

# 验证Catalyst 9000系列交换机上的SPAN和ERSPAN

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## 简介

本文档介绍如何在Catalyst 9000系列交换机上验证SPAN和ERSPAN。

## 先决条件

### 要求

本文档没有任何特定的要求。

### 使用的组件

本文档中的信息基于以下软件和硬件版本：

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

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

### 相关产品

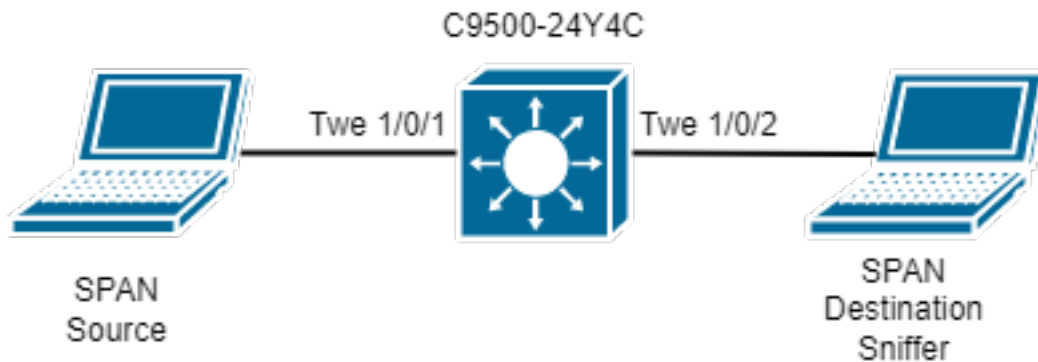
本文档也可用于以下硬件和软件版本：

- Catalyst 9200

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

## 检验SPAN

### 网络图



### SPAN配置

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

**检验SPAN软件配置。** 记录源和目标SPAN接口以及SPAN捕获的方向。

```
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
```

**检验SPAN硬件条目。** 请使用 FED会话ID，每个SPAN配置都是唯一的。最多可同时配置8个FED会话（从FED会话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

```

收集已配置的源和目标SPAN端口的ASIC、核心和端口号。需要端口号来确认源SPAN接口是否已正确编程，以及SPAN是否指向正确的目的SPAN接口。

**提示：**使用正确的命名法独立设备**show platform software/hardware fed active**或堆栈设备**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

**IlePortLeSpanBitMapTable** Doppler寄存器用于定义端口是否在入口(RX)方向接受SPAN。要确认已配置的源SPAN端口(ASIC端口20)已分配到正确的FED会话(会话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会话位映射是8位寄存器。每个位对应一个FED会话：最低有效位对应于FED会话0，最高有效位对应于FED会话7。因此，如前所述，支持的SPAN会话最大数量为8。

如果接口配置为多个SPAN会话的SPAN源端口，则所有FED会话必须出现在SSBM寄存器中。例如，值为0x5(0b00000101)的SSBM意味着该接口是FED会话0和FED会话2的SPAN源。

类似地，Doppler寄存器**ElePortLeSpanBitMapTable**寄存器确定端口是否在出口(TX)方向上受到SPAN约束。分析与**FilePortLeSpanBitMapTable**寄存器相同。要确认已配置的源SPAN端口(ASIC端口20)已分配到正确的FED会话(会话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

```

这确认源SPAN接口已映射到RX和TX方向的正确FED会话。

使用**FED session ID**，我们可以在**AqmRepSpanPortMap** Doppler寄存器中找到SPAN的目的端口。要确认FED会话0指向正确的SPAN目标端口(ASIC端口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
```

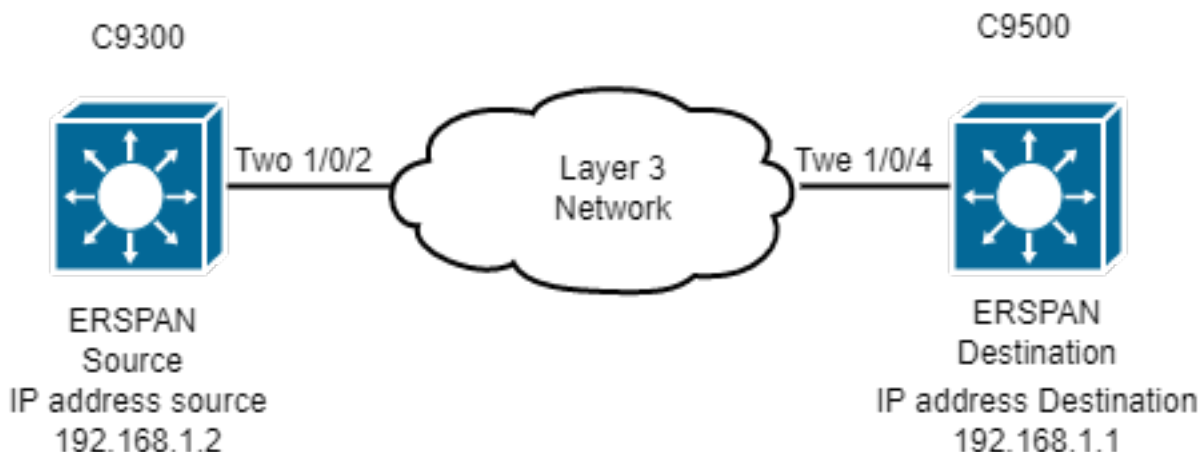
```
Module 0 - AqmRepSpanPortMap[0][0]
```

```
cpuQueueNum          : 0x0
cpuSpanValid         : 0x0
indirectApPortMap    : 0x0
portMap0             : 0x200000 <-- Convert from Hexadecimal to Binary:
0b00100000000000000000000000000000. Bit 21 is set.
rcpPortMap           : 0x0
spanCtiLo            : 0x0
```

这确认使用SPAN捕获的数据包必须显示为从接口Tw1/0/2 ( ASIC端口21 ) 复制。 如果配置了更多SPAN目标端口，这些端口显示在AqmRepSpanPortMap寄存器中。

## 检验ERSPAN

### 网络图



**注意：** Catalyst C9200不支持ERSPAN。

**注意：** 需要DNA优势许可证。

## ERSPAN配置

```
### 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 Twel/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
```

## 源设备

检验源IP地址和目的IP地址之间的连通性。

```
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软件编程

在Cisco IOS软件中验证ERSPAN会话的条目。

```
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编程

验证软件发送到程序硬件(SHIM对象)。

```
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

```

## 转发管理器路由处理器

验证软件发送到程序硬件(FMAN RP层)的内容。

```

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

```

## 转发管理器 — 转发处理器

验证软件发送到程序硬件(FMAN FP层)的内容。

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)

## 转发引擎驱动程序

检查对ASIC(FED)进行编程的层。

```
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) :
```

检验硬件隧道编程(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-L3iflfe.....[0x7f00e0a50a28] <-- Same number as previous highlighted output.  
Decap-L3iflfe.....[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	0x000000035	ENCAP_L3_LE <--
<b>L3IF + IF_ID (ENCAP) match here.</b>			
0x00007f00e0a50bd8	Tunnel1000000000	0x000000035	DECAP_L3_LE <--
<b>L3IF + IF_ID (DECAP) match here.</b>			

**Encapsulation LE**

C9300-ERSPAN#show platform hardware 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 0x00007f00e0a50bd8 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  
=====

在通向目标交换机的出口端口上运行嵌入式数据包捕获。可以应用过滤器，使用GRE隧道的源IP地址和目的IP地址（数据包是封装数据包）。

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目的设备

### Cisco IOS软件编程

```

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

```

### SHIM编程

验证软件将什么发送到程序硬件 ( SHIM对象 )。

```

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: Twel/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

```

## 转发管理器 — 转发处理器

验证软件发送到程序硬件 ( FMAN FP层 ) 的命令。

```

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 Twel/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 Encap : 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

```

## 转发管理器 — 转发处理器

验证软件发送到程序硬件 ( FMAN FP层 ) 的命令。

```

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

## 转发引擎驱动程序

检查对ASIC(FED)进行编程的层。

```

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 Decimal 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)           :

```

### 检验硬件隧道编程(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 : 0x000000000000000026
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 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 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-ctr-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 00 00 01 6b 36 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-ctr-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)

Table with 5 columns: Labels, Port, Vlan, L3If, Group. Row M: 0000 0000 0000 0000. Row 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)

Table with 5 columns: Labels, Port, Vlan, L3If, Group. Row M: 0000 0000 0000 0000. Row 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 000000**ad** 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 000000**ae** 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
```

## 相关调试和跟踪

### 思科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
```

### 美联储

```
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 <>
```

## 相关信息

- [技术支持和文档 - Cisco Systems](#)
- [网络管理配置指南，Cisco IOS XE Amsterdam 17.3.x \( Catalyst 9500交换机 \) ERSPAN](#)
- [网络管理配置指南，Cisco IOS XE Amsterdam 17.3.x \( Catalyst 9500交换机 \) SPAN](#)
- [博客：Cisco TAC如何转变文档和简化自助服务](#)

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