

Ntpd

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2023-03-22

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A system's time can be set using various commands. The network time protocol daemon (ntpd) helps to manage the time and keep it current.

1 What is a Stratum?

Time servers are divided into classes. The highest class is 0 and is called **stratum 0**. A stratum is an artificially created bed or layer. Stratum 0 time servers are usually time servers that have atomic clocks, GPS clocks, or radio clocks. The next level of time servers is stratum 1, which takes its time from the stratum 0 server. This goes down to stratum 16. These time servers do not propagate time, but set the local clock.

2 What is the Best Practice Regarding NTP?

- Standardize to Coordinated Universal Time (UTC). Standardize all systems within an organization to Coordinated Universal Time (UTC). Standardizing to UTC simpli-

fies the correlation of log entries within the organization and with external parties, regardless of the time zone of the device being synchronized.

- Run a higher tier (stratum) time server (for example, stratum 0, stratum 1, ...) within the organization. Either with a local clock source or with access to an external stratum 0 time server. This is to avoid multiple time daemons competing for access to external stratum 0 servers.
- Do not run **two** independent stratum 0 (or 1) time servers within the same organization. If you are running multiple stratum 0 or stratum 1 servers, use an **odd** number of servers. That is, run three or more servers.
- If possible, run servers in geographically separate locations.
- Secure the network time service and server. Use a dedicated machine or machines without load. Restrict the commands that can be used on the high-level stratum servers. Do not allow public queries to the primary high stratum servers. Only allow known networks/hosts to communicate with their respective high stratum servers.
- UTC time is no longer considered a secret. While it is possible to add encryption to `NTP`, it comes with extended key management and as such is more likely to fail. While security is considered a good feature, it may cause more problems than benefits for `NTP`. Consider this carefully.
- Set up your own hierarchical `NTP` service for your local network.
- While it is possible to run a `NTP` server on a Raspberry Pi, consider a server with a UPS and battery buffered real-time clock. While the Raspberry Pi might work fine, it will lose accuracy on power loss. For a time server, high uptime is appreciated.

3 How to Set the Time via Ntpd Manually?

When the battery of the real time clock is changed, or for other reasons (for example, if the system does not have a buffered clock), the on-board time differs greatly from the real time. Normally `ntpd` refuses to set this. However, it is possible to force `ntpd` to set it from the network.

The old and short way is:

```
/etc/init.d/ntp stop
ntpd -gq
/etc/init.d/ntp start
```

The `-g` option is the same as `--panicgate` and allows a to set a time much different from the current time. While `-q` (or `--quit`) sets the time once and quits. The “modern” way is:

```
systemctl stop ntp
ntpd --panicgate --quit
systemctl start ntp
```

If you don't have network access, use `date -s 'FORMAT'` to set the time. For example, `FORMAT` can be `2021-06-03T14:22:12`.

4 History

Version	Date	Notes
0.1.2	2023-03-22	Improve writing, fix version, typos
0.1.1	2022-06-11	Shell->bash, +history
0.1.0	2021-06-03	Initial release

5 Disclaimer of Warranty

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