PTP (Precision Time Protocol)

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- timemaster
  - (ptp_domain)
  - chronyd
  - ntp
  - timemaster
- ptp4l
- phc2sys
-

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- Astra Linux

Astra Linux :

- NTP (ntpd) (ntp);
- chrony (chronyd) (chrony);
- OpenNTP (openntpd) (openntp);
- timedatectl / systemd-timesyncd.service.

Astra Linux. , .

Astra Linux Common Edition 2.12.10, Astra Linux Special Edition x.7 linuxptp, :

- **ptp4l** - , PTP (Precision Time Protocol) IEEE 1588. , IEEE 1588. , , , , 1-100 . ;
- **phc2sys** - ;
- **timemaster** - , ntp ptp.

ntpd, chronyd PTP timedatectl.

, , ( ).
, , . .
, ethtool ethtool (ethtool ,):

```
sudo apt install ethtool
sudo ethtool -T eth0
```

, :

```
$ sudo ethtool -T eth0
Time stamping parameters for eth0:
Capabilities:
hardware-transmit (SOF_TIMESTAMPING_TX_HARDWARE)
software-transmit (SOF_TIMESTAMPING_TX_SOFTWARE)
hardware-receive (SOF_TIMESTAMPING_RX_HARDWARE)
software-receive (SOF_TIMESTAMPING_RX_SOFTWARE)
software-system-clock (SOF_TIMESTAMPING_SOFTWARE)
hardware-raw-clock (SOF_TIMESTAMPING_RAW_HARDWARE)
PTP Hardware Clock: 0
Hardware Transmit Timestamp Modes:
off (HWTSTAMP_TX_OFF)
on (HWTSTAMP_TX_ON)
Hardware Receive Filter Modes:
none (HWTSTAMP_FILTER_NONE)
all (HWTSTAMP_FILTER_ALL)
ptpv1-l4-sync (HWTSTAMP_FILTER_PTP_V1_L4_SYNC)
ptpv1-l4-delay-req (HWTSTAMP_FILTER_PTP_V1_L4_DELAY_REQ)
ptpv2-l4-sync (HWTSTAMP_FILTER_PTP_V2_L4_SYNC)
ptpv2-l4-delay-req (HWTSTAMP_FILTER_PTP_V2_L4_DELAY_REQ)
ptpv2-l2-sync (HWTSTAMP_FILTER_PTP_V2_L2_SYNC)
ptpv2-l2-delay-req (HWTSTAMP_FILTER_PTP_V2_L2_DELAY_REQ)
ptpv2-event (HWTSTAMP_FILTER_PTP_V2_EVENT)
ptpv2-sync (HWTSTAMP_FILTER_PTP_V2_SYNC)
ptpv2-delay-req (HWTSTAMP_FILTER_PTP_V2_DELAY_REQ)
```

linuxptp Astra Linux Common Edition 2.12.10 (. synaptic) :

```
sudo apt install linuxptp
```

timemaster

timemaster /etc/linuxptp/timemaster.conf.
:

```
man timemaster
```

(ptp_domain)

ptp4l /etc/linuxptp/timemaster.conf [ptp_domain 0] (- , eth0):

```
[ptp_domain 0]
interfaces eth0
delay 10e-6
```

ptp4l, .

chronyd

Astra Linux, chronyd (chrony). chronyd .

chronyd:

1. chrony, .
2. chronyd :

   ```
   sudo systemctl stop chronyd
   sudo systemctl mask chronyd
   ```

3. /etc/linuxptp/timemaster.conf:

   a. , [timemaster] ntp_program cronyd:

   ```
   [timemaster]
   ntp_program chronyd
   ```

   b. [chrony.conf] include /etc/chrony/chrony.conf:

   ```
   [chrony.conf]
   include /etc/chrony/chrony.conf
   ```

4. () timemaster:

   ```
   sudo systemctl restart timemaster
   ```

ntp

Astra Linux, chronyd.

ntp:

1. ntp, .
2. ntp :

```
sudo systemctl stop ntp
sudo systemctl mask ntp
```

3. /etc/linuxptp/timemaster.conf [timemaster] ntp_program ntpd cronyd:

```
[timemaster]
ntp_program ntpd
```

4. () timemaster:

```
sudo systemctl restart timemaster
```

timemaster

timemaster :

```
sudo systemctl enable timemaster
```

ptp4l

ptp4l , (time stamping).

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ptp4l /etc/linuxptp/ptp4l.conf, :

```
man pdp4l
```

, ptp4l (/etc/linuxptp/ptp4l.conf) :

~~time_stamping hardware~~

time_stamping software

phc2sys

phc2sys , RTC ( ), phc2sys . , phc2sys .

```
sudo systemctl start timemaster
```

timemaster , :

```
$ systemctl status timemaster
 timemaster.service - Synchronize system clock to NTP and PTP time sources
Loaded: loaded (/lib/systemd/system/timemaster.service; disabled; vendor preset: enabled)
Active: active (running) since Mon 2019-04-22 15:51:02 MSK; 2s ago
Docs: man:timemaster
Main PID: 2508 (timemaster)
Tasks: 5 (limit: 4608)
CGroup: /system.slice/timemaster.service
2508 /usr/sbin/timemaster -f /etc/linuxptp/timemaster.conf
2509 /usr/sbin/ntpd -u ntp:ntp -g -n -c /var/run/timemaster/ntp.conf
2510 /usr/sbin/ptp4l -l 5 -f /var/run/timemaster/ptp4l.0.conf -H -i eth0
2511 /usr/sbin/phc2sys -l 5 -a -r -R 1.00 -z /var/run/timemaster/ptp4l.0.socket -n 0 -E ntpshm -M 0
.....
```