Configure NTP (Chronyd) Server & Client in Linux | Setup Chronyd Server in RHEL

Network Time Protocol {Port No. 123 (UDP)}:
NTP is an old, widely known and cross-platform protocol designed to synchronize the clocks of computers over a network. It commonly synchronizes a computer to Internet time servers or other sources, such as a radio or satellite receiver or telephone modem service. It can also be used as a time source/server for client systems.

Configure NTP Server & NTP Clients in Redhat Enterprise Linux 8 (Chronyd Service for Clock Synchronization):

In RHEL Linux 8, the ntp package is no longer supported and it is implemented by the chronyd (a daemon that runs in user-space) which is provided in the chrony package.

chrony works both as an NTP server and as an NTP client, which is used to synchronize the system clock with NTP servers, and can be used to synchronize the system clock with a reference clock (e.g a GPS receiver).

Server Side Configuration:
---
1. Login as root user in server and ensure that the local yum repository in properly configure in your server.

dnf repolist

2. Install NTP Packages (Chrony) in the server.

dnf install chrony* -y

3. Start the chronyd service in the server.

systemctl start chronyd

4. Enable the chrony service so that it can restart at its own after the reboot.

systemctl enable chronyd

5. Check the status of chrony service to make sure it is up and running.

systemctl status chronyd

6. Make an entry for the Network in configuration file of NTP (chrony).

vim /etc/chrony.conf

allow 192.168.1.0/24

7. Restart the chronyd service.

systemctl restart chronyd

8. Add NTP service in the firewall so that others systems in the network can connect to it.

firewall-cmd --permanent --add-service=ntp

9. Reload the firewall now, so that the new rule can get implement.

firewall-cmd --reload

10. Check NTP clients connected to the Server.

chronyc clients

Client Side Configuration: (RHEL 7 Or RHEL 8)

---

1. Login as root user in server and ensure that the local yum repository in properly configure in your server.

yum repolist

2. Install NTP Packages (Chrony) in the server.

yum install chrony* -y

OR

You can install it using RPM command if local yum repository is not configured in your server.

rpm -ivh chrony

3. Start the chronyd service in the server.

systemctl start chronyd

4. Enable the chrony service so that it can restart at its own after the reboot.

systemctl enable chronyd

5. Check the status of chrony service to make sure it is up and running.

systemctl status chronyd

6. Make an entry for the Network in configuration file of NTP (chrony).

vim /etc/chrony.conf

server 192.168.1.107

7. Restart the chronyd service.

systemctl restart chronyd

8. Check the details of your NTP server with which your are getting service.

chronyc sources

Client Side Configuration (Microsoft Windows):

Win+R =) Control =) Date & Time =) Internet Time

Mention the IP Address of your NTP Server.

Win+R =) Control =) Date & Time =) Internet Time

Mention the IP Address of your NTP Server.

Verify All Clients are connected and working as expected:

Now Go To NTP Server:

And Check the details of NTP clients connected to the Server. It must show you the details of the client machine you have just configured.

chronyc clients

Now Change the time on the NTP Client and resnyc it again.

Now Go to NTP Server & Verify that the time has been changed on it.

date

You should see the same time on both.

 # Practical client -- Windows -PC / Server - RHEL

```
[root@NTPServer ~]# uname -a
Linux NTPServer 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019 x86_64 x86_64 x86_64 GNU/Lin
ux
[root@NTPServer ~]# dnf repolist
Updating Subscription Management repositories.
Unable to read consumer identity
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
 register.
Last metadata expiration check: -1 day, 18:41:18 ago on Tuesday 31 March 2020 04:10:16 AM IST.
repo id                                repo name                                              status
InstallMedia-AppStream                 Red Hat Enterprise Linux 8 - AppStream                 4,672
InstallMedia-BaseOS                    Red Hat Enterprise Linux 8 - BaseOS                    1,658
[root@NTPServer ~]# dnf install chrony* -y
Updating Subscription Management repositories.
Unable to read consumer identity
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
 register.
Last metadata expiration check: -1 day, 18:41:42 ago on Tuesday 31 March 2020 04:10:16 AM IST.
Package chrony-3.3-3.el8.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@NTPServer ~]#
```

 # note : Chrony - package - used to proved service for NTP

 # now start the service

```
[root@NTPServer ~]# systemctl start chronyd
[root@NTPServer ~]# systemctl enable chronyd
[root@NTPServer ~]# systemctl status chronyd
```

```
[root@NTPServer ~]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2020-03-31 04:17:07 IST; 5h 24min left
     Docs: man:chronyd(8)
           man:chrony.conf(5)
 Main PID: 3050 (chronyd)
    Tasks: 1 (limit: 4915)
   Memory: 1.7M
   CGroup: /system.slice/chronyd.service
           └─3050 /usr/sbin/chronyd

Mar 31 04:17:06 NTPServer systemd[1]: Starting NTP client/server...
Mar 31 04:17:06 NTPServer chronyd[3050]: chronyd version 3.3 starting (+CMDMON +NTP +REFCLOCK +RTC +>
Mar 31 04:17:07 NTPServer chronyd[3050]: Using right/UTC timezone to obtain leap second data
Mar 31 04:17:07 NTPServer systemd[1]: Started NTP client/server.
Mar 31 04:17:15 NTPServer chronyd[3050]: Selected source 185.216.231.25
Mar 31 04:17:15 NTPServer chronyd[3050]: System clock TAI offset set to 37 seconds
Mar 31 04:17:15 NTPServer chronyd[3050]: System clock wrong by -19799.577757 seconds, adjustment sta>
Mar 30 22:47:15 NTPServer chronyd[3050]: System clock was stepped by -19799.577757 seconds
Mar 30 22:47:16 NTPServer chronyd[3050]: Source 95.216.200.137 replaced with 2001:470:19:301::100
Mar 30 22:50:36 NTPServer chronyd[3050]: Selected source 95.217.158.80
[root@NTPServer ~]#
```

```
[root@NTPServer ~]# vim /etc/chrony.conf
```

```
# the system clock.
#minsources 2

# Allow NTP client access from local network.
allow 192.168.1.0/24

# Serve time even if not synchronized to a time source.
#local stratum 10

# Specify file containing keys for NTP authentication.
keyfile /etc/chrony.keys

# Get TAI-UTC offset and leap seconds from the system tz database.
leapsectz right/UTC

# Specify directory for log files.
logdir /var/log/chrony

# Select which information is logged.
#log measurements statistics tracking
```

```
[root@NTPServer ~]# systemctl restart chronyd
[root@NTPServer ~]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2020-03-30 22:53:38 IST; 4s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Process: 3211 ExecStartPost=/usr/libexec/chrony-helper update-daemon (code=exited, status=0/SUCCES
  Process: 3207 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 3209 (chronyd)
    Tasks: 1 (limit: 4915)
   Memory: 3.3M
   CGroup: /system.slice/chronyd.service
           └─3209 /usr/sbin/chronyd

Mar 30 22:53:38 NTPServer systemd[1]: Starting NTP client/server...
Mar 30 22:53:38 NTPServer chronyd[3209]: chronyd version 3.3 starting (+CMDMON +NTP +REFCLOCK +RTC +
Mar 30 22:53:38 NTPServer chronyd[3209]: Frequency -28.445 +/- 314.599 ppm read from /var/lib/chrony
Mar 30 22:53:38 NTPServer chronyd[3209]: Using right/UTC timezone to obtain leap second data
Mar 30 22:53:38 NTPServer systemd[1]: Started NTP client/server.
lines 1-18/18 (END)
```

 # Firewall reloaded

```
[root@NTPServer ~]# firewall-cmd --permanent --add-service=ntp
success
[root@NTPServer ~]# firewall-cmd --reload
success
[root@NTPServer ~]#
```

 # Clients Connection -- current no Such Connection

```
[root@NTPServer ~]# chronyc clients
Hostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
[root@NTPServer ~]#
```

 # go to the Client Machine .. Repeat the same Steps configure the NTP client

```
[root@ntpclient ~]# uname -a
Linux ntpclient 3.10.0-1062.el7.x86_64 #1 SMP Thu Jul 18 20:25:13 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux
[root@ntpclient ~]# mount /dev/sr0 /mnt
mount: /dev/sr0 is write-protected, mounting read-only
[root@ntpclient ~]#
```

Client Side Configuration:

---

1. Login as root user in server and ensure that the local yum repository in properly configure in your server.

yum repolist

2. Install NTP Packages (Chrony) in the server.

yum install chrony* -y

```
[root@ntpclient ~]# cd /mnt
[root@ntpclient mnt]# df -hT
Filesystem             Type      Size  Used Avail Use% Mounted on
devtmpfs               devtmpfs  470M     0  470M   0% /dev
tmpfs                  tmpfs     487M     0  487M   0% /dev/shm
tmpfs                  tmpfs     487M  8.6M  478M   2% /run
tmpfs                  tmpfs     487M     0  487M   0% /sys/fs/cgroup
/dev/mapper/rhel-root  xfs        17G  4.5G   13G  27% /
/dev/sda1              xfs      1014M  169M  846M  17% /boot
tmpfs                  tmpfs      98M   28K   98M   1% /run/user/0
/dev/sr0               iso9660   4.2G  4.2G     0 100% /mnt
[root@ntpclient mnt]#
```

```
[root@ntpclient mnt]# ll
total 974
dr-xr-xr-x. 4 root root   2048 Jul 23  2019 addons
dr-xr-xr-x. 3 root root   2048 Jul 23  2019 EFI
-r--r--r--. 1 root root   8266 Jul 23  2019 EULA
-r--r--r--. 1 root root   1455 Jul 23  2019 extra_files.json
-r--r--r--. 1 root root  18092 Jul 23  2019 GPL
dr-xr-xr-x. 3 root root   2048 Jul 23  2019 images
dr-xr-xr-x. 2 root root   2048 Jul 23  2019 isolinux
dr-xr-xr-x. 2 root root   2048 Jul 23  2019 LiveOS
-r--r--r--. 1 root root    114 Jul 23  2019 media.repo
dr-xr-xr-x. 2 root root 946176 Jul 23  2019 Packages
dr-xr-xr-x. 2 root root   2048 Jul 23  2019 repodata
-r--r--r--. 1 root root   3375 Jul  3  2019 RPM-GPG-KEY-redhat-beta
-r--r--r--. 1 root root   3211 Jul  3  2019 RPM-GPG-KEY-redhat-release
-r--r--r--. 1 root root   1796 Jul 23  2019 TRANS.TBL
[root@ntpclient mnt]# cd Packages/
[root@ntpclient Packages]# rpm -ivh chrony-3.4-1.el7.x86_64.rpm
warning: chrony-3.4-1.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing...                          ################################# [100%]
        package chrony-3.4-1.el7.x86_64 is already installed
[root@ntpclient Packages]#
```

```
[root@ntpclient Packages]# systemctl start chronyd
[root@ntpclient Packages]# systemctl enable chronyd
[root@ntpclient Packages]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2020-03-30 22:30:57 IST; 27min ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  CGroup: /system.slice/chronyd.service
           └─900 /usr/sbin/chronyd

Mar 30 22:30:55 client systemd[1]: Starting NTP client/server...
Mar 30 22:30:56 client chronyd[900]: chronyd version 3.4 starting (+CMDMON +NTP +REFCLOCK +RTC +PRIVDR...EBUG)
Mar 30 22:30:57 client chronyd[900]: Frequency -7.664 +/- 12.731 ppm read from /var/lib/chrony/drift
Mar 30 22:30:57 client systemd[1]: Permission denied while opening PID file or unsafe symlink chain: /...d.pid
Mar 30 22:30:57 client systemd[1]: Started NTP client/server.
Mar 30 22:31:31 client chronyd[900]: Selected source 95.216.144.226
Mar 30 22:31:42 client chronyd[900]: Source 157.119.108.165 replaced with 95.216.200.137
Hint: Some lines were ellipsized, use -l to show in full.
[root@ntpclient Packages]#
```

```
[root@ntpclient Packages]#  vim /etc/chrony.conf
```

 # comment

```
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
server 0.rhel.pool.ntp.org iburst
server 1.rhel.pool.ntp.org iburst
server 2.rhel.pool.ntp.org iburst
server 3.rhel.pool.ntp.org iburst

# Record the rate at which the system clock gains/losses time.
driftfile /var/lib/chrony/drift

# Allow the system clock to be stepped in the first three updates
# if its offset is larger than 1 second.
makestep 1.0 3

# Enable kernel synchronization of the real-time clock (RTC).
rtcsync

# Enable hardware timestamping on all interfaces that support it.
#hwtimestamp *

# Increase the minimum number of selectable sources required to adjust
# the system clock
```

 # go back to ntp server -- check ip addr

```
[root@NTPServer ~]# ip addr
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
       valid_lft forever preferred_lft forever
2: ens160: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:29:d9:c5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.107/24 brd 192.168.1.255 scope global dynamic noprefixroute ens160
       valid_lft 84673sec preferred_lft 84673sec
    inet6 fe80::621f:ffaa:15c0:84c0/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1
000
    link/ether 52:54:00:18:1c:df brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel master virbr0 state DOWN group default q
len 1000
```

#cp the ip addr + add in the client conf file + save the changes + exit

```
# Use public servers from the pool.ntp.org project.
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
#server 0.rhel.pool.ntp.org iburst
#server 1.rhel.pool.ntp.org iburst
#server 2.rhel.pool.ntp.org iburst
#server 3.rhel.pool.ntp.org iburst
server 192.168.1.107

# Record the rate at which the system clock gains/losses time.
driftfile /var/lib/chrony/drift

# Allow the system clock to be stepped in the first three updates
# if its offset is larger than 1 second.
makestep 1.0 3

# Enable kernel synchronization of the real-time clock (RTC).
rtcsync

# Enable hardware timestamping on all interfaces that support it.
#hwtimestamp *
```

```
[root@ntpclient Packages]# systemctl restart chronyd
[root@ntpclient Packages]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2020-03-30 23:00:15 IST; 7s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Process: 3534 ExecStartPost=/usr/libexec/chrony-helper update-daemon (code=exited, status=0/SUCCESS)
  Process: 3531 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
    Tasks: 1
   CGroup: /system.slice/chronyd.service
           └─3533 /usr/sbin/chronyd

Mar 30 23:00:15 ntpclient systemd[1]: Starting NTP client/server...
Mar 30 23:00:15 ntpclient chronyd[3533]: chronyd version 3.4 starting (+CMDMON +NTP +REFCLOCK +RTC +PRI...BUG)
Mar 30 23:00:15 ntpclient chronyd[3533]: Frequency -5.786 +/- 69.349 ppm read from /var/lib/chrony/drift
Mar 30 23:00:15 ntpclient systemd[1]: Permission denied while opening PID file or unsafe symlink chain...d.pid
Mar 30 23:00:15 ntpclient systemd[1]: Started NTP client/server.
Hint: Some lines were ellipsized, use -l to show in full.
[root@ntpclient Packages]# c
```

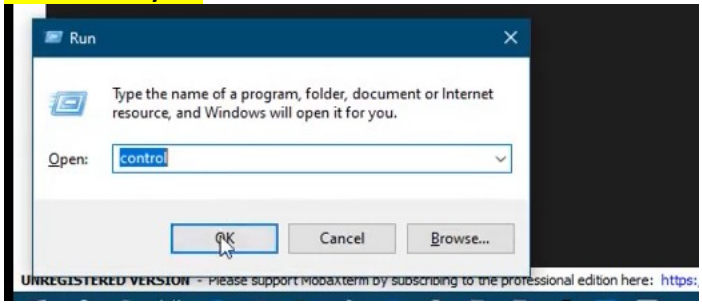
5 seconds

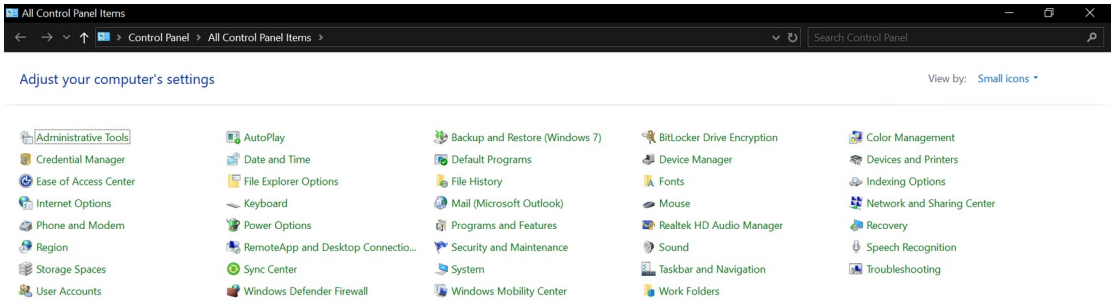
 # connection from client to Server

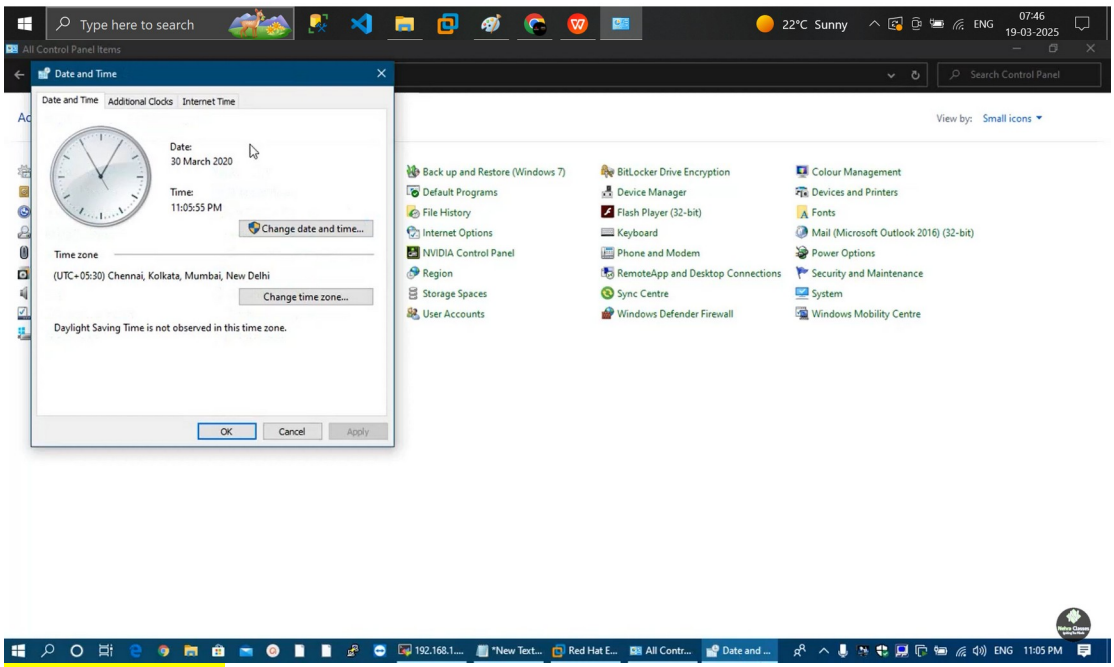
```
[root@ntpclient ~]# chronyc sources
210 Number of sources = 1
MS Name/IP address         Stratum Poll Reach LastRx Last sample
===============================================================================
^* 192.168.1.107                 3   6    37    45   +814us[+3811us] +/-  140ms
[root@ntpclient ~]#
```

 # now configure ntp client on the windows machine

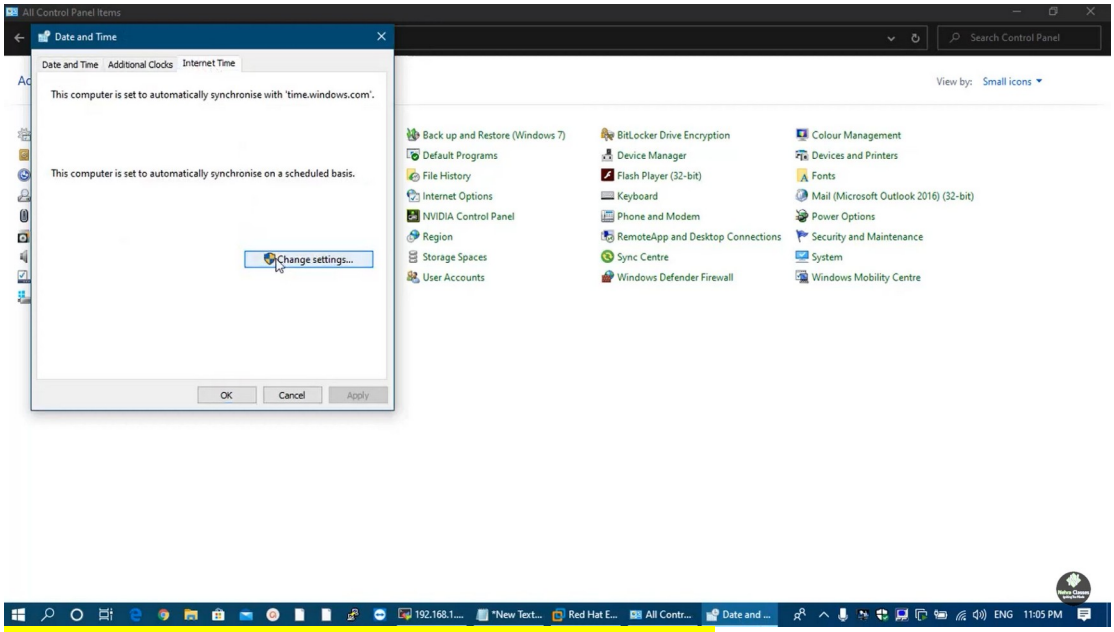
#windows key + R



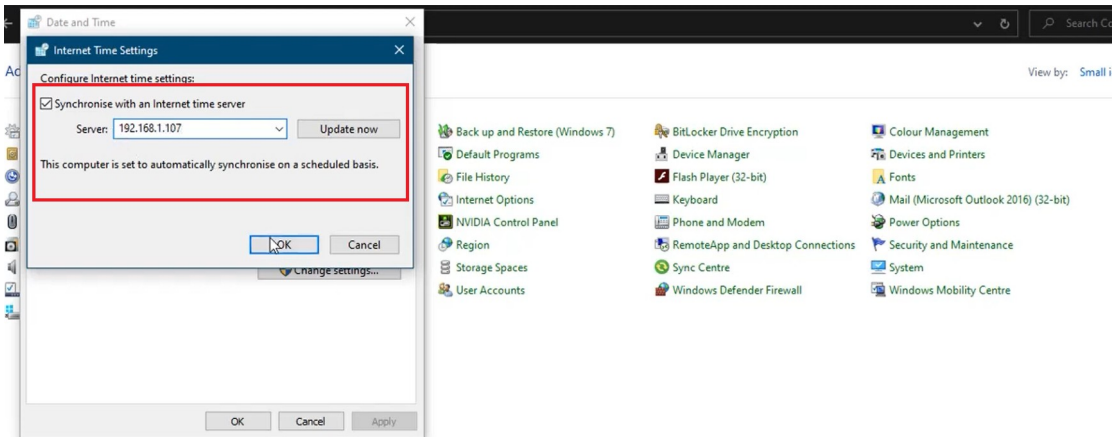




 # click internet time



 # click on change settings tab - mention the ip addr of ntp server



 # go to ntp server check now many client connected

```
root@NTPServer ~]# chronyc clients
ostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
92.168.1.116                   6      0   6   -    61       0      0   -     -
92.168.1.105                   1      0   -   -    19       0      0   -     -
root@NTPServer ~]#
```

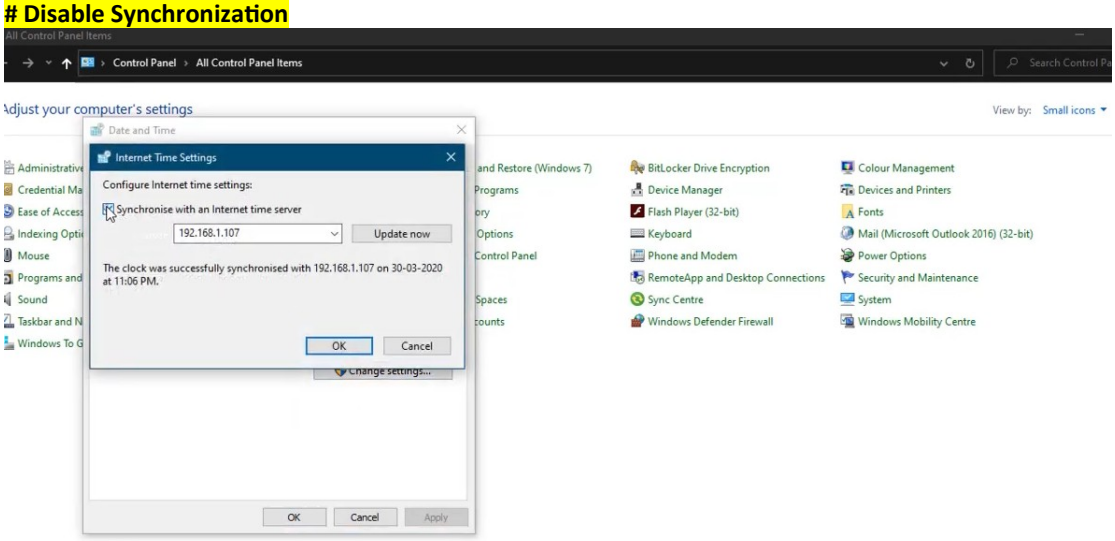
 # the 1st ip from RHEL client / # 2nd is from windows PC

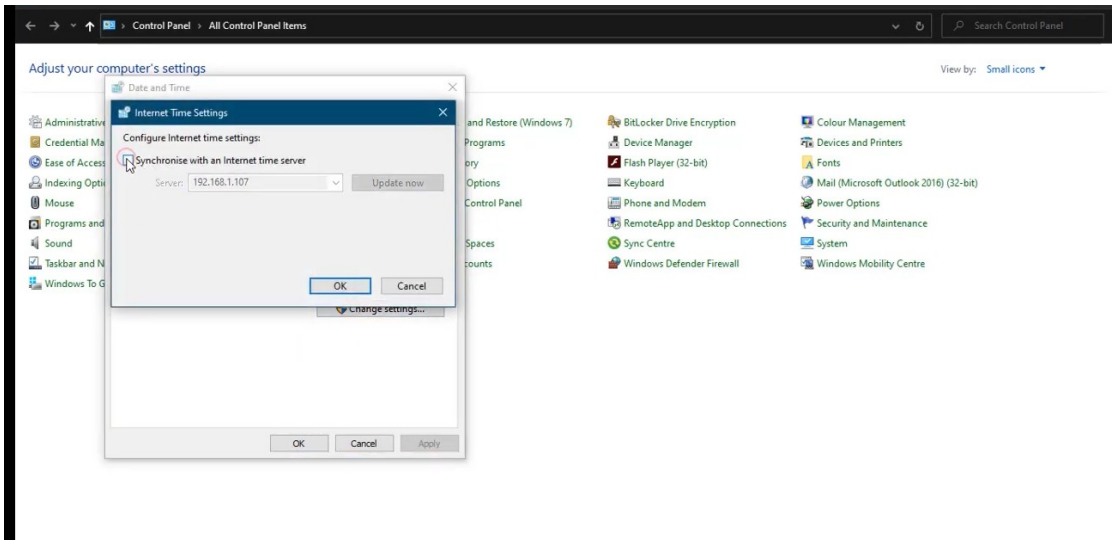
 # windows - ipconfig

```
  Media State . . . . . . . . . . . : Media disconnected
  Connection-specific DNS Suffix  . :

thernet adapter VMware Network Adapter VMnet8:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::1554:7a92:ef2c:e2a4%11
  IPv4 Address. . . . . . . . . . . : 192.168.75.1
  Subnet Mask . . . . . . . . . . . : 255.255.255.0
  Default Gateway . . . . . . . . . :

ireless LAN adapter WiFi:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::3168:ea85:4c25:b1a4%16
  IPv4 Address. . . . . . . . . . . : 192.168.1.105
  Subnet Mask . . . . . . . . . . . : 255.255.255.0
  Default Gateway . . . . . . . . . : 192.168.1.1

ireless LAN adapter Local Area Connection* 3:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::412c:4353:dd24:295e%9
  IPv4 Address. . . . . . . . . . . : 192.168.137.1
  Subnet Mask . . . . . . . . . . . : 255.255.255.0
  Default Gateway . . . . . . . . . :
```

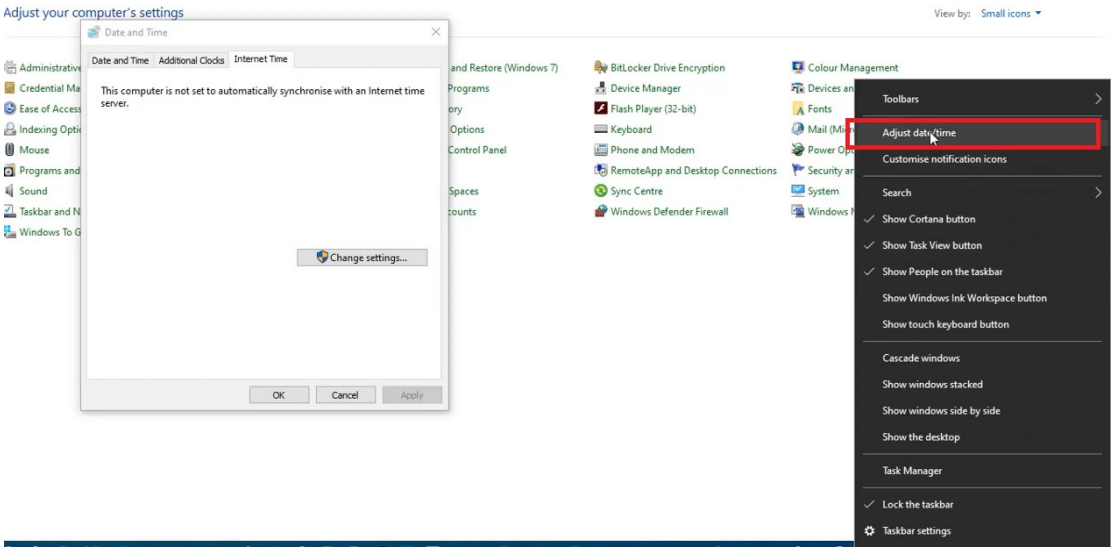
 # ntp service help us in client synchronization on server machine

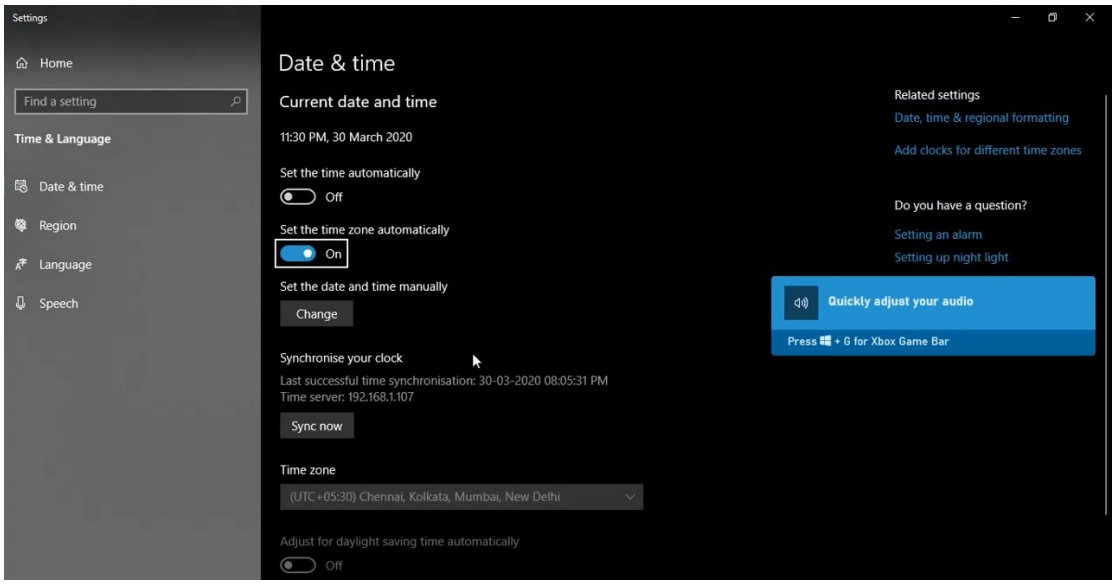
 # Disable Synchronization



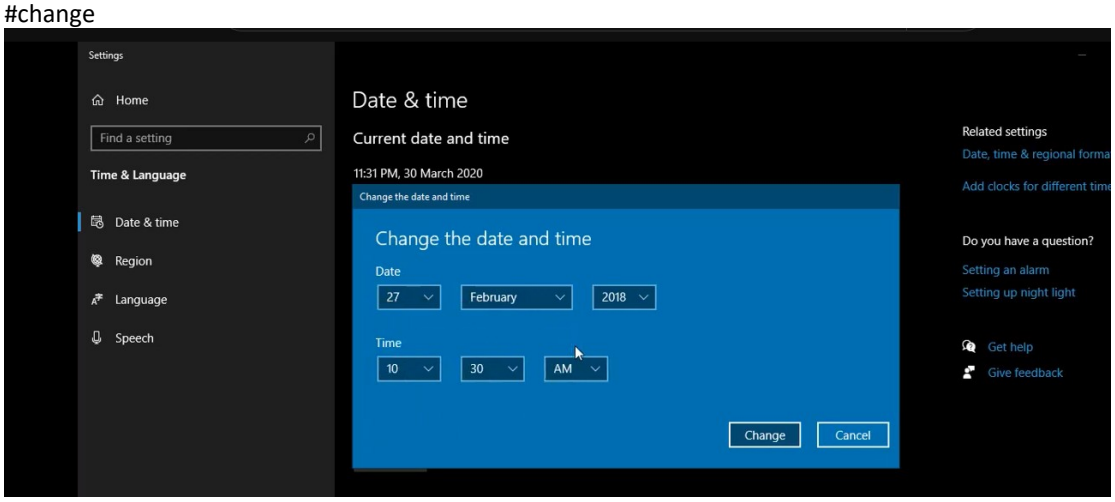


Task bar . Adjust time/ date Opt

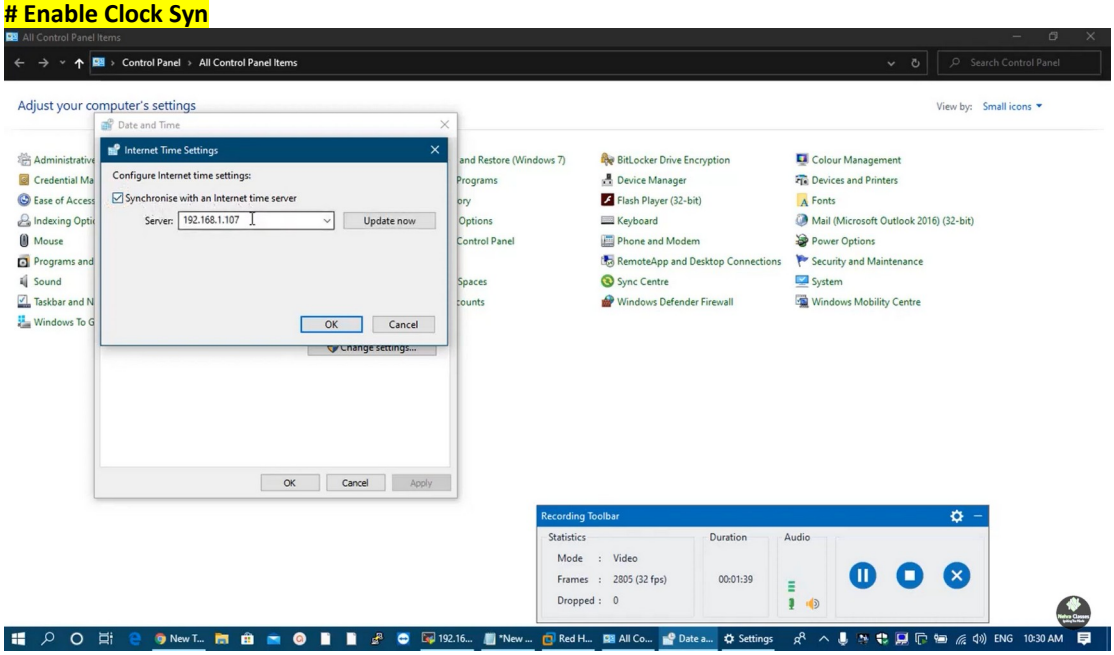


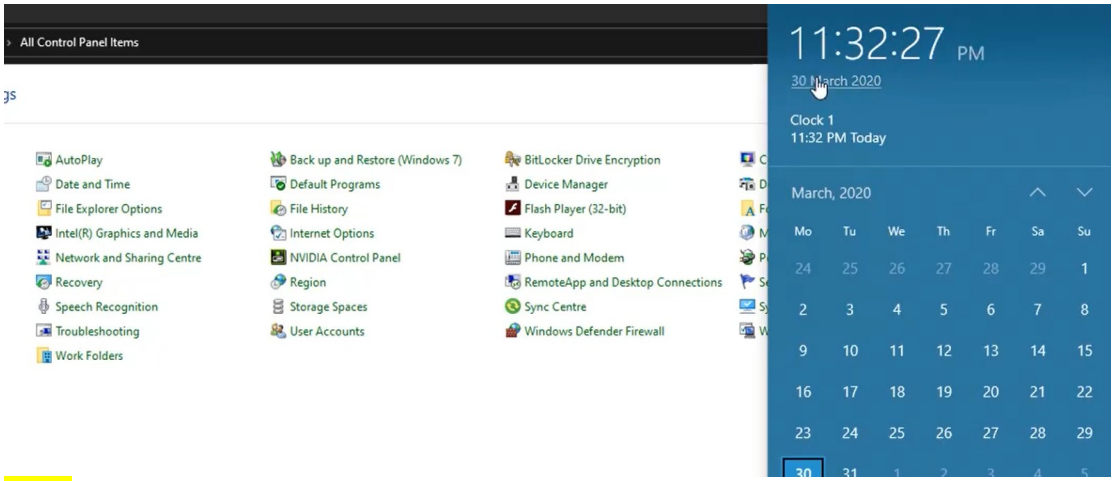


#change

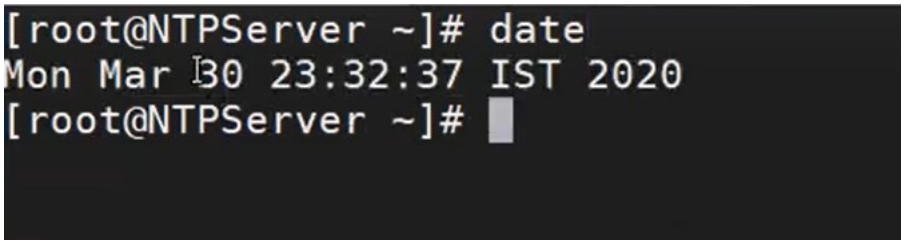


 # Enable Clock Syn



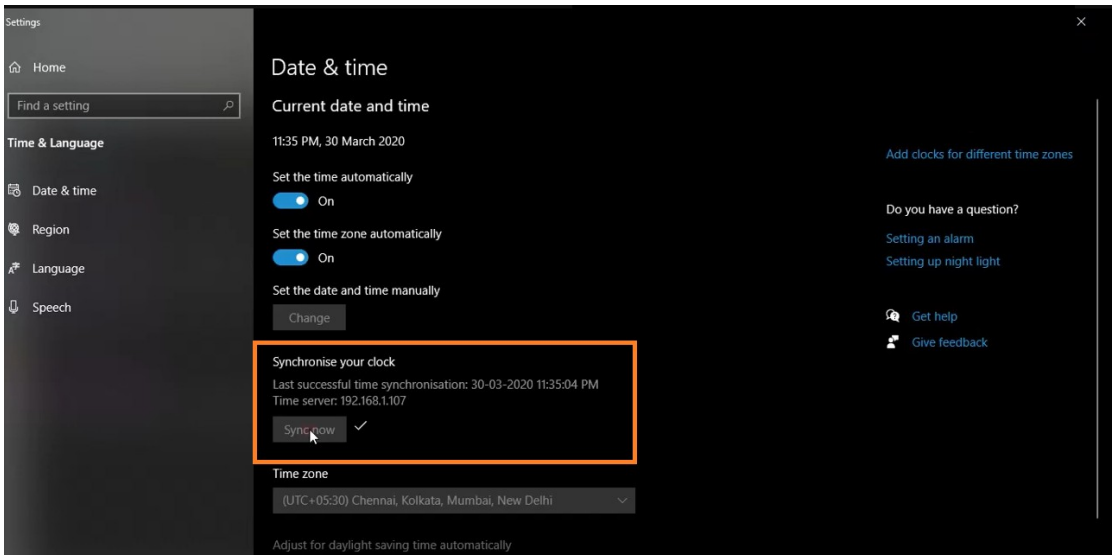


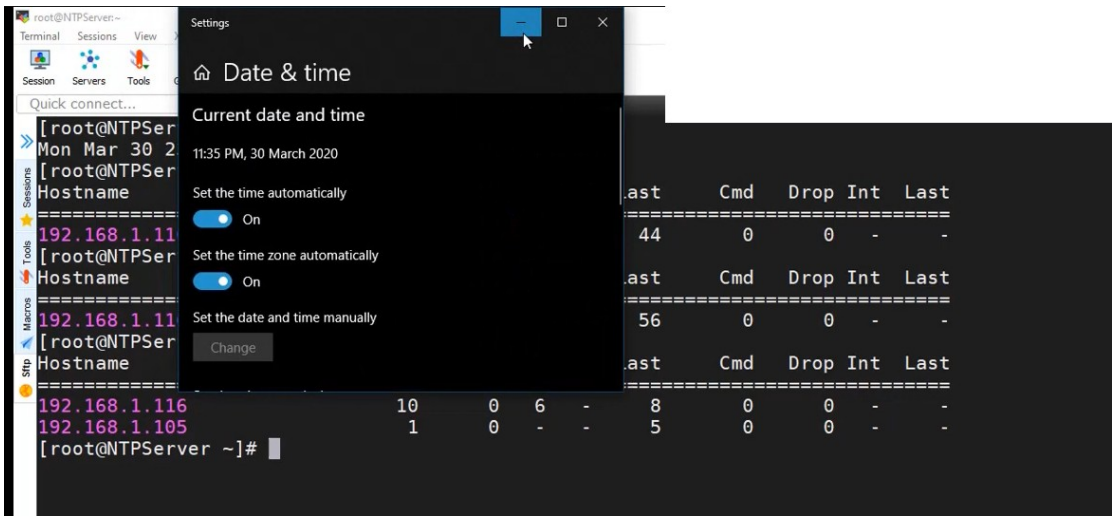
server



```
[root@NTPServer ~]# chronyc clients
Hostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
192.168.1.116                   9      0   6   -    44       0      0   -     -
[root@NTPServer ~]# chronyc clients
Hostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
192.168.1.116                   9      0   6   -    56       0      0   -     -
[root@NTPServer ~]# chronyc clients
Hostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
192.168.1.116                  10      0   6   -     8       0      0   -     -
192.168.1.105                   1      0   -   -     5       0      0   -     -
[root@NTPServer ~]#
```

 # click on Syn -- will Syn will NTP Server





#Server

```
[root@NTPServer ~]# chronyc clients
Hostname                      NTP   Drop Int IntL Last     Cmd   Drop Int  Last
===============================================================================
192.168.1.116                  10      0   6   -    40       0      0   -     -
192.168.1.105                   1      0   -   -    37       0      0   -     -
[root@NTPServer ~]#
```

 # client

```
[root@ntpclient ~]# chronyc sources
210 Number of sources = 1
MS Name/IP address         Stratum Poll Reach LastRx Last sample
===============================================================================
^* 192.168.1.107                 2   6    77    52  -1610us[-6618us] +/-   87ms
[root@ntpclient ~]#
```