Docker

Docker Strategy - Study and Apply

Contents

- Docker fundamentals and operations
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# What is Docker: Docker vs VMs

Comparing houses (VMs) to apartment buildings (containers).

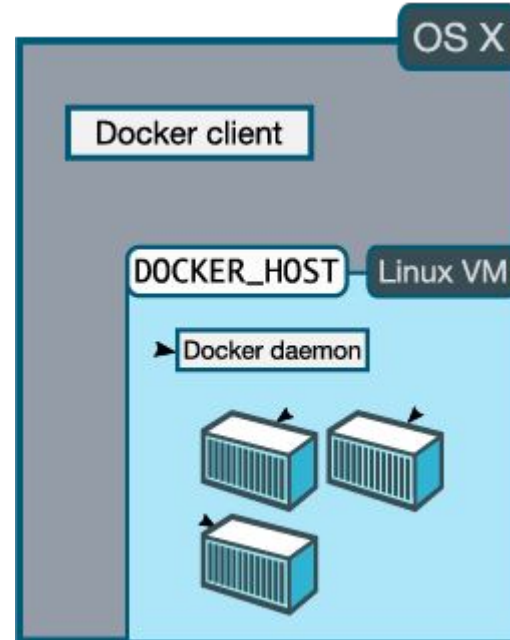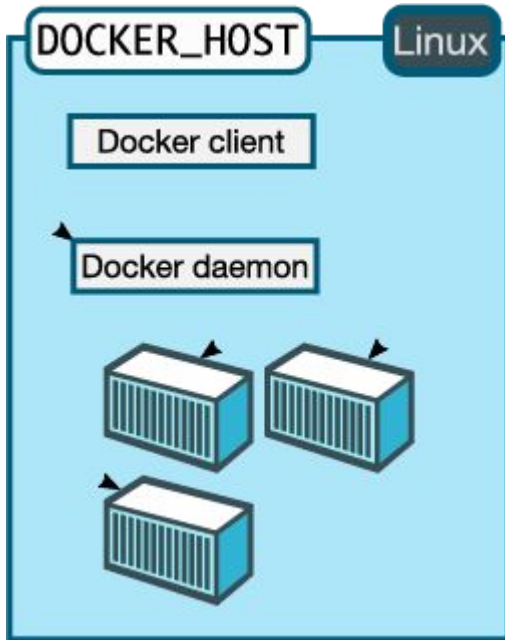Both are designed to provide an isolated environment in which to run an application.

Docker is not a virtualization technology, it's an application delivery technology.

An application-centric way to deliver high-performing, scalable applications on the infrastructure of your choosing.

VM vs Container
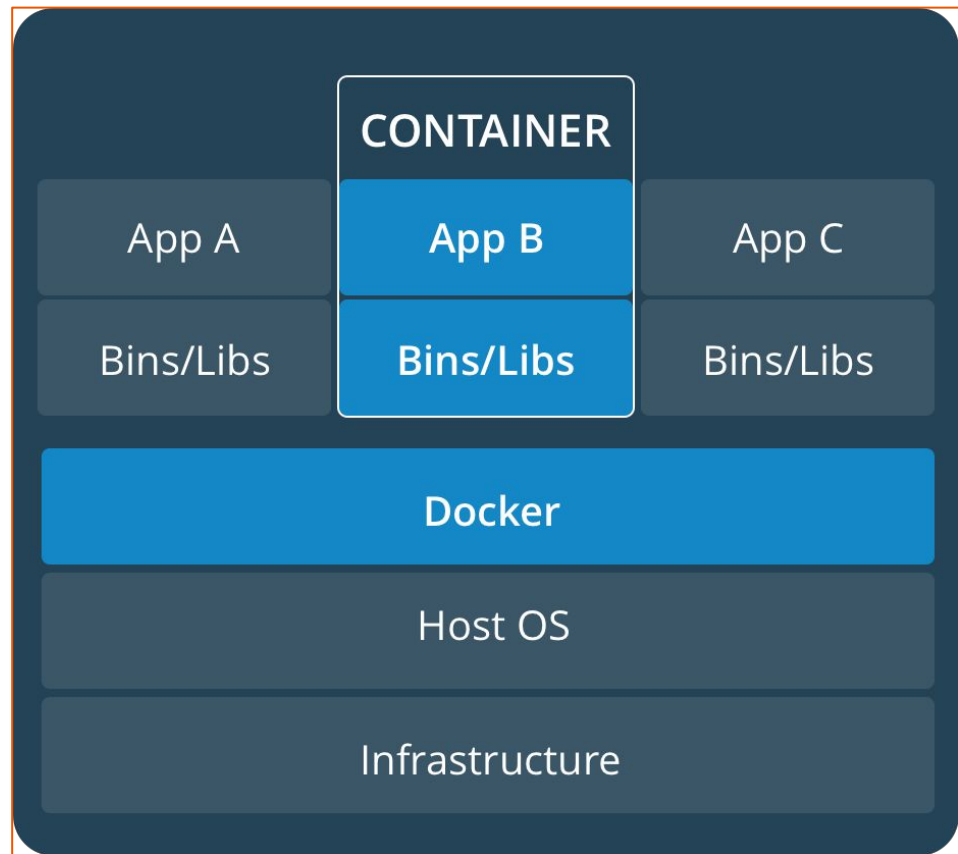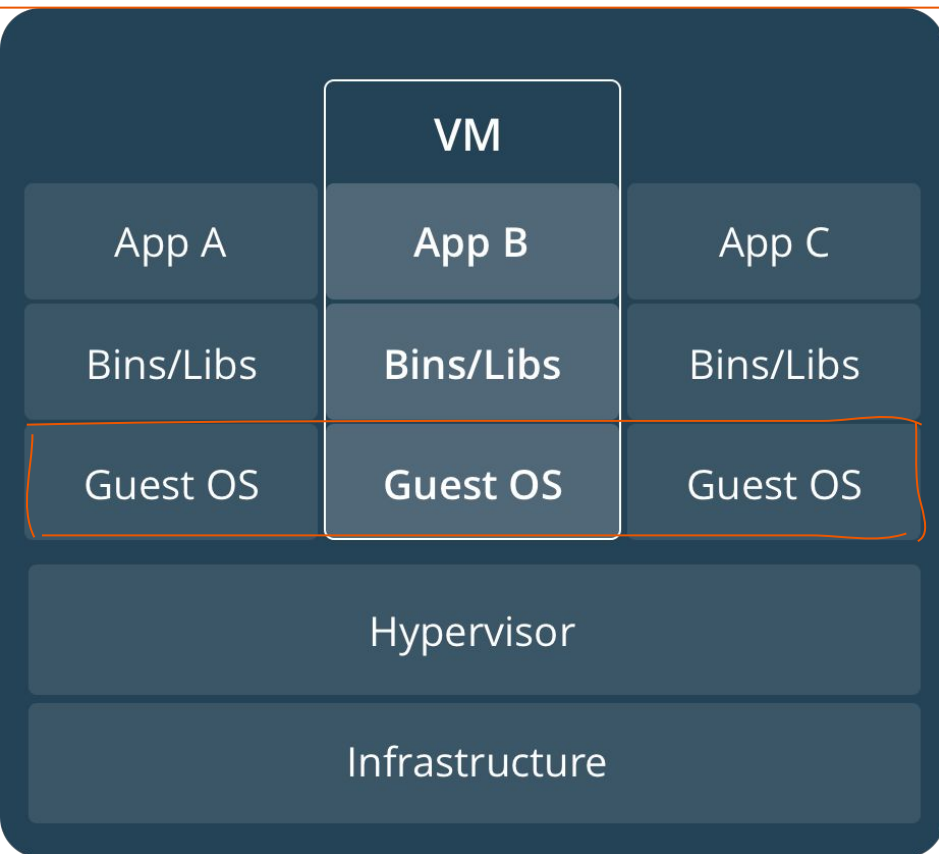
Docker on Linux, Windows and OSX

Docker operations

- Build, run, create, start, stop, remove, backup …container
- Building, remove, sharing image
- Sharing data between host-container, container-container …
- Docker compose, link

Examples

- Sample image Aptible docker-mysql, docker-express-link
- Compose PHP-NGINX-Mysql-PhpMyadmin
- Supervisord to run many service in one container (ie. Wordpress)
- Docker machine with Digital Ocean driver (repository)
- Auto build image with github and Dockerhub (not auto deployment)
- Auto deploy with Jenkins or Distelli + Kubernetes + DockerHub, GitHub

Dockerfile's syntax

Comment

INSTRUCTION arguments

FROM, RUN

 COPY, ADD

EXPOSE, CMD

Dockerfile

1 Define the base image.

2 Declare the maintainer.

3 Clone the todoapp code.

4 Move to the new cloned directory.

5 Run the node package manager's install command (npm).

6 Specify that containers from the built image should listen on this port.

7 Specify which command will be run on startup.

```
FROM node
MAINTAINER ian.miell@gmail.com
RUN git clone -q https://github.com/docker-in-practice/todo.git
WORKDIR todo
RUN npm install > /dev/null
EXPOSE 8000
CMD ["npm","start"]
```
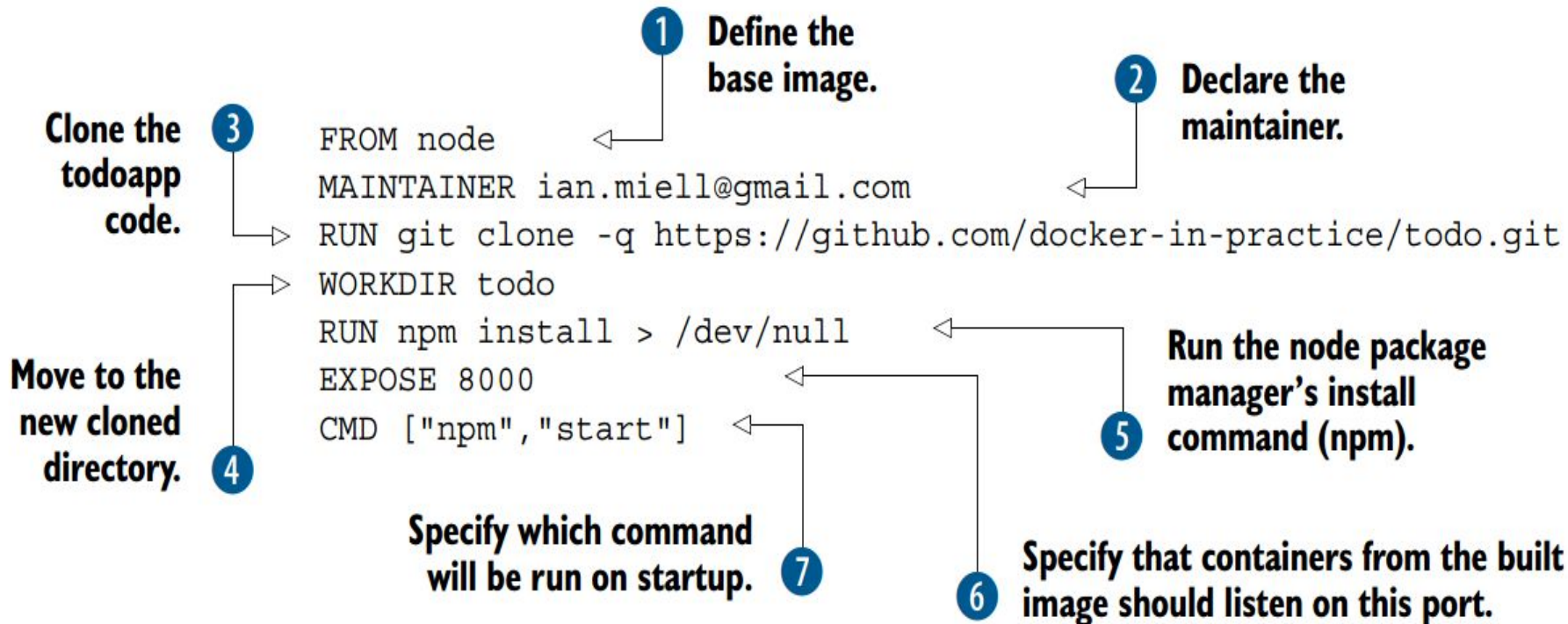
Image from `Dockerfile`

```
FROM ubuntu                          # base image (default :latest)
MAINTAINER Evan Clark

RUN echo "deb http://archive.ubuntu.com/ubuntu/ raring main universe" >> /etc/apt/sources.list

RUN apt-get update                # image setup command

RUN apt-get install -y nano wget dialog net-tools

RUN apt-get install -y nginx

RUN rm -v /etc/nginx/nginx.conf

ADD nginx.conf /etc/nginx/         # copy file to image

RUN echo "daemon off;" >> /etc/nginx/nginx.conf

EXPOSE 80

CMD service nginx start            # start nginx service
```

Run `docker build`

$ docker build --tag nginx-one .

`--tag`: set image tag. Tag mean image name:version or URL to get image from repository (default Dockerhub). Like package.json, composer.json with github

ie. `quay.io/aptible/nodejs , littlewing/docker-autobuild-demo`

Run the nginx in the container

```
$ docker run -it nginx-one -p 8086:80 --name nginx-one-container
```

-p = --publish: port forwading from host to container, similar NAT port forwading in VirtualBox or another VM tools.

Stop and remove container

```
$ docker stop nginx-one-container && docker rm nginx-one-container
```

Deploy, share the image

$ docker save nginx-one| gzip > nginx-one.tar.gz

$ docker push

$ docker import

Private register like quay.io, dockerhub

Image layers

Each command in Dockerfile create a layer to image.

$ docker history [image_ID] or [image_tag_name]

Docker compose

```
nginx:
    build: ./nginx/
    ports:
        - 8091:80
    links:
        - php
    volumes_from:
        - app
php:
    build: ./php/
    expose:
        - 9000
    links:
        - mysql
    volumes_from:
        - app
app:
    image: php:7.0-fpm
    volumes:
        - ./www/html:/var/www/html
    command: "true"
```

Benefit

- Faster, lighter than VM (Hypervisor), can be use to replace VM.
- Fit CI/CD process.
- Avoid mines field of dependencies, reduce debuging overhead
- Enabling full-stack productivity when offline
- Reduce time/cost of operating/development cost. (Dev-Ops). Software dependencies documented.

Drawback

- New tools need time to study. Tradeoff cost/tax.
- Dependencies

Apply to PG

- Good tool for lean UNIX, bash script
- New tool for Dev: similar Dev environment packed in a container .
- Another way to design application: micro service: ie. Terva, TXP …

WebRefs

https://stackoverflow.com/questions/38234611/is-there-a-way-to-tag-a-previous-layer-in-a-docker-image-or-revert-a-commit

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http://tech.osteel.me/posts/2015/12/18/from-vagrant-to-docker-how-to-use-docker-for-local-web-development.html

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WebRefs (cont)

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https://github.com/miguellgt/books/tree/master/docker [docker-in-practice is the best]