HL7 FHIR DevDays 2018

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Deploying a FHIR server in a Kubernetes cluster

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Introduction

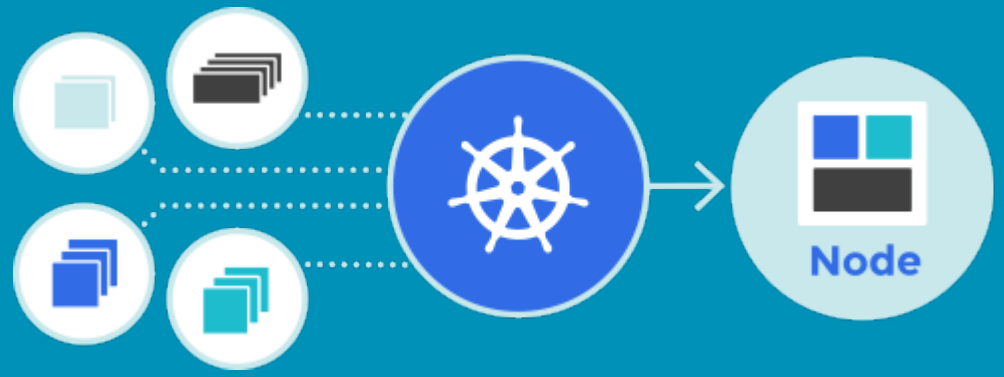
- **Name**: Marco Visser
- **Background**:
  - Firely team
  - Vonk developer
  - FHIR API developer
  - Devops for the Firely team
- **Contact**: marco@fire.ly

Agenda

- Short introduction to Kubernetes
- Helm Charts
- Demo

Short introduction to Kubernetes

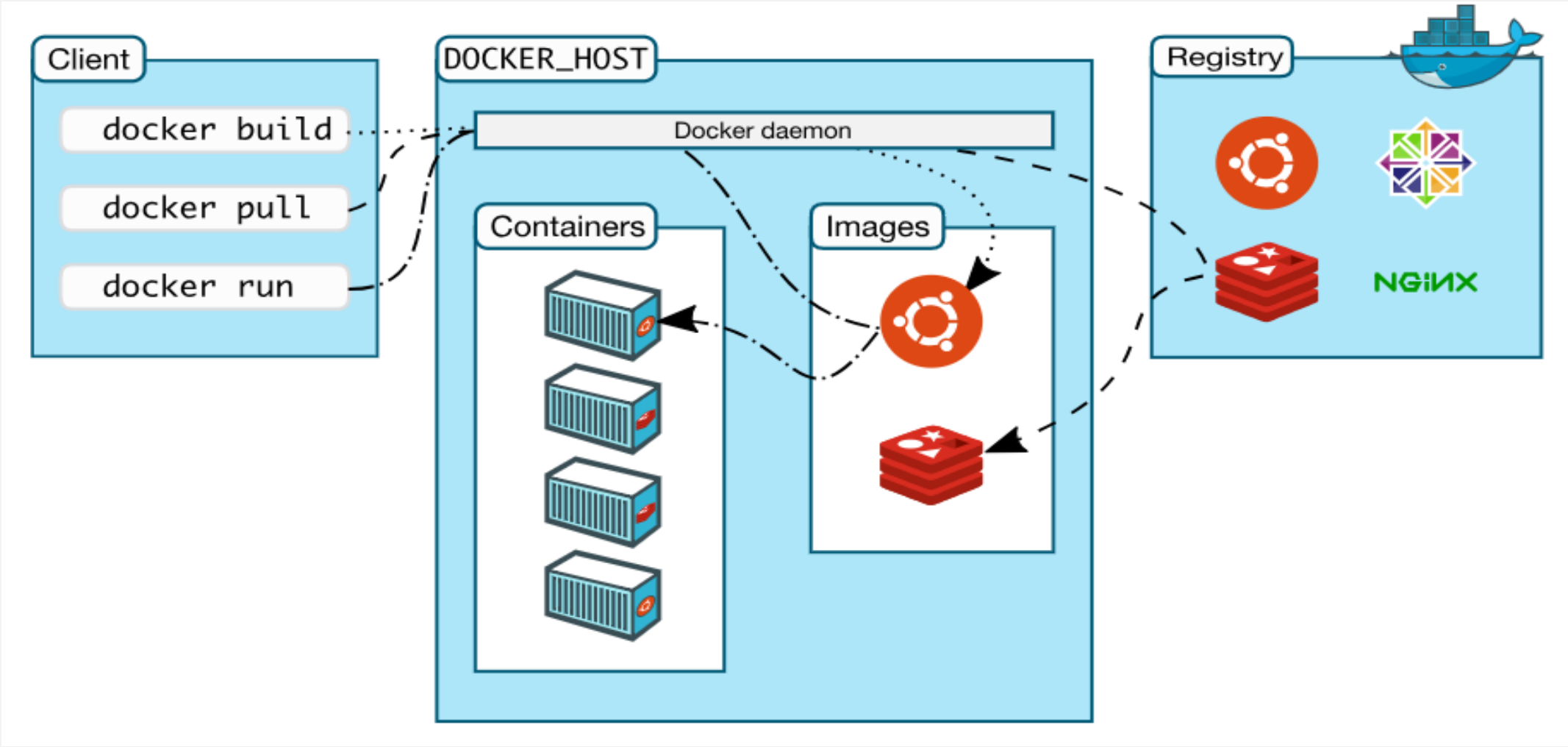
"Kubernetes is an open-source system for automating deployment, scaling, and management of containerized applications."



What does Kubernetes do?

- Provide a runtime environment to Docker containers
- Scale and load balance Docker containers
- Provide an abstract view of the infrastructure of containers
- Monitor and health checking running containers
- Update containers
- Etc.

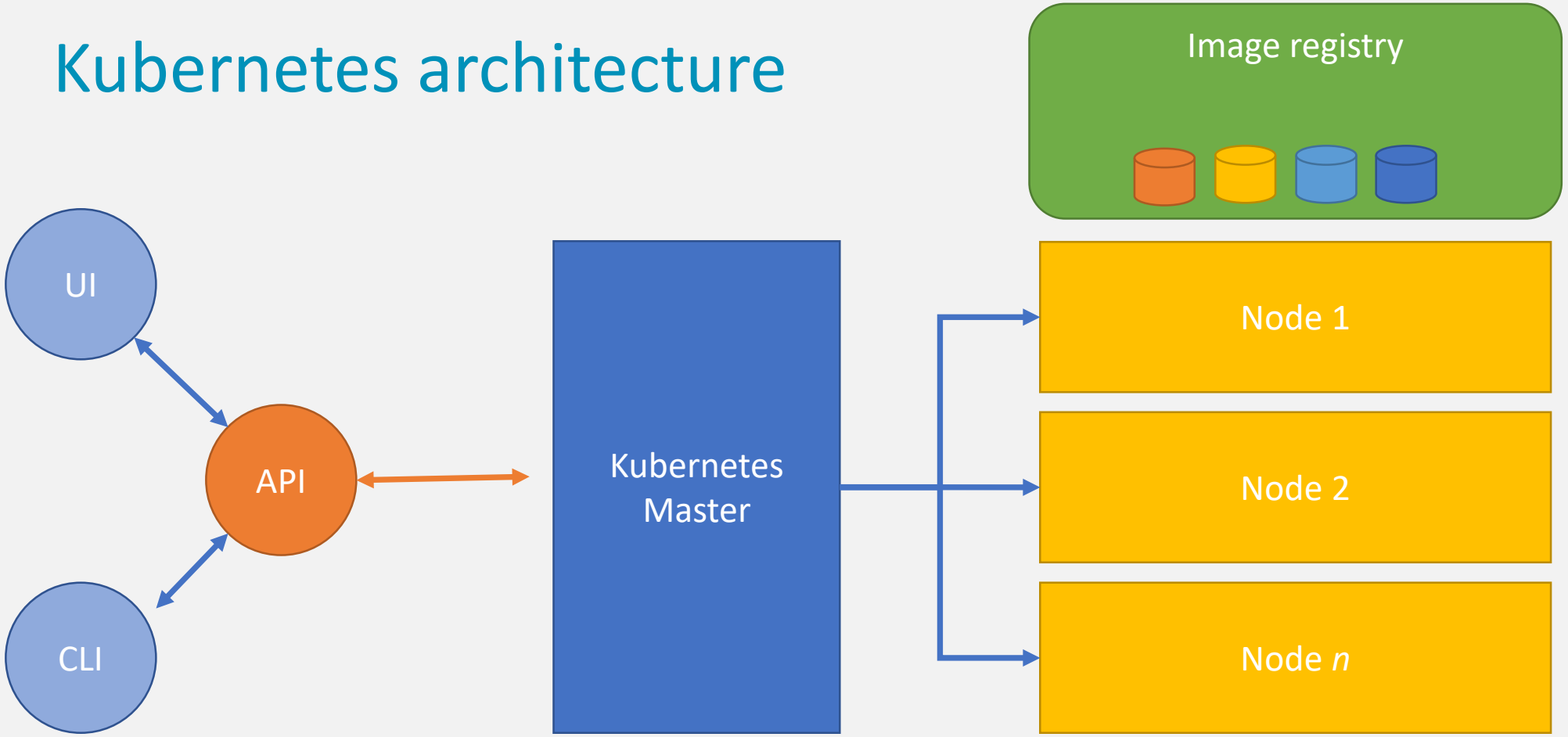
Docker?


Client
docker build
docker pull
docker run
DOCKER_HOST
Docker daemon
Containers
Images
Registry
NGINX

Kubernetes and Docker

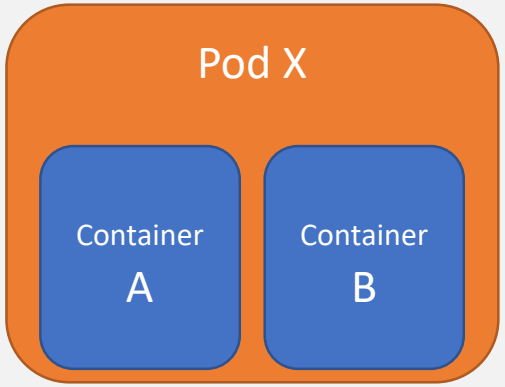
- Kubernetes adds functionality to Docker
- Manages a set of Docker hosts forming a Cluster
- Takes care of Container scheduling (also scaling out)

Kubernetes architecture



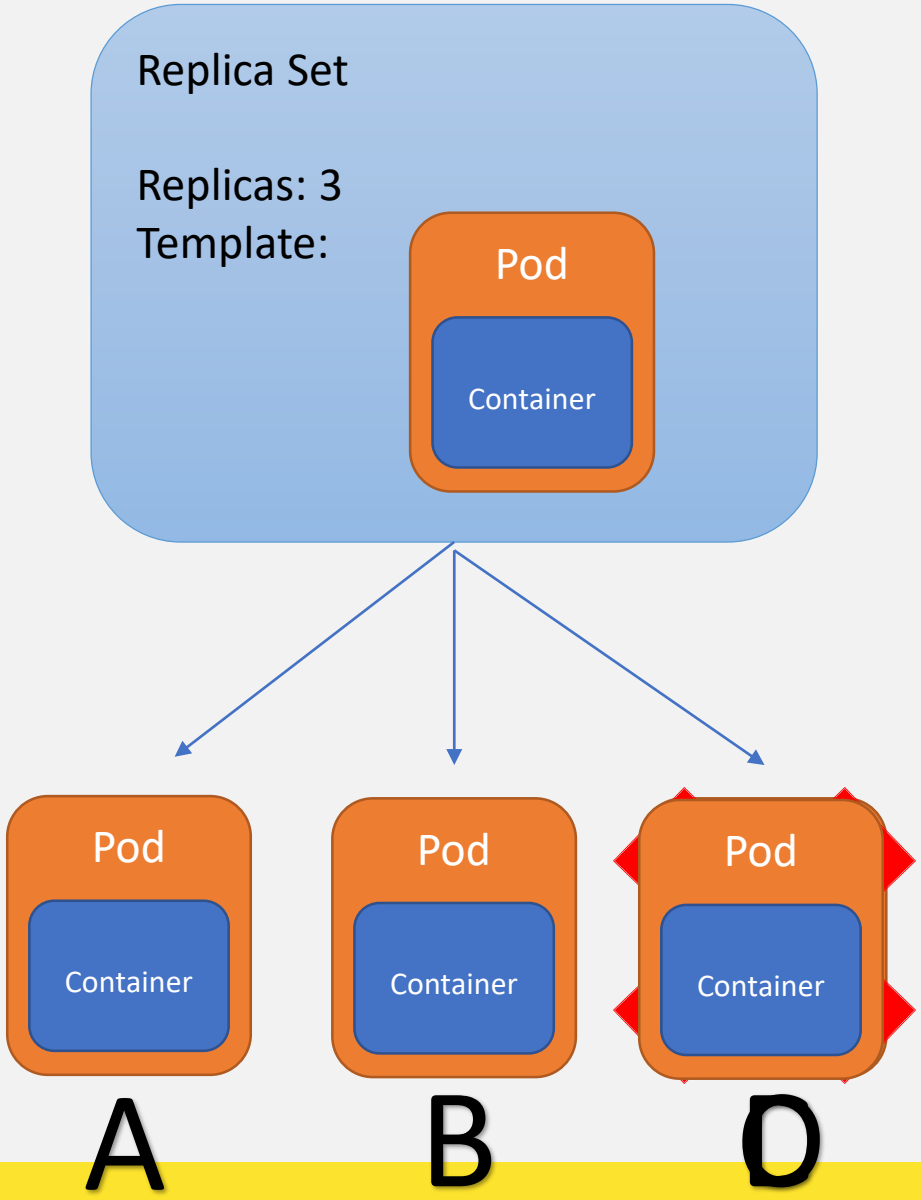
Pods

- Each pod has is own ip address
- Pods are expected to be stateless



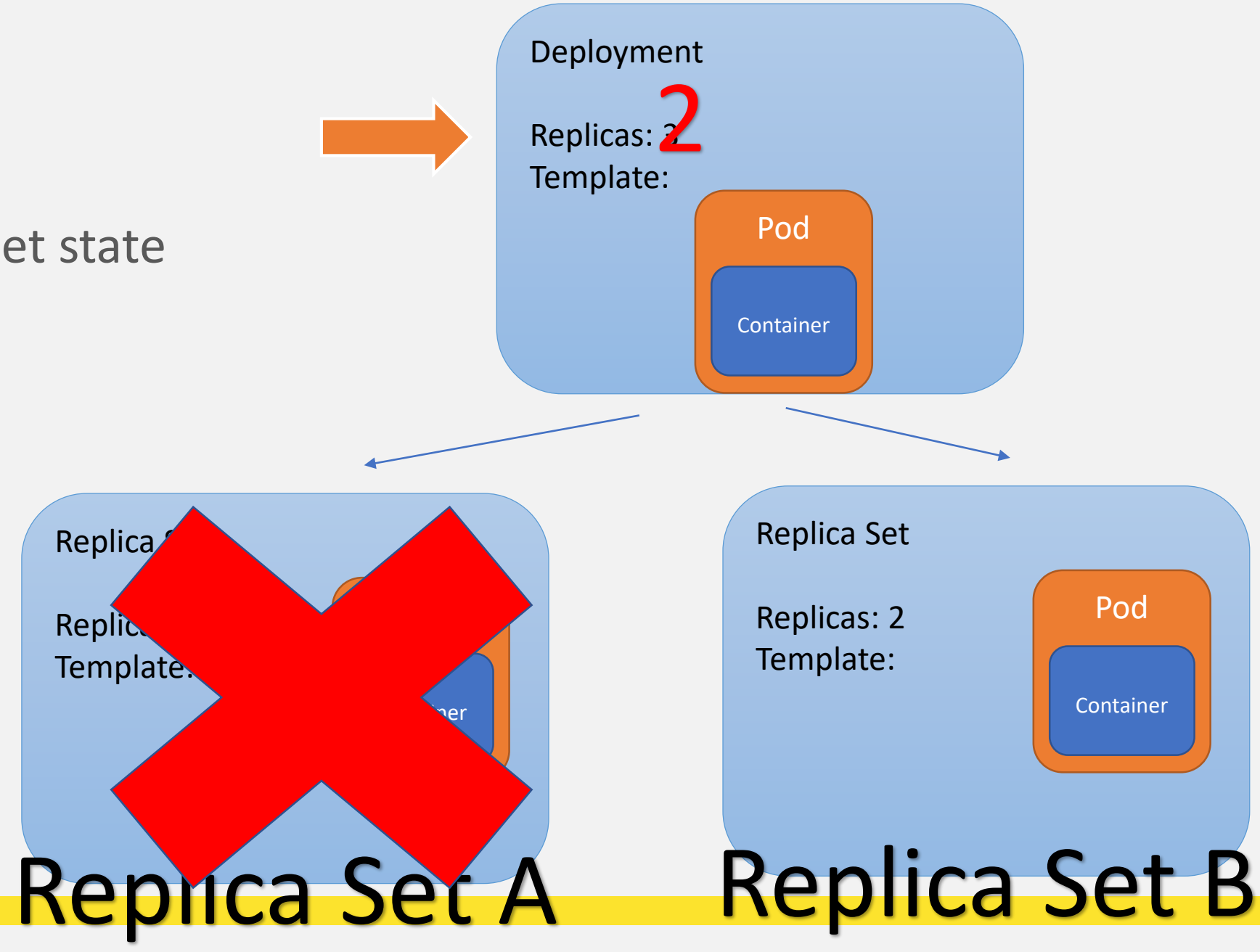
Replica Set

- Keeps track of pods



Deployments

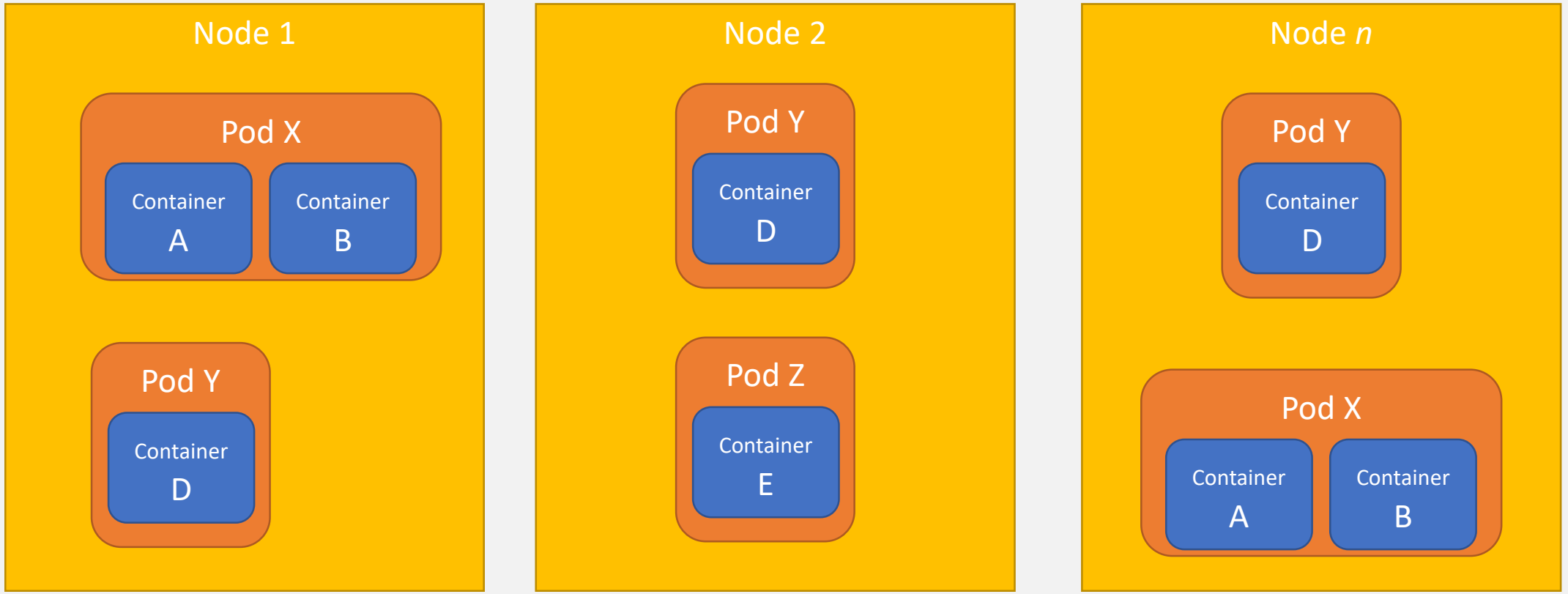
- Manage Replica Set state transitions



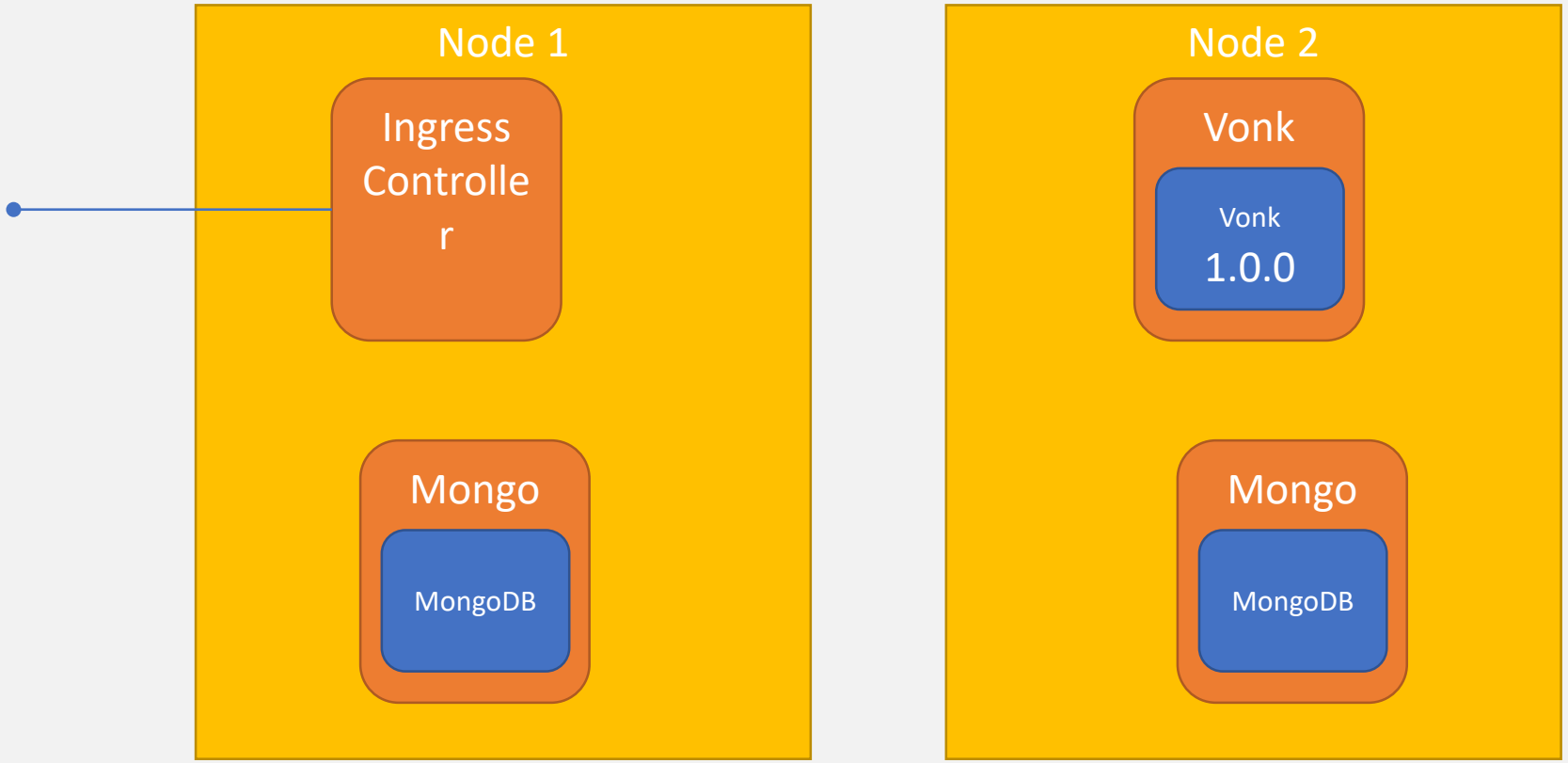
Services

- Exposing the pods to each other or to the outside world (out of the cluster)

Kubernetes runtime



Vonk in production (https://vonk.fire.ly)



Example deployment

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.15.4
        ports:
        - containerPort: 80
```

In this example:

- A deployment nginx-deployment is created
- Three pods will be created with a nginx container inside

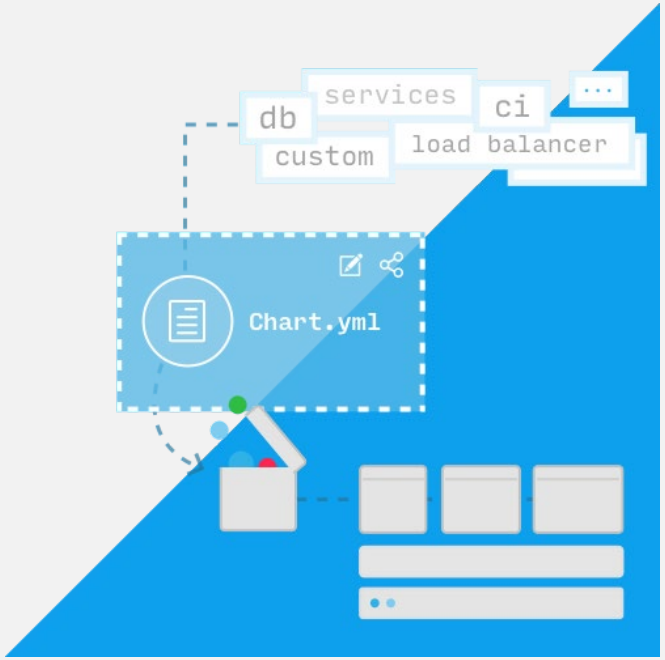
Helm Charts

The package manager for Kubernetes

“Helm is the best way to find, share, and use software built for Kubernetes”

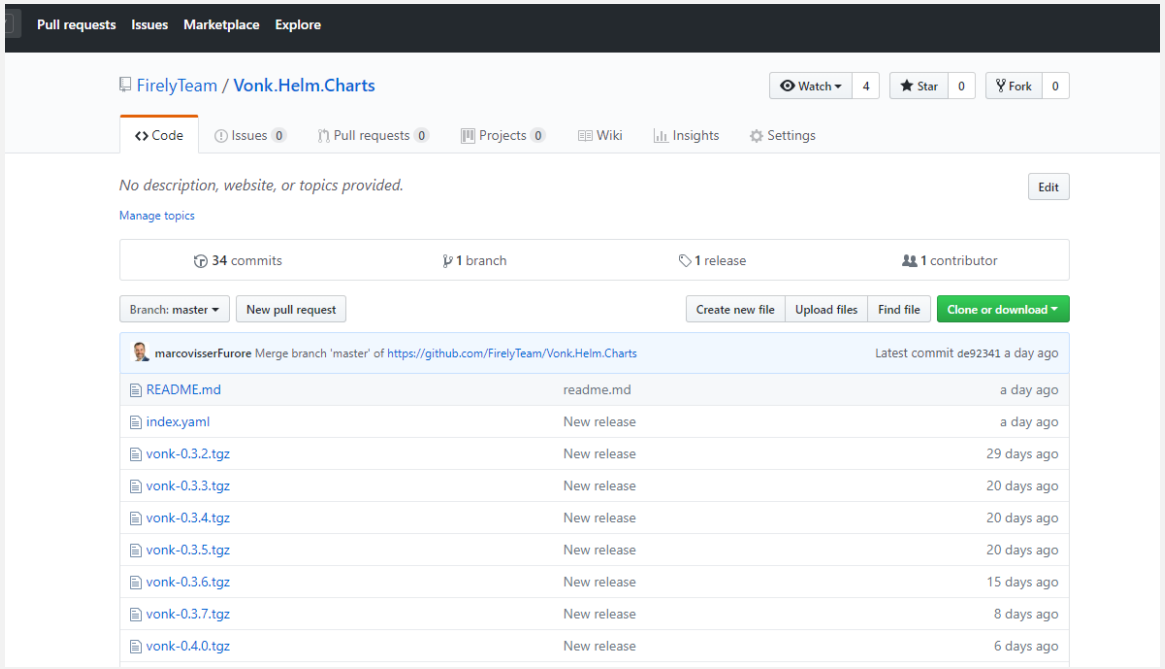
What is Helm?

- Helm helps you manage Kubernetes applications
- Helm Charts helps you define, install, and upgrade even the most complex Kubernetes application.
- Takes the pain out of updates with in-place upgrades and custom hooks.
- Charts are easy to version, share, and host on public or private servers.



Vonk Helm Chart

- Public on https://github.com/FirelyTeam/Vonk.Helm.Charts



Install Vonk on a Kubernetes Cluster

```
$ helm repo add firely
https://raw.githubusercontent.com/FirelyTeam/Vonk.Helm.Charts/master/
$ helm install --name my-release firely/vonk
```

Tested on:

- Azure Kubernetes Service
- Google Kubernetes Engine
- Amazon EKS

Demo

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