驗證Catalyst 9000系列交換器上的SPAN和ERSPAN

目錄

簡介

本檔案介紹如何在Catalyst 9000系列交換器上驗證SPAN和ERSPAN。

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：

- Catalyst 9300(Cisco IOS®-XE 17.3.5)
- Catalyst 9500(Cisco IOS®-XE 17.3.5)

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。

相關產品

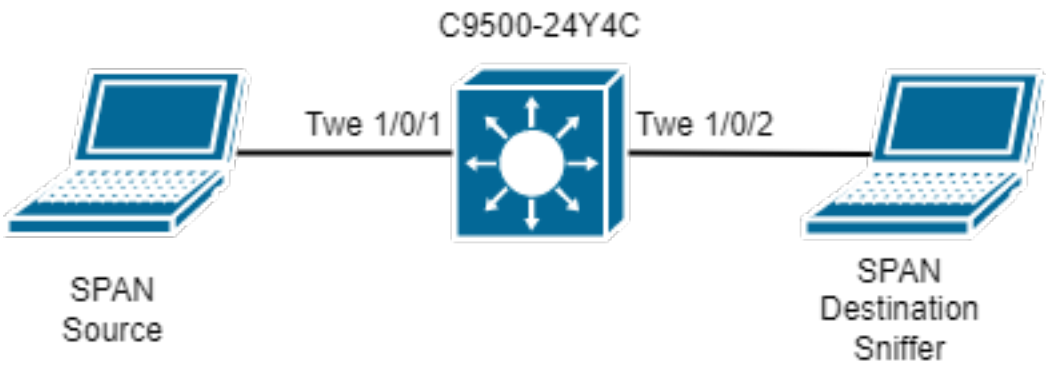
本文件也適用於以下硬體和軟體版本：

- Catalyst 9200

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

驗證SPAN

網路圖表



SPAN設定

```
monitor session 1 source interface Twe1/0/1
monitor session 1 destination interface Twe1/0/2
```

驗證SPAN軟體設定。 請注意來源SPAN和目的地SPAN介面以及SPAN擷取的方向。

```
C9500-SPAN#show monitor session all
Session 1
---------
Type                   : Local Session
Source Ports           :
    Both               : Twe1/0/1
Destination Ports      : Twe1/0/2
    Encapsulation      : Native
          Ingress      : Disabled
```

驗證SPAN硬體專案。使用每個SPAN設定唯一的FED作業階段ID。最多可同時配置8個FED會話（從FED會話0到7）。

```
C9500-SPAN# show platform software monitor session 1
Span Session 1 (FED Session 0):
  Type:      Local SPAN
  Prev type: Local SPAN
  Ingress Src Ports: Twe1/0/1    <-- Hardware entry for source interface.
  Egress Src Ports:  Twe1/0/1    <-- Hardware entry for source interface.
  Ingress Local Src Ports: (null)
  Egress Local Src Ports: (null)
  Destination Ports:  Twe1/0/2   <-- Hardware entry for destination interface.
  Ingress Src Vlans:
  Egress Src Vlans:
  Ingress Up Src Vlans: (null)
  Egress Up Src Vlans:  (null)
  Src Trunk filter Vlans:
```

```
  RSPAN dst vlan: 0
  RSPAN src vlan: 0
  RSPAN src vlan sav: 0
  Dest port encap = 0x0000
  Dest port ingress encap = 0xFFFFFFFFFFFFFFFF
  Dest port ingress vlan = 0x0
  SrcSess: 1  DstSess: 0 DstPortCfgd: 1  RspnDstCfg: 0  RspnSrcVld: 0
  DstCliCfg: 0  DstPrtInit: 1  PsLclCfgd: 0
  Flags: 0x00000031 PSPAN
  Remote dest port: 0   Dest port group: 0
  FSPAN disabled
FSPAN not notified
```

收集已設定來源和目的地SPAN連線埠的ASIC、核心和連線埠號碼。需要輸入連線埠號碼，以確認來源SPAN介面是否已正確程式設計，以及SPAN是否指向正確的目的地SPAN介面。

> **提示：**使用正確的命名法獨立裝置**show platform software/hardware fed active**或stack device **show platform software/hardware fed switch <number>**。

```
C9500-SPAN# show platform software fed active ifm mappings
Interface                IF_ID    Inst Asic Core Port SubPort Mac  Cntx LPN  GPN  Type Active
TwentyFiveGigE1/0/1      0x8        1   0   1    20     0      16   4    1    101  NIF  Y
TwentyFiveGigE1/0/2      0x9        1   0   1    21     0      17   5    2    102  NIF  Y
```

FilePortLeSpanBitMapTable多普勒暫存器用於定義埠是否受輸入(RX)方向的SPAN約束。要確認已配置的源SPAN埠（ASIC埠20）已分配到正確的**FED會話**（會話0）：

```
C9500-SPAN# show platform hardware fed active fwd-asic register read register-name
IlePortLeSpanBitMapTable-20 asic 0 core 1
For asic 0 core 1

Module 0 - IlePortLeSpanBitMapTable[0][20]

ssbm                     : 0x1     <-- Convert from Hexadecimal to Binary: 0b00000001. Bit 0 is
set.
```

SPAN作業階段點陣圖是8位元暫存器。每個位對應一個FED作業階段：最低有效位對應於FED作業階段0，最高有效位對應於FED作業階段7。因此，如前所述，支援的SPAN作業階段最大數量為8。

如果介面設定為多個SPAN作業階段的SPAN來源連線埠，則所有FED作業階段都必須出現在SSBM註冊器中。例如，值為0x5(0b00000101)的SSBM表示介面是FED作業階段0和FED作業階段2的SPAN來源。

類似地，Doppler暫存器**ElePortLeSpanBitMapTable暫存器**確定埠在輸出(TX)方向上是否受SPAN支配。分析與FilePortLeSpanBitMapTable暫存器相同。要確認已配置的源SPAN埠（ASIC埠20）已分配到正確的**FED會話**（會話0）：

```
C9500-SPAN# show platform hardware fed active fwd-asic register read register-name
ElePortLeSpanBitMapTable-20 asic 0 core 1
For asic 0 core 1

Module 0 - ElePortLeSpanBitMapTable[0][20]

ssbm                     : 0x1
```

這確認來源SPAN介面已對應到RX和TX方向的正確FED作業階段。

使用**FED作業階段ID**，我們可以在AqmRepSpanPortMap多普勒登錄檔中找到SPAN的目**的地連**接

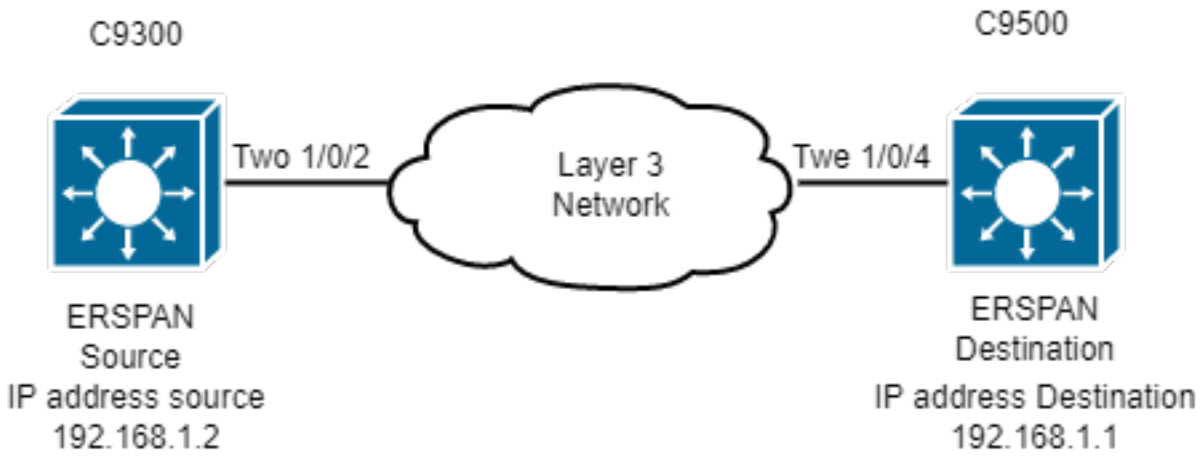
埠。要確認FED會話0指向正確的SPAN目的地埠（ASIC埠21）：

```
C9500-SPAN# show platform hardware fed active fwd-asic register read register-name
AqmRepSpanPortMap-0 asic 0 core 1
For asic 0 core 1

Module 0 - AqmRepSpanPortMap[0][0]

cpuQueueNum               : 0x0
cpuSpanValid              : 0x0
indirectApPortMap         : 0x0
portMap0                  : 0x200000     <-- Convert from Hexadecimal to Binary:
0b00100000000000000000000. Bit 21 is set.
rcpPortMap                : 0x0
spanCtiLo                 : 0x0
```

這確認必須顯示使用SPAN擷取的封包已從介面Tw1/0/2（ASIC連線埠21）複製。 如果配置了多個SPAN目標埠，這些埠將顯示在**AqmRepSpanPortMap註冊器**中。

驗證ERSPAN

網路圖表



附註：Catalyst C9200不支援ERSPAN。

附註：需要DNA優勢許可證。

ERSPAN設定

```
### Source ESRPAN Device ###

C9300-ERSPAN# show run | section monitor
monitor session 1 type erspan-source
 source vlan 10
 destination
  erspan-id 3                    <-- ERSPAN id must be identical on source and destination.
  ip address 192.168.1.1         <-- GRE tunnel destination IP (IP addr configured on ERSPAN
destination switch).
```

```
  origin ip address 192.168.1.2   <-- GRE tunnel source IP (IP addr configured on ERSPAN source
switch).

C9300-ERSPAN# show ip interface brief | exclude unassigned
Interface              IP-Address      OK? Method Status                Protocol
<snip>
Loopback0              192.168.1.2     YES NVRAM  up                    up

### Destination ERSPAN Device ###

C9500-ERSPAN# show run | section monitor
monitor session 1 type erspan-destination
destination interface Twe1/0/3
source
erspan-id 3 <-- ERSPAN id must be identical on source and destination.
ip address 192.168.1.1  <-- GRE tunnel destination IP (IP addr configured on ERSPAN destination
switch).

C9500-ERSPAN# show ip interface brief | exclude unassigned
Interface IP-Address OK? Method Status Protocol
<snip>
Loopback0 192.168.1.1 YES NVRAM up up
```

源裝置

驗證源IP和目標IP之間的可達性。

```
C9300-ERSPAN#ping 192.168.1.1 source 192.168.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.1.2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

Cisco IOS軟體程式設計

在Cisco IOS軟體中驗證ERSPAN作業階段的專案。

```
C9300-ERSPAN#show monitor session 1
Session 1
---------
Type                   : ERSPAN Source Session
Status                 : Admin Enabled
Source VLANs           :
    Both               : 10
Destination IP Address : 192.168.1.1
Destination ERSPAN ID  : 3
Origin IP Address      : 192.168.1.2
```

SHIM程式設計

驗證軟體傳送到程式硬體(**SHIM對象**)。

```
C9300-ERSPAN#show platform software monitor session 1
Span Session 1 (FED Session 0):
  Type:      ERSPAN Source
  Prev type: Unknown
  Ingress Src Ports:
  Egress Src Ports:
```

```
  Ingress Local Src Ports: (null)
  Egress Local Src Ports: (null)
  Destination Ports:
  Ingress Src Vlans: 10     <-- Replicate Traffic.
  Egress Src Vlans:  10     <-- Replicate Traffic.
  Ingress Up Src Vlans: 10
  Egress Up Src Vlans:  10
  Src Trunk filter Vlans:
  RSPAN dst vlan: 0
  RSPAN src vlan: 0
  RSPAN src vlan sav: 0
  Dest port encap = 0x0000
  Dest port ingress encap = 0x0000
  Dest port ingress vlan = 0x0
  SrcSess: 1  DstPortCfgd: 0  RspnDstCfg: 0  RspnSrcVld: 0    <-- Monitor session number.
  DstCliCfg: 0  DstPrtInit: 0  PsLclCfgd: 0
  Flags: 0x00000002 VSPAN
  Remote dest port: 0   Dest port group: 0
  FSPAN disabled
  FSPAN not notified
  ERSPAN Id    : 3           <-- Value match with the software setting.
  ERSPAN Org Ip: 192.168.1.2  <-- Value match with the software setting.
  ERSPAN Dst Ip: 192.168.1.1  <-- Value match with the software setting.
  ERSPAN Ip Ttl: 255
  ERSPAN State : Enabled
  ERSPAN Tun id: 77
```

轉送管理器路由處理器

驗證軟體將什麼傳送到程式硬體(FMAN RP層)。

```
C9300-ERSPAN#show platform software swspan switch active R0 source
Showing SPAN source table summary info

Sess-id   IF-type   IF-id   Sess-type   Dir
-------------------------------------------------
0         VLAN      10      ERSPAN SRC  Ingress
0         VLAN      10      ERSPAN SRC  Egress


C9300-ERSPAN#show platform software swspan switch active R0 source sess-id 0
Showing SPAN source detail info
Session ID : 0 Intf Type : VLAN Vlan id : 10 <-- Vlan entry
PD Sess ID : 0
Session Type : ERSPAN SRC
Direction : Ingress
Filter Enabled : No
ACL Configured : No
ERSPAN Enable : Yes

Session ID : 0
Intf Type : VLAN
Vlan id : 10    <-- Match with the Vlan/Interface SPAN.
PD Sess ID : 0
Session Type : ERSPAN SRC
Direction : Egress
Filter Enabled : No
ACL Configured : No
ERSPAN Enable : Yes
```

轉發管理器 — 轉發處理器

驗證軟體將什麼傳送到程式硬體(FMAN FP層)。

```
C9300-ERSPAN#show platform software swspan switch active F0 source
Showing SPAN source table summary info

Sess-id   IF-type   IF-id   Sess-type   Dir
-------------------------------------------------
0         VLAN      10      ERSPAN SRC  Ingress
0         VLAN      10      ERSPAN SRC  Egress


C9300-ERSPAN#show platform software swspan switch active F0 source sess-id 0
Showing SPAN source detail info

Session ID : 0
Intf Type : VLAN
Vlan id : 10
PD Sess ID : 0
Session Type : ERSPAN SRC   <-- Source Interface.
Direction : Ingress
Filter Enabled : No
ACL Configured : No
AOM Object id : 519
AOM Object Status : Done
Parent AOM object Id : 30
Parent AOM object Status : Done

Session ID : 0
Intf Type : VLAN
Vlan id : 10
PD Sess ID : 0
Session Type : ERSPAN SRC  <-- Source Interface.
Direction : Egress
Filter Enabled : No
ACL Configured : No
AOM Object id : 520
AOM Object Status : Done
Parent AOM object Id : 30
Parent AOM object Status : Done


C9300-ERSPAN#show platform software swspan switch active F0 counters  <-- Check for any err
counters that increment on PI/PD/HW
Dump Switch SPAN FP operation counters  <-- Operational Counters.

Source SPAN Config Counters

PI: Create 2 (err 0), Modify 0 (err 0), Delete 0 (err 0) <-- PI = platform independent
(Software/IOS).
PD: Create 2 (err 0), Modify 0 (err 0), Delete 0 (err 0) <-- PD = platform dependent
(SHIM/FMAN/FED).
HW: Create 2 (err 0), Modify 0 (err 0), Delete 0 (err 0) <-- HW = hardware (FED/ASIC).

Destination SPAN Config Counters

PI: Create 1 (err 0), Modify 0 (err 0), Delete 0 (err 0)
PD: Create 1 (err 0), Modify 0 (err 0), Delete 0 (err 0)
HW: Create 1 (err 0), Modify 0 (err 0), Delete 0 (err 0)

Filter SPAN Config Counters

PI: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
```

```
PD: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
HW: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
```

轉發引擎驅動程式

驗證對ASIC(FED)進行程式設計的層。

```
C9300-ERSPAN#show platform software fed switch active monitor 0
Session 0
---------
  Session Type         : ERSPAN Source Session
  Source Ports         : RX: None  TX: None
  Destination Ports    : None
  Source VLANs         : VLAN-10
  Destination VLANs    : VLAN-10
  Source RSPAN VLAN    : 0
  DST RSPAN VLAN       : 0
  Encap                : Native
  Ingress Forwarding   : Disabled
  Filter VLANs         : None
  ERSPAN Enable        : 1         <-- 1 = On/Completed.
  ERSPAN Hw Programmed : 1         <-- 1 = On/Completed.
  ERSPAN Mandatory Cfg : 1         <-- 1 = On/Completed.
  ERSPAN Id            : 3
  Gre Prot             : 88be
  MTU                  : 9000
  Ip Tos               : 0
  Ip Ttl               : 255
  Cos                  : 0
  Vrf Id               : 0
  Dst Ip               : 192.168.1.1
Org Ip : 192.168.1.2
Dst Ipv6 : ::
Org Ipv6 : ::
SGT count : 0
SGT Tag(s) :
```

驗證硬體通道程式設計(FED)。

```
C9300-ERSPAN#show platform software fed switch active ifm interfaces tunnel
Interface                      IF_ID               State
----------------------------------------------------------------------
Tunnel1000000000               0x00000035          READY            <-- 0x35 in Hex is 53 in
Decimal (tunnel number 53).


C9300-ERSPAN#show platform software fed switch active ifm if-id 0x35 <-- Hardware tunnel number
0x35.
Interface IF_ID : 0x0000000000000035
Interface Name : Tunnel1000000000
Interface Block Pointer : 0x55d0ff5b6c98
Interface Block State : READY
Interface State : Enabled
Interface Status : ADD
Interface Ref-Cnt : 4
Interface Type : TUNNEL
Unit : 0
SNMP IF Index : 0
Encap L3If LE Handle : 0x7f00e0a50a28 <-- Hardware handle info (used to check final Hardware
```

```
program state).
Decap L3If LE Handle : 0x7f00e0a50bd8 <-- Hardware handle info (used to check final Hardware
program state).
Tunnel Mode : 0 [gre] <-- Tunnel Protocol Enable.
Tunnel Sub-mode: 0 [none]
Hw Support : Yes
Tunnel Vrf : 0
IPv4 MTU : 0
IPv6 MTU : 0
IPv4 VRF ID : 0
IPv6 VRF ID : 0
Protocol flags : 0x0001 [ ipv4 ]
Misc flags : 0x0000 [ None ]
ICMPv4 flags : 0x03 [ unreachable redirect ]
ICMPv6 flags : 0x03 [ unreachable redirect ]

Port Information
Handle ..... [0xcf000051]
Type ..... [L3-Tunnel]
Identifier ..... [0x35]
Unit ..... [53]
Port Logical Tunnel Subblock
Encap-L3ifle.......[0x7f00e0a50a28] <-- Same number as previous highlighted output.
Decap-L3ifle.......[0x7f00e0a50bd8] <-- Same number as previous highlighted output.
decap-portle.......[0x0]
RI-decap...........[0x7f00e0a5a1a8]
SI-decap...........[0x7f00e0a5a678]
Decap-Tcam_handle..[0x7f00e0a5a9a8]
Tunnel_capability..[0x3]
Encap-RCP-PMAP.....[0x0]
GPN................[0]

C9300-ERSPAN#show platform software fed switch active ifm mappings l3if-le | include L3IF|Tunnel
L3IF_LE                  Interface                        IF_ID               Type
0x00007f00e0a50a28       Tunnel1000000000                 0x00000035          ENCAP_L3_LE <--
L3IF + IF_ID (ENCAP) match here.
0x00007f00e0a50bd8       Tunnel1000000000                 0x00000035          DECAP_L3_LE <--
L3IF + IF_ID (DECAP) match here.

Encapsulation LE

C9300-ERSPAN#show platform hardwware fed switch active fwd-asic abstraction print-resource-
handle 0x00007f00e0a50a28 0 <-- ENCAP.
Handle:0x7f00e0a50a28 Res-Type:ASIC_RSC_L3IF_LE Res-Switch-Num:255 Asic-Num:255 Feature-
ID:AL_FID_IFM Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index0:0x27 mtu_index/l3u_ri_index0:0x5
sm handle [ASIC 0]: 0x7f00e0a56d08 index1:0x27 mtu_index/l3u_ri_index1:0x5
============================================================
Decapsulation LE
C9300-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x00007f00e0a50a28 0 <-- DECAP.
Handle:0x7f00e0a50bd8 Res-Type:ASIC_RSC_L3IF_LE Res-Switch-Num:255 Asic-Num:255 Feature-
ID:AL_FID_IFM Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index0:0x28 mtu_index/l3u_ri_index0:0x0
sm handle [ASIC 0]: 0x7f00e0a559c8 index1:0x28 mtu_index/l3u_ri_index1:0x0
============================================================
```

在通往目的地交換器的輸出連線埠上執行嵌入式封包擷取。可以應用過濾器，使用GRE通道的來源和目的地IP（封包是封裝的封包）。

```
Frame 1: 110 bytes on wire (880 bits), 110 bytes captured (880 bits) on interface 0
 <snip>
Internet Protocol Version 4, Src: 192.168.1.2, Dst: 192.168.1.1 <-- ERSPAN IP HEADER.
```

```
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
        0000 00.. = Differentiated Services Codepoint: Default (0)
        .... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
    Total Length: 96
    Identification: 0x1018 (4120)
    Flags: 0x00
        0... .... = Reserved bit: Not set
        .0.. .... = Don't fragment: Not set
        ..0. .... = More fragments: Not set
    Fragment offset: 0
    Time to live: 255
    Protocol: Generic Routing Encapsulation (47)  <-- GRE tunnel encapsulation.
    Header checksum: 0x9c56 [validation disabled]
        [Good: False]
        [Bad: False]
    Source: 192.168.1.2             <-- Source GRE IP tunnel.
    Destination: 192.168.1.1        <-- Destination GRE IP tunnel.
Generic Routing Encapsulation (ERSPAN)
    Flags and Version: 0x1000
        0... .... .... .... = Checksum Bit: No
        .0.. .... .... .... = Routing Bit: No
        ..0. .... .... .... = Key Bit: No
        ...1 .... .... .... = Sequence Number Bit: Yes
        .... 0... .... .... = Strict Source Route Bit: No
        .... .000 .... .... = Recursion control: 0
        .... .... 0000 0... = Flags (Reserved): 0
        .... .... .... .000 = Version: GRE (0)
    Protocol Type: ERSPAN (0x88be)        <--ERSPAN enable.
    Sequence Number: 0
Encapsulated Remote Switch Packet Analysis
    0001 .... .... .... = Version: Type II (1)
    .... 0000 0001 1000 = Vlan: 10
    000. .... .... .... = Priority: 0
    ...1 .... .... .... = Unknown2: 1
    .... 1... .... .... = Direction: Outgoing (1)
    .... .0.. .... .... = Truncated: Not truncated (0)
    .... ..00 0000 0011 = SpanID: 3       <--ERSPAN ID.
    Unknown7: 00000002
Ethernet II, Src: Xerox_00:02:00 (00:00:08:00:02:00), Dst: Cisco_eb:90:68 (00:9e:1e:eb:90:68)
  <snip>
(Internal data packet comes here, output truncated)
```

ERSPAN目的地裝置

Cisco IOS軟體程式

```
C9500-ERSPAN#show monitor session 1
Session 1
---------
Type                    : ERSPAN Destination Session
Status                  : Admin Enabled
Destination Ports       : Twe1/0/3
Source IP Address       : 192.168.1.1
Source ERSPAN ID        : 3
```

SHIM程式設計

驗證將什麼軟體傳送到程式硬體（SHIM對象）。

```
C9500-ERSPAN#show platform software monitor session 1
Span Session 1 (FED Session 0):
  Type:      ERSPAN Destination
  Prev type: Unknown
  Ingress Src Ports:
  Egress Src Ports:
  Ingress Local Src Ports: (null)
  Egress Local Src Ports: (null)
  Destination Ports:  Twe1/0/3
  Ingress Src Vlans:
  Egress Src Vlans:
  Ingress Up Src Vlans: (null)
  Egress Up Src Vlans:  (null)
  Src Trunk filter Vlans:
  RSPAN dst vlan: 0
  RSPAN src vlan: 0
  RSPAN src vlan sav: 0
  Dest port encap = 0x0004
  Dest port ingress encap = 0x0000
  Dest port ingress vlan = 0x0
  SrcSess: 0  DstSess: 1 DstPortCfgd: 1  RspnDstCfg: 0  RspnSrcVld: 0
  DstCliCfg: 0  DstPrtInit: 1  PsLclCfgd: 0
  Flags: 0x00000000
  Remote dest port: 0   Dest port group: 0
  FSPAN disabled
  FSPAN not notified
  ERSPAN Id    : 3
  ERSPAN Dst Ip: 192.168.1.1
  ERSPAN Vrf   : 0
```

轉發管理器 — 轉發處理器

驗證軟體將什麼傳送到程式硬體（FMAN FP層）。

```
C9500-ERSPAN#show platform software swspan switch active r0 destination
Showing SPAN destination table summary info Sess-id IF-type IF-id Sess-type --------------------
------------------ 0 PORT 11  Local        <-- IF-if 0xb maps to Twe1/0/3 (Check under 'show
platform software fed active ifm mapping').
0         ERSPAN    ERSPAN   DST


C9500-ERSPAN#show platform software swspan R0 destination sess-id 0
Showing SPAN destination detail info

Session ID : 0
Intf Type : PORT
Port dpidx :11         <--Match with IF-id
PD Sess Id : 0
Session Type : Local   <-- Type of monitor session
Ingress Fwd : No
Ingress Encape : Disabled
Ingress Vlan : 0
Encap Value : Replicate
RSPAN Vlan : 0

Session ID : 0
Intf Type : ERSPAN
Vlan id :
PD Sess Id : 0
Session Type : ERSPAN DST
```

```
ERSPAN Id : 3
ERSPAN Dst Ip: 192.168.1.1
ERSPAN Src Ip: 0.0.0.0
GRE Prot  : 35006
MTU       : 0
IP Tos    : 0
IP Ttl    : 255
Cos       : 0
Vrf Id    : 0
Tunnel Ifid: 38         <-- 38 in Decimal is 0x26 in Hex which is the IF_ID of Tunnel1
ERSPAN En : TDL_TRUE
```

轉發管理器 — 轉發處理器

驗證軟體將什麼傳送到程式硬體（FMAN FP層）。

```
C9500-ERSPAN#show platform software swspan switch active F0 counters  <-- (check for any error
counters on PI/PD/HW).
Dump Switch SPAN FP operation counters

Source SPAN Config Counters

PI: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)  <-- PI = platform independent
(Software/IOS).
PD: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)  <-- PD = platform dependent
(SHIM/FMAN/FED).
HW: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)  <-- HW = hardware (FED/ASIC).

Destination SPAN Config Counters

PI: Create 10 (err 0), Modify 6 (err 0), Delete 4 (err 0)
PD: Create 4 (err 0), Modify 0 (err 0), Delete 2 (err 0)
HW: Create 4 (err 0), Modify 0 (err 0), Delete 2 (err 0)

Filter SPAN Config Counters

PI: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
PD: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
HW: Create 0 (err 0), Modify 0 (err 0), Delete 0 (err 0)
```

```
C9500-ERSPAN#show platform software swspan switch active F0 destination
Showing SPAN destination table summary info

Sess-id   IF-type   IF-id   Sess-type
--------------------------------------
0         PORT      11       Local
0         VLAN      0       ERSPAN DST
```

轉發引擎驅動程式

驗證對ASIC(FED)進行程式設計的層。

```
C9500-ERSPAN#show platform software fed switch active monitor 0
Session 0
---------
  Session Type         : ERSPAN Destination Session
Source Ports : RX: None TX: Tunnel1000000000 Destination Ports    : TwentyFiveGigE1/0/3
```

```
  Source VLANs         : None
  Destination VLANs    : None
  Source RSPAN VLAN    : 0
  DST RSPAN VLAN       : 0
  Encap                : Replicate
  Ingress Forwarding   : Disabled
  Filter VLANs         : None
  ERSPAN Enable        : 1
  ERSPAN Hw Programmed : 1
  ERSPAN Mandatory Cfg : 1
  ERSPAN Id            : 3
  Ip Tos               : 0 (DSCP:0)
  Ip Ttl               : 0
  Cos                  : 0
  Vrf Id               : 0
  Tunnel IfId          : 38                <-- 38 in Decicmal is 0x26 in Hex which is the IF_ID
of Tunnel1
  Dst Ip               : 192.168.1.1
  Org Ip               : 0.0.0.0
  SGT count            : 0
  SGT Tag(s)           :
```

驗證硬體通道程式設計(FED)。

```
C9500-ERSPAN#show platform software fed switch active ifm interfaces tunnel
Interface IF_ID State
------------------------------------------------------------------------
Tunnel1000000000  0x00000026   READY

C9500-ERSPAN#show platform software fed switch active ifm if-id 0x00000026
Interface IF_ID : 0x0000000000000026
Interface Name : Tunnel1000000000
Interface Block Pointer : 0x7f2cd48e9958
Interface Block State : READY
Interface State : Enabled
Interface Status : ADD
Interface Ref-Cnt : 5
Interface Type : TUNNEL
Unit : 0 SNMP IF Index : 0 Encap L3If LE Handle : 0x7f2cd4904e08    <-- Hardware handle info
(used to check final Hardware program state).
Decap L3If LE Handle : 0x7f2cd48dabc8    <-- Hardware handle info (used to check final Hardware
program state).
Tunnel Mode    : 0 [gre]                <-- Tunnel Protocol Enable.
Hw Support     : Yes
Tunnel Vrf     : 0
IPv4 MTU       : 0
IPv6 MTU       : 0
IPv4 VRF ID    : 0
IPv6 VRF ID    : 0
Protocol flags : 0x0001 [ ipv4 ]
Misc flags     : 0x0000 [ None ]
ICMPv4 flags   : 0x03 [ unreachable redirect ]
ICMPv6 flags   : 0x03 [ unreachable redirect ]

Port Information
Handle ..... [0xd4000043]
Type ..... [L3-Tunnel] Identifier ..... [0x26] Unit ..... [38] Port Logical
Tunnel Subblock Encap-L3ifle.......[0x7f2cd4904e08]     <-- Same number as previous highlighted
output.
Decap-L3ifle.......[0x7f2cd48dabc8]     <-- Same number as previous highlighted output.
decap-portle.......[0x0]
```

```
RI-decap..........[0x7f2cd49615d8]     <-- Same number as previous highlighted output.
SI-decap..........[0x7f2cd4958dd8]     <-- Same number as previous highlighted output.
Decap-Tcam_handle..[0x7f2cd46eee08]     <-- Same number as previous highlighted output.
Tunnel_capability..[0x3]
Encap-RCP-PMAP.....[0x0]
GPN...............[0]
<snip>

C9500-ERSPAN#show platform software fed switch active ifm mappings l3if-le | include L3IF|Tunnel
L3IF_LE                  Interface                        IF_ID               Type
0x00007f2cd48dabc8       Tunnel1000000000                 0x00000026          DECAP_L3_LE
<-- L3IF + IF_ID (DECAP) match here.
0x00007f2cd4904e08       Tunnel1000000000                 0x00000026          ENCAP_L3_LE
<-- L3IF + IF_ID (ENCAP) match here.

### Encapsulation LE ###

C9500-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x7f2cd4904e08 0 <--ENCAP
Handle:0x7f2cd4904e08 Res-Type:ASIC_RSC_L3IF_LE Res-Switch-Num:255 Asic-Num:255 Feature-
ID:AL_FID_IFM Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index0:0x27  mtu_index/l3u_ri_index0:0x2
sm handle [ASIC 0]: 0x7f2cd46ece38 index1:0x27 mtu_index/l3u_ri_index1:0x4

============================================================

### Decapsulation LE ###

C9500-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x7f2cd48dabc8 0 <--DECAP
Handle:0x7f2cd48dabc8 Res-Type:ASIC_RSC_L3IF_LE Res-Switch-Num:255 Asic-Num:255 Feature-
ID:AL_FID_IFM Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index0:0x28 mtu_index/l3u_ri_index0:0x0
sm handle [ASIC 0]: 0x7f2cd46d91c8 index1:0x28 mtu_index/l3u_ri_index1:0x0



### Rewrite Index (decapsulation) ###

C9500-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x7f2cd49615d8 1   <-- RI-decap
Handle:0x7f2cd49615d8 Res-Type:ASIC_RSC_RI Res-Switch-Num:255 Asic-Num:255 Feature-ID:AL_FID_GRE
Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: 0x7f2cd48daf28Hardware Indices/Handles: index0:0x16
mtu_index/l3u_ri_index0:0x0 index1:0x16 mtu_index/l3u_ri_index1:0x0
Features sharing this resource:107 (1)]
Cookie length: 56
00 00 00 00 00 00 00 00 28 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 6b 33 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Detailed Resource Information (ASIC# 0) ------------------------------------
Rewrite Data Table Entry, ASIC#:0 RI:22 Rewrite_type:AL_RRM_REWRITE_IPV4_ERSPAN2_DECAP(61)
Mapped_rii:TUNNEL_IPv4Erspan_DECAP(83)   L3IF LE Index: 40           <-- 64 in Decimal is 0x40
in Hex which matches Decap LE index seen above

Detailed Resource Information (ASIC# 1)
---------------------------------------

Rewrite Data Table Entry,
ASIC#:1 RI:22 Rewrite_type:AL_RRM_REWRITE_IPV4_ERSPAN2_DECAP(61)
Mapped_rii:TUNNEL_IPv4Erspan_DECAP(83)

L3IF LE Index: 40 ============================================================

### Station Index (decapsulation) ###
```

```
C9500-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x7f2cd4958dd8 1  <-- SI-decap
Handle:0x7f2cd4958dd8 Res-Type:ASIC_RSC_SI Res-Switch-Num:255 Asic-Num:255 Feature-ID:AL_FID_GRE
Lkp-ftr-id:LKP_FEAT_INVALID ref_count:1
priv_ri/priv_si Handle: 0x7f2cd49615d8Hardware Indices/Handles: index0:0xae
mtu_index/l3u_ri_index0:0x0 index1:0xae mtu_index/l3u_ri_index1:0x0
Features sharing this resource:107 (1)]
Cookie length: 56
00 00 00 00 00 00 00 00 28 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 6b 36 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Detailed Resource Information (ASIC# 0) ------------------------------------- Station Index
(SI) [0xae]
RI = 0x16 DI = 0x5012 stationTableGenericLabel = 0 stationFdConstructionLabel = 0x7
lookupSkipIdIndex = 0x15 rcpServiceId = 0 dejaVuPreCheckEn = 0 Replication Bitmap: LD Detailed
Resource Information (ASIC# 1) ------------------------------------- Station Index (SI)
[0xae]
RI = 0x16 DI = 0x5012 stationTableGenericLabel = 0 stationFdConstructionLabel = 0x7
lookupSkipIdIndex = 0x15 rcpServiceId = 0 dejaVuPreCheckEn = 0 Replication Bitmap: CD
============================================================
```

Tunnel Decap (TCAM)

```
C9500-ERSPAN#show platform hardware fed switch active fwd-asic abstraction print-resource-handle
0x7f2cd46eee08 1  <-- Decap-Tcam_handle.
Handle:0x7f2cd46eee08 Res-Type:ASIC_RSC_HASH_TCAM Res-Switch-Num:0 Asic-Num:255 Feature-
ID:AL_FID_GRE Lkp-ftr-id:LKP_FEAT_TT_IPV4_GRE ref_count:1
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: handle [ASIC: 0]: 0x7f2cd48db018
Detailed Resource Information (ASIC# 0) ------------------------------------- Number of HTM
Entries: 3 Entry 0: (handle 0x7f2cd48db018)
Labels  Port   Vlan   L3If   Group
M:      0000   0000   0000   0000
V:      0000   0000   0000   0000

M: ffffffff 00000000 00000000 000003ff 00000000 00000100 01000000 00000fff
3f000000 V: c0a80101 00000000 00000000 00000003 00000000 00000100 01000000 00000000      <--
c0a80101 in Hex maps to 192.168.1.1
        00000000

GREv4 Dst       Src     Key     C S R D E F VRF Fl L3P GreP Misc RCPSVCId
  M: ffffffff 00000000 00000000 0 0 0 0 0 1 000 0  00  0000 00 3f               <-- F=1
Forwarding
  V: c0a80101 00000000 00000000 0 0 0 0 0 1 000 0  00  0000 00 00
Action: 00000100 06000000 00000000 00000000 00000000 00000000 000000ad 00000000
        00000000 00000000
RL2 RL3 ACF SPK CLPC LKV PRI STL LPC ADC LKI   SI

0   1   0   0    0   0   6   0   0   0   0    ad                                  <-- Hexadecimal
value for Station Index.
Start/Skip Word: 0x00000003
Start Feature, Terminate

Entry 1: (handle 0x7f2cd495c3f8)
Labels  Port   Vlan   L3If   Group
M:      0000   0000   0000   0000
V:      0000   0000   0000   0000

M: ffffffff 00000000 00000000 000003ff 00000000 00000100 00000000 000a0000
        3f000000
V: c0a80101 00000000 00000000 00000003 00000000 00000100 00000000 00080000
        00000000

GREv4 Dst       Src     Key     C S R D E F VRF Fl L3P GreP Misc RCPSVCId
```

```
  M: ffffffff 00000000 00000000 0 0 0 0 0 0 000 a  00  0000 00 3f
  V: c0a80101 00000000 00000000 0 0 0 0 0 0 000 8  00  0000 00 00
Action: 00000100 06000000 00000000 00000000 00000000 00000000 000000ad 00000000
        00000000 00000000
RL2 RL3 ACF SPK CLPC LKV PRI STL LPC ADC LKI   SI

0   1   0   0    0   0   6   0   0   0   0   ad
Start/Skip Word: 0x00000000
No Start, Terminate


Entry 2: (handle 0x7f2cd46ef568)
Labels  Port   Vlan   L3If   Group
M:      0000   0000   0000   0000
V:      0000   0000   0000   0000

M: ffffffff 00000000 00000000 000003ff 00000000 00000100 00000000 00020fff
        00000000
V: c0a80101 00000000 00000000 00000003 00000000 00000100 00000000 00000000
        00000000

GREv4 Dst       Src     Key     C S R D E F VRF Fl L3P GreP Misc RCPSVCId
  M: ffffffff 00000000 00000000 0 0 0 0 0 0 000 2  00  0000 00 00
  V: c0a80101 00000000 00000000 0 0 0 0 0 0 000 0  00  0000 00 00
Action: 00000100 06000000 00000000 00000000 00000000 00000000 000000ae 00000000
        00000000 00000000
RL2 RL3 ACF SPK CLPC LKV PRI STL LPC ADC LKI   SI

0   1   0   0    0   0   6   0   0   0   0   ae                                <-- Hexadecimal
value for Station Index.
Start/Skip Word: 0x00000000
No Start, Terminate
============================================================


C9500-ERSPAN#show platform hardware fed switch active fwd-asic resource asic 0 station-index
range 0xab 0xab
ASIC#0:
Station Index (SI) [0xad]
RI = 0x14
DI = 0x505a                   <-- Destination Index
stationTableGenericLabel = 0
stationFdConstructionLabel = 0x7
lookupSkipIdIndex = 0x15
rcpServiceId = 0xd
dejaVuPreCheckEn = 0
Replication Bitmap: LD

C9500-ERSPAN#show platform hardware fed switch active fwd-asic resource asic 0 station-index
range 0xae 0xae

Station Index (SI) [0xae]
RI = 0x16
DI = 0x5012                 <-- Destination Index
stationTableGenericLabel = 0
stationFdConstructionLabel = 0x7
lookupSkipIdIndex = 0x15
rcpServiceId = 0
dejaVuPreCheckEn = 0
Replication Bitmap: LD

C9500-ERSPAN#show platform hardware fed switch active fwd-asic resource asic 0 destination-index
range 0x505a 0x505a
```

```
Destination index = 0x505a DI_RCP_PORT2
pmap = 0x00000000 0x00000000
cmi = 0x0
rcp_pmap = 0x2
al_rsc_cmi
CPU Map Index (CMI) [0]
ctiLo0 = 0
ctiLo1 = 0
ctiLo2 = 0
cpuQNum0 = 0
cpuQNum1 = 0
cpuQNum2 = 0
npuIndex = 0
stripSeg = 0
copySeg = 0
C9500-ERSPAN#show platform hardware fed switch active fwd-asic resource asic 0 destination-index
range 0x5012 0x5012
ASIC#0:
Destination Index (DI) [0x5012]
portMap = 0x00000000 00000000
cmi1 = 0
rcpPortMap = 0x1

CPU Map Index (CMI) [0]
ctiLo0 = 0
ctiLo1 = 0
ctiLo2 = 0
cpuQNum0 = 0
cpuQNum1 = 0
cpuQNum2 = 0
npuIndex = 0
stripSeg = 0
copySeg = 0
```

相關調試和跟蹤

Cisco IOS XE

```
debug monitor all
debug platform monitor
```

FMAN-RP

```
set platform software trace forwarding-manager switch <> R0 switch-span  verbose
show platform software trace message forwarding-manager switch <> R0
```

FMAN-FP

```
set platform software trace forwarding-manager switch <> F0 switch-span verbose
show platform software trace message forwarding-manager switch <> F0
```

美聯儲

```
set platform software trace fed switch <> swspan verbose
set platform software trace fed switch <> asic_spn verbose
set platform software trace fed switch <> acl verbose  (Useful when ip/ipv6 filter is
configured)
show platform software trace message fed switch <>
```

相關資訊

- 技術支援與文件 - Cisco Systems
- 網路管理組態設定指南，Cisco IOS XE阿姆斯特丹版17.3.x（Catalyst 9500交換器）ERSPAN
- 網路管理組態設定指南，Cisco IOS XE阿姆斯特丹版17.3.x（Catalyst 9500交換器）SPAN
- 部落格：Cisco TAC如何轉換文檔和簡化自助服務

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）。