Intro

NTP is a protocol used to synchronize clocks over a network. It works by exchanging time information between devices and adjusting their clocks accordingly. NTP can synchronize clocks to within a few milliseconds of each other and can be used to synchronize devices across a LAN or WAN.

NTP Configuration on Windows Server as Master Server Clock:

open your PowerShell and use these commands:

Step 1: Enable NTP Server

```
Set-ItemProperty -Path "HKLM:\SYSTEM\CurrentControlSet\Services\w32time\TimeProviders\NtpServer" -Name "Enabled" -Value 1
```

Step 2: Make the Announce Flags 5

```
Set-ItemProperty -Path "HKLM:\SYSTEM\CurrentControlSet\services\W32Time\Config" -Name "AnnounceFlags" -Value 5
```

Step 3: Restart NTP Server

```
Restart-Service w32Time
```

Step 4: Allow NTP Port (123) on Firewall

```
New-NetFirewallRule `
  -Name "NTP Server Port" `
  -DisplayName "NTP Server Port" `
  -Description 'Allow NTP Server Port' `
  -Profile Any `
  -Direction Inbound `
  -Action Allow `
  -Protocol UDP `
  -Program Any `
  -LocalAddress Any `
  -LocalPort 123
```

Configure the ESXi host to synchronize time with the Windows Server:

1. Connect to the ESXi host using the vSphere Client or vSphere Web Client.
2. Select the ESXi host from the inventory.
3. Go to the "Configure" tab.
4. Under "System," click on "Time Configuration."
5. In the "Time Configuration" window, click on the "Edit" button.
6. Select the checkbox for "Enable NTP Client."
7. Enter the IP address or hostname of the Windows Server acting as the NTP server.
8. Click "OK" to save the changes.

Update Time Zone for Linux

```
tar -xzvf tzdata2022b.tar.gz
```

Compile to apply the updates for the region(s) of interest (Asia) the system's time zone data through the 'zic' (timezone compiler) command (you should be *root/root-privileged* user):

```
zic asia
```

Note: the changes will be applied on the Asia/Tehran directly as well as other regions in Asia.

Relink the localtime /etc/localtime with the corrected timeZone information using the following command:

```
zic -l Asia/Tehran
```

Note: Depending on what Linux distribution are you using, you will need to reconfigure the ZONE for which system is using at startup (configure with tzdata-update or timedatectl set-timezone Asia/Tehran)

Note: User/shell level timeZone
The date command by default is using the same /etc/localtime when displaying date &time at user/shell level, however if variable TZ was set to something different, then it will read and apply the timeZone from that TZ variable, so you will need to either unset/delete it or set that to the current locatime TZ='Asia/Tehran' in the user level shell profiles; this is a command to find files which TZ variable might set in those files under user's home directories:

```
find /home/ -maxdepth 2 -type f -exec grep -wH 'TZ' {} +
```

Configure the ntpd **service to start on every boot in CentOS 6:**

```
chkconfig ntpd on
```

Configure the ntpd **service to start on every boot in Ubuntu:**

```
sudo systemctl is-enabled ntp
```

Install NTP on CentOS with usb drive:

1) See usb in disk list:

```
lsblk
```

2) Mount USB:

```
sudo mkdir /mnt/usb
sudo mount /dev/sdX1 /mnt/usb
```

* Replace /dev/sdX1 with the appropriate device path for your USB drive. You can find the correct device path by running the lsblk command before and after inserting the USB drive.

3) Extract ntp.tar.gz

```
sudo tar -zxvf ntp.tar.gz
cd ntp
```

4) Make install:

```
sudo ./configure
sudo make
sudo make install
ntpq –version
```

5) Edit ntp config file:

```
sudo nano /etc/ntp.conf
```

```
driftfile /var/lib/ntp/ntp.driftfile

# Specify one or more NTP servers.
server <NTP-Server-IP>
```

6) Restart ntpd service:

```
sudo service ntpd restart
```

7) Check client connection to ntp server:

```
ntpq -p
```

8) Unmount USB:

```
sudo umount /mnt/usb
```

Install NTP on Ubuntu Client with USB Drive:

1) After mount usb, go to ntp.deb file directory then uses this command for install ntp:

   ```
   sudo apt install ./ntp.deb
   ```

2) Edit ntp config file:

   ```
   sudo nano /etc/ntp.conf
   ```

   ```
   driftfile /var/lib/ntp/ntp.driftfile

   # Specify one or more NTP servers.
   server <NTP-Server-IP>
   ```

3) Restart ntp service:

   ```
   sudo service ntp restart
   ```

4) Check client connection to ntp server:

   ```
   ntpq -p
   ```

   ```
        remote           refid      st t when poll reach   delay   offset  jitter
   ==============================================================================
   *192.168.67.129  51.137.137.111   4 u   63   64  377    1.496   -1.164   3.200
   ```

Here are some details from the output**:**

- remote: IP address of the NTP server.
- refid: Reference ID of the NTP server.
- st: Stratum level of the NTP server.
- t: Type of the NTP server (in this case, u for unicast client).
- when: Time since the last response from the NTP server.
- poll: Polling interval to contact the NTP server.
- reach: A bitmask indicating the success of recent communications with the NTP server.
- delay: Round-trip delay to the NTP server.
- offset: Difference in time between the system clock and the NTP server.
- jitter: Variability in the time measurements.

5) Check ntp server date in client:

   ```
   sudo ntpdate <Server-IP>
   ```

Configure NTP on Windows Client:

1. Open the Control Panel and navigate to the "Date and Time" settings.
2. Select the "Internet Time" tab and click on the "Change settings" button.
3. Check the box for "Synchronize with an Internet time server" and enter the address of your master clock's NTP server.
4. Click "Update now" to synchronize the time with the master clock.
5. Click "OK" to save the changes.