TIPS FOR USING DOCKER

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UCL

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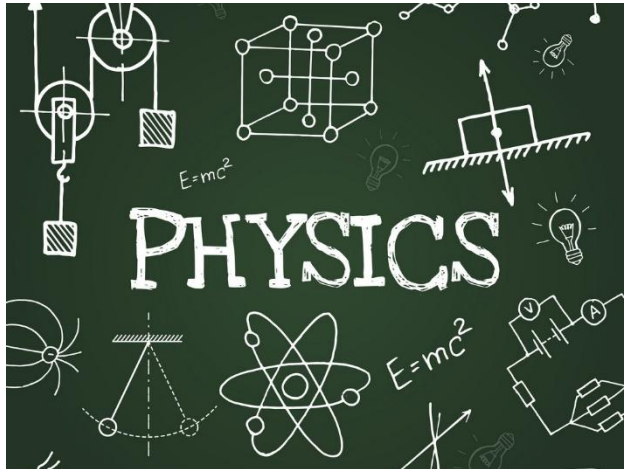

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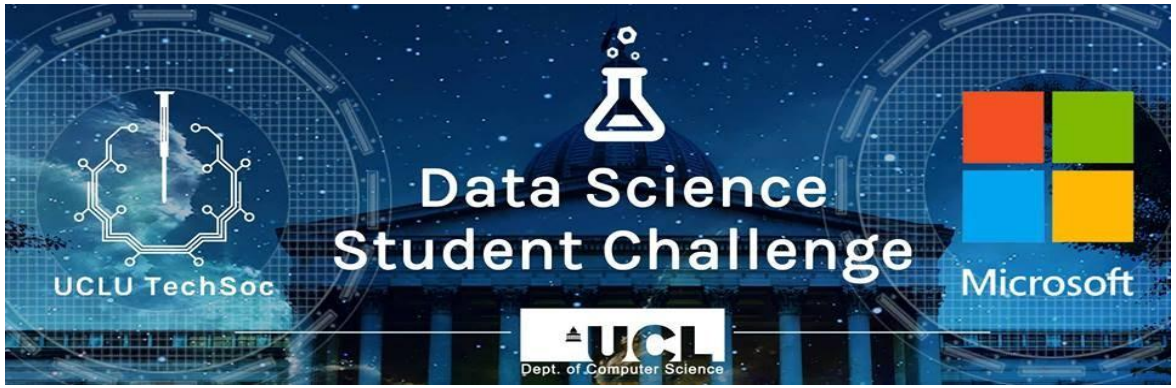
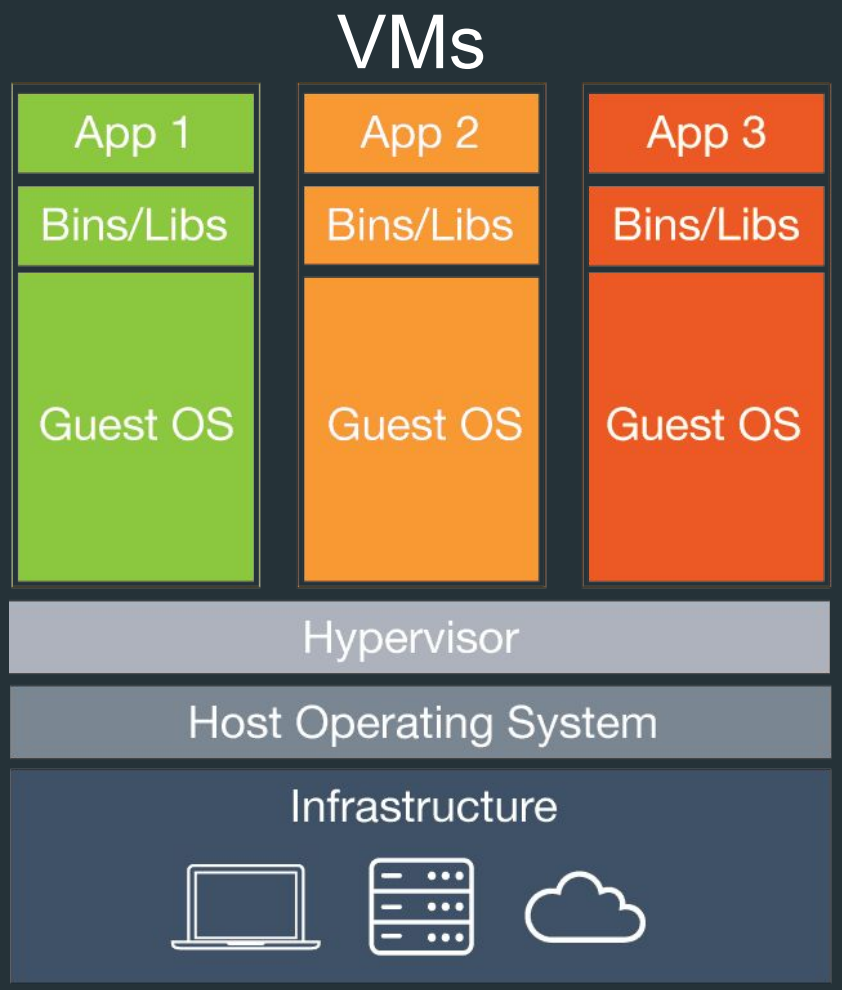


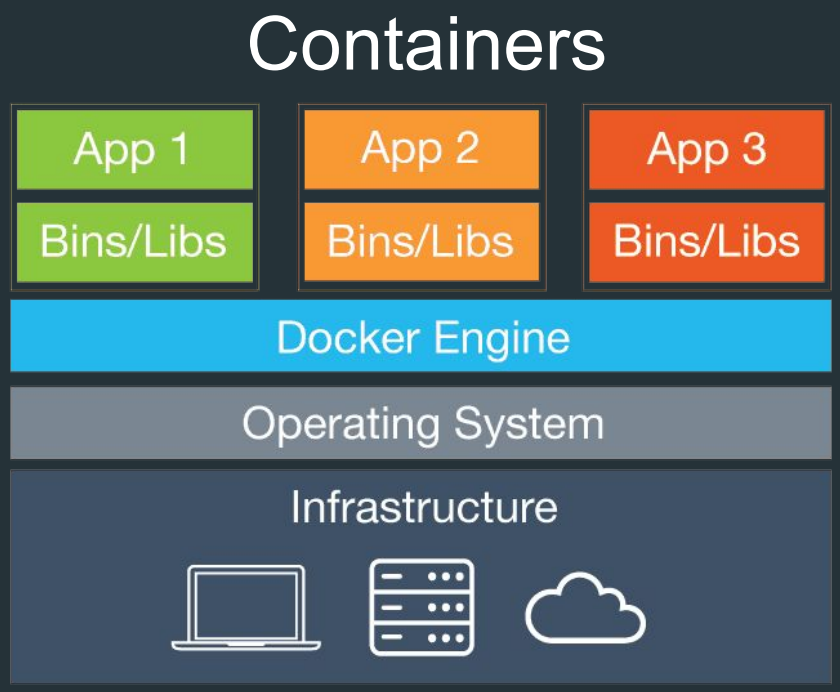
SEATTLE SEAHAWKS

WHAT IS DOCKER?

- Open Source!
- Container-based system
- Docker wraps up the application & all of its dependencies into a software container
- Automates the deployment of applications
- Independent of underlying OS of the host system
- Simple to use!

THE CONTAINER WORLD…



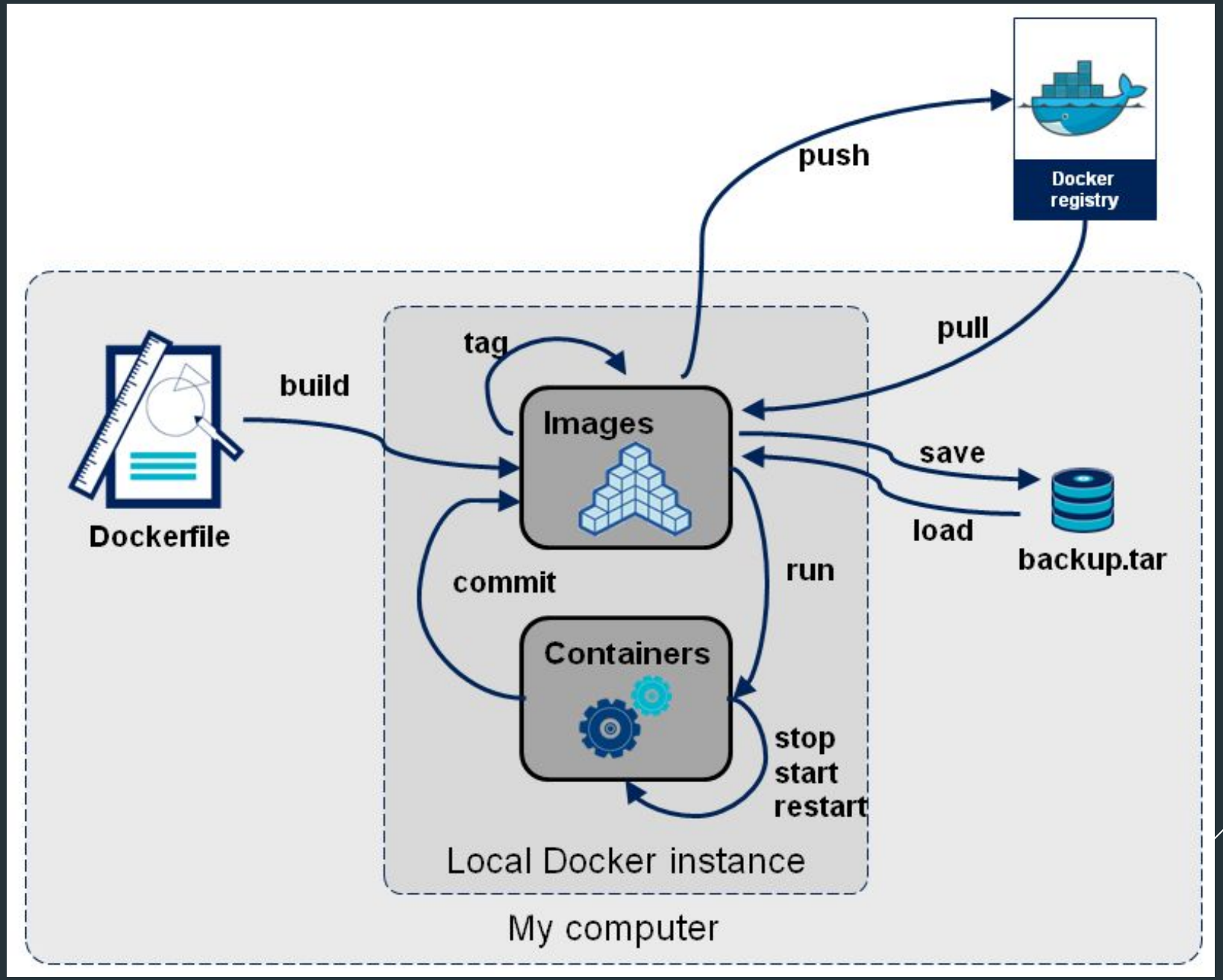


WHAT IS KUBERNETES?

- Scale up containers
- Container Cluster Management System
- DevOps focused
- Originally designed by Google

MICROSERVICES

- Microservices architecture: smaller modular processes
- Docker is well suited to microservices architecture
- Agile methodology practises, efficiency for developers
- Continuous delivery, continuous integration pipelines
- Hudson & Jenkins


Docker registry
push
pull
tag
build
Images
save
load
backup.tar
Dockerfile
commit
run
Containers
stop
start
restart
Local Docker instance
My computer

DOCKERFILE

Command	Description
ADD	Copies a file from the host system onto the container
CMD	The command that runs when the container starts
ENV	Sets an environment variable in the new container
EXPOSE	Opens a port for linked containers
FROM	The base image to use in the build. Mandatory and must be the first command
ONBUILD	A command that is triggered when the image in the Dockerfile is used as a base for another image
RUN	Executes a command and saves the results as a new layer
VOLUME	Creates a shared volume that can be shared among containers by host machine
WORKDIR	Set the default working directory for the container

DOCKERFILE EXAMPLE

```
# comment
INSTRUCTIONS arguments

# our base image
FROM python:3-onbuild

# specify the port number the container
should expose
EXPOSE 5000

# run the application!
CMD ["python", "./myapp.py"]
```

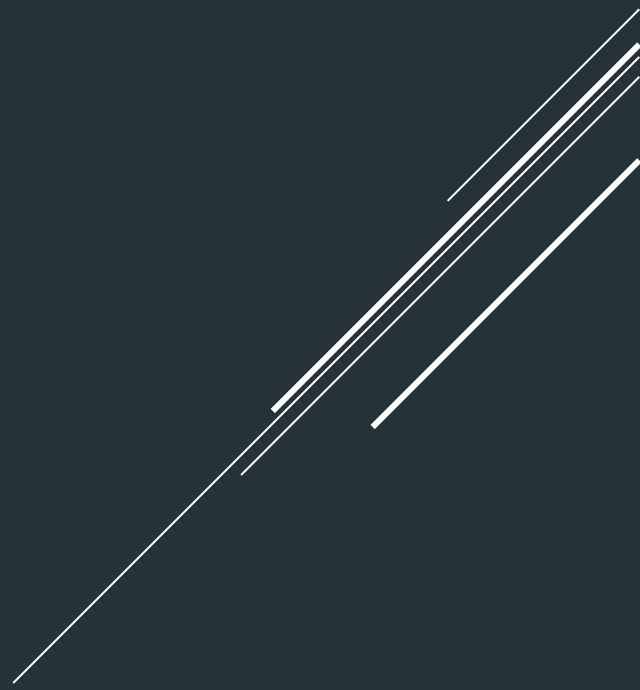
DOCKERFILE EXAMPLE

```
$ docker build -t prakhar1989/catnip .
Sending build context to Docker daemon 8.704 kB
Step 1 : FROM python:3-onbuild
# Executing 3 build triggers...
Step 1 : COPY requirements.txt /usr/src/app/
 ---> Using cache
Step 1 : RUN pip install --no-cache-dir -r requirements.txt
 ---> Using cache
Step 1 : COPY . /usr/src/app
 ---> 1d61f639ef9e
Removing intermediate container 4de6ddf5528c
Step 2 : EXPOSE 5000
 ---> Running in 12cfcf6d67ee
 ---> f423c2f179d1
Removing intermediate container 12cfcf6d67ee
Step 3 : CMD python ./app.py
 ---> Running in f01401a5ace9
 ---> 13e87ed1fbc2
Removing intermediate container f01401a5ace9
Successfully built 13e87ed1fbc2
```

Replace with your username on Docker Hub and application name

DOCKERFILE EXAMPLE

```
$ docker run -p 8888:5000 <userName>/<appName>
   * Running on http://0.0.0.0:5000/ (Press CTRL+ to quit)
```



EXAMPLE COMMANDS:

`docker pull python:2.7`	Pull image from DockerHub
`docker images`	Shows all images
`docker rmi python:2.7`	Remove an image
`docker ps`	Show only running containers
`docker ps -a`	Shows all containers
`docker build -t <image_name>`	Create your own image
`docker logs -f <container_name>`	Check the logs of container
`docker load -i <CONTAINER_FILE>.tar`	Restoring docker container
`docker rm $(docker ps -a -q)`	Deletes all containers but fails on the ones running

CONFIGURE DOCKER PS OUTPUT

- Default output of `docker ps`

```
$ docker ps

CONTAINER ID    IMAGE      COMMAND       ……
247wh3jddee0    nginx      “nginx -g daemon” ……
```

- This output takes up too much room – can get annoying!

CONFIGURE DOCKER PS OUTPUT

- It can be fixed!
- Solution is to use --`format` argument

```
$ docker ps --format \
   "table {{.Names}}\\t{{.Image}}\\t{{.Status}}"

NAMES       IMAGE    STATUS
web         nginx    Up 20 minutes
```

- Make the output in permanent format by setting an alias in config.json

```
$ cat ~/.docker/config.json
{……
   "psFormat": "table
{{.Names}}\\t{{.Image}}\\t{{.Status}}"
}
```

PROCESS IDS

- Getting the ID of the last run container
- Very useful!

```
$ ID=$(docker run Ubuntu echo hello world)
hello world
$ docker commit $ID helloworld
24jkerndff9ue
```

- But you have to keep assigning IDs!

PROCESS IDS

- Set an alias!

```
$ alias dl = ‘docker ps -l -q’
$ docker run Ubuntu echo hello world
hello world
$ dl
19733hdbwff9we
$ docker commit `dl` helloworld
ff09sjbew8hew3
```

USEFUL COMMANDS

- Deleting “dangling” images
- <none> images

```
$ docker image prune
WARNING! This will remove all dangling images
Are you sure you want to continue? [y/N] y
Deleted images:
deleted:
23j2j3kmcerkeddne09eea3goed232nfks..
……
Total reclaimed space: 3GB
```

USEFUL COMMANDS

- Delete stopped containers

```
$ docker container prune
WARNING! This will remove all stopped containers
Are you sure you want to continue? [y/N] y
Deleted Containers:
deleted:
23j2j3kmcerkeddne09eea3goed232nfks..
……
Total reclaimed space: 300MB
```

HEALTH CHECKS

- Used by docker to determine the “health” of a container

```
FROM nginx

RUN apt-get update && apt-get install -y curl
HEALTHCHECK --interval=10s
```

SHRINKING A CONTAINER

- Smith CLI
  - Open Source!
  - Apache License 2.0
  - Universal Permissive License
- Command line tool for
  - Building Microcontainers
    - yum repos
    - rpm files
  - Shrinking existing containers
    - Standard container in Microcontainer out

USEFUL WEBSITES & WHERE TO LOOK

- Docker 101 blog:
  https://blog.docker.com/2016/05/docker-101-getting-to-know-docker/
- Docker Curriculum:
  https://docker-curriculum.com/
- Liz Rice: Building a container from scratch in Go
  https://www.youtube.com/watch?v=Utf-A4rODH8
- DigitalOcean
- Good defaults for node and docker – Bret Fisher
  https://github.com/BretFisher/node-docker-good-defaults
- Walkthrough on Dockerfiles:
  http://odewahn.github.io/docker-jumpstart