
Docker
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Outline

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- Starting to Use Docker
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Introduction

Docker is an open platform for developing, shipping, and running applications.

Docker enables developers to separate the applications from the infrastructure and setup a clean environment for it.

Container vs. VM

Docker use a technology called *container* to separate the applications from the infrastructure

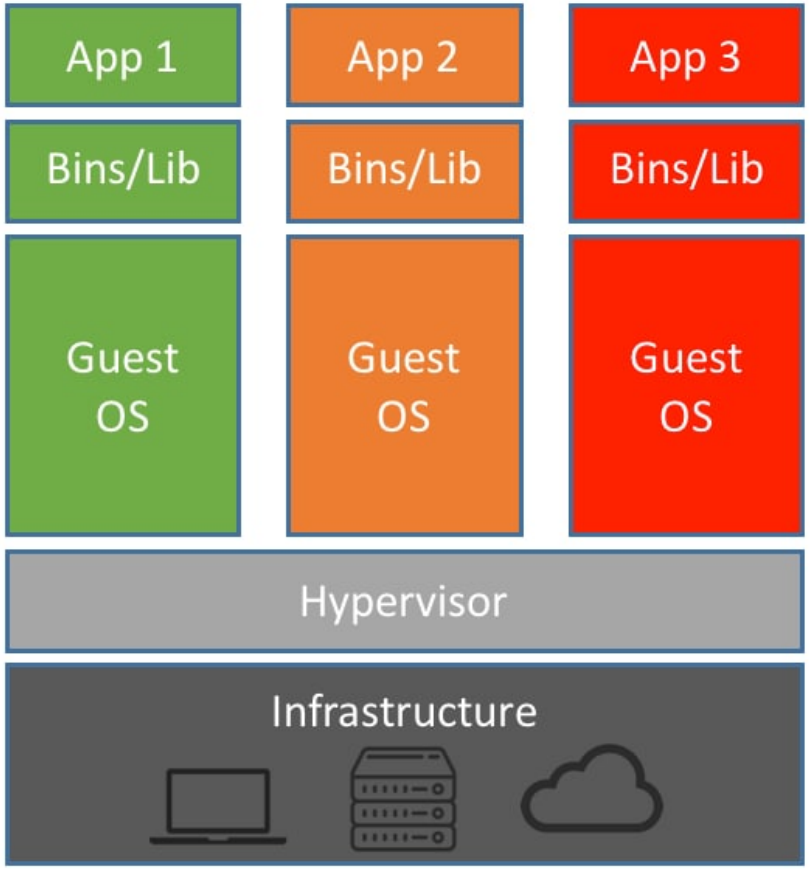
Besides, VM can also do it

Container vs. VM

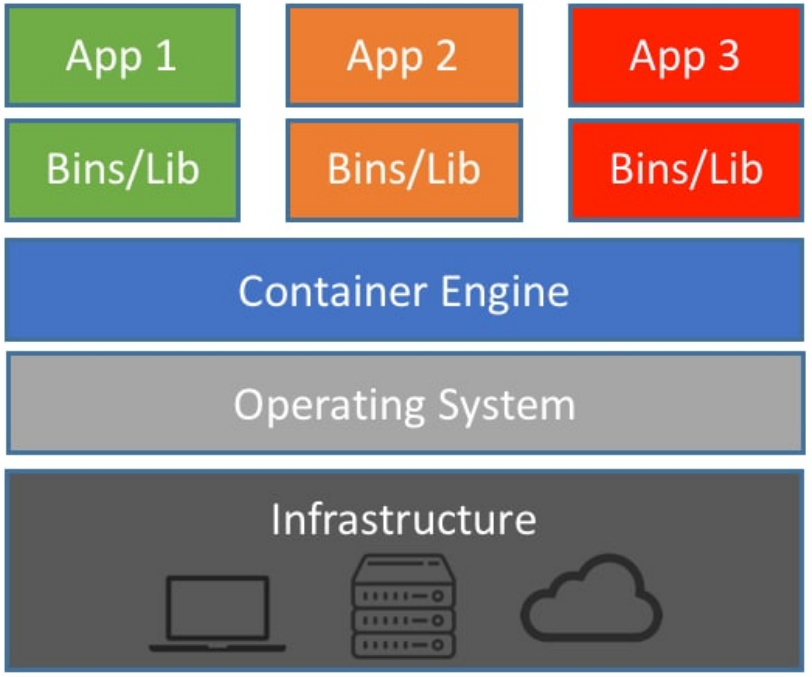
They are different

- VM has independent environment
- Container is faster and more lightweight
- VM is safer
- Container is reusable

Container vs. VM



Machine Virtualization



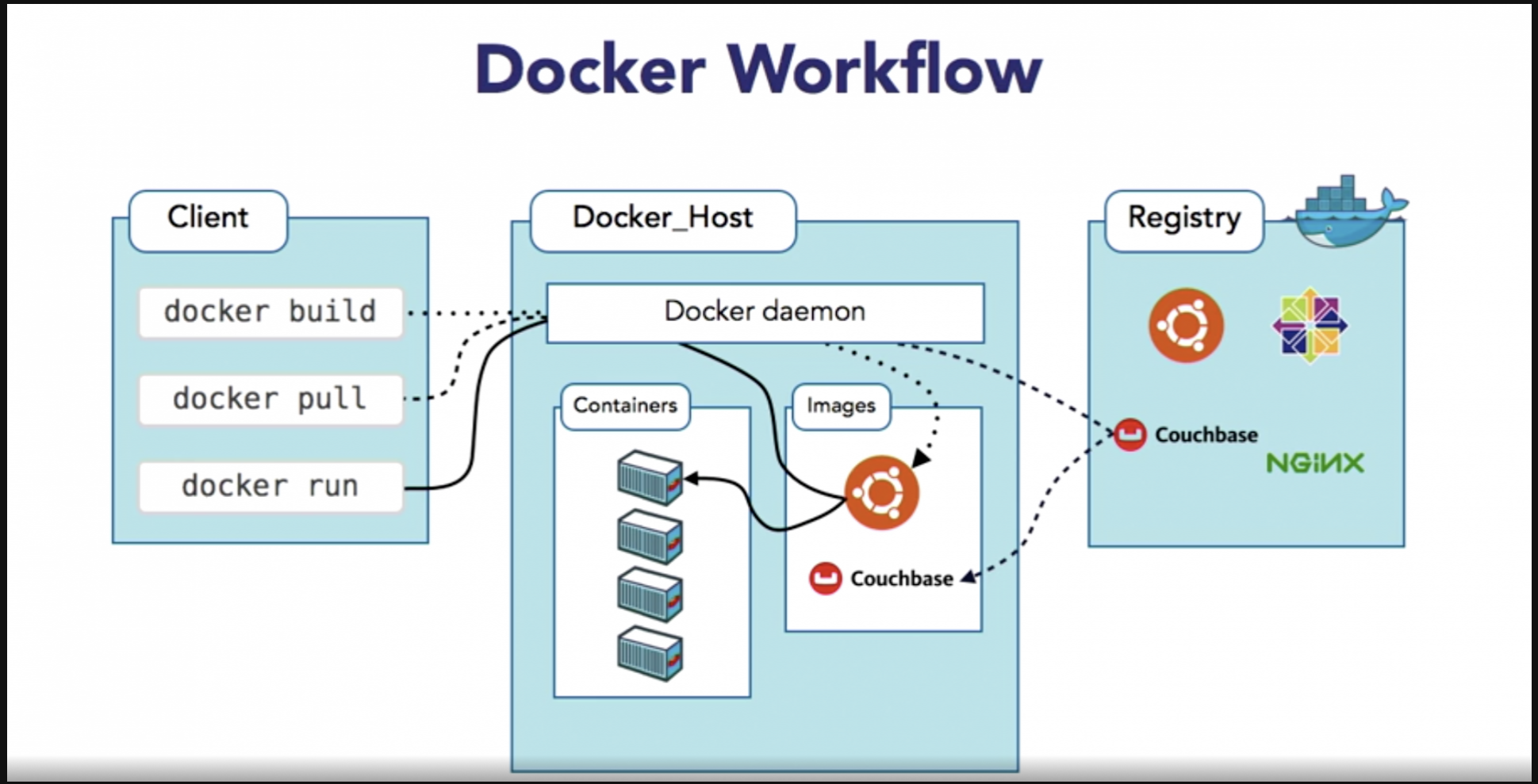
Containers

How It Works

We need an *image* to create container, it is a template containing the library, config, ...

DockerHub plays the role like GitHub

How It Works


Docker Workflow
Client
docker build
docker pull
docker run
Docker_Host
Docker daemon
Containers
Images
Couchbase
Registry
Couchbase
NGINX

Starting to Use Docker

- `docker run`
- `docker start/restart/stop/rm`
- `docker ps`
- `docker logs`
- `docker exec`
  - `docker exec -it [name] bash`

Starting to Use Docker

Sometimes the image itself is too simple, and we can customize images with `Dockerfile`

Starting to Use Docker

Here is an example

```
FROM python:3.9.5
WORKDIR /code
ENV ENVIRONEMENT="PRODUCTION"
COPY . /code
RUN chmod +x /code/docker-entrypoint.sh \
    && apt update \
    && apt upgrade -y \
    && apt install -y --no-install-recommends gcc default-mysql-c
    && apt clean \
    && python3 -m pip install -r requirements.txt \
    && python3 -m pip cache purge
CMD /usr/local/bin/python3 -m gunicorn -b 0.0.0.0:5000 manage:app
EXPOSE 5000
```

Starting to Use Docker

`Dockerfile` itself is dead, while container is alive

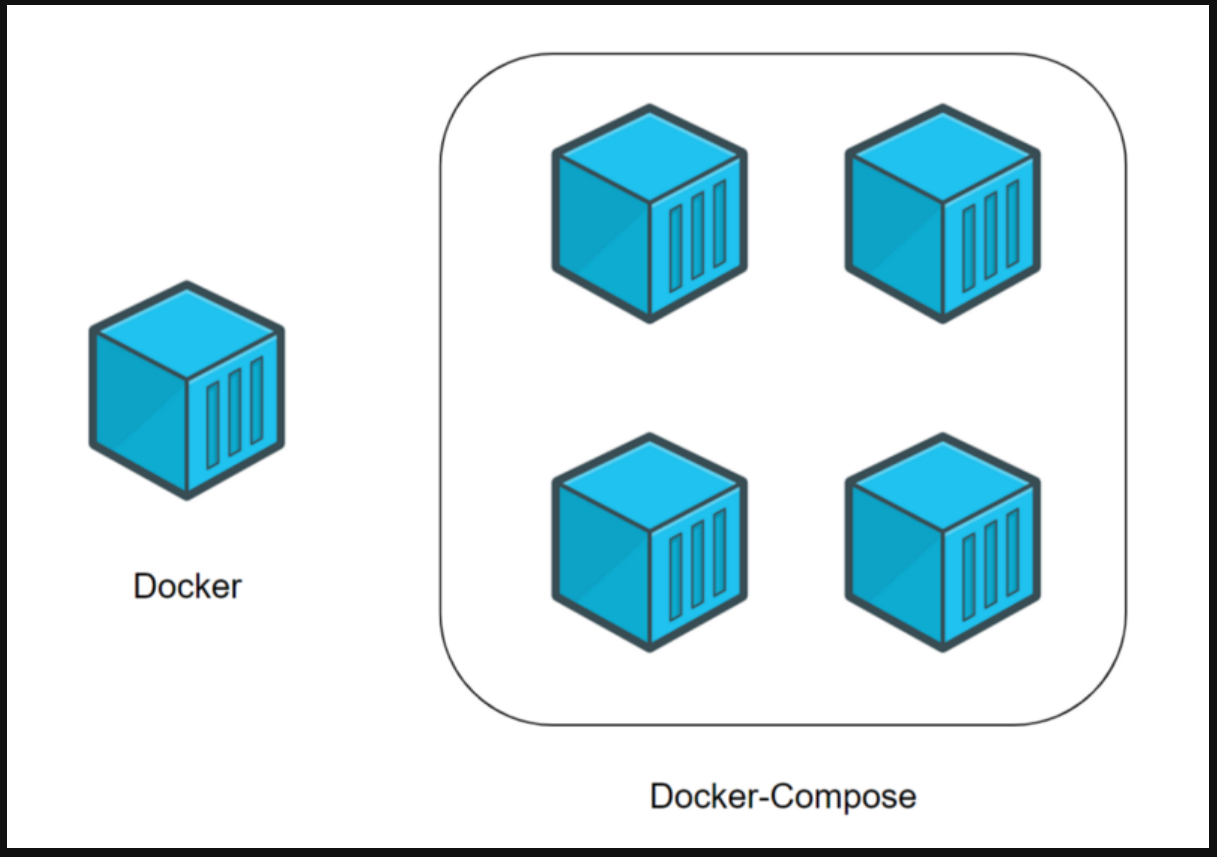
We can use `docker build` to build our `Dockerfile`, and we can use `docker run` to run it

Starting to Use Docker - Docker Compose

Sometimes we need to connect multiple containers and make them work together

We can use `docker-compose`

Starting to Use Docker - Docker Compose



Starting to Use Docker - Docker Compose

```
version: '2'

services:
  web:
    build: ./src
    container_name: web
    restart: on-failure
    environment:
      - ENV=production
    volumes:
      - ./data/log:/code/log
    networks:
      - net
  nginx:
    image: nginx
    container_name: nginx
```

Starting to Use Docker - Docker Compose

After creating `docker-compose.yaml`, we can use

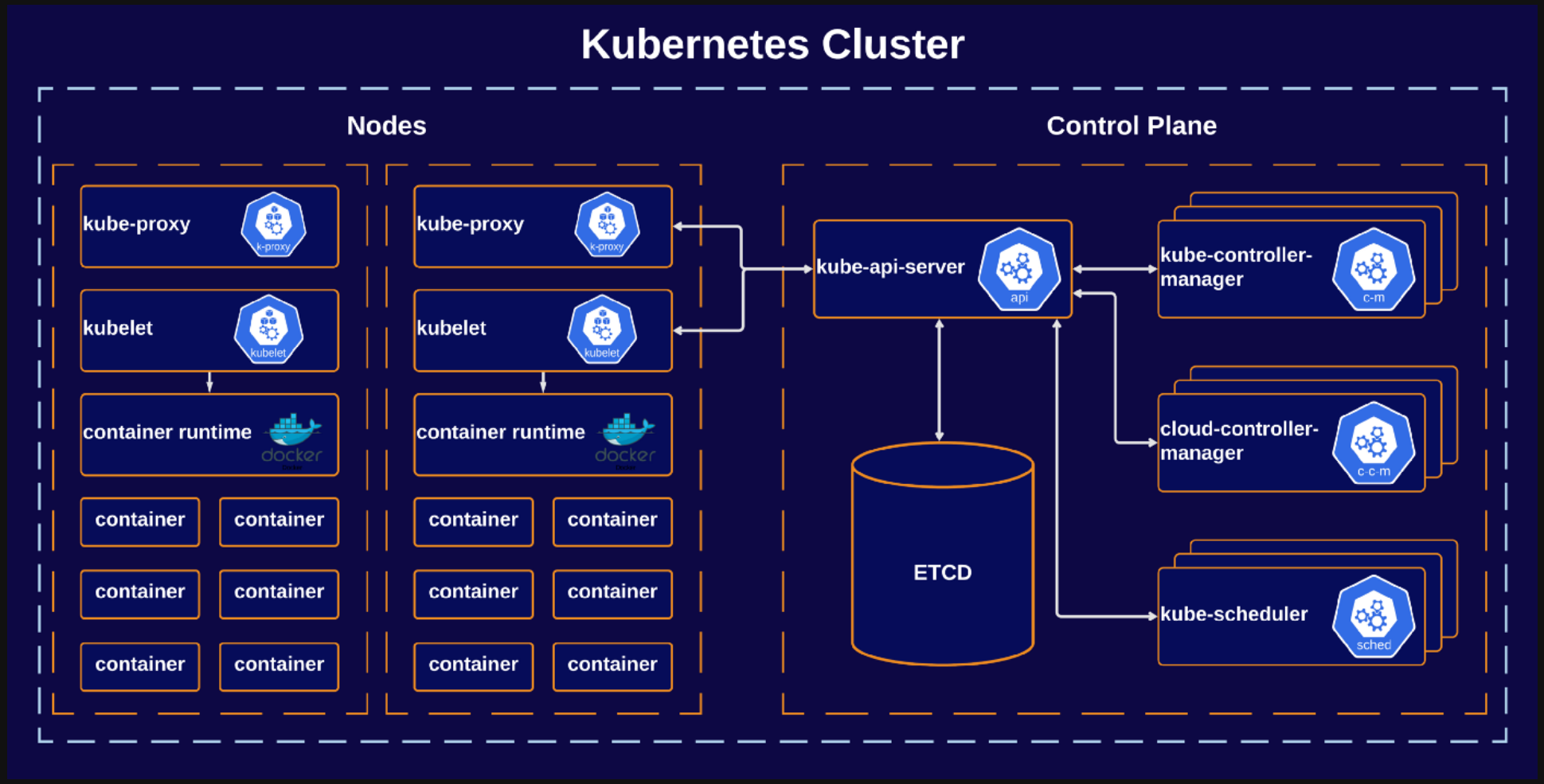
- `docker-compose up -d` to create containers, networks, volumes, etc.
- `docker-compose down` to shutdown containers and remove everything

Introduction to Kubernetes

K8s, standing for Kubernetes, is a system for automating management of containerized applications

Docker is an engine for running containers, and K8s is a system for managing them

Introduction to Kubernetes



Introduction to Kubernetes