

2 25.8升級後的測試

簡介

必要條件

需求

採用元件

設定

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組態

驗證

疑難排解

本高級故障排除指南可幫助工程師瞭解如何診斷ASR9000上的流量丟棄問題。它可能未涵蓋所有方案，但我們已嘗試歸納最常見的情況。

《行話大盜》

- GDPlane :通用資料平面
- CEF: Cisco Express Forwarding
- RFD接收幀描述符
- PLU: 字首查詢單位
- PHU: PLU提示單元
- TBM: 樹點陣圖
- BUM: 廣播/未知單點傳播/L2多點傳送
- LC -線路卡
 - 基於戰斧的線路卡

第三代ASR 9000系列乙太網線卡通常稱為基於Tomahawk的線卡。術語來自這些線卡上使用的NP。

- 基於光速的線路卡

第四代ASR 9000系列乙太網線卡通常稱為基於光速的線卡。術語來自這些線卡上使用的NP。它們有時被稱為LSQ。

- 基於Lightspeed-Plus的線卡

第五代ASR 9000系列乙太網線卡通常稱為基於Lightspeed-Plus的線卡。術語來自這些線卡上使用的NP。它們有時被稱為LSP。

[瞭解ASR 9000系列線路卡型別](#)

- VNI:已識別VxLAN
 - L2VNI：第2層Vxlan識別符號
 - L3VNI:第3層Vxlan識別碼
- 泛洪 — 通常單播資料包將僅輸出到一個出口埠。但是，如果交換器不知道將封包傳送到哪個位置（由於MAC未命中），那麼我們會將封包傳送到傳入vlan的所有成員連線埠。這叫洪水。
- FGID — 交換矩陣組識別符號
- MGID — 多播組識別符號

簡介

本文列出了各種丟包場景以及逐步進行這些情況的調試方法。

R9K — 資料包的壽命

入口功能訂購

出口功能訂購

資料包處理中涉及的模組

「For us」流量

「for us」資料包可能發往LC或RSP，具體取決於應用程式。

- [對於Punt to LC CPU](#)
來自線路的資料包 → NP <-> Punt Switch <-> SPP(LC CPU)<-> Netio/Spio客戶端<->應用程式
- [對於Punt到RP CPU](#)
來自有線的→NP <-> LC FIA <->縱橫制<-> RSP FIA <->點選/道/查FPGA <-> SPP(RSP CPU)<-> Netio/Spio客戶端的資料包

傳輸流量

- 來自有線的→包←輸入NP ↔ LC FIA ↔縱橫制←輸出NP數→包傳出到電線

注入流量

- 從LC CPU

- Egress注入

應用程式↔ Netio/Spio客戶端↔ SPP(LC CPU)↔ Punt switch ↔輸出NP數→包輸出到線

- 向內注入

應用↔ SRPM ↔點交換機↔輸入NP ↔ LC FIA ↔縱橫制←輸出NP →封包離線

- 從RP CPU

- Egress注入

應用↔ Netio/Spio客戶端↔ SPP(RP CPU)↔ RSP FIA ↔縱橫制↔ LC FIA ↔輸出NP代→ 封包離線

- LC CPU到RSP CPU

Netio/Spio客戶端↔ SPP(LC CPU)↔點觸開關↔ NP ↔ LC Fia ↔縱橫制↔ RSP Fia ↔點觸/通道FPGA
↔ SPP(RSP CPU)↔ Netio/Spio客戶端

- RSP CPU到LC CPU

Netio/Spio客戶端↔ SPP(RSP CPU)↔ Punt/Dao/Cha FPGA ↔ RSP Fia ↔ Crossbar ↔ LC Fia ↔ NP ↔Punt交換機↔ SPP(LC CPU)↔ Netio/Spio客戶端

識別有問題的裝置：

1. 對流量問題進行分類

找出問題的型別。確定是完全丟棄、部分資料包丟棄、靜默丟棄還是其他情況。

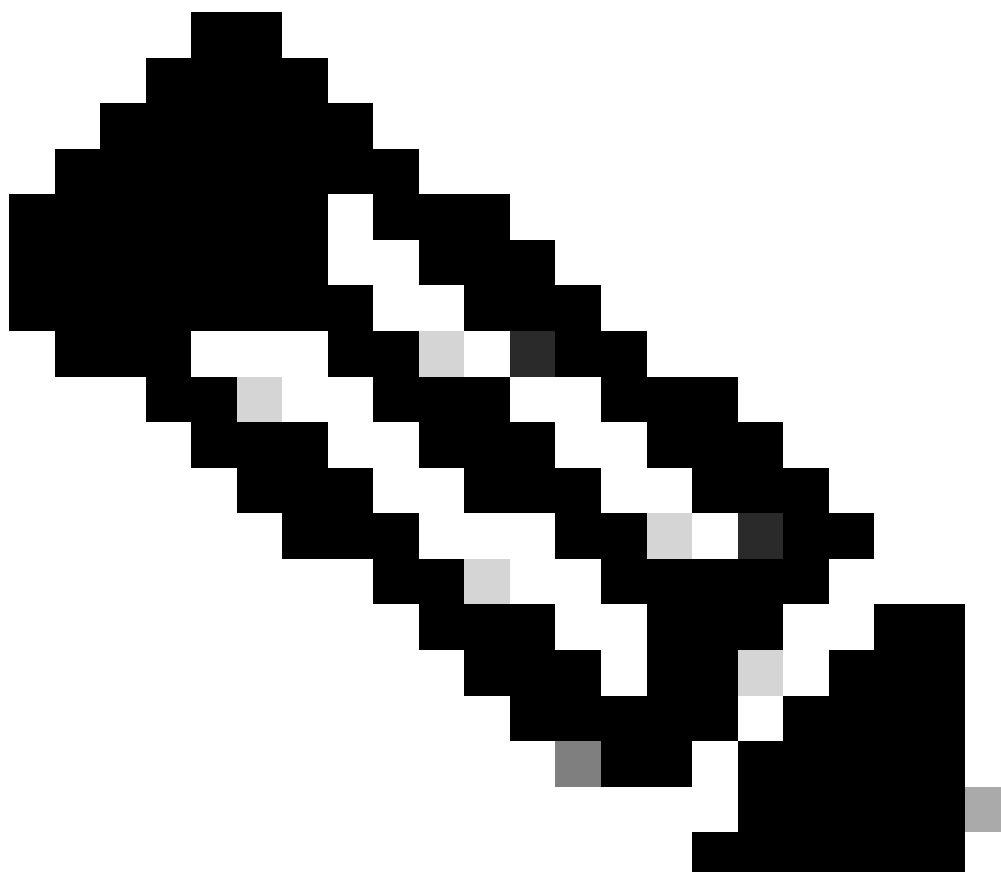
2. 確定流量型別

L2/L3/單播/BUM/組播

3. 識別單個受害者流

儘可能從IXIA向下鑽取並找到單個流，我們將使用該流進行進一步分類

4. 跟蹤單一流並縮小丟棄或啟動複製的裝置（可疑裝置）的範圍

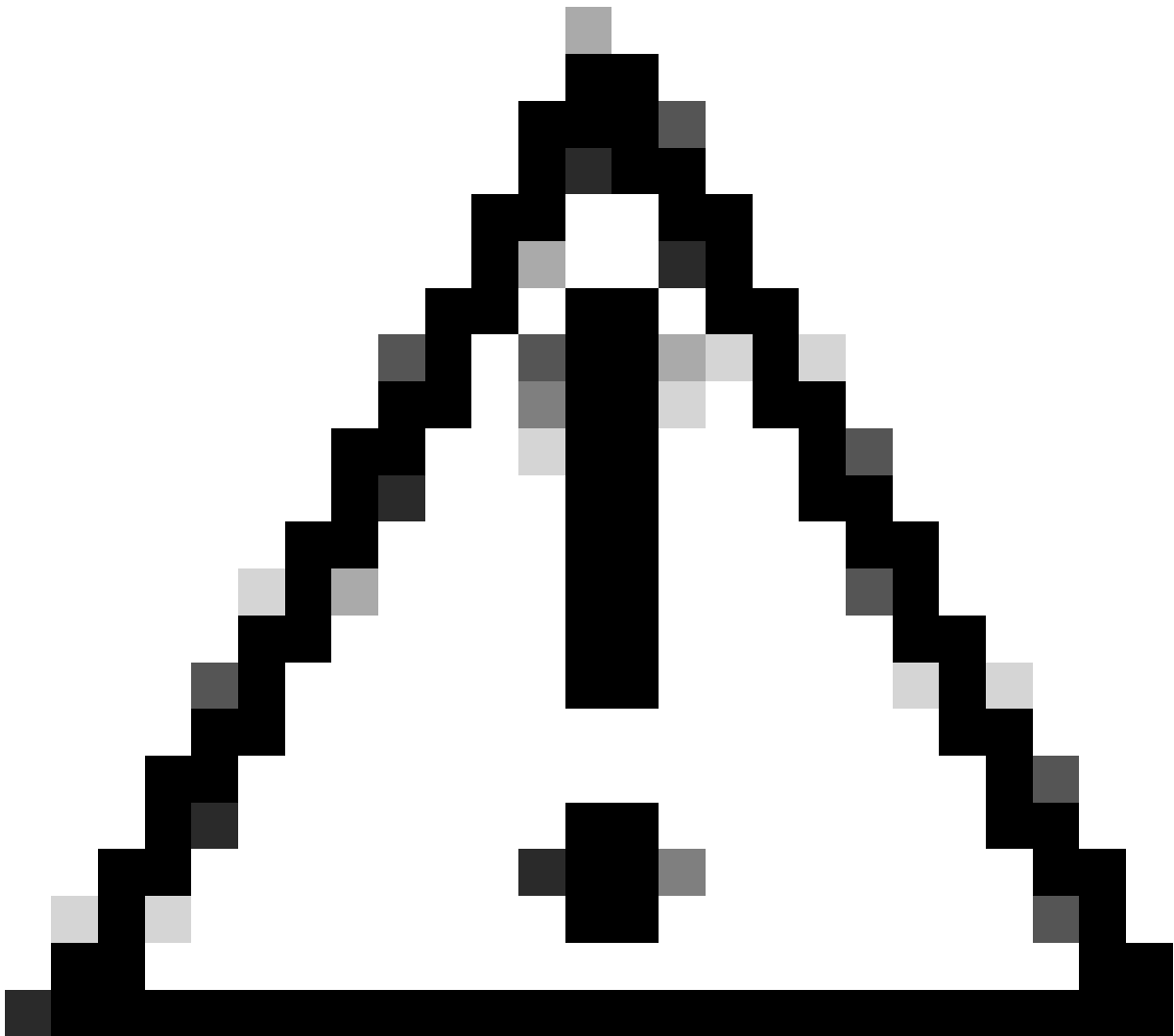


注意：使用拓撲圖和show interface counters命令獲取資料包的實際路徑

1. 在IXIA上，停止所有流量，並建立一個新的流量流「DEBUG」，該流量流具有我們在步驟2中選擇的單一流量，並將流量速率設定為某個較高的速率（例如10K PPS（如果它是A資料流量）），對於ARP/其他管理引擎控制平面，在它經過速率限制器/COPP時將其保持在較低的速率）
 2. 在IXIA上，僅啟動新流量項，並從入口裝置啟動，使用「sh int counters brief」查詢問題在哪些裝置上啟動（丟棄/重複）
5. 獲取以下流詳細資訊並記下該流，以簡化故障排除
1. 來源 MAC
 2. 目的地 MAC
 3. 來源 IP
 4. 目的地 IP
 5. 來源Vlan
 6. 目的地VLAN（如果為路由流量）
 7. 來源和目的地的VRF資訊（如果其L3路由流量）
 8. VNI資訊

1. L2VNI (如果L2流量)
2. L3VNI (如果其L3路由流量)
6. 縮小流量範圍後，請使用以下方法找到有問題的路由器/裝置。
 1. [Traceroute/Ping/MPLS Ping/Ethernet Ping](#)
 2. ACL — 檢查流量是否真的到達裝置的輸入埠
 3. 介面計數器
 4. 介面控制器統計資訊
 5. 標籤交換統計資訊
7. [驗證沒有與配置相關的問題](#)
請參閱部分常見配置錯誤部分。

從可疑裝置開始實際調試



注意：雖然可疑裝置正在丟棄/泛洪流量，但這並不意味著肇事者。在某些情況下，向可疑裝置傳送流量的裝置可能是罪魁禍首。

流量丟棄的位置/模組：

介面層級捨棄

- **show interface <interface>**

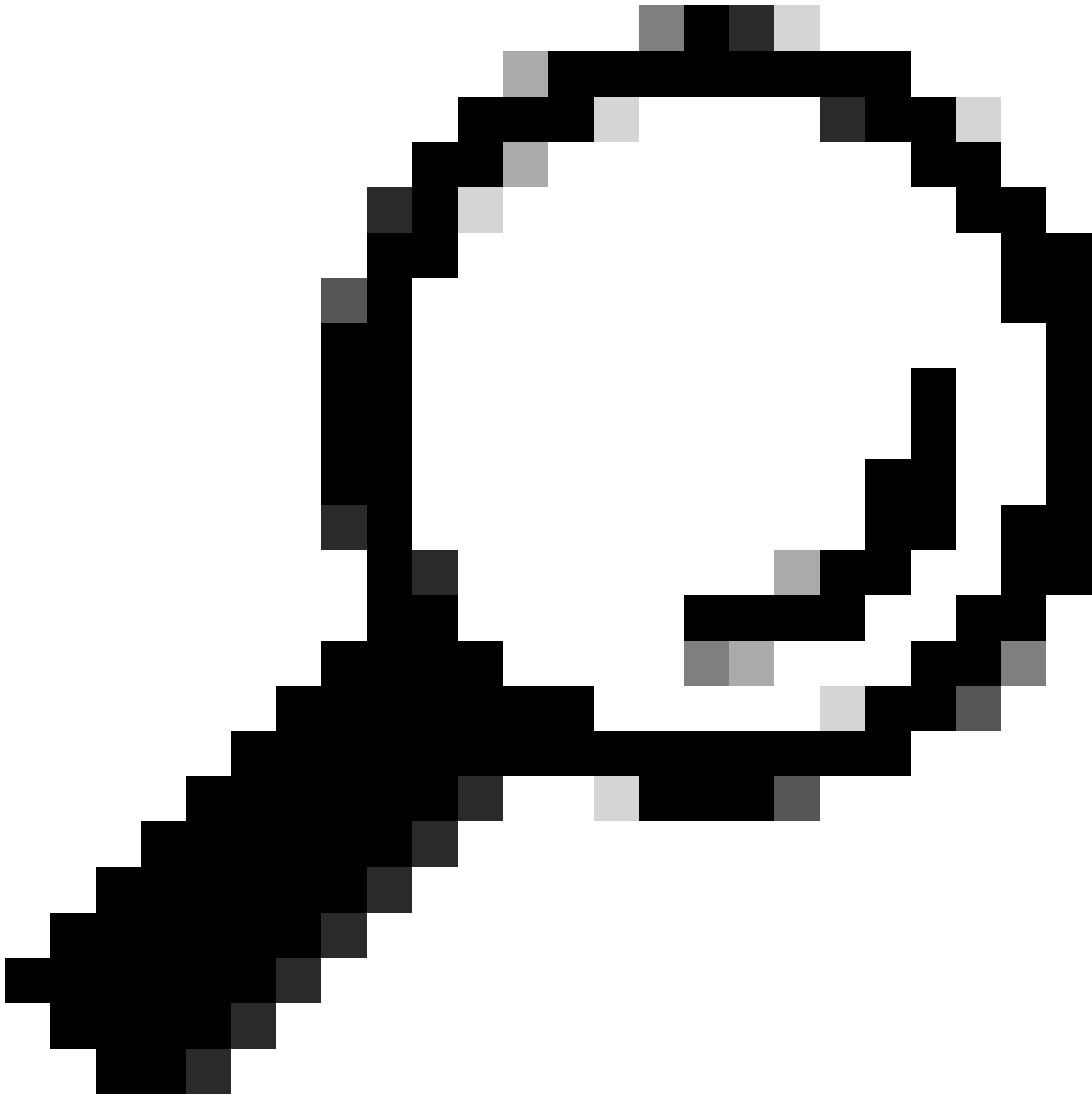
```
RP/0/RSP0/CPU0:YOG-CDCT-CN2-C9910# show interface Bundle-Ether602.3048 Thu May 11 13:16:40.091 WIB Bundle-
Ether602.3048 is up, line protocol is up Interface state transitions: 1 Dampening enabled: penalty 0, not suppressed half-life: 1 reuse: 750
suppress: 2000 max-suppress-time: 4 restart-penalty: 0 Hardware is VLAN sub-interface(s), address is ecce.13c9.d8c5 Description:
ABIS_MCBSC_CDC4_NSN_VLAN3048 Internet address is 10.17.191.179/28 MTU 9216 bytes, BW 2000000 Kbit (Max: 2000000
Kbit) reliability 255/255, txload 0/255, rxload 0/255 Encapsulation 802.1Q Virtual LAN, VLAN Id 3048, loopback not set, Last link
flapped 36w1d ARP type ARPA, ARP timeout 04:00:00 Last input 00:00:00, output never Last clearing of "show interface" counters
135y46w 30 second input rate 4000 bits/sec, 9 packets/sec 30 second output rate 0 bits/sec, 0 packets/sec 85212564 packets input,
5396765891 bytes, 2493252749 total input drops 0 drops for unrecognized upper-level protocol Received 20089331 broadcast packets,
39963824 multicast packets 70999919503 packets output, 7186711514645 bytes, 0 total output drops Output 309 broadcast packets, 57
multicast packets
```

- **show controllers <interface>統計資訊**

```
RP/0/RSP0/CPU0#show controller hundredGigE0/3/0/40 stats Wed Oct 18 16:54:04.904 WEST
Statistics for interface HundredGigE0/3/0/40 (cached values): Ingress: Input total bytes =
16850796039449085 Input good bytes = 16850796039449085 Input total packets = 13769166661248
Input 802.1Q frames = 0 Input pause frames = 0 Input pkts 64 bytes = 257446881559 Input pkts
65-127 bytes = 1285971034813 Input pkts 128-255 bytes = 401173319511 Input pkts 256-511
bytes = 261817914140 Input pkts 512-1023 bytes = 323254550402 Input pkts 1024-1518 bytes =
6444289537421 Input pkts 1519-Max bytes = 4795213423402 Input good pkts = 13769166661248
Input unicast pkts = 13769157512691 Input multicast pkts = 9147481 Input broadcast pkts =
1076 Input drop overrun = 0 Input drop abort = 0 Input drop invalid VLAN = 0 Input drop
invalid DMAC = 0 Input drop invalid encap = 0 Input drop other = 0 Input error giant = 0
Input error runt = 0 Input error jabbers = 0 Input error fragments = 0 Input error CRC = 0
Input error collisions = 0 Input error symbol = 0 Input error other = 0 Input MIB giant =
4795213423402 Input MIB jabber = 0 Input MIB CRC = 0 Egress: Output total bytes =
3150799484820437 Output good bytes = 3150799484820437 Output total packets = 5987194620610
Output 802.1Q frames = 0 Output pause frames = 0 Output pkts 64 bytes = 59685948036 Output
pkts 65-127 bytes = 3272599163757 Output pkts 128-255 bytes = 477536708073 Output pkts 256-
511 bytes = 150420175953 Output pkts 512-1023 bytes = 191150155497 Output pkts 1024-1518
bytes = 999535758139 Output pkts 1519-Max bytes = 836266711152 Output good pkts =
5987194446122 Output unicast pkts = 5987180721273 Output multicast pkts = 13724849 Output
broadcast pkts = 0 Output drop underrun = 0 Output drop abort = 0 Output drop other = 0
Output error other = 174488
```

早期快速丟棄

如何檢查EFD正在丟棄資料包？



提示：必須注意的是，戰斧式EFD丟棄不會顯示在「show controller np counters <>」命令輸出中，也不會顯示在「show drops」命令輸出中。開啟新的增強請求，以便在「show drops」命令中包含EFD丟包。請參閱

```
RP/0/RP0/CPU0:asr9k-1# sh controllers np fast-drop np0 location 0/0/CPU0 Fri Jan 27 12:17:57.333 PST Node: 0/0/CPU0: -----
----- All fast drop counters for NP 0: TenGigE0/0/0/1/0-TenGigE0/0/0/1_9:[Priority1] 0
TenGigE0/0/0/1/0-TenGigE0/0/0/1_9:[Priority2] 0 TenGigE0/0/0/1/0-TenGigE0/0/0/1_9:[Priority3] 0 HundredGigE0/0/0/0-
TenGigE0/0/0_1_9:[Priority1] 0 HundredGigE0/0/0/0-TenGigE0/0/0_1_9:[Priority2] 0 HundredGigE0/0/0/0-
TenGigE0/0/0_1_9:[Priority3] 123532779 <=== Priority 3 packets dropped -----
RP/0/RP0/CPU0:asr9k-1#
```

要收集哪些資料？

ASR9000 Tomahawk和Lightspeed線卡上的「np_perf」設施，用於排除NP快速丟棄故障

NP丟棄

1.根據入口埠資訊確定相關NP。以下命令可用於標識NP

show controllers np portmap all location < >

```
RP/0/RSP0/CPU0:SRv6-R5# show controllers np portmap all location 0/1/CPU0 Wed May 17
05:30:40.389 EDT Node: 0/1/CPU0: -----
----- Show Port Map for NP: 0, and RX Unicast Ports phy port num interface desc
uiMappedSourcePort 0 HundredGigE0_1_0_0 0 10 HundredGigE0_1_0_1 10 20 HundredGigE0_1_0_2
20 30 HundredGigE0_1_0_3 30 Show Port Map for NP: 1, and RX Unicast Ports phy port num
interface desc uiMappedSourcePort 0 HundredGigE0_1_0_4 0 10 TenGigE0_1_0_5_0 10 11
TenGigE0_1_0_5_1 11 12 TenGigE0_1_0_5_2 257 (bundle) 13 TenGigE0_1_0_5_3 13 20
HundredGigE0_1_0_6 20 30 TenGigE0_1_0_7_0 30 31 TenGigE0_1_0_7_1 31 32 TenGigE0_1_0_7_2
256 (bundle) 33 TenGigE0_1_0_7_3 33 RP/0/RSP0/CPU0:SRv6-R5#
```

2.檢查步驟(a)中識別的NP的np計數器統計資訊。

show controller np counters <nnum>/all > location < >

```
RP/0/RSP0/CPU0:SRv6-R5# show controller np counters all location 0/3/CPU0 Wed Oct 18 16:54:46.557 WEST Node: 0/3/CPU0:
----- Show global stats counters for NP0, revision v0 Last clearing of counters for
this NP: 2543:27:1 Read 0 non-zero NP counters: Offset Counter FrameValue Rate (pps) -----
----- 104 BFD discriminator zero packet 2 0 158 IPv4 PIM all routers detected 31878304 3 170 IPv6 LL
hash lookup miss on egress 1 0 192 L2 MAC learning source MAC lookup miss 53 0 193 L2 MAC move on egress NP 55 0 194 L2
MAC notify delete 15 0 195 L2 MAC notify delete no entry 2 0 198 L2 MAC notify learn complete 2520170 0 200 L2 MAC notify
received 21518947 3 201 L2 MAC notify reflection filtered 113082 0 202 L2 MAC notify refresh complete 18885133 3 205 L2
MAC notify update with bridge domain flush 366 0 206 L2 MAC notify update with port flush 30 0 208 L2 MAC update via
reverse MAC notify skipped 2 0 220 L2 aging scan delete from BD key mismatch 108 0 221 L2 aging scan delete from XID invalid
3 0 223 L2 aging scan delete from entry aging out 2516745 0 227 L2 egress MAC modify 18885584 3 246 L2 ingress MAC bridge
domain flush 2 0 250 L2 ingress MAC learn 53 0 251 L2 ingress MAC modify 113027 0 253 L2 ingress MAC move 2 0 256 L2
ingress MAC refresh update 113025 0 266 L2 on demand scan delete from BD key mismatch 3060 0 267 L2 on demand scan delete
from XID invalid 49 0 292 MAPT - TBPG Event 1562667425 171 349 TBPG L2 mailbox events 1376253865 150 350 TBPG MAC
scan events 22942615 3 351 TBPG stat events 88080247335 9620 361 VPLS egress MAC notify MAC lock retry 607 0 363 VPLS
egress MAC notify entry lock retry 176 0 372 VPLS ingress entry lock not acquired 4758 0 373 VPLS ingress entry lock retry
1362180 0 400 DMAC mismatch MY_MAC or MCAST_MAC for L3 intf 1 0 420 GRE IPv4 decap qualification failed 34389 0
431 GRE IPv6 decap qualification failed 34 0 460 IP multicast route drop flag enabled 10985 0 463 IPv4 BFD SH packet TTL
below min 2705 0 464 IPv4 BFD SH packet invalid size 2294 0 486 IPv4 multicast egress no route 1363073 0 488 IPv4 multicast
fail RPF drop 222733 0 550 L2 VNI info no hash entry drop 7 0 562 L2 egress VLAN tag missing drop 97 0 576 L2 ingress LAG
no match drop 172286 0 592 L2 ingress flood null FGID drop 62617 0 602 L2 on L3 ingress unknown protocol 4577940 0 617
LAC subscribers L2TP version mismatch drop 404 0 623 LSM dropped due to egress drop flag on label 3 0 635 MPLS over UDP
decap is disabled 5 0 650 P2MP carries more than two labels 27398 0 652 P2MP with invalid v4 or v6 explicit null label 60273 0
671 Queue tail drops due to queue buffer limit 67132 0 728 VPWS ingress DXID no match drop 5 0 729 WRED curve probability
drops 22229 0 734 CLNS multicast from fabric pre-route 1502161 0 738 IPv4 from fabric 984281239 206 739 IPv4 from fabric pre-
route 4472288 0 740 IPv4 inward 18133144 2 742 IPv4 multicast from fabric pre-route 3293512 0 745 IPv6 from fabric 2412441 0
747 IPv6 link-local from fabric pre-route 281239 0 749 IPv6 multicast from fabric pre-route 529 0 753 Inject to fabric 406582755
151 754 Inject to port 199262152 106 755 MPLS from fabric 295962479 30 759 Pre-route punt request 101423 0 1410 Drop due to
```

invalid table content 9 0 1418 IPv4 egress null route 1 0 1423 IPv4 invalid length in ingress 21 0 1443 MPLS MTU exceeded
3512168 0 1466 MPLS invalid payload when disposing all labels 85 0 1468 MPLS leaf with no control flags set 13281 0 1470
MPLS receive adjacency 1 0 1503 ARP 65599 0 1518 Bundle protocol 27441792 3 1524 Diags 152495 0 1572 IPv4 options 188 0
1587 ICMP generation needed 33 0 1599 TTL exceeded 173434294 21 1600 Punt policer: TTL exceeded 7506 0 1602 IPv4
fragmentation needed 213116 12 1605 IPv4 BFD 1288 0 1611 IFIB 466671481 157 1612 Punt policer: IFIB 413684 0 1632 IPv6
hop-by-hop 1285 0 1635 IPv6 TTL error 2230163 0 1695 Diags RSP active 152501 0 1698 Diags RSP standby 152559 0 1701
NetIO RP to LC CPU 78667597 8 1716 SyncE 9155455 1 1749 MPLS fragmentation needed 16 0 1752 MPLS TTL exceeded 194 0
1755 IPv4 adjacency null route 9760672 0 1756 Punt policer: IPv4 adjacency null route 1673465 0 1809 PTP ethernet 516895376
56 1899 DHCP broadcast 891 0 1995 IPv4 incomplete Rx adjacency 64643796 6 1996 Punt policer: IPv4 incomplete Rx adjacency
26014 0 1998 IPv4 incomplete Tx adjacency 9143978 1 1999 Punt policer: IPv4 incomplete Tx adjacency 13053 0 2013 IPv6
incomplete Tx adjacency 206 0 2022 MPLS incomplete Tx adjacency 339606 0 2028 Remote punt BFD 31 0 HW Received from
Line 29024842290654 3235969 HW Transmit to Fabric 29024410231530 3235922 HW Received from Fabric 23530268012585
2664187 HW Transmit to Line 23530333637629 2664266 HW Host Inject Received 605997250 257 HW Host Punt Transmit
980248296 225 HW Local Loopback Received at iGTR 1081176162 309 HW Local Loopback Transmit by iGTR 1081176162 309
HW Local Loopback Received at Egress 1081176162 309 HW Transmit to TM from eGTR 23531332324079 2664493 HW
Transmit to L2 23531313885879 2664491 HW Received from Service Loopback 18438204 2 HW Transmit to Service Loopback
18438204 2 HW Internal generated by PDMA 214940487672 23474

a.L3特定計數器

對於丟棄，您應檢視以下Wiki以查詢原因。檢視它是否屬於L3類別。

如果屬於L3類別，請獲取與該流相關的所有L3相關輸出。

L3 CEF鏈輸出和其他show命令

show cef [ipv4 | ipv6 | mpls]硬體[輸入 | egress] detail location <LC>

show mpls forwarding labels <LABEL> hardware egress detail location <LC>

show cef vrf <vrf> <IP> internal location <LC>

show cef vrf <vrf> <IP> hardware [ingres | egress] location <LC>

show cef mpls local-label <標籤> EOS

show cef mpls local-label <LABEL> non-eos location <LC>

show mpls forwarding labels <LABEL> det hardware [ingres | egress]
location <LC>

顯示與介面級別輸出相關的命令[子介面、捆綁包及其成員.....]

顯示與介面相關的uidb im資料庫及其鏈。

如果已啟用捆綁包，則顯示捆綁包<>相關命令。

sh controllers pm vqi location <LC>

PI命令：

```

sh cef <IP> internal location <LC>

sh cef <IP> detail location <LC>

show cef unresolved loc <>

show cef adjacency loc <>

show cef [drops | exception] loc <>

show cef [misc | summary] loc <>

show cef [ipv4 | ipv6 | mpls]跟蹤[錯誤 | eve |表] loc <>

show cef interface <>loc <>

show mpls forwarding [..] loc <>

```

b. L2特異性計數器

對於丟棄，您應檢視以下Wiki以查詢原因。檢視它是否屬於L2類別。

LSP所有計數器詳細資訊

如果是L2類別，請獲取與該流相關的所有L2相關輸出。

L2VPN鏈輸出和其他show命令

```

show l2vpn forwarding hardware ingress detail location <LC>

show l2vpn forwarding hardware egress detail location <LC>

show l2vpn forwarding bridge-domain <BD Group:BD Name>硬體輸入詳細資訊位置<LC>

show l2vpn forwarding bridge-domain <BD Group:BD Name>硬體出口詳細資訊位置<LC>

show l2vpn forwarding bridge-domain mac-address hardware ingress location <LC>

show l2vpn forwarding interface pw-ether <PW> hard detail location <LC>

show l2vpn xconnect interface pw-ether <PW> detail

show l2vpn forwarding main-port pwhe interface pw-ether600 hardware ingress detail location <LC>

show l2vpn mstp port msti 0

show l2vpn mstp port msti 1

顯示與介面級別輸出相關的命令[子介面、捆綁包及其成員.....]

顯示與介面相關的uidb im資料庫及其鏈。

```

如果已啟用捆綁包，則顯示捆綁包<>相關命令。

```
sh controllers pm vqi location < >
```

```
show l2vpn forwarding bridge-domain mac-address internal private first 1000  
location 0/RP0/CPU0
```

```
show evpn internal-label private location 0/RP0/CPU0
```

```
show evpn internal-label path-list private location 0/RP0/CPU0
```

```
show evpn internal-id private location 0/RP0/CPU0
```

```
show l2vpn forwarding bridge-domain mac-address internal private first 1000  
location 0/RP1/CPU0
```

```
show evpn internal-label private location 0/RP1/CPU0
```

```
show evpn internal-label path-list private location 0/RP1/CPU0
```

3.在丟棄計數器上捕獲監視器np計數器。

範例：要對計數器<DROP_COUNTER_NAME>進行監視，請執行

monitor np counter <DROP_COUNTER_NAME> <np> location <LC>

```
RP/0/RP0/CPU0:agg03.rjo# monitor np counter PARSE_DROP_IPV4_CHECKSUM_ERROR np0 location 0/1/cpu0 Tue  
Oct 5 10:49:30.349 BRA Usage of NP monitor is recommended for cisco internal use only. Please use instead 'show  
controllers np capture' for troubleshooting packet drops in NP and 'monitor np interface' for per (sub)interface counter  
monitoring Warning: Every packet captured will be dropped! If you use the 'count' option to capture multiple protocol  
packets, this could disrupt protocol sessions (eg, OSPF session flap). So if capturing protocol packets, capture only 1 at a  
time. Warning: A mandatory NP reset will be done after monitor to clean up. This will cause ~150ms traffic outage. Links  
will stay Up. Proceed y/n [y] > y Monitor PARSE_DROP_IPV4_CHECKSUM_ERROR on NP0 ... (Ctrl-C to quit) Tue Oct 5  
10:49:33 2021 -- NP0 packet From HundredGigE0_1_0_0: 86 byte packet 0000: b0 26 80 67 3c bd bc 16 65 5e 2c 04 08 00  
45 00 0&.g<=<.e^,...E. 0010: 00 48 cb b9 40 00 38 11 53 7f b3 e8 5e 74 08 08 .HK9@.8.S.3h^t.. 0020: 08 08 b5 a6 00 35 00  
34 e5 22 d0 f0 01 00 00 01 ..5&.5.4e"Pp.... 0030: 00 00 00 00 00 00 0e 6e 72 64 70 35 31 2d 61 70 .....nrp51-ap 0040: 70  
62 6f 6f 74 07 6e 65 74 66 6c 69 78 03 63 6f pboot.netflix.co 0050: 6d 00 00 01 00 01 m....
```

monitor np counter <DROP_COUNTER_NAME> <np> detail location <LC>

```
RP/0/RP0/CPU0:PE23#monitor np counter 12 np3 detail location 0/0/CPU0 Mon Mar 11 18:20:49.180 IST Usage of  
NP monitor is recommended for cisco internal use only. Warning: Using monitor will cause brief traffic loss twice for  
setup and takedown. Each outage could exceed ? ms. After a packet is monitored, it will resume normal handling (i.e.  
forward, punt, drop, etc). Setup ... ready for traffic outage? [enter] Monitoring NP3 for NP counter 12 [Invalid stats  
pointer 12] ... (Ctrl-C to quit) Mon Mar 11 18:21:25 2024 -- NP3 packet 150 bytes -----  
----- NPU 03: Cluster 11: PPE 15: Thread 00 Ptrace 00 Received from : Fabric GPM Pkt  
Dump Contents: 00 04 08 0C 10 14 18 1C G 000: 70e42225 e554f86b d9a39247 88470057 80049000 0054004a  
00000000 00000000 G 020: 00000000 9424118c 05000400 000000a6 c024400f 00000001 248c80c1 cd000004 G 040:  
000186a0 000186a0 00000000 dad4994e 00200000 20c80318 000101ba 00060296 G 060: 0111bef8 64001700  
7f000001 c0000ec8 03e83cff 064eddf 45c00034 00000000 G 080: 801318e5 044420b0 0000fc00 00000020 0000ff00
```

0000ff80 0000fd00 00000000 G 0a0: c040401d 82000201 080e0000 000e0000 eb190080 00000004 053942d2
00d20048 G 0c0: 003bbbff 0001f86b d9a3923f 810003e9 08004500 00640000 0000ff01 8bd21764 G 0e0: 00fe1764
00010800 b4ee1a25 0000abcd abcdabcd abcdabcd abcdabcd abcdabcd G 100: abcdabcd abcdabcd abcdabcd abcdabcd
abcdabcd abcdabcd abcdabcd abcdabcd G 120: abcdabcd abcdabcd abcdabcd abcdabcd abcdabcd abcd49d6 79520000
00000000 DMEM Contents: 00 04 08 0C 10 14 18 1C 000: 40000256 009609c0 00000000 00000000 deadbeef
deadbeef deadbeef deadbeef 020: f0000010 05000172 40000000 00000000 00000000 810003e9 00000000 0004fc49
040: 70000000 01004c1b 64000300 00000000 02000000 00000000 0000000e 000992a1 060: 00000000 00000000
00000000 01800000 00000000 f0000000 00000000 06d035fb 080: 000f0109 00711ef0 00000046 06d035fb 41800000
01000001 64000b00 00064ed1 0a0: 8200f86b d9a39247 1e01f25f 00009003 00000000 00000000 00000000 00000000
0c0: c0000000 00018c00 001e0000 00000000 000f0109 0077e248 00000076 00000000 0e0: 8200f86b d9a39247
1e01f25f 00009003 00000000 00000000 00000000 00000000 100: 83211001 00000000 0d94001b 0992a096 07aa60a2
1e000fa0 1c000001 00000000 120: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 140:
deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 160: deadbeef deadbeef deadbeef deadbeef
deadbeef deadbeef deadbeef deadbeef 180: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef
1a0: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 1c0: deadbeef deadbeef deadbeef
deadbeef 28010100 00000000 00000000 0000004b 1e0: d0000000 00000000 00002000 0000004b 90004031 800019d3
00000000 00000000 200: 00000004 00000004 01000000 0a000000 b8008810 01010003 00000000 00000000 220:
00000000 00000000 00000000 010423de deadbeef deadbeef deadbeef deadbeef 240: deadbeef deadbeef deadbeef
deadbeef deadbeef deadbeef deadbeef deadbeef 260: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef
deadbeef 280: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 2a0: deadbeef deadbeef
deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 2c0: 000f0108 004aea60 deadbeef deadbeef 001e0003
80000000 00000008 deadbeef 2e0: deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef deadbeef 0096 00021000 300:
00008008 0992a004 04fc49ef deadbeef deadbeef deadbeef 000001ef deadbeef 320: 083961ef 03e83cff 061adfff
deadbeef deadbeef deadbeef deadbeef deadbeef 340: deadbeef deadbeef deadbeef deadbeef c0000ec8 000011ef
deadbeef 00000172 360: deadbeef 0d00beef 00000000 0000000e 00000000 000210c0 a2961b00 000210d2 380:
00000084 deadbeef 000210ec 03e83cff deadbeef deadbeef 00009000 0001f250 3a0: 800019d3 000210a0 deadbeef
deadbeef 00000000 02000000 deadbeef 00000000 3c0: 00680d8f 01d20000 deadbeef 00ffbeef deadbeef 000000ef
deadbeef deadbeef 3e0: 02000000 05800010 00040004 00000000 00020390 3195f8fe 04441100 044422c0 Register
Contents: r00: 800980b9 00000001 0000000c 0000000c 004aea60 3c084204 00000032 18000004 r08: 04442200
044421d0 00000008 00000003 000210a0 00000004 00000001 00000001 r16: 80119bab 04442170 0000fc00 ffff000
000210a0 000210c0 000000ff 00ffffff r24: 80125faf 04442140 0000fc00 000210c0 000210a0 00000001 00000001
00500000 = = Above Register Contents are from windowbase = 3 = = = Easy-to-read Register Contents
(windowbase: 0) = = a00 000210a0 | a08 000210a0 | a16 004aea60 | a24 000210a0 a01 000210c0 | a09 00000001 | a17
3c084204 | a25 00000004 a02 000000ff | a10 00000001 | a18 00000032 | a26 00000001 a03 00ffffff | a11 00500000 |
a19 18000004 | a27 00000001 a04 80125faf | a12 800980b9 | a20 04442200 | a28 80119bab a05 04442140 | a13
00000001 | a21 044421d0 | a29 04442170 a06 0000fc00 | a14 0000000c | a22 00000008 | a30 0000fc00 a07 000210c0 |
a15 0000000c | a23 00000003 | a31 ffff0000 Special Registers: sar = 0000001a window_start = 0000008a window_base
= 00000003 epc = 00040250 exccause = 00000001 (SycallCause) ps = 00020330 sse_cop_errorcode = 00000000 h3ta =
deb4cf17 h3tb = deadbf03 h3tc = deadbef7 h3tr = 2609d946 timestamp_high_1 = 00095a09 timestamp_low_1 =
19f84b99 cycle_count_high_1 = 0000008c cycle_count_low_1 = 1a732982 ppe_id = 6bc60d7e uidb_ext0 = 3195f8fe
uidb_ext1 = 00020390 uidb_ext2 = 00000000 uidb_ext3 = 00000000 uidb_ext4 = 00000000 uidb_ext5 = 00000000
softerr_misc = 00000034 timestamp_high_2 = 00095a09 timestamp_low_2 = 19f8609a cycle_count_high_2 =
0000008c cycle_count_low_2 = 1a732ae8 css = 00000001 ci_count_1 = 000003a8 thread_stop = 00000000 ci_count_2
= 000003a8 memctrl = 00000000 softerr_dmem0 = 60411000 softerr_dmem1 = 67f15000 code_segment0 = 08000000
code_segment1 = 08000000 l1t_data_sbe_log = 00000000 l1t_mshr_sbe_log = 00000000 random_1 = 19382747
stall_control = 00000003 l1t_tag_parity_log = 6bc60d7e random_2 = 697de1cb depc = 00000000 timeout_control =

00000008 rtb0 = 00000000 rtb1 = 0000000f invalidate = 00000000 tlu_cmd_hdr = 6bc60d7e l1t_enables = 00000003
l1t_replacement_way = 00000007 excvaddr = 00060330 l1t_data_mbe_log = 00000000 l1t_mshr_mbe_log = 00000000
sse_cop_seedh = 356c9a7b sse_cop_tlu_cnt1_rw = 00000000 sse_cop_lock = 800034a7 sse_cop_tlu_perr = 00000000
sse_cop_tlu_cnte1_rw = 00000000 sse_cop_tps_tpd_parity_log = 00000000 sse_cop_tps_tpt_parity_log = 00000000
sse_cop_tmu_parity_log_rw = 00000000 sse_cop_tmu_sram_mbe_log_rw = 00000000 sse_cop_tmu_sram_sbe_log_rw
= 00000000 sse_cop_tlu_cnte0_rw = 00000000 sse_cop_tlu_cntp_rw = 00000000 sse_cop_tlu_cnt0_rw = 00000000
rtt_index = 00000000 rtt_data0 = 00000000 rtt_data1 = 00000000 ppe_lock = 8000000c stack_limit = 04441400
stack_limit_enable = 00000001 sse_cop_dma_mem_access = 00000000 sse_cop_dma_mem_data = 000000a0
error_code = 00000000(No Error)

4.HW程式設計詳細資訊 — 可以使用下面收集有關轉發HW結構程式設計的詳細資訊。(對於NP團隊進一步調試非常有用)

L3

show controller np struct R-LDI unsafe det all location <LC>
show controller np struct NR-LDI unsafe det all location <LC>

show controller np struct TE-NH-ADJ unsafe det all location <LC>

show controller np struct RX-ADJ unsafe det all location <LC>

show controller np struct TX-ADJ unsafe det all location <LC>

show controller np struct NHINDEX unsafe det all location <LC>

show controller np struct LAG unsafe det all location <LC>

show controller np struct LAG-Info unsafe det all location <LC>

L2

show controller np struct UIDB-EGR-EXT unsafe det all location <LC>

show controller np struct UIDB-Ext unsafe det all location <LC>

show controller np struct UIDB-ING-EXT unsafe det all location <LC>

show controller np struct EGR-UIDB unsafe det all location <LC>

show controller np struct XID unsafe det all location <LC>

show controller np struct XID-EXT unsafe det all location <LC>

show controller np struct BD unsafe det all location <LC>

show controller np struct BD-EXT unsafe det all location <LC>

show controller np struct BD-LEARN-COUNT unsafe det all location <LC>

show controller np struct L2-BRGMEM unsafe det all location <LC>

```
show controller np struct l2-fib unsafe det all location <LC>
```

LSP:運行ssh lc0_xr /pkg/bin/show_l2ufib <Collect in all active LCs>

```
show controller np struct L2-MAILBOX unsafe det all location <LC>
```

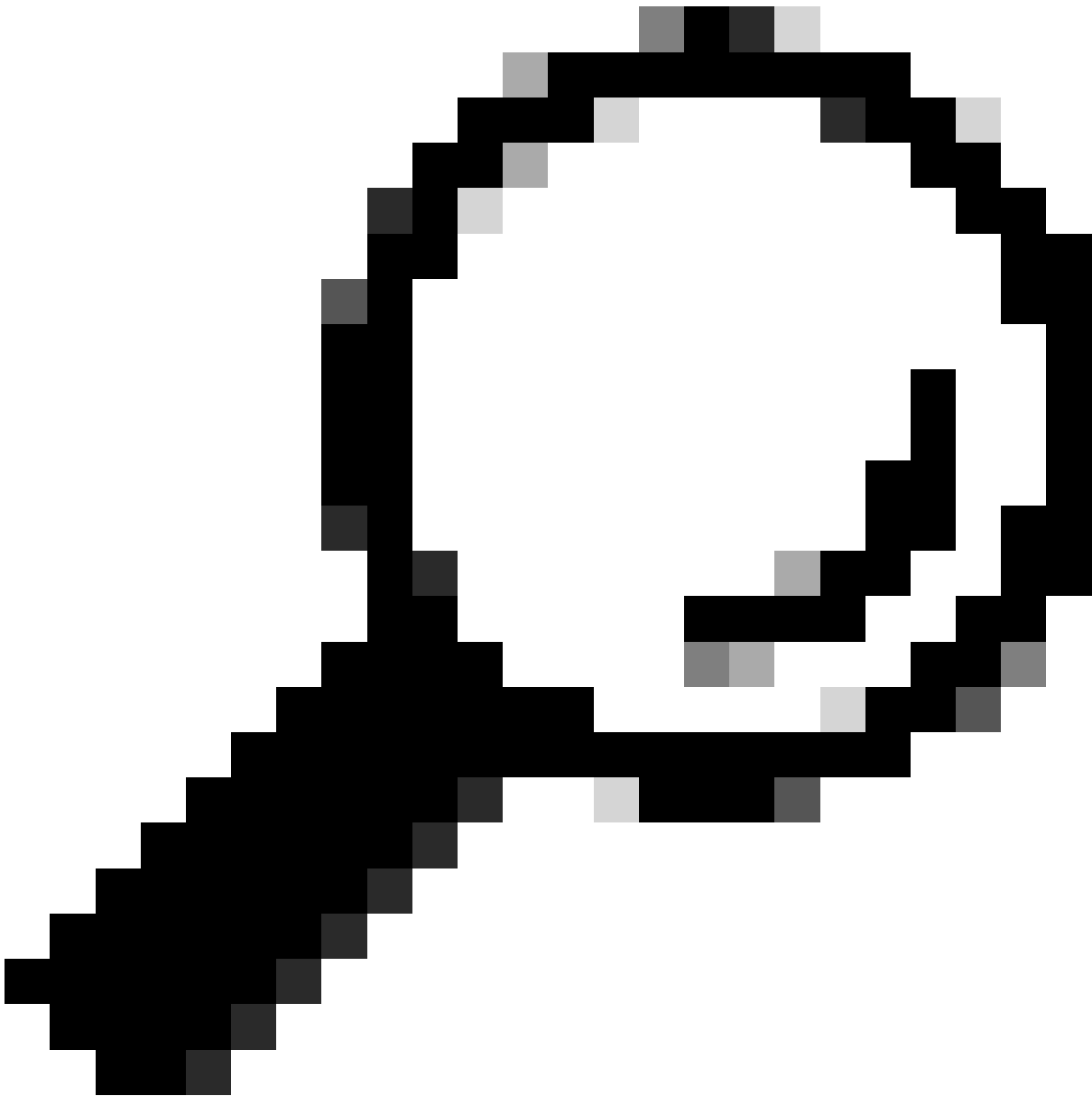
```
show controller np struct L2-MBX-HOST-TO-NP unsafe det all location <LC>
```

```
show controller np struct L2-MBX-NP-TO-HOST unsafe det all location <LC>
```

SPP

```
show spp sids stats location < >
```

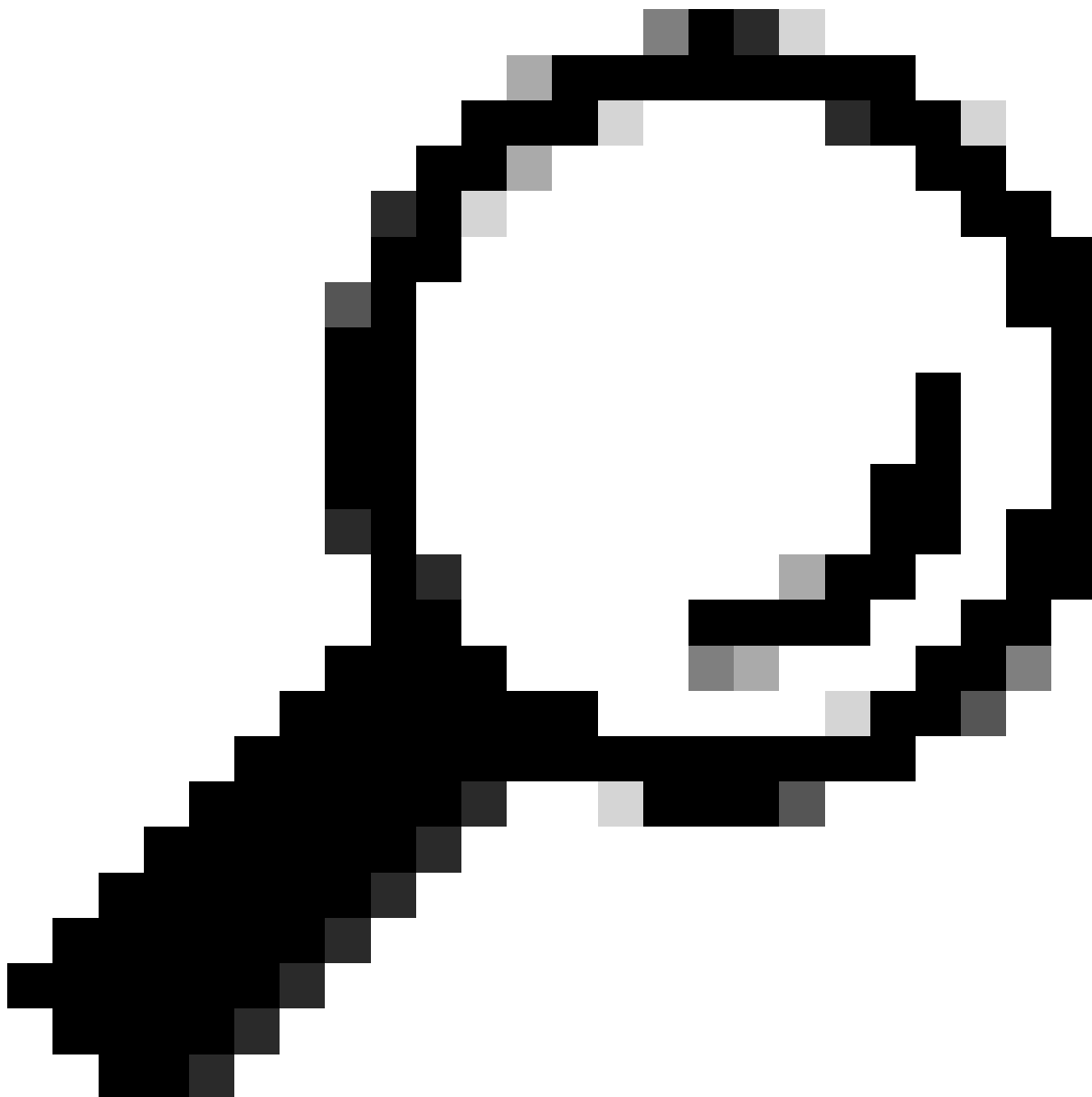
```
show spp node-counters location < >
```



提示：如何在SPP捕獲/過濾資料包？請參閱

內蒂奧

[show netio drops location < >](#)



提示：您可以參閱

SRPM

[ip maddr show eth-srpm \(用於檢查介面的組播條目 \)](#)

[ip maddr show eth-srpm.1283 \(用於檢查介面的組播條目 \)](#)

[ifconfig \(檢查介面的資料包統計資訊以檢視RX和TX是否正確執行 \)](#)

```
[xr-vm_node0_0_CPU0:~]$ip maddr show eth-srpm.1283 9: eth-srpm.1283 link 33:33:00:00:00:01 users 2 link 01:00:5e:00:00:01
```

```
users 2 link 33:33:ff:50:4e:52 users 2 link 01:56:47:50:4e:30 users 2 static link 33:33:00:01:00:03 users 2 inet 224.0.0.1 inet6  
ff02::1:3 inet6 ff02::1:ff50:4e52 inet6 ff02::1 inet6 ff01::1 [xr-vm_node0_0_CPU0:~]$ifconfig eth-srpm.1283: flags=4163  
  
mtu 9700 metric 1 inet6 fe80::544b:47ff:fe50:4e52 prefixlen 64 scopeid 0x20  
ether 56:4b:47:50:4e:52 txqueuelen 1000 (Ethernet) RX packets 0 bytes 0 (0.0 B) RX errors 0 dropped 0 overruns 0 frame 0 TX  
packets 828560 bytes 138041161 (131.6 MiB) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

LPTS

```
show lpts pifib hardware entry statistics loc <>  
show lpts pifib hard police loc <>  
show lpts pifib hardware static-police loc <>  
show lpts pifib ha entry stats location <>
```

交換矩陣

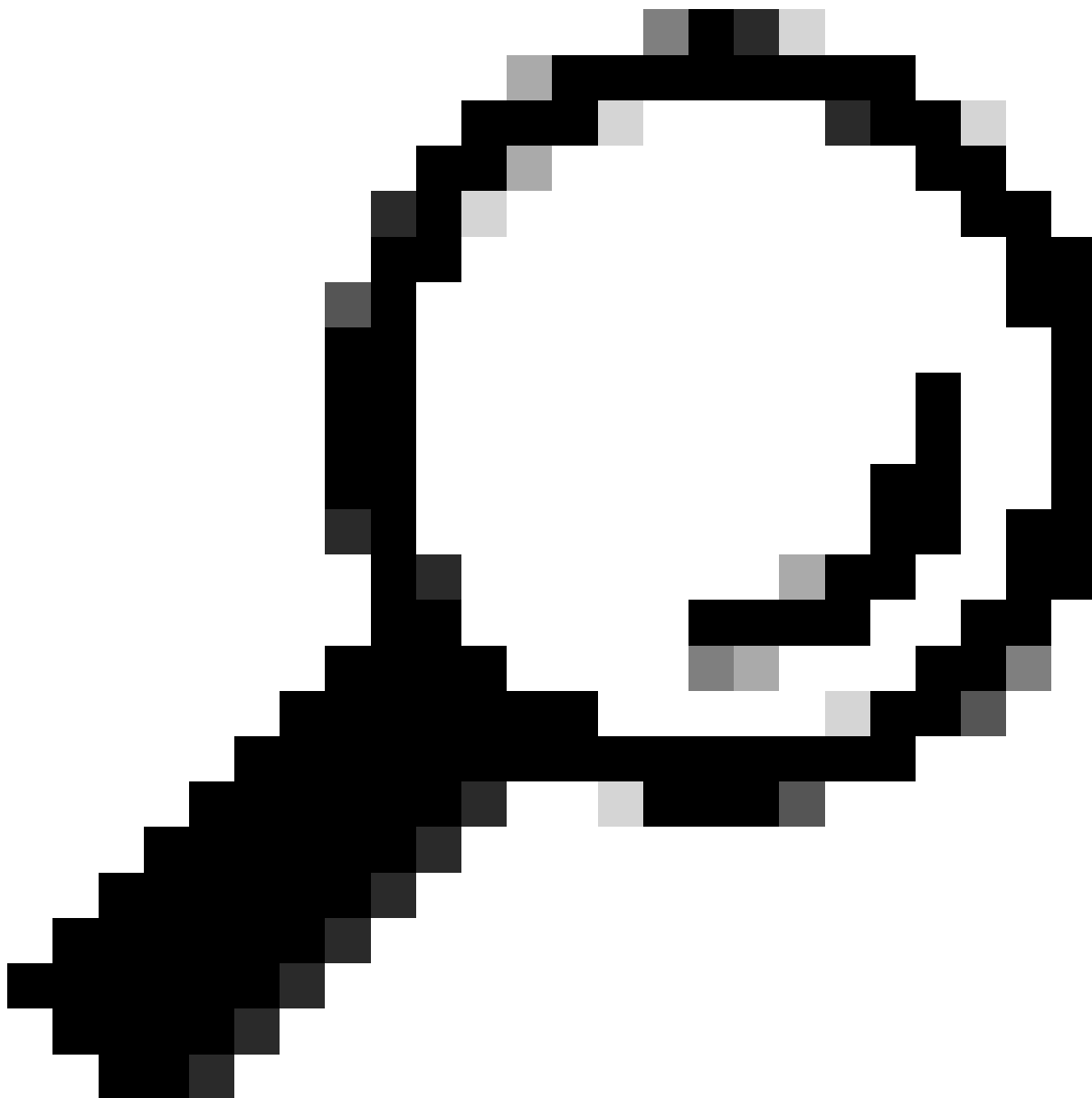
```
show controller fabric fia stats location <>  
show controllers fabric fia drops ingress location <>  
show controllers fabric fia drops egress location <>  
show controller fabric fia status location <>  
show controller pm vqi location <LC>  
show controllers fabric vqi assignment location ( show controllers fabric vqi分配位置 ) <>  
show tech fabric  
show_sm15_ltrace -s 2 fab_xbar | grep "sm15_pcie_read_fpo"
```

應用

```
show ipv4 traffic brief location < >
```

靜默丟棄

如果沒有記帳，我們不會丟棄任何資料包，但生產設定中會增加多個計數器，並且計數器名稱可能沒有直接指向丟棄。在某些情況下，很難判斷傳入資料包是被丟棄還是被轉發。因此，使用資料包跟蹤，我們可以觀察設定中的資料包流並驗證資料包是否正在傳輸。下面是資料包跟蹤輸出示例。



提示：嵌入式Packet Tracer，PRM嵌入式[Packet Trace](https://xrdocs.io/asr9k/tutorials/xr-embedded-packet-tracer/)的[更多資訊](https://xrdocs.io/asr9k/tutorials/xr-embedded-packet-tracer/)。
(<https://xrdocs.io/asr9k/tutorials/xr-embedded-packet-tracer/>)

CLI命令摘要

指令語法	說明
clear packet-trace conditions all	清除所有緩衝的資料包跟蹤條件。僅當資料包跟蹤處於非活動狀態時，才允許使用命令。
clear packet-trace counters all	將所有資料包跟蹤計數器重置為零。
packet-trace條件介面介面	指定您希望接收要通過路由器跟蹤的資料包的介面。
packet-trace conditionoffsetoffsetvaluevaluemaskmask	指定用於定義關注流的偏移/值/掩碼集。

指令語法	說明
packet-trace start	開始資料包跟蹤。
packet-trace stop	停止資料包跟蹤。
show packet-trace description	請參閱在Packet Tracer框架中註冊的所有計數器及其說明。
show packet-trace status[detail]	請參閱在活動RP上運行的pkt_trace_master進程緩衝的條件和Packet tracer狀態（活動/非活動）。命令的詳細選項顯示路由器中每個卡上向Packet Tracer框架註冊了哪些進程。如果Packet Tracer狀態為Active，輸出還會顯示哪些條件已成功程式設計到data-path。
show packet-trace result	檢視非零Packet Tracer計數器。
show packet-trace result countername[sourcessource] [locationlocation]	請參閱特定封包追蹤計數器的最新1023增量。

```
RP/0/RSP1/CPU0:ios#sh packet-trace results Tue Jan 24 19:28:56.151 UTC T: D - Drop counter; P - Pass counter Location | Source
| Counter | T | Last-Attribute | Count -----
----- 0/0/CPU0 NP1 PACKET_MARKED P FortyGigE0_0_1_0 1522128420
0/0/CPU0 NP1 PACKET_ING_DROP D 2000908208 0/0/CPU0 NP1
PACKET_TO_FABRIC P 1522238547 0/0/CPU0 NP1 PACKET_TO_PUNT P
296246 0/0/CPU0 NP1 PACKET_INGR_TOP_LOOPBACK P 1000371630
0/0/CPU0 NP1 PACKET_INGR_TM_LOOPBACK P 1000375084 0/0/CPU0 spp-LIB
ENTRY_COUNT P SPP PD Punt: stage1 299311 0/0/CPU0 NP1 PACKET_FROM_FABRIC P
1522238531 0/0/CPU0 NP1 PACKET_EGR_TOP_LOOPBACK P
1000371546 0/0/CPU0 NP1 PACKET_EGR_TM_LOOPBACK P 1000375020 0/0/CPU0
NP1 PACKET_TO_INTERFACE P FortyGigE0_0_1_0 1522241940
```

分類流：

首先多次檢查「show drops，show drops all ongoing location all」輸出，以確定出現丟包的模組/代碼元件。

識別出後，可使用元件/模組特定的命令進一步隔離問題。

[show drops all ongoing location all](#) →提供NP/FIA/LPTS/CEF的即時丟棄資訊

```
RP/0/RP1/CPU0:R1# show drops all location 0/7/CPU0
世界協調時2015年5月20日09點31分34.58秒
=====
檢查0/7/CPU0上的丟包
=====
```

```
show arp traffic:
[arp:ARP]節點0/7/CPU0的IP資料包丟棄計數 : 265
show cef drops:
[cef:0/7/CPU0]無路由丟棄資料包 : 30536808
show spp node-counters:
[spp:pd_utility]解除安裝丟棄 : 介面停止運作 : 1
[spp:port3/classify]無效 : logged n dropped:10
[spp:client/punt]客戶端配額丟棄 : 445639
show spp client detail:
[spp:ASR9K SPI0客戶端流ID 50, JID 253(pid 7464)]當前 : 0 , 限制
: 20000 , 可用 : 0 , 已入隊 : 0 , 丟棄 : 445639
RP/0/RP1/CPU0:R1#
```

show drops

```
RP/0/RP1/CPU0:R1# show drops all location 0/7/CPU0 Fri May 20 09:31:34.585 UTC
===== Checking for drops on 0/7/CPU0
===== show arp traffic: [arp:ARP] IP Packet drop count for node 0/7/CPU0: 265 show
cef drops: [cef:0/7/CPU0] No route drops packets : 30536808 show spp node-counters: [spp:pd_utility] Offload Drop: Interface
Down: 1 [spp:port3/classify] Invalid: logged n dropped: 10 [spp:client/punt] client quota drop: 445639 show spp client detail:
[spp:ASR9K SPI0 client stream ID 50, JID 253 (pid 7464)] Current: 0, Limit: 20000, Available: 0, Enqueued: 0, Drops: 445639
RP/0/RP1/CPU0:R1#
```

show pfm location all →提供系統相關警報，如ASIC錯誤、Punt_data_path_failed等

```
RP/0/RP0/CPU0:l51#show pfm location all Mon Apr 1 10:02:49.952 UTC node: node0_0_CPU0 ----- CURRENT
TIME: Apr 1 10:02:50 2024 PFM TOTAL: 0 EMERGENCY/ALERT(E/A): 0 CRITICAL(CR): 0 ERROR(ER): 0 -----
----- Raised Time |S#|Fault Name |Sev|Proc_ID|Dev/Path Name |Handle -
-----+--+-----+---+-----+-----+----- Mon Jan 01 00:00:00|--|NONE |NO
|00000000|NONE |0x00000000 node: node0_RP0_CPU0 ----- CURRENT TIME: Apr 1 10:02:50 2024 PFM TOTAL: 0
EMERGENCY/ALERT(E/A): 0 CRITICAL(CR): 0 ERROR(ER): 0 -----
----- Raised Time |S#|Fault Name |Sev|Proc_ID|Dev/Path Name |Handle -----+--+-----+-----
-----+--+-----+-----+----- Mon Jan 01 00:00:00|--|NONE |NO |00000000|NONE |0x00000000 RP/0/RP0/CPU0:l51#
```

「For us」資料包丟棄

檢查介面統計資訊

檢查NP計數器

檢查SPP計數器

檢查網路計數器

檢查SRPM埠統計資訊

檢查交換矩陣統計資訊

[檢查應用程式級別統計資訊](#)

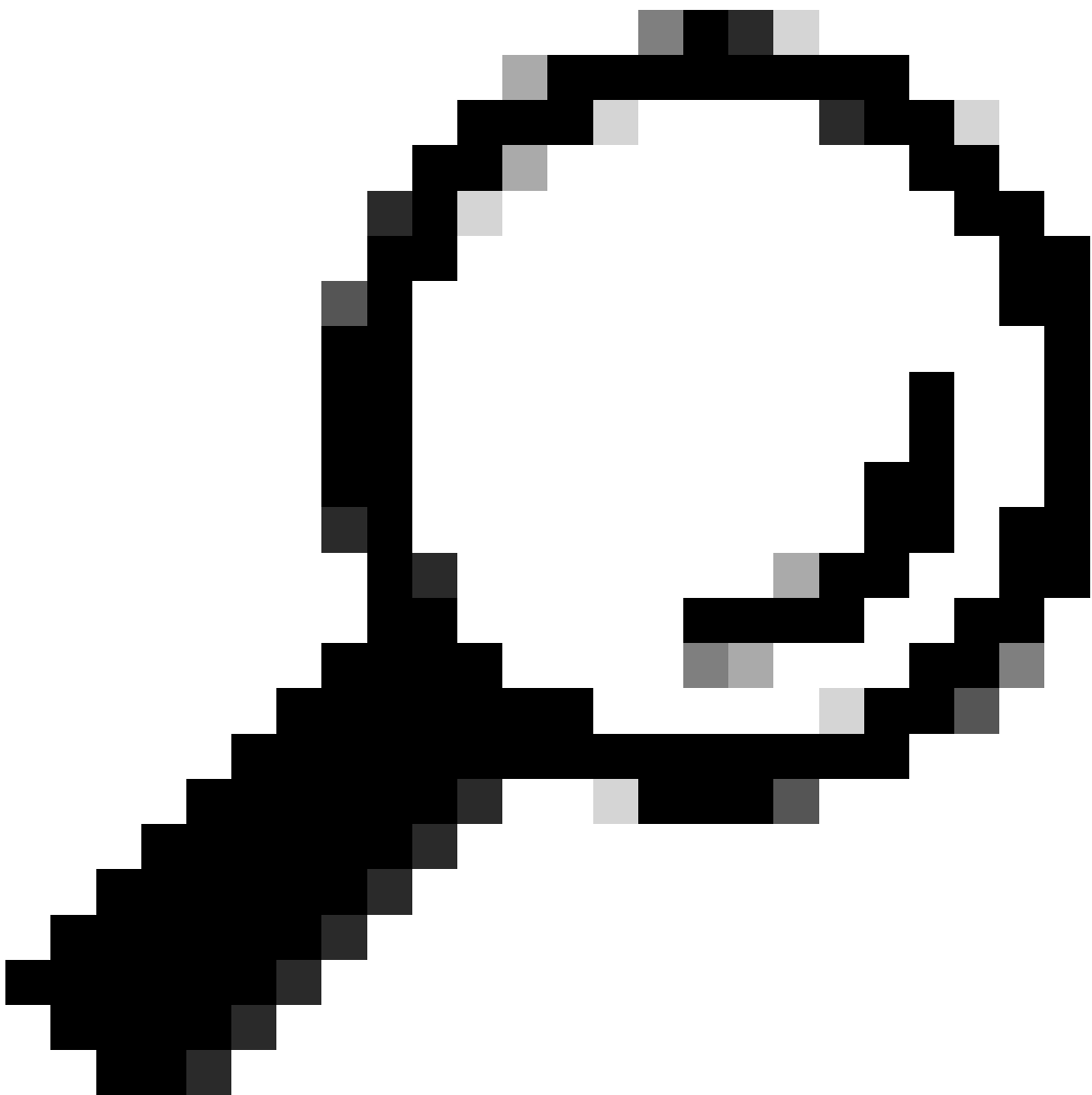
傳輸資料包丟棄

[檢查介面統計資訊](#)

[檢查NP計數器](#)

[檢查交換矩陣統計資訊](#)

注入的流量丟棄



提示：請參閱

[檢查應用程式級別統計資訊](#)

[enable debug punt-inject l3/l2-packets <protocol> location <>](#)

[檢查網路計數器](#)
[檢查SPP計數器](#)
[檢查SRPM埠統計資訊](#)
[檢查NP計數器](#)
[檢查介面統計資訊](#)

其他有用的連結：

意見回饋

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）。