

排除Nexus 7000系列交換機上的硬體轉發問題

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簡介

本文檔介紹如何對Cisco Nexus 7000系列交換機的F3系列模組上的硬體轉發問題進行故障排除。

必要條件

需求

思科建議您先熟悉Cisco Nexus作業系統(NX-OS)和基本Nexus架構，然後再繼續處理本文檔中介紹的資訊。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Cisco Nexus 7000系列交換機(N7K)
- 思科N7K F3系列模組 (N7K-F312FQ-25,12埠10/40千兆乙太網模組)
- Cisco NX-OS版本6.2.8a及更高版本

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

背景資訊

本文檔主要介紹一些內建工具，用於在轉發表或控制平面的軟體部分用盡後進行硬體故障排除。其中一個工具是嵌入式邏輯分析器模組(ELAM)，它是一種特定應用積體電路(ASIC)，擷取單一封包，並顯示輸入封包在轉送後如何顯示在資料匯流排(DBUS)和結果匯流排(RBUS)上。

ASIC嵌入在轉發管道中，它可以即時捕獲資料包，而不會中斷效能或控制平面資源。這有助於回答以下問題：

- 封包是否已到達轉送引擎(FE)?
- 資料包是在哪個埠和VLAN上接收的?
- 封包如何顯示(第2層(L2)或第4層(L4)資料)?
- 資料包是如何更改的，它傳送到哪裡?

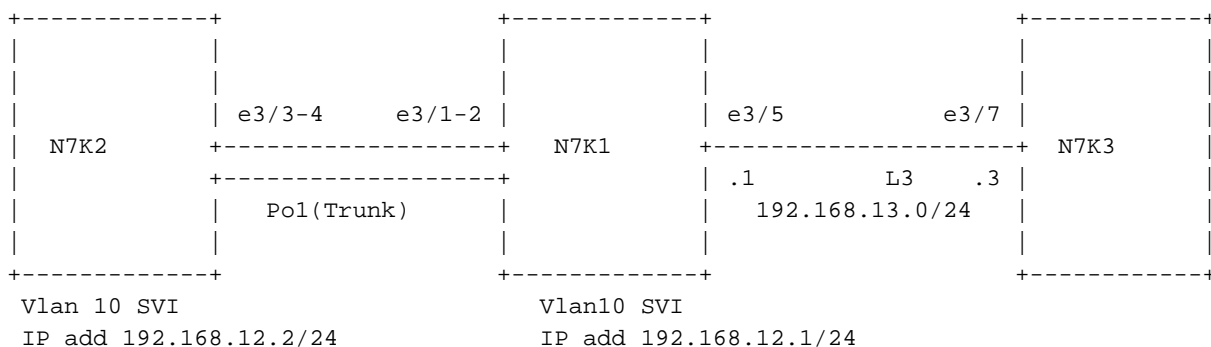
ELAM是一種功能強大、精確且無干擾的工具，最常用於從事硬體交換平台工作的思科技術支援中心(TAC)工程師。但是，必須知道ELAM工具一次只能捕獲一個資料包。即，在觸發ELAM之後收到的第一個資料包。

疑難排解

本節介紹在不使用分支電纜的部署中，以及在使用分支電纜的部署中，如何對F3系列模組上的ELAM進行故障排除。

排除不帶分支電纜的F3系列模組上的ELAM故障

本節中的示例使用的拓撲如下：



以下是關於此拓撲的一些註解：

- N7Ks運行NX-OS版本6.2.8a。
- 從N7K2 VLAN 10介面向遠端IP地址192.168.12.1傳送ping。
- ELAM捕獲N7K1上的資料包。
- 使用的是N7K-F312FQ-25，它是插入插槽3中的12埠10/40千兆乙太網模組。

開始對系統進行故障排除之前，應確認基本連線：

```

N7K2# ping 192.168.13.3
PING 192.168.13.3 (192.168.13.3): 56 data bytes
64 bytes from 192.168.13.3: icmp_seq=0 ttl=253 time=1.513 ms
64 bytes from 192.168.13.3: icmp_seq=1 ttl=253 time=1.062 ms
64 bytes from 192.168.13.3: icmp_seq=2 ttl=253 time=0.822 ms
64 bytes from 192.168.13.3: icmp_seq=3 ttl=253 time=0.830 ms
64 bytes from 192.168.13.3: icmp_seq=4 ttl=253 time=0.845 ms

--- 192.168.13.3 ping statistics ---

```

5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.822/1.014/1.513 ms

N7K2# **show ip route 192.168.13.3**

IP Route Table for VRF "default"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

192.168.13.0/24, ubest/mbest: 1/0
*via 192.168.12.1, [1/0], 01:20:36, static

!--- The next command verifies the Address Resolution Protocol (ARP) for the next hop.

N7K2# **show ip arp 192.168.12.1**

----SNIP----
IP ARP Table
Total number of entries: 1
Address Age MAC Address Interface
192.168.12.1 00:10:29 e4c7.2210.a142 Vlan10

您還應驗證Supervisor引擎(Sup)和模組上的媒體訪問控制(MAC)地址學習功能，以瞭解下一跳：

N7K2# **show mac address-table address e4c7.2210.a142**

!--- This command output shows the MAC learning on the Sup (software).

Legend:

* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
age - seconds since last seen, + - primary entry using vPC Peer-Link,
(T) - True, (F) - False

VLAN	MAC Address	Type	age	Secure	NTFY	Ports/SWID	SSID.LID
* 10	e4c7.2210.a142	dynamic	120	F	F	Pol	

此輸出顯示模組/硬體上的MAC學習；但是，為了瞭解介面，必須轉換索引：

N7K2# **show hardware mac address-table 3 address e4c7.2210.a142**

FE	Valid	PI	BD	MAC	Index	Stat	SW	Modi	Age	Tmr	GM	Sec
						ic		fied	Byte	Sel		ure
1	1	1	41	e4c7.2210.a142	0x00a2a	0	0x089	1	185	1	0	0

TR	NT	RM	RMA	Cap	Fld	Always	PV	RD	NN	UC	PI_E8	VIF	SWID	SSWID	LID
AP	FY			ture		Learn									
0	0	0	0	0	0	0	0x00	0	0	1	0	0x000	0x000	0x000	0x00a2a

N7K2# **show system internal pixm info ltl 0x00a2a**

!--- This is the index that was received in the previous output.

---SNIP---

PC_TYPE	PORT	LTL	RES_ID	LTL_FLAG	CB_FLAG	MEMB_CNT
Normal	Pol	0x0a2a	0x16000000	0x00000000	0x00000002	2

```
Member rbh rbh_cnt
Eth3/4    0x000000f0    0x04
Eth3/3    0x0000000f    0x04
```

---SNIP---

輸入以下命令可獲取虛擬裝置環境(VDC)編號(在本例中為3)，並直接檢查模組上的MAC:

```
N7K2# show vdc
```

---SNIP---

vdc_id	vdc_name	state	mac	type	lc
3	N7K2	active	e4:c7:22:10:a1:43	Ethernet	f3

```
module-3#attach module 3
```

```
module-3# vdc 3
```

!--- This data is obtained from the previous command output.

```
module-3# show mac address-table address e4c7.2210.a142
```

Legend:

* - primary entry, G - Gateway MAC, (R) - Routed MAC, (d) - dec
Age - seconds since last seen,,+ - primary entry using vPC Peer-Link
(T) - True, (F) - False, h - hex, d - decimal

VDC = 3

FE	VLAN/BD	MAC Address	Type	Age	Secure	NTFY	Ports/SWID.SSID.LID(d)
* 1	10	e4c7.2210.a142	dynamic	360	F	F	Po1

確定埠通道1上用於從N7K2向Sup轉發流量的鏈路，以及當埠通道1從N7K1向N7K2使用時用於從N7K3傳送回覆的鏈路：

```
N7K2# show port-channel load-balance forwarding-path interface port-channel 1 src-ip 192.168.12.2 dst-ip 192.168.13.3 module 3
```

Module 3: Missing params will be substituted by 0's.

Load-balance Algorithm: src-dst ip

RBH: 0xd2 Outgoing port id: Ethernet3/3

```
N7K1# show port-channel load-balance forwarding-path interface port-channel 1 src-ip 192.168.13.3 dst-ip 192.168.12.2 module 3
```

Module 3: Missing params will be substituted by 0's.

Load-balance Algorithm: src-dst ip

RBH: 0xd2 Outgoing port id: Ethernet3/1

從N7K2 (IP地址192.168.12.2) 傳送ping命令，並在入口方向上捕獲N7K1上的資料包，以確認資料包是否已轉發到N7K3 (IP地址192.168.13.3)。

傳送ping之前，您應該知道硬體堆積。完成以下步驟即可瞭解累積：

1. 連線模組：

```
N7K1# attach module 3
```

Attaching to module 3 ...
To exit type 'exit', to abort type '\$.'

2. 找出側翼的實例。側翼是用於F3系列模組的晶片交換(SOC)ASIC。每個側翼對映到模組上的兩個外部埠 (資訊因模組型別而改變，且特定於N7K-F312FQ-25)。

模組上有12個埠，每個ASIC對映到前面板上的兩個埠，這意味著模組上有6個(0-5)側翼例項 (例項計數基於零)。附註：開始之前，請確保您具有網路管理許可權。捕獲通過N7K1上的埠通道1從N7K2到達的資料包時，請查詢對映到每個例項的埠 (e3/1和e3/2)：

```
module-3# show hardware internal dev-port-map
-----
CARD_TYPE:      12 port 40G
>Front Panel ports:12
-----
Device name           Dev role           Abbr num_inst:
-----
>Flanker Eth Mac Driver DEV_ETHERNET_MAC   MAC_0  6
>Flanker Fwd Driver    DEV_LAYER_2_LOOKUP L2LKP  6

!--- Check for the L2LKP number for ports 1 and 2.

>Flanker Xbar Driver   DEV_XBAR_INTF      XBAR_INTF 6
>Flanker Queue Driver  DEV_QUEUEING        QUEUE  6
>Sacramento Xbar ASIC  DEV_SWITCH_FABRIC   SWICHF  1
>Flanker L3 Driver     DEV_LAYER_3_LOOKUP L3LKP  6
>EDC                   DEV_PHY             PHYS  2
+-----+
+-----+++FRONT PANEL PORT TO ASIC INSTANCE MAP+++-----+
+-----+
FP port |  PHYS | MAC_0 | L2LKP | L3LKP | QUEUE | SWICHF
-----+-----+-----+-----+-----+-----+
1       |      0 |      0 |      0 |      0 |      0 |      0
2       |      0 |      0 |      0 |      0 |      0 |      0
3       |      1 |      1 |      1 |      1 |      1 |      0
4       |      1 |      1 |      1 |      1 |      1 |      0
5       |      0 |      2 |      2 |      2 |      2 |      0
6       |      0 |      2 |      2 |      2 |      2 |      0
7       |      1 |      3 |      3 |      3 |      3 |      0
8       |      1 |      3 |      3 |      3 |      3 |      0
9       |      4 |      4 |      4 |      4 |      4 |      0
10      |      4 |      4 |      4 |      4 |      4 |      0
11      |      5 |      5 |      5 |      5 |      5 |      0
12      |      5 |      5 |      5 |      5 |      5 |      0
+-----+
+-----+
```

3. 選擇例項，設定觸發器，然後開始捕獲。但是，必須瞭解，有許多選項可用於ELAM觸發器：

```
module-3# elam ASIC flanker instance 0
module-3(fln-elam)# layer2
module-3(fln-l2-elam)# trigger ?
dbus  Pre L2 BUS
rbus  Post L2 BUS
```

-----SNIP-----

如果要在捕獲 (交換機接收的資料包) 中包括DBUS，這兩個選項非常重要。這是未經查詢的

原始資料包。RBUS顯示DBUS硬體中的查詢結果。要獲得完整的ELAM和分析，必須捕獲RBUS和DBUS。

下一個輸出顯示可以使用DBUS選項捕獲的資料包型別。在此範例中，已選擇Internet通訊協定第4版(IPv4)封包：

```
module-3(fln-l2-elam)# trigger dbus ?
arp      ARP Frame Format
fc       Fc hdr Frame Format
ipv4     IPV4 Frame Format
ipv6     IPV6 Frame Format
mpls     MPLS
other    L2 hdr Frame Format
pup      PUP Frame Format
rarp     RARP Frame Format
valid    On valid packet
```

以下是您可以選擇使用的一些其他選項：

```
module-3(fln-l2-elam)# trigger dbus ipv4 ?
egress           Egress packets

!--- Capture packets in egress (outbound from the port).

if               If Trigger Condition
ingress          Ingress packets

!--- Capture packets in ingress (inbound to the port).

multicast        Multicast packet
multicast-replication Multicast replication
```

在本示例中，使用if控制代碼為捕獲選擇條件。下一個輸出中顯示的多數選項基於L2、L3和L4報頭。源IP地址和目的IP地址也用於捕獲。

```
module-3(fln-l2-elam)# trigger dbus ipv4 ingress if ?
<CR>
acos              Acos
block-capture     Capture l2 blocks
bpdu              Bpdu
bundle-port       Bundle-port
ccc               Ccc
copp              Copp
da-type           Da-type
de-cfi            De cfi
destination-index Destination-index
destination-ipv4-address destination ipv4 address
destination-mac-address Destination-mac-address
destination-vif   Destination-vif
df                df
dfst              Dfst
dft               Dft
disable-index-learn Disable-index-learn
disable-new-learn Disable-new-learn
dont-forward      Dont-forward
dont-learn        Dont-learn
dtag-ftag         Dtag-ftag
dtag-ttl          Dtag-ttl
```

dti-type-vpnid	Dti type vpnid
error	Error
erspan-kpa-valid	Erspan kpa valid
ff	Ff
frag	frag
header-type	Header type
ib-length-bundle	Ib length bundle
ids-check-fail	Ids-check-fail
ignore-acli	Ignore-acli
ignore-aclo	Ignore-aclo
ignore-qosi	Ignore-qosi
ignore-qoso	Ignore-qoso
inband-flow-creation-deletion	Inband-flow-creation-deletion
index-direct	Index-direct
inner-cos	Inner-cos
inner-de-valid	Inner de valid
inner-drop-eligibility	Inner-drop-eligibility
ip-da-multicast	Ip-da-multicast
ip-multicast	Ip-multicast
ip-multicast-control	Ip-multicast-control
ipv6	Ipv6
l2	L2
l2-frame-type	L2-frame-type
l2-length-check	L2 length check
l2lu-mode	L2lu-mode
l3-packet-length	l3 packet length
l4-protocol	l4 protocol
label-count	Label count
last-ethertype	Last-ethertype
lbl0-eos	Lbl0 eos
lbl0-exp	Lbl0 exp
lbl0-lbl	Lbl0 lbl
lbl0-ttl	Lbl0 ttl
lbl0-valid	Lbl0 valid
lbl1-exp	Lbl1 exp
lbl1-ttl	Lbl1 ttl
mac-in-mac-valid	Mac-in-mac-valid
mc	Mc
md-acos	Md acos
md-destination-table-index	Md destination table index
md-fwd-only	Md fwd only
md-lif	Md lif
md-mark-enable	Md mark enable
md-multicast-bridge-disable	Md multicast bridge disable
md-preserve-acos	Md preserve acos
md-qos-group-id	Md qos group id
md-replication-packet	Md replication packet
md-router-mac	Md router mac
md-ttl-err	Md-ttl-err
md-version	Md version
mf	mf
mim-destination-mac-address	Mim-destination-mac-address
mim-source-mac-address	Mim-source-mac-address
mlh-type	Mlh-type
no-stats	No-stats
notify-index-learn	Notify-index-learn
notify-new-learn	Notify-new-learn
null-label-exp	Null label exp
null-label-ttl	Null label ttl
null-label-valid	Null label valid
option	option
outer-cos	Outer-cos
outer-drop-eligibility	Outer-drop-eligibility
ovl-mlh-bndl	Ovl mlh bndl

ovl-ulh-bndl	Ovl ulh bndl
ovl-ulh-bndl-1	Ovl-ulh-bndl-1
ovl-ulh-bndl-2	Ovl-ulh-bndl-2
packet-length	Packet-length
packet-type	Packet type
pd-t-ag-gt-2	Pdt-tag-gt-2
pd-t-ag0	Pdt-tag0
pd-t-ag1	Pdt-tag1
pd-t-valid	Pdt-valid
pd-t-value	Pdt-value
port-id	Port-id
rbh	Rbh
rdt	Rdt
recir-shim-vxlan-src-peer-id	Recir shim vxlan src peer id
recirc-acos	Recirc acos
recirc-bypass-ife	Recirc bypass ife
recirc-bypass-l2	Recirc bypass l2
recirc-destination-table-index	Recirc destination table index
recirc-forward-only	Recirc forward only
recirc-l2-tunnel-encap	Recirc l2 tunnel encap
recirc-lif	Recirc lif
recirc-ls-hash	Recirc ls hash
recirc-mark-enable	Recirc mark enable
recirc-multicast-bridge-disable	Recirc multicast bridge disable
recirc-preserve-acos	Recirc preserve acos
recirc-preserve-ls-hash	Recirc preserve ls hash
recirc-preserve-rbh	Recirc preserve rbh
recirc-qos-group-id	Recirc qos group id
recirc-replication-packet	Recirc replication packet
recirc-router-mac	Recirc router mac
recirc-ttl-err	Recirc ttl err
recirc-valid	Recirc-valid
recirc-version	Recirc version
redirect	Redirect
repl-bypass-ife	Repl bypass ife
repl-bypass-l2	Repl bypass l2
repl-disable-local-bridge	Repl disable local bridge
repl-fwd-only	Repl fwd only
repl-l2-tunnel-encap	Repl l2 tunnel encap
repl-l2-tunnel-info	Repl l2 tunnel info
repl-lif	Repl lif
repl-mark-enable	Repl mark enable
repl-met-lif	Repl met lif
repl-ml3	Repl ml3
repl-preserve-acos	Repl preserve acos
repl-preserve-rbh	Repl preserve rbh
repl-qos-group-id	Repl qos group id
repl-replication-packet	Repl replication packet
repl-router-mac	Repl router mac
repl-ttl-err	Repl ttl err
repl-version	Repl version
rf	Rf
second-inner-cos	Second inner cos
segment-id	Segment id
segment-id-valid	Segment id valid
sequence-number	Sequence-number
sg-tag	Sg-tag
shim-valid	Shim valid
source-index	Source-index
source-ipv4-address	source ipv4 address
source-mac-address	Source-mac-address
source-vif	Source-vif
status-ce-lq	Status-ce-lq
status-is-lq	Status-is-lq

sup-eid	Sup-eid
tos	tos
traceroute	Traceroute
trig	Any of previous elam triggered
trill-encap	Trill-encap
ttl	ttl
tunnel-bundle	Tunnel bundle
tunnel-type	Tunnel type
ulh-type	Ulh-type
valid	VALID
v1	V1
vlan	Vlan
vn-p	Vn p
vn-valid	Vn-valid
vqi	Vqi
vqi-valid	Vqi-valid
vsl-num	Vsl-num

此輸出顯示了最終的觸發器選項：

```
module-3# elam asic flanker instance 0
module-3(fln-elam)# layer2
module-3(fln-l2-elam)# trigger dbus ipv4 ingress if source-ipv4-address 192.168.12.2
destination-ipv4-address 192.168.13.3
module-3(fln-l2-elam)# trigger rbus ingress if trig
```

附註：RBUS配置通常不複雜且保持簡單。

- 若要檢查觸發器，請輸入**status**命令，啟動捕獲進程，然後啟動從N7K2到N7K3 (192.168.12.1到192.168.13.3) 的ping:

```
module-3(fln-l2-elam)# stat
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 ingress if
source-ipv4-address 192.168.12.2 destination-ipv4-address 192.168.13.3
L2 DBUS: Configured
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus ingress if trig
L2 RBUS: Configured
```

```
module-3(fln-l2-elam)# start
module-3(fln-l2-elam)# status
```

!--- The status shows as Armed because the process has begun.

```
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 ingress if
source-ipv4-address 192.168.12.2 destination-ipv4-address 192.168.13.1
L2 DBUS: Armed
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus ingress if trig
L2 RBUS: Armed
module-3(fln-l2-elam)#
```

```
module-3(fln-l2-elam)# status
```

!--- If the packet is captured, the status shows Triggered.

```
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 ingress if
source-ipv4-address 192.168.12.2 destination-ipv4-address 192.168.13.3
L2 DBUS: Triggered
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus ingress if trig
L2 RBUS: Triggered
module-3(fln-l2-elam)#
```

5. 如果狀態顯示**Triggered**，請確認RBUS和DBUS是否具有相同的序列號，以確認它們用於相同的包。在本示例中，使用了**0x55**，但顯示序列號的列不同：

```
module-3(fln-l2-elam)# show dbus | in seq
sequence-number      : 0x6b          v1      : 0x0
```

!--- The sequence number is the same (0x6b).

```
module-3(fln-l2-elam)# show rbus | in seq
l2-rbus-trigger      : 0x1          sequence-number      : 0x6b
```

6. 輸入**show dbus**和**show rbus**命令以驗證DBUS和RBUS。在DBUS命令輸出中查詢**源索引**，在RBUS命令輸出中查詢**destination index**:

```
module-3(fln-l2-elam)# show dbus
cp = 0x1007db4c, buf = 0x1007db4c, end = 0x10089e9c
```

Flanker Instance 00 - Capture Buffer On L2 DBUS:

Status(0x0102), TriggerWord(0x000), SampleStored(0x005),CaptureBufferPointer(0x005)

is_l2_egress: 0x0000, data_size: 0x023

```
[000]: 5902a000 08010000 00000000 0cc01400 00145800 00000000 01800100 00000000
00000000 00000000 003931c8 842850b9 31c88428 50c00000 01ac0000 00000000 00000000
00000000 00000000 00000000 00000005 80005000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00605406 01605406 8180008f f0054608 00000000
```

Printing packet 0

L2 DBUS PRS MLH IPV4

label-count	: 0x0	mc	: 0x0
null-label-valid	: 0x0	null-label-exp	: 0x0
null-label-ttl	: 0x0	lb10-vld	: 0x0
lb10-eos	: 0x0	lb10-lb1	: 0x0
lb10-exp	: 0x0	lb10-ttl	: 0x0
lb11-exp	: 0x0	lb11-ttl	: 0x0
ipv4	: 0x0	ipv6	: 0x0
l4-protocol	: 0x1	df	: 0x0
mf	: 0x0	frag	: 0x0
ttl	: 0xff	l3-packet-length	: 0x54
option	: 0x0	tos	: 0x0
sup-eid	: 0x0	header-type	: 0x1
error	: 0x0	redirect	: 0x0
port-id	: 0x0	last-ethertype	: 0x800
l2-frame-type	: 0x0	da-type	: 0x0
packet-type	: 0x0	l2-length-check	: 0x0
ip-da-multicast	: 0x0	ip-multicast	: 0x0
ip-multicast-control	: 0x0	ids-check-fail	: 0x0
traceroute	: 0x0	outer-cos	: 0x0
inner-cos	: 0x0	vqi-valid	: 0x0
vqi	: 0x0	packet-length	: 0x66
vlan	: 0xa	destination-index	: 0x0
source-index	: 0xa2c	bundle-port	: 0x0
acos	: 0x0	outer-drop-eligibility	: 0x0
inner-drop-eligibility	: 0x0	sg-tag	: 0x0
rbh	: 0x0	vsl-num	: 0x0
inband-flow-creation-deletion	: 0x0	ignore-qoso	: 0x0
ignore-qosi	: 0x0	ignore-aclo	: 0x0
ignore-acli	: 0x0	index-direct	: 0x0

```

no-stats          : 0x0          dont-forward      : 0x0
notify-index-learn : 0x1          notify-new-learn  : 0x1
disable-new-learn  : 0x0          disable-index-learn : 0x0
dont-learn         : 0x0          bpdu              : 0x0
ff                : 0x0          rf                : 0x0
ccc               : 0x0          l2               : 0x0
rdt               : 0x0          dft              : 0x0
dfst              : 0x0          status-ce-lq     : 0x0
status-is-lq      : 0x1          trill-encap      : 0x0
mim-valid         : 0x0          dtag-ttl         : 0x0
dtag-ftag        : 0x0          valid            : 0x1
erspan-kpa-valid  : 0x0          recir-shim-vxlan-src-peer-id: 0x0
vn-valid         : 0x0          source-vif       : 0x0
destination-vif   : 0x0          vn-p             : 0x0
sequence-number   : 0x6b         vl              : 0x0
inner-de-valid    : 0x0          de-cfi          : 0x0
second-inner-cos  : 0x0          tunnel-type      : 0x0
shim-valid        : 0x0
segment-id-valid  : 0x0          copp            : 0x0
dti-type-vmid    : 0x0          segment-id       : 0x0
ib-length-bundle  : 0x58000      mlh-type         : 0x5
ulh-type          : 0x6
source-ipv4-address: 192.168.12.2
destination-ipv4-address: 192.168.13.3
mim-destination-mac-address : 0000.0000.0000
mim-source-mac-address : 0000.0000.0000
destination-mac-address : e4c7.2210.a142
source-mac-address : e4c7.2210.a143

```

```

module-3(fln-l2-elam)# show rbus
cp = 0x100a2548, buf = 0x100a2548, end = 0x100ae898

```

```

-----
Flanker Instance 00 - Capture Buffer On L2 RBUS:

```

```

Status(0x0102), TriggerWord(0x000), SampleStored(0x005),CaptureBufferPointer(0x005)

```

```

is_l2_egress: 0x0000, data_size: 0x018
[000]: 0059d930 0000000c c0000000 03580000 00000000 00000000 0000001f 57b00021
fdfc0000 00000000 02000000 14001402 8b000105 00000000 68200000 00000000 00000000
00000400 00008000 005b0000 00fe0e4c 7220850a 210000a0 000000b6

```

```

Printing packet 0

```

```

-----
L2 RBUS INGRESS CONTENT
-----

```

```

pad                : 0x16764      valid             : 0x1
l2-rbus-trigger    : 0x1          sequence-number   : 0x6b
rit-ipv4-id        : 0x0          ipv4-tunnel-encap : 0x0
rit-mpls-rw        : 0x0          ml2-ptr          : 0x0
ml3-ptr            : 0x0          mark             : 0x0
result-cap3        : 0x0          dil-v5-delta-length : 0x0
dil-v5-delta-length-plus: 0x0      dil-v4-delta-length : 0x0
dil-v4-delta-length-plus: 0x0      di2-delta-length  : 0x0
di2-delta-length-plus: 0x0          ml2-delta-length  : 0x0
ml2-delta-length-plus: 0x0          ml3-delta-length  : 0x0
ml3-delta-length-plus: 0x0          s-vector         : 0x0
lcpu-ff-valid      : 0x0          sup-di-vqi       : 0x0
erspan-term-index-dir: 0x0          erspan-buffer-check : 0x0
l2-tunnel-decapped : 0x0          l3-delta-length  : 0x0
rit-crcl6-valid    : 0x1          rit-crcl6        : 0xf57b
vntag-p            : 0x0          frr-recirc       : 0x0
ingress-lif        : 0x1          earl-proxy-vld   : 0x0

```

```

md-di-vld          : 0x0          rc          : 0x0
segment-id-valid   : 0x0          ttl-out     : 0xfe
ttl-mid           : 0xfe         tos-out     : 0x0
tos-in            : 0x0          orig-vlan1  : 0x0
vlan1             : 0x0          source-peer-id : 0x0
final-ignore-qoso : 0x0          port-id     : 0x0
cr-type           : 0x1          pup-packet  : 0x0
bpdu              : 0x0          vdc         : 0x0
traceroute        : 0x0          de          : 0x0
cos               : 0x0          inner-drop-eligibility: 0x0
inner-cos         : 0x0          acos        : 0x0
di-ltl-index      : 0x50       l3-multicast-di  : 0x50
source-index      : 0xa2c        vlan        : 0x0
index-direct     : 0x0          di1-valid  : 0x1
vqi              : 0x50         di2-valid  : 0x0
v5-fpoe-idx     : 0x0          di2-fpoe-idx : 0x0
l3-multicast-v5  : 0x0          dft        : 0x0
dfst             : 0x0          l3-learning-ff : 0x0
result-rbh       : 0xd0         di2-cr-type : 0x0
result-2         : 0x1          dtag-ftag  : 0x0
dtag-ttl         : 0x20         mac-in-mac-op : 0x0
dvif             : 0x0          result-cap1 : 0x0
result-cap2      : 0x0          erspan-term : 0x0
erspan-decap     : 0x0          dont-learn  : 0x0
routed-frame     : 0x1          copy-cause  : 0x0
l2-copy-cause    : 0x0          l3-rit-ptr  : 0x5b
sg-tag           : 0x0          trill-nh-id : 0x0
ttl-in           : 0xfe         fc-up       : 0x0
up-did           : 0x0          did         : 0xe4c722
up-sid           : 0x0          sid         : 0x10a144
shim-l2-tunnel-encap: 0x0       shim-ls-hash : 0x8
shim-rc          : 0x0          shim-lif    : 0x1
shim-replication-pkt: 0x0       shim-router-mac : 0x1
shim-mark-enable : 0x0          shim-qos-group-id : 0x0
shim-destination-table-index: 0x5b      shim-acos-preserve : 0x0
mim-destination-mac-address : 0000.0000.0000
mim-source-mac-address : 0000.0000.0000

```

7. 檢查Sup : 上的目標索引和源索引

```
N7K1# show system internal pixm info ltl 0xa2c
```

PC_TYPE	PORT	LTL	RES_ID	LTL_FLAG	CB_FLAG	MEMB_CNT
Normal	Po1	0x0a2c	0x16000000	0x00000000	0x00000002	2

```
Member rbh rbh_cnt
```

```

Eth3/2 0x000000f0 0x04
Eth3/1 0x0000000f 0x04

```

```
CBL Check States: Ingress: Enabled; Egress: Enabled
```

```
VLAN| BD| BD-St | CBL St & Direction:
```

```

-----
1 | 0x15 | INCLUDE_IF_IN_BD | FORWARDING (Both)
10 | 0x19 | INCLUDE_IF_IN_BD | FORWARDING (Both)

```

```
Member info
```

```
-----
Type          LTL
-----
```

```
PORT_CHANNEL  Po1
```

```
FLOOD_W_FPOE 0x8019
FLOOD_W_FPOE 0x8015
```

```
N7K1# show system internal pixm info ltl 0x50
0x0050 is in DCE/FC pool
```

Member info

```
-----
Type          LTL
-----
PHY_PORT      Eth3/5
```

此輸出確認資料包是在埠通道1(Po1)上收到並通過Eth3/5轉發。

8. 驗證模組上的本地目標邏輯(LTL)是否正確程式設計：

```
module-3# show system internal pixmc info ltl-cb ltl 0xa2c
ltl |ltl_type|if_index|lc_type| vdc |v4_fpoelv5_fpoel base_fpoel_idx | flag
0x0a2c | 4 | Po1 | 2 | 2 | 0x00 | 0x00 | 0x0000 | 0x0
, local ports:
VDCs the entry is part of:
```

LTL HW programming info

```
.....
-----
|Index | ec |drop|span_vec|SOM|ucr_fab|
|-----|
|[ a2c]| 1 | 0 | 0 | 0 | 0 |
| RBH | VQI | PS(INST:LPOE)
|-----|
0, 40 0 : 1
1, 40 0 : 1
2, 40 0 : 1
3, 40 0 : 1
4, 44 0 : 10
5, 44 0 : 10
6, 44 0 : 10
7, 44 0 : 10
8, 0 0 : 1
9, 0 0 : 1
a, 0 0 : 1
b, 0 0 : 1
c, 0 0 : 10
d, 0 0 : 10
e, 0 0 : 10
f, 0 0 : 10
```

```
module-3# show system internal pixmc info ltl-cb ltl 0x50
ltl |ltl_type|if_index|lc_type| vdc |v4_fpoel v5_fpoel base_fpoel_idx | flag
0x0050 | 5 | Eth3/5 | 2 | 2 | 0x00 | 0x00 | 0x0000 | 0x0
, local ports:
VDCs the entry is part of:
```

LTL HW programming info

```
.....
-----
|Index | ec |drop|span_vec|SOM|ucr_fab|
|-----|
```

```

| [ 50] | 1 | 0 | 0 | 0 | 0 |
| RBH   | VQI |   | PS |
|-----|
ALL RBH|    50 |    2 :    1

```

9. 在輸出時捕獲ELAM資料包。為了擷取封包，請從IP位址192.168.13.3到192.168.12.2傳送ping回覆。您必須在連線埠通道1介面(e3/1-2)上使用**egress**關鍵字設定擷取。介面屬於例項0 (如前所述)。

```

N7K1# att mo 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
module-3# el asic flanker instance 0
module-3(fln-elam)# layer2
module-3(fln-l2-elam)# trigger dbus ipv4 egress if source-ipv4-address 192.168.13.3
destination-ipv4-address 192.168.12.2
module-3(fln-l2-elam)# trigger rbus egress if trig

```

```

module-3(fln-l2-elam)# status
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.13.3 destination-ipv4-address 192.168.12.2
L2 DBUS: Configured
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Configured

```

```

module-3(fln-l2-elam)# start
module-3(fln-l2-elam)# status
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.13.3 destination-ipv4-address 192.168.12.2
L2 DBUS: Armed
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Armed

```

```

module-3(fln-l2-elam)# status
ELAM Slot 3 instance 0: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.13.3 destination-ipv4-address 192.168.12.2
L2 DBUS: Triggered
ELAM Slot 3 instance 0: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Triggered
module-3(fln-l2-elam)#

```

```

module-3(fln-l2-elam)# show dbus | in seq
sequence-number      : 0x8d          vl          : 0x3

```

!--- The sequence number is the same.

```

module-3(fln-l2-elam)# show rbus | in seq
vl          : 0x0          sequence-number      : 0x8d

```

```

module-3(fln-l2-elam)# show dbus
cp = 0x1007db4c, buf = 0x1007db4c, end = 0x10089e9c
-----

```

Flanker Instance 00 - Capture Buffer On L2 DBUS:

```

Status(0x0102), TriggerWord(0x000), SampleStored(0x005), CaptureBufferPointer(0x005)

```

is_l2_egress: 0x0000, data_size: 0x023
[000]: 48c22000 08210000 40020800 0cc01414 5800a000 00001a40 01030000 00000000
00000000 00000000 003931c8 842850f9 31c88428 50800000 02358000 00000000 00000000
00000000 00000000 00000000 00000000 00005000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00605406 81e05406 0100008f e0054600 00000000

Printing packet 0

```
-----  
L2 DBUS PRS MLH IPV4  
-----  
label-count          : 0x0          mc          : 0x0  
null-label-valid     : 0x0          null-label-exp : 0x0  
null-label-ttl       : 0x0          lb10-vld     : 0x0  
lb10-eos             : 0x0          lb10-lbl     : 0x0  
lb10-exp             : 0x0          lb10-ttl     : 0x0  
lb11-exp             : 0x0          lb11-ttl     : 0x0  
ipv4                 : 0x0          ipv6         : 0x0  
l4-protocol          : 0x1          df           : 0x0  
mf                   : 0x0          frag        : 0x0  
ttl                  : 0xfe         13-packet-length : 0x54  
option               : 0x0          tos         : 0x0  
sup-eid              : 0x0          header-type  : 0x1  
error                : 0x0          redirect    : 0x0  
port-id              : 0x1          last-ethertype : 0x800  
l2-frame-type        : 0x0          da-type     : 0x0  
packet-type          : 0x1          l2-length-check : 0x0  
ip-da-multicast      : 0x0          ip-multicast : 0x0  
ip-multicast-control: 0x0          ids-check-fail : 0x0  
traceroute           : 0x0          outer-cos   : 0x0  
inner-cos            : 0x0          vqi-valid   : 0x1  
vqi                  : 0x40         packet-length : 0x66  
vlan                : 0xa          destination-index : 0xa2c  
source-index        : 0x50         bundle-port       : 0x0  
acos                 : 0x0          outer-drop-eligibility: 0x0  
inner-drop-eligibility: 0x0          sg-tag      : 0x0  
rbh                  : 0xd2         vsl-num     : 0x0  
inband-flow-creation-deletion: 0x0          ignore-qoso : 0x0  
ignore-qosi          : 0x0          ignore-aclo : 0x0  
ignore-acli          : 0x0          index-direct : 0x0  
no-stats             : 0x0          dont-forward : 0x0  
notify-index-learn   : 0x1          notify-new-learn : 0x0  
disable-new-learn    : 0x0          disable-index-learn : 0x0  
dont-learn           : 0x0          bpdu        : 0x0  
ff                   : 0x0          rf          : 0x1  
ccc                  : 0x4          l2          : 0x0  
rdt                  : 0x0          dft         : 0x0  
dfst                 : 0x0          status-ce-lq : 0x0  
status-is-lq         : 0x0          trill-encap : 0x0  
mim-valid            : 0x0          dtag-ttl    : 0x0  
dtag-ftag            : 0x0          valid       : 0x1  
erspan-kpa-valid     : 0x0          recir-shim-vxlan-src-peer-id: 0x0  
vn-valid             : 0x0          source-vif  : 0x0  
destination-vif      : 0x0          vn-p        : 0x0  
sequence-number      : 0x8d         vl          : 0x3  
inner-de-valid       : 0x0          de-cfi     : 0x0  
second-inner-cos     : 0x0          tunnel-type : 0x0  
shim-valid           : 0x0  
segment-id-valid     : 0x0          copp       : 0x0  
dti-type-vpnid       : 0x0          segment-id  : 0x0  
ib-length-bundle     : 0x0          mlh-type   : 0x5  
ulh-type             : 0x6  
source-ipv4-address: 192.168.13.3  
destination-ipv4-address: 192.168.12.2
```

```
mim-destination-mac-address : 0000.0000.0000
mim-source-mac-address : 0000.0000.0000
destination-mac-address : e4c7.2210.a143
source-mac-address : e4c7.2210.a142
```

如圖所示，源和目標索引都是DBUS的一部分（與入口捕獲中所示不同）。

```
module-3(fln-l2-elam)# show rbus
cp = 0x100a2548, buf = 0x100a2548, end = 0x100ae898
-----
Flanker Instance 00 - Capture Buffer On L2 RBUS:

Status(0x1102), TriggerWord(0x000), SampleStored(0x008),CaptureBufferPointer(0x000)

is_l2_egress: 0x0001, data_size: 0x018
[000]: 0048ea00 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 0c000000 00000000 04014008 00005000 00000000
00000726 3910850a 1b931c88 42850800 00000000 00000000 0000008d

Printing packet 0
```

```
-----
L2 RBUS EGRESS CONTENT
-----
pad : 0x0 valid : 0x1
trig : 0x1 reserved : 0x0
vn-tag-p : 0x0 cbl-vlan-valid : 0x0
vft-hop-count : 0x0 vft-vsant : 0x0
vft-up : 0x0 vft-valid : 0x0
copp : 0x0 segment-id-valid : 0x0
segment-id-23 : 0x0 vsl-num : 0x0
inner-cos : 0x0 inner-drop-eligibility: 0x0
cos : 0x0 drop-eligibility : 0x0
dce-mode : 0x0 flood-to-bd : 0x0
pt-bit-en : 0x1 cpu-port : 0x0
vlan-id : 0xa ip-tos : 0x0
result-rbh : 0x1 met-ptr : 0x2000
packet-type : 0x1 sg-tag : 0x0
dtag-ftag : 0x0 vdc : 0x0
vn-tag-src-vif : 0x0 vn-tag-dst-vif : 0x0
vn-tag-l : 0x0 dc3-tr : 0x0
vl : 0x0 sequence-number : 0x8d
destination-mac-valid: 0x0
source-mac-valid: 0x0
mim-destination-mac-address : 0000.0000.0000
destination-mac-address : e4c7.2210.a143
source-mac-address : e4c7.2210.a142
mim-source-mac-address : 0000.0000.0000
```

源和目的IP地址正確，在入口ELAM資料包捕獲後解碼；但是，與輸入ELAM相比，方向肯定相反，因為會擷取回傳流量。

10. 檢查N7K1上埠通道1的模組3的基於顏色的邏輯(CBL)，以確定VLAN 10是否通過它轉發流量。CBL是基於每個物理介面的邏輯，因此您應該輸入N7K1上埠通道1的成員介面號，而不是埠通道號。在下一個輸出中，可以看到VLAN 10按照預期轉發它。

CBL用於確定硬體中埠的生成樹協定(STP)狀態。檢查Sup上VLAN的STP時，介面可能會顯示轉送，但模組會封鎖流量。附註：必須分別檢查兩個成員介面（e3/1和e3/2）的CBL。

```
module-3# show hardware internal mac port 1 table cbl vlan
```



```

| Disabled State | 0,2-9,11-4031,4036-4095 |
| Forwarding State | 1,10,4032-4035 |
| Blocked State | |
| Learning State | |
-----

```

```

|                                     EGRESS
| Disabled State | 0,2-9,11-4031,4036-4095 |
| Forwarding State | 1,10,4032-4035 |
| Blocked State | |
| Learning State | |
-----

```

附註：上一個命令用於埠通道1(模組3位於e3/1上)。

```
module-3# show hardware internal mac port 2 table cbl vlan
```

```

|                                     INGRESS
| Disabled State | 0,2-9,11-4031,4036-4095 |
| Forwarding State | 1,10,4032-4035 |
| Blocked State | |
| Learning State | |
-----

```

```

|                                     EGRESS
| Disabled State | 0,2-9,11-4031,4036-4095 |
| Forwarding State | 1,10,4032-4035 |
| Blocked State | |
| Learning State | |
-----

```

附註：同樣，此命令檢查連線埠通道2(e3/2)的CBL。

使用分支電纜排除F3系列模組上的ELAM故障

連線分支電纜時，F3系列模組的ELAM過程與常規模組埠上的ELAM過程沒有區別。但是，在嘗試將索引轉換為前面板編號期間，連線埠索引管理員(PIXM)的驗證有一些變更，在這種情況下，介面會從分支纜線接收。

本節中的示例使用的拓撲如下：

```

+-----+ BreakOut Cable +-----+
|         |         e3/8/1-4  te1/1|
|         |         +-----+
| N7K3    | |e3/8      | 1/2 | 4500-X |
|         | +-----+
|         | Po2      | 1/3 |
|         |         +-----+
|         |         1/4 |
+-----+ +-----+
Vlan20 SVI                               Vlan20 SVI
IP add 192.168.20.3                       IP add 192.168.20.1

```

在本例中，一根分支電纜連線到乙太網介面3/8，該介面將40千兆埠分為四個10千兆埠。本節提供了所需的配置以供參考。

```
N7K3(config)# interface breakout module 3 port 8 map 10g-4x
```

```
N7K3(config)# show interface brief
---SNIP---
```

```

-----
Ethernet      VLAN    Type Mode   Status Reason  Speed  Port
Interface
-----
Eth3/7        --      eth  routed up      none   40G(D) --
Eth3/8/1      1       eth  trunk  up      none   10G(D) 2

```

!--- From 3/8/1 to 3/8/4.

```

Eth3/8/2      1       eth  trunk  up      none   10G(D) 2
Eth3/8/3      1       eth  trunk  up      none   10G(D) 2
Eth3/8/4      1       eth  trunk  up      none   10G(D) 2

```

在先前的輸出中，您可以看到Ethernet interface 3/7仍然是40 Gigabit連線埠；但是，Ethernet interface 3/8現在分為四個10-Gigabit連線埠，可以分別進行設定：

```
N7K3# show run interface e3/8/1 - 4
```

```
!Command: show running-config interface Ethernet3/8/1-4
!Time: Mon May 4 01:46:28 2015
```

```
version 6.2(8a)
```

```
interface Ethernet3/8/1
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 10,20
  no shutdown
```

```
interface Ethernet3/8/2
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 30,40
  no shutdown
```

```
interface Ethernet3/8/3
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 50
  no shutdown
```

```
interface Ethernet3/8/4
  switchport
  switchport mode trunk
  no shutdown
```

開始從N7K3交換虛擬介面(SVI)20 IP地址(192.168.20.3)到4500 SVI 20 IP地址(192.168.20.1)的資料包捕獲。在出口到4500時，資料包將在N7K3上捕獲，並將應答從4500傳送到N7K3。

如上一節所述，必須瞭解Flanker例項才能應用觸發器。此輸出顯示了模組3的附件：

```
N7K3# attach module 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
```

```
module-3# show hardware internal dev
dev-port-map dev-version
module-3# show hardware internal dev-port-map
```

```
CARD_TYPE:      12 port 40G
>Front Panel ports:12
```

```
-----
Device name          Dev role          Abbr num_inst:
-----
>Flanker Eth Mac Driver DEV_ETHERNET_MAC   MAC_0  6
>Flanker Fwd Driver    DEV_LAYER_2_LOOKUP L2LKP  6
>Flanker Xbar Driver    DEV_XBAR_INTF      XBAR_INTF 6
>Flanker Queue Driver  DEV_QUEUEING       QUEUE    6
>Sacramento Xbar ASIC  DEV_SWITCH_FABRIC  SWICHF  1
>Flanker L3 Driver     DEV_LAYER_3_LOOKUP L3LKP  6
>EDC                   DEV_PHY            PHYS    2
```

```
+-----+
+-----+++FRONT PANEL PORT TO ASIC INSTANCE MAP+++-----+
+-----+
```

FP port	PHYS	MAC_0	L2LKP	L3LKP	QUEUE	SWICHF
1		0	0	0	0	0
2		0	0	0	0	0
3		1	1	1	1	0
4		1	1	1	1	0
5	0	2	2	2	2	0
6	0	2	2	2	2	0
7	1	3	3	3	3	0
8	1	3	3	3	3	0

!--- The port 8 L2LKP column shows a value of 3.

9		4	4	4	4	0
10		4	4	4	4	0
11		5	5	5	5	0
12		5	5	5	5	0

在此輸出中，埠8位於flanker例項3上。現在您已瞭解該例項，可以通過源和目標IP地址放置觸發器。因為您將捕獲從N7K3到4500的ping請求，所以它將是一個出口ELAM。

```
module-3# elam asic flanker instance 3
module-3(fln-elam)# layer2
module-3(fln-l2-elam)# trigger dbus ipv4 egress if source-ipv4-address 192.168.20.3
destination-ipv4-address 192.168.20.1
module-3(fln-l2-elam)# trigger rbus egress if trig
```

```
module-3(fln-l2-elam)# status
ELAM Slot 3 instance 3: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.20.3 destination-ipv4-address 192.168.20.1
L2 DBUS: Configured
ELAM Slot 3 instance 3: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Configured
```

```
module-3(fln-l2-elam)# start
module-3(fln-l2-elam)# status
ELAM Slot 3 instance 3: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.20.3 destination-ipv4-address 192.168.20.1
L2 DBUS: Armed
ELAM Slot 3 instance 3: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Armed
```

從N7K3向4500發起ping:

```
N7K3# ping 192.168.20.1
PING 192.168.20.1 (192.168.20.1): 56 data bytes
36 bytes from 192.168.20.3: Destination Host Unreachable
Request 0 timed out
64 bytes from 192.168.20.1: icmp_seq=1 ttl=254 time=6.49 ms
64 bytes from 192.168.20.1: icmp_seq=2 ttl=254 time=6.518 ms
64 bytes from 192.168.20.1: icmp_seq=3 ttl=254 time=7.936 ms
64 bytes from 192.168.20.1: icmp_seq=4 ttl=254 time=7.945 ms
```

```
--- 192.168.20.1 ping statistics ---
5 packets transmitted, 4 packets received, 20.00% packet loss
round-trip min/avg/max = 6.49/7.222/7.945 ms
```

以下是ELAM狀態：

```
module-3(fln-12-elam)# status
ELAM Slot 3 instance 3: L2 DBUS Configuration: trigger dbus ipv4 egress if
source-ipv4-address 192.168.20.3 destination-ipv4-address 192.168.20.1
L2 DBUS: Triggered
ELAM Slot 3 instance 3: L2 RBUS Configuration: trigger rbus egress if trig
L2 RBUS: Triggered
```

驗證序列號是否相同：

```
module-3(fln-12-elam)# show dbus | in seq
sequence-number      : 0x27          vl          : 0x3
module-3(fln-12-elam)# show rbus | in seq
vl                   : 0x0          sequence-number : 0x27
```

序列號相同。現在您可以檢查DBUS和RBUS資訊：

```
module-3(fln-12-elam)# show dbus
cp = 0x1011033c, buf = 0x1011033c, end = 0x1011c68c
-----
Flanker Instance 03 - Capture Buffer On L2 DBUS:

Status(0x0102), TriggerWord(0x000), SampleStored(0x004),CaptureBufferPointer(0x004)

is_l2_egress: 0x0000, data_size: 0x023
[000]: 4c1ea000 20a10000 40021040 0cc02801 04080000 00000000 08100000 00000000
00000000 00000000 003c1fc1 8732dff9 31c88428 51000000 009d8000 00000000 00000000
00000000 00000000 00000000 00000000 00005000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 0060540a 01e0540a 0080008f f0054608 00000000
```

Printing packet 0

```
-----
L2 DBUS PRS MLH IPV4
-----
label-count          : 0x0          mc          : 0x0
null-label-valid    : 0x0          null-label-exp : 0x0
null-label-ttl      : 0x0          lb10-vld     : 0x0
lb10-eos            : 0x0          lb10-lbl    : 0x0
lb10-exp            : 0x0          lb10-ttl    : 0x0
lb11-exp            : 0x0          lb11-ttl    : 0x0
ipv4                 : 0x0          ipv6         : 0x0
l4-protocol          : 0x1          df           : 0x0
mf                   : 0x0          frag        : 0x0
ttl                  : 0xff         l3-packet-length : 0x54
option               : 0x0          tos         : 0x0
sup-eid              : 0x1          header-type  : 0x0
```

```

error                : 0x0          redirect           : 0x0
port-id              : 0x5          last-ethertype    : 0x800
l2-frame-type        : 0x0          da-type           : 0x0
packet-type          : 0x1          l2-length-check   : 0x0
ip-da-multicast      : 0x0          ip-multicast      : 0x0
ip-multicast-control: 0x0          ids-check-fail    : 0x0
traceroute           : 0x0          outer-cos         : 0x0
inner-cos            : 0x0          vqi-valid         : 0x1
vqi                  : 0x82         packet-length     : 0x66
vlan                : 0x14         destination-index : 0x82
source-index        : 0x400       bundle-port       : 0x0
acos                 : 0x0          outer-drop-eligibility: 0x0
inner-drop-eligibility: 0x0          sg-tag            : 0x0
rbh                  : 0x0          vsl-num           : 0x0
inband-flow-creation-deletion: 0x0          ignore-qoso       : 0x0
ignore-qosi          : 0x0          ignore-aclo       : 0x0
ignore-acli          : 0x0          index-direct      : 0x1
no-stats             : 0x0          dont-forward      : 0x0
notify-index-learn   : 0x0          notify-new-learn  : 0x0
disable-new-learn    : 0x0          disable-index-learn : 0x0
dont-learn           : 0x1          bpdu              : 0x0
ff                   : 0x0          rf                : 0x0
ccc                  : 0x0          l2                : 0x0
rdt                  : 0x0          dft               : 0x0
dfst                 : 0x0          status-ce-lq      : 0x0
status-is-lq         : 0x0          trill-encap       : 0x0
mim-valid            : 0x0          dtag-ttl          : 0x0
dtag-ftag            : 0x0          valid              : 0x1
erspan-kpa-valid     : 0x0          recir-shim-vxlan-src-peer-id: 0x0
vn-valid             : 0x0          source-vif        : 0x0
destination-vif      : 0x0          vn-p              : 0x0
sequence-number      : 0x27         vl                : 0x3
inner-de-valid       : 0x0          de-cfi            : 0x0
second-inner-cos     : 0x0          tunnel-type       : 0x0
shim-valid           : 0x0
segment-id-valid     : 0x0          copp              : 0x0
dti-type-vpnid       : 0x0          segment-id        : 0x0
ib-length-bundle     : 0x0          mlh-type          : 0x5
ulh-type             : 0x6
source-ipv4-address: 192.168.20.3
destination-ipv4-address: 192.168.20.1
mim-destination-mac-address : 0000.0000.0000
mim-source-mac-address  : 0000.0000.0000
destination-mac-address : f07f.061c.cb7f
source-mac-address     : e4c7.2210.a144

```

```

module-3(fln-l2-elam)#
module-3(fln-l2-elam)#
module-3(fln-l2-elam)#
module-3(fln-l2-elam)# show rbus
cp = 0x10134d38, buf = 0x10134d38, end = 0x10141088

```

```
-----
Flanker Instance 03 - Capture Buffer On L2 RBUS:
```

```
Status(0x1102), TriggerWord(0x000), SampleStored(0x008),CaptureBufferPointer(0x000)
```

```
is_l2_egress: 0x0001, data_size: 0x018
[000]: 004c4780 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 0c001000 00000000 80028010 00009000 00000000
00000783 f830e65b fb931c88 42851000 00000000 00000000 00000027
```

```
Printing packet 0
```

```

-----
                        L2 RBUS EGRESS CONTENT
-----
pad                : 0x0          valid                : 0x1
trig               : 0x1          reserved              : 0x0
vn-tag-p           : 0x1          cbl-vlan-valid       : 0x0
vft-hop-count     : 0x0          vft-vsane             : 0x0
vft-up            : 0x0          vft-valid             : 0x0
copp               : 0x0          segment-id-valid     : 0x0
segment-id-23     : 0x0          vs1-num               : 0x0
inner-cos          : 0x0          inner-drop-eligibility: 0x0
cos               : 0x0          drop-eligibility     : 0x0
dce-mode          : 0x0          flood-to-bd          : 0x0
pt-bit-en         : 0x20         cpu-port              : 0x0
vlan-id           : 0x14         ip-tos                : 0x0
result-rbh        : 0x2          met-ptr               : 0x4000
packet-type       : 0x1          sg-tag                : 0x0
dtag-ftag         : 0x0          vdc                   : 0x0
vn-tag-src-vif    : 0x0          vn-tag-dst-vif        : 0x0
vn-tag-l          : 0x0          dc3-tr                : 0x0
vl                : 0x0          sequence-number       : 0x27
destination-mac-valid: 0x0
source-mac-valid: 0x0
mim-destination-mac-address : 0000.0000.0000
destination-mac-address : f07f.061c.cb7f
source-mac-address : e4c7.2210.a144
mim-source-mac-address : 0000.0000.0000
將目標和源索引轉換為前面板埠以確認流：

```

```

N7K3# show system internal pixm info lt1 0x400
0x0400 is in SUP In-band LTL range

```

此輸出顯示源索引。您知道這是正確的，因為從Sup向N7K3發出了ping。下一個輸出顯示了輸出介面(e3/8/1)，它是N7K上允許VLAN 20的兩個介面之一。另一個介面是e3/8/4,4500上由於STP而被阻止。

```

N7K3# show system internal pixm info lt1 0x82
0x0082 is in DCE/FC pool

```

Member info

```

-----
Type                LTL
-----
PHY_PORT            Eth3/8/1
FLOOD_W_FPOE        0x8039
FLOOD_W_FPOE        0x803f

```

驗證已使用N7K上的分支電纜建立的埠的CBL。要檢查CBL，您必須擁有所有新形成的埠的硬體埠號。

附註：交換器上不存在介面e3/8。僅顯示新形成的埠。

```

N7K3# show interface e3/8
          ^
% Incomplete command at '^' marker.
N7K3#

```

由於使用了分支電纜並且交換機上不存在e3/8介面，因此用於獲取硬體埠號的計算方式會改變。對於支援分支的任何模組，硬體埠編號均不同。您應首先檢查連線埠是否支援中斷：


```
| Disabled State | 0,2-9,11-19,21-4031,4036-4095 |
| Forwarding State | 10,20,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

```
-----
|                                     EGRESS |
| Disabled State | 0,2-9,11-19,21-4031,4036-4095 |
| Forwarding State | 10,20,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

以下是乙太網路介面3/8/2的執行組態，用於檢查並確認VLAN轉送狀態：

```
interface Ethernet3/8/2
switchport
switchport mode trunk
switchport trunk allowed vlan 30,40
no shutdown
```

module-3# **show hardware internal mac port 30 table cbl vlan**

```
-----
|                                     INGRESS |
| Disabled State | 0,2-29,31-39,41-4031,4036-4095 |
| Forwarding State | 30,40,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

```
-----
|                                     EGRESS |
| Disabled State | 0,2-29,31-39,41-4031,4036-4095 |
| Forwarding State | 30,40,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

以下是乙太網路介面3/8/3的執行組態，用於檢查並確認VLAN轉送狀態：

```
interface Ethernet3/8/3
switchport
switchport mode trunk
switchport trunk allowed vlan 50
no shutdown
```

module-3# **show hardware internal mac port 31 table cbl vlan**

```
-----
|                                     INGRESS |
| Disabled State | 0,2-49,51-4031,4036-4095 |
| Forwarding State | 50,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

```
-----
|                                     EGRESS |
| Disabled State | 0,2-49,51-4031,4036-4095 |
| Forwarding State | 50,4032-4035 |
| Blocked State | 1 |
| Learning State | |
```

以下是乙太網路介面3/8/4的執行組態，用於檢查並確認VLAN轉送狀態 (允許所有已設定的

VLAN) :

```
interface Ethernet3/8/4
switchport
switchport mode trunk
no shutdown
```

```
module-3# show hardware internal mac port 32 table cbl vlan
```

```
-----
```

INGRESS	
Disabled State	0,2-9,11-19,21-29,31-39,41-49,51-59,61-669,671-4031
Disabled State	4036-4095
Forwarding State	1,20,30,40,50,60,670,4032-4035
Blocked State	10
Learning State	

```
-----
```

EGRESS	
Disabled State	0,2-9,11-19,21-29,31-39,41-49,51-59,61-669,671-4031
Disabled State	4036-4095
Forwarding State	1,20,30,40,50,60,670,4032-4035
Blocked State	10
Learning State	

```
-----
```

CBL顯示轉發的VLAN正確。

您可以使用**show hardware internal error module <module number>**命令獲取硬體埠號。當必須檢查未顯示在**show interface x/y**命令輸出中的任何內部丟棄時，此命令非常有用。以下是範例：

```
N7K2# show hardware internal errors module 3
```

```
---SNIP---
```

```
Instance:1
```

Cntr	Name	Value	Ports
3836	igr rx pl: cbl drops	0000000000000001	10 -
4636	igr rx pl: cbl drops	0000000000000001	14 -

```
Instance:2
```

Cntr	Name	Value	Ports
423	igr in upm: pkts with symbol/sequence error rcvd	0000000000000478	18 -
455	igr in upm: pkts with symbol/sequence error rcvd	0000000000000478	17 -
487	igr in upm: pkts with symbol/sequence error rcvd	0000000000000478	19 -
519	igr in upm: pkts with symbol/sequence error rcvd	0000000000000478	20 -

```
Instance:3
```

Cntr	Name	Value	Ports
423	igr in upm: pkts with symbol/sequence error rcvd	0000000000000745	26 -
455	igr in upm: pkts with symbol/sequence error rcvd	0000000000000745	25 -
487	igr in upm: pkts with symbol/sequence error rcvd	0000000000000745	27 -
519	igr in upm: pkts with symbol/sequence error rcvd	0000000000000745	28 -
550	igr in upm: pkts rcvd, with RCODE violation	0000359810913821	30 -
551	igr in upm: pkts with symbol/sequence error rcvd	0000425092490108	30 -
552	igr in upm: pkts with error	000000000176136	30 -
582	igr in upm: pkts rcvd, with RCODE violation	000000000292641	29 -
583	igr in upm: pkts with symbol/sequence error rcvd	000000000114014	29 -
614	igr in upm: pkts rcvd, with RCODE violation	0000133362265995	31 -

```
615 igr in upm: pkts with symbol/sequence error rcvd 0000146701474013 31 -
616 igr in upm: pkts with error 0000000000157479 31 -
646 igr in upm: pkts rcvd, with RCODE violation 0000000002160959 32 -
647 igr in upm: pkts with symbol/sequence error rcvd 0000000003722562 32 -
648 igr in upm: pkts with error 0000000000000002 32 -
```