Troubleshoot Precision Time Protocol (PTP) on Nexus 9000

Contents

Introduction

This document describes how to troubleshoot the Precision Time Protocol (PTP) on Nexus 9000 switches.

Prerequisites

Cisco recommends that you know these topics:

- Basic knowledge of PTP
- Familiar with the Cisco Nexus Operating System (NX-OS)

The design and configuration of PTP (Precision Time Protocol) are not covered in this article. For such information, it is recommended that you refer to the configuration guide.

Nexus 9000 PTP configuration guide

Precision Time Protocol (PTP) for Cisco Nexus Dashboard Insights

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document is based on these software and hardware versions:

- N9K Spine01: N9K-C93180YC-FX NX-OS 10.3(4a)
- N9K Spine02: N9K-C93180YC-EX NX-OS 10.3(4a)
- N9K Leaf01: N9K-C92160YC-X NX-OS 9.3.12
- N9K Host: N9K-C92160YC-X NX-OS 9.3.12

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Restrictions and Limitations

- For PTP to function properly, you must use the latest SUP and line card FPGA versions. For information on upgrading FPGAs, access the Release Notes landing page go to the FPGA/EPLD Upgrade Release Notes (NX-OS Mode Switches) section and locate the FPGA/EPLD Upgrade Release Notes for your software version. Refer to the Installation Guidelines topic.
- On Nexus 9000 PTP operates only in boundary clock mode. End-to-end transparent clock and peer-to-peer transparent clock modes are not supported.
- PTP is not supported on the Cisco Nexus 92348GC-X platform switch.
- The QoS TCAM region Ingress SUP [ingress-sup] must be set to 768 or higher for PTP IPv6 transport to work.

Before troubleshooting the PTP issue, it is recommended to review the PTP section of Nexus 9000 System Management Configuration for the given platform and version.

Understand PTP

The PTP process consists of two phases: establishing the primary-secondary hierarchy and synchronizing the clocks.

Best Master Clock(BMC) Algorithm

The BMCA is used to select the time source clock on each link, and it ultimately selects the grandmaster clock for the whole PTP domain. It runs locally on each port of the ordinary and boundary clocks to compare the local data sets with the received data from Announce messages to select the best clock on the link.

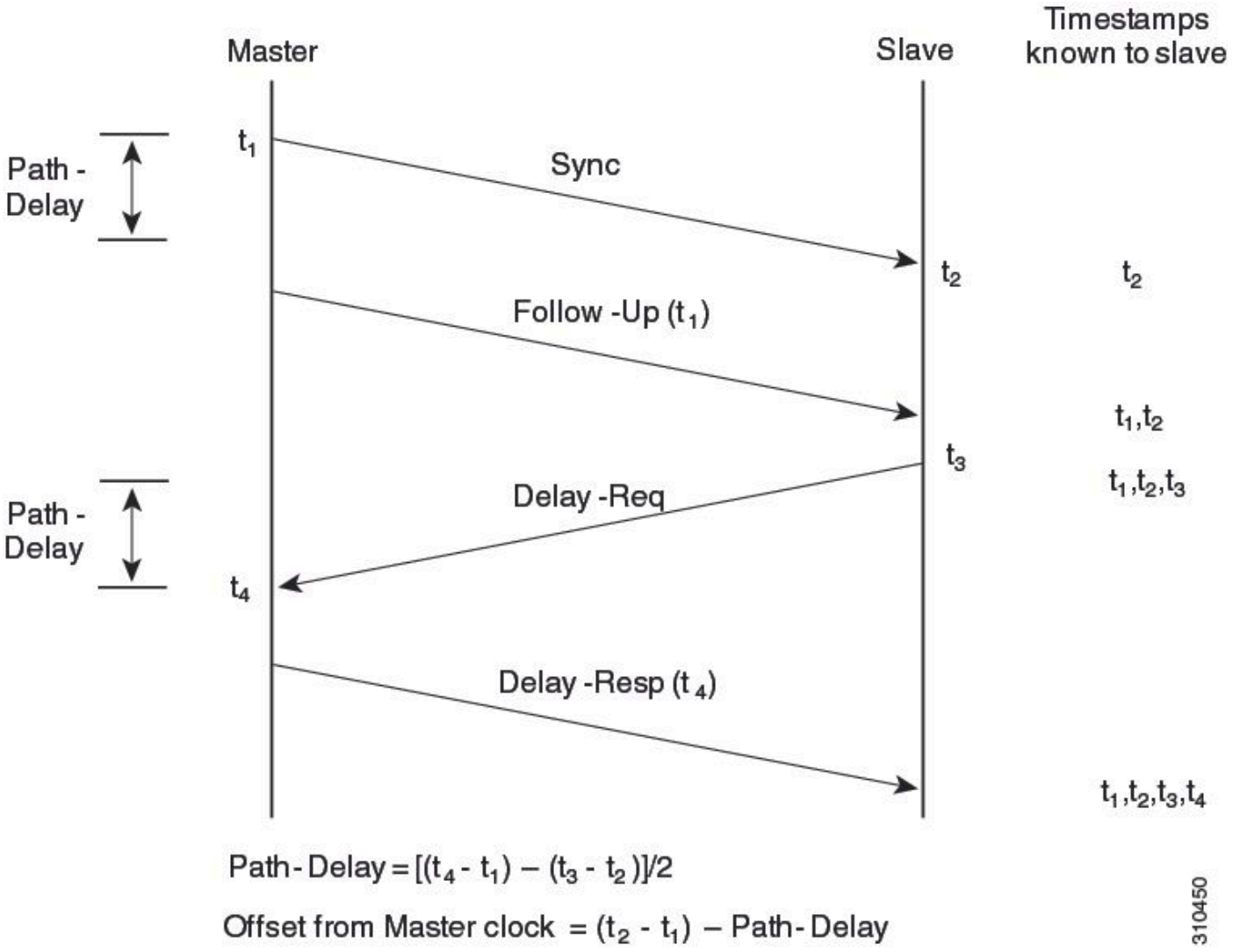
1. Priority1: User configurable absolute priority (lower value wins)

2. Clock Class: Attribute defining clock's traceability (not user configurable, lower value wins)
3. Clock Accuracy: Defines the accuracy of a clock (not user configurable, lower value wins)
4. Clock Variance: Attribute defining the precision of a clock (not user configurable)
5. Priority2: User configurable
6. Source Port ID: Mac address of source port

Announce messages are used to establish the synchronization hierarchy.

Synchronizing the clock

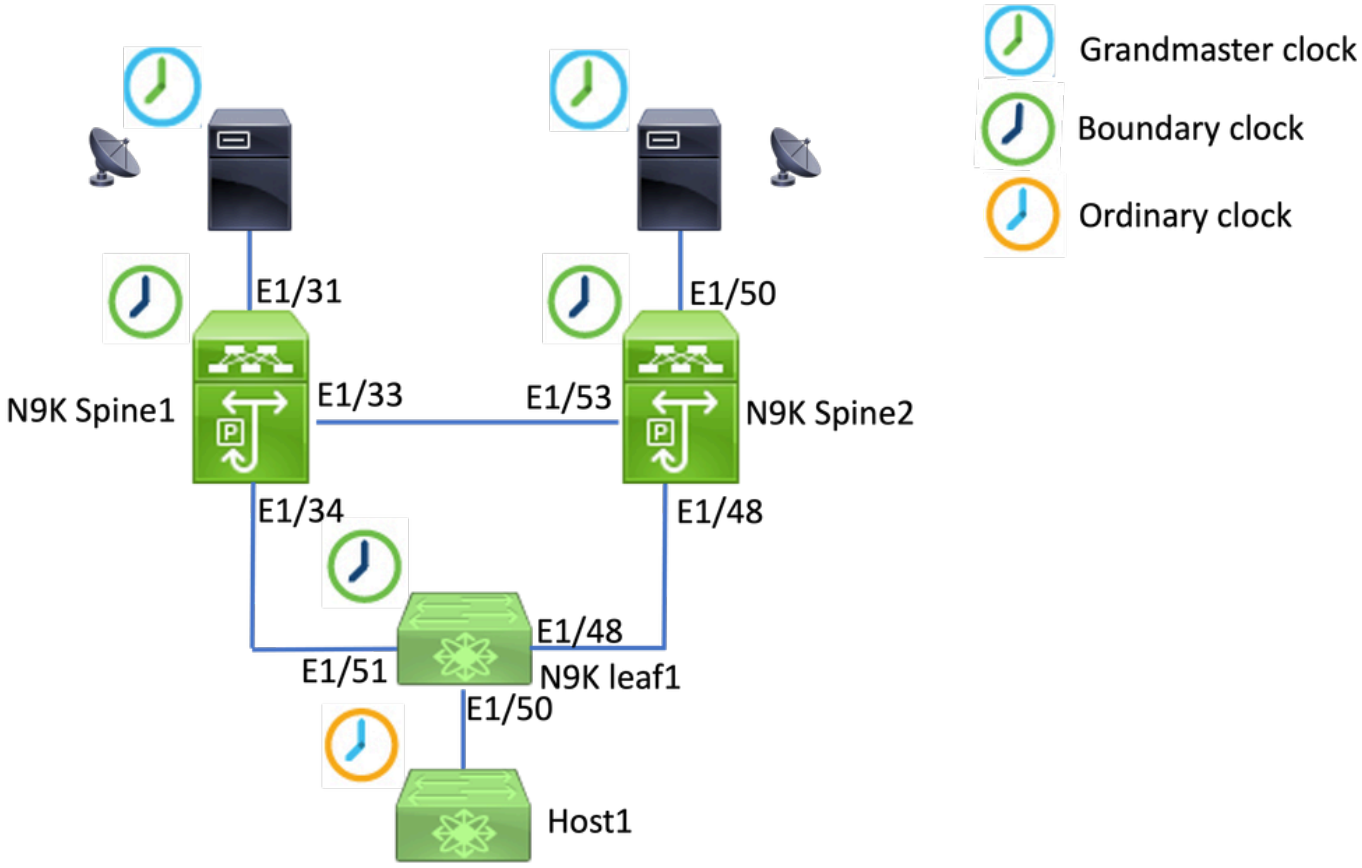
Sync, Delay_Req, Follow_Up, and Delay_Resp messages are used to calculate time.



PTP messages can be either multicast or unicast, with multicast being the default mode. PTP uses multicast destination IP address 224.0.1.129 UDP319/320 as per IEEE 1588 standards.

PTP Profiles — PTP supports default (1588), AES67, and SMPTE 2059-2 profiles. Each of these profiles has different ranges of sync and delay request intervals. For more information about these profiles, please refer to the configuration guide.

Lab Topology



Basic Configuration:

```
feature ptp
ptp source 192.168.1.3>>>>Define PTP packet source IP
ptp priority1 127     >>>>Define PTP priority 1
ptp priority2 127     >>>>Define PTP priority 2

interface Ethernet1/31
ptp                   >>>>Enable PTP in all interconnected ports.
interface Ethernet1/33
ptp
interface Ethernet1/34
ptp
```

Troubleshoot Steps:

Verify that PTP is Configured Correctly.

Ensure each device has a unique source IP and the PTP domain ID is the same on all devices.

<#root>

```
N9K_Spine01# show ptp clock
```

```
PTP Device Type : boundary-clock
```

PTP Source IPv4 Address : 192.168.1.3>>>>PTP source IP

PTP Source IPv6 Address : 0::
Clock Identity : 00:ee:ab:ff:fe:67:3e:9d

Clock Domain: 0 >>>>PTP domain id. Must same in one PTP domain.

Slave Clock Operation : Two-step

Master Clock Operation : Two-step >>>>N9K EX/FX/FX2/FX3 only support two-step mode.

Slave-Only Clock Mode : Disabled
Number of PTP ports: 3

Priority1 : 127

Priority2 : 127

Clock Quality:
Class : 248
Accuracy : 254
Offset (log variance) : 65535

Steps removed : 1 >>>>Hops from GM

Verify PTP Hierarchy Setup Successful as Your Design.

The **slave** port is connected to the upstream clock device. The **master** port is connected to the downstream device.

<#root>

N9K_Spine01# show ptp brief

PTP port status

Port State

Eth1/31 Slave

>>>>Connected to GM

Eth1/33 Master

>>>>Connected to N9K Spine 2

Eth1/34 Master

>>>>Connected to N9K leaf

N9K_Spine02# show ptp brief

PTP port status

```
-------------------------------------------
Port State
------------------------------ ------------
```

Eth1/48 Passive

>>>>Connected to N9K leaf. The Port should be in the passive state to avoid loop

Eth1/50 Master

>>>>Connected to GM02

Eth1/53 Slave

>>>>Connected to N9K Spine 1

N9K_Leaf01# show ptp brief

```
PTP port status
-------------------------------------------
Port State
------------------------------ ------------
```

Eth1/48 Master

>>>>Connected to Spine02

Eth1/50 Master

>>>>Connected to host

Eth1/51 Slave

>>>>Connected to Spine01

GM01# show system internal ptp info announce-pkts

```
2024-01-02T13:36:23.242624000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [TX] If Eth1/35 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:0 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
2024-01-02T13:36:15.238816000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [TX] If Eth1/35 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:0 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
```

N9K_Spine01# show system internal ptp info announce-pkts

```
2024-01-02T13:36:20.826735000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [TX] If Eth1/33 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:1 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
2024-01-02T13:36:17.231080000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [TX] If Eth1/34 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:1 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
2024-01-02T13:36:16.239728000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [RX] If Eth1/31 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:0 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
```

N9K_Spine02# show system internal ptp info announce-pkts

```
2024-01-02T13:36:21.368978000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [RX] If Eth1/48 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:2 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
2024-01-02T13:36:19.363095000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [TX] If Eth1/50 (0x1
s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:2 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:
2024-01-02T13:36:16.828573000+08:00 [M 1] [ptp] E_DEBUG [ptp_ev_hist_ann_pkt:5469] [RX] If Eth1/53 (0x1
:0 s 0 ns; UTC_OFF:37 TM_SRC:a0 STEP:1 PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:
```

N9K_Leaf01# show system internal ptp info announce-pkts

```
2024 Jan 02 13:36:23.893622: E_PTP_ANN_PKT_EV[TX] I/f Eth1/50 (0x1a006200): MSG:Announce TS:0 V:2 LEN:6
PRIO1:1 PRIO2:1
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9

2024 Jan 02 13:36:23.369089: E_PTP_ANN_PKT_EV[TX] I/f Eth1/48 (0x1a005e00): MSG:Announce TS:0 V:2 LEN:6
PRIO1:1 PRIO2:1
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9

2024 Jan 02 13:36:23.233889: E_PTP_ANN_PKT_EV[RX] I/f Eth1/51 (0x1a006400): MSG:Announce TS:0 V:2 LEN:6
PRIO1:1 PRIO2:1
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9
```

Host# show system internal ptp info announce-pkts

```
2024 Jan 02 13:36:23.898218: E_PTP_ANN_PKT_EV[RX] I/f Eth1/50 (0x1a006200): MSG:Announce TS:0 V:2 LEN:6
PRIO1:1 PRIO2:1
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9
```

V:2	PTP version 2
LEN:64	PTP message length 64
D:0	PTP domain 0
UC:0	0: PTP multicast packet,1:PTP unicast packet
2S:0	maybe leap 59/61
UTCVAL:0	UTC offset valid flag. 0 means false. GM set it.
PTPTS:1	PTP TimeScale flag. 1 means true
TT:0	PTP TimeTrace flag. 0 means false
FT:0	PTP FreqTrace flag .0 means false
SRC:	PTP packet source mac
CORR:0	Correction

SEQ:	PTP sequence ID
INT:1	Log message period. 1 mean 2s
TS:	Timestamps
UTC_OFF	UTC offset value. GM set this value.
TM_SRC	0x20 GPS, 0x40 PTP, 0x50 NTP, 0x60 Hand_set 0xa internal oscillator. GM set this value.
STEP:2	Clock operation in two-step mode(N9K only supports two steps mode on the primary port)
PRIO1:1 PRIO2:1 CLASS:248 ACC:fe LOG_VAR:ffff	GM priority, GM clock class, GM clock accuracy
GM	GM Clock Identity. Come from mac address.

Verify Parent and Grandmaster Information in the PTP Domain

Ensure the parent clock device and grandmaster device are stable.

<#root>

```
N9K_Spine01# show ptp parent

Parent Clock:

Parent Clock Identity: 00:ee:ab:ff:fe:67:37:e9       >>>>upstream clock identity. 37:e9 is GM in lab top

Parent Port Number: 137
Observed Parent Offset (log variance): N/A
Observed Parent Clock Phase Change Rate: N/A

Parent IP: 192.168.1.1                               >>>>upstream clock source IP


Grandmaster Clock:

Grandmaster Clock Identity: 00:ee:ab:ff:fe:67:37:e9  >>>>GM clock identity

Grandmaster Clock Quality:                           >>>>GM clock attributes

Class: 248
Accuracy: 254
Offset (log variance): 65535

Priority1: 1                                         >>>>GM priority1

Priority2: 1
```

```
N9K_Spine02# show ptp parent
Parent Clock:
```

Parent Clock Identity: 00:ee:ab:ff:fe:67:3e:9d>>>upstream clock identity. 37:9d is N9K Spine01 in lab to

```
Parent Port Number: 129
Observed Parent Offset (log variance): N/A
Observed Parent Clock Phase Change Rate: N/A
```

Parent IP: 192.168.1.3 >>>>upstream clock source IP. 192.168.1.3 is N9K S

```
Grandmaster Clock:
Grandmaster Clock Identity: 00:ee:ab:ff:fe:67:37:e9
Grandmaster Clock Quality:
Class: 248
Accuracy: 254
Offset (log variance): 65535
Priority1: 1
Priority2: 1
```

N9K_Leaf01# show ptp parent

```
PTP PARENT PROPERTIES
Parent Clock:
Parent Clock Identity: 00:ee:ab:ff:fe:67:3e:9d
Parent Port Number: 133
Observed Parent Offset (log variance): N/A
Observed Parent Clock Phase Change Rate: N/A
Parent IP: 192.168.1.3
Grandmaster Clock:
Grandmaster Clock Identity: 00:ee:ab:ff:fe:67:37:e9
Grandmaster Clock Quality:
Class: 248
Accuracy: 254
Offset (log variance): 65535
Priority1: 1
Priority2: 1
```

Verify PTP Correction and Bad Correction.

The Sync-SeqID must increase with each entry. The correction must be less than 10000 nanoseconds (ns).

<#root>

N9K_Spine02# show system internal ptp corrections

```
PTP past corrections
--------------------------------------------------------------------------------------------------
Slave Port   SUP Time
```

Correction(ns)

```
 MeanPath Delay(ns) MasterTimestamp (sec, nsec) Slave Timestamp (sec, nsec) Sync-SeqID   PTPLC ts_corr(
--------------------------------------------------------------------------------------------------
 Eth1/53    Wed Jan  3 15:29:05 2024  15928                  -8                 204          1704266945
 Eth1/53    Wed Jan  3 15:29:04 2024 765051                  24                 204          1704266944
 Eth1/53    Wed Jan  3 15:29:04 2024 509436                  24                 204          1704266944
 Eth1/53    Wed Jan  3 15:29:04 2024 264139                   0                 204          1704266944
```

```
 Eth1/53    Wed Jan  3 15:29:04 2024  13239                    -8                  204          1704266944
 Eth1/53    Wed Jan  3 15:29:03 2024 762756                    24                  212          1704266943
```

Bad Correction Record

By default, the correction threshold is 100000 nanoseconds (100us). Corrections not within this range are recorded as bad corrections.

<#root>

```
N9K_Spine02(config)# show system internal ptp bad-corrections
PTP past corrections
-------------------------------------------------------------------------------------------------------------
Slave Port   SUP Time
```

Correction(ns)

```
 MeanPath Delay(ns) MasterTimestamp (sec, nsec) Slave Timestamp (sec, nsec) Sync-SeqID   PTPLC ts_corr(
-------------------------------------------------------------------------------------------------------------
Eth1/48     Tue Jan  2 13:28:30 2024 692911
```

17111776

```
               172          1704173310  705666212          1704173310  688554608    52942
Eth1/48     Tue Jan  2 13:28:30 2024 443146
```

17111808

```
                 172          1704173310  454735796          1704173310  437624160    52941
Eth1/48     Tue Jan  2 13:28:30 2024 188850            17111784                 172          1704173310
Eth1/48     Tue Jan  2 13:28:29 2024 949432            51292504                 172          1704173309
```

Useful Collection:

```
show running-config ptp
show ptp brief
show ptp counters all
show ptp clock
show system internal ptp info all
show system internal ptp info global
show ptp clock foreign-masters record
show system internal ptp corrections entries 2000
show system internal ptp bad-corrections entries 2000
show system internal ptp trouble-shooting all
show tech ptp
```

Common Issues:

Nexus 9000 Cannot Sync Time with Grandmaster or Upstream Boundary Clock

In most cases, these are configuration issues.

Actions to Take:

1. Check if the PTP domain number is the same on all PTP-enabled devices. Ensure the unique PTP source IP is configured on all devices.

```
show ptp clock
TP Device Type : boundary-clock
PTP Device Encapsulation : NA
PTP Source IP Address : 192.168.1.4
Clock Identity : c0:14:fe:ff:fe:89:9b:77
Clock Domain: 0
Slave Clock Operation : Two-step
Master Clock Operation : Two-step

<snip>
Local clock time : Thu Jan 4 19:34:26 2024
PTP Clock state : Locked
```

2. Verify that PTP is enabled on the interface. By default, it is disabled.

```
N9K_Spine02# show ptp brief
-----------------------------------------
Port State
------------------------------ ------------
Eth1/48 Passive   >>>>Connected to N9K leaf. Port in the passive state to prevent loop
Eth1/50 Master    >>>>Connected to GM02
Eth1/53 Slave     >>>>Connected to N9K Spine 1
```

3. Check PTP interface parameters. Ensure that the same PTP VLAN as the peer is being used.

<#root>

N9K_Spine02# show ptp port interface e1/48

```
PTP Port Dataset: Eth1/48
Port identity: clock identity: c0:14:fe:ff:fe:89:9b:77
Port identity: port number: 188
PTP version: 2
Port state: Master
```

VLAN info: 1

```
Delay request interval(log mean): 0
Announce receipt time out: 3
Peer mean path delay: 0
Announce interval(log mean): 1
Sync interval(log mean): -2
Delay Mechanism: End to End
Cost: 255
```

Domain: 0

Unexpected Grandmaster Switchover

```
2024 Jan 4 19:27:05 N9K_Spine02 %PTP-2-PTP_GM_CHANGE: Grandmaster clock has changed from 00:ee:ab:ff:fe
```

Actions to Take

1. Check the PTP announce history for changes in priority or other clock attribute changes.

<#root>

```
show system internal ptp info announce-pkts
```

2024 Jan 04 19:27:07.408293: E_PTP_ANN_PKT_EV[RX] I/f Eth1/48 (0x1a005e00): MSG:Announce TS:0 V:2 LEN:64
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9

2024 Jan 04 19:27:06.321569: E_PTP_ANN_PKT_EV[RX] I/f Eth1/50 (0x1a006200): MSG:Announce TS:0 V:2 LEN:64
CLASS:248 ACC:fe LOG_VAR:ffff GM:c0:14:fe:ff:fe:a3:c4:67
2024 Jan 04 19:27:05.427431: E_PTP_ANN_PKT_EV[RX] I/f Eth1/53 (0x1a006800): MSG:Announce TS:0 V:2 LEN:64
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9
2024 Jan 04 19:27:05.407196: E_PTP_ANN_PKT_EV[RX] I/f Eth1/48 (0x1a005e00): MSG:Announce TS:0 V:2 LEN:64
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9

2024 Jan 04 19:27:04.822821: E_PTP_ANN_PKT_EV[TX] I/f Eth1/50 (0x1a006200): MSG:Announce TS:0 V:2 LEN:64
CLASS:248 ACC:fe LOG_VAR:ffff GM:00:ee:ab:ff:fe:67:37:e9

High Bad Correction

A random bad correction can be challenging to analyze due to a lack of data. Nexus 9000 provides an auto-log feature to capture PTP logs in the backend without impacting performance.

Actions to take:

1. Identify the bad corrections.

<#root>

```
N9K_Spine02# show system internal ptp bad-corrections entries 2000
-------------------------------------------------------------------------------------------------------
Slave Port   SUP Time
```

Correction(ns)

```
 MeanPath Delay(ns) MasterTimestamp (sec, nsec) Slave Timestamp (sec, nsec) Sync-SeqID   PTPLC ts_corr(
-------------------------------------------------------------------------------------------------------
Eth1/48     Thu Jan  4 18:41:07 2024 140073           19167640                172          1704364867
Eth1/48     Thu Jan  4 18:41:06 2024 889689           19167624                172          1704364866
Eth1/48     Thu Jan  4 18:41:06 2024 634900           19167604                172          1704364866
Eth1/48     Thu Jan  4 18:41:06 2024 386534           19167636                172          1704364866
Eth1/48     Thu Jan  4 18:41:05 2024 732409          425695900                172          1704364866
Eth1/48     Thu Jan  4 18:41:05 2024 480431          425695932                172          1704364865
Eth1/48     Thu Jan  4 18:41:05 2024 225514          425695908                172          1704364865
```

```
Eth1/48     Thu Jan  4 18:41:04 2024 977564           425695924                 172          1704364865
```

2. Enable PTP Auto Log

```
test system internal ptp auto-log correction-limit 10000   >> Set a threshold of correction to trigger
test system internal ptp auto-log file-max-count 5         >> Maximum Auto-log files quantity
no test system internal ptp auto-log file-rollover         >> Disable auto-log rollover
test system internal ptp auto-log                          >> Start auto-log in backend
```

3. In case a PTP bad correction occurs, the PTP log is created in bootflash.

```
N9K_Spine02# dir bootflash:
4096 Jan 04 19:57:44 2024 ptp_autolog/

N9K_Spine02# dir ptp_autolog
1115095 Jan 04 19:27:06 2024 auto_ptp_dbg_log_1.log
1099741 Jan 04 19:57:43 2024 auto_ptp_dbg_log_2.log
53631 Jan 04 19:57:43 2024 auto_ptp_dbg_log_3.log
87478 Jan 04 19:57:44 2024 auto_ptp_dbg_log_4.log
```

In this file, you can locate T1-T4 to perform calculations.

```
19:26:56 056993 ptp_calc_mean_path_delay t1/m sec 1704367616 ns 54142980 t2/s sec 1704367616 ns 5414318
19:26:57 060081 ptp_calc_mean_path_delay t1/m sec 1704367617 ns 56716444 t2/s sec 1704367617 ns 5671663
19:26:58 062591 ptp_calc_mean_path_delay t1/m sec 1704367618 ns 59552956 t2/s sec 1704367618 ns 5955316
19:26:59 061974 ptp_calc_mean_path_delay t1/m sec 1704367619 ns 61891376 t2/s sec 1704367619 ns 6189163
```

PTP Port in the Master State when it is Supposed to be a Slave or Passive

A PTP port changes to the primary state if it encounters a message exchange issue on the RX (receive) path side.

Actions to take:

1. Check if the PTP RX (receive) counters are increasing on the problematic master port.

```
N9K_Spine01# show ptp counters all
PTP Packet Counters of Interface Eth1/31:
---------------------------------------------------------------
Packet Type                  TX                     RX
----------------    --------------------    --------------------
Announce                       0                       3
Sync                           0                      21
FollowUp                       0                      21
Delay Request                  5                       0
```

```
Delay Response                 0                        5
```

2. If it is not increasing, then check the SUP redirect ACL (Access Control List) statistics.

```
N9K_Spine01# show system internal access-list sup-redirect-stats | in PTP|Slice
Instance: 0  [Unit: 0 Slice: 0]
    3118                                PTP EVENT REDIRECT    3358695
    3119                        ETH PTP EVENT TX TIMESTAMP    0
    3120                            PTP EVENT TX TIMESTAMP    5046146
    3167                                  PTP MSG REDIRECT    3088156
    3183                          PTP UNICAST MSG REDIRECT    0
    3184                        PTP UNICAST EVENT REDIRECT    0
Instance: 1  [Unit: 0 Slice: 1]
    3118                                PTP EVENT REDIRECT    0
    3119                        ETH PTP EVENT TX TIMESTAMP    0
    3120                            PTP EVENT TX TIMESTAMP    0
    3167                                  PTP MSG REDIRECT    0
    3183                          PTP UNICAST MSG REDIRECT    0
    3184                        PTP UNICAST EVENT REDIRECT    0
```

3. Check if Control Plane Policing (CoPP) is dropping PTP messages. If there is a drop counter here, then verify your scale.

```
N9K_Spine01# show policy-map interface control-plane class copp-system-p-class-redirect
  Service-policy  input: copp-system-p-policy-strict
    class-map copp-system-p-class-redirect (match-any)
      match access-group name copp-system-p-acl-ptp
      match access-group name copp-system-p-acl-ptp-l2
      match access-group name copp-system-p-acl-ptp-uc
      set cos 1
      police cir 280 kbps , bc 32000 bytes
      module 1 :
        transmitted 875343860 bytes;
        5-minute offered rate 1650 bytes/sec
        conformed 1932 peak-rate bytes/sec
          at Thu Jan 04 22:08:20 2024
        dropped 0 bytes;               >>>> Check if any counter increasing
        5-min violate rate 0 byte/sec
        violated 0 peak-rate byte/sec
```

Best Practice

- Ensure that everything is in the same PTP domain.
- Sync, Announce, and Delay intervals must match on both ends of the link.
- The CLI command ensures that the leaf access port stays in the master state even if the recipient is misconfigured or a grandmaster is accidentally connected under this port:

```
interface Ethernet1/1
      ptp multicast master-only
```

- Check the verified scalability guide for the maximum number of master ports per model of a switch.

Related Information

Nexus 9000 PTP Configuration Guide

Precision Time Protocol (PTP) for Cisco Nexus Dashboard Insights