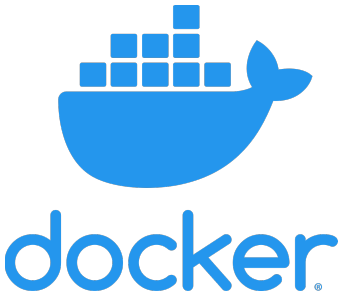

DOCKER - WORKSHOP 1

Created by Frédérick PERRIN

DOCKER "IN DEV" ?

BECAUSE:

BECAUSE:

- homogeneous installations

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- homogeneous installations
- iso PROD env

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- homogeneous installations
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- easy onboarding

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- homogeneous installations
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- host machine stay clean
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- can easily create POC

DOCKER, GET STARTED

QUICK INTRODUCTION

WHAT'S DOCKER ?

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Docker is a platform for developers and sysadmins to build, run, and share applications with containers.

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Docker is a platform for developers and sysadmins to build, run, and share applications with containers.

Based on **Linux** kernel and on one feature: containers (**LXC**). The goal is to run one process in an isolated environment

WHAT ABOUT VM'S ?

Everything works with vm's (isolation, abstraction layers, ...)

What the differences between vm and containers?

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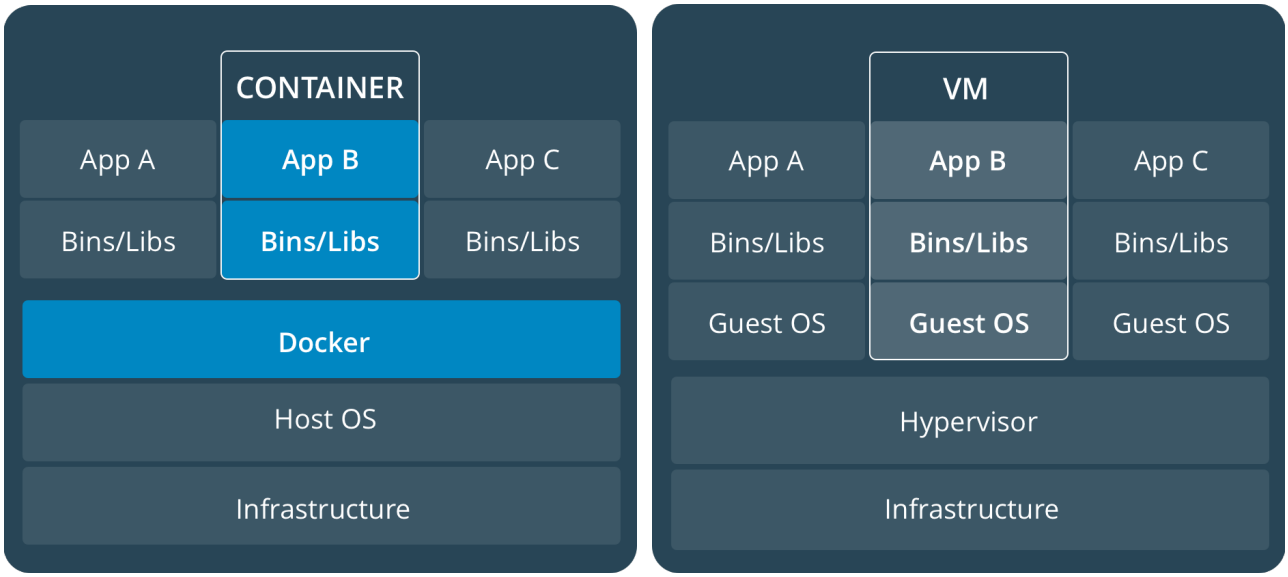

IMAGES VS CONTAINER

Fundamentally, a container is nothing but a running process

The image is the definition of a container, containers are just image's instances

you can run multiple instances (containers) of an image

WORKFLOW

WORKFLOW

Create /
Use image

WORKFLOW

Create /
Use image →

WORKFLOW

Create / Use image → Create a container

WORKFLOW

Create / Use image → Create a container →

WORKFLOW

Create / Use image → Create a container → Start container

BASIC COMMANDS AND CONCEPTS

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docker's documentation is really well organized and clear

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Command line reference: https://docs.docker.com/engine/reference/commandline/docker/

COMMANDS TO KNOW 1/4

```
# The default docker images will show all top level images,
# their repository and tags, and their size.
docker images

# Manage images
docker image COMMAND

# Build an image from a Dockerfile
docker build [OPTIONS] PATH | URL | -

# Copy files/folders between a container
# and the local filesystem
docker cp [OPTIONS] CONTAINER:SRC_PATH DEST_PATH|-
docker cp [OPTIONS] SRC_PATH|- CONTAINER:DEST_PATH
```

COMMANDS TO KNOW 2/4

```
# Create a new container
docker create [OPTIONS] IMAGE [COMMAND] [ARG...]

# Run a command in a running container
docker exec [OPTIONS] CONTAINER COMMAND [ARG...]

# Run a command in a new container
docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

# Return low-level information on Docker objects
docker inspect [OPTIONS] NAME|ID [NAME|ID...]

# Fetch the logs of a container
docker logs [OPTIONS] CONTAINER

# List containers
```

COMMANDS TO KNOW 3/4

```
# Restart one or more containers
docker restart [OPTIONS] CONTAINER [CONTAINER...]

# Start one or more stopped containers
docker start [OPTIONS] CONTAINER [CONTAINER...]

# Stop one or more running containers
docker stop [OPTIONS] CONTAINER [CONTAINER...]

# Display the running processes of a container
docker top CONTAINER [ps OPTIONS]
```

COMMANDS TO KNOW 4/4

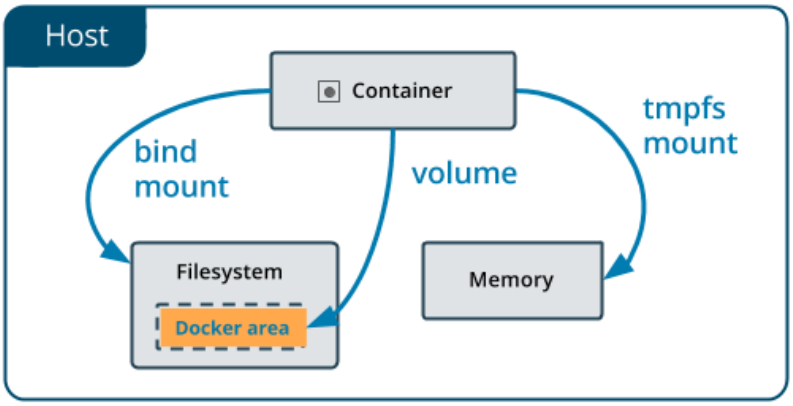
```
# Remove one or more containers
docker rm [OPTIONS] CONTAINER [CONTAINER...]

# Remove one or more images
docker rmi [OPTIONS] IMAGE [IMAGE...]
```

CONFIGURE CONTAINERS

VOLUMES

Volumes are the preferred mechanism for persisting data generated by and used by Docker containers



Documentation: https://docs.docker.com/storage/volumes/

LINK / DEPENDENCIES

- container links (deprecated)
- networks (user defined networks, give a better isolation)

ENVIRONMENTS

you can define environment variables in image build and in container creation

It gives a powerfull tool to customize and configure your container

- embed configuration
- on run customization

NETWORKS

Use to connect containers between them. You can add networks, connect containers to them, isolate them.

Documentation: https://docs.docker.com/network/

DOCKERFILE

Docker can build images automatically by reading the instructions from a Dockerfile.

A Dockerfile is a text document that contains all the commands a user could call on the command line to assemble an image

Documentation: https://docs.docker.com/engine/reference/builder/

DOCKERFILE EXAMPLE

```
1  FROM debian:buster-slim
2
3  LABEL description="This an iad workshop on docker" \
4            maintainer="frederick.perrin@iadinternational.com"
5
6  RUN apt-get update && apt-get install -y procps
7
8  ENV COMPANY="docker"
9  COPY test.txt /mnt/
10 EXPOSE 80
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12 ENTRYPOINT ["top", "-b"]
13 CMD ["-c"]
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LET'S PLAY

DOCKER RUN

DOCKER RUN

```
# get image in local
docker pull debian:buster-slim
```

DOCKER RUN

```
# let's check our images
docker images
REPOSITORY   TAG          IMAGE ID       CREATED     SIZE
debian       buster-slim  f49666103347   8 days ago  69.2MB
```

DOCKER RUN

```
# your first container
docker run debian:buster-slim
```

DOCKER RUN

```
# show our containers
docker ps -a --filter ancestor=debian:buster-slim
```

DOCKER RUN

```
# clean those containers
docker rm ac3cc529dcfc e9d5dfdfc3f6
```

DOCKER RUN

```
# clean execution
docker run --rm debian:buster-slim
```

DOCKER RUN

```
# execute a command inside our
docker run --rm debian:buster-slim echo "I love docker !"
```

DOCKER RUN

```
# execute a shell
docker run --rm debian:buster-slim bash
```

DOCKER RUN

```
# -it flags attaches us to an interactive tty in the container.
docker run --rm -it debian:buster-slim bash
```

DOCKER RUN

```
# mount a volume
docker run -it -v $(pwd):/mnt --rm debian:buster-slim bash
```

DOCKER RUN

```
# use environment variable
docker run -e IAD=42 -v $(pwd):/mnt --rm debian:buster-slim env
```

DOCKER BUILD

DOCKER BUILD

```
# get Dockerfile from repo:
git clone git@github.com:yonzin/docker-workshop.git
```

DOCKER BUILD

```
# let's build our first image
docker build -t iad_workshop:1.0 -t iad_workshop:latest .

# got check our images
docker image ls
```

DOCKER BUILD

```
docker run -e IAD=42 -v $(pwd):/mnt --rm iad_workshop:1.0

docker ps test
```

DOCKER BUILD

```
docker run -e IAD=42 -v $(pwd):/mnt --rm iad_workshop -H

docker ps test
```

DOCKER BUILD

```
docker run -it --entrypoint bash --rm iad_workshop --debug

docker ps test

docker exec -ti test top
```

DOCKER BUILD

```
docker run -it --entrypoint bash --name test-workshop iad_workshop

docker start test-workshop
```

DOCKER BUILD

```
docker run -it --entrypoint bash --rm --name test iad_workshop

> ls -la /mnt
> cat /mnt/test.txt

docker run -it -v $(pwd):/mnt --entrypoint bash --rm iad_workshop

> ls -la /mnt
```

DOCKER-COMPOSE, KEZAKO ? AND WHY ?

DEFINITION

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.

YES

This is IaC (infrastructure as code)

You can define your services, networks, volumes

```yaml
version: '3.8'
services:
  my-service:
        image: nginx
        container_name: my_awesome_service
        ports:
          - "8080:80"
        networks:
          - my-own-network
  my-second-service:
        build: ./my-second-service
        environment:
          - IAD=42
        volumes:
          - ./my-src:/home/service
        depends_on:
```

Documentation: https://docs.docker.com/compose/compose-file/

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DOCKER COMPOSE CLI

There is commands to manage docker compose files

Documentation: https://docs.docker.com/compose/reference/overview/

COMMANDS TO KNOW

```
# Services are built once and then tagged
docker-compose build

# Builds, (re)creates, starts, and attaches to containers for
docker-compose up

docker-compose start
docker-compose stop
docker-compose restart

# Removes stopped service containers.
docker-compose rm

# Stops containers and removes containers, networks,
# volumes, and images created by up.
docker-compose down
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PROJECT DO IT YOURSELF

PROJECT DO IT YOURSELF

Let's build together our own docker dev environment

- Symfony
- reverse proxy
- and more ...

INSTRUCTIONS

I want a docker-compose file with those services:

- nginx
- php fpm
- PostgreSQL
- adminer

Directory structure is in the do-it-yourself folder (repo: https://github.com/yonzin/docker-workshop)

BONUS

- use a reverse-proxy (traefik) with a custom host
- mount a volume for nginx and fpm in foler infrastructure/logs
- add ssh-agent host config inside fpm container

WORKSHOP2

- try to migrate DockerDev yourself with the branch (epic/rework-CICD-project)
- remove all your containers
- check you don't have any modified file
- backup your .env and run make init_env and make init commands (README is coming)
- don't be afraid, workshop2 purpose is to present new DockerDev features and help you to migrate your env.

THE END

thank you for your attention workshop 2 is coming