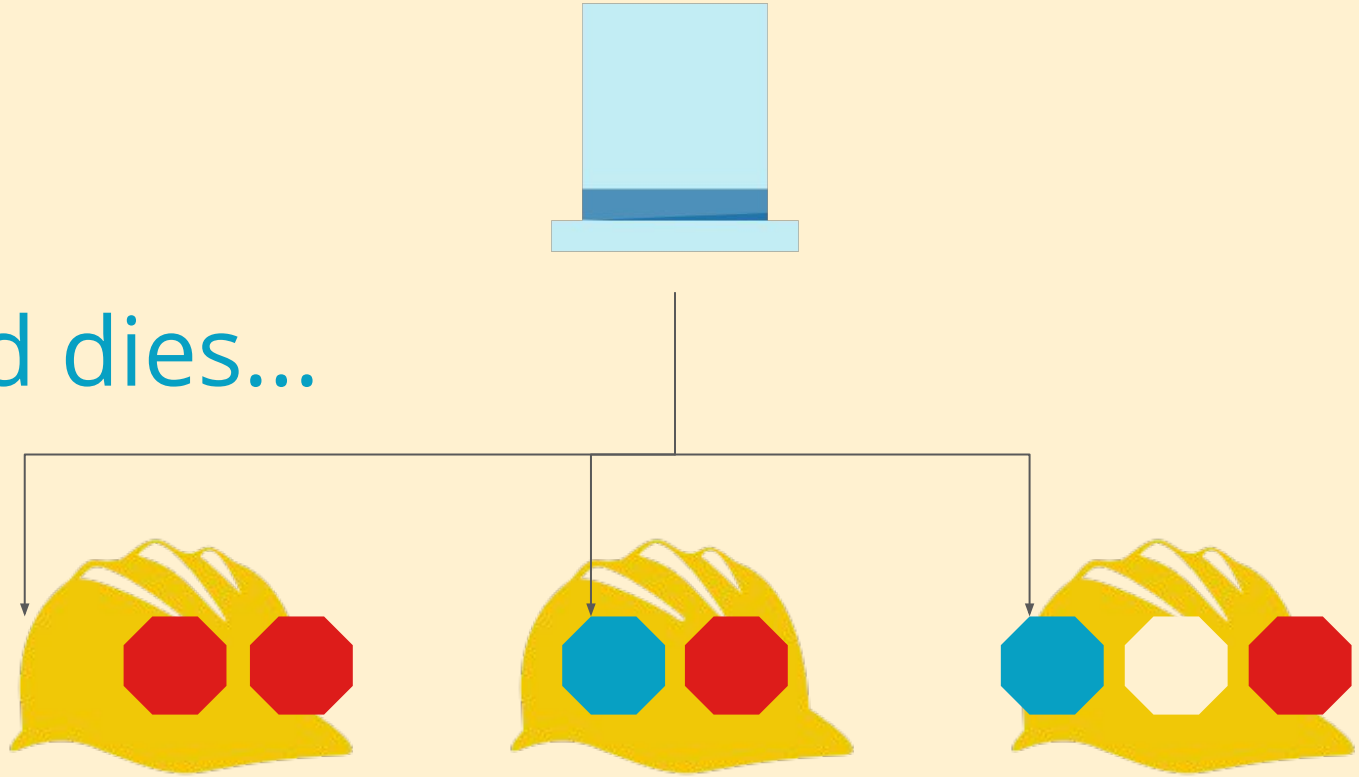
I want 3 replicas of my

pods.

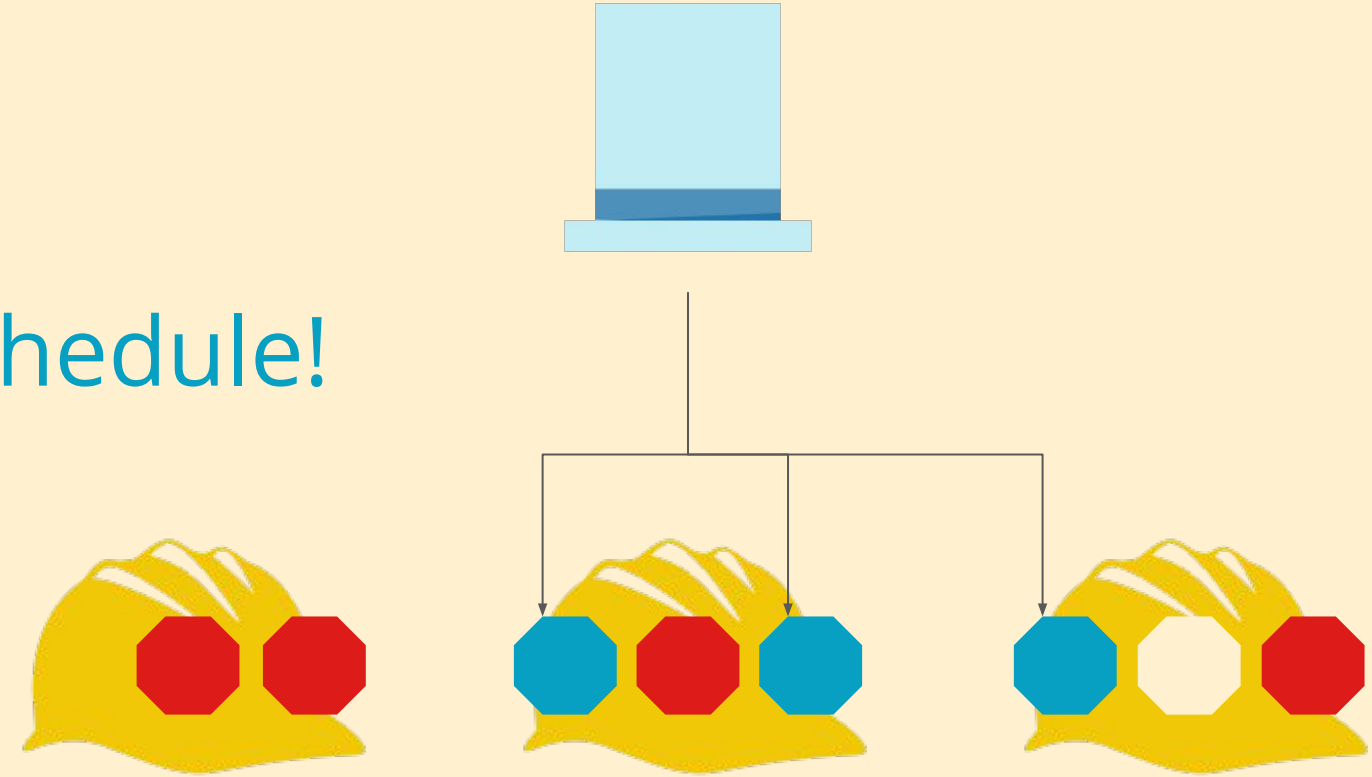



create replicaset of 3 pods

A pod dies...



Reschedule!



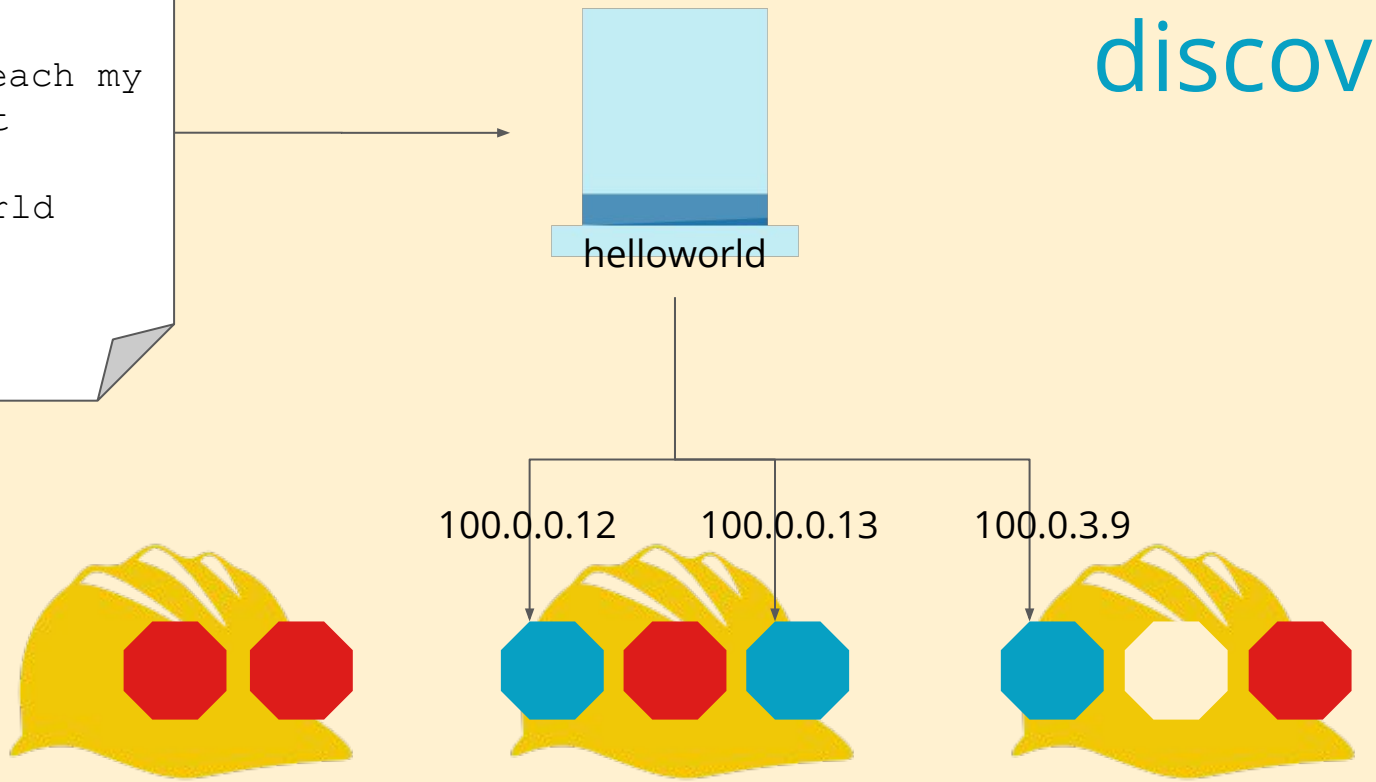
How do we reach
our application?

AKA service discovery!

Service

I want to reach my app at

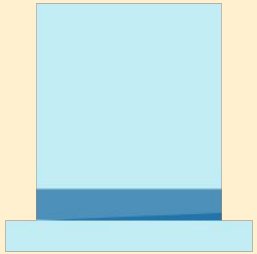
helloworld

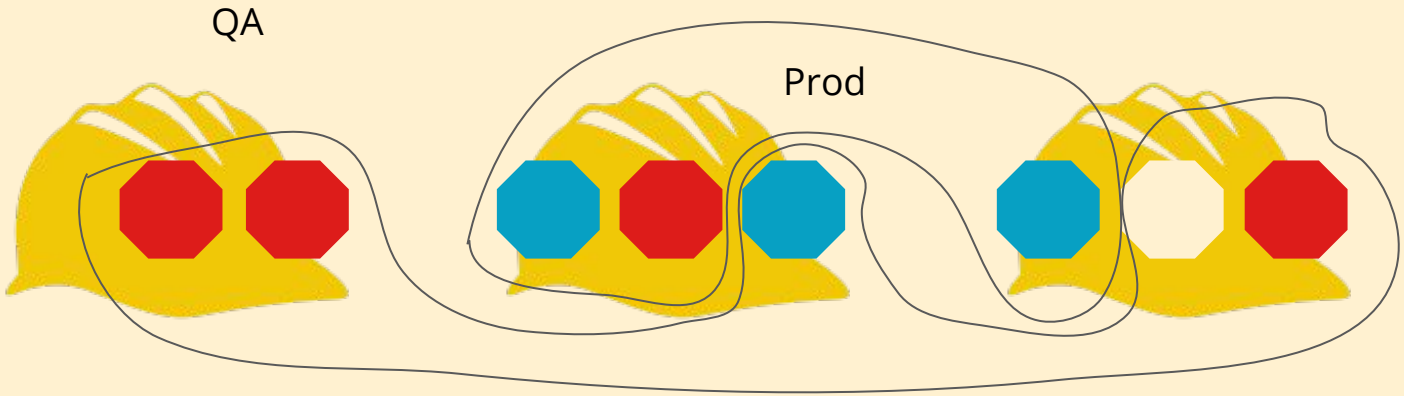


Do I want my helloworld app
borrowing resources
from my most critical apps?

Namespace

helloworld should be deployed in QA ...but shouldn't borrow resources from Prod.





cheatsheet

A Pod contains everything my app needs.

A Deployment describes how many pods I want.

A Service lets my app be discoverable.

A Namespace isolates my app’s resources.

quiz!

What is the set of pods produced from a deployment?

a. ReplicaController
b. StatefulSet
c. ReplicaSet
d. BatchSet

quiz!

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the (other) what

other ways to schedule pods...

A StatefulSet creates pods that link to external volumes for persistent data.

A DaemonSet always schedules a pod per node.

A Job runs a pod to completion and exits.

other constructs mounted to pod...

A Secret contains passwords, certs, etc.

A ConfigMap is static configuration information.

A Volume is soft-linked to the host file system for “persistent” data.

what you need to deploy...

kubectl is the command line interface to control the Kubernetes cluster.

A manifest is a YAML outlining the Kubernetes constructs you want and their configuration. (Optional but highly recommended.)

the relevant

github.com/joatmon08/k8s-b8cs

useful resources

- kubectl cheat sheet
- Kubernetes Manifest Examples
- Kubernetes Documentation