Argparse,
Makefile,
Docker

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Argparse

Hands on - arguments

ArgumentParser

name

- **Optional** argument, identified by ‘-’
  - parser.add_argument('-f', ‘--foo’)
- **Positional** arguments, anything without a prefix
  - parser.add_argument(‘bar')

ArgumentParser.add_argument()

- **name or flags** - foo or -f, --foo.
- **action** - Basic action taken when t encountered
- **help** - Brief description
- **type** - Type to be converted to
- **default** - The value produced if the argument is absent
- **choices** - Allowable values
- **required** - If option can be omitted (optionals only)
- **nargs** - Number of arguments consumed
- **metavar** - A name for the argument in usage messages.
- **const** - A constant value required by some action and nargs selections
- **dest** - Name of attribute returned by parse_args()

Hands on - argparse

Hands on - mutually exclusive group

Take the Fibonacci model

Add an argument to **print** all fibonacci numbers up to the provided input

Makefile

Project Maintenance

- A makefile is a **file** (script) containing:
  - The project **structure** (files, dependencies).
  - Instructions for **files creation**.
- The **make** command reads a makefile, understands the project structure and makes up the **Target(s)**.

filename: makefile

```
Target01: Dependencies

←tab→ rules


Target02: Dependencies

←tab→ rules
```

```
>cd ‘dir’ of the makefile
>make
```

- Type **make**
- finds a file called **makefile**
- run the commands from the **first target**
- Check dependancies

Hands on - Makefile

Hands on - Look at the sphinx Makefile and execute the command

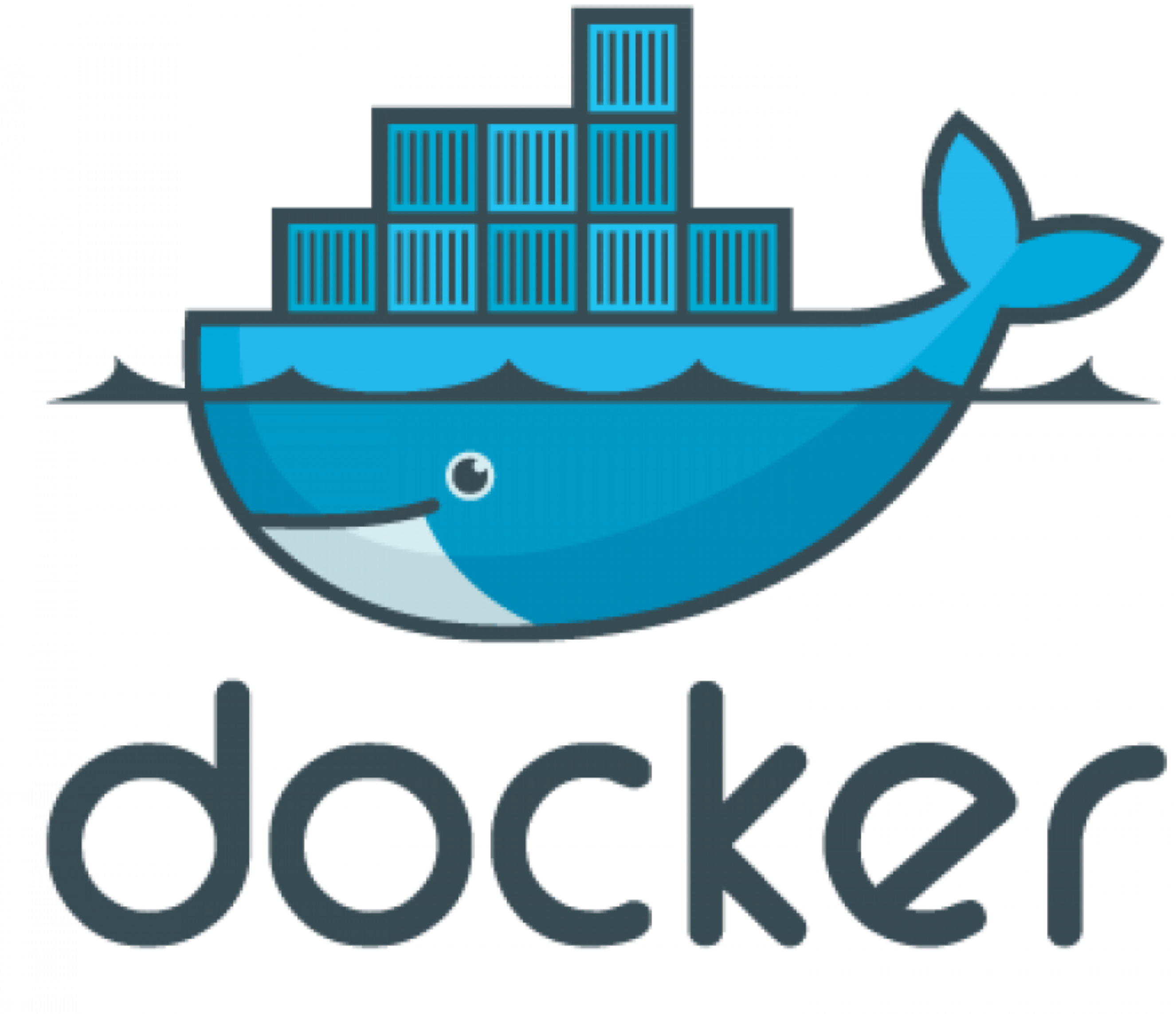
Hands on - Makefile - excersises

Docker

Containers

A platform for building, running, and shipping applications

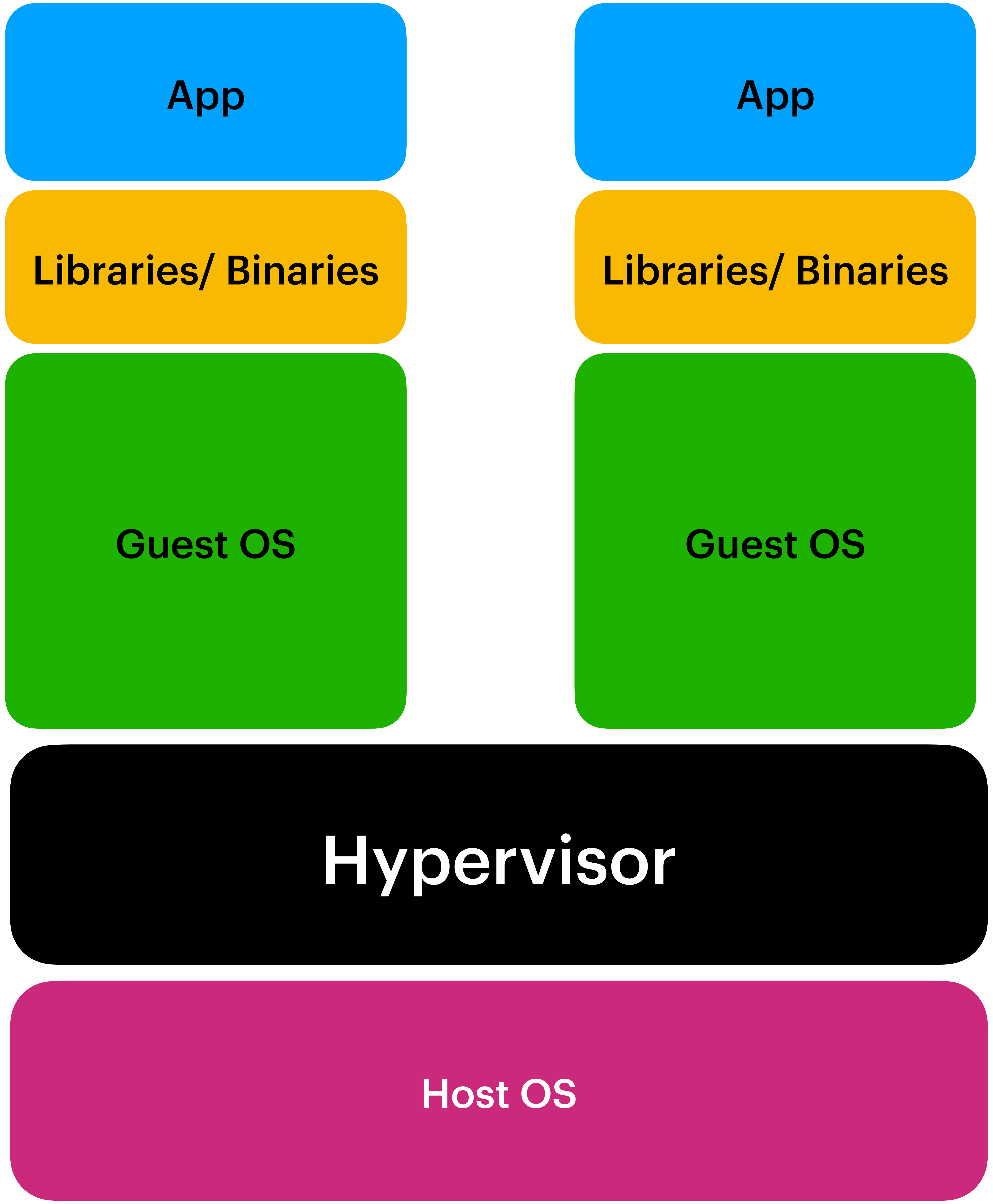
- Code works on my machine
- It doesn't work on another machine
- WHY?
  - Some files are missing
  - Software version mismatch
  - Different configuration settings
- What is the solution?



Package and run anywhere

New user wants to use your code

- Read install instructions and requirements
- Spend half a day setting up the computer
- What if ..
    - Run multiple applicationson same machine with different dependancies?

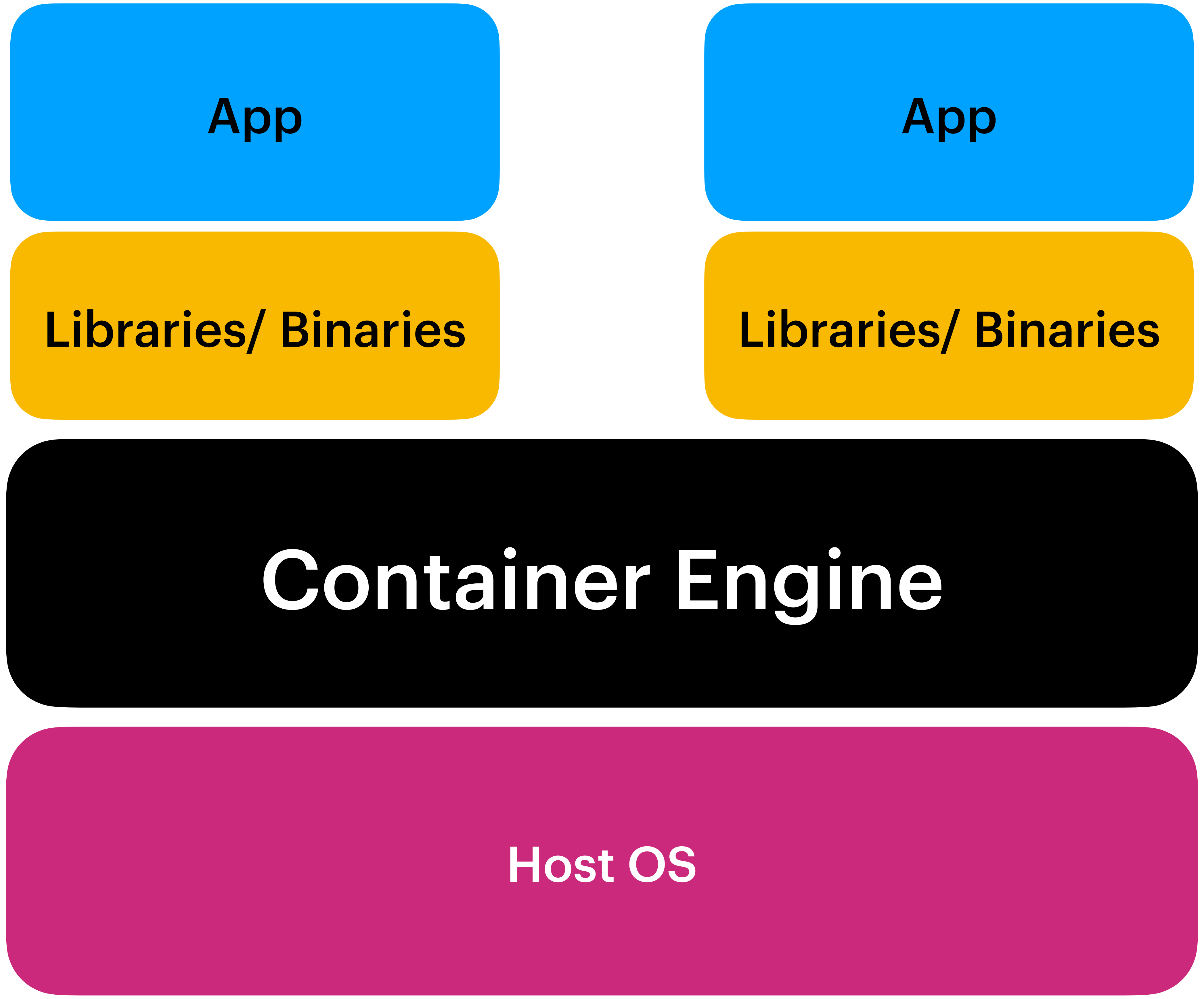


Virtual Machines

Run multiple apps in isolation

- Each VM needs a full copy of a OS
- Slow
- Resource intensive (limited number of VMs to run)

Containers



Run multiple apps in isolation

- Light weight
- Uses Host OS (Kernel)
    - Windows, linux, and Mac can run **linux apps**.
- Start quickly
- Needs less hardware resources (10-100s of containers)

Install Docker

- Get Docker
- Check system requirements (specially Windows users)
- Check if docker is running:
    - $ docker version
    - Client and Server

- Docker Image
  - Application
  - Dependancies (files, libraries)
  - Dockerfile
  - A cut-down OS
- Push Image to DockerHub
- Pull on machine with Docker

No need to follow complicated install instructions.

Just pull

Hands on - Docker - Hello-Docker

- Dockerfile
  - Create and OS
  - Copy Script
  - Run script

- Go to DockerHub
- Find a Bash Container
- Write the Dockerfile
- $ docker build -t hello-docker .
- $ docker images / docker image ls
- $ docker run hello-docker

Hands on - Docker - Python-Ubuntu

Hands on -docker -Interactive ubuntu

Hands on -docker -Setup ubuntu pdflatex

Write tests for the “Station” module

Find test coverage

Licensing

Who has used Open Source software?

- Softwares usually come with a license
- It will determine what a user can and cannot do with the software
- Some licenses are free, some you have to purchase, some might have different requirements.

- Licenses are written by lawyers and not by developers.
- But developers must know the basics.
- Facebook’s ReactNative vs Apache

General License Types

- Permissive
  - Users have more freedom
- Copyleft
  - Makes sure the software stays on the same license

Permissive

- Fewer restrictions on what users can do with the software
- Allows companies to use the software without contributing back
- Apache, MIT, VSD, creative commons atribution
  - Sharing material within specific parameters.
  - Crediting authers for their work
  - Allows free leagle copying/distribution/sharing of content
  - Like what Samsung does with Android.
  - Most of Android in on Apache license but Samsung freely modifies it and does not release the changes. And sell it

Copyleft

Want to keep it on the license

- If you use it you have to give back to the community
- Prevents componies from using the software without contributing back.
- Can have potential licensing conflicts.
- How linux Kernel is setup underneath Android
- GPL, CC atribute share.., IBM, Mozilla
-

Which license should I choose?

- Depends on your project.
  - If you want to write a library so that anyone can take it and put it in their software and use it how they want, better off with permissive (Apache)

Dual licensing

- Usually it means the user can pick one license
    - Your code must be compatible with both licenses
- Occasionally projects require users to abide by both licenses.

Contributor License Agreement (CLA)

- Gives project leader the ability to relicense the codebase.
- Good: Allows projects to adapt as the licensing situation changes.
- Bad: Allows projects to be dramatically shifted away from the contributors wishes.
- Bad/Good: Companies can take the code and relicense and sell it to other companies without contributing (Canonical, Eclipse, Cyanogen, etc)