Docker

Docker is a centralized platform for packaging, deploying, and running applications. Before Docker, many users face the problem that a particular code is running in the developer's system but not in the user's system. So, the main reason to develop docker is to help developers to develop applications easily, ship them into containers, and can be deployed anywhere.

Docker is an open-source centralized platform designed to create, deploy, and run applications. Docker uses container on the host's operating system to run applications. It allows applications to use the same Linux kernel as a system on the host computer, rather than creating a whole virtual operating system.

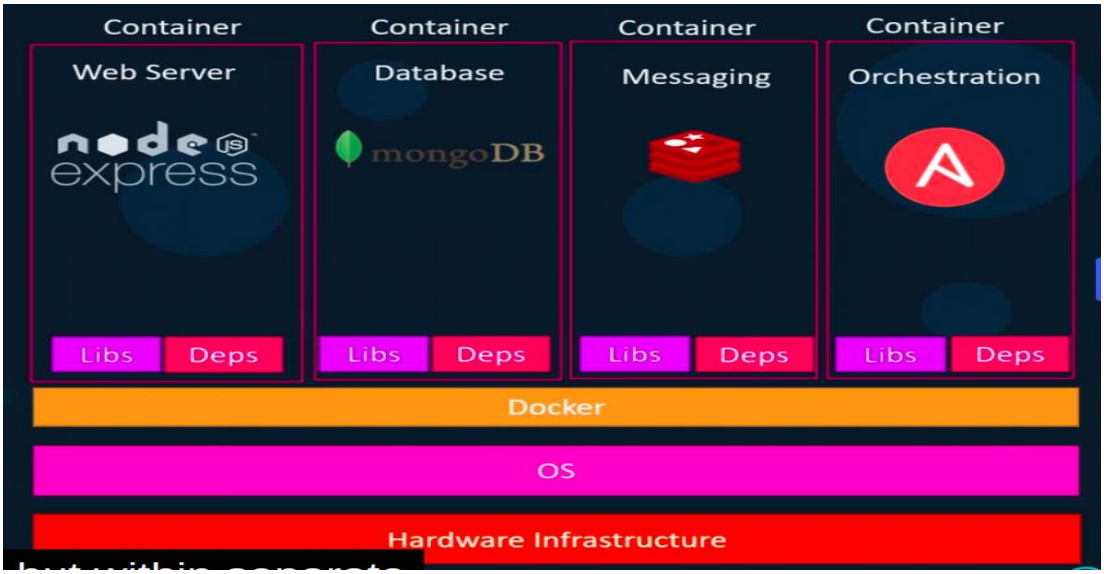
Maintainability.

Docker Containers

Docker containers are the **lightweight** alternatives of the virtual machine. It allows developers to package up the application with all its libraries and dependencies, and ship it as a single package. The advantage of using a docker container is that you don't need to allocate any RAM and disk space for the applications. It automatically generates storage and space according to the application requirement.

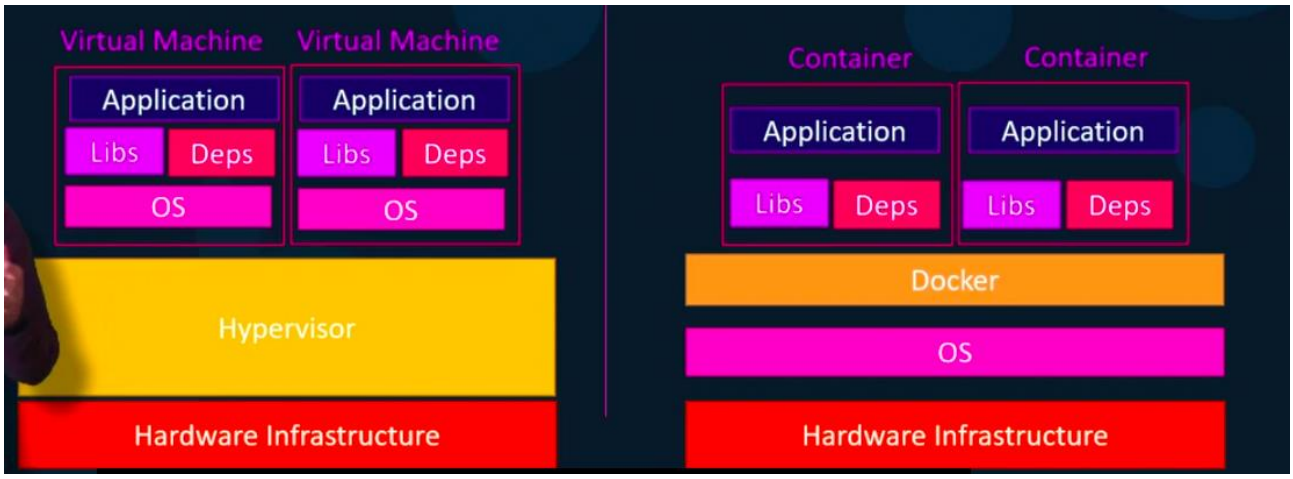
(or)

container are complete **isolated environment , they can have there own processes or services there own network interfaces**.except they all share the same OS kernel.Docker utilizes LXC containers. **Containers are portable.**

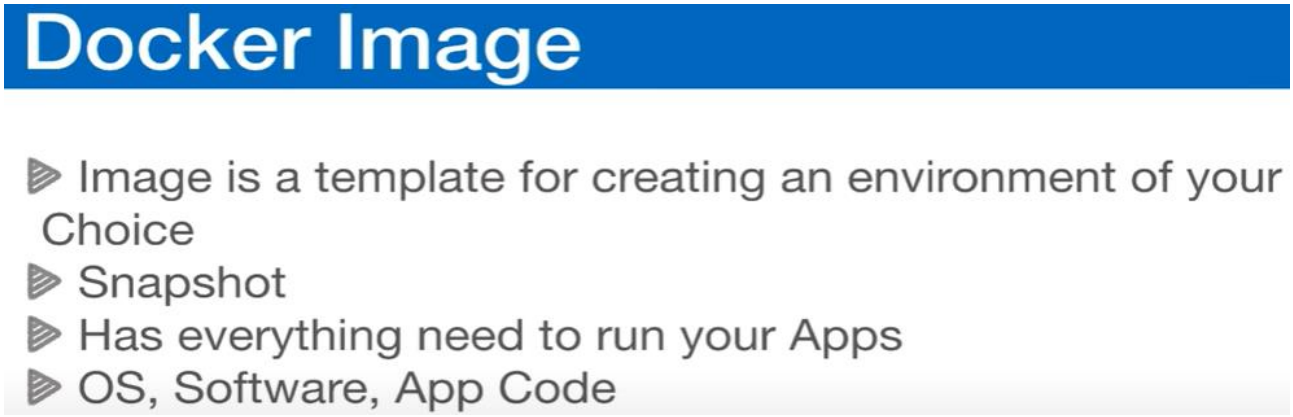


Containers Vs. Virtual Machine

Containers	Virtual Machine
Integration in a container is faster and cheap.	Integration in virtual is slow and costly.
No wastage of memory.	Wastage of memory.
It uses the same kernel, but different distribution.	It uses multiple independent operating systems.



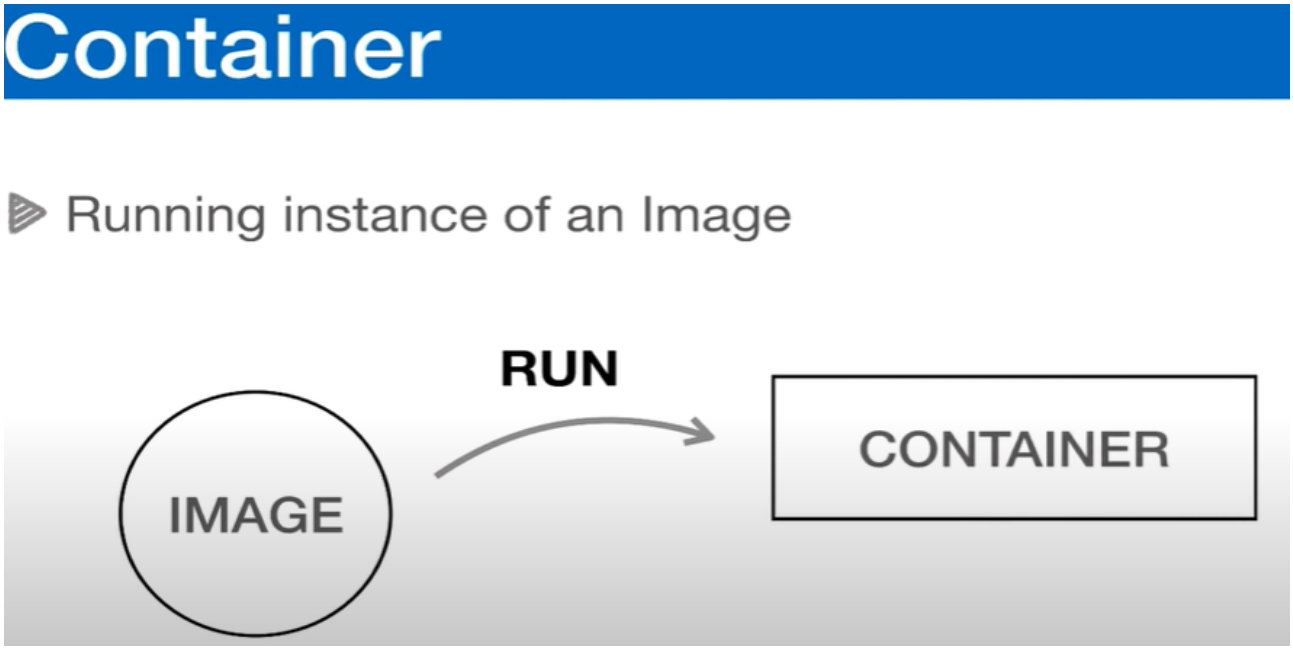
Docker images: image is a template for creating an environment of your choice (like databases etc) . image is used to create a one or more containers.



Containers are running instances of images that are isolated and have there own environments and set of processes.

Or

Images are used to store and ship applications. An image can be used on its own to build a container or customized to add additional elements to extend the current configuration.



Container: container is running an instance of image.

Docker image commands:

docker pull nginx(nginx is image) => to pull an image from the docker hub.

docker images => to see list of images.

Docker Container Commands:

docker run nginx(image):latest=> run the instance nginx of application to create container.

docker run -d nginx(image):latest=> run the instance nginx of application to create container in detach mode(detachedmode is nothing but running the container in background).

Docker container ls => print app the running containers.

OR

Docker ps => print all running containers.

Docker ps -a => print all available containers.

Docker stop container_ID => stop the container by ID .

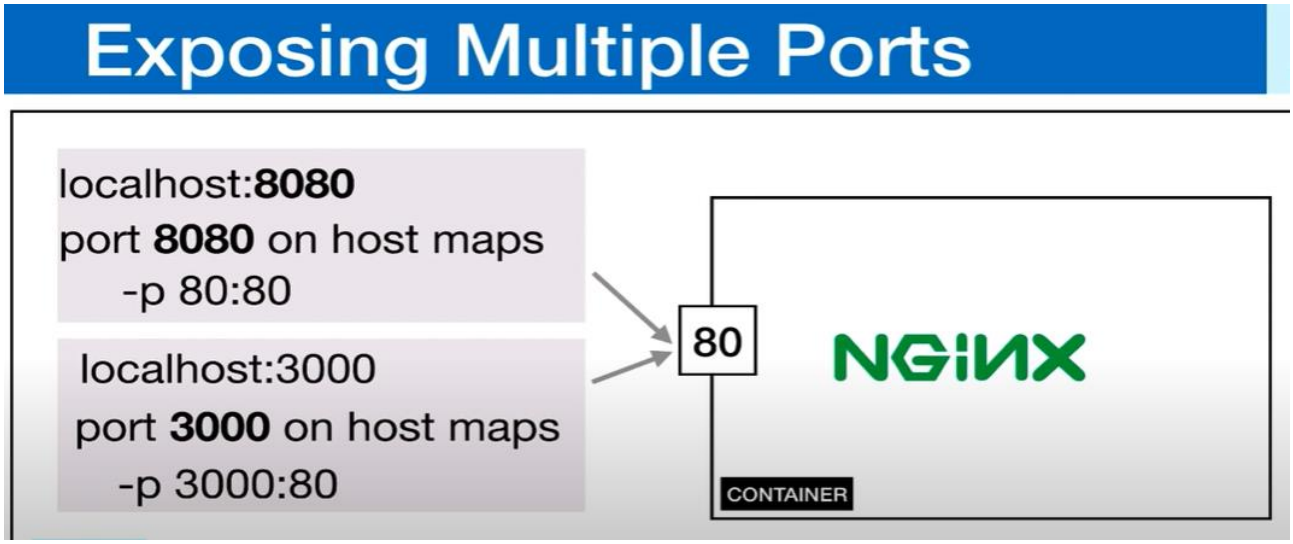
Docker rm -f container_ID or container_name :remove the container by force without stop

Exposing ports:

Docker run -d -p 8080:80 nginx:latest => its will run the nginx image by creating container in a detached mode by mapping localhost 8080 port to container port 80.

Exposing multiple ports:

Docker run -d -p 8080:80 -p 3000:80 nginx:latest => its will run the nginx image by creating container in a detached mode by mapping multiple ports localhost 8080 port to container port 80 and localhost 3000 port to 80.



Managing Containers:

Docker stop CotainerName or container_ID. => to stop container.
Docker start CotainerName or container_ID=> to start container .
Docker rm CotainerName or container_ID => to remove (Delete) the container.
Docker rmi nginx (IMAGE_NAME)=> to remove (Delete)the image (first remove (Delete) all containers.)

Delete (rm command) all available and quite containers but is will not delete the running containers.

```
➜ ~ docker ps -aq
c17639b9bc14
64c290c3f67d
43d7fc868509
7c16ce4bf5b0
839101ab360c
➜ ~ docker rm $(docker ps -aq)
c17639b9bc14
64c290c3f67d
43d7fc868509
7c16ce4bf5b0
839101ab360c
➜ ~ _
```

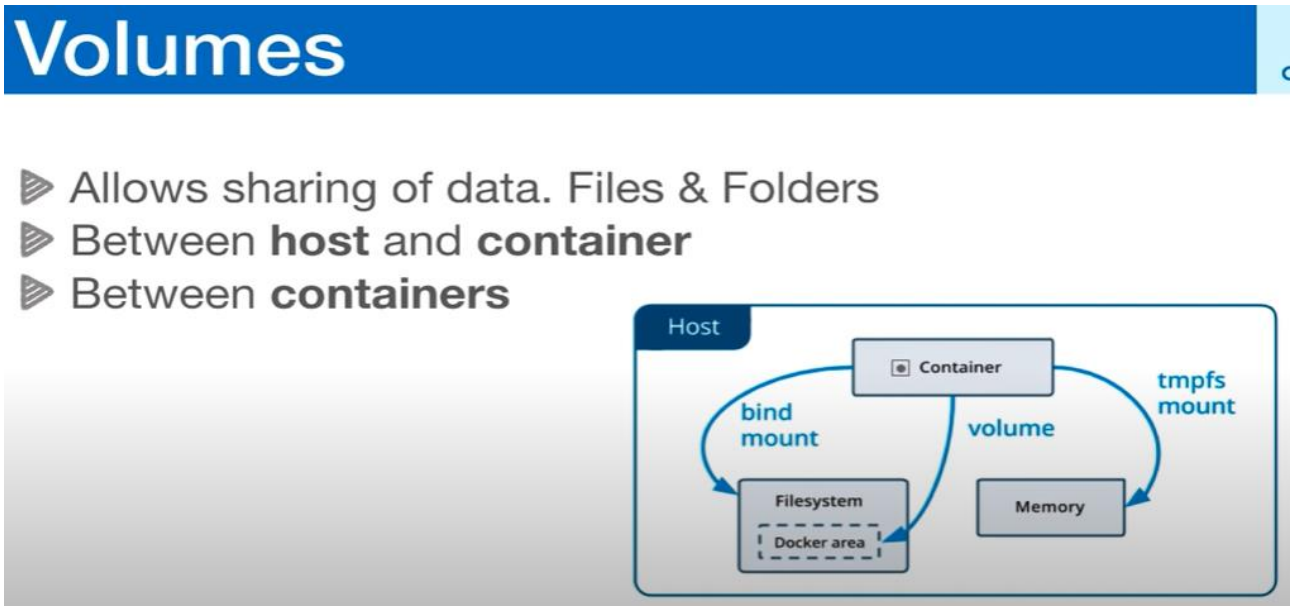
(rm)command It will not delete the running containers. Use -f force to delete

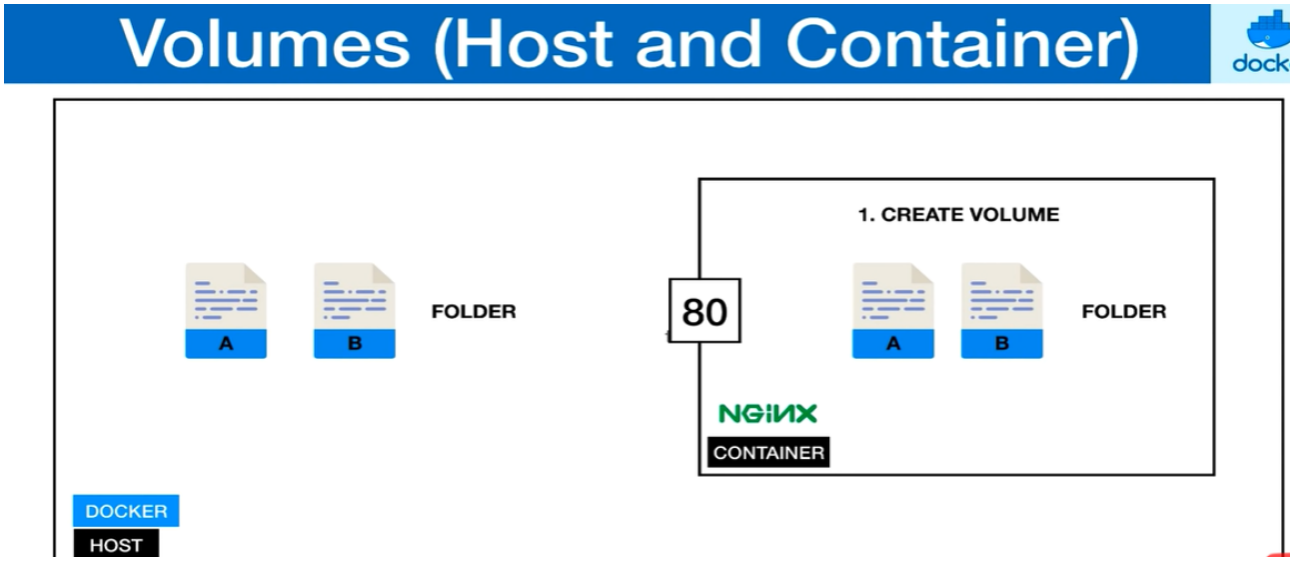
```
➜ ~ docker run -d -p 3000:80 -p 8080:80 nginx:latest
93f20bc99d06be69d299c80b3e61e1d790ff5269904096185bcfea50fbe8d268
➜ ~ docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS
            PORTS                                           NAMES
93f20bc99d06        nginx:latest        "nginx -g 'daemon of…"   4 seconds ago       Up 2 sec
onds        0.0.0.0:3000->80/tcp, 0.0.0.0:8080->80/tcp   sad_murdock
➜ ~ docker rm $(docker ps -aq)
Error response from daemon: You cannot remove a running container 93f20bc99d06be69d299c80b3e6
1e1d790ff5269904096185bcfea50fbe8d268. Stop the container before attempting removal or force
remove
➜ ~ docker rm -f $(docker ps -aq)
93f20bc99d06
➜ ~ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
       PORTS               NAMES
➜ ~ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
       PORTS               NAMES
➜ ~ _
```

Naming Containers:

Docker run - -name website -d -p 8080:80 -p 3000:80 nginx:latest => naming website to

Docker Volumes:

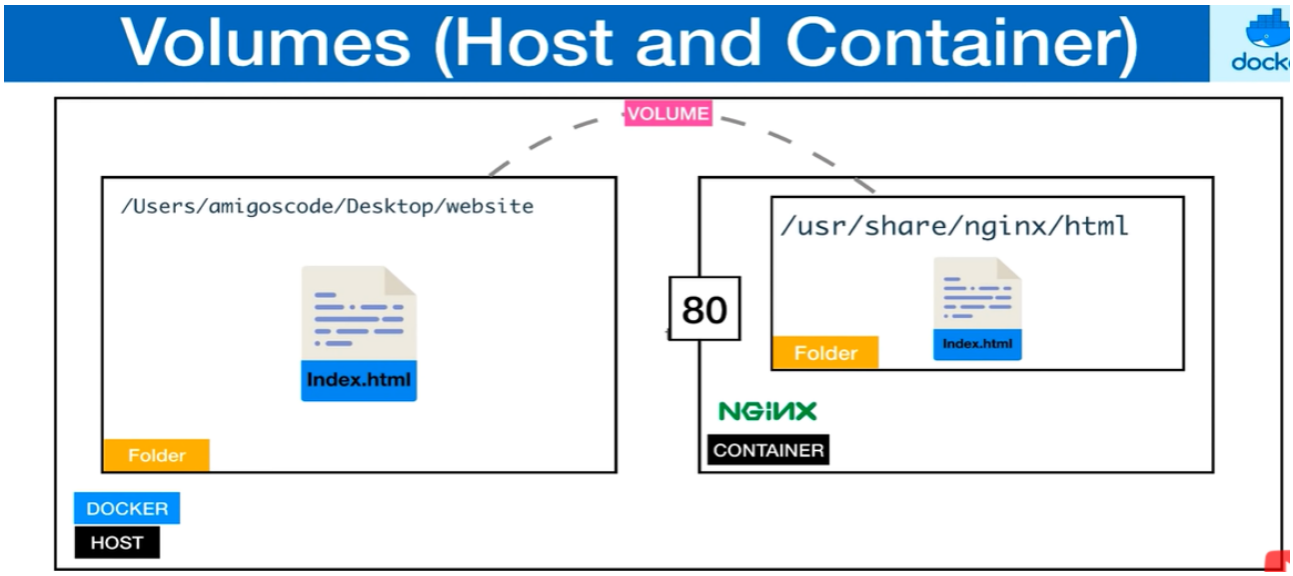





```
$ docker run --name some-nginx -v /some/content:/usr/share/nginx/html:ro -d nginx
```

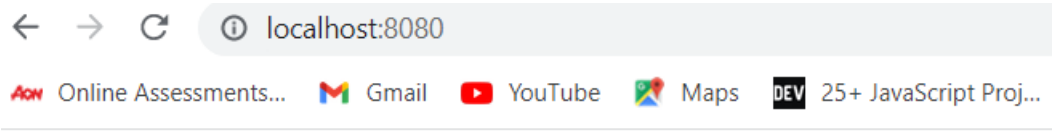
Name some-nginx -V Volume source : destination :read only mode .

Volumes Between Host and Containers:




```
C:\Users\RAPELLI\Desktop\website>docker run --name  website -v C:/Users/RAPELLI/Desktop/website:/usr/share/nginx/html:ro -d -p 8080:80  nginx:latest
46808b4faf9255c0b71d612c1afaa1f869c2a08124edb54ba3a46cc3fb82f60b

C:\Users\RAPELLI\Desktop\website>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED         STATUS         PORTS                   NAMES
46808b4faf92   nginx:latest   "/docker-entrypoint.…"   2 minutes ago   Up 2 minutes   0.0.0.0:8080->80/tcp   website
```

Output:



Hello docker and volumes: read only

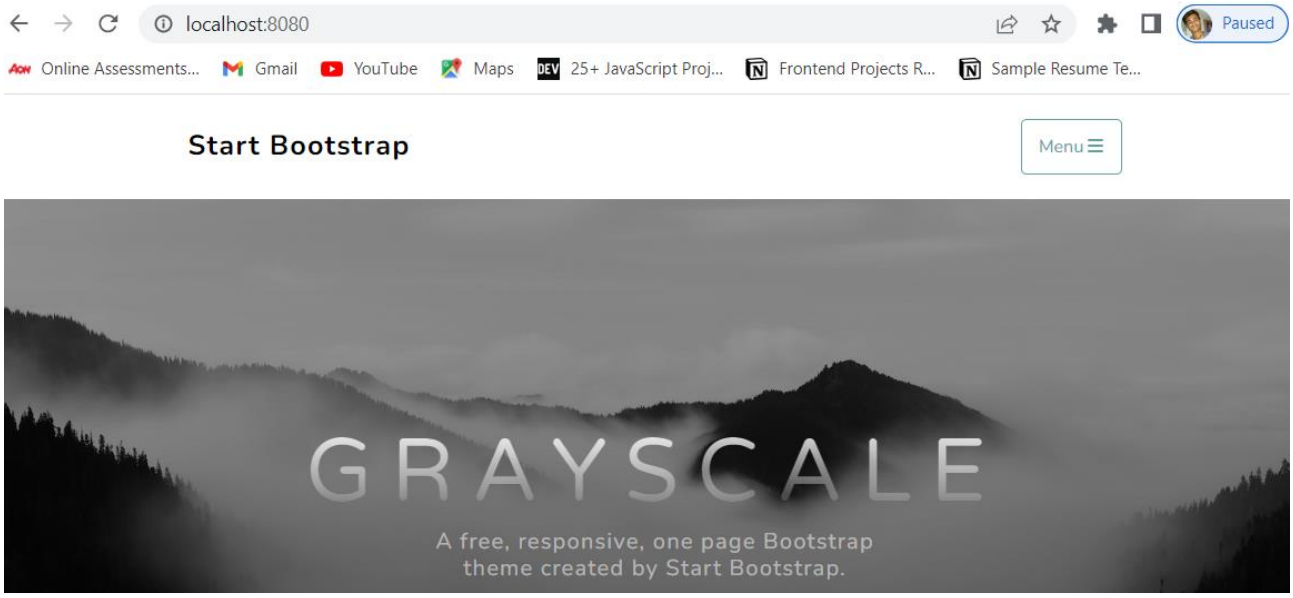
```
root@fa2cf506b07b:/usr/share/nginx/html# ls -al
total 8
drwxr-xr-x 3 root root   96 Jul 25 22:02 .
drwxr-xr-x 3 root root 4096 Jul 17 23:24 ..
-rw-r--r-- 1 root root   44 Jul 25 22:07 index.html
root@fa2cf506b07b:/usr/share/nginx/html# touch about.html
touch: cannot touch 'about.html': Read-only file system
root@fa2cf506b07b:/usr/share/nginx/html# exit
➜ website docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS
            PORTS                   NAMES
fa2cf506b07b        nginx               "nginx -g 'daemon of…"   4 minutes ago       Up 4 min
utes        0.0.0.0:8080->80/tcp    website
➜ website docker rm -f website
website
➜ website docker run --name website -v $(pwd):/usr/share/nginx/html -d -p 8080:80 nginx
07338e9736493d6500319c53bc181afca6dc529ae755d7bb37221974c73ecbf8
➜ website docker exec -it website bash
root@07338e973649:/# cd /usr/share/nginx/_
```

```
root@07338e973649:/usr/share/nginx/html# ls
index.html
root@07338e973649:/usr/share/nginx/html# touch about.html
root@07338e973649:/usr/share/nginx/html# _
```

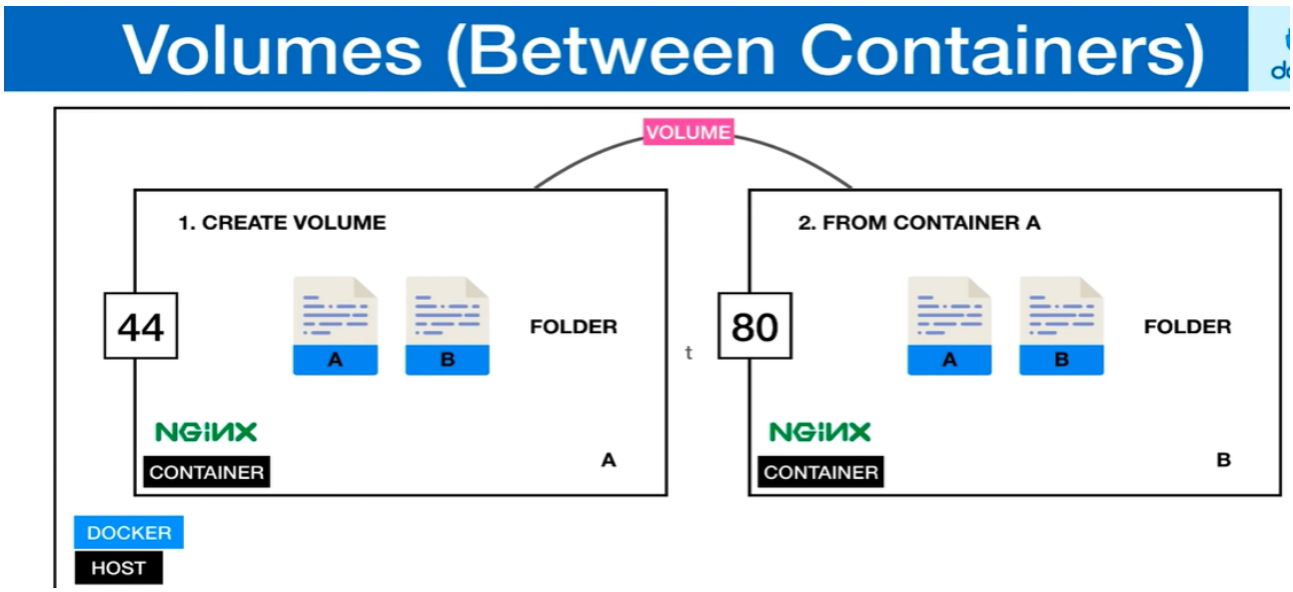
Customise website:

```
C:\Users\RAPELLI\Desktop\website>docker ps -a
CONTAINER ID   IMAGE                    COMMAND                  CREATED          STATUS                      PORTS                   NAMES
8018419e1d50   nginx:latest             "/docker-entrypoint.…"   48 seconds ago   Up 46 seconds               0.0.0.0:8080->80/tcp    website
346b793504a9   nginx:latest             "/docker-entrypoint.…"   2 hours ago      Exited (0) 2 hours ago                              keen_swirles
89597492bb3c   nginx:latest             "/docker-entrypoint.…"   3 hours ago      Exited (137) 3 hours ago                            bold_morse
b5072d04bde6   nginx:latest             "/docker-entrypoint.…"   3 hours ago      Exited (0) 3 hours ago                              priceless_cerf
1fad18d1160b   nginx:latest             "/docker-entrypoint.…"   3 hours ago      Exited (0) 3 hours ago                              agitated_swartz
044fc57111db   nginx                    "/docker-entrypoint.…"   3 hours ago      Exited (0) 3 hours ago                              youthful_thompson
cb738e023bbd   nxtwave/ccbp-ide:latest  "node /home/theia/sr…"   8 months ago     Exited (0) 3 hours ago                              ccbp-ide
7623aa7bc1fd   docker/getting-started   "/docker-entrypoint.…"   8 months ago     Exited (255) 8 months ago   0.0.0.0:80->80/tcp      relaxed_panini

C:\Users\RAPELLI\Desktop\website>docker stop website
website

C:\Users\RAPELLI\Desktop\website>docker run --name  website -v C:/Users/RAPELLI/Desktop/website/dist:/usr/share/nginx/html: -d -p 8080:80  nginx:latest
docker: Error response from daemon: Conflict. The container name "/website" is already in use by container "8018419e1d501c36d621c3ff077342688bfc370162481423e5d265af807a0361". You have to remove (or rename) tha
container to be able to reuse that name.
See 'docker run --help'.

C:\Users\RAPELLI\Desktop\website>docker rm website
website

C:\Users\RAPELLI\Desktop\website>docker run --name  website -v C:/Users/RAPELLI/Desktop/website/dist:/usr/share/nginx/html: -d -p 8080:80  nginx:latest
927bac460ee943c1a84495ee610e8bfaad6485a1fda57f26681a6d38b0559586
```

Deployed the application on the localhost



Sharing Volumes Between Containers:



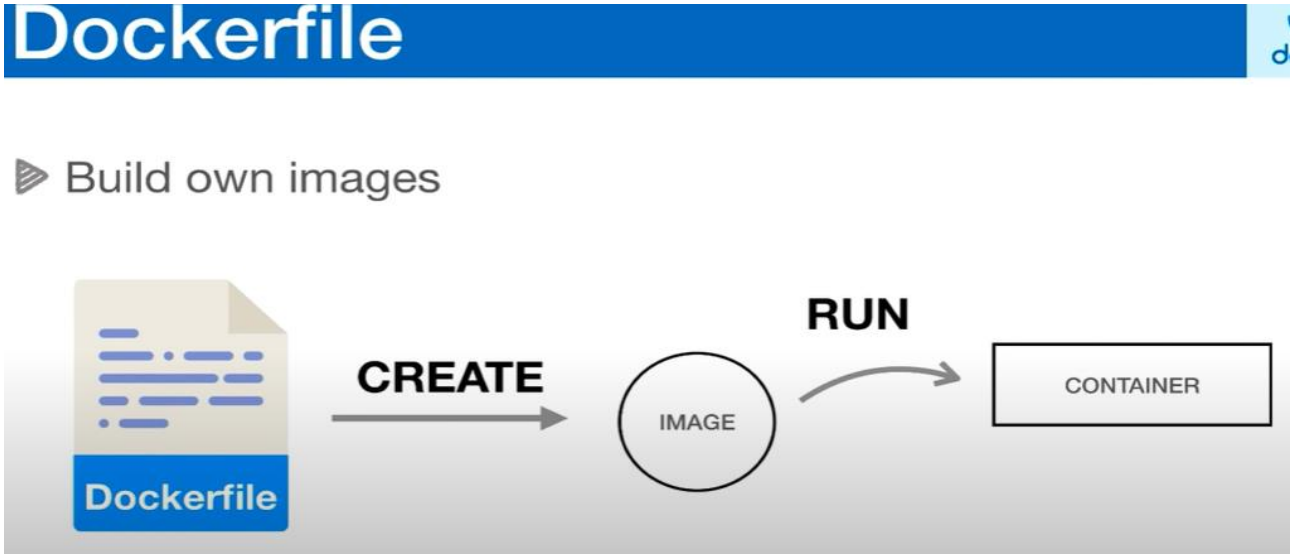
To share volumes between containers we need to use two different ports and copy one volume to another volume.

```
C:\Users\RAPELLI\Desktop\website>docker run --name  website -v C:/Users/RAPELLI/Desktop/website/dist:/usr/share/nginx/html: -d -p 8080:80  nginx:latest
docker: Error response from daemon: Conflict. The container name "/website" is already in use by container "8018419e1d501c36d621c3ff077342688bfc37016248
container to be able to reuse that name.
See 'docker run --help'.

C:\Users\RAPELLI\Desktop\website>docker rm website
website

C:\Users\RAPELLI\Desktop\website>docker run --name  website -v C:/Users/RAPELLI/Desktop/website/dist:/usr/share/nginx/html: -d -p 8080:80  nginx:latest
927bac460ee943c1a84495ee610e8bfaad6485a1fda57f26681a6d38b0559586

C:\Users\RAPELLI\Desktop\website>docker run --name  website-copy --volumes-from website -d -p 8081:80  nginx:latest
0abffe054f38a6c3016905293f6f2da1ec71a3ffb294e3531c3701c823c63d35

C:\Users\RAPELLI\Desktop\website>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED          STATUS          PORTS                   NAMES
0abffe054f38   nginx:latest   "/docker-entrypoint.…"   8 seconds ago    Up 6 seconds    0.0.0.0:8081->80/tcp    website-copy
927bac460ee9   nginx:latest   "/docker-entrypoint.…"   11 minutes ago   Up 11 minutes   0.0.0.0:8080->80/tcp    website
```

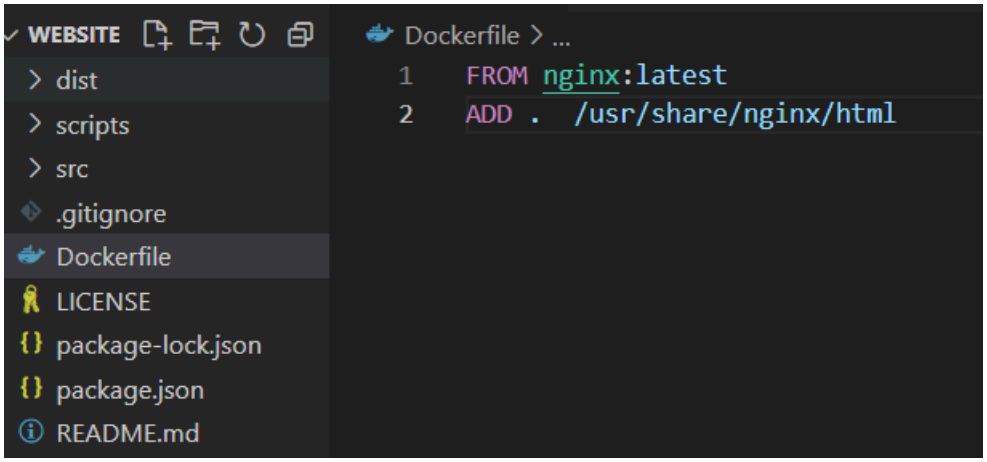
Dockerfile:

Docker can build images automatically by reading the instructions from a Dockerfile. A Dockerfile is a text document that contains all the commands a user could call on the command line to assemble an image. This page describes the commands you can use in a Dockerfile.

It helps us to build our own images by writing Dockerfile as mentioned below.



Example:



Dockerfile should be inside the current dir, we can also pass the environment variables.

Command to build:

Docker build - - tag user-service-api:latest .

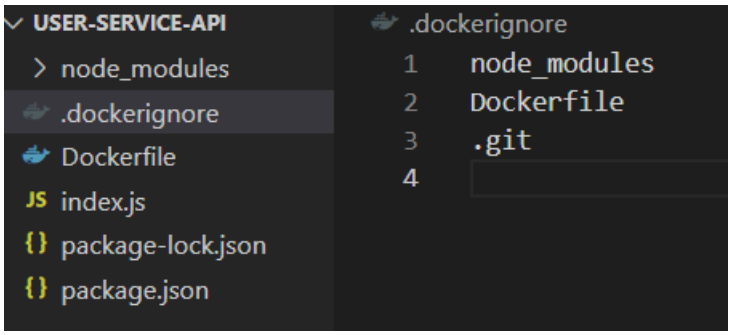
OR

Docker build –tag –name user-service-api -d -p 8080:80 user-service-api:latest .

Caching and Layers

Docker file Ignore:

Add the .dockerignore file and add the files, folders to ignore while building image.



After that build the image and create a container and run it.

Docker build –tag –name user-service-api -d -p 8080:80 user-service-api:latest .

Start container again .

Caching and Layers:

Reducing Image Size:

-Linux Alpine
- Pulling Aline Docker Images
- Switching to Alpine

- Linux Alpine : small , simple, secure

- Alpine Linux is an independent, non-commercial, general purpose Linux distribution designed for power users who appreciate security, simplicity and resource efficiency.
- Alpine Linux is built around musl libc and busybox. This makes it small and very resource efficient. A container requires no more than 8 MB and a minimal installation to disk requires around 130 MB of storage.

- Pulling Aline Docker Images:

docker pull node:alpine => it will pull the node image from docker hub of less size due to alpine.

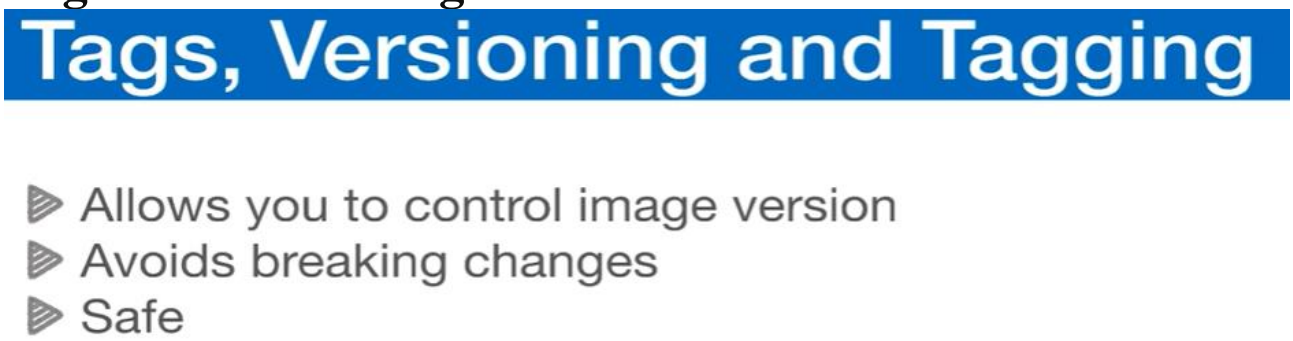
```
C:\Users\RAPELLI\user-service-api>docker pull node:lts-alpine
lts-alpine: Pulling from library/node
ca7dd9ec2225: Pull complete
55371e6747e8: Pull complete
694d6b1b2d1b: Pull complete
71f41f5ff77d: Pull complete
Digest: sha256:9eff44230b2fdcca57a73b8f908c8029e72d24dd05cac5339c79d3dedf6b208b
Status: Downloaded newer image for node:lts-alpine
docker.io/library/node:lts-alpine
```

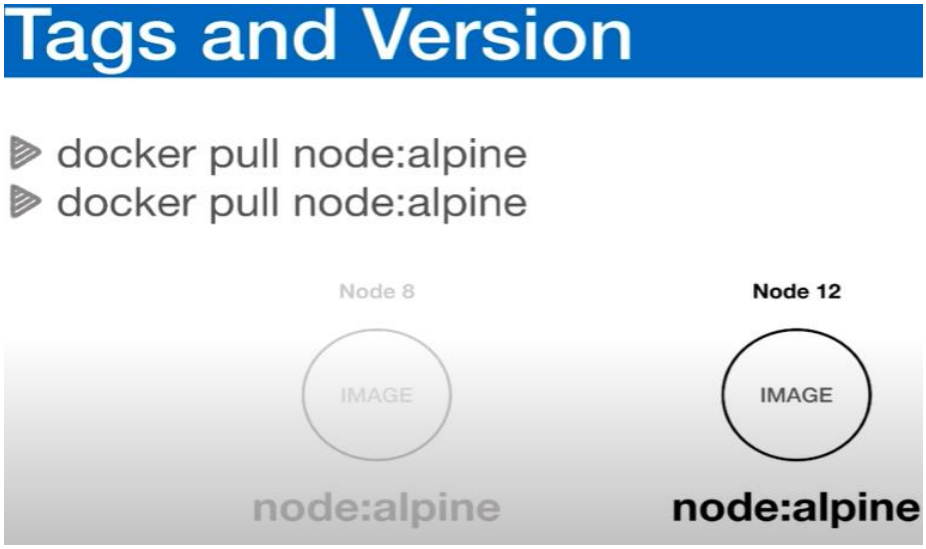
Or

docker pull node:alpine:

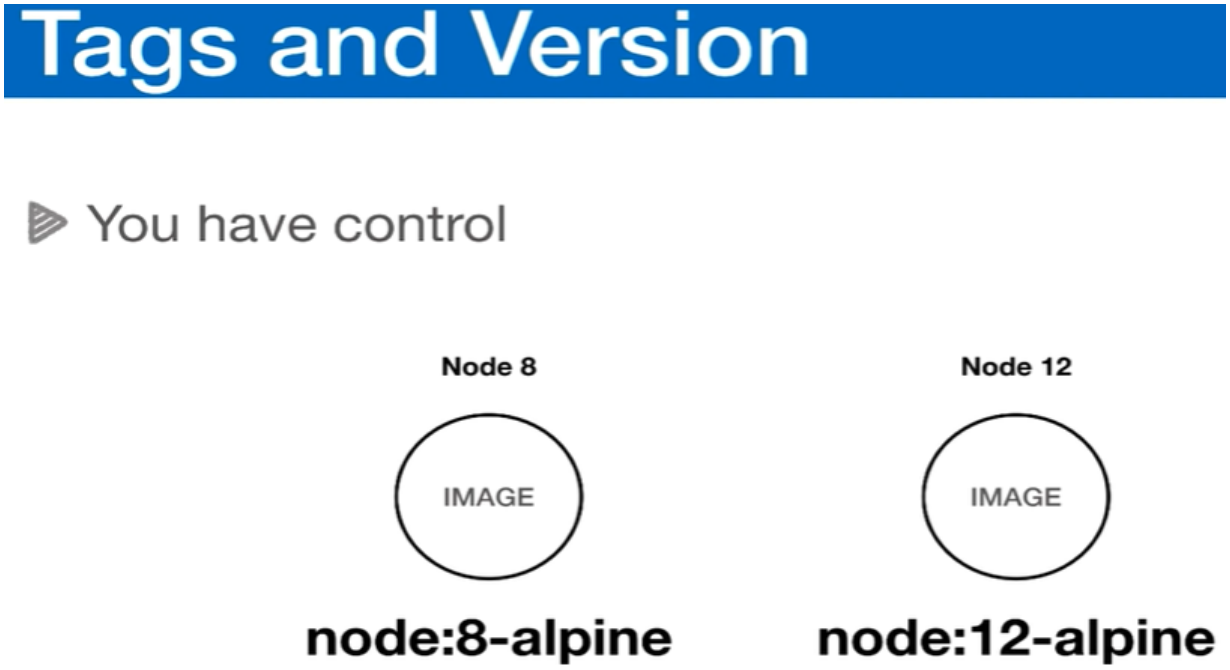
```
C:\Users\RAPELLI\user-service-api>docker pull nginx:alpine
alpine: Pulling from library/nginx
ca7dd9ec2225: Already exists
76a48b0f5898: Pull complete
2f12a0e7c01d: Pull complete
1a7b9b9bbef6: Pull complete
b704883c57af: Pull complete
4342b1ab302e: Pull complete
Digest: sha256:455c39afebd4d98ef26dd70284aa86e6810b0485af5f4f222b19b89758cabf1e
Status: Downloaded newer image for nginx:alpine
docker.io/library/nginx:alpine

C:\Users\RAPELLI\user-service-api>docker images
REPOSITORY         TAG          IMAGE ID       CREATED             SIZE
user-service-api   latest       540c7de71c43   32 minutes ago      998MB
<none>             <none>       d0e54d65f273   49 minutes ago      1e+03MB
<none>             <none>       41f8deda2a18   About an hour ago   998MB
<none>             <none>       83bf39f58fcf   About an hour ago   999MB
<none>             <none>       99a4b0efd02f   2 hours ago         997MB
<none>             <none>       94c63f8cb7cd   2 hours ago         998MB
website            latest       9746caa36283   19 hours ago        144MB
node               lts-alpine   0fa08f92e64b   2 weeks ago         167MB
nginx              alpine       19dd4d73108a   2 weeks ago         23.5MB
```

Tags and Versioning :





- Using Tags



- Running Containers Using Tags :

```
➜ website docker build -t website:latest .
Sending build context to Docker daemon  9.094MB
Step 1/2 : FROM nginx:1.17.2-alpine
1.17.2-alpine: Pulling from library/nginx
Digest: sha256:482ead44b2203fa32b3390abdaf97cbdc8ad15c07f
Status: Downloaded newer image for nginx:1.17.2-alpine
 ---> 55ceb2abad47
Step 2/2 : ADD . /usr/share/nginx/html
 ---> 6fba6baed71a
Successfully built 6fba6baed71a
Successfully tagged website:latest
➜ website
```

- Tagging Override : when we don't mention the proper tags the images will override example:

```
C:\Users\RAPELLI\user-service-api>docker images
REPOSITORY          TAG       IMAGE ID       CREATED             SIZE
user-service-api    latest    1e1d7201e8d0   21 seconds ago      174MB
<none>              <none>    540c7de71c43   44 minutes ago      998MB
<none>              <none>    d0e54d65f273   About an hour ago   1e+03MB
<none>              <none>    41f8deda2a18   About an hour ago   998MB
<none>              <none>    83bf39f58fcf   2 hours ago         999MB
<none>              <none>    99a4b0efd02f   2 hours ago         997MB
<none>              <none>    94c63f8cb7cd   2 hours ago         998MB
node                alpine    9b78801b4058   9 hours ago         171MB
website             latest    9746caa36283   20 hours ago        144MB
nginx               alpine    19dd4d73108a   2 weeks ago         23.5MB
```

- **Tagging Images :**

Command => **docker tag user-service-api:latest user-service-api:1**

```
➜ website docker tag amigoscode-website:latest amigoscode-website:1
➜ website docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
website             latest              a78ef7d495b4        10 minutes ago      30.2MB
user-service-api    latest              1548314edf5a        22 minutes ago      114MB
amigoscode-website  1                   6fba6baed71a        23 minutes ago      30.2MB
amigoscode-website  latest              6fba6baed71a        23 minutes ago      30.2MB
node                10.16.1-alpine      0fdd71ec1d1a        18 hours ago        75.7MB
<none>              <none>              773b34ce2ddb        2 days ago          30.2MB
<none>              <none>              53203be29fbb        2 days ago          117MB
<none>              <none>              51e8a974485c        4 days ago          946MB
<none>              <none>              368a4de2a381        5 days ago          135MB
node                latest              16b062cafbd0        8 days ago          908MB
node                alpine              d97a436daee9        8 days ago          79.3MB
nginx               1-alpine            55ceb2abad47        10 days ago         21.1MB
nginx               1.17.2-alpine       55ceb2abad47        10 days ago         21.1MB
nginx               alpine              55ceb2abad47        10 days ago         21.1MB
nginx               latest              e445ab08b2be        10 days ago         126MB
➜ website
```

```
➜ website docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
amigoscode-website  2                   9eaa0d24693b        41 seconds ago      30.2MB
amigoscode-website  latest              9eaa0d24693b        41 seconds ago      30.2MB
website             latest              a78ef7d495b4        12 minutes ago      30.2MB
user-service-api    latest              1548314edf5a        24 minutes ago      114MB
amigoscode-website  1                   6fba6baed71a        25 minutes ago      30.2MB
node                10.16.1-alpine      0fdd71ec1d1a        18 hours ago        75.7MB
<none>              <none>              773b34ce2ddb        2 days ago          30.2MB
<none>              <none>              53203be29fbb        2 days ago          117MB
<none>              <none>              51e8a974485c        4 days ago          946MB
<none>              <none>              368a4de2a381        5 days ago          135MB
node                latest              16b062cafbd0        8 days ago          908MB
node                alpine              d97a436daee9        8 days ago          79.3MB
nginx               1-alpine            55ceb2abad47        10 days ago         21.1MB
nginx               1.17.2-alpine       55ceb2abad47        10 days ago         21.1MB
nginx               alpine              55ceb2abad47        10 days ago         21.1MB
nginx               latest              e445ab08b2be        10 days ago         126MB
➜ website
```

- Running Container Using Tags:

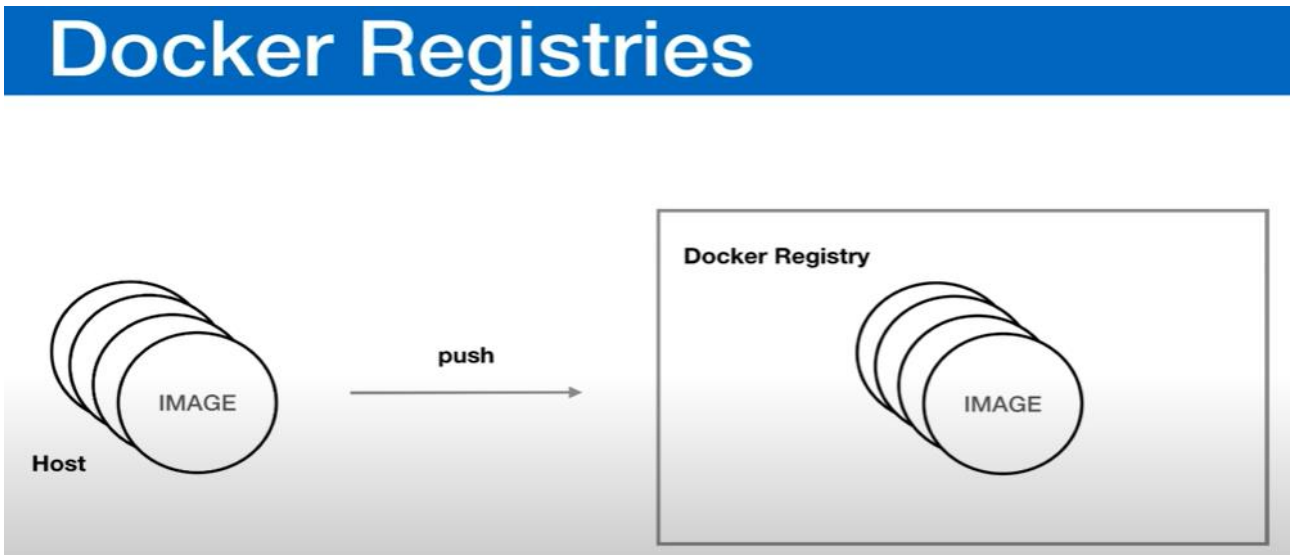
```
➜ website docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
  PORTS               NAMES
➜ website docker run --name amigoscode-latest -p 8080:80 -d amigoscode-website:latest
d9b5aeb3ec83a93abc50166bd9675b03a89d25eb2b54703b881f883cbc844bae
➜ website docker run --name amigoscode-2 -p 8081:80 -d amigoscode-website:2
8b1d665ca1523995c2a863ee395dcca35e882a348bd0566fb08a12824eab38c1
➜ website docker run --name amigoscode-1 -p 8082:80 -d amigoscode-website:1
634ffc301ce846535ca327363ccef7f9b23ca5c120756efafb7019c7dd740bff
➜ website _
```

Docker Registries:

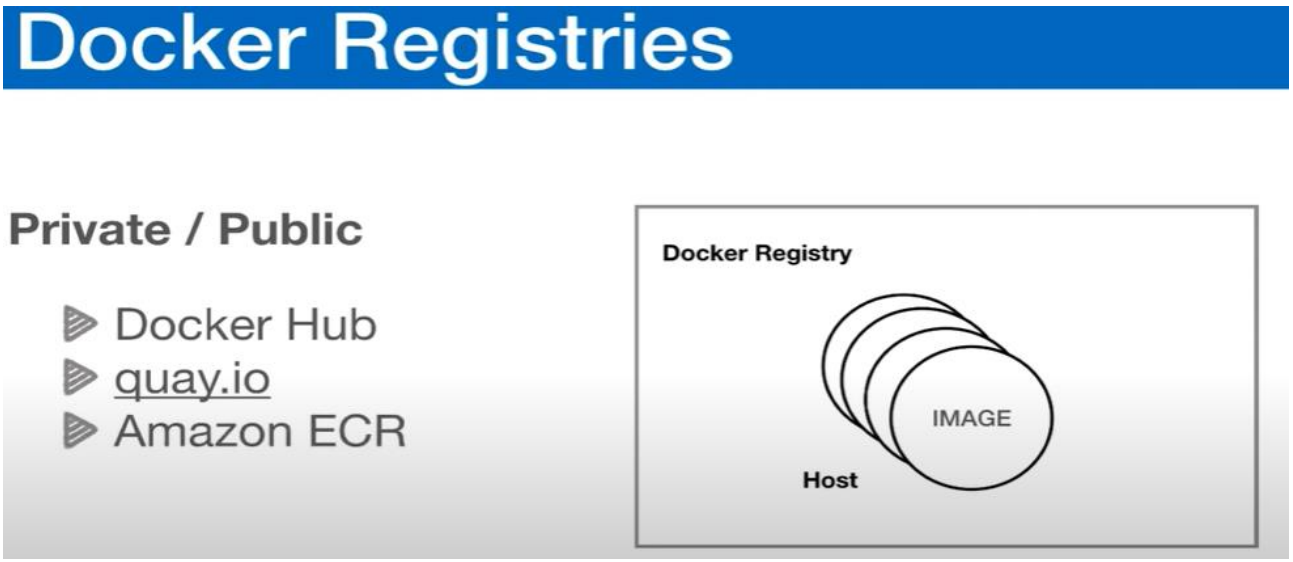
Docker registries highly scalable server side application that stores and lets you distribute docker images .

- Its also used for CD/CI pipeline .
- Run you application .

We use push command to push the image from localhost to server (docker hub)

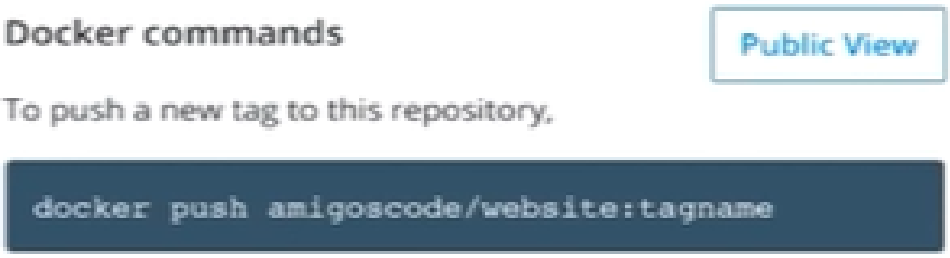


The registers are of two types

- Public
- Private
- 

Pushing images to docker Hub:

Command to push:



Pulling images from registry (Docker Hub):

Command to pull:
Docker pull amigoscode / website: latest

Debugging Containers:

- Docker Inspect
- Docker Logs
- Docker exec

Inspect Container:

docker inspect Container_Name or Container_ID: gives the complete info of the container .

Example : Its give much more info then the below one Example.

```
C:\Users\RAPELLI>docker inspect 65c1c359ebef
[
    {
        "Id": "65c1c359ebefba587febadc63616648df3b0efac8cc1aa7c8e941d5cc5e5e1c9",
        "Created": "2022-11-29T14:52:53.874956217Z",
        "Path": "/docker-entrypoint.sh",
        "Args": [
            "nginx",
            "-g",
            "daemon off;"
        ],
        "State": {
            "Status": "exited",
            "Running": false,
            "Paused": false,
            "Restarting": false,
            "OOMKilled": false,
            "Dead": false,
            "Pid": 0,
            "ExitCode": 255,
            "Error": "",
            "StartedAt": "2022-11-29T14:52:54.945397324Z",
            "FinishedAt": "2022-11-30T03:50:55.908001474Z"
        },
        "Image": "sha256:9746caa362831b8007d5809748bc7bba59939132e742e97eaae5b4a7778
        "ResolvConfPath": "/var/lib/docker/containers/65c1c359ebefba587febadc6361664
        "HostnamePath": "/var/lib/docker/containers/65c1c359ebefba587febadc63616648d
        "HostsPath": "/var/lib/docker/containers/65c1c359ebefba587febadc63616648df3b
        "LogPath": "/var/lib/docker/containers/65c1c359ebefba587febadc63616648df3b0e
        "Name": "/website",
        "RestartCount": 0,
        "Driver": "overlay2",
        "Platform": "linux",
        "MountLabel": "",
        "ProcessLabel": "",
        "AppArmorProfile": "",
        "ExecIDs": null,
        "HostConfig": {
```

```
        "Image": "sha256:9746caa362831b8007d5809748bc7bba599391
        "ResolvConfPath": "/var/lib/docker/containers/65c1c359e
        "HostnamePath": "/var/lib/docker/containers/65c1c359ebe
        "HostsPath": "/var/lib/docker/containers/65c1c359ebefba
        "LogPath": "/var/lib/docker/containers/65c1c359ebefba58
        "Name": "/website",
        "RestartCount": 0,
        "Driver": "overlay2",
        "Platform": "linux",
        "MountLabel": "",
        "ProcessLabel": "",
        "AppArmorProfile": "",
        "ExecIDs": null,
        "HostConfig": {
            "Binds": null,
            "ContainerIDFile": "",
            "LogConfig": {
                "Type": "json-file",
                "Config": {}
            },
            "NetworkMode": "default",
            "PortBindings": {
                "80/tcp": [
                    {
                        "HostIp": "",
                        "HostPort": "8080"
                    }
                ]
            },
            "RestartPolicy": {
                "Name": "no",
                "MaximumRetryCount": 0
            },
            "AutoRemove": false,
            "VolumeDriver": "",
            "VolumesFrom": null,
            "CapAdd": null,
            "CapDrop": null,
            "CgroupnsMode": "host",
            "Dns": [],
            "DnsOptions": [],
            "DnsSearch": [],
            "ExtraHosts": null,
```

Container Logs:

docker logs container_name :

docker logs -f container_name or container_ID:

example:

```
C:\Users\RAPELLI>docker logs 65c1c359ebef
/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
/docker-entrypoint.sh: Configuration complete; ready for start up
2022/11/29 14:52:54 [notice] 1#1: using the "epoll" event method
2022/11/29 14:52:54 [notice] 1#1: nginx/1.23.2
2022/11/29 14:52:54 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2022/11/29 14:52:54 [notice] 1#1: OS: Linux 5.10.16.3-microsoft-standard-WSL2
2022/11/29 14:52:54 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2022/11/29 14:52:54 [notice] 1#1: start worker processes
2022/11/29 14:52:54 [notice] 1#1: start worker process 30
2022/11/29 14:52:54 [notice] 1#1: start worker process 31
2022/11/29 14:52:54 [notice] 1#1: start worker process 32
2022/11/29 14:52:54 [notice] 1#1: start worker process 33
2022/11/29 14:52:54 [notice] 1#1: start worker process 34
2022/11/29 14:52:54 [notice] 1#1: start worker process 35
2022/11/29 14:52:54 [notice] 1#1: start worker process 36
2022/11/29 14:52:54 [notice] 1#1: start worker process 37
172.17.0.1 - - [29/Nov/2022:14:52:59 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:53:01 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:53:02 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:53:04 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:54:31 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:54:32 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;
172.17.0.1 - - [29/Nov/2022:14:54:32 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0;

C:\Users\RAPELLI>
```

Example:

```
➜ website docker logs db07a606992f
Example app listening on port 3000!
Example app listening on port 3000!
➜ website _
```

Docker exec:

To jump into the container see how its working

Command : docker exec -it container_Name or container_ID /bin/bash

or

docker exec -it container_Name or container_ID /bin/sh

this commands helps us go inside the container

command :ls -al => list all the folders in the working directory

when we go back using cd .. we can see the linux system which helps us to run the container on linux operating system.

```
➜ website docker exec --help

Usage:  docker exec [OPTIONS] CONTAINER COMMAND [ARG...]

Run a command in a running container

Options:
  -d, --detach               Detached mode: run command in the background
      --detach-keys string   Override the key sequence for detaching a container
  -e, --env list             Set environment variables
  -i, --interactive          Keep STDIN open even if not attached
      --privileged           Give extended privileges to the command
  -t, --tty                  Allocate a pseudo-TTY
  -u, --user string          Username or UID (format: <name|uid>[:<group|gid>])
  -w, --workdir string       Working directory inside the container
➜ website
```

Docker compose:

Docker Compose

It is a tool which is used to create and start Docker application by using a single command. We can use it to file to configure our application's services.

It is a great tool for development, testing, and staging environments.

It provides the following commands for managing the whole lifecycle of our application.

- Start, stop and rebuild services
- View the status of running services
- Stream the log output of running services
- Run a one-off command on a service

To implement compose, it consists the following steps.

1. Put Application environment variables inside the Dockerfile to access publicly.
2. Provide services name in the docker-compose.yml file so they can be run together in an isolated environment.
3. run docker-compose up and Compose will start and run your entire app.

A typical **docker-compose.yml** file has the following format and arguments.

// docker-compose.yml

```
1. version: '3'
2. services:
3. web:
4. build: .
5. ports:
6. - "5000:5000"
7. volumes:
8. - .:/code
9. - logvolume01:/var/log
10. links:
11. - redis
12. redis:
13. image: redis
14. volumes:
```

15. logvolume01: {}

Installing Docker Compose

Following are the instructions to install Docker Compose in Linux Ubuntu.

1. curl -L https://github.com/docker/compose/releases/download/1.12.0/docker-compose-`uname -s`-`uname -m` > /usr/local/bin/docker-compose

```
root@irfan-GB-BXBT-2807: /home/irfan
root@irfan-GB-BXBT-2807:/home/irfan# curl -L https://github.com/docker/compose/releases/downloa
d/1.12.0/docker-compose-`uname -s`-`uname -m` > /usr/local/bin/docker-compose
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   600    0   600    0     0    267      0 --:--:--  0:00:02 --:--:--   267
100 8076k  100 8076k    0     0   605k      0  0:00:13  0:00:13 --:--:-- 1277k
```

Docker-compose version

1. $ docker-compose --version

```
root@irfan-GB-BXBT-2807: /home/irfan
root@irfan-GB-BXBT-2807:/home/irfan# curl -L https://github.com/docker/compose/releases/downloa
d/1.12.0/docker-compose-`uname -s`-`uname -m` > /usr/local/bin/docker-compose
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   600    0   600    0     0    267      0 --:--:--  0:00:02 --:--:--   267
100 8076k  100 8076k    0     0   605k      0  0:00:13  0:00:13 --:--:-- 1277k
root@irfan-GB-BXBT-2807:/home/irfan# docker-compose --version
bash: /usr/local/bin/docker-compose: Permission denied
```

It says, permission denied. So, make file executable.

1. $ sudo chmod +x /usr/local/bin/docker-compose

```
root@irfan-GB-BXBT-2807: /home/irfan
root@irfan-GB-BXBT-2807:/home/irfan# docker-compose version
bash: /usr/local/bin/docker-compose: Permission denied
root@irfan-GB-BXBT-2807:/home/irfan# sudo chmod +x /usr/local/bin/docker-compose
root@irfan-GB-BXBT-2807:/home/irfan#
```

Now, check version again.

1. $ docker-compose ?version

```
root@irfan-GB-BXBT-2807: /home/irfan
root@irfan-GB-BXBT-2807:/home/irfan# docker-compose version
bash: /usr/local/bin/docker-compose: Permission denied
root@irfan-GB-BXBT-2807:/home/irfan# sudo chmod +x /usr/local/bin/docker-compose
root@irfan-GB-BXBT-2807:/home/irfan# docker-compose --version
docker-compose version 1.12.0, build b31ff33
root@irfan-GB-BXBT-2807:/home/irfan#
```

Running Application using Docker Compose

Example

Follow the following example

1) Create a Directory

```
$ mkdir docker-compose-example
$ cd docker-composer-example
```

2) Create a file **app.py.**

// app.py

```
1. from flask import Flask
2. from redis import Redis
3. app = Flask(__name__)
4. redis = Redis(host='redis', port=6379)
5. @app.route('/')
6. def hello():
7. count = redis.incr('hits')
8. return 'Hello World! I have been seen {} times.\n'.format(count)
9. if __name__ == "__main__":
10. app.run(host="0.0.0.0", debug=True)
```

3) Create a file **requirements.txt.**

// requirements.txt

```
1. flask
2. redis
```

4) Create a Dockerfile.

// Dockerfile

```
1. FROM python:3.4-alpine
2. ADD . /code
3. WORKDIR /code
4. RUN pip install -r requirements.txt
```

5. CMD ["python", "app.py"]

5) Create a Compose File.

// docker-compose.yml

1. version: '2'
2. services:
3. web:
4. build: .
5. ports:
6. - "5000:5000"
7. volumes:
8. - .:/code
9. redis:
10. image: "redis:alpine"

6) Build and Run Docker App with Compose

1. $ docker-compose up

After running the above command, it shows the following output.

```
root@irfan-GB-BXBT-2807: /home/docker/docker-compose
root@irfan-GB-BXBT-2807:/home/docker/docker-compose# docker-compose up
Creating network "dockercompose_default" with the default driver
Building web
Step 1/5 : FROM python:3.4-alpine
 ---> f9b5ec164bb9
Step 2/5 : ADD . /code
 ---> ce7a951b7838
Removing intermediate container 98e19cab51a2
Step 3/5 : WORKDIR /code
 ---> 71e481420282
Removing intermediate container 20e81ef49e15
Step 4/5 : RUN pip install -r requirements.txt
 ---> Running in 278db10fa751
Collecting flask (from -r requirements.txt (line 1))
  Downloading Flask-0.12.1-py2.py3-none-any.whl (82kB)
Collecting redis (from -r requirements.txt (line 2))
  Downloading redis-2.10.5-py2.py3-none-any.whl (60kB)
Collecting Jinja2>=2.4 (from flask->-r requirements.txt (line 1))
  Downloading Jinja2-2.9.6-py2.py3-none-any.whl (340kB)
Collecting click>=2.0 (from flask->-r requirements.txt (line 1))
  Downloading click-6.7-py2.py3-none-any.whl (71kB)
Collecting Werkzeug>=0.7 (from flask->-r requirements.txt (line 1))
  Downloading Werkzeug-0.12.1-py2.py3-none-any.whl (312kB)
Collecting itsdangerous>=0.21 (from flask->-r requirements.txt (line 1))
  Downloading itsdangerous-0.24.tar.gz (46kB)
Collecting MarkupSafe>=0.23 (from Jinja2>=2.4->flask->-r requirements.txt (line 1))
  Downloading MarkupSafe-1.0.tar.gz
Building wheels for collected packages: itsdangerous, MarkupSafe
  Running setup.py bdist_wheel for itsdangerous: started
  Running setup.py bdist_wheel for itsdangerous: finished with status 'done'
  Stored in directory: /root/.cache/pip/wheels/fc/a8/66/24d655233c757e178d45dea2de22a04c6d92766
```

```
root@irfan-GB-BXBT-2807: /home/docker/docker-compose
g. In order to specify a config file use redis-server /path/to/redis.conf
redis_1  |                 _._
redis_1  |            _.-``__ ''-._
redis_1  |       _.-``    `.  `_.  ''-._           Redis 3.2.8 (00000000/0) 64 bit
redis_1  |   .-`` .-```.  ```\/    _.,_ ''-._
redis_1  |  (    '      ,       .-`  |`,    )     Running in standalone mode
redis_1  |  |`-._`-...-` __...-.``-._|'` _.-'|     Port: 6379
redis_1  |  |    `-._   `._    /     _.-'    |     PID: 1
redis_1  |   `-._    `-._  `-./  _.-'    _.-'
redis_1  |  |`-._`-._    `-.__.-'    _.-'_.-'|
redis_1  |  |    `-._`-._        _.-'_.-'    |           http://redis.io
redis_1  |   `-._    `-._`-.__.-'_.-'    _.-'
redis_1  |  |`-._`-._    `-.__.-'    _.-'_.-'|
redis_1  |  |    `-._`-._        _.-'_.-'    |
redis_1  |   `-._    `-._`-.__.-'_.-'    _.-'
redis_1  |       `-._    `-.__.-'    _.-'
redis_1  |           `-._        _.-'
redis_1  |               `-.__.-'
redis_1  |
redis_1  | 1:M 03 May 12:51:43.447 # WARNING: The TCP backlog setting of 511 cannot be enforced
 because /proc/sys/net/core/somaxconn is set to the lower value of 128.
redis_1  | 1:M 03 May 12:51:43.447 # Server started, Redis version 3.2.8
redis_1  | 1:M 03 May 12:51:43.447 # WARNING overcommit_memory is set to 0! Background save may
 fail under low memory condition. To fix this issue add 'vm.overcommit_memory = 1' to /etc/sysc
tl.conf and then reboot or run the command 'sysctl vm.overcommit_memory=1' for this to take eff
ect.
redis_1  | 1:M 03 May 12:51:43.447 # WARNING you have Transparent Huge Pages (THP) support enab
led in your kernel. This will create latency and memory usage issues with Redis. To fix this is
sue run the command 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' as root, and add
 it to your /etc/rc.local in order to retain the setting after a reboot. Redis must be restarte
d after THP is disabled.
redis_1  | 1:M 03 May 12:51:43.447 * The server is now ready to accept connections on port 6379
web_1    |  * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
web_1    |  * Restarting with stat
web_1    |  * Debugger is active!
web_1    |  * Debugger PIN: 245-870-899
```

Now, we can see the output by following the running http url.

Output:

Each time, when we refresh the page. It shows counter incremented by 1.

Docker commands:

docker run nginx=> run the instance nginx of application.
Docker ps => print all running containers.
Docker ps -a => shows all previously and now running container.
Docker stop ContainerName. => to stop container.
Docker rm CotainerName => to remove the container.
Docker images => list of images.
Docker rmi nginx (IMAGE_NAME)=> to remove the image (first remove all containers.)

docker pull nginx(nginx is image) => to pull an image from the docker hub
docker run container sleep 5 => sleep for 5 sec.
Docker exec distract_mcclintock cat /*etc*/hosts => executes

Run – Attach and detach :

```
docker run kodekloud/simple-webapp
This is a sample web application that displays a colored background.
* Serving Flask app "app" (lazy loading)
* Running on http://0.0.0.0:8080/ (Press CTRL+C to quit)

docker run -d kodekloud/simple-webapp
a043d40f85fefa414254e4775f9336ea59e19e5cf597af5c554e0a35a1631118
```

docker attach IDNUM(a04f9)
docker attach

DEMO:

sudo docker run -it centos bash
cat /*etc/**release*
exit

```
saitR@PF-3JTN67:~$ sudo docker run -it centos bash
[root@03d1a7f831eb /]#
[root@03d1a7f831eb /]# cat /etc/*release*
CentOS Linux release 8.4.2105
Derived from Red Hat Enterprise Linux 8.4
NAME="CentOS Linux"
VERSION="8"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:centos:centos:8"
HOME_URL="https://centos.org/"
BUG_REPORT_URL="https://bugs.centos.org/"
CENTOS_MANTISBT_PROJECT="CentOS-8"
CENTOS_MANTISBT_PROJECT_VERSION="8"
CentOS Linux release 8.4.2105
CentOS Linux release 8.4.2105
cpe:/o:centos:centos:8
[root@03d1a7f831eb /]# exit
exit
```

docker sleep :

```
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
saitR@PF-3JTN67:~$ sudo docker ps -a
CONTAINER ID   IMAGE             COMMAND                  CREATED
03d1a7f831eb   centos            "bash"                   3 minutes ago
3292dd4a6c57   centos            "/bin/bash"              7 minutes ago
622abcb64e83   docker/whalesay   "cowsay Hello-World!"    15 hours ago
saitR@PF-3JTN67:~$ sudo docker run -d centos sleep 25
9a97e30731810c767d74ed1cae708a5c760ac670f4f6c0e6d5ad151fe2edea5b
saitR@PF-3JTN67:~$ docker ps
Got permission denied while trying to connect to the Docker daemon socke
nnect: permission denied
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND      CREATED          STATUS          P
9a97e3073181   centos    "sleep 25"   19 seconds ago   Up 17 seconds
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
saitR@PF-3JTN67:~$
```

```
saitR@PF-3JTN67:~$
saitR@PF-3JTN67:~$ sudo docker run -d centos sleep 2000
8b10969cfaf714b931f87a9d78b153f8849f8815c0ac284e3facb70f9c3ab774
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND        CREATED         STATUS         PORTS     NAMES
8b10969cfaf7   centos    "sleep 2000"   8 seconds ago   Up 7 seconds             festive_jennings
saitR@PF-3JTN67:~$ sudo docker stop festive_jennings
festive_jennings
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
saitR@PF-3JTN67:~$
```

remove container:

remove by container Name:

remove by container ID:

```
aitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
aitR@PF-3JTN67:~$ sudo docker ps -a
CONTAINER ID   IMAGE             COMMAND                  CREATED          STATUS                      PORTS     NAMES
8b10969cfaf7   centos            "sleep 2000"             2 minutes ago    Exited (137) 2 minutes ago            festive_jennings
9a97e3073181   centos            "sleep 25"               7 minutes ago    Exited (0) 7 minutes ago              vibrant_maxwell
93d1a7f831eb   centos            "bash"                   13 minutes ago   Exited (0) 11 minutes ago             agitated_cartwright
8292dd4a6c57   centos            "/bin/bash"              16 minutes ago   Exited (0) 16 minutes ago             stupefied_mclean
622abcb64e83   docker/whalesay   "cowsay Hello-World!"    15 hours ago     Exited (0) 15 hours ago               nostalgic_chatelet
aitR@PF-3JTN67:~$ sudo docker rm agitated_cartwright
agitated_cartwright
aitR@PF-3JTN67:~$ sudo docker ps -a
CONTAINER ID   IMAGE             COMMAND                  CREATED          STATUS                      PORTS     NAMES
8b10969cfaf7   centos            "sleep 2000"             4 minutes ago    Exited (137) 3 minutes ago            festive_jennings
9a97e3073181   centos            "sleep 25"               8 minutes ago    Exited (0) 8 minutes ago              vibrant_maxwell
8292dd4a6c57   centos            "/bin/bash"              18 minutes ago   Exited (0) 18 minutes ago             stupefied_mclean
622abcb64e83   docker/whalesay   "cowsay Hello-World!"    16 hours ago     Exited (0) 16 hours ago               nostalgic_chatelet
aitR@PF-3JTN67:~$
```

```
root@Docker:/root # docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED
S
5bd099577c30        centos              "sleep 2000"        2 minutes ago
ne_pasteur
62bbd3c98f08        centos              "sleep 20"          4 minutes ago
boyant_noyce
7731a28a43aa        busybox             "sh"                6 minutes ago
dochial_colden
e0ae1ec7e1d3        centos              "bash"              8 minutes ago
y_heyrovsky
345e385fa930        centos              "/bin/bash"         9 minutes ago
y_hodgkin
root@Docker:/root # docker rm 345 e0a 773
345
e0a
773
root@Docker:/root # docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED
S
5bd099577c30        centos              "sleep 2000"        2 minutes ago
ne_pasteur
62bbd3c98f08        centos              "sleep 20"          5 minutes ago
boyant_noyce
```

Docker Images:

```
saitR@PF-3JTN67:~$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
centos              latest    5d0da3dc9764   11 months ago    231MB
docker/whalesay     latest    6b362a9f73eb   7 years ago      247MB
saitR@PF-3JTN67:~$
```

remove docker images:

```
saitR@PF-3JTN67:~$ sudo docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
50783e0dfb64: Pull complete
Digest: sha256:ef320ff10026a50cf5f0213d35537ce0041ac1d96e9b7800bafd8bc9eff6c693
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest
saitR@PF-3JTN67:~$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
busybox             latest    7a80323521cc   2 weeks ago      1.24MB
centos              latest    5d0da3dc9764   11 months ago    231MB
docker/whalesay     latest    6b362a9f73eb   7 years ago      247MB
saitR@PF-3JTN67:~$ sudo docker rmi busybox
Untagged: busybox:latest
Untagged: busybox@sha256:ef320ff10026a50cf5f0213d35537ce0041ac1d96e9b7800bafd8bc9eff6c693
Deleted: sha256:7a80323521ccd4c2b4b423fa6e38e5cea156600f40cd855e464cc52a321a24dd
Deleted: sha256:084326605ab6715ca698453e530e4d0319d4e402b468894a06affef944b4ef04
saitR@PF-3JTN67:~$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
centos              latest    5d0da3dc9764   11 months ago    231MB
docker/whalesay     latest    6b362a9f73eb   7 years ago      247MB
saitR@PF-3JTN67:~$
```

docker Exec: exec command execute on a running container.

To

```
saitR@PF-3JTN67:~$ sudo docker run -d centos sleep 100
d09d1bab8374a73f6d43c7f06f1b609a5b20f5e6f81260912da9fbe1b2356f6e
saitR@PF-3JTN67:~$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
centos              latest    5d0da3dc9764   11 months ago    231MB
docker/whalesay     latest    6b362a9f73eb   7 years ago      247MB
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND       CREATED          STATUS          PORTS     NAMES
d09d1bab8374   centos    "sleep 100"   45 seconds ago   Up 44 seconds             loving_bhabha
saitR@PF-3JTN67:~$ sudo docker exec d09d1bab8374 cat /etc/*release*
Error response from daemon: Container d09d1bab8374a73f6d43c7f06f1b609a5b20f5e6f81260912da9fbe1b2356f6e is not running
saitR@PF-3JTN67:~$ sudo docker run -d centos sleep 100
73fc34fcd920d9637e53f133f0612ca3462d3cb73cf5fca087b26ffcda7e8770
saitR@PF-3JTN67:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND       CREATED          STATUS          PORTS     NAMES
73fc34fcd920   centos    "sleep 100"   6 seconds ago    Up 5 seconds              silly_swanson
saitR@PF-3JTN67:~$ sudo docker exec d09d1bab8374 cat /etc/*release*
Error response from daemon: Container d09d1bab8374a73f6d43c7f06f1b609a5b20f5e6f81260912da9fbe1b2356f6e is not running
saitR@PF-3JTN67:~$ sudo docker exec 73fc34fcd920  cat /etc/*release*
NAME="CentOS Linux"
VERSION="8"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:centos:centos:8"
HOME_URL="https://centos.org/"
BUG_REPORT_URL="https://bugs.centos.org/"
CENTOS_MANTISBT_PROJECT="CentOS-8"
CENTOS_MANTISBT_PROJECT_VERSION="8"
cat: /etc/lsb-release: No such file or directory
saitR@PF-3JTN67:~$
```

delete all containers and images:

```
docker rmi <IMAGE:TAG>
```

Stop and delete all the containers being used by images.
Then run the command to delete all the available images: docker rmi $(docker images -aq)

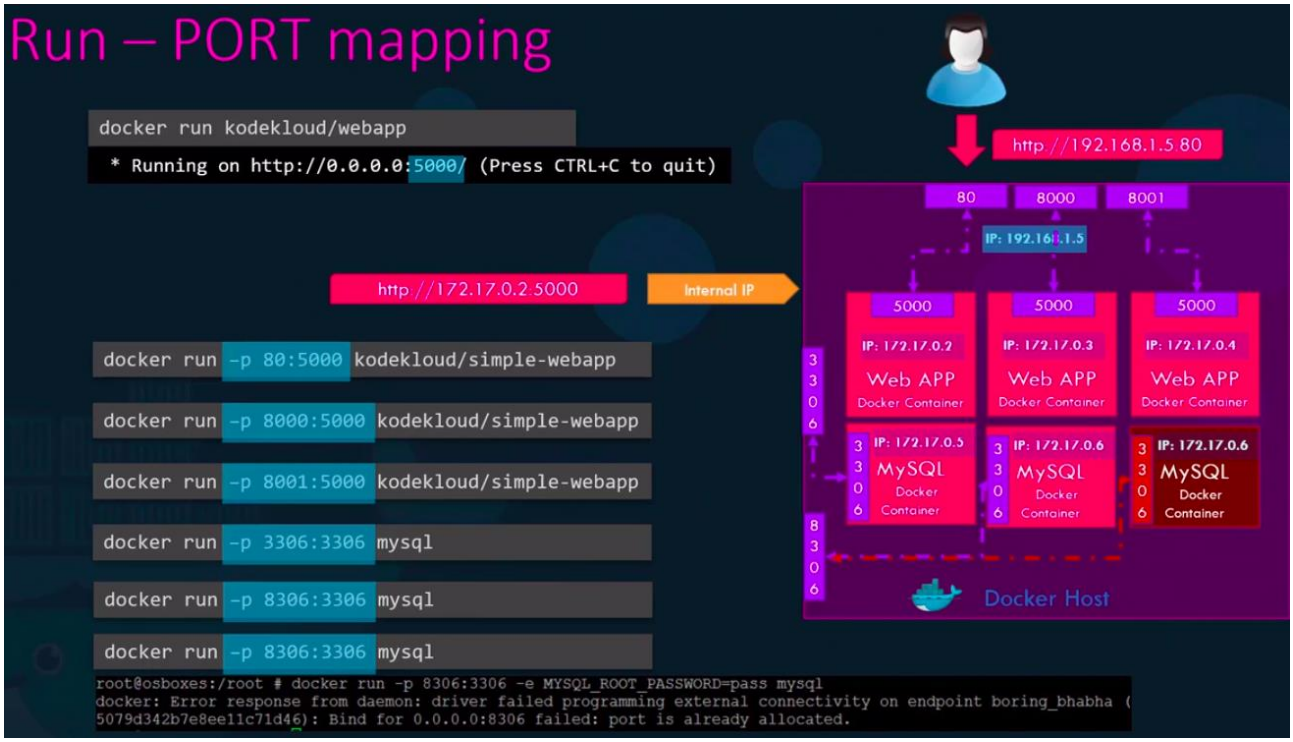
run tag:
docker run redis => pulls the latest version of the redis.

Docker run redis:4.0.4 => pulls the version mentioned

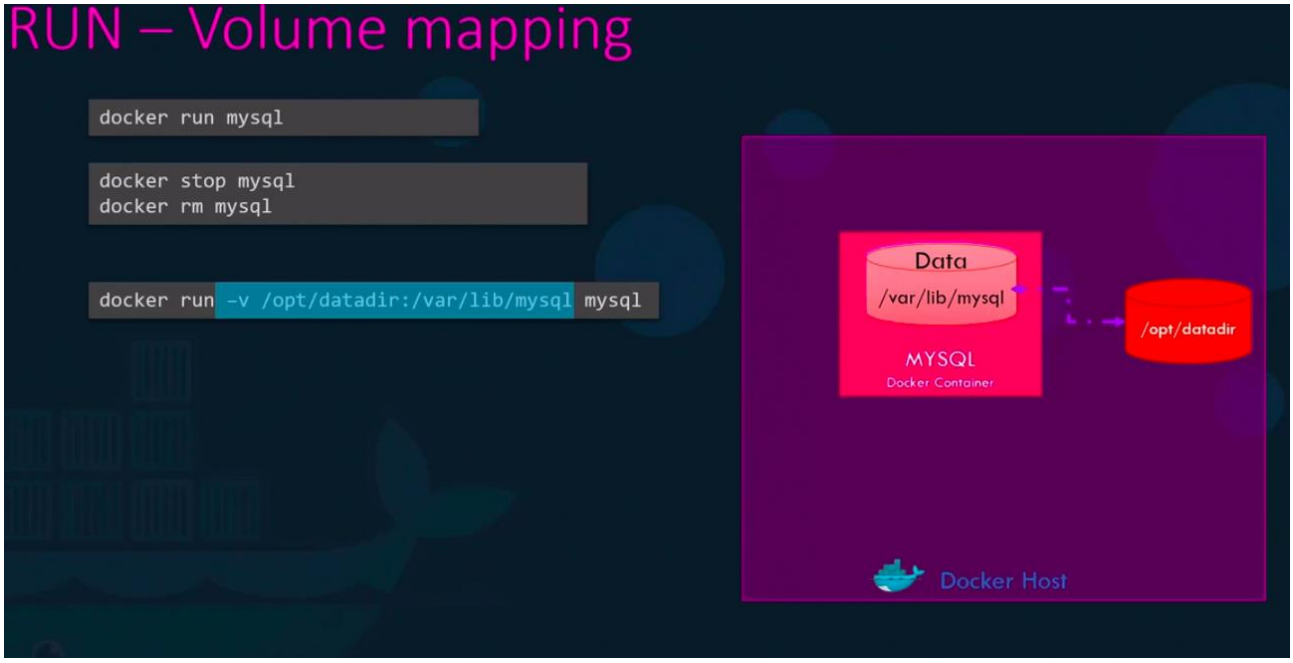
```
saitR@PF-3JTN67:~$ sudo docker run centos cat /etc/*release*
cat: /etc/lsb-release: No such file or directory
NAME="CentOS Linux"
VERSION="8"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:centos:centos:8"
HOME_URL="https://centos.org/"
BUG_REPORT_URL="https://bugs.centos.org/"
CENTOS_MANTISBT_PROJECT="CentOS-8"
CENTOS_MANTISBT_PROJECT_VERSION="8"
saitR@PF-3JTN67:~$ sudo docker run centos:7 cat /etc/*release*
Unable to find image 'centos:7' locally
7: Pulling from library/centos
2d473b07cdd5: Pull complete
Digest: sha256:c73f515d06b0fa07bb18d8202035e739a494ce760aa73129
Status: Downloaded newer image for centos:7
cat: /etc/lsb-release: No such file or directory
NAME="CentOS Linux"
VERSION="7 (Core)"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="7"
PRETTY_NAME="CentOS Linux 7 (Core)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:centos:centos:7"
HOME_URL="https://www.centos.org/"
BUG_REPORT_URL="https://bugs.centos.org/"

CENTOS_MANTISBT_PROJECT="CentOS-7"
CENTOS_MANTISBT_PROJECT_VERSION="7"
REDHAT_SUPPORT_PRODUCT="centos"
REDHAT_SUPPORT_PRODUCT_VERSION="7"
```

Run – STDIN:

Run -PORT mapping:



Run Volume Mapping:



Inspect Container:

docker inspect Container_Name:

Container Logs:

docker logs container_name

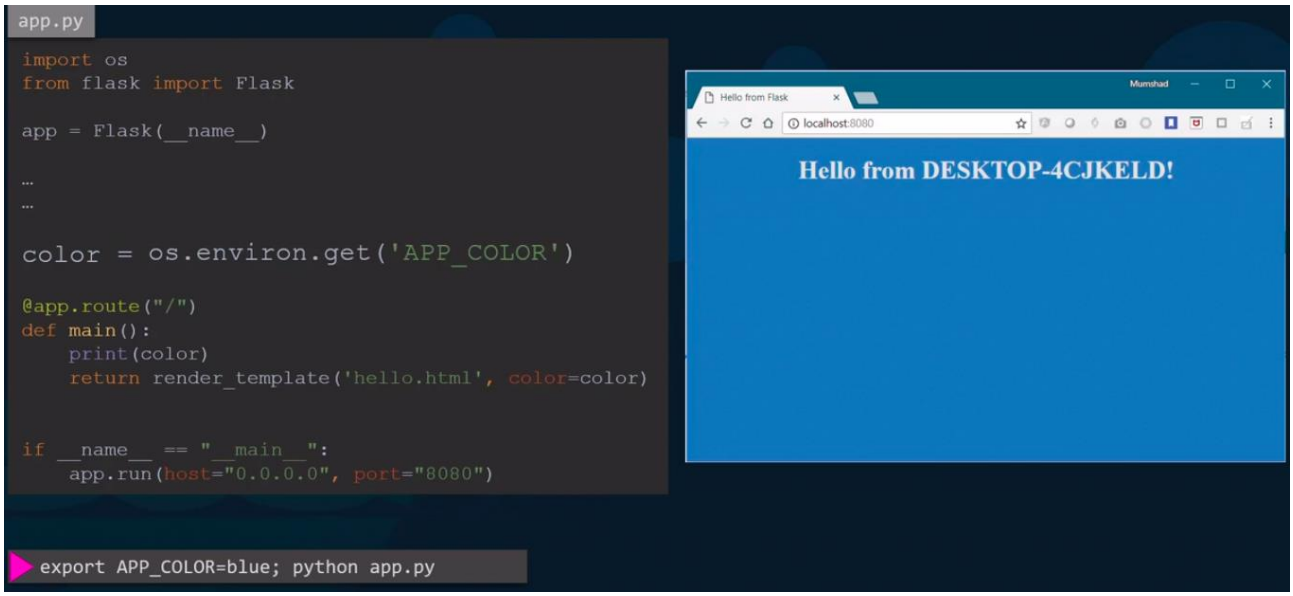
Docker Images:
$ docker build -t webapp-color => create a docker image.
commands:

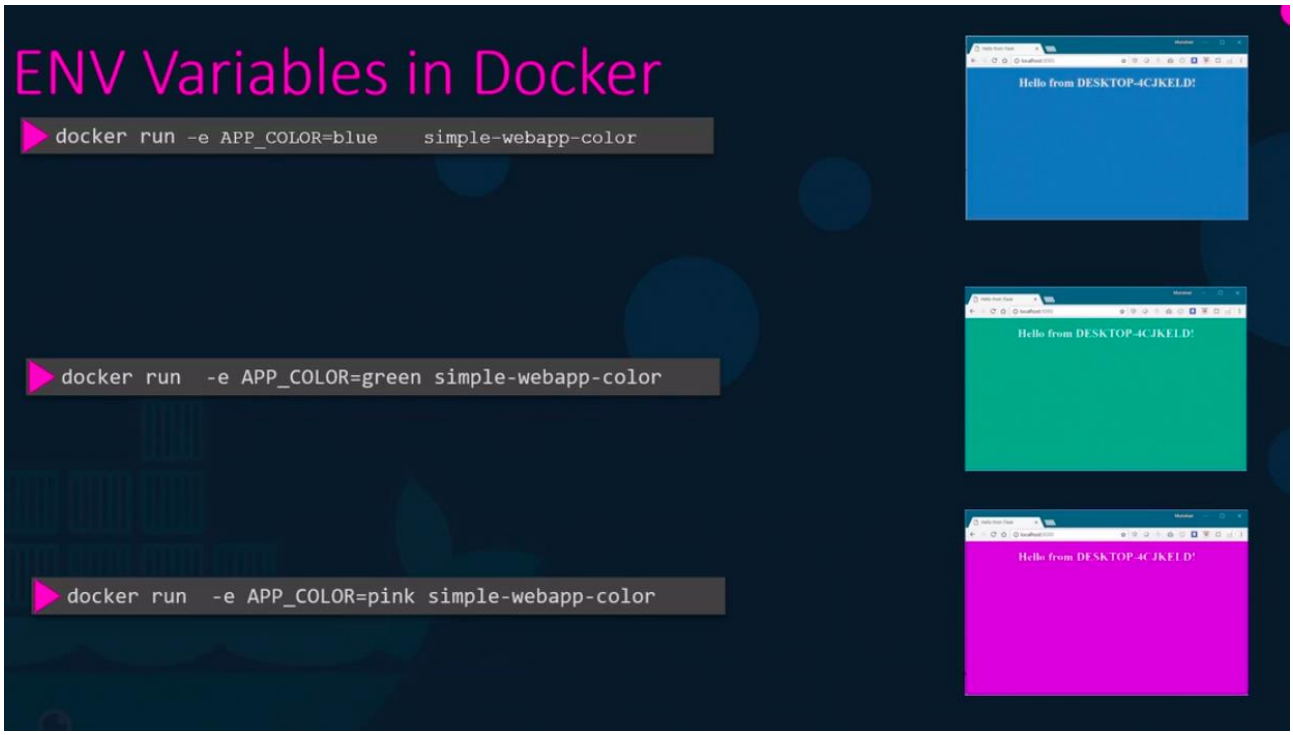
apt-get update
apt-get install -y python3
apt-get install python3-pip
pip install flask
create a copy application code to */opt/app.py*
FLASK_APP=/opt/app.py flask run --host=0.0.0.0

```
^Croot@aac078673cf8:/opt# history
    1  apt-get install -y python
    2  apt-get update
    3  apt-get install -y python
    4  apt-get install -y python2
    5  python
    6  apt-get install -y python2
    7  python
    8  apt-get install -y python2
    9  python
   10  python -version
   11  python
   12  apt-get install -y python3
   13  python
   14  apt-get install -y python3
   15  python
   16  python3
   17  python2
   18  pip install flask
   19  apt-get install python-pip
   20*
   21  apt-get install python-pip
   22  pip install flask
   23  apt-get install python2-pip
   24  pip install flask
   25  apt-get install python3-pip
   26  pip install flask
   27  cat > /opt/app.py
   28  cd opt
   29  FLASK_APP=app.py flask run --host=0.0.0.0
   30  history
```

Environment variables:

in the dockerfile we can set the env variables,
color =os.environ.get('App-COLOR');





Inspect Environment Variable

```
docker inspect blissful_hopper
```


```
[
    {
        "Id": "35505f7810d17291261a43391d4b6c0846594d415ce4f4d0a6ffbf9cc5109048",
        "State": {
            "Status": "running",
            "Running": true,
        },

        "Mounts": [],
        "Config": {
            "Env": [
                "APP_COLOR=blue",
                "LANG=C.UTF-8",
                "GPG_KEY=0D96DF4D4110E5C43FBFB17F2D347EA6AA65421D",
                "PYTHON_VERSION=3.6.6",
                "PYTHON_PIP_VERSION=18.1"
            ],
            "Entrypoint": [
                "python",
                "app.py"
            ],
      }
```


```
FROM Ubuntu

CMD sleep 5
```

```
CMD command param1          CMD sleep 5
CMD ["command", "param1"]   CMD ["sleep", "5"]
```

docker run ubuntu sleep 10

FROM Ubuntu

ENTRYPOINT [“sleep”]

CMD[“5”]

docker run ubuntu-container 15

docker run –entrypoint sleep2.0 ubuntu-container 10

Docker compose :

Compose is a tool for defining and running multi-container Docker applications. With Compose, you use a YAML file to configure your application’s services. Then, with a single command, you create and start all the services from your configuration.

Docker compose

```
docker run mmumshad/simple-webapp
docker run mongodb
docker run redis:alpine
docker run ansible
```

docker-compose.yml

```
services:
     web:
        image: “mmumshad/simple-webapp"
     database:
        image: “mongodb“
     messaging:
        image: "redis:alpine“
     orchestration:
        image:  “ansible“
```

```
docker-compose up
```

docker-compose up => to bring up the application stack.

```
docker run -d --name=redis redis

docker run -d --name=db postgres

docker run -d --name=vote -p 5000:80  voting-app

docker run -d --name=result -p 5001:80  result-app

docker run -d --name=worker  worker
```

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