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Support for Precision Time Protocol on Cisco Catalyst Switches

Q: What is Precision Time Protocol (PTP)?

A: PTP is a high-precision distributed time synchronization protocol that is used to synchronize clocks across an Ethernet network.

Q: What are the benefits of enabling PTP?

A: PTP uses hardware stamping capability to provide accurate clock synchronization on the order of microseconds, sub-microseconds, and even nanoseconds.

Q: What platforms in the Cisco® Catalyst® 9000 portfolio support PTP?

A: PTP is supported on the following platforms in the Catalyst 9000 switching portfolio:

- Catalyst 9300 Series platforms

- Catalyst 9400 Series platforms

- Catalyst 9500 Series platforms

- Catalyst 9600 Series platforms

Q: Are there any limitations on the uplink or downlink ports?

A: The limitation on the downlink ports is for Catalyst 9300-48UXM and 9300-48UN models. PTP is supported on ports 1 to 16 for 9300-48UXM model and ports 1 to 36 for the 9300-48UN model. On Catalyst 9400, PTP is not supported on Supervisor ports.

Q: What is the first software version that supports PTP on the Cisco Catalyst 9000 switch platforms?

A: Table 1 lists the software versions that provided initial support for PTP.

Table 1.   Support for PTP in Cisco IOS XE releases

	Platform	Release
Catalyst 9300 Series	All Models	Cisco IOS® XE 16.8.1a
Catalyst 9400 Series	SUP-1/1XL/1XL-Y	17.6.1
Catalyst 9500 Series	C9500-24Q/ C9500-12Q/ C9500-40X/ C9500-16X	Cisco IOS XE 16.8.1a
	C9500-24Y4C/ C9500-48Y4C C9500-32QC/ C9500-32C	Cisco IOS XE 16.12.1
Catalyst 9600 Series	With SUP-1	17.6.1

Q: What is the license level needed to enable PTP on the Catalyst 9000 switch platforms?

A: Network Advantage is needed to enable PTP on the Catalyst 9000 switch platforms.

Q: What PTP profiles are supported on the Catalyst 9000 switch platforms?

A: The PTP default profile (IEEE 1588v2), IEEE 802.1AS (gPTP) profile, 8275.1 profile and AES67 profiles are supported.

Q: Do the Catalyst 9000 switch platforms support one-step or two-step message exchange?

A: The switches support two-step message exchange only. One-step message exchange is not supported on the Catalyst 9000 switch platforms.

Q: Do the Catalyst 9000 switch platforms support PTP multicast or unicast messaging?

A: The switches support multicast messaging.

Q: How many PTP domains are supported?

A: The Catalyst 9000 switch platforms support one PTP domain. The domain ID is configurable.

Q: Do the Catalyst 9000 switch platforms support PTP versions 1 and 2?

A: The switches support PTP version 2 as per the requirements in IEEE 1588v2. They do not support PTP version 1.

Q: Can the Catalyst 9000 switch platforms transparently transit PTP version 1 packets?

A: Yes, the switches can transit PTP version 1 packets transparently.

Q: Do the Catalyst 9000 switch platforms support Layer 2 and Layer 3 PTP?

A: Yes, the switches support both Layer 2 and Layer 3 PTP.

Q: Is PTP supported when 9300 Series switches are stacked (Cisco StackWise® 1T/480/320)?

A: Yes, PTP is supported when 9300 Series switches are deployed in StackWise 1T/480/320 starting 17.6.1.

Q: Is PTP supported in StackWise Virtual environments?

A: Yes, PTP is supported in StackWise Virtual environments starting 17.10.1.

Q: Is PTP supported on EtherChannels?

A: Yes, PTP is supported on EtherChannels beginning with Cisco IOS XE Release 17.2.1.

Q: What clock modes are supported on the Catalyst 9000 switch platforms?

A: The switches can support transparent and boundary clock modes.

Q: Do the Catalyst 9000 switch platforms support clock synchronization across VLANs in PTP transparent mode?

A: No, the switches do not support clock synchronization across VLANs in PTP transparent mode. Boundary clock mode can be used for inter-VLAN clock synchronization.

Q: Do the Catalyst 9000 switch platforms forward PTP packets by default without enabling PTP on the switch?

A: Yes, the switches forward PTP packets transparently by default.

Q: Can we have non-PTP-enabled switches in the PTP network?

A: Yes, it is possible to have non-PTP-enabled switches in the PTP network. This is not recommended, however, as it will decrease the accuracy of the clock synchronization.

Q: Can we switch from one PTP mode to another?

A: Yes, you can switch from one PTP mode to another PTP mode. It is recommended that you first clear the current PTP mode using "no PTP mode" and then configure the desired PTP mode.

Q: Can PTP be enabled on native Layer 3 interfaces?

A: Yes, you can enable PTP on a Layer 3 native port as well as a Layer 3 EtherChannel.

Q: Can we enable multiple profiles (Eg: Default and 802.1AS) at the same time?

A: No, you cannot enable two profiles at the same time. They are mutually exclusive, and only one can be enabled at a time.

Q: Do the Catalyst 9000 switch platforms support management and signaling messages?

A: Signaling messages are dropped. The boundary hop count is decremented for management messages, and they are forwarded without any processing, as per the requirements in IEEE 1588v2.

Q: What peer delay mechanisms do the Catalyst 9000 switch platforms support?

A: The switches support end-to-end and peer-to-peer delay mechanisms.

Q: Can Catalyst 9000 switch platforms transport Dante traffic?

A: Yes, the switches can transport Dante traffic transparently.

Q: What is the expected accuracy of PTP on the Catalyst 9000 switch platforms?

A: Accuracy of less than 100 nanoseconds can be expected.

Q: Is PTP over Cisco Software-Defined Access (SD-Access) fabric supported?

A: Yes, PTP over SD-Access fabric is supported.

Q: Do the Catalyst 9000 switch platforms support PTP over IPv6?

A: No, currently the switches do not support PTP over IPv6.

Q: Is PTP aware of Virtual Routing and Forwarding (VRF) instances on the Catalyst 9000 switch platforms?

A: No, PTP is not VRF-aware on the switches.

Q: Is PTP over Multiprotocol Label Switching (MPLS) supported on the Catalyst 9000 switch platforms?

A: No, PTP over MPLS is not supported on the switches.