排除ASR 1000系列服務路由器上的資料包丟棄故障

目錄

簡介

本文檔介紹如何對Cisco ASR 1000系列匯聚多業務路由器上的資料包丟棄問題進行故障排除。

必要條件

需求

本文件沒有特定需求。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- 所有Cisco ASR 1000系列聚合服務路由器，包括1002、1004和1006

- Cisco IOS® XE軟體版本2.3.x及更高版本，支援Cisco ASR 1000系列匯聚多業務路由器

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。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

ASR 1000系列路由器的資料包流

高級資料包流

Cisco ASR 1000系列路由器在系統中包含以下功能元素：

- Cisco ASR 1000系列路由處理器1 (RP1)

- Cisco ASR 1000系列嵌入式服務處理器(ESP)

- Cisco ASR 1000系列SPA介面處理器(SIP)

Cisco ASR 1000系列路由器採用Cisco QuantumFlow處理器(QFP)作為其硬體架構。在基於QFP的架構中，所有資料包都透過ESP進行轉發，因此，如果ESP出現問題，轉發將停止。

圖1 Cisco ASR 1006系統配備雙路由處理器、雙ESP和三個SIP
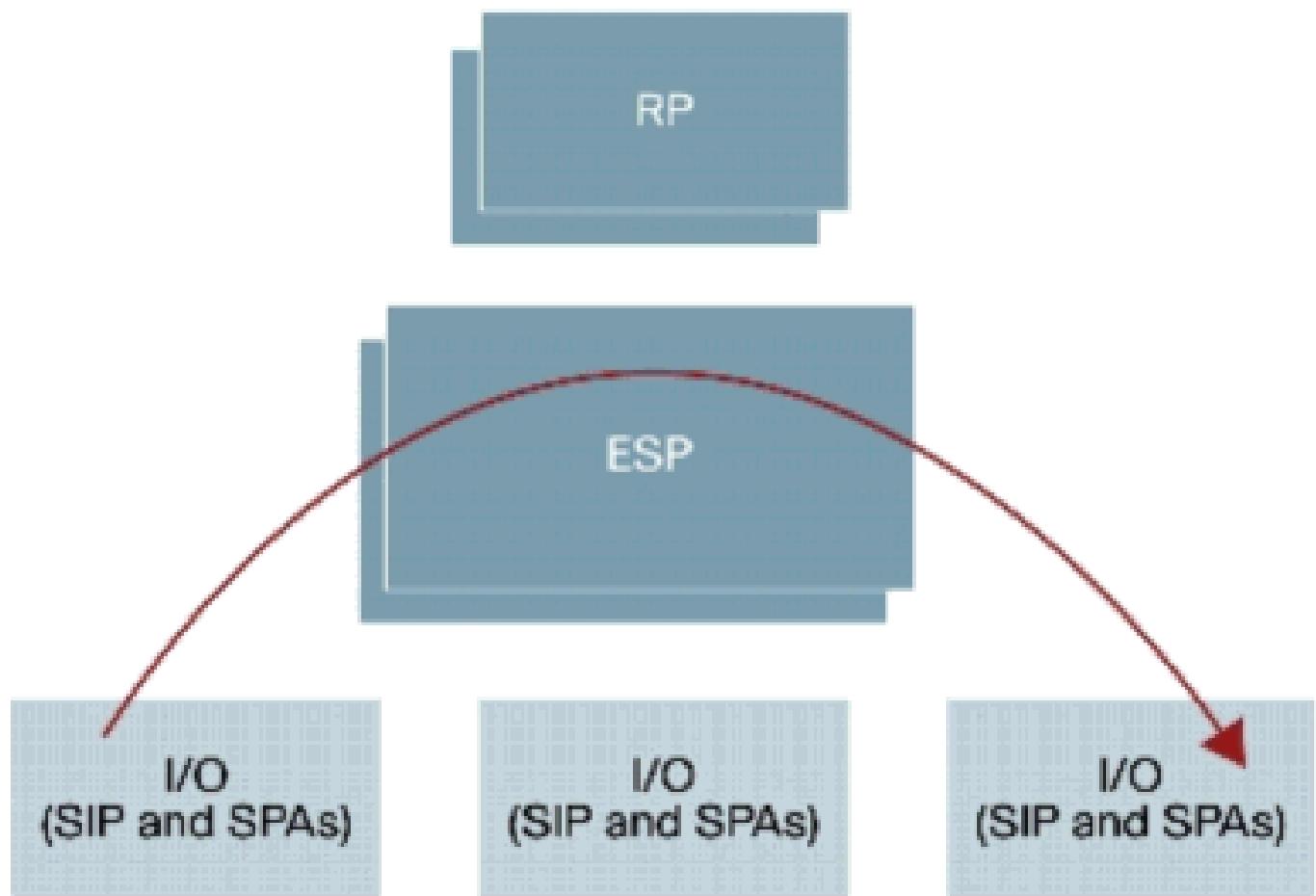
有關詳細資訊，請參閱Cisco ASR 1000系列匯聚多業務路由器。

Cisco ASR 1000系列服務路由器上的資料包丟棄故障排除步驟

封包捨棄點

Cisco ASR 1000系列路由器構建在路由處理器(RP)、嵌入式服務處理器(ESP)、SPA介面處理器(SIP)和共用埠介面卡(SPA)之上。透過每個模組上的ASIC轉發所有資料包。

圖2 Cisco ASR 1000系列系統的資料路徑圖
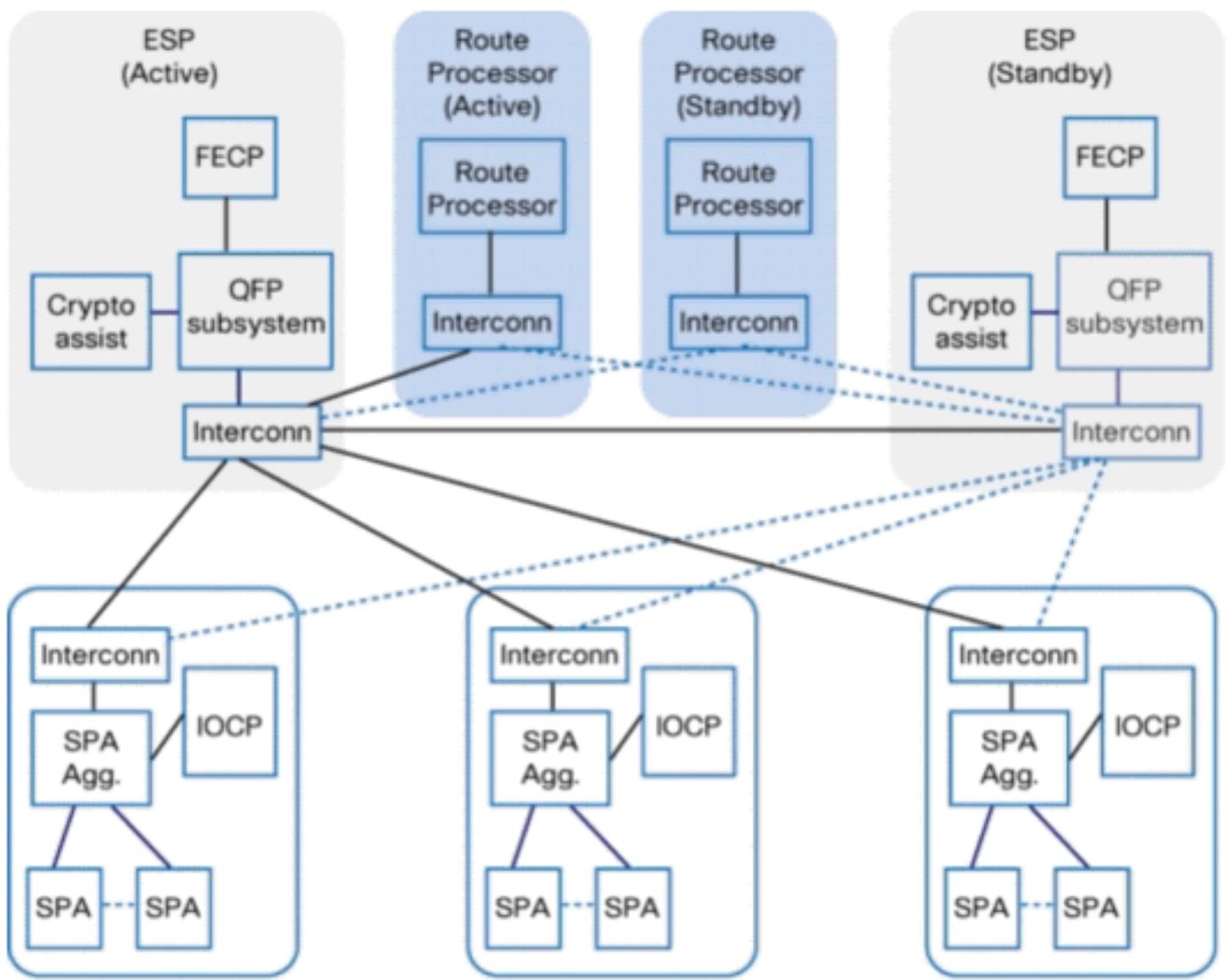
Cisco ASR 1000系列路由器上有多個資料包丟棄點，如表1所示。

表1封包捨棄點

模組	功能元件
SPA	視介面型別而定
SIP	IO控制處理器(IOCP) SPA彙總ASIC互連ASIC
ESP	Cisco QuantumFlow處理器(QFP)轉發控制處理器(FECP)互聯ASIC QFP子系統。QFP子系統由以下元件組成： • 封包處理器引擎(PPE) • 緩衝、排隊和排程(BQS)

	• 輸入封包模組(IPM)
	• 輸出封包模組(OPM)
	• 全域封包記憶體(GPM)
RP	Linux共用記憶體傳送介面(LSMPI)互連ASIC

獲取有關資料包丟棄的資訊

如果遇到意外的資料包丟棄，您必須確保控制檯輸出、資料包計數器的差異和重現步驟可用於故障排除。為了確定原因，第一步是獲取儘可能多的有關問題的資訊。需要提供以下資訊來確定問題的原因：

- 控制檯日誌- 有關詳細資訊，請參閱為控制檯連線應用正確的終端模擬器設定。

- Syslog資訊 -如果您已將路由器設定為向Syslog伺服器傳送日誌，則可以獲取有關如何發生情況的資訊。有關詳細資訊，請參閱How to Configure Cisco Devices for Syslog。

- show platform — show platform命令顯示RP、ESP、SPA和電源的狀態。

- show tech-support — show tech-support命令是許多不同命令的集合，包括show version和show running-config。 當路由器遇到問題時，Cisco技術支援中心(TAC)工程師通常會要求提供此資訊來排查硬體問題。執行過載或重啟之前，您必須收集show tech-supportal，因為這些操作可能導致有關該問題的資訊丟失。
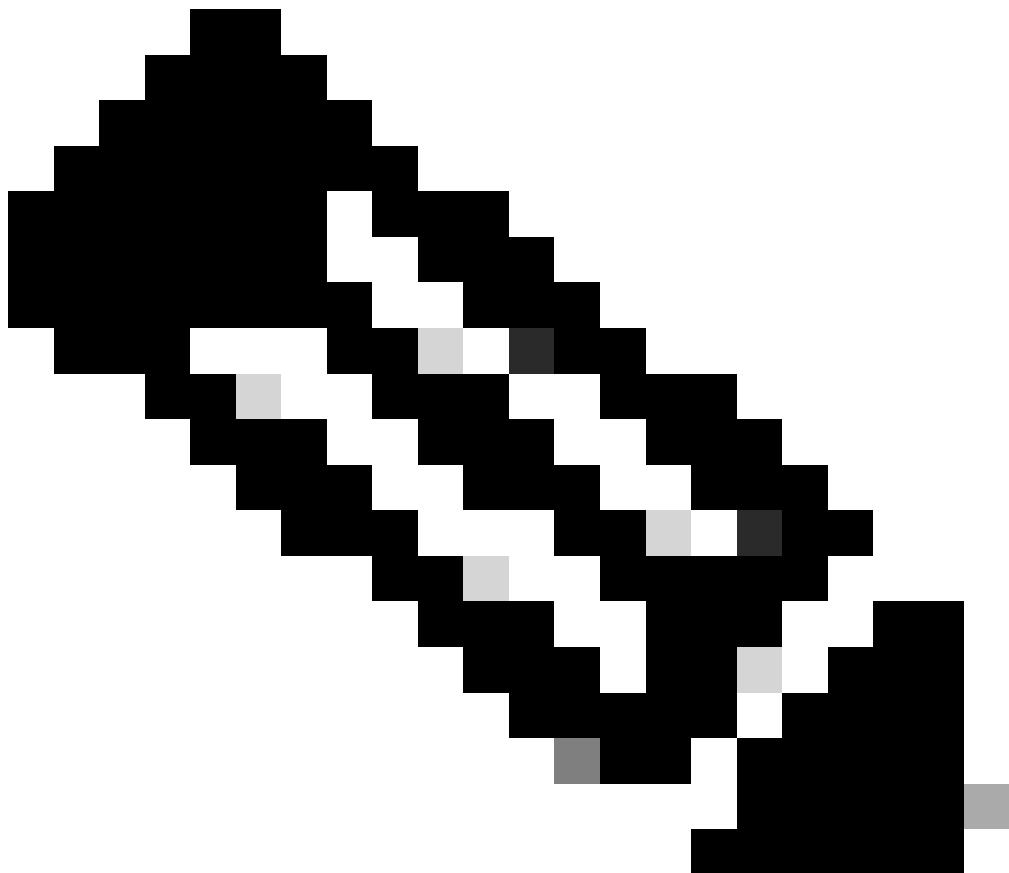
注意: show tech-support命令不包括show platform或show logging命令。

- 重現步驟（如果可用）—重現問題的步驟。如果無法複製，請檢查資料包丟棄時的條件。

- SPA計數器資訊— 請參閱[SPA計數器](#)部分。

- SIP計數器資訊— 請參閱[SIP計數器](#)部分。

- ESP計數器資訊— 請參閱[ESP計數器](#)部分。

- RP計數器資訊— 請參閱[RP計數器](#)部分。

用於收集計數器資訊的命令清單

有許多特定於平台的命令可用於排除資料包轉發故障。如果打開TAC服務請求，請收集這些命令。為了確定計數器的差異，請多次收集這些命令。粗體字元命令對於開始故障排除特別有用。exclude _0_ 選項可有效使計數器排除0。

SPA

<#root>

show interfaces <interface-name>

show interfaces <interface-name> accounting
show interfaces <interface-name> stats

SIP

show platform hardware port <slot/card/port> plim statistics
show platform hardware subslot {slot/card} plim statistics
show platform hardware slot {slot} plim statistics
show platform hardware slot {0|1|2} plim status internal
show platform hardware slot {0|1|2} serdes statistics

ESP

<#root>

show platform hardware slot {f0|f1} serdes statistics
show platform hardware slot {f0|f1} serdes statistics internal
show platform hardware qfp active bqs 0 ipm mapping
show platform hardware qfp active bqs 0 ipm statistics channel all
show platform hardware qfp active bqs 0 opm mapping
show platform hardware qfp active bqs 0 opm statistics channel all

show platform hardware qfp active statistics drop | exclude _0_

show platform hardware qfp active interface

if-name

 <Interface-name> statistics

show platform hardware qfp active infrastructure punt statistics type per-cause | exclude _0_
show platform hardware qfp active infrastructure punt statistics type punt-drop | exclude _0_
show platform hardware qfp active infrastructure punt statistics type inject-drop | exclude _0_
show platform hardware qfp active infrastructure punt statistics type global-drop | exclude _0_
show platform hardware qfp active infrastructure bqs queue output default all
show platform hardware qfp active infrastructure bqs queue output recycle all

!--- The if-name option requires full interface-name

RP

show platform hardware slot {r0|r1} serdes statistics
show platform software infrastructure lsmpi

SPA計數器

對SPA和其他平台使用通用資料包丟棄故障排除。clear counters命令可用於查詢計數器的差異。

要顯示路由器上配置的所有介面的統計資訊，請使用以下命令：

<#root>

Router#

show interfaces TenGigabitEthernet 1/0/0

```
TenGigabitEthernet1/0/0 is up, line protocol is up
  Hardware is SPA-1X10GE-L-V2, address is 0022.5516.2040 (bia 0022.5516.2040)
  Internet address is 192.168.1.1/24
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
      reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 10000Mbps, link type is force-up, media type is 10GBase-LR
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:59, output 00:00:46, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/415441/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     510252 packets input, 763315452 bytes, 0 no buffer
     Received 3 broadcasts (0 IP multicasts)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog, 0 multicast, 0 pause input
     55055 packets output, 62118229 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     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
```

要顯示根據協定的資料包的統計資訊，請使用以下命令：

<#root>

Router#

show interfaces TenGigabitEthernet 1/0/0 accounting

```
TenGigabitEthernet1/0/0
                Protocol    Pkts In    Chars In    Pkts Out    Chars Out
                   Other         15         900       17979      6652533
                      IP     510237   763314552       37076     55465696
                 DEC MOP          0           0        1633       125741
                     ARP         15         900          20         1200
                     CDP          0           0       16326      6525592
```

要顯示已進行進程交換、快速交換或分散式交換的資料包的統計資訊，請使用以下命令：

```
<#root>

Router#

show interfaces TenGigabitEthernet 1/0/0 stats

TenGigabitEthernet1/0/0
         Switching path    Pkts In   Chars In    Pkts Out  Chars Out
              Processor         15        900       17979    6652533
            Route cache          0          0           0          0
       Distributed cache     510252  763315452       55055   62118229
                  Total     510267  763316352       73034   68770762
```

SIP計數器

Cisco ASR 1000系列SIP不參與資料包轉發。它容納系統中的水療中心。SIP為來自SPA的入口資料包提供資料包優先順序，並為等待傳輸到ESP以進行處理的入口資料包提供大型入口突發吸收緩衝區。出口緩衝在流量管理器上進行集中處理，並且在SIP上以出口隊列的形式提供。Cisco ASR 1000系列路由器可以配置入口和出口分類，從而不僅在ESP級別確定流量的優先順序，而且可以在整個系統中確定流量的優先順序。系統中提供緩衝（入口和出口）以及與ESP之間的背壓，以處理超訂用。

圖3 Cisco ASR 1000系列路由器入口隊列
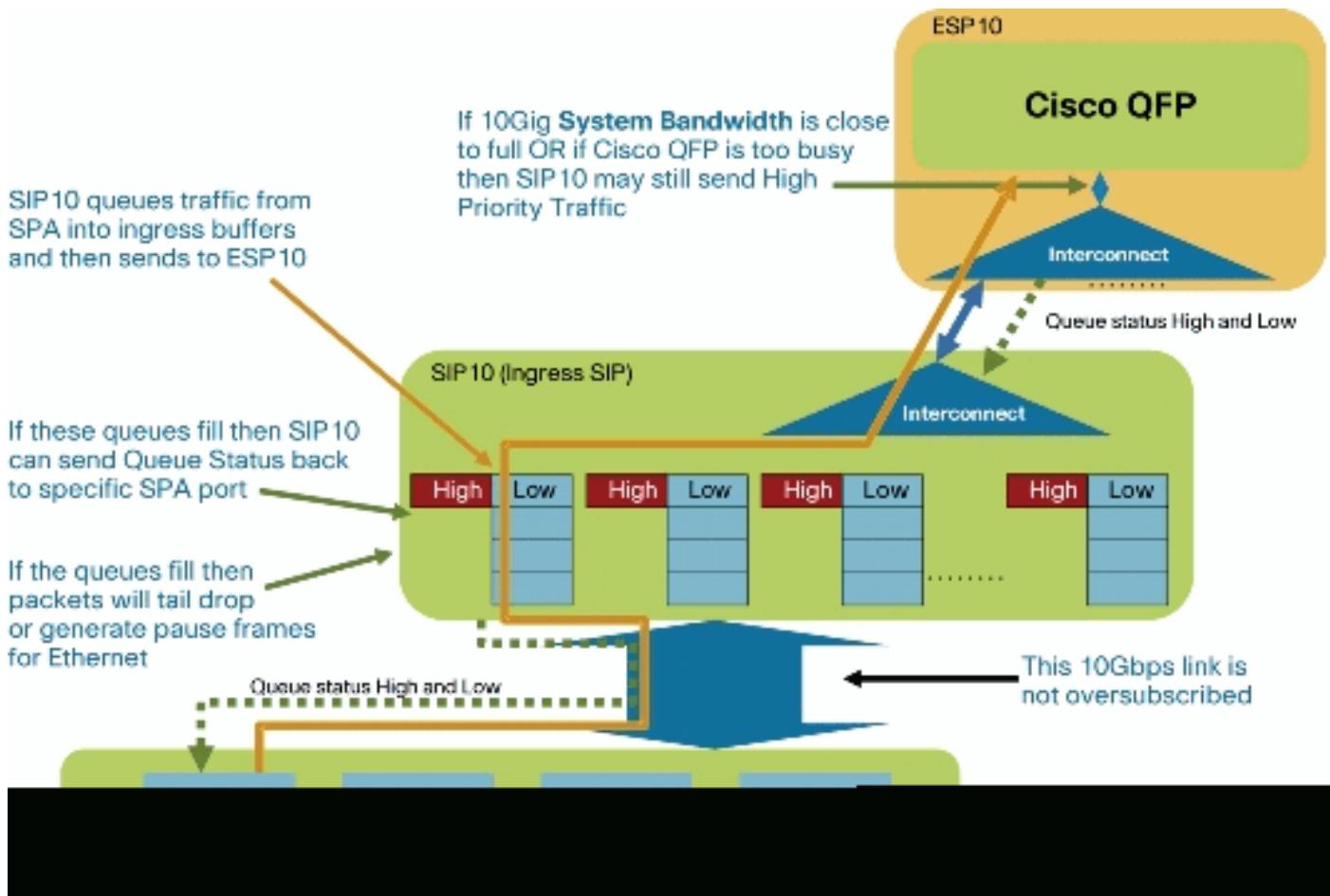
圖4 SIP架構圖
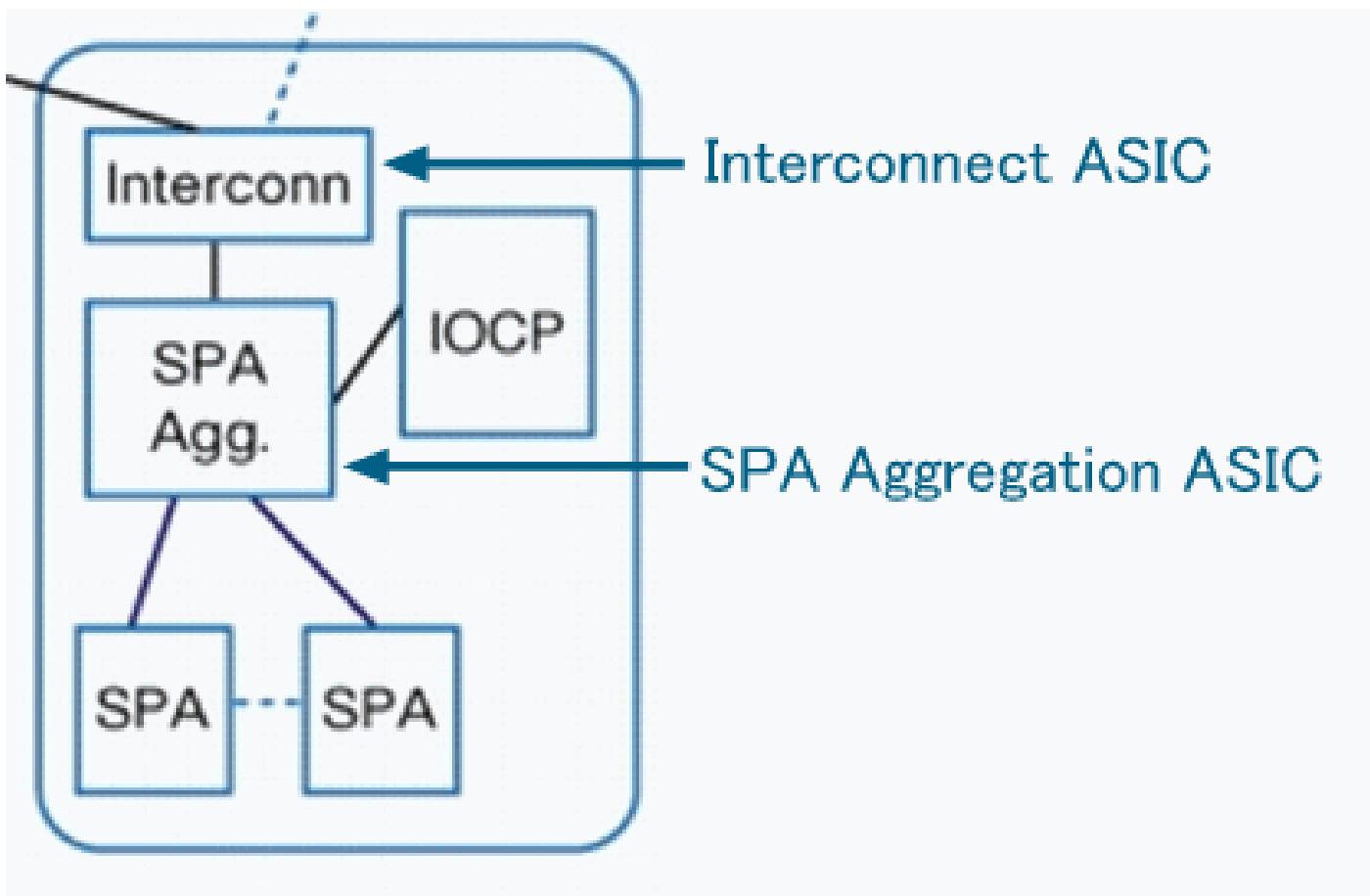
若要顯示SPA彙總ASIC上的每個連線埠佇列捨棄計數器，請使用以下命令：

<#root>

Router#

show platform hardware port 1/0/0 plim statistics

```
Interface 1/0/0
  RX Low Priority
    RX Drop Pkts 0          Bytes 0
    RX Err  Pkts 0          Bytes 0
  TX Low Priority
    TX Drop Pkts 0          Bytes 0
  RX High Priority
    RX Drop Pkts 0          Bytes 0
    RX Err  Pkts 0          Bytes 0
  TX High Priority
    TX Drop Pkts 0          Bytes 0
```

要顯示SPA匯聚ASIC上的每個SPA計數器，請使用此命令：

<#root>

Router#

```
show platform hardware subslot 1/0 plim statistics

1/0, SPA-1XTENGE-XFP-V2, Online
  RX Pkts 510252      Bytes 763315452
  TX Pkts 55078       Bytes 62126783
  RX IPC Pkts 0           Bytes 0
  TX IPC Pkts 0           Bytes 0
```

要顯示SPA聚合ASIC上的所有SPA計數器，請使用以下命令：

<#root>

Router#

show platform hardware slot 1 plim statistics

```
1/0, SPA-1XTENGE-XFP-V2, Online
  RX Pkts 510252      Bytes 763315452
  TX Pkts 55078       Bytes 62126783
  RX IPC Pkts 0           Bytes 0
  TX IPC Pkts 0           Bytes 0

1/1, SPA-5X1GE-V2, Online
  RX Pkts 42          Bytes 2520
  TX Pkts 65352       Bytes 31454689
  RX IPC Pkts 0           Bytes 0
  TX IPC Pkts 0           Bytes 0

1/2, Empty

1/3, Empty
```

要顯示SPA聚合ASIC上的互聯ASIC之間的聚合rx/tx計數器，請使用此命令。Rx計數器表示來自SPA的輸入資料包；Tx計數器表示輸出資料包到SPA。

<#root>

Router#

show platform hardware slot 1 plim status internal

```
FCM Status
  XON/XOFF 0x0000000F00000000
ECC Status
Data Path Config
  MaxBurst1 256, MaxBurst2 128, DataMaxT 32768
  Cal Length RX 0x0002, TX 0x0002
  Repetitions RX 0x0010, TX 0x0010
Data Path Status
  RX in sync, TX in sync
  Spi4 Channel 0, Rx Channel Status Starving, Tx Channel Status Starving
  Spi4 Channel 1, Rx Channel Status Starving, Tx Channel Status Starving
  RX Pkts 510294      Bytes 765359148
  TX Pkts 120430      Bytes 94063192
Hypertransport Status
  RX Pkts 0           Bytes 0
```

```
   TX Pkts 0           Bytes 0
```

要顯示SIP互連ASIC上ESP互連ASIC的rx計數器，請使用以下命令：

<#root>

Router#

show platform hardware slot 1 serdes statistics

```
From Slot F0
  Pkts  High: 0         Low: 120435    Bad: 0        Dropped: 0
  Bytes High: 0         Low: 94065235  Bad: 0        Dropped: 0
  Pkts  Looped: 0        Error: 0
  Bytes Looped 0
  Qstat count: 0         Flow ctrl count: 196099
```

ESP計數器

ESP提供集中轉發引擎，負責大多數資料平面處理任務。透過Cisco ASR 1000系列路由器的所有網路流量都透過ESP。

圖5 ESP架構圖

圖6 Cisco QuantumFlow處理器基本架構

有關詳細資訊，請參閱Cisco 1000系列匯聚多業務路由器。

要顯示RP、ESP互連ASIC上的SIP互連ASIC的rx計數器，請使用以下命令：

<#root>

Router#

show platform hardware slot F0 serdes statistics

```
From Slot R0
  Pkts  High: 70328      Low: 13223      Bad: 0          Dropped: 0
  Bytes High: 31049950   Low: 10062155   Bad: 0          Dropped: 0
  Pkts  Looped: 0         Error: 0
  Bytes Looped 0
  Qstat count: 0          Flow ctrl count: 311097
From Slot 2
```
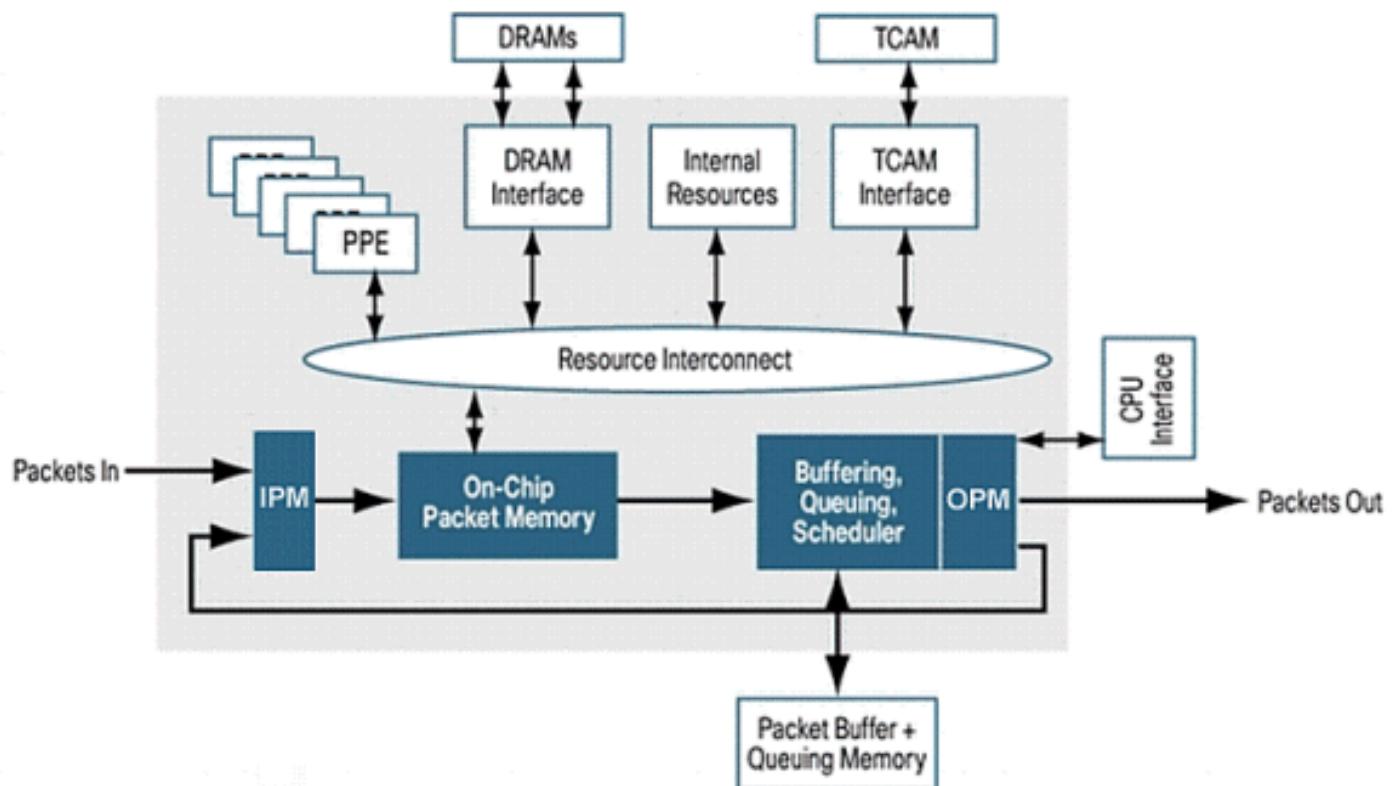
<snip>

要顯示內部鏈路資料包計數器和錯誤計數器，請使用以下命令：

<#root>

Router#

show platform hardware slot F0 serdes statistics internal

```
Network-Processor Link:
  Local TX in sync, Local RX in sync
  From Network-Processor   Packets:      421655  Bytes:    645807536
  To Network-Processor     Packets:       83551  Bytes:     41112105

RP/ESP Link:
  Local TX in sync, Local RX in sync
  Remote TX in sync, Remote RX in sync
  To RP/ESP                Packets:      421650  Bytes:    645807296
    Drops                  Packets:           0  Bytes:            0
  From RP/ESP              Packets:       83551  Bytes:     41112105
    Drops                  Packets:           0  Bytes:            0
```

<snip>

若要檢查輸入封包模組(IPM)通道和其他元件的對應，請使用以下命令：

<#root>

Router#

show platform hardware qfp active bqs 0 ipm mapping

```
BQS IPM Channel Mapping

Chan   Name                 Interface     Port    CFIFO

 1     CC3 Low              SPI1          0       1
 2     CC3 Hi               SPI1          1       0
 3     CC2 Low              SPI1          2       1
```

<snip>

若要顯示輸入封包模組(IPM)中每個通道的統計資訊，請使用以下命令：

<#root>

Router#

show platform hardware qfp active bqs 0 ipm statistics channel all

```
BQS IPM Channel Statistics

Chan   GoodPkts   GoodBytes     BadPkts    BadBytes

 1 - 0000000000 0000000000 0000000000 0000000000
 2 - 0000000000 0000000000 0000000000 0000000000
 3 - 0000000000 0000000000 0000000000 0000000000
```

<snip>

若要檢查輸出封包模組(OPM)通道和其他元件的對應，請使用以下命令：

<#root>

Router#

show platform hardware qfp active bqs 0 opm mapping

BQS OPM Channel Mapping

```
Chan     Name                      Interface      LogicalChannel

0        CC3 Low                   SPI1           0
1        CC3 Hi                    SPI1           1
2        CC2 Low                   SPI1           2
```

<snip>

若要顯示輸出封包模組(OPM)中每個通道的統計資訊，請使用以下命令：

<#root>

Router#

show platform hardware qfp active bqs 0 opm statistics channel all

BQS OPM Channel Statistics

```
Chan   GoodPkts  GoodBytes    BadPkts    BadBytes

 0 - 0000000000 0000000000 0000000000 0000000000
 1 - 0000000000 0000000000 0000000000 0000000000
 2 - 0000000000 0000000000 0000000000 0000000000
```

<snip>

要顯示資料包處理器引擎(PPE)中所有介面的丟棄統計資訊，請使用此命令。
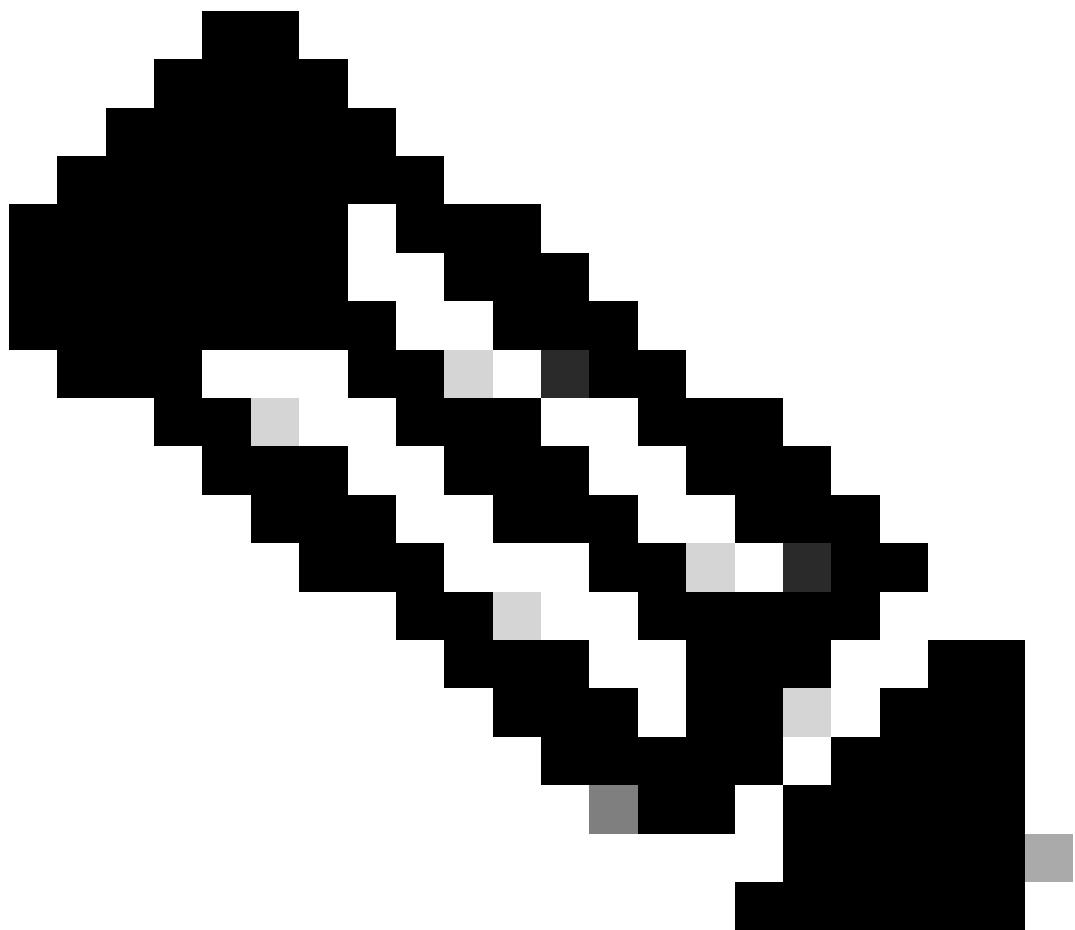
注意：此命令在用於排除故障時非常有用。

<#root>

Router#

show platform hardware qfp active statistics drop

```
------------------------------------------------------------------
Global Drop Stats                        Octets         Packets
------------------------------------------------------------------
  AttnInvalidSpid                             0               0
  BadDistFifo                                 0               0
  BadIpChecksum                               0               0
```

<snip>

若要清除封包處理器引擎(PPE)中所有介面的捨棄統計資料，請使用此命令。此命令在顯示計數器

後會被清除。

<#root>

Router#

show platform hardware qfp active statistics drop clear

```
-----------------------------------------------------------------
Global Drop Stats                         Octets        Packets
-----------------------------------------------------------------
  AttnInvalidSpid                              0              0
  BadDistFifo                                  0              0
  BadIpChecksum                                0              0
```

<snip>

若要顯示封包處理器引擎(PPE)中每個介面的捨棄統計資料，請使用此命令。此計數器每10秒清除一次。

<#root>

Router#

show platform hardware qfp active interface if-name TenGigabitEthernet1/0/0 statistics

```
Platform Handle 6
-----------------------------------------------------------------
Receive Stats                             Octets        Packets
-----------------------------------------------------------------
  Ipv4                                         0              0
  Ipv6                                         0              0
```

<snip>

!--- The if-name option requires full interface-name

要檢查被傳送到RP的資料包的原因，請使用以下命令：

<#root>

Router#

show platform hardware qfp active infrastructure punt statistics type per-cause

```
Global Per Cause Statistics

  Number of punt causes =    46
```

```
Per Punt Cause Statistics
                                    Packets      Packets
   Counter ID  Punt Cause Name      Received     Transmitted
   --------------------------------------------------------------------
   00          RESERVED             0            0
   01          MPLS_FRAG_REQUIRE    0            0
   02          IPV4_OPTIONS         0            0
```

<snip>

要顯示傳送資料包（ESP到RP）的丟棄統計資訊，請使用以下命令：

<#root>

Router#

show platform hardware qfp active infrastructure punt statistics type punt-drop

```
Punt Drop Statistics


   Drop Counter ID   0    Drop Counter Name PUNT_NOT_ENABLED_BY_DATA_PLANE

   Counter ID  Punt Cause Name              Packets
   -----------------------------------------------------------
   00          RESERVED                     0
   01          MPLS_FRAG_REQUIRE            0
   02          IPV4_OPTIONS                 0
```

<snip>

要顯示插入資料包（RP到ESP）的丟棄統計資訊，請使用此命令。插入資料包從RP傳送到ESP。其中大部分是由IOSD所產生。它們是L2 keep alive、路由協定、管理協定（如SNMP）等。

<#root>

Router#

show platform hardware qfp active infrastructure punt statistics type inject-drop

```
Inject Drop Statistics


   Drop Counter ID   0    Drop Counter Name INJECT_NOT_ENABLED_BY_DATA_PLANE

   Counter ID  Inject Cause Name            Packets
   -----------------------------------------------------------
   00          RESERVED                     0
   01          L2 control/legacy            0
   02          CPP destination lookup       0
```

<snip>

要顯示全局丟棄資料包的統計資訊，請使用以下命令：

<#root>

Router#

show platform hardware qfp active infrastructure punt statistics type global-drop

```
Global Drop Statistics


  Counter ID  Drop Counter Name                          Packets
  ------------------------------------------------------------------
  00          INVALID_COUNTER_SELECTED                   0
  01          INIT_PUNT_INVALID_PUNT_MODE                0
  02          INIT_PUNT_INVALID_PUNT_CAUSE               0
```

<snip>

要顯示每個介面的緩衝、排隊和排程(BQS)的預設隊列/排程的統計資訊，請使用以下命令：

<#root>

Router#

show platform hardware qfp active infrastructure bqs queue output default all

```
Interface: internal0/0/rp:0, QFP if_h: 1, Num Queues/Schedules: 2
  Queue specifics:
    Index 0 (Queue ID:0x2f, Name: )
      Software Control Info:
        (cache) queue id: 0x0000002f, wred: 0x88b002d2, qlimit (bytes): 6250048
        parent_sid: 0x232, debug_name:
        sw_flags: 0x00000011, sw_state: 0x00000001
        orig_min  : 0                       ,      min: 0
        orig_max  : 0                       ,      max: 0
        share     : 1
      Statistics:
        tail drops (bytes): 77225016        ,          (packets): 51621
        total enqs (bytes): 630623840       ,          (packets): 421540
        queue_depth (bytes): 0
```

<snip>

要顯示每個介面的循環隊列/緩衝、隊列和排程(BQS)的排程統計資訊，請使用此命令。回收佇列會保留QFP多次處理的封包。例如，分段資料包和多播資料包放在這裡。

<#root>

Router#

```
show platform hardware qfp active infrastructure bqs queue output recycle all

Recycle Queue Object ID:0x3  Name:MulticastLeafHigh   (Parent Object ID: 0x2)
  plevel: 1, bandwidth: 0                     , rate_type: 0
  queue_mode: 0, queue_limit: 0, num_queues: 36
  Queue specifics:
    Index 0 (Queue ID:0x2, Name: MulticastLeafHigh)
      Software Control Info:
        (cache) queue id: 0x00000002, wred: 0x88b00000, qlimit (packets): 2048
        parent_sid: 0x208, debug_name: MulticastLeafHigh
        sw_flags: 0x00010001, sw_state: 0x00000001
        orig_min  : 0                     ,      min: 0
        orig_max  : 0                     ,      max: 0
        share     : 0
      Statistics:
        tail drops (bytes): 0               ,           (packets): 0
        total enqs (bytes): 0               ,           (packets): 0
        queue_depth (packets): 0
```

<snip>

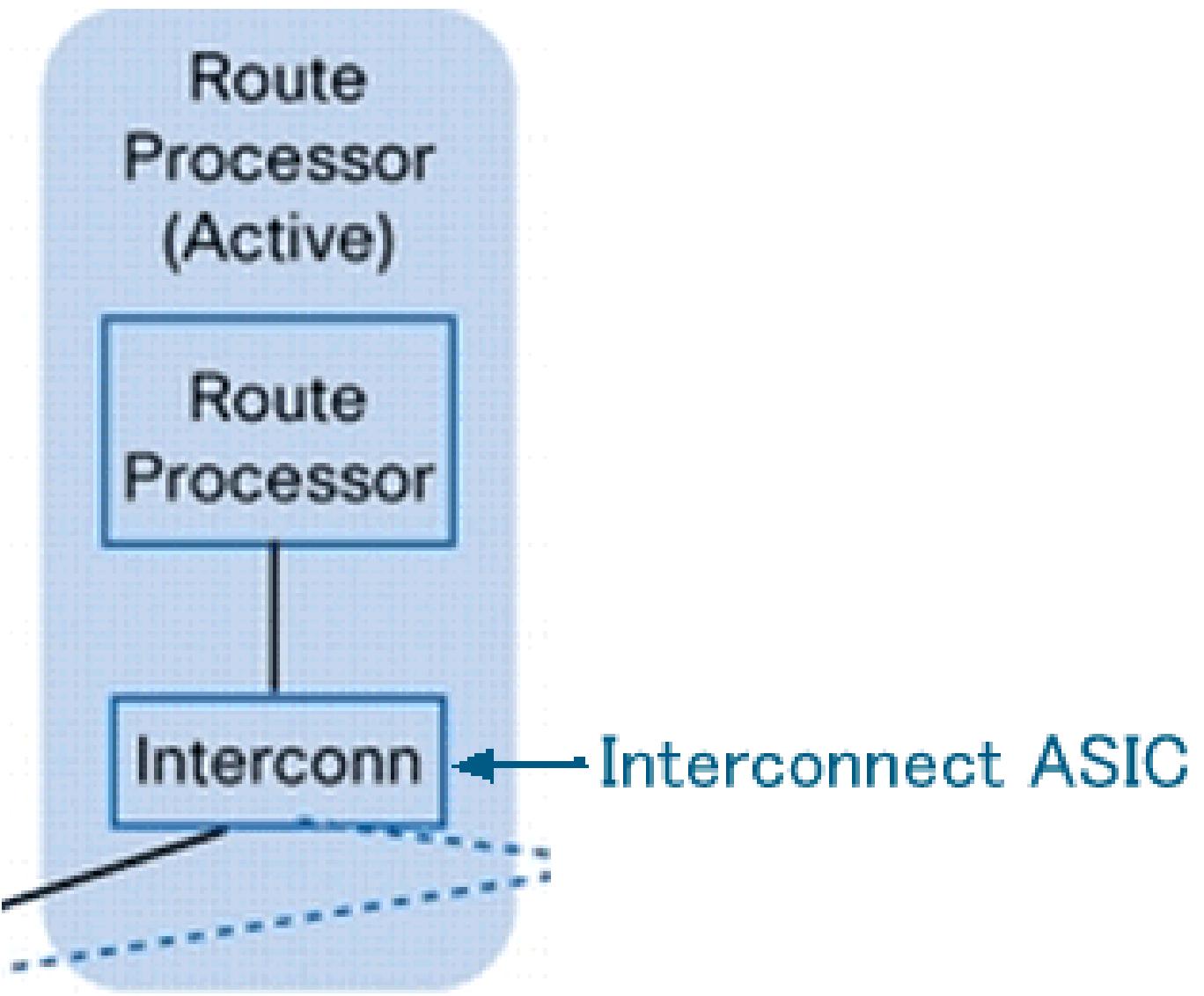## RP計數器

RP處理以下型別的流量：

- 透過路由處理器上的千兆乙太網管理埠的管理流量。

- 傳送系統中的流量（透過ESP），其中包括在任何SPA上接收的所有控制平面流量。

- 舊的協定流量、DECnet、網際網路分組交換(IPX)等。

圖7 RP架構圖

Interconnect ASIC

這是Cisco ASR 1000系列路由器的傳送/插入路徑：

<#root>

QFP

<==>

RP Kernel

<==>

LSMPI

<==>

Fast-Path Thread

<==>

Cisco IOS Thread

圖8 Linux共用記憶體傳送介面(LSMPI)的位置
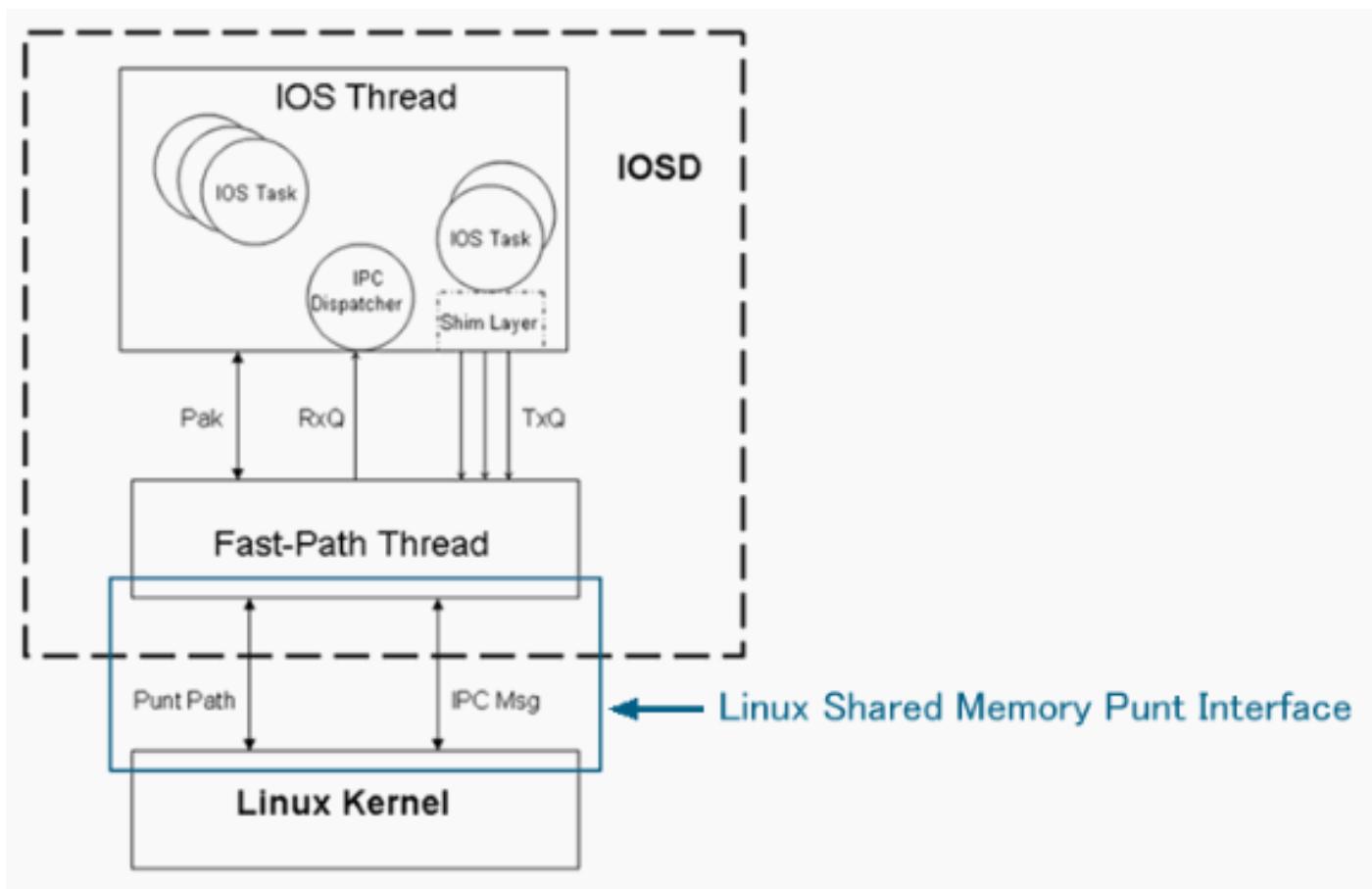
要顯示RP互連ASIC上ESP互連ASIC的rx計數器，請使用以下命令：

<#root>

Router#

show platform hardware slot r0 serdes statistics

```
From Slot F0
  Pkts  High: 57          Low: 421540    Bad: 0          Dropped: 0
  Bytes High: 5472        Low: 645799280 Bad: 0          Dropped: 0
  Pkts  Looped: 0          Error: 0
  Bytes Looped 0
  Qstat count: 0           Flow ctrl count: 196207
```

若要顯示路由器上的Linux共用記憶體傳送介面(LSMPI)統計資料，請使用以下命令。LSMPI提供了一種在網路和IOSd之間實現資料包零複製傳輸的方法，以實現高效能。為此，請在Linux核心虛擬記憶體中在LSMPI模組和IOSd之間共用（記憶體對映）區域。

<#root>

Router#

show platform software infrastructure lsmpi

```
LSMPI interface internal stats:
enabled=0, disabled=0, throttled=0, unthrottled=0, state is ready
Input Buffers = 8772684
Output Buffers = 206519
rxdone count = 8772684
txdone count = 206515
```

<snip>

```
ASR1000-RP Punt packet causes:
      421540 IPV4_OPTIONS packets
     7085686 L2 control/legacy packets
          57 ARP packets
         774 FOR_US packets
Packet histogram(500 bytes/bin), avg size in 172, out 471:
 Pak-Size       In-Count        Out-Count
      0+:        7086514            95568
    500+:              1                0
   1000+:              2                0
   1500+:         421540             6099


Lsmpi0 is up, line protocol is up
  Hardware is LSMPI
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not set
  Unknown, Unknown, media type is unknown media type
```

<snip>

```
    7508057 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 watchdog, 0 multicast, 0 pause input
    101667 packets output, 47950080 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

個案研究

SPA上的資料包丟棄

錯誤封包

如果封包發生錯誤,這些封包會在SPA上捨棄。這是常見的行為,不僅在Cisco ASR 1000系列路由器上,而且在所有平台上都是如此。

<#root>

Router#

show interfaces TenGigabitEthernet 1/0/0

TenGigabitEthernet1/0/0 is up, line protocol is up

```
Hardware is SPA-1X10GE-L-V2, address is 0022.5516.2040 (bia 0022.5516.2040)
Internet address is 192.168.1.1/24
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
    reliability 250/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not supported
Full Duplex, 10000Mbps, link type is force-up, media type is 10GBase-LR
output flow-control is on, input flow-control is on
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:45:13, output 00:00:08, output hang never
Last clearing of "show interface" counters 00:00:26
Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runts, 0 giants, 0 throttles
```

419050 input errors, 419050 CRC

```
, 0 frame, 0 overrun, 0 ignored
    0 watchdog, 0 multicast, 0 pause input
    1 packets output, 402 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    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
```

SIP上的資料包丟棄

QFP的高利用率

在QFP高使用率的情況下，資料包在SIP的每個介面隊列中由於QFP的反壓而被丟棄。在這種情況下，也會從介面傳送暫停訊框。

<#root>

Router#

show platform hardware port 1/0/0 plim statistics

```
Interface 1/0/0
  RX Low Priority
```

RX Drop Pkts 21344279   Bytes 1515446578

```
    RX Err  Pkts 0          Bytes 0
  TX Low Priority
    TX Drop Pkts 0          Bytes 0
  RX High Priority
    RX Drop Pkts 0          Bytes 0
    RX Err  Pkts 0          Bytes 0
  TX High Priority
    TX Drop Pkts 0          Bytes 0
```

ESP上的資料包丟棄

超額訂閱

如果傳送的資料包超過了介面的線速，則資料包會在輸出介面被丟棄。

```
<#root>

Router#

show interfaces GigabitEthernet 1/1/0

GigabitEthernet1/1/0 is up, line protocol is up
  Hardware is SPA-5X1GE-V2, address is 0021.55dc.3f50 (bia 0021.55dc.3f50)
  Internet address is 192.168.2.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 35/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 1000Mbps, link type is auto, media type is SX
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 02:24:23, output 00:00:55, output hang never
  Last clearing of "show interface" counters 00:01:04
  Input queue: 0/375/0/0 (size/max/drops/flushes);

Total output drops: 48783

...
```

在QFP上，可以將這些丟棄檢查為Taildrop。

```
<#root>

Router#

show platform hardware qfp active statistics drop | exclude _0_

------------------------------------------------------------------
Global Drop Stats                         Octets          Packets
------------------------------------------------------------------


TailDrop

                        72374984

483790
```

依封包片段超載

如果封包由於MTU大小而分段，即使輸入介面小於線速，也可能會在輸出介面超過線速。在這種情

況下，封包會在輸出介面遭到捨棄。

<#root>

Router#

show interfaces gigabitEthernet 1/1/0

```
GigabitEthernet1/1/0 is up, line protocol is up
  Hardware is SPA-5X1GE-V2, address is 0022.5516.2050 (bia 0022.5516.2050)
  Internet address is 192.168.2.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 25/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 1000Mbps, link type is auto, media type is SX
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:36:52, output 00:00:12, output hang never
  Last clearing of "show interface" counters 00:00:55
  Input queue: 0/375/0/0 (size/max/drops/flushes);
```

Total output drops: 272828

```
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 99998000 bits/sec, 14290 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts (0 IP multicasts)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog, 0 multicast, 0 pause input
     4531543 packets output, 4009748196 bytes, 0 underruns
```

在QFP上，可以將這些丟棄檢查為Taildrop。

<#root>

Router#

show platform hardware qfp active statistics drop | exclude _0_

```
----------------------------------------------------------------
Global Drop Stats                        Octets        Packets
----------------------------------------------------------------
```

TailDrop

                         109431162

272769

分段資料包的效能限制

在QFP中，全域封包記憶體(GPM)用於重組分段封包。如果在重組大量分段資料包時耗盡GPM，這些計數器將顯示資料包丟棄的數量。在許多情況下，這是效能限制。

<#root>

Router#

show platform hardware qfp active statistics drop | ex _0_

```
-------------------------------------------------------------------
Global Drop Stats                           Octets          Packets
-------------------------------------------------------------------
```

ReassNoFragInfo

```
              39280654854
```

57344096

ReassTimeout

```
                    124672
```

128

轉發到Null0介面

發往Null0介面的資料包在ESP上被丟棄，而不會被傳送到RP。在這種情況下，可能無法使用傳統命令(show interfaces null0)檢查計數器。檢查ESP計數器，以瞭解資料包丟棄的數量。如果同時使用「clear」和「exclude _0_」選項，則只能檢查新的丟棄資料包。

<#root>

Router#

show platform hardware qfp active statistics drop clear | ex _0_

```
-------------------------------------------------------------------
Global Drop Stats                           Octets          Packets
-------------------------------------------------------------------
```

Ipv4Null0

```
                    11286
```

99

具有HA不支援功能的RP切換

在RP切換的情況下，這些資料包將被丟棄，直到新的活動RP重新程式設計QFP為止：

- 如果新的活動RP在切換之前未與舊的活動RP同步，則會丟棄所有資料包。

- 封包是由高可用性(HA)非支援功能所處理。

<#root>

Router#

show platform hardware qfp active statistics drop | ex _0_

```
-----------------------------------------------------------------
Global Drop Stats                        Octets         Packets
-----------------------------------------------------------------
```

Ipv4NoAdj

                              6993660

116561

Ipv4NoRoute

                            338660188

5644337

傳送封包

在Cisco ASR 1000系列路由器上，無法由ESP處理的資料包將被傳送到RP。如果傳送的資料包過多，QFP丟棄統計資訊的TailDrop將增加。

<#root>

Router#

show platform hardware qfp active statistics drop | ex _0_

```
-----------------------------------------------------------------
Global Drop Stats                        Octets         Packets
-----------------------------------------------------------------
```

TailDrop

                              26257792

17552

檢查Buffering，Queuing，and Scheduling (BQS)隊列輸出計數器以指定丟棄的介面。「internal0/0/rp：0」顯示從ESP傳送到RP的介面。

<#root>

Router#

show platform hardware qfp active infrastructure bqs queue output default all

Interface:

internal0/0/rp:0

, QFP if_h: 1, Num Queues/Schedules: 2
  Queue specifics:
    Index 0 (Queue ID:0x2f, Name:)
      Software Control Info:
        (cache) queue id: 0x0000002f, wred: 0x88b002d2, qlimit (bytes): 6250048
        parent_sid: 0x232, debug_name:
        sw_flags: 0x00000011, sw_state: 0x00000001
        orig_min : 0   ,   min: 0
        orig_max : 0   ,   max: 0
        share   : 1
      Statistics:

tail drops (bytes): 26257792   ,   (packets): 17552

        total enqs (bytes): 4433777480   ,   (packets): 2963755
        queue_depth (bytes): 0
  Queue specifics:
...

在這種情況下，輸入佇列捨棄會在輸入介面上計數。

<#root>

Router#

show interfaces TenGigabitEthernet 1/0/0

TenGigabitEthernet1/0/0 is up, line protocol is up
  Hardware is SPA-1X10GE-L-V2, address is 0022.5516.2040 (bia 0022.5516.2040)
  Internet address is 192.168.1.1/24
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 10000Mbps, link type is force-up, media type is 10GBase-LR
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:15:10, output 00:00:30, output hang never
  Last clearing of "show interface" counters 00:14:28

Input queue

: 0/375/

2438309

/0 (size/max/

drops

/flushes); Total output drops: 0

```
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 70886000 bits/sec, 5915 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
   2981307 packets input, 4460035272 bytes, 0 no buffer
   Received 0 broadcasts (0 IP multicasts)
   0 runts, 0 giants, 0 throttles
   0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
   0 watchdog, 0 multicast, 0 pause input
   15 packets output, 5705 bytes, 0 underruns
   0 output errors, 0 collisions, 0 interface resets
   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
```

此指令可以顯示點選原因：

<#root>

Router#

show platform hardware qfp active infrastructure punt statistics type per-cause

Global Per Cause Statistics

  Number of punt causes =   46

  Per Punt Cause Statistics

```
                                      Packets        Packets
  Counter ID  Punt Cause Name         Received       Transmitted
  -------------------------------------------------------------------
  00        RESERVED                  0              0
  01        MPLS_FRAG_REQUIRE         0              0

  02        IPV4_OPTIONS              2981307        2963755

  ...
```

您還可以檢查**show ip traffic** 命令。

    <#root>

Router#

show ip traffic

```
IP statistics:
  Rcvd: 2981307 total, 15 local destination
        0 format errors, 0 checksum errors, 0 bad hop count
        0 unknown protocol, 0 not a gateway
        0 security failures, 0 bad options,
```

2981307 with options

```
  Opts:  2981307 end, 0 nop, 0 basic security, 0 loose source route
         0 timestamp, 0 extended security, 0 record route
         0 stream ID, 2981307 strict source route, 0 alert, 0 cipso, 0 ump
         0 other, 0 ignored
  Frags: 0 reassembled, 0 timeouts, 0 couldn't reassemble
         0 fragmented, 0 fragments, 0 couldn't fragment
  Bcast: 0 received, 0 sent
  Mcast: 0 received, 0 sent
  Sent:  23 generated, 525450 forwarded
  Drop:  0 encapsulation failed, 0 unresolved, 0 no adjacency
         0 no route, 0 unicast RPF, 0 forced drop, 0 unsupported-addr
         0 options denied, 0 source IP address zero
...
```

Punt全局監察器設定的Punt限制

如果太多傳送資料包發往路由器本身，則Taildrop會透過QFP丟棄計數器與PuntGlobalPolicerDrops進行計數。Punt全局監察器可保護RP免受過載的影響。這些丟棄不會在傳輸資料包中看到，而在FOR_US資料包中看到。

```
   <#root>
```

```
Router#
```

show platform hardware qfp active statistics drop | ex _0_

```
----------------------------------------------------------------
Global Drop Stats                        Octets       Packets
----------------------------------------------------------------
```

PuntGlobalPolicerDrops   **155856**   **102**

  TailDrop   4141792688   2768579
...

此命令可瞭解傳送的原因：

   <#root>

Router#

show platform hardware qfp active infrastructure punt statistics type per-cause

Global Per Cause Statistics

  Number of punt causes =   46

  Per Punt Cause Statistics
                                              Packets   Packets
  Counter ID Punt Cause Name   Received   Transmitted
  ----
  00   RESERVED   0   0
  01   MPLS_FRAG_REQUIRE   0   0
  02   IPV4_OPTIONS   0   0
  03   L2 control/legacy   0   0
  04   PPP_CONTROL   0   0
  05   CLNS_CONTROL   0   0
  06   HDLC_KEEPALIVE   0   0
  07   ARP   3   3
  08   REVERSE_ARP   0   0
  09   LMI_CONTROL   0   0
  10   incomplete adjacency punt   0   0

11   **FOR_US**   **5197865**   **2428755**

RP上的資料包丟棄

LSMPI上的資料包錯誤

在Cisco ASR 1000系列路由器上，資料包透過Linux共用記憶體傳送介面(LSMPI)從ESP傳送到RP。LSMPI是透過Linux共用內存在RP上的IOSd和Linux核心之間傳輸資料包的虛擬介面。從ESP傳送到RP的資料包由RP的Linux核心接收。Linux核心透過LSMPI將這些資料包傳送到IOSD進程。如果在LSMPI上看到錯誤計數器，則這是軟體缺陷。建立TAC案例。

```
<#root>

Router#
```

show platform software infrastructure lsmpi

<snip>

```
  Lsmpi0 is up, line protocol is up
  Hardware is LSMPI
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not set
  Unknown, Unknown, media type is unknown media type
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/1500/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     15643 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts (0 IP multicasts)
     0 runts, 0 giants, 0 throttles
```

1 input errors

```
, 0 CRC,
```

3 frame

```
, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast, 0 pause input
     295 packets output, 120491 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

相關資訊

- [排除Cisco ASR 1000系列聚合服務路由器崩潰故障](#)

- [Cisco ASR 1000系列匯聚多業務路由器-產品支援](#)

- [思科技術支援與下載](#)