

Last login: Sat Nov 30 16:14:22 on ttys000
(base) tahayasin@Tahas-MacBook-Pro ~ % chmod 400 "assignment1.pem"
chmod: assignment1.pem: No such file or directory
(base) tahayasin@Tahas-MacBook-Pro ~ % cd ~/Desktop
(base) tahayasin@Tahas-MacBook-Pro Desktop % chmod 400 "assignment1.pem"
(base) tahayasin@Tahas-MacBook-Pro Desktop % ssh -i "assignment1.pem" ubuntu@ec2-3-238-161-249.compute-1.amazonaws.com
The authenticity of host 'ec2-3-238-161-249.compute-1.amazonaws.com (3.238.161.249)' can't be established.
ED25519 key fingerprint is SHA256:PZcf/Rf0APDKnJPtGObtUS2TMdwpPjAPucBftXHlbQU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-238-161-249.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1015-aws x86_64)

- * Documentation: <https://help.ubuntu.com>
- * Management: <https://landscape.canonical.com>
- * Support: <https://ubuntu.com/pro>

System information as of Sat Nov 30 09:18:40 UTC 2024

System load: 0.67 Processes: 115
Usage of /: 21.1% of 7.57GB Users logged in: 0
Memory usage: 3% IPv4 address for ens5: 172.31.4.160
Swap usage: 0%

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`

The list of available updates is more than a week old.
To check for new updates run: `sudo apt update`

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in `/usr/share/doc/*/copyright`.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by

applicable law.

To run a command as administrator (user "root"), use "sudo <command>".

See "man sudo_root" for details.

```
ubuntu@ip-172-31-4-160:~$ sudo apt-get update
```

```
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
```

```
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
```

```
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
```

```
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
```

```
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
```

```
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
```

```
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
```

```
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
```

```
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
```

```
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
```

```
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2179 kB]
```

```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [372 kB]
```

```
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [17.9 kB]
```

```
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2680 kB]
```

```
Get:15 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1956 kB]
```

```
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [466 kB]
```

```
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [612 B]
```

```
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1177 kB]
```

```
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [287 kB]
```

```
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
```

Get:21 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse amd64 Packages](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse/amd64/Packages) [43.6 kB]
Get:22 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse Translation-en](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse/Translation-en) [11.4 kB]
Get:23 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse amd64 c-n-f Metadata](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/multiverse/amd64/c-n-f/Metadata) [440 B]
Get:24 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main amd64 Packages](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main/amd64/Packages) [67.7 kB]
Get:25 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main Translation-en](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main/Translation-en) [11.1 kB]
Get:26 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main amd64 c-n-f Metadata](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/main/amd64/c-n-f/Metadata) [388 B]
Get:27 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/restricted amd64 c-n-f Metadata](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/restricted/amd64/c-n-f/Metadata) [116 B]
Get:28 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe amd64 Packages](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe/amd64/Packages) [28.9 kB]
Get:29 [http://security.ubuntu.com/ubuntu/jammy-security/main Translation-en](http://security.ubuntu.com/ubuntu/jammy-security/main/Translation-en) [313 kB]
Get:30 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe Translation-en](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe/Translation-en) [16.5 kB]
Get:31 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe amd64 c-n-f Metadata](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/universe/amd64/c-n-f/Metadata) [672 B]
Get:32 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/multiverse amd64 c-n-f Metadata](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-backports/multiverse/amd64/c-n-f/Metadata) [116 B]
Get:33 [http://security.ubuntu.com/ubuntu/jammy-security/main amd64 c-n-f Metadata](http://security.ubuntu.com/ubuntu/jammy-security/main/amd64/c-n-f/Metadata) [13.3 kB]
Get:34 [http://security.ubuntu.com/ubuntu/jammy-security/restricted amd64 Packages](http://security.ubuntu.com/ubuntu/jammy-security/restricted/amd64/Packages) [2611 kB]
Get:35 [http://security.ubuntu.com/ubuntu/jammy-security/restricted Translation-en](http://security.ubuntu.com/ubuntu/jammy-security/restricted/Translation-en) [453 kB]
Get:36 [http://security.ubuntu.com/ubuntu/jammy-security/restricted amd64 c-n-f Metadata](http://security.ubuntu.com/ubuntu/jammy-security/restricted/amd64/c-n-f/Metadata) [580 B]
Get:37 [http://security.ubuntu.com/ubuntu/jammy-security/universe amd64 Packages](http://security.ubuntu.com/ubuntu/jammy-security/universe/amd64/Packages) [957 kB]
Get:38 [http://security.ubuntu.com/ubuntu/jammy-security/universe Translation-en](http://security.ubuntu.com/ubuntu/jammy-security/universe/Translation-en) [203 kB]
Get:39 [http://security.ubuntu.com/ubuntu/jammy-security/universe amd64 c-n-f Metadata](http://security.ubuntu.com/ubuntu/jammy-security/universe/amd64/c-n-f/Metadata) [19.5 kB]
Get:40 [http://security.ubuntu.com/ubuntu/jammy-security/multiverse amd64 Packages](http://security.ubuntu.com/ubuntu/jammy-security/multiverse/amd64/Packages) [37.6 kB]
Get:41 [http://security.ubuntu.com/ubuntu/jammy-security/multiverse Translation-en](http://security.ubuntu.com/ubuntu/jammy-security/multiverse/Translation-en) [8260 B]
Get:42 [http://security.ubuntu.com/ubuntu/jammy-security/multiverse amd64 c-n-f Metadata](http://security.ubuntu.com/ubuntu/jammy-security/multiverse/amd64/c-n-f/Metadata) [224 B]
Fetched 34.7 MB in 6s (5857 kB/s)

Reading package lists... Done

ubuntu@ip-172-31-4-160:~\$ sudo apt-get install sysbench

Reading package lists... Done

Building dependency tree... Done

Reading state information... Done

The following additional packages will be installed:

liblua5.1-2 liblua5.1-common libmysqlclient21 libpq5 mysql-common

The following NEW packages will be installed:

liblua5.1-2 liblua5.1-common libmysqlclient21 libpq5 mysql-common
sysbench

0 upgraded, 6 newly installed, 0 to remove and 30 not upgraded.

Need to get 1866 kB of archives.

After this operation, 8498 kB 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 jammy/universe amd64 liblua5.1-common all 2.1.0~beta3+dfsg-6 [44.3 kB]

Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 liblua5.1-2 amd64 2.1.0~beta3+dfsg-6 [238 kB]

Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 mysql-common all 5.8+1.0.8 [7212 B]

Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libmysqlclient21 amd64 8.0.40-0ubuntu0.22.04.1 [1308 kB]

Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libpq5 amd64 14.13-0ubuntu0.22.04.1 [149 kB]

Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 sysbench amd64 1.0.20+ds-2 [120 kB]

Fetched 1866 kB in 0s (33.2 MB/s)

Selecting previously unselected package liblua5.1-common.

(Reading database ... 65783 files and directories currently installed.)

Preparing to unpack .../0-liblua5.1-common_2.1.0~beta3+dfsg-6_all.deb ...

Unpacking liblua5.1-common (2.1.0~beta3+dfsg-6) ...

Selecting previously unselected package liblua5.1-2:amd64.

Preparing to unpack .../1-liblua5.1-2_2.1.0~beta3+dfsg-6_amd64.deb ...

Unpacking liblua5.1-2:amd64 (2.1.0~beta3+dfsg-6) ...

Selecting previously unselected package mysql-common.

Preparing to unpack .../2-mysql-common_5.8+1.0.8_all.deb ...

Unpacking mysql-common (5.8+1.0.8) ...

Selecting previously unselected package libmysqlclient21:amd64.

Preparing to unpack .../3-libmysqlclient21_8.0.40-0ubuntu0.22.04.1_amd64.deb ...

Unpacking libmysqlclient21:amd64 (8.0.40-0ubuntu0.22.04.1) ...

Selecting previously unselected package libpq5:amd64.

Preparing to unpack .../4-libpq5_14.13-0ubuntu0.22.04.1_amd64.deb ...

Unpacking libpq5:amd64 (14.13-0ubuntu0.22.04.1) ...

Selecting previously unselected package sysbench.

Preparing to unpack .../5-sysbench_1.0.20+ds-2_amd64.deb ...
Unpacking sysbench (1.0.20+ds-2) ...
Setting up mysql-common (5.8+1.0.8) ...
update-alternatives: using /etc/mysql/my.cnf.fallback to provide /etc/mysql/my.cnf (my.cnf)
in auto mode
Setting up libmysqlclient21:amd64 (8.0.40-0ubuntu0.22.04.1) ...
Setting up libpq5:amd64 (14.13-0ubuntu0.22.04.1) ...
Setting up liblua5.1-common (2.1.0~beta3+dfsg-6) ...
Setting up liblua5.1-2:amd64 (2.1.0~beta3+dfsg-6) ...
Setting up sysbench (1.0.20+ds-2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

ubuntu@ip-172-31-4-160:~\$ sysbench --test=cpu --num-threads=500 --cpu-max-prime=1000 run

WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.

WARNING: --num-threads is deprecated, use --threads instead
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:

Number of threads: 500

Initializing random number generator from current time

Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:

events per second: 38032.87

General statistics:

total time: 10.0133s
total number of events: 380891

Latency (ms):

min: 0.04
avg: 12.30
max: 1172.95
95th percentile: 0.07
sum: 4686522.32

Threads fairness:

events (avg/stddev): 761.7820/63.98
execution time (avg/stddev): 9.3730/0.47

ubuntu@ip-172-31-4-160:~\$ sysbench --test=cpu --num-threads=500 --cpu-max-prime=1000 run

WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.

WARNING: --num-threads is deprecated, use --threads instead
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:

Number of threads: 500

Initializing random number generator from current time

Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:

events per second: 39523.00

General statistics:

total time: 10.0119s
total number of events: 395771

Latency (ms):

min: 0.04
avg: 12.23

max: 1372.85
95th percentile: 0.06
sum: 4842243.31

Threads fairness:

events (avg/stddev): 791.5420/24.01
execution time (avg/stddev): 9.6845/0.23

ubuntu@ip-172-31-4-160:~\$ sysbench --test=cpu --num-threads=500 --cpu-max-prime=5000 run

WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.

WARNING: --num-threads is deprecated, use --threads instead
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:

Number of threads: 500

Initializing random number generator from current time

Prime numbers limit: 5000

Initializing worker threads...

Threads started!

CPU speed:

events per second: 4092.05

General statistics:

total time: 10.0640s

total number of events: 41189

Latency (ms):

min: 0.35
avg: 118.58
max: 1594.00
95th percentile: 502.20
sum: 4884367.45

Threads fairness:

events (avg/stddev): 82.3780/2.57
execution time (avg/stddev): 9.7687/0.16

```
ubuntu@ip-172-31-4-160:~$ sysbench --test=cpu --num-threads=500 --cpu-max-prime=30000 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
WARNING: --num-threads is deprecated, use --threads instead
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)
```

Running the test with following options:
Number of threads: 500
Initializing random number generator from current time

Prime numbers limit: 30000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 369.83

General statistics:
total time: 10.8141s
total number of events: 4000

Latency (ms):
min: 699.38
avg: 1304.91
max: 1715.31
95th percentile: 1533.66
sum: 5219650.69

Threads fairness:
events (avg/stddev): 8.0000/0.00
execution time (avg/stddev): 10.4393/0.12

```
ubuntu@ip-172-31-4-160:~$ sudo apt-get install fio
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ibverbs-providers libboost-iostreams1.74.0 libboost-thread1.74.0 libdaxctl1
  libgfsapi0 libgfrpc0 libgfxdr0 libglusterfs0 libibverbs1 libndctl6
  libnl-route-3-200 libpmem1 libpmemblk1 libpmemobj1 librados2 librbd1
```


librdmacm1

Suggested packages:

gnuplot gfio python-scipy

The following NEW packages will be installed:

fio ibverbs-providers libboost-iostreams1.74.0 libboost-thread1.74.0

libdaxctl1 libgfapi0 libgfrpc0 libgfxdr0 libglusterfs0 libibverbs1 libndctl6

libnl-route-3-200 libpmem1 libpmemblk1 libpmemobj1 librados2 librbd1

librdmacm1

0 upgraded, 18 newly installed, 0 to remove and 30 not upgraded.

Need to get 13.1 MB of archives.

After this operation, 46.2 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/jammy-updates/main amd64 libgfxdr0 amd64 10.1-1ubuntu0.2> [22.3 kB]

Get:2 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main amd64 libglusterfs0 amd64 10.1-1ubuntu0.2> [287 kB]

Get:3 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main amd64 libgfrpc0 amd64 10.1-1ubuntu0.2> [47.1 kB]

Get:4 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main amd64 libgfapi0 amd64 10.1-1ubuntu0.2> [77.3 kB]

Get:5 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libnl-route-3-200 amd64 3.5.0-0.1> [180 kB]

Get:6 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libibverbs1 amd64 39.0-1> [69.3 kB]

Get:7 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libdaxctl1 amd64 72.1-1> [19.8 kB]

Get:8 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libndctl6 amd64 72.1-1> [57.7 kB]

Get:9 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libpmem1 amd64 1.11.1-3build1> [81.4 kB]

Get:10 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/universe amd64 libpmemblk1 amd64 1.11.1-3build1> [65.6 kB]

Get:11 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libboost-iostreams1.74.0 amd64 1.74.0-14ubuntu3> [245 kB]

Get:12 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libboost-thread1.74.0 amd64 1.74.0-14ubuntu3> [262 kB]

Get:13 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 librdmacm1 amd64 39.0-1> [71.2 kB]

Get:14 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main amd64 librados2 amd64 17.2.7-0ubuntu0.22.04.1> [3590 kB]

Get:15 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 libpmemobj1 amd64 1.11.1-3build1> [124 kB]

Get:16 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main amd64 librbd1 amd64 17.2.7-0ubuntu0.22.04.1> [3547 kB]

Get:17 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/universe amd64 fio](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/universe/amd64/fio) amd64 3.28-1 [4047 kB]
Get:18 [http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main amd64 ibverbs-providers](http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main/amd64/ibverbs-providers) amd64 39.0-1 [341 kB]
Fetched 13.1 MB in 0s (55.9 MB/s)
Selecting previously unselected package libgfxdr0:amd64.
(Reading database ... 65854 files and directories currently installed.)
Preparing to unpack .../00-libgfxdr0_10.1-1ubuntu0.2_amd64.deb ...
Unpacking libgfxdr0:amd64 (10.1-1ubuntu0.2) ...
Selecting previously unselected package libglusterfs0:amd64.
Preparing to unpack .../01-libglusterfs0_10.1-1ubuntu0.2_amd64.deb ...
Unpacking libglusterfs0:amd64 (10.1-1ubuntu0.2) ...
Selecting previously unselected package libgfrpc0:amd64.
Preparing to unpack .../02-libgfrpc0_10.1-1ubuntu0.2_amd64.deb ...
Unpacking libgfrpc0:amd64 (10.1-1ubuntu0.2) ...
Selecting previously unselected package libgfapi0:amd64.
Preparing to unpack .../03-libgfapi0_10.1-1ubuntu0.2_amd64.deb ...
Unpacking libgfapi0:amd64 (10.1-1ubuntu0.2) ...
Selecting previously unselected package libnl-route-3-200:amd64.
Preparing to unpack .../04-libnl-route-3-200_3.5.0-0.1_amd64.deb ...
Unpacking libnl-route-3-200:amd64 (3.5.0-0.1) ...
Selecting previously unselected package libibverbs1:amd64.
Preparing to unpack .../05-libibverbs1_39.0-1_amd64.deb ...
Unpacking libibverbs1:amd64 (39.0-1) ...
Selecting previously unselected package libdaxctl1:amd64.
Preparing to unpack .../06-libdaxctl1_72.1-1_amd64.deb ...
Unpacking libdaxctl1:amd64 (72.1-1) ...
Selecting previously unselected package libndctl6:amd64.
Preparing to unpack .../07-libndctl6_72.1-1_amd64.deb ...
Unpacking libndctl6:amd64 (72.1-1) ...
Selecting previously unselected package libpmem1:amd64.
Preparing to unpack .../08-libpmem1_1.11.1-3build1_amd64.deb ...
Unpacking libpmem1:amd64 (1.11.1-3build1) ...
Selecting previously unselected package libpmemblk1:amd64.
Preparing to unpack .../09-libpmemblk1_1.11.1-3build1_amd64.deb ...
Unpacking libpmemblk1:amd64 (1.11.1-3build1) ...
Selecting previously unselected package libboost-iostreams1.74.0:amd64.
Preparing to unpack .../10-libboost-iostreams1.74.0_1.74.0-14ubuntu3_amd64.deb ...
Unpacking libboost-iostreams1.74.0:amd64 (1.74.0-14ubuntu3) ...
Selecting previously unselected package libboost-thread1.74.0:amd64.
Preparing to unpack .../11-libboost-thread1.74.0_1.74.0-14ubuntu3_amd64.deb ...
Unpacking libboost-thread1.74.0:amd64 (1.74.0-14ubuntu3) ...
Selecting previously unselected package librdmacm1:amd64.
Preparing to unpack .../12-librdmacm1_39.0-1_amd64.deb ...

Unpacking librdmacm1:amd64 (39.0-1) ...
Selecting previously unselected package librados2.
Preparing to unpack .../13-librados2_17.2.7-0ubuntu0.22.04.1_amd64.deb ...
Unpacking librados2 (17.2.7-0ubuntu0.22.04.1) ...
Selecting previously unselected package libpmemobj1:amd64.
Preparing to unpack .../14-libpmemobj1_1.11.1-3build1_amd64.deb ...
Unpacking libpmemobj1:amd64 (1.11.1-3build1) ...
Selecting previously unselected package librbd1.
Preparing to unpack .../15-librbd1_17.2.7-0ubuntu0.22.04.1_amd64.deb ...
Unpacking librbd1 (17.2.7-0ubuntu0.22.04.1) ...
Selecting previously unselected package fio.
Preparing to unpack .../16-fio_3.28-1_amd64.deb ...
Unpacking fio (3.28-1) ...
Selecting previously unselected package ibverbs-providers:amd64.
Preparing to unpack .../17-ibverbs-providers_39.0-1_amd64.deb ...
Unpacking ibverbs-providers:amd64 (39.0-1) ...
Setting up libboost-iostreams1.74.0:amd64 (1.74.0-14ubuntu3) ...
Setting up libnl-route-3-200:amd64 (3.5.0-0.1) ...
Setting up libglusterfs0:amd64 (10.1-1ubuntu0.2) ...
Setting up libdaxctl1:amd64 (72.1-1) ...
Setting up libndctl6:amd64 (72.1-1) ...
Setting up libpmem1:amd64 (1.11.1-3build1) ...
Setting up libgfxdr0:amd64 (10.1-1ubuntu0.2) ...
Setting up libboost-thread1.74.0:amd64 (1.74.0-14ubuntu3) ...
Setting up libibverbs1:amd64 (39.0-1) ...
Setting up ibverbs-providers:amd64 (39.0-1) ...
Setting up libpmemobj1:amd64 (1.11.1-3build1) ...
Setting up libpmemblk1:amd64 (1.11.1-3build1) ...
Setting up libgfrpc0:amd64 (10.1-1ubuntu0.2) ...
Setting up librdmacm1:amd64 (39.0-1) ...
Setting up librados2 (17.2.7-0ubuntu0.22.04.1) ...
Setting up librbd1 (17.2.7-0ubuntu0.22.04.1) ...
Setting up libgfapi0:amd64 (10.1-1ubuntu0.2) ...
Setting up fio (3.28-1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

```
ubuntu@ip-172-31-4-160:~$ fio --name=randread --ioengine=libaio --rw=randread --bs=4k
--size=100M --numjobs=4 --runtime=60 --time_based --group_reporting
randread: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B,
ioengine=libaio, iodepth=1
```

...

fio-3.28

Starting 4 processes

randread: Laying out IO file (1 file / 100MiB)

randread: Laying out IO file (1 file / 100MiB)

randread: Laying out IO file (1 file / 100MiB)

randread: Laying out IO file (1 file / 100MiB)

Jobs: 4 (f=4): [r(4)][100.0%][r=11.7MiB/s][r=3002 IOPS][eta 00m:00s]

randread: (groupid=0, jobs=4): err= 0: pid=4205: Sat Nov 30 09:25:02 2024

read: IOPS=3045, BW=11.9MiB/s (12.5MB/s)(714MiB/60003msec)

slat (usec): min=130, max=11871, avg=1308.21, stdev=375.22

clat (nsec): min=913, max=1161.2k, avg=2118.65, stdev=9516.42

lat (usec): min=132, max=11874, avg=1310.81, stdev=375.42

clat percentiles (nsec):

| 1.00th=[1176], 5.00th=[1272], 10.00th=[1336], 20.00th=[1432],

| 30.00th=[1544], 40.00th=[1624], 50.00th=[1720], 60.00th=[1816],

| 70.00th=[1944], 80.00th=[2128], 90.00th=[2448], 95.00th=[2672],

| 99.00th=[3344], 99.50th=[13376], 99.90th=[62720], 99.95th=[116224],

| 99.99th=[481280]

bw (KiB/s): min=10856, max=35992, per=100.00%, avg=12191.66, stdev=551.91,

samples=476

iops : min= 2714, max= 8998, avg=3047.92, stdev=137.98, samples=476

lat (nsec) : 1000=0.01%

lat (usec) : 2=73.38%, 4=25.72%, 10=0.29%, 20=0.30%, 50=0.17%

lat (usec) : 100=0.07%, 250=0.04%, 500=0.01%, 750=0.01%, 1000=0.01%

lat (msec) : 2=0.01%

cpu : usr=0.57%, sys=1.40%, ctx=182782, majf=0, minf=57

IO depths : 1=100.0%, 2=0.0%, 4=0.0%, 8=0.0%, 16=0.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued rwts: total=182732,0,0,0 short=0,0,0,0 dropped=0,0,0,0

latency : target=0, window=0, percentile=100.00%, depth=1

Run status group 0 (all jobs):

READ: bw=11.9MiB/s (12.5MB/s), 11.9MiB/s-11.9MiB/s (12.5MB/s-12.5MB/s), io=714MiB
(748MB), run=60003-60003msec

Disk stats (read/write):

nvme0n1: ios=182144/277, merge=0/28, ticks=234238/2014, in_queue=236252, util=93.17%

ubuntu@ip-172-31-4-160:~\$ fio --name=randwrite --ioengine=libaio --rw=randwrite --bs=4k --size=100M --numjobs=4 --runtime=60 --time_based --group_reporting
randwrite: (g=0): rw=randwrite, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B, ioengine=libaio, iodepth=1

...

fio-3.28

Starting 4 processes

randwrite: Laying out IO file (1 file / 100MiB)

randwrite: Laying out IO file (1 file / 100MiB)

randwrite: Laying out IO file (1 file / 100MiB)

randwrite: Laying out IO file (1 file / 100MiB)

Jobs: 2 (f=2): [_ (1),w(2),_ (1)][100.0%][w=1774KiB/s][w=443 IOPS][eta 00m:00s]

randwrite: (groupid=0, jobs=4): err= 0: pid=4213: Sat Nov 30 09:28:32 2024

write: IOPS=33.1k, BW=129MiB/s (136MB/s)(7902MiB/61077msec); 0 zone resets

slat (usec): min=2, max=20879, avg= 5.18, stdev=53.25

clat (nsec): min=636, max=9825.8k, avg=1059.08, stdev=21530.84

lat (usec): min=2, max=20887, avg= 6.36, stdev=58.33

clat percentiles (nsec):

| 1.00th=[660], 5.00th=[668], 10.00th=[676], 20.00th=[684],
| 30.00th=[684], 40.00th=[692], 50.00th=[692], 60.00th=[700],
| 70.00th=[820], 80.00th=[916], 90.00th=[1096], 95.00th=[1144],
| 99.00th=[1336], 99.50th=[1672], 99.90th=[27520], 99.95th=[63744],
| 99.99th=[460800]

bw (KiB/s): min=111661, max=819610, per=100.00%, avg=651269.98, stdev=63126.18, samples=100

iops : min=27915, max=204902, avg=162817.24, stdev=15781.54, samples=100

lat (nsec) : 750=65.03%, 1000=19.32%

lat (usec) : 2=15.27%, 4=0.12%, 10=0.07%, 20=0.07%, 50=0.06%

lat (usec) : 100=0.03%, 250=0.01%, 500=0.01%, 750=0.01%, 1000=0.01%

lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%

cpu : usr=1.61%, sys=5.39%, ctx=33030, majf=0, minf=60

IO depths : 1=100.0%, 2=0.0%, 4=0.0%, 8=0.0%, 16=0.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued rwts: total=0,2022846,0,0 short=0,0,0,0 dropped=0,0,0,0

latency : target=0, window=0, percentile=100.00%, depth=1

Run status group 0 (all jobs):

WRITE: bw=129MiB/s (136MB/s), 129MiB/s-129MiB/s (136MB/s-136MB/s), io=7902MiB (8286MB), run=61077-61077msec

Disk stats (read/write):

nvme0n1: ios=0/32332, merge=0/47, ticks=0/660465, in_queue=660466, util=96.28%

ubuntu@ip-172-31-4-160:~\$ sudo apt-get install postgresql postgresql-contrib

Reading package lists... Done

Building dependency tree... Done

Reading state information... Done

The following additional packages will be installed:

libcommon-sense-perl libjson-perl libjson-xs-perl libllvm14

libsensors-config libsensors5 libtypes-serialiser-perl postgresql-14

postgresql-client-14 postgresql-client-common postgresql-common ssl-cert
sysstat

Suggested packages:

lm-sensors postgresql-doc postgresql-doc-14 isag

The following NEW packages will be installed:

libcommon-sense-perl libjson-perl libjson-xs-perl libllvm14

libsensors-config libsensors5 libtypes-serialiser-perl postgresql

postgresql-14 postgresql-client-14 postgresql-client-common

postgresql-common postgresql-contrib ssl-cert sysstat

0 upgraded, 15 newly installed, 0 to remove and 30 not upgraded.

Need to get 42.3 MB of archives.

After this operation, 161 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 jammy/main amd64 libcommon-sense-perl amd64 3.75-2build1 [21.1 kB]

Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libjson-perl all 4.04000-1 [81.8 kB]

Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libtypes-serialiser-perl all 1.01-1 [11.6 kB]

Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libjson-xs-perl amd64 4.030-1build3 [87.2 kB]

Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libllvm14 amd64 1:14.0.0-1ubuntu1.1 [24.0 MB]

Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libsensors-config all 1:3.6.0-7ubuntu1 [5274 B]

Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libsensors5 amd64 1:3.6.0-7ubuntu1 [26.3 kB]

Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 postgresql-client-common all 238 [29.6 kB]

Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 postgresql-client-14 amd64 14.13-0ubuntu0.22.04.1 [1225 kB]

Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 ssl-cert all 1.1.2 [17.4 kB]

Get:11 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main/amd64/postgresql-common> all 238 [169 kB]
Get:12 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main/amd64/postgresql-14> amd64 14.13-0ubuntu0.22.04.1 [16.2 MB]
Get:13 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main/amd64/postgresql-14>+238 [3288 B]
Get:14 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy/main/amd64/postgresql-contrib> all 14+238 [3292 B]
Get:15 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu/jammy-updates/main/amd64/sysstat> amd64 12.5.2-2ubuntu0.2 [487 kB]
Fetched 42.3 MB in 1s (68.1 MB/s)
Preconfiguring packages ...
Selecting previously unselected package libcommon-sense-perl:amd64.
(Reading database ... 66187 files and directories currently installed.)
Preparing to unpack .../00-libcommon-sense-perl_3.75-2build1_amd64.deb ...
Unpacking libcommon-sense-perl:amd64 (3.75-2build1) ...
Selecting previously unselected package libjson-perl.
Preparing to unpack .../01-libjson-perl_4.04000-1_all.deb ...
Unpacking libjson-perl (4.04000-1) ...
Selecting previously unselected package libtypes-serialiser-perl.
Preparing to unpack .../02-libtypes-serialiser-perl_1.01-1_all.deb ...
Unpacking libtypes-serialiser-perl (1.01-1) ...
Selecting previously unselected package libjson-xs-perl.
Preparing to unpack .../03-libjson-xs-perl_4.030-1build3_amd64.deb ...
Unpacking libjson-xs-perl (4.030-1build3) ...
Selecting previously unselected package libllvm14:amd64.
Preparing to unpack .../04-libllvm14_1%3a14.0.0-1ubuntu1.1_amd64.deb ...
Unpacking libllvm14:amd64 (1:14.0.0-1ubuntu1.1) ...
Selecting previously unselected package libsensors-config.
Preparing to unpack .../05-libensors-config_1%3a3.6.0-7ubuntu1_all.deb ...
Unpacking libsensors-config (1:3.6.0-7ubuntu1) ...
Selecting previously unselected package libsensors5:amd64.
Preparing to unpack .../06-libensors5_1%3a3.6.0-7ubuntu1_amd64.deb ...
Unpacking libsensors5:amd64 (1:3.6.0-7ubuntu1) ...
Selecting previously unselected package postgresql-client-common.
Preparing to unpack .../07-postgresql-client-common_238_all.deb ...
Unpacking postgresql-client-common (238) ...
Selecting previously unselected package postgresql-client-14.
Preparing to unpack .../08-postgresql-client-14_14.13-0ubuntu0.22.04.1_amd64.deb ...
Unpacking postgresql-client-14 (14.13-0ubuntu0.22.04.1) ...
Selecting previously unselected package ssl-cert.
Preparing to unpack .../09-ssl-cert_1.1.2_all.deb ...
Unpacking ssl-cert (1.1.2) ...
Selecting previously unselected package postgresql-common.

Preparing to unpack .../10-postgresql-common_238_all.deb ...
Adding 'diversion of /usr/bin/pg_config to /usr/bin/pg_config.libpq-dev by postgresql-common'
Unpacking postgresql-common (238) ...
Selecting previously unselected package postgresql-14.
Preparing to unpack .../11-postgresql-14_14.13-0ubuntu0.22.04.1_amd64.deb ...
Unpacking postgresql-14 (14.13-0ubuntu0.22.04.1) ...
Selecting previously unselected package postgresql.
Preparing to unpack .../12-postgresql_14+238_all.deb ...
Unpacking postgresql (14+238) ...
Selecting previously unselected package postgresql-contrib.
Preparing to unpack .../13-postgresql-contrib_14+238_all.deb ...
Unpacking postgresql-contrib (14+238) ...
Selecting previously unselected package sysstat.
Preparing to unpack .../14-sysstat_12.5.2-2ubuntu0.2_amd64.deb ...
Unpacking sysstat (12.5.2-2ubuntu0.2) ...
Setting up postgresql-client-common (238) ...
Setting up libsensors-config (1:3.6.0-7ubuntu1) ...
Setting up libcommon-sense-perl:amd64 (3.75-2build1) ...
Setting up postgresql-client-14 (14.13-0ubuntu0.22.04.1) ...
update-alternatives: using /usr/share/postgresql/14/man/man1/psql.1.gz to provide /usr/share/man/man1/psql.1.gz (psql.1.gz) in auto mode
Setting up ssl-cert (1.1.2) ...
Setting up libsensors5:amd64 (1:3.6.0-7ubuntu1) ...
Setting up libllvm14:amd64 (1:14.0.0-1ubuntu1.1) ...
Setting up libtypes-serialiser-perl (1.01-1) ...
Setting up libjson-perl (4.04000-1) ...
Setting up sysstat (12.5.2-2ubuntu0.2) ...

Creating config file /etc/default/sysstat with new version
update-alternatives: using /usr/bin/sar.sysstat to provide /usr/bin/sar (sar) in auto mode
Created symlink /etc/systemd/system/sysstat.service.wants/sysstat-collect.timer → /lib/systemd/system/sysstat-collect.timer.
Created symlink /etc/systemd/system/sysstat.service.wants/sysstat-summary.timer → /lib/systemd/system/sysstat-summary.timer.
Created symlink /etc/systemd/system/multi-user.target.wants/sysstat.service → /lib/systemd/system/sysstat.service.
Setting up libjson-xs-perl (4.030-1build3) ...
Setting up postgresql-common (238) ...
Adding user postgres to group ssl-cert

Creating config file /etc/postgresql-common/createcluster.conf with new version
Building PostgreSQL dictionaries from installed myspell/hunspell packages...
Removing obsolete dictionary files:

Created symlink /etc/systemd/system/multi-user.target.wants/postgresql.service → /lib/systemd/system/postgresql.service.
Setting up postgresql-14 (14.13-0ubuntu0.22.04.1) ...
Creating new PostgreSQL cluster 14/main ...
/usr/lib/postgresql/14/bin/initdb -D /var/lib/postgresql/14/main --auth-local peer --auth-host scram-sha-256 --no-instructions
The files belonging to this database system will be owned by user "postgres".
This user must also own the server process.

The database cluster will be initialized with locale "C.UTF-8".
The default database encoding has accordingly been set to "UTF8".
The default text search configuration will be set to "english".

Data page checksums are disabled.

fixing permissions on existing directory /var/lib/postgresql/14/main ... ok
creating subdirectories ... ok
selecting dynamic shared memory implementation ... posix
selecting default max_connections ... 100
selecting default shared_buffers ... 128MB
selecting default time zone ... Etc/UTC
creating configuration files ... ok
running bootstrap script ... ok
performing post-bootstrap initialization ... ok
syncing data to disk ... ok
update-alternatives: using /usr/share/postgresql/14/man/man1/postmaster.1.gz to provide /usr/share/man/man1/postmaster.1.gz (postmaster.1.gz) in auto mode
Setting up postgresql-contrib (14+238) ...
Setting up postgresql (14+238) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

ubuntu@ip-172-31-4-160:~\$ sudo -u postgres psql

could not change directory to "/home/ubuntu": Permission denied
psql (14.13 (Ubuntu 14.13-0ubuntu0.22.04.1))
Type "help" for help.

```
postgres=# CREATE DATABASE testdb;
```

```
CREATE DATABASE
```

```
postgres=# CREATE ROLE ubuntu WITH LOGIN PASSWORD '1234';
```

```
CREATE ROLE
```

```
postgres=# ALTER ROLE ubuntu CREATEDB;
```

```
ALTER ROLE
```

```
postgres=# \q
```

```
ubuntu@ip-172-31-4-160:~$ pgbench -i -s 10 -U ubuntu testdb
```

```
dropping old tables...
```

```
NOTICE: table "pgbench_accounts" does not exist, skipping
```

```
NOTICE: table "pgbench_branches" does not exist, skipping
```

```
NOTICE: table "pgbench_history" does not exist, skipping
```

```
NOTICE: table "pgbench_tellers" does not exist, skipping
```

```
creating tables...
```

```
generating data (client-side)...
```

```
1000000 of 1000000 tuples (100%) done (elapsed 1.81 s, remaining 0.00 s)
```

```
vacuuming...
```

```
creating primary keys...
```

```
done in 2.87 s (drop tables 0.00 s, create tables 0.01 s, client-side generate 1.87 s, vacuum  
0.33 s, primary keys 0.66 s).
```

```
ubuntu@ip-172-31-4-160:~$ pgbench -c 10 -j 2 -t 1000 -U ubuntu testdb
```

```
pgbench (14.13 (Ubuntu 14.13-0ubuntu0.22.04.1))
```

```
starting vacuum...end.
```

```
transaction type: <builtin: TPC-B (sort of)>
```

```
scaling factor: 10
```

```
query mode: simple
```

```
number of clients: 10
```

```
number of threads: 2
```

```
number of transactions per client: 1000
```

```
number of transactions actually processed: 10000/10000
```

```
latency average = 4.504 ms
```

```
initial connection time = 19.780 ms
```

```
tps = 2220.322120 (without initial connection time)
```

```
ubuntu@ip-172-31-4-160:~$ pgbench -c 25 -j 2 -t 1000 -U ubuntu testdb
```

```
pgbench (14.13 (Ubuntu 14.13-0ubuntu0.22.04.1))
```

```
starting vacuum...end.
```

```
transaction type: <builtin: TPC-B (sort of)>
```

```
scaling factor: 10
```

```
query mode: simple
```

```
number of clients: 25
```

number of threads: 2
number of transactions per client: 1000
number of transactions actually processed: 25000/25000
latency average = 11.108 ms
initial connection time = 66.824 ms
tps = 2250.639902 (without initial connection time)
ubuntu@ip-172-31-4-160:~\$ pgbench -c 50 -j 2 -t 1000 -U ubuntu testdb
pgbench (14.13 (Ubuntu 14.13-0ubuntu0.22.04.1))
starting vacuum...end.
transaction type: <builtin: TPC-B (sort of)>
scaling factor: 10
query mode: simple
number of clients: 50
number of threads: 2
number of transactions per client: 1000
number of transactions actually processed: 50000/50000
latency average = 25.182 ms
initial connection time = 83.832 ms
tps = 1985.508331 (without initial connection time)
ubuntu@ip-172-31-4-160:~\$ exit
logout
Connection to ec2-3-238-161-249.compute-1.amazonaws.com closed.
(base) tahayasin@Tahas-MacBook-Pro Desktop %