Learning Docker From Square One

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Developer Evangelist, Codefresh

dockercon17 EU

@chloecondon

I'm Whaley Glad You're Here! 🐳

Me at my last DockerCon!

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Hi, I'm Chloe!

Our Docker journey begins…

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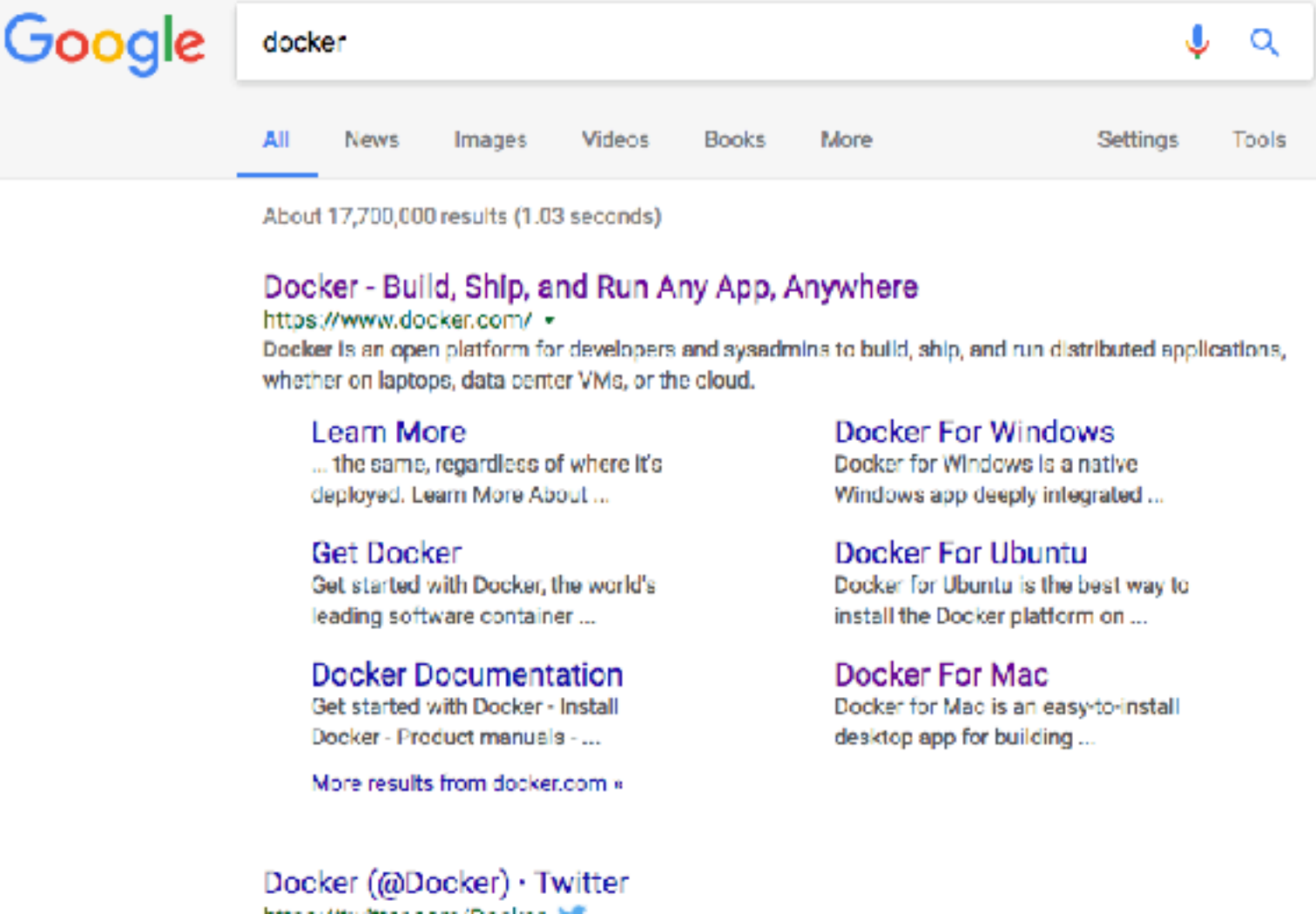
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About 17,700,000 results (1.03 seconds)
Docker - Build, Ship, and Run Any App, Anywhere
https://www.docker.com/
Docker is an open platform for developers and sysadmins to build, ship, and run distributed applications, whether on laptops, data center VMs, or the cloud.
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Docker, what is it and what is the purpose

asked 2 years, 8 mon

viewed 2,591 times

active 8 months ago

15

I've heard about Docker some days ago and wanted to go across.

But in fact, I dont know what is the purpose of this "container" ?

What is a container ?

Can it replace a virtual machine dedicated to developpment ?

What is the purpose, in simple words, of using Docker in companies ? The main advantage ?

Thanks for advance

docker

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2409 How is Docker di
virtual machine?

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Now a Developer Evangelist

(Woo! Thanks Docker! 🎉)

Let's Start From the Very Beginning

"A very good place to start…"

I'll Show You A Thing Or Two About...

Images & Containers

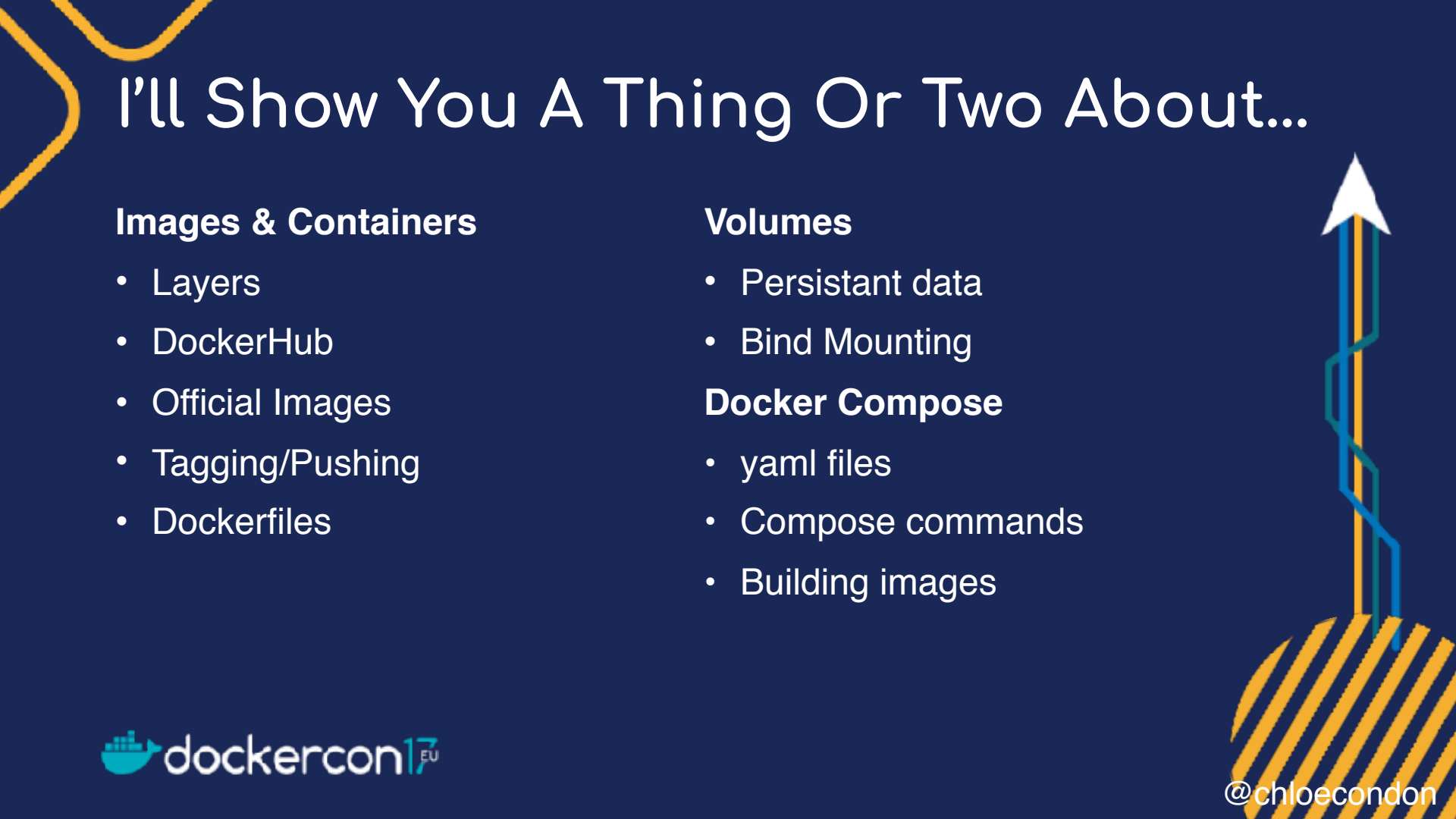
- Layers
- DockerHub
- Official Images
- Tagging/Pushing
- Dockerfiles

Volumes

- Persistant data
- Bind Mounting

Docker Compose

- yaml files
- Compose commands
- Building images



Demo Time!

Images & Containers

What's the difference? 🤔

Let's Break it Down...

An **image** is an application you'd like to run

A **container** is a running instance of an image

Let's Break it Down...

An **image** is un

A **container** nage

```
class Whale(object):
    order = “Cetacea”
    suborder = “mysticeti”

    def __init__(self, name, location=”ocean”):

        self.name = name
        self.location = location

    def speak(self):
        return “EEEeoooo000E0E00oO00, I'm {} the whale and I
            live in the {}.”.format(self.name, self.location)

whale_1 = Whale(“Willy”)
```

Think of it this way...

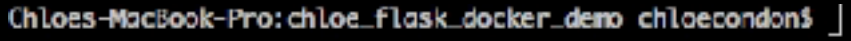
Image = DVD 

Container = DVD Player 📺

Think of it this way...

Docker Image = The basis of a Docker container. Represents a full application.

Container = The standard unit in which the application service resides and executes.


Chloes-MacBook-Pro:chloe_flask_docker_demo chloecondon$

```
Chloes-MacBook-Pro:chloe_flask_docker_demo chloecondon$
```

```
Chloes-MacBook-Pro:chloe_flask_docker_demo chloecondon$ ||
```

So, a container is a lightweight VM, right?

So, a container is a lightweight VM, right?

Think of VMs like a 🏡…

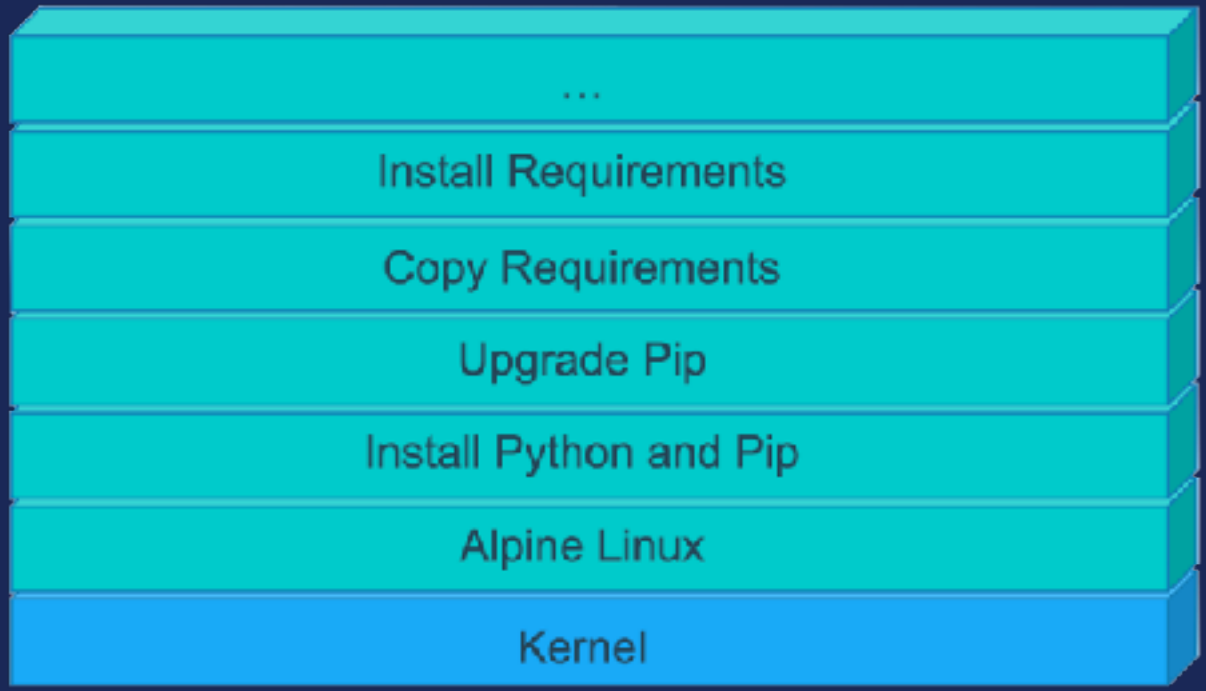
…and containers like an 🏢…

…stay with me here!

So, a container is a lightweight VM, right?

So, a container is a lightweight VM, right?

Let's Review!


...
Install Requirements
Copy Requirements
Upgrade Pip
Install Python and Pip
Alpine Linux
Kernel

So, a container is a lightweight VM, right?

"Docker is not a virtualization technology, it's an application delivery technology" -Mike Coleman

Layers

Layers

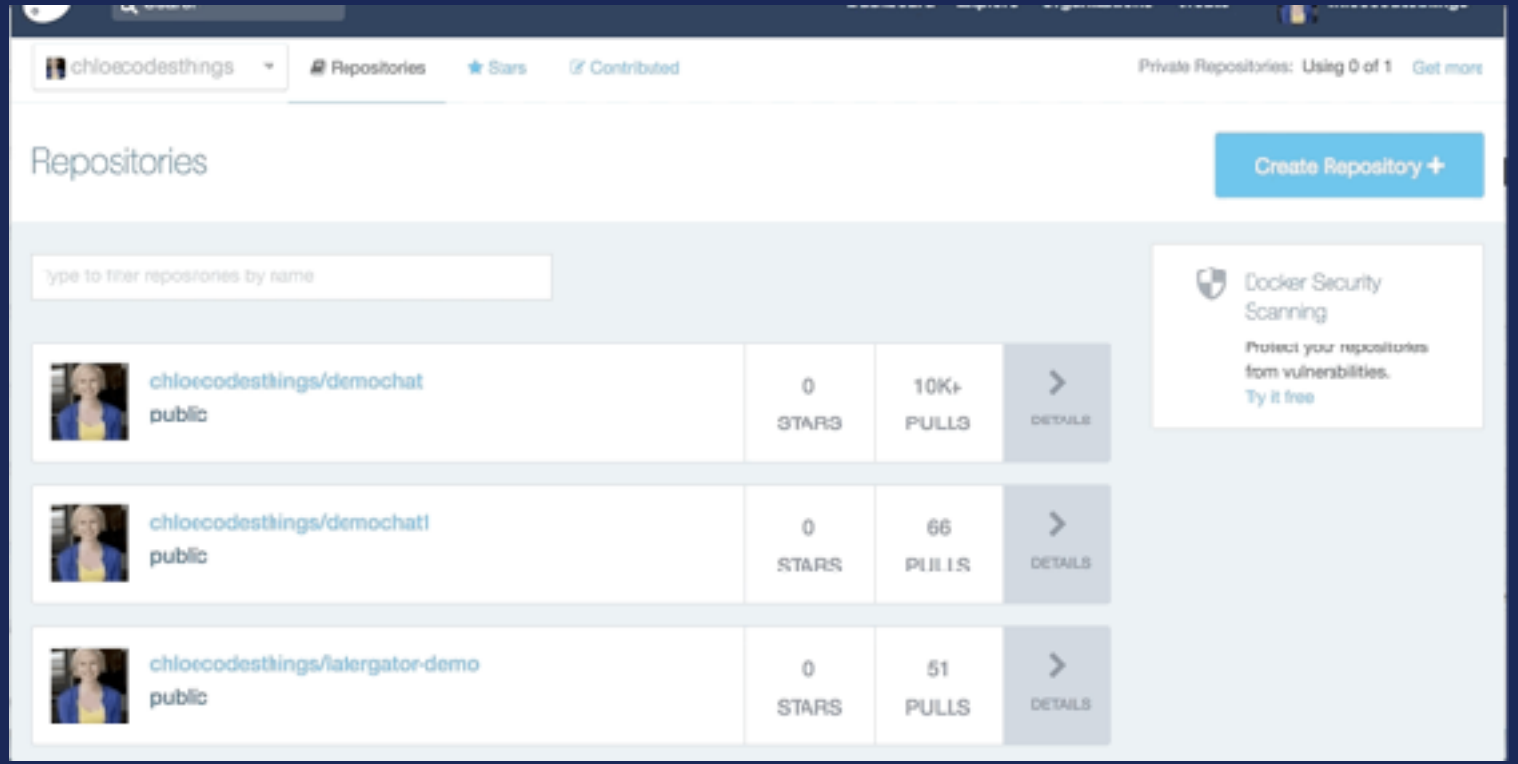
Layers

Layers

Layers

Layers

DockerHub


chloecodesthings
Repositories
Stars
Contributed
Private Repositories: Using 0 of 1
Get more
Repositories
Create Repository +
Type to filter repositories by name
Docker Security Scanning
Protect your repositories from vulnerabilities.
Try it free
chloecodesthings/demochat
public
0 STARS
10K+ PULLS
DETAILS
chloecodesthings/demochat1
public
0 STARS
66 PULLS
DETAILS
chloecodesthings/alligator-demo
public
0 STARS
51 PULLS
DETAILS

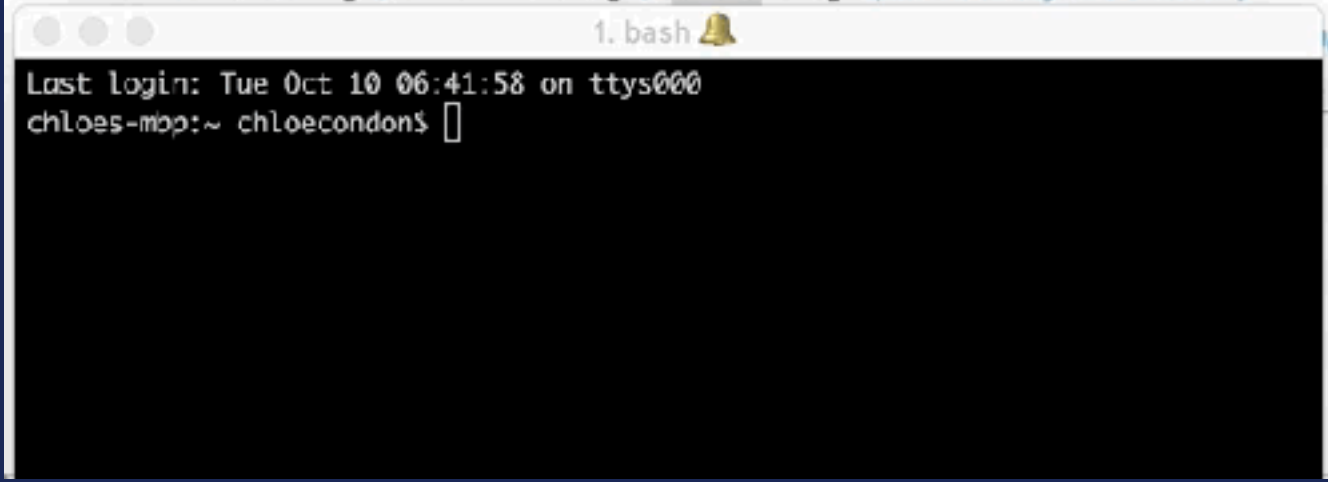
Tags

```
chloes-mbp:~ chloecondon$ docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
python              latest              be512ebcbac9        6 days ago          690MB
chloes-mbp:~ chloecondon$
```

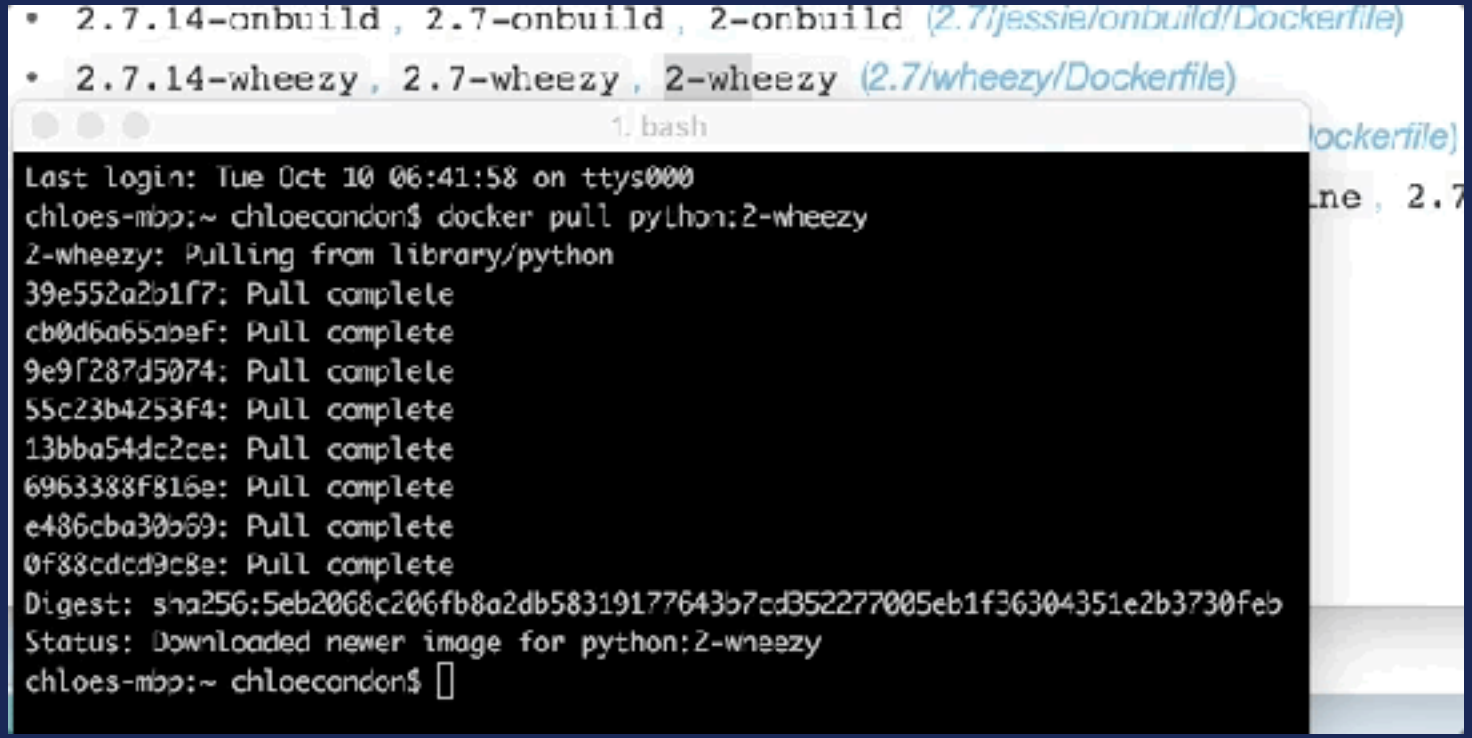
Enter Tags!

Tags

- 2.7.14-jessie, 2.7-jessie, 2-jessie (2.7/jessie/Dockerfile)
- 2.7.14-slim, 2.7-slim, 2-slim (2.7/jessie/slim/Dockerfile)
- 2.7.14-onbuild, 2.7-onbuild, 2-onbuild (2.7/jessie/onbuild/Dockerfile)
- 2.7.14-wheezy, 2.7-wheezy, 2-wheezy (2.7/wheezy/Dockerfile)



Tags

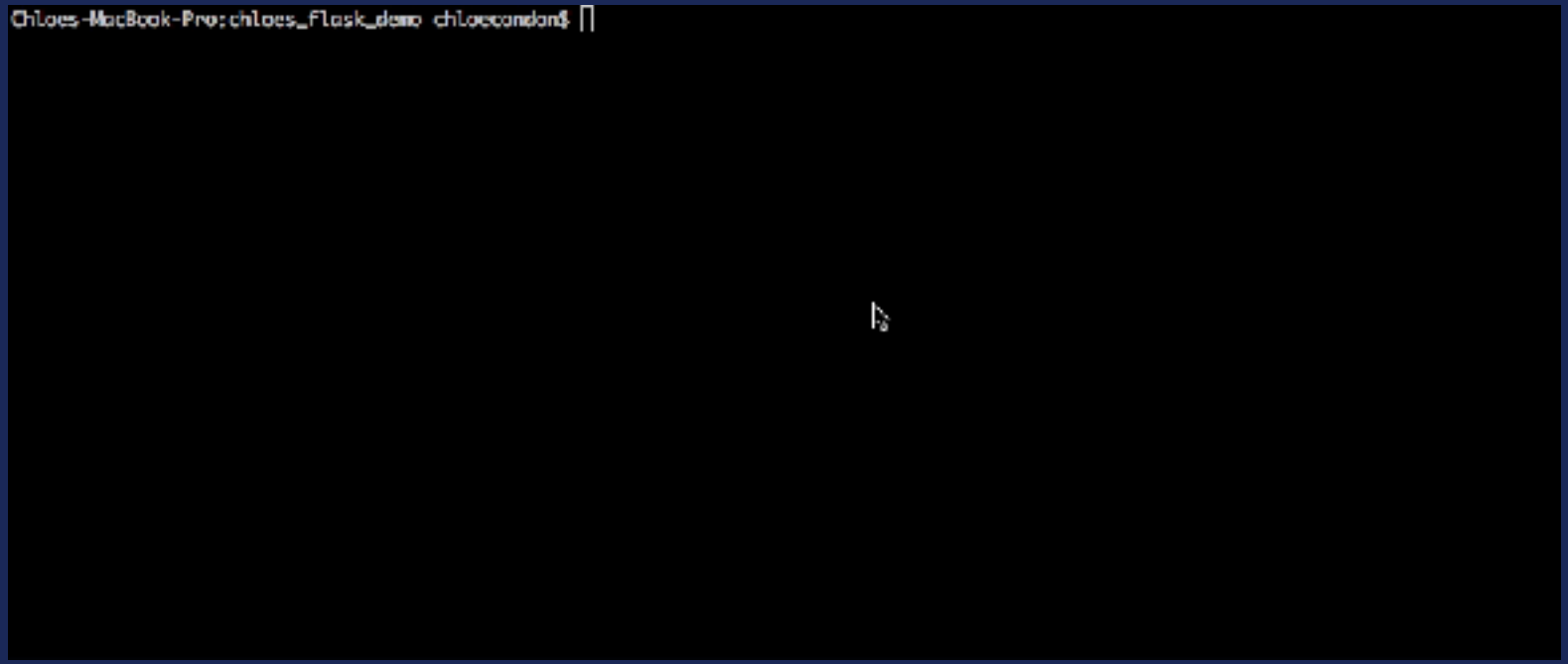

• 2.7.14-onbuild, 2.7-onbuild, 2-onbuild (2.7/jessie/onbuild/Dockerfile)
• 2.7.14-wheezy, 2.7-wheezy, 2-wheezy (2.7/wheezy/Dockerfile)
1. bash
Last login: Tue Oct 10 06:41:58 on ttys000
chloes-mbp:~ chloecondon$ docker pull python:2-wheezy
2-wheezy: Pulling from library/python
39e552a2b1f7: Pull complete
cb0d6a65abef: Pull complete
9e9f287d5074: Pull complete
55c23b4253f4: Pull complete
13bba54dc2ce: Pull complete
6963388f816e: Pull complete
e486cba30b69: Pull complete
0f88cdcd9c8e: Pull complete
Digest: sha256:5eb2068c206fb8a2db58319177643b7cd352277005eb1f36304351e2b3730feb
Status: Downloaded newer image for python:2-wheezy
chloes-mbp:~ chloecondon$

Tags

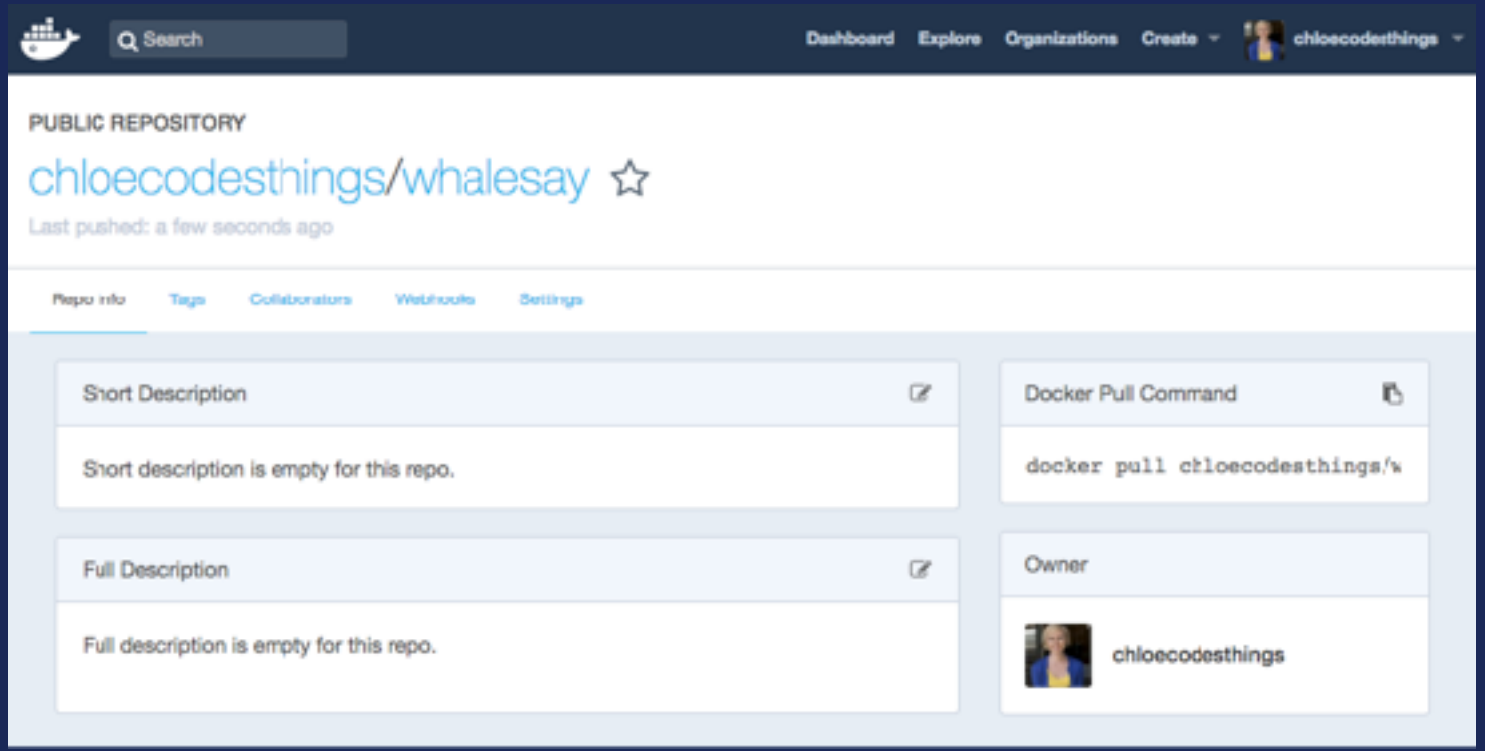
```
chloes-mbp:~ chloecondon$ docker pull python:2.7-wheezy
2.7-wheezy: Pulling from library/python
Digest: sha256:5eb2068c206fb8a2db58319177643b7cd352277005eb1f36304351e2b3730feb
Status: Downloaded newer image for python:2.7-wheezy
chloes-mbp:~ chloecondon$
```

Tags... what's in a name? -Shakespeare… jk

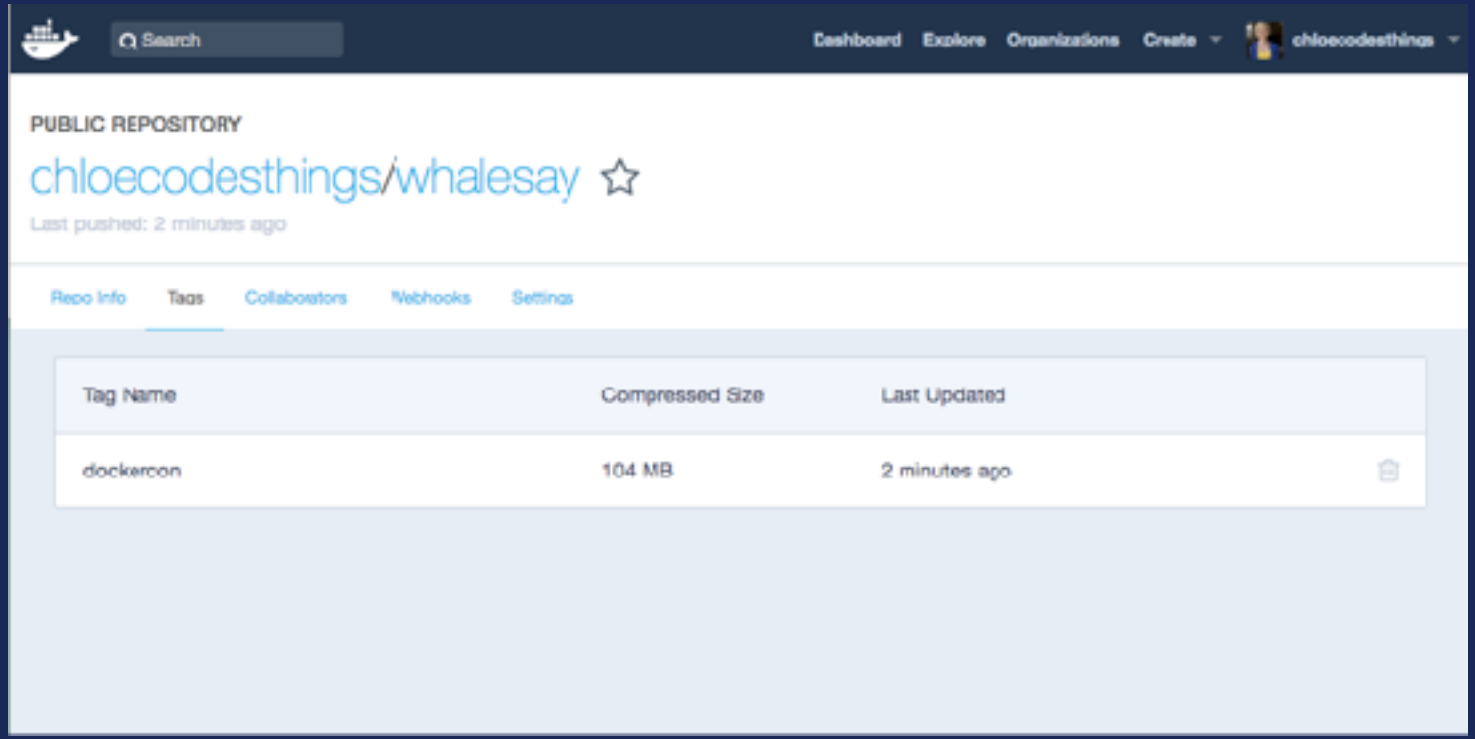
Push it!



Push it!


Search
Dashboard
Explore
Organizations
Create
chloecodesthings
PUBLIC REPOSITORY
chloecodesthings/whalesay
Last pushed: a few seconds ago
Short Description
Short description is empty for this repo.
Docker Pull Command
docker pull chloecodesthings/w
Full Description
Full description is empty for this repo.
Owner
chloecodesthings

Push it!


Search
Dashboard
Explore
Organizations
Create
chloecodesthings
PUBLIC REPOSITORY
chloecodesthings/whalesay
Last pushed: 2 minutes ago
Repo Info
Tags
Collaborators
Webhooks
Settings
Tag Name
Compressed Size
Last Updated
dockercon
104 MB
2 minutes ago

Dockerfiles are...

…instructions…

…that you need to optimize!

Things to consider with Dockerfiles

Ephemeral

🙅‍♀️ unnecessary packages

1 container = 1 concern

Minimal layers

@chloecondon

```
# our base image
FROM alpine:latest

# Install python and pip
RUN apk add --update py-pip

# upgrade pip
RUN pip install --upgrade pip

# install Python modules needed by the Python app
COPY requirements.txt /usr/src/app/
RUN pip install --no-cache-dir -r /usr/src/app/requirements.txt

# copy files required for the app to run
COPY app.py /usr/src/app/
COPY templates/index.html /usr/src/app/templates/

# tell the port number the container should expose
EXPOSE 5000

# run the application
CMD ["python", "/usr/src/app/app.py"]
```

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13
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COPY templates/index.html /usr/src/app/templates/

# tell the port number the container should expose
EXPOSE 5000

# run the application
CMD ["python", "/usr/src/app/app.py"]
```

19 lines (15 sloc) | 832 Bytes

Raw | Blame | History

```
FROM microsoft/windowsservercore

ENV NPM_CONFIG_LOGLEVEL info
ENV NODE_VERSION 6.5.0
ENV NODE_SHA256 0c0962800916c7104ce6643302b259217217183d76e34997823be3978b5ee34cf2

RUN powershell -Command \
    $ErrorActionPreference = 'Stop' ; \
    (New-Object System.Net.WebClient).DownloadFile('https://nodejs.org/dist/v%NODE_VERSION%/node-v%NODE_VERSION%-win-x64.zip',
    if ((Get-FileHash node.zip -Algorithm sha256).Hash -ne $env:NODE_SHA256) {exit 1} ; \
    Expand-Archive node.zip -DestinationPath C:\ ; \
    Rename-Item 'C:\node-v%NODE_VERSION%-win-x64' 'C:\nodejs' ; \
    New-Item '%APPDATA%\npm' ; \
    $env:PATH = 'C:\nodejs;%APPDATA%\npm;' + $env:PATH ; \
    [Environment]::SetEnvironmentVariable('PATH', $env:PATH, [EnvironmentVariableTarget]::Machine) ; \
    Remove-Item -Path node.zip

CMD [ "node.exe" ]
```

Volumes

Volumes

Data volumes are designed to **persist data**, independent of the container's lifecycle.

Volumes

VOLUME [“/data”]

Volumes

- Host Volumes

```
docker run -v /path/on/host:/path/in/container ...
```

- Anonymous Volumes

```
docker run -v /path/in/container ...
```

- Named Volumes

```
docker volume create somevolumename
docker run -v name:/path/in/container ...
```

Volumes

Docker Compose

1. Define with a Dockerfile
2. Write a docker-compose.yml
3. Run docker-compose up

Demo Time!

Great Resources!

- Play with Docker 🤹🏻
- Bret Fisher's class on Udemy 👨🏼‍🏫
- Docker Docs 🐳
- Anything from a Docker Captain! 🚢 (docker.com/captains)
- Codefresh 🌿

Thank You!

@chloecondon on most things!

My articles on Medium cover:

- Docker Basics
- Volumes
- Tags
- & much more!

Come to my Hallway Track after this!

Otherwise, I'll be chilling in the foam pit!

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