

Nexus 6000 Switch ELAM Overview

TAC

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Introduction

This document describes the steps used in order to perform an Embedded Logic Analyzer Module (ELAM) on a Cisco Nexus 6000 Switch, explains the most relevant outputs, and describes how to interpret the results.

Topology



IP: 12.12.12.2

SVI vlan 100 IP: 12.12.12.3

IP: 13.13.13.2

(Mac 78da.6e71.95ff)
78da.6e71.9b7f

SVI vlan 200 IP: 13.13.13.3

(Mac

A Nexus 6001T switch is used in the previous example, but this procedure and commands used to troubleshoot apply to any model of the Nexus 6000 switch.

Host 1 in Vlan100 with the IP address 12.12.12.2 is connected to a Nexus 6000 switch on port Ethernet2/1. The other end of the Nexus 6000 switch is connected to Host 2 with the IP address 13.13.13.2 on Vlan200 port ethernet2/4.

In this instance Host 1 sends an Address Resolution Protocol (ARP) request to Host 2 in Vlan200. ELAM is used in order to capture this single broadcast packet from 12.12.12.2, which goes to 13.13.13.2. It is important to remember that ELAM allows you to capture a single frame.

Determine the ASIC Instance

```
Nexus6k-11.25-2-ESC# show platform fwm info pif ethernet 2/1 | inc slot_asic
Eth2/1 pd: slot 1 logical port num 0 slot_asic_num 0 global_asic_num 5 fw_inst
  8 phy_fw_inst 2 fc 0
```

```
Nexus6k-11.25-2-ESC# show platform fwm info pif ethernet 2/4 | inc slot_asic
Eth2/4 pd: slot 1 logical port num 3 slot_asic_num 1 global_asic_num 6 fw_inst
  4 phy_fw_inst 1 fc 0
```

The previous output shows that both eth2/1 and eth2/4 correspond to "slot 1."

Note: The slot numbers are 0-based, whereas the bigsur instances are 1-based. Therefore, in this example slot 1 corresponds to bigsur instance 2.

Configure the Trigger

```
Nexus6k-11.25-2-ESC(config)# elam slot 2 asic bigsur instance ?
*** No matching command found in current mode, matching in (exec) mode ***
<0-5> ASIC Instance Number
all All the ASICs in this slot.
```

Since the ASIC instance is 0 and 1, in this case you can use all instances.

This trigger captures a packet which matches these parameters:

- Source mac address 78da.6e71.95ff
- VLAN 100

```
Nexus6k-11.25-2-ESC(config)# elam slot 2 asic bigsur instance 0
Nexus6k-11.25-2-ESC(bigsur-elam)# trigger lu ingress arp if source-mac-address
78da.6e71.95ff vlan 0x64
```

Note: The VLAN is entered as a HEX value in the ELAM trigger. Enter the *hex 100* command in order to convert the decimal to HEX.

Start the Capture

```
12.12.12.3Nexus6k-11.25-2-ESC(bigsur-elam)# start capture
Nexus6k-11.25-2-ESC(bigsur-elam)# show elam asic bigsur
```

```
+-----+
| Slot | Instance | State |
+-----+
|  --  |    --    |    -- |
|  --  |    --    |    -- |
|  --  |    --    |    -- |
|  --  |    --    |    -- |
|  --  |    --    |    -- |
|  02  |    00    |  Start |
|  02  |    01    |  Start |
|  02  |    02    |  Start |
|  02  |    03    |  Start |
|  02  |    04    |  Start |
+-----+
```

```
Nexus6k-11.25-2-ESC(bigsur-elam)# show capture lu
Things of interest in elam capture
Ethernet2/1 IS NOT A PC
```

```
+-----+
|                Lookup Vector                |
+-----+
```

Field	Raw Value
...	
...	
CE_DA	0x002a6a570401
CE_SA	0x78da6e7195ff
...	
...	
CE_QO_ETYPE	0x8100
CE_QO_VLAN	100
CE_QO_VLAN	100
...	
...	
ARP_SHA	0x78da6e7195ff
ARP_SPA	12.12.12.2
ARP_THA	0x002a6a570401
ARP_TPA	12.12.12.3

Egress Interface: Ethernet2/4 IS NOT A PC

Lookup Vector	
Field	Raw Value
CE_DA	0xffffffffffff
CE_SA	0x002a6a570401
...	
...	
ARP_SHA	0x002a6a570401
ARP_SPA	13.13.13.3
ARP_THA	0xffffffffffff
ARP_TPA	13.13.13.2

Interpret the Results

This output displays the details of the captured packet.

Nexus6k-11.25-2-ESC(bigsur-elam)# **show capture rs**

Result Vector	
Field	Raw Value
NSH_WORD2	0x20640
CE_DA	0x002a6a570401
CE_DA_RW	0
CE_SA	0x78da6e7195ff
CE_SA_RW	0
...	
...	
EXT_VLAN	100
CDCE_DA	0x020abc000002
CDCE_DA_RW	1
CDCE_SA	0x020abc000033
CDCE_SA_RW	1
CDCE_DTAG_ETYPE	0x0000
CDCE_QTAG_ETYPE	0x0000
CDCE_DTAG_TTL	32
CDCE_DTAG_TTL_RW	1
CDCE_DTAG_FTAG	1023
CDCE_DTAG_FTAG_RW	1

<<<<<<<<<< source mac address

Additional Verification

You can also modify the trigger in order to capture based on these parameters for additional verification:

- Source IP address 12.12.12.2
- Destination IP address 13.13.13.2

```
trigger lu ingress ipv4 if source-ipv4-address_ipv4 12.12.12.2
destination-ipv4-address_ipv4 13.13.13.2
```

Different Frame Formats Supported by Nexus 6000 ELAM

In addition to IPv4 packets, the Nexus 6000 ELAM can also be configured to capture these frame types:

```
arp    ARP Frame Format
ce     CE Frame Format
fc     FC Frame Format
```

Some Common Triggers in ELAM for IPv4 and ARP

In addition to the examples provided, ELAM triggers can also be written to capture based on these parameters:

ce_q0_etype	Ce_q0_etype
destination-ipv4-address_ipv4	Destination-ipv4-address_ipv4
destination-mac-address	L2 destination address
l2_cos	L2 cos (valid for lu ingress trigger only)
l3_ah	L3_ah
l3_esp	L3_esp
l3_frag	L3_frag
l3_ipv6	L3_ipv6
l3_length	L3_length
l3_mf	L3_mf
l3_none_dest	L3_none_dest
l3_none_frag	L3_none_frag
l3_none_hbh	L3_none_hbh
l3_none_route	L3_none_route
l3_opt_none	L3_opt_none
l3_prot	L3_prot
l3_tos	L3_tos
l3_ttl	L3_ttl
l4_dp	L4_dp
l4_sp	L4_sp
l4_tcp_udp	L4_tcp_udp
l4_tcpflags	L4_tcpflags
max_ipv6_frag	Max_ipv6_frag
max_ipv6_hbh	Max_ipv6_hbh
pkt_id	Pkt_id
sid	Sid
source-ipv4-address_ipv4	Source-ipv4-address_ipv4
source-mac-address	L2 source address
vlan	L2 vlan (valid for lu ingress trigger only)
arp_hlen	Arp_hlen
arp_htype	Arp_htype
arp_oper	Arp_oper
arp_plen	Arp_plen
arp_ptype	Arp_ptype
arp_sha	Arp_sha
arp_spa	Arp_spa
arp_tha	Arp_tha

arp_tpa	Arp_tpa
ce_q0_etype	Ce_q0_etype
destination-mac-address	L2 destination address
l2_cos	L2 cos
pkt_id	Pkt_id
sid	Sid
source-mac-address	L2 source address
vlan	Vlan

Related Information

- *ELAM Overview*
- *Technical Support & Documentation – Cisco Systems*

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