Configuring PTP

Precision Time Protocol (PTP) is a protocol that defines a method to distribute time around a network. PTP support is based on the IEEE 1588-2008 standard.

This module describes the tasks you need to configure PTP on the Cisco IOS XR software.

For more information about PTP on the Cisco IOS XR software and complete descriptions of the PTP commands listed in this module, see Additional References, on page 33. To locate documentation for other commands that might appear in the course of running a configuration task, search online in *Cisco ASR 9000 Series Aggregation Services Router Commands Master List*.

Table 1: Feature History for Implementing PTP on Cisco IOS XR Software

Release	Modification
Release 4.2.0	This feature was introduced.
Release 4.3.0	Support for hybrid mode and Telecom Profile were added.
Release 4.3.1	Support for PTP in Ethernet link bundles was added.
Release 5.3.2	Support for the RSP IEEE 1588 port was added for the PIDs A9K-RSP880-TR, A9K-RSP880-SE.
Release 6.0.1	Support for the RSP IEEE 1588 port was added for the PIDs A9K-RSP440-SE, A9K-RSP440-TR, A9K-RP-SE, A9K-RP-TR.
Release 6.1.2	Support for G.8275.1 Telecom Profile was added. Compliance to G.8273.2 T-BC performance is not supported.
Release 6.2.2	Support for the RSP IEEE 1588 port was added for the PIDs A99-RP2-SE and A99-RP2-TR.

This module contains the following topics:

Prerequisites for Implementing PTP on Cisco IOS XR Software

You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Information About Configuring PTP

PTP Implementation

IEEE Standard 1588-2008 defines a method for distributing time around a network using the Precision Time Protocol (PTP) version 2. PTP ensures that the best available clock is selected as the source of time (the grandmaster clock) for the network and that other clocks in the network are synchronized to the grandmaster.

PTP consists of two parts:

- The port state machine and best master clock algorithm, which provides a method to determine which ports in the network will run as master (providing time to other clocks to the network), which will run as slaves (receiving time from other clocks in the network), and which will be passive (neither master nor slave).
- Mechanisms for slave ports to calculate the difference between the time of their own clocks and the time of their master clock. To calculate the differences, PTP uses a delay request/response mechanism and a peer delay mechanism.

Note Peer-delay mechanism is not supported on the Cisco ASR 9000 Series routers.

The implementation of PTP on Cisco IOS XR software is designed to operate effectively in Telecommunication networks, which are different from the networks for which PTP was originally designed.

PTP is configurable on Gigabit Ethernet interfaces (G, 10G, 40G, and 100G), Bundle Ethernet interfaces, and sub-interfaces. PTP is not configurable on LAG Ethernet sub-interfaces.

PTP Transport Media

PTP is supported over the following transport media:

- UDP over IPv4
- Ethernet

- IPv6

PTP Messages

PTP supports the following message types:

- Signaling
- Announce
- Sync
- Follow-up
- Delay-request
- Delay-Response
- Management

Unicast and Multicast Messages

PTP supports the following options for unicast and multicast:

- Unicast mode: In this mode, all PTP messages are sent as unicast messages. This is the default behavior.
- Mixed mode: In this mode, Announce and Sync messages are sent as multicast messages, while Signaling, Delay-Request, and Delay-Response messages are sent as unicast messages.
- Multicast mode: In this mode, all packets are sent as multicast messages.

Frequency and Time Selection

The selection of the source to synchronize the backplane clock frequency is made by frequency synchronization, and is outside of the scope of PTP. The Announce, Sync and Delay-Request frequencies must be the same on the master and slave.

Delay-Response Mechanism

The Delay Request-Response Mechanism, defined in section 11.3 of IEEE Std 1588-2008, is a mechanism which allows a slave ports to estimate to a good degree of accuracy the difference between its own clock-time, and the clock-time of its master. The following options are supported:

- One-step mechanism - The timestamp for the Sync message is sent in the Sync message itself.
- Two-step mechanism - The timestamp for the Sync message in a later Follow-Up message.

When running a port in Slave state, a router can send Delay-Request messages and handle incoming Sync, Follow-Up and Delay-Response messages. The timeout periods for both Sync and Delay-Response messages are individually configurable.

PTP Interface and Profile Configuration

If a global PTP profile is attached to an interface, its values are used as the default settings for that interface. If additional settings are configured under the interface itself, these override the defaults in the profile. If no profile is attached to an interface, the configuration on the interface is used to determine the PTP settings for the interface.

You can use either of the following approaches when configuring PTP:

- Create a profile (or multiple profiles) containing all the default settings to use on all PTP interfaces. Override any settings that differ for particular interfaces by using the interface configuration under the interfaces themselves.
- Configure all settings separately for each interface, without using any global profiles. Use this approach if the interfaces do not have consistent settings, or if you are configuring only a small number of PTP interfaces.

Supported Hardware

The line cards that support PTP are:

- A9K-MOD80-SE
- A9K-MOD80-TR
- A9K-MOD160-SE
- A9K-MOD160-TR
- A9K-MOD200-SE
- A9K-MOD200-TR
- A9K-MOD400-SE
- A9K-MOD400-TR
- A9K-24X10GE-SE
- A9K-24X10GE-TR
- A9K-36X10GE-SE
- A9K-36X10GE-TR
- A9K-2X100GE-SE
- A9K-2X100GE-TR
- A9K-1X100GE-SE
- A9K-1X100GE-TR
- A9K-4T16GE-TR
- A9K-4T16GE-SE
- A9K-40GE-SE
- A9K-40GE-TR
- A9K-8X100GE-L-SE

The RPs and RSPs that support PTP are:

- A9K-RSP880-TR
- A9K-RSP880-SE

- A99-RP2-SE
- A99-RP2-TR
- A9K-RSP440-SE
- A9K-RSP440-TR
- A9K-RP-SE
- A9K-RP-TR

Note PTP is supported on the face plate IEEE 1588 port on the above mentioned RPs and RSPs.

Restrictions

- Rack switchover is not supported on a ASR 9000 cluster in the PTP Master mode when a Grand Master is a GPS source connected to the GPS port on ASR 9000.
- SyncE is not supported by 1588 port on RSP.
- Only one PTP session is allowed on the PTP port on RSP.

  Note For redundancy, it is recommended to make connections to 1588 ports on both Standby and Active RSPs. PTP sessions will be enabled only on the Active RSP 1588 port.

- We recommend two-step clock operation over one-step clock operation for ASR 9000 PTP Master. One-step clock operation on ASR 9000 PTP Master is not supported for G.8275.1 profile.
- 1 Pulse per Second (1PPS) output is not supported on Cisco ASR 9000 Series routers.
- G.8275.1 profile is not supported on Cisco ASR 9001 chassis.
- G.8273.2 T-BC performance is supported only on the following hardware:
  - A9K-RSP880-SE
  - A9K-RSP880-TR
  - A9K-8x100GE-L-SE
  - A9K-8x100GE-L-TR
  - A9K-4x100GE-L-SE
  - A9K-4x100GE-L-TR
- G.8273.2 Telecom Boundary Clock (T-BC) performance is not supported on 40G and 100G interfaces.

The G.8273.2 Class B performance is observed when the same type of line card is used for both PTP Master and PTP Slave ports. Class A performance is observed when different types of line cards are used for PTP Master and PTP Slave on T-BC.

1588 Packet Types

- Announce : Used to announce the existence of PTP clocks throughout the network. Sent by ports in MASTER state.
- Sync/Follow-Up/Delay-Req/Delay-Resp: Used to exchange timestamps between master and slave, to synchronize time.
- Signalling Messages: Used to negotiate unicast grants.

GPS ToD support for NMEA

National Marine Electronics Associations (NMEA) provides protocol strings to send out GPS updates. GPRMC is one such NMEA string that provides exact data and time (Greenwich time), latitude, longitude, heading and speed. The ASR9000 series router receives GPS ToD messages in serial ASCII stream through the RS422 interface in three formats (NTP Type 4, Cisco and GPRMC) and extracts the timing data. ASR 9000 series routers can supoort ToD in NMEA or GPRMC format. This is supported only on RS422.

Supported HW:

- A9K-RSP440-SE
- A9K-RSP440-TR
- A9K-RSP880-TR
- A9K-RSP880-SE
- A99-RP2-SE
- A99-RP2-TR

Note NMEA stands for National Marine Electronics Associations. NMEA 0183 is a standard protocol, used by GPS receivers to transmit data. NMEA created the only uniform interface standard for digital data exchange between different marine electronic products.

PTP Hybrid Mode

Your router allows the ability to select separate sources for frequency and time-of-day (ToD). Frequency selection can be between any source of frequency available to the router, such as: BITS, GPS, SyncE or IEEE 1588 PTP. The ToD selection is between the source selected for frequency and PTP, if available (ToD selection is from GPS, DTI or PTP). This is known as hybrid mode, where a physical frequency source (BITS or SyncE) is used to provide frequency synchronization, while PTP is used to provide ToD synchronization.

Frequency selection uses the algorithm described in ITU-T recommendation G.871, and is described in the *Configuring Frequency Synchronization* module in this document. The ToD selection is controlled using the time-of-day priority configuration. This configuration is found under the source interface frequency synchronization configuration mode and under the global PTP configuration mode. It controls the order for

which sources are selected for ToD. Values in the range of 1 to 254 are allowed, with lower numbers indicating higher priority.

Related Topics

Configuring PTP Hybrid Mode, on page 22
PTP Hybrid Mode: Example, on page 30
Configuring Frequency Synchronization

ITU-T Telecom Profiles for PTP

Cisco IOS XR software supports ITU-T Telecom Profiles for PTP as defined in the ITU-T recommendation. A profile consists of PTP configuration options applicable only to a specific application.

Separate profiles can be defined to incorporate PTP in different scenarios based on the IEEE 1588-2008 standard. A telecom profile differs in several ways from the default behavior defined in the IEEE 1588-2008 standard and the key differences are mentioned in the subsequent sections.

The following sections describe the ITU-T Telecom Profiles that are supported for PTP.

G.8265.1 Profile

G.8265.1 profile fulfills specific frequency-distribution requirements in telecom networks. Features of G.8265.1 profile are:

- *Clock advertisement*: G.8265.1 profile specifies changes to values used in Announce messages for advertising PTP clocks. The clock class value is used to advertise the quality level of the clock, while the other values are not used.
- *Clock Selection*: G.8265.1 profile also defines an alternate Best Master Clock Algorithm (BMCA) to select port states and clocks is defined for the profile. This profile also requires to receive Sync messages (and optionally, Delay-Response messages) to qualify a clock for selection.
- *Port State Decision*: The ports are statically configured to be Master or Slave instead of using FSM to dynamically set port states.
- *Packet Rates*: The packet rates higher than rates specified in the IEEE 1588-2008 standard are used. They are:
  - Sync/Follow-Up Packets: Rates from 128 packets-per-second to 16 seconds-per-packet.
  - Delay-Request/Delay-Response Packets: Rates from 128 packets-per-second to 16 seconds-per-packet.
  - Announce Packets: Rates from 8 packets-per-second to 64 packets-per-second.
- *Transport Mechanism*: G.8265.1 profile only supports IPv4 PTP transport mechanism.
- *Mode*: G.8265.1 profile supports transport of data packets only in unicast mode.
- *Clock Type*: G.8265.1 profile only supports Ordinary Clock-type (a clock with only one PTP port).
- *Domain Numbers*: The domain numbers that can be used in a G.8265.1 profile network ranges from 4 to 23. The default domain number is 4.

- *Port Numbers*: All PTP port numbers can only be 1 because all clocks in a this profile network are Ordinary Clocks.

G.8265.1 profile defines an alternate algorithm to select between different master clocks based on the local priority given to each master clock and their quality levels (QL). This profile also defines Packet Timing Signal Fail (PTSF) conditions to identify the master clocks that do not qualify for selection. They are:

- PTSF-lossSync condition: Raised for master clocks that do not receive a reliable stream of Sync and Delay-Resp messages. Cisco IOS XR software requests Sync and Delay-Resp grants for each configured master clock to track the master clock with this condition.
- PTSF-lossAnnounce condition: Raised for master clocks that do not receive a reliable stream of Announce messages.
- PTSF-unusable condition: Raised for master clocks that receives a reliable stream of Announce, Sync, and Delay-Resp messages, but not usable by slave clocks. Cisco IOS XR software does not use this condition.

G.8275.1 Profile

Note G.8275.1 profile is not supported on Cisco ASR 9000 Ethernet and Cisco ASR 9000 Enhanced Ethernet line cards.

G.8275.1 profile fulfills the time-of-day and phase synchronization requirements in telecom networks with all network devices participating in the PTP protocol. G.8275.1 profile with SyncE provides better frequency stability for the time-of-day and phase synchronization.

Features of G.8275.1 profile are:

- *Synchronization Model*: G.8275.1 profile adopts hop-by-hop synchronization model. Each network device in the path from master to slave synchronizes its local clock to upstream devices and provides synchronization to downstream devices.
- *Clock Selection*: G.8275.1 profile also defines an alternate BMCA that selects a clock for synchronization and port state for the local ports of all devices in the network is defined for the profile. The parameters defined as a part of the BMCA are:
  - Clock Class
  - Clock Accuracy
  - Offset Scaled Log Variance
  - Priority 2
  - Clock Identity
  - Steps Removed
  - Port Identity
  - notSlave flag
  - Local Priority

- *Port State Decision*: The port states are selected based on the alternate BMCA algorithm. A port is configured to a **master-only** port state to enforce the port to be a master for multicast transport mode.
- *Packet Rates*: The nominal packet rate for Announce packets is 8 packets-per-second and 16 packets-per-second for Sync/Follow-Up and Delay-Request/Delay-Response packets.
- *Transport Mechanism*: G.8275.1 profile only supports Ethernet PTP transport mechanism.
- *Mode*: G.8275.1 profile supports transport of data packets only in multicast mode. The forwarding is done based on forwardable or non-forwardable multicast MAC address.
- *Clock Type*: G.8275.1 profile supports the following clock types:
  - *Telecom Grandmaster (T-GM)*: Provides timing for other network devices and does not synchronize its local clock to other network devices.
  - *Telecom Time Slave Clock (T-TSC)*: A slave clock synchronizes its local clock to another PTP clock, but does not provide PTP synchronization to any other network devices.
  - *Telecom Boundary Clock (T-BC)*: Synchronizes its local clock to a T-GM or an upstream T-BC clock and provides timing information to downstream T-BC or T-TSC clocks.
- *Domain Numbers*: The domain numbers that can be used in a G.8275.1 profile network ranges from 24 to 43. The default domain number is 24.

Note

- G.8275.1 profile is not supported on Cisco ASR 9001 chassis.
- G.8275.1 profile is not supported on A9K-12X100GE-SE/TR and A9K-400G-DWDM-SE/TR line cards.
- As recommended in ITU-T G.8275.1 document, Appendix VI, G.8275.1 profile is supported only on Bundle Link Aggregation (LAG) member links and not supported on a bundle interface.

States of Ports

State machine indicates the behavior of each port. The possible states are:

- INIT – Port is not yet ready to participate in PTP.
- LISTENING – First state when a port becomes ready to participate in PTP: port listens for PTP masters for a (configurable) period of time.
- PRE-MASTER – The port is about to go into MASTER state.
- MASTER – The port is provides timestamps for any listening slave/boundary clocks.
- UNCALIBRATED – The port receives timestamps from a master clock, but the router's clock is not yet synchronized to that master.
- SLAVE – The port receives timestamps from a master clock, and the router's clock is synchronized to that master.

- PASSIVE – The port is aware of a better clock than the one it would advertise if it was in MASTER state, but is not slaving off that clock.

How to Configure PTP

Configuring Frequency and Quality Settings for PTP

These steps configure frequency and quality settings for PTP:

SUMMARY STEPS

1. **configure**
2. **frequency synchronization**
3. **quality itu-t option** *option* **generation** *number*
4. Use one of these commands:
   - **end**
   - **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**frequency synchronization** **Example:** `RP/0/RSP0/CPU0:router(config)# frequency synchronization`	Enters frequency synchronization mode.
Step 3	**quality itu-t option** *option* **generation** *number* **Example:** `RP/0/RSP0/CPU0:router(config-freqsync)# quality itu-t option 2 generation 2`	Sets ITU-T quality parameters.
Step 4	Use one of these commands: • **end** • **commit**	Saves configuration changes. • When you issue the **end** command, the system prompts you to commit changes: `Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:`

	Command or Action	Purpose

	Example:
	`RP/0/RSP0/CPU0:router(config-freqsync)# end`
	or
	`RP/0/RSP0/CPU0:router(config-freqsync)# commit`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

Configuring Global Profile Settings for PTP

Use these steps to configure a global configuration profile for a PTP interface. This profile can then be assigned to any interface as required. You can override this configuration for any particular interface using configuration commands in interface PTP configuration mode. See Configuring a PTP Slave Interface, on page 13 or Configuring a PTP Master Interface, on page 17 for more information.

SUMMARY STEPS

1. **configure**
2. **ptp**
3. **profile** *name*
4. **sync frequency** *rate*
5. **delay-request frequency** *rate*
6. Use one of these commands:
   - **end**
   - **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**ptp**	Enters PTP configuration mode.

	Command or Action	Purpose
	Example: `RP/0/RSP0/CPU0:router(config)# ptp`	
Step 3	**profile** *name* **Example:** `RP/0/RSP0/CPU0:router(config-ptp)# profile tp64`	Enters PTP profile configuration mode for the specified profile.
Step 4	**sync frequency** *rate* **Example:** `RP/0/RSP0/CPU0:router(config-ptp-profile)# sync frequency 64`	Configures the Sync message frequency for the profile.
Step 5	**delay-request frequency** *rate* **Example:** `RP/0/RSP0/CPU0:router(config-ptp-profile)# delay-request frequency 64`	Sets the delay request frequency for the profile.

Step 6	Use one of these commands:
	• **end**
	• **commit**
	Example:
	`RP/0/RSP0/CPU0:router(config-ptp-profile)# end`
	or
	`RP/0/RSP0/CPU0:router(config-ptp-profile)# commit`
		Saves configuration changes.
		• When you issue the **end** command, the system prompts you to commit changes:
		`Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

Configuring a PTP Slave Interface

Use these steps to configure an interface to be a PTP slave:

SUMMARY STEPS

1. **configure**
2. **interface** *type interface-path-id*
3. **ptp**
4. **profile** *name*
5. **transport ipv4**
6. **announce timeout** *timeout*
7. **port state slave-only**
8. **master** {**ipv4** *address* | **ipv6** *address*}
9. **exit**
10. **ipv4 address** *address mask*
11. **transceiver permit pid all**
12. **commit**
13. **show run interface** *value*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**interface** *type interface-path-id* **Example:** `RP/0/RSP0/CPU0:router(config)# interface TenGigE 0/1/0/5`	Enters configuration mode for a specified interface. PTP is supported on Gigabit Ethernet and Bundle Ethernet interfaces.
Step 3	**ptp** **Example:** `RP/0/RSP0/CPU0:router(config-if)# ptp`	Enters PTP configuration mode for the interface.
Step 4	**profile** *name* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# profile tp64`	Specifies a previously-defined configuration profile to use for this interface. See Configuring Global Profile Settings for PTP, on page 11 for more information. Any additional commands entered in PTP interface configuration mode override settings in this profile.

	Command or Action	Purpose
Step 5	**transport ipv4** **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# transport ipv4`	Specifies that IPv4 is the transport mode for PTP messages.
Step 6	**announce timeout** *timeout* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# announce timeout 2`	Sets the timeout for PTP announce messages.
Step 7	**port state slave-only** **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# port state slave-only`	Specifies that the port state is for a slave.

Step 8	**master** {**ipv4** *address* | **ipv6** *address*}
	
	Example:
	`RP/0/RSP0/CPU0:router(config-if-ptp)# master ipv4 192.168.2.1`
	`RP/0/RSP0/CPU0:router(config-if-ptp)# master ipv6 2001:DB8::1`
		Specifies the IPv4 address or IPv6 address for the PTP master.

Step 9	**exit**
	
	Example:
	`RP/0/RSP0/CPU0:router(config-if-ptp)# exit`
	`RP/0/RSP0/CPU0:router(config-if)`
		Exits PTP interface configuration mode.

Step 10	**ipv4 address** *address mask* **Example:** `RP/0/RSP0/CPU0:router(config-if)# ipv4 address 1.7.1.1 255.255.255.0`	Configures the gateway for the interface.
Step 11	**transceiver permit pid all** **Example:** `RP/0/RSP0/CPU0:router(config-if)# transceiver permit pid all`	Configures the transceiver for the interface.
Step 12	**commit**	
Step 13	**show run interface** *value* **Example:** `RP/0/RSP0/CPU0:router# show run interface tengige0/1/0/5`	Displays the running configuration.

	Command or Action	Purpose
	Fri Aug 3 19:57:14.184 UTC interface TenGigE0/1/0/5 ptp profile tp64 transport ipv4 port state slave-only master ipv4 1.7.1.2 ! announce timeout 2 ! ipv4 address 1.7.1.1 255.255.255.0 transceiver permit pid all !	

Configuring the Clock Interface for a PTP Master

Use these steps to configure a clock interface for the PTP master:

SUMMARY STEPS

1. **configure**
2. **clock-interface sync** *value* **location** *node*
3. **port-parameters dti**
4. **frequency synchronization**
5. **selection input**
6. **priority** *number*
7. **wait-to-restore** *number*
8. **ssm disable**
9. **quality receive exact itu-t option** *number* **generation** *number* **PRS**
10. Use one of these commands:
    - **end**
    - **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**clock-interface sync** *value* **location** *node* **Example:** `RP/0/RSP0/CPU0:router(config)# clock-interface`	Enters configuration mode for the specified clock interface.

	Command or Action	Purpose
	sync 1 location 0/RSP0/CPU0	
Step 3	**port-parameters dti** **Example:** RP/0/RSP0/CPU0:router(config-clock-if)# port-parameters dti	Configures the port parameters for the clock interface.
Step 4	**frequency synchronization** **Example:** RP/0/RSP0/CPU0:router(config-clock-if)# frequency synchronization	Enters frequency synchronization mode for the clock interface.
Step 5	**selection input** **Example:** RP/0/RSP0/CPU0:router(config-clk-freqsync)# selection input	Configures selection input for the clock interface.
Step 6	**priority** *number* **Example:** RP/0/RSP0/CPU0:router(config-clk-freqsync)# priority 10	Configures priority for the clock interface.
Step 7	**wait-to-restore** *number* **Example:** RP/0/RSP0/CPU0:router(config-clk-freqsync)# wait-to-restore 0	Configures the wait-to-restore time for the clock interface.
Step 8	**ssm disable** **Example:** RP/0/RSP0/CPU0:router(config-clk-freqsync)# ssm disable	Disables SSM packets for the clock interface.
Step 9	**quality receive exact itu-t option** *number* **generation** *number* **PRS** **Example:** RP/0/RSP0/CPU0:router(config-clk-freqsync)# quality receive exact itu-t option 2 generation 2 PRS	Configures quality settings for frequency synchronization for the clock interface.
Step 10	Use one of these commands:	Saves configuration changes.

	Command or Action	Purpose

	• **end**
	• **commit**
	
	Example:
	`RP/0/RSP0/CPU0:router(config-clk-freqsync)# end`
	or
	`RP/0/RSP0/CPU0:router(config-clk-freqsync)# commit`
		• When you issue the **end** command, the system prompts you to commit changes:
		`Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

Configuring a PTP Master Interface

Use these steps to configure an interface that acts as a PTP master.

SUMMARY STEPS

1. **configure**
2. **interface** *type interface-path-id*
3. **ptp**
4. **profile** *name*
5. **transport ipv4**
6. **announce timeout** *timeout*
7. **exit**
8. **ipv4 address** *address mask*
9. **transceiver permit pid all**
10. **commit**
11. **show run interface** *value*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**interface** *type interface-path-id* **Example:** `RP/0/RSP0/CPU0:router(config)# interface TenGigE 0/1/0/5`	Enters configuration mode for a specified interface. PTP is supported on Gigabit Ethernet and Bundle Ethernet interfaces. A single member of the bundle is selected on which to send all PTP packets. In the event that this member goes down, another member is selected on which to send all PTP packets.
Step 3	**ptp** **Example:** `RP/0/RSP0/CPU0:router(config-if)# ptp`	Enters PTP configuration mode for the interface.
Step 4	**profile** *name* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# profile tp64`	Specifies a previously-defined configuration profile to use for this interface. See Configuring Global Profile Settings for PTP, on page 11 for more information. Any additional commands entered in PTP interface configuration mode override settings in this profile.
Step 5	**transport ipv4** **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# transport ipv4`	Specifies that IPv4 is the transport mode for PTP messages.
Step 6	**announce timeout** *timeout* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# announce timeout 2`	Sets the timeout for PTP announce messages.
Step 7	**exit** **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# exit`	Returns to configuration mode for the interface.
Step 8	**ipv4 address** *address mask* **Example:** `RP/0/RSP0/CPU0:router(config-if)# ipv4 address 1.7.1.2 255.255.255.0`	Configures the gateway for the interface.

	Command or Action	Purpose
Step 9	**transceiver permit pid all** **Example:** `RP/0/RSP0/CPU0:router(config-if)# transceiver permit pid all`	Configures the transceiver for the interface.
Step 10	**commit**	

Step 11	**show run interface** *value*
	
	Example:
	
	`RP/0/RSP0/CPU0:router# show run interface Te0/1/0/5`
	`Fri Aug  3 13:57:44.366 PST`
	`interface TenGigE0/5/1/0`
	` ptp`
	`  profile tp64`
	`  transport ipv4`
	`  announce timeout 2`
	` !`
	` ipv4 address 1.7.1.2 255.255.255.0`
	` transceiver permit pid all`
	`!`
		Shows the running configuration.

Configuring GPS Settings for the Grand Master Clock

Use these steps to configure GPS settings for PTP.

SUMMARY STEPS

1. **configure**
2. **clock-interface sync** *port-number* **location** *interface-location*
3. **port-parameters**
4. **gps-input tod-format cisco pps-input rs422**
5. **exit**
6. **frequency synchronization**
7. **selection input**
8. **priority** *number*
9. **wait-to-restore** *number*
10. **ssm disable**
11. **quality receive exact itu-t option** *option* **generation** *number*
12. Use one of these commands:
    - **end**
    - **commit**
13. **show run interface** *value*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**clock-interface sync** *port-number* **location** *interface-location* **Example:** `RP/0/RSP0/CPU0:router(config)# clock-interface sync 2 location 0/RSP0/CPU0`	Enters configuration mode for the clock interface.
Step 3	**port-parameters** **Example:** `RP/0/RSP0/CPU0:router(config-clock-if)# port-parameters`	Enters configuration mode for the port parameters.
Step 4	**gps-input tod-format cisco pps-input rs422** **Example:** `RP/0/RSP0/CPU0:router(config-clk-parms)# gps-input tod-format cisco pps-input rs422`	Configures GPS input parameters.

	Command or Action	Purpose
Step 5	**exit** **Example:** `RP/0/RSP0/CPU0:router(config-clk-parms)# exit`	Exits clock port parameter configuration mode.
Step 6	**frequency synchronization** **Example:** `RP/0/RSP0/CPU0:router(config-clock-if)# frequency synchronization`	Enters frequency synchronization mode for the clock interface.
Step 7	**selection input** **Example:** `RP/0/RSP0/CPU0:router(config-clk-freqsync)# selection input`	Configures selection input for the clock interface.
Step 8	**priority** *number* **Example:** `RP/0/RSP0/CPU0:router(config-clk-freqsync)# priority 10`	Configures priority for the clock interface.
Step 9	**wait-to-restore** *number* **Example:** `RP/0/RSP0/CPU0:router(config-clk-freqsync)# wait-to-restore 0`	Configures the wait-to-restore time for the clock interface.
Step 10	**ssm disable** **Example:** `RP/0/RSP0/CPU0:router(config-clk-freqsync)# ssm disable`	Disables SSM packets for the clock interface.
Step 11	**quality receive exact itu-t option** *option* **generation** *number* **Example:** `RP/0/RSP0/CPU0:router(config-clk-freqsync)# quality receive exact itu-t option 2 generation 2 PRS`	Configures ITU-T quality parameters.
Step 12	Use one of these commands: • **end** • **commit**	Saves configuration changes. • When you issue the **end** command, the system prompts you to commit changes: `Uncommitted changes found, commit them`

	Command or Action	Purpose

	Example:
	`RP/0/RSP0/CPU0:router(config-clk-freqsync)# end`
	or
	`RP/0/RSP0/CPU0:router(config-clk-freqsync)# commit`
		`before exiting(yes/no/cancel)? [cancel]:`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

Step 13	**show run interface** *value*
	Example:
	`RP/0/RSP0/CPU0:router# show run interface Te0/1/0/5`
	`Fri Aug 3 13:57:44.366 PST`
	`interface TenGigE0/5/1/0`
	` ptp`
	`  profile tp64`
	`  transport ipv4`
	`  announce timeout 2`
	` !`
	` ipv4 address 1.7.1.2 255.255.255.0`
	` transceiver permit pid all`
	`!`
		Shows the running configuration.

Configuring PTP Hybrid Mode

You configure hybrid mode by selecting PTP for the time-of-day (ToD) and another source for the frequency. This task summaries the hybrid configuration. Refer to the other PTP configuration modules for more detailed information regarding the PTP configurations. Refer to the *Configuring Ethernet Interfaces* module in *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide* for more information regarding SyncE configurations.

SUMMARY STEPS

1. Enable Frequency Synchronization.
2. Configure a SyncE input.
3. Enable PTP on the router.
4. Configure a PTP interface on the router.

DETAILED STEPS

	Command or Action	Purpose

Step 1	Enable Frequency Synchronization.
	
	Example:
	
	`RP/0/RSP0/CPU0:router(config)# frequency synchronization`
	`RP/0/RSP0/CPU0:router(config)# commit`
		Enables frequency synchronization on the router.

Step 2	Configure a SyncE input.
	
	Example:
	
	`RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/0/0`
	`RP/0/RSP0/CPU0:router(config-if)# frequency synchronization`
	`RP/0/RSP0/CPU0:router(config-if-freqsync)# selection input`
	`RP/0/RSP0/CPU0:router(config-if-freqsync)# time-of-day-priority 100`
	`RP/0/RSP0/CPU0:router(config-if-freqsync)# commit`
		Configures an interface to be a SyncE input. It is also possible to configure BITS or SONET/SDH as the frequency source. The time-of-day-priority setting specifies that SyncE is used as the ToD source if no source has a lower priority.

Step 3	Enable PTP on the router.
	
	Example:
	
	`RP/0/RSP0/CPU0:router(config)# ptp`
	`RP/0/RSP0/CPU0:router(config-ptp)# time-of-day priority 1`
	`RP/0/RSP0/CPU0:router(config)# commit`
		Enables PTP on the router and specifies that PTP is the ToD source if it is available. Values for the ToD priority can range from 1 (highest priority) to 254 (lowest priority).

Step 4	Configure a PTP interface on the router.
	
	Example:
	
	`RP/0/RSP0/CPU0:router(config)# interface gigabitEthernet 0/1/0/1`
	`RP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.0.0.1/24`
	`RP/0/RSP0/CPU0:router(config-if)# ptp`
	`RP/0/RSP0/CPU0:router(config-if-ptp)# master ipv4 10.0.0.2`
	`RP/0/RSP0/CPU0:router(config-if-ptp)# commit`
		Enables a PTP interface on the router and specifies an interface as the PTP master.

How to Configure PTP Telecom Profile

Configuring an Interface for the PTP Telecom Profile

This task details the interface settings that are applicable to ITU-T Telecom Profiles.

Note It is also possible to make these definitions within a global PTP profile and attach them to the interface using the profile command in PTP interface configuration mode.

SUMMARY STEPS

1. **configure**
2. **interface** *type interface-path-id*
3. **ptp**
4. **profile** *name*
5. **sync frequency** *rate*
6. **delay-request frequency** *rate*
7. **announce grant-duration** *duration*
8. **sync grant-duration** *duration*
9. **delay-response grant-duration** *duration*
10. **sync timeout** *timeout*
11. **delay-response timeout** *timeout*
12. **unicast-grant invalid-request** {**reduce** | **deny**}
13. **master**{**ipv4** *ip-address*|**ipv6** *ip-address*}
14. **clock-class** *class*
15. Use one of these commands:
    - **end**
    - **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**interface** *type interface-path-id* **Example:** `RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/1/0/1`	Enters interface configuration mode for the specified interface.

	Command or Action	Purpose
Step 3	**ptp** **Example:** `RP/0/RSP0/CPU0:router(config-if)# ptp`	Enters PTP interface configuration mode.
Step 4	**profile** *name* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# profile tele64`	Attaches a previously-defined profile to this interface. Profiles are defined in global PTP configuration mode. **Note** Any configurations made in PTP interface configuration mode override the global profile settings.
Step 5	**sync frequency** *rate* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# sync frequency 128`	Configures the interval between sending Sync messages. Valid values are 2, 4, 8, 16, 32, 64 or 128.
Step 6	**delay-request frequency** *rate* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# delay-request frequency 128`	Configures the interval between sending Delay Request messages. Valid values are 2, 4, 8, 16, 32, 64 or 128.
Step 7	**announce grant-duration** *duration* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# announce grant-duration 120`	Specifies the Announce message grant duration, in seconds. Values can range from 60 to 1000. If the port is in slave state, this is the length of grant that is requested. If the port is in master mode, this is the maximum grant allowed.
Step 8	**sync grant-duration** *duration* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# sync grant-duration 120`	Specifies the Sync message grant duration, in seconds. Values can range from 60 to 1000. If the port is in slave state, this is the length of grant requested. If the port is in master mode, this is the maximum grant allowed.
Step 9	**delay-response grant-duration** *duration* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# delay-response grant-duration 120`	Specifies the Delay Response message grant duration in seconds. Values can range from 60 to 1000. If the port is in slave state, this is the length of the grant requested. If the port is in master mode, this is the maximum grant allowed.
Step 10	**sync timeout** *timeout* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# sync timeout 120`	Specifies the length of time in micro seconds that Sync messages are not received before a PTSF-lossSync is raised. Values can range from 100 to 10000.

	Command or Action	Purpose
Step 11	**delay-response timeout** *timeout* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# delay-response timeout 120`	Specifies the length of time, in micro seconds, that Delay Response messages are not received before a PTSF-lossSync is raised. Values can range from 100 to 10000.
Step 12	**unicast-grant invalid-request** {**reduce** | **deny**} **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp)# unicast-grant invalid-request reduce`	Specifies whether unicast grant requests with unacceptable parameters are denied or granted with reduced parameters.

Step 13	**master**{**ipv4** *ip-address*|**ipv6** *ip-address*}
	
	Example:
	`RP/0/RSP0/CPU0:router(config-if-ptp)# master ipv4 192.168.2.1`
	
	`RP/0/RSP0/CPU0:router(config-if-ptp)# master ipv6 2001:DB8::1`
		Specifies the IPv4 address or the IPv6 address for the PTP master that the interface should listen to. Multiple masters can be configured.

Step 14	**clock-class** *class* **Example:** `RP/0/RSP0/CPU0:router(config-if-ptp-master)# clock-class 2`	Overrides the clock class received in announce messages from this master. Values can range from 0 to 255.

Step 15	Use one of these commands:
	• **end**
	• **commit**
	
	Example:
	`RP/0/RSP0/CPU0:router(config-if-ptp-master)# end`
	or
	`RP/0/RSP0/CPU0:router(config-if-ptp-master)# commit`
		Saves configuration changes.
		• When you issue the **end** command, the system prompts you to commit changes:
		`Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

Related Topics

Configuring a PTP Slave Interface, on page 13

Configuring PTP Clock Settings for the Telecom Profile

Perform this task to configure clock settings to be consistent with ITU-T Telecom Profiles for Frequency.

SUMMARY STEPS

1. **configure**
2. **ptp**
3. **clock**
4. **domain**
5. **timescale**
6. **time-source** *source*
7. **exit**
8. **clock profile** { **g.8265.1** | **g.8275.1**} **clock-type** {**T-GM** | **T-GM** | **T-TSC**}
9. Use one of these commands:
   - **end**
   - **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	

Step 2	**ptp**
	
	Example:
	`RP/0/RSP0/CPU0:router(config)# ptp`
	`RP/0/RSP0/CPU0:router(config-ptp)#`
		Enters PTP configuration mode.

Step 3	**clock**
	
	Example:
	`RP/0/RSP0/CPU0:router(config-ptp)# clock`
	`RP/0/RSP0/CPU0:router(config-ptp-clock)#`
		Enters PTP clock configuration mode.

	Command or Action	Purpose
Step 4	**domain** **Example:** `RP/0/RSP0/CPU0:router(config-ptp)# domain 4`	Sets the domain number for the PTP profile. The allowed domain number range for G.8265.1 profile is between 4 and 23 and the range for G.8275.1 profile is between 24 and 43.
Step 5	**timescale** **Example:** `RP/0/RSP0/CPU0:router(config-ptp-clock)# timescale ptp`	Sets the timescale to PTP.
Step 6	**time-source** *source* **Example:** `RP/0/RSP0/CPU0:router(config-ptp-clock)# time-source ptp`	Sets the time source advertised in Announce messages. Valid options are: atomic-clock, GPS, hand-set, internal-oscillator, NTP, other, PTP, terrestrial-radio.
Step 7	**exit** **Example:** `RP/0/RSP0/CPU0:router(config-ptp-clock)# exit`	Exits PTP clock configuration mode.

Step 8	**clock profile** { **g.8265.1** | **g.8275.1**} **clock-type** {**T-GM** | **T-GM** | **T-TSC**}
	
	Example:
	`RP/0/RSP0/CPU0:router (config-ptp)# clock profile g.8265.1 T-BC`
	`RP/0/RSP0/CPU0:router(config-ptp)# clock profile g.8275.1 T-BC`
		Configures the telecom profile and clock type for PTP.
		Note The **clock-selection telecom-profile** and **clock-advertisement telecom-profile** commands are deprecated from Release 6.1.2. They are replaced by the **clock profile** command.

Step 9	Use one of these commands:
	• **end**
	• **commit**
	
	Example:
	`RP/0/RSP0/CPU0:router(config-ptp)# end`
	or
	`RP/0/RSP0/CPU0:router(config-ptp)# commit`
		Saves configuration changes.
		• When you issue the **end** command, the system prompts you to commit changes:
		`Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:`
		◦ Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode.
		◦ Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes.
		◦ Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes.

	Command or Action	Purpose
		• Use the **commit** command to save the configuration changes to the running configuration file, and remain within the configuration session.

What to Do Next

Configure your interface to be consistent with the ITU-T Telecom Profile.

Configuration Examples for Implementing PTP

Configuring Slave Settings: Example

The following example shows a PTP slave configuration .

```
 ptp
  profile tp64
  transport ipv4
  port state slave-only
  master ipv4 1.7.1.2
  !
  announce timeout 2
 !
 ipv4 address 1.7.1.1 255.255.255.0
 transceiver permit pid all
!
```

Configuring Master Settings: Example

This example shows a PTP master configuration .

```
 ptp
  profile tp64
  transport ipv4
  announce timeout 2
 !
 ipv4 address 1.7.1.2 255.255.255.0
 transceiver permit pid all
!
```

Configuring GPS Settings: Example

This example shows the GPS configuration for PTP.

```
clock-interface sync 2 location 0/RSP0/CPU0
 port-parameters
```

```
  gps-input tod-format cisco pps-input rs422
 !
 frequency synchronization
  selection input
  priority 2
  wait-to-restore 0
  ssm disable
  quality receive exact itu-t option 2 generation 2 PRS
 !
!
```

PTP Hybrid Mode: Example

This example shows the configuration of PTP hybrid mode:

```
ptp
 time-of-day priority 10
 !
interface GigabitEthernet0/1/1/0
 ptp
  transport ipv4
  port state slave-only
  master ipv4 192.168.52.38
  !
  sync frequency 64
  announce timeout 2
  delay-request frequency 64
 !
interface GigabitEthernet 0/1/0/1
 ipv4 address 192.168.52.41 255.255.255.0
 speed 100
 frequency synchronization
  selection input
  priority 10
  wait-to-restore 0
  ssm disable
  time-of-day-priority 100
 !
 transceiver permit pid all
```

This example shows the output from the **show frequency synchronization** command:

```
RP/0/RSP0/CPU0:router# show frequency synchronization selection

Node 0/RSP0/CPU0:
==============
Selection point: T0-SEL-B (3 inputs, 1 selected)
  Last programmed 18h30m ago, and selection made 4h30m ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T4-SEL-C CHASSIS-TOD-SEL
    Chassis scoped: LC_TX_SELECT
    Router scoped : None
  Uses frequency selection
  Used for local line interface output
  S  Input                     Last Selection Point         QL  Pri  Status
  == ========================  ========================  =====  ===  ===========
  1  GigabitEthernet0/1/1/0    0/1/CPU0 SPA_RXMUX 1        STU   10  Locked
     PTP [0/RSP0/CPU0]         n/a                       ST3E  100  Available
     Internal0 [0/RSP0/CPU0]   n/a                       ST3E  255  Available


Selection point: CHASSIS-TOD-SEL (2 inputs, 1 selected)
  Last programmed 18h30m ago, and selection made 4h30m ago
  Next selection points
    SPA scoped    : None
    Node scoped   : None
```

```
    Chassis scoped: None
    Router scoped : None
  Uses time-of-day selection
  S  Input                      Last Selection Point      Pri  Time  Status
  == ========================  ========================  ===  ====  ===========
  1  PTP [0/RSP0/CPU0]         n/a                        10  Yes   Available
     GigabitEthernet0/1/1/0    0/RSP0/CPU0 T0-SEL-B 1     10  No    Available
```

This example shows the output for interface ptp (1588):

```
RP/0/RSP0/CPU0:router# show running-config interface ptp 0/RSP0/CPU0/0

interface PTP0/RSP0/CPU0/0
 ptp
  profile slave
  port state slave-only
  master ipv4 15.1.1.1
  !
  clock operation one-step
 !
 ipv4 address 15.1.1.2 255.255.255.0
!
```

Configuring ITU-T Telecom Profiles: Examples

This example shows Master global configuration for the telecom profile:

```
-- For G.8265.1 profile --

ptp
 clock
 domain 4
 profile g.8265.1
 !
  profile master
  transport ipv4
  sync frequency 16
  announce interval 1
  delay-request frequency 16
interface gi 0/2/0/4
 ptp
  profile master
  transport ipv4
  clock operation two-step
 !
 ipv4 address 17.1.1.1/24

-- For G.8275.1 profile --

ptp
 clock
 domain 24
 profile g.8275.1
 !
  profile master
  transport ethernet
  sync frequency 16
  announce interval 1
  delay-request frequency 16
interface gi 0/2/0/4
 ptp
  profile master
  transport ethernet
  multicast target-address ethernet 01-1B-19-00-00-00
  clock operation two-step
 !
 ipv4 address 17.1.1.1/24
```

This example shows Slave global configuration for the telecom profile:

```
-- For G.8265.1 profile --

ptp
 clock
 domain 4
 profile g.8265.1
 !
  profile slave
  transport ipv4
  sync frequency 16
  announce interval 1
  delay-request frequency 16
interface gi 0/1/0/0
 ptp
  profile slave
  transport ipv4
  Master ipv4 18.1.1.1
  port state slave-only
  !
  clock operation two-step
  !
 ipv4 address 18.1.1.2/24

-- For G.8275.1 profile --

ptp
 clock
 domain 24
 profile g.8275.1 clock-type T-TSC
 !
  profile slave
  transport ethernet
  sync frequency 16
  announce interval 1
  delay-request frequency 16
interface gi 0/1/0/0
 ptp
  profile slave
  transport ethernet
  multicast target-address ethernet 01-1B-19-00-00-00
  !
  clock operation two-step
  !
 ipv4 address 18.1.1.2/24
```

This example shows global configuration with clock type as T-Boundary Clock (T-BC) for the telecom profile:

```
-- For G.8265.1 profile --

ptp
 clock
 domain 4
 profile g.8265.1
 !
  profile master
  transport ipv4
  sync frequency 16
  announce interval 1
  delay-request frequency 16
  exit
  profile slave
  transport ipv4
  sync frequency 16
  announce interval 1
  delay-request frequency 16
  exit
interface gi 0/2/0/4
 ptp
  profile slave
```

```
  transport ipv4
  Master ipv4 17.1.1.1
  port state slave-only
  !
  clock operation two-step
  !
ipv4 address 17.1.1.2/24
interface gi 0/2/0/0
 ptp
  profile master
  transport ipv4
  clock operation two-step
  !
 ipv4 address 18.1.1.1/24

-- For G.8275.1 profile --

ptp
 clock
 domain 24
 profile g.8275.1 clock-type T-BC
 !
  profile master
  transport ethernet
  sync frequency 16
  announce interval 1
  delay-request frequency 16
  exit
  profile slave
  transport ethernet
  sync frequency 16
  announce interval 1
  delay-request frequency 16
  exit
interface gi 0/2/0/4
 ptp
  profile slave
  transport ethernet
  multicast target-address ethernet 01-1B-19-00-00-00
  !
  clock operation two-step
  !
 ipv4 address 17.1.1.2/24
interface gi 0/2/0/0
 ptp
  profile master
  transport ethernet
  multicast target-address ethernet 01-1B-19-00-00-00
  clock operation two-step
  !
 ipv4 address 18.1.1.1/24
```

Additional References

The following sections provide references related to implementing PTP on Cisco IOS XR software.

Related Documents

Related Topic	Document Title
Cisco IOS XR PTP commands	*PTP Commands* module of *Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference*
Cisco IOS XR SyncE commands	*Frequency Synchronization Commands* module of *Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference*
Cisco IOS XR SyncE configuration information	*Configuring Ethernet Interfaces* module of *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide*
Information about getting started with Cisco IOS XR Software	*Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide*
Cisco IOS XR master command index	*Cisco ASR 9000 Series Aggregation Services Router Commands Master List*
Information about user groups and task IDs	*Configuring AAA Services on the Cisco ASR 9000 Series Router* module of *Cisco ASR 9000 Series Aggregation Services Router System Security Configuration Guide*

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.	—

MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
RFC 1588	*Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems, 2008*

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of 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/cisco/web/support/index.html