

An altered Docker image is visualized as _____

Several layers one above another.

None of the options

The final layer that undergoes required changes.

Both the options

Docker images can be sent to registry by using _____ .

docker publish

docker push

docker pull

docker send

Docker hub images can be accessed at _____ .

index.docker.io

docker

index.docker

None of the options

What is Docker Daemon?

It is the latest feature added to Docker.

It is a continuous long-running program responsible for managing containers.

It is the unauthorized access to the image content.

It is a type of malware in Docker.

Application running in a VM is hidden from the host OS with the help of Hypervisor/VMM.

True

False

Running Docker containers can be checked by using _____.

docker ps

docker cs

Container can alter host filesystem without any restriction.

True

False

What is the name of the virtual Ethernet bridge that is created at the start of Docker Daemon?

docker2

docker1

docker0

docker00

The following are components of Docker Engine, except

Command Line Interface

None of the options

REST API

Docker Daemon

Containers have shared resources and are lightweight.

False

True

Which of the following is the correct method of exporting a TAR file?


docker exampleImage > exampleImage.tar

docker export exampleImage > exampleImage.tar

docker exampleImage.zip > exampleImage.tar

docker exampleImage.tar > exampleImage

Docker Networking is needed while working on Docker .

 on a small scale

in real-time on a large scale

Which sub-command is used for removing all stopped containers?


docker prune container

docker delete container

docker container delete

docker container prune

Docker Daemon does not require root privileges to run.

 True

False

Which of the following statements is true about containerization?

All the options

Docker containers do not have a complete OS with them.

Response time of the VM boosts.

Container consumes very less memory.

Docker Daemon does not require root privileges to run.

True

False

You can search for Docker images by using _____.

docker search imageName

docker searchfor imageName

docker find imageName

docker pull image

The default network to which the new containers get connected to is _____.

Bridge mode

Container mode

Host mode

None of the options

To get help on a topic in Docker, you can use _____.

docker --help topicName

docker topicName --help

Docker Daemon and Docker Client use the same binary.

False

✗ True

Hands-on scenario

labuser :

Welcome to the Docker challenge, your task is to follow the below steps and complete them successfully.

*Perform the following actions described below by executing the respective commands. Open terminal and execute the commands. *

1. Check the version of Docker.

```
labuser@ip-172-31-6-209:~$ docker --version
Docker version 19.03.11, build 42e35e61f3
labuser@ip-172-31-6-209:~$
```

2. Check the detailed information on the running/stopped containers.

```
labuser@ip-172-31-6-209:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
```

3. Download tomcat:latest image from docker hub.

```
labuser@ip-172-31-6-209:~$ docker pull tomcat:latest
latest: Pulling from library/tomcat
6e3729cf69e0: Pull complete
4d8d923227d8: Pull complete
f1d795e5a9fa: Pull complete
b4e28e72d611: Pull complete
131edf041726: Pull complete
55d9a6c76445: Pull complete
fc0b35b356bc: Pull complete
Digest: sha256:b5e7c6d7cec7a95e7340700578c72aaeal1c4bf6f266b3b18f0ef7d9ad3ae9efd
Status: Downloaded newer image for tomcat:latest
docker.io/library/tomcat:latest
labuser@ip-172-31-6-209:~$
```

4. Verify the downloaded docker images.

```
labuser@ip-172-31-6-209:~$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
tomcat	latest	46fc4709696c	6 days ago	475MB

```
labuser@ip-172-31-6-209:~$
```

- View all the commands that were run on the tomcat:latest image (check docker image history).

```
labuser@ip-172-31-6-209:~$ docker history tomcat
```

IMAGE	CREATED	CREATED BY	SIZE	COMMENT
46fc4709696c	6 days ago	/bin/sh -c #(nop) CMD ["catalina.sh" "run"]	0B	
<missing>	6 days ago	/bin/sh -c #(nop) EXPOSE 8080	0B	
<missing>	6 days ago	/bin/sh -c set -eux; nativeLines="\$(catalin...	0B	
<missing>	6 days ago	/bin/sh -c set -eux; savedAptMark="\$(apt-m...	19.7MB	
<missing>	6 days ago	/bin/sh -c #(nop) ENV TOMCAT_SHA512=7fa381d...	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV TOMCAT_VERSION=10.1.5	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV TOMCAT_MAJOR=10	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV GPG_KEYS=A9C5DF4D22E9...	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV LD_LIBRARY_PATH=/usr/...	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV TOMCAT_NATIVE_LIBDIR=...	0B	
<missing>	6 days ago	/bin/sh -c #(nop) WORKDIR /usr/local/tomcat	0B	
<missing>	6 days ago	/bin/sh -c mkdir -p "\$CATALINA_HOME"	0B	
<missing>	6 days ago	/bin/sh -c #(nop) ENV PATH=/usr/local/tomca...	0B	

- Remove tomcat:latest docker image.

```
labuser@ip-172-31-6-209:~$ docker rmi tomcat
```

```
Untagged: tomcat:latest
```

```
Deleted: sha256:46fc4709696ca12889b7ce90c1ead8f9a3c167308e9ce642ae3fe436d4906e62
```

```
Deleted: sha256:64c3dd54c3e8796f657ce2b26d0dce162e967c1bfe9f223959d28498560d1e0a
```

```
Deleted: sha256:20a849386e7bcd368c6c21d6c2bcd50dfbb817e0d6035e7a014036c79a30f7
```

```
Deleted: sha256:c52e3b254fea54687ffc8d82ff649bba0a686d77ed09bc181cb32fed15914c85
```

```
Deleted: sha256:fd9bdc889f132778b365b350ea53454d0590988b74cbb08caa9d42bd784747b7
```

```
Deleted: sha256:96e65560784053582a494c44541d4601efebd9b1cb4f130c340b97fb5723fcd7
```

```
Deleted: sha256:36a4d27dc05ad9e66db2f3d415b2497d0303c0f94e29b0eb31ac43d3a8ec30
```

```
Deleted: sha256:6515074984c6f8bb1b8a9962c8fb5f310fc85e70b04c88442a3939c026dbfad3
```

```
labuser@ip-172-31-6-209:~$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
------------	-----	----------	---------	------

```
labuser@ip-172-31-6-209:~$
```

- Download and run an nginx:latest image in the docker container using the run command, name the container nginxservice.

```
labuser@ip-172-31-6-209:~$ docker run --name nginxservice -d nginx
```

```
6d6e65159aafcb4b233cbeb3883357faeda80625f329ef1a794d124755dc90ca
```

```
labuser@ip-172-31-6-209:~$
```

- Pull busybox:1.24 docker image.

```
labuser@ip-172-31-6-209:~$ docker pull busybox:1.24
```

```
1.24: Pulling from library/busybox
```

```
Image docker.io/library/busybox:1.24 uses outdated schema1 manifest format. Please upgrade to a schema2 image for better future compatibility. More information at https://docs.docker.com/registry/spec/deprecated-schema-v1/
```

```
385e281300cc: Pull complete
```

```
a3ed95caeb02: Pull complete
```

```
Digest: sha256:8ea3273d79b47a8b6d018be398c17590a4b5ec604515f416c5b797db9dde3ad8
```

```
Status: Downloaded newer image for busybox:1.24
```

```
docker.io/library/busybox:1.24
```

9. Search for ubuntu images in the Docker hub, and limit the search result to 20.

```
labuser@ip-172-31-6-209:~$ docker search ubuntu | head -20
```

NAME	DESCRIPTION	STARS	OFFICIAL	AUTOMATED
ubuntu	Ubuntu is a Debian-based Linux operating sys...	15516	[OK]	
websphere-liberty	WebSphere Liberty multi-architecture images ...	291	[OK]	
ubuntu-upstart	DEPRECATED, as is Upstart (find other proces...	112	[OK]	
neurodebian	NeuroDebian provides neuroscience research s...	98	[OK]	
ubuntu/nginx	Nginx, a high-performance reverse proxy & we...	75		
open-liberty	Open Liberty multi-architecture images based...	56	[OK]	
ubuntu/apache2	Apache, a secure & extensible open-source HT...	53		
ubuntu-debootstrap	DEPRECATED; use "ubuntu" instead	50	[OK]	
ubuntu/squid	Squid is a caching proxy for the Web. Long-t...	50		
ubuntu/bind9	BIND 9 is a very flexible, full-featured DNS...	45		
ubuntu/mysql	MySQL open source fast, stable, multi-thread...	41		
ubuntu/prometheus	Prometheus is a systems and service monitori...	35		
ubuntu/postgres	PostgreSQL is an open source object-relatio...	23		
ubuntu/kafka	Apache Kafka, a distributed event streaming ...	21		
ubuntu/redis	Redis, an open source key-value store. Long...	16		
ubuntu/prometheus-alertmanager	Alertmanager handles client alerts from Prom...	8		
ubuntu/dotnet-deps	Chiselled Ubuntu for self-contained .NET & A...	6		
ubuntu/grafana	Grafana, a feature rich metrics dashboard & ...	6		
ubuntu/memcached	Memcached, in-memory keyvalue store for sma...	5		

```
labuser@ip-172-31-6-209:~$
```

10. List all containers.

```
labuser@ip-172-31-6-209:~$ docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
6d6e65159aaf	nginx	"/docker-entrypoint..."	3 minutes ago	Up 3 minutes	80/tcp	nginxservice

```
labuser@ip-172-31-6-209:~$
```

11. Identify the IP address of the running container 'nginxservice'.

```
labuser@ip-172-31-6-209:~$ docker inspect nginxservice
```

```
[
  {
    "Id": "6d6e65159aafcb4b233cbef3883357faeda80625f329ef1a794d124755dc90ca",
    "Created": "2023-01-31T11:55:16.429626662Z",
    "Path": "/docker-entrypoint.sh",
    "Args": [
      "nginx",
      "-g",
      "daemon off;"
    ],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 6634,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2023-01-31T11:55:17.009897507Z",
```

12. Print the stats for a running container 'nginxservice'.

```
docker stats nginxservice
```

CONTAINER ID	NAME	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O
6d6e65159aaf	nginxservice	0.00%	3.25MiB / 7.53GiB	0.04%	7.81kB / 0B	0B / 8.19kB

13. Pause the processes in a running container 'nginxservice'.

```
~
labuser@ip-172-31-6-209:~$ docker pause nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ █
```

14. Start the processes in a running container 'nginxservice'.

```
~
labuser@ip-172-31-6-209:~$ docker pause nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ docker start nginxservice
Error response from daemon: cannot start a paused container, try unpause instead
Error: failed to start containers: nginxservice
labuser@ip-172-31-6-209:~$ docker unpause nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ █
```

15. Kill the processes in a running container 'nginxservice'.

```
~
labuser@ip-172-31-6-209:~$ docker kill nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ █
```

16. Start the same container 'nginxservice'.

17. Stop the running container 'nginxservice'.

```
~
labuser@ip-172-31-6-209:~$ docker start nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ docker stop nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ █
```

18. List all containers (including the containers in all states).

```
~
labuser@ip-172-31-6-209:~$ docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS      PORTS          NAMES
6d6e65159aaf   nginx    "/docker-entrypoint..." 7 minutes ago  Exited (0) 17 seconds ago          nginx
service
labuser@ip-172-31-6-209:~$ █
```

19. Export the container 'nginxservice' and name the tar as 'test.tar'.

```
~
labuser@ip-172-31-6-209:~$ docker export nginxservice > test.tar
labuser@ip-172-31-6-209:~$ █
```

20. Delete the container 'nginxservice'.

```
~
labuser@ip-172-31-6-209:~$ docker rm nginxservice
nginxservice
labuser@ip-172-31-6-209:~$ █
```

21. Remove all stopped containers by pruning them.

```
labuser@ip-172-31-6-209:~$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Total reclaimed space: 0B
labuser@ip-172-31-6-209:~$
```

22. Import the container 'test.tar'

```
labuser@ip-172-31-6-209:~$ docker import test.tar
sha256:4e6bf7e68c1b63b88cb3024cf577fcc9710fe1032cf67ead6ffb7dbfa25f3933
labuser@ip-172-31-6-209:~$
```

- Create an nginx Dockerfile with index page that returns the string 'Welcome to fresco'

```
labuser@ip-172-31-1-142:~$ cat Dockerfile
FROM nginx:latest
COPY ./index.html /usr/share/nginx/html/incex.html
labuser@ip-172-31-1-142:~$ cat index.html
<!doctype html>
<html lang="en">
<body>
  <h2>Welcome to fresco</h2>
</body>
</html>
labuser@ip-172-31-1-142:~$ cd test
```

- Build the image and name it 'nginximage', run the image and expose it on port 80 and name it 'nginxcontainer'

```
labuser@ip-172-31-1-142:~$ docker build -t nginx:v1.1 /home/labuser/Dockerfile
unable to prepare context: context must be a directory: /home/labuser/Dockerfile
labuser@ip-172-31-1-142:~$ docker build -t nginx:v1.1 /home/labuser/
error checking context: 'can't stat '/home/labuser/.dbus''.
```

Got this error as directory did not have permissions for user to run .

```
labuser@ip-172-31-1-142:~/test$ docker build -t nginximage:v1.1 .
Sending build context to Docker daemon 3.072kB
Step 1/2 : FROM nginx:latest
--> a99a39d070bf
Step 2/2 : COPY ./index.html /usr/share/nginx/html/incex.html
--> Using cache
--> 7e5d74fedc2f
Successfully built 7e5d74fedc2f
Successfully tagged nginximage:v1.1
labuser@ip-172-31-1-142:~/test$
```

```
labuser@ip-172-31-1-142:~/test$ docker push nginximage
The push refers to repository [docker.io/library/nginximage]
e039effcd6e8: Preparing
80115eeb30bc: Preparing
049fd3bdb25d: Preparing
ff1154af28db: Preparing
8477a329ab95: Preparing
7e7121bf193a: Waiting
67a4178b7d47: Waiting
denied: requested access to the resource is denied
labuser@ip-172-31-1-142:~/test$ docker run -p 8080:80 --name nginxcontainer nginximage
Unable to find image 'nginximage:latest' locally
docker: Error response from daemon: pull access denied for nginximage, repository does not exist or may require 'docker login': denied: requested access to the resource is denied.
See 'docker run --help'.
```

- Start a container registry image using following command `docker run -d -p 5000:5000 --restart=always --name registry registry:2`

```
labuser@ip-172-31-1-142:~/test$ docker run -d -p 5000:5000 --restart=always --name registry registry:2
Unable to find image 'registry:2' locally
2: Pulling from library/registry
ca7dd9ec2225: Pull complete
c41ae7ad2b39: Pull complete
1ed0fc8a6161: Pull complete
21df229223d2: Pull complete
626897ccab21: Pull complete
Digest: sha256:ce14a6258f37702ff3cd92232a6f5b81ace542d9f1631966999e9f7c1ee6ddba
Status: Downloaded newer image for registry:2
20905d25d982c76b76d31b9568b5e91d374275c9341ebc1c1f05d16abaa387ac
labuser@ip-172-31-1-142:~/test$
```

- Write the following content to `/etc/docker/daemon.json` file to avoid http security error. Replace the string with registry container ip.

```
{
  "insecure-registries": ["replace-with-registry-ip:5000"]
}
```

```
labuser@ip-172-31-1-142:~/test$ sudo vi /etc/docker/daemon.json
labuser@ip-172-31-1-142:~/test$ cat /etc/docker/daemon.json
{
  "insecure-registries": ["172.17.0.2:5000"]
}
labuser@ip-172-31-1-142:~/test$
```

- Restart docker service using the command `'sudo service docker restart'`

```
:$ sudo service docker restart
-#
```

- Push the nginximage image to registry. (Hint: need to tag the docker image with the registry ip and port)

```
See 'docker build --help'.
labuser@ip-172-31-1-142:~/test$ docker build -t nginximage172.17.0.25000 .
Sending build context to Docker daemon 3.072kB
Step 1/2 : FROM nginx:latest
--> a99a39d070bf
Step 2/2 : COPY ./index.html /usr/share/nginx/html/incex.html
--> Using cache
--> 7e5d74fedc2f
Successfully built 7e5d74fedc2f
Successfully tagged nginximage172.17.0.25000:latest
labuser@ip-172-31-1-142:~/test$
```