



Configuring PTP

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PTP Clock Configuration

This feature allows you to configure and inspect the current PTP clock settings.

The screenshot shows the Cisco ME1200 GigaBit Ethernet Switch web interface. The left sidebar contains a navigation menu with options like System, Green Ethernet, Thermal Protection, Ports, DHCP, Security, Aggregation, Link OAM, Loop Protection, Spanning Tree, IPMC Profile, MVR, IPMC, LLDP, SyncE, EPS, MEP, ERPS, MAC Table, VLANs, VLAN Translation, and Private VLANs. The main content area is divided into two sections: 'PTP External Clock Mode' and 'PTP Clock Configuration'. The 'PTP External Clock Mode' section has four settings: One_PPS_Mode (Disable), External Enable (False), Adjust Method (LTC frequency), and Clock Frequency (1). The 'PTP Clock Configuration' section features a table with columns for Delete, Clock Instance, HW Domain, Device Type, and Profile. Below the table are buttons for 'Add New PTP Clock', 'Save', and 'Reset'. A vertical ID number '409645' is visible on the right side of the interface.

Delete	Clock Instance	HW Domain	Device Type	Profile
<input type="checkbox"/>	0	0	Mastronly	G8275.1
Delete	1	1	Ord-Bound	No Profile

PTP External Clock Mode

- **One_PPS_Mode:** This drop-down list allows you to select the One_pps_mode configuration. The following values are possible:
 - *Output:* Enables the 1 pps clock output.
 - *Input:* Enables the 1 pps clock input.
 - *Disable:* Disables the 1 pps clock input or output.
- **External Enable:** This drop-down list allows you to configure the external clock output. The following values are possible:
 - *True:* Enables the external clock output.

- *False*: Disables the external clock output.
- **Adjust Method**: This drop-down list allows you to configure the frequency adjustment configuration.
 - *LTC frequency*: Selects Local Time Counter (LTC) frequency control.
 - *SyncE-DPLL*: Selects SyncE DPLL frequency control, if allowed by SyncE.
 - *Oscillator*: Selects an oscillator independent of SyncE for frequency control, if supported by the hardware.
 - *LTC phase*: Selects Local Time Counter (LTC) phase control (assumes that the frequency is locked by means of SyncE).
- **Clock Frequency**: This will allow to set the Clock Frequency. The possible range of values are 1 - 25000000 (1 - 25MHz).

PTP Clock Configuration

- **Delete**: Check the corresponding check box and click **Save** to delete a clock instance.
- **Clock Instance**: Indicates the Instance of a particular Clock Instance [0..3]. Click on the Clock Instance number to edit the Clock details.
- **HW Domain**: Indicates the HW clock domain used by the clock.
- **Device Type**: Indicates the Type of the Clock Instance. There are five Device Types.
 - *Ord-Bound* - clock's Device Type is Ordinary-Boundary Clock.
 - *P2p Transp* - clock's Device Type is Peer to Peer Transparent Clock.
 - *E2e Transp* - clock's Device Type is End to End Transparent Clock.
 - *Master Only* - clock's Device Type is Master Only.
 - *Slave Only* - clock's Device Type is Slave Only.
- **Profile**: Indicates the profile used by the clock. The different PTP profiles available are as follows:
 - G8275.1
 - G8265.1
 - IEEE1588

Related Topics

[Monitoring PTP](#)

PTP Clock's Configuration for an Instance

This option allows you to inspect and configure the current PTP clock settings.

Clock Type and Profile

- **Clock Instance:** Indicates the instance number of a particular Clock Instance [0..3].
- **HW Domain:** Indicates the HW clock domain used by the clock.
- **Device Type:** Indicates the Type of the Clock Instance. There are five Device Types.
 - *Ord-Bound* - clock's Device Type is Ordinary-Boundary Clock.
 - *P2p Transp* - clock's Device Type is Peer to Peer Transparent Clock.
 - *E2e Transp* - clock's Device Type is End to End Transparent Clock.
 - *Master Only* - clock's Device Type is Master Only.
 - *Slave Only* - clock's Device Type is Slave Only.
- **Profile:** Indicates the profile used by the clock.
- **Apply Profile Defaults:** If the clock has been configured to use a profile, clicking the **Apply** button will reset configured values to profile defaults.

Port Enable and Configuration

- **Port Enable:** Check the corresponding check box for each port configured for this Clock Instance.
- **Configuration:** Click **Ports Configuration** to edit the port data set for the ports assigned to this clock instance.

Local Clock Current Time: Show or update local clock data.

- **PTP Time:** Shows the actual PTP time with nanosecond resolution.
- **Clock Adjustment method:** Shows the actual clock adjustment method. The method depends on the available hardware.
- **Synchronize to System Clock:** Activate this button to synchronize the System Clock to PTP Time.

Clock Current DataSet: The clock current data set is defined in the IEEE 1588 Standard. The current data set is dynamic.

- **Steps Removed (stpRm):** It is the number of PTP clocks traversed from the grandmaster to the local slave clock.
- **Offset From Master:** Time difference between the master clock and the local slave clock, measured in ns.
- **Mean Path Delay:** The mean propagation time for the link between the master and the local slave.

Clock Parent DataSet: The clock parent data set is defined in the IEEE 1588 standard. The parent data set is dynamic.

- **Parent Port ID:** Clock identity for the parent clock. If the local clock is not a slave, the value is the clock's own id.
- **Port:** Port Id for the parent master port.
- **PStat:** Parent's Stats (always **False**).
- **Var:** It is observed parent offset scaled log variance.
- **Rate:** Observed Parent Clock Phase Change Rate that is, the slave clocks rate offset compared to the master. (unit = ns per s).
- **GrandMaster ID:** Clock identity for the grand master clock. If the local clock is not a slave, the value is the clock's own id.
- **GrandMaster Clock Quality:** The clock quality announced by the grand master (See the description of Clock Default DataSet: Clock Quality).
- **Pri1:** Clock priority 1 announced by the grand master.
- **Pri2:** Clock priority 2 announced by the grand master.

Clock Default DataSet: The clock default data set is defined in the IEEE 1588 Standard. It holds three groups of data: the static members defined at clock creation time, the Dynamic members defined by the system, and the configurable members which can be set here.

- **Device Type:** Indicates the Type of the Clock Instance. There are five Device Types.
 - *Ord-Bound* - clock's Device Type is Ordinary-Boundary Clock.

- *P2p Transp* - clock's Device Type is Peer to Peer Transparent Clock.
 - *E2e Transp* - clock's Device Type is End to End Transparent Clock.
 - *Master Only* - clock's Device Type is Master Only.
 - *Slave Only* - clock's Device Type is Slave Only.
- **2 Step Flag:** *True* if two-step Sync events and Pdelay_Resp events are used.
 - **One-Way:** If *True*, one way measurements are used. This parameter applies only to a slave. In one-way mode no delay measurements are performed, that is, this is applicable only if frequency synchronization is needed. The master always responds to delay requests.
 - **Ports:** The total number of physical ports in the node.
 - **Clock Identity:** It shows unique clock identifier.
 - **Dom:** Clock domain [0..127].
 - **Clock Quality:** The clock quality is determined by the system, and holds three parts: Clock Class, Clock Accuracy and OffsetScaledLog Variance as defined in IEEE1588. The Clock Accuracy values are defined in IEEE1588 table 6 (Currently, the clock Accuracy is set to 'Unknown' as default).
 - **Pri1:** Clock priority 1 [0..255] used by the BMC master select algorithm
 - **Pri2:** Clock priority 2 [0..255] used by the BMC master select algorithm.
 - **Protocol:** Transport protocol used by the PTP protocol engine. The following values are possible:
 - *Ethernet:* PTP over Ethernet multicast.
 - *EthernetMixed:* PTP using a combination of Ethernet multicast and unicast.
 - *Pv4Multi:* PTP over IPv4multicast.
 - *IPv4Mixed:* PTP using a combination of IPv4 multicast and unicast.
 - *IPv4Uni:* PTP over IPv4 unicast.
 - **VLAN Tag Enable:** The VLAN Tag Enable parameter is ignored, because the tagging is controlled by the VLAN configuration.
 - **VID:** VLAN Identifier used for tagging the VLAN packets.
 - **PCP:** Priority Code Point value used for PTP frames.

Clock Time Properties DataSet: The clock time properties data set is defined in the IEEE 1588 Standard. The data set is both configurable and dynamic, that is, the parameters can be configured for a grandmaster. In a slave clock the parameters are overwritten by the grandmaster's timing properties. The parameters are not used in the current PTP implementation. The valid values for the **Time Source** parameter are:

- 16 (0x10) ATOMIC_CLOCK
- 32 (0x20) GPS
- 48 (0x30) TERRESTRIAL_RADIO
- 64 (0x40) PTP
- 80 (0x50) NTP

- 96 (0x60) HAND_SET
- 144 (0x90) OTHER
- 160 (0xA0) INTERNAL_OSCILLATOR

Filter Parameters: The default delay filter is a low pass filter, with a time constant of $2 \times \text{Delay Filter} \times \text{DelayRequestRate}$.

If the **Delay Filter** parameter is set to 0 or the **Dist** parameter is 0, the delay filter uses the same algorithm as the offset filter. The default offset filter uses a minimum offset or a mean filter method that is, the minimum measured offset during **Period** samples is used in the calculation. The distance between two calculations is **Dist** periods.

**Note**

In configurations with Timestamp enabled PHYs, the period is automatically increased, if $\text{period} \times \text{dist} < \text{SyncPackets per sec} / 4$, that is, max four adjustments are made per sec.

- **Filter Type:** Shows the filter type used which can be either the basic filter or an advanced filter that can be configured to use only a fraction of the packets received (that is, the packets that have experienced the least latency).
- **Delay Filter:** See above.
- **Period:** See above.
- **Dist:** See above.

Servo Parameters: The default clock servo uses a PID regulator to calculate the current clock rate that is, $\text{clockAdjustment} = \text{OffsetFromMaster} / \text{P constant} + \text{Integral}(\text{OffsetFromMaster}) / \text{I constant} + \text{Differential}(\text{OffsetFromMaster}) / \text{D constant}$

- **Display:** If *True*, then Offset From Master, MeanPathDelay and clockAdjustment are logged on the debug terminal.
- **P-enable:** If *True*, the P part of the algorithm is included.
- **I-enable:** If *True*, the I part of the algorithm is included.
- **D-enable:** If *True*, the D part of the algorithm is included.
- **'P' constant:** [1..1000] See above.
- **'I' constant:** [1..1000] See above.
- **'D' constant:** [1..1000] See above.

Unicast Slave Configuration: When operating in IPv4 Unicast mode, the slave is configured up to five master IP addresses. The slave then requests Announce messages from all the configured masters. The slave uses the BMC algorithm to select one as master clock, the slave then request Sync messages from the selected master.

- **Duration:** The number of seconds a master is requested to send Announce/Sync messages. The request is repeated from the slave each $\text{Duration} / 4$ seconds.

- **ip_address**: IPv4 Address of the Master clock.
- **grant**: The granted repetition period for the sync message.
- **CommState**: The state of the communication with the master, possible values are:
 - *IDLE*: The entry is not in use.
 - *INIT*: Announce is sent to the master (Waiting for a response).
 - *CONN*: The master has responded.
 - *SELL*: The assigned master is selected as current master.
 - *SYNC*: The master is sending Sync messages.

PTP Clock's Port Configuration

The port data set is defined in the IEEE 1588 Standard. It holds three groups of data: the static members, the dynamic members, and configurable members which can be set here.

The screenshot shows the configuration page for the PTP Clock's Port Data Set on a Cisco ME1200 GigaBit Ethernet Switch. The table below represents the data shown in the interface.

Port	Stat	MDR	PeerMeanPathDel	Anv	ATo	Syv	Dlm	MPR	Delay Asymmetry	Ingress Latency	Egress Latency	Version	Mcast Addr	Not Slave	Local Prio
2	mstr	0	0.000.000.000	0	3	0	e2e	0	0	0	0	2	Default	False	128
3	slve	0	0.000.000.000	0	3	0	e2e	0	0	0	0	2	Default	False	128
5	mstr	0	0.000.000.000	0	3	0	e2e	0	0	0	0	2	Default	True	128

Port Data Set

- **Port**: Static member port Identity. Port number [1..max port no].
- **Stat**: Dynamic member port State. Current state of the port.
- **MDR**: Dynamic member log Min Delay Req Interval. The delay request interval announced by the master.
- **PeerMeanPathDel**: The path delay measured by the port in P2P mode. In E2E mode this value is 0.
- **Anv**: The interval for issuing announce messages in master state. Range is -3 to 4.
- **ATo**: The timeout for receiving announce messages on the port. Range is 1 to 10.
- **Syv**: The interval for issuing sync messages in master. Range is -7 to 4.
- Configurable member delay mechanism (**Dlm**): The delay mechanism used for the port. Possible values are:
 - *e2e*: End to end delay measurement.
 - *p2p*: Peer to peer delay measurement.

Can be defined per port in an Ordinary or Boundary clock. In a transparent clock all ports use the same delay mechanism, determined by the clock type.

- **MPR:** The interval for issuing Delay_Req messages for the port in e2e mode. This value is announced from the master to the slave in an announce message. The value is reflected in the MDR field in the Slave. The interval for issuing Pdelay_Req messages for the port in P2P mode.



Note The interpretation of this parameter has changed from release 2.40. In earlier versions, the value was interpreted relative to the Sync interval, this was a violation of the standard, so now the value is interpreted as an interval that is, $MPR = 0 \Rightarrow 1 \text{ Delay_Req pr sec}$, independent of the Sync rate. Range is -7 to 5.

- **Delay Asymmetry:** If the transmission delay for a link is not symmetric, the asymmetry can be configured here, see IEEE 1588 Section 7.4.2 Communication path asymmetry. Range is -100000 to 100000.
- **Ingress latency:** Ingress latency measured in ns, as defined in IEEE 1588 Section 7.3.4.2. Range is -100000 to 100000.
- **Egress Latency:** Egress latency measured in ns, as defined in IEEE 1588 Section 7.3.4.2. Range is -100000 to 100000.
- **Version:** The current implementation only supports PTP version 2.