Practical 3:- Configure NTP Server (NTPd), Install and Configure NTPd, Configure NTP Client (Ubuntu and Windows)

Solution:

Install and configure NTP Server on the host computer

Step 1: Update repository index

In order to install the latest available version of software from the Internet repositories, your local repository index needs to be in line with them. Run the following command as sudo in order to update your local repository index:

 # sudo apt-get update

```
ruchi12@ubuntu:~$ sudo apt-get update
[sudo] password for ruchi12:
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu bionic InRelease
Get:3 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [497
 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main i386 Packages [365
kB]
Get:7 http://us.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [578
 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [169
 kB]
```

Step 2: Install NTP Server with apt-get

Run the command as sudo in order to install NTP server daemon from the APT repositories:

#sudo apt-get install ntp

```
ruchi12@ubuntu:~$ sudo apt-get install ntp
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libopts25 sntp
Suggested packages:
  ntp-doc
The following NEW packages will be installed:
  libopts25 ntp sntp
0 upgraded, 3 newly installed, 0 to remove and 113 not upgraded.
Need to get 785 kB of archives.
After this operation, 2,393 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us.archive.ubuntu.com/ubuntu bionic/universe amd64 libopts25 amd64
```

The system might ask you the password for sudo and also provide you with a Y/n option to continue the installation. Enter Y and then hit enter; NTP server will then be installed on your system. The process may, however, take some time depending on your Internet speed.

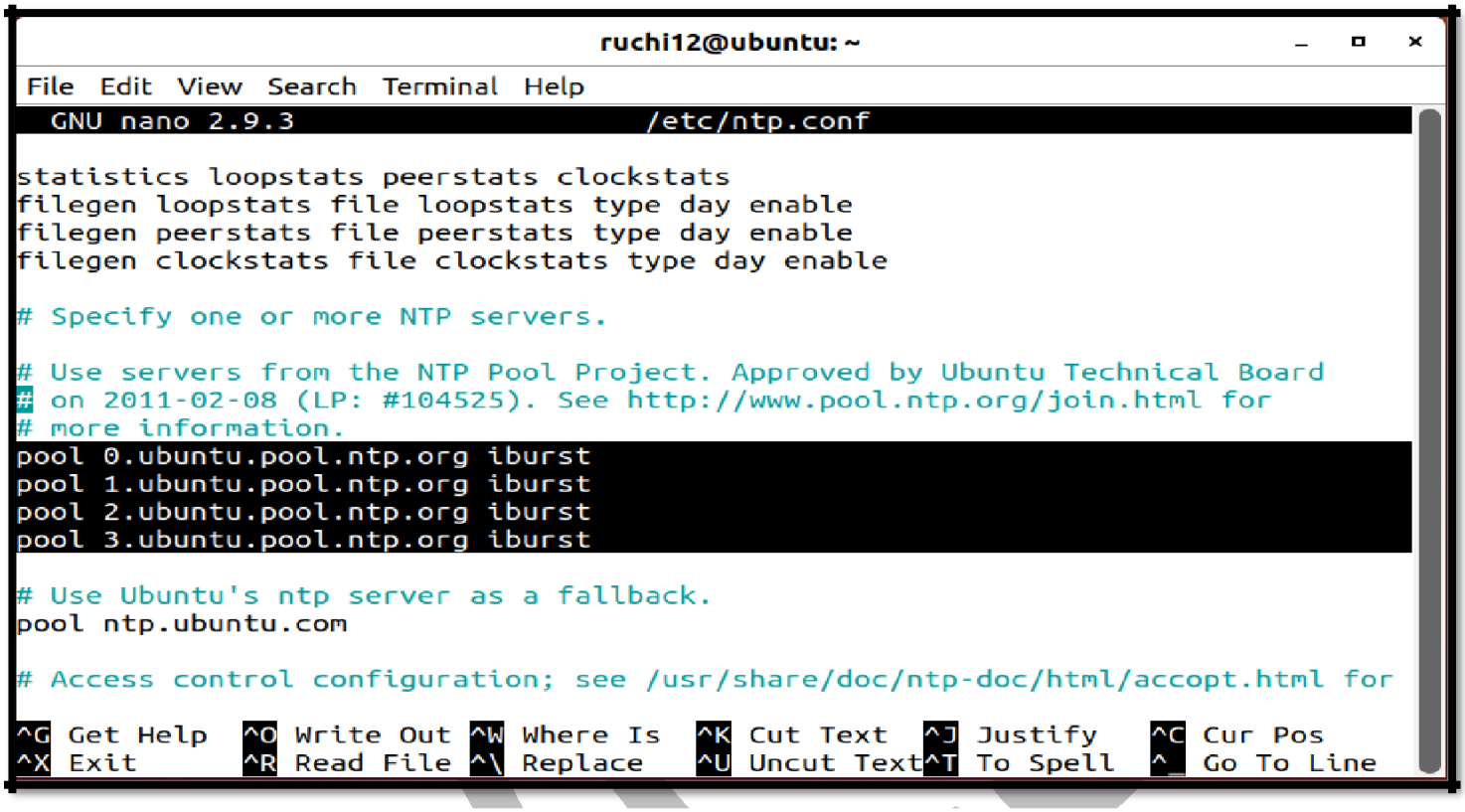
Step 3: Verify installation (optional)

You can verify your NTP installation and also check the version number by running the following command in your Terminal:

 # sntp --version

Step 4: Switch to an NTP server pool closest to your location

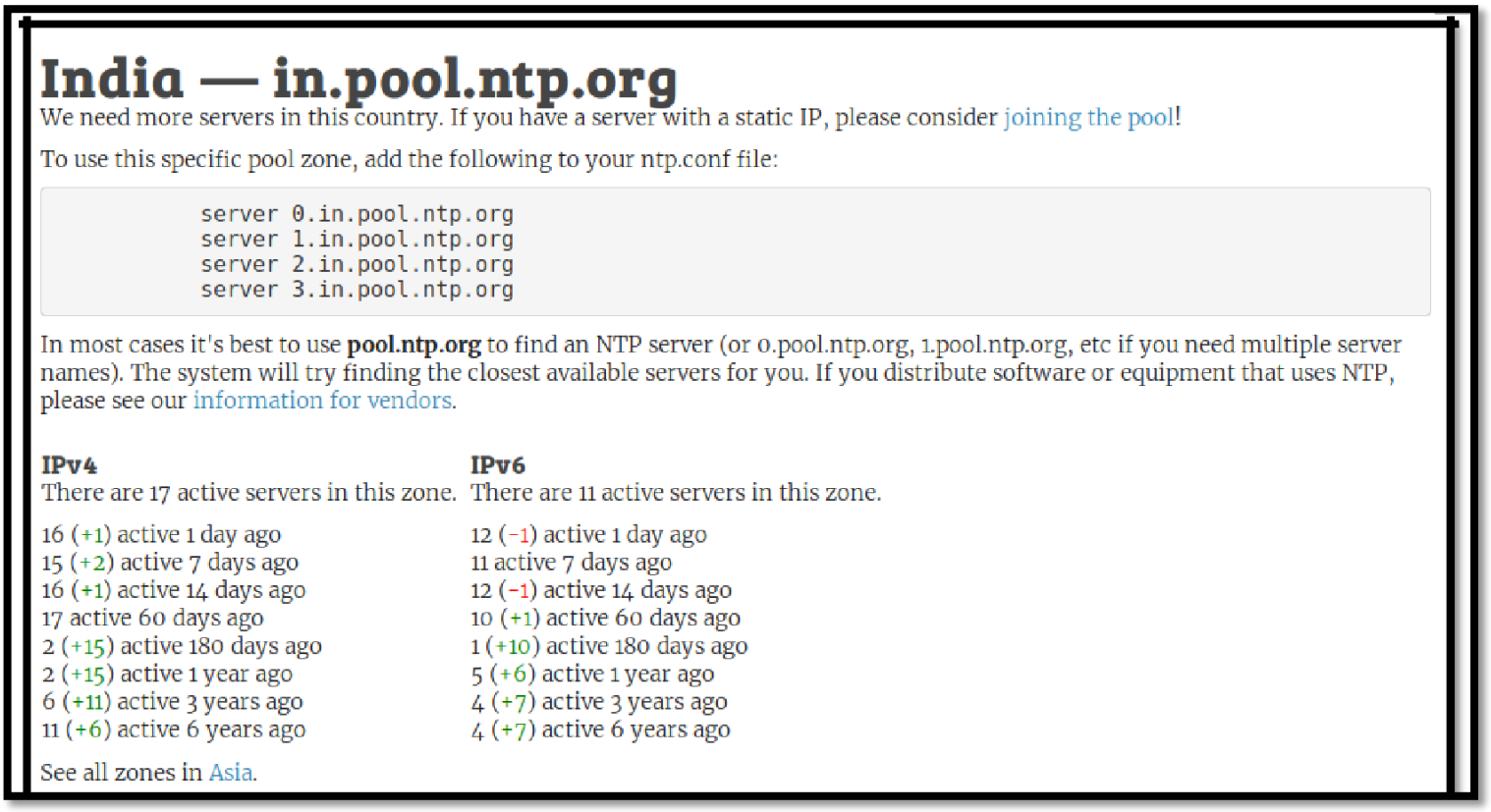
When you install the NTP server, it is mostly configured to fetch proper time. However, you can switch the server pool to the ones closest to your location. This includes making some changes in the */etc/*ntp*.conf* file.
Open the file in the nano editor as sudo by running this following command:
 # sudo nano /etc/ntp.conf



In this file, you will be able to see a pool list. We have highlighted this list in the above image. The task here is to replace this pool list by a pool of time servers closest to your location. The pol.ntp.org project provides reliable NTP service from a big cluster of time servers. To choose a pool list according to your location, visit the following page:

https://support.ntp.org/bin/view/Servers/NTPPoolServers

We have searched for a pool list for the India:



India — in.pool.ntp.org

We need more servers in this country. If you have a server with a static IP, please consider joining the pool!

To use this specific pool zone, add the following to your ntp.conf file:

```
server 0.in.pool.ntp.org
server 1.in.pool.ntp.org
server 2.in.pool.ntp.org
server 3.in.pool.ntp.org
```

In most cases it's best to use **pool.ntp.org** to find an NTP server (or 0.pool.ntp.org, 1.pool.ntp.org, etc if you need multiple server names). The system will try finding the closest available servers for you. If you distribute software or equipment that uses NTP, please see our information for vendors.

IPv4	**IPv6**
There are 17 active servers in this zone.	There are 11 active servers in this zone.
16 (+1) active 1 day ago	12 (-1) active 1 day ago
15 (+2) active 7 days ago	11 active 7 days ago
16 (+1) active 14 days ago	12 (-1) active 14 days ago
17 active 60 days ago	10 (+1) active 60 days ago
2 (+15) active 180 days ago	1 (+10) active 180 days ago
2 (+15) active 1 year ago	5 (+6) active 1 year ago
6 (+11) active 3 years ago	4 (+7) active 3 years ago
11 (+6) active 6 years ago	4 (+7) active 6 years ago

See all zones in Asia.

The page tells us to add the following lines to the ntp.conf file:

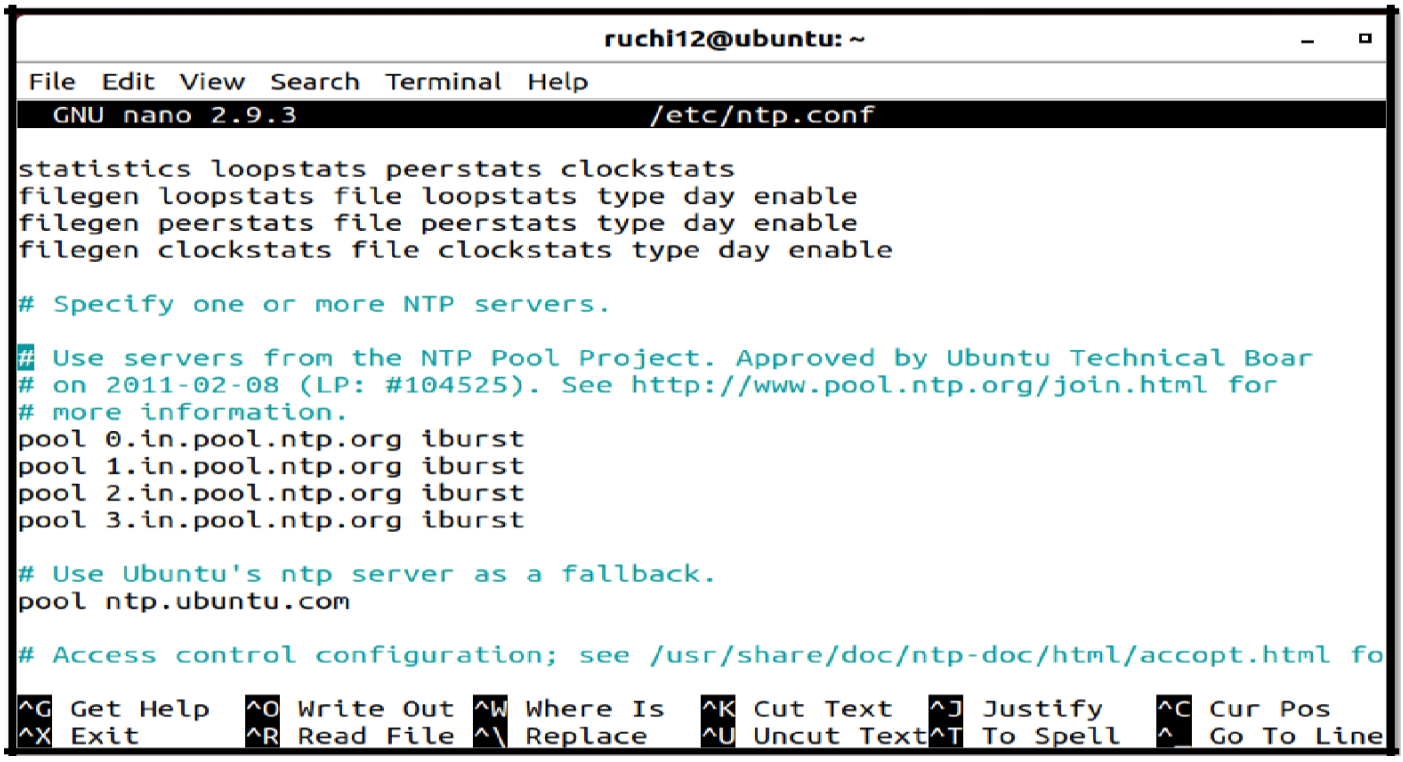
server 0.in.pool.ntp.org

server 1.in.pool.ntp.org

server 2.in.pool.ntp.org

server 3.in.pool.ntp.org

This is how my file looks after adding the above lines to it:



Quit the file by hitting Ctrl+X and then by entering y for saving changes.

Step 5: Restart the NTP server

In order for the above changes to take effect, you need to restart the NTP server. Run the following command as sudo in order to do so:

$ sudo service ntp restart

Step 6: Verify that the NTP Server is running

Now, check the status of the NTP service through the following command:

$ sudo service ntp status

```
ruchi12@ubuntu:~$ sudo service ntp restart
ruchi12@ubuntu:~$ sudo service ntp status
● ntp.service - Network Time Service
   Loaded: loaded (/lib/systemd/system/ntp.service; enabled; vendor preset: enab
   Active: active (running) since Sun 2019-09-08 13:18:19 IST; 22s ago
     Docs: man:ntpd(8)
  Process: 10478 ExecStart=/usr/lib/ntp/ntp-systemd-wrapper (code=exited, status
re
 Main PID: 10486 (ntpd)
    Tasks: 2 (limit: 4660)
   CGroup: /system.slice/ntp.service
           └─10486 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -u 123:127

Sep 08 13:18:27 ubuntu ntpd[10486]: Soliciting pool server 139.59.50.38
Sep 08 13:18:28 ubuntu ntpd[10486]: Soliciting pool server 148.251.69.45
Sep 08 13:18:28 ubuntu ntpd[10486]: Soliciting pool server 64:ff9b::5fd8:90e2
Sep 08 13:18:29 ubuntu ntpd[10486]: Soliciting pool server 123.108.200.124
Sep 08 13:18:29 ubuntu ntpd[10486]: Soliciting pool server 13.126.27.131
Sep 08 13:18:29 ubuntu ntpd[10486]: Soliciting pool server 2a01:4f9:c010:c22::1
Sep 08 13:18:30 ubuntu ntpd[10486]: Soliciting pool server 103.219.141.146
Sep 08 13:18:31 ubuntu ntpd[10486]: Soliciting pool server 64:ff9b::8b3b:fb9
Sep 08 13:18:31 ubuntu ntpd[10486]: Soliciting pool server 91.189.89.198
Sep 08 13:18:32 ubuntu ntpd[10486]: Soliciting pool server 91.189.91.157
lines 1-20/20 (END)
```

The Active status verifies that your NTP server is up and running.

Step 7: Configure Firewall so that client(s) can access NTP server

Finally, it is time to configure your system's UFW firewall so that incoming connections can access the NTP server at UDP Port number 12sud3.

Run the following command as sudo to open port 123 for incoming traffic:

$ sudo ufw allow from any to any port 123 proto udp

```
ruchi12@ubuntu:~$ sudo ufw allow  from any to any port 123 proto udp
Rules updated
Rules updated (v6)
ruchi12@ubuntu:~$
```

Your Ubuntu host machine is now configured to be used as an NTP server.

Configure NTP Client to be Time Synced with the NTP Server

Let us now configure our Ubuntu client machine to be time synchronized with the NTP server.

Step 1: Install ntpdate

The ntpdate command will let you manually check your connection configuration with the NTP-server. Open the Terminal application on the client machine and enter the following command as sudo:

$ sudo apt-get install ntpdate

```
ruchi12@ubuntu:~$ sudo apt-get install ntpdate
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  ntpdate
0 upgraded, 1 newly installed, 0 to remove and 113 not upgraded.
Need to get 51.8 kB of archives.
After this operation, 183 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 ntpdate amd64 1:4.2.8p10+dfsg-5ubunt
u7.1 [51.8 kB]
Fetched 51.8 kB in 6s (9,080 B/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package ntpdate.
(Reading database ... 126471 files and directories currently installed.)
Preparing to unpack .../ntpdate_1%3a4.2.8p10+dfsg-5ubuntu7.1_amd64.deb ...
Unpacking ntpdate (1:4.2.8p10+dfsg-5ubuntu7.1) ...
Setting up ntpdate (1:4.2.8p10+dfsg-5ubuntu7.1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
```

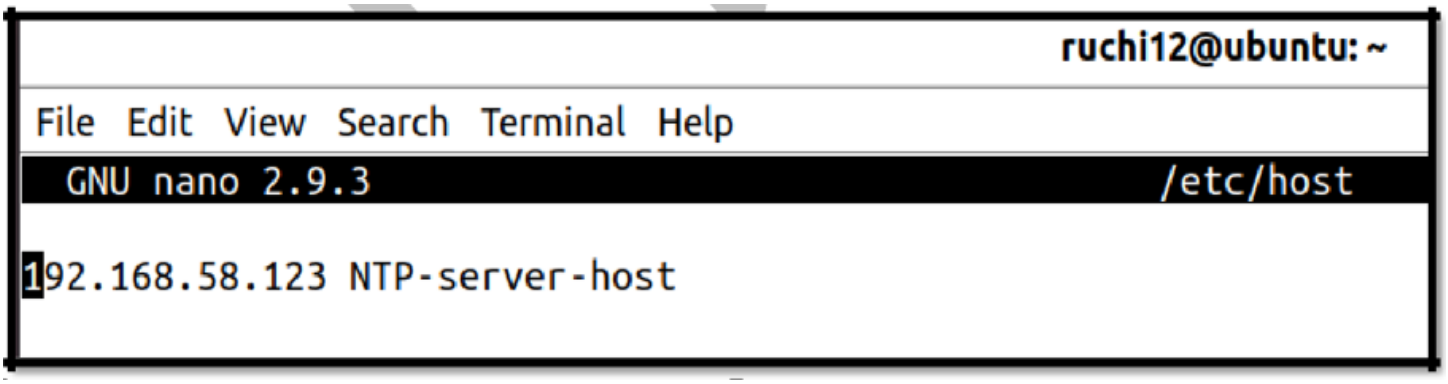
Step 2: Specify IP and hostname of the NTP server in the hosts file

For your NTP server to be resolved by a hostname in your client machine, you need to configure your /etc/hosts file.

Open the hosts file as sudo in the nano editor by entering the following command:

$ sudo nano /etc/hosts

Now add your NTP server's IP and specify a hostname as follows in this file:



Quit the file by hitting Ctrl+X and then save it by entering y.

Step 3: Check if the client machine's time is synchronized with NTP server

The following ntpdate command will let you manually check if time is synchronized between the client and server systems:

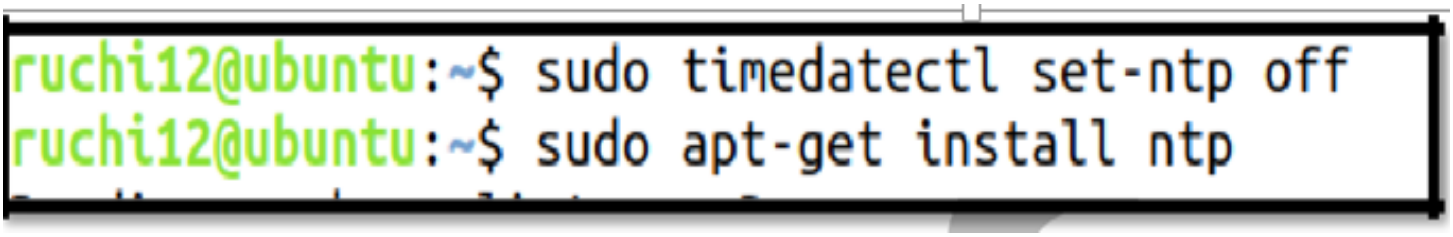
$ sudo ntpdate NTP-server-host

The output should ideally show a time offset between the two systems.

Step 4: Disable the system timesyncd service on the client

Because we want our client to sync time with the NTP server, let us disable the timesyncd service on the client machine.

Enter the following command to do so:



Step 5: Install NTP on your client

Run the following command as sudo in order to install NTP on your client machine:

$ sudo apt-get install ntp

Step 6: Configure the /etc/ntp.conf file to add your NTP server as the new time server

Now we want our client machine to use our own NTP host server to be used as the default time server. For this, we need to edit the /etc/ntp.conf file on the client machine.

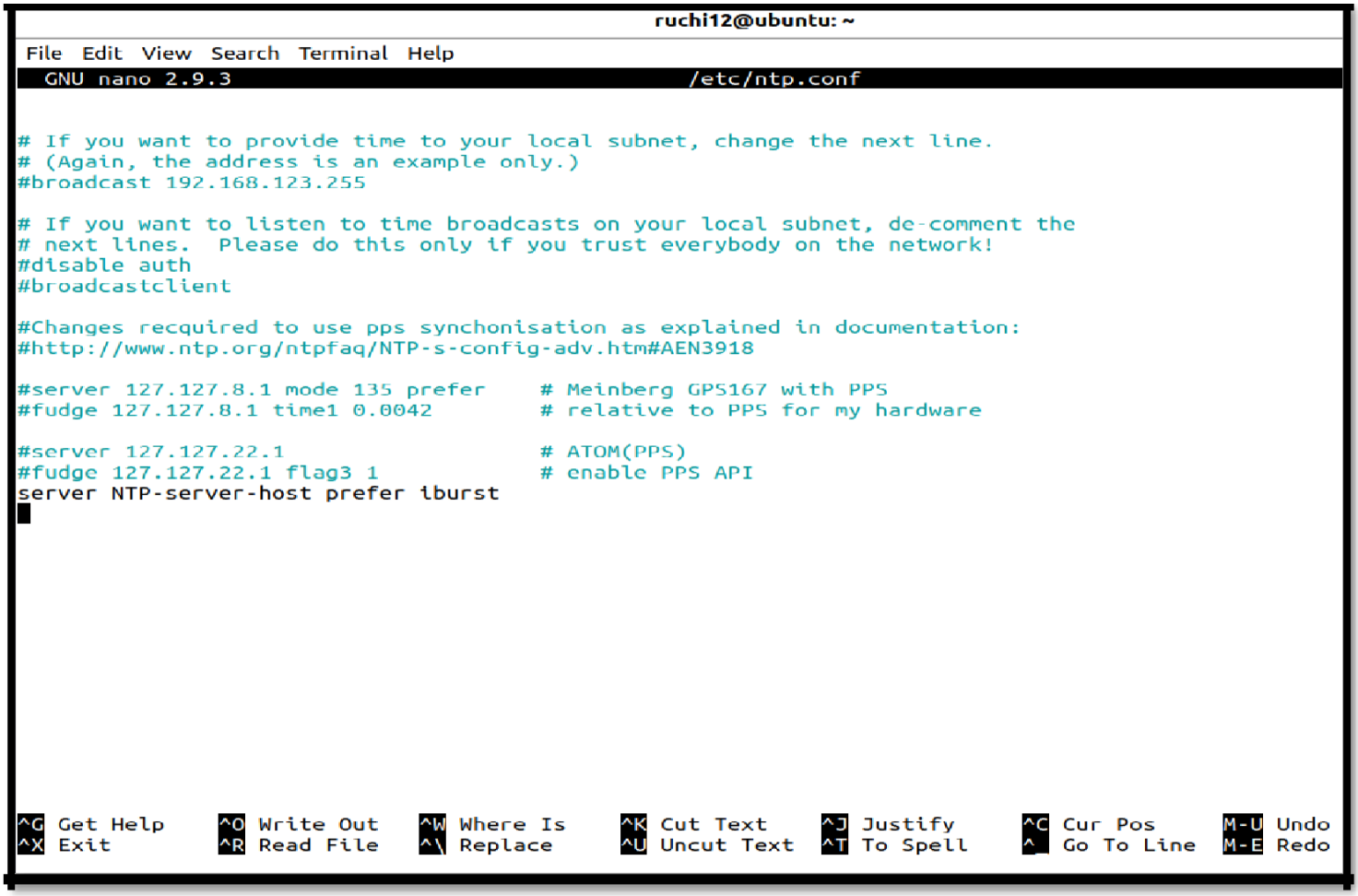
Run the following command as sudo in order to open the file in the Nano editor:

$ sudo nano /etc/ntp.conf

Then, add the following line in the file, where NTP-server-host is the hostname you specified for your NTP server:

server NTP-server-host prefer iburst

This is how my file looks like after I have specified the time server:



Hit Ctrl+x in order to quit the file and then enter y to save the changes.

Step 7: Restart the NTP server

In order for the above changes to take effect, you need to restart the NTP service. Run the following command as sudo in order to do so:

$ sudo service ntp restart

Step 8: View the Time Synchronization Queue

Now your client and server machines are configured to be time-synced. You can view the time synchronization queue by running the following command:

$ ntpq -ps

You should be able to see NTP-server-host as the time synchronization host/source in the queue.

```
ruchi12@ubuntu:~$ sudo ntpdate pool.ntp.org
 9 Sep 00:02:16 ntpdate[8551]: adjust time server 213.209.109.45 offset 0.005106 sec
ruchi12@ubuntu:~$ sudo timedatectl set-ntp off
ruchi12@ubuntu:~$ sudo nano /etc/ntp.conf
ruchi12@ubuntu:~$ sudo systemctl restart ntp
ruchi12@ubuntu:~$ ntpq -p
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
 0.in.pool.ntp.o .POOL.          16 p    -   64    0    0.000    0.000   0.000
 1.in.pool.ntp.o .POOL.          16 p    -   64    0    0.000    0.000   0.000
 2.in.pool.ntp.o .POOL.          16 p    -   64    0    0.000    0.000   0.000
 3.in.pool.ntp.o .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
 ntp-server-host .INIT.          16 u    -   64    0    0.000    0.000   0.000
*static.15.192.2 194.58.200.20    2 u    -   64    1  195.467    3.939   6.276
+ec2-13-235-109- 139.59.55.93     3 u    4   64    1   68.821    3.252   6.602
+static.238.6.69 17.253.54.125    2 u    8   64    1  166.318   -8.328   6.317
-52.172.27.135   218.73.139.35    2 u    9   64    1   78.746   14.961   3.654
*static.226.144. 134.71.66.21     2 u    7   64    1  178.445  -11.585  10.977
+139.59.55.93    17.253.82.125    2 u   13   64    1  121.680  -15.024   5.302
```