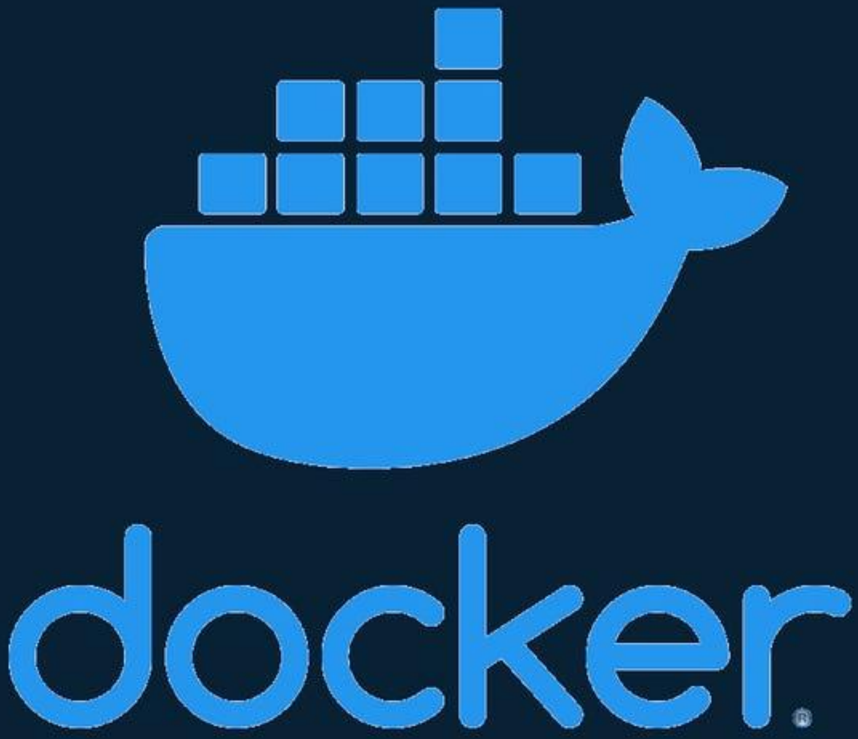
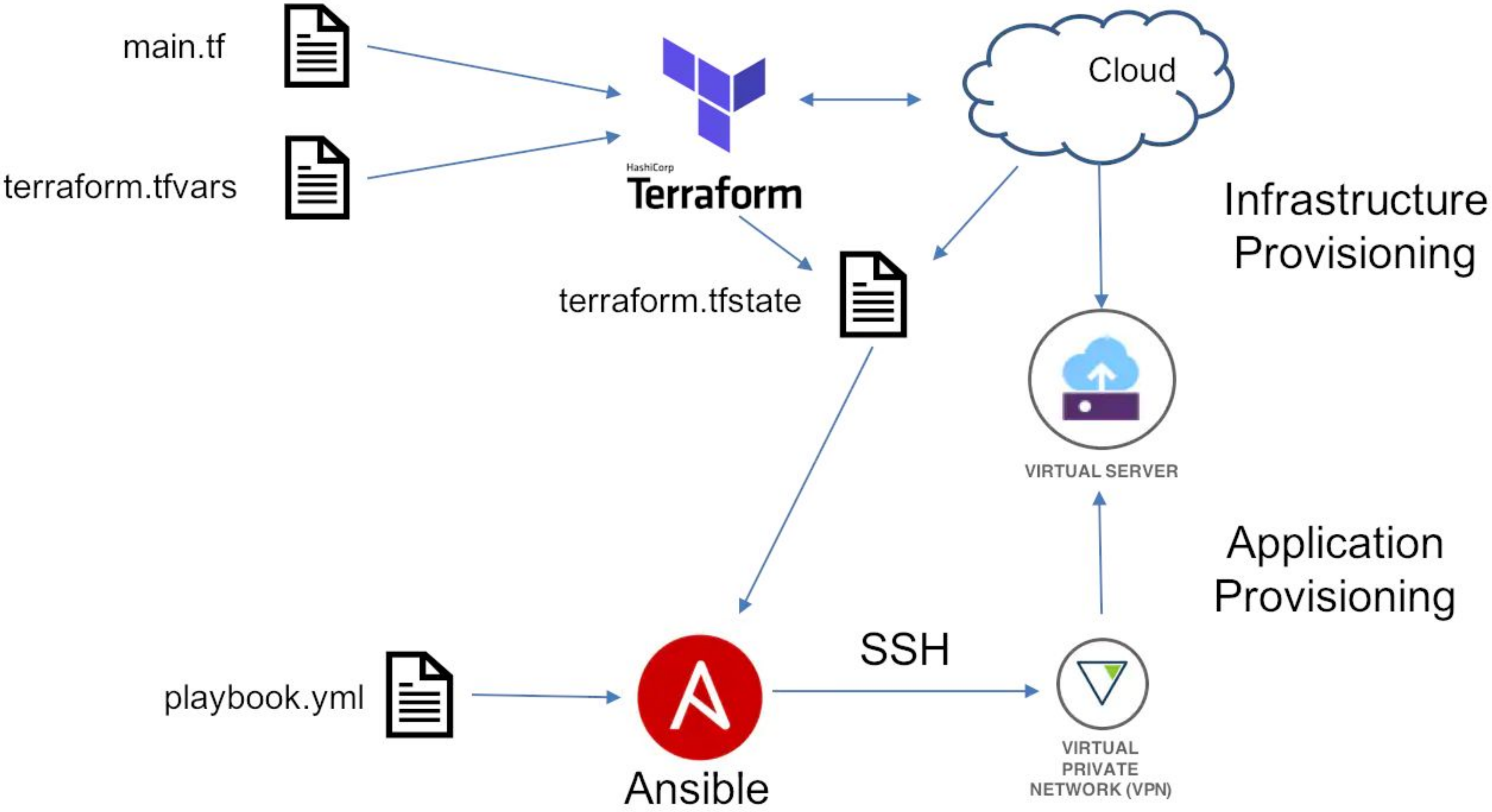


docker®



main.tf

terraform.tfvars

HashiCorp Terraform

Cloud

terraform.tfstate

Infrastructure Provisioning

VIRTUAL SERVER

Application Provisioning

playbook.yml

Ansible

SSH

VIRTUAL PRIVATE NETWORK (VPN)

¿Qué es Docker?

Docker es una plataforma para empaquetar y distribuir aplicaciones dentro de contenedores.

Se encuentra entre los 30 proyectos de Github con mas estrellas, 2600+ forks y 560+ contribuidores; más de 150 proyectos alrededor de Docker.

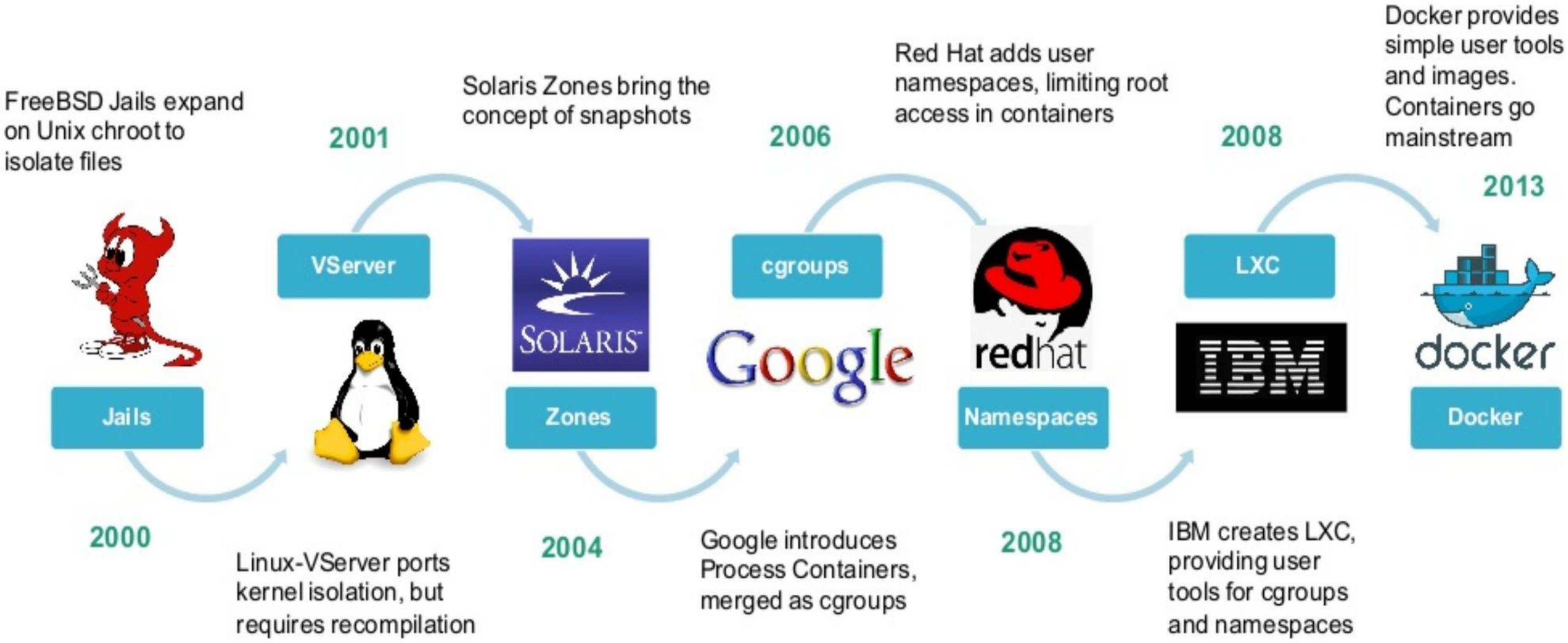
Historia

- Se funda dotCloud el 2011 brindando el primer PaaS políglota
- Solomon Hykes inicia Docker como proyecto interno en dotCloud
- Se liberó el proyecto como código abierto en Marzo del 2013
- A partir de Septiembre del 2013 colaboran con RedHat para arreglar incompatibilidades

dotCloud

Docker en PyCon 2013

..Evolución… casi hasta hoy..



2000

Jails

FreeBSD Jails expand on Unix chroot to isolate files

2001

VServer

Linux-VServer ports kernel isolation, but requires recompilation

2004

Zones

Solaris Zones bring the concept of snapshots

2006

cgroups

Google introduces Process Containers, merged as cgroups

2008

Namespaces

Red Hat adds user namespaces, limiting root access in containers

2008

LXC

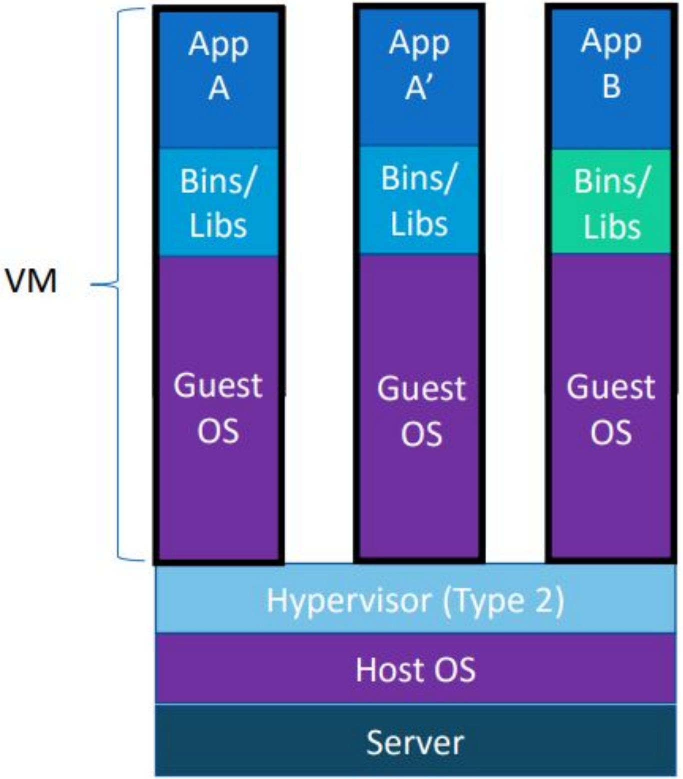
IBM creates LXC, providing user tools for cgroups and namespaces

2013

Docker

Docker provides simple user tools and images. Containers go mainstream

Contenedores vs Maquinas Virtuales



VM

App A | App A’ | App B

Bins/ Libs | Bins/ Libs | Bins/ Libs

Guest OS | Guest OS | Guest OS

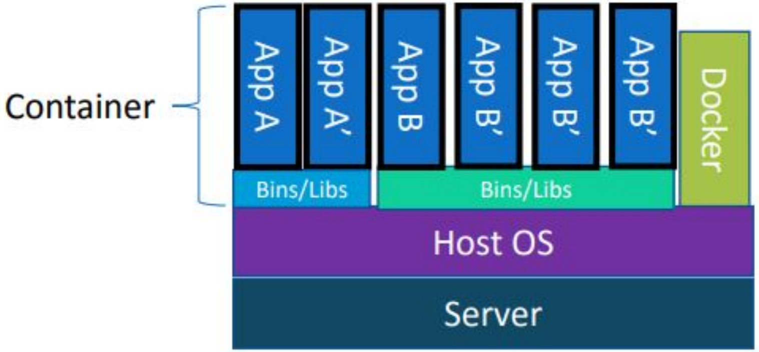
Hypervisor (Type 2)

Host OS

Server

Los contenedores están aislados, pero comparten SO y opcionalmente binarios y librerías

Da como resultado despliegues mas rápidos, con menos sobrecoste, más facilites de migrar y reiniciar.



Container

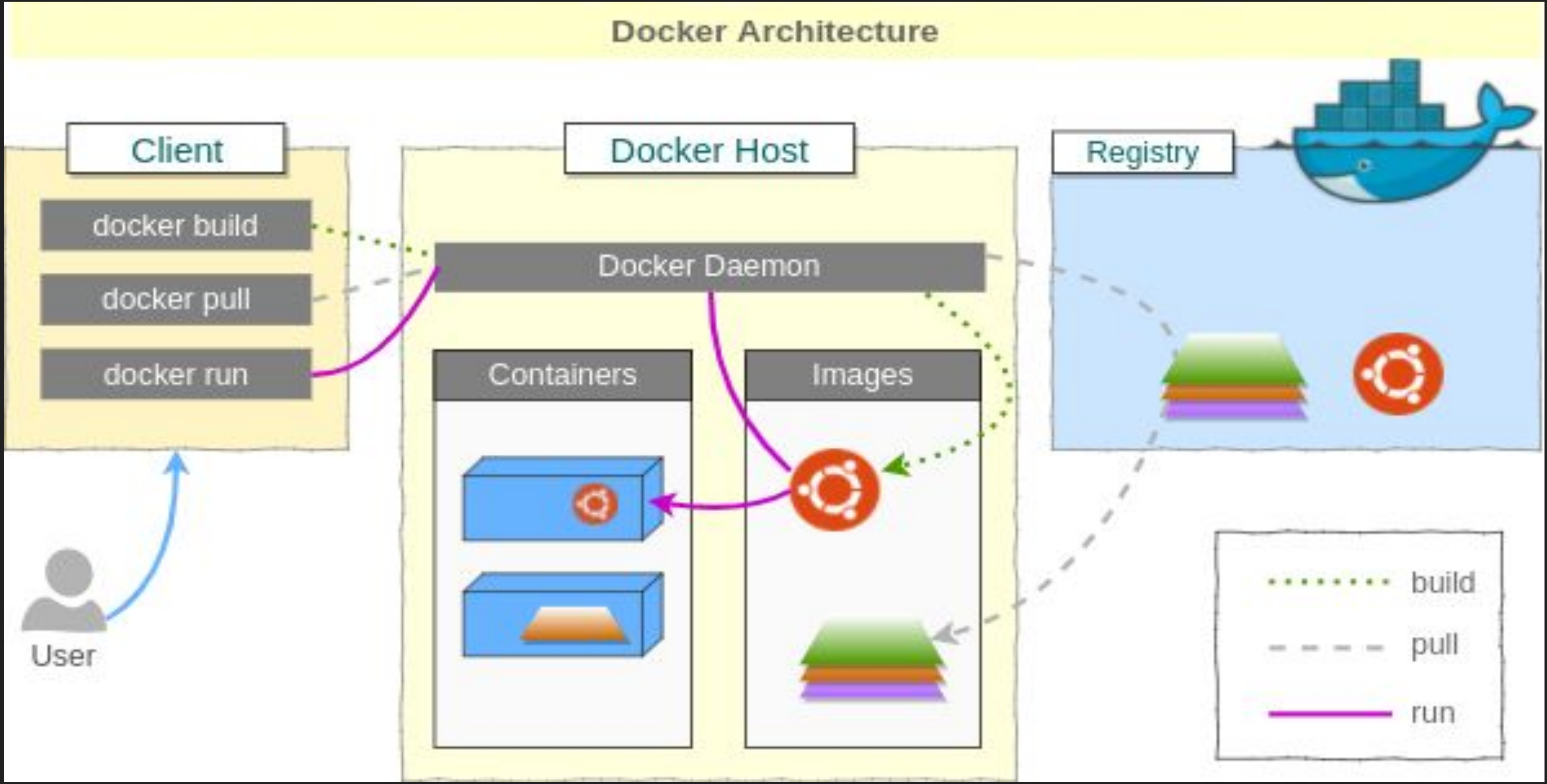
App A | App A´ | App B | App B´ | App B´ | App B´

Docker

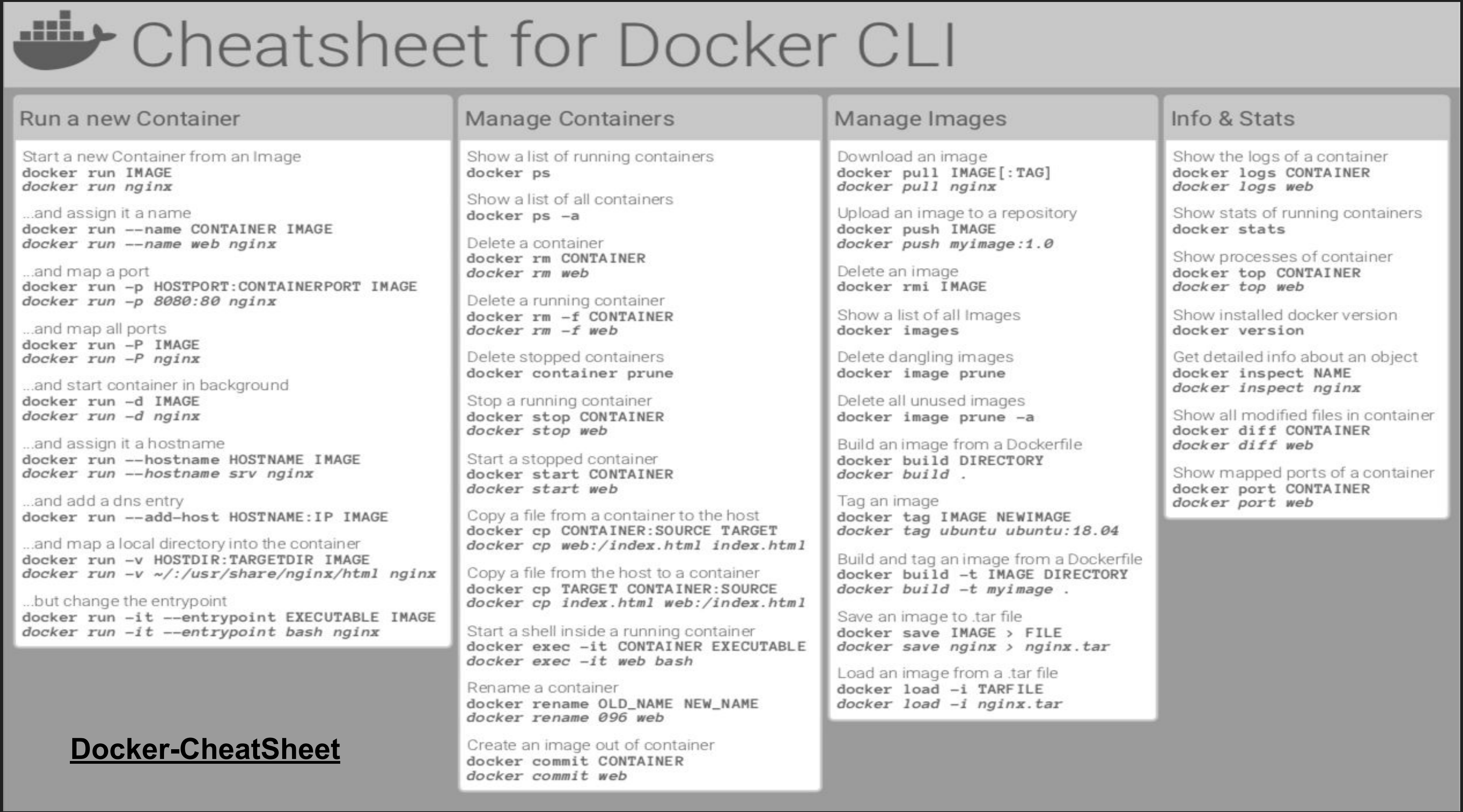
Bins/Libs | Bins/Libs

Host OS

Server



Registry - > docker hub



Cheatsheet for Docker CLI

Run a new Container

Start a new Container from an Image

```
docker run IMAGE
docker run nginx
```

...and assign it a name

```
docker run --name CONTAINER IMAGE
docker run --name web nginx
```

...and map a port

```
docker run -p HOSTPORT:CONTAINERPORT IMAGE
docker run -p 8080:80 nginx
```

...and map all ports

```
docker run -P IMAGE
docker run -P nginx
```

...and start container in background

```
docker run -d IMAGE
docker run -d nginx
```

...and assign it a hostname

```
docker run --hostname HOSTNAME IMAGE
docker run --hostname srv nginx
```

...and add a dns entry

```
docker run --add-host HOSTNAME:IP IMAGE
```

...and map a local directory into the container

```
docker run -v HOSTDIR:TARGETDIR IMAGE
docker run -v ~/:/usr/share/nginx/html nginx
```

...but change the entrypoint

```
docker run -it --entrypoint EXECUTABLE IMAGE
docker run -it --entrypoint bash nginx
```

Manage Containers

Show a list of running containers

```
docker ps
```

Show a list of all containers

```
docker ps -a
```

Delete a container

```
docker rm CONTAINER
docker rm web
```

Delete a running container

```
docker rm -f CONTAINER
docker rm -f web
```

Delete stopped containers

```
docker container prune
```

Stop a running container

```
docker stop CONTAINER
docker stop web
```

Start a stopped container

```
docker start CONTAINER
docker start web
```

Copy a file from a container to the host

```
docker cp CONTAINER:SOURCE TARGET
docker cp web:/index.html index.html
```

Copy a file from the host to a container

```
docker cp TARGET CONTAINER:SOURCE
docker cp index.html web:/index.html
```

Start a shell inside a running container

```
docker exec -it CONTAINER EXECUTABLE
docker exec -it web bash
```

Rename a container

```
docker rename OLD_NAME NEW_NAME
docker rename 096 web
```

Create an image out of container

```
docker commit CONTAINER
docker commit web
```

Manage Images

Download an image

```
docker pull IMAGE[:TAG]
docker pull nginx
```

Upload an image to a repository

```
docker push IMAGE
docker push myimage:1.0
```

Delete an image

```
docker rmi IMAGE
```

Show a list of all Images

```
docker images
```

Delete dangling images

```
docker image prune
```

Delete all unused images

```
docker image prune -a
```

Build an image from a Dockerfile

```
docker build DIRECTORY
docker build .
```

Tag an image

```
docker tag IMAGE NEWIMAGE
docker tag ubuntu ubuntu:18.04
```

Build and tag an image from a Dockerfile

```
docker build -t IMAGE DIRECTORY
docker build -t myimage .
```

Save an image to .tar file

```
docker save IMAGE > FILE
docker save nginx > nginx.tar
```

Load an image from a .tar file

```
docker load -i TARFILE
docker load -i nginx.tar
```

Info & Stats

Show the logs of a container

```
docker logs CONTAINER
docker logs web
```

Show stats of running containers

```
docker stats
```

Show processes of container

```
docker top CONTAINER
docker top web
```

Show installed docker version

```
docker version
```

Get detailed info about an object

```
docker inspect NAME
docker inspect nginx
```

Show all modified files in container

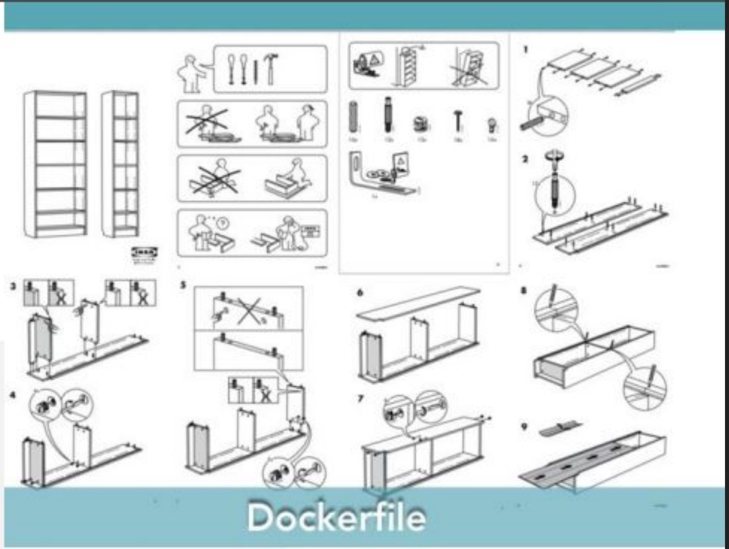
```
docker diff CONTAINER
docker diff web
```

Show mapped ports of a container

```
docker port CONTAINER
docker port web
```

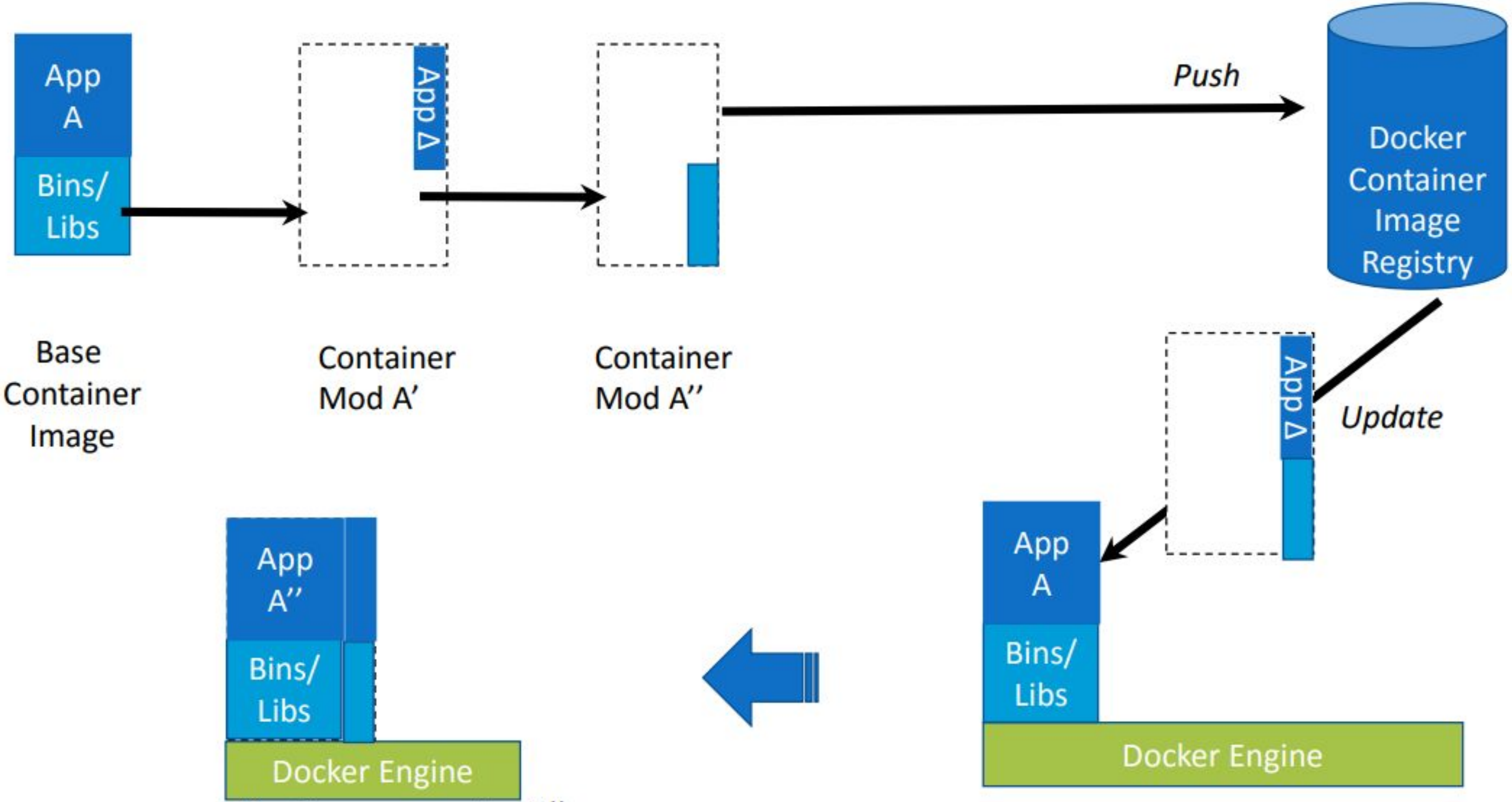
Docker-CheatSheet

Glosario Docker: **Dockerfile**



```
# A basic apache server.

FROM ubuntu:14.04

MAINTAINER Kimbro Staken version: 0.1

RUN apt-get update && apt-get install –y apache2

ENV APACHE_LOG_DIR /var/log/apache2

EXPOSE 80

CMD ["/usr/sbin/apache2", "-D", "FOREGROUND"]
```

Cambios y actualizaciones



App A

Bins/ Libs

Base Container Image

App Δ

Container Mod A'

Container Mod A''

Push

Docker Container Image Registry

Update

App Δ

App A

Bins/ Libs

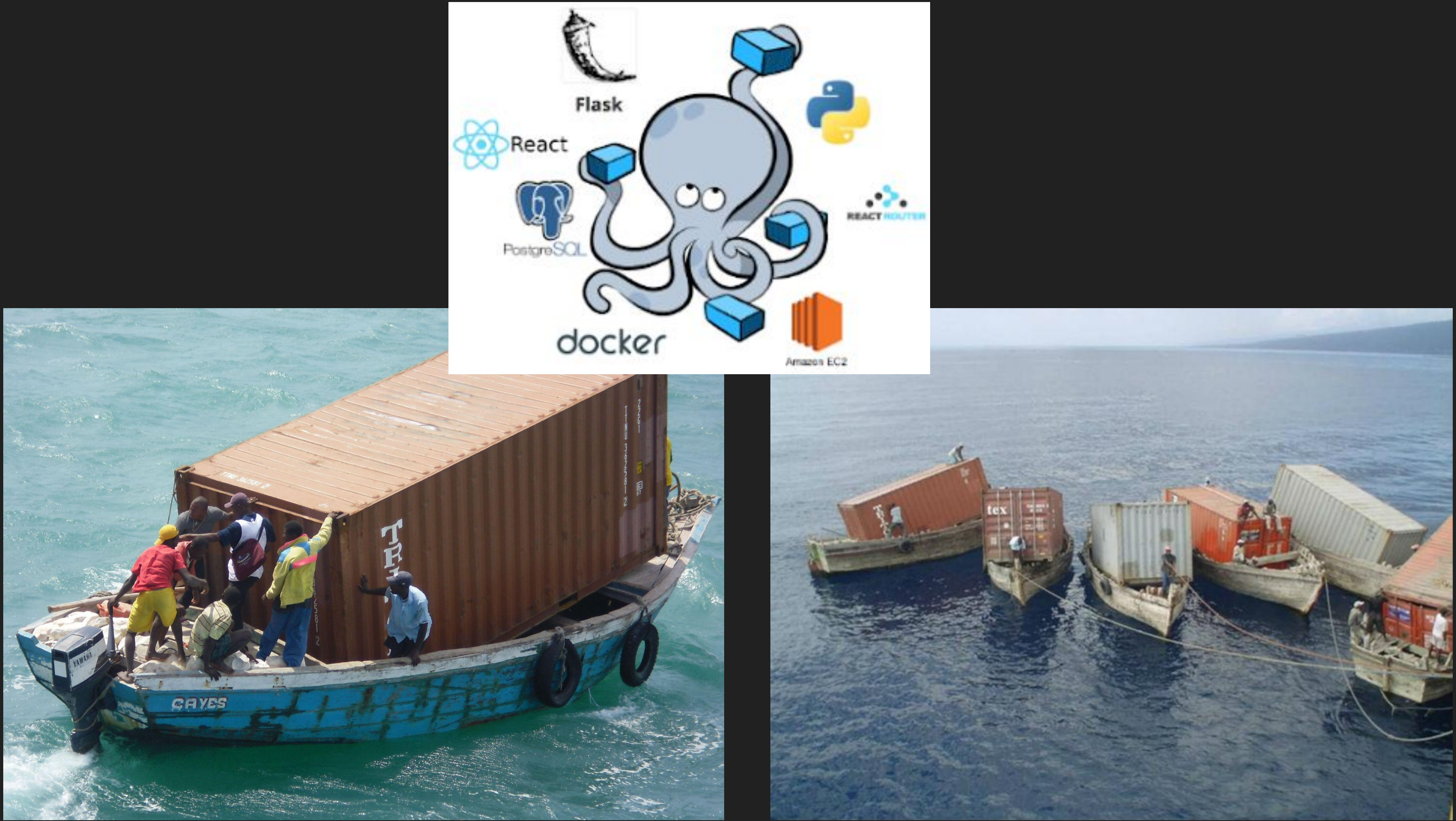
Docker Engine

App A''

Bins/ Libs

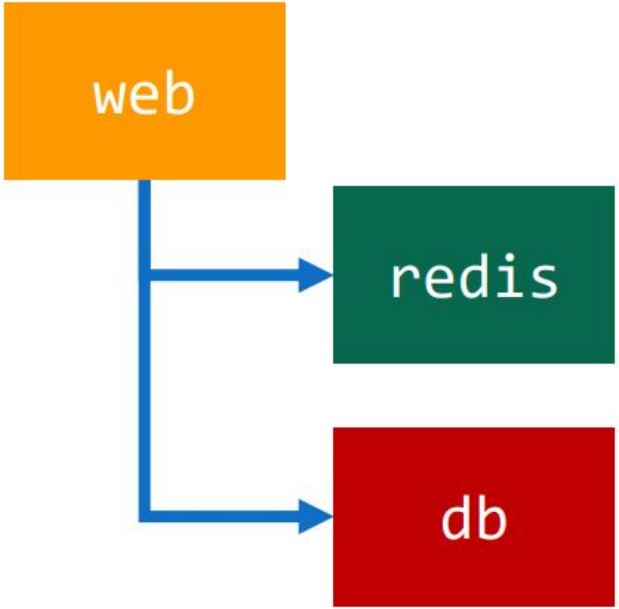
Docker Engine

Host is now running A''


Flask
React
PostgreSQL
docker
REACT ROUTER
Amazon EC2
YAMAHA
CAYES
tex

docker-compose.yml. Ref. de comandos

```yaml
version: '2'
services:
  web:
    build: .
    depends_on:
      - db
      - redis
  redis:
    image: redis
  db:
    image: postgres
```



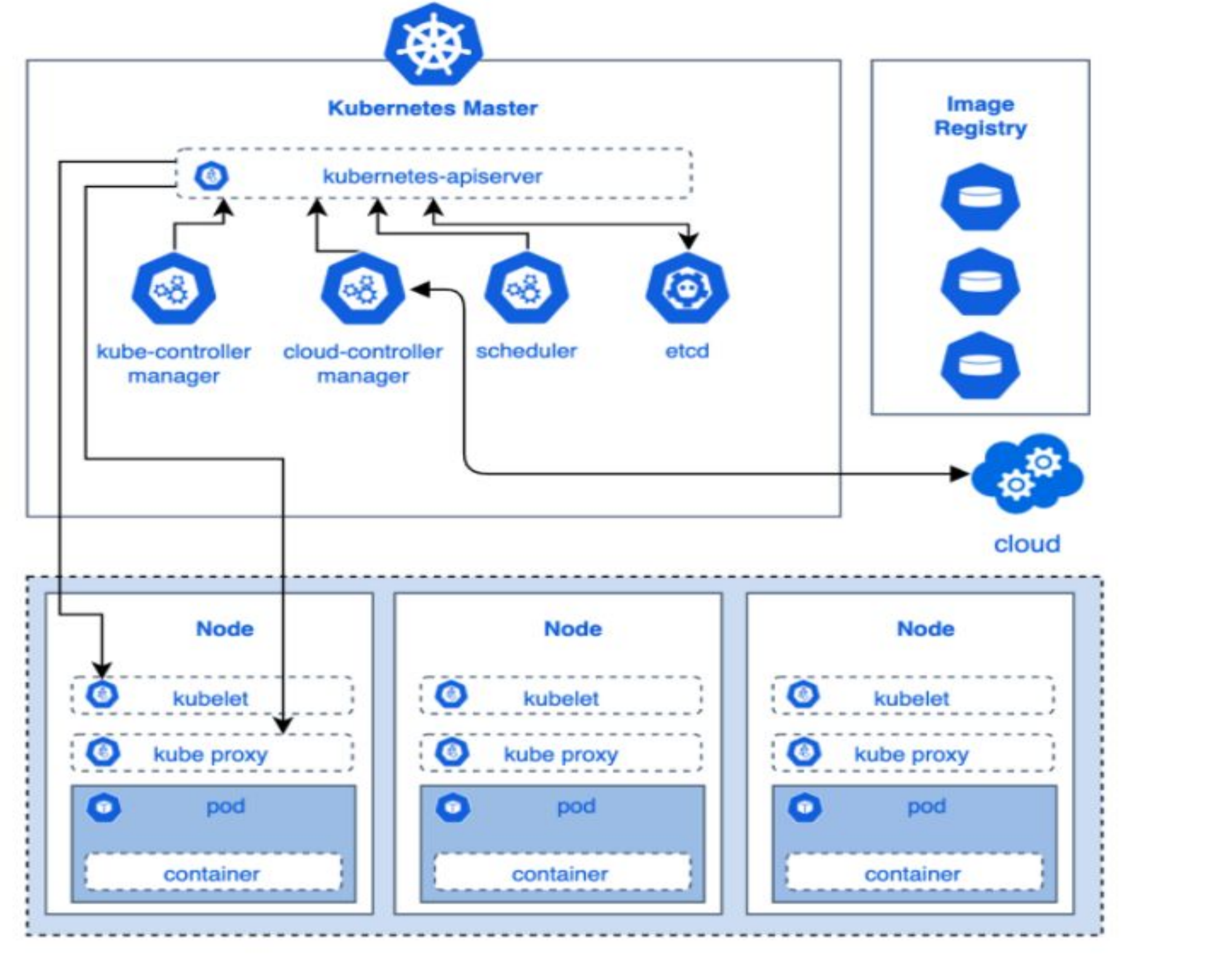
Reference: https://docs.docker.com/compose/compose-file

SIPG
231
COSCO
UASC
MAERSK
HAMBURG SÜD
HYUNDAI
CMA CGM
EVERGREEN
Hapag-Lloyd
HANJIN
YANG MI
OOCL

Orquestadores

kubernetes
Openshift
OKD (Openshift Comunidad)

Minikube
Rancher


Kubernetes Master
Image Registry
kubernetes-apiserver
kube-controller manager
cloud-controller manager
scheduler
etcd
cloud
Node
kubelet
kube proxy
pod
container
Node
kubelet
kube proxy
pod
container
Node
kubelet
kube proxy
pod
container