



CHAPTER 8

Configuring PTP

This chapter describes how to configure the Precision Time Protocol (PTP) on the Cisco IE 3000 switch.

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Note

For complete syntax and usage information for the commands used in this chapter, see the switch command reference for this release.

Understanding PTP

The Precision Time Protocol (PTP), as defined in the IEEE 1588 standard, synchronizes with nanosecond accuracy the real-time clocks of the devices in a network. The clocks in are organized into a master-member hierarchy. PTP identifies the switch port that is connected to a device with the most precise clock. This clock is referred to as the master clock. All the other devices on the network synchronize their clocks with the master and are referred to as members. Constantly exchanged timing messages ensure continued synchronization.

PTP is particularly useful for industrial automation systems and process control networks, where motion and precision control of instrumentation and test equipment are important.

Configuring PTP

Default Configuration


By default, PTP is enabled on all the Fast Ethernet and Gigabit Ethernet ports on the base switch module. Only the ports on the base switch module are PTP-capable. The switch expansion modules do not support PTP.

Table 8-1 Default PTP Configuration

Feature	Default Setting
PTP boundary mode	Enabled
PTP transparent mode	Disabled
PTP priority1 and PTP priority2	Default priority number is 128
PTP announce interval	2 seconds
PTP announce timeout	8 seconds
PTP delay request interval	32 seconds
PTP sync interval	1 second
PTP sync limit	50000 nanoseconds

Setting Up PTP

	Command	Purpose
Step 1	<code>configure terminal</code>	Enter global configuration mode.
Step 2	<code>ptp {mode {boundary e2transparent} priority1 value priority2 value }</code>	<p>Set the synchronization clock.</p> <ul style="list-style-type: none"> Select boundary mode to identify the switch port that is connected to a device with the most precise clock. This is the default clock mode. <p>The device synchronizes with the grand-master clock and operates as a <i>parent master clock</i>. Use this mode for switch ports when overload or heavy load conditions produce significant delay jitter.</p> Select e2transparent (end-to-end transparent) mode for the switch to synchronize all switch ports with the grand master clock. <p>The switch corrects for the delay incurred by every packet passing through it (referred to <i>residence time</i>). This mode causes less jitter and error accumulation than boundary mode.</p> <p>Note: You can disable ports in both boundary and end-to-end transparent mode.</p> <p>Set the clock properties.</p> <ul style="list-style-type: none"> Specify the priority1 and priority2 values. The range for both is 0 to 255. The default is 128. <p>These values set the clock priority on the PTP network for the purpose of best master selection.</p>
Step 3	<code>interface interface-id</code>	<p>Specify an interface to configure, and enter interface configuration mode.</p> <p>Enter the number of the switch port, including port type (such as <i>Fa</i> for Fast Ethernet and <i>Gi</i> for Gigabit Ethernet), the base switch number (1), and the specific port number. For example: <i>Fa1/1</i> is Fast Ethernet port 1 on the base switch.</p>

	Command	Purpose
Step 4	<code>ptp {announce {interval value timeout value} delay-req interval value enable sync {interval value limit value}}</code>	<p>Specify the settings for the timing messages. These options are only available when the switch is in boundary mode.</p> <ul style="list-style-type: none"> For <i>announce interval</i>, specify the time for sending announce messages. The range is 0 to 4 seconds. The default is 1 (2 seconds). For <i>timeout value</i>, specify the time for announcing timeout messages. The range is 2 to 10 seconds. The default is 3 (8 seconds). For <i>delay request interval</i>, specify the time recommended to the member devices to send delay request messages when the port is in the master state. The range is -1 second to 6 seconds. The default is 5 (32 seconds). For <i>sync interval</i>, enter the time for sending synchronization messages. The range is -1 second to 1 second. The default is 1 second. For <i>sync limit</i>, specify the maximum clock offset value before PTP attempts to resynchronize. The range is 50 to 500000000 nanoseconds. The default is 50000 nanoseconds. = <p> Note We recommend against setting the sync limit below the default (50000 nanoseconds). Use values below 50000 nanoseconds only in networks with a high-precision grand master clock.</p>
Step 5	<code>end</code>	Return to privileged EXEC mode.
Step 6	<code>show running-config</code>	Verify your entries.
Step 7	<code>copy running-config startup-config</code>	(Optional) Save your entries in the configuration file.

Displaying the PTP Configuration

To display the PTP configuration, use one or more of these privileged EXEC commands in [Table 8-2](#).

Table 8-2 Commands for Displaying the PTP Configuration

Command	Purpose
<code>show ptp clock</code>	Display the PTP clock properties.
<code>show ptp foreign-master-record</code>	Display the PTP foreign-master dataset.
<code>show ptp parent</code>	Display the parent and grand-master properties.
<code>show ptp port</code>	Display all the PTP port properties.
<code>show ptp FastEthernet interface</code>	(Optional) Display the PTP FastEthernet properties on the specified port.
<code>show ptp GigabitEthernet interface</code>	Display the PTP GigabitEthernet properties on the specified port.
<code>show ptp time-property</code>	Display the PTP time properties.

