



Configuring PTP

This document describes the Precision Time Protocol (PTP) feature and configuration steps to implement PTP.

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Prerequisites for Configuring PTP

- NID must have an IP address.

Information About PTP

PTP, as defined in the IEEE 1588 standard, synchronizes with nanosecond accuracy the real-time clocks of the devices in a network. The clocks 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.

How to Provision PTP

Configuring Slave IPv4

To configure slave IPv4, unicast, one step on VLAN 7 with domain number 0, perform the following steps:

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>PTPPortType</p> <p>Example: Switch# PTPPortType</p>	Enters the PTPPortType mode.
Step 2	<p>setPTPclockInstance-v3 ptpClkConfig {clk-inst-domain clk-slave clock-enable clock-instance <i>clock-instance-number</i> dscp mode {boundary e2transparent master p2transparent slave} two-step-flag one-way protocol {disable ethernet unicast-ipv4 multicast-ipv4} servo slave-cfg vlan {disable vlan-id <i>vlan-id-number</i>} pcp {disable pcp-value} enabled-ports {port1 port2 port3 port4 port5 port6} filter ho identifier localpriority priority1 priority2 {profile disable g8265dot1 g8275dot1 ieee1588} clock-domain <i>clock-domain-number</i>}</p> <p>Example: Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config clock-instance 1 Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config clock-domain 0 Switch(PTPPortType)# setPTPclockInstance_v3 ptp-clock-config clock-enable enable Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config mode slave Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config one-way disable Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config protocol unicast-ipv4 Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config two-step-flag disable Switch(PTPPortType)# setPTPclockInstance-v3 ptp-clock-config vlan vlan-id 7</p>	<p>Configures slave IPV4, unicast, one step on VLAN 7 with domain number 0.</p> <ul style="list-style-type: none"> • clk-inst-domain—HW based or SW based Clock domain. • clk-slave—Set PTP slave clock options. • clock-enable—Enables or disables clock. • clock-instance— Specifies PTP clock instance. • <i>clock-instance-number</i>— Clock instance number. • dscp— Dscp value. • mode—Specifies clock mode. • boundary—Specifies ordinary boundary clock. • e2transparent— Specifies end to end transparent clock. • master—Specifies master only clock. • p2transparent—Specifies peer to peer transparent clock. • slave— Specifies slave only clock. • two-step_flag—Specifies two step flag. • one-way—Specifies one way. • protocol— Specifies the protocol. • servo— Set servo parameters. • slave-cfg— Specifies Unicast Slave configuration Entry. • disable—Disables protocol. • ethernet—Specifies EPS Ethernet protocol. • unicast-ipv4—Specifies unicast protocol. • multicast-ipv4— Specifies multicast protocol. • vlan—Specifies the VLAN ID. • disable—Disables VLAN tag. • vlan-id— Specifies the VLAN tag. • <i>vlan-id-number</i>— VLAN tag number.

	Command or Action	Purpose
		<ul style="list-style-type: none"> • pcp—Specifies VLAN PCP. • disable—Disables VLAN PCP. • pcp-value—Specifies the PCP value. • enabled-ports—Specifies UNI ports. • port1— Specifies physical port 1. • port2—Specifies physical port 2. • port3—Specifies physical port 3. • port4— Specifies physical port 4. • port5—Specifies physical port 5. • port6—Specifies physical port 6. • filter—Specifies filter parameters. • ho— Set PTP Servo holdover parameters. • identifier— Defines PTP clock instance identifier. • localpriority— Set Local priority for the port. • priority1—Specifies clock priority 1 for PTP BMC algorithm, 0 is highest priority. • priority2—Specifies clock priority 2 for PTP BMC algorithm. • profile— Specifies Clock's associated profile. • clock_domain—Specifies PTP domain. • <i>clock-domain-number</i>—PTP domain number.
Step 3	setPTPclockInstance-v3 review Example: Switch (PTPPortType) # setPTPclockInstance-v3 review	Displays the configuration.
Step 4	setPTPclockInstance-v3 commit Example: Switch (PTPPortType) # setPTPclockInstance-v3 commit	Sends the configuration to NID.
Step 5	exit Example: Switch (PTPPortType) # exit	Exits PTPPortType mode.

Configuration Example

The example shows how to configure slave IPv4, unicast, one step on VLAN 7 with domain number 0:

```
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config clock-instance 1
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config clock-domain 0
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config clock_enable enable
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config mode slave
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config one-way disable
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config protocol unicast-ipv4
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config two-step-flag disable
Switch (PTPPortType) # setPTPclockInstance-v3 ptp-clock-config vlan vlan-id 7

Switch (PTPPortType) # setPTPclockInstance-v3 review
Switch (PTPPortType) # setPTPclockInstance-v3 commit
Switch (PTPPortType) # exit
```

Enabling PTP on a Port

To enable PTP on port 1/4 with PTP instance 1, perform the following steps:

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>PTPPortType</p> <p>Example: Switch# PTPPortType</p>	Enters the PTPPortType mode.
Step 2	<p>setPTPportProperties ptp-port-conf {ptp-run clock-inst <i>clock-inst-number</i> port-id <i>port-id-number</i> announce-interval {disable value} announce-timeout {disable value} delay-asymmetry {disable value} delay-mechanism {disable e2e p2p} delay-req {disable interval <i>interval-value</i> } egress-latency {disable value} ingress-latency {disable value} internal sync-interval {disable value value} }</p> <p>Example: Switch (PTPPortType) # setPTPportProperties ptp-port-conf port-id 4 Switch (PTPPortType) # setPTPportProperties ptp-port-conf clock-inst 1 Switch (PTPPortType) # setPTPportProperties ptp-port-conf sync-interval value -4 Switch (PTPPortType) # setPTPportProperties ptp-port-conf delay-req interval -6 Switch (PTPPortType) # setPTPportProperties ptp-port-conf ptp-run enable</p>	<p>Enables PTP on port 1/4, instance: 1.</p> <ul style="list-style-type: none"> • ptp-run—Enables PTP on the specified port. • clock-inst— Specifies the PTP clock number. • clock-inst-number— PTP clock number. • port-id—Specifies the physical port number. • port-id-number—Physical port number. • announce-interval—Specifies the time interval for sending announce messages. • disable— Disables announce interval. • value—Specifies announce interval value. • announce-timeout—Sets announce timeout. • disable— Disables announce timeout. • value—Specifies announce timeout value. • delay-asymmetry—Sets path delay asymmetry. • disable— Disables delay asymmetry. • value—Specifies delay asymmetry in nano seconds.

	Command or Action	Purpose
		<ul style="list-style-type: none"> • delay-mechanism—Sets delay mechanism. • disable— Disables delay mechanism. • e2e—Specifies end to end delay mechanism. • p2p—Specifies peer to peer delay mechanism. • delay-req—Sets delay request interval. • disable— Disables delay request mechanism. • interval—Specifies peer to peer delay mechanism. • <i>interval-value</i>—Peer to peer delay value. • egress-latency—Sets port egress latency. • disable— Disables delay asymmetry. • value— Specifies egress latency in nano seconds. • ingress-latency—Sets port ingress latency. • disable— Disables delay asymmetry. • value— Specifies ingress latency in nano seconds. • internal— Enables as an internal interface. • sync-interval—Sets sync interval. • disable— Disables sync interval. • value— Specifies sync interval value. • <i>value</i>—Sync interval value.
Step 3	setPTPportProperties review Example: Switch(PTPPortType) # setPTPportProperties review	Displays the configuration.
Step 4	setPTPportProperties commit Example: Switch(PTPPortType) # setPTPportProperties commit	Sends the configuration to NID.
Step 5	exit Example: Switch(PTPPortType) # exit	Exits to the PTPPortType mode.

Configuration Example

The following example shows how to enable PTP on a port.

```
Switch(PTPPortType) # setPTPportProperties ptp-port-conf port-id 4
Switch(PTPPortType) # setPTPportProperties ptp-port-conf clock-inst 1
Switch(PTPPortType) # setPTPportProperties ptp-port-conf sync-interval value -4
Switch(PTPPortType) # setPTPportProperties ptp-port-conf delay-req interval -6
Switch(PTPPortType) # setPTPportProperties ptp-port-conf ptp-run enable

Switch(PTPPortType) # setPTPportProperties review
Switch(PTPPortType) # setPTPportProperties commit
Switch(PTPPortType) # exit
```



Note

For G.8275.1 profile, there are a few additional parameters that have been added under **setPTPportProperties-v2**. In addition to the available parameters for **setPTPportProperties**, the following are the new parameters available:

- *localpriority* - Sets Local priority for the port.
- *mcast-dest* - Sets multicast destination address type for the port for G.8275.1 profile.
- *not-slave* - Sets not-slave attribute for the port for G8275.1 BMC algorithm.

Configuration Example

The following example shows how to enable PTP on a port using **setPTPportProperties-v2**.

```
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config ptp-run enable
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config clock-inst 1
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config port-id 2
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config localpriority value 12
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config not-slave enable
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config mcast-dest default
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config sync-interval value -4
Switch(PTPPortType) # setPTPportProperties-v2 ptp-port-config delay-req interval -6

Switch(PTPPortType) # setPTPportProperties-v2 review

Commands in queue:
  setPTPportProperties-v2 ptp-port-config ptp-run enable
  setPTPportProperties-v2 ptp-port-config clock-inst 1
  setPTPportProperties-v2 ptp-port-config port-id 2
  setPTPportProperties-v2 ptp-port-config localpriority value 12
  setPTPportProperties-v2 ptp-port-config not-slave enable
  setPTPportProperties-v2 ptp-port-config mcast-dest default
  setPTPportProperties-v2 ptp-port-config sync-interval value -4
  setPTPportProperties-v2 ptp-port-config delay-req interval -6

Switch(PTPPortType) # setPTPportProperties-v2 commit
Switch(PTPPortType) # exit
```

Enabling or Disabling Microsemi APR

To enable or disable Microsemi APR, perform the following steps:

DETAILED STEPS

	Command or Action	Purpose
Step 1	PTPPortType Example: Switch# PTPPortType	Enters the PTPPortType mode.
Step 2	setPTPEXternalProperties ptp-external-conf {clock-output-freq one-pps-output one-pps-input vcxo-freq-control algorithm {enable one-hertz min-phase}} Example: Switch(PTPPortType)# setPTPEXternalProperties ptp-external-conf algorithm enable enable Switch(PTPPortType)# setPTPEXternalProperties ptp-external-conf algorithm one-hertz enable	Enables Microsemi APR. <ul style="list-style-type: none"> • clock-output-freq—Specifies external clock output frequency in Hz. • one-pps-output— Enables 1 PPS output. • one-pps-input— Enables 1 PPS input. • vcxo-freq-control—Specifies APR settings. • enable—Enables or disables the APR. • one-hertz— Enables or disables 1 Hz. • min-phase—Specifies phase correction begin threshold.
Step 3	setPTPEXternalProperties ptp-external-conf {clock-output-freq one-pps-output one-pps-input vcxo-freq-control algorithm {enable one-hertz min-phase}} Example: Switch(PTPPortType)# setPTPEXternalProperties ptp-external-conf algorithm enable disable	Disables Microsemi APR and returns to default VTSS APR. <ul style="list-style-type: none"> • clock-output-freq—Specifies external clock output frequency in Hz. • one-pps-output— Enables 1 PPS output. • one-pps-input— Enables 1 PPS input. • vcxo-freq-control—Specifies APR settings. • enable—Enables or disables the APR. • one-hertz— Enables or disables 1 Hz. • min-phase—Specifies phase correction begin threshold.
Step 4	setPTPEXternalProperties review Example: Switch(PTPPortType)# setPTPEXternalProperties review	Displays the configuration.
Step 5	setPTPClockInstance commit Example: Switch(PTPPortType)# setPTPEXternalProperties commit	Sends the configuration to NID.

	Command or Action	Purpose
Step 6	exit Example: Switch(PTPPortType)# exit	Exits the PTPPortType mode.

Configuration Example

The following example shows how to enable Microsemi APR.

```
Switch(PTPPortType)# setPTPexternalProperties ptp-external-conf algorithm enable enable
Switch(PTPPortType)# setPTPexternalProperties ptp-external-conf algorithm one-hertz enable
```

```
Switch(PTPPortType)# setPTPexternalProperties review
Switch(PTPPortType)# setPTPexternalProperties commit
Switch(PTPPortType)# exit
```

The following example shows how to disable Microsemi APR and return to default VTSS APR.

```
Switch(PTPPortType)# setPTPexternalProperties ptp-external-conf algorithm enable disable
```

```
Switch(PTPPortType)# setPTPexternalProperties review
Switch(PTPPortType)# setPTPexternalProperties commit
Switch(PTPPortType)# exit
```



Note

For G.8275.1 profile, there are a few additional parameters that have been added under **setPTPexternalProperties-v2**. In addition to the available parameters for **setPTPexternalProperties**, the following are the new parameters available:

- *ho-spec* - Holdover specification for G.8275 PTP clocks.
- *adjustment-method* - Adjustment method.

Configuration Example

The following example shows how to set holdover specification and adjustment method for G.8275.1 profile.

```
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config ho-spec enable enable
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config ho-spec cat1-value 11
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config ho-spec cat2-value 12
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config ho-spec cat3-value 13
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config one-pps-mode
one-pps-input enable
Switch(PTPPortType)# setPTPexternalProperties-v2 ptp-external-config adjustment-method
ltc-phase enable
```

```
Switch(PTPPortType)# setPTPexternalProperties-v2 review
```

Commands in queue:

```
setPTPexternalProperties-v2 ptp-external-config ho-spec enable enable
setPTPexternalProperties-v2 ptp-external-config ho-spec cat1-value 11
setPTPexternalProperties-v2 ptp-external-config ho-spec cat2-value 12
setPTPexternalProperties-v2 ptp-external-config ho-spec cat3-value 13
setPTPexternalProperties-v2 ptp-external-config one-pps-mode one-pps-input enable
setPTPexternalProperties-v2 ptp-external-config adjustment-method ltc-phase enable
```

```
Switch(PTPPortType)# setPTPexternalProperties-v2 commit
Switch(PTPPortType)# exit
```


Verifying PTP

Use the following commands to verify the PTP status on the Cisco ME 1200 NID:

```
Switch(PTPPortType)# showPTPall ptp-show-req 1
Switch(PTPPortType)# showPTPall commit
```

This command displays the PTP configuration status on the NID.



Note

To view the values of the parameters that have been added as part of G.8275.1 profile, use the **showPTPall-v2** command.

The following is a sample output from the **showPTPall** command:

```
ShowPTPall_Output.ptp_show_response[0].local_current_time.ptp_time =
'local time not implemented for clk_inst = 1'
ShowPTPall_Output.ptp_show_response[0].local_current_time.clock_adjustment_method.t
= 4
ShowPTPall_Output.ptp_show_response[0].local_current_time.clock_adjustment_method.u.software
= ''
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.clock_id =
1
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.mode.t = 5
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.mode.u.slave
= ''
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.two_step_flag
= false
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.ports = '255'
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.clock_identity
= '4348018d07000075'
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.clock_quality
= 'Cl:255 Ac:128 Va:00004'
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.properties.priority1
= 0
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.properties.priority2
= 0
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.properties.clock_domain
= 127
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.protocol.t
= 1
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.protocol.u.ethernet
= ''
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.one_way =
true
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.vlan.t = 1
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.vlan.u.disable
= ''
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.pcp.t = 1
ShowPTPall_Output.ptp_show_response[0].clock_default_dataset.pcp.u.disable
= ''
ShowPTPall_Output.ptp_show_response[0].time_property.UTC_offset.t = 2
ShowPTPall_Output.ptp_show_response[0].time_property.UTC_offset.u.value
= 34
ShowPTPall_Output.ptp_show_response[0].time_property.frequency_traceable
= true
```

```

ShowPTPall_Output.ptp_show_response[0].time_property.leap59 = true
ShowPTPall_Output.ptp_show_response[0].time_property.leap61 = true
ShowPTPall_Output.ptp_show_response[0].time_property.timing_traceable =
true
ShowPTPall_Output.ptp_show_response[0].time_property.ptp_timescale = true
ShowPTPall_Output.ptp_show_response[0].time_property.ptp_timesource = 0
ShowPTPall_Output.ptp_show_response[0].clock_parent_dataset =
'ParentPortIdentity port Pstat Var ChangeRate d0c282fffe17dfbf 1 0
65170-8207664

GrandmasterIdentity GrandmasterClockQuality Pri1 Pri2fe17dfbf68fe70cd
Cl:128 Ac:128 Va:33914 92 145
'
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.stpRm = 1
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.offset_from_master
= ' 0.000.000.003'
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.mean_path_delay
= ' 0.000.000.067'
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.slave_port
= 4
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.slave_state.t
= 4
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.slave_state.u.LOCKED
= ''
ShowPTPall_Output.ptp_show_response[0].clock_current_dataset.holdover =
'TRUE -368.3
'
ShowPTPall_Output.ptp_show_response[0].slave_cfg[0].index_ = 0
ShowPTPall_Output.ptp_show_response[0].slave_cfg[0].duration = 100
ShowPTPall_Output.ptp_show_response[0].slave_cfg[0].peer_ip_addr =
'7.7.7.7'
ShowPTPall_Output.ptp_show_response[0].slave_cfg[1].index_ = 1
ShowPTPall_Output.ptp_show_response[0].slave_cfg[1].duration = 100
ShowPTPall_Output.ptp_show_response[0].slave_cfg[1].peer_ip_addr =
'0.0.0.0'
ShowPTPall_Output.ptp_show_response[0].slave_cfg[2].index_ = 2
ShowPTPall_Output.ptp_show_response[0].slave_cfg[2].duration = 100
ShowPTPall_Output.ptp_show_response[0].slave_cfg[2].peer_ip_addr =
'0.0.0.0'
ShowPTPall_Output.ptp_show_response[0].slave_cfg[3].index_ = 3
ShowPTPall_Output.ptp_show_response[0].slave_cfg[3].duration = 100
ShowPTPall_Output.ptp_show_response[0].slave_cfg[3].peer_ip_addr =
'0.0.0.0'
ShowPTPall_Output.ptp_show_response[0].slave_cfg4.index_ = 4
ShowPTPall_Output.ptp_show_response[0].slave_cfg4.duration = 100
ShowPTPall_Output.ptp_show_response[0].slave_cfg4.peer_ip_addr = '0.0.0.0'

ShowPTPall Commit Success!!!

```

Additional References

Related Documents

Related Topic	Document Title
Cisco ME 3800x and ME 3600x Switches Software Configuration Guide, Cisco IOS Release 15.4(1)S	http://www.cisco.com/c/en/us/td/docs/switches/metro/me3600x_3800x/software/release/15-4_1_S/configuration/guide/3800x3600xscg.html

MIBs

MIB	MIBs Link
MIBs Supporting Cisco IOS	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

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	http://www.cisco.com/support

