Kubernetes in 30 minutes

Mar 10, 2017

Daisuke Maki @lestrrat

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Netscape Navigator

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~~Netscape Navigator~~

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Kubernetes

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κυβερνήτης

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k8s

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“Something to do with containers…?

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Assumptions

- You know about containers
- You know about orchestration
- You know about the ~~painful~~ art of deploying stuff

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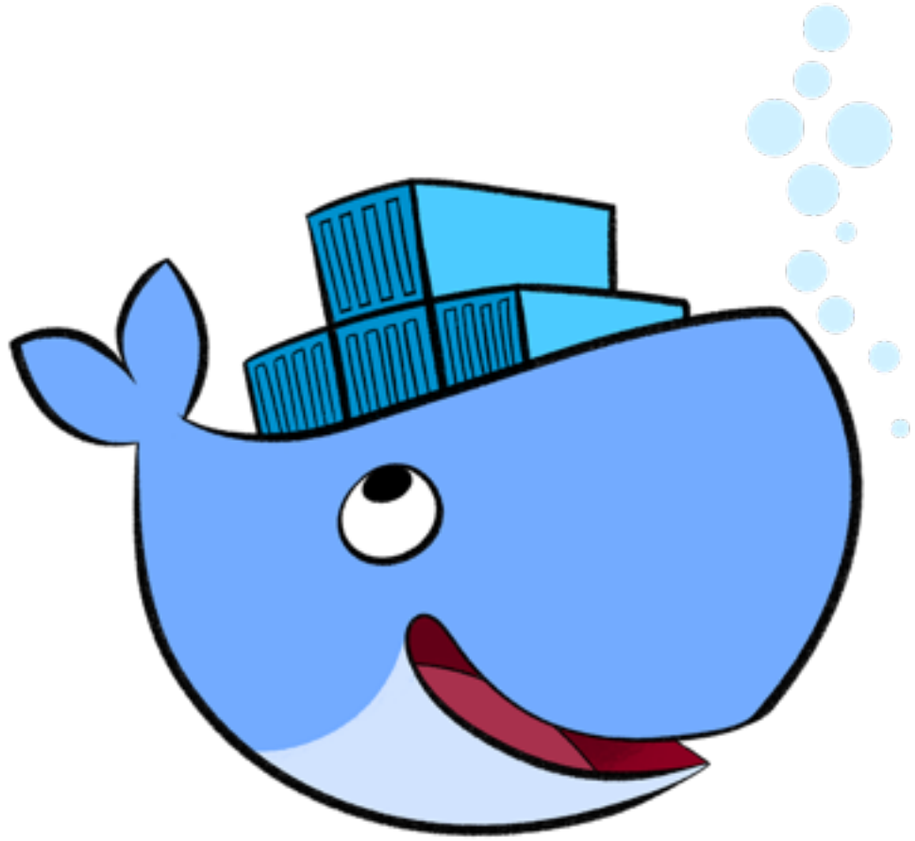

Docker

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“Random containers doing their own sh*t”

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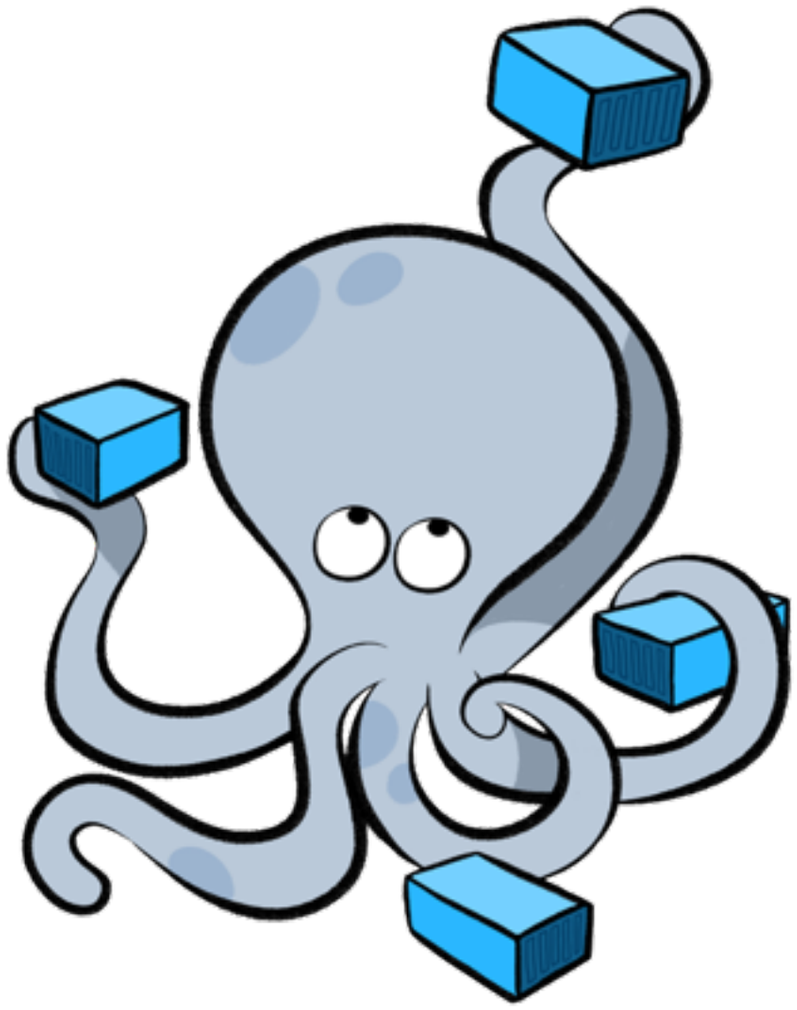

Compose

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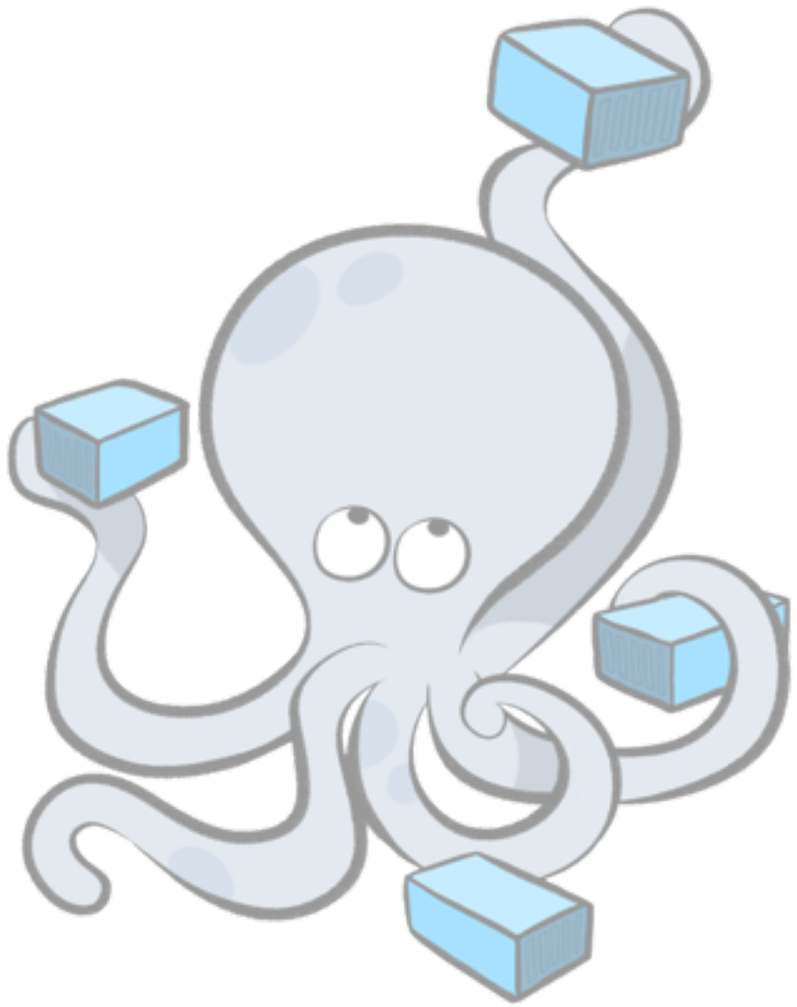

“Foreman on Acid”

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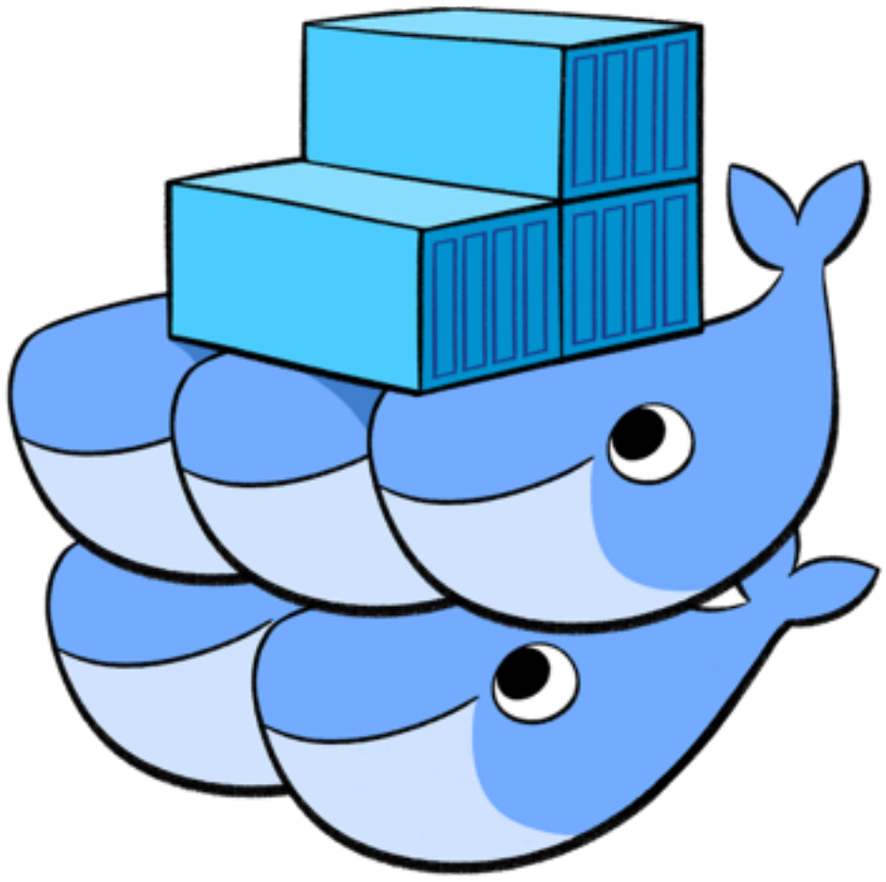

Swarm

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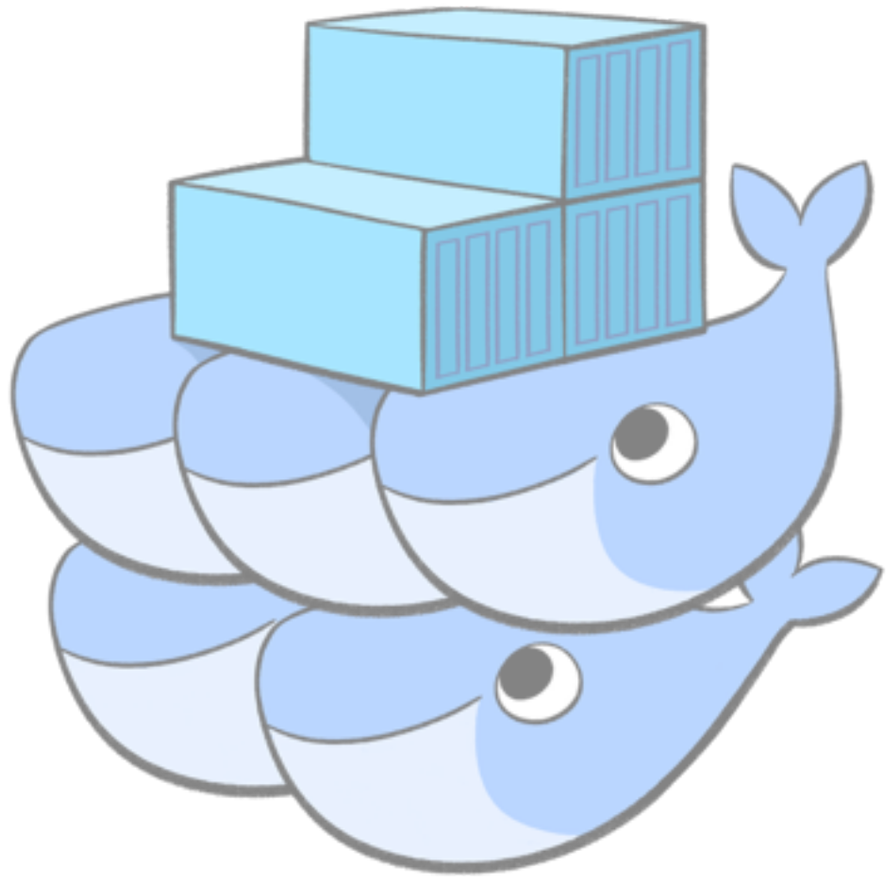

“Clustering and Discovery”

(hey, we’re getting somewhere!)

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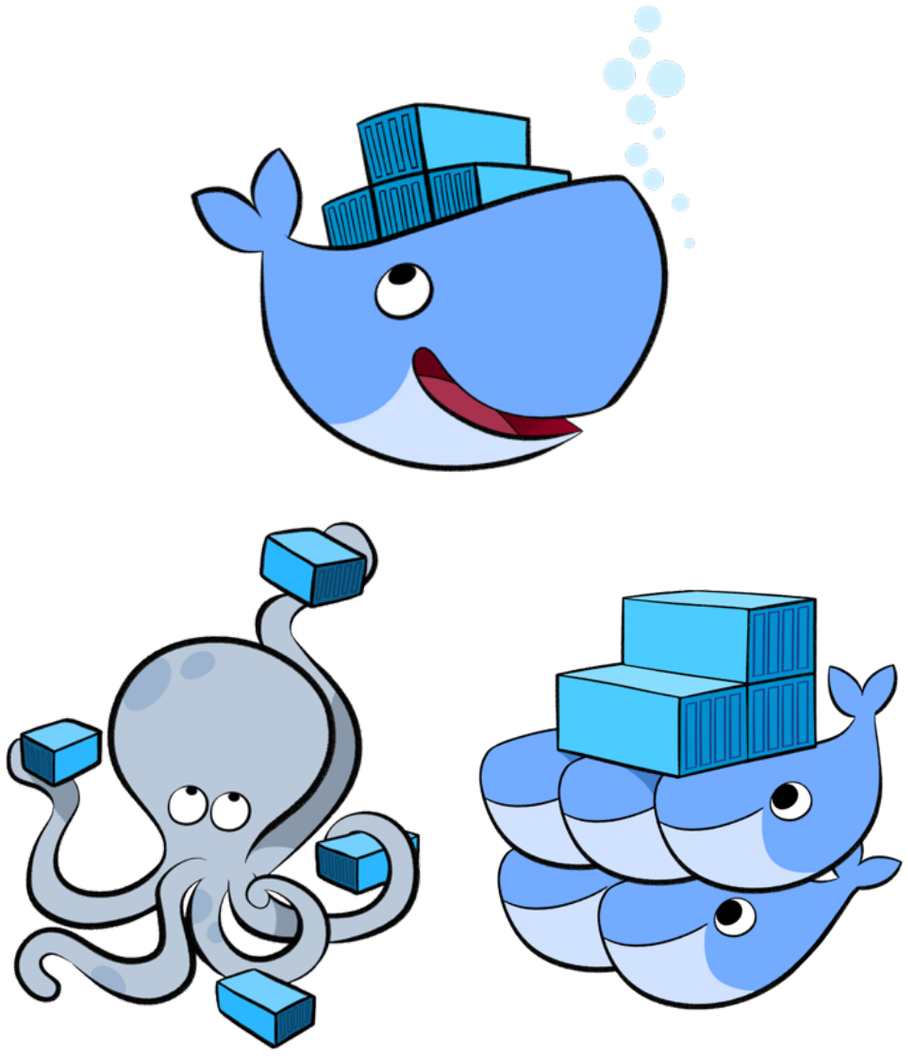
=



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“Batteries Included”

K8s on GCP

GKE GCE Networking

…and others

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Basic Concepts

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Node

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Hosts running k8s daemons

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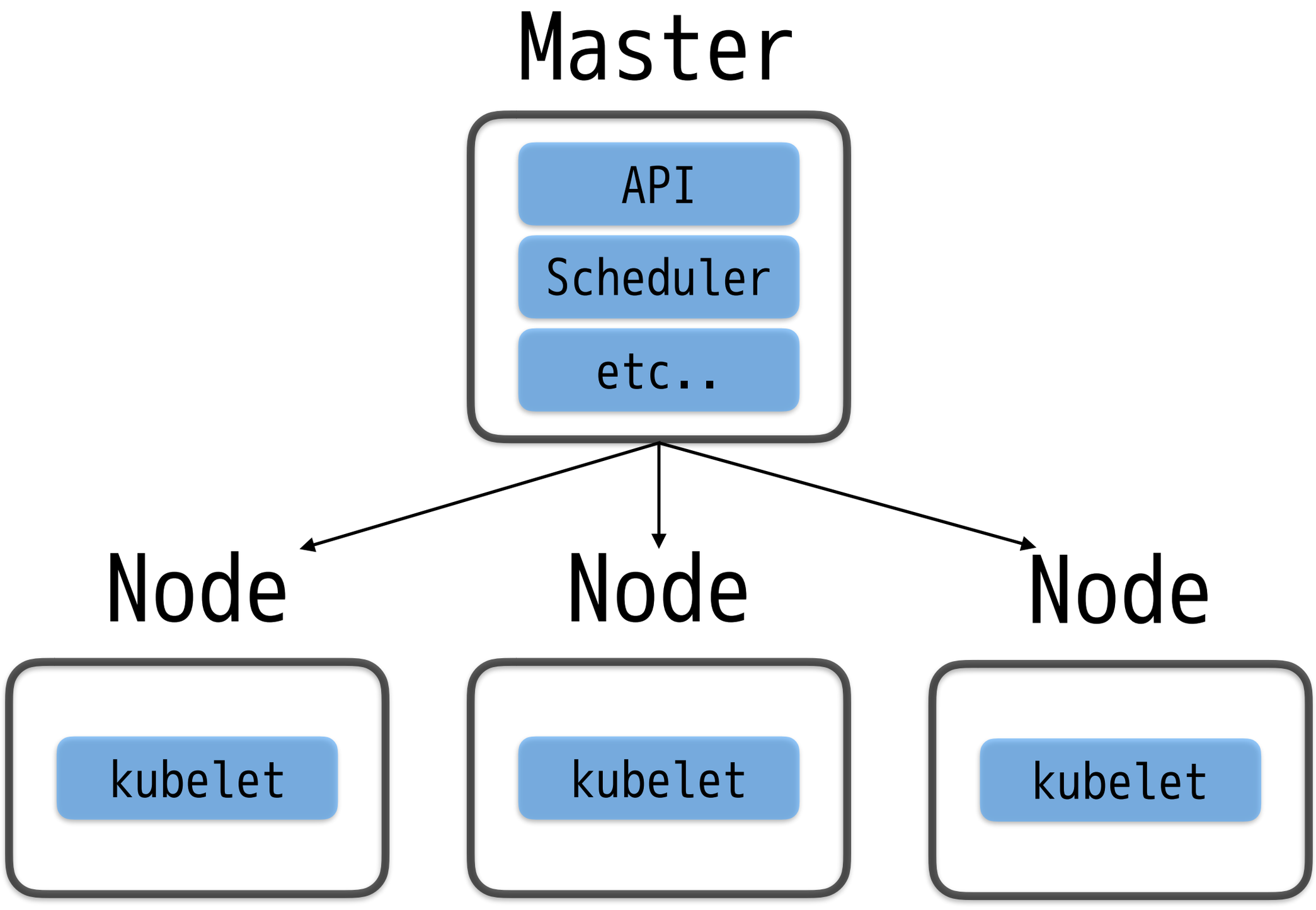

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Red Pod

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基本

Basic unit of deployment in k8s

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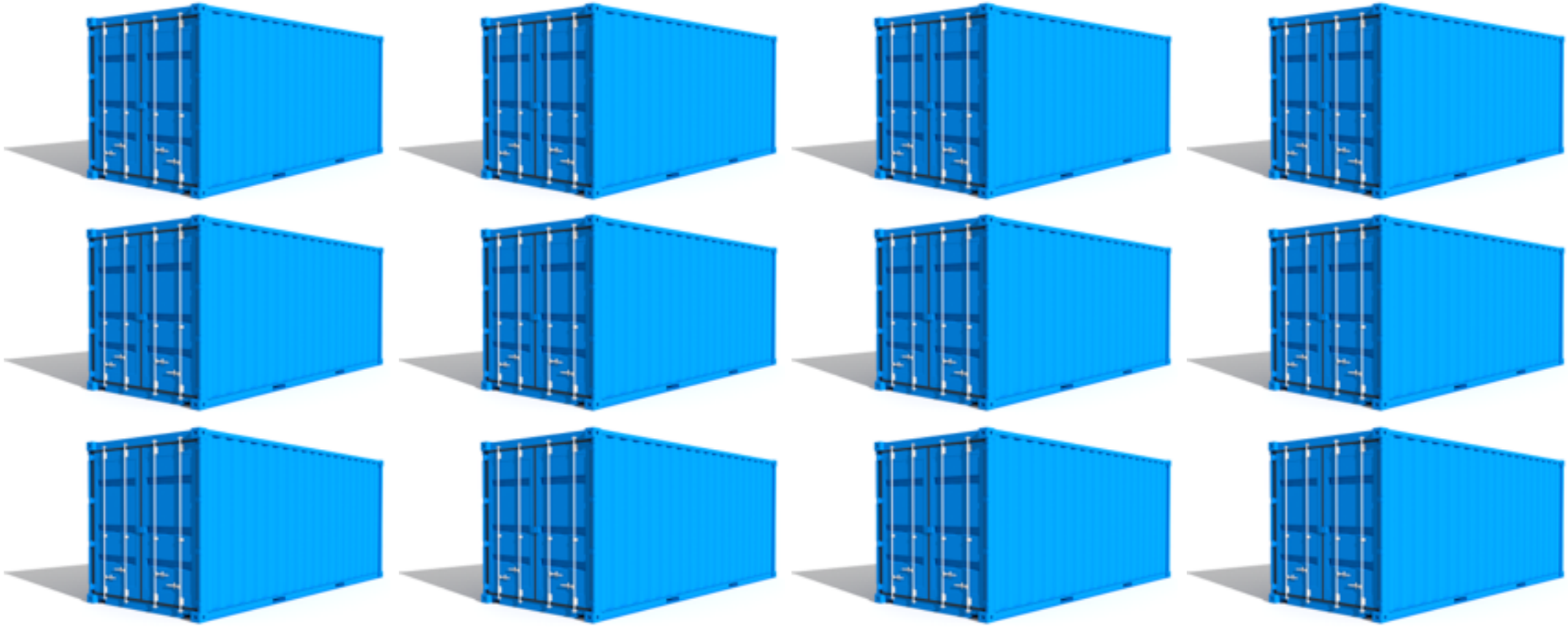
Group of Containers



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Container configurations

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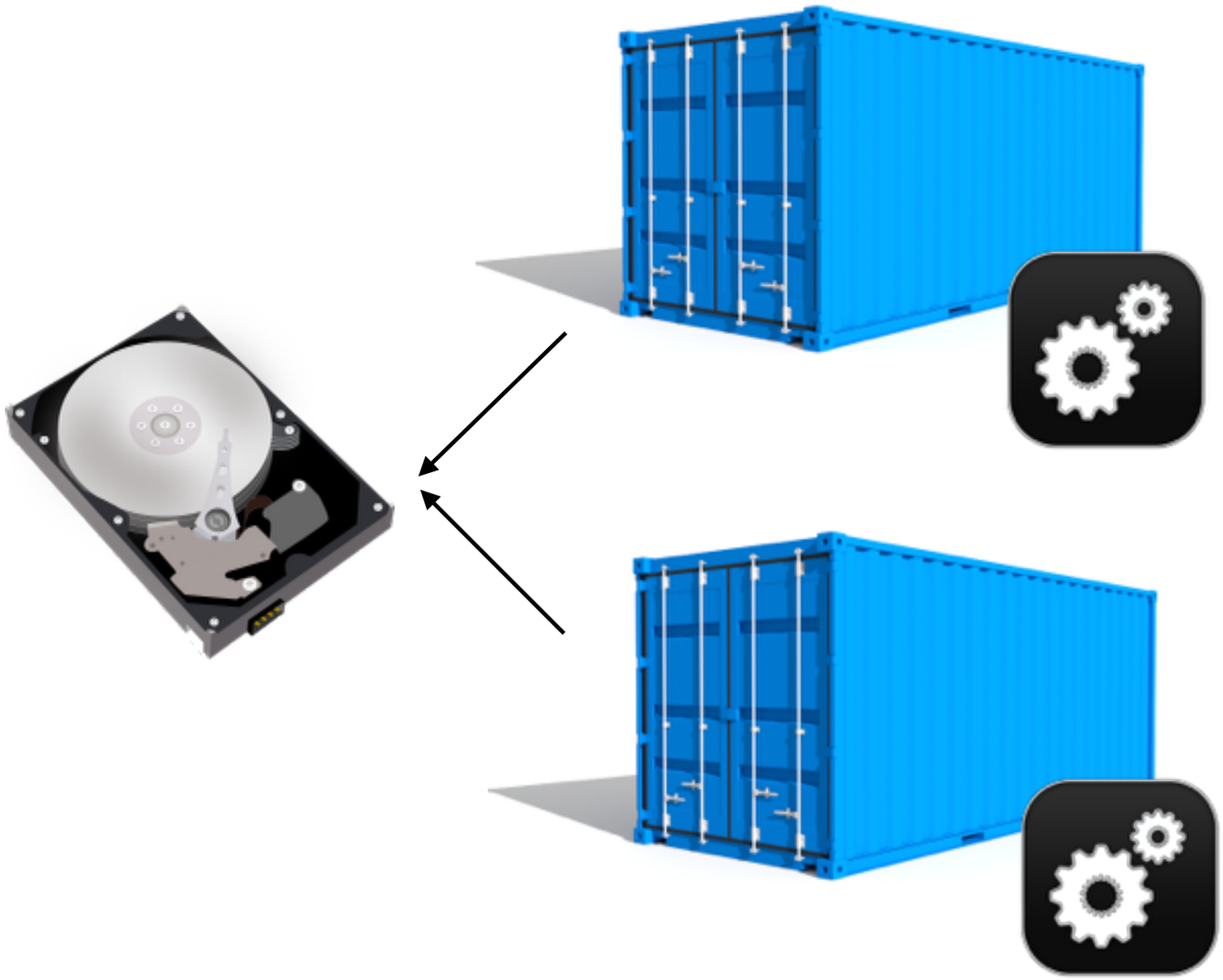
Shared storage



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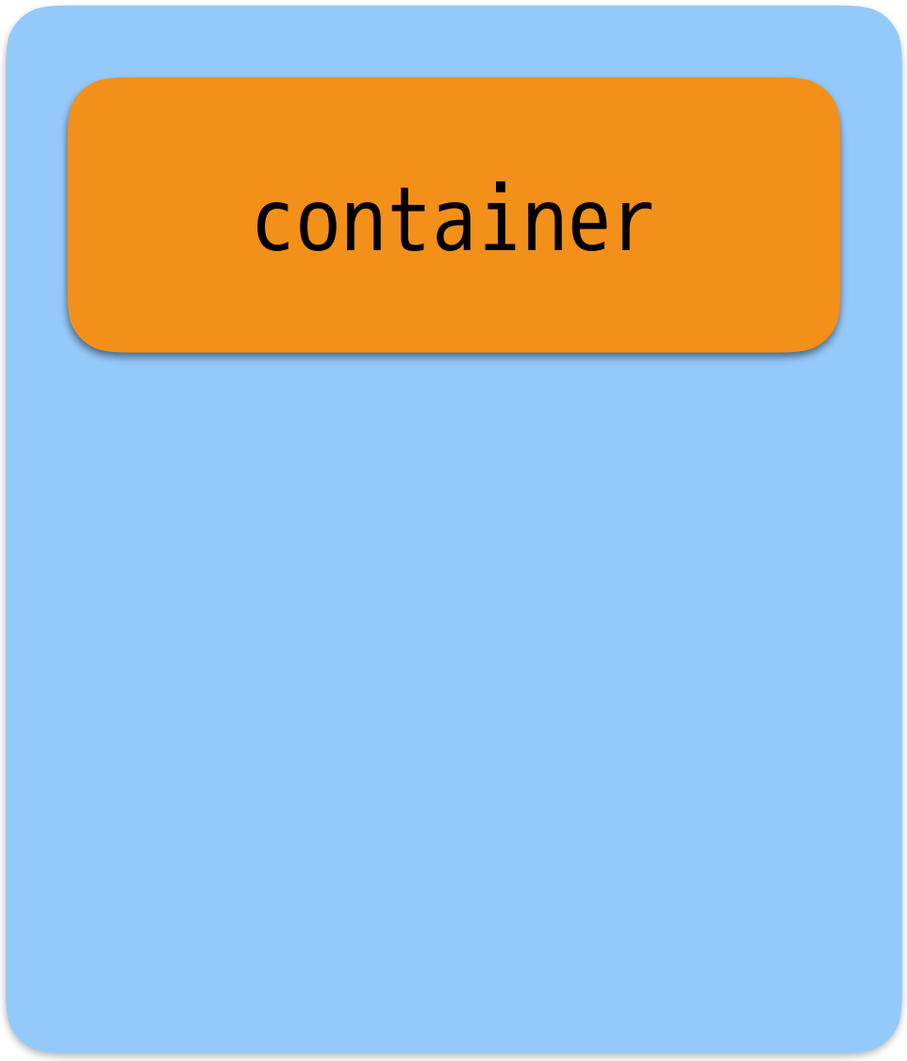
Pod



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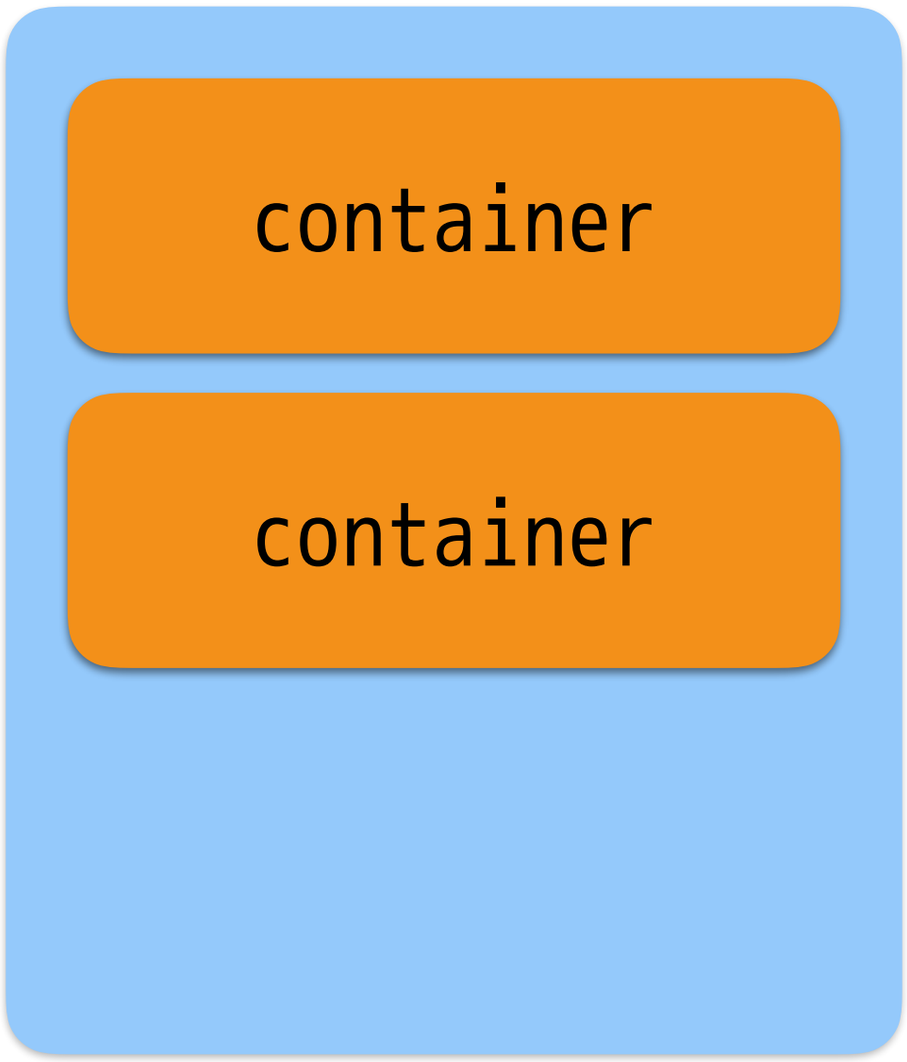
Pod



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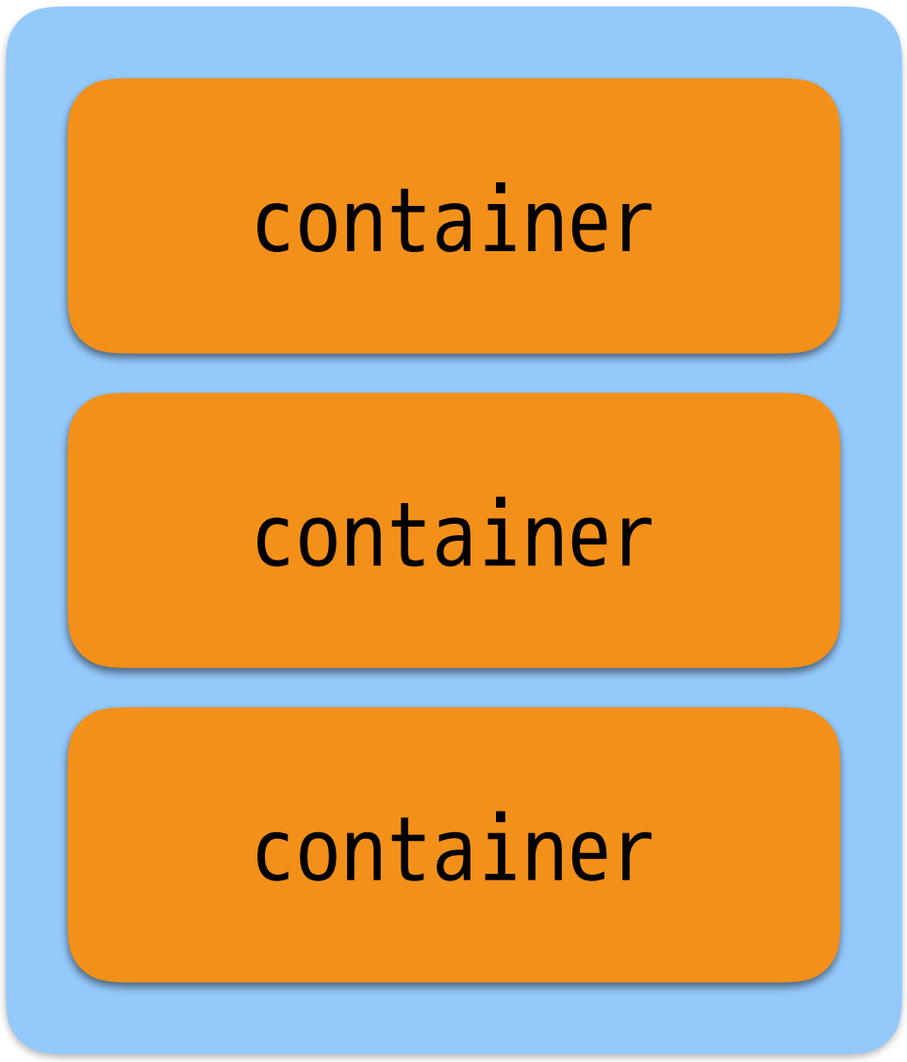
Pod



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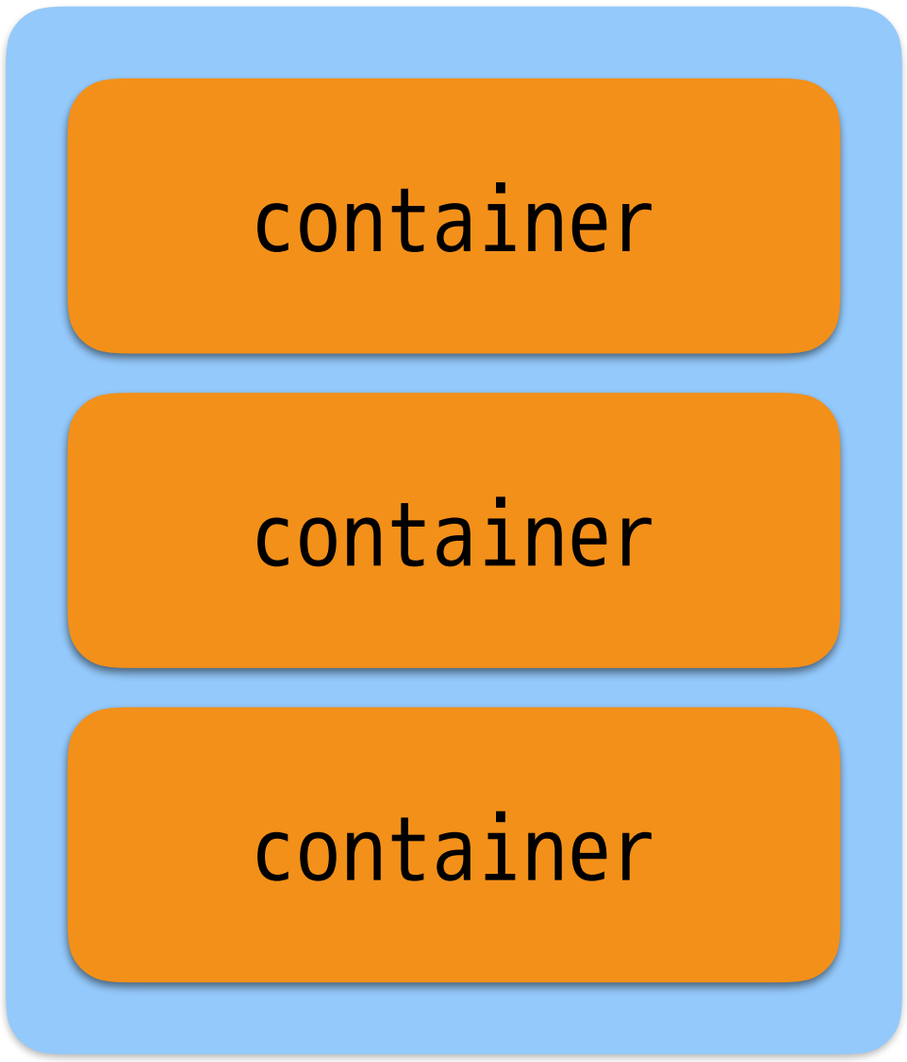
Pod



e.g.

nginx

app

redis/cache

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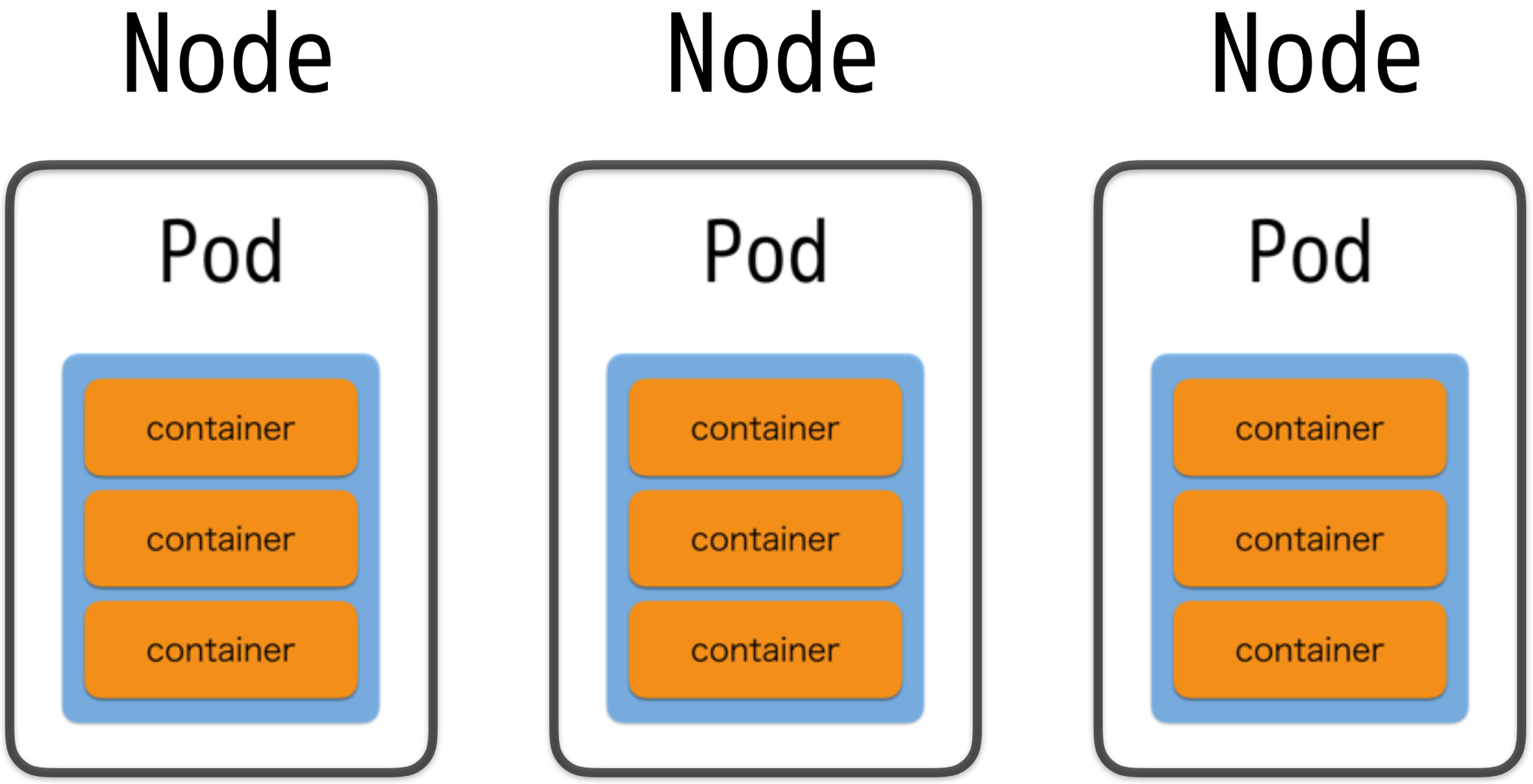
Scheduled together

(“co-scheduled”)

Guaranteed to be on the same node

(“co-located”)



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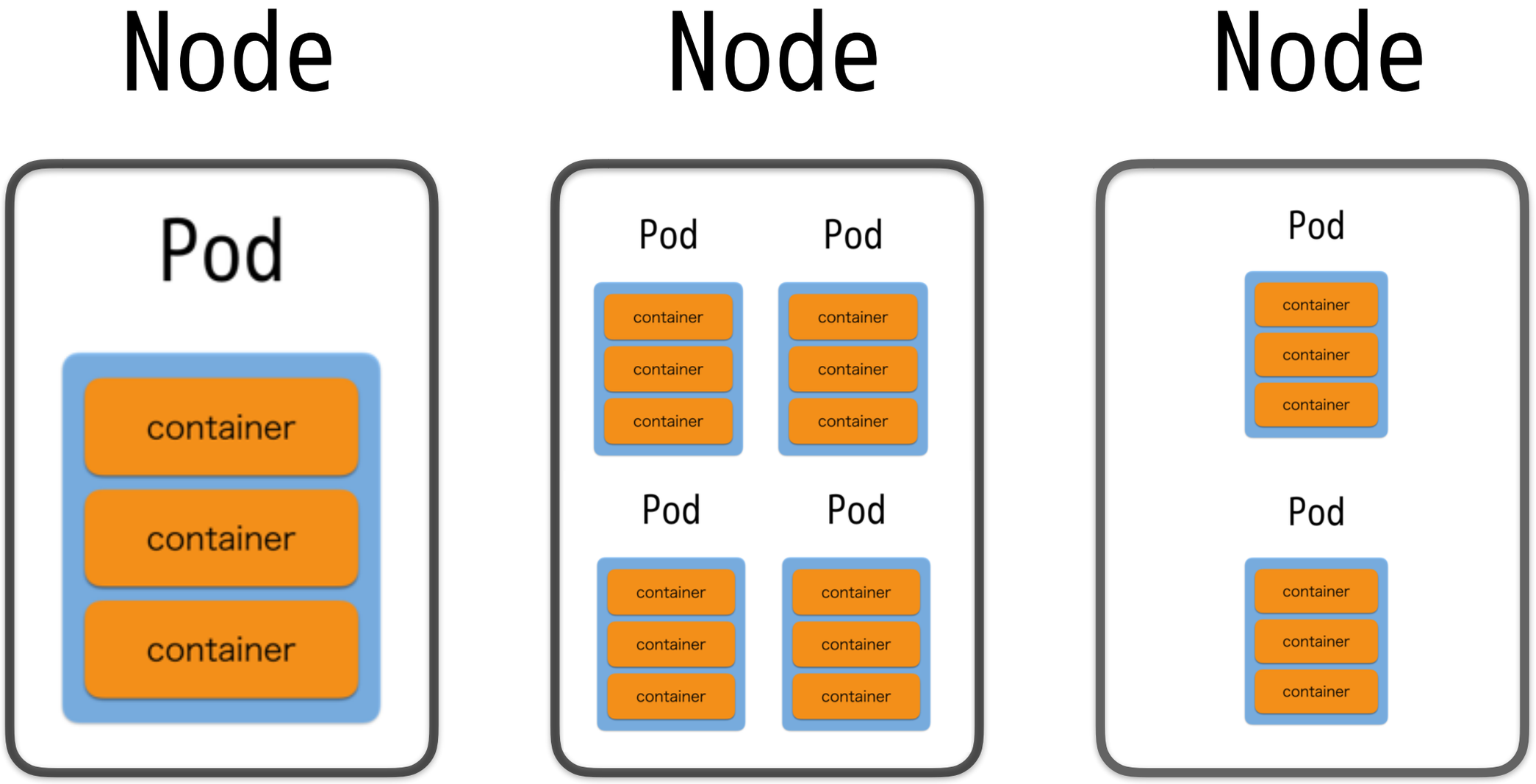

Depends on each node’s resource availability and each pod’s resource requirements

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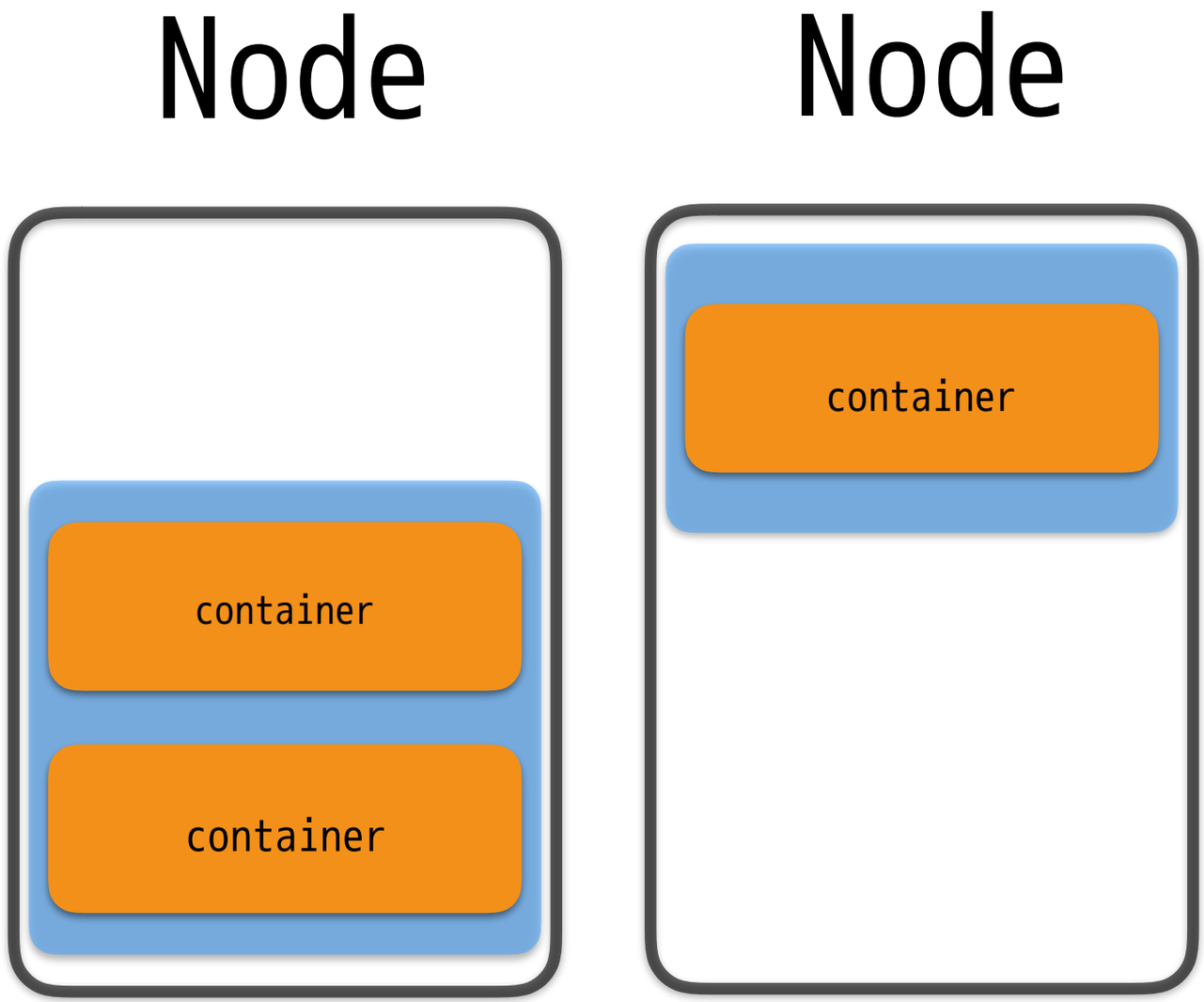

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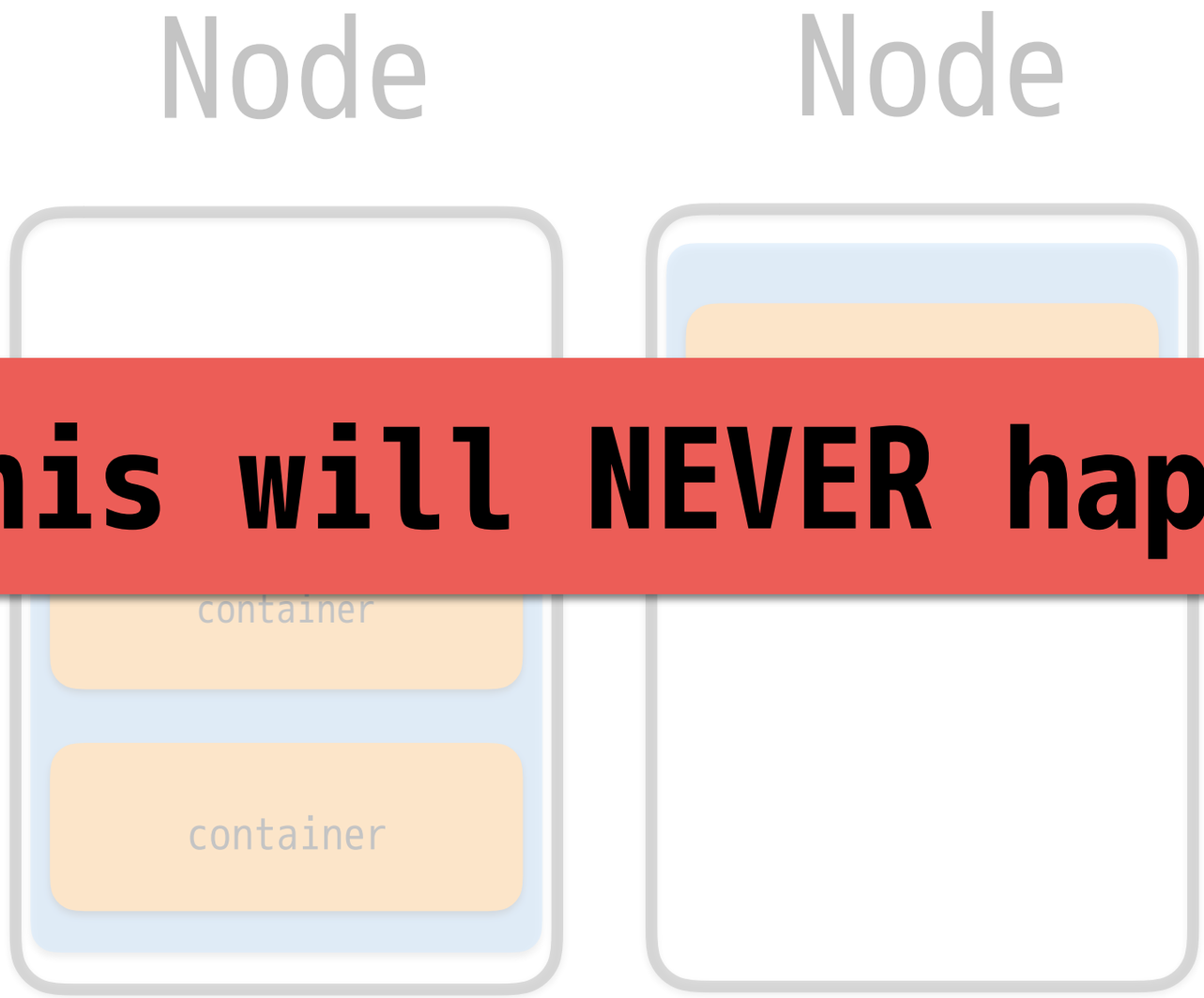

This will NEVER happen

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Miscellaneous

- Each pod has its own IP address
- Pods are expected to be stateless

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Replica Set

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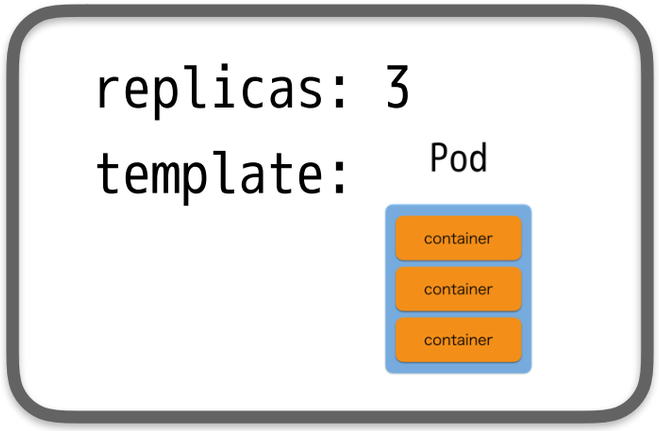
Keeps track of Pod replicas

Replica Set



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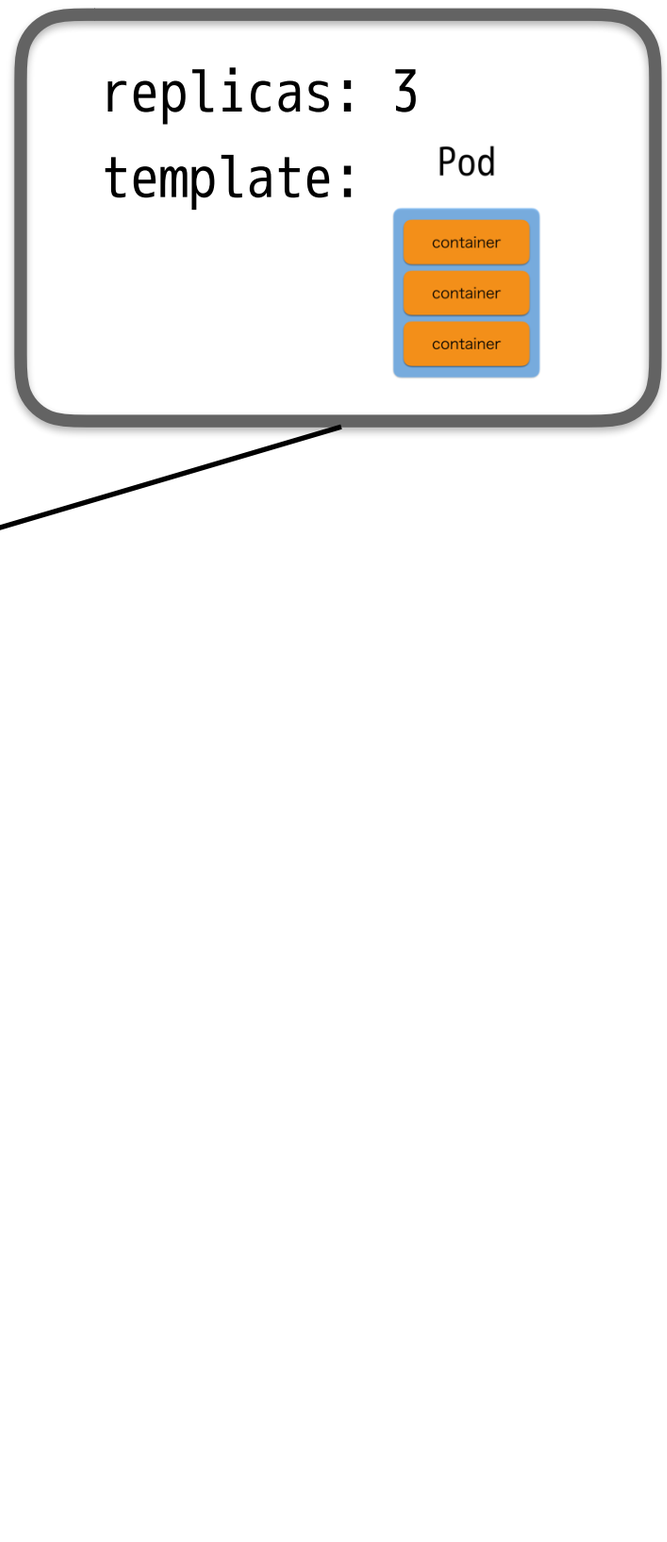
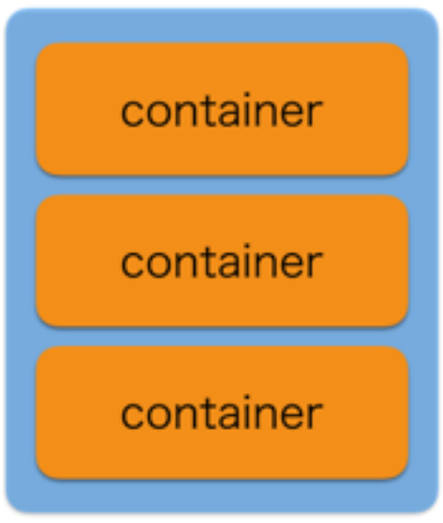
Replica Set



A



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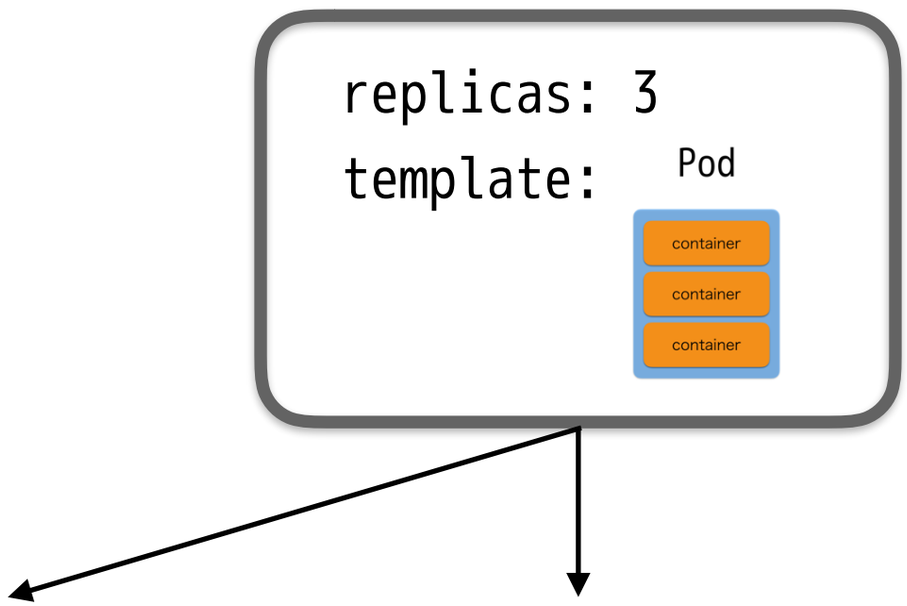
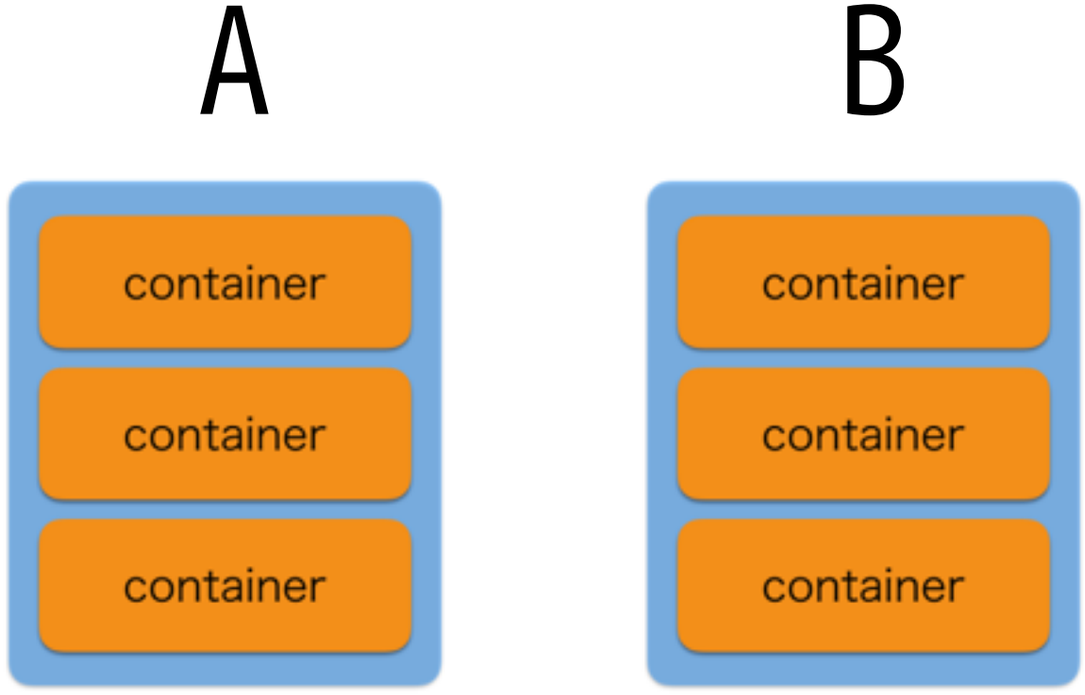
Replica Set





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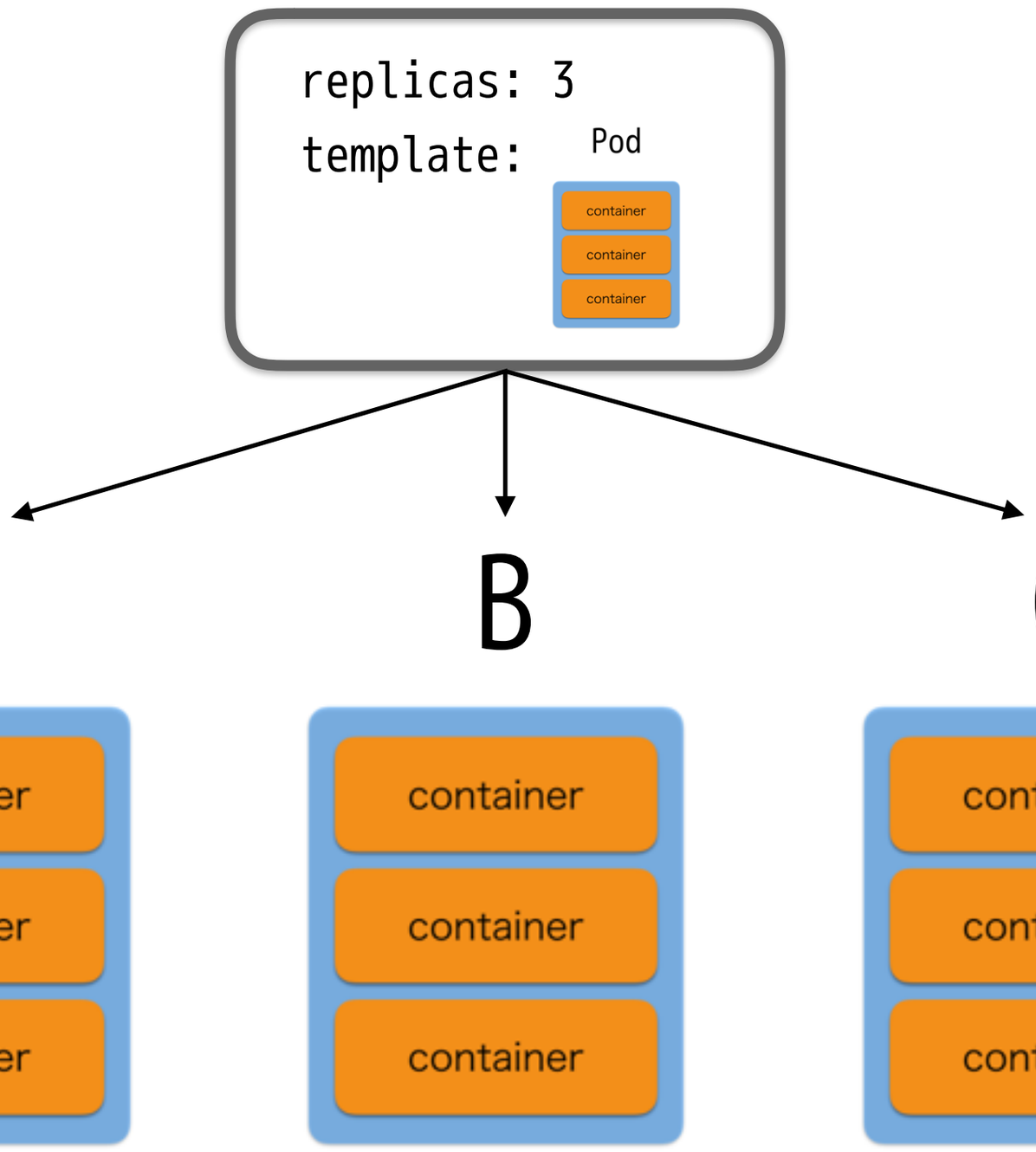
Replica Set



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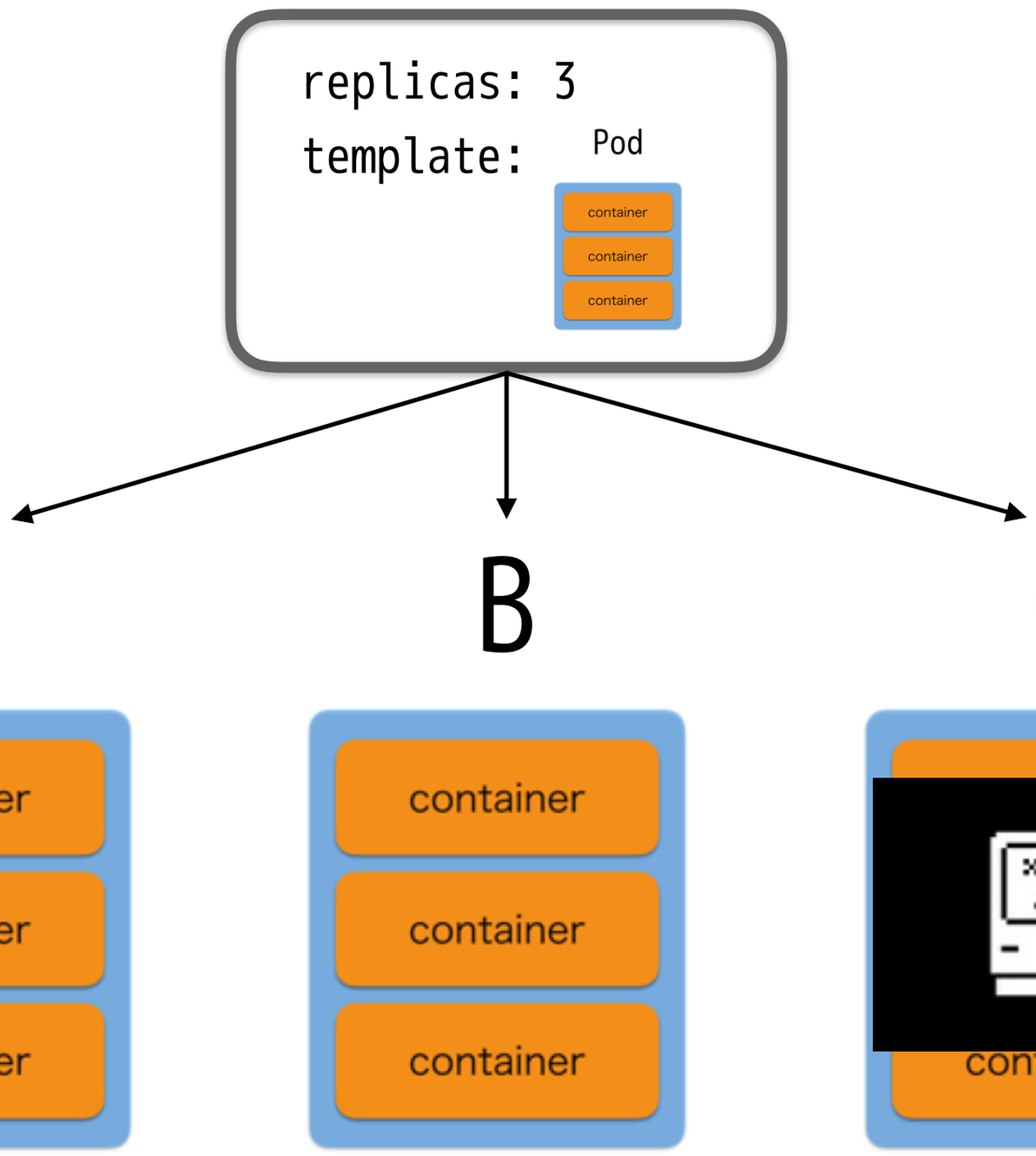
Replica Set



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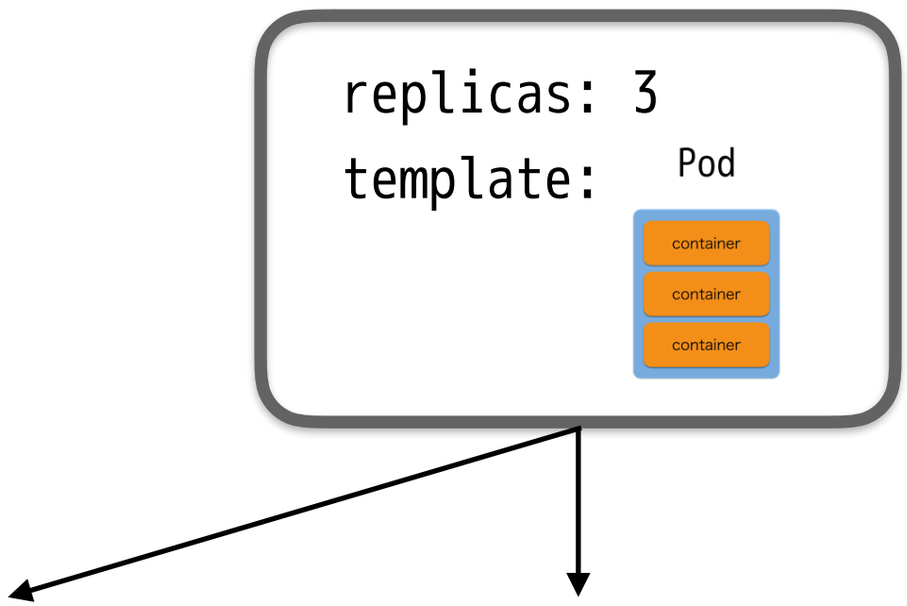

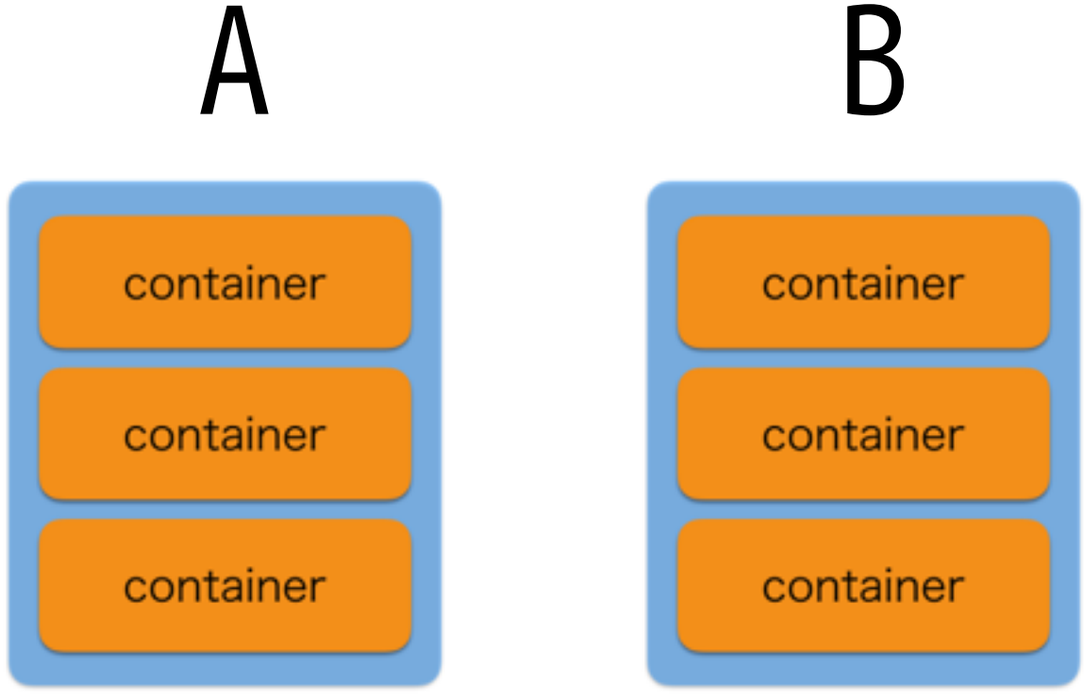

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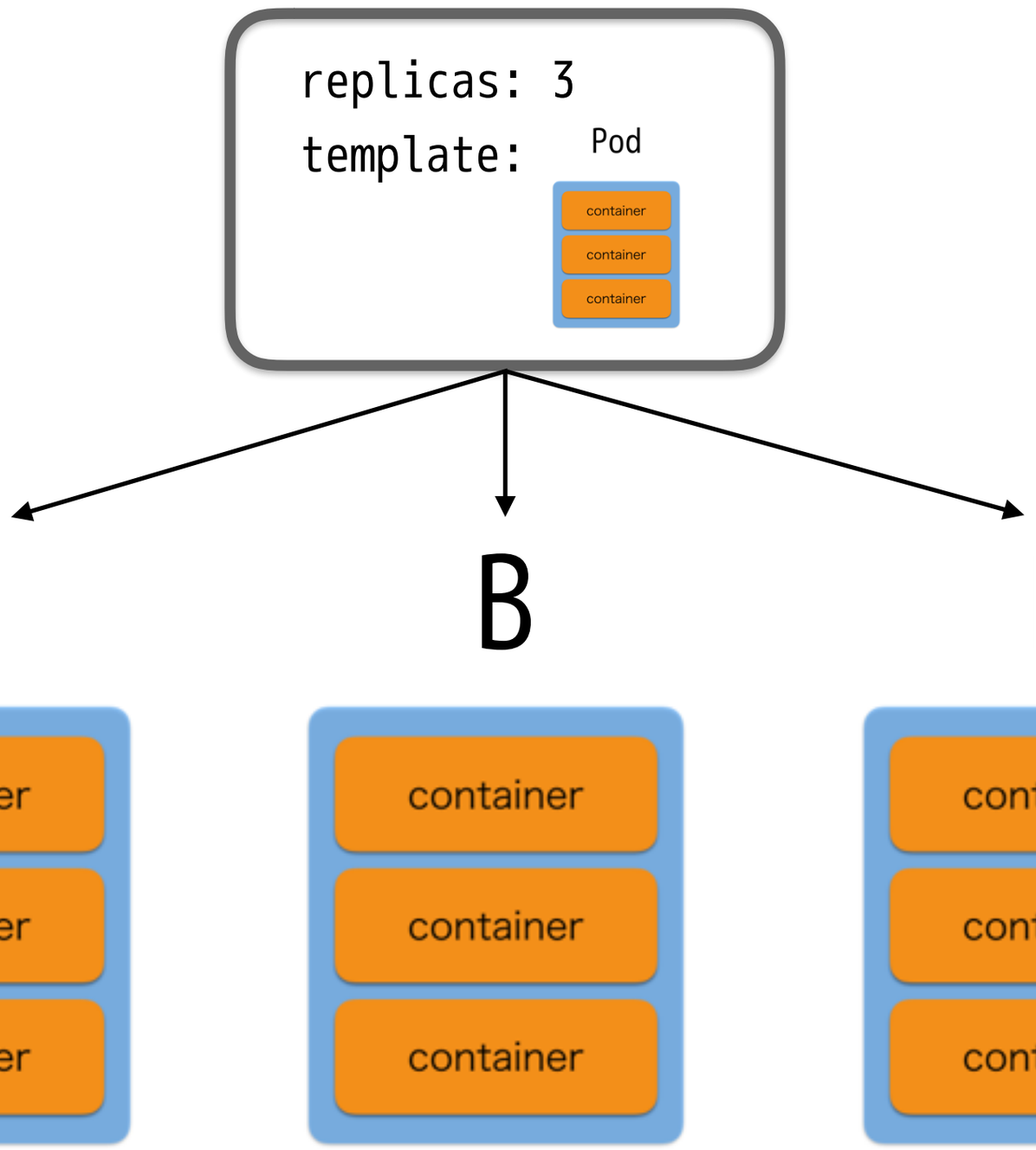

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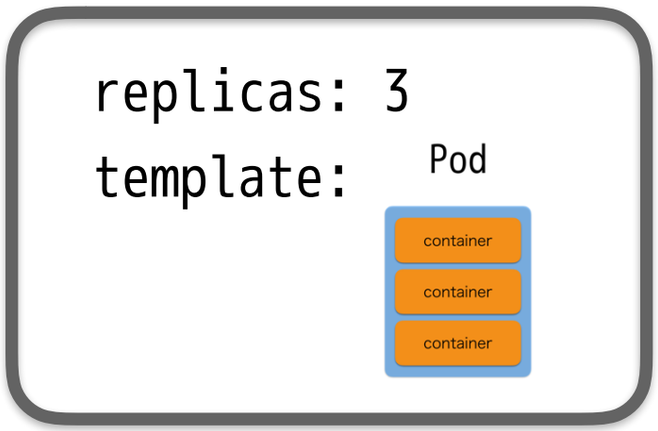
Deployment

Manages Replica Set state transitions

Deployment



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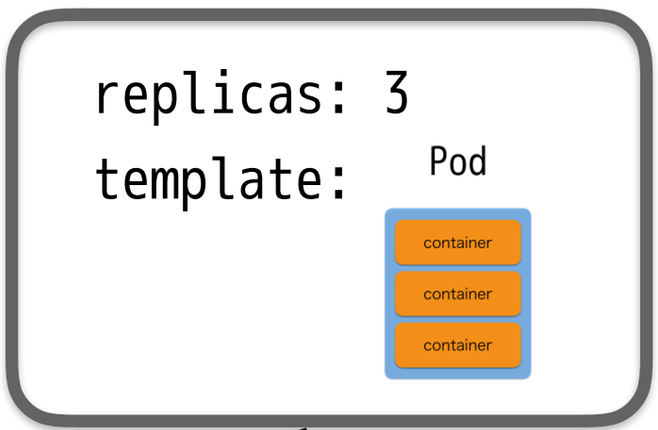
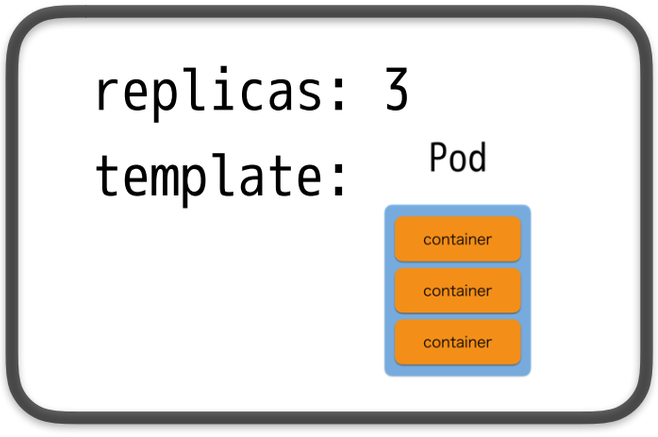
Deployment



Replica Set A



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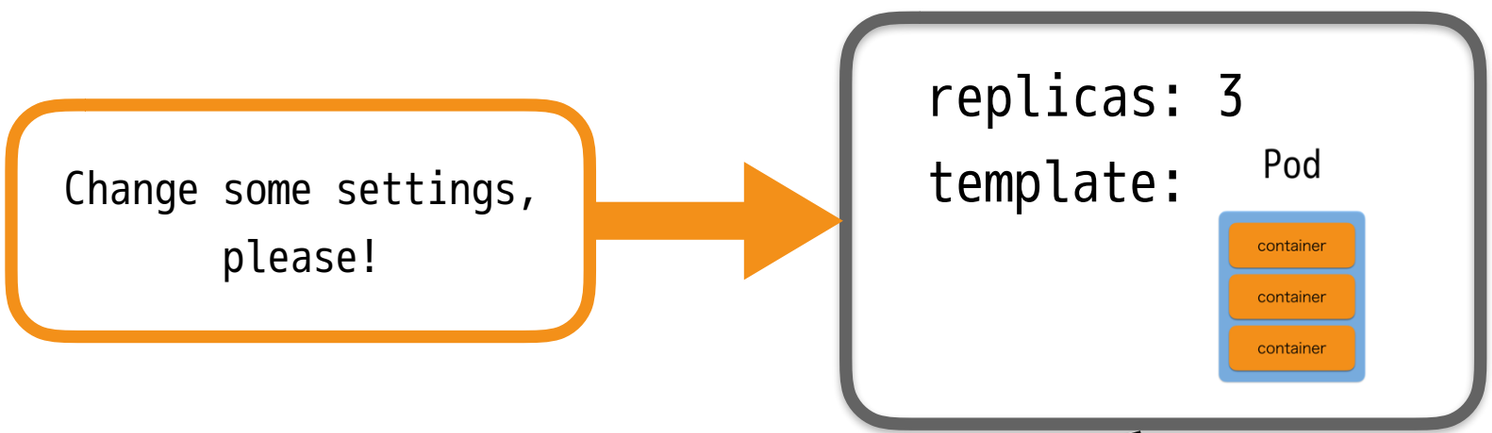
Deployment



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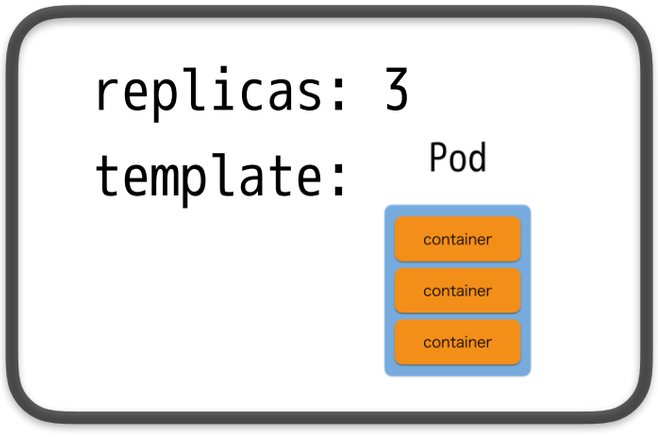

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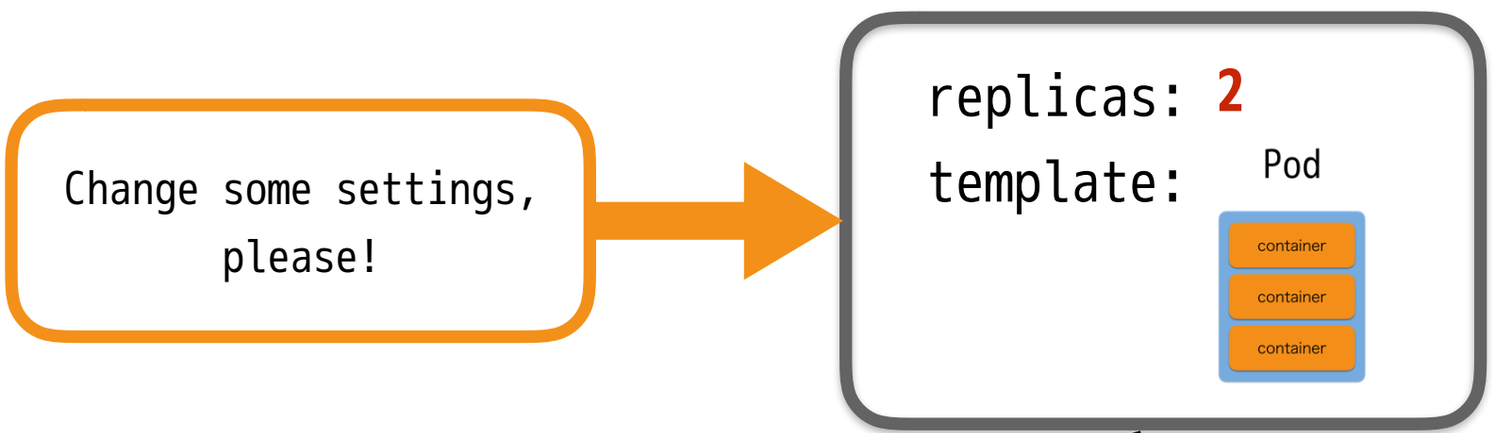
Deployment



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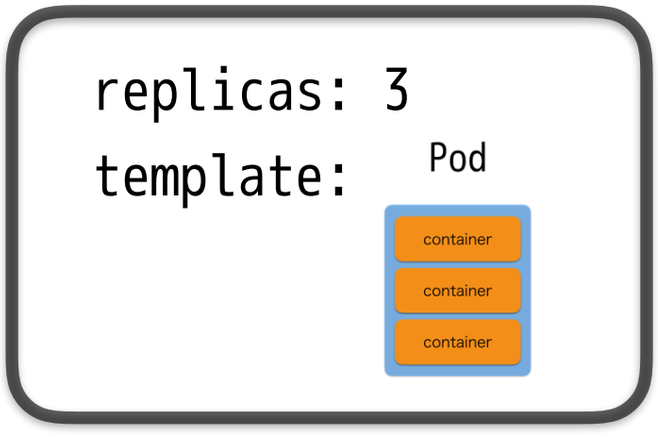

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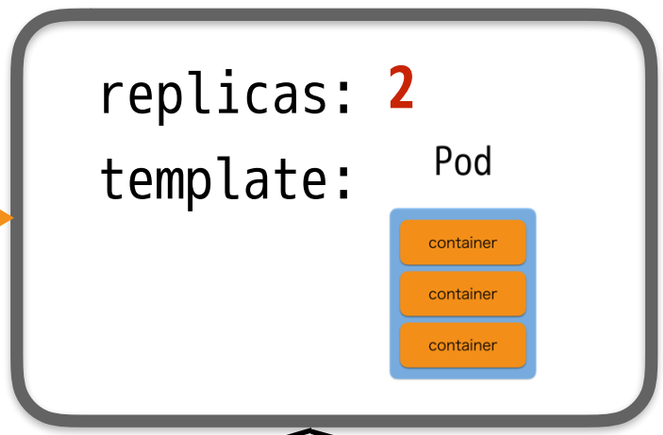
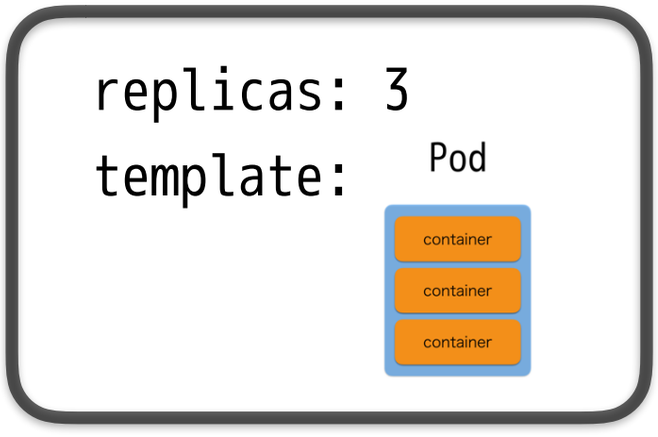
Deployment

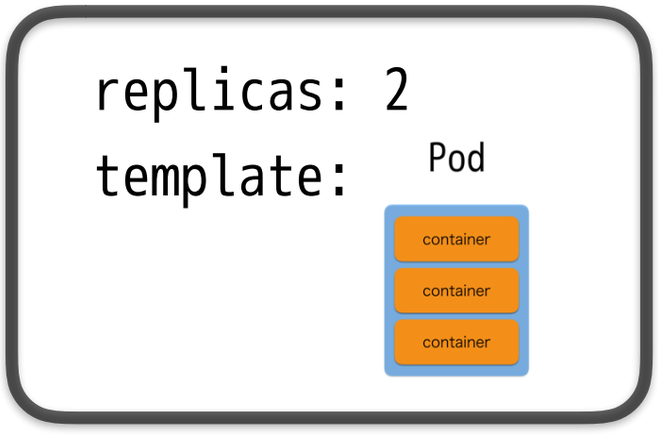
Change some settings, please!



Replica Set A



Replica Set B



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Deployment

Change some settings, please!

replicas: 2

template:

Pod

container

container

container

Replica Set A

Replica Set B

replicas: 2

template:

Pod

container

container

container

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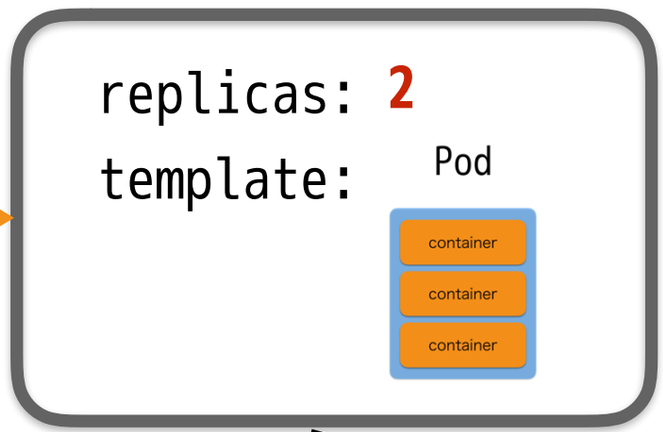
Deployment

Change some settings, please!



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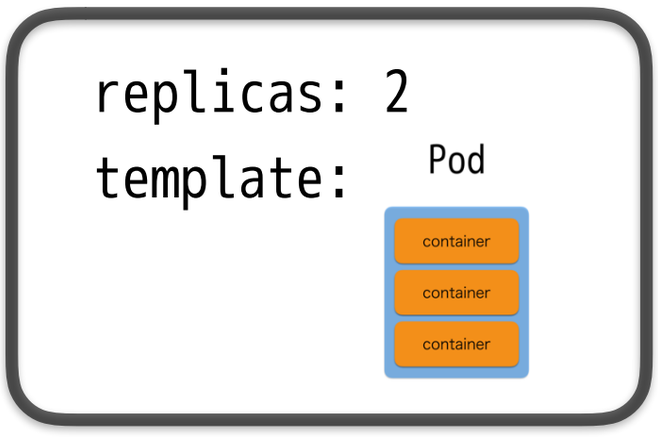

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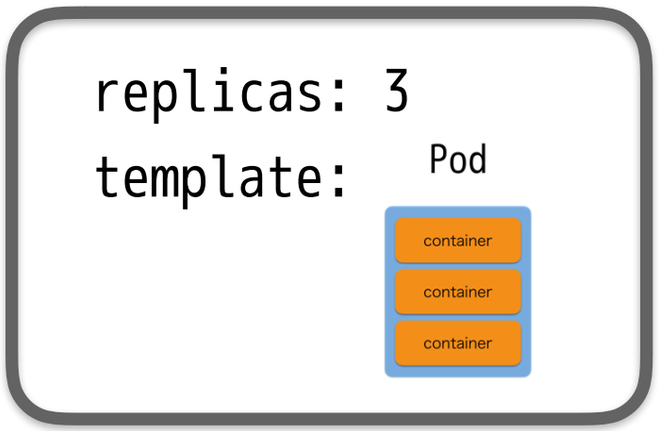
Keeps track of state change history

Deployment



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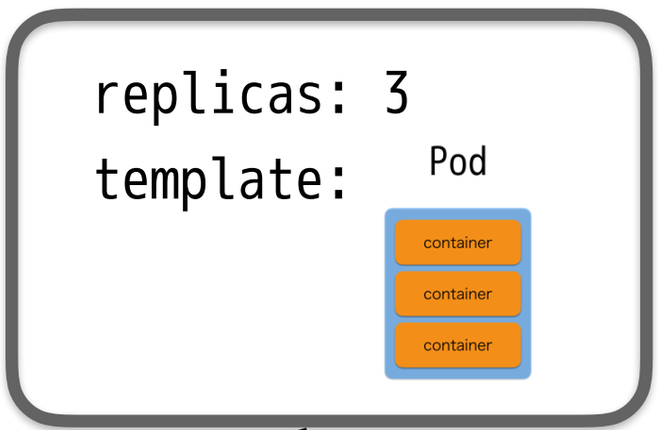
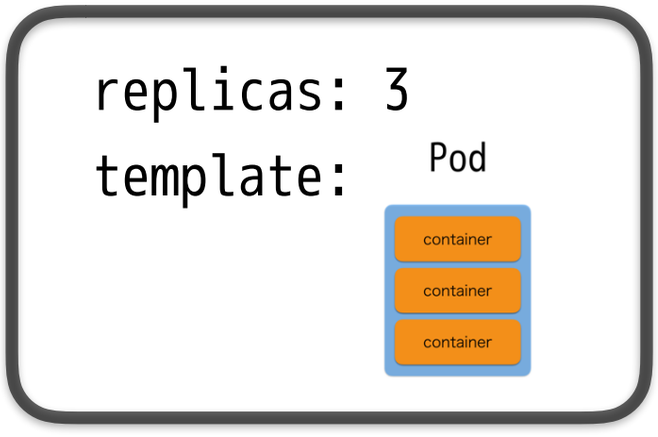
Deployment



A



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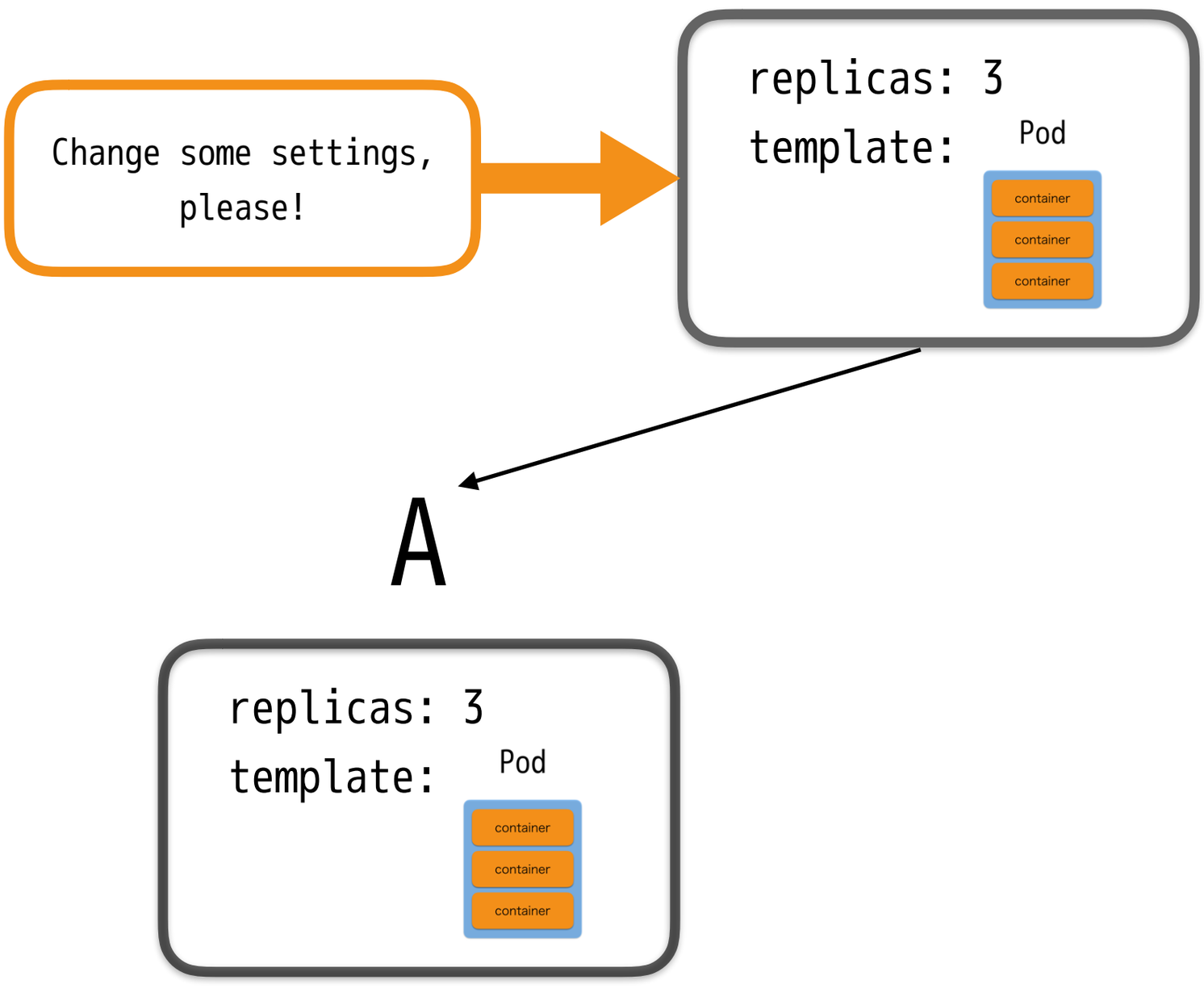
Deployment



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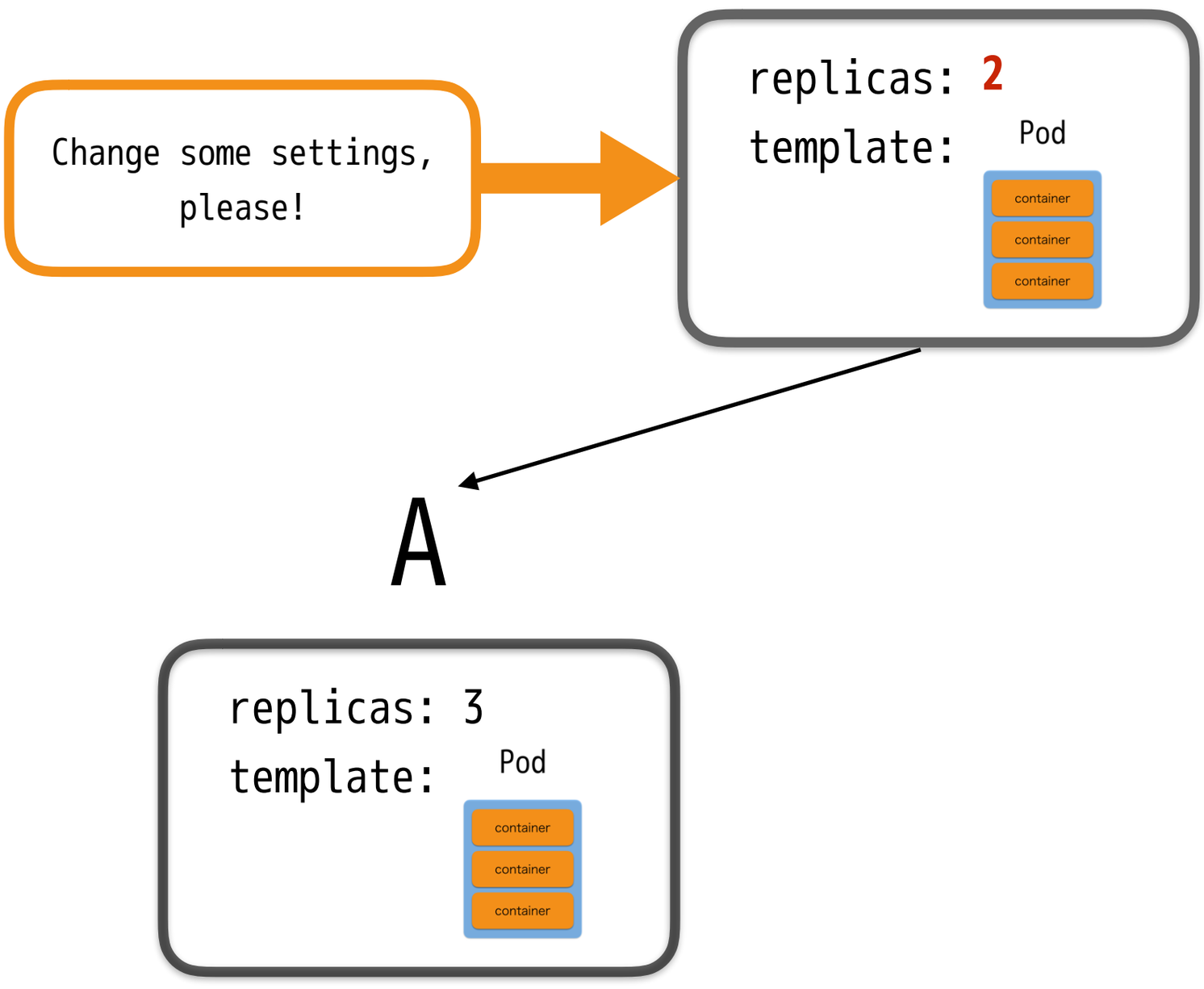
Deployment



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Deployment

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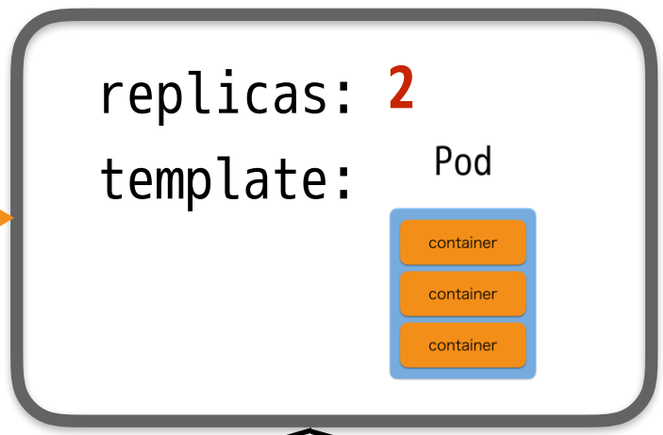

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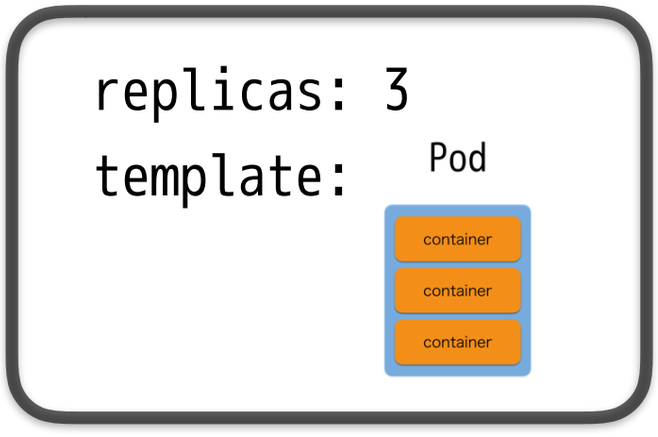
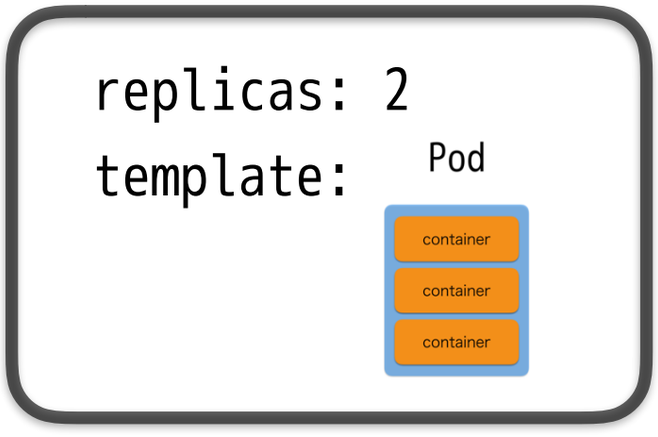


B



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Deployment

Change some settings, please!

replicas: 2

template:

Pod

container

container

container

A

B

replicas: 2

template:

Pod

container

container

container

HDE

Liberation of Technology

Deployment

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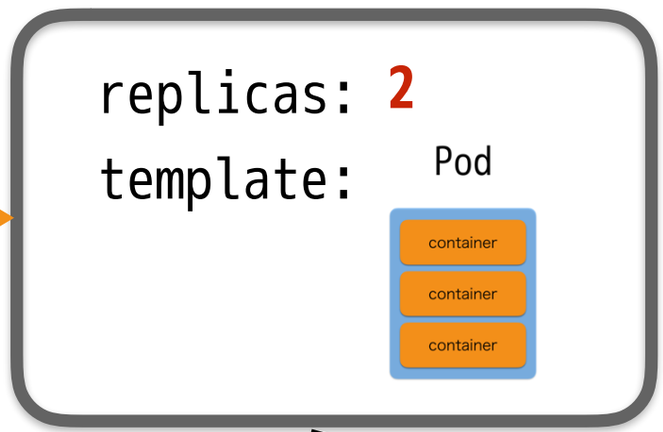
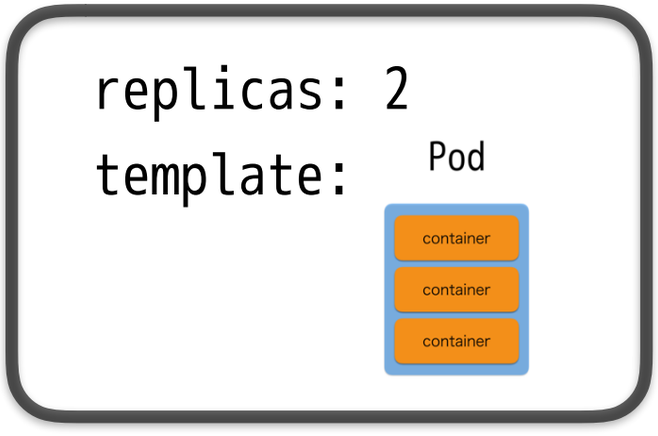


B



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Deployment

Oh wait, I actually didn’t want to do that…

replicas: 2

template: Pod

container
container
container

B

replicas: 2

template: Pod

container
container
container

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Deployment

Oh wait, I actually didn’t want to do that…

replicas: 3

template:

Pod

container

container

container

B

replicas: 2

template:

Pod

container

container

container

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Deployment

Oh wait, I actually didn’t want to do that…

replicas: 3
template:
Pod
container
container
container

B

rollback

replicas: 2
template:
Pod
container
container
container

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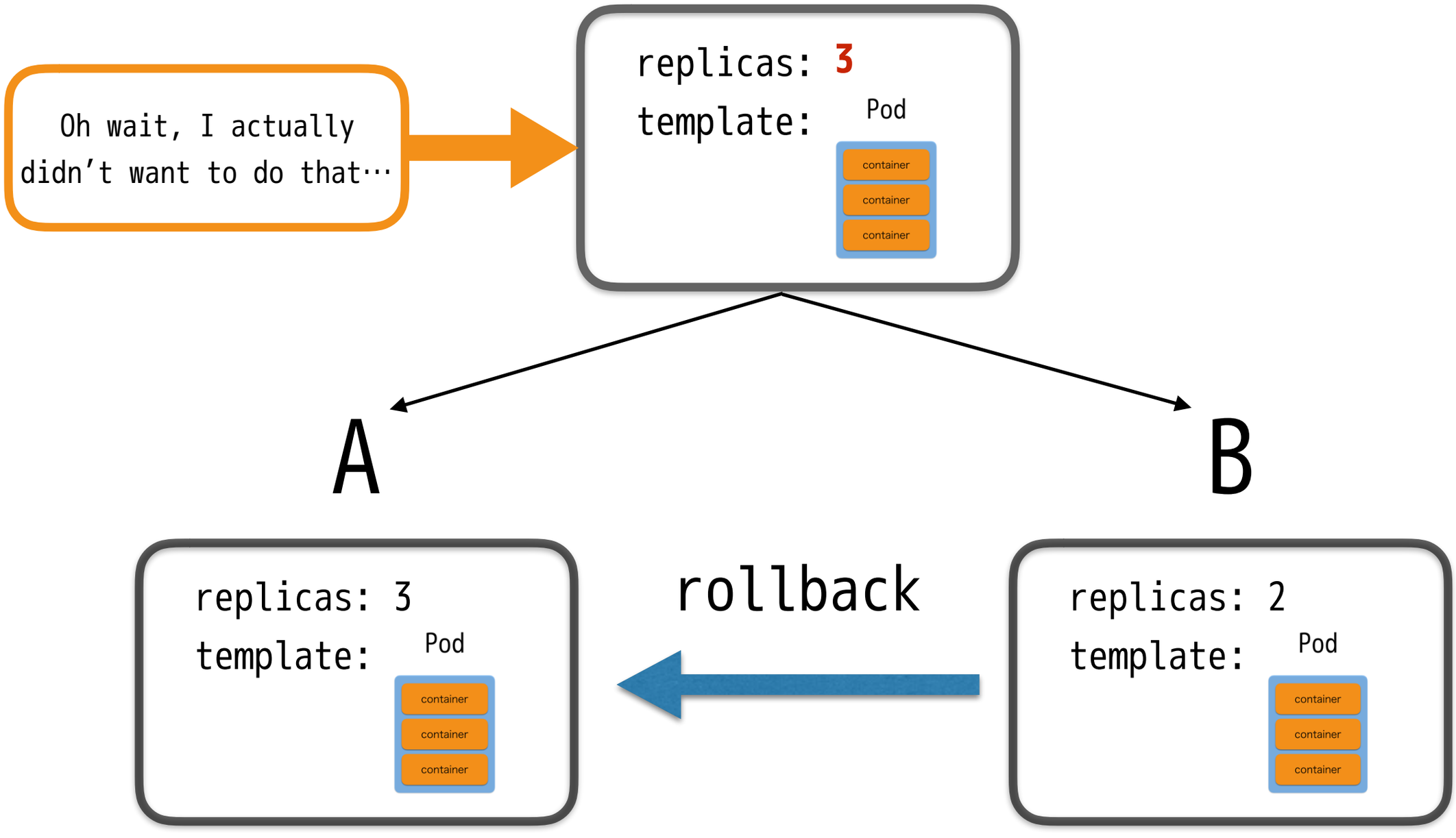
Deployment



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Deployment

Oh wait, I actually didn't want to do that…

replicas: 3

template: Pod

container
container
container

A

replicas: 3

template: Pod

container
container
container

rollback

B

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Deployment

Oh wait, I actually didn’t want to do that…

replicas: 3

template:

Pod

container

container

container

A

replicas: 3

template:

Pod

container

container

container

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Services

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Logical set of Pods

(and ways to access them)

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Raw Pod Access

Pod 10.0.96.2

Pod 10.0.96.3

Pod 10.0.96.3

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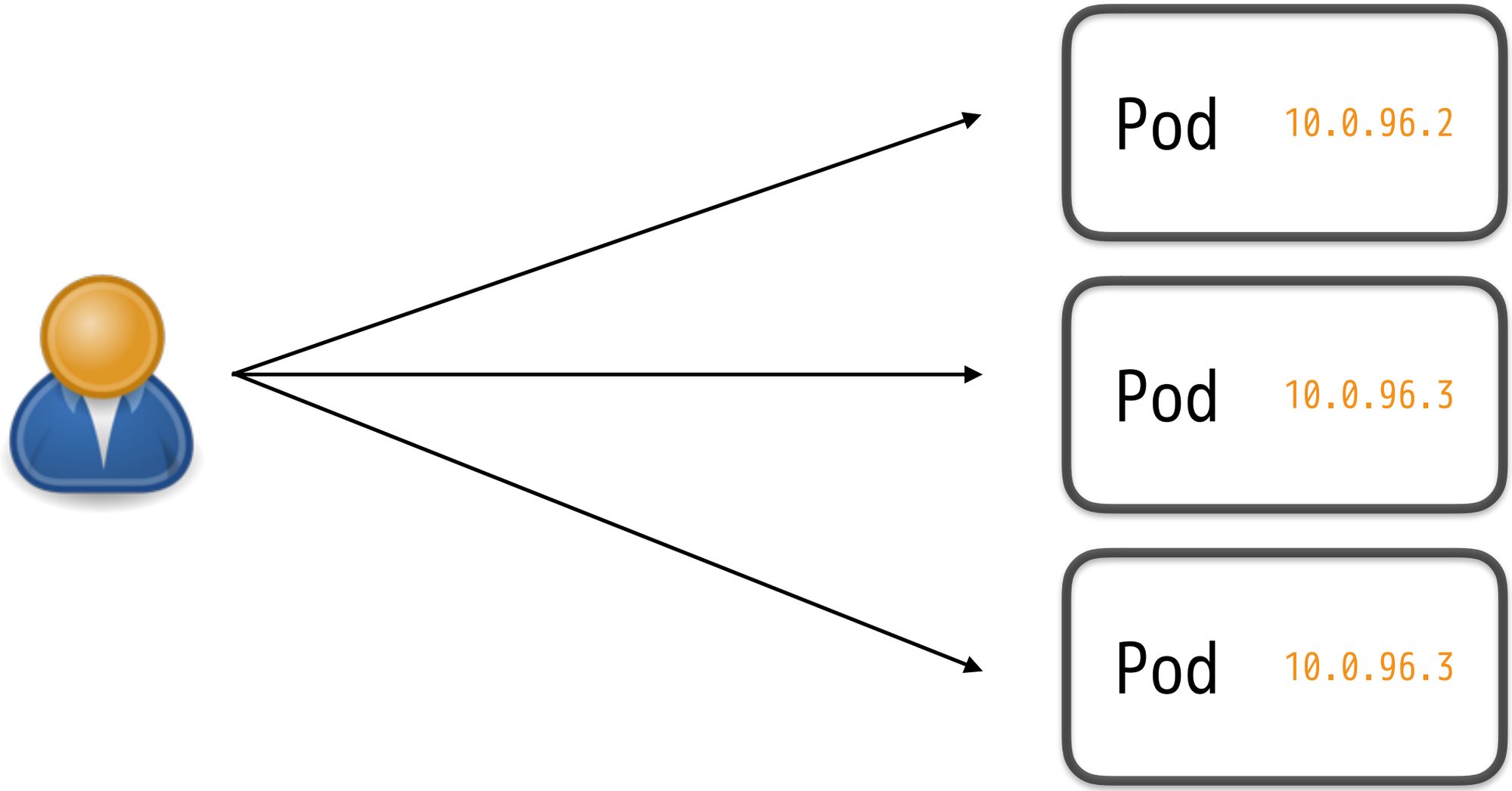
Raw Pod Access



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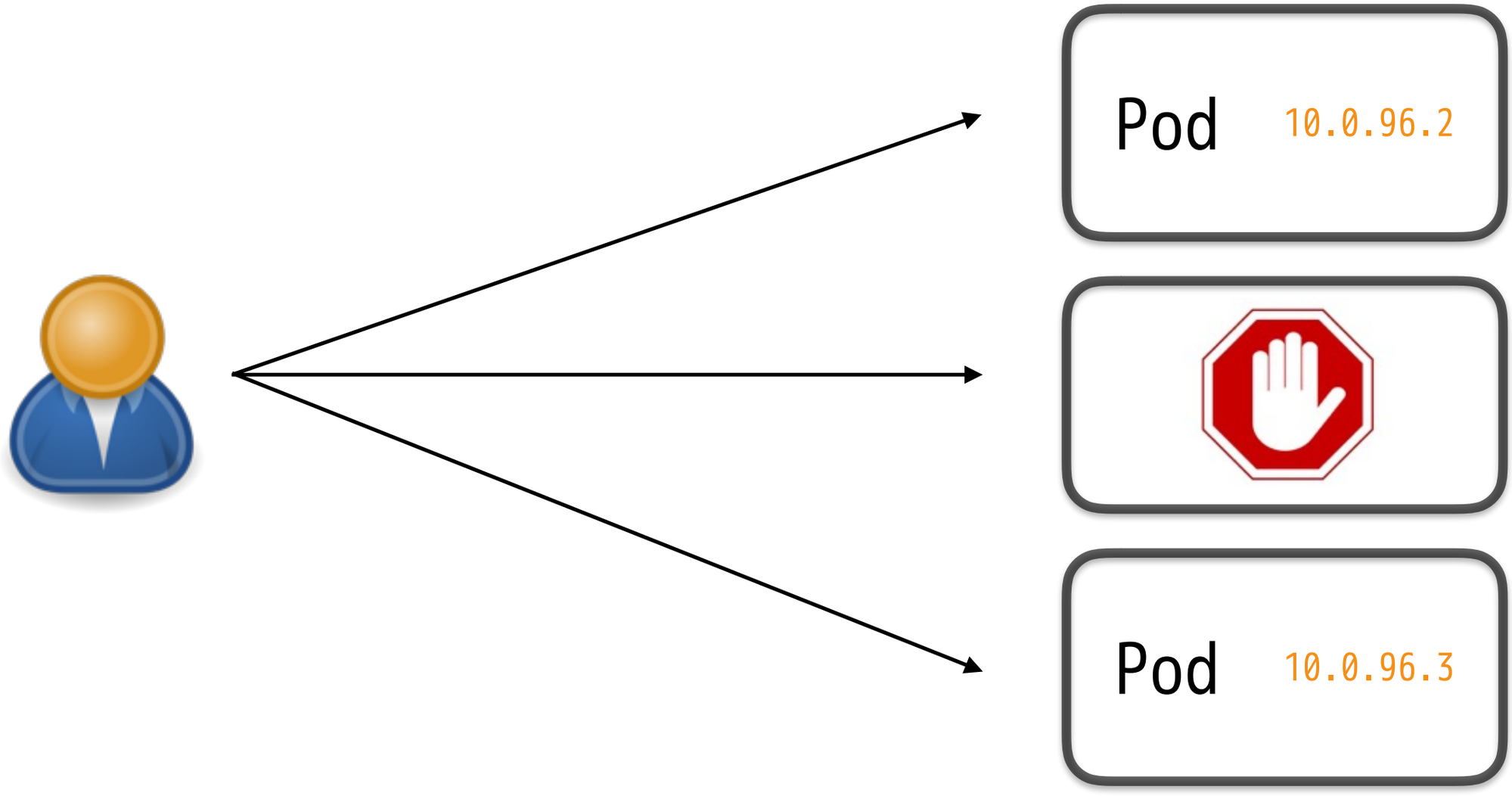
Raw Pod Access



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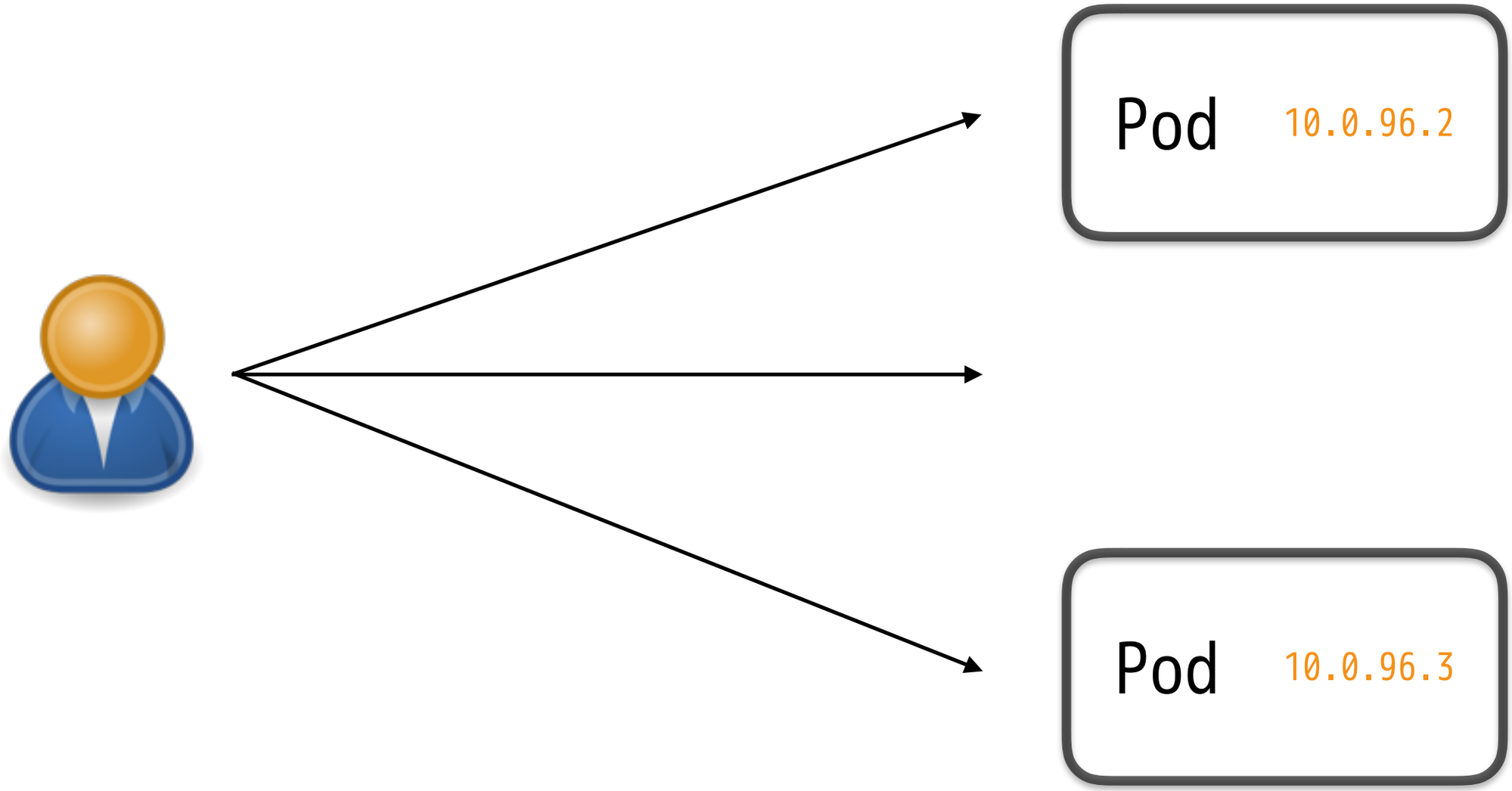
Raw Pod Access



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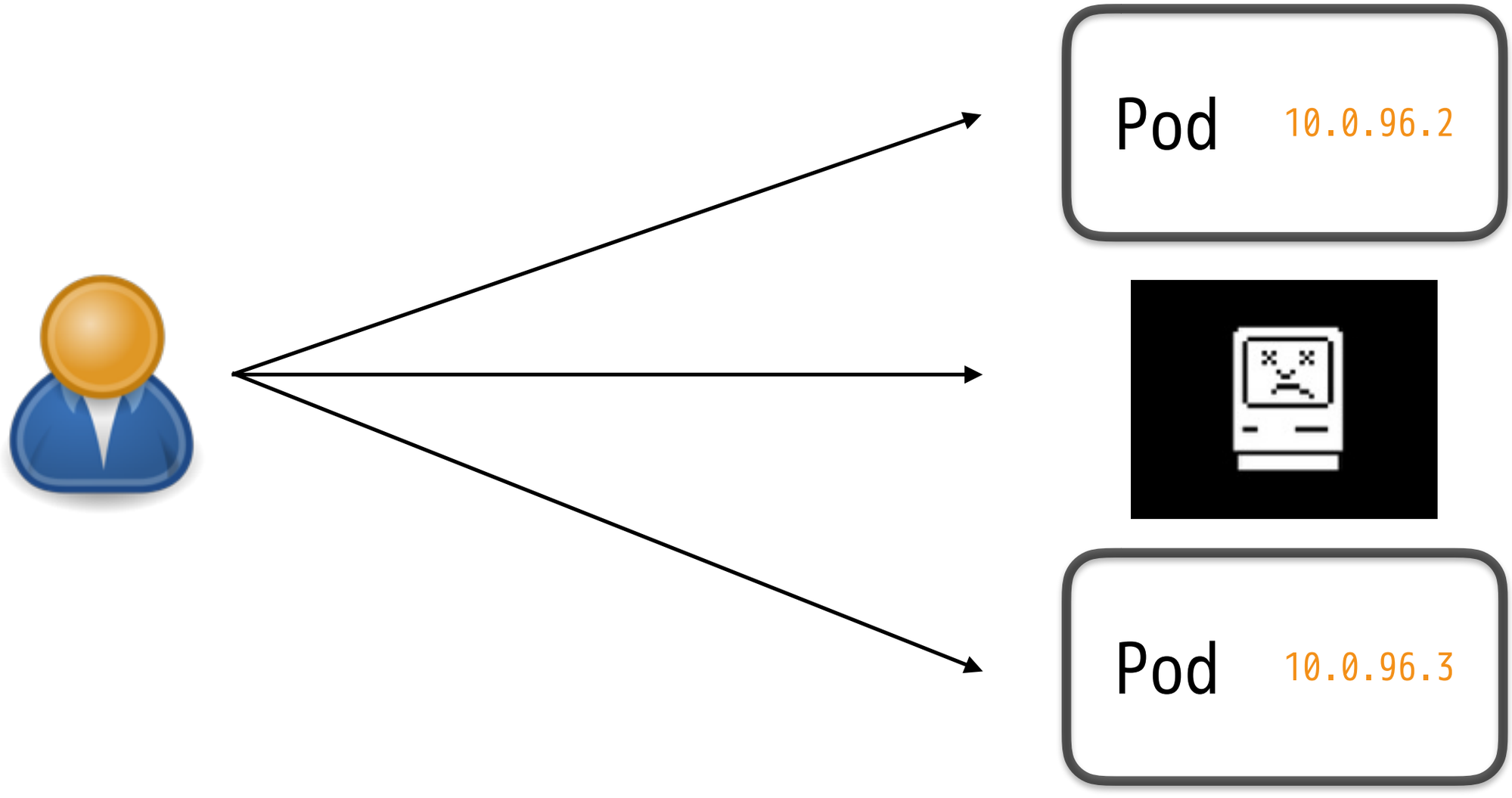
Raw Pod Access



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Access Via Service

Service

match role=**web**

Pod 10.0.96.2

role=**web**

Pod 10.0.96.3

role=**web**

Pod 10.0.96.4

role=**web**

Pod 10.0.96.5

role=**db**

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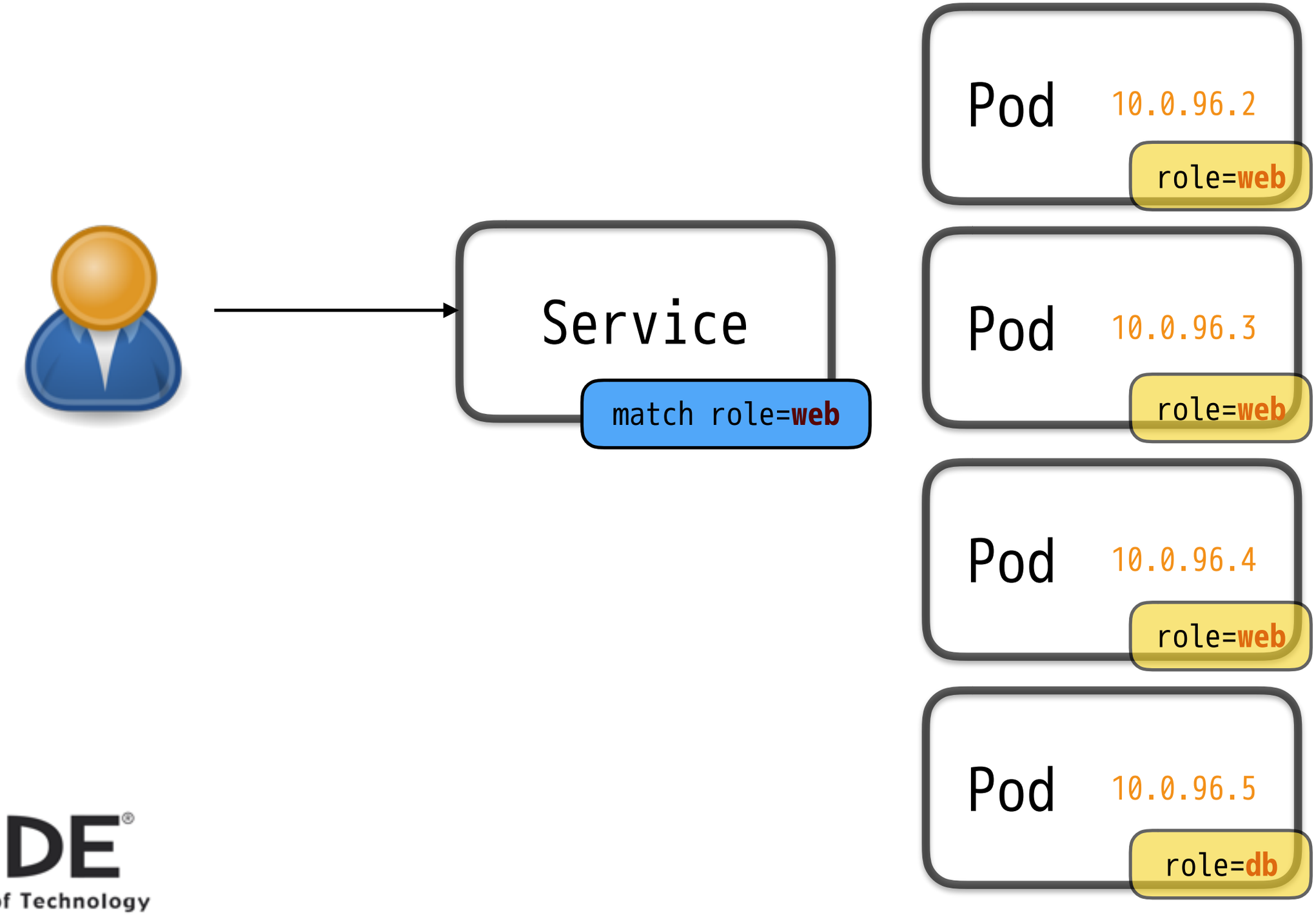
Access Via Service



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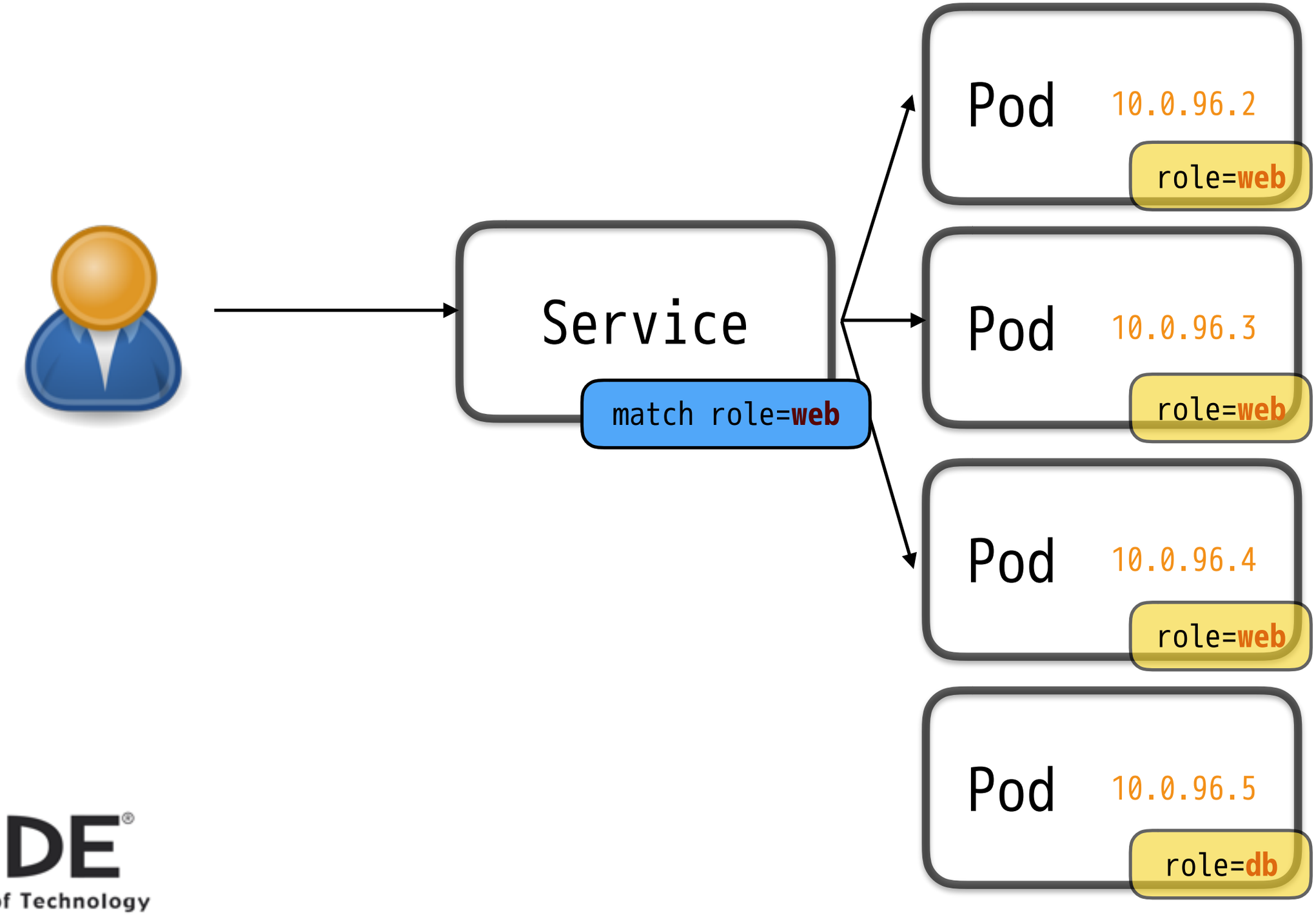
Access Via Service



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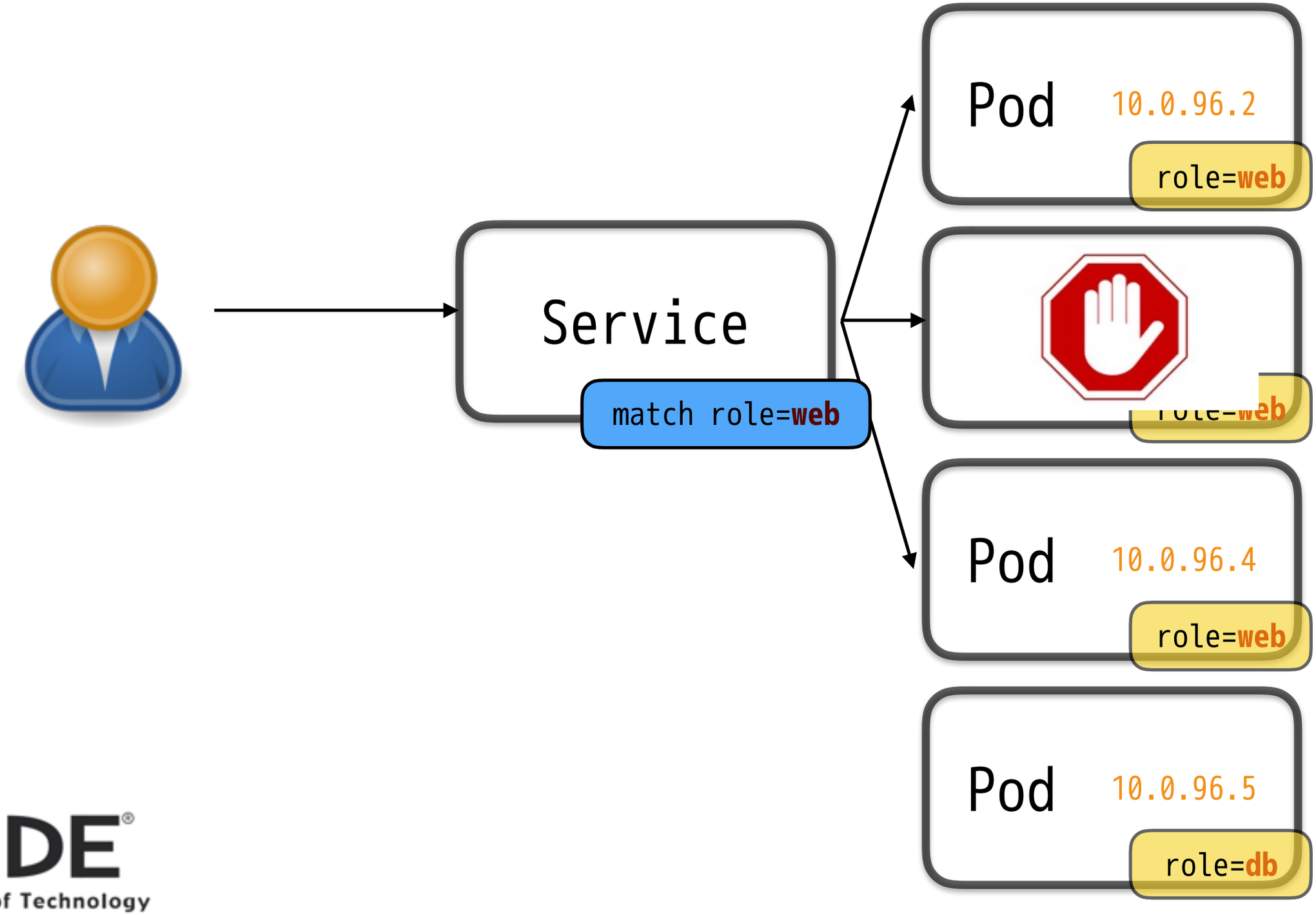
Access Via Service



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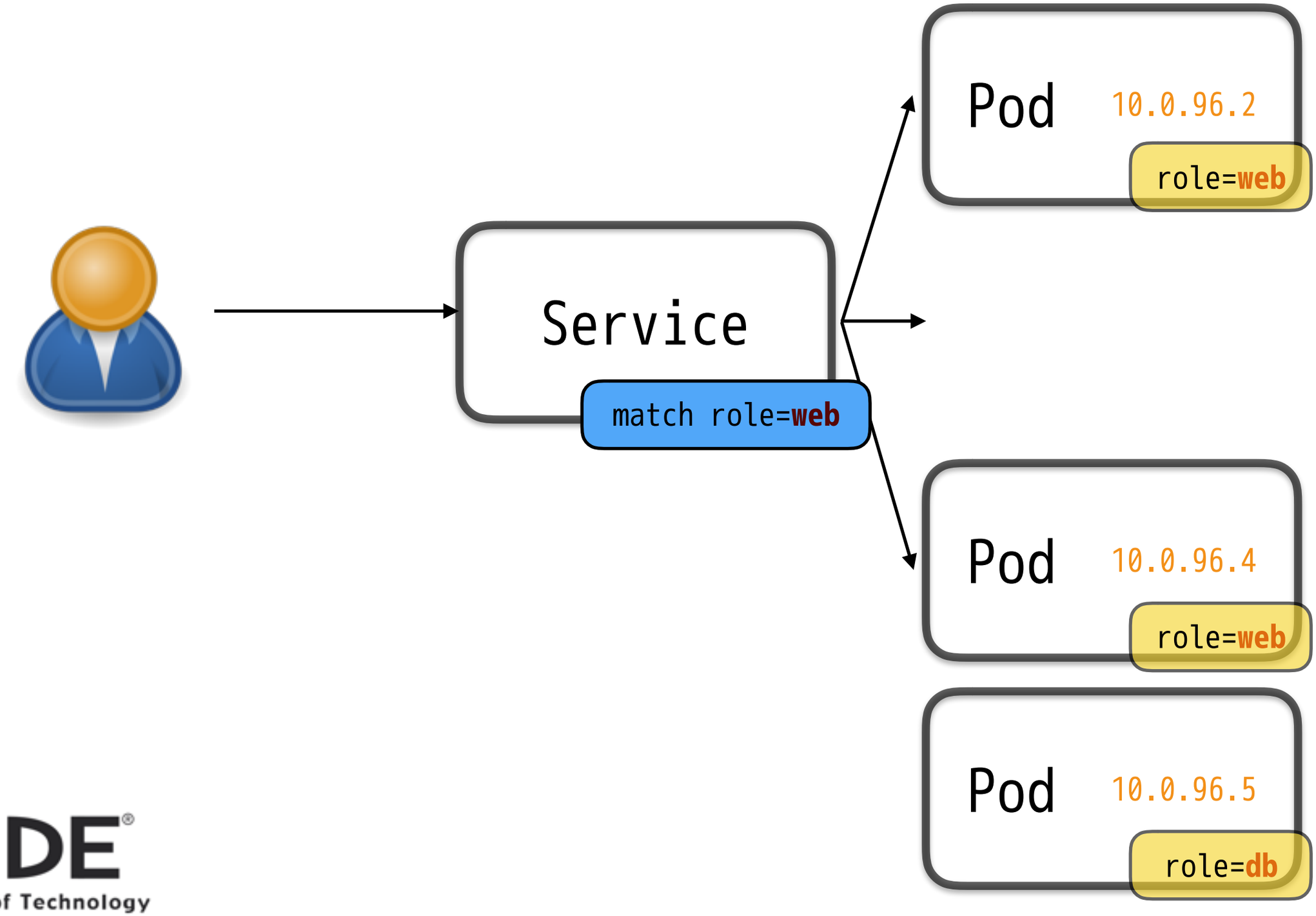
Access Via Service



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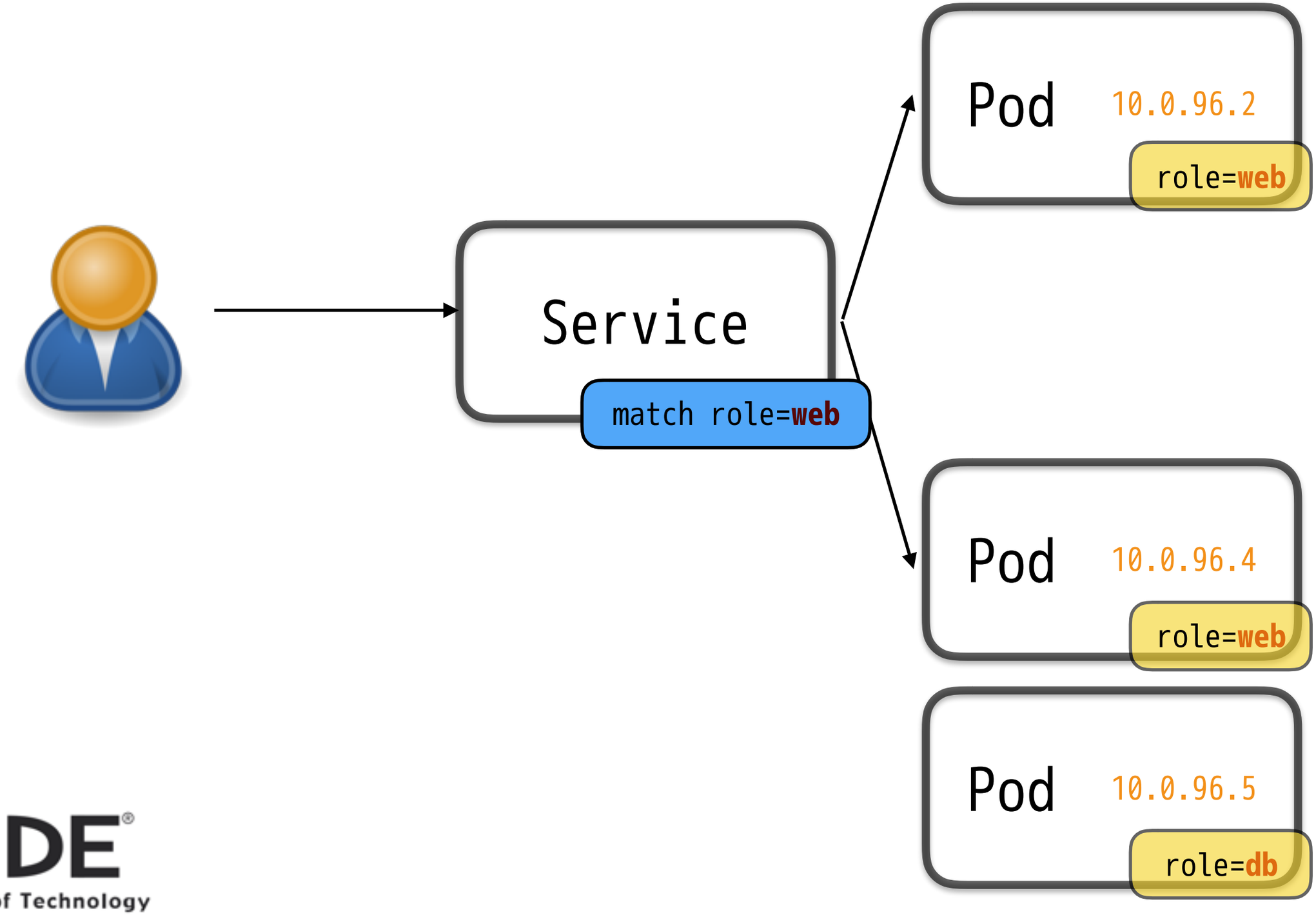
Access Via Service



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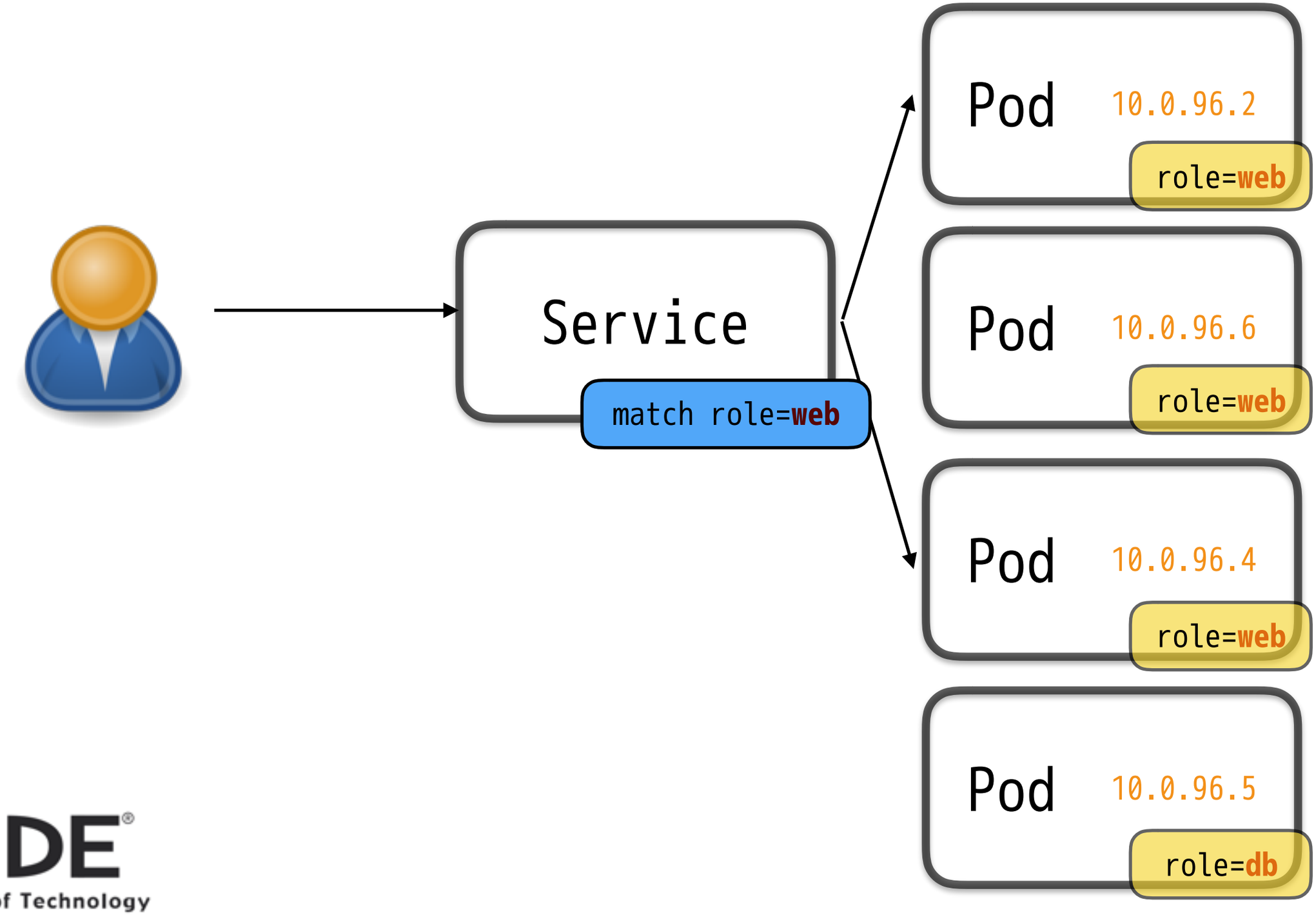
Access Via Service



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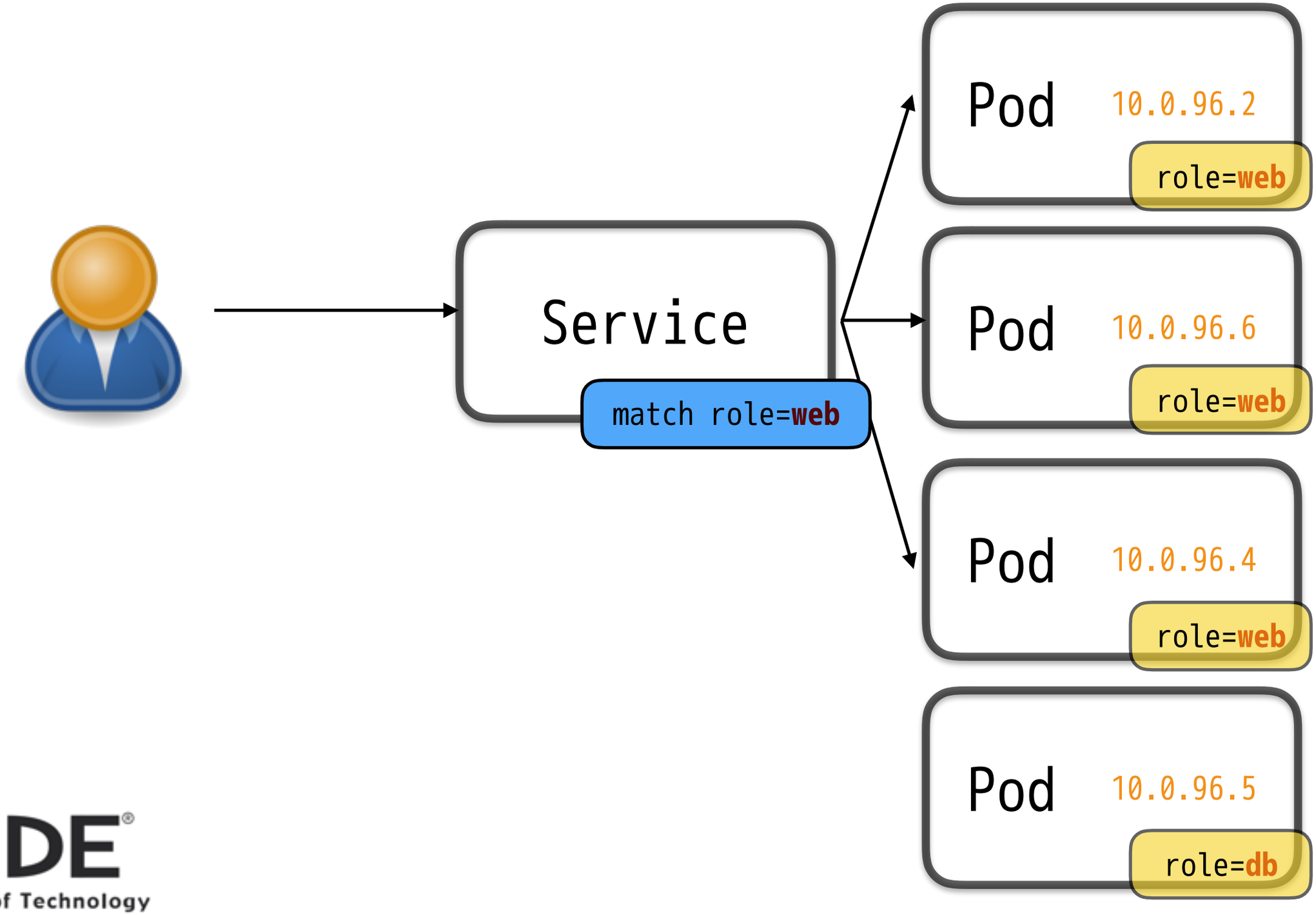
Access Via Service



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Secrets

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Store pieces of data in k8s

e.g. Identity Information

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(securely)

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(…in the future)

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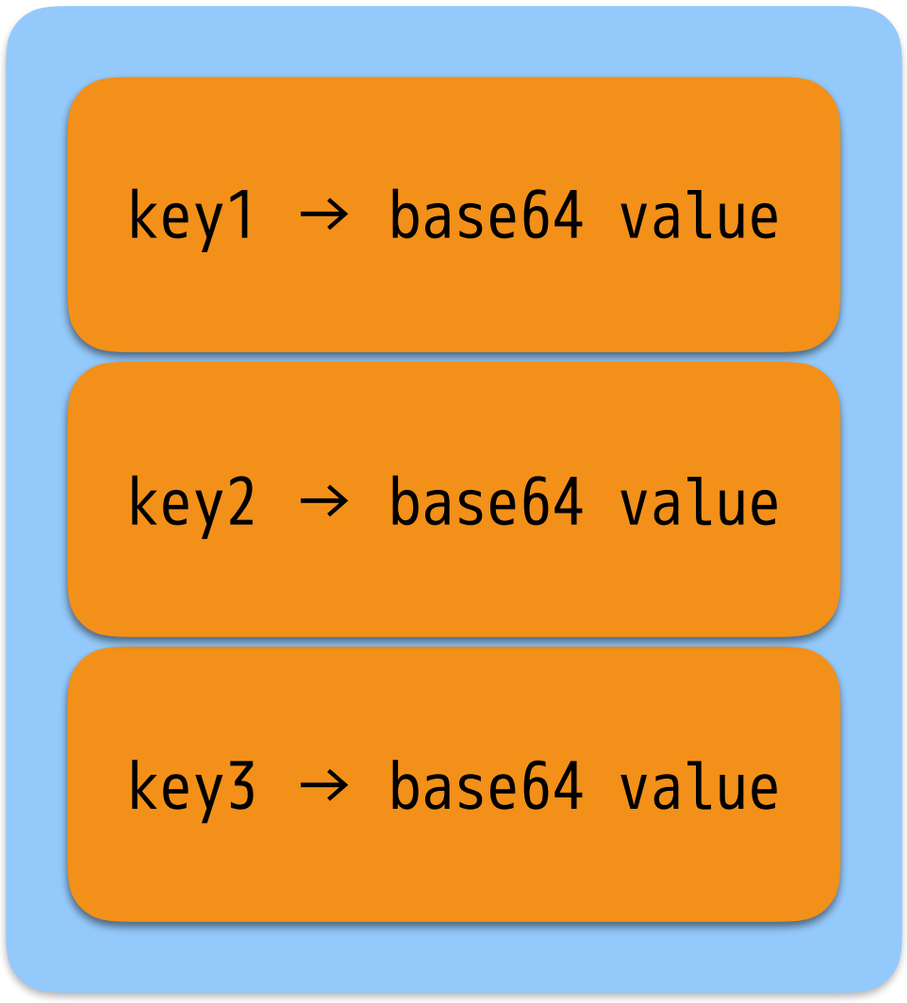
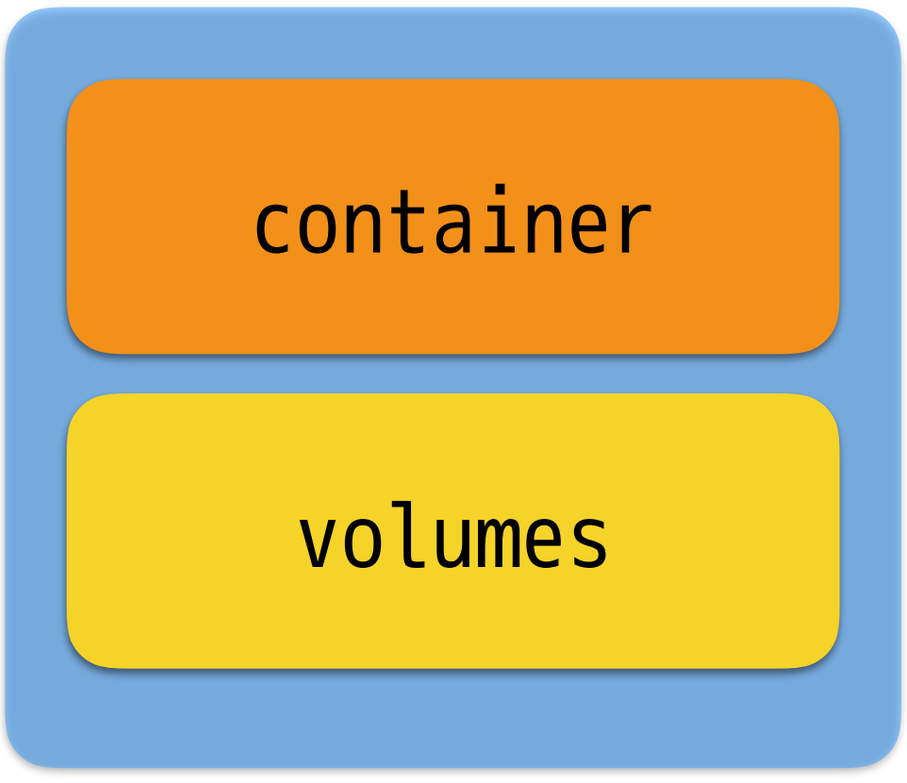
Secret



Pod




```
container:
  volumeMounts:
    - name: certificates
      mountPath: /etc/ssl/certs
```

```
volumes:
  - name: certificates
    secret:
      secretName: ca-certificates
```

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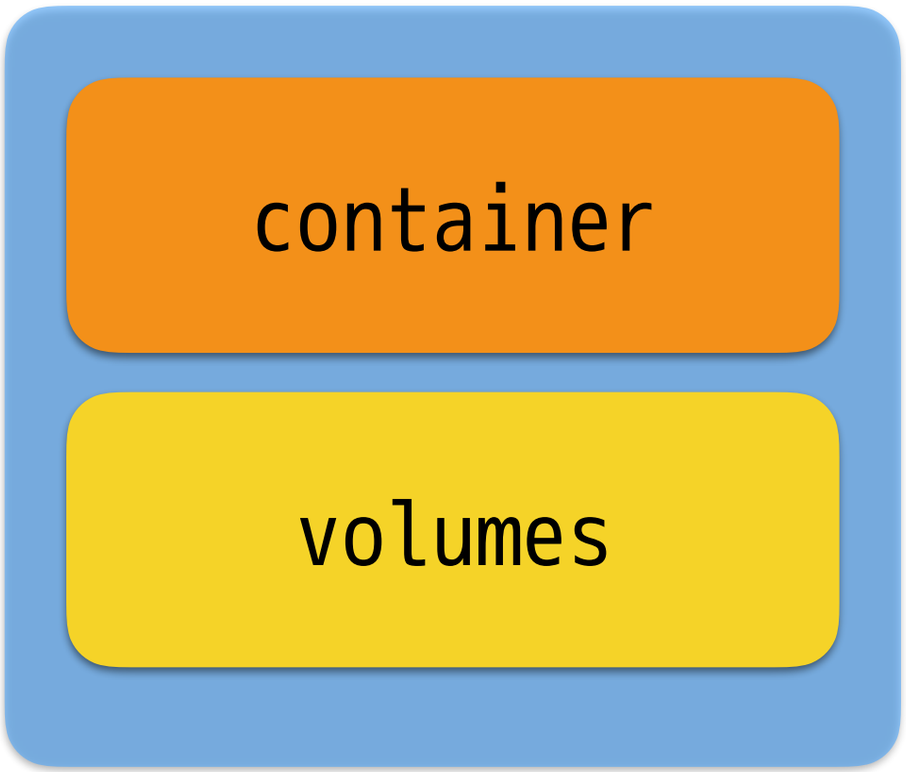
Pod




```
env:
  - name: foo-secret
    valueFrom:
     secretKeyRef:
       name: foo
       value: secret-value
```

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ConfigMaps

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Same as Secrets (Unprotected)

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Ingress

Services are for within the cluster only

(external IPs allowed, but don’ use that to serve external requests)

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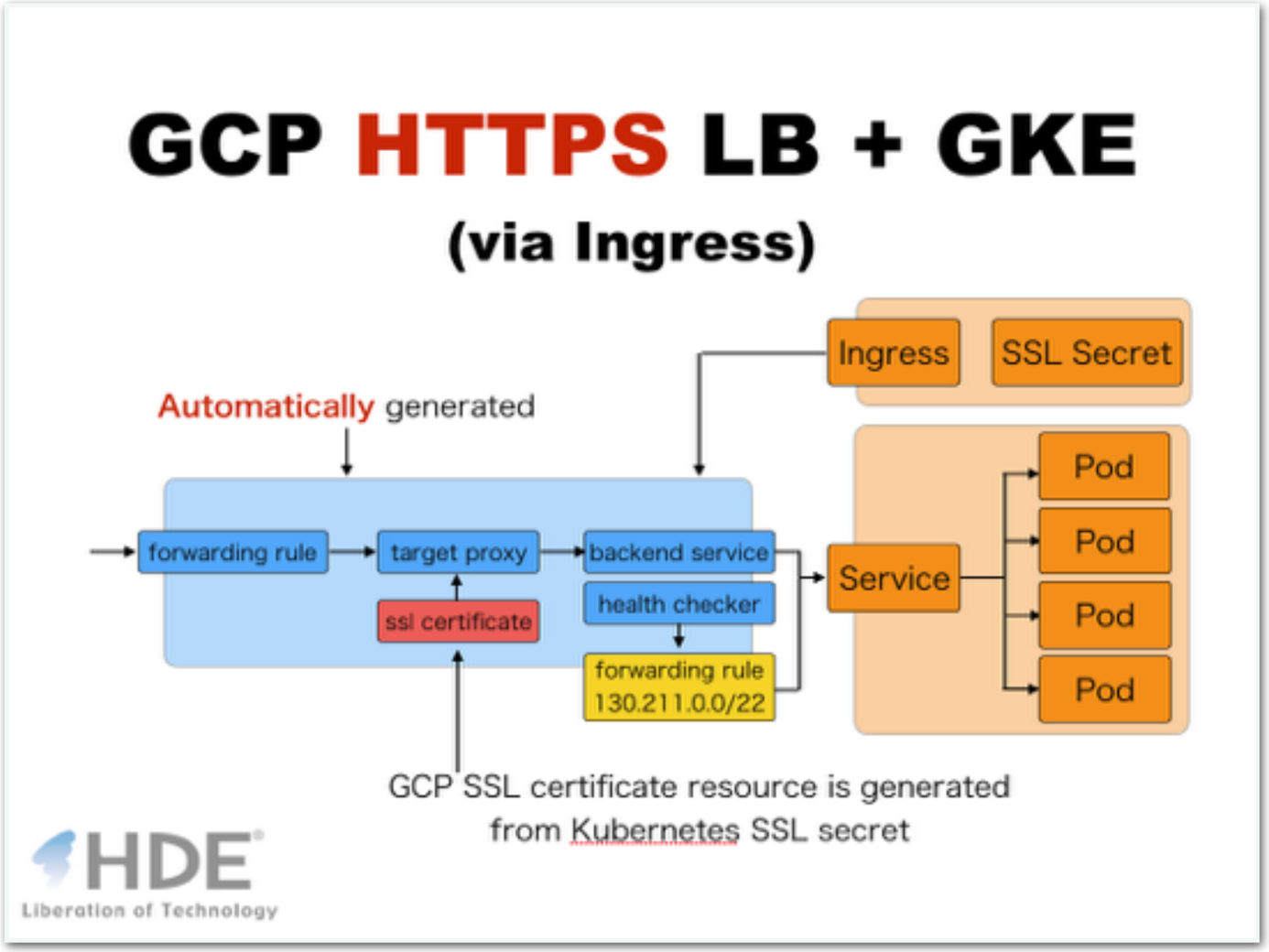
Inbound connections to internal cluster services

(New since 1.2)



Please checkout my presentation

https://docs.google.com/presentation/d/11ZN6qgiuZZfVyhBK2hjp1vhp_5N0DOGnAmhPreS3L5A/pub?start=false&loop=false&delayms=3000

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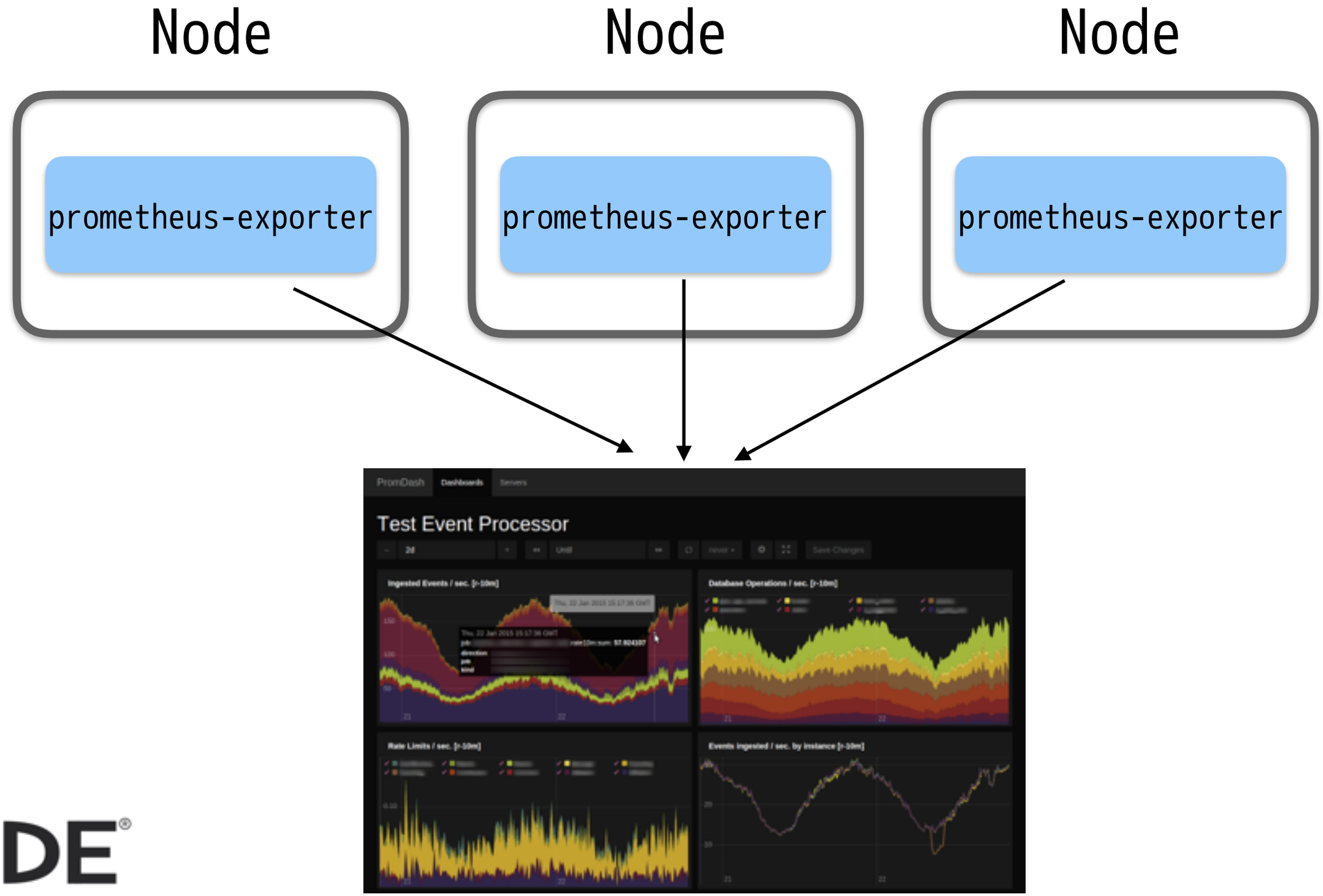
DaemonSets

Ensure nodes run a copy of a Pod



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PetSets

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~~PetSets~~

StatefulSets

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Use only when *really* needed

Keeps unique IDs in replicas

(x-0, x-1, x-2,･･･)

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Questions?

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