kubernetes

An Introduction to Container Orchestration and Kubernetes

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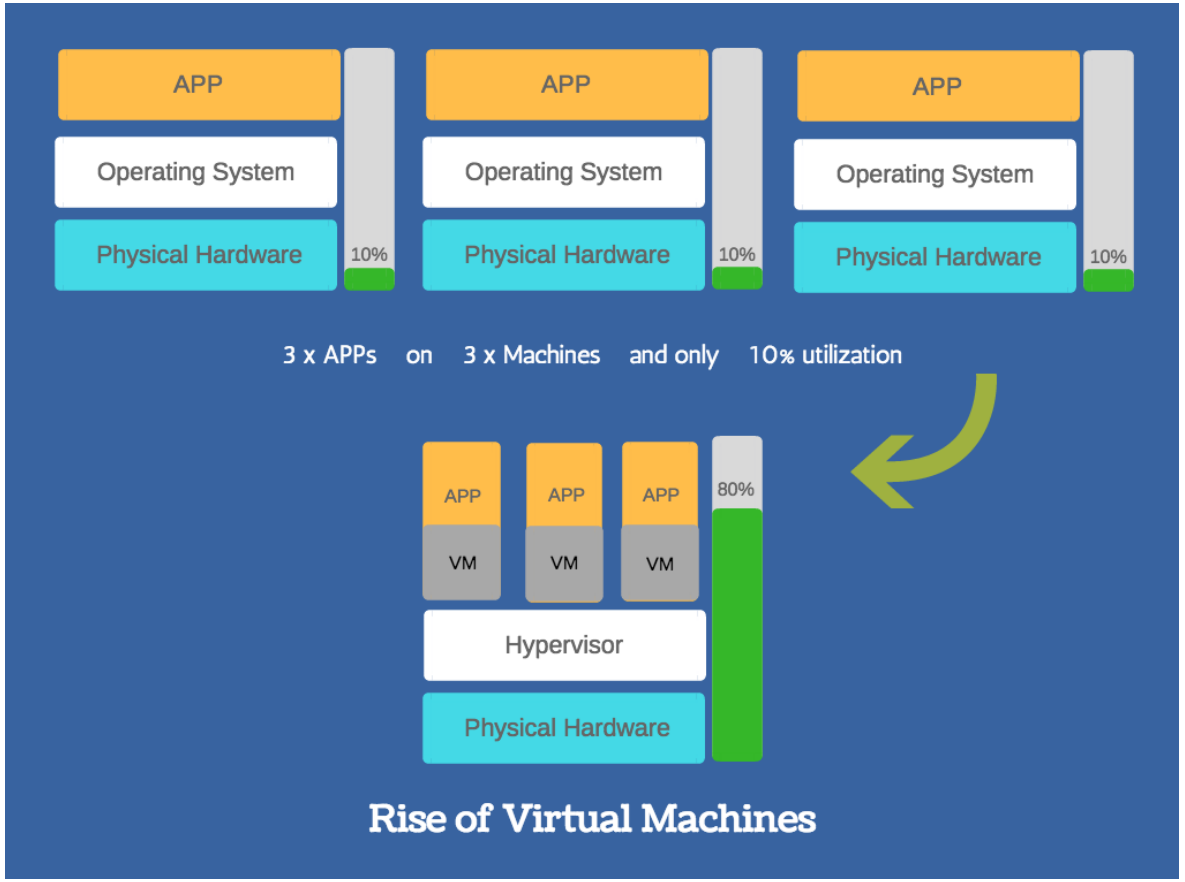
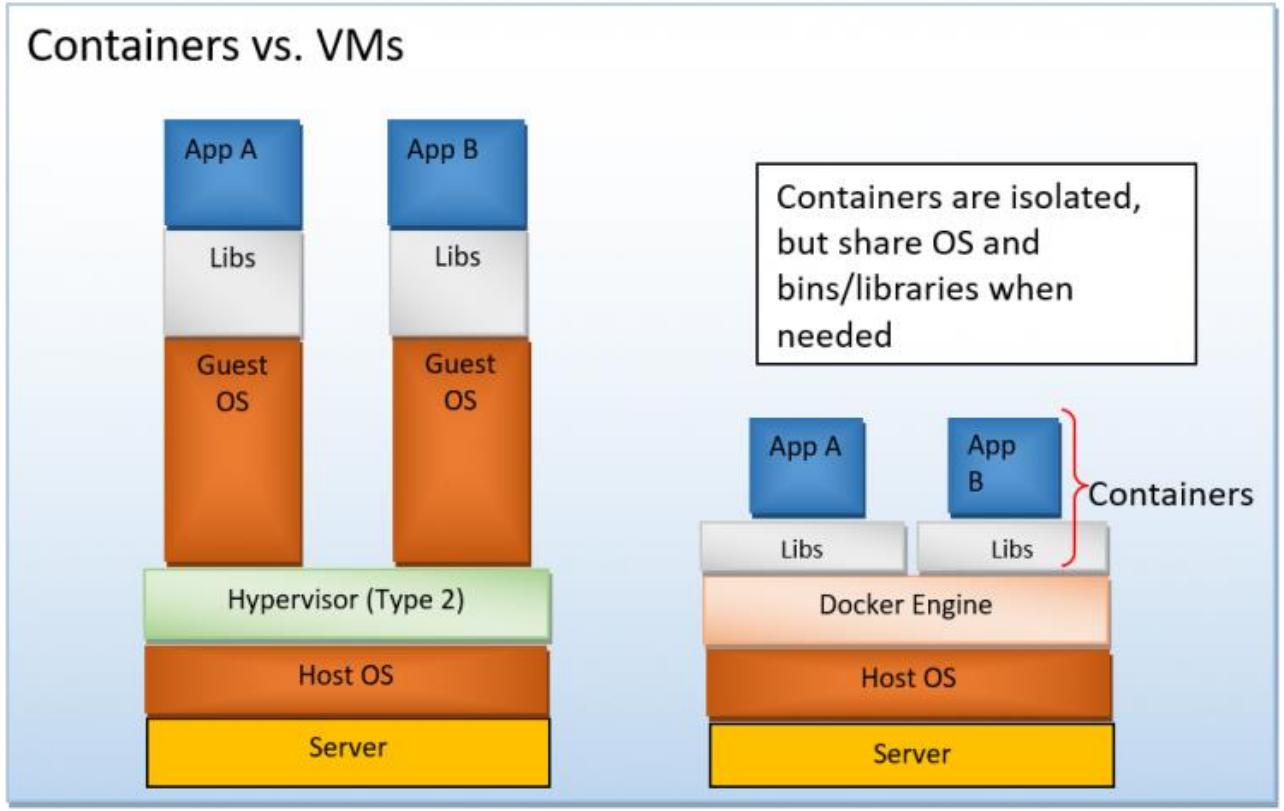
Why we need containers in the first place?

- **Very in-efficient and costly** to have three different machines**.**
- All OS resources available to apps through VM.
- VMs take **a lot of time to boot** and cannot be deployed easily to public cloud if there are 100s of them.

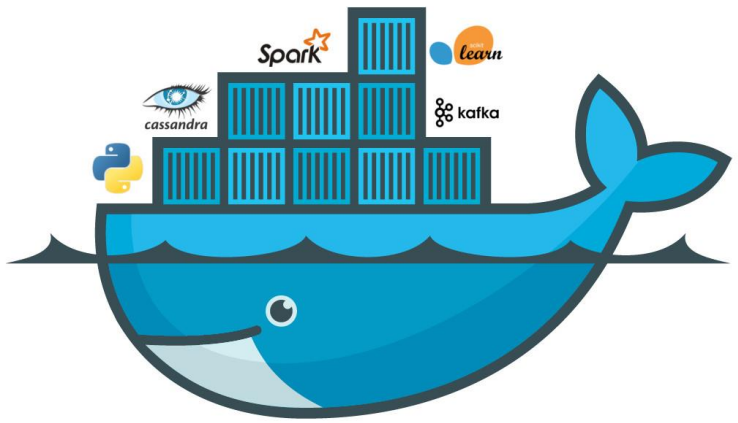


Virtual Machines vs Containers

- Containers are **lightweight, scalable and isolated.**
- Deploy once, use everywhere.
- Less code to transfer



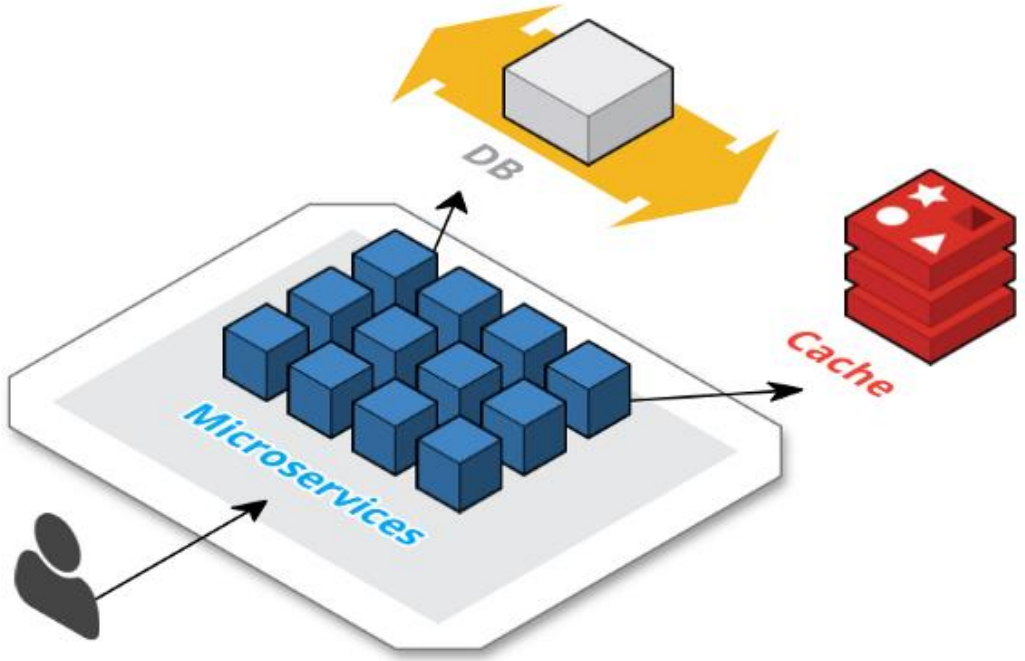
Docker – Container technology to the rescue



- **Docker** is a tool designed to make it easier to create, deploy, and run applications by using containers.

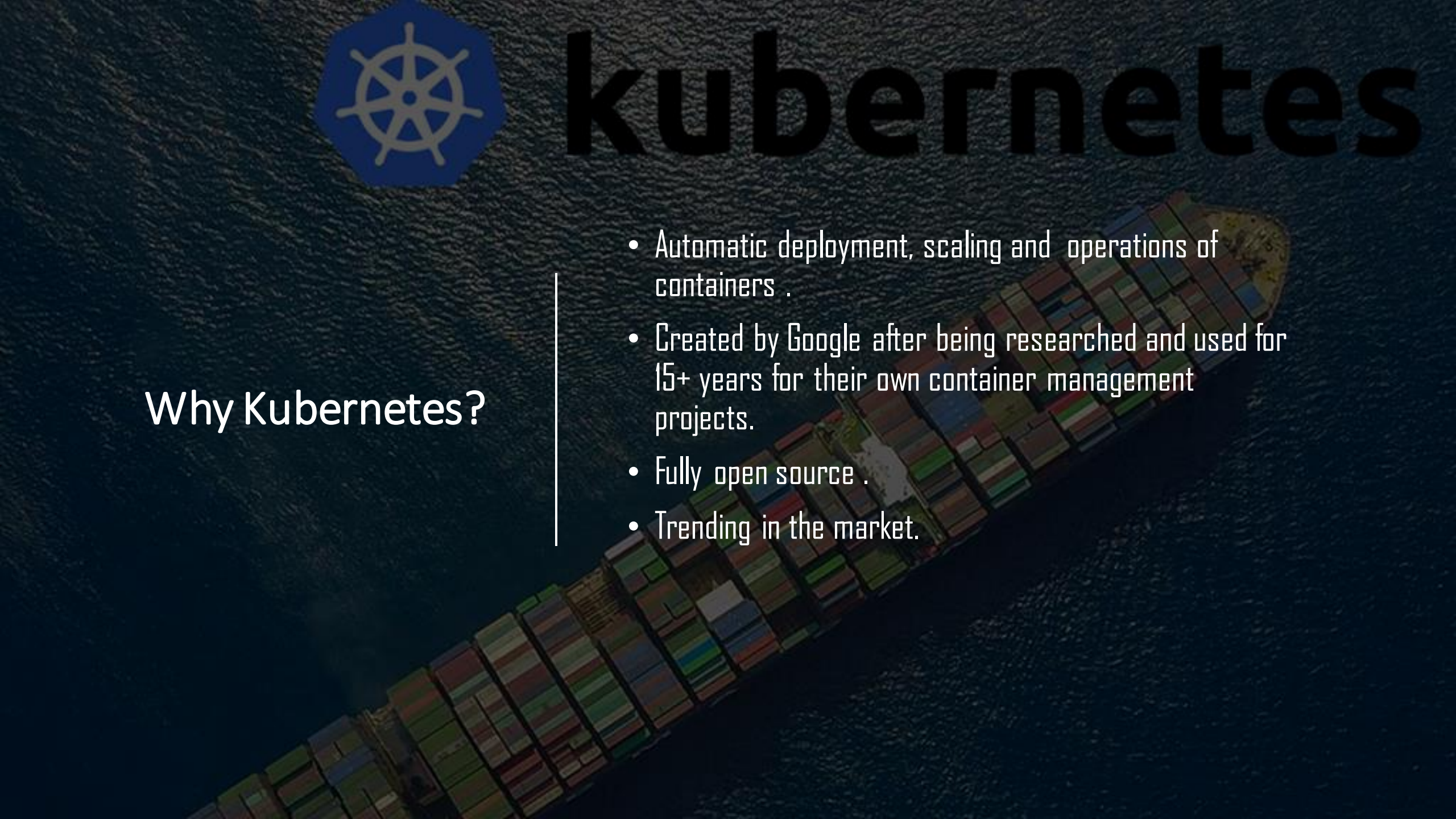
Need of container orchestration

- Scalability and management of all the microservices deployed in containers is still a big problem.
- Container orchestration will help **manage, load balance, scaling of these containers efficiently**.



Which one?


Tools of Container Orchestration
Amazon ECS
FROM AMAZON
Azure Container Services
FROM MICROSOFT
Docker Swarm
DOCKER OPENSOURCE TOOLS
Google Container Engine
FROM GOOGLE CLOUD PLATFORM
Kubernetes
DOCKER OPENSOURCE TOOLS
CoreOS Fleet
FROM COREOS
Mesosphere Marathon
FROM MARATHON
Cloud Foundry's Diego
FROM CLOUD FOUNDRY

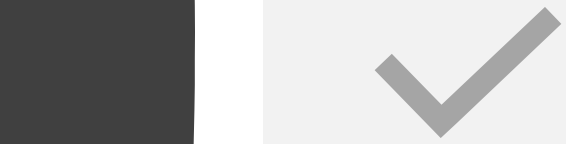


Why Kubernetes?

- Automatic deployment, scaling and operations of containers .
- Created by Google after being researched and used for 15+ years for their own container management projects.
- Fully open source .
- Trending in the market.

What does Kubernetes do?

Provide a runtime environment for docker containers.



Scale and load balance docker containers.

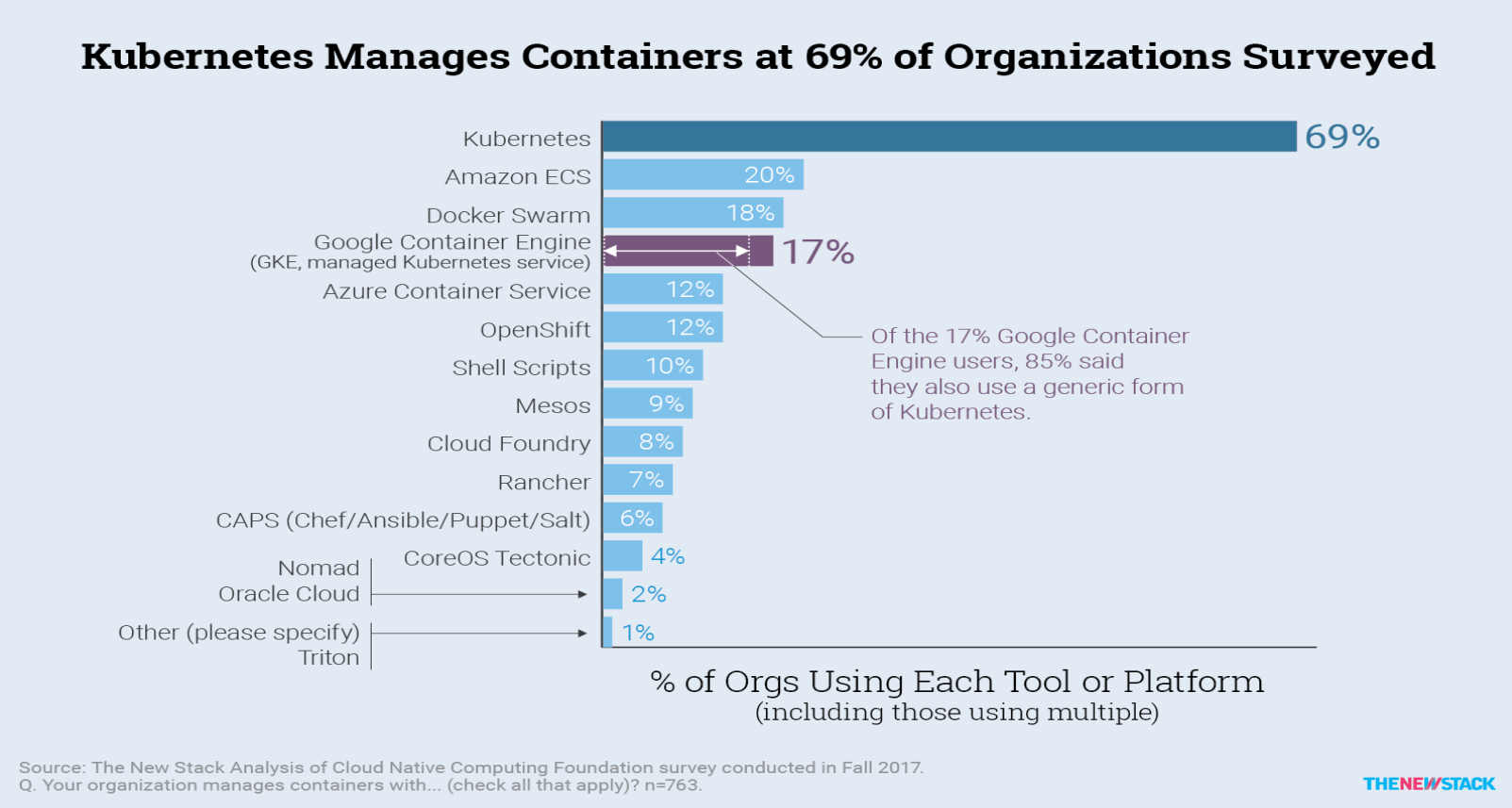
Monitor/health check containers.

What does Kubernetes do?

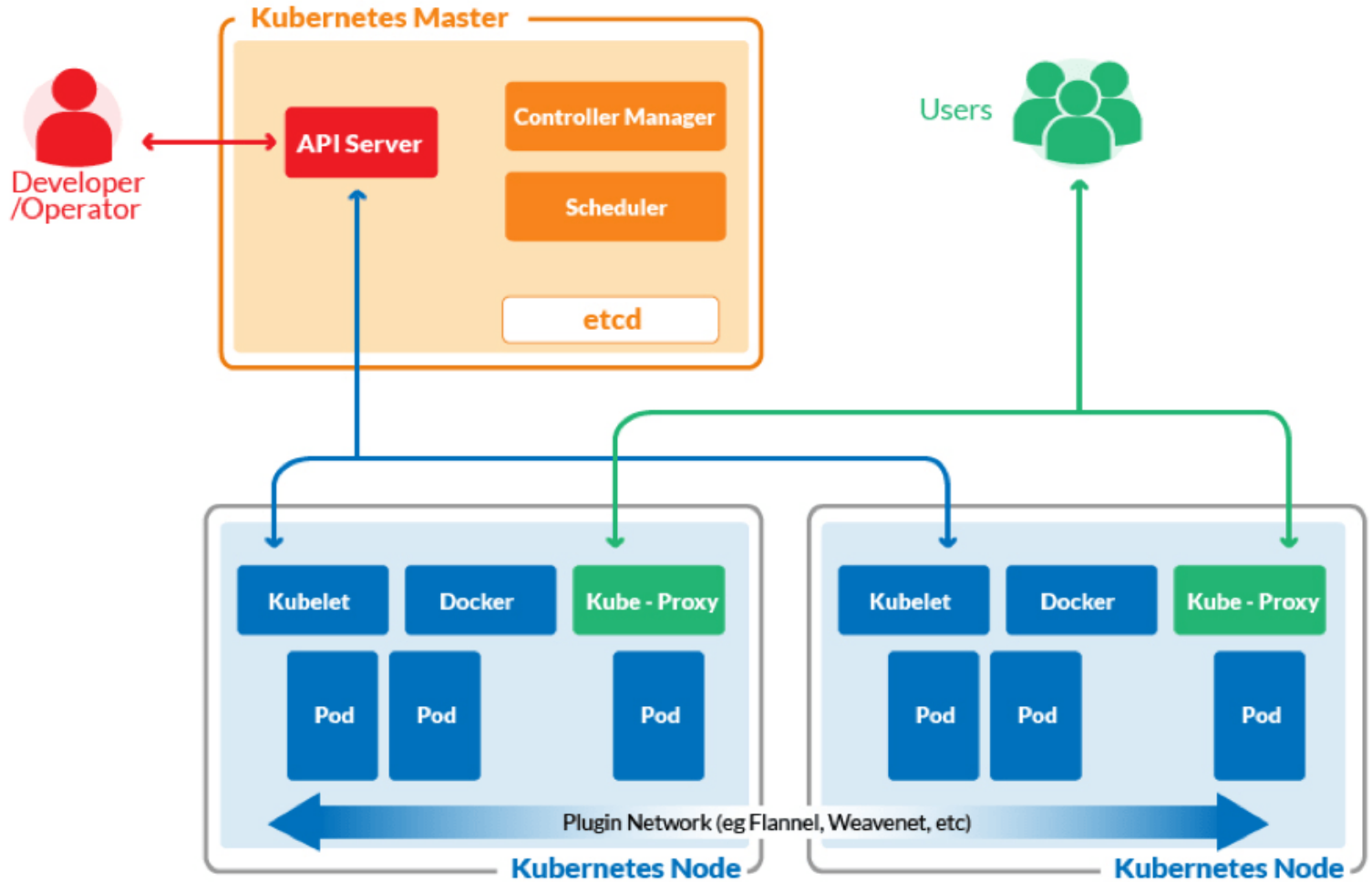
Provide declarative definition for running containers.

Control and automate application deployments and updates.

Is Kubernetes successful in Industry?

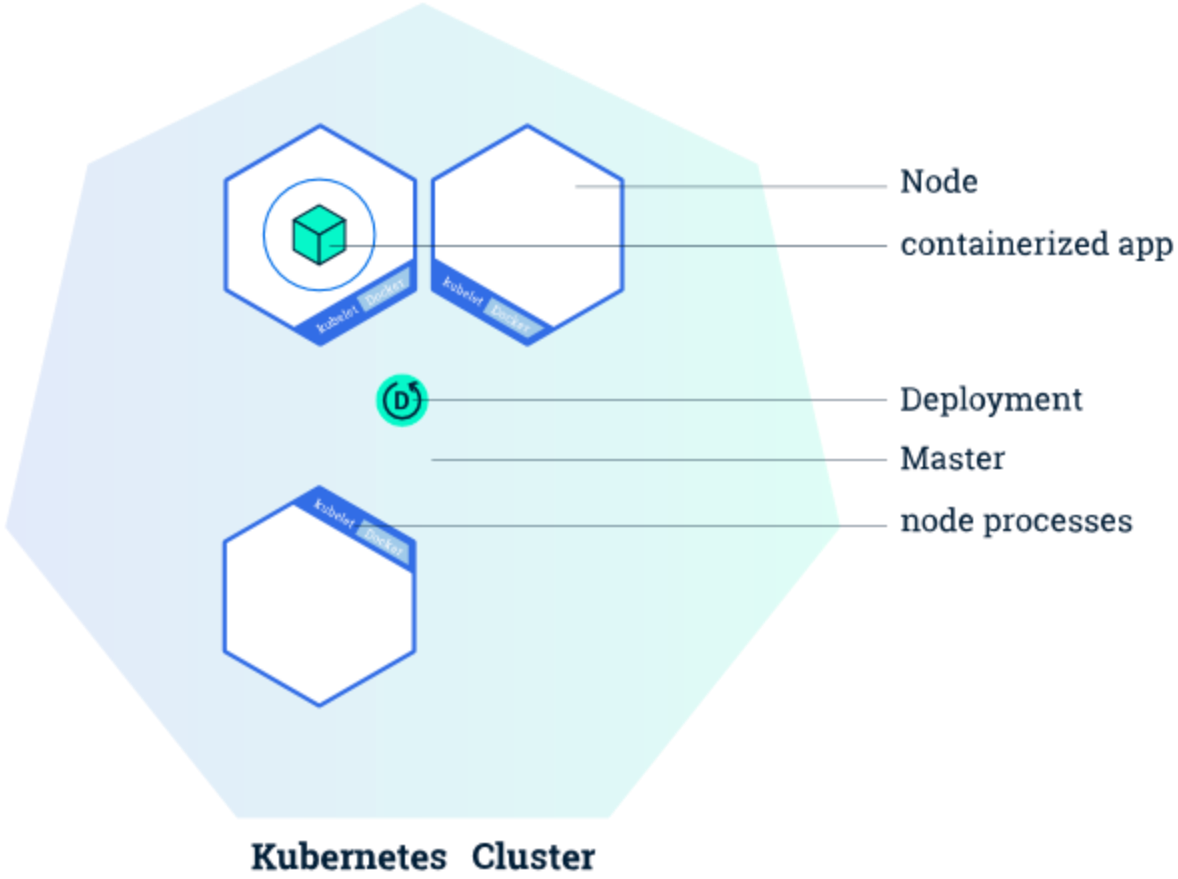


Architecture



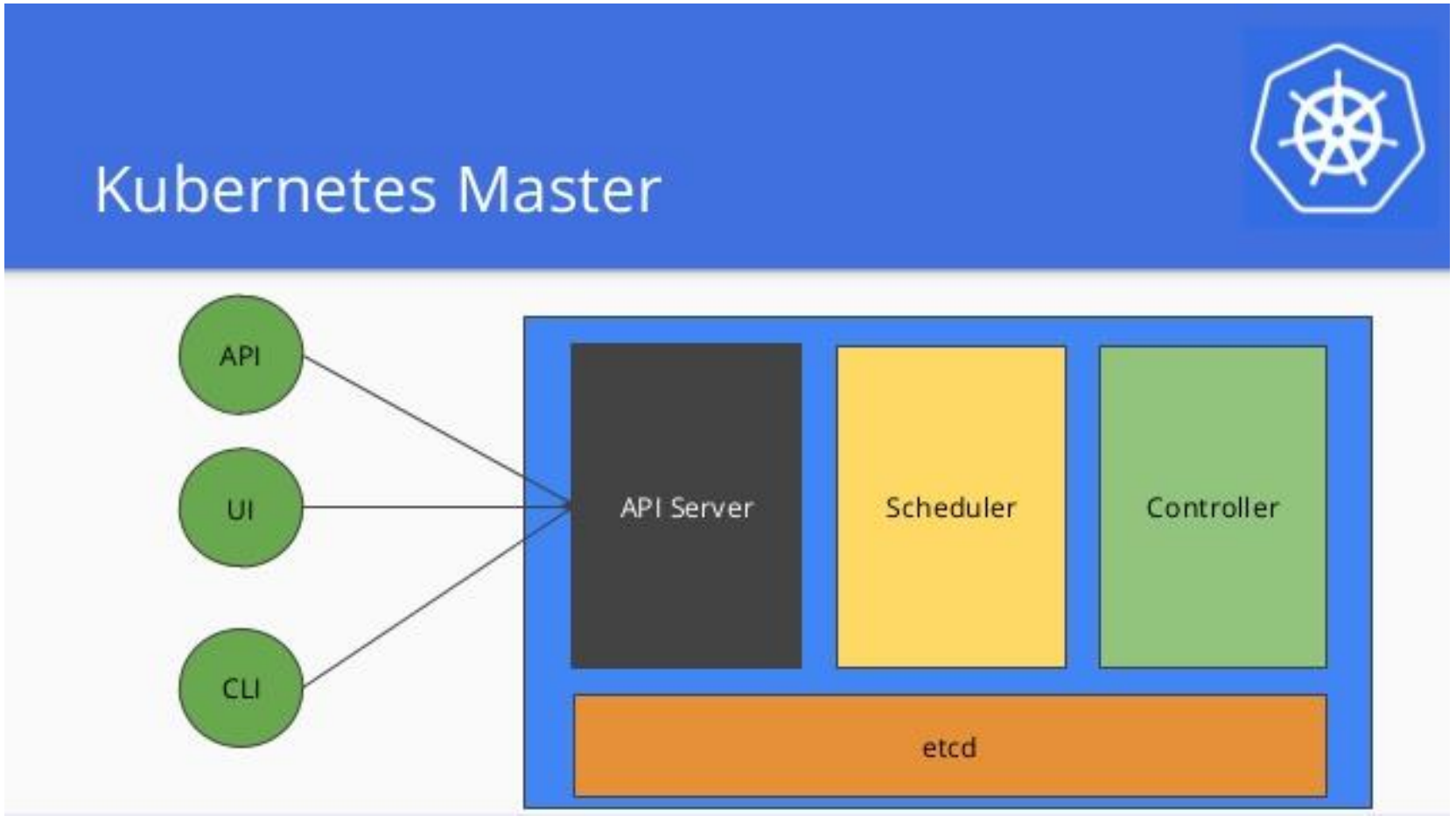
Cluster:

- A ***cluster*** consists of at least one ***cluster master*** and multiple worker machines called ***nodes***.



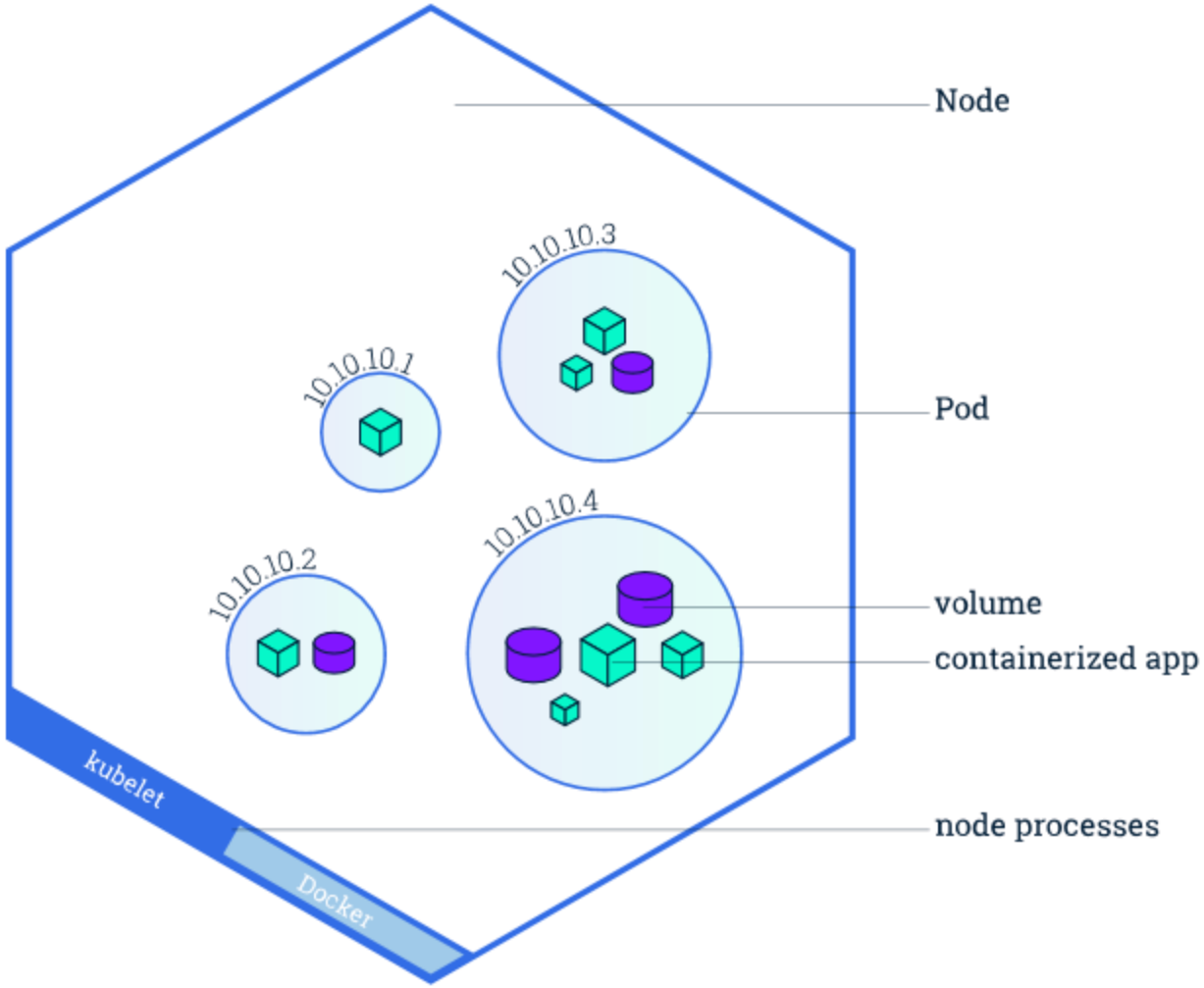
Master node:

- Responsible for maintaining the desired state for your cluster.
- Managing the resources and worker nodes.



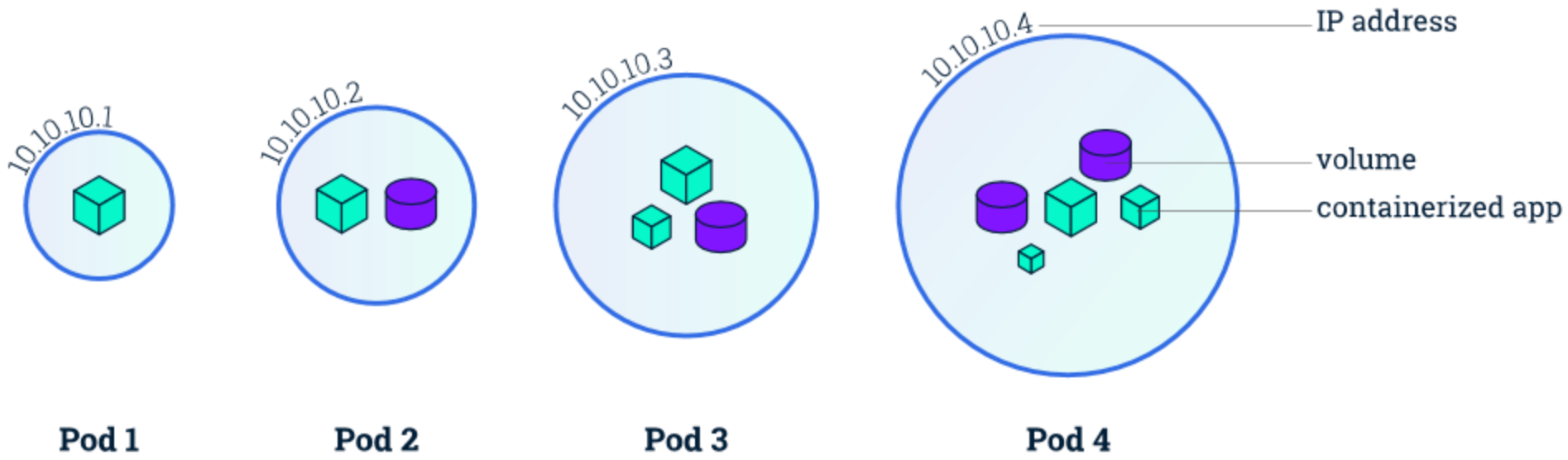
Node:

- A ***node*** is a worker machine in Kubernetes, also known as **minion.**
- Managed by master node.
- Services necessary to run pods.

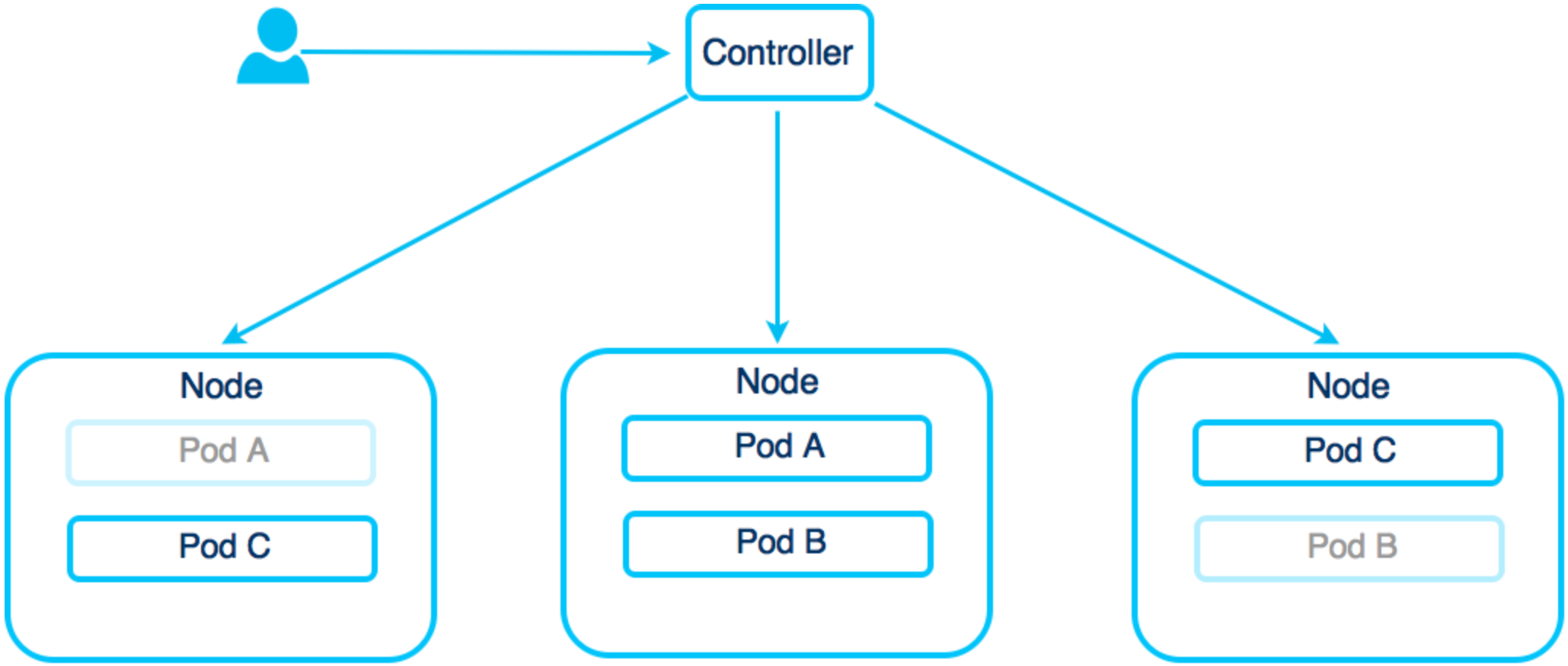


Pod: Basic building block of Kubernetes

- A ***Pod*** is the smallest and simplest unit in the Kubernetes object model that you create or deploy.



Controller



YAML

```yaml
kind: Pod
   metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort:9376
```

```yaml
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
     [...]
```

```yaml
kind: Service
apiVersion: v1
metadata:
  name: web-service
spec:
  selector:
    app: MyWebApp
  ports:
  - protocol: TCP
    port: 80
    targetPort: 9376
```

Use case: ING


kubernetes
CASE STUDY: ING
Driving Banking Innovation with Cloud Native

Use case: adform

Conclusion

- Highly scalable
- Battle tested and proven
- Easy configuration
- De facto standard
- Huge developers' community

References:

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