

Introduction to Docker



Announcements

- ▶ HW 2ab released, due Thursday
 - ▶ Golang Syntax
 - ▶ Feedback form
- ▶ HW 3 releasing Thursday
 - ▶ Golang Coding Assignment
- ▶ AWS account emails sent out

Last Time

- ▶ Golang
 - ▶ Command Line args
 - ▶ Environment Variables
- ▶ Web Server Programming

Today

- ▶ Review Golang + Web Server Programming
- ▶ Introduction Docker
 - ▷ Local vs Production Environments
 - ▷ VMs vs Containers
 - ▷ Hello World Program

Recall





Golang Demo

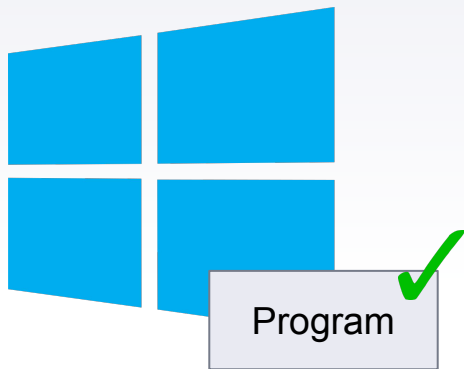
Local vs Production

- ▶ Programs
 - ▷ Program Code
 - ▷ .go, .py, .c, .cpp
 - ▷ Code Dependencies
 - ▷ gorilla/mux (Go), flask/Django (Python)
 - ▷ Environment Configuration Settings
 - ▷ environment variables, deployment configurations

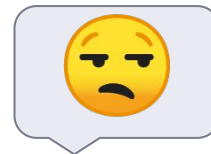
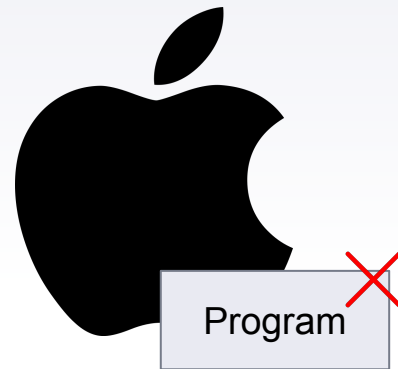
Local vs Production

- ▶ Currently
 - ▷ All code runs on our current operating system
 - ▷ All dependencies installed on our machine
 - ▷ All configs defined locally
- ▶ Issues?
 - ▷ Program should run the same regardless of where it's run
 - ▷ Reality: different operating systems, different configurations, different dependency versions, etc.

Compatibility Issues



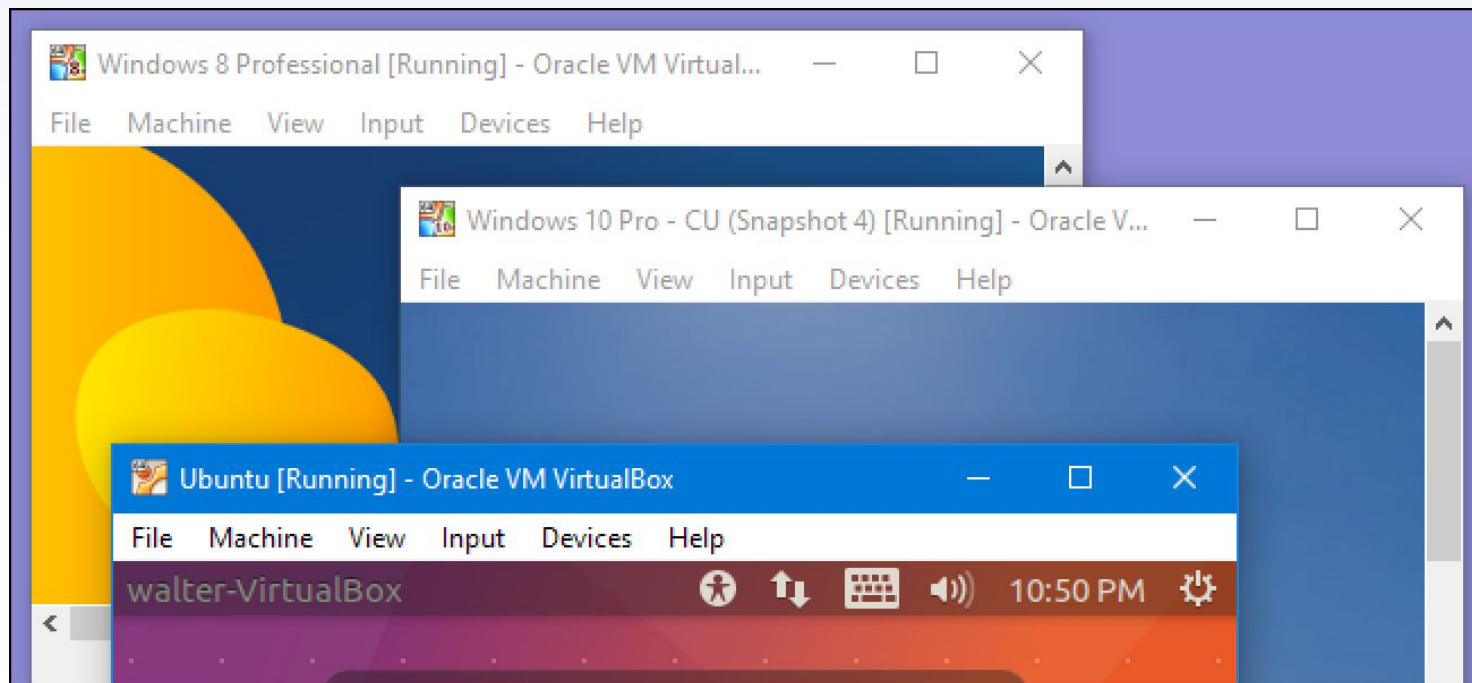
It worked
on my
machine!?



Virtual Machines

- ▶ Emulation of an Operating System
- ▶ “A computer within a computer”
- ▶ Host -> Computer running the VM
- ▶ VM is completely isolated from the host
 - ▶ Might as well be a different computer altogether
- ▶ Software Applications?

Virtual Machines

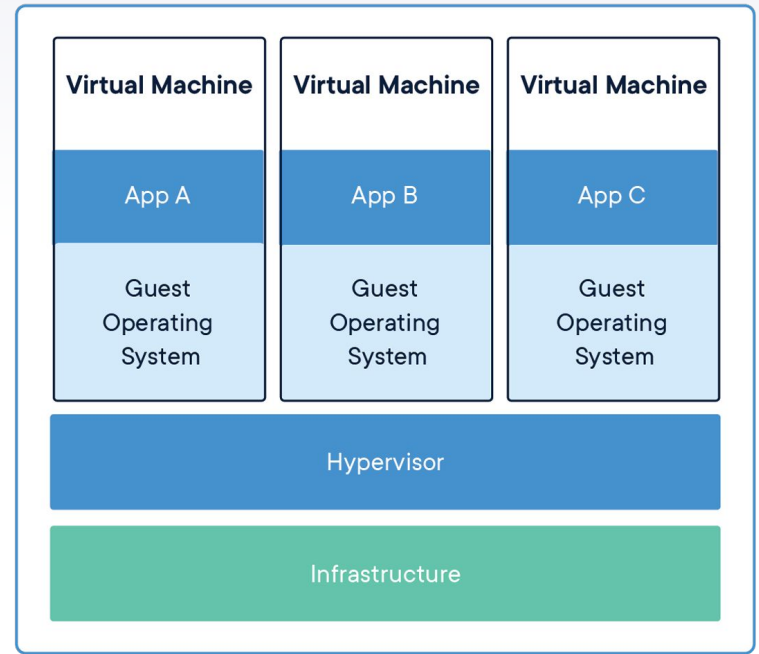


▶ Virtual Machines

Should we use virtual machines to package our applications?

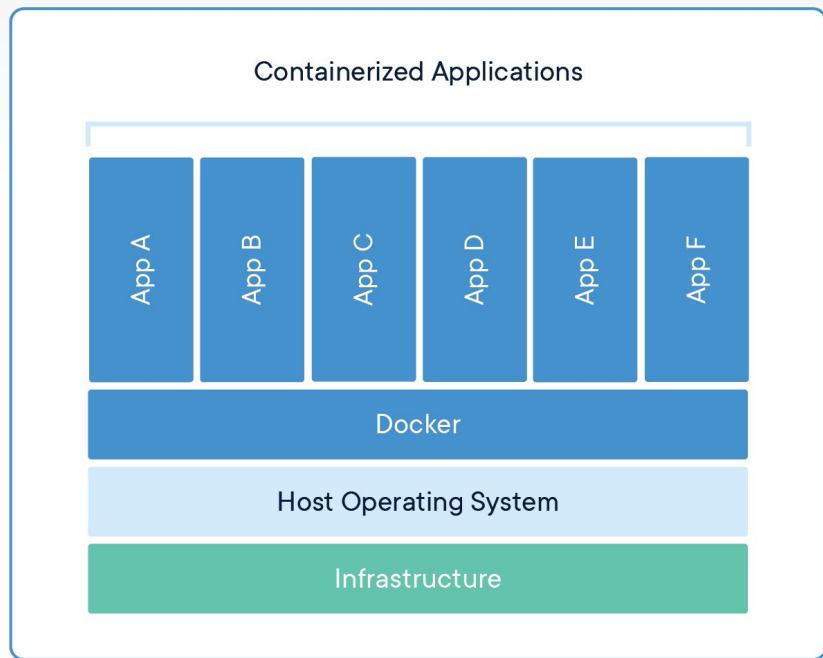
Virtual Machines

- ▶ Extremely computation heavy
 - ▷ Using resources for running two computers simultaneously
- ▶ Inefficient
 - ▷ Indirect access to hardware
- ▶ Difficult to develop with
 - ▷ Need to be

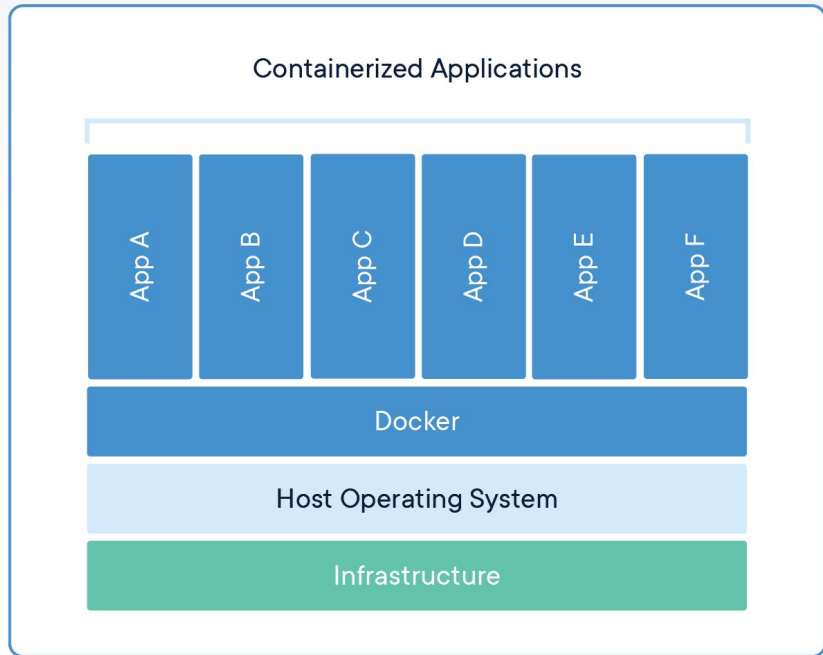
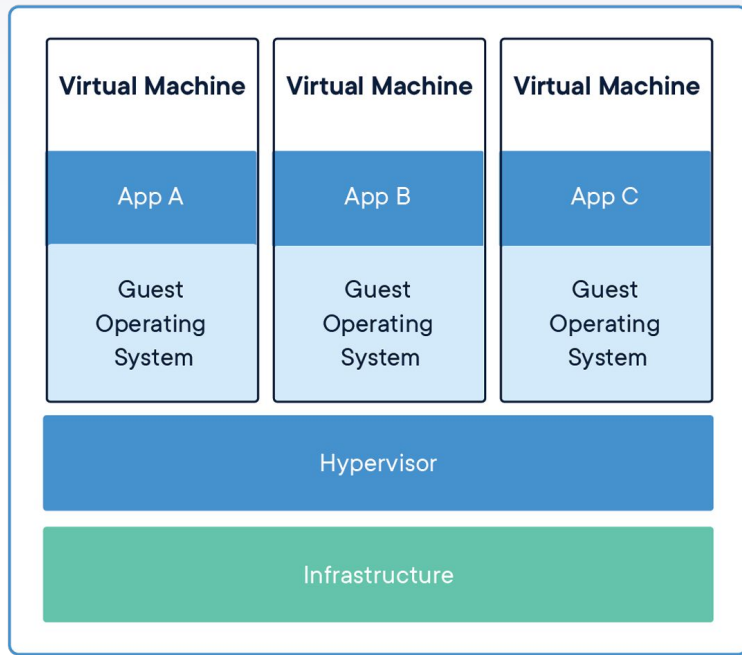


Containers

- ▶ Packaging mechanism abstracted from the running environment
- ▶ VMs without the overhead
- ▶ Isolated environment
 - ▷ Very close to host OS
 - ▷ Can be thought of an application running locally on host OS
- ▶ Easily configurable, shareable, and deployable



VMs vs Containers





VMs vs Containers

Should we use virtual machines or containers
to package our applications?

Docker

- ▶ Build and run containers
- ▶ Building
 - ▶ Packages an application with all of its dependencies into one unit
 - ▶ “Image”
- ▶ Running
 - ▶ Create an “instance” of an “image”
 - ▶ Can have multiple instances of the same image



Docker Demo

