

Docker



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Docker: samenvatting

- Een docker image is de kleinst mogelijke software nodig om net dat ene proces (jouw applicatie) te laten draaien.
- Een docker container is een instantie van een image.
- Micro-services

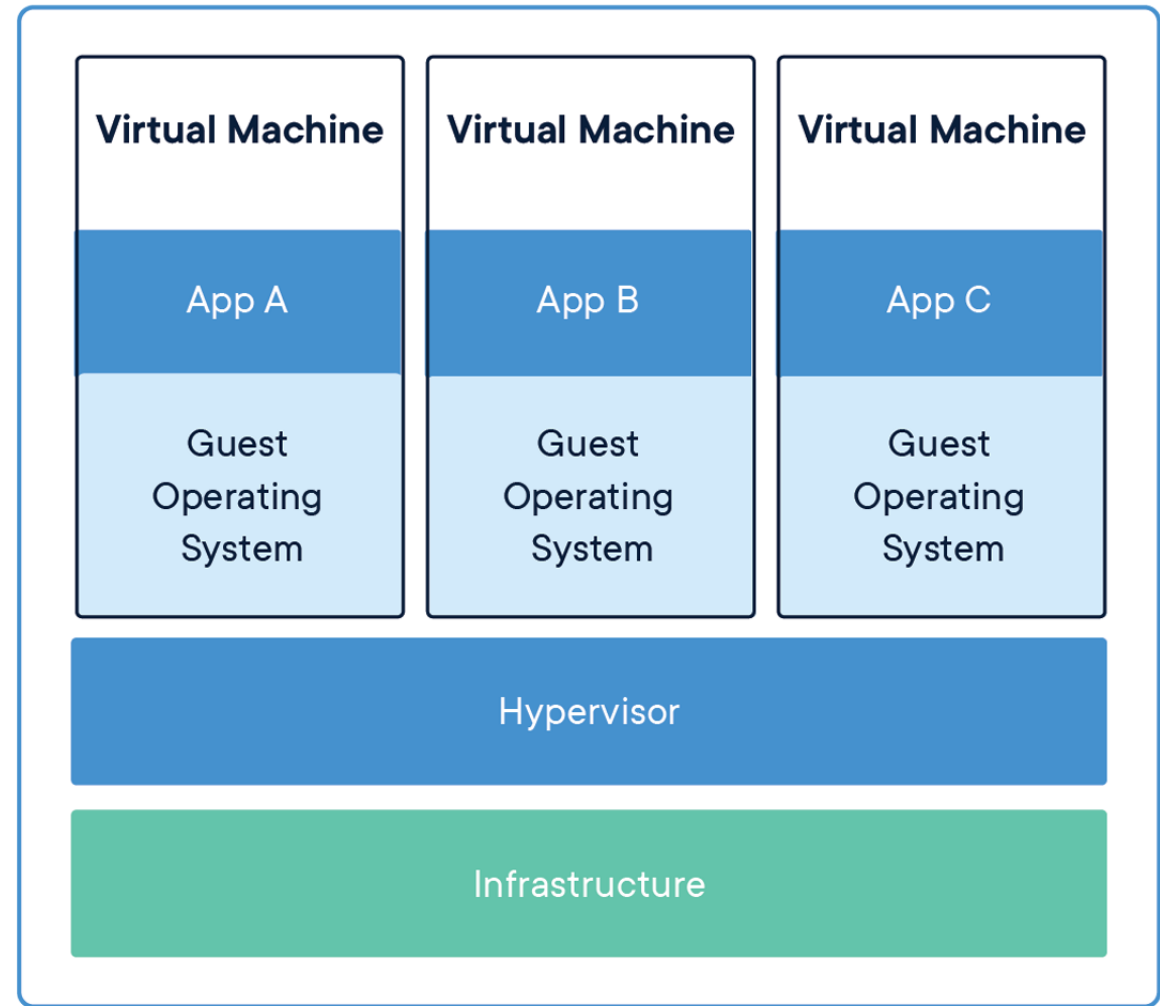
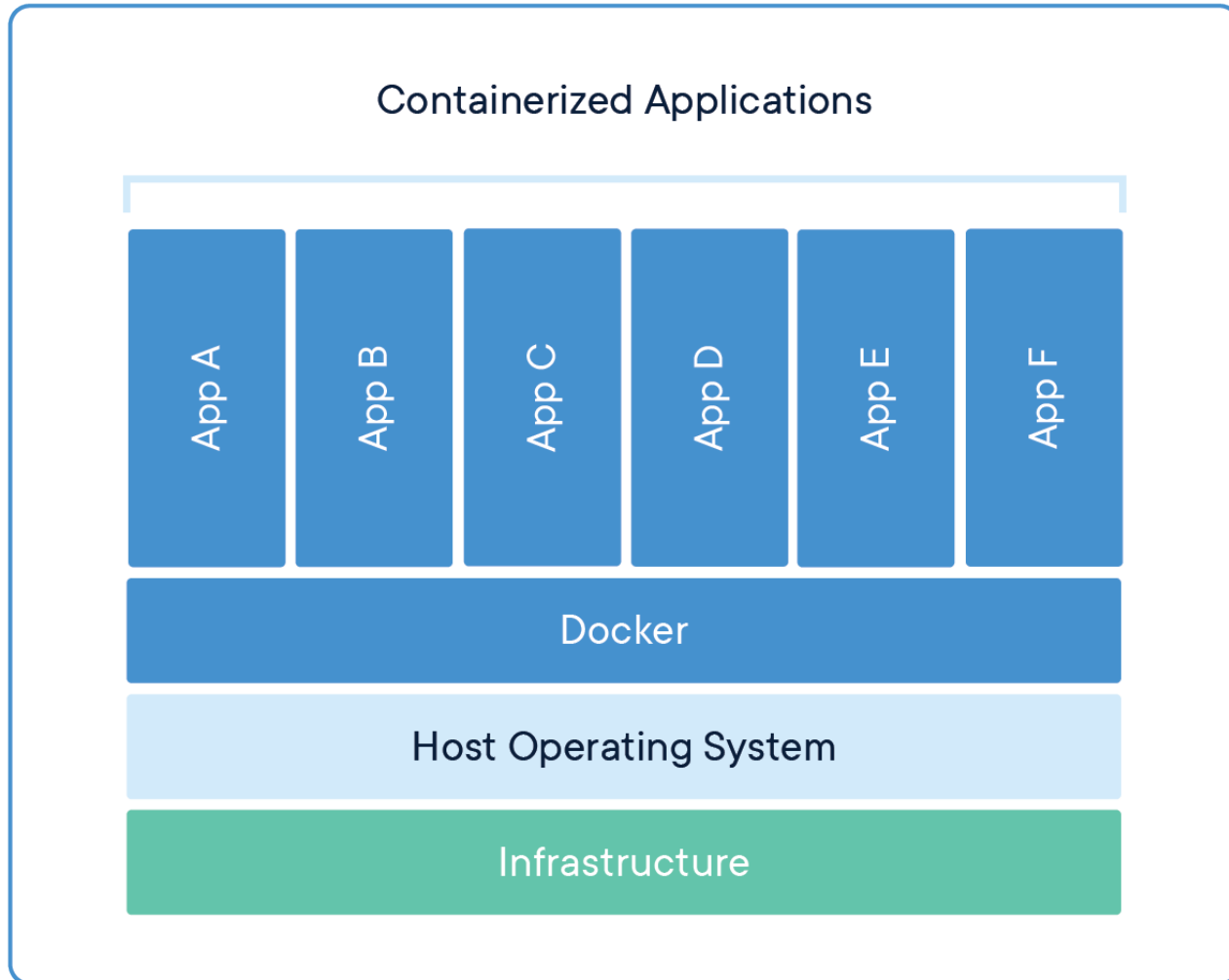


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[Learn Docker in 12 Minutes](#)



Container?





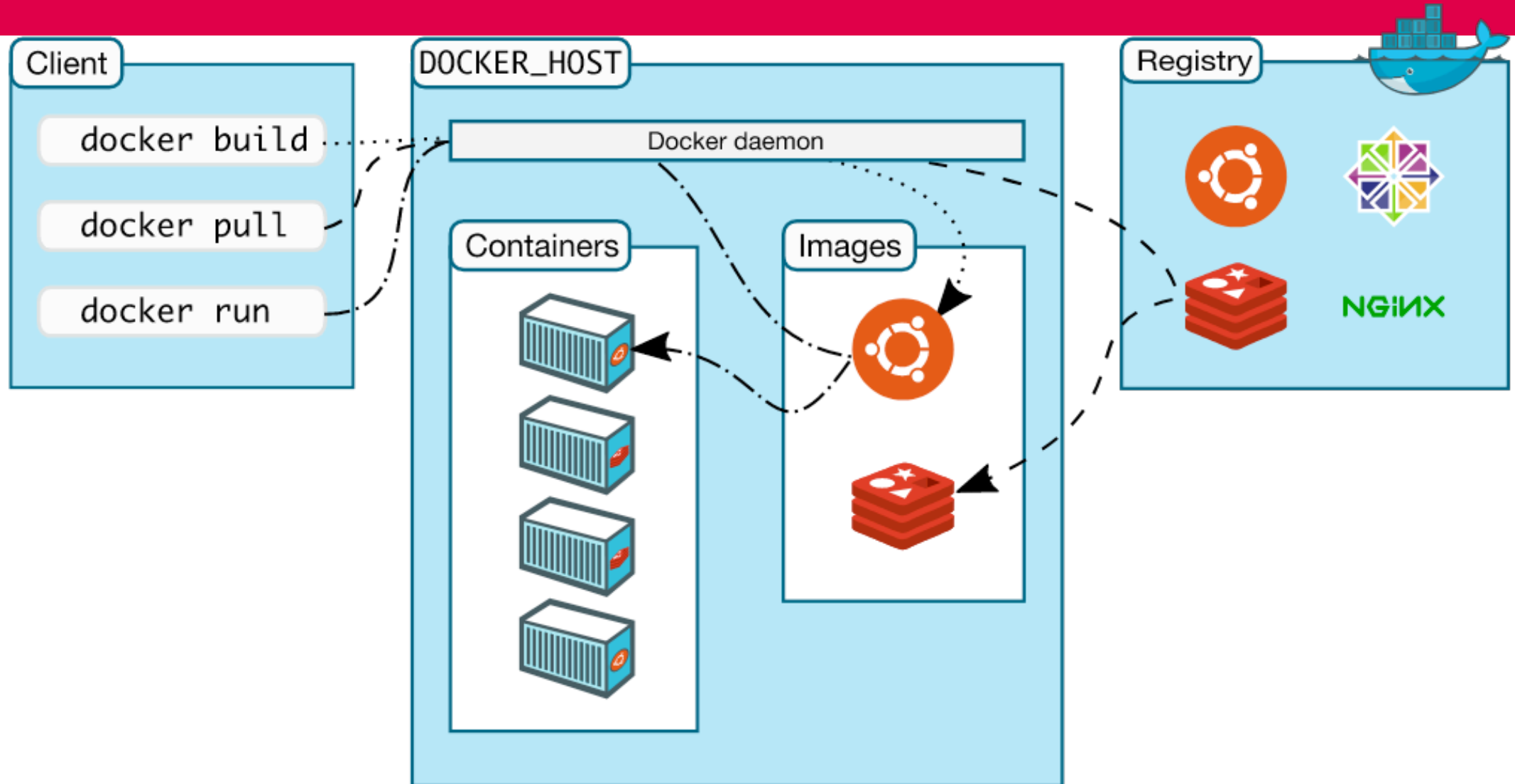
- It worked on my system
- Code on another system doesn't work due to different computing environments
- If the computing environment is consistent => it worked on my system and should work on yours
 - dev-test-qa-prod all have the same computing environment



- A container is **a software package** that consists of the application and all the dependencies to run the application
- Images are as small as possible
- Configure one image and **copy** them between systems
- Very easy to scale HORIZONTAL



Docker components





- Images can be pulled from the Registry
- Images can be created via a **Dockerfile**
- Images are templates, used to create containers
 - Think of it as class and object



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Install DOCKER



Commands

- docker
 - version
 - container
 - pull
 - run
 - images
 - attach
 - stop
 - start



docker pull

- `$ docker pull hello-world`
- The pull command fetches the hello-world **image** from the Docker registry and saves it on your local disk.



docker run

- `$ docker run hello-world`
- Usage: `docker run [OPTIONS] IMAGE [COMMAND] [ARG...]`
 - `docker run -it debian bash`
 - `-i` or `-t` or `-it` or `-???`
 - `docker run --help`
 - Command can be "predefined"
- Docker container?
 - a docker container is an image in run



- `$ docker run -it debian touch /root/test`
- `$ docker run -it debian ls /root/test`
- Each "docker run" creates an other separate container
- `$ docker container ls -a`
 - ID: the corresponding unique identifier for that container
 - NAMES



- To detach from a running container: $\wedge P + \wedge Q$
 - The container will **continue** to run
 - `docker container ls`
- To attach to a container
 - `docker attach`
 - `docker exec`
- Typing `exit` in the container
 - stops the container and exits back to the shell
 - `docker ps` and `docker ps -a`



start and stop

- Containers are only created via docker run
- All created containers can be viewed
 - `docker container ls -a`
 - `docker ps -a`
- Remove stopped containers
 - `docker rm`
 - `docker container prune`

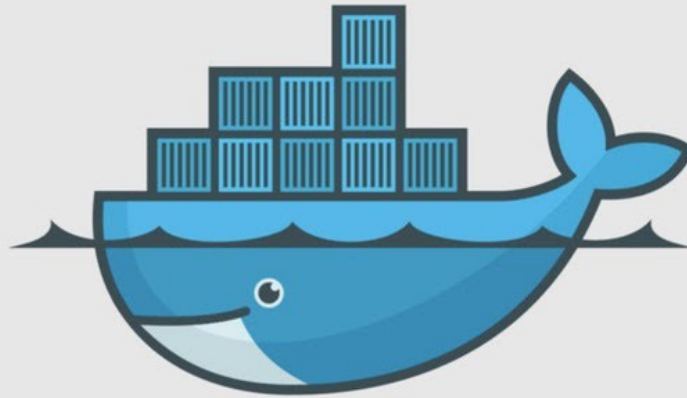


- To view all downloaded images: docker images
 - TAG: refers to a particular snapshot or version number of the image
 - IMAGE ID: the corresponding unique identifier for that image
- Pull a specific version of ubuntu image
 - docker pull ubuntu:12.04
 - No version number => version **latest**
- To remove an image
 - docker rmi hello-world



Repository for docker images

Docker Hub



docker



Create an image

- Write a Dockerfile
- Build the image
- Run and test the image

- Build instruction located in a Dockerfile
 - text file that contains a list of commands for creating an image
- All user images start from a base image
 - FROM debian:latest
- Run some commands with the RUN command
 - RUN apt update && apt -y upgrade && apt install -y apache2
- Let's add a file student.html (don't forget to create it)
 - ADD student.html /var/www/html
- Specify the port which needs to be exposed
 - EXPOSE 80
- The last step, which command should run when it is started
 - CMD ["service", "apache2", "start"]



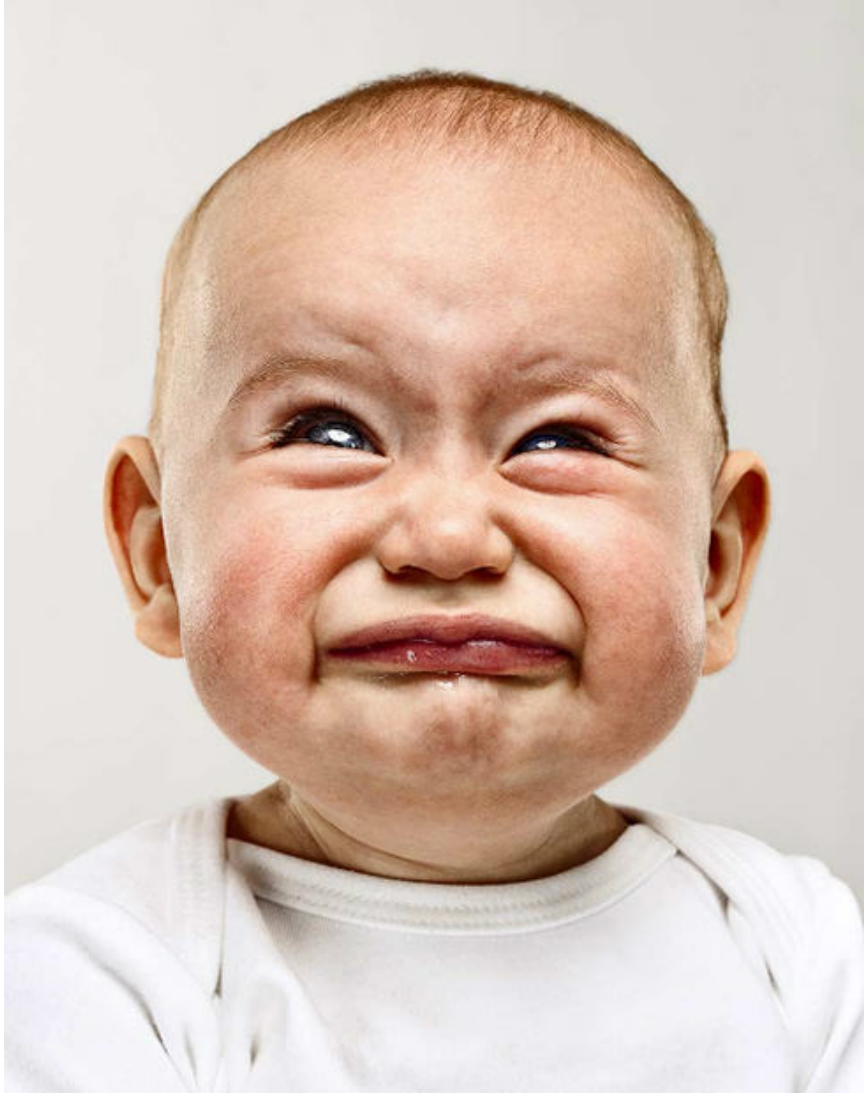
- Write Dockerfile => done
- `docker build -t myfirst:1 .`
- `docker build --help`
- An image is a template for
 - base os
 - software + libs
 - application



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Run your image

- Docker run





Dockerfile, second try

```
FROM debian:latest
```

```
RUN apt update && apt -y upgrade && apt install -y apache2
```

```
EXPOSE 80
```

```
CMD ["apachectl", "-DFOREGROUND"]
```

Keep in mind that the container stops if the command after the CMD keyword also exits or stops!



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Volumes



Docker HUB

- Log in on <https://hub.docker.com/>
- Click on Create Repository
- Choose a name and a description for your repository and click Create.
- `docker login --username=yourhubusername`
- Check the image ID using `docker images`
- tag your image:
 - `docker tag [hex-value] yourhubusername/repository:tag`
- `docker push yourhubusername/verse_gapminder`



Microservices - Link

- Cat /etc/hosts



Docker compose

- A tool for defining and running multi-container applications
- Configuration file `docker-compose.yml`
- <https://docs.docker.com/compose/install/>
- Run `docker-compose config` to check your config

```
# Use postgres/example user/password credentials
version: '3.6'

services:
  db:
    image: postgres
    environment:
      POSTGRES_PASSWORD: example

  adminer:
    image: adminer
    ports:
      - 8080:8080
    depends_on:
      - db
```



Reminder

- One process or single service per container
- <https://www.katacoda.com/courses/docker>
- Docker is a tool used to automate the deployment of applications in a container so that the applications can work on **different system**.
- <https://ropenscilabs.github.io/r-docker-tutorial/04-Dockerhub.html>
- <https://takacsmark.com/docker-compose-tutorial-beginners-by-example-basics/>