使用DCNM構建Nexus 9000 VXLAN多站點TRM

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簡介

本文檔旨在說明如何部署邊界網關通過DCI交換機連線的Cisco Nexus 9000 VXLAN多站點TRM交換 矩陣



拓撲詳細資訊

- DC1和DC2是運行VXLAN的兩個資料中心位置。
- DC1和DC2邊界網關通過DCI交換機相互連線。
- DCI交換器不執行任何VXLAN;它們為底層運行eBGP,以實現從DC1到DC2的可達性,反之亦 然。此外,DCI交換機還配置了租戶vrf;在本示例中,它是vrf — 「tenant-1」。
- DCI交換機還連線到非VXLAN的外部網路。
- 在邊界網關上終止VRFLITE連線(支援從NXOS-9.3(3)和DCNM-11.3(1)開始的VRFLITE和邊界 網關功能的共存)
- 邊界網關在任播模式下運行;在此版本上運行TRM(租戶路由組播)時,無法將邊界網關配置 為vPC(有關其他限制,請參閱多站點TRM配置指南)
- 對於此拓撲,所有BGW交換機將具有通向每個DCI交換機的兩個物理連線;一個鏈路將處於預設VRF中(將用於站點間流量),而另一個鏈路將位於VRF租戶–1中,該租戶用於將VRFLITE擴展至非VXLAN環境。

PIM/多點傳送詳細資訊(特定於TRM)

- •兩個站點的底層PIM RP是主幹交換機,Loopback254配置為相同。使用底層PIM RP,以便 VTEP可以將PIM暫存器以及PIM加入傳送到主幹(用於為各種VNID複製BUM流量)
- •對於TRM,RP可以通過不同方式指定;就本文檔而言,PIM RP是位於VXLAN交換矩陣外部拓 撲頂部的核心路由器。
- •所有VTEP將核心路由器指定為各個VRF中配置的PIM RP

- DC1-Host1正在將組播傳送到組239.144.144.144;DC2-Host1是DC2中此組的接收器,vxlan的 主機外部(172.17.100.100)也訂閱此組
- DC2-Host1正在將組播傳送到組239.145.145;DC1-Host1是DC1中此組的接收器,vxlan的 Host External(172.17.100.100)也訂閱此組
- DC2-Host2位於Vlan 144中,是組播組的接收器 239.144.144.144和239.100.100.100
- 外部主機(172.17.100.100)正在傳送流量, DC1-Host1和DC2-Host1都是該流量的接收器。
- 這包括East/West Inter和Intra Vlan以及北/南組播流量

採用元件

- 運行9.3(3)的Nexus 9k交換機
- DCNM運行11.3(1)

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。如果您的網路正在作用,請確保您已瞭解任何指令可能造成的影響。

高級步驟

1)考慮到本文檔基於兩個使用VXLAN多站點功能的資料中心,因此必須建立兩個簡單的結構

2)建立MSD並移動DC1和DC2

3)建立外部交換矩陣並新增DCI交換機

4)建立多站點底層和覆蓋

5)在邊界網關上建立VRF擴展附件

6)驗證單播流量

7)驗證組播流量

第1步:為DC1建立簡易交換矩陣

• 登入到DCNM,從儀表板中選擇選項 — >「Fabric Builder」

Good morning, admin! Let's get started.





Creates a managed and controlled SDN fabric.



Networks & VRFs Simple network overlay provisioning for N9K VXLAN EVPN Fabrics.



Documentation Access cisco.com from documentation on configuration, maintenance and operation.

• 選擇「建立交換矩陣」選項



Fabric Builder creates a managed and controlled SDN fabric. Select an existing fabric below or define a new VXLAN fabric, add switches using *Power On Auto Provisioning (POAP)*, set the roles of the switches and deploy settings to devices.



• 接下來是提供Fabric Name(交換矩陣名稱)、 Template(模板),然後在General(常規)頁籤下,填寫相關的ASN、交換矩陣介面編號、Any Cast Gateway MAC(AGM)

* Fabric Name : DC1 * Fabric Template : Easy_Fabric_11	_1	
General Replication vPC	Protocols Advanced Res	ources Manageability Bootstrap Configuration Backu
* BGP ASN Enable IPv6 Underlay	65000	1-4294967295 1-65535[.0-65535]
Enable IPv6 Link-Local Address * Fabric Interface Numbering	unnumbered	Wumbered (Point-to-Point) or Unnumbered
* Underlay Subnet IP Mask Underlay Subnet IPv6 Mask	30	 Mask for Underlay Subnet IP Range Mask for Underlay Subnet IPv6 Range
* Link-State Routing Protocol * Route-Reflectors	ospf 🔍 🔻	 Suppported routing protocols (OSPF/IS-IS) Number of spines acting as Route-Reflectors
* Anycast Gateway MAC NX-OS Software Image Version	cc46.d6ba.c555	 Shared MAC address for all leafs (xxxx.xxxx.xxxx) If Set, Image Version Check Enforced On All Switches. Images Can Be Uploaded From Control:Image Upload
		_) Images Can Be Uploaded From Control:Image Upload

#AGM被交換矩陣中的主機用作預設網關MAC地址。所有枝葉交換機上都是相同的(因為交換矩陣 中的所有枝葉交換機都運行任播交換矩陣轉發)。 所有枝葉交換機上的預設網關IP地址和MAC地址 將相同

• 下一步是設定複製模式

* Fabr	ric Name : DC1									
* Eshric 1	Template : Easy 6	Fabric 11	1	•						
Fabric			_'							
General	Replication	vPC	Protocols	Advanced	Reso	urces	Manag	jeability	Bootstrap	Configuration Backup
	*				-					
	* Replicatio	on Mode	Multicast		•	l l Re	blication N	ode for BUN	A Traffic	
	* Multicast Group	Subnet	239.1.1.0/24] 🕜 Mu	lticast add	ress with pre	efix 16 to 30	
Enable Tenant Routed Multicast (TRM) 🗹 👔 For Overlay Multicast Support In V					/XLAN F	abrics				
Default N	Default MDT Address for TRM VRFs 239.1.1.0				IPV	4 Multica:t	t Address			
	* Rendezvous	s-Points	2	Wumber of spines acting as Rendezvous-Point (RP)						
	* R	P Mode	asm				lticast RP	Mode		
		a mode	054					0001		
	Underlay RP Loop	pback Id	254			(M	n:u, max. i	023)		
	Underlay RP Loop	Primary pback Id				0 Us (Min:0,	ed for Bidl Max:1023	-PIM Phanto	om RP	
	Underlay RP Loo	/ Backup /pback Id				(Min:0,	ed for Fallo Max:1023	ack Bidir-Pl	M Phantom RP	
	Underlay Second RP Loop	l Backup pback Id				OUS (Min:0,	ed for seco Max:1023	nd Fallback	Bidir-PIM Phanto	om RP
	Underlay Third RP Loop	l Backup pback Id				(Min:0,	ed for thire Max:1023	Fallback Bi	dir-PIM Phantom	RP

#用於此文檔的複製模式為組播;另一種方法是使用輸入複製(IR)

#組播組子網將是VTEP用來複製BUM流量(如ARP請求)的組播組

#必須啟用「啟用租戶路由組播(TRM)」覈取方塊

#根據需要填充其他框。

• vPC的Tab鍵保持不變,因為這裡的拓撲未使用任何vPC

• 接下來是協定頁籤

* Fabric Name : DC1 * Fabric Template : Easy_Fabric_11	_1 ▼	
General Replication vPC	Protocols Advanced Resor	urces Manageability Bootstrap Configuration Backup
* Underlay Routing Loopback Id * Underlay VTEP Loopback Id Underlay Anycast Loopback Id * Link-State Routing Protocol Tag * OSPF Area Id Enable OSPF Authentication OSPF Authentication Key ID OSPF Authentication Key	0 1 UNDERLAY 0.0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	 (Min:0, Max:1023) (Win:0, Max:1023) Used for vPC Peering in VXLANv6 Fabrics (Min:0, Max:1023) Routing Process Tag (Max Size 20) OSPF Area Id in IP address format (Min:0, Max:255) 3DES Encrypted
IS-IS Level Enable IS-IS Authentication	□ Ø	Supported IS types: level-1, level-2
IS-IS Authentication Keychain Name IS-IS Authentication Key ID IS-IS Authentication Key		 (Min:0, Max:65535) Cisco Type 7 Encrypted
BGP Authentication BGP Authentication Key Encryption Type BGP Authentication Key	↓ ♥ 	 BGP Key Encryption Type: 3 - 3DES, 7 - Cisco Encrypted BGP Authentication Key based on type
Enable BFD Enable BFD For iBGP Enable BFD For OSPF Enable BFD For ISIS Enable BFD For PIM Enable BFD Authentication	Image: Walid for IPv4 Underlay only Image: Walid for IPv4 Underlay only	
BFD Authentication Key ID BFD Authentication Key		Encrypted SHA1 secret value

#根據需要修改相關框。

• 下一步是「高級」頁籤

* Fab	ric Name :	DC1							
* Fabric	Template :	Easy_Fabric_11	_1	•					
General	Replicati	on vPC	Protocols	Advanced	Resou	Irces	Manageability	Bootstrap	Configuration Backup
		VRF Template	Default_VRF_U	Iniversal	•	🕐 Dei	fault Overlay VRF Tem	plate For Leafs	
	* Ne	twork Template	Default_Networ	rk_Universal	•	🕜 De	fault Overlay Network	Template For Lea	fs
	* VRF Exte	nsion Template	Default_VRF_E	xtension_Univers	al 🔻	O Dei	fault Overlay VRF Tem	plate For Borders	
* N	etwork Exte	nsion Template	Default_Networ	rk_Extension_Uni	versa 🔻	🕜 De	fault Overlay Network	Template For Bord	ders
		Site Id	65000			Por Defaults	EVPN Multi-Site Sup; to Fabric ASN	oort (Min:1, Max: 2	281474976710655).
*	Intra Fabrio	c Interface MTU	9216			😧 (Mi	n:576, Max:9216). Mu	st be an even nun	nber
*	Layer 2 Hos	t Interface MTU	9216			😮 (M	n:1500, Max:9216). M	ust be an even nu	mber
	* Powe	er Supply Mode	ps-redundant			O De	fault Power Supply Mo	de For The Fabric	,
		* CoPP Profile	strict			Provide	bric Wide CoPP Policy. d when 'manual' is sele	Customized CoP	P policy should be
	VTEP H	loldDown Time	180			O NV	E Source Inteface Hol	dDown Time (Min	:1, Max:1500) in seconds
Brownf	ield Overlay	Network Name Format	Auto_Net_VNI	\$\$VNI\$\$_VLAN\$	\$VLAN_I	🕜 Ge	nerated network name	should be < 64 c	haracters
	Enab	le VXLAN OAM	☑ ()						
	Enabl	e Tenant DHCP	☑ 🕐						
		Enable NX-API							
	Enable N	X-API on HTTP							
Enable P	olicy-Based	Routing (PBR)							
Enabl	le Strict Con	fig Compliance			46				
E	nable AAA II	P Authorization		oniy, when IP Au	thorization	i is enabi	ed in the AAA Server		
	Enable DCN	m as Trap Host			-	O SW	itch Cleanup Without F	Reload	
	Greenfield (Cleanup Option	Disable		•	When P	reserveConfig=no		
Enable Pre	cision Time	Protocol (PTP)	0						
	PTP Sou	rce Loopback Id				🕜 (Mi	n:0, Max:1023)		
		PTP Domain Id				On a Sir	Itiple Independent PTF ale Network (Min:0_M	Clocking Subdor lax:127)	mains
	Enable	MPLS Handoff	0			211 0 011			
						🙆 Use	ed for VXLAN to MPLS	S SR/LDP Handoff	

#出於本文檔的目的,所有欄位都保留為預設值。

#ASN從「常規」頁籤中提供的自動填充

• 下一步是填寫「資源」頁籤中的欄位

* Fabric Name : D	C1								
* Fabric Template : E	asy_Fabric_11	_1	•						
General Replication	vPC	Protocols	Advanced	Resou	irces	Manageability	Bootstrap	Configuration Backup	
Manual Underla	y IP Address Allocation	Checki	ng this will disable	e Dynamic	: Underla	ay IP Address Allocation	ns		
* Underlay Routing	Loopback IP Range	10.10.10.0/24			() Тур	pically Loopback0 IP A	ddress Range		
* Underlay VTEP Loopba	ick IP Range	192.168.10.0/2	4		🕜 Тур	pically Loopback1 IP A	ddress Range		
* Underlay RP Loopba	ick IP Range	10.254.10.0/24			🕜 An	ycast or Phantom RP I	P Address Range		
* Underlay Subi	net IP Range	10.4.10.0/24			🕜 Ad	dress range to assign i	Numbered and Pe	er Link SVI IPs	
Underlay MPLS Loopb	ack IP Range				🕜 Us	ed for VXLAN to MPLS	SR/LDP Handoff		
Underlay Routing Lo	oopback IPv6 Range				🕜 Тур	pically Loopback0 IPv6	Address Range		
Underlay VTEP Lo	oopback IPv6 Range				Typically Loopback1 and Anycast Loopback IPv6 Address Range				
Underlay Subne	t IPv6 Range				1 IPV	/6 Address range to as	sign Numbered ar	nd Peer Link SVI IPs	
BGP Router ID R	ange for IPv6 Underlay				0				
* Layer 2 VXLA	N VNI Range	100144,10014	5		O OV	erlay Network Identifie	r Range (Min:1, M	lax:16777214)	
* Layer 3 VXLA	N VNI Range	1001445			O OV	erlay VRF Identifier Ra	nge (Min:1, Max:1	16777214)	
* Network V	VLAN Range	144,145			🕜 Pe	r Switch Overlay Netwo	ork VLAN Range ((Min:2, Max:3967)	
* VRF	VLAN Range	1445			🕜 Pe	r Switch Overlay VRF	VLAN Range (Min	:2, Max:3967)	
* Subinterface I	Dot1q Range	2-511			🕜 Pe	r Border Dot1q Range	For VRF Lite Con	nectivity (Min:2, Max:4093)	
* VRF Lite	Deployment	Manual		•	O VR	F Lite Inter-Fabric Con	nection Deployme	ent Options	
* VRF Lite Sub	net IP Range	10.33.10.0/24			🕜 Ad	dress range to assign i	P2P Interfabric Co	nnections	
* VRF Lite \$	Subnet Mask	30			🕜 (M	in:8, Max:31)			
* Service Network	VLAN Range	3000-3199			🕜 Pe	r Switch Overlay Servio	ce Network VLAN	Range (Min:2, Max:3967)	
* Route Map Sequence Nu	mber Range	1-65534			🕜 (M	in:1, Max:65534)			

#底層路由環回IP範圍將用於BGP、OSPF等協定

#將用於NVE介面的Underlay VTEP環回IP範圍。

#襯底RP用於用於BUM組播組的PIM RP。

• 用相關資訊填充其他頁籤,然後「儲存」

第2步:為DC2建立簡易交換矩陣

- •執行與步驟1相同的任務,為DC2建立Easy Fabric
- 確保在Resources for NVE and Routing Loopback和任何其他相關區域下提供不同的IP地址塊
- ASN也應不同
- 第2層和第2層VNID相同

步驟3:為多站點建立MSD

•必須建立MSD結構,如下所示。

General DCI Resources Prics (2) * Layer 2 VXLAN VNI Range 100144,100145 Overlay Network Identifier Range (Min:1, Max:16777214) C1 * Layer 3 VXLAN VNI Range 1445 Overlay VRF Identifier Range (Min:1, Max:16777214) * Layer 3 VXLAN VNI Range 1445 Overlay VRF Identifier Range (Min:1, Max:16777214) * VRF Template Default_VRF_Universal Operative Default Overlay VRF Template For Leafs * Network Template Default_VRF_Extension_Universal Default Overlay VRF Template For Borders * VRF Extension Template Default_VRF_Extension_Universal Default Overlay Network Template For Borders * Network Extension Template Default_VRF_Extension_Universal Default Overlay Network Template For Borders * Network Extension Template Default_Network_Extension_Universal Default Overlay Network Template For Borders * Network Extension Template Default_Network_Extension_Universal Default Overlay Network Template For Borders Multi-Site Routing Loopback Id 100 Multi-Site Routing Loopback Id 100 Tor Auto-deploy Flag @ Enables Overlay VLANs on uplink between ToRs and Leafs Image: Site Auto-deploy Flag	General DCI Resources	Fabric Builder	Add Fabric * Fabric Name : Multisite-MSD * Fabric Template : MSD_Fabric_11_1	
c1 Layer or VALARY WITH Range Theo Image: Carly or VALARY WITH Range Image: Carly or VALARY W	Layer of VLCAR VIR hange (a) Carlos VLCAR VIR hange (b) Carlos VLCAR VIR hange (c) Carlos VLCAR VLCAR VLCAR VLCAR S on uplink between ToRs and Leafs (c) Carlos VLCAR VLCAR VLCAR S on uplink between ToRs and Leafs	orics (2)	General DCI Resources * Layer 2 VXLAN VNI Range 100144,100145 * Layer 2 VXLAN VNI Range 1445	Overlay Network Identifier Range (Min:1, Max:16777214) Overlay VRF Identifier Range (Min:1, Max:16777214)
ToR Auto-deploy Flag 🗌 🕜 Enables Overlay VLANs on uplink between ToRs and Leafs	ToR Auto-deploy Flag 🗌 🕢 Enables Overlay VLANs on uplink between ToRs and Leafs	PE: Switch Fabric N: 65000 Plication Mode: Multicast chnology: VXLAN Fabric	* Layer 3 VXLAN VNI Range 1445 * VRF Template Default_VRF_Universal * Network Template Default_Network_Universal * VRF Extension Template Default_VRF_Extension_Universal * Network Extension Template Default_Network_Extension_Universal * Network Extension Template Default_Network_Extension_Universal Anycast-Gateway-MAC cc46.d6ba.c555 Multi-Site Routing Loopback Id 100	 Overlay VKH Identifier Raine (min.), max.1077214) Default Overlay VRF Temp ate For Leafs Default Overlay Network Template For Borders Default Overlay Network Template For Borders Shared MAC address for a leaves (Min:0, Max:1023)
			ToR Auto-deploy Flag 🗌 🔞 Enables Overlay VLANs on uplin	k between ToRs and Leafs

• 同時填寫DCI頁籤

Add Fabric

* Fabric Name :	Multisite-MSD			
* Fabric Template :	MSD_Fabric_11	_1		
General DCI	Resources			
* Multi-S Deple	Bite Overlay IFC	Direct_To_BGWS	V	W Manual, Auto Overlay EVPN Peering to Route Servers, Auto Overlay EVPN Direct Peering to Border Gateways
Multi-Site F	Route Server List			Wulti-Site Router-Server peer list, e.g. 128.89.0.1, 128.89.0.2
Multi-S	ite Route Server BGP ASN List			1-4294967295 1-65535[.0-65535], e.g. 65000, 65001
Multi-Sit Auto D	te Underlay IFC eployment Flag			
Dela	ay Restore time	300		Multi-Site underlay and overlay control plane convergence time (Min:30, Max:1000) in seconds

#多站點重疊IFC部署方法是「Direct_To_BGWS」,因為此處DC1-BGW將與DC2-BGW形成重疊連 線。拓撲中顯示的DCI交換機只是傳輸第3層裝置(以及VRFLITE)

• 下一步是提及多站點環回範圍(此IP地址將用作DC1和DC2 BGW上的多站點環回IP;DC1-BGW1和DC1-BGW2共用同一多站點環回IP;DC2-BGW1和DC2-BGW2共用同一多站點環回 IP,但將不同於DC1-BGW

* Fabric Name : Multisite-MSD		
* Fabric Template : MSD_Fabric_11	_1	
General DCI Resources		
* Multi-Site Routing Loopback IP Range	192.168.200.0/24	Typically Loopback100 IP Address Range
DCI Subnet IP Range	10.10.1.0/24	Address range to assign P2P DCI Links
Subnet Target Mask	30	(2) Target Mask for Subnet Range (Min:8, Max:31)

#填寫欄位後,按一下「儲存」。

#完成步驟1至3後,交換矩陣生成器頁面將如下所示。

Fabrics (3)

DC1	$\dot{\alpha} \times$	DC2	$\diamond \times$	Multisite-MSD	$\diamond \times$
Type: Switch Fabric ASN: 65000 Replication Mode: Nulticast Technolow: VOIAL Eabric		Type: Switch Fabric ASN: 65002 Replication Mode: Multicast Technolow: VOLAN Entric		Type: Nulti-Fabric Domain Hember Fabrics: None	

第4步:將DC1和DC2交換矩陣移至多站點MSD

#在此步驟中,DC1和DC2交換矩陣被移動到步驟3中建立的Multisite-MSD。以下是有關如何實現此 操作的螢幕截圖。

Fabric Builder: Multisite-MSD					
ctions –					
- 53 🛆					
Tabular view					
3 Refresh topology					
Save layout					
Delete saved layout		Mov	o Fabric		
stom saved layout 🔻		() Plas		a faw minutas if thara is a lara	<u>e</u>
		numbe	r of VRFs/NWs in the fab	rics!	
Settings				Selected 0 / Total.	2 99
abrics			Fabric Name	Fabric State	
		0	DC1	standalone	
)	0	DC2	standalone	
			(
		4			+
				Add Remove C	ancel
					10.

#選擇MSD,按一下「移動交換矩陣」,然後依次選擇DC1和DC2,再選擇「新增」。

#移動兩個交換矩陣後,首頁將如下所示

Fabrics (3)					
DC1	$\Leftrightarrow \times$	DC2	$\Leftrightarrow \times$	Multisite-MSD	\$ ×
Type: Switch Fabric ASN: 65000 Replication Mode: Hulticast		Type: Switch Fabric ASN: 65002 Replication Mode: Multicast		Type: Multi-Fabric Domain Member Fabrics: DC1, DC2	
Technology: VXLAN Fabric		Technology: VXLAN Fabric			

Multisite-MSD將顯示DC1和DC2為成員結構

第5步:建立VRF

#可以從MSD交換矩陣建立VRF,該交換矩陣將同時適用於這兩種交換矩陣。以下是實現相同目標 的截圖。

	Ŧ	Control	nter Network Manager	SCOPE: Multisite-MS	3D 🔻
N Dashboard		Fabrics	Network / VRF Deployment		Net
		Fabric Builder Interfaces Networks	Fabric Selected: Multisite-MSD		
ropology		VRFs			Selecte
Control	>	Services	٢	Show A	All

Network / VRF Selectio	Create V	RF				
VRFs + VRF Name No data available	 VRF I General Advance 	* v * v	* VRF ID * VRF Name VRF Template RF Extension Template VLAN ID VRF VRF Intf VRF	1445 tenant-1 Default_VRF_Universal Default_VRF_Extension_Universal 1445 • Vlan Name Description Description	Propose VLAN	

#填寫高級頁籤,然後「建立」

第6步:建立網路

#建立Vlan和相應的VNID,SVI可以從MSD交換矩陣中完成,該交換矩陣將同時適用於這兩種交換 矩陣。

	Ŧ	Control	nter Network Manager	SCOPE: Multisite-MSD	•
	Deebbeerd	Fabrics	site-MSD		
	Dashboard	Fabric Builder			
*	Topology	Interfaces Networks VRFs	-		(• •
٩	Control	Services			

Network / VRF Sele	Create Network			×
	 Network Information 			
Networks	* Network ID	100144		
+ / ×	* Network Name	MyNetwork_100144		
Network N	* VRF Name	tenant-1	+	
No data available	Layer 2 Only		_	
	* Network Template	Default_Network_Universal		
* Network Extension Template		Default_Network_Extension_Univer		
	VLAN ID	144	Propose VLA	N
	 Network Profile General Advanced IPv4 Gate IPv6 Gate 	vay/NetMask 172.16.144.254/24 teway/Prefix Vian Name		example 192.0.2.1/24 example 2001:db8::1/64) if > 32 chars enable:system vlan long-name
				Create Network

#在「高級」頁籤中,如果要求BGW是網路的網關,請啟用該覈取方塊

#填寫所有欄位後,按一下「建立網路」

#對任何其他Vlan/網路重複相同步驟

第7步:為DCI交換機建立外部交換矩陣

#本示例考慮了資料包從DC1到DC2的路徑中的DCI交換機(就站點間通訊而言),當交換矩陣超過 2個時通常會發生這種情況。

#外部交換矩陣將包括位於本文檔開頭所示拓撲頂部的兩台DCI交換機

#使用「external」模板建立Fabri並指定ASN

#修改部署的任何其他相關欄位



第8步:將交換機新增到每個交換矩陣

#在這裡,每個交換矩陣的所有交換機都將新增到各自的交換矩陣中。

新增交換機的過程如下面的螢幕截圖所示。

← Fabric Builder: DC1	Inventory Manage	ement					
Actions –	Discover Existing Switches PowerOn Auto Provisioning (POAP)						
+ - 53 🛆	Discovery Information	Scan Details					
Tabular view	Seed IP	10.122.165.173,10.122.165.227,10					
Ø Refresh topology		Ex: "2.2.2.20"; "10.10.10.40-60"; "2.2.2.20, 2.2.2.1"					
Save layout	Authentication Protocol	MD5					
X Delete saved layout	Username	admin					
Custom saved layout •	Password	••••••					
 Restore Fabric 	Max Hops	10 hop(s)					
🕏 Backup Now	Preserve Config	no yes					
Ø Re-sync Fabric		Selecting 'no' will clean up the configuration on swit <mark>c</mark> h(es)					
+ Add switches	Start discovery						
Fabric Settings							

#如果「預設配置」為「否」;存在的任何交換機配置都將擦除;例外是VRF Context Management中的主機名、引導變數、MGMT0 IP地址、路由

#正確設定交換機上的角色(按一下右鍵交換機,設定角色,然後設定相關角色

#同時相應地安排交換機的佈局,然後按一下「儲存佈局」









第9步:單個交換矩陣的TRM設定

• 下一步是在每個交換矩陣上啟用TRM覈取方塊

Network Name	Network ID	VRF Name	IPv4 Gateway/Subnet	IPv6 Gateway/Prefix	Status	VLAN ID	
MyNetwork 100144	100144	tenant-1	172 16 144 254/24		NA	144	
MyNetwork_100145	100145	tenant-1	172.16.145.254/24		NA	145	
			Edit Network				×
			 Network Information 				^
			* Network II	100144			- 11
			* Network Name	MyNetwork_100144			- 11
			* VRF Name	e tenant-1	T		- 11
			* Network Templat	Default Network Univ	ersal 🔻		- 11
			* Network Extension	Default Network Exte	nsion Univer		- 11
			Templat				- 11
			▼ Network Profile Generate Multicast IP (General Advanced DHCP	DPlease click only to gener Address CPv4 Server 1 CPv4 Server 2 v4 Server VRF	ate a New Multicast Group	Address and overide the default value!	
			Loopbac Relay in	terface (Min:0, Max:1023)		0	- 11
				Routing Tag 12345		O-4294967295	
			_				

#對所有結構的所有網路執行此步驟。

• 完成此操作後,還需要各個結構中的VRF進行一些更改並新增如下所示的資訊。

VRFs					(Fabric Selected: DC2
+ / × 0	G					
VRF Name	*	VRF ID	Status			
✓ tenant-1		1445	PENDING			
				Edit VRF		×
				VRF Information		1
				* VRF	D 1445	
				* VRF Nar	tenant-1	
				* VRF Templa	Default_VRF_Universal	v
				VRF Extensi Templa	Default_VRF_Extension_Universal	v
				VLAN	D 1445	Propose VLAN
				 VRF Profile 	\frown	
				General	TRM Enable 🗹 🕜 Enable Tenant	Routed Multicast
				Advanced	RP Address 10.200.200	to the fabric?
					RP Loopback ID	Ø 0-1023
				* Under	y Mcast Add 239.1.2.100	() IP.4 Multicast Address
				Overla	Mcast Groups	22 0.0.0/4 to 239.255.255.255/4
				Enable Enable 1	RM BGW MSite V A Inable TRM of	nk-local Option under VRF SVI n Border Gateway Multisite
				Advent	se Host Routes Erlag to Control	Advertisement of /32 and /128 Routes to Edge Routers
						Save Cancel

#這必須在DC1和DC2以及VRF部分完成。

#請注意,VRF-> 239.1.2.100的組播組已從自動填充組手動更改;最佳作法是對第3層VNI VRF和任

何L2 VNI Vlan的BUM流量多點傳送群組使用不同的群組

步驟10:邊界網關上的VRFLITE配置

#從NXOS 9.3(3)和DCNM 11.3(1)開始,邊界網關可以充當邊界網關和VRFLITE連線點(這將使邊 界網關與外部路由器具有VRFLITE鄰居關係,因此外部裝置可以與交換矩陣中的裝置通訊)

#對於本文檔而言,邊界網關正在與DCI路由器形成VRFLITE鄰居關係,DCI路由器位於上述拓撲的 北部。

#需要注意的一點是:VRFLITE和多站點底層鏈路不能是相同的物理鏈路。必須旋轉單獨的連結 ,以形成軟體和多站點襯底

#以下螢幕截圖將說明如何在邊界網關上實現VRF LITE和多站點擴展。

Fabric Builder: Mul	tisite-N	1SD
Actions	-	
+ - 53		
■ Tabular view]	
C Refresh topology		
🗎 Save layout		
X Delete saved layout		
Custom saved layout	•	
Fabric Settings		
Move Fabrics		

ownumes	Links Opera	ational View				_		
				Link Management	t – Edit Link]		
+ /								
	Fabric Name	Name	Policy	Link Type		V		
1	DC1	DC1-VTEP~Ethernet1/2DC1-N3K~Ethernet1/1		Link Sub-Type	wit fabric colum 11.1	-		
2	DC2	DC2-VTEP~Ethernet1/1DC2-N3K~Ethernet1/1/1		* Source Eabric	DC1			
3	DC1<->DC2	DC1-BGW1~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	* Destination Fabric		v		
4	DC1<->DC2	DC1-BGW1~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	* Source Device		T		
5	DC1<->DC2	DC1-BGW2~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	* Source Interface		V		
6	DC1<->DC2	DC1-BGW2~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	* Destination Device		~		
7	DC1	DC1-VTEP~Ethernet1/1DC1-SPINE~Ethernet1/1	int_intra_fabric_unnum_link_11_1	* Destination Interface		v		
8	DC1	DC1-BGW2~Ethernet1/2DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1					
9 🗌	DC1	DC1-BGW1~Ethernet1/3DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1	 Link Profile 				
10	DC2	DC2-BGW2~Ethernet1/1DC2-SPINE~Ethernet	int_intra_fabric_num_link_11_1	General	* DOD L and A 01	65000		Q Local BCD Autonomous Sustam Number
1	DC2	DC2-BGW1~Ethernet1/1DC2-SPINE~Ethernet	int_intra_fabric_num_link_11_1	Advanced	BGP Local ASN	63000	20	Deal box Autonomous System Humber
2	DC2	DC2-VTEP~Ethernet1/3DC2-SPINE~Ethernet1/3	int_intra_fabric_num_link_11_1		* IP Address/Mask	10.33.10.5/3	30	In address for sub-interface in each VRP
3	DC2<->DCI	DC2-BGW2~Ethernet1/5DCI-1~Ethernet1/8	ext_multisite_underlay_setup_1		BGP Neighbor IP	10.33.10.6		Neighbor IP address in each VKr
4	DC2<->DCI	DC2-BGW2~Ethernet1/6DCI-2~Ethernet1/8	ext_multisite_underlay_setup_1		BGP Neighbor ASN	65001		Weighbor BGP Autonomous System Number
5	DCI<->DC2	DCI-2~Ethernet1/8DC2-BGW2~Ethernet1/8			Link MTU	9216	that controls Auto VDE Life I	Interface MTU on both ends of VRF Lite IFG Deployment on both ends for Managed devices
6 🗸	DC1<->DCI	DC1-BGW1~Ethernet1/1DC1-2~Ethernet1/1	ext_fabric_setup_11_1		Auto Deploy Plag	U U Hay	The concors Auto VAT Life I	reproyment on bour enus for managed devices
7 🗆	DC1<->DCI	DC1-BGW2~Ethernet1/5DCI-2~Ethernet1/5	ext_multisite_underlay_setup_1					
8	DC2<->DCI	DC2-BGW1~Ethernet1/4DCI-2~Ethernet1/6	ext_multisite_underlay_setup_1					
9	DC1<->DCI	DC1-BGW1~Ethernet1/5DC1-2~Ethernet1/7	ext_multisite_underlay_setup_1					
20	DC1<->DCI	DC1-BGW2~Ethernet1/4DCI-1~Ethernet1/5	ext_multisite_underlay_setup_1					
1	DC2<->DCI	DC2-BGW1~Ethernet1/5DCI-1~Ethernet1/6	ext_multisite_underlay_setup_1					
22	DC1<->DCI	DC1-BGW1~Ethernet1/4DCI-1~Ethernet1/7	ext_multisite_underlay_setup_1					

#切換到「表格檢視」

#移動到頁籤「links」,然後新增「inter-fabric VRFLITE」連結,必須指定源交換矩陣為DC1,目 標交換矩陣為DCI

#為指向正確DCI交換機的源介面選擇正確的介面

#在鏈路配置檔案下,提供本地和遠端IP地址

#還啟用覈取方塊 — 「自動部署標誌」,以便同時自動填充VRFLITE的DCI交換機配置(這將在以 後的步驟中完成)

自動填充ASN數量

#填寫所有欄位後,按一下「儲存」按鈕

- •對於通向兩個DCI交換機的所有4個邊界網關上的所有BGW到DCI連線,必須執行上述步驟。
- •考慮到本文檔的拓撲,將共有8個交換矩陣間VRF LITE連線,如下所示。

← ।	Fabric	Builder:	Multisite-	MSE
-----	--------	----------	------------	-----

Switches Links

Operational View

+	X C (5					
	Fabric Name	Name	Policy	Info	Admin State	Oper State
1	DC1	DC1-VTEP~Ethernet1/2DC1-N3K~Ethernet1/1		Neighbor Present	Up:-	Up:-
2	DC2	DC2-VTEP~Ethernet1/1DC2-N3K~Ethernet1/1/1		Neighbor Present	Up:-	Up:-
3	DC1	DC1-BGW2~Ethernet1/2DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1	Link Present	Up:Up	Up:Up
4	DC1	DC1-BGW1~Ethernet1/3DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1	Link Present	Up:Up	Up:Up
5	DC1	DC1-VTEP~Ethernet1/1DC1-SPINE~Ethernet1/1	int_intra_fabric_unnum_link_11_1	Link Present	Up:Up	Up:Up
6	DC2	DC2-BGW2~Ethernet1/1DC2-SPINE~Ethernet		Link Present	Up:Up	Up:Up
7	DC2	DC2-VTEP~Ethernet1/3DC2-SPINE~Ethernet1/3		Link Present	Up:Up	Up:Up
8	DC2	DC2-BGW1~Ethernet1/1DC2-SPINE~Ethernet		Link Present	Up:Up	Up:Up
9	DC2<->DCI	DC2-BGW2~Ethernet1/2DCI-1~Ethernet1/4	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
10	DC2<->DCI	DC2-BGW2~Ethernet1/4DCI-2~Ethernet1/4	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
11	DC1<->DCI	DC1-BGW1~Ethernet1/1DCI-2~Ethernet1/1	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
12	DC1<->DCI	DC1-BGW2~Ethernet1/1DCI-2~Ethernet1/2	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
13	DC2<->DCI	DC2-BGW1~Ethernet1/3DCI-2~Ethernet1/3	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
14	DC2<->DCI	DC2-BGW1~Ethernet1/2DCI-1~Ethernet1/3	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
15	DC1<->DCI	DC1-BGW1~Ethernet1/2DCI-1~Ethernet1/1	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
16	DC1<->DCI	DC1-BGW2~Ethernet1/3DCI-1~Ethernet1/2	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up

步驟11:邊界網關上的多站點底層配置

#下一步是配置每個交換矩陣中每個邊界網關上的多站點底層。

#為此,我們需要從BGW到DCI交換機的獨立物理鏈路。在步驟10中用於VRFLITE的連結不能用於 多站點覆蓋

#這些介面將是「預設vrf」的一部分,與之前的介面將是「租戶vrf」的一部分不同(此示例為 tenant-1)

#下面的螢幕截圖有助於逐步完成此配置。

←	Fabric	pric Builder: Multisite-MSD									
Swi	ches	Links Operatio	nal View								
					Link Menagement	Edit Link	_			\bowtie	
+		XCC								_	
		Eabric Name	Name	Policy	* Link Type		T				
		0.04	DOLUTED Etheraultic DOLUDY Etherault/	(only	* Link Sub-Type		•				
1		DC1	DC1-VTEP*Ellement/2DC1-NSK*Ellement/1		* Link Template	ext_multisite_underlay_setup_	· •				
2		002	DC2-VTEP-Enement/1DC2-NSK-Enement/1/1	and some multiplic soundary ashies	* Source Fabric		V				
3		DC1<->DC2	DC1-BGW1~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	* Destination Fabric		V				
4		DC1<->DC2	DC1-BGW1~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	* Source Device		*				
5		DC1<->DC2	DC1-BGW2~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	* Source Interface		V				
6		DC1<->DC2	DC1-BGW2~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	* Destination Device		v				
7		DC1<->DCI	DC1-BGW1~Ethernet1/1DCI-2~Ethernet1/1	ext_fabric_setup_11_1	Destination Interface		v				
8		DC1<->DCI	DC1-BGW1~Ethernet1/2DCI-1~Ethernet1/1	ext_fabric_setup_11_1							
9		DC1	DC1-BGW1~Ethernet1/3DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1	 Link Profile 						
10		DC1<->DCI	DC1-BGW1~Ethernet1/4DCI-1~Ethernet1/7	ext_multisite_underlay_setup_1	General		* BGP Local ASN	65000	Q Loca BGP	Autonomous SL	
11		DC1<->DCI	DC1-BGW1~Ethernet1/5DCI-2~Ethernet1/7	ext_multisite_underlay_setup_1	Advanced		* ID Address Black	10.4.10.1/20	O ID an Higgs	with mask (e.g.	
12		DC1<->DCI	DC1-BGW2~Ethernet1/1DCI-2~Ethernet1/2	ext_fabric_setup_11_1			IP Address/Mask	10.4.10.1130		Deddaes	
13		DC1	DC1-BGW2~Ethernet1/2DC1-SPINE~Ethernet	int_intra_fabric_unnum_link_11_1			[°] BGP Neighbor IP	10.4.10.2	@ Neighbor IF	address	
14		DC1<->DCI	DC1-BGW2~Ethernet1/3DCI-1~Ethernet1/2	ext_fabric_setup_11_1			BGP Neighbor ASN	65001	W Neighbor B	GP Autonomou	
15		DC1<->DCI	DC1-BGW2~Ethernet1/4DCI-1~Ethernet1/5	ext_multisite_underlay_setup_1			* BGP Maximum Paths	1	@ Maxinum n	sumber of IBGP,	
16		DC1<->DCI	DC1-BGW2~Ethernet1/5DCI-2~Ethernet1/5	ext_multisite_underlay_setup_1			Routing TAG	54321	Routing tag	associated witi	
17		DC1	DC1-VTEP~Ethernet1/1DC1-SPINE~Ethernet1/1	int_intra_fabric_unnum_link_11_1			Link MTU	9216	Interace M	TU on both end	
18		DC2	DC2-VTEP~Ethernet1/3DC2-SPINE~Ethernet1/3	int_intra_fabric_num_link_11_1							
19		DC2	DC2-BGW2~Ethernet1/1DC2-SPINE~Ethernet	int_intra_fabric_num_link_11_1		(
20		DC2	DC2-BGW1~Ethernet1/1DC2-SPINE~Ethernet	int_intra_fabric_num_link_11_1							
21		DC2<->DCI	DC2-BGW1~Ethernet1/2DCI-1~Ethernet1/3	ext_fabric_setup_11_1							
22		DC2<->DCI	DC2-BGW1~Ethernet1/3DCI-2~Ethernet1/3	ext_fabric_setup_11_1							
23		DC2<->DCI	DC2-BGW1~Ethernet1/4DCI-2~Ethernet1/6	ext_multisite_underlay_setup_1							
24		DC2<->DCI	DC2-BGW1~Ethernet1/5DCI-1~Ethernet1/6	ext_multisite_underlay_setup_1							
25		DC2<->DCI	DC2-BGW2~Ethernet1/4DCI-2~Ethernet1/4	ext_fabric_setup_11_1						Save	
26		DCI<->DC2	DCI-2~Ethernet1/8DC2-BGW2~Ethernet1/8								
27		DC2<->DCI	DC2-BGW2~Ethernet1/6DCI-2~Ethernet1/8	ext_multisite_underlay_setup_1							
20		Dog > Dol	DO1 DOUD, Ethomatical DOI 1. Ethomatical	and fabric cabus 44.4	Link Drosont Lindh						

#對於從BGW到DCI交換機的所有連線,必須執行相同的步驟

#最後,總共將看到8個交換矩陣間多站點底層連線,如下所示。

F	abric	Builder: Multisite-M	SD				
Swit	ches	Links Operat	ional View				
+							
		Fabric Name	Name	Policy	Info	Admin State	Oper State
1		DC1<->DC2	DC1-BGW1~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	NA	-1-	-:-
2		DC1<->DC2	DC1-BGW1~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	NA	-1-	-1-
3		DC1<->DC2	DC1-BGW2~loopback0DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	NA	-1-	-(-
4		DC1<->DC2	DC1-BGW2~loopback0DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	NA	-1-	-1-
5		DC1<->DCI	DC1-BGW1~Ethernet1/1DCI-2~Ethernet1/1	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
6		DC1<->DCI	DC1-BGW1~Ethernet1/2DCI-1~Ethernet1/1	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
7		DC1<->DCI	DC1-BGW2~Ethernet1/1DCI-2~Ethernet1/2	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
8		DC1<->DCI	DC1-BGW2~Ethernet1/3DCI-1~Ethernet1/2	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
9		DC2<->DCI	DC2-BGW1~Ethernet1/2DCI-1~Ethernet1/3	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
10		DC2<->DCI	DC2-BGW1~Ethernet1/3DCI-2~Ethernet1/3	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
11		DC2<->DCI	DC2-BGW2~Ethernet1/4DCI-2~Ethernet1/4	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
12		DC2<->DCI	DC2-BGW2~Ethernet1/2DCI-1~Ethernet1/4	ext_fabric_setup_11_1	Link Present	Up:Up	Up:Up
13		DC1<->DCI	DC1-BGW1~Ethernet1/4DCI-1~Ethernet1/7	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
14		DC1<->DCI	DC1-BGW1~Ethernet1/5DCI-2~Ethernet1/7	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
15		DC1<->DCI	DC1-BGW2~Ethernet1/4DCI-1~Ethernet1/5	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
16		DC1<->DCI	DC1-BGW2~Ethernet1/5DCI-2~Ethernet1/5	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
17		DC2<->DCI	DC2-BGW1~Ethernet1/4DCI-2~Ethernet1/6	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
18		DC2<->DCI	DC2-BGW1~Ethernet1/5DCI-1~Ethernet1/6	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
19		DC2<->DCI	DC2-BGW2~Ethernet1/6DCI-2~Ethernet1/8	ext_multisite_underlay_setup_1	Link Present	Up:Up	Up:Up
20		DC2<->DCI	DC2-BGW2~Ethernet1/5DCI-1~Ethernet1/8	ext_multisite_underlay_setup_1	LinkPresent	Up:Up	Up:Up

步驟12:TRM的多站點覆蓋設定

#當多站點底層完成後,多站點重疊介面/鏈路將會自動填充,並且可以在表格檢視中的多站點 MSD交換矩陣內的鏈路下看到。

#預設情況下,多站點重疊僅形成從每個站點BGW到另一個站點的bgp l2vpn evpn鄰居關係,這是 從一個站點到另一個站點進行單播通訊所必需的。但是,當需要在站點(通過vxlan多站點功能連線)之間運行組播時,需要為多站點MSD交換矩陣內的所有重疊介面啟用TRM覈取方塊,如下圖所示 。螢幕截圖將說明如何執行此任務。

←	Fabric	Builder: Multisite	-MSD				S	ave & De	eploy
Sw	itches	Links	erational View						
							Selected 0 / Total 29	Ø	- 1 <u>2</u>
+						Show	All	•	Y
		Fabric Name	Name		Policy	Info	Admin State	Oper	
1		DC1<->DC2	DC1-BGW1~loopback0-	DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	NA	->-	-:-	*
2		DC1<->DC2	DC1-BGW1~loopback0-	DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	NA	->-	-:-	
3		DC1<->DC2	DC1-BGW2~loopback0-	DC2-BGW1~loopback0	ext_evpn_multisite_overlay_setup	NA	÷	-:-	-
4		DC1<->DC2	DC1-BGW2~loopback0-	DC2-BGW2~loopback0	ext_evpn_multisite_overlay_setup	NA	->-	-:-	
Ð	cisc	B Data Centr	Link Management	- Edit Link					×
←	Fabrio	Builder: Multisite	Link Management						, Die
			* Link Type	Inter-Fabric	V				- 8
Sv	vitches	Links Of	* Link Sub-Type	MULTISITE OVERLAY					
			* Link Template	ext_evpn_multisite_overlay	se' 🔻				¢
+	. /		* Source Fabric	DC1	V				
		Eshris Name	* Destination Fabric	DC2	•				- 1
		Fabric Name	* Source Device	DC1-BGW1	•				
1		DC1<->DC2	* Source Interface	loopback0	•				- 1
2	2	DC1<->DC2	* Destination Device	DC2-BGW1					_
3	3	DC1<->DC2	* Destination Interface	loopback0					- 1
4		DC1<->DC2	General						•
Ę	5	DC1<->DCI		* BGP Local ASN	65000	🕐 BGI	P Local Autonomous Sy	/stem N	ι
6	3	DC1<->DCI		* Source IP Address	10.10.10.1	🕐 Sou	Irce IPv4 Address for B	GP EVF	2
7		DC1<->DCI		* Destination IP Addr	10.10.20.3	🕐 Des	stination IPv4 Address f	or BGP	E
8	3	DC1<->DCI		* BGP Neighbor ASN	65002	😮 BGI	P Neighbor Autonomou	s Syster	7
9		DC2<->DCI		Enable TRM	C Enable Tenant Routed Mu	ılticast			-
10		DC2<->DCI							-
11		DC2<->DCI						Save	
12	2	DC2<->DCI							h.

步驟13:在MSD和單個結構中儲存/部署

#執行儲存/部署,這將按照以上完成的步驟推送相關配置

#選擇MSD時,將推送的配置將僅適用於邊界網關。

#因此,需要為單個交換矩陣儲存/部署,這些交換矩陣會將相關配置推送到所有常規枝葉交換機 /VTEP

步驟14:適用於MSD的VRF延伸器附件

#選擇MSD並轉到VRF部分

CISCO															
Network / VRF Selection > N	Network / VRF Deploy	ment)													work View Continue
									6		1			_	
									Fat	bric Selected: Multisite-MSD	J				
VRFs														Select	d1/Toul1 Ø Ø ∗
+ / X 8 6														Show At	• Y
VRF Name		 VRF ID 	5	itatus											
tenant-1		1445	N	A											
_															
															Depky Detailed Vew
VRE Extension Att	tachment - A	ttach exte	insions for a	iven switch(e	25									×	
Charles and the second se		toren erte	instons for §	inen onnen(e											0
Fabric Name: Multisite-	-MSD													_	ø
Deployment Options															
Solid the row and chilk on the o	out to ock and save charges													_	
tenant-1							(_	2
Switch				 VLA 	N			Extend		CL	J Freeform	Status	Loopback Id		
DC1-BGW1				1445				MULTISITE + VRF_LITE	2)	P	reeform config.)	NA		_	
DC1-BOW2				1445				MULTISITE + VRF_LITE	2)	<u>8</u>	reeform config.)	NA		_	
DC2-BGW1				1445				MULTISITE + VRF_LITE	2)	A	reeform config)	NA		_	
DC2-BOW2				1445				MULTISITE + VRF_LITE	3)	E	reeform config.)	NA		_	
							(
Extension Details															
C fourre fait &	Turne	IE NAME	Dest Switch	Dest interface	00710.00	10 MA.SV		NEWWOOD ASM			DEED VOE NAME	INVENDMENT INVENTORY		1.1	
	- type	IP_NAME	Dest. Switch	Dest internate	00110_0	IP_MASK	NEWNBOR P	NEWNEUR ASN	AUTO_VRP_CITE_PCA		PEER_VRP_NAME	PTE REARBOR PTE MAD			
DC140W1	VIO-LITE	Ethernet1/2	DCI-1	Ethemert/1	2	10.33.10.1/30	10.33.10.2	60001	sue		tenant-1				
	WRP_UTE	Envernett/1	0012	Ethemet 1/2		10.33.10.5/30	10.33.90.6	65001			Secure-1				
DC1-BOW2	VIO-LITE	Emernett/3	001-1	Ethemerv2	2	10.33.10.9/30	10.33.10.10	60001	sue		tenare-1				
	WRF LITE	Ethernet1/7	DCL4	Ethemet 1/2		10.33.10.13/30	10.33.30.34	60001			Jengro-1				
	HOP LITE	Energens/2	0010	Ellernet vo		10 00 00 000	10.00.00.0	60001			Jenare 1				
C2-00M1	WAR LITE	Cinemetto	DCL 4	Ellement/	-	10.00.20.500	40.00.20.6	60001			lands I				
2 002-80W2	NOE LITE	Ethornaltic	001.0	Ethomore in		10.22.20.2020	10.10.20.10	65004	100		hannes a				
- 002-00M2	100_010	Contraction	UNUTR.	0.00000000		10.00.20.13/30	10.00.20.14	00001	<u> </u>)	and the second s				
4)		and and	
														Save	

#請注意,「擴展」選項必須是「MULTISITE+VRF_LITE」(如本文檔所述),邊界網關功能和 VRFLITE整合到邊界網關交換機上。

AUTO_VRF_LITE將設定為true

#所有8個從BGW到DCI交換機的對等VRF名稱都必須手動填充,如下所示(此處示例在DCI交換機 上使用相同的VRF名稱)

#完成後,按一下「儲存」

	🐥 🕑 admin 🕻
VRF Attachment - Attach VRFs for given switch(es).	Diploy Costaled New
Fabric Name: Multisite-MSD	0
Deployment Options	Ø
Select the row and click on the cell to edit and save changes	۵
tenant-1	
Switch A VLAN CLI Preeform Status Looppack id Looppace DCLVTEP 1445 Examplementer) NA	
✓ DC2-VTEP 1445 Freeform config) NA	
_	
Save	
Fabric: DC1	
Table. DOT	Fabric: DC2
3)	
BGW1 DC1-BGW2	DC2 ROWA DC2RGW2
	DC2-DOWN DC4-DGW2
DCI-PPINE	DC2-\$PINE
DC1-VIEP	DC2-VTEP

#建立VRF擴展時,只有邊界網關對VRFLITE DCI交換機有額外的配置 #因此,必須單獨選擇常規枝葉,然後按一下每個租戶VRF的「覈取方塊」,如上所示。

#按一下「部署」推送配置

步驟15:將網路配置從MSD推送到交換矩陣

Ne	work / VRF Selection >	vetwork.	/ VIIF Deployment						Aff Mer	Contrue
No	works	1							Fabric Selected: Multishe-MSD Selected: Multishe-MSD Selected 2 / Not2	100-
E									Show M	• •
6	Network Name	•	Network ID	VRF Name	IPv4 Gateway/Subnet	IPv6 Gateway/Prefix	Status	VLAN ID		
Ð	MyNetwork_100144		100144	tenant-1	172.16.144.25424		NA	144		
R	MyNetwork_100145		100145	tenant-1	172.16.145.254.24		NA	145		
-		·								

#選擇MSD交換矩陣內的相關網路



#請注意,此時僅選擇邊界網關;執行相同操作,並選擇常規枝葉交換機/VTEP-> DC1-VTEP和 DC2-VTEP。



#完成後,點選「部署」(將配置推送到上面所有6台交換機)

步驟16:檢驗所有VRF上的VRF和網路

#此步驟用於驗證VRF和網路是否在所有交換矩陣上顯示為「已部署」;如果其顯示為掛起,請確保 「部署」配置。

第17步:在外部交換矩陣上部署配置

#需要執行此步驟,以便將所有相關的IP定址、BGP和VRFLITE配置推送到DCI交換機。

#要執行此操作,請選擇外部交換矩陣,然後按一下「儲存和部署」

DCI-1# sh ip bgp sum BGP summary information for VRF default, address family IPv4 Unicast BGP router identifier 10.10.100.1, local AS number 65001 BGP table version is 173, IPv4 Unicast config peers 4, capable peers 4 22 network entries and 28 paths using 6000 bytes of memory BGP attribute entries [3/504], BGP AS path entries [2/12] BGP community entries [0/0], BGP clusterlist entries [0/0] Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 173 0 0 00:04:42 5 10.4.10.1 4 65000 11 10 11 10 173 0 0 00:04:46 5 10.4.10.9 4 65000 10.4.20.37 4 65002 11 10 173 0 0 00:04:48 5 10.4.20.49 4 65002 11 10 173 0 0 00:04:44 5 DCI-1# sh ip bgp sum vrf tenant-1 BGP summary information for VRF tenant-1, address family IPv4 Unicast BGP router identifier 10.33.10.2, local AS number 65001 BGP table version is 14, IPv4 Unicast config peers 4, capable peers 4 2 network entries and 8 paths using 1200 bytes of memory BGP attribute entries [2/336], BGP AS path entries [2/12] BGP community entries [0/0], BGP clusterlist entries [0/0] V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd Neighbor 10.33.10.1 10.33.10.9 10.33.20.1 10.33.20.9 10.33.10.1 4 65000 8 10 14 0 0 00:01:41 2 10 11 11 10 11 10 14 0 00:03:16 2 0 4 65000 4 65000 4 65002 4 65002 14 0 0 00:04:40 2 14 0 0 00:04:39 2 DCI-2# sh ip bgp sum BGP summary information for VRF default, address family IPv4 Unicast BGP router identifier 10.10.100.2, local AS number 65001 BGP table version is 160, IPv4 Unicast config peers 4, capable peers 4 22 network entries and 28 paths using 6000 bytes of memory BGP attribute entries [3/504], BGP AS path entries [2/12] BGP community entries [0/0], BGP clusterlist entries [0/0] V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd Neighbor 10.4.10.5 4 65000 12 11 160 0 0 00:05:10 5 0 00:05:11 5 10.4.10.13 0 4 65000 12 11 160 160 10.4.20.45 4 65002 12 11 0 0 00:05:10 5 10.4.20.53 4 65002 160 0 0 00:05:07 5 12 11 DCI-2# sh ip bgp sum vrf tenant-1 BGP summary information for VRF tenant-1, address family IPv4 Unicast BGP router identifier 10.33.10.6, local AS number 65001 BGP table version is 14, IPv4 Unicast config peers 4, capable peers 4 2 network entries and 8 paths using 1200 bytes of memory BGP attribute entries [2/336], BGP AS path entries [2/12] BGP community entries [0/0], BGP clusterlist entries [0/0] Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 10.33.10.5 4 65000 14 0 0 00:03:28 2 10 11 10.33.10.13 0 00:04:30 2 4 65000 14 11 11 0 10.33.20.5 4 65002 12 11 14 0 0 00:05:05 2 10.33.20.13 4 65002 12 11 14 0 0 00:05:03 2

#部署後,我們將看到4個IPv4 BGP鄰居關係從每個DCI交換機到所有BGW,以及4個IPv4 VRF BGP鄰居關係(適用於租戶VRF EXtension)

第18步:在DCI交換機之間配置iBGP

#考慮到DCI交換機之間具有連線的鏈路,因此理想的是iBGP IPv4鄰居關係,這樣,如果任何下游 連線在DCI-1交換機上斷開,仍然可以通過DCI-2轉發南北流量

#為此,DCI交換機之間需要iBGP IPv4鄰居關係,並在兩端使用next-hop-self。

#自由格式必須在DCI交換機上旋轉才能實現這一點。所需的配置行如下所示。

上述拓撲中的DCI交換機數量在vPC中配置;因此,備份SVI可用於構建iBGP鄰居關係

#選擇DCI交換矩陣,按一下右鍵每台交換機並「檢視/編輯策略」

ew/Edit Policies	for DCI-1(FDO	22141QDG)				×
+ 🖊 🗙 🔽	ew View All	Push Config Current Switch	Config	Se Quick F	Filter	
Policy ID	Template	Description	Generated Config	Entity Name	Entity Type	Sour
	free					
POLICY-450390	switch_freeform	management vrf configuration	View	SWITCH	SWITCH	
1000): Genera Variables:	* Switch Freeform Co	router bgp 65001 neighbor 10.10.8.2 remote-as address-family ipv4 unicast next-hop-self	65001			

#在DCI-2交換機上執行相同的更改,然後「儲存並部署」以將實際配置推送到DCI交換機

#完成後,可以使用以下命令完成CLI驗證。

24 network entries and 46 paths using 8400 bytes of memory BGP attribute entries [6/1008], BGP AS path entries [2/12] BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/P	fxRcd	
10.4.10.5	4	65000	1206	1204	187	0	0	19:59:17	5		
10.4.10.13	4	65000	1206	1204	187	0	0	19:59:19	5		
10.4.20.45	4	65002	1206	1204	187	0	0	19:59:17	5		
10.4.20.53	4	65002	1206	1204	187	0	0	19:59:14	5		
10.10.8.1	4	65001	12	7	187	0	0	00:00:12	18 #	iBGP	neighborship
From DOT 0 to	DAT	1									

from DCI-2 to DCI-1

第19步:驗證IGP/BGP鄰居關係

OSPF鄰居關係

#在本示例中,所有襯底IGP都是OSPF,所有VTEP都將與主幹形成OSPF鄰居關係,這還包括一個 站點中的BGW交換機。

DC1-SPINE# show ip ospf neighbors OSPF Process ID UNDERLAY VRF default Total number of neighbors: 3 Neighbor ID Pri State Up Time Address Interface 10.10.10.3 1 FULL/ - 1d01h 10.10.10.3 Eth1/1 # DC1-Spine to DC1-VTEP 10.10.10.2 1 FULL/ - 1d01h 10.10.10.2 Eth1/2 # DC1-Spine to DC1-BGW2 10.10.10.1 1 FULL/ -1d01h 10.10.10.1 Eth1/3 # DC1-Spine to DC1-BGW1

#所有環回(BGP路由器ID、NVE環回)都在OSPF中通告;因此,在交換矩陣內,所有環回都通過 OSPF路由協定獲知,這將有助於進一步形成l2vpn evpn鄰居關係

BGP鄰居關係

#在交換矩陣中,此拓撲將具有從Spines到常規VTEP以及邊界網關的I2vpn evpn鄰居關係。

DC1-SPINE# show bgp l2vpn evpn sum BGP summary information for VRF default, address family L2VPN EVPN BGP router identifier 10.10.10.4, local AS number 65000 BGP table version is 80, L2VPN EVPN config peers 3, capable peers 3 22 network entries and 22 paths using 5280 bytes of memory BGP attribute entries [14/2352], BGP AS path entries [1/6] BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 10.10.10.1 4 65000 1584 1560 80 0 0 1d01h 10 # DC1-Spine to DC1-BGW1 10.10.10.2 4 65000 1565 1555 80 0 0 1d01h 10 # DC1-Spine to DC1-BGW2 10.10.10.3 4 65000 1550 1554 80 0 0 1d01h 2 # DC1-Spine to DC1-VTEP

#鑑於這是一個使用eBGP l2vpn evpn從一個站點到另一個站點進行邊界網關對等的多站點部署,可 以在邊界網關交換機上使用下面的命令驗證相同情況。

DC1-BGW1# show bgp l2vpn evpn sum BGP summary information for VRF default, address family L2VPN EVPN BGP router identifier 10.10.10.1, local AS number 65000 BGP table version is 156, L2VPN EVPN config peers 3, capable peers 3 45 network entries and 60 paths using 9480 bytes of memory BGP attribute entries [47/7896], BGP AS path entries [1/6] BGP community entries [0/0], BGP clusterlist entries [2/8] Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 10.10.10.4 4 65000 1634 1560 156 0 0 1d01h 8 # DC1-BGW1 to DC1-SPINE 10.10.20.3 4 65002 1258 1218 156 0 0 20:08:03 9 # DC1-BGW1 to DC2-BGW1 10.10.20.4 4 65002 1258 1217 156 0 0 20:07:29 9 # DC1-BGW1 to DC2-BGW2 Neighbor T AS PfxRcd Type-2 Type-3 Type-4 Type-5 10.10.10.4 I 65000 8 2 0 1 5 10.10.20.3 E 65002 9 4 2 0 3 10.10.20.4 E 65002 9 4 2 0 3

適用於TRM的BGP MVPN鄰居關係

#在建立TRM配置後,所有枝葉交換機(包括BGW)將與主幹形成mvpn鄰居關係

DC1-SPINE# show bgp ipv4 mvpn summary BGP summary information for VRF default, address family IPv4 MVPN BGP router identifier 10.10.10.4, local AS number 65000 BGP table version is 20, IPv4 MVPN config peers 3, capable peers 3 0 network entries and 0 paths using 0 bytes of memory BGP attribute entries [0/0], BGP AS path entries [0/0] BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRc	d
10.10.10.1	4	65000	2596	2572	20	0	0	1d18h	0	
10.10.10.2	4	65000	2577	2567	20	0	0	1d18h	0	
10.10.10.3	4	65000	2562	2566	20	0	0	1d18h	0	

#此外,邊界網關需要在彼此之間形成mvpn鄰居關係,以便東/西組播流量能夠正確傳輸。

DC1-BGW1# show bgp ipv4 mvpn summary BGP summary information for VRF default, address family IPv4 MVPN BGP router identifier 10.10.10.1, local AS number 65000 BGP table version is 6, IPv4 MVPN config peers 3, capable peers 3 0 network entries and 0 paths using 0 bytes of memory BGP attribute entries [0/0], BGP AS path entries [0/0] BGP community entries [0/0], BGP clusterlist entries [2/8]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.10.10.4	4	65000	2645	2571	6	0	0	1d18h	0
10.10.20.3	4	65002	2273	2233	6	0	0	1d12h	0
10.10.20.4	4	65002	2273	2232	6	0	0	1d12h	0

第20步:在邊界網關交換機上建立租戶VRF環回

#在所有邊界網關上使用唯一IP地址在租戶VRF中建立環回。

#為此,選擇DC1,按一下右鍵DC1-BGW1,管理介面,然後建立環回,如下所示。

Add Interface				>
	* ту	pe: Loopback		í
	* Select a dev	rice DC1-BGW1		
	* Loopback	(ID 2		
	* Poli	cy: int_loopback_11_1		
General				_
Interface VRF	tenant-1) Interface VRF name, default VRF if not specifie	ed	
Loopback IP	172.19.10.1	Loopback IP address for V4 underlay		
Loopback IPv6 Address		Loopback IPv6 address for V6 underlay		
Route-Map TAG	12345	Route-Map tag associated with interface IP		
Interface Description		Add description to the interface (Max Size 254)		
Freeform Config			Note I All configs should strictly match show run' output, with respect to case and newlines. Any mismatches will yield unexpected diffs during deploy.	
Enable Interface	Uncheck to disable the interface			

#必須在其他3個邊界網關上執行相同的步驟。

第21步:DCI交換機上的VRFLITE配置

#在此拓撲中,DCI交換機配置了VRFLITE以指向BGW。VRFLITE還配置在DCI交換機的北側(即 核心交換機)

Save Preview Deploy

#根據TRM用途,VRF tenant-1中的PIM RP位於核心交換機中,該核心交換機通過VRFLITE連線到 DCI交換機

#此拓撲具有從DCI交換機到位於圖頂部的VRF tenant-1中的核心交換機的IPv4 BGP鄰居關係。

#為此目的,建立子介面並分配有IP地址,同時建立BGP鄰居關係(這些直接在DCI和核心交換機上 通過CLI完成)

DCI-1# sh ip bgp sum vrf tenant-1 BGP summary information for VRF tenant-1, address family IPv4 Unicast BGP router identifier 10.33.10.2, local AS number 65001 BGP table version is 17, IPv4 Unicast config peers 5, capable peers 5 4 network entries and 10 paths using 1680 bytes of memory BGP attribute entries [3/504], BGP AS path entries [3/18] BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.33.10.1	4	65000	6366	6368	17	0	0	4d10h	2
10.33.10.9	4	65000	6368	6369	17	0	0	4d10h	2

6368 10.33.20.1 4 65002 6369 17 0 0 4d10h 2 4 65002 17 4d10h 2 10.33.20.9 6369 6368 0 0 172.16.111.2 4 65100 68 67 17 0 0 00:49:49 2 # This is towards the Core switch from DCI-1 #上方的紅色是從DCI-1到核心交換機的BGP鄰居。

DCI-2# sh ip bgp sum vr tenant-1 BGP summary information for VRF tenant-1, address family IPv4 Unicast BGP router identifier 10.33.10.6, local AS number 65001 BGP table version is 17, IPv4 Unicast config peers 5, capable peers 5 4 network entries and 10 paths using 1680 bytes of memory BGP attribute entries [3/504], BGP AS path entries [3/18] BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 17 10.33.10.5 4 65000 6368 6369 0 0 4d10h 2 10.33.10.13 0 4 65000 17 0 6369 6369 4d10h 2 6369 0 10.33.20.5 4 65002 6370 17 0 4d10h 2 10.33.20.13 4 65002 6370 6369 17 0 0 4d10h 2 172.16.222.2 4 65100 53 52 17 0 0 00:46:12 2 # This is towards the Core switch from DCI-2 #核心交換機上還需要各自的BGP配置(返回DCI-1和DCI-2)

單點傳播驗證

從DC1-Host1到DC2-Host1的東/西連線

#當從DCNM和手動CLI(步驟1至21)推送所有上述配置時,單播可達性應可在East/West運行

DC1-Hostl# ping 172.16.144.2 source 172.16.144.1 PING 172.16.144.2 (172.16.144.2) from 172.16.144.1: 56 data bytes 64 bytes from 172.16.144.2: icmp_seq=0 ttl=254 time=0.858 ms 64 bytes from 172.16.144.2: icmp_seq=1 ttl=254 time=0.456 ms 64 bytes from 172.16.144.2: icmp_seq=2 ttl=254 time=0.431 ms 64 bytes from 172.16.144.2: icmp_seq=3 ttl=254 time=0.454 ms 64 bytes from 172.16.144.2: icmp_seq=4 ttl=254 time=0.446 ms

--- 172.16.144.2 ping statistics --5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.431/0.529/0.858 ms

從DC1-Host1到PIM RP(10.200.200.100)的北/南

DC1-Host1# ping 10.200.200.100 source 172.16.144.1 PING 10.200.200.100 (10.200.200.100) from 172.16.144.1: 56 data bytes 64 bytes from 10.200.200.100: icmp_seq=0 ttl=250 time=0.879 ms 64 bytes from 10.200.200.100: icmp_seq=1 ttl=250 time=0.481 ms 64 bytes from 10.200.200.100: icmp_seq=2 ttl=250 time=0.483 ms 64 bytes from 10.200.200.100: icmp_seq=3 ttl=250 time=0.464 ms 64 bytes from 10.200.200.100: icmp_seq=4 ttl=250 time=0.485 ms

--- 10.200.200.100 ping statistics --5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.464/0.558/0.879 ms

多點傳送驗證

出於本文檔的目的,為「tenant-1」VRF配置了PIM RP,並將其存在於VXLAN交換矩陣外部;根據 拓撲,PIM RP在核心交換機上配置IP地址 — > 10.200.200.100

非VXLAN中的源(在核心交換機之後),DC2中的接收器

請參閱圖示開頭的拓撲。

#源自非VXLAN主機的北/南組播流量 — > 172.17.100.100,兩個資料中心都存在接收器;DC1-Host1-> 172.16.144.1和DC2-Host1-> 172.16.144.2,組 — > 239.100.100.100

Legacy-SW#ping 239.100.100.100 source 172.17.100.100 rep 1 Type escape sequence to abort. Sending 1, 100-byte ICMP Echos to 239.100.100.100, timeout is 2 seconds: Packet sent with a source address of 172.17.100.100

Reply to request 0 from 172.16.144.1, 3 ms Reply to request 0 from 172.16.144.1, 3 ms Reply to request 0 from 172.16.144.2, 3 ms Reply to request 0 from 172.16.144.2, 3 ms

DC1中的源、DC2中的接收器以及外部

--- 239.144.144.144 ping multicast statistics ---

1 packets transmitted, From member 172.17.100.100: 1 packet received, 0.00% packet loss From member 172.16.144.2: 1 packet received, 0.00% packet loss --- in total, 2 group members responded ---

DC2中的源、DC1中的接收器以及外部

--- 239.145.145.145 ping multicast statistics ---1 packets transmitted, From member 172.17.100.100: 1 packet received, 0.00% packet loss From member 172.16.144.1: 1 packet received, 0.00% packet loss --- in total, 2 group members responded ---