

Intro to Docker

Phaser Deep Dive

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What are Containers?

Containers are a method of virtualization at the Operating System level which allows an application and all its dependencies to run in resource-restricted, isolated processes.

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How do containers work?

Containers are built on top of several features built into the linux kernel:

- namespaces
- cgroups

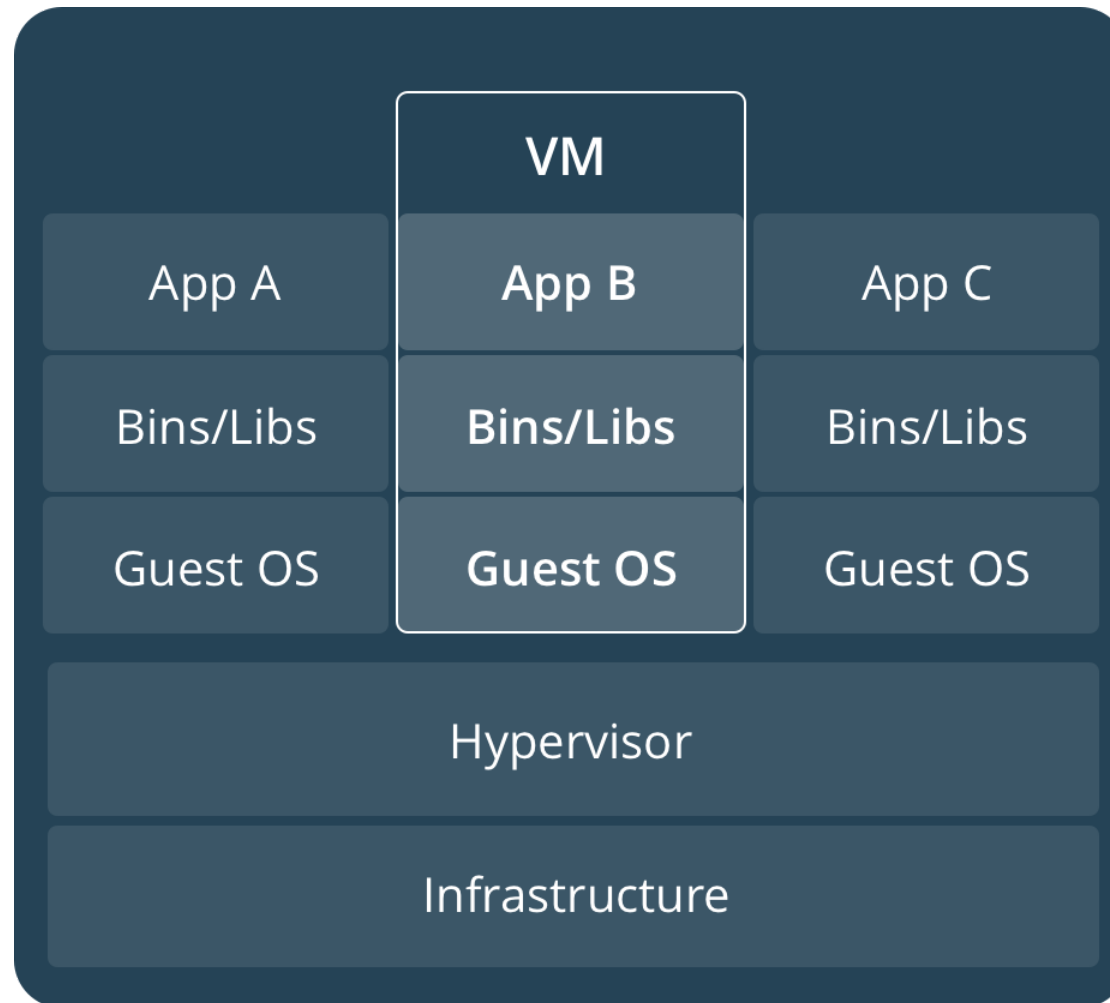
namespaces

- Partitions kernel resources and isolates processes
- limits what each process can 'see'
- Each process is in one namespace of each type
- namespace types include pid, net, mnt, uts, ipc, user

cgroups

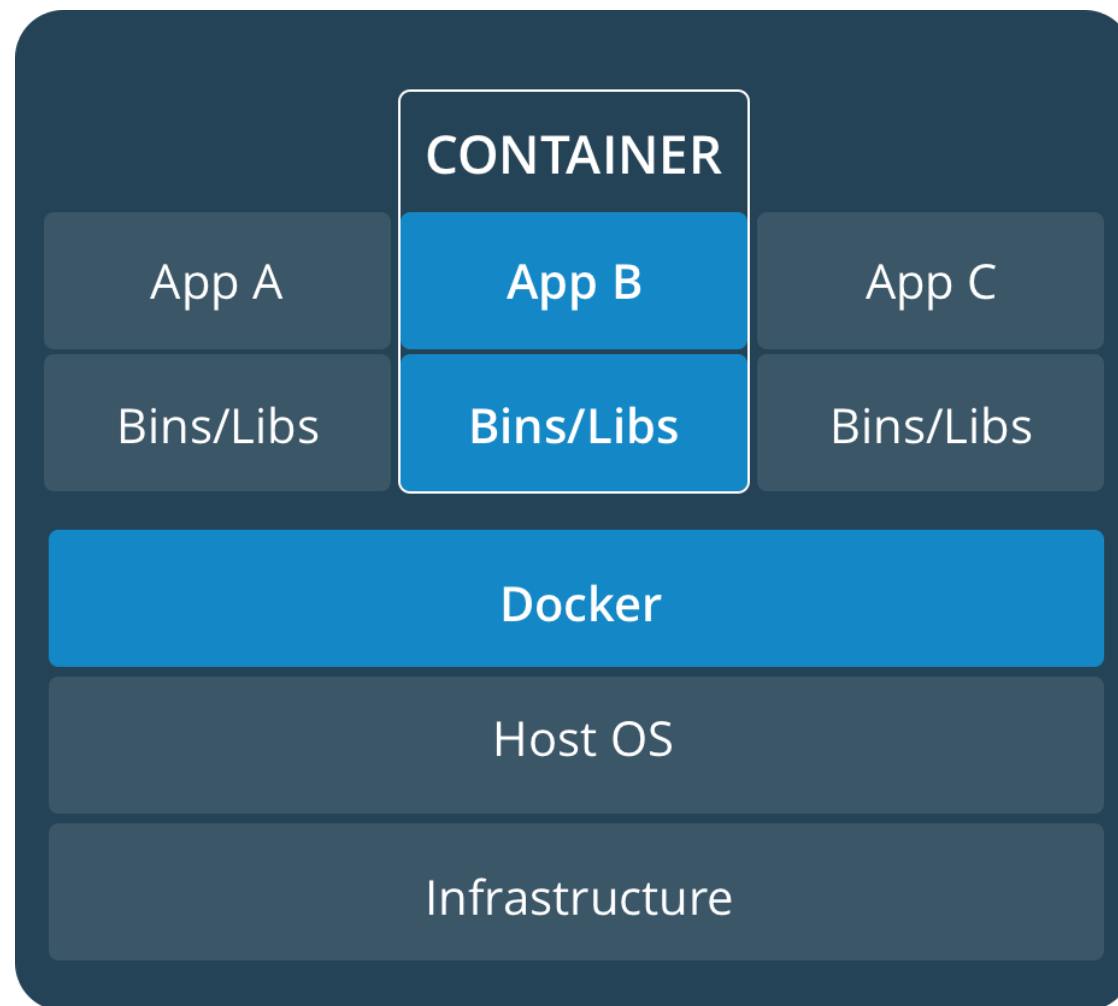
- "Control Groups"
- limits/accounts/isolates specific resource usage
- eg. CPU, Memory, Disk I/O, Network

Containers vs. Virtual Machines



"VM model"

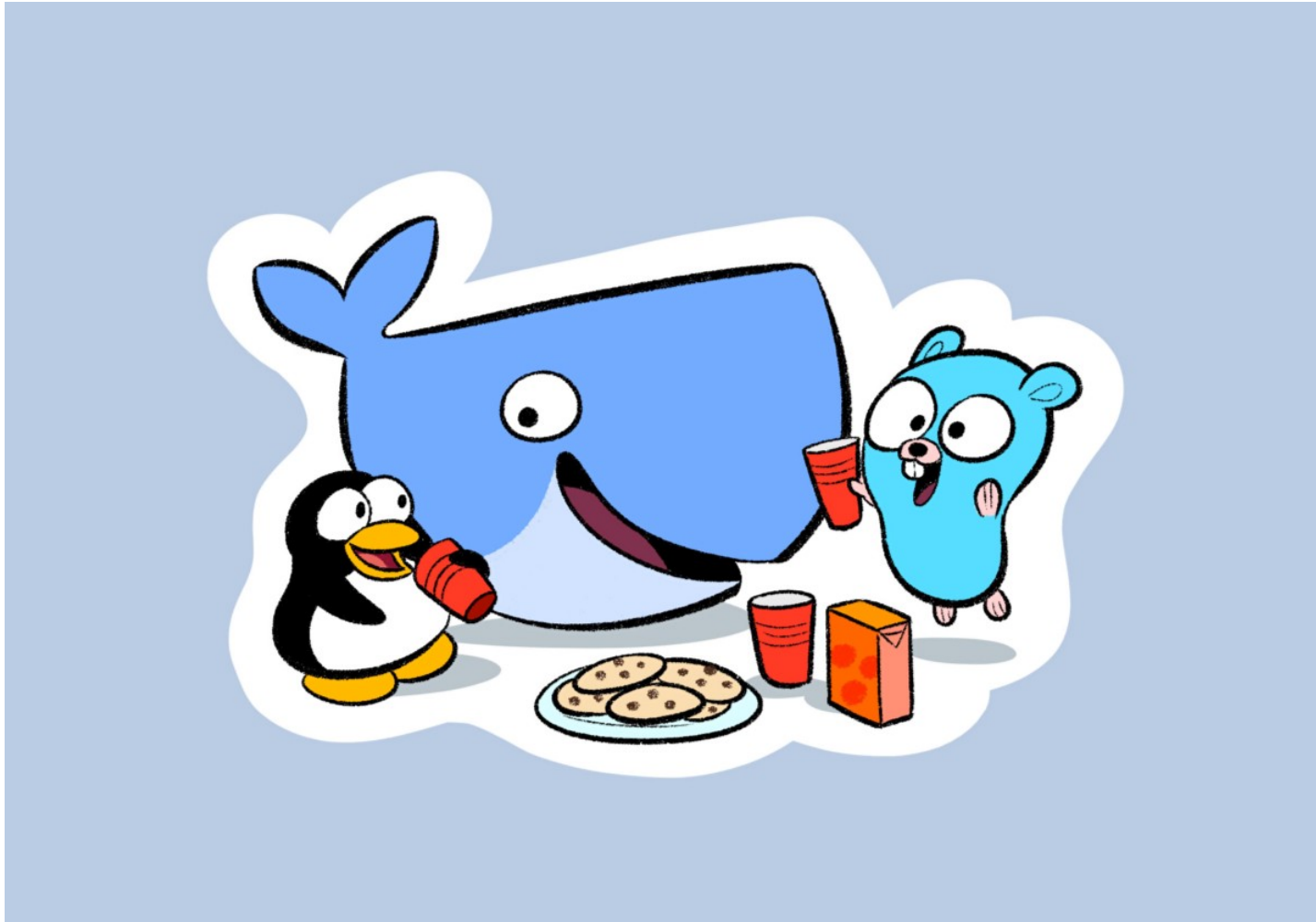
Containers vs. Virtual Machines



"Container model"

What is Docker?

Docker is a user-friendly platform for performing OS-Level virtualization, written in Go!

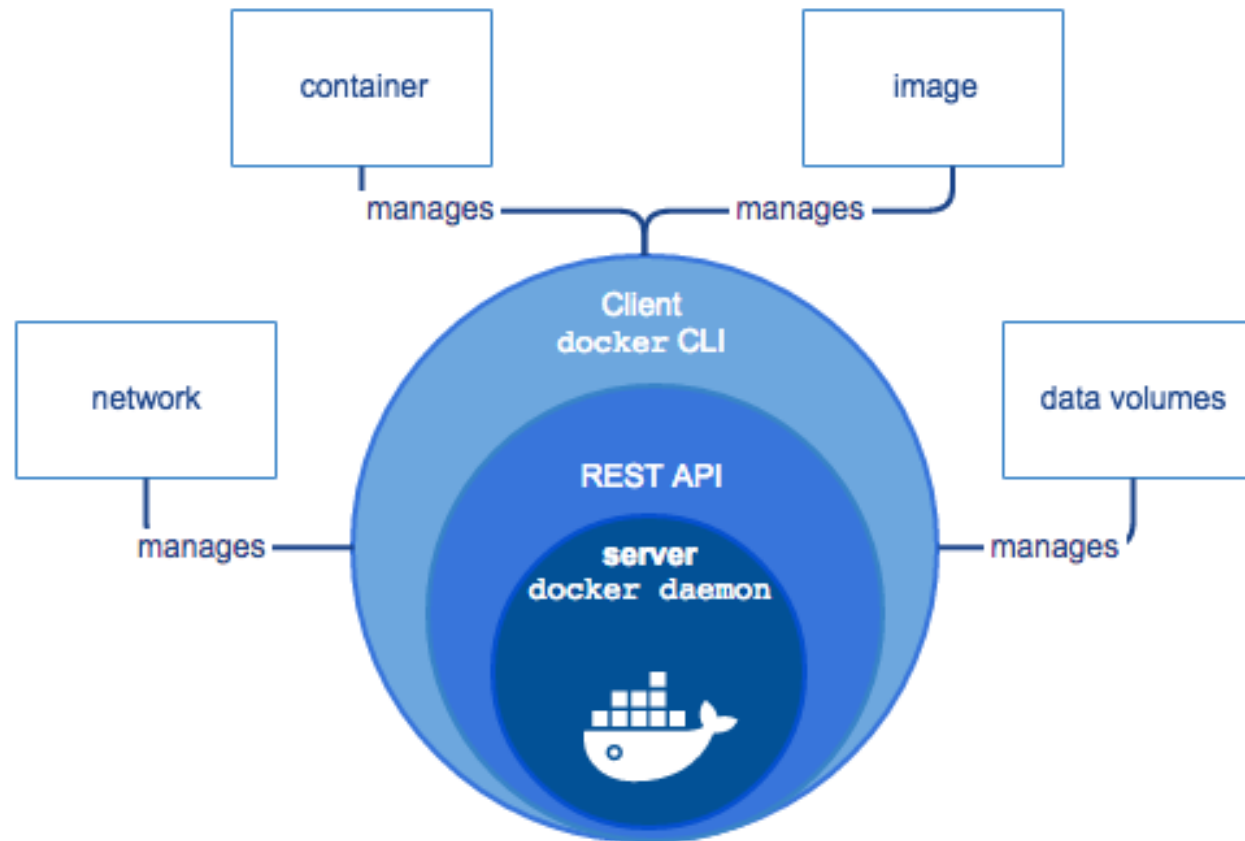


Docker on Mac/Windows

- Docker runs natively on Linux
- On macOS, Docker isn't directly supported. Instead, it uses Hyperkit to spin up a lightweight linux VM as the Host OS
- Docker **is** supported natively by windows server. However, Windows desktop uses Hyper-V to spin up Windows Server Nano as the Host OS

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Docker Components



Docker Images

- Read-only template with instructions for building docker images
- Used to store and ship applications
- Can be built on top of other images
- Defined by *Dockerfile*
- Composed of 'layers'

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Hello Dockerfile

```
FROM alpine:3.7

LABEL maintainer="Gian Biondi <gianfranco.biondi@jet.com>"

CMD ["/bin/echo", "hello, world!"]
```

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Simple Dockerfile

```
FROM alpine:3.7

LABEL maintainer="Gian Biondi <gianfranco.biondi@jet.com>"

RUN apk --update add \
    bash \
    ctags \
    curl \
    git \
    python \
    && apk add --virtual build-deps \
    build-base \
    python-dev \

RUN apk del build-deps

COPY app.py /usr/local/app/app.py
COPY requirements.txt /usr/local/app/app.py
COPY entrypoint.sh /entrypoint.sh

ENTRYPOINT ['sh', '/entrypoint.sh']
```

Docker Containers

- runnable instance of an image with read-write layer on top
- isolated from other containers and from host machine

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Docker Registry

- Repository for storing pre-built docker images
- Docker Clients connect to registries to download images to use or upload

images they have built.

- Can be public or private

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Docker-Compose

Compose is a tool for defining and running multi-container Docker applications.

```
version: '3.3'
services:
  nginx:
    image: library/nginx
    restart: always
    ports:
      - "8080:80"
    volumes:
      - "lua_config:/var/nginx"
  consul-template:
    build: ./src/consul/TEMPLATES
    command: -consul "consul:8500" -wait=5s
    volumes:
      - "./src/consul/TEMPLATES:/consul-template/data"
      - "lua_config:/tmp"
    depends_on:
      - consul
volumes:
  lua_config:
```


Orchestration

- kubernetes
- nomad

Thank you

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