



Configuring the Fabric Extender

This chapter describes how to configure a Cisco Nexus 2000 Series Fabric Extender using a parent Cisco Nexus 7000 Series device and includes the following sections:

- [Configuring the Cisco Nexus 2000 Series Fabric Extender, page 1](#)
- [Verifying the Configuration, page 18](#)
- [Additional References, page 25](#)

Configuring the Cisco Nexus 2000 Series Fabric Extender

This section describes how to configure the Fabric Extender.

Information About Cisco Nexus 2000 Series Fabric Extender

FEX in Active-Active Mode

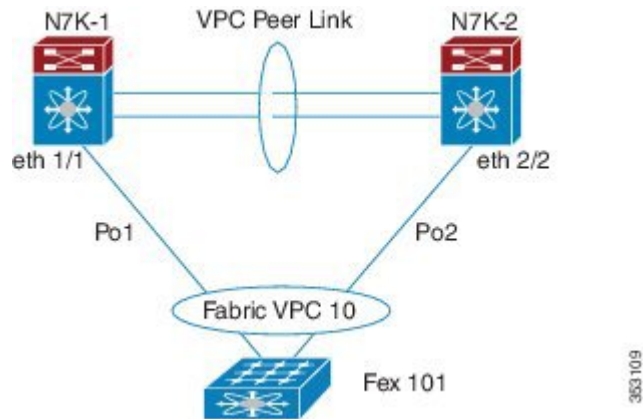
Beginning with Cisco NX-OS Release 7.2(0)D1(1), a Fabric Extender can support connections to two Cisco Nexus 7000 Series switches in active-active mode using a vPC.

A Fabric Extender in active-active (FEX-AA) mode:

- Uses a vPC to provide a seamless fail-over and fast convergence when one of the switches fail.

- Supports traffic across both switches to maintain efficiency.

Figure 1: FEX Active-Active



Configuration Synchronization and FEX-AA

The vPC configuration synchronization feature can be used for FEX-AA. Configuration synchronization allows you to synchronize the configuration between a pair of switches in a network. You use a switch profile to create a configuration file that is applied locally and used to synchronize the configuration to the peer.

Guidelines and Limitations for FEX-AA

The following are guidelines and limitations for FEX-AA:

- FEX-AA is not supported on vPC+ deployments.
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- Configuring FEX-AA across two VDCs on the same chassis is not supported.
- FEXs configured in AA mode cannot have host interfaces configured in L3 mode.
- Straight-Through FEX and Active-Active FEX cannot exist on a same ASIC instance.
- Both Cisco Nexus 7000 Series switches can configure the FEX.
- Both Cisco Nexus 7000 Series switches must configure the FEX in the same way so that the fex-id is the same for each.
- The configuration of host ports and host port-channels behind the FEX in AA mode must be the same on both the Cisco Nexus 7000 switches .
- The FEX image can be downloaded from either Cisco Nexus 7000 Series switch.

Managing the Fabric Extender Feature Set

You can install and manage the Fabric Extender feature set.

SUMMARY STEPS

1. [Installing the Fabric Extender Feature Set, on page 3](#)
2. [Enabling the Fabric Extender Feature Set, on page 4](#)
3. (Optional) [Disallowing the Fabric Extender Feature Set, on page 5](#)

DETAILED STEPS

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- Step 1** [Installing the Fabric Extender Feature Set, on page 3](#)
- Step 2** [Enabling the Fabric Extender Feature Set, on page 4](#)
- Step 3** (Optional) [Disallowing the Fabric Extender Feature Set, on page 5](#)
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Installing the Fabric Extender Feature Set



Note You must enable the Fabric Extender feature set in the default virtual device context (VDC). Once enabled in the default VDC, the FEX can belong to any VDC and can be configured from those VDCs. A single Fabric Extender belongs exclusively to a single VDC.

Before You Begin

Ensure that you are in the default VDC.

Ensure that you have disabled the Intrusion Detection System (IDS) reserved addresses check (it is disabled by default). Use the **show hardware ip verify** command and look for the string "address reserved" in the output. If the IDS reserved addresses check is enabled, disable it with the **no hardware ip verify address reserved** command.

SUMMARY STEPS

1. **configure terminal**
2. **install feature-set fex**
3. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	install feature-set fex	Installs the Fabric Extender feature set in the default VDC.

	Command or Action	Purpose
	Example: <pre>switch(config)# install feature-set fex</pre>	To uninstall the Fabric Extender feature set, use the no install feature-set fex command. Before you can uninstall the feature set, you must ensure the following: <ul style="list-style-type: none"> • The feature set must be installed in the default VDC. • The feature set must not be enabled in any VDC.
Step 3	exit Example: <pre>switch(config)# exit switch#</pre>	Exits global configuration mode.

Enabling the Fabric Extender Feature Set

You can enable the installed Fabric Extender feature set in any VDC on the device.

Before You Begin

Ensure that you have installed the Fabric Extender feature set in the default VDC.

Ensure that you are in the correct VDC or use the **switchto vdc** command.

SUMMARY STEPS

1. **configure terminal**
2. **feature-set fex**
3. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	feature-set fex Example: <pre>switch(config)# feature-set fex</pre>	Enables the Fabric Extender feature set. The feature set must be installed before it shows as an option to this command. To disable the Fabric Extender feature set, use the no feature-set fex command. Before you can disable a feature set, you must install the feature set in the default VDC.

	Command or Action	Purpose
		Note The no feature-set fex command might take some time to complete if the size of the configuration is very large. The command cleans up all of the configurations associated with the Fabric Extender feature set.
Step 3	exit Example: <pre>switch(config)# exit switch#</pre>	Exits global configuration mode.

Disallowing the Fabric Extender Feature Set

By default, when you install the Fabric Extender feature set, it is allowed in all VDCs. You can disallow the installed Fabric Extender feature set in a specific VDC on the device.

Before You Begin

Ensure that you have installed the feature set in the default VDC.

Ensure that you have not enabled the feature set in the specified VDC.

SUMMARY STEPS

1. **configure terminal**
2. **vdc vdc_ID**
3. **no allow feature-set fex**
4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	vdc vdc_ID Example: <pre>switch(config)# vdc 1</pre>	Specifies a VDC and enters VDC configuration mode.

	Command or Action	Purpose
Step 3	no allow feature-set fex Example: <pre>switch(config-vdc)# no allow feature-set fex</pre>	Disallows the feature set in the VDC. You cannot disallow a feature set that is enabled in the specified VDC. By default, the installed Fabric Extender feature set is allowed in all VDCs on the device. You can disallow a feature set in a specific VDC. Subsequently, you can change the status back to allowed with the allow feature-set fex command.
Step 4	end Example: <pre>switch(config-vdc)# end switch#</pre>	Exits VDC configuration mode and returns to EXEC mode.

Associating a Fabric Extender to a Fabric Interface

A FEX is connected to its parent device through a port channel. By default, the parent device does not allow the attached Fabric Extender to connect until it has been assigned a FEX number and is associated with the connected interface.



Note You must have installed and enabled the Fabric Extender features with the **install feature-set fex** and **feature-set fex** commands before you can configure and use a Fabric Extender that is connected to the parent switch.



Note Nexus 7000 doesn't support static pinning configuration on FEX.



Note Associating a Fabric Extender to a fabric interface enables the specified port to operate only in shared rate-mode. The port does not support dedicated rate-mode when associated with a Fabric Extender.

Associating a Fabric Extender to a Port Channel

Before You Begin

Ensure that you have installed and enabled the Fabric Extender feature set.

SUMMARY STEPS

1. **configure terminal**
2. **interface port-channel** *channel*
3. **switchport**
4. **switchport mode fex-fabric**
5. **fex associate** *FEX-number*
6. (Optional) **show interface port-channel** *channel fex-intf*

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	interface port-channel <i>channel</i> Example: switch(config)# interface port-channel 4 switch(config-if)#	Specifies a port channel to configure.
Step 3	switchport Example: switch(config-if)# switchport	Sets the interface as a Layer 2 switching port.
Step 4	switchport mode fex-fabric Example: switch(config-if)# switchport mode fex-fabric	Sets the port channel to support an external Fabric Extender.
Step 5	fex associate <i>FEX-number</i> Example: switch(config-if)# fex associate 101	Associates a FEX number to the Fabric Extender unit attached to the interface. The range is from 100 to 199.
Step 6	show interface port-channel <i>channel fex-intf</i> Example: switch# show interface port-channel 4 fex-intf	(Optional) Displays the association of a Fabric Extender to a port channel interface.

This example shows how to associate the Fabric Extender to a port channel interface on the parent device:

```
switch# configure terminal
switch(config)# interface ethernet 1/28
switch(config-if)# channel-group 4
switch(config-if)# no shutdown
switch(config-if)# exit
switch(config)# interface ethernet 1/29
```

```

switch(config-if)# channel-group 4
switch(config-if)# no shutdown
switch(config-if)# exit
switch(config)# interface ethernet 1/30
switch(config-if)# channel-group 4
switch(config-if)# no shutdown
switch(config-if)# exit
switch(config)# interface ethernet 1/31
switch(config-if)# channel-group 4
switch(config-if)# no shutdown
switch(config-if)# exit
switch(config)# interface port-channel 4
switch(config-if)# switchport
switch(config-if)# switchport mode fex-fabric
switch(config-if)# fex associate 101

```

**Tip**

As a best practice, only enter the **fex associate** command from the port channel interface, not from the physical interface.

**Note**

When adding physical interfaces to port channels, all configurations on the port channel and physical interface must match.

This example shows how to display the association of the Fabric Extender and the parent device:

```

switch# show interface port-channel 4 fex-intf
Fabric          FEX
Interface       Interfaces
-----
Po4             Eth101/1/48   Eth101/1/47   Eth101/1/46   Eth101/1/45
                Eth101/1/44   Eth101/1/43   Eth101/1/42   Eth101/1/41
                Eth101/1/40   Eth101/1/39   Eth101/1/38   Eth101/1/37
                Eth101/1/36   Eth101/1/35   Eth101/1/34   Eth101/1/33
                Eth101/1/32   Eth101/1/31   Eth101/1/30   Eth101/1/29
                Eth101/1/28   Eth101/1/27   Eth101/1/26   Eth101/1/25
                Eth101/1/24   Eth101/1/23   Eth101/1/22   Eth101/1/21
                Eth101/1/20   Eth101/1/19   Eth101/1/18   Eth101/1/17
                Eth101/1/16   Eth101/1/15   Eth101/1/14   Eth101/1/13
                Eth101/1/12   Eth101/1/11   Eth101/1/10   Eth101/1/9
                Eth101/1/8    Eth101/1/7    Eth101/1/6    Eth101/1/5
                Eth101/1/4    Eth101/1/3    Eth101/1/2    Eth101/1/1

```

Disassociating a Fabric Extender from an Interface

Before You Begin

Ensure that you have installed and enabled the Fabric Extender feature set.

Ensure that you are in the correct VDC (or use the **switchto vdc** command).

SUMMARY STEPS

1. **configure terminal**
2. **interface {ethernet slot/port | port-channel channel}**
3. **no fex associate**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	interface {ethernet slot/port port-channel channel} Example: switch(config)# interface port-channel 4 switch(config-if)#	Specifies the interface to configure. The interface can be an Ethernet interface or a port channel.
Step 3	no fex associate Example: switch(config-if)# no fex associate	Disassociates the Fabric Extender unit attached to the interface.

Associating a Fabric Extender to an F-Series Module

Before You Begin

Ensure that you have installed and enabled the Fabric Extender feature set.

- switch# **configure terminal**
- switch(config)# **install feature-set fex**
- switch(config)# **feature-set fex**

**Note**

F-Series modules (except F1 Series) are supported only by the following FEX devices:

- 2248TP
 - 2248TP-E
 - 2248PQ
 - 2348UPQ
 - 2348TQ
 - 2232TP
 - 2232PP
 - 2232TM
 - 2224TP
 - B22-IBM
 - B22-HP
-

**Note**

Restriction for F2-Series Linecards in an F2 VDC:

Each port in the ASIC has an index. Allow only ports with similar indices across ASICs to be added to a port channel.

For example, if port 1 has an index of 1 and port 2 has an index of 2, the following ports are supported and not supported:

- Supported: Port 1 of ASIC 1 and port 1 of ASIC 2 are added to a port channel.
- Not supported (For F2-series): Port 1 of ASIC 1 and port 2 of ASIC 2 to form a port channel.

A set of ports from an ASIC that has an index sub-set S, such as {1,2,4}, is allowed to be added to a port channel only if the port channel has an equivalent or an empty set.

SUMMARY STEPS

1. **vdc switch**
2. **limit-resource module-type** [f2e | f3]
3. **interface ethernet** *mod-number port-range*
4. **allocate interface ethernet** *slot-port*
5. **switchport mode fex -fabric**
6. **fex associate** *FEX chassis number*
7. **channel-group** *port-channel number*
8. **no shutdown**
9. **int port** *port-channel number*
10. **no shutdown**

DETAILED STEPS

	Command or Action	Purpose
Step 1	vdc switch Example: switch(config)# vdc switch	Specifies the VDC.
Step 2	limit-resource module-type [f2e f3] Example: switch(config)# limit-resource module-type f2e	Specifies the module type.
Step 3	interface ethernet <i>mod-number port-range</i> Example: switch(config)# interface ethernet 1/1	Specifies the interface.
Step 4	allocate interface ethernet <i>slot-port</i> Example: switch(config)# allocate interface ethernet 1	Allocates the F2-Series interfaces to VDC.
Step 5	switchport mode fex -fabric Example: switch(config-if)# switchport mode fex -fabric	Specifies the FEX.
Step 6	fex associate <i>FEX chassis number</i> Example: switch(config-if)# fex associate 101	Specifies the chassis.
Step 7	channel-group <i>port-channel number</i> Example: switch(config-if)# channel-group 1	Specifies the port channel number.
Step 8	no shutdown Example: switch(config-if)# no shutdown	Brings up the port.
Step 9	int port <i>port-channel number</i> Example: switch(config-if)# int port 1	Specifies the port channel.
Step 10	no shutdown Example: switch(config-if)# no shutdown	Brings up the port channel.

Configuring Fabric Extender Global Features

You can configure global features on the Fabric Extender.

Before You Begin

Ensure that you have enabled the Fabric Extender feature set.

SUMMARY STEPS

1. **configure terminal**
2. **fex** *FEX-number*
3. (Optional) **description** *desc*
4. (Optional) **no description**
5. (Optional) **type** *FEX-type*
6. (Optional) **no type**
7. (Optional) **serial** *serial*
8. (Optional) **no serial**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	fex <i>FEX-number</i> Example: <pre>switch(config)# fex 101 switch(config-fex)#</pre>	Enters FEX configuration mode for the specified Fabric Extender. The range of the <i>FEX-number</i> is from 101 to 199.
Step 3	description <i>desc</i> Example: <pre>switch(config-fex)# description Rack7A-N2K</pre>	(Optional) Specifies the description. The default is the string FEXxxxx where <i>xxxx</i> is the FEX number. If the FEX number is 123, the description is FEX0123.
Step 4	no description Example: <pre>switch(config-fex)# no description</pre>	(Optional) Deletes the description.
Step 5	type <i>FEX-type</i> Example: <pre>switch(config-fex)# type N2248T</pre>	(Optional) Specifies the type of Fabric Extender. The <i>FEX-type</i> is one of the following: <ul style="list-style-type: none"> • N2224TP—24 100 Base-T/1000 Base-T Ethernet host interfaces and 2 10-Gigabit SFP+ Ethernet fabric interfaces module

	Command or Action	Purpose
		<ul style="list-style-type: none"> • N2232P and N2232TM—32 10-Gigabit SFP+ Ethernet host interfaces and 8 10-Gigabit SFP+ Ethernet fabric interfaces module • N2248T and N2248TP-E—48 100 Base-T/1000 Base-T Ethernet host interfaces and 4 10-Gigabit SFP+ Ethernet fabric interfaces module. • N2248PQ—48 10-Gigabit SFP+ Ethernet host interfaces and 16 10-Gigabit SFP+ Ethernet fabric interfaces module. • NB22HP—16 1G/10-Gigabit SFP+ Ethernet host interfaces and 8 10-Gigabit SFP+ Ethernet fabric interfaces module <p>The parent Cisco Nexus Series device remembers the type of the Fabric Extender in its binary configuration. When this feature is configured, the Fabric Extender is allowed only to come online if its type matches the configured FEX type.</p>
Step 6	no type Example: <pre>switch(config-fex)# no type</pre>	(Optional) Deletes the FEX type. When a Fabric Extender is connected to the fabric interfaces and does not match the configured type that is saved in the binary configuration on the parent switch, all configurations for all interfaces on the Fabric Extender are deleted.
Step 7	serial serial Example: <pre>switch(config-fex)# serial JAF1339BDSK</pre>	(Optional) Defines a serial number string. If this command is configured, a switch allows the corresponding chassis ID to associate (using the fex associate command) only if the Fabric Extender reports a matching serial number string. Caution Configuring a serial number that does not match the specified Fabric Extender forces the Fabric Extender offline.
Step 8	no serial Example: <pre>switch(config-fex)# no serial</pre>	(Optional) Deletes the serial number string.

Enabling DSCP to Queue Mapping

For Cisco NX-OS Release 6.2(2) and later releases, the Cisco Fabric Extenders support Layer 3 protocol adjacencies on host interfaces (HIFs) and DSCP to queue mapping. Before Cisco NX-OS Release 6.2(2), you can configure a Fabric Extender (FEX) port as a Layer 3 interface for host connectivity, but not for routing. See the Configuring the Cisco Nexus 2000 Series Fabric Extender for more information about fabric extenders.

Before Cisco NX-OS 6.2(2), the Fabric Extender cannot participate in a routing protocol adjacency with a device attached to its port. Only a static direct route is supported. This restriction applies to both of the following supported connectivity cases:

- Switch virtual interfaces (SVI) with Fabric Extender single port or portchannel in Layer 2 mode.
- Fabric Extender port or portchannel in Layer 3 mode.

SUMMARY STEPS

1. **configure terminal**
2. **hardware qos dscp-to-queue ingress module type {all | f-series | m-series}**
3. (Optional) **show hardware qos dscp-to-queue ingress**
4. (Optional) **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: switch(config)# configure terminal	Enters global configuration mode.
Step 2	hardware qos dscp-to-queue ingress module type {all f-series m-series} Example: switch(config)# hardware qos dscp-to-queue ingress module type m-series	Enables the dscp-to-queue mapping on the specified module(s).
Step 3	show hardware qos dscp-to-queue ingress Example: switch(config)# show hardware qos dscp-to-queue ingress	(Optional) Displays information about the status of dscp-to-queue mapping in ingress direction.
Step 4	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Saves the running configuration to the startup configuration.

Configuration Examples

This section contains examples of FEX configurations.

Configuring a FEX with a Layer 3 Host Interface

This example shows how to configure a Fabric Extender with a Layer 3 host interface (at the interface level, subinterface level, port channel level, and port channel subinterface level):

Layer 3 Configuration	Layer 3 Subinterface Configuration
<pre> config t interface ethernet 101/1/1 no switchport ip address 192.0.1.1/24 Mtu 9000 no shutdown </pre>	<pre> config t interface ethernet 101/1/1.12 ip address 192.0.2.1/24 encapsulation dot1Q 12 mtu 850 no shutdown </pre>

Layer 3 Host Interface Port Channel Configuration	Layer 3 Host Interface Port Channel Subinterface Configuration
<pre> config t interface ethernet 101/1/1-2 no switchport channel-group 12 no shutdown interface port-channel 12 ip address 192.0.3.1/24 mtu 2000 no shutdown </pre>	<pre> config t interface ethernet 101/1/1-2 no switchport channel-group 12 no shutdown interface port-channel 12.14 ip address 192.0.4.1/24 encapsulation dot1Q 14 mtu 1700 no shutdown </pre>



Note The VLAN used in the Layer 3 host interface (HIF) or host interface port channel (HIFPC) subinterface has only local significance to its parent interface. The same VLAN ID can be reused between Layer 3 subinterfaces in the same switch or VDC.

Configuring a Host Interface in a vPC Topology Connected to Two FEXs

This example shows how to configure a host vPC with a FEX (host vPC attached to two different FEXs):



Note The `switchport trunk allowed vlan vlan-list` command is not supported on FEX fabric interfaces.

Switch 1 Configuration	Switch 2 Configuration
<pre> config t feature lacp int e101/1/1-2 channel-group 12 mode active no shutdown int port-channel10 switchport switchport mode trunk switchport trunk allowed vlan 1-20 vpc 10 </pre>	<pre> config t feature lacp int e101/1/1-2 channel-group 12 mode active no shutdown int port-channel10 switchport switchport mode trunk switchport trunk allowed vlan 1-20 vpc 10 </pre>

Configuring a Host Interface in a vPC Topology Connected to Two FEXs

This example shows how to configure a host vPC with a FEX (host vPC attached to two different FEXs):



Note The `switchport trunk allowed vlan vlan-list` command is not supported on FEX fabric interfaces.

Switch 1 Configuration	Switch 2 Configuration
<pre> config t feature lacp int e101/1/1-2 channel-group 12 mode active no shutdown int port-channel10 switchport switchport mode trunk switchport trunk allowed vlan 1-20 vpc 10 </pre>	<pre> config t feature lacp int e101/1/1-2 channel-group 12 mode active no shutdown int port-channel10 switchport switchport mode trunk switchport trunk allowed vlan 1-20 vpc 10 </pre>

Dual-Homing of a Server to a FEX with FabricPath



Note Cisco Nexus 7000 Series switches do not support dual-homing.

To configure FabricPath interfaces for two switches that are connected with FabricPath, perform the following tasks on each switch:

- Enable FabricPath on each switch.
- Configure the interfaces that you want to designate as FabricPath interfaces.
- Set the STP priority device to 8192 on all FabricPath Layer 2 gateway devices.
- (Optional) Set the STP domain ID for each of the separate STP domains that are connected to the FabricPath network.

- (Optional) Configure a FEX switch ID.

To configure FabricPath interfaces, follow these steps:

- 1 (Optional) Enable FabricPath on each switch.

```
switch# config terminal
switch(config)# feature fabricpath
switch(config-lldp)# exit
switch(config)#
```

- 2 After you enable FabricPath on the switch, configure the specified interface as FabricPath interfaces.

```
switch(config)# interface ethernet 1/2
switch(config-if)# switchport mode fabricpath
switch(config-if)# exit
switch(config)#
```

- 3 Configure the STP priority for all Rapid PVST+ VLANs as 8192.

```
switch# config terminal
switch(config)# spanning-tree vlan 11-20 priority 8192
switch(config)#
```

- 4 Configure the STP priority for all MST instances as 8192.

```
switch# config terminal
switch(config)# spanning-tree mst 1-5 priority 8192
switch(config)#
```

- 5 (Optional) Configure the STP domain ID on each FabricPath Layer 2 gateway switch attached to the FabricPath network.

```
switch# config terminal
switch(config)# spanning-tree domain 5
switch(config)
```

- 6 (Optional) Configure the FEX switch ID.



Note

See the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide* for information on configuring FEX.



Note

FEX VPC+ configurations are supported only on F2-Series modules.

If you are setting up an initial FEX VPC+ configuration on an F2-Series module, follow these steps:

- a In the VPC domain configuration mode, enable partial DF mode with the **fabricpath multicast load-balance** command.
- b If disabled, enable TRILL style mac-address learning with the **mac address-table core-port-learning** command.
- c In the VPC domain configuration mode, configure the emulated switch ID with the **fabricpath switchid switchid#** command.
- d On each of the VPC/VPC+ peer link interfaces in interface configuration mode, enter the **switchport mode fabricpath** command.
- e On each VPC/VPC+ peer link port channel, enter the **VPC peer-link** command.
- f Configure the VPC ID with the **vpc vpcid** command.

If you are changing an existing FEX VPC configuration to a FEX VPC+ configuration on an F2-Series module, follow these steps:

- a In the VPC domain configuration mode, enable partial DF mode with the **fabricpath multicast load-balance** command.
- b If disabled, enable trill style mac-address learning with the **mac address-table core-port-learning** command.
- c In the VPC domain configuration mode, configure the emulated switch ID with the **fabricpath switchid switchid#** command.

7 Copy the configuration.

```
switch(config)# copy running-config startup-config
switch(config)#
```

Configuring a FEX in Active-Active Mode

This example shows how to configure a FEX in active-active (FEX-AA) mode:

Switch 1 Configuration	Switch 2 Configuration
<pre>int eth 1/1 channel-group 1 int po1 switchport switchport mode fex-fabric fex associate 101 vpc 10</pre>	<pre>int eth 2/2 channel-group 2 int po2 switchport switchport mode fex-fabric fex associate 101 vpc 10</pre>



Note

- The chassis number (fex-id) for both switches must be the same.
- Configuring FEX-AA across two VDCs on the same chassis is not supported.
- FEX-AA does not support Layer 3 interfaces.

Verifying the Status of DSCP-to-queue Mapping

The following sample output from the **show hardware qos dscp-to-queue ingress** command displays the status of DSCP-to-queue mapping enabled in ingress direction on F-series modules:

```
Switch# show hardware qos dscp-to-queue ingress

status: Enabled
module_type : f-series
```

Verifying the Configuration

This section describes how to display the configuration of the Fabric Extender and verify the chassis hardware status.

Verifying the Fabric Extender Configuration

Use the following commands to display configuration information about the defined interfaces on a Fabric Extender:

Command or Action	Purpose
<code>show fex [FEX-number] [detail]</code>	Displays information about a specific Fabric Extender or all attached units.
<code>show interface type number fex-intf</code>	Displays the Fabric Extender ports that are pinned to a specific switch interface.
<code>show interface fex-fabric</code>	Displays the switch interfaces that have detected a Fabric Extender uplink.
<code>show interface ethernet number transceiver [fex-fabric]</code>	Displays the SFP+ transceiver and diagnostic optical monitoring (DOM) information for the Fabric Extender uplinks.
<code>show feature-set</code>	Displays the status of the feature sets on the device.

Configuration Examples for the Fabric Extender

This example shows how to display all the attached Fabric Extender units:

```
switch# show fex
      FEX          FEX          FEX          FEX
Number  Description      State      Model          Serial
-----
101     FEX0101             Online     N2K-C2248TP-1GE  JAF1418AARL
```

This example shows how to display the detailed status of a specific Fabric Extender:

```
switch# show fex 101 detail
FEX: 101 Description: FEX0101 state: Online
  FEX version: 5.1(1) [Switch version: 5.1(1)]
  FEX Interim version: 5.1(0.159.6)
  Switch Interim version: 5.1(1)
  Extender Model: N2K-C2248TP-1GE, Extender Serial: JAF1418AARL
  Part No: 73-12748-05
  Card Id: 99, Mac Addr: 54:75:d0:a9:49:42, Num Macs: 64
  Module Sw Gen: 21 [Switch Sw Gen: 21]
  pinning-mode: static Max-links: 1
  Fabric port for control traffic: Po101
  Fabric interface state:
    Po101 - Interface Up. State: Active
    Eth2/1 - Interface Up. State: Active
    Eth2/2 - Interface Up. State: Active
    Eth4/1 - Interface Up. State: Active
    Eth4/2 - Interface Up. State: Active
  Fex Port      State  Fabric Port  Primary Fabric
  -----
    Eth101/1/1  Up    Po101        Po101
    Eth101/1/2  Up    Po101        Po101
    Eth101/1/3  Down  Po101        Po101
    Eth101/1/4  Down  Po101        Po101
    Eth101/1/5  Down  Po101        Po101
    Eth101/1/6  Down  Po101        Po101
    Eth101/1/7  Down  Po101        Po101
    Eth101/1/8  Down  Po101        Po101
```

```

Eth101/1/9   Down   Po101   Po101
Eth101/1/10 Down   Po101   Po101
Eth101/1/11 Down   Po101   Po101
Eth101/1/12 Down   Po101   Po101
Eth101/1/13 Down   Po101   Po101
Eth101/1/14 Down   Po101   Po101
Eth101/1/15 Down   Po101   Po101
Eth101/1/16 Down   Po101   Po101
Eth101/1/17 Down   Po101   Po101
Eth101/1/18 Down   Po101   Po101
Eth101/1/19 Down   Po101   Po101
Eth101/1/20 Down   Po101   Po101
Eth101/1/21 Down   Po101   Po101
Eth101/1/22 Down   Po101   Po101
Eth101/1/23 Down   Po101   Po101
Eth101/1/24 Down   Po101   Po101
Eth101/1/25 Down   Po101   Po101
Eth101/1/26 Down   Po101   Po101
Eth101/1/27 Down   Po101   Po101
Eth101/1/28 Down   Po101   Po101
Eth101/1/29 Down   Po101   Po101
Eth101/1/30 Down   Po101   Po101
Eth101/1/31 Down   Po101   Po101
Eth101/1/32 Down   Po101   Po101
Eth101/1/33 Down   Po101   Po101
Eth101/1/34 Down   Po101   Po101
Eth101/1/35 Down   Po101   Po101
Eth101/1/36 Down   Po101   Po101
Eth101/1/37 Down   Po101   Po101
Eth101/1/38 Down   Po101   Po101
Eth101/1/39 Down   Po101   Po101
Eth101/1/40 Down   Po101   Po101
Eth101/1/41 Down   Po101   Po101
Eth101/1/42 Down   Po101   Po101
Eth101/1/43 Down   Po101   Po101
Eth101/1/44 Down   Po101   Po101
Eth101/1/45 Down   Po101   Po101
Eth101/1/46 Down   Po101   Po101
Eth101/1/47 Down   Po101   Po101
Eth101/1/48 Down   Po101   Po101

```

Logs:

```

09/21/2010 21:14:26.843850: Module register received
09/21/2010 21:14:26.845778: Registration response sent
09/21/2010 21:14:27.663073: Module Online Sequence
09/21/2010 21:14:30.191121: Module Online

```

This example shows how to display the Fabric Extender interfaces pinned to a specific switch interface:

```

switch# show interface port-channel 101 fex-intf
Fabric          FEX
Interface       Interfaces
-----
Po101           Eth101/1/2   Eth101/1/1

```

This example shows how to display the switch interfaces that are connected to a Fabric Extender uplink:

```

switch# show interface fex-fabric
Fabric          Fabric          Fex          FEX
Fex  Port        Port State    Uplink      Model        Serial
-----
101  Eth2/1        Active       1           N2K-C2248TP-1GE  JAF1418AARL
101  Eth2/2        Active       2           N2K-C2248TP-1GE  JAF1418AARL
101  Eth4/1        Active       3           N2K-C2248TP-1GE  JAF1418AARL
101  Eth4/2        Active       4           N2K-C2248TP-1GE  JAF1418AARL

```

This example shows how to display the SFP+ transceiver and diagnostic optical monitoring (DOM) information for Fabric Extender uplinks for an SFP+ transceiver that is plugged into the parent switch interface:

```

switch# show interface ethernet 1/40 transceiver
Ethernet1/40
  sfp is present
  name is CISCO-MOLEX INC

```

```
part number is 74752-9026
revision is A0
serial number is MOC13321057
nominal bitrate is 12000 Mbits/sec
Link length supported for copper is 3 m(s)
cisco id is --
cisco extended id number is 4
```

This example shows how to display the SFP+ transceiver and DOM information for Fabric Extender uplinks for an SFP+ transceiver that is plugged into the uplink port on the Fabric Extender:

```
switch# show interface ethernet 1/40 transceiver fex-fabric
Ethernet1/40
  sfp is present
  name is CISCO-MOLEX INC
  part number is 74752-9026
  revision is A0
  serial number is MOC13321057
  nominal bitrate is 12000 Mbits/sec
  Link length supported for 50/125mm fiber is 0 m(s)
  Link length supported for 62.5/125mm fiber is 0 m(s)
  cisco id is --
  cisco extended id number is 4
```

This example shows how to display the status of the feature sets on the device:

```
switch# show feature-set
Feature Set Name      ID      State
-----
fcoe                  1       installed
fabricpath            2       enabled
fex                   3       enabled
switch#
```

This example shows how to display the services used by the Fabric Extender feature set:

```
switch# show feature-set services fex
vntag_mgr
fex
2 services in feature set fex
switch#
```

Verifying the Chassis Management Information

Use the following to display configuration information used on the switch supervisor to manage the Fabric Extender.

Command or Action	Purpose
show environment fex {all <i>FEX-number</i> } [temperature power fan]	Displays the environmental sensor status.
show inventory fex <i>FEX-number</i>	Displays inventory information for a Fabric Extender.
show module fex [<i>FEX-number</i>]	Displays module information about a Fabric Extender.
show sprom fex <i>FEX-number</i> {all backplane powersupply <i>ps-num</i> } all	Displays the contents of the serial PROM (SPROM) on the Fabric Extender. The unit of the power for the show sprom command is displayed in centi-amperes.

Configuration Examples for Chassis Management

This example shows how to display the module information about all connected Fabric Extender units:

```
switch# show module fex

FEX Mod Ports Card Type Model Status.
-----
101 1 48 Fabric Extender 48x1GE + 4x10G M N2K-C2248TP-1GE ok

FEX Mod Sw Hw World-Wide-Name(s) (WWN)
-----
101 1 5.1(1) 3.5 --
FEX Mod MAC-Address(es) Serial-Num
-----
101 1 5475.d0a9.4940 to 5475.d0a9.496f JAF1418AARL
```

This example shows how to display the inventory information about a specific Fabric Extender:

```
switch# show inventory fex 101
NAME: "FEX 101 CHASSIS", DESCR: "N2K-C2248TP-1GE CHASSIS"
PID: N2K-C2248TP-1GE , VID: V00 , SN: SSI13380FSM

NAME: "FEX 101 Module 1", DESCR: "Fabric Extender Module: 48x1GE, 4x10GE Supervisor"
PID: N2K-C2248TP-1GE , VID: V00 , SN: JAF1339BDSK

NAME: "FEX 101 Fan 1", DESCR: "Fabric Extender Fan module"
PID: N2K-C2248-FAN , VID: N/A , SN: N/A

NAME: "FEX 101 Power Supply 2", DESCR: "Fabric Extender AC power supply"
PID: NXK-PAC-400W , VID: 000, SN: LIT13370QD6
```

This example shows how to display the environment status for a specific Fabric Extender:

```
switch# show environment fex 101

Temperature Fex 101:
-----
Module Sensor MajorThresh MinorThres CurTemp Status
(Celsius) (Celsius) (Celsius)
-----
1 Outlet-1 60 50 33 ok
1 Outlet-2 60 50 38 ok
1 Inlet-1 50 40 35 ok
1 Die-1 100 90 44 ok

Fan Fex: 101:
-----
Fan Model Hw Status
-----
Chassis N2K-C2148-FAN -- ok
PS-1 -- -- absent
PS-2 NXK-PAC-400W -- ok

Power Supply Fex 101:
-----
Voltage: 12 Volts
-----
PS Model Power Power Status
(Watts) (Amp)
-----
1 -- -- --
2 NXK-PAC-400W 4.32 0.36 ok

Mod Model Power Power Power Power Status
Requested Requested Allocated Allocated
(Watts) (Amp) (Watts) (Amp)
-----
1 N2K-C2248TP-1GE 0.00 0.00 0.00 0.00 powered-up
```

```

Power Usage Summary:
-----
Power Supply redundancy mode:                redundant

Total Power Capacity                        4.32 W

Power reserved for Supervisor(s)           0.00 W
Power currently used by Modules             0.00 W

-----
Total Power Available                        4.32 W
-----

```

This example shows how to display the SPROM for a specific Fabric Extender:

```

switch# show sprom fex 101 all
DISPLAY FEX 101 SUP sprom contents
Common block:
Block Signature : 0xabab
Block Version   : 3
Block Length    : 160
Block Checksum  : 0x1a1e
EEPROM Size     : 65535
Block Count     : 3
FRU Major Type  : 0x6002
FRU Minor Type  : 0x0
OEM String      : Cisco Systems, Inc.
Product Number  : N2K-C2248TP-1GE
Serial Number   : JAF1339BDSK
Part Number     : 73-12748-01
Part Revision   : 11
Mfg Deviation   : 0
H/W Version    : 0.103
Mfg Bits       : 0
Engineer Use    : 0
snmpOID        : 9.12.3.1.9.78.3.0
Power Consump  : 1666
RMA Code       : 0-0-0-0
CLEI Code      : XXXXXXXXXTBDV00
VID            : V00
Supervisor Module specific block:
Block Signature : 0x6002
Block Version   : 2
Block Length    : 103
Block Checksum  : 0x2686
Feature Bits    : 0x0
HW Changes Bits : 0x0
Card Index     : 11016
MAC Addresses   : 00-00-00-00-00-00
Number of MACs  : 0
Number of EPLD : 0
Port Type-Num  : 1-48;2-4
Sensor #1      : 60,50
Sensor #2      : 60,50
Sensor #3      : -128,-128
Sensor #4      : -128,-128
Sensor #5      : 50,40
Sensor #6      : -128,-128
Sensor #7      : -128,-128
Sensor #8      : -128,-128
Max Connector Power: 4000
Cooling Requirement: 65
Ambient Temperature: 40

DISPLAY FEX 101 backplane sprom contents:
Common block:
Block Signature : 0xabab
Block Version   : 3
Block Length    : 160
Block Checksum  : 0x1947
EEPROM Size     : 65535

```

Verifying the Chassis Management Information

```

Block Count      : 5
FRU Major Type  : 0x6001
FRU Minor Type  : 0x0
OEM String      : Cisco Systems, Inc.
Product Number  : N2K-C2248TP-1GE
Serial Number   : SSI13380FSM
Part Number     : 68-3601-01
Part Revision   : 03
Mfg Deviation   : 0
H/W Version    : 1.0
Mfg Bits       : 0
Engineer Use    : 0
snmpOID        : 9.12.3.1.3.914.0.0
Power Consump   : 0
RMA Code       : 0-0-0-0
CLEI Code      : XXXXXXXXXTDBV00
VID            : V00
Chassis specific block:
Block Signature : 0x6001
Block Version   : 3
Block Length    : 39
Block Checksum  : 0x2cf
Feature Bits    : 0x0
HW Changes Bits : 0x0
Stackmib OID    : 0
MAC Addresses   : 00-0d-ec-e3-28-00
Number of MACs  : 64
OEM Enterprise  : 0
OEM MIB Offset  : 0
MAX Connector Power: 0
WNN software-module specific block:
Block Signature : 0x6005
Block Version   : 1
Block Length    : 0
Block Checksum  : 0x66
wnn usage bits:
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
00 00
License software-module specific block:
Block Signature : 0x6006
Block Version   : 1
Block Length    : 16
Block Checksum  : 0x86f

```



```

lic usage bits:
ff ff ff ff ff ff ff ff

DISPLAY FEX 101 power-supply 2 srom contents:
Common block:
Block Signature : 0xabab
Block Version   : 3
Block Length    : 160
Block Checksum  : 0x1673
EEPROM Size     : 65535
Block Count     : 2
FRU Major Type  : 0xab01
FRU Minor Type  : 0x0
OEM String      : Cisco Systems Inc   NXK-PAC-400W
Product Number  : NXK-PAC-400W
Serial Number   : LIT13370QD6
Part Number     : 341
Part Revision   : -037
CLEI Code       : 5-01 01 000
VID             : 000
snmpOID         : 12336.12336.12336.12336.12336.12336.12374.12336
H/W Version     : 43777.2
Current         : 36
RMA Code        : 200-32-32-32
Power supply specific block:
Block Signature : 0x0
Block Version   : 0
Block Length    : 0
Block Checksum  : 0x0
Feature Bits    : 0x0
Current 110v   : 36
Current 220v   : 36
Stackmib OID   : 0

```

Additional References

This section includes additional information that is related to configuring the Cisco Nexus 2000 Series Fabric Extender.

Related Documents

Related Topic	Document Title
Cisco NX-OS Licensing	<i>Cisco NX-OS Licensing Guide</i>
Virtual device contexts (VDC)	<i>Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide</i>
Interface configuration	<i>Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide</i>
Command reference	<i>Cisco Nexus 7000 Series Command References</i> available at the following URL: http://www.cisco.com/en/US/products/ps9402/prod_command_reference_list.html

Feature History

This table lists the release history for this feature.

Table 1: Feature History for the Cisco Nexus 2000 Series Fabric Extender

Feature Name	Releases	Feature Information
vPC configuration synchronization	7.2(0)D1(1)	Added support for vPC configuration synchronization for FEX
Cisco Nexus 7000 Series FEX Fabric Active-Active	7.2(0)D1(1)	Added support for FEX Active-Active.
Feature set commands	5.1(1)	The Fabric Extender is enabled on the Cisco Nexus 7000 Series device with the install feature-set and feature-set commands.
Port channel and vPC support	5.2(1)	Support was added for port channels and the integration of vPC on the host interfaces.
Layer 3 support	5.2(1)	Layer 3 capability was added to the Fabric Extender host interface ports including IPv4 and IPv6 and IGMP snooping.

This table lists the supported line cards and FEXs.

Table 2: Supported Line cards and FEXs History

FEX and Line card	Releases
Cisco Nexus B22 Fabric Extender for IBM Cisco Nexus 2348UPQ Fabric Extender Cisco Nexus 2348TQ Fabric Extender	7.2(0)D1(1)
Cisco Nexus B22 Fabric Extender for HP Cisco Nexus 2248PQ Fabric Extender	6.2(2)

FEX and Line card	Releases
48-port, 100/1000 BASE-T (100-Mb/1-Gigabit) N2248TP-E 32-port 10-Gigabit SFP+ N2248TP-E Support for M2 series modules Cisco Nexus 2224TP Fabric Extender Cisco Nexus 2232TM Fabric Extender	6.1(1)
48-port, 1/10-Gigabit F2-Series module (N7K-F248XP-25).	6.0(1)
Cisco Nexus 2248TP Fabric Extender Cisco Nexus 2232PP Fabric Extender	5.2(1)
32-port, 10-Gigabit M1 module (N7K-M132XP-12) 32-port, 10-Gigabit M1 XL module (N7K-M132XP-12L).	5.1(1)

