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IEEE1588 Transparent Clock Configuration

Table of Contents

Chapter 1 Configuring IEEE1588 Transparent Clock	1
Task List for IEEE1588 Transparent Clock Configuration.....	1
Tasks for IEEE1588 Transparent Clock Configuration	1
Enabling the Transparent Clock	1
Creating the Transparent Clock Port.....	2
Configuring the Link Delay Calculation Mode	2
Configuring the Forwarding Mode of Sync Packets	2
Configuring the Domain Filtration Function.....	3
Setting the Transmission Interval of Pdelay_Req Packets	3
PTP TC Configuration Example.....	4

Chapter 1 Configuring IEEE1588 Transparent Clock

Task List for IEEE1588 Transparent Clock Configuration

- Enabling the Transparent Clock
- Creating the Transparent Clock Port
- Configuring the Link Delay Calculation Mode
- Configuring the Forwarding Mode of Sync Packets
- Configuring the Domain Filtration Function
- Setting the Transmission Interval of Pdelay_Req Packets

Tasks for IEEE1588 Transparent Clock Configuration

Enabling the Transparent Clock

The IEEE1588 transparent clock is an intermediate device to connect the master and slave clocks. The IEEE1588 transparent clock can effectively reduce time synchronization interference caused by switch's delay processing and ensure ns-level time synchronization by verifying the dwell time when sync packets pass through the transparent clock.

In global configuration mode, run the following command to enable the transparent clock:

Command	Purpose
ptp enable	Enables the PTP transparent clock.

In global configuration mode, run the following command to shut down the transparent clock and delete all already added PTP ports:

Command	Purpose
no ptp enable	Closes the PTP transparent clock.

The IEEE1588 clock synchronization protocol is independent from the underneath level protocols. It is based on either Ethernet or IPv4/UDP. To enable the transparent clock to transmit and receive IPv4- or UDP-based packets, you have to enable PTP in L3 port mode.

Run the following command in L3 port mode to enable PTP:

Command	Purpose
ptp enable	Enables the PTP transparent clock.

Creating the Transparent Clock Port

The transparent clock can include multiple PTP ports to connect the master and slave clock respectively.

Run the following commands in port configuration mode to create the PTP ports:

Command	Purpose
ptp start I2	Creates the PTP L2 port.
Ptp start I3	Creates the PTP L3 port.

Run the following command in port configuration mode to delete the PTP ports:

Command	Purpose
no ptp start	Delete the PTP port.

Configuring the Link Delay Calculation Mode

The PTP transparent clock supports two link delay modes (E2E and P2P) to help the master and slave clocks switch between the two modes, among which P2P is the default mode. In E2E mode, TC can process **Delay_Req**, **Delay_Resp** packets; In P2P mode, the path-delay mechanism is running on each PTP port, the **Pdelay_Req** packets are transmitted periodically, and the **Pdelay_Resp** and **Pdelay_Resp_Follow_Up** packets are responded to. The two modes are incompatible with each other. For example, if it is in P2P mode, the **Delay_Req** packets received from the clock will be dropped.

Run the following command in global configuration mode to configure an authentication mode:

Command	Purpose
ptp delay-mechanism e2e	Sets TC to work in E2E mode.

To configure the authentication mode, you also can run the following command in interface configuration mode:

Command	Purpose
ptp delay-mechanism p2p	Sets TC to work in P2P mode.

Configuring the Forwarding Mode of Sync Packets

There are two ways to forward Sync packets: straight forwarding and store-forward.

In straight forwarding mode, the PTP port immediately forwards after receiving Sync packets, re-encapsulates the Follow_UP packets after receiving them and then forwards them out from the corresponding port.

In store-forward mode, the PTP port shall not forward Sync packets after receiving them but store them first, receive corresponding Follow_up packets and then forward the two kinds of packets together.

The straight forwarding mode is the default one. In this mode, the time to handle Sync packets is apparently less than the time to handle Follow_up packets and hence in case of multi-level TC cascading the risk of packet disorder arises.

That's why the store-forward mode is recommended in case of multi-level TC cascading. However, in normal cases, we recommend the straight forwarding mode for it can lessen the residence time of Sync packets at the maximum level and reduce its impact on time synchronization.

Run the following command in global configuration mode to configure an authentication mode:

Command	Purpose
ptp sync-mechanism store-forward	Sets the forwarding method of Sync packets to store-forward .

To switch the forwarding mode over to straight forwarding, run the following command in global configuration mode:

Command	Purpose
ptp sync-mechanism straight-forward	Sets the forwarding method of Sync packets to store-forward .

Configuring the Domain Filtration Function

PTP devices can be classified through their domains for only PTP clocks in the same domain can exchange PTP synchronization packets and PTP devices in different domains cannot conduct time synchronization. After the domain filtration function is enabled, the PTP packets in other domains are dropped; if domain filtration is disabled, TC will not conduct the domain checkup.

Before domain filtration, you have to set the domain in which the PTP port is located. Run the following command in port mode:

Command	Purpose
ptp domain <i>number</i>	Sets the domain to which the PTP port belongs. The default domain of this port is domain0.

To configure the authentication mode, you also can run the following command in interface configuration mode:

Command	Purpose
ptp domain-filter	Enables domain filtration, which is enabled by default.

Run the following command in global mode to shut down domain filtration:

Command	Purpose
no ptp domain-filter	Closes domain filtration.

Setting the Transmission Interval of Pdelay_Req Packets

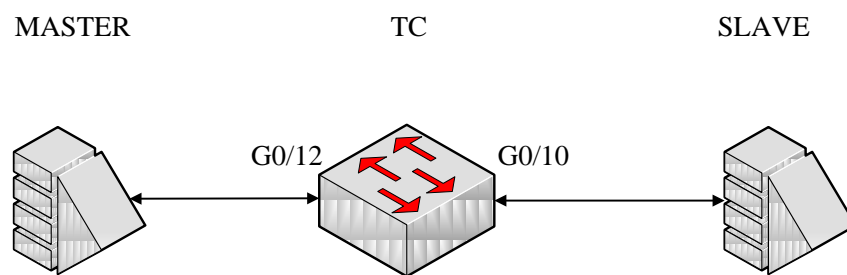
During the path-delay process, you can set the transmission interval of Pdelay_Req packets.

Run the following command to configure the transmission frequency.

Command	Purpose
ptp delay-interval <i>time</i>	time stands for the transmission interval, which ranges from -4 to 4. The actual transmission interval is <i>time</i> powers of 2. For example, if time is 0, the actual transmission interval is 1 second.

PTP TC Configuration Example

See the following figure:



MASTER here stands for the master clock, which is a L2 PTP device. **SLAVE** here stands for the master clock, which is a L3 PTP device. TC stands for a switch that supports transparent clock. The master clock connects port g0/12 of the switch, while the slave clock connects port g0/10 of the switch. MASTER, TC and SLAVE are all working in P2P mode. Ports g0/10 and G0/12 belong to VLAN1.

Global configuration

```
ptp enable
ptp delay-mechanism p2p
```

Configuration of L3 port

```
Ip add 192.168.0.2 255.0.0.0
ptp enable
```

Configuration of port g0/10

```
ptp start I2
```

Configuration of port g0/12

```
ptp start I3
```