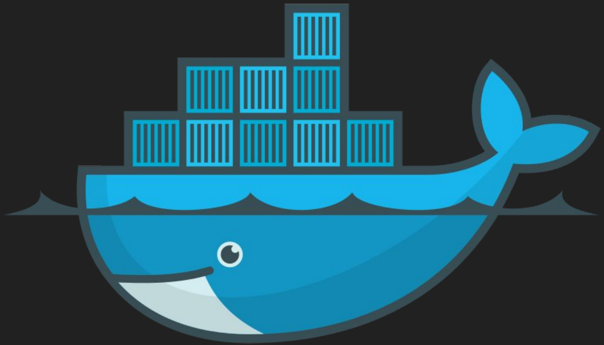


# Docker

## The Big Picture

# Agenda

- What is docker
- Why is it so popular?
- Docker Vs Virtual Machines
- Docker Architecture
- Docker Desktop

# Docker - What & Why

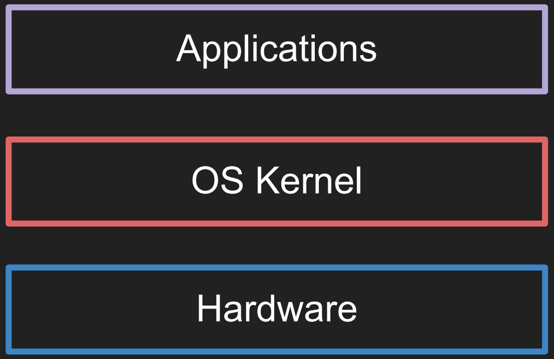
What is docker?

- Docker is an open source, virtualization tool
- Open platform for developing, shipping & running applications
- Build once, deploy everywhere

Why is docker popular?

- Evolution of Microservices
- Cloud Native approach
- Multi Cloud Strategies

# OS Layers



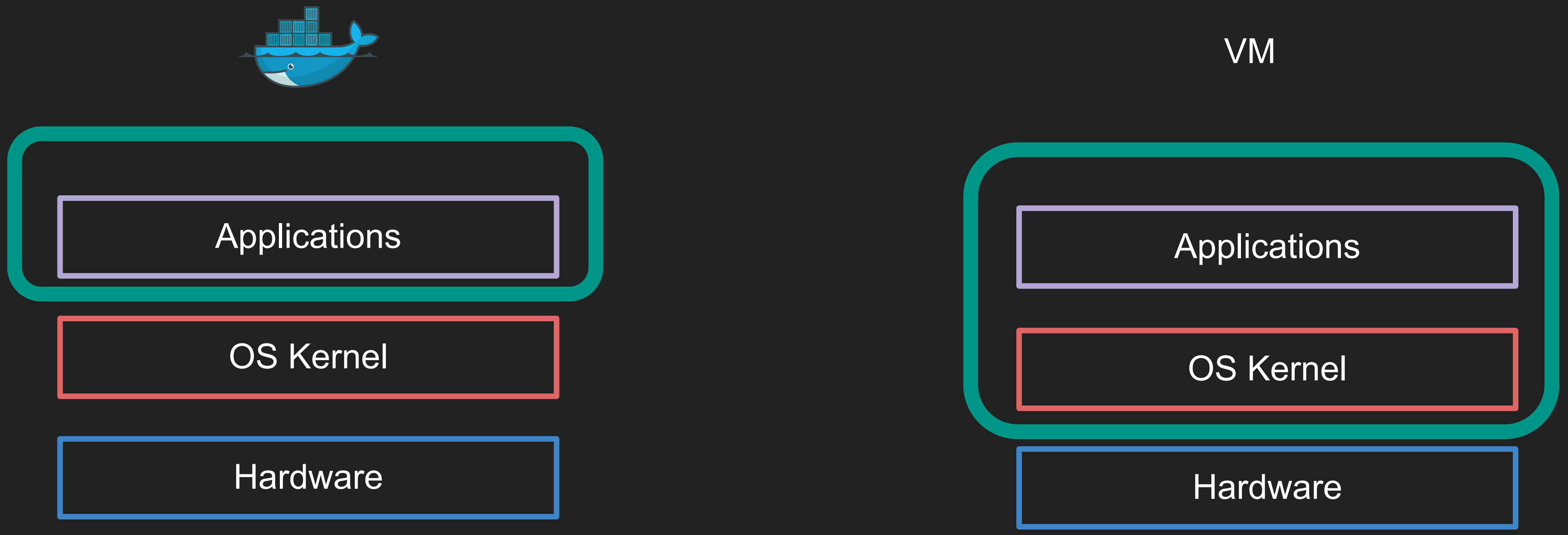
Applications

OS Kernel

Hardware

Windows or Linux or Mac

# Docker Vs VM



Applications

OS Kernel

Hardware

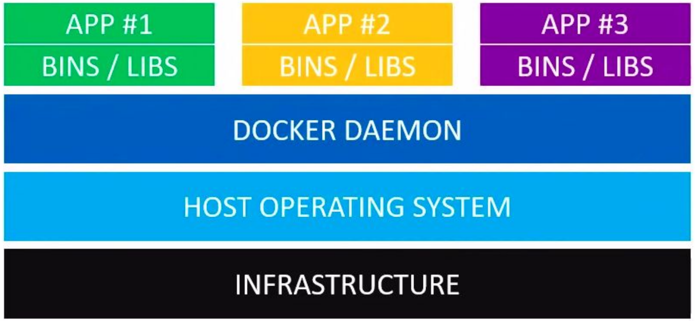
VM

Applications

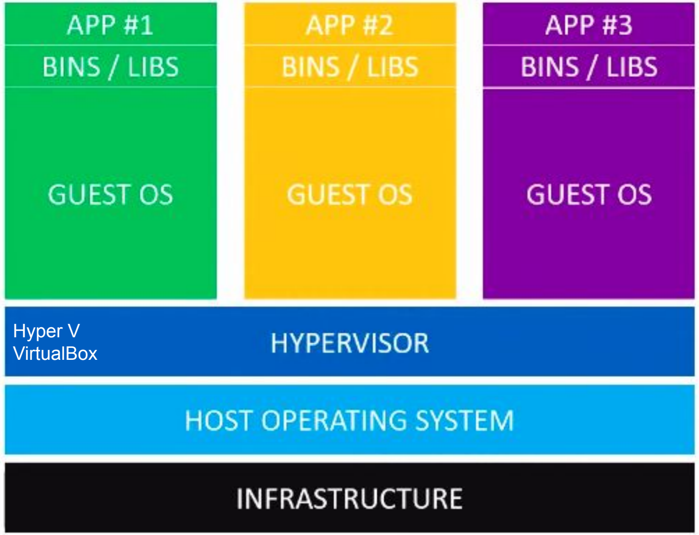
OS Kernel

Hardware

# Docker Vs VM



Docker Containers

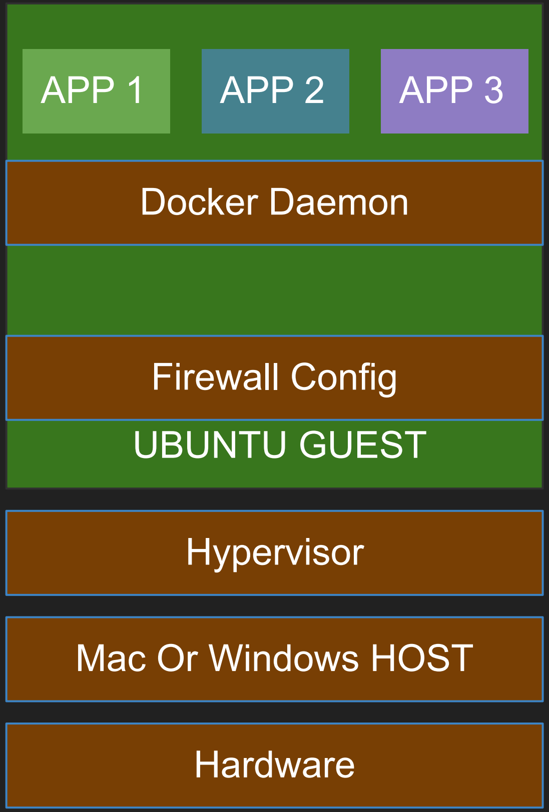


Virtual Machines

# Docker Vs VM

| | Docker | VM |
|---|---|---|
| Image Size | Much smaller (MB) | Bigger (GB) |
| Speed | Much Faster | Slower |
| Compatibility | Not possible | Any OS can run on any OS Host |
| Resource Usage (CPU, Storage, Memory) | Less | More |
| Isolates | Applications | Systems |

# We still need VMs…



APP 1

APP 2

APP 3

Docker Daemon

Firewall Config

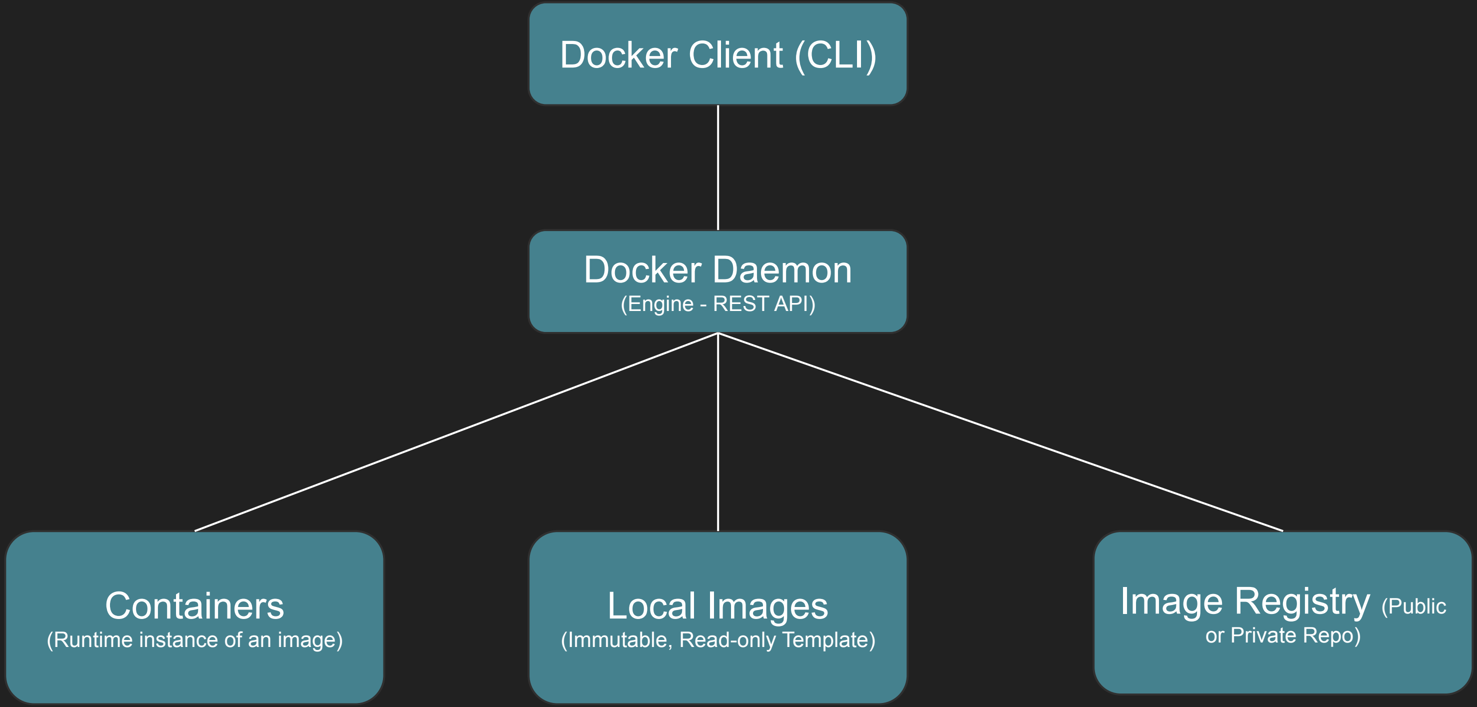
UBUNTU GUEST

Hypervisor

Mac Or Windows HOST

Hardware

# Docker Architecture



Docker Client (CLI)

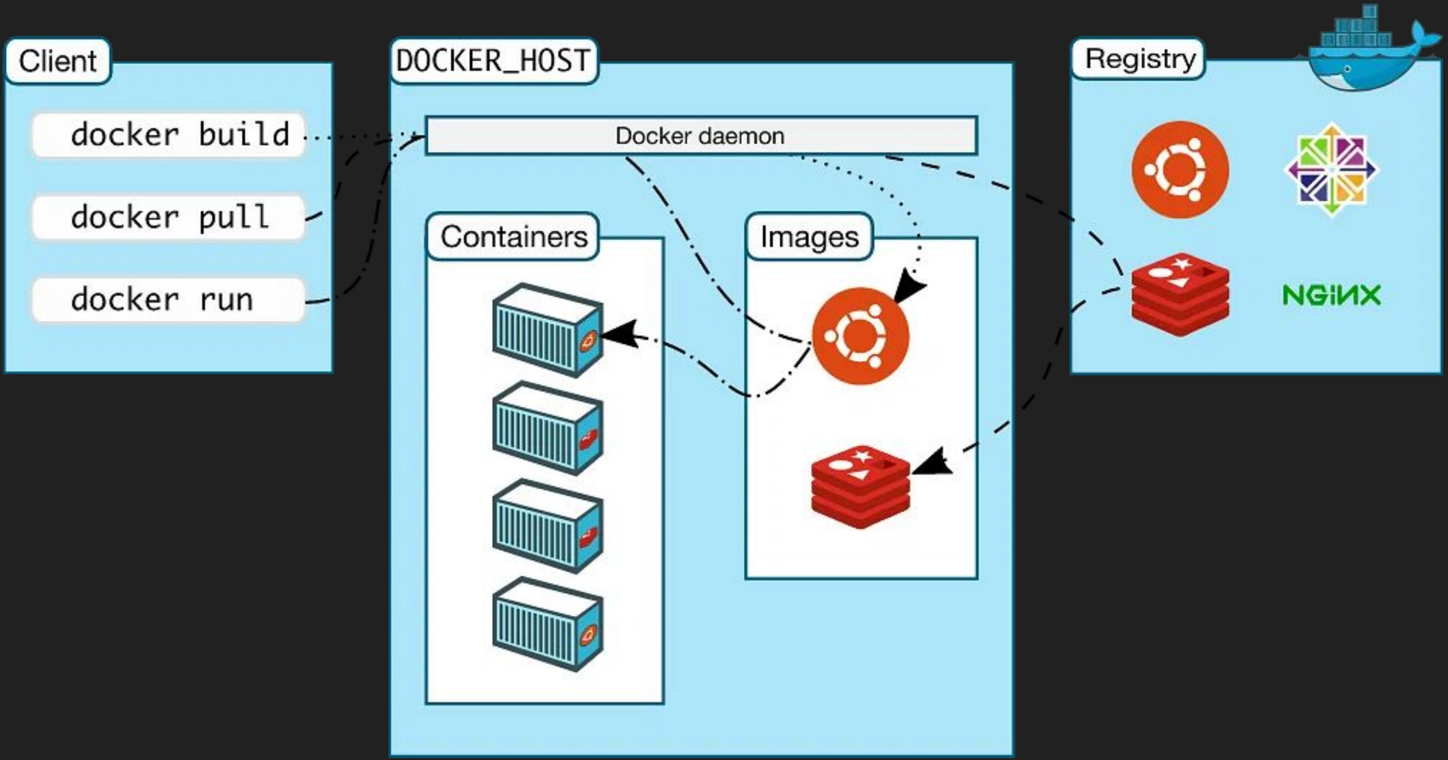
Docker Daemon
(Engine - REST API)

Containers
(Runtime instance of an image)

Local Images
(Immutable, Read-only Template)

Image Registry (Public or Private Repo)

# Docker Architecture



# Getting Started

- Install Docker CLI (linux)
- Install Docker Desktop
    - Community Edition - Free for personal use, start ups and open source contributions
    - Enterprise Edition - For Offices > 250+ employees
        - Unlimited repositories / data center
        - Vulnerability scanning
        - Official same day support

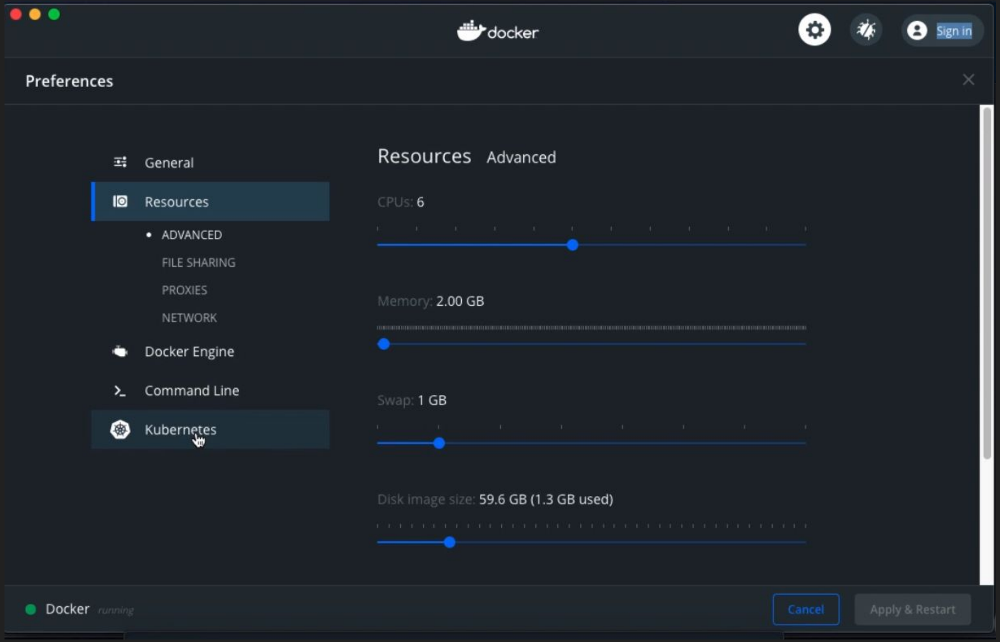
# Docker Desktop

Windows 10 (or later), 64 bit

Mac - 11 or newer (intel), latest with Apple Chip

Docker Desktop for windows - Develop Windows & Linux Apps

Docker Desktop for mac - Develop only linux apps



CPUs: 6

Memory: 2.00 GB

Swap: 1 GB

Disk image size: 59.6 GB (1.3 GB used)

# Docker Engine Vs Docker Desktop

| | | |
|---|---|---|
| CLI for managing container lifecycle | ✅ | ✅ |
| OCI Compatible container runtime | ✅ | ✅ |
| Integrated Kubernetes Runtime & Load Balancer | ❌ | ✅ |
| Integration with any WSL2 / Linux Distro | ❌ | ✅ |
| Automated Security Patches & Vulnerability Scanning | ❌ | ✅ |
| All Dev Tools - Build, Compose, K8 - in one click | ❌ | ✅ |
| VPN Integration | ❌ | ✅ |

# Docker Commands

```
docker –version

docker pull <image_name>

docker run rancher/hello-world

docker images

docker image inspect <image_name>

docker container ls

docker container rm <container_name>

docker run –name <name> <image_name>

docker logs -f <container_id>
```

Reference ::

Project: https://github.com/in28minutes/devops-master-class/tree/master/projects

Image: https://hub.docker.com/r/in28min/hello-world-nodejs/tags

# Dockerfile

```
FROM python:alpine3.10

WORKDIR /app

COPY .  /app

RUN pip install -r requirements.txt

EXPOSE 5000

CMD python ./launch.py
```

```
FROM node:8.16.1_alpine

WORKDIR /app

COPY .  /app

RUN npm install

EXPOSE 5000

CMD node index.js
```

# Building & Pushing an image

```
// Creates a local image

docker build -t msd/hello-python .

// Login to docker

docker login -u msd

// Push an image to public repository

docker push msd/hello-python
```

# Advanced Topics

- Layer Caching
- Volume & Data Management
- Managing Networks
- Docker Compose
- Docker Swarm
- Container Orchestration K8 (scaling , load balancing, monitoring)

# To explore more…

- Best Course: in28minutes
    - https://www.udemy.com/course/devops-with-docker-kubernetes-and-azure-devops/
- Best Author:
    - https://app.pluralsight.com/profile/author/nigel-poulton
- Best Practices:
    - https://docs.docker.com/develop/develop-images/dockerfile_best-practices/