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Batch & Course: Btech CSE(DevOps:2021-25) & B4

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Lab Exercise 1

Performing CRUD Operation on Containers

Objective: Performing CRUD Operation on Containers

Tools required: Docker Configuration

Pre-requisites: Ubuntu Configuration, Docker

Steps to be followed:

1. Pulling a Docker image
2. Creating a new container
3. Stopping the container
4. Listing all the containers
5. Deleting the container
6. Removing the image

Step 1: Pulling a Docker image

1.1 Open the terminal and pull an image using the command:

sudo docker pull nginx

```
Shweta@DESKTOP-5FQK6TA MINGW64 ~ (master)
$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
52d2b7f179e3: Pulling fs layer
fd9f026c6310: Pulling fs layer
055fa98b4363: Pulling fs layer
96576293dd29: Pulling fs layer
a7c4092be904: Pulling fs layer
96576293dd29: Waiting
e3b6889c8954: Pulling fs layer
a7c4092be904: Waiting
da761d9a302b: Pulling fs layer
e3b6889c8954: Waiting
da761d9a302b: Waiting
055fa98b4363: Downloading
055fa98b4363: Retrying in 5 seconds
055fa98b4363: Retrying in 4 seconds
055fa98b4363: Retrying in 3 seconds
055fa98b4363: Retrying in 2 seconds
055fa98b4363: Retrying in 1 second
055fa98b4363: Verifying Checksum
055fa98b4363: Download complete
96576293dd29: Verifying Checksum
96576293dd29: Download complete
a7c4092be904: Verifying Checksum
a7c4092be904: Download complete
e3b6889c8954: Verifying Checksum
e3b6889c8954: Download complete
da761d9a302b: Download complete
52d2b7f179e3: Download complete
52d2b7f179e3: Pull complete
fd9f026c6310: Download complete
fd9f026c6310: Pull complete
055fa98b4363: Pull complete
96576293dd29: Pull complete
a7c4092be904: Pull complete
e3b6889c8954: Pull complete
da761d9a302b: Pull complete
Digest: sha256:104c7c5c54f2685f0f46f3be607ce60da7085da3eaa5ad22d3d9f01594295e9c
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
```

1.2 List all the docker images to check the newly pulled *nginx* image:

sudo docker images

```
Shweta@DESKTOP-5FQK6TA MINGW64 ~ (master)
$ docker images
REPOSITORY          TAG          IMAGE ID       CREATED        SIZE
nginx               latest      eea7b3dcba7e  8 days ago    187MB
frontend           v3.0       9510d6246290  6 weeks ago   175MB
shwetasng/frontend v3.0       9510d6246290  6 weeks ago   175MB
frontend           v2.0       858070b63708  6 weeks ago   175MB
shwetasng/frontend v2.0       858070b63708  6 weeks ago   175MB
polybot            v2.0       e1d20b539002  6 weeks ago   195MB
shwetasng/polybot  v2.0       e1d20b539002  6 weeks ago   195MB
polybot            0.0.1      00f3f93d3aee  6 weeks ago   195MB
shwetasng/polybot  v1.0       00f3f93d3aee  6 weeks ago   195MB
fronetend          latest     5d3a645cdafd  7 weeks ago   169MB
shwetasng/frontend v1.0       5d3a645cdafd  7 weeks ago   169MB
yolo5              0.0.1      fb97da63c4cb  7 weeks ago   2.5GB
yolo5              0.0.2      fb97da63c4cb  7 weeks ago   2.5GB
shwetasng/yolo5    v1.0       fb97da63c4cb  7 weeks ago   2.5GB
mongo              latest     1f3d6ec739d8  7 weeks ago   654MB
nginx              <none>     eb4a57159180  2 months ago  187MB
ambassador/telepresence-docker-extension 1.0.8      bb2143440bbd  3 months ago  528MB
ambassador/telepresence-docker-runtime    1.0.8      a1a178ca4417  3 months ago  21.3MB
ubuntu          latest     1f6ddc1b2547  3 months ago  77.8MB
hello-world     latest     9c7a54a9a43c  3 months ago  13.3kB
docker/welcome-to-docker latest     b1eb53af308a  4 months ago  13.6MB
shwetasng/welcome-to-docker latest     b1eb53af308a  4 months ago  13.6MB
```

```
Shweta@DESKTOP-5FQK6TA MINGW64 ~ (master)
$ docker image ls
REPOSITORY          TAG          IMAGE ID       CREATED        SIZE
nginx               latest      eea7b3dcba7e  8 days ago    187MB
frontend           v3.0       9510d6246290  6 weeks ago   175MB
shwetasng/Fontend  v3.0       9510d6246290  6 weeks ago   175MB
frontend           v2.0       858070b63708  6 weeks ago   175MB
shwetasng/Fontend v2.0       858070b63708  6 weeks ago   175MB
shwetasng/polybot  v2.0       e1d20b539002  6 weeks ago   195MB
polybot            v2.0       e1d20b539002  6 weeks ago   195MB
polybot            0.0.1      00f3f93d3aee  6 weeks ago   195MB
shwetasng/polybot  v1.0       00f3f93d3aee  6 weeks ago   195MB
shwetasng/Fontend v1.0       5d3a645cdafd  7 weeks ago   169MB
fronetend          latest     5d3a645cdafd  7 weeks ago   169MB
yolo5              0.0.1      fb97da63c4cb  7 weeks ago   2.5GB
yolo5              0.0.2      fb97da63c4cb  7 weeks ago   2.5GB
shwetasng/yolo5    v1.0       fb97da63c4cb  7 weeks ago   2.5GB
mongo              latest     1f3d6ec739d8  7 weeks ago   654MB
nginx              <none>     eb4a57159180  2 months ago  187MB
ambassador/telepresence-docker-extension 1.0.8      bb2143440bbd  3 months ago  528MB
ambassador/telepresence-docker-runtime    1.0.8      a1a178ca4417  3 months ago  21.3MB
ubuntu          latest     1f6ddc1b2547  3 months ago  77.8MB
hello-world     latest     9c7a54a9a43c  3 months ago  13.3kB
docker/welcome-to-docker latest     b1eb53af308a  4 months ago  13.6MB
shwetasng/welcome-to-docker latest     b1eb53af308a  4 months ago  13.6MB
```

Step 2: Creating a new container

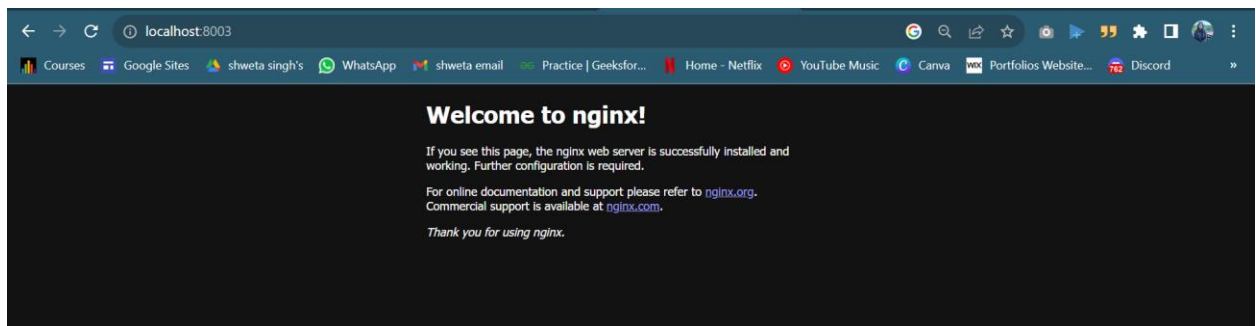
2.1 Create a new container from the *nginx* image:

sudo docker run -dt -p 81:81 nginx

```
C:\Users\shwet>docker run -dt -p 8008:80 nginx
8884abb9f48995812ce2491b9146cd7e5bf34c05935cd7b226d049e53236f819
```



```
C:\Users\shwet>docker run -p 8003:80 nginx
/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: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/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
2023/08/25 07:47:14 [notice] 1#1: using the "epoll" event method
2023/08/25 07:47:14 [notice] 1#1: nginx/1.25.2
2023/08/25 07:47:14 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/08/25 07:47:14 [notice] 1#1: OS: Linux 5.10.16.3-microsoft-standard-WSL2
```



2.2 List all the running containers to check the newly created container. You can find various details like port of container, it's time of creation and ID.

sudo docker ps

```
C:\Users\shwet>docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS                NAMES
8884abb9f489   nginx    "/docker-entrypoint..." About a minute ago Up About a minute 0.0.0.0:8008->80/tcp  condescending_engelbart
376b37e7eea2   nginx    "/docker-entrypoint..." 9 minutes ago  Up 9 minutes  0.0.0.0:8001->80/tcp  admiring_franklin
```

Step 3: Stopping the container

3.1 Use the following command to stop the running container. (You can also use the container ID to stop the container: *sudo docker stop CONTAINER_ID*)

sudo docker stop CONTAINER_NAME

Note: Replace CONTAINER_NAME with the name of the newly created container. In this case CONTAINER_NAME is stoic_darwin. The container name may differ from the one shown in the image below.

```
C:\Users\shwet>docker stop admiring_franklin
admiring_franklin
```

3.2 Use the following command to list all the running containers and verify if the container has stopped running:

sudo docker ps

```
C:\Users\shwet>docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS                NAMES
8884abb9f489   nginx    "/docker-entrypoint..." 3 minutes ago  Up 3 minutes  0.0.0.0:8008->80/tcp  condescending_engelbart
```

3.3 You can start the container again and check the running containers. (You can also use the container ID to start the container: `sudo docker start CONTAINER_ID`)

`sudo docker start CONTAINER_NAME`

`sudo docker ps`

Note: Replace CONTAINER_NAME with the name of the newly created container. In this case CONTAINER_NAME is stoic_darwin. The container name may differ from the one shown in the image below.

```
C:\Users\shwet>docker start admiring_franklin
admiring_franklin

C:\Users\shwet>docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS                    NAMES
8884abb9f489   nginx    "/docker-entrypoint..." 4 minutes ago  Up 4 minutes  0.0.0.0:8008->80/tcp      condescending_engelbart
376b37e7eea2   nginx    "/docker-entrypoint..." 12 minutes ago  Up 20 seconds  0.0.0.0:8001->80/tcp      admiring_franklin
```

3.4 To start the container in interactive mode, use the `-i` and `-t` options.

`sudo docker run -it --name=Test_1 ubuntu`

```
C:\Users\shwet>docker run -it --name=Test_1 ubuntu
root@5a623ad4715b:/#
```

Step 4: Listing all the containers

4.1 Use the below command to list all the containers started and the ones which are stopped:

`sudo docker ps -a`

```
C:\Users\shwet>docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS                    NAMES
5a623ad4715b   ubuntu    "/bin/bash"             41 seconds ago  Exited (0) 5 seconds ago
Test_1
8884abb9f489   nginx    "/docker-entrypoint..." 6 minutes ago  Up 6 minutes  0.0.0.0:8008->80/tcp      condescending_engelbart
2ceb38c8218   nginx    "/docker-entrypoint..." 11 minutes ago  Exited (0) 7 minutes ago
bold_knuth
66be7a988996   nginx    "/docker-entrypoint..." 11 minutes ago  Created
amazing_elgamal
376b37e7eea2   nginx    "/docker-entrypoint..." 14 minutes ago  Up 2 minutes  0.0.0.0:8001->80/tcp      admiring_franklin
180f29a89772   nginx    "/docker-entrypoint..." 21 minutes ago  Exited (0) 16 minutes ago
exciting_noyce
dd0deb6f25c2   nginx    "/docker-entrypoint..." 26 minutes ago  Exited (130) 24 minutes ago
pensive_bell
14df55c0dc1b   nginx    "/docker-entrypoint..." 26 minutes ago  Exited (127) 26 minutes ago
intelligent_lalande
ccae727bd065   nginx    "/docker-entrypoint..." 35 minutes ago  Exited (0) 34 minutes ago
cranky_ardinghelli
442aa8df430b   shwetasing/polybot:v2.0 6 weeks ago  Exited (137) 6 weeks ago
telegram-bot
```

4.2 To list the containers by their ID, use the below command

sudo docker ps -aq

```
C:\Users\shwet>docker ps -aq
5a623ad4715b
8884abb9f489
2cecb38c8218
66be7a988996
376b37e7eea2
180f29a89772
dd0deb6f25c2
14df55c0dc1b
ccae727bd065
442aa8df430b
1bec890faf72
0783b7d0aaf3
dc33033241c3
c6864be4318a
e7d293c5661e
e1e00762ac78
a2e4d9930742
eb0a1cb9132b
fa3be4ebe8e0
1e5b957ea066
71e64e0296d3
ea61596c7571
3db5a0d50780
58aadb512ce3
319fdb32257a
a7739592aeaa
66efb5ad8766
21b301669d60
c9adb5ab5c1a
```

You can see the containers with ID are listed.

4.3 To list the total file size of each container, use the below command:

sudo docker ps -s

```
C:\Users\shwet>docker ps -s
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES                SI
ZE
8884abb9f489   nginx     "/docker-entrypoint..." 9 minutes ago  Up 9 minutes  0.0.0.0:8008->80/tcp     condensing_engelbart 1.
09kB (virtual 187MB)
376b37e7eea2   nginx     "/docker-entrypoint..." 17 minutes ago Up 5 minutes  0.0.0.0:8001->80/tcp     admiring_franklin    1.
09kB (virtual 187MB)
```

4.4 To list the latest created containers, use the following command:

sudo docker ps -l

```
C:\Users\shwet>docker ps -l
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
5a623ad4715b   ubuntu    "/bin/bash"             4 minutes ago   Exited (0)    3 minutes ago   Test_1
```

Step 5: Deleting the container

5.1 Stop the running container and remove it using the following commands:

sudo docker stop CONTAINER_NAME

sudo docker container rm CONTAINER_NAME

```
C:\Users\shwet>docker stop admiring_franklin
admiring_franklin

C:\Users\shwet>docker container rm admiring_franklin
admiring_franklin
```

Note: Replace CONTAINER_NAME with the name of the newly created container. In this case CONTAINER_NAME is sweet_brown. The container name may differ from the one shown in the image below.

Step 6: Removing the image

6.1 Remove the image using the command:

sudo docker image rm nginx

```
C:\Users\shwet>docker image rm -f nginx
Untagged: nginx:latest
Untagged: nginx@sha256:104c7c5c54f2685f0f46f3be607ce60da7085da3eaa5ad22d3d9f01594295e9c
```