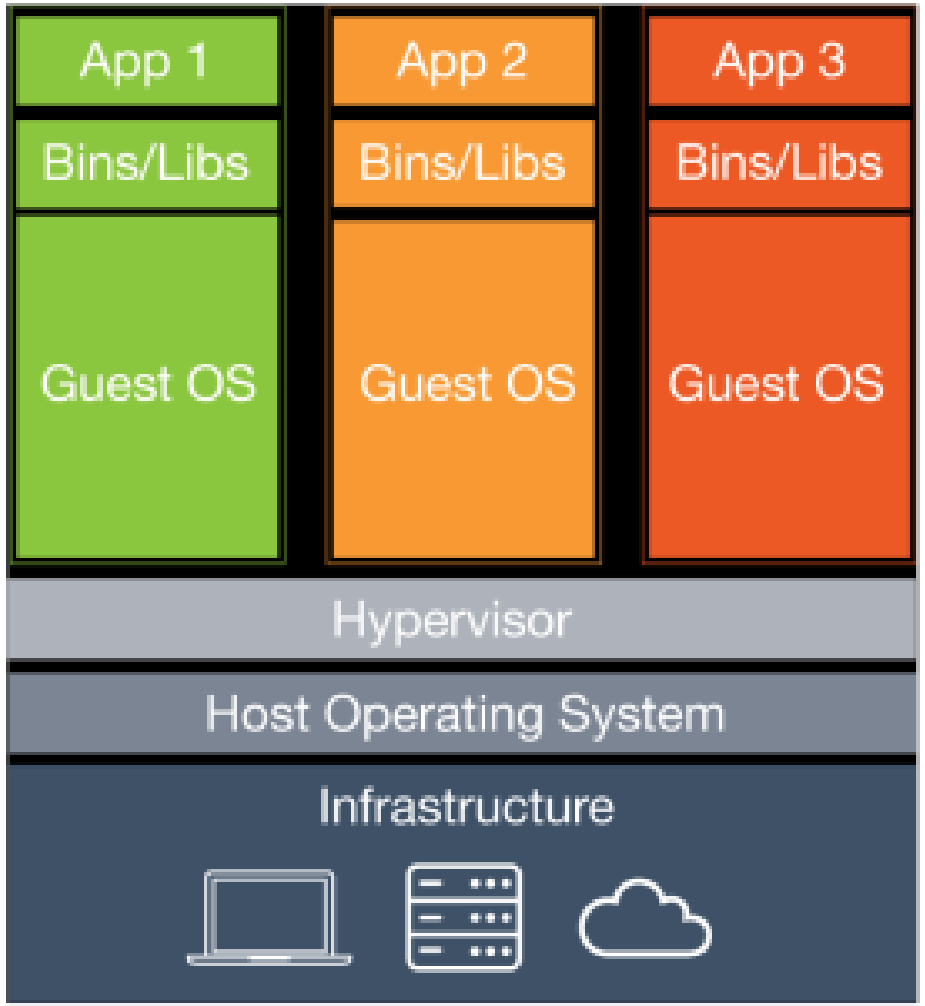
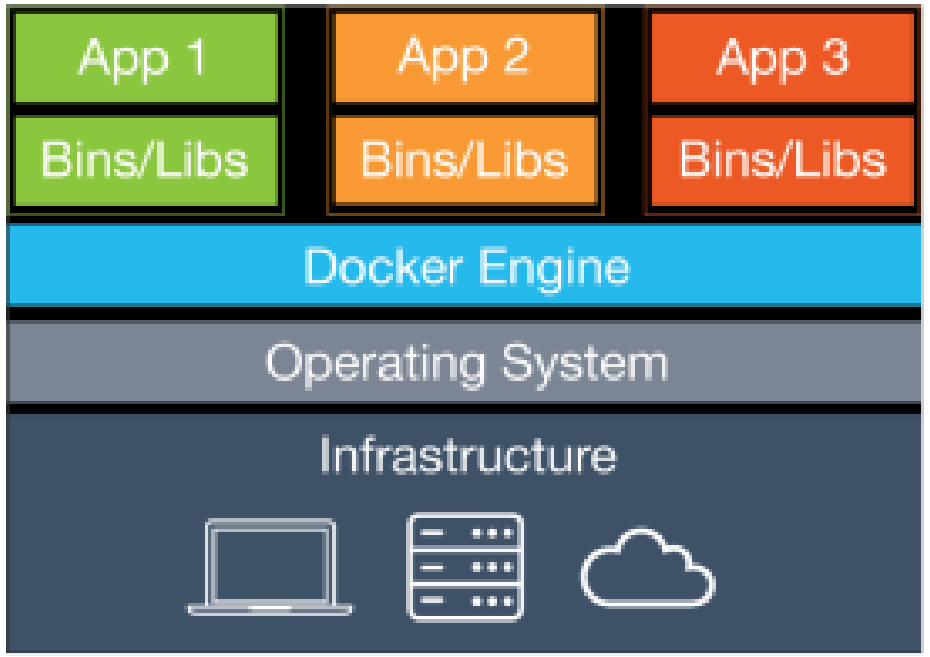
Docker – Technical Details

COMP-10097 – Virtual Infrastructure

Mohawk



Traditional Type 2 VM
(e.g. VirtualBox)



Container
(e.g. Docker)

Docker: Image *vs* Container

Image

- A union of layered filesystems
- Never changes

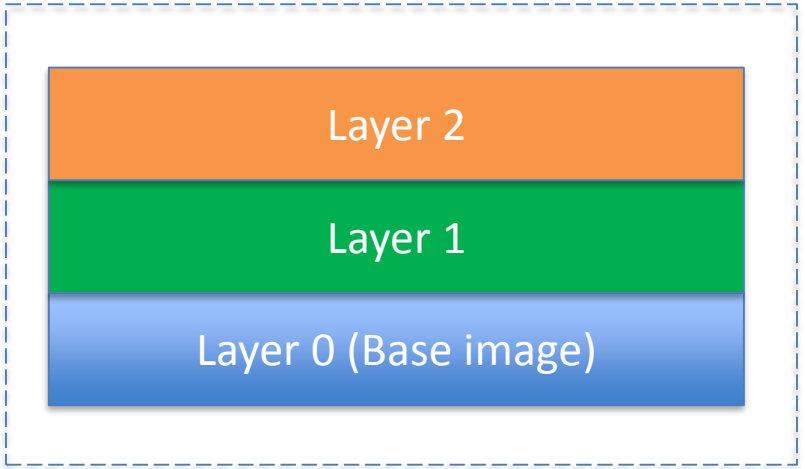
Example Dockerfile

```
FROM alpine:3.5 (Layer 0)

# Install python and pip
RUN apk add --update py2-pip (Layer 1)

# install Python modules needed by the Python app
COPY requirements.txt /usr/src/app/ (Layer 2)
```

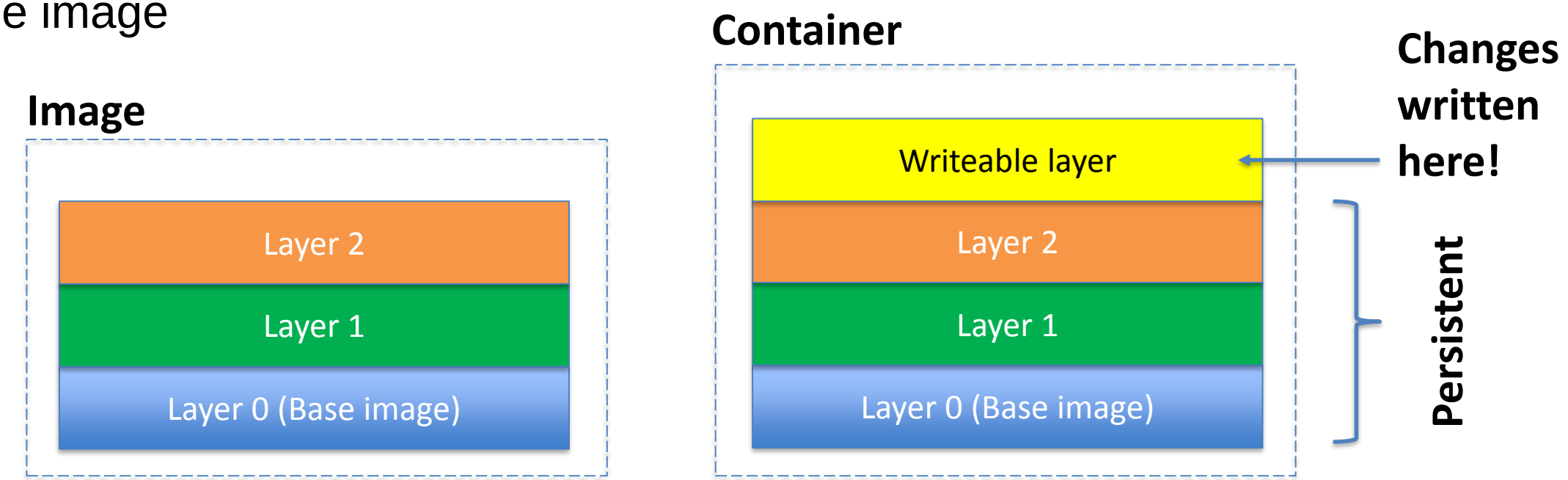
Final Image



Docker: Image *vs* Container

Container

- Runtime instance of an image + a writeable layer
- Many containers each with a unique writeable layer can be run from the same image



Try this!

1. docker run -it ubuntu

*(then from within container install the **wget** application)*

2a. apt-get update

2b. apt-get install wget

2c. wget (it runs!)

Ctrl+d to exit container. Now, run another container based on the same image:

3a. docker run -it ubuntu

3b. wget (FAIL! WHY?!)

Docker Networking

By default, docker creates three networks: Host, Bridge and None

- **Host** -> container added to host network
- **Bridge** -> container(s) added on new network.
    - Containers can communicate with host & each other
    - Containers added to **Bridge** network by default
- **None** -> no network

Docker Networking, cont'd

Start two containers: **`docker run -it bash`**

They will start in bridge mode, by default

a. What are their IP address?

b. Can the two containers communicate?

c. Can they communicate with the host? The internet?

(172.17.0.x, YES, YES)

Docker Networking, cont'd

More details…

https://docs.docker.com/engine/userguide/networking/#the-default-bridge-network

Key Docker Commands

`docker run -i <image>`	-> run a docker image
`docker run -it <image>`	-> run a docker image and attach to host terminal
`docker images`	-> list all docker images
`docker ps`	-> list running containers
`docker ps -a`	-> list running containers, even those that have exited.