

VIRTUALIZATION AND CONTAINERS ASSIGNMENT

Submitted By:

Dona M Thomas

S2 MCA, Rollno:49

Submitted Date:

23/05/2022

DOCKER CERTIFICATE



Declaration of Completion

DONA M THOMAS

has successfully completed the online course:

Getting Started with Docker

This professional has demonstrated initiative and a commitment to deepening their skills and advancing their career. Well done!

18th Apr 2022

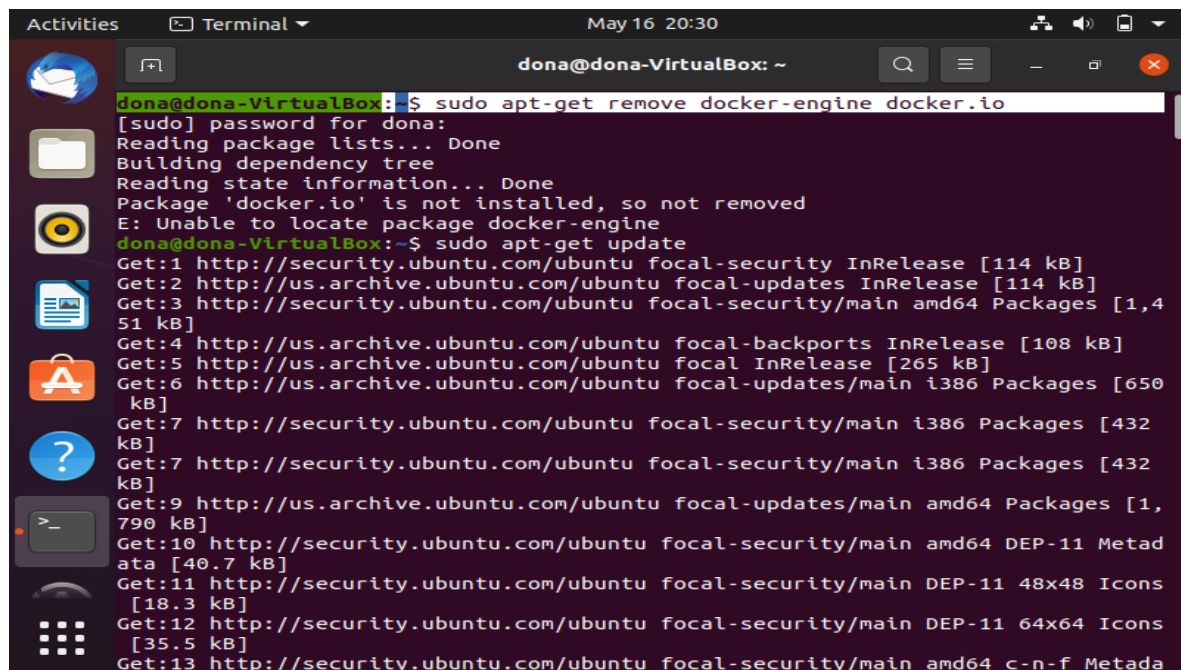
Certificate code : 3396058

A handwritten signature in black ink, appearing to read "KR", positioned above the printed name and title.

Krishna Kumar
CEO

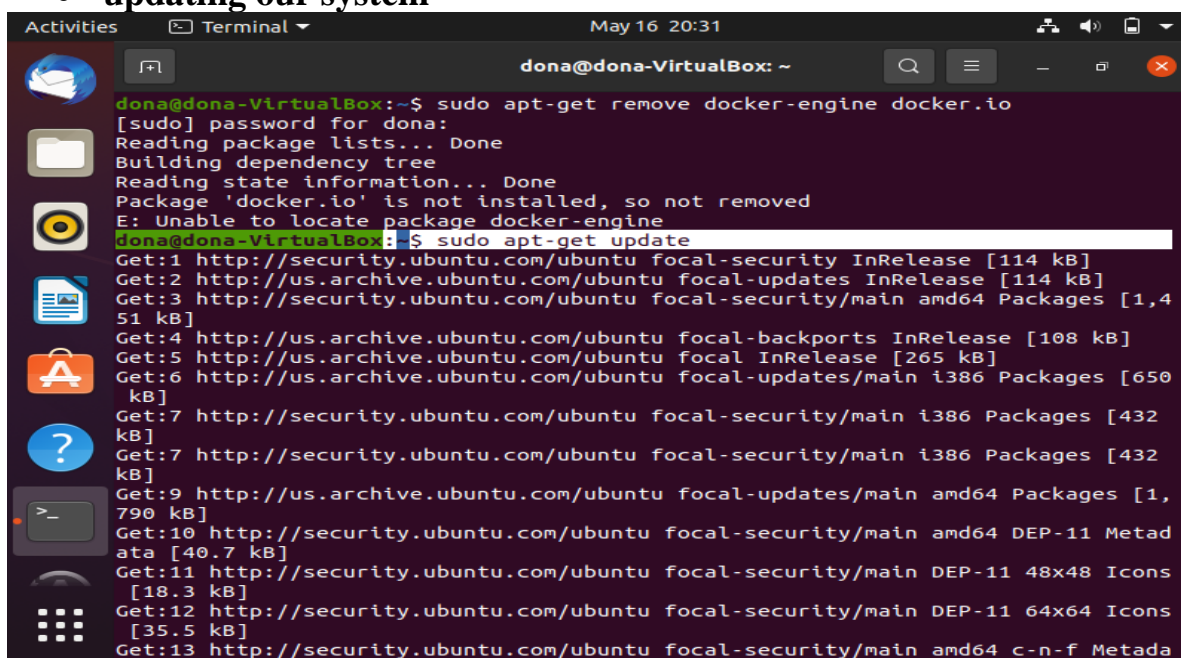
Docker Installation and Container

- Already you have docker. Use this command if you want to remove.



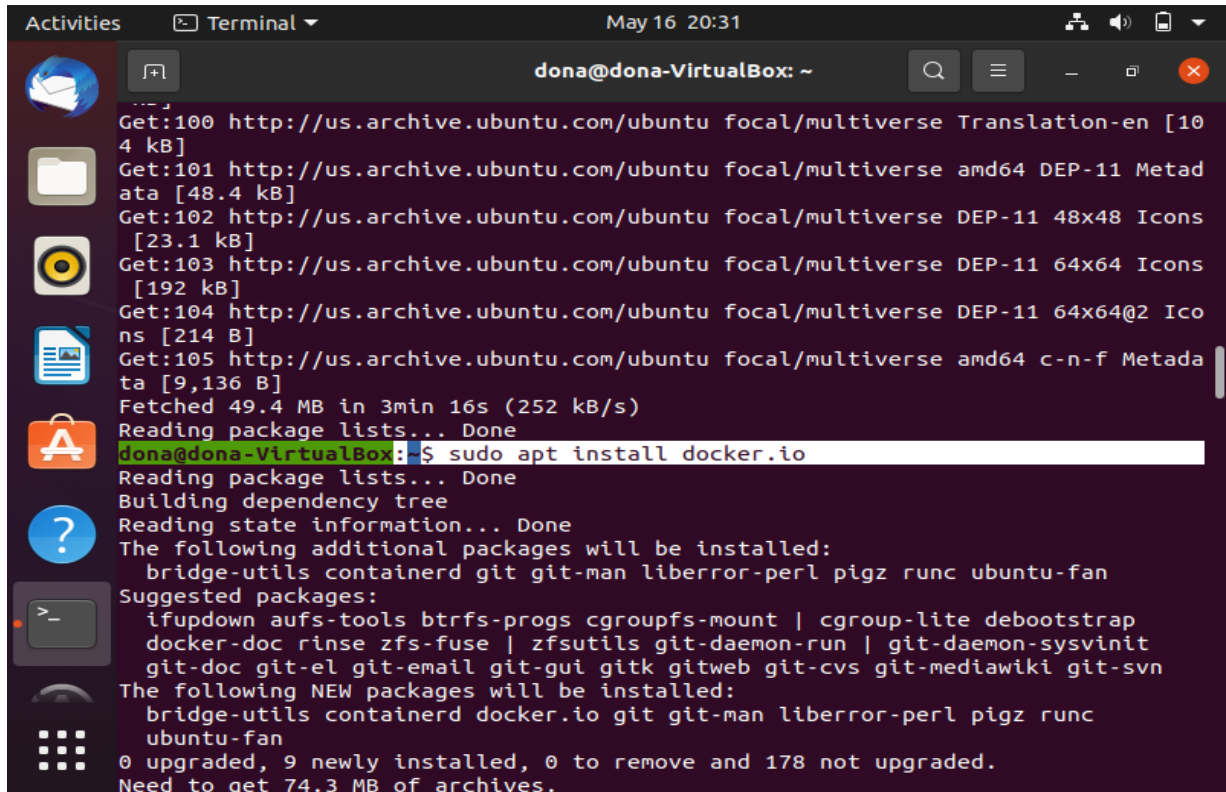
```
dona@dona-VirtualBox: ~$ sudo apt-get remove docker-engine docker.io
[sudo] password for dona:
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'docker.io' is not installed, so not removed
E: Unable to locate package docker-engine
dona@dona-VirtualBox:~$ sudo apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1,451 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [650 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [432 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [432 kB]
Get:9 http://us.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,790 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metad ata [40.7 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/main DEP-11 48x48 Icons [18.3 kB]
Get:12 http://security.ubuntu.com/ubuntu focal-security/main DEP-11 64x64 Icons [35.5 kB]
Get:13 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metada
```

- updating our system



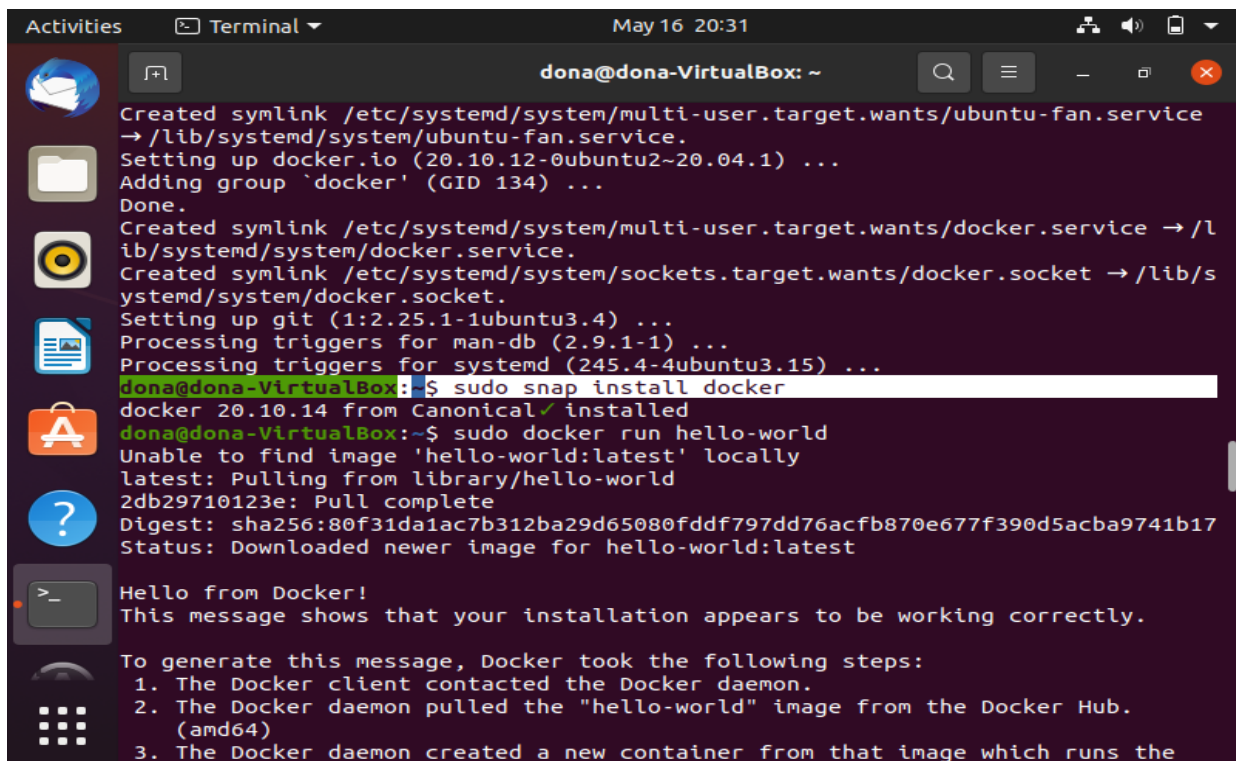
```
dona@dona-VirtualBox:~$ sudo apt-get remove docker-engine docker.io
[sudo] password for dona:
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'docker.io' is not installed, so not removed
E: Unable to locate package docker-engine
dona@dona-VirtualBox:~$ sudo apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1,451 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [650 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [432 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [432 kB]
Get:9 http://us.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,790 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metad ata [40.7 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/main DEP-11 48x48 Icons [18.3 kB]
Get:12 http://security.ubuntu.com/ubuntu focal-security/main DEP-11 64x64 Icons [35.5 kB]
Get:13 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metada
```

- installing docker

A terminal window titled 'dona@dona-VirtualBox: ~' showing the installation of docker.io. The terminal output includes the fetching of various Ubuntu packages, the command 'sudo apt install docker.io', and the resulting package list. The output shows that several additional packages will be installed along with docker.io, including bridge-utils, containerd, git, and others. The total size of the packages to be installed is 74.3 MB.

```
Get:100 http://us.archive.ubuntu.com/ubuntu focal/multiverse Translation-en [10
4 kB]
Get:101 http://us.archive.ubuntu.com/ubuntu focal/multiverse amd64 DEP-11 Metad
ata [48.4 kB]
Get:102 http://us.archive.ubuntu.com/ubuntu focal/multiverse DEP-11 48x48 Icons
[23.1 kB]
Get:103 http://us.archive.ubuntu.com/ubuntu focal/multiverse DEP-11 64x64 Icons
[192 kB]
Get:104 http://us.archive.ubuntu.com/ubuntu focal/multiverse DEP-11 64x64@2 Ico
ns [214 B]
Get:105 http://us.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metada
ta [9,136 B]
Fetched 49.4 MB in 3min 16s (252 kB/s)
Reading package lists... Done
dona@dona-VirtualBox:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd git git-man liberror-perl pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools btrfs-progs cgroupfs-mount | cgroup-lite debootstrap
  docker-doc rinse zfs-fuse | zfsutils git-daemon-run | git-daemon-sysvinit
  git-doc git-el git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following NEW packages will be installed:
  bridge-utils containerd docker.io git git-man liberror-perl pigz runc
  ubuntu-fan
0 upgraded, 9 newly installed, 0 to remove and 178 not upgraded.
Need to get 74.3 MB of archives.
```

- installing docker dependency packages

A terminal window titled 'dona@dona-VirtualBox: ~' showing the installation of docker and running a hello-world container. The terminal output includes the creation of symlinks, the installation of docker, and the execution of 'sudo docker run hello-world'. The output shows that the docker client contacted the Docker daemon, which pulled the 'hello-world' image from the Docker Hub and created a new container from that image.

```
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service
→ /lib/systemd/system/ubuntu-fan.service.
Setting up docker.io (20.10.12-0ubuntu2~20.04.1) ...
Adding group `docker' (GID 134) ...
Done.
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /l
ib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/s
ystemd/system/docker.socket.
Setting up git (1:2.25.1-1ubuntu3.4) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3.15) ...
dona@dona-VirtualBox:~$ sudo snap install docker
docker 20.10.14 from Canonical✓ installed
dona@dona-VirtualBox:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1ac7b312ba29d65080fddf797dd76acfb870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
```

- pulling hello-world from docker hub

```

Activities  Terminal  May 16 20:32
dona@dona-VirtualBox: ~
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service
→ /lib/systemd/system/ubuntu-fan.service.
Setting up docker.io (20.10.12-0ubuntu2~20.04.1) ...
Adding group 'docker' (GID 134) ...
Done.
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /l
ib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/s
ystemd/system/docker.socket.
Setting up git (1:2.25.1-1ubuntu3.4) ...
Processing triggers for man-db (2.9.1-1) ...
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Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1ac7b312ba29d65080fddf797dd76acfb870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the

```

- displaying the images

```

Activities  Terminal  May 16 20:32
dona@dona-VirtualBox: ~
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

dona@dona-VirtualBox:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
dona@dona-VirtualBox:~$ sudo docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
13a5cd0ee5ba   hello-world  "/hello"   42 seconds ago   Exited (0) 40 seconds ago   hardcore_newton
dona@dona-VirtualBox:~$ sudo docker images
REPOSITORY    TAG       IMAGE ID   CREATED   SIZE
hello-world   latest   feb5d9fea6a5  7 months ago  13.3kB
dona@dona-VirtualBox:~$ sudo docker pull mysql
Using default tag: latest
latest: Pulling from library/mysql

```

```
Activities Terminal May 16 20:32 dona@dona-VirtualBox: ~  
dona@dona-VirtualBox:~$ sudo docker ps  
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES  
dona@dona-VirtualBox:~$ sudo docker ps -a  
CONTAINER ID IMAGE COMMAND CREATED STATUS  
PORTS NAMES  
13a5cd0ee5ba hello-world "/hello" 42 seconds ago Exited (0) 40 seconds ago  
hardcore newton  
dona@dona-VirtualBox:~$ sudo docker images  
REPOSITORY TAG IMAGE ID CREATED SIZE  
hello-world latest feb5d9fea6a5 7 months ago 13.3kB  
dona@dona-VirtualBox:~$ sudo docker pull mysql  
Using default tag: latest  
latest: Pulling from library/mysql  
c32ce6654453: Pull complete  
415d08ee031a: Pull complete  
7a38fec2542f: Pull complete  
352881ee8fe9: Pull complete  
b8e20da291b6: Pull complete  
66c2a8cc1999: Pull complete  
d3a3a8e49878: Pull complete  
e33a48832bec: Pull complete  
410b942b8b28: Pull complete  
d5323c9dd265: Pull complete  
3212737f31c0: Pull complete  
d0032d4b0dc5: Pull complete  
Digest: sha256:a0805d37d4d298bd61e0dfa61f0ddf6f4680b453fa25d7aad420485a62417eab  
Status: Downloaded newer image for mysql:latest  
docker.io/library/mysql:latest  
dona@dona-VirtualBox:~$ sudo docker run --name mysql -e MYSQL_ROOT_PASSWORD=12345678 -d mysql
```


Deployment of MYSQL

- pulling mysql and showing the mysql image

```
Activities Terminal May 16 20:34
dona@dona-VirtualBox: ~
save Save one or more images to a tar archive (streamed to STDOUT by d
efault)
tag Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
Run 'docker image COMMAND --help' for more information on a command.

dona@dona-VirtualBox:~$ sudo docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
PORTS             NAMES
13a5cd0ee5ba        hello-world         "/hello"            5 minutes ago       Exited (0) 5 minutes ag
o
hardcore newton

dona@dona-VirtualBox:~$ sudo docker pull mysql/mysql-server:latest
latest: Pulling from mysql/mysql-server
1866ca302f77: Pull complete
7208ad90232c: Pull complete
b2d9c817f662: Pull complete
3292176f57b6: Pull complete
d77130a2f17e: Pull complete
47bc31a509ca: Pull complete
fade2a0af17d: Pull complete
Digest: sha256:1a8d2a5584e53a42a43cbd430ae340a36942afee9e14a86624a2cb2d90ce655b
Status: Downloaded newer image for mysql/mysql-server:latest
docker.io/mysql/mysql-server:latest
dona@dona-VirtualBox:~$ sudo docker images
REPOSITORY          TAG             IMAGE ID          CREATED           SIZE
mysql                latest          76152be68449     5 days ago       524MB
mysql/mysql-server   latest          5a9594052aec     2 weeks ago      438MB
hello-world          latest          feb5d9fea6a5     7 months ago     13.3kB
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql/mysql-serv
```

```
Activities Terminal May 16 20:34
dona@dona-VirtualBox: ~
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
PORTS             NAMES
13a5cd0ee5ba        hello-world         "/hello"            5 minutes ago       Exited (0) 5 minutes ag
o
hardcore newton

dona@dona-VirtualBox:~$ sudo docker pull mysql/mysql-server:latest
latest: Pulling from mysql/mysql-server
1866ca302f77: Pull complete
7208ad90232c: Pull complete
b2d9c817f662: Pull complete
3292176f57b6: Pull complete
d77130a2f17e: Pull complete
47bc31a509ca: Pull complete
fade2a0af17d: Pull complete
Digest: sha256:1a8d2a5584e53a42a43cbd430ae340a36942afee9e14a86624a2cb2d90ce655b
Status: Downloaded newer image for mysql/mysql-server:latest
docker.io/mysql/mysql-server:latest
dona@dona-VirtualBox:~$ sudo docker images
REPOSITORY          TAG             IMAGE ID          CREATED           SIZE
mysql                latest          76152be68449     5 days ago       524MB
mysql/mysql-server   latest          5a9594052aec     2 weeks ago      438MB
hello-world          latest          feb5d9fea6a5     7 months ago     13.3kB
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql/mysql-serv
er:latest
"docker run" requires at least 1 argument.
See 'docker run --help'.

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

Run a command in a new container
```

- running the mysql and linking the port address: `sudo docker -p 3306:3306 -d --name=mysql mysql/mysql-server:latest`
- checking whether it is in running state by `:sudo docker ps`
- then type `sudo docker logs mysql`

```

Activities  Terminal  May 16 20:34
dona@dona-VirtualBox: ~

47bc31a509ca: Pull complete
fade2a0af17d: Pull complete
Digest: sha256:1a8d2a5584e53a42a43cbd430ae340a36942afee9e14a86624a2cb2d90ce655b
Status: Downloaded newer image for mysql/mysql-server:latest
dona@dona-VirtualBox:~$ sudo docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
mysql                latest             76152be68449       5 days ago         524MB
mysql/mysql-server   latest             5a9594052aec       2 weeks ago        438MB
hello-world          latest             feb5d9fea6a5       7 months ago       13.3kB
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql/mysql-server:latest
"docker run" requires at least 1 argument.
See 'docker run --help'.

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

Run a command in a new container
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql mysql/mysql-server:latest
80dad1ff9d7eca0f4de806750f155e369d6c624c2dcd6c24948bcf89d8902780
dona@dona-VirtualBox:~$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED
STATUS
80dad1ff9d7e       mysql/mysql-server:latest   "/entrypoint.sh mysql..."   18 seconds
ago                Up 16 seconds (health: starting)   0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060-33061/tcp   mysql
dona@dona-VirtualBox:~$ sudo docker logs mysql

```

```

Activities  Terminal  May 16 20:35
dona@dona-VirtualBox: ~

mysql                latest             76152be68449       5 days ago         524MB
mysql/mysql-server   latest             5a9594052aec       2 weeks ago        438MB
hello-world          latest             feb5d9fea6a5       7 months ago       13.3kB
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql/mysql-server:latest
"docker run" requires at least 1 argument.
See 'docker run --help'.

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

Run a command in a new container
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql mysql/mysql-server:latest
80dad1ff9d7eca0f4de806750f155e369d6c624c2dcd6c24948bcf89d8902780
dona@dona-VirtualBox:~$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED
STATUS
80dad1ff9d7e       mysql/mysql-server:latest   "/entrypoint.sh mysql..."   18 seconds
ago                Up 16 seconds (health: starting)   0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060-33061/tcp   mysql
dona@dona-VirtualBox:~$ sudo docker logs mysql
[Entrypoint] MySQL Docker Image 8.0.29-1.2.8-server
[Entrypoint] No password option specified for new database.
[Entrypoint] A random onetime password will be generated.
[Entrypoint] Initializing database
2022-05-17T00:20:09.998482Z 0 [System] [MY-013169] [Server] /usr/sbin/mysqld (mysqld 8.0.29) initializing of server in progress as process 17
2022-05-17T00:20:10.005451Z 1 [System] [MY-013576] [InnoDB] InnoDB initializati

```

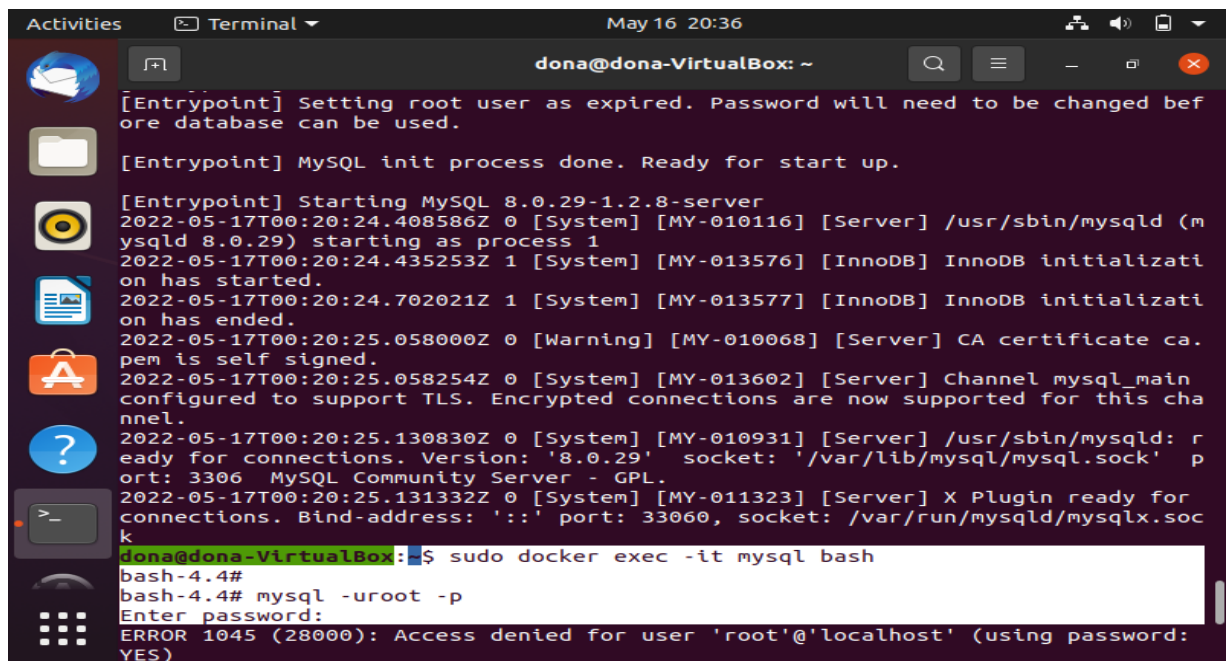


```
Activities Terminal May 16 20:35
dona@dona-VirtualBox: ~
Run a command in a new container
dona@dona-VirtualBox:~$ sudo docker run -p 3306:3306 -d --name=mysql mysql/mysql-server:latest
80dad1ff9d7eca0f4de806750f155e369d6c624c2dcd6c24948bcf89d8902780
dona@dona-VirtualBox:~$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED
STATUS            NAMES
80dad1ff9d7e       mysql/mysql-server:latest "/entrypoint.sh mysql..." 18 seconds
ago               Up 16 seconds (health: starting) 0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060-33061/tcp mysql
dona@dona-VirtualBox:~$ sudo docker logs mysql
[Entrypoint] MySQL Docker Image 8.0.29-1.2.8-server
[Entrypoint] No password option specified for new database.
[Entrypoint] A random onetime password will be generated.
[Entrypoint] Initializing database
2022-05-17T00:20:09.998482Z 0 [System] [MY-013169] [Server] /usr/sbin/mysqld (m
ysqld 8.0.29) initializing of server in progress as process 17
2022-05-17T00:20:10.005451Z 1 [System] [MY-013576] [InnoDB] InnoDB initializati
on has started.
2022-05-17T00:20:11.133952Z 1 [System] [MY-013577] [InnoDB] InnoDB initializati
on has ended.
2022-05-17T00:20:12.682190Z 6 [Warning] [MY-010453] [Server] root@localhost is
created with an empty password ! Please consider switching off the --initialize
-insecure option.
[Entrypoint] Database initialized
2022-05-17T00:20:16.378920Z 0 [System] [MY-010116] [Server] /usr/sbin/mysqld (m
ysqld 8.0.29) starting as process 60
2022-05-17T00:20:16.428729Z 1 [System] [MY-013576] [InnoDB] InnoDB initializati
```

- a password will be generated by that command copy that command and paste it some writer or editor

```
Activities Terminal May 16 20:35
dona@dona-VirtualBox: ~
2022-05-17T00:20:10.428729Z 1 [System] [MY-013576] [InnoDB] InnoDB initializati
on has started.
2022-05-17T00:20:16.712124Z 1 [System] [MY-013577] [InnoDB] InnoDB initializati
on has ended.
2022-05-17T00:20:17.176949Z 0 [Warning] [MY-010068] [Server] CA certificate ca.
pem is self signed.
2022-05-17T00:20:17.177193Z 0 [System] [MY-013602] [Server] Channel mysql_main
configured to support TLS. Encrypted connections are now supported for this cha
nnel.
2022-05-17T00:20:17.212469Z 0 [System] [MY-011323] [Server] X Plugin ready for
connections. Socket: /var/run/mysqld/mysqlx.sock
2022-05-17T00:20:17.212797Z 0 [System] [MY-010931] [Server] /usr/sbin/mysqld: r
eady for connections. Version: '8.0.29' socket: '/var/lib/mysql/mysql.sock' p
ort: 0 MySQL Community Server - GPL.
Warning: Unable to load '/usr/share/zoneinfo/iso3166.tab' as time zone. Skippin
g it.
Warning: Unable to load '/usr/share/zoneinfo/leapseconds' as time zone. Skippin
g it.
Warning: Unable to load '/usr/share/zoneinfo/tzdata.zi' as time zone. Skipping
it.
Warning: Unable to load '/usr/share/zoneinfo/zone.tab' as time zone. Skipping i
t.
Warning: Unable to load '/usr/share/zoneinfo/zone1970.tab' as time zone. Skippi
ng it.
[Entrypoint] GENERATED ROOT PASSWORD: 8n#bj07Jn#06w?mL1m?&2so5?Dw#%Rc6
[Entrypoint] ignoring /docker-entrypoint-initdb.d/*
2022-05-17T00:20:21.033053Z 11 [System] [MY-013172] [Server] Received SHUTDOWN
from user root. Shutting down mysqld (Version: 8.0.29)
```

- then execute the mysql by : `sudo docker exec -it mysql bash`
- Then :`mysql -uroot -p`



The screenshot shows a terminal window titled 'dona@dona-VirtualBox: ~' with a timestamp of 'May 16 20:36'. The terminal output displays the MySQL installation process, including setting the root user as expired, starting the MySQL 8.0.29-1.2.8-server, and initializing the InnoDB database. The logs show the server is ready for connections on port 3306. The user then runs the command `sudo docker exec -it mysql bash`, which opens a bash shell. Inside the shell, the user runs `mysql -uroot -p` and enters a password. The terminal shows an 'ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)' message.

```
[Entrypoint] Setting root user as expired. Password will need to be changed before database can be used.
[Entrypoint] MySQL init process done. Ready for start up.
[Entrypoint] Starting MySQL 8.0.29-1.2.8-server
2022-05-17T00:20:24.408586Z 0 [System] [MY-010116] [Server] /usr/sbin/mysqld (mysqld 8.0.29) starting as process 1
2022-05-17T00:20:24.435253Z 1 [System] [MY-013576] [InnoDB] InnoDB initialization has started.
2022-05-17T00:20:24.702021Z 1 [System] [MY-013577] [InnoDB] InnoDB initialization has ended.
2022-05-17T00:20:25.058000Z 0 [Warning] [MY-010068] [Server] CA certificate ca.pem is self signed.
2022-05-17T00:20:25.058254Z 0 [System] [MY-013602] [Server] Channel mysql_main configured to support TLS. Encrypted connections are now supported for this channel.
2022-05-17T00:20:25.130830Z 0 [System] [MY-010931] [Server] /usr/sbin/mysqld: ready for connections. Version: '8.0.29' socket: '/var/lib/mysql/mysql.sock' port: 3306 MySQL Community Server - GPL.
2022-05-17T00:20:25.131332Z 0 [System] [MY-011323] [Server] X Plugin ready for connections. Bind-address: '::' port: 33060, socket: /var/run/mysqld/mysqld.sock
dona@dona-VirtualBox:~$ sudo docker exec -it mysql bash
bash-4.4#
bash-4.4# mysql -uroot -p
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)
```

- Then password will ask. Enter the password we have saved
- Then we can change the password by `ALTER USER 'root'@'localhost' IDENTIFIED BY 'newpassword';`

Activities Terminal May 16 20:36 dona@dona-VirtualBox: ~

Oracle is a registered trademark of Oracle Corporation and/or its 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> ALTER USER 'root'@'localhost' IDENTIFIED BY 'root';
Query OK, 0 rows affected (0.09 sec)
```

```
mysql> show database
->
-> show database;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'dat
abase
show database' at line 1
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.12 sec)

mysql>
```

Activities Terminal May 16 20:36 dona@dona-VirtualBox: ~

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

```
mysql> ALTER USER 'root'@'localhost' IDENTIFIED BY 'root';
Query OK, 0 rows affected (0.09 sec)
```

```
mysql> show database
->
-> show database;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'dat
abase
show database' at line 1
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.12 sec)

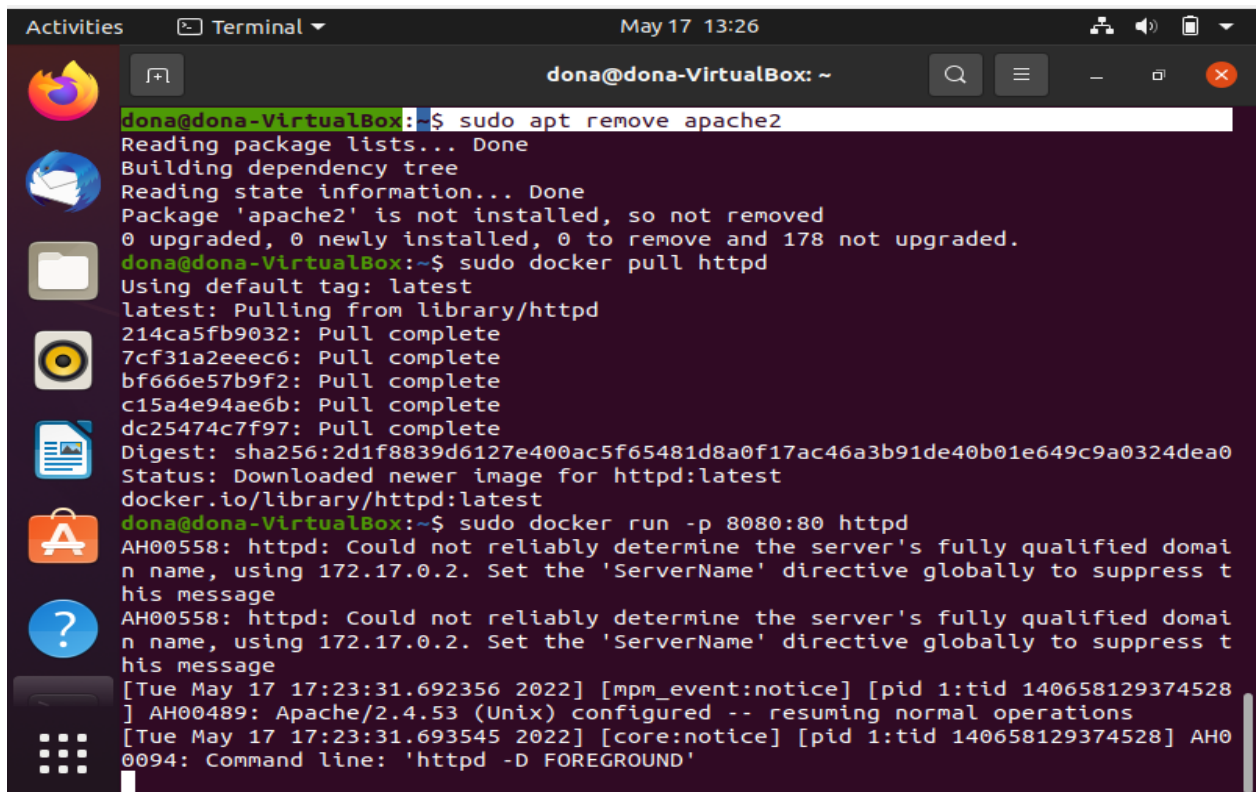
mysql>
```

Deployment of Apache

Step 1: To install the Apache package on Ubuntu

Step 2: The system prompts for confirmation do so, and allow the system to complete the installation.

Step 3: To verify Apache was installed correctly, Open a web browser and type in the address bar.



```
dona@dona-VirtualBox: ~  
$ sudo apt remove apache2  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Package 'apache2' is not installed, so not removed  
0 upgraded, 0 newly installed, 0 to remove and 178 not upgraded.  
dona@dona-VirtualBox:~$ sudo docker pull httpd  
Using default tag: latest  
latest: Pulling from library/httpd  
214ca5fb9032: Pull complete  
7cf31a2eeec6: Pull complete  
bf666e57b9f2: Pull complete  
c15a4e94ae6b: Pull complete  
dc25474c7f97: Pull complete  
Digest: sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0  
Status: Downloaded newer image for httpd:latest  
docker.io/library/httpd:latest  
dona@dona-VirtualBox:~$ sudo docker run -p 8080:80 httpd  
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message  
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message  
[Tue May 17 17:23:31.692356 2022] [mpm_event:notice] [pid 1:tid 140658129374528] AH00489: Apache/2.4.53 (Unix) configured -- resuming normal operations  
[Tue May 17 17:23:31.693545 2022] [core:notice] [pid 1:tid 140658129374528] AH00094: Command line: 'httpd -D FOREGROUND'
```

```
Activities Terminal May 17 13:27
dona@dona-VirtualBox: ~
dona@dona-VirtualBox:~$ sudo apt remove apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'apache2' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 178 not upgraded.
dona@dona-VirtualBox:~$ sudo docker pull httpd
Using default tag: latest
latest: Pulling from library/httpd
214ca5fb9032: Pull complete
7cf31a2eeec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:latest
dona@dona-VirtualBox:~$ sudo docker run -p 8080:80 httpd
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
[Tue May 17 17:23:31.692356 2022] [mpm_event:notice] [pid 1:tid 140658129374528] AH00489: Apache/2.4.53 (Unix) configured -- resuming normal operations
[Tue May 17 17:23:31.693545 2022] [core:notice] [pid 1:tid 140658129374528] AH00094: Command line: 'httpd -D FOREGROUND'
```

```
Activities Terminal May 17 13:27
dona@dona-VirtualBox: ~
dona@dona-VirtualBox:~$ sudo apt remove apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'apache2' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 178 not upgraded.
dona@dona-VirtualBox:~$ sudo docker pull httpd
Using default tag: latest
latest: Pulling from library/httpd
214ca5fb9032: Pull complete
7cf31a2eeec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:latest
dona@dona-VirtualBox:~$ sudo docker run -p 8080:80 httpd
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
[Tue May 17 17:23:31.692356 2022] [mpm_event:notice] [pid 1:tid 140658129374528] AH00489: Apache/2.4.53 (Unix) configured -- resuming normal operations
[Tue May 17 17:23:31.693545 2022] [core:notice] [pid 1:tid 140658129374528] AH00094: Command line: 'httpd -D FOREGROUND'
```



```
Activities Terminal May 19 19:47
root@dona-VirtualBox: /home/dona

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

dona@dona-VirtualBox:~$ sudo su
[sudo] password for dona:
root@dona-VirtualBox:/home/dona# sudo apt update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 114 kB in 7s (17.5 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
170 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@dona-VirtualBox:/home/dona# sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 170 not upgraded.
Need to get 1,820 kB of archives.
```

```
Activities Terminal May 19 19:47
root@dona-VirtualBox: /home/dona

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

dona@dona-VirtualBox:~$ sudo su
[sudo] password for dona:
root@dona-VirtualBox:/home/dona# sudo apt update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 114 kB in 7s (17.5 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
170 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@dona-VirtualBox:/home/dona# sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 170 not upgraded.
Need to get 1,820 kB of archives.
```



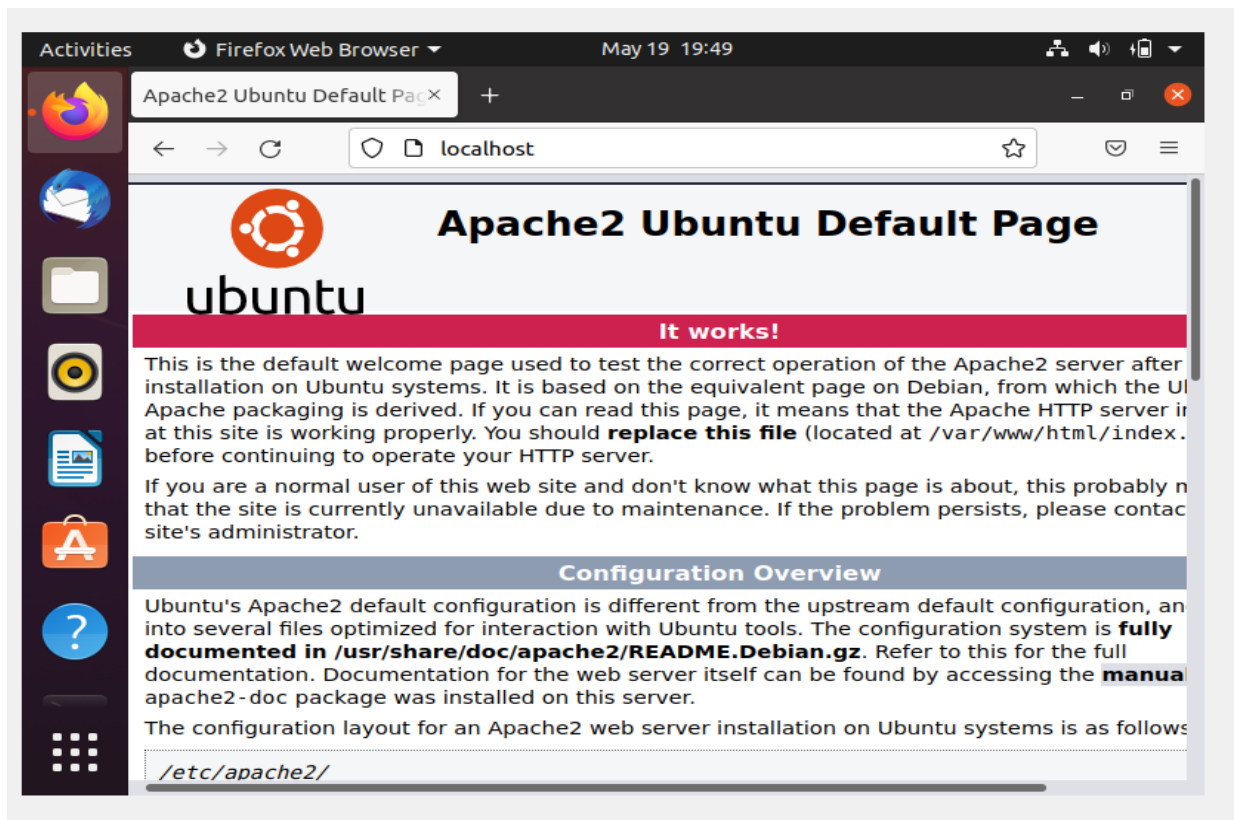
```
Activities Terminal May 19 19:48
root@dona-VirtualBox: /home/dona

Enabling module ssl.
Enabling module autoindex.
Enabling module env.
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36-6ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.15) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
root@dona-VirtualBox:/home/dona# sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Thu 2022-05-19 19:33:54 IST; 2min 11s ago
     Docs: https://httpd.apache.org/docs/2.4/
    Main PID: 2752 (apache2)
```

```
Activities Terminal May 19 19:48
root@dona-VirtualBox: /home/dona

Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36-6ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.15) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
root@dona-VirtualBox:/home/dona# sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Thu 2022-05-19 19:33:54 IST; 2min 11s ago
     Docs: https://httpd.apache.org/docs/2.4/
    Main PID: 2752 (apache2)
      Tasks: 55 (limit: 1087)
     Memory: 4.6M
    CGroup: /system.slice/apache2.service
            └─2752 /usr/sbin/apache2 -k start
              └─2754 /usr/sbin/apache2 -k start
                └─2755 /usr/sbin/apache2 -k start

May 19 19:33:54 dona-VirtualBox systemd[1]: Starting The Apache HTTP Server...
May 19 19:33:54 dona-VirtualBox apachectl[2751]: AH00558: apache2: Could not r
May 19 19:33:54 dona-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
```



HOSTING A SIMPLE WEBSITE

Requests made to public IP address on port 8098 be redirected to port 80 on the container

named dona. Also, instead of serving content from the container itself, we will serve a

simple web page from /home/dona/website1. Do this by mapping /home/dona/website1/ on

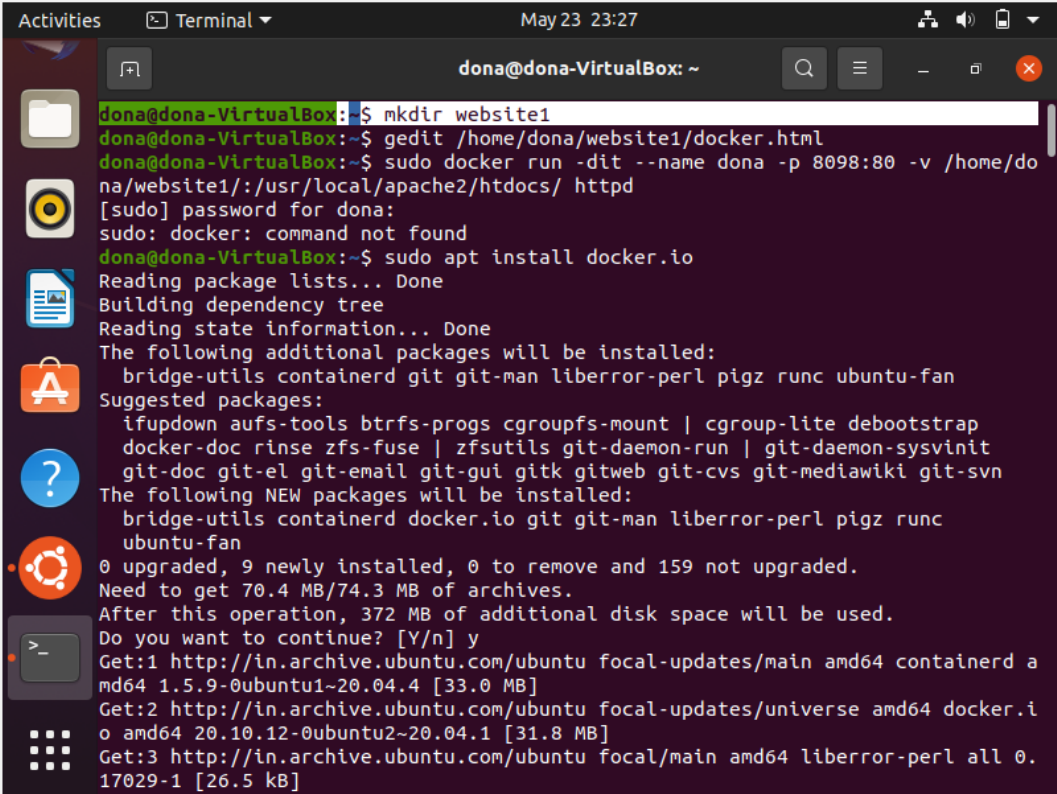
the /usr/local/apache2/htdocs/ on the container.

Directory website is created containing a simple web page named docker.html, and after saving

the html file, point your browser to Server-IP:8098/docker.html (where Server-IP is host's

public IP address). Find the IP address by inspect command using the container id. We can also

simply paste the corresponding IP address on the browser.



```
dona@dona-VirtualBox: ~  
dona@dona-VirtualBox:~$ mkdir website1  
dona@dona-VirtualBox:~$ gedit /home/dona/website1/docker.html  
dona@dona-VirtualBox:~$ sudo docker run -dit --name dona -p 8098:80 -v /home/do  
na/website1:/usr/local/apache2/htdocs/ httpd  
[sudo] password for dona:  
sudo: docker: command not found  
dona@dona-VirtualBox:~$ sudo apt install docker.io  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  bridge-utils containerd git git-man liberror-perl pigz runc ubuntu-fan  
Suggested packages:  
  ifupdown aufs-tools btrfs-progs cgroupfs-mount | cgroup-lite debootstrap  
  docker-doc rinse zfs-fuse | zfsutils git-daemon-run | git-daemon-sysvinit  
  git-doc git-el git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn  
The following NEW packages will be installed:  
  bridge-utils containerd docker.io git git-man liberror-perl pigz runc  
  ubuntu-fan  
0 upgraded, 9 newly installed, 0 to remove and 159 not upgraded.  
Need to get 70.4 MB/74.3 MB of archives.  
After this operation, 372 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 containerd a  
md64 1.5.9-0ubuntu1~20.04.4 [33.0 MB]  
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 docker.i  
o amd64 20.10.12-0ubuntu2~20.04.1 [31.8 MB]  
Get:3 http://in.archive.ubuntu.com/ubuntu focal/main amd64 liberror-perl all 0.  
17029-1 [26.5 kB]
```

```
Activities Terminal May 23 23:29
dona@dona-VirtualBox: ~
214ca5fb9032: Pull complete
7cf31a2e6ec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:latest
8ce145f6e7a6664d94e3aa674164cead20085a9787708b812edbfbc26a507cfc
dona@dona-VirtualBox:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS
PORTS         NAMES
8ce145f6e7a6   httpd     "httpd-foreground"      17 seconds ago Up 17 seconds
0.0.0.0:8098->80/tcp, :::8098->80/tcp   dona
dona@dona-VirtualBox:~$ sudo docker inspect 8ce145f6e7a6
[
  {
    "Id": "8ce145f6e7a6664d94e3aa674164cead20085a9787708b812edbfbc26a507cfc",
    "Created": "2022-05-23T17:48:41.09174797Z",
    "Path": "httpd-foreground",
    "Args": [],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 5243,
```

```
Activities Terminal May 23 23:29
dona@dona-VirtualBox: ~
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "172.17.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "MacAddress": "02:42:ac:11:00:02",
    "Networks": {
      "bridge": {
        "IPAMConfig": null,
        "Links": null,
        "Aliases": null,
        "NetworkID": "65a2b48a4c9dcf8251dcc25274923f37782fd33fbc432f484862624ccea198d8",
        "EndpointID": "ef82c4fc71160f243e029a6b6f6845b9f75b73bf2f3348706ded2fa72b5a39ce",
        "Gateway": "172.17.0.1",
        "IPAddress": "172.17.0.2",
        "IPPrefixLen": 16,
        "IPv6Gateway": "",
        "GlobalIPv6Address": "",
        "GlobalIPv6PrefixLen": 0,
        "MacAddress": "02:42:ac:11:00:02",
        "DriverOpts": null
      }
    }
  }
]
dona@dona-VirtualBox:~$
```

