

# SYSTEM AND NETWORK ADMINISTRATION

## LAB 7: DOCKER

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### Task 1: Create three containers

#### Container 1:

**Question 1:** What is the meaning of the value on the last line printed on the screen?

```
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run --detach --name myngi
nx -p 8080:80 nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
2d429b9e73a6: Pull complete
20c8b3871098: Pull complete
06da587a7970: Pull complete
f7895e95e2d4: Pull complete
7b25f3e99685: Pull complete
dffc1412b7c8: Pull complete
d550bb6d1800: Pull complete
Digest: sha256:0c86dddac19f2ce4fd716ac58c0fd87bf69bfd4edabfd6971fb885bafd12a00b
Status: Downloaded newer image for nginx:latest
434a713b4415f64c1731bf2ee6864ba47229ec6ce12541ab33f692abc7be4c4c
```

The last line is the container ID

**Question 2.** What is the `--detach` option used for?

The `--detach` option runs the container in the background

**Question 3.** Why is server software generally run in detached containers?

Server software is run in detached containers so that it can keep running independently of the terminal session

**Question 4.** What is a daemon?

A daemon is a background process that runs continuously.

#### Container 2:

```
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run -d --name mailer dock
erinaction/ch2_mailer
Unable to find image 'dockerinaction/ch2_mailer:latest' locally
latest: Pulling from dockerinaction/ch2_mailer
[DEPRECATION NOTICE] Docker Image Format v1, and Docker Image manifest version 2
, schema 1 support will be removed in an upcoming release. Suggest the author of
docker.io/dockerinaction/ch2_mailer:latest to upgrade the image to the OCI Form
at, or Docker Image manifest v2, schema 2. More information at https://docs.dock
er.com/go/deprecated-image-specs/
a3ed95caeb02: Pull complete
1db09adb5ddd: Pull complete
fd22002b688a: Pull complete
b50bdc71da50: Pull complete
290aad86b00b: Pull complete
Digest: sha256:a6937a6871ecf9d96d93ae77863d07efb5f35d1523d67590f5be43e9c5f8c9dc
Status: Downloaded newer image for dockerinaction/ch2_mailer:latest
53f33251f2dac57de97a74728fceb21f5c2b24b2e75d73a62fae2eef632382f1
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$
```

**Question 5:** What is the option -d used for?

The -d option is short for --detach, running the container in the background.

### Container 3:

**Question 6:** What are the options --interactive --tty used for? What are the short forms of those options?

--interactive (-i): Keep the instance open so the container can receive input from the user. Without this option, the container will terminate as soon as its main command completes.

--tty (-t): Create a Virtual terminal instance (pseudo-TTY) for the container. This allows users to interact with the container to function properly in a terminal.

```
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run --interactive --tty --li
nk mynginx:mynginx --name web_test busybox:1.29 /bin/sh
/ # hello
/bin/sh: hello: not found
/ # ls
bin  dev  etc  home  proc  root  sys  tmp  usr  var
/ # wget -O - http://mynginx:80/
Connecting to mynginx:80 (172.17.0.2:80)
hello world
- 100% |*****| 12 0:00:00 ETA
/ #
```

**Question 7:** What is the output of the previous command?

The output should show the HTML content served by the NGINX server.

## Task 2: Creating Monitoring Agent

```
phuc@phuc-HP-240-G8-Notebook-PC: ~/s... x phuc@phuc-HP-240-G8-Notebook-PC: ~/sn... x v
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run -it --name agent --link
web:insideweb --link mailer:insidemailer dockerinaction/ch2_agent
Unable to find image 'dockerinaction/ch2_agent:latest' locally
latest: Pulling from dockerinaction/ch2_agent
[DEPRECATION NOTICE] Docker Image Format v1, and Docker Image manifest version 2, s
chema 1 support will be removed in an upcoming release. Suggest the author of docke
r.io/dockerinaction/ch2_agent:latest to upgrade the image to the OCI Format, or Doc
ker Image manifest v2, schema 2. More information at https://docs.docker.com/go/dep
recated-image-specs/
a3ed95caeb02: Pull complete
1db09adb5ddd: Already exists
dd9575f5e421: Pull complete
0c6cc09b49a4: Pull complete
e8281c5025cf: Pull complete
Digest: sha256:85a9dfe1851f6e8bcc8111cb3f14cc8df07eb4221aaa448df0f3fd1ddc485e9b
Status: Downloaded newer image for dockerinaction/ch2_agent:latest
System up.
System up.
System up.
System up.
System up.
System up.
System up.
System up.
```

**Question 8:** When running, the container will test the web container every second and print what message on the screen?

The agent container will check the web server every second and print a status message such as “System up” in this case.

**Question 9:** What is the --link option used for?

The --link option creates a link between containers for communication.

```
^Cphuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker container attach agent
You cannot attach to a stopped container, start it first
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker container start agent
agent
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker container attach agent
System up.
System up.
System up.
System up.
System up.
System up.
System up.
System up.
System up.
```

**Question 10:** What will happen if you remove container from the above commands?

```

phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                    NAMES
735552ac70b4   dockerinaction/ch2_mailer          "/mailer/mailer.sh"     12 minutes ago Up 12 minutes   33333/tcp             mailer
706b72c7cab6   nginx:latest                       "/docker-entrypoint..." 13 minutes ago Up 13 minutes   80/tcp                web
53f33251f2da   dockerinaction/ch2_mailer          "/mailer/mailer.sh"     About an hour ago Up About an hour   33333/tcp             mail
434a713b4415   nginx                               "/docker-entrypoint..." About an hour ago Up About an hour   0.0.0.0:8080->80/tcp, :::8080->80/tcp myn
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker rm web
Error response from daemon: You cannot remove a running container 706b72c7cab6c84bae36c0997a733df61b09b86772faa03d42c00ff5691d6160. Stop the container before attempting removal or force remove
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker stop web
web
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker rm web
web
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                    NAMES
735552ac70b4   dockerinaction/ch2_mailer          "/mailer/mailer.sh"     15 minutes ago Up 15 minutes   33333/tcp             mailer
53f33251f2da   dockerinaction/ch2_mailer          "/mailer/mailer.sh"     About an hour ago Up About an hour   33333/tcp             mail
434a713b4415   nginx                               "/docker-entrypoint..." About an hour ago Up About an hour   0.0.0.0:8080->80/tcp, :::8080->80/tcp myn
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$

```

If we remove a container that is running, then we cannot remove it. We must stop the container and then remove it later. And if we remove it, all data associated with it will be lost unless stored in a volume.

**Question 11:** What will be displayed on the screen? What is the information about each running container shown?

It will show the containers, and each container includes container IDs, names, images, and statuses.

**Question 12:** What does the log show? What happens when examining the log for web container with option --follow?

```

phuc@phuc-HP-240-G8-Notebook-PC: ~/s... x phuc@phuc-HP-240-G8-Notebook-PC: ~/sn... x v
matter1
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker restart mailer
mailer
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker logs mynginx
/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/de
fault.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
2024/11/29 15:44:02 [notice] 1#1: using the "epoll" event method
2024/11/29 15:44:02 [notice] 1#1: nginx/1.27.3
2024/11/29 15:44:02 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/11/29 15:44:02 [notice] 1#1: OS: Linux 6.8.0-49-generic
2024/11/29 15:44:02 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2024/11/29 15:44:02 [notice] 1#1: start worker processes
2024/11/29 15:44:02 [notice] 1#1: start worker process 20

```

```
phuc@phuc-HP-240-G8-Notebook-PC: ~/sna2024/lab7
172.17.0.1 - - [29/Nov/2024:16:53:27 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:27 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:16:53:28 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
172.17.0.1 - - [29/Nov/2024:17:03:11 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:132.0) Gecko/20100101 Firefox/132.0"
2024/11/29 17:21:46 [notice] 1#1: signal 3 (SIGQUIT) received, shutting down
2024/11/29 17:21:46 [notice] 30#30: gracefully shutting down
2024/11/29 17:21:46 [notice] 29#29: gracefully shutting down
2024/11/29 17:21:46 [notice] 31#31: gracefully shutting down
2024/11/29 17:21:46 [notice] 33#33: gracefully shutting down
2024/11/29 17:21:46 [notice] 32#32: gracefully shutting down
2024/11/29 17:21:46 [notice] 30#30: exiting
2024/11/29 17:21:46 [notice] 33#33: exiting
2024/11/29 17:21:46 [notice] 31#31: exiting
2024/11/29 17:21:46 [notice] 29#29: exiting
2024/11/29 17:21:46 [notice] 30#30: gracefully shutting down
2024/11/29 17:21:46 [notice] 32#32: exiting
2024/11/29 17:21:46 [notice] 30#30: exiting
2024/11/29 17:21:46 [notice] 30#30: exit
2024/11/29 17:21:46 [notice] 36#36: exit
2024/11/29 17:21:46 [notice] 33#33: exit
2024/11/29 17:21:46 [notice] 29#29: exit
2024/11/29 17:21:46 [notice] 32#32: exit
2024/11/29 17:21:46 [notice] 31#31: exit
```

```
phuc@phuc-HP-240-G8-Notebook-PC: ~/sna2024/lab7
2024/11/29 17:21:46 [notice] 1#1: signal 29 (SIGIO) received
2024/11/29 17:21:46 [notice] 1#1: signal 17 (SIGCHLD) received from 29
2024/11/29 17:21:46 [notice] 1#1: worker process 29 exited with code 0
2024/11/29 17:21:46 [notice] 1#1: signal 29 (SIGIO) received
2024/11/29 17:21:46 [notice] 1#1: signal 17 (SIGCHLD) received from 34
2024/11/29 17:21:46 [notice] 1#1: worker process 34 exited with code 0
2024/11/29 17:21:46 [notice] 1#1: signal 29 (SIGIO) received
2024/11/29 17:21:46 [notice] 1#1: signal 17 (SIGCHLD) received from 36
2024/11/29 17:21:46 [notice] 1#1: worker process 36 exited with code 0
2024/11/29 17:21:46 [notice] 1#1: signal 29 (SIGIO) received
2024/11/29 17:21:46 [notice] 1#1: signal 17 (SIGCHLD) received from 30
2024/11/29 17:21:46 [notice] 1#1: worker process 30 exited with code 0
2024/11/29 17:21:46 [notice] 1#1: exit
/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: IPv6 listen already enabled
/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
2024/11/29 17:21:47 [notice] 1#1: using the "epoll" event method
2024/11/29 17:21:47 [notice] 1#1: nginx/1.27.3
2024/11/29 17:21:47 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/11/29 17:21:47 [notice] 1#1: OS: Linux 6.8.0-49-generic
2024/11/29 17:21:47 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2024/11/29 17:21:47 [notice] 1#1: start worker processes
2024/11/29 17:21:47 [notice] 1#1: start worker process 22
2024/11/29 17:21:47 [notice] 1#1: start worker process 23
2024/11/29 17:21:47 [notice] 1#1: start worker process 24
2024/11/29 17:21:47 [notice] 1#1: start worker process 25
2024/11/29 17:21:47 [notice] 1#1: start worker process 26
2024/11/29 17:21:47 [notice] 1#1: start worker process 27
2024/11/29 17:21:47 [notice] 1#1: start worker process 28
2024/11/29 17:21:47 [notice] 1#1: start worker process 29
```

Log helps us to see the log of the nginx and its output will be the status and request of the server, and the follow log have allowed us to follow the live output.

**Question 13:** If you stop the agent by running docker stop agent, what will show on the log?

When we run the docker stop agent command, the agent log will stop updating, and no new information will be displayed in the log until you restart the container.

**Question 14:** What does the log show?

```
phuc@phuc-HP-240-G8-Notebook-PC: ~/sna2024/lab7$ docker stop mynginx
mynginx
phuc@phuc-HP-240-G8-Notebook-PC: ~/sna2024/lab7$ docker logs mailer
CH2 Example Mailer has started.
CH2 Example Mailer has started.
CH2 Example Mailer has started.
```

**Question 15:** Create a nginx website that show Hello world!.

```
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run --detach --name helloworld -p 8080:80 nginx
49dfcf3d14f54bbfbd8ae016dee8f52494df1940b45882ae73938808de11c7be
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ echo "Hello world!" > index.html
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker cp index.html mynginx:/usr/share/nginx/html/index.html
Successfully copied 2.05kB to mynginx:/usr/share/nginx/html/index.html

phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker cp index.html helloworld:/usr/share/nginx/html/index.html
Successfully copied 2.05kB to helloworld:/usr/share/nginx/html/index.html
```

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Facebook Content BB\_SNA\_Lab Ubuntu localhost: X New Tab Word | M Docume gg dich (25) Nh PLAYING

localhost:8080

Hello world!

**Question 16:** Create a busybox:1.29 that monitor the status of HCMIU web server. Write a script that get HCMIU website using wget and check whether it's online or offline.

```
phuc@phuc-HP-240-G8-Notebook-PC:~/sna2024/lab7$ docker run --interactive --tty busybox:1.29 /bin/sh
```

```
#!/bin/sh
while true; do
    wget -q --spider http://hcmiu.edu.vn
    if [ $? -eq 0 ]; then
        echo "Website is online"
    else
        echo "Website is offline"
    fi
    sleep 10
done
```

```
/ # vi check.sh
/ # sh check.sh
wget: note: TLS certificate validation not implemented
wget: TLS error from peer (alert code 40): handshake failure
wget: error getting response: Connection reset by peer
Website is offline
wget: note: TLS certificate validation not implemented
wget: TLS error from peer (alert code 40): handshake failure
wget: error getting response: Connection reset by peer
Website is offline
wget: note: TLS certificate validation not implemented
wget: TLS error from peer (alert code 40): handshake failure
wget: error getting response: Connection reset by peer
Website is offline
wget: note: TLS certificate validation not implemented
wget: TLS error from peer (alert code 40): handshake failure
wget: error getting response: Connection reset by peer
Website is offline
```