CHAPTER 8

Configuring NTP

This chapter describes how to configure the Network Time Protocol (NTP) and includes the following topics:

Information about NTP

This section includes the following topics:

NTP Overview

The Network Time Protocol (NTP) synchronizes timekeeping among a set of distributed time servers and clients. This synchronization allows you to correlate events when you receive system logs and other time-specific events from multiple network devices.

NTP uses the User Datagram Protocol (UDP) as its transport protocol. All NTP communication uses the Universal Time Coordinated (UTC) standard. An NTP server usually receives its time from an authoritative time source, such as a radio clock or an atomic clock attached to a time server. NTP distributes this time across the network. NTP is extremely efficient; no more than one packet per minute is necessary to synchronize two machines to within a millisecond of each other.

NTP uses a stratum to describe how many NTP hops away that a network device is from an authoritative time source. A stratum 1 time server has an authoritative time source (such as an atomic clock) directly attached to the server. A stratum 2 NTP server receives its time through NTP from a stratum 1 NTP server, which in turn connects to the authoritative time source.

NTP avoids synchronizing to a network device that may keep accurate time. NTP never synchronizes to a system that is not in turn synchronized itself. NTP compares the time reported by several network devices and does not synchronize to a network device that has a time that is significantly different than the others, even if its stratum is lower.

Cisco NX-OS cannot act as a stratum 1 server. You cannot connect to a radio or atomic clock. We recommend that the time service that you use for your network is derived from the public NTP servers available on the Internet.

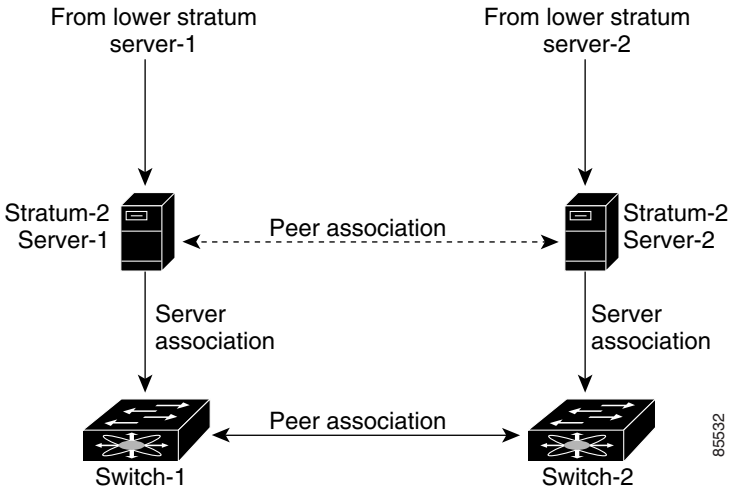
If the network is isolated from the Internet, Cisco NX-OS allows you to configure a network device so that the device acts as though it is synchronized through NTP, when in fact it has determined the time using other means. Other network devices can then synchronize to that network device through NTP.

NTP Peers

NTP allows you to create a peer relationship between two networking devices. A peer can provide time on its own or connect to an NTP server. If both the local device and the remote peer point to different NTP servers, your NTP service is more reliable. The local device maintains the right time even if its NTP server fails by using the time from the peer.

Figure 8-1 displays a network with two NTP stratum 2 servers and two switches.

Figure 8-1 NTP Peer and Server Association



In this configuration, switch 1 and switch 2 are NTP peers. switch 1 uses stratum-2 server 1, while switch 2 uses stratum-2 server 2. If stratum-2 server-1 fails, switch 1 maintains the correct time through its peer association with switch 2.

High Availability

Stateless restarts are supported for NTP. After a reboot or a supervisor switchover, the running configuration is applied.

You can configure NTP peers to provide redundancy in case an NTP server fails.

Prerequisites for NTP

If you configure NTP, you must have connectivity to at least one server that is running NTP.

Configuration Guidelines and Limitations

NTP has the following configuration guidelines and limitations:

- You should have a peer association with another device only when you are sure that your clock is reliable (which means that you are a client of a reliable NTP server).
- A peer configured alone takes on the role of a server and should be used as backup. If you have two servers, you can configure several devices to point to one server and the remaining devices point to the other server. You can then configure peer association between these two servers to create a more reliable NTP configuration.
- If you only have one server, you should configure all the devices as clients to that server.
- You can configure up to 64 NTP entities (servers and peers).

Configuring an NTP Server and Peer

Use this procedure to configure an NTP server and peer.

BEFORE YOU BEGIN

- You can configure NTP using IPv4 addresses or domain name server (DNS) names.

SUMMARY STEPS

1. **config t**
2. **ntp server** {*ip-address* | *ipv6-address* | *dns-name*}
3. **ntp peer** {*ip-address* | *ipv6-address* | *dns-name*}
4. **show ntp peers**
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	**config t** **Example:** n1000v# config t n1000v(config)#	Places you into the CLI Global Configuration mode.
Step 2	**ntp server** {*ip-address* | *ipv6-address* | *dns-name*} **Example:** n1000v(config)# ntp server 192.0.2.10	Forms an association with a server.
Step 3	**ntp peer** {*ip-address* | *dns-name*} n1000v(config)# ntp peer 2001:0db8::4101	Forms an association with a peer. You can specify multiple peer associations.
Step 4	**show ntp peers** **Example:** n1000v(config)# show ntp peers	(Optional) Displays the configured server and peers. **Note** A domain name is resolved only when you have a DNS server configured.
Step 5	**copy running-config startup-config** **Example:** n1000v(config-if)# copy running-config startup-config	(Optional) Saves this configuration change.

The following is an example configures an NTP server and peer:

```
n1000v# config t
n1000v(config)# ntp server 192.0.2.10
n1000v(config# ntp peer 2001:0db8::4101
```

Clearing NTP Statistics

Use the following command to clear NTP statistics.

Command	Purpose
clear ntp statistics	Clears the NTP statistics.

Clearing NTP Sessions

Use the following commands to clear NTP sessions.

Command	Purpose
clear ntp session	Clears the NTP sessions.

Verifying the NTP Configuration

To display NTP configuration information, use one of the following commands:

Command	Purpose
show ntp peer-status	Displays the status for all NTP servers and peers.
show ntp peers	Displays all the NTP peers.
show ntp statistics {**io** | **local** | **memory** | **peer** {*ip-address* | *dns-name*}	Displays the NTP statistics
show ntp status	Displays the NTP distribution status

NTP Example Configuration

This example configures an NTP server:

```
config t
ntp server 192.0.2.10
```

Default Settings

The following table lists the default settings for CDP and NTP parameters.

Parameter	Default
NTP	Enabled

Additional References

For additional information related to NTP, see the following sections:

- Related Documents, page 8-6
- Standards, page 8-6

Related Documents

Related Topic	Document Title
Interface	*Cisco Nexus 1000V Interface Configuration Guide, Release 4.0(4)SV1(1)*

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

Feature History for NTP

This section provides the NTP feature release history.

Feature Name	Releases	Feature Information
NTP	4.0(4)SV1(1)	This feature was introduced.