Implement ACI Transit Routing (Multipod)

Contents

Introduction	
Prerequisites	
Requirements	
Components Used	
Background Information	
<u>Configure</u>	
Network Diagram	
Configurations	
Related Information	

Introduction

This document describes how to configure transit routing in an Application Centric Infrastructure (ACI) multipod environment.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- 1. ACI multipod
- 2. L3Out
- 3. Contracts
- 4. Routing protocols

Components Used

The information in this document is based on these software and hardware versions:

- 1. 2 N5K-C5548UP switches, both on NXOS version 7.3(8) (used as external routers)
- 2. 1 N9K-C9332PQ leaf switch and 1 N9K-C93108TC-EX leaf switch, both on ACI version 14.2(7f)
- 3. 2 N9K-C9336PQ spine switches, both on ACI version 14.2(7f)
- 4. 1 N9K-C9232C switch (used as IPN device) on NXOS version 10.3(3)

The information in this document was created using the above 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

In transit routing, the Cisco ACI fabric advertises the routes that are learned from one Layer 3 Out (L3Out) connection to another L3Out connection. The external Layer 3 domains peer with the fabric on the border

leaf switches. The fabric is a transit Multiprotocol Border Gateway Protocol (MP-BGP) domain between the peers.

Configure

Network Diagram



Network diagram

Configurations

A logical node profile is used to identify the leaf switch that is connected to external networks, and that can deploy the routing protocol or static routes towards it. To view the logical node profile in the L3Out, navigate to your Tenant > Networking > L3Outs > L3Out > Logical Node Profiles > Logical Node Profile as shown in the image.

MR () ()	Logical Node Profile - MR	R-BGP_nodeProfile					6	10
C Quick Start					Policy	Faults	Hist	
· ✓ ∰ MR					ronoy	1 danta	1101	,
> E Application Profiles						Ó	+	**-
V Retworking	Properties							
> 🚞 Bridge Domains	Name:	MR-BGP_nodeProfile						
> 🧮 VRFs	Description:	optional						
> 🚞 External Bridged Networks								
✓ ➡ L3Outs	Alias:							
✓ 💁 MR-BGP	Target DSCP:	Unspecified 🗸						
✓ Image: Value >> Comparison >> Comparis	Nodes:							+
V F MR-BGP_nodeProfile		 Node ID 	Router ID	Loopback Address				_
Logical Interface Profiles		topology/pod-1/node-102	50.50.50.55	50.50.55				
> E MR-BGP_interfaceProfile								
Configured Nodes								
✓								
ARP for VRF-MR:MR-VRF								
BGP for VRF-MR:MR-VRF								
> 📄 ND for VRF- MR:MR-VRF	BGP Peer Connectivity:						1	**-
> E OSPF for VRF-MR:MR-VRF		Peer IP Address	Peer Con	trols	Interface			
🗸 🚞 External EPGs		50.50.50/24			Pod-1/Node-102/eth1/1			
MR-BGP-EXT-EPG								

Logical node profile for LEAF102

MR (P̂ €) © > O• Quick Start → III up	Logical Node Profile - MF	R-OSPF_nodeProfile			Policy	Faults	History
Application Profiles						0	+ 40
V 🖬 Networking	Dreportion					0	- ^*
> Eridge Domains	Name:	MR-OSPF_nodeProfile					
> 🖬 VRFs	Description:	optional					
External Bridged Networks							
V 🚍 L3Outs	Alias:						
> 🔿 MR-BGP	Target DSCP:	Unspecified					
> 🚯 MR-EIGRP	Nodes:						· · · +
✓ ▲ MR-OSPF		 Node ID 	Router ID	Loopback Address			
V 🔚 Logical Node Profiles		topology/pod-2/pode-202	111111	111111			
V F MR-OSPF_nodeProfile		whole a strange - to t					
V 🔚 Logical Interface Profiles							
> E MR-OSPF_interfaceProfile							
✓							
✓							
ARP for VRF-MR:MR-VRF	Create BGP Protocol Profile:						
BGP for VRF-MR:MR-VRF							
> 📮 ND for VRF- MR:MR-VRF							
> 🗧 OSPF for VRF-MR.MR-VRF							
External EPGs							
MR-OSPF-EXT-EPG							

Logical node profile for LEAF202

A logical interface profile is used to identify the L3Out interface that connects to the external device. You see several function elements that are defined for virtual routing and forwarding (VRF): Address Resolution Protocol (ARP), Border Gateway Protocol (BGP), Neighbor Discovery, and Open Shortest Path First (OSPF) as a consequence of both profiles. To view the logical interface profile in the L3Out, navigate to your Tenant > Networking > L3Outs > L3Out > Logical Node Profiles > Logical Node Profile > Logical Interface Profiles > Logical Interface Profile.

MR	$\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$	Logical Interface Profi	e - MR-BGP	interfaceProfile							0.0
> C+ Quick Start ∽ ⊞ MR									Policy	Faults	History
> Application Profiles						General R	outed Sub-Interfaces	Routed In	terfaces	SVI	Floating SVI
V 🧮 Networking		0000								_	A 1
> 🚞 Bridge Domains		\odot \bigcirc \bigcirc \bigcirc									0 -
> 🚞 VRFs											1
> 🚞 External Bridged Networks		 Path 	Side A IP	Side B IP	Secondary IP Address	IP Address	MAC Address	MTU (bytes)	Encap	En	cap Scope
V 🖿 L3Outs		Pad-1/Node-102/eth1/1			1001000	50 50 50 51/24	00-22-PD-E9-10-EE	inharit	ulan-400	Le.	cal
V 🚯 MR-BGP		Pod=1/Node=102/e011/1				50.50.50.51/24	00.22.BD.P0.19.FF	mmeric	Vi311-499	LO	pai
V 🚞 Logical Node Profiles											
V = MR-BGP_nodeProfile											
Logical Interface Profiles	1										
> 🗧 MR-BGP_interfacePr	ofile										
Configured Nodes											
topology/pod-1/node topology/pod-1/node	e-102										
ARP for VRF-MR	MR-VRF										
> 🗧 BGP for VRF-MR	MR-VRF										
> 🗾 ND for VRF- MR:	MR-VRF										
> 📕 OSPF for VRF-MF	EMR-VRF										
External EPGs											
R-BGP-EXT-EPG											
> 🚞 Route map for import and expo	ort route control										

Logical interface profile for LEAF102, eth1/1



Logical interface profile for LEAF202, eth1/2

An external EPG instance profile (External EPG, L3Out EPG) represents a group of external subnets that have the same security behavior. Other subnets can also associate with other scopes, which define the routing behavior for that subnet. To view the external EPG in the L3Out, navigate to your Tenant > Networking > L3Outs > L3Out > External EPGs > External EPG as shown in the image.

MR () () ()	External EPG Insta	nce Profile - MR-B	GP-EXT-EPG							0	0
O Quick Start					Policy	Operational	State	Health	Foulte	Histo	
∼ III MR					roncy	operational	01010	r hourin	ruarta	Thato	· y
> E Application Profiles						Ge	neral Con	tracts	Inherited (Contrac	/ts
V Networking						_			<i>.</i>		**
> 🖿 Bridge Domains									0	÷ 7	×*
> 🖿 VRFs	Properties	NO DOD EVT EDO									
> External Bridged Networks	Alias:	MR-BGP-EXT-EPG									÷.
✓	Tage										
✓ 🛖 MR-BGP	Tuga.	enter tags separated by comm	na 🗸								
V 🚞 Logical Node Profiles	Global Alias:										
V 📕 MR-BGP_nodeProfile	Description:	optional									
Logical Interface Profiles											
> 🐺 MR-BGP_interfaceProfile	pcTag:	49159									
Configured Nodes	Contract Exception Tag:										
V 🗧 topology/pod-1/node-102	Configured VRF Name:	MR-VRF									
ARP for VRF-MR:MR-VRF	Resolved VRF:	uni/tn-MR/ctx-MR-VRF									
BGP for VRF-MR:MR-VRF	QoS Class:	Unspecified	~								
> D for VRF- MR:MR-VRF	Target DSCP:	Unspecified	\sim								
> SORE FOR VRF-MR:MR-VRF	Configuration Status:	applied									
V 🔤 External EPGs	Configuration issues.		<u> </u>								
MR-BGP-EXT-EPG	Preterred Group Member:	Exclude)								
Route map for import and export route control	Subnets:									i +	
> 🚯 MR-EIGRP		 IP Address 	Scope	Name	Aggregate	e R	oute Control Profi	le Route Policy	Summariza	tion	
> 🚯 MR-OSPF		49.49.49.49/32	External Subne	ts for th							

External EPG instance profile for MR-BGP L3Out

MR (*) (*) (*)	External EPG Insta	nce Profile - MR-O	SPF-EXT-EPG						0.0
C Quick Start					Policy	Operational	Stats He	alth Faults	History
V 🌐 MR						o por a normal			
> 🚞 Application Profiles						Ge	neral Contra	icts Inherited	Contracts
V 🚞 Networking	0000					_		<i>^</i>	1 40
> 📰 Bridge Domains								0	- ו
> 🚞 VRFs	Properties	UD CODE EVE EDO							
> 🚞 External Bridged Networks	Name: Alias:	MR-OSPF-EXT-EPG							- Î
V 🚍 L3Outs	Tags:								
> 🚯 MR-BGP	Tags.	enter tags separated by comm	a						
> 🚯 MR-EIGRP	Global Alias:								
V 🚯 MR-OSPF	Description:	optional							
V 🔚 Logical Node Profiles									
✓ ■ MR-OSPF_nodeProfile	pcTag:	49156							
V 🔤 Logical Interface Profiles	Contract Exception Tag:								
> R-OSPF_interfaceProfile	Configured VRF Name:	MR-VRF							
V 🖿 Configured Nodes	Resolved VRF:	uni/tn-MR/ctx-MR-VRF							
V topology/pod-2/node-202	QoS Class:	Unspecified	\sim						
ARP for VRE-MR-MR-VRE	Target DSCP:	Unspecified	\sim						
BGP for VPE-MP-MP-VPE	Configuration Status:	applied							
	Configuration Issues:	_	_						
	Preferred Group Member:	Exclude Include							
	Subnets:								1 +
		 IP Address 	Scope	Name	Aggregate	R	oute Control Profile	Route Summariza	ition
MR-USPT-EXI-EPG								Policy	
Houte map for import and export route control		101.101.101.101/32	External Subnets	for th					

External EPG instance profile for MR-OSPF L3Out

In these examples, the MR-PERMIT-ICMPcontract is applied as both a provided and consumed contract in both external EPGs.

MR	$\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$	External EPG	Instance Prof	ile - MR-BGP-EX	T-EPG					0.6
> C+ Quick Start							Policy (Operational Sta	te Health	Equite History
∼ ⊞ MR							Policy	operational Sta	to ricalui	Faults History
> E Application Profiles								General	Contracts	Inherited Contracts
V 📰 Networking										A 1 46
> 🚞 Bridge Domains		Healthy 🙁 🔇								0 * **
> 🥅 VRFs		Name	 Tenant 	Tenant Alias	Contract Type	Provided / Consumed	QoS Class	State	Label	Subject Label
> 🧮 External Bridged Networks		Contract Type: Con	tract							
V 🚞 L3Outs		MD_DEDMIT_ICMD	MD		Contract	Drouided	Unenacified	formed		
V 🐽 MR-BGP		MIC-PERMIT-IOMP	inity .		Contract	Provided	onspecified	Ionnea		
V 🚞 Logical Node Profiles		MR-PERMIT-ICMP	MR		Contract	Consumed	Unspecified	formed		
V 📕 MR-BGP_nodeProfile										
Logical Interface Profiles	3									
> 🖉 MR-BGP_interfacePr	ofile									
Configured Nodes										
✓	e-102									
ARP for VRF-MR.	MR-VRF									
> 🐺 BGP for VRF-MRI	MR-VRF									
> \Xi ND for VRF- MR.N	MR-VRF									
> 📴 OSPF for VRF-MR	EMR-VRF									
🗸 🚞 External EPGs										
MR-BGP-EXT-EPG										
> 🧮 Route map for import and expo	ort route control									

MR-PERMIT-ICMP contract applied to MR-BGP-EXT-EPG

MR (00	External EPG	Instance Profile	- MR-OSPF-EX	T-EPG						00
→ C → Quick Start → Ⅲ MR							Policy	Operational	Stats Health	Faults	History
> Application Profiles								Gener	ral Contracts	Inherited C	Contracts
V Networking S Bridge Domains		♥Healthy 🛞 🔇								Ó	± ***
> 🖬 VRFs		Name	 Tenant 	Tenant Alias	Contract Type	Provided / Consumed	QoS Class	s State	Label	Subje	ct Label
External Bridged Networks		Contract Type: Con	tract								
✓ ➡ L3Outs		MR-PERMIT-ICMP	MR		Contract	Provided	Unspecified	formed			
> 合 MR-BGP		MR-PERMIT-ICMP	MR		Contract	Consumed	Unspecified	formed			
>											
✓ ④ MR-OSPF											
Logical Node Profiles MR-OSPE nodeProfile											
Interview Control C											
> 📕 MR-OSPF_interfacePro	nie										
✓											
✓	202										
ARP for VRF-MR:MF	R-VRF										
> E BGP for VRE-MR:MF	R-VRF										
> 🚽 ND for VRF- MR:MR	R-VRF										
> 📑 OSPF for VRF-MR:N	IR-VRF										
V External EPGs											
MR-OSPF-EXT-EPG											
Route map for import and export	route control										

MR-PERMIT-ICMP contract applied to MR-OSPF-EXT-EPG

On LEAF102, BGP is established with neighbor 50.50.50.50 and is receiving the external network 49.49.49/32.

MR (D)	BGP Peer Entry	- 50.50.50	0.50							0.0
O Quick Start						G		11 lab	F	
∼ 🌐 MR						General	Address	Health	Faults	History
> E Application Profiles										0 ±
🗸 🚞 Networking	Properties									
> 🧮 Bridge Domains	\	/rf Name: MR#	MR-VRF		Lost Devel Dull	. 1070 01 01	700.00.00.000	00.00		
> 🧮 VRFs	BGF	Version: BGP	Version 4		Major Error Reset By U	s: 1970-01-01	1100:00:00.000+	00:00		
External Bridged Networks	Remote	Router Id: 50.5	0.50.50		Minor Error Reset By Us	s: None				
✓ ➡ L3Outs	В	GP State: Estal	blished	02-00-00	Last Error Value By Us	s: 0				
✓ ♠ MR-BGP	Re	mote As: 6500	01	93+00.00	Last Error Len By Us	s: 0				
V E Logical Node Profiles	Update	e Source: vlan1	14		Last Error Data By U:	E 1070-01-01	1700-00-00 000-	00.00		
V B MR-RGP nodeProfile	Restart Time A	dvertised Defa	ult		Major Error Reset By Pee	r: None	1100.00.00.000+	00.00		
V DI Logical Interface Drofiles	н	old Time: 180			Minor Error Reset By Pee	r: None				
V ND.DCD interfaceDrofile	Keepaliw	e Interval: 60			Last Error Value By Pee	r: 0				
BOD Date Operation Durity 5	1	Neighbor: 50.5	0.50.50		Last Error Len By Pee	r: 0				
BGP Peer Connectivity Profile 5		Link: eBGI	P		Last Error Data By Pee	r:	D			
Configured Nodes	Pe	er Index: 1			Capabilities Advertised	 AS4 capable multiprotoco 	e,Dynamic,Dynam I,Dynamic old,Dy	namic refresh,	Graceful restar	t
V 📑 topology/pod-1/node-102	Shutdown	Reason: Unsp Reason: Door	pecified		Canabilities Deceiver	helper,IPv4 i t: ASA canable	unicast, Hefresh, H Capability paran	etresh neter Dunamic	Dunamic grace	and a large
ARP for VRF-MR:MR-VRF	Directly	Attached			Capabilities Received	restart,Dyna	mic multiprotocol	Dynamic old,I	Dynamic refres	h,Graceful
SGP for VRF-MR-MR-VRF		Interface: Vian	14			TO STATLUP YM	universi, Nemesin, N	enean		
V 📄 Neighbors	Tcp Md5 Authe	ntication: disat	bled							
> 📻 194.168.1.2	Connection	Dropped: 0								
> 🛒 50.50.50	Connection	Attempts: na								
> F ND for VRF- MR:MR-VRF										
> 🗧 OSPF for VRF-MR:MR-VRF	Message Stat	istics								
✓ External EPGs	0	0	Des 1							
MR-BGP-EXT-EPG		Sent	RCVG							
Route map for import and export route control	Opens	1	1							
> 🐽 MR-EIGRP	Notifications	0	0							
> 🚯 MR-OSPF	Updates	8	2							
> 🐽 MR-OSPF-BGP	Keepalives	1692	1689							
> 🚞 Dot1Q Tunnels	Doute Defrech	0	0							
> 🚞 Contracts	Route Reliesi	0	0							
> 🚞 Policies	Capability	1	1							
> 🚍 Services	Total	1702	1693							
	Total bytes	32485	32186							
	Bytes in queue	0	0							
	Next Hop									
		Refcount:								*

BGP peer entry on LEAF102

LEAF102# show ip bgp summary vrf MR:MR-VRF
BGP summary information for VRF MR:MR-VRF, address family IPv4 Unicast
BGP router identifier 50.50.50.55, local AS number 65535
BGP table version is 37, IPv4 Unicast config peers 4, capable peers 2
14 network entries and 16 paths using 1952 bytes of memory
BGP attribute entries [12/1776], BGP AS path entries [0/0]
BGP community entries [0/0], BGP clusterlist entries [5/28]
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
50.50.50 4 65001 1691 1700 37 0 0 1d04h 1

BGP summary for VRF MR:MR-VRF on LEAF102

```
LEAF102# show ip route bgp vrf MR:MR-VRF
IP Route Table for VRF "MR:MR-VRF"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>
49.49.49.49/32, ubest/mbest: 1/0
*via 50.50.50%MR:MR-VRF, [20/0], 1d04h, bgp-65535, external, tag 65010
```

BGP route for VRF MR:MR-VRF on LEAF102

On LEAF202, OSPF is established with neighbor 1.1.1.222 and is receiving the external network 101.101.101.101/32.

MR (È) (E) (O)	OSPE - MR:MR-VRE							0.0
O Quick Start	OOT MICANY VI							6
→ III MR					General He	ealth	Faults	History
> 🖿 Application Profiles								0 ±
V 🚞 Networking	PROPERTIES		STAT	'S				
> 🚞 Bridge Domains	Name: MR:MR-	VRF	0.11	Interface Count: 2				
> 🚞 VRFs	Route ID: 1.1.1.11	11		Activeareacnt: 1				
External Bridged Networks	Distance: 110			Active Nssa Areacnt: 0				
✓ ➡ L3Outs	Max ECMP: 8			Active Stub Areacot: 0				
> MR-BGP	(Mbps): 40000			Extareacnt: 1				
MR-EIGRP	Operational State: Up			Nssa Areacnt: 0				
MR-OSPF				Stubareacnt: 0				
V E Logical Node Profiles				Areacnt: 1				
				Opagas Lsacht: 0				
V 🗖 Lonical Interface Profiles								
Alexandream Antibility of the second se	Neighbors							
	 Neighbor Id 	State	Pee	r lp	Interface			
Sector states	111222	Full	10.1	101 101 100	eth1/2			
	1.1.1.4.4.4	1.00	10.1		0011/2			
	C Page 1 Or1 >		Objects Per P	age: 15 🗸		Disp	laying Objects	1 - 1 Of 1
	Inter Protocol Route Leak Ir	to OSPF						
	 Name 	Redistribution Protocol	Route Map	Scope	۵	sn		
	MR:MR-VRF	BGP	exp-ctx-proto-255590	6 Inter protocol leak	6	5535		
Interfaces	MR:MR-VRF	COOP	exp-ctx-st-2555906	Inter protocol leak	1			
 ■ Interface eth1/2	MR:MR-VRF	Direct	exp-ctx-st-2555906	Inter protocol leak	1			
Interface Io1	MD-MD_V/DE	EVODD	eve_etv_proto_255500	6 Inter protocol leak				
Routes	MIRLINIK- VIC	Elditr	exp-cix-pi0i0-200050	o inter protocor leak				
V E External EPGs	MR:MR-VRF	Static	exp-ctx-st-2555906	Inter protocol leak	1			
MR-OSPF-EXT-EPG								
Route map for import and export route control								

OSPF neighbor entry on LEAF202

LEAF202# show	ip ospf neighbors vr	f MR:MR-VRF			
OSPF Process	ID default VRF MR:MF	R-VRF			
Total number	of neighbors: 1				
Neighbor ID	Pri State	Up Time	Address	Interface	
1.1.1.222	1 FULL/ -	2d04h	10.101.101.100	Eth1/2	

OSPF neighbor for VRF MR:MR-VRF on LEAF202

```
LEAF202# show ip route ospf vrf MR:MR-VRF
IP Route Table for VRF "MR:MR-VRF"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>
101.101.101.101/32, ubest/mbest: 1/0
    *via 10.101.101.100, eth1/2, [110/41], 1d00h, ospf-default, intra
```

OSPF route for VRF MR:MR-VRF on LEAF202

On both LEAF102 and LEAF202, the MP-BGP table for the VRF shows the external BGP network, 49.49.49/32, but it appears as external on LEAF102 and internal on LEAF202. The OSPF external network, 101.101.101/32, also appears in the BGP tables on both leaf switches; on LEAF202 it shows as redistributed from OSPF and on LEAF102 it shows as internal.



MP-BGP table for VRF MR:MR-VRF on LEAF102

LEAF202# show bgp vpr BGP routing table inf BGP table version is Status: s-suppressed, Path type: i-internal Origin codes: i - IGF	v4 unicast vrf MM Formation for VRF 95, local router x-deleted, S-sta , e-external, c-o 2, e - EGP, ? - in	R:MR-VRF overlay-1, add ID is 20.0.248 ale, d-dampened confed, l-local ncomplete, -	ress family .0 , h-history , a-aggrega multipath,	VPNv4 (, *-val: te, r-re & - back	Jnicas id, >-l edist, <up< th=""><th>best I-injected</th></up<>	best I-injected
Network Route Distinguisher:	Next Hop 202:2555906 (\	Metric /RF MR:MR-VRF)	LocPrf	Weight	Path	
*>i49.49.49.49/32 *>r101.101.101.101/32	10.0.232.68 0.0.0.0	41	100 100	0 32768	65010 ?	65001 i

MP-BGP table for VRF MR:MR-VRF on LEAF202

The BGP IPv4 table contains equivalent information.



BGP IPv4 table for VRF MR:MR-VRF on LEAF102

LEAF202# show bgp ipv BGP routing table info BGP table version is a Status: s-suppressed.	4 unicast vrf MR:MR ormation for VRF MR 31, local router ID x-deleted. S-stale	-VRF :MR-VRF, add is 1.1.1.11 . d-dampened	ress family 1 . h-history.	IPv4 Un . *-vali	icast .d. >-ł	best	
Path type: i-internal	, e-external, c-con	fed, l-local	, a-aggregat	te, r-re	dist,	I-injected	
Origin codes: i - IGP	, e - EGP, ? - inco	mplete, - ı	multipath, 8	& - back	up		
Materials	Naut II	Madaratia			Dett		
Network	Next Hop	Metric	LocPrt	Weight	Path		
*>i49.49.49.49/32	10.0.232.68		100	0	65010	65001 i	
*>r101.101.101.101/32	0.0.0.0	41	100	32768	?		

BGP IPv4 table for VRF MR:MR-VRF on LEAF202

However, the OSPF external network, 101.101.101.101/32, is not in the routing table of N5K1.



RIB for VRF MR-BGP on N5K1

Similarly, the BGP external network, 49.49.49/32, is not in N5K2 's RIB.





In the BGP L3Out, navigate to External EPGs > External EPG > Subnets and select the + icon in the top-right corner of the table. Enter the IP address of the external subnet received from the OSPF L3Out,

101.101.101/32. Choose Export Route Control Subnet in the Route Control section and clear the External Subnets for the External EPG classification. Click Submit. The Export Route Control Subnet option allows a network to be exported (advertised) to the external peer.

V 🛅 External EPGs	Preferred Group Member:	Exclude Include)				
Route map for import and export route control	Subnets:	 IP Address 	Scope	Name	Aggregate	Route Control Profile	Route Summarization Policy Create
> 🚯 MR-OSPF		49.49.49.49/32	External Subnets for th				

Create new subnet

Create Subnet					?⊗
IP Address:	101.101.101.101/32				
	address/mask				
Name:					
Route Control:					
🗹 Export	Route Control Subnet	Aggregate		Route Summarization Policy	
Import	Route Control Subnet			BGP Route Summarization Policy: select an option	\sim
L Shared	Route Control Subnet				
Route Control Profile:					
	Name		Direction		а т
Route control is	used for filtering external routes advertis	ed out of the fabric, allowed into the fa	bric, or leaked to other	VRFs within the fabric.	
External EPG classificat	ion: al Subnets for External EPG I Security Import Subnet				
External EPG cla	assification is used to identify the externa	I networks associated with this externa	I EPG for policy enforce	ement (Contracts).	
				Cancel	Submit
Configure the corre	ect options for the new subnet				

On N5K1, the OSPF external network, 101.101.101.101/32, is now received over BGP.



RIB for VRF MR-BGP on N5K1

In the OSPF L3Out, navigate to External EPGs > External EPG > Subnets and select the + icon in the top-right corner of the table. Enter the IP address of the external subnet received from the BGP L3Out, 49.49.49.49.32. Choose Export Route Control Subnet in the Route Control section and clear External Subnets for the External EPG classification. Click Submit.

	D for VRF- MR:MR-VRF	Preferred Group Member	Exclude Include						
✓	SPF for VRF-MR:MR-VRF	Subnets:							
> 🖿	Areas		 IP Address 	Scope	Name	Aggregate	Route Control Profile	Route Summarizat	tion
× 🖿	Interfaces							Policy	Create
	Interface eth1/2		101.101.101.101/32	External Subnets for th					
-	Interface Io1								
	Routes								
V 📰 External EPGs									
Create new subnet									
Create Subnet									? ⊗
IP Address:	49.49.49.49/32								
	address/mask								
Name:									
Route Control:									
Export	Route Control Subnet	A	ggregate			Route Summariza	ation Policy		
	Route Control Subnet					select an option			\sim
Route Control Profile:									1 +
	Name				Direction				
Route control is	s used for filtering extern	nal routes advertised o	out of the fabric, all	owed into the fabri	c, or leaked to othe	er VRFs within the fa	abric.		
External EPG classifical Externa Shared	tion: al Subnets for External EPG d Security Import Subnet								
External EPG cl	assification is used to ic	dentify the external net	works associated	with this external E	PG for policy enford	cement (Contracts).			
							Ca	ncel Su	bmit
Configure the corre	ect options for the	new subnet							

Now on	N5K2, the BGP	external network,	49.49.49/32, i	s received	over OSPF.
--------	---------------	-------------------	----------------	------------	------------

N5K2# show ip route vrf MR-OSPF IP Route Table for VRF "MR-OSPF" '*' denotes best ucast next-hop '**' denotes best mcast next-hop '[x/y]' denotes [preference/metric] '% <string>' in via output denotes VRF <string></string></string>
1.1.1.11/32, ubest/mbest: 1/0
*via 10.101.101.101, Eth1/5, [110/41], 2d05h, ospf-1, intra
10.101.101.0/24, ubest/mbest: 1/0, attached
*via 10.101.101.100, Eth1/5, [0/0], 6d22h, direct
10.101.101.100/32, ubest/mbest: 1/0, attached
*via 10.101.101.100, Eth1/5, [0/0], 6d22h, local
49.49.49/32, ubest/mbest: 1/0
*via 10.101.101.101, Eth1/5, [110/1], 00:01:59, ospf-1, type-2, tag 4294967295,
101.101.101.101/32, ubest/mbest: 2/0, attached
*via 101.101.101.101, Lo101, [0/0], 2d05h, local
*via 101.101.101.101, Lo101, [0/0], 2d05h, direct

Ping works between the two networks because of the MR-PERMIT-ICMP contract that was applied to both external EPGs earlier.

```
N5K1# ping 101.101.101.101 vrf MR-BGP source 49.49.49.49

PING 101.101.101.101 (101.101.101) from 49.49.49.49: 56 data bytes

64 bytes from 101.101.101.101: icmp_seq=0 ttl=252 time=3.059 ms

64 bytes from 101.101.101.101: icmp_seq=1 ttl=252 time=2.963 ms

64 bytes from 101.101.101.101: icmp_seq=2 ttl=252 time=7.928 ms

64 bytes from 101.101.101.101: icmp_seq=3 ttl=252 time=2.954 ms

64 bytes from 101.101.101.101: icmp_seq=4 ttl=252 time=2.982 ms

--- 101.101.101.101 ping statistics ---

5 packets transmitted, 5 packets received, 0.00% packet loss

round-trip min/avg/max = 2.954/3.977/7.928 ms
```

Communication verification on N5K1

```
N5K2# ping 49.49.49.49 vrf MR-OSPF source 101.101.101.101
PING 49.49.49.49 (49.49.49) from 101.101.101.101: 56 data bytes
64 bytes from 49.49.49.49: icmp_seq=0 ttl=252 time=3.107 ms
64 bytes from 49.49.49.49: icmp_seq=1 ttl=252 time=2.99 ms
64 bytes from 49.49.49.49: icmp_seq=2 ttl=252 time=2.98 ms
64 bytes from 49.49.49.49: icmp_seq=3 ttl=252 time=2.986 ms
64 bytes from 49.49.49.49: icmp_seq=4 ttl=252 time=2.99 ms
--- 49.49.49.49 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 2.98/3.01/3.107 ms
```

Communication verification on N5K2

Related Information

- <u>Cisco APIC Layer 3 Networking Configuration Guide, Release 6.0(x)</u>
- Cisco Application Centric Infrastructure Fundamentals, Release 4.2(x)
- <u>Cisco APIC Layer 3 Networking Configuration Guide, Release 3.x and Earlier</u>
- <u>Cisco Technical Support & Downloads</u>