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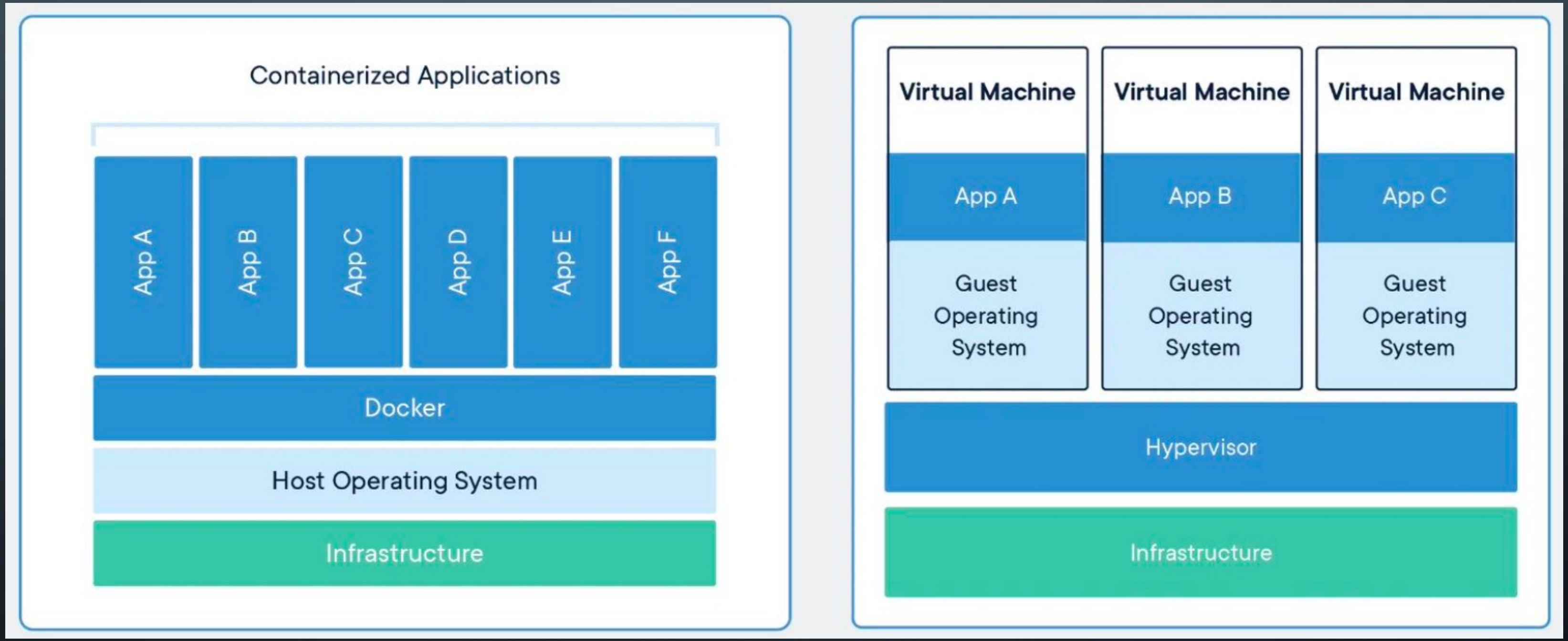
An Introduction to Containers

Virtualization and Installation of On-Prem Video Conferencing Platform

CONTAINERS

- Containers are an abstraction at the app layer. •
- E.g.: Docker, Linux Containers (LXC)



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WHY CONTAINERS

- *Less overhead*

- Containers require less system resources than traditional or hardware virtual machine environments because they don't include operating system images.

- *Increased portability*

- Containers can run virtually anywhere, on Linux, Windows, and Mac operating systems; on virtual machine or on physical servers; on a developer's machine or in data centres on-premises; and of course, in the public cloud.

- *Greater efficiency*

- allow you to use just the computing resources you need. This lets you run your applications efficiently. More rapidly deployed, patched, or scaled.

- *Better application development*

- Containers support agile and DevOps efforts to accelerate development, test, and production cycles. More secure.

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INTRODUCTION TO DOCKER

- Docker is an open platform for developing, shipping, and running applications.
- Docker detach applications from their underlying infrastructure so one can deliver software quickly.
- Docker Image - is a read-only template with instructions for creating a Docker container
- A Docker container is a runnable instance of an image.

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WHY DOCKER

- Community

- Docker Hub

- Isolation

-virtualize CPU, memory, storage, and network resources at the operating system level, providing developers with a view of the OS logically isolated from other applications. Library separation.

- Lightweight

- share the machine's OS system kernel and therefore do not require an OS per application, driving higher server efficiencies and reducing server and licensing costs

- Simplicity

- Docker's friendly, CLI-based workflow makes building, sharing, and running containerized applications accessible to developers of all skill levels.

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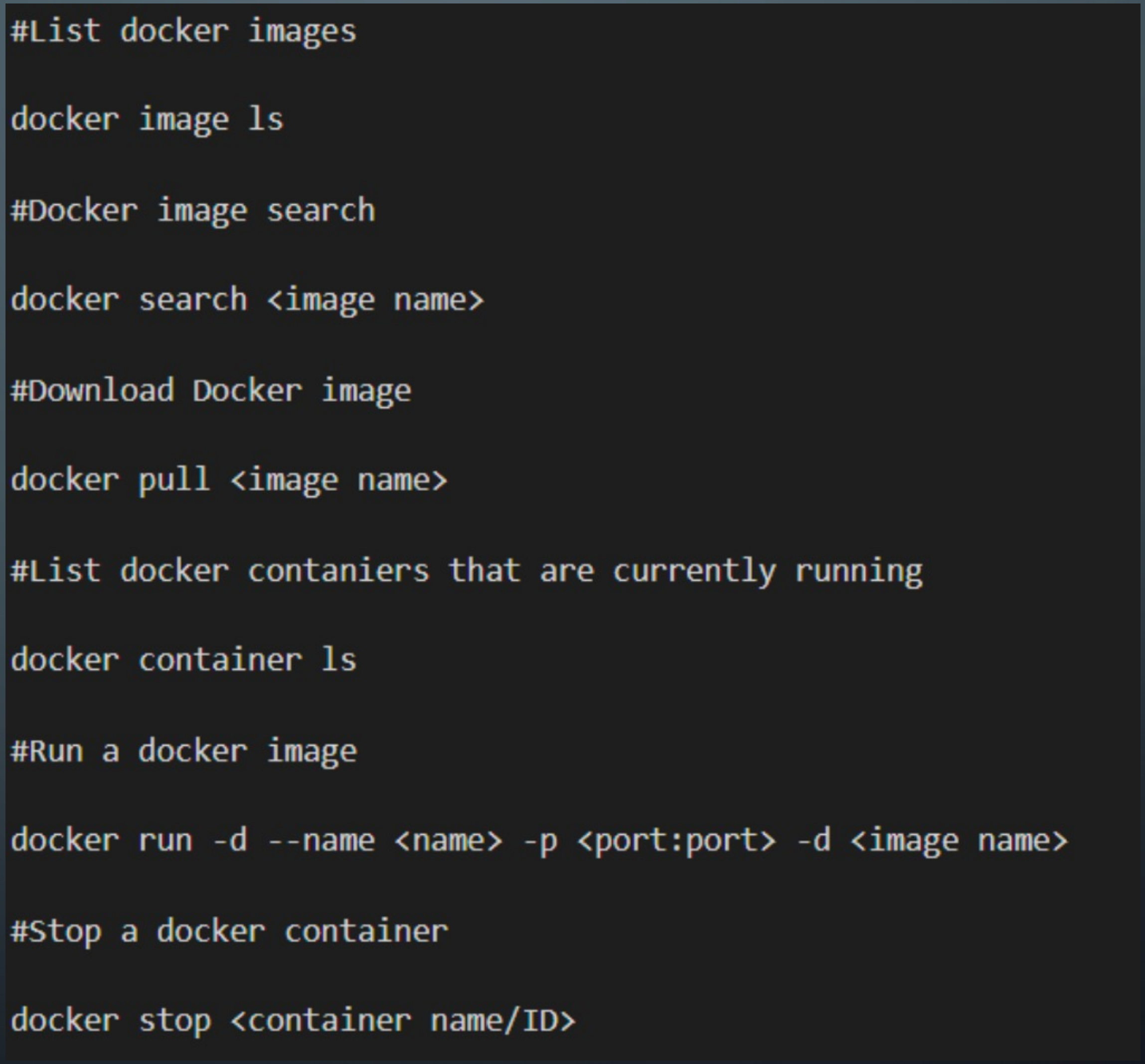
CONT'D

- Workflow

- Write the code.
- Build a container image.
- Push the image to the server or Docker Hub.
- Start the application, with the new image.
- Revise the (if necessary) and rerun the above workflow

DOCKER COMMANDS



```
#List docker images

docker image ls

#Docker image search

docker search <image name>

#Download Docker image

docker pull <image name>

#List docker contaniers that are currently running

docker container ls

#Run a docker image

docker run -d --name <name> -p <port:port> -d <image name>

#Stop a docker container

docker stop <container name/ID>
```

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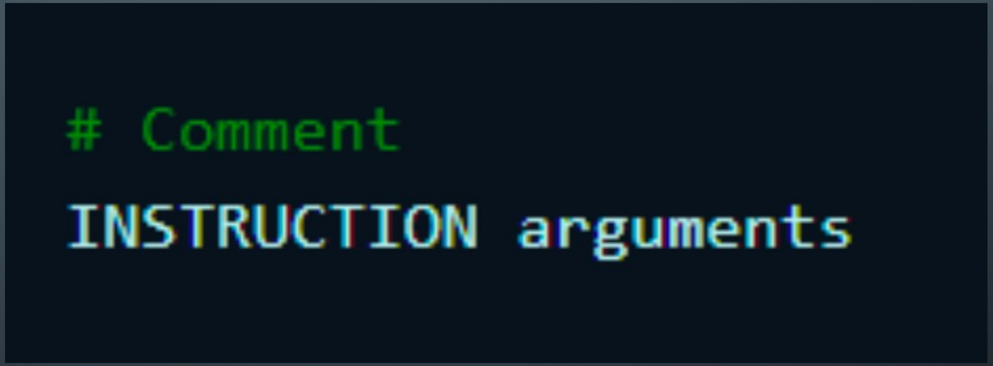
DOCKER FILE

- Used to setup a Docker image
- A Dockerfile is a text document that contains all the commands a
- user could call on the command line to assemble an image.
- Dockerfile format



```
# Comment
INSTRUCTION arguments
```

- The instruction is not case-sensitive. However, convention is for them to be UPPERCASE to distinguish them from arguments more easily.

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CONT'D

- Generally, a Dockerfile must begin with a FROM instruction.
- Commonly used instructions with formats
  - FROM <parent Docker image name>
  - RUN <command>
  - CMD <command>

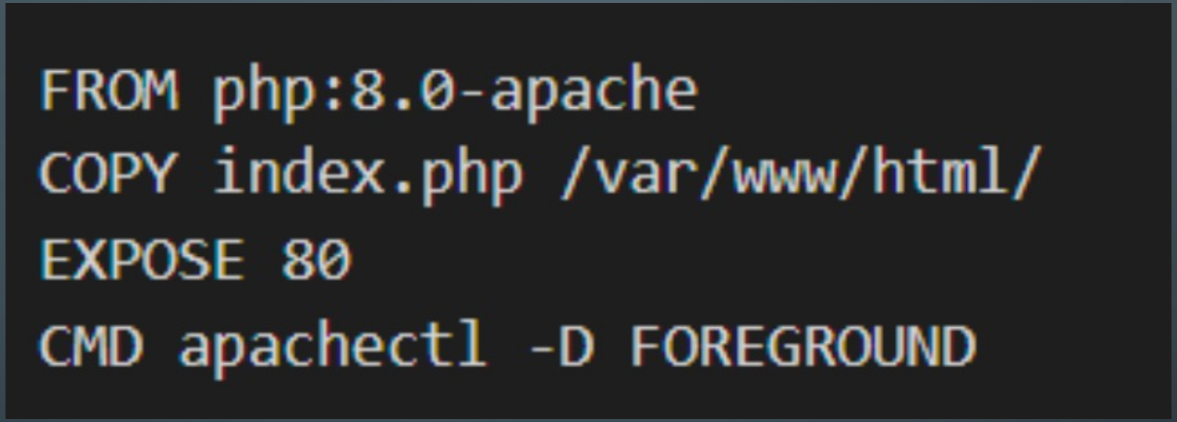
The main purpose of a CMD is to provide defaults for an executing container. RUN actually runs a command and commits the result; CMD does not execute anything at build time, but specifies the intended command for the image.

  - COPY <src>... <dest>
  - EXPOSE <port> [<port>/<protocol>...]
  - VOLUME <["/data"]>

The VOLUME instruction creates a mount point with the specified name and marks it as holding externally mounted volumes.

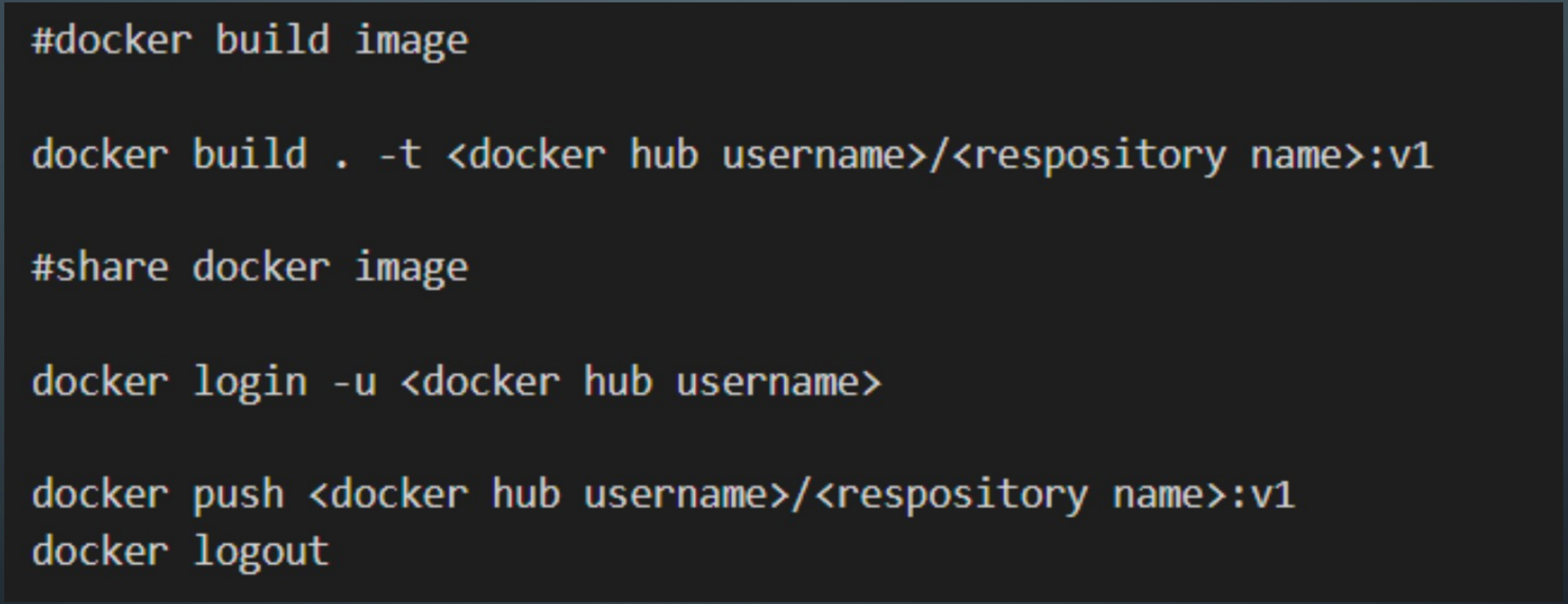
DOCKERFILE EXAMPLE

- Simple Dockerfile content



```
FROM php:8.0-apache
COPY index.php /var/www/html/
EXPOSE 80
CMD apachectl -D FOREGROUND
```

DOCKER IMAGE COMMANDS



```
#docker build image

docker build . -t <docker hub username>/<respository name>:v1

#share docker image

docker login -u <docker hub username>

docker push <docker hub username>/<respository name>:v1
docker logout
```

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DOCKER COMPOSE

- Compose is a tool for defining and running multi-container Docker applications.
- With Compose, you use a YAML file to configure your application's services.
- Then, with a single command, you create and start all the services from your configuration.
- Can install as a plugin

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THANK YOU

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