

• DOCKER 101

What, Why, How?





Hello!

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Python | Django | AWS



• Agenda



- What is Docker?
- What is an Image?
- What is Container?
- How Docker works?
- Why Docker?
- Docker vs Virtual Machine
- Important Docker Commands
- Dockerfile
- Docker Compose
- Docker Hub
- Practical



• What is Docker?



- Open Platform for developing, shipping and running applications
- Enables you to separate your applications from your infrastructure so you can deliver software quickly
- 4.5k stars and counting on [Github](#)
- Solomon Hykes created Docker
- Making developers lives easier since 2013



• What is an Image?



- A template which is used to create Docker Containers
- Building blocks of a Docker Container
- Created using `docker build` command

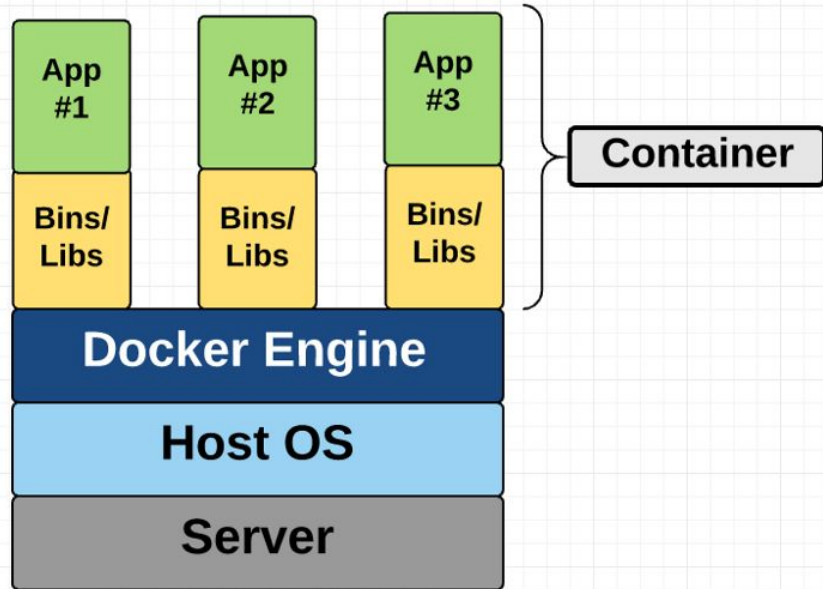


Docker container

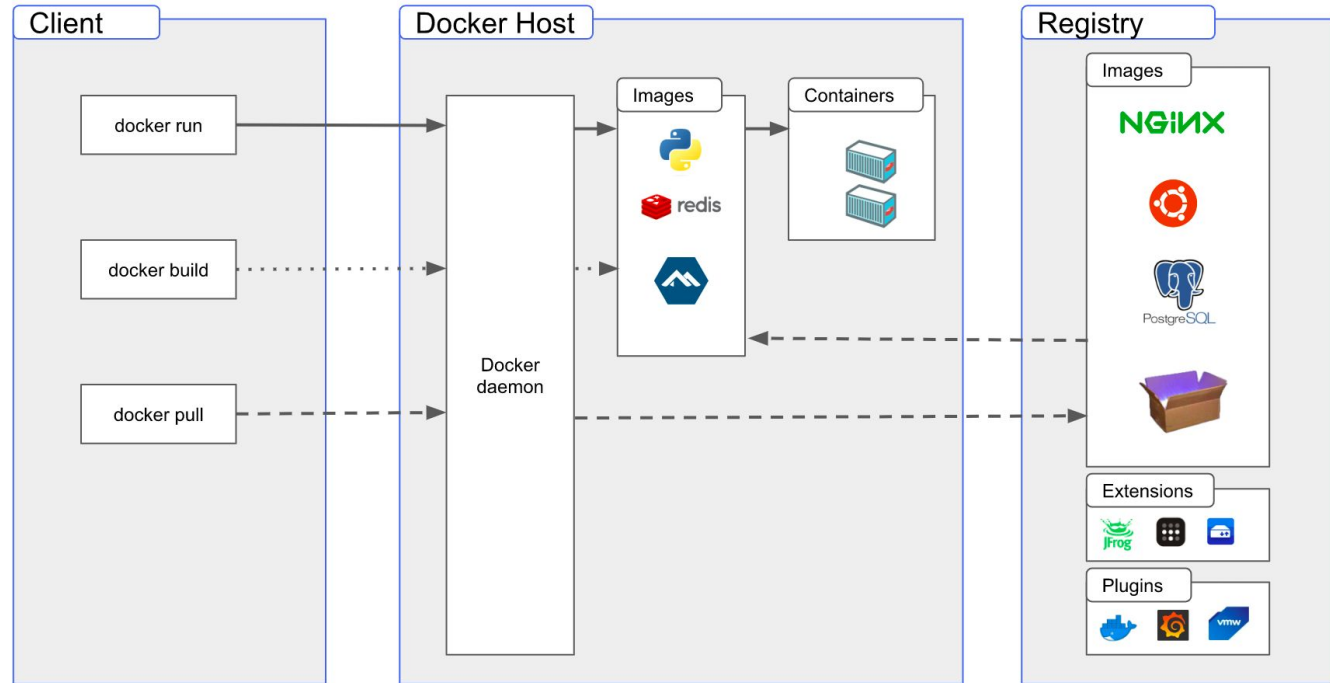


• What is Container?

- Standard unit of software that packages up code and all its dependencies
- Provides operating-system-level virtualization by abstracting the “**user space**”.



• How Docker works?

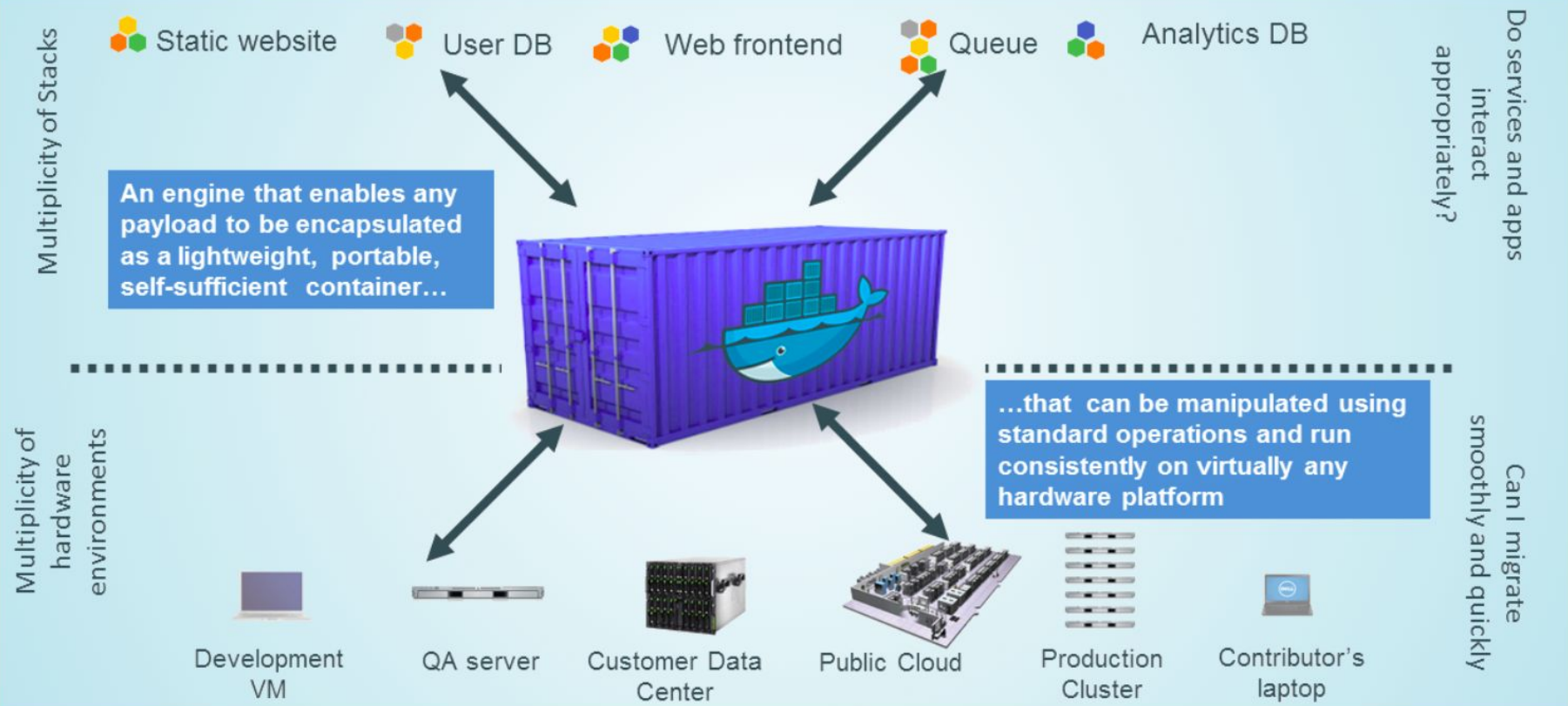


• Why Docker?

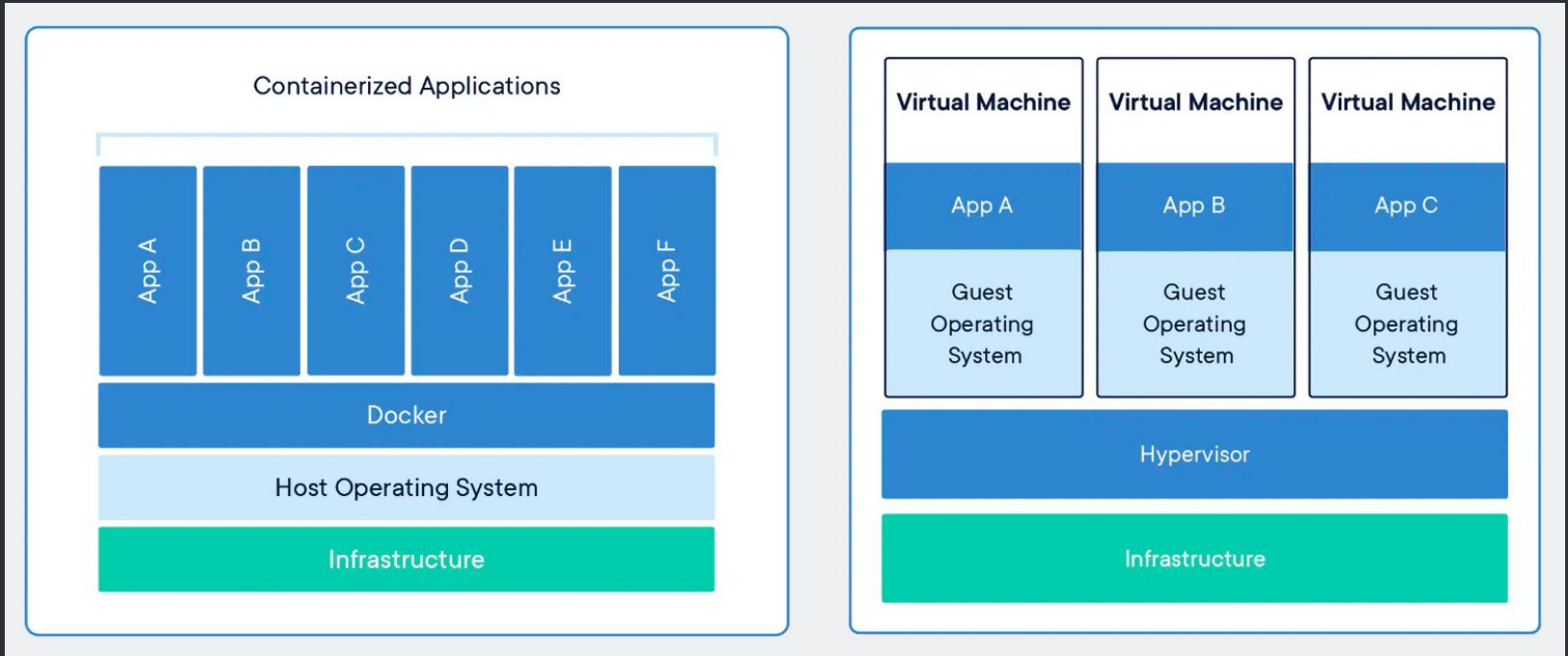


- **Portability** - Can be run on any machine
- **Consistency** - Helps avoid “*It runs on my machine*” problem
- **Isolation** - Reduces risk of conflicts or compatibility issues
- **Scalability** - Can run multiple containers across multiple machines
- **Speed** - Lightweight & start-up quickly
- **Ecosystem** - Services to simplify CI / CD, monitoring





• Docker vs Virtual Machine



Docker Container vs Virtual Machine

- Abstraction at the app layer that packages code and dependencies together
 - Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space
 - Take up less space than VMs (typically tens of MBs in size)
- Abstraction of physical hardware turning one server into many servers
 - Hypervisor allows multiple VMs to run on a single machine
 - Each VM includes a full copy of an operating system, the application, necessary binaries and libraries – taking up tens of GBs
 - VMs can also be slow to boot.

docker

• Important Docker Commands

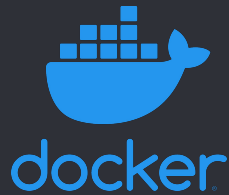


- docker --version
- docker ps
- docker images
- docker container
- docker build
- docker start
- docker stop
- docker restart
- docker run
- docker exec
- docker logs
- docker rm
- docker rmi
- docker login
- docker pull
- docker exec --help



docker®

• Dockerfile



- A text document that contains all the commands a user could call on the command line to assemble an image
- Docker can build images automatically by reading the instructions from a Dockerfile

```
Dockerfile > ...  
1 FROM python:3.11-slim-buster  
2 ENV PYTHONBUFFERED=1  
3 WORKDIR /django  
4 COPY requirements.txt requirements.txt  
5 RUN pip3 install -r requirements.txt
```

• Docker Compose

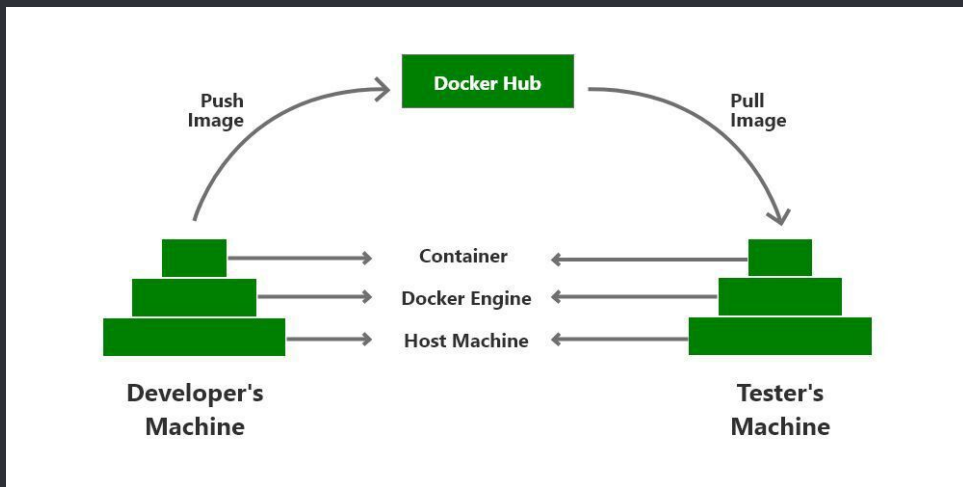
- A tool developed to help define and share multi-container applications
- We can create a YAML file to define the services and with a single command, can spin everything up or tear it all down
- Need to install separately. Instructions [here](#)
- Create and run the container using `docker compose up -d`

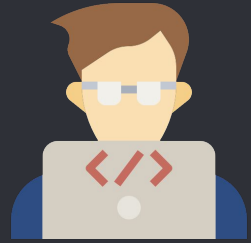
```
1 version: '3.8'
2 services:
3   app:
4     build: .
5     volumes:
6       - ./django
7     ports:
8       - 8000:8000
9     image: app:django
10    container_name: dj_docker_compose
11    command: python3 manage.py runserver 0.0.0.0:8000
12    depends_on:
13      - db
14  db:
15    image: postgres
16    volumes:
17      - ./data/db:/var/lib/postgresql/data
18    environment:
19      - POSTGRES_DB=postgres
20      - POSTGRES_USER=postgres
21      - POSTGRES_PASSWORD=postgres
22    container_name: postgres_db
```



• Docker Hub

- A repository service where people push their Docker images and pull whenever required
- Also called Docker Repository / Docker Registry
- Can have private / public repos





Practical

Let's get our hands dirty with Docker





Thanks!

ANY QUESTIONS?

You can find me here 



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