

配置并验证Firepower设备上的端口通道

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简介

本文档介绍如何配置、验证 Firepower 设备上的端口通道并对其进行故障排除。

先决条件

要求

Cisco 建议您了解以下主题：

- Firepower Management Center (FMC)
- Firepower Chassis Manager (FCM)
- Firepower eXtensible Operating System (FXOS)
- Firepower Threat Defense (FTD)
- EtherChannel (EC)

注意：在本文档中，术语EtherChannel和Port-Channel(PC)互换使用。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- 2个FPR4120，用于FXOS 2.2(2.17),FTD 6.2.0.2.51
- 1个FPR4110，用于FXOS 2.1(0.159),FTD 6.1.0.330
- 1个FTD 6.2.1上的FPR2110 (内部版本341)
- 1个FPR1150 (在FTD 6.5.0上)
- WS-C3750X-24 on15.2(4)E5

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

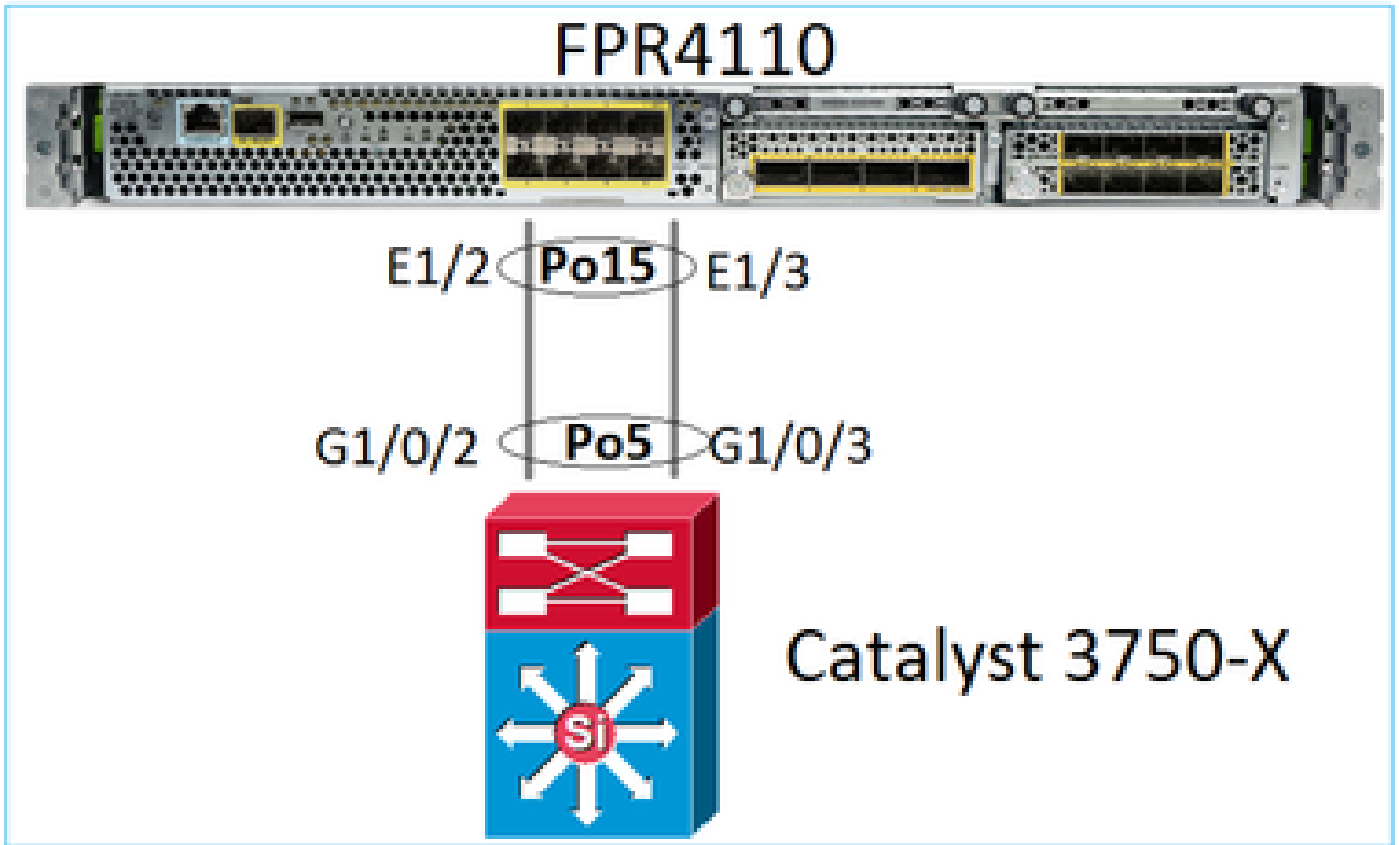
背景信息

本文档介绍如何在 Firepower 设备 (如 FPR1xxx、FPR21xx、FPR41xx、FPR93xx) 上配置、验证端口通道并进行故障排除。文档配置示例基于Firepower威胁防御(FTD)，但许多概念 (例如验证和故障排除) 也完全适用于自适应安全设备(ASA)。

配置

在 FPR4100/FPR9300 上配置端口通道

网络图



通过 FXOS 用户界面配置端口通道 (FPR4100/FPR9300)

Firepower 设备上的 FTD 端口通道由 FXOS 代码管理。在 FPR4100/FPR9300 上，可通过 Firepower Chassis Manager 完成配置：

Overview **Interfaces** Logical Devices Security Engine Platform Settings

CONSOLE MGMT USB

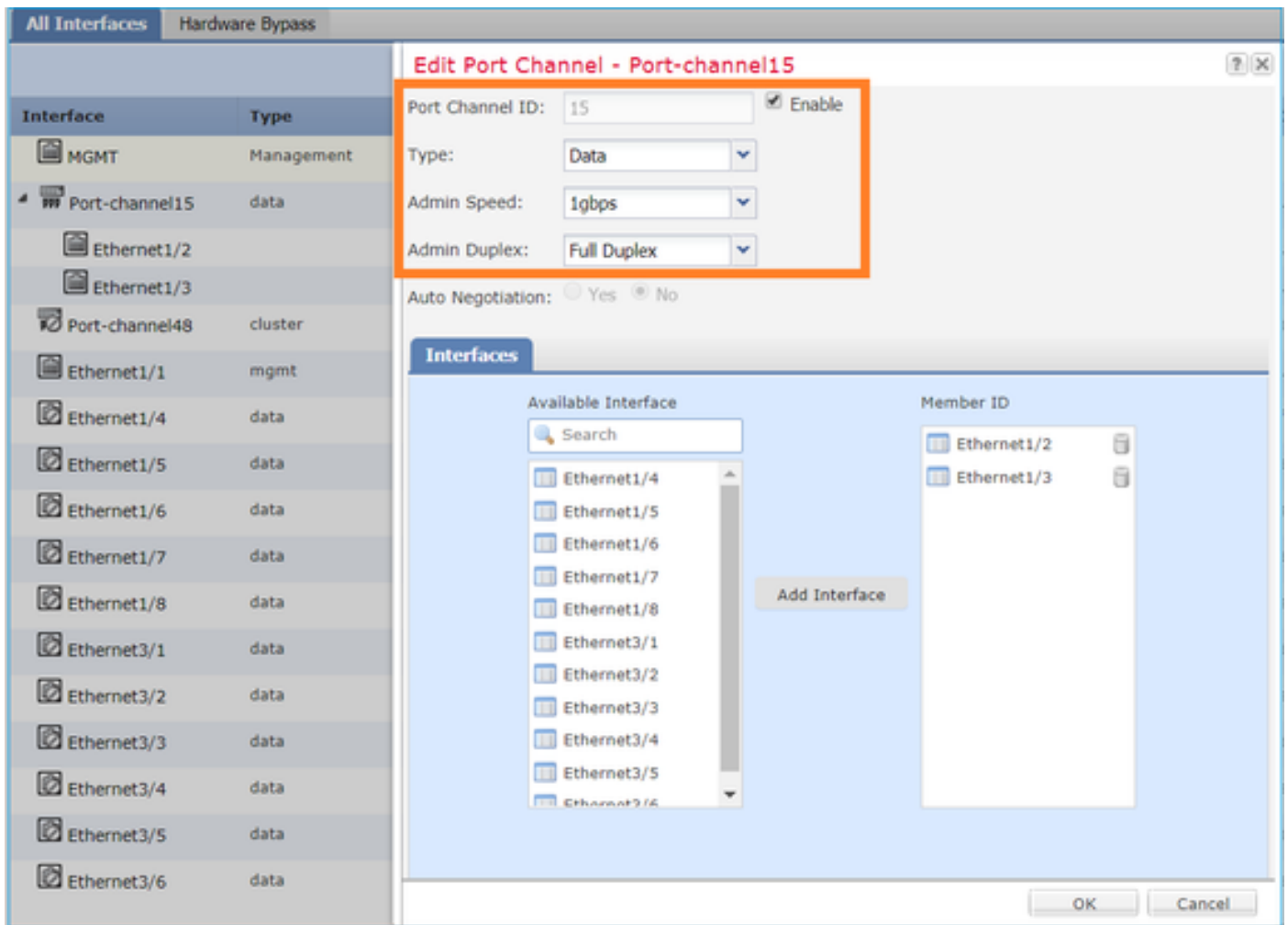
Network Module 1: 1, 3, 5, 7, 2, 4, 6, 8

Network Module 2: Empty

Network Module 3: 1, 3, 5, 2, 4, 6

All Interfaces Hardware Bypass Add Port Channel

Interface	Type	Admin Speed	Operational Speed	Application	Admin Duplex	Auto Negotiation	Operation State	Admin State
MGMT	Management							<input checked="" type="checkbox"/>
Port-channel15	data	1gbps	1gbps	FTD	Full Duplex	no	up	<input checked="" type="checkbox"/>
Ethernet1/2							up	
Ethernet1/3							up	
Port-channel48	cluster	10gbps	indeterminate		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet1/1	mgmt	1gbps	1gbps	FTD	Full Duplex	no	up	<input checked="" type="checkbox"/>
Ethernet1/4	data	10gbps	10gbps		Full Duplex	no	failed	<input type="checkbox"/>



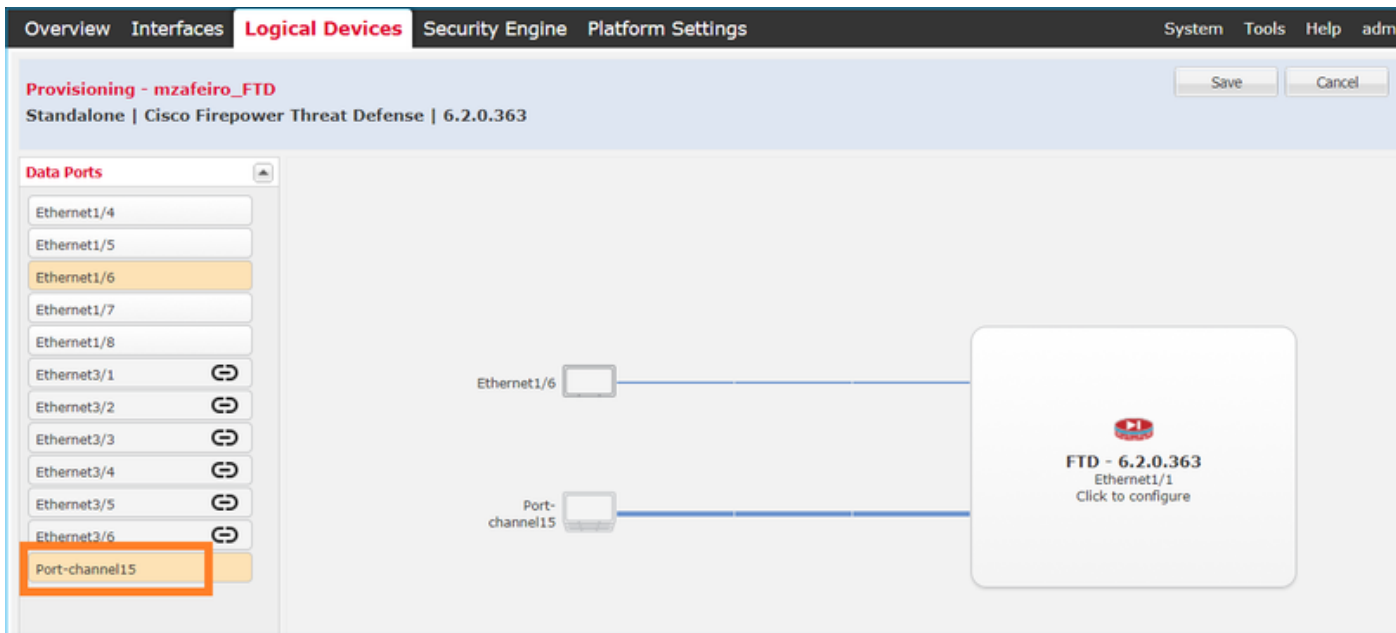
在分配给逻辑设备之前，端口通道一直处于关闭状态（故障状态）：

Overview **Interfaces** Logical Devices Security Engine Platform Settings

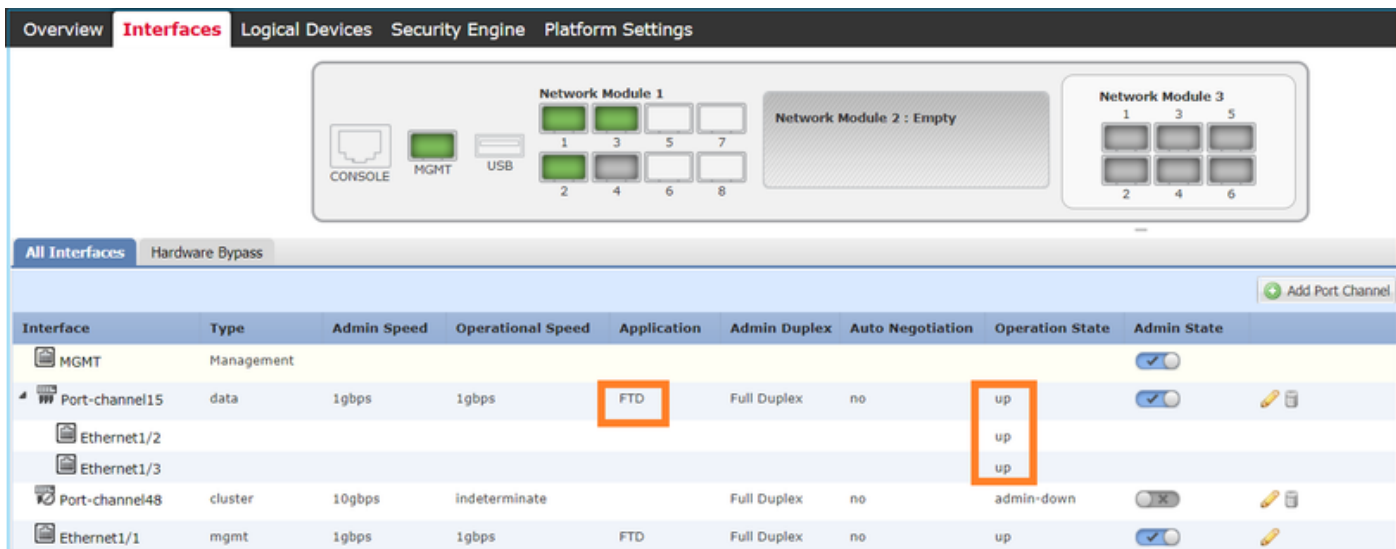
All Interfaces Hardware Bypass Add Port Channel

Interface	Type	Admin Speed	Operational Speed	Application	Admin Duplex	Auto Negotiation	Operation State	Admin State
MGMT	Management							<input checked="" type="checkbox"/>
Port-channel15	data	1gbps	1gbps		Full Duplex	no	failed	<input checked="" type="checkbox"/>
Ethernet1/2	data	1gbps			Full Duplex	no	down	<input checked="" type="checkbox"/>
Ethernet1/3	data	1gbps			Full Duplex	no	down	<input checked="" type="checkbox"/>
Port-channel48	cluster	10gbps	indeterminate		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet1/1	mgmt	1gbps	1gbps	FTD	Full Duplex	no	up	<input checked="" type="checkbox"/>
Ethernet1/4	data	10gbps	10gbps		Full Duplex	no	failed	<input type="checkbox"/>
Ethernet1/5	data	10gbps	10gbps		Full Duplex	no	sfp-not-present	<input type="checkbox"/>
Ethernet1/6	data	10gbps	10gbps	FTD	Full Duplex	no	sfp-not-present	<input type="checkbox"/>
Ethernet1/7	data	10gbps	10gbps		Full Duplex	no	sfp-not-present	<input type="checkbox"/>
Ethernet1/8	data	10gbps	10gbps		Full Duplex	no	sfp-not-present	<input type="checkbox"/>
Ethernet3/1	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet3/2	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet3/3	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet3/4	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet3/5	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>
Ethernet3/6	data	10gbps	10gbps		Full Duplex	no	admin-down	<input type="checkbox"/>

要将端口通道分配给逻辑设备，请按下图操作：



结果：



要点

- 在 FXOS 2.4.x 之前的版本中，FPR4100/FPR9300 仅支持 LACP，无“开启”模式或 PAGP。自 FXOS 2.4.1.101 版本开始，数据和数据共享 EtherChannel 支持“开启”模式。
- 请确保要添加到 Port-Channel 的接口尚未添加到逻辑设备。如果是，则在添加 Port-Channel 时，它们不会显示在接口中。
- 无法启用/禁用单个端口通道成员，只能启用/禁用端口通道本身。
- 不能删除逻辑设备使用的端口通道（例如，ASA 或 FTD）。必须先取消二者的关联。
- 除非已分配给逻辑设备，否则端口通道无法正常运行。如果从逻辑设备中移除 EtherChannel 或删除逻辑设备，该端口通道将恢复为挂起状态。
- 将连接至 Active 模式的交换机端口设置为最佳兼容性。

交换机配置

配置交换机时，为避免端口通道不稳定，建议执行以下操作：

- 使用 interface range 命令。
- 在进行影响端口通道操作的更改之前（例如，如果端口通道模式已更改），请关闭端口通道接口成员。

示例

```
<#root>
```

```
Switch(config)#
```

```
interface range g1/0/2 - 3
```

```
Switch(config-if-range)#
```

```
shutdown
```

```
Switch(config-if-range)#
```

```
switchport trunk encapsulation dot1q
```

```
Switch(config-if-range)#
```

```
switchport mode trunk
Switch(config-if-range)#
channel-group 5 mode active
Switch(config-if-range)#
no shutdown
```

注意：请始终参阅交换机型号配置指南部分了解更多详细信息。

通过 FXOS CLI 配置端口通道 (FPR4100/FPR9300)

步骤1:检验已分配给FTD逻辑设备的接口

```
<#root>
```

```
FP4110-7-A#
```

```
scope ssa
```

```
FP4110-7-A /ssa #
```

```
show logical-device
```

```
Logical Device:
```

Name	Description	Slot ID	Mode	Oper State	Template Name
mzafteiro_FTD			1	Standalone Ok	ftd

```
FP4110-7-A /ssa #
```

```
scope logical-device mzafteiro_FTD
```

```
FP4110-7-A /ssa/logical-device #
```

```
show external-port-link
```

```
External-Port Link:
```

Name	Port or Port Channel Name	App Name	Description
Ethernet11_ftd	Ethernet1/1	ftd	
Ethernet16_ftd	Ethernet1/6	ftd	

第二步：检验机箱接口

```
<#root>
```

```
FP4110-7-A#
```

```
scope eth-uplink
```

```
FP4110-7-A /eth-uplink #
```

```
scope fabric a
```

```
FP4110-7-A /eth-uplink/fabric #
```

```
show interface
```

```
Interface:
```

Port Name	Port Type	Admin State	Oper State	State Reason
Ethernet1/1	Mgmt	Enabled	Up	
Ethernet1/2	Data	Disabled	Admin Down	Administratively down
Ethernet1/3	Data	Disabled	Admin Down	Administratively down
Ethernet1/4	Data	Disabled	Failed	SFP checksum error
Ethernet1/5	Data	Disabled	Sfp Not Present	Unknown
Ethernet1/6	Data	Disabled	Sfp Not Present	Unknown
Ethernet1/7	Data	Disabled	Sfp Not Present	Unknown
Ethernet1/8	Data	Disabled	Sfp Not Present	Unknown
Ethernet3/1	Data	Disabled	Admin Down	Administratively down
Ethernet3/2	Data	Disabled	Admin Down	Administratively down
Ethernet3/3	Data	Disabled	Admin Down	Administratively down
Ethernet3/4	Data	Disabled	Admin Down	Administratively down
Ethernet3/5	Data	Disabled	Admin Down	Administratively down
Ethernet3/6	Data	Disabled	Admin Down	Administratively down

```
FP4110-7-A /eth-uplink/fabric #
```

```
show port-channel
```

```
Port Channel:
```

Port Channel Id	Name	Port Type	Admin State	Oper State	State Reason
48	Port-channel48	Cluster	Disabled	Admin Down	Administratively down

第三步：创建Port-Channel

```
<#root>
```

```
bsns-4110-2-A#
```

```
scope eth-uplink
```

```
bsns-4110-2-A /eth-uplink #
```

```
scope fabric a
```

```
bsns-4110-2-A /eth-uplink/fabric #
```

```
create port-channel 15
```

```
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
```

```
create member-port Ethernet1/5
```

```
bsns-4110-2-A /eth-uplink/fabric/port-channel/member-port* #
```

```
exit
```

```
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
```

```
create member-port Ethernet1/6
```



```
bsns-4110-2-A /eth-uplink/fabric/port-channel/member-port* #
exit
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
set port-type data
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
set speed 1gbps
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
enable
bsns-4110-2-A /eth-uplink/fabric/port-channel* #
commit-buffer
```

第四步：将接口分配给FTD逻辑设备：

```
<#root>
FP4110-7-A#
scope ssa
FP4110-7-A /ssa #
scope logical-device mzafeiro_FTD
FP4110-7-A /ssa/logical-device #
create external-port-link PC15_ftd Port-channel15 ftd
FP4110-7-A /ssa/logical-device/external-port-link* #
commit-buffer
FP4110-7-A /ssa/logical-device/external-port-link #
```

确认

```
<#root>
FP4110-7-A#
scope ssa
FP4110-7-A /ssa #
scope logical-device mzafeiro_FTD
FP4110-7-A /ssa/logical-device #
show external-port-link
```

External-Port Link:

Name	Port or Port Channel Name	App Name	Description
Ethernet11_ftd	Ethernet1/1	ftd	
Ethernet16_ftd	Ethernet1/6	ftd	
PC15_ftd	Port-channel15	ftd	

<#root>

FP4110-7-A#

scope eth-uplink

FP4110-7-A /eth-uplink #

scope fabric a

FP4110-7-A /eth-uplink/fabric #

show port-channel

Port Channel:

Port Channel Id	Name	Port Type	Admin State	Oper State	State Reason
15	Port-channel15	Data	Enabled	Up	
48	Port-channel48	Cluster	Disabled	Admin Down	Administratively down

<#root>

FP4110-7-A /eth-uplink/fabric #

enter port-channel 15

FP4110-7-A /eth-uplink/fabric/port-channel #

show member-port

Member Port:

Port Name	Membership	Oper State	State Reason
Ethernet1/2	Up	Up	
Ethernet1/3	Up	Up	

通过 FXOS CLI 删除端口通道 (FPR4100/FPR9300)

<#root>

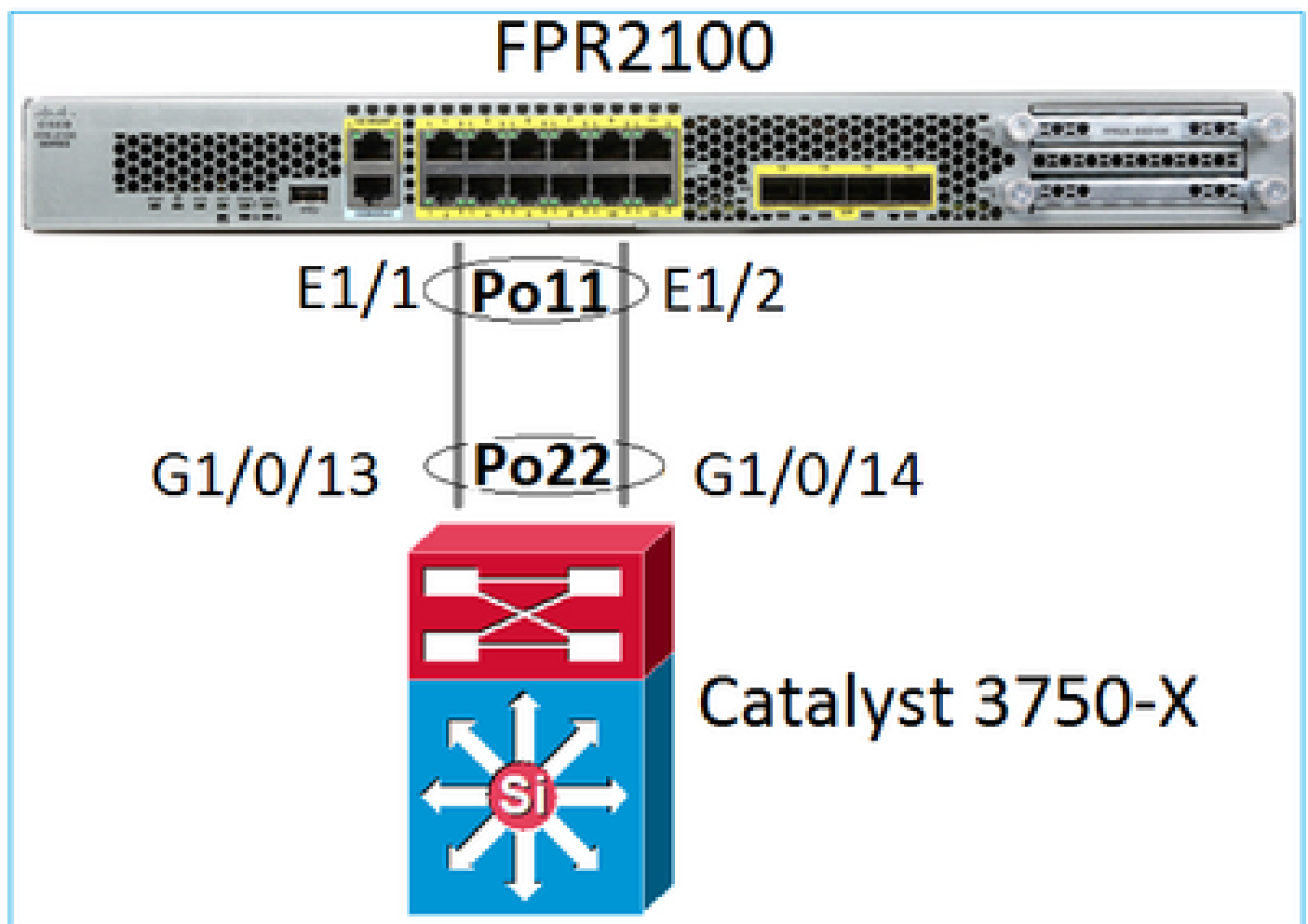
FP4110-7-A#

scope eth-uplink

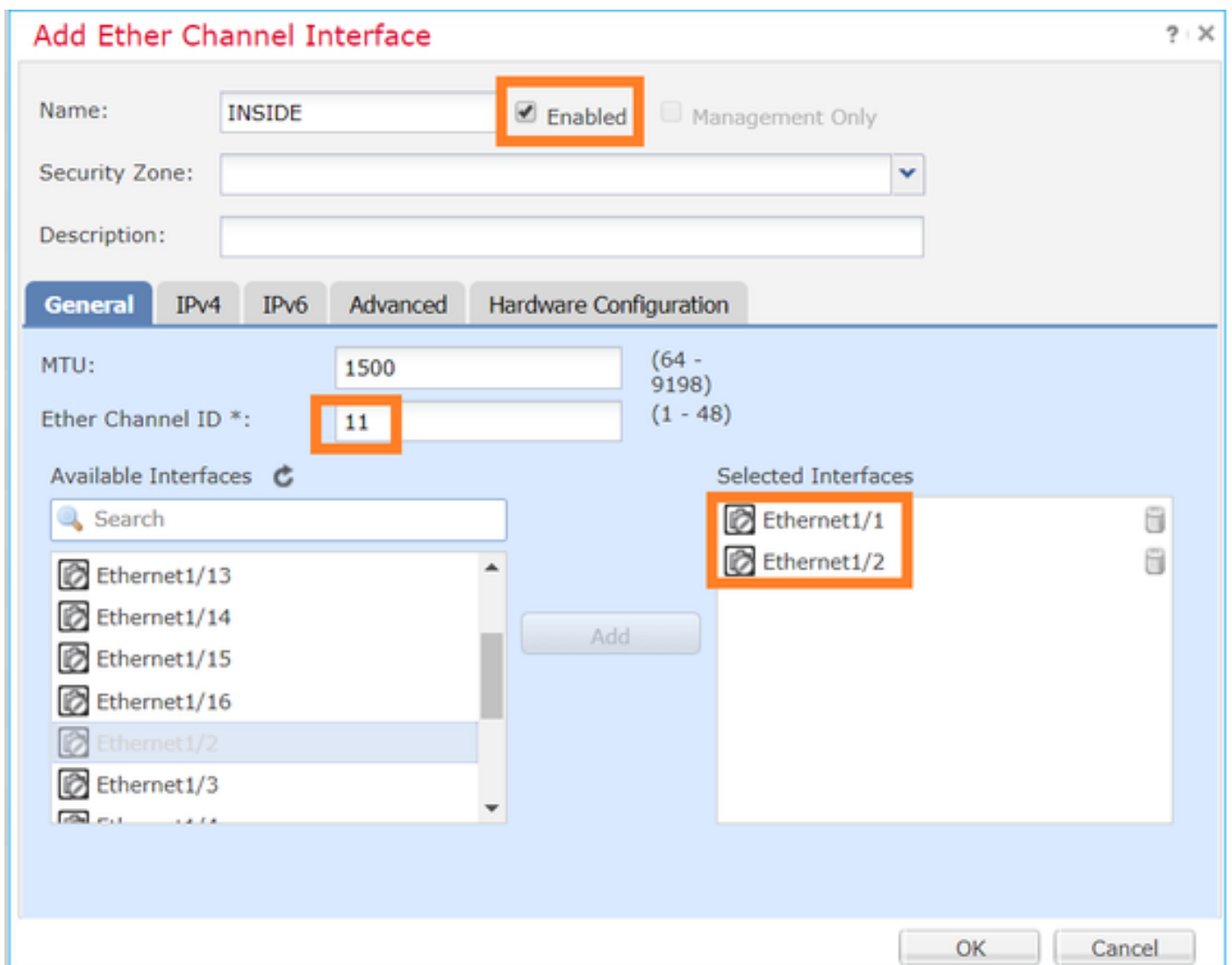
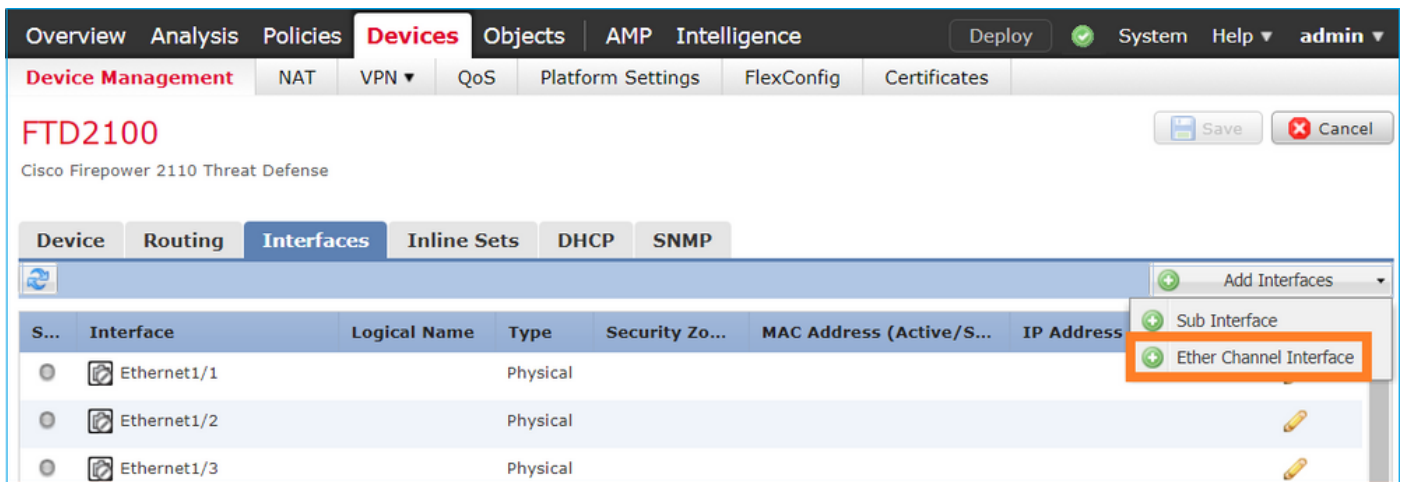
```
FP4110-7-A /eth-uplink #  
scope fabric a  
FP4110-7-A /eth-uplink/fabric #  
delete port-channel 15  
FP4110-7-A /eth-uplink/fabric* #  
commit-buffer
```

在 FPR21xx/FPR1xxx 上配置端口通道

网络图



FPR21xx/FPR1xxx 设备上的 FTD 端口通道由 FXOS 代码管理，但由于 FTD 和 FXOS 代码集成在同一软件捆绑包中，因此配置是从 FMC 完成：



通过高级选项卡配置模式（LACP“主动”或“开启”）：

Add Ether Channel Interface ? X

Name: Enabled Management Only

Security Zone:

Description:

General IPv4 IPv6 **Advanced** Hardware Configuration

Information ARP and MAC Security Configuration

LACP Mode:

- Active
- On

Active Mac Address:

Standby Mac Address:

DNS Lookup:

通过硬件配置选项卡配置“双工”和“速度”设置：

Add Ether Channel Interface

Name: Enabled Management Only

Security Zone:

Description:

General IPv4 IPv6 Advanced **Hardware Configuration**

Duplex:

- full

Speed:

- 1gbps

Auto-negotiation:

注意：在FPR2100上，除非将ASA用作逻辑设备，否则无法从FXOS CLI创建端口通道。在ASA 9.13.x 之后的版本中，只有在“平台”模式下才会出现这种情况。“设备”模式（11xx/21xx）下没有FCM，所有接口均直接在ASA CLI中配置。

<#root>

```
Fp2110 /eth-uplink/fabric* #
```

```
create port-channel 16
```

```
Fp2110 /eth-uplink/fabric/port-channel* #
```

```

create member-port Ethernet1/10
Fp2110 /eth-uplink/fabric/port-channel/member-port* #
exit
Fp2110 /eth-uplink/fabric/port-channel* #
create member-port Ethernet1/11
Fp2110 /eth-uplink/fabric/port-channel/member-port* #
exit
Fp2110 /eth-uplink/fabric/port-channel* #
commit-buffer
Error: Changes not allowed. use: 'connect ftd' to make changes.

```

如果物理接口关闭，要启用该接口，请按如下所示操作：

```

<#root>
firepower-2110#
scope eth-uplink
firepower-2110 /eth-uplink #
scope fabric a
firepower-2110 /eth-uplink/fabric #
show interface

```

Interface:					
Port Name	Port Type	Admin State	Oper State	State	Reason
Ethernet1/3	Data	Enabled	Up	Up	
Ethernet1/4	Data	Disabled	Link Down	Down	
Ethernet1/5	Data	Disabled	Link Down	Down	
Ethernet1/6	Data	Disabled	Link Down	Down	
Ethernet1/7	Data	Disabled	Link Down	Down	
Ethernet1/8	Data	Disabled	Link Down	Down	
Ethernet1/9	Data	Disabled	Link Down	Down	
Ethernet1/10	Data	Disabled	Link Down	Down	
Ethernet1/11	Data	Disabled	Link Down	Down	
Ethernet1/12	Data	Disabled	Link Down	Down	
Ethernet1/13	Data	Disabled	Link Down	Down	
Ethernet1/14	Data	Disabled	Link Down	Down	
Ethernet1/15	Data	Disabled	Link Down	Down	
Ethernet1/16	Data	Disabled	Link Down	Down	

```

firepower-2110 /eth-uplink/fabric #
enter interface Ethernet1/4
firepower-2110 /eth-uplink/fabric/interface #
show

```

```

Interface:
  Port Name      Port Type      Admin State Oper State      State Reason
-----
Ethernet1/4     Data          Disabled   Link Down      Down
firepower-2110 /eth-uplink/fabric/interface #
enable
firepower-2110 /eth-uplink/fabric/interface* #
commit-buffer
firepower-2110 /eth-uplink/fabric/interface #
show

```

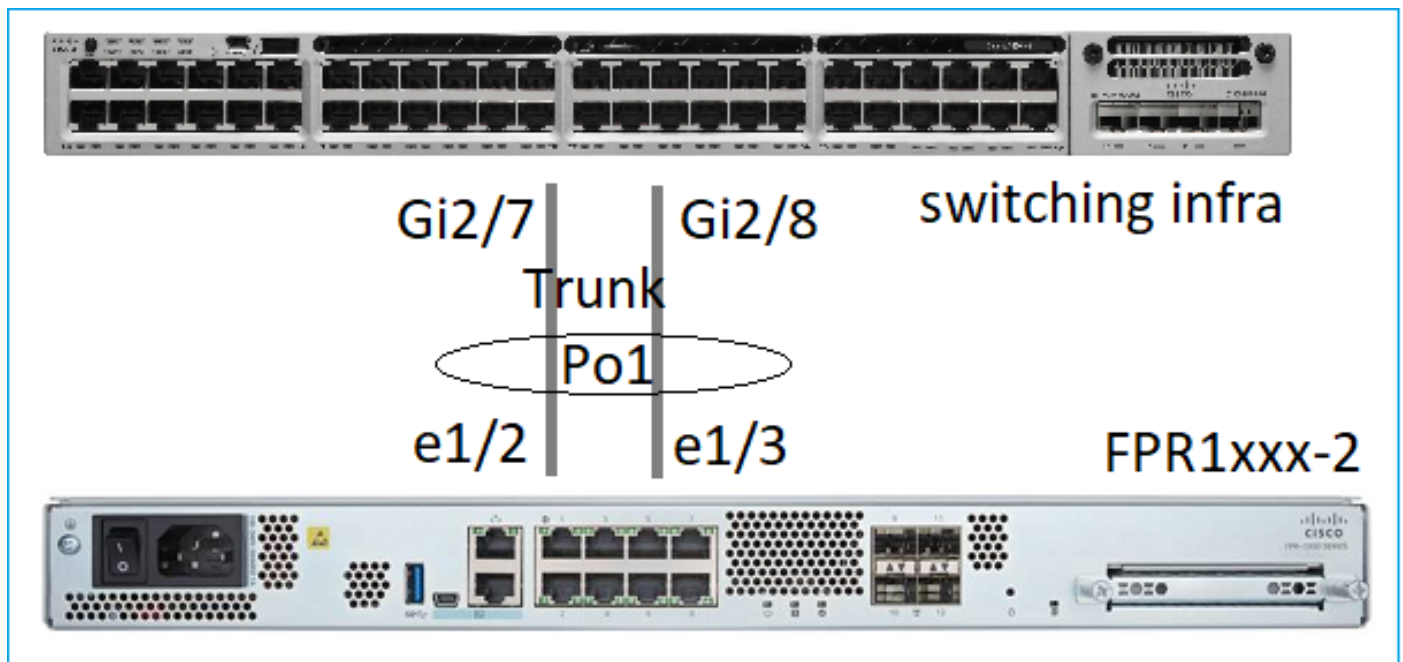
```

Interface:
  Port Name      Port Type      Admin State Oper State      State Reason
-----
Ethernet1/4     Data          Enabled    Link Down      Down
firepower-2110 /eth-uplink/fabric/interface #

```

FDM 配置

请思考以下拓扑：



可以配置从6.5软件版本开始使用FDM的EtherChannel接口。导航至设备 > 接口 > EtherChannel，然后添加 EtherChannel。在这种情况下，EtherChannel 是中继，因此请指定 EtherChannel ID，启用该 ID（状态），然后添加成员。EtherChannel 支持 LACP“主动”和“开启”模式（无 LACP）。在这种情况下，系统会配置 LACP“主动”模式。

Add EtherChannel Interface



Name

Mode

Routed ▾

EtherChannel ID

1

Status

Most features work with named interfaces only, although some require unnamed interfaces.

1 - 48

Description

EtherChannel Specific

IPv4 Address

IPv6 Address

Advanced

Link Aggregation Control Protocol

Active ▾

EtherChannel Members



- unnamed (Ethernet1/3)
- unnamed (Ethernet1/2)

添加子接口：

Add EtherChannel Subinterface



Parent Interface

unnamed (Port-channel1)

Subinterface Name

inside1

Mode

Routed

Status



Most features work with named interfaces only, although some require unnamed interfaces.

Description

VLAN ID

201

1 - 4094

Subinterface ID

201

IPv4 Address

IPv6 Address

Advanced

Type

Static

IP Address and Subnet Mask

192.168.201.112 / 24

e.g. 192.168.5.15/17 or 192.168.5.15/255.255.128.0

结果：

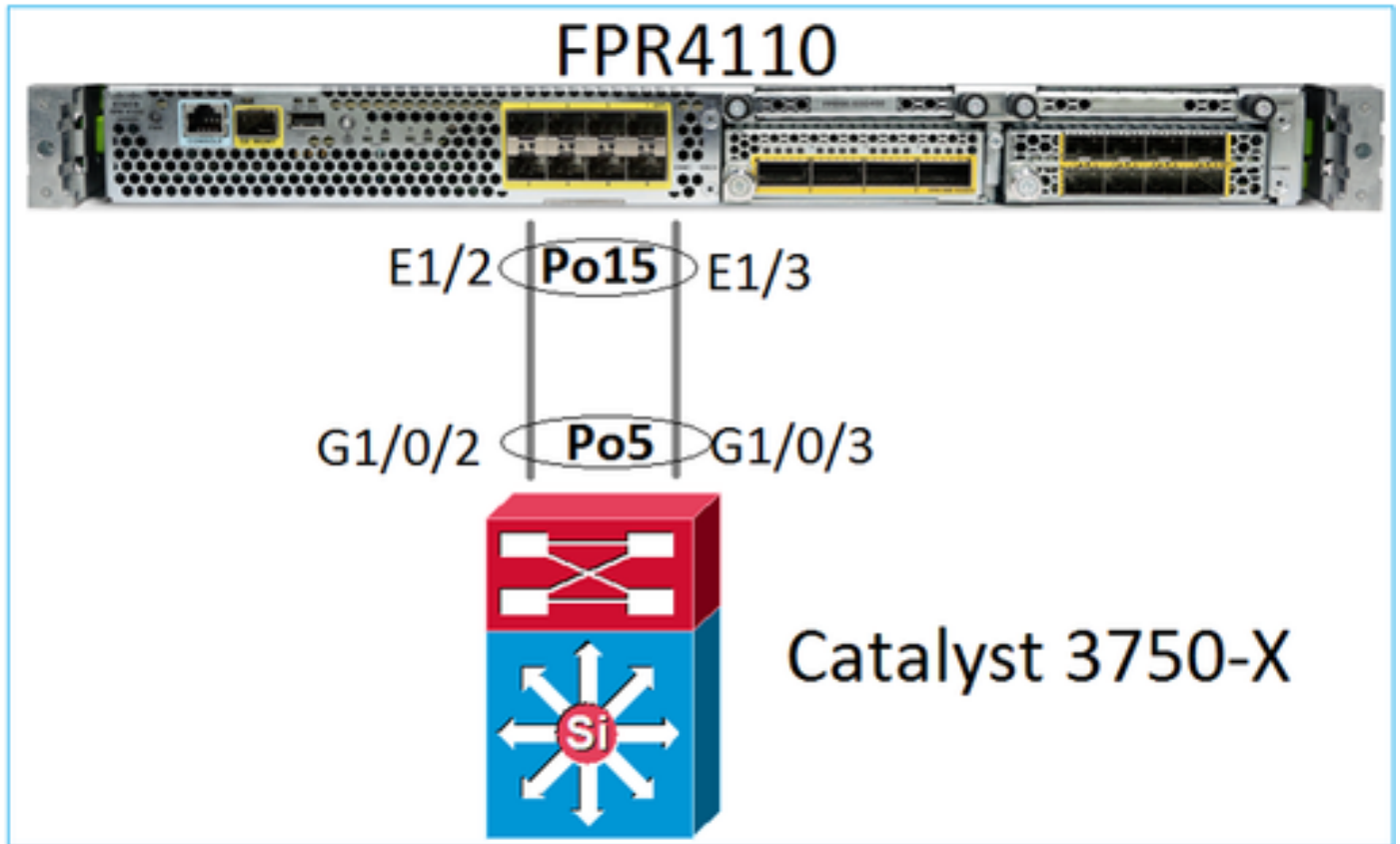
NAME	LOGICAL NAME	TYPE	STATE	MODE	IP ADDRESS	MONITOR FOR HA	ACTIONS
Port-channel1		EtherChannel	<input checked="" type="checkbox"/>	Routed		Enabled	
ETHERCHANNEL MEMBERS							
<input checked="" type="checkbox"/> Ethernet1/2		Physical Interface					
<input checked="" type="checkbox"/> Ethernet1/3		Physical Interface					
SUBINTERFACES							
<input checked="" type="checkbox"/> Port-channel1.201	inside1	Subinterface	<input checked="" type="checkbox"/>		192.168.201.112 <small>Static</small>	Enabled	
<input checked="" type="checkbox"/> Port-channel1.202	inside202	Subinterface	<input checked="" type="checkbox"/>		192.168.202.112 <small>Static</small>	Enabled	

部署预期更改

验证

验证 FPR4100/FPR9300 上的端口通道

网络图



FTD (或 ASA) 并不了解端口通道单个成员。在 FMC 中配置逻辑接口 (子接口) :

```
<#root>
```

```
>
```

```
system support diagnostic-cli
```

```
firepower#
```

```
show interface ip brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
Internal-Data0/0	unassigned	YES	unset	up	up
Internal-Data0/1	unassigned	YES	unset	up	up
Internal-Data0/2	169.254.1.1	YES	unset	up	up
Port-channel15	unassigned	YES	unset	up	up

```
firepower# show nameif
Interface          Name          Security
Port-channel15    INSIDE        0
Ethernet1/1       diagnostic    0
```

<#root>

firepower#

show interface Port-channel15 detail

```
Interface Port-channel15 "INSIDE", is up, line protocol is up
  Hardware is EtherSVI, BW 20000 Mbps, DLY 1000 usec
  MAC address 2c33.118e.07de, MTU 1500
  IP address unassigned
  Traffic Statistics for "INSIDE":
    6767 packets input, 566328 bytes
    0 packets output, 0 bytes
    6736 packets dropped
    1 minute input rate 4 pkts/sec, 375 bytes/sec
    1 minute output rate 0 pkts/sec, 0 bytes/sec
    1 minute drop rate, 4 pkts/sec
    5 minute input rate 4 pkts/sec, 401 bytes/sec
    5 minute output rate 0 pkts/sec, 0 bytes/sec
    5 minute drop rate, 4 pkts/sec
  Control Point Interface States:
    Interface number is 6
    Interface config status is active
    Interface state is active
```

要检查端口通道及其成员的状态，请导航至 FXOS 模式：

<#root>

FP4110-7-A#

connect fxos

FP4110-7-A(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
-----
15   Po15(SU)    Eth       LACP      Eth1/2(P)  Eth1/3(P)
48   Po48(SD)    Eth       NONE      --
```

要查看端口通道的状态以及上次状态历史记录：

<#root>

FP4110-7-A(fxos)#

show port-channel database

port-channel15

Last membership update is successful
2 ports in total, 2 ports up
First operational port is Ethernet1/3
Age of the port-channel is 0d:00h:35m:00s
Time since last bundle is 0d:00h:34m:56s
Last bundled member is Ethernet1/3
Ports: Ethernet1/2 [active] [up]
Ethernet1/3 [active] [up] *

port-channel48

Last membership update is successful
0 ports in total, 0 ports up
Age of the port-channel is 5d:06h:35m:27s

要检查端口通道接口成员之间的流量分布：

<#root>

FP4110-7-A(fxos)#

show port-channel traffic

ChanId	Port	Rx-Ucst	Tx-Ucst	Rx-Mcst	Tx-Mcst	Rx-Bcst	Tx-Bcst
15	Eth1/2	20.83%	49.71%	17.75%	43.67%	20.11%	49.94%
15	Eth1/3	79.16%	50.28%	82.24%	56.32%	79.88%	50.05%

LACP 邻居验证

<#root>

FP4110-7-A(fxos)#

show lacp neighbor

Flags: S - Device is sending Slow LACPDUs F - Device is sending Fast LACPDUs
A - Device is in Active mode P - Device is in Passive mode

port-channel15 neighbors

Partner's information

Port	Partner System ID	Partner Port Number	Age	Partner Flags
Eth1/2	32768,28-6f-7f-ec-59-800x103		1984	FA
	LACP Partner	Partner		Partner
	Port Priority	Oper Key		Port State

	32768	0x5		0x3f
Partner's information				
Partner	Partner	Partner	Partner	Partner
Port	System ID	Port Number	Age	Flags
Eth1/3	32768,28-6f-7f-ec-59-800x104		2221	FA
	LACP Partner	Partner		Partner
	Port Priority	Oper Key		Port State
	32768	0x5		0x3f

Partner Oper Key 0x5 = 交换机配置了端口通道 ID 5

在交换机上：

<#root>

Switch#

show lacp neighbor

Flags: S - Device is requesting Slow LACPDUs
 F - Device is requesting Fast LACPDUs
 A - Device is in Active mode P - Device is in Passive mode

Channel group 5 neighbors

Partner's information:

Port	Flags	LACP port Priority	Dev ID	Age	Admin key	Oper Key	Port Number	Port State
Gi1/0/2	FA	32768	2c33.118e.07b3	0s	0x0	0xE	0x42	0x3F
Gi1/0/3	FA	32768	2c33.118e.07b3	0s	0x0	0xE	0x43	0x3F

请注意，虽然 FXOS 配置了端口通道 ID 15，但在相邻交换机上，Partner Oper Key 仍显示为 0xE (14)

Wireshark 中的 LACP 数据包捕获:

LACP switch capture - SLOW - FXOS FAST.pcapng

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

lACP

No.	Time	Source	Destination	Protocol	Length	Source Port
480	2017-10-12 11:25:34.759928	Cisco_ec:59:8f	Slow-Protocols	LACP	124	
481	2017-10-12 11:25:34.903681	Cisco_8e:02:a3	Slow-Protocols	LACP	124	
483	2017-10-12 11:25:35.723075	Cisco_ec:59:8f	Slow-Protocols	LACP	124	
484	2017-10-12 11:25:35.903752	Cisco_8e:02:a3	Slow-Protocols	LACP	124	

Partner State: 0x3f LACP Activity, LACP Timeout, Aggregation, Synchronization, Collecting, Distributing

- 1 = LACP Activity: Active
- 1. = LACP Timeout: Short Timeout
- 1.. = Aggregation: Aggregatable
- 1... = Synchronization: In Sync
- 1... = Collecting: Enabled
- 1... = Distributing: Enabled
- 0... = Defaulted: No
- 0... = Expired: No

[Partner State Flags: **DCSGSA]

Reserved: 000000

Collector Information: 0x03

Collector Information Length: 0x10

Collector Max Delay: 32768

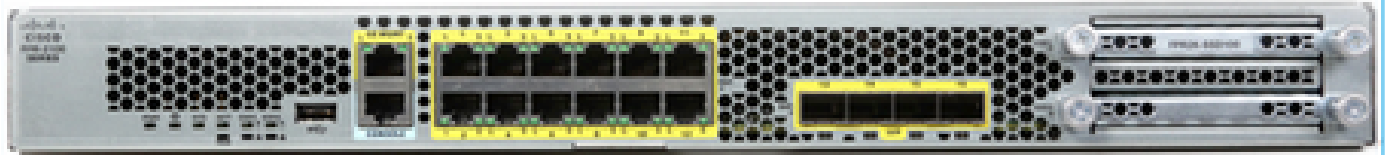
Reserved: 000000000000000000000000

	合作伙伴状态							
状态	已到期	已违约	已分发	已收集	同步	汇聚	LACP 超时	LACP 活动
价值	0	0	1	1	1	1	1	1
十六进制	3				f			

验证 FPR21xx/FPR1xxx 上的端口通道

网络图

FPR2100



E1/1 **Po11** E1/2

G1/0/13 **Po22** G1/0/14



Catalyst 3750-X

端口通道基本验证

```
<#root>
```

```
>
```

```
connect fxos
```

```
FP2110-2#
```

```
connect local-mgmt
```

```
FP2110-2(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-Channel	Type	Protocol	Member Ports
11	Po11(U)	Eth	LACP	Eth1/1(P) Eth1/2(P)

```
-----
```

其他验证：

```
<#root>
```

```
FP2110-2#
```

```
scope eth-uplink
```

```
FP2110-2 /eth-uplink #
```

```
scope fabric a
```

```
FP2110-2 /eth-uplink/fabric #
```

```
show port-channel
```

```
Port Channel:
```

Port Channel Id	Name	Port Type	Admin State	Oper State	State Reason
11	Port-channel11	Data	Enabled	Up	Up

验证端口通道详细信息：

```
<#root>
```

```
FP2110-2 /eth-uplink/fabric #
```

```
show port-channel detail
```

```
Port Channel:
```

```
Port Channel Id: 11
Name: Port-channel11
Port Type: Data
Description:
Admin State: Enabled
Oper State: Up
Auto negotiation: Yes
Speed: 1 Gbps
Duplex: Full Duplex
Oper Speed: 1 Gbps
Band Width (Gbps): 2
State Reason: Up
flow control policy: default
LACP policy name: default
oper LACP policy name: org-root/lacp-default
Lacp Mode: Active
Inline Pair Admin State: Enabled
Inline Pair Peer Port Name:
```

验证端口通道成员详细信息：

```
<#root>
```


FP2110-2#

scope eth-uplink

FP2110-2 /eth-uplink #

scope fabric a

FP2110-2 /eth-uplink/fabric #

scope port-channel 11

FP2110-2 /eth-uplink/fabric/port-channel #

show member-port

Member Port:

Port Name	Membership	Oper State	State Reason
Ethernet1/1	Up	Up	Up
Ethernet1/2	Up	Up	Up

成员端口详细信息：

<#root>

FP2110-2 /eth-uplink/fabric/port-channel #

show member-port detail

Member Port:

Port Name: Ethernet1/1
Membership: Up
Oper State: Up
State Reason: Up
Ethernet Link Profile name: default
Oper Ethernet Link Profile name: fabric/lan/eth-link-prof-default
Udld Oper State: Unknown
Current Task:

Port Name: Ethernet1/2
Membership: Up
Oper State: Up
State Reason: Up
Ethernet Link Profile name: default
Oper Ethernet Link Profile name: fabric/lan/eth-link-prof-default
Udld Oper State: Unknown
Current Task:

LACP 验证

<#root>

FP2110-2(local-mgmt)#

show lacp neighbor

Flags: S - Device is requesting Slow LACPDUs
F - Device is requesting Fast LACPDUs
A - Device is in Active mode P - Device is in Passive mode

Channel group: 11

Partner (internal) information:

Port	Partner System ID	Partner Port Number	Age	Partner Flags
Eth1/1	32768,286f.7fec.5980	0x10e	13 s	FA <-- the peer is requesting Fast Rate

LACP Partner Port Priority	Partner Oper Key	Partner Port State
32768	0x16	0x3f

Port State Flags Decode:

Activity:	Timeout:	Aggregation:	Synchronization:
Active	Long	Yes	Yes

Collected:	Distributing:	Defaulted:	Expired:
Yes	Yes	No	No

Port	Partner System ID	Partner Port Number	Age	Partner Flags
Eth1/2	32768,286f.7fec.5980	0x10f	5 s	FA <-- the peer is requesting Fast Rate

LACP Partner Port Priority	Partner Oper Key	Partner Port State
32768	0x16	0x3f

Port State Flags Decode:

Activity:	Timeout:	Aggregation:	Synchronization:
Active	Long	Yes	Yes

Collected:	Distributing:	Defaulted:	Expired:
Yes	Yes	No	No

注意：在FPR21xx/FPR1xxx上，默认LACP速率为缓慢且无法更改

LACP 计数器

<#root>

FP2110-2(local-mgmt)#

show lacp counters

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 11								
Eth1/1	4435	3532	0	0	0	0	0	0
Eth1/2	4566	3532	0	0	0	0	0	0
FP2110-2(local-mgmt)#								

show lacp counters

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 11								
Eth1/1	4436	3532	0	0	0	0	0	0
Eth1/2	4567	3532	0	0	0	0	0	0

FPR2100 接口验证

物理接口与 FPR2100 内部交换机的对应关系：

接口	FPR2110/FPR2120 上的内部交换机	FPR2130/FPR2140 上的内部交换机
E1/1	1	1
E1/2	0	0
E1/3	3	3
E1/4	2	2
E1/5	5	5
E1/6	4	4
E1/7	7	7
E1/8	6	6

E1/9	9	49
E1/10	8	48
E1/11	11	51
E1/12	10	50
E1/13	12	59
E1/14	13	58
E1/15	14	57
E1/16	15	56
E2/1	-	70
E2/2	-	71
E2/3	-	69
E2/4	-	68
E2/5	-	66
E2/6	-	67
E2/7	-	65
E2/8	-	64

验证物理接口状态

<#root>

FP2110-2(local-mgmt)#

show portmanager port-info ethernet 1 1

port_info:

```
if_index:    0x1081000
type:        PORTMGR_IPC_MSG_PORT_TYPE_PHYSICAL
mac_address: 70:df:2f:18:d8:04
flowctl:     PORTMGR_IPC_MSG_FLOWCTL_NONE
role:        PORTMGR_IPC_MSG_PORT_ROLE_NPU
admin_state: PORTMGR_IPC_MSG_PORT_STATE_ENABLED
oper_state:  PORTMGR_IPC_MSG_PORT_STATE_UP
admin_speed: PORTMGR_IPC_MSG_SPEED_AUTO
oper_speed:  PORTMGR_IPC_MSG_SPEED_1GB
admin_mtu:   9216
admin_duplex: PORTMGR_IPC_MSG_PORT_DUPLEX_FULL
oper_duplex: PORTMGR_IPC_MSG_PORT_DUPLEX_FULL
pc_if_index: 0x200000b
pc_membership_status: PORTMGR_IPC_MSG_MMBR_UP
pc_protocol: PORTMGR_IPC_MSG_PORT_CHANNEL_PRTCL_LACP_ACTIVE
native_vlan: 1011
num_allowed_vlan: 1
    allowed_vlan[0]: 1011
```

物理接口计数器：

<#root>

FP2110-2(local-mgmt)#

show portmanager counters ethernet 1 1

```
Good Octets Received           : 2692986
Bad Octets Received            : 0
MAC Transmit Error             : 0
Good Packets Received          : 37038
Bad Packets Received           : 0
BRDC Packets Received          : 22290
MC Packets Received            : 12538
Size 64                         : 34193
Size 65 to 127                 : 1531
Size 128 to 255                : 1515
Size 256 to 511                : 374
Size 512 to 1023               : 95
Size 1024 to Max                : 0
Good Octets Sent                : 87296
Good Packets Sent               : 682
Excessive Collision            : 0
MC Packets Sent                 : 682
BRDC Packets Sent               : 0
Unrecognized MAC Received      : 0
FC Sent                         : 0
Good FC Received               : 0
Drop Events                     : 0
Undersize Packets              : 0
Fragments Packets              : 0
Oversize Packets                : 0
```

```
Jabber Packets : 0
MAC RX Error Packets Received : 0
Bad CRC : 0
Collisions : 0
```

FPR2100 内部交换机 MAC 表。请注意，01:80:C2:00:00:02 = LACP

<#root>

FP2110-2(local-mgmt)#

show portmanager switch mac-filters

port	ix	MAC	mask	action	packets	bytes
00	03e	70:DF:2F:18:D8:05	FF:FF:FF:FF:FF:FF	FORWARD		
	043	01:80:C2:00:00:02	FF:FF:FF:FF:FF:FF	FORWARD	687	87936
	044	70:DF:2F:18:D8:2D	FF:FF:FF:FF:FF:FF	FORWARD		
	045	FF:FF:FF:FF:FF:FF	FF:FF:FF:FF:FF:FF	FORWARD	5501	385360
	3d0	00:00:00:00:00:00	01:00:00:00:00:00	DROP	2101	141426
	3e8	01:00:00:00:00:00	01:00:00:00:00:00	DROP	7946	1524820
01	03f	70:DF:2F:18:D8:04	FF:FF:FF:FF:FF:FF	FORWARD		
	040	01:80:C2:00:00:02	FF:FF:FF:FF:FF:FF	FORWARD	687	87936
	041	70:DF:2F:18:D8:2D	FF:FF:FF:FF:FF:FF	FORWARD		
	042	FF:FF:FF:FF:FF:FF	FF:FF:FF:FF:FF:FF	FORWARD	22351	1451504
	3d1	00:00:00:00:00:00	01:00:00:00:00:00	DROP	2215	154542
	3e9	01:00:00:00:00:00	01:00:00:00:00:00	DROP	11886	1006067
02	03c	70:DF:2F:18:D8:07	FF:FF:FF:FF:FF:FF	FORWARD		
	049	01:80:C2:00:00:02	FF:FF:FF:FF:FF:FF	FORWARD		
	04a	70:DF:2F:18:D8:6D	FF:FF:FF:FF:FF:FF	FORWARD		
	04b	FF:FF:FF:FF:FF:FF	FF:FF:FF:FF:FF:FF	FORWARD		
	3d2	00:00:00:00:00:00	01:00:00:00:00:00	DROP		
	3ea	01:00:00:00:00:00	01:00:00:00:00:00	DROP		

端口 E1/1 和 E1/2 对应内部交换机上的 0/0 和 0/1 :

<#root>

FP2110-2(local-mgmt)#

show portmanager switch status

Dev/Port	Mode	Link	Speed	Duplex	Loopback Mode
0/0	QSGMII	Up	1G	Full	None
0/1	QSGMII	Up	1G	Full	None
0/2	QSGMII	Down	1G	Half	None
0/3	QSGMII	Down	1G	Half	None
0/4	QSGMII	Down	1G	Half	None
0/5	QSGMII	Down	1G	Half	None
0/6	QSGMII	Down	1G	Half	None
0/7	QSGMII	Down	1G	Half	None

0/8	QSGMII	Down	1G	Half	None
0/9	QSGMII	Down	1G	Half	None
0/10	QSGMII	Down	1G	Half	None
0/11	QSGMII	Down	1G	Half	None
0/12	QSGMII	Down	10	Half	None
0/13	QSGMII	Down	10	Half	None
0/14	QSGMII	Down	10	Half	None
0/15	QSGMII	Down	10	Half	None
0/16	n/a	Down	n/a	Full	N/A
0/17	n/a	Down	n/a	Full	N/A
0/18	n/a	Down	n/a	Full	N/A
0/19	n/a	Down	n/a	Full	N/A
0/20	n/a	Down	n/a	Full	N/A
0/21	n/a	Down	n/a	Full	N/A
0/22	n/a	Down	n/a	Full	N/A
0/23	n/a	Down	n/a	Full	N/A
0/24	KR	Up	10G	Full	None
0/25	KR	Up	10G	Full	None
0/26	KR	Down	10G	Full	None
0/27	KR	Up	10G	Full	None

故障排除

LACP 概述

LACP事实：

- IEEE 标准 (802.3ad) 链路聚合控制协议 (LACP) 是用于端口通道协商的第 2 层协议。
- LACP 使用目的 MAC 0180.c200.0002 和以太网类型 0x8809。
- Firepower 设备仅支持 LACP 和“开启”模式 (无 LACP) (采用 2.4.x FXOS 版本的 FP4100/FP9300 中已添加“开启”模式)。
- LACP 可以配置为两种模式 (“主动”或“被动”) 中的任意一种。FXOS 始终使用“主动”模式。
- LACP 的主要目标是防止端口通道配置错误。
- 为确保 LACP PC 正常运行，端口通道接口成员需要具有相同的速度/双工设置。在 FXOS 中，可以在端口通道级别设置速度。
- LACP 攻击者 = 本地设备
- LACP 合作伙伴 = 远程设备
- 每台设备都有一个 LACP 系统 ID，通常是机箱的 MAC 地址。LACP 系统 ID 随每个 LACP 数据包发送。
- 每个 LACP 数据包的大小约为 110 字节。
- LACP 支持“快速”和“慢速 (正常)”速率。FXOS 默认使用“快速” (1xxx/21xx 除外，始终为“慢速”)，但也可配置为“慢速”。交换机端的 LACP 模式取决于所使用的交换机型号和软件。例如，自 15.2(4)E 开始，Cat3750 同时支持“慢速”和“快速”。有关详细信息，请参阅交换机确认指南。
- 在 LACP 检测期间，无论 LACP 速率如何，LACP 都会每 1 秒发送一次。启用接口后，LACP 速率仅影响 LACP 保持连接的间隔。

交换机配置为“慢速”	交换机请求为“慢速” FXOS 请求为“慢速” 交换机每 30 秒发送 1 次 LACP FXOS 每 30 秒发送 1 次 LACP	交换机请求为“慢速” FXOS 请求为“快速” 交换机每秒发送 1 次 LACP FXOS 每 30 秒发送 1 次 LACP
交换机配置为“快速”	交换机请求为“快速” FXOS 请求为“慢速” 交换机每 30 秒发送 1 次 LACP FXOS 每秒发送 1 次 LACP	交换机请求为“快速” FXOS 请求为“快速” 交换机每秒发送 1 次 LACP FXOS 每秒发送 1 次 LACP

要在 FXOS (41xx/93xx) 上配置 LACP 模式：

```
<#root>
```

```
KSEC-FPR4100-1#
```

```
scope org
```

```
KSEC-FPR4100-1 /org #
```

```
show lacppolicy
```

```
LACP policy:
```

```
  Name          LACP rate
```

```
-----
```

```
default      Fast
```

```
KSEC-FPR4100-1 /org # scope lacppolicy default
```

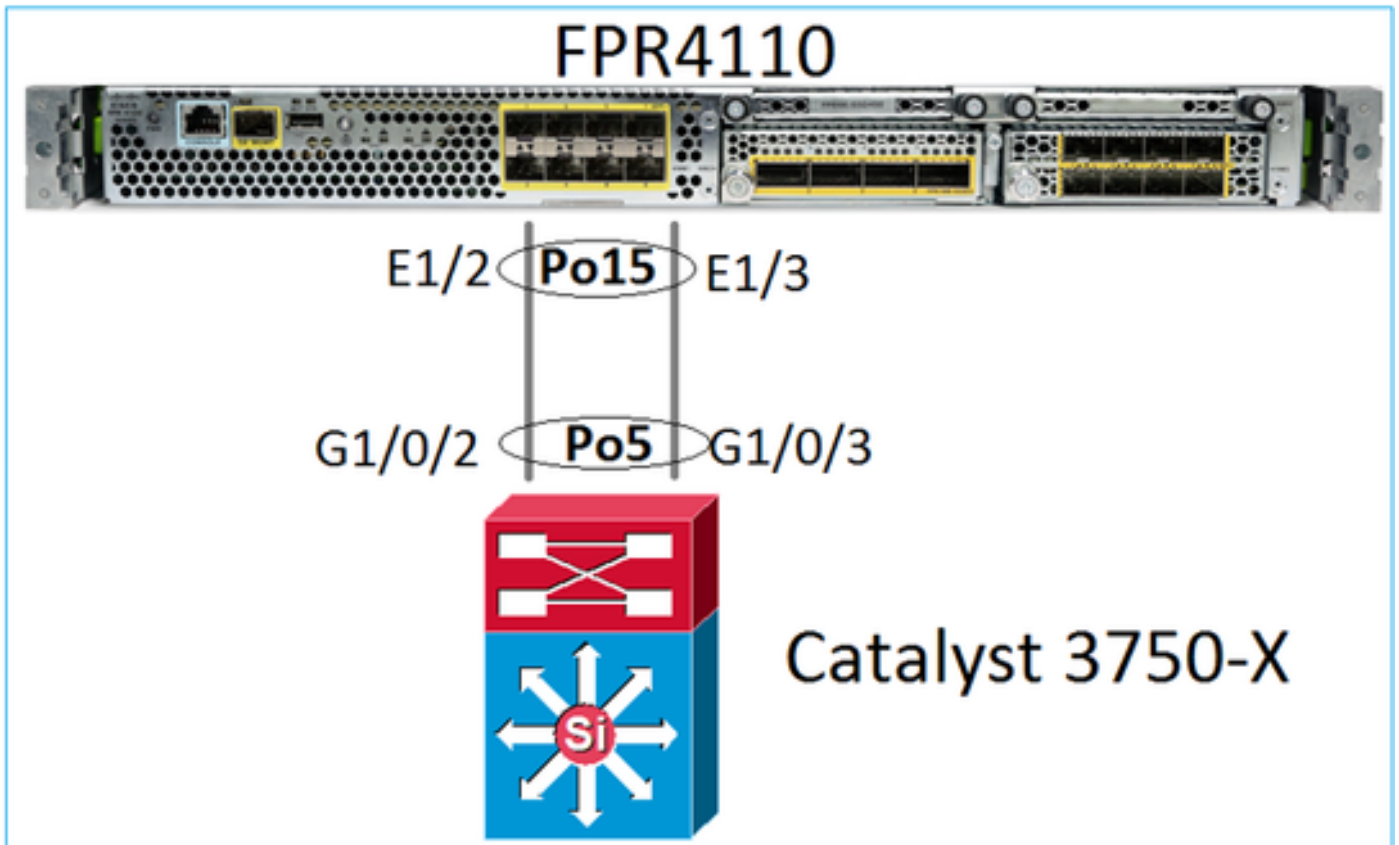
```
KSEC-FPR4100-1 /org/lacppolicy # set lacp-rate
```

```
fast      lacp rate fast
```

```
normal    lacp rate normal
```

对 FPR4100/FPR9300 上的端口通道执行故障排除

网络图



FPR4100 和 FPR9300 机箱包含端口通道端接的内部交换机。由于内部交换机与 Nexus 5K 类似，而且 FXOS 仅支持 LACP，因此内部交换机与 Nexus 5K 的故障排除方法也比较相似。

检查 1 – 验证端口通道状态

```
<#root>
```

```
FP4110-7-A(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-Channel	Type	Protocol	Member Ports
15	Po15(SU)	Eth	LACP	Eth1/2(P) Eth1/3(P)

验证 FXOS 接口状态：

```
<#root>
```

```
FP4110-7-A(fxos)#
```

show interface brief

Ethernet Interface	VLAN	Type	Mode	Status	Reason	Speed	Port Ch #
Eth1/1	1	eth	1qtun1	up	none	1000(D)	--
Eth1/2	1	eth	1qtun1	up	none	1000(D)	15
Eth1/3	1	eth	1qtun1	up	none	1000(D)	15
Eth1/4	1	eth	1qtun1	down	SFP not inserted	10G(D)	--
Eth1/5	1	eth	1qtun1	down	Administratively down	1000(D)	--
Eth1/6	1	eth	1qtun1	down	Administratively down	1000(D)	--
Eth1/7	1	eth	1qtun1	down	Administratively down	10G(D)	--
Eth1/8	1	eth	1qtun1	down	SFP not inserted	10G(D)	--
Eth1/9	1	eth	vntag	up	none	40G(D)	--
Eth1/10	1	eth	access	down	Administratively down	40G(D)	--
Eth1/11	1	eth	access	down	Administratively down	1000(D)	--
Eth1/12	1	eth	access	down	Administratively down	1000(D)	--

检查 2 – 验证 FXOS 是否发送和接收 LACP (多次运行该命令)

<#root>

FP4110-7-A(fxos)#

show lacp counters interface port-channel 15

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

port-channel15								
Ethernet1/2	223019	207280	0	0	0	0	0	
Ethernet1/3	296532	207744	0	0	0	0	0	

验证交换机是否发送和接收 LACP :

<#root>

Switch#

show lacp 5 counters

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 5								
Gi1/0/2	627	596	0	0	0	0	0	
Gi1/0/3	623	593	0	0	0	0	0	

验证单个 FXOS 接口的 LACP 详细信息 :

```
<#root>
```

```
FP4110-7-A(fxos)#
```

```
show lacp interface ethernet 1/2
```

```
Interface Ethernet1/2 is up
  Channel group is 15 port channel is Po15
  PDUs sent: 222828
  PDUs rcvd: 207074
  Markers sent: 0
  Markers rcvd: 0
  Marker response sent: 0
  Marker response rcvd: 0
  Unknown packets rcvd: 0
  Illegal packets rcvd: 0
Lag Id: [ [(8000, 28-6f-7f-ec-59-80, 5, 8000, 103), (8000, 2c-33-11-8e-7-b3, e,
8000, 42)] ]
Operational as aggregated link since Tue Oct 31 19:14:57 2017

Local Port: Eth1/2   MAC Address= 2c-33-11-8e-7-b3
  System Identifier=0x8000,2c-33-11-8e-7-b3
  Port Identifier=0x8000,0x42
  Operational key=14
  LACP_Activity=active
  LACP_Timeout=Short Timeout (1s)
  Synchronization=IN_SYNC
  Collected=true
  Distributing=true
```

检查 3 – 验证本地和远程设备的 LACP ID

```
<#root>
```

```
FP4110-7-A(fxos)#
```

```
show lacp port-channel interface port-channel 15
```

```
port-channel15
  System Mac=2c-33-11-8e-7-b3
  Local System Identifier=0x8000,2c-33-11-8e-7-b3
  Admin key=0xe
  Operational key=0xe
  Partner System Identifier=0x8000,28-6f-7f-ec-59-80
  Operational key=0x5
  Max delay=0
  Aggregate or individual=1
  Member Port List=
```

检查 4 (可选) – 收集此输出 (可供 Cisco TAC 使用)

```
<#root>
```

```
FP4110-7-A(fxos)#
```

```
show lacp internal event-history errors
```

- 1) Event:E_DEBUG, length:74, at 574387 usecs after Tue Oct 31 19:14:57 2017
[102] lacp_proto_set_ntt(1780): Restarting periodic tx timer in 0x210 msecs
- 2) Event:E_DEBUG, length:467, at 544757 usecs after Tue Oct 31 19:14:57 2017
[102] lacp_ac_init_port_channel_member(1660): TYPE1 UPDATE lacp_ac_init_port_channel_member port-channel port-channel15(0x1600000e) lacp_mcec_type1_upd_sent
...

检查 5 – 检查出现问题的特定端口的 LACP FSM 转换。消息由旧到新显示

<#root>

FP4110-7-A(fxos)#

show lacp internal event-history interface ethernet 1/2

>>>>FSM: <Ethernet1/2> has 975 logged transitions<<<<<

- 1) FSM:<Ethernet1/2> Transition at 257150 usecs after Sun Oct 29 12:35:16 2017
Previous state: [LACP_ST_WAIT_FOR_HW_TO_PROGRAM_RECEIVE_PATH]
Triggered event: [LACP_EV_PORT_RECEIVE_PATH_ENABLED_AS_CHANNEL_MEMBER_MESSAGE]
Next state: [LACP_ST_PORT_MEMBER_RECEIVE_ENABLED]

...

- 4) FSM:<Ethernet1/2> Transition at 966987 usecs after Sun Oct 29 12:35:19 2017
Previous state: [LACP_ST_PORT_MEMBER_COLLECTING_AND_DISTRIBUTING_ENABLED]
Triggered event: [LACP_EV_PARTNER_PDU_IN_SYNC] <--- Good (Received LACP with 'Synchronization')
Next state: [LACP_ST_PORT_IS_DOWN_OR_LACP_IS_DISABLED]

...

- 207) FSM:<Ethernet1/4> Transition at 482767 usecs after Sun Oct 29 13:18:40 2017
Previous state: [LACP_ST_ATTACHED_TO_AGGREGATOR]
Triggered event: [LACP_EV_PARTNER_PDU_OUT_OF_SYNC]
Next state: [FSM_ST_NO_CHANGE]

- 208) FSM:<Ethernet1/4> Transition at 363720 usecs after Sun Oct 29 13:18:41 2017
Previous state: [LACP_ST_ATTACHED_TO_AGGREGATOR]
Triggered event: [LACP_EV_PARTNER_PDU_OUT_OF_SYNC] <--- Bad (Received LACP with 'Synchronization')
Next state: [FSM_ST_NO_CHANGE]

检查 6 – 收集端口通道事件历史记录 (可供 Cisco TAC 使用)

<#root>

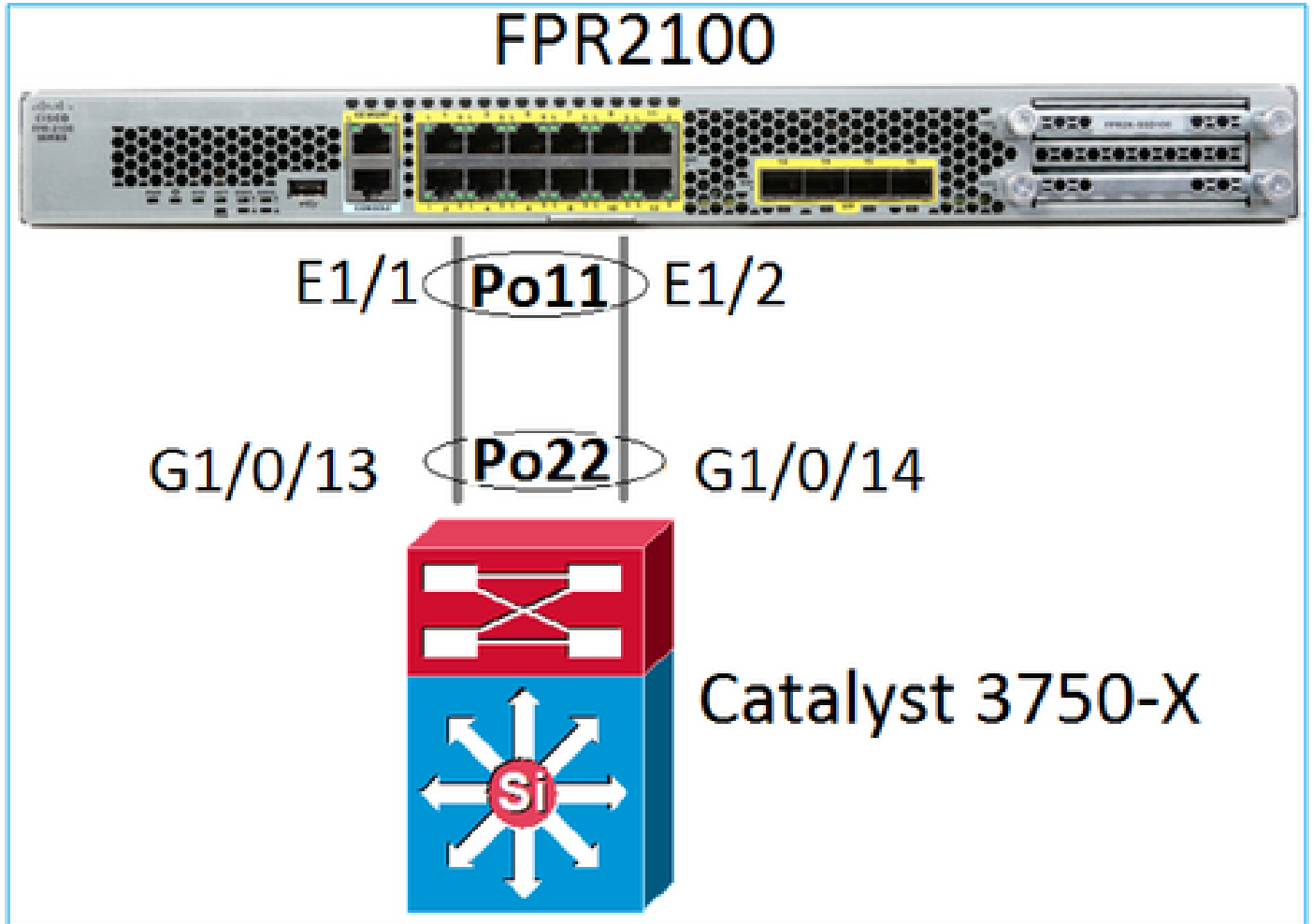
FP4110-7-A(fxos)#

show port-channel internal event-history all

Low Priority Pending queue: len(0), max len(1) [Tue Oct 31 19:37:03 2017] High Priority Pending queue: 1

对 FPR21xx/FPR1xxx 上的端口通道执行故障排除

网络图



选中1。如果使用LACP，请验证LACP计数器

您会发现两端（交换机和FXOS）都在发送和接收LACP：

```
<#root>
```

```
FP2110-2(local-mgmt)#
```

```
show lacp counters
```

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 11								
Eth1/1	4435	3532	0	0	0	0	0	0
Eth1/2	4566	3532	0	0	0	0	0	0

另一种验证方法：

<#root>

FP2110-2(local-mgmt)#

show pktmgr counters

Ports	Tx Packets	Tx Drops	Tx Bytes	Rx Packets	Rx Drops	Rx Bytes	Rx Forwards	
Eth1/1	4575	0	567300	3537	0	452736	3537	< LACP PDUs forwarded inter
Eth1/2	4706	0	583544	3537	0	452736	3537	< LACP PDUs forwarded inter
Eth1/3	0	0	0	0	0	0	0	
Eth1/4	0	0	0	0	0	0	0	
Eth1/5	0	0	0	0	0	0	0	
Eth1/6	0	0	0	0	0	0	0	
Eth1/7	0	0	0	0	0	0	0	
Eth1/8	0	0	0	0	0	0	0	
Eth1/9	0	0	0	0	0	0	0	
Eth1/10	0	0	0	0	0	0	0	
Eth1/11	0	0	0	0	0	0	0	
Eth1/12	0	0	0	0	0	0	0	
Eth1/13	0	0	0	0	0	0	0	
Eth1/14	0	0	0	0	0	0	0	
Eth1/15	0	0	0	0	0	0	0	
Eth1/16	0	0	0	0	0	0	0	
Misc.	0	0	0	0	0	0	n/a	

检查2。检验上游交换机状态

<#root>

FP2110-2(local-mgmt)#

show lacp neighbor

Flags: S - Device is requesting Slow LACPDUs
F - Device is requesting Fast LACPDUs
A - Device is in Active mode P - Device is in Passive mode

Channel group: 11

Partner (internal) information:

Port	Partner System ID	Partner Port Number	Age	Partner Flags
Eth1/1	32768,286f.7fec.5980	0x10e	9 s	FA

LACP Partner Port Priority	Partner Oper Key	Partner Port State
32768	0x16	0x3f

Port State Flags Decode:

Activity: Timeout: Aggregation: Synchronization:

	Active	Long	Yes	Yes
	Collected:	Distributing:	Defaulted:	Expired:
	Yes	Yes	No	No
Port	Partner	Partner	Age	Partner
Eth1/2	System ID	Port Number	24 s	Flags
	32768,286f.7fec.5980	0x10f		FA
	LACP Partner	Partner	Partner	
	Port Priority	Oper Key	Port State	
	32768	0x16	0x3f	
	Port State Flags Decode:			
	Activity:	Timeout:	Aggregation:	Synchronization:
	Active	Long	Yes	Yes
	Collected:	Distributed:	Defaulted:	Expired:
	Yes	Yes	No	No

注意：如果Collected and Distributed不是“Yes”，而Defaulted是“No”，则LACP未收敛。

检查3。检验本地LACP系统ID是否为0

```
<#root>
FP2110-2(local-mgmt)#
show lacp sys-id
32768, 70df.2f18.d813
```

其他故障排除（所有平台通用）

检查 1

确保两端（防火墙和交换机）具有匹配的设置（例如，速度相同，端口通道模式相同）。

检查 2

检查 FXOS 是否发生故障。您可以从机箱用户界面(UI)或使用以下命令的CLI执行此检查：

```
<#root>
FPR4100#
```


show fault

Severity	Code	Last Transition Time	ID	Description
Major	F0479	2020-03-19T11:50:44.322	543322	Virtual interface 781 link state is down
Major	F0373	2020-03-19T10:55:13.778	34178	Fan 1 in Fan Module 1-5 under chassis 1 operability
Minor	F0480	2020-03-19T10:55:13.777	34177	Fan module 1-5 in chassis 1 operability: degraded
Major	F1767	2020-03-19T10:54:04.162	531228	The password encryption key has not been set.
Major	F0727	2020-03-19T09:50:02.891	522921	lan Member 1/5 of Port-Channel 10 on fabric interconnect A oper state
Major	F0282	2020-03-19T09:49:31.462	522922	lan port-channel 10 on fabric interconnect A oper state
Major	F0277	2020-03-19T09:49:31.437	522929	ether port 1/5 on fabric interconnect A oper state
Info	F0279	2020-01-17T11:06:45.472	300958	ether port 1/7 on fabric interconnect A oper state
Info	F0279	2020-01-17T11:06:37.941	300903	ether port 1/6 on fabric interconnect A oper state
Minor	F1437	2020-01-16T10:11:39.675	291723	Config backup may be outdated

故障按时间顺序显示。严重程度反映故障的重要性，说明中会提供简要概述。请重点关注严重程度、时间戳和说明。故障严重程度由高到低依次为：

- 关键
- 重大
- Minor (轻微)
- 警告
- 信息/条件
- 已清除

有关每个故障的详细信息，请查看FXOS故障和错误消息指南：[FXOS错误和系统消息](#)

The screenshot shows a web page with the following content:

- Navigation path: Support / Product Support / Security / Cisco Firepower 9300 Series /
- Section title: Error and System Messages
- Filter: View Documents by Topic [Choose a Topic]
- Section title: Cisco Firepower 9300 FXOS Faults and Error Messages
- List of documents:
 - Cisco Firepower 4100/9300 FXOS Faults and Error Messages, 2.7(1) 25/Sep/2019
 - Cisco Firepower 4100/9300 FXOS Faults and Error Messages, 2.6(1) 13/Mar/2019
 - Cisco Firepower 4100/9300 FXOS Faults and Error Messages, 2.4(1) 25/Oct/2018
 - Cisco FXOS Faults and Error Messages, 2.3(1) 29/Nov/2017
 - Cisco FXOS Faults and Error Messages, 2.2(2) 28/Aug/2017

检查 3

如果最近对 FMC 上的端口通道配置进行了一些更改，请确保该策略已从 FMC 部署到 FTD

检查 4

如果端口通道处于故障状态且设备属于集群，请确保已在设备上启用该集群。对于被逐出集群的设备而言，其端口通道处于故障状态非常正常

检查 5

如果配置正确，但接口未启动，请检查并更换电缆和/或小型封装热插拔 (SFP) 收发器

检查 6

有关与端口通道相关的已知问题，请查看 Firepower 版本说明。例如，如果运行 FXOS 2.6.1.169 和 FTD 6.4.0.6 版本，请查看以下部分：

Cisco Firepower 4100/9300 FXOS Release Notes, 2.6(1)

Contents

[Cisco Firepower 4100/9300 FXOS Release Notes, 2.6\(1\)](#)

[Introduction](#)

[What's New](#)

[Software Download](#)

[Important Notes](#)

[Adapter Bootloader Upgrade](#)

[System Requirements](#)

[Upgrade Instructions](#)

[Open and Resolved Bugs](#)

[Open Bugs](#)

[Resolved Bugs in FXOS 2.6.1.192](#)

[Resolved Bugs in FXOS 2.6.1.187](#)

[Resolved Bugs in FXOS 2.6.1.174](#)

[Resolved Bugs in FXOS 2.6.1.169](#)

[Resolved Bugs in FXOS 2.6.1.166](#)

[Resolved Bugs in FXOS 2.6.1.157](#)

[Resolved Bugs in FXOS 2.6.1.131](#)

此外，请查看相关的 FMC/FTD 版本说明。在本例中，FTD 运行 6.4.0.5，因此需要查看 6.4.x 版本

说明：

Home / ... / Cisco Firepower Management Center / Release Notes /

Cisco Firepower Release Notes, Version 6.4.0.1, 6.4.0.2, 6.4.0.3, 6.4.0.4, 6.4.0.5, 6.4.0.7, and 6.4.0.8

Book Contents Download Print

Chapter: Resolved Issues

Updated: February 26, 2020

> Chapter Contents

Bugs listed for a patch were verified as resolved when that patch was initially released.

Note For your convenience, this document provides lists of resolved bugs for each patch. These lists are auto-generated once and are not subsequently updated. Depending on how and when a particular resolved issue was categorized or updated in our system, it may not appear in the release notes. You should regard the Cisco Bug Search Tool as the 'source of truth.'

- Searching for Resolved Issues
- Resolved Issues in New Builds
- **Version 6.4.0.8 Resolved Issues**
- Version 6.4.0.7 Resolved Issues
- Version 6.4.0.6 Resolved Issues
- Version 6.4.0.5 Resolved Issues

Was this Document Helpful?

Feedback

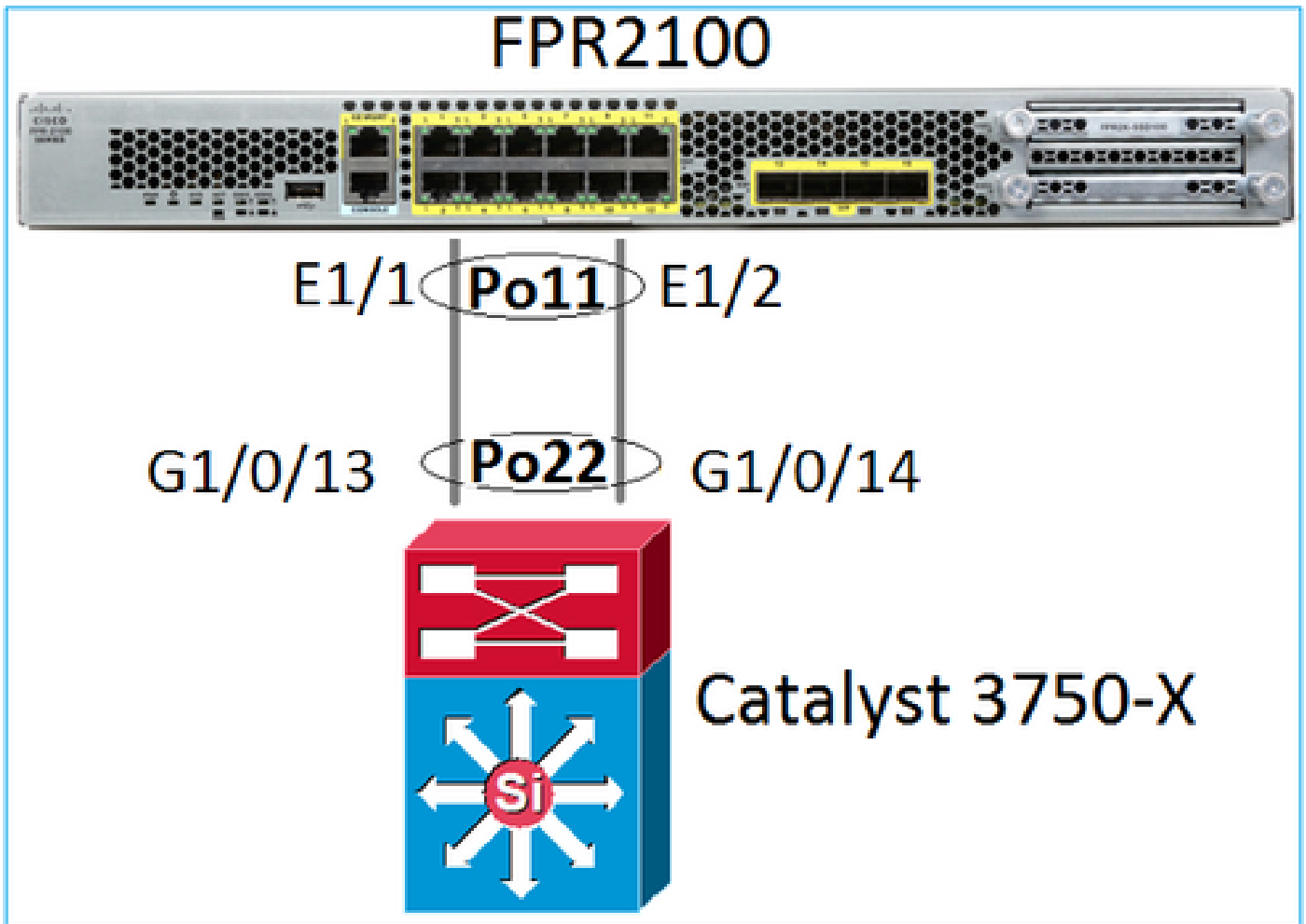
Viewers of This Document Also Viewed

- Upgrade to Version 6.4.0.x
- Known Issues
- Available Hotfixes

常见问题

例 1.EtherChannel模式不匹配

请思考以下拓扑：



问题症状

Firepower 上端口通道关闭，协商协议为 LACP：

```
<#root>
```

```
FP2110-2(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-Channel	Type	Protocol	Member Ports
11	Po11(D)	Eth	LACP	Eth1/1(D) Eth1/2(D)

在FXOS上，LACP发送计数器每30秒递增，但接收计数器不是：

```
<#root>
```

```
FP2110-2(local-mgmt)#
```

```
show lacp counters
```

```
-----  
Port          LACPDU     Marker     Marker  Response  LACPDU  
              Sent   Recv     Sent   Recv     Sent   Recv     Pkts Err  
-----  
Channel group: 11  
Eth1/1       11356  3762      0      0         0      0         0  
Eth1/2       11393  3761      0      0         0      0         0  
FP2110-2(local-mgmt)#
```

```
show lacp counters
```

```
-----  
Port          LACPDU     Marker     Marker  Response  LACPDU  
              Sent   Recv     Sent   Recv     Sent   Recv     Pkts Err  
-----  
Channel group: 11  
Eth1/1       11357  3762      0      0         0      0         0  
Eth1/2       11394  3761      0      0         0      0         0
```

根本原因

交换机上的端口通道已启用，但缺少协商协议：

```
<#root>
```

```
Switch#
```

```
show etherchannel 22 summary
```

```
...  
Number of channel-groups in use: 15  
Number of aggregators:          15
```

```
Group Port-channel Protocol Ports  
-----+-----+-----+-----  
22    Po22(SU)         -      Gi1/0/13(P) Gi1/0/14(P)
```

交换机端口配置证实了这一点：

```
<#root>
```

```
Switch#
```

```
show run int g1/0/13
```

```
interface GigabitEthernet1/0/13  
  lacp rate fast  
  channel-group 22 mode on  
end
```

```
Switch#
```

```
show run int g1/0/14
```

```
interface GigabitEthernet1/0/14
 lacp rate fast
 channel-group 22 mode on
end
```

解决方案

对 FPR21xx 设备而言，存在两种可能的解决方案：

1. 将交换机端的端口通道模式从“开启”更改为“LACP”（“主动”或“被动”均可）。
2. 将 FTD 端的端口通道模式从“LACP”更改为“开启”。

在这种情况下，我们选择了第二种解决方案（将 FTD 端口通道模式设置为“开启”）：

<#root>

```
FP2110-2(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
-----
11   Po11(U)    Eth       ON        Eth1/1(P)  Eth1/2(P)
```

LACP 计数器不再显示：

<#root>

```
FP2110-2(local-mgmt)#
```

```
show lacp counters
```

```
FP2110-2(local-mgmt)#
```

案例 2. 错误的端口通道设计

问题症状

<#root>

```
FP4110-7-A(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-Channel	Type	Protocol	Member Ports
15	Po15(SD)	Eth	LACP	Eth1/2(P) Eth1/3(s)
48	Po48(SD)	Eth	NONE	--

FXOS LACP 计数器双向增加：

<#root>

FP4110-7-A(fxos)#

show lacp counters

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err
port-channel15								
Ethernet1/2	419219	451268	0	0	0	0	0	0
Ethernet1/3	419215	446806	0	0	0	0	0	0

FP4110-7-A(fxos)# show lacp counters

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err
port-channel15								
Ethernet1/2	419219	451269	0	0	0	0	0	0
Ethernet1/3	419216	446807	0	0	0	0	0	0

根本原因

show lacp neighbor 的输出结果表明各端口的合作伙伴系统 ID 不同：

<#root>

FP4110-7-A(fxos)#

show lacp neighbor

Flags: S - Device is sending Slow LACPDU F - Device is sending Fast LACPDU
A - Device is in Active mode P - Device is in Passive mode

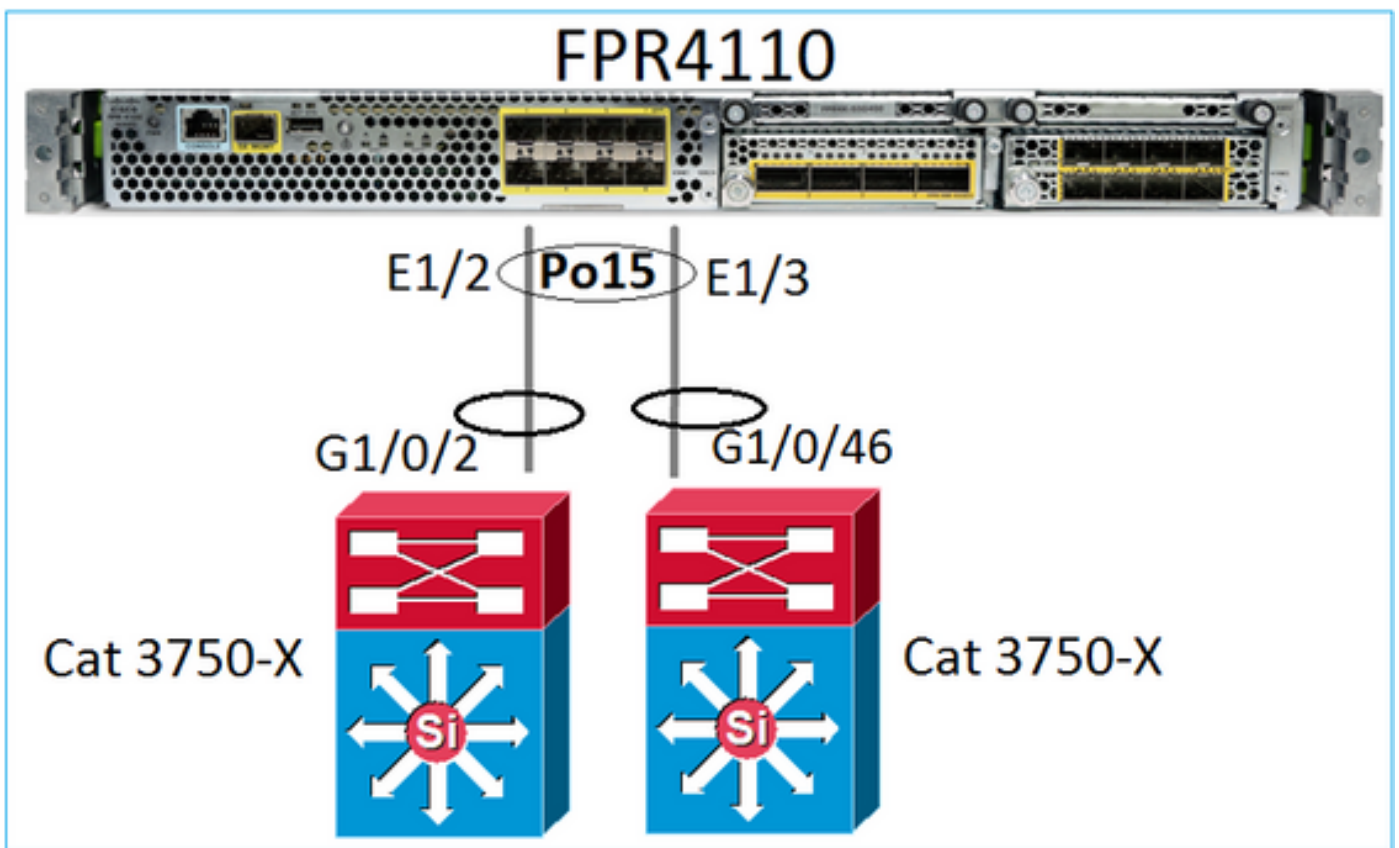
port-channel15 neighbors

Partner's information

Port	Partner System ID	Partner Port Number	Age	Partner Flags
Eth1/2	32768,28-6f-7f-ec-59-800x103		419611	FA

LACP Partner	Partner	Partner	Partner
Port Priority	Oper Key	Oper Key	Port State
32768	0x5	0x5	0x3d
Partner's information			
Port	Partner	Partner	Partner
Eth1/3	System ID	Port Number	Age
	32768,4-62-73-d2-65-0	0x12f	419610
	Flags		SA
	SA		
LACP Partner	Partner	Partner	Partner
Port Priority	Oper Key	Oper Key	Port State
32768	0x16	0x16	0xd

上述内容可以图形表示为：

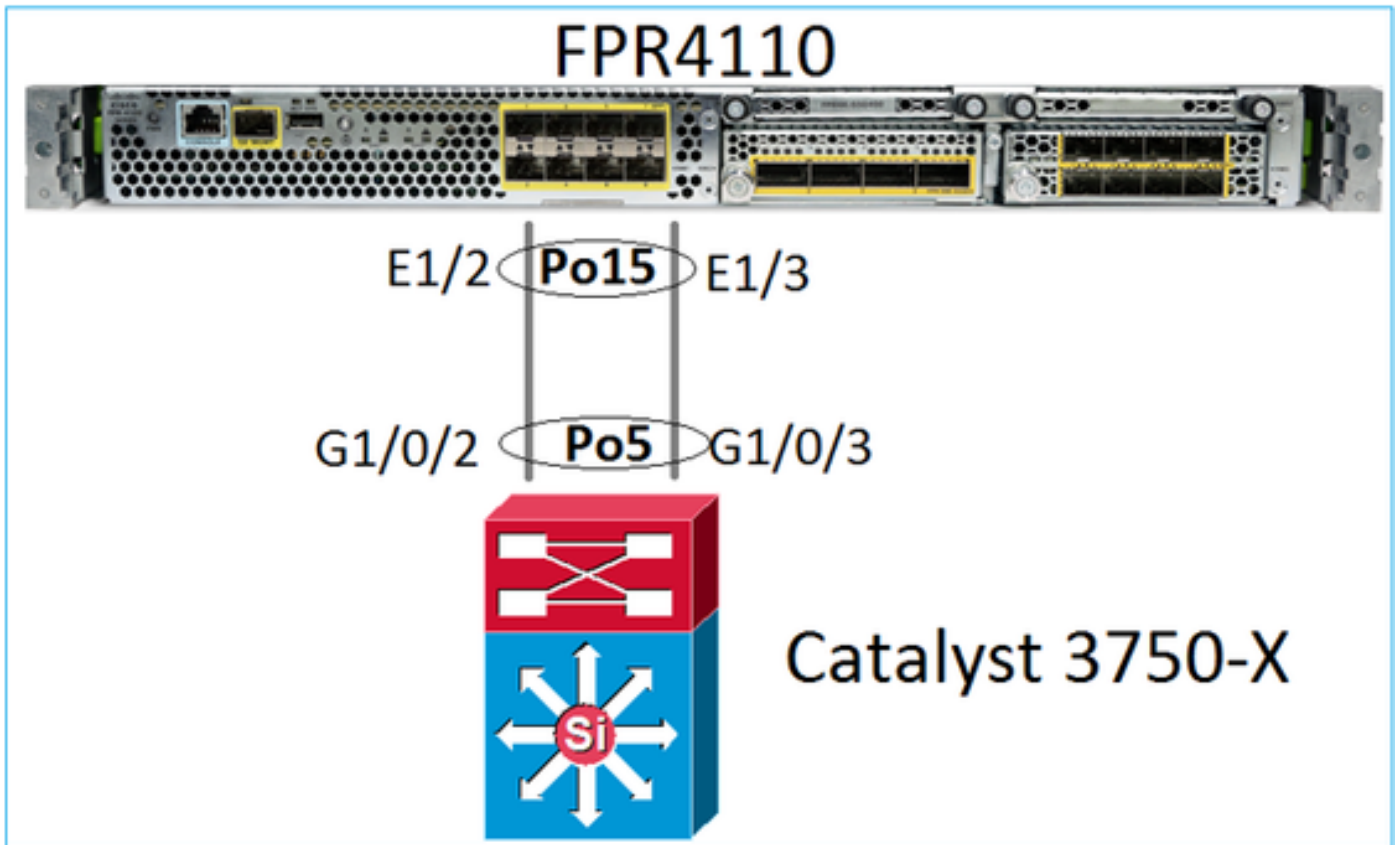


解决方案

- 对于 2960，需要配置堆栈 (FlexStack)。
- 对于 3750-X/3850 等，需要配置堆栈 (StackWise Plus)。
- 对于 4500、6500、6800，需要使用虚拟交换系统 (VSS)。
- 对于 Nexus 5K、7K 或 9K，您需要使用虚拟端口通道 (vPC)。
- 在其他情况下，需要将 FXOS 连接到同一物理交换机。

案例 3. 未分配 FXOS 端口通道

网络图



问题症状

在 FXOS 端，端口通道成员处于挂起状态：

<#root>

FP4110-7-A(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-Channel	Type	Protocol	Member Ports
15	Po15(SD)	Eth	LACP	Eth1/2(s) Eth1/3(s)
48	Po48(SD)	Eth	NONE	--

在交换机端也是如此：

<#root>

Switch#

```
show etherchannel 5 summary
```

```
...
Group Port-channel Protocol Ports
-----+-----+-----+-----
5 Po5(SD) LACP Gi1/0/2(s) Gi1/0/3(s)
```

FXOS LACP计数器显示发送和接收的数据包：

```
<#root>
```

```
FP4110-7-A(fxos)#
```

```
show lacp counters
```

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

port-channel15								
Ethernet1/2	420839	452531	0	0	0	0	0	
Ethernet1/3	420793	447409	0	0	0	0	0	

```
FP4110-7-A(fxos)#
```

```
show lacp counters
```

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

port-channel15								
Ethernet1/2	421026	452537	0	0	0	0	0	
Ethernet1/3	420981	447416	0	0	0	0	0	

在交换机端，LACP计数器还会显示已发送但未接收的数据包：

```
<#root>
```

```
Switch#
```

```
show lacp 5 counters
```

Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 5								
Gi1/0/2	452539	420223	0	0	0	0	0	
Gi1/0/3	447232	415274	0	0	0	0	0	

```
Switch#
```

```
show lacp 5 counters
```

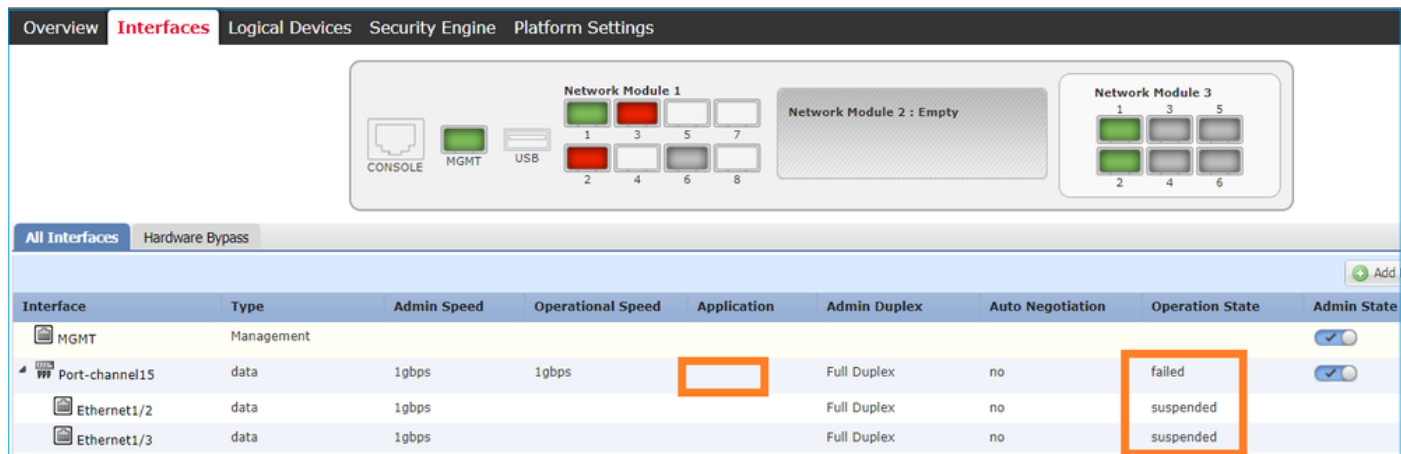
Port	LACPDUs		Marker		Marker Response		LACPDUs	
	Sent	Recv	Sent	Recv	Sent	Recv	Pkts	Err

Channel group: 5								
Gi1/0/2	452540	420223	0	0	0	0	0	

Gi1/0/3 447233 415274 0 0 0 0 0

根本原因

在本例中，问题在于 FXOS 端口通道未分配给逻辑设备（FTD 应用）：

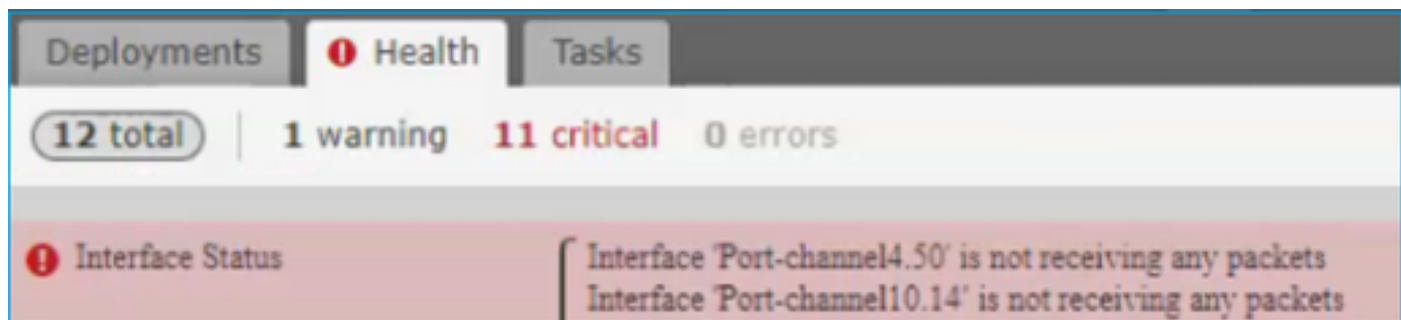


解决方案

将端口通道分配给逻辑设备

案例 4.有关Port-Channel的运行状况警报未接收任何数据包

设备 (FTD) 每 5 分钟发送一次各接口（已配置名称并处于运行状态）收到的接口流量信息。如果在上一时间间隔中未收到数据包，则 FMC UI 中会显示如下消息：



建议操作

从FTD CLI检查show traffic输出并重点关注5分钟的输入速率，例如，

```
Interface Port-channel10.14
INSIDE:
    received (in 237938.740 secs):
        2 packets      84 bytes
        0 pkts/sec     0 bytes/sec
    transmitted (in 237938.740 secs):
        5 packets     140 bytes
        0 pkts/sec     0 bytes/sec
1 minute input rate 0 pkts/sec, 0 bytes/sec
```

```
1 minute output rate 0 pkts/sec, 0 bytes/sec
1 minute drop rate, 0 pkts/sec
5 minute input rate 0 pkts/sec, 0 bytes/sec
5 minute output rate 0 pkts/sec, 0 bytes/sec
5 minute drop rate, 0 pkts/sec
```

案例 5.FMC上的运行状况警报：已取消关联端口通道或已添加接口

运行状况警报状态：“Interface with physical-name: "Port-Channel" disassociated.”或“Interface with physical-name: \"name_if\"已添加。”

建议操作

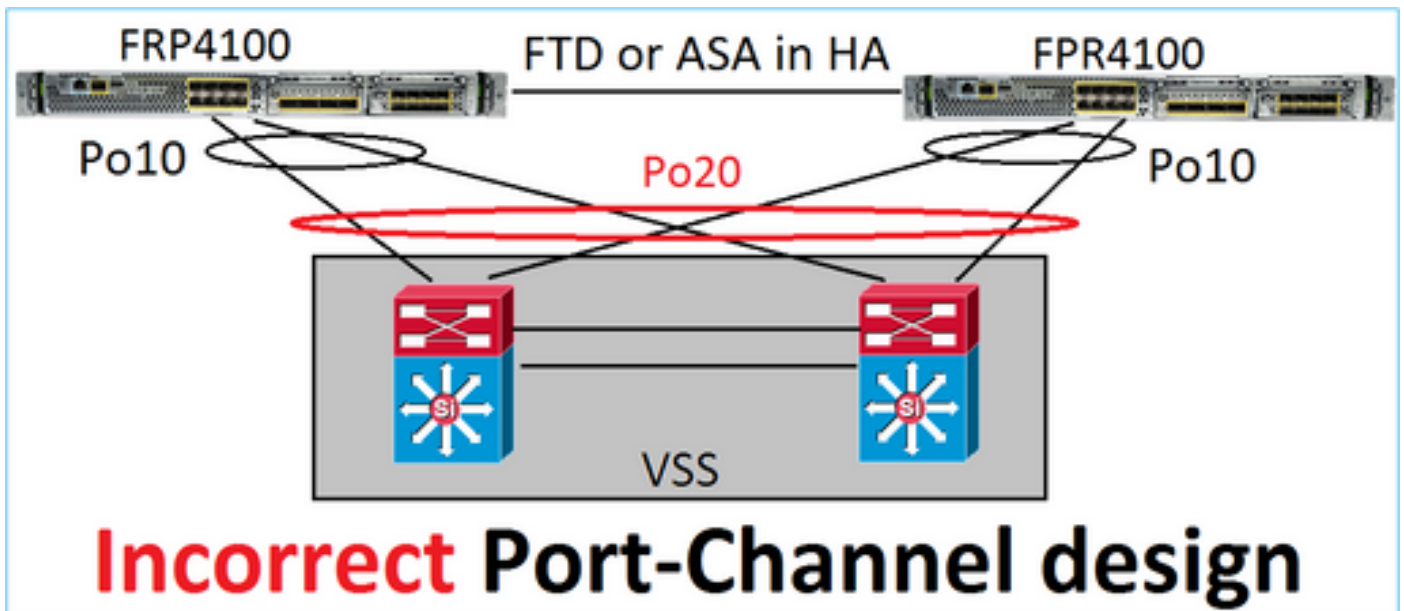
[Cisco Bug ID CSCvb](#)跟踪此已知的外观问题15074

端口通道注意事项

设计注意事项

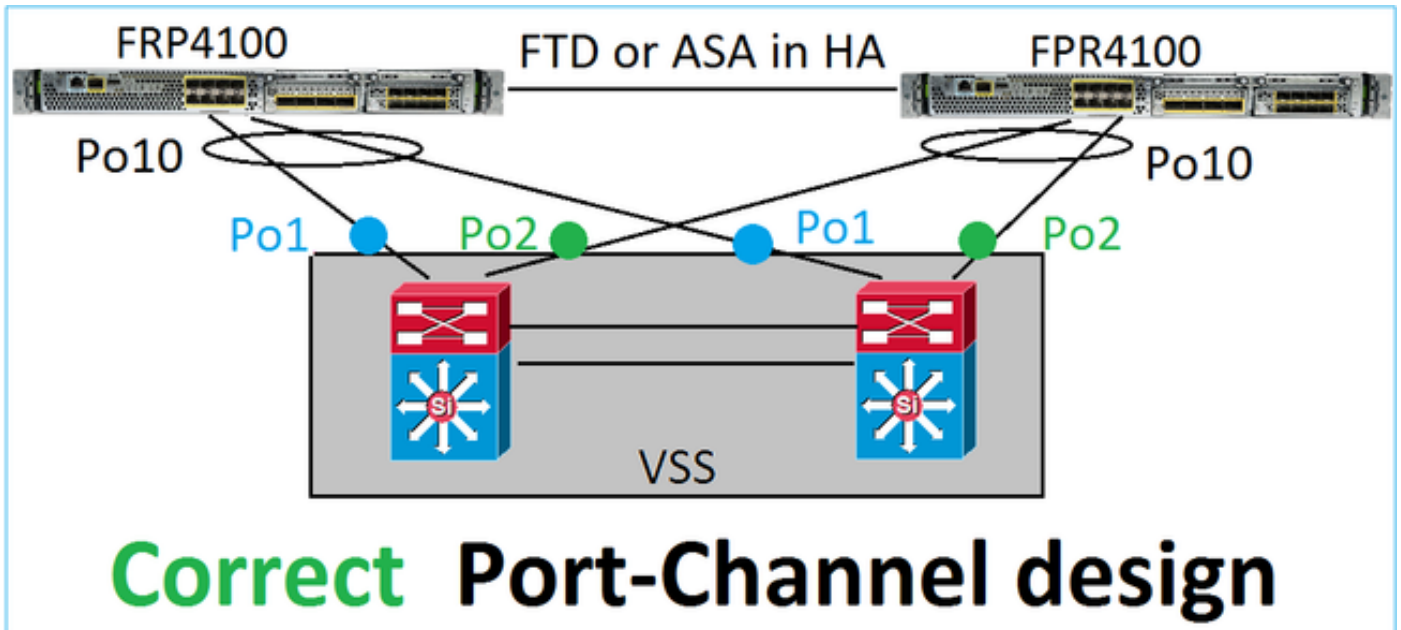
例 1.高可用性中的FTD/ASA刀片

此设置不受支持。原因是交换机端的端口通道配置不正确，导致备用设备上的流量阻塞。仅在“集群跨网络”模式下配置 ASA 或 FTD 时，才支持此设计。



警告：此场景在故障切换中不正确（高可用性）

适合高可用性的端口通道设计如下：



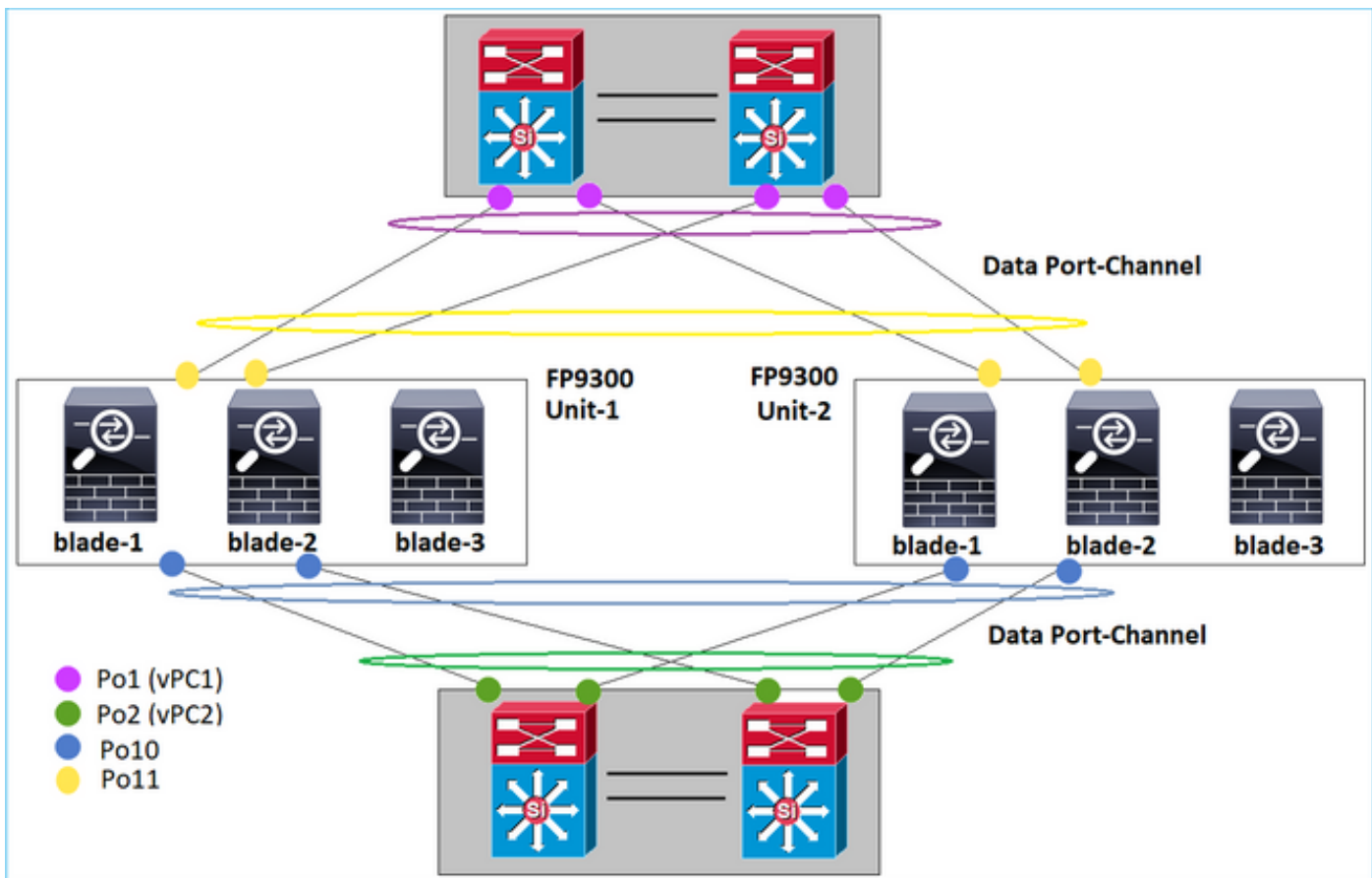
参考

- [连接到其他设备上的 EtherChannel](#)
- [机箱间集群的 EtherChannel](#)

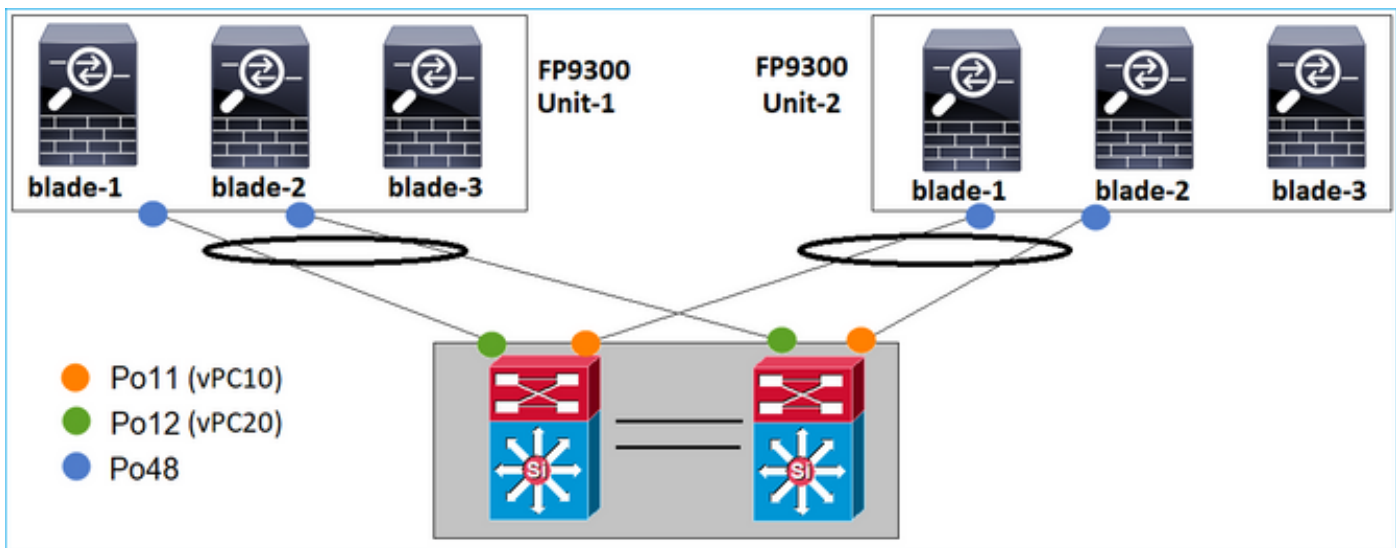
案例 2. 集群中的 FTD/ASA

每个防火墙数据接口端口通道均使用“跨网络”模式（Firepower 平台支持的唯一模式）。从设计角度来看，在交换机端，单个数据接口的交换机端口属于一个端口通道。

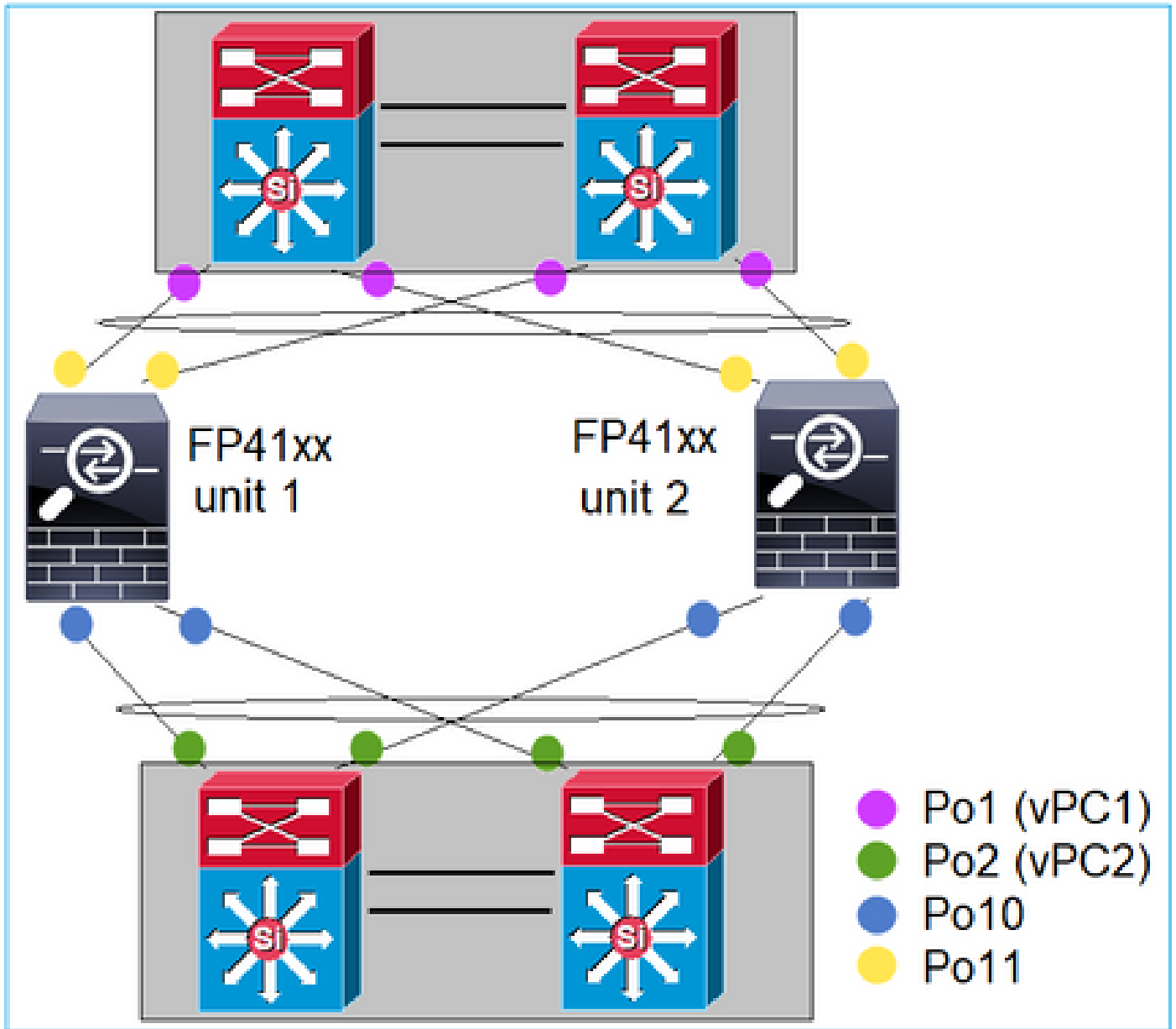
例如，对于 FP9300（2 个机箱、6 个刀片），数据端口可按如下方式配置：



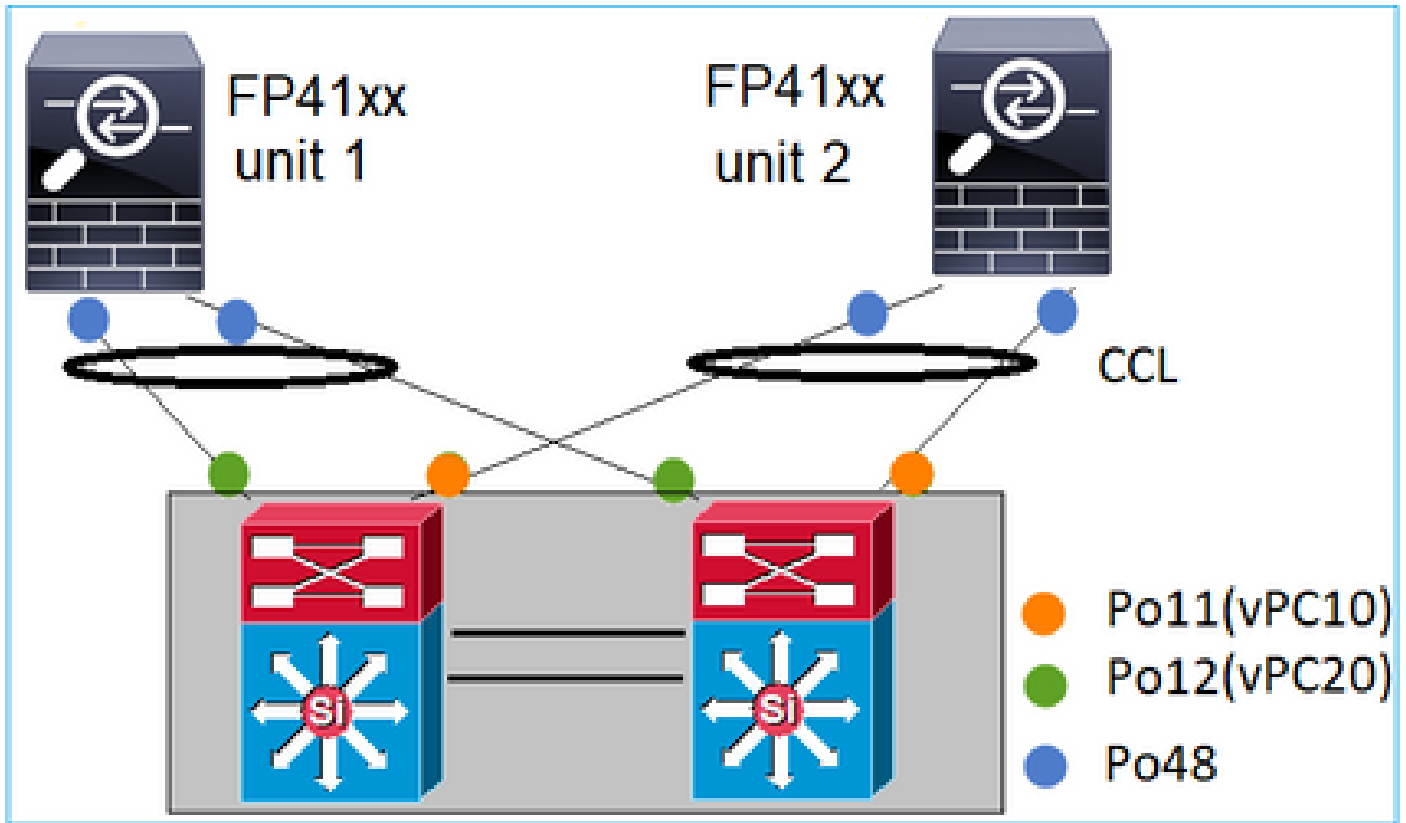
另一方面，集群控制链路(CCL)使用单个端口通道模式，根据最佳实践，带宽必须匹配每个成员的最大容量。此外，对于 Nexus，每个端口通道都属于不同的 vPC。



同样，对于 FP41xx：

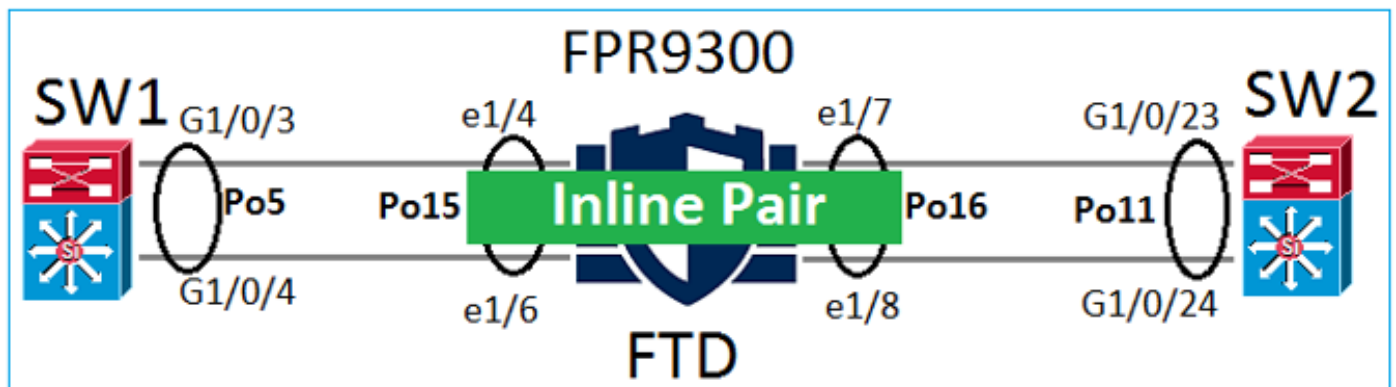


CCL :



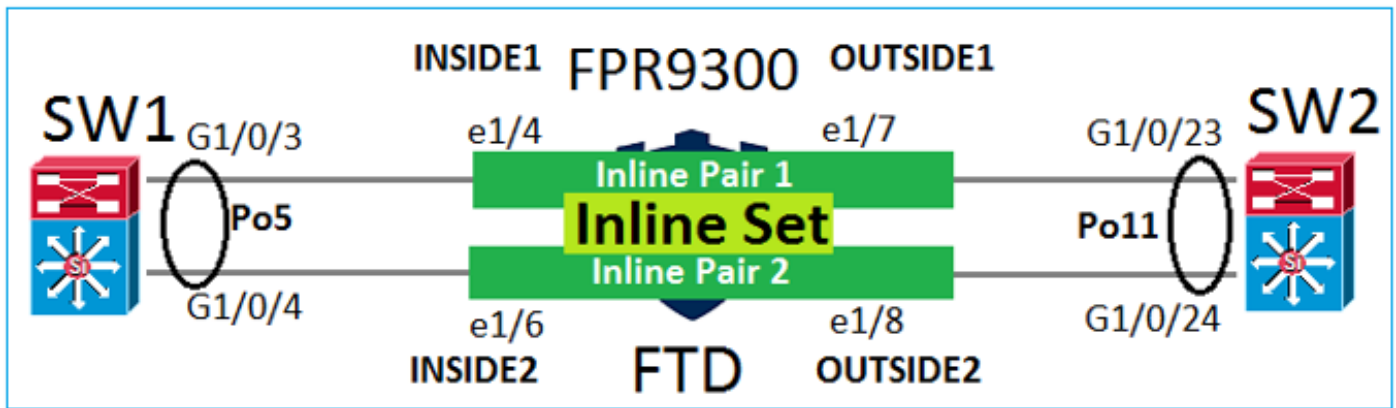
案例 3. Port-Channel在FXOS上终止

端口通道在 FXOS 机箱上端接。此设计的示例如下：



案例 4. 通过FXOS的端口通道

端口通道通过FXOS机箱。此设计的示例如下：



注意：在第二个场景中，Firepower设备上未配置端口通道。

“端口通道在 FXOS 上端接”与“端口通道穿过 FXOS”的区别

功能	备注
端口通道在 FXOS 机箱上端接 (MIO)	适用于 FXOS 2.1.1 及以上版本
端口通道通过FXOS机箱 (MIO)	<ul style="list-style-type: none"> • 适用于 FXOS 2.1.1.58 以下版本 • 在FXOS \geq 2.1.1.58和$<$ 2.3.1.3上不起作用 (由于Cisco Bug ID CSCva00405) • 适用于 FXOS 2.3.1.3 以上版本

其他注意事项

LACP 平稳收敛

在集群设置 (ASA 或 FTD) 中，建议在 Nexus 上启用“LACP 平稳收敛”。

常见问题解答 (FAQ)

问：SSP端口通道散列分配是固定还是自适应？

FXOS 使用弹性散列分布。这大概相当于 Nexus 7000/9000 在线文档中介绍的固定散列分布模式。在弹性散列中，如果链路发生故障，分配给故障链路的流将在活动链路之间均匀地重新分配。流经活动链路的当前流不会重新进行散列处理，其数据包的传输也不会顺序混乱。将链路添加到port-channel或ECMP组时，散列到当前链路的部分流会重新散列到新链路，但不会跨所有当前链路。

案例 3.通过FTD的端口通道 — FTD接口部署为网桥组模式：

```
interface Ethernet1/2
  bridge-group 1
  nameif INSIDE
  cts manual
  propagate sgt preserve-untag
  policy static sgt disabled trusted
  security-level 0
!
interface Ethernet1/3
  bridge-group 1
  nameif OUTSIDE
  cts manual
  propagate sgt preserve-untag
  policy static sgt disabled trusted
  security-level 0
!
interface BVI1
  ip address 192.168.201.134 255.255.255.0

firepower# capture CAP interface INSIDE ethernet-type 34825
firepower# show capture CAP

1 packet captured

   1: 21:21:29.731987          2894.0f57.271c 0180.c200.0002 0x8809 Length: 124 <-- LACP packet

          0101 0114 8000 0017 dfd6 ec00 0015 8000
          0222 7d00 0000 0214 0000 0000 0000 0000
          0000 0000 0000 0000 0000 0310 8000 0000
          0000 0000 0000 0000 0000 0000 0000 0000
          0000 0000 0000 0000 0000 0000 0000 0000
          0000 0000 0000 0000 0000 0000 0000 0000
          0000 0000 0000 0000 0000 0000 0000

1 packet shown
```

问：如何从单个端口迁移到Port-Channel?

此变更需要维护窗口 (MW)，且具有侵入性。从单个接口迁移到端口通道后，所有与该单个接口相关的配置都会与之取消关联。创建端口通道后，需要将相同配置重新与新配置的端口通道关联，例如NAT、路由、VPN等。对于 FTD，相关说明详见文档：

[配置 EtherChannel](#)

对于 ASA 设备，相关流程详见文档：

[将使用中的接口转换为冗余或 EtherChannel 接口](#)

问：如何将FTD高可用性(HA)链路更改为Port-Channel?

此变更需要维护窗口 (MW)，且具有侵入性。必须中断 HA 并进行重新配置。在新的 HA 对中，请

将端口通道指定为 HA 链路。相关文档：
[在 Firepower 设备上配置 FTD 高可用性](#)

问：Firepower与ASA一起显示端口通道打开、物理接口状态关闭

这与[Cisco Bug ID CSCvp03354](#)相关

问：为FMC上的端口通道ID选择什么重要吗？ 是否必须与交换机端的内容相匹配？

不，这并不重要。可以随心所欲使用任何端口通道 ID。

问：在端口通道高级选项卡下，是否需要为主用/备用MAC执行任何操作？

如果计划在接入模式（无中继）下使用端口通道并使用高可用性 (HA) 设置，强烈建议配置主用/备用 MAC。此建议并不针对某种端口通道，但适用于任何 HA 设置。

问：能否配置Port-Channel的接口成员的说明？

目前(FXOS 2.13.x)，不支持此功能。有关更多详细信息，请查看最新 FXOS 配置指南。

问：能否更改FXOS端口通道负载均衡算法？

目前(FXOS 2.13.x)，不支持此功能。有关更多详细信息，请查看最新 FXOS 配置指南。

问：是否可以配置端口通道中成员接口的最小数量（最小链路），以便将端口通道转换为捆绑状态？

目前(FXOS 2.13.x)，不支持此功能。有关更多详细信息，请查看最新 FXOS 配置指南。

相关信息

- [FXOS 配置指南](#)
- [FMC/FTD 配置指南](#)

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