# 使用以應用為中心的基礎設施配置交換矩陣擴展 器

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## 簡介

本文檔介紹如何使用以應用為中心的基礎設施(ACI)配置交換矩陣擴展器(FEX),以及如何配置 FEX上的主機介面(HIF)。

## 必要條件

### 需求

本文件沒有特定需求。

## 採用元件

本檔案中的資訊是根據ACI軟體版本1.1(3f)。

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除(預設))的組態來啟動。如果您的網路運作中,請確保您瞭解任何指令可能造成的影響。

## 設定

### 1.將FEX連線到ACI交換矩陣

撰寫本文時:

- 支援FEX到枝葉的直通連線。
- 支援以下FEX型號: N2K-C2232PP-10GEN2K-C2232TM-E-10GEN2K-C2348UPQN2K-C2348TQN2K-C2332TQN2K-C2248TP-E-1GEN2K-C2248TP-1GEN2K-C2248PQ-10GEN2K-B22IBM-PN2K-B22DELL-P

但是,由於此清單可能會經常更新,因此請參閱ACI軟體的Nexus 9000交換機發行說明以獲取準確 且更新的清單。

ACI中的FEX只能連線到具有一個或多個埠的單個枝葉。將FEX連線到枝葉的埠將是埠通道的一部分 。

在本示例中,FEX已連線到埠1/17-18上的ACI枝葉1。

#### 使用GUI配置

- 1. 在頂部選單欄上,按一下Fabric,然後按一下Access Policies。
- 2. **在左側導**航窗格中選擇Quick Start,然後按一下連結Configure an interface, PC and VPC(如圖所示)。

cisco	SYSTEM	TENANTS	FABRIC	VM NETWORKING	L4-L7 SERVICES	ADMIN	ρ	welcome, admin
			VENTORY   FABRIC POLICIES					
Policies		🛛 🖸 🛛 Quick	Start					
Quick Start         Module Policies         Module Policies         Global Policies         Monting Policies         Troubleshoot Policies         Pools         Physical and External Domains			ELP Ccess policies govern the operatin rivus functions or protocols. And dministrators to select the pods, I ccess policies configure external- notrollers and hypervisors, hosts, DP or LACP, and features like mic sing the Configure an interface, at you will apply, such as CDP or Quick Start Configure in-band manageme Configure out-of-band manage Create a CDP. (or other) interf Configure an interface, PC, an Monitor access port statistics	on of interfaces that provide ext inisistrators who have fabric adn leaf switches, and interfaces to facing interfaces that do not co routers, or fabric extenders (FE onitoring or diagnostics. PC, and VPC wizard link below, iLLDP policies, before launchin hat access ( ement access ( face policy d VPC (	Imal access to the fabric. The i inistrator privileges can create which they will apply access po- nect to a spine switch. Externa X). Access policies enable con you can apply a common temp g the wizard. You can also crea	system provides default access, new access policies according blicies. Al-facing interfaces connect to ex- figuring port channels and virtua virtual to a number of interfaces. V tate the policies as you complete See Also Physical Interface (Link Level) CDP LLOP LACP Hember Spanning Tree Interface SPAN On-demand Diagnostics Attachable Entity Profile QS DHCP Relay	policies. Access policies to their requirements. Tr ternal devices such as vi al port channels, protocol Ve recommended that yo the wizard.	enable configuring te APIC enables irlual machine s such as LLDP, u create the policies

3. 按一下綠**色**+圖示,如下圖所示。

	ONFI	GURE	INTER	FACE,	PC, AN	D VPC
SWITCH:   SWITCH:S            POLICY   GROUP        POLICY   GROUP        POLICY   GROUP        POLICY   GROUP        POLICY   GROUP      POLICY   GROUP         PCOMARINE        POLICY   GROUP         PCOMARINE        POLICY     POLICY     POLICY     POLICY    GROUP    POLICY     POLICY     POLICY      POLICY      POLICY    POLICY    POLICY      POLICY    POLICY    POLICY  POLICY      POLICY   POLICY  POLICY   POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY  POLICY POLICY POLICY<	CONFI	GURED :	SWITCH	INTERFA	CES	
	+ 🗵				-	
VPC SWITCH PAIRS	PROFILE	SWITCHES	SELECTOR	INTERFACES	TYPE G	ROUP
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS + X predomain ID - SWITCH B						
VPC SWITCH PAIRS						
VPC SWITCH PAIRS  → ∞   predomain id — switch a switch b						
UPC DOMAIN ID - SWITCH A SWITCH B	VPC SV	WITCH P.	AIRS			
	VPC DOMAIN		- SWITCH	4	SWITCH B	

4. 按一下Advanced按鈕,然後在Switches部分中按一下小型+,然後選擇FEX連線的枝葉(本例 中為枝葉101),如下圖所示。

	GOIL		TACL,	10,7		
CONE		SWITCH		CES		Select Switches To Configure Interfaces:  Quick
	IGORED	SWITCH		CL3		
		INTERFACE			DOLLOY	Switches.
PROFILE	SWITCHES	SELECTOR	INTERFACES	TYPE	GROUP	Switch Holicy Group
						↓ 101 leaf1 leaf
						Switch Profile Name:
						Switch Type:
						Fexes: 🚽
						ID Switch Port(s) It Connects To
						interfaces
VPC S	WITCH P	AIRS				
+ 🗵						
VPC DOMAI	NID	- SWITCH	A	SWITCH B		다다다다
						SAVE CANCE
						Switch ( Access Port Fabric Port ). Only the access ports can be selected.

SUBMIT CANCEL

- 5. 請完成以下步驟: 在Switch Profile Name欄位中,輸入FEX配置檔案的名稱(本例中為 fex101)。在FEX部分,輸入FEX ID(這將是FEX編號)和枝葉上連線到該FEX的埠清單 (1/17-18)。按一下「**Update」。**
- 6. 按一下「**Save**」。
- 7. 按一下「Submit」。

CONFIGURE	D SWITCH INTE	RFACES	Select Switches To Co Switches	nfigure Interfaces: 🔿 Quick	Advanced	
NOCE ID IN 175 265-382 253-384 263-384 263 263 263	ences () e type	ENCAP		South IDe	Switch Policy Group	
204			Sattle Prove cane	100101 10 48 Ports © 56 Po 10 10 10	nii 2000-1000-1000-000 2010-108	
				LPDAT	CANCEL	figure suritzi
VPC SWITCH	PAIRS					
e (d) PC DOMUN (D)	- SHITCH 1	SW10+2			<u>ààààà</u>	$\frown$
14	181	102		2	The share share	Sant Canet

8. 您的FEX現在已連線到交換矩陣。

### 使用GUI檢查FEX

1.在頂部選單欄中,按一下Fabric,然後按一下Access Policies。

2.在左側導航窗格中,您將看到Switch Policies > Profiles、在步驟3中使用的FEX的名稱,以及附加 了相同名稱和if\_selector字串的關聯介面配置檔案。

	INVENTORY   FABRIC POLICIES   AC	CCESS POLICIES		
Policies	Switch Profile - f	ex101		
Quick Start				POL
Policies	0.4			
Policy Groups				
Profiles	PROPERTIES			
Leaf1	Name: 1	ex101		
Leaf1-2	Description:	GUI Interface Selector Generated Profile: fex101		
Leaf2				
Leaf3				
Leaf3-4	Switch Selectors:			
Centre		- NAME	BLOCKS	POLICY GROUP
( [] fex101		fordet enlaster 1	101	1 - Charles of State State State States
Hodure voncies		rexto1_selector_1	101	
Interface Policies				
Policies				
Policy Groups				
Profiles				
ESX01	Associated Interface			
ESX02	Selector Profiles:			
ESX02-copper		NAME	DESCRIPTION	
ESX03	_	fex101_ifselector	GUI Interface Selector Generated PortP Profile: fex101	formed
N3k-If-isolated		No. of Concession, Name of		
N6k-Isolated				
fex101_FexP101				
fex101_itselector				
FexCard101	Associated Module Selector			
E I NOR-PC	Profiles:		DEPENDEN	271.7T
in the second second		NAME	DESCRIPTION	SIAIE
nosi2-PC			No items have been found.	
M C Interfere Consider			Select Actions to create a new item.	
Figure Clabel Delivier				
Godal Policies				
Troublachase Dolicias		<u>.</u>		
C3 C Pools				

3.在Interface Policies > Profiles中,您將看到自動生成的介面策略名稱:name\_ifselector。這包含 工作窗格中的FEX附件資訊,其中包括在枝葉上用於連線到FEX的埠(在示例埠17-18中)。

ululu cisco	TENANTS		VM NETWORKING	L4-L7 SERVICES	ADMIN	OPERATIONS	i
	INVEN	TORY   FABRIC POLICIES   ACCES	S POLICIES				
Policies		nterface Profile - f	ex101_ifselector				
Quick Start     Synch Policies     Mondle Policies     Policies	E	PROPERTIES Name: fext Description: GUI Interface Selectors:	01_ifselector Interface Selector Generated PortF NAME Card101	P Profile: fex101	>		Policy GROUP FedbrideP101

4.在頂部選單欄中,按一下Fabric,然後按一下Inventory。

5.在左側導航窗格中,導航到**Pod 1 >交換矩陣擴展器**。您將看到您的FEX和FEX詳細資訊顯示在工 作窗格中。

這可能在您配置它的時間和它在清單中可見的時間之間需要一段時間(大約1分鐘)。如果這是您 首次將此FEX連線或配置到交換矩陣,或者ACI交換矩陣剛剛升級,則ACI可能會下載新軟體以升級 FEX。在這種情況下,FEX可見的時間要長得多(預計超過10分鐘)。在此場景中,如果您將安全 外殼(SSH)連線到枝葉並按一下show fex detail,則會看到軟體下載。

SYSTEM	TENANTS	FABRIC	VM NETWORKING	L4-L7 SERVICES	
	INVE		POLICIES		
	≤ O	FEX - Fex 101			
Sisterioned Switches		FEX - Fex 101	Extender 48x1GE + 4x10G N e 22248TP-1GE Systems 4280VQE 1/18 YPE	lodule	ADMI
	SYSTEM	SYSTEM TENANTS	SYSTEM TENANTS FABRIC INVENTORY ABRIC POLICIES ACCESS FEX - Fex 101 FEX - Fex 101 PROPERTIES ID: 101 Description: Fabric Operational State: Online Model: N2K-C Vendor: Cisco Revision: Serial: SS114 connected Interfaces: 1/17, ISSN: 1/17	SYSTEM TENANTS FABRIC VM NETWORKING	SYSTEM TENANTS FABRIC VM NETWORKING L4-L7 SERVICES  INVENTORY ABRIC POLICIES   ACCESS POLICIES  FEX - Fex 101  FEX - Fex 101  FEX - Fex 101  FOR PERTIES  D: 101  Description: Fabric Extender 48x16E + 4x106 Module Operational State: Online  Model: N2K-C2248TP-16E  Vendor: Cisco Systems Revision: Serial: SS114280VQE Connected Interfaces: 1/17, 1/18  Second Switches  ssioned Switches

仍處於Fabric > Inventory、Expand Pod 1 > Leaf1 > Interfaces中,您將看到Leaf1上的介面清單 ,該清單應列出由fex\_id/1/x編號的FEX的主機介面。FEX ID是在步驟5中選擇的ID號。x是FEX上的 HIF。

cisco	SYSTEM	TENANTS			VM NETWORKING	L4	I-L7 SERVICES	ADMIN	OPER/	ATIONS	P	
		IN										
Inventory		S 🖻	Physical Ir	terfaces								
Quick Start		*										
Topology												
Pod 1			<u>•</u>									
Chassis	01)			SPEED	LAVER	MODE	SWITCHING STATE	LISAGE	OPER MANS	CONFIGURED VI ANS	BUNDLE INDEX	08
Fabric Extenders			- INTERPACE	SPEED	LATCK	MODE	SWITCHING STATE	USAGE	OPER VDAIS	CONFIGURED VERNS	BUNDLEINDEX	UP1
Fex 101			eth101/1/31	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
Extended (	Chassis Modules		eth101/1/32	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
Fan Trays			ath101/1/33	inharit	suitchad	trunk	enabled	EDG		47-48	unmarified	full
Power Sup	oply Units		Curro 2/ 2/ 55	mineric	smeened	CTONIN.	enobled	L'U		17-10	unspectived	100
Interfaces	fares		eth101/1/34	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
eth1/1	THEE		eth101/1/35	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/2			eth101/1/36	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
🖵 eth1/3												
C eth1/4			eth101/1/3/	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
eth1/5			eth101/1/38	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
eth1/7			eth101/1/39	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
eth1/8			ath101/1/40	inharit	quitchad	trunk	apphlad	EDC		47-49	unmarified	6.0
🖵 eth1/9				minerix	amoneo	(TOTIN	chooled			17-10	unipeentee	Tem
🖵 eth1/10			eth101/1/41	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/11			eth101/1/42	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/12			eth101/1/43	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
L eth1/13						10000				110-170 100-100		
eth1/15			eth101/1/44	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/16			eth101/1/45	inherit	switched	trunk	enabled	EPG		47-48	unspecified	full
C eth1/17												

**附註**:從交換矩陣角度來看,FEX主機埠的完整介面編號包括節點ID。因此,枝葉X上FEX Y上的主機介面Z將編號為X/Y/1/Z。例如,枝葉101上FEX 101上的埠1將為101/101/1/1。

### 在交換機CLI上驗證

使用SSH連線到交換機(pod2-leaf1)並使用以下命令進行驗證:

show fex

show fex detail

ACI枝葉可能需要將新映像下載到FEX。如果是這種情況,您將看到:

pod2-lea:	1# show fex							
FEX	FEX	FEX	FEX					
Number	Description	State	Model	Serial				
101	FEX0101	Image Download	N2K-C2248TP-1G	E SSI14280VQE				
FEX完全發現後,您將看到:								
pod2-lea:	1# show fex							
FEX	FEX	FEX	FEX					
Number	Description	State	Model	Serial				
101	FEX0101	Online	N2K-C2248TP-1G	E SSI14280VQE				
pod2-lea:	f1# <b>show fex deta</b>	il						
FEX: 101	Description: FEX	0101 state: Onl	ine					
FEX ve	rsion: 11.1(3f) [S	witch version: 11	.1(3f)]					
FEX Int	terim version: 11.	1(3f)						
Switch	Interim version:	11.1(3f)						
Extende	er Model: N2K-C224	8TP-1GE, Extende	r Serial: SSI14	280VQE				
Part No	o: 68-3601-05							
Card Io	d: 99, Mac Addr: c	4:71:fe:42:d7, Nu	m Macs: 64					
Module	Module Sw Con: 22 [Switch Sw Con: 21]							

Module Sw Gen: 22 [Switch Sw Gen: 21 pinning-mode: static Max-links: 1

Fabric port for control traffic: Eth1/17

Fabric interface	state	e:
Ethl/17 - Inte	rface	Up. State: Active
Eth1/18 - Inte	rface	Up. State: Active
Po7 - Interfac	e 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	αIJ	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
$E \pm h101/1/20$	Down	Po7
F+h101/1/21	Down	Po7
E = 11101/1/21 E = b 1 0 1 / 1 / 2 2	Down	P07
E = 11101/1/22 E = 101/1/22	Down	P07
E = 11101/1/23 E = 101/1/24	Down	P07
E = 101/1/24 E = $101/1/25$	Down	P07
E = 11101/1/25 E = 101/1/26	Down	P07
E = 101/1/20 E = 101/1/27	Down	P07
EtHI01/1/2/	Down	PO7
EtHI01/1/20	Down	PO7
Eth101/1/29	Down	Po7
Eth101/1/30	Down	Po /
Eth101/1/31	Down	Po7
Eth101/1/32	Down	Po'/
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

## 使用REST API將FEX附加到枝葉

發佈到**x.x.x.x/api/mo/uni.xml**的XML代碼將FEX101新增到埠1/17-18上的枝葉1(軟體101):

```
<infraLeafS descr="" name="FEX101_selector_101" ownerKey="" ownerTag="" type="range">
        <infraNodeBlk from_="101" name="single0" to_="101"/>
     </infraLeafS>
     <infraRsAccPortP tDn="uni/infra/accportprof-FEX101_ifselector"/>
   </infraNodeP>
   <infraFexP descr="GUI Interface Selector Generated FexP Profile: FEX101_FexP101"</pre>
dn="uni/infra/fexprof-FEX101_FexP101" name="FEX101_FexP101" ownerKey="" ownerTag="">
      <infraFexBndlGrp descr="GUI Interface Selector Generated FexBundleP Profile"</pre>
name="FexBndleP101" ownerKey="" ownerTag="">
         <infraRsMonFexInfraPol tnMonInfraPolName=""/>
      </infraFexBndlGrp>
   </infraFexP>
   <infraAccPortP descr="GUI Interface Selector Generated PortP Profile: FEX101"</pre>
dn="uni/infra/accportprof-FEX101_ifselector" name="FEX101_ifselector" ownerKey="" ownerTag="">
      <infraHPortS descr="" name="FexCard101" ownerKey="" ownerTag="" type="range">
         <infraRsAccBaseGrp fexId="101" tDn="uni/infra/fexprof-FEX101_FexP101/fexbundle-</pre>
FexBndleP101"/>
         <infraPortBlk fromCard="1" fromPort="17" name="block1" toCard="1" toPort="18"/>
      </infraHPortS>
   </infraAccPortP>
</infraInfra>
```

### 2.配置FEX HIF

在這個階段,ACI枝葉可以看到FEX HIF,但是,當您配置FEX HIF的物理屬性時,它們尚未完成。

在本示例中,將FEX 101的介面1和2設定為1 Gigabit乙太網速度。

 選擇Fabric > Access Policy。在「導航」(Navigation)窗格中,導航到介面策略(Interface Policies)>配置檔案(Profiles),然後選擇fex101\_FexP101。(此值是在FEX連線到枝葉時自動建 立的,如本文檔前面所述。此對象名為FEX,並附加FexP<fexId>)。在工作窗格中,按一下 FEX的Interface selector前面的+按鈕:

<ul> <li>I01_102_three</li> <li>Apiconnected 102</li> <li>FEX_leaf2</li> <li>VC_N3X</li> <li>apicConnected.eaves</li> <li>fex.101</li> <li>fexSwitchProfile 104</li> <li>n3x_connections</li> <li>Module Policies</li> <li>Interface Policies</li> </ul>	•	PROPERTIES Name: fex101 Description: GUI Int fex101 FEX Policy Group: FexBad	_ <b>FexP101</b> erface Selector Generated FexP Profile _FexP101 <b>IleP101</b>	8:		 POLICY FAULTS	ACTIONS	DRY
<ul> <li>Policy Groups</li> <li>Profiles</li> <li>101_102_jfselector</li> <li>101_102_fselector</li> <li>101_102_fselector</li> <li>101_102_fselector</li> <li>101_102_fselector</li> <li>101_102_fselector</li> <li>101_102_fselector</li> <li>101_101_fselector</li> </ul>	E	Interface Selectors For FEX:	ме түре	POLICY GROUP No items Select Actions	BLOCKS have been found. to create a new item.			E
Pools	-	•		m		SUBMIT	RESET	

2. 在Create Access Port Selector視窗中: 附註:在此步驟中,選擇並配置主機埠。因此,此處 選擇的介面ID是FEX 101上的HIF,而不是任何物理枝葉埠。a.在名稱欄位中,輸入要配置的 埠組的名稱,如下所示: Fex101\_access\_port\_select。

b.在介面ID欄位中,輸入要配置的介面ID,如下所示:1/1-2.

c.從Interface Policy Group下拉選單中,選擇先前配置的1 Gigabit乙太網介面速度(名稱為

1Gig)的策略。您可能希望為此埠組建立新策略。

d.按一下「**Submit**」。



### 使用GUI驗證

在交換矩陣清單中,導航到**Pod 1 > LeafX(連線fex的枝葉)> Interfaces。**選擇FEX HIF,如下圖 所示。



## 驗證

目前沒有適用於此組態的驗證程序。

## 疑難排解

目前尚無適用於此組態的具體疑難排解資訊。