



G.8265.1 Profile

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Information about G.8265.1 Profile

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

- **Clock Advertisement:** G.8265.1 specifies changes to values used in Announce messages for advertising PTP clocks: the clock class value is used to advertise the QL of the clock, while other values are not used.
- **Clock Selection:** G.8265.1 profile also defines an alternate Best Master Clock Algorithm (BMCA) to select port states and clocks is defined for the profile. This profile also requires to receive Sync messages (and optionally, Delay-Response messages) to qualify a clock for selection.
- **Port State Decision:** The ports are statically configured to be Master or Slave instead of using FSM to dynamically set port states.
- **Packet Rates:** The packet rates higher than rates specified in the IEEE 1588-2008 standard are used. They are:
 - Sync/Follow-Up Packets: Rates from 128 packets-per-second to 16 seconds-per-packet.
 - Delay-Req/Delay-Resp Packets: Rates from 128 packets-per-second to 16 seconds-per-packet.
 - Announce Packets: Rates from 8 packets-per-second to 64 seconds-per-packet.
- **Transport Mechanism:** G.8265.1 restricts the PTP transport mechanism to IPv4. G.8265.1 mandates that all packets should be sent unicast, rather than multicast.
- **Clock Type:** G.8265.1 restricts the supported clock-types to Ordinary Clock (a clock with only a single PTP port). For a G.8265.1 slave, this means that all PTP ports on a single device operate independently of each other: functions such as clock selection operate outside of the context of each Ordinary Clock within the system.

- **Domain Numbers:** G.8265.1 restricts the range of domain numbers to between 4 and 23, with the default being 4.
- **Port Numbers:** G.8265.1 dictates that all port numbers for PTP ports should be 1, as all clocks within a G.8265.1 network are ordinary clocks.

G.8265.1 also restricts the clock types in a network to Master and Slave clocks, meaning that neither boundary clock nor transparent clocks are supported. This document covers extensions to G.8265.1 in order to support boundary clock.

Limitations

- G.8265.1 doesn't support on sub-interface.
- G.8265.1 doesn't support on vrf interface.
- G.8265.1 doesn't support on port-channel interfac.

G.8265.1 Profile Mapping

The following table provides the mapping of SSM/ESMC and G.8265.1 QL values.

Table 1: G.8265.1 Profile Mapping

SSM QL	ITU-T G.781			Clock Class
	Option I	Option II	Option III	
0001		QL-PRS		80
0000		QL-STU	QL-UNK	82
0010	QL-PRC			84
0111		QL-ST2		86
0011				88
0100	QL-SSU-A	QL-TNC		90
0101				92
0110				94
1000	QL-SSU-B			96
1001				98
1101		QL-ST3E		100
1010		QL-ST3/QL-EEC2		102
1011	QL-SEC/QL-EEC1		QL-SEC	104
1100		QL-SMC		106
1110		QL-PROV		108
1111		QL-DUS		110

Configuring G.8265.1 Server and Client Ordinary Clock

Configuring Server Ordinary Clock

Follow these steps to configure server ordinary clock:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ptp clock ordinary domain** *domain-number* **profile g8265.1**
4. **priority1** *priorityvalue*
5. **priority2** *priorityvalue*
6. **clock-port** *port-name* **master**
7. **transport ipv4 unicast interface** *interface-type interface-number* [**negotiation**]
8. **sync interval** *interval*
9. **announce interval** *interval*
10. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enter configuration mode.
Step 3	ptp clock ordinary domain <i>domain-number</i> profile g8265.1 Example: Router(config)# ptp clock ordinary domain 4 profile g8265.1	Configures the PTP ordinary clock. The profile keyword configures the clock to use the G.8265.1 profile. Using a telecom profile requires that the clock have a domain number of 4–23.
Step 4	priority1 <i>priorityvalue</i> Example: Router(config-ptp-clk)# priority1 priorityvalue	Sets the preference level for a clock. Client devices use the <i>priority1</i> value when selecting a server clock: a lower <i>priority1</i> value indicates a preferred clock. The <i>priority1</i> value is considered above all other clock attributes. Valid values are from 0-255. The default value is 128.

	Command or Action	Purpose
Step 5	<p>priority2 <i>priorityvalue</i></p> <p>Example:</p> <pre>Router(config-ptp-clk)# priority1 priorityvalue</pre>	<p>Sets a secondary preference level for a clock. Subordinate devices use the priority2 value when selecting a server clock: a lower priority2 value indicates a preferred clock. The priority2 value is considered only when the router is unable to use priority1 and other clock attributes to select a clock.</p> <p>Valid values are from 0-255. The default value is 128.</p>
Step 6	<p>clock-port <i>port-name master</i></p> <p>Example:</p> <pre>Router(config-ptp-clk)# clock-port master master</pre>	<p>Sets the clock port to PTP server mode.</p>
Step 7	<p>transport ipv4 unicast interface <i>interface-type interface-number [negotiation]</i></p> <p>Example:</p> <pre>Router(config-ptp-port)# transport ipv4 unicast interface GigabitEthernet 0/0/0 negotiation</pre>	<p>Specifies the transport mechanism for clocking traffic. Loopback interface can be used as well as the WAN ports.</p> <p>The client router IP address should be reachable via WAN interface (GigabitEthernet 0/0/0 or GigabitEthernet 0/0/1) so that PTP packets can be sent or received on the WAN ports.</p> <p>The negotiation keyword configures the router to discover a PTP server clock from all available PTP clock sources.</p>
Step 8	<p>sync interval <i>interval</i></p> <p>Example:</p> <pre>Router(config-ptp-port)# sync interval -4</pre>	<p>Specifies the interval used to send PTP synchronization messages. The intervals are set using log base 2 values, as follows:</p> <ul style="list-style-type: none"> • 1—1 packet every 2 seconds • 0—1 packet every second • -1—1 packet every 1/2 second, or 2 packets per second • -2—1 packet every 1/4 second, or 4 packets per second • -3—1 packet every 1/8 second, or 8 packets per second • -4—1 packet every 1/16 seconds, or 16 packets per second. • -5—1 packet every 1/32 seconds, or 32 packets per second. • -6—1 packet every 1/64 seconds, or 64 packets per second. • -7—1 packet every 1/128 seconds, or 128 packets per second.

	Command or Action	Purpose
Step 9	<p>announce interval <i>interval</i></p> <p>Example:</p> <pre>Router(config-ptp-port)# announce interval 2</pre>	<p>Specifies the interval for PTP announce messages. The intervals are set using log base 2 values, as follows:</p> <ul style="list-style-type: none"> • 3—1 packet every 8 seconds • 2—1 packet every 4 seconds • 1—1 packet every 2 seconds • 0—1 packet every second • -1—1 packet every 1/2 second, or 2 packets per second • -2—1 packet every 1/4 second, or 4 packets per second • -3—1 packet every 1/8 second, or 8 packets per second
Step 10	<p>end</p> <p>Example:</p> <pre>Router(config-ptp-port)# end</pre>	Exit configuration mode.

Configuring Client Ordinary Clock

Follow these steps to configure client ordinary clock:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ptp clock ordinary domain** *domain-number* **profile g8265.1**
4. **clock-port** *port-name* **slave**
5. **transport ipv4 unicast interface** *interface-type interface-number* [**negotiation**]
6. **delay-req interval** *interval*
7. **announce timeout** *value*
8. **clock source** *source-address*
9. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example:</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
	Router> enable	
Step 2	configure terminal Example: Router# configure terminal	Enter configuration mode.
Step 3	ptp clock ordinary domain <i>domain-number</i> profile g8265.1 Example: Router(config)# ptp clock ordinary domain 4 profile g8265.1	Configures the PTP ordinary clock. The profile keyword configures the clock to use the G.8265.1 profile. Using a telecom profile requires that the clock have a domain number of 4–23.
Step 4	clock-port <i>port-name</i> slave Example: Router(config-ptp-clk)# clock-port client slave	Sets the clock port to PTP client mode.
Step 5	transport ipv4 unicast interface <i>interface-type interface-number</i> [negotiation] Example: Router(config-ptp-port)# transport ipv4 unicast interface GigabitEthernet 0/0/0 negotiation	<p>Specifies the transport mechanism for clocking traffic. Loopback interface can be used as well as the WAN ports.</p> <p>The server router IP address should be reachable via WAN interface (GigabitEthernet 0/0/0 or GigabitEthernet 0/0/1) so that PTP packets can be sent or received on the WAN ports.</p> <p>The negotiation keyword configures the router to discover a PTP server clock from all available PTP clock sources.</p>
Step 6	delay-req interval <i>interval</i> Example: Router(config-ptp-port)# delay-req interval -4	<p>Configures the minimum interval allowed between PTP delay-request messages when the port is in the server state.</p> <p>The intervals are set using log base 2 values, as follows:</p> <ul style="list-style-type: none"> • 3—1 packet every 8 seconds • 2—1 packet every 4 seconds • 1—1 packet every 2 seconds • 0—1 packet every second • -1—1 packet every 1/2 second, or 2 packets per second • -2—1 packet every 1/4 second, or 4 packets per second • -3—1 packet every 1/8 second, or 8 packets per second • -4—1 packet every 1/16 seconds, or 16 packets per second. • -5—1 packet every 1/32 seconds, or 32 packets per second. • -6—1 packet every 1/64 seconds, or 64 packets per second.

	Command or Action	Purpose
		<ul style="list-style-type: none"> • -7—1 packet every 1/128 seconds, or 128 packets per second.
Step 7	announce timeout <i>value</i> Example: Router(config-ptp-port)# announce timeout 8	Specifies the number of PTP announcement intervals before the session times out. Valid values are 1-10.
Step 8	clock source <i>source-address</i> Example: Router(config-ptp-port)# clock-source 8.8.8.1	Specifies the address of a PTP server clock.
Step 9	end Example: Router(config-ptp-port)# end	Exit configuration mode.

Verifying the Configuration

You can use the following commands to verify a clocking configuration:

- show ptp clock running domain <domain no>
- show ptp clock dataset default
- show ptp clock dataset parent
- show ptp port <name of virtual port>
- show ptp wan stat stream < stream id>
- show network-clock synchronization
- show ptp port dataset port
- show ptp wan tod
- show gnss time
- show gnss status

Examples

```
IR8340#show ptp clock running domain 4
                PTP Ordinary Clock [Domain 4] [Profile: g8265.1]
      State      Ports      Pkts sent      Pkts rcvd      Redundancy Mode
      ACQUIRING  1          1543           4680           Hot standby

                                PORT SUMMARY

Name Tx Mode      Role      Transport      State      Sessions      PTP Master
slave unicast   slave     Gi0/0/1        Slave      1             2.3.1.1

                                SESSION INFORMATION
slave [Gi0/0/1] [Sessions 1]
Peer addr          Pkts in      Pkts out      In Errs      Out Errs
```

```

2.3.1.1          4680      1543      0          0
IR8340#

IR8340#show ptp clock running domain 4
                PTP Ordinary Clock [Domain 4] [Profile: g8265.1]
                State      Ports      Pkts sent  Pkts rcvd  Redundancy Mode
                PHASE_ALIGNED 1          44752     135639     Hot standby

                PORT SUMMARY

Name Tx Mode      Role      Transport  State      Sessions  PTP Master
slave unicast  slave    Gi0/0/1   Slave      1          2.3.1.1

                SESSION INFORMATION

slave [Gi0/0/1] [Sessions 1]
Peer addr      Pkts in    Pkts out   In Errs    Out Errs
2.3.1.1        135639     44752      0           0
IR8340#

IR8340#show ptp clock dataset default
CLOCK [Ordinary Clock, domain 4]
Profile: g8265.1
Two Step Flag: No
Clock Identity: 0x6C:03:09:FF:FE:18:5F:03
Number Of Ports: 1
Priority1: 128
Priority2: 128
Domain Number: 4
Slave Only: Yes
Clock Quality:
Class: 255
Accuracy: Unknown
Offset (log variance): 0
IR8340#

IR8340#show ptp clock dataset parent
CLOCK [Ordinary Clock, domain 4]
Profile: g8265.1
Parent Clock Identity: 0x44:B6:BE:FF:FE:42:EF:13
Parent Port Number: 0
Parent Stats: No
Observed Parent Offset (log variance): 0
Observed Parent Clock Phase Change Rate: 0
Grandmaster Clock:
Identity: 0x44:B6:BE:FF:FE:42:EF:13
Priority1: 128
Priority2: 128
Clock Quality:
Class: 104
Accuracy: Unknown
Offset (log variance): 52592
IR8340#

IR8340#show ptp clock dataset time-properties
CLOCK [Ordinary Clock, domain 4]

Current UTC Offset Valid: FALSE
Current UTC Offset: 37
Leap 59: FALSE
Leap 61: FALSE
Time Traceable: FALSE
Frequency Traceable: TRUE
PTP Timescale: TRUE
Time Source: Internal Oscillator
IR8340#

IR8340#show ptp port dataset port
PORT [slave]

```



```

Clock Identity: 0x6C:03:09:FF:FE:18:5F:03
Clock Profile: g8265.1
Transport Interface: GigabitEthernet0/0/1
Port Number: 1
Port State: Slave
Min Delay Req Interval (log base 2): -4
Peer Mean Path Delay: 0
Announce interval (log base 2): 1
Announce Receipt Timeout: 3
Sync Interval (log base 2): -5
Delay Mechanism: End to End
Peer Delay Request Interval (log base 2): -4
PTP version: 2
IR8340#

IR8340#show ptp wan stat stream 0
LOCK STATUS : PHASE LOCKED
SYNC Packet Stats
  Time elapsed since last packet: 0.0
  Configured Interval : -5, Acting Interval -5
  Tx packets : 0, Rx Packets : 96215
  Last Seq Number : 30678, Error Packets : 0
Delay Req Packet Stats
  Time elapsed since last packet: 0.0
  Configured Interval : -4, Acting Interval : -4
  Tx packets : 48107, Rx Packets : 0
  Last Seq Number : 0, Error Packets : 0
Delay Response Packet Stats
  Time elapsed since last packet: 0.0
  Configured Interval : -4, Acting Interval : -4
  Tx packets : 0, Rx Packets : 48107
  Last Seq Number : 48106, Error Packets : 0
Announce Packet Stats
  Time elapsed since last packet: 0.0
  Configured Interval : 1, Acting Interval : 1
  Tx packets : 0, Rx Packets : 1509
  Last Seq Number 1508 Error Packets 0
Signalling Packet Stats
  Time elapsed since last packet: 0.0
  Configured Interval : 0, Acting Interval : 0
  Tx packets : 12, Rx Packets : 12
  Last Seq Number : 0, Error Packets : 0
Current Data Set
  Offset from master : +0.000000000          Units      Within tolerance?
  Mean Path Delay    : +0.000000027          seconds    Yes
  Forward Path Delay : +0.000000027          seconds    Yes
  Reverse Path Delay : +0.000000028          seconds    Yes
  Steps Removed 1
IR8340#

IR8340#show ptp wan tod
PTPd ToD information:

Time: 01/05/22 11:35:21

IR8340#

```

