ipinfusion™

OcNOS®

Open Compute Network Operating System for Service Providers

Timing and Synchronization

Version 6.6.1

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PREFACE

About this Guide

This guide describes how to configure Timing and Synchronization in OcNOS.

Audience

This guide is intended for network administrators and other engineering professionals who configure OcNOS.

Conventions

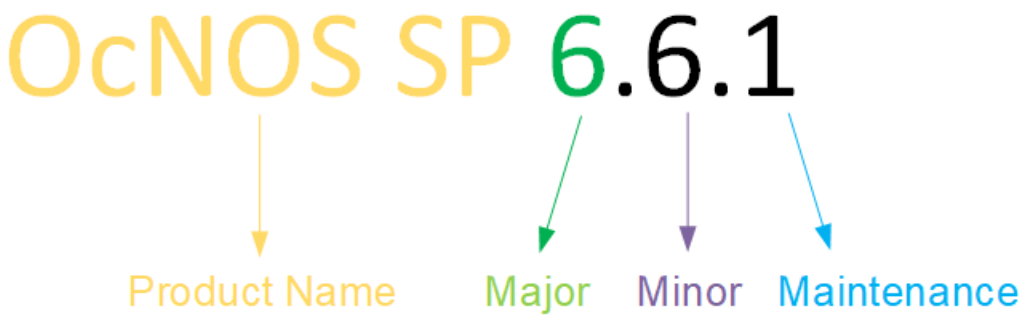
The Table 1 table shows the conventions used in this guide.

Table 1. Conventions

Convention	Description
Italics	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
`monospaced type`	Code elements such as commands, parameters, files, and directories

IP Infusion Product Release Version

Each integer in release numbers indicates Major, Minor, and Maintenance release versions. Build numbers that follow the release numbers are for internal tracking and verification of the software build process and are visible to customers as part of the software version number.



Product Name: IP Infusion Product Family

Major Version: New customer-facing functionality that represents a significant change to the code base; including a significant marketing change or direction in the product.

Minor Version: Enhancements or extensions to existing features, changes to address external needs, or internal improvements to satisfy new sales regions or marketing initiatives.

Maintenance Version: A collection of product bugs or issues usually scheduled every 30 or 60 days, based on the number of issues.

Related Documentation

For information about installing OcNOS, see the *Installation Guide* for your platform.

Feature Availability

Each OcNOS SKU contains a set of supported features. For a list of available features based on the SKU that you purchased, refer to the *Feature Matrix* .

Migration Guide

Check the *Migration Guide* for necessary configuration changes before migrating from one version of OcNOS to another.

IP Maestro Support

Monitor devices running OcNOS Release 6.3.4-70 and above using IP Maestro software.

Technical Support

IP Infusion maintains an online technical support site that provides a variety of technical support programs for licensed OcNOS customers at the Technical Assistance Center.

Customers and partners enjoy full access to the support website. The site allows customers and partners to open technical support calls, update open calls with new information, and review the status of open or closed calls. The password-protected site includes technical documentation, Release Notes, and descriptions of service offerings.

Technical Sales

Contact the IP Infusion sales representative for more information about the OcNOS solution.

Technical Documentation

For core commands and configuration procedures, visit: Product Documentation.

For training videos, visit: OcNOS Free Training Videos.

For a list of supported platforms and SKUs of OcNOS features, refer to the OcNOS Feature Matrix.

Documentation Disclaimer

The global documentation site is evolving to provide an enhanced website user experience for select topics included in this release. Some guides are now available outside the existing documentation library and can be accessed directly from custom documentation landing pages. These guides offer robust in-built search functionality.

For the latest documentation, visit the product-specific documentation landing page and select the relevant guide.

Comments

If you have comments, or need to report a problem with the content, contact techpubs@ipinfusion.com.

Command Line Interface

This chapter introduces the OcNOS Command Line Interface (CLI) and how to use its features.

Overview

You use the CLI to configure, monitor, and maintain OcNOS devices. The CLI is text-based and each command is usually associated with a specific task.

You can give the commands described in this manual locally from the console of a device running OcNOS or remotely from a terminal emulator such as putty or xterm. You can also use the commands in scripts to automate configuration tasks.

Chapter Organization

The chapters in command references are organized as described in Command Description Format (page 26).

The chapters in configuration guides are organized into these major sections:

- An overview that explains a configuration in words
- Topology with a diagram that shows the devices and connections used in the configuration
- Configuration steps in a table for each device where the left-hand side shows the commands you enter and the right-hand side explains the actions that the commands perform
- Validation which shows commands and their output that verify the configuration

Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

```
show ?
  application-priority            Application Priority
  arp                             Internet Protocol (IP)
  bfd                             Bidirectional Forwarding Detection (BFD)
  bgp                             Border Gateway Protocol (BGP)
  bi-lsp                          Bi-directional lsp status and configuration
  bridge                          Bridge group commands
  ce-vlan                         COS Preservation for Customer Edge VLAN
  class-map                       Class map entry
  cli                             Show CLI tree of current mode
  clns                            Connectionless-Mode Network Service (CLNS)
  control-adjacency               Control Adjacency status and configuration
  control-channel                 Control Channel status and configuration
  cspf                            CSPF Information
  customer                        Display Customer spanning-tree
  cvlan                           Display CVLAN information
  debugging                       Debugging functions
  etherchannel                    LACP etherchannel
```



```
  ethernet                        Layer-2
...
```

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```
> show de?
debugging  Debugging functions
```

If you type the ? in the middle of a keyword, but the incomplete keyword matches several other keywords, OcNOS displays help for all matching keywords.

```
> show i? (CLI does not display the question mark).
interface  Interface status and configuration
ip         IP information
isis       ISIS information
```

Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type **sh**:

```
> sh
```

Press the tab key. The CLI displays:

```
> show
```

If the spelling of a command or parameter is ambiguous, the CLI displays the choices that match the abbreviation. Type **show i** and press the tab key. The CLI displays:

```
> show i
  interface  ip         ipv6       isis
> show i
```

The CLI displays the **interface** and **ip** keywords. Type **n** to select **interface** and press the tab key. The CLI displays:

```
> show in
> show interface
```

Type ? and the CLI displays the list of parameters for the **show interface** command.

```
> show interface
  IFNAME  Interface name
  |       Output modifiers
  >       Output redirection
  <cr>
```

The CLI displays the only parameter associated with this command, the **IFNAME** parameter.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example:

```
> sh int xe0
```

is an abbreviation for:

```
> show interface xe0
```


Command Line Errors

Any unknown spelling causes the CLI to display the error **`Unrecognized command`** in response to the ?. The CLI displays the command again as last entered.

```
> show dd?
% Unrecognized command
> show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
(config)#router ospf here
                        ^
% Invalid input detected at '^' marker.
```

where the ^ points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap mid-parameter or mid-keyword, as shown below. This does *not* cause an error and the command performs as expected:

```
area 10.10.0.18 virtual-link 10.10.0.19 authentication-key 57393
```

Command Negation

Many commands have a **`no`** form that resets a feature to its default value or disables the feature. For example:

- The **`ip address`** command assigns an IPv4 address to an interface
- The **`no ip address`** command removes an IPv4 address from an interface

Syntax Conventions

Table 2 describes the conventions used to represent command syntax in this reference.

Table 2. Syntax conventions

Convention	Description	Example
`monospaced font`	Command strings entered on a command line	**`show ip ospf`**
`lowercase`	Keywords that you enter exactly as shown in the command syntax.	`show ip ospf`
`UPPERCASE`	See Variable Placeholders (page 25)	`IFNAME`
`()`	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>)`
`()`	Optional parameters, from which you select one or none. Vertical bars delimit the	`(A.B.C.D|<0-4294967295>|)`

Table 2. Syntax conventions (continued)

Convention	Description	Example
	selections. Do not enter the parentheses or vertical bars as part of the command.	
`()`	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	`(IFNAME|)`
`{}`	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	`{intra-area <1-255>|inter-area <1-255>|external <1-255>}`
`[]`	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command.	`[<1-65535>|AA:NN|internet|local-AS|no-advertise|no-export]`
`?`	Nonrepeatable parameter. The parameter that follows a question mark can only appear once in a command string. Do not enter the question mark as part of the command.	`?route-map WORD`
`.`	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	`set as-path prepend .<1-65535>`

Variable Placeholders

Table 3 shows the tokens used in command syntax use to represent variables for which you supply a value.

Table 3. Variable placeholders

Token	Description
`WORD`	A contiguous text string (excluding spaces)
`LINE`	A text string, including spaces; no other parameters can follow this parameter
`IFNAME`	Interface name whose format varies depending on the platform; examples are: **`eth0`**, **`Ethernet0`**, **`ethernet0`**, **`xe0`**
`A.B.C.D`	IPv4 address
`A.B.C.D/M`	IPv4 address and mask/prefix
`X:X::X:X`	IPv6 address
`X:X::X:X/M`	IPv6 address and mask/prefix
`HH:MM:SS`	Time format
`AA:NN`	BGP community value

Table 3. Variable placeholders (continued)

Token	Description
`XX:XX:XX:XX:XX:XX`	MAC address

`<1-5>`
`<1-65535>`
`<0-2147483647>`
`<0-4294967295>`
	Numeric range

Command Description Format

The Table 4 table explains the sections used to describe each command in this reference.

Table 4. Command descriptions

Section	Description
Command Name	The name of the command, followed by what the command does and when should it be used
Command Syntax	The syntax of the command
Parameters	Parameters and options for the command
Default	The state before the command is executed
Command Mode	The mode in which the command runs; see Command Modes (page 29)
Applicability	The command introduced in a specific release version and modified or updated in subsequent versions.
Example	An example of the command being executed

Keyboard Operations

The Table 5 table lists the operations you can perform from the keyboard.

Table 5. Keyboard operations

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl-f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line

Table 5. Keyboard operations (continued)

Key combination	Operation
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplays the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

Show Command Modifiers

You can use two tokens to modify the output of a **`show`** command. Enter a question mark to display these tokens:

```
# show users ?
  | Output modifiers
  > Output redirection
```

You can type the | (vertical bar character) to use output modifiers. For example:

```
> show rsvp | ?
  begin     Begin with the line that matches
  exclude   Exclude lines that match
  include   Include lines that match
  last      Last few lines
  redirect  Redirect output
```

Begin Modifier

The **`begin`** modifier displays the output beginning with the first line that contains the input string (everything typed after the **`begin`** keyword). For example:

```
# show running-config | begin xe1
...skipping
interface xe1
ipv6 address fe80::204:75ff:fee6:5393/64
!
interface xe2
ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
login
!
end
```

You can specify a regular expression after the **`begin`** keyword, This example begins the output at a line with either “xe2” or “xe4”:

```
# show running-config | begin xe[2-4]

...skipping
interface xe2
 shutdown
!
interface xe4
 shutdown
!
interface svlan0.1
 no shutdown
!
route-map myroute permit 2
!
route-map mymap1 permit 10
!
route-map rmap1 permit 2
!
line con 0
 login
line vty 0 4
 login
!
end
```

Include Modifier

The **include** modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
# show interface xe1 | include input
    input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the **include** keyword. This examples includes all lines with “input” or “output”:

```
#show interface xe0 | include (in|out)put
    input packets 597058, bytes 338081476, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    output packets 613147, bytes 126055987, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

Exclude Modifier

The **exclude** modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
# show interface xe1 | exclude input
Interface xe1
  Scope: both
  Hardware is Ethernet, address is 0004.75e6.5393
  index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Administrative Group(s): None
  DSTE Bandwidth Constraint Mode is MAM
  inet6 fe80::204:75ff:fee6:5393/64
    output packets 4438, bytes 394940, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    collisions 0
```

You can specify a regular expression after the **exclude** keyword. This example excludes lines with “output” or “input”:

```
show interface xe0 | exclude (in|out)put
Interface xe0
  Scope: both
  Hardware is Ethernet  Current HW addr: 001b.2139.6c4a
  Physical:001b.2139.6c4a  Logical:(not set)
  index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
  <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Bandwidth 100m
  DHCP client is disabled.
  inet 10.1.2.173/24 broadcast 10.1.2.255
  VRRP Master of :  VRRP is not configured on this interface.
  inet6 fe80::21b:21ff:fe39:6c4a/64
    collisions 0
```

Redirect Modifier

The **`redirect`** modifier writes the output into a file. The output is not displayed.

```
# show cli history | redirect /var/frame.txt
```

The output redirection token (>) does the same thing:

```
# show cli history >/var/frame.txt
```

Last Modifier

The **`last`** modifier displays the output of last few number of lines (As per the user input). The last number ranges from 1 to 9999.

For example:

```
#show running-config | last 10
```

String Parameters

The restrictions in Table 6 apply for all string parameters used in OcNOS commands, unless some other restrictions are noted for a particular command.

Table 6. String parameter restrictions

Restriction	Description
Input length	1965 characters or less
Restricted special characters	“?”, “,”, “>”, “|”, and “=” The “|” character is allowed only for the **`description`** command in interface mode.

Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. The table below lists the command modes common to all protocols.

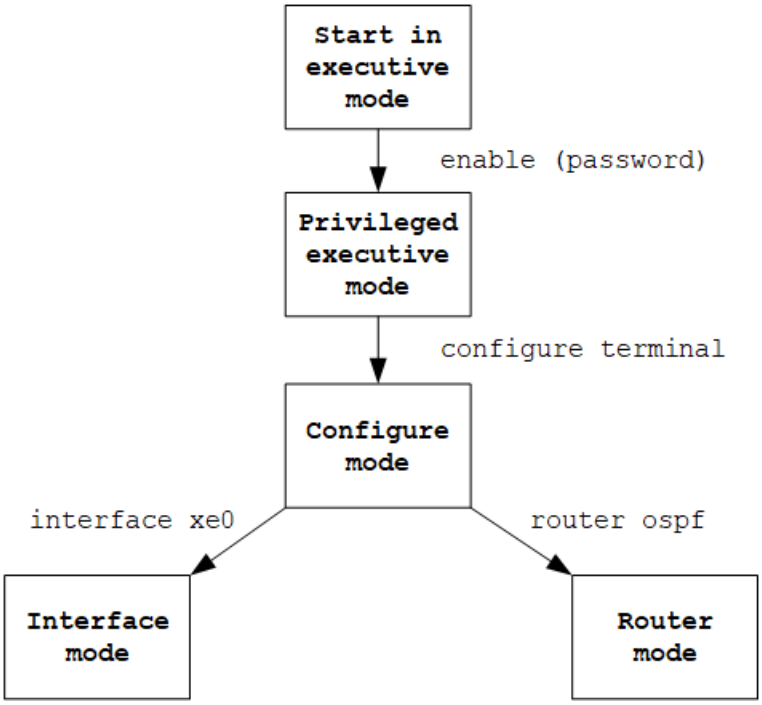
Table 7. Common Command Modes

Name	Description
`Execution mode`	Also called *view* mode, this is the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as show, exit, quit, help, and enable.
Privileged execution mode	Also called *enable* mode, in this mode you can run additional basic commands such as debug, write, and show.
Configure mode	Also called *configure terminal* mode, in this mode you can run configuration commands and go into other modes such as interface, router, route map, key chain, and address family. Configure mode is single user. Only one user at a time can be in configure mode.
Interface mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in router mode.
Router mode	This mode is used to configure router-specific settings for a protocol such as BGP or OSPF.

Command Mode Tree

The diagram below shows the common command mode hierarchy.

Figure 1. Common command modes



To change modes:

1. Enter privileged executive mode by entering **`enable`** in Executive mode.
2. Enter configure mode by entering **`configure terminal`** in Privileged Executive mode.

The example below shows moving from executive mode to privileged executive mode to configure mode and finally to router mode:

```
> enable mypassword
# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
(config)# router ospf
(config-router)#
```

Note: Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

Transaction-based Command-line Interface

The OcNOS command line interface is transaction based:

- Any changes done in configure mode are stored in a separate *candidate* configuration that you can view with the `show transaction current` command.
- When a configuration is complete, apply the candidate configuration to the running configuration with the command.

- If a `commit` fails, no configuration is applied as the entire transaction is considered failed. You can continue to change the candidate configuration and then retry the `commit`.
- Discard the candidate configuration with the `abort transaction` command.
- Check the last aborted transaction with the `show transaction last-aborted` command.
- Multiple configurations cannot be removed with a single . You must remove each configuration followed by a `commit`.

Note: All commands MUST be executed only in the default CML shell (**`cmlsh`**). If you log in as root and start **`imish`**, then the system configurations will go out of sync. The **`imish`** shell is not supported and should not be started manually.

PRECISION TIME PROTOCOL CONFIGURATION

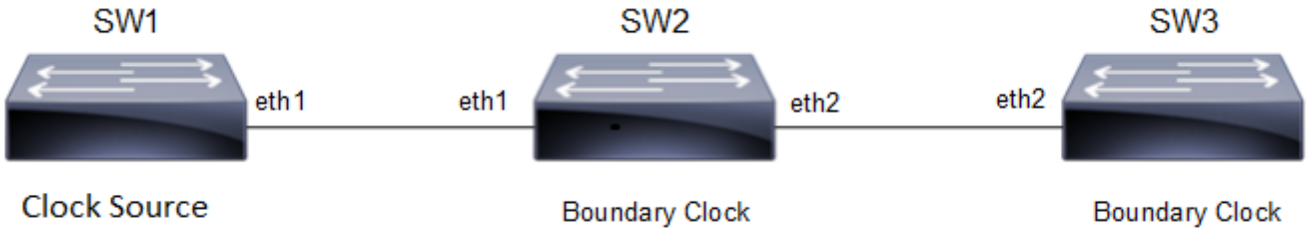
Boundary Clock Configuration

This chapter shows how to configure a boundary clock over Ethernet, IPv4, and IPv6. You configure a boundary clock with more than one port.

Note: We can enable PTP on physical interfaces which can be L2, L3 or member port of the **LAG**[1].

Topology

Figure 2. Configuration Topology



In this example, SW2 and SW3 are running PTP acting as boundary clock.

Boundary Clock Configuration

This section shows how to set up a boundary clock.

SW2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with

[1]Link Aggregation Group

	priority 2.
(config-if-synce)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#exit	Exit Port Configure mode
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#network-interface xe2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface xe1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW3 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 4	Configure the interface as an input source with priority 4.

(config-if-synce)#exit	Exit Port Configure mode
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#network-interface xe2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-clk-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface xe1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW2

1. Verify the default data set on SW2.

```
#show ptp clock 0 dataset
Default Dataset:
Two Step Flag               : No
  Clock Identity              : B8:6A:97:FF:FE:F5:F4:C4
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 24
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535
```

2. Verify the port state on SW2.

```
#show ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : B8:6A:97:FF:FE:F5:F4:C4:00:01
  Log Min Delay Req Interval  : -4
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -4
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe1
  Vlan Configured             :
  Description                 :

  Foreign Master #0
  L2 Address                  : e8:c5:7a:79:57:1d
```

```
  Grandmaster clockIdentity   : E8:C5:7A:FF:FE:2E:4B:1C
  Port ID                     : E8:C5:7A:FF:FE:2E:4B:1C:00:01
  clockClass                  : 135
  Clock accuracy              : 254
  Offset scaled log variance  : 65535
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 0
  PDV Scaled Allan Variance   : 10

  Received Packets            : 7530
  Discarded Packets           : 4
  Transmitted Packets         : 3018

  Peer #0
  L2 Address                  : e8:c5:7a:79:57:1d
  Clock Identity              : e8:c5:7a:ff:fe:2e:4b:1c
  Received Announce           : 1021
  Received Sync               : 2042
  Received Delay Response     : 2041
  Transmitted Delay Request   : 2041

Port 2:
  Port State                  : Master
  Port Identity               : B8:6A:97:FF:FE:F5:F4:C4:00:02
  Log Min Delay Req Interval  : -4
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -4
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe2
  Vlan Configured             :
  Description                 :

  Received Packets            : 0
  Discarded Packets           : 0
  Transmitted Packets         : 113
```

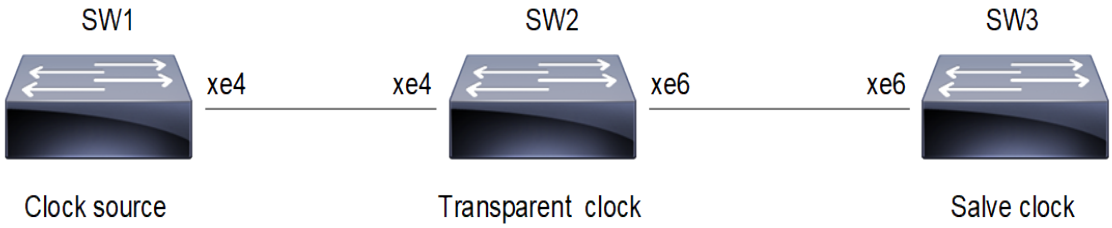
Note: Use `show ptp stats` to collect the PTP statistics and use `clear ptp stats` to clear the same.

PTP G.8265.1 Profile Configuration

This chapter shows how to configure a PTP G.8265.1 profile over IPv4. G.8265.1 profile only supports Ordinary Clock-type (a clock with only one PTP port).

Topology

Figure 3. Configuration Topology



In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM, SW2 as a Transparent clock and SW3 as a slave clock.

PTP G.8265.1 Profile Configuration

This section shows how to set up G.8265.1 profile.

SW2 (Transparent clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#vlan database	Create Vlan database
(config-vlan)#vlan 10 bridge 1	Configure Vlan 10 associated with bridge1
(config-vlan)#exit	Exit Interface mode
(config)#ptp clock 0 profile e2e-transparent	Configure Switch as Transparent clock
(config)#interface xe4	Configure interface xe4
(config-if)#switchport	Configure xe4 as Layer 2 port
(config-if)#bridge-group 1	Configure xe4 in bridge group 1
(config-if)#switchport mode trunk	Configure mode trunk
(config-if)#switchport trunk allowed vlan add 10	Add vlan 10 to the interface xe4
(conig-if)#exit	Exit Interface mode
(config)#interface xe6	Configure interface xe6
(config-if)#switchport	Configure xe6 as Layer 2 port

(config-if)#bridge-group 1	Configure xe6 in bridge group 1
(config-if)#switchport mode trunk	Configure mode trunk
(config-if)#switchport trunk allowed vlan add 10	Add vlan 10 to the interface xe4
(conig-if)#exit	Exit Interface mode

SW3 (Slave clock)

(config)#synce-interface ptp	Configure synce interface ptp
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#mode synchronous	Configure synchronous mode.
(config-synce-if)#wait-to-restore 0	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Interface configure mode
(config)#interface xe6	Configure interface xe6
(config-if)#ip address 192.168.5.103/24	Configure Ipv4 address of interface
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8265.1	Enables G8265.1 for PTP time/phase telecom profile
(config-ptp-clk)#slave-only	Configure the device as a Slave clock
(config-clk-clk)#clock-port 1	Configure ptp clock-port 1
(config-clk-port)#transport ipv4	Configure transport as ipv4
(config-clk-port)#network-interface xe6	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.5.102	Configure the master ipv4 address
(config-clk-port)#exit	Exit ptp clock port mode

SW1 (T-GM)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1

(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#mode synchronous	Configure synchronous mode.
(config-synce-if)#wait-to-restore 0	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode
(config)#interface xe4	Configure interface xe4
(config-if)#ip address 192.168.5.102/24	Configure ipv4 address of xe4
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8265.1	Enables G8265.1 for PTP time/phase telecom profile
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp clock-port 2
(config-ptp-clk)#transport ipv4	Configure transport as ipv4
(config-clk-port)#master-only	Configure the port as an master-only port
(config-clk-port)#network-interface xe4	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp clock-port 1
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW1

Verify the port state on SW1.

```
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:16:07
  Servo APTS Mode             : GPS
  Frequency Correction        : 231.812 ppb
  Phase Correction            : -155999960695.000 nsec
  Offset From Master          : 0.000 nsec
  Mean Path Delay             : 0 nsec
  APTS GPS to PTP Offset      : 0 nsec
  Sync Packet Rate            : 0
  Delay Packet Rate           : 0
```

SW3

Verify the ptp servo on SW3.

#sh ptp servo

```
#show ptp servo
PTP servo status for clock 0
```

```
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:16:39
  Servo APTS Mode             : PTP
  Frequency Correction        : -217.791 ppb
  Phase Correction            : 48.000 nsec
  Offset From Master          : 77.000 nsec
  Mean Path Delay             : 246 nsec
  APTS GPS to PTP Offset      : 0 nsec
  Sync Packet Rate            : 32
  Delay Packet Rate           : 32
```

Verify the port status on SW3.

```
#show ptp port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:5C:A0:6C:00:01
  Peer Mean Path Delay        : 0
  Log Announce Interval       : 1
  Log Min Delay Req Interval  : -5
  Log Sync Interval           : -5
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe6
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.5.102
  Grandmaster clockIdentity   : E8:C5:7A:FF:FE:69:4D:E6
  Port ID                     : E8:C5:7A:FF:FE:69:4D:E6:00:01
  clockClass                  : 84
  Clock accuracy              : 33
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 1
  PDV Scaled Allan Variance   : 21

  Received Packets            : 255700
  Discarded Packets           : 122
  Transmitted Packets         : 126785

  Drop Counters
  Pkt rcvd on bad port state  : 122

  Peer #0
  IPv4 Address                : 192.168.5.102
  Clock Identity              : e8:c5:7a:ff:fe:69:4d:e6
  Received Announce           : 1983
  Received Sync               : 61345
  Received Delay Response     : 61223
  Received Signalling         : 81
  Transmitted Delay Request   : 61223
  Transmitted Signalling      : 28
```



```
Master #0                   : 192.168.5.102
```

Note: Note: Use show ptp stats to collect the PTP statistics and use clear ptp stats to clear the same.

PTP G.8275.1 Profile Configuration

This chapter shows how to configure a PTP G.8275.1 profile over Ethernet, IPv4, and IPv6. You configure T-GM and boundary clock with more than one port.

Note: Enable G.8275.1 profile only on L3 interfaces and sub interfaces. When **LAG**[1] is available configure the PTP on a LAG interface. However, in certain cases, L2-LAG-member interface is supported. For example, MLAG use cases.

Topology

Figure 4. Configuration Topology

In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM and SW2, SW3 acting as boundary clock.

PTP G.8275.1 Profile Configuration

This section shows how to set up G.8275.1 profile.

SW2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1

[1]Link Aggregation Group

(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with priority 2.
(config-if-synce)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-if-synce)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#exit	Exit Port Configure mode
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW3 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1

(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 4	Configure the interface as an input source with priority 4.
(config-if-synce)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-if-synce)#exit	Exit Port Configure mode
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 1	Configure the number of PTP ports on the instance
(config-clk-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW1 (T-GM)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#mode synchronous	Configure synchronous mode.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode
(config)#interface eth1	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#exit	Exit Port Configure mode

(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#master-only	Configure the port as an master-only port
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW2

Verify the default data set on SW2.

```
#show ptp clock 0 dataset
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:23:6E:1C
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 24
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535
```

Verify the port state on SW2.

```
#show ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:23:6E:1C:00:01
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : -4
  Log Sync Interval           : -4
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth1
  Vlan Configured             :
  Description                 :
  Configured delay asymmetry  : 0 nsec
```

```
  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  L2 Address                  : a0:00:00:00:00:01
  Grandmaster clockIdentity   : 00:00:00:00:00:00:00:01
  Port ID                     : 00:00:00:00:00:00:00:01:00:01
  clockClass                  : 6
  Clock accuracy              : 33
  Offset scaled log variance  : 65535
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 0
  PDV Scaled Allan Variance   : 5

  Received Packets            : 46955
  Discarded Packets           : 4
  Transmitted Packets         : 19485

  Drop Counters
  Pkt rcvd on bad port state  : 4

  Peer #0
  L2 Address                  : a0:00:00:00:00:01
  Clock Identity              : 00:00:00:00:00:00:00:01
  Received Announce           : 9392
  Received Sync               : 18784
  Received Delay Response     : 18781
  Transmitted Delay Request   : 18781

Port 2:
  Port State                  : Master
  Port Identity               : E8:C5:7A:FF:FE:23:6E:1C:00:02
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : -4
  Log Sync Interval           : -4
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth2
  Vlan Configured             :
  Description                 :
  Configured delay asymmetry  : 0 nsec

  Received Packets            : 18783
  Discarded Packets           : 0
  Transmitted Packets         : 47655

  Peer #0
  L2 Address                  : d0:00:00:00:00:01
  Clock Identity              : 00:00:00:00:00:00:00:02
  Received Delay Request      : 18786
  Transmitted Announce        : 9626
  Transmitted Sync            : 19251
  Transmitted Delay Response  : 18786
```

Verify the ptp servo on SW2.

```
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Phase Correction
  Servo State                 : Normal Loop
```

```
Servo State Duration        : 00:20:46
Servo APTS Mode             : N/A
Frequency Correction        : 0.000 ppb
Phase Correction            : -3537.000 nsec
Offset From Master          : -479.000 nsec
Mean Path Delay             : 3536 nsec
APTS GPS to PTP Offset      : 0 nsec
Sync Packet Rate            : 16
Delay Packet Rate           : 16
```

Note: Use `show ptp clock 0 stats` to collect the PTP statistics and use `clear ptp clock 0 stats` to clear the same.

PTP G.8275.2 Profile Configuration

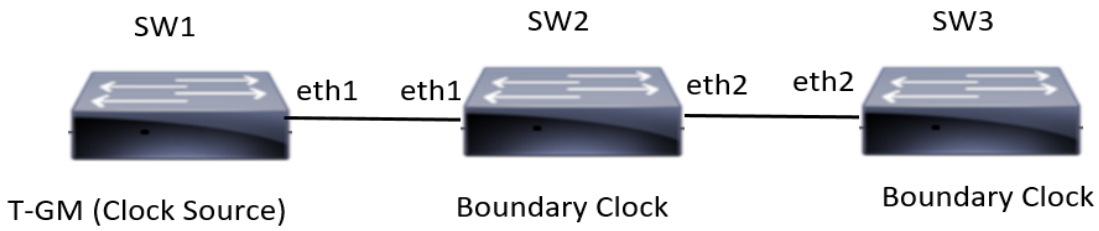
This chapter shows how to configure a PTP G.8275.2 profile over IPv4 and IPv6. You configure T-GM and boundary clock with more than one port.

Notes:

- Enable G.8275.2 profile on L3 interfaces, sub interfaces and the **LAG**[1] interface when LAG is available.
- SyncE is optional for G.8275.2 profile.

Partial Timing Support (PTS) Topology

Figure 5. Configuration Topology



In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM and SW2, SW3 acting as boundary clock.

PTS G.8275.2 Profile Configuration

This section shows how to set up a G.8275.2 Profile.

SW2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth1	Configure interface eth1
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-synce-if)#exit	Exit synce Configure mode.
(config)#interface eth2	Configure interface eth2

[1]Link Aggregation Group

(config-if)#ip address 192.168.5.100/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.4.100	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW3 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth1	Configure interface eth1
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-synce-if)#exit	Exit synce Configure mode.
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 192.168.5.100/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.4.100	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4

(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW1 (T-GM)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 192.168.4.100/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Configure the port as an master-only port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master-only	Configure the port as an master-only port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW2

1. Verify the default data set on SW2.

```
#show ptp 0 clock dataset default
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:02:A0:3C
```

```
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 44
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535
```

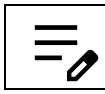
2. Verify the port state on SW2.

```
#show ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:02:A0:3C:00:01
  Log Min Delay Req Interval  : -6
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -6
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth1
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.4.100
  Grandmaster clockIdentity   : 00:00:00:00:00:00:00:01
  Port ID                     : 00:00:00:00:00:00:00:01:00:01
  clockClass                  : 6
  Clock accuracy              : 33
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 0
  PDV Scaled Allan Variance   : 5

  Received Packets            : 109666
  Discarded Packets           : 0
  Transmitted Packets         : 51821

  Peer #0
  IPv4 Address                : 192.168.4.100
  Clock Identity              : 00:00:00:00:00:00:00:01
  Received Announce           : 6435
  Received Sync               : 51415
  Received Delay Response     : 51825
  Received Signalling         : 18
  Transmitted Delay Request   : 51825
  Transmitted Signalling      : 38

  Master #0                   : 192.168.4.100

Port 2:
```

```
  Port State                  : Master
  Port Identity               : E8:C5:7A:FF:FE:02:A0:3C:00:02
  Log Min Delay Req Interval  : -6
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -6
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth2
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300

  Received Packets            : 51476
  Discarded Packets           : 0
  Transmitted Packets         : 109804

  Peer #0
  IPv4 Address                : 192.168.5.101
  Clock Identity              : 00:00:00:00:00:00:00:02
  Received Delay Request      : 51485
  Received Signalling         : 18
  Transmitted Announce        : 6436
  Transmitted Sync            : 51902
  Transmitted Delay Response  : 51485
  Transmitted Signalling      : 18

  Slave #0
  IPv4 Address                : 192.168.5.101
  Clock Identity              : 00:00:00:00:00:00:00:02
  Delay Mechanism             : End to end
  log Announce Interval       : -3
  log Sync Interval           : -6
  Log Delay Req Interval      : -6
```

3. Verify the ptp servo on SW2.

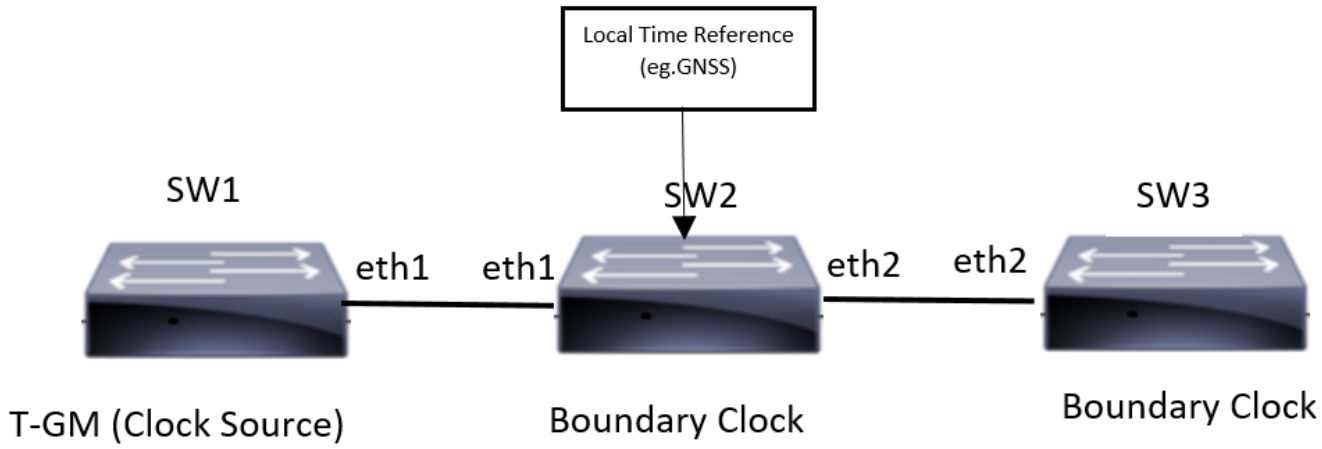
```
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:13:33
  Servo APTS Mode             : PTP
  Frequency Correction        : -0.674 ppb
  Phase Correction            : 0.000 nsec
  Offset From Master          : 10.000 nsec
  Mean Path Delay             : 3060 nsec
  APTS GPS to PTP Offset      : 0 nsec
  Sync Packet Rate            : 64
  Delay Packet Rate           : 65
```



Note: Use show ptp stats to collect the PTP statistics and use clear ptp stats to clear the same.

Asserted Partial Timing Support (APTS) Topology

Figure 6. Configuration Topology



In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM and SW2, SW3 acting as boundary clock.

APTS G.8275.2 Profile Configuration

This section shows how to set up a G.8275.2 Profile.

SW2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode.
(config)#interface eth1	Configure interface eth1
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-synce-if)#exit	Exit synce Configure mode.
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 192.168.5.100/24	Configure the IP address of the interface.

(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 3	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.4.100	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 3	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW3 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 192.168.5.101/24	Configure eth2 as Layer 2 port
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 1	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#transport ipv4	Set transport type ipv4.
(config-clk-port)#master ipv4 192.168.5.100	Set master clock source address.
(config-clk-port)#exit	Exit ptp clock port mode

SW1 (T-GM)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 192.168.4.100/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Configure the port as an master-only port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master-only	Configure the port as an master-only port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW2

1. Verify the default data set on SW2.

```
#show ptp clock 0 dataset
Default Dataset:
  Two Step Flag              : No
  Clock Identity             : E8:C5:7A:FF:FE:23:6E:1C
  Number Of Ports            : 3
  Priority1                  : 128
  Priority2                  : 128
  Slave Only                 : No
  Local Priority             : 128
```

```
  Max Steps Removed           : 255
  Domain Number               : 44
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535
```

2. Verify the port state on SW2.

```
#show ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:23:6E:1C:00:01
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : 127
  Log Sync Interval           : -6
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 0
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : gps
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Received Packets            : 0
  Discarded Packets           : 0
  Transmitted Packets         : 0

Port 2:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:23:6E:1C:00:02
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : -6
  Log Sync Interval           : -6
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe14
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.4.100
  Grandmaster clockIdentity   : 00:00:00:00:00:00:00:01
  Port ID                     : 00:00:00:00:00:00:00:01:00:02
  clockClass                  : 6
  Clock accuracy              : 33
  Offset scaled log variance  : 20061
  priority1                   : 128
```

```
  priority2                   : 128
  Steps removed               : 0
  PDV Scaled Allan Variance   : 32

  Received Packets            : 41218
  Discarded Packets           : 0
  Transmitted Packets         : 19473

  Peer #0
  IPv4 Address                : 192.168.4.100
  Clock Identity              : 00:00:00:00:00:00:00:01
  Received Announce           : 191
  Received Sync               : 1523
  Received Delay Response     : 1536
  Transmitted Delay Request   : 1536

  Master #0                   : 192.168.4.100

Port 3:
  Port State                  : Master
  Port Identity               : E8:C5:7A:FF:FE:23:6E:1C:00:03
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : -6
  Log Sync Interval           : -6
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe15
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Received Packets            : 19385
  Discarded Packets           : 0
  Transmitted Packets         : 41355

  Peer #0
  IPv4 Address                : 192.168.5.101
  Clock Identity              : 00:00:00:00:00:00:00:02
  Received Delay Request      : 1521
  Received Signalling         : 3
  Transmitted Announce        : 190
  Transmitted Sync            : 1533
  Transmitted Delay Response  : 1521
  Transmitted Signalling      : 3

  Slave #0
  IPv4 Address                : 192.168.5.101
  Clock Identity              : 00:00:00:00:00:00:00:02
  Delay Mechanism             : End to end
  log Announce Interval       : -3
  log Sync Interval           : -6
  Log Delay Req Interval      : -6
```

3. Verify the ptp servo on SW2.

```
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
```

```
Servo State Duration        : 00:11:17
Servo APTS Mode             : GPS
Frequency Correction        : 0.002 ppb
Phase Correction            : 0.000 nsec
Offset From Master          : 0.000 nsec
Mean Path Delay             : 0 nsec
APTS GPS to PTP Offset      : 32723445187 nsec
Sync Packet Rate            : 0
Delay Packet Rate           : 0
```

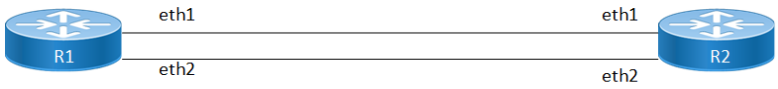
Note: Use show ptp stats to collect the PTP statistics and use clear ptp stats to clear the same.

PTP G.8275.2 Profile Source IP as Loopback Configuration

This section shows how to configure a PTP G.8275.2 profile source IP as Loopback over IPv4 and IPv6. You configure T-GM and boundary clock with more than one port.

Topology

Figure 7. Configuration topology



Configuration

This section shows how to set up a G.8275.2 Profile with loopback using as source IP

R1 (TGM)

#configure terminal	Enter Configure mode
(config)#interface lo	Configure loopback interface lo
(config-if)#ip address 1.1.1.1/32 secondary	Configure the IP address of the loopback interface.
(config-if)#interface eth1	Configure interface eth1
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-if)#interface eth2	Configure interface eth2
(config-if)#ip address 10.1.1.1/24	Configure the IP address of the interface.

(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)# source-address ipv4 interface lo	Configure underlying loopback source interface that is used by this PTP Port
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)# source-address ipv4 interface lo	Configure underlying loopback source interface that is used by this PTP Port
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

R2 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#ip address 192.168.4.100/24	Configure the IP address of the interface.
(config-if)#interface lo	Configure interface loopback
(config-if)#ip address 2.2.2.2/32 secondary	Configure the loopback IP address of the interface.
(config)#interface eth2	Configure interface eth2
(config-if)#ip address 10.1.1.2/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config-if)#ip route 1.1.1.1/32 192.168.4.100	Configure the static route to reach other network
(config-if)#ip route 1.1.1.1/32 10.1.1.1	Configure the static route to reach other network
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 3	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 1.1.1.1	Set master clock source address using loopback ip
(config-clk-port)#exit	Exit ptp clock port mode

(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 1.1.1.1	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode

Validation

R2

1. Verify the port state on R2.

```
#show ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:02:A0:3C:00:01
  Log Min Delay Req Interval  : -6
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -6
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth1
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 1.1.1.1
  Grandmaster clockIdentity   : 00:00:00:00:00:00:00:01
  Port ID                     : 00:00:00:00:00:00:00:01:00:01
  clockClass                  : 6
  Clock accuracy              : 33
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 0
  PDV Scaled Allan Variance   : 5

  Received Packets            : 109666
  Discarded Packets           : 0
  Transmitted Packets         : 51821

  Peer #0
  IPv4 Address                : 1.1.1.1
  Clock Identity              : 00:00:00:00:00:00:00:01
  Received Announce           : 6435
  Received Sync               : 51415
  Received Delay Response     : 51825
  Received Signalling         : 18
  Transmitted Delay Request   : 51825
  Transmitted Signalling      : 38
```

```
  Master #0                   : 1.1.1.1
```

R1

```
Port 1:
  Port State                  : Master
  Port Identity               : E8:C5:7A:FF:FE:02:A0:3C:00:02
  Log Min Delay Req Interval  : -6
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -6
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : eth1
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300

  Received Packets            : 51476
  Discarded Packets           : 0
  Transmitted Packets         : 109804

  Peer #0
  IPv4 Address                : 10.1.1.2
  Clock Identity              : 00:00:00:00:00:00:00:02
  Received Delay Request      : 51485
  Received Signalling         : 18
  Transmitted Announce        : 6436
  Transmitted Sync            : 51902
  Transmitted Delay Response  : 51485
  Transmitted Signalling      : 18

  Slave #0
  IPv4 Address                : 10.1.1.2
  Clock Identity              : 00:00:00:00:00:00:00:02
  Delay Mechanism             : End to end
  log Announce Interval       : -3
  log Sync Interval           : -6
  Log Delay Req Interval      : -6
3.    Verify the ptp servo on R2.
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:13:33
  Servo APTS Mode             : PTP
  Frequency Correction        : -0.674 ppb
  Phase Correction            : 0.000 nsec
  Offset From Master          : 10.000 nsec
  Mean Path Delay             : 3060 nsec
  APTS GPS to PTP Offset      : 0 nsec
  Sync Packet Rate            : 64
  Delay Packet Rate           : 65
```

Note: Use show ptp stats to collect the PTP statistics and use clear ptp stats to clear the same.

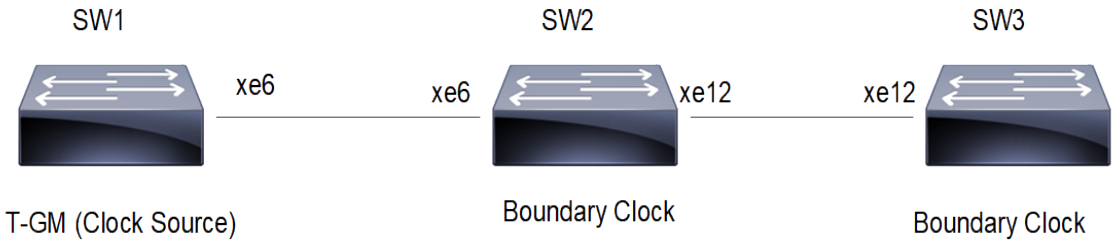
PTP Default Profile Configuration

This chapter shows how to configure a PTP Default profile over IPv4 and IPv6. You can configure T-GM and boundary clock with more than one port.

Note: You can enable the default profile on L3 physical interfaces, sub interfaces, **LAG**[1] interfaces and VLAN interfaces.

Topology

Figure 8. Configuration Topology



In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM and SW2, SW3 acting as boundary clock.

Default Profile Configuration

This section shows how to set up a Default Profile.

SW2 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface xe6	Configure interface eth1
(config-if)#ip address 192.168.4.100/24	Configure the IP address of the interface.
(config-synce-if)#exit	Exit synce Configure mode.
(config)#interface xe12	Configure interface eth2
(config-if)#ip address 192.168.5.101/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode

[1]Link Aggregation Group

(config)#ptp clock 0 profile default	Enables Default PTP profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface xe6	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.4.100	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface xe12	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

SW3 (Boundary clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode
(config)#interface xe12	Configure interface eth1
(config-if)#ip address 192.168.5.102/24	Configure the IP address of the interface.
(config-synce-if)#exit	Exit synce Configure mode.
(config)#ptp clock 0 profile default	Enables DEFAULT for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface xe12	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master ipv4 192.168.5.101	Set master clock source address
(config-clk-port)#exit	Exit ptp clock port mode

SW1 (T-GM)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode

(config)#synce-interface gps	Configure synce interface gps
(config-synce-if)#mode synchronous	Configure synchronous mode
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode
(config)#interface xe6	Configure interface eth2
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode
(config)#ptp clock 0 profile default	Enables DEFAULT PTP profile
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure ptp port
(config-clk-port)#transport ipv4	Configure the port as an master-only port
(config-clk-port)#network-interface xe6	Configure underlying interface that is used by this PTP Port
(config-clk-port)#master-only	Configure the port as an master-only port
(config-clk-port)#exit	Exit ptp clock port mode
(config-ptp-clk)#clock-port 1	Configure ptp port
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port
(config-clk-port)#exit	Exit ptp clock port mode

Validation

SW2

```
#sh ptp clock 0 dataset
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:8F:B4:31
  Number Of Ports             : 3
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 0
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 1
  Offset From Master          : -24 nsec
  Mean Path Delay             : 3080 nsec

Parent Dataset:
```

```
  Parent Port ID              :
    Clock Identity            : 00:00:00:00:00:00:00:01
    Port Number               : 1
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : 00:00:00:00:00:00:00:01
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 6
    Clock Accuracy            : 32
    Offset ScaledLogVariance  : 0

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Atomic clock
  Time of Day                 : Mon 11 Jul 2022 11:07:31 UTC

#show ptp clock 0 port Port 1:
Port State   : Slave
Port Identity   : E8:C5:7A:FF:FE:5C:77:6C:00:01
Peer Mean Path Delay   : 0
Log Announce Interval  : 1
Log Min Delay Req Interval : 0 Log Sync Interval   : 0 Announce Receipt Timeout  : 3
Delay Mechanism   : End to end
Version Number   : 2
Local Priority   : 128
Master only   : False
Signal Fail   : False
Network Interface   : xe6
Vlan Configured   :
Description   :
TTL   : 64
DSCP   : 56
Unicast Grant Duration   : 300 Configured delay asymmetry : 0 nsec
Number of Foreign Masters : 1 Current Foreign Master   : 0

Foreign Master #0
IPv4 Address   : 192.168.4.101
Grandmaster clockIdentity   : E8:C5:7A:FF:FE:69:4D:1A
Port ID   : E8:C5:7A:FF:FE:69:4D:1A:00:01
clockClass   :   6
Clock accuracy   :   33
Offset scaled log   variance :   20061
priority1   :   128
priority2   :   128
Steps removed   :   1
PDV Scaled Allan   Variance   :   12

Received Packets   :
773
Discarded Packets   :   3
Transmitted Packets   :   313

Drop Counters
Pkt rcvd on bad port state :   3
Peer #0
IPv4 Address   :
192.168.4.101
Clock Identity   :   e8:c5:7a:ff:fe:69:4d:1a
Received Announce   :   154
```

```
Received Sync   :   306
Received Delay Response   :   304
Received Signalling   :   9
Transmitted Delay Request   :   304
Transmitted Signalling   :   9
Master #0   :   192.168.4.101

Port 2:
Port State   : Master
Port Identity   : E8:C5:7A:FF:FE:5C:77:6C:00:02
Peer Mean Path Delay   : 0
Log Announce Interval  : 1
Log Min Delay Req Interval : 0 Log Sync Interval   : 0 Announce Receipt Timeout  : 3
Delay Mechanism   : End to end
Version Number   : 2
Local Priority   : 128
Master only   : False
Signal Fail   : False
Network Interface   : xe12
Vlan Configured   :
Description   :
TTL   : 64
DSCP   : 56
Unicast Grant Duration   : 300 Configured delay asymmetry : 0 nsec
Received Packets   : 259
Discarded Packets   : 0


Transmitted Packets   : 641

Peer #0
IPv4 Address   : 192.168.5.102
Clock Identity   : b8:6a:97:ff:fe:f5:e7:c4 Received Delay Request   : 253
Received Signalling   : 6
Transmitted Announce   : 128
Transmitted Sync   : 254 Transmitted Delay Response : 253 Transmitted Signalling   : 6

Slave #0
IPv4 Address   : 192.168.5.102
Clock Identity   : b8:6a:97:ff:fe:f5:e7:c4
Delay Mechanism   : End to end
log Announce Interval   : 1
log Sync Interval   : 0 Log Delay Req Interval   : 0

#show ptp servo
PTP servo status for clock 0
Servo Config   : Freq + Phase Correction
Servo State   : Time Locked
Servo State Duration   : 00:04:56
Servo APTS Mode   : PTP
Frequency Correction   : 0.170 ppb
Phase Correction   : 0.000 nsec
Offset From Master   : 35.500 nsec
Mean Path Delay   : 101 nsec APTS GPS to PTP Offset   : 0 nsec Sync Packet Rate   : 1
Delay Packet Rate   : 1
```

SW3

```
#show ptp servo
PTP servo status for clock 0
Servo Config   : Freq + Phase Correction
Servo State   : Time Locked
Servo State Duration   : 00:00:26
Servo APTS Mode   : PTP Frequency Correction   : -2.146 ppb Phase Correction   : 0.000 nsec
Offset From Master   : -190.000 nsec
Mean Path Delay   : 100 nsec APTS GPS to PTP Offset   : 0 nsec Sync Packet Rate   : 1
Delay Packet Rate   : 1
```

```
#sh ptp clock 0 dataset
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:8F:B4:31
  Number Of Ports             : 3
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 0
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 1
  Offset From Master          : 29492 nsec
  Mean Path Delay             : 3075 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : 00:00:00:00:00:00:00:01
    Port Number               : 1
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : 00:00:00:00:00:00:00:01
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 165
    Clock Accuracy            : 32
    Offset ScaledLogVariance  : 0

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Atomic clock
    Time of Day                 : Mon 11 Jul 2022 11:15:16 UTC
```

```
   #sh ptp clock 0 port
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:8F:B4:31:00:01
  Peer Mean Path Delay        : 3073
  Log Announce Interval       : 1
  Log Min Delay Req Interval  : 0
  Log Sync Interval           : 0
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 0
  Master only                 : False
  Signal Fail                 : False
```

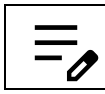
```
  Network Interface           : xe0
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.5.101
  Grandmaster clockIdentity   : 00:00:00:00:00:00:00:01
  Port ID                     : 00:00:00:00:00:00:00:01:00:01
  clockClass                  : 6
  Clock accuracy              : 32
  Offset scaled log variance  : 0
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 1

  Received Packets            : 96
  Discarded Packets           : 6
  Transmitted Packets         : 37

  Peer #0
  IPv4 Address                : 192.168.5.101
  Clock Identity              : 00:00:00:00:00:00:00:01
  Received Announce           : 20
  Received Sync               : 39
  Received Delay Response     : 34
  Received Signalling         : 3
  Transmitted Delay Request   : 34
  Transmitted Signalling      : 3

  Master #0                   :  192.168.5.101
```

SW1

```
#show ptp servo
PTP servo status for clock 0
Servo Config   : Freq + Phase Correction
Servo State   : Time Locked
Servo State Duration   : 00:03:24
Servo APTS Mode   : GPS Frequency Correction   : -9.900 ppb Phase Correction   : 0.000 nsec
Offset From Master     : 0.000 nsec
Mean Path Delay             : 0 nsec
APTS GPS to PTP Offset   : 0 nsec
Sync Packet Rate            : 0
Delay Packet Rate           : 0


#sh ptp clock 0 dataset
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:8F:B4:31
  Number Of Ports             : 3
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 0
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535
```

```
Current Dataset:
  Steps Removed               : 1
  Offset From Master          : -24 nsec
  Mean Path Delay             : 3080 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : 00:00:00:00:00:00:00:01
    Port Number               : 1
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : 00:00:00:00:00:00:00:01
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 6
    Clock Accuracy            : 32
    Offset ScaledLogVariance  : 0

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Atomic clock
  Time of Day                 : Mon 11 Jul 2022 11:07:31 UTC

#sh ptp clock 0 port
Port1:
   Port State                  : Slave
   Port Identity               : E8:C5:7A:FF:FE:69:4D:1A:00:01
   Peer Mean Path Delay        : 0
   Log Announce Interval   : 1
   Log Min Delay Req Interval  : 0
   Log Sync Interval            :0
   Announce Receipt Timeout   : 3
Delay Mechanism   : End to end
Version Number   : 2
Local Priority   : 0
Master only   : False
Signal Fail   : False
Network Interface   : gps
Vlan Configured   :
Description   :
TTL   : 64
DSCP   : 56
Unicast Grant Duration   : 300
Configured delay asymmetry : 0 nsec
Received Packets   : 0
Discarded Packets   : 0
Transmitted Packets   : 0

Port 2:
Port State   : Master
Port Identity   : E8:C5:7A:FF:FE:69:4D:1A:00:02
Peer Mean Path Delay   : 0
Log Announce Interval   : 1
Log Min Delay Req Interval : 0
Log Sync Interval   :0
Announce Receipt Timeout  : 3
Delay Mechanism   : End to end
Version Number   : 2
Local Priority   : 128
```

```
Master only   : True
Signal Fail   : False
Network Interface   : xe6
Vlan Configured   :
Description   :
TTL   : 64
DSCP   : 56
Unicast Grant Duration   : 300
Configured delay asymmetry  : 0 nsec
Received Packets   : 299
Discarded Packets   : 0
Transmitted Packets   : 744

Peer #0
IPv4 Address   : 192.168.4.100
Clock Identity   :e8:c5:7a:ff:fe:5c:77:6c
Received Delay Request   : 293
Received Signalling   : 6
Transmitted Announce   : 149
Transmitted Sync   : 296
Transmitted Delay Response  : 293
Transmitted Signalling   : 6

Slave #0
IPv4 Address   : 192.168.4.100
Clock Identity   : e8:c5:7a:ff:fe:5c:77:6c
Delay Mechanism   : End to end
log Announce Interval   : 1
log Sync Interval   : 0
Log Delay Req Interval   : 0
```



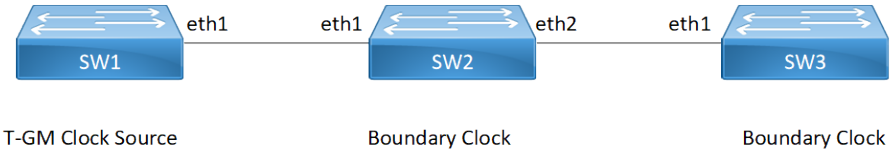
Note: Use show ptp stats to collect the PTP statistics and use clear ptp stats to clear the same.

PTP IWF Profile Configuration

This chapter shows how to configure an Interworking function (IWF) Profile Configuration. IWF can translate between different profiles used on different network segments. OcNOS supports maximum 2 PTP instances, and instance 0 is always the master instance or instance with slave PTP ports (servo instance). Instance 1 can only have PTP ports as master and doesn't have a servo.

Topology

Figure 9. PTP IWF Profile Configuration



In this example, SW2 receives G.8275.1 clock from SW1 (T-GM), and after the translation, it sends G.8275.2 clock to SW3.

Configuration

This section shows how to set up an IWF profile configuration.

SW2 (Boundary Clock)

#configure terminal	Enter Configure mode
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#exit	Exit Synce mode
(config)#interface eth1	Configure interface ge14
(config-if)# synce	Enter configure Synchronous Ethernet mode.
(config-synce-if)# mode synchronous	Configure synchronous mode
(config-synce-if)# input-source 2	Configure the interface as an input source with priority 2
(config-synce-if)# wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)# exit	Exit synce Configure mode.
(config-if)# exit	Exit port Configure mode.
(config)# interface eth2	Configure interface eth2
(config-if)# ip address 192.168.4.100/24	Configure the IP address of the interface.
(config-if)# exit	Exit from the Configure mode
(config-if)# commit	Commit the configuration
(config)#ptp clock 0 profile g8275.1	Enables G8275.1 for PTP time/phase telecom profile

(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 1	Configure PTP port
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port
(config-clk-port)# commit	Commit the configuration
(config-clk-port)# end	Exit from configure mode
#configure terminal	Enter Configure mode
(config)#ptp clock 1 profile g8275.2	Enables G8275.2 for PTP time/phase telecom profile
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance
(config-ptp-clk)#clock-port 2	Configure PTP port
(config-clk-port)#transport ipv4	Set transport type ipv4
(config-clk-port)#network-interface eth2	Configure underlying interface that is used by this PTP Port
(config-clk-port)# commit	Commit the configuration
(config-clk-port)# end	Exit from configure mode

Validation

SW2

```
#sh ptp clock 0
PTP Clock Profile             : g8275.1
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:8F:CA:97
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 24
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 2
  Offset From Master          : 1 nsec
  Mean Path Delay             : -74 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : E8:C5:7A:FF:FE:9F:20:37
    Port Number               : 2
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : E8:C5:7A:FF:FE:9F:20:37
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 6
    Clock Accuracy            : 33
```

```
    Offset ScaledLogVariance  : 20061

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Global positioning system
  Time of Day                 : Fri 15 Jul 2022 17:58:27 IST

#sh ptp clock 1
PTP Clock Profile             : g8275.2
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:8F:CA:98
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 44
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 0
  Offset From Master          : 0 nsec
  Mean Path Delay             : 0 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : E8:C5:7A:FF:FE:8F:CA:98
    Port Number               : 0
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : E8:C5:7A:FF:FE:9F:20:37
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 6
    Clock Accuracy            : 33
    Offset ScaledLogVariance  : 20061

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Global positioning system
  Time of Day                 : Fri 15 Jul 2022 17:58:29 IST

#sh ptp clock 0 port
Port 1:
  Port State                  : Slave
  L2 Destination Mac          : 01:1B:19:00:00:00
  Port Identity               : E8:C5:7A:FF:FE:8F:CA:97:00:01
  Peer Mean Path Delay        : -73
  Log Announce Interval       : -3
```

```
  Log Min Delay Req Interval  : -4
  Log Sync Interval           : -4
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe16
  Vlan Configured             :
  Description                 :
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  L2 Address                  : e8:c5:7a:88:17:4d
  Grandmaster clockIdentity   : E8:C5:7A:FF:FE:9F:20:37
  Port ID                     : E8:C5:7A:FF:FE:9F:20:37:00:01
  clockClass                  : 6
  Clock accuracy              : 33
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 2

  Received Packets            : 13788
  Discarded Packets           : 8
  Transmitted Packets         : 5522

#sh ptp clock 1 port
Port 2:
  Port State                  : Master
  Port Identity               : E8:C5:7A:FF:FE:8F:CA:98:00:02
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Log Min Delay Req Interval  : -6
  Log Sync Interval           : -6
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : True
  Signal Fail                 : False
  Network Interface           : xe23
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Received Packets            : 13247
  Discarded Packets           : 0
  Transmitted Packets         : 28446

  Peer #0
  IPv4 Address                : 192.168.4.101
  Clock Identity              : b8:6a:97:ff:fe:f5:ea:c4
  Received Delay Request      : 13241
  Received Signalling         : 6
  Transmitted Announce        : 1693
  Transmitted Sync            : 13506
  Transmitted Delay Response  : 13241
  Transmitted Signalling      : 6
```



```
  Slave #0
  IPv4 Address                : 192.168.4.101
  Clock Identity              : b8:6a:97:ff:fe:f5:ea:c4
  Delay Mechanism             : End to end
  log Announce Interval       : -3
  log Sync Interval           : -6
  Log Delay Req Interval      : -6

#sh ptp clock 0 stats
clock 0:
  Number of ports             : 32
  Received Packets            : 14898
  Discarded Packets           : 8
  Received IPv4 PTP Packets   : 0
  Received IPv6 PTP Packets   : 0
  Received L2 PTP Packets     : 14898
  RX Queue Overflows          : 0
  Transmitted Packets         : 5966

Port 1:
  Received Packets            : 14898
  Discarded Packets           : 8
  Transmitted Packets         : 5966


#sh ptp clock 1 stats
clock 1:
  Number of ports             : 32
  Received Packets            : 15991
  Discarded Packets           : 0
  Received IPv4 PTP Packets   : 15991
  Received IPv6 PTP Packets   : 0
  Received L2 PTP Packets     : 0
  RX Queue Overflows          : 0
  Transmitted Packets         : 34252

Port 2:
  Received Packets            : 15991
  Discarded Packets           : 0
  Transmitted Packets         : 34252
```


PTP SMPTE Profile Configuration

Overview

The IEEE 1588 v2 Precision Time Protocol (PTP) functionality is enhanced to support the Society of Motion Picture and Television Engineers (SMPTE) 2059-2 in OcNOS-SP 6.4.2.

The PTP is a protocol used to synchronize timing among the systems connected in computer networks; it is similar to Network Time Protocol (NTP), which does not have the capability to measure in nanoseconds. The timing capability to measure less than a microsecond is critical while broadcasting multimedia data such as audio, video, etc. The PTP is essential in scenarios where very accurate timing is required.

Currently, the PTP implementation is supported with the following profiles:

- ITU-T G.8275.1
- G.8275.2,
- G.8265.1
- Boundary Clock
- Interworking function (IWF)
- Synchronous Ethernet
- End-to-End (E2E) telecom profile for time/phase synchronization

For more information on existing PTP profiles support refer to Timing and Synchronization Guide.

Feature Characteristics

This section describes the PTP SMPTE 2059-2 time and frequency synchronization profile functionalities.

In a computer network, a system installed with a PTP module is called a Grand Master Clock, which performs the timing and synchronization with the other connected systems, called a Slave Clock. The PTP modules can include many timing profiles according to the functionality requirements.

The SMPTE PTP profile is based on IEEE Standard 1588-2008 and includes a description of parameters, their default values, and permitted ranges. This standard specifies a PTP for synchronizing audio/video equipment in a professional broadcast environment.

The SMPTE ST 2059-2 profile defines a point in time, the SMPTE Epoch, which is used for the alignment of real-time signals; formulae that specify the ongoing alignment of signals to time since the SMPTE Epoch; and formulae that specify the calculation of SMPTE ST 12-1 time address values and SMPTE ST 309 date values.

The SMPTE enhanced profile includes the following functionality:

- Implements appropriate algorithm to compare clocks and determines the best clock to use as a source clock
- Implements appropriate configuration management options
- Implements the appropriate path delay mechanisms, delay request-response or peer delay
- Defines the range and default values of all PTP configurable attributes and data set members.
- Defines the transport mechanisms as required, permitted, or prohibited.
- Defines the node types as required, permitted, or prohibited.

Limitations:

- The SMPTE timing profile is supported only on UFI-QUX and UFI-Q2 platforms.
- The new CLI `Priority1` command is supported only on Default and SMPTE profiles

Benefits

The SMPTE PTP Profile is used for time and frequency synchronization in a professional multimedia broadcast environment. It provides the following benefits:

- To permit clocks to be synchronized quickly and accurately to enable professional media over IP applications.
- To convey Synchronization Metadata (SM) required for synchronization and time labeling of audio/video signals.

Prerequisites

The PTP process should be up and running.

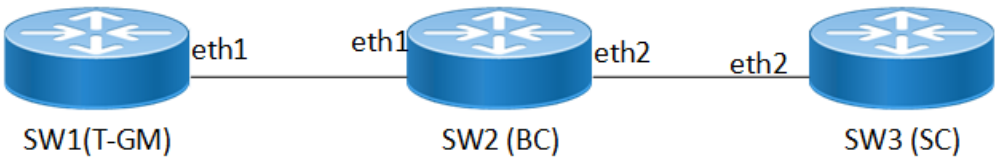
Configuration

This chapter shows how to configure a PTP SMPTE profile over IPv4 and IPv6. You can configure T-GM and boundary clock with more than one port.S

Note: The SMPTE profile can be enabled on L2/L3 physical interfaces, Sub interfaces, **LAG**[1] interfaces and VLAN interfaces.

Topology

Figure 10. SMPTE PTP Configuration Toplogy



In this example, SW1, SW2 and SW3 are running PTP. SW1 acting as T-GM, SW2 as a boundary clock and SW3 as a slave clock.

SW1 Telecom Grandmaster (T-GM)

Perform the following configurations to set T-GM clock.

`#configure terminal`	Enter Configure mode
`(config)#synce`	Enter configure Synchronous Ethernet mode.

[1]Link Aggregation Group

(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit Synce mode.
(config)#synce-interface gps	Configure synce interface GPS.
(config-synce-if)#mode synchronous	Configure synchronous mode.
(config-synce-if)#input-source 1	Configure the interface as an input source with priority 1.
(config-synce-if)#quality-level QL_PRC	Configure QL-value.
(config-synce-if)#wait-to-restore 1	Configure Wait-to-Restore timer.
(config-synce-if)#exit	Exit Port Configure mode.
(config)#interface eth1	Configure interface eth2.
(config-if)#ip address 192.168.4.101/24	Configure the IP address of the interface.
(config-if)#exit	Exit interface mode.
(config)#ptp clock 0 profile smpte	Enables smpte PTP profile.
(config)# sm-tlv default-frame-rate 4294967295 4294967294	Enables sm tlv colour frame rate value.
(config)# sm-tlv time-address-flags color-frame	Enables sm-tlv time flag as color frame.
(config)# sm-tlv time-address-flags drop-frame	Enables sm-tlv time flag as drop frame.
(config-ptp-clk)#clock-type tgm	Enables clock type as T-GM.
(config-ptp-clk)#number-ports 2	Configure the number of PTP ports on the instance.
(config-ptp-clk)#clock-port 2	Configure PTP port.
(config-clk-port)#transport ipv4-multicast	Set the transport type as IPv4 multicast.
(config-clk-port)#network-interface eth1	Configure underlying interface that is used by this PTP Port.
(config-clk-port)#exit	Exit PTP clock port mode.
(config-ptp-clk)#clock-port 1	Configure PTP port.
(config-clk-port)#network-interface gps	Configure underlying interface that is used by this PTP Port.
(config-clk-port)#exit	Exit PTP clock port mode.

SW2 Boundary Clock (BC)

Perform the following configuration to set Boundary clock. It can function as both Grand Master and Slave to another PTP clock.

#configure terminal	Enter Configure mode.
(config)#interface eth1	Configure interface eth1.
(config-if)#ip address 192.168.4.100/24	Configure the IP address of the interface.
(config)#interface eth2	Configure interface eth1.

`(config-if)#ip address 192.168.5.100/24`	Configure the IP address of the interface.
`(config)#ptp clock 0 profile smpte`	Enables SMPTE for PTP time/phase telecom profile.
`(config-ptp-clk)#number-ports 2`	Configure the number of PTP ports on the instance.
`(config-ptp-clk)#clock-port 1`	Configure PTP port.
`(config-clk-port)#transport ipv4-multicast`	Set transport type IPv4 as multicast.
`(config-clk-port)#network-interface eth1`	Configure underlying interface that is used by this PTP Port.
`(config-ptp-clk)#clock-port 2`	Configure PTP port.
`(config-clk-port)#transport ipv4-multicast`	Set transport type IPv4 as multicast.
`(config-clk-port)#network-interface eth2`	Configure underlying interface that is used by this PTP Port.
`(config-clk-port)#exit`	Exit PTP clock port mode.

SW3 Slave Clock (SC)

Perform the following configuration to set Slave clock.

`#configure terminal`	Enter Configure mode.
`(config)#interface eth2`	Configure interface eth2.
`(config-if)#ip address 192.168.5.101/24`	Configure the IP address of the interface.
`(config-if)#exit`	Exit interface mode.
`(config)#ptp clock 0 profile smpte`	Enables SMPTE PTP profile.
`(config-ptp-clk)#number-ports 2`	Configure the number of PTP ports on the instance.
`(config-ptp-clk)#slave-only`	Configure the device as a Slave clock.
`(config-ptp-clk)#clock-port 1`	Configure PTP port.
`(config-clk-port)#transport ipv4-multicast`	Set transport type IPv4 as multicast.
`(config-clk-port)#network-interface eth2`	Configure underlying interface that is used by this PTP Port.
`(config-clk-port)#exit`	Exit PTP clock port mode.

Validation

SW2(BC)

```
#show ptp clock 0
PTP Clock Profile            : smpte
Default Dataset:
  Two Step Flag              : No
  Clock Identity             : 5C:07:58:FF:FE:54:12:02
  Number Of Ports            : 2
  Priority1                  : 128
  Priority2                  : 128
  Slave Only                 : No
  Local Priority             : 128
  Max Steps Removed          : 255
```

```
  Domain Number               : 127
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 1
  Offset From Master          : -5318 nsec
  Mean Path Delay             : 89 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : 5C:07:58:FF:FE:51:13:09
    Port Number               : 2
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : 5C:07:58:FF:FE:51:13:09
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 248
    Clock Accuracy            : 32
    Offset ScaledLogVariance  : 20061

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Global positioning system
  Time of Day                 : Fri 10 Nov 2023 07:52:31 UTC

2. show ptp clock 0 port 1
Port 1:
  Port State                  : Slave
  Port Identity               : 5C:07:58:FF:FE:54:12:02:00:01
  Peer Mean Path Delay        : 89
  Log Announce Interval       : 0
  Log Min Delay Req Interval  : -3
  Log Sync Interval           : -3
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : cd20/1
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.4.100
  Grandmaster clockIdentity   : 5C:07:58:FF:FE:51:13:09
  Port ID                     : 5C:07:58:FF:FE:51:13:09:00:02
  clockClass                  : 6
  Clock accuracy              : 32
```

```
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 1

  Received Packets            : 20087
  Discarded Packets           : 74
  Transmitted Packets         : 8929

  Peer #0
  IPv4 Address                : 192.168.4.100
  Clock Identity              : 5c:07:58:ff:fe:51:13:09
  Received Announce           : 1115
  Received Sync               : 8926
  Received Delay Request      : 41
  Received Delay Response     : 8894
  Received Management         : 1111
  Transmitted Announce        : 4
  Transmitted Sync            : 28
  Transmitted Delay Request   : 8894
  Transmitted Management      : 3

  SMPTE Sync Metadata:
  Default frame rate          : 0xfffffffffffffffe
  GM Lock Status              : 4
  Time Address Flags          : 0x03
  Current Local Offset        : -37
  Jump Seconds                : 0
  Time of Next Jump           : 0x000000000000
  Time of Next Jam            : 0x000000000000
  Time of Previous Jam        : 0x000000000000
  Previous Jam Local Offset   : 0
  Daylight Saving             : 0x00
  Leap Second Jump            : 0x00

  Master #0                   : 192.168.4.100

3. show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:00:28
  Servo APTS Mode             : N/A
  Frequency Correction        : 24.887 ppb
  Phase Correction            : -370500000.000 nsec
  Offset From Master          : -317 nsec
  Mean Path Delay             : 89 nsec
  APTS GPS to PTP Offset      : N/A
  Sync Packet Rate            : 8
  Delay Packet Rate           : 8
```

SW3(Slave clock)

```
1. show ptp clock 0
PTP Clock Profile             : smpte
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : E8:C5:7A:FF:FE:DA:68:CF
  Number Of Ports             : 1
  Priority1                   : 128
  Priority2                   : 255
  Slave Only                  : Yes
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 127
  Clock Quality               :
    Clock Class               : 255
    Clock Accuracy            : 254
```

```
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 0
  Offset From Master          : 0 nsec
  Mean Path Delay             : 0 nsec

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : E8:C5:7A:FF:FE:DA:68:CF
    Port Number               : 0
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : E8:C5:7A:FF:FE:DA:68:CF
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 255
  Grandmaster Clock Quality   :
    Clock Class               : 255
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : False
  Frequency Traceable         : False
  PTP Timescale               : True
  Time Source                 : Internal Oscillator
  Time of Day                 : Thu 01 Jan 1970 00:05:58 UTC

2. show ptp clock 0 port 1
Port 1:
  Port State                  : Slave
  Port Identity               : E8:C5:7A:FF:FE:DA:68:CF:00:01
  Peer Mean Path Delay        : 2974
  Log Announce Interval       : 0
  Log Min Delay Req Interval  : -3
  Log Sync Interval           : -3
  Announce Receipt Timeout    : 3
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : ce2
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Number of Foreign Masters   : 1
  Current Foreign Master      : 0

  Foreign Master #0
  IPv4 Address                : 192.168.4.100
  Grandmaster clockIdentity   : 5C:07:58:FF:FE:51:13:09
  Port ID                     : 5C:07:58:FF:FE:51:13:09:00:02
  clockClass                  : 6
  Clock accuracy              : 32
  Offset scaled log variance  : 20061
  priority1                   : 128
  priority2                   : 128
  Steps removed               : 1
```

```
  Received Packets            : 210
  Discarded Packets           : 33
  Transmitted Packets         : 82

  Peer #0
  IPv4 Address                : 192.168.4.100
  Clock Identity              : 5c:07:58:ff:fe:51:13:09
  Received Announce           : 15
  Received Sync               : 114
  Received Delay Response     : 82
  Transmitted Delay Request   : 82

  Master #0                   : 192.168.4.100

3. show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:01:09
  Servo APTS Mode             : N/A
  Frequency Correction        : -11.610 ppb
  Phase Correction            : -86000000.000 nsec
  Offset From Master          : -4 nsec
  Mean Path Delay             : -52 nsec
  APTS GPS to PTP Offset      : N/A
  Sync Packet Rate            : 8
  Delay Packet Rate           : 8
```

SW1(T-GM)

```
1. show ptp servo
PTP servo status for clock 0
  Servo Config                : Freq + Phase Correction
  Servo State                 : Time Locked
  Servo State Duration        : 00:11:16
  Servo APTS Mode             : GPS
  Frequency Correction        : -234.160 ppb
  Phase Correction            : 0.000 nsec
  Offset From Master          : 0 nsec
  Mean Path Delay             : 0 nsec
  APTS GPS to PTP Offset      : N/A
  Sync Packet Rate            : 8
  Delay Packet Rate           : 8

2. show ptp clock 0
PTP Clock Profile             : smpte
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : 5C:07:58:FF:FE:51:13:09
  Number Of Ports             : 2
  Priority1                   : 128
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 127
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 0
  Offset From Master          : 0 nsec
  Mean Path Delay             : 0 nsec

Parent Dataset:
```

```
  Parent Port ID              :
    Clock Identity            : 5C:07:58:FF:FE:51:13:09
    Port Number               : 0
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : 5C:07:58:FF:FE:51:13:09
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 6
    Clock Accuracy            : 32
    Offset ScaledLogVariance  : 20061

Time Dateset:
  Current UTC Offset Valid    : True
  Current UTC Offset          : 37
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : True
  Frequency Traceable         : True
  PTP Timescale               : True
  Time Source                 : Global positioning system
  Time of Day                 : Fri 10 Nov 2023 04:33:40 UTC

3. show ptp clock 0 port 1
Port 1:
  Port State                  : Slave
  Port Identity               : 5C:07:58:FF:FE:51:13:09:00:01
  Peer Mean Path Delay        : 0
  Log Announce Interval       : 0
  Log Min Delay Req Interval  : -3
  Log Sync Interval           : -3
  Announce Receipt Timeout    : 3
  Delay Mechanism             : Disabled
  Version Number              : 2
  Local Priority              : 0
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : gps
  Vlan Configured             :
  Description                 :
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 0 nsec

  Received Packets            : 0
  Discarded Packets           : 0
  Transmitted Packets         : 0
```

Note: Use `show ptp stats` to collect the PTP statistics and use `clear ptp stats` to clear the same.

Implementation Examples

Gather typical use cases for this feature. Your information must include the following:

- Where a customer will enable or disable this feature.
- Cover how the new feature works with other existing features?

Note: Work with SE's and TAC to request and understand customer use cases.

New CLI Commands

Following are the new CLIs introduced in this feature.

- sm-tlv time-address-flags color-frame (page 173)
- sm-tlv time-address-flags drop-frame (page 174)
- sm-tlv default-frame-rates (page 171)
- sm-tlv append disable (page 170)
- sm-tlv process disable (page 172)
- transport ipv6-multicast type (page 180)

Existing CLI Commands

The following existing CLIs are applicable for SMPTE profile.

- announce-receipt-timeout (page 115)
- dscp (page 124)
- log-announce-interval (page 136)
- log-min-delay-req-interval (page 137)
- log-sync-interval (page 138)
- master (page 139)
- source-address linklocal (page 177)
- source-address interface (page 176)
- ttl (page 182)
- unicast-grant-duration (page 184)

The following existing CLIs are updated for SMPTE profile.

- ptp clock profile (page 150)

For complete CLI command information, refer to PTP Commands (page 102) section.

Abbreviations

Acronym	Description
OC	Ordinary Clock
BC	Boundary Clock
SMPTE	The Society of Motion Picture and Television Engineers
TC	Transparent Clock
T-GM	Telecom Grandmaster
T-TSC	Telecom Time Slave Clock

Glossary

The following provides definitions for key terms used throughout this document.

SMPTE	The SMPTE ST 2059-2 profile defines a point in time, the SMPTE Epoch, which is used for alignment of real-time signals; formulae which specify the ongoing alignment of signals to time since the SMPTE Epoch; and formulae which specify the calculation of SMPTE ST 12-1 time address values and SMPTE ST 309 date values.
PTP	A protocol that synchronizes clocks throughout a computer network. On a LAN, PTP achieves clock accuracy in the sub-microsecond range, making it suitable for measurement and control systems. The time synchronization is achieved through packets that are transmitted and received in a session between a master clock and a slave clock. Defined by IEEE 1588v2.

PRECISION TIME PROTOCOL COMMAND REFERENCE

PTP Commands

This section outlines the commands utilized for Precision Time Protocol (PTP):

1pps-out offset

Use this command to set the external interface output signal offset for 1PPS in nanoseconds.

Use the "no" form of this command to reset the default value to 0.

Command Syntax

```
1pps-out offset <-2048-2048>
no 1pps-out offset
```

Parameters

<-2048-2048>
Offset value in range. The default is 0

Command Mode

PTP Clock Mode

Default

The default offset value is zero.

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#1pps-out offset 2048
```

announce-receipt-timeout

Use this command to set the announce-receipt-timeout. It is applicable only for G.8275.2, SMPTE, the default profile, and G.8265.1.

Use the 'no' form of this command to set the default value to 3.

Command Syntax

```
announce-receipt-timeout <2-10>
no announce-receipt-timeout
```

Parameters

<2-10>
Specifies the announcement receipt timeout range (default is 3).

Command Mode

PTP Clock Port Mode

Default

The default announcement receipt timeout range is 3.

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#announce-receipt-timeout 3
```

clear ptp clock stats

Use this command to clear PTP packet statistics.

Command Syntax

```
clear ptp clock <0-1> stats
```

Parameters

<0-1>
Clock 0 or 1

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#clear ptp clock 0 stats
```

clock-accuracy

Use this command to indicate the expected accuracy of the clock.

Use the `no` parameter of this command in PTP Clock Mode and PTP Clock Port Mode to set the default value.

Note: Applicable to Non-Ethernet ports for PTP Clock Port mode.

Command Syntax

```
clock-accuracy <0-255>
no clock-accuracy
```

Parameters

<0-255>

A number representing the expected clock accuracy.

Command Mode

PTP Clock Mode

PTP Clock Port Mode

Default

The default value for PTP Clock Mode is 254.

The default value for PTP Clock Port Mode is 0x21.

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-accuracy 10

(config-ptp-clk)#clock-port 1
(config-clk-port)#clock-accuracy 15
```

clock-class

Use this command to denote the traceability of the time or frequency distributed by the clock.

Use the `no` parameter of this command to set the default value.

Note: Applicable to non-Ethernet ports for PTP Clock Port mode.

Command Syntax

```
clock-class <0-255>
no clock-class
```

Parameters

<0-255>

A number that indicates the traceability of the time or frequency of the clock.

Command Mode

PTP Clock Mode

PTP Clock Port Mode

Default

In PTP Clock Mode, the default value is 248, and in PTP Clock Port Mode, the default value is 6 for the clock-port.

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-class 3

(config-ptp-clk)#clock-port 1
(config-clk-port)#clock-class 7
```

clock-port

Use this command to enter PTP Clock Mode.

Use the `no` parameter of the command to remove the clock-port configuration.

Command Syntax

```
clock-port <1-128>
no clock-port <1-128>
```

Parameters

<1-128>
Specifies the number of clock ports.

Default

None

Command Mode

PTP Clock Mode

Applicability

Introduced in OcNOS version 3.0. The maximum number of port values has been changed to 128 in OcNOS version 6.5.3

Example

```
#configure terminal
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 55
(config-clk-port)#
```

clock-type tgm

Use this command to make a clock a grandmaster clock.

Command Syntax

```
clock-type tgm
```

Parameters

None

Command Mode

PTP Clock Mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-type tgm
(config-ptp-clk)#number-ports 2
(config-ptp-clk)#clock-port 2
(config-clk-port)#master-only
(config-clk-port)#network-interface eth1
```

delay-asymmetry

Use this command to set an asymmetric delay in nanoseconds. The value can be entered in either milliseconds or nanoseconds.

Note: Entering a value in both milliseconds and nanoseconds will result in the two values being summed.

Use the `no` parameter of this command to set the default value to 0.

Command Syntax

```
delay-asymmetry {msec <-100-100>|nsec <-1000000-1000000>}
no delay-asymmetry
```

Parameters

msec <-100-100>
Value of latency in milliseconds.

nsec <-1000000-1000000>
Value of latency in nanoseconds.

Command Mode

PTP Clock Port mode

Default

Zero

Applicability

This command introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#delay-asymmetry msec 100 nsec 1000000
```

description

Use this command to set the description for the clock port.

Use the no form of this command to delete this description.

Command Syntax

```
description LINE
no description
```

Parameters

LINE
Clock port description.

Command Mode

PTP Clock Port Mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#description l3
```

domain

Use this command to set the current synchronization domain.

Command Syntax

```
domain <0-127>
no domain
```

Parameters

<0-127>
Synchronization domain.

Command Mode

PTP Clock Mode

Default

- For G.8275.1, domain numbers range from 24 to 43, with the default set at 24.
- For G.8275.2, domain numbers range from 44 to 63, with the default set at 44.
- For the default profile, domain numbers range from 0 to 127.
- For G.8265.1, domain numbers range from 4 to 23.

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#configure terminal
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#domain 30
```

dscp

Use this command to set the DSCP value. It is applicable for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the no parameter of this command to reset it to the default value.

Command Syntax

```
dscp <0-63>
no dscp
```

Parameters

<0-63>
DSCP value (default is 56)

Command Mode

PTP Clock Port mode

Default

56

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#dscp 2
```

g8265.1-option

Use this command to set G 8265.1 to option 1 or 2.

Use the no parameter of this command to reset it to the default value.

Command Syntax

```
g8265.1-option (1|2)
no g8265.1-option
```

Parameters

option 1
Set network option 1

option 2
Set network option 2

Command Mode

PTP Clock mode

Default

Option 1

Applicability

Introduced in OcNOS version 4.2.

Example

```
(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#g8265.1-option 2
```

g8265.1-wtr

Use this command to set the G 8265.1 WTR duration.

Use the no parameter of this command to reset it to the default value.

Command Syntax

```
g8265.1-wtr DURATION
no g8265.1-wtr
```

Parameters

DURATION

Specifies the duration value of the g8265 WTR master in seconds.

Command Mode

PTP Clock mode

Default

Zero

Applicability

Introduced in OcNOS version 4.2.

Example

```
(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#g8265.1-wtr 60
```

gps-offset

Use this command to set the GPS offset in nanoseconds and seconds.

Use the no parameter of this command to reset it to the default value.

Command Syntax

```
gps-offset (sec <-100-100> | nsec <-2048-2048>)
no gps-offset
```

Parameters

sec <-100-100>
Specifies the offset value in seconds.

nsec<-2048-2048>
Specifies the offset value in nanoseconds.

Command Mode

PTP Clock Mode

Default

Zero nanoseconds

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#gps-offset sec 100 nsec 2048
```

gps position

Use this command to enable survey-in, fixed, and disabled modes.

Use the no parameter of this command to reset it to the default value.

Command Syntax

```
gps position (survey-in <1-1440> <1-10000> | fixed LATITUDE LONGITUDE ALTITUDE |disable)
no gps position
```

Parameters

survey-in
Mode as a survey-in

<1-1440>
Minimum duration in minutes

<1-10000>
Position accuracy limit in centimeters

fixed
Mode as fixed

LATITUDE
GPS fixed latitude in decimal degree format

LONGITUDE
GPS fixed longitude in decimal degree format

ALTITUDE
GPS fixed altitude in meters

disable
Disable position

Command Mode

Configuration mode

Default

None

Applicability

Introduced in OcNOS version 5.1.

Example

For `survey-in`:

```
(config)#gps position survey-in 30 1000
```

For `fixed`:

```
(config)#gps position fixed 12.975516 77.712692 919.1
```

For `disable`:

```
(config)#gps position disable
```

For the `no` command:

```
(config)#no gps position
```

gps satellite-system

Use this command to configure the global navigation satellite system (GNSS). GNSS satellites transmit navigation and timing data to GNSS receivers.

Use the no parameter of this command to unset the configured GNSS.

The UBLOX NEO-M8T is a GNSS timing module that receives signals from GNSS satellites. Platforms with the UBLOX NEO-M8T support the concurrent GNSS combinations listed below:

Table 8. UBLOX neo-m8t supports the GNSS combination

GPS	Galileo	GLONASS	BeiDou
Yes	Yes	No	No
Yes	Yes	Yes	No
Yes	Yes	No	Yes
Yes	No	Yes	No
Yes	No	No	Yes
No	Yes	Yes	No
No	Yes	No	Yes
No	No	Yes	Yes

Command Syntax

```
gps satellite-system {gps|galileo|glonass|beidou}
no gps satellite-system {gps|galileo|glonass|beidou}
```

Parameters

gps
The Global Positioning System (GPS) is a satellite-based navigation system.

galileo
Galileo is a satellite-based navigation system.

glonass
GLONASS is a satellite-based navigation system.

beidou
BEIDOU is a satellite-based navigation system.

Default

None

Command Mode

Configuration mode

Applicability

Introduced in OcNOS version 6.5.2 and is applicable for UfiSpace Qumran2 (Q2) series platforms and Qumran-UX (QUX) series platforms.

Example

The following example illustrates how to configure the GNSS:

```
OcNOS(config)#gps satellite-system gps galileo
OcNOS(config)#gps satellite-system glonass
OcNOS(config)#no gps satellite-system gps galileo
OcNOS(config)#no gps satellite-system glonass
```

grandmaster-priority2

Use this command to configure grandmaster-priority2 for the virtual-clock-port. This command applies to the g.8275.1 profile but is not applicable to Ethernet interfaces.

Use the no parameter of this command to reset the priority2 to its default value.

Command Syntax

```
grandmaster-priority2 <0-255>
no grandmaster-priority2
```

Parameters

<0-255>
Priority range

Command Mode

PTP Clock Port Mode

Default

128

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#grandmaster-priority2 2
```

holdover

Use this command to enable holdover.

Use the no parameter of this command to reset it to the default duration.

Command Syntax

```
holdover <0-10080>
no holdover
```

Parameters

<0-10080>
Range of holdover in minutes.

Command Mode

PTP Clock Mode

Default

The default holdover minutes are 120.

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#holdover 15
```

local-priority (ptp-clk mode)

Use this command to specify the local attribute of the local clock.

Use the no form of this command to set the default value.

Note: Not supported for the default profile.

Command Syntax

```
local-priority <1-255>
no local-priority
```

Parameters

<1-255>
A numerical value specifying the local priority

Command Mode

PTP Clock Mode

Default

128

Applicability

Introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#local-priority 100
```

local-priority (ptp-clk-port mode)

Use this command to specify the local attribute of the local clock.

Use the no form of this command to set the default value.

Command Syntax

```
local-priority <1-255>
no local-priority
```

Parameters

<1-255>
Local priority

Command Mode

PTP Clock Port Mode

Default

128

Applicability

Introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 5
(config-clk-port)#local-priority 50
```

log-announce-interval

Use this command to set the log-announce interval. This command is applicable only for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the no form of this command to set the default value.

Command Syntax

```
log-announce-interval <-3-4>
no log-announce-interval
```

Parameters

<-3-4>

log-announce-interval range:

-3 to 3 for g8275.2

0 to 4 for the default profile

-3 to 4 for g8265.1

Command Mode

PTP Clock Port Mode

Default

- -3 for G 8275.2 profile
- 1 for the default profile
- 1 for G 8265.1 profile

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-announce-interval -2

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-announce-interval 2

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-announce-interval 2
```

log-min-delay-req-interval

Use this command to set the log-min-delay-req-interval. This command is applicable only for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the no form of this command to set the default value.

Command Syntax

```
log-min-delay-req-interval <-7-5>
no log-min-delay-req-interval
```

Parameters

<-7-5>

log-min-delay-req-interval range:

-7 to 0 or g8275.2

0 to 5 for the default profile

-7 to 4 for g8265.1

Command Mode

PTP Clock Port mode

Default

- -6 for g8275.2 profile
- 0 for the default profile
- 5 for G 8265.1 profile

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-min-delay-req-interval -5

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-min-delay-req-interval 5

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-min-delay-req-interval 4
```

log-sync-interval

Use this command to set the log-sync interval. This command applies only to the G.8275.2 profile, G.8265.1 profile, and the default profile.

Use the no form of this command to set the default value.

Command Syntax

```
log-sync-interval <-7-1>
no log-sync-interval
```

Parameters

<-7-1>

log-sync-interval range:

-7 to 0 for g8275.2

-1 to 1 for the default profile

-7 to 4 for g8265.1

Command Mode

PTP Clock Port mode

Default

- -6 for g8275.2 profile
- 0 for the default profile
- -5 for G 8265.1 profile

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-sync-interval -4

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-sync-interval -1

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#log-sync-interval -1
```

master

Use this command to configure the master IPv4 and IPv6 addresses. This applies to the G.8275.2 profile, G 8265.1 profile, SMPTE, and the default profile.

Use the no form of this command to delete the master address.

Priority applies only to the G 8265.1 profile.

Command Syntax

```
master (ipv4 A.B.C.D|ipv6 X:X::X:X) (priority PRIORITY|)
no master (ipv4 A.B.C.D|ipv6 X:X::X:X)
```

Parameters

A.B.C.D
Master IPv4 address

X:X::X:X
Master IPv6 address

PRIORITY
Priority value of master (Default is 0)

Command Mode

PTP Clock Port mode

Default

None

Applicability

Introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv4
(config-clk-port)#master ipv4 10.1.1.2

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv4
(config-clk-port)#master ipv4 10.1.1.2

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv4
(config-clk-port)#master ipv4 10.1.1.2 priority 1

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv4
```

```
(config-clk-port)#master ipv4 10.1.1.2
```

master-only

Use this command to configure a port as a master-only port.

Use the no form of this command to delete the master-only port configuration.

Command Syntax

```
master-only
no master-only
```

Parameters

None

Command Mode

PTP Clock Port Mode

Default

None

Applicability

Introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 10
(config-clk-port)#master-only
```

max-steps-removed

Use this command to set the maximum number of communication paths between the local clock and the grandmaster clock.

Use the no form of this command to set the default value.

Command Syntax

```
max-steps-removed <1-255>
no max-steps-removed
```

Parameters

<1-255>
Indicates the number of communication links between the local clock and the grandmaster clock.

Command Mode

PTP Clock Mode

Default

255

Applicability

Introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#max-steps-removed 10
```

network-interface

Use this command to reference the configured underlying interface used by this PTP Port.

Use the no form of this command to delete the network interface.

Command Syntax

```
network-interface IFNAME
network-interface IFNAME vlan VLAN_ID
network-interface IFNAME port IFNAME
network-interface(gps|prc)
no network-interface
```

Parameters

IFNAME
The name of a physical interface.

VLAN_ID
VLAN ID <1-4094> applicable for G.8275.1 profile

gps
GPS interface

prc
SMA/SMB or external interfaces

Command Mode

PTP Clock Port Mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#network-interface xe2
(config-clk-port)#exit
(config-ptp-clk)#clock-port 2
(config-clk-port)#network-interface xe3 vlan 2
(config-clk-port)#exit
(config-ptp-clk)#clock-port 3
(config-clk-port)#network-interface gps

(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#network-interface vlan1.2 port xe1

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
```

```
(config-clk-port)#network-interface vlan1.2 port xe1

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#network-interface vlan1.2 port xe1
```

number-ports

Use this command to set the number of PTP ports on the instance. If the number of ports exceeds one, the clock is configured as a boundary clock; otherwise, it's an ordinary clock.

Use the no form of this command to set the default value.

Command Syntax

```
number-ports <1-128>
no number-ports
```

Parameters

<1-128>
Number of PTP ports in this instance.

Command Mode

PTP Clock Mode

Default

One

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#number-ports 3
```

offset-log-variance

Use the command to specify an offset variance. The offset (scaled logarithmic variance) estimates the variations of the clock from a linear time scale when it is not synchronized with another clock using the PTP protocol.

Use the `no` form of this command to set the default value.

Note: Applicable to non-Ethernet ports for PTP clock port mode.

Command Syntax

```
offset-log-variance <0-65535>
no offset-log-variance
```

Parameters

<0-65535>
The offset variance occurs when it is not synchronized.

Command Mode

PTP Clock Mode

PTP Clock Port Mode

Default

In PTP Clock Mode, the default value is 65535.

In PTP Clock Port Mode, the default value for the clock-port is 0x4E5D.

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#offset-log-variance 3000

(config-ptp-clk)#clock-port 1
(config-clk-port)#offset-log-variance 2000
```

one-way

Use this command to set G 8265.1 to one-way.

Use the no form of this command to set the default value.

Command Syntax

```
one-way
```

Parameters

None

Command Mode

PTP Clock mode

Default

Two-way

Applicability

This command was introduced in OcNOS version 4.2.

Example

```
(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#one-way
```

priority1

Use this command to set the Priority1 attribute of the local clock (as specified in the IEEE-1588 standard). This command is applicable only for Default and SMPTE profiles.

Use the `no` form of this command to set the default value.

Command Syntax

```
priority1 <0-255>
no priority1
```

Parameters

<0-255>
Specifies the Priority1 attribute of the local clock.

Default

128

Command Mode

PTP Clock Mode

Applicability

This command was introduced in OcNOS version 6.4.2

Example

The following example shows how to execute the command.

```
#configure terminal
(config)#ptp clock 0 profile smpte
(config-ptp-clk)#priority1 3
```

priority2

Use this command to set the Priority2 attribute of the local clock (as specified in the IEEE-1588 standard).

Use the no form of this command to set the default value.

Command Syntax

```
priority2 <1-255>
no priority2
```

Parameters

<1-255>
Specifies the Priority2 attribute.

Command Mode

PTP Clock Mode

Default

128

Applicability

This command was introduced in OcNOS version 3.0.

Example

The following example shows how to execute the command.

```
#configure terminal
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#priority2 3
```

ptp clock profile

Use this command to access PTP Clock Mode and configure the G 8275.1, G 8275.2, default profile, and G 8265.1.

Use the `no` form of this command to delete the PTP clock.

Note: For a single clock configuration, only clock 0 should be configured. Clock 1 is used only for the IWF use case.

Command Syntax

```
ptp clock <0-1> profile (g8275.1|g8275.2|default|g8265.1|smpte)
no ptp clock <0-1> profile
```

Parameters

<0-1>
Clock 0 or 1

g8275.1
PTP Time/Phase G8275.1 Telecom Profile

g8275.2
PTP Time/Phase G8275.2 Telecom Profile

default
PTP time/phase default profile

g8265.1
PTP frequency telecom profile

smpte
PTP SMPTE profile

Command Mode

Configure Mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)exit

(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)exit
```

```
(config)#ptp clock 0 profile default
(config-ptp-clk)exit

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)exit

(config)#ptp clock 0 profile smpte
(config-ptp-clk)exit
```

ptp clock profile e2e-transparent

Use this command to configure the PTP transparent clock profile.

Use the no form of this command to unconfigure the PTP transparent clock profile.

Command Syntax

```
ptp clock 0 profile e2e-transparent
no ptp clock 0 profile
```

Parameters

None

Command Mode

Configure mode

Default

None

Applicability

This command is introduced in OcNOS version 4.2.

Examples

```
(config)#ptp clock 0 profile e2e-transparent

(config)#no ptp clock 0 profile
```

ptp-clock-sync

Use this command to set up the PTP clock based on the operating system clock.

Use the no form of this command to disable PTP clock sync.

Command Syntax

```
ptp-clock-sync
no ptp-clock-sync
```

Parameters

None

Command Mode

PTP Clock Mode

Default

None

Applicability

This command was introduced in OcNOS version 6.0.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#ptp-clock-sync
(config)#
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#ptp-clock-sync
```

reserved-vlan-base-id

Use this command to set the Reserved VLAN base ID.

Use the no form of this command to set the default base ID.

Command Syntax

```
reserved-vlan-base-id <2-4094>
no reserved-vlan-base-id
```

Parameters

<2-4094>
Base VLAN identifier range.

Command Mode

PTP Clock Mode

Default

The default VLAN base ID is 4064.

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#reserved-vlan-base-id 2
```

servo fts

Use this command to enable full-time support with SyncE.

Use the `no` form of this command to disable servo FTS.

Note: This command is available only for default and G.8275.2 profiles.

Command Syntax

```
servo fts
no servo
```

Parameters

None

Command Mode

PTP Clock Mode

Default

None

Applicability

This command was introduced in OcNOS version 6.0.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#servo fts

(config)#ptp clock 0 profile default
(config-ptp-clk)#servo fts
```

servo-history

Use this command to enable servo history with a specified interval.

Use the no form of this command to disable servo-history.

Command Syntax

```
servo-history <1-60>
no servo-history
```

Parameters

<1-60>

Enable servo history at intervals of 1 to 60 minutes (default is 15 minutes).

Command Mode

PTP Clock Mode

Default

The default interval value is 15 minutes.

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#servo-history 2
```

show ptp clock

Use this command to display a summary of the Precision Time Protocol (PTP) clock status.

Note: The sm-tlv option applies only to the SMPTE profile.

Command Syntax

```
show ptp clock <0-1> ((dataset (default|current|parent|time-properties|)|)|      (sm-tlv))
```

Parameters

<0-1>
Clock 0 or 1

dataset
The clock dataset

default
The default clock status

current
The current clock status

parent
The clock status of the parent clock

time-properties
The clock dataset time properties

sm-tlv
SMPTE TLV information

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp clock 0
PTP Clock Profile             : g8275.1
Holdover Duration             : 120 min
Default Dataset:
  Two Step Flag               : No
  Clock Identity              : B8:6A:97:FF:FE:F5:F4:C4
  Number Of Ports             : 1
  Priority1                   : 128
```

```
  Priority2                   : 128
  Slave Only                  : No
  Local Priority              : 128
  Max Steps Removed           : 255
  Domain Number               : 24
  Clock Quality               :
    Clock Class               : 248
    Clock Accuracy            : 254
    Offset ScaledLogVariance  : 65535

Current Dataset:
  Steps Removed               : 0
  Offset From Master          : 0 (0.000 nsec)
  Mean Path Delay             : 0

Parent Dataset:
  Parent Port ID              :
    Clock Identity            : B8:6A:97:FF:FE:F5:F4:C4
    Port Number               : 0
  Parent Stats                : No
  Observed Parent O.S.L.V     : 65535 (Offset Scaled Log Variance)
  Observed Parent P.C.R.      : 2147483647 (Phase Change Rate)
  Grandmaster Identity        : B8:6A:97:FF:FE:F5:F4:C4
  Grandmaster Priority1       : 128
  Grandmaster Priority2       : 128
  Grandmaster Clock Quality   :
    Clock Class               : 248
    Clock Accuracy            : 38
    Offset ScaledLogVariance  : 65535

Time Dateset:
  Current UTC Offset Valid    : False
  Current UTC Offset          : 36
  Leap 59                     : False
  Leap 61                     : False
  Time Traceable              : False
  Frequency Traceable         : False
  PTP Timescale               : True
  Time Source                 : Internal Oscillator
  Time of Day                 : Thu Jan  1 19:52:59 1970

OcNOS#sh ptp clock 0 sm-tlv

SMPTE Sync Metadata:
  Default frame rate          : 30000/1001
  GM Lock Status              : 0
  Time Address Flags          : 0x00
  Current Local Offset        : -37
  Jump Seconds                : 0
  Time of Next Jump           : 0x000000000000
  Time of Next Jam            : 0x000000000000
  Time of Previous Jam        : 0x000000000000
  Previous Jam Local Offset   : 0
  Daylight Saving             :
    Current                   : Not in effect
    Next discontinuity        : Not in effect
    Previous daily jam event  : Not in effect
  Leap Second Jump            : 0x00
```

show ptp clock port brief

Use this command to display a summary of PTP ports.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) brief
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
Port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp clock 0 port brief
Clock    Intf               Port                    Link
Port     Name               State          Encap    State     Mechanism
-------------------------------------------------------------------------
1        xe2                Master         Eth      Up        1-step E2E
2        xe1                Master         Eth      Up        1-step E2E
```

show ptp clock port dataset

Use this command to display a summary of PTP ports.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) dataset
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
PTP port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp clock 0 port dataset
Port 1:
  Port State                  : Master
  Port Identity               : B8:6A:97:FF:FE:F5:F4:C4:00:01
  Log Min Delay Req Interval  : -4
  Peer Mean Path Delay        : 0
  Log Announce Interval       : -3
  Announce Receipt Timeout    : 3
  Log Sync Interval           : -4
  Delay Mechanism             : End to end
  Version Number              : 2
  Local Priority              : 128
  Master only                 : False
  Signal Fail                 : False
  Network Interface           : xe0
  Vlan Configured             :
  Description                 : 13
  TTL                         : 64
  DSCP                        : 56
  Unicast Grant Duration      : 300
  Configured delay asymmetry  : 101000000 nsec
  Received Packets            : 0
  Discarded Packets           : 0
  Transmitted Packets         : 99
```


show ptp clock port drop-counters

Use this command to show the drop counters of the clock port.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) drop-counters
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
PTP port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
#show ptp clock 0 port drop-counters
Port 1:
  Drop Counters
  Pkt rcvd on bad port state  : 4042
```

show ptp clock port master

Use this command to display a master summary of PTP ports.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) master
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
PTP port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0

Example

```
#show ptp clock 0 port master
Port 1:
  Master #0                   : 10.1.1.2
```

show ptp clock port peer

Use this command to show a summary of peer PTP ports.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) peer
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
PTP port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp clock 0 port peer
Port 1 (1 peers):
  Peer #0
  IPv4 Address                : 10.1.1.2
  Clock Identity              : e8:c5:7a:ff:fe:2e:63:1c
  Received Announce           : 3297
  Received Sync               : 26523
  Received Delay Response     : 26524
  Received Signalling         : 9
  Transmitted Delay Request   : 26524
  Transmitted Signalling      : 9
```

show ptp clock port slave

Use this command to display a slave summary of PTP ports.

Command Syntax

```
show ptp clock <0-1> port (<1-31>|) slave
```

Parameters

<0-1>
Clock 0 or 1

<1-31>
PTP port number

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
#show ptp clock 0 port slave
Port 1:  Slave #0
     IPv4 Address               : 10.1.1.1
    Clock Identity             : e8:c5:7a:ff:fe:2e:4b:1c
    Delay Mechanism            : End to end
    log Announce Interval      : -3
    log Sync Interval          : -6
    Log Delay Req Interval     : -6
```

show ptp clock stats

Use this command to display PTP packet statistics.

Command Syntax

```
show ptp clock <0-1> stats
```

Parameters

<0-1>
Clock 0 or 1

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp clock 0 stats

clock 0:
  Number of ports             : 32
  Received Packets            : 0
  Discarded Packets           : 0
  Received IPv4 PTP Packets   : 0
  Received IPv6 PTP Packets   : 0
  Received L2 PTP Packets     : 0
  RX Queue Overflows          : 0
  Transmitted Packets         : 346

Port 1:
  Received Packets            : 0
  Discarded Packets           : 0
  Transmitted Packets         : 34
```

show ptp servo

Use this command to display servo information.

Command Syntax

```
show ptp servo
```

Parameters

None

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show ptp servo
PTP servo status for clock 0
  Servo Config                : Phase Correction
  Servo State                 : Warmup
  Servo State Duration        : 04:26:07
  Servo APTS Mode             : N/A
  Lock Status                 : Unlocked
  Frequency Correction        : 0.000 ppb
  Phase Correction            : 0.000 nsec
  Offset From Master          : 0.000 nsec
  Mean Path Delay             : 0 nsec
  Sync Packet Rate            : 0
  Delay Packet Rate           : 0
```

show ptp servo history

Use this command to show the servo history.

Command Syntax

```
show ptp servo history
```

Parameters

None

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
#show ptp servo history
Time                            Phase Correction        Freq Correction
                                (nsec)                  (pbb)
-------------------------------------------------------------------------
2000 Jan 06 19:15:01            0.000                   0.000
2000 Jan 06 19:17:01            0.000                   0.000
2000 Jan 06 19:19:01            0.000                   0.000
2000 Jan 06 19:21:01            0.000                   0.000
2000 Jan 06 19:23:01            0.000                   0.000
2000 Jan 06 19:25:01            0.000                   0.000
```

show ptp utc-offset

Use this command to show the PTP leap seconds configuration.

Command Syntax

```
show ptp utc-offset
```

Parameters

None

Command Mode

Privileged Exec mode

Default

None

Applicability

This command was introduced in OcNOS version 6.4.1.

Example

```
#show ptp utc-offset
Utc offset baseline is 37

Leap seconds configured:
 From 2024-01-01 (3913056000 NTP seconds), utc offset is +38 seconds.
 From 2024-07-01 (3928780800 NTP seconds), utc offset is +39 seconds.
```

slave-only

Use this command to set a clock as a slave-only clock.

Use the no form of this command to disable this option.

Command Syntax

```
slave-only
no slave-only
```

Parameters

None

Command Mode

PTP Clock Mode

Default

None

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#configure terminal
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#slave-only
```

sm-tlv append disable

Use this command to disable tlv append. Applicable only for SMPTE profile.

Use the noform of this command to unconfigure sm-tlv append disable.

Command Syntax

```
sm-tlv append disable
no sm-tlv append disable
```

Parameters

None

Default

The sm-tlv append is enabled.

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Following is an example to execute the CLI.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#sm-tlv append disable
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#no sm-tlv append disable
```

sm-tlv default-frame-rates

Use this command to set the default frame rate. Applicable only for SMPTE profile.For example, if the video default frame rate is 30000/1001 Hz, set first argument to numerator value (i.e 30000) and second argument to denominator value (i.e 1001).

Use the no form of this command to unconfigure default frame rates.

Command Syntax

```
sm-tlv default-frame-rates <numerator> <denominator>
no sm-tlv default-frame-rates
```

Parameters

numerator
Setting numerator for the default system frame rate

denominator
Setting denominator for the default system frame rate

Default

None

Command Mode

PTP Clock mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Following is an example to execute the CLI.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)# sm-tlv default-frame-rate 30000 1001

OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)# no sm-tlv default-frame-rate
```

sm-tlv process disable

Use this command to disable tlv processing. Applicable only for smpte profile.

Use the no form of this command to unconfigure sm-tlv process disable.

Command Syntax

```
sm-tlv process disable
no sm-tlv process disable
```

Parameters

None

Default

The sm-tlv process is enabled.

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Following is an example to execute the CLI.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#sm-tlv process disable
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#no sm-tlv process disable
```

sm-tlv time-address-flags color-frame

Use this command to set the sm-tlv color frame. This is applicable only for the SMPTE profile.

Use the no form of this command to remove the configured SM-TLV color frame.

Command Syntax

```
sm-tlv time-address-flags color-frame
no sm-tlv time-address-flags color-frame
```

Parameters

None

Default

None

Command Mode

PTP Clock mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

The following is an example of executing the CLI.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#sm-tlv time-address-flags color-frame

OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#no sm-tlv time-address-flags color-frame
```

sm-tlv time-address-flags drop-frame

Use this command to set the sm-tlv drop frame. This is applicable only for the SMPTE profile.

Use the no form of this command to unconfigure the SM-TLV drop-frame.

Command Syntax

```
sm-tlv time-address-flags drop-frame
no sm-tlv time-address-flags drop-frame
```

Parameters

None

Default

None

Command Mode

PTP Clock mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Here is an example of how to execute the CLI.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#sm-tlv time-address-flags drop-frame

OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#no sm-tlv time-address-flags drop-frame
```

source-address address

Use this command to set the source address to the configured IP address for the G.8275.2 profile, G.8265.1, SMPTE, and Default profile.

Use the 'no' form of this command to remove the configured source address. This command is only supported if the transport mode is multicast.

Command Syntax

```
source-address ipv4 address A.B.C.D
source-address ipv6 address X:X::X:X
no source-address (ipv4 | ipv6) address
```

Parameters

ipv4
Configuring IPv4 address

ipv6
Configuring IPv4 address

A.B.C.D
IPv4 address.

X:X::X:X
IPv6 address.

Default

None

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Here is an example to execute the CLI.

```
OcNOS(config)#ptp clock 0 profile g8275.2
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)# source-address ipv4 address 10.1.1.1

OcNOS(config)#ptp clock 0 profile g8275.2
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#source-address ipv6 address 10:1::1
```

source-address interface

Use this command to set the source address to the configured interface IP address for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the `no` form of this command to remove the configured source address.

Command Syntax

```
source-address (ipv4 | ipv6) interface IFNAME
no source-address (ipv4 | ipv6) interface
```

Parameters

ipv4
Configuring IPv4 address

ipv6
Configuring IPv4 address

IFNAME
Name of the interface whose IP address is used as the source address.

Default

None

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in OcNOS version 6.4.1.

Example

```
OcNOS(config)#ptp clock 0 profile g8275.2
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#source-address ipv4 interface lo

OcNOS(config)#ptp clock 0 profile g8275.2
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#source-address ipv6 interface lo
```

source-address linklocal

Use this command to set the source address as link-local for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the no form of this command to remove the configured source address.

Command Syntax

```
source-address ipv6 linklocal
no source-address ipv6 linklocal
```

Parameters

None

Default

None

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#source-address ipv6 linklocal

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#source-address ipv6 linklocal
```

transport

Use this command to set the transport type to IPv4 unicast/multicast or IPv6 unicast/multicast. This is applicable for the G.8275.2 profile, G.8265.1, SMPTE, and the default profile.

Use the no form of this command to remove the configured transport type.

Command Syntax

```
transport (ipv4|ipv6|ipv4-multicast|ipv6-multicast)
no transport
no transport ipv6-multicast
```

Parameters

ipv4
IPv4 Transport Type

ipv6
IPv6 Transport Type

ipv4-multicast
IPv4 Multicast Transport Type

ipv6-multicast
IPv6 Multicast Transport Type

Default

None

Command Mode

PTP Clock Port mode

Applicability

The command `transport (ipv4|ipv6)` was introduced in the OcNOS version 4.0.

The command `transport (ipv4-multicast|ipv6-multicast)` was introduced in OcNOS version 6.4.2.

Example

The following is an example of executing the CLI.

```
OcNOS#configure terminal
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv4-multicast

(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#no transport

(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#transport ipv6-multicast
```

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#no transport
```

transport ipv6-multicast type

Use this command to set transport type as ipv6 multicast and we can specify the multicast address type. Applicable for G.8275.2 profile, G 8265.1, SMPTE profile and default profile.

Use the no form of this command to unconfigure transport-type.

Command Syntax

```
transport ipv6-multicast type (site-local|interface-local|link-local|admin-local|organization-
local|global-local)
no transport ipv6-multicast type
```

Parameters

Site-local
- ff05::181

interface-local
- ff01::181

link-local
- ff02::181

admin-local
- ff04::181

organization-local
- ff08::181

global-local
- ff0e::181

Default

None

Command Mode

PTP Clock Port mode

Applicability

This command was introduced in the OcNOS version 6.4.2.

Example

Explain or describe the example.

```
OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#transport ipv6-multicast type admin-local

OcNOS(config)#ptp clock 0 profile smpte
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#transport ipv6-multicast type global-local

OcNOS(config)#ptp clock 0 profile smpte
```

```
OcNOS(config-ptp-clk)#clock-port 1
OcNOS(config-clk-port)#no transport ipv6-multicast type
```

ttl

Use this command to set the TTL value. It applies to the G.8275.2 profile, G.8265.1, SMPTE, and the default profile. Use the no form of this command to set the default value.

Command Syntax

```
ttl VALUE
no ttl
```

Parameters

<1-255>
Setting TTL value (default is 64)

Command Mode

PTP Clock Port mode

Default

64

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#ttl 2

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#ttl 2

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#ttl 2
```

two-step

Use this command to set the two-step clock flag.

Note: Applicable for Qumran-UX (QUX) series platforms.

Use the no form of this command to set the default one-step.

Command Syntax

```
two-step
no two-step
```

Parameters

None

Default

The default is one-step.

Command Mode

PTP Clock mode

Applicability

This command introduced in OcNOS version 4.2.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#two-step
```

unicast-grant-duration

Use this command to set the unicast-grant-duration value. This applies to G.8275.2, G.8265.1, SMPTE, and the default profile.

Use the no form of this command to set the default value.

Command Syntax

```
unicast-grant-duration <60-1000>
no unicast-grant-duration
```

Parameters

<60-1000>
Unicast-grant-duration value (default is 300)

Command Mode

PTP Clock Port mode

Default

300

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#ptp clock 0 profile g8275.2
(config-ptp-clk)#clock-port 1
(config-clk-port)#unicast-grant-duration 70

(config)#ptp clock 0 profile default
(config-ptp-clk)#clock-port 1
(config-clk-port)#unicast-grant-duration 70

(config)#ptp clock 0 profile g8265.1
(config-ptp-clk)#clock-port 1
(config-clk-port)#unicast-grant-duration 70
```

utc-offset baseline

Use this command to set the UTC leap seconds baseline, which is the default value of leap seconds prior to any configured UTC offset date, in order to calculate UTC time from the TAI timescale: UTC = TAI - offset.

Use the no form of this command to set the default value to 37 seconds, which is applied on 2017-01-01.

Command Syntax

```
utc-offset baseline <0-99>
```

Parameters

<0-99>
UTC leap seconds baseline

Command Mode

PTP Clock Mode

Default

37 seconds

Applicability

This command was introduced in OcNOS version 6.3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#utc-offset baseline 38
(config-ptp-clk)#utc-offset date 2024-07-01 39
(config-ptp-clk)#clock-type tgm
(config-ptp-clk)#number-ports 1
(config-ptp-clk)#clock-port 1
(config-clk-port)#network-interface xe5
(config-clk-port)#master-only
(config-clk-port)#exit
(config-ptp-clk)#commit
(config-ptp-clk)#exit
```

utc-offset date

Use this command to set the UTC date when applying a new offset value for leap seconds. Can add multiple dates with offset entries.

Command Syntax

```
utc-offset date YYYY-MM-DD <0-99>
no utc-offset date YYYY-MM-DD
```

Parameters

YYYY-MM-DD
Date

<0-99>
Offset in seconds

Command Mode

PTP Clock Mode

Default

None

Applicability

This command was introduced in OcNOS version 6.3.0.

Example

```
(config)#ptp clock 0 profile g8275.1
(config-ptp-clk)#utc-offset baseline 38
(config-ptp-clk)#utc-offset date 2024-07-01 39
(config-ptp-clk)#clock-type tgm
(config-ptp-clk)#number-ports 1
(config-ptp-clk)#clock-port 1
(config-clk-port)#network-interface xe5
(config-clk-port)#master-only
(config-clk-port)#exit
(config-ptp-clk)#commit
(config-ptp-clk)#exit
```

SYNCHRONOUS ETHERNET CONFIGURATION

Configuring Synchronous Ethernet

This chapter shows how to configure Synchronous Ethernet. This chapter shows two scenarios in selecting a frequency source:

- Using quality level
- Using priority

Topology

In the following topology, SW2 can select a clock source from SW1 or SW3. The selection is based on quality level or priority.

Note: We can enable SyncE on the physical interfaces which can be L2, L3 or member port of the **LAG**[1].

Figure 11. Selecting a Frequency Source

Using Quality Level

In the procedure below, SW1 and SW3 are both configured as output sources, with SW1 having quality level QL_PRC and SW3 having quality level QL_SSU_A. SW2 is configured to accept a frequency from either SW1 or SW3. Because quality level is used as the clock selection criteria (the default setting), SW2 chooses SW1 as the frequency source.

SW1

`#configure terminal`	Enter configure mode.
`(config)#synce`	Enter configure Synchronous Ethernet mode.
`(config-synce)#synchronization option 1`	Set the synchronization network type.
`(config-synce)#exit`	Exit configure Synchronous Ethernet mode.
`(config)#interface eth6`	Configure interface eth6.
`(config-if)#switchport`	Configure eth6 as a layer 2 port.
`(config-if)# bridge group 1`	Configure the interface to be part of bridge 1.
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.

[1]Link Aggregation Group

`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#output-source`	Configure the interface as an output source.
`(config-if-synce)#quality-level QL_PRC`	Assign the quality level as PRC.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

SW2

`(config)#interface eth9`	Configure interface eth9.
`(config-if)#switchport`	Configure eth9 as a layer 2 port.
`(config-if)# bridge group 1`	Configure the interface to be part of bridge 1.
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#input-source 2`	Configure the interface as an input source with priority 2.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.
`(config)#interface eth10`	Configure interface eth10.
`(config-if)#switchport`	Configure eth10 as a layer 2 port.
`(config-if)# bridge group 1`	Configure the interface to be part of bridge 1.
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#input-source 2`	Configure the interface as an input source with priority 2.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

SW3

`(config)#interface eth6`	Configure interface eth6.
`(config-if)#switchport`	Configure eth1 as a layer 2 port.
`(config-if)# bridge group 1`	Configure the interface to be part of bridge 1.
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#output-source`	Configure the interface as an output source.
`(config-if-synce)#quality-level QL_SSU_A`	Assign the quality level as SSU_A.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

Validation

SW1

Verify the Synchronous Ethernet details.

```
#Verify the output source.
#show synce output-sources
Interface Name  : eth6
Link State      : Up
QL Configured   : QL_PRC
QL Operational  : QL_PRC
```

SW2

Verify the input source.

```
#show synce input-sources
Interface Name          : eth9
ESMC Status             : OK
Is-selected-Source      : Yes
QL Configured           : N/A
QL received in ESMC     : QL_PRC
QL Operational          : QL_PRC
Priority                : 2
Hold-off(ms)            : 300
Wait-to-restore(mins)   : 5
Link State              : Up
Signal Fail             : No
External Commands       : None
Clock-source-ID         : 256
WTR Timer Running       : No
Hold-off Timer Running  : No

Interface Name          : eth10
ESMC Status             : OK
Is-selected-Source      : No
QL Configured           : N/A
QL received in ESMC     : Ql_SSU_A
QL Operational          : Ql_SSU_A
Priority                : 2
Hold-off(ms)            : 300
Wait-to-restore(mins)   : 5
Link State              : Up
Signal Fail             : No
External Commands       : None
Clock-source-ID         : 256
WTR Timer Running       : No
Hold-off Timer Running  : No
```

Verify the Synchronous Ethernet details.

```
#
# show synce de
Equipment Clock         : EEC-option1
Interface Name          : eth9
ESMC Status             : OK
Is-selected-Source      : YES
QL                      : QL_PRC
SyncE Clock State       : Locked
DPLL Clock State        : Locked
Synce State Duration    : 00:02:25
Selected-Clk-Src-ID     : 256
```


SW3

Verify the Synchronous Ethernet details.

```
#
#show synce de
Equipment Clock         : EEC-option1
SyncE Clock State       : Free-run
DPLL Clock State        : Free-run
```

Verify the output source on SW3.

```
#
Interface Name  : eth6
Link State      : Up
QL Configured   : QL_SSU_A
QL Operational  : QL_SSU_A
```

Note: Use "`show synce stats`" to check the counter statistics and use "`clear synce stats`" to clear the counters. Show esmc counters changed to show synce stats.

Using Priority

In the procedure below, SW1 and SW3 in Figure 11 are both configured as output sources, with SW1 having priority 2 and SW3 having priority 1. SW2 is configured to accept a frequency from either SW1 or SW3. Because quality level is not used as the clock selection criteria (an explicit setting), SW2 chooses SW3 (with the higher priority) as the frequency source.

SW1

`#configure terminal`	Enter configure mode.
`(config)#synce`	Enter configure Synchronous Ethernet mode.
`(config-synce)#synchronization option 1`	Set the synchronization network type.
`(config-synce)#clock-selection mode ql-disabled`	Disable quality level checking.
`(config-synce)#exit`	Exit configure Synchronous Ethernet mode.
`(config)#interface eth6`	Configure interface eth6.
`(config-if)#switchport`	Configure eth6 as a layer 2 port.
`(config-if)#bridge group 1`	Configure the interface to be part of bridge 1
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#output-source`	Configure the interface as an output source.
`(config-if-synce)#quality-level QL_PRC`	Assign quality level as PRC.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

SW2

`#configure terminal`	Enter configure mode.
`(config)#synce`	Enter configure Synchronous Ethernet mode.
`(config-synce)#clock-selection mode ql-disabled`	Disable quality level checking.
`(config-synce)#exit`	Exit configure Synchronous Ethernet mode
`(config)#interface eth9`	Configure interface eth9.
`(config-if)#switchport`	Configure eth9 as a layer 2 port.
`(config-if)#bridge group 1`	Configure the interface to be part of bridge 1
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#input-source 2`	Configure the interface as an input source with priority 2.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.
`(config)#interface eth10`	Configure interface eth10.
`(config-if)#switchport`	Configure eth10 as a layer 2 port
`(config-if)#bridge group 1`	Configure the interface to be part of bridge 1
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#input-source 1`	Configure the interface as an input source with priority 1.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

SW3

`#configure terminal`	Enter configure mode.
`(config)#synce`	Enter configure Synchronous Ethernet mode.
`(config-synce)#synchronization option 1`	Configure synchronization network as option 1.
`(config-synce)#clock-selection mode ql-disabled`	Disable quality level checking.
`(config-synce)#exit`	Exit configure Synchronous Ethernet mode.
`(config)#interface eth6`	Configure interface eth6.
`(config-if)#switchport`	Configure eth6 as a layer 2 port.
`(config-if)#bridge group 1`	Configure the interface to be part of bridge 1
`(config-if)#synce`	Enter interface Synchronous Ethernet mode.
`(config-if-synce)#mode synchronous`	Configure synchronous mode.
`(config-if-synce)#output-source`	Configure the interface as an output source.

`(config-if-synce)#quality-level QL_SSU_A`	Assign quality level as SSU_A.
`(config-if-synce)#exit`	Exit interface Synchronous Ethernet mode.
`(config-if)#exit`	Exit interface mode.

Validation

SW1

Verify the Synchronous Ethernet details.

```
#show synce de
Equipment Clock         : EEC-option1
SyncE Clock State       : Free-run
DPLL Clock State        : Free-run
Synce State Duration    : 00:39:20
```

Verify the output source.

```
#show synce output-sources
Interface Name  : eth6
Link State      : Up
QL Configured   : QL_PRC
QL Operational  : QL_PRC
```

SW2

Verify the input source

```
#show synce input-sources
Interface Name          : eth9
ESMC Status             : OK
Is-selected-Source      : No
QL Configured           : N/A
QL received in ESMC     : QL_PRC
QL Operational          : QL_PRC
Priority                : 2
Hold-off(ms)            : 300
Wait-to-restore(mins)   : 5
Link State              : Up
Signal Fail             : No
External Commands       : None
Clock-source-ID         : 256
WTR Timer Running       : No
Hold-off Timer Running  : No

Interface Name          : eth10
ESMC Status             : OK
Is-selected-Source      : Yes
QL Configured           : N/A
QL received in ESMC     : Ql_SSU_A
QL Operational          : Ql_SSU_A
Priority                : 2
Hold-off(ms)            : 300
Wait-to-restore(mins)   : 5
Link State              : Up
Signal Fail             : No
External Commands       : None
Clock-source-ID         : 256
WTR Timer Running       : No
Hold-off Timer Running  : No
```

Verify the Synchronous Ethernet details.

```
# show synce de
Equipment Clock         : EEC-option1
Interface Name          : eth10
ESMC Status             : OK
Is-selected-Source      : YES
QL                      : QL_SSU_A
SyncE Clock State       : Locked
DPLL Clock State        : Locked
Synce State Duration    : 00:02:25
Selected-Clk-Src-ID     : 256
```

SW3

Verify the Synchronous Ethernet details.

```
#show synce de
Equipment Clock         : EEC-option1
SyncE Clock State       : Free-run
DPLL Clock State        : Free-run
Synce State Duration    : 00:39:20
```

Verify the output source.

```
#show synce output-sources
Interface Name  : eth6
Link State      : Up
QL Configured   : QL_SSU_A
QL Operational  : QL_SSU_A
```


SYNCHRONOUS ETHERNET COMMAND REFERENCE

SyncE Commands

This chapter describes the Synchronous Ethernet configuration commands:

1000Base-T mode

Use this command to set the 1000Base-T mode as master or slave. Applicable for broncos phy ports.

Use `no` form of this command to unset this configuration and set default value as auto

Command Syntax

```
1000Base-T (master|slave)
no 1000Base-T
```

Parameters

Master
Configure 1000Base-T mode to master

slave
Configure 1000Base-T mode to slave

Default

Auto

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced in OcNOS version 4.1.

Example

```
(config)#interface ge1
(config-if)#
(config-if)#synce
(config-if-synce)#1000Base-T master
```

clock-selection mode

Use this command to set whether to use the Quality Level (QL) as a criteria when selecting a clock.

Use the `no` form of this command to set the QL to its default (`ql-enabled`).

Command Syntax

```
clock-selection mode (ql-enabled|ql-disabled)
no clock-selection
```

Parameters

ql-enabled
Use the quality level as a criteria when selecting a clock

ql-disabled
Do not use the quality level as a criteria when selecting a clock

Default

The default value is ql-enabled.

Command Mode

Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#synce
(config-synce)#clock-selection mode ql-enabled

(config-synce)#no clock-selection
```

clock-source-id

Use this command to set the clock source ID for Synchronous Ethernet interface.

Use the `no` form of this command to unset this value.

Note: Assign the same clock source ID if interfaces are connected to same clock source.

Command Syntax

```
clock-source-id <1-255>
no clock-source-id
```

Parameters

<1-255>
Clock Source ID.

Command Mode

Interface Synchronous Ethernet Mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#configure terminal
(config)#interface xe1
(config-if)#synce
(config-if-synce)#clock-source-id 1
```

debug synce

Use this command to turn on debugging.

Use the no form of this command to turn off debugging

Command Syntax

```
debug synce (event|recvd|trans|all)
no debug synce (event|recvd|trans|all)
```

Parameters

event
Enable event debugs

recvd
Enable receive debugs

trans
Enable transmit debugs

all
Enable all debugs

Command Mode

Exec mode and Privileged Exec mode

Configure mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#debug synce event
(config)#debug synce recvd
(config)#debug synce trans
(config)#no debug synce event
(config)#no debug synce recvd
(config)#no debug synce trans
```

dpll3-select

Use this command to select dpll3 as fixed input 10MHZ-IN.

Use `no` form of this command to unset this configuration.

Command syntax

```
dpll3-select 10mhz-in
no dpll3-select
```

Command Mode

Configure Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 4.0. Applicable only for UFI-S9500-30XS board.

Examples

```
(config)#synce
(config-synce)#dpll3-select 10mhz-in
```

hold-off

Use this command to set the hold-off time in milliseconds. The hold-off time ensures that short activation of signal fail is not passed to the selection process.

Use the `no` form of this command to set the default value (300 milliseconds).

Command syntax

```
hold-off <300-1800>
no hold-off
```

Parameters

<300-1800>
Hold-off time in milliseconds

Default

The default value is 300 milliseconds.

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Examples

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#hold-off 500

(config-if-synce)#no hold-off
```

holdover

Use this command to set Synchronous holdover.

Use `no` form of this command to disable holdover.

Command Syntax

```
holdover (<0-1440>|)
no holdover
```

Parameters

<0-1440>
Synchronous holdover range in minutes.

Command Mode

Synchronous Ethernet Mode

Default

Default Synchronous holdover is 10 minutes.

Applicability

This command was introduced in OcNOS version 4.0. Applicable only for 10MHz out interface.

Example

#configure termin

```
#configure terminal
(config)#synce
(config-synce)#holdover 2
```

input-source

Use this command to set an input timing source. Synchronization packets are received from this source and sent to the clock selection algorithm.

Use the `no` form of this command to delete an input source.

Command Syntax

```
input-source <0-255>
no input-source
```

Parameters

<0-255>

Priority: 1 is the highest, 255 is the lowest; 0 means the source will not be considered by the clock selection algorithm

Default

The default value is 0 meaning the interface will not be considered by the clock selection algorithm.

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#input-source 1
```

mode

Use this command to configure the interface as synchronous or non-synchronous:

- Synchronous interfaces extract the frequency of their input signal from synchronization packets and passes them to their internal clocks.
- Non-synchronous interfaces do not participate in the synchronization process.

Use the `no` form of this command to set the mode to its default (non-synchronous).

Command Syntax

```
mode (synchronous | non-synchronous)
no mode
```

Parameters

synchronous
Synchronous mode

non-synchronous
Non-synchronous mode

Default

The default value is `non-synchronous`.

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#mode synchronous

(config-if-synce)#no mode
```

output-source

Use this command to use an Ethernet interface as a timing output source.

Use the `no` form of this command to stop using an Ethernet interface as a timing output source.

Command Syntax

```
output-source
no output-source
```

Parameters

None

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#output-source
```

quality-level

Use this command to set the quality level (QL) for the timing source.

Use the `no` form of this command to unconfigure quality-level on a port.

Command Syntax

```
quality-level QL_VAL
no quality-level
```

Parameters

QL_VAL
Quality level. The quality level you can specify depends on the setting of the synce-interface (page 211) command. See ITU-T Rec. G.781 for details.

QL_PRC
Primary Reference Clock

QL_SSU_A
Types I or V slave clock

QL_SSU_B
Type VI slave clock

QL_SEC
SDH Equipment Clock

QL_DNU
Do not use this signal for synchronization

QL_STU
Synchronized – traceability unknown

QL_ST2
Traceable to stratum 2

QL_ST3E
Traceable to stratum 3E

QL_SMC
Traceable to the SONET clock self-timed

QL_PROV
Provisionable by the network operator

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Examples

```
(config)#interface eth1
```



```
(config-if)#synce
(config-if-synce)#quality-level QL_PRC
```

synce (configure mode)

Use this command to configure Synchronous Ethernet.

This command changes the mode from configure mode to configure Synchronous Ethernet mode and initializes the global Synchronous Ethernet parameters.

Use `no` form of this command to disable synce.

Command Syntax

```
synce
no synce
```

Parameters

None

Command Mode

Configure mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#synce
(config-synce)
```

synce (interface mode)

Use this command to enable Synchronous Ethernet for an interface.

This command changes the mode from interface mode to interface Synchronous Ethernet mode.

This command does not automatically start synchronization distribution. You must explicitly give the mode (page 205) command, specifying the `synchronous` option.

Use the `no` form of this command disable Synchronous Ethernet for an interface.

Command Syntax

```
synce
no synce
```

Parameters

None

Command Mode

Interface mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#
```

synce-interface

Use this command to enable Synchronous Ethernet for both GPS and 10MHz interfaces as input interfaces. This command changes the mode from interface mode to Synchronous interface Ethernet mode.

Use no form of this command to delete synce interface.

Note: Bits-e1 Applicable only for UFI-S9500-30XS, UFI-S9500-22XST, AS7316-26XB boards.

Note: Bits-t1 Applicable only for UFI-S9500-30XS, UFI-S9500-22XST boards.

Command Syntax

```
synce-interface (gps | 10mhz-in|ptp|bits-t1|bits-e1)
no synce-interface (gps | 10mhz-in|ptp |bits-t1|bits-e1)
```

Parameters

gps
Input interface as GPS

10mhz-in
Input interface as 10MHz

ptp
PTP interface as input-source

bits-t1
bits-t1 interface as input-source

bits-e1
bits-e1 interface as input-source

Command Mode

Interface mode

Applicability

This command was introduced in OcNOS version 4.0.

Example

```
(config)#interface eth1
(config-if)#synce-interface gps
(config-synce-if)#

 (config)#synce-interface bits-t1
(config-synce-if)#
```

synchronization option

Use this command to set the synchronization option for the internal clock that is locked in frequency to an incoming signal.

Use the `no` form of this command to set the default synchronization option (1).

Command Syntax

```
synchronization option (1 | 2)
no synchronization option
```

Parameters

1
Networks optimized for the 2048 kbit/s hierarchy

2
Networks optimized for the 1544 kbit/s hierarchy that includes the rates 1544 kbit/s, 6312 kbit/s, and 44 736 kbit/s

Default

The default value is 1.

Command Mode

Configure Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Example

```
(config)#synce
(config-synce)#synchronization option 2

(config-synce)#no synchronization option
```

wait-to-restore

Use this command to set the wait-to-restore timer in minutes. The wait-to-restore time ensures that a synchronization source that previously failed is considered by the selection process again only if it is fault free for a certain time.

Use the `no` form of this command to set the default wait-to-restore time (5 minutes).

Command syntax

```
wait-to-restore <0-12>
no wait-to-restore
```

Parameters

<0-12>
Wait-to-restore time in minutes

Default

The default value is 5 minutes.

Command Mode

Interface Synchronous Ethernet mode

Applicability

This command was introduced before OcNOS version 1.3.

Examples

```
(config)#interface eth1
(config-if)#synce
(config-if-synce)#wait-to-restore 1

(config-if-synce)#no wait-to-restore
```

SyncE Show Commands

This chapter describes the Synchronous Ethernet show commands:

show debugging synce

Use this command to display debugging of Ethernet Synchronization.

Command Syntax

```
show debugging synce
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Applicability

This command was introduced in OcNOS version 6.3.0.

Example

```
#debug synce all
#show debugging synce
SyncE debugging status:
SyncE events debugging is on
SyncE receive debugging is on
SyncE transmit debugging is on
```

show synce details

Use this command to display details of the clock most recently selected by the Clock Selection Algorithm (CSA).

Command Syntax

```
show synce details
```

Parameters

None

Command Mode

Privileged Exec mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show synce details
Equipment Clock         : EEC-option1
Interface Name          : eth9
ESMC Status             : OK
Is-selected-Source      : YES
QL                      : QL_PRC
SyncE Clock State       : Locked
DPLL Clock State        : Locked
Synce State Duration    : 00:03:26
Selected-Clk-Src-ID     : 256
```

show synce input-sources

Use this command to display details of all interfaces that are configured as Synchronous Ethernet input sources.

Command Syntax

```
show synce input-sources
```

Parameters

None

Command Mode

Privileged Exec mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show synce input-sources
Interface Name          : xe1
ESMC Status             : OK
Is-selected-Source      : YES
QL Configured           : QL_PRC
QL received in ESMC     : QL_PRC
Operational QL          : QL_PRC
Priority                : 1
Hold-off(ms)            : 300
Wait-to-restore(mins)   : 5
Signal Fail             : No
External Commands       : None
Clock-source-ID         : 256
WTR Timer Running       : No
Hold-off Timer Running  : No
```

show synce output-sources

Use this command to display details of all interfaces that are configured as Synchronous Ethernet output sources.

Command Syntax

```
show synce output-sources
```

Parameters

None

Command Mode

Privileged Exec mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show synce output-sources
Interface Name  : eth6
Link State      : Up
QL Configured   : QL_PRC
QL Operational  : QL_DNU
```

show synce stats

Use this command to display Ethernet Synchronization statistics.

Note: Show esmc counters changed to show synce stats.

Command Syntax

```
show synce stats
```

Parameters

None

Command Mode

Privileged Exec mode

Applicability

This command was introduced in OcNOS version 3.0.

Example

```
#show synce stats
Interface Name    Status      ESMC Received  ESMC Sent
_____________________________________________________
xe47                OK          1_______________1
xe48                OK          5_______________2
```