Configure Intersite L3out With ACI Multi-Site Fabrics

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Introduction

This document describes the steps for the intersite L3out configuration with Cisco Application Centric Infrastructure (ACI) multi-site fabric.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Functional ACI multi-site fabric setup
- External router/connectivity

Components Used

The information in this document is based on:

- Multi-Site Orchestrator (MSO) Version 2.2(1) or later
- ACI Version 4.2(1) or later
- MSO nodes
- ACI fabrics
- Nexus 9000 Series Switch (N9K) (End Host and L3out external device simulation)
- Nexus 9000 Series Switch (N9K) (Inter-site Network (ISN))

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

Background Information

Supported Schemas for Intersite L3out Configuration

Schema-config1

- Tenant stretched between sites (A and B).
- Virtual Routing and Forwarding (VRF) stretched between sites (A and B).
- Endpoint Group (EPG)/Bridge Domain (BD) local to one site (A).
- L3out local to another site (B).
- External EPG of L3out local to site (B).
- Contract creation and configuration done from MSO.

Schema-config2

- Tenant stretched between sites (A and B).
- VRF stretched between sites (A and B).
- EPG/BD stretched between sites (A and B).
- L3out local to one site (B).
- External EPG of L3out local to site (B).
- Contract configuration can be done from MSO, or each site has local contract creation from Application Policy Infrastructure Controller (APIC) and attached locally between the stretched EPG and L3out external EPG. In this case, shadow External_EPG appears at site-A because it is needed for local contract relation and policy implementations.

Schema-config3

- Tenant stretched between sites (A and B).
- VRF stretched between sites (A and B).
- EPG/BD stretched between sites (A and B).
- L3out local to one site (B).
- External EPG of L3out stretched between sites (A and B).
- Contract configuration can be done from MSO, or each site has local contract creation from APIC and attached locally between the stretched EPG and stretched external EPG.

Schema-config4

- Tenant stretched between sites (A and B).
- VRF stretched between sites (A and B).
- EPG/BD local to one site (A) or EPG/BD local to each site (EPG-A in site A and EPG-B in site B).
- L3out local to one site (B), or for redundancy toward external connectivity you can have L3out local to each site (local to site A and local to site B).
- External EPG of L3out stretched between sites (A and B).
- Contract configuration can be done from MSO or each site has local contract creation from APIC and attached locally between stretched EPG and stretched external EPG.

Schema-config5 (Transit routing)

- Tenant stretched between sites (A and B).
- VRF stretched between sites (A and B).
- L3out local to each site (local to site A and local to site B).
- External EPG of local to each site (A and B).
- Contract configuration can be done from MSO or each site has local contract creation from APIC and attached locally between the external EPG local and shadow external EPG local.

Schema-config5 (InterVRF Transit Routing)

- Tenant stretched between sites (A and B).
- VRF local to each site (A and B).
- L3out local to each site (local to site A and local to site B).

- External EPG of local to each site (A and B).
- Contract configuration can be done from MSO or each site has local contract creation from APIC and attached locally between the external EPG local and shadow external EPG local.

Note: This document provides basic intersite L3out configuration steps and verification. In this example, Schema-config1 is used.

Configure

Network Diagrams

Physical Topology



Logical Topology



Configurations

In this example, we use Schema-config1. However, this configuration can be completed in a similar way (with minor changes as per contract relation) for other supported schema-configs, except the stretched object needs to be in the stretched template instead of the specific site template.

Configure Schema-config1

- Tenant stretched between sites (A and B).
- VRF stretched between sites (A and B).
- EPG/BD local to one site (A).
- L3out local to another site (B).
- External EPG of L3out local to site (B).
- Contract creation and configurations done from MSO. Review the <u>Intersite L3Out Guidelines and Limitations</u>.
- Unsupported configuration with intersite L3out:Multicast receivers in a site that receives multicast from an external source via another site L3out. Multicast received in a site from an external source is never sent to other sites. When a receiver in a site receives multicast from an external source it must be received on a local L3out.An internal multicast source sends a multicast to an external receiver with PIM-SM any source multicast (ASM). An internal multicast source must be able to reach an external Rendezvous Point (RP) from a local L3out.Giant OverLay Fabric (GOLF).Preferred groups for external EPG.

Configure the Fabric Policies

Fabric policies at each site are an essential configuration, because those policy configurations are linked to specific tenant/EPG/static port bind or L3out physical connections. Any misconfiguration with fabric policies can lead to failure of the logical configuration from APIC or MSO, hence the provided fabric policy configuration which was used in a lab setup. It helps to understand what

object is linked to which object in MSO or APIC.

Host_A Connection Fabric Policies at Site-A



L3out Connection Fabric Policies at Site-B



Optional Step

Once you have fabric policies in place for respective connections, you can ensure all leaf/spines are discovered and reachable from the respective APIC cluster. Next, you can validate both sites (APIC clusters) are reachable from MSO and the multi-site setup is operational (and IPN connectivity).

Configure RTEP/ETEP

Routable Tunnel Endpoint Pool (RTEP) or External Tunnel Endpoint Pool (ETEP) is the required

configuration for intersite L3out. The older version of MSO displays "Routable TEP Pools" while the newer version of MSO displays "External TEP Pools", but both are synonymous. These TEP pools are used for Border Gateway Protocol (BGP) Ethernet VPN (EVPN) via VRF "Overlay-1".

External routes from L3out are advertised via BGP EVPN toward another site. This RTEP/ETEP is also used for remote leaf configuration, so if you have an ETEP/RTEP configuration that already exists in APIC then it must be imported in MSO.

Here are the steps to configure ETEP from the MSO GUI. Since the version is 3.X MSO, it displays ETEP. ETEP pools must be unique at each site and must not overlap with any internal EPG/BD subnet of each site.

Site-A

Step 1. In the MSO GUI page (open the multi-site controller in a web page), choose **Infrastructure > Infra Configuration**. Click **Configure Infra**.

Ŧ	Multi-Site Orchestrator
Dashboard	
Application Management	Infra Configuration
Operations	Configure for a
O Infrastructure	
System Configuration	
Sites	
Infra Configuration	
SD-WAN	

Step 2. Inside Configure Infra, choose **Site-A**, Inside Site-A, choose **pod-1**. Then, inside pod-1, configure **External TEP Pools** with the external TEP IP address for Site-A. (In this example it is 192.168.200.0/24). If you have Multi-POD in Site-A, repeat this step for other pods.

Fabric Connectivity Infra	Deploy Q O 🗙
SETTINGS	pod-1
General Setting: Referen	
	0 1 0 1 4 1 4
G SizeA (IN) C POURT	192.168.10.12
e Site 8 (/C) excluded () Site 1, Spine	External TEP Pools 🔮 TEP
BGP preving on	192.168.200.0/24 Reserved Address
	192.106.200.0/24

Step 3. In order to verify the configuration of the ETEP pools in the APIC GUI, choose **Fabric > Inventory > Pod Fabric Setup Policy > Pod-ID** (double click to open **[Fabric Setup Policy a POD-Pod-x]**) **> External TEP.**

APIC (SiteA)									admin	9	5 😍	•	0
System Tenants	/irtual Networking L4-L7 S	ervices Admin	Operations Apps	Integrations									
Inventory Fabric Policies Ar	ccess Policies			integration of the second seco									
Inventory	000	Pod Fabric Setup	Policy										0
> ()• Quick Start										Phy	sical Pods	Virtu	al Pods
Topology												-	0 +
Pod Fabric Setup Policy		▲ Pod ID		1	TEP Pool		Remote	e ID					0 1
Fabric Membership	N25944	1			10.0.0/16								
Disabled Interfaces and Decommissioned 1 Duplicate ID Licago	Switches												
			Fabric Setup Pol	icy for a POD -	Pod 1				008	2			
							Policy	Faults	History				
			8 🐨 🗠 🕥					Ó	± %-				
			Properties										
			TEP Pool: 1	0.0.0/16					- 1				
			Pod Type: pl Remote Pools:	hysical									
	·			Remote ID		Remote Pool			a T				
						No items have been found. Select Actions to create a new item.							
			External TEP:						≘ +				
				IP	Reser	ve Address Count	State						
				192.168.200.0/24	0		active						
							C	lose					
							_						

You can also verify the configuration with these commands:

```
moquery -c fabricExtRoutablePodSubnet
moquery -c fabricExtRoutablePodSubnet -f 'fabric.ExtRoutablePodSubnet.pool=="192.168.200.0/24"'
APIC1# moquery -c fabricExtRoutablePodSubnet
Total Objects shown: 1
# fabric.ExtRoutablePodSubnet
                   : 192.168.200.0/24
p001
                    : orchestrator:msc
annotation
childAction
descr
                    :
                   : uni/controller/setuppol/setupp-1/extrtpodsubnet-[192.168.200.0/24]
dn
extMngdBy
                   :
lcOwn
                   : local
modTs
                   : 2021-07-19T14:45:22.387+00:00
name
nameAlias
                    :
reserveAddressCount : 0
                   : extrtpodsubnet-[192.168.200.0/24]
\mathbf{rn}
state
                   : active
status
                   :
uid
                    : 0
```

Site-B

Step 1. Configure the External TEP Pool for Site-B (The same steps as for Site-A.) In the MSO GUI page (open the multi-site controller in a web page), choose **Infrastructure > Infra Configuration**. Click **Configure Infra**. Inside Configure Infra, choose **Site-B**. Inside Site-B, choose **pod-1**. Then, inside pod-1, configure **External TEP Pools** with the external TEP IP address for Site-B. (In this example it is 192.168.100.0/24). If you have Multi-POD in Site-B, repeat this step for other pods.



Step 2. In order to verify the configuration of the ETEP pools in the APIC GUI, choose Fabric > Inventory > Pod Fabric Setup Policy > Pod-ID (double click to open [Fabric Setup Policy a POD-Pod-x]) > External TEP.

CISCO APIC (SiteB)					admin 🔇 🔿	😍 💿 💿
System Tenants Fabric Virtual Networking L4-	L7 Services Admin Opera	tions Apps Integrations				
Inventory Fabric Policies Access Policies						
Inventory	Pod Fabric Setup Policy					0
> C Quick Start	, contracting conceptioner,				Disclosed	
Topology					Physical	Pods Virtual Pods
> 🗃 Pod 1	▲ Pod ID	TEP Pool		Remote ID		0 +
Fabric Membership	1	10.0.0.0/16				
Disabled Interfaces and Decommissioned Switches						
E Duplicate IP Usage		Fabric Setup Policy for a POD - Pod 1			008	
				Policy	Faults History	
		8 0 0			0 ± %-	
		Properties				
		ID: 1 TEP Pool: 10.0.0.0/16			î.	
		Pod Type: physical				
		Remote Pools:	Rometo Deel		m +	
		× relice io	No items have been found			
			Select Actions to create a new item.			
		External TEP:			≡ +	
		IP 102 168 100 0/24	Reserve Address Count	State		
		192.100.100.0/24	v	acuve		
				Clo	se Submit	

For the Site-B APIC, enter this command in order to verify the ETEP address pool.

```
apic1# moquery -c fabricExtRoutablePodSubnet -f
'fabric.ExtRoutablePodSubnet.pool=="192.168.100.0/24"'
Total Objects shown: 1
# fabric.ExtRoutablePodSubnet
pool
        : 192.168.100.0/24
                   : orchestrator:msc <<< This means, configuration pushed from MSO.
annotation
childAction
                    :
descr
                    :
dn
                    : uni/controller/setuppol/setupp-1/extrtpodsubnet-[192.168.100.0/24]
extMngdBy
                    :
lcOwn
                    : local
                    : 2021-07-19T14:34:18.838+00:00
modTs
name
                    :
nameAlias
                    :
reserveAddressCount : 0
                    : extrtpodsubnet-[192.168.100.0/24]
\mathbf{rn}
                    : active
state
status
                     :
uid
                     : 0
```

Configure the Stretch Tenant

Step 1. In the MSO GUI, choose Application Management > Tenants. Click Add Tenant. In this

example, the Tenant name is "TN_D".

Ŧ	Multi-Site Orche	estrator				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

Step 2. In the **Display Name** field, enter the tenant's name. In the **Associated Sites** section, check the **Site A** and **Site B** check boxes.

Add Tenant		ð ×
	General Settings	ĺ
	* Display Name TN_D Innul Rase: TN_D	
	Description	
	Associated Sites	
	Site Stack (A01, 4206) Stack (B01, 4206) Stack (B01, 4206)	
	Associated Users o	
	User Status	
	mso-admin Active	
	Consistency Checker Scheduler Settings	
	Diable Scheduer	
	Select Frequency Every 24 hours	
		Save

Step 3. Verify that the new tenant "Tn_D" is created.

Ŧ	Multi-Site Orchestrate	or					۵ 🕲
Dashboard	Terrate						
Application Management	Tenants					0.00	Add Tennet
Tenants	Eiter bu attributer					GO	Add Tenant
Policies	Prior by automates						
Operations	Name	Description	Assigned To Sites	Assigned To Users	Assigned to Schemas	Consistency Scheduler	
O Infrastructure	TN_D		2	1	0	Set Schedule	
System Configuration							
Sites							
Infra Configuration							
SD-WAN							
	10 🗸 Rows					Page 1 of 1 4 4	-7 of 7 🕨 📲

Logical View

When we create a tenant from MSO, it basically creates a tenant at Site-A and Site-B. It is a stretch tenant. A logical view of this tenant is shown in this example. This logical view helps to understand that tenant TN_D is stretched tenant between Site-A and Site-B.

		-					~ ~
Ŧ	disco Multi-Site Orchestrator	1				0	۲
Dashboard	Tananta						
Application Management	renants					O O CAMIT	there
Tenants						G O Add I	mane
Schemas	Filter by attributes						
Policies	Name	Description	Assigned To Sites	Assigned To Users	Assigned to Schemas	Consistency Scheduler	
EX Operations V							-
) Infrastructure	TN_D		2	1	0	Set Schedule	
System Configuration							
enant:::TN D							

L

You can verify the logical view in the APIC of each site. You can see that Site-A and Site-B both show "TN_D" tenant created.

cisco	APIC	(SiteA)
System	Tenants	Fabric
ALL TENANT	'S Add	Tenant T
i This	s has been o	created fror
TN_D		
> 🕩 Quick S	tart	
∨ 📆 TN_D		
> 🚞 Appl	ication Profile	s
> 🚞 Netv	vorking	
> 🚞 Cont	tracts	
> 🚞 Polic	ies	
> 🚞 Serv	ices	

The same stretched tenant "TN_D" is also created in Site-B.

cisco	APIC	(SiteB)				
System	Tenants	Fabric				
ALL TENANT	S Add 1	Fenant T				
i This	has been o	created from				
TN_D						
> C Quick St	tart					
V 🔣 TN_D	✓ I TN_D					
> 🚞 Appli	ication Profile	s				
> 🚞 Netw	> 🚞 Networking					
> 🚞 Cont	> 🚞 Contracts					
> 🚞 Polic	ies					
> 🚞 Servi	ices					

This command shows the tenant pushed from MSO and you can use it for verification purposes. You can run this command in the APIC of both sites.

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

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

Configure the Schema

Next, create a schema that has a total of three templates:

- 1. Template for Site-A: The template for Site-A only associates with Site-A, hence whatever logical object configuration in that template can only push to the APIC of Site-A.
- 2. Template for Site-B: The template for Site-B only associates with Site-B, hence whatever logical object configuration in that template can only push to the APIC of Site-B.
- 3. Stretched Template: The stretched template associates with both sites and any logical configuration in the stretched template can push to both sites of APICs.

Create the Schema

Schema is locally significant in MSO, it does not create any object in APIC. Schema configuration is the logical separation of each configuration. You can have multiple schema for the same tenants, and you can also have multiple templates inside each schema.

For example, you can have a schema for the database server for tenant X and the application server uses a different schema for the same tenant-X. This can help to separate each specific application-related configuration and is easy when you need to debug an issue. It is also easy to find information.

Create a schema with the name of the tenant (for example, TN_D_Schema). However, it is not necessary to have the name of schema start with the tenant name, you can create a schema with any name.

Step 1. Choose Application Management > Schemas. Click Add Schema.

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

Step 2. In the **Name** field, enter the name of the schema. In this example it is "TN_D_Schema", however you can keep any name which is appropriate for your environment. Click **Add**.

×
Add

Step 3. Verify that schema "TN_D_Schema" was created.

TN_D_Schema									0 Policies	Z Autosave	Save O	×
TN_D_Schema TEMPLATES	Overview											
	General Name TN_D_Schema	Description Schema for Tenant TN_D			1	Audit Log Created O	Del	leted Upda 0 0	ted	Deployed O	Other 0	
	Sites Health O Total O Total Cities Cities	(0) (0) (0) (0) (0) (0)	Type O Total	ARC (0) CCAM (0) AV/S (0) Azure (0)		Template to Site Ass Deployment Status 0 Total	Deployed (0) ModSted (0) Not Deployed (0)		Consistency 0 Total	Vecified (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 Do	mains (0)	• Filters (0)	• External EPGs (0			0 Total Policies	
	Topology TOOLS Show Lines Show Names TYPE	•0										

Create the Site-A Template

Step 1. Add a template inside the schema.

- 1. In order to create a template, click **Templates** under the schema which you have created. The Select a Template type dialog box is displayed.
- 2. Choose ACI Multi-cloud.
- 3. Click Add.

TN_D_Schema				c	D Policies 🗹 Autosave Save 🖉 🗙
TN_D_Schema TEMPLATES	Overview				
	General Name TN_D_Schema	Description Schema for Tenant TN_D	Audit Log Created De O	eleted Updated 0 0	Deployed Other 0 0
	Sites Health Oral Oral	Select a Template type Select a Template type Control of Head Area Select a Template type Control of Area Control of Ar	Template to Site Associations	Consisten Consisten External (Pris. (0)	су • Vutilinat (0) • Trainet (0) • Trainet (0) • Nivia (0) • Nivia (0) • Total Paticles

Step 2. Enter a name for the template. This template is specific to Site-A, hence the template name "Site-A Template". Once the template is created, you can attach a specific tenant to the template. In this example, the tenant "TN_D" is attached.

TN_D_Sche	ma	TN_D_Schema		
TN_D_Schema		💽 TN D Schema		
TEMPLATES	\oplus	TEMPLATES (+)		
🥐 Template 1	er en	Site-A Template		
TN_D_Schema				0 Policies 🖉 Autosave Save
TN_D_Schema TEMPLATES	Site-A Template			TEMPLATE Site-A Template
🕐 Site-A Template	Tenant: TN_D			Save Schema now
SITES 💮			SELECT 🔮 CREATE OBJECT	* Display Name Site-A Template
	Application Profile			SR-MPLS
	00 EPGs			Tenant Settings
	Contracts			TN_D × ~
	VRFs			
	10 Bridge Domains			Scroll Down and Select Tenant Example: 'TN_D'
	Filters			
	External EPGs			
	C L3Outs			
	6 Service Graphs			

Configure the Template

Application Profile Configuration

Step 1. From the schema that you created, choose **Site-A Template**. Click **Add Application Profile**.



Step 2. In the **Display Name** field, enter the application profile name **App_Profile**.

TN_D_Schema		1 Policy	🗹 Autosave Save 🖈 🥝 🔿 🗙
TN_D_Schema TEMPLATES	Site-A Template Th D	Depicy to size	APPLICATION PROFILE
Site-A Template	RUDRS	MPORT ~ SELECT 😨 CREATE OBJECT	* Display Name App_Profile Deployed Name: App_Profile
	Application Profile App_Profile	a	
	EPGs		

Step 3. The next step is to create EPG. In order to add EPG under the application profile, click **Add EPG** under the Site-A template. You can see a new EPG is created inside the EPG configuration.

TN_D_Schema			1 Policy 🗹 Autosave	★ @ O ×
TN_D_Schema	۲	Site-A Template	00 A700	ATION PROFILE
Site-A Template		Tenant: TN_D	* Display Nam	e
			INPORT SELECT CRATE ORACIT	kpp_Profile
		Application Profile App_Profile	Û	
		DPGs		

Step 4. In order to attach EPG with BD and VRF, you have to add BD and VRF under EPG. Choose **Site-A Template**. In the **Display Name** field, enter the name of the EPG and attach a new BD (you can create a new BD or attach an existing BD).

TN_D_Schema			is 🖬 Autosave Save 🛧 🥝 🔿 🗙
TN_D_Schema TEMPLATES (Site-A Template	ə (Site-A Template (Svev 1994) Tennet: TNLD	EPG_990 Local til Anotomet 0
SITES	0	PRIME REPORT - SELECT CERATE ORACI	Common Properties
	C	Application Profile App_Profile	Display Name EPG_990
			Contracts Name Add Connect EPG Type Application Service
	•	Contracts	Properties On-Premises Properties
	•	165	Bridge Domain BD, 990
	e	Bridge Domains	"8D_990" was not found. Click to create 8D "8D_990"
	0	Fiters	Add Subnet
	•	Edemal EPGs	USeg EPG
	•	Lõus	Enforced Unenforced Intersite Multicast Source
	e	Service Graphs	Include In Preferred Group
			QoS Level Unspecified ×

Note that you have to attach VRF to a BD, but VRF is stretched in this case. You can create the stretched template with stretched VRF and then attach that VRF to BD under site specific template (in our case it is **Site-A Template**).

Create the Stretch Template

Step 1. In order to create the stretch template, under the TN_D_Schema click **Templates**. The Select a Template type dialog box is displayed. Choose **ACI Multi-cloud**. Click **Add**. Enter the name **Stretched Template** for the template. (You can enter any name for the stretched template.)



Step 2. Choose **Stretched Template** and create a VRF with the name **VRF_Stretch**. (You can enter any name for VRF.)

TN_D_Schema	4 Policies	🗹 Autosave 🛛 Silve 🛧 Q. O. 🗙
TN_D_Schema TEMPLATES	Stretched Template Tenant: TH_D	TEMPLATE Stretched Template
Site-A Template Stretched Template Stretched Template SiTES	FRIERS AMONT V SELLET © COSATE OBJECT © Application Profile:	Template Settings
<	Environment and Express of raphs	

BD was created with the EPG creation under **Site-A Template**, but there were no VRF attached, hence you have to attach VRF which is now reated in the **Stretched Template**.

Step 3. Choose Site-A Template > BD_990. In the Virtual Routing & Forwarding drop-down list, choose VRF_Stretch. (The one you created in Step 2 of this section.)

TN_D_Schema	4 Potcies	🗹 Autosave 🛛 Save 🖈 🥝 🔿 🗙
TN_D_Schema TEMPLATES Site-A Template	Site-A Template Tenant: TNLD	BD_990 X X X X X X X X X X X X X X X X X X
Stretched Template SITES	PRITIES MODORT - SELECT CREATE GRACE	Common Properties
	Application Profile App_Profile	Properties
	* EPG_990	* Virtual Routing & Forwarding M VRF_Stretch X ∨ L2 Stretch
	Contracts VRFs	Contractive BUM Traffic Allow Contractive WAN Bandwidth
	Bridge Domains W	1.3 Malicest 1.2 Unknown Unicest Prood Unknown Multicest Flooding Prood Prof Unknown Multicest Flooding Prof Unknown Multicest Flooding
	Fites	HIGG Optimized Flood Multi-Destination Flooding Rood in BD Drop Flood in Encapsulation ARP Flooding
	Cuenta LPus L30vts	Virtual MAC Address Not Configured Subnets

Attach the Template

The next step is to attach the **Site-A Template** with **Site-A** only, and the stretched template needs to be attached to both sites. Click **Deploy to site** inside the schema in order to deploy templates to the respective sites.

Step 1. Click the **+** sign under **TN_D_Schema > SITES** to add sites to template. In the **Assign to Template** drop-down list, choose the respective template for the appropriate sites.

TN_D_Schema	3	×	
TN_D_Schema TEMPLATES	Assign To Template		
Site-A Template Sites Stetched Template Sites Sites Sites Add	42(h) Ster A Template x Stretched Template x 42(h) Stretched Template x x		
TN_D_Schema			4 Policies 🗹 Autosave Save 🛠 🙆 🔿 🗙
TN_D_Schema TEMPLATES O Site-A Template Applied to 1 sites	7	Dep	to sites p
SRe-A Template Stretched Template FILTERS			Template Settings
Stress O SiteA (ACI) 4.2(6h)			Ste-A Template
© Stretched Te ▲ 😰 EPGs 🧹			Tenant Settings
stres (AL) 4.2(8) A	Deploy To Sites	×	TN_D Name TN_D
	C + Created C / Modified C C Deleted C & Co	nfig Drift	Description
	EPG EPG,990 + Created		
	Bridge Domain BD_590 + Created	A	
		Some referenced policies are not deploye Doploy	1

Step 2. You can see **Site-A** has EPG and BD now create but **Site-B** does not have same EPG/BD created because those configuration only applies to Site-A from MSO. However, you can see VRF is created in the **Stretched Template** hence it is created in both sites.





Step 3. Verify the configuration with these commands.

```
APIC1# moquery -c fvAEPg -f 'fv.AEPg.name=="EPG_990"'
Total Objects shown: 1
# fv.AEPg
                     : EPG_990
name
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
                    : AtleastOne
matchT
modTs
                    : 2021-09-18T08:26:49.906+00:00
monPolDn
                    : uni/tn-common/monepg-default
nameAlias
                     :
pcEnfPref
                     : unenforced
pcTag
                     : 32770
prefGrMemb
                     : exclude
                     : unspecified
prio
rn
                     : epg-EPG_990
                     : 2850817
scope
shutdown
                     : no
status
                     :
triggerSt
                     : triggerable
txId
                     : 1152921504609182523
uid
                     : 0
```

APIC1# moquery -c fvBD -f		'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

Configure Static Port Bind

4. Click Save.

You can now configure static port bind under EPG "EPG_990" and also configure the N9K with VRF HOST_A (basically it simulates HOST_A). The ACI side static port bind configuration will be completed first.

Step 1. Add the physical domain under EPG_990.

- 1. From the schema that you created, choose **Site-A Template > EPG_990**.
- 2. In the **Template Properties** box, click **Add Domain**.
- In the Add Domain dialog box, choose these options from the drop-down lists: Domain Association Type - PhysicalDomain Profile - TN_D_PhysDomDeployment Immediacy -ImmediateResolution Immediacy - Immediate

TN_D_Schema			4 Policies	Autosave Save 🛧 Q O 🗙
TN_D_Schema				0 1 0 1 0 1 0
TEMPLATES ③	SiteA Site-A Template		Last Deployed: Sep 18, 2021 04:27 am	Template Properties
📀 Site-A Template	Tenant: TN_D			* Display Name
Stretched Template	FILTERS			EPG_990 Deployed Name: EPG_990
SITES ③				Contracts
SiteA (ACI) 4.2(6h)	Application Profile App. Profile			EPG Type
o Site-A Template⊘	• • • • • • • • • • • • • • • • • • • •			Application Service
Stretched Te	🕕 EPGs 🗸			* Bridge Domain BD_990
SiteB (ACI) 4.2(6h)				Subnets
Stretched te	© EPG_990			N/A USed EPG
				Intra EPG isolation Enforced
	Contracts	Add Domain	×	Unenforced
				Intersite Multicast Source
	VRFs VRFs	* DOMAIN ASSOCIATION TYPE		Include in Preferred Group
		Physical	× v	QoS Level
	👜 Bridge Domains 🗸			Unspecified
		* DOMAIN PROFILE		Site Local Properties
	9 BD_990	TN_D_PhysDom	××	Subnets Gateway IP
	constant	* DEPLOYMENT IMMEDIACY		Add Subnet
		Immediate	×v	
	Filters	* RESOLUTION IMMEDIACY		Static ports
		Immediate	×	Add Static Port
	External EPGs			
				Static Leat Node
	CO L3Outs		Save	O Add Static Leaf
				and a second sec
	Service Graphs			Profile
				Add Domail Add
				land the second s

Step 2. Add the static port (Site1_Leaf1 eth1/5).

- 1. From the schema that you created, choose **Site-A Template > EPG_990**.
- 2. In the **Template Properties** box, click **Add Static Port**.
- 3. In the Add Static EPG on PC, VPC or Interface dialog box, choose Node-101 eth1/5 and

assign VLAN 990.

TN_D_Schema				4 Policies	🗹 Autosave 🛛 Save 🖈	e o ×	
TN_D_Schema TEMPLATES	SiteA Site-A Template Tenant: TN_D			Last Deployed: Sep 18, 2021 04:27 am	Template Properties * Display Name EPQ_990 Deployed Name: EP0_990	^	
Stretched Template SiTES O SiteA (ACD 4.2(6b) SiteA Template SiteA Template O	PLEARS PLEARS				Contracts N/A EPG Type Application Service * Bridge Domain BD_990 Subnets		
SiteB (ACI) 4.3(6h)	EP0_990	Add Static EPG on PC, VPC or	r Interface X		N/A USeg EPG Intra EPG Isolation Enforced		
	Contracts	* Pod pod-1	× •		Intersite Multicast Source		
	VRFs	* Leaf Site1_Leaf1 (Node-1101)	××		QoS Level Unspecified		
	Bridge Domains	* Path eth1/5 * Port Encap VLAN	××		Site Local Properties Subnets Gateway IP	^	
	contectual	990 Primary MICRO-SEG VLAN			Static ports Path		
	 Filters External EPOs 	* DEPLOYMENT IMMEDIAGY	× •		Add Stells Port		
	130uts	Trunk	x ~		Add Static Leaf		
	Service Graphs		Save		Profile TN_D_PhysDom Type: physical	۲	
					Add Domain		

Step 3. Ensure the static ports and physical domain are added under EPG_990.

TN_D_Schema		🗹 Autosave 🛛 Save 🚬 🖈 📿	o ×
TN_D_Schema	SiteA	Template Properties * Display Name	^
Site-A Template	Site-A Temptote Last Dophyse: Step 18, 2021 04:27 am	EPG_990 Deployed Name: EPG_990 Contracts	
Stretched Template	PLTDS	N/A	
SITES ③		Application Service	
o Site-A Template …⊘	Application Profile	* Bridge Domain BD_990	
o Stretched Te O	🕼 EPGs 🗸	Subnets N/A	
SiteB (ACt) 4.2(bh) A	₹ £P0_990	USeg EPG Intra EPG Isolation Enforced () Unenforced	
	Contracts	Intersite Multicast Source	
	🕲 Vass	QoS Level Unspecified	
	Bridge Domains V	Site Local Properties Subnets Gateway IP	^
	* 60_990	 Add Subnet 	
	conneud	Static ports Path	
	Fiters	eth1/5 (node-1101) Type: port, Vian: 990	۲
	Caternal EPGs	Add Static Port Static Leaf	
	O LOOIS	Node Add Static Leaf	
	Service Graphs	Domains Profile	
		TN_D_PhysDom Type: physical	٢

Verify the static path bind with this command:

APIC1# moquer	сy	-c fvStPathAtt -f 'fv.StPathAtt.pathName=="eth1/5"' grep EPG_990 -A 10 -B 5
<pre># fv.StPathAt</pre>	Ξt	
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 :
```

Configure BD

Step 1. Add the subnet/IP under BD (HOST_A uses BD IP as the gateway).

- 1. From the schema that you created, choose Site-A Template > BD_990.
- 2. Click Add Subnet.
- 3. In the Add New Subnet dialog box, enter the Gateway IP address and click the Advertised Externally radio button.

TN_D_Schema				🗹 Autosave 🛛 Save 🛠 🥝 🔿 🗙
TN_D_Schema TEMPLATES Site-A Template	Site-A Template Applied to 1 sites Tenant: TN_D		Last Deployed: Sep 19, 2021 02:26 am Deploy to sites UNVOINTED	BD_990 OCAL BILLATION OF X
Citte-A Template Citt	FEITINS	Add New Subnet	NHORT ~ SELECT CREAT CALLOT	2 0 Common Properties Display Name BD_590 Displayd Name: 80,590 Properties
	Contracts VRFs Bridge Domains V R B0_990			Colombra BUM. Thatfic Allow Colombra WAN Bandwidth Calificate L3 Malicast Flood Mandware Procy Unknown Muticast Flooding Flood Optimized Flood
	Fiters External EPOs	Cardene Wills		Pard Euronem Martical Flooding Flood Optimized Flood Mail-Destination Flooding Road Is 10 Drep Flood in Encapeulation ARP Flooding Vinsal MACA Address
	Sours Service Graphs		Son	Not Configured Subjects Gateway IP

Step 2. Verify that the subnet is added in APIC1 Site-A with this command.

```
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 :
    : nd
ctrl
descr
           :
           : uni/tn-TN_D/BD-BD_990/subnet-[90.0.0.254/24]
dn
extMngdBy :
lcOwn
          : local
modTs
           : 2021-09-19T06:33:19.943+00:00
monPolDn
           : uni/tn-common/monepg-default
name
            :
nameAlias
           :
preferred : no
           : subnet-[90.0.0.254/24]
rn
```

scope	:	public
status	:	
uid	:	0
virtual	:	no

Step 3. Deploy the Site-A template.

1. From the schema that you created, choose **Site-A Template**.

2. Click **Deploy to sites**.



Configure Host-A (N9K)

Configure the N9K device with VRF HOST_A. Once the N9K configuration completes, you can see ACI Leaf BD anycast address (gateway of HOST_A) is reachable now via ICMP(ping).



In the ACI operational tab, you can see 90.0.0.10 (HOST_A IP address) is learned.

cisco	APIC (SiteA)												admin Q	0	•	٥
System	Tenants Fabric V	irtual Networking	L4-L7 Sen	vices Admin	Operations	Apps I	ntegrations									
ALL TENANTS	Add Tenant Tenant S	earch: name or descr	1 9	common TN_D	mgmt infr	a dosykes-tn1	1									
i This	has been created from Multi	-Site. It is recommen	ided to only m	nake changes from N	Multi-Site. Plea	se review the do	cumentation before	making any chan	ges here.							
TN_D		Ċ	30	EPG - EPG_9	90											000
										Summary	Policy	Operational	Stats	Health	Faults	History
Applic	ation Profiles						0	lient End-Points	Configured Access Policie	s Contracts	Control	er End-Points	Deployed	Leaves	Learned Er	id-Points
~ 🚱 AD	p_Profile			Charlthu O C	001-		_									A +
	Application EPGs			End Point	- MAC	IP	Learning	Source Hosting	g Server	Reporting	Interfac	8		Multicast	Encap	0 ±
	Domains (VMs and Bare-N	/letals)					1			Controller Name				Address		
	> EPG Members			EP-C0:14:FE:5E:1	C0:14:FE:5E:14	90.0.0.10	learned				Pod-1/N	ode-1101/eth1/5 (k	arned)		vlan-99	0
	> 🚞 Static Ports															
	E Static Leafs															
	> Fibre Channel (Paths)															
	Contracts															
	Static Endpoint															
	L4-L7 Virtual IPs															
	L4-L7 IP Address Pool		Eth	1/5 6 990 /Eccap viao 9	(00											
> 🖿	uSeg EPGs		BD	: 90.0.0.254/24	.50,		_									
> 🚞 Netwo	rking		VRI	F: TN D:VRF Stretc	h / P	od2-n9k	‡ ping 90		vrf HOST_A							
> 🚞 Contra	icts				- P) <mark>.0.254 (</mark>	90.0.0.2	54): 56 dat <mark>a</mark> 1							
> 🚞 Policie	IS			Trunk	3											
> 🚞 Servic	es				R											
					6			0.0.254:	icmp_seq=1 t							
			Eth1/5		6		from 90.	0.0.254:	icmp_seq=2 t			76 ms				
					6			0.0.254:	icmp_seq=3 th icmp_seq=4 th							
		V IP: Route: 0.	RF HOST_ VLAN-990 90.0.0.10/ .0.0.0/0 90	A) /24 0.0.0.254	- 5 r p	90.0 packets ound-tri od2-n9k	.0.254 pi s transmi ip min/av #	ng stati tted, 4 g/max =	stics packets receiv 0.576/0.711/0	ved, 20.0 .902 ms	0% pa	cket los	S			

Create the Site-B Template

Step 1. From the schema that you created, choose **TEMPLATES**. Click the **+** sign and create a template with the name **Site-B Template**.

TN_D_Schema		4 Policies	🗹 Autosave 💽 🛧 🥝 🔿 🗙
TN_D_Schema TEMPLATES	Ste-B Template Tenat: Tk_D	aved. X	Site-B Template X
Site-A Template Stretched Template Site-B Template		MPORT ~ SELECT ORATE ORJECT	Template Settings * Display Name Site - B Template
SITES () SiteA (ACI) 4.2(6h)	Application Profile		SR-MPLS Off
Ster-A Template Stretched Te SiteB (ACI) 4.2(6b)			Tenant Settings
e Stretched Te	V8Fs		TN_D Description
	Bridge Domains		
	6 Filtes		
	External EPGs		
	Sector and and and a sector and		

Configure Site-B L3out

Create L3out and attach VRF_Stretch. You have to create an L3out object from MSO and the rest of the L3out configuration needs to be done from APIC (as L3out parameters are not available in MSO). Also, create an external EPG from MSO (in the Site-B template only, as external EPG is not stretched).

Step 1. From the schema that you created, choose **Site-B Template**. In the **Display Name** field, enter **L3out_OSPF_siteB**. In the **Virtual Routing & Forwarding** drop-down list, choose **VRF_Stretch**.

TN_D_Schema			🛛 Autosave 🛛 Save 🔒 🛧 🥝 🔿 🗙
 TN_D_Schema TEMPLATES Site-A Template 	۲	Site-B Template	LSOUT-OSPF-siteB >>
Stretched Template Ste-B Template Site A Template Site A (ACI) 4.2(6h) Site A Template	••••••••••••••••••••••••••••••••••••••	PRIMES NPORT ~ SELECT CREATE OLECT C Application Profile	Common Properties Common Properties Colorigin Name L3Our-OBFF-site8 Despond Name: LOur-OBFF-site8 Virtual Routing & Forwarding # Virtual Routing & Forwarding # Virtual Routing & Virtual Routing # Virtual Routing & Virtual Routing # Virtual Routin
Stretched Te SiteB (ACI) 4.2(6h) Stretched Te	© ^ ©	Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image: Contracts Image:	
		Bridge Domains Fibers	
		External EPGs LiOuts I JOU-059F- steB	
		Service Graphs	

Create the External EPG

Step 1. From the schema that you created, choose Site-B Template. Click Add External EPG.

TN_D_Schema			5 Policies	Autosave	Save	* @	٥	×	
TN_D_Schema TEMPLATES Site-A Template	٢	Ste-B Template Applied to 1 sites Fenalt: TL_0	19, 2021 03:33 am Deploy to sites UNVERIFIED	TEMPLAT Site-B	Template			×	
Stretched Template		PRITERS	r 🗸 SELECT 🚯 CREATE OBJECT	* Display Name Site-B Templat	0			~	
SITES SitcA (ACI) 4.2(6h)	•	Application Profile		SR-MPLS Off					
Site-A Template Stretched Te	0		Tenant Settings Display name TN.D						
SiteB (ACI) 4.2(6h) © Stretched Te	^ 0	Contracts		Name TN_D Description					
© Site-8 Template	0	🕲 Vasa							
		Bridge Domains							
		Files							
		External EPGs	Add Externa EPG	xternal EPG					
		S 13048							
		9 L30x-05%- sht8							
		Service Graphs							

Step 2. Attach L3out with External EPG.

- 1. From the schema that you created, choose **Site-B Template**.
- 2. In the Display Name field, enter EXT_EPG_Site2.
- 3. In the Classification Subnets field, enter 0.0.0.0/0 for the external subnet for external EPG.

TN_D_Schema	1		6 Policies 🗹 Autosave 🖉 📩 🛠
TN_D_Schema TEMPLATES Site-A Template	۲	Site-B Template Applied to 1 Mise Ternant: TNLD	Last Deployed: Sep 19, 2021 02.33 am Orginy to allers
 Ster-A template Steches Template Ster-B Template Ster-B Template Strate A (ACD 4.2)(h) BineA Template Developed Sun StiteB (ACD 4.2)(h) BineA Template Ster-B Template 	···· ··· ··· ··· ··· ··· ··· ··	PAIRS Application Profile Contracts VIP's Bridge Domains	MPORT ∨ SLUCT CSEATE OLIVET Common Non-risk Common Non-risk Contracts Contracts VPE_Stretch × Contracts Name Contracts Contracts Stated Sile Type 0 COUP
		Filters	Properties O Co-Premises Properties
		External EPGs V	L3Out L3Ou-059F-step8 Suborts Classification Subnets 0.00.00 (0) Atti Subort
		LIDuts LIDuts LIDuts LIDuts Service Organ	Include in Performed Group

The rest of the L3out configuration is completed from APIC (Site-B).

Step 3. Add the L3 domain, enable the OSPF protocol, and configure OSPF with regular area 0.

- 1. From APIC-1 at Site-B, choose **TN_D > Networking > L3out-OSPF-siteB > Policy > Main**.
- 2. In the L3 Domain drop-down list, choose TN_D_L3Dom.
- 3. Check the OSPF check box for Enable BGP/EIGRP/OSPF.
- 4. In the OSPF Area ID field, enter 0.
- 5. In the OSPF Area Type, choose Regular area.
- 6. Click Submit.

cisco APIC (SiteB)			admin 🔕 🔿 😍 💷 🚳
System Tenants Fabric Virtual Networking L4-L7 S	Services Admin Operations Apps Integrations		
ALL TENANTS Add Tenant Tenant Search: name or descr	common TN_D Tenant Infra mgmt		
This has been created from Multi-Site. It is recommended to on	y make changes from Multi-Site. Please review the documentation before r	naking any changes here.	
™_D ©®©	L3 Outside - L3Out-OSPF-siteB		
> C • Quick Start			Summary Policy Stats Faults History
> Application Profiles			Main Node Profiles External EPGs
V 🖿 Networking	0.0.0		
> 🖿 Bridge Domains			0 * **
> VRFs	Properties		
S External Bridged Networks S E 1.30 uts	Rodue Control Enforcement. Import		
> AL3Out-OSPF-siteB	VRF: VRF_Stretch VRF- TN_D/VRF. Stretch		
> 🚞 Dot1Q Tunnels	L3 Domain: TN_D_L3Dom 🗸 🛃		
> Contracts	Route Profile for Interleak: select a value		
> Policies	Route Profile for Redistribution:		宣 +
> — Services	▲ Source	Route Map	
		No items have been found. Select Actions to create a new item.	
	Enable BGP/EIGRP/OSPE: BGP		
	OSPF Area ID: 0		
	OSPF Area Control:		
	Originate summary LSA		
	Suppress forwarding address in translated	LSA	
	OSPE Area Cost: 1		
			-
			Show Lleage Depart
			Show Usage Reset Submit

Step 4. Create the node profile.

 From APIC-1 at Site-B, choose TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles.



Step 5. Choose switch Site2_Leaf1 as a node at site-B.

- 1. From APIC-1 at Site-B, choose TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles > Create Node Profile.
- 2. In the Name field, enter Site2_Leaf1.
- 3. Click the + sign to add a node.

4. Add the **pod-2 node-101** with the router ID IP address.

CISCO APIC (SiteB)				
System Tenants Fabric Virtual Networking L4-L7 S	rvices Admin Operations Ap	ps Integrations		
ALL TENANTS Add Tenant Tenant Search: name or descr	common TN_D Tenant infra	mgmt		
This has been created from Multi-Site. It is recommended to on	m Create Node Profile		00	•
™_D (C)	Description: optional			
> C Quick Start	Target DSCP: Unspecified			
> Application Profiles	Nodes:		a -	Target DSCP
V The Networking	Node ID	Router ID Static Routes	Loopback Address	
> 🔤 Bridge Domains	(opoiogy/pod-1)		110,110,110	
>				
✓				
🗸 🚱 L3Out-OSPF-siteB				
Logical Node Profiles				
External EPGs				
Enduce map for import and export route control Dot10 Tunnels				
) Contracts				
> 🧮 Policies				
> 🚞 Services				
			Cancel	

Step 6. Add the Interface profile (External VLAN is 920 (SVI creation)).

- 1. From APIC-1 at Site-B, choose TN_D > Networking > L3Outs > L3out-OSPF-SiteB > Logical Interface Profiles.
- 2. Right-click and add the interface profile.
- 3. Choose Routed Sub-Interfaces.
- 4. Configure the IP Address, MTU, and VLAN-920.

CISCO							admin Q	0 😍		
System Tenants Fabric Virtual Networking L4-L7 Se	ervices Admin Operations	Apps Integration	ns							
ALL TENANTS Add Tenant Tenant Search: name or descr	common TN_D Tenant i	infra mgmt								
This has been created from Multi-Site. It is recommended to only	v make changes from Multi-Site. Ple	ease review the documentati	on before making any cl	nanges here.						
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Step 7. Create the OSPF policy (Point to Point Network).

- 1. From APIC-1 at Site-B, choose **TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Interface Profiles**.
- 2. Right-click and choose Create OSPF Interface Profile.
- 3. Choose the options as shown in the screenshot and **click** Submit.

				reate USPF Inte	enace Policy	00
cisco APIC (SiteB)				Name:	OSPF_P2P_Policy	
Sustem Tenante Esbria Virtual Natworking	14-17 50			Description:	optional	
System Tenants Pabric Virtual Networking	L4-L7 Se		/			
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Site-2-Leaf1_sub-int-990		Create	SDE Interface Dre	file	0.0	
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topology/pod=1/node=1		Authentic	ation Type: No authentication			
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ARP for VRF-TN_D/V Delete		0	SPF Policy: OSPF_P2P_Policy	V 2		
V 🖿 External EPGs Save as						
EXT_EPG_Site2						
> Route map for import and export r Share						
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					Cubwit	
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Step 8. Verify the OSPF interface profile policy attached under TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Interface Profiles > (interface profile) > OSPF Interface Profile.

cisco APIC (SiteB)		
System Tenants Fabric Virtual Networking 14-17.5	Services Admin Operations	Apps Integrations
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V 🚍 Networking	Properties	
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> 🧮 VRFs	Description:	a: optional
> 🧮 External Bridged Networks		
V 🚞 L3Outs	Authentication Key:	
✓ 🕎 L3Out-OSPF-siteB	Confirm Authentication Key:	r
V logical Node Profiles	Authentication Key ID:	1
V Site2_Leaf1	Authentication Type:	(MD5 authentication No authentication Simple authentication)
Logical interface profiles	Associated OSPF Interface Policy Name:	COSPF_P2P_Policy
Configured Nodes		
V		
ARP for VRF-TN_D:VRF_Stretch		
> BGP for VRF-TN_D:VRF_Stretch		
> F ND for VRF- TN_D:VRF_Stretch		
> 📴 OSPF for VRF-TN_D:VRF_Stretch		
🗸 🚞 External EPGs		
EXT_EPG_Site2		

Step 9. Verify External EPG "EXT_EPG_Site2" is created by MSO. From APIC-1 at Site-B, choose **TN_D > L3Outs > L3Out-OSPF-siteB > External EPGs > EXT_EPG_Site2**.

cisco APIC (SiteB)			admin		😲 💿	٥
System Tenants Fabric Virtual Networking L4-L7	rvices Admin Operations Apps Integrations					
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V 🔥 L3Out-OSPF-siteB	Tags:					- 1
> Logical Node Profiles	Global Allas:					- 1
V 🚍 External EPGs	Description: optional					- 1
EXT_EPG_Site2						- 1
The second se	pcTag: 32770					- 1
> Dotto lunnels	Configured VBE Name: VBE Strotch					- 1
> Policies	Resolved VRF: uni/in-TN_D/ctx-VRF_Stretch					
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						_
			Show Us	age		

Configure the External N9K (Site-B)



After the N9K configuration (VRF L3out-OSPF-siteB), we can see OSPF neighborship is established between the N9K and the ACI Leaf (at Site-B).

Verify OSPF neighborship is established and UP (Full State).

From APIC-1 at Site-B, choose TN_D > Networking > L3Outs > L3Out-OSPF-siteB > Logical Node Profiles > Logical Interface Profiles > Configured Nodes > topology/pod01/node-1101 > OSPF for VRF-TN_DVRF_Switch > Neighbor ID state > Full.

cisco APIC (SiteB)					admin Q	0 😲 🛛	٥
System Tenants Fabric Virtual Networking L4	-L7 Services Admin Operation	s Apps Integrations					
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> Site-2-Leaf1_sub-int-990			E	xt Lsacnt: 0			
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topology/pod-1/node-1101	Neighbors						
RP for VRF-TN_D:VRF_Stretch	. Neighbor Id	State	Peer In		Interface		
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V 🚞 External EPGs	Inter Protocol Route Leak I	Ito OSPF			N9K-C9364C-GX		
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 lea	Eth1/53.2 IP: 92.2.2.	30 1/30	
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> Contracts	TN_D:VRF_Stretch	Direct	exp-ctx-st-2686978	Inter protocol lea	EXT_EPG_	Site2	
> Policies	TN_D:VRF_Stretch	EIGRP	exp-ctx-proto-2686978	Inter protocol lea			
/ Services	TN_D:VRF_Stretch	Static	exp-ctx-st-2686978	Inter protocol lea	L3Ou	t	
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					Eth1/49.2	30	
					VRF L3out-OSPF-siteB		
					Ethernet1/49.290	VRF L3out-OSP	F-siteB
					IP:92.2.2/30	Loopback: 9	999
					Router ID: 92.92.92.92	IP:91.0.0.1	/32

You can also check OSPF neighborship in N9K. Also, you are able to ping ACI Leaf IP (Site-B).

OSPF-2 AREA 0



At this point, Host_A configuration at site-A and L3out configuration at site-B is complete.



Attach Site-B L3out to Site-A EPG(BD)

Next, you can attach Site-B L3out to Site-A BD-990 from MSO. Note that the left side column has two sections: 1) Template and 2) Sites.

Step 1. In the second section **Sites**, you can see the template attached with each site. When you attach L3out to "Site-A Template", you are basically attached from the already attached template inside the **Sites** section.

However, when you deploy the template, deploy from section **Templates > Site-A Template** and choose **save/deploy** to sites.

TN_D_Schema	8 Policie	s 🗹 Autosave 🛛 Save 🛧 🥝 🔿 🗙
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Step 2. Deploy from main template "Site-A Template" in first section "Templates".

TN_D_Schema	8 Policies	Autosave Save
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	External EPGs	
	D L3Outs	
	Ø Service Graphs	

Configure the Contract

You require a contract between External EPG at site-B and Internal EPG_990 at site-A. So, you can first create a contract from MSO and attach it to both EPGs.

<u>Cisco Application Centric Infrastructure - Cisco ACI Contract Guide</u> can help to understand the contract. Generally, internal EPG is configured as a provider and external EPG is configured as a consumer.



Create the Contract

Step 1. From TN_D_Schema, choose Stretched Template > Contracts. Click Add Contract.

TN_D_Schema	6 Policies	🗹 Autosave Save 🛧 Q O 🗙	
TN_D_Schema TEMPLATES	Stretched Template Applied to 2 Jiles Last Deployed: Sep 18, 2021 04.58 am Deploy to biles	TEMPLATE Stretched Template	×
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Stretched Te SiteB (ACI) 4.2(6h)	Contracts Add Contract	Display name	
Stretched Te O	had	Contract	

Step 2. Add a filter to allow all traffic.

- 1. From TN_D_Schema, choose **Stretched Template > Contracts**.
- 2. Add a contract with:
- Display Name: Intersite-L3out-Contract
- Scope: VRF

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		Piters Allow-all- traffic			

Step 3.

- 1. From TN_D_Schema, choose **Stretched Template > Filters**.
- 2. In the Display Name field, enter Allow-all-traffic.
- 3. Click Add Entry. The Add Entry dialog box displays.
- 4. In the Name field, enter Any_Traffic.
- 5. In the Ether Type drop-down list, choose unspecified to allow all traffic.

6. Click	Save.
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		Source Port Range To		
	Allow-all- traffic	unspecified V		
	Cano.	TCP Session Rules		
	External EPGs		Sive	
	L3Outs			

Step 4. Add contract to External EPG as "Consumer" (In Site-B Template) (Deploy to the site).

- 1. From TN_D_Schema, choose **Site-B Template > EXT_EPG_Site2**.
- 2. Click Add Contract. The Add Contract dialog box displays.
- 3. In the Contract field, enter Intersite-L3out-Contract.
- 4. In the **Type** drop-down list, choose **consumer**.

TN_D_Schema			8 Policies 🗹 Autosave Save 🛧 Q O 🗙
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	© 130xs		0.02.00 O Add Sabret Include in Preferent Group
	connect		

Step 5. Add contract to Internal EPG "EPG_990" as "Provider" (In Site-A Template) (Deploy to site).

- 1. From TN_D_Schema, choose **Site-A Template > EPG_990**.
- 2. Click Add Contract. The Add Contract dialog box displays.
- 3. In the Contract field, enter Intersite-L3out-Contract.
- 4. In the **Type** drop-down list, choose **provider**.

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	External EPGs							
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	D L3Outs				QoS Level			
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	6 Service Graphs							

As soon as the contract gets added, you can see "Shadow L3out / External EPG" created at Site-A.

cisco	APIC	(SiteA)							
System	Tenants	Fabric	Virtual Networkin	ng L4-L7					
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> 🖿 Doi	> Dot10 Tunnels								
> 🗖 Contra	> Contracts								
> 🚞 Policie	S								
> 🚞 Servic	es								

You can also see that "Shadow EPG_990 and BD_990" were also created at Site-B.



Step 6. Enter these commands in order to verify Site-B APIC.

apic1# moquery -c fv	AE)	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	рсТад	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	•	Weg
annotation	:	orchestrator.msc
arpElood	:	Veg
bcastP	:	yes 225 0 181 182
childAction	:	223.0.101.192
configIcques	:	
dosar	•	
dn	:	UNI/TR-TN D/BD-BD 990
opCloar	•	
	:	110
ephoveDetectMode	•	
extMigdby	:	20
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





Verify

Use this section to confirm that your configuration works properly.

Endpoint Learn

Verify the Site-A endpoint was learned as an endpoint in Site1_Leaf1.

<pre>Site1_Leaf1# show endpoint Legend:</pre>	interface ethernet 1/5		
s - arp H - R - peer-attached-rl B - D - bounce-to-proxy O - L - local E -	vtep V - vpc- bounce S - stat peer-attached a - loca shared-service	attached p - pe ic M - sp 1-aged m - sv	er-aged an c-mgr
+		-+	+
VLAN/	Encap	MAC Address	MAC Info/
Interface			
Domain	VLAN	IP Address	IP Info
+		-+	+
18	vlan-990	c014.fe5e.1407	L
eth1/5			
TN_D:VRF_Stretch vlan-990	90.0.10 L	eth	1/5

ETEP/RTEP Verification

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)	
eth1/50	unassigned	protocol-up/link-up/admin-up
eth1/50.8	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
eth1/53	unassigned	protocol-down/link-down/admin-up
eth1/54	unassigned	protocol-down/link-down/admin-up
vlan9	10.0.30/27	protocol-up/link-up/admin-up
100	10.0.80.64/32	protocol-up/link-up/admin-up
101	10.0.8.67/32	protocol-up/link-up/admin-up
108	192.168.200.225/32	protocol-up/link-up/admin-up <<<<< IP from ETEP site-
A		
101023	10.0.32/32	protocol-up/link-up/admin-up

Site2_Leaf1# show ip interface brief vrf overlay-1

	-	-
IP Interface State	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-B
101023	10.0.32/32	protocol-up/link-up/admin-up

ICMP Reachability

Ping the external device WAN IP address from HOST_A.



Ping the external device loopback address.



Route Verification

Verify the external device WAN IP address OR the loopback subnet route is present in the routing table. When you check the next hop for external device subnet in "Site1_Leaf1", it is the External TEP IP of Leaf "Site2-Leaf1".



```
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
```

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

Site2_Leaf1

BGP address-family route import/export between TN_D:VRF_stretch and Overlay-1.

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:

Site-B

apici# acidi	ag invread					
ID P	od ID	Name	Serial Number	IP Address	Role	State
LastUpdMsgId						
101	1	Site2_Spine	FD0243207JH	10.0.72.65/32	spine	
active 0						
102	1	Site2_Leaf2	FDO24260FCH	10.0.72.66/32	leaf	
active 0						
1101	1	Site2_Leaf1	FDO24260ECW	10.0.72.64/32	leaf	
active 0						

Site2_Spine



Site2_Spine# vsh Site2_Spine# show bgp vpnv4 unicast 91.0.0.1 vrf overlay-1 BGP routing table information for VRF overlay-1, address family VPNv4 Unicast <---->26bits----> Route Distinguisher: 1101:2686978 <<<<2686978 <--BGP routing table entry for 91.0.0.1/32, version 717 dest ptr 0xae643d0c 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 0x800040 ref 0 adv path ref 1, path is valid, is best path AS-Path: NONE, path sourced internal to AS 10.0.72.64 (metric 2) from 10.0.72.64 (10.0.72.64) <<< Site2_leaf1 IP Origin incomplete, MED 2, localpref 100, weight 0 Received label 0 Received path-id 1 Extcommunity: RT:65001:2686978 COST:pre-bestpath:168:3221225472 VNID:2686978 COST:pre-bestpath:162:110 Path-id 1 advertised to peers: 192.168.10.13 <<<< Site1_Spine mscp-etep IP. Site1_Spine# show ip interface vrf overlay-1 <snip...> lo12, Interface status: protocol-up/link-up/admin-up, iod: 89, mode: mscp-etep IP address: 192.168.10.13, IP subnet: 192.168.10.13/32 <<<Site-B spine mscp-ETEP address which is BGP peer with Site-A Spine IP broadcast address: 255.255.255.255 IP primary address route-preference: 0, tag: 0 <snip...>

Site1_Spine



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 <---->26Bits----> 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 IP Address Role ID Pod ID Name Serial Number State LastUpdMsgId _____ _____ FD0243207JH **10.0.72.65/32** spine 101 1 Site2_Spine active 0 102 1 Site2_Leaf2 FD024260FCH 10.0.72.66/32 leaf active 0 FD024260ECW **10.0.72.64/32** leaf 1101 1 Site2_Leaf1 active 0

Verify the intersite flag.

Site1_Spine# moqu	er	y -c bgpPeer -f 'bgp.Peer.addr*"192.168.11.13"'			
Total Objects sho	wn	: 1			
# bgp.Peer					
addr	:	192.168.11.13/32			
activePfxPeers	:	0			
adminSt	:	enabled			
asn	:	65001			
bgpCfgFailedBmp					
bgpCfgFailedTs		00:00:00.000			
bgpCfgState		0			
childAction					
ctrl					
curPfxPeers		0			
dn		<pre>sys/bgp/inst/dom-overlay-1/peer-[192.168.11.13/32]</pre>			
lcOwn		local			
maxCurPeers		0			
maxPfxPeers		0			
modTs		2021-09-13T11:58:26.395+00:00			
monPolDn	:				
name	:				
passwdSet		disabled			
password	:				
peerRole		msite-speaker			
privateASctrl	:				
rn	:	peer-[192.168.11.13/32] << <site-2 spine<="" td=""></site-2>			
srcIf	:	1012			
status	:				
totalPfxPeers		0			
ttl	:	16			
type		inter-site << <inter-site flag="" is="" set<="" td=""></inter-site>			

Understand Route Distinguisher Entry

When the intersite flag is set, the local-site spine can set the local site id in the route-target starting at the 25th bit. When Site1 gets the BGP path with this bit set in the RT, it knows this is a remote-site path.

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

Notice that the RT binary value is exactly the same for Site1 except for the 26th bit set to 1. It has a decimal value (marked as blue). 1101:36241410 is what you can expect to see in Site1 and what the internal leaf at Site1 must be imported.



Site1_Leaf1

Site1_Leaf1# show vrf TN_D:VRF_Stretch detai1 VRF-Name: TN_D:VRF_Stretch, VRF-ID: 46, State: Up VPNID: unknown RD: 1101:2850817 Max Routes: 0 Mid-Threshold: 0 Table-ID: 0x8000002e, AF: IPv6, Fwd-ID: 0x8000002e, State: Up Table-ID: 0x0000002e, AF: IPv4, Fwd-ID: 0x0000002e, State: Up Site1_Leaf1# 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: 1101:2850817 (VRF TN_D:VRF_Stretch) BGP routing table entry for 91.0.0.1/32, version 17 dest ptr 0xadeda550 Paths: (1 available, best #1) Flags: (0x08001a 0000000) on xmit-list, is in urib, is best urib route, is in HW vpn: version 357, (0x100002) on xmit-list Multipath: eBGP iBGP Advertised path-id 1, VPN AF advertised path-id 1 Path type: internal 0xc0000018 0x80040 ref 56506 adv path ref 2, path is valid, is best path, remote site path Imported from 1101:36241410:91.0.0.1/32 AS-Path: NONE, path sourced internal to AS 192.168.100.225 (metric 64) from 10.0.80.65 (192.168.10.13) Origin incomplete, MED 2, localpref 100, weight 0 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: 192.168.10.13192.168.11.13 <<<< '10.0.72.64'='Site2_Leaf1', '192.168.10.13'='Site1_Spine', '192.168.11.13'='Site2_Spine' VRF advertise information: Path-id 1 not advertised to any peer VPN AF advertise information: Path-id 1 not advertised to any peer <snip..> Site1_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 (VRF TN_D:VRF_Stretch) Route Distinguisher: 1101:2850817 BGP routing table entry for 91.0.0.1/32, version 17 dest ptr 0xadeda550 Paths: (1 available, best #1) Flags: (0x08001a 0000000) on xmit-list, is in urib, is best urib route, is in HW vpn: version 357, (0x100002) on xmit-listMultipath: eBGP iBGP Advertised path-id 1, VPN AF advertised path-id 1 Path type: internal 0xc0000018 0x80040 ref 56506 adv path ref 2, path is valid, is best path,

```
remote site path
             Imported from 1101:36241410:91.0.0.1/32
 AS-Path: NONE, path sourced internal to AS
    192.168.100.225 (metric 64) from 10.0.80.65 (192.168.10.13)
     Origin incomplete, MED 2, localpref 100, weight 0
     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
```

Hence "Site1_Leaf1" has route entry for subnet 91.0.0.1/32 with next-hop "Site2_Leaf1" ETEP address 192.168.100.225.

Site-A Spine does add route-map toward the BGP neighbor IP address of "Site2_Spine" mcsp-ETEP.

So if you think about traffic flows, when the Site-A endpoint talks to the external IP address, the packet can encapsulate with the source as "Site1_Leaf1" TEP address and the destination is ETEP address of "Site2_Leaf" IP address 192.168.100.225.

Verify ELAM (Site1_Spine)

```
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=0.818 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 is triggered. Ereport confirms that the packet encapsulates with a TEP address of the Site-A Leaf TEP IP address and destination toward the Site2_Leaf1 ETEP address.

module-1(DBG-elam-insel14)# status								
ELAM STATUS									
=========									
Asic O Slice O Status Armed									
Asic O Slice 1 Status Armed									
Asic 0 Slice 2 Status Triggered									
Asic 0 Slice 3 Status Arm	ned								
module-1(DBG-elam-insel14)# ereport								
Python available. Continu	e ELAM decode with LC Pkg								
ELAM REPORT									
Outer L3 Header									
L3 Type	: IPv4								
DSCP	: 0								
Don't Fragment Bit	: 0x0								
TTL	: 32								
IP Protocol Number	: UDP								
Destination IP	: 192.168.100.225	<<<'Site2_Leaf1' ETEP address							
Source IP	: 10.0.80.64	<<<'Sitel_Leaf1' TEP address							
Inner L3 Header									
L3 Туре	: IPv4								
DSCP	: 0								
Don't Fragment Bit	: 0x0								
TTL	: 254								
IP Protocol Number	: ICMP								
Destination IP	: 91.0.0.1								
Source IP	: 90.0.0.10								

Site1_Spine Verify Route-Map

When the Site-A spine receives a packet, it can redirect to "Site2_Leaf1" ETEP address instead of looking coop or route entry. (When you have intersite-L3out at Site-B, then the Site-A spine creates a route-map called "infra-intersite-l3out" to redirect traffic toward ETEP of Site2_Leaf1 and exit out from L3out.)

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 1 1 Opens: Notifications: 0 0 1960 Updates: 2317 107108 107088 Keepalives: Route Refresh: 105 123 Capability: 104 102 Total: 109278 109631 2230365 Total bytes: 2260031 0 Bytes in queue: 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
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 <<<Site1_Leaf1 TEP address.</pre>
```

Site1_Spine# show ip prefix-list IPv4-Node-entry-102
ip prefix-list IPv4-Node-entry-102: 1 entries
 seq 1 permit 10.0.80.66/32
Site1_Spine# show ip prefix-list infra_prefix_local_pteps_inexact
ip prefix-list infra_prefix_local_pteps_inexact: 1 entries
 seq 1 permit 10.0.0.0/16 le 32