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Simplify Your Deployment Application with Docker

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Contents

Disclaimer

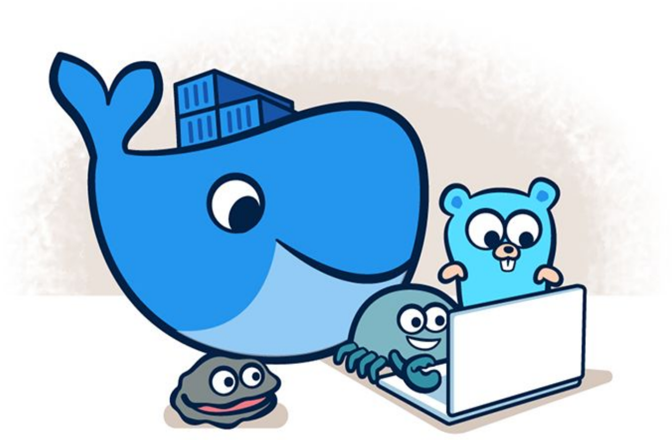
1. I try to present **basic introduction** in this session, let’s learn together!
2. Only as stepping stone, 1,5 hours isn’t enough not understand everything. **Follow up learning is a must**.
3. The presentation material is in English, but I’ll explain in Indonesian. Please ask right away if you confused with the terms used.
4. Don’t forget to **prepare your question**.

:)

Why Docker?

Why Docker exist? Why we must use Docker?

- What is deployment ?
- State before Docker.
- Problem Docker trying to solve.
- Docker use case (for Univ. Student).



What is “Deployment” ?

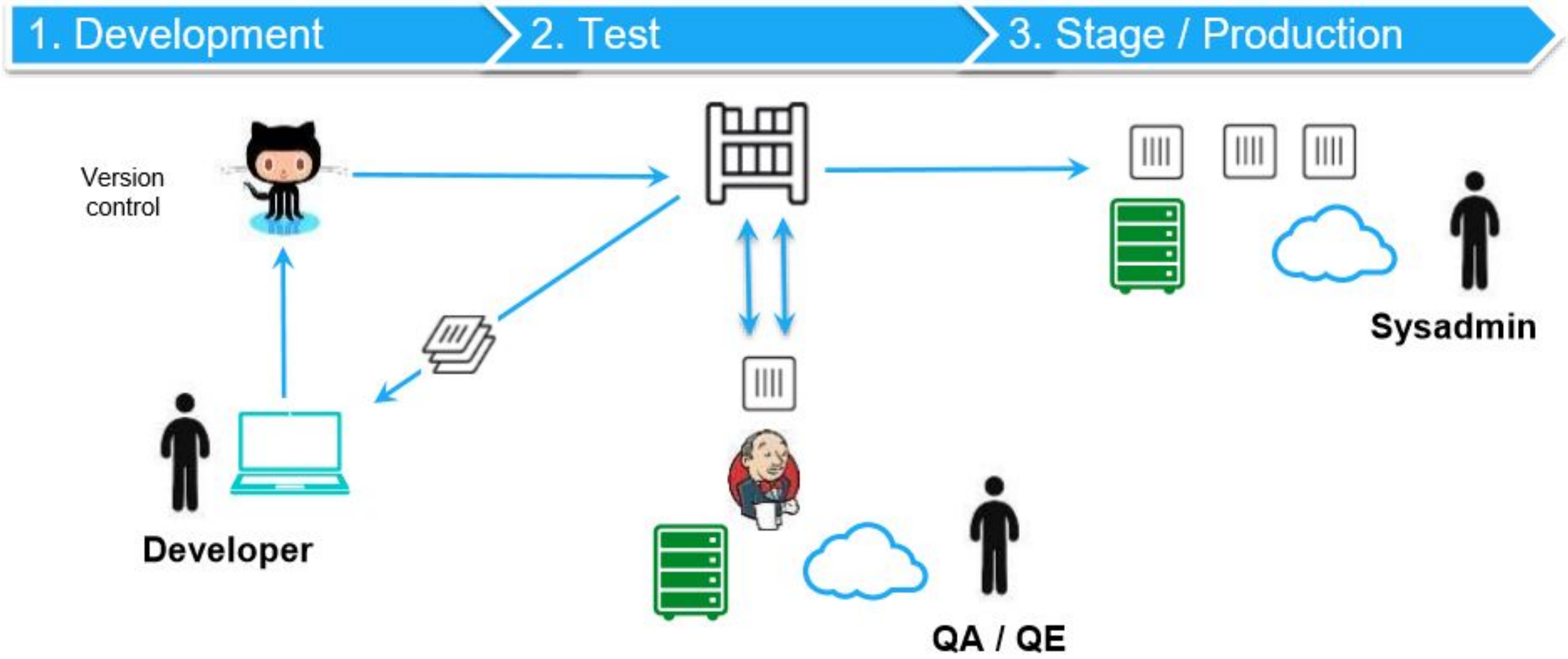
*“Simplify Your **Deployment** Application with Docker”*

+ **Deployment** is a process in getting software/application running properly.

+ **Involves**:
    - Configuration
    - Dependency
    - Installation
    - Multiple Environment (testing - production)

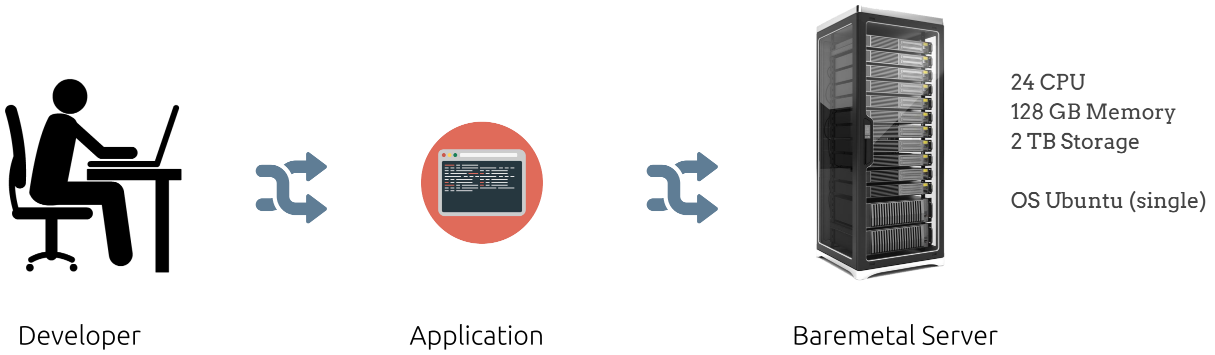
+ **Target**:
    - Server (On Premises & Cloud)

+ **Goals**:
    - Apps is running, customer can access, delivered.


1. Development
2. Test
3. Stage / Production
Version control
Developer
QA / QE
Sysadmin

State before Docker

- Directly to Server (Baremetal)



(+) Simple process

(-) Not Efficient
(-) Become complex on large scale application
(-) Not Isolated

State before Docker

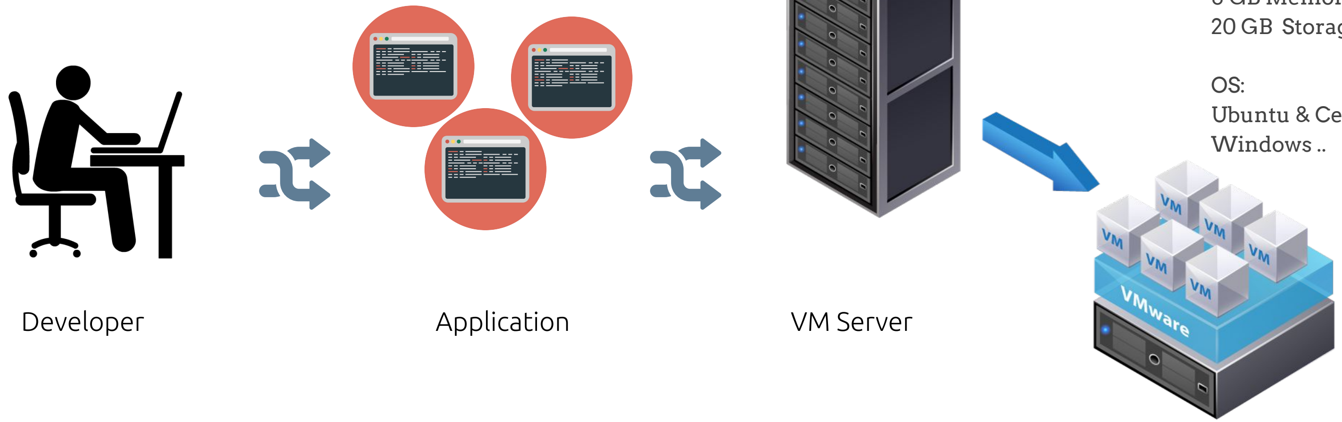
- Virtual Machine

24 CPU
128 GB Memory
2 TB Storage

OS Ubuntu (single)

@ Each VM:
4 CPU
8 GB Memory
20 GB Storage

OS:
Ubuntu & CentOS & Windows ..



(+) Resource Efficient
(+) Isolated

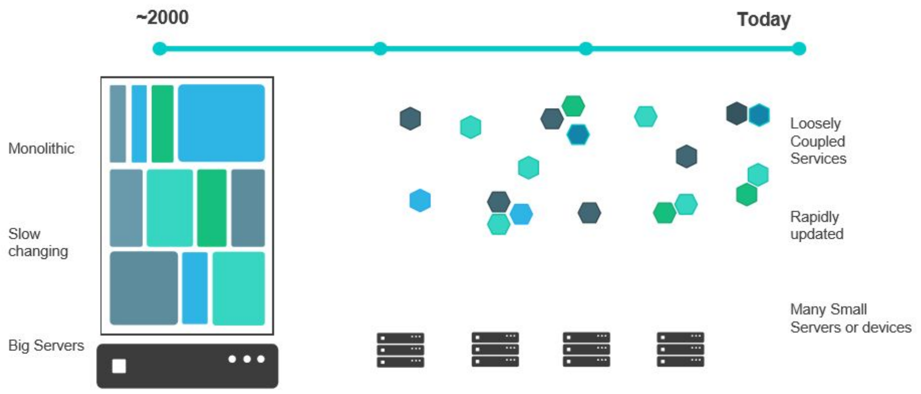
(-) Hard to maintain (configure many os)
(-) Complex to scale

Problem Trying to Solve

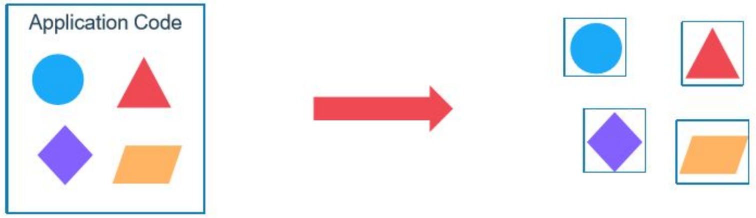
- Application is **evolving** (Monolith → Microservices)
- **Complex** configuration on **deployment** process

  (example: database, os version, dependency version)
- Environment **Isolation**
- **Scalability**
- **Efficiency**

Applications are transforming



Application Modernization



Developer Issues:

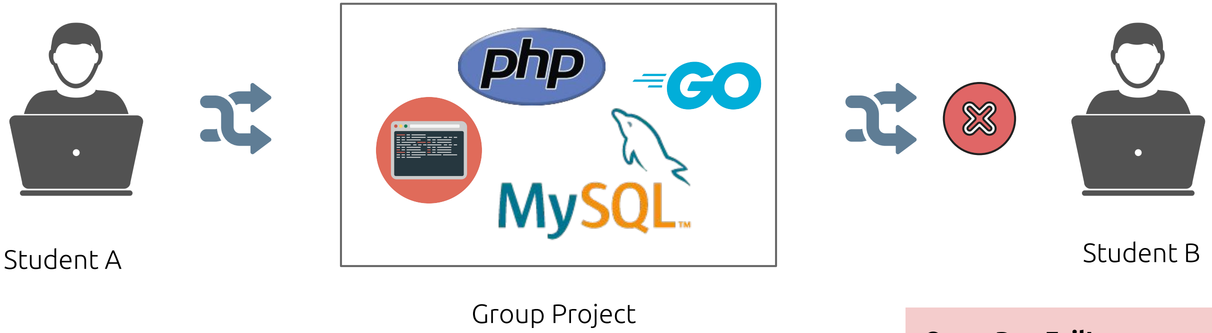
- Minor code changes require full re-compile and re-test
- Application becomes single point of failure
- Application is difficult to scale

Microservices: Break application into separate operations

12-Factor Apps: Make the app independently scalable, stateless, highly available by design

Docker Use Case (for Univ. Student)

- Problem when sharing project/task in a group

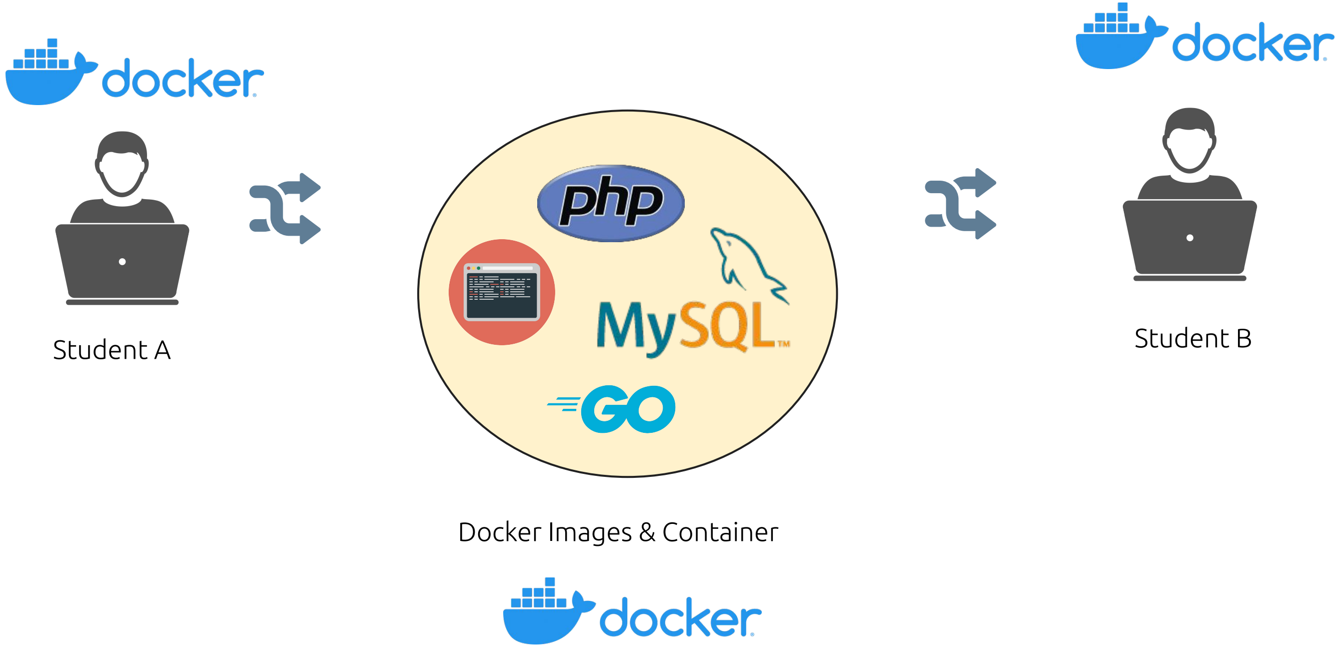


Opps, Run Fail!

- Version miss-match
- Different OS
- “magic” behaviour

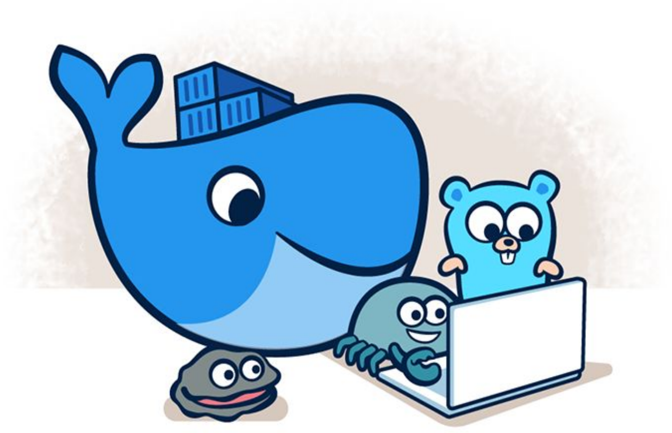
Docker Use Case (for Univ. Student)

- **Easy sharing** project/task in a group

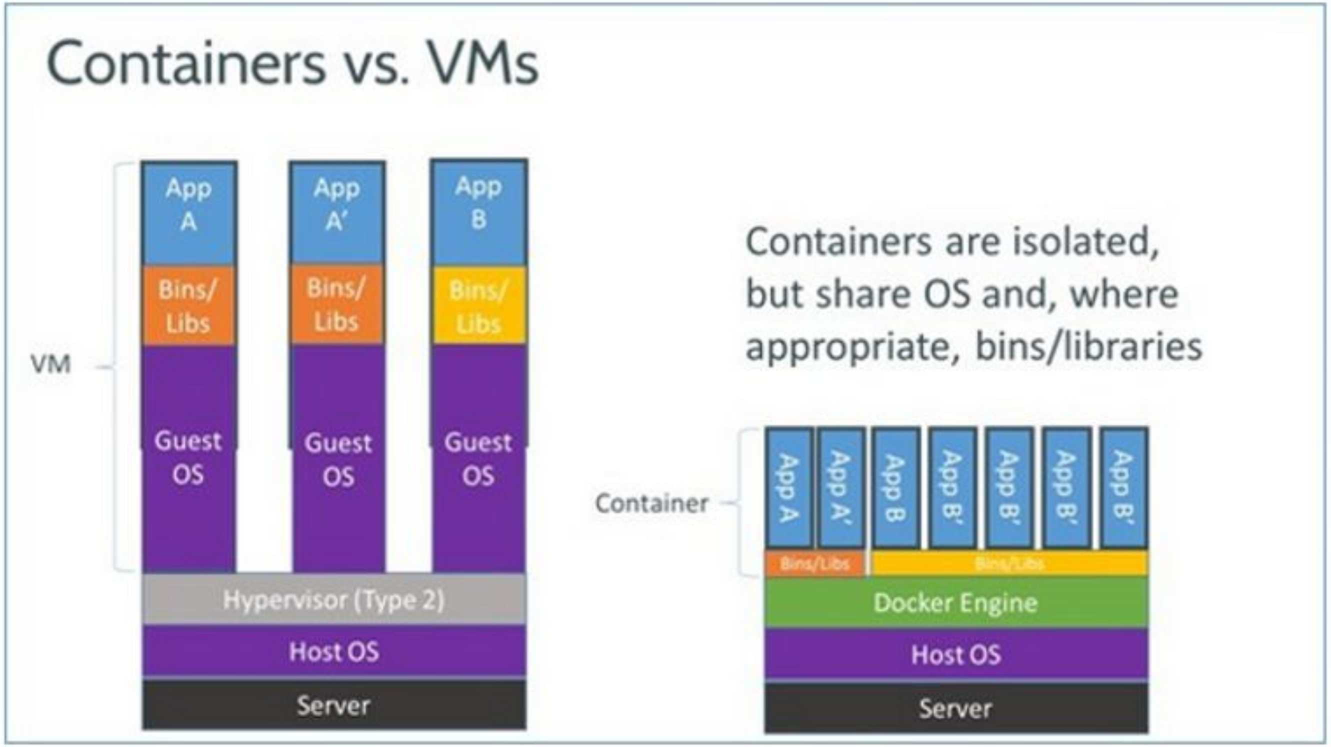


Inside Docker

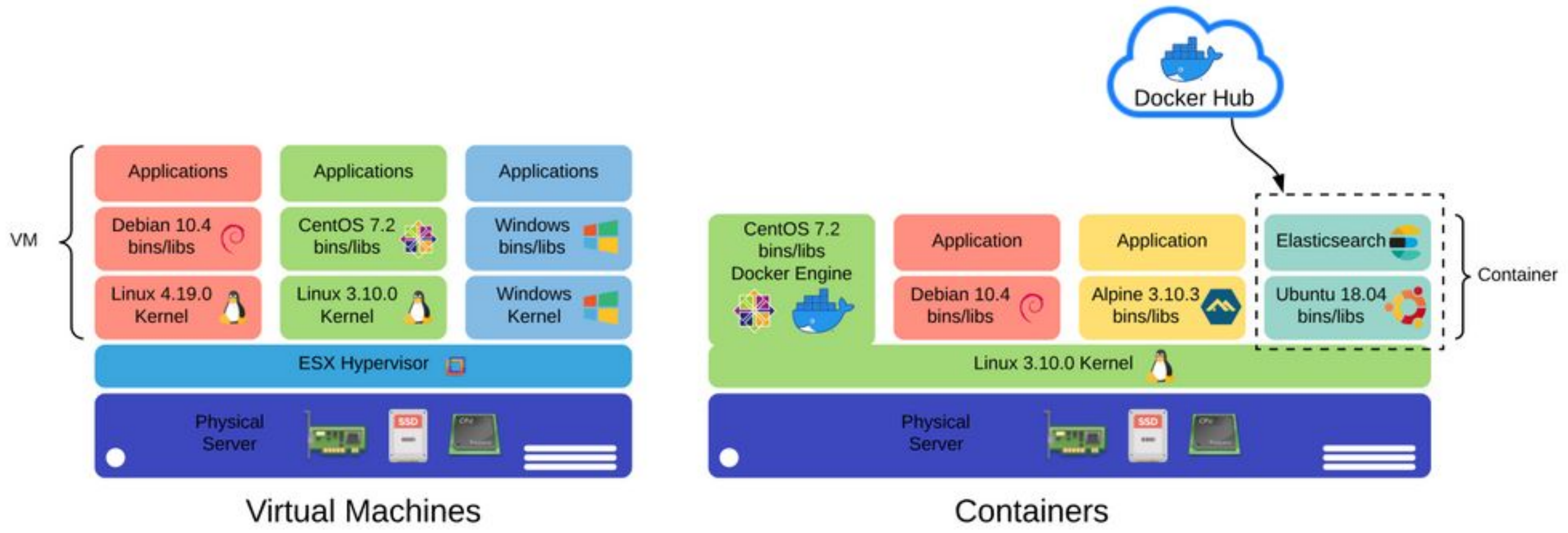
- Docker Architecture
- Dockerfile
- Images
- Container
- Registry
- Engine & Control Plane



Docker Architecture



Docker Architecture



Component: Docker Images

- **Docker Images** is **template** with instructions to creating application container.

  Template contain:
  - Configuration
  - Dependency
  - Apps files (.php .py .html … etc)

* Docker images is object that “**delivered**” for deployments.
* **Dockerfile** used to create docker images.

Component: Dockerfile

+ **Dockerfile** is **template** with instructions to creating application container.

Example: **Dockerfile** with php 7 & php 5

```
FROM php:7.4-cli

COPY /home/my-laptop/myapp /myapp

CMD [ "php", "/myapp/your-script.php" ]
```

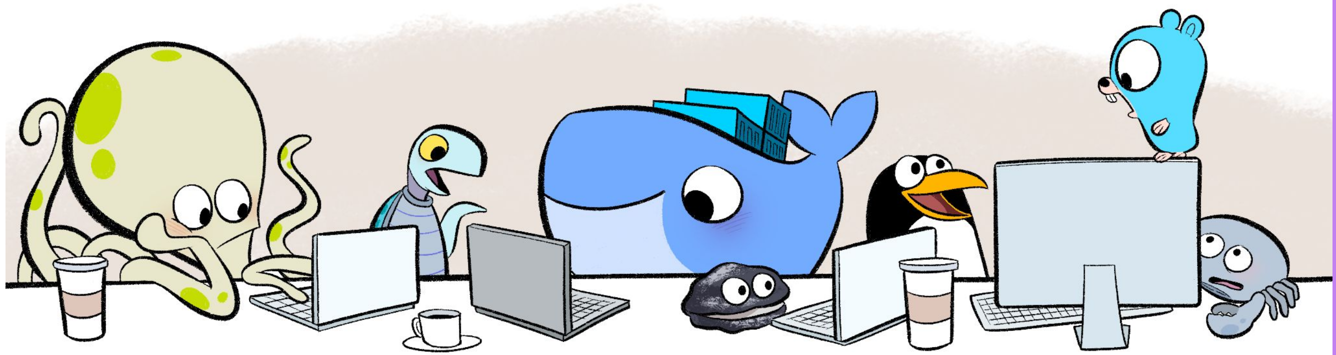
```
FROM php:5.6-cli

COPY /home/my-laptop/myapp /myapp

CMD [ "php", "/myapp/your-script.php" ]
```

```
FROM python:3

WORKDIR /usr/src/app

COPY requirements.txt ./

RUN pip install -r requirements.txt

COPY . .

CMD [ "python", "./my-app.py" ]
```

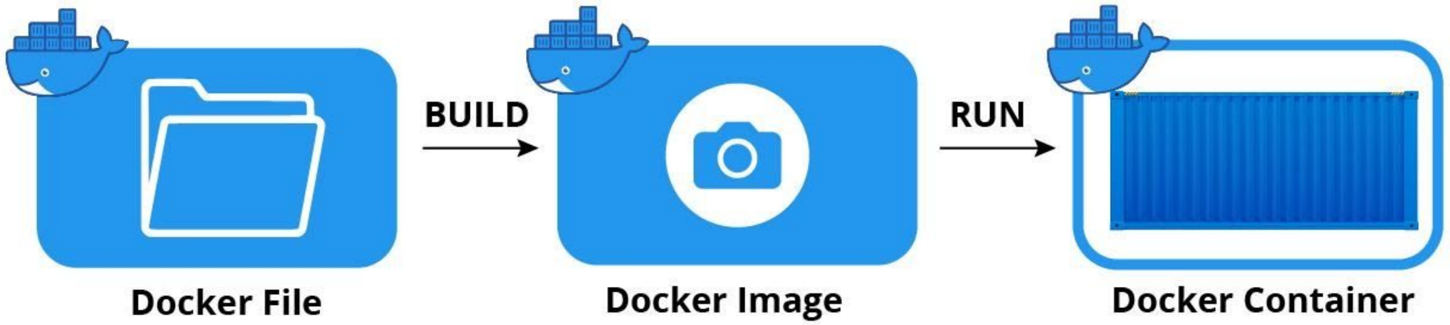
Component: Container

+ **Docker Container** is **runnable** instance of docker images.

  Container can be:
  - Start
  - Stop
  - Delete
  - Scale (create replica)



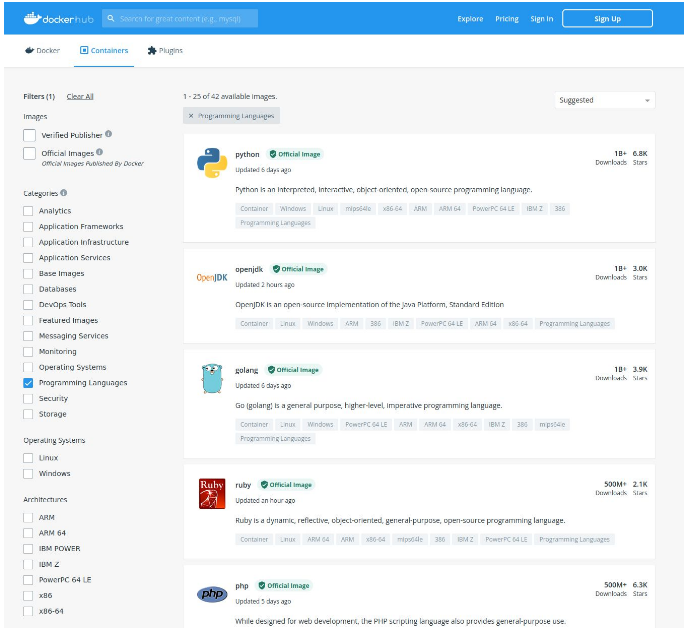
Docker Component



Docker Registry

- **Docker Registry** is **marketplace** for docker images.

  You can use **ready-to-use** template from others.



Filters (1) Clear All

Images
- [ ] Verified Publisher
- [ ] Official Images
  Official Images Published By Docker

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- [ ] Windows

Architectures
- [ ] ARM
- [ ] ARM 64
- [ ] IBM POWER
- [ ] IBM Z
- [ ] PowerPC 64 LE
- [ ] x86
- [ ] x86-64

1 - 25 of 42 available images.

× Programming Languages

Suggested

python Official Image — 1B+ Downloads, 6.8K Stars
Updated 6 days ago
Python is an interpreted, interactive, object-oriented, open-source programming language.
Container | Windows | Linux | mips64le | x86-64 | ARM | ARM 64 | PowerPC 64 LE | IBM Z | 386 | Programming Languages

openjdk Official Image — 1B+ Downloads, 3.0K Stars
Updated 2 hours ago
OpenJDK is an open-source implementation of the Java Platform, Standard Edition
Container | Linux | Windows | ARM | 386 | IBM Z | PowerPC 64 LE | ARM 64 | x86-64 | Programming Languages

golang Official Image — 1B+ Downloads, 3.9K Stars
Updated 6 days ago
Go (golang) is a general purpose, higher-level, imperative programming language.
Container | Linux | Windows | PowerPC 64 LE | ARM | ARM 64 | x86-64 | IBM Z | 386 | mips64le | Programming Languages

ruby Official Image — 500M+ Downloads, 2.1K Stars
Updated an hour ago
Ruby is a dynamic, reflective, object-oriented, general-purpose, open-source programming language.
Container | Linux | ARM 64 | ARM | x86-64 | mips64le | 386 | IBM Z | PowerPC 64 LE | Programming Languages

php Official Image — 500M+ Downloads, 6.3K Stars
Updated 5 days ago
While designed for web development, the PHP scripting language also provides general-purpose use.

Docker Engine and Control Plane

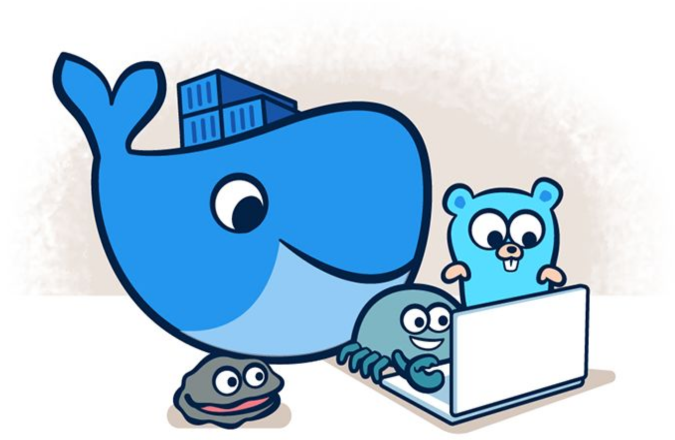
- **Docker Engine** is the main program/services that manage container.
- **Docker Control Plane** used to connect multiple node of docker.

Develop with Docker

Example:

- Simple HTML Web Server
- Laravel Web Apps

Example:
https://github.com/heronimus/sharing-unesa-docker



Simple HTML Web Server

index.html

```
<!doctype html>

<html lang="en">
<head>
  <meta charset="utf-8">
  <title>Docker Nginx</title>
</head>

<body>
  <h2>Hello from Docker World</h2>
  <p>Kuliah Umum UNESA.</p>
</body>
</html>
```

Dockerfile

```
FROM nginx:latest

COPY ./index.html /usr/share/nginx/html/index.html
```

Build Command

```
docker build -t my-webserver .
```

Run Command

```
docker run -it --rm -p 8080:80 --name web my-webserver
```

Laravel Web Apps

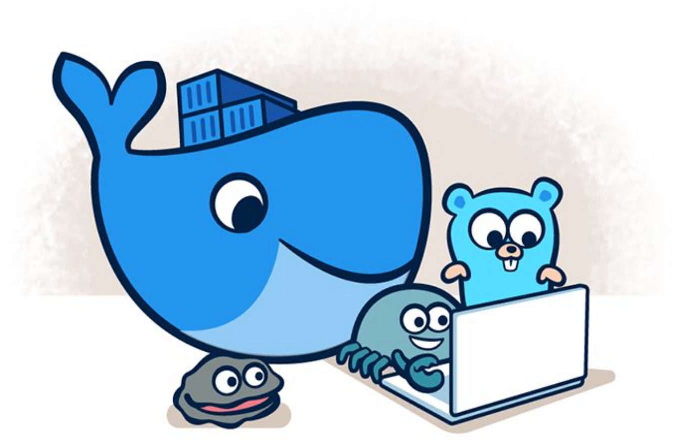
Dockerfile

```
FROM php:7.4
RUN apt-get update -y && apt-get install -y openssl zip unzip git libonig5 libonig-dev libzip-dev

## Install Composer
RUN curl -sS https://getcomposer.org/installer | php -- --install-dir=/usr/local/bin --filename=composer
RUN docker-php-ext-install pdo mbstring

## Copy Laravel Apps
WORKDIR /app
COPY ./laravel-app /app
RUN composer install

## Run PHP Serve
CMD php artisan serve --host=0.0.0.0 --port=8080
EXPOSE 8080
```

Extras

- IT always evolve ..
- Always learning, it’s free :)

- After familiar with docker, what’s next?
    - docker-compose
    - docker-swarm / kubernetes



Laravel Web Apps

Build Command

```
docker build -t my-laravel-image .
```

Run Command

```
docker run -it --rm -p 8181:8080 --name laravel my-laravel-image:latest
```