Docker

Thibaut BAYER - Tech sharing - Février 2019

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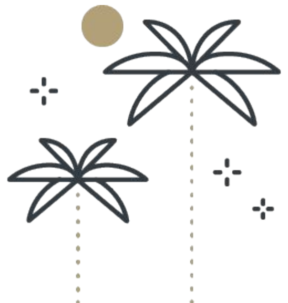
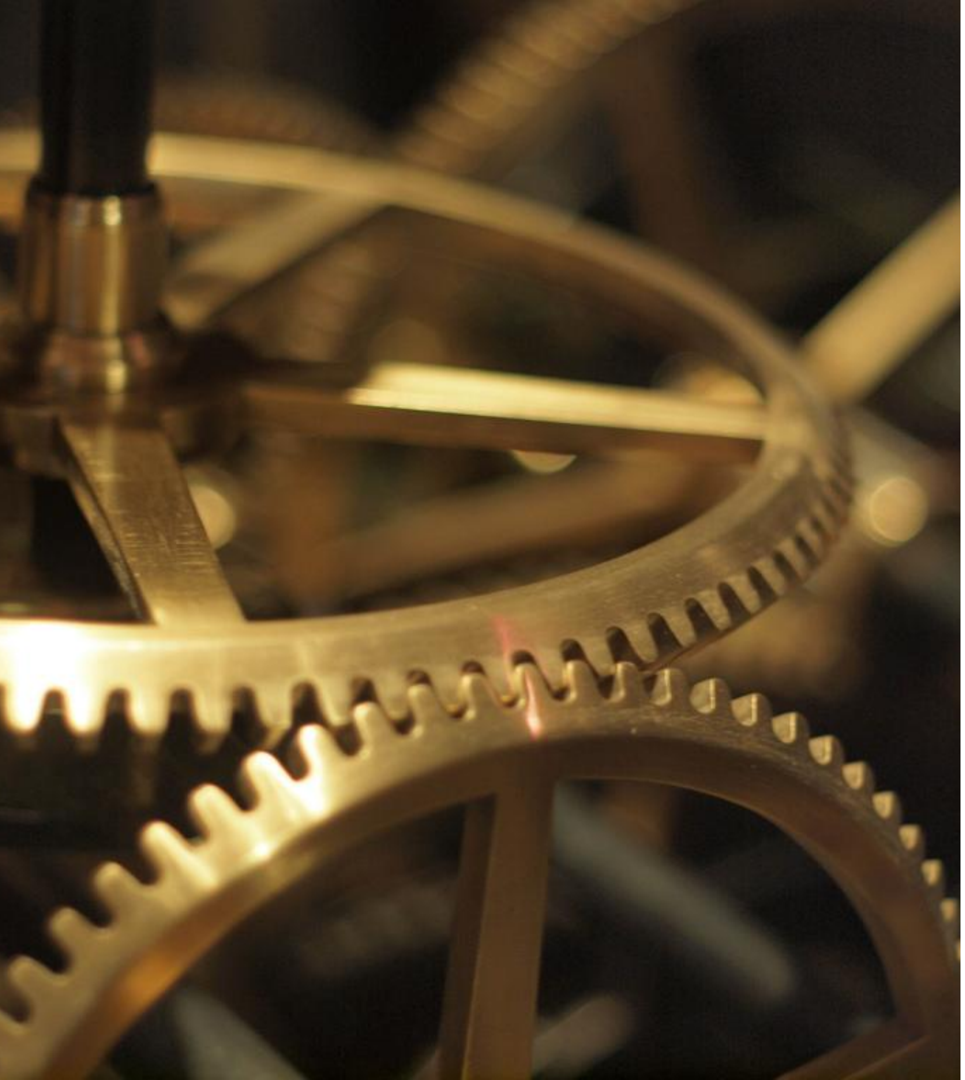




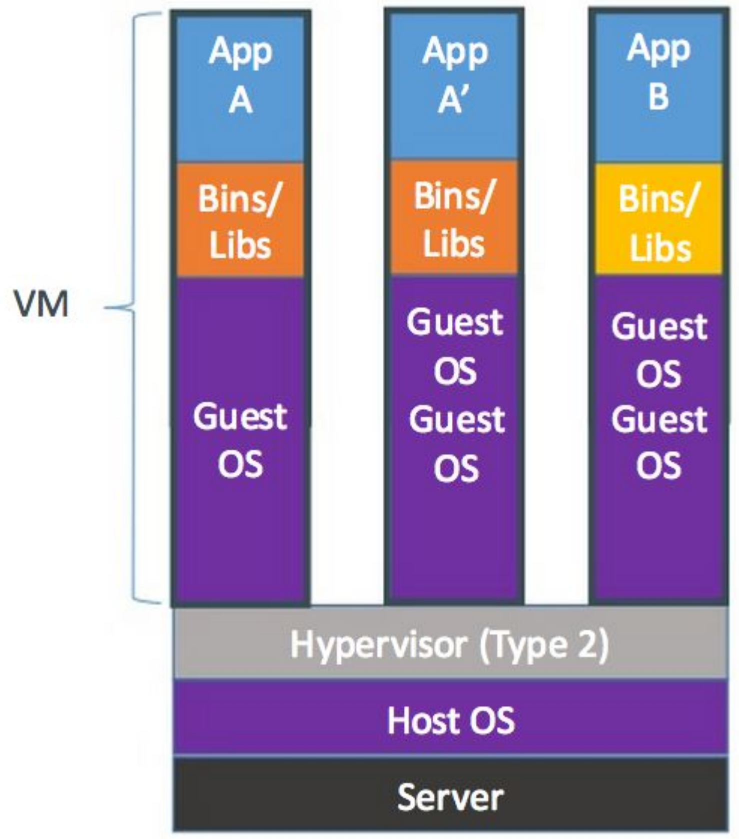
How it works

#1 How it works – Summary

“**Docker** is a computer program that performs operating-system-level virtualization, also known as containerization”

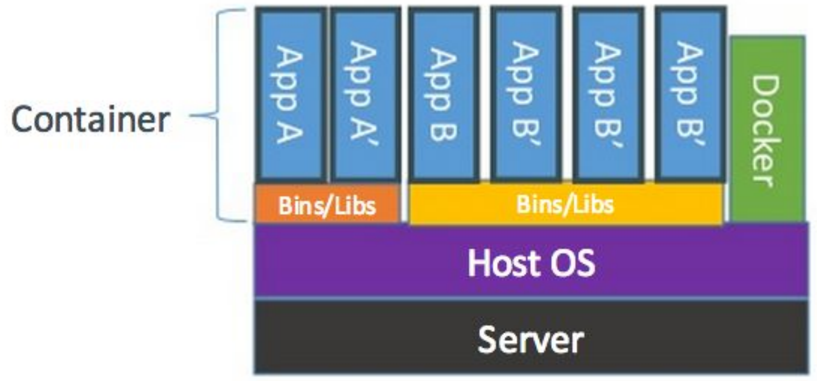
✓ Containers are isolated.
✓ Containers should run one process, not a full stack.
✓ Docker is not a common virtualization system, it’s containerization.
✘ Containers are not permanent, it mean, you should not store data.

#1 How it works - Virtualization VS Containerization



Containers are isolated, but share OS and, where appropriate, bins/libraries

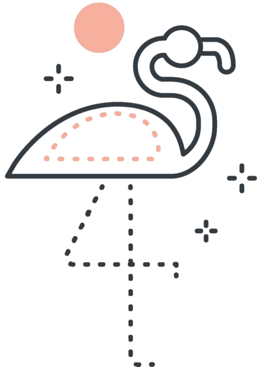
...result is significantly faster deployment, much less overhead, easier migration, faster restart



#1 How it works – Advantages

- Performance (low-level virtualization)
- Security (isolation)
- Available in all operating system (windows included with WSL)
- Allows developers to test in the same environment
- Easy to test with multiple applications versions

Let’s play



#1 Let's play - Hello World

- docker run hello-world
- docker run --privileged -it --rm --name swiftfun swiftdocker/swift:latest swift
    - run: Pull & Build and run the image
    - --privilege: Ask super user privileges
    - -it: Run in interactive mode
    - --rm: Remove filesystem to have a clean container
    - --name: The name of the container
    - swiftdocker/swift: Name of the image we want to pull
    - :latest : Version of the image
    - swift: Command to execute

#1 Let’s play - Swift Web server

- docker build . -t btor/swift-webserver
    - build: Build the image
    - . : Location of the image
    - -t btor/swift-webserver: Name the image (with tag)
- docker run -p=8181:8181 -it btor/swift-webserver
    - run: pull & build & run the image
    - -p:8181:8181 : Ask docker to open internal port 8181 to host port 8181

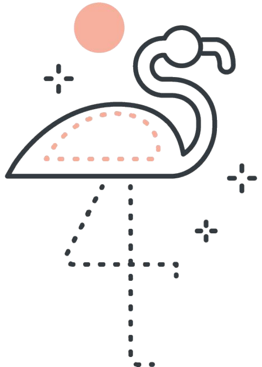
And with GO ?

- docker build . -t btor/go-webserver
- docker run -p=8181:80 -it btor/go-webserver

Cool, but it’s boring

When using Docker “vanilla” you must know all commands and arguments.

Docker-compose



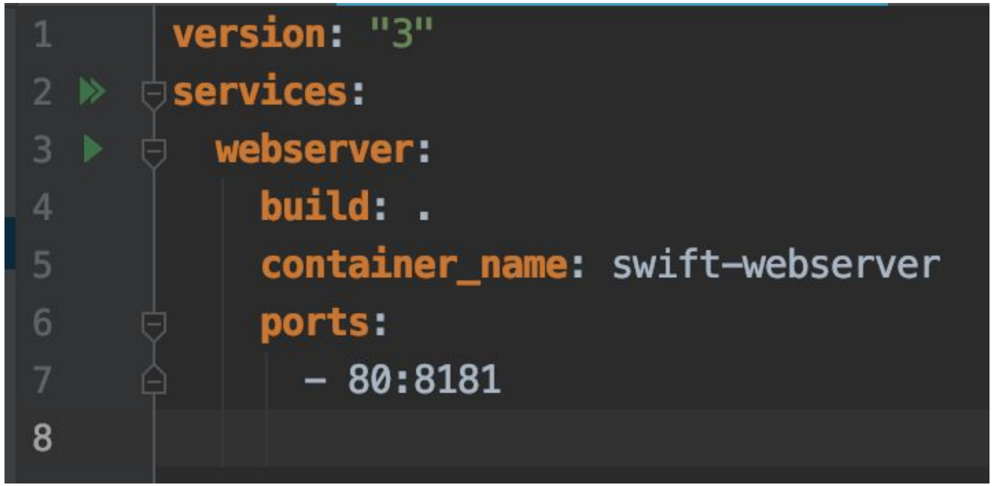
#1 Docker-compose

Docker-compose is a tool to help you to run and manage docker containers.

Without docker-compose we must do:

- docker build . -t btor/swift-webserver
- docker run -p=80:8181 -it btor/swift-webserver

With docker-compose, we can do:



```yaml
version: "3"
services:
  webserver:
    build: .
    container_name: swift-webserver
    ports:
      - 80:8181

```

version: Version of docker-compose syntax
services: Where you define all your containers
webserver: Name of the container for docker-compose
build: Path to your Dockerfile, you can replace 'build' by 'image' of you want to use a docker image
container_name: Name of the container for docker.
ports: Same as docker

#1 Docker-compose

To run a docker-compose stack:

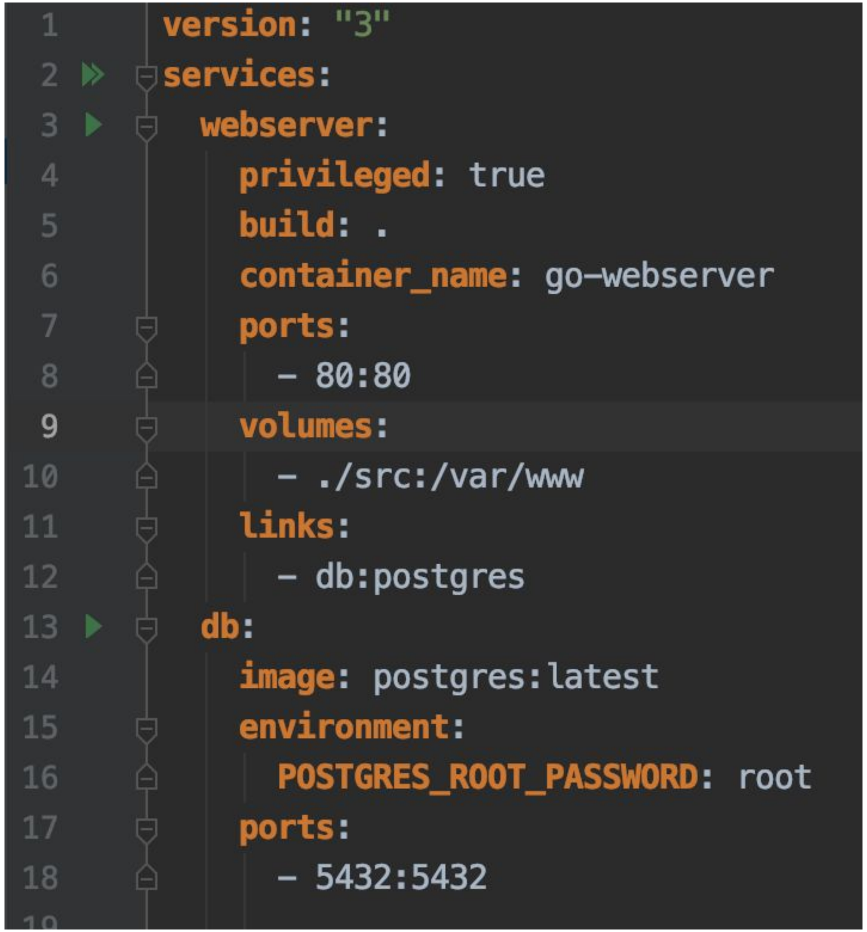
- docker-compose build
- docker-compose up

or both ! docker-compose up --build

To stop a docker-compose stack, you can send:

- docker-compose down

#1 Docker-compose



```
version: "3"
services:
  webserver:
    privileged: true
    build: .
    container_name: go-webserver
    ports:
      - 80:80
    volumes:
      - ./src:/var/www
    links:
      - db:postgres
  db:
    image: postgres:latest
    environment:
      POSTGRES_ROOT_PASSWORD: root
    ports:
      - 5432:5432
```

More complex docker-compose file

volumes: Mount a directory inside the container

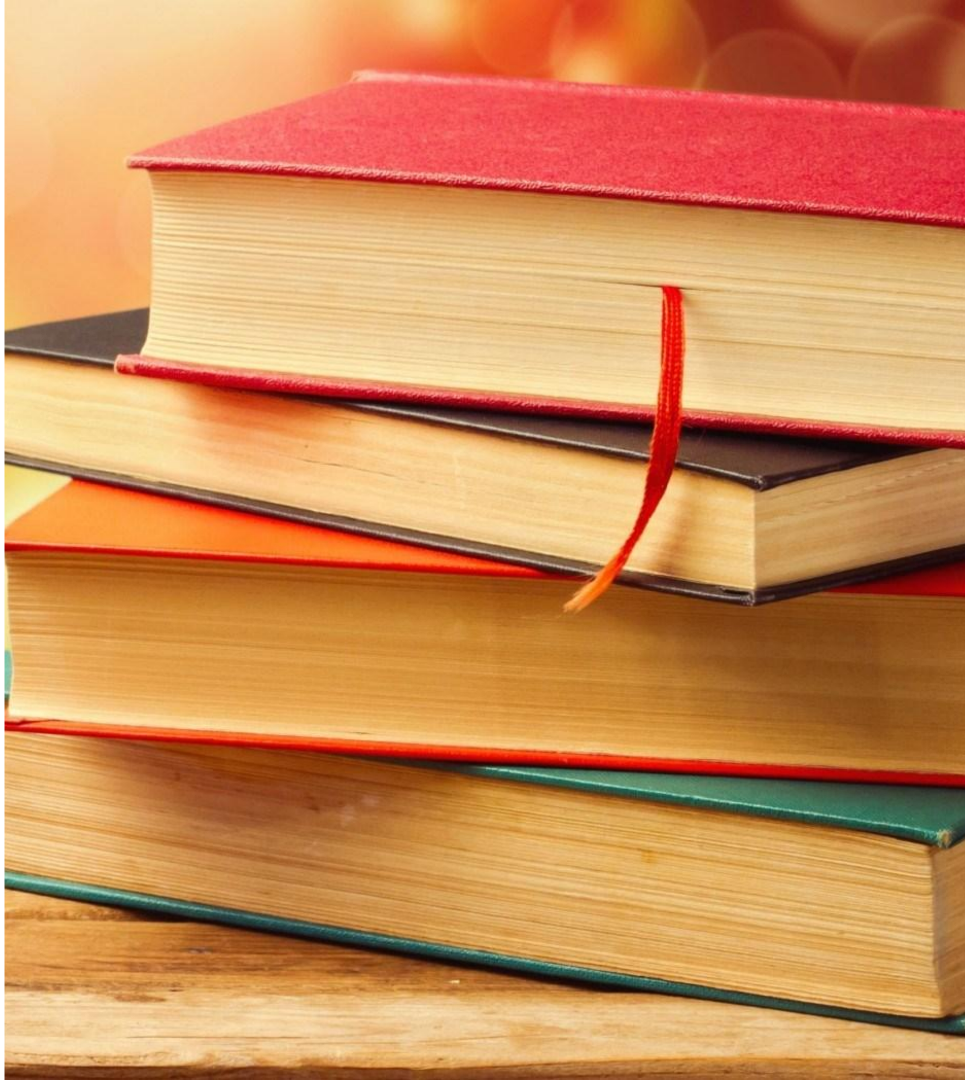
links: Allow the current container (webserver) to reach container “db” with an alias (here postgres)

environment: Set environments variables, most of them or explained in the docker hub readme page.

#1 Docker-compose

- ✓ Simplify the versionning of docker stacks.
- ✓ Useful for linking containers
- ✓ Easy to use than docker vanilla
- ✗ Add nothing more than docker, it’s just an abstraction.

CheatSheet



#1 Docker keywords

- **FROM**: The image we want to use to start (we can create our own)
- **RUN**: Run a command
- **WORKDIR**: Change de “home” directory
- **EXPOSE**: Open a specific port of the container to the others
- **CMD**: Run this command when container is up
- **COPY**: Copy files from the host to the container

#1 Tools

- **Docker hub**: Like Github but for Docker 🎉
- **docker-compose**: Tool to simplify the run/management of containers
- **Kubernetes / Docker swarm**: Orchestrator for containerized applications, manage the health/status of containers.

@LateNightSeth
THANK YOU!