KUBERNETES

QUALITY THOUGHT

INFOSYSTEMS (INDIA) PVT. LTD.

What is Kubernetes

Kubernetes

Where did it come from

What does the name mean

...

What does it do

Why do we have it

...

Born in Google

Dona in 20 n source)

Writt an

https n/ku /kubernetes

IRC, @kubernetesio, slack.k8s.io, Meetups...

Borg
(Proprietary)

Omega
(Proprietary)

Kubernetes
(open-source)

Kubernetes

K8s

Greek for "Helmsman" < the person who steers a ship

- Born in Google
- Donated to CNCF in 2014
- Open source (Apache 2.0)
- v1.0 July 2015
- Written in Go/Golang
- https://github.com/kubernetes/kubernetes
- IRC, @kubernetesio, slack.k8s.io, Meetups...
- DNA from Borg and Omega
- Often shortened to **k8s**

Kubernetes

What & Why

Containers bring scalability challenges!

We're starting to view the data center as a computer!

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Kubernetes can manage it

Pets vs. Cattle

- Standard package format
- Manifest

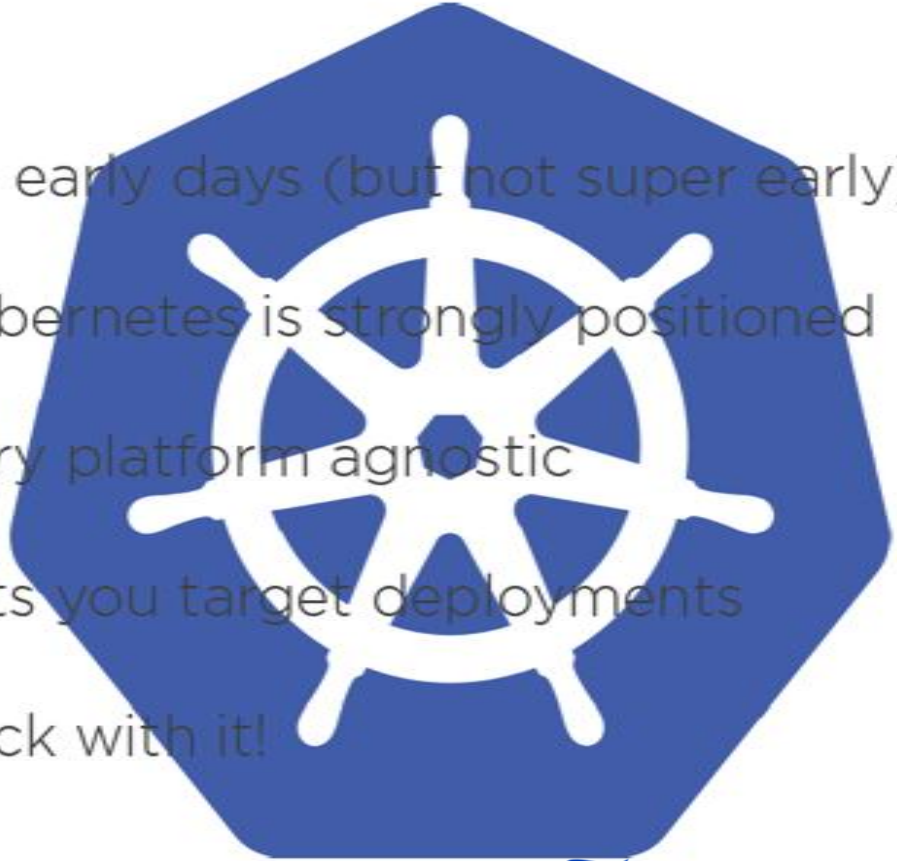
Job done!

- Standard package format
- Manifest

Job done!

- Standard package format
- Manifest

Job done!



It's early days (but not super early)

Kubernetes is strongly positioned

Very platform agnostic

Lets you target deployments

Stick with it!

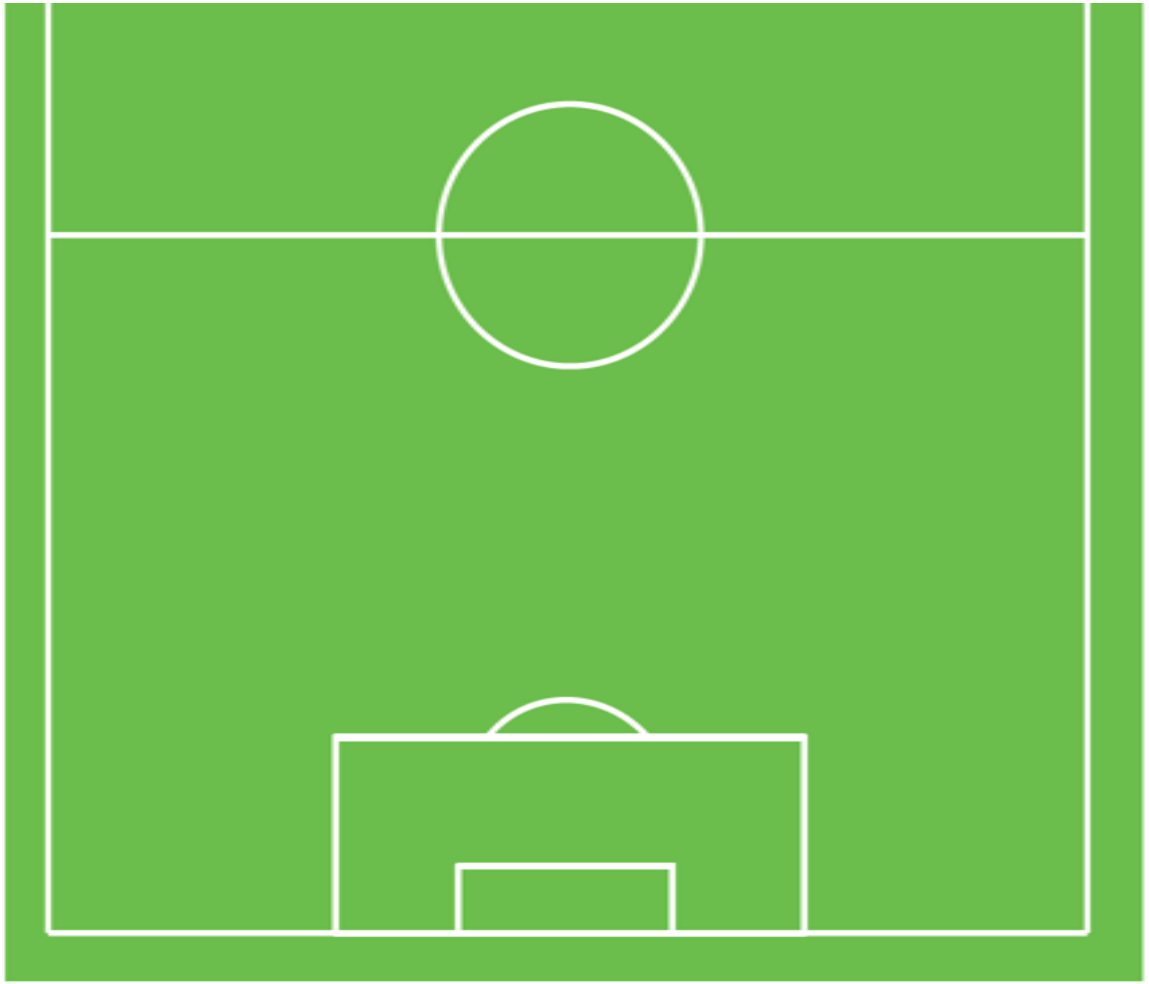
Kubernetes is
moving **FAST**

Kubernetes Architecture

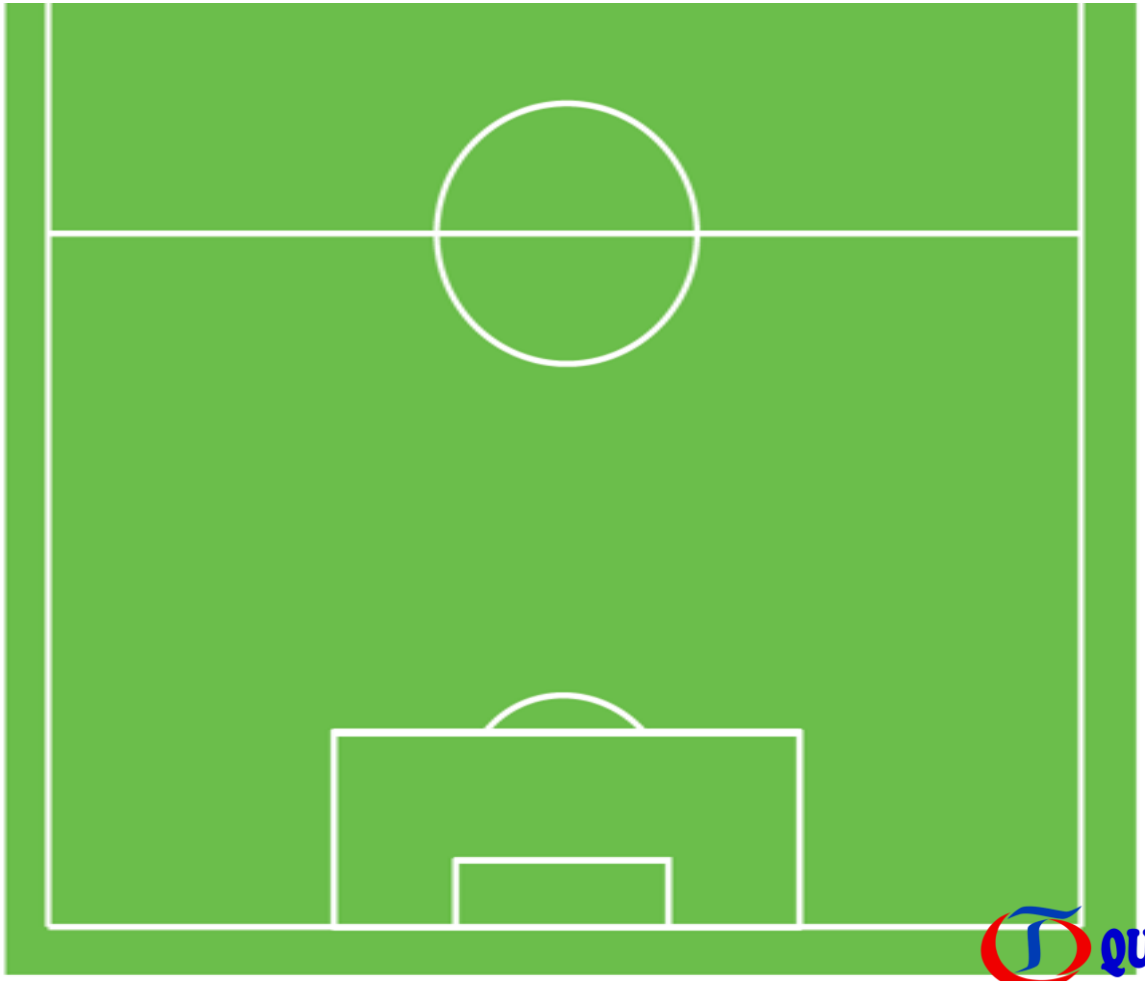
Kubernetes
Big Picture View

Team

Manager
(coach)



Team



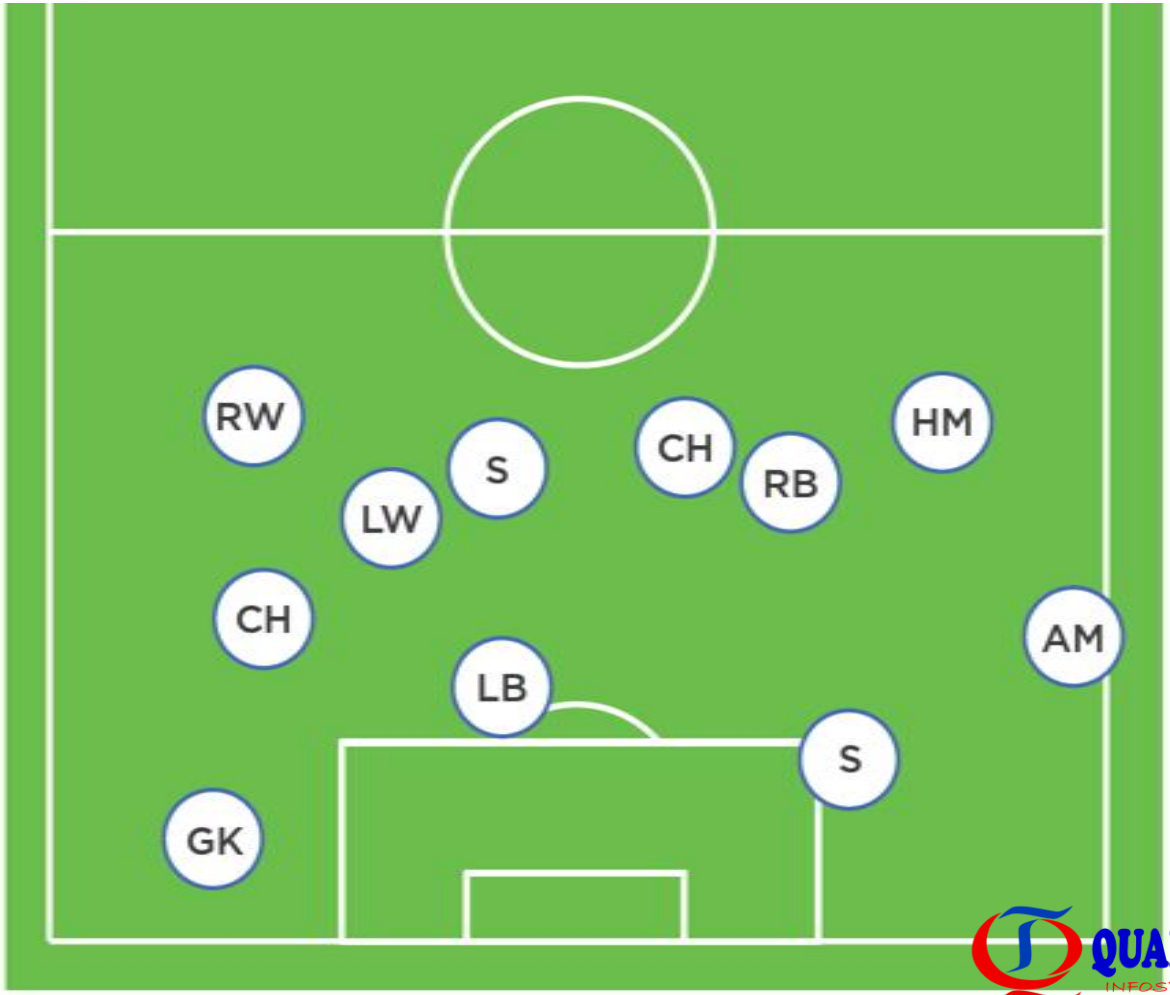
Team

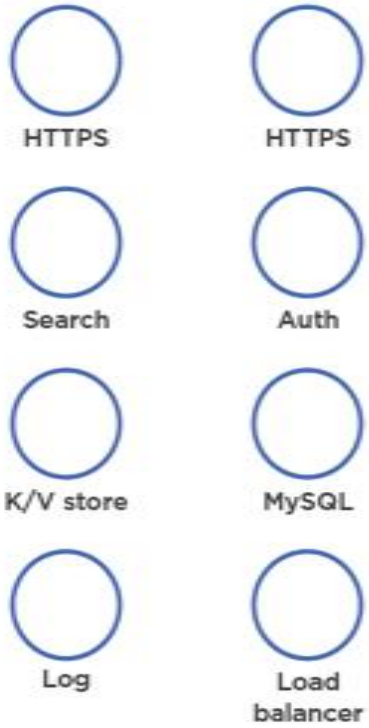
Manager
(coach)

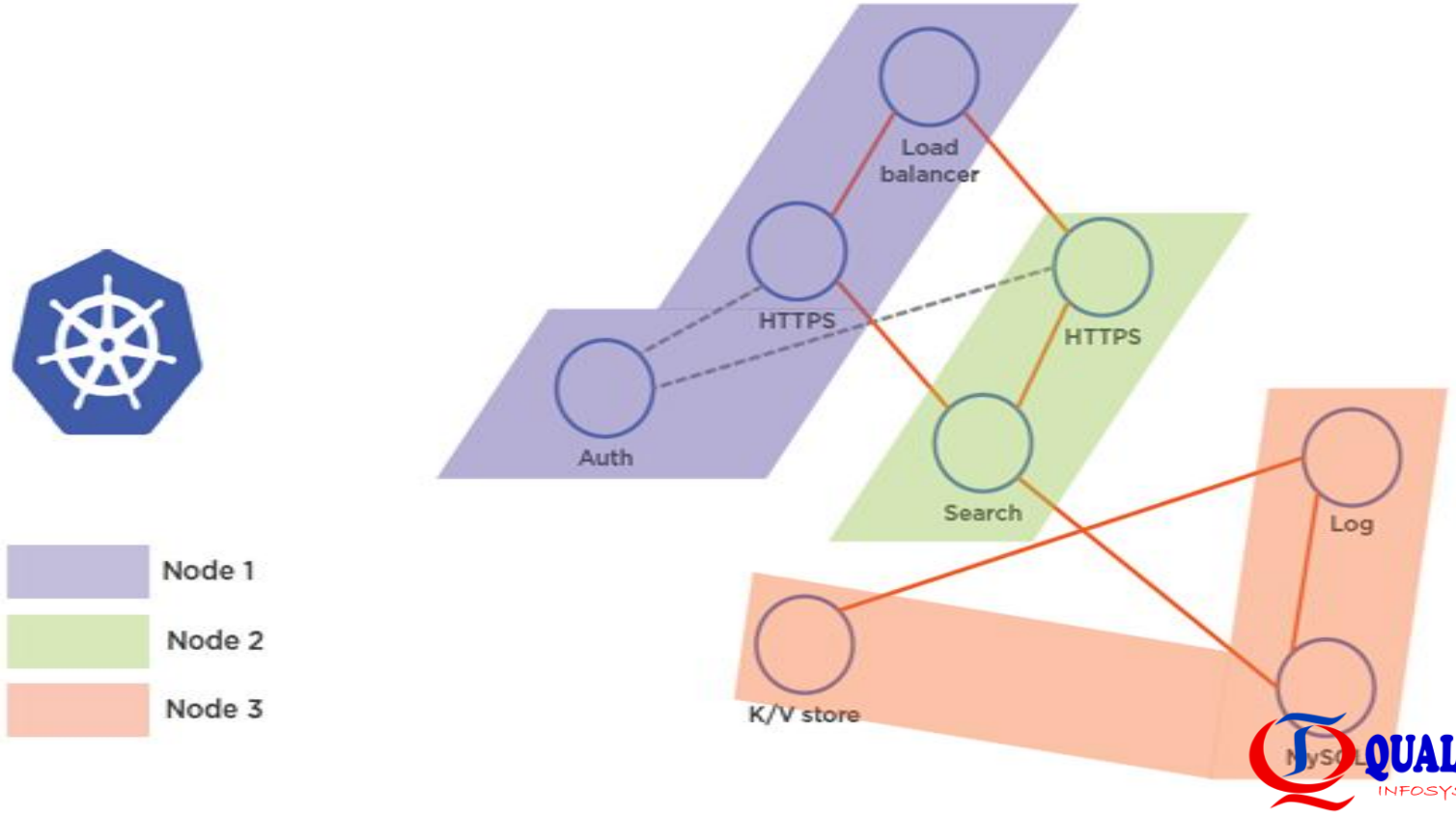
S1

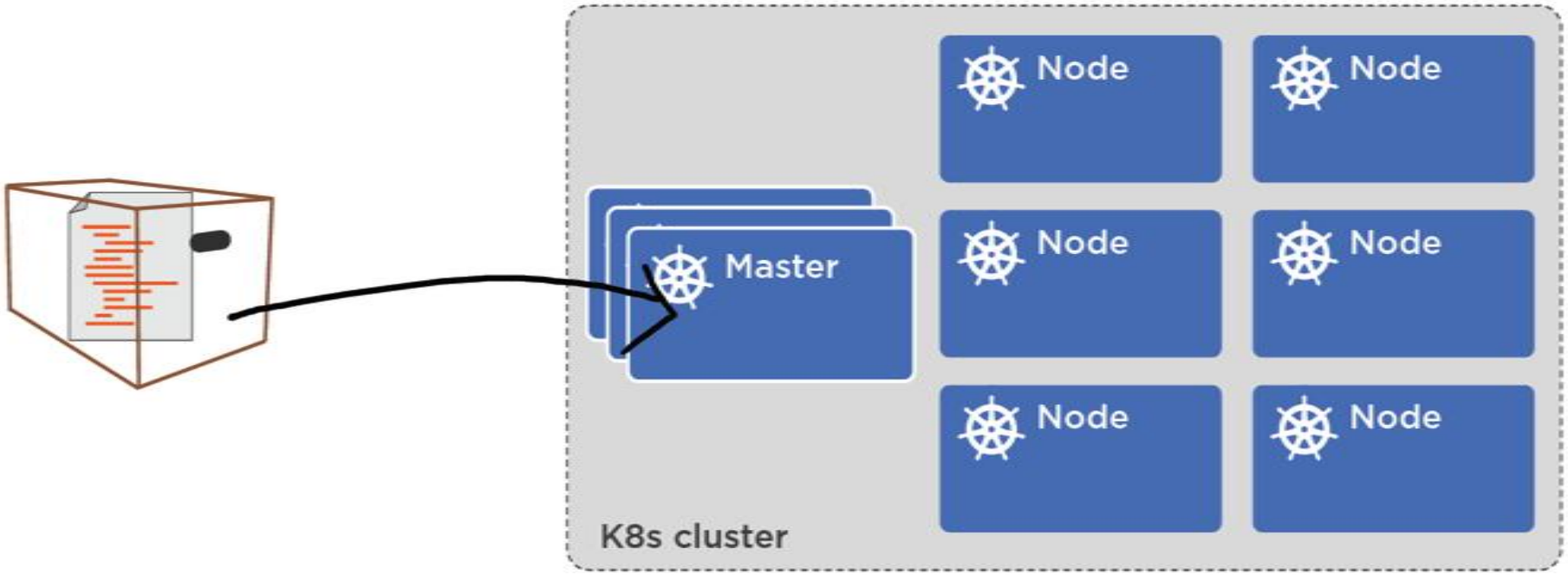
S2

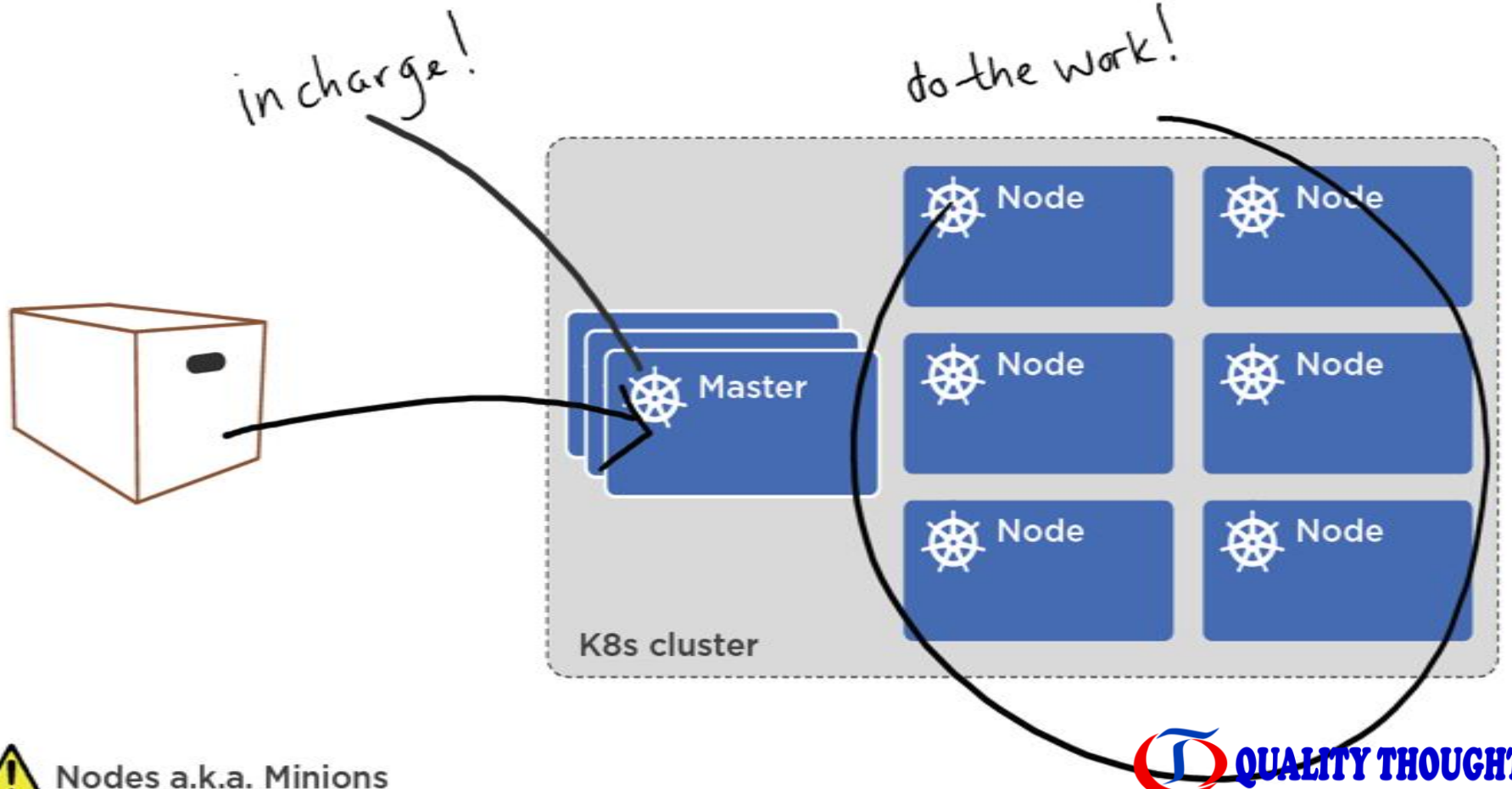
S3



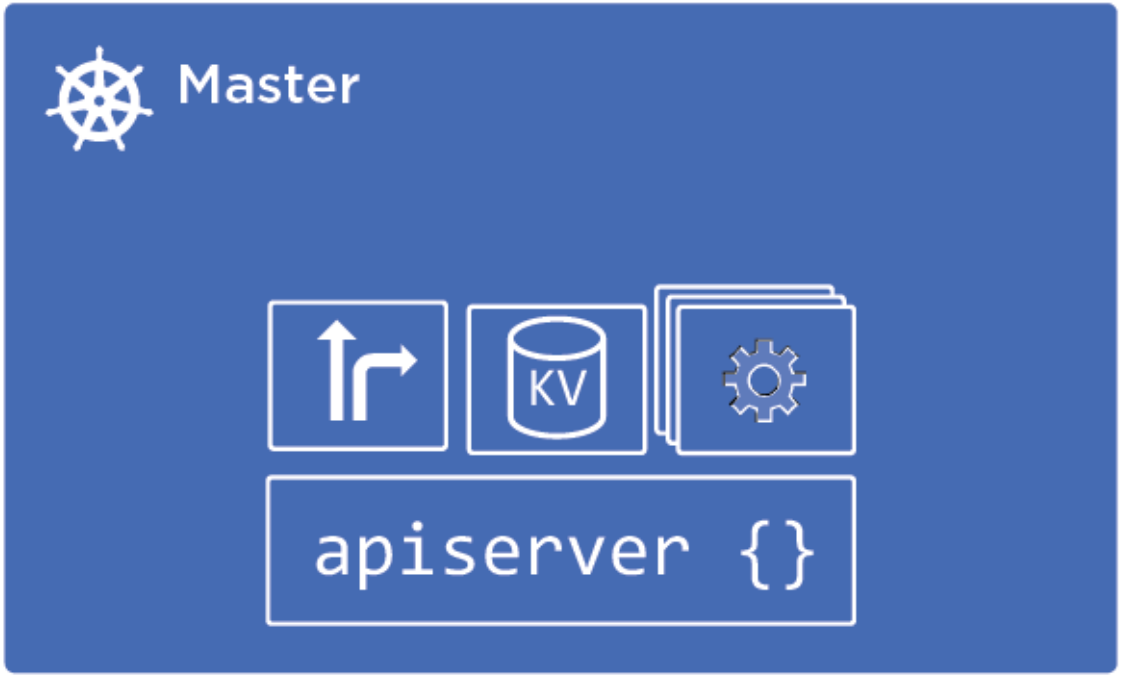






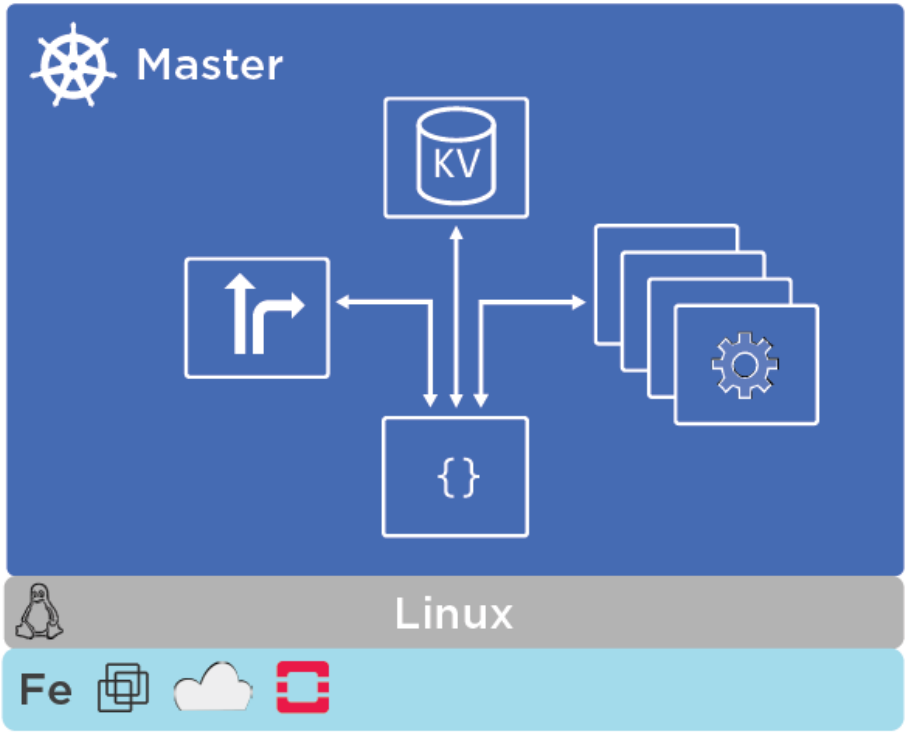


Nodes a.k.a. Minions

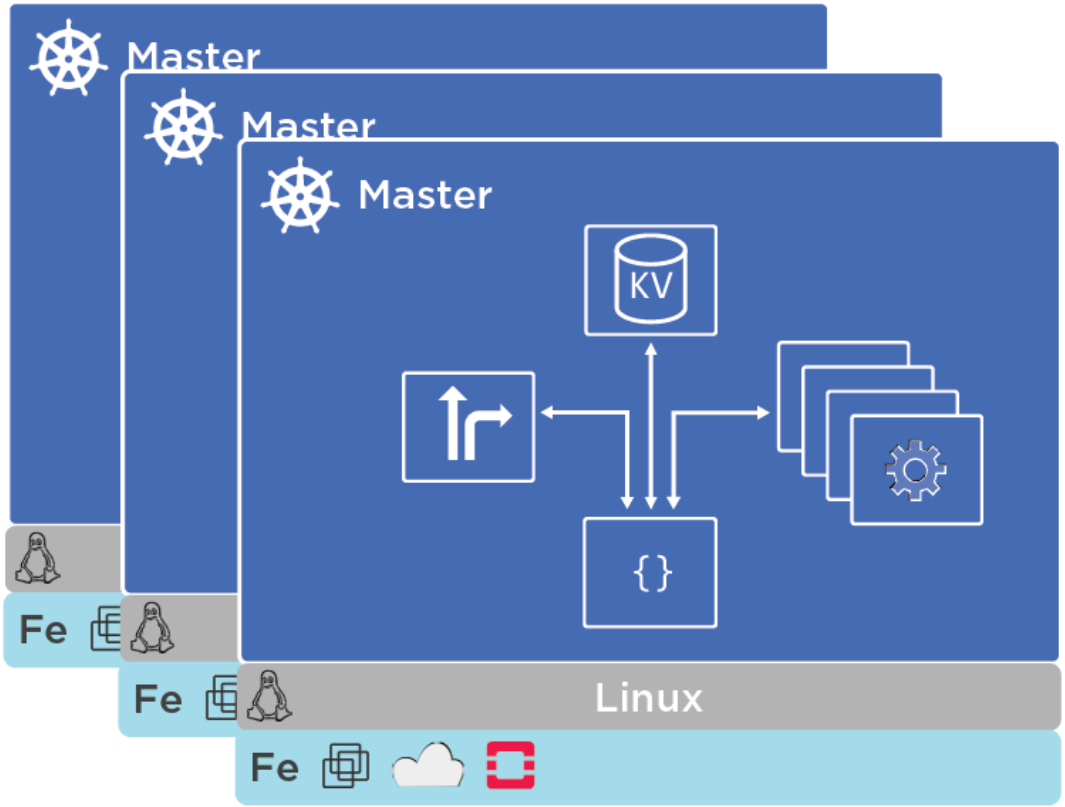


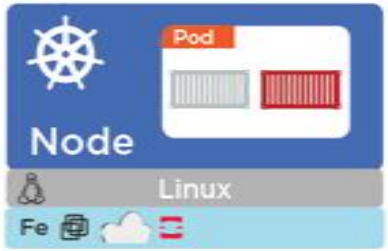
Masters

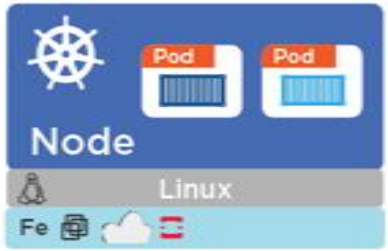
The Kubernetes Control Plane

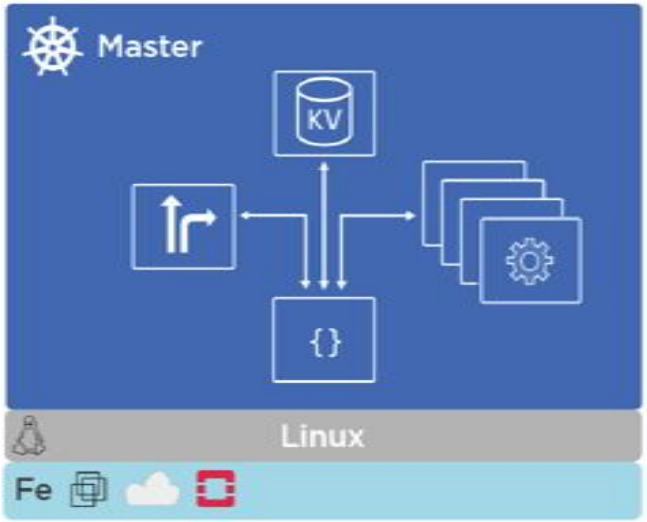


Multi-master HA









Don't run user workloads on "Master"

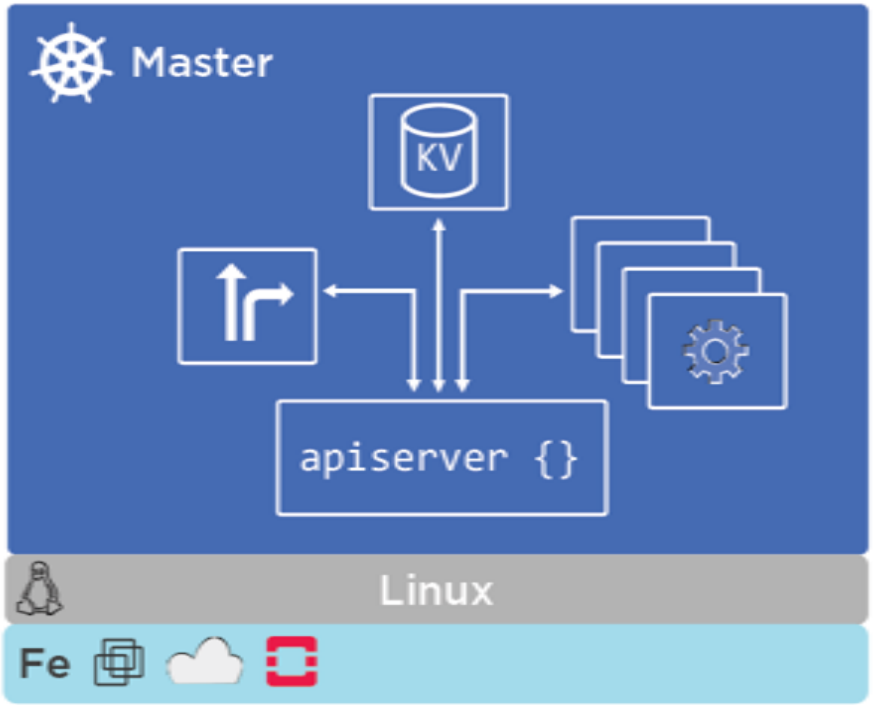
kube-apiserver

Front-end to the control plane

Exposes the API (REST)

Consumes JSON

(via manifest files)



Cluster store

Persistent storage

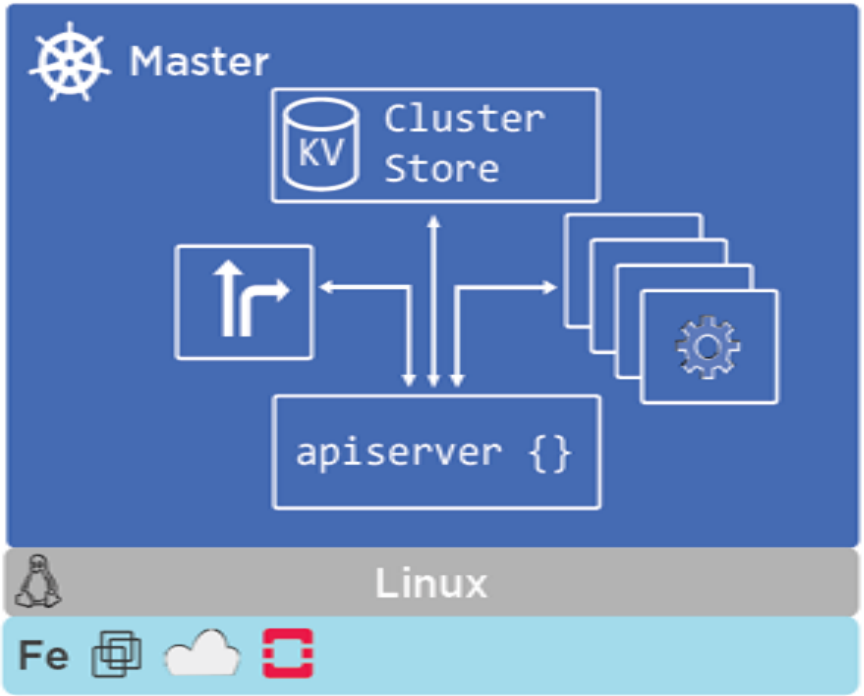
Cluster state and config

Uses **etcd**

Distributed, consistent, watchable...

The *"source of truth"* for the cluster

Have a backup plan for it!



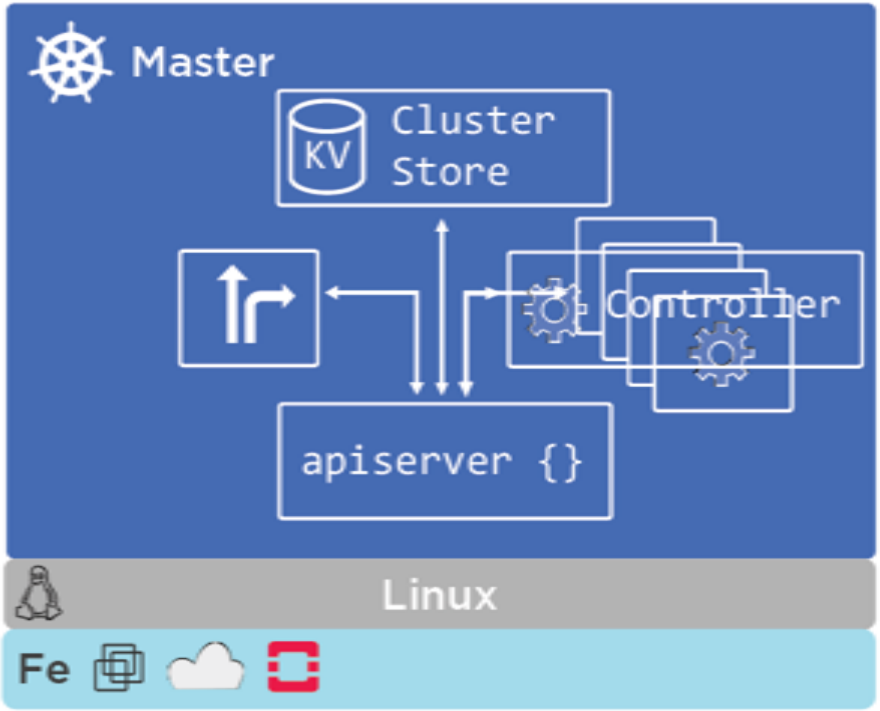
kube-controller-manager

Controller of controllers

- Node controller
- Endpoints controller
- Namespace controller
- ...

Watches for changes

Helps maintain *desired state*

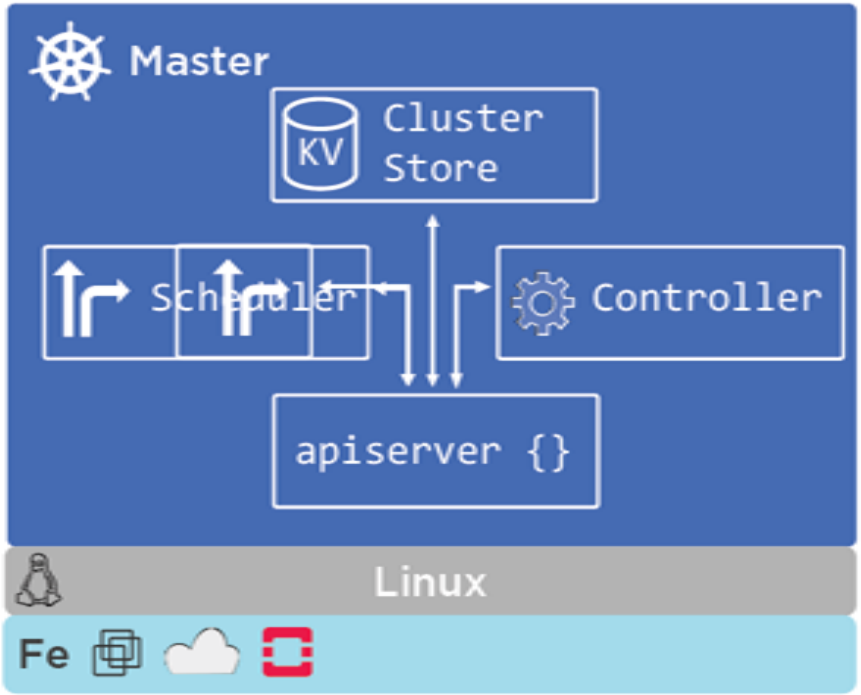


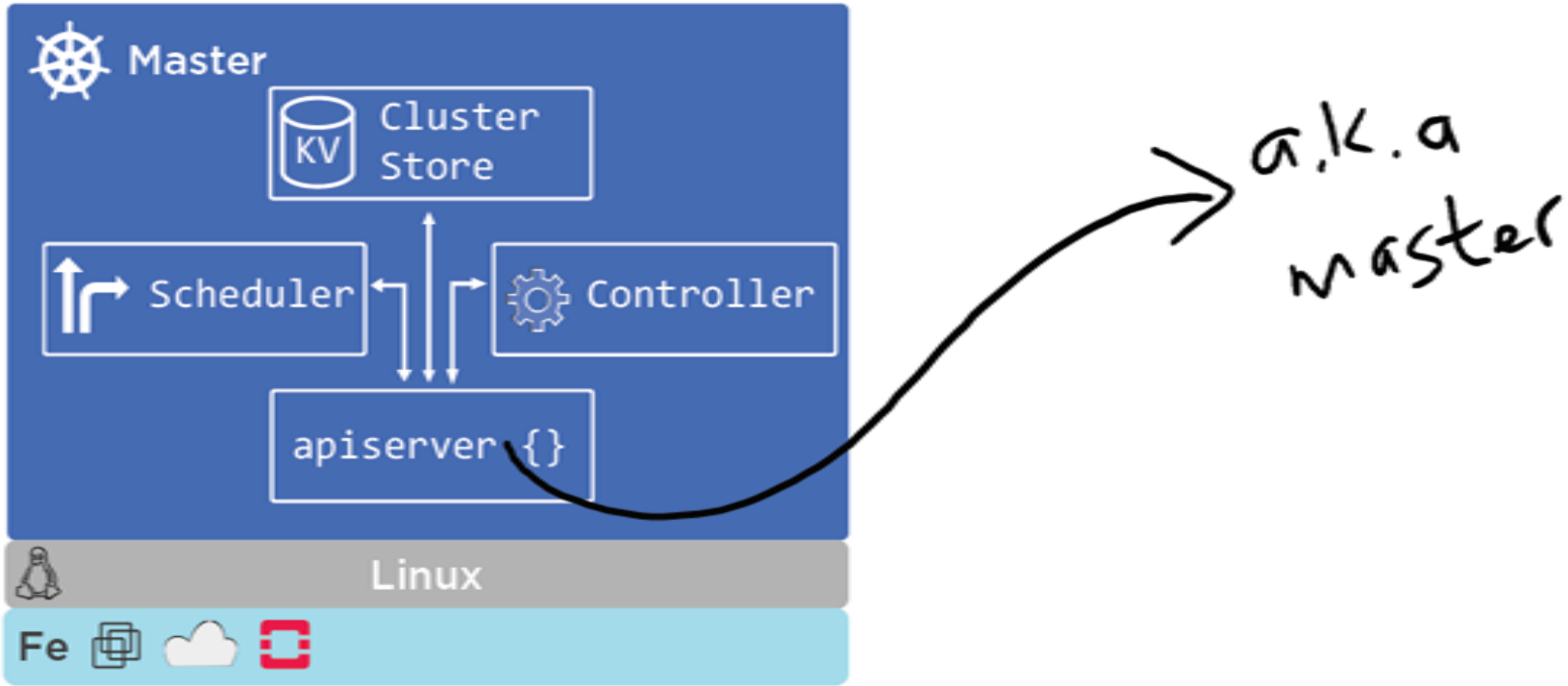
kube-scheduler

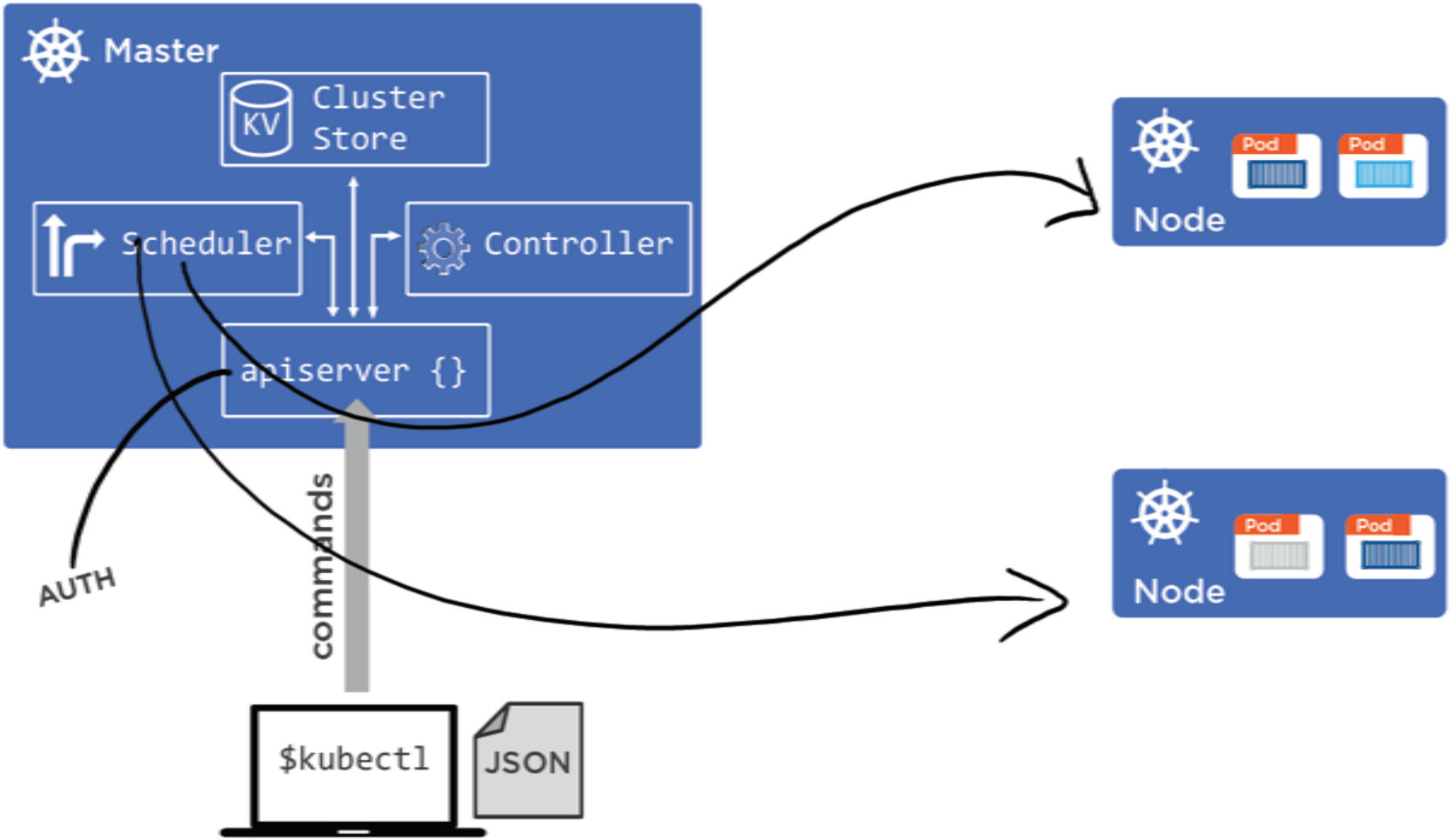
Watches **apiserver** for new pods

Assigns work to **nodes**

- affinity/anti-affinity
- constraints
- resources
- ...

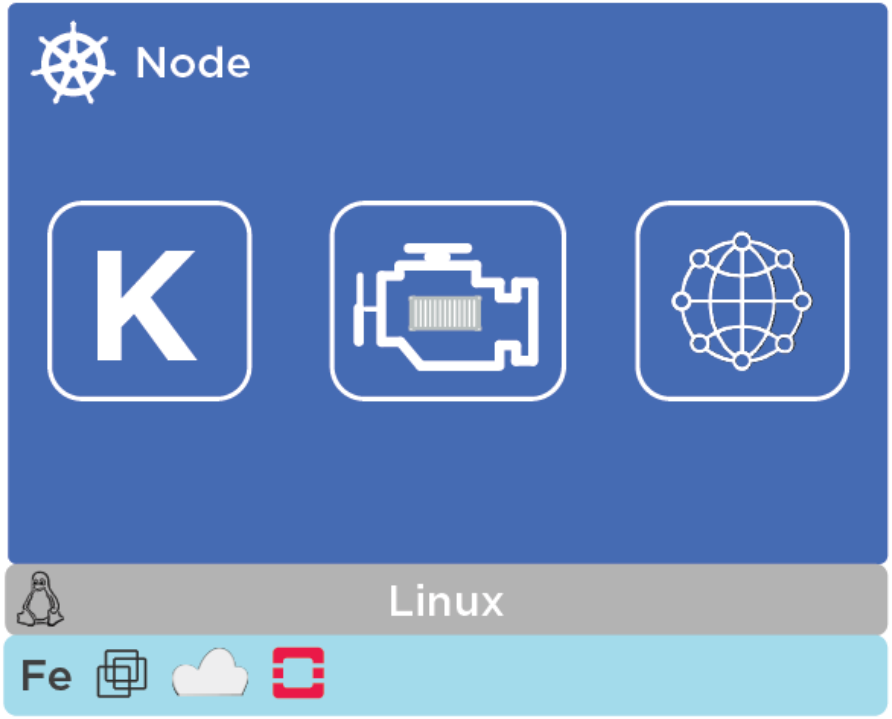





Master
KV
Cluster Store
Scheduler
Controller
apiserver {}
AUTH
commands
$kubectl
JSON
Pod
Pod
Node
Pod
Pod
Node

Nodes
a.k.a. "Minions"

The Kubernetes Workers



Kubelet

- The **main** Kubernetes agent
- Registers node with cluster
- Watches **apiserver**
- Instantiates **pods**
- Reports back to **master**
- Exposes endpoint on :10255

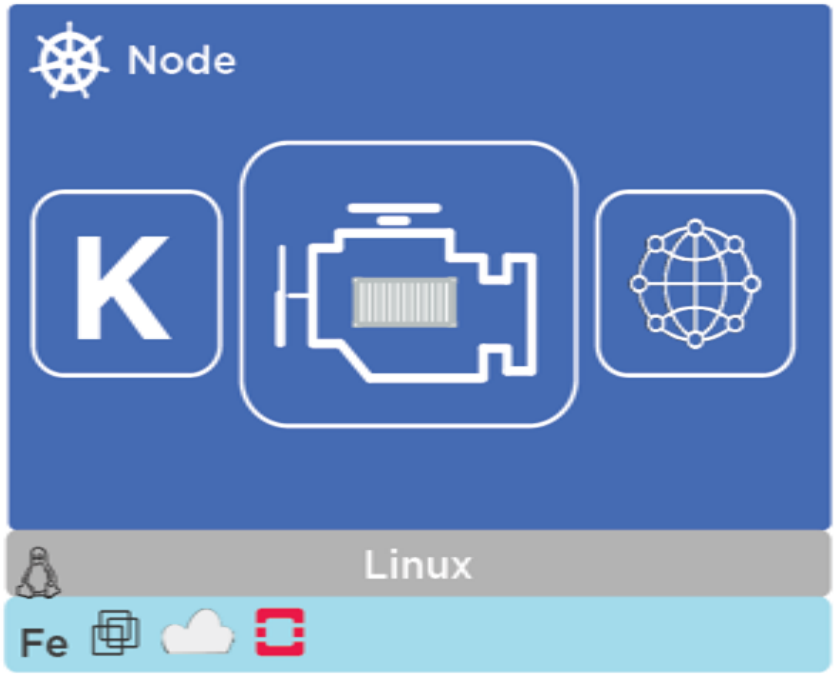
Container Engine

Does container management:

- Pulling images
- Starting/stopping containers
- ...

Pluggable:

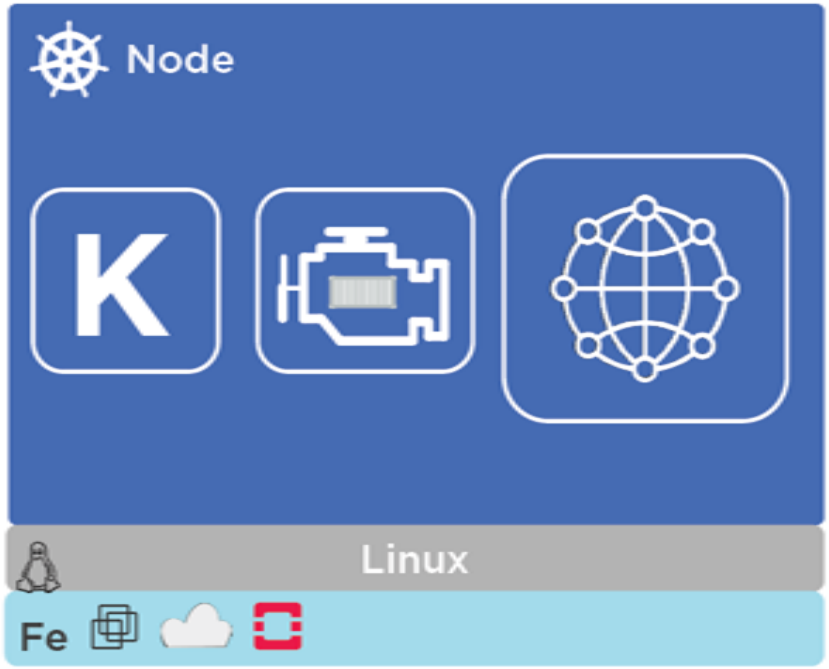
- Usually **Docker**
- Can be **rkt**



kube-proxy

Kubernetes networking:

- Pod IP addresses
  - All containers in a pod share a single IP
- Load balances across all pods in a **service**



Kubelet

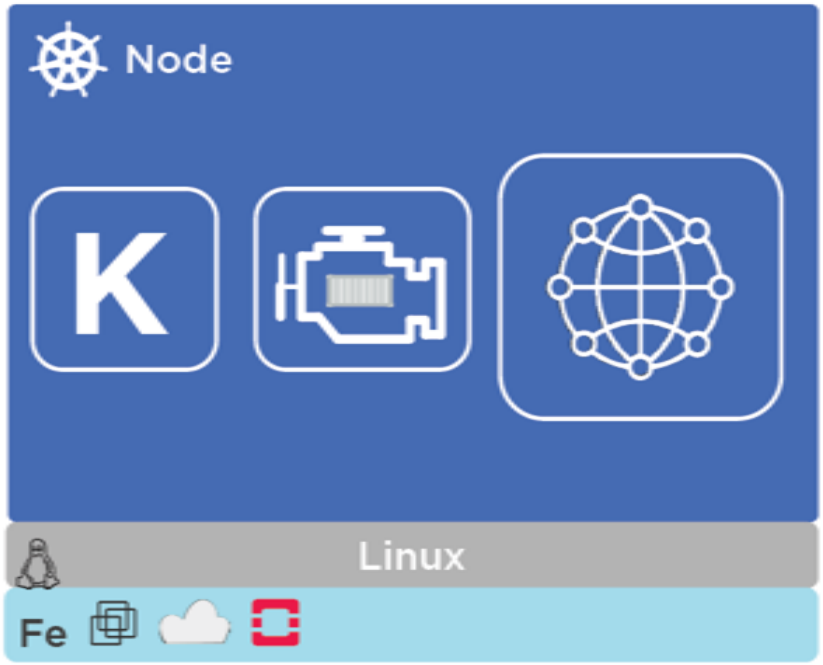
Main Kubernetes agent

Container engine

Docker or rkt

kube-proxy

Kubernetes networking



Declarative Model
&
Desired State