Network Synchronization Commands

This chapter describes the Cisco IOS XR Network Synchronization Precision Time Protocol (PTP) commands that are used to distribute precision frequency and time around a network.

For detailed information about PTP concepts, configuration tasks, and examples, see the *Configuring PTP on Cisco IOS XR Software* configuration module in *System Management Command Reference for Cisco CRS Routers*

announce

To configure PTP profile announcement messages, use the **announce** command in PTP profile configuration or interface PTP configuration mode. To remove setting, use the **no** form of this command.

announce { **frequency** *frequency* | **interval** *interval* | **grant-duration** *duration* | **timeout** *timeout* } **no announce**

Syntax Description

frequency *frequency*	Specifies multiple announce messages per second (2, 4, 8, 16, 32, 64, or 128). 4 means that four messages are sent per second.
interval *interval*	Specifies the time interval in seconds at which messages are sent.
grant-duration *duration*	Specifies the length of time permission to send unicast messages is granted.
timeout *timeout*	Specifies the number of announce intervals that PTP ports wait in the Listen state before transitioning to the Master state.

Command Default

Defaults: frequency none, grant-duration 600, interval 2, timeout 3. Values are in seconds.

Command Modes

PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **announce** command used configure the global PTP configuration profile which then is associated with many interfaces. Similarly it is used in interface PTP configuration mode to set the announce message settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

The **grant-duration** keyword is used for the ITU-T telecommunication Profile.

Example

The following sets the announcement interval to 8 seconds in the PTP configuration profile:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# announce interval 8
```

clock

To enter Precision Time Protocol (PTP) clock configuration mode and run PTP clock configuration command, use the **clock** command in PTP configuration mode. To remove, use the **no** form of this command.

clock
no clock

Syntax Description	This command has no keywords or arguments.

Command Default	None

Command Modes	Global PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

PTP clock configuration commands can also be run from global PTP configuration mode by preceding the command string with the **ptp clock** keywords. From PTP clock configuration mode, various PTP clock settings can be configured.

Example

The following example shows how to enter PTP clock configuration mode from global configuration mode.

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)#
```

clock operation

To configure the type of PTP clock operation, use the **clock operation** command in PTP interface or profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

clock operation {one-step | two-step}
no clock operation

Syntax Description

one-step	Specifies the timestamp for the time synchronization message sent directly within the message itself.
two-step	Specifies the timestamp for the time synchronization message that follows the message.

Command Default

The default is two step.

Command Modes

PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **clock operation** command is used configure the global PTP configuration profile which then is associated with many interfaces. Similarly it is used in the interface PTP configuration mode to set the clock operation for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets PTP clock operation to two-step:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# clock operation two-step
```

clock profile

To configure the ITU-T telecommunication profile and clock type that can be used in all local PTP sessions, use the **clock profile** command in the PTP configuration mode. To remove, use the **no** form of this command.

clock   profile
clock-type   T-GMT-BC | T-TSC
no clock profile

Syntax Description	**clock-type T-GM** | **T-BC** | **T-TSC**	Indicates the clock type for G.8275.1 profile. G.8275.1 profile supports three clock types:
		• T-GM: Telecommunication Grandmaster
		• T-BC: Telecommunication Boundary Clock
		• T-TSC: Telecommunication Time Slave Clock

Command Default   The default PTP profile defined in the IEEE-1588 standard is used if this configuration is not used.

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **clock-type** can be configured only when G.8275.1 is selected as the PTP profile.

Note   The **clock-selection telecom-profile** and **clock-advertisement telecom-profile** commands are deprecated from Release 6.3.2Release 6.6.25. They are replaced by the **clock profile** command.

Note   Configuring the G.8265.1 profile using **clock profile** command is equivalent to using **clock-selection telecom-profile** and **clock-advertisement telecom-profile** commands to configure the G.8265.1 profile in the earlier releases.

Example

The following example shows configuring G.8265.1 profile:

```
Router(config)#ptp
Router(config-ptp)#
clock profile g.8265.1
```

The following example shows configuring G.8275.1 profile with T-BC clock type:

```
Router(config)#ptp
Router(config-ptp)#clock profile g.8275.1 T-BC
```

cos

To specify the Class of Service (CoS) value to use for Precision Time Protocol (PTP) packets sent by the router, use the **cos** command in PTP profile configuration mode or interface PTP configuration mode. To remove, use the **no** form of this command.

cos *number*

no cos

Syntax Description	*number*	Specifies the Class of Service (CoS) value to use in the Ethernet header when running over IPv4 or Ethernet.

Command Default The default CoS value is 6.

Command Modes PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines The **cos** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly it is used in the interface PTP configuration mode to set the CoS value for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the CoS value to 3 in the PTP configuration profile p1:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# cos 3
```

The following example overrides the CoS value in the profile and sets it to be 2 for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# cos 2
```

delay-asymmetry

To configure options for configuring PTP profile delays, use the **delay-asymmetry** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

delay-asymmetry { **delay-asymmetry** *frequency* }
no delay-asymmetry

Syntax Description	*frequency* Specifies time taken by the master port to delay messages compared to the slave port.

Command Default	The default is one second.

Command Modes	PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **delay-asymmetry** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly it is used in interface PTP configuration mode to set the delay-asymmetry settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the announcement interval to 8 seconds in the PTP configuration profile:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# delay-asymmetry 8
```

delay-request

To configure settings for the PTP delay request message, use the **delay-request** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

delay-request {**frequency** *number* | **interval** *number*}
no delay-request

Syntax Description	*frequency*	Specifies the delay interval.
	interval	Specifies the time interval in seconds at which messages are sent.

Command Default

The default interval is two seconds between messages.

Command Modes

PTP configuration mode

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **delay-request** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly it is used in interface PTP configuration mode to set the delay-request message settings for a specific interface. Any values set in interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the delay request interval in the PTP configuration profile to 8 seconds:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# delay-request interval 8
```

delay-response

To configure settings for the PTP delay response message, use the **delay-response** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

delay-response {**grant-duration** *duration* | **timeout** *value*}
no delay-response

Syntax Description		
	grant-duration	Specifies the grant duration. If a port is in the slave state, this is the length of grant-duration is requested. If the port is in master state, this is the maximum grant-duration is allowed.
	timeout	Specifies delay response timeout value. If delay-response messages are not received from a master clock for, the master is no longer qualified for selection. This setting only applies if the clock-selection telecom-profile is specified.

Command Default Default is grant-duration 600, timeout 5000.

Command Modes PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines The **delay-response** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it can be used in the interface PTP configuration mode to set the delay response value for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the PTP delay response timeout to 200 milliseconds in the PTP configuration profile:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# delay-response timeout 200
```

The following example overrides the delay response timeout value in the profile and sets it to be 150 milliseconds for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
```

delay-response

```
Router(config-if-ptp)# delay-response timeout 150
```

domain

To specify the domain number for the PTP clock, use the **domain** command in PTP clock configuration mode. To remove, use the **no** form of this command.

domain *number*
no domain

Syntax Description

number	Specifies the domain number to use for this clock.

Command Default   Default is 0.

Command Modes   PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   PTP uses the specified domain number in all its PTP messages and ignores all PTP messages received from a different domain.

Example

The following example sets the domain to 200:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# domain 200
```

dscp

To set the Differentiated Services Code Point (DSCP) value for use in Precision Time Protocol (PTP) packets sent by the router, use the **dscp** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

dscp *number*
no dscp

Syntax Description	*number*	Specifies the DSCP value to use (0-63).

Command Default   The default DSCP value is 46.

Command Modes   PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **dscp** command is used configure the global PTP configuration profile which is associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the DSCP value for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the DSCP value to 20 for PTP operation:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# dscp 20
```

The following example overrides the DSCP value in the profile and sets it to be 42 for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# dscp 42
```

egress-conversion

To configure interoperability options for configuring the PTP profile, use the **egress-conversion** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

egress-conversion { *clock accuracy* | *clock class* | *offset log scaled variance* | *priority1* | *priority2*}
no egress-conversion

Syntax Description		
clock accuracy *clock accuracy*	Specifies the clock-accuracy value to use for the peer clock.
clock class *clock class*	Specifies the clock class mapping for use.
offset log scaled variance *offset log scaled variance*	Specifies the Offset Scaled Log Variance (OSLV) value to use for the peer clock.
priority 1 *timeout*	Specifies the priority1 value to use for the peer clock.
priority 2 *timeout*	Specifies the priority2 value to use for the peer clock.

Command Default   None

Table 1: Default Profile to Other Profiles

Default Profile	**G.8275.x**	**G.8265.1**
Priority 1	128	128
Priority 2	—	128
Clock Accuracy	0xFE	0xFE
OSLV	0xFFFF	0xFFFF

Table 2: G.8265.1 Profile to Other Profiles

G.8265.1	**Default Profile**	**G.8275.1**
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE
OSLV	—	0xFFFF

Table 3: G.8275.x Profile to Other Profiles

G.8275.x	Default Profile	G.8265.1
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE
OSLV	—	0xFFFF

Command Modes   PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **egress-conversion** command is used configure the global PTP configuration profile which is associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the egress-conversion settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

```
Router(config)# ptp
Router(config-ptp)#interop
Router(config-ptp)#interop egress-conversion
Router(config-ptp)#clock accuracy
Router(config-ptp)#clock class
Router(config-ptp)#offset log scaled variance
Router(config-ptp)#priority1
Router(config-ptp)#priority2
```

freerun-clock-class

To configure the clock class to use when advertising a PTP clock, use the **clock-class** command in PTP clock configuration mode. To remove the setting, use the **no** form of this command.

freerun-clock-class *class*
no freerun-clock-class

Syntax Description

class   Specifies the clock class to use to advertise this clock. Values range 0–255.

Command Default   The default is that the clock class is derived from platform properties.

Command Modes   PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   Use this command to override the platform value, if needed.

The following example sets the clock class to 100.

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# freerun-clock-class 100
```

holdover-spec-clock-class

To enter Precision Time Protocol (PTP) clock configuration mode and run PTP clock configuration command, use the **holdover-spec-clock-class** command in PTP configuration mode. To remove, use the **no** form of this command.

holdover-spec-clock-class
no   holdover-spec-clock-class

Syntax Description	*class* Specifies the clock class to use while in holdover-spec. Values can range 0–255.

Command Default   None

Command Modes   Global PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   PTP clock configuration commands is run from global configuration mode by preceding the command string with the **ptp   holdover-spec-clock-class** keywords. From PTP clock configuration mode, various PTP clock settings can be configured.

Example

The following example shows how to enter PTP clock configuration mode from global configuration mode:

```
Router(config)# ptp
Router(config-ptp)# holdover-spec-clock-class 10
```

holdover-spec-duration

To enter Precision Time Protocol (PTP) clock configuration mode and run PTP clock configuration command, use the **holdover-spec-duration** command in PTP configuration mode. To remove, use the **no** form of this command.

holdover-spec-duration
no   holdover-spec-duration

Syntax Description	*duration* Specifies the exact duration of holdover-spec, in seconds. Values can range 0–255.

Command Default   None

Command Modes   Global PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   PTP clock configuration commands is run from global configuration mode by preceding the command string with the **ptp   clock** keywords. From PTP clock configuration mode, various PTP clock settings can be configured.

Example

The following example shows how to enter PTP clock configuration mode from global configuration mode:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# holdover-spec-duration 23
```

identity

To configure the PTP clock identity, use the **identity** command in PTP clock configuration mode. To remove, use the **no** form of this command.

identity {**eui-64** *number* | **mac-address** *address*}
no identity

Syntax Description		
eui-64 *number*	Specifies the full EUI-64 number to determine the clock identity.	
mac-address *address*	Specifies the router to determine the clock identity. Use one of the following addressing options to identify the router: • Use the router's built-in MAC address as the clock identity. • Enter a MAC address (H.H.H format).	

Command Default The router for the clock identity is derived from the router MAC address.

Command Modes PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines You can specify a MAC address or a complete EUI-64 value to derive the clock identity. If you do not use this command, clock identity is derived from the router MAC address.

Example

The following example sets the clock identity to a MAC address A.B.C:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# identity mac-address A.B.C
```

ingress-conversion

To configure ingress options for configuring the PTP profile, use the **ingress-conversion** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

ingress-conversion { *clock accuracy* | *clock class* | *offset log scaled variance* | *priority1* | *priority2* }
no ingress-conversion

Syntax Description

clock accuracy *clock accuracy*	Specifies the clock-accuracy value to use for the peer clock.
clock class *clock class*	Specifies the clock class mapping for use.
offset log scaled variance *offset log scaled variance*	Specifies the Offset Scaled Log Variance (OSLV) value to use for the peer clock.
priority 1 *timeout*	Specifies the priority1 value to use for the peer clock.
priority 2	Specifies the priority2 value to use for the peer clock.

Command Default   None

Table 4: Default Profile to Other Profiles

Default Profile	G.8275.x	G.8265.1
Priority 1	128	128
Priority 2	—	128
Clock Accuracy	0xFE	0xFE
OSLV	0xFFFF	0xFFFF

Table 5: G.8265.1 Profile to Other Profiles

G.8265.1	Default Profile	G.8275.x
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE
OSLV	—	0xFFFF

Table 6: G.8275.x Profile to Other Profiles

G.8275.x	Default Profile	G.8265.1
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE
OSLV	—	0xFFFF

Command Modes   PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **ingress-conversion** command is used configure the global PTP configuration profile which is associated with many interfaces. Similarly it is used in the interface PTP configuration mode to set the ingress-conversion settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the ingress-conversion with clock accuracy and clock class:

```
Router(config)# ptp
Router(config)# ptp(config)# ptp
Router(config-ptp)#interop
Router(config-ptp)#interop ingress-conversion
Router(config-ptp)#clock accuracy
Router(config-ptp)#clock class
Router(config-ptp)#offset log scaled variance
Router(config-ptp)#priority1
Router(config-ptp)#priority2
```

interoperability

To configure interoperating interfaces using PTP profile, configure **interop** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

interop { *domain* | *egress-conversion* *ingress-conversion* | *profile* | *clock accuracy* | *clock class* | *offset log scaled variance* | *priority1* | *priority2* }
no interop

Syntax Description

domain *domain*	Specifies domain of the peer clock.
egress-conversion *egress-conversion*	Specifies conversion rules to apply on the egress interface.
ingress-conversion*duration*	Specifies conversion rules to apply on the ingress interface.
profile *profile*	Specifies the PTP profile to interoperate with.
clock accuracy *clock accuracy*	Specifies the clock-accuracy value to use for the peer clock.
clock class *clock class*	Specifies the clock class mapping for use.
offset log scaled variance *offset log scaled variance*	Specifies the Offset Scaled Log Variance (OSLV) value to use for the peer clock.
priority 1 *timeout*	Specifies the priority1 value to use for the peer clock.
priority 2 *timeout*	Specifies the priority2 value to use for the peer clock.

Command Default

Table 7: Default Profile to Other Profiles

Default Profile	G.8275.x	G.8265.1
Priority 1	128	128
Priority 2	—	128
Clock Accuracy	0xFE	0xFE
OSLV	0xFFFF	0xFFFF

Table 8: G.8265.1 Profile to Other Profiles

G.8265.1	Default Profile	G.8275.x
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE

G.8265.1	Default Profile	G.8275.x
OSLV	—	0xFFFF

Table 9: G.8275.x Profile to Other Profiles

G.8275.x	Default Profile	G.8265.1
Priority 1	—	128
Priority 2	—	128
Clock Accuracy	—	0xFE
OSLV	—	0xFFFF

Command Modes   PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **interop** command is used configure the global PTP configuration profile which is associated with many interfaces. Similarly it is used in interface PTP configuration mode to set the interoperability settings for ingress or egress interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the interoperability using profile p1:

```
Router(config)# ptp
Router(config)# ptp(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# interop
Router(config-ptp-profile)# domain
Router(config-ptp-profile)# egress-conversion
Router(config-ptp-profile)# ingress-conversion
Router(config-ptp-profile)# profile
```

ipv4-ttl

To configure Time to Live (TTL) value using Precision Time Protocol (PTP) profile for IPv4, use the **ipv4-ttl** command in PTP configuration mode or interface PTP configuration mode. To remove, use the **no** form of this command.

ipv4-ttl   *ipv4-ttl*

no ipv4-ttl

Syntax Description	**ipv4-ttl** Specifies the IPv4 Time to Live (TTL) value to use (1-255).

Command Default   The default value is 255 milliseconds.

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **ipv4-ttl**command is used to configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in interface PTP configuration mode to set the ipv4-ttl settings for a specific interface. Any values set in interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example shows how to configure the profile tp128:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp)# ipv4-ttl 20
```

ipv6-hop-limit

To configure the IPv6 hop limit using PTP, use the **ipv6-hop-limit** command in PTP configuration mode or interface PTP configuration mode. To remove, use the **no** form of this command.

ipv6-hop-limit *ipv6-hop-limit*

no ipv6-hop-limit

Syntax Description		
	ipv6-hop-limit	Specifies the IPv6 hop time to use (1-255).

Command Default The default value is 255 milliseconds.

Command Modes PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines The **ipv6-hop-limit** command is used to configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the ipv6-hop-limit settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example shows how to configure the IPv6 hop limits:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp)# ipv6-hop-limit 45
```

local-priority

To configure priority for a port in the G.8275.1 profile, use the **local-priority** command in the PTP profile configuration mode or the Interface PTP configuration mode. To remove, use the **no** form of this command.

local-priority {*priority-value*}
no local-priority

Syntax Description	*priority-value* Indicates the priority value set for a port in the G.8275.1 profile. This priority value is used in the profile's alternate Best Master Clock Algorithm (BMCA).
	Note Lower number indicates higher priority value.

Command Default   The allowed range for the priority values are 1–255. The default priority value is 128.

Command Modes   PTP configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The configured local priority value is ignored if the G.8275.1 BMCA is not in use and a warning message is displayed in the **show ptp configuration-errors** command.

Note   The per-master priority value that is configured on a master clock overrides the per-port local priority value.

Example

The following example shows configuring priority 1 for a port in the G.8275.1 profile:

```
Router(config)# ptp
Router(config-ptp)# local-priority 1
```

log best-master-clock changes

To enable logging of changes to the best master clock for Precision Time Protocol (PTP), use the **log best-master-clockchanges** command in PTP configuration mode. To remove, use the **no** form of this command.

log best-master-clock changes
no log best-master-clock changes

Command Default   None

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **log best-master-clock change** command is configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets up PTP to log the best master clock changes:

```
Router(config)# ptp
Router(config-ptp)# log best-master-clock changes
```

master

To add a master to the list of acceptable Precision Time Protocol (PTP) masters for an interface or profile, use the **master** command in PTP profile configuration or Interface PTP configuration mode. To remove, use the **no** form of this command.

master { **ipv4** *address* | **ipv6** *address* | **clock-class** *class* | **delay-symmetry** *number* | **multicast** |
non-negotiated | **priority** *number* }
no master

Syntax Description

ipv4 *address*	Specifies the IPv4 address of a master.
ipv6 *address*	Specifies the IPv6 address of a master.
clock-class *class*	Overrides the clock class received in announce messages from this master.
delay-symmetry *number*	Specifies the expected asymmetry.
multicast	Indicates that the master sends multicast message.
non-negotiated	Specifies non-negotiated unicast message.
priority *number*	Indicates the priority for selecting between multiple masters (lower numbers are higher priority).
clock-class *class*	Overrides the clock class that is received in announce messages from this master.

Command Default   None

Command Modes   PTP profile configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The address type used to configure the master must match the PTP transport type configured on the interface. If multiple masters are configured, the router attempts to communicate with all configured masters and selects between the available ones based on priority.

Example

s

The following example assigns two masters to the profile and gives higher priority to the master with IPv4 address 10.10.4.5:

```
Router(config)# ptp
```

```
Router(config-ptp)# profile p1
Router(config-ptp-profile)# master ipv4 10.10.4.5 priority 1
Router(config-ptp-profile)# master ipv4 10.10.4.7 priority 2
```

min-clock-class

To configure the minimum clock class accepted from a Precision Time Protocol (PTP) master port, use the **min-clock-class** command in the PTP configuration mode. To remove, use the **no** form of this command.

min-clock-class   *class*
no min-clock-class

Syntax Description	*class* Indicates that the minimum clock class accepted. The range is 0–255.
	Foreign clocks with a clock class greater than this value is **not** be considered in the BMCA.

Command Default   Nones

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The clocks with higher clock-class number than the minimum clock-class number will not be considered for a parent clock. This command is used to override the platform value (if needed).

Note   The clock-class values are not numerically ordered (lower value of clock-class has higher importance).

Example

The following example configures the minimum clock class to 7:

```
Router(config)# ptp
Router(config-ptp)# min-clock-class 7
```

multicast

To allow multicast messages to be sent, use the **multicast** command in PTP profile configuration mode or Interface PTP configuration mode. To remove, use the **no** form of this command.

multicast {**target-address** **ethernet**{*forwardable mac-address* | *non-forwardable mac-address*}}
no multicast

Syntax Description	

target-address ethernet *forwardable mac-address* | *non-forwardable mac-address*	Indicates the Ethernet multicast group address to send the multicast messages. This command supports either forwarding or nonforwarding Ethernet MAC addresses only.
	• Forwarding MAC-address: 01-1B-19-00-00-00
	• Nonforwarding MAC-address: 01-80-C2-00-00-0E

Command Default

By default, multicast messaging is disabled for PTP.

Command Modes

PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

When multicast is configured, announce and sync messages are sent as multicast messages. Delay-response messages are sent as unicast messages.

Example

The following example enables PTP multicast messages in the configuration profile:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# multicast
```

The following example enables PTP multicast messages in the configuration profile to be sent to the forwarding mac-address:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# multicast target-address ethernet 01-1B-19-00-00-00
```

The following example overrides the multicast setting in the profile and removes it for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
```

```
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# no multicast
```

frequency-priority1

To specify the priority 1 number to use when advertising a PTP clock, use the **frquency priority1** command in PTP clock configuration mode. To remove, use the **no** form of this command.

frequency-priority1   *number*
no frequency-priority1

Syntax Description	*number* Specifies the priority value to rank a foreign PTP GM against other frequency sources (0-255).

Command Default   Default is 254.

Command Modes   PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **frequency-priority1** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the frequency-priority1 settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the priority 1 number to 50:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# frequency-priority1 50
```

frequency-priority2

To specify the priority 2 number to use when advertising a PTP clock, use the **frequency-priority2** command in PTP clock configuration mode. To remove, use the **no** form of this command.

frequency-priority2   *number*
no frequency-priority2

Syntax Description

number	Specifies the priority 2 number to use for this clock (0-255).

Command Default

Default is 128.

Command Modes

PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **frequency-priority2**command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly it is used in the interface PTP configuration mode to set the frequency-priority2 settings for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the priority 2 number to 50:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# frequency-priority2 50
```

port state

To configure the state for a PTP port, use the **port state** command in the PTP profile configuration mode or the Interface PTP configuration mode. To remove, use the **no** form of this command.

port state {**slave-only** | **master-only**}
no port state

Syntax Description		
slave-only	Configures the port state to be a slave.	
master-only	Configures the port state to be a master. The **master-only** keyword is used for multicast transport mode.	

Command Default   Dynamic port state changes are based on the peers with which the port communicates.

Command Modes   PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The following example configures the PTP port state to be slave-only:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp)# port state slave-only
```

The following example configures the PTP port state to be master-only:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp)# port state master-only
```

profile (interface)

To assign a Precision Time Protocol (PTP) configuration profile to an interface, use the **profile** command in interface PTP configuration mode. To remove, use the **no** form of this command.

profile *profile-name*
no profile

Syntax Description	**Pprofile** *profile-name*	Name of profile to associate with the Interface.

Command Default None

Command Modes Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines A PTP profile is a configuration template that is applied to multiple interfaces. You must define the profile using the **profile** command in PTP configuration mode.

Example

The following example shows how to assign a configuration profile to a specific interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if)# ptp
Router(config-if-ptp)# profile tp128
```

profile (PTP)

To enter Precision Time Protocol (PTP) profile configuration mode and run PTP profile configuration commands, use the **profile** command in PTP configuration mode or interface PTP configuration mode. To remove, use the **no** form of this command.

profile *name*
no profile

Syntax Description

name	Enters PTP profile configuration mode for the specified profile name.

Command Default None

Command Modes PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines A Precision Time Protocol (PTP) profile is a configuration template that is applied to multiple interfaces. From PTP profile configuration mode, the following PTP profile configuration commands are available:

```
Router(config-ptp-profile)# ?

  announce        Announce message options
  clock           PTP clock-operation to use
  cos             Specify the COS value to use
  delay-asymmetry Delay asymmetry to apply to all masters on an interface
  delay-request   Configure the sending of delay-request messages
  delay-response  Delay-Response message options
  dscp            Specify the DSCP value to use
  interop         Interfaces using this profile should interoperate with a peer clock
running a different profile
  ipv4-ttl        Specify the IPv4 TTL value to use
  ipv6-hop-limit  Specify the IPv6 hop limit value to use
  master          Add a master to listen to on interfaces using this profile
  multicast       Allow multicast messages to be sent
  port            PTP port options
  slave           Add a slave to announce to on this interface
  source          PTP source address options
  sync            Sync message options
  transport       PTP transport type to use on this interface
  unicast-grant   Unicast grant options
```

Example

The following example shows how to configure the profile tp128:

```
Router(config)# ptp
```

```
Router(config-ptp)# profile tp128
Router(config-ptp-profile)#
```

ptp

To enter Precision Time Protocol (PTP) configuration mode and run PTP configuration commands, use the **ptp** command. Using the command from global configuration mode enter the PTP configuration mode. To remove, use the **no** form of this command.

ptp
no ptp

Syntax Description	This command has no keywords or arguments.
Command Default	None
Command Modes	Global PTP configuration
	Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

PTP configuration commands are run from global configuration mode by preceding the command string with the **ptp** keyword. From PTP configuration mode, the following PTP configuration commands are available:

```
Router(config-ptp)# ?
  clock                          PTP Clock Configuration
 freerun-clock-class             The clock class to use when the PTP servo is freerunning

 frequency                       Precision Time Protocol frequency configuration
 holdover-spec-clock-class       The clock class to use while in holdover-spec
 holdover-spec-duration          Specify duration of holdover-spec
 holdover-spec-traceable-override  Override time-traceability to true while in holdover-spec

 ipv6-verify-checksum            Verify UDP checksum for IPv6 packets
 log                             Precision Time Protocol logging configuration
 min-clock-class                 Clocks with a clock-class higher than minimum clock
class will not be considered for selection as a parent clock.
 physical-layer-frequency        Disable PTP as a source for frequency as only physical
 layer frequency sources are used
 profile                         PTP Profile Configuration
 servo-slow-tracking             Restrict the rate, in ns per second, at which the servo
may track to update the time and attain sync
 startup-clock-class             The clock class to use when PTP starts up
 time-of-day                     Precision Time Protocol time-of-day configuration
 transparent-clock               Configure transparent clock
 uncalibrated-clock-class        Clock class to be used while acquiring phase-lock to a
parent clock
 uncalibrated-traceable-override  Override time-traceability to true while acquiring phase
lock to a parent clock
 utc-offset                      Configure the UTC offset
 virtual-port                    PTP Virtual Port Configuration
```

PTP commands can either run on Gigabit Ethernet interfaces or Bundle Ethernet interfaces.

Example

The following example shows how to enter the PTP configuration mode from global configuration mode:

```
Router(config)# ptp
Router(config-ptp)#
```

The following example shows how to enter the interface PTP configuration mode:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if)# ptp
Router(config-if-ptp)#
```

show ptp advertised-clock

To display properties of the clock that the system advertises over Precision Time Protocol (PTP), use the **show ptp advertised-clock** command in EXEC mode.

show   ptp   advertised-clock

Command Default	None

Command Modes	EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The following shows information about the PTP advertised clock. Output displays the clock identity and the clock properties.

```
Router# show ptp advertised-clock

Fri Jan  9 04:54:33.345 PST
Clock ID: Local Clock (2651fffec41c26)
Clock properties:
  Priority1: 128, Priority2: 128, Class: 6, Accuracy: 0xfe
  Offset scaled log variance: 0xffff
  Domain: 0, Time Source: GPS, Timescale: PTP
  Frequency-traceable, Time-traceable
  Current UTC offset: 34 seconds
```

show ptp foreign-masters

To display the Precision Time Protocol (PTP) foreign master clocks that are available to the router, use the **show ptp foreign-masters** command in EXEC mode.

show ptp foreign-masters [*brief*] {**interface** *name* | **location** *node*}
show ptp foreign-masters best

Syntax Description	*brief* Lists all foreign-masters known on the router, ordered by the interface on which they were discovered.

brief   Lists all foreign-masters known on the router, ordered by the interface on which they were discovered.

If this option is omitted, the output also include detailed clock properties, unicast messages that are granted from the master, length of time the master has been qualified, and information about the clock peer.

name   Displays foreign masters that are discovered by the specified interface. For more information, use the question mark (?) online help function.

node   Displays foreign masters tdiscovered by the specified node

best   Displays the state of the best foreign master found in the network

Command Default This command has no default values or behavior.

Command Modes EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines This command displays the state of foreign masters for the PTP processes. It is only relevant when running as a boundary clock; in grandmaster mode, no relevant output gets displayed.

The **show ptp foreign-masters** command with the **best** keyword collects grandmaster information from all RPs and filters out all but the grandmaster on the active timing card. If the active timing card does not support running as slave, no foreign masters are displayed and instead, it is indicated that slaving is not supported (refer examples section).

Example

The following shows output with the brief option:

```
Router# show ptp foreign-masters brief

M=Multicast,Q=Qualified,GM=Grandmaster

Interface          Transport Address                    Priority1 State
Gi0/2/0/0          IPv4      192.168.172.122            13        M,Q
                   IPv4      192.168.172.123            17        M
```

```
Gi0/2/0/1          IPv6     fe80::2b0:4aff:fe6b:f4fc  1          Q,GM
                   IPv6     fe80::2b0:4aff:fe6b:1234  18         Q
Gi0/3/0/0          Ethernet 00b0.4a6b.f4fc
```

The example indicates if the foreign-master is multicast and the clock that is being used as the grandmaster.

Example

The following example shows output for the location 0/2/CPU0, including the brief option:

```
Router# show ptp foreign-masters brief location 0/2/CPU0

M=Multicast,Q=Qualified,GM=Grandmaster

Interface          Transport Address                 Priority1 State
Gi0/2/0/0          IPv4     192.168.172.122          13        M,Q
                   IPv4     192.168.172.123          17        M
Gi0/2/0/1          IPv6     fe80::2b0:4aff:fe6b:f4fc  1         Q,GM
                   IPv6     fe80::2b0:4aff:fe6b:1234  18        Q
```

Example

The following example shows output for the interface GigabitEthernet0/2/0/0, without the brief option:

```
Router# show ptp foreign-masters brief interface GigabitEthernet0/2/0/0

Interface GigabitEthernet0/2/0/3 (PTP port number 27):

    IPv4, Address 172.108.11.25
       Configured priority: None
       Announce granted:   every 2 seconds,   600 seconds
       Sync granted:       16 per-second,     400 seconds
       Delay-Resp granted: 16 per-second,     600 seconds
       Qualified for 6 days, 2 hours, 11 minutes
       Clock ID: ACDE48FFFE234567
       Clock properties:
           Priority1: 1, Priority2: 83, Class: 6, Accuracy: 0x2B
           Offset scaled log variance: 0x27FF, Steps-removed: 5
           Domain: 0, Time Source: GPS, Timescale: PTP
           Frequency-traceable, Time-traceable
           Current UTC offset: 25 seconds
       Parent properties:
           Clock-ID: BADE48FFFE234367
           Port number: 3, Steps Removed: 2

    IPv4, Address 172.108.11.23, Multicast
       Configured priority: 27
       Announce granted: every 2 seconds,   600 seconds
       Qualified for 5 days, 4 hours, 27 minutes
       Clock ID: ACDE48FFFE234567
       Clock properties:
           Priority1: 7, Priority2: 83, Class: 6, Accuracy: 0x2B
           Offset scaled log variance: 0x27FF, Steps-removed: 5
           Domain: 0, Time Source: GPS, Timescale: PTP
           Frequency-traceable, Time-traceable
```

```
        Current UTC offset: 25 seconds
    Parent properties:
        Clock-ID: BADE48FFFE234367
        Port number: 5, Steps Removed: 1

    IPv4, Address 172.108.11.18, Multicast
        Configured priority: 11
        Not qualified
```

Example

The following example shows state information for the best foreign master in the network:

```
Router# show ptp foreign-masters best

    Used to set system frequency and time
    IPv4, Address 1.2.3.4
    Received on interface GigabitEthernet0/2/0/3 (port number 0x1007)
    Clock ID: ACDE48FFFE234567
    Best foreign-master for 5 days, 4 hours, 27 minutes
    Advertised for 5 days, 4 hours, 20 minutes
    Clock properties:
        Priority1: 7, Priority2: 83, Class: 6, Accuracy: 0x2B
        Offset scaled log variance: 0x27FF, Steps-removed: 5
        Domain: 0, Time Source: GPS, Timescale: PTP
        Frequency-traceable, Time-traceable
        Current UTC offset: 25 seconds
    Parent properties:
        Clock-ID: BADE48FFFE234367
        Port number: 0x0005
```

This example indicates the display when slaving is not supported on the active timing card:

```
Router # show ptp foreign-masters best
PTP slaving is not supported on the RSP.
```

show ptp interfaces

To display a summary of the Precision Time Protocol (PTP) port state for the specified interface, use the **show ptp interfaces** command in EXEC mode.

show ptp interfaces [**brief**] {*interface* | **all**}
show ptp interfaces summary location *node*

Syntax Description

interface	Specifies the interface. For more information, use the question mark (?) online help function.
all	Displays information for all interfaces.
brief	Displays a one-line summary of the functional state of the interface (or all interfaces).
location *node*	Displays information for the specified node

Command Default   None

Command Modes   EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The output displays Local Priority value only if the configured profile is G.8275.1 profile.

The following shows the output for a GigabitEthernet0/2/0/3 interface in master state:

```
Router# show ptp interfaces GigabitEthernet0/2/0/3

      GigabitEthernet0/2/0/3 is in MASTER state
       PTP port number: 1
       IPv4 transport: IPv4 address 1.2.3.4
       Linestate: Up
       Local Priority: 128
       Mechanism: Two-step delay-request-response
          Sync rate: every 2 seconds
          Announce rate: every 8 seconds, timeout 5
          Delay-Req rate: every 4 seconds
       CoS: 6, DSCP: 46
       Platform capabilities:
          Supported:     One-step, Ethernet
          Not-Supported: IPv6, Multicast, Slave
          Max-Sync-rate: 4 per second
       Master state only
       23 Unicast peers
```

Example

The following shows that the GigabitEthernet0/1/0/3 interface is in the uncalibrated state:

```
Router# show ptp interfaces GigabitEthernet0/1/0/3

     GigabitEthernet0/1/0/3 is in UNCALIBRATED state
       PTP port number: 4
       IPv4 transport: IPv4 address 5.4.3.2
       Linestate: Up
       Mechanism: Two-step delay-request-response, Slave-only
          Sync rate: 2 per second
          Announce rate: 2 per second, timeout 4
          Delay-Req interval: 4 per second
       CoS: 5, DSCP: 23
       Platform capabilities:
          Supported:     One-step, Ethernet, Multicast, Slave
          Not-Supported: IPv6
          Max-Sync-rate: 2 per second
       Master table:
       (K = Known, Q = Qualified, GM = Grandmaster)
          IPv4 address 5.4.3.3: priority 5, multicast, K,Q,GM
          IPv4 address 5.4.3.4: priority not set
          MAC-address 12ab.7431.327c: priority 3, K
       Slave state only
```

Example

The following shows output with the **brief** keyword specified:

```
Router# show ptp interfaces brief

Intf            Port       Port                  Line
Name            Number     State       Transport State     Mechanism
--------------------------------------------------------------------
Gi0/2/0/0       1          MASTER      IPv4      Up        2-step DRRM
Gi0/2/0/1       5          PASSIVE     Ethernet  Up        1-step DRRM
Gi0/2/0/2       23         MASTER      Ethernet  Up        2-step DRRM
Gi0/2/0/0       6          INIT        IPv4      Down      2-step DRRM
```

Example

The following shows summary output for the location 0/2/cpu0:

```
Router# show ptp interfaces summary location 0/2/cpu0

     ==================================
     Interface port states
     ==================================
      INIT                 11
      LISTENING            27
      PASSIVE              12
      PRE-MASTER            2
      MASTER               50
      UNCALIBRATED          0
```

```
SLAVE                   1
FAULTY                  0
--------------------------
Total                 103
```

show ptp local-clock

To display properties of the local Precision Time Protocol (PTP) clock, use the **show ptp local-clock** command in EXEC mode.

show ptp local-clock

Command Default	None

Command Modes	EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The following shows information about the local PTP clock:

```
Router# show ptp local-clock

    Sat Jul 28 14:15:54.357 UTC
    Clock ID: 2651fffec4496e
    Clock properties:
      Priority1: 128, Priority2: 128, Class: 248, Accuracy: 0xfe
      Offset scaled log variance: 0xffff
      Domain: 0, Time Source: Internal, Timescale: ARB
      No frequency or time traceability
      Current UTC offset: 34 seconds
```

show ptp packet-counters

To display counters for packets that are received and send by Precision Time Protocol (PTP), use the **show ptp packet-counters** command in EXEC mode.

show ptp packet-counters location *node*
show ptp packet-counters *interface* **detail**
show ptp packet-counters *interface* **master** {**ipv4** *ipv4-address* | **ethernet** *ethernet-address*}

Syntax Description

location *node*	Displays information for the specified node
interface	Specifies the interface.
detail	Displays detailed information.
master	Displays information about the PTP master.
ipv4-address	Specifies an IPv4 address.
ethernet-address	Specifies an Ethernet address.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

NA

Example

The following displays the packet counters for the GigabitEthernet0/2/0/1 interface:

```
Router# show ptp packet-counters GigabitEthernet0/2/0/1

        Packets                         Sent        Received        Dropped
        -------------------------------------------------------------
        Announce                          3              83             11
        Sync                              0              32              5
        Follow-Up                         0              31              0
        Delay-Req                        22               0              0
        Delay-Resp                        0              21              7
        Pdelay-Req                        0               7              0
        Pdelay-Resp                       0               0              0
        Pdelay-Resp-Follow-Up             0               0              0
        Signaling                         2               1              0
        Management                        0               0              0
```

```
      Other                            0               3              12
                                   -----           -----           -----
      TOTAL                           27             178              35
```

Example

The following displays the packet counters with other details for the GigabitEthernet0/2/0/1 interface:

```
Router# show ptp packet-counters GigabitEthernet0/2/0/1 details

      Packets                   Sent        Received         Dropped
      ------------------------------------------------------------------
      Announce                     3              83              11
      Sync                         0              32               5
      Follow-Up                    0              31               0
      Delay-Req                   22               0               0
      Delay-Resp                   0              21               7
      Pdelay-Req                   0               7               0
      Pdelay-Resp                  0               0               0
      Pdelay-Resp-Follow-Up        0               0               0
      Signaling                    2               1               0
      Management                   0               0               0
      Other                        0               3              12
                               -----           -----           -----
      TOTAL                       27             178              35

Master IPv4 5.4.3.4:
      Packets                   Sent        Received         Dropped
      ------------------------------------------------------------------
      Announce                     1              40               1
      Sync                         0              23               4
      Follow-Up                    0              14               0
      Delay-Req                   12               0               0
      Delay-Resp                   0              10               7
      Pdelay-Req                   0               7               0
      Pdelay-Resp                  0               0               0
      Pdelay-Resp-Follow-Up        0               0               0
      Signaling                    2               1               0
      Management                   0               0               0
      Other                        0               3              12
                               -----           -----           -----
      TOTAL                       15              98              24

Master Ethernet 12ab.7431.327c:
      Packets                   Sent        Received         Dropped
      ------------------------------------------------------------------
      Announce                     2              43              10
      Sync                         0               9               1
      Follow-Up                    0              17               0
      Delay-Req                   10               0               0
      Delay-Resp                   0              11               0
      Pdelay-Req                   0               0               0
      Pdelay-Resp                  0               0               0
      Pdelay-Resp-Follow-Up        0               0               0
      Signaling                    0               0               0
      Management                   0               0               0
      Other                        0               0               0
                               -----           -----           -----
      TOTAL                       12              80              11
```

Example

The following displays the packet counters for the master with IPv4 address 5.4.3.4 for the GigabitEthernet0/2/0/1 interface:

```
Router# show ptp packet-counters GigabitEthernet0/2/0/1 master ipv4 5.4.3.4

    Master IPv4 5.4.3.4:
    Packets                        Sent        Received       Dropped
    ----------------------------------------------------------------
    Announce                          1              40             1
    Sync                              0              23             4
    Follow-Up                         0              14             0
    Delay-Req                        12               0             0
    Delay-Resp                        0              10             7
    Pdelay-Req                        0               7             0
    Pdelay-Resp                       0               0             0
    Pdelay-Resp-Follow-Up             0               0             0
    Signaling                         2               1             0
    Management                        0               0             0
    Other                             0               3            12
                                  -----           -----         -----
    TOTAL                            15              98            24
```

Example

The following displays the packet counters for the location 0/2/cpu0 for the GigabitEthernet0/2/0/1 interface:

```
Router# show ptp packet-counters location 0/2/cpu0

    Packets                        Sent        Received       Dropped
    ----------------------------------------------------------------
    Announce                       1735             101            52
    Sync                           3753              32             5
    Follow-Up                      3751              32             7
    Delay-Req                         0            4073           108
    Delay-Resp                     4073               0             0
    Pdelay-Req                        0               7             0
    Pdelay-Resp                       0               0             0
    Pdelay-Resp-Follow-Up             0               0             0
    Signaling                        73              18             0
    Management                        0               0             0
    Other                             0               3           218
                                  -----           -----         -----
    TOTAL                         13385            4266           390

    Drop Reason                                Drop Count
    ----------------------------------------------------------
    Not ready for packets                          289
    Wrong domain number                             71
    Packet too short                                 1
    Local packet received, same port number          7
    Local packet received, higher port number       11
    Local packet received, lower port number        11
    No timestamp received with packet                0
    Zero timestamp received with packet              0
                                               -----
    TOTAL
```

show ptp unicast-peers

To display information on the peers to which Precision Time Protocol (PTP) is sending unicast messages, use the **show ptp unicast-peers** command in EXEC mode.

show ptp unicast-peers *interface*

Syntax Description

interface	Displays information for the specified interface.

Command Default   None

Command Modes   EXEC

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The following example shows PTP unicast peer information for the GigabitEthernet0/2/0/1 interface:

```
Router# show ptp unicast-peers GigabitEthernet0/2/0/1

Interface GigabitEthernet0/2/0/1:
    IPv4-address 1.2.3.4
      Announce granted:   every 2 seconds,  600 seconds
      Sync granted:       16 per second,    600 seconds
      Delay-Resp granted: 16 per second,    600 seconds
    IPv4-address 1.2.3.5
      Announce granted:   every 1 second,   400 seconds
    IPv4-address 1.2.3.6
      Delay-Resp granted: 16 per second,    600 seconds
```

Example

The following example shows PTP unicast peer information for all interfaces:

```
Router# show ptp unicast-peers

Interface GigabitEthernet0/2/0/1:
    IPv4-address 1.2.3.4
      Announce granted:   every 2 seconds,  600 seconds
      Sync granted:       16 per second,    600 seconds
      Delay-Resp granted: 16 per second,    600 seconds
```

```
        IPv4-address 1.2.3.5
          Announce granted:   every 1 second,    400 seconds
        IPv4-address 1.2.3.6
          Delay-Resp granted: 16 per second,     600 seconds

    Interface GigabitEthernet0/3/0/2:
        Mac-address 00b0.4a6b.f4fc
          Announce granted:   every 2 seconds,   600 seconds
          Sync granted:       16 per second,     600 seconds
          Delay-Resp granted: 16 per second,     600 seconds
        Mac-address 00b0.4a6b.f4fd
          Announce granted:   every 1 second,    400 seconds

    Interface GigabitEthernet0/3/0/3:
        No known peers
```

source IPv4 address

To specify the source IPv4 address to use when sending IPv4 packets, use the **source ipv4 address** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

source ipv4 address *address*

Syntax Description

address	Specifies an IPv4 address.

Command Default
None

Command Modes
Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines
The **source ipv4 address** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is also used in the interface PTP configuration mode to set the source IPv4 address for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example specifies the source IPv4 address 10.10.10.4 for PTP packets:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# source ipv4 address 10.10.10.4
```

The following example overrides the source IPv4 address in the profile and sets it to be 10.10.10.6 for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
ROuter(config-if-ptp)# source ipv4 address 10.10.10.6
```

source ipv6 address

To specify the source IPv6 address used to send IPv6 packets, use the **source ipv6 address** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

source ipv6 address *address*

Syntax Description	*address*	Specifies an IPv6 address.

Command Default   None

Command Modes   PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   The **source ipv4 address** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the source IPv4 address for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example specifies the source IPv6 address 10.10.10.6 for PTP packets:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# source ipv6 address 10.10.10.6
```

The following example overrides the source IPv4 address in the profile and sets it to be 10.10.10.8 for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
ROuter(config-if-ptp)# source ipv6 address 10.10.10.8
```

sync

To configure settings for PTP sync messages, use the **sync** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

sync { *frequency* | *duration* | *interval* | *timeout* }
no sync

Syntax Description

frequency *frequency*	Specifies multiple sync messages per second (2, 4, 8, 16, 32, 64, or 128). Frequency of 4 means that four messages are sent per second.
grant-duration *duration*	Specifies the announce grant duration (60-1000 seconds). If the port is in the slave state, this is the grant that is requested. If the port is in the master state, this is the maximum grant that is allowed.
interval*interval*	Specifies one or fewer sync messages per second (every 1, 2,4, 8, or 16 seconds). Interval of 2 means that a sync message is sent every two seconds.
timeout *timeout*	Specifies the time after which the sync message times out (100-10000 milliseconds).

Command Default

Defaults: grant-duration 600, interval 1, timeout 5000

Command Modes

PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **sync** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the sync value for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

The **grant-duration** and **timeout** keywords are used for the ITU-T Telecom Profile. A frequency value of 128 messages per second is valid for the ITU-T telecommunication Profile only.

Example

The following example sets the PTP sync timeout to 2000 milliseconds:

```
Router(config)# ptp
```

```
Router(config-ptp)# profile p1
Router(config-ptp-profile)# sync frequency 2000
```

The following example overrides the sync frequency value in the profile and sets it to be 1500 milliseconds for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# sync frequency 1500
```

time-of-day

To set the priority used by Precision Time Protocol (PTP) when selecting between PTP and other sources for time-of-day on the router (for example GPS), use the **time-of-day** command in PTP configuration mode. To remove, use the **no** form of this command.

time-of-day priority *number*
no time-of-day

Syntax Description	**priority** *number*	Specifies the time of day priority to rank a foreign PTP grand master against other time sources, such as GPS (1-255).

Command Default The default is priority 100.

Command Modes PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines NA

The following example sets the time of day priority to 200:

```
Router(config)# ptp
Router(config-ptp)# time-of-day priority 200
```

timescale

To set the time scale to use when advertising time for Precision Time Protocol (PTP), use the **timescale** command in PTP clock configuration mode. To remove, use the **no** form of this command.

timescale {**ARB** | **PTP**}
no timescale

Syntax Description		
	ARB	Specifies ARB (arbitrary) time.
	PTP	Specifies PTP time.

Command Default   The default value is derived from platform default PTP properties.

Command Modes   PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   Use this command to override the platform value, if needed.

Example

The following example sets the time scale to ARB:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# timescale ARB
```

time-source

To set the time source advertised in announcement messages by the local clock for Precision Time Protocol (PTP), use the **time-source** command in PTP clock configuration mode. To remove, use the **no** form of this command.

time-source *source*
no time-source

Syntax Description	*source*	Specifies the type of time source to advertise for the internal clock: GPS, NTP, PTP, atomic-clock, handset, internal oscillator, other, or terrestrial radio.

Command Default   The default is the value that is specified by the platform internal oscillator.

Command Modes   PTP clock configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   Use this command to override the platform value, if needed, using any of the time-source values specified in the IEEE 1588-2008 standard.

Example

The following example sets the time source to PTP:

```
Router(config)# ptp
Router(config-ptp)# clock
Router(config-ptp-clock)# time-source ptp
```

transport

To specify the PTP transport type, use the **transport** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

transport {**ethernet** | **ipv4**}
no transport

Syntax Description

ethernet	Specifies that Ethernet is used as the transport type on the interface.
ipv4	Specifies IPv4 is used as the transport type on the interface

Command Default

None

Command Modes

PTP profile configuration

Interface PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines

The **transport** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the transport type for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

Example

The following example sets the transport type to be Ethernet:s

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# transport ethernet
```

The following example overrides the transport type in the profile and sets it to be IPv4 for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# transport ipv4
```

uncalibrated-clock-class

To configure the clock-class that is advertised when PTP is in ACQUIRING state and the interface is connected to the Best Master is in Uncalibrated state, use the **uncalibrated-clock-class** command in the PTP configuration mode. To remove, use the **no** form of this command.

uncalibrated-clock-class *class*

Syntax Description	*class* Indicates the advertised clock-class when PTP is in ACQUIRING state. The range is 0–255.

Command Default   The default clock class can be obtained from the platform properties.

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   This command is used to override the platform value, if needed.

Example

The following example configures the clock class to 255:

```
Router(config)# ptp
Router(config-ptp)# uncalibrated-clock-class 255
```

unicast-grant invalid-request

To specify whether unicast grant requests with unacceptable parameters are denied or granted with reduced parameters, use the **unicast-grant invalid-request** command in PTP profile configuration or interface PTP configuration mode. To remove, use the **no** form of this command.

unicast-grant invalid-request { **deny** | **reduce** }
no unicast-grant invalid-request

Syntax Description		
	deny	Indicates that unicast grant requests with unacceptable parameters are denied.
		For example, assume that a request for a grant is received with a packet interval of 1 per second and duration of 600 seconds, and that the maximum packet interval is 2 per second and duration is 500 seconds. If **deny** is configured, the grant will be denied.
	reduce	Indicates that unicast grant requests with unacceptable parameters are granted with reduced parameters.
		For example, assume that a request for a grant is received with a packet interval of 1 per second and duration of 600 seconds. The maximum packet interval is 2 per second and duration is 500 seconds. If **reduce** is configured, a grant with packet interval of 2-per-second and duration of 500 seconds will be granted.

Command Default The default is **reduce**.

Command Modes PTP profile configuration

Interface PTP configuration

Command History	Release	Modification
	Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
	Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines The **unicast-grant invalid-request** command is used configure the global PTP configuration profile which is then associated with many interfaces. Similarly, it is used in the interface PTP configuration mode to set the unicast-grant invalid-request value for a specific interface. Any values set in the interface PTP configuration mode override the settings in the PTP configuration profile associated with the interface.

v

The following example determines that unicast grant requests with unacceptable parameters are granted with reduced parameters:

```
Router(config)# ptp
Router(config-ptp)# profile p1
Router(config-ptp-profile)# unicast-grant invalid-request reduce
```

The following example overrides the unicast grant value in the profile and sets it to be deny for the interface:

```
Router(config)# interface TenGigE 0/0/0/10
Router(config-if) ptp
Router(config-if-ptp)# profile p1
Router(config-if-ptp)# unicast-grant invalid-request deny
```

utc-offset

To configure UTC offset information, use the **utc-offset** command in PTP configuration mode. To remove, use the **no** form of this command.

utc-offset *number*
no utc-offset

Syntax Description		
utc-offset *number*	Specifies the date to apply the UTC offset, in ISO 8601 format (YYYY-MM-DD) format.	
baseline	Specifies the configuration of baseline UTC offset.	
leap-second-file	Specifies the configuration of a file containing leap-second information to poll.	

Command Default   The default is priority 100.

Command Modes   PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines   NA

Example

The following example sets UTC offset information:

```
Router(config)# ptp
Router(config-ptp)# utc-offset
Router(config-ptp)#baseline
Router(config-ptp)#leap-second-file
```

virtual-port

To configure a virtual port using Precision Time Protocol (PTP), use the **virtual-port** command in PTP configuration mode or interface PTP configuration mode. To remove, use the **no** form of this command.

virtual-port { *clock accuracy* | *clock class* | *offset log scaled variance* | *priority1* | *priority2* }
no virtual-port

Syntax Description	**clock accuracy** *clock accuracy*	Specifies the clock-accuracy value to use for the peer clock.
	clock class *clock class*	Specifies the clock class mapping for use.
	offset log scaled variance *offset log scaled variance*	Specifies the Offset Scaled Log Variance (OSLV) value to use for the peer clock.
	priority 1 *timeout*	Specifies the priority1 value to use for the peer clock.
	priority 2	Specifies the priority2 value to use for the peer clock.

Command Default None

Command Modes PTP configuration

Command History

Release	Modification
Release 6.3.2	This command was introduced on the Cisco NCS 540 Series Routers.
Release 6.6.25	This command was introduced on the Cisco NCS 560 Series Routers.

Usage Guidelines Precision Time Protocol (PTP) profile is a configuration template that is applied to multiple interfaces. From PTP profile configuration mode, the following PTP profile configuration commands are available:

Example

The following example shows how to configure the profile tp128:

```
Router(config)# ptp
Router(config-ptp)# virtual-port
Router(config-ptp)#clock accuracy
Router(config-ptp)#clock class
Router(config-ptp)#offset log scaled variance
Router(config-ptp)#priority1
Router(config-ptp)#priority2
```

virtual-port