

Catalyst 9000交换机上的Precision Time Protocol故障排除

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简介

本文档介绍如何对Catalyst 9000交换机上的精确时间协议(PTP)进行故障排除。

先决条件

要求

Cisco 建议您了解以下主题：

- 精确时间协议(PTP)

使用的组件

本文档中的信息基于Catalyst 9300、9400、9500和9600交换机。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

规则

有关文档规则的详细信息，请参阅[Cisco技术提示和规则](#)。

限制和限制

- Catalyst 9200交换机不支持PTP，但从17.14.01开始的C9200CX交换机支持PTP。
- 在17.06.01之前，Stackwise部署中的Catalyst 9300交换机不支持PTP。
- 在17.10.01之前，Stackwise-Virtual中的Catalyst 9400、9500或9600交换机不支持PTP

[Cisco Catalyst交换机支持Precision时间协议常见问题](#)

有关Catalyst 9000的PTP限制和限制的详尽列表，请参阅给定平台和版本的第2层配置指南的PTP部分。

术语

期限	定义
大师级时钟(GMC)	在PTP域内，祖母时钟是使用PTP进行时钟同步的主要时间源。大师级时钟通常具有非常精确的时间源，例如GPS或原子钟。当网络不需要任何外部时间参考且仅需要在内部同步时，祖母时钟可以自由运行。
普通时钟(OC)	普通时钟是具有单个PTP端口的PTP时钟。它用作PTP网络中的节点，可以被BMCA选为子域内的主节点或从节点。普通时钟是PTP网络中最常见的时钟类型，因为它们用作连接到需要同步的设备的网络中的终端节点。普通时钟与外部设备具有不同的接口。
边界时钟(BC)	PTP网络中的边界时钟代替标准网络交换机或路由器运行。边界时钟有多个PTP端口，每个端口都提供对单独PTP通信路径的访问。边界时钟提供PTP域之间的接口。它们会拦截和处理所有PTP消息，并传递所有其他网络流量。边界时钟使用BMCA选择任何端口看到的最佳时钟。然后，将选定端口设置为从端口。主端口与下游连接的时钟同步，而从端口与上游主时钟同步。
透明时钟(TC)	PTP网络中透明时钟的作用是更新PTP事件消息中的时间间隔字段。此更新补偿了交换机延迟，其准确度在1皮秒内。透明时钟有两种类型：
端到端(E2E)透明	测量SYNC和DELAY_REQUEST消息的PTP事件消息传输时间（也称为驻留时间）。此测量的传输时间将添加到相应消息中的数据字段（更正字段）：

	- 测量的SYNC消息的传输时间会添加到相应的SYNC或FOLLOW_UP消息的校正字段中。 - 测量的DELAY_REQUEST消息的传输时间被添加到相应的DELAY_RESPONSE消息的校正字段中。
点对点(P2P)透明	如上所述，使用E2E透明时钟的相同方法测量PTP事件消息传输时间。此外，P2P透明时钟可测量上行链路延迟。上行链路延迟是所考虑的上游邻居P2P透明时钟和P2P透明时钟之间的估计数据包传播延迟。这两次（消息中转时间和上行链路延迟时间）都被添加到PTP事件消息的校正字段中，并且从设备接收的消息的校正字段包含所有链路延迟的总和。理论上，这是SYNC数据包的端到端总延迟（从主到从）。

PTP时钟故障同步

原因如下：

- 网络拥塞，导致PTP数据包在接口（传输中）或控制平面策略(CoPP)上被缓冲或丢弃。
- 防火墙拦截PTP数据包。
- 耗尽硬件资源，例如CPU、内存或TCAM。
- 硬件或软件限制，无法精确测量时间。

要执行的操作：

[检查Cat9k PTP常见问题页面](#)

查看show命令故障排除流程

特定故障点

通告和发现

症状	可能的原因
普通时钟CPU不处理来自GMC的通告数据包。普通时钟不会发送延迟请求数据包。在PTP协商之后，时钟无法同步。	根时钟未配置为发送Announce packets.PTP Packets lost in transit. 接口、控制平面或ASIC丢弃的PTP数据包。配置错误导致GMC发送不正确的PTP域/配置文件或普通时钟配置的域/配置文件不正确。

要采取的操作：

验证PTP配置和状态：

执行接口或控制平面EPC以验证时钟正在接收和发送PTP数据包：

如果EPC不可靠，请使用PTP调试收集的数据验证正在发送和接收的PTP值：

最佳主时钟算法(BMCA)

症状	可能的原因
同步失败 忽略或拒绝来自GMC的PTP消息的时钟 日志记录错误重新同步尝试	网络设备和GMC之间的PTP版本不兼容。通告数据包中的时钟数据不准确。同一域内多个主时钟导致的时钟不稳定。

要采取的操作：

排除可能造成延迟或不准确时间保持的任何中转时钟或边界时钟。

排除平台上的任何硬件或软件限制，以免精确计时。

收集PTP调试并检查是否存在任何错误。

大师级时钟选择

症状	可能的原因
	最佳主时钟算法(BMCA)不选择最准确的GMC。 BMCA不计算网络延迟。优先级设置不匹配。

要采取的操作：

同步消息交换

症状	可能的原因
	透明时钟(TC)配置错误，例如PTP配置文件或模式不正确。延迟计算出错。同步消息数据包在传输中或OC的控制平面上丢弃。

要采取的操作：

延迟请求和响应

症状	可能的原因
	透明时钟无法计算精确的时间戳，从而导致延迟计算不准确。延迟请求或响应数据包以错误顺序接收、在传输中丢失或在控制平面之前丢弃

要采取的操作：

更正和同步

症状	可能的原因
	时钟计算出的时间修正和延迟补偿不准确。硬件或软件限制，导致不正确的系统时钟调整，从而导致同步失败。

要采取的操作

PTP命令行界面Show命令

验证PTP模式、配置文件、身份、域、启用PTP的接口和PTP接口状态：

```
<#root>
```

```
Cat9300#
```

```
show ptp clock
```

```
PTP CLOCK INFO
PTP Device Type:
```

```
Unknown
```

```
PTP Device Profile:
```

```
Default Profile
```

```
Clock Identity:
```

```
0x70:B:4F:FF:FE:A8:52:80
```

```
Clock Domain:
```

```
0
```

```
Network Transport Protocol: 802.3
Number of PTP ports:
```

```
0
```

```
Cat9300#
```

没有PTP配置的接口仍处于域0中并处于INITIALIZING状态。

```
<#root>
```

```
Cat9300#
```

```
show ptp brief
```

Interface	Domain	PTP State
GigabitEthernet1/0/1		
0		

```
INITIALIZING
```

这是端到端透明模式下时钟的过渡阶段。

```
<#root>
```

```
Cat9300#
```

```
configuration terminal
```

```
Cat9300(config)#
```

```
interface tve1/0/1
```

```
Cat9300(config-if)#
```

```
shut
```

```
Cat9300(config-if)#
```

```
no shut
```

```
Cat9300(config-if)#
```

```
end
```

```
%LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to down
```

```
Cat9300#
```

```
show ptp brief | i 1/0/1
```

Interface	Domain	PTP State
-----------	--------	-----------

TwentyFiveGigE1/0/1 8

FAULTY

%LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to up

Cat9300#

show ptp brief | i 1/0/1

Interface	Domain	PTP State
TwentyFiveGigE1/0/1	8	

LISTENING

%LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to up

Cat9300#

show ptp brief | i 1/0/1

Interface	Domain	PTP State
TwentyFiveGigE1/0/1	8	

UNCALIBRATED

Cat9300#

show ptp brief | i 1/0/1

Interface	Domain	PTP State
TwentyFiveGigE1/0/1	8	

SLAVE

<#root>

Cat9300#

show platform software fed switch active ptp debugs interface twe1/0/1

Offload Monitor Data:

=====

Ofld sig cnt: 0, Ofld ts cnt: 0, Ofld miss cnt: 0, Ofld issue hit: 0

Sig (rd,wr)ptr: (0,0), Nif (rd,wr)ptr: (0,0)

Drop counters:

=====

ptp messages dropped due to qos drain count : 0

<#root>

Cat9300#

show platform software fed switch active ifm mappings

Interface

IF_ID

Inst	Asic	Core	Port	SubPort	Mac	Cntx	LPN	GPN	Type	Active
TwentyFiveGigE1/0/1				0x9						
0	0	0	0	0	7	8	1	1	NRU	Y

<>

Cat9300#

show platform software fed switch active ptp if-id 0x009

Displaying port data for if_id 9

=====

Port Mac Address 9C:54:16:AE:4C:81

Port Clock Identity 9C:54:16:FF:FE:AE:4C:80

Port number 1

PTP Version 2

domain_value 8

Profile Type: : DEFAULT

Clock Mode : TRANSPARENT CLOCK E2E

Delay mechanism: End-to-End

port_enabled: TRUE

ptt_port_enabled: TRUE

Port state: : SLAVE

sync_seq_num 52439

delay_req_seq_num 0

ptp vlan is valid : TRUE

ptp vlan id 10

port mode 2

tag native vlan : FALSE

num sync messages transmitted 0

num followup messages transmitted 0

num sync messages received 4434

num followup messages received 4434

num delay requests transmitted 0

num delay responses received 0

num delay requests received 0

num delay responses transmitted 0

<#root>

Cat9300#

show platform software fed switch active ptp domain

Displaying data for domain number 8

=====

Profile Type : DEFAULT

Profile State: enabled

Clock Mode : TRANSPARENT CLOCK E2E

Delay Mechanism: : END-TO-END

PTP clock : 1970-1-1 1:45:13

mean_path_delay 0 nanoseconds

Transport Method : 802.3

Message general ip dscp : 59

Message event ip dscp : 47

<#root>

Cat9300#

show platform software fed switch active ptp auto-calibrate

PTP Auto Calibration:

PTP auto_calibration status : FALSE

<#root>

C9300-4c80#

ptp calibrate interface twe1/0/1 speed all

%SYS-5-CONFIG_P: Configured programmatically by process PTP protocol engine from console as vty0

%PTP_RP_MODULE-6-PTP_AUTO_CALIBRATION_COMPLETE: PTP auto calibration on the interface TwentyFiveGigE1/0/1

%SYS-5-CONFIG_P: Configured programmatically by process PTP protocol engine from console as vty0

检查平台资源

检查接口

PTP数据包路径中的输入丢弃、输出丢弃或CRC错误的非零值会导致故障。

<#root>

Cat9300#

show interfaces tve1/0/1 human-readable

TwentyFiveGigE1/0/1 is up, line protocol is up (connected)
Hardware is Twenty Five Gigabit Ethernet, address is 9c54.16ae.4c81 (bia 9c54.16ae.4c81)
MTU 1500 bytes, BW 10000000 Kbit/sec, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not set
Full-duplex, 10Gb/s, link type is auto, media type is SFP-10GBase-CX1
input flow-control is on, output flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters never

Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0

Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 3.0 kilobits , 5 pps
5 minute output rate 0 bits/sec, 0 packets/sec
 26,497 packets input, 1,955,114 bytes, 0 no buffer
 Received 26,477 broadcasts (26,476 multicasts)
 0 runs, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored

 0 watchdog, 26,476 multicast, 0 pause input
 0 input packets with dribble condition detected
 947 packets output, 124,533 bytes, 0 underruns
 Output 17 broadcasts (917 multicasts)
 0 output errors, 0 collisions, 3 interface resets
 2 unknown protocol drops
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier, 0 pause output
 0 output buffer failures, 0 output buffers swapped out

检查控制平面策略

PTP数据包通过低延迟队列进行处理。PTP流量与其他网络流量类型共享策略索引，因此最好验证控制平面上没有递增丢包。

<#root>

Cat9300#

show platform hardware fed switch active qos queue stats internal cpu policier

CPU Queue Statistics

=====

(default) (set)

Queue

Queue

QId	PlcIdx	Queue Name	Enabled	Rate	Rate
-----	--------	------------	---------	------	------

Drop(Bytes)

Drop(Frames)

0	11	DOT1X Auth	Yes	1000	1000	0	0
1	1	L2 Control	Yes	2000	2000	0	0
2	14	Forus traffic	Yes	4000	4000	0	0
3	0	ICMP GEN	Yes	600	600	0	0
4	2	Routing Control	Yes	5400	5400	0	0
5	14	Forus Address resolution	Yes	4000	4000	0	0
6	0	ICMP Redirect	Yes	600	600	0	0
7	16	Inter FED Traffic	Yes	2000	2000	0	0
8	4	L2 LVX Cont Pack	Yes	1000	1000	0	0
9	19	EWLC Control	Yes	13000	13000	0	0
10	16	EWLC Data	Yes	2000	2000	0	0
11	13	L2 LVX Data Pack	Yes	1000	1000	0	0
12	0	BROADCAST	Yes	600	600	0	0
13	10	Openflow	Yes	200	200	0	0
14	13	Sw forwarding	Yes	1000	1000	0	0
15	8	Topology Control	Yes	13000	13000	0	0
16	12	Proto Snooping	Yes	2000	2000	0	0
17	6	DHCP Snooping	Yes	400	400	0	0
18	13	Transit Traffic	Yes	1000	1000	0	0
19	10	RPF Failed	Yes	200	200	0	0
20	15	MCAST END STATION	Yes	2000	2000	0	0
21	13	LOGGING	Yes	1000	1000	0	0
22	7	Punt Webauth	Yes	1000	1000	0	0
23	18	High Rate App	Yes	13000	13000	0	0
24	10	Exception	Yes	200	200	0	0
25	3	System Critical	Yes	1000	1000	0	0
26	10	NFL SAMPLED DATA	Yes	200	200	0	0
27	2	Low Latency	Yes	5400	5400	0	0 <<< Queue for PTP tra
28	10	EGR Exception	Yes	200	200	0	0
29	5	Stackwise Virtual OOB	Yes	8000	8000	0	0
30	9	MCAST Data	Yes	400	400	0	0
31	3	Gold Pkt	Yes	1000	1000	0	0

* NOTE: CPU queue policer rates are configured to the closest hardware supported value

CPU Queue Policer Statistics

Policer Index	Policer Accept Bytes	Policer Accept Frames	Policer Drop Bytes	Policer Drop Frames
0	4052	48	0	0
1	3520420	10686	0	0
2	1966076	16634	0	0 <<< PTP packets share this Policier Inde
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0

6	0	0	0	0
7	0	0	0	0
8	2937088	45892	0	0
9	0	0	0	0
10	1770	15	0	0
11	0	0	0	0
12	0	0	0	0
13	20246	191	0	0
14	24918	252	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0

Second Level Policer Statistics

20	8423584	73212	0	0
21	50986	506	0	0

Policer Index Mapping and Settings

level-2	:	level-1	(default)	(set)
PlcIndex	:	PlcIndex	rate	rate
20	:	1 2 8	13000	13000
21	:	0 4 7 9 10 11 12 13 14 15	6000	6000

Second Level Policer Config

level-1	level-2		level-2
QId	PlcIdx	Queue Name	Enabled
0	11	21 DOT1X Auth	Yes
1	1	20 L2 Control	Yes
2	14	21 Forus traffic	Yes
3	0	21 ICMP GEN	Yes
4	2	20 Routing Control	Yes
5	14	21 Forus Address resolution	Yes
6	0	21 ICMP Redirect	Yes
7	16	- Inter FED Traffic	No
8	4	21 L2 LVX Cont Pack	Yes
9	19	- EWLC Control	No
10	16	- EWLC Data	No
11	13	21 L2 LVX Data Pack	Yes
12	0	21 BROADCAST	Yes
13	10	21 Openflow	Yes
14	13	21 Sw forwarding	Yes
15	8	20 Topology Control	Yes
16	12	21 Proto Snooping	Yes
17	6	- DHCP Snooping	No
18	13	21 Transit Traffic	Yes
19	10	21 RPF Failed	Yes
20	15	21 MCAST END STATION	Yes
21	13	21 LOGGING	Yes
22	7	21 Punt Webauth	Yes
23	18	- High Rate App	No
24	10	21 Exception	Yes
25	3	- System Critical	No
26	10	21 NFL SAMPLED DATA	Yes
27	2	20 Low Latency	Yes

28	10	21	EGR Exception	Yes
29	5	-	Stackwise Virtual OOB	No
30	9	21	MCAST Data	Yes
31	3	-	Gold Pkt	No
<>				

检查CPU和内存

<#root>

Cat9300#

show platform resources

**State Acronym: H - Healthy, W - Warning, C - Critical					
Resource	Usage	Max	Warning	Critical	State

Control Processor	1.28%	100%	90%	95%	H
DRAM	3566MB (47%)	7575MB	85%	90%	H
TMPFS	1001MB (13%)	7575MB	40%	50%	H

show processes cpu sorted | ex 0.00
show cpu history
show processes memory sorted

检查TCAM

<#root>

Cat9300#

show platform hardware fed switch active fwd-asic resource tcam utilization

Codes: EM - Exact_Match, I - Input, O - Output, IO - Input & Output, NA - Not Applicable

CAM Utilization for ASIC [0]									
Table	Subtype	Dir	Max	Used	%Used	V4	V6	MPLS	Other

Mac Address Table	EM	I	32768	20	0.06%	0	0	0	20
Mac Address Table	TCAM	I	1024	21	2.05%	0	0	0	21
L3 Multicast	EM	I	8192	0	0.00%	0	0	0	0
L3 Multicast	TCAM	I	512	9	1.76%	3	6	0	0
L2 Multicast	EM	I	8192	0	0.00%	0	0	0	0
L2 Multicast	TCAM	I	512	11	2.15%	3	8	0	0
IP Route Table	EM	I	24576	12	0.05%	11	0	1	0
IP Route Table	TCAM	I	8192	25	0.31%	12	10	2	0
QOS ACL	TCAM	IO	5120	85	1.66%	28	38	0	1
Security ACL	TCAM	IO	5120	129	2.52%	26	58	0	4
Netflow ACL	TCAM	I	256	6	2.34%	2	2	0	0
PBR ACL	TCAM	I	1024	22	2.15%	16	6	0	0
Netflow ACL	TCAM	O	768	6	0.78%	2	2	0	0

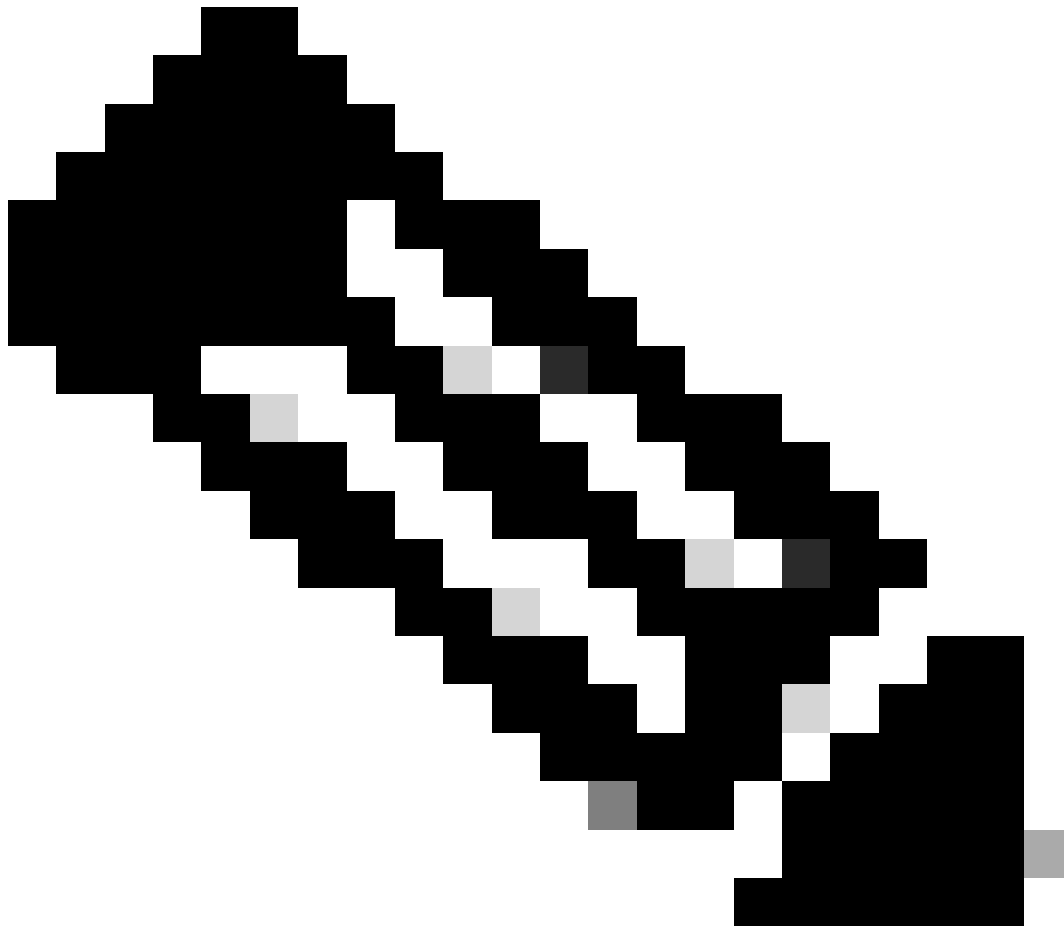
Flow SPAN ACL	TCAM	IO	1024	13	1.27%	3	6	0	4
Control Plane	TCAM	I	512	282	55.08%	130	106	0	46
Tunnel Termination	TCAM	I	512	18	3.52%	8	10	0	0
Lisp Inst Mapping	TCAM	I	2048	1	0.05%	0	0	0	1
Security Association	TCAM	I	256	4	1.56%	2	2	0	0
CTS Cell Matrix/VPN Label	EM	O	8192	0	0.00%	0	0	0	0
CTS Cell Matrix/VPN Label	TCAM	O	512	1	0.20%	0	0	0	1
Client Table	EM	I	4096	0	0.00%	0	0	0	0
Client Table	TCAM	I	256	0	0.00%	0	0	0	0
Input Group LE	TCAM	I	1024	0	0.00%	0	0	0	0
Output Group LE	TCAM	O	1024	0	0.00%	0	0	0	0
Macsec SPD	TCAM	I	256	2	0.78%	0	0	0	1

平台工具

执行嵌入式数据包捕获(EPC)

配置EPC

```
<#root>
Cat9300#monitor capture tac [
interface
|
  control-plane
] [
in
|
  out
|
  both
] [
match
|
  access-list
] buffer size 100
```



注意：有关用于EPC的更多配置选项，请查看给定平台/版本的网络管理配置指南。

在接口级别验证Rx PTP数据包

<#root>

Cat9300#

monitor capture tac interface tve1/0/1 in match any buffer size 100

Cat9300#

monitor capture tac start

Started capture point : tac
%BUFCAP-6-ENABLE: Capture Point tac enabled.
C9300-4c80#

monitor capture stop

Capture statistics collected at software:

Capture duration - 3 seconds

Packets received - 28

Packets dropped - 0

Packets oversized - 0

Bytes dropped in asic - 0

Capture buffer exists till exported or cleared

Stopped capture point : tac

%BUFCAP-6-DISABLE: Capture Point tac disabled.

C9300-4c80#

show monitor capture tac buffer brief | i PTP

2	0.032858	74:8f:c2:dc:b0:63	->	01:1b:19:00:00:00	PTPv2	82	Announce	Message
12	1.032894	74:8f:c2:dc:b0:63	->	01:1b:19:00:00:00	PTPv2	82	Announce	Message
15	2.032831	74:8f:c2:dc:b0:63	->	01:1b:19:00:00:00	PTPv2	82	Announce	Message
28	3.033414	74:8f:c2:dc:b0:63	->	01:1b:19:00:00:00	PTPv2	82	Announce	Message

检验Rx数据包是否到达控制平面

<#root>

Cat9300#

monitor capture cpu control-plane in match any buffer size 100

Cat9300#

monitor capture cpu start

Started capture point : cpu

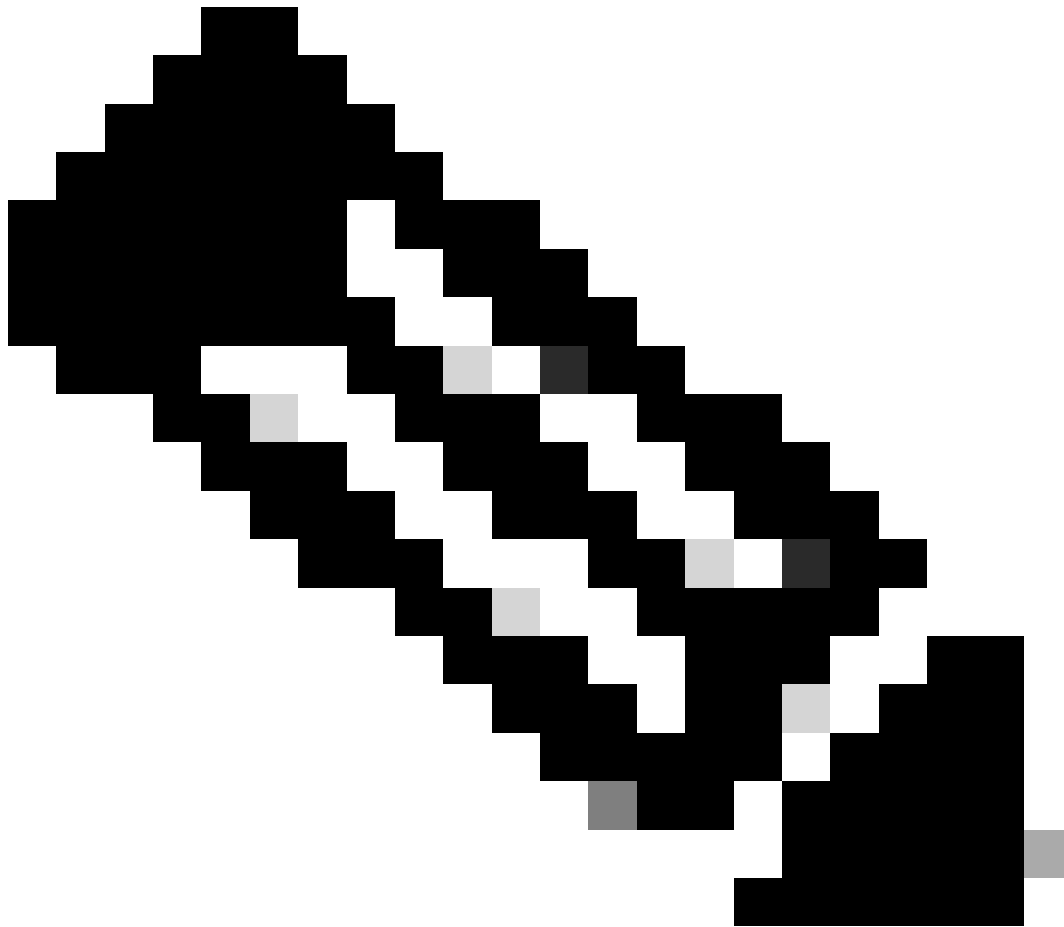
Cat9300#

*Sep 28 14:05:28.375: %BUFCAP-6-ENABLE: Capture Point cpu enabled.

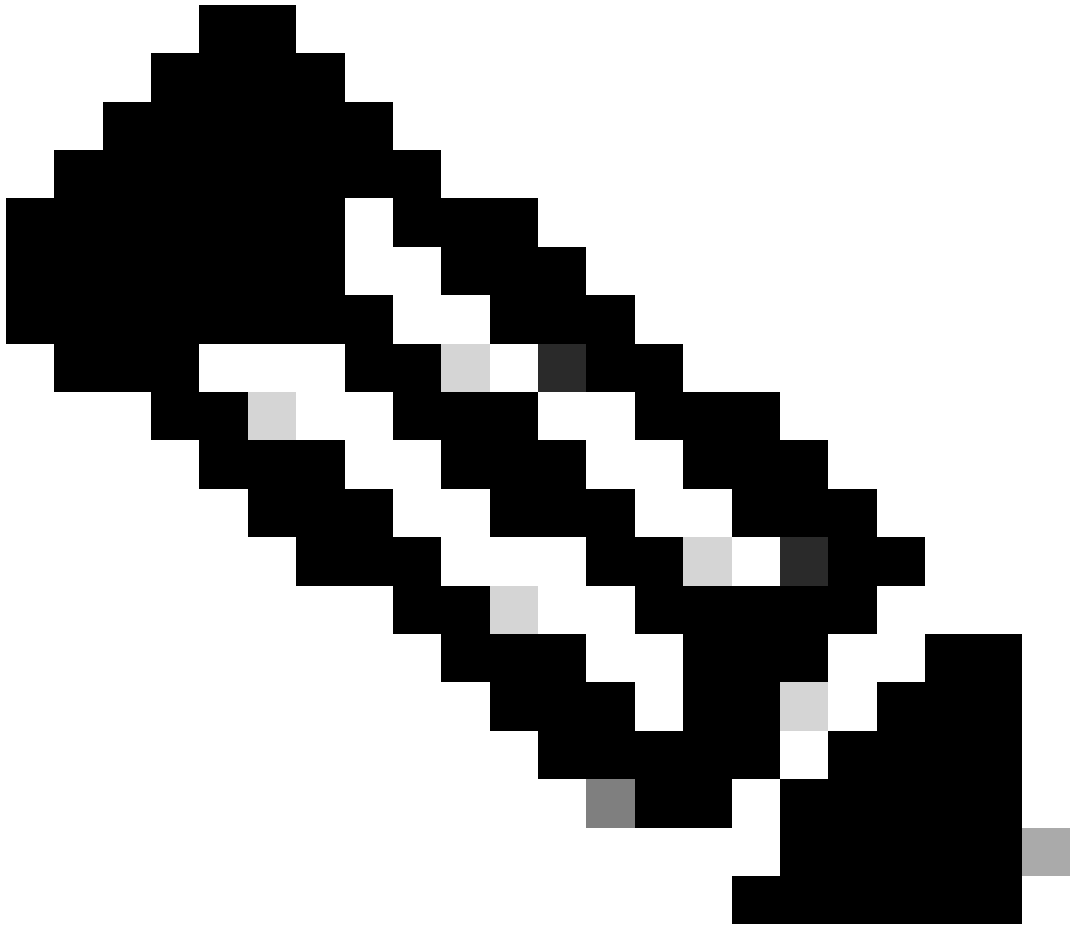
Cat9300#

验证控制平面级别的Tx PTP数据包

这表示Cisco IOS® XE软件和CPU正在生成Rx PTP数据包。



注意：下一跳交换机或SPAN/RSPAN上的入口EPC更可靠，可以验证本地普通时钟正在发送PTP数据包。



注意：CPU生成的数据包（如“ ”）在出口中不会在物理接口上配置了EPC，这是EPC工具的书面限制。

<#root>

```
Cat9300#  
  
monitor capture cpu control-plane out match any buffer size 100  
  
Cat9300#  
  
monitor capture cpu start
```

收集PTP调试

调试	目的
自动校准	

bmc	显示接口的选定对象。
消息	

自动校准调试

<#root>

21:41:12.543: %LINK-5-CHANGED: Interface TwentyFiveGigE1/0/1, changed state to administratively down
21:41:13.542: %LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to down
21:41:13.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to down
1:41:29.714:

Autocalibration: No autocalibration is progress (status - 0) or linkup interface TwentyFiveGigE1/0/1 di

21:41:30.118: %SYS-5-CONFIG_I: Configured from console by console
21:41:31.714: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to down
21:41:35.821: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to up
21:41:37.824: %LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to up
21:41:37.824:

Autocalibration: No autocalibration is progress (status - 0) or linkup interface TwentyFiveGigE1/0/1 di

21:41:38.849: Autocalibration: No autocalibration is progress (status - 0) or linkup interface Vlan10 d
21:41:39.849: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

bmc debug

<#root>

21:41:12.543: %LINK-5-CHANGED: Interface TwentyFiveGigE1/0/1, changed state to administratively down
21:41:13.542: %LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to down
21:41:13.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to down
21:41:30.118: %SYS-5-CONFIG_I: Configured from console by console
21:41:31.714: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to down
21:41:35.821: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to up
21:41:37.824: %LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to up
21:41:39.849: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

21:41:40.277: Set gmc interface: TwentyFiveGigE1/0/1 <<<

消息debug

<#root>

Cat9300#

clear logging

Cat9300#

conf t

Enter configuration commands, one per line. End with CNTL/Z.

Clear logging buffer [confirm]

Cat9300(config)#

Cat9300(config)#

int twe1/0/1

Cat9300(config-if)#

shut

Cat9300(config-if)#

end

Cat9300#

Cat9300#

debug ptp messages

PTP Messages debugging is on

Cat9300#

Cat9300#

conf t

Enter configuration commands, one per line. End with CNTL/Z.

Cat9300(config)#

interface twe1/0/1

Cat9300(config-if)#

no shut

Cat9300(config-if)#

end

Cat9300#

Cat9300#

show ptp bri | i 1/0/1

TwentyFiveGigE1/0/1 8

FAULTY

Cat9300#

show ptp bri | i 1/0/1

TwentyFiveGigE1/0/1 8

LISTENING

Cat9300#

show ptp bri | i 1/0/1

TwentyFiveGigE1/0/1 8

UNCALIBRATED

Cat9300#

show ptp bri | i 1/0/1

TwentyFiveGigE1/0/1 8

SLAVE

Cat9300#

undebug all

All possible debugging has been turned off

Cat9300#

Cat9300#

show logging

<>

Log Buffer (131072 bytes):

21:59:06.980: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to down

21:59:07.826: %SYS-5-CONFIG_I: Configured from console by console

21:59:11.271: %LINK-3-UPDOWN: Interface TwentyFiveGigE1/0/1, changed state to up

21:59:12.976: Cisco IOS-FMAN-PTP:retrieve interface: Twei/0/1 iif_id: 9(fmanrp_ptp_port_data_update) p

local data sent by clock

if_hdl = 9

mac address =

9c54.16ae.4c81

<<< similar to local clock identity

domain_value = 8

port_number = 1

port_state = 4

port_enabled = 1

ptt_port_enabled = 1

delete_flag = False

21:59:13.273:

%LINEPROTO-5-UPDOWN: Line protocol on Interface TwentyFiveGigE1/0/1, changed state to up <<<

21:59:13.846:

received message on TwentyFiveGigE1/0/1 <<<

21:59:13.846:

PTP message received, intf: TwentyFiveGigE1/0/1, type: ANNOUNCE

21:59:14.846: received message on TwentyFiveGigE1/0/1

21:59:14.846: PTP message received, intf: TwentyFiveGigE1/0/1, type: ANNOUNCE

21:59:15.845: received message on TwentyFiveGigE1/0/1

21:59:15.845: PTP message received, intf: TwentyFiveGigE1/0/1, type: ANNOUNCE

21:59:15.976: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

21:59:16.775:

```
Set gmc interface: TwentyFiveGigE1/0/1 <<<
```

执行Show Platform Forward(SPF)

如果看到PTP数据包到达接口但未传送到控制平面，请运行此工具。

<#root>

1. Configure ingress EPC on PTP enabled interface.

2. View buffer output and filter for PTP and make note of PTP packet number.

Cat9300#

```
show monitor capture tac buffer brief
```

```
| i PTP
```

2

```
0.032858 74:8f:c2:dc:b0:63 -> 01:1b:19:00:00:00 PTPv2 82 Announce Message
```

<<<

```
12 1.032894 74:8f:c2:dc:b0:63 -> 01:1b:19:00:00:00 PTPv2 82 Announce Message
15 2.032831 74:8f:c2:dc:b0:63 -> 01:1b:19:00:00:00 PTPv2 82 Announce Message
28 3.033414 74:8f:c2:dc:b0:63 -> 01:1b:19:00:00:00 PTPv2 82 Announce Message
```

3. Export buffer to .pcap on Switch's flash.

Cat9300-4c80#

```
monitor capture tac export location flash:/ptp-cpu.pcap
```

4. Execute the SPF command and make note of interface where PTP packets are expected to ingress and ref

Cat9300#

```
show platform hardware fed switch active forward interface twe1/0/1 pcap flash:ptp-cpu.pcap number 2 dat
```

Show forward is running in the background. After completion, syslog can be generated.

4. View Forward/Drop decision

Cat9300#

```
show platform hardware fed switch active forward last summary
```

Input Packet Details:

```
###[ Ethernet ]###
```

```
dst          = 01:1b:19:00:00:00
src=74:8f:c2:dc:b0:63
```

```
type         = 0x8100
###[ 802.1Q ]###
prio         = 0
```

id = 0

vlan = 10

type = 0x88f7

###[Raw]###

load = '0B 02 00 40 08 00 00 08 00 00 00 00 00 00 00 00 00 00 00 00 74 8F C2 FF FE DC B0 6

Ingress:

Port : TwentyFiveGigE1/0/1

Global Port Number : 1
Local Port Number : 1
Asic Port Number : 0
Asic Instance : 0

Vlan : 10

Mapped Vlan ID : 5
STP Instance : 3
BlockForward : 0
BlockLearn : 0
L3 Interface : 38
IPv4 Routing : enabled
IPv6 Routing : enabled
Vrf Id : 0
Adjacency:
Station Index : 172
Destination Index : 21151
Rewrite Index : 1
Replication Bit Map : 0xa ['localCpu', 'remoteCpu']

Decision:

Destination Index : 21151 [DI_CPUQ_LOW_LATENCY]

Rewrite Index : 1 [RI_CPU]
Dest Mod Index : 0 [IGR_FIXED_DMI_NULL_VALUE]
CPU Map Index : 0 [CMI_NULL]

Forwarding Mode : 0 [Bridging]
Replication Bit Map : ['localCpu', 'remoteCpu']

Winner : CPPMAC LOOKUP2
Qos Label : 65
SGT : 0
DGTID : 0

Egress:

Possible Replication :
Port : CPU_Q_LOW_LATENCY <<< This should be the forwarding decision to this CPU

Output Port Data :
Port : CPU
Asic Instance : 0

CPU Queue : 27 [CPU_Q_LOW_LATENCY]

Unique RI : 0
Rewrite Type : 0 [Unknown]

Mapped Rewrite Type : 17 [CPU_ENCAP]

Vlan : 10
Mapped Vlan ID : 5

C9300-4c80#

执行Packet Tracer(PT)

Catalyst 9000上的PTP警告

Cisco Bug ID	标题思科漏洞ID
思科漏洞ID CSCvg24999	在ptp模式p2pttransparent上交换机崩溃。
思科漏洞ID CSCwf81913	PTP停止在Catalyst交换机上工作，端口进入未校准的状态。
思科漏洞ID CSCwa49052	PTP偏移和平均路径延迟可能滞留在故障交换机上，并且永远不会增加。思科漏洞ID
思科漏洞ID CSCvu73652	C9300 — 丢弃源端口不等于319的PTP事件消息。 Cisco Bug ID
思科漏洞ID CSCwc35946	在8275.1、802.1AS和默认PTP配置文件之间更改时，CLI选项不一致。
思科漏洞ID CSCwc00050	无法通过Web UI更改PTP模式

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