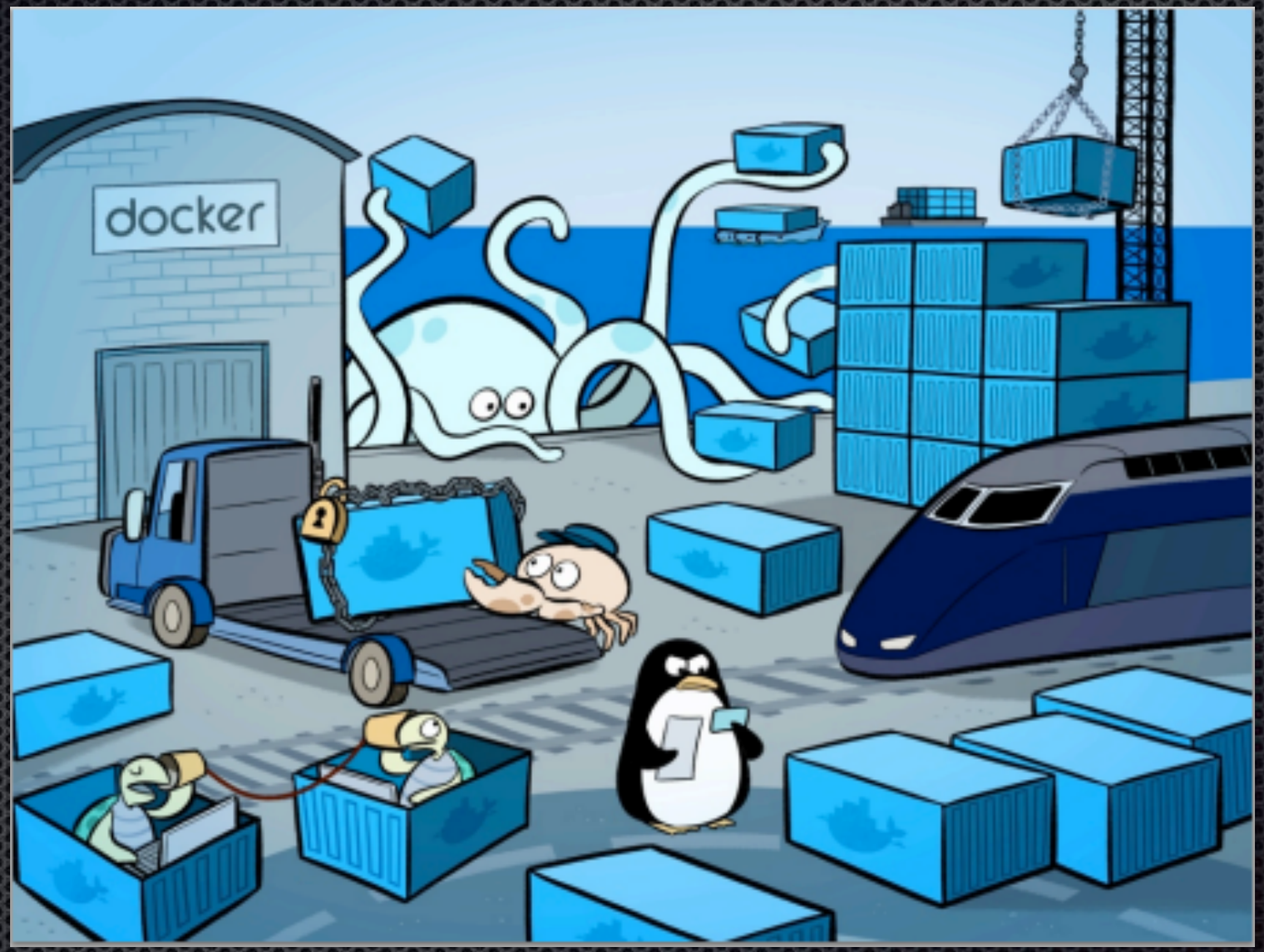
Avantica Lab Docker



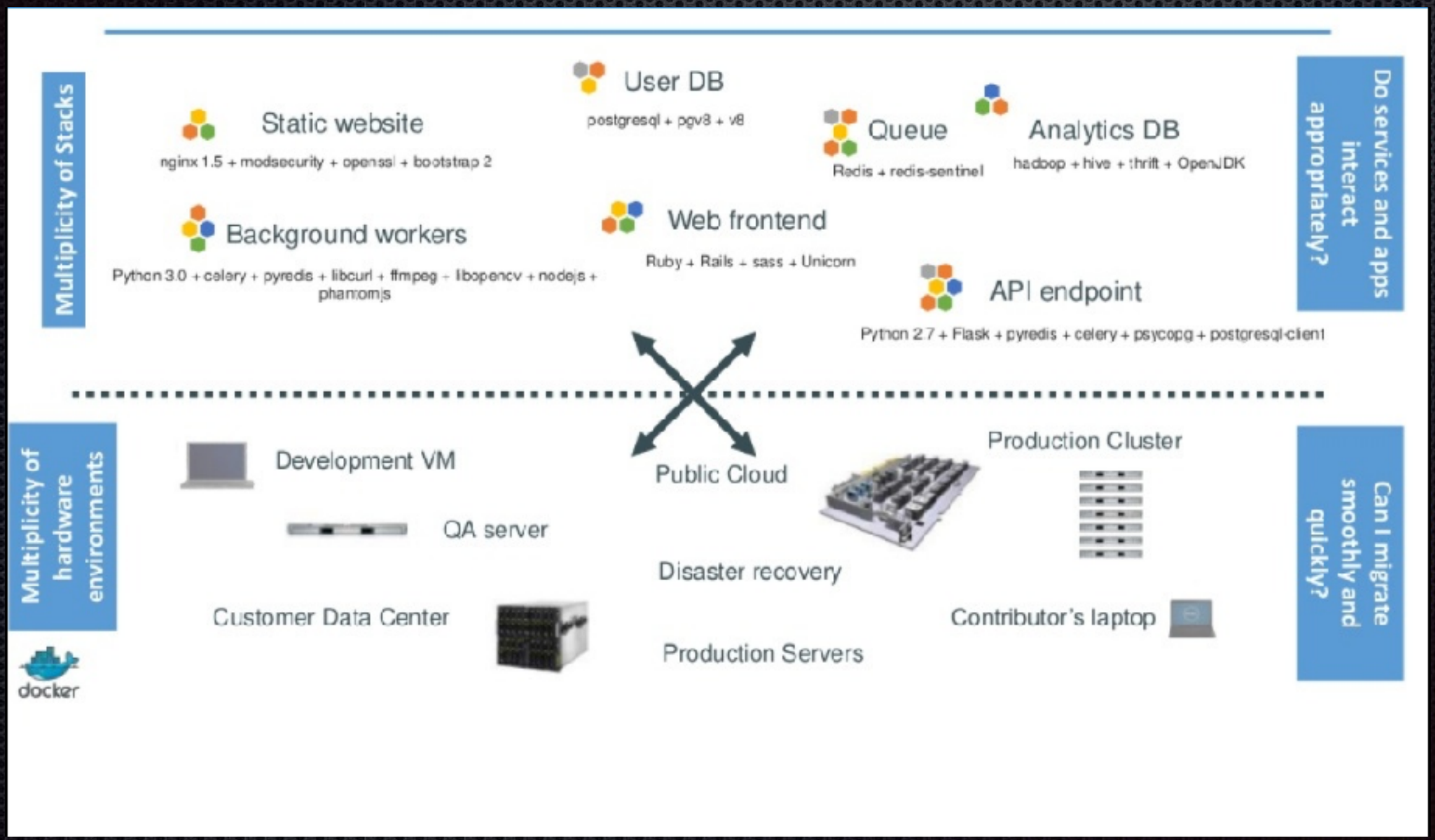
by @mario21ic

Agenda

- Intro a Docker
- Images
- Containers
- Port forwarding
- Volumes
- Linking
- Extender un image con Dockerfile
- Docker compose

hashtag:
#AvanticaLab
#DockerLima

El problema


Multiplicity of Stacks
Static website
nginx 1.5 + modsecurity + openssl + bootstrap 2
User DB
postgresql + pgv8 + v8
Queue
Redis + redis-sentinel
Analytics DB
hadoop + hive + thrift + OpenJDK
Do services and apps interact appropriately?
Background workers
Python 3.0 + celery + pyredis + libcurl + ffmpeg + libopencv + nodejs + phantomjs
Web frontend
Ruby + Rails + sass + Unicorn
API endpoint
Python 2.7 + Flask + pyredis + celery + psycopg + postgresql-client
Multiplicity of hardware environments
Development VM
QA server
Customer Data Center
Public Cloud
Disaster recovery
Production Servers
Production Cluster
Contributor's laptop
Can I migrate smoothly and quickly?
docker

El día a día

Manejo de dependencias

En mi local funciona

Desarrollo en entorno Prod

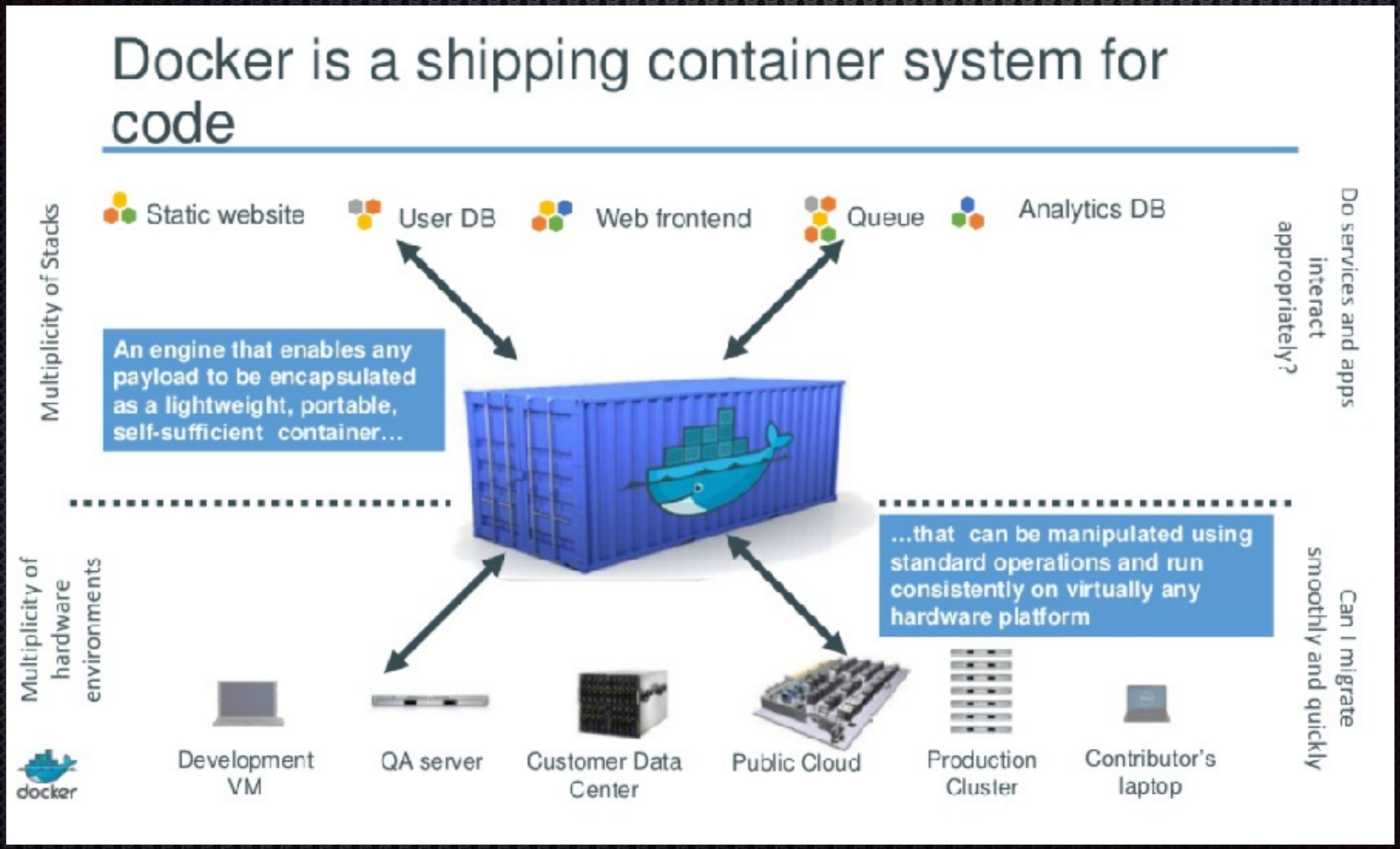
Versionar cambios

Manual de instalación

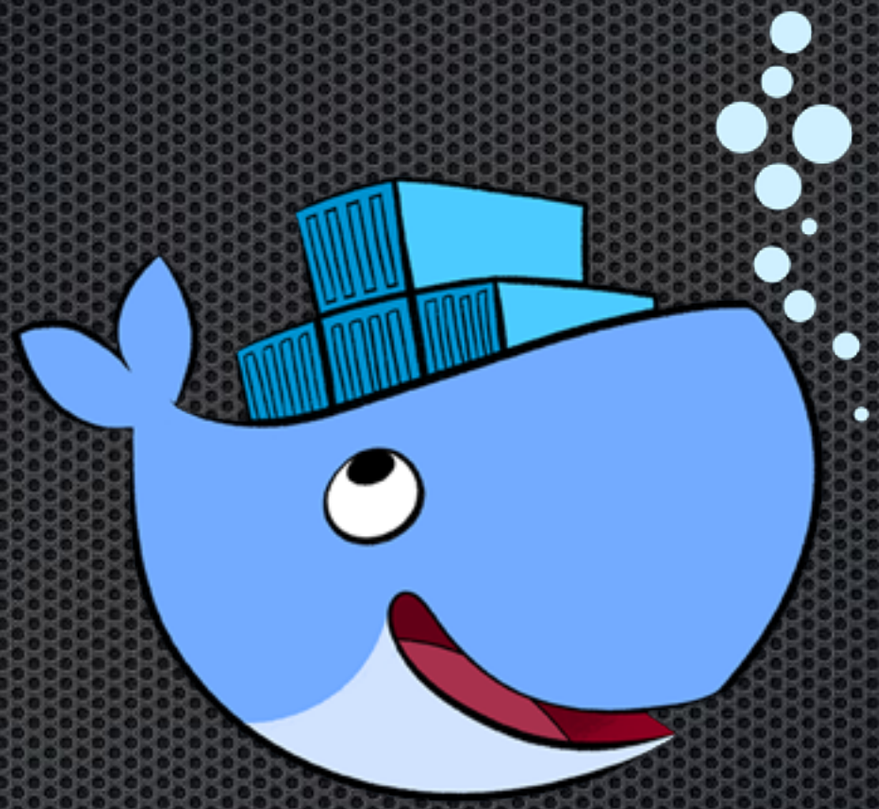
Orchestration


VAMO A
DOCKERIZARNO
Imagen creada en GeneradorMemes.com

Solución


Docker is a shipping container system for code
Static website
User DB
Web frontend
Queue
Analytics DB
Multiplicity of Stacks
Do services and apps interact appropriately?
An engine that enables any payload to be encapsulated as a lightweight, portable, self-sufficient container...
...that can be manipulated using standard operations and run consistently on virtually any hardware platform
Multiplicity of hardware environments
Can I migrate smoothly and quickly
docker
Development VM
QA server
Customer Data Center
Public Cloud
Production Cluster
Contributor's laptop

Docker

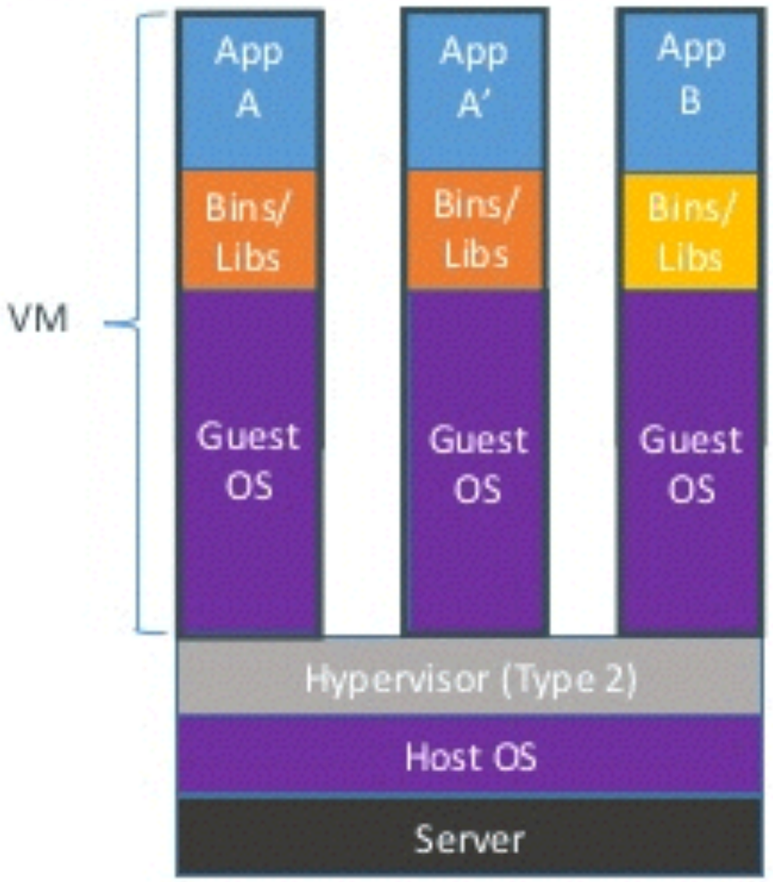


Docker

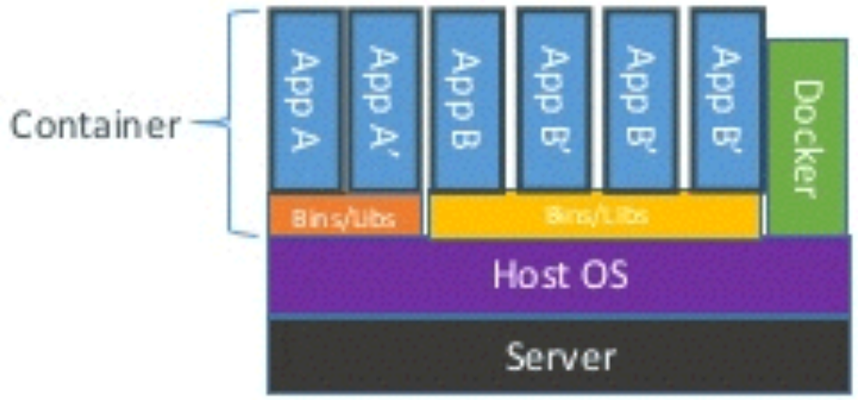
- Una plataforma abierta para aplicaciones distribuidas para developers y sysadmins
- Desarrollado inicialmente en Python y migrado a Go
- Servidor - Cliente
- Soporte para generar images a partir de Dockerfiles
- Open source

Docker

Containers vs. VMs

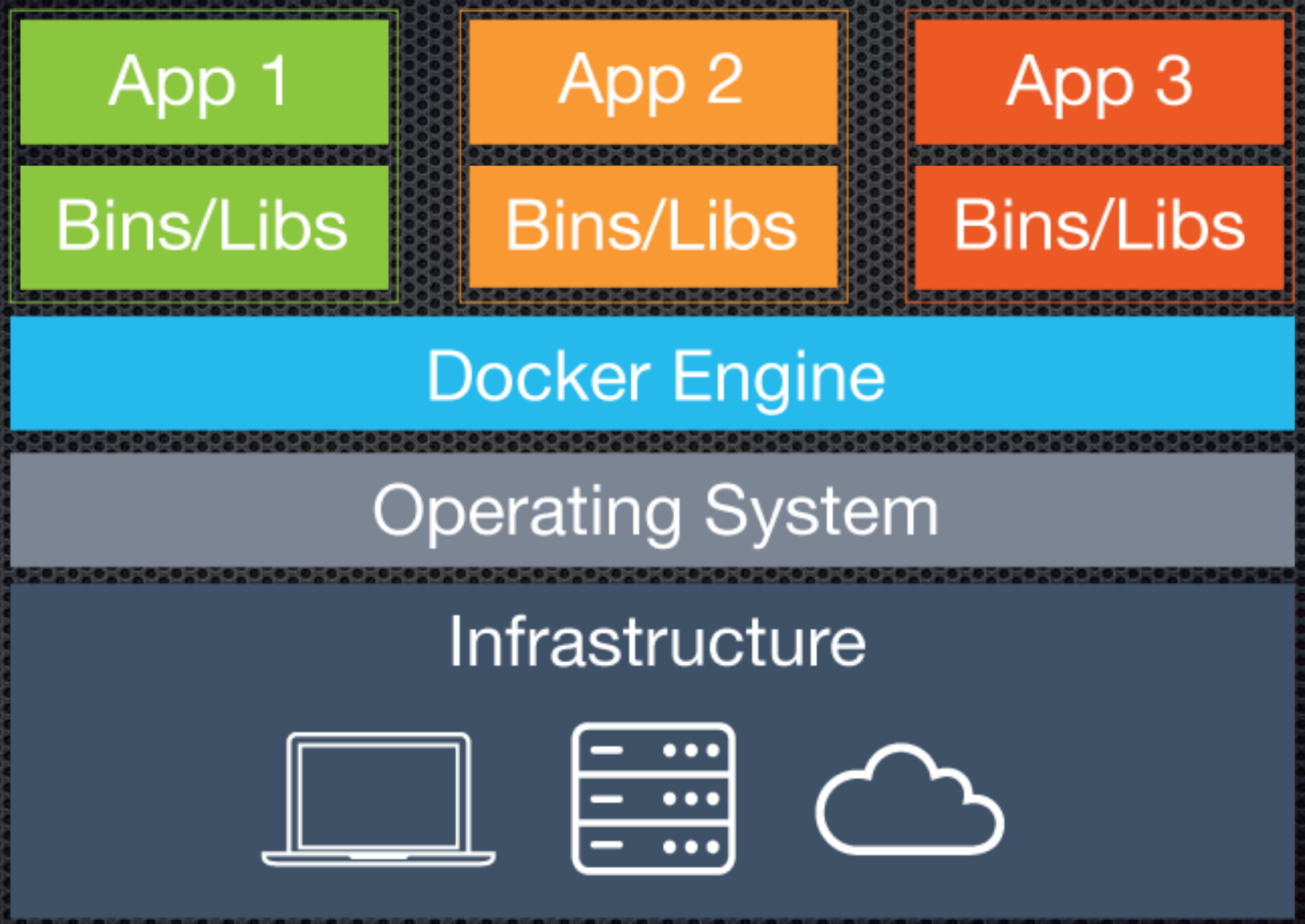


Containers are isolated, but share OS and, where appropriate, bins/libraries

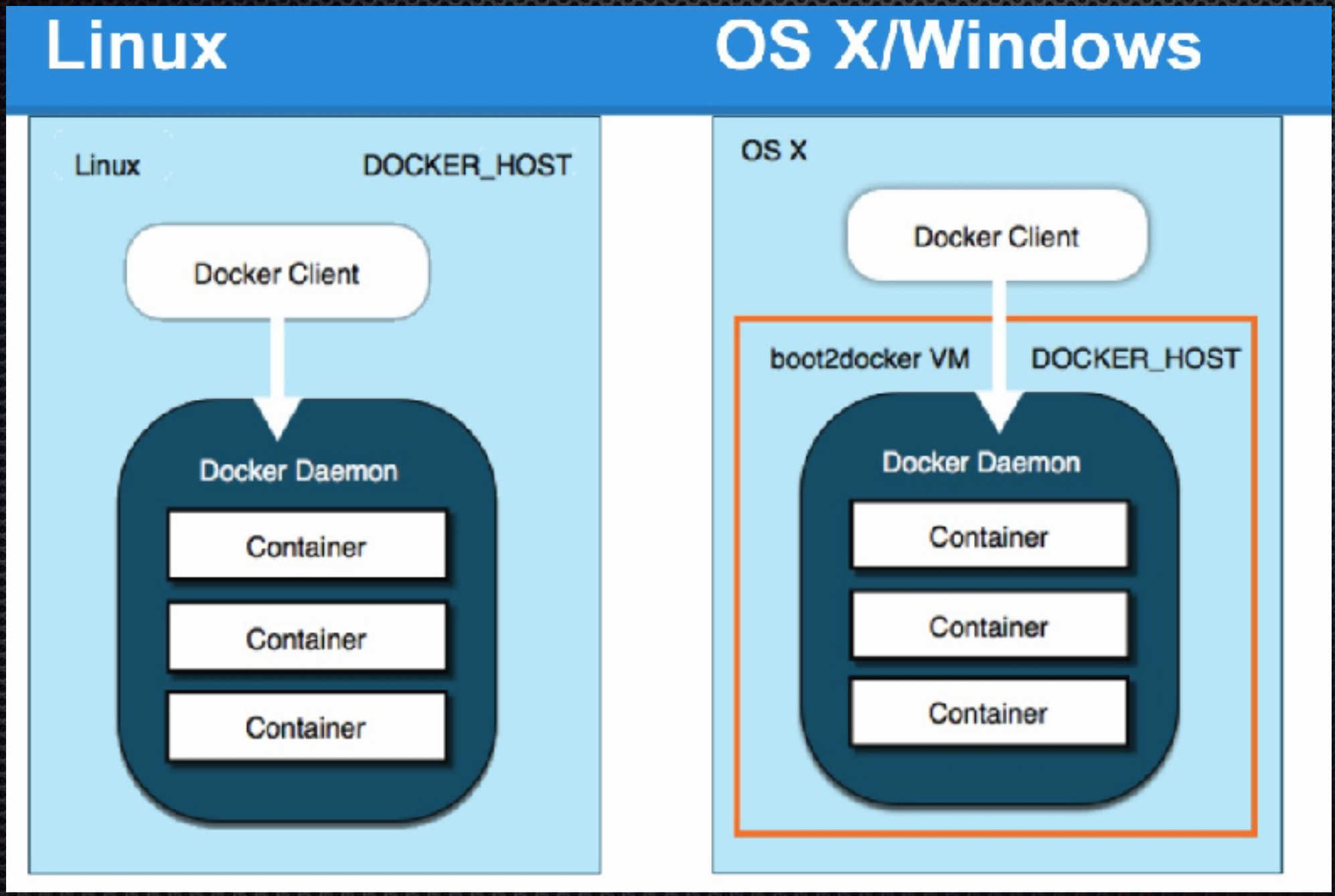


docker

Docker


App 1
Bins/Libs
App 2
Bins/Libs
App 3
Bins/Libs
Docker Engine
Operating System
Infrastructure

Docker Server - Cliente



Docker CLI - Syntax

- *docker run --name myalpine alpine:latest echo "Hello from container"*

  cliente: ***docker***

  comando: ***run***

  key param: ***--name***

  value param: ***myalpine***

  image: ***alpine***

  tag: ***latest***

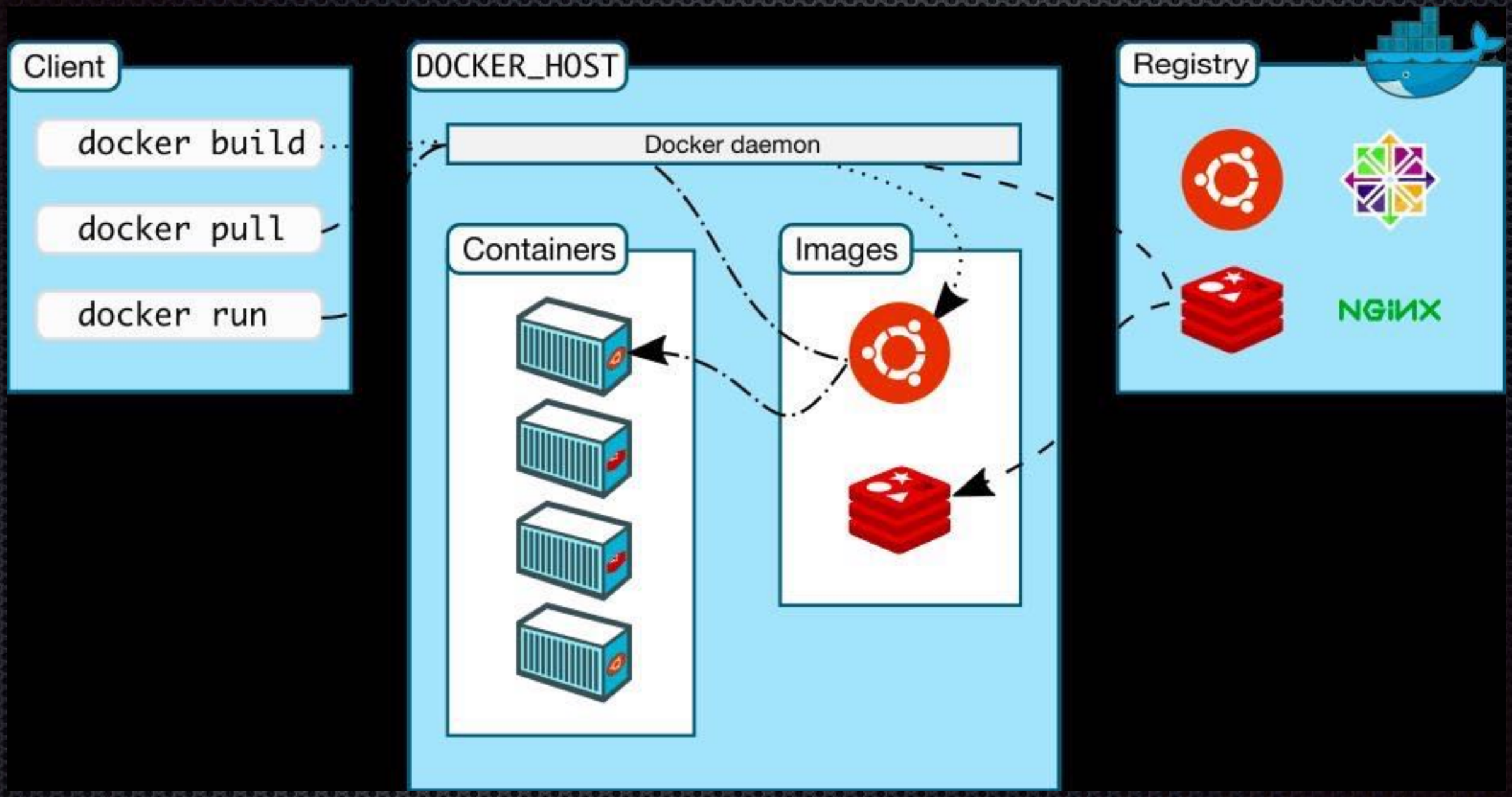
  comando container: ***echo***

  parametros container: "***Hello from container***"

Vocabulario básico

- **Image**: template de solo lectura, similar a un template
- **Container**: instancia aislada de lectura-escritura generada a partir de un image.
- **Repository**: Docker Hub donde se almacenan images
- **Volume**: para montar directorios entre host y container
- **Link**: acción de linkear un container con otro

Docker


Client
docker build
docker pull
docker run
DOCKER_HOST
Docker daemon
Containers
Images
Registry
NGINX

Requerimientos:

- Tener docker instalado correctamente, verificar mediante comando:

  $ docker ps

- Clonar el repositorio del Laboratorio:

  git clone https://github.com/mario21ic/DockerJava

Image: search & pull

- Buscar image:

  $ docker search alpine

  $ docker search alpine --limit 5

- Descargar un image:

  $ docker pull alpine

  $ docker pull alpine:3.4

Image: list, tag & delete

- Listar images local:

  $ docker images

- Tag:

  $ docker tag alpine:3.4 myalpine:mytag

- Eliminar:

  $ docker rmi alpine:3.4

Containers: run

- En un terminal, ejecutar:

  $ docker run -ti alpine /bin/sh

  # echo "Hello Lab" > /tmp/hello.txt

- En otro terminal:

  $ docker run --name mysh -ti alpine:3.4 /bin/sh

  # echo "Bye Lab" > /tmp/bye.txt

Containers: ps & exec

- En un 3er terminal, ejecutar:

  $ docker ps

- Ejecutar en un container:

  $ docker exec mysh ps

  $ docker exec -ti mysh sh

  # ls -lha /tmp

Containers: run, ps & start

- En un 4to terminal, ejecutar:

  $ docker run --name myecho alpine:3.3 echo "Hello Lab"

- Listar todos los containers:

  $ docker ps -a

- *Iniciar un container:*

  $ docker start myecho

Containers: create, attach, kill

- Create:

  $ docker create --name echoxD debian:latest echo "xD"

- Iniciar:

  $ docker start --attach echoxD

- En otro terminal, eliminar un container:

  $ docker kill mysh

Containers: start & delete

- Iniciar mysh:

  $ docker start mysh

- Eliminar un container:

  $ docker rm mysh

  $ docker rm -f mysh

- Eliminar un container:

  $ docker ps -a

Port forwarding

- Del puerto 80 del container al localhost 8080:

  $ docker run --name mynginx -p 8080:80 -d nginx

- Abrir browser:

  http://localhost:8080/

Demo Container: Volume

- En cli ejecutar:

  $ docker run --name mynginx -v $(pwd)/html:/usr/share/nginx/html -p 8080:80 -d nginx

- Abrir browser:

  http://localhost:8080/

Demo Container: Volume

- En cli ejecutar:

  $ docker run --name mynginx -v $(pwd)/html:/usr/share/nginx/html -v $(pwd)/subdir:/usr/share/nginx/html/subdir -p 8080:80 -d nginx

- Abrir browser:

  http://localhost:8080/subdir/

Container save as Image

- En cli ejecutar:

  $ docker run --name container_debian -ti debian bash

  # echo "hello from container debian"

- En otro terminal:

  $ docker commit container_debian debian_hola

- Verificar:

  $ docker images

Dockerfile

Y como extiendo un Docker Image?

Dockerfile

- Generar archivo Dockerfile con contenido:

```
FROM nginx:latest
MAINTAINER Mario Inga <mario21ic@gmail.com>

RUN echo 'Building from Dockerfile'
COPY html/index.html /usr/share/nginx/html/index.html
```

Dockerfile

- Ejecutar:

  $ docker build -t image_from_dockerfile:latest .

- Verificar: *$ docker images*

- Usar:

  $ docker run --name newcontainer -p 8088:80 -d image_from_dockerfile

Docker Link

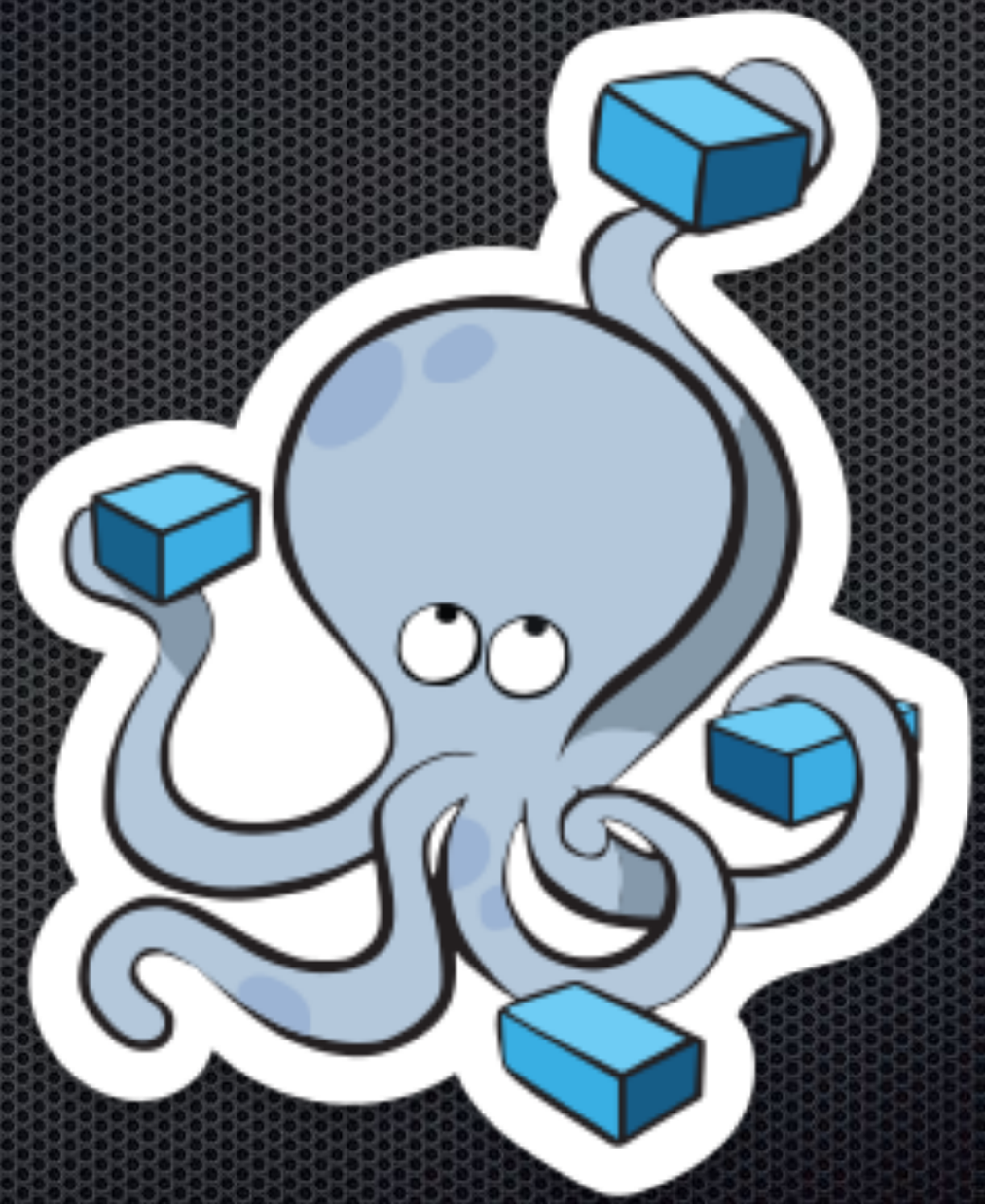
- Ejecutar:

  $ docker run --name some-mysql -e MYSQL_ROOT_PASSWORD=myclavesecreta -d mysql:latest

  $ docker run --name some-wordpress --link some-mysql:mysql -p 8080:80 -d wordpress

- Browser: http://localhost:8080/

Docker Compose



Problema

- Containers aislados
- Configurar la ip cada vez que reinicia
- Compartir configs
- Construir cada Image desde Dockerfile
- Escalar un container

Docker Compose

- Permite una fácil orchestration entre containers
- Desarrollado en Python
- Instalacion: pip install -U docker-compose
- Configuración en un “docker-compose.yml" como template y “docker-compose.override.yml” para dev
- Define cada services como componente.

docker-compose.yml

```
version: '2'

services:
  nginx:
    image: nginx:1.11
```

docker-compose.override.yml

```
version: '2'

services:
  nginx:
    volumes:
      - ./html:/usr/share/nginx/html
    ports:
      - 8080:80
```

- Ejecutar:
  $ docker-compose up

docker-compose.prod.yml

```
version: '2'
services:
  nginx:
    build: .
    ports:
      - 80:80
```

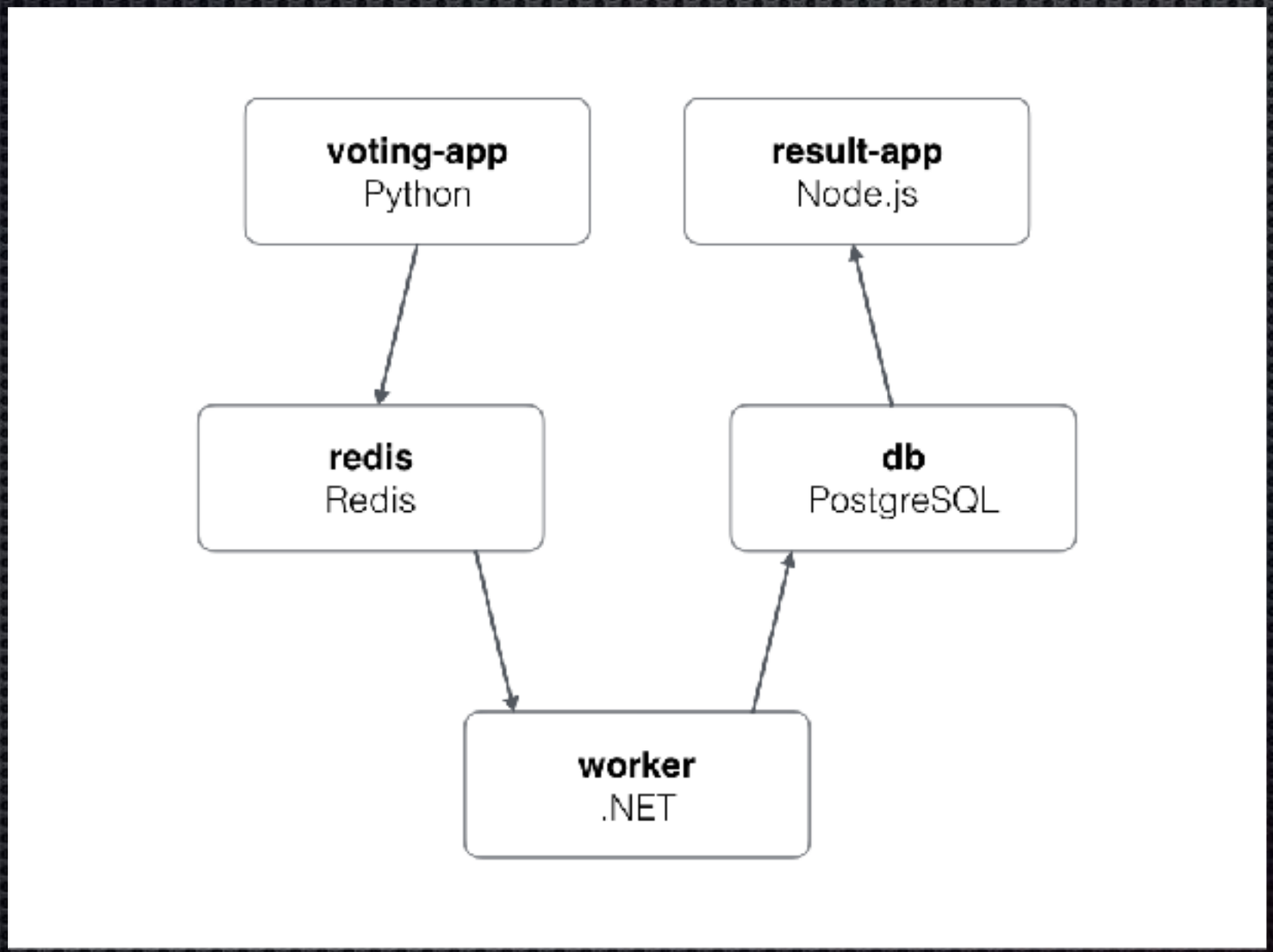
- Ejecutar:
  $ docker-compose -f docker-compose.prod.yml up

docker-compose.yml

```
web:
    image: odoo:8
    volumes:
        - ./odoo_vps:/mnt/extra-addons/odoo_vps
    links:
        - db
    ports:
        - "8069:8069"
db:
    image: postgres:latest
    environment:
        POSTGRES_USER: odoo
        POSTGRES_PASSWORD: odoo
```

Docker Compose

- https://github.com/docker/example-voting-app



CLIENT

SERVER

REPOSITORY

Docker
CLI

Docker
Compose

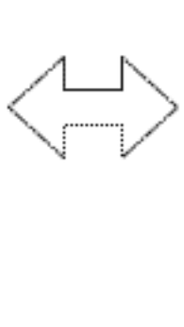
Local

Docker
Machine

Docker
Machine

Docker
Machine

Docker
Machine



Docker
Registry

CLUSTER

Docker Swarm

Recomendaciones

- Usa base image oficiales
- Los containers son desechables
- Ejecutar solo un proceso en un container
- Linkear solo lo necesario
- No abusar del depends_on
- Separar tus docker-compose.yml
- Dividir mediante networking

Preguntas?