Kubernetes 101

What I wish I knew as a developer...

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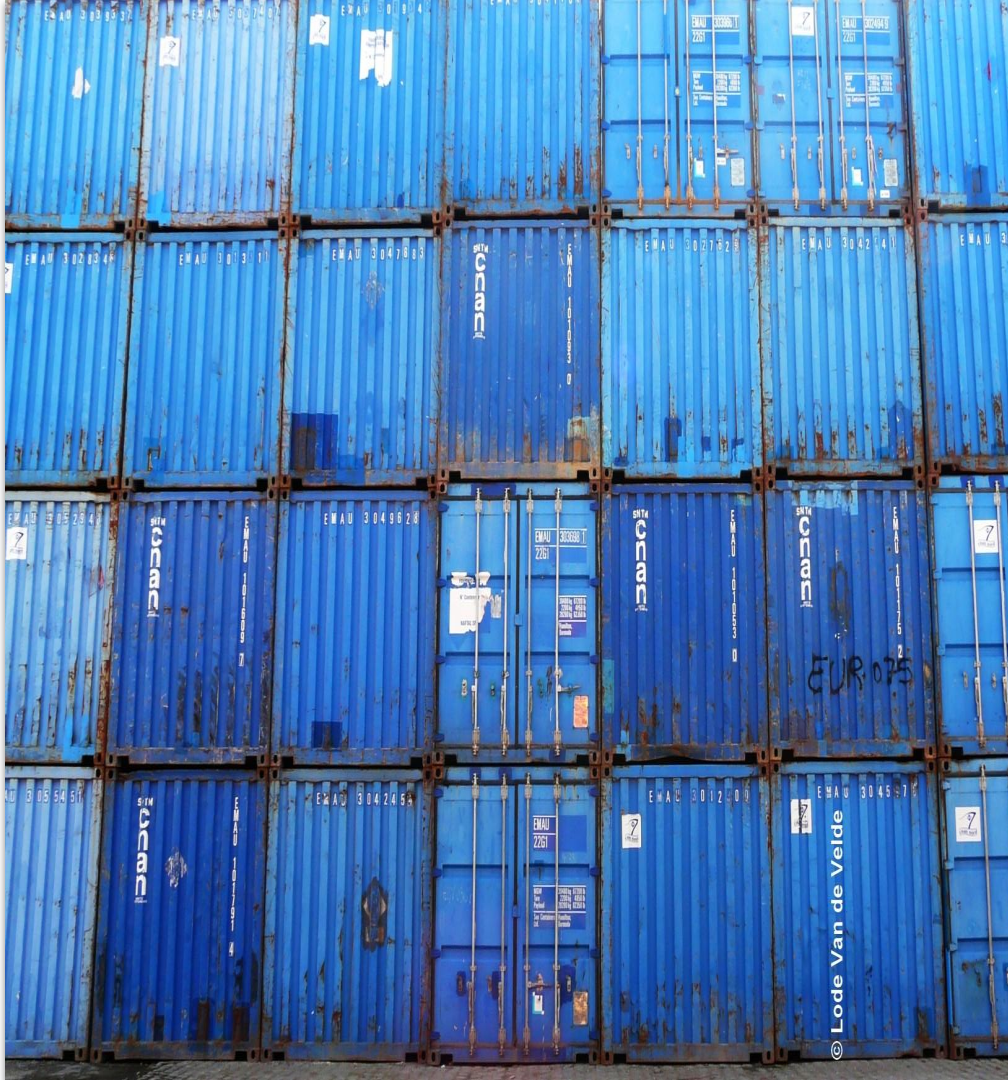
What is Kubernetes (K8)?

The official site says...

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

Understanding the Concept of K8 as an Orchestration System

It automates manual processes when deploying and scaling your containerized applicationsand allows you to manage your applications at scale easier.

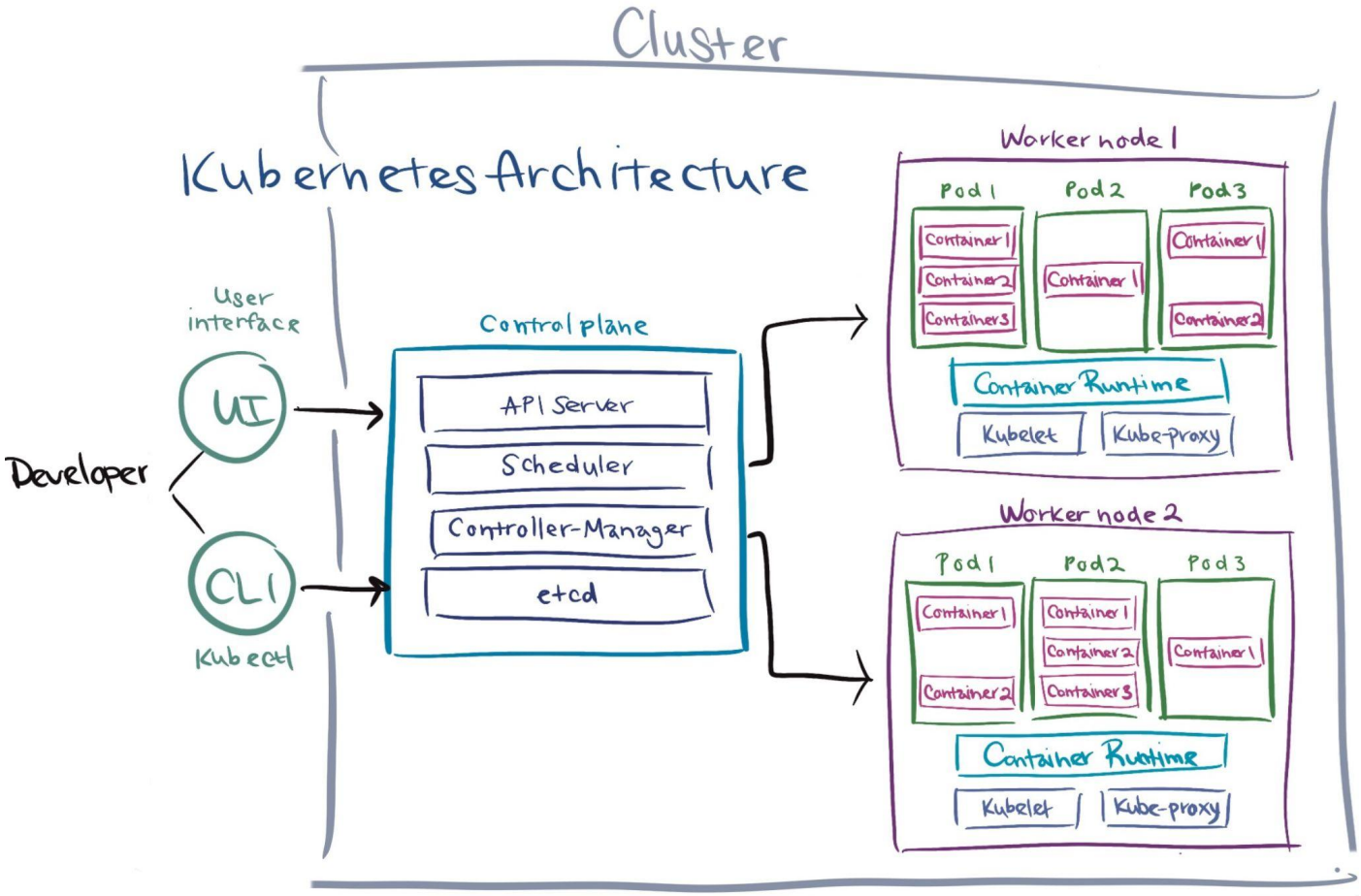


Kubernetes guarantees

Scalability

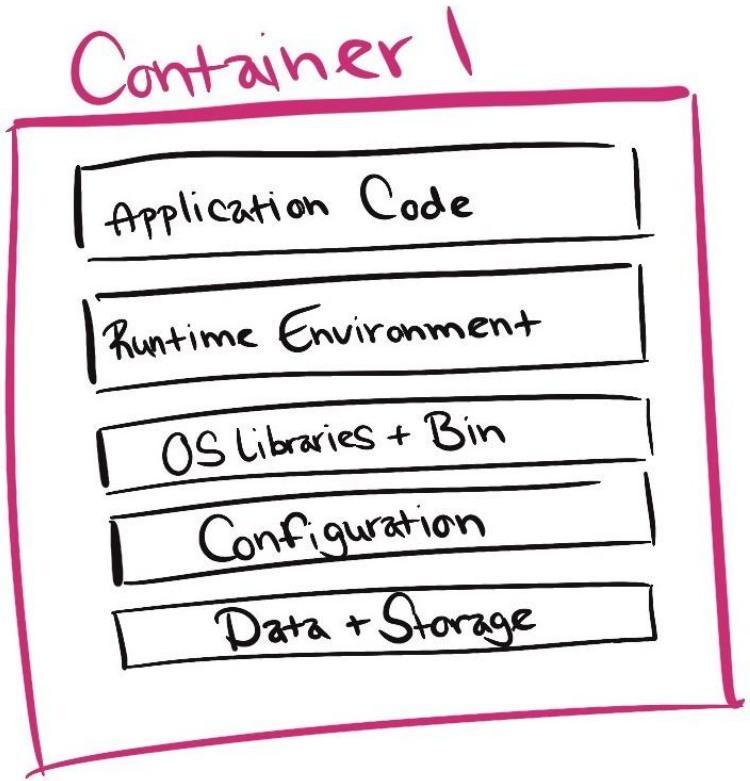
High availability

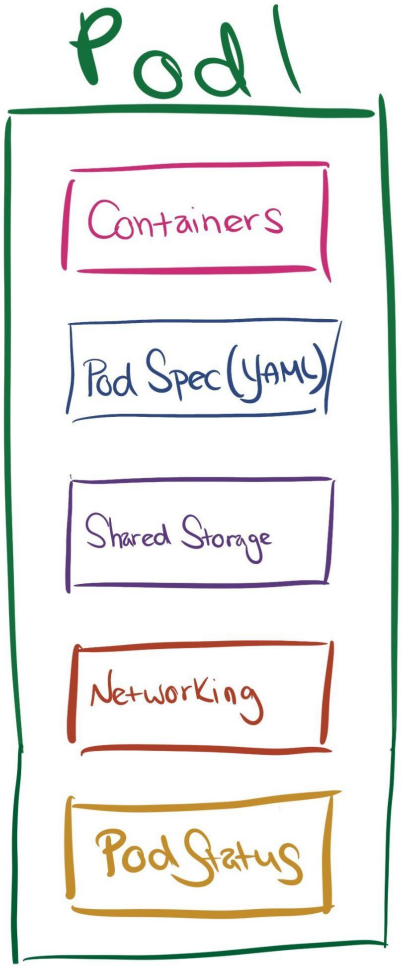
Disaster recovery

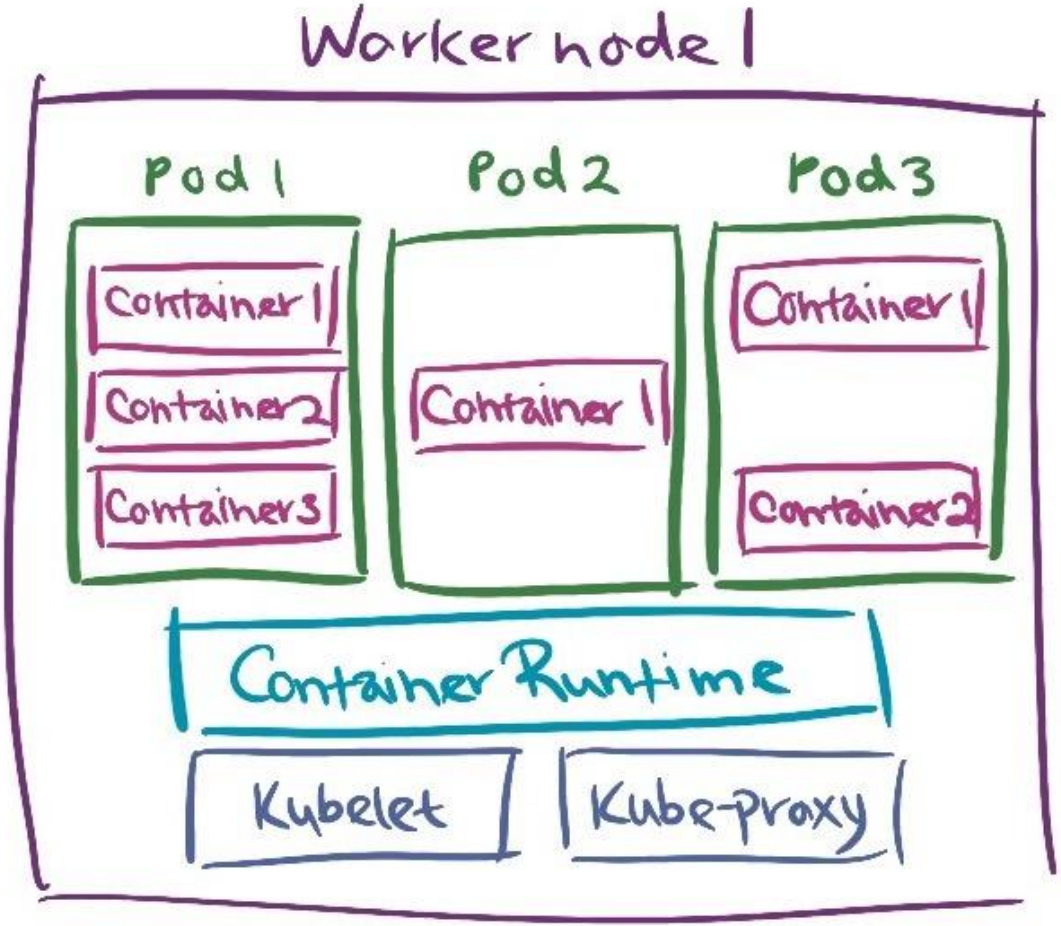

Cluster
Kubernetes Architecture
User interface
UI
Developer
CLI
Kubectl
Control plane
API Server
Scheduler
Controller-Manager
etcd
Worker node 1
Pod 1
Pod 2
Pod 3
Container 1
Container 2
Container 3
Container 1
Container 1
Container 2
Container Runtime
Kubelet
Kube-proxy
Worker node 2
Pod 1
Pod 2
Pod 3
Container 1
Container 2
Container 1
Container 2
Container 3
Container 1
Container Runtime
Kubelet
Kube-proxy

Kubernetes architecture and deployment of containerized applications contain a...

- Cluster
- Pod
- Container
- Node


Container 1
Application Code
Runtime Environment
OS Libraries + Bin
Configuration
Data + Storage


Pod 1
Containers
Pod Spec (YAML)
Shared Storage
Networking
Pod Status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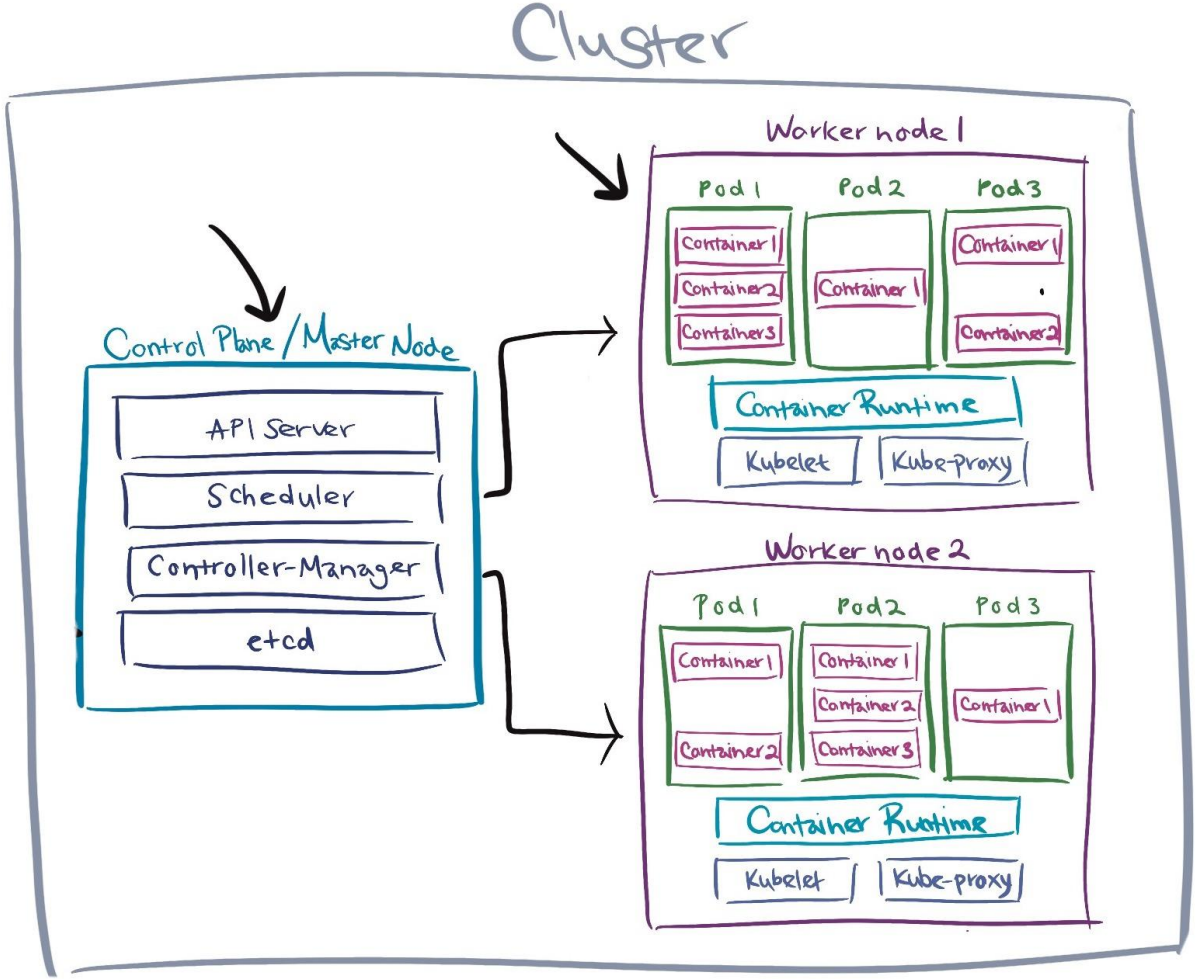
Container Runtime
Kubelet
Kube-proxy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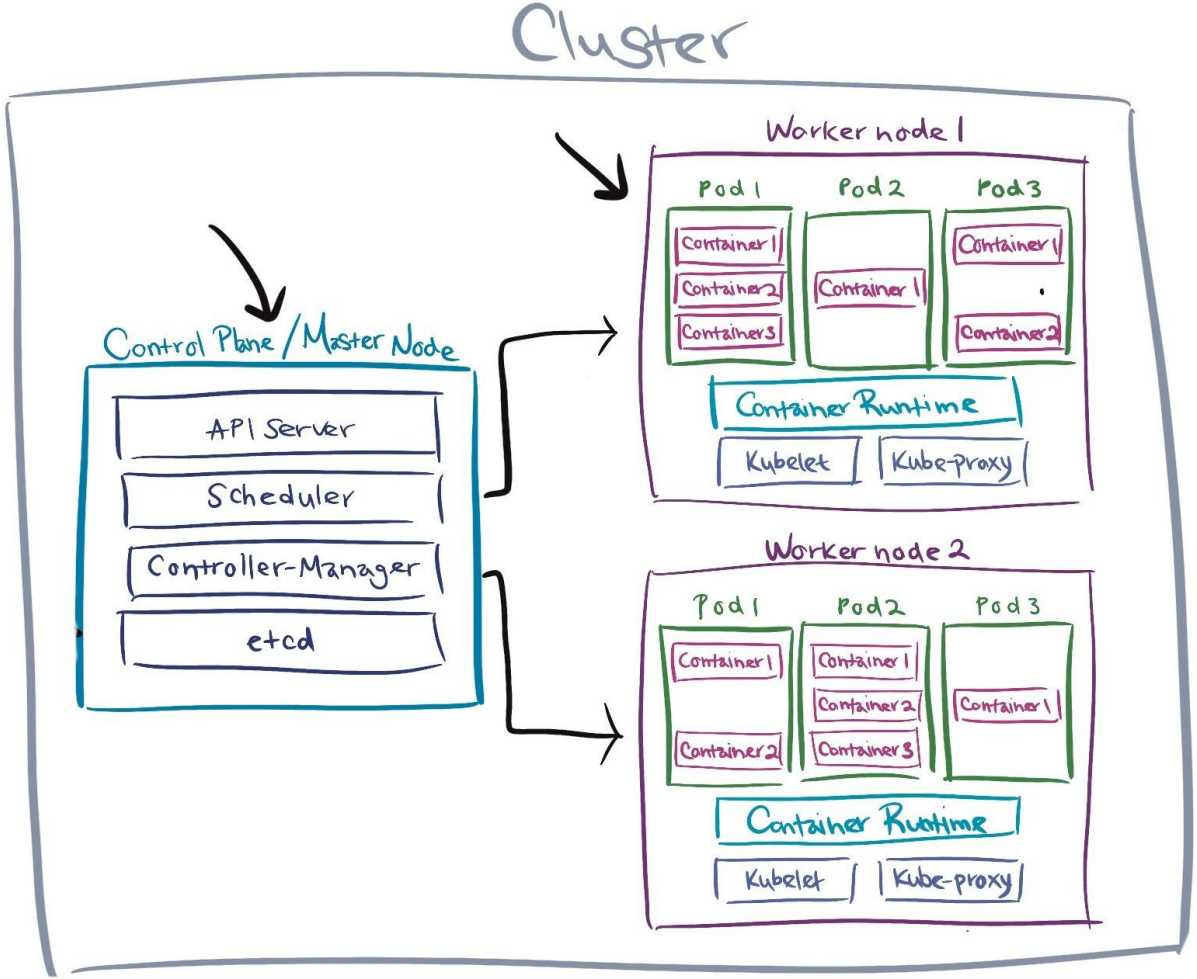
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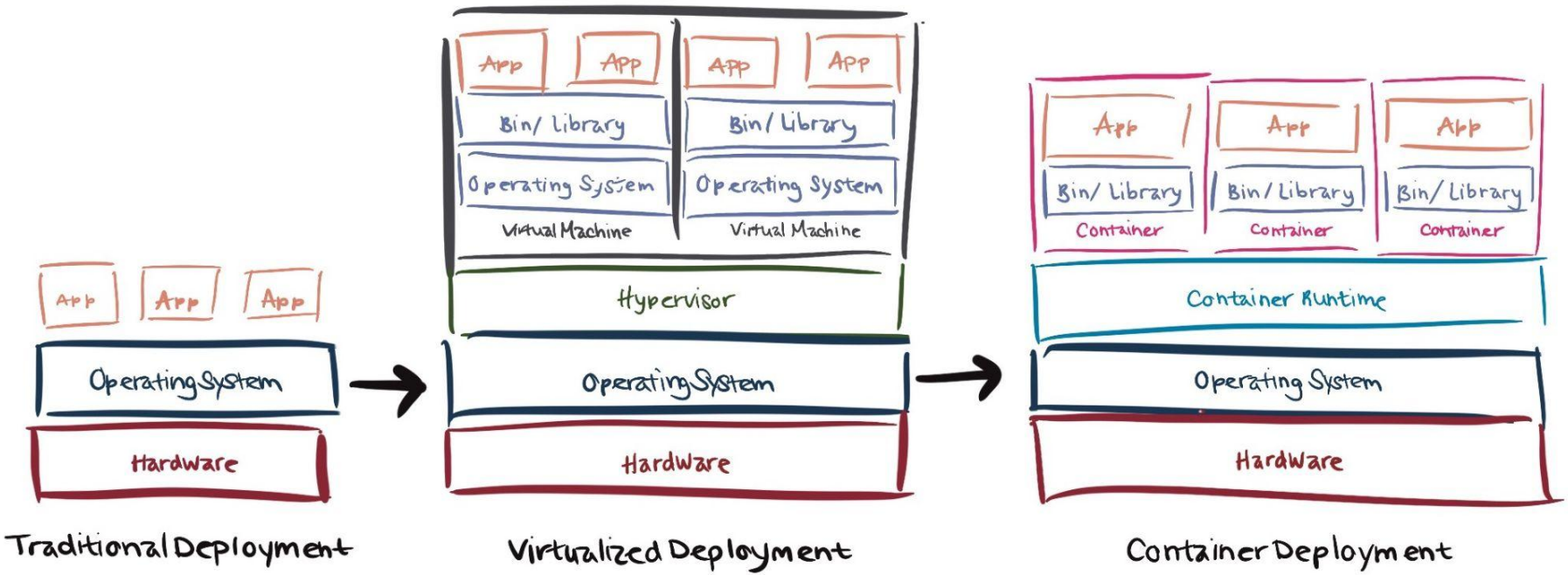
Kubernetes Deployment Object

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-app-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-app
  template:
    metadata:
      labels:
        app: my-app
    spec:
      containers:
      - name: my-app-container
        image: my-app-image:latest
        ports:
        - containerPort: 8080
        env:
        - name: DB_HOST
          value: my-db-host
```

Other Kubernetes Objects

Kubernetes has several types of objects that can be used to define and manage an application lifecycle in a cluster. Some of the most commonly used objects include:

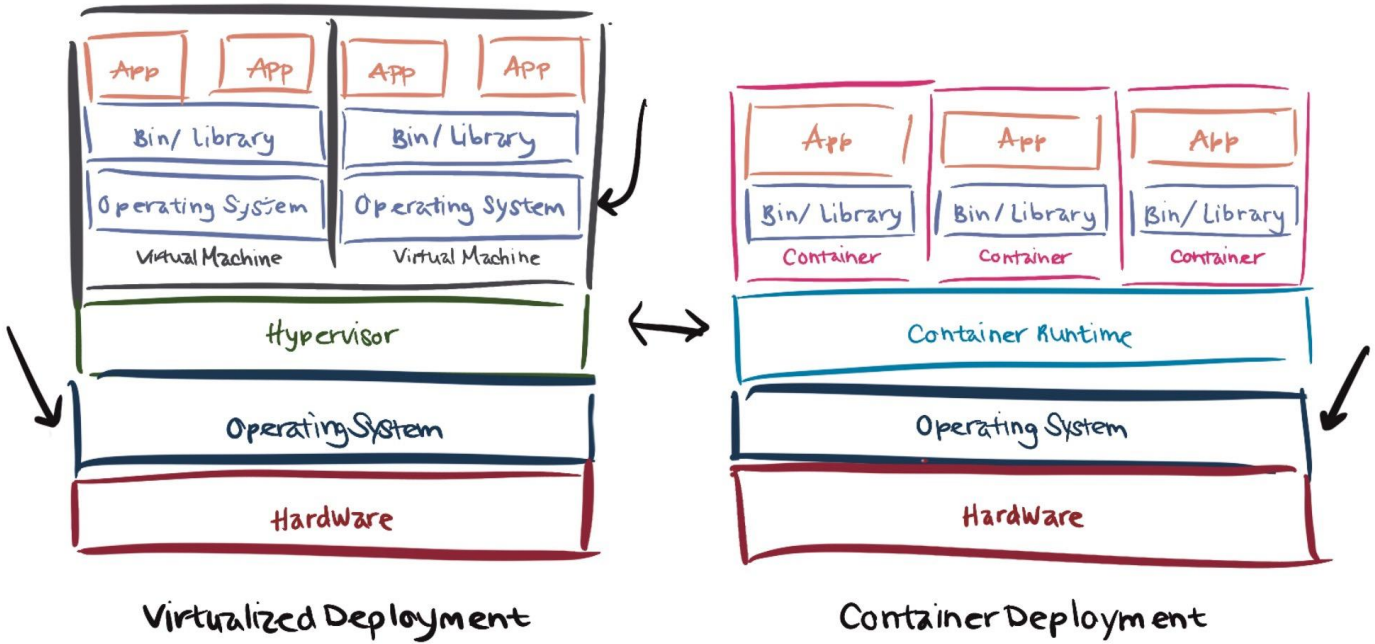
- Pod
- ReplicaSet
- Deployment
- Service
- Ingress
- ConfigMap
- StatefulSet
- DaemonSet
- Job and CronJob


App
App
App
Operating System
Hardware
Traditional Deployment
App
App
App
App
Bin/ Library
Bin/ Library
Operating System
Operating System
Virtual Machine
Virtual Machine
Hypervisor
Operating System
Hardware
Virtualized Deployment
App
App
App
Bin/ Library
Bin/ Library
Bin/ Library
Container
Container
Container
Container Runtime
Operating System
Hardware
Container Deployment

Common misconception by devs:

Are containers mini VMs?

VM vs. Container



What if you're brand new to Kubernetes

Resources!

- Kubernetes 101 workshop by Kubesimplify, aka Saiyam Pathak
- Linux and Docker Fundamentals by Kubesimplify, aka Saiyam Pathak
- DevOps Toolkit by Viktor Farcic
- KBE, Kube by Example
- Learnk8s
- 100 Days of Kubernetes
- vEducate, Kubernetes by Dean Lewis
- Production Kubernetes
- Cloud Native Podcast by Saim Safdar
- Understanding Kubernetes in a visual way by Aurélie Vache
- Cloud Native Computing Foundation
- Kopf: Kubernetes Operators Framework
- 100 Days of Kubernetes by Anais Urlichs
- Bash for Programmers
- Linux Command Line Basics
- DevOps Bootcamp: Learn Linux & Become a Linux Sysadmin