

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ  
РОССИЙСКОЙ ФЕДЕРАЦИИ  
Федеральное государственное автономное образовательное учреждение  
высшего образования  
«КРЫМСКИЙ ФЕДЕРАЛЬНЫЙ УНИВЕРСИТЕТ им. В. И. ВЕРНАДСКОГО»  
ФИЗИКО-ТЕХНИЧЕСКИЙ ИНСТИТУТ  
Кафедра компьютерной инженерии и моделирования

**ОТЧЕТ ПО ПРАКТИЧЕСКОМУ ЗАДАНИЮ №3**  
**«Основы Docker»**

Практическая работа  
по дисциплине «Программная инженерия»  
студента 1 курса группы ПИ-б-о-241(1)  
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09.03.04 «Программная инженерия»

Симферополь, 2025

## Ход работы

1.

```
boss@ubuntu-serv:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast
    link/ether 08:00:27:19:4f:ec brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic
        valid_lft forever preferred_lft forever
```

2.

```
boss@ubuntu-serv:~$ sudo resolvectl dns enp0s3 8.8.8.8
[sudo] password for boss:
boss@ubuntu-serv:~$ sudo resolvectl dns enp0s3
Link 2 (enp0s3): 8.8.8.8
boss@ubuntu-serv:~$
```

3.

```
0 upgraded, 0 newly installed, 0 to remove and 57 not upgraded.
boss@ubuntu-serv:~$ sudo install-m 0755 -d /etc/apt/keyrings
sudo: install-m: command not found
boss@ubuntu-serv:~$ sudo install -m 0755 -d /etc/apt/keyrings
boss@ubuntu-serv:~$ sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/keyrings/docker.asc
boss@ubuntu-serv:~$ sudo chmod a+r /etc/apt/keyrings/docker.asc
boss@ubuntu-serv:~$
```

```
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
```

```
*** System restart required ***
```

```
boss@ubuntu-serv:~$ docker version
```

```
Client: Docker Engine - Community
```

```
Version: 28.1.1
```

```
API version: 1.49
```

```
Go version: go1.23.8
```

```
Git commit: 4eba377
```

```
Built: Fri Apr 18 09:52:10 2025
```

```
OS/Arch: linux/amd64
```

```
Context: default
```

```
Server: Docker Engine - Community
```

```
Engine:
```

```
Version: 28.1.1
```

```
API version: 1.49 (minimum version 1.24)
```

```
Go version: go1.23.8
```

```
Git commit: 01f442b
```

```
Built: Fri Apr 18 09:52:10 2025
```

```
OS/Arch: linux/amd64
```

```
Experimental: false
```

```
containerd:
```

```
Version: 1.7.27
```

```
GitCommit: 05044ec0a9a75232cad458027ca83437aae3f4da
```

```
runc:
```

```
Version: 1.2.5
```

```
GitCommit: v1.2.5-0-g59923ef
```

```
docker-init:
```

```
Version: 0.19.0
```

```
GitCommit: de40ad0
```

```
boss@ubuntu-serv:~$ docker compose version
```

```
Docker Compose version v2.35.1
```

```
boss@ubuntu-serv:~$
```

```
=====
To run Docker as a non-privileged user, consider setting up the
Docker daemon in rootless mode for your user:
```

```
    dockerd-rootless-setuptool.sh install
```

```
Visit https://docs.docker.com/go/rootless/ to learn about rootless mode.
```

```
To run the Docker daemon as a fully privileged service, but granting non-root
users access, refer to https://docs.docker.com/go/daemon-access/
```

```
WARNING: Access to the remote API on a privileged Docker daemon is equivalent
to root access on the host. Refer to the 'Docker daemon attack surface'
documentation for details: https://docs.docker.com/go/attack-surface/
```

```
Global Options:
  -c, --config string      Location of client config files (default "/home/boss/.docker/config.json")
  --context string         Name of the context to use to connect to the daemon (contexts are stored in "/home/boss/.docker/contexts.json", use "docker context use" to get the list)
  -D, --debug              Enable debug mode
  -H, --host list           Daemon socket to connect to
  -l, --log-level string    Set the logging level ("debug", "info", "warn", "error")
  --tls                    Use TLS; implied by --tlsverify
  --tlscacert string        Trust certs signed only by this CA (default "/home/boss/.docker/ca.pem")
  --tlscert string          Path to TLS certificate file (default "/home/boss/.docker/cert.pem")
  --tlskey string           Path to TLS key file (default "/home/boss/.docker/key.pem")
  --tlsverify              Use TLS and verify the remote
  -v, --version            Print version information and quit

Run 'docker COMMAND --help' for more information on a command.

For more help on how to use Docker, head to https://docs.docker.com/go/guides/
boss@ubuntu-serv:~$
```

5.

```
boss@ubuntu-serv:~$ docker image ls
REPOSITORY      TAG          IMAGE ID       CREATED        SIZE
hello-world     latest      74cc54e27dc4   3 months ago   10.1kB
boss@ubuntu-serv:~$
```

6.

```
boss@ubuntu-serv:~$ docker run hello-world

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
    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/

boss@ubuntu-serv:~$
```

7.

```
boss@ubuntu-serv:~$ docker image ls
REPOSITORY      TAG          IMAGE ID       CREATED        SIZE
hello-world     latest      74cc54e27dc4   3 months ago   10.1kB
boss@ubuntu-serv:~$ |
```

8-9.

```

boss@ubuntu-serv:~$ docker container ls -a
CONTAINER ID   IMAGE          COMMAND         CREATED        STATUS
PORTS         NAMES
d649e234c576   hello-world    "/hello"        3 minutes ago  Exited (0) 3 minutes
ago           loving_hugle
d6e299de3678   hello-world    "/hello"        2 hours ago    Exited (0) 2 hours a
go           nostalgic_mahavira

```

10.

```

boss@ubuntu-serv:~$ docker container ls -as
CONTAINER ID   IMAGE          COMMAND         CREATED        STATUS
PORTS         NAMES         SIZE
d649e234c576   hello-world    "/hello"        4 minutes ago  Exited (0) 4 minutes ag
o           loving_hugle   0B (virtual 10.1kB)
d6e299de3678   hello-world    "/hello"        2 hours ago    Exited (0) 2 hours ago
           nostalgic_mahavira 0B (virtual 10.1kB)

```

11.

```

boss@ubuntu-serv:~$ docker rm -f 3
3
boss@ubuntu-serv:~$ docker container ls -a
CONTAINER ID   IMAGE          COMMAND         CREATED        STATUS        PORTS        NAMES
boss@ubuntu-serv:~$

```

12.

```

boss@ubuntu-serv:~$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
d649e234c576632945b62fc9a65f0635f90adc93fe1c6bb579b0d7ac6668485a
d6e299de367821c6cc72f8bd322d9fa6bdc8a144230e03be4e4d9098e59aaaad

Total reclaimed space: 0B

```

13-14.

```

boss@ubuntu-serv:~$ docker rmi hello-world
Untagged: hello-world:latest
Untagged: hello-world@sha256:c41088499908a59aae84b0a49c70e86f4731e588a737f1637e73c8c09d995654
Deleted: sha256:74cc54e27dc41bb10dc4b2226072d469509f2f22f1a3ce74f4a59661a1d44602
Deleted: sha256:63a41026379f4391a306242eb0b9f26dc3550d863b7fdbb97d899f6eb89efe72
boss@ubuntu-serv:~$ docker images ls
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE

```

15.

```

boss@ubuntu-serv:~$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
8a628cdd7ccc: Pull complete
b0c073cda91f: Pull complete
e6557c42ebea: Pull complete
ec74683520b9: Pull complete
6c95adab80c5: Pull complete
ad8a0171f43e: Pull complete
32ef64864ec3: Pull complete
Digest: sha256:5ed8fcc66f4ed123c1b2560ed708dc148755b6e4cbd8b943fab094f2c6bfa91e
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
boss@ubuntu-serv:~$

```

16.



```

/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
2025/04/24 18:33:24 [notice] 1#1: using the "epoll" event method
2025/04/24 18:33:24 [notice] 1#1: nginx/1.27.5
2025/04/24 18:33:24 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/04/24 18:33:24 [notice] 1#1: OS: Linux 6.8.0-58-generic
2025/04/24 18:33:24 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/04/24 18:33:24 [notice] 1#1: start worker processes
2025/04/24 18:33:24 [notice] 1#1: start worker process 29
2025/04/24 18:33:24 [notice] 1#1: start worker process 30
2025/04/24 18:33:24 [notice] 1#1: start worker process 31
2025/04/24 18:33:24 [notice] 1#1: start worker process 32

```

17.

```

2025/04/24 18:35:05 [notice] 32#32: exiting
2025/04/24 18:35:05 [notice] 32#32: exit
2025/04/24 18:35:05 [notice] 29#29: exit
2025/04/24 18:35:05 [notice] 31#31: exiting
2025/04/24 18:35:05 [notice] 31#31: exit
2025/04/24 18:35:05 [notice] 1#1: signal 17 (SIGCHLD) received from 29
2025/04/24 18:35:05 [notice] 1#1: worker process 29 exited with code 0
2025/04/24 18:35:05 [notice] 1#1: signal 29 (SIGIO) received
2025/04/24 18:35:05 [notice] 1#1: signal 17 (SIGCHLD) received from 32
2025/04/24 18:35:05 [notice] 1#1: worker process 32 exited with code 0
2025/04/24 18:35:05 [notice] 1#1: signal 29 (SIGIO) received
2025/04/24 18:35:05 [notice] 1#1: signal 14 (SIGALRM) received
2025/04/24 18:35:05 [notice] 1#1: signal 17 (SIGCHLD) received from 31
2025/04/24 18:35:05 [notice] 1#1: worker process 31 exited with code 0
2025/04/24 18:35:05 [notice] 1#1: signal 29 (SIGIO) received
2025/04/24 18:35:05 [notice] 1#1: signal 17 (SIGCHLD) received from 30
2025/04/24 18:35:05 [notice] 1#1: worker process 30 exited with code 0
2025/04/24 18:35:05 [notice] 1#1: exit
boss@ubuntu-serv:~$

```

18.

```

boss@ubuntu-serv:~$ tty
/dev/pts/0
boss@ubuntu-serv:~$ |

```

19.

```

boss@ubuntu-serv:~$ docker run nginx tty
not a tty
boss@ubuntu-serv:~$ |

```

20.

```

boss@ubuntu-serv:~$ docker run -d nginx
a63793873a537e9195536e767fe1cab7848e64bbe71718b2967c7e29294e4d76
boss@ubuntu-serv:~$ |

```

21.

```

boss@ubuntu-serv:~$ docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS        NAMES
a63793873a53   nginx     "/docker-entrypoint. ..." 37 seconds ago Up 37 seconds 80/tcp       fervent_engelbart
boss@ubuntu-serv:~$

```

22.

```

boss@ubuntu-serv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
a63793873a53   nginx    "/docker-entrypoint..." 37 seconds ago Up 37 seconds 80/tcp        fervent_engelbart
boss@ubuntu-serv:~$ docker stop a
a
boss@ubuntu-serv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
boss@ubuntu-serv:~$ docker start a
a
boss@ubuntu-serv:~$ docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
a63793873a53   nginx    "/docker-entrypoint..." About a minute ago Up 2 seconds 80/tcp        fervent_engelbart
boss@ubuntu-serv:~$

```

23.

```

/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
2025/04/24 18:39:21 [notice] 1#1: using the "epoll" event method
2025/04/24 18:39:21 [notice] 1#1: nginx/1.27.5
2025/04/24 18:39:21 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/04/24 18:39:21 [notice] 1#1: OS: Linux 6.8.0-58-generic
2025/04/24 18:39:21 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/04/24 18:39:21 [notice] 1#1: start worker processes
2025/04/24 18:39:21 [notice] 1#1: start worker process 29
2025/04/24 18:39:21 [notice] 1#1: start worker process 30
2025/04/24 18:39:21 [notice] 1#1: start worker process 31
2025/04/24 18:39:21 [notice] 1#1: start worker process 32
|

```

24.

```

2025/04/24 18:39:57 [notice] 29#29: exit
2025/04/24 18:39:57 [notice] 1#1: signal 2 (SIGINT) received, exiting
2025/04/24 18:39:57 [notice] 1#1: signal 14 (SIGALRM) received
2025/04/24 18:39:57 [notice] 1#1: signal 17 (SIGCHLD) received from 30
2025/04/24 18:39:57 [notice] 1#1: worker process 30 exited with code 0
2025/04/24 18:39:57 [notice] 1#1: signal 29 (SIGIO) received
2025/04/24 18:39:57 [notice] 1#1: signal 17 (SIGCHLD) received from 31
2025/04/24 18:39:57 [notice] 1#1: worker process 31 exited with code 0
2025/04/24 18:39:57 [notice] 1#1: signal 29 (SIGIO) received
2025/04/24 18:39:57 [notice] 1#1: signal 17 (SIGCHLD) received from 29
2025/04/24 18:39:57 [notice] 1#1: worker process 29 exited with code 0
2025/04/24 18:39:57 [notice] 1#1: worker process 32 exited with code 0
2025/04/24 18:39:57 [notice] 1#1: exit
boss@ubuntu-serv:~$

```

25.

```

boss@ubuntu-serv:~$ docker run -it nginx tty
/dev/pts/0

```

26.

```

boss@ubuntu-serv:~$ docker container ls
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
a63793873a53   nginx    "/docker-entrypoint..." 3 minutes ago Up About a minute 80/tcp        fervent_engelbart
boss@ubuntu-serv:~$ docker prune
docker: unknown command: docker prune

Run 'docker --help' for more information
boss@ubuntu-serv:~$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
8432e9923aa86c34a4a94ada923b59296a1b9a477df5bcb8fca1d8ac7da89df0
3d881466a501c75a3dd2ca9e4cfbe6a09ae6984af40bbdfef317f13261d582361
728e71df7c672df148f0ce78b582d1cd5b243d67c6f40ee7805e95065715fcdcf
28f7fff4d0c96626bae5c3abfaf3ebd0817c8b09223f6378d66c919d080583b5

Total reclaimed space: 2.186kB
boss@ubuntu-serv:~$

```

27.

```

boss@ubuntu-serv:~$ docker run --rm -d nginx
195e43465df179dd5688a595298b6b318583addea8ebd8b3afc875bef4ca8c36
boss@ubuntu-serv:~$ docker stop
docker: 'docker stop' requires at least 1 argument

Usage:  docker stop [OPTIONS] CONTAINER [CONTAINER...]

See 'docker stop --help' for more information
boss@ubuntu-serv:~$ docker stop 1
1

```

28.

```

boss@ubuntu-serv:~$ docker container ls
CONTAINER ID   IMAGE          COMMAND         CREATED        STATUS        PORTS          NAMES
boss@ubuntu-serv:~$

```

29-30.

```

boss@ubuntu-serv:~$ docker run --rm -d nginx
1b9ed003a1712f714a3e8e3f793b6e726e70719a3efe0e8ce370dc145938bd26
boss@ubuntu-serv:~$ docker exec -it 1 bash
root@1b9ed003a171:/#

```

31.

```

root@1b9ed003a171:/# cd /usr/share/nginx/html
root@1b9ed003a171:/usr/share/nginx/html# ls
50x.html  index.html
root@1b9ed003a171:/usr/share/nginx/html#

```

32-34.

```

</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx
working. Further configuration is 1

<p>For online documentation and sup
<a href="http://nginx.org/">nginx.o
Commercial support is available at
"index.html" 23L, 615B

```

35.

```

shell returned 127

Press ENTER or type command to continue
root@1b9ed003a171:/usr/share/nginx/html# exit
exit
boss@ubuntu-serv:~$

```



```
exit
boss@ubuntu-serv:~$ docker exec 1 ls -al
total 76
drwxr-xr-x  1 root root 4096 Apr 25 09:23 .
drwxr-xr-x  1 root root 4096 Apr 25 09:23 ..
-rwxr-xr-x  1 root root    0 Apr 25 09:23 .dockerenv
lrwxrwxrwx  1 root root    7 Apr  7 00:00 bin -> usr/bin
drwxr-xr-x  2 root root 4096 Mar  7 17:30 boot
drwxr-xr-x  5 root root 3440 Apr 25 09:23 dev
```

36.

```
boss@ubuntu-serv:~$ docker stop 1
1
boss@ubuntu-serv:~$ |
```

37.

```
boss@ubuntu-serv:~$ curl 127.0.0.1:80
curl: (7) Failed to connect to 127.0.0.1 port 80 after 0 ms: Couldn't connect to server
boss@ubuntu-serv:~$
```

38.

```
boss@ubuntu-serv:~$ curl 127.0.0.1:80
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
```

39.

```
boss@ubuntu-serv:~$ docker container ls -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
f7174d1d57c6	nginx	"/docker-entrypoint..."	31 seconds ago	Exited (1) 28 seconds ago		reverent_payne
6d915ba079ff	nginx	"/docker-entrypoint..."	55 seconds ago	Up 54 seconds		sweet_bassi
69d11a348541	nginx	"/docker-entrypoint..."	2 minutes ago	Exited (0) 43 seconds ago		optimistic_feynman

40.

```
2025/04/25 09:34:32 [emerg] 1#1: bind() to 0.0.0.0:80 failed (98: Address already in use)
nginx: [emerg] bind() to 0.0.0.0:80 failed (98: Address already in use)
2025/04/25 09:34:32 [emerg] 1#1: bind() to [::]:80 failed (98: Address already in use)
nginx: [emerg] bind() to [::]:80 failed (98: Address already in use)
2025/04/25 09:34:32 [notice] 1#1: try again to bind() after 500ms
2025/04/25 09:34:32 [emerg] 1#1: bind() to 0.0.0.0:80 failed (98: Address already in use)
nginx: [emerg] bind() to 0.0.0.0:80 failed (98: Address already in use)
2025/04/25 09:34:32 [emerg] 1#1: bind() to [::]:80 failed (98: Address already in use)
nginx: [emerg] bind() to [::]:80 failed (98: Address already in use)
2025/04/25 09:34:32 [notice] 1#1: try again to bind() after 500ms
2025/04/25 09:34:32 [emerg] 1#1: still could not bind()
nginx: [emerg] still could not bind()
boss@ubuntu-serv:~$
```

41.

```
boss@ubuntu-serv:~$ docker stop f
f
```

42.

```
boss@ubuntu-serv:~$ docker run -d -p 8080:80 nginx
b99150125d4c41f848de9f72369cde31ebdf82db2812ec0a8c1f9b7ab40367ca
boss@ubuntu-serv:~$ docker port b
80/tcp -> 0.0.0.0:8080
80/tcp -> [::]:8080
boss@ubuntu-serv:~$ |
```

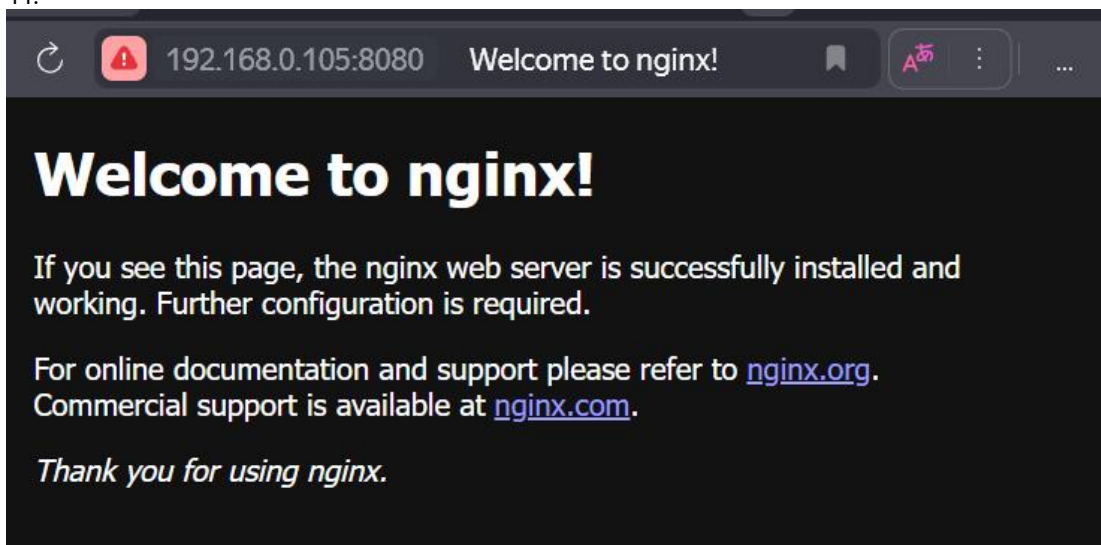
43.

```
boss@ubuntu-serv:~$ docker run -d -p 8081:80 nginx
9297cba0085a9e5ce1dd6775f662adfa37e3ab5e5525bbe04e09a447b9e8e6c8
boss@ubuntu-serv:~$ curl 127.0.0.1:8080:80
curl: (3) URL rejected: Port number was not a decimal number between 0 and 65535
boss@ubuntu-serv:~$ curl 127.0.0.1:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html {background-color: #ffffff; border: 1px solid #cccccc; margin: 0; padding: 0;}
body {background-color: #ffffff; border: 1px solid #cccccc; margin: 0; padding: 0;}
h1 {margin: 0; padding: 5px 0 0 5px;}
p {margin: 0; padding: 5px 0 0 5px;}
a {margin: 0; padding: 5px 0 0 5px; color: #0000ff; text-decoration: underline;}
i {margin: 0; padding: 5px 0 0 5px; font-style: italic;}

```

```
boss@ubuntu-serv:~$ curl 127.0.0.1:8081
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
```

44.



45.

```
boss@ubuntu-serv:~$ docker container ls
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
boss@ubuntu-serv:~$ |
```

46.

```
boss@ubuntu-serv:~$ docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
c224c6278260   bridge    bridge    local
c605e1d5ffea   host      host      local
42d2cc4f0b31   none      null      local
boss@ubuntu-serv:~$ |
```

47.

```

boss@ubuntu-serv:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:19:4f:ec brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.105/24 metric 100 brd 192.168.0.255 scope global dynamic enp0s3
        valid_lft 3079sec preferred_lft 3079sec
    inet6 fe80::a00:27ff:fe19:4fec/64 scope link
        valid_lft forever preferred_lft forever
3: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether e2:ad:61:39:6e:bc brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::e0ad:61ff:fe39:6ebc/64 scope link
        valid_lft forever preferred_lft forever

```

48.

<pre> inet6 ::1/128 scope host noprefixroute     valid_lft forever preferred_lft forever : enp0s3: &lt;BROADCAST,MULTICAST,UP,LOWER_UP&gt; mtu 1500 qdisc fq_codel state U group default qlen 1000     link/ether 08:00:27:19:4f:ec brd ff:ff:ff:ff:ff:ff     inet 192.168.0.105/24 metric 100 brd 192.168.0.255 scope global dynamic enp0s3         valid_lft 3079sec preferred_lft 3079sec     inet6 fe80::a00:27ff:fe19:4fec/64 scope link         valid_lft forever preferred_lft forever : docker0: &lt;NO-CARRIER,BROADCAST,MULTICAST,UP&gt; mtu 1500 qdisc noqueue state DOWN group default     link/ether e2:ad:61:39:6e:bc brd ff:ff:ff:ff:ff:ff     inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0         valid_lft forever preferred_lft forever     inet6 fe80::e0ad:61ff:fe39:6ebc/64 scope link         valid_lft forever preferred_lft forever boss@ubuntu-serv:~\$ docker run -it --name=one avenga/net-tools # </pre>	<pre> Expanded Security Maintenance for Applications is not enabled.  0 updates can be applied immediately.  Enable ESM Apps to receive additional future security updates. See https://ubuntu.com/esm or run: sudo pro status  Last login: Fri Apr 25 10:24:23 2025 from 192.168.0.100 boss@ubuntu-serv:~\$ docker run -it --name=two avenga/net-tools Unable to find image 'avenga/net-tools:latest' locally latest: Pulling from avenga/net-tools 5d0db60ca938: Pull complete 1dca19b5623d: Pull complete Digest: sha256:a75fd879a5cba88bccb69fa793fa0160b0a2bbb7add045095ff08291de429 9d8 Status: Downloaded newer image for avenga/net-tools:latest /# </pre>
---	--

49.

```

boss@ubuntu-serv:~$ docker run -it --name=one avenga/net-tools
/ # ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0@if13: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue
state UP
    link/ether c6:cd:31:19:43:51 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.3/16 brd 172.17.255.255 scope global eth0
        valid_lft forever preferred_lft forever
/ #

```

50.

```

2: eth0@if12: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqu
eue state UP
    link/ether da:ab:a8:ed:9b:fc brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.2/16 brd 172.17.255.255 scope global eth0
        valid_lft forever preferred_lft forever
/ #

```

51.

```

/ # ping 172.17.0.2
PING 172.17.0.2 (172.17.0.2): 56 data bytes
64 bytes from 172.17.0.2: seq=0 ttl=64 time=0.277 ms
64 bytes from 172.17.0.2: seq=1 ttl=64 time=0.140 ms
64 bytes from 172.17.0.2: seq=2 ttl=64 time=0.085 ms
^C
--- 172.17.0.2 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.085/0.167/0.277 ms
/ #

```

51-55.



```
Last login: Fri Apr 25 10:32:08 2025 from 192.168.0.100
boss@ubuntu-serv:~$ docker run -it --name=three --link=one --link=two
:alias_for_two avenga/net-tools
/ # |
```

56.

```
boss@ubuntu-serv:~$ docker run -it --name=three --link=one --link=two
:alias_for_two avenga/net-tools
/ # env
ALIAS_FOR_TWO_NAME=/three/alias_for_two
ONE_NAME=/three/one
HOSTNAME=ad9679d684eb
SHLVL=1
HOME=/root
TERM=xterm
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
PWD=/
/ # |
```

57.

```
/ # cat /etc/hosts
127.0.0.1      localhost
::1          localhost ip6-localhost ip6-loopback
fe00::       ip6-localnet
ff00::       ip6-mcastprefix
ff02::1      ip6-allnodes
ff02::2      ip6-allrouters
172.17.0.3    one 74ed10e4d498
172.17.0.2    alias_for_two b6463271a37d two
172.17.0.4    ad9679d684eb
/ # |
```

58.

```
/ # ping one
PING one (172.17.0.3): 56 data bytes
64 bytes from 172.17.0.3: seq=0 ttl=64 time=1.000 ms
64 bytes from 172.17.0.3: seq=1 ttl=64 time=0.000 ms
64 bytes from 172.17.0.3: seq=2 ttl=64 time=0.000 ms
^C
--- one ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.000/0.333/1.000 ms
/ # |
```

59.



```

/ # ping 172.17.0.4
PING 172.17.0.4 (172.17.0.4): 56 data bytes
64 bytes from 172.17.0.4: seq=0 ttl=64 time=0.095 ms
64 bytes from 172.17.0.4: seq=1 ttl=64 time=0.101 ms
64 bytes from 172.17.0.4: seq=2 ttl=64 time=0.096 ms
^C
--- 172.17.0.4 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.095/0.097/0.101 ms
/ # ping three
^C
/ # |

```

60.

```

boss@ubuntu-serv:~$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
ad9679d684eb6eb22d75ce502d50f7c35cd568e61056f6f8d4c82b8d7a01f389
74ed10e4d4980c71e3125979dc9bd9e2c445c2d5ec3f9235223e20a2a1676ae9
b6463271a37d67bc731f8a83bdbd05ddfe1ef52ea1e6d7bf9e5fd953977c12b5
9297cba0085a9e5ce1dd6775f662adfa37e3ab5e5525bbe04e09a447b9e8e6c8
b99150125d4c41f848de9f72369cde31ebdf82db2812ec0a8c1f9b7ab40367ca
f7174d1d57c6b895819ec3eab8ebbd5d721d4c343852051b9c81fbcc5803550a
6d915ba079ff6c3251a8902a390b4dd909cfe35dc7c2dd76927bb067ff7d9022
69d11a348541b9d8b7dff3dbf1cfc200f750cf47aa504769284a5456a2ae0748

Total reclaimed space: 5.566kB
boss@ubuntu-serv:~$ |

```

62-64.

```

boss@ubuntu-serv:~$ docker network create sky_net
3f172031418c9c1571d897c75dbb69278d13430edccbe95e516da477c69c7f79
boss@ubuntu-serv:~$ docker network ls

```

NETWORK ID	NAME	DRIVER	SCOPE
c224c6278260	bridge	bridge	local
c605e1d5ffea	host	host	local
42d2cc4f0b31	none	null	local
3f172031418c	sky_net	bridge	local

```

boss@ubuntu-serv:~$ |

```

80-82.

# Hello from the local directory

83.

# Hello from the local directory

84.

```

boss@ubuntu-serv:~/content$ docker volume ls
DRIVER      VOLUME NAME
boss@ubuntu-serv:~/content$ |

```

85-86.

```

boss@ubuntu-serv:~/content$ docker volume inspect data
[
  {
    "CreatedAt": "2025-04-25T15:30:53Z",
    "Driver": "local",
    "Labels": null,
    "Mountpoint": "/var/lib/docker/volumes/data/_data",
    "Name": "data",
    "Options": null,
    "Scope": "local"
  }
]
boss@ubuntu-serv:~/content$ |

```

87-88.

```

boss@ubuntu-serv:~/content$ docker volume inspect data
[
  {
    "CreatedAt": "2025-04-25T15:30:53Z",
    "Driver": "local",
    "Labels": null,
    "Mountpoint": "/var/lib/docker/volumes/data/_data",
    "Name": "data",
    "Options": null,
    "Scope": "local"
  }
]
boss@ubuntu-serv:~/content$ ls /var/lib/docker/volumes/data/_data
ls: cannot access '/var/lib/docker/volumes/data/_data': Permission denied
boss@ubuntu-serv:~/content$ sudo ls /var/lib/docker/volumes/data/_data
[sudo] password for boss:
50x.html  index.html
boss@ubuntu-serv:~/content$ |

```

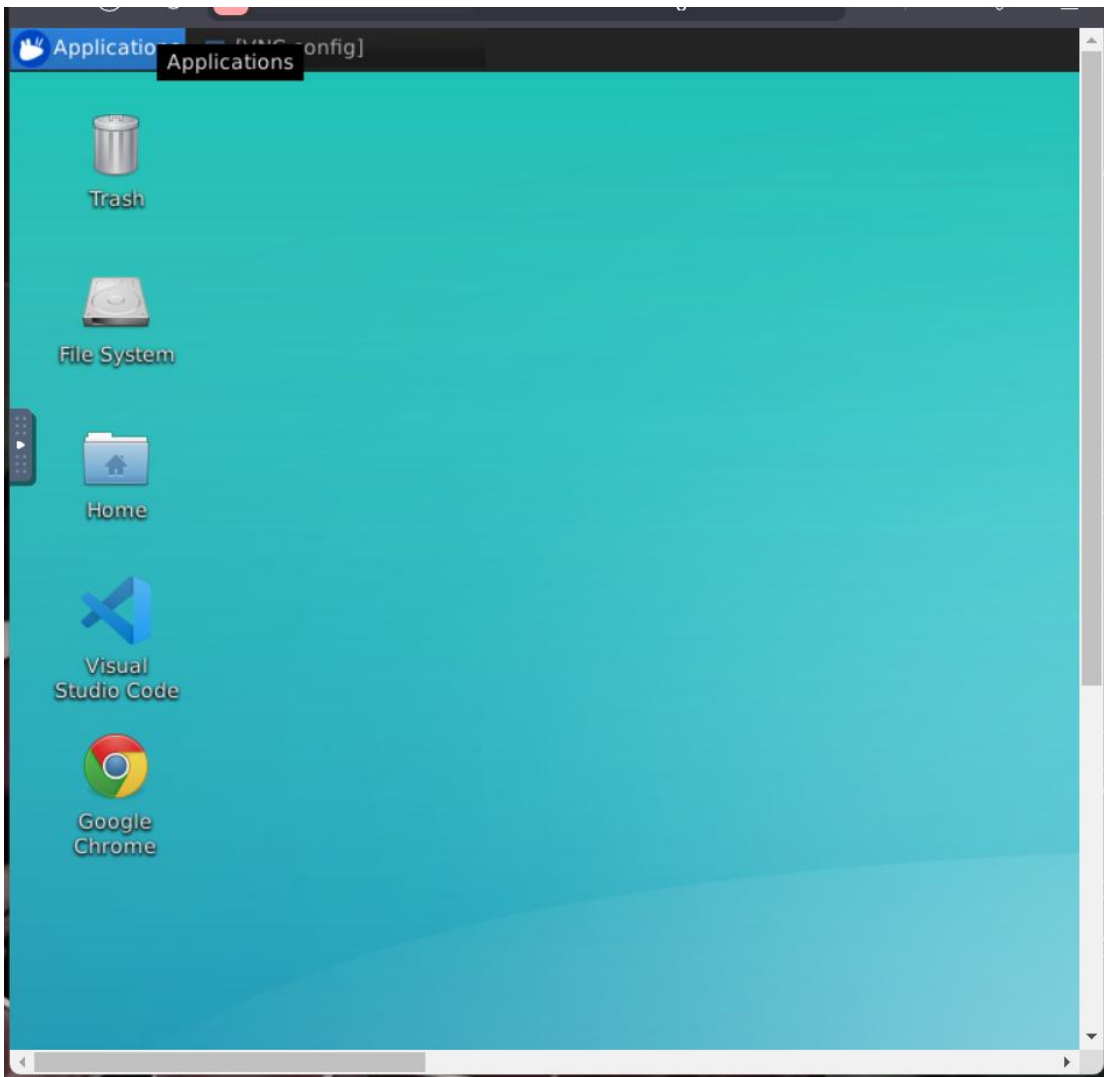
89.

```

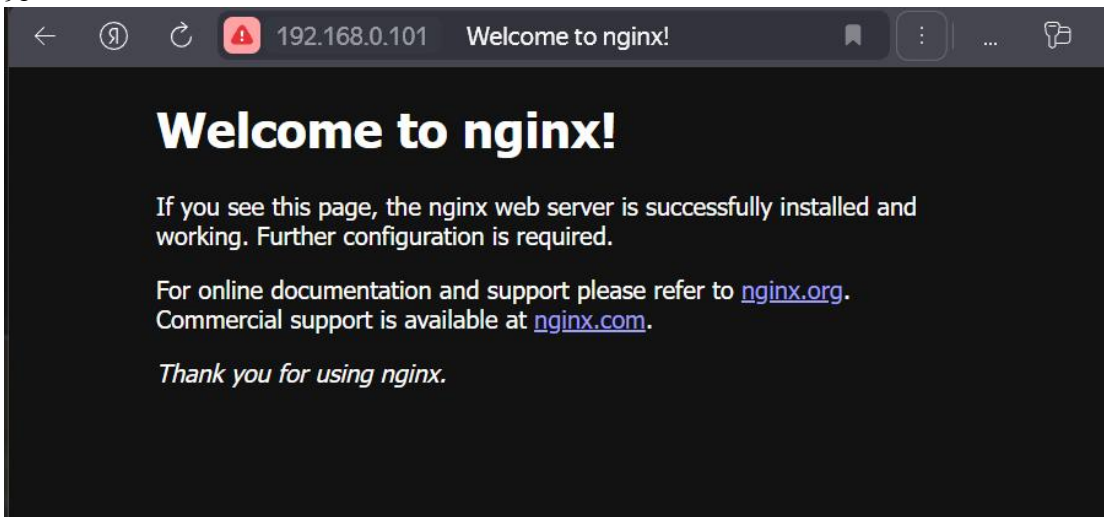
923eeeb914a7: Pull complete
f9815cee44df: Pull complete
ab6046805c0d: Pull complete
7b2fe5d9e8ed: Pull complete
b9ac4339e27f: Pull complete
492e900d1b4d: Pull complete
2d0ae8e36264: Pull complete
79573d8f23f4: Pull complete
Digest: sha256:dda686f0576d2573378eef1840f67dfb12717813efa5dce0ba6be5a5a2e327d6
Status: Downloaded newer image for beneventsur/xubuntu:vscode-1.44.2
663a1af64b445d567cfa46366b502f2a85b5f5bd118d3c17cfb0eeb5be2f7cb4
boss@ubuntu-serv:~/content$ |

```

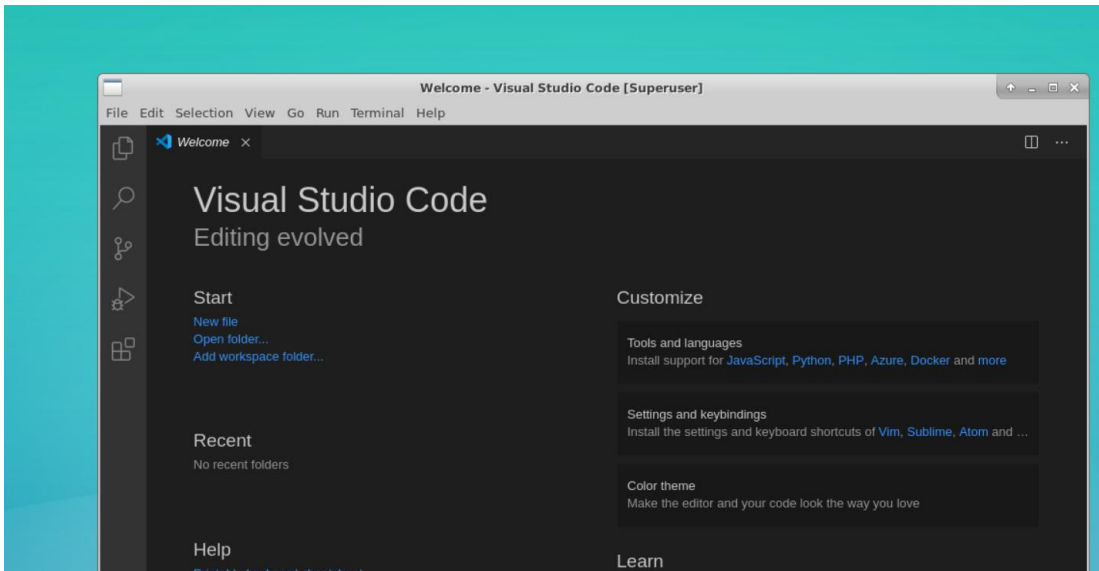
90



91



92



```
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!YAY hi, really. Just hi. please...</h1>
<p>If you see this page, the nginx web server is succes please...
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
```

# Welcome to nginx!YAY hi, really. Just hi. please...

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to [nginx.org](http://nginx.org).  
Commercial support is available at [nginx.com](http://nginx.com).

*Thank you for using nginx.*



```
, 0.0.0.0:6080->6080/tcp, [::]:6080->6080/tcp    flamboyant_sammet
0f971ba6e1e5    nginx    "/docker-entrypoint. ..."
29 minutes ago    Up 29 minutes    0.0.0.0:80->80/tcp, [::]:80->80/tcp
web

boss@ubuntu-serv:~/content$ docker stop 6 0
6
0
boss@ubuntu-serv:~/content$ docker prune
docker: unknown command: docker prune

Run 'docker --help' for more information
boss@ubuntu-serv:~/content$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
663a1af64b445d567cfa46366b502f2a85b5f5bd118d3c17cfb0eeb5be2f7cb4

Total reclaimed space: 10.92MB
boss@ubuntu-serv:~/content$ |
```

94

```
boss@ubuntu-serv:~/content$ docker volume ls
DRIVER    VOLUME NAME
local     data
boss@ubuntu-serv:~/content$ docker volume rm data
data
boss@ubuntu-serv:~/content$ |
```

95

```
boss@ubuntu-serv:~/content$ docker run --name=web -d -p 80:80 nginx
dd45989b75664bacb0a005c454c006f0c01912255981a38f47efbe916a1a233b
boss@ubuntu-serv:~/content$
```

96

```
boss@ubuntu-serv:~/content$ docker cp web:/usr/share/nginx/html/. ~/new_site
Successfully copied 4.1kB to /home/boss/new_site
boss@ubuntu-serv:~/content$ |
```

97

```
boss@ubuntu-serv:~$ ls
content docs get-docker.sh new_site project project_copy
boss@ubuntu-serv:~$ |
```

```
boss@ubuntu-serv:~/new_site$ ls
50x.html index.html
boss@ubuntu-serv:~/new_site$ vim index.html
boss@ubuntu-serv:~/new_site$ |
```

98

```
boss@ubuntu-serv:~/new_site$ docker cp ~/new_site/. web:/usr/share/nginx/html
Successfully copied 4.1kB to web:/usr/share/nginx/html
```

99

# Hi? Yes! Hi!

100-102

```

boss@ubuntu-serv:~$ mkdir flask
boss@ubuntu-serv:~$ cd flask
boss@ubuntu-serv:~/flask$ man mkdir
boss@ubuntu-serv:~/flask$ mkdir app
boss@ubuntu-serv:~/flask$ cd app
boss@ubuntu-serv:~/flask/app$ python3 --version
Python 3.12.3
boss@ubuntu-serv:~/flask/app$ |

```

103-104

```

boss@ubuntu-serv:~/flask/app$ python3 -m venv venv
boss@ubuntu-serv:~/flask/app$ source venv/bin/activate
(venv) boss@ubuntu-serv:~/flask/app$ |

```

105-106

```

boss@ubuntu-serv: ~/flask/ap  ×  +  ▾

4_x86_64.whl.metadata (4.0 kB)
Downloading flask-3.1.0-py3-none-any.whl (102 kB)
 103.0/103.0 kB 3
Downloading blinker-1.9.0-py3-none-any.whl (8.5 kB)
Downloading click-8.1.8-py3-none-any.whl (98 kB)
 98.2/98.2 kB 4
Downloading itsdangerous-2.2.0-py3-none-any.whl (16 kB)
Downloading jinja2-3.1.6-py3-none-any.whl (134 kB)
 134.9/134.9 kB 4
Downloading werkzeug-3.1.3-py3-none-any.whl (224 kB)
 224.5/224.5 kB 5
Downloading MarkupSafe-3.0.2-cp312-cp312-manylinux_2_17
x86_64.whl (23 kB)
Installing collected packages: MarkupSafe, itsdangerous
kzeug, Jinja2, Flask
Successfully installed Flask-3.1.0 Jinja2-3.1.6 MarkupS
1.3 blinker-1.9.0 click-8.1.8 itsdangerous-2.2.0
(venv) boss@ubuntu-serv:~/flask/app$ vim app.py
(venv) boss@ubuntu-serv:~/flask/app$ |

```

107

Hello, World!

```

(venv) boss@ubuntu-serv:~/flask/app$ vim app.py
(venv) boss@ubuntu-serv:~/flask/app$ python app.py
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deploy
ent. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://192.168.0.101:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 704-435-097
192.168.0.100 - - [25/Apr/2025 16:38:54] "GET / HTTP/1.1" 200 -
192.168.0.100 - - [25/Apr/2025 16:38:54] "GET /favicon.ico HTTP/1.1" 404 -

```

108

```
192.168.0.100 - - [25/Apr/2025 16:38:54]
192.168.0.100 - - [25/Apr/2025 16:38:54]
^C(venv) boss@ubuntu-serv:~/flask/app$ |
```

109-110

```
^C(venv) boss@ubuntu-serv:~/flask/app$ pip freeze > requirements.txt
(venv) boss@ubuntu-serv:~/flask/app$ cat requirements.txt
blinker==1.9.0
click==8.1.8
Flask==3.1.0
itsdangerous==2.2.0
Jinja2==3.1.6
MarkupSafe==3.0.2
Werkzeug==3.1.3
(venv) boss@ubuntu-serv:~/flask/app$ deactivate
boss@ubuntu-serv:~/flask/app$ |
```

111-112

```
=> exporting to image
=> => exporting layers
=> => writing image sha256:b7440d20644422bb61e5f47e2995ba661c6dfaa50
=> => naming to docker.io/library/flask
boss@ubuntu-serv:~/flask/app$ docker image ls
REPOSITORY          TAG         IMAGE ID      CREATED        SIZE
flask                latest      b7440d206444  49 seconds ago 1.05GB
nginx                latest      4e1b6bae1e48  9 days ago    192MB
avenga/net-tools     latest      711a1d6e68c3  3 years ago   36.3MB
beneventsur/xubuntu vscode-1.44.2 05224dab2e89  5 years ago   1.41GB
boss@ubuntu-serv:~/flask/app$ |
```

113-114

```
← ② 192.168.0.101 192.168.0.101
Hello, World!
update Update configuration of one or more containers
wait Block until one or more containers stop, then print their exit
codes
Run 'docker container COMMAND --help' for more information on a command.
boss@ubuntu-serv:~/flask/app$ docker container ls
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS
PORTS
dd45989b7566   nginx    "/docker-entrypoint..." 44 minutes ago Up 44 min
utes 0.0.0.0:80->80/tcp, [::]:80->80/tcp web
boss@ubuntu-serv:~/flask/app$ docker stop d
d
boss@ubuntu-serv:~/flask/app$ docker run --rm -p 80:5000 flask
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deploy
ment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
```

115-119

```
boss@ubuntu-serv:~/flask/app$ docker run -d --rm --name=app flask
docker exec app ls -al
743c0b10c91d3d9088ae61ceb72ace8d0169ecd4de12582554dd23b596f20d55
total 24
drwxr-xr-x 1 root root 4096 Apr 25 16:47 .
drwxr-xr-x 1 root root 4096 Apr 25 16:55 ..
-rw-rw-r-- 1 root root 114 Apr 25 16:44 Dockerfile
-rw-rw-r-- 1 root root 184 Apr 25 16:36 app.py
-rw-rw-r-- 1 root root 109 Apr 25 16:39 requirements.txt
drwxrwxr-x 5 root root 4096 Apr 25 16:18 venv
boss@ubuntu-serv:~/flask/app$ docker exec app du -ha --max-depth=1
21M    ./venv
4.0K   ./app.py
4.0K   ./Dockerfile
4.0K   ./requirements.txt
21M    .
boss@ubuntu-serv:~/flask/app$ vim .dockerignore
```

120-124



```
=> => writing image sha256:26fcbe6eadd2205ddaacc68a83bd47042044a512dcdd 0.0s
=> => naming to docker.io/library/flask:alpine 0.0s
boss@ubuntu-serv:~/flask/app$ docker image ls
REPOSITORY          TAG          IMAGE ID      CREATED        SIZE
flask                alpine       26fcbe6eadd  6 seconds ago  67MB
flask                clean        4071338dbfd8  3 minutes ago  1.03GB
flask                latest       b7440d206444  12 minutes ago 1.05GB
nginx                latest       4e1b6bae1e48  9 days ago     192MB
avenga/net-tools     latest       711a1d6e68c3  3 years ago    36.3MB
beneventsur/xubuntu  vscode-1.44.2 05224dab2e89  5 years ago    1.41GB
boss@ubuntu-serv:~/flask/app$ docker rmi 40 b
```

125

```
boss@ubuntu-serv:~/flask/app$ docker rmi 40 b
Untagged: flask:clean
Deleted: sha256:4071338dbfd8f078f7a1ac07de0d0b0868dea4b75ffd3b062f5c09f4027f6bef
Error response from daemon: conflict: unable to delete b7440d206444 (cannot be forced) - image is being used by running container 743c0b10c91d
boss@ubuntu-serv:~/flask/app$ docker container ls
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS
743c0b10c91d   flask     "python app.py"         8 minutes ago Up 8 minutes
app
boss@ubuntu-serv:~/flask/app$ docker stop 7
7
boss@ubuntu-serv:~/flask/app$ docker rmi b
Untagged: flask:latest
Deleted: sha256:b7440d20644422bb61e5f47e2995ba661c6dfaa50c950b68239d3ecc9121946e
boss@ubuntu-serv:~/flask/app$ |
```

127

```
boss@ubuntu-serv:~/flask/app$ docker image tag flask:alpine flask:latest
docker image tag flask:alpine my_app:latest
docker image ls
REPOSITORY          TAG          IMAGE ID      CREATED        SIZE
flask                alpine       26fcbe6eadd  2 minutes ago  67MB
flask                latest       26fcbe6eadd  2 minutes ago  67MB
my_app               latest       26fcbe6eadd  2 minutes ago  67MB
nginx                latest       4e1b6bae1e48  9 days ago     192MB
avenga/net-tools     latest       711a1d6e68c3  3 years ago    36.3MB
beneventsur/xubuntu  vscode-1.44.2 05224dab2e89  5 years ago    1.41GB
boss@ubuntu-serv:~/flask/app$ |
```

128

```
boss@ubuntu-serv:~/flask/app$ docker rmi flask:alpine
Untagged: flask:alpine
boss@ubuntu-serv:~/flask/app$ docker rmi my_app:latest
Error response from daemon: No such image: my_app:latest
boss@ubuntu-serv:~/flask/app$ docker rmi my_app:latest
Untagged: my_app:latest
boss@ubuntu-serv:~/flask/app$ |
```

129-134

```
boss@ubuntu-serv:~/flask/app$ docker image ls
REPOSITORY          TAG          IMAGE ID      CREATED        SIZE
var_keeper          latest       3cb1381d9643  About a minute ago  83.6MB
flask                latest       26fcbe6eadd  10 minutes ago  67MB
nginx                latest       4e1b6bae1e48  9 days ago     192MB
avenga/net-tools     latest       711a1d6e68c3  3 years ago    36.3MB
beneventsur/xubuntu  vscode-1.44.2 05224dab2e89  5 years ago    1.41GB
boss@ubuntu-serv:~/flask/app$ |
```

135-137



```

f488b2cd8494: Pull complete
9451290759df: Pull complete
Digest: sha256:7839322bd6c3174a699586c3ea36314c59b61b4ce01b4146951818b94aef5fd7
Status: Downloaded newer image for mysql:latest
4230b123b89b48edae91f537366d7def99cb87f1cfd947127c5ec59b583a61a5
boss@ubuntu-serv:~/flask/app$ docker run -d --name=keeper --network=net -p 80:500
0 var_keeper
f776b8b6fd4b627ce600bac412324573c050da866b443db3aeafe3db6530d3ca
boss@ubuntu-serv:~/flask/app$ |

```

```

boss@ubuntu-serv:~/flask/app$ docker logs keeper
Connection to db:OK
Create db:OK
Change db:OK
Create table:OK
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production
Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.18.0.3:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 266-598-874
boss@ubuntu-serv:~/flask/app$ |

```