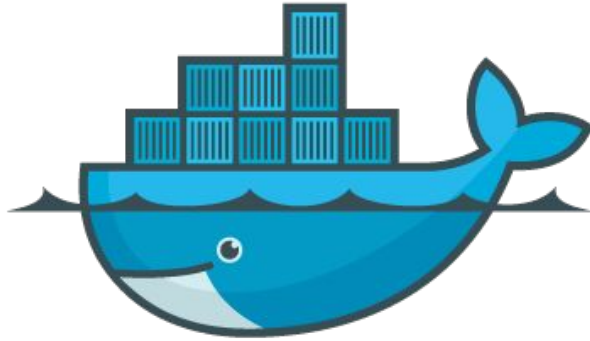


Docker



docker

Written in Feb 2023

What is Docker ?

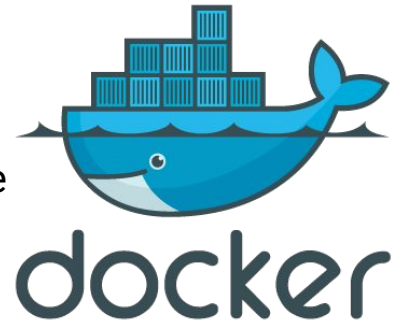
Docker is an open platform for developing, shipping, and running applications.

Docker enables you to separate your applications from your infrastructure so you can deliver software quickly.

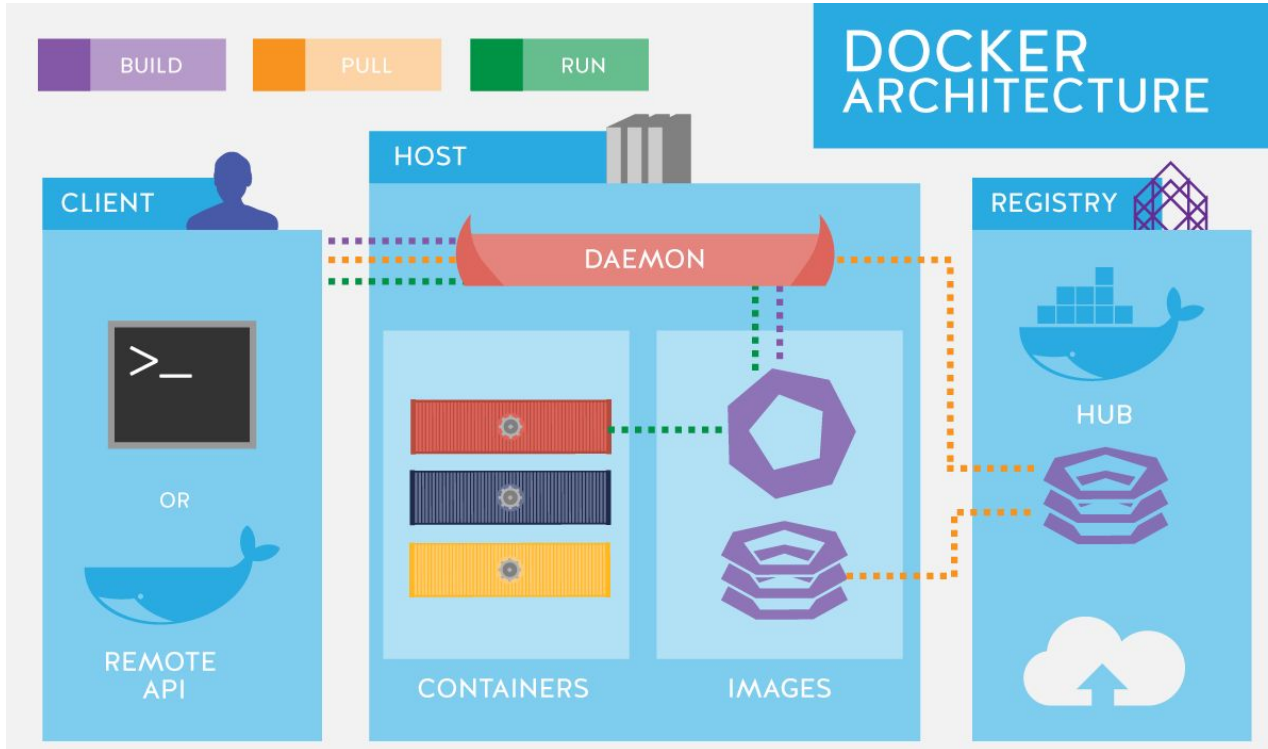
With Docker, you can manage your infrastructure in the same ways you manage your applications.

By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

<https://docs.docker.com/get-started/overview>



Docker Architecture



The Docker daemon: `dockerd` listens for Docker API requests and manages Docker objects such as images, containers, networks, and volumes.

The Docker client (`docker`) is the primary way that many Docker users interact with Docker. It calls `dockerd` via its APIs.

Docker registries store Docker images

Docker Image

Images: An *image* is a read-only template with instructions for creating a Docker container. Often, an image is *based on* another image, with some additional customization. For example, you may build an image which is based on the ubuntu image, but installs the Apache web server and your application, as well as the configuration details needed to make your application run.

You might create your own images or you might only use those created by others and published in a registry. To build your own image, you create a Dockerfile with a simple syntax for defining the steps needed to create the image and run it. Each instruction in a Dockerfile creates a layer in the image. When you change the Dockerfile and rebuild the image, only those layers which have changed are rebuilt.

Dockerfile



```
FROM node:17-alpine
WORKDIR /app
COPY package*.json .
RUN npm install --production
COPY . .
RUN npm run build
CMD ["node", "dist/index.js"]
```

```
$ docker build -t getting-started .
```

Docker Container

A **container** is a runnable instance of an image. You can create, start, stop, move, or delete a container using the Docker API or CLI. You can connect a container to one or more networks, attach storage to it, or even create a new image based on its current state.

By default, a container is relatively well isolated from other containers and its host machine. You can control how isolated a container's network, storage, or other underlying subsystems are from other containers or from the host machine.

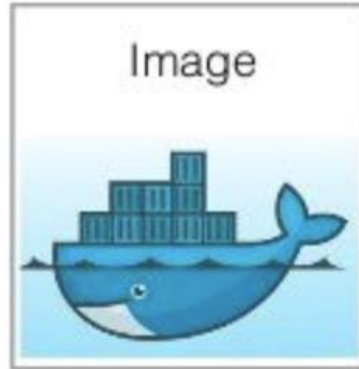
```
$ docker run -i -t ubuntu /bin/bash
```

Docker lifecycle - Very simple

```
FROM ubuntu:14.04
MAINTAINER John Doe <john.doe@example.com>
RUN apt-get update && apt-get install -y python
RUN apt-get install -y python-dev python-pip
RUN pip install Flask
RUN mkdir /app
RUN cp -r /tmp/app /app
RUN chown -R $USER:$USER /app
EXPOSE 80
CMD ["python", "-u", "-c", "import sys; from flask import Flask, jsonify; app = Flask(__name__); app.route('/').methods = ['GET']; app.route('/hello').methods = ['GET']; app.run(host='0.0.0.0', port=80)"]
```

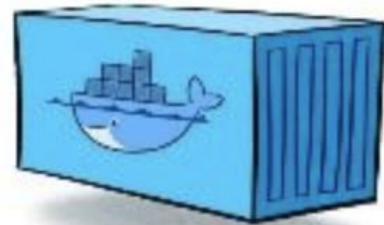
Dockerfile

→
build



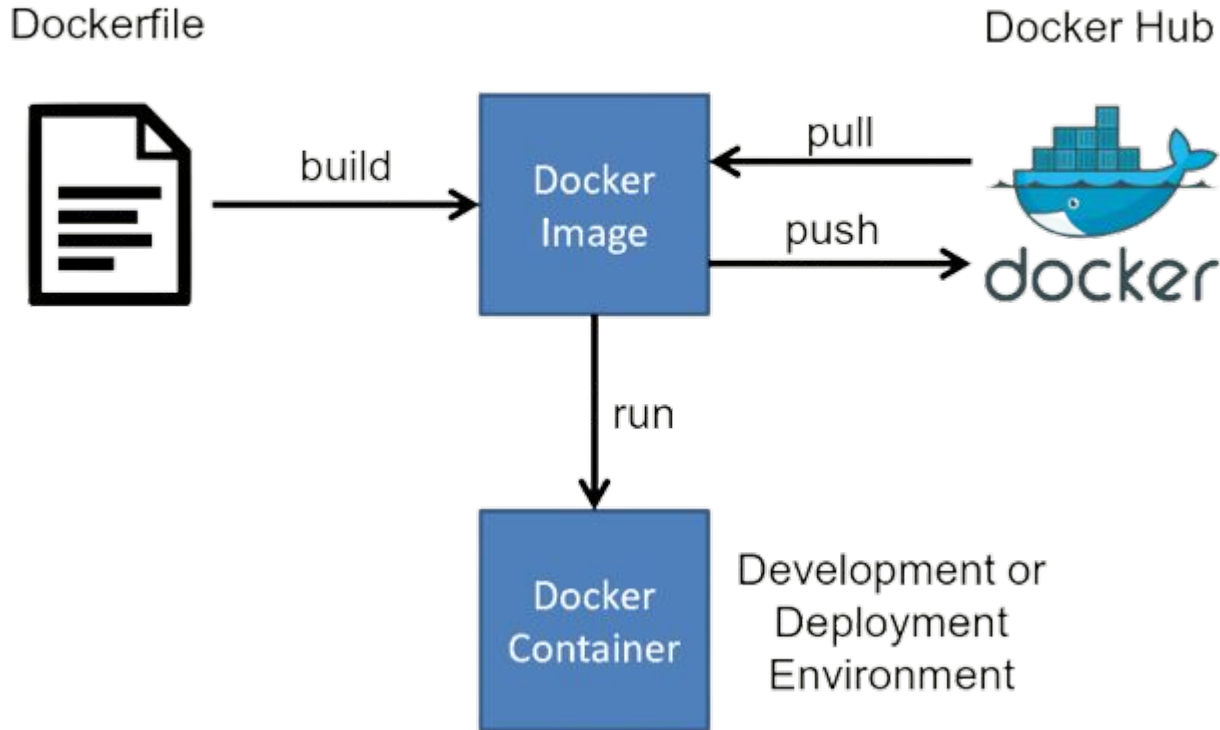
Docker Image

→
run

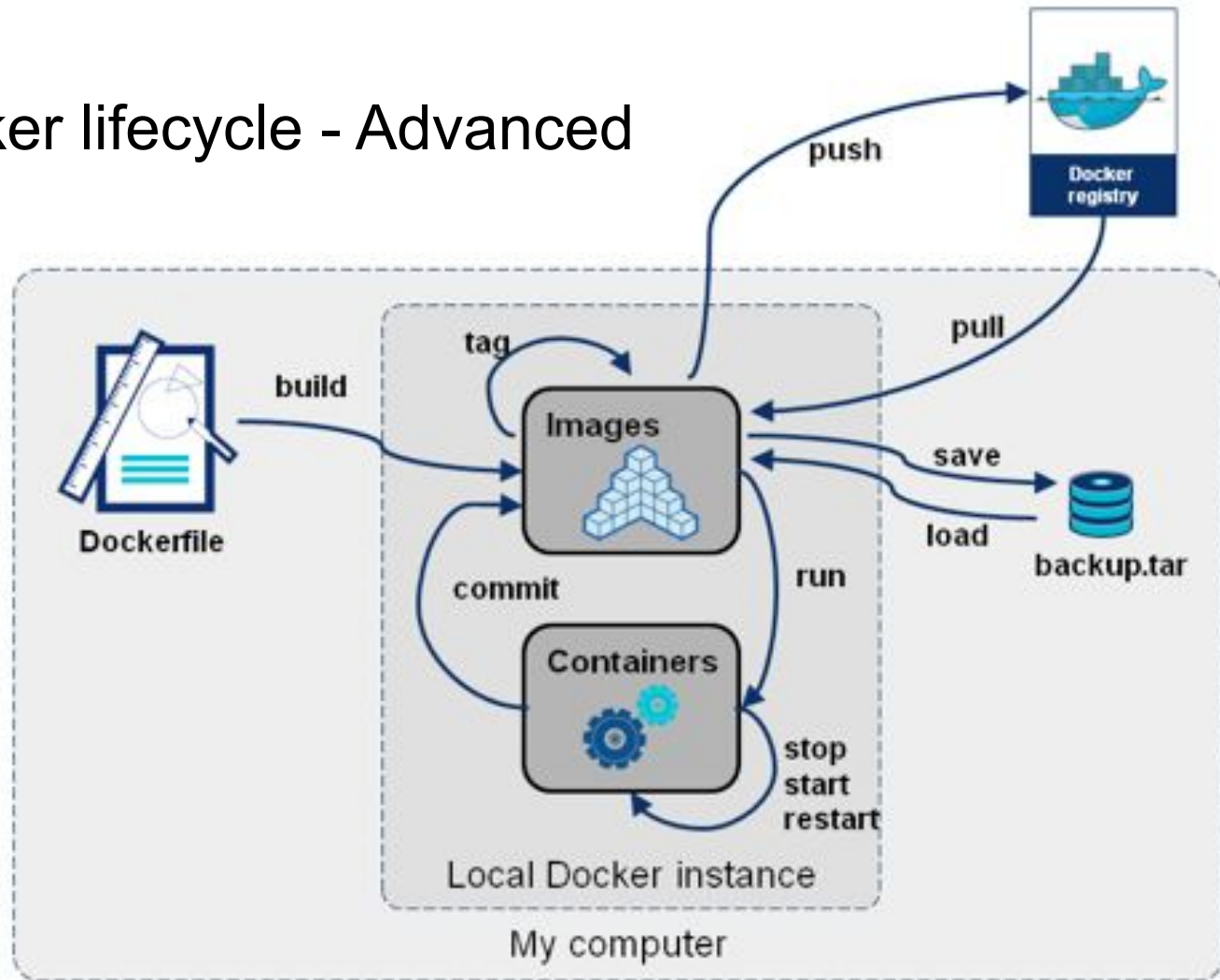


Docker Container

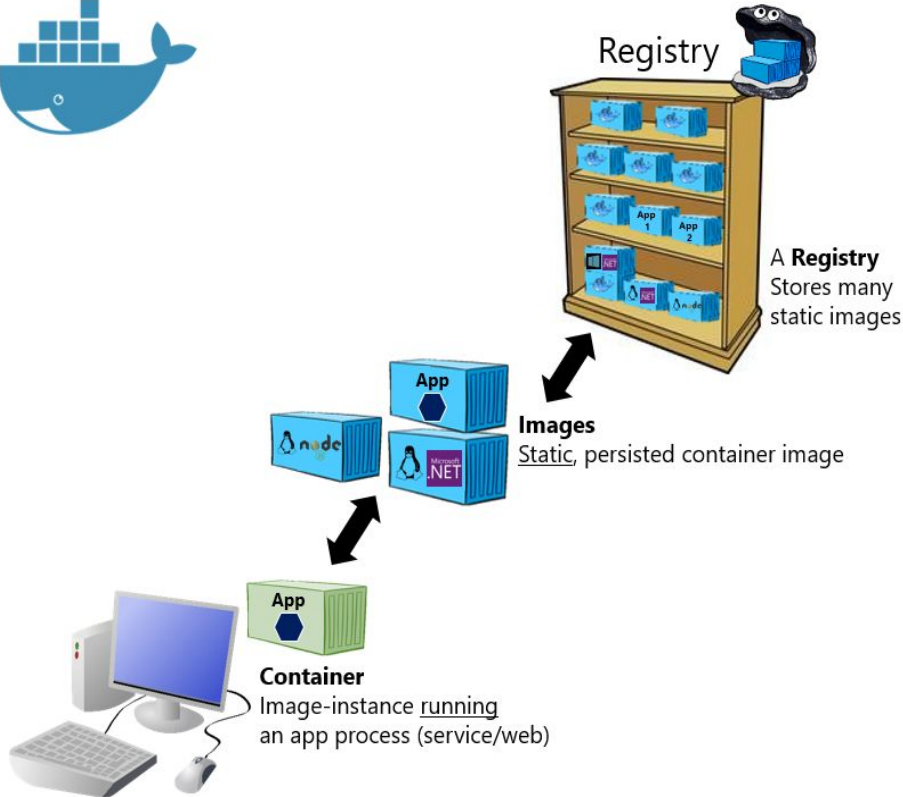
Docker lifecycle - Simple



Docker lifecycle - Advanced



Basic Taxonomy



Hosted Docker Registry

Docker Trusted Registry on-prem.

On-premises

('n' private organizations)

Docker Hub Registry

Docker Trusted Registry on-cloud

Azure Container Registry

AWS Container Registry

Public Cloud

(specific vendors)

Google Container Registry

Quay Registry

Other Cloud

Docker list images

docker images

```
thibautdebroyca@Thibauts-MacBook-Pro:~$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
airbyte/worker	0.40.32	eb39f04d7a5b	13 days ago	1.74GB
airbyte/webapp	0.40.32	5077fa222c8b	13 days ago	107MB
airbyte/temporal	0.40.32	4a0d24d579e7	13 days ago	250MB
airbyte/server	0.40.32	67b1884b75c3	13 days ago	1.03GB
airbyte/proxy	0.40.32	15ffc2357616	13 days ago	143MB
airbyte/db	0.40.32	d7d8c69129ba	13 days ago	238MB
airbyte/connector-builder-server	0.40.32	7f76c59ef859	13 days ago	203MB
airbyte/cron	0.40.32	676a56f5bc72	13 days ago	1GB
airbyte/init	0.40.32	e5433e965fbc	13 days ago	5.61MB
airbyte/bootloader	0.40.32	442667221bb0	13 days ago	986MB
airbyte/octavia-cli	0.40.32	4c9b994d779c	13 days ago	169MB
postgres	latest	75993dd36176	5 months ago	376MB

Docker pull image

```
docker pull oracleinanutshell/oracle-xe-11g
```

```
[thibautdebroya@Thibauts-MacBook-Pro:~$ docker pull oracleinanutshell/oracle-xe-11g
Using default tag: latest
latest: Pulling from oracleinanutshell/oracle-xe-11g
6cf436f81810: Downloading [=====>] 4.59MB/32.37MB
987088a85b96: Download complete
b4624b3efe06: Download complete
d42beb8ded59: Download complete
15522cc0fb47: Downloading [>] 1.622MB/275.8MB
f747bf1d551d: Downloading [>] 1.078MB/335.6MB
```

```
[thibautdebroya@Thibauts-MacBook-Pro:~$ docker pull oracleinanutshell/oracle-xe-11g
Using default tag: latest
latest: Pulling from oracleinanutshell/oracle-xe-11g
6cf436f81810: Pull complete
987088a85b96: Pull complete
b4624b3efe06: Pull complete
d42beb8ded59: Pull complete
15522cc0fb47: Pull complete
f747bf1d551d: Pull complete
Digest: sha256:8b740e77d4b90add693fedb22938f340821e89665fb58ecae0b0dace853b9ee5
Status: Downloaded newer image for oracleinanutshell/oracle-xe-11g:latest
docker.io/oracleinanutshell/oracle-xe-11g:latest
```

Docker list images (see the new image)

docker images

```
thibautdebroyca@Thibauts-MacBook-Pro:~$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
airbyte/worker	0.40.32	eb39f04d7a5b	13 days ago	1.74GB
airbyte/webapp	0.40.32	5077fa222c8b	13 days ago	107MB
airbyte/temporal	0.40.32	4a0d24d579e7	13 days ago	250MB
airbyte/server	0.40.32	67b1884b75c3	13 days ago	1.03GB
airbyte/proxy	0.40.32	15ffc2357616	13 days ago	143MB
airbyte/db	0.40.32	d7d8c69129ba	13 days ago	238MB
airbyte/connector-builder-server	0.40.32	7f76c59ef859	13 days ago	203MB
airbyte/cron	0.40.32	676a56f5bc72	13 days ago	1GB
airbyte/init	0.40.32	e5433e965fbc	13 days ago	5.61MB
airbyte/bootloader	0.40.32	442667221bb0	13 days ago	986MB
airbyte/octavia-cli	0.40.32	4c9b994d779c	13 days ago	169MB
postgres	latest	75993dd36176	5 months ago	376MB
oracleinanutshell/oracle-xe-11g	latest	ad13c30ec346	4 years ago	2.13GB

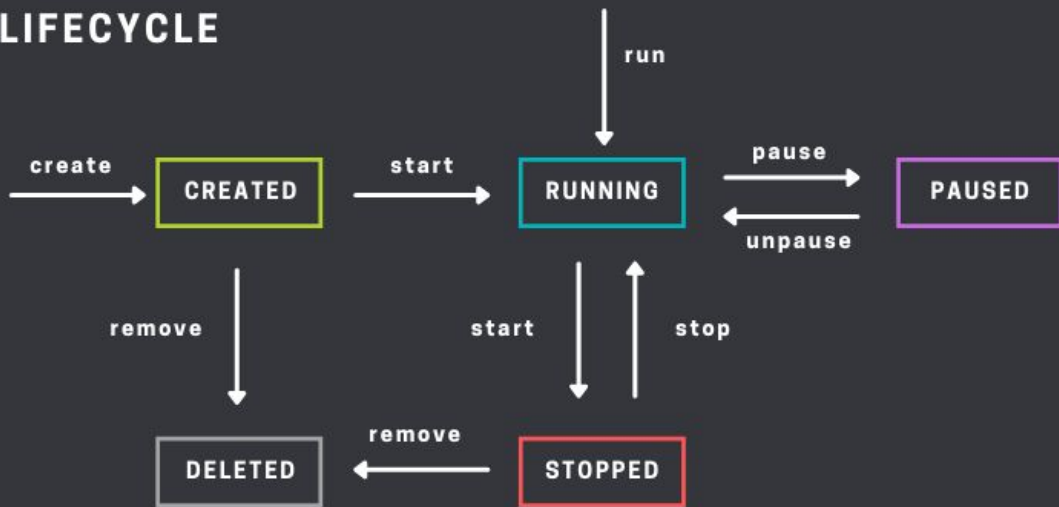
Docker run

```
docker run -d -p 49161:1521 oracleinanutshell/oracle-xe-11g
```

```
[thibautdebroya@Thibauts-MacBook-Pro:~$ docker run -d -p 49161:1521 oracleinanutshell/oracle-xe-11g  
64ebec79ac2d8a0084bf6a591c4554567f9969084a5b18d8cb8bd7bb16507510
```

DOCKER CONTAINER LIFECYCLE

LINUX
HANDBOOK



Docker container (list / stop / start)

docker container list

```
thibautdebroya@Thibauts-MacBook-Pro:~$ docker container list
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
64ebec79ac2d	oracleinanutshell/oracle-xe-11g	"/bin/sh -c '/usr/sb..."	45 seconds ago	Up 43 seconds	22/tcp, 8080/tcp, 0.0.0.0:49161->1521/tcp	sleepy_northcutt

docker stop 64

```
[thibautdebroya@Thibauts-MacBook-Pro:~$ docker stop 64
64
```

docker container ls -all

```
thibautdebroya@Thibauts-MacBook-Pro:~$ docker container ls -all
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
64ebec79ac2d	oracleinanutshell/oracle-xe-11g	"/bin/sh -c '/usr/sb..."	2 minutes ago	Exited (137) 33 seconds ago		sleepy_northcutt

docker start 64

```
[thibautdebroya@Thibauts-MacBook-Pro:~$ docker start 64
64
```

docker container list

```
thibautdebroya@Thibauts-MacBook-Pro:~$ docker container ls
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
64ebec79ac2d	oracleinanutshell/oracle-xe-11g	"/bin/sh -c '/usr/sb..."	4 minutes ago	Up 36 seconds	22/tcp, 8080/tcp, 0.0.0.0:49161->1521/tcp	sleepy_northcutt

Docker remove image

```
docker image rm ad
```

```
[thibautdebroya@Thibauts-MacBook-Pro:~]$ docker image rm ad13c30ec346
Untagged: oracleinanutshell/oracle-xe-11g:latest
Untagged: oracleinanutshell/oracle-xe-11g@sha256:8b740e77d4b90add693fedb22938f340821e89665fb58ecaeeb0dace853b9ee5
Deleted: sha256:ad13c30ec34613988c94dd85083e95952000ac6e74a7a3693bf981980ba0813c
Deleted: sha256:dca584b5c21ecf00d8f24c2854d3e8208b36bbb23d55afe73e5c688898410f77
Deleted: sha256:62ccd096710e11a02b513269726652dbc08430fb7d1857e61dad7739daf029fd
Deleted: sha256:d4c69838355b876cd3eb0d92b4ef27b1839f5b094a4eb1ad2a1d747dd5d6088f
Deleted: sha256:1c29a32189d8f2738d0d99378dc0912c9f9d289b52fb698bdd6c1c8cd7a33727
Deleted: sha256:d801a12f6af7beff367268f99607376584d8b2da656dcd8656973b7ad9779ab4
Deleted: sha256:bebe7ce6215aee349bee5d67222abeb5c5a834bbeaa2f2f5d05363d9fd68db41
```

Full commands list (1)

Commands:

attach	Attach local standard input, output, and error streams to a running container
build	Build an image from a Dockerfile
commit	Create a new image from a container's changes
cp	Copy files/folders between a container and the local filesystem
create	Create a new container
diff	Inspect changes to files or directories on a container's filesystem
events	Get real time events from the server
exec	Run a command in a running container
export	Export a container's filesystem as a tar archive
history	Show the history of an image
images	List images
import	Import the contents from a tarball to create a filesystem image
info	Display system-wide information
inspect	Return low-level information on Docker objects
kill	Kill one or more running containers
load	Load an image from a tar archive or STDIN
login	Log in to a Docker registry
logout	Log out from a Docker registry
logs	Fetch the logs of a container
pause	Pause all processes within one or more containers
port	List port mappings or a specific mapping for the container
ps	List containers
pull	Pull an image or a repository from a registry
push	Push an image or a repository to a registry

Full commands list (2)

rename	Rename a container
restart	Restart one or more containers
rm	Remove one or more containers
rmi	Remove one or more images
run	Run a command in a new container
save	Save one or more images to a tar archive (streamed to STDOUT by default)
search	Search the Docker Hub for images
start	Start one or more stopped containers
stats	Display a live stream of container(s) resource usage statistics
stop	Stop one or more running containers
tag	Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top	Display the running processes of a container
unpause	Unpause all processes within one or more containers
update	Update configuration of one or more containers
version	Show the Docker version information
wait	Block until one or more containers stop, then print their exit codes