



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 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, 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. 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. For ASA: You can later enable management from a data interface; but you must assign a Management interface to the logical device even if you don't intend to use it after you enable data management.
- **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 [FMC configuration guide](#) for more information. 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. The Cluster type is only supported on EtherChannel interfaces.

FXOS Interfaces vs. Application Interfaces

The Firepower 4100/9300 manages the basic Ethernet settings of physical interfaces, VLAN subinterfaces for container instances, and EtherChannel (port-channel) interfaces. Within the application, you configure higher level settings. For example, you can only create EtherChannels in FXOS; but you can assign an IP address to the EtherChannel within the application.

The following sections describe the interaction between FXOS and the application for interfaces.

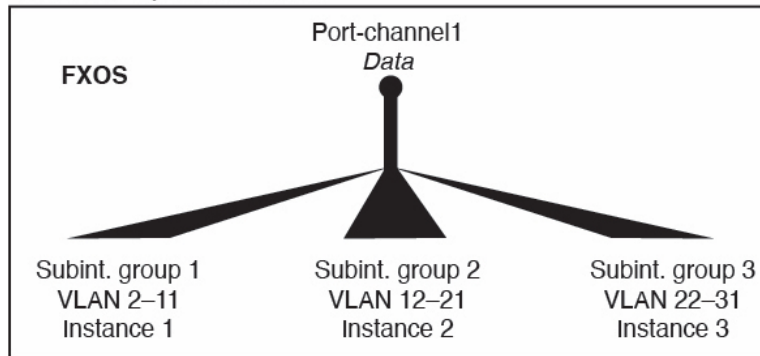
VLAN Subinterfaces

For all logical devices, you can create VLAN subinterfaces within the application.

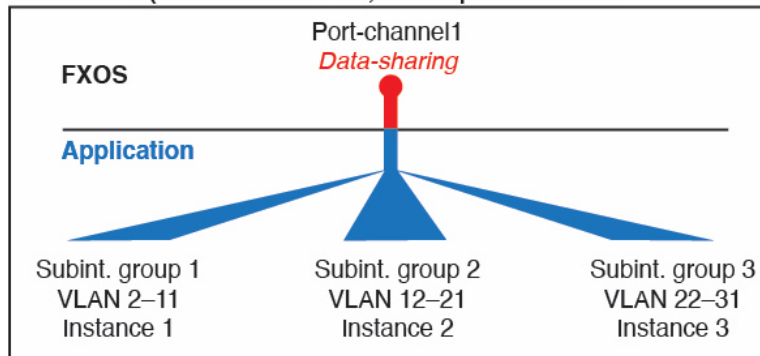
For container instances only, you can *also* create VLAN subinterfaces in FXOS (on interfaces without FXOS subinterfaces). Application-defined subinterfaces are not subject to the FXOS limit. Choosing in which operating system to create subinterfaces depends on your network deployment and personal preference. 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:

Figure 1: VLANs in FXOS vs. the Application for Container Instances

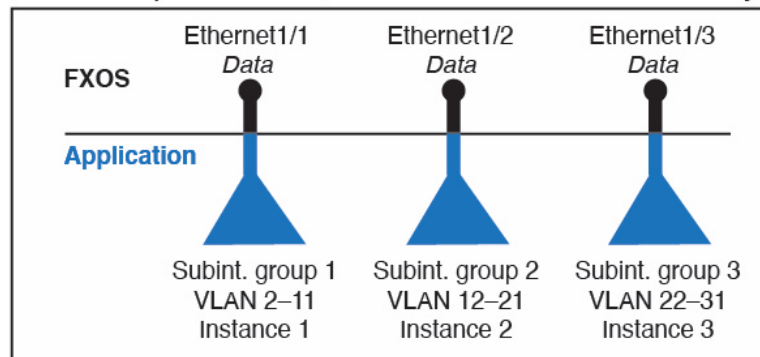
Scenario 1 (recommended)



Scenario 2 (not recommended, worse performance)



Scenario 3 (recommended, but lacks EtherChannel redundancy)



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.

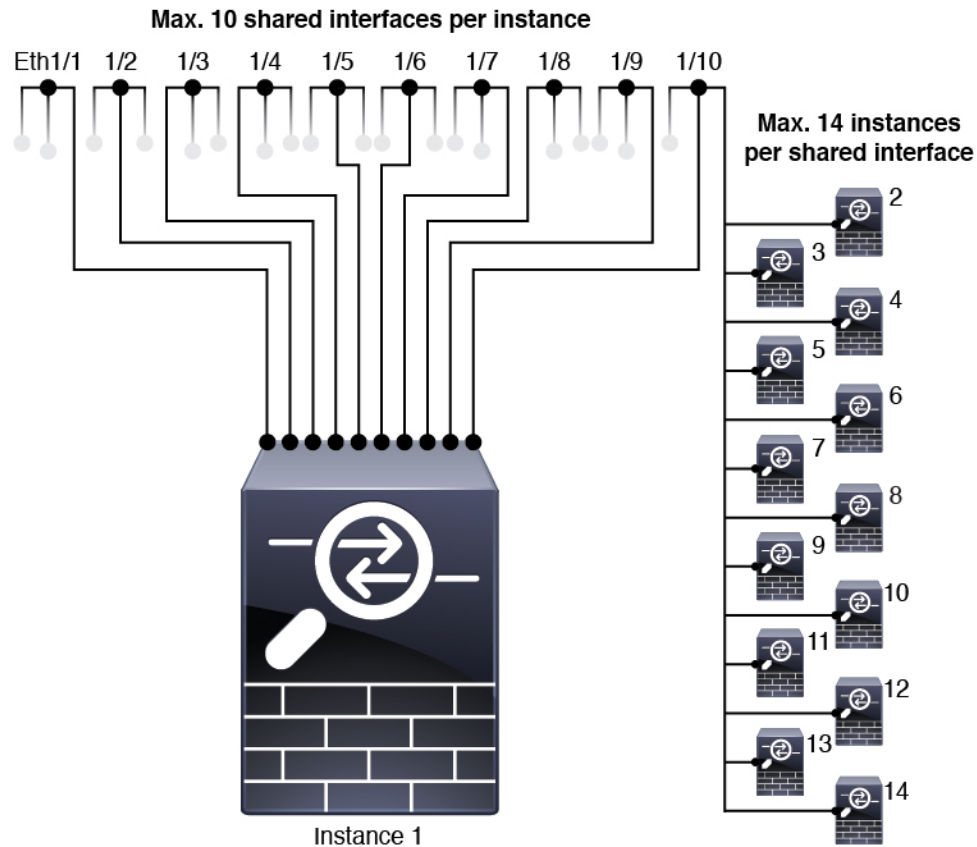
Shared Interface Scalability

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

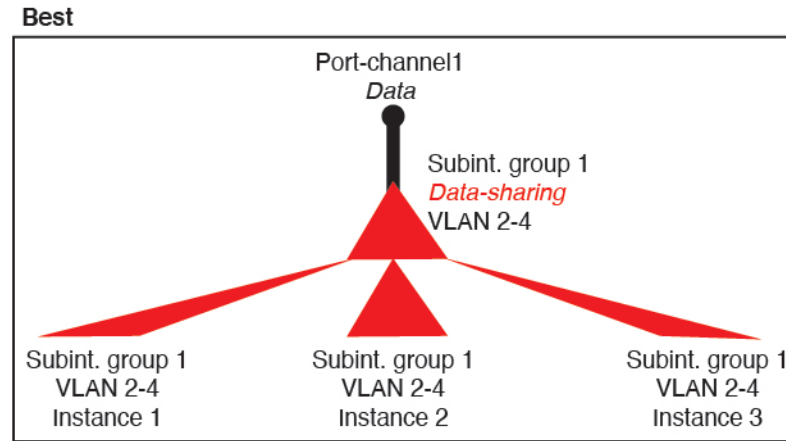
For optimal scalability of the forwarding table, share as few interfaces as possible. Instead, you can create up to 500 VLAN subinterfaces on one or more physical interfaces, and then divide the VLANs among the container instances.

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 instances.

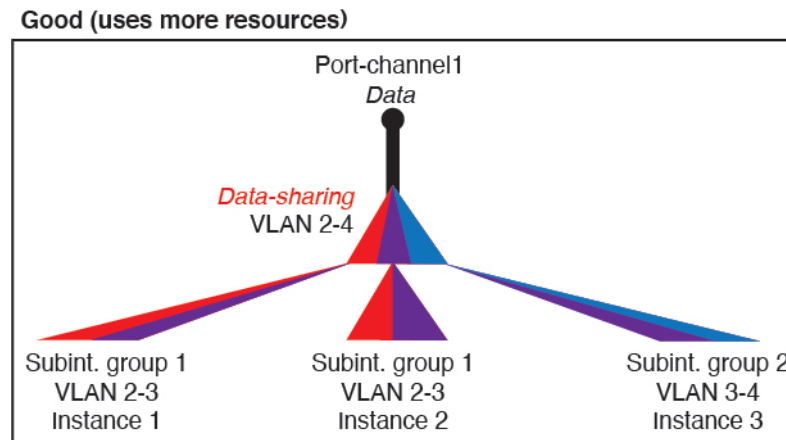
For example, create a large EtherChannel to bundle all of your like-kind interfaces together, and then share subinterfaces of that EtherChannel: Port-Channel1.2, 3, and 4 instead of Port-Channel2, Port-Channel3, and Port-Channel4. When you share subinterfaces from a single parent, the VLAN group table provides better scaling of the forwarding table than when sharing physical/EtherChannel interfaces or subinterfaces across parents.

Figure 2: Best: Shared Subinterface Group on One Parent



If you do not share the same set of subinterfaces with a group of instances, your configuration can cause more resource usage (more VLAN groups). For example, share Port-Channel1.2, 3, and 4 with instances 1, 2, and 3 (one VLAN group) instead of sharing Port-Channel1.2 and 3 with instances 1 and 2, while sharing Port-Channel1.3 and 4 with instance 3 (two VLAN groups).

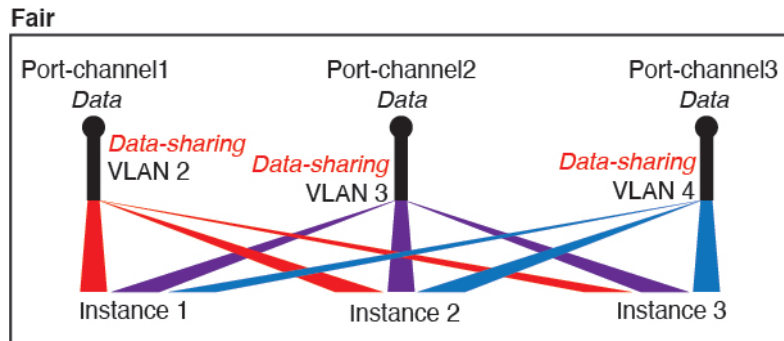
Figure 3: Good: Sharing Multiple Subinterface Groups on One Parent



2. Fair—Share subinterfaces across parents.

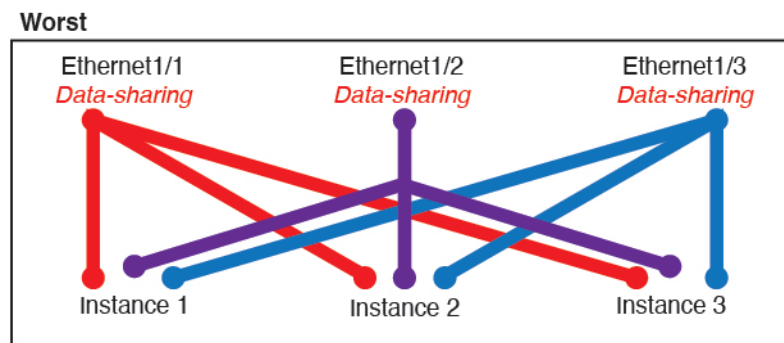
For example, share Port-Channel1.2, Port-Channel2.3, and Port-Channel3.4 instead of Port-Channel2, Port-Channel4, and Port-Channel4. Although this usage is not as efficient as only sharing subinterfaces on the same parent, it still takes advantage of VLAN groups.

Figure 4: Fair: Shared Subinterfaces on Separate Parents



3. Worst—Share individual parent interfaces (physical or EtherChannel). This method uses the most forwarding table entries.

Figure 5: Worst: Shared Parent Interfaces



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 8](#)
- [Table 2: Subinterfaces on One Parent and Instances on a Firepower 9300 with Three SM-44s, on page 9](#)
- [Table 3: Physical/EtherChannel Interfaces and Instances on a Firepower 9300 with One SM-44, on page 11](#)
- [Table 4: Subinterfaces on One Parent and Instances on a Firepower 9300 with One SM-44, on page 12](#)

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%
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%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
30: • 30 (6 ea.)	2	5: • Instance 1-Instance 5	28%
30: • 12 (6 ea.) • 18 (6 ea.)	4: • 2 • 2	5: • Instance 1-Instance2 • Instance 2-Instance 5	26%
24: • 6 • 6 • 6 • 6	7	4: • Instance 1 • Instance 2 • Instance 3 • Instance 4	44%
24: • 12 (6 ea.) • 12 (6 ea.)	14: • 7 • 7	4: • Instance 1-Instance2 • 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: • 168 (4 ea.)	0	42: • Instance 1-Instance 42	33%
224: • 224 (16 ea.)	0	14: • Instance 1-Instance 14	27%
14: • 14 (1 ea.)	1	14: • Instance 1-Instance 14	46%

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
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%
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%
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%

Dedicated Interfaces	Shared Interfaces	Number of Instances	% Forwarding Table Used
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%
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%

Dedicated Subinterfaces	Shared Subinterfaces	Number of Instances	% Forwarding Table Used
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%
112: <ul style="list-style-type: none"> • 112 (8 ea.) 	2	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.) 	4: <ul style="list-style-type: none"> • 2 • 2 	14: <ul style="list-style-type: none"> • Instance 1-Instance 7 • Instance 8-Instance 14 	37%
140: <ul style="list-style-type: none"> • 140 (10 ea.) 	10	14: <ul style="list-style-type: none"> • Instance 1-Instance 14 	46%
140: <ul style="list-style-type: none"> • 70 (10 ea.) • 70 (10 ea.) 	20: <ul style="list-style-type: none"> • 10 • 10 	14: <ul style="list-style-type: none"> • 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

- 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.

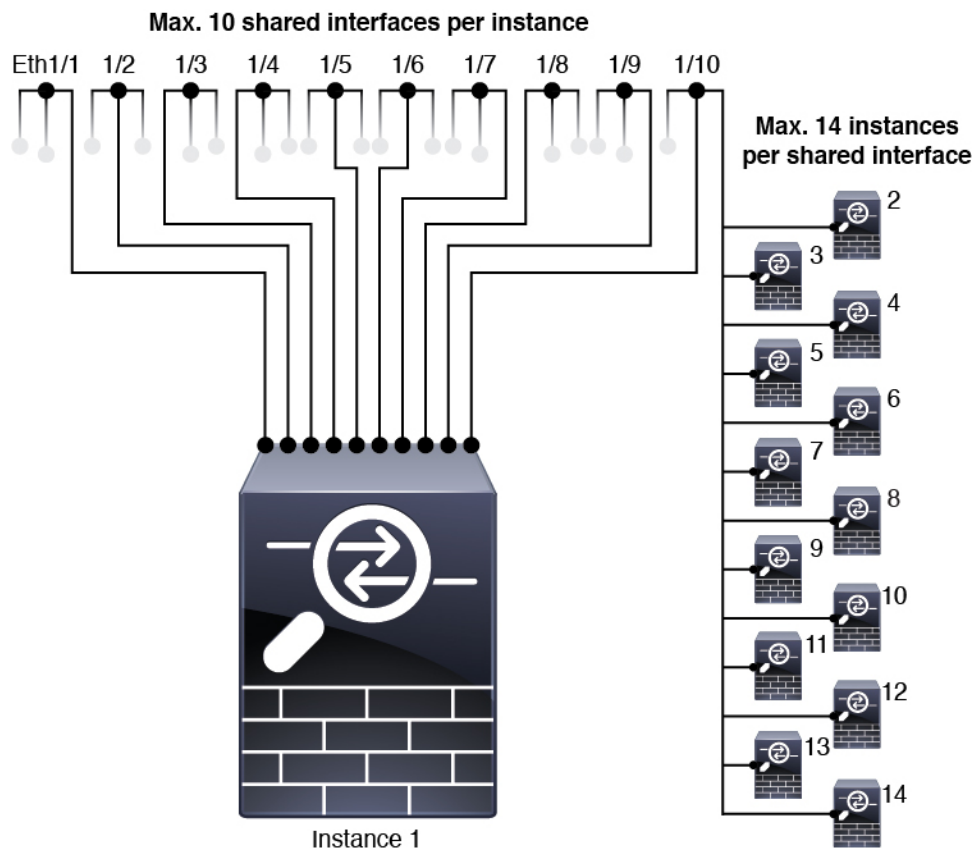
- Subinterfaces are supported on Data or Data-sharing type interfaces.
- You can create between 250 and 500 subinterfaces per chassis using up to 500 VLAN IDs, depending on your network deployment.
- See the following limitations within the logical device application; keep these limitations in mind when 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

- You cannot use a data-sharing interface with a native instance.
- 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.



- 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.

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 Enter interface mode.

```
scope eth-uplink
```

```
scope fabric a
```

Step 2 Enable the interface.

```
enter interface interface_id
```

```
enable
```

Example:

```
Firepower /eth-uplink/fabric # enter interface Ethernet1/8  
Firepower /eth-uplink/fabric/interface # enable
```

Note Interfaces that are already a member of a port-channel cannot be modified individually. If you use the **enter interface** or **scope interface** command on an interface that is a member of a port channel, you will receive an error stating that the object does not exist. You should edit interfaces using the **enter interface** command before you add them to a port-channel.

Step 3 (Optional) Set the interface type.

```
set port-type {data | data-sharing | mgmt | firepower-eventing | cluster}
```

Example:

```
Firepower /eth-uplink/fabric/interface # set port-type mgmt
```

The **data** keyword is the default type. The **data-sharing** type is only supported with container instances. Do not choose the **cluster** keyword; by default, the cluster control link is automatically created on Port-channel 48.

Step 4 Enable or disable autonegotiation, if supported for your interface.

```
set auto-negotiation {on | off}
```

Example:

```
Firepower /eth-uplink/fabric/interface* # set auto-negotiation off
```

Step 5 Set the interface speed.

```
set admin-speed {10mbps | 100mbps | 1gbps | 10gbps | 40gbps | 100gbps}
```

Example:

```
Firepower /eth-uplink/fabric/interface* # set admin-speed 1gbps
```

Step 6 Set the interface duplex mode.

```
set admin-duplex {fullduplex | halfduplex}
```

Example:

```
Firepower /eth-uplink/fabric/interface* # set admin-duplex halfduplex
```

Step 7 If you edited the default flow control policy, it is already applied to interfaces. If you created a new policy, apply it to the interface. See [Configure a Flow Control Policy, on page 24](#).

```
set flow-control-policy name
```

Example:

```
Firepower /eth-uplink/fabric/interface* # set flow-control-policy flow1
```

Step 8 Save the configuration.

```
commit-buffer
```

Example:

```
Firepower /eth-uplink/fabric/interface* # commit-buffer
Firepower /eth-uplink/fabric/interface #
```

Add an EtherChannel (Port Channel)

An EtherChannel (also known as a port channel) can include up to 16 member interfaces of the same media type and capacity, and must be set to the same speed and duplex. The media type can be either RJ-45 or SFP; SFPs of different types (copper and fiber) can be mixed. You cannot mix interface capacities (for example 1GB and 10GB interfaces) by setting the speed to be lower on the larger-capacity interface. The Link Aggregation Control Protocol (LACP) aggregates interfaces by exchanging the Link Aggregation Control Protocol Data Units (LACPDU)s 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** Enter interface mode:
- ```
scope eth-uplink
scope fabric a
```
- Step 2** Create the port-channel:
- ```
create port-channel id
enable
```
- Step 3** Assign member interfaces:
- ```
create member-port interface_id
```

### Example:

```
Firepower /eth-uplink/fabric/port-channel* # create member-port Ethernet1/1
Firepower /eth-uplink/fabric/port-channel/member-port* # exit
Firepower /eth-uplink/fabric/port-channel* # create member-port Ethernet1/2
Firepower /eth-uplink/fabric/port-channel/member-port* # exit
Firepower /eth-uplink/fabric/port-channel* # create member-port Ethernet1/3
Firepower /eth-uplink/fabric/port-channel/member-port* # exit
Firepower /eth-uplink/fabric/port-channel* # create member-port Ethernet1/4
```

```
Firepower /eth-uplink/fabric/port-channel/member-port* # exit
```

**Step 4** (Optional) Set the interface type.

```
set port-type {data | data-sharing | mgmt | firepower-eventing | cluster}
```

**Example:**

```
Firepower /eth-uplink/fabric/port-channel # set port-type data
```

The **data** keyword is the default type. The **data-sharing** type is only supported with container instances. Do not choose the **cluster** keyword unless you want to use this port-channel as the cluster control link instead of the default.

**Step 5** (Optional) Set the interface speed for all members of the port-channel.

```
set speed {10mbps | 100mbps | 1gbps | 10gbps | 40gbps | 100gbps}
```

**Example:**

```
Firepower /eth-uplink/fabric/port-channel* # set speed 1gbps
```

**Step 6** (Optional) Set the duplex for all members of the port-channel.

```
set duplex {fullduplex | halfduplex}
```

**Example:**

```
Firepower /eth-uplink/fabric/port-channel* # set duplex fullduplex
```

**Step 7** Enable or disable autonegotiation, if supported for your interface.

```
set auto-negotiation {on | off}
```

**Example:**

```
Firepower /eth-uplink/fabric/interface* # set auto-negotiation off
```

**Step 8** Set the LACP port-channel mode for data and data-sharing interfaces.

For non-Data and non-data-sharing interfaces, the mode is always active.

```
set port-channel-mode {active | on}
```

**Example:**

```
Firepower /eth-uplink/fabric/port-channel* # set port-channel-mode on
```

**Step 9** If you edited the default flow control policy, it is already applied to interfaces. If you created a new policy, apply it to the interface. See [Configure a Flow Control Policy, on page 24](#).

```
set flow-control-policy name
```

**Example:**

```
Firepower /eth-uplink/fabric/interface* # set flow-control-policy flow1
```

- Step 10** Commit the configuration:  
**commit-buffer**

## 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.

You can also add subinterfaces within the application.

### Procedure

- Step 1** Enter fabric a mode.

```
scope eth-uplink
```

```
scope fabric a
```

**Example:**

```
Firepower# scope eth-uplink
Firepower /eth-uplink # scope fabric a
Firepower /eth-uplink/fabric #
```

- Step 2** Enter the interface to which you want to add the subinterface.

```
enter {interface | port-channel} interface_id
```

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.

Subinterfaces are supported on data or data-sharing type interfaces.

**Example:**

```
Firepower /eth-uplink/fabric # enter interface Ethernet1/8
Firepower /eth-uplink/fabric/interface #
```

- Step 3** Create the subinterface.

```
enter subinterface id
```

- *id*—Set the 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.

**Example:**

```
Firepower /eth-uplink/fabric/interface # enter subinterface 100
Firepower /eth-uplink/fabric/interface/subinterface* #
```

**Step 4** Set the VLAN.

**set vlan *id***

- *id*—Set the VLAN ID between 1 and 4095.

**Example:**

```
Firepower /eth-uplink/fabric/interface/subinterface* # set vlan 100
```

**Step 5** Set the interface type.

**set port-type {data | data-sharing}**

**Example:**

```
Firepower /eth-uplink/fabric/interface/subinterface* # set port-type data
```

The type is independent of the parent interface type; you can have a data-sharing parent and a data subinterface, for example. The default type is data.

**Step 6** Save the configuration.

**commit-buffer**

**Example:**

```
Firepower /eth-uplink/fabric/interface/subinterface* # commit-buffer
Firepower /eth-uplink/fabric/interface/subinterface #
```

**Example**

The following example creates 3 subinterfaces on Ethernet 1/1, and sets them to be data-sharing interfaces.

```
Firepower# scope eth-uplink
Firepower /eth-uplink # scope fabric a
Firepower /eth-uplink/fabric # enter interface Ethernet1/1
Firepower /eth-uplink/fabric/interface # enter subinterface 10
Firepower /eth-uplink/fabric/interface/subinterface* # set vlan 10
Firepower /eth-uplink/fabric/interface/subinterface* # set port-type data-sharing
Firepower /eth-uplink/fabric/interface/subinterface* # exit
Firepower /eth-uplink/fabric/interface # enter subinterface 11
Firepower /eth-uplink/fabric/interface/subinterface* # set vlan 11
Firepower /eth-uplink/fabric/interface/subinterface* # set port-type data-sharing
```

```

Firepower /eth-uplink/fabric/interface/subinterface* # exit
Firepower /eth-uplink/fabric/interface # enter subinterface 12
Firepower /eth-uplink/fabric/interface/subinterface* # set vlan 12
Firepower /eth-uplink/fabric/interface/subinterface* # set port-type data-sharing
Firepower /eth-uplink/fabric/interface/subinterface* # commit-buffer
Firepower /eth-uplink/fabric/interface/subinterface #

```

## 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** To create a new breakout, use the following commands:

a) Enter cabling mode:

```
scope cabling
```

```
scope fabric a
```

b) Create the breakout:

```
create breakout network_module_slot port
```

#### Example:

```
Firepower /cabling/fabric/ # create breakout 2 1
```

c) Commit the configuration:

```
commit-buffer
```

This will cause an automatic reboot. If you are configuring more than one breakout, you should create all of them before you issue the commit-buffer command.

**Step 2** To enable/configure the breakout ports, use the following commands:

a) Enter interface mode:

```
scope eth-uplink
```

```
scope fabric a
```

```
scope aggr-interface network_module_slot port
```

**Note** Interfaces that are already a member of a port-channel cannot be modified individually. If you use the **enter interface** or **scope interface** command on an interface that is a member of a port channel, you will receive an error stating that the object does not exist. You should edit interfaces using the **enter interface** command before you add them to a port-channel.

- b) Use the **set** command to configure the interface speed and port type.  
Use the **enable** or **disable** command to set the administrative state of the interface.
  - c) Commit the configuration:  
**commit-buffer**
- 

## Configure a Flow Control Policy

Flow control policies determine whether the Ethernet ports send and receive IEEE 802.3x pause frames when the receive buffer for a port fills. These pause frames request that the transmitting port stop sending data for a few milliseconds until the buffer clears. For flow control to work between devices, you must enable the corresponding receive and send flow control parameters for both devices.

The default policy disables send and receive control, and sets the priority to autonegotiate.

### Procedure

---

**Step 1** Enter eth-uplink and then flow-control mode.

**scope eth-uplink**

**scope flow-control**

**Example:**

```
firepower-4110# scope eth-uplink
firepower-4110 /eth-uplink # scope flow-control
firepower-4110 /eth-uplink/flow-control #
```

**Step 2** Edit or create a flow control policy.

**enter policy name**

If you want to edit the default policy, enter **default** for the name.

**Example:**

```
firepower-4110 /eth-uplink/flow-control # enter policy default
firepower-4110 /eth-uplink/flow-control/policy* #
```

**Step 3** Set the priority.

**set prio {auto | on}**

The priority sets whether to negotiate or enable PPP for this link.

**Example:**

```
firepower-4110 /eth-uplink/flow-control/policy* # set prio on
```

**Step 4** Enable or disable flow control receive pauses.



**set receive {on | off}**

- **on**—Pause requests are honored and all traffic is halted on that uplink port until the network cancels the pause request.
- **off**—Pause requests from the network are ignored and traffic flow continues as normal.

**Example:**

```
firepower-4110 /eth-uplink/flow-control/policy* # set receive on
```

**Step 5** Enable or disable flow control send pauses.

**set send {on | off}**

- **on**—The Firepower 4100/9300 sends a pause request to the network if the incoming packet rate becomes too high. The pause remains in effect for a few milliseconds before traffic is reset to normal levels.
- **off**—Traffic on the port flows normally regardless of the packet load.

**Example:**

```
firepower-4110 /eth-uplink/flow-control/policy* # set send on
```

**Step 6** Save the configuration.

**commit-buffer****Example:**

```
firepower-4110 /eth-uplink/flow-control/policy* # commit-buffer
firepower-4110 /eth-uplink/flow-control/policy #
```

**Example**

The following example configures a flow control policy.

```
firepower-4110# scope eth-uplink
firepower-4110 /eth-uplink # scope flow-control
firepower-4110 /eth-uplink/flow-control # enter policy FlowControlPolicy23
firepower-4110 /eth-uplink/flow-control/policy* # set prio auto
firepower-4110 /eth-uplink/flow-control/policy* # set receive on
firepower-4110 /eth-uplink/flow-control/policy* # set send on
firepower-4110 /eth-uplink/flow-control/policy* # commit-buffer
firepower-4110 /eth-uplink/flow-control/policy #
```

## Monitoring Interfaces

- show interface

Shows interface status.



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

```
Firepower# scope eth-uplink
Firepower /eth-uplink # scope fabric a
Firepower /eth-uplink/fabric # show interface
```

```
Interface:
 Port Name Port Type Admin State Oper State
 Allowed Vlan State Reason

 Ethernet1/2 Data Enabled Up
All
 Ethernet1/4 Mgmt Enabled Up
All
 Ethernet1/5 Data Enabled Up
Untagged
 Ethernet1/7 Firepower Eventing Enabled Up
All
 Ethernet1/8 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/1 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/2 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/3 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/4 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/5 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/6 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/7 Data Disabled Sfp Not Present
All Unknown
 Ethernet2/8 Data Disabled Sfp Not Present
All Unknown
```

#### • show port-channel

Shows port-channel status.

```
Firepower# scope eth-uplink
Firepower /eth-uplink # scope fabric a
Firepower /eth-uplink/fabric # show port-channel
```

```
Port Channel:
 Port Channel Id Name Port Type Admin State Oper State
 Port Channel Mode Allowed Vlan State Reason

 1 Port-channel1 Data Enabled Up
Active Untagged
 2 Port-channel2 Data Enabled Failed
Active All No operational members
 48 Port-channel48 Cluster Enabled Up
```

```
Active All
```

- **show detail**

View forwarding table and VLAN group usage for shared interfaces.

```
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:
```

- **show subinterface**

Shows subinterfaces for a given interface.

```
Firepower# scope eth-uplink
Firepower /eth-uplink # scope fabric a
Firepower /eth-uplink/fabric # enter interface ethernet1/8
Firepower /eth-uplink/fabric/interface # show subinterface
Sub Interface:
 Sub-If Id Sub-Interface Name VLAN Port Type

 10 Ethernet1/8.10 11 Data
 11 Ethernet1/8.11 12 Data
```

- **show mac-address**

Shows MAC address assignments for container instance interfaces.

```
Firepower# scope ssa
Firepower /ssa # scope auto-macpool
Firepower /ssa/auto-macpool # show mac-address
Mac Address Item:
 Mac Address Owner Profile Owner Name

 A2:46:C4:00:00:1E ftd13 Port-channel14
 A2:46:C4:00:00:20 ftd14 Port-channel15
 A2:46:C4:00:01:7B ftd1 Ethernet1/3
 A2:46:C4:00:01:7C ftd12 Port-channel11
```

|                   |       |                |
|-------------------|-------|----------------|
| A2:46:C4:00:01:7D | ftd13 | Port-channel14 |
| A2:46:C4:00:01:7E | ftd14 | Port-channel15 |
| A2:46:C4:00:01:7F | ftd1  | Ethernet1/2    |
| A2:46:C4:00:01:80 | ftd12 | Ethernet1/2    |
| A2:46:C4:00:01:81 | ftd13 | Ethernet1/2    |
| A2:46:C4:00:01:82 | ftd14 | Ethernet1/2    |
| A2:46:C4:00:01:83 | ftd2  | Ethernet3/1/4  |
| A2:46:C4:00:01:84 | ftd2  | Ethernet3/1/1  |
| A2:46:C4:00:01:85 | ftd2  | Ethernet3/1/3  |
| A2:46:C4:00:01:86 | ftd2  | Ethernet3/1/2  |
| A2:46:C4:00:01:87 | ftd2  | Ethernet1/2    |
| A2:46:C4:00:01:88 | ftd1  | Port-channel21 |
| A2:46:C4:00:01:89 | ftd1  | Ethernet1/8    |

## 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#
```

- 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
```

- 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:

- 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
2049 511 configured
 0 present
 0 present

```

- 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 6: 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-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:B0:00:00:25

```

```
Name: PC1.300_ftd
Port or Port Channel Name: Port-channel1.300
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-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:B0:00:00:28
```

```
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-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:B0:00:00:2E

Name: PC1.300_ftd
Port or Port Channel Name: Port-channel1.300
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-channel1.400
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-channel1.400
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-channel1.400
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-channel1.400
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-channel1.400 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><b>Note</b> Requires FTD Version 6.3 or later.</p> <p>New/Modified commands: <b>create subinterface, set vlan, show interface, show subinterface</b></p> <p>New/Modified Firepower Management Center screens:</p> <p><b>Devices &gt; Device Management &gt; Edit icon &gt; Interfaces</b> 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><b>Note</b> Requires FTD Version 6.3 or later.</p> <p>New/Modified commands: <b>set port-type data-sharing, show interface</b></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 commands: <b>set port-channel-mode</b></p>                                                                                                                                                                                                                                  |
| Support for EtherChannels in FTD inline sets            | 2.1.1             | <p>You can now use EtherChannels in a FTD inline set.</p>                                                                                                                                                                                                                                                                                                                                                                                               |
| 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> <p>New/Modified commands: <b>show fault  grep link-down, show interface detail</b></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><b>Devices &gt; Device Management &gt; Interfaces &gt; Edit Physical Interface</b></p>                                                                        |

| Feature Name                              | Platform Releases | Feature Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 FXOS commands: <b>set port-type firepower-eventing, show interface</b></p> |

