Chapter 1

Configuring Time Services

1.1 Understanding Time on Linux

When the system starts up, the hardware clock is reached. From this the system time is set. The system time is the time in software maintained by the Operating System. The system time can be changed using:

```
# timedatectl set-time
```

The system can even be configured to use an NTP server to set time, using:

```
# timedatectl set-ntp yes
```

This will enable the **chronyd** service. The chronyd service stores its config file in `/etc/chrony.conf`, where we can set which NTP service we want to use.

However, the system time isn't automatically written to the hardware clock, and thus, if the hardware clock's time is significantly different from the software time, after a reboot the changes made using `timedatectl` will be lost. To write the system time back to the hardware clock, we use:

```
# hwclock --systohc
```

1.2 Setting up a Chrony Time Server

To configure the time on RHEL 7, we need to configure chrony, using the `timedatectl` command, recently introduced in this version. The current system time details can be obtained by:

```
# timedatectl status
Local time: Fri 2017-12-22 17:27:31 IST
Universal time: Fri 2017-12-22 11:57:31 UTC
RTC time: Fri 2017-12-22 11:57:31
Time zone: Asia/Kolkata (IST, +0530)
NTP enabled: yes
```

```
        NTP synchronized: yes
        RTC in local TZ: no
        DST active: n/a
```

If the current time-zone needs to be changed, we can use the command:

```
        # timedatectl list-timezones
        Africa/Abidjan
        Africa/Accra
        ...
        Pacific/Wallis
        UTC
```

After a new time-zone has been set, it can be verified with `timedatectl status`. A new time-zone can be set using:

```
        # timedatectl set-timezone Europe/Amsterdam
        # timedatectl status
        Local time: Fri 2017-12-22 13:06:02 CET
        Universal time: Fri 2017-12-22 12:06:02 UTC
        RTC time: Fri 2017-12-22 12:06:02
        Time zone: Europe/Amsterdam (CET, +0100)
        NTP enabled: yes
        NTP synchronized: yes
        RTC in local TZ: no
        DST active: no
        Last DST change: DST ended at
        Sun 2017-10-29 02:59:59 CEST
        Sun 2017-10-29 02:00:00 CET
        Next DST change: DST begins (the clock jumps one hour forward) at
        Sun 2018-03-25 01:59:59 CET
        Sun 2018-03-25 03:00:00 CEST
```

1.2.1 NTP & Chronyd Service

The system can be configured to use a NTP server by setting the option `timedatectl set-ntp yes`. This will start the chronyd service, if it wasn't already started. The current status of the chronyd service can be obtained with:

```
        # systemctl status chronyd
        ● chronyd.service - NTP client/server
        Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset:
    ↪   enabled)
        Active: active (running) since Fri 2017-12-22 10:29:48 IST; 7h ago
        Docs: man:chronyd(8)
        man:chrony.conf(5)
        Main PID: 774 (chronyd)
        CGroup: /system.slice/chronyd.service
                └─774 /usr/sbin/chronyd

        Dec 22 13:06:47 vmPrime.somuVMnet.com chronyd[774]: Source 139.59.43.68 online
        Dec 22 13:06:47 vmPrime.somuVMnet.com chronyd[774]: Source 13.126.27.131 online
        Dec 22 13:06:47 vmPrime.somuVMnet.com chronyd[774]: Source 139.59.21.22 online
```

The location of the chronyd configuration files can be found by first finding out which package it comes from, and then performing a series of rpm queries. The `rpm -qf <file>`

command tells us which package contains that service (i.e., which package installed that file) while `rpm -qc <package>` shows us the location of all the configuration files for that package. The method to determine the location of chrony's config files is:

```
        # systemctl status chronyd
        ● chronyd.service - NTP client/server
        Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset:
↪   enabled)
        Active: active (running) since Fri 2017-12-22 10:29:48 IST; 7h ago
        Docs: man:chronyd(8)
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        Main PID: 774 (chronyd)
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        Dec 22 13:06:47 vmPrime.somuVMnet.com chronyd[774]: Source 139.59.43.68 online
        Dec 22 13:06:47 vmPrime.somuVMnet.com chronyd[774]: Source 13.126.27.131 online
        ...
        # rpm -qf /usr/lib/systemd/system/chronyd.service
        chrony-3.1-2.el7.centos.x86_64
        # rpm -qc chrony-3.1-2.el7.centos.x86_64
        /etc/chrony.conf
        /etc/chrony.keys
        /etc/logrotate.d/chrony
        /etc/sysconfig/chronyd
```

Thus the chronyd service can be managed by editing the config file `/etc/chrony.conf`.