排除Catalyst 9000交換機上的EtherChannel故障

目錄

簡介

本檔案介紹如何瞭解Catalyst 9000系列交換器上的EtherChannel並對其進行疑難排解。

必要條件

需求

思科建議您瞭解以下主題：

- Catalyst 9000系列交換器架構
- Cisco IOS® XE軟體架構
- 連結彙總控制通訊協定(LACP)和連線埠彙總通訊協定(PAgP)

採用元件

本檔案中的資訊是根據以下硬體版本：

- Catalyst 9200
- Catalyst 9300
- Catalyst 9400
- Catalyst 9500
- Catalyst 9600

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

背景資訊

有關限制、限制、配置選項和注意事項的最新資訊，以及有關此功能的任何其他相關詳細資訊，請參閱思科官方發行說明和配置指南。

EtherChannel在交換機、路由器和伺服器之間提供容錯高速鏈路。 使用EtherChannel增加裝置之間的頻寬，並將其部署到網路中可能發生瓶頸的任何位置。EtherChannel為鏈路丟失提供自動恢復，它將負載重新分配到其餘鏈路。如果鏈路發生故障，EtherChannel會將來自故障鏈路的流量重定向到通道中的其餘鏈路，無需干預。

可以配置EtherChannel，無需協商，也可以透過鏈路聚合協定（PAgP或LACP）的支援進行動態協商。

啟用PAgP或LACP後，交換機將瞭解合作夥伴的身份和每個介面的功能。然後，交換機將具有類似配置的介面動態分組為單個邏輯鏈路（通道或聚合埠）；交換機將這些介面組基於硬體、管理和埠引數限制。

LACP標誌

LACP標誌用於在埠通道啟動時協商埠通道引數。看看每面旗子的意義：

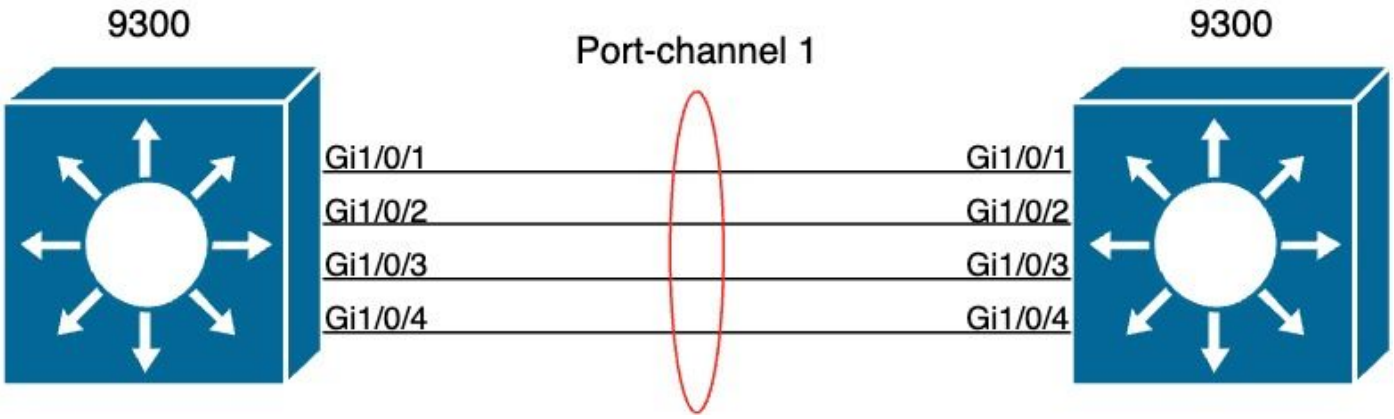
旗標	狀態
LACP活動（低有效位）	0 =被動模式 1 =活動模式
LACP超時：指示LACP傳送/接收超時	0 =長超時。3 x 30秒（預設） 1 =短超時。3 x 1秒（LACP速率快）

彙總	0 =單個鏈路（不考慮聚合） 1 =可聚合（潛在的聚合候選對象）
同步	0 =鏈路不同步（非良好狀態） 1 =鏈路處於同步狀態（正常狀態）
正在收集	0 =尚未準備好接收/處理幀 1 =準備接收/處理幀
分佈	0 =尚未準備好傳送/傳輸幀 1 =準備傳送/傳輸幀
已預設	0 =使用收到的PDU中的資訊給合作夥伴 1 =它使用合作夥伴的預設資訊
已過期（最高有效位）	0 = PDU已過期， 1 = PDU有效

LACP標誌的預期值是0x3D（十六進位制）或0111101（二進位制），以達到P（捆綁在埠通道中）狀態。

```
.... ...1 = LACP Activity (less significant bit)
.... ..0. = LACP Timeout
.... .1.. = Aggregation
.... 1... = Synchronization

...1 .... = Collecting
..1. .... = Distributing
.0.. .... = Defaulted
0... .... = Expired (most significant bit)
```

網路圖表



檢驗LACP的運行情況

本節介紹如何驗證LACP協定的正確狀態和操作。

基本檢查

使用以下命令檢查LACP輸出：

<#root>

show lacp sys-id

show lacp <*channel-group number*> neighbor

show lacp <*channel-group number*> counters

show interfaces <*interface ID*> accounting

debug lacp [event|packet|fsm|misc]

debug condition <*condition*>

第一個命令輸出顯示交換機系統ID及其優先順序（對於LACP）。

<#root>

switch#

show lacp sys-id

32768,

f04a.0206.1900 <-- Your system MAC address

檢查LACP鄰居的詳細資訊，如運行模式、鄰居系統Dev ID及其優先順序。

<#root>

switch#

show lacp 1 neighbor

```
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 1 neighbors

                    LACP port                      Admin  Oper   Port    Port
Port          Flags  Priority
```

Dev ID

```
          Age  key    Key    Number  State
Gi1/0/1       SA     32768
```

f04a.0205.d600

```
  12s  0x0    0x1    0x102   0x3D
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/2       SA     32768
```

f04a.0205.d600

```
  24s  0x0    0x1    0x103   0x3D
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/3       SA     32768
```

f04a.0205.d600

```
  16s  0x0    0x1    0x104   0x3D
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/4       SA     32768
```

f04a.0205.d600

```
  24s  0x0    0x1    0x105   0x3D
```

<-- Dev ID: Neighbor MAC Address

驗證每個介面傳送和接收的LACP資料包。如果檢測到損壞的LACP資料包，則Pkts Err計數器會增加。

<#root>

switch#

show lacp 1 counters

```
                LACPDUs         Marker          Marker Response  LACPDUs
Port            Sent   Recv     Sent   Recv     Sent   Recv      Pkts Err
--------------------------------------------------------------------------
Channel group: 1
Gi1/0/1
```

3111   3085

```
     0      0        0      0
```

0

```
Gi1/0/2
```

3075   3057

```
     0      0        0      0
```

0

```
Gi1/0/3
```

3081   3060

```
     0      0        0      0
```

0

```
Gi1/0/4
```

3076   3046

```
     0      0        0      0
```

0

還有一個選項可用於檢查LACP的介面記帳。

<#root>

switch#

show interface gigabitEthernet1/0/1 accounting

```
GigabitEthernet1/0/1
                Protocol    Pkts In   Chars In   Pkts Out  Chars Out
                   Other          0          0      10677     640620
                    PAgP        879      78231        891      79299
           Spanning Tree        240      12720         85       5100
                     CDP       2179     936495       2180     937020
                     DTP       3545     170160       3545     212700
```

```
LACP       3102     384648       3127     387748
```

調試

如果沒有LACP同步，或者遠端對等體不運行LACP，則會生成系統日誌消息。

```
%ETC-5-L3DONTBNDL2: Gig1/0/1 suspended: LACP currently not enabled on the remote port.
%ETC-5-L3DONTBNDL2: Gig/1/0/1 suspended: LACP currently not enabled on the remote port.
```

使用以下命令啟用LACP調試：

<#root>

debug lacp [event|packet|fsm|misc]

debug condition <*condition*>

如果發現LACP協商問題，請啟用LACP調試以分析原因。

<#root>

switch#

debug lacp event

Link Aggregation Control Protocol events debugging is on
switch#

debug lacp packet

Link Aggregation Control Protocol packet debugging is on
switch#

debug lacp fsm

Link Aggregation Control Protocol fsm debugging is on
switch#

debug lacp misc

Link Aggregation Control Protocol miscellaneous debugging is on

如果需要，還應啟用特定介面的調試條件並過濾輸出。

<#root>

switch#

debug condition interface gigabitEthernet 1/0/1

注意：LACP調試與平台無關。

驗證調試和過濾器已設定。

<#root>

switch#

show debugging

Packet Infra debugs:

Ip Address Port
---|----------

LACP:
  Link Aggregation Control Protocol

miscellaneous

 debugging is

on

  Link Aggregation Control Protocol

packet

 debugging is

on

  Link Aggregation Control Protocol

fsm

 debugging is

on

  Link Aggregation Control Protocol

events

 debugging is

on

```
Condition 1: interface Gi1/0/1 (1 flags triggered)

        Flags: Gi1/0/1
```

分析LACP調試，並使用show logging命令顯示它們。調試輸出顯示了埠通道介面啟動之前的最後一個LACP幀：

<#root>

```
switch#

show logging

<omitted output>

LACP :lacp_bugpak: Send LACP-PDU packet via Gi1/0/1
LACP : packet size: 124

LACP: pdu: subtype: 1, version: 1

LACP: Act: tlv:1, tlv-len:20, key:0x1, p-pri:0x8000, p:0x102, p-state:0x3D, s-pri:0x8000, s-mac:f04a.020
LACP: Part: tlv:2, tlv-len:20, key:0x1, p-pri:0x8000, p:0x102, p-state:0xF, s-pri:0x8000, s-mac:f04a.020

LACP: col-tlv:3, col-tlv-len:16, col-max-d:0x8000
LACP: term-tlv:0 termr-tlv-len:0
LACP: HA: Attempt to sync events -- no action  (event type 0x1)


LACP :lacp_bugpak: Receive LACP-PDU packet via Gi1/0/1
LACP : packet size: 124

LACP: pdu: subtype: 1, version: 1

LACP: Act: tlv:1, tlv-len:20, key:0x1, p-pri:0x8000, p:0x102, p-state:0x3D, s-pri:0x8000, s-mac:f04a.020
LACP: Part: tlv:2, tlv-len:20, key:0x1, p-pri:0x8000, p:0x102, p-state:0x3D, s-pri:0x8000, s-mac:f04a.02

LACP: col-tlv:3, col-tlv-len:16, col-max-d:0x8000
LACP: term-tlv:0 termr-tlv-len:0

LACP: Gi1/0/1 LACP packet received, processing    <-- beginning to process LACP PDU

    lacp_rx Gi1/0/1 - rx: during state CURRENT, got event 5(recv_lacpdu)
@@@ lacp_rx Gi1/0/1 - rx: CURRENT -> CURRENT
LACP: Gi1/0/1 lacp_action_rx_current entered

LACP: recordPDU Gi1/0/1 LACP PDU Rcvd. Partners oper state is hex F    <-- operational state

LACP: Gi1/0/1 partner timeout mode changed to 0
    lacp_ptx Gi1/0/1 - ptx: during state FAST_PERIODIC, got event 2(long_timeout)
@@@ lacp_ptx Gi1/0/1 - ptx: FAST_PERIODIC -> SLOW_PERIODIC
LACP: Gi1/0/1 lacp_action_ptx_fast_periodic_exit entered
LACP: lacp_p(Gi1/0/1) timer stopped
LACP: Gi1/0/1 lacp_action_ptx_slow_periodic entered
LACP: timer lacp_p_s(Gi1/0/1) started with interval 30000.

LACP: recordPDU Gi1/0/1 Partner in sync and aggregating    <-- peer is in sync
LACP: Gi1/0/1 Partners oper state is hex 3D    <-- operational state update

LACP: timer lacp_c_l(Gi1/0/1) started with interval 90000.
LACP: Gi1/0/1 LAG_PARTNER_UP.
LACP: Gi1/0/1 LAG unchanged
    lacp_mux Gi1/0/1 - mux: during state COLLECTING_DISTRIBUTING, got event 5(in_sync) (ignored)
```

```
lacp_handle_standby_port_internal called, depth = 1
LACP: lacp_handle_standby_port_internal: No Standby port found for LAG 1
lacp_handle_standby_port_internal called, depth = 1
LACP: lacp_handle_standby_port_internal: No Standby port found for LAG 1
lacp_handle_standby_port_internal called, depth = 1
LACP: lacp_handle_standby_port_internal: No Standby port found for LAG 1
LACP: lacp_t(Gi1/0/1) timer stopped
LACP: lacp_t(Gi1/0/1) expired

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to up

%LINK-3-UPDOWN: Interface Port-channel1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
```

如果您關注LACP調試的兩條最重要的線路，則有一些概念值得定義一些LACP PDU概念。

```
<#root>

LACP:

 Act

: tlv:1, tlv-len:20,

key:0x1

, p-pri:0x8000, p:0x102,

p-state:0x3D

, s-pri:0x8000,

s-mac:f04a.0205.d600


LACP:

Part

: tlv:2, tlv-len:20,

key:0x1

, p-pri:0x8000, p:0x102,

p-state:0x3D

, s-pri:0x8000,

s-mac:f04a.0206.1900
```

概念	說明
行動	代表演員（您）

零件	代表合作夥伴（您的鄰居/同儕節點）
主要	它是配置的埠通道號。
p狀態	表示埠狀態，這是最重要的概念。它使用8位（LACP標誌）構建。有關詳細資訊，請檢視背景資訊部分。
s-mac	它是LACP使用的系統MAC地址。

注意：在調試中看到的值是十六進位制的。要正確讀取這些值，必須將其轉換為十進位制或二進位制系統。

驗證PAgP操作

本節介紹如何驗證PAgP協定的正確狀態和操作。

基本檢查

使用以下命令檢查PAgP輸出：

<#root>

show pagp <*channel-group number*> neighbor

show pagp <*channel-group number*> counters

show interfaces <*interface ID*> accounting

檢查 PAgP鄰居的詳細資訊，例如操作模式、夥伴系統ID、主機名和優先順序。

<#root>

```
switch#
```

show pagp 1 neighbor

```
Flags:  S - Device is sending Slow hello.  C - Device is in Consistent state.
        A - Device is in Auto mode.        P - Device learns on physical port.
```

```
Channel group 1 neighbors
          Partner
```

Partner

```
         Partner                   Partner Group
Port        Name
```

Device ID

```
      Port        Age  Flags    Cap.
Gi1/0/1     switch
```

f04a.0205.d600

```
   Gi1/0/1     16s  SC       10001
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/2     switch
```

f04a.0205.d600

```
   Gi1/0/2     19s  SC       10001
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/3     switch
```

f04a.0205.d600

```
   Gi1/0/3     17s  SC       10001
```

<-- Dev ID: Neighbor MAC Address

```
Gi1/0/4     switch
```

f04a.0205.d600

```
   Gi1/0/4     15s  SC       10001
```

<-- Dev ID: Neighbor MAC Address

驗證每個介面傳送和接收的PAgP資料包的輸出詳細資訊。如果檢測到損壞的PAgP資料包，則Pkts Err計數器會增加。

<#root>

```
switch#
```

show pagp 1 counters

```
            Information         Flush        PAgP
Port        Sent    Recv     Sent    Recv    Err Pkts
--------------------------------------------------
Channel group: 1
Gi1/0/1
```

29   17

```
       0       0
```

0

```
Gi1/0/2
 28      17
      0       0
 0

Gi1/0/3
  28      16
      0       0
 0

Gi1/0/4
 29      16
       0       0
0
```

還有一個選項可用於檢查PAgP的介面記帳。

```
<#root>
switch#
show int gi1/0/1 accounting

GigabitEthernet1/0/1
                Protocol    Pkts In   Chars In   Pkts Out  Chars Out
                   Other          0          0      10677     640620
                   PAgP         879      78231        891      79299
           Spanning Tree         240      12720         85       5100
                     CDP        2179     936495       2180     937020
                     DTP        3545     170160       3545     212700
                    LACP        3102     384648       3127     387748
```

調試

如果您注意到PAgP協商問題，請啟用PAgP調試來分析原因。

```
<#root>
switch#
debug pagp event
```

```
Port Aggregation Protocol events debugging is on
switch#
```

debug pagp packet

```
Port Aggregation Protocol packet debugging is on
switch#
```

debug pagp fsm

```
Port Aggregation Protocol fsm debugging is on
switch#
```

debug pagp misc

```
Port Aggregation Protocol miscellaneous debugging is on
```

如果需要，請為特定介面啟用調試條件並過濾輸出。

<#root>

switch#

debug condition interface gigabitEthernet 1/0/1

注意：PAgP調試與平台無關。

驗證調試和過濾器已設定。

<#root>

switch#

show debugging

```
Packet Infra debugs:

Ip Address                                              Port
-------------------------------------------------------|----------

PAGP:
  Port Aggregation Protocol
```

miscellaneous

```
 debugging is
```

on

```
  Port Aggregation Protocol
```

packet

debugging is

on

Port Aggregation Protocol

fsm

debugging is

on

Port Aggregation Protocol

events

debugging is

on

Condition 1: interface Gi1/0/1 (1 flags triggered)

Flags: Gi1/0/1

分析PAgP調試。調試輸出顯示了埠通道介面啟動之前的最後一個PAgP幀：

<#root>

PAgP: Receive information packet via Gi1/0/1, packet size: 89
flags: 5, my device ID: f04a.0205.d600, learn-cap: 2, port-priority: 128, sent-port-ifindex: 9, group-ca
your device ID: f04a.0206.1900, learn-cap: 2, port-priority: 128, sent-port-ifindex: 9, group-cap: 10001

partner count: 1, num-tlvs: 2
device name TLV: switch
port name TLV: Gi1/0/1

PAgP: Gi1/0/1 PAgP packet received, processing <-- Processing ingress PAgP frame
PAgP: Gi1/0/1 proved to be bidirectional <--

PAgP: Gi1/0/1 action_b0 is entered
PAgP: Gi1/0/1 Input = Transmission State, V12 Old State = U5 New State = U5
PAgP: Gi1/0/1 action_a6 is entered
PAgP: Gi1/0/1 action_b9 is entered

PAgP: set hello interval from 1000 to 30000 for port Gi1/0/1 <--

PAgP: Gi1/0/1 Input = Transmission State, V10 Old State = U5 New State = U6
PAgP: set partner 0 interval from 3500 to 105000 for port Gi1/0/1
PAgP: Gi1/0/1 Setting hello flag
PAgP: timer pagp_p(Gi1/0/1) started with interval 105000.
PAgP: pagp_i(Gi1/0/1) timer stopped
PAgP: Gi1/0/1 Input = Port State, E5 Old State = S7 New State = S7
PAgP: pagp_h(Gi1/0/1) expired

PAgP: Send information packet via Gi1/0/1, packet size: 89
flags: 5, my device ID: f04a.0206.1900, learn-cap: 2, port-priority: 128, sent-port-ifindex: 9, group-ca
your device ID: f04a.0205.d600, learn-cap: 2, port-priority: 128, sent-port-ifindex: 9, group-cap: 10001

```
partner count: 1, num-tlvs: 2
device name TLV: switch
port name TLV: Gi1/0/1
PAgP: 89 bytes out Gi1/0/1
```

PAgP: Gi1/0/1 Transmitting information packet

PAgP: timer pagp_h(Gi1/0/1) started with interval 30000 <--
%LINK-3-UPDOWN: Interface Port-channel1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up

驗證Etherchannel程式設計

本節介紹如何驗證EtherChannel的軟體和硬體設定。

驗證軟體

驗證軟體專案。

<#root>

show run interface <*interface ID*>

show etherchannel <*channel-group number*> summary

檢查EtherChannel配置。

<#root>

```
switch#
```

show run interface gigabitEthernet 1/0/1

```
<output omitted>
interface GigabitEthernet1/0/1
 channel-group 1 mode active
end

switch#
```

show run interface gigabitEthernet 1/0/2

<output omitted> interface GigabitEthernet1/0/2 channel-group 1 mode active end switch#

show run interface gigabitEthernet 1/0/3

<output omitted> interface GigabitEthernet1/0/3 channel-group 1 mode active end switch#

show run interface gigabitEthernet 1/0/4

<output omitted> interface GigabitEthernet1/0/4 channel-group 1 mode active end switch#

```
show run interface port-channel 1

 <output omitted> interface Port-channel1 end
```

驗證所有埠成員是否都捆綁在埠通道中。

<#root>

```
switch#

show etherchannel 1 summary


<output omitted>
Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP        Gi1/0/1(P)      Gi1/0/2(P)
                                   Gi1/0/3(P)      Gi1/0/4(P)
```

驗證硬體

在硬體層級驗證軟體專案：

<#root>

```
show platform software interface switch <switch number or role> r0 br


show platform software fed switch <switch number or role> etherchannel <channel-group number> group-mask


show platform software fed switch <switch number or role> ifm mappings etherchannel


show platform software fed switch <switch number or role> ifm if-id <if ID>
```

檢查埠通道和捆綁介面的ID。

<#root>

```
switch#

show platform software interface switch active r0 br

Forwarding Manager Interfaces Information

Name

ID
```

```
               QFP ID
------------------------------------------------------------
<output omitted>
GigabitEthernet1/0/1

9

                  0
GigabitEthernet1/0/2

10

                 0
GigabitEthernet1/0/3

11

                 0
GigabitEthernet1/0/4

12

                 0
<output omitted> Port-channel1

76

 0
```

將焦點放在IF ID部分，並確保值（十六進位制數）與在上一個命令中觀察到的ID（十進位制數）相等。

```
<#root>

switch#

show platform software fed switch active etherchannel 1 group-mask


Group Mask Info

Aggport IIF Id: 000000000000004c    <-- IfId Hex 0x4c = 76 decimal

Active Port: : 4

Member Ports
If Name

If Id

              local  Group Mask
----------------------------------------------------------------------
GigabitEthernet1/0/4

000000000000000c

  true   777777777777777

<-- IfId Hex 0xc = 12 decimal


GigabitEthernet1/0/3

000000000000000b
```

```
  true   bbbbbbbbbbbbbbbb
<-- IfId Hex 0xb = 11 decimal

GigabitEthernet1/0/2
000000000000000a
  true   dddddddddddddddd
<-- IfId Hex 0xa = 10 decimal

GigabitEthernet1/0/1
0000000000000009
  true   eeeeeeeeeeeeeeee
<-- IfId Hex 0x9 = 10 decimal
```

使用下一個命令獲取埠通道的IF ID。該值必須與之前命令中的值匹配。

```
<#root>

Switch#
show platform software fed switch active ifm mappings etherchannel

Mappings Table

Chan Interface IF_ID
-------------------------------------------------
1 Port-channel1
0x0000004c
```

使用下一個命令的IF ID。顯示的資訊必須與之前收集的輸出相符。

```
<#root>

switch#
show platform software fed switch active ifm if-id 0x0000004c

Interface IF_ID         : 0x000000000000004c
Interface Name          : Port-channel1

Interface Block Pointer : 0x7f0178ca1a28
Interface Block State   : READY
Interface State         : Enabled
Interface Status        : ADD, UPD
Interface Ref-Cnt       : 8

Interface Type          : ETHERCHANNEL
```

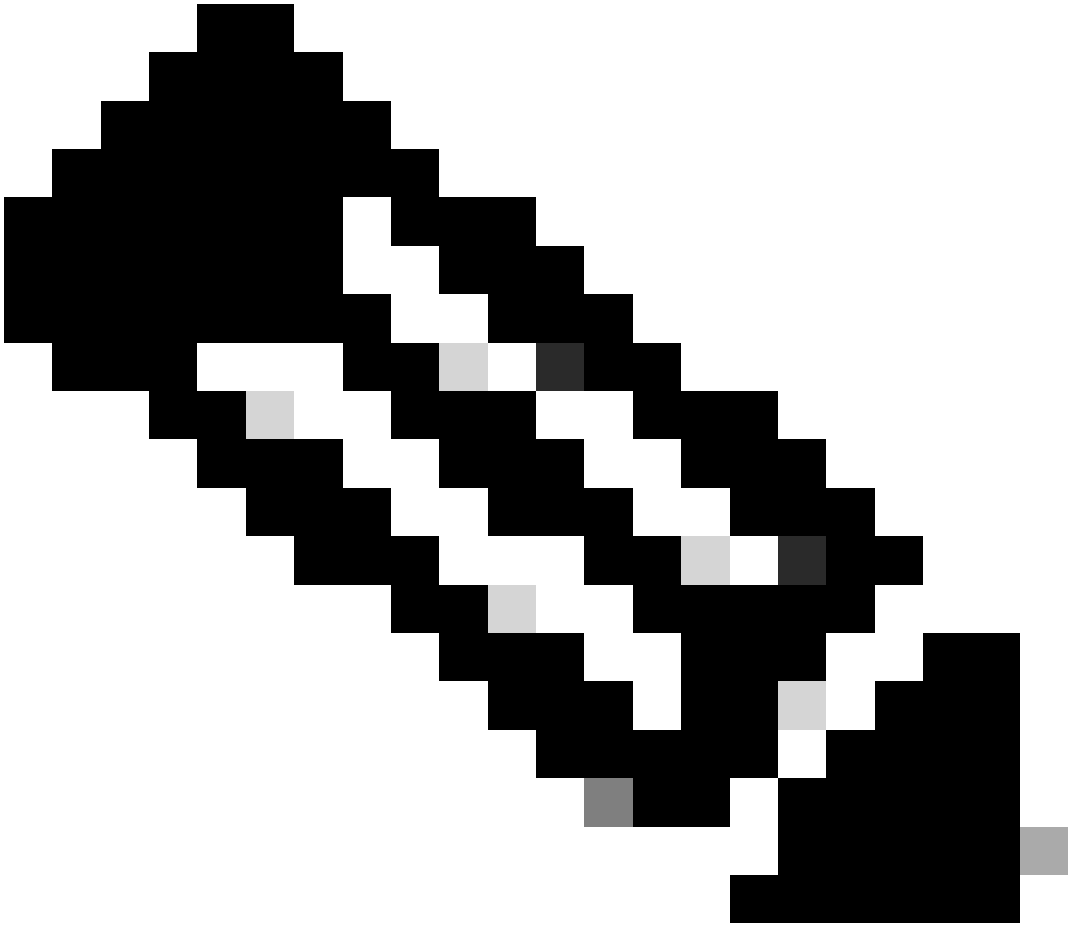
```
Port Type         : SWITCH PORT
Channel Number    : 1

SNMP IF Index     : 78
Port Handle       : 0xdd000068
# Of Active Ports : 4
Base GPN          : 1536

        Index[2]  : 000000000000000c
        Index[3]  : 000000000000000b
        Index[4]  : 000000000000000a
        Index[5]  : 0000000000000009


Port Information
Handle ............ [0xdd000068]

Type ............... [L2-Ethchannel]

Identifier ........ [0x4c]
Unit ............... [1]

DI ................. [0x7f0178c058a8]
Port Logical Subblock
        L3IF_LE handle .... [0x0]
        Num physical port . [4]
        GPN Base .......... [1536]
        Physical Port[2] .. [0x7b000027]
        Physical Port[3] .. [0x1f000026]
        Physical Port[4] .. [0xc000025]
        Physical Port[5] .. [0xb7000024]
        Num physical port on asic [0] is  [0]
        DiBcam handle on asic [0].... [0x0]
        Num physical port on asic [1] is  [4]
        DiBcam handle on asic [1].... [0x7f0178c850a8]
        SubIf count ....... [0]
Port L2 Subblock
        Enabled ............. [No]
        Allow dot1q ......... [No]
        Allow native ........ [No]
        Default VLAN ........ [0]
        Allow priority tag ... [No]
        Allow unknown unicast  [No]
        Allow unknown multicast[No]
        Allow unknown broadcast[No]
        Allow unknown multicast[Enabled]
        Allow unknown unicast  [Enabled]
        Protected ............ [No]
        IPv4 ARP snoop ....... [No]
        IPv6 ARP snoop ....... [No]
        Jumbo MTU ............ [0]
        Learning Mode ........ [0]
        Vepa ................. [Disabled]
        App Hosting........... [Disabled]
Port QoS Subblock
        Trust Type ................... [0x7]
        Default Value ................ [0]
        Ingress Table Map ............ [0x0]
        Egress Table Map ............. [0x0]
        Queue Map .................... [0x0]
Port Netflow Subblock
Port Policy Subblock
List of Ingress Policies attached to an interface
List of Egress Policies attached to an interface
```

```
        Port CTS Subblock
                Disable SGACL ..................... [0x0]
                Trust ............................. [0x0]
                Propagate ......................... [0x0]
                Port SGT .......................... [0xffff]
Ref Count : 8 (feature Ref Counts + 1)
IFM Feature Ref Counts
        FID : 97 (AAL_FEATURE_L2_MULTICAST_IGMP), Ref Count : 1
        FID : 119 ((null)), Ref Count : 1
        FID : 84 (AAL_FEATURE_L2_MATM), Ref Count : 1
No Sub Blocks Present
```

平台工具

下表顯示哪些工具和功能可用於幫助瞭解何時使用它們：

工具	層級	使用時機
EPC	硬體和軟體	使用它來驗證位於物理介面的LACP幀，或驗證它們與CPU之間的連線。
平台向前	硬體	如果確認交換機上的LACP幀已著陸，請使用此工具瞭解交換機的內部轉發決策。
PSV	硬體	如果確認交換機上的LACP幀已著陸，請使用此工具瞭解交換機的內部轉發決策。
CoPP	硬體	但是，如果從硬體角度將資料包轉發到CPU，則在軟體(CPU)級別上看不到該資料包。此功能很可能在硬體和CPU之間的路徑上丟棄LACP幀。
FED CPU資料包捕獲	軟體	使用它來驗證LACP幀是否透過正確的隊列傳送到CPU，它還驗證CPU是否將LACP幀傳送回硬體。



注意：使用這些工具只能分析LACP協定，但是，它們也可用於分析PAgP幀。

內嵌式封包擷取(EPC)

用於設定Wireshark (EPC)和捕獲入口/出口LACP PDU的命令。

<#root>

monitor capture <*capture name*> [control-plane|interface <*interface ID*>] BOTH

monitor capture <*capture name*> match mac [any|host <*source MAC address*>|<*source MAC address*>][any|host <

monitor capture <*capture name*> file location flash:<*name*>.pcap

show monitor capture <*capture name*> parameter

```
show monitor capture <capture name>

monitor capture <capture name> start

monitor capture <capture name> stop

show monitor capture file flash:<name>.pcap [detailed]
```

注意：命令是在特權模式下輸入的。

設定Wireshark捕獲。

提示：如果要將重點放在特定的捆綁介面和/或特定源MAC地址上，請調整介面並匹配mac關鍵字。

<#root>

```
monitor capture CAP interface GigabitEthernet1/0/1 BOTH

monitor capture CAP interface GigabitEthernet1/0/2 BOTH

monitor capture CAP interface GigabitEthernet1/0/3 BOTH

monitor capture CAP interface GigabitEthernet1/0/4 BOTH

monitor capture CAP match mac any host 0180.c200.0002

show monitor capture CAP file location flash:CAP.pcap
```

注意：在捕獲上定義的目標MAC地址0180.c200.0002可幫助您過濾LACP幀。

驗證是否已正確配置Wireshark：

<#root>

```
switch#
```

```
show monitor capture CAP parameter


monitor capture CAP interface GigabitEthernet1/0/1 BOTH
monitor capture CAP interface GigabitEthernet1/0/2 BOTH
monitor capture CAP interface GigabitEthernet1/0/3 BOTH
monitor capture CAP interface GigabitEthernet1/0/4 BOTH
monitor capture CAP match mac any host 0180.c200.0002
monitor capture CAP file location flash:LACP.pcap

switch#
show monitor capture CAP


Status Information for Capture CAP
  Target Type:
 Interface: GigabitEthernet1/0/1, Direction: BOTH
 Interface: GigabitEthernet1/0/2, Direction: BOTH
 Interface: GigabitEthernet1/0/3, Direction: BOTH
 Interface: GigabitEthernet1/0/4, Direction: BOTH
   Status : Inactive
  Filter Details:
   MAC
     Source MAC: 0000.0000.0000 mask:ffff.ffff.ffff
     Destination MAC: 0180.c200.0002 mask:0000.0000.0000
  Buffer Details:
   Buffer Type: LINEAR (default)
  File Details:
   Associated file name: flash:CAP.pcap
  Limit Details:
   Number of Packets to capture: 0 (no limit)
   Packet Capture duration: 0 (no limit)
   Packet Size to capture: 0 (no limit)
   Packet sampling rate: 0 (no sampling)
```

開始捕獲：

<#root>

```
switch#
monitor capture CAP start


Started capture point : CAP
```

如果不使用LACP速率快速計時器，請在30秒後（至少）停止它：

<#root>

```
switch#
monitor capture CAP stop
```

```
Capture statistics collected at software:
        Capture duration - 58 seconds
        Packets received - 16
        Packets dropped - 0
        Packets oversized - 0

Bytes dropped in asic - 0

Stopped capture point : CAP
```

捕獲的幀：

<#root>

```
switch#
```

show monitor capture file flash:CAP.pcap

```
Starting the packet display ........ Press Ctrl + Shift + 6 to exit

    1   0.000000 f0:4a:02:06:19:04 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 261 K
    2   2.563406 f0:4a:02:05:d6:01 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 258 K
    3   3.325148 f0:4a:02:05:d6:04 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 261 K
    4   5.105978 f0:4a:02:06:19:01 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 258 K
    5   6.621438 f0:4a:02:06:19:02 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 259 K
    6   8.797498 f0:4a:02:05:d6:03 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 260 K
    7  13.438561 f0:4a:02:05:d6:02 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 259 K
    8  16.658497 f0:4a:02:06:19:03 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 260 K
    9  28.862344 f0:4a:02:06:19:04 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 261 K
   10  29.013031 f0:4a:02:05:d6:01 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 258 K
   11  30.756138 f0:4a:02:05:d6:04 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 261 K
   12  33.290542 f0:4a:02:06:19:01 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 258 K
   13  36.387119 f0:4a:02:06:19:02 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 259 K
   14  37.598788 f0:4a:02:05:d6:03 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 260 K
   15  40.659931 f0:4a:02:05:d6:02 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:05:d6:00 P: 259 K
   16  45.242014 f0:4a:02:06:19:03 b^F^R 01:80:c2:00:00:02 LACP 124 v1 ACTOR f0:4a:02:06:19:00 P: 260 K
```

如果需要檢查特定幀的LACP欄位，請使用detailed關鍵字。

<#root>

```
switch#
```

show monitor capture file flash:CAP.pcap detailed

```
Starting the packet display ........ Press Ctrl + Shift + 6 to exit
```

Frame 1: 124 bytes on wire (992 bits), 124 bytes captured (992 bits)

```
 on interface 0
    Interface id: 0 (/tmp/epc_ws/wif_to_ts_pipe)
        Interface name: /tmp/epc_ws/wif_to_ts_pipe
    Encapsulation type: Ethernet (1)
    Arrival Time: Mar 28, 2023 15:48:14.985430000 UTC
```

```
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1680018494.985430000 seconds
    [Time delta from previous captured frame: 0.000000000 seconds]
    [Time delta from previous displayed frame: 0.000000000 seconds]
    [Time since reference or first frame: 0.000000000 seconds]
    Frame Number: 1
    Frame Length: 124 bytes (992 bits)
    Capture Length: 124 bytes (992 bits)
    [Frame is marked: False]
    [Frame is ignored: False]
    [Protocols in frame: eth:ethertype:slow:lacp]
```

Ethernet II, Src: f0:4a:02:06:19:04 (f0:4a:02:06:19:04), Dst: 01:80:c2:00:00:02 (01:80:c2:00:00:02)

```
    Destination: 01:80:c2:00:00:02 (01:80:c2:00:00:02)
        Address: 01:80:c2:00:00:02 (01:80:c2:00:00:02)
        .... ..0. .... .... .... .... = LG bit: Globally unique address (factory default)
        .... ...1 .... .... .... .... = IG bit: Group address (multicast/broadcast)
    Source: f0:4a:02:06:19:04 (f0:4a:02:06:19:04)
        Address: f0:4a:02:06:19:04 (f0:4a:02:06:19:04)
        .... ..0. .... .... .... .... = LG bit: Globally unique address (factory default)
        .... ...0 .... .... .... .... = IG bit: Individual address (unicast)
    Type: Slow Protocols (0x8809)
```

Slow Protocols

**   Slow Protocols subtype: LACP (0x01)**

Link Aggregation Control Protocol

```
    LACP Version: 0x01
    TLV Type: Actor Information (0x01)
    TLV Length: 0x14
    Actor System Priority: 32768
    Actor System ID: f0:4a:02:06:19:00 (f0:4a:02:06:19:00)
    Actor Key: 1
    Actor Port Priority: 32768
    Actor Port: 261
    Actor State: 0x3d, LACP Activity, Aggregation, Synchronization, Collecting, Distributing
        .... ...1 = LACP Activity: Active
        .... ..0. = LACP Timeout: Long Timeout
        .... .1.. = Aggregation: Aggregatable
        .... 1... = Synchronization: In Sync
        ...1 .... = Collecting: Enabled
        ..1. .... = Distributing: Enabled
        .0.. .... = Defaulted: No
        0... .... = Expired: No
    [Actor State Flags: **DCSG*A]
    Reserved: 000000
    TLV Type: Partner Information (0x02)
    TLV Length: 0x14
    Partner System Priority: 32768
    Partner System: f0:4a:02:05:d6:00 (f0:4a:02:05:d6:00)
    Partner Key: 1
    Partner Port Priority: 32768
    Partner Port: 261
    Partner State: 0x3d, LACP Activity, Aggregation, Synchronization, Collecting, Distributing
        .... ...1 = LACP Activity: Active
        .... ..0. = LACP Timeout: Long Timeout
        .... .1.. = Aggregation: Aggregatable
        .... 1... = Synchronization: In Sync
        ...1 .... = Collecting: Enabled
        ..1. .... = Distributing: Enabled
        .0.. .... = Defaulted: No
        0... .... = Expired: No
```

```
    [Partner State Flags: **DCSG*A]
    Reserved: 000000
    TLV Type: Collector Information (0x03)
    TLV Length: 0x10
    Collector Max Delay: 32768
    Reserved: 00000000000000000000000000
    TLV Type: Terminator (0x00)
    TLV Length: 0x00
    Pad: 000000000000000000000000000000000000000000000000000...

Frame 2: 124 bytes on wire (992 bits), 124 bytes captured (992 bits) on interface 0
    Interface id: 0 (/tmp/epc_ws/wif_to_ts_pipe)
        Interface name: /tmp/epc_ws/wif_to_ts_pipe
    Encapsulation type: Ethernet (1)
    Arrival Time: Mar 28, 2023 15:48:17.548836000 UTC
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1680018497.548836000 seconds
    [Time delta from previous captured frame: 2.563406000 seconds]
    [Time delta from previous displayed frame: 2.563406000 seconds]
    [Time since reference or first frame: 2.563406000 seconds]
```

注意：9200裝置上的Wireshark輸出格式可能有所不同，交換機無法讀取。導出捕獲並從您的PC讀取它（如果出現這種情況）。

平台向前

要調試轉發資訊並跟蹤硬體轉發平面中的資料包路徑，請使用show platform hardware fed switch <switch number or role> forward interface命令。此命令模擬使用者定義的包，並從硬體轉發平面檢索轉發資訊。入口連線埠上會根據您在此命令中指定的封包引數產生封包。您還可以從儲存在PCAP檔案中的捕獲資料包中提供完整的資料包。

本主題僅詳細介紹介面轉發特定的選項，即show platform hardware fed switch {switch_num|active|standby}forward interface命令提供的選項。

<#root>

show platform hardware fed switch *<switch number or role>* forward interface *<interface ID>* *<source mac a*
show platform hardware fed switch *<switch number or role>* forward interface *<interface ID>* pcap *<pcap fi*
show platform hardware fed switch *<switch number or role>* forward interface *<interface ID>* vlan *<VLAN ID*

定義平台轉發捕獲。在這種情況下，將分析CAP.pcap 幀1。

```
<#root>

switch#

show platform hardware fed switch active forward interface gigabitEthernet 1/0/1 pcap flash:CAP.pcap num

show forward is running in the background. After completion, syslog will be generated.
```

一旦完成Platform Forward捕獲，將顯示下一個Syslog消息。

```
<#root>

switch#

show logging

<output omitted>
*Mar 28 16:47:57.289: %SHFWD-6-PACKET_TRACE_DONE: Switch 1 R0/0: fed: Packet Trace Complete: Execute (s
*Mar 28 16:47:57.289: %SHFWD-6-PACKET_TRACE_FLOW_ID: Switch 1 R0/0: fed: Packet Trace Flow id is 100990
```

分析平台轉發捕獲。Egress部分告訴您內部轉發決策是什麼。LACP和PAgP幀應傳送到CPU。

```
<#root>

switch#
```

show platform hardware fed switch active forward last summary

Input Packet Details:

###[Ethernet]### dst = 01:80:c2:00:00:02 src. = f0:4a:02:06:19:04 type = 0x8809 <-- slow protocols (LA

```
###[ Raw ]###
     load      = '01 01 01 14 80 00 F0 4A 02 06 19 00 00 01 80 00 01 05 3D 00 00 00 02 14 80 00 F0 4A 0
Ingress:
   Port                      :
   Global Port Number        : 1536
   Local Port Number         : 0
   Asic Port Number          : 0
   Asic Instance             : 1
   Vlan                      : 1
   Mapped Vlan ID            : 4
   STP Instance              : 2
   BlockForward              : 0
   BlockLearn                : 0
   L3 Interface              : 37
       IPv4 Routing          : enabled
       IPv6 Routing          : enabled
       Vrf Id                : 0
   Adjacency:
       Station Index         : 107    [SI_CPUQ_L2_CONTROL]
       Destination Index     : 21106
       Rewrite Index         : 1
       Replication Bit Map   : 0x20   ['coreCpu']
   Decision:
       Destination Index     : 21106  [DI_CPUQ_L2_CONTROL]
       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   :        ['coreCpu']
       Winner                :        L2DESTMACVLAN LOOKUP
       Qos Label             : 65
       SGT                   : 0
       DGTID                 : 0
```

Egress: Possible Replication : Port : CPU_Q_L2_CONTROL Output Port Data : Port : CPU

```
       Asic Instance         : 0
```

```
CPU Queue : 1 [CPU_Q_L2_CONTROL]



       Unique RI             : 0
       Rewrite Type          : 0      [NULL]
       Mapped Rewrite Type   : 15     [CPU_ENCAP]



Vlan : 1



      Mapped Vlan ID        : 4
*******************************************************************************
```

封包狀態向量(PSV)

PSV與Platform Forward捕獲類似，不同之處在於PSV從符合觸發條件的網路中捕獲即時入口幀。

注意：僅C9500-32C、C9500-32QC、C9500-24Y4C、C9500-48Y4C和C9606R平台支援PSV。

```
<#root>
```

debug platform hardware fed <*switch number or role*> capture trigger interface <*interface ID*> ingress

**debug platform hardware fed <*switch number or role*> capture trigger layer2 <*source MAC address*> <*destina*

show platform hardware fed <*switch number or role*> capture trigger

show platform hardware fed <*switch number or role*> capture status

show platform hardware fed <*switch number or role*> capture summary

兩個相互連線的C9500-48Y4C用於下一個埠通道和PSV捕獲。

<#root>

switch#

show etherchannel 1 summary

```
<output omitted>
Group Port-channel Protocol Ports
------+-------------+-----------+-----------------------------------------------
1 Po1(SU) LACP
```

Twe1/0/1(P)

```
 Twe1/0/2(P)
```

設定觸發條件。使用layer2關鍵字匹配特定源MAC地址和LACP MAC地址作為目標。

```
    <#root>

switch#debug platform hardware fed active capture trigger interface twentyFiveGigE1/0/1 ingress
switch#debug platform hardware fed active capture trigger layer2

0000.0000.0000 0180.c200.0002 <-- match source MAC: any, match destination MAC: LACP MAC address

Capture trigger set successful.
```

注意：在PSV捕獲上定義的MAC地址0000.0000.0000表示任意匹配。

驗證觸發條件已設定。

```
    <#root>

switch#

show platform hardware fed active capture trigger

Trigger Set:
Ingress Interface: TwentyFiveGigE1/0/1
Dest Mac: 0180.c200.0002
```

觸發PST後，狀態將顯示為「已完成」。

<#root>

switch#

show platform hardware fed active capture status

Asic: 0

Status: Completed

使用下一個命令分析PSV捕獲輸出。預期會看到LACP和PAgP幀被傳送到CPU。

<#root>

switch#

show platform hardware fed active capture summary

Trigger: Ingress Interface:TwentyFiveGigE1/0/1 Dest Mac:0180.c200.0002

Input Output State Reason

Tw1/0/1 cpuQ 1 PUNT

Bridged

控制平面管制器(CoPP)

CoPP基本上是應用於資料平面（硬體）和控制平面(CPU)之間的管道的QoS監察器，以避免高CPU問題。如果這些幀超過功能建立的閾值，CoPP可以過濾LACP和PAgP幀。

驗證CoPP是否丟棄LACP資料包。

<#root>

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

此命令**L2 Control** queue的輸出沒有丟棄：

<#root>

switch#

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

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 <-- L2 Control queue filters LACP packets, rate set to 2000 (packets pe

2 14 Forus traffic Yes 4000 4000 0 0

<*output omitted*>

* 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 0 0 0 0

1 13328202 79853 0 0 <-- QId = 1 matches policer index (level 1) = 1, no drops

2 0 0 0 0

<output omitted>

Second Level Policer Statistics
==========

20 34149506 389054 0 0 <-- Policer index (level 2) no drops

21 76896 596 0 0

Policer Index Mapping and Settings
---
level-2 : level-1 (default) (set)
PlcIndex : PlcIndex rate rate
---

20 : 1 2 8 13000 13000 <-- Policer index (level 1) = 1 matches policer index (level 2) = 20

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 PlcIdx Queue Name Enabled
---
0 11 21 DOT1X Auth Yes

1 1 20 L2 Control Yes

2 14 21 Forus traffic Yes

<output omitted>

它不會超過L2控制隊列。當觀察到相反的情況時，需要捕獲控制平面資料包。

FED CPU資料包捕獲

如果您已確保在介面級別收到LACP資料包，EPC和ELAM/PSV確認LACP幀被傳送到CPU，在CoPP級別沒有觀察到丟包現象，則使用FED CPU資料包捕獲工具。

FED CPU資料包捕獲告訴您資料包從硬體傳送到CPU的原因，它還告訴您資料包被傳送到哪個CPU隊列。FED CPU資料包捕獲還可以捕獲注入硬體的CPU生成的資料包。

<#root>

debug platform software fed sw active punt packet-capture set-filter *<filter>*

debug platform software fed switch active punt packet-capture start

debug platform software fed switch active punt packet-capture stop

show platform software fed switch active punt packet-capture status

show platform software fed switch active punt packet-capture brief

debug platform software fed sw active inject packet-capture set-filter <*filter*>

debug platform software fed switch active inject packet-capture start

debug platform software fed switch active inject packet-capture stop

show platform software fed switch active inject packet-capture status

show platform software fed switch active inject packet-capture brief

傳送

定義資料包捕獲以僅過濾LACP資料包。

```
<#root>

switch#

debug platform software fed sw active punt packet-capture set-filter "eth.dst==0180.c200.0002"

Filter setup successful. Captured packets will be cleared
```

開始捕獲。

```
<#root>

switch#

debug platform software fed sw active punt packet-capture start

Punt packet capturing started.
```

如果不使用LACP速率快速計時器，請在（至少）30秒後停止該任務。

```
<#root>

switch#
```

debug platform software fed switch active punt packet-capture stop

Punt packet capturing stopped.

Captured 11 packet(s)

檢查FED CPU資料包捕獲狀態。

<#root>

switch#

show platform software fed switch active punt packet-capture status

Punt packet capturing: disabled. Buffer wrapping: disabled

Total captured so far: 11 packets.

Capture capacity : 4096 packets

Capture filter : "eth.dst==0180.c200.0002"

分析FED CPU資料包捕獲輸出。

<#root>

switch#

show platform software fed switch active punt packet-capture brief

Punt packet capturing: disabled. Buffer wrapping: disabled

Total captured so far: 11 packets

. Capture capacity : 4096 packets

Capture filter : "eth.dst==0180.c200.0002"

------ Punt Packet Number: 1, Timestamp: 2023/03/31 00:27:54.141 ------
 interface :

physical: GigabitEthernet1/0/2[if-id: 0x0000000a]

, pal: GigabitEthernet1/0/2 [if-id: 0x0000000a]

<-- interface that punted the frame

 metadata :

cause: 96 [Layer2 control protocols],

 sub-cause: 0,

q-no: 1

, linktype: MCP_LINK_TYPE_LAYER2 [10]

<-- LACP frame was punted due to L2 ctrl protocol to queue 1 (L2 control)

 ether hdr :

dest mac: 0180.c200.0002, src mac: f04a.0205.d602 <-- source and destination MAC addresses

 ether hdr : ethertype: 0x8809

------ Punt Packet Number: 2, Timestamp: 2023/03/31 00:27:58.436 ------
 interface :

physical: GigabitEthernet1/0/4[if-id: 0x0000000c]

, pal: GigabitEthernet1/0/4 [if-id: 0x0000000c]
 metadata :

cause: 96 [Layer2 control protocols]

, sub-cause: 0,

q-no: 1

, linktype: MCP_LINK_TYPE_LAYER2 [10]
 ether hdr : dest mac: 0180.c200.0002,

src mac: f04a.0205.d604

 ether hdr : ethertype: 0x8809

------ Punt Packet Number: 3, Timestamp: 2023/03/31 00:28:00.758 ------
 interface :

physical: GigabitEthernet1/0/1[if-id: 0x00000009]

, pal: GigabitEthernet1/0/1 [if-id: 0x00000009]
 metadata :

cause: 96 [Layer2 control protocols]

, sub-cause: 0,

q-no: 1

, linktype: MCP_LINK_TYPE_LAYER2 [10]
 ether hdr : dest mac: 0180.c200.0002,

src mac: f04a.0205.d601

ether hdr : ethertype: 0x8809

------ Punt Packet Number: 4, Timestamp: 2023/03/31 00:28:11.888 ------
interface :

physical: GigabitEthernet1/0/3[if-id: 0x0000000b]

, pal: GigabitEthernet1/0/3 [if-id: 0x0000000b]
metadata :

cause: 96 [Layer2 control protocols]

, sub-cause: 0,

q-no: 1

, linktype: MCP_LINK_TYPE_LAYER2 [10]
ether hdr : dest mac: 0180.c200.0002,

src mac: f04a.0205.d603

ether hdr : ethertype: 0x8809

注入

定義資料包捕獲以僅過濾LACP資料包。

```
<#root>

switch#

debug platform software fed sw active inject packet-capture set-filter "eth.dst==0180.c200.0002"

Filter setup successful. Captured packets will be cleared
```

開始捕獲。

```
<#root>

switch#

debug platform software fed sw active inject packet-capture start

Punt packet capturing started.
```

如果不使用LACP速率快速計時器，請在（至少）30秒後**停止**該任務。

```
<#root>

switch#
```

debug platform software fed switch active inject packet-capture stop

Inject packet capturing stopped.

Captured 12 packet(s)

檢查FED CPU資料包捕獲狀態。

<#root>

switch#

show platform software fed sw active inject packet-capture status

Inject packet capturing: disabled. Buffer wrapping: disabled

Total captured so far: 12 packets.

Capture capacity : 4096 packets

Capture filter : "eth.dst==0180.c200.0002"

分析FED CPU資料包捕獲輸出。

<#root>

switch#

show platform software fed sw active inject packet-capture brief

Inject packet capturing: disabled. Buffer wrapping: disabled

Total captured so far: 12

packets. Capture capacity : 4096 packets

Capture filter : "eth.dst==0180.c200.0002"

------ Inject Packet Number: 1, Timestamp: 2023/03/31 19:59:26.507 ------
interface :

pal: GigabitEthernet1/0/2 [if-id: 0x0000000a] <-- interface that LACP frame is destined to

metadata :

cause: 1 [L2 control/legacy]

, sub-cause: 0,

q-no: 7

, linktype: MCP_LINK_TYPE_LAYER2 [10]

<-- cause L2 ctrl, queue=7 (high priority)

ether hdr :

dest mac: 0180.c200.0002, src mac: f04a.0206.1902 <-- source and destination MAC addresses

ether hdr : ethertype: 0x8809

------ Inject Packet Number: 2, Timestamp: 2023/03/31 19:59:28.538 ------
interface :

pal: GigabitEthernet1/0/3 [if-id: 0x0000000b]

metadata :

cause: 1 [L2 control/legacy]

, sub-cause: 0,

q-no: 7

, linktype: MCP_LINK_TYPE_LAYER2 [10]
 ether hdr :

dest mac: 0180.c200.0002, src mac: f04a.0206.1903

 ether hdr : ethertype: 0x8809

------ Inject Packet Number: 3, Timestamp: 2023/03/31 19:59:30.050 ------
 interface :

pal: GigabitEthernet1/0/1 [if-id: 0x00000009]

 metadata :

cause: 1 [L2 control/legacy]

, sub-cause: 0,

q-no: 7

, linktype: MCP_LINK_TYPE_LAYER2 [10]
 ether hdr :

dest mac: 0180.c200.0002, src mac: f04a.0206.1901

 ether hdr : ethertype: 0x8809

------ Inject Packet Number: 4, Timestamp: 2023/03/31 19:59:33.467 ------
 interface : pal:

GigabitEthernet1/0/4 [if-id: 0x0000000c]

metadata :

cause: 1 [L2 control/legacy]

, sub-cause: 0,

q-no: 7

, linktype: MCP_LINK_TYPE_LAYER2 [10]
ether hdr :

dest mac: 0180.c200.0002, src mac: f04a.0206.1904

ether hdr : ethertype: 0x8809

相關資訊

- IEEE 802號碼
- IEEE -連結聚合控制通訊協定
- 第2層配置指南，Cisco IOS XE Amsterdam 17.3.x（Catalyst 9200交換機）-章節：配置EtherChannel
- Cisco IOS XE Cupertino 17.7.x（Catalyst 9300交換機）第2層配置指南-章節：配置EtherChannel
- 第2層配置指南，Cisco IOS XE Amsterdam 17.3.x（Catalyst 9400交換機）-章節：配置EtherChannel

- Cisco IOS XE Cupertino 17.9.x（Catalyst 9500交換機）第2層配置指南-章節：配置EtherChannel
- Cisco IOS XE Cupertino 17.9.x（Catalyst 9600交換機）第2層配置指南-章節：配置EtherChannel
- 章節：介面和硬體命令- show platform hardware fed switch forward interface
- 在Catalyst 9000交換機上配置FED CPU資料包捕獲
- 技術支援與文件 - Cisco Systems

關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。