DevTech Training

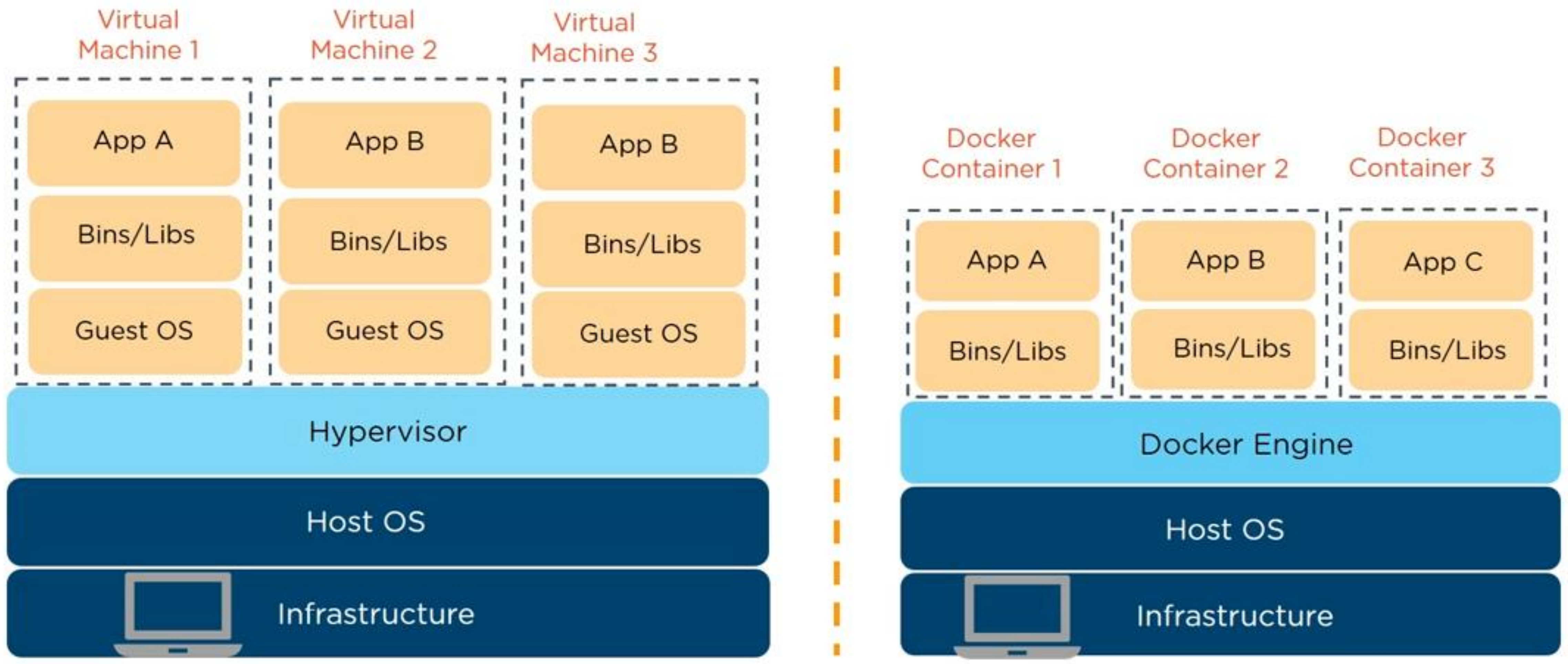
Short Course - Day 2

Docker

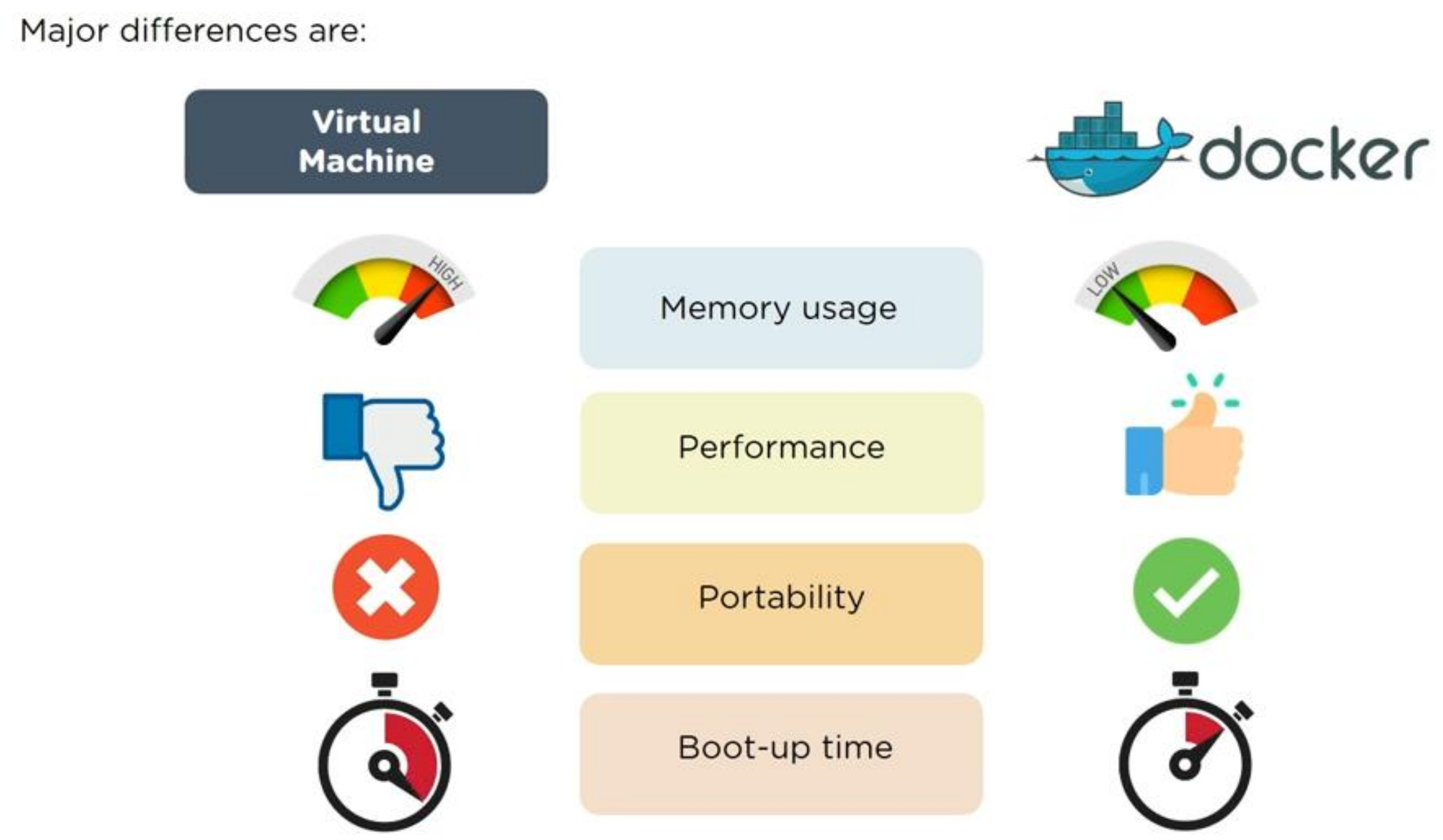
(Play Video 01)

Virtual Machine vs Docker

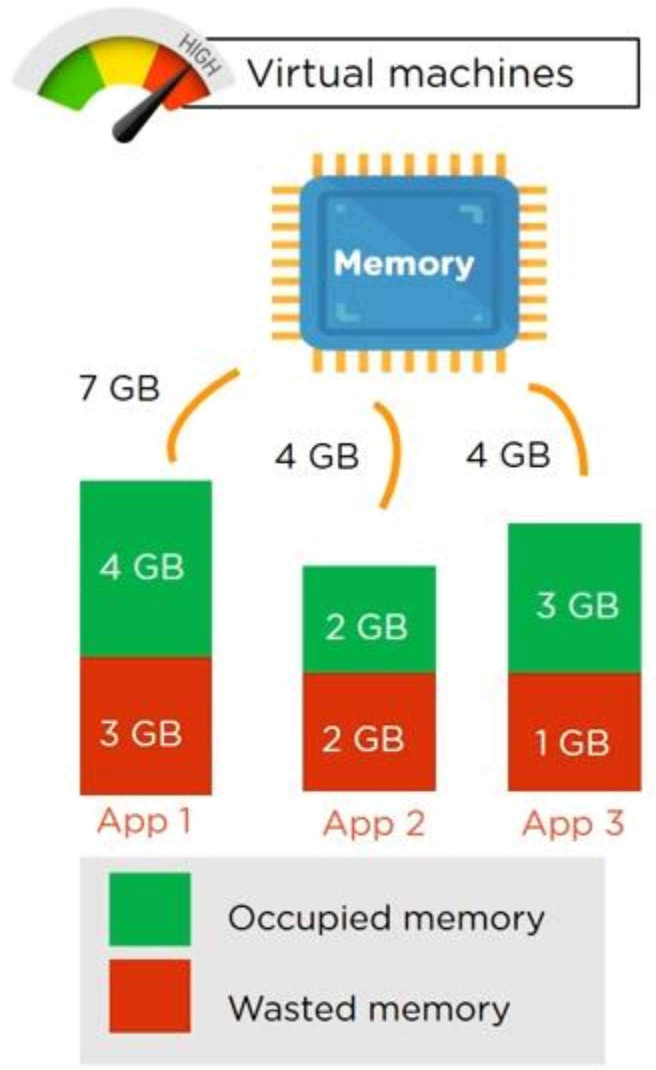
Virtual Machine vs Docker



Virtual Machine vs Docker

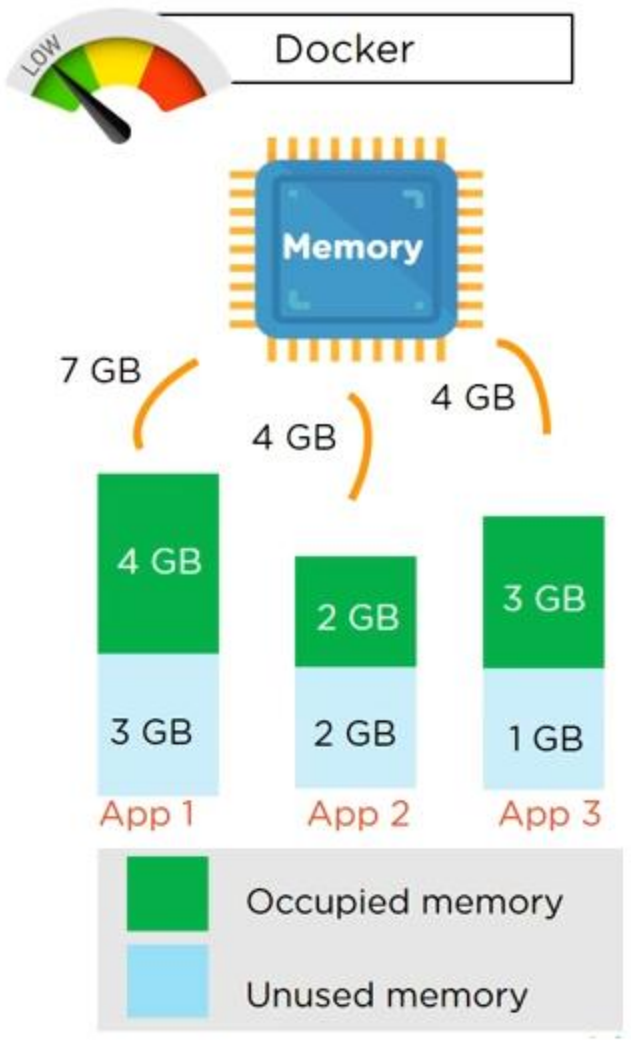


Virtual Machine vs Docker - Memory Usage

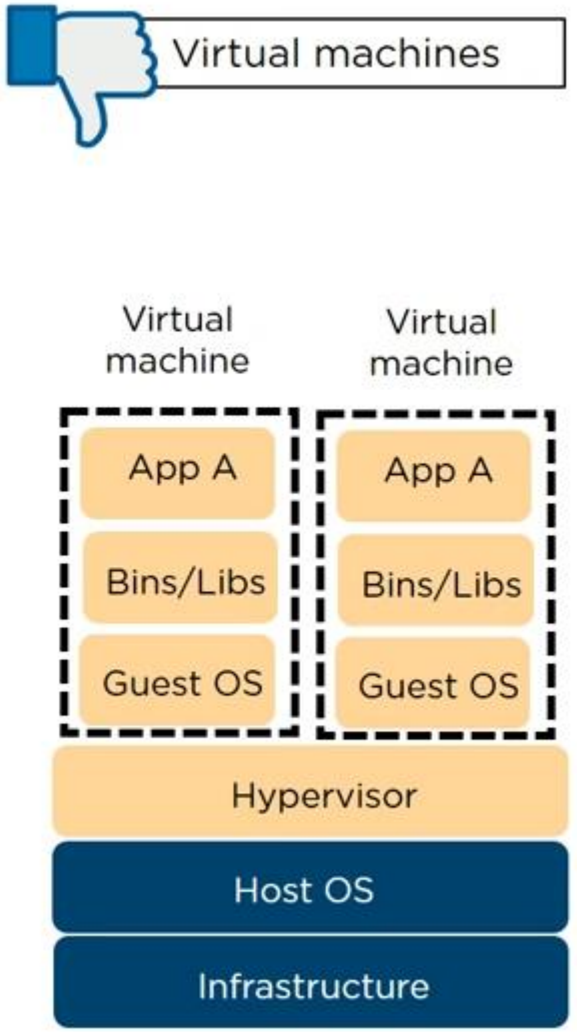


VM - Only 9 GB of memory is used whereas the remaining 6 GB of unused memory cannot be reused

Docker - Only 9 GB of memory is used whereas the remaining 6 GB of memory can be reused for a new container

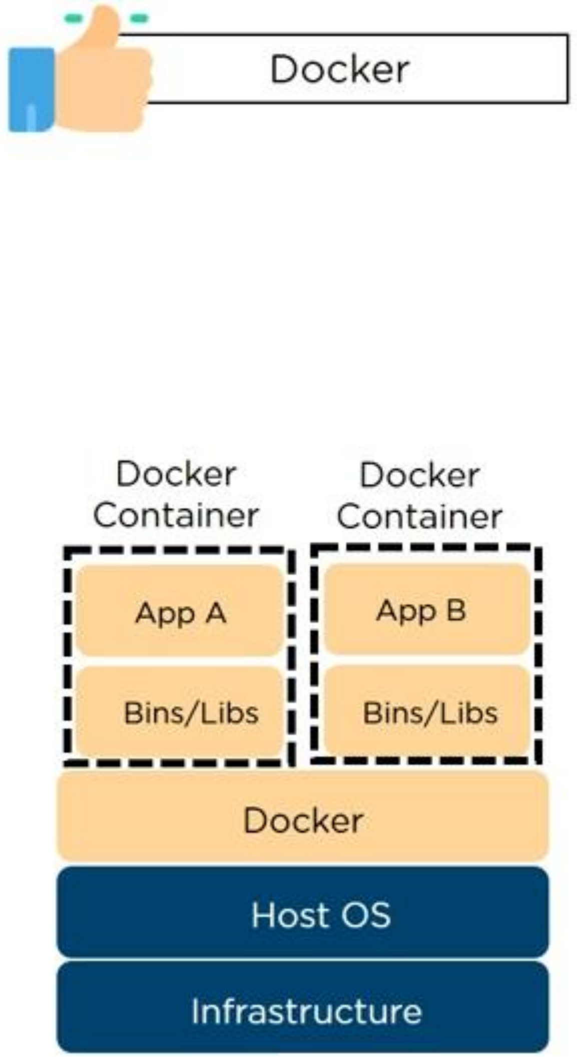


Virtual Machine vs Docker - Performance



VM - Running multiple virtual machines leads to unstable performance

Docker - Containers have a better performance as they are hosted on a single Docker engine



Virtual Machine vs Docker - Portability

✗ Virtual machines

Software works on system A

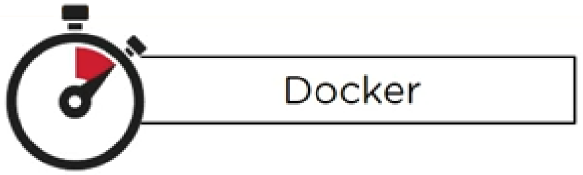
The same software doesn't work on system B

VM - Portability issues while executing applications in different platforms

Docker – Multiple software can be encapsulated in a single container and can be easily deployed to different platforms

✓ Docker

Virtual Machine vs Docker - Boot-up Time



VM – Takes long boot-up time (minutes)

Docker – Takes less boot-up time (milliseconds)

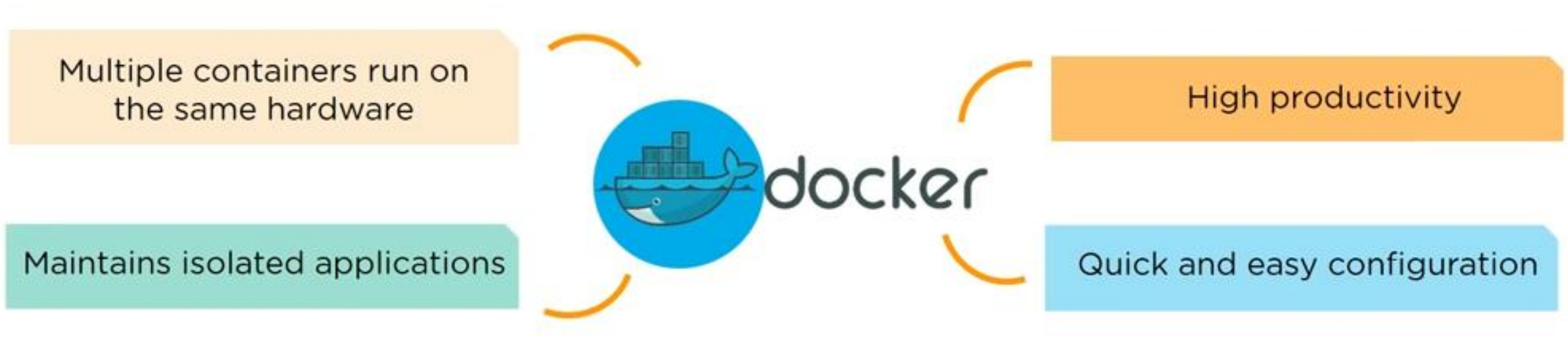
What is Docker ?

- **Docker** is a tool which is used to automate the deployment of applications in lightweight containers so that applications can work efficiently in different environments

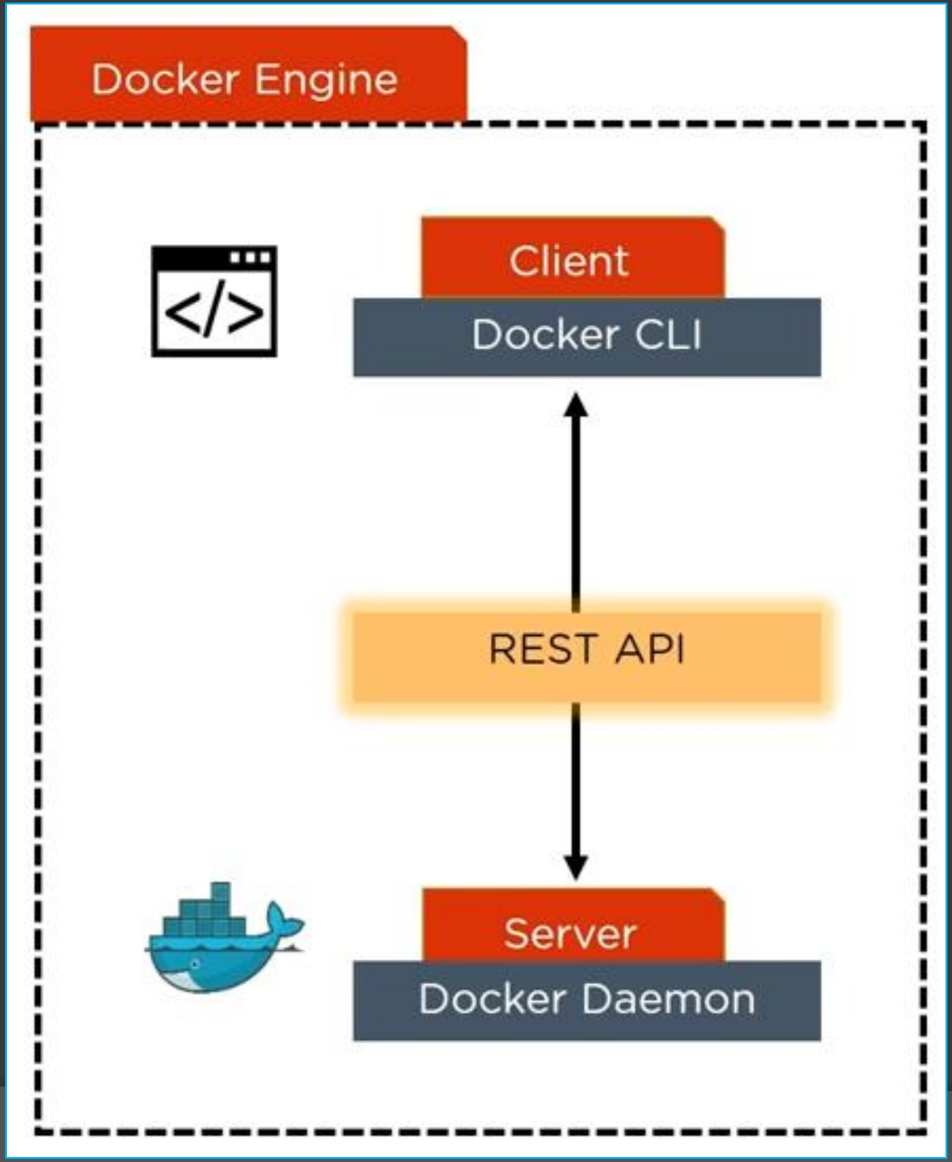
- **Docker** is an OS-level virtualization software platform that enables developers and IT administrators to create, deploy and run applications in a Docker Container with all their dependencies

- Container is a software package that consists of all the dependencies (frameworks, libraries, etc…) required to execute and run an application

What is Docker ?

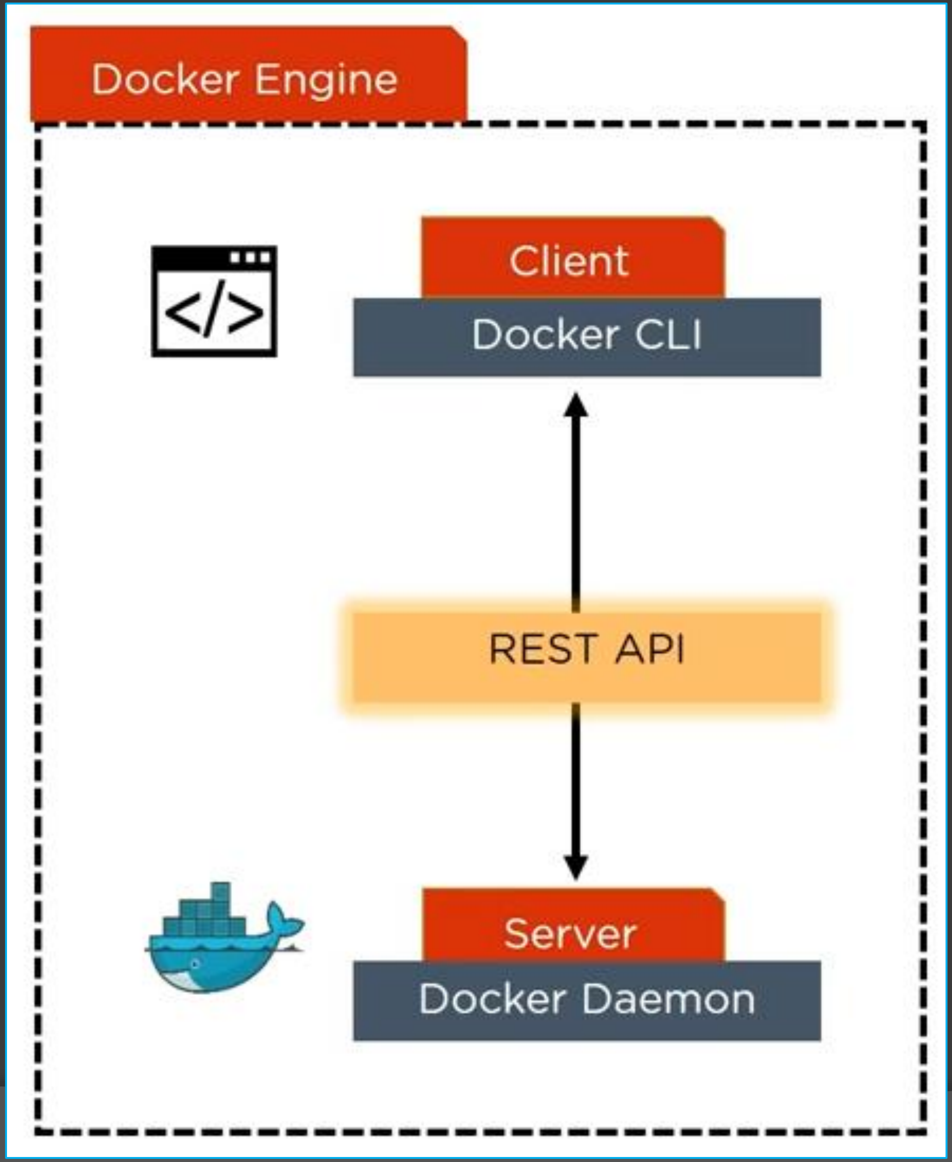

Multiple containers run on the same hardware
Maintains isolated applications
docker
High productivity
Quick and easy configuration

How does Docker work ?



- Docker Engine or Docker is the base engine installed on your host machine to build and run containers using Docker components and services
- It uses a client-server architecture
- Docker Client and Server communicates using REST API

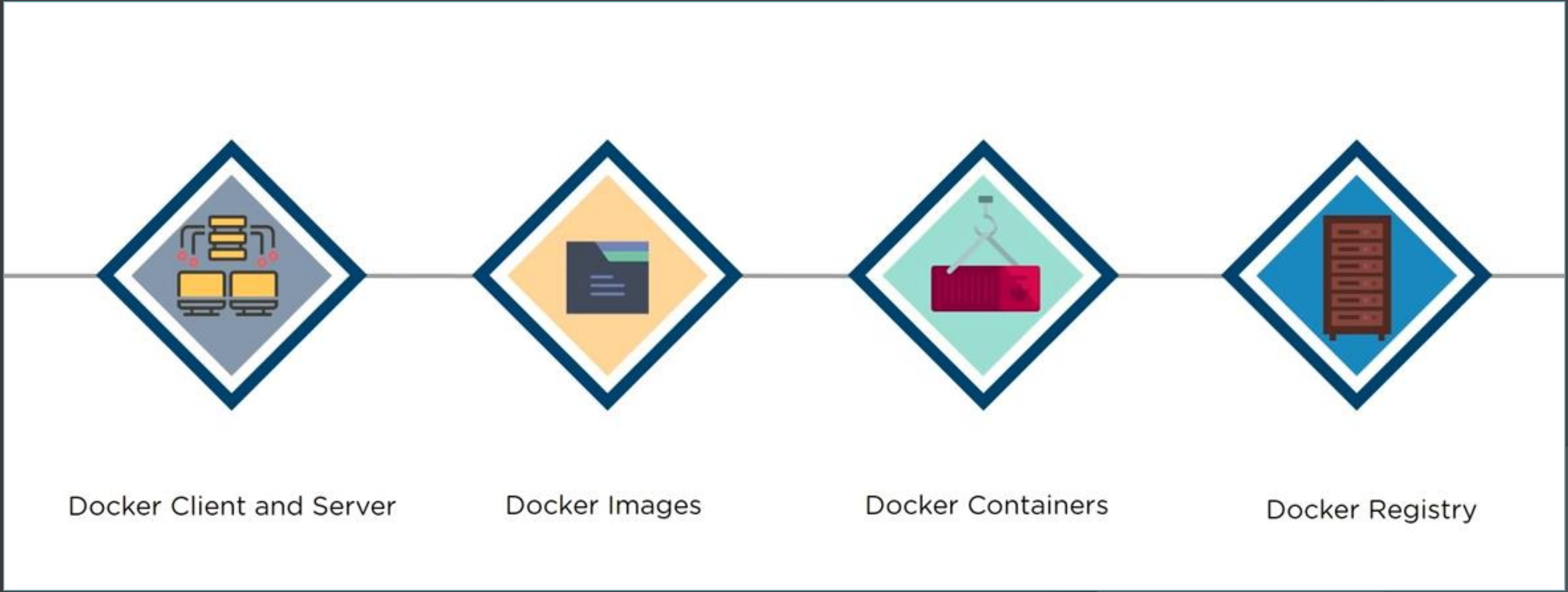
How does Docker work ?



- Docker Client is a service which runs a command, and is translated using REST API, and is sent to the Docker Daemon (server)
- The Docker Daemon check the client request and interacts with the operating system in order to create or manage containers

Components of Docker

Components of Docker



Components of Docker - Docker Client and Server

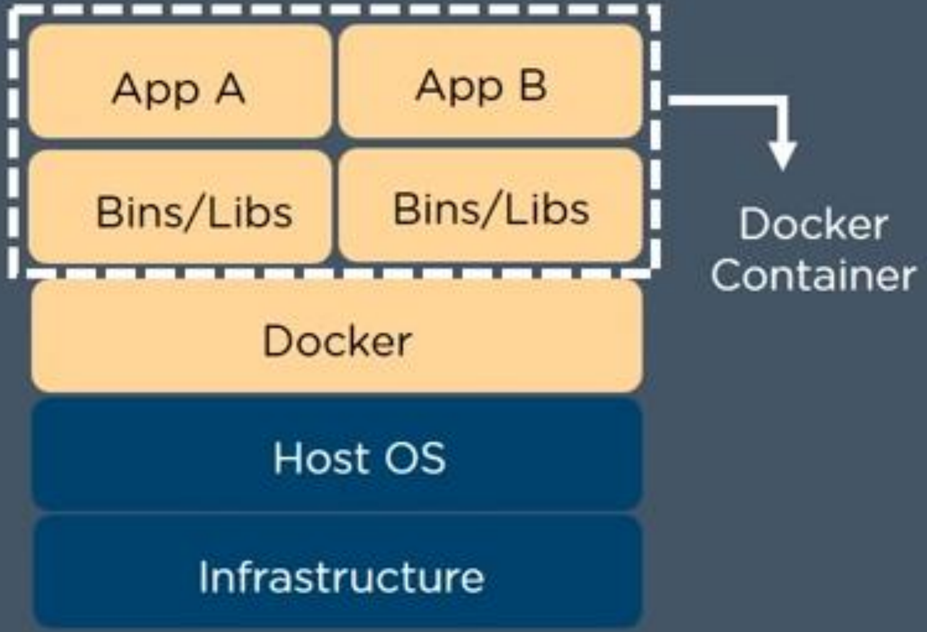
- Docker Client is accessed from the terminal and a Docker Host runs the Docker Daemon and registry
- A user can build Docker Images and run Docker Containers by passing commands from the Docker Client to the Docker Server

Components of Docker - Docker Image

- Docker Image is a template with instructions, which is used for creating Docker Containers
- A Docker Image is built using a file called Docker File
- Docker Image is stored in a Docker Hub or in a repository

Components of Docker - Docker Container

- Docker Container is a standalone, executable software package which includes applications and their dependencies



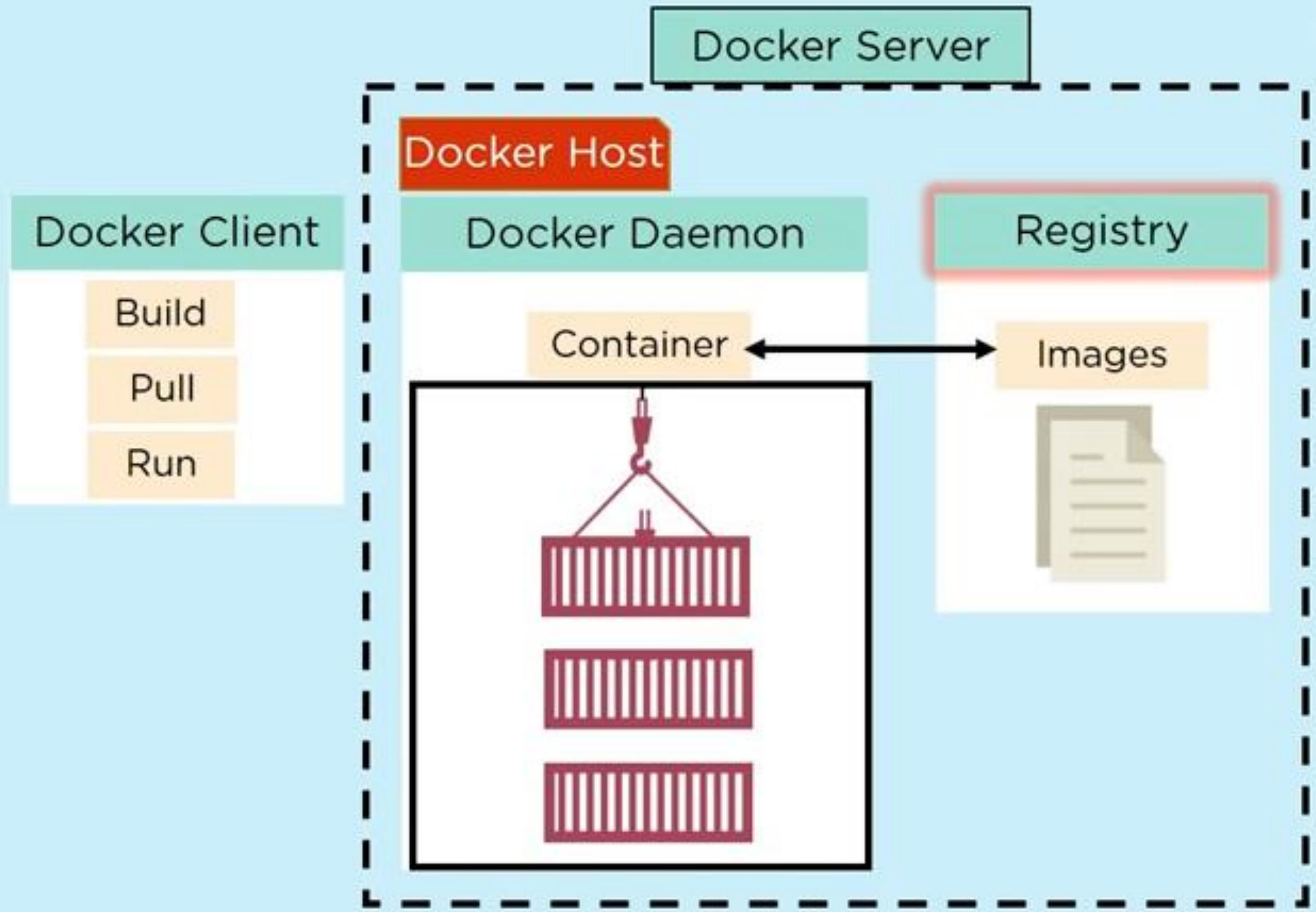
Components of Docker - Docker Container

- Numerous Docker Containers run on the same infrastructure and share operating system (OS) with its other containers
- Each application runs in isolation

Components of Docker - Docker Registry

- Docker Registry is an open source server-side service used for hosting and distributing images
- Docker also has its own default registry called Docker Hub
- Images can be stored in either public or private repositories
- Pull and Push are the commands used by users in order to interact with a Docker Registry

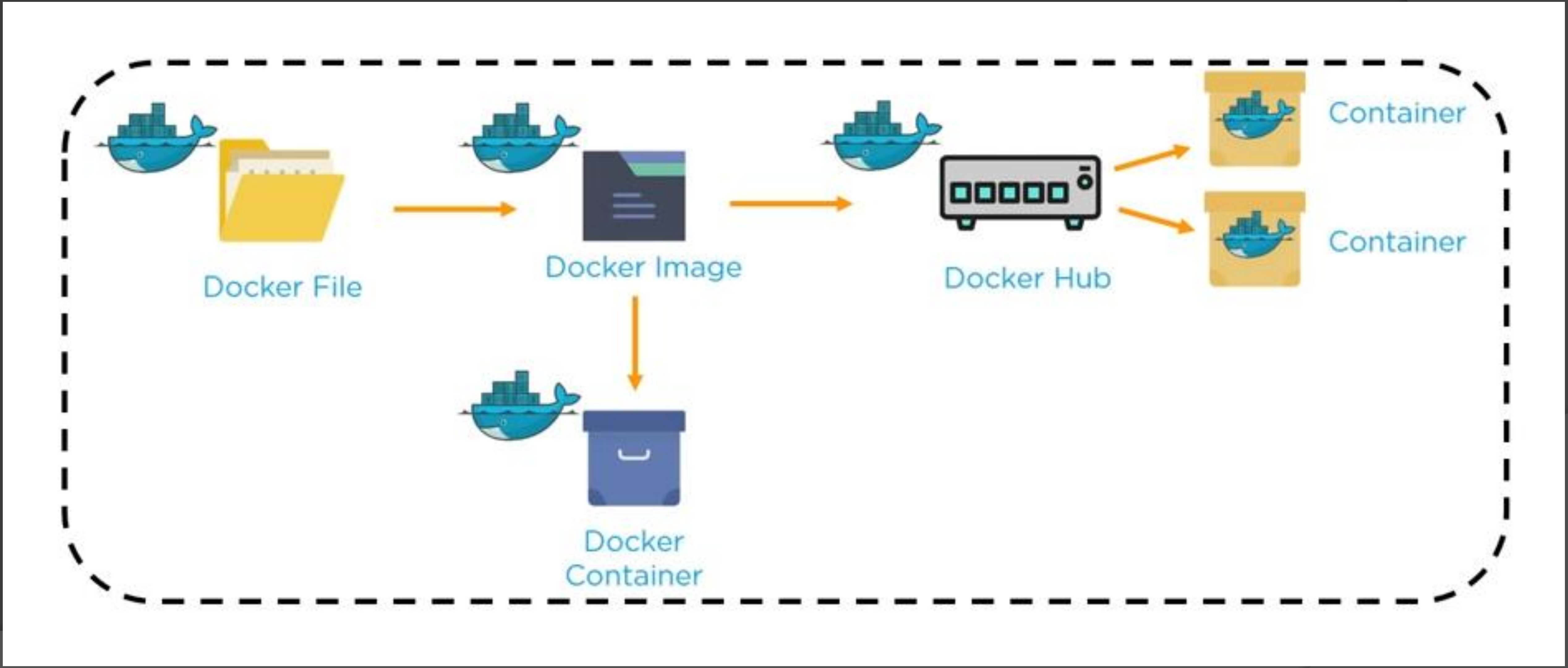
Components of Docker - Diagram



Components of Docker - Recap

- Docker File creates a Docker Image using the build command
- A Docker Image contains all the project's code
- Using Docker Image, any user can run the code in order to create Docker Containers
- Once a Docker Image is built, it's uploaded in a registry or a Docker Hub
- From the Docker Hub, users can get the Docker Image and build new containers

Components of Docker - Recap



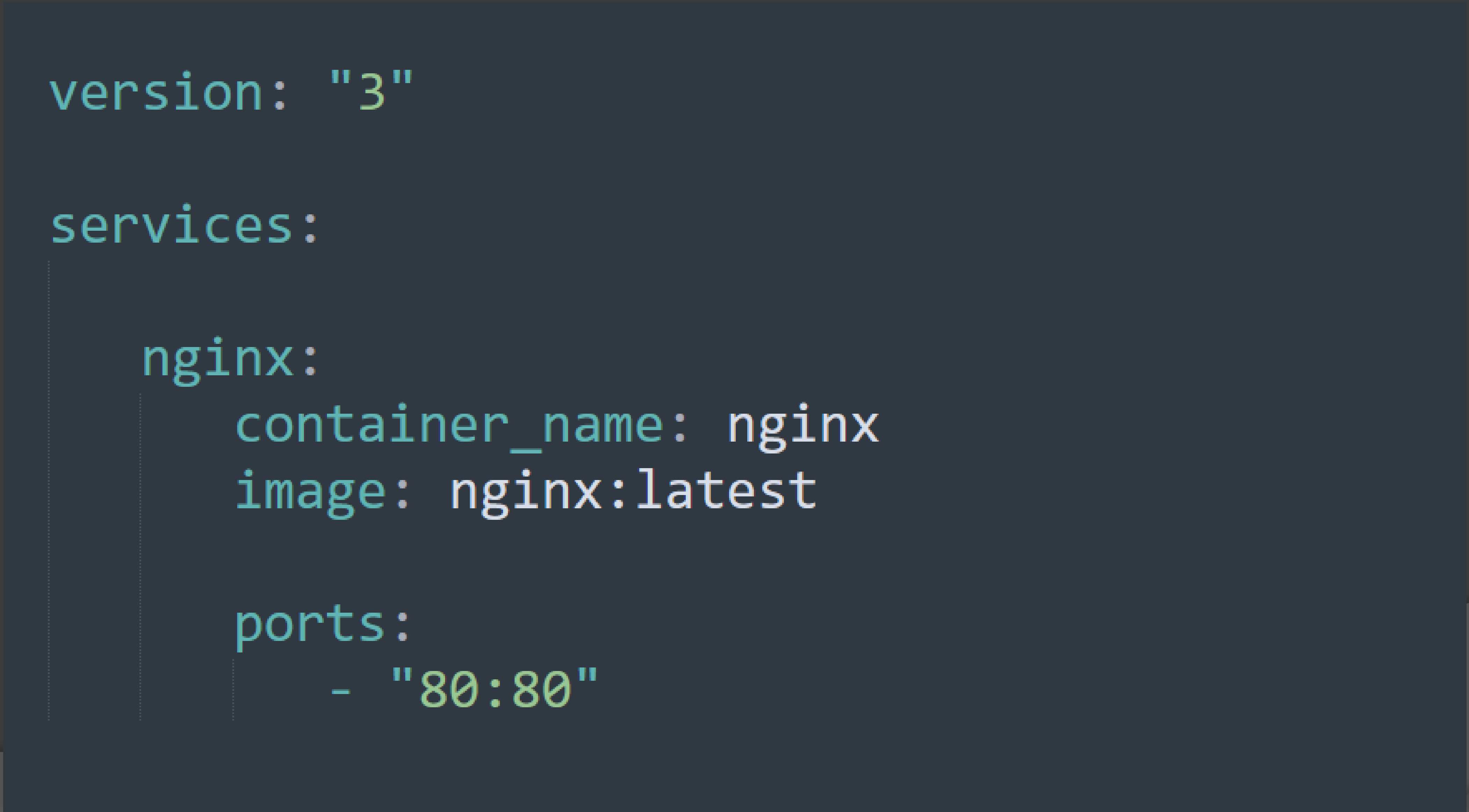
Advanced Concepts in Docker

- Docker Compose
- Docker Swarm

Docker Compose

- It is used for running multiple containers as a single server
- Each container runs in isolation but can interact with each other
- All Docker Compose files are YAML files

Docker Compose - YAML file



```yaml
version: "3"

services:

  nginx:
    container_name: nginx
    image: nginx:latest

    ports:
      - "80:80"
```

Basic Docker Commands

Basic Docker Commands

```
docker -v
```

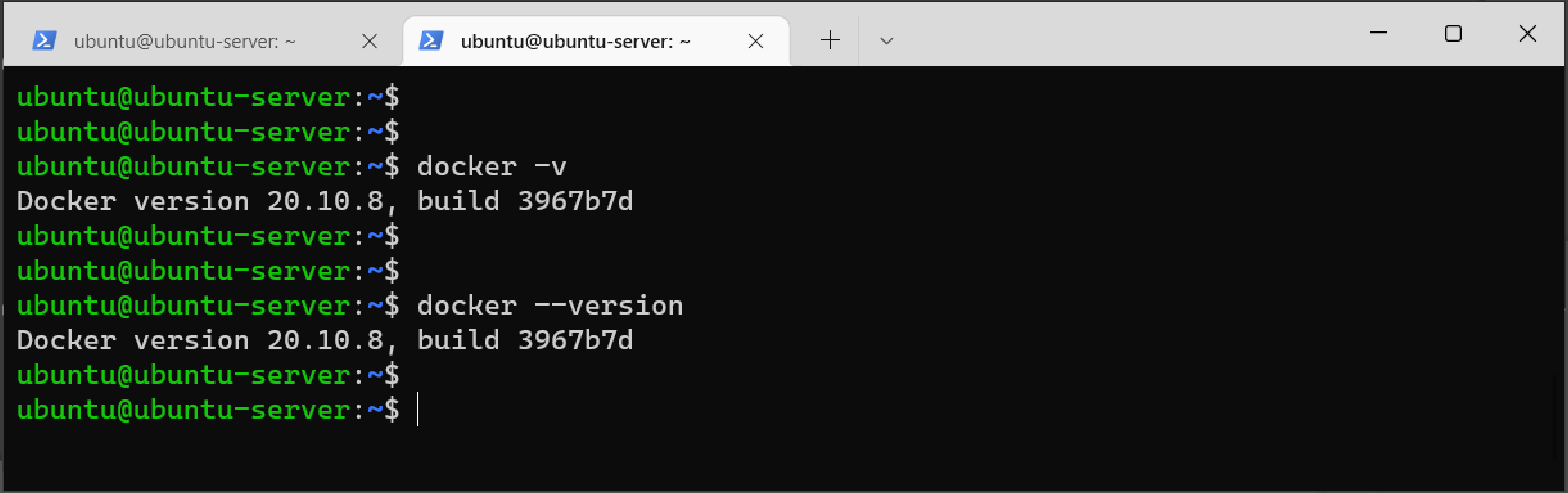
```
docker --version
```

- Used to get the installed version

Basic Docker Commands

docker -v

docker --version



```
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker -v
Docker version 20.10.8, build 3967b7d
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker --version
Docker version 20.10.8, build 3967b7d
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$
```

Basic Docker Commands

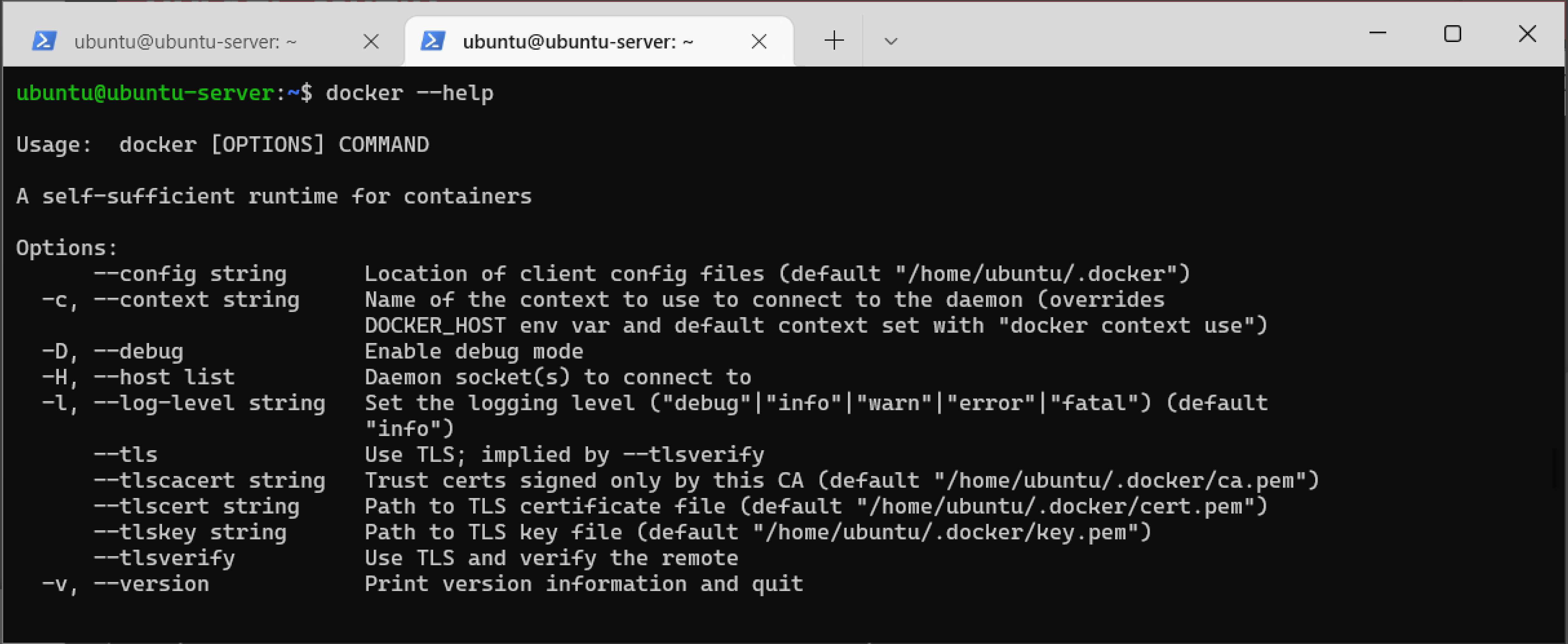
```
docker  --help
```

```
docker  [COMMAND]  --help
```

- Used to get help information

Basic Docker Commands

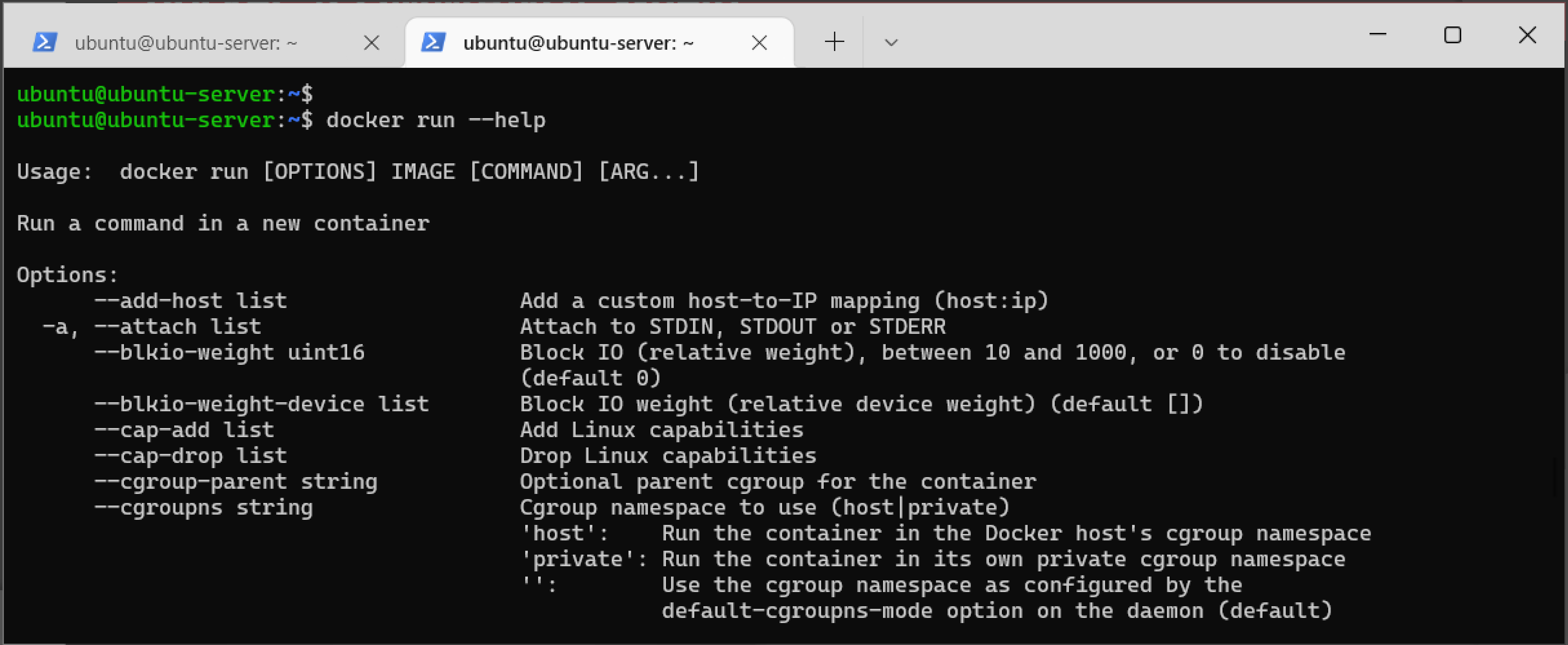
docker --help



```
ubuntu@ubuntu-server:~$ docker --help

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Options:
      --config string      Location of client config files (default "/home/ubuntu/.docker")
  -c, --context string     Name of the context to use to connect to the daemon (overrides
                           DOCKER_HOST env var and default context set with "docker context use")
  -D, --debug              Enable debug mode
  -H, --host list          Daemon socket(s) to connect to
  -l, --log-level string   Set the logging level ("debug"|"info"|"warn"|"error"|"fatal") (default
                           "info")
      --tls                Use TLS; implied by --tlsverify
      --tlscacert string   Trust certs signed only by this CA (default "/home/ubuntu/.docker/ca.pem")
      --tlscert string     Path to TLS certificate file (default "/home/ubuntu/.docker/cert.pem")
      --tlskey string      Path to TLS key file (default "/home/ubuntu/.docker/key.pem")
      --tlsverify          Use TLS and verify the remote
  -v, --version            Print version information and quit
```

Basic Docker Commands

docker [COMMAND] --help


ubuntu@ubuntu-server: ~

ubuntu@ubuntu-server: ~

```
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker run --help

Usage:  docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

Run a command in a new container

Options:
      --add-host list                 Add a custom host-to-IP mapping (host:ip)
  -a, --attach list                   Attach to STDIN, STDOUT or STDERR
      --blkio-weight uint16           Block IO (relative weight), between 10 and 1000, or 0 to disable
                                      (default 0)
      --blkio-weight-device list      Block IO weight (relative device weight) (default [])
      --cap-add list                  Add Linux capabilities
      --cap-drop list                 Drop Linux capabilities
      --cgroup-parent string          Optional parent cgroup for the container
      --cgroupns string               Cgroup namespace to use (host|private)
                                      'host':    Run the container in the Docker host's cgroup namespace
                                      'private': Run the container in its own private cgroup namespace
                                      '':        Use the cgroup namespace as configured by the
                                                 default-cgroupns-mode option on the daemon (default)
```

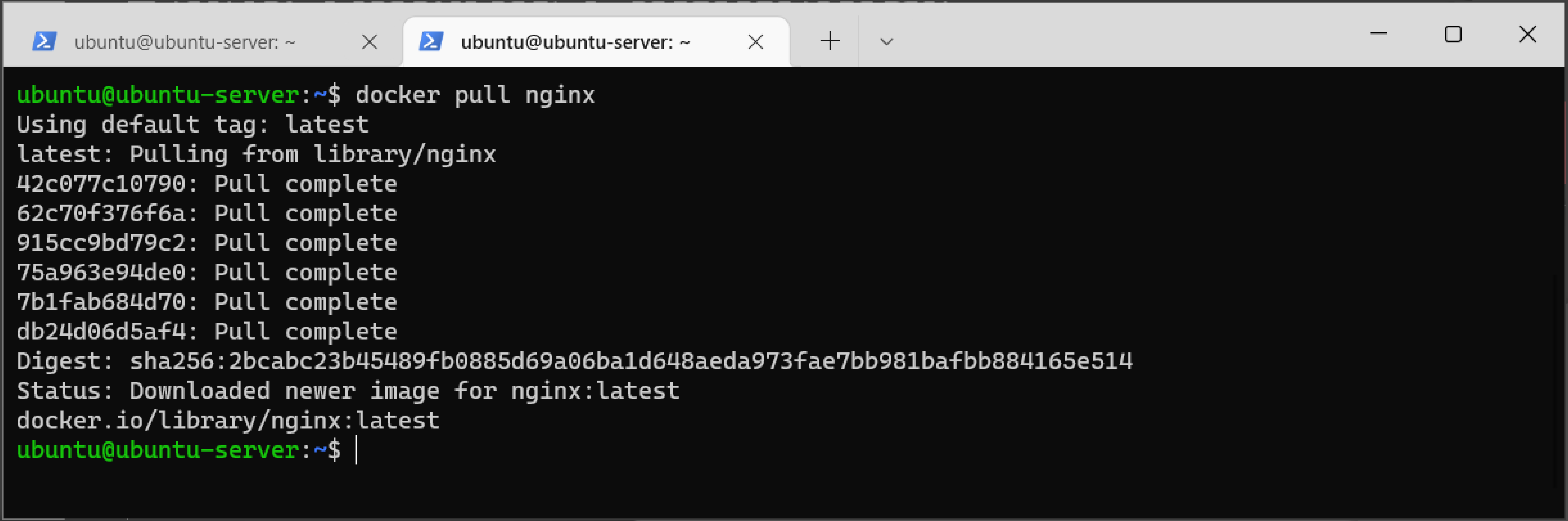
Basic Docker Commands

```
docker pull <image_name>
```

- Used to pull images from the docker repository (hub.docker.com)

Basic Docker Commands

docker pull <image_name>



```
ubuntu@ubuntu-server:~$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
42c077c10790: Pull complete
62c70f376f6a: Pull complete
915cc9bd79c2: Pull complete
75a963e94de0: Pull complete
7b1fab684d70: Pull complete
db24d06d5af4: Pull complete
Digest: sha256:2bcabc23b45489fb0885d69a06ba1d648aeda973fae7bb981bafbb884165e514
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
ubuntu@ubuntu-server:~$
```

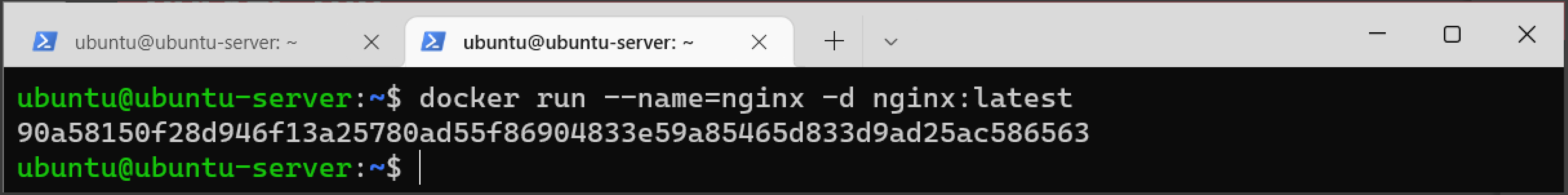
Basic Docker Commands

docker run

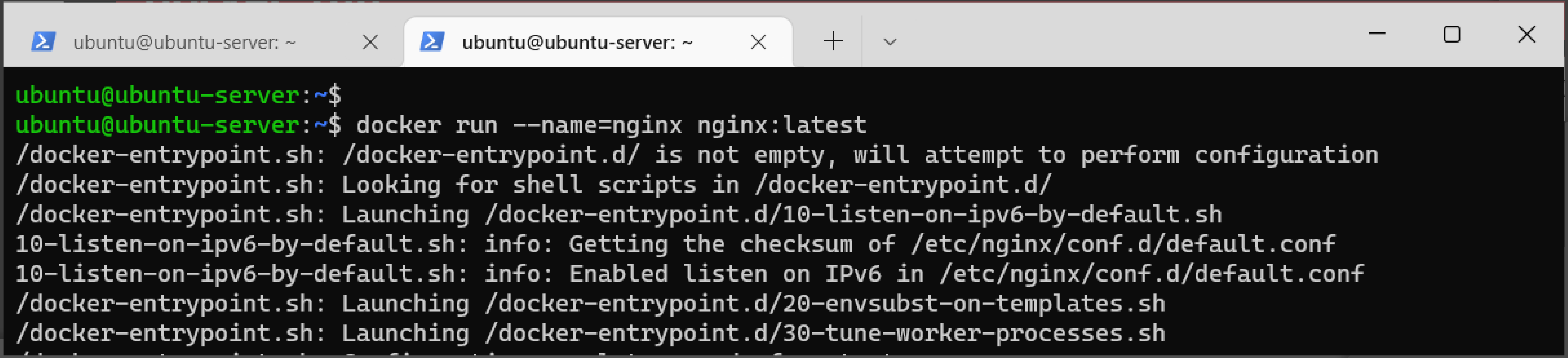
- Used to create a container from an image

Basic Docker Commands

docker run



```
ubuntu@ubuntu-server:~$ docker run --name=nginx -d nginx:latest
90a58150f28d946f13a25780ad55f86904833e59a85465d833d9ad25ac586563
ubuntu@ubuntu-server:~$
```



```
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker run --name=nginx nginx:latest
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
```

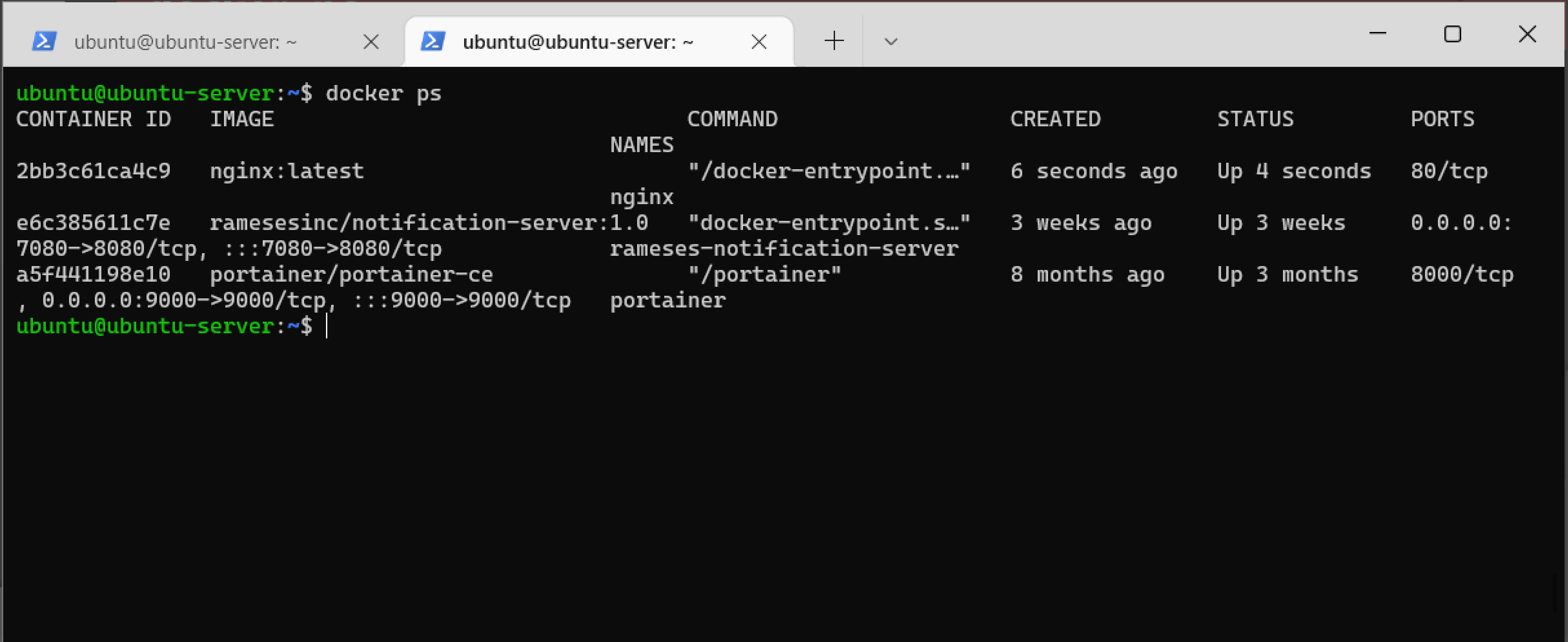
Basic Docker Commands

docker ps

- Used to list the running containers

Basic Docker Commands

docker ps



```
ubuntu@ubuntu-server:~$ docker ps
CONTAINER ID   IMAGE                                  COMMAND                  CREATED          STATUS          PORTS
                                              NAMES
2bb3c61ca4c9   nginx:latest                                 "/docker-entrypoint.…"   6 seconds ago    Up 4 seconds    80/tcp
                                              nginx
e6c385611c7e   ramesesinc/notification-server:1.0     "docker-entrypoint.s…"   3 weeks ago      Up 3 weeks      0.0.0.0:
7080->8080/tcp, :::7080->8080/tcp             rameses-notification-server
a5f441198e10   portainer/portainer-ce                       "/portainer"             8 months ago     Up 3 months     8000/tcp
, 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   portainer
ubuntu@ubuntu-server:~$ 
```

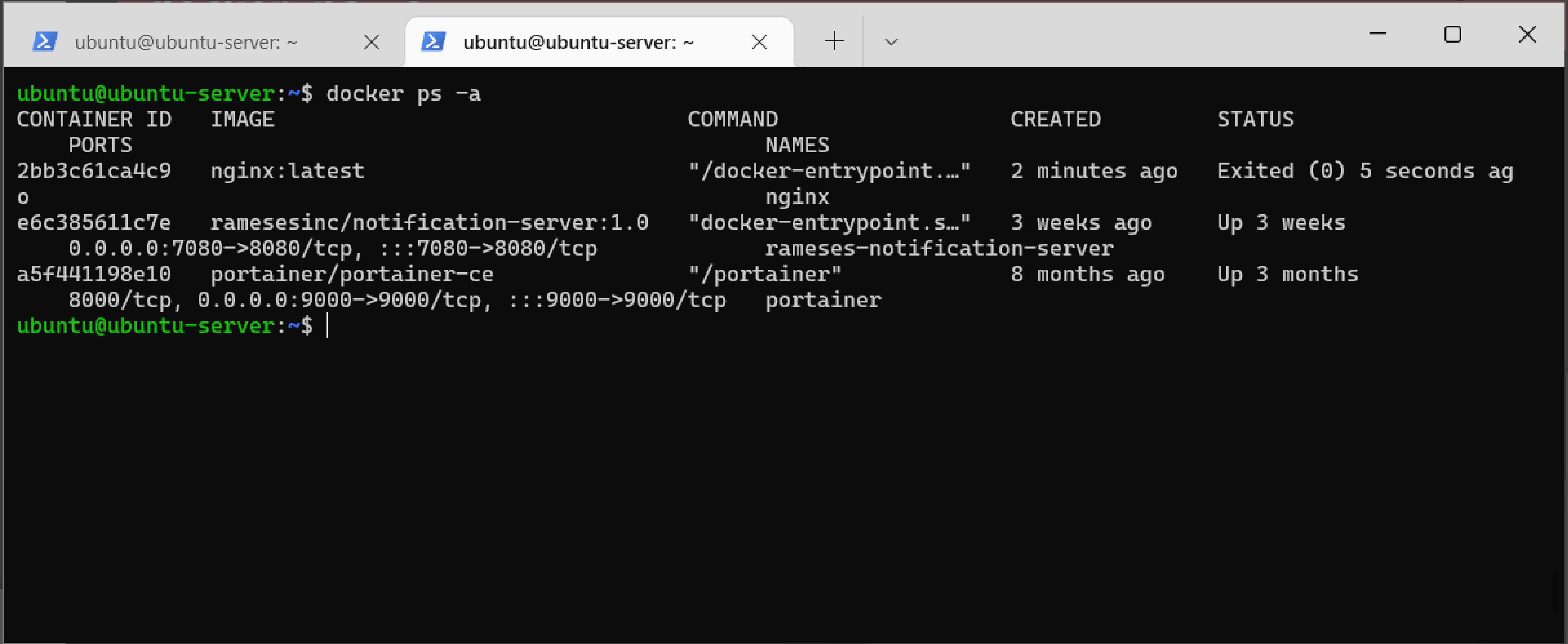
Basic Docker Commands

```
docker ps -a
```

- Used to show all the running and exited containers

Basic Docker Commands

docker ps -a



ubuntu@ubuntu-server: ~
ubuntu@ubuntu-server: ~

```
ubuntu@ubuntu-server:~$ docker ps -a
CONTAINER ID   IMAGE                                     COMMAND                  CREATED          STATUS
    PORTS                                                  NAMES
2bb3c61ca4c9   nginx:latest                              "/docker-entrypoint.…"   2 minutes ago    Exited (0) 5 seconds ag
o                                                          nginx
e6c385611c7e   ramesesinc/notification-server:1.0        "docker-entrypoint.s…"   3 weeks ago      Up 3 weeks
    0.0.0.0:7080->8080/tcp, :::7080->8080/tcp              rameses-notification-server
a5f441198e10   portainer/portainer-ce                    "/portainer"             8 months ago     Up 3 months
    8000/tcp, 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   portainer
ubuntu@ubuntu-server:~$
```

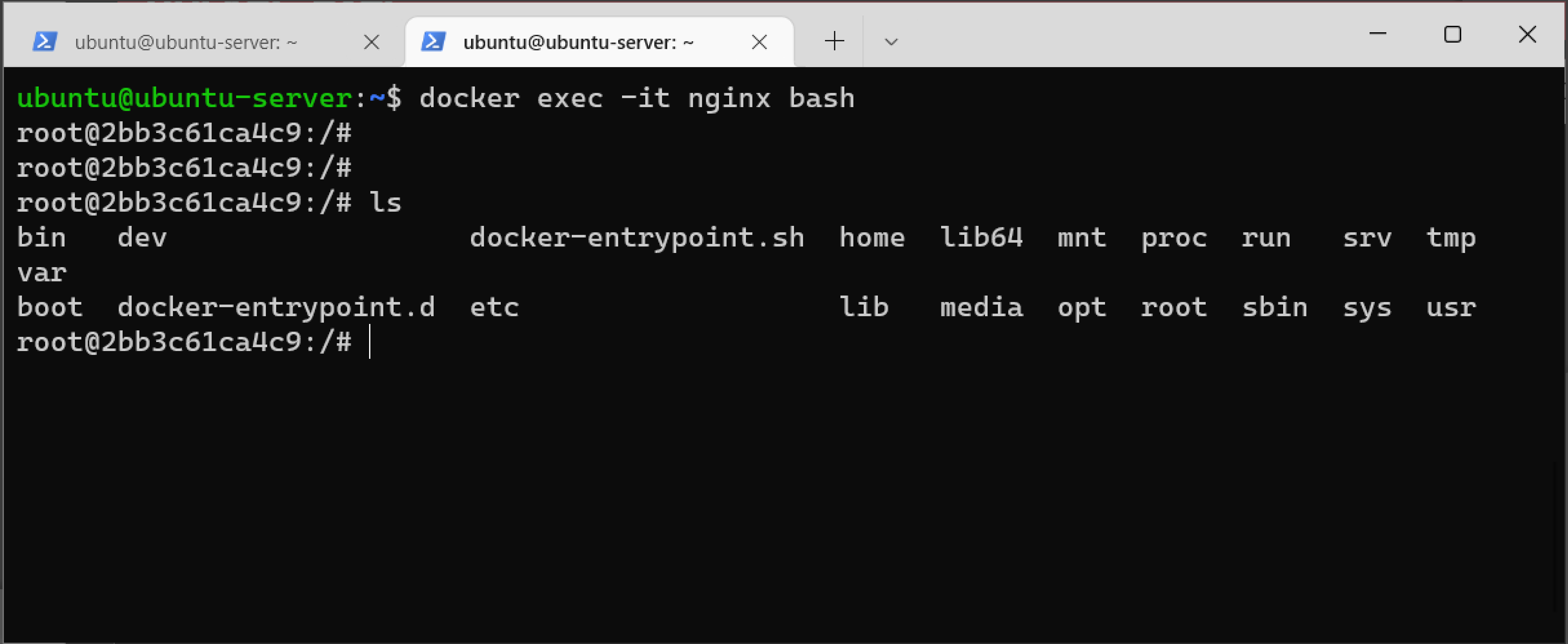
Basic Docker Commands

docker exec

- Used to access the running container

Basic Docker Commands

docker exec



```
ubuntu@ubuntu-server:~$ docker exec -it nginx bash
root@2bb3c61ca4c9:/#
root@2bb3c61ca4c9:/#
root@2bb3c61ca4c9:/# ls
bin   dev                  docker-entrypoint.sh  home  lib64  mnt  proc  run   srv  tmp
var
boot  docker-entrypoint.d  etc                   lib   media  opt  root  sbin  sys  usr
root@2bb3c61ca4c9:/#
```

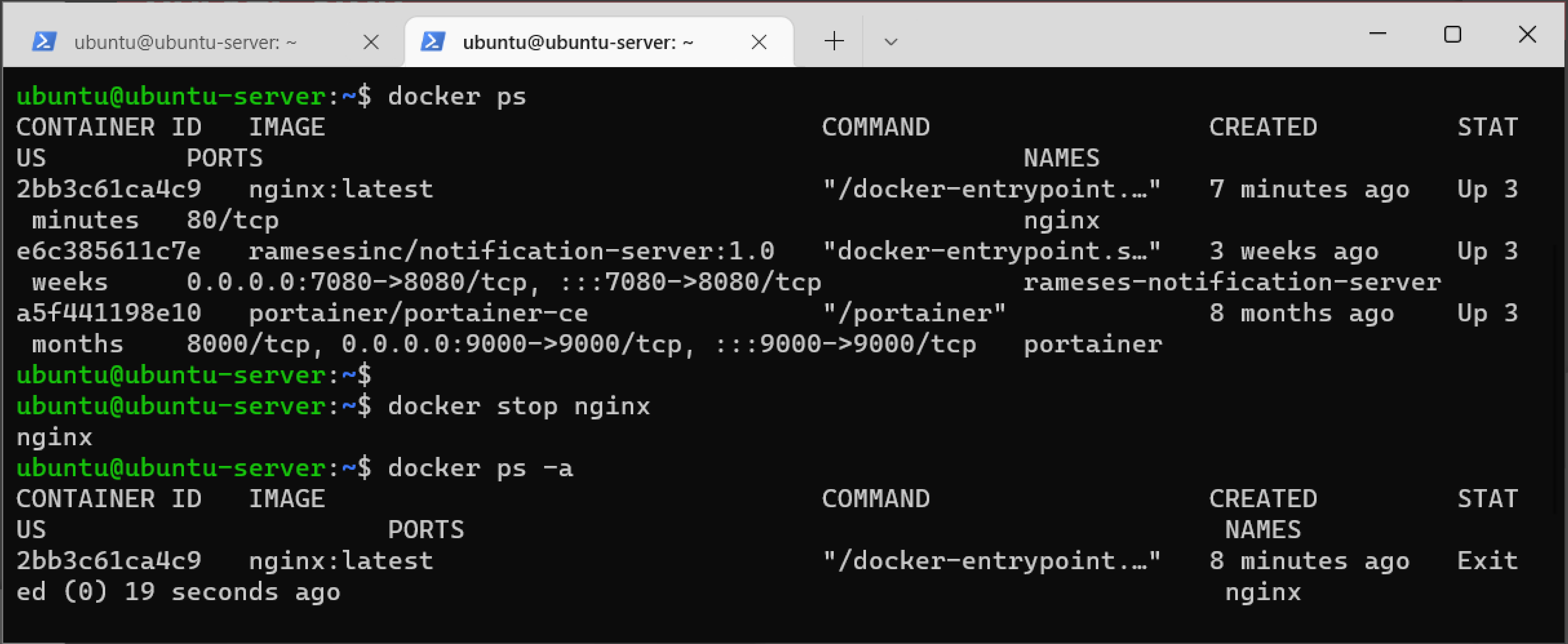
Basic Docker Commands

docker stop

- Used to stop a running container

Basic Docker Commands

docker stop


ubuntu@ubuntu-server: ~
ubuntu@ubuntu-server: ~

```
ubuntu@ubuntu-server:~$ docker ps
CONTAINER ID   IMAGE                                 COMMAND                  CREATED          STAT
US          PORTS                                                        NAMES
2bb3c61ca4c9   nginx:latest                          "/docker-entrypoint.…"   7 minutes ago    Up 3
 minutes    80/tcp                                                      nginx
e6c385611c7e   ramesesinc/notification-server:1.0    "docker-entrypoint.s…"   3 weeks ago      Up 3
 weeks      0.0.0.0:7080->8080/tcp, :::7080->8080/tcp                   rameses-notification-server
a5f441198e10   portainer/portainer-ce                "/portainer"             8 months ago     Up 3
 months     8000/tcp, 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   portainer
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker stop nginx
nginx
ubuntu@ubuntu-server:~$ docker ps -a
CONTAINER ID   IMAGE                                 COMMAND                  CREATED          STAT
US                      PORTS                                                    NAMES
2bb3c61ca4c9   nginx:latest                          "/docker-entrypoint.…"   8 minutes ago    Exit
ed (0) 19 seconds ago                                                            nginx
```

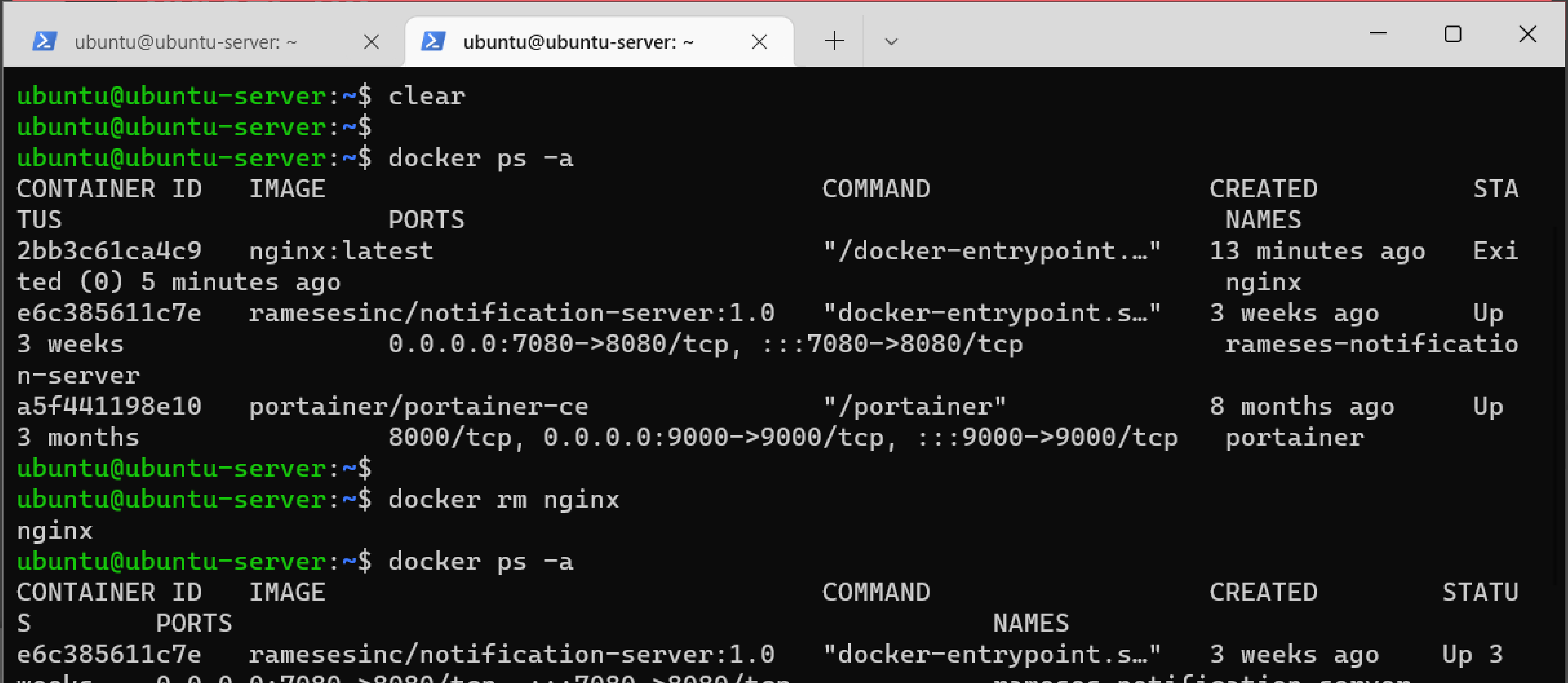
Basic Docker Commands

docker rm

- Used to delete or remove a stopped container

Basic Docker Commands

docker rm



```
ubuntu@ubuntu-server:~$ clear
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker ps -a
CONTAINER ID   IMAGE                                  COMMAND                   CREATED          STA
TUS                        PORTS                                                NAMES
2bb3c61ca4c9   nginx:latest                           "/docker-entrypoint.…"   13 minutes ago   Exi
ted (0) 5 minutes ago                                                            nginx
e6c385611c7e   ramesesinc/notification-server:1.0     "docker-entrypoint.s…"   3 weeks ago      Up
3 weeks                    0.0.0.0:7080->8080/tcp, :::7080->8080/tcp             rameses-notificatio
n-server
a5f441198e10   portainer/portainer-ce                 "/portainer"              8 months ago     Up
3 months                   8000/tcp, 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   portainer
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker rm nginx
nginx
ubuntu@ubuntu-server:~$ docker ps -a
CONTAINER ID   IMAGE                                  COMMAND                   CREATED        STATU
S         PORTS                                                NAMES
e6c385611c7e   ramesesinc/notification-server:1.0     "docker-entrypoint.s…"   3 weeks ago    Up 3
```

Basic Docker Commands

docker kill

- This command kills the container by stopping its execution immediately.
- The difference between ‘docker kill’ and ‘docker stop’ is that ‘docker stop’ gives the container time to shutdown gracefully

Basic Docker Commands

docker commit

- This command creates a new image of an edited container on the local system

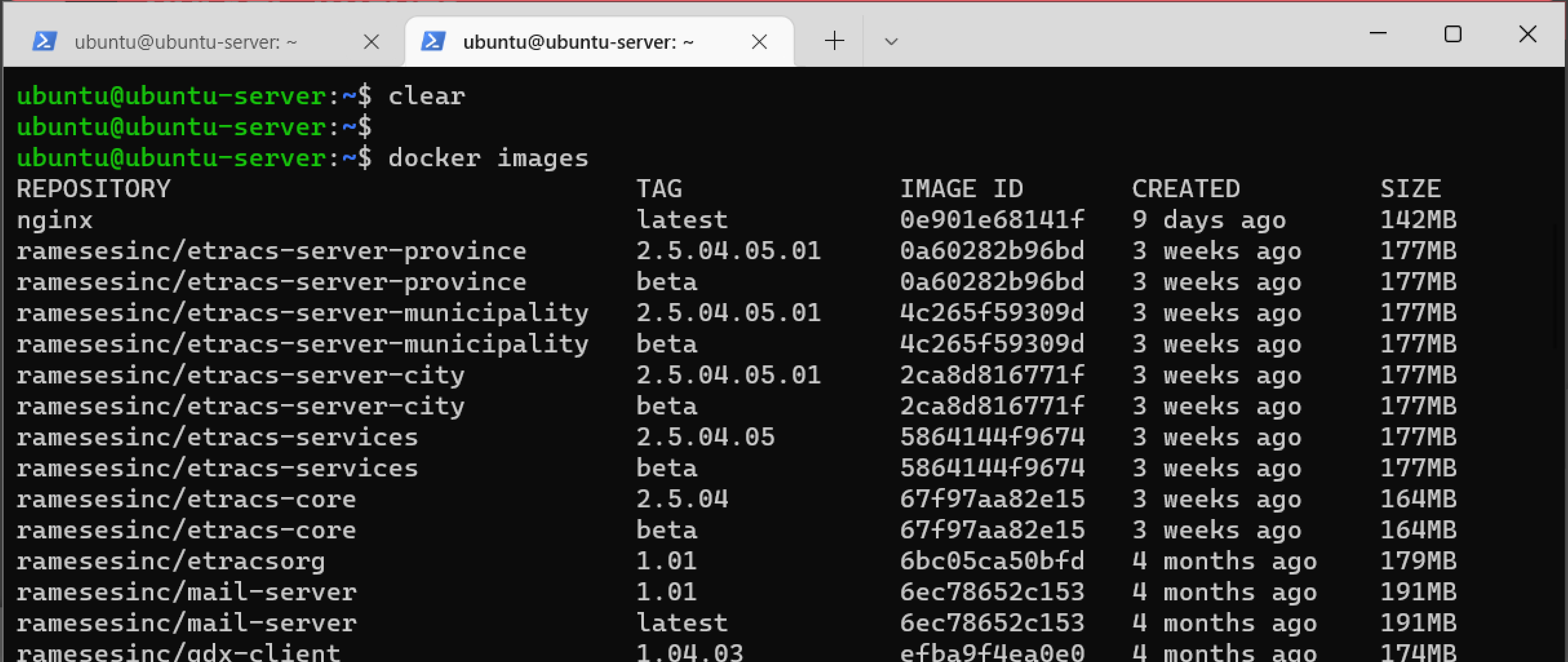
Basic Docker Commands

docker images

- Used to lists all locally stored docker images

Basic Docker Commands

docker images



```
ubuntu@ubuntu-server:~$ clear
ubuntu@ubuntu-server:~$
ubuntu@ubuntu-server:~$ docker images
REPOSITORY                              TAG             IMAGE ID       CREATED         SIZE
nginx                                   latest          0e901e68141f   9 days ago      142MB
ramesesinc/etracs-server-province       2.5.04.05.01    0a60282b96bd   3 weeks ago     177MB
ramesesinc/etracs-server-province       beta            0a60282b96bd   3 weeks ago     177MB
ramesesinc/etracs-server-municipality   2.5.04.05.01    4c265f59309d   3 weeks ago     177MB
ramesesinc/etracs-server-municipality   beta            4c265f59309d   3 weeks ago     177MB
ramesesinc/etracs-server-city           2.5.04.05.01    2ca8d816771f   3 weeks ago     177MB
ramesesinc/etracs-server-city           beta            2ca8d816771f   3 weeks ago     177MB
ramesesinc/etracs-services              2.5.04.05       5864144f9674   3 weeks ago     177MB
ramesesinc/etracs-services              beta            5864144f9674   3 weeks ago     177MB
ramesesinc/etracs-core                  2.5.04          67f97aa82e15   3 weeks ago     164MB
ramesesinc/etracs-core                  beta            67f97aa82e15   3 weeks ago     164MB
ramesesinc/etracsorg                    1.01            6bc05ca50bfd   4 months ago    179MB
ramesesinc/mail-server                  1.01            6ec78652c153   4 months ago    191MB
ramesesinc/mail-server                  latest          6ec78652c153   4 months ago    191MB
ramesesinc/gdx-client                   1.04.03         efba9f4ea0e0   4 months ago    174MB
```

Basic Docker Commands

docker rmi

- Used to delete an image from local storage

Basic Docker Commands

docker login

- Used to login to the docker hub repository

Basic Docker Commands

docker logout

- Used to logout from a Docker registry

Basic Docker Commands

docker push

- Used to push an image to the docker hub repository

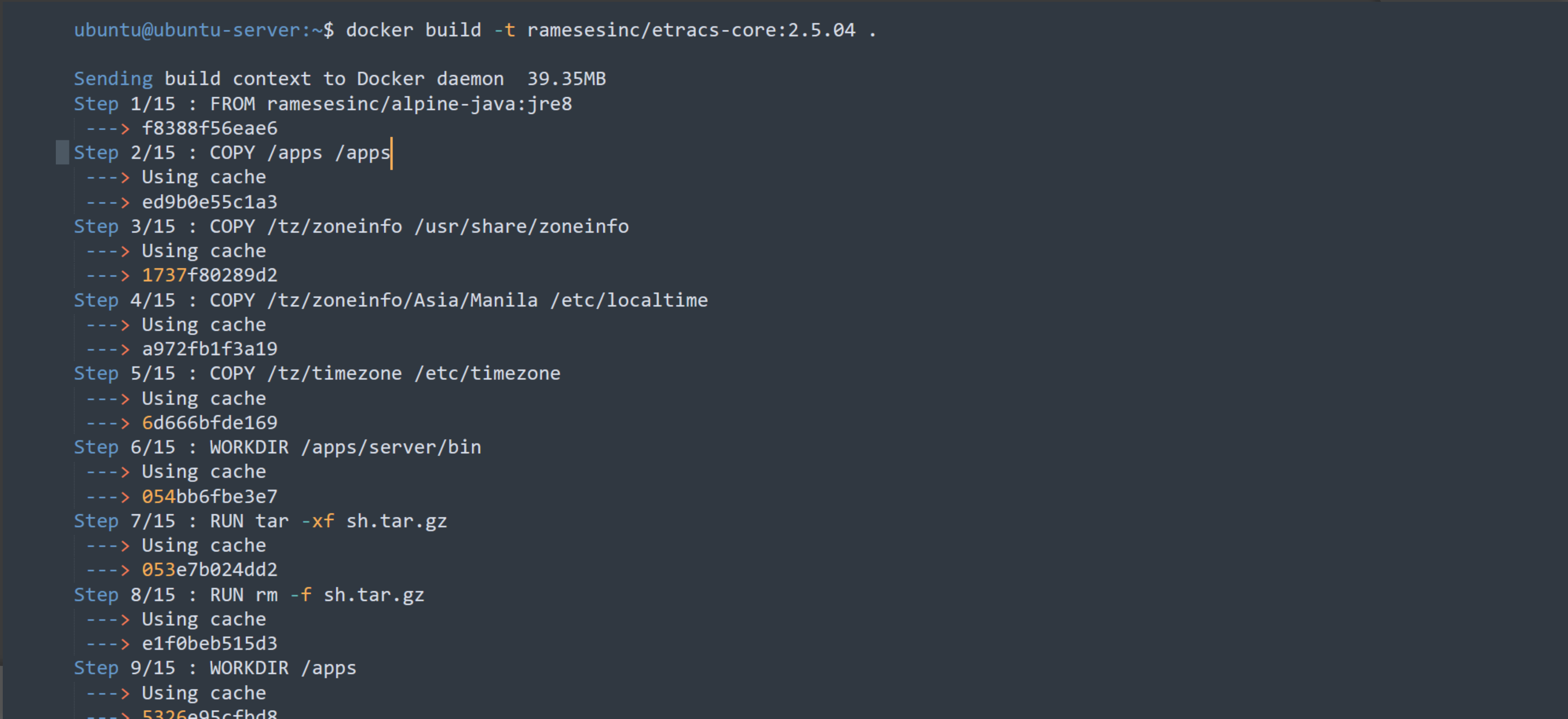
Basic Docker Commands

docker build

- Used to build an image from a specified docker file

Basic Docker Commands

docker build



```
ubuntu@ubuntu-server:~$ docker build -t ramesesinc/etracs-core:2.5.04 .

Sending build context to Docker daemon  39.35MB
Step 1/15 : FROM ramesesinc/alpine-java:jre8
 ---> f8388f56eae6
Step 2/15 : COPY /apps /apps
 ---> Using cache
 ---> ed9b0e55c1a3
Step 3/15 : COPY /tz/zoneinfo /usr/share/zoneinfo
 ---> Using cache
 ---> 1737f80289d2
Step 4/15 : COPY /tz/zoneinfo/Asia/Manila /etc/localtime
 ---> Using cache
 ---> a972fb1f3a19
Step 5/15 : COPY /tz/timezone /etc/timezone
 ---> Using cache
 ---> 6d666bfde169
Step 6/15 : WORKDIR /apps/server/bin
 ---> Using cache
 ---> 054bb6fbe3e7
Step 7/15 : RUN tar -xf sh.tar.gz
 ---> Using cache
 ---> 053e7b024dd2
Step 8/15 : RUN rm -f sh.tar.gz
 ---> Using cache
 ---> e1f0beb515d3
Step 9/15 : WORKDIR /apps
 ---> Using cache
```

Docker Compose

What is Docker Compose ?

- **Compose** is a tool for defining and running multi-container Docker applications.
- Use a YAML file to configure your application’s services.
- Create and start all the services from your configuration

How does Docker Compose works ?

- Define your app’s environment with a **Dockerfile** so it can be reproduced anywhere
- Define the services that make up your app in **docker-compose.yml** file, so they can be run together in an isolated environment
- Run "**docker compose up**" to start and run your entire app

docker-compose.yml

```yaml
version: "3"

services:

  nginx:
    container_name: nginx
    image: nginx:latest
    ports:
      - "80:80"


  portainer1:
    container_name: portainer1
    image: portainer/portainer-ce
    ports:
      - "9001:9000"
    volumes:
      - /var/run/docker.sock:/var/run/docker.sock
```

Docker Compose Commands

Docker Compose Commands

```
docker-compose  --version
```

- Used to check a version

Docker Compose Commands

docker-compose --version

```
ubuntu@ubuntu-server:~/training-202206/nginx$ docker-compose --version

docker-compose version 1.23.1, build b02f1306

ubuntu@ubuntu-server:~/training-202206/nginx$
```

Docker Compose Commands

```
docker-compose  up
```

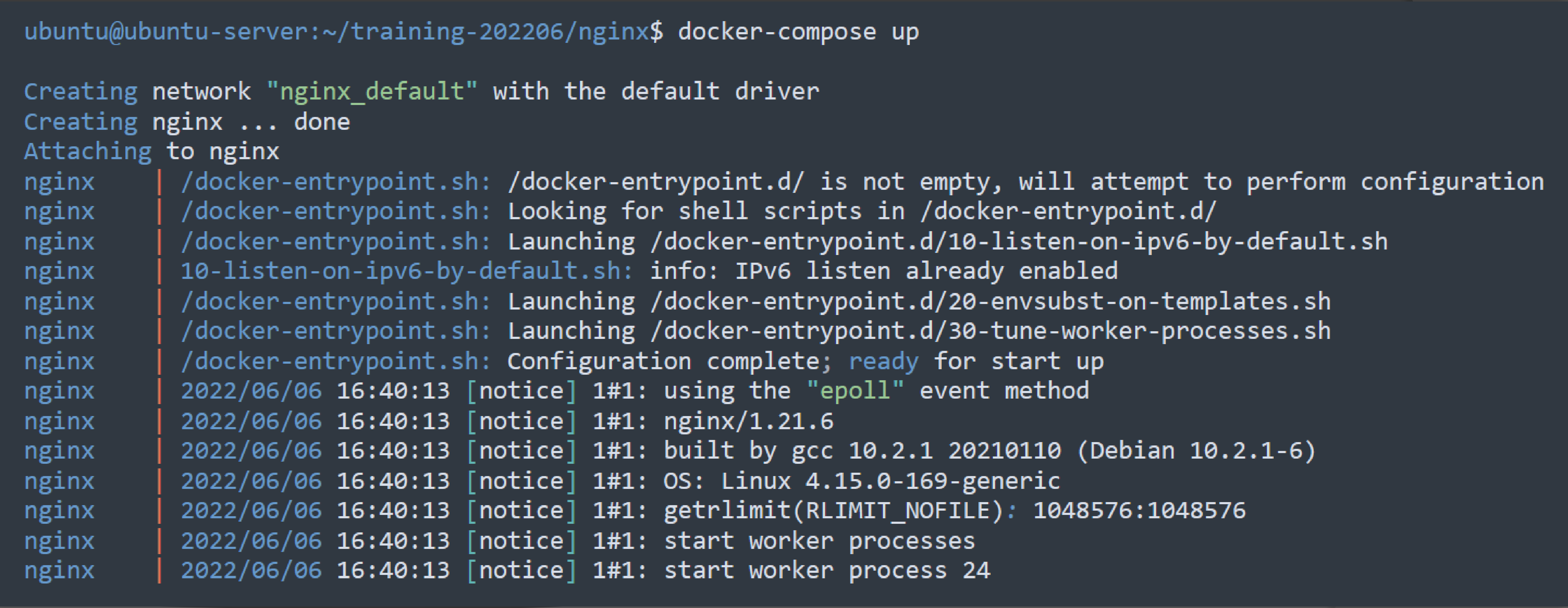
- Used to start all services

```
docker-compose  up  -d
```

- Used to start all services in the background and leave them running

Docker Compose Commands

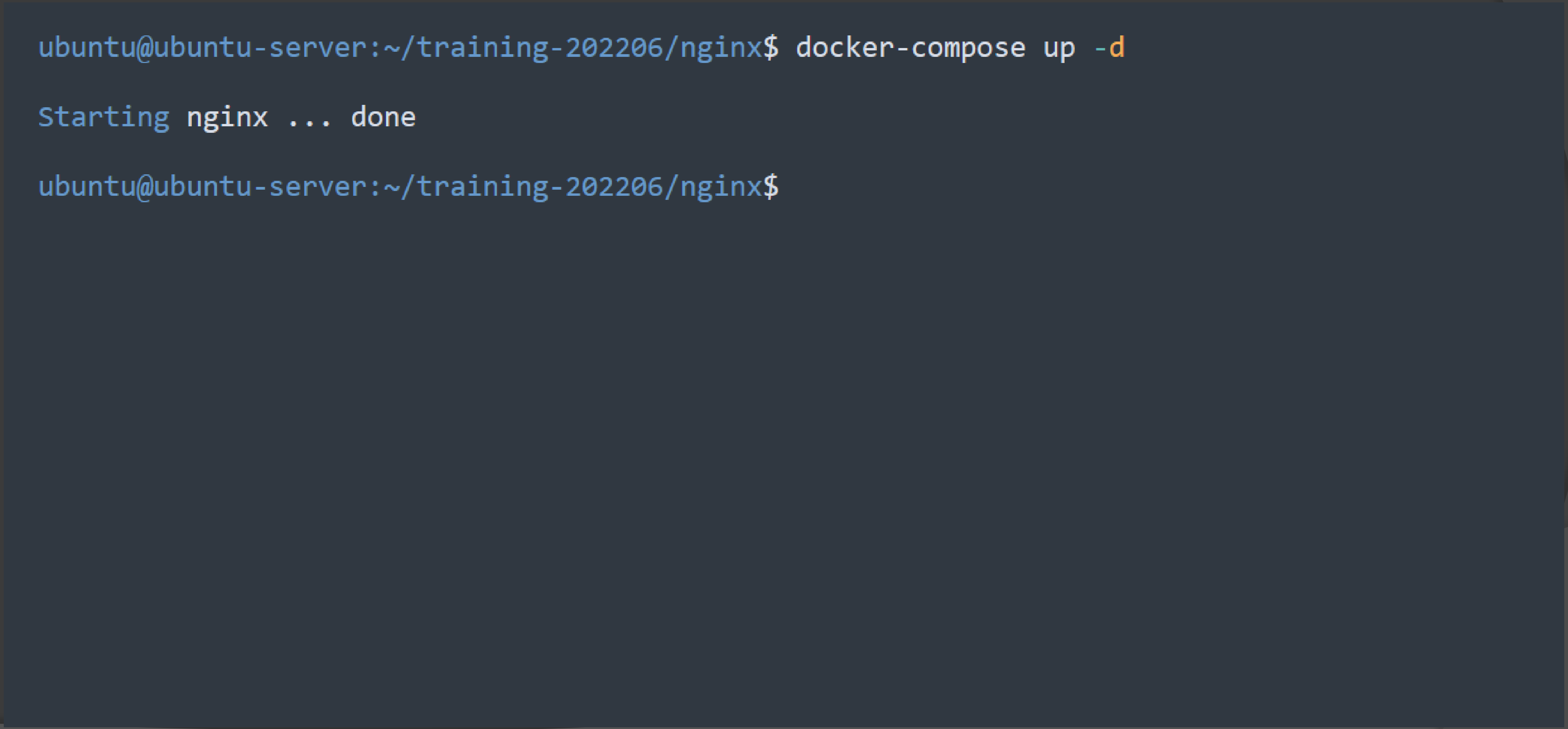
docker-compose up



```
ubuntu@ubuntu-server:~/training-202206/nginx$ docker-compose up

Creating network "nginx_default" with the default driver
Creating nginx ... done
Attaching to nginx
nginx     | /docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
nginx     | /docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
nginx     | /docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
nginx     | 10-listen-on-ipv6-by-default.sh: info: IPv6 listen already enabled
nginx     | /docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
nginx     | /docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
nginx     | /docker-entrypoint.sh: Configuration complete; ready for start up
nginx     | 2022/06/06 16:40:13 [notice] 1#1: using the "epoll" event method
nginx     | 2022/06/06 16:40:13 [notice] 1#1: nginx/1.21.6
nginx     | 2022/06/06 16:40:13 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
nginx     | 2022/06/06 16:40:13 [notice] 1#1: OS: Linux 4.15.0-169-generic
nginx     | 2022/06/06 16:40:13 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
nginx     | 2022/06/06 16:40:13 [notice] 1#1: start worker processes
nginx     | 2022/06/06 16:40:13 [notice] 1#1: start worker process 24
```

Docker Compose Commands

docker-compose up -d



```
ubuntu@ubuntu-server:~/training-202206/nginx$ docker-compose up -d

Starting nginx ... done

ubuntu@ubuntu-server:~/training-202206/nginx$
```

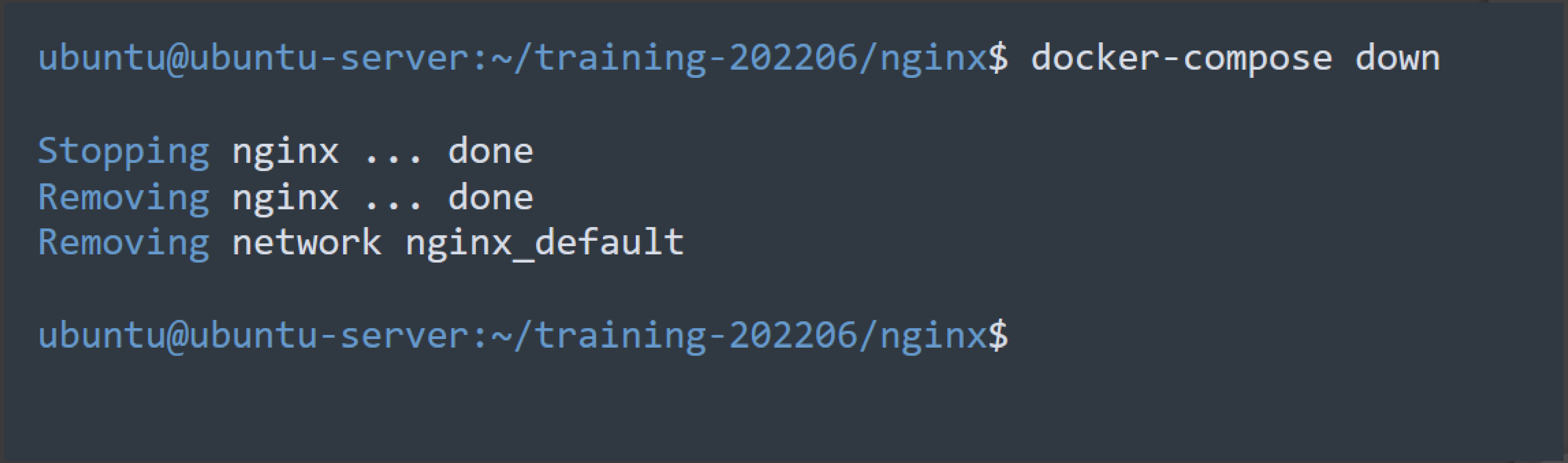
Docker Compose Commands

```
docker-compose  down
```

- Used to stop all services

Docker Compose Commands

docker-compose down



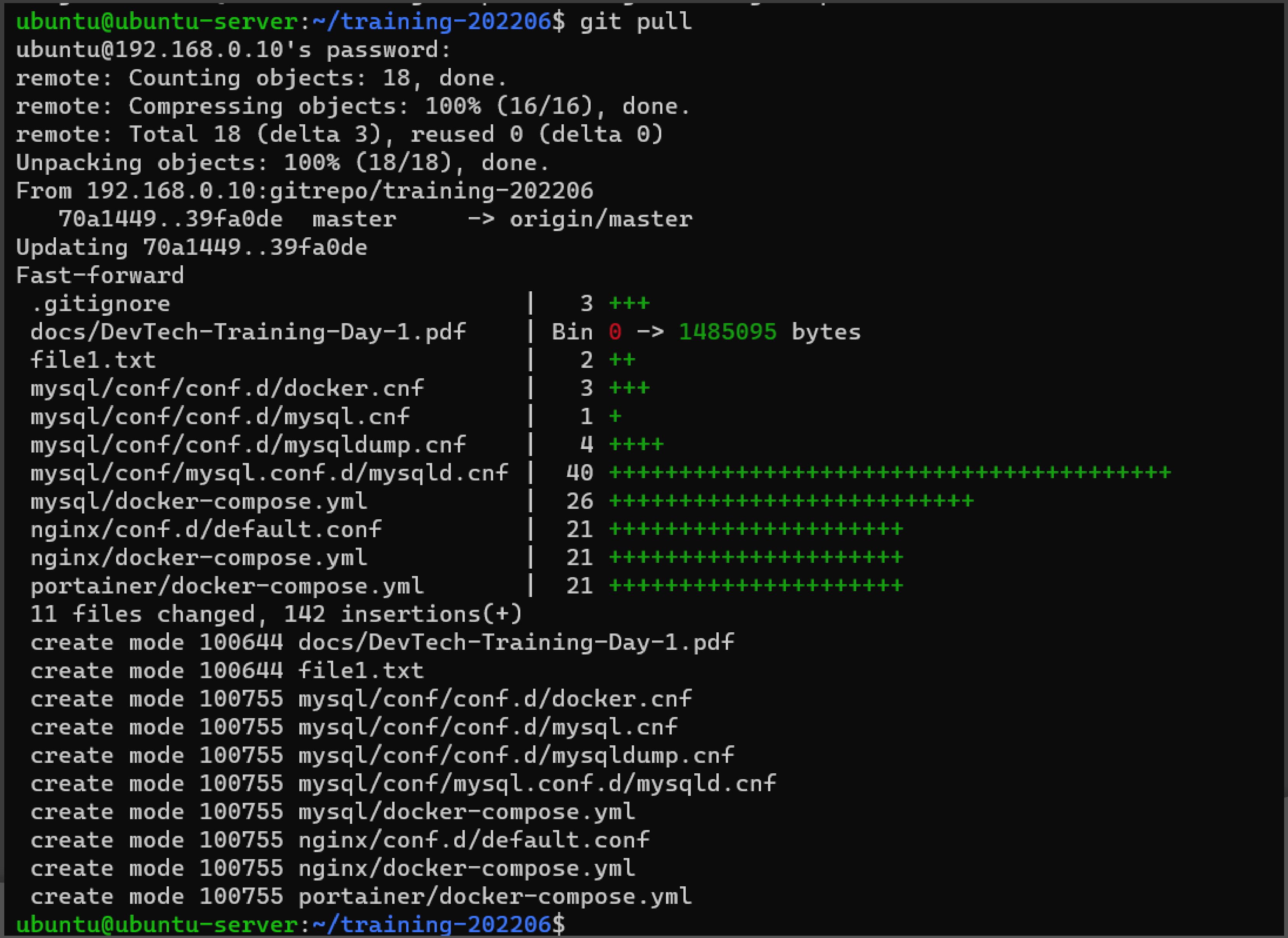
```
ubuntu@ubuntu-server:~/training-202206/nginx$ docker-compose down

Stopping nginx ... done
Removing nginx ... done
Removing network nginx_default

ubuntu@ubuntu-server:~/training-202206/nginx$
```

Demo and Exercises

Exercise #1

```
## Go to your training-202206 repository folder
cd /mnt/c/training-202206

## Pull updates from remote origin
## Usage: git pull <remote_name> <branch>
git pull
```

Exercise #1 - Result

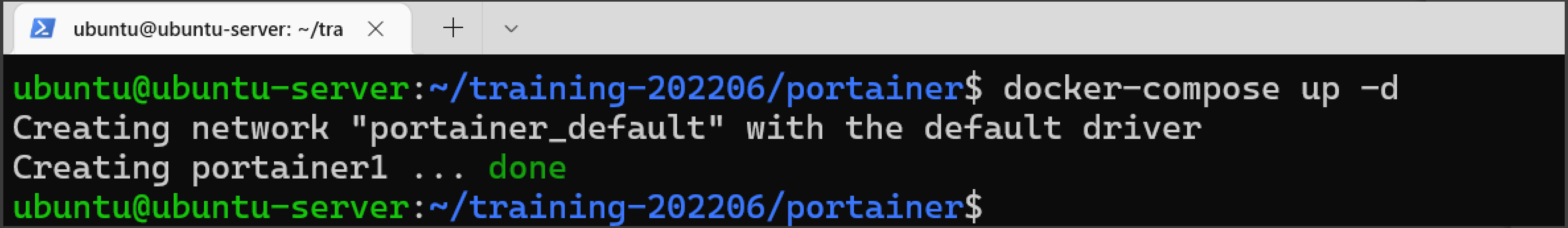


```
ubuntu@ubuntu-server:~/training-202206$ git pull
ubuntu@192.168.0.10's password:
remote: Counting objects: 18, done.
remote: Compressing objects: 100% (16/16), done.
remote: Total 18 (delta 3), reused 0 (delta 0)
Unpacking objects: 100% (18/18), done.
From 192.168.0.10:gitrepo/training-202206
   70a1449..39fa0de  master     -> origin/master
Updating 70a1449..39fa0de
Fast-forward
 .gitignore                         |   3 +++
 docs/DevTech-Training-Day-1.pdf    | Bin 0 -> 1485095 bytes
 file1.txt                          |   2 ++
 mysql/conf/conf.d/docker.cnf       |   3 +++
 mysql/conf/conf.d/mysql.cnf        |   1 +
 mysql/conf/conf.d/mysqldump.cnf    |   4 ++++
 mysql/conf/mysql.conf.d/mysqld.cnf |  40 ++++++++++++++++++++++++++++++++++++++++
 mysql/docker-compose.yml           |  26 ++++++++++++++++++++++++++
 nginx/conf.d/default.conf          |  21 +++++++++++++++++++++
 nginx/docker-compose.yml           |  21 +++++++++++++++++++++
 portainer/docker-compose.yml       |  21 +++++++++++++++++++++
 11 files changed, 142 insertions(+)
 create mode 100644 docs/DevTech-Training-Day-1.pdf
 create mode 100644 file1.txt
 create mode 100755 mysql/conf/conf.d/docker.cnf
 create mode 100755 mysql/conf/conf.d/mysql.cnf
 create mode 100755 mysql/conf/conf.d/mysqldump.cnf
 create mode 100755 mysql/conf/mysql.conf.d/mysqld.cnf
 create mode 100755 mysql/docker-compose.yml
 create mode 100755 nginx/conf.d/default.conf
 create mode 100755 nginx/docker-compose.yml
 create mode 100755 portainer/docker-compose.yml
ubuntu@ubuntu-server:~/training-202206$
```

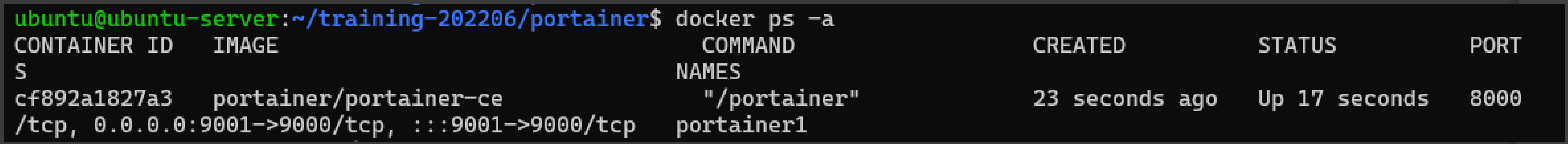
Exercise #2

```
## Go to your training-202206 repository folder
cd /mnt/c/training-202206

## Go to portainer folder
cd portainer

## Start the Portainer service
docker-compose up -d
```

Exercise #2 - Result



```
ubuntu@ubuntu-server:~/training-202206/portainer$ docker-compose up -d
Creating network "portainer_default" with the default driver
Creating portainer1 ... done
ubuntu@ubuntu-server:~/training-202206/portainer$
```



```
ubuntu@ubuntu-server:~/training-202206/portainer$ docker ps -a
CONTAINER ID   IMAGE                             COMMAND                    CREATED          STATUS          PORT
S                                                NAMES
cf892a1827a3   portainer/portainer-ce            "/portainer"               23 seconds ago   Up 17 seconds   8000
/tcp, 0.0.0.0:9001->9000/tcp, :::9001->9000/tcp   portainer1
```

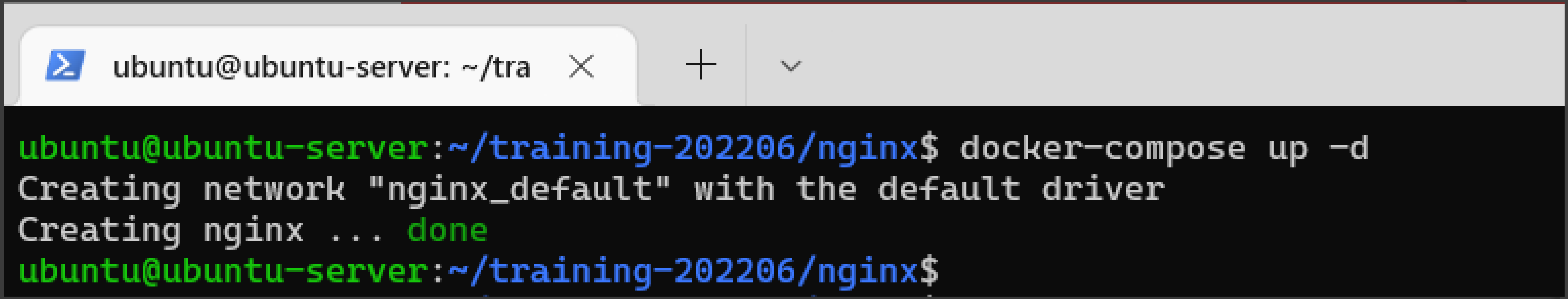
- Open a web browser and go to the following:

http://localhost:9001

Exercise #3

```
## Go to your training-202206 repository folder
cd /mnt/c/training-202206

## Go to nginx folder
cd nginx

## Start the Nginx service
docker-compose up -d
```

Exercise #3 - Result



```
ubuntu@ubuntu-server:~/training-202206/nginx$ docker-compose up -d
Creating network "nginx_default" with the default driver
Creating nginx ... done
ubuntu@ubuntu-server:~/training-202206/nginx$
```

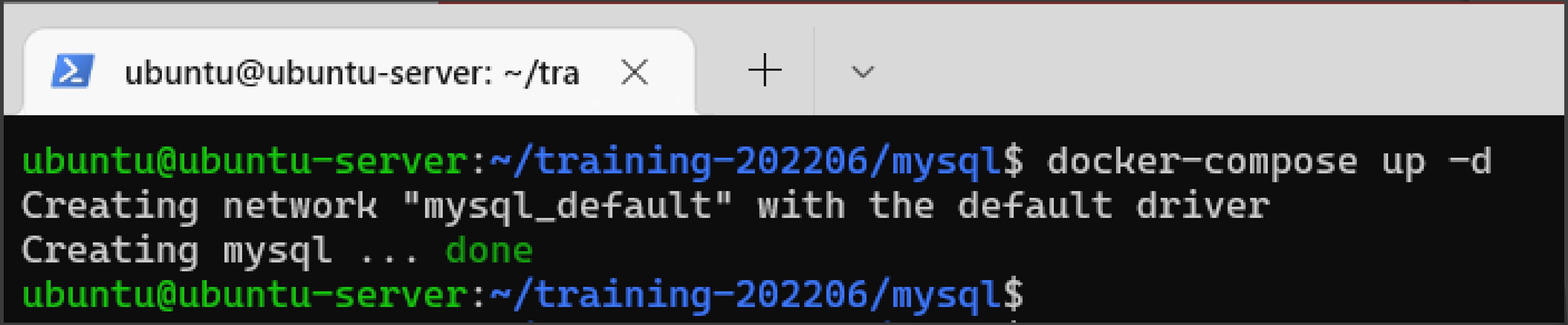
- Open a web browser and go to the following:

http://localhost

Exercise #4

```
## Go to your training-202206 repository folder
cd /mnt/c/training-202206

## Go to mysql folder
cd mysql

## Start the MySQL service
docker-compose up -d
```

Exercise #4 - Result

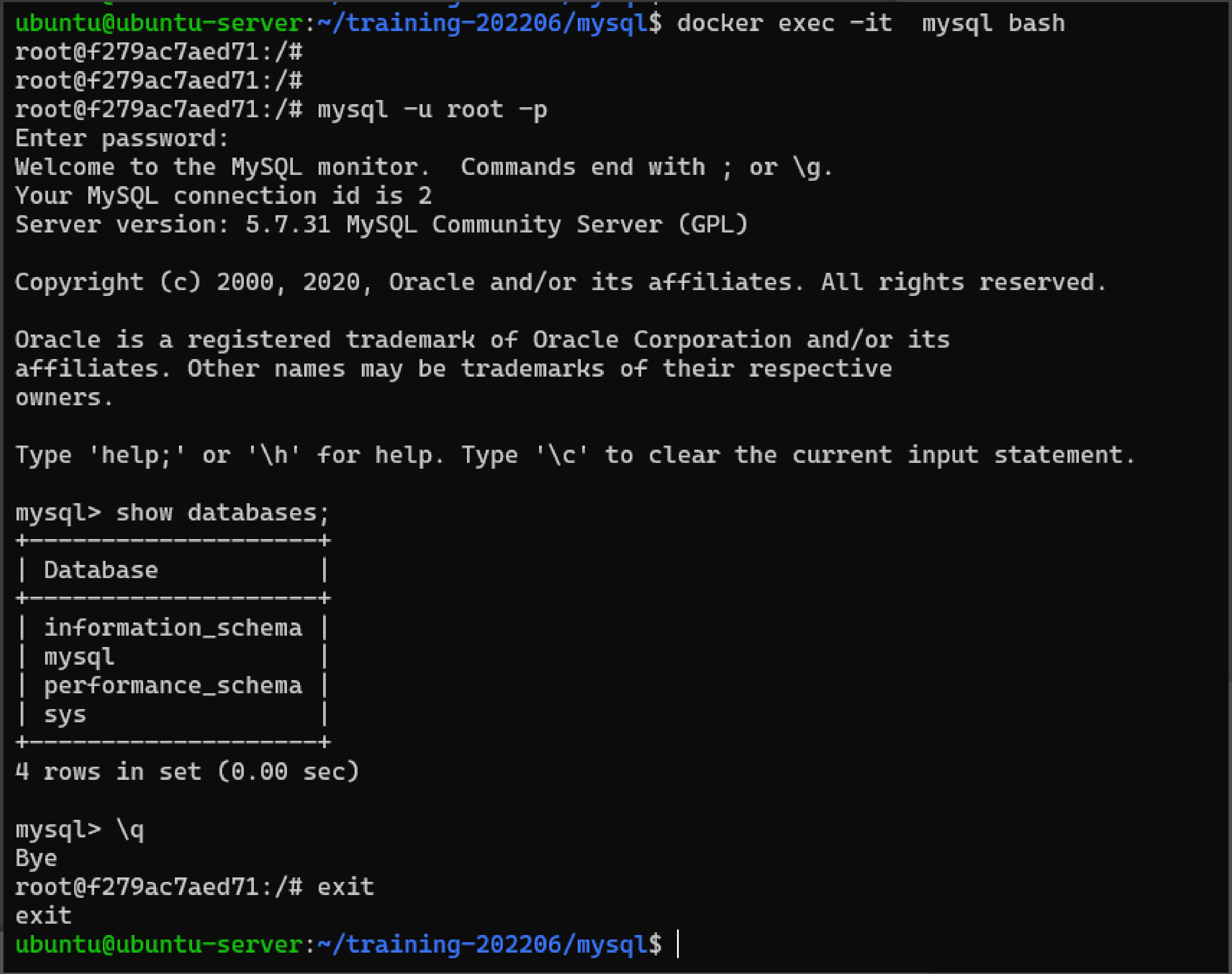


```
ubuntu@ubuntu-server:~/training-202206/mysql$ docker-compose up -d
Creating network "mysql_default" with the default driver
Creating mysql ... done
ubuntu@ubuntu-server:~/training-202206/mysql$
```

Exercise #5

```
## Get inside the docker container
docker exec -it mysql bash

## Login to mysql
mysql -u root -p

## Display the available databases
show databases;

## Exit from mysql shell
\q

## Exit from docker container
exit
```

Exercise #5 Result



```
ubuntu@ubuntu-server:~/training-202206/mysql$ docker exec -it  mysql bash
root@f279ac7aed71:/#
root@f279ac7aed71:/#
root@f279ac7aed71:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.7.31 MySQL Community Server (GPL)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
4 rows in set (0.00 sec)

mysql> \q
Bye
root@f279ac7aed71:/# exit
exit
ubuntu@ubuntu-server:~/training-202206/mysql$
```

Exercise #6 - Shutting down services

```
## Go to your training-202206 repository folder
cd /mnt/c/training-202206

## Go to portainer folder
cd portainer

## Shutdown the Portainer service
docker-compose down

## Go to nginx folder
cd ../nginx

## Shutdown the Nginx service
docker-compose down

## Go to mysql folder
cd ../mysql

## Shutdown the MySQL service
docker-compose down
```

Next Topic - Day 3

- iReport 3.0.0 Designer
- Editing Reports (Old Way)
- Editing Reports (New Way)

Thank You!