



## Summary

### Session No - 2

- Revision of the previous session
  - Docker works on the concept of containerization
  - Case study on Hotstar
  - We use containerization to launch the operating system in one second
  - A docker engine is a program or a software
  - If we want to launch the operating system we need the image
- Docker-related commands can be run on the docker host only
- **docker ps** command is used to see all the running containers
- **docker images** command is used to see the docker images
- **docker ps -a** command is used to see all the containers

```
[root@ip-172-31-40-68 ~]# docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
[root@ip-172-31-40-68 ~]# docker images
REPOSITORY    TAG       IMAGE ID   CREATED   SIZE
centos        7         eeb6ee3f44bd  12 months ago  204MB
ubuntu       14.04    13b66b487594  18 months ago  197MB
[root@ip-172-31-40-68 ~]# docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
95e21ccc22bb  ubuntu:14.04  "/bin/bash"  46 hours ago  Exited (0) 46 hours ago  sleepy_hermann
a37162c1aeaa  ubuntu:14.04  "/bin/bash"  46 hours ago  Exited (0) 46 hours ago  naughty_dhawan
ed6875c357d1  centos:7     "/bin/bash"  46 hours ago  Exited (0) 46 hours ago  beautiful_wing
ca15ebc88b5a  ubuntu:14.04  "/bin/bash"  46 hours ago  Exited (0) 46 hours ago  friendly_lampport
474472007da0  ubuntu:14.04  "/bin/bash"  47 hours ago  Exited (0) 46 hours ago  intelligent_kilby
[root@ip-172-31-40-68 ~]#
```

- The minimum requirement to run any program is that we need the operating system

- Docker gives every container a unique ID & name for management

```
[root@ip-172-31-40-68 ~]# docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
b521fa23f4b5	ubuntu:14.04	"/bin/bash"	3 minutes ago	Exited (127) 5 seconds ago		wizardly_joliot
95e21ccc22bb	ubuntu:14.04	"/bin/bash"	46 hours ago	Exited (0) 46 hours ago		sleepy_hermann
a37162c1aeea	ubuntu:14.04	"/bin/bash"	46 hours ago	Exited (0) 46 hours ago		naughty_dhawan
ed6875c357d1	centos:7	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		beautiful_wing
ca15ebc88b5a	ubuntu:14.04	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		friendly_lamport
474472007da0	ubuntu:14.04	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		intelligent_kilby

- **--name** keyword in the run command is used to give a custom name to the container

```
[root@ip-172-31-40-68 ~]# docker run -i -t --name myweb centos:7
[root@450f0f387f2f /]#
[root@450f0f387f2f /]#
[root@450f0f387f2f /]#
[root@450f0f387f2f /]#
```

```
[root@ip-172-31-40-68 ~]# docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
450f0f387f2f	centos:7	"/bin/bash"	24 seconds ago	Up 23 seconds		myweb

- **docker stop (container name or ID )** command is used to stop the container
- **docker start (container name or ID )** command is used to start the container

```
[root@ip-172-31-40-68 ~]# docker start myweb
myweb
```

- **docker attach (container name or ID)** to attach the running container

```
[root@ip-172-31-40-68 ~]# docker attach myweb
[root@450f0f387f2f /]#
[root@450f0f387f2f /]#
[root@450f0f387f2f /]#
```

- **docker rm (container name or ID)** command is used to delete the container

```
[root@ip-172-31-40-68 ~]# docker rm myweb
myweb
[root@ip-172-31-40-68 ~]# docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
b521fa23f4b5	ubuntu:14.04	"/bin/bash"	11 minutes ago	Exited (127) 8 minutes ago		wizardly_joliot
95e21ccc22bb	ubuntu:14.04	"/bin/bash"	46 hours ago	Exited (0) 46 hours ago		sleepy_hermann
a37162c1aeea	ubuntu:14.04	"/bin/bash"	46 hours ago	Exited (0) 46 hours ago		naughty_dhawan
ed6875c357d1	centos:7	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		beautiful_wing
ca15ebc88b5a	ubuntu:14.04	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		friendly_lamport
474472007da0	ubuntu:14.04	"/bin/bash"	47 hours ago	Exited (0) 47 hours ago		intelligent_kilby

- **docker rmi (image name)** command is used for deleting the image
- **ifconfig** command is used to check the IP address
- **net-tools** is a package that provides the **ifconfig** command
- The minimum requirement for connection between the web server and web client is that they should have network connectivity
- Steps to configuring the web server
  - Step 1: Install the software
    - Command:- yum install httpd

```
[root@a74d237f98d4 /]# yum install httpd
Loaded plugins: fastestmirror, ovl
Loading mirror speeds from cached hostfile
 * base: download.cf.centos.org
 * extras: download.cf.centos.org
 * updates: download.cf.centos.org
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-97.el7.centos.5 will be installed
--> Processing Dependency: httpd-tools = 2.4.6-97.el7.centos.5 for package: httpd-2.4.6-97.el7.centos.5.x86_64
--> Processing Dependency: system-logs >= 7.92.1-1 for package: httpd-2.4.6-97.el7.centos.5.x86_64
```

- Step 2: Put or create a webpage in **/var/www/html**

```
[root@a74d237f98d4 /]# cd /var/www/html/
[root@a74d237f98d4 html]#
[root@a74d237f98d4 html]# ls
[root@a74d237f98d4 html]# cat > vimal.html
i m vimal daga
[root@a74d237f98d4 html]#
```

- Step 3: Start the web services
  - Command:- httpd

```
[root@a74d237f98d4 html]# 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
[root@a74d237f98d4 html]#
[root@a74d237f98d4 html]#
```

- **ps -aux** command in Linux tells how many processes are running

```
[root@a74d237f98d4 html]# ps -aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.3  11844   3088 pts/0    Ss   15:50   0:00 /bin/bash
root       82  0.0  0.6 224096   6028 ?        Ss   16:05   0:00 httpd
apache    83  0.0  0.6 224096   6020 ?        S    16:05   0:00 httpd
apache    84  0.0  0.6 224096   6020 ?        S    16:05   0:00 httpd
apache    85  0.0  0.6 224096   6020 ?        S    16:05   0:00 httpd
apache    86  0.0  0.6 224096   6020 ?        S    16:05   0:00 httpd
apache    87  0.0  0.6 224096   6020 ?        S    16:05   0:00 httpd
root      88  0.0  0.3  51748   3516 pts/0    R+   16:06   0:00 ps -aux
[root@a74d237f98d4 html]#
```

- Different ways to access the browser are through GUI & CLI

- **curl** command is used to access the browser from CLI

```
[root@338a9254800e /]# curl http://172.17.0.2/vimal.html
i m vimal daga
```

- **kill -9 (process ID)** command is used to stop the running process

```
[root@a74d237f98d4 html]# kill -9 82
[root@a74d237f98d4 html]# ps -aux
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.0	0.3	11844	3088	pts/0	Ss	15:50	0:00	/bin/bash
apache	83	0.0	0.6	224096	6020	?	S	16:05	0:00	httpd
apache	84	0.0	0.7	224232	6924	?	S	16:05	0:00	httpd
apache	85	0.0	0.7	224232	6924	?	S	16:05	0:00	httpd
apache	86	0.0	0.6	224096	6020	?	S	16:05	0:00	httpd
apache	87	0.0	0.6	224096	6020	?	S	16:05	0:00	httpd
root	92	0.0	0.3	51748	3412	pts/0	R+	16:11	0:00	ps -aux

- **Ctrl + p + q** shortcut is used to come out of the container without stopping
- **docker exec (Container name) (command)** is used to run the command inside the container without entering or attaching it

```
[root@ip-172-31-40-68 ~]# docker exec webclient ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.0.3 netmask 255.255.0.0 broadcast 172.17.255.255
    ether 02:42:ac:11:00:03 txqueuelen 0 (Ethernet)
    RX packets 1152 bytes 25349377 (24.1 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 732 bytes 52684 (51.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
[root@ip-172-31-40-68 ~]#
```

- Two different types of storage
  - Ephemeral or Temporary storage (e.g. C drive)
  - Persistent or permanent storage (e.g. Pen drive, Hard disk)
- Creating persistent storage in a container
  - Creating a directory on the base system

```
[root@ip-172-31-40-68 ~]# mkdir /data
[root@ip-172-31-40-68 ~]# cd /data
[root@ip-172-31-40-68 data]# ls
[root@ip-172-31-40-68 data]# cd
[root@ip-172-31-40-68 ~]#
```



- Creating a container with a volume

```
[root@ip-172-31-40-68 ~]#
[root@ip-172-31-40-68 ~]# docker run -it --name os1 -v /data:/var/www/html/posts centos:7
[root@1c220d3dc737 /]#
```

- Storing data in the container

```
[root@1c220d3dc737 /]#
[root@1c220d3dc737 /]# cd /var/www/html/
[root@1c220d3dc737 html]# ls
posts
[root@1c220d3dc737 html]# cat > vimal.html
i m vimal
[root@1c220d3dc737 html]#
[root@1c220d3dc737 html]# ls
posts vimal.html
[root@1c220d3dc737 html]# cd posts/
[root@1c220d3dc737 posts]# ls
[root@1c220d3dc737 posts]# touch j.png
[root@1c220d3dc737 posts]# touch p.jpg
[root@1c220d3dc737 posts]# ls
j.png p.jpg
```

- Internally all the data created in /var/www/html is stored in the base system after attaching the volume
- Deleting the container

```
[root@1c220d3dc737 posts]#
[root@1c220d3dc737 posts]# exit
exit
[root@ip-172-31-40-68 ~]#
[root@ip-172-31-40-68 ~]# docker rm os1
os1
[root@ip-172-31-40-68 ~]#
```

- On the base system, the entire data is stored

```
[root@ip-172-31-40-68 ~]# cd /data/
[root@ip-172-31-40-68 data]# ls
j.png p.jpg text.txt vvvvv
[root@ip-172-31-40-68 data]#
```