

Install docker in EC2:

```
ubuntu@ip-172-31-75-40:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 64 not upgraded.
Need to get 76.1 MB of archives.
After this operation, 288 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 pigz amd64 2.8-1 [65.6 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 bridge-utils amd64 1.7.1-1ubuntu2 [33.9 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 runc amd64 1.3.3-0ubuntu1-24.04.3 [8815 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 containerd amd64 1.7.28-0ubuntu1-24.04.2 [38.4 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 dns-root-data all 2024071801~ubuntu0.24.04.1 [5918 B]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 dnsmasq-base amd64 2.90-2ubuntu0.1 [376 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 docker.io amd64 28.2.2-0ubuntu1-24.04.1 [28.3 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 ubuntu-fan all 0.12.16+24.04.1 [34.2 kB]
Fetched 76.1 MB in 1s (76.9 MB/s)
Preconfiguring packages ...
Selecting previously unselected package pigz.
(Reading database ... 110389 files and directories currently installed.)
Preparing to unpack .../0-pigz_2.8-1_amd64.deb ...
Unpacking pigz (2.8-1) ...
Selecting previously unselected package bridge-utils.
Preparing to unpack .../1-bridge-utils_1.7.1-1ubuntu2_amd64.deb ...
```

```
ubuntu@ip-172-31-75-40:~$ ps -aux | grep docker
root      9794  0.2  5.2 1898340 48856 ?        Ssl  10:45   0:00 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.
sock
ubuntu    10105  0.0  0.2   7076  2228 pts/1    S+   10:46   0:00 grep --color=auto docker
ubuntu@ip-172-31-75-40:~$
```

Any container is running or not:

```
ubuntu@ip-172-31-75-40:~$ sudo docker ps
CONTAINER ID   IMAGE      COMMAND   CREATED   STATUS     PORTS      NAMES
```

To see any image:

```
root@ip-172-31-75-40:/home/ubuntu# docker images
REPOSITORY      TAG          IMAGE ID      CREATED      SIZE
```

Nginx will be pulled from docker hub:

```
root@ip-172-31-75-40:/home/ubuntu# docker image pull nginx
Using default tag: latest
latest: Pulling from library/nginx
119d43eecd815: Pull complete
700146c8ad64: Pull complete
d989100b8a84: Pull complete
500799c30424: Pull complete
10b68cfefee1: Pull complete
57f0dd1befc2: Pull complete
eaf8753feae0: Pull complete
Digest: sha256:c881927c4077710ac4b1da63b83aa163937fb47457950c267d92f7e4dedf4aec
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
root@ip-172-31-75-40:/home/ubuntu# docker image ls
REPOSITORY      TAG          IMAGE ID      CREATED      SIZE
nginx          latest       4af177a024eb  2 weeks ago  161MB
```

Run the images:

```

root@ip-172-31-75-40:/home/ubuntu# docker run 4af177a024eb
/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/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
2026/02/02 11:14:48 [notice] 1#1: using the "epoll" event method
2026/02/02 11:14:48 [notice] 1#1: nginx/1.29.4
2026/02/02 11:14:48 [notice] 1#1: built by gcc 14.2.0 (Debian 14.2.0-19)
2026/02/02 11:14:48 [notice] 1#1: OS: Linux 6.14.0-1018-aws
2026/02/02 11:14:48 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2026/02/02 11:14:48 [notice] 1#1: start worker processes
2026/02/02 11:14:48 [notice] 1#1: start worker process 29
2026/02/02 11:14:48 [notice] 1#1: start worker process 30
^C2026/02/02 11:14:59 [notice] 1#1: signal 2 (SIGINT) received, exiting
2026/02/02 11:14:59 [notice] 29#29: exiting
2026/02/02 11:14:59 [notice] 29#29: exit
2026/02/02 11:14:59 [notice] 30#30: exiting
2026/02/02 11:14:59 [notice] 30#30: exit
2026/02/02 11:14:59 [notice] 1#1: signal 17 (SIGCHLD) received from 30
2026/02/02 11:14:59 [notice] 1#1: worker process 29 exited with code 0
2026/02/02 11:14:59 [notice] 1#1: worker process 30 exited with code 0
2026/02/02 11:14:59 [notice] 1#1: exit

root@ip-172-31-75-40:/home/ubuntu# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS               NAMES
f5836065ebb4        4af177a024eb   "/docker-entrypoint...."   About a minute ago   Exited (0) About a minute ago
ra
root@ip-172-31-75-40:/home/ubuntu# docker rm f5836065ebb4
f5836065ebb4
root@ip-172-31-75-40:/home/ubuntu# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS               NAMES
```

To run the docker image in detached mode:

```

root@ip-172-31-75-40:/home/ubuntu# docker image ls
REPOSITORY      TAG      IMAGE ID      CREATED          SIZE
nginx           latest   4af177a024eb   2 weeks ago    161MB
root@ip-172-31-75-40:/home/ubuntu# docker run -d 4af177a024eb
00fcfd6484beb48258769a1640339f96f34f3004289c446b18d767862080e4380
root@ip-172-31-75-40:/home/ubuntu# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS               NAMES
00fcfd6484beb   4af177a024eb   "/docker-entrypoint...."   7 seconds ago   Up 6 seconds   80/tcp   happy_ride
root@ip-172-31-75-40:/home/ubuntu#
```

To run bash / curl from the container:

```

root@ip-172-31-75-40:/home/ubuntu# docker exec -it e0109ebdafd2 bash
root@e0109ebdafd2:/# curl https://localhost:80
curl: (35) TLS connect error: error:0A0000C6:SSL routines::packet length too long
root@e0109ebdafd2:/# curl http://localhost: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>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
root@e0109ebdafd2:/# exit
exit
root@ip-172-31-75-40:/home/ubuntu# docker exec e0109ebdafd2 curl http://localhost:80
  % Total    % Received % Xferd  Average Speed   Time     Time      Current
               Dload  Upload Total   Spent    Left  Speed
100<!DOCTYPE html>  0     0     0       0      0 --:--:-- --:--:-- --:--:--   0
<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>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
  615  100  615     0      0   590k      0 --:--:-- --:--:-- --:--:--  600k
  100  172  31  75  "  /"  "  "  "  "

```

Port is is forwarding/publishing to host in outside the container:

```

root@ip-172-31-75-40:/home/ubuntu# docker run -d -p 8080:80 4af177a024eb
564cb70a4ce017c11e35a9a2db3714248eb129e6b5672c7eaal812f1b1b0bc70
root@ip-172-31-75-40:/home/ubuntu# ss -tulpn
Netid State Recv-Q Send-Q Local Address:Port      Peer Address:Port Process
udp  UNCONN  0      0          127.0.0.54:53        0.0.0.0:*      users:(("systemd-resolve",pid=8325,fd=16))
udp  UNCONN  0      0          127.0.0.53%lo:53      0.0.0.0:*      users:(("systemd-resolve",pid=8325,fd=14))
udp  UNCONN  0      0          172.31.75.40%ens5:68    0.0.0.0:*      users:(("systemd-network",pid=8353,fd=23))
udp  UNCONN  0      0          127.0.0.1:323       0.0.0.0:*      users:(("chronyd",pid=735,fd=5))
udp  UNCONN  0      0          [::]:323           [::]:*       users:(("chronyd",pid=735,fd=6))
tcp  LISTEN  0     4096      127.0.0.54:53        0.0.0.0:*      users:(("systemd-resolve",pid=8325,fd=17))
tcp  LISTEN  0     4096      0.0.0.0:22         0.0.0.0:*      users:(("sshd",pid=8331,fd=3),("systemd",pid=1,fd=142))
tcp  LISTEN  0     4096      127.0.0.1:33687      0.0.0.0:*      users:(("containerd",pid=9554,fd=9))
tcp  LISTEN  0     4096      0.0.0.0:8080       0.0.0.0:*      users:(("docker-proxy",pid=11287,fd=7))
tcp  LISTEN  0     4096      127.0.0.53%lo:53    0.0.0.0:*      users:(("systemd-resolve",pid=8325,fd=15))
tcp  LISTEN  0     4096      [::]:22            [::]:*       users:(("sshd",pid=8331,fd=4),("systemd",pid=1,fd=146))
tcp  LISTEN  0     4096      [::]:8080        [::]:*       users:(("docker-proxy",pid=11297,fd=7))
tcp  LISTEN  0      511       *:3000           *:*        users:(("node",pid=9171,fd=24))

```

```

root@ip-172-31-75-40:/home/ubuntu# curl http://localhost:8080
<!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>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>

```

Volumes:

```
ubuntu@ip-172-31-75-40:~$ top
top - 11:55:18 up 6:01, 5 users, load average: 0.00, 0.00, 0.00
Tasks: 137 total, 1 running, 136 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.2 sy, 0.0 ni, 99.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 914.2 total, 73.4 free, 490.6 used, 527.0 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 423.6 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
9554	root	20	0	1802380	39556	24492	S	0.3	4.2	0:04.76	containerd
11426	ubuntu	20	0	12352	5868	3656	R	0.3	0.6	0:00.01	top
1	root	20	0	22524	13928	9652	S	0.0	1.5	0:07.50	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.02	kthreadd
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_workqueue_release
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rCU_gp
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-sync_wq
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-kvfree_rcu_reclaim
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-slub_flushwq
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-netns
11	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-events_highpri
13	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-mm_percpu_wq
14	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_rude_kthread
15	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_trace_kthread
16	root	20	0	0	0	0	S	0.0	0.0	0:00.12	ksoftirqd/0
17	root	20	0	0	0	0	I	0.0	0.0	0:00.93	rcu_sched
18	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_exp_par_gp_kthread_worker/0
19	root	20	0	0	0	0	S	0.0	0.0	0:00.01	rcu_exp_gp_kthread_worker
20	root	rt	0	0	0	0	S	0.0	0.0	0:00.10	migration/0
21	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/0
22	root	20	0	0	0	0	S	0.0	0.0	0:00.01	cpuhp/0
23	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/1

```
ubuntu@ip-172-31-75-40:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root       6.8G  3.4G  3.4G  51% /
tmpfs          458M    0  458M   0% /dev/shm
tmpfs          183M 1020K 182M   1% /run
tmpfs          5.0M    0  5.0M   0% /run/lock
efivarfs       128K  3.6K  120K   3% /sys/firmware/efi/efivars
/dev/nvme0n1p16 881M  89M  730M  11% /boot
/dev/nvme0n1p15 105M  6.2M  99M   6% /boot/efi
tmpfs          92M   12K  92M   1% /run/user/1000
```

Docker networks: by default docker uses bridge network

```
root@ip-172-31-75-40:/home/ubuntu# docker network ls
NETWORK ID      NAME      DRIVER      SCOPE
938feef51a52   bridge    bridge      local
003bdbc8c023   host      host      local
a2874a22d489   none      null      local
71b208076b03   sample_nodejs_default  bridge      local
root@ip-172-31-75-40:/home/ubuntu#
```

We can configure that what type of network to be used for the container:

```
root@ip-172-31-75-40:/home/ubuntu/sample_nodejs# docker run --name nginx --network host nginx
/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/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
2026/02/03 06:17:22 [notice] 1#1: using the "epoll" event method
2026/02/03 06:17:22 [notice] 1#1: nginx/1.29.4
2026/02/03 06:17:22 [notice] 1#1: built by gcc 14.2.0 (Debian 14.2.0-19)
2026/02/03 06:17:22 [notice] 1#1: OS: Linux 6.14.0-1018-aws
2026/02/03 06:17:22 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2026/02/03 06:17:22 [notice] 1#1: start worker processes
2026/02/03 06:17:22 [notice] 1#1: start worker process 29
2026/02/03 06:17:22 [notice] 1#1: start worker process 30
```

```
root@ip-172-31-75-40:/home/ubuntu/sample_nodejs ^ + ~
[{"EndpointID": "e65766bc02c9ba7b1283f296e075138a5ccff2f1192d9f7f0db839a987c7800f",
 "Gateway": "172.18.0.1",
 "IPAddress": "172.18.0.3",
 "IPPrefixLen": 16,
 "IPv6Gateway": "",
 "GlobalIPv6Address": "",
 "GlobalIPv6PrefixLen": 0,
 "DNSNames": [
     "sample_nodejs_database_1",
     "f3a7cef2b635",
     "database"
 ],
 },
 },
 ]
}
]
root@ip-172-31-75-40:/home/ubuntu/sample_nodejs# 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: ens5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc mq state UP group default qlen 1000
    link/ether 16:ff:e3:da:5c:f1 brd ff:ff:ff:ff:ff:ff
    altname enp0s5
    inet 172.31.75.40/20 metric 100 brd 172.31.79.255 scope global dynamic ens5
        valid_lft 3340sec preferred_lft 3340sec
    inet6 fe80::14ff:e3ff:fed:a5cf1/64 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 4e:00:5d:09:23:c4 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::4c00:5dff:fe09:23c4/64 scope link
        valid_lft forever preferred_lft forever
24: br-71b208076b03: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether ce:bb:7f:33:d7:c6 brd ff:ff:ff:ff:ff:ff
    inet 172.18.0.1/16 brd 172.18.255.255 scope global br-71b208076b03
        valid_lft forever preferred_lft forever
    inet6 fe80::ccb7fffffe33:d7c6/64 scope link
```