Configure a Fabric Extender with Application Centric Infrastructure

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Introduction

This document describes how a Fabric Extender (FEX) can be configured with Application Centric Infrastructure (ACI) and how Host Interfaces (HIF) on a FEX can be configured.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on ACI Software Release 1.1(3f).

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

Configure

1. Attach a FEX to the ACI Fabric

At the time of this writing:

- Straight-through attachment of a FEX to a leaf is supported.
- These FEX models were supported: N2K-C2232PP-10GEN2K-C2232TM-E-10GEN2K-C2348UPQN2K-C2348TQN2K-C2332TQN2K-C2248TP-E-1GEN2K-C2248TP-1GEN2K-C2248PQ-10GEN2K-B22IBM-PN2K-B22DELL-P

However, because this list might be frequently updated, refer to Nexus 9000 Switch Release Notes for your ACI software for an accurate and updated list.

A FEX in ACI can only be attached to a single leaf with one or more ports. The ports that connect FEX to leaves will be part of a port-channel.

In this example, a FEX has been attached to ACI Leaf 1 on port 1/17-18.

Configure with the GUI

- 1. On the top menu bar, click Fabric and then click Access Policies.
- 2. Select Quick Start in the left navigation pane and then click the link Configure an interface, PC and VPC as shown in the image.

cisco SYSTEM	TENANTS	FABRIC	VM NETWORKING	L4-L7 SERVICES	ADMIN	Q	welcome, admin v
			ISS POLICIES				
Policies Quick Start Control C	Quick Start	t slicies govern the operation inctions or protocols. Admini stors to select the pods, lea slicies configure external-tar and hypersions, hosts, ro iCP, and features like monil Configure an interface, PC ill apply, such as CDP or LL sk Start gure in-band management gure out-of-band management gure out-of-band management or access port statistics	of interfaces that provide exter istrators who have fabric admi f switches, and interfaces to w ing interfaces that do not con- uters, or fabric eat-neters (FEX toring or diagnostics. , and VPC wizard link below, y DP policies, before launching access access access a policy (PC	hal access to the fabric. Thistrator privileges can cri hich they will apply access eet to a spine switch. Exit b, Access policies enable ou can apply a common to the wizard. You can also of the wizard.	he system provides default access sate new access policies accordin s policies. mal-facing interfaces connect to e configuring port channels and virtu mplate to a number of interfaces. Create the policies as you complete See Also Physical Interface (Link Level) COP LLOP LACP CACP Spaning Tree Interface SPAN On-demand Diagnostics Attachable Entity Profile QoS DHCP Rebay	policies. Access policies g lo their requirements. Tr vaternal devices such as vi ial port channels, protocoli We recommended that you the wizard.	enable configuring te APIC enables rlual machine s such as LLDP, u create the policies

3. Click the green + icon as shown in this image.

V SWITCH SWITCHES INTERFACES POULCY GROUP SWITCH SELECTOR INTERFACES TYPE POULCY GROUP VPC SWITCH PAIRS VPC SWITCH PAIRS VPC SWITCH PAIRS VPC SWITCH PAIRS
VPC SWITCH PAIRS

4. Click the Advanced button, and in the Switches section click the small + and select the leaf on which the FEX is connected (in this case, leaf 101) as shown in this image.
 CONFIGURE INTERFACE, PC, AND VPC

CONFIGURED SWITCH INTERFACES	Select Switches To Configure Interfaces: O Quick October Quick
+ 🗵	Switches: 🕂 🗵
SWITCH SWITCHES INTERFACE INTERFACES TYPE GROUP	Switch IDs Switch Policy Group
	101 v select or type to pre-provision v
	ID NAME TYPE
	v to c v v 101 leaf1 leaf
	Switch Profile Name:
	Feyer 1
	ID Switch Port(s) It Connects To
	Click '+' to configure switch
	interfaces
VPC SWITCH PAIRS	
+ 🗵	00000
VPC DOMAIN ID - SWITCH A SWITCH B	
	SAVE CANCEL
	Switch (🖤 Access Fort 🎔 Fabric Port). Only the access ports can be selected.

SUBMIT CANCEI

- 5. Complete these steps: In the Switch Profile Name field, enter the name for the FEX profile (in this case, fex101). In the FEX section, enter the FEX ID (this will be the FEX number) and the list of ports on the leaf that connect to that FEX (1/17-18). Click Update.
- 6. Click Save.
- 7. Click Submit.

CONFIGURE	D SWITCH INTE	ERFACES	Select Solutions To C	vefigure Interfaces: 🔿 Quick	Advanced	
Model ID INT Model ID INT	SPACES IF THRE	ENCAP	Switches	senteh Da Ioti	Switch Policy Group	
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			<	20 183 UPDAT	2 1/17-18 CANOL	\geq
VPC SWITCH	H PAIRS					ntig une methole
e Si Victowinio	- SMITCH 1	5WTC+2		I	<u> </u>	
200	185	104				

8. Your FEX is now attached to the Fabric.

Check the FEX with the GUI

1. In the top menu bar, click **Fabric** and then click **Access Policies**.

2. In the left Navigation Pane, you will see **Switch Policies > Profiles**, the name of the FEX you used in Step 3., and an Associated Interface Profile with the same name and the **if_selector** string appended.

	INVENTORY FABRIC POLICIES ACCESS POLICIES		
Policies	Switch Profile - fex101		
E Quick Start			
Switch Policies			POL
Policies			
Policy Groups			
Profiles	PROPERTIES		
Leaf1	Name: fex101		
Leaf1-2	Description: GUI Interface Selector Generated Pr	ofile: fex101	
Leaf2			
Leaf3			
Leaf3-4	Switch Selectors:		
CONT		BLOCKE	POLICY CROUP
([fexi01	- 1000	BLUCKS	POLICI GROUP
Hodure Pointies	fex101_selector_1	101	
Interface Policies			
Policies			
Policy Groups			
Profiles			
E5x02	Associated Interface		
ESX02-copper	Selector Profiles:	DESCRIPTION	Contraction of the second s
- E5X03			
N3k-If-isolated	fex101_itselector	GUI Interface Selector Generated PortP Profile: fex101	formed
N6k-Isolated			
Fex101_FexP101			
fex101 ifselector	*		
FexCard101			
mil n6k1-PC	Associated Module Selector		
n6kl-vpc	Promes: NAME	DESCRIPTION	STATE
			100000000
mil n6k2-and		No items have been found. Select Actions to create a new item.	
E Interface Overrides		select Actions to create a new item.	
Cichal Policies			
To Monitoring Policies			
Troubleshoot Policies			
Pools			
The plant of Colored Department			

3. In **Interface Policies > Profiles**, you will see the automatically generated interface policy name: **name_ifselector**. This contains the FEX attachment information in the work pane, that includes the port used on the Leaf to connect to the FEX (in the example port 17-18).

cisco System	M TENANTS		VM NETWORKING	L4-L7 SERVICES	ADMIN	OPERATIONS	i
		VENTORY FABRIC POLICIES ACCE	SS POLICIES				
Policies	a 0	Interface Profile - f	ex101_ifselector				
Quick Start Switch Policies Diverties Div		PROPERTIES Name: fex Description: GU Interface Selectors:	101_ifselector Interface Selector Generated PortF NAME CardIO1	P Profile: fex101	>		POLICY GROUP FeidendleP101

4. In the top menu bar, click **Fabric** and then click **Inventory**.

5. In the left Navigation Pane, navigate to **Pod 1 > Fabric Extender**. You will see your FEX and the FEX detail appear in the work pane.

This might take a moment between the time you configure it and the time it is visible in the inventory (around 1 minute). If it is the first time you attach or configure this FEX to the Fabric or if the ACI Fabric was just upgraded, it is likely that ACI will download new software to upgrade the FEX. In case of such a scenario, it takes much longer for the FEX to be visible (expect more than 10 minutes). In this scenario, if you Secure Shell (SSH) to the leaf and click on **show fex detail**, you see that a software download occurs.

ululu cisco	SYSTEM	TENANTS	FABRIC	VM NETWORKING	L4-L7 SERVICES
		INVE	NTORY DABRIC POLICIES ACCESS	POLICIES	
Inventory		a O 🛛	EX - Fex 101		
Quick Start Topology Pod 1 Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Extenders Fabric Rules Fabric Node-102) Fabric Node-103) Fabric Kembership Unmanaged Fabric Nodes Unreachable Nodes Disabled Interfaces and Decon	nmissioned Switches		PROPERTIES II: 101 Description: Fabri Operational State: Onlin Model: N2K-1 Vendor: Cisco Revision: Serial: SSI1 Connected Interfaces: 1/17.	c Extender 48x1GE + 4x10G f e C2248TP-1GE Systems 4280VQE , 1/18 YPE	1odule ADM

While still in **Fabric > Inventory**, **Expand Pod 1 > Leaf1 > Interfaces**, you will see the list of interfaces on Leaf1 and that should list the host interfaces of the FEX numbered by the **fex_id/1/x**. The FEX ID is the ID number you chose in Step 5. and x is the HIF on the FEX.

cisco	SYSTEM	TENANTS			VM NETWORKING	L4	-L7 SERVICES	ADMIN	OPERA	TIONS	P	
		IN										
Inventory		20	Physical In	terfaces								
Inventory Quick Start Topology Pool 1 Pool 1 Pool 2-leaf (Node-101) Pool	essis Modules : Units :ee		Physical In	SPEED inherit inherit inherit inherit inherit inherit inherit inherit inherit inherit inherit	LAYER switched switched switched switched switched switched switched switched switched switched switched switched switched switched switched	MODE trunk trunk trunk trunk trunk trunk trunk trunk trunk trunk trunk trunk	SWITCHING STATE enabled enabled enabled enabled enabled enabled enabled enabled enabled enabled enabled enabled	USAGE EPG EPG EPG EPG EPG EPG EPG EPG EPG E	OPERVLANS	CONFIGURED VLANS 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48 47-48	BUNDLE INDEX unspecified unspecified unspecified unspecified unspecified unspecified unspecified unspecified unspecified unspecified unspecified	OPI full full full full full full full ful
C eth1/12		•	eth101/1/43	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/14			eth101/1/44	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/15 C eth1/16 C eth1/17			eth101/1/45	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full

Note: The complete interface numbering for a FEX host port from the Fabric point of view includes the Node ID. Hence, a Host Interface Z on FEX Y on Leaf X will be numbered X/Y/1/Z. For example, port 1 on FEX 101 on leaf 101 will be 101/101/1/1.

Verify on the Switch CLI

SSH to the switch (pod2-leaf1) and verify with these commands:

show fex

show fex detail

It might be possible that the ACI leaf needs to download a new image to the FEX. If that is the case, you will see:

pod2-lea	f1# show fex			
FEX	FEX	FEX	FEX	
Number	Description	State	Model	Serial
101	FEX0101	Image Download	N2K-C2248TP-1GE	SSI14280VQE

When the FEX is completely discovered, you will see:

pod2-lea	f1# show fex			
FEX	FEX	FEX	FEX	
Number	Description	State	Model	Serial
101	FEX0101	Online	N2K-C2248TP-1GE	SSI14280VQE
pod2-lea	f1# show fex de	tail		
FEX: 101	Description: F	EX0101 state	: Online	
FEX ve	ersion: 11.1(3f)	[Switch versio	n: 11.1(3f)]	
FEX In	terim version: 1	1.1(3f)		
Switch	Interim version	: 11.1(3f)		
Extend	ler Model: N2K-C2	248TP-1GE, Ex	tender Serial: SSI1428	BOVQE
Part N	io: 68-3601-05			
Card I	d: 99, Mac Addr:	c4:71:fe:42:d	7, Num Macs: 64	

Module Sw Gen: 22 [Switch Sw Gen: 21] pinning-mode: static Max-links: 1 Fabric port for control traffic: Eth1/17 Fabric interface state: Eth1/17 - Interface Up. State: Active Eth1/18 - Interface Up. State: Active Po7 - Interface Up. State: Active State Fabric Port Fex Port Eth101/1/1 Up Po7 Eth101/1/2 Down Po7 Eth101/1/3 Down Po7 Eth101/1/4 Down Po7 Eth101/1/5 Down Po7 Eth101/1/6 Down Po7 Eth101/1/7 Down Po7 Eth101/1/8 Down Po7 Eth101/1/9 Down Po7 Eth101/1/10 Up Po7 Eth101/1/11 Down Po7 Eth101/1/12 Down Po7 Eth101/1/13 Down Po7 Eth101/1/14 Down Po7 Eth101/1/15 Down Po7 Eth101/1/16 Down Po7 Eth101/1/17 Down Po7 Eth101/1/18 Down Po7 Eth101/1/19 Down Po7 Eth101/1/20 Down Po7 Eth101/1/21 Down Po7 Eth101/1/22 Down Po7 Eth101/1/23 Down Po7 Eth101/1/24 Down Po7 Eth101/1/25 Down Po7 Eth101/1/26 Down Po7 Eth101/1/27 Down Po7 Eth101/1/28 Down Po7 Eth101/1/29 Down Po7 Eth101/1/30 Down Po7 Po7 Eth101/1/31 Down Eth101/1/32 Down Po7 Eth101/1/33 Down Po7 Eth101/1/34 Down Po7 Eth101/1/35 Down Po7 Eth101/1/36 Down Po7 Eth101/1/37 Down Po7 Eth101/1/38 Down Po7 Eth101/1/39 Down Po7 Eth101/1/40 Down Po7 Eth101/1/41 Down Po7 Eth101/1/42 Down Po7 Eth101/1/43 Down Po7 Eth101/1/44 Down Po7 Eth101/1/45 Down Po7 Eth101/1/46 Down Po7 Eth101/1/47 Down Po7 Eth101/1/48 Down Po7

Attach a FEX to a Leaf with REST API

This XML code posted to **x.x.x.x/api/mo/uni.xml** adds FEX101 to Leaf 1 (sw 101) on port 1/17-18:

pod2-leaf1# show fex FEX FEX FEX FEX Description State Model Number Serial 101 FEX0101 Online N2K-C2248TP-1GE SSI14280VQE pod2-leaf1# show fex detail FEX: 101 Description: FEX0101 state: Online FEX version: 11.1(3f) [Switch version: 11.1(3f)] FEX Interim version: 11.1(3f) Switch Interim version: 11.1(3f) Extender Model: N2K-C2248TP-1GE, Extender Serial: SSI14280VQE Part No: 68-3601-05 Card Id: 99, Mac Addr: c4:71:fe:42:d7, Num Macs: 64 Module Sw Gen: 22 [Switch Sw Gen: 21] pinning-mode: static Max-links: 1 Fabric port for control traffic: Eth1/17 Fabric interface state: Eth1/17 - Interface Up. State: Active Eth1/18 - Interface Up. State: Active Po7 - Interface Up. State: Active Fex Port State Fabric Port Eth101/1/1 Up Po7 Eth101/1/2 Down Po7 Eth101/1/3 Down Po7 Eth101/1/4 Down Po7 Eth101/1/5 Down Po7 Eth101/1/6 Down Po7 Eth101/1/7 Down Po7 Eth101/1/8 Down Po7 Eth101/1/9 Down Po7 Eth101/1/10 Up Po7 Eth101/1/11 Down Po7 Po7 Eth101/1/12 Down Eth101/1/13 Down Po7 Eth101/1/14 Down Po7 Eth101/1/15 Down Po7 Eth101/1/16 Down Po7 Eth101/1/17 Down Po7 Eth101/1/18 Down Po7 Eth101/1/19 Down Po7 Eth101/1/20 Down Po7 Eth101/1/21 Down Po7 Eth101/1/22 Down Po7 Eth101/1/23 Down Po7 Eth101/1/24 Down Po7 Eth101/1/25 Down Po7 Eth101/1/26 Down Po7 Eth101/1/27 Down Po7 Eth101/1/28 Down Po7 Eth101/1/29 Down Po7 Eth101/1/30 Down Po7 Eth101/1/31 Down Po7 Eth101/1/32 Down Po7 Eth101/1/33 Down Po7 Eth101/1/34 Down Po7 Eth101/1/35 Down Po7 Eth101/1/36 Down Po7 Eth101/1/37 Down Po7 Eth101/1/38 Down Po7 Eth101/1/39 Down Po7 Eth101/1/40 Down Po7

Eth101/1/41	Down	Po7
Eth101/1/42	Down	Po7
Eth101/1/43	Down	Po7
Eth101/1/44	Down	Po7
Eth101/1/45	Down	Po7
Eth101/1/46	Down	Po7
Eth101/1/47	Down	Po7
Eth101/1/48	Down	Po7

2. Configure FEX HIF

At this stage, the FEX HIFs are visible by the ACI Leaf, however when you configure physical properties of FEX HIF, they are still not done yet.

In this example, set the interface 1 and 2 of FEX 101 to 1 Gigabit Ethernet speed.

Select Fabric > Access Policy. In the Navigation pane, navigate to Interface Policies >
Profiles and select fex101_FexP101. (This was created automatically when FEX was
attached to the Leaf as explained previously in this document. This object is named as FEX
appended with FexP<fexId>). In the work pane, click the + button in front of the Interface
selector for FEX:



2. In the Create Access Port Selector window: Note: In this step, select and configure the Host port. So, the interface ID chosen here is HIF on FEX 101 and not any physical Leaf ports.a. In the Name field, enter a name for the group of port to configure, here: Fex101_access_port_select.

b. In the Interface IDs field, enter the interface IDs you want to configure, here: 1/1-2.
c. From the Interface Policy Group drop-down list, select the policy for 1 Gigabit Ethernet

interface speed (named **1Gig**) configured earlier. You might want to create a new policy for this group of ports.

d. Click Submit.

CREATE ACCESS PORT SELECTOR

Name:	Fex101 access port select
Description:	optional
Interface IDs:	1/1-2
	valid values: All or Ranges. For Example: 1/13,1/15 or 1/22-24
Interface Policy Group:	select an option
	1-41 test
	1Gig
	CDP
	inband
	L2_ext
	LLDP_ACT
	mioAcessPortPolicyGroup
	n3k_pol
	N3K_Policy
	UCS_B_SERIES
	VMM
	Create Access Port Policy Group

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Verify with the GUI

In the Fabric Inventory, navigate to **Pod 1 > LeafX (leaf where fex is attached) > Interfaces.** Choose the FEX HIF as shown in this image.



Verify

There is currently no verification procedure available for this configuration.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.