CHAPTER 19

Time-of-Day Server for the Cisco CMTS

Revised: February 5, 2007, OL-1467-08

The Time-of-Day Server feature enables the Cisco Cable Modem Termination System (CMTS) to provide a time-of-day (ToD) server to the cable modems and other customer premises equipment (CPE) devices connected to its cable interfaces. The cable modem uses the ToD server to get the current date and time to accurately time-stamp its Simple Network Management Protocol (SNMP) messages and error log entries.

Feature Specifications for the Time-of-Day Server

Feature History	
Release	**Modification**
Release 12.0(4)XI	This feature was introduced for the Cisco uBR7200 series routers.
Release 12.1(5)EC	This feature was supported on the Cisco uBR7100 series routers.
Release 12.2(4)BC1	This feature was supported on the Release 12.2 BC train for all Cisco CMTS platforms.
Supported Platforms	
Cisco uBR7100 series, Cisco uBR7200 series, Cisco uBR10012 universal broadband routers.	

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Note This document describes only the ToD server on the Cisco CMTS. For information about using the ToD server along with the Dynamic Host Configuration Protocol (DHCP) and Trivial File Transfer Protocol (TFTP) services that are also available on the Cisco CMTS, see the *DHCP, ToD, and TFTP Services for the Cisco CMTS* chapter in the Cisco CMTS Feature Guide, at the following URL:

http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/cmtsfg.html

Contents

- Prerequisites for the Time-of-Day Server, page 19-2

- Restrictions for the Time-of-Day Server, page 19-2
- Information About the Time-of-Day Server, page 19-2
- How to Configure the Time-of-Day Server on the Cisco CMTS, page 19-3
- Configuration Examples for the Time-of-Day Server, page 19-5
- Additional References, page 19-6

Prerequisites for the Time-of-Day Server

- The Cisco CMTS must be running Cisco IOS Release 12.0(4)XI or later release. Cisco recommends using the latest Cisco IOS Release 12.2 BC software release.
- To supply an accurate clock, the system clock on the Cisco CMTS should be configured for the correct time, either by using the **set clock** command or by configuring the Cisco CMTS to act as a Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) client.
- To be able to use the Cisco CMTS as the ToD server, either alone or along with other, external ToD servers, you must configure the DHCP server to provide the IP address Cisco CMTS as one of the valid ToD servers (DHCP option 4) for cable modems.

Restrictions for the Time-of-Day Server

- To conform to the Data-over-Cable Service Interface Specifications (DOCSIS) specifications, the time-of-day server is restricted to using User Datagram Protocol (UDP) packets.

Information About the Time-of-Day Server

The DOCSIS 1.0 and 1.1 specifications require that a DOCSIS cable modem or other CPE device must specify the following time-related fields in the Dynamic Host Configuration Protocol (DHCP) request it sends during its initial power-on provisioning:

- Time Offset (option 2)—Specifies the time zone for the cable modem or CPE device, as the number of seconds that the device's time stamp is offset from Greenwich Mean Time (GMT).
- Time Server Option (option 4)—Specifies one or more IP addresses for a time-of-day server.

During initial provisioning, a DOCSIS cable modem or CPE device attempts to contact the time-of-day server. If successful, the cable device updates its onboard clock with the time offset and timestamp received from the time-of-day server. If a time-of-day server cannot be reached or if it does not respond, the cable device eventually times out and continues on with the initialization process.

Note Initial versions of the DOCSIS 1.0 specification specified that the cable device must obtain a valid response from a ToD server before continuing with the initialization process. This requirement was removed in later versions of the DOCSIS 1.0 specification and in the DOCSIS 1.1 specification. Older cable devices that are compliant with the initial DOCSIS 1.0 specification, however, might require a time-of-day server before being able to come online.

By providing a time-of-day server, the Cisco CMTS eliminates the requirement for a separate, external time-of-day server. Using the time-of-day server also ensures that all devices connected to the cable interfaces are using the same time-stamp references, making it easier to troubleshoot system problems when analyzing the debugging output and error logs generated by the cable modems, CPE devices, CMTS, and other servers.

Note To be able to use the Cisco CMTS as the ToD server, either alone or with other, external servers, you must configure the DHCP server to provide the IP address Cisco CMTS as one of the valid ToD servers (DHCP option 4) for cable modems.

Although a DOCSIS cable modem or cable CPE device does not have to contact a time-of-day server to complete its provisioning sequence, the DOCSIS specification requires that the device attempt to contact the time-of-day server at least once, and no more than three times, before timing out. When the Cisco CMTS provides a time-of-day server, it enables cable devices to register more quickly because they do not have to wait for the time-of-day timeout period before continuing.

In addition, although the DOCSIS specifications do not require that a cable modem successfully obtain a response from a ToD server before coming online, not obtaining a timestamp could prevent the cable modem from coming online in the following situations:

- If DOCSIS configuration files are being timestamped, to prevent cable modems from caching the files and replaying them, the clocks on the cable modem and CMTS must be synchronized. Otherwise, the cable modem cannot determine whether a DOCSIS configuration file has the proper timestamp.
- If cable modems register using Baseline Privacy Interface Plus (BPI+) authentication and encryption, the clocks on the cable modem and CMTS must be synchronized. This is because BPI+ authorization requires that the CMTS and cable modem verify the timestamps on the digital certificates being used for authentication. If the timestamps on the CMTS and cable modem are not synchronized, the cable modem cannot come online using BPI+ encryption.

How to Configure the Time-of-Day Server on the Cisco CMTS

See the following sections for information on enabling and disabling the time-of-day server on the Cisco CMTS server.

- Enabling the Time-of-Day Server, page 19-3
- Disabling the Time-of-Day Server, page 19-4

Enabling the Time-of-Day Server

To enable the time-of-day server on the Cisco CMTS, use the following procedure beginning in user EXEC mode:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **service udp-small-servers max-servers no-limit**
4. **cable time-server**

5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode. Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**service udp-small-servers max-servers no-limit**
	
	Example:
	`Router(config)# service udp-small-servers max-servers no-limit`
	`Router(config)#`
		Enables use of minor servers that use the UDP protocol (such as ToD, echo, chargen, and discard). The **max-servers no-limit** option allows a large number of cable modems to obtain the ToD server at one time, in the event that a cable or power failure forces many cable modems offline. When the problem has been resolved, the cable modems can quickly reconnect.

Step 4	**cable time-server**
	
	Example:
	`Router(config)# cable time-server`
	`Router(config)#`
		Enables the time-of-day server on the Cisco CMTS.

Step 5	**exit**
	
	Example:
	`Router(config)# exit`
	`Router#`
		Exits global configuration mode.

Disabling the Time-of-Day Server

To disable the time-of-day server on the Cisco CMTS, use the following procedure beginning in user EXEC mode:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **no cable time-server**
4. **no service udp-small-servers**
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode. Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**no cable time-server**
	
	Example:
	`Router(config)# no cable time-server`
	`Router(config)#`
		Disables the time-of-day server on the Cisco CMTS.

Step 4	**no service udp-small-servers**
	
	Example:
	`Router(config)# no service udp-small-servers`
	`Router(config)#`
		(Optional) Disables the use of all minor UDP servers.

Step 5	**exit**
	
	Example:
	`Router(config)# exit`
	`Router#`
		Exits global configuration mode.

Configuration Examples for the Time-of-Day Server

The following excerpt from a configuration file shows a typical configuration that enables the time-of-day server on the Cisco CMTS:

- Time-of-Day Server Configuration, page 19-5

Time-of-Day Server Configuration

```
!
service udp small-servers max-servers no-limit
!
cable time-server
```

Additional References

For additional information related to the Time-of-Day Server on the Cisco CMTS, refer to the following references:

Related Documents

Related Topic	Document Title
DHCP, ToD, and TFTP Services for the Cisco CMTS	For information about using the ToD server along with the Dynamic Host Configuration Protocol (DHCP) and Trivial File Transfer Protocol (TFTP) services that are also available on the Cisco CMTS, see the *DHCP, ToD, and TFTP Services for the Cisco CMTS* chapter in the Cisco CMTS Feature Guide, at the following URL: http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/cmtsfg.html
NTP or SNTP Configuration	To configure the Cisco CMTS to use Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) to set its system clock, see the "Performing Basic System Management" chapter in the "System Management" section of the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.2*, at the following URL: http://www.cisco.com/en/US/docs/ios/12_2/configfun/configuration/guide/fcf012.html
Cable Command Reference Guide	For syntax and usage information on the cable-specific commands used in this chapter, see the "Cisco Cable Modem Termination System Commands" chapter of the *Cisco Broadband Cable Command Reference Guide* at the following URL: http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html
Cisco IOS Release 12.2 Command Reference	Cisco IOS Release 12.2 Configuration Guides and Command References, at the following URL: http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_installation_and_configuration_guides_list.html http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/prod_command_reference_list.html

Standards

Standards[1]	Title
SP-RFIv1.1-I09-020830	Data-Over-Cable Service Interface Specifications Radio Frequency Interface Specification, version 1.1

1. Not all supported standards are listed.

MIBs

MIBs[1]	MIBs Link
No new or modified MIBs are supported by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

1. Not all supported MIBs are listed.

RFCs

RFCs[1]	Title
RFC 868	Time Protocol
RFC 2131	Dynamic Host Configuration Protocol
RFC 2132	DCHP Options and BOOTP Vendor Extensions

1. Not all supported RFCs are listed.

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/cmtsfg.html