



Interface Management

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About Firepower Interfaces

The Firepower 4100/9300 chassis supports physical interfaces, VLAN subinterfaces for container instances, and EtherChannel (port-channel) interfaces. EtherChannel interfaces can include up to 16 member interfaces of the same type.

Chassis Management Interface

The chassis management interface is used for management of the FXOS Chassis by SSH or Firepower Chassis Manager. This interface appears at the top of the **Interfaces** tab as **MGMT**, and you can only enable or disable this interface on the **Interfaces** tab. This interface is separate from the mgmt-type interface that you assign to the logical devices for application management.

To configure parameters for this interface, you must configure them from the CLI. See also [Changing the Management IP Address](#). To view information about this interface in the FXOS CLI, connect to local management and show the management port:

```
Firepower # connect local-mgmt
```

```
Firepower(local-mgmt) # show mgmt-port
```

Note that the chassis management interface remains up even if the physical cable or SFP module are unplugged, or if the **mgmt-port shut** command is performed.

Interface Types

Each interface can be one of the following types:

- **Data**—Use for regular data. Data interfaces cannot be shared between logical devices. Data interfaces cannot be shared between logical devices, and logical devices cannot communicate over the backplane

to other logical devices. For traffic on Data interfaces, all traffic must exit the chassis on one interface and return on another interface to reach another logical device.

- **Data-sharing**—Use for regular data. Only supported with container instances, these data interfaces can be shared by one or more logical devices/container instances (FTD only). Each container instance can communicate over the backplane with all other instances that share this interface. Shared interfaces can affect the number of container instances you can deploy; see [Shared Interface Scalability, on page 3](#). Shared interfaces are not supported for bridge group member interfaces (in transparent mode or routed mode), inline sets, passive interfaces, or failover links.
- **Mgmt**—Use to manage application instances. These interfaces can be shared by one or more logical devices to access external hosts; logical devices cannot communicate over this interface with other logical devices that share the interface. You can only assign one management interface per logical device.
- **Firepower-eventing**—Use as a secondary management interface for FTD devices. To use this interface, you must configure its IP address and other parameters at the FTD CLI. For example, you can separate management traffic from events (such as web events). See the "Management Interfaces" section in the Firepower Management Center configuration guide *System Configuration* chapter. Firepower-eventing interfaces can be shared by one or more logical devices to access external hosts; logical devices cannot communicate over this interface with other logical devices that share the interface.
- **Cluster**—Use as the cluster control link for a clustered logical device. By default, the cluster control link is automatically created on Port-channel 48. This type is only supported on EtherChannel interfaces.

Independent Interface States in the Chassis and in the Application

You can administratively enable and disable interfaces in both the chassis and in the application. For an interface to be operational, the interface must be enabled in both operating systems. Because the interface state is controlled independently, you may have a mismatch between the chassis and application.

The default state of an interface within the application depends on the type of interface. For example, the physical interface or EtherChannel is disabled by default within the application, but a subinterface is enabled by default.

Hardware Bypass Pairs

For the FTD, certain interface modules on the Firepower 9300 and 4100 series let you enable the Hardware Bypass feature. Hardware Bypass ensures that traffic continues to flow between an inline interface pair during a power outage. This feature can be used to maintain network connectivity in the case of software or hardware failures.

The Hardware Bypass feature is configured within the FTD application. You do not need to use these interfaces as Hardware Bypass pairs; they can be used as regular interfaces for both the ASA and the FTD applications. Note that Hardware Bypass-capable interfaces cannot be configured for breakout ports. If you want to use the Hardware Bypass feature, do not configure the ports as EtherChannels; otherwise, you can include these interfaces as EtherChannel members in regular interface mode.

When Hardware Bypass is enabled on an inline pair, switch bypass is attempted first. If the bypass configuration fails due a switch error, physical bypass is enabled.

The FTD supports Hardware Bypass for interface pairs on specific network modules on the following models:

- Firepower 9300

- Firepower 4100 series

The supported Hardware Bypass network modules for these models include:

- Firepower 6-port 1G SX FTW Network Module single-wide (FPR-NM-6X1SX-F)
- Firepower 6-port 10G SR FTW Network Module single-wide (FPR-NM-6X10SR-F)
- Firepower 6-port 10G LR FTW Network Module single-wide (FPR-NM-6X10LR-F)
- Firepower 2-port 40G SR FTW Network Module single-wide (FPR-NM-2X40G-F)
- Firepower 8-port 1G Copper FTW Network Module single-wide (FPR-NM-8X1G-F)

Hardware Bypass can only use the following port pairs:

- 1 & 2
- 3 & 4
- 5 & 6
- 7 & 8

Jumbo Frame Support

The Firepower 4100/9300 chassis has support for jumbo frames enabled by default. To enable jumbo frame support on a specific logical device installed on the Firepower 4100/9300 chassis, you will need to configure the appropriate MTU settings for the interfaces on the logical device.

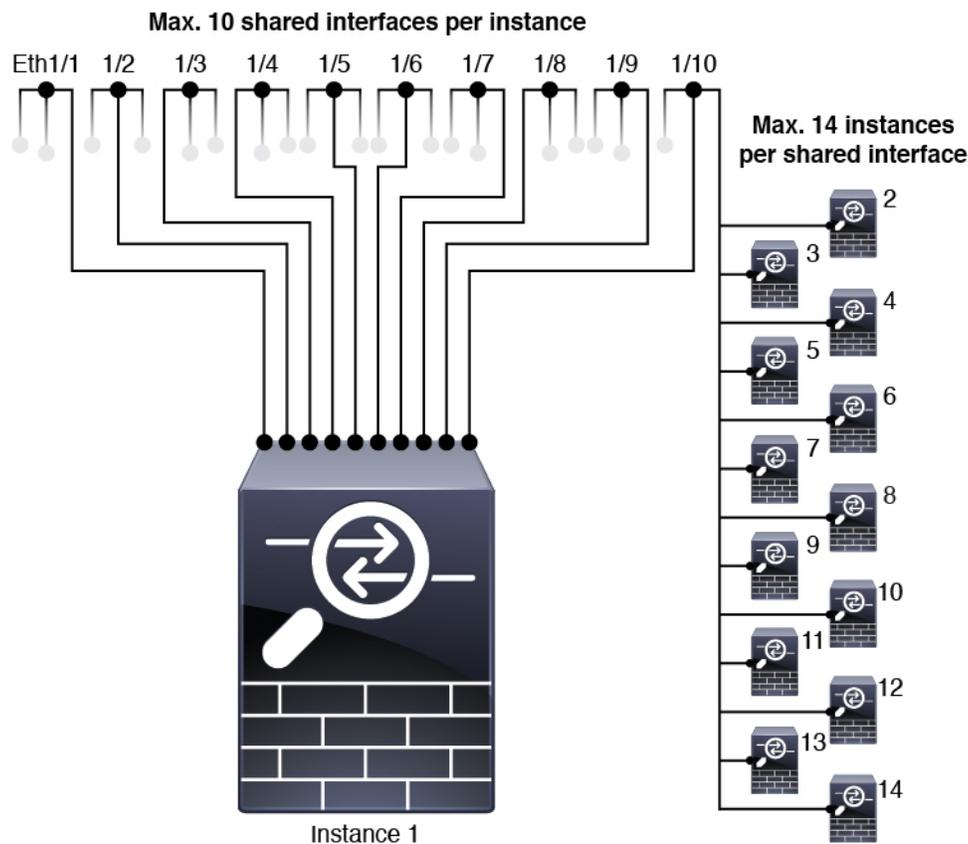
The maximum MTU that is supported for the application on the Firepower 4100/9300 chassis is 9184.

Shared Interface Scalability

Container instances can share data-sharing type interfaces. This capability lets you conserve physical interface usage as well as support flexible networking deployments. When you share an interface, the chassis uses unique MAC addresses to forward traffic to the correct instance. However, shared interfaces can cause the forwarding table to grow large due to the need for a full mesh topology within the chassis (every instance must be able to communicate with every other instance that is sharing the same interface). Therefore, there are limits to how many interfaces you can share.

In addition to the forwarding table, the chassis maintains a VLAN group table for VLAN subinterface forwarding. Depending on the number of parent interfaces and other deployment decisions, you can create up to 500 VLAN subinterfaces.

See the following limits for shared interface allocation:



Shared Interface Best Practices

For optimal scalability of the forwarding table, share as few interfaces as possible. Instead, you can create up to 500 VLAN subinterfaces on one or more physical interfaces, and then divide the VLANs among the container instances.

When sharing interfaces, follow these practices in the order of most scalable to least scalable:

1. **Best**—Share subinterfaces under a single parent, and use the same set of subinterfaces with the same group of logical devices.

For example, create a large EtherChannel to bundle all of your like-kind interfaces together, and then share subinterfaces of that EtherChannel: Port-Channel1.100, 200, and 300 instead of Port-Channel1, Port-Channel2, and Port-Channel3. When you share subinterfaces from a single parent, the VLAN group table provides better scaling of the forwarding table than when sharing physical/EtherChannel interfaces or subinterfaces across parents.

If you do not share the same set of subinterfaces with a group of logical devices, your configuration can cause more resource usage (more VLAN groups). For example, share Port-Channel1.100 and 200 with Logical Devices 1, 2, and 3 (one VLAN group) instead of sharing Port-Channel1.100 with Logical Devices 1 and 2, while sharing Port-Channel1.200 with Logical Devices 2 and 3 (two VLAN groups).

2. **Fair**—Share subinterfaces across parents.

For example, share Port-Channel1.100, Port-Channel2.200, and Port-Channel3.300 instead of Port-Channel1, Port-Channel2, and Port-Channel3. Although this usage is not as efficient as only sharing subinterfaces on the same parent, it still takes advantage of VLAN groups.

3. Worst—Share individual parent interfaces (physical or EtherChannel).

This method uses the most forwarding table entries.

Shared Interface Usage Examples

See the following tables for examples of interface sharing and scalability. The below scenarios assume use of one physical/EtherChannel interface for management shared across all instances, and another physical or EtherChannel interface with dedicated subinterfaces for use with High Availability.

- [Table 1: Physical/EtherChannel Interfaces and Instances on a Firepower 9300 with Three SM-44s, on page 5](#)
- [Table 2: Subinterfaces on One Parent and Instances on a Firepower 9300 with Three SM-44s, on page 7](#)
- [Table 3: Physical/EtherChannel Interfaces and Instances on a Firepower 9300 with One SM-44, on page 8](#)
- [Table 4: Subinterfaces on One Parent and Instances on a Firepower 9300 with One SM-44, on page 10](#)

Firepower 9300 with Three SM-44s

The following table applies to three SM-44 security modules on a 9300 using only physical interfaces or EtherChannels. Without subinterfaces, the maximum number of interfaces are limited. Moreover, sharing multiple physical interfaces uses more forwarding table resources than sharing multiple subinterfaces.

Each SM-44 module can support up to 14 instances. Instances are split between modules as necessary to stay within limits.

Table 1: Physical/EtherChannel Interfaces and Instances on a Firepower 9300 with Three SM-44s

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
32: <ul style="list-style-type: none"> • 8 • 8 • 8 • 8 	0	4: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 • Instance 4 	16%
30: <ul style="list-style-type: none"> • 15 • 15 	0	2: <ul style="list-style-type: none"> • Instance 1 • Instance 2 	14%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
14: <ul style="list-style-type: none"> • 14 (1 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
33: <ul style="list-style-type: none"> • 11 (1 ea.) • 11 (1 ea.) • 11 (1 ea.) 	3: <ul style="list-style-type: none"> • 1 • 1 • 1 	33: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 33 	98%
33: <ul style="list-style-type: none"> • 11 (1 ea.) • 11 (1 ea.) • 12 (1 ea.) 	3: <ul style="list-style-type: none"> • 1 • 1 • 1 	34: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 34 	102% DISALLOWED
30: <ul style="list-style-type: none"> • 30 (1 ea.) 	1	6: <ul style="list-style-type: none"> • Instance 1-Instance 6 	25%
30: <ul style="list-style-type: none"> • 10 (5 ea.) • 10 (5 ea.) • 10 (5 ea.) 	3: <ul style="list-style-type: none"> • 1 • 1 • 1 	6: <ul style="list-style-type: none"> • Instance 1-Instance2 • Instance 2-Instance 4 • Instance 5-Instance 6 	23%
30: <ul style="list-style-type: none"> • 30 (6 ea.) 	2	5: <ul style="list-style-type: none"> • Instance 1-Instance 5 	28%
30: <ul style="list-style-type: none"> • 12 (6 ea.) • 18 (6 ea.) 	4: <ul style="list-style-type: none"> • 2 • 2 	5: <ul style="list-style-type: none"> • Instance 1-Instance2 • Instance 2-Instance 5 	26%
24: <ul style="list-style-type: none"> • 6 • 6 • 6 • 6 	7	4: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 • Instance 4 	44%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
24: <ul style="list-style-type: none"> • 12 (6 ea.) • 12 (6 ea.) 	14: <ul style="list-style-type: none"> • 7 • 7 	4: <ul style="list-style-type: none"> • Instance 1-Instance 2 • Instance 2-Instance 4 	41%

The following table applies to three SM-44 security modules on a 9300 using subinterfaces on a single parent physical interface. For example, create a large EtherChannel to bundle all of your like-kind interfaces together, and then share subinterfaces of that EtherChannel. Sharing multiple physical interfaces uses more forwarding table resources than sharing multiple subinterfaces.

Each SM-44 module can support up to 14 instances. Instances are split between modules as necessary to stay within limits.

Table 2: Subinterfaces on One Parent and Instances on a Firepower 9300 with Three SM-44s

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
168: <ul style="list-style-type: none"> • 168 (4 ea.) 	0	42: <ul style="list-style-type: none"> • Instance 1-Instance 42 	33%
224: <ul style="list-style-type: none"> • 224 (16 ea.) 	0	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	27%
14: <ul style="list-style-type: none"> • 14 (1 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
33: <ul style="list-style-type: none"> • 11 (1 ea.) • 11 (1 ea.) • 11 (1 ea.) 	3: <ul style="list-style-type: none"> • 1 • 1 • 1 	33: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 33 	98%
70: <ul style="list-style-type: none"> • 70 (5 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
165: <ul style="list-style-type: none"> • 55 (5 ea.) • 55 (5 ea.) • 55 (5 ea.) 	3: <ul style="list-style-type: none"> • 1 • 1 • 1 	33: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 33 	98%

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
70: <ul style="list-style-type: none"> • 70 (5 ea.) 	2	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
165: <ul style="list-style-type: none"> • 55 (5 ea.) • 55 (5 ea.) • 55 (5 ea.) 	6: <ul style="list-style-type: none"> • 2 • 2 • 2 	33: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 33 	98%
70: <ul style="list-style-type: none"> • 70 (5 ea.) 	10	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
165: <ul style="list-style-type: none"> • 55 (5 ea.) • 55 (5 ea.) • 55 (5 ea.) 	30: <ul style="list-style-type: none"> • 10 • 10 • 10 	33: <ul style="list-style-type: none"> • Instance 1-Instance 11 • Instance 12-Instance 22 • Instance 23-Instance 33 	102% DISALLOWED

Firepower 9300 with One SM-44

The following table applies to the Firepower 9300 with one SM-44 using only physical interfaces or EtherChannels. Without subinterfaces, the maximum number of interfaces are limited. Moreover, sharing multiple physical interfaces uses more forwarding table resources than sharing multiple subinterfaces.

The Firepower Firepower 9300 with one SM-44 can support up to 14 instances.

Table 3: Physical/EtherChannel Interfaces and Instances on a Firepower 9300 with One SM-44

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
32: <ul style="list-style-type: none"> • 8 • 8 • 8 • 8 	0	4: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 • Instance 4 	16%
30: <ul style="list-style-type: none"> • 15 • 15 	0	2: <ul style="list-style-type: none"> • Instance 1 • Instance 2 	14%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
14: <ul style="list-style-type: none"> • 14 (1 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
14: <ul style="list-style-type: none"> • 7 (1 ea.) • 7 (1 ea.) 	2: <ul style="list-style-type: none"> • 1 • 1 	14: <ul style="list-style-type: none"> • Instance 1-Instance 7 • Instance 8-Instance 14 	37%
32: <ul style="list-style-type: none"> • 8 • 8 • 8 • 8 	1	4: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 • Instance 4 	21%
32: <ul style="list-style-type: none"> • 16 (8 ea.) • 16 (8 ea.) 	2	4: <ul style="list-style-type: none"> • Instance 1-Instance 2 • Instance 3-Instance 4 	20%
32: <ul style="list-style-type: none"> • 8 • 8 • 8 • 8 	2	4: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 • Instance 4 	25%
32: <ul style="list-style-type: none"> • 16 (8 ea.) • 16 (8 ea.) 	4: <ul style="list-style-type: none"> • 2 • 2 	4: <ul style="list-style-type: none"> • Instance 1-Instance 2 • Instance 3-Instance 4 	24%
24: <ul style="list-style-type: none"> • 8 • 8 • 8 	8	3: <ul style="list-style-type: none"> • Instance 1 • Instance 2 • Instance 3 	37%
10: <ul style="list-style-type: none"> • 10 (2 ea.) 	10	5: <ul style="list-style-type: none"> • Instance 1-Instance 5 	69%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
10: <ul style="list-style-type: none"> • 6 (2 ea.) • 4 (2 ea.) 	20: <ul style="list-style-type: none"> • 10 • 10 	5: <ul style="list-style-type: none"> • Instance 1-Instance 3 • Instance 4-Instance 5 	59%
14: <ul style="list-style-type: none"> • 12 (2 ea.) 	10	7: <ul style="list-style-type: none"> • Instance 1-Instance 7 	109% DISALLOWED

The following table applies to the Firepower 9300 with one SM-44 using subinterfaces on a single parent physical interface. For example, create a large EtherChannel to bundle all of your like-kind interfaces together, and then share subinterfaces of that EtherChannel. Sharing multiple physical interfaces uses more forwarding table resources than sharing multiple subinterfaces.

The Firepower 9300 with one SM-44 can support up to 14 instances.

Table 4: Subinterfaces on One Parent and Instances on a Firepower 9300 with One SM-44

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
112: <ul style="list-style-type: none"> • 112 (8 ea.) 	0	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	17%
224: <ul style="list-style-type: none"> • 224 (16 ea.) 	0	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	17%
14: <ul style="list-style-type: none"> • 14 (1 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
14: <ul style="list-style-type: none"> • 7 (1 ea.) • 7 (1 ea.) 	2: <ul style="list-style-type: none"> • 1 • 1 	14: <ul style="list-style-type: none"> • Instance 1-Instance 7 • Instance 8-Instance 14 	37%
112: <ul style="list-style-type: none"> • 112 (8 ea.) 	1	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
112: <ul style="list-style-type: none"> • 56 (8 ea.) • 56 (8 ea.) 	2: <ul style="list-style-type: none"> • 1 • 1 	14: <ul style="list-style-type: none"> • Instance 1-Instance 7 • Instance 8-Instance 14 	37%

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
112: • 112 (8 ea.)	2	14: • Instance 1-Instance 14	46%
112: • 56 (8 ea.) • 56 (8 ea.)	4: • 2 • 2	14: • Instance 1-Instance 7 • Instance 8-Instance 14	37%
140: • 140 (10 ea.)	10	14: • Instance 1-Instance 14	46%
140: • 70 (10 ea.) • 70 (10 ea.)	20: • 10 • 10	14: • Instance 1-Instance 7 • Instance 8-Instance 14	37%

Viewing Shared Interface Resources

To view forwarding table and VLAN group usage, enter the **show detail** command under **scope fabric-interconnect**. For example:

```
Firepower# scope fabric-interconnect
DFirepower /fabric-interconnect # show detail
```

Fabric Interconnect:

```
ID: A
Product Name: Cisco FPR9K-SUP
PID: FPR9K-SUP
VID: V02
Vendor: Cisco Systems, Inc.
Serial (SN): JAD104807YN
HW Revision: 0
Total Memory (MB): 16185
OOB IP Addr: 10.10.5.14
OOB Gateway: 10.10.5.1
OOB Netmask: 255.255.255.0
OOB IPv6 Address: ::
OOB IPv6 Gateway: ::
Prefix: 64
Operability: Operable
Thermal Status: Ok
Ingress VLAN Group Entry Count (Current/Max): 0/500
Switch Forwarding Path Entry Count (Current/Max): 16/1021
Current Task 1:
Current Task 2:
Current Task 3:
```

Inline Set Link State Propagation for the Firepower Threat Defense

An inline set acts like a bump on the wire, and binds two interfaces together to slot into an existing network. This function allows the system to be installed in any network environment without the configuration of adjacent network devices. Inline interfaces receive all traffic unconditionally, but all traffic received on these interfaces is retransmitted out of an inline set unless explicitly dropped.

When you configure an inline set in the FTD application and enable link state propagation, the FTD sends inline set membership to the FXOS chassis. Link state propagation means that the chassis automatically brings down the second interface in the inline interface pair when one of the interfaces in an inline set goes down. When the downed interface comes back up, the second interface automatically comes back up, also. In other words, if the link state of one interface changes, the chassis senses the change and updates the link state of the other interface to match it. Note that the chassis requires up to 4 seconds to propagate link state changes. Link state propagation is especially useful in resilient network environments where routers are configured to reroute traffic automatically around network devices that are in a failure state.

Guidelines and Limitations for Firepower Interfaces

VLAN Subinterfaces

- You can create between 250 and 500 subinterfaces per chassis using up to 500 VLAN IDs, depending on your network deployment.
- Subinterfaces are supported on data or data-sharing type interfaces only.
- Subinterfaces (and the parent interfaces) can only be assigned to container instances.

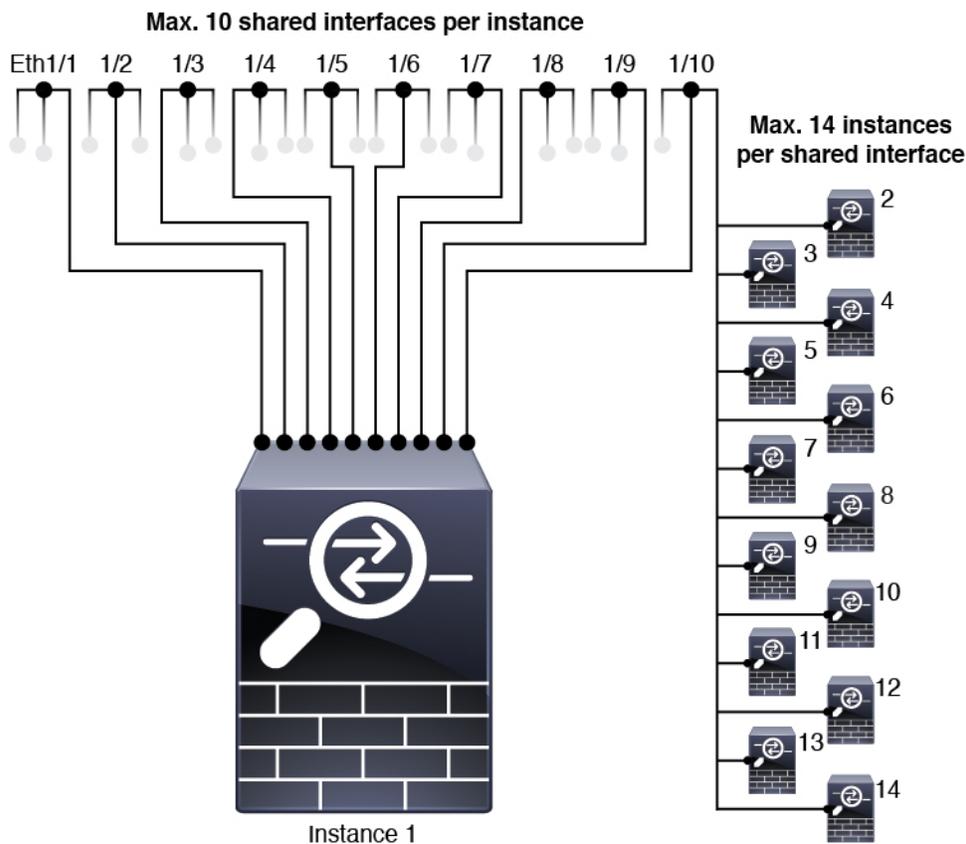


Note If you assign a parent interface to a container instance, it only passes untagged (non-VLAN) traffic. Do not assign the parent interface unless you intend to pass untagged traffic.

- See the following limitations within the logical device application; keep these limitations in mind when planning your interface allocation.
 - You cannot use subinterfaces for an FTD inline set or as a passive interface.
 - If you use a subinterface for the failover link, then all subinterfaces on that parent, and the parent itself, are restricted for use as failover links. You cannot use some subinterfaces as failover links, and some as regular data interfaces.

Data-sharing Interfaces

- Maximum 14 instances per shared interface. For example, you can allocate Ethernet1/1 to Instance1 through Instance14.
Maximum 10 shared interfaces per instance. For example, you can allocate Ethernet1/1.1 through Ethernet1/1.10 to Instance1.



- You cannot use a data-sharing interface with a native instance.
- See the following limitations within the logical device application; keep these limitations in mind when planning your interface allocation.
 - You cannot use a data-sharing interface with a transparent firewall mode device.
 - You cannot use a data-sharing interface with FTD inline sets or passive interfaces.
 - You cannot use a data-sharing interface for the failover link.

Inline Sets for FTD

- Supported for physical interfaces (both regular and breakout ports) and EtherChannels. Subinterfaces are not supported.
- Link state propagation is supported.

Hardware Bypass

- Supported for the FTD; you can use them as regular interfaces for the ASA.
- The FTD only supports Hardware Bypass with inline sets.
- Hardware Bypass-capable interfaces cannot be configured for breakout ports.

- You cannot include Hardware Bypass interfaces in an EtherChannel and use them for Hardware Bypass; you can use them as regular interfaces in an EtherChannel.
- Hardware Bypass is not supported with High Availability.

Default MAC Addresses

For native instances:

Default MAC address assignments depend on the type of interface.

- Physical interfaces—The physical interface uses the burned-in MAC address.
- EtherChannels—For an EtherChannel, all interfaces that are part of the channel group share the same MAC address. This feature makes the EtherChannel transparent to network applications and users, because they only see the one logical connection; they have no knowledge of the individual links. The port-channel interface uses a unique MAC address from a pool; interface membership does not affect the MAC address.

For container instances:

- MAC addresses for all interfaces are taken from a MAC address pool. For subinterfaces, if you decide to manually configure MAC addresses, make sure you use unique MAC addresses for all subinterfaces on the same parent interface to ensure proper classification. See [Automatic MAC Addresses for Container Instance Interfaces](#).

Configure Interfaces

By default, physical interfaces are disabled. You can enable interfaces, add EtherChannels, add VLAN subinterfaces, edit interface properties, and configure breakout ports.



Note

If you remove an interface in FXOS (for example, if you remove a network module, remove an EtherChannel, or reassign an interface to an EtherChannel), then the ASA configuration retains the original commands so that you can make any necessary adjustments; removing an interface from the configuration can have wide effects. You can manually remove the old interface configuration in the ASA OS.

Enable or Disable an Interface

You can change the **Admin State** of each interface to be enabled or disabled. By default, physical interfaces are disabled. For VLAN subinterfaces, the admin state is inherited from the parent interface.

Procedure

Step 1 Choose **Interfaces** to open the Interfaces page.

The Interfaces page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.

- Step 2** To enable the interface, click the disabled slider () so that it changes to the enabled slider ().
Click **Yes** to confirm the change. The corresponding interface in the visual representation changes from gray to green.
- Step 3** To disable the interface, click the enabled slider () so that it changes to the disabled slider ().
Click **Yes** to confirm the change. The corresponding interface in the visual representation changes from green to gray.
-

Configure a Physical Interface

You can physically enable and disable interfaces, as well as set the interface speed and duplex. To use an interface, it must be physically enabled in FXOS and logically enabled in the application.

Before you begin

- Interfaces that are already a member of an EtherChannel cannot be modified individually. Be sure to configure settings before you add it to the EtherChannel.

Procedure

- Step 1** Choose **Interfaces** to open the Interfaces page.
The **All Interfaces** page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.
- Step 2** Click **Edit** in the row for the interface you want to edit to open the **Edit Interface** dialog box.
- Step 3** To enable the interface, check the **Enable** check box. To disable the interface, uncheck the **Enable** check box.
- Step 4** Choose the interface **Type**: **Data**, **Data-sharing**, **Mgmt**, **Firepower-eventing**, or **Cluster**.
Do not choose the **Cluster** type; by default, the cluster control link is automatically created on Port-channel 48.
- Step 5** (Optional) Choose the speed of the interface from the **Speed** drop-down list.
- Step 6** (Optional) If your interface supports **Auto Negotiation**, click the **Yes** or **No** radio button.
- Step 7** (Optional) Choose the duplex of the interface from the **Duplex** drop-down list.
- Step 8** Click **OK**.
-

Add an EtherChannel (Port Channel)

An EtherChannel (also known as a port channel) can include up to 16 member interfaces of the same type. The Link Aggregation Control Protocol (LACP) aggregates interfaces by exchanging the Link Aggregation Control Protocol Data Units (LACPDU) between two network devices.

You can configure each physical Data or Data-sharing interface in an EtherChannel to be:

- **Active**—Sends and receives LACP updates. An active EtherChannel can establish connectivity with either an active or a passive EtherChannel. You should use the active mode unless you need to minimize the amount of LACP traffic.
- **On**—The EtherChannel is always on, and LACP is not used. An “on” EtherChannel can only establish a connection with another “on” EtherChannel.



Note It may take up to three minutes for an EtherChannel to come up to an operational state if you change its mode from On to Active or from Active to On.

Non-data interfaces only support active mode.

LACP coordinates the automatic addition and deletion of links to the EtherChannel without user intervention. It also handles misconfigurations and checks that both ends of member interfaces are connected to the correct channel group. “On” mode cannot use standby interfaces in the channel group when an interface goes down, and the connectivity and configurations are not checked.

When the Firepower 4100/9300 chassis creates an EtherChannel, the EtherChannel stays in a **Suspended** state for Active LACP mode or a **Down** state for On LACP mode until you assign it to a logical device, even if the physical link is up. The EtherChannel will be brought out of this **Suspended** state in the following situations:

- The EtherChannel is added as a data or management interface for a standalone logical device
- The EtherChannel is added as a management interface or cluster control link for a logical device that is part of a cluster
- The EtherChannel is added as a data interface for a logical device that is part of a cluster and at least one unit has joined the cluster

Note that the EtherChannel does not come up until you assign it to a logical device. If the EtherChannel is removed from the logical device or the logical device is deleted, the EtherChannel will revert to a **Suspended** or **Down** state.

Procedure

Step 1 Choose **Interfaces** to open the Interfaces page.

The **All Interfaces** page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.

Step 2 Click **Add Port Channel** above the interfaces table to open the **Add Port Channel** dialog box.

Step 3 Enter an ID for the port channel in the **Port Channel ID** field. Valid values are between 1 and 47.

Port-channel 48 is reserved for the cluster control link when you deploy a clustered logical device. If you do not want to use Port-channel 48 for the cluster control link, you can configure an EtherChannel with a different ID and choose the Cluster type for the interface. For intra-chassis clustering, do not assign any interfaces to the Cluster EtherChannel.

Step 4 To enable the port channel, check the **Enable** check box. To disable the port channel, uncheck the **Enable** check box.

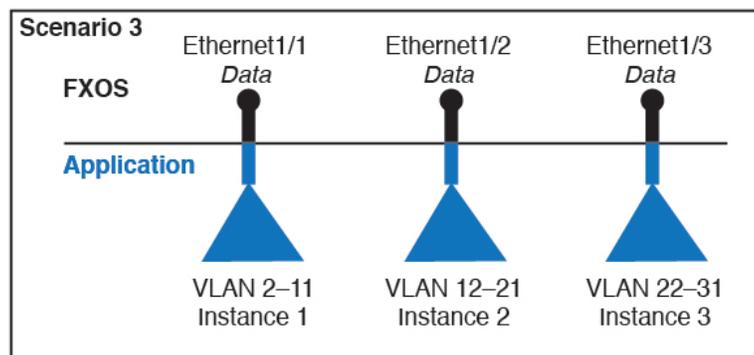
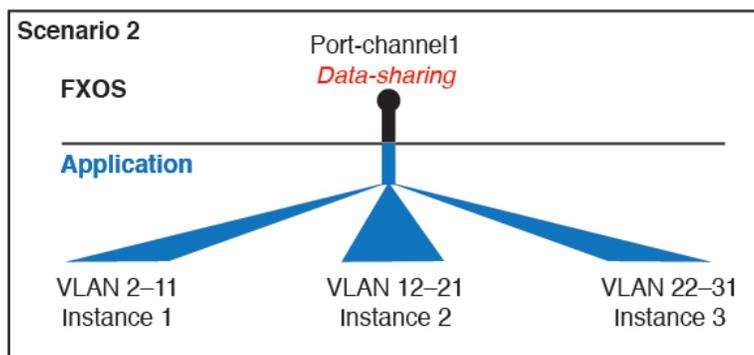
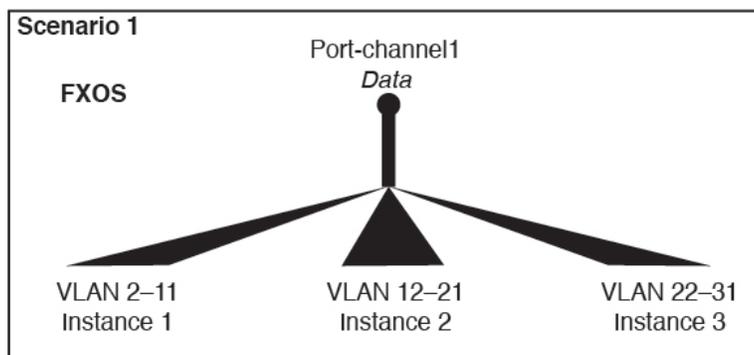
- Step 5** Choose the interface **Type**: **Data**, **Data-sharing**, **Mgmt**, **Firepower-eventing**, or **Cluster**.
Do not choose the **Cluster** type unless you want to use this port-channel as the cluster control link instead of the default.
- Step 6** Set the **Admin Speed** of the member interfaces from the drop-down list.
- Step 7** For Data or Data-sharing interfaces, choose the LACP port-channel **Mode**, **Active** or **On**.
For non-Data or non-Data-sharing interfaces, the mode is always active.
- Step 8** Set the **Admin Duplex**, **Full Duplex** or **Half Duplex**.
- Step 9** To add an interface to the port channel, select the interface in the **Available Interface** list and click **Add Interface** to move the interface to the Member ID list. You can add up to 16 interfaces of the same type and speed.
- Tip** You can add multiple interfaces at one time. To select multiple individual interfaces, click on the desired interfaces while holding down the **Ctrl** key. To select a range of interfaces, select the first interface in the range, and then, while holding down the **Shift** key, click to select the last interface in the range.
- Step 10** To remove an interface from the port channel, click the **Delete** button to the right of the interface in the Member ID list.
- Step 11** Click **OK**.
-

Add a VLAN Subinterface for Container Instances

You can add between 250 and 500 VLAN subinterfaces to the chassis, depending on your network deployment.

VLAN IDs per interface must be unique, and within a container instance, VLAN IDs must be unique across all assigned interfaces. You can reuse VLAN IDs on *separate* interfaces as long as they are assigned to different container instances. However, each subinterface still counts towards the limit even though it uses the same ID.

For native instances, you can create VLAN subinterfaces within the application only. For container instances, you can also create VLAN subinterfaces inside the application on interfaces that do not have FXOS VLAN subinterfaces defined, and these subinterfaces are not subject to the FXOS limit. Choosing in which operating system to create subinterfaces depends on your network deployment and personal preference. For example, to share a subinterface, you must create the subinterface in FXOS. Another scenario that favors FXOS subinterfaces comprises allocating separate subinterface groups on a single interface to multiple instances. For example, you want to use Port-channel1 with VLAN 2–11 on instance A, VLAN 12–21 on instance B, and VLAN 22–31 on instance C. If you create these subinterfaces within the application, then you would have to share the parent interface in FXOS, which may not be desirable. See the following illustration that shows the three ways you can accomplish this scenario:



Procedure

-
- Step 1** Choose **Interfaces** to open the **All Interfaces** tab.
- The **All Interfaces** tab shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.
- Step 2** Click **Add New > Subinterface** to open the **Add Subinterface** dialog box.
- Step 3** Choose the interface **Type: Data** or **Data-sharing**.
- Subinterfaces are supported on data or data-sharing type interfaces only. The type is independent of the parent interface type; you can have a Data-sharing parent and a Data subinterface, for example.
- Step 4** Choose the parent **Interface** from the drop-down list.

You cannot add a subinterface to a physical interface that is currently allocated to a logical device. If other subinterfaces of the parent are allocated, you can add a new subinterface as long as the parent interface itself is not allocated.

Step 5 Enter a **Subinterface ID**, between 1 and 4294967295.

This ID will be appended to the parent interface ID as *interface_id.subinterface_id*. For example, if you add a subinterface to Ethernet1/1 with the ID of 100, then the subinterface ID will be: Ethernet1/1.100. This ID is not the same as the VLAN ID, although you can set them to match for convenience.

Step 6 Set the **VLAN ID** between 1 and 4095.

Step 7 Click **OK**.

Expand the parent interface to view all subinterfaces under it.

Configure Breakout Cables

The following procedure shows how to configure breakout cables for use with the Firepower 4100/9300 chassis. You can use a breakout cable to provide four 10 Gbps ports in place of a single 40 Gbps port.

Before you begin

Hardware Bypass-capable interfaces cannot be configured for breakout ports.

Procedure

Step 1 Choose **Interfaces** to open the Interfaces page.

The Interfaces page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.

The interfaces that are capable of supporting breakout cables but are not currently configured as such are indicated by a Breakout Port icon in the row for that interface. For interfaces that have already been configured as using a breakout cable, the individual breakout interfaces are listed separately (for example, Ethernet 2/1/1, 2/1/2, 2/1/3, and 2/1/4).

Step 2 To convert a 40 Gbps interface into four 10 Gbps interfaces:

a) Click the **Breakout Port** icon for the interface that you want to convert.

The Breakout Port Creation dialog box opens asking you to confirm that you want to proceed and warning you that the chassis will be rebooted.

b) Click **Yes** to confirm.

The Firepower chassis reboots and the specified interface is converted into four 10 Gbps interfaces.

Step 3 To convert the four 10 Gbps breakout interfaces back into a single 40 Gbps interface:

a) Click **Delete** for any of the breakout interfaces.

A confirmation dialog box opens asking you to confirm that you want to proceed and warning you that all four breakout interfaces will be deleted and that the chassis will be rebooted.

- b) Click **Yes** to confirm.

The Firepower chassis reboots and the specified interfaces are converted into a single 40 Gbps interface.

Monitoring Interfaces

From the Interfaces page of the Firepower Chassis Manager, you can view the status of the installed interfaces on the chassis, edit interface properties, enable or disable an interface, and create port channels.

The Interfaces page is made up of two sections:

- The upper section shows a visual representation of the interfaces that are installed in the Firepower chassis. You can hover over any of the interfaces to get additional information about the interface.

The interfaces are color coded to indicate their current status:

- Green—The interface is installed and enabled.
- Dark Grey—The interface is installed but disabled.
- Red—There is a problem with the operational state of the interface.
- Light Grey—The interface is not installed.



Note Interfaces that act as ports in port channels do not appear in this list.

- The lower section contains two tabs: **All Interfaces** and **Hardware Bypass**. On the **All Interfaces** tab: For each interface, you can enable or disable the interface. You can also click **Edit** to edit the properties of an interface, such as speed and interface type. For **Hardware Bypass**, see [Hardware Bypass Pairs, on page 2](#).



Note The port-channel 48 cluster type interface shows the **Operation State** as **failed** if it does not include any member interfaces. For intra-chassis clustering, this EtherChannel does not require any member interfaces, and you can ignore this Operational State.

Troubleshooting Interfaces

Error: The Switch Forwarding Path has 1076 entries and exceeds the limit of 1024. If you are adding an interface, reduce the number of shared interfaces assigned to logical devices, reduce the number of logical devices sharing interfaces, or use non-shared subinterfaces instead. If you are deleting a subinterface, you are seeing this message because the remaining configuration is no longer optimized to fit within the Switch Forwarding Path table. See the FXOS configuration guide for troubleshooting information about the deletion

use case. Use 'show detail' under scope 'fabric-interconnect' to view the current Switch Forwarding Path Entry Count.

If you see this error when trying to delete a shared subinterface from a logical device, it is because your new configuration is not following this guideline for shared subinterfaces: use the same set of subinterfaces with the same group of logical devices. If you delete a shared subinterface from one logical device, you can end up with more VLAN groups and therefore less efficient usage of the forwarding table. To work around this situation, you need to add and delete shared subinterfaces simultaneously using the CLI so that you maintain the same set of subinterfaces for the same group of logical devices.

See the following scenarios for more information. These scenarios start with the following interfaces and logical devices:

- Shared subinterface set on the same parent: Port-Channel1.100 (VLAN 100), Port-Channel1.200 (VLAN 200), Port-Channel1.300 (VLAN 300)
- Logical device group: LD1, LD2, LD3, and LD4

Scenario 1: Remove a subinterface from one logical device, but leave it assigned to other logical devices

Do not remove the subinterface. Instead, just disable it in the application configuration. If you have to remove the subinterface, you will need to reduce the number of shared interfaces in general to continue to fit in the forwarding table.

Scenario 2: Remove all subinterfaces in the set from one logical device

Remove all subinterfaces in the set from the logical device at the CLI, and then save the configuration so that the removal is simultaneous.

1. View the VLAN groups for reference. In the following output, group 1 includes VLAN 100, 200, and 300, representing the 3 shared subinterfaces.

```
firepower# connect fxos
[...]
firepower(fxos)# show ingress-vlan-groups
ID   Class ID  Status      INTF          Vlan Status
1    1          configured
                                100 present
                                200 present
                                300 present
2048 512        configured
                                0   present
2049 511        configured
                                0   present
firepower(fxos)# exit
firepower#
```

2. View the shared subinterfaces assigned to the logical device you want to change.

```
firepower# scope ssa
firepower /ssa # scope logical-device LD1
firepower /ssa/logical-device # show external-port-link

External-Port Link:
  Name                               Port or Port Channel Name  Port Type          App Name
  Description
  -----
  Ethernet14_ftd                    Ethernet1/4                 Mgmt               ftd
```

```

PC1.100_ftd          Port-channel1.100      Data Sharing      ftd
PC1.200_ftd          Port-channel1.200      Data Sharing      ftd
PC1.300_ftd          Port-channel1.300      Data Sharing      ftd

```

3. Remove the subinterfaces from the logical device, and then save the configuration.

```

firepower /ssa/logical-device # delete external-port-link PC1.100_ftd
firepower /ssa/logical-device* # delete external-port-link PC1.200_ftd
firepower /ssa/logical-device* # delete external-port-link PC1.300_ftd
firepower /ssa/logical-device* # commit-buffer
firepower /ssa/logical-device #

```

If you had committed the configuration in the middle, you would have ended up with 2 VLAN groups, which could have generated the switch forwarding path error and prevented you from saving the configuration.

Scenario 3: Remove a subinterface from all logical devices in the group

Remove the subinterface from all logical devices in the group at the CLI, and then save the configuration so that the removal is simultaneous. For example:

1. View the VLAN groups for reference. In the following output, group 1 includes VLAN 100, 200, and 300, representing the 3 shared subinterfaces.

```

firepower# connect fxos
[...]
firepower(fxos)# show ingress-vlan-groups
ID   Class ID   Status      INTF      Vlan Status
1    1           configured
                                100 present
                                200 present
                                300 present
2048 512       configured
                                0   present
2049 511       configured
                                0   present

```

2. View the interfaces assigned to each logical device, and note the shared subinterfaces in common. If they are on the same parent interface, they will belong to one VLAN group, and should match the **show ingress-vlan-groups** list. In Firepower Chassis Manager, you can hover over each shared subinterface to see which instances it is allocated to.

Figure 1: Instances per shared interface

Interface	Type	Admin Speed	Operational Speed	Instances	VLAN
MGMT	Management				
Port-channel1	data	1gbps	1gbps		
Port-channel1.100	data-sharing			LD4...	100
Port-channel1.200	data-sharing			LD4...	
Port-channel1.300	data-sharing			LD4...	300
Ethernet1/3					
Port-channel2	data	1gbps	1gbps		

Interface is shared by 4 instances:
LD4
LD3
LD2
LD1

At the CLI, you can view characteristics of all logical devices, including the allocated interfaces.

```
firepower# scope ssa
firepower /ssa # show logical-device expand

Logical Device:
  Name: LD1
  Description:
  Slot ID: 1
  Mode: Standalone
  Oper State: Ok
  Template Name: ftd

  External-Port Link:
    Name: Ethernet14_ftd
    Port or Port Channel Name: Ethernet1/4
    Port Type: Mgmt
    App Name: ftd
    Description:

    Name: PC1.100_ftd
    Port or Port Channel Name: Port-channell.100
    Port Type: Data Sharing
    App Name: ftd
    Description:

    Name: PC1.200_ftd
    Port or Port Channel Name: Port-channell.200
    Port Type: Data Sharing
    App Name: ftd
    Description:

  System MAC address:
    Mac Address
    -----
    A2:F0:B0:00:00:25

    Name: PC1.300_ftd
    Port or Port Channel Name: Port-channell.300
    Port Type: Data Sharing
    App Name: ftd
    Description:

[...]

  Name: LD2
  Description:
  Slot ID: 1
  Mode: Standalone
  Oper State: Ok
  Template Name: ftd

  External-Port Link:
    Name: Ethernet14_ftd
    Port or Port Channel Name: Ethernet1/4
    Port Type: Mgmt
    App Name: ftd
    Description:

    Name: PC1.100_ftd
    Port or Port Channel Name: Port-channell.100
    Port Type: Data Sharing
    App Name: ftd
```

```

Description:

Name: PC1.200_ftd
Port or Port Channel Name: Port-channel1.200
Port Type: Data Sharing
App Name: ftd
Description:

System MAC address:
  Mac Address
  -----
  A2:F0:B0:00:00:28

Name: PC1.300_ftd
Port or Port Channel Name: Port-channel1.300
Port Type: Data Sharing
App Name: ftd
Description:
    
```

[...]

```

Name: LD3
Description:
Slot ID: 1
Mode: Standalone
Oper State: Ok
Template Name: ftd

External-Port Link:
  Name: Ethernet14_ftd
  Port or Port Channel Name: Ethernet1/4
  Port Type: Mgmt
  App Name: ftd
  Description:

  Name: PC1.100_ftd
  Port or Port Channel Name: Port-channel1.100
  Port Type: Data Sharing
  App Name: ftd
  Description:

  Name: PC1.200_ftd
  Port or Port Channel Name: Port-channel1.200
  Port Type: Data Sharing
  App Name: ftd
  Description:

System MAC address:
  Mac Address
  -----
  A2:F0:B0:00:00:2B

Name: PC1.300_ftd
Port or Port Channel Name: Port-channel1.300
Port Type: Data Sharing
App Name: ftd
Description:
    
```

[...]

```

Name: LD4
Description:
Slot ID: 1
Mode: Standalone
    
```

```

Oper State: Ok
Template Name: ftd

External-Port Link:
  Name: Ethernet14_ftd
  Port or Port Channel Name: Ethernet1/4
  Port Type: Mgmt
  App Name: ftd
  Description:

  Name: PC1.100_ftd
  Port or Port Channel Name: Port-channell.100
  Port Type: Data Sharing
  App Name: ftd
  Description:

  Name: PC1.200_ftd
  Port or Port Channel Name: Port-channell.200
  Port Type: Data Sharing
  App Name: ftd
  Description:

System MAC address:
  Mac Address
  -----
  A2:F0:B0:00:00:2E

  Name: PC1.300_ftd
  Port or Port Channel Name: Port-channell.300
  Port Type: Data Sharing
  App Name: ftd
  Description:

```

[...]

3. Remove the subinterface from each logical device, and then save the configuration.

```

firepower /ssa # scope logical device LD1
firepower /ssa/logical-device # delete external-port-link PC1.300_ftd
firepower /ssa/logical-device* # exit
firepower /ssa* # scope logical-device LD2
firepower /ssa/logical-device* # delete external-port-link PC1.300_ftd
firepower /ssa/logical-device* # exit
firepower /ssa* # scope logical-device LD3
firepower /ssa/logical-device* # delete external-port-link PC1.300_ftd
firepower /ssa/logical-device* # exit
firepower /ssa* # scope logical-device LD4
firepower /ssa/logical-device* # delete external-port-link PC1.300_ftd
firepower /ssa/logical-device* # commit-buffer
firepower /ssa/logical-device #

```

If you had committed the configuration in the middle, you would have ended up with 2 VLAN groups, which could have generated the switch forwarding path error and prevented you from saving the configuration.

Scenario 4: Add a subinterface to one or more logical devices

Add the subinterface to *all* logical devices in the group at the CLI, and then save the configuration so that the addition is simultaneous.

1. Add the subinterface to each logical device, and then save the configuration.

```

firepower# scope ssa
firepower /ssa # scope logical-device LD1
firepower /ssa/logical-device # create external-port-link PC1.400_ftd Port-channell.400
ftd
firepower /ssa/logical-device/external-port-link* # exit
firepower /ssa/logical-device* # exit
firepower /ssa # scope logical-device LD2
firepower /ssa/logical-device # create external-port-link PC1.400_ftd Port-channell.400
ftd
firepower /ssa/logical-device/external-port-link* # exit
firepower /ssa/logical-device* # exit
firepower /ssa # scope logical-device LD3
firepower /ssa/logical-device # create external-port-link PC1.400_ftd Port-channell.400
ftd
firepower /ssa/logical-device/external-port-link* # exit
firepower /ssa/logical-device* # exit
firepower /ssa # scope logical-device LD4
firepower /ssa/logical-device # create external-port-link PC1.400_ftd Port-channell.400
ftd
firepower /ssa/logical-device/external-port-link* # commit-buffer
firepower /ssa/logical-device/external-port-link #

```

If you had committed the configuration in the middle, you would have ended up with 2 VLAN groups, which could have generated the switch forwarding path error and prevented you from saving the configuration.

2. You can check that the Port-channell.400 VLAN ID was added to VLAN group 1.

```

firepower /ssa/logical-device/external-port-link # connect fxos
[...]
firepower(fxos)# show ingress-vlan-groups
ID   Class ID  Status      INTF      Vlan Status
1    1          configured
                                200 present
                                100 present
                                300 present
                                400 present
2048 512       configured
                                0   present
2049 511       configured
                                0   present
firepower(fxos)# exit
firepower /ssa/logical-device/external-port-link #

```

History for Interfaces

Feature Name	Platform Releases	Feature Information
VLAN subinterfaces for use with container instances	2.4.1	<p>To provide flexible physical interface use, you can create VLAN subinterfaces in FXOS and also share interfaces between multiple instances.</p> <p>Note Requires FTD Version 6.3 or later.</p> <p>New/Modified screens: Interfaces > All Interfaces > Add New drop-down menu > Subinterface</p> <p>New/Modified Firepower Management Center screens: Devices > Device Management > Edit icon > Interfaces tab</p>
Data-sharing interfaces for container instances	2.4.1	<p>To provide flexible physical interface use, you can share interfaces between multiple instances.</p> <p>Note Requires FTD Version 6.3 or later.</p> <p>New/Modified screens: Interfaces > All Interfaces > Type</p>
Support for data EtherChannels in On mode	2.4.1	<p>You can now set data and data-sharing EtherChannels to either Active LACP mode or to On mode. Other types of EtherChannels only support Active mode.</p> <p>New/Modified screens: Interfaces > All Interfaces > Edit Port Channel > Mode</p>
Support for EtherChannels in FTD inline sets	2.1.1	<p>You can now use EtherChannels in a FTD inline set.</p>

Feature Name	Platform Releases	Feature Information
Inline set link state propagation support for the FTD	2.0.1	<p>When you configure an inline set in the FTD application and enable link state propagation, the FTD sends inline set membership to the FXOS chassis. Link state propagation means that the chassis automatically brings down the second interface in the inline interface pair when one of the interfaces in an inline set goes down.</p>
Support for Hardware bypass network modules for the FTD	2.0.1	<p>Hardware Bypass ensures that traffic continues to flow between an inline interface pair during a power outage. This feature can be used to maintain network connectivity in the case of software or hardware failures.</p> <p>New/Modified Firepower Management Center screens:</p> <p>Devices > Device Management > Interfaces > Edit Physical Interface</p>
Firepower-eventing type interface for FTD	1.1.4	<p>You can specify an interface as firepower-eventing for use with the FTD. This interface is a secondary management interface for FTD devices. To use this interface, you must configure its IP address and other parameters at the FTD CLI. For example, you can separate management traffic from events (such as web events). See the "Management Interfaces" section in the Firepower Management Center configuration guide <i>System Configuration</i> chapter.</p> <p>New/Modified Firepower Chassis Manager screens:</p> <p>Interfaces > All Interfaces > Type</p>