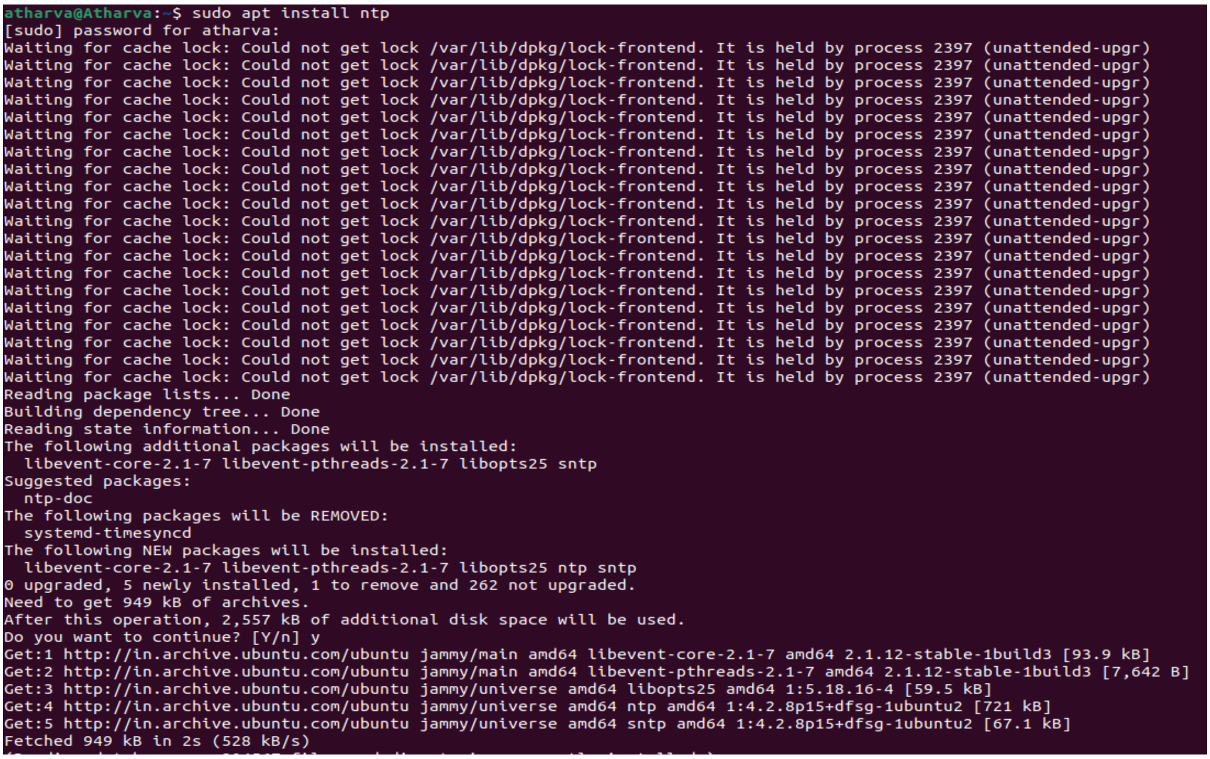
PRACTICAL 4

Aim: To configure NTP Server and configure NTP Client Network Timing.

Step 1: Step 1 would be installing NTP server on our machine which can be done by the following command. (Also make sure your machine's software are up to date).

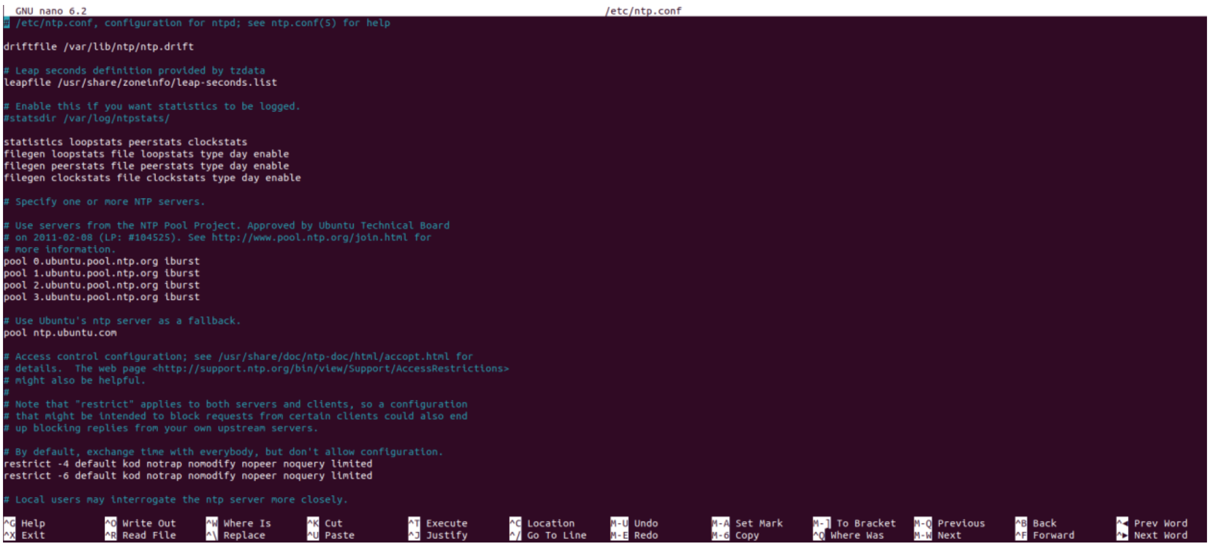
sudo apt install ntp



```
atharva@Atharva:~$ sudo apt install ntp
[sudo] password for atharva:
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 2397 (unattended-upgr)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libevent-core-2.1-7 libevent-pthreads-2.1-7 libopts25 sntp
Suggested packages:
  ntp-doc
The following packages will be REMOVED:
  systemd-timesyncd
The following NEW packages will be installed:
  libevent-core-2.1-7 libevent-pthreads-2.1-7 libopts25 ntp sntp
0 upgraded, 5 newly installed, 1 to remove and 262 not upgraded.
Need to get 949 kB of archives.
After this operation, 2,557 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libevent-core-2.1-7 amd64 2.1.12-stable-1build3 [93.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libevent-pthreads-2.1-7 amd64 2.1.12-stable-1build3 [7,642 B]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libopts25 amd64 1:5.18.16-4 [59.5 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 ntp amd64 1:4.2.8p15+dfsg-1ubuntu2 [721 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 sntp amd64 1:4.2.8p15+dfsg-1ubuntu2 [67.1 kB]
Fetched 949 kB in 2s (528 kB/s)
```

Step 2: To configure ntp the ntp file is stored at /etc/nano.conf" and can be modified with any editor. The command for that would be as follows.

sudo nano /etc/ntp.conf



```
  GNU nano 6.2                                   /etc/ntp.conf
# /etc/ntp.conf, configuration for ntpd; see ntp.conf(5) for help

driftfile /var/lib/ntp/ntp.drift

# Leap seconds definition provided by tzdata
leapfile /usr/share/zoneinfo/leap-seconds.list

# Enable this if you want statistics to be logged.
#statsdir /var/log/ntpstats/

statistics loopstats peerstats clockstats
filegen loopstats file loopstats type day enable
filegen peerstats file peerstats type day enable
filegen clockstats file clockstats type day enable

# Specify one or more NTP servers.

# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
# more information.
pool 0.ubuntu.pool.ntp.org iburst
pool 1.ubuntu.pool.ntp.org iburst
pool 2.ubuntu.pool.ntp.org iburst
pool 3.ubuntu.pool.ntp.org iburst

# Use Ubuntu's ntp server as a fallback.
pool ntp.ubuntu.com

# Access control configuration; see /usr/share/doc/ntp-doc/html/accopt.html for
# details.  The web page <http://support.ntp.org/bin/view/Support/AccessRestrictions>
# might also be helpful.
#
# Note that "restrict" applies to both servers and clients, so a configuration
# that might be intended to block requests from certain clients could also end
# up blocking replies from your own upstream servers.

# By default, exchange time with everybody, but don't allow configuration.
restrict -4 default kod notrap nomodify nopeer noquery limited
restrict -6 default kod notrap nomodify nopeer noquery limited

# Local users may interrogate the ntp server more closely.

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark   M-] To Bracket  M-Q Previous  ^B Back        ^◂ Prev Word
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy       ^Q Where Was    M-W Next      ^F Forward     ^▸ Next Word
```

Step 3: After the configuration you will need to restart the ntp service which can be done by the 'service ntp restart' command.

sudo service ntp restart

Step 4: Now we will show the NTP servers running on the host.

ntpq-pn

```
atharva@Atharva:~$ ntpq -pn
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
 0.ubuntu.pool.n .POOL.          16 p    -   64    0    0.000   +0.000   0.000
 1.ubuntu.pool.n .POOL.          16 p    -   64    0    0.000   +0.000   0.000
 2.ubuntu.pool.n .POOL.          16 p    -   64    0    0.000   +0.000   0.000
 3.ubuntu.pool.n .POOL.          16 p    -   64    0    0.000   +0.000   0.000
 ntp.ubuntu.com  .POOL.          16 p    -   64    0    0.000   +0.000   0.000
+172.105.60.167  139.59.15.185    6 u   35   64    1   91.631  -38.887  12.554
+164.100.255.123 10.160.2.73      2 u   37   64    1   97.412  -43.134  12.354
*103.146.168.7   .GPS.            1 u   38   64    1  124.104  -40.467   9.583
+172.105.40.86   14.139.60.106    2 u   37   64    1   78.485  -44.118  13.151
-139.59.55.93    15.207.248.194   5 u   36   64    1  132.869  -22.380   8.080
-95.216.144.226  194.58.200.20    2 u   36   64    1  225.394  -35.194  14.707
 139.59.74.161   13.126.27.131    5 u   34   64    1  103.042  -47.070  12.299
 192.46.210.39   192.171.1.150    2 u   33   64    1   65.487  -48.578   8.405
 192.46.215.60   124.216.164.14   2 u   33   64    1   65.687  -47.773   8.039
 185.125.190.56  145.238.203.14   2 u   42   64    1  215.198  -43.330   0.000
 144.126.253.247 14.139.60.106    2 u   33   64    1  111.072  -29.765   8.360
 185.125.190.58  86.23.195.30     2 u   40   64    1  187.879  -51.758   0.000
 95.216.192.15   194.58.200.20    2 u   33   64    1  191.444  -52.977   9.203
 91.189.91.157   132.163.96.1     2 u   43   64    1  268.822  -47.404   0.000
 185.125.190.57  201.68.88.106    2 u   42   64    1  206.069  -47.646   0.000
```

Step 5: Now we will check the time synchronization on our client (Ubuntu) machine for that you will need to install the ntpdate package first which can be done by following command

sudo apt-get install ntpdate

```
atharva@Atharva:~$ sudo apt-get install ntpdate
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  ntpdate
0 upgraded, 1 newly installed, 0 to remove and 262 not upgraded.
Need to get 51.5 kB of archives.
After this operation, 178 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 ntpdate amd64 1:4.2.8p15+dfsg-1ubuntu2 [51.5 kB]
Fetched 51.5 kB in 1s (41.2 kB/s)
Selecting previously unselected package ntpdate.
(Reading database ... 204638 files and directories currently installed.)
Preparing to unpack .../ntpdate_1%3a4.2.8p15+dfsg-1ubuntu2_amd64.deb ...
Unpacking ntpdate (1:4.2.8p15+dfsg-1ubuntu2) ...
Setting up ntpdate (1:4.2.8p15+dfsg-1ubuntu2) ...
Processing triggers for man-db (2.10.2-1) ...
```

Step 6: To check the time synchronization on our client machine use the following command.

ntpdate ntp1.jst.mfeed.ad.jp

```
atharva@Atharva:~$ ntpdate ntp1.jst.mfeed.ad.jp
18 Aug 19:31:37 ntpdate[3842]: bind() fails: Permission denied
```

```
atharva@Atharva:~$ sudo ntpdate ntp1.jst.mfeed.ad.jp
18 Aug 19:32:30 ntpdate[3847]: the NTP socket is in use, exiting
```