

NTP timing based on GPS clock

This reference details the configuration and operational requirements for integrating a GPS clock source with NTP to maintain accurate system time.

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Configure NTP using GPS time

You can configure the GPS time as the reference clock for NTP using the command **ntp refclock gps**.

The GPS time acts as a stratum 0 source, and the Cisco IOS NTP server acts as a stratum 1 device, which in turn provides clock information to its NTP clients (stratum 2 and 3).

Procedure

Step 1 Use the **enable** command to enable the router and enter the privileged EXEC mode.

Example:

```
Router> enable
```

Step 2 Use the **configure terminal** command to enter the global configuration mode.

Example:

```
Router# configure terminal
```

Step 3 Use the **ntp refclock gps** command to configure the NTP reference clock as GPS:

Example:

```
Router(config)# ntp refclock gps
```

Step 4 Use the **ntp refclock gps** command to verify the configuration.

Example:

```
Router#
Sep 24 19:58:43.046 GMT: %PKI-6-AUTHORITATIVE_CLOCK: The system clock has been set.
Router# show ntp status
Clock is synchronized, stratum 1, reference is .GPS.
nominal freq is 250.0000 Hz, actual freq is 249.9970 Hz, precision is 2**10
ntp uptime is 94000 (1/100 of seconds), resolution is 4016
reference time is E31778F3.0B851ED8 (19:58:43.045 GMT Thu Sep 24 2020)
```

```
clock offset is 11.0000 msec, root delay is 0.00 msec
root dispersion is 3950.55 msec, peer dispersion is 3938.47 msec
loopfilter state is 'CTRL' (Normal Controlled Loop), drift is 0.000011995 s/s
system poll interval is 64, last update was 7 sec ago.
Router#
Router#
Router#
show ntp associations
address ref clock st when poll reach delay offset disp
*~127.127.5.1 .GPS. 0 38 64 7 0.000 11.000 1938.8
* sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
Router# show clock
20:00:43.660 GMT Thu Sep 24 2020
```

Step 5 Use the **debug ntp refclock** command to troubleshoot the configuration.

Example:

```
Router# debug ntp ?
adjust NTP clock adjustments
all NTP all debugging on
core NTP core messages
events NTP events
packet NTP packet debugging
refclock NTP refclock messages
Router# debug ntp re
Router#debug ntp refclock
*Sep 24 19:58:43.045 GMT: GPS: Poll Requested
*Sep 24 19:58:43.045 GMT: GPS (19:58:43.056 GMT Thu Sep 24 2020)
*Sep 24 19:58:43.045 GMT: Valid time rcvd from GPS: 2020/09/24 19:58:43.056 (frac =
0x0E560440)
*Sep 24 19:58:43.045 GMT: RTS poll timestamp (local clock) was 0xE31778F3.0B851ED8
*Sep 24 19:58:43.045 GMT: GPS timestamp is 0xE31778F3.0E560440
*Sep 24 19:58:43.045 GMT: NTP Core(NOTICE): ntpd PPM
*Sep 24 19:58:43.046 GMT: NTP Core(NOTICE): trans state : 5
*Sep 24 19:58:43.046 GMT: NTP Core(NOTICE): Clock is synchronized.
```