使用ACI多站点交换矩阵配置站点间L3out

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简介

本文档介绍使用思科以应用为中心的基础设施(ACI)多站点交换矩阵进行站点间L3out配置的步骤。

先决条件

要求

Cisco 建议您了解以下主题:

- 功能性ACI多站点交换矩阵设置
- 外部路由器/连接

使用的组件

本文档中的信息基于:

- •多站点协调器(MSO)2.2(1)版或更高版本
- ACI版本4.2(1)或更高版本
- MSO节点
- ACI交换矩阵
- Nexus 9000系列交换机(N9K)(终端主机和L3out外部设备模拟)
- Nexus 9000系列交换机(N9K)(站点间网络(ISN))

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原 始(默认)配置。如果您的网络处于活动状态,请确保您了解所有命令的潜在影响。

背景信息

站点间L3out配置支持的方案

架构配置1

- •租户在站点(A和B)之间延伸。
- 虚拟路由和转发(VRF)在站点(A和B)之间延伸。
- •一个站点(A)的本地终端组(EPG)/网桥域(BD)。
- •L3out本地到另一个站点(B)。
- •L3out本地到站点(B)的外部EPG。
- •从MSO创建和配置合同。

架构配置2

•租户在站点(A和B)之间延伸。

- VRF在站点(A和B)之间延伸。
- EPG/BD在站点(A和B)之间延伸。
- •L3out本地到一个站点(B)。
- •L3out本地到站点(B)的外部EPG。
- 合同配置可以从MSO完成,或者每个站点都通过应用策略基础设施控制器(APIC)创建本地合同 ,并在延伸EPG和L3out外部EPG之间本地连接。在这种情况下,由于本地合同关系和策略实 施需要影子External EPG,因此它会出现在站点A。

方案配置3

- •租户在站点(A和B)之间延伸。
- VRF在站点(A和B)之间延伸。
- EPG/BD在站点(A和B)之间延伸。
- •L3out本地到一个站点(B)。
- •L3out的外部EPG在站点(A和B)之间延伸。
- 合同配置可以从MSO完成,或每个站点都从APIC创建本地合同,并在延伸EPG和延伸外部 EPG之间本地连接。

方案配置4

- •租户在站点(A和B)之间延伸。
- VRF在站点(A和B)之间延伸。
- EPG/BD本地到一个站点(A)或EPG/BD本地到每个站点(站点A中的EPG-A和站点B中的EPG-B)。
- L3out本地到一个站点(B),或为了实现外部连接的冗余,您可以将L3out本地到每个站点(本地 到站点A,本地到站点B)。
- •L3out的外部EPG在站点(A和B)之间延伸。
- 合同配置可以从MSO完成,或每个站点具有从APIC创建的本地合同,并在延伸EPG和延伸外 部EPG之间本地连接。

方案配置5(传输路由)

- •租户在站点(A和B)之间延伸。
- VRF在站点(A和B)之间延伸。
- •L3out本地到每个站点(本地到站点A和本地到站点B)。
- 每个站点(A和B)的本地外部EPG。
- 合同配置可以从MSO完成,或每个站点具有从APIC创建的本地合同,并在外部EPG本地和影子外部EPG本地之间本地附加。

方案配置5(VRF间传输路由)

- •租户在站点(A和B)之间延伸。
- •本地到每个站点(A和B)的VRF。
- •L3out本地到每个站点(本地到站点A和本地到站点B)。
- 每个站点(A和B)的本地外部EPG。
- 合同配置可以从MSO完成,或每个站点具有从APIC创建的本地合同,并在外部EPG本地和影子外部EPG本地之间本地附加。

注意:本文档提供基本站点间L3out配置步骤和验证。在本例中,使用Schema-config1。

配置

网络图

物理拓扑



逻辑拓扑



在本示例中,我们使用Schema-config1。但是,此配置可以以类似方式完成(根据合同关系进行微 小更改)其他受支持的架构配置,但拉伸对象需要位于拉伸模板而不是特定站点模板中。

配置架构配置1

- •租户在站点(A和B)之间延伸。
- VRF在站点(A和B)之间延伸。
- EPG/BD本地到一个站点(A)。
- •L3out本地到另一个站点(B)。
- •L3out本地到站点(B)的外部EPG。
- •从MSO创建合同和配置。 查看站<u>点间L3Out准则和限制</u>。
- 站点间L3out的配置不受支持:站点中的组播接收器,通过另一站点L3out从外部源接收组播。
 站点中从外部源接收的组播从不发送到其他站点。当站点中的接收方从外部源接收组播时,必须在本地L3out上接收组播。内部组播源使用PIM-SM任意源组播(ASM)将组播发送到外部接收器。内部组播源必须能够从本地L3out到达外部交汇点(RP)。巨型OverLay交换矩阵(GOLF)。
 外部EPG的首选组。

配置交换矩阵策略

每个站点的交换矩阵策略是基本配置,因为这些策略配置链接到特定租户/EPG/静态端口绑定或 L3out物理连接。使用交换矩阵策略的任何错误配置都可能导致来自APIC或MSO的逻辑配置失败 ,从而导致实验室设置中使用的所提供的交换矩阵策略配置失败。它有助于了解在MSO或APIC中 链接到哪个对象的对象。



Host_A站点A的连接交换矩阵策略

站点B的L3out连接交换矩阵策略



可选步骤

一旦为各个连接设置了交换矩阵策略,您就可以确保从各个APIC集群发现并可访问所有枝叶/主干。接下来,您可以验证从MSO可到达的两个站点(APIC集群),并且多站点设置可操作(和IPN连接)。

配置RTEP/ETEP

可路由隧道终端池(RTEP)或外部隧道终端池(ETEP)是站点间L3out的必需配置。旧版本的MSO显示 "可路由TEP池",而较新版本的MSO显示"外部TEP池",但两者同义。这些TEP池通过VRF"Overlay-1"用于边界网关协议(BGP)以太网VPN(EVPN)。

来自L3out的外部路由通过BGP EVPN通告到另一个站点。此RTEP/ETEP也用于远程枝叶配置,因此,如果APIC中已存在ETEP/RTEP配置,则必须将其导入MSO。

以下是从MSO GUI配置ETEP的步骤。由于版本为3.X MSO,因此它显示ETEP。ETEP池在每个站点必须唯一,并且不得与每个站点的任何内部EPG/BD子网重叠。

站点A

步骤1.在MSO GUI页面(在网页中打开多站点控制器)中,选择"基础设施">"**基础设施配置"**。单击 Configure Infra。

Ē	alede Multi-Site Orchestrator)
Dashboard		i
Application Management	Infra Configuration	_
D Operations V	Configure Infra	
O Infrastructure		
System Configuration	CONNECTIVITY VIEW	
Sites		
Infra Configuration		
SD-WAN		

步骤2.在Configure Infra中,选择**Site-A**,Inside Site-A,选择**pod-1**。然后,在Pod-1内部,使用Site-A的外部TEP IP地址配置**External TEP Pools**。(在本例中为192.168.200.0/24)。 如果站点A中有多

POD,请对其他Pod重复此步骤。

Fabric Connectivity Infra		Deploy Q O X
SETTINGS		pod-1
General Settings		• pour
SITES	Asile	0 1 0 1 4 1 4
SiteA (Ib) erabled	😵 pod-1	* Overlay Unicast TEP 192.168,10.12
enabled	9 Sha t _a Spine B6P peering on	External TEP Pools TEP 192.168.200.0/24 Bearered Address 192.168.200.0/24

步骤3.要验证APIC GUI中ETEP池的配置,请选择**Fabric > Inventory > Pod Fabric Setup Policy >** Pod-ID(双击以打开[Fabric Setup Policy a POD-Pod-x])> External TEP。

cisco	APIC (SiteA)								admi	٩	0	2		
System Te	enants Fabric Virtual	Networking L4-L7 S	ervices Admin C	Operations Apps	Integrations									
Inventor	Y Fabric Policies Access	Policies												
Inventory		00	Pod Fabric Setup Po	blicy										0
> C Quick Start											Physical I	Pods	Virtual P	ods
Topology										-	Tryotouri	ous	C	\
Pod T	Setup Policy		Pod ID		,	TEP Pool		Remot	e ID				C) 1
Fabric Memb	bership		1			10.0.0/16								
Disabled Inte		es		-										
Duplicate IP				Fabric Setup Po	licy for a POD -	Pod 1			00	\otimes				
								Policy	Faults Hist	iry				
				8 0 0 0					0 <u>+</u>	**-				
				Properties										
				TEP Pool: 1	10.0.0.0/16					Î				
				Pod Type: p	physical					41				
		•		Remote Pools.	 Remote ID 		Remote Pool		Ξ.					
							No items have been found.			11				
						S	elect Actions to create a new item.			11				
										11				
				External TEP:	ID	Parana	Address Count	Chate	1 ·					
				l l	192.168.200.0/24	0	And the Observe	active						
										•				
									Close					
								_						

您还可以使用以下命令验证配置:

```
moquery -c fabricExtRoutablePodSubnet
moquery -c fabricExtRoutablePodSubnet -f 'fabric.ExtRoutablePodSubnet.pool=="192.168.200.0/24"'
```

APIC1# moquery -c fa	bricExtRoutablePodSubnet
Total Objects shown:	1
<pre># fabric.ExtRoutable</pre>	PodSubnet
pool	: 192.168.200.0/24
annotation	: orchestrator:msc
childAction	:
descr	:
dn	: uni/controller/setuppol/setupp-1/extrtpodsubnet-[192.168.200.0/24]
extMngdBy	:
lcOwn	: local
modTs	: 2021-07-19T14:45:22.387+00:00
name	:
nameAlias	:
reserveAddressCount	: 0
rn	: extrtpodsubnet-[192.168.200.0/24]
state	: active
status	:
uid	: 0

站点B

步骤1.为站点B配置外部TEP池(与站点A的步骤相同) 在MSO GUI页面(在网页中打开多站点控制器)中,选择Infrastructure > Infra Configuration。单击**配置基础**设施。在配置基础设施内,**选择** 站点B。在Site-B内,选择pod-1。然后,在Pod-1内,使用站点B的外部TEP IP地址配置External TEP Pools。(在本例中为192.168.100.0/24)。 如果您在站点B中有多POD,请对其他Pod重复此步骤。

Fabric Connectivity Infra		Deploy Q O X
SETTINGS		♥ pod-1
General Settings	SiteB Refresh	0 1 0 1 4 1 0
SiteA (ACI) enabled Ø	pod-1	* Overlay Unicast TEP 192.168.11.12
SiteB imabled	9 SRe2_Spine BDP peering on	External TEP Pools TEP TEP 192.168.100.0/24 Reserved Address Count, undefined
		Add TEP Pool

步骤2.要验证APIC GUI中ETEP池的配置,请选择Fabric > Inventory > Pod Fabric Setup Policy > Pod-ID(双击以打开[Fabric Setup Policy a POD-Pod-x])> External TEP。

cisco APIC (SiteB)				admin 🔇 🔿 🔮	900
System Tenants Fabric Virtual Networking L4-L7	Services Admin Operations Apps Inte	grations			
Inventory Fabric Policies Access Policies					
Inventory	Pod Fabric Setup Policy				0
> 🗘 Quick Start	,			Dhurical Dod	Virtual Dode
🛞 Topology				- Hysical Fou	s virtuai Pous
Pod 1	▲ Pod ID	TEP Pool	Remote ID		0 +
Fabric Membership	1	10.0.0/16			
Disabled Interfaces and Decommissioned Switches					
Duplicate IP Usage	Fabric Setup P	olicy for a POD - Pod 1		000	
			Policy	Faults History	
	8 🗘 🙆 🖉			0 ± **-	
	Properties	1			
	TEP Pool	10.0.0/16			
	Pod Type Remote Pools	; physical			
	•	* Remote ID	Remote Pool		
			No items have been found.		
	External TEP				
		IP Reserve	re Address Count State		
		192.168.100.0/24 0	active		
			Clo	se Submit	

对于Site-B APIC,输入此命令以验证ETEP地址池。

apic1# moquery -c fak	pricExtRoutablePodSubnet -f
'fabric.ExtRoutablePo	odSubnet.pool=="192.168.100.0/24"'
Total Objects shown:	1
<pre># fabric.ExtRoutable#</pre>	PodSubnet
pool	: 192.168.100.0/24
annotation	: orchestrator:msc <<< This means, configuration pushed from MSO.
childAction	:
descr	:
dn	: uni/controller/setuppol/setupp-1/extrtpodsubnet-[192.168.100.0/24]
extMngdBy	:
lcOwn	: local
modTs	: 2021-07-19T14:34:18.838+00:00
name	:
nameAlias	:
reserveAddressCount	: 0
rn	: extrtpodsubnet-[192.168.100.0/24]

state	:	active
status	:	
uid	:	0

配置Stretch租户

步骤1.在MSO GUI中,选择Application Management > **Tenants**。 单击"**添加租户**"。在本例中,租 户名称为"TN_D"**。**

Ŧ	diale Multi-Site Orci	nestrator				۵ 🕸 📼
Dashboard						
Application Management ^	Tenants					
Tenants						😋 👌 🚺 Add Tenant
Schemas	Filter by attributes					
Policies	Name	Description	Assigned To Sites	Assigned To Users	Assigned to Schemas	Consistency Scheduler

步骤2.在"显**示名称**"字段中,输入租户的名称。在"关**联的站**点"部分,选**中"站**点A**"和"站点**B"复选框 。

Add Tenant		ð ×
	General Settings * Display Name	Î
	TNLD Internal Name: TNLD Description	
	Associated Sites	
	Stack J(x) (1.3)(h) ////////////////////////////////////	
	Associated Users 👔	
	User Status	
	Consistency Checker Scheduler Settings	
	Diable Scheduler	
	Select Property Demy 24 hours	
		Save

步骤3.检验新租户"Tn_D"是否已创建。

Ē	Multi-Site Orchestrator					۵ 🛞	
Dashboard Dashboard Application Management A Tenants	Tenants					Q Ö (Add Tenant	
Schemas	Filter by attributes						
Policies	Name	Description	Assigned To Sites	Assigned To Users	Assigned to Schemas	Consistency Scheduler	
Operations							
System Configuration	TN_D		2	1	0	Set Schedule	1
Sites							
Infra Configuration							
SD-WAN							
	10 V Rows					Page 1 of 1 4 4 1-7 of 7 🕨	·I

逻辑视图

从MSO创建租户时,它基本上会在站点A和站点B创建租户。它是一个延伸租户。此租户的逻辑视 图如本例所示。此逻辑视图有助于了解租户TN_D是站点A和站点B之间的扩展租户。

							Si
Ŧ	dude Multi-Site Orche	strator				0	
Dashboard	Tenants						
Tenants	Tondito					C O Add Ten	ant
Schemas	Filter by attributes						
Policies	Name	Description	Assigned To Sites	Assigned To Users	Assigned to Schemas	Consistency Scheduler	
C Infrastructure	∧ TN_D		2	1	0	Set Schedule	
System Configuration							
DantTN D							
iant:::IN_D							

您可以验证每个站点的APIC中的逻辑视图。您可以看到站点A和站点B都显示已创建"TN_D"租户。



站点B中也创建了相同的拉伸租户"TN_D"。



此命令显示从MSO推送的租户,您可以将其用于验证目的。您可以在两个站点的APIC中运行此命 令。

APIC1# moque	ry	-c fvTenant -f 'fv.Tenant.name=="TN_D"'
Total Objects	5 8	shown: 1
<pre># fv.Tenant</pre>		
name	:	TN_D
annotation	:	orchestrator:msc
childAction	:	
descr	:	
dn	:	uni/tn-TN_D
extMngdBy	:	msc
lcOwn	:	local
modTs	:	2021-09-17T21:42:52.218+00:00
monPolDn	:	uni/tn-common/monepg-default
nameAlias	:	
ownerKey	:	
ownerTag	:	
rn	:	tn-TN_D
status	:	
uid	:	0

apic1# moquery -c fvTenant -f 'fv.Tenant.name=="TN_D"'
Total Objects shown: 1
fv.Tenant
name : TN_D

annotation	:	orchestrator:msc
childAction	:	
descr	:	
dn	:	uni/tn-TN_D
extMngdBy	:	msc
lcOwn	:	local
modTs	:	2021-09-17T21:43:04.195+00:00
monPolDn	:	uni/tn-common/monepg-default
nameAlias	:	
ownerKey	:	
ownerTag	:	
rn	:	tn-TN_D
status	:	
uid	:	0

配置方案

接下来,创建一个共有三个模板的架构:

- 站点A的模板:站点A的模板仅与站点A关联,因此该模板中的任何逻辑对象配置都只能推送到 站点A的APIC。
- 站点B的模板:站点B的模板仅与站点B关联,因此该模板中的任何逻辑对象配置都只能推送到站点B的APIC。
- 拉伸模板:拉伸模板与两个站点关联,并且拉伸模板中的任何逻辑配置都可推送到APIC的两 个站点。

创建架构

方案在MSO中具有本地意义,它不在APIC中创建任何对象。方案配置是每个配置的逻辑分离。您可以为同一租户使用多个架构,也可以在每个架构内使用多个模板。

例如,您可以为租户X的数据库服务器设置一个模式,而应用服务器为同一租户X使用不同的模式。 这有助于分离每个与应用程序相关的特定配置,并且在您需要调试问题时非常容易。信息也很容易 找到。

使用租户名称(例如TN_D_Schema)创建架构。 但是,不需要将架构名称以租户名称开头,您可 以创建具有任何名称的架构。

步骤1.选择应用程序管理>方案。单击"添加架构"。

Ŧ	diale Multi-Site Orchestrator			۵ 🕲
Dashboard Application Management	Schemas			
Tenants	Filter by attributes			C O Add Schema
Policies	Name	Templates	Tenants	

步骤2.在"名**称"**字段中,输入方案的名称。在本例中,它是"TN_D_Schema",但是,您可以保留适 合您环境的任何名称。单击 Add。

×
Add

步骤3.检验架构"TN_D_Schema"是否已创建。

TN_D_Schema										0 Policies	Mutosave	Save O	×
TN_D_Schema TEMPLATES	Overview												
	General Name TN_D_Schema	Description Schema for Tenant TN_D			1	Audit Log Created O		Deleted 0	Updated O	D	eployed O	Other O	
	Sites Health 0 Total 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(0) (0) (0) (0) (0)	Type O Total	AJRC (0) DCMM (0) AVRS (0) Azum (0)		Template to Site As Deployment Status 0 Total	Deployed (I Modified (I Not Deployed (I	0) 0) 0)	Cons	O Total	Verified (0) Failed (0) Unverified (0) N/A (0)		
	Application Management Application Profiles (0) L3Outs (0)	• EPGs (0) • Service Graphs (0)	Contracts (0) Networks (0)	• VRFs (0)	Bridge Don	nains (0)	• Filters (0)	• 5	External EPGs (0)			0 Total Policies	
	Topology TOOL5 Show Lites Show Names. TVYE	■ ○ ●■											

创建站点A模板

步骤1.在架构内添加模板。

- 1. 要创建模板,请单击已**创**建的架构下的模板。此时将显示"选择模板类型"对话框。
- 2. 选择ACI Multi-cloud。
- 3. 单击 **Add**。

TN_D_Schema				0 Policies ZAutosave Save 🔿 🗙
TN_D_Schema	Overview			
	General Name T TN_D_Schema	Description \$	Audit Log Created Deleted 0 0	Updated Deployed Other 0 0 0
	Sites Health O Total Major (0 Total	Select a Template type	Template to Site Associations.	Consistency 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1
	Cottoal ((Cottoal () Cottoal () Cottoal () Cottoal () Cottoal () Cottoal () Cottoal ()		读 读	NUA (0) O Total Policies
	Topology TOOLS Show Lans Show Names	ACI Multi-cloud On-prem ACI site to site On-prem ACI site to site Cloud to cloud site Networking On-prem DCNM site to site Networking	SR-MPLS • On-prem ACI site local only Act	
		5		•

步骤2.输入模板的名称。此模板特定于站点A,因此模板名称为"站点A模板"。 创建模板后,可以将 特定租户附加到模板。在本例中,租户"TN_D"已附加。

N_D_Schem	а	TN_D_Schema	
😵 TN_D_Schema		TN_D_Schema	
TEMPLATES	÷	TEMPLATES	Œ
7 Template 1		Site-A Template	

TN_D_Schema		0 Policies 🗹 Autosave Save 🔿 🗙
TN_D_Schema TEMPLATES	Site-A Template	TEMPLATE Site-A Template Save Schema now A
SITES ③	PLETES SELECT © CREATE OBJECT	* Display Name Site-A Template SR-MPLS
	Appication Profile Bys	Tenant Settings
	Contracts	
	Bridge Domains	Scroll Down and Select Tenant Example: 'TN_D'
	Fiters	
	External EPGs L3Outs	
	🚳 Service Graphs	

配置模板

应用配置文件配置

Г

步骤1.从您创建的方案中,选择Site-A模板。单击"添加应用配置文件"。

TN_D_Schema		0 Policies	Z Autosave	Save	☆ @	• ×			
TN_D_Schema TEMPLATES Site-A Template Sittes ()	Ster-A Template Texat: TN_D		TEMPLATE Site-A Template						
	Application Profile Application Profile Application Profile	tion Profile	Site-A Template	5					
	Contracts		Display name TN_D Name TN_D						
	a 1894		Description						

步骤2.在"显示名称"字段中,输入应用配置文件名App_Profile。

TN_D_Schema				Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema TEMPLATES O Site-A Template SITES O		Site-A Template Tenunt: TNLD	App_Profile App_Profile App_Profile App_Profile App_Profile App_Profile App_Profile App_Profile App_Profile App_Profile	
		Application Profile App_Profile POS EPGs	<u>ت</u>	

步骤3.下一步是创建EPG。要在应用配置文件下添加EPG,请点击**Site-A模**板下的Add EPG。您可 以看到在EPG配置内创建了新EPG。

TN_D_Schema					Z Autosave	Save	*	ම ර	s ×
TN_D_Schema	•	Site-A Template Termit: TL,D		Deploy to stime	APPLI	ATION PROFILE			
Site-A Template SITES	 ©	PLTERS BLPORT - SELECT		CREATE OBJECT	* Display Name App_Profile Deployed Name: App_Profile				
		Application Profile App_Profile		1					
		C EPGs		Add TPG	EPG				

步骤4.为了将EPG与BD和VRF连接,您必须在EPG下添加BD和VRF。选择**Site-A模板**。在**显示名称** 字段中,输入EPG的名称并附加新BD(您可以创建新BD或附加现有BD)。

TN_D_Schema		🖬 Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema TEMPLATES	Site-A Template	EPG_990 Control and the interview O O
sertes O	PLTBS ANOST V SLLCT © CRART CALCT © Application Profile App_Profile Image: Contract State S	Common Properties • Display Name PO_590 Contracts Name And Connet Properties © On-Premises Properties
	VSFs Indge Domains Fitters	Bridge Domain B0_990 'B0_990' was not found. Click to results BD 'BD_990' Add Subnet
	External EPGs Locus Service Graphs	Ubig DP0 inter EP0 Isolation Ceffered Weinstead Hernste Multicast Source Notable in Preferred Group
		QoS Level Unspecified X N

请注意,您必须将VRF连接到BD,但VRF在本例中是拉伸的。您可以使用拉伸VRF创建拉伸模板 ,然后将该VRF附加到站点特定模板下的BD(在我们的例子中为**站点A模**板)。

创建拉伸模板

步骤1.要创建拉伸模板,请在TN_D_Schema下单击Templates。此时将显示"选择模板类型"对话框



← → C ▲ Not secure	10.2.36.144/mso/appManagement/sche	mas/edit/61452f8e390000d5782ce509/Te	mplate1				Q	* *
TN_D_Schema								o ×
TEMPLATES Site-A Template	Site-A Template Tenant: TN_D					App_Profile		
SITES ()	FALTERS			IMPORT ~	SELECT OREATE OBJECT	App_Profile Deployed Name: App_Profile		
	Application Profile App_Profile				Ē			
	🐨 EPQs 🗸	Select a Template type			×			
	* EPQ_990	•						
	Contracts			读 读 读				
	 Bridge Domains ~ BD_990 	ACI Multi-cloud • On-prem ACI site to site • On-prem ACI site to cloud site • Cloud to cloud site	• On-prem DCNM site to site	SR-MPLS . On-prem ACI site local only				
	Filters	_			Add			
	External EPGs							
	D L3Outs							

步骤2.选择"**拉伸模**板"并创建名为VRF_Stretch的VRF。(可以输入VRF的任何名称。)

TN D Schema		es 🔽 Autosave Silve 🛧 Q. O. 🕯
TN_D_Schema TEMPLATES	f Stretched Template	TEMPLATE Stretched Template
Site-A Template Stretched Template SITES	RUTINE REFORM Y SELLET CREATE OBJECT	Template Settings * Display Name Stretched Template SR-M/LS ort
	Contracts Vois v	Tenant Settings Discipion name TN_D Name TN_D Description
	VWF_Stretch	
	Bridge Domains Fitters	
	External EPGs L30vts	
	Service Graphs	

BD是通过在**Site-A模板**下创建EPG而创建的,但没有附加VRF,因此您必须附加VRF,该VRF现在 在延伸模板**中创建**。

步骤3.选**择Site-A Template > BD_990。**在"虚**拟路由和转**发"下拉列表中,选**择VRF_Stretch**。(您 在本节步骤2中创建的。)

TN_D_Schema	AA.	olicies 🗹 Autosave Save 🖈 Q O 🗙
TN_D_Schema TEMPLATES Site-A Template	Ste-A Template Tenant: TNLD	END OF BOUNDARY EXTERNAL STLATONOMOUS LOCAL SELFORMER Extra RALL attachments 0 0
Stretched Template SITES	PRITRES MINORY ~ SELECT CORATE ORACE	Common Properties
	Application Profile App_Profile	BD_990 Deployed reame: BU_990
	Image: Contracts Image: Contracts Image: VRFs Image: Contracts	Properties On-Premises Properties
	Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains BD_990 Bridge Domains Bridge Dom	13 Multicast 12 Uninoom Unicast Flood Hardware Proxy Ukanown Multicast Flooding Flood Optimized Flood PPG Multicast Rooding Flood Optimized Flood Multi-Destination Flooding Blood In Blo Dree Flood In Encapsulation
	External EPGs	ARP Flooding
	Sector Contraction Contraction	Subnets

附加模板

下一步是仅将Site-A模板附加Site-A,并且拉伸模板需要附加到两个站点。单击Deploy to site inside the schema,以将模板部署到各个站点。

步骤1.单击TN_D_Schema > SITES下的+号将站点添加到模板。在分配到模板下拉列表中,选择相 应站点的相应模板。

TN_D_Schema Add : TN_D_Schema Nam TEMPLATES Image: Complete co	Sites ×		
TN_D_Schema		4 Policier	■ Additate Ser ★ C O ★
		NPORT - SELECT CREATE OBJECT	Template Settings
Sorothed Te Sorothed Te Sorothed Te Sorothed Te EP0_990	Deploy To Sites	×	Tenant Settings A Dipply runne TR_0 Nume TR_0 Description
Construct To Construct To Source To Source To Construct To Construct To	Deploy To Sites	Seme referenced policies are not degloy	Tenant Settings Display name TN_D Name Description

步骤2.您可以看到站点A现在已创建EPG和BD,但站点B没有创建相同的EPG/BD,因为这些配置仅 适用于来自MSO的站点A。但是,您可以看到VRF是在拉伸模**板中创**建的,因此在两个站点中创建



cisco	APIC	(SiteB)		
System	Tenants	Fabric	Virtual Networking	L4-I
ALL TENANTS	6 Add Te	nant Tena	ant Search: name or descr	
i This	has been cr	eated from I	Multi-Site. It is recomme	nded tc
TN_D	t		Ĉ	1
∨ 🗒 TN_D				
Application Applicati	cauon Prohies orking idge Domains RFs v VRF_Stretch ternal Bridged KOuts ot 1Q Tunnels acts es ces	Networks		

步骤3.使用这些命令检验配置。

APIC1# moquery -c fvAEPg -f 'fv.AEPg.name=="EPG_990"'

Total Objects shown: 1

# fv.AEPg		
name	:	EPG_990
annotation	:	orchestrator:msc
childAction	:	
configIssues	:	
configSt	:	applied
descr	:	
dn	:	uni/tn-TN_D/ap-App_Profile/epg-EPG_990
exceptionTag	:	
extMngdBy	:	
floodOnEncap	:	disabled
fwdCtrl	:	
hasMcastSource	:	no
isAttrBasedEPg	:	no
isSharedSrvMsiteEPg	:	no
lcOwn	:	local
matchT	:	AtleastOne
modTs	:	2021-09-18T08:26:49.906+00:00
monPolDn	:	uni/tn-common/monepg-default
nameAlias	:	
pcEnfPref	:	unenforced
pcTag	:	32770
prefGrMemb	:	exclude
prio	:	unspecified
rn	:	epg-EPG_990
scope	:	2850817
shutdown	:	no
status	:	
triggerSt	:	triggerable
txId	:	1152921504609182523
uid	:	0

APIC1# moquery -c fvBD -f	I	'fv.BD.name=="BD_990"'
Total Objects shown: 1		
# fv.BD		
name	:	BD_990
OptimizeWanBandwidth	:	yes
annotation	:	orchestrator:msc
arpFlood	:	yes
bcastP	:	225.0.56.224
childAction	:	
configIssues	:	
descr	:	
dn	:	uni/tn-TN_D/BD-BD_990
epClear	:	no
epMoveDetectMode	:	
extMngdBy	:	
hostBasedRouting	:	no
intersiteBumTrafficAllow	:	yes
intersiteL2Stretch	:	yes
ipLearning	:	yes
ipv6McastAllow	:	no
lcOwn	:	local
limitIpLearnToSubnets	:	yes
llAddr	:	::
mac	:	00:22:BD:F8:19:FF
mcastAllow	:	no
modTs	:	2021-09-18T08:26:49.906+00:00
monPolDn	:	uni/tn-common/monepg-default
mtu	:	inherit
multiDstPktAct	:	bd-flood
nameAlias	:	
ownerKey	:	
ownerTag	:	
рсТад	:	16387
rn	:	BD-BD_990
scope	:	2850817
seg	:	16580488
status	:	
type	:	regular
uid	:	0
unicastRoute	:	yes
unkMacUcastAct	:	ргоху
unkMcastAct	:	flood
v6unkMcastAct	:	flood
vmac	:	not-applicable
: 0		

APIC1# moquery -c fvCtx -f 'fv.Ctx.name=="VRF_Stretch"'

Total Objects shown:	1	
# fv.Ctx		
name	:	VRF_Stretch
annotation	:	orchestrator:msc
bdEnforcedEnable	:	no
childAction	:	
descr	:	
dn	:	uni/tn-TN_D/ctx-VRF_Stretch
extMngdBy	:	
ipDataPlaneLearning	:	enabled
knwMcastAct	:	permit
lcOwn	:	local
modTs	:	2021-09-18T08:26:58.185+00:00

monPolDn	:	uni/tn-common/monepg-default
nameAlias	:	
ownerKey	:	
ownerTag	:	
pcEnfDir	:	ingress
pcEnfDirUpdated	:	yes
pcEnfPref	:	enforced
рсТад	:	16386
rn	:	ctx-VRF_Stretch
scope	:	2850817
seg	:	2850817
status	:	
uid	:	0

配置静态端口绑定

现在,您可以在EPG"EPG_990"下配置静态端口绑定,也可以使用VRF HOST_A配置N9K(基本上 是模拟HOST_A)。 ACI端静态端口绑定配置将首先完成。

步骤1.在EPG_990下添加物理域。

- 1. 从您创建的架构中,选择Site-A Template > EPG_990。
- 2. 在"模板属性"框中,单击添加域。
- 3. 在"添**加域**"对话框中,从下拉列表中选择以下选项: 域关联类型 物**理**域配置文件-TN_D_PhysDom部署即时性 — 即**时**解决方案即时性 — 即**时**
- 4. Click Save.

TN_D_Schema					Autosave Save 🛧	00	×
TN_D_Schema	CiteA				0 i 0 i	0 i	0
TEMPLATES 💮	Site-A Template		Last Deployed: Sep 18, 202	1 04:27 am	Template Properties		^
Site-A Template					* Display Name EPG_990		
Stretched Template	FILTERS				Deployed Name: EPG_990		
sites 💮					Contracts N/A		
SiteA (ACI) 4.2(6h)	O Application Profile App_Profile				EPG Type		
Site-A Template					Application Service		
	tros ↓				* Bridge Domain BD_990		
Stretched Te					Subnets		
	© EPG_990			_	USeg EPG		
					Later FDC Inclusion		
					Enforced		
	Contracts	Add Domain	×		Unenforced		
					Intersite Multicast Source		
	00 VRFs	* DOMAIN ASSOCIATION TYPE			Include In Preferred Group		
		Physical			QoS Level		
	👜 Bridge Domains 🗸	Filyarda			Unspecified		
		* DOMAIN PROFILE			Site Local Properties		^
	• BD_990	TN_D_PhysDom	×~		Subnets Cateway IP		
		* DEPLOYMENT IMMEDIACY			Add Colour		
	connected	Immediate	××				
	() Filters			\mathbf{i}	Static ports		
	-	* RESOLUTION IMMEDIACY			Path		
	External EPGs	Immediate	× ~		Add Static Port		
					Static Leaf		
	D L3Outs		Save		Node		
					Add Static Leaf		
	Service Graphs				Domains		
					Profile		
					Add Domain		

步骤2.添加静态端口(Site1_Leaf1 eth1/5)。

- 1. 从您创建的架构中,选择Site-A Template > EPG_990。
- 2. 在"模**板属性**"框中,单**击添加静态端口**。
- 3. 在"在PC、VPC或接口上添加静态EPG"对话框中,选择Node-101 eth1/5并分配VLAN 990。

TN_D_Schema			4 Policies 🗹 Autosave 🛛 Save 🛠 🥝 🔿 🗙
TN_D_Schema TEMPLATES	SiteA	LasPacient Sa 12 VII	Template Properties * Display Name
🕐 Site-A Template	V Site-A Template Tenant: TN_D	sans beginninges, ang ing ang i	Deployed Name: EP0_990 Contracts
Stretched Template	FILTERS		N/A
SITES			Application Service
SiteA (ACI) 4.2(6h)	D Application Profile App_Profile		* Bridge Domain
Site-A Template O			BD_990
Stretched Te	🐽 EPGs 🗸		Subnets N/A
SiteB (ACI) 4.2(6h)		Add Static EBC on BC V/BC or Interface	USeg EPG
Stretched Te	© EPG_990	Add Static EFG 011PC, VFC 01 Intenace	Intra EPG Isolation
		1000 Tax	Enforced
		Port XV	Unenforced
	Contracts	1 Dod	Intersite Multicast Source
		pod-1	Include in Preferred Group
	VBFs	1 and	QoS Level
		Site1_Leaf1 (Node-1101)	Unspecified
	Bridge Domains	1 Dath	Site Local Properties
		eth1/5 × v	Subnets
	8 BD 990	* Ont Foran M AM	Gateway IP
		990	Add Subnet
	connected	Primary MICRO-SEG VLAN	Static ports
			Path
	6 Filters	* DEPLOYMENT IMMEDIACY	Add Statio Port
		Immediate X V	Add
	External EPGs	* MODE	Node
		Trunk X v	Add Static Leaf
	L3Outs		
		Save	Profile
	Service Graphs		TN_D_PhysDom (T)
			Type: physical
			Add Domain

步骤3.确保在EPG_990下添加静态端口和**物理域。**

TN_D_Schema	4 Polcies	Autosave Save	@ 0	×
 TN_D_Schema TEMPLATES Site-A Template 	SteA Sta-A Tenchine Tenant: TNLD	Template Properties * Display Name EP0_990 Deployed Name: EP0_990		^
Stretched Template Stres Stres	FILTER	Contracts N/A EPG Type Application Service * Bridge Domain BD-999 Subvets N/A Useg EPG Bridge EPG B		
	 Bridge Bornains ~ It B0_390 Extended T Fitnes External EPOs Colouds Service Grapts 	Site Local Properties Suborts Cateways IP Addeways JDew Static ports Path eth/Jo [mode-1101) Tyres port, Yame 980 Add Static Port Static Leaf Node Domains Profile		(11)
		TN_D_PhysDom Type: physical		٢

使用以下命令验证静态路径绑定:

APIC1# moquer	ч	-c fvStPathAtt -f 'fv.StPathAtt.pathName=="eth1/5"' grep EPG_990 -A 10 -B 5
<pre># fv.StPathAt</pre>	t	
pathName	:	eth1/5
childAction	:	
descr	:	
dn	:	uni/epp/fv-[uni/tn-TN_D/ap-App_Profile/epg-EPG_990]/node-1101/stpathatt-[eth1/5]
lcOwn	:	local
modTs	:	2021-09-19T06:16:46.226+00:00
monPolDn	:	uni/tn-common/monepg-default
name	:	

```
nameAlias :
ownerKey :
ownerTag :
rn : stpathatt-[eth1/5]
status :
```

配置BD

步骤1.在BD下添加子网/IP(HOST_A使用BD IP作为网关)。

- 1. 从您创建的架构中,选择Site-A Template > BD_990。
- 2. 单击Add Subnet。
- 3. 在添加**新子网对**话框中,输入网关IP地址,然后单击外部通告单选按钮。

TN_D_Schema				Policies 🗹 Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema	Site-A Template		Last Deployed: Sep 19, 2021 02:26 am Deploy to site	BD BRIDGE DOMAIN BD 990 ① ×
Site-A Template	Applied to 1 sites Tenant: TN_D		UNICE	UFIED LOCAL RELATIONSHIPS EXTERNAL RELATIONSHIPS 2 0
Stretched Template	FILTERS		IMPORT 🗸 SELECT 🚯 CREATE OBJEC	T Common Properties
SITES	•			* Display Name
SiteA (ACI) 4.2(6h)	^			BD_990
 Site-A Template 	Application Profile App_Profile			Deployed Name: BD_990
 Stretched Te 	Ø IB EPGs ↓			Properties
SiteB (ACI) 4.2(6h)	^			🛆 On-Premises Properties
Stretched Te	© © EPG_990			
				VIRE_Stretch
	connected	Add Now Subpot	~	12 Stretch
	Contracts	Add New Subher	^	
		* Gateway IP		Intersite BUM Traffic Allow
	W VRFs	90.0.254/24		Optimize WAN Bandwidth
		Description		L3 Multicast
	🐵 Bridge Domains 🗸			
		Treat as virtual IP address		El Unknown Unicast
	♥ BD_990	Scope		Unknown Multicast Flooding
		Private to VRF		Flood Optimized Flood
		Advertised Externally		IPv6 Unknown Multicast Flooding
	7 Filters			Multi-Destination Flooding
		No Default SVI Gateway		Flood in BD Drop Flood in Encapsulation
	External EPGs	Querier		ARP Flooding
				Virtual MAC Address
	(D) L3Outs		Save	Not Configured
	-			Subnets
	60 Service Graphs			Gateway IP
				Add Subret
				DHCP Policy

步骤2.使用此命令检验子网是否已添加到APIC1 Site-A中。

APIC1# moquery -c fvSubnet -f 'fv.Subnet.ip=="90.0.0.254/24"' Total Objects shown: 1

```
# fv.Subnet
           : 90.0.0.254/24
ip
annotation : orchestrator:msc
childAction :
ctrl
            : nd
descr
           :
           : uni/tn-TN_D/BD-BD_990/subnet-[90.0.0.254/24]
dn
extMngdBy :
           : local
lcOwn
           : 2021-09-19T06:33:19.943+00:00
modTs
monPolDn
           : uni/tn-common/monepg-default
name
            :
nameAlias
           :
preferred
          : no
           : subnet-[90.0.0.254/24]
rn
scope
           : public
status
           :
```

uid	:	0	
virtual	:	no	

步骤3.部署Site-A模板。

- 1. 从您创建的架构中,选择Site-A Template。
- 2. 单击"**部署到站点**"。

TN_D_Schema		🗹 Autosave Save 🛠 🥝 O	×
TN_D_Schema TEMPLATES Site-A Template	Ste-A Template Applied to 1 sites Testant: TIL D	TEMPLATE Site-A Template	×
TLMPLATES O TLMPLATES O Template Image: Complete state s	Ste-A Template Notion <	Site-A Template Template Settings Template Settings Site-A Template Site-A Template Site-A Template Site-A Template Site-A Template Site-A Template Site-A Template Sit	
	🚳 Service Graphs		

配置主机A(N9K)

使用VRF HOST_A配置N9K设备。完成N9K配置后,您可以看到ACI枝叶BD任播地址(HOST_A的 网关)现在可通过ICMP(ping)到达。



在ACI操作选项卡中,您可以看到90.0.0.10(HOST_A IP地址)已获知。

cisco APIC (SiteA)								admin Q	0 (00)
System Tenants Fabric Virtua	al Networking L4-L7	Services Admin Opera	tions Apps Inte	grations							
This has been created from Multi-Site	e. It is recommended to o	nly make changes from Multi-Sit	e. Please review the docur	nentation before making any char	iges here.						
TN_D	©¶©	♥ EPG - EPG_990		Client End-Points	Configured Access Policies	Summary 6 Contracts	Policy Operational Controller End-Points	Stats Deployed L	Health eaves	Faults Histo Learned End-Poi	lory ints
	\$)	Healthy Image: Constraint of the second	E:5E:14:07 90.0.0.10	Learning Source Hostin	g Server	Reporting Controller Name	Interface Pod-1/Node-1101/eth1/5 ((learned)	Multicast Address	C Encap Vlan-990	<u>+</u>
	14.4	Eth1/5									
2 2		EPG_990 (Encap vian 990) BD: 90.0.0.254/24 VRF: <u>TN_D:VRF_Stretch</u> Trunk	pod2-n9k# PING 90.0 36 bytes f Request 0 64 bytes f	ping 90.0.0.254 0.254 (90.0.0.2 from 90.0.0.10: timed out from 90 0 0 254	vrf HOST_A 54): 56 data k Destination Ho	oytes ost Unrea 1=63 tim	chable				
	Eth1/5 VRF HO. VLAN- IP:90.0.0, Route: 0.0.0.0/	ST_A 990 10/24 0 90.0.0.254	64 bytes f 64 bytes f 64 bytes f 64 bytes f 90.0.0 5 packets round-trip pod2-n9k#	rom 90.0.0.254 rom 90.0.0.254 rom 90.0.0.254 rom 90.0.0.254 .254 ping stati transmitted, 4 min/avg/max =	icmp_seq=2 tt icmp_seq=3 tt icmp_seq=4 tt stics packets receiv 0.576/0.711/0.	l=63 tim l=63 tim l=63 tim l=63 tim red, 20.0 902 ms	e=0.576 ms e=0.708 ms e=0.659 ms	55			

创建站点B模板

步骤1.从您创建的方案中,选择TEMPLATES。单击+号,然后创建名为Site-B Template的模板。

	TN_D_Schem TN_D_Schema TEMPLATES Site-A Template Stretched Templ	ma									
	TN_D_Schema					4 Policies	Autosave Save) ☆	ø	o ×	¢
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			External EPGs								
			S L3Outs								
			i Service Graphs								
- 1											

配置站点B L3out

创建L3out并连接VRF_Stretch。您必须从MSO创建L3out对象,其余L3out配置需要从APIC完成 (因为L3out参数在MSO中不可用)。 此外,从MSO创建外部EPG(仅在站点B模板中,因为外部 EPG不延伸)。 步骤1.从您创建的方案中,选择Site-B Template。在"显**示名**称"字**段中,输入L3out_OSPF_siteB**。 在虚**拟路由和转**发下拉列表中,选**择VRF_Stretch**。

TN_D_Schema				Autosava Save 🛓 🖈	© ¢ ×
 TN_D_Schema TEMPLATES Site-A Template 	٢	Site-B Template	Deploy to shoe	LIGUT LIGOUT-OSPF-siteB LOCAL RELATIONEMPS 0	EXTERNAL RELATIONSHIPS 0
Stretched Template Site-B Template SiTES		PATTRS	IMPORT - SELECT CREATE OBJECT	Common Properties * Display Name L3Out-OSPF-site8 Perioved Name 130x6-OSPF-site8	^
SiteA (ACI) 4.2(6h) Site-A Template SiteA Template SiteB (ACI) 4.2(6h)	 0 0 	Contracts		* Virtual Routing & Forwarding	XV
 Stretched Te 	Ø	€ V821			
		Bridge Domains Fitters			
		External EPGs			
		* LJOH-0597- shiB			
		Service Graphs			

创建外部EPG

步骤1.从您创建的方案中,选择Site-B Template。单击Add External EPG。

TN_D_Schema		🗹 Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema TEMPLATES Site-A Template	Site-B Template Applied to 1 sites Tenant TNLD	TEMPLATE X
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	Fiters External EPGs Add External EPG Add External CPG Add External CPG Add External EPG Add Exte	xternal EPG
	LOuis Signature S	
	Sentee Gapha	

步骤2.将L3out与外部EPG连接。

- 1. 从您创建的架构中,选择Site-B Template。
- 2. 在"显示名称"字段中,输入EXT_EPG_Site2。
- 3. 在分**类子网**字段中,输入0.0.0/0作为外部EPG的外部子网。

TN_D_Schema		6 Policies	Autosave Since 🛧 Q O 🗙
TN_D_Schema TEMPLATES	Site-B Template Applied to 1 ultes Testart: TN_D	Last Deployed: Sep 18, 2021 03:33 am Deploy to site	EXTERNAL OF STATE OF X
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	Dridge Domains Fitters External EPGs v		* Select Size Type 0 CON-PREM CLOUD Properties
	ET_EPQ_Site Doubs		Lour Con-state Subnets Classification Subnets Classification Add Subnets Classification Add Subnet Include in Preferred Group
	Sone Cospe- Sone Service Graphs		

其余L3out配置从APIC(站点B)完成。

步骤3.添加L3域,启用OSPF协议,并使用常规区域0配置OSPF。

- 1. 从Site-B的APIC-1,选择TN_D > Networking > L3out-OSPF-siteB > Policy > Main。
- 2. 在L**3域下**拉列表中,选**择TN_D_L3Dom**。
- 3. 选中**启用BGP**/EIGRP/**OSPF的OSPF复选框**。
- 4. 在OSPF**区域ID字**段中,输入0。
- 5. 在OSPF区域**类型中,**选择常规**区域**。
- 6. 单击"Submit"。

CISCO APIC (SiteB)			admin 🔇 🔿 😍 😰 🐯
System Tenants Fabric Virtual Networking L4-L7	Services Admin Operations Apps Integrations		
ALL TENANTS Add Tenant Tenant Search: name or descr	common TN_D Tenant infra mgmt		
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> Policies	Route Profile for Redistribution:		÷ 1
> 🚞 Services	▲ Source	Route Map	
		No items have been found. Select Actions to create a new item.	
	Enable (KOFIRARE/IGSP) Capp OSPF Capp OSPF Capp OSPF Area Cottel: Construction (SAP)		Show Usage Reset Submit

步骤4.创建节点配置文件。

- 1. 从Site-B的APIC-1,选择TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles。
- 2. 单击"创建节点配置文件"。



步骤5.选择交换机Site2_Leaf1作为站点B的节点。

- 1. 从Site-B的APIC-1,选择TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles > Create Node Profile。
- 2. 在"名**称"**字段中,**输入Site2_Leaf1**。
- 3. 单击**+号**添加节点。
- 4. 使用路由器ID IP地址添加Pod-2节点101。

cisco APIC (SiteB)							
System Tenants Fabric Virtual Networking L4-L7 S	ervices Admin Ope	rations Apps	Integrations	5			
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v ⊞ TN D	Target DSCP:	Unspecified					
> Application Profiles	Nodes:					會 +	Target DSCP
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> 🖿 Bridge Domains		topology/pod-1/	110.110.110.110		110.110.110.110		
> 🖿 VRFs							
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V 🔁 L3Outs							
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Logical Node Profiles							
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> 🗖 Contracts							
> 🗖 Policies							
> 🚞 Services							
					_		
					Cancel	Submit	
						Line .	

步骤6.添加接口配置文件(外部VLAN为920(SVI创建))。

- 1. 从Site-B的APIC-1,选择TN_D > Networking > L3Outs > L3out-OSPF-SiteB > Logical Interface Profiles。
- 2. 右键单击并添加接口配置文件。
- 3. 选择Routed Sub-Interfaces。
- 4. 配置IP地址、MTU和VLAN-920。



步骤7.创建OSPF策略(点对点网络)。

- 1. 从Site-B的APIC-1中,选择TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Interface Profiles。
- 2. 右键单击并选择Create OSPF Interface Profile。
- 3. 选择屏幕截图中显示的选项,然后单击"提交"。

	Cleate OSPF Interface Policy	
cisco APIC (SiteB)	Name: OSPF_P2P_Policy	
System Tenants Fabric Virtual Networking L4-L7 Se	pazvihran ohnougi	
ALL TENANTS Add Tenant Tenant Search: name or descr	Network Type: Broadcast Point-to-point Unspecified	
	Create OSPF Interface Profile	
This has been created from Multi-Site. It is recommended to only	Authentication Type: No authentication	
	Authentication Key:	
©®©	Confirm Key:	
O Quick Start	OSPF Policy: select a value	
	default Desktore	
> E Application Profiles	common Hello Interval (sec): 10 🔿	
V 🖿 Networking	Create OSOE Interface Policy	
> Bridge Domains	Retransmit Interval (sec): 5	
> WRFS	Transmit Delay (sec): 1	
External Bridged Networks		
V LOUIS		
✓	Cancel Submit	Submit
Logical Interface Profiles		Submit
Site-2-Leaf1_sub-Int-900		
✓	Create OSPF Interface Profile	
topology/pod=1/node=1	Authentication Type: No authentication	
BGP for VRF-TN_D:V Create HSRP Interface Profile	Authentication Key:	
> F ND for VRF- TN_D:VI Create DHCP Relay Label	Confirm Key:	
ARP for VRF-TN_D.V Delete	OSPF Policy: OSPF_P2P_Policy V 🛃	
External EPGs Save as		
EXT_EPG_Site2 Post		
Route map for import and export r Share		
Dotto Tunnels Open In Object Store Browser		
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	Sublin P	

步骤8.检验在TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Interface Profiles > (接 口配置文件) > OSPF Interface Profile下附加的OSPF接口配置文件策略。



步骤9.验证外部EPG"EXT_EPG_Site2"是否由MSO创建。从Site-B的APIC-1,选择**TN_D>L3Outs** >L3Out-OSPF-siteB>External EPGs>EXT_EPG_Site2。

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System Tenants Fabric Virtual Networking L4-L7	Services Admin Operations Apps Integrations		
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V The Networking		General	Contracts Innented Contracts
> 🚞 Bridge Domains			0 ± %∗
> 🔤 VRFs	Properties Name: EXT_EPG_Site2		<u>^</u>
Cheman Bruged Networks	Allas:		
✓ ♣ L3Out-OSPF-siteB	Tags:		
> Logical Node Profiles	Global Allas:		
🗸 🚍 External EPGs	Description: optional		
EXT_EPG_Site2			
> The Route map for import and export route control	pcTag: 32770		
> E Dot1Q Tunnels	Contract Exception Tag:		
> Contracts	Configured VRF Name: VRF_Stretch Resolved VRF: unitm-TN_D/ctv-VRF_Stretch		
> Honcies	QoS Class: Unspecified		
) Services	Target DSCP: Unspecified 🗸		
	Configuration Status: applied		
	Configuration Issues:		
	Preferred Group Member: Exclude Include)		
	Subnets:		
	IP Address Scope Name	Aggregate Route Control Profile	Route Summarization Policy
	0.0.0,0/0 External Subnets for the Extern		
			*
		Show	Usage Reset Súbmit

配置外部N9K(站点B)



在N9K配置(VRF L3out-OSPF-siteB)后,我们可以看到N9K与ACI枝叶(位于站点B)之间已建立 OSPF邻居关系。

验证OSPF邻居关系已建立且UP(完全状态)。

从站点B的APIC-1,选择TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles > Logical Interface Profiles > Configured Nodes > topology/pod01/node-1101 > OSPF for VRF_DVRF_Switch > Neighbor ID state > Full。

cisco APIC (SiteB)					admin Q	0	😍 💿	٥
System Tenants Fabric Virtual Networking L4-L7 S	ervices Admin Operations	Apps Integrations						
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✓ III TN_D					General	Health	Faults	History
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V 🚞 Networking	PROPERTIES		STATS					
> 🧮 Bridge Domains	Name: TN_D:VR	F_Stretch	Interfa	ice Count: 2				
> 🧮 VRFs	Route ID: 110.110.	110.110	Acth	veareacnt: 1				
> 📰 External Bridged Networks	Max ECMP: 8		Active Istal	b Areacnt: 0				
V 🖿 L3Outs	Bandwidth Reference 40000		Active Ex	t Areacnt: 1				
V 🚱 L3Out-OSPF-siteB	(Mbps): 40000		E	xtareacnt: 1				
V 🖬 Logical Node Profiles	Operational state, op		Nss	a Areacnt: 0				
Site2_Leaf1			Sti	Areacot: 1				
Logical Interface Profiles			E	ext Lsacnt: 0				
> F Site-2-Leaf1_sub-int-990			Opag	as Lsacnt: 0				
topology/pod-1/hode-1101	Neighbors							
	 Neighbor Id 	State	Peer Ip		Interface			
> BGP for VRF-TN_D/VRF_Stretch	92.92.92.92	Full	92.2.2.2		eth1/53.25			
	IC C Page 1 Of 1 >	м	Objects Per Page: 15	v	011-0-1		Disalarian Oblact	
External EPGs	Inter Protocol Route Leak Int	to OSPF			SITE2_Leat1	Y		
EXT_EPG_Site2	 Name 	Redistribution Protocol	Route Map	Scope	14.2(6h)	~		
Route map for import and export route control	TN D/VRF Stretch	BGP	exp-ctx-proto-2686978	Inter protocol les	Td Eth1/5	.290		
> E Dot1Q Tunnels	Thi DUDE Church	0000	exp-cit-picto-2000570	Inter protocorrier	IP: 92.2	.2.1/30	rotch	
> 🧮 Contracts	TN_D.VRF_SUBICI		exp-cix-si-2000376	niter protocorrea	EXT_EP	G_Site2	083800	
> 🧰 Policies	TN_D:VRF_Stretch	Direct	exp-cbx-st-2686978	Inter protocol lea				
> 🚞 Services	TN_D:VRF_Stretch	EIGRP	exp-ctx-proto-2686978	Inter protocol lea	120) t		
	TN_D:VRF_Stretch	Static	exp-ctx-st-2686978	Inter protocol lea	LSC	ut		
					F=1.6 (4)			
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					VRF L3out-OSPF-siteB Ethernet1/49.290 IP:92.2.2.2/30 Router ID: 92.92.92.92 OSPE 2 A PEA D	VI	RF L3out-OS Loopback IP:91.0.0.	PF-siteB : 999 1/32

您还可以在N9K中检查OSPF邻居关系。此外,您还能ping通ACI枝叶IP(站点B)。



此时,站点A的Host_A配置和站点B的L3out配置已完成。



将站点B L3out连接到站点A EPG(BD)

接下来,您可以从MSO将Site-B L3out连接到Site-A BD-990。请注意,左侧列有两个部分:1)模板 和2)站点。

步骤1.在"站点"的第二**部分,**您可以看到每个站点附加的模板。将L3out附加到"Site-A Template"时 ,您基本上是从"Sites"部分内已附加的模**板**附加。

但是,在部署模板时,请从"模板">"站**点 — A模板"部分进**行部署,**然后选择保存**/部署到站点。

TN_D_Schema	8 Policies	🗹 Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema	P11_8	BED 900
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Stretched Template	PRT05	Template Properties
📀 Site-B Template		* Display Name
SITES 💮		BD_990 Deployed Name: BD_990
SiteA (ACI) 4.2(6h)		Subnets
👳 Site-A Template 🛛 … 🛆	BPOS V	Gateway IP
🛛 Stretched Te		90.0.0.254/24
SiteB (ACI) 4.2(6h)	* EPG_090	
🛛 Stretched Te		Site Local Properties
👳 Site-B Template 🛆	CONVELLE	VRF_Stretch
	0	L3Outs
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	© contracts Cool Cool Cool Cool Cool Cool Cool Coo	Name Add L30ut L2 Stretch
	Bridge Domains Sorce S	Intersite BUM Traffic Allow
	Fiters	L2 Unknown Unicast Hardware Proxy Host Route
	External EPOs	Hood IPv6 Unknown Mutticast Flooding Flood Mutti-Destination Flooding Flood in 8D ARE Exection
	Service Graphs	Virtual MAC Address Not Configured SVI MAC Address 0.02280F819FF

步骤2.从主模板"Site-A Template"(站点A模板)的第一部分"Templates"(模板)部署。

TN_D_Schema		8 Policies	Autosave Save 🛧 🕻
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📀 Site-B Template			Site-A Template
SITES	۲	Application Profile App_Profile	SR-MPLS Off
Site A Template Site-A Template Stretched Te	 ⊘	teos v	Tenant Settings Display name TN D
SiteB (ACI) 4.2(6h) Stretched Te Site-B Tomplate	^ 0	* EPG_990	Name TN_D Description
		Contracts	
		Bridge Domains V BD_990	
		Fiters	
		External EPGs	
		S L3Outs	
		Service Graphs	

配置合同

您需要在站点B的外部EPG和站点A的内部EPG_990之间签订合同。因此,您可以先从MSO创建合同,然后将其附加到两个EPG。

<u>思科以应用为中心的基础设施 — 思科ACI合</u>同指南可帮助理解合同。通常,内部EPG配置为提供商 ,而外部EPG配置为消费者。



创建合同

步骤1.从TN_D_Schema中,选择"拉伸模**板">"合同"**。单击 添加合同。

TN_D_Schema	6 Policies	🗹 Autosave Save 🖈 @ O 🔸	×
TN_D_Schema TEMPLATES	Stretched Template Last Deployed: Says 16, 2021 01.02 am Deploy to this	TEMPLATE Stretched Template	×
Site-A Template Stretched Template		Template Settings * Display Name	^
Site-B Template		Stretched Template	
SiteA (ACI) 4.2(6h)	Application Profile		
Site-A Template O Stretched Te		Display name	^
SiteB (ACI) 4.2(6h) ^ g Stretched Te Ø	Contracts Add Compet	Name Contract	
 Site-8 Template 	•		

步骤2.添加过滤器以允许所有流量。

- 1. 从TN_D_Schema中,选择"延伸模板">"合同"。
- 2. 添加合同时应:

•显示姓名:站点间L3输出合同

●氾□		VRF			
TN_D_Schema				Autosave Save 🖈 😋	o ×
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Site-A Template Stretched Te	0	C POS		VRF	\times \checkmark
SiteB (ACI) 4.2(6h) © Stretched Te © Site+B Template	^ 0	Contracts ~		* Filter Chain Name Allow-Bi-traffic #	۱
				Add Filter Service Graph	×v
		* VRF_Stretch		Properties On-Premises Properties	^
		Bridge Domains Fitters		QoS Level Unspecified	× ~
		(* Abro-al- tolka			

第三步:

- 1. 从TN_D_Schema中,选择"延伸模**板">"过滤器"**。
- 2. 在"显**示名称**"字段中,输入"允许所有流量"。
- 3. 单击Add Entry。系统随即会显示"添加条目"对话框。
- 4. 在"名**称"**字段中,**输入Any_Traffic**。
- 5. 在Ether Type下拉列表中,选择未指定以允许所有流量。
- 6. Click Save.

TN_D_Schema			B Policies 🗹 Autosave Sere 🖈 🥝	¢ ×
TN_D_Schema				
TEMPLATES 💮	Stretched Template Applied to 2 sites		Last Deployed: Sep 18, 2021 04:36 am Deploy to the Allow-all-traffic	×
Site-A Template	Tenant: TN_D	Add Entry		O
Stretched Template	FRITERS		DRT V SELECT O CREATE OBJECT	
Site-B Template		Common Properties	Common Properties * Display Name	
SITES 🤆	Anniestics Profile	Name	Allow-all-traffic	
SiteA (ACI) 4.2(6h)	Application Profile	Any_Trafid	Deployed Name: Allow-all-traffic	
Site-A Template	D EPGs	Description	Entries	
Stretched Te			Name	
SiteB (ACI) 4.2(6h)	Contracts V	Ether Type	Add Entry	
Stretched Te		unspecified		
Site-B Template	♥ Intersite -	IP Protocol		
	L3out- Contract	unspecified		
		Destination Port Range From		
		unspecified V		
	😡 VRFs 🗸	Destination Port Range To		
		unspecified ~		
	VRF_Stretch	On Premise Properties		
		Match only fragments		
		Stateful		
		ARP flag		
	Bridge Domains	unspecified X V		
		Source Port Range From		
	🕖 Filters 🗸	unspecified V		
		Source Port Range To		
	Allow-all- traffic	unspecified ~		
		TCP Session Rules		
			Swe	
	External EPGs			
	C L3Outs			

步骤4.将合同作为"消费者"(在站点B模板中)添加到外部EPG(部署到站点)。

- 1. 从TN_D_Schema中,选择Site-B Template > EXT_EPG_Site2。
- 2. 单击"**添加合同**"。系统随即会显示"添加合同"对话框。
- 3. 在"合同"字段中,输入Intersite-L3out-Contract。
- 4. 在"类型"下拉列表中,选择消费者。

IN_D_Schema				8 Policies	Autosave Save 🖈 (e o ×
TN_D_Schema	۲	Site-B Template Applied to 1 sites Template	Last 0	eployed: Sep 19, 2021 04:06 am Deploy to sites UNVERIFIED	EXTERNAL SPO EXT_EPG_Site2	
Site-A lemplate					2	0
Stretched Template		FILTERS		IMPORT - SELECT 💽 CREATE OBJECT	Common Properties	^
Site-B Template					* Display Name	
SITES		Application Profile			EXT_EPG_Site2	
SiteA (ACI) 4.2(6h)	^				* Virtual Pourting & Conversion	
Site-A Template		EPGs			VRF Stretch	
o Stretched Te						
SiteB (ACI) 4.2(6h)	^	Contracts			Contracts	
e Stretched Te						
Site-B Template		VRFs	Add Contract	×	Add Contract	
		Bridge Domains	* Contract Interaite-13our-Contract		* Select Site Type ON-PREM CLOUD Properties	
		Filters	* 7.504 consumer X *		On-Premises Properties	
		External EPGs ~	Save		L3Out L3Out-OSPF-siteB	
		EXT_EPG_Site 2			Subnets Classification Subnets	
					0.0.0/0	(11)
					Add Subnet	
		D L3Outs			Include in Preferred Group	
		L3Out-OSPF- sitte8 connected				
		Service Graphs				

步骤5.将合同作为"提供商"(在Site-A模板中)添加到内部EPG"EPG_990"(部署到站点)。

- 1. 从TN_D_Schema中,选择**Site-A Template > EPG_990**。
- 2. 单击"添加合同"。系统随即会显示"添加合同"对话框。
- 3. 在"Contract"(合同)字段中,输入Intersite-L3out-Contract。
- 4. 在"类型"下拉列表中,选择"提供程序"。

TN_D_Schema		8 Policies 🗹 Autosave Save 🖈 🧟 (×
TN_D_Schema TEMPLATES	Site-A Template Appled to 1 sites Ternat: TN_D	Last Duployed: Sup 19, 2021 02-43 am COpploy to sites UNICERED UNICERED I COLLEGE AL ACCOUNTER I COLLEGE AL ACCOUN	• X
Stretched Template Site_B Template	PLITINS	MPORT ~ SELECT OCREATE OBJECT Common Properties	^
Start D Template STTES SiteA (ACD) 4.2((b) SiteA (ACD) 4.2((b) SiteA (ACD) 4.2((b) SiteB (ACD) 4.2((b)) SiteB (ACD) 4.2((Application Profile App_Profile EPGs	Copy Name EP0_990 Epstypet Nene: (F0_590 Contracts Name Add Contract Ep3 Tan	
g Ste-B Template	Contract Contract Contract	X Application Service Properties	^
	VRFs VRFs VrFs VrFs VrFs VrFs VrFs VrFs VrFs Vr	* Bridge Domain * Bridge Domain 80_990	
	Bridge Domains ~	Subnets Gateway IP Add Subnet	
		Useg EPG	
	Fiters External EPOs	Unerforced Intersite Muticast Source	
	130uts	OoS Level Unspecified	
	Service Graphs		

一旦添加合同,您就会看到在站点A创建的"影子L3out /外部EPG"。

cisco	APIC	(SiteA)		
System	Tenants	Fabric	Virtual Networkin	g L4-L7
ALL TENANTS	Add Ter	nant Tena	nt Search: name or de	scr
i This I	has been cre	eated from N	/lulti-Site. It is recom	mended to or
TN_D				00
> C Quick Sta	rt			
V 📆 TN_D				
> Applic	ation Profiles			
V Netwo	rking			
> 🗖 Bro	dge Domains			
	rs oroal Bridged	Notworks		
2 — EXU 2 — 13/	Dute	Networks		
	130ut-OSPE-	siteR	hadow I Sout s	ito-R
	Logical No	de Profiles	nadow Esour s	ite-b
~	External EF	Gs		
	EXT_EF	PG_Site2	Shadow Ext El	PC
> •	Route map	for import and	d export route control	
> 🚞 Dot	t1Q Tunnels			
> 🚞 Contra	icts			
> 🚞 Policie	s			
> 🚞 Servic	es			



步骤6.输入这些命令以检验Site-B APIC。

apic1# moquery -c fv	٩E)	Pg -f 'fv.AEPg.name=="EPG_990"'
Total Objects shown:	1	
# fv.AEPg		
name	:	EPG_990
annotation	:	orchestrator:msc
childAction	:	
configIssues	:	
configSt	:	applied
descr	:	
dn	:	uni/tn-TN_D/ap-App_Profile/epg-EPG_990
exceptionTag	:	
extMngdBy	:	
floodOnEncap	:	disabled
fwdCtrl	:	

hasMcastSource	:	no									
isAttrBasedEPg	:	no									
isSharedSrvMsiteEPg	:	no									
lcOwn	:	local									
matchT	:	AtleastOne									
modTs	:	2021-09-19T18:47:53.374+00:00									
monPolDn	:	uni/tn-common/mc	nep	g-def	ault						
nameAlias	:										
pcEnfPref	:	unenforced									
рсТад	:	49153 <	<<<	Note	that	pcTag	is	different	for	shadow	EPG.
prefGrMemb	:	exclude									
prio	:	unspecified									
rn	:	epg-EPG_990									
scope	:	2686978									
shutdown	:	no									
status	:										
triggerSt	:	triggerable									
txId	:	1152921504609244	629								
uid	:	0									

apic1# moquery -c fvBD -f 'fv.BD.name==\"BD_990\"'

Total Objects shown: 1		
	•	BD 990
OptimizeWanBandwidth	•	Ves
annotation	:	orchestrator.msc
arpElood	:	Veg
bcastP	:	225 0 181 182
childAction	:	223.0.101.192
configIcques	:	
doggr	•	
dn	:	UN1/th-TN D/BD_BD 990
opCloar	•	
	:	110
ephoveDetectMode	•	
extMigdby	:	~~
intersite Dummus ffi aller	:	
intersiteBummallicAllow	:	yes
intersiteL2Stretch	:	yes
ipLearning	:	yes
1pv6McastAllow	:	no
lcOwn	:	local
limitIpLearnToSubnets	:	yes
llAddr	:	::
mac	:	00:22:BD:F8:19:FF
mcastAllow	:	no
modTs	:	2021-09-19T18:47:53.374+00:00
monPolDn	:	uni/tn-common/monepg-default
mtu	:	inherit
multiDstPktAct	:	bd-flood
nameAlias	:	
ownerKey	:	
ownerTag	:	
рсТад	:	32771
rn	:	BD-BD_990
scope	:	2686978
seg	:	15957972
status	:	
type	:	regular
uid	:	0
unicastRoute	:	yes
unkMacUcastAct	:	ргоху
unkMcastAct	:	flood

: flood : not-applicable

步骤7.检查并检验外部设备N9K配置。



验证

使用本部分可确认配置能否正常运行。

终端学习

验证Site-A终端已作为终端在Site1_Leaf1中获知。

Site1_Leaf1# show endpoi	int interface ethern	net 1/5				
Legend:						
s - arp H	- vtep	V - vpc-atta	ached j	p - peer	-aged	
R - peer-attached-rl B	- bounce	S - static	1	M - span		
D - bounce-to-proxy O	- peer-attached	a - local-ag	ged 1	m - svc-	mgr	
L - local E	- shared-service					
+	+	+-		+-	++	
+						
VLAN/	Encap		MAC Addres	S	MAC Info/	
Interface						
Domain	VLAN		IP Address		IP Info	
+	+	+-		+-	++	
+						
18		vlan-990	c014.fe5e	.1407 L		
eth1/5						
TN_D:VRF_Stretch vlan-99	90.0.0.10) L		eth1/	5	

ETEP/RTEP验证

Site1_Leaf1# show ip interface brief vrf overlay-1

IP Interface Status for VRF "overlay-1"(4) Interface Address Interface Status eth1/49 unassigned protocol-up/link-up/admin-up eth1/49.7 unnumbered protocol-up/link-up/admin-up (100) protocol-up/link-up/admin-up eth1/50 unassigned eth1/50.8 protocol-up/link-up/admin-up unnumbered (100) protocol-down/link-down/admin-up eth1/51 unassigned protocol-down/link-down/admin-up eth1/52 unassigned eth1/53 protocol-down/link-down/admin-up unassigned eth1/54 unassigned protocol-down/link-down/admin-up vlan9 10.0.0.30/27 protocol-up/link-up/admin-up 10.0.80.64/32 100 protocol-up/link-up/admin-up 10.0.8.67/32 101 protocol-up/link-up/admin-up 108 192.168.200.225/32 protocol-up/link-up/admin-up <<<<< IP from ETEP site-Α 101023 10.0.0.32/32 protocol-up/link-up/admin-up

Site2_Leaf1# show ip interface brief vrf overlay-1

IP Interface Statu	us for VRF "overlay-1"(4)
Interface	Address	Interface Status
eth1/49	unassigned	protocol-up/link-up/admin-up
eth1/49.16	unnumbered	protocol-up/link-up/admin-up
	(100)	
eth1/50	unassigned	protocol-up/link-up/admin-up
eth1/50.17	unnumbered	protocol-up/link-up/admin-up
	(100)	
eth1/51	unassigned	protocol-down/link-down/admin-up
eth1/52	unassigned	protocol-down/link-down/admin-up
eth1/54	unassigned	protocol-down/link-down/admin-up
eth1/55	unassigned	protocol-down/link-down/admin-up
eth1/56	unassigned	protocol-down/link-down/admin-up
eth1/57	unassigned	protocol-down/link-down/admin-up
eth1/58	unassigned	protocol-down/link-down/admin-up
eth1/59	unassigned	protocol-down/link-down/admin-up
eth1/60	unassigned	protocol-down/link-down/admin-up
eth1/61	unassigned	protocol-down/link-down/admin-up
eth1/62	unassigned	protocol-down/link-down/admin-up
eth1/63	unassigned	protocol-down/link-down/admin-up
eth1/64	unassigned	protocol-down/link-down/admin-up
vlan18	10.0.30/27	protocol-up/link-up/admin-up
100	10.0.72.64/32	protocol-up/link-up/admin-up
101	10.0.80.67/32	protocol-up/link-up/admin-up
106	192.168.100.225/32	protocol-up/link-up/admin-up <<<<< IP from ETEP site-E
101023	10.0.32/32	protocol-up/link-up/admin-up

ICMP可达性

从HOST_A对外部设备的WAN IP地址执行ping操作。



Ping外部设备环回地址。



路由验证

检验外部设备的WAN IP地址或环回子网路由是否存在于路由表中。当您在"Site1_Leaf1"中检查外部 设备子网的下一跳时,它是枝叶"Site2-Leaf1"的外部TEP IP。



```
Site1_Leaf1# show ip route 92.2.2.2 vrf TN_D:VRF_Stretch
IP Route Table for VRF "TN_D:VRF_Stretch"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%' in via output denotes VRF
92.2.2.0/30, ubest/mbest: 1/0
    *via 192.168.100.225%overlay-1, [200/0], 5d23h, bgp-65001, internal, tag 65001 <<<< Note
that next hope is External TEP pool (ETEP) ip address of Site-B.
        recursive next hop: 192.168.100.225/32%overlay-1
Site1_Leaf1# show ip route 91.0.0.1 vrf TN_D:VRF_Stretch
IP Route Table for VRF "TN_D:VRF_Stretch"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%' in via output denotes VRF
91.0.0.1/32, ubest/mbest: 1/0
    *via 192.168.100.225%overlay-1, [200/2], 5d23h, bgp-65001, internal, tag 65001 <<<< Note
that next hope is External TEP pool (ETEP) ip address of Site-B.
```

recursive next hop: 192.168.100.225/32%overlay-1

故障排除

本部分提供的信息可用于对配置进行故障排除。

站点2_枝叶1

BGP地址系列路由在TN_D:VRF_stretch和Overlay-1之间导入/导出。

Site2_Leaf1# show system internal epm vrf TN_D:VRF_Stretch



BGP routing table information for VRF overlay-1, address family VPNv4 Unicast
Route Distinguisher: 1101:2686978 (VRF TN_D:VRF_Stretch)
BGP routing table entry for 91.0.0.1/32, version 12 dest ptr 0xae6da350
Paths: (1 available, best #1)
Flags: (0x80c0002 0000000) on xmit-list, is not in urib, exported
vpn: version 346, (0x100002) on xmit-list
Multipath: eBGP iBGP
Advertised path-id 1, VPN AF advertised path-id 1
Path type: redist 0x408 0x1 ref 0 adv path ref 2, path is valid, is best path
AS-Path: NONE, path locally originated
0.0.0.0 (metric 0) from 0.0.0.0 (10.0.72.64)

Origin incomplete, MED 2, localpref 100, weight 32768 Extcommunity: **RT:65001:2686978 VNID:2686978**

COST:pre-bestpath:162:110 VRF advertise information: Path-id 1 not advertised to any peer VPN AF advertise information: Path-id 1 advertised to peers: 10.0.72.65

<<

apic1# acidiag fnvread ID Pod ID Name Serial Number IP Address Role State LastUpdMsgId -------

Site2_Spine FDO243207JH

10.0.72.65/32 spine active 0 102 1 Site2_Leaf2 FD024260FCH 10.0.72.66/32 leaf active 0 1101 1 Site2_Leaf1 FD024260ECW 10.0.72.64/32 leaf active 0



```
Site1_Spine
N9K-C9332C
14.2(6h)
```

```
站点1 主干
Site1_Spine# vsh
Site1_Spine# show bgp vpnv4 unicast 91.0.0.1 vrf overlay-1
BGP routing table information for VRF overlay-1, address family VPNv4 Unicast
<---->
Route Distinguisher: 1101:36241410
BGP routing table entry for 91.0.0.1/32, version 533 dest ptr 0xae643dd4
Paths: (1 available, best #1)
Flags: (0x000002 00000000) on xmit-list, is not in urib, is not in HW
Multipath: eBGP iBGP
 Advertised path-id 1
 Path type: internal 0x40000018 0x880000 ref 0 adv path ref 1, path is valid, is best path,
remote site path
 AS-Path: NONE, path sourced internal to AS
   192.168.100.225 (metric 20) from 192.168.11.13 (192.168.11.13) <<< Site2_Leaf1 ETEP IP
learn via Site2_Spine mcsp-etep address.
     Origin incomplete, MED 2, localpref 100, weight 0
     Received label 0
     Extcommunity:
        RT:65001:36241410
        SOO:65001:50331631
        COST:pre-bestpath:166:2684354560
        COST:pre-bestpath:168:3221225472
        VNID:2686978
        COST:pre-bestpath:162:110
     Originator: 10.0.72.64 Cluster list: 192.168.11.13 <<< Originator Site2_Leaf1 and
Site2 Spine ips are listed here...
 Path-id 1 advertised to peers:
   10.0.80.64
                                  <<<< Site1_Leaf1 ip
Site2_Spine# show ip interface vrf overlay-1
<snip..>
1013, Interface status: protocol-up/link-up/admin-up, iod: 92, mode: mscp-etep IP address:
192.168.11.13, IP subnet: 192.168.11.13/32
 IP broadcast address: 255.255.255.255
 IP primary address route-preference: 0, tag: 0
<snip..>
Site-B apic1# acidiag fnvread
     ID
        Pođ ID
                                     Serial Number
                                                         IP Address
                              Name
                                                                   Role
                                                                                State
LastUpdMsgId
_____
    101
              1
                      Site2_Spine
                                      FDO243207JH
                                                      10.0.72.65/32 spine
active 0
    102
             1
                      Site2_Leaf2
                                      FDO24260FCH
                                                     10.0.72.66/32 leaf
active
      0
                       Site2_Leaf1
                                      FDO24260ECW
   1101
              1
                                                     10.0.72.64/32 leaf
active 0
```

验证站点间标志。

Site1_Spine# moquery -c bgpPeer -f 'bgp.Peer.addr*"192.168.11.13"'

Total Objects shown: 1 # bgp.Peer addr : 192.168.11.13/32 activePfxPeers : 0 adminSt : enabled : 65001 asn bgpCfgFailedBmp : bgpCfgFailedTs : 00:00:00:00.000 : 0 bgpCfgState childAction : ctrl : curPfxPeers : 0 : sys/bgp/inst/dom-overlay-1/peer-[192.168.11.13/32] dn 1cOwn : local maxCurPeers : 0 maxPfxPeers : 0 : 2021-09-13T11:58:26.395+00:00 modts monPolDn . name . passwdSet : disabled password peerRole : msite-speaker privateASctrl : \mathbf{rn} : peer-[192.168.11.13/32] <<

<<

了解路由区分器条目设置站点间标志后,本地站点主干可以在从第25位开始的路由目标中设置 本地站点ID。当站点1在RT中设置此位时获取BGP路径,它知道这是远程站点路径。 Site2_Leaf1# vsh Site2_Leaf1# show bgp vpnv4 unicast 91.0.0.1 vrf TN_D:VRF_Stretch BGP routing table information for VRF overlay-1, address family VPNv4 Unicast <------26Bits------> Route Distinguisher: 1101:2686978 (VRF TN_D:VRF_Stretch) <---Sinary--> 00001010010000000000000 BGP routing table entry for 91.0.0.1/32, version 12 dest ptr 0xae6da350 Site1_Spine# vsh Site1_Spine# show bgp vpnv4 unicast 91.0.0.1 vrf overlay-1 <------26Bits----->

^^---26th bit set to 1 and with 25th bit value it become 10.

请注意,除第26位设置为1外,Site1的RT二进制值完全相同。它有十进制值(标记为蓝色)。 1101:36241410是您预期在Site1中看到的内容,以及必须导入Site1的内部枝叶。



```
Received label 0
     Received path-id 1
     Extcommunity:
         RT:65001:36241410
         SOO:65001:50331631
         COST:pre-bestpath:166:2684354560
         COST:pre-bestpath:168:3221225472
         VNID:2686978
         COST:pre-bestpath:162:110
     Originator: 10.0.72.64 Cluster list: 192.168.10.13 192.168.11.13
  VRF advertise information:
  Path-id 1 not advertised to any peer
  VPN AF advertise information:
  Path-id 1 not advertised to any peer
因此,"Site1_Leaf1"具有子网91.0.0.1/32的路由条目,下一跳为"Site2_Leaf1"ETEP地址
192.168.100.225。
Site1_Leaf1# show ip route 91.0.0.1 vrf TN_D:VRF_Stretch
IP Route Table for VRF "TN_D:VRF_Stretch"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%' in via output denotes VRF
91.0.0.1/32, ubest/mbest: 1/0
    *via 192.168.100.225%overlay-1, [200/2], 5d23h, bgp-65001, internal, tag 65001 <<<< Note
that next hope is External TEP pool (ETEP) ip address of Site-B.
        recursive next hop: 192.168.100.225/32%overlay-1
Site-A主干向"Site2_Spine" mcsp-ETEP的BGP邻居IP地址添加路由映射。 因此,如果考虑流量
 ,当站点A终端与外部IP地址通信时,数据包可以将源地址封装为"Site1_Leaf1" TEP地址,目标地
业为"Site2_Leaf" IP地址192.168.100.225的ETEP地址。 检验ELAM(Site1_Spine)
Site1_Spine# vsh_lc
module-1# debug platform internal roc elam asic 0
module-1(DBG-elam)# trigger reset
module-1(DBG-elam)# trigger init in-select 14 out-select 1
module-1(DBG-elam-insel14)# set inner ipv4 src_ip 90.0.0.10 dst_ip 91.0.0.1 next-protocol 1
module-1(DBG-elam-insel14)# start
module-1(DBG-elam-insel14)# status
 ELAM STATUS
______
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed
Asic 0 Slice 2 Status Armed
Asic 0 Slice 3 Status Armed
pod2-n9k# ping 91.0.0.1 vrf HOST_A source 90.0.0.10
PING 91.0.0.1 (91.0.0.1) from 90.0.0.10: 56 data bytes
64 bytes from 91.0.0.1: icmp_seq=0 ttl=252 time=1.015 ms
64 bytes from 91.0.0.1: icmp_seq=1 ttl=252 time=0.852 ms
64 bytes from 91.0.0.1: icmp_seq=2 ttl=252 time=0.859 ms
64 bytes from 91.0.0.1: icmp_seq=3 ttl=252 time=0.818 ms
64 bytes from 91.0.0.1: icmp_seq=4 ttl=252 time=0.778 ms
--- 91.0.0.1 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.778/0.864/1.015 ms
Site1_Spine ELAM被触发。Ereport确认数据包使用Site-A枝叶TEP IP地址和目的地的TEP地址封装
到Site2_Leaf1 ETEP地址。
module-1(DBG-elam-insel14)# status
```

ELAM STATUS

Asic 0 Slice 0 Status Armed Asic 0 Slice 1 Status Armed Asic 0 Slice 2 Status Triggered Asic 0 Slice 3 Status Armed module-1(DBG-elam-insel14)# ereport Python available. Continue ELAM decode with LC Pkg ELAM REPORT _____ **Outer L3 Header** _____ L3 Туре : IPv4 DSCP : 0 Don't Fragment Bit : ОжО TTL : 32 IP Protocol Number : UDP Destination IP : 192.168.100.225 <<<'Site2_Leaf1' ETEP address <<<'Site1_Leaf1' TEP address Source IP : 10.0.80.64 _____ _____ Inner L3 Header _____ _____ L3 Type : IPv4 DSCP : 0 Don't Fragment Bit : 0x0 TTL : 254 IP Protocol Number : ICMP : 91.0.0.1 Destination IP Source IP : 90.0.0.10

站点1 主干检验路由映射当站点A主干收到数据包时,它可以重定向到"Site2_Leaf1" ETEP地址 ,而不是查看coop或路由条目。(当您在站点B上有站点间L3out时,站点A主干会创建名为"infraintersite-l3out"的路由映射,以将流量重定向到站点2_Leaf1的ETEP并从L3out退出。) Site1_Spine# show bgp vpnv4 unicast neighbors 192.168.11.13 vrf overlay-1 BGP neighbor is 192.168.11.13, remote AS 65001, ibgp link, Peer index 4 BGP version 4, remote router ID 192.168.11.13 BGP state = Established, up for 10w4d Using loopback12 as update source for this peer Last read 00:00:03, hold time = 180, keepalive interval is 60 seconds Last written 00:00:03, keepalive timer expiry due 00:00:56 Received 109631 messages, 0 notifications, 0 bytes in queue Sent 109278 messages, 0 notifications, 0 bytes in queue Connections established 1, dropped 0 Last reset by us never, due to No error Last reset by peer never, due to No error Neighbor capabilities: Dynamic capability: advertised (mp, refresh, gr) received (mp, refresh, gr) Dynamic capability (old): advertised received Route refresh capability (new): advertised received Route refresh capability (old): advertised received 4-Byte AS capability: advertised received Address family VPNv4 Unicast: advertised received Address family VPNv6 Unicast: advertised received Address family L2VPN EVPN: advertised received Graceful Restart capability: advertised (GR helper) received (GR helper) Graceful Restart Parameters: Address families advertised to peer: Address families received from peer: Forwarding state preserved by peer for:

Restart time advertised by peer: 0 seconds Additional Paths capability: advertised received Additional Paths Capability Parameters: Send capability advertised to Peer for AF: L2VPN EVPN Receive capability advertised to Peer for AF: L2VPN EVPN Send capability received from Peer for AF: L2VPN EVPN Receive capability received from Peer for AF: L2VPN EVPN Additional Paths Capability Parameters for next session: [E] - Enable [D] - Disable Send Capability state for AF: VPNv4 Unicast[E] VPNv6 Unicast[E] Receive Capability state for AF: VPNv4 Unicast[E] VPNv6 Unicast[E] Extended Next Hop Encoding Capability: advertised received Receive IPv6 next hop encoding Capability for AF: **IPv4** Unicast Message statistics: Sent Rcvd Opens: 1 1 Notifications: 0 0 Updates: 1960 2317 Keepalives: 107108 107088 Route Refresh: 105 123 104 102 Capability: Total: 109278 109631 Total bytes: 2230365 2260031 Bytes in queue: 0 0 For address family: VPNv4 Unicast BGP table version 533, neighbor version 533 3 accepted paths consume 360 bytes of memory 3 sent paths 0 denied paths Community attribute sent to this neighbor Extended community attribute sent to this neighbor Third-party Nexthop will not be computed. Outbound route-map configured is infra-intersite-13out, handle obtained <<<< route-map to redirect traffic from Site-A to Site-B 'Site2 Leaf1' L3out For address family: VPNv6 Unicast BGP table version 241, neighbor version 241 0 accepted paths consume 0 bytes of memory 0 sent paths 0 denied paths Community attribute sent to this neighbor Extended community attribute sent to this neighbor Third-party Nexthop will not be computed. Outbound route-map configured is infra-intersite-13out, handle obtained <snip...> Site1_Spine# show route-map infra-intersite-13out route-map infra-intersite-13out, permit, sequence 1 Match clauses: ip next-hop prefix-lists: IPv4-Node-entry-102 ipv6 next-hop prefix-lists: IPv6-Node-entry-102 Set clauses: ip next-hop 192.168.200.226 route-map infra-intersite-13out, permit, sequence 2 <<<< This route-map match if destination IP of packet 'Site1_Spine' TEP address then send to 'Site2_Leaf1' ETEP address. Match clauses: ip next-hop prefix-lists: IPv4-Node-entry-1101 ipv6 next-hop prefix-lists: IPv6-Node-entry-1101 Set clauses: ip next-hop 192.168.200.225

route-map infra-intersite-13out, deny, sequence 999
Match clauses:
 ip next-hop prefix-lists: infra_prefix_local_pteps_inexact
 Set clauses:
 route-map infra-intersite-13out, permit, sequence 1000
Match clauses:
 Set clauses:
 ip next-hop unchanged

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Site1_Spine# show ip prefix-list IPv4-Node-entry-1101
ip prefix-list IPv4-Node-entry-1101: 1 entries
seq 1 permit 10.0.80.64/32 <<</pre>
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