Configure and Verify Secure Firewall and Firepower Internal Switch Captures

Contents

Introduction

This document describes the configuration and verification of the Firepower, and the Secure Firewall internal switch captures.

Prerequisites

Requirements

Basic product knowledge, capture analysis.

Components Used

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

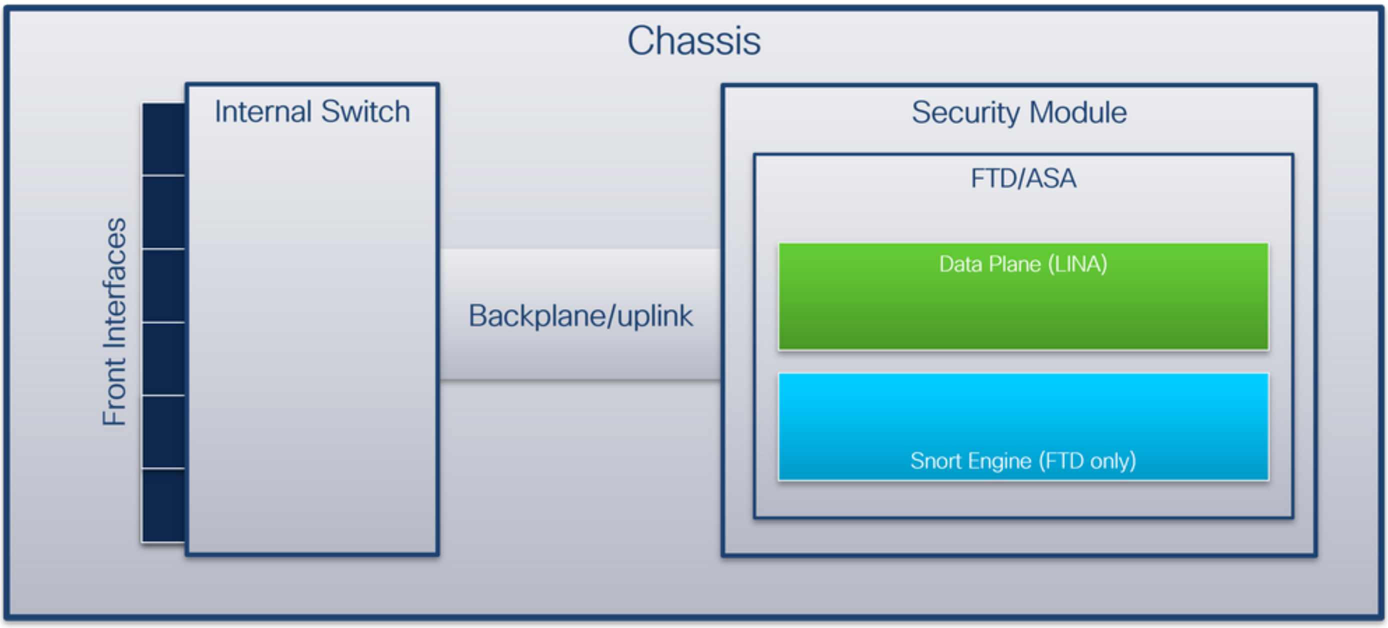
The information in this document is based on these software and hardware versions:

- Secure Firewall 31xx, 42xx
- Firepower 41xx
- Firepower 93xx
- Cisco Secure eXtensible Operating System (FXOS) 2.12.0.x
- Cisco Secure Firewall Threat Defense (FTD) 7.2.0.x, 7.4.1-172
- Cisco Secure Firewall Management Center (FMC) 7.2.0.x, 7.4.1-172
- Adaptive Security Appliance (ASA) 9.18(1)x, 9.20(x)
- Wireshark 3.6.7 (https://www.wireshark.org/download.html)

Background Information

High-Level Overview of the System Architecture

From the packet flow perspective, the architecture of the Firepower 4100/9300 and Secure Firewall 3100/4200 can be visualized as shown in this figure:



The chassis includes these components:

- **Internal switch** – forwards packet from the network to the application and vice versa. The internal switch is connected to the **front interfaces** that reside on the built-in interface module or external network modules and connect to external devices, for example, switches. Examples of front interfaces are Ethernet 1/1, Ethernet 2/4, and so on. The “front” is not a strong technical definition. In this document, it is used to distinguish interfaces connected to external devices from the backplane or uplink interfaces.

- **Backplane or uplink** – an internal interface that connects the security module (SM) to the internal switch.
- **Management uplink** – an internal interface exclusive to Secure Firewall 3100/4200 that provides management traffic path between the internal switch and the application.

This table shows backplane interfaces on Firepower 4100/9300 and uplink interfaces on Secure Firewall 3100/4200:

Platform	**Number of supported security modules**	**Backplane/uplink interfaces**	**Management uplink interfaces**	**Mapped application interfaces**
Firepower 4100 (except Firepower 4110/4112)	1	SM1: Ethernet1/9 Ethernet1/10	N/A	Internal-Data0/0 Internal-Data0/1
Firepower 4110/4112	1	Ethernet1/9	N/A	Internal-Data0/0 Internal-Data0/1
Firepower 9300	3	SM1: Ethernet1/9 Ethernet1/10 SM2: Ethernet1/11 Ethernet1/12 SM3: Ethernet1/13 Ethernet1/14	N/A	Internal-Data0/0 Internal-Data0/1 Internal-Data0/0 Internal-Data0/1 Internal-Data0/0 Internal-Data0/1
Secure Firewall 3100	1	SM1: in_data_uplink1	in_mgmt_uplink1	Internal-Data0/1 Management1/1
Secure Firewall 4200	1	SM1: in_data_uplink1 SM1: in_data_uplink2 (only 4245)	in_mgmt_uplink1 in_mgmt_uplink2	Internal-Data0/1 Internal-Data0/2 (only 4245) Management1/1 Management1/2

In the case Firepower 4100/9300 with 2 backplane interfaces per module or Secure Firewall 4245 with 2 data uplink interfaces, the internal switch and the applications on the modules perform traffic load-balancing over the 2 interfaces.

- **Security module, security engine,** or **blade** – the module where applications such as FTD or ASA are installed. Firepower 9300 supports up to 3 security modules.
- **Mapped application interface** - the names of the backplane or uplink interfaces in applications, such as FTD or ASA.

Use the **show interface detail** command to verify internal interfaces:

<#root>

```
>

show interface detail | grep Interface


Interface Internal-Control0/0 "ha_ctl_nlp_int_tap", is up, line protocol is up
  Control Point Interface States:
        Interface number is 6
        Interface config status is active
        Interface state is active

Interface Internal-Data0/0 "", is up, line protocol is up


  Control Point Interface States:
        Interface number is 2
        Interface config status is active
        Interface state is active

Interface Internal-Data0/1 "", is up, line protocol is up


  Control Point Interface States:
        Interface number is 3
        Interface config status is active
        Interface state is active
Interface Internal-Data0/2 "nlp_int_tap", is up, line protocol is up
  Control Point Interface States:
        Interface number is 4
        Interface config status is active
        Interface state is active
Interface Internal-Data0/3 "ccl_ha_nlp_int_tap", is up, line protocol is up
  Control Point Interface States:
        Interface number is 5
        Interface config status is active
        Interface state is active
Interface Internal-Data0/4 "cmi_mgmt_int_tap", is up, line protocol is up
  Control Point Interface States:
        Interface number is 7
        Interface config status is active
        Interface state is active
Interface Port-channel6.666 "", is up, line protocol is up
Interface Ethernet1/1 "diagnostic", is up, line protocol is up
  Control Point Interface States:
        Interface number is 8
        Interface config status is active
        Interface state is active
```

High-Level Overview of the Internal Switch Operations

Firepower 4100/9300

To make a forwarding decision the internal switch uses an **interface VLAN tag**, or **port VLAN tag**, and a **virtual network tag (VN-tag)**.

The port VLAN tag is used by the internal switch to identify an interface. The switch inserts the port VLAN tag into each ingress packet that came on front interfaces. The VLAN tag is automatically configured by the system and cannot be manually changed. The tag value can be checked in the **fxos** command shell:

<#root>

```
firepower#

connect fxos


…
firepower(fxos)#

show run int e1/2


!Command: show running-config interface Ethernet1/2
!Time: Tue Jul 12 22:32:11 2022

version 5.0(3)N2(4.120)

interface Ethernet1/2
  description U: Uplink
  no lldp transmit
  no lldp receive
  no cdp enable
  switchport mode dot1q-tunnel


switchport trunk native vlan 102


  speed 1000
  duplex full
  udld disable
  no shutdown
```

The VN-tag is also inserted by the internal switch and used to forward the packets to the application. It is automatically configured by the system and cannot be manually changed.

The port VLAN tag and the VN-tag are shared with the application. The application inserts the respective egress interface VLAN tags and the VN-tags into each packet. When a packet from the application is received by the internal switch on the backplane interfaces, the switch reads the egress interface VLAN tag and the VN-tag, identifies the application and the egress interface, strips the port VLAN tag and the VN-tag, and forwards the packet to the network.

Secure Firewall 3100/4200

Like in Firepower 4100/9300, the port VLAN tag is used by the internal switch to identify an interface.

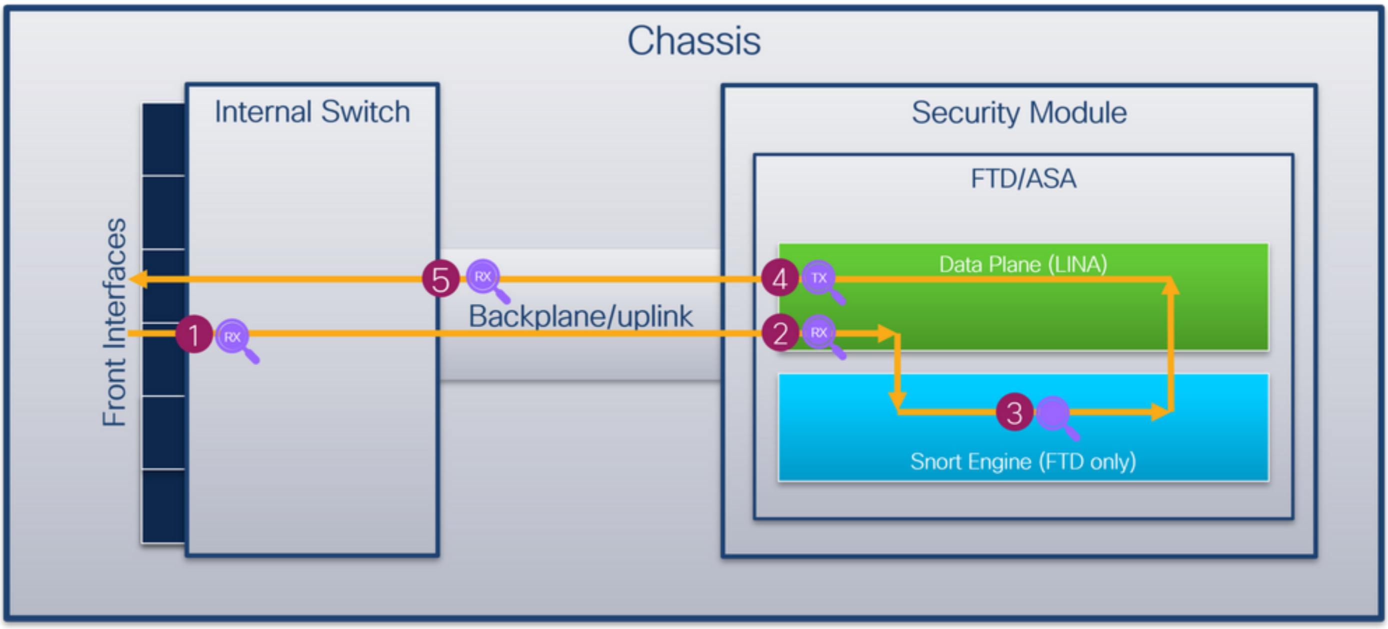
The port VLAN tag is shared with the application. The application inserts the respective egress interface VLAN tags into each packet. When a packet from the application is received by the internal switch on the uplink interface, the switch reads the egress interface VLAN tag, identifies the egress interface, strips the port VLAN tag, and forwards the packet to the network.

Packet Flow and Capture Points

Firepower 4100/9300 and Secure Firewall 3100

The Firepower 4100/9300 and the Secure Firewall 3100 firewalls support packet captures on the interfaces of the internal switch.

This figure shows the packet capture points along the packet path within the chassis and the application:



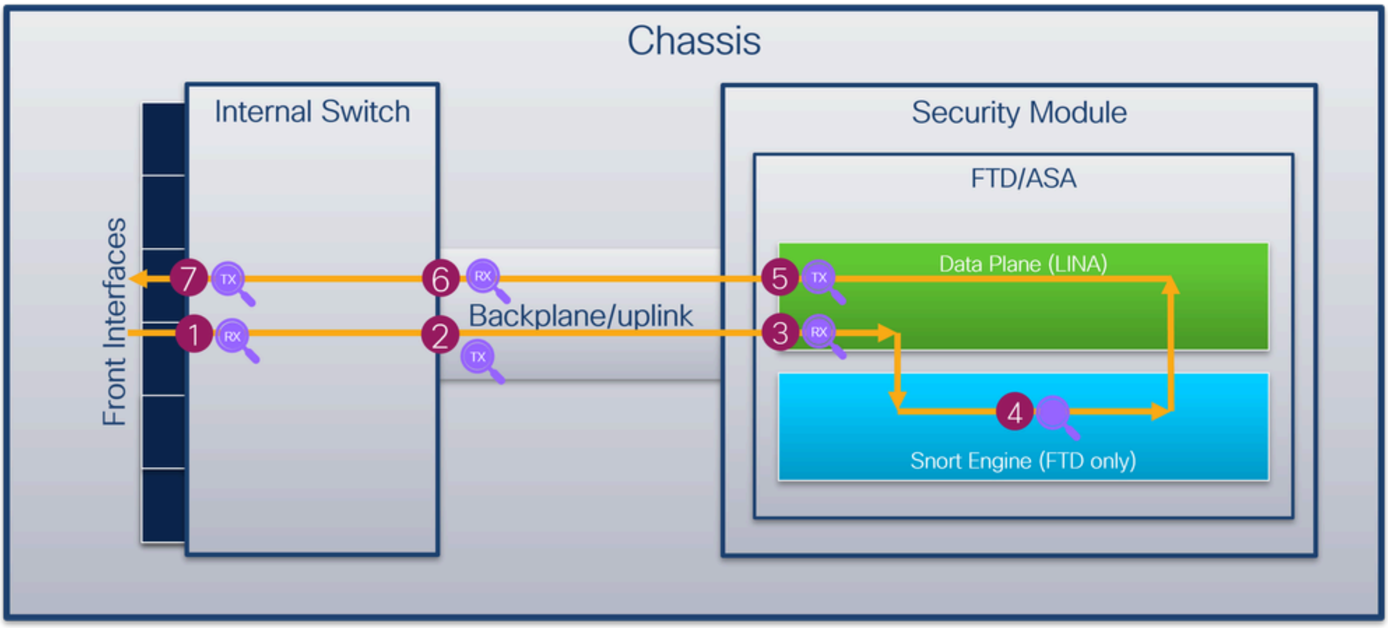
The capture points are:

1. Internal switch front interface ingress capture point. A front interface is any interface connected to the peer devices such as switches.
2. Data plane interface ingress capture point
3. Snort capture point
4. Data plane interface egress capture point
5. Internal switch backplane or uplink ingress capture point. A backplane or uplink interface connects the internal switch to the application.

The internal switch supports only ingress interface captures. That is only the packets received from the network or from the ASA/FTD application can be captured. **Egress packet captures are not supported.**

Secure Firewall 4200

The Secure Firewall 4200 firewalls support packet captures on the interfaces of the internal switch. This figure shows the packet capture points along the packet path within the chassis and the application:



The capture points are:

1. Internal switch front interface ingress capture point. A front interface is any interface connected to the peer devices such as switches.
2. Internal switch backplane interface egress capture point.
3. Data plane interface ingress capture point
4. Snort capture point
5. Data plane interface egress capture point
6. Internal switch backplane or uplink ingress capture point. A backplane or uplink interface connects the internal switch to the application.
7. Internal switch front interface egress capture point.

The internal switch optionally supports bidirectional - both ingress and egress - captures. By default, the internal switch captures packets in the ingress direction.

Configuration and Verification on Firepower 4100/9300

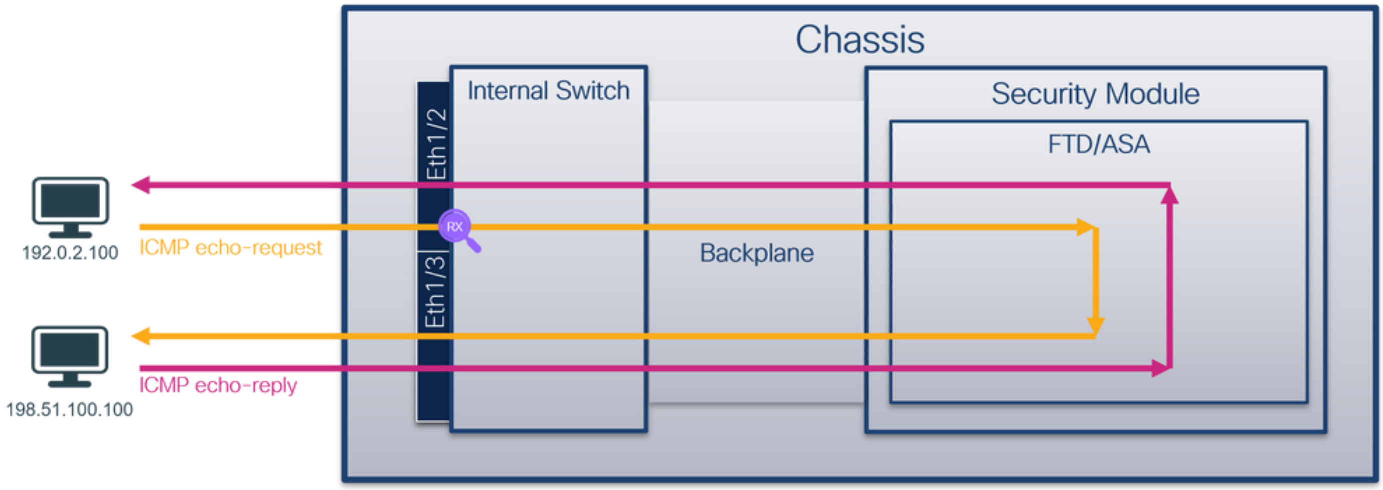
The Firepower 4100/9300 internal switch captures can be configured in **Tools** > **Packet Capture** on FCM or in **scope packet-capture** in FXOS CLI**.** For the description of the packet capture options refer to the *Cisco Firepower 4100/9300 FXOS Chassis Manager Configuration Guide* or *Cisco Firepower 4100/9300 FXOS CLI Configuration Guide*, chapter **Troubleshooting**, section **Packet Capture**.

These scenarios cover common use cases of Firepower 4100/9300 internal switch captures.

Packet Capture on a Physical or Port-channel Interface

Use the FCM and CLI to configure and verify a packet capture on interface Ethernet1/2 or Portchannel1 interface. In the case of a port-channel interface, ensure to select all physical member interfaces.

Topology, packet flow, and the capture points

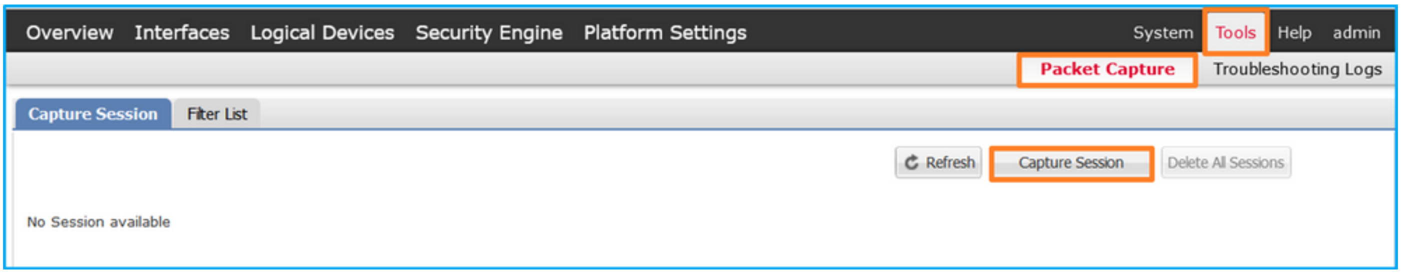


Configuration

FCM

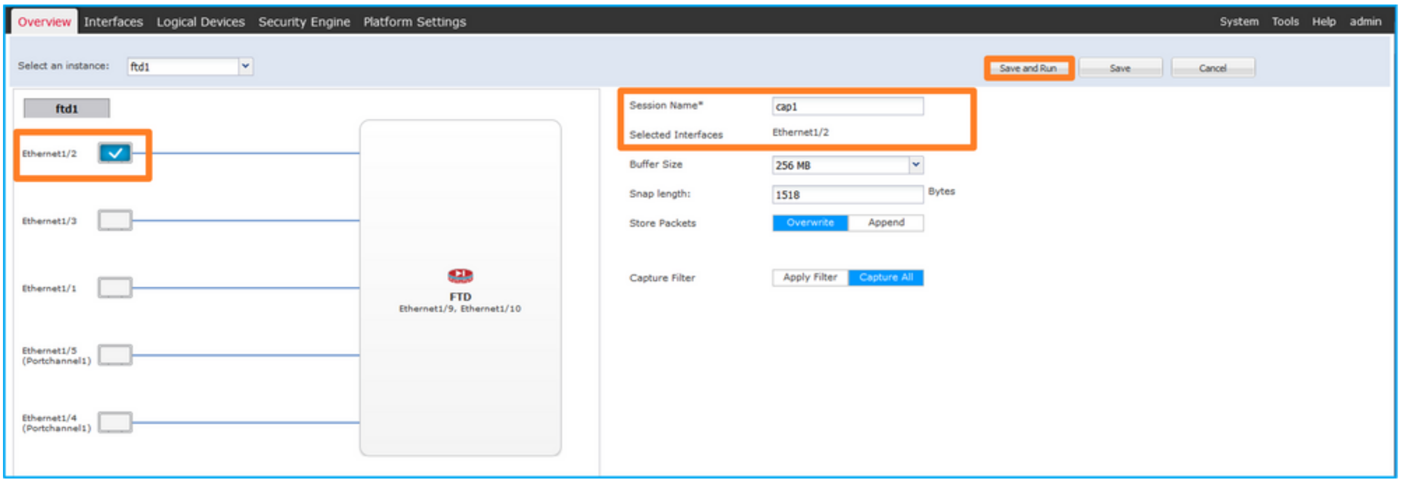
Perform these steps on FCM to configure a packet capture on interfaces Ethernet1/2 or Portchannel1:

1. Use **Tools** > **Packet Capture** > **Capture Session** to create a new capture session**:**



No Session available

2. Select the interface **Ethernet1/2**, provide the session name and click **Save and Run** to activate the capture:



Select an instance: ftd1

Ethernet1/2 ☑

Ethernet1/3 □

Ethernet1/1 □

Ethernet1/5 (Portchannel1) □

Ethernet1/4 (Portchannel1) □

Session Name* cap1

Selected Interfaces Ethernet1/2

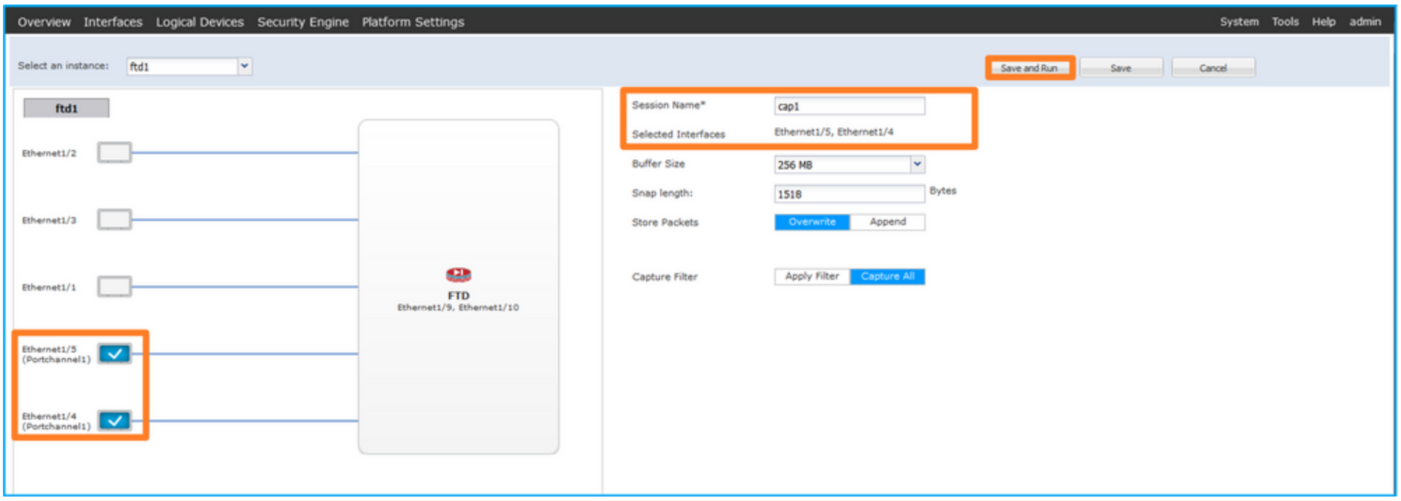
Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets [✓ Overwrite] Append

Capture Filter Apply Filter [✓ Capture All]

3. In the case of a port-channel interface, select all physical member interfaces, provide the session name and click **Save and Run** to activate the capture:



Select an instance: ftd1

Session Name* cap1

Selected Interfaces Ethernet1/5, Ethernet1/4

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets Overwrite

Capture Filter Capture All

FXOS CLI

Perform these steps on FXOS CLI to configure a packet capture on interfaces Ethernet1/2 or Portchannel1:

1. Identify the application type and identifier:

<#root>

```
firepower#

scope ssa


firepower /ssa #

show app-instance


App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online           7.2.0.82        7.2.0.82        Native      No
```

2. In the case of a port-channel interface, identify its member interfaces:

<#root>

```
firepower#

connect fxos


<output skipped>
firepower(fxos)#

show port-channel summary


Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------

1     Po1(SU)     Eth      LACP      Eth1/4(P)    Eth1/5(P)
```

3. Create a capture session:

<#root>

```
firepower#

scope packet-capture


firepower /packet-capture #

create session cap1


firepower /packet-capture/session* #

create phy-port Eth1/2


firepower /packet-capture/session/phy-port* #

set app ftd


firepower /packet-capture/session/phy-port* #

set app-identifier ftd1


firepower /packet-capture/session/phy-port* #

up


firepower /packet-capture/session* #

enable


firepower /packet-capture/session* #

commit


firepower /packet-capture/session #
```

For port-channel interfaces, a separate capture for each member interface is configured:

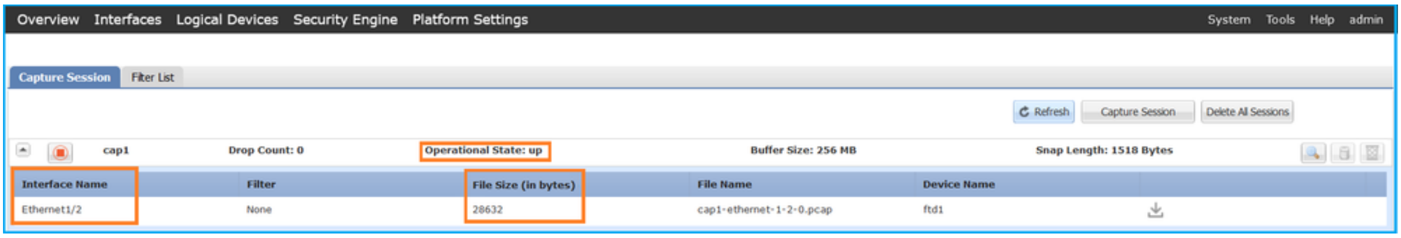
<#root>

```
firepower#
scope packet-capture

firepower /packet-capture #
create session cap1

firepower /packet-capture/session* #
create phy-port Eth1/4

firepower /packet-capture/session/phy-port* #
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
up

firepower /packet-capture/session* #
create phy-port Eth1/5

firepower /packet-capture/session/phy-port* #
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
up

firepower /packet-capture/session* #
enable

firepower /packet-capture/session* #
commit

firepower /packet-capture/session #
```

Verification

FCM

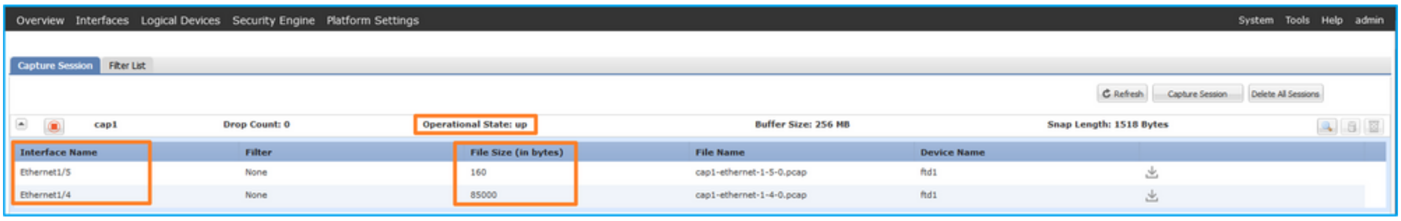
Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	None	28632	cap1-ethernet-1-2-0.pcap	ftd1

Portchannel1 with member interfaces Ethernet1/4 and Ethernet1/5:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/5	None	160	cap1-ethernet-1-5-0.pcap	ftd1
Ethernet1/4	None	85000	cap1-ethernet-1-4-0.pcap	ftd1

FXOS CLI

Verify the capture details in **scope packet-capture**:

```
<#root>

firepower#

scope packet-capture


firepower /packet-capture #

show session cap1



Traffic Monitoring Session:

    Packet Capture Session Name: cap1


    Session: 1

    Admin State: Enabled



    Oper State: Up



    Oper State Reason: Active


    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0
```

```
Physical ports involved in Packet Capture:
    Slot Id: 1


    Port Id: 2


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-2-0.pcap


    Pcapsize: 75136  bytes

    Filter:
    Sub Interface: 0
    Application Instance Identifier: ftd1


    Application Name: ftd
```

Port-channel 1 with member interfaces Ethernet1/4 and Ethernet1/5:

<#root>

```
firepower#
scope packet-capture

firepower /packet-capture #
show session cap1


Traffic Monitoring Session:
    Packet Capture Session Name: cap1

    Session: 1
    Admin State: Enabled


    Oper State: Up


    Oper State Reason: Active

    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:


Slot Id: 1


    Port Id: 4


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-4-0.pcap


    Pcapsize: 310276  bytes


    Filter:
    Sub Interface: 0

    Application Instance Identifier: ftd1


    Application Name: ftd




Slot Id: 1


    Port Id: 5


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-5-0.pcap


    Pcapsize: 160  bytes


    Filter:
    Sub Interface: 0

    Application Instance Identifier: ftd1


    Application Name: ftd
```

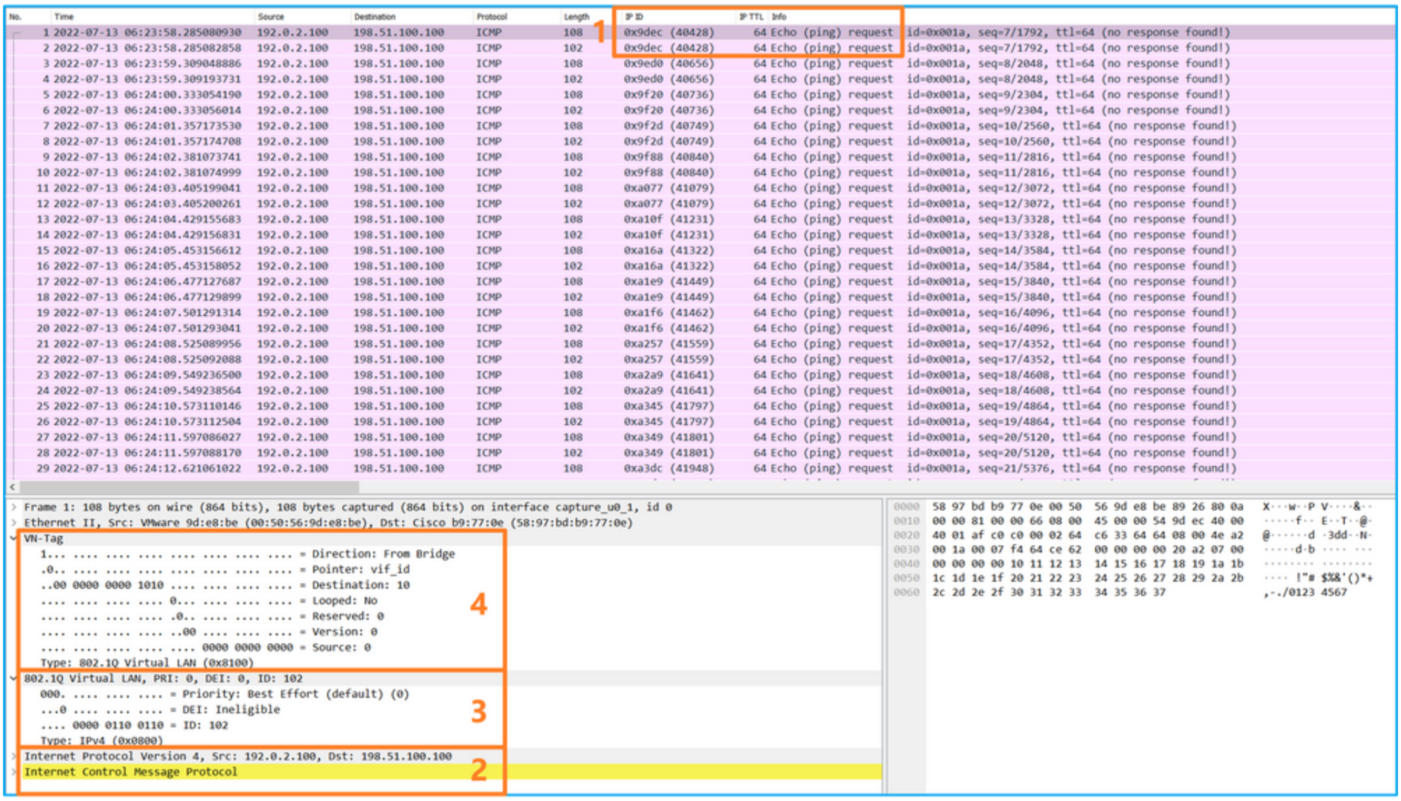
Collect capture files

Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture file for Ethernet1/2. Select the first packet and check the key points:

1. Only ICMP echo-request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.
4. The internal switch inserts an additional VN tag.



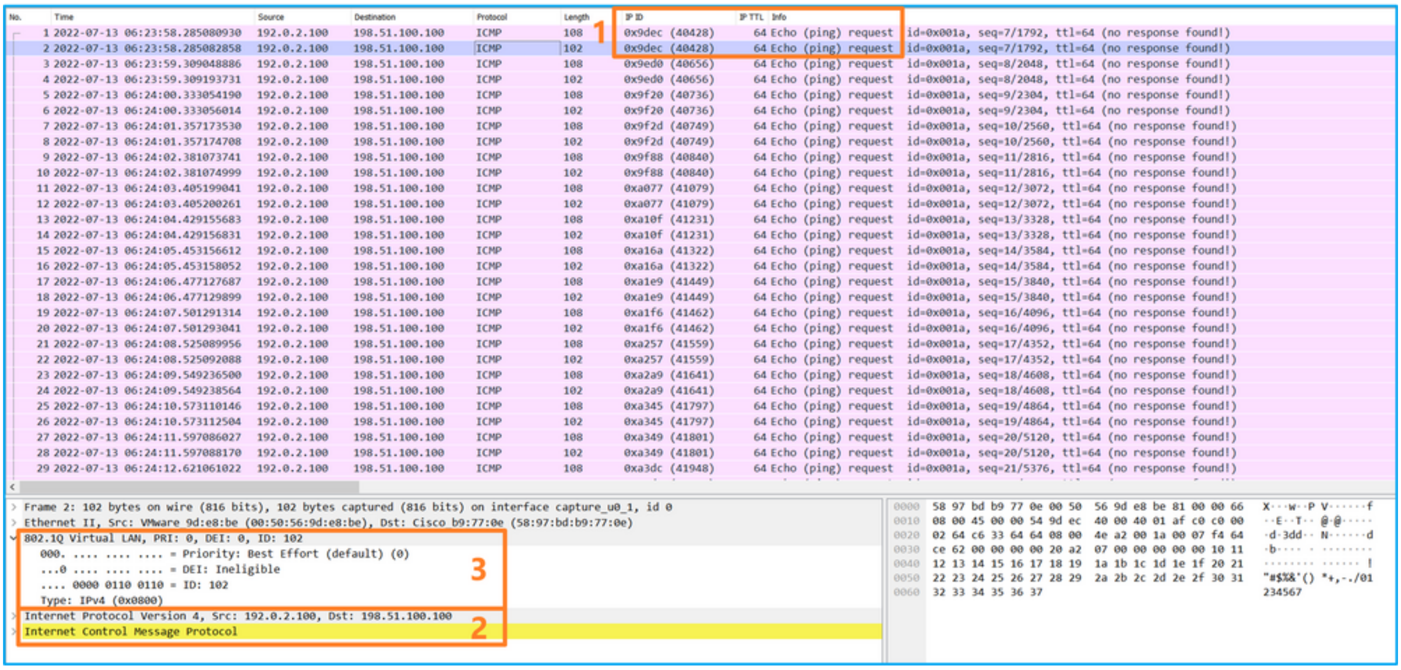
```
No. Time                          Source       Destination     Protocol Length IP ID          IP TTL Info
  1 2022-07-13 06:23:58.285080930 192.0.2.100  198.51.100.100  ICMP     108    0x9dec (40428) 64 Echo (ping) request  id=0x001a, seq=7/1792, ttl=64 (no response found!)
  2 2022-07-13 06:23:58.285082858 192.0.2.100  198.51.100.100  ICMP     102    0x9dec (40428) 64 Echo (ping) request  id=0x001a, seq=7/1792, ttl=64 (no response found!)
  3 2022-07-13 06:23:59.309048886 192.0.2.100  198.51.100.100  ICMP     108    0x9ed0 (40656) 64 Echo (ping) request  id=0x001a, seq=8/2048, ttl=64 (no response found!)
  4 2022-07-13 06:23:59.309193731 192.0.2.100  198.51.100.100  ICMP     102    0x9ed0 (40656) 64 Echo (ping) request  id=0x001a, seq=8/2048, ttl=64 (no response found!)
  5 2022-07-13 06:24:00.333054190 192.0.2.100  198.51.100.100  ICMP     108    0x9f20 (40736) 64 Echo (ping) request  id=0x001a, seq=9/2304, ttl=64 (no response found!)
  6 2022-07-13 06:24:00.333056014 192.0.2.100  198.51.100.100  ICMP     102    0x9f20 (40736) 64 Echo (ping) request  id=0x001a, seq=9/2304, ttl=64 (no response found!)
  7 2022-07-13 06:24:01.357173530 192.0.2.100  198.51.100.100  ICMP     108    0x9f2d (40749) 64 Echo (ping) request  id=0x001a, seq=10/2560, ttl=64 (no response found!)
  8 2022-07-13 06:24:01.357174708 192.0.2.100  198.51.100.100  ICMP     102    0x9f2d (40749) 64 Echo (ping) request  id=0x001a, seq=10/2560, ttl=64 (no response found!)
  9 2022-07-13 06:24:02.381073741 192.0.2.100  198.51.100.100  ICMP     108    0x9f88 (40840) 64 Echo (ping) request  id=0x001a, seq=11/2816, ttl=64 (no response found!)
 10 2022-07-13 06:24:02.381074999 192.0.2.100  198.51.100.100  ICMP     102    0x9f88 (40840) 64 Echo (ping) request  id=0x001a, seq=11/2816, ttl=64 (no response found!)
 11 2022-07-13 06:24:03.405199041 192.0.2.100  198.51.100.100  ICMP     108    0xa077 (41079) 64 Echo (ping) request  id=0x001a, seq=12/3072, ttl=64 (no response found!)
 12 2022-07-13 06:24:03.405200261 192.0.2.100  198.51.100.100  ICMP     102    0xa077 (41079) 64 Echo (ping) request  id=0x001a, seq=12/3072, ttl=64 (no response found!)
 13 2022-07-13 06:24:04.429155683 192.0.2.100  198.51.100.100  ICMP     108    0xa10f (41231) 64 Echo (ping) request  id=0x001a, seq=13/3328, ttl=64 (no response found!)
 14 2022-07-13 06:24:04.429156831 192.0.2.100  198.51.100.100  ICMP     102    0xa10f (41231) 64 Echo (ping) request  id=0x001a, seq=13/3328, ttl=64 (no response found!)
 15 2022-07-13 06:24:05.453156612 192.0.2.100  198.51.100.100  ICMP     108    0xa16a (41322) 64 Echo (ping) request  id=0x001a, seq=14/3584, ttl=64 (no response found!)
 16 2022-07-13 06:24:05.453158052 192.0.2.100  198.51.100.100  ICMP     102    0xa16a (41322) 64 Echo (ping) request  id=0x001a, seq=14/3584, ttl=64 (no response found!)
 17 2022-07-13 06:24:06.477127687 192.0.2.100  198.51.100.100  ICMP     108    0xa1e9 (41449) 64 Echo (ping) request  id=0x001a, seq=15/3840, ttl=64 (no response found!)
 18 2022-07-13 06:24:06.477129899 192.0.2.100  198.51.100.100  ICMP     102    0xa1e9 (41449) 64 Echo (ping) request  id=0x001a, seq=15/3840, ttl=64 (no response found!)
 19 2022-07-13 06:24:07.501291314 192.0.2.100  198.51.100.100  ICMP     108    0xa1f6 (41462) 64 Echo (ping) request  id=0x001a, seq=16/4096, ttl=64 (no response found!)
 20 2022-07-13 06:24:07.501293041 192.0.2.100  198.51.100.100  ICMP     102    0xa1f6 (41462) 64 Echo (ping) request  id=0x001a, seq=16/4096, ttl=64 (no response found!)
 21 2022-07-13 06:24:08.525089956 192.0.2.100  198.51.100.100  ICMP     108    0xa257 (41559) 64 Echo (ping) request  id=0x001a, seq=17/4352, ttl=64 (no response found!)
 22 2022-07-13 06:24:08.525092088 192.0.2.100  198.51.100.100  ICMP     102    0xa257 (41559) 64 Echo (ping) request  id=0x001a, seq=17/4352, ttl=64 (no response found!)
 23 2022-07-13 06:24:09.549236500 192.0.2.100  198.51.100.100  ICMP     108    0xa2a9 (41641) 64 Echo (ping) request  id=0x001a, seq=18/4608, ttl=64 (no response found!)
 24 2022-07-13 06:24:09.549238564 192.0.2.100  198.51.100.100  ICMP     102    0xa2a9 (41641) 64 Echo (ping) request  id=0x001a, seq=18/4608, ttl=64 (no response found!)
 25 2022-07-13 06:24:10.573110146 192.0.2.100  198.51.100.100  ICMP     108    0xa345 (41797) 64 Echo (ping) request  id=0x001a, seq=19/4864, ttl=64 (no response found!)
 26 2022-07-13 06:24:10.573112504 192.0.2.100  198.51.100.100  ICMP     102    0xa345 (41797) 64 Echo (ping) request  id=0x001a, seq=19/4864, ttl=64 (no response found!)
 27 2022-07-13 06:24:11.597086027 192.0.2.100  198.51.100.100  ICMP     108    0xa349 (41801) 64 Echo (ping) request  id=0x001a, seq=20/5120, ttl=64 (no response found!)
 28 2022-07-13 06:24:11.597088170 192.0.2.100  198.51.100.100  ICMP     102    0xa349 (41801) 64 Echo (ping) request  id=0x001a, seq=20/5120, ttl=64 (no response found!)
 29 2022-07-13 06:24:12.621061022 192.0.2.100  198.51.100.100  ICMP     108    0xa3dc (41948) 64 Echo (ping) request  id=0x001a, seq=21/5376, ttl=64 (no response found!)
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware 9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco b9:77:0e (58:97:bd:b9:77:0e)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 1010 .... .... .... .... = Destination: 10
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 89 26 80 0a   X···w··P V····&··
0010  00 00 81 00 00 66 08 00  45 00 00 54 9d ec 40 00   ·····f·· E··T··@·
0020  40 01 af c0 c0 00 02 64  c6 33 64 64 08 00 4e a2   @······d ·3dd··N·
0030  00 1a 00 07 f4 64 ce 62  00 00 00 00 20 a2 07 00   ·····d·b ···· ···
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Select the second packet and check the key points:

1. Only ICMP echo-request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.



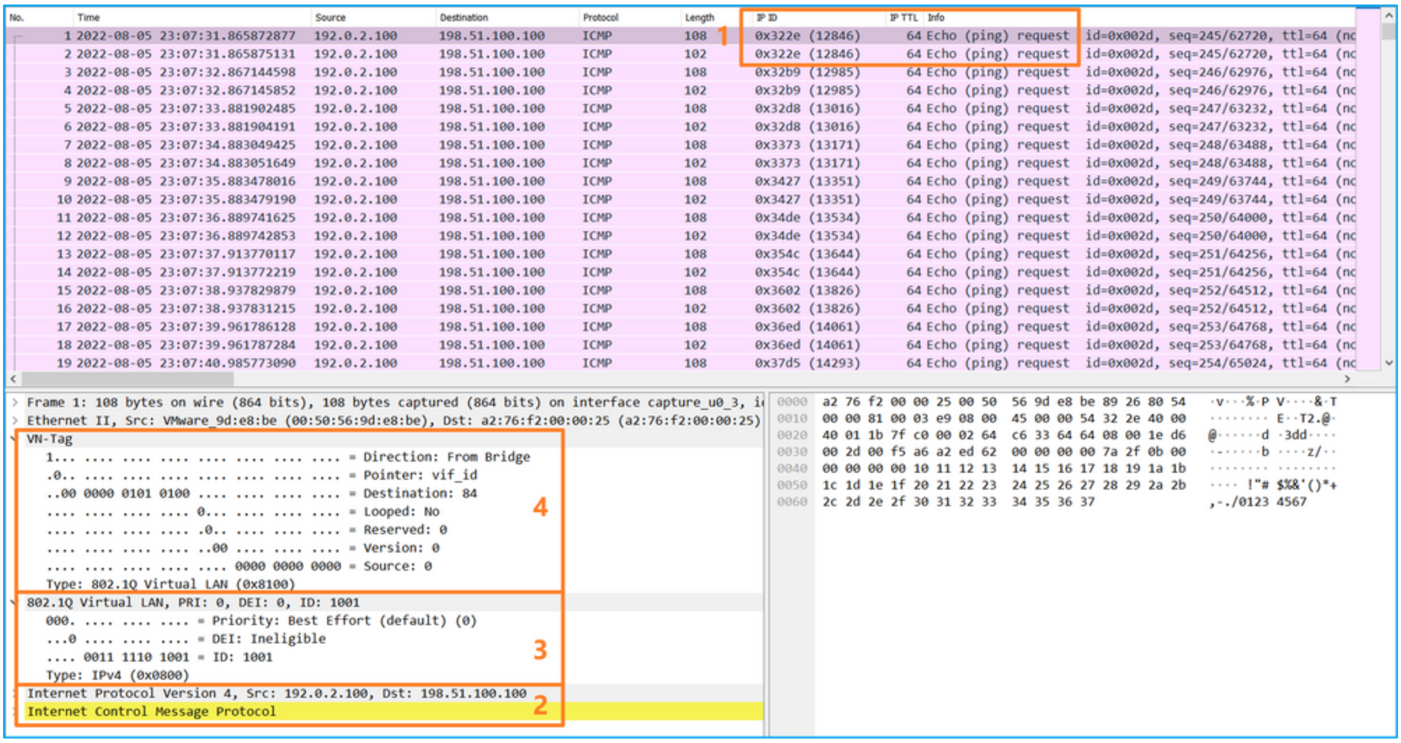
```
No.  Time                           Source       Destination     Protocol  Length  IP ID           IP TTL  Info
   1 2022-07-13 06:23:58.285080930 192.0.2.100  198.51.100.100  ICMP      108     0x9dec (40428)  64 Echo (ping) request  id=0x001a, seq=7/1792, ttl=64 (no response found!)
   2 2022-07-13 06:23:58.285082858 192.0.2.100  198.51.100.100  ICMP      102     0x9dec (40428)  64 Echo (ping) request  id=0x001a, seq=7/1792, ttl=64 (no response found!)
   3 2022-07-13 06:23:59.309048886 192.0.2.100  198.51.100.100  ICMP      108     0x9ed0 (40656)  64 Echo (ping) request  id=0x001a, seq=8/2048, ttl=64 (no response found!)
   4 2022-07-13 06:23:59.309193731 192.0.2.100  198.51.100.100  ICMP      102     0x9ed0 (40656)  64 Echo (ping) request  id=0x001a, seq=8/2048, ttl=64 (no response found!)
   5 2022-07-13 06:24:00.333054190 192.0.2.100  198.51.100.100  ICMP      108     0x9f20 (40736)  64 Echo (ping) request  id=0x001a, seq=9/2304, ttl=64 (no response found!)
   6 2022-07-13 06:24:00.333056014 192.0.2.100  198.51.100.100  ICMP      102     0x9f20 (40736)  64 Echo (ping) request  id=0x001a, seq=9/2304, ttl=64 (no response found!)
   7 2022-07-13 06:24:01.357173530 192.0.2.100  198.51.100.100  ICMP      108     0x9f2d (40749)  64 Echo (ping) request  id=0x001a, seq=10/2560, ttl=64 (no response found!)
   8 2022-07-13 06:24:01.357174708 192.0.2.100  198.51.100.100  ICMP      102     0x9f2d (40749)  64 Echo (ping) request  id=0x001a, seq=10/2560, ttl=64 (no response found!)
   9 2022-07-13 06:24:02.381073741 192.0.2.100  198.51.100.100  ICMP      108     0x9f88 (40840)  64 Echo (ping) request  id=0x001a, seq=11/2816, ttl=64 (no response found!)
  10 2022-07-13 06:24:02.381074999 192.0.2.100  198.51.100.100  ICMP      102     0x9f88 (40840)  64 Echo (ping) request  id=0x001a, seq=11/2816, ttl=64 (no response found!)
  11 2022-07-13 06:24:03.405199041 192.0.2.100  198.51.100.100  ICMP      108     0xa077 (41079)  64 Echo (ping) request  id=0x001a, seq=12/3072, ttl=64 (no response found!)
  12 2022-07-13 06:24:03.405200261 192.0.2.100  198.51.100.100  ICMP      102     0xa077 (41079)  64 Echo (ping) request  id=0x001a, seq=12/3072, ttl=64 (no response found!)
  13 2022-07-13 06:24:04.429155683 192.0.2.100  198.51.100.100  ICMP      108     0xa10f (41231)  64 Echo (ping) request  id=0x001a, seq=13/3328, ttl=64 (no response found!)
  14 2022-07-13 06:24:04.429156831 192.0.2.100  198.51.100.100  ICMP      102     0xa10f (41231)  64 Echo (ping) request  id=0x001a, seq=13/3328, ttl=64 (no response found!)
  15 2022-07-13 06:24:05.453156612 192.0.2.100  198.51.100.100  ICMP      108     0xa16a (41322)  64 Echo (ping) request  id=0x001a, seq=14/3584, ttl=64 (no response found!)
  16 2022-07-13 06:24:05.453158052 192.0.2.100  198.51.100.100  ICMP      102     0xa16a (41322)  64 Echo (ping) request  id=0x001a, seq=14/3584, ttl=64 (no response found!)
  17 2022-07-13 06:24:06.477127687 192.0.2.100  198.51.100.100  ICMP      108     0xa1e9 (41449)  64 Echo (ping) request  id=0x001a, seq=15/3840, ttl=64 (no response found!)
  18 2022-07-13 06:24:06.477129899 192.0.2.100  198.51.100.100  ICMP      102     0xa1e9 (41449)  64 Echo (ping) request  id=0x001a, seq=15/3840, ttl=64 (no response found!)
  19 2022-07-13 06:24:07.501291314 192.0.2.100  198.51.100.100  ICMP      108     0xa1f6 (41462)  64 Echo (ping) request  id=0x001a, seq=16/4096, ttl=64 (no response found!)
  20 2022-07-13 06:24:07.501293041 192.0.2.100  198.51.100.100  ICMP      102     0xa1f6 (41462)  64 Echo (ping) request  id=0x001a, seq=16/4096, ttl=64 (no response found!)
  21 2022-07-13 06:24:08.525089956 192.0.2.100  198.51.100.100  ICMP      108     0xa257 (41559)  64 Echo (ping) request  id=0x001a, seq=17/4352, ttl=64 (no response found!)
  22 2022-07-13 06:24:08.525092088 192.0.2.100  198.51.100.100  ICMP      102     0xa257 (41559)  64 Echo (ping) request  id=0x001a, seq=17/4352, ttl=64 (no response found!)
  23 2022-07-13 06:24:09.549236500 192.0.2.100  198.51.100.100  ICMP      108     0xa2a9 (41641)  64 Echo (ping) request  id=0x001a, seq=18/4608, ttl=64 (no response found!)
  24 2022-07-13 06:24:09.549238564 192.0.2.100  198.51.100.100  ICMP      102     0xa2a9 (41641)  64 Echo (ping) request  id=0x001a, seq=18/4608, ttl=64 (no response found!)
  25 2022-07-13 06:24:10.573110146 192.0.2.100  198.51.100.100  ICMP      108     0xa345 (41797)  64 Echo (ping) request  id=0x001a, seq=19/4864, ttl=64 (no response found!)
  26 2022-07-13 06:24:10.573112504 192.0.2.100  198.51.100.100  ICMP      102     0xa345 (41797)  64 Echo (ping) request  id=0x001a, seq=19/4864, ttl=64 (no response found!)
  27 2022-07-13 06:24:11.597086027 192.0.2.100  198.51.100.100  ICMP      108     0xa349 (41801)  64 Echo (ping) request  id=0x001a, seq=20/5120, ttl=64 (no response found!)
  28 2022-07-13 06:24:11.597088170 192.0.2.100  198.51.100.100  ICMP      102     0xa349 (41801)  64 Echo (ping) request  id=0x001a, seq=20/5120, ttl=64 (no response found!)
  29 2022-07-13 06:24:12.621061022 192.0.2.100  198.51.100.100  ICMP      108     0xa3dc (41948)  64 Echo (ping) request  id=0x001a, seq=21/5376, ttl=64 (no response found!)
```

```
> Frame 2: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_b9:77:0e (58:97:bd:b9:77:0e)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 81 00 00 66   X···w··P V······f
0010  08 00 45 00 00 54 9d ec  40 00 40 01 af c0 c0 00   ··E··T·· @·@·····
0020  02 64 c6 33 64 64 08 00  4e a2 00 1a 00 07 f4 64   ·d·3dd·· N······d
0030  ce 62 00 00 00 00 20 a2  07 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37                                  234567
```

Open the capture files for Portchannel1 member interfaces. Select the first packet and check the key points:

1. Only ICMP echo-request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts an additional port VLAN tag **1001** that identifies the ingress interface Portchannel1.
4. The internal switch inserts an additional VN tag.



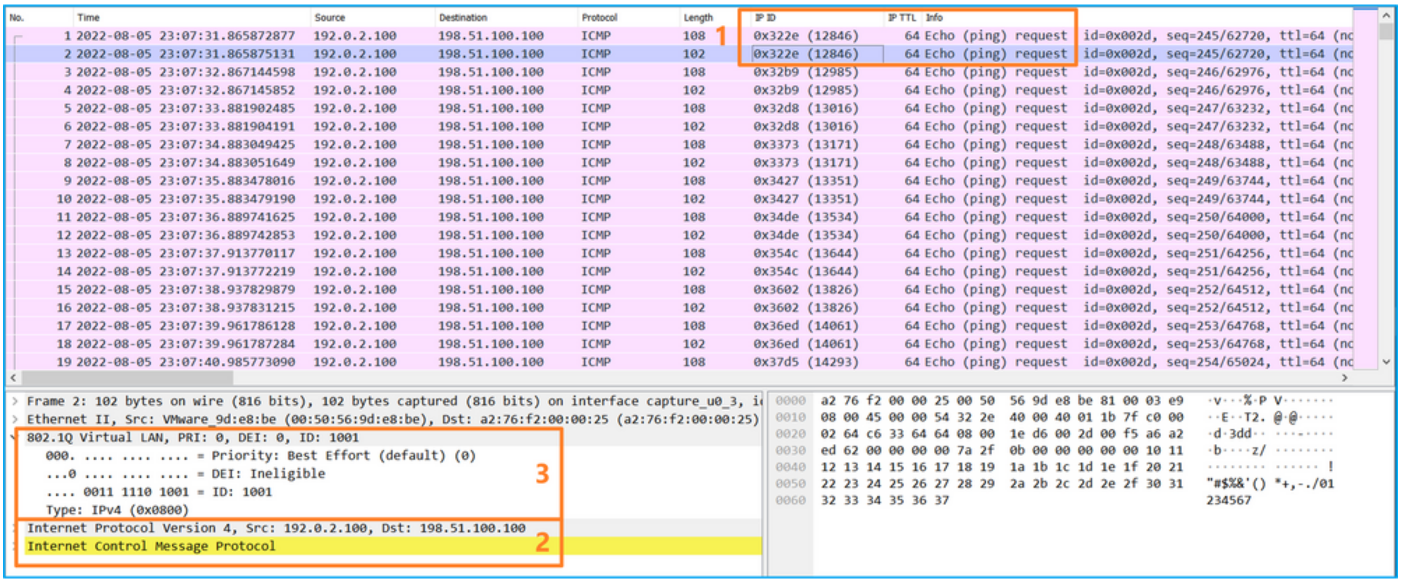
```
No.  Time                           Source       Destination     Protocol  Length  IP ID           IP TTL  Info
   1 2022-08-05 23:07:31.865872877 192.0.2.100  198.51.100.100  ICMP      108     0x322e (12846)  64 Echo (ping) request  id=0x002d, seq=245/62720, ttl=64 (nc
   2 2022-08-05 23:07:31.865875131 192.0.2.100  198.51.100.100  ICMP      102     0x322e (12846)  64 Echo (ping) request  id=0x002d, seq=245/62720, ttl=64 (nc
   3 2022-08-05 23:07:32.867144598 192.0.2.100  198.51.100.100  ICMP      108     0x32b9 (12985)  64 Echo (ping) request  id=0x002d, seq=246/62976, ttl=64 (nc
   4 2022-08-05 23:07:32.867145852 192.0.2.100  198.51.100.100  ICMP      102     0x32b9 (12985)  64 Echo (ping) request  id=0x002d, seq=246/62976, ttl=64 (nc
   5 2022-08-05 23:07:33.881902485 192.0.2.100  198.51.100.100  ICMP      108     0x32d8 (13016)  64 Echo (ping) request  id=0x002d, seq=247/63232, ttl=64 (nc
   6 2022-08-05 23:07:33.881904191 192.0.2.100  198.51.100.100  ICMP      102     0x32d8 (13016)  64 Echo (ping) request  id=0x002d, seq=247/63232, ttl=64 (nc
   7 2022-08-05 23:07:34.883049425 192.0.2.100  198.51.100.100  ICMP      108     0x3373 (13171)  64 Echo (ping) request  id=0x002d, seq=248/63488, ttl=64 (nc
   8 2022-08-05 23:07:34.883051649 192.0.2.100  198.51.100.100  ICMP      102     0x3373 (13171)  64 Echo (ping) request  id=0x002d, seq=248/63488, ttl=64 (nc
   9 2022-08-05 23:07:35.883478016 192.0.2.100  198.51.100.100  ICMP      108     0x3427 (13351)  64 Echo (ping) request  id=0x002d, seq=249/63744, ttl=64 (nc
  10 2022-08-05 23:07:35.883479190 192.0.2.100  198.51.100.100  ICMP      102     0x3427 (13351)  64 Echo (ping) request  id=0x002d, seq=249/63744, ttl=64 (nc
  11 2022-08-05 23:07:36.889741625 192.0.2.100  198.51.100.100  ICMP      108     0x34de (13534)  64 Echo (ping) request  id=0x002d, seq=250/64000, ttl=64 (nc
  12 2022-08-05 23:07:36.889742853 192.0.2.100  198.51.100.100  ICMP      102     0x34de (13534)  64 Echo (ping) request  id=0x002d, seq=250/64000, ttl=64 (nc
  13 2022-08-05 23:07:37.913770117 192.0.2.100  198.51.100.100  ICMP      108     0x354c (13644)  64 Echo (ping) request  id=0x002d, seq=251/64256, ttl=64 (nc
  14 2022-08-05 23:07:37.913772219 192.0.2.100  198.51.100.100  ICMP      102     0x354c (13644)  64 Echo (ping) request  id=0x002d, seq=251/64256, ttl=64 (nc
  15 2022-08-05 23:07:38.937829879 192.0.2.100  198.51.100.100  ICMP      108     0x3602 (13826)  64 Echo (ping) request  id=0x002d, seq=252/64512, ttl=64 (nc
  16 2022-08-05 23:07:38.937831215 192.0.2.100  198.51.100.100  ICMP      102     0x3602 (13826)  64 Echo (ping) request  id=0x002d, seq=252/64512, ttl=64 (nc
  17 2022-08-05 23:07:39.961786128 192.0.2.100  198.51.100.100  ICMP      108     0x36ed (14061)  64 Echo (ping) request  id=0x002d, seq=253/64768, ttl=64 (nc
  18 2022-08-05 23:07:39.961787284 192.0.2.100  198.51.100.100  ICMP      102     0x36ed (14061)  64 Echo (ping) request  id=0x002d, seq=253/64768, ttl=64 (nc
  19 2022-08-05 23:07:40.985773090 192.0.2.100  198.51.100.100  ICMP      108     0x37d5 (14293)  64 Echo (ping) request  id=0x002d, seq=254/65024, ttl=64 (nc
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_3, i
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: a2:76:f2:00:00:25 (a2:76:f2:00:00:25)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0101 0100 .... .... .... .... = Destination: 84
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1001
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0011 1110 1001 = ID: 1001
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 25 00 50  56 9d e8 be 89 26 80 54   ·v···%·P V····&·T
0010  00 00 81 00 03 e9 08 00  45 00 00 54 32 2e 40 00   ········ E··T2.@·
0020  40 01 1b 7f c0 00 02 64  c6 33 64 64 08 00 1e d6   @······d ·3dd····
0030  00 2d 00 f5 a6 a2 ed 62  00 00 00 00 7a 2f 0b 00   ·-·····b ····z/··
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Select the second packet and check the key points:

1. Only ICMP echo-request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts an additional port VLAN tag **1001** that identifies the ingress interface Portchannel1.



```
No.  Time                           Source       Destination     Protocol Length IP ID           IP TTL Info
   1 2022-08-05 23:07:31.865872877 192.0.2.100  198.51.100.100  ICMP     108    0x322e (12846)   64 Echo (ping) request  id=0x002d, seq=245/62720, ttl=64 (nc
   2 2022-08-05 23:07:31.865875131 192.0.2.100  198.51.100.100  ICMP     102    0x322e (12846)   64 Echo (ping) request  id=0x002d, seq=245/62720, ttl=64 (nc
   3 2022-08-05 23:07:32.867144598 192.0.2.100  198.51.100.100  ICMP     108    0x32b9 (12985)   64 Echo (ping) request  id=0x002d, seq=246/62976, ttl=64 (nc
   4 2022-08-05 23:07:32.867145852 192.0.2.100  198.51.100.100  ICMP     102    0x32b9 (12985)   64 Echo (ping) request  id=0x002d, seq=246/62976, ttl=64 (nc
   5 2022-08-05 23:07:33.881902485 192.0.2.100  198.51.100.100  ICMP     108    0x32d8 (13016)   64 Echo (ping) request  id=0x002d, seq=247/63232, ttl=64 (nc
   6 2022-08-05 23:07:33.881904191 192.0.2.100  198.51.100.100  ICMP     102    0x32d8 (13016)   64 Echo (ping) request  id=0x002d, seq=247/63232, ttl=64 (nc
   7 2022-08-05 23:07:34.883049425 192.0.2.100  198.51.100.100  ICMP     108    0x3373 (13171)   64 Echo (ping) request  id=0x002d, seq=248/63488, ttl=64 (nc
   8 2022-08-05 23:07:34.883051649 192.0.2.100  198.51.100.100  ICMP     102    0x3373 (13171)   64 Echo (ping) request  id=0x002d, seq=248/63488, ttl=64 (nc
   9 2022-08-05 23:07:35.883478016 192.0.2.100  198.51.100.100  ICMP     108    0x3427 (13351)   64 Echo (ping) request  id=0x002d, seq=249/63744, ttl=64 (nc
  10 2022-08-05 23:07:35.883479190 192.0.2.100  198.51.100.100  ICMP     102    0x3427 (13351)   64 Echo (ping) request  id=0x002d, seq=249/63744, ttl=64 (nc
  11 2022-08-05 23:07:36.889741625 192.0.2.100  198.51.100.100  ICMP     108    0x34de (13534)   64 Echo (ping) request  id=0x002d, seq=250/64000, ttl=64 (nc
  12 2022-08-05 23:07:36.889742853 192.0.2.100  198.51.100.100  ICMP     102    0x34de (13534)   64 Echo (ping) request  id=0x002d, seq=250/64000, ttl=64 (nc
  13 2022-08-05 23:07:37.913770117 192.0.2.100  198.51.100.100  ICMP     108    0x354c (13644)   64 Echo (ping) request  id=0x002d, seq=251/64256, ttl=64 (nc
  14 2022-08-05 23:07:37.913772219 192.0.2.100  198.51.100.100  ICMP     102    0x354c (13644)   64 Echo (ping) request  id=0x002d, seq=251/64256, ttl=64 (nc
  15 2022-08-05 23:07:38.937829879 192.0.2.100  198.51.100.100  ICMP     108    0x3602 (13826)   64 Echo (ping) request  id=0x002d, seq=252/64512, ttl=64 (nc
  16 2022-08-05 23:07:38.937831215 192.0.2.100  198.51.100.100  ICMP     102    0x3602 (13826)   64 Echo (ping) request  id=0x002d, seq=252/64512, ttl=64 (nc
  17 2022-08-05 23:07:39.961786128 192.0.2.100  198.51.100.100  ICMP     108    0x36ed (14061)   64 Echo (ping) request  id=0x002d, seq=253/64768, ttl=64 (nc
  18 2022-08-05 23:07:39.961787284 192.0.2.100  198.51.100.100  ICMP     102    0x36ed (14061)   64 Echo (ping) request  id=0x002d, seq=253/64768, ttl=64 (nc
  19 2022-08-05 23:07:40.985773090 192.0.2.100  198.51.100.100  ICMP     108    0x37d5 (14293)   64 Echo (ping) request  id=0x002d, seq=254/65024, ttl=64 (nc
```

```
> Frame 2: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface capture_u0_3, i
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: a2:76:f2:00:00:25 (a2:76:f2:00:00:25)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1001
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0011 1110 1001 = ID: 1001
    Type: IPv4 (0x0800)
  Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
  Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 25 00 50  56 9d e8 be 81 00 03 e9   ·v···%·P V·······
0010  08 00 45 00 00 54 32 2e  40 00 40 01 1b 7f c0 00   ··E··T2. @·@·····
0020  02 64 c6 33 64 64 08 00  1e d6 00 2d 00 f5 a6 a2   ·d·3dd·· ···-····
0030  ed 62 00 00 00 00 7a 2f  0b 00 00 00 00 00 10 11   ·b····z/ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37                                  234567
```

Explanation

When a packet capture on a front interface is configured, the switch simultaneously captures each packet twice:

- After the insertion of the port VLAN tag.
- After the insertion of the VN tag.

In the order of operations, the VN tag is inserted at a later stage than the port VLAN tag insertion. However, in the capture file, the packet with the VN tag is shown earlier than the packet with the port VLAN tag.

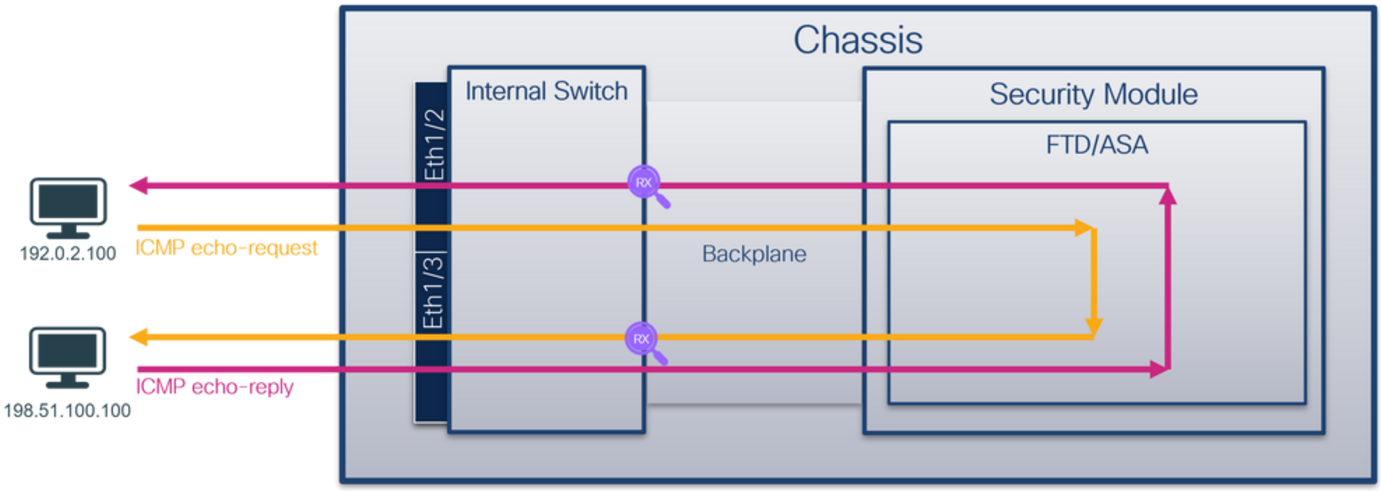
This table summarizes the task:

Task	**Capture point**	**Internal port VLAN in captured packets**	**Direction**	**Captured traffic**
Configure and verify a packet capture on interface Ethernet1/2	Ethernet1/2	102	Ingress only	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100
Configure and verify a packet capture on interface Portchannel1 with member interfaces Ethernet1/4 and Ethernet1/5	Ethernet1/4 Ethernet1/5	1001	Ingress only	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

Packet Captures on Backplane Interfaces

Use the FCM and CLI to configure and verify a packet capture on backplane interfaces.

Topology, packet flow, and the capture points

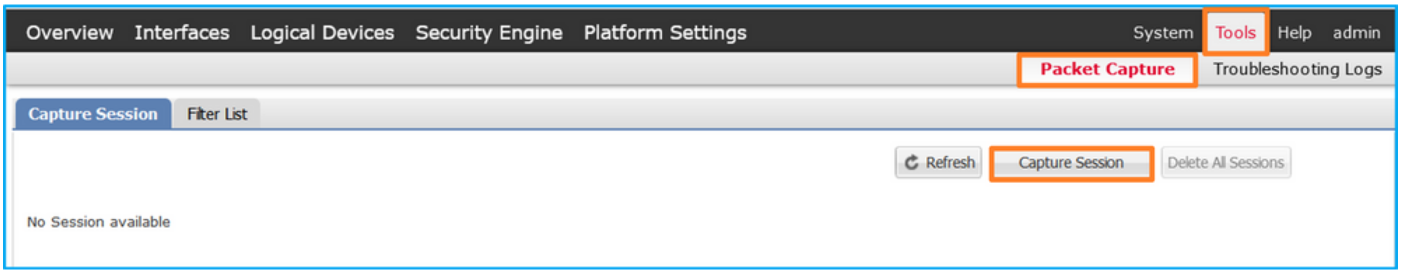


Configuration

FCM

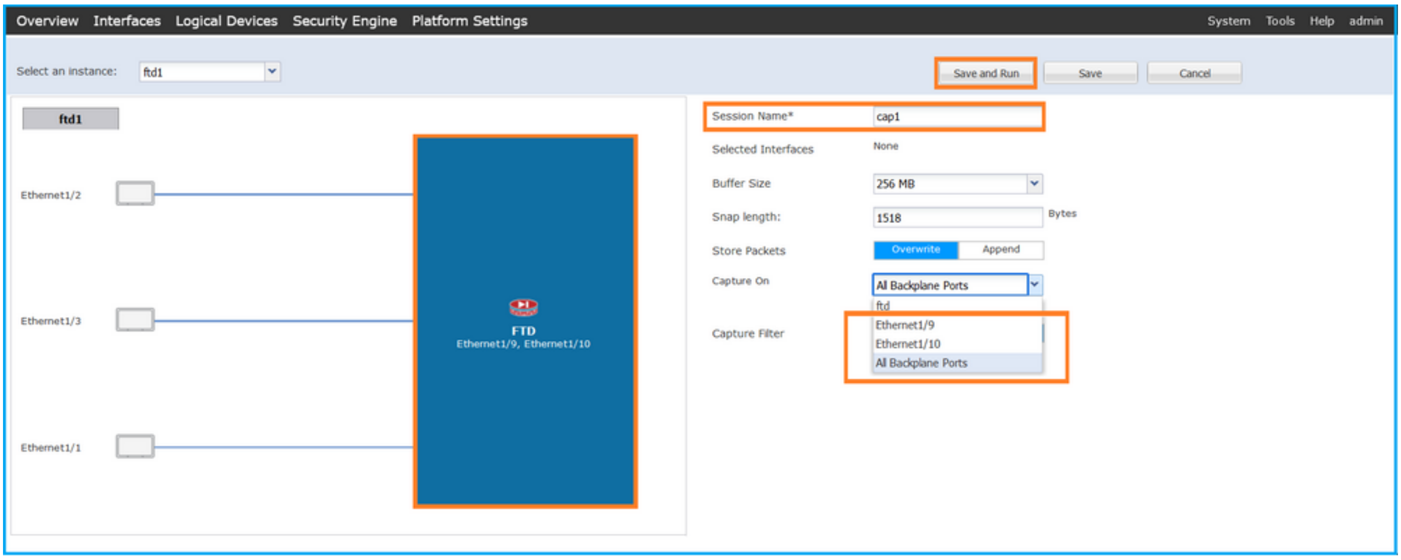
Perform these steps on FCM to configure packet captures on backplane interfaces:

1. Use **Tools > Packet Capture > Capture Session** to create a new capture session**:**



No Session available

2. To capture packets on all backplane interfaces, select the application, then **All Backplane Ports** from the **Capture On** the dropdown list. Alternatively, choose the specific backplane interface. In this case, backplane interfaces Ethernet1/9 and Ethernet1/10 are available. Provide the **Session Name** and click **Save and Run** to activate the capture**:**



Select an instance: ftd1

Session Name* cap1

Selected Interfaces None

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets [✓ Overwrite] Append

Capture On All Backplane Ports

Capture Filter

FXOS CLI

Perform these steps on FXOS CLI to configure packet captures on backplane interfaces:

1. Identify the application type and identifier:

<#root>

```
firepower#
scope ssa

firepower /ssa#
show app-instance

App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online           7.2.0.82        7.2.0.82        Native      No
```

2. Create a capture session:

<#root>

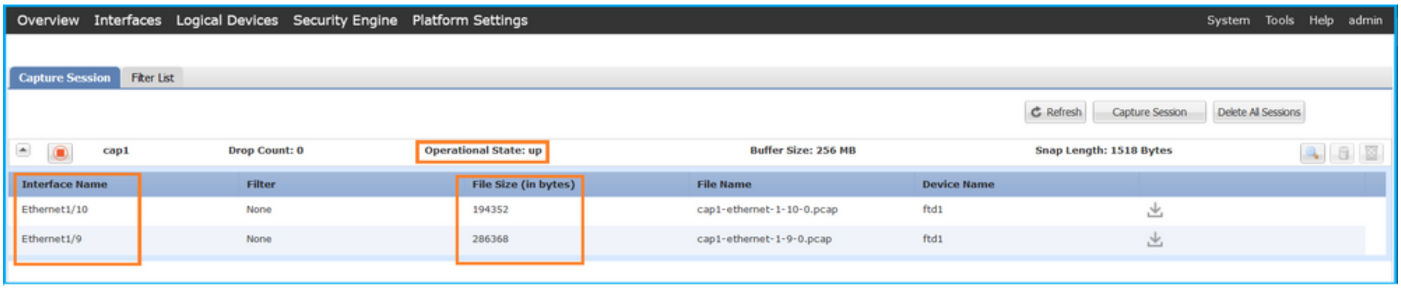
```
firepower#
scope packet-capture

firepower /packet-capture #
create session cap1

firepower /packet-capture/session* #
create phy-port Eth1/9

firepower /packet-capture/session/phy-port* #
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
up

firepower /packet-capture/session* #
create phy-port Eth1/10

firepower /packet-capture/session/phy-port* #
```

```
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
up

firepower /packet-capture/session* #
enable

firepower /packet-capture/session* #
commit

firepower /packet-capture/session #
```

Verification

FCM

Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/10	None	194352	cap1-ethernet-1-10-0.pcap	ftd1
Ethernet1/9	None	286368	cap1-ethernet-1-9-0.pcap	ftd1

FXOS CLI

Verify the capture details in **scope packet-capture**:

<#root>

```
firepower#
scope packet-capture

firepower /packet-capture #
show session cap1


Traffic Monitoring Session:
    Packet Capture Session Name: cap1
    Session: 1

Admin State: Enabled


    Oper State: Up


    Oper State Reason: Active


    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:


Slot Id: 1


    Port Id: 10


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-10-0.pcap


    Pcapsize: 1017424  bytes


    Filter:
    Sub Interface: 0

    Application Instance Identifier: ftd1


    Application Name: ftd



    Slot Id: 1


    Port Id: 9


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-9-0.pcap


    Pcapsize: 1557432  bytes


    Filter:
```

```
    Sub Interface: 0

    Application Instance Identifier: ftd1


    Application Name: ftd
```

Collect capture files

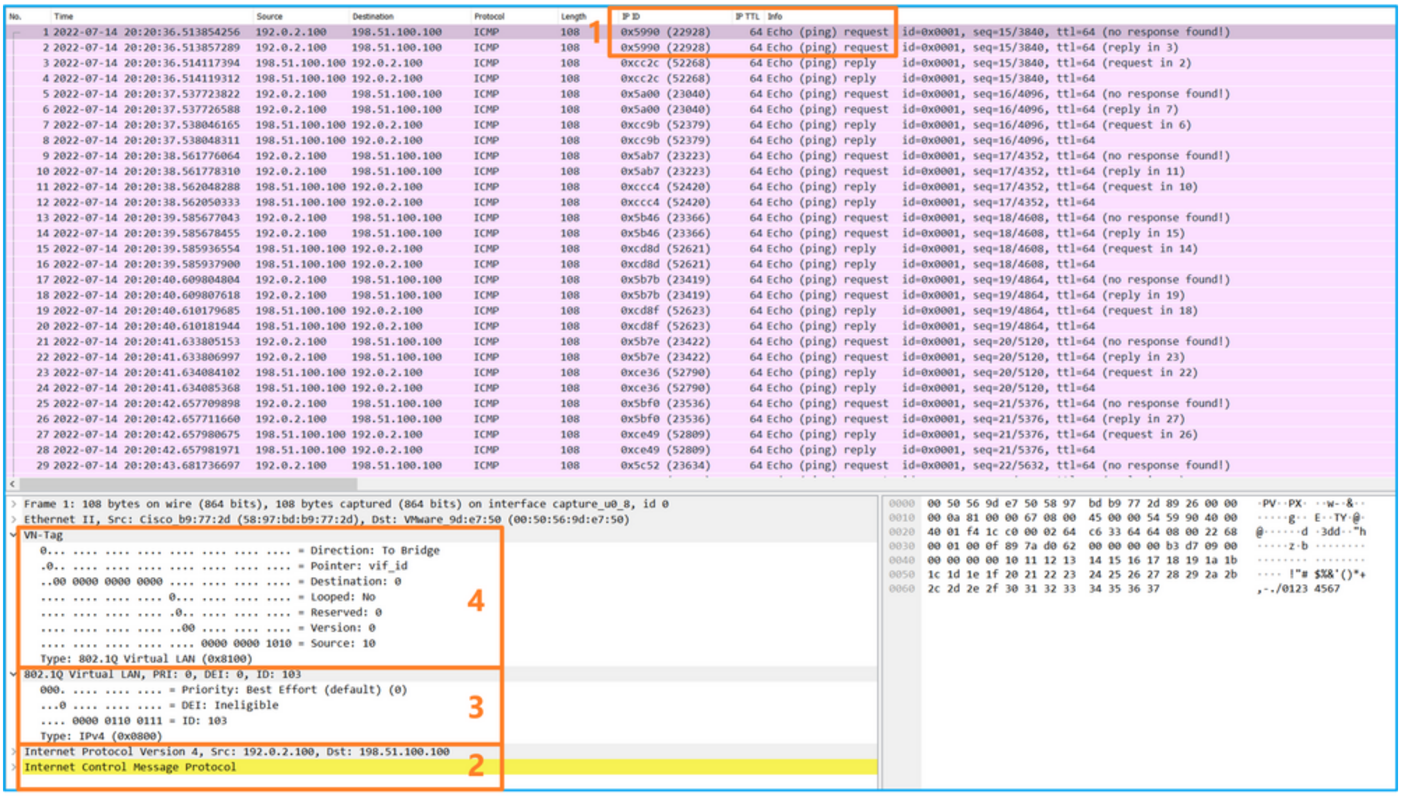
Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files. In the case of more than 1 backplane interface, ensure to open all capture files for each backplane interface. In this case, the packets are captured on the backplane interface Ethernet1/9.

Select the first and the second packets, and check the key points:

1. Each ICMP echo request packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **103** that identifies the egress interface Ethernet1/3.
4. The internal switch inserts an additional VN tag.



```
No. Time                          Source          Destination     Protocol  Length  IP ID          IP TTL Info
  1 2022-07-14 20:20:36.513854256 192.0.2.100     198.51.100.100  ICMP      108     0x5990 (22928)     64 Echo (ping) request  id=0x0001, seq=15/3840, ttl=64 (no response found!)
  2 2022-07-14 20:20:36.513857289 192.0.2.100     198.51.100.100  ICMP      108     0x5990 (22928)     64 Echo (ping) request  id=0x0001, seq=15/3840, ttl=64 (reply in 3)
  3 2022-07-14 20:20:36.514117394 198.51.100.100 192.0.2.100      ICMP      108     0xcc2c (52268)     64 Echo (ping) reply    id=0x0001, seq=15/3840, ttl=64 (request in 2)
  4 2022-07-14 20:20:36.514119312 198.51.100.100 192.0.2.100      ICMP      108     0xcc2c (52268)     64 Echo (ping) reply    id=0x0001, seq=15/3840, ttl=64
  5 2022-07-14 20:20:37.537723822 192.0.2.100     198.51.100.100  ICMP      108     0x5a00 (23040)     64 Echo (ping) request  id=0x0001, seq=16/4096, ttl=64 (no response found!)
  6 2022-07-14 20:20:37.537726588 192.0.2.100     198.51.100.100  ICMP      108     0x5a00 (23040)     64 Echo (ping) request  id=0x0001, seq=16/4096, ttl=64 (reply in 7)
  7 2022-07-14 20:20:37.538046165 198.51.100.100 192.0.2.100      ICMP      108     0xcc9b (52379)     64 Echo (ping) reply    id=0x0001, seq=16/4096, ttl=64 (request in 6)
  8 2022-07-14 20:20:37.538048311 198.51.100.100 192.0.2.100      ICMP      108     0xcc9b (52379)     64 Echo (ping) reply    id=0x0001, seq=16/4096, ttl=64
  9 2022-07-14 20:20:38.561776064 192.0.2.100     198.51.100.100  ICMP      108     0x5ab7 (23223)     64 Echo (ping) request  id=0x0001, seq=17/4352, ttl=64 (no response found!)
 10 2022-07-14 20:20:38.561778310 192.0.2.100     198.51.100.100  ICMP      108     0x5ab7 (23223)     64 Echo (ping) request  id=0x0001, seq=17/4352, ttl=64 (reply in 11)
 11 2022-07-14 20:20:38.562048288 198.51.100.100 192.0.2.100      ICMP      108     0xccc4 (52420)     64 Echo (ping) reply    id=0x0001, seq=17/4352, ttl=64 (request in 10)
 12 2022-07-14 20:20:38.562050333 198.51.100.100 192.0.2.100      ICMP      108     0xccc4 (52420)     64 Echo (ping) reply    id=0x0001, seq=17/4352, ttl=64
 13 2022-07-14 20:20:39.585677043 192.0.2.100     198.51.100.100  ICMP      108     0x5b46 (23366)     64 Echo (ping) request  id=0x0001, seq=18/4608, ttl=64 (no response found!)
 14 2022-07-14 20:20:39.585678455 192.0.2.100     198.51.100.100  ICMP      108     0x5b46 (23366)     64 Echo (ping) request  id=0x0001, seq=18/4608, ttl=64 (reply in 15)
 15 2022-07-14 20:20:39.585936554 198.51.100.100 192.0.2.100      ICMP      108     0xcd8d (52621)     64 Echo (ping) reply    id=0x0001, seq=18/4608, ttl=64 (request in 14)
 16 2022-07-14 20:20:39.585937900 198.51.100.100 192.0.2.100      ICMP      108     0xcd8d (52621)     64 Echo (ping) reply    id=0x0001, seq=18/4608, ttl=64
 17 2022-07-14 20:20:40.609804804 192.0.2.100     198.51.100.100  ICMP      108     0x5b7b (23419)     64 Echo (ping) request  id=0x0001, seq=19/4864, ttl=64 (no response found!)
 18 2022-07-14 20:20:40.609807618 192.0.2.100     198.51.100.100  ICMP      108     0x5b7b (23419)     64 Echo (ping) request  id=0x0001, seq=19/4864, ttl=64 (reply in 19)
 19 2022-07-14 20:20:40.610179685 198.51.100.100 192.0.2.100      ICMP      108     0xcd8f (52623)     64 Echo (ping) reply    id=0x0001, seq=19/4864, ttl=64 (request in 18)
 20 2022-07-14 20:20:40.610181944 198.51.100.100 192.0.2.100      ICMP      108     0xcd8f (52623)     64 Echo (ping) reply    id=0x0001, seq=19/4864, ttl=64
 21 2022-07-14 20:20:41.633805153 192.0.2.100     198.51.100.100  ICMP      108     0x5b7e (23422)     64 Echo (ping) request  id=0x0001, seq=20/5120, ttl=64 (no response found!)
 22 2022-07-14 20:20:41.633806997 192.0.2.100     198.51.100.100  ICMP      108     0x5b7e (23422)     64 Echo (ping) request  id=0x0001, seq=20/5120, ttl=64 (reply in 23)
 23 2022-07-14 20:20:41.634084102 198.51.100.100 192.0.2.100      ICMP      108     0xce36 (52790)     64 Echo (ping) reply    id=0x0001, seq=20/5120, ttl=64 (request in 22)
 24 2022-07-14 20:20:41.634085368 198.51.100.100 192.0.2.100      ICMP      108     0xce36 (52790)     64 Echo (ping) reply    id=0x0001, seq=20/5120, ttl=64
 25 2022-07-14 20:20:42.657709898 192.0.2.100     198.51.100.100  ICMP      108     0x5bf0 (23536)     64 Echo (ping) request  id=0x0001, seq=21/5376, ttl=64 (no response found!)
 26 2022-07-14 20:20:42.657711660 192.0.2.100     198.51.100.100  ICMP      108     0x5bf0 (23536)     64 Echo (ping) request  id=0x0001, seq=21/5376, ttl=64 (reply in 27)
 27 2022-07-14 20:20:42.657980675 198.51.100.100 192.0.2.100      ICMP      108     0xce49 (52809)     64 Echo (ping) reply    id=0x0001, seq=21/5376, ttl=64 (request in 26)
 28 2022-07-14 20:20:42.657981971 198.51.100.100 192.0.2.100      ICMP      108     0xce49 (52809)     64 Echo (ping) reply    id=0x0001, seq=21/5376, ttl=64
 29 2022-07-14 20:20:43.681736697 192.0.2.100     198.51.100.100  ICMP      108     0x5c52 (23634)     64 Echo (ping) request  id=0x0001, seq=22/5632, ttl=64 (no response found!)
```

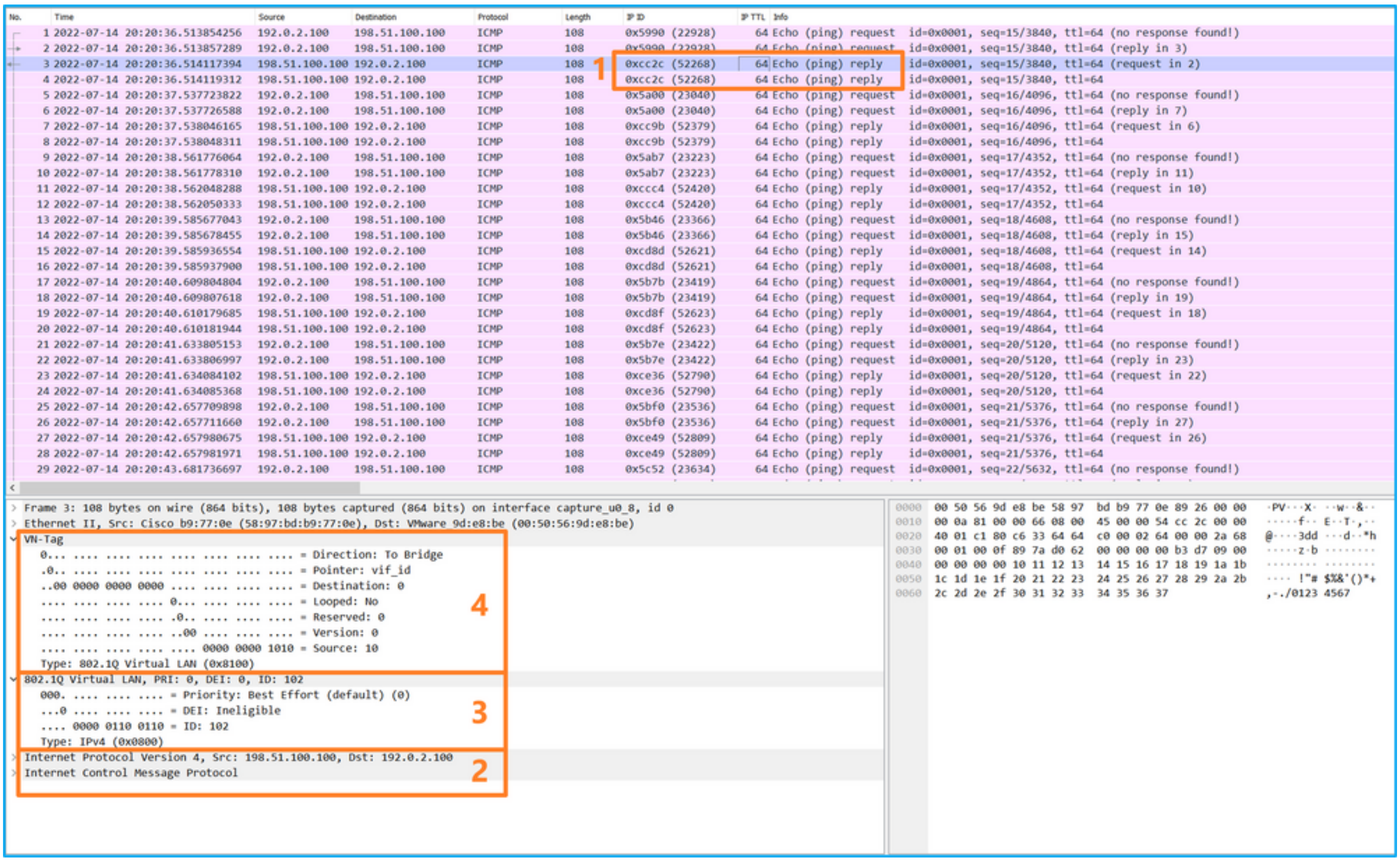
```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_8, id 0
> Ethernet II, Src: Cisco_b9:77:2d (58:97:bd:b9:77:2d), Dst: VMware_9d:e7:50 (00:50:56:9d:e7:50)
v VN-Tag
    0... .... .... .... .... .... .... .... = Direction: To Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 0000 .... .... .... .... = Destination: 0
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 1010 = Source: 10
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 103
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0111 = ID: 103
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  00 50 56 9d e7 50 58 97  bd b9 77 2d 89 26 00 00   ·PV··PX· ··w-·&··
0010  00 0a 81 00 00 67 08 00  45 00 00 54 59 90 40 00   ·····g·· E··TY·@·
0020  40 01 f4 1c c0 00 02 64  c6 33 64 64 08 00 22 68   @······d ·3dd··"h
0030  00 01 00 0f 89 7a d0 62  00 00 00 00 b3 d7 09 00   ·····z·b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Select the third and the fourth packets, and check the key points:

1. Each ICMP echo reply is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the egress interface Ethernet1/2.

4. The internal switch inserts an additional VN tag.



```
No. Time                          Source          Destination     Protocol Length IP ID          IP TTL Info
  1 2022-07-14 20:20:36.513854256 192.0.2.100     198.51.100.100  ICMP     108    0x5990 (22928)    64 Echo (ping) request  id=0x0001, seq=15/3840, ttl=64 (no response found!)
  2 2022-07-14 20:20:36.513857289 192.0.2.100     198.51.100.100  ICMP     108    0x5990 (22928)    64 Echo (ping) request  id=0x0001, seq=15/3840, ttl=64 (reply in 3)
  3 2022-07-14 20:20:36.514117394 198.51.100.100  192.0.2.100     ICMP     108    0xcc2c (52268)    64 Echo (ping) reply    id=0x0001, seq=15/3840, ttl=64 (request in 2)
  4 2022-07-14 20:20:36.514119312 198.51.100.100  192.0.2.100     ICMP     108    0xcc2c (52268)    64 Echo (ping) reply    id=0x0001, seq=15/3840, ttl=64
  5 2022-07-14 20:20:37.537723822 192.0.2.100     198.51.100.100  ICMP     108    0x5a00 (23040)    64 Echo (ping) request  id=0x0001, seq=16/4096, ttl=64 (no response found!)
  6 2022-07-14 20:20:37.537726588 192.0.2.100     198.51.100.100  ICMP     108    0x5a00 (23040)    64 Echo (ping) request  id=0x0001, seq=16/4096, ttl=64 (reply in 7)
  7 2022-07-14 20:20:37.538046165 198.51.100.100  192.0.2.100     ICMP     108    0xcc9b (52379)    64 Echo (ping) reply    id=0x0001, seq=16/4096, ttl=64 (request in 6)
  8 2022-07-14 20:20:37.538048311 198.51.100.100  192.0.2.100     ICMP     108    0xcc9b (52379)    64 Echo (ping) reply    id=0x0001, seq=16/4096, ttl=64
  9 2022-07-14 20:20:38.561776064 192.0.2.100     198.51.100.100  ICMP     108    0x5ab7 (23223)    64 Echo (ping) request  id=0x0001, seq=17/4352, ttl=64 (no response found!)
 10 2022-07-14 20:20:38.561778310 192.0.2.100     198.51.100.100  ICMP     108    0x5ab7 (23223)    64 Echo (ping) request  id=0x0001, seq=17/4352, ttl=64 (reply in 11)
 11 2022-07-14 20:20:38.562048288 198.51.100.100  192.0.2.100     ICMP     108    0xccc4 (52420)    64 Echo (ping) reply    id=0x0001, seq=17/4352, ttl=64 (request in 10)
 12 2022-07-14 20:20:38.562050333 198.51.100.100  192.0.2.100     ICMP     108    0xccc4 (52420)    64 Echo (ping) reply    id=0x0001, seq=17/4352, ttl=64
 13 2022-07-14 20:20:39.585677043 192.0.2.100     198.51.100.100  ICMP     108    0x5b46 (23366)    64 Echo (ping) request  id=0x0001, seq=18/4608, ttl=64 (no response found!)
 14 2022-07-14 20:20:39.585678455 192.0.2.100     198.51.100.100  ICMP     108    0x5b46 (23366)    64 Echo (ping) request  id=0x0001, seq=18/4608, ttl=64 (reply in 15)
 15 2022-07-14 20:20:39.585936554 198.51.100.100  192.0.2.100     ICMP     108    0xcd8d (52621)    64 Echo (ping) reply    id=0x0001, seq=18/4608, ttl=64 (request in 14)
 16 2022-07-14 20:20:39.585937900 198.51.100.100  192.0.2.100     ICMP     108    0xcd8d (52621)    64 Echo (ping) reply    id=0x0001, seq=18/4608, ttl=64
 17 2022-07-14 20:20:40.609804804 192.0.2.100     198.51.100.100  ICMP     108    0x5b7b (23419)    64 Echo (ping) request  id=0x0001, seq=19/4864, ttl=64 (no response found!)
 18 2022-07-14 20:20:40.609807618 192.0.2.100     198.51.100.100  ICMP     108    0x5b7b (23419)    64 Echo (ping) request  id=0x0001, seq=19/4864, ttl=64 (reply in 19)
 19 2022-07-14 20:20:40.610179685 198.51.100.100  192.0.2.100     ICMP     108    0xcd8f (52623)    64 Echo (ping) reply    id=0x0001, seq=19/4864, ttl=64 (request in 18)
 20 2022-07-14 20:20:40.610181944 198.51.100.100  192.0.2.100     ICMP     108    0xcd8f (52623)    64 Echo (ping) reply    id=0x0001, seq=19/4864, ttl=64
 21 2022-07-14 20:20:41.633805153 192.0.2.100     198.51.100.100  ICMP     108    0x5b7e (23422)    64 Echo (ping) request  id=0x0001, seq=20/5120, ttl=64 (no response found!)
 22 2022-07-14 20:20:41.633806997 192.0.2.100     198.51.100.100  ICMP     108    0x5b7e (23422)    64 Echo (ping) request  id=0x0001, seq=20/5120, ttl=64 (reply in 23)
 23 2022-07-14 20:20:41.634084102 198.51.100.100  192.0.2.100     ICMP     108    0xce36 (52790)    64 Echo (ping) reply    id=0x0001, seq=20/5120, ttl=64 (request in 22)
 24 2022-07-14 20:20:41.634085368 198.51.100.100  192.0.2.100     ICMP     108    0xce36 (52790)    64 Echo (ping) reply    id=0x0001, seq=20/5120, ttl=64
 25 2022-07-14 20:20:42.657709898 192.0.2.100     198.51.100.100  ICMP     108    0x5bf0 (23536)    64 Echo (ping) request  id=0x0001, seq=21/5376, ttl=64 (no response found!)
 26 2022-07-14 20:20:42.657711660 192.0.2.100     198.51.100.100  ICMP     108    0x5bf0 (23536)    64 Echo (ping) request  id=0x0001, seq=21/5376, ttl=64 (reply in 27)
 27 2022-07-14 20:20:42.657980675 198.51.100.100  192.0.2.100     ICMP     108    0xce49 (52809)    64 Echo (ping) reply    id=0x0001, seq=21/5376, ttl=64 (request in 26)
 28 2022-07-14 20:20:42.657981971 198.51.100.100  192.0.2.100     ICMP     108    0xce49 (52809)    64 Echo (ping) reply    id=0x0001, seq=21/5376, ttl=64
 29 2022-07-14 20:20:43.681736697 192.0.2.100     198.51.100.100  ICMP     108    0x5c52 (23634)    64 Echo (ping) request  id=0x0001, seq=22/5632, ttl=64 (no response found!)
```

```
> Frame 3: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_8, id 0
> Ethernet II, Src: Cisco_b9:77:0e (58:97:bd:b9:77:0e), Dst: VMware_9d:e8:be (00:50:56:9d:e8:be)
v VN-Tag
    0... .... .... .... .... .... .... .... = Direction: To Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 0000 .... .... .... .... = Destination: 0
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 1010 = Source: 10
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 198.51.100.100, Dst: 192.0.2.100
> Internet Control Message Protocol
```

```
0000  00 50 56 9d e8 be 58 97  bd b9 77 0e 89 26 00 00   ·PV···X· ··w··&··
0010  00 0a 81 00 00 66 08 00  45 00 00 54 cc 2c 00 00   ·····f·· E··T·,··
0020  40 01 c1 80 c6 33 64 64  c0 00 02 64 00 00 2a 68   @····3dd ···d··*h
0030  00 01 00 0f 89 7a d0 62  00 00 00 00 b3 d7 09 00   ·····z·b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Explanation

When a packet capture on a backplane interface is configured, the switch simultaneously captures each packet twice. In this case, the internal switch receives packets that are already tagged by the application on the security module with the port VLAN tag and the VN tag. The VLAN tag identifies the egress interface that the internal chassis uses to forward the packets to the network. The VLAN tag 103 in ICMP echo request packets identifies Ethernet1/3 as the egress interface, while VLAN tag 102 in ICMP echo reply packets identifies Ethernet1/2 as the egress interface. The internal switch removes the VN tag and the internal interface VLAN tag before the packets are forwarded to the network.

This table summarizes the task:

Task	**Capture point**	**Internal port VLAN in captured packets**	**Direction**	**Captured traffic**
Configure and verify packet captures on backplane interfaces	Backplane interfaces	102 103	Ingress only	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100 ICMP echo replies from host 198.51.100.100 to host 192.0.2.100

Packet Captures on Application and Application Ports

Application or application port packet captures are always configured on backplane interfaces and additionally on the front interfaces if the user specifies the application capture direction.

There are mainly 2 use cases:

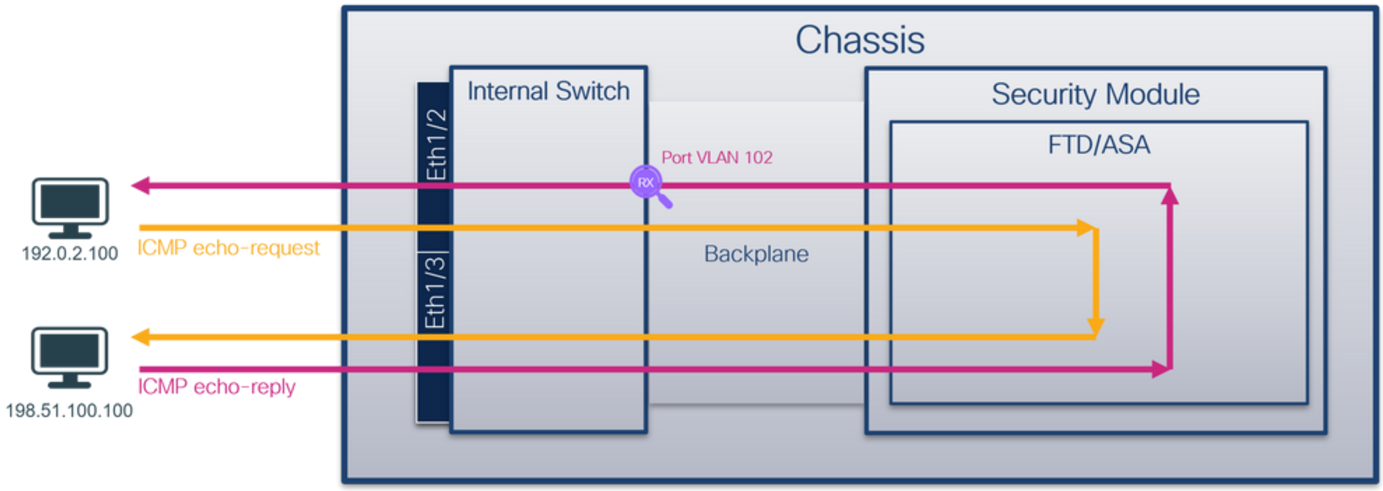
- Configure packet captures on backplane interfaces for packets that leave a specific front interface. For example, configure packet captures on the backplane interface Ethernet1/9 for packets that leave interface Ethernet1/2.
- Configure simultaneous packet captures on a specific front interface and the backplane interfaces. For example, configure simultaneous packet captures on interface Ethernet1/2 and on the backplane interface Ethernet1/9 for packets that leave interface Ethernet1/2.

This section covers both use cases.

Task 1

Use the FCM and CLI to configure and verify a packet capture on the backplane interface. Packets for which the application port Ethernet1/2 is identified as the egress interface are captured. In this case, ICMP replies are captured.

Topology, packet flow, and the capture points

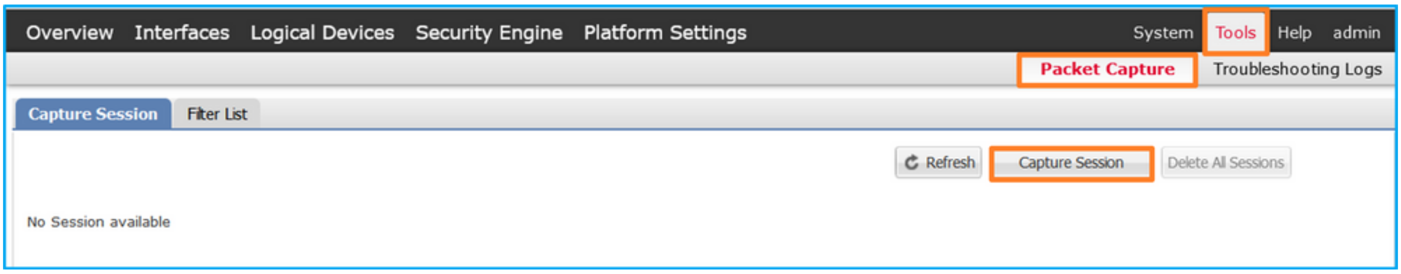


Configuration

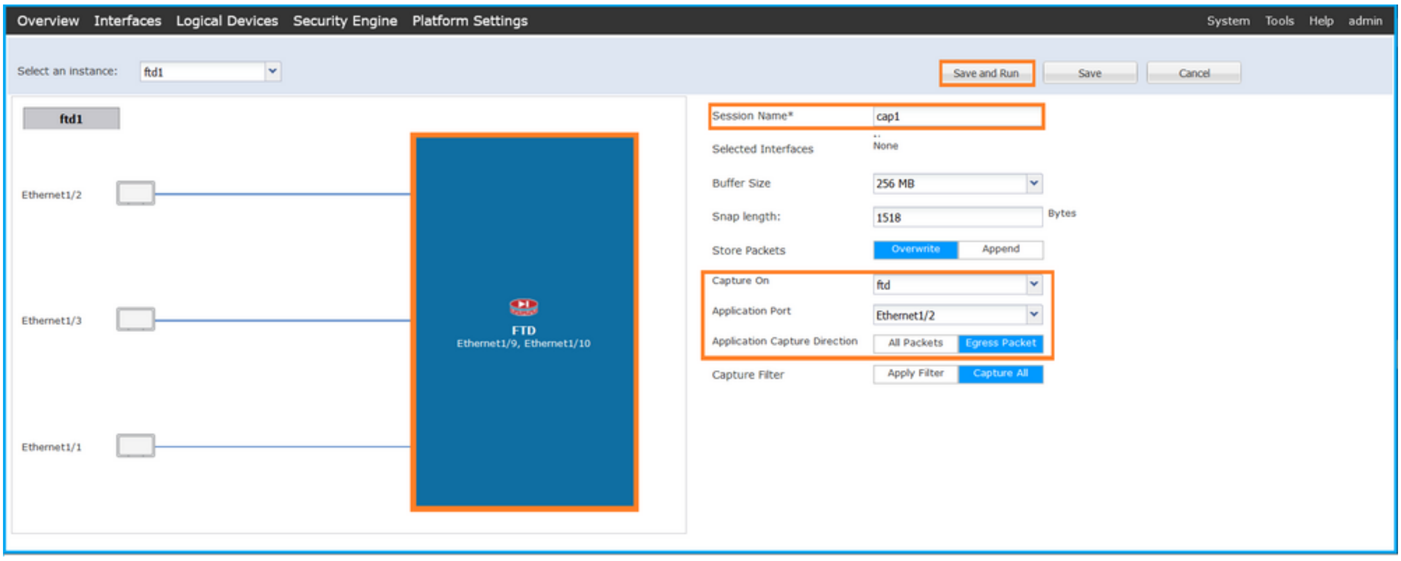
FCM

Perform these steps on FCM to configure a packet capture on the FTD application and the application port Ethernet1/2:

1. Use **Tools > Packet Capture > Capture Session** to create a new capture session**:**



2. Select the application, **Ethernet1/2** in the **Application Port** dropdown list and select **Egress Packet** in the **Application Capture Direction**. Provide the **Session Name** and click **Save and Run** to activate the capture**:**



Select an instance: ftd1

Session Name* cap1

Selected Interfaces None

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets: Overwrite

Capture On ftd

Application Port Ethernet1/2

Application Capture Direction Egress Packet

Capture Filter Capture All

FXOS CLI

Perform these steps on FXOS CLI to configure packet captures on backplane interfaces:

1. Identify the application type and identifier:

<#root>

```
firepower#
scope ssa

firepower /ssa#
show app-instance

App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online           7.2.0.82        7.2.0.82        Native       No
```

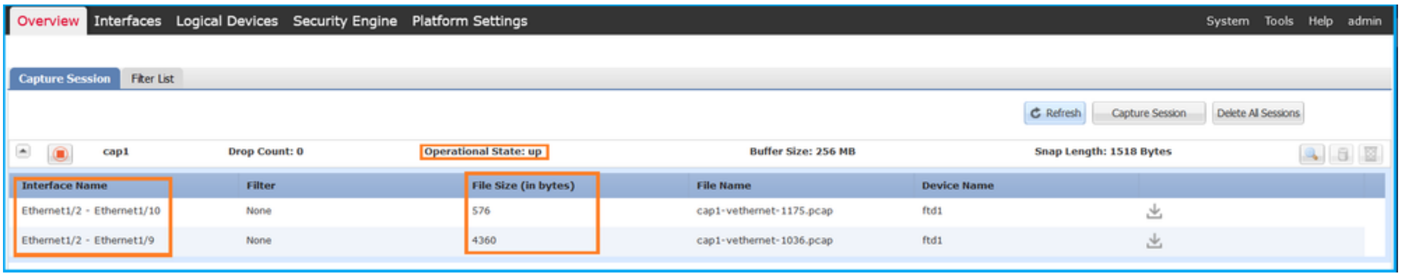
2. Create a capture session:

```
<#root>

firepower#

scope packet-capture


firepower /packet-capture #

create session cap1


firepower /packet-capture/session* #

create app-port 1 l12 Ethernet1/2 ftd


firepower /packet-capture/session/app-port* #

set app-identifier ftd1


firepower /packet-capture/session/app-port* #

set filter ""


firepower /packet-capture/session/app-port* #

set subinterface 0


firepower /packet-capture/session/app-port* #

up


firepower /packet-capture/session* #

commit

firepower /packet-capture/session #
```

Verification

FCM

Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2 - Ethernet1/10	None	576	cap1-vethernet-1175.pcap	ftd1
Ethernet1/2 - Ethernet1/9	None	4360	cap1-vethernet-1036.pcap	ftd1

FXOS CLI

Verify the capture details in **scope packet-capture**:

<#root>

```
firepower#

scope packet-capture


firepower /packet-capture #

show session cap1



Traffic Monitoring Session:

    Packet Capture Session Name: cap1


    Session: 1

    Admin State: Enabled



    Oper State: Up



    Oper State Reason: Active


    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Application ports involved in Packet Capture:

    Slot Id: 1



    Link Name: l12



    Port Name: Ethernet1/2


    App Name: ftd
    Sub Interface: 0

    Application Instance Identifier: ftd1



Application ports resolved to:

    Name: vnic1



    Eq Slot Id: 1



    Eq Port Id: 9
    Pcapfile: /workspace/packet-capture/session-1/cap1-vethernet-1036.pcap

    Pcapsize: 53640  bytes


Vlan: 102

    Filter:

Name: vnic2

    Eq Slot Id: 1

    Eq Port Id: 10

    Pcapfile: /workspace/packet-capture/session-1/cap1-vethernet-1175.pcap

    Pcapsize: 1824  bytes


Vlan: 102

    Filter:
```

Collect capture files

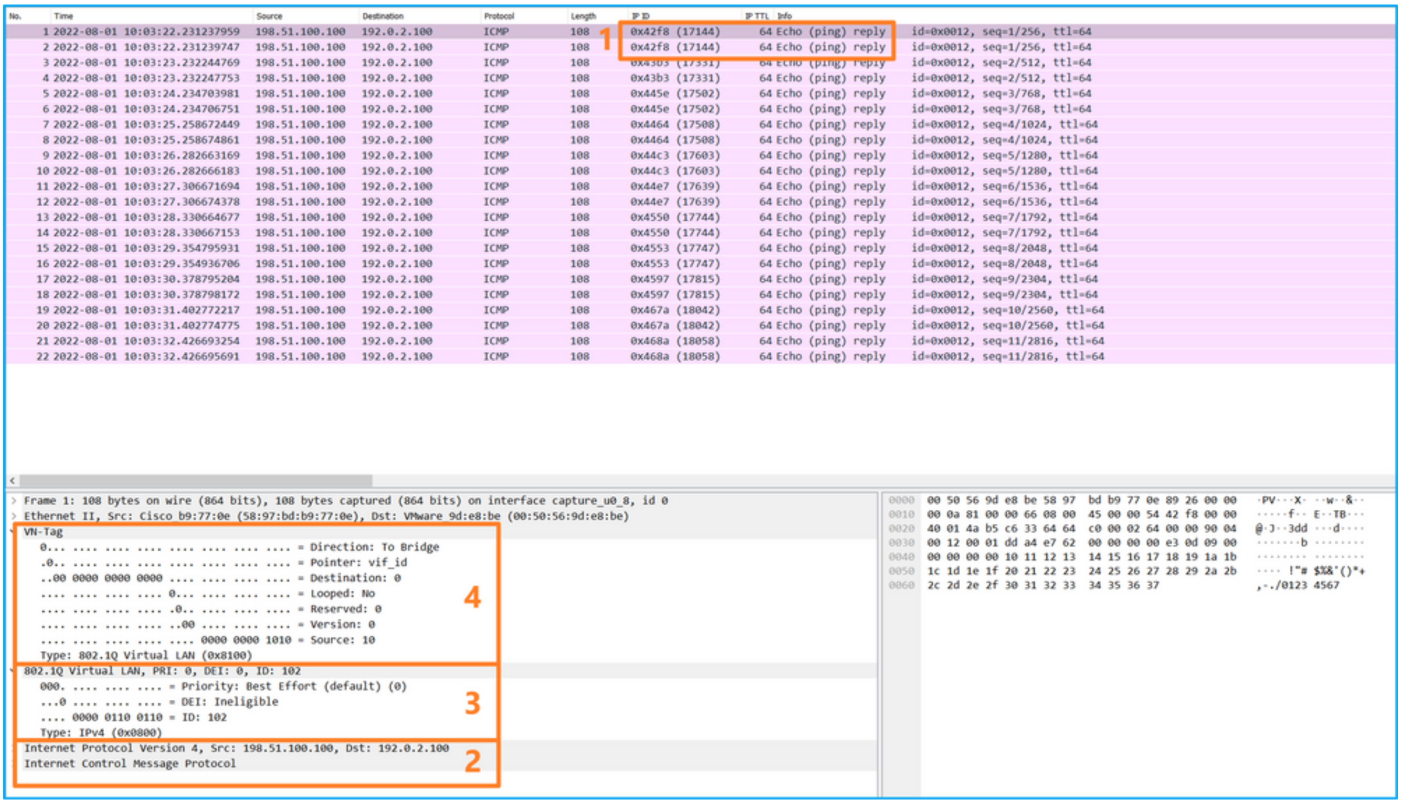
Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files. In the case of multiple backplane interfaces, ensure to open all capture files for each backplane interface. In this case, the packets are captured on the backplane interface Ethernet1/9.

Select the first and the second packets, and check the key points:

1. Each ICMP echo reply is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the egress interface Ethernet1/2.
4. The internal switch inserts an additional VN tag.



```
No.  Time                           Source          Destination  Protocol  Length  IP ID           IP TTL  Info
   1 2022-08-01 10:03:22.231237959  198.51.100.100  192.0.2.100  ICMP      108     0x42f8 (17144)  64 Echo (ping) reply   id=0x0012, seq=1/256, ttl=64
   2 2022-08-01 10:03:22.231239747  198.51.100.100  192.0.2.100  ICMP      108     0x42f8 (17144)  64 Echo (ping) reply   id=0x0012, seq=1/256, ttl=64
   3 2022-08-01 10:03:23.232244769  198.51.100.100  192.0.2.100  ICMP      108     0x43b3 (17331)  64 Echo (ping) reply   id=0x0012, seq=2/512, ttl=64
   4 2022-08-01 10:03:23.232247753  198.51.100.100  192.0.2.100  ICMP      108     0x43b3 (17331)  64 Echo (ping) reply   id=0x0012, seq=2/512, ttl=64
   5 2022-08-01 10:03:24.234703981  198.51.100.100  192.0.2.100  ICMP      108     0x445e (17502)  64 Echo (ping) reply   id=0x0012, seq=3/768, ttl=64
   6 2022-08-01 10:03:24.234706751  198.51.100.100  192.0.2.100  ICMP      108     0x445e (17502)  64 Echo (ping) reply   id=0x0012, seq=3/768, ttl=64
   7 2022-08-01 10:03:25.258672449  198.51.100.100  192.0.2.100  ICMP      108     0x4464 (17508)  64 Echo (ping) reply   id=0x0012, seq=4/1024, ttl=64
   8 2022-08-01 10:03:25.258674861  198.51.100.100  192.0.2.100  ICMP      108     0x4464 (17508)  64 Echo (ping) reply   id=0x0012, seq=4/1024, ttl=64
   9 2022-08-01 10:03:26.282663169  198.51.100.100  192.0.2.100  ICMP      108     0x44c3 (17603)  64 Echo (ping) reply   id=0x0012, seq=5/1280, ttl=64
  10 2022-08-01 10:03:26.282666183  198.51.100.100  192.0.2.100  ICMP      108     0x44c3 (17603)  64 Echo (ping) reply   id=0x0012, seq=5/1280, ttl=64
  11 2022-08-01 10:03:27.306671694  198.51.100.100  192.0.2.100  ICMP      108     0x44e7 (17639)  64 Echo (ping) reply   id=0x0012, seq=6/1536, ttl=64
  12 2022-08-01 10:03:27.306674378  198.51.100.100  192.0.2.100  ICMP      108     0x44e7 (17639)  64 Echo (ping) reply   id=0x0012, seq=6/1536, ttl=64
  13 2022-08-01 10:03:28.330664677  198.51.100.100  192.0.2.100  ICMP      108     0x4550 (17744)  64 Echo (ping) reply   id=0x0012, seq=7/1792, ttl=64
  14 2022-08-01 10:03:28.330667153  198.51.100.100  192.0.2.100  ICMP      108     0x4550 (17744)  64 Echo (ping) reply   id=0x0012, seq=7/1792, ttl=64
  15 2022-08-01 10:03:29.354795931  198.51.100.100  192.0.2.100  ICMP      108     0x4553 (17747)  64 Echo (ping) reply   id=0x0012, seq=8/2048, ttl=64
  16 2022-08-01 10:03:29.354936706  198.51.100.100  192.0.2.100  ICMP      108     0x4553 (17747)  64 Echo (ping) reply   id=0x0012, seq=8/2048, ttl=64
  17 2022-08-01 10:03:30.378795204  198.51.100.100  192.0.2.100  ICMP      108     0x4597 (17815)  64 Echo (ping) reply   id=0x0012, seq=9/2304, ttl=64
  18 2022-08-01 10:03:30.378798172  198.51.100.100  192.0.2.100  ICMP      108     0x4597 (17815)  64 Echo (ping) reply   id=0x0012, seq=9/2304, ttl=64
  19 2022-08-01 10:03:31.402772217  198.51.100.100  192.0.2.100  ICMP      108     0x467a (18042)  64 Echo (ping) reply   id=0x0012, seq=10/2560, ttl=64
  20 2022-08-01 10:03:31.402774775  198.51.100.100  192.0.2.100  ICMP      108     0x467a (18042)  64 Echo (ping) reply   id=0x0012, seq=10/2560, ttl=64
  21 2022-08-01 10:03:32.426693254  198.51.100.100  192.0.2.100  ICMP      108     0x468a (18058)  64 Echo (ping) reply   id=0x0012, seq=11/2816, ttl=64
  22 2022-08-01 10:03:32.426695691  198.51.100.100  192.0.2.100  ICMP      108     0x468a (18058)  64 Echo (ping) reply   id=0x0012, seq=11/2816, ttl=64
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_8, id 0
> Ethernet II, Src: Cisco_b9:77:0e (58:97:bd:b9:77:0e), Dst: VMware_9d:e8:be (00:50:56:9d:e8:be)
v VN-Tag
    0... .... .... .... .... .... .... .... = Direction: To Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 0000 .... .... .... .... = Destination: 0
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 1010 = Source: 10
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 198.51.100.100, Dst: 192.0.2.100
> Internet Control Message Protocol
```

```
0000  00 50 56 9d e8 be 58 97  bd b9 77 0e 89 26 00 00   ·PV···X· ··w··&··
0010  00 0a 81 00 00 66 08 00  45 00 00 54 42 f8 00 00   ·····f·· E··TB···
0020  40 01 4a b5 c6 33 64 64  c0 00 02 64 00 00 90 04   @·J··3dd ···d····
0030  00 12 00 01 dd a4 e7 62  00 00 00 00 e3 0d 09 00   ·······b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Explanation

In this case, Ethernet1/2 with port VLAN tag 102 is the egress interface for the ICMP echo reply packets.

When the application capture direction is set to **Egress** in the capture options, packets with the port VLAN tag 102 in the Ethernet header are captured on the backplane interfaces in the ingress direction.

This table summarizes the task:

Task	Capture point	Internal port VLAN in captured packets	Direction	Captured traffic
Configure and verify captures on application and application port Ethernet1/2	Backplane interfaces	102	Ingress only	ICMP echo replies from host 198.51.100.100 to host 192.0.2.100

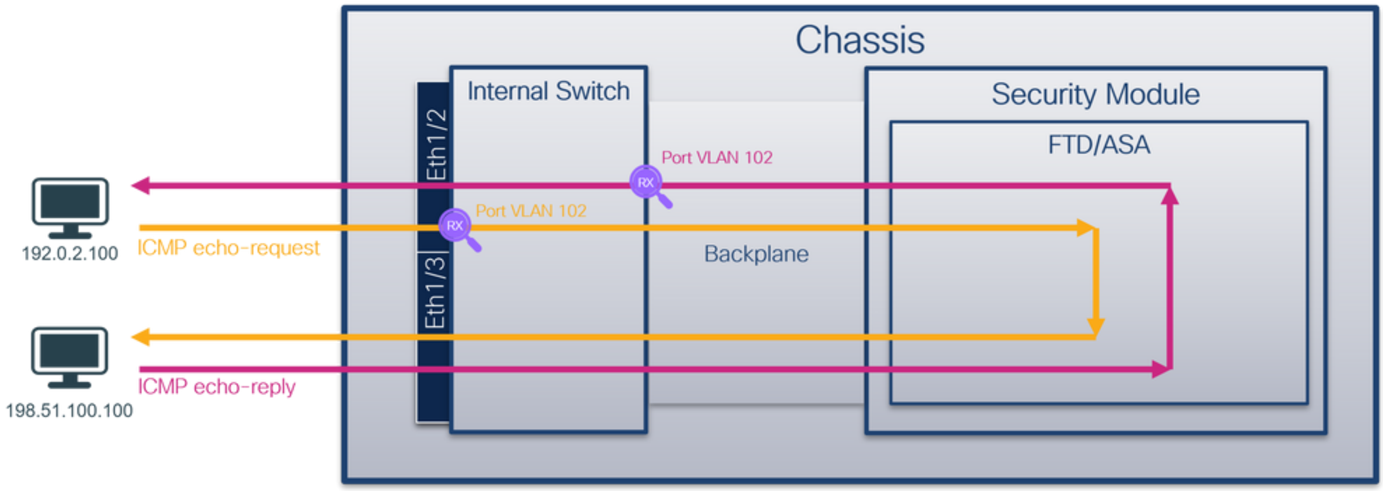
Task 2

Use the FCM and CLI to configure and verify a packet capture on the backplane interface and the front interface Ethernet1/2.

Simultaneous packet captures are configured on:

- Front interface – the packets with the port VLAN 102 on the interface Ethernet1/2 are captured. Captured packets are ICMP echo requests.
- Backplane interfaces – packets for which Ethernet1/2 is identified as the egress interface, or the packets with the port VLAN 102, are captured. Captured packets are ICMP echo replies.

Topology, packet flow, and the capture points

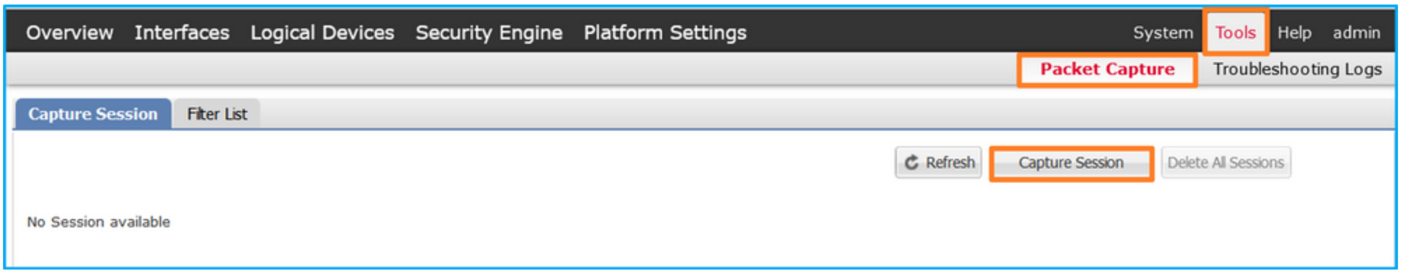


Configuration

FCM

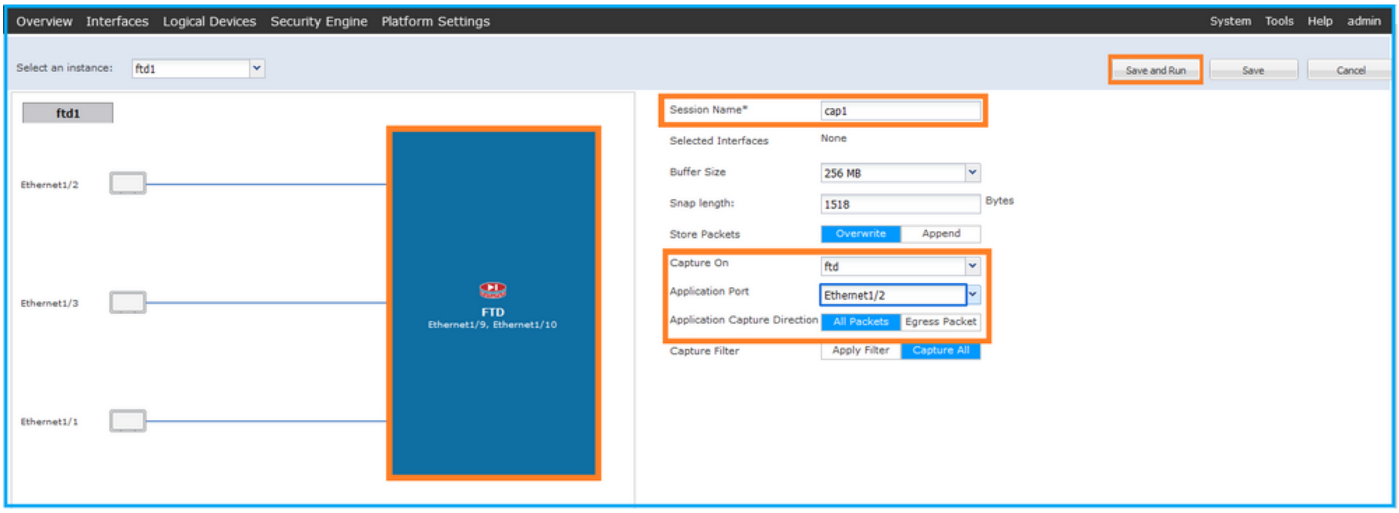
Perform these steps on FCM to configure a packet capture on the FTD application and the application port Ethernet1/2:

1. Use **Tools** > **Packet Capture** > **Capture Session** to create a new capture session**:**



No Session available

2. Select the FTD application, **Ethernet1/2** in the **Application Port** dropdown list and select **All Packets** in the **Application Capture Direction**. Provide the **Session Name** and click **Save and Run** to activate the capture**:**



Select an instance: ftd1

Session Name* cap1

Selected Interfaces None

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets [✓ Overwrite] Append

Capture On ftd

Application Port Ethernet1/2

Application Capture Direction [✓ All Packets] Egress Packet

Capture Filter Apply Filter [✓ Capture All]

FXOS CLI

Perform these steps on FXOS CLI to configure packet captures on backplane interfaces:

1. Identify the application type and identifier:

<#root>

```
firepower#

scope ssa

firepower /ssa#

show app-instance

App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online           7.2.0.82        7.2.0.82        Native      No
```

2. Create a capture session:

<#root>

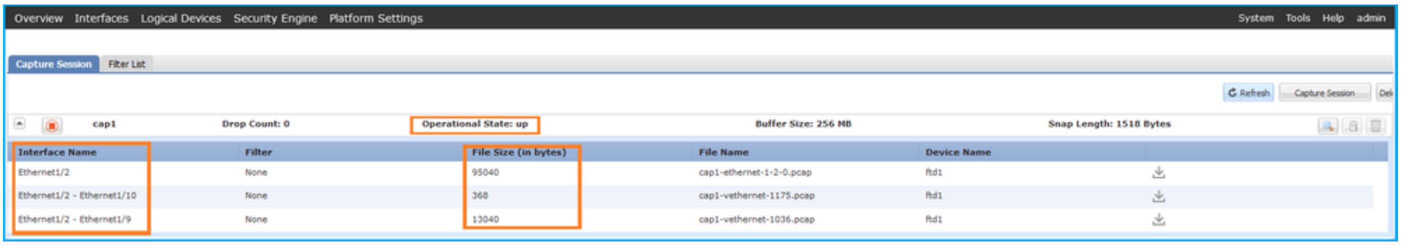
```
firepower#

scope packet-capture

firepower /packet-capture #

create session cap1

firepower /packet-capture/session* #

create phy-port eth1/2

firepower /packet-capture/session/phy-port* #

set app-identifier ftd1

firepower /packet-capture/session/phy-port* #

exit

firepower /packet-capture/session* #

create app-port 1 link12 Ethernet1/2 ftd

firepower /packet-capture/session/app-port* #

set app-identifier ftd1

firepower /packet-capture/session* #
```

```
enable

firepower /packet-capture/session* #
commit
firepower /packet-capture/session # commit
```

Verification

FCM

Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	None	95040	cap1-ethernet-1-2-0.pcap	ftd1
Ethernet1/2 - Ethernet1/10	None	368	cap1-vethernet-1175.pcap	ftd1
Ethernet1/2 - Ethernet1/9	None	13040	cap1-vethernet-1036.pcap	ftd1

FXOS CLI

Verify the capture details in **scope packet-capture**:

```
<#root>
firepower#
scope packet-capture

firepower /packet-capture #
show session cap1


Traffic Monitoring Session:
    Packet Capture Session Name: cap1

    Session: 1
    Admin State: Enabled


    Oper State: Up


    Oper State Reason: Active

    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:

    Slot Id: 1


    Port Id: 2


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-2-0.pcap


    Pcapsize: 410444  bytes


    Filter:
    Sub Interface: 0

    Application Instance Identifier: ftd1


    Application Name: ftd



Application ports involved in Packet Capture:


Slot Id: 1


    Link Name: link12


    Port Name: Ethernet1/2


    App Name: ftd


    Sub Interface: 0

    Application Instance Identifier: ftd1



Application ports resolved to:
    Name: vnic1


Eq Slot Id: 1


    Eq Port Id: 9
    Pcapfile: /workspace/packet-capture/session-1/cap1-vethernet-1036.pcap

    Pcapsize: 128400  bytes

    Vlan: 102

    Filter:

    Name: vnic2

Eq Slot Id: 1

    Eq Port Id: 10

    Pcapfile: /workspace/packet-capture/session-1/cap1-vethernet-1175.pcap

    Pcapsize: 2656  bytes

    Vlan: 102

    Filter:
```

Collect capture files

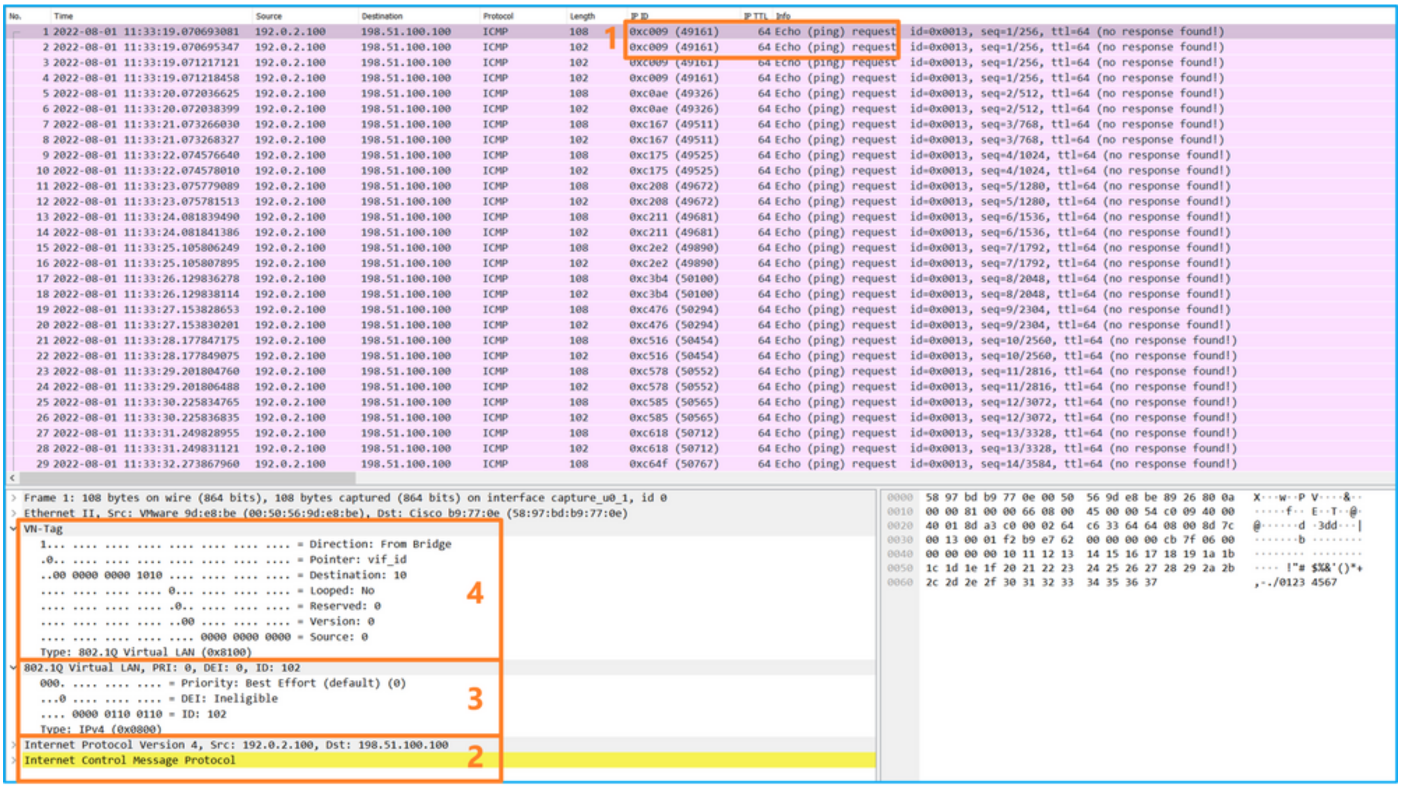
Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files. In the case of multiple backplane interfaces, ensure to open all capture files for each backplane interface. In this case, the packets are captured on the backplane interface Ethernet1/9.

Open the capture file for the interface Ethernet1/2, select the first packet, and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.
4. The internal switch inserts an additional VN tag.



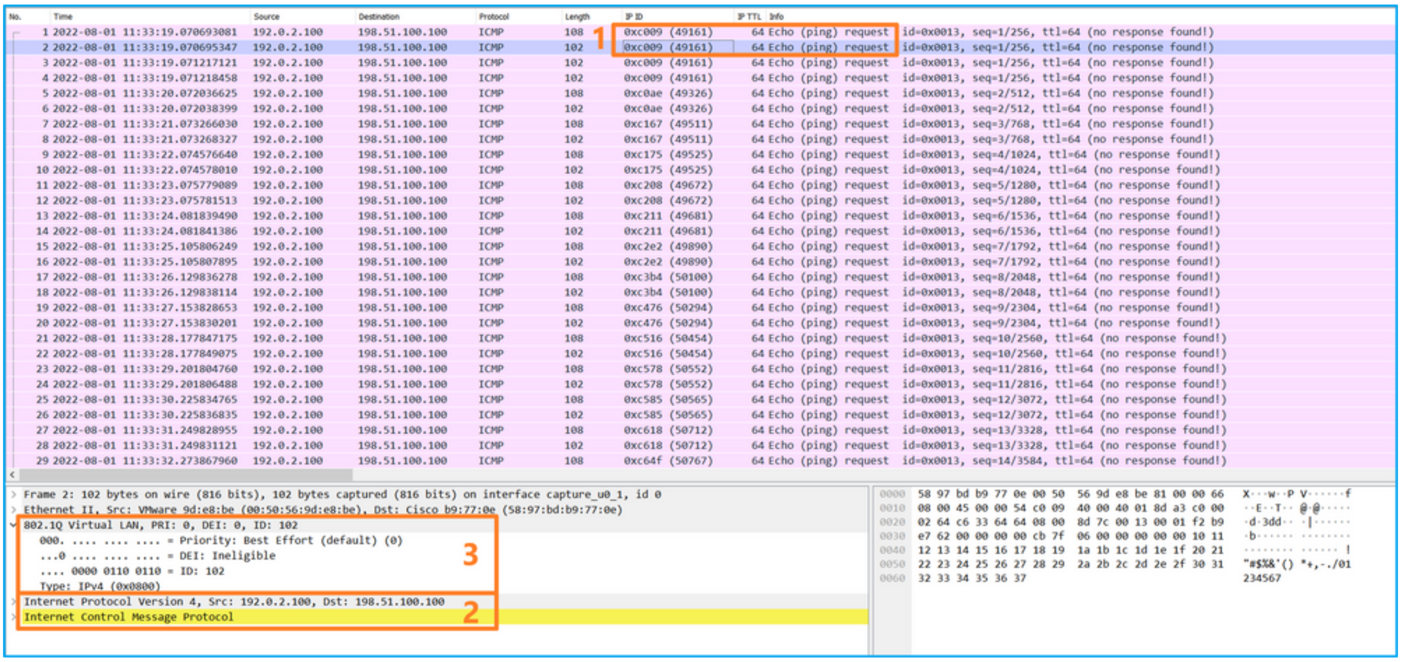
```
No. Time                          Source        Destination     Protocol Length IP ID          IP TTL Info
  1 2022-08-01 11:33:19.070693081 192.0.2.100   198.51.100.100  ICMP     108    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  2 2022-08-01 11:33:19.070695347 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  3 2022-08-01 11:33:19.071217121 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  4 2022-08-01 11:33:19.071218458 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  5 2022-08-01 11:33:20.072036625 192.0.2.100   198.51.100.100  ICMP     108    0xc0ae (49326) 64 Echo (ping) request  id=0x0013, seq=2/512, ttl=64 (no response found!)
  6 2022-08-01 11:33:20.072038399 192.0.2.100   198.51.100.100  ICMP     102    0xc0ae (49326) 64 Echo (ping) request  id=0x0013, seq=2/512, ttl=64 (no response found!)
  7 2022-08-01 11:33:21.073266030 192.0.2.100   198.51.100.100  ICMP     108    0xc167 (49511) 64 Echo (ping) request  id=0x0013, seq=3/768, ttl=64 (no response found!)
  8 2022-08-01 11:33:21.073268327 192.0.2.100   198.51.100.100  ICMP     102    0xc167 (49511) 64 Echo (ping) request  id=0x0013, seq=3/768, ttl=64 (no response found!)
  9 2022-08-01 11:33:22.074576640 192.0.2.100   198.51.100.100  ICMP     108    0xc175 (49525) 64 Echo (ping) request  id=0x0013, seq=4/1024, ttl=64 (no response found!)
 10 2022-08-01 11:33:22.074578010 192.0.2.100   198.51.100.100  ICMP     102    0xc175 (49525) 64 Echo (ping) request  id=0x0013, seq=4/1024, ttl=64 (no response found!)
 11 2022-08-01 11:33:23.075779089 192.0.2.100   198.51.100.100  ICMP     108    0xc208 (49672) 64 Echo (ping) request  id=0x0013, seq=5/1280, ttl=64 (no response found!)
 12 2022-08-01 11:33:23.075781513 192.0.2.100   198.51.100.100  ICMP     102    0xc208 (49672) 64 Echo (ping) request  id=0x0013, seq=5/1280, ttl=64 (no response found!)
 13 2022-08-01 11:33:24.081839490 192.0.2.100   198.51.100.100  ICMP     108    0xc211 (49681) 64 Echo (ping) request  id=0x0013, seq=6/1536, ttl=64 (no response found!)
 14 2022-08-01 11:33:24.081841386 192.0.2.100   198.51.100.100  ICMP     102    0xc211 (49681) 64 Echo (ping) request  id=0x0013, seq=6/1536, ttl=64 (no response found!)
 15 2022-08-01 11:33:25.105806249 192.0.2.100   198.51.100.100  ICMP     108    0xc2e2 (49890) 64 Echo (ping) request  id=0x0013, seq=7/1792, ttl=64 (no response found!)
 16 2022-08-01 11:33:25.105807895 192.0.2.100   198.51.100.100  ICMP     102    0xc2e2 (49890) 64 Echo (ping) request  id=0x0013, seq=7/1792, ttl=64 (no response found!)
 17 2022-08-01 11:33:26.129836278 192.0.2.100   198.51.100.100  ICMP     108    0xc3b4 (50100) 64 Echo (ping) request  id=0x0013, seq=8/2048, ttl=64 (no response found!)
 18 2022-08-01 11:33:26.129838114 192.0.2.100   198.51.100.100  ICMP     102    0xc3b4 (50100) 64 Echo (ping) request  id=0x0013, seq=8/2048, ttl=64 (no response found!)
 19 2022-08-01 11:33:27.153828653 192.0.2.100   198.51.100.100  ICMP     108    0xc476 (50294) 64 Echo (ping) request  id=0x0013, seq=9/2304, ttl=64 (no response found!)
 20 2022-08-01 11:33:27.153830201 192.0.2.100   198.51.100.100  ICMP     102    0xc476 (50294) 64 Echo (ping) request  id=0x0013, seq=9/2304, ttl=64 (no response found!)
 21 2022-08-01 11:33:28.177847175 192.0.2.100   198.51.100.100  ICMP     108    0xc516 (50454) 64 Echo (ping) request  id=0x0013, seq=10/2560, ttl=64 (no response found!)
 22 2022-08-01 11:33:28.177849075 192.0.2.100   198.51.100.100  ICMP     102    0xc516 (50454) 64 Echo (ping) request  id=0x0013, seq=10/2560, ttl=64 (no response found!)
 23 2022-08-01 11:33:29.201804760 192.0.2.100   198.51.100.100  ICMP     108    0xc578 (50552) 64 Echo (ping) request  id=0x0013, seq=11/2816, ttl=64 (no response found!)
 24 2022-08-01 11:33:29.201806488 192.0.2.100   198.51.100.100  ICMP     102    0xc578 (50552) 64 Echo (ping) request  id=0x0013, seq=11/2816, ttl=64 (no response found!)
 25 2022-08-01 11:33:30.225834765 192.0.2.100   198.51.100.100  ICMP     108    0xc585 (50565) 64 Echo (ping) request  id=0x0013, seq=12/3072, ttl=64 (no response found!)
 26 2022-08-01 11:33:30.225836835 192.0.2.100   198.51.100.100  ICMP     102    0xc585 (50565) 64 Echo (ping) request  id=0x0013, seq=12/3072, ttl=64 (no response found!)
 27 2022-08-01 11:33:31.249828955 192.0.2.100   198.51.100.100  ICMP     108    0xc618 (50712) 64 Echo (ping) request  id=0x0013, seq=13/3328, ttl=64 (no response found!)
 28 2022-08-01 11:33:31.249831121 192.0.2.100   198.51.100.100  ICMP     102    0xc618 (50712) 64 Echo (ping) request  id=0x0013, seq=13/3328, ttl=64 (no response found!)
 29 2022-08-01 11:33:32.273867960 192.0.2.100   198.51.100.100  ICMP     108    0xc64f (50767) 64 Echo (ping) request  id=0x0013, seq=14/3584, ttl=64 (no response found!)
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_b9:77:0e (58:97:bd:b9:77:0e)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 1010 .... .... .... .... = Destination: 10
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 89 26 80 0a   X···w··P V····&··
0010  00 00 81 00 00 66 08 00  45 00 00 54 c0 09 40 00   ·····f·· E··T··@·
0020  40 01 8d a3 c0 00 02 64  c6 33 64 64 08 00 8d 7c   @······d ·3dd···|
0030  00 13 00 01 f2 b9 e7 62  00 00 00 00 cb 7f 06 00   ·······b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Select the second packet and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.



```
No. Time                          Source        Destination     Protocol Length IP ID          IP TTL Info
  1 2022-08-01 11:33:19.070693081 192.0.2.100   198.51.100.100  ICMP     108    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  2 2022-08-01 11:33:19.070695347 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  3 2022-08-01 11:33:19.071217121 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  4 2022-08-01 11:33:19.071218458 192.0.2.100   198.51.100.100  ICMP     102    0xc009 (49161) 64 Echo (ping) request  id=0x0013, seq=1/256, ttl=64 (no response found!)
  5 2022-08-01 11:33:20.072036625 192.0.2.100   198.51.100.100  ICMP     108    0xc0ae (49326) 64 Echo (ping) request  id=0x0013, seq=2/512, ttl=64 (no response found!)
  6 2022-08-01 11:33:20.072038399 192.0.2.100   198.51.100.100  ICMP     102    0xc0ae (49326) 64 Echo (ping) request  id=0x0013, seq=2/512, ttl=64 (no response found!)
  7 2022-08-01 11:33:21.073266030 192.0.2.100   198.51.100.100  ICMP     108    0xc167 (49511) 64 Echo (ping) request  id=0x0013, seq=3/768, ttl=64 (no response found!)
  8 2022-08-01 11:33:21.073268327 192.0.2.100   198.51.100.100  ICMP     102    0xc167 (49511) 64 Echo (ping) request  id=0x0013, seq=3/768, ttl=64 (no response found!)
  9 2022-08-01 11:33:22.074576640 192.0.2.100   198.51.100.100  ICMP     108    0xc175 (49525) 64 Echo (ping) request  id=0x0013, seq=4/1024, ttl=64 (no response found!)
 10 2022-08-01 11:33:22.074578010 192.0.2.100   198.51.100.100  ICMP     102    0xc175 (49525) 64 Echo (ping) request  id=0x0013, seq=4/1024, ttl=64 (no response found!)
 11 2022-08-01 11:33:23.075779089 192.0.2.100   198.51.100.100  ICMP     108    0xc208 (49672) 64 Echo (ping) request  id=0x0013, seq=5/1280, ttl=64 (no response found!)
 12 2022-08-01 11:33:23.075781513 192.0.2.100   198.51.100.100  ICMP     102    0xc208 (49672) 64 Echo (ping) request  id=0x0013, seq=5/1280, ttl=64 (no response found!)
 13 2022-08-01 11:33:24.081839490 192.0.2.100   198.51.100.100  ICMP     108    0xc211 (49681) 64 Echo (ping) request  id=0x0013, seq=6/1536, ttl=64 (no response found!)
 14 2022-08-01 11:33:24.081841386 192.0.2.100   198.51.100.100  ICMP     102    0xc211 (49681) 64 Echo (ping) request  id=0x0013, seq=6/1536, ttl=64 (no response found!)
 15 2022-08-01 11:33:25.105806249 192.0.2.100   198.51.100.100  ICMP     108    0xc2e2 (49890) 64 Echo (ping) request  id=0x0013, seq=7/1792, ttl=64 (no response found!)
 16 2022-08-01 11:33:25.105807895 192.0.2.100   198.51.100.100  ICMP     102    0xc2e2 (49890) 64 Echo (ping) request  id=0x0013, seq=7/1792, ttl=64 (no response found!)
 17 2022-08-01 11:33:26.129836278 192.0.2.100   198.51.100.100  ICMP     108    0xc3b4 (50100) 64 Echo (ping) request  id=0x0013, seq=8/2048, ttl=64 (no response found!)
 18 2022-08-01 11:33:26.129838114 192.0.2.100   198.51.100.100  ICMP     102    0xc3b4 (50100) 64 Echo (ping) request  id=0x0013, seq=8/2048, ttl=64 (no response found!)
 19 2022-08-01 11:33:27.153828653 192.0.2.100   198.51.100.100  ICMP     108    0xc476 (50294) 64 Echo (ping) request  id=0x0013, seq=9/2304, ttl=64 (no response found!)
 20 2022-08-01 11:33:27.153830201 192.0.2.100   198.51.100.100  ICMP     102    0xc476 (50294) 64 Echo (ping) request  id=0x0013, seq=9/2304, ttl=64 (no response found!)
 21 2022-08-01 11:33:28.177847175 192.0.2.100   198.51.100.100  ICMP     108    0xc516 (50454) 64 Echo (ping) request  id=0x0013, seq=10/2560, ttl=64 (no response found!)
 22 2022-08-01 11:33:28.177849075 192.0.2.100   198.51.100.100  ICMP     102    0xc516 (50454) 64 Echo (ping) request  id=0x0013, seq=10/2560, ttl=64 (no response found!)
 23 2022-08-01 11:33:29.201804760 192.0.2.100   198.51.100.100  ICMP     108    0xc578 (50552) 64 Echo (ping) request  id=0x0013, seq=11/2816, ttl=64 (no response found!)
 24 2022-08-01 11:33:29.201806488 192.0.2.100   198.51.100.100  ICMP     102    0xc578 (50552) 64 Echo (ping) request  id=0x0013, seq=11/2816, ttl=64 (no response found!)
 25 2022-08-01 11:33:30.225834765 192.0.2.100   198.51.100.100  ICMP     108    0xc585 (50565) 64 Echo (ping) request  id=0x0013, seq=12/3072, ttl=64 (no response found!)
 26 2022-08-01 11:33:30.225836835 192.0.2.100   198.51.100.100  ICMP     102    0xc585 (50565) 64 Echo (ping) request  id=0x0013, seq=12/3072, ttl=64 (no response found!)
 27 2022-08-01 11:33:31.249828955 192.0.2.100   198.51.100.100  ICMP     108    0xc618 (50712) 64 Echo (ping) request  id=0x0013, seq=13/3328, ttl=64 (no response found!)
 28 2022-08-01 11:33:31.249831121 192.0.2.100   198.51.100.100  ICMP     102    0xc618 (50712) 64 Echo (ping) request  id=0x0013, seq=13/3328, ttl=64 (no response found!)
 29 2022-08-01 11:33:32.273867960 192.0.2.100   198.51.100.100  ICMP     108    0xc64f (50767) 64 Echo (ping) request  id=0x0013, seq=14/3584, ttl=64 (no response found!)
```

```
> Frame 2: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_b9:77:0e (58:97:bd:b9:77:0e)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

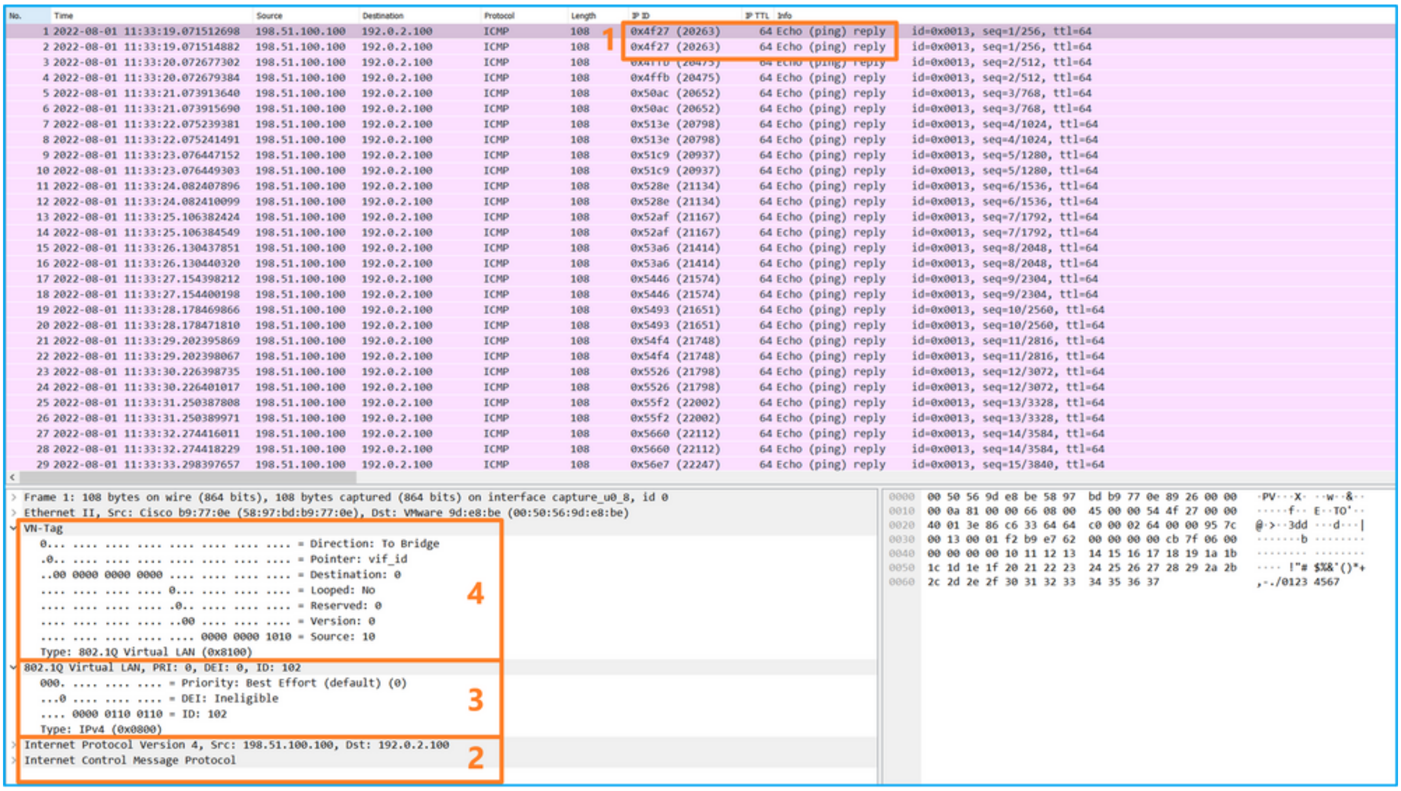
```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 81 00 00 66   X···w··P V······f
0010  08 00 45 00 00 54 c0 09  40 00 40 01 8d a3 c0 00   ··E··T·· @·@·····
0020  02 64 c6 33 64 64 08 00  8d 7c 00 13 00 01 f2 b9   ·d·3dd·· ·|······
0030  e7 62 00 00 00 00 cb 7f  06 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37                                  234567
```

Open the capture file for the interface Ethernet1/9, select the first and the second packets, and check the key points:

1. Each ICMP echo reply is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the egress interface

Ethernet1/2.

4. The internal switch inserts an additional VN tag.



```
No. Time                          Source           Destination    Protocol  Length  IP ID           IP TTL Info
  1 2022-08-01 11:33:19.071512698 198.51.100.100   192.0.2.100    ICMP      108     0x4f27 (20263)  64 Echo (ping) reply   id=0x0013, seq=1/256, ttl=64
  2 2022-08-01 11:33:19.071514882 198.51.100.100   192.0.2.100    ICMP      108     0x4f27 (20263)  64 Echo (ping) reply   id=0x0013, seq=1/256, ttl=64
  3 2022-08-01 11:33:20.072677302 198.51.100.100   192.0.2.100    ICMP      108     0x4ffb (20475)  64 Echo (ping) reply   id=0x0013, seq=2/512, ttl=64
  4 2022-08-01 11:33:20.072679384 198.51.100.100   192.0.2.100    ICMP      108     0x4ffb (20475)  64 Echo (ping) reply   id=0x0013, seq=2/512, ttl=64
  5 2022-08-01 11:33:21.073913640 198.51.100.100   192.0.2.100    ICMP      108     0x50ac (20652)  64 Echo (ping) reply   id=0x0013, seq=3/768, ttl=64
  6 2022-08-01 11:33:21.073915690 198.51.100.100   192.0.2.100    ICMP      108     0x50ac (20652)  64 Echo (ping) reply   id=0x0013, seq=3/768, ttl=64
  7 2022-08-01 11:33:22.075239381 198.51.100.100   192.0.2.100    ICMP      108     0x513e (20798)  64 Echo (ping) reply   id=0x0013, seq=4/1024, ttl=64
  8 2022-08-01 11:33:22.075241491 198.51.100.100   192.0.2.100    ICMP      108     0x513e (20798)  64 Echo (ping) reply   id=0x0013, seq=4/1024, ttl=64
  9 2022-08-01 11:33:23.076447152 198.51.100.100   192.0.2.100    ICMP      108     0x51c9 (20937)  64 Echo (ping) reply   id=0x0013, seq=5/1280, ttl=64
 10 2022-08-01 11:33:23.076449303 198.51.100.100   192.0.2.100    ICMP      108     0x51c9 (20937)  64 Echo (ping) reply   id=0x0013, seq=5/1280, ttl=64
 11 2022-08-01 11:33:24.082407896 198.51.100.100   192.0.2.100    ICMP      108     0x528e (21134)  64 Echo (ping) reply   id=0x0013, seq=6/1536, ttl=64
 12 2022-08-01 11:33:24.082410099 198.51.100.100   192.0.2.100    ICMP      108     0x528e (21134)  64 Echo (ping) reply   id=0x0013, seq=6/1536, ttl=64
 13 2022-08-01 11:33:25.106382424 198.51.100.100   192.0.2.100    ICMP      108     0x52af (21167)  64 Echo (ping) reply   id=0x0013, seq=7/1792, ttl=64
 14 2022-08-01 11:33:25.106384549 198.51.100.100   192.0.2.100    ICMP      108     0x52af (21167)  64 Echo (ping) reply   id=0x0013, seq=7/1792, ttl=64
 15 2022-08-01 11:33:26.130437851 198.51.100.100   192.0.2.100    ICMP      108     0x53a6 (21414)  64 Echo (ping) reply   id=0x0013, seq=8/2048, ttl=64
 16 2022-08-01 11:33:26.130440320 198.51.100.100   192.0.2.100    ICMP      108     0x53a6 (21414)  64 Echo (ping) reply   id=0x0013, seq=8/2048, ttl=64
 17 2022-08-01 11:33:27.154398212 198.51.100.100   192.0.2.100    ICMP      108     0x5446 (21574)  64 Echo (ping) reply   id=0x0013, seq=9/2304, ttl=64
 18 2022-08-01 11:33:27.154400198 198.51.100.100   192.0.2.100    ICMP      108     0x5446 (21574)  64 Echo (ping) reply   id=0x0013, seq=9/2304, ttl=64
 19 2022-08-01 11:33:28.178469866 198.51.100.100   192.0.2.100    ICMP      108     0x5493 (21651)  64 Echo (ping) reply   id=0x0013, seq=10/2560, ttl=64
 20 2022-08-01 11:33:28.178471810 198.51.100.100   192.0.2.100    ICMP      108     0x5493 (21651)  64 Echo (ping) reply   id=0x0013, seq=10/2560, ttl=64
 21 2022-08-01 11:33:29.202395869 198.51.100.100   192.0.2.100    ICMP      108     0x54f4 (21748)  64 Echo (ping) reply   id=0x0013, seq=11/2816, ttl=64
 22 2022-08-01 11:33:29.202398067 198.51.100.100   192.0.2.100    ICMP      108     0x54f4 (21748)  64 Echo (ping) reply   id=0x0013, seq=11/2816, ttl=64
 23 2022-08-01 11:33:30.226398735 198.51.100.100   192.0.2.100    ICMP      108     0x5526 (21798)  64 Echo (ping) reply   id=0x0013, seq=12/3072, ttl=64
 24 2022-08-01 11:33:30.226401017 198.51.100.100   192.0.2.100    ICMP      108     0x5526 (21798)  64 Echo (ping) reply   id=0x0013, seq=12/3072, ttl=64
 25 2022-08-01 11:33:31.250387808 198.51.100.100   192.0.2.100    ICMP      108     0x55f2 (22002)  64 Echo (ping) reply   id=0x0013, seq=13/3328, ttl=64
 26 2022-08-01 11:33:31.250389971 198.51.100.100   192.0.2.100    ICMP      108     0x55f2 (22002)  64 Echo (ping) reply   id=0x0013, seq=13/3328, ttl=64
 27 2022-08-01 11:33:32.274416011 198.51.100.100   192.0.2.100    ICMP      108     0x5660 (22112)  64 Echo (ping) reply   id=0x0013, seq=14/3584, ttl=64
 28 2022-08-01 11:33:32.274418229 198.51.100.100   192.0.2.100    ICMP      108     0x5660 (22112)  64 Echo (ping) reply   id=0x0013, seq=14/3584, ttl=64
 29 2022-08-01 11:33:33.298397657 198.51.100.100   192.0.2.100    ICMP      108     0x56e7 (22247)  64 Echo (ping) reply   id=0x0013, seq=15/3840, ttl=64
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_8, id 0
> Ethernet II, Src: Cisco b9:77:0e (58:97:bd:b9:77:0e), Dst: VMware 9d:e8:be (00:50:56:9d:e8:be)
v VN-Tag
    0... .... .... .... .... .... .... .... = Direction: To Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 0000 .... .... .... .... = Destination: 0
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 1010 = Source: 10
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 198.51.100.100, Dst: 192.0.2.100
> Internet Control Message Protocol
```

```
0000  00 50 56 9d e8 be 58 97  bd b9 77 0e 89 26 00 00   ·PV···X· ··w··&··
0010  00 0a 81 00 00 66 08 00  45 00 00 54 4f 27 00 00   ·····f·· E··TO'··
0020  40 01 3e 86 c6 33 64 64  c0 00 02 64 00 00 95 7c   @·>··3dd ···d···|
0030  00 13 00 01 f2 b9 e7 62  00 00 00 00 cb 7f 06 00   ·······b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Explanation

If the option **All Packets** in the **Application Capture Direction** is selected, 2 simultaneous packet captures related to the selected application port Ethernet1/2 are configured: a capture on the front interface Ethernet1/2 and a capture on selected backplane interfaces.

When a packet capture on a front interface is configured, the switch simultaneously captures each packet twice:

- After the insertion of the port VLAN tag.
- After the insertion of the VN tag.

In the order of operations, the VN tag is inserted at a later stage than the port VLAN tag insertion. But in the capture file, the packet with the VN tag is shown earlier than the packet with the port VLAN tag. In this example, the VLAN tag 102 in ICMP echo request packets identifies Ethernet1/2 as the ingress interface.

When a packet capture on a backplane interface is configured, the switch simultaneously captures each packet twice. The internal switch receives packets that are already tagged by the application on the security module with the port VLAN tag and the VN tag. The port VLAN tag identifies the egress interface that the internal chassis uses to forward the packets to the network. In this example, the VLAN tag 102 in ICMP echo reply packets identifies Ethernet1/2 as the egress interface.

The internal switch removes the VN tag and the internal interface VLAN tag before the packets are forwarded to the network.

This table summarizes the task:

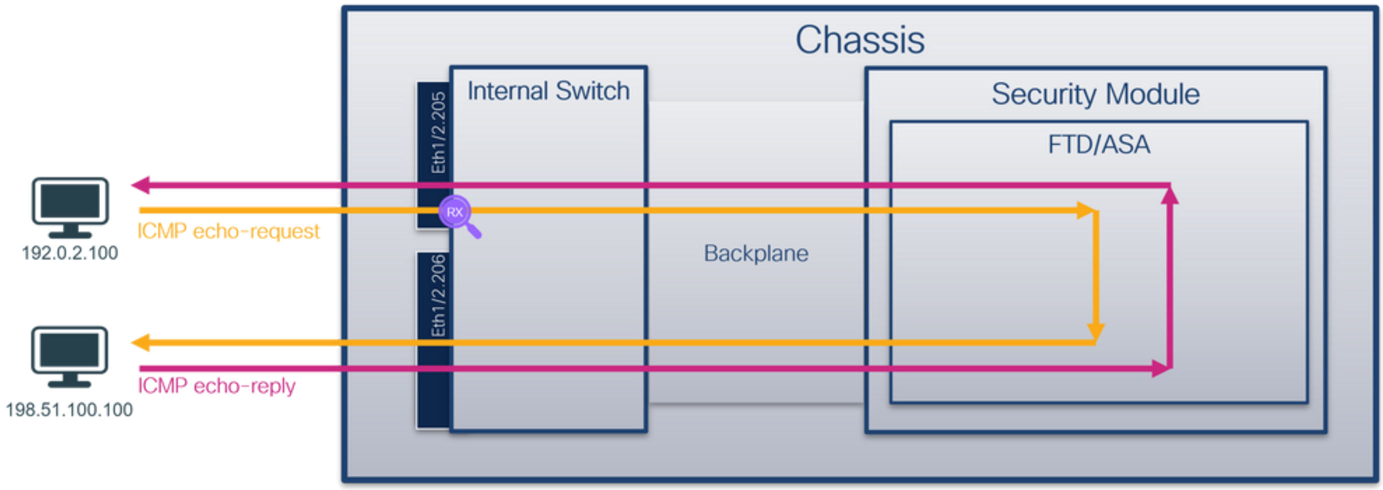
Task	**Capture point**	**Internal port**	**Direction**	**Captured traffic**

		VLAN in captured packets		
Configure and verify captures on application and application port Ethernet1/2	Backplane interfaces	102	Ingress only	ICMP echo replies from host 198.51.100.100 to host 192.0.2.100
	Interface Ethernet1/2	102	Ingress only	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

Packet Capture on a Subinterface of a Physical or Port-channel Interface

Use the FCM and CLI to configure and verify a packet capture on subinterface Ethernet1/2.205 or port-channel subinterface Portchannel1.207. Subinterfaces and captures on subinterfaces are supported only for the FTD application in container mode. In this case, a packet capture on Ethernet1/2.205 and Portchannel1.207 are configured.

Topology, packet flow, and the capture points

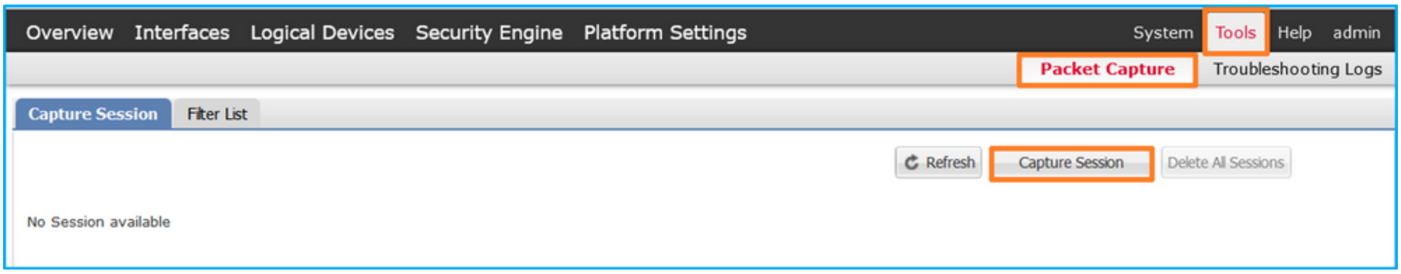


Configuration

FCM

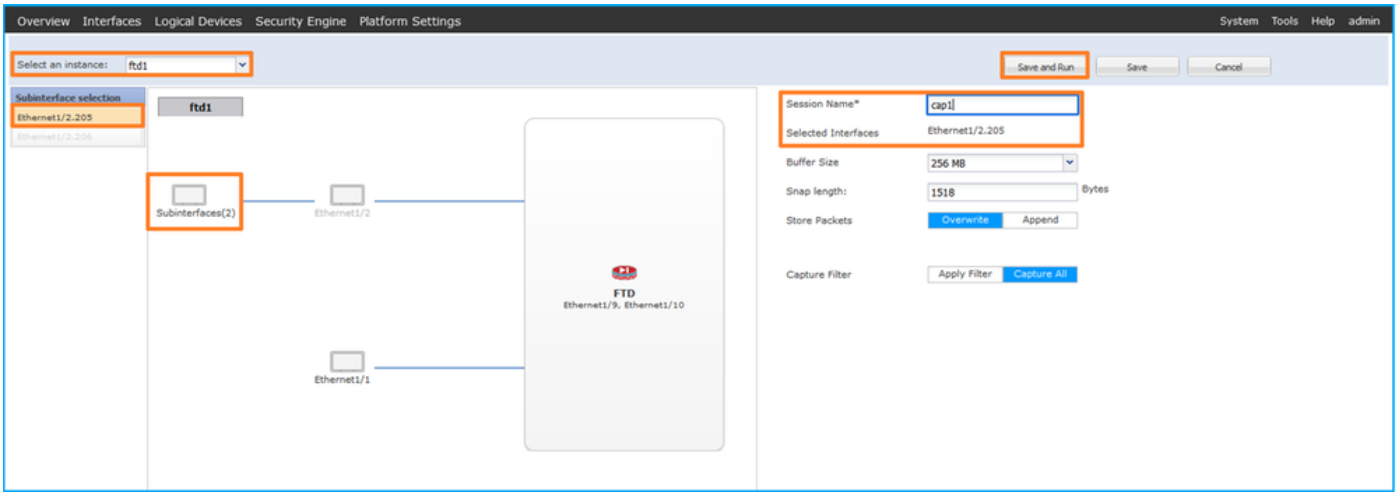
Perform these steps on FCM to configure a packet capture on the FTD application and the application port Ethernet1/2:

1. Use **Tools > Packet Capture > Capture Session** to create a new capture session**:**



No Session available

2. Select the specific application instance ftd1, the subinterface Ethernet1/2.205, provide the session name, and click **Save and Run** to activate the capture:



Select an instance: ftd1

Session Name* cap1

Selected Interfaces Ethernet1/2.205

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets ● Overwrite ○ Append

Capture Filter ○ Apply Filter ● Capture All

3. In the case of a port-channel subinterface, due to the Cisco bug ID CSCvq33119 subinterfaces are not visible in the FCM. Use the FXOS CLI to configure captures on port-channel subinterfaces.

FXOS CLI

Perform these steps on FXOS CLI to configure a packet capture on subinterfaces Ethernet1/2.205 and Portchannel1.207:

1. Identify the application type and identifier:

<#root>

```
firepower#

scope ssa


firepower /ssa #

show app-instance


App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online          7.2.0.82        7.2.0.82        Container   No          R
ftd        ftd2       1          Enabled     Online           7.2.0.82        7.2.0.82        Container
```

2. In the case of a port-channel interface, identify its member interfaces:

<#root>

```
firepower#

connect fxos
```

```
<output skipped>
firepower(fxos)#

show port-channel summary


Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------

1     Po1(SU)     Eth      LACP      Eth1/3(P)    Eth1/3(P)
```

3. Create a capture session:

<#root>

```
firepower#

scope packet-capture


firepower /packet-capture #

create session cap1


firepower /packet-capture/session* #

create phy-port Eth1/2


firepower /packet-capture/session/phy-port* #

set app ftd


firepower /packet-capture/session/phy-port* #

set app-identifier ftd1


firepower /packet-capture/session/phy-port* #

set subinterface 205


firepower /packet-capture/session/phy-port* #

up


firepower /packet-capture/session* #

enable


firepower /packet-capture/session* #
```

```
commit

firepower /packet-capture/session #
```

For port-channel subinterfaces, create a packet capture for each port-channel member interface:

<#root>

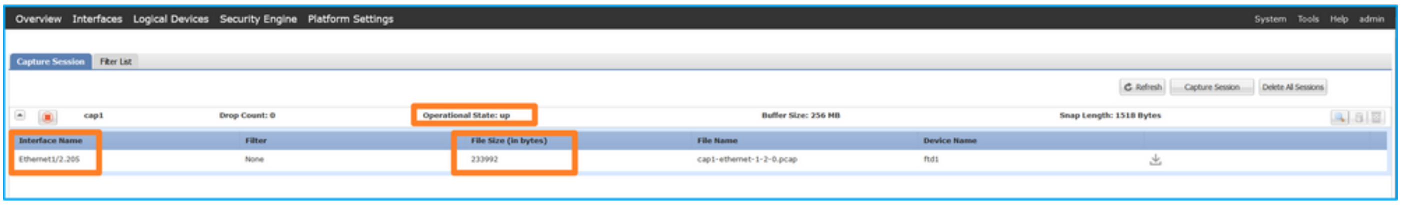
```
firepower#
scope packet-capture

firepower /packet-capture #
create filter vlan207

firepower /packet-capture/filter* #
set ovlan 207

firepower /packet-capture/filter* #
up

firepower /packet-capture* #
create session cap1

firepower /packet-capture/session*
create phy-port Eth1/3

firepower /packet-capture/session/phy-port* #
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
set subinterface 207

firepower /packet-capture/session/phy-port* #
up

firepower /packet-capture/session* #
create phy-port Eth1/4

firepower /packet-capture/session/phy-port* #
```

```
set app ftd

firepower /packet-capture/session/phy-port* #

set app-identifier ftd1

firepower /packet-capture/session/phy-port* #

set subinterface 207

firepower /packet-capture/session/phy-port* #

up

firepower /packet-capture/session* #

enable

firepower /packet-capture/session* #

commit

firepower /packet-capture/session #
```

Verification

FCM

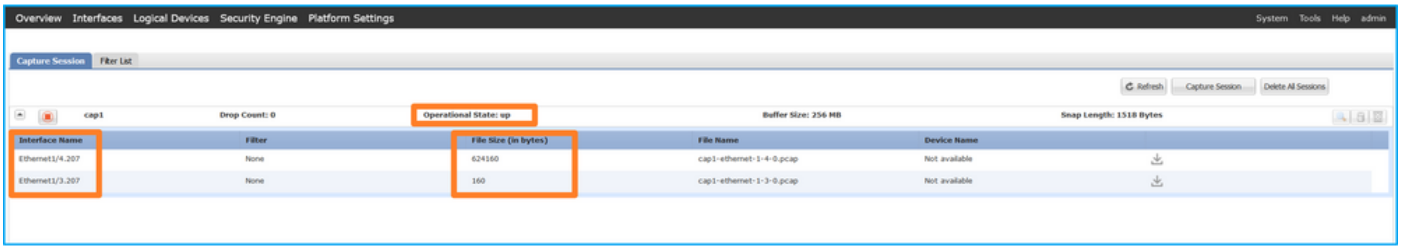
Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2.205	None	233992	cap1-ethernet-1-2-0.pcap	ftd1

Port-channel subinterface captures configured on FXOS CLI are also visible on FCM; however, they cannot be edited:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/4.207	None	624160	cap1-ethernet-1-4-0.pcap	Not available
Ethernet1/3.207	None	160	cap1-ethernet-1-3-0.pcap	Not available

FXOS CLI

Verify the capture details in **scope packet-capture**:

<#root>

```
firepower#
scope packet-capture

firepower /packet-capture #
show session cap1


Traffic Monitoring Session:
    Packet Capture Session Name: cap1

    Session: 1
    Admin State: Enabled


    Oper State: Up


    Oper State Reason: Active

    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0
Physical ports involved in Packet Capture:
    Slot Id: 1


    Port Id: 2


    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-2-0.pcap


    Pcapsize: 9324  bytes

    Filter:
    Sub Interface: 205


    Application Instance Identifier: ftd1


    Application Name: ftd
```

Port-channel 1 with member interfaces Ethernet1/3 and Ethernet1/4:

<#root>

```
firepower#

scope packet-capture


firepower /packet-capture # show session cap1

Traffic Monitoring Session:

    Packet Capture Session Name: cap1


    Session: 1


Admin State: Enabled



    Oper State: Up



    Oper State Reason: Active


    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:

    Slot Id: 1



    Port Id: 3



    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-3-0.pcap



    Pcapsize: 160  bytes


    Filter:

    Sub Interface: 207




Application Instance Identifier: ftd1



    Application Name: ftd
```

```
Slot Id: 1

    Port Id: 4

    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-4-0.pcap

    Pcapsize: 624160  bytes

    Filter:

Sub Interface: 207

    Application Instance Identifier: ftd1

    Application Name: ftd
```

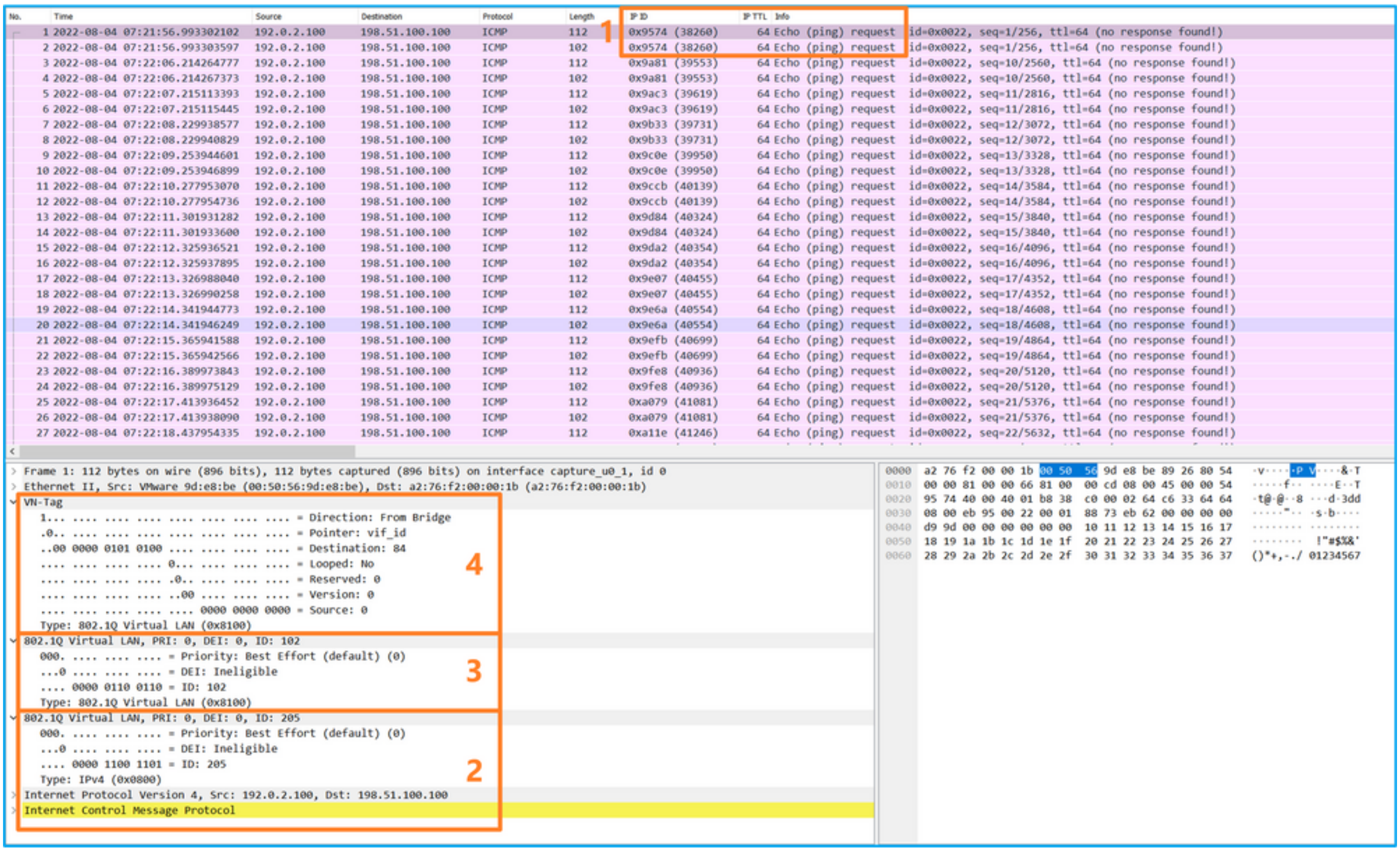
Collect capture files

Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture file. Select the first packet and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header has the VLAN tag **205**.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.
4. The internal switch inserts an additional VN tag.



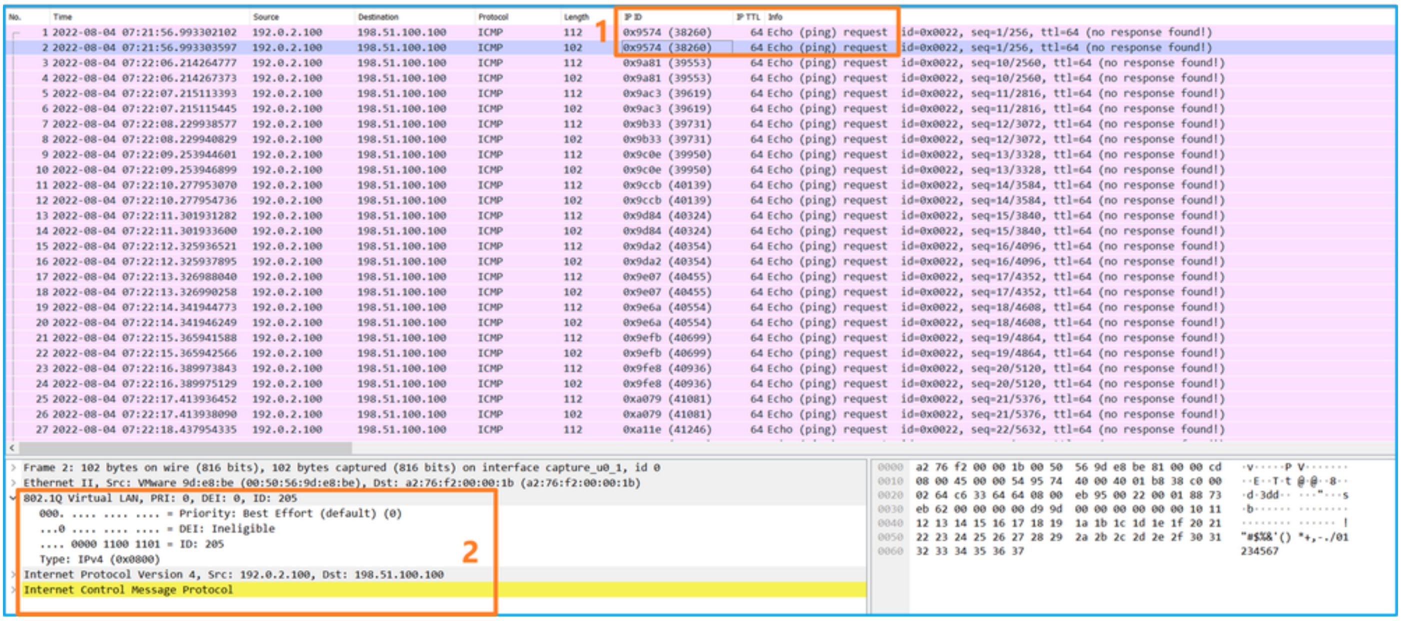
```
No. Time                          Source       Destination     Protocol Length IP ID           IP TTL Info
  1 2022-08-04 07:21:56.993302102 192.0.2.100  198.51.100.100  ICMP     112    0x9574 (38260)  64 Echo (ping) request  id=0x0022, seq=1/256, ttl=64 (no response found!)
  2 2022-08-04 07:21:56.993303597 192.0.2.100  198.51.100.100  ICMP     102    0x9574 (38260)  64 Echo (ping) request  id=0x0022, seq=1/256, ttl=64 (no response found!)
  3 2022-08-04 07:22:06.214264777 192.0.2.100  198.51.100.100  ICMP     112    0x9a81 (39553)  64 Echo (ping) request  id=0x0022, seq=10/2560, ttl=64 (no response found!)
  4 2022-08-04 07:22:06.214267373 192.0.2.100  198.51.100.100  ICMP     102    0x9a81 (39553)  64 Echo (ping) request  id=0x0022, seq=10/2560, ttl=64 (no response found!)
  5 2022-08-04 07:22:07.215113393 192.0.2.100  198.51.100.100  ICMP     112    0x9ac3 (39619)  64 Echo (ping) request  id=0x0022, seq=11/2816, ttl=64 (no response found!)
  6 2022-08-04 07:22:07.215115445 192.0.2.100  198.51.100.100  ICMP     102    0x9ac3 (39619)  64 Echo (ping) request  id=0x0022, seq=11/2816, ttl=64 (no response found!)
  7 2022-08-04 07:22:08.229938577 192.0.2.100  198.51.100.100  ICMP     112    0x9b33 (39731)  64 Echo (ping) request  id=0x0022, seq=12/3072, ttl=64 (no response found!)
  8 2022-08-04 07:22:08.229940829 192.0.2.100  198.51.100.100  ICMP     102    0x9b33 (39731)  64 Echo (ping) request  id=0x0022, seq=12/3072, ttl=64 (no response found!)
  9 2022-08-04 07:22:09.253944601 192.0.2.100  198.51.100.100  ICMP     112    0x9c0e (39950)  64 Echo (ping) request  id=0x0022, seq=13/3328, ttl=64 (no response found!)
 10 2022-08-04 07:22:09.253946899 192.0.2.100  198.51.100.100  ICMP     102    0x9c0e (39950)  64 Echo (ping) request  id=0x0022, seq=13/3328, ttl=64 (no response found!)
 11 2022-08-04 07:22:10.277953070 192.0.2.100  198.51.100.100  ICMP     112    0x9ccb (40139)  64 Echo (ping) request  id=0x0022, seq=14/3584, ttl=64 (no response found!)
 12 2022-08-04 07:22:10.277954736 192.0.2.100  198.51.100.100  ICMP     102    0x9ccb (40139)  64 Echo (ping) request  id=0x0022, seq=14/3584, ttl=64 (no response found!)
 13 2022-08-04 07:22:11.301931282 192.0.2.100  198.51.100.100  ICMP     112    0x9d84 (40324)  64 Echo (ping) request  id=0x0022, seq=15/3840, ttl=64 (no response found!)
 14 2022-08-04 07:22:11.301933600 192.0.2.100  198.51.100.100  ICMP     102    0x9d84 (40324)  64 Echo (ping) request  id=0x0022, seq=15/3840, ttl=64 (no response found!)
 15 2022-08-04 07:22:12.325936521 192.0.2.100  198.51.100.100  ICMP     112    0x9da2 (40354)  64 Echo (ping) request  id=0x0022, seq=16/4096, ttl=64 (no response found!)
 16 2022-08-04 07:22:12.325937895 192.0.2.100  198.51.100.100  ICMP     102    0x9da2 (40354)  64 Echo (ping) request  id=0x0022, seq=16/4096, ttl=64 (no response found!)
 17 2022-08-04 07:22:13.326988040 192.0.2.100  198.51.100.100  ICMP     112    0x9e07 (40455)  64 Echo (ping) request  id=0x0022, seq=17/4352, ttl=64 (no response found!)
 18 2022-08-04 07:22:13.326990258 192.0.2.100  198.51.100.100  ICMP     102    0x9e07 (40455)  64 Echo (ping) request  id=0x0022, seq=17/4352, ttl=64 (no response found!)
 19 2022-08-04 07:22:14.341944773 192.0.2.100  198.51.100.100  ICMP     112    0x9e6a (40554)  64 Echo (ping) request  id=0x0022, seq=18/4608, ttl=64 (no response found!)
 20 2022-08-04 07:22:14.341946249 192.0.2.100  198.51.100.100  ICMP     102    0x9e6a (40554)  64 Echo (ping) request  id=0x0022, seq=18/4608, ttl=64 (no response found!)
 21 2022-08-04 07:22:15.365941588 192.0.2.100  198.51.100.100  ICMP     112    0x9efb (40699)  64 Echo (ping) request  id=0x0022, seq=19/4864, ttl=64 (no response found!)
 22 2022-08-04 07:22:15.365942566 192.0.2.100  198.51.100.100  ICMP     102    0x9efb (40699)  64 Echo (ping) request  id=0x0022, seq=19/4864, ttl=64 (no response found!)
 23 2022-08-04 07:22:16.389973843 192.0.2.100  198.51.100.100  ICMP     112    0x9fe8 (40936)  64 Echo (ping) request  id=0x0022, seq=20/5120, ttl=64 (no response found!)
 24 2022-08-04 07:22:16.389975129 192.0.2.100  198.51.100.100  ICMP     102    0x9fe8 (40936)  64 Echo (ping) request  id=0x0022, seq=20/5120, ttl=64 (no response found!)
 25 2022-08-04 07:22:17.413936452 192.0.2.100  198.51.100.100  ICMP     112    0xa079 (41081)  64 Echo (ping) request  id=0x0022, seq=21/5376, ttl=64 (no response found!)
 26 2022-08-04 07:22:17.413938090 192.0.2.100  198.51.100.100  ICMP     102    0xa079 (41081)  64 Echo (ping) request  id=0x0022, seq=21/5376, ttl=64 (no response found!)
 27 2022-08-04 07:22:18.437954335 192.0.2.100  198.51.100.100  ICMP     112    0xa11e (41246)  64 Echo (ping) request  id=0x0022, seq=22/5632, ttl=64 (no response found!)
```

```
> Frame 1: 112 bytes on wire (896 bits), 112 bytes captured (896 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware 9d:e8:be (00:50:56:9d:e8:be), Dst: a2:76:f2:00:00:1b (a2:76:f2:00:00:1b)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0101 0100 .... .... .... .... = Destination: 84
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 205
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1101 = ID: 205
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 1b 00 50  56 9d e8 be 89 26 80 54   ·v·····P V····&·T
0010  00 00 81 00 00 66 81 00  00 cd 08 00 45 00 00 54   ·····f·· ····E··T
0020  95 74 40 00 40 01 b8 38  c0 00 02 64 c6 33 64 64   ·t@·@··8 ···d·3dd
0030  08 00 eb 95 00 22 00 01  88 73 eb 62 00 00 00 00   ·····"·· ·s·b····
0040  d9 9d 00 00 00 00 00 00  10 11 12 13 14 15 16 17   ········ ········
0050  18 19 1a 1b 1c 1d 1e 1f  20 21 22 23 24 25 26 27   ········  !"#$%&'
0060  28 29 2a 2b 2c 2d 2e 2f  30 31 32 33 34 35 36 37   ()*+,-./ 01234567
```

Select the second packet and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header has the VLAN tag **205**.



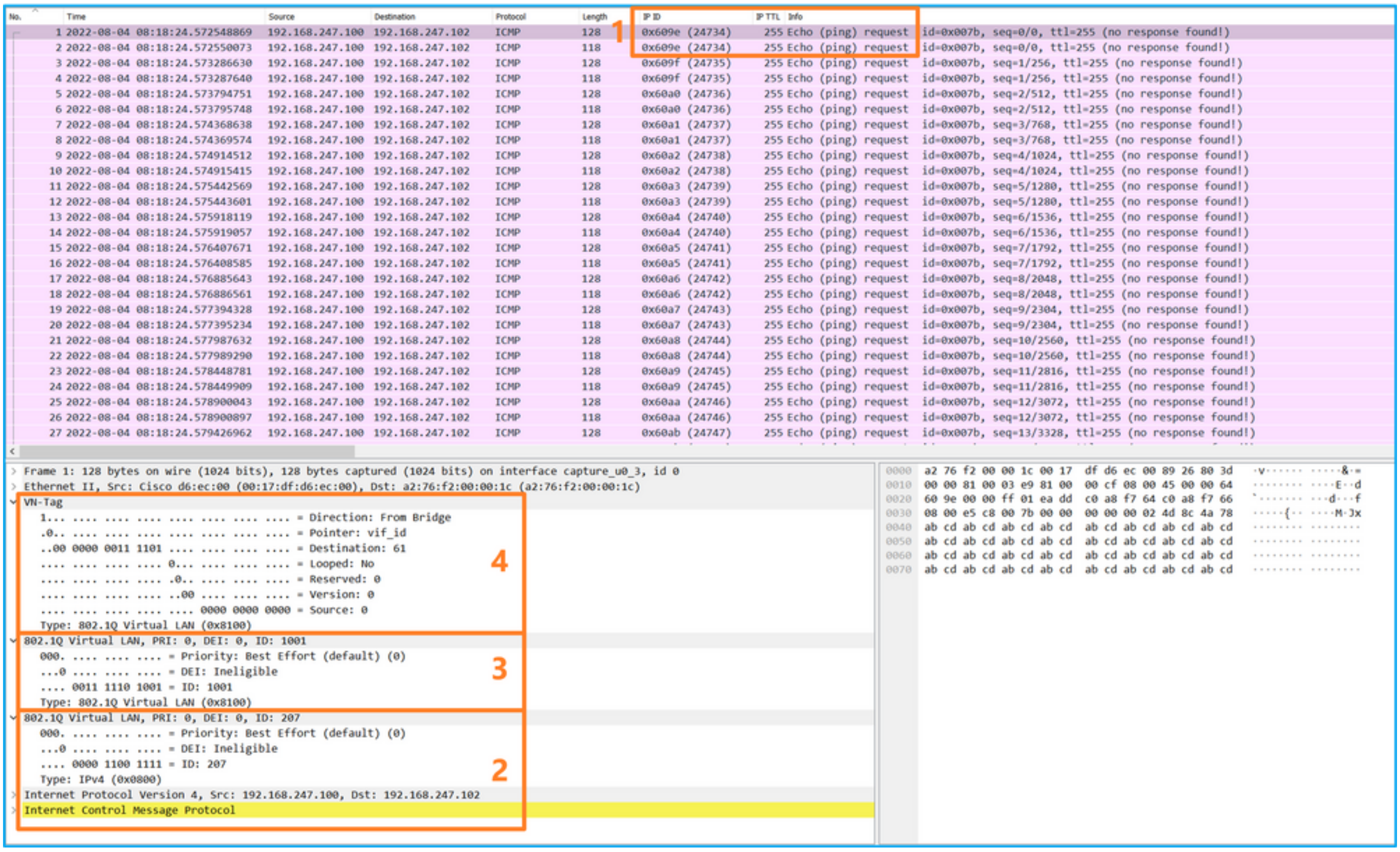
```
No. Time                          Source       Destination     Protocol Length IP ID           IP TTL Info
  1 2022-08-04 07:21:56.993302102 192.0.2.100  198.51.100.100  ICMP     112    0x9574 (38260)  64 Echo (ping) request  id=0x0022, seq=1/256, ttl=64 (no response found!)
  2 2022-08-04 07:21:56.993303597 192.0.2.100  198.51.100.100  ICMP     102    0x9574 (38260)  64 Echo (ping) request  id=0x0022, seq=1/256, ttl=64 (no response found!)
  3 2022-08-04 07:22:06.214264777 192.0.2.100  198.51.100.100  ICMP     112    0x9a81 (39553)  64 Echo (ping) request  id=0x0022, seq=10/2560, ttl=64 (no response found!)
  4 2022-08-04 07:22:06.214267373 192.0.2.100  198.51.100.100  ICMP     102    0x9a81 (39553)  64 Echo (ping) request  id=0x0022, seq=10/2560, ttl=64 (no response found!)
  5 2022-08-04 07:22:07.215113393 192.0.2.100  198.51.100.100  ICMP     112    0x9ac3 (39619)  64 Echo (ping) request  id=0x0022, seq=11/2816, ttl=64 (no response found!)
  6 2022-08-04 07:22:07.215115445 192.0.2.100  198.51.100.100  ICMP     102    0x9ac3 (39619)  64 Echo (ping) request  id=0x0022, seq=11/2816, ttl=64 (no response found!)
  7 2022-08-04 07:22:08.229938577 192.0.2.100  198.51.100.100  ICMP     112    0x9b33 (39731)  64 Echo (ping) request  id=0x0022, seq=12/3072, ttl=64 (no response found!)
  8 2022-08-04 07:22:08.229940829 192.0.2.100  198.51.100.100  ICMP     102    0x9b33 (39731)  64 Echo (ping) request  id=0x0022, seq=12/3072, ttl=64 (no response found!)
  9 2022-08-04 07:22:09.253944601 192.0.2.100  198.51.100.100  ICMP     112    0x9c0e (39950)  64 Echo (ping) request  id=0x0022, seq=13/3328, ttl=64 (no response found!)
 10 2022-08-04 07:22:09.253946899 192.0.2.100  198.51.100.100  ICMP     102    0x9c0e (39950)  64 Echo (ping) request  id=0x0022, seq=13/3328, ttl=64 (no response found!)
 11 2022-08-04 07:22:10.277953070 192.0.2.100  198.51.100.100  ICMP     112    0x9ccb (40139)  64 Echo (ping) request  id=0x0022, seq=14/3584, ttl=64 (no response found!)
 12 2022-08-04 07:22:10.277954736 192.0.2.100  198.51.100.100  ICMP     102    0x9ccb (40139)  64 Echo (ping) request  id=0x0022, seq=14/3584, ttl=64 (no response found!)
 13 2022-08-04 07:22:11.301931282 192.0.2.100  198.51.100.100  ICMP     112    0x9d84 (40324)  64 Echo (ping) request  id=0x0022, seq=15/3840, ttl=64 (no response found!)
 14 2022-08-04 07:22:11.301933600 192.0.2.100  198.51.100.100  ICMP     102    0x9d84 (40324)  64 Echo (ping) request  id=0x0022, seq=15/3840, ttl=64 (no response found!)
 15 2022-08-04 07:22:12.325936521 192.0.2.100  198.51.100.100  ICMP     112    0x9da2 (40354)  64 Echo (ping) request  id=0x0022, seq=16/4096, ttl=64 (no response found!)
 16 2022-08-04 07:22:12.325937895 192.0.2.100  198.51.100.100  ICMP     102    0x9da2 (40354)  64 Echo (ping) request  id=0x0022, seq=16/4096, ttl=64 (no response found!)
 17 2022-08-04 07:22:13.326988040 192.0.2.100  198.51.100.100  ICMP     112    0x9e07 (40455)  64 Echo (ping) request  id=0x0022, seq=17/4352, ttl=64 (no response found!)
 18 2022-08-04 07:22:13.326990258 192.0.2.100  198.51.100.100  ICMP     102    0x9e07 (40455)  64 Echo (ping) request  id=0x0022, seq=17/4352, ttl=64 (no response found!)
 19 2022-08-04 07:22:14.341944773 192.0.2.100  198.51.100.100  ICMP     112    0x9e6a (40554)  64 Echo (ping) request  id=0x0022, seq=18/4608, ttl=64 (no response found!)
 20 2022-08-04 07:22:14.341946249 192.0.2.100  198.51.100.100  ICMP     102    0x9e6a (40554)  64 Echo (ping) request  id=0x0022, seq=18/4608, ttl=64 (no response found!)
 21 2022-08-04 07:22:15.365941588 192.0.2.100  198.51.100.100  ICMP     112    0x9efb (40699)  64 Echo (ping) request  id=0x0022, seq=19/4864, ttl=64 (no response found!)
 22 2022-08-04 07:22:15.365942566 192.0.2.100  198.51.100.100  ICMP     102    0x9efb (40699)  64 Echo (ping) request  id=0x0022, seq=19/4864, ttl=64 (no response found!)
 23 2022-08-04 07:22:16.389973843 192.0.2.100  198.51.100.100  ICMP     112    0x9fe8 (40936)  64 Echo (ping) request  id=0x0022, seq=20/5120, ttl=64 (no response found!)
 24 2022-08-04 07:22:16.389975129 192.0.2.100  198.51.100.100  ICMP     102    0x9fe8 (40936)  64 Echo (ping) request  id=0x0022, seq=20/5120, ttl=64 (no response found!)
 25 2022-08-04 07:22:17.413936452 192.0.2.100  198.51.100.100  ICMP     112    0xa079 (41081)  64 Echo (ping) request  id=0x0022, seq=21/5376, ttl=64 (no response found!)
 26 2022-08-04 07:22:17.413938090 192.0.2.100  198.51.100.100  ICMP     102    0xa079 (41081)  64 Echo (ping) request  id=0x0022, seq=21/5376, ttl=64 (no response found!)
 27 2022-08-04 07:22:18.437954335 192.0.2.100  198.51.100.100  ICMP     112    0xa11e (41246)  64 Echo (ping) request  id=0x0022, seq=22/5632, ttl=64 (no response found!)
```

```
> Frame 2: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface capture_u0_1, id 0
> Ethernet II, Src: VMware 9d:e8:be (00:50:56:9d:e8:be), Dst: a2:76:f2:00:00:1b (a2:76:f2:00:00:1b)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 205
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1101 = ID: 205
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 1b 00 50  56 9d e8 be 81 00 00 cd   ·v·····P V·······
0010  08 00 45 00 00 54 95 74  40 00 40 01 b8 38 c0 00   ··E··T·t @·@··8··
0020  02 64 c6 33 64 64 08 00  eb 95 00 22 00 01 88 73   ·d·3dd·· ···"···s
0030  eb 62 00 00 00 00 d9 9d  00 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37                                   234567
```

Now open the capture files for Portchannel1.207. Select the first packet and check the key points

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header has the VLAN tag **207**.
3. The internal switch inserts an additional port VLAN tag **1001** that identifies the ingress interface Portchannel1.
4. The internal switch inserts an additional VN tag.



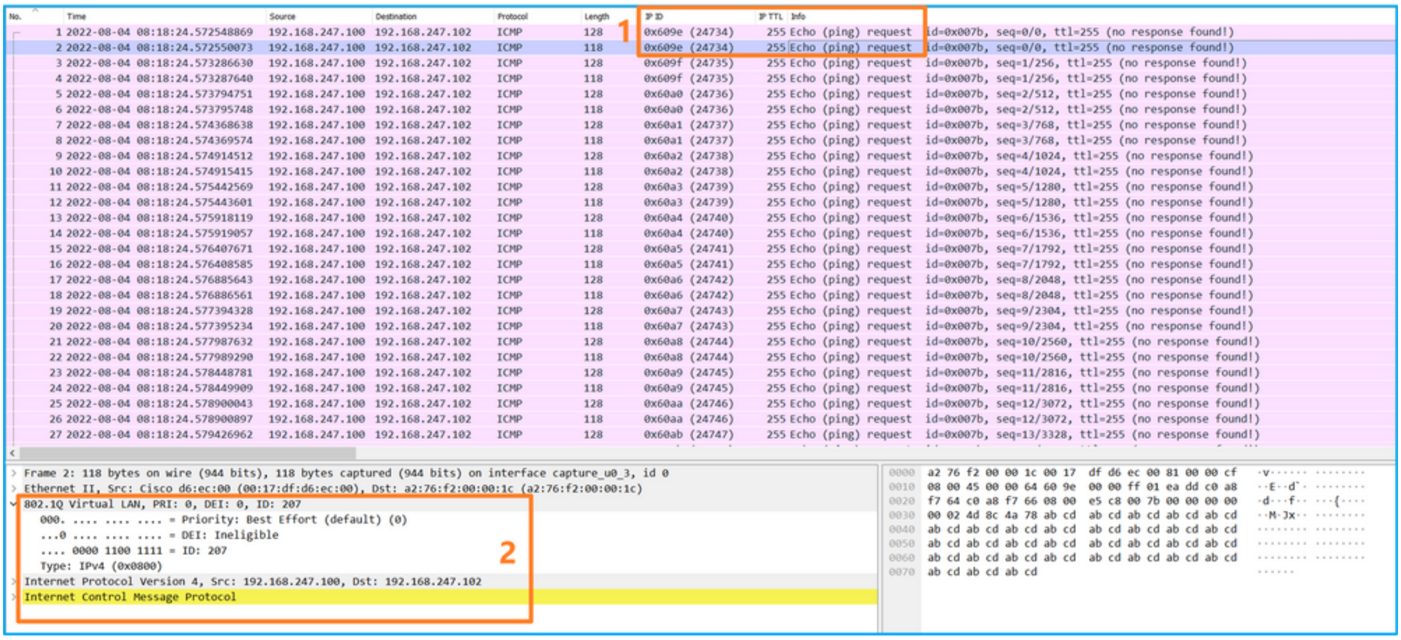
```
No.  Time                           Source           Destination      Protocol Length IP ID          IP TTL Info
   1 2022-08-04 08:18:24.572548869  192.168.247.100  192.168.247.102  ICMP     128    0x609e (24734) 255 Echo (ping) request  id=0x007b, seq=0/0, ttl=255 (no response found!)
   2 2022-08-04 08:18:24.572550073  192.168.247.100  192.168.247.102  ICMP     118    0x609e (24734) 255 Echo (ping) request  id=0x007b, seq=0/0, ttl=255 (no response found!)
   3 2022-08-04 08:18:24.573286630  192.168.247.100  192.168.247.102  ICMP     128    0x609f (24735) 255 Echo (ping) request  id=0x007b, seq=1/256, ttl=255 (no response found!)
   4 2022-08-04 08:18:24.573287640  192.168.247.100  192.168.247.102  ICMP     118    0x609f (24735) 255 Echo (ping) request  id=0x007b, seq=1/256, ttl=255 (no response found!)
   5 2022-08-04 08:18:24.573794751  192.168.247.100  192.168.247.102  ICMP     128    0x60a0 (24736) 255 Echo (ping) request  id=0x007b, seq=2/512, ttl=255 (no response found!)
   6 2022-08-04 08:18:24.573795748  192.168.247.100  192.168.247.102  ICMP     118    0x60a0 (24736) 255 Echo (ping) request  id=0x007b, seq=2/512, ttl=255 (no response found!)
   7 2022-08-04 08:18:24.574368638  192.168.247.100  192.168.247.102  ICMP     128    0x60a1 (24737) 255 Echo (ping) request  id=0x007b, seq=3/768, ttl=255 (no response found!)
   8 2022-08-04 08:18:24.574369574  192.168.247.100  192.168.247.102  ICMP     118    0x60a1 (24737) 255 Echo (ping) request  id=0x007b, seq=3/768, ttl=255 (no response found!)
   9 2022-08-04 08:18:24.574914512  192.168.247.100  192.168.247.102  ICMP     128    0x60a2 (24738) 255 Echo (ping) request  id=0x007b, seq=4/1024, ttl=255 (no response found!)
  10 2022-08-04 08:18:24.574915415  192.168.247.100  192.168.247.102  ICMP     118    0x60a2 (24738) 255 Echo (ping) request  id=0x007b, seq=4/1024, ttl=255 (no response found!)
  11 2022-08-04 08:18:24.575442569  192.168.247.100  192.168.247.102  ICMP     128    0x60a3 (24739) 255 Echo (ping) request  id=0x007b, seq=5/1280, ttl=255 (no response found!)
  12 2022-08-04 08:18:24.575443601  192.168.247.100  192.168.247.102  ICMP     118    0x60a3 (24739) 255 Echo (ping) request  id=0x007b, seq=5/1280, ttl=255 (no response found!)
  13 2022-08-04 08:18:24.575918119  192.168.247.100  192.168.247.102  ICMP     128    0x60a4 (24740) 255 Echo (ping) request  id=0x007b, seq=6/1536, ttl=255 (no response found!)
  14 2022-08-04 08:18:24.575919057  192.168.247.100  192.168.247.102  ICMP     118    0x60a4 (24740) 255 Echo (ping) request  id=0x007b, seq=6/1536, ttl=255 (no response found!)
  15 2022-08-04 08:18:24.576407671  192.168.247.100  192.168.247.102  ICMP     128    0x60a5 (24741) 255 Echo (ping) request  id=0x007b, seq=7/1792, ttl=255 (no response found!)
  16 2022-08-04 08:18:24.576408585  192.168.247.100  192.168.247.102  ICMP     118    0x60a5 (24741) 255 Echo (ping) request  id=0x007b, seq=7/1792, ttl=255 (no response found!)
  17 2022-08-04 08:18:24.576885643  192.168.247.100  192.168.247.102  ICMP     128    0x60a6 (24742) 255 Echo (ping) request  id=0x007b, seq=8/2048, ttl=255 (no response found!)
  18 2022-08-04 08:18:24.576886561  192.168.247.100  192.168.247.102  ICMP     118    0x60a6 (24742) 255 Echo (ping) request  id=0x007b, seq=8/2048, ttl=255 (no response found!)
  19 2022-08-04 08:18:24.577394328  192.168.247.100  192.168.247.102  ICMP     128    0x60a7 (24743) 255 Echo (ping) request  id=0x007b, seq=9/2304, ttl=255 (no response found!)
  20 2022-08-04 08:18:24.577395234  192.168.247.100  192.168.247.102  ICMP     118    0x60a7 (24743) 255 Echo (ping) request  id=0x007b, seq=9/2304, ttl=255 (no response found!)
  21 2022-08-04 08:18:24.577987632  192.168.247.100  192.168.247.102  ICMP     128    0x60a8 (24744) 255 Echo (ping) request  id=0x007b, seq=10/2560, ttl=255 (no response found!)
  22 2022-08-04 08:18:24.577989290  192.168.247.100  192.168.247.102  ICMP     118    0x60a8 (24744) 255 Echo (ping) request  id=0x007b, seq=10/2560, ttl=255 (no response found!)
  23 2022-08-04 08:18:24.578448781  192.168.247.100  192.168.247.102  ICMP     128    0x60a9 (24745) 255 Echo (ping) request  id=0x007b, seq=11/2816, ttl=255 (no response found!)
  24 2022-08-04 08:18:24.578449909  192.168.247.100  192.168.247.102  ICMP     118    0x60a9 (24745) 255 Echo (ping) request  id=0x007b, seq=11/2816, ttl=255 (no response found!)
  25 2022-08-04 08:18:24.578900043  192.168.247.100  192.168.247.102  ICMP     128    0x60aa (24746) 255 Echo (ping) request  id=0x007b, seq=12/3072, ttl=255 (no response found!)
  26 2022-08-04 08:18:24.578900897  192.168.247.100  192.168.247.102  ICMP     118    0x60aa (24746) 255 Echo (ping) request  id=0x007b, seq=12/3072, ttl=255 (no response found!)
  27 2022-08-04 08:18:24.579426962  192.168.247.100  192.168.247.102  ICMP     128    0x60ab (24747) 255 Echo (ping) request  id=0x007b, seq=13/3328, ttl=255 (no response found!)
```

```
> Frame 1: 128 bytes on wire (1024 bits), 128 bytes captured (1024 bits) on interface capture_u0_3, id 0
> Ethernet II, Src: Cisco d6:ec:00 (00:17:df:d6:ec:00), Dst: a2:76:f2:00:00:1c (a2:76:f2:00:00:1c)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0011 1101 .... .... .... .... = Destination: 61
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1001
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0011 1110 1001 = ID: 1001
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 207
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1111 = ID: 207
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.168.247.100, Dst: 192.168.247.102
> Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 1c 00 17  df d6 ec 00 89 26 80 3d   ·v······ ·····&·=
0010  00 00 81 00 03 e9 81 00  00 cf 08 00 45 00 00 64   ········ ····E··d
0020  60 9e 00 00 ff 01 ea dd  c0 a8 f7 64 c0 a8 f7 66   `······· ···d···f
0030  08 00 e5 c8 00 7b 00 00  00 00 00 02 4d 8c 4a 78   ·····{·· ····M·Jx
0040  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0050  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0060  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0070  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
```

Select the second packet and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header has the VLAN tag 207.



```
No.  Time                           Source           Destination      Protocol Length IP ID          IP TTL Info
   1 2022-08-04 08:18:24.572548869  192.168.247.100  192.168.247.102  ICMP     128    0x609e (24734) 255 Echo (ping) request  id=0x007b, seq=0/0, ttl=255 (no response found!)
   2 2022-08-04 08:18:24.572550073  192.168.247.100  192.168.247.102  ICMP     118    0x609e (24734) 255 Echo (ping) request  id=0x007b, seq=0/0, ttl=255 (no response found!)
   3 2022-08-04 08:18:24.573286630  192.168.247.100  192.168.247.102  ICMP     128    0x609f (24735) 255 Echo (ping) request  id=0x007b, seq=1/256, ttl=255 (no response found!)
   4 2022-08-04 08:18:24.573287640  192.168.247.100  192.168.247.102  ICMP     118    0x609f (24735) 255 Echo (ping) request  id=0x007b, seq=1/256, ttl=255 (no response found!)
   5 2022-08-04 08:18:24.573794751  192.168.247.100  192.168.247.102  ICMP     128    0x60a0 (24736) 255 Echo (ping) request  id=0x007b, seq=2/512, ttl=255 (no response found!)
   6 2022-08-04 08:18:24.573795748  192.168.247.100  192.168.247.102  ICMP     118    0x60a0 (24736) 255 Echo (ping) request  id=0x007b, seq=2/512, ttl=255 (no response found!)
   7 2022-08-04 08:18:24.574368638  192.168.247.100  192.168.247.102  ICMP     128    0x60a1 (24737) 255 Echo (ping) request  id=0x007b, seq=3/768, ttl=255 (no response found!)
   8 2022-08-04 08:18:24.574369574  192.168.247.100  192.168.247.102  ICMP     118    0x60a1 (24737) 255 Echo (ping) request  id=0x007b, seq=3/768, ttl=255 (no response found!)
   9 2022-08-04 08:18:24.574914512  192.168.247.100  192.168.247.102  ICMP     128    0x60a2 (24738) 255 Echo (ping) request  id=0x007b, seq=4/1024, ttl=255 (no response found!)
  10 2022-08-04 08:18:24.574915415  192.168.247.100  192.168.247.102  ICMP     118    0x60a2 (24738) 255 Echo (ping) request  id=0x007b, seq=4/1024, ttl=255 (no response found!)
  11 2022-08-04 08:18:24.575442569  192.168.247.100  192.168.247.102  ICMP     128    0x60a3 (24739) 255 Echo (ping) request  id=0x007b, seq=5/1280, ttl=255 (no response found!)
  12 2022-08-04 08:18:24.575443601  192.168.247.100  192.168.247.102  ICMP     118    0x60a3 (24739) 255 Echo (ping) request  id=0x007b, seq=5/1280, ttl=255 (no response found!)
  13 2022-08-04 08:18:24.575918119  192.168.247.100  192.168.247.102  ICMP     128    0x60a4 (24740) 255 Echo (ping) request  id=0x007b, seq=6/1536, ttl=255 (no response found!)
  14 2022-08-04 08:18:24.575919057  192.168.247.100  192.168.247.102  ICMP     118    0x60a4 (24740) 255 Echo (ping) request  id=0x007b, seq=6/1536, ttl=255 (no response found!)
  15 2022-08-04 08:18:24.576407671  192.168.247.100  192.168.247.102  ICMP     128    0x60a5 (24741) 255 Echo (ping) request  id=0x007b, seq=7/1792, ttl=255 (no response found!)
  16 2022-08-04 08:18:24.576408585  192.168.247.100  192.168.247.102  ICMP     118    0x60a5 (24741) 255 Echo (ping) request  id=0x007b, seq=7/1792, ttl=255 (no response found!)
  17 2022-08-04 08:18:24.576885643  192.168.247.100  192.168.247.102  ICMP     128    0x60a6 (24742) 255 Echo (ping) request  id=0x007b, seq=8/2048, ttl=255 (no response found!)
  18 2022-08-04 08:18:24.576886561  192.168.247.100  192.168.247.102  ICMP     118    0x60a6 (24742) 255 Echo (ping) request  id=0x007b, seq=8/2048, ttl=255 (no response found!)
  19 2022-08-04 08:18:24.577394328  192.168.247.100  192.168.247.102  ICMP     128    0x60a7 (24743) 255 Echo (ping) request  id=0x007b, seq=9/2304, ttl=255 (no response found!)
  20 2022-08-04 08:18:24.577395234  192.168.247.100  192.168.247.102  ICMP     118    0x60a7 (24743) 255 Echo (ping) request  id=0x007b, seq=9/2304, ttl=255 (no response found!)
  21 2022-08-04 08:18:24.577987632  192.168.247.100  192.168.247.102  ICMP     128    0x60a8 (24744) 255 Echo (ping) request  id=0x007b, seq=10/2560, ttl=255 (no response found!)
  22 2022-08-04 08:18:24.577989290  192.168.247.100  192.168.247.102  ICMP     118    0x60a8 (24744) 255 Echo (ping) request  id=0x007b, seq=10/2560, ttl=255 (no response found!)
  23 2022-08-04 08:18:24.578448781  192.168.247.100  192.168.247.102  ICMP     128    0x60a9 (24745) 255 Echo (ping) request  id=0x007b, seq=11/2816, ttl=255 (no response found!)
  24 2022-08-04 08:18:24.578449909  192.168.247.100  192.168.247.102  ICMP     118    0x60a9 (24745) 255 Echo (ping) request  id=0x007b, seq=11/2816, ttl=255 (no response found!)
  25 2022-08-04 08:18:24.578900043  192.168.247.100  192.168.247.102  ICMP     128    0x60aa (24746) 255 Echo (ping) request  id=0x007b, seq=12/3072, ttl=255 (no response found!)
  26 2022-08-04 08:18:24.578900897  192.168.247.100  192.168.247.102  ICMP     118    0x60aa (24746) 255 Echo (ping) request  id=0x007b, seq=12/3072, ttl=255 (no response found!)
  27 2022-08-04 08:18:24.579426962  192.168.247.100  192.168.247.102  ICMP     128    0x60ab (24747) 255 Echo (ping) request  id=0x007b, seq=13/3328, ttl=255 (no response found!)
```

```
> Frame 2: 118 bytes on wire (944 bits), 118 bytes captured (944 bits) on interface capture_u0_3, id 0
> Ethernet II, Src: Cisco d6:ec:00 (00:17:df:d6:ec:00), Dst: a2:76:f2:00:00:1c (a2:76:f2:00:00:1c)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 207
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1111 = ID: 207
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.168.247.100, Dst: 192.168.247.102
> Internet Control Message Protocol
```

```
0000  a2 76 f2 00 00 1c 00 17  df d6 ec 00 81 00 00 cf   ·v······ ········
0010  08 00 45 00 00 64 60 9e  00 00 ff 01 ea dd c0 a8   ··E··d`· ········
0020  f7 64 c0 a8 f7 66 08 00  e5 c8 00 7b 00 00 00 00   ·d···f·· ···{····
0030  00 02 4d 8c 4a 78 ab cd  ab cd ab cd ab cd ab cd   ··M·Jx·· ········
0040  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0050  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0060  ab cd ab cd ab cd ab cd  ab cd ab cd ab cd ab cd   ········ ········
0070  ab cd ab cd ab cd                                  ······
```

Explanation

When a packet capture on a front interface is configured, the switch simultaneously captures each packet twice:

- After the insertion of the port VLAN tag.
- After the insertion of the VN tag.

In the order of operations, the VN tag is inserted at a later stage than the port VLAN tag insertion. But in the capture file, the packet with the VN tag is shown earlier than the packet with the port VLAN tag. Additionally, in the case of subinterfaces, in the capture files, every second packet does not contain the port VLAN tag.

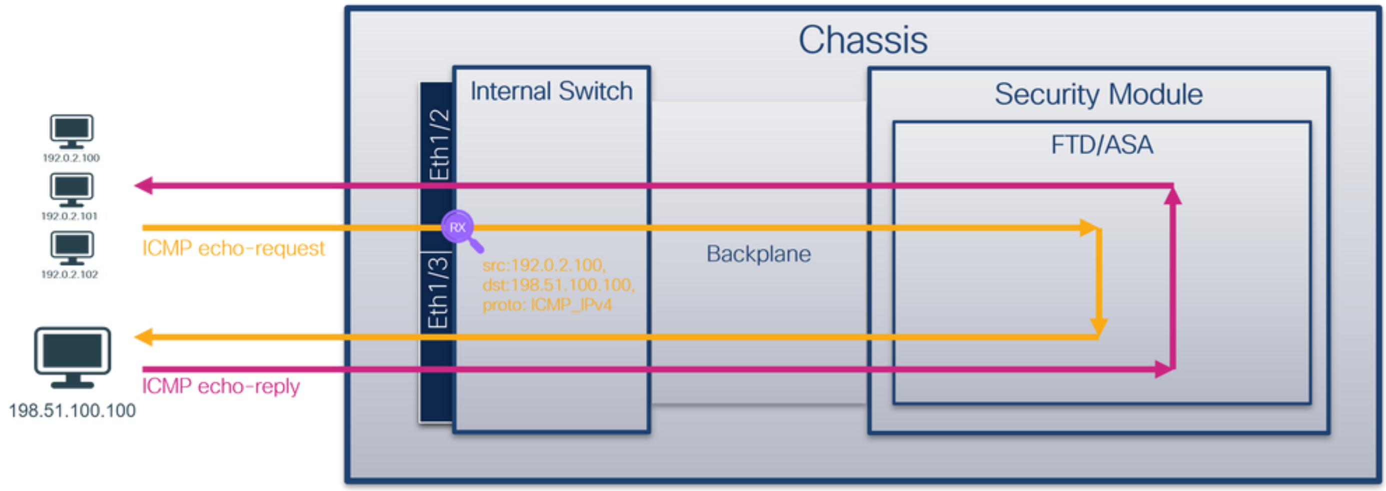
This table summarizes the task:

Task	**Capture point**	**Internal port VLAN in captured packets**	**Direction**	**Captured traffic**
Configure and verify a packet capture on subinterface Ethernet1/2.205	Ethernet1/2.205	102	Ingress only	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100
Configure and verify a packet capture on Portchannel1 subinterface with member interfaces Ethernet1/3 and Ethernet1/4	Ethernet1/3 Ethernet1/4	1001	Ingress only	ICMP echo requests from 192.168.207.100 to host 192.168.207.102

Packet Capture Filters

Use the FCM and CLI to configure and verify a packet capture on interface Ethernet1/2 with a filter.

Topology, packet flow, and the capture points



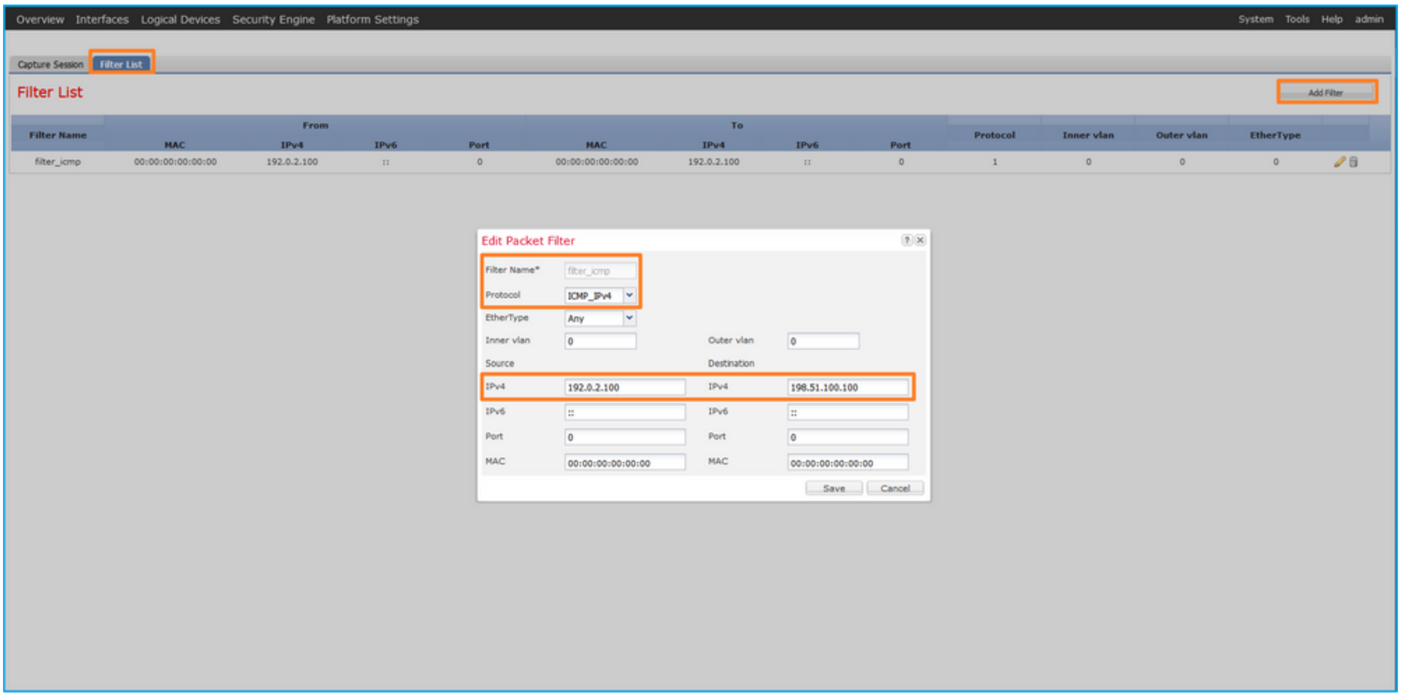
Configuration

FCM

Perform these steps on FCM to configure a capture filter for ICMP echo request packets from host 192.0.2.100 to host 198.51.100.100 and apply it to packet capture on interface Ethernet1/2:

1. Use **Tools** > **Packet Capture** > **Filter List** > **Add Filter** to create a capture filter**.**

2. Specify the **Filter Name, Protocol, Source IPv4, Destination IPv4** and click **Save:**



Filter List

Filter Name	From				To				Protocol	Inner vlan	Outer vlan	EtherType
	MAC	IPv4	IPv6	Port	MAC	IPv4	IPv6	Port				
filter_icmp	00:00:00:00:00:00	192.0.2.100	::	0	00:00:00:00:00:00	192.0.2.100	::	0	1	0	0	0

Edit Packet Filter

Filter Name* filter_icmp

Protocol ICMP_IPv4

EtherType Any

Inner vlan 0   Outer vlan 0

Source   Destination

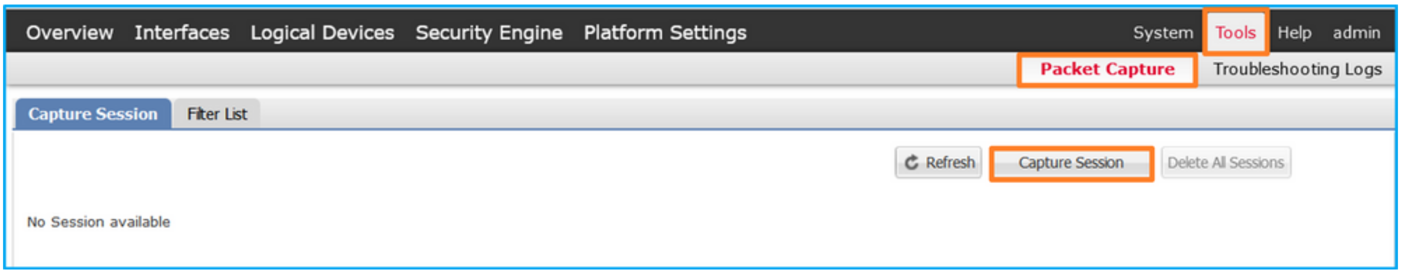
IPv4 192.0.2.100   IPv4 198.51.100.100

IPv6 ::   IPv6 ::

Port 0   Port 0

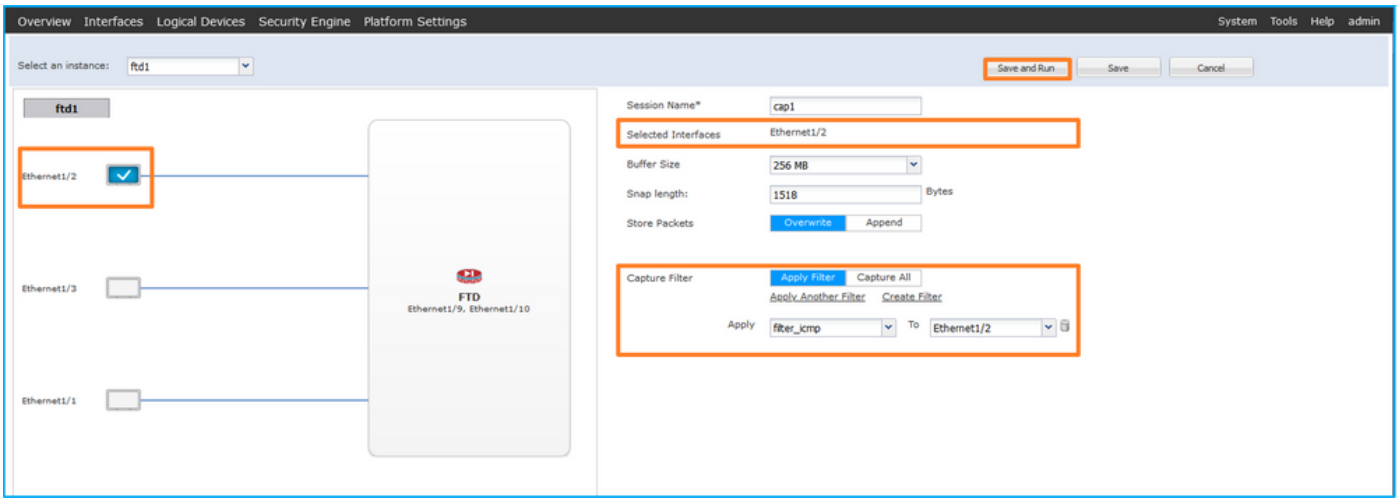
MAC 00:00:00:00:00:00   MAC 00:00:00:00:00:00

3. Use **Tools** > **Packet Capture** > **Capture Session** to create a new capture session**:**



No Session available

4. Select Ethernet1/2, provide the **Session Name,** apply the capture filter and click **Save and Run** to activate the capture**:**



Select an instance: ftd1

Session Name* cap1

Selected Interfaces Ethernet1/2

Buffer Size 256 MB

Snap length: 1518 Bytes

Store Packets [✓ Overwrite] Append

Capture Filter [✓ Apply Filter] Capture All

Apply filter_icmp To Ethernet1/2

FXOS CLI

Perform these steps on FXOS CLI to configure packet captures on backplane interfaces:

1. Identify the application type and identifier:

```
<#root>

firepower#

scope ssa


firepower /ssa#

show app-instance


App Name   Identifier Slot ID    Admin State Oper State       Running Version Startup Version Deploy Ty
---------- ---------- ---------- ----------- ---------------- --------------- --------------- ---------

ftd        ftd1

       1          Enabled     Online           7.2.0.82        7.2.0.82        Native      No
```

2. Identify the IP protocol number in https://www.iana.org/assignments/protocol-numbers/protocol-numbers.xhtml. In this case, the ICMP protocol number is 1.

3. Create a capture session:

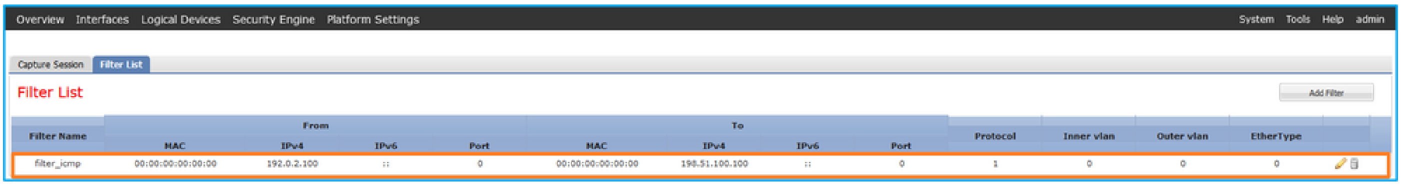
```
<#root>

firepower#

scope packet-capture


firepower /packet-capture #

create filter filter_icmp


firepower /packet-capture/filter* #

set destip 198.51.100.100


firepower /packet-capture/filter* #

set protocol 1


firepower /packet-capture/filter* #

set srcip 192.0.2.100


firepower /packet-capture/filter* #

exit


firepower /packet-capture* #

create session cap1
```

```
firepower /packet-capture/session* #
create phy-port Ethernet1/2

firepower /packet-capture/session/phy-port* #
set app ftd

firepower /packet-capture/session/phy-port* #
set app-identifier ftd1

firepower /packet-capture/session/phy-port* #
set filter filter_icmp

firepower /packet-capture/session/phy-port* #
exit

firepower /packet-capture/session* #
enable

firepower /packet-capture/session* #
commit

firepower /packet-capture/session #
```

Verification

FCM

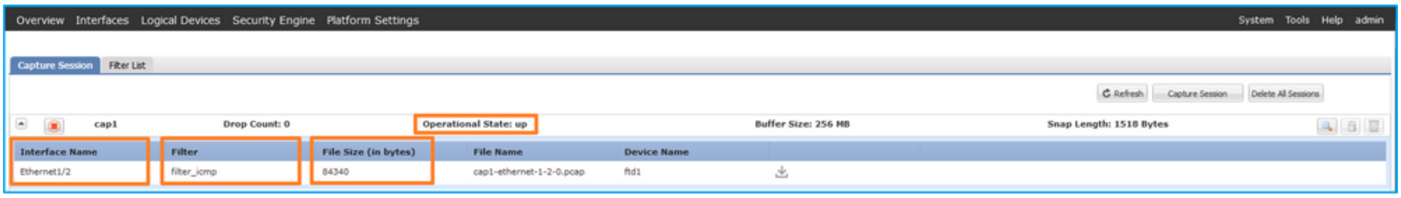
Verify the **Interface Name**, ensure that the **Operational Status** is up and that the **File Size (in bytes)** increases:



Filter List

Filter Name	From				To				Protocol	Inner vlan	Outer vlan	EtherType
	MAC	IPv4	IPv6	Port	MAC	IPv4	IPv6	Port				
filter_icmp	00:00:00:00:00:00	192.0.2.100	::	0	00:00:00:00:00:00	198.51.100.100	::	0	1	0	0	0

Verify the **Interface Name**, the **Filter**, ensure the **Operational Status** is up, and the **File Size (in bytes)** increases in **Tools > Packet Capture > Capture Session**:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	filter_icmp	84340	cap1-ethernet-1-2-0.pcap	ftd1

FXOS CLI

Verify the capture details in **scope packet-capture**:

<#root>

```
firepower#

scope packet-capture


firepower /packet-capture #

show filter detail



Configure a filter for packet capture:


Name: filter_icmp



    Protocol: 1


    Ivlan: 0
    Ovlan: 0


Src Ip: 192.0.2.100



    Dest Ip: 198.51.100.100


    Src MAC: 00:00:00:00:00:00
    Dest MAC: 00:00:00:00:00:00
    Src Port: 0
    Dest Port: 0
    Ethertype: 0
    Src Ipv6: ::
    Dest Ipv6: ::
firepower /packet-capture #

show session cap1



Traffic Monitoring Session:
    Packet Capture Session Name: cap1


    Session: 1

    Admin State: Enabled



    Oper State: Up
    Oper State Reason: Active

    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:

Slot Id: 1

    Port Id: 2

    Pcapfile: /workspace/packet-capture/session-1/cap1-ethernet-1-2-0.pcap

    Pcapsize: 213784  bytes

Filter: filter_icmp

    Sub Interface: 0
    Application Instance Identifier: ftd1

    Application Name: ftd
```

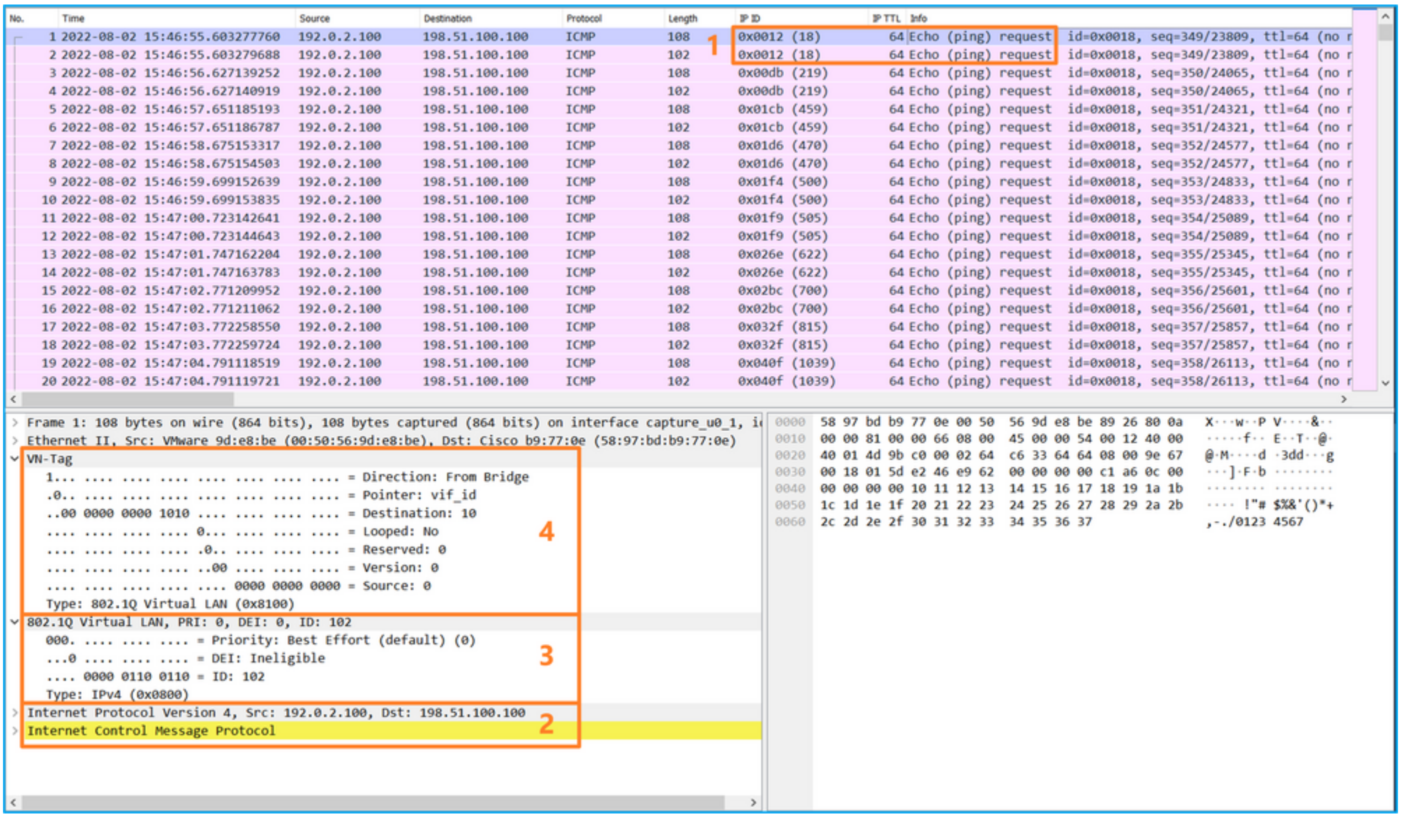
Collect capture files

Perform the steps in the section **Collect Firepower 4100/9300 Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture file. Select the first packet and check the key points

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.
4. The internal switch inserts an additional VN tag.



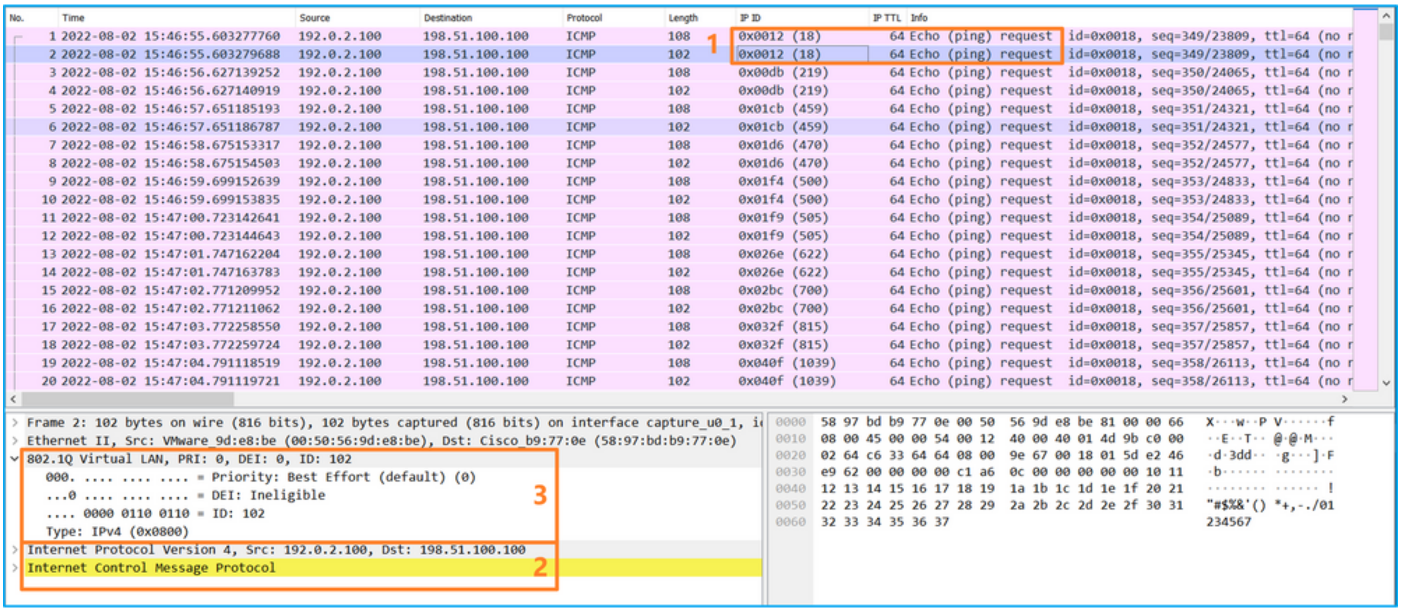
```
No. Time                           Source       Destination     Protocol Length IP ID        IP TTL Info
  1 2022-08-02 15:46:55.603277760  192.0.2.100  198.51.100.100  ICMP     108    0x0012 (18)      64 Echo (ping) request  id=0x0018, seq=349/23809, ttl=64 (no r
  2 2022-08-02 15:46:55.603279688  192.0.2.100  198.51.100.100  ICMP     102    0x0012 (18)      64 Echo (ping) request  id=0x0018, seq=349/23809, ttl=64 (no r
  3 2022-08-02 15:46:56.627139252  192.0.2.100  198.51.100.100  ICMP     108    0x00db (219)     64 Echo (ping) request  id=0x0018, seq=350/24065, ttl=64 (no r
  4 2022-08-02 15:46:56.627140919  192.0.2.100  198.51.100.100  ICMP     102    0x00db (219)     64 Echo (ping) request  id=0x0018, seq=350/24065, ttl=64 (no r
  5 2022-08-02 15:46:57.651185193  192.0.2.100  198.51.100.100  ICMP     108    0x01cb (459)     64 Echo (ping) request  id=0x0018, seq=351/24321, ttl=64 (no r
  6 2022-08-02 15:46:57.651186787  192.0.2.100  198.51.100.100  ICMP     102    0x01cb (459)     64 Echo (ping) request  id=0x0018, seq=351/24321, ttl=64 (no r
  7 2022-08-02 15:46:58.675153317  192.0.2.100  198.51.100.100  ICMP     108    0x01d6 (470)     64 Echo (ping) request  id=0x0018, seq=352/24577, ttl=64 (no r
  8 2022-08-02 15:46:58.675154503  192.0.2.100  198.51.100.100  ICMP     102    0x01d6 (470)     64 Echo (ping) request  id=0x0018, seq=352/24577, ttl=64 (no r
  9 2022-08-02 15:46:59.699152639  192.0.2.100  198.51.100.100  ICMP     108    0x01f4 (500)     64 Echo (ping) request  id=0x0018, seq=353/24833, ttl=64 (no r
 10 2022-08-02 15:46:59.699153835  192.0.2.100  198.51.100.100  ICMP     102    0x01f4 (500)     64 Echo (ping) request  id=0x0018, seq=353/24833, ttl=64 (no r
 11 2022-08-02 15:47:00.723142641  192.0.2.100  198.51.100.100  ICMP     108    0x01f9 (505)     64 Echo (ping) request  id=0x0018, seq=354/25089, ttl=64 (no r
 12 2022-08-02 15:47:00.723144643  192.0.2.100  198.51.100.100  ICMP     102    0x01f9 (505)     64 Echo (ping) request  id=0x0018, seq=354/25089, ttl=64 (no r
 13 2022-08-02 15:47:01.747162204  192.0.2.100  198.51.100.100  ICMP     108    0x026e (622)     64 Echo (ping) request  id=0x0018, seq=355/25345, ttl=64 (no r
 14 2022-08-02 15:47:01.747163783  192.0.2.100  198.51.100.100  ICMP     102    0x026e (622)     64 Echo (ping) request  id=0x0018, seq=355/25345, ttl=64 (no r
 15 2022-08-02 15:47:02.771209952  192.0.2.100  198.51.100.100  ICMP     108    0x02bc (700)     64 Echo (ping) request  id=0x0018, seq=356/25601, ttl=64 (no r
 16 2022-08-02 15:47:02.771211062  192.0.2.100  198.51.100.100  ICMP     102    0x02bc (700)     64 Echo (ping) request  id=0x0018, seq=356/25601, ttl=64 (no r
 17 2022-08-02 15:47:03.772258550  192.0.2.100  198.51.100.100  ICMP     108    0x032f (815)     64 Echo (ping) request  id=0x0018, seq=357/25857, ttl=64 (no r
 18 2022-08-02 15:47:03.772259724  192.0.2.100  198.51.100.100  ICMP     102    0x032f (815)     64 Echo (ping) request  id=0x0018, seq=357/25857, ttl=64 (no r
 19 2022-08-02 15:47:04.791118519  192.0.2.100  198.51.100.100  ICMP     108    0x040f (1039)    64 Echo (ping) request  id=0x0018, seq=358/26113, ttl=64 (no r
 20 2022-08-02 15:47:04.791119721  192.0.2.100  198.51.100.100  ICMP     102    0x040f (1039)    64 Echo (ping) request  id=0x0018, seq=358/26113, ttl=64 (no r
```

```
> Frame 1: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface capture_u0_1, i
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_b9:77:0e (58:97:bd:b9:77:0e)
v VN-Tag
    1... .... .... .... .... .... .... .... = Direction: From Bridge
    .0.. .... .... .... .... .... .... .... = Pointer: vif_id
    ..00 0000 0000 1010 .... .... .... .... = Destination: 10
    .... .... .... .... 0... .... .... .... = Looped: No
    .... .... .... .... .0.. .... .... .... = Reserved: 0
    .... .... .... .... ..00 .... .... .... = Version: 0
    .... .... .... .... .... 0000 0000 0000 = Source: 0
    Type: 802.1Q Virtual LAN (0x8100)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 89 26 80 0a   X···w··P V····&··
0010  00 00 81 00 00 66 08 00  45 00 00 54 00 12 40 00   ·····f·· E··T··@·
0020  40 01 4d 9b c0 00 02 64  c6 33 64 64 08 00 9e 67   @·M····d ·3dd···g
0030  00 18 01 5d e2 46 e9 62  00 00 00 00 c1 a6 0c 00   ···]·F·b ········
0040  00 00 00 00 10 11 12 13  14 15 16 17 18 19 1a 1b   ········ ········
0050  1c 1d 1e 1f 20 21 22 23  24 25 26 27 28 29 2a 2b   ···· !"# $%&'()*+
0060  2c 2d 2e 2f 30 31 32 33  34 35 36 37               ,-./0123 4567
```

Select the second packet, and check the key points:

1. Only ICMP echo request packets are captured. Each packet is captured and shown 2 times.
2. The original packet header is without the VLAN tag.
3. The internal switch inserts additional port VLAN tag **102** that identifies the ingress interface Ethernet1/2.



```
No. Time                           Source       Destination     Protocol Length IP ID        IP TTL Info
  1 2022-08-02 15:46:55.603277760  192.0.2.100  198.51.100.100  ICMP     108    0x0012 (18)      64 Echo (ping) request  id=0x0018, seq=349/23809, ttl=64 (no r
  2 2022-08-02 15:46:55.603279688  192.0.2.100  198.51.100.100  ICMP     102    0x0012 (18)      64 Echo (ping) request  id=0x0018, seq=349/23809, ttl=64 (no r
  3 2022-08-02 15:46:56.627139252  192.0.2.100  198.51.100.100  ICMP     108    0x00db (219)     64 Echo (ping) request  id=0x0018, seq=350/24065, ttl=64 (no r
  4 2022-08-02 15:46:56.627140919  192.0.2.100  198.51.100.100  ICMP     102    0x00db (219)     64 Echo (ping) request  id=0x0018, seq=350/24065, ttl=64 (no r
  5 2022-08-02 15:46:57.651185193  192.0.2.100  198.51.100.100  ICMP     108    0x01cb (459)     64 Echo (ping) request  id=0x0018, seq=351/24321, ttl=64 (no r
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  7 2022-08-02 15:46:58.675153317  192.0.2.100  198.51.100.100  ICMP     108    0x01d6 (470)     64 Echo (ping) request  id=0x0018, seq=352/24577, ttl=64 (no r
  8 2022-08-02 15:46:58.675154503  192.0.2.100  198.51.100.100  ICMP     102    0x01d6 (470)     64 Echo (ping) request  id=0x0018, seq=352/24577, ttl=64 (no r
  9 2022-08-02 15:46:59.699152639  192.0.2.100  198.51.100.100  ICMP     108    0x01f4 (500)     64 Echo (ping) request  id=0x0018, seq=353/24833, ttl=64 (no r
 10 2022-08-02 15:46:59.699153835  192.0.2.100  198.51.100.100  ICMP     102    0x01f4 (500)     64 Echo (ping) request  id=0x0018, seq=353/24833, ttl=64 (no r
 11 2022-08-02 15:47:00.723142641  192.0.2.100  198.51.100.100  ICMP     108    0x01f9 (505)     64 Echo (ping) request  id=0x0018, seq=354/25089, ttl=64 (no r
 12 2022-08-02 15:47:00.723144643  192.0.2.100  198.51.100.100  ICMP     102    0x01f9 (505)     64 Echo (ping) request  id=0x0018, seq=354/25089, ttl=64 (no r
 13 2022-08-02 15:47:01.747162204  192.0.2.100  198.51.100.100  ICMP     108    0x026e (622)     64 Echo (ping) request  id=0x0018, seq=355/25345, ttl=64 (no r
 14 2022-08-02 15:47:01.747163783  192.0.2.100  198.51.100.100  ICMP     102    0x026e (622)     64 Echo (ping) request  id=0x0018, seq=355/25345, ttl=64 (no r
 15 2022-08-02 15:47:02.771209952  192.0.2.100  198.51.100.100  ICMP     108    0x02bc (700)     64 Echo (ping) request  id=0x0018, seq=356/25601, ttl=64 (no r
 16 2022-08-02 15:47:02.771211062  192.0.2.100  198.51.100.100  ICMP     102    0x02bc (700)     64 Echo (ping) request  id=0x0018, seq=356/25601, ttl=64 (no r
 17 2022-08-02 15:47:03.772258550  192.0.2.100  198.51.100.100  ICMP     108    0x032f (815)     64 Echo (ping) request  id=0x0018, seq=357/25857, ttl=64 (no r
 18 2022-08-02 15:47:03.772259724  192.0.2.100  198.51.100.100  ICMP     102    0x032f (815)     64 Echo (ping) request  id=0x0018, seq=357/25857, ttl=64 (no r
 19 2022-08-02 15:47:04.791118519  192.0.2.100  198.51.100.100  ICMP     108    0x040f (1039)    64 Echo (ping) request  id=0x0018, seq=358/26113, ttl=64 (no r
 20 2022-08-02 15:47:04.791119721  192.0.2.100  198.51.100.100  ICMP     102    0x040f (1039)    64 Echo (ping) request  id=0x0018, seq=358/26113, ttl=64 (no r
```

```
> Frame 2: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface capture_u0_1, i
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_b9:77:0e (58:97:bd:b9:77:0e)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 102
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 0110 0110 = ID: 102
    Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  58 97 bd b9 77 0e 00 50  56 9d e8 be 81 00 00 66   X···w··P V······f
0010  08 00 45 00 00 54 00 12  40 00 40 01 4d 9b c0 00   ··E··T·· @·@·M···
0020  02 64 c6 33 64 64 08 00  9e 67 00 18 01 5d e2 46   ·d·3dd·· ·g···]·F
0030  e9 62 00 00 00 00 c1 a6  0c 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37                                  234567
```

Explanation

When a packet capture on a front interface is configured, the switch simultaneously captures each packet twice:

- After the insertion of the port VLAN tag.
- After the insertion of the VN tag.

In the order of operations, the VN tag is inserted at a later stage than the port VLAN tag insertion. But in the capture file, the packet with the VN tag is shown earlier than the packet with the port VLAN tag.

When a capture filter is applied only the packets that match the filter in the ingress direction are captured.

This table summarizes the task:

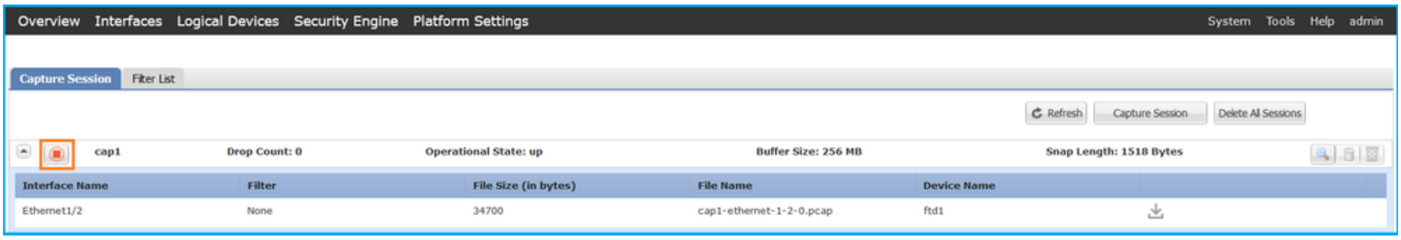
Task	**Capture point**	**Internal port VLAN in captured packets**	**Direction**	**User filter**	**Captured traffic**
Configure and verify a packet capture with a filter on the front interface Ethernet1/2	Ethernet1/2	102	Ingress only	Protocol: ICMP Source:192.0.2.100 Destination: 198.51.100.100	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

Collect Firepower 4100/9300 Internal Switch Capture Files

FCM

Perform these steps on FCM to collect internal switch capture files:

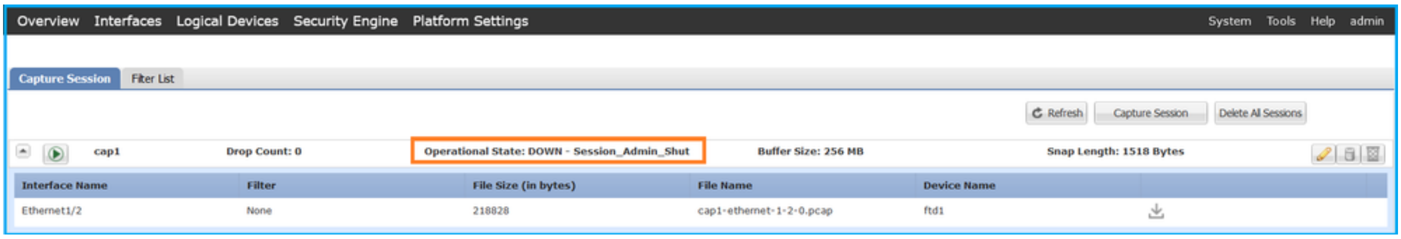
1. Click the **Disable Session** button to stop the active capture:



cap1 Drop Count: 0 Operational State: up Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	None	34700	cap1-ethernet-1-2-0.pcap	ftd1

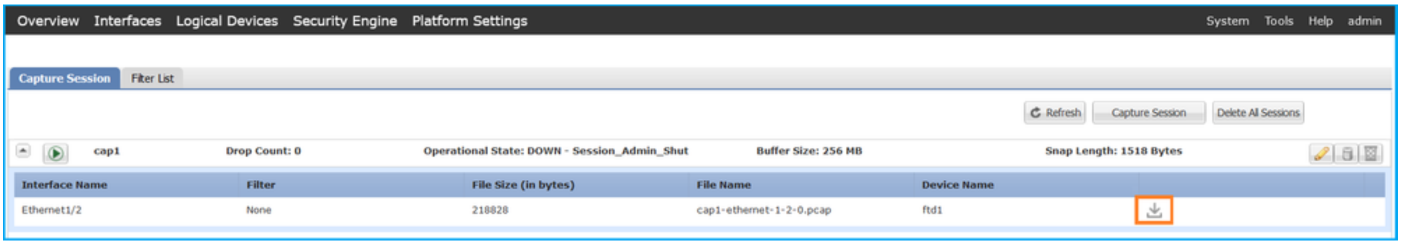
2. Ensure the operational state is **DOWN - Session_Admin_Shut:**



cap1 Drop Count: 0 Operational State: DOWN - Session_Admin_Shut Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	None	218828	cap1-ethernet-1-2-0.pcap	ftd1

3. Click **Download** to download the capture file:



cap1 Drop Count: 0 Operational State: DOWN - Session_Admin_Shut Buffer Size: 256 MB Snap Length: 1518 Bytes

Interface Name	Filter	File Size (in bytes)	File Name	Device Name
Ethernet1/2	None	218828	cap1-ethernet-1-2-0.pcap	ftd1

In the case of port-channel interfaces, repeat this step for each member interface.

FXOS CLI

Perform these steps on the FXOS CLI to collect capture files:

1. Stop the active capture:

<#root>

```
firepower#

scope packet-capture

firepower /packet-capture #

scope session cap1

firepower /packet-capture/session #

disable

firepower /packet-capture/session* #

commit

firepower /packet-capture/session #

up

firepower /packet-capture #

show session cap1 detail



Traffic Monitoring Session:
    Packet Capture Session Name:

cap1


    Session: 1

    Admin State: Disabled



    Oper State: Down
    Oper State Reason: Admin Disable


    Config Success: Yes
    Config Fail Reason:
    Append Flag: Overwrite
    Session Mem Usage: 256  MB
    Session Pcap Snap Len: 1518  Bytes
    Error Code: 0
    Drop Count: 0

Physical ports involved in Packet Capture:
    Slot Id: 1
    Port Id: 2
    Pcapfile:

/workspace/packet-capture/session-1/cap1-ethernet-1-2-0.pcap


    Pcapsize: 115744  bytes
    Filter:
    Sub Interface: 0
    Application Instance Identifier: ftd1
    Application Name: ftd
```

2. Upload the capture file from the **local-mgmt** command scope:

<#root>

```
firepower#

connect local-mgmt


firepower(local-mgmt)#

copy /packet-capture/session-1/cap1-ethernet-1-2-0.pcap ?


  ftp:        Dest File URI
  http:       Dest File URI
  https:      Dest File URI
  scp:        Dest File URI
  sftp:       Dest File URI
  tftp:       Dest File URI
  usbdrive:   Dest File URI
  volatile:   Dest File URI
  workspace:  Dest File URI

firepower(local-mgmt)#

copy /packet-capture/session-1/cap1-ethernet-1-2-0.pcap ftp://ftpuser@10.10.10.1/cap1-ethernet-1-2-0.pca


Password:
```

In the case of port-channel interfaces, copy the capture file for each member interface.

Guidelines, Limitations, and Best Practices for Internal Switch Packet Capture

For the guidelines and limitations related to Firepower 4100/9300 internal switch capture refer to the *Cisco Firepower 4100/9300 FXOS Chassis Manager Configuration Guide* or *Cisco Firepower 4100/9300 FXOS CLI Configuration Guide*, chapter **Troubleshooting**, section **Packet Capture**.

This is the list of best practices based on the usage of packet capture in TAC cases:

- Be aware of guidelines and limitations.
- Capture packets on all port-channel member interfaces and analyze all capture files.
- Use capture filters.
- Consider the impact of NAT on packet IP addresses when a capture filter is configured.
- Increase or decrease the **Snap Len** that specifies frame size in case it differs from the default value of 1518 bytes. Shorter size results in an increased number of captured packets and vice versa.
- Adjust the **Buffer Size** as needed.
- Be aware of the **Drop Count** on FCM or FXOS CLI. Once the buffer size limit is reached, the drop count counter increases.
- Use the filter **!vntag** on Wireshark to display only packets without the VN-tag. This is useful to hide VN-tagged packets in the front interface packet capture files.
- Use the filter **frame.number&1** on Wireshark to display only odd frames. This is useful to hide duplicate packets in the backplane interface packet capture files.
- In the case of protocols like TCP, Wireshark by default applies colorization rules that display packets with specific conditions in different colors. In the case of internal switch captures due to duplicate packets in capture files, the packet can be colored and marked in a false-positive way. If you analyze packet capture files and apply any filter, then export the displayed packets to a new file and open the new file instead.

Configuration and Verification on Secure Firewall 3100/4200

Unlike Firepower 4100/9300, the internal switch captures on the Secure Firewall 3100/4200 are configured on the application command line interface via the **capture <name> switch** command, where the **switch** option specifies that the captures are configured on the internal switch.

This is the **capture** command with the **switch** option:

<#root>

```
> capture cap_sw switch

 ?
  buffer         Configure size of capture buffer, default is 256MB
  ethernet-type  Capture Ethernet packets of a particular type, default is IP
  interface      Capture packets on a specific interface
  ivlan          Inner Vlan
  match          Capture packets based on match criteria
  ovlan          Outer Vlan
  packet-length  Configure maximum length to save from each packet, default is
                 64 bytes
  real-time      Display captured packets in real-time. Warning: using this
                 option with a slow console connection may result in an
                 excessive amount of non-displayed packets due to performance
                 limitations.
  stop           Stop packet capture
  trace          Trace the captured packets
  type           Capture packets based on a particular type
  <cr>
```

General steps for packet capture configuration are as follows:

1. Specify an ingress interface:

Switch capture configuration accepts the ingress interface **nameif**. The user can specify data interfaces names, internal uplink, or the management interfaces:

<#root>

```
>

capture capsw switch interface ?


Available interfaces to listen:
  in_data_uplink1  Capture packets on internal data uplink1 interface
  in_mgmt_uplink1  Capture packets on internal mgmt uplink1 interface
  inside           Name of interface Ethernet1/1.205

  management       Name of interface Management1/1
```

The Secure Firewall 4200 supports bidirectional captures. The default value is **ingress**, unless specified otherwise:

<#root>

```
>

capture capi switch interface inside direction


  both     To capture switch bi-directional traffic
  egress   To capture switch egressing traffic
  ingress  To capture switch ingressing traffic
```

Additionall, the Secure Firewall 4245 has **2** internal data and **2** management uplink interfaces:

<#root>

```
>

capture capsw switch interface


  eventing         Name of interface Management1/2
  in_data_uplink1  Capture packets on internal data uplink1 interface
  in_data_uplink2  Capture packets on internal data uplink2 interface
  in_mgmt_uplink1  Capture packets on internal mgmt uplink1 interface
  in_mgmt_uplink2  Capture packets on internal mgmt uplink2 interface
  management       Name of interface Management1/1
```

2. Specify the ethernet frame EtherType. The default EtherType is IP. The **ethernet-type** option values specify the EtherType:

```
<#root>

>

capture capsw switch interface inside ethernet-type ?


  802.1Q
  <0-65535>  Ethernet type
  arp
  ip
  ip6
  pppoed
  pppoes
  rarp
  sgt
  vlan
```

3. Specify the match conditions. The capture **match** option specifies the match criteria:

```
<#root>

>

capture capsw switch interface inside match ?


  <0-255>  Enter protocol number (0 - 255)
  ah
  eigrp
  esp
  gre
  icmp
  icmp6
  igmp
  igrp
  ip
  ipinip
  ipsec
  mac      Mac-address filter
  nos
  ospf
  pcp
  pim
  pptp
  sctp
  snp
  spi      SPI value
  tcp
  udp
  <cr>
```

4. Specify other optional parameters such as the buffer size, the packet length, and so on.

5. Enable the capture. The command **no capture <name> switch stop** activates the capture**:**

```
<#root>

>

capture capsw switch interface inside match ip


>

no capture capsw switch stop
```

6. Verify the capture details:

- Administrative status is **enabled**, and operational status is **up** and active.
- Packet capture file size **Pcapsize** increases.
- The number of captured packets in the output of the **show capture <cap_name>** is non-zero.
- Capture path **Pcapfile.** The captured packets are automatically saved in the **/mnt/disk0/packet-capture/** folder.
- Capture conditions. The software automatically creates capture filters based on capture conditions.

```
<#root>

>

show capture capsw


27 packet captured on disk using switch capture


Reading of capture file from disk is not supported

>

show capture capsw  detail


Packet Capture info

  Name:              capsw


  Session:           1

  Admin State:       enabled



  Oper State:        up




Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
```

```
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1
Physical port:
  Slot Id:           1
  Port Id:           1


Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap



  Pcapsize:          18838


  Filter:            capsw-1-1


Packet Capture Filter Info



  Name:              capsw-1-1


  Protocol:          0
  Ivlan:             0


Ovlan:             205


  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0
0 packet captured on disk using switch capture
Reading of capture file from disk is not supported
```

7. Stop the captures when needed:

<#root>

```
>

capture capsw switch stop


>

show capture capsw detail
```

```
Packet Capture info
  Name:              capsw


  Session:           1
  Admin State:       disabled



  Oper State:        down



  Oper State Reason: Session_Admin_Shut


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0
Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1
  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap
  Pcapsize:          24
  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             205
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0
0 packet captured on disk using switch capture
Reading of capture file from disk is not supported
```

8. Collect the capture files. Perform the steps in the section **Collect Secure Firewall Internal Switch Capture Files**.

In Secure Firewall software version 7.4, the internal switch capture configuration is not supported on the FMC or FDM. In the case of ASA software version 9.18(1) and later, internal switch captures can be configured in ASDM versions 7.18.1.x and later.

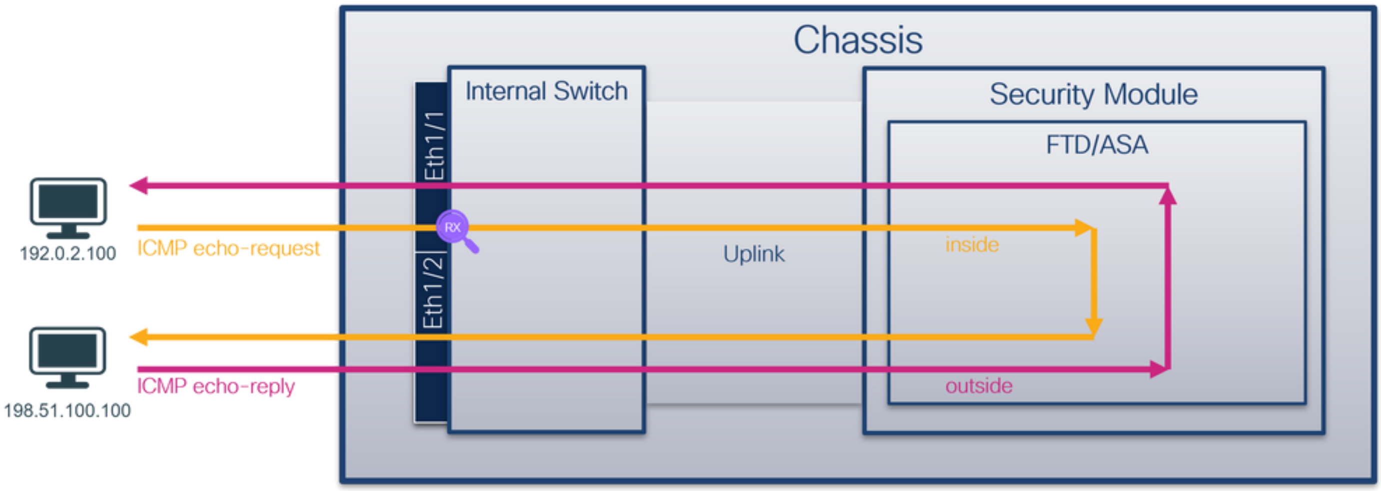
These scenarios cover common use cases of Secure Firewall 3100/4200 internal switch captures.

Packet Capture on a Physical or Port-channel Interface

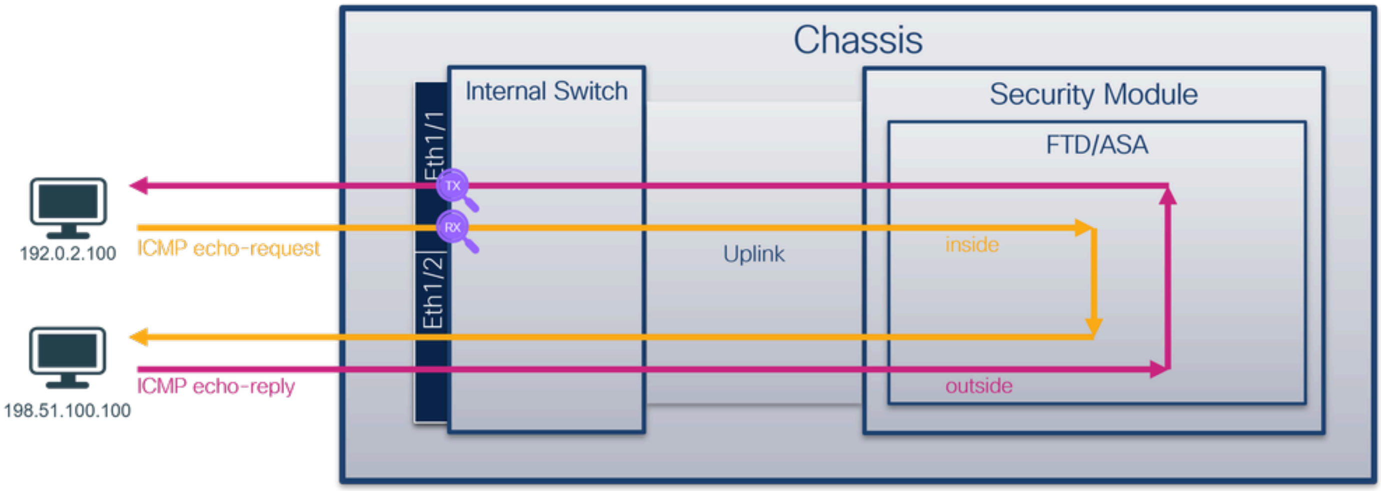
Use the FTD or ASA CLI to configure and verify a packet capture on interface Ethernet1/1 or Portchannel1 interface. Both interfaces have the nameif **inside**.

Topology, packet flow, and the capture points

Secure Firewall 3100:



Secure Firewall 4200 with bidirectional captures:



Configuration

Perform these steps on ASA or FTD CLI to configure a packet capture on interface Ethernet1/1 or Port-channel1:

1. Verify the nameif:

<#root>

```
>

show nameif
```

```
Interface                Name                     Security

Ethernet1/1              inside                     0


Ethernet1/2              outside                    0
Management1/1            diagnostic                 0
```

<#root>

```
>

show nameif

Interface                Name                     Security

Port-channel1            inside                    0


Ethernet1/2              outside                    0
Management1/1            diagnostic                 0
```

2. Create a capture session

<#root>

```
>

capture capsw switch interface inside
```

The Secure Firewall 4200 supports capture directionality:

<#root>

```
> capture capsw switch interface inside direction ?


  both To capture switch bi-directional traffic
  egress To capture switch egressing traffic
  ingress To capture switch ingressing traffic


> capture capsw switch interface inside direction both
```

3. Enable the capture session:

<#root>

```
> no capture capsw switch stop
```

Verification

Verify the capture session name, administrative and operational state, interface slot, and identifier. Ensure the **Pcapsize** value in bytes increases and the number of captured packets is non-zero:

<#root>

```
>

show capture capsw detail


Packet Capture info

  Name:              capsw


  Session:           1

  Admin State:       enabled



  Oper State:        up



  Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:

  Slot Id:           1



  Port Id:           1


  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap

  Pcapsize:          12653


  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
```

```
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0

79 packets captured on disk using switch capture



Reading of capture file from disk is not supported
```

Secure Firewal 4200:

<#root>

```
>
 show cap capsw detail

Packet Capture info

  Name:              capsw


  Session:           1

  Admin State:       enabled



  Oper State:        up



  Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1
  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap
  Pcapsize:          0

Direction:         both


  Drop:              disable
  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0

33 packet captured on disk using switch capture



Reading of capture file from disk is not supported
```

In the case of Port-channel1 the capture is configured on all member interfaces:

<#root>

```
>

show capture capsw detail


Packet Capture info

  Name:              capsw


  Session:           1

  Admin State:       enabled



  Oper State:        up



  Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 2
```

```
Physical port:

  Slot Id:          1


  Port Id:          4


  Pcapfile:         /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-4-0.pcap

  Pcapsize:         28824


  Filter:           capsw-1-4


Packet Capture Filter Info
  Name:             capsw-1-4
  Protocol:         0
  Ivlan:            0
  Ovlan:            0
  Src Ip:           0.0.0.0
  Dest Ip:          0.0.0.0
  Src Ipv6:         ::
  Dest Ipv6:        ::
  Src MAC:          00:00:00:00:00:00
  Dest MAC:         00:00:00:00:00:00
  Src Port:         0
  Dest Port:        0
  Ethertype:        0

Physical port:

  Slot Id:          1


  Port Id:          3


  Pcapfile:         /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-3-0.pcap

  Pcapsize:         18399


  Filter:           capsw-1-3

Packet Capture Filter Info
  Name:             capsw-1-3
  Protocol:         0
  Ivlan:            0
  Ovlan:            0
  Src Ip:           0.0.0.0
  Dest Ip:          0.0.0.0
  Src Ipv6:         ::
  Dest Ipv6:        ::
  Src MAC:          00:00:00:00:00:00
  Dest MAC:         00:00:00:00:00:00
  Src Port:         0
  Dest Port:        0
  Ethertype:        0

Total Physical breakout ports involved in Packet Capture: 0
```

```
56 packet captured on disk using switch capture



Reading of capture file from disk is not supported
```

The port-channel member interfaces can be verified in the FXOS **local-mgmt** command shell via the **show portchannel summary** command**:**

<#root>

```
>

connect fxos


…
firewall#

connect local-mgmt


firewall(local-mgmt)#

show portchannel summary


Flags:  D - Down        P - Up in port-channel (members)
I - Individual  H - Hot-standby (LACP only)
s - Suspended   r - Module-removed
S - Switched    R - Routed
U - Up (port-channel)
M - Not in use. Min-links not met
-------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------

1     Po1(U)      Eth      LACP      Eth1/3(P)    Eth1/4(P)



LACP KeepAlive Timer:
--------------------------------------------------------------------------------
      Channel  PeerKeepAliveTimerFast
--------------------------------------------------------------------------------
1     Po1(U)      False

Cluster LACP Status:
--------------------------------------------------------------------------------
      Channel  ClusterSpanned  ClusterDetach  ClusterUnitID  ClusterSysID
--------------------------------------------------------------------------------
1     Po1(U)      False          False         0            clust
```

To access the FXOS on ASA, run the **connect fxos admin** command. In the case of multi-context, run the command in the admin context.

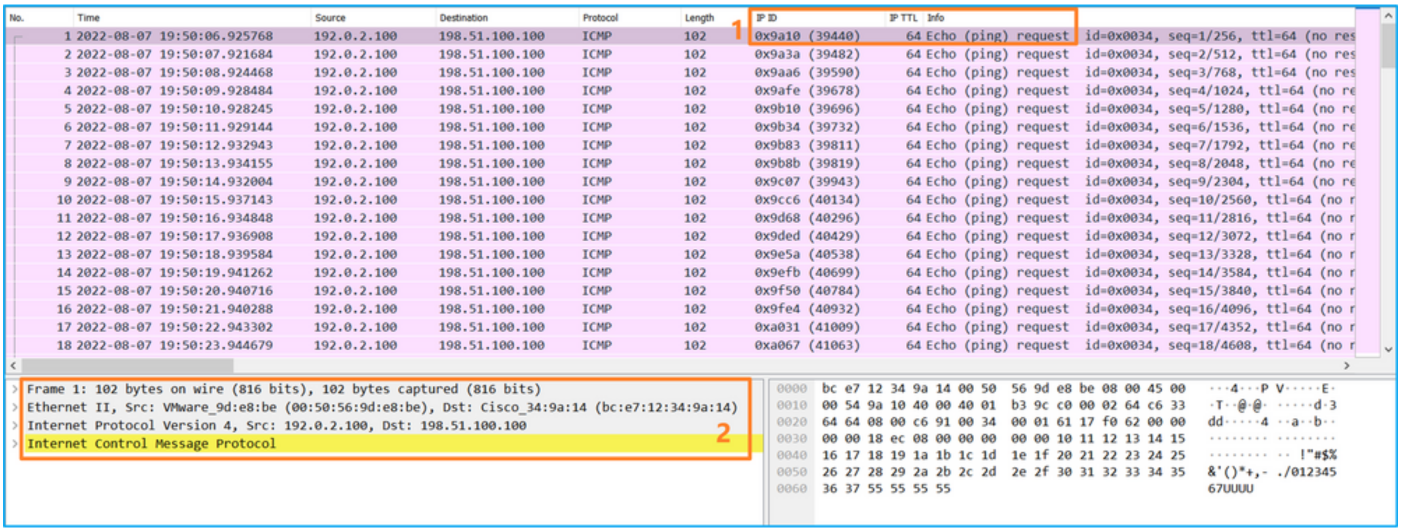
Collect capture files

Perform the steps in the section **Collect Secure Firewall Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files for Ethernet1/1. In this example, the packets capture on the Secure Firewall 3100 are analyzed. Select the first packet and check the key points:

1. Only ICMP echo request packets are captured.
2. The original packet header is without the VLAN tag.



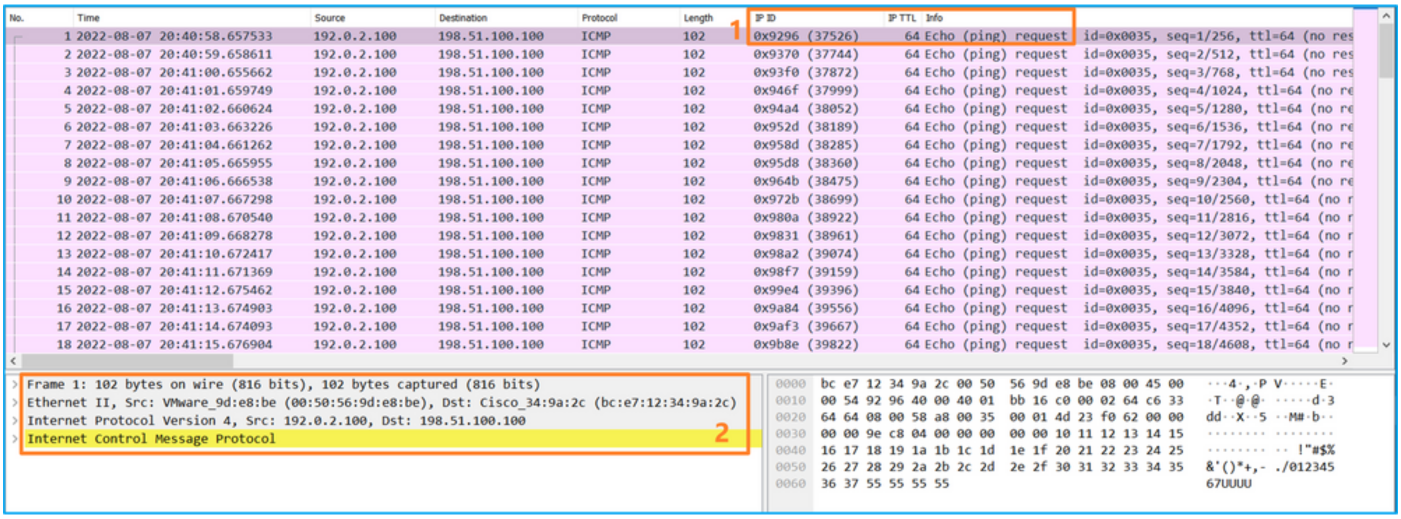
```
No.  Time                        Source       Destination     Protocol Length IP ID           IP TTL Info
   1 2022-08-07 19:50:06.925768  192.0.2.100  198.51.100.100  ICMP     102    0x9a10 (39440)  64 Echo (ping) request  id=0x0034, seq=1/256, ttl=64 (no res
   2 2022-08-07 19:50:07.921684  192.0.2.100  198.51.100.100  ICMP     102    0x9a3a (39482)  64 Echo (ping) request  id=0x0034, seq=2/512, ttl=64 (no res
   3 2022-08-07 19:50:08.924468  192.0.2.100  198.51.100.100  ICMP     102    0x9aa6 (39590)  64 Echo (ping) request  id=0x0034, seq=3/768, ttl=64 (no res
   4 2022-08-07 19:50:09.928484  192.0.2.100  198.51.100.100  ICMP     102    0x9afe (39678)  64 Echo (ping) request  id=0x0034, seq=4/1024, ttl=64 (no re
   5 2022-08-07 19:50:10.928245  192.0.2.100  198.51.100.100  ICMP     102    0x9b10 (39696)  64 Echo (ping) request  id=0x0034, seq=5/1280, ttl=64 (no re
   6 2022-08-07 19:50:11.929144  192.0.2.100  198.51.100.100  ICMP     102    0x9b34 (39732)  64 Echo (ping) request  id=0x0034, seq=6/1536, ttl=64 (no re
   7 2022-08-07 19:50:12.932943  192.0.2.100  198.51.100.100  ICMP     102    0x9b83 (39811)  64 Echo (ping) request  id=0x0034, seq=7/1792, ttl=64 (no re
   8 2022-08-07 19:50:13.934155  192.0.2.100  198.51.100.100  ICMP     102    0x9b8b (39819)  64 Echo (ping) request  id=0x0034, seq=8/2048, ttl=64 (no re
   9 2022-08-07 19:50:14.932004  192.0.2.100  198.51.100.100  ICMP     102    0x9c07 (39943)  64 Echo (ping) request  id=0x0034, seq=9/2304, ttl=64 (no re
  10 2022-08-07 19:50:15.937143  192.0.2.100  198.51.100.100  ICMP     102    0x9cc6 (40134)  64 Echo (ping) request  id=0x0034, seq=10/2560, ttl=64 (no r
  11 2022-08-07 19:50:16.934848  192.0.2.100  198.51.100.100  ICMP     102    0x9d68 (40296)  64 Echo (ping) request  id=0x0034, seq=11/2816, ttl=64 (no r
  12 2022-08-07 19:50:17.936908  192.0.2.100  198.51.100.100  ICMP     102    0x9ded (40429)  64 Echo (ping) request  id=0x0034, seq=12/3072, ttl=64 (no r
  13 2022-08-07 19:50:18.939584  192.0.2.100  198.51.100.100  ICMP     102    0x9e5a (40538)  64 Echo (ping) request  id=0x0034, seq=13/3328, ttl=64 (no r
  14 2022-08-07 19:50:19.941262  192.0.2.100  198.51.100.100  ICMP     102    0x9efb (40699)  64 Echo (ping) request  id=0x0034, seq=14/3584, ttl=64 (no r
  15 2022-08-07 19:50:20.940716  192.0.2.100  198.51.100.100  ICMP     102    0x9f50 (40784)  64 Echo (ping) request  id=0x0034, seq=15/3840, ttl=64 (no r
  16 2022-08-07 19:50:21.940288  192.0.2.100  198.51.100.100  ICMP     102    0x9fe4 (40932)  64 Echo (ping) request  id=0x0034, seq=16/4096, ttl=64 (no r
  17 2022-08-07 19:50:22.943302  192.0.2.100  198.51.100.100  ICMP     102    0xa031 (41009)  64 Echo (ping) request  id=0x0034, seq=17/4352, ttl=64 (no r
  18 2022-08-07 19:50:23.944679  192.0.2.100  198.51.100.100  ICMP     102    0xa067 (41063)  64 Echo (ping) request  id=0x0034, seq=18/4608, ttl=64 (no r
```

```
> Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits)
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_34:9a:14 (bc:e7:12:34:9a:14)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  bc e7 12 34 9a 14 00 50  56 9d e8 be 08 00 45 00   ···4···P V·····E·
0010  00 54 9a 10 40 00 40 01  b3 9c c0 00 02 64 c6 33   ·T··@·@· ·····d·3
0020  64 64 08 00 c6 91 00 34  00 01 61 17 f0 62 00 00   dd·····4 ··a··b··
0030  00 00 18 ec 08 00 00 00  00 00 10 11 12 13 14 15   ········ ········
0040  16 17 18 19 1a 1b 1c 1d  1e 1f 20 21 22 23 24 25   ········ ·· !"#$%
0050  26 27 28 29 2a 2b 2c 2d  2e 2f 30 31 32 33 34 35   &'()*+,- ./012345
0060  36 37 55 55 55 55                                  67UUUU
```

Open the capture files for Portchannel1 member interfaces. Select the first packet and check the key points:

1. Only ICMP echo request packets are captured.
2. The original packet header is without the VLAN tag.



```
No.  Time                        Source       Destination     Protocol Length IP ID           IP TTL Info
   1 2022-08-07 20:40:58.657533  192.0.2.100  198.51.100.100  ICMP     102    0x9296 (37526)  64 Echo (ping) request  id=0x0035, seq=1/256, ttl=64 (no res
   2 2022-08-07 20:40:59.658611  192.0.2.100  198.51.100.100  ICMP     102    0x9370 (37744)  64 Echo (ping) request  id=0x0035, seq=2/512, ttl=64 (no res
   3 2022-08-07 20:41:00.655662  192.0.2.100  198.51.100.100  ICMP     102    0x93f0 (37872)  64 Echo (ping) request  id=0x0035, seq=3/768, ttl=64 (no res
   4 2022-08-07 20:41:01.659749  192.0.2.100  198.51.100.100  ICMP     102    0x946f (37999)  64 Echo (ping) request  id=0x0035, seq=4/1024, ttl=64 (no re
   5 2022-08-07 20:41:02.660624  192.0.2.100  198.51.100.100  ICMP     102    0x94a4 (38052)  64 Echo (ping) request  id=0x0035, seq=5/1280, ttl=64 (no re
   6 2022-08-07 20:41:03.663226  192.0.2.100  198.51.100.100  ICMP     102    0x952d (38189)  64 Echo (ping) request  id=0x0035, seq=6/1536, ttl=64 (no re
   7 2022-08-07 20:41:04.661262  192.0.2.100  198.51.100.100  ICMP     102    0x958d (38285)  64 Echo (ping) request  id=0x0035, seq=7/1792, ttl=64 (no re
   8 2022-08-07 20:41:05.665955  192.0.2.100  198.51.100.100  ICMP     102    0x95d8 (38360)  64 Echo (ping) request  id=0x0035, seq=8/2048, ttl=64 (no re
   9 2022-08-07 20:41:06.666538  192.0.2.100  198.51.100.100  ICMP     102    0x964b (38475)  64 Echo (ping) request  id=0x0035, seq=9/2304, ttl=64 (no re
  10 2022-08-07 20:41:07.667298  192.0.2.100  198.51.100.100  ICMP     102    0x972b (38699)  64 Echo (ping) request  id=0x0035, seq=10/2560, ttl=64 (no r
  11 2022-08-07 20:41:08.670540  192.0.2.100  198.51.100.100  ICMP     102    0x980a (38922)  64 Echo (ping) request  id=0x0035, seq=11/2816, ttl=64 (no r
  12 2022-08-07 20:41:09.668278  192.0.2.100  198.51.100.100  ICMP     102    0x9831 (38961)  64 Echo (ping) request  id=0x0035, seq=12/3072, ttl=64 (no r
  13 2022-08-07 20:41:10.672417  192.0.2.100  198.51.100.100  ICMP     102    0x98a2 (39074)  64 Echo (ping) request  id=0x0035, seq=13/3328, ttl=64 (no r
  14 2022-08-07 20:41:11.671369  192.0.2.100  198.51.100.100  ICMP     102    0x98f7 (39159)  64 Echo (ping) request  id=0x0035, seq=14/3584, ttl=64 (no r
  15 2022-08-07 20:41:12.675462  192.0.2.100  198.51.100.100  ICMP     102    0x99e4 (39396)  64 Echo (ping) request  id=0x0035, seq=15/3840, ttl=64 (no r
  16 2022-08-07 20:41:13.674903  192.0.2.100  198.51.100.100  ICMP     102    0x9a84 (39556)  64 Echo (ping) request  id=0x0035, seq=16/4096, ttl=64 (no r
  17 2022-08-07 20:41:14.674093  192.0.2.100  198.51.100.100  ICMP     102    0x9af3 (39667)  64 Echo (ping) request  id=0x0035, seq=17/4352, ttl=64 (no r
  18 2022-08-07 20:41:15.676904  192.0.2.100  198.51.100.100  ICMP     102    0x9b8e (39822)  64 Echo (ping) request  id=0x0035, seq=18/4608, ttl=64 (no r
```

```
> Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits)
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_34:9a:2c (bc:e7:12:34:9a:2c)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  bc e7 12 34 9a 2c 00 50  56 9d e8 be 08 00 45 00   ···4·,·P V·····E·
0010  00 54 92 96 40 00 40 01  bb 16 c0 00 02 64 c6 33   ·T··@·@· ·····d·3
0020  64 64 08 00 58 a8 00 35  00 01 4d 23 f0 62 00 00   dd··X··5 ··M#·b··
0030  00 00 9e c8 04 00 00 00  00 00 10 11 12 13 14 15   ········ ········
0040  16 17 18 19 1a 1b 1c 1d  1e 1f 20 21 22 23 24 25   ········ ·· !"#$%
0050  26 27 28 29 2a 2b 2c 2d  2e 2f 30 31 32 33 34 35   &'()*+,- ./012345
0060  36 37 55 55 55 55                                  67UUUU
```

Explanation

The switch captures are configured on interfaces Ethernet1/1 or Portchannel1.

This table summarizes the task:

Task	Capture	Internal	Direction	Captured traffic

	point	**filter**		
Configure and verify a packet capture on interface Ethernet1/1	Ethernet1/1	None	Ingress only*	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100
Configure and verify a packet capture on interface Portchannel1 with member interfaces Ethernet1/3 and Ethernet1/4	Ethernet1/3 Ethernet1/4	None	Ingress only*	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

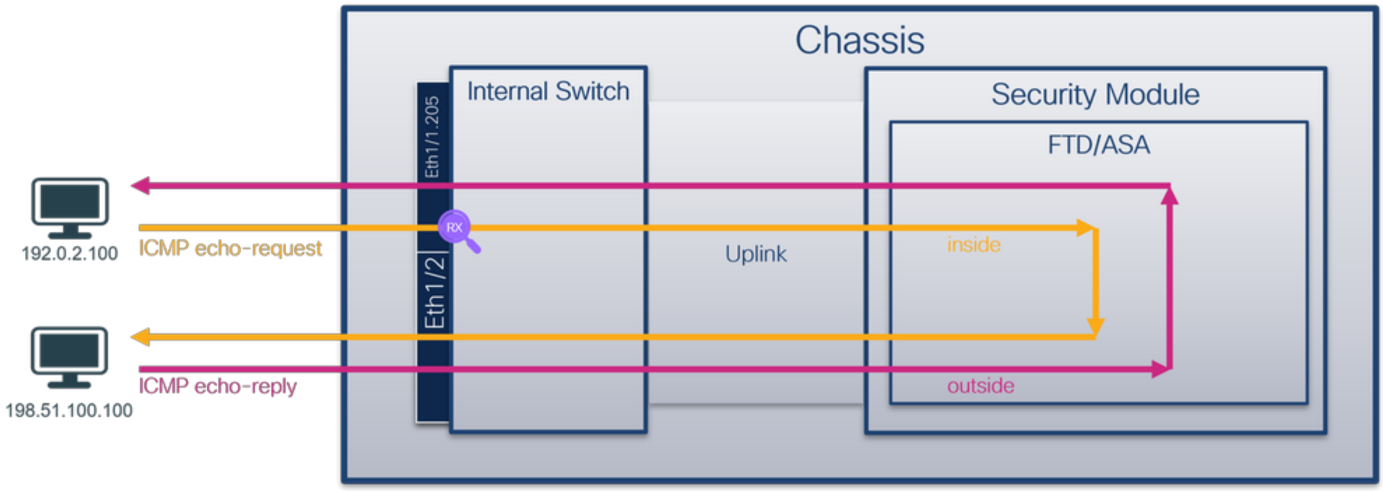
* Unlike 3100, the Secure Firewall 4200 supports **bidirectional** (ingress and egress) captures.

Packet Capture on a Subinterface of a Physical or Port-channel Interface

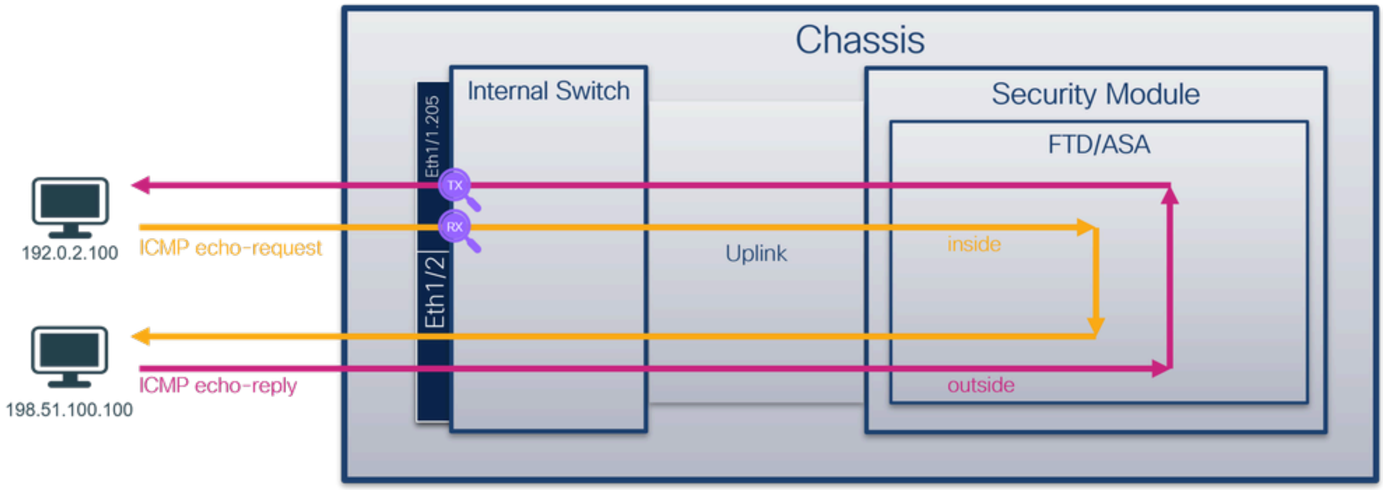
Use the FTD or ASA CLI to configure and verify a packet capture on subinterfaces Ethernet1/1.205 or Portchannel1.205. Both subinterfaces have the nameif **inside**.

Topology, packet flow, and the capture points

Secure Firewall 3100:



Secure Firewall 4200:



Configuration

Perform these steps on ASA or FTD CLI to configure a packet capture on interface Ethernet1/1 or Port-channel1:

1. Verify the nameif:

```
<#root>

>

show nameif

Interface                Name                     Security

Ethernet1/1.205          inside                     0


Ethernet1/2              outside                    0
Management1/1            diagnostic                 0



<#root>

>

show nameif

Interface                Name                     Security

Port-channel1.205        inside                     0


Ethernet1/2              outside                    0
Management1/1            diagnostic                 0
```

2. Create a capture session:

```
<#root>
```

```
>

capture capsw switch interface inside
```

The Secure Firewall 4200 supports capture directionality:

```
<#root>

> capture capsw switch interface inside direction ?


  both To capture switch bi-directional traffic
  egress To capture switch egressing traffic
  ingress To capture switch ingressing traffic


> capture capsw switch interface inside direction both
```

3. Enable the capture session:

```
<#root>

> no capture capsw switch stop
```

Verification

Verify the capture session name, administrative and operational state, interface slot, and identifier. Ensure the **Pcapsize** value in bytes increases and the number of captured packets is non-zero:

```
<#root>

>

show capture capsw detail


Packet Capture info

  Name:              capsw


  Session:           1

  Admin State:       enabled



  Oper State:        up



  Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
```

```
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:

  Slot Id:           1


  Port Id:           1


  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap

  Pcapsize:          6360


  Filter:            capsw-1-1

Packet Capture Filter Info

  Name:              capsw-1-1


  Protocol:          0
  Ivlan:             0

  Ovlan:             205


  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0


46 packets captured on disk using switch capture



Reading of capture file from disk is not supported
```

In this case, a filter with outer VLAN **Ovlan=205** is created and applied to the interface.

In the case of Port-channel1 the capture with a filter **Ovlan=205** is configured on all member interfaces:

<#root>

>

```
show capture capsw detail

Packet Capture info

  Name:              capsw

  Session:           1

  Admin State:       enabled

  Oper State:        up

  Oper State Reason: Active

  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 2

Physical port:

  Slot Id:           1

  Port Id:           4

  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-4-0.pcap

  Pcapsize:          23442

  Filter:            capsw-1-4

Packet Capture Filter Info
  Name:              capsw-1-4
  Protocol:          0
  Ivlan:             0

  Ovlan:             205

  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0
```

```
Physical port:

  Slot Id:           1


  Port Id:           3


  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-3-0.pcap

  Pcapsize:          5600


  Filter:            capsw-1-3

Packet Capture Filter Info
  Name:              capsw-1-3
  Protocol:          0
  Ivlan:             0

  Ovlan:             205


  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0


49 packet captured on disk using switch capture



Reading of capture file from disk is not supported
```

The port-channel member interfaces can be verified in the FXOS **local-mgmt** command shell via the **show portchannel summary** command**:**

<#root>

```
>

connect fxos


…
firewall#

connect local-mgmt


firewall(local-mgmt)#

show portchannel summary
```

```
Flags:  D - Down        P - Up in port-channel (members)
I - Individual  H - Hot-standby (LACP only)
s - Suspended   r - Module-removed
S - Switched    R - Routed
U - Up (port-channel)
M - Not in use. Min-links not met
-------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------

1     Po1(U)      Eth      LACP      Eth1/3(P)    Eth1/4(P)



LACP KeepAlive Timer:
--------------------------------------------------------------------------------
      Channel  PeerKeepAliveTimerFast
--------------------------------------------------------------------------------
1     Po1(U)      False

Cluster LACP Status:
--------------------------------------------------------------------------------
      Channel  ClusterSpanned  ClusterDetach  ClusterUnitID  ClusterSysID
--------------------------------------------------------------------------------
1     Po1(U)      False          False          0            clust
```

To access the FXOS on ASA, run the **connect fxos admin** command. In the case of multi-context, run this command in the admin context.

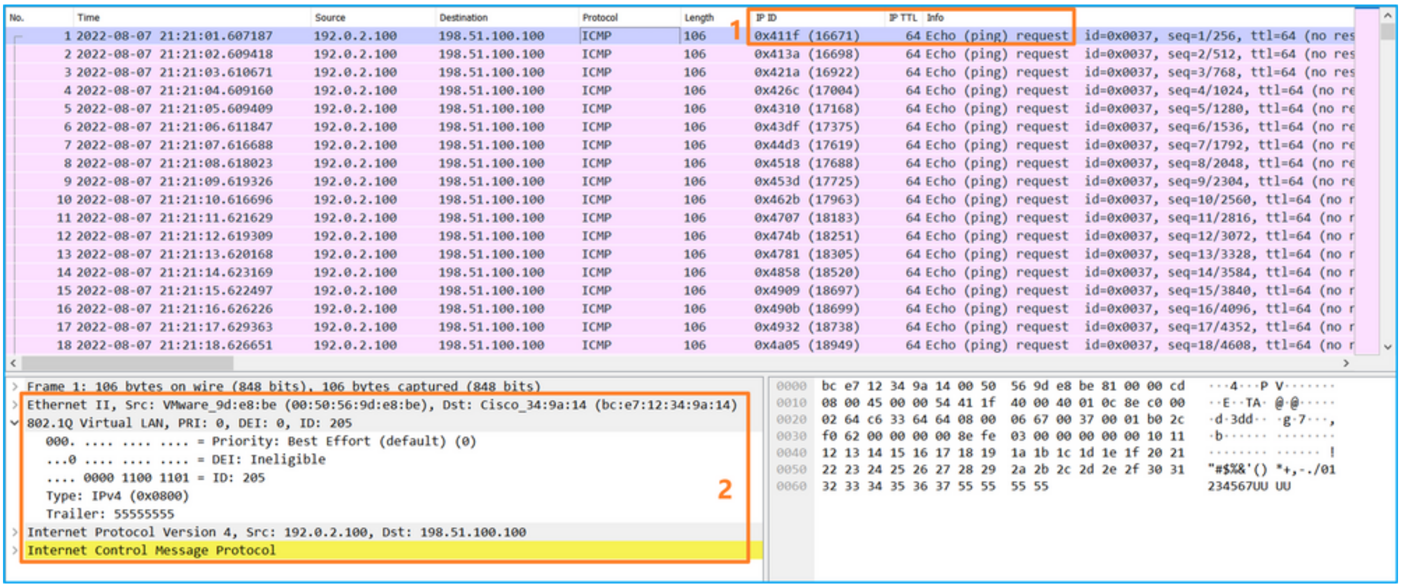
Collect capture files

Perform the steps in the section **Collect Secure Firewall Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files for Ethernet1/1.205. In this example, the packets capture on the Secure Firewall 3100 are analyzed. Select the first packet and check the key points:

1. Only ICMP echo request packets are captured.
2. The original packet header has VLAN tag **205**.



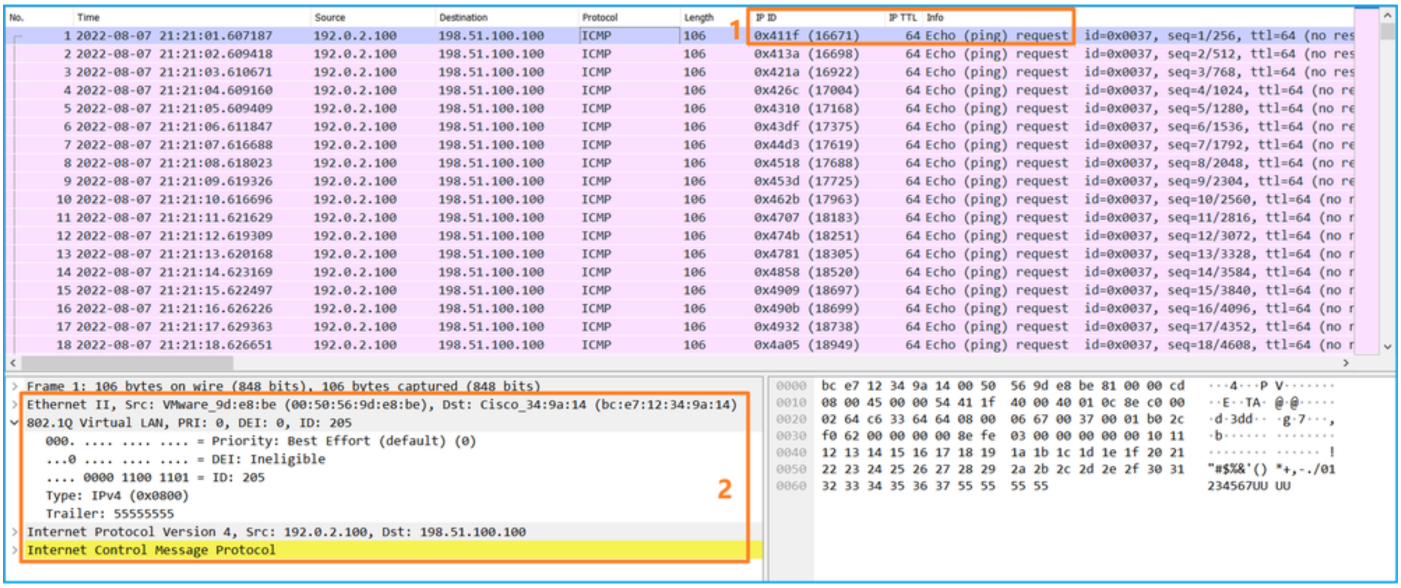
```
No.  Time                        Source        Destination     Protocol  Length  IP ID           IP TTL  Info
   1 2022-08-07 21:21:01.607187  192.0.2.100   198.51.100.100  ICMP      106     0x411f (16671)  64 Echo (ping) request  id=0x0037, seq=1/256, ttl=64 (no res
   2 2022-08-07 21:21:02.609418  192.0.2.100   198.51.100.100  ICMP      106     0x413a (16698)  64 Echo (ping) request  id=0x0037, seq=2/512, ttl=64 (no res
   3 2022-08-07 21:21:03.610671  192.0.2.100   198.51.100.100  ICMP      106     0x421a (16922)  64 Echo (ping) request  id=0x0037, seq=3/768, ttl=64 (no res
   4 2022-08-07 21:21:04.609160  192.0.2.100   198.51.100.100  ICMP      106     0x426c (17004)  64 Echo (ping) request  id=0x0037, seq=4/1024, ttl=64 (no re
   5 2022-08-07 21:21:05.609409  192.0.2.100   198.51.100.100  ICMP      106     0x4310 (17168)  64 Echo (ping) request  id=0x0037, seq=5/1280, ttl=64 (no re
   6 2022-08-07 21:21:06.611847  192.0.2.100   198.51.100.100  ICMP      106     0x43df (17375)  64 Echo (ping) request  id=0x0037, seq=6/1536, ttl=64 (no re
   7 2022-08-07 21:21:07.616688  192.0.2.100   198.51.100.100  ICMP      106     0x44d3 (17619)  64 Echo (ping) request  id=0x0037, seq=7/1792, ttl=64 (no re
   8 2022-08-07 21:21:08.618023  192.0.2.100   198.51.100.100  ICMP      106     0x4518 (17688)  64 Echo (ping) request  id=0x0037, seq=8/2048, ttl=64 (no re
   9 2022-08-07 21:21:09.619326  192.0.2.100   198.51.100.100  ICMP      106     0x453d (17725)  64 Echo (ping) request  id=0x0037, seq=9/2304, ttl=64 (no re
  10 2022-08-07 21:21:10.616696  192.0.2.100   198.51.100.100  ICMP      106     0x462b (17963)  64 Echo (ping) request  id=0x0037, seq=10/2560, ttl=64 (no r
  11 2022-08-07 21:21:11.621629  192.0.2.100   198.51.100.100  ICMP      106     0x4707 (18183)  64 Echo (ping) request  id=0x0037, seq=11/2816, ttl=64 (no r
  12 2022-08-07 21:21:12.619309  192.0.2.100   198.51.100.100  ICMP      106     0x474b (18251)  64 Echo (ping) request  id=0x0037, seq=12/3072, ttl=64 (no r
  13 2022-08-07 21:21:13.620168  192.0.2.100   198.51.100.100  ICMP      106     0x4781 (18305)  64 Echo (ping) request  id=0x0037, seq=13/3328, ttl=64 (no r
  14 2022-08-07 21:21:14.623169  192.0.2.100   198.51.100.100  ICMP      106     0x4858 (18520)  64 Echo (ping) request  id=0x0037, seq=14/3584, ttl=64 (no r
  15 2022-08-07 21:21:15.622497  192.0.2.100   198.51.100.100  ICMP      106     0x4909 (18697)  64 Echo (ping) request  id=0x0037, seq=15/3840, ttl=64 (no r
  16 2022-08-07 21:21:16.626226  192.0.2.100   198.51.100.100  ICMP      106     0x490b (18699)  64 Echo (ping) request  id=0x0037, seq=16/4096, ttl=64 (no r
  17 2022-08-07 21:21:17.629363  192.0.2.100   198.51.100.100  ICMP      106     0x4932 (18738)  64 Echo (ping) request  id=0x0037, seq=17/4352, ttl=64 (no r
  18 2022-08-07 21:21:18.626651  192.0.2.100   198.51.100.100  ICMP      106     0x4a05 (18949)  64 Echo (ping) request  id=0x0037, seq=18/4608, ttl=64 (no r
```

```
> Frame 1: 106 bytes on wire (848 bits), 106 bytes captured (848 bits)
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_34:9a:14 (bc:e7:12:34:9a:14)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 205
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1101 = ID: 205
    Type: IPv4 (0x0800)
    Trailer: 55555555
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  bc e7 12 34 9a 14 00 50  56 9d e8 be 81 00 00 cd   ···4···P V·······
0010  08 00 45 00 00 54 41 1f  40 00 40 01 0c 8e c0 00   ··E··TA· @·@·····
0020  02 64 c6 33 64 64 08 00  06 67 00 37 00 01 b0 2c   ·d·3dd·· ·g·7···,
0030  f0 62 00 00 00 00 8e fe  03 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37 55 55  55 55                     234567UU UU
```

Open the capture files for Portchannel1 member interfaces. Select the first packet and check the key points:

1. Only ICMP echo request packets are captured.
2. The original packet header has VLAN tag **205**.



```
No.  Time                        Source        Destination     Protocol  Length  IP ID           IP TTL  Info
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   2 2022-08-07 21:21:02.609418  192.0.2.100   198.51.100.100  ICMP      106     0x413a (16698)  64 Echo (ping) request  id=0x0037, seq=2/512, ttl=64 (no res
   3 2022-08-07 21:21:03.610671  192.0.2.100   198.51.100.100  ICMP      106     0x421a (16922)  64 Echo (ping) request  id=0x0037, seq=3/768, ttl=64 (no res
   4 2022-08-07 21:21:04.609160  192.0.2.100   198.51.100.100  ICMP      106     0x426c (17004)  64 Echo (ping) request  id=0x0037, seq=4/1024, ttl=64 (no re
   5 2022-08-07 21:21:05.609409  192.0.2.100   198.51.100.100  ICMP      106     0x4310 (17168)  64 Echo (ping) request  id=0x0037, seq=5/1280, ttl=64 (no re
   6 2022-08-07 21:21:06.611847  192.0.2.100   198.51.100.100  ICMP      106     0x43df (17375)  64 Echo (ping) request  id=0x0037, seq=6/1536, ttl=64 (no re
   7 2022-08-07 21:21:07.616688  192.0.2.100   198.51.100.100  ICMP      106     0x44d3 (17619)  64 Echo (ping) request  id=0x0037, seq=7/1792, ttl=64 (no re
   8 2022-08-07 21:21:08.618023  192.0.2.100   198.51.100.100  ICMP      106     0x4518 (17688)  64 Echo (ping) request  id=0x0037, seq=8/2048, ttl=64 (no re
   9 2022-08-07 21:21:09.619326  192.0.2.100   198.51.100.100  ICMP      106     0x453d (17725)  64 Echo (ping) request  id=0x0037, seq=9/2304, ttl=64 (no re
  10 2022-08-07 21:21:10.616696  192.0.2.100   198.51.100.100  ICMP      106     0x462b (17963)  64 Echo (ping) request  id=0x0037, seq=10/2560, ttl=64 (no r
  11 2022-08-07 21:21:11.621629  192.0.2.100   198.51.100.100  ICMP      106     0x4707 (18183)  64 Echo (ping) request  id=0x0037, seq=11/2816, ttl=64 (no r
  12 2022-08-07 21:21:12.619309  192.0.2.100   198.51.100.100  ICMP      106     0x474b (18251)  64 Echo (ping) request  id=0x0037, seq=12/3072, ttl=64 (no r
  13 2022-08-07 21:21:13.620168  192.0.2.100   198.51.100.100  ICMP      106     0x4781 (18305)  64 Echo (ping) request  id=0x0037, seq=13/3328, ttl=64 (no r
  14 2022-08-07 21:21:14.623169  192.0.2.100   198.51.100.100  ICMP      106     0x4858 (18520)  64 Echo (ping) request  id=0x0037, seq=14/3584, ttl=64 (no r
  15 2022-08-07 21:21:15.622497  192.0.2.100   198.51.100.100  ICMP      106     0x4909 (18697)  64 Echo (ping) request  id=0x0037, seq=15/3840, ttl=64 (no r
  16 2022-08-07 21:21:16.626226  192.0.2.100   198.51.100.100  ICMP      106     0x490b (18699)  64 Echo (ping) request  id=0x0037, seq=16/4096, ttl=64 (no r
  17 2022-08-07 21:21:17.629363  192.0.2.100   198.51.100.100  ICMP      106     0x4932 (18738)  64 Echo (ping) request  id=0x0037, seq=17/4352, ttl=64 (no r
  18 2022-08-07 21:21:18.626651  192.0.2.100   198.51.100.100  ICMP      106     0x4a05 (18949)  64 Echo (ping) request  id=0x0037, seq=18/4608, ttl=64 (no r
```

```
> Frame 1: 106 bytes on wire (848 bits), 106 bytes captured (848 bits)
> Ethernet II, Src: VMware_9d:e8:be (00:50:56:9d:e8:be), Dst: Cisco_34:9a:14 (bc:e7:12:34:9a:14)
v 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 205
    000. .... .... .... = Priority: Best Effort (default) (0)
    ...0 .... .... .... = DEI: Ineligible
    .... 0000 1100 1101 = ID: 205
    Type: IPv4 (0x0800)
    Trailer: 55555555
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol
```

```
0000  bc e7 12 34 9a 14 00 50  56 9d e8 be 81 00 00 cd   ···4···P V·······
0010  08 00 45 00 00 54 41 1f  40 00 40 01 0c 8e c0 00   ··E··TA· @·@·····
0020  02 64 c6 33 64 64 08 00  06 67 00 37 00 01 b0 2c   ·d·3dd·· ·g·7···,
0030  f0 62 00 00 00 00 8e fe  03 00 00 00 00 00 10 11   ·b······ ········
0040  12 13 14 15 16 17 18 19  1a 1b 1c 1d 1e 1f 20 21   ········ ······ !
0050  22 23 24 25 26 27 28 29  2a 2b 2c 2d 2e 2f 30 31   "#$%&'() *+,-./01
0060  32 33 34 35 36 37 55 55  55 55                     234567UU UU
```

Explanation

The switch captures are configured on subinterfaces Ethernet1/1.205 or Portchannel1.205 with a filter that matches outer VLAN 205.

This table summarizes the task:

Task	**Capture point**	**Internal filter**	**Direction**	**Captured traffic**
Configure and verify a packet capture on subinterface Ethernet1/1.205	Ethernet1/1	Outer VLAN 205	Ingress only*	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

Configure and verify a packet capture on subinterface Portchannel1.205 with member interfaces Ethernet1/3 and Ethernet1/4	Ethernet1/3 Ethernet1/4	Outer VLAN 205	Ingress only*	ICMP echo requests from host 192.0.2.100 to host 198.51.100.100

* Unlike 3100, the Secure Firewall 4200 supports **bidirectional** (ingress and egress) captures.

Packet Capture on Internal Interfaces

The Secure Firewall 3100 has 2 internal interfaces:

- **in_data_uplink1** - connects the application to the internal switch.
- **in_mgmt_uplink1** - provides a dedicated packet path for management connections, such as SSH to the management interface, or the management connection, also known as the sftunnel, between the FMC and the FTD.

The Secure Firewall 4200 has up to 4 internal interfaces:

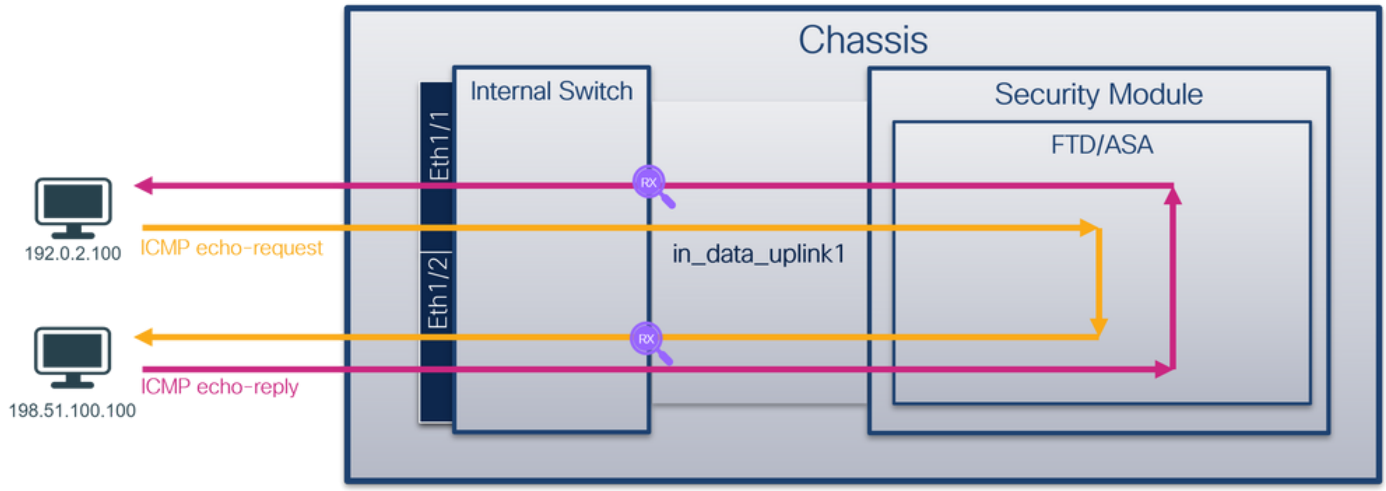
- **in_data_uplink1** and **in_data_uplink2 (4245 only)** - these interfaces connect the application to the internal switch. In the case of 4245, the packets are load balance across the 2 uplink interfaces.
- **in_mgmt_uplink1** and **in_mgmt_uplink2** - these interfaces provide a dedicated packet path for management connections, such as SSH to the management interface, or the management connection, also known as the sftunnel, between the FMC and the FTD. The Secure Firewall 4200 supports 2 managemet interfaces.

Task 1

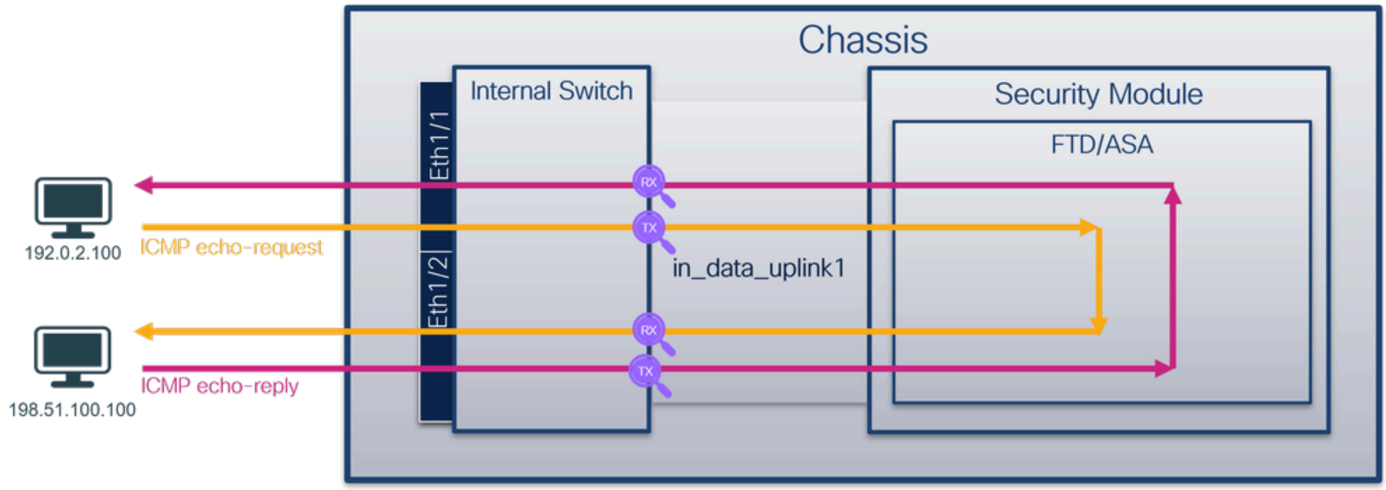
Use the FTD or ASA CLI to configure and verify a packet capture on the uplink interface **in_data_uplink1.**

Topology, packet flow, and the capture points

Secure Firewall 3100:



Secure Firewall 4200:



Configuration

Perform these steps on ASA or FTD CLI to configure a packet capture on interface **in_data_uplink1**:

1. Create a capture session:

<#root>

```
>

capture capsw switch interface in_data_uplink1
```

The Secure Firewall 4200 supports capture directionality:

<#root>

```
> capture capsw switch interface in_data_uplink1 direction ?

  both To capture switch bi-directional traffic
  egress To capture switch egressing traffic
  ingress To capture switch ingressing traffic

> capture capsw switch interface in_data_uplink1 direction both
```

2.Enable the capture session:

<#root>

```
> no capture capsw switch stop
```

Verification

Verify the capture session name, administrative and operational state, interface slot, and identifier. Ensure the **Pcapsize** value in bytes increases and the number of captured packets is non-zero:

<#root>

```
>

show capture capsw detail


Packet Capture info

  Name:               capsw


  Session:            1

  Admin State:        enabled



  Oper State:         up



  Oper State Reason: Active


  Config Success:     yes
  Config Fail Reason:
  Append Flag:        overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:         0
  Drop Count:         0

Total Physical ports involved in Packet Capture: 1

Physical port:

  Slot Id:            1



  Port Id:            18


  Pcapfile:           /mnt/disk0/packet-capture/sess-1-capsw-data-uplink1.pcap

  Pcapsize:           7704


  Filter:             capsw-1-18

Packet Capture Filter Info
  Name:               capsw-1-18
  Protocol:           0
  Ivlan:              0
  Ovlan:              0
  Src Ip:             0.0.0.0
  Dest Ip:            0.0.0.0
  Src Ipv6:           ::
  Dest Ipv6:          ::
  Src MAC:            00:00:00:00:00:00
  Dest MAC:           00:00:00:00:00:00
  Src Port:           0
  Dest Port:          0
  Ethertype:          0
```

```
Total Physical breakout ports involved in Packet Capture: 0

66 packets captured on disk using switch capture


Reading of capture file from disk is not supported
```

In this case, a capture is created on the interface with an internal ID **18** which is the in_data_uplink1 interface on the Secure Firewall 3130. The **show portmanager switch status** command in the FXOS **local-mgmt** command shell shows the interface IDs**:**

<#root>

```
>

connect fxos


…
firewall#

connect local-mgmt


firewall(local-mgmt)#

show portmanager switch status


Dev/Port         Mode         Link   Speed  Duplex  Loopback Mode  Port Manager
---------  ----------------  -----  -----  ------  -------------  ------------
0/1             SGMII          Up     1G     Full    None           Link-Up
0/2             SGMII          Up     1G     Full    None           Link-Up
0/3             SGMII          Up     1G     Full    None           Link-Up
0/4             SGMII          Up     1G     Full    None           Link-Up
0/5             SGMII         Down    1G     Half    None           Mac-Link-Down
0/6             SGMII         Down    1G     Half    None           Mac-Link-Down
0/7             SGMII         Down    1G     Half    None           Mac-Link-Down
0/8             SGMII         Down    1G     Half    None           Mac-Link-Down
0/9           1000_BaseX      Down    1G     Full    None           Link-Down
0/10          1000_BaseX      Down    1G     Full    None           Link-Down
0/11          1000_BaseX      Down    1G     Full    None           Link-Down
0/12          1000_BaseX      Down    1G     Full    None           Link-Down
0/13          1000_BaseX      Down    1G     Full    None           Link-Down
0/14          1000_BaseX      Down    1G     Full    None           Link-Down
0/15          1000_BaseX      Down    1G     Full    None           Link-Down
0/16          1000_BaseX      Down    1G     Full    None           Link-Down
0/17          1000_BaseX       Up     1G     Full    None           Link-Up

0/18             KR2           Up     50G    Full    None           Link-Up


0/19              KR           Up     25G    Full    None           Link-Up
0/20              KR           Up     25G    Full    None           Link-Up
0/21             KR4          Down    40G    Full    None           Link-Down
0/22             n/a          Down    n/a    Full    N/A            Reset
0/23             n/a          Down    n/a    Full    N/A            Reset
0/24             n/a          Down    n/a    Full    N/A            Reset
0/25          1000_BaseX      Down    1G     Full    None           Link-Down
```

```
0/26            n/a         Down    n/a     Full    N/A             Reset
0/27            n/a         Down    n/a     Full    N/A             Reset
0/28            n/a         Down    n/a     Full    N/A             Reset
0/29         1000_BaseX     Down    1G      Full    None            Link-Down
0/30            n/a         Down    n/a     Full    N/A             Reset
0/31            n/a         Down    n/a     Full    N/A             Reset
0/32            n/a         Down    n/a     Full    N/A             Reset
0/33         1000_BaseX     Down    1G      Full    None            Link-Down
0/34            n/a         Down    n/a     Full    N/A             Reset
0/35            n/a         Down    n/a     Full    N/A             Reset
0/36            n/a         Down    n/a     Full    N/A             Reset
```

To access the FXOS on ASA, run the **connect fxos admin** command. In the case of multi-context, run this command in the admin context.

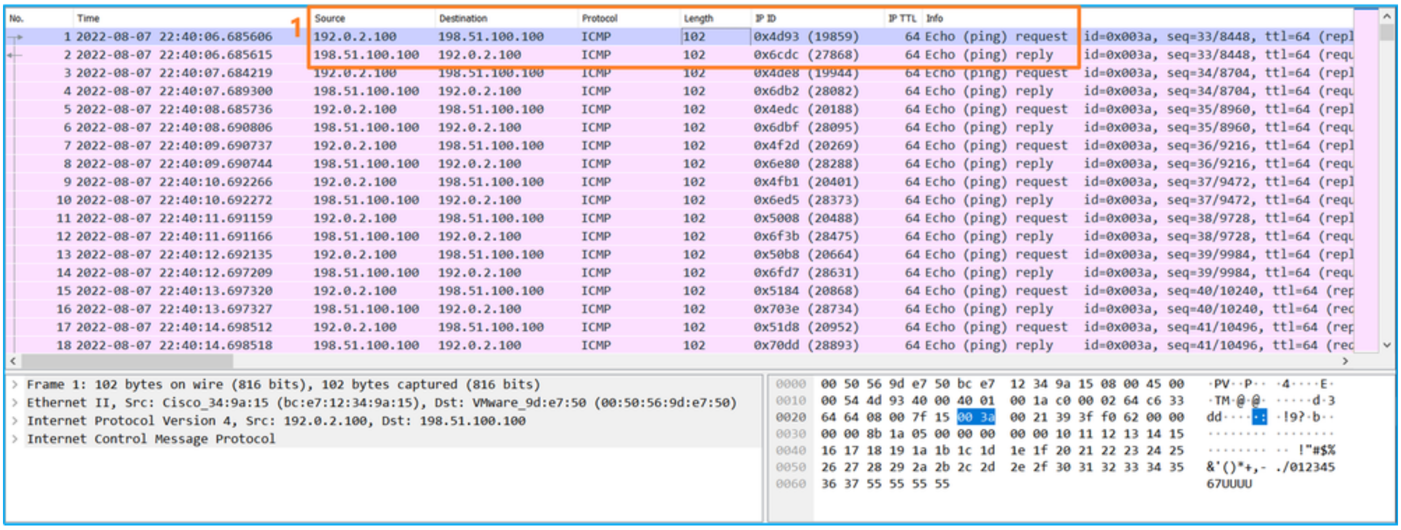
Collect capture files

Perform the steps in the section **Collect Secure Firewall Internal Switch Capture Files**.

Capture file analysis

Use a packet capture file reader application to open the capture files for interface in_data_uplink1. In this example, the packets capture on the Secure Firewall 3100 are analyzed.

Check the key point - in this case, ICMP echo request and echo reply packets are captured. These are the packets sent from the application to the internal switch.



```
No.  Time                        Source          Destination     Protocol  Length  IP ID           IP TTL  Info
  1 2022-08-07 22:40:06.685606  192.0.2.100     198.51.100.100  ICMP      102     0x4d93 (19859)  64 Echo (ping) request  id=0x003a, seq=33/8448, ttl=64 (repl
  2 2022-08-07 22:40:06.685615  198.51.100.100  192.0.2.100     ICMP      102     0x6cdc (27868)  64 Echo (ping) reply    id=0x003a, seq=33/8448, ttl=64 (requ
  3 2022-08-07 22:40:07.684219  192.0.2.100     198.51.100.100  ICMP      102     0x4de8 (19944)  64 Echo (ping) request  id=0x003a, seq=34/8704, ttl=64 (repl
  4 2022-08-07 22:40:07.689300  198.51.100.100  192.0.2.100     ICMP      102     0x6db2 (28082)  64 Echo (ping) reply    id=0x003a, seq=34/8704, ttl=64 (requ
  5 2022-08-07 22:40:08.685736  192.0.2.100     198.51.100.100  ICMP      102     0x4edc (20188)  64 Echo (ping) request  id=0x003a, seq=35/8960, ttl=64 (repl
  6 2022-08-07 22:40:08.690806  198.51.100.100  192.0.2.100     ICMP      102     0x6dbf (28095)  64 Echo (ping) reply    id=0x003a, seq=35/8960, ttl=64 (requ
  7 2022-08-07 22:40:09.690737  192.0.2.100     198.51.100.100  ICMP      102     0x4f2d (20269)  64 Echo (ping) request  id=0x003a, seq=36/9216, ttl=64 (repl
  8 2022-08-07 22:40:09.690744  198.51.100.100  192.0.2.100     ICMP      102     0x6e80 (28288)  64 Echo (ping) reply    id=0x003a, seq=36/9216, ttl=64 (requ
  9 2022-08-07 22:40:10.692266  192.0.2.100     198.51.100.100  ICMP      102     0x4fb1 (20401)  64 Echo (ping) request  id=0x003a, seq=37/9472, ttl=64 (repl
 10 2022-08-07 22:40:10.692272  198.51.100.100  192.0.2.100     ICMP      102     0x6ed5 (28373)  64 Echo (ping) reply    id=0x003a, seq=37/9472, ttl=64 (requ
 11 2022-08-07 22:40:11.691159  192.0.2.100     198.51.100.100  ICMP      102     0x5008 (20488)  64 Echo (ping) request  id=0x003a, seq=38/9728, ttl=64 (repl
 12 2022-08-07 22:40:11.691166  198.51.100.100  192.0.2.100     ICMP      102     0x6f3b (28475)  64 Echo (ping) reply    id=0x003a, seq=38/9728, ttl=64 (requ
 13 2022-08-07 22:40:12.692135  192.0.2.100     198.51.100.100  ICMP      102     0x50b8 (20664)  64 Echo (ping) request  id=0x003a, seq=39/9984, ttl=64 (repl
 14 2022-08-07 22:40:12.697209  198.51.100.100  192.0.2.100     ICMP      102     0x6fd7 (28631)  64 Echo (ping) reply    id=0x003a, seq=39/9984, ttl=64 (requ
 15 2022-08-07 22:40:13.697320  192.0.2.100     198.51.100.100  ICMP      102     0x5184 (20868)  64 Echo (ping) request  id=0x003a, seq=40/10240, ttl=64 (rep
 16 2022-08-07 22:40:13.697327  198.51.100.100  192.0.2.100     ICMP      102     0x703e (28734)  64 Echo (ping) reply    id=0x003a, seq=40/10240, ttl=64 (rec
 17 2022-08-07 22:40:14.698512  192.0.2.100     198.51.100.100  ICMP      102     0x51d8 (20952)  64 Echo (ping) request  id=0x003a, seq=41/10496, ttl=64 (rep
 18 2022-08-07 22:40:14.698518  198.51.100.100  192.0.2.100     ICMP      102     0x70dd (28893)  64 Echo (ping) reply    id=0x003a, seq=41/10496, ttl=64 (rec

> Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits)
> Ethernet II, Src: Cisco_34:9a:15 (bc:e7:12:34:9a:15), Dst: VMware_9d:e7:50 (00:50:56:9d:e7:50)
> Internet Protocol Version 4, Src: 192.0.2.100, Dst: 198.51.100.100
> Internet Control Message Protocol

0000  00 50 56 9d e7 50 bc e7  12 34 9a 15 08 00 45 00   ·PV··P·· ·4····E·
0010  00 54 4d 93 40 00 40 01  00 1a c0 00 02 64 c6 33   ·TM·@·@· ·····d·3
0020  64 64 08 00 7f 15 00 3a  00 21 39 3f f0 62 00 00   dd·····: ·!9?·b··
0030  00 00 8b 1a 05 00 00 00  00 00 10 11 12 13 14 15   ········ ········
0040  16 17 18 19 1a 1b 1c 1d  1e 1f 20 21 22 23 24 25   ········ ·· !"#$%
0050  26 27 28 29 2a 2b 2c 2d  2e 2f 30 31 32 33 34 35   &'()*+,- ./012345
0060  36 37 55 55 55 55                                  67UUUU
```

Explanation

When a switch capture on the uplink interface is configured, only packets sent from the application to the internal switch are captured. Packets sent to the application are not captured.

This table summarizes the task:

Task	Capture point	Internal filter	Direction	Captured traffic
Configure and verify a packet	in_data_uplink1	None	Ingress	ICMP echo requests from host

capture on the uplink interface in_data_uplink1			only*	192.0.2.100 to host 198.51.100.100 ICMP echo replies from host 198.51.100.100 to host 192.0.2.100

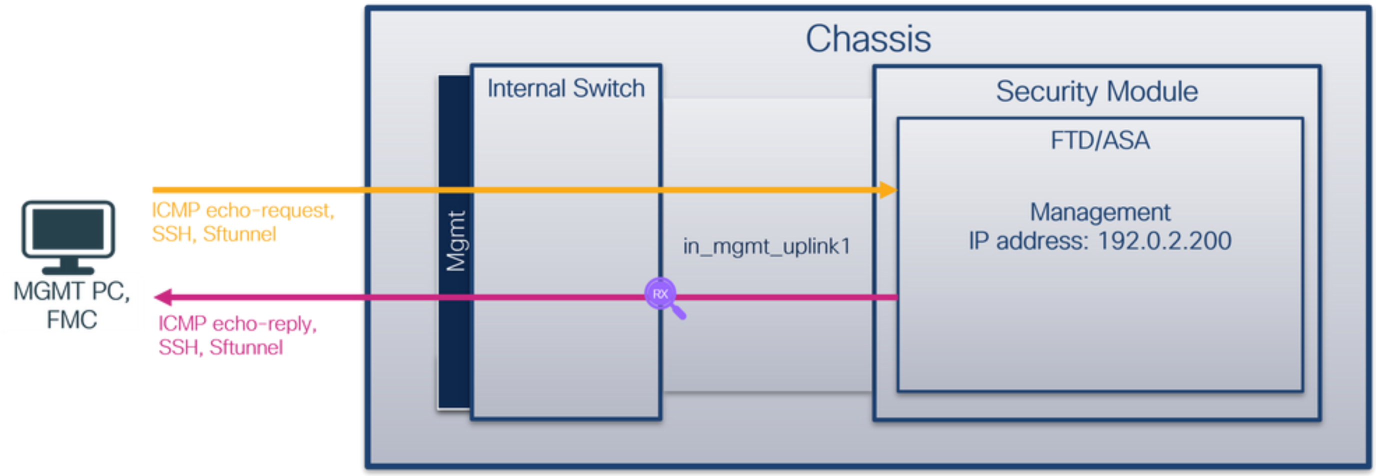
* Unlike 3100, the Secure Firewall 4200 supports **bidirectional** (ingress and egress) captures.

Task 2

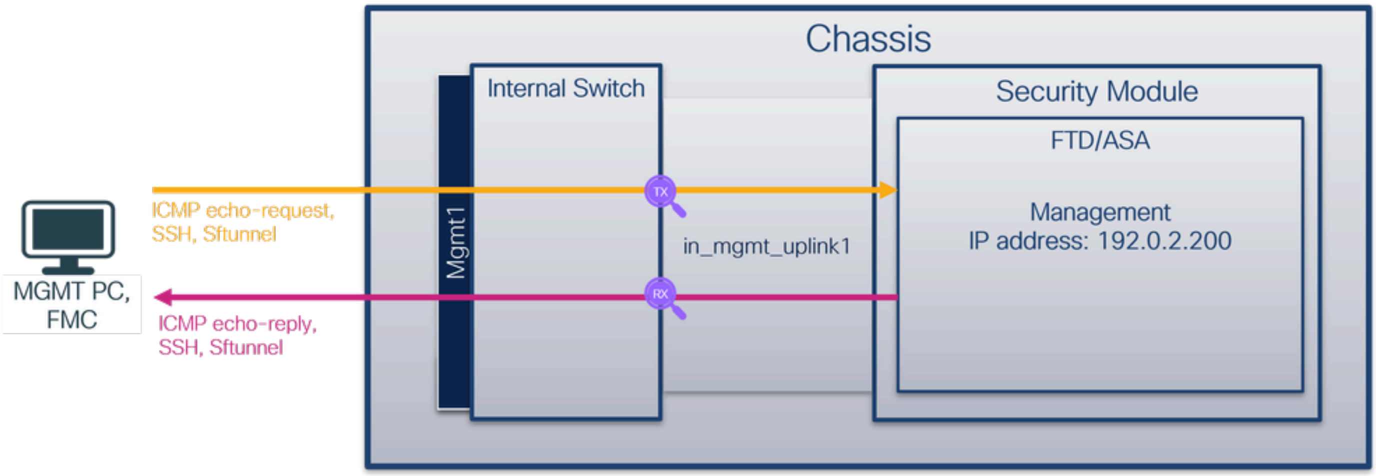
Use the FTD or ASA CLI to configure and verify a packet capture on the uplink interface **in_mgmt_uplink1.** Only the packets of management plane connections are captured.

Topology, packet flow, and the capture points

Secure Firewall 3100:



Secure Firewall 4200:



Configuration

Perform these steps on ASA or FTD CLI to configure a packet capture on interface **in_mgmt_uplink1**:

1. Create a capture session:

<#root>

```
>

capture capsw switch interface in_mgmt_uplink1
```

The Secure Firewall 4200 supports capture directionality:

<#root>

```
> capture capsw switch interface in_mgmt_uplink1 direction ?


  both To capture switch bi-directional traffic
  egress To capture switch egressing traffic
  ingress To capture switch ingressing traffic


> capture capsw switch interface in_mgmt_uplink1 direction both
```

2. Enable the capture session:

<#root>

```
> no capture capsw switch stop
```

Verification

Verify the capture session name, administrative and operational state, interface slot, and identifier. Ensure the **Pcapsize** value in bytes increases and the number of captured packets is non-zero:

<#root>

```
> show capture capsw detail


Packet Capture info


Name:              capsw


  Session:           1


Admin State:       enabled



  Oper State:        up



  Oper State Reason: Active


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:

  Slot Id:           1



  Port Id:           19


  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-mgmt-uplink1.pcap


Pcapsize:          137248


  Filter:            capsw-1-19

Packet Capture Filter Info
  Name:              capsw-1-19
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0


281 packets captured on disk using switch capture



Reading of capture file from disk is not supported
```

In this case, a capture is created on the interface with an internal ID 19 which is the **in_mgmt_uplink1** interface on the Secure Firewall 3130. The **show portmanager switch status** command in the FXOS **local-mgmt** command shell shows the interface IDs:

```
<#root>

>

connect fxos
```

```
…
firewall#

connect local-mgmt


firewall(local-mgmt)#

show portmanager switch status


Dev/Port         Mode         Link   Speed  Duplex  Loopback Mode  Port Manager
---------  ----------------  -----  -----  ------  -------------  ------------
0/1              SGMII         Up      1G     Full    None           Link-Up
0/2              SGMII         Up      1G     Full    None           Link-Up
0/3              SGMII         Up      1G     Full    None           Link-Up
0/4              SGMII         Up      1G     Full    None           Link-Up
0/5              SGMII        Down     1G     Half    None           Mac-Link-Down
0/6              SGMII        Down     1G     Half    None           Mac-Link-Down
0/7              SGMII        Down     1G     Half    None           Mac-Link-Down
0/8              SGMII        Down     1G     Half    None           Mac-Link-Down
0/9            1000_BaseX     Down     1G     Full    None           Link-Down
0/10           1000_BaseX     Down     1G     Full    None           Link-Down
0/11           1000_BaseX     Down     1G     Full    None           Link-Down
0/12           1000_BaseX     Down     1G     Full    None           Link-Down
0/13           1000_BaseX     Down     1G     Full    None           Link-Down
0/14           1000_BaseX     Down     1G     Full    None           Link-Down
0/15           1000_BaseX     Down     1G     Full    None           Link-Down
0/16           1000_BaseX     Down     1G     Full    None           Link-Down
0/17           1000_BaseX      Up      1G     Full    None           Link-Up
0/18               KR2         Up      50G    Full    None           Link-Up

0/19               KR          Up      25G    Full    None           Link-Up


0/20               KR          Up      25G    Full    None           Link-Up
0/21               KR4        Down     40G    Full    None           Link-Down
0/22               n/a        Down     n/a    Full    N/A            Reset
0/23               n/a        Down     n/a    Full    N/A            Reset
0/24               n/a        Down     n/a    Full    N/A            Reset
0/25           1000_BaseX     Down     1G     Full    None           Link-Down
0/26               n/a        Down     n/a    Full    N/A            Reset
0/27               n/a        Down     n/a    Full    N/A            Reset
0/28               n/a        Down     n/a    Full    N/A            Reset
0/29           1000_BaseX     Down     1G     Full    None           Link-Down
0/30               n/a        Down     n/a    Full    N/A            Reset
0/31               n/a        Down     n/a    Full    N/A            Reset
0/32               n/a        Down     n/a    Full    N/A            Reset
0/33           1000_BaseX     Down     1G     Full    None           Link-Down
0/34               n/a        Down     n/a    Full    N/A            Reset
0/35               n/a        Down     n/a    Full    N/A            Reset
0/36               n/a        Down     n/a    Full    N/A            Reset
```

To access the FXOS on ASA, run the **connect fxos admin** command. In the case of multi-context, run this command in the admin context.

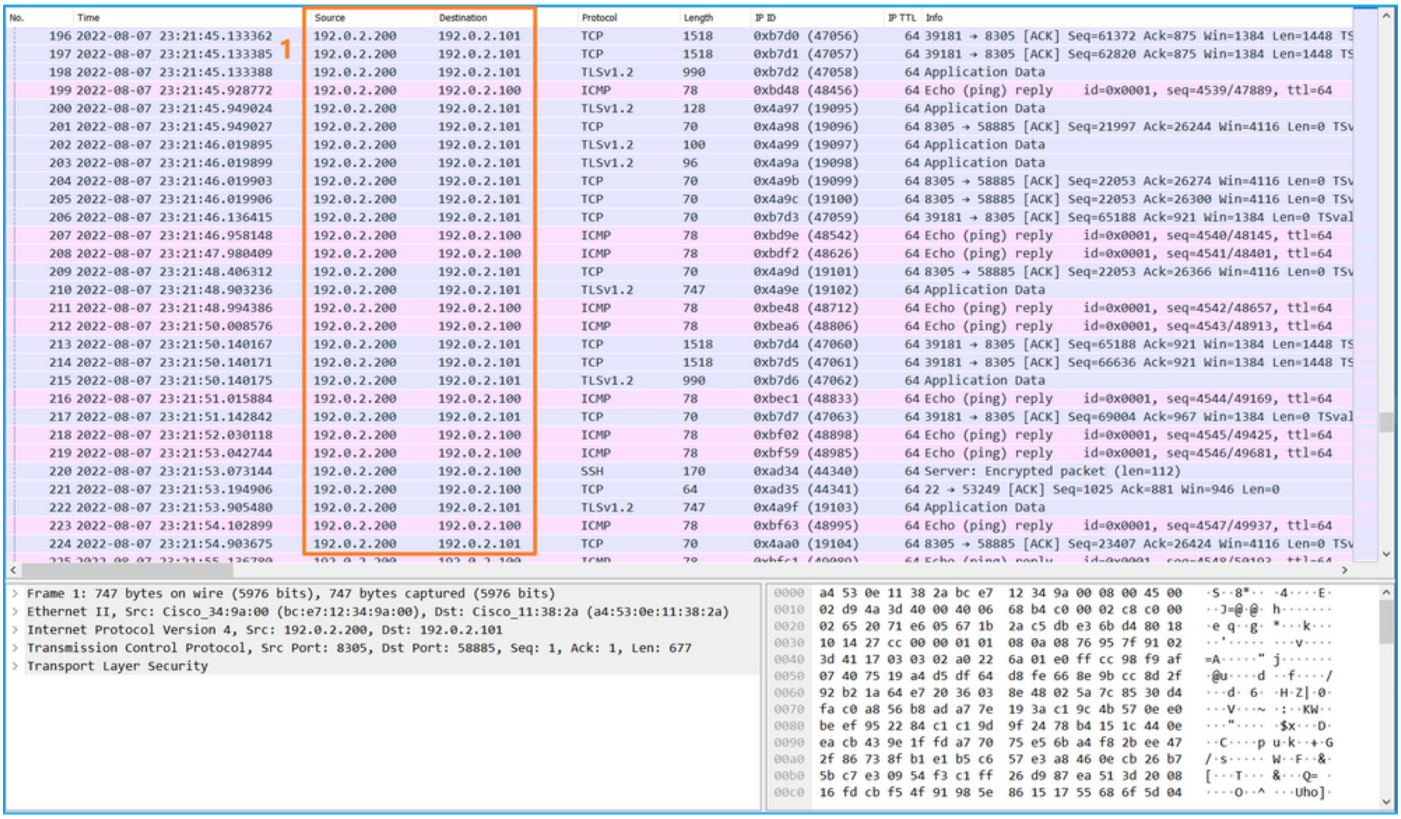
Collect capture files

Perform the steps in the section **Collect Secure Firewall Internal Switch Capture Files.**

Capture file analysis

Use a packet capture file reader application to open the capture files for interface **in_mgmt_uplink1**. In this example, the packets capture on the Secure Firewall 3100 are analyzed.

Check the key point - in this case only the packets from the management IP address 192.0.2.200 are shown. Examples are SSH, Sftunnel or ICMP echo reply packets. These are the packets sent from the application management interface to the network through the internal switch.



```
No.  Time                        Source       Destination  Protocol  Length  IP ID            IP TTL  Info
196  2022-08-07 23:21:45.133362  192.0.2.200  192.0.2.101  TCP       1518    0xb7d0 (47056)  64 39181 → 8305 [ACK] Seq=61372 Ack=875 Win=1384 Len=1448 TS
197  2022-08-07 23:21:45.133385  192.0.2.200  192.0.2.101  TCP       1518    0xb7d1 (47057)  64 39181 → 8305 [ACK] Seq=62820 Ack=875 Win=1384 Len=1448 TS
198  2022-08-07 23:21:45.133388  192.0.2.200  192.0.2.101  TLSv1.2   990     0xb7d2 (47058)  64 Application Data
199  2022-08-07 23:21:45.928772  192.0.2.200  192.0.2.100  ICMP      78      0xbd48 (48456)  64 Echo (ping) reply    id=0x0001, seq=4539/47889, ttl=64
200  2022-08-07 23:21:45.949024  192.0.2.200  192.0.2.101  TLSv1.2   128     0x4a97 (19095)  64 Application Data
201  2022-08-07 23:21:45.949027  192.0.2.200  192.0.2.101  TCP       70      0x4a98 (19096)  64 8305 → 58885 [ACK] Seq=21997 Ack=26244 Win=4116 Len=0 TSv
202  2022-08-07 23:21:46.019895  192.0.2.200  192.0.2.101  TLSv1.2   100     0x4a99 (19097)  64 Application Data
203  2022-08-07 23:21:46.019899  192.0.2.200  192.0.2.101  TLSv1.2   96      0x4a9a (19098)  64 Application Data
204  2022-08-07 23:21:46.019903  192.0.2.200  192.0.2.101  TCP       70      0x4a9b (19099)  64 8305 → 58885 [ACK] Seq=22053 Ack=26274 Win=4116 Len=0 TSv
205  2022-08-07 23:21:46.019906  192.0.2.200  192.0.2.101  TCP       70      0x4a9c (19100)  64 8305 → 58885 [ACK] Seq=22053 Ack=26300 Win=4116 Len=0 TSv
206  2022-08-07 23:21:46.136415  192.0.2.200  192.0.2.101  TCP       70      0xb7d3 (47059)  64 39181 → 8305 [ACK] Seq=65188 Ack=921 Win=1384 Len=0 TSval
207  2022-08-07 23:21:46.958148  192.0.2.200  192.0.2.100  ICMP      78      0xbd9e (48542)  64 Echo (ping) reply    id=0x0001, seq=4540/48145, ttl=64
208  2022-08-07 23:21:47.980409  192.0.2.200  192.0.2.100  ICMP      78      0xbdf2 (48626)  64 Echo (ping) reply    id=0x0001, seq=4541/48401, ttl=64
209  2022-08-07 23:21:48.406312  192.0.2.200  192.0.2.101  TCP       70      0x4a9d (19101)  64 8305 → 58885 [ACK] Seq=22053 Ack=26366 Win=4116 Len=0 TSv
210  2022-08-07 23:21:48.903236  192.0.2.200  192.0.2.101  TLSv1.2   747     0x4a9e (19102)  64 Application Data
211  2022-08-07 23:21:48.994386  192.0.2.200  192.0.2.100  ICMP      78      0xbe48 (48712)  64 Echo (ping) reply    id=0x0001, seq=4542/48657, ttl=64
212  2022-08-07 23:21:50.008576  192.0.2.200  192.0.2.100  ICMP      78      0xbea6 (48806)  64 Echo (ping) reply    id=0x0001, seq=4543/48913, ttl=64
213  2022-08-07 23:21:50.140167  192.0.2.200  192.0.2.101  TCP       1518    0xb7d4 (47060)  64 39181 → 8305 [ACK] Seq=65188 Ack=921 Win=1384 Len=1448 TS
214  2022-08-07 23:21:50.140171  192.0.2.200  192.0.2.101  TCP       1518    0xb7d5 (47061)  64 39181 → 8305 [ACK] Seq=66636 Ack=921 Win=1384 Len=1448 TS
215  2022-08-07 23:21:50.140175  192.0.2.200  192.0.2.101  TLSv1.2   990     0xb7d6 (47062)  64 Application Data
216  2022-08-07 23:21:51.015884  192.0.2.200  192.0.2.100  ICMP      78      0xbec1 (48833)  64 Echo (ping) reply    id=0x0001, seq=4544/49169, ttl=64
217  2022-08-07 23:21:51.142842  192.0.2.200  192.0.2.101  TCP       70      0xb7d7 (47063)  64 39181 → 8305 [ACK] Seq=69004 Ack=967 Win=1384 Len=0 TSval
218  2022-08-07 23:21:52.030118  192.0.2.200  192.0.2.100  ICMP      78      0xbf02 (48898)  64 Echo (ping) reply    id=0x0001, seq=4545/49425, ttl=64
219  2022-08-07 23:21:53.042744  192.0.2.200  192.0.2.100  ICMP      78      0xbf59 (48985)  64 Echo (ping) reply    id=0x0001, seq=4546/49681, ttl=64
220  2022-08-07 23:21:53.073144  192.0.2.200  192.0.2.100  SSH       170     0xad34 (44340)  64 Server: Encrypted packet (len=112)
221  2022-08-07 23:21:53.194906  192.0.2.200  192.0.2.100  TCP       64      0xad35 (44341)  64 22 → 53249 [ACK] Seq=1025 Ack=881 Win=946 Len=0
222  2022-08-07 23:21:53.905480  192.0.2.200  192.0.2.101  TLSv1.2   747     0x4a9f (19103)  64 Application Data
223  2022-08-07 23:21:54.102899  192.0.2.200  192.0.2.100  ICMP      78      0xbf63 (48995)  64 Echo (ping) reply    id=0x0001, seq=4547/49937, ttl=64
224  2022-08-07 23:21:54.903675  192.0.2.200  192.0.2.101  TCP       70      0x4aa0 (19104)  64 8305 → 58885 [ACK] Seq=23407 Ack=26424 Win=4116 Len=0 TSv
```

```
> Frame 1: 747 bytes on wire (5976 bits), 747 bytes captured (5976 bits)
> Ethernet II, Src: Cisco_34:9a:00 (bc:e7:12:34:9a:00), Dst: Cisco_11:38:2a (a4:53:0e:11:38:2a)
> Internet Protocol Version 4, Src: 192.0.2.200, Dst: 192.0.2.101
> Transmission Control Protocol, Src Port: 8305, Dst Port: 58885, Seq: 1, Ack: 1, Len: 677
> Transport Layer Security
```

```
0000  a4 53 0e 11 38 2a bc e7  12 34 9a 00 08 00 45 00   ·S··8*·· ·4····E·
0010  02 d9 4a 3d 40 00 40 06  68 b4 c0 00 02 c8 c0 00   ··J=@·@· h·······
0020  02 65 20 71 e6 05 67 1b  2a c5 db e3 6b d4 80 18   ·e q··g· *···k···
0030  10 14 27 cc 00 00 01 01  08 0a 08 76 95 7f 91 02   ··'····· ···v····
0040  3d 41 17 03 03 02 a0 22  6a 01 e0 ff cc 98 f9 af   =A·····" j·······
0050  07 40 75 19 a4 d5 df 64  d8 fe 66 8e 9b cc 8d 2f   ·@u····d ··f····/
0060  92 b2 1a 64 e7 20 36 03  8e 48 02 5a 7c 85 30 d4   ···d· 6· ·H·Z|·0·
0070  fa c0 a8 56 b8 ad a7 7e  19 3a c1 9c 4b 57 0e e0   ···V···~ ·:··KW··
0080  be ef 95 22 84 c1 c1 9d  9f 24 78 b4 15 1c 44 0e   ···"···· ·$x···D·
0090  ea cb 43 9e 1f fd a7 70  75 e5 6b a4 f8 2b ee 47   ··C····p u·k··+·G
00a0  2f 86 73 8f b1 e1 b5 c6  57 e3 a8 46 0e cb 26 b7   /·s····· W··F··&·
00b0  5b c7 e3 09 54 f3 c1 ff  26 d9 87 ea 51 3d 20 08   [···T··· &···Q= ·
00c0  16 fd cb f5 4f 91 98 5e  86 15 17 55 68 6f 5d 04   ····O··^ ···Uho]·
```

Explanation

When a switch capture on the management uplink interface is configured, only ingress packets sent from the application management interface are captured. Packets destined for the application management interface are not captured.

This table summarizes the task:

Task	Capture point	Internal filter	Direction	Captured traffic
Configure and verify a packet capture on the management uplink interface	in_mgmt_uplink1	None	Ingress only* (from the management interface to the network through the internal switch)	ICMP echo replies from FTD management IP address 192.0.2.200 to host 192.0.2.100 Sftunnel from FTD management IP address 192.0.2.200 to FMC IP address 192.0.2.101 SSH from FTD management IP address 192.0.2.200 to host 192.0.2.100

* Unlike 3100, the Secure Firewall 4200 supports **bidirectional** (ingress and egress) captures.

Packet Capture Filters

Internal switch packet capture filters are configured the same way as the data plane captures. Use the **ethernet-type** and **match** options to configure filters.

Configuration

Perform these steps on ASA or FTD CLI to configure a packet capture with a filter that matches ARP frames or ICMP packets from host 198.51.100.100 on interface Ethernet1/1:

1. Verify the nameif:

```
<#root>

>

show nameif


Interface                Name                     Security

Ethernet1/1              inside                     0


Ethernet1/2              outside                    0
Management1/1            diagnostic                 0
```

2. Create a capture session for ARP or ICMP:

```
<#root>

>

capture capsw switch interface inside ethernet-type arp
```

```
<#root>

> capture capsw switch interface inside match icmp 198.51.100.100
```

Verification

Verify the capture session name and the filter. The Ethertype value is **2054** in decimal and **0x0806** in hexadecimal:

```
<#root>

>

show capture capsw detail
```

```
Packet Capture info
 Name:              capsw


  Session:           1
  Admin State:       disabled
  Oper State:        down
  Oper State Reason: Session_Admin_Shut
  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1
  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap
  Pcapsize:          0


Filter:             capsw-1-1



Packet Capture Filter Info



  Name:              capsw-1-1


  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0

Ethertype:          2054


Total Physical breakout ports involved in Packet Capture: 0

0 packet captured on disk using switch capture

Reading of capture file from disk is not supported
```

This is the verification of the filter for ICMP. IP protocol 1 is the ICMP:

<#root>

```
>

show capture capsw detail


Packet Capture info


Name:              capsw


  Session:           1
  Admin State:       disabled
  Oper State:        down
  Oper State Reason: Session_Admin_Shut
  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1
  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap
  Pcapsize:          0


Filter:            capsw-1-1




Packet Capture Filter Info



  Name:              capsw-1-1




Protocol:          1


  Ivlan:             0
  Ovlan:             0


Src Ip:            198.51.100.100


  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0
```

```
Total Physical breakout ports involved in Packet Capture: 0

0 packets captured on disk using switch capture

Reading of capture file from disk is not supported
```

Collect Secure Firewall Internal Switch Capture Files

Use ASA or FTD CLI to collect internal switch capture files. On FTD, the capture file can also be exported via the CLI **copy** command to destinations reachable via the data or diagnostic interfaces.

Alternatively, the file can be copied to **/ngfw/var/common** in expert mode and downloaded from FMC via the **File Download** option.

In the case of port-channel interfaces ensure to collect packet capture files from all member interfaces.

ASA

Perform these steps on to collect internal switch capture files on ASA CLI:

1. Stop the capture:

```
<#root>

asa#

capture capsw switch stop
```

2. Verify the capture session is stopped and note the capture file name.

```
<#root>

asa#

show capture capsw detail


Packet Capture info


Name:              capsw


  Session:           1


Admin State:       disabled



  Oper State:        down



  Oper State Reason: Session_Admin_Shut
  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1

  Pcapfile:

/mnt/disk0/packet-capture/

sess-1-capsw-ethernet-1-1-0.pcap


  Pcapsize:          139826
  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0

886 packets captured on disk using switch capture

Reading of capture file from disk is not supported
```

3. Use the CLI **copy** command to export the file to remote destinations:

<#root>

```
asa#

copy flash:/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap ?


  cluster:        Copy to cluster: file system
  disk0:          Copy to disk0: file system
  disk1:          Copy to disk1: file system
  flash:          Copy to flash: file system
  ftp:            Copy to ftp: file system
  running-config  Update (merge with) current system configuration
  scp:            Copy to scp: file system
  smb:            Copy to smb: file system
  startup-config  Copy to startup configuration
  system:         Copy to system: file system
  tftp:           Copy to tftp: file system

asa#

copy flash:/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap tftp://198.51.100.10/


Source filename [/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap]?
Destination filename [sess-1-capsw-ethernet-1-1-0.pcap]?
Copy in progress...C

139826 bytes copied in 0.532 secs
```

FTD

Perform these steps to collect internal switch capture files on FTD CLI and copy them to servers reachable via data or diagnostic interfaces:

1. Go to diagnostic CLI:

<#root>

```
>

system support diagnostic-cli


Attaching to Diagnostic CLI ... Click 'Ctrl+a then d' to detach.
Type help or '?' for a list of available commands.

firepower>

enable


Password:

<-- Enter


firepower#
```

2. Stop the capture:

<#root>

```
firepower#

capture capi switch stop
```

3. Verify the capture session is stopped and note the capture file name:

<#root>

```
firepower#

show capture capsw detail


Packet Capture info


Name:              capsw


  Session:           1


Admin State:       disabled



  Oper State:        down



  Oper State Reason: Session_Admin_Shut


  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1
Physical port:
  Slot Id:           1
  Port Id:           1

  Pcapfile:

/mnt/disk0/packet-capture/

sess-1-capsw-ethernet-1-1-0.pcap


  Pcapsize:          139826
  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0
```

```
886 packets captured on disk using switch capture

Reading of capture file from disk is not supported
```

4. Use the CLI **copy** command to export the file to remote destinations.

<#root>

```
firepower#

copy flash:/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap ?


  cluster:        Copy to cluster: file system
  disk0:          Copy to disk0: file system
  disk1:          Copy to disk1: file system
  flash:          Copy to flash: file system
  ftp:            Copy to ftp: file system
  running-config  Update (merge with) current system configuration
  scp:            Copy to scp: file system
  smb:            Copy to smb: file system
  startup-config  Copy to startup configuration
  system:         Copy to system: file system
  tftp:           Copy to tftp: file system

firepower#

copy flash:/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap tftp://198.51.100.10/


Source filename [/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap]?
Destination filename [sess-1-capsw-ethernet-1-1-0.pcap]?
Copy in progress...C

139826 bytes copied in 0.532 secs
```

Perform these steps on to collect capture files from FMC via the **File Download** option:

1. Stop the capture:

<#root>

```
>

capture capsw switch stop
```

2. Verify the capture session is stopped and note the file name and full capture file path:

<#root>

```
>

show capture capsw detail
```

```
Packet Capture info

Name:              capsw

  Session:           1

Admin State:       disabled

  Oper State:        down

  Oper State Reason: Session_Admin_Shut

  Config Success:    yes
  Config Fail Reason:
  Append Flag:       overwrite
  Session Mem Usage: 256
  Session Pcap Snap Len: 1518
  Error Code:        0
  Drop Count:        0

Total Physical ports involved in Packet Capture: 1

Physical port:
  Slot Id:           1
  Port Id:           1

  Pcapfile:          /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap

  Pcapsize:          139826
  Filter:            capsw-1-1

Packet Capture Filter Info
  Name:              capsw-1-1
  Protocol:          0
  Ivlan:             0
  Ovlan:             0
  Src Ip:            0.0.0.0
  Dest Ip:           0.0.0.0
  Src Ipv6:          ::
  Dest Ipv6:         ::
  Src MAC:           00:00:00:00:00:00
  Dest MAC:          00:00:00:00:00:00
  Src Port:          0
  Dest Port:         0
  Ethertype:         0

Total Physical breakout ports involved in Packet Capture: 0
886 packets captured on disk using switch capture
Reading of capture file from disk is not supported
```

3. Go to expert mode and switch to root mode:

<#root>

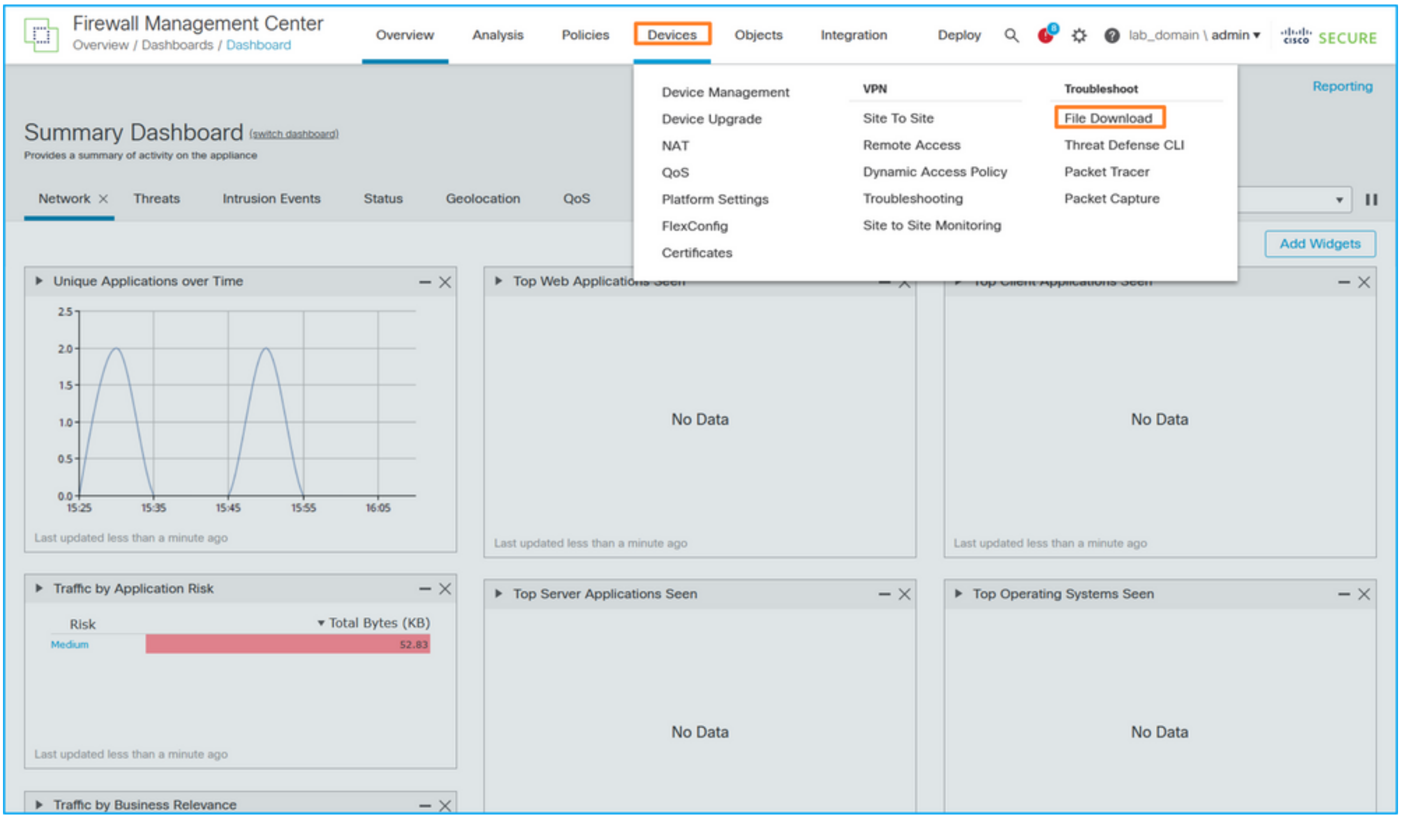
```
>
expert

admin@firepower:~$
sudo su

root@firepower:/home/admin
```

4. Copy the capture file to **/ngfw/var/common/:**

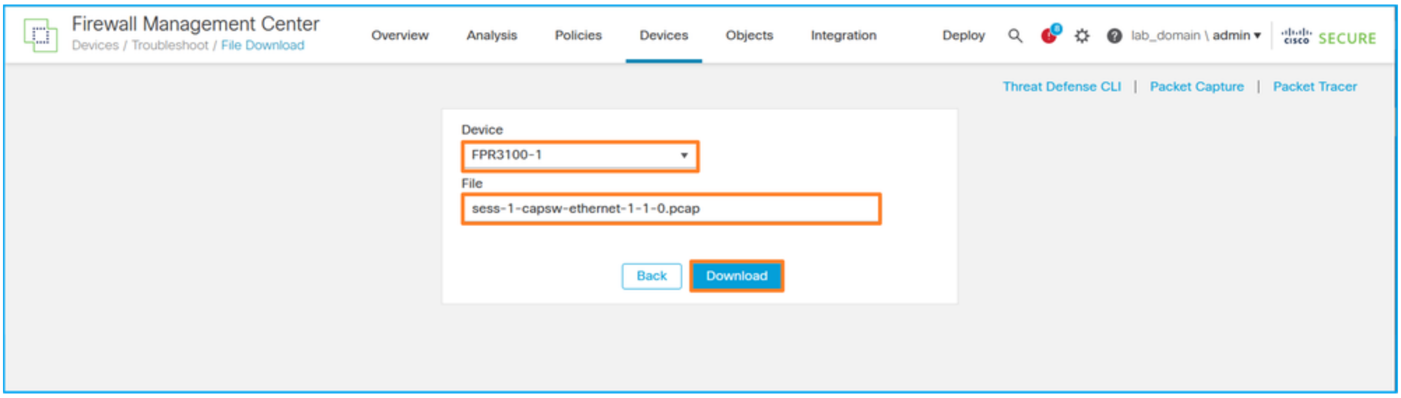
<#root>

```
root@KSEC-FPR3100-1:/home/admin
cp /mnt/disk0/packet-capture/sess-1-capsw-ethernet-1-1-0.pcap /ngfw/var/common/

root@KSEC-FPR3100-1:/home/admin
ls -l /ngfw/var/common/sess*

-rwxr-xr-x 1 root admin 139826 Aug  7 20:14
/ngfw/var/common/sess-1-capsw-ethernet-1-1-0.pcap

-rwxr-xr-x 1 root admin     24 Aug  6 21:58 /ngfw/var/common/sess-1-capsw-ethernet-1-3-0.pcap
```

5. On FMC choose **Devices** > **File Download**:



6. Choose the FTD, provide the capture file name, and click **Download**:


Firewall Management Center
Devices / Troubleshoot / File Download
Overview
Analysis
Policies
Devices
Objects
Integration
Deploy
lab_domain \ admin
SECURE
Threat Defense CLI | Packet Capture | Packet Tracer
Back
Download

Device: FPR3100-1

File: sess-1-capsw-ethernet-1-1-0.pcap

Guidelines, Limitations, and Best Practices for Internal Switch Packet Capture

Guidelines and limitations:

- Multiple switch capture configuration sessions are supported, but only 1 switch capture session can be active at a time. An attempt to enable 2 or more capture sessions results in an error "**ERROR: Failed to enable session, as limit of maximum 1 active packet capture sessions reached**".
- An active switch capture cannot be deleted.
- Switch captures cannot be read on the application. The user must export the files.
- Certain data plane capture options such as **dump, decode, packet-number, trace,** and others are not supported for switch captures.
- In the case of multi-context ASA, the switch captures on data interfaces are configured in user contexts. The switch captures on interfaces in_data_uplink1, and in_mgmt_uplink1 are supported only in the admin context.

This is the list of best practices based on the usage of packet capture in TAC cases:

- Be aware of guidelines and limitations.
- Use capture filters.
- Consider the impact of NAT on packet IP addresses when a capture filter is configured.
- Increase or decrease the **packet-length** that specifies frame size, in case it differs from the default value of 1518 bytes. Shorter size results in an increased number of captured packets and vice versa.
- Adjust the **buffer** size as needed.
- Be aware of the **Drop Count** in the output of the **show cap <cap_name> detail** command. Once the buffer size limit is reached, the drop count counter increases.

Related Information

- Firepower 4100/9300 Chassis Manager and FXOS CLI Configuration Guides
- Cisco Secure Firewall 3100 Getting Started Guide
- Cisco Firepower 4100/9300 FXOS Command Reference