

Implemente a transferência de VxLAN/EVPN para MPLS/SR no Nexus 9000

Contents

[Introduction](#)

[Prerequisites](#)

[Requirements](#)

[Componentes Utilizados](#)

[Informações de Apoio](#)

[Vantagens da SR](#)

[Diretrizes e limitações para configurar a integração perfeita do EVPN com L3VPN \(MPLS SR\)](#)

[Configurar](#)

[Diagrama de Rede](#)

[Configuração](#)

[Verificar](#)

[Informações Relacionadas](#)

Introduction

Este documento descreve como configurar a transferência de MPLS de roteamento VxLAN EVPN sobre segmento nos switches Cisco Nexus 9000 Series.

Prerequisites

Requirements

A Cisco recomenda que você tenha conhecimento destes tópicos:

- VPNs MPLS de camada 3
- MP-BGP
- Roteamento de segmento

Componentes Utilizados

As informações neste documento são baseadas nestas versões de software e hardware:

- BL // N9K-C93240YC-FX2 // 9.3(3)
- ASR1K // 16.12.02
- Spine-1 // N9K-C92160YC-X // 9.2(3)
- PE // N9K-C93240YC-FX2 // 9.3(3)

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. Se a rede estiver

ativa, certifique-se de que você entenda o impacto potencial de qualquer comando.

Informações de Apoio

As implantações de data center (DC) adotaram o VXLAN EVPN para seus benefícios, como aprendizagem do plano de controle EVPN, multilocação, mobilidade contínua, redundância e acréscimos de POD mais fáceis. Da mesma forma, o CORE é uma rede MPLS L3VPN baseada em Protocolo de Distribuição de Rótulo (LDP - Label Distribution Protocol) ou está fazendo a transição da base tradicional baseada em LDP de L3VPN MPLS para uma solução mais sofisticada, como o Roteamento de Segmento (SR - Segment Routing).

O roteamento de segmento é um método de encaminhamento de pacotes na rede com base no paradigma de roteamento de origem. A origem escolhe um caminho e o codifica no cabeçalho do pacote como uma lista ordenada de segmentos. Os segmentos são um identificador para qualquer tipo de instrução.

Vantagens da SR

O roteamento de segmento é adotado para seus benefícios, como:

- Planos de controle de MPLS IGP unificado.
- Pronto para SDN: O roteamento de segmento foi criado para SDN e é a base para o Application Engineered Routing (AER). O SR prepara redes para modelos de negócios, onde os aplicativos podem direcionar o comportamento da rede. O SR oferece o equilíbrio certo entre inteligência distribuída e otimização e programação centralizadas.
- Configuração mínima: O roteamento de segmento para TE requer configuração mínima no roteador de origem.
- Balanceamento de carga: Ao contrário do RSVP-TE, o balanceamento de carga para o roteamento de segmento pode ocorrer na presença de caminhos múltiplos de custo igual (ECMPs).
- Suporta Reroteamento Rápido (FRR - Fast Reroute): O redirecionamento rápido permite a ativação de um caminho de backup pré-configurado dentro de 50 milissegundos de uma falha de caminho.
- Implantação plug-and-play: As políticas de roteamento de segmento são interoperáveis com os planos de dados e controle MPLS existentes e podem ser implementadas em uma implantação existente.

Diretrizes e limitações para configurar a integração perfeita do EVPN com L3VPN (MPLS SR)

Recurso	Switches Cisco Nexus 9300-FX2	Switches Cisco Nexus 9504 e 9508 com placas de linha -R	Comentários
VXLAN EVPN	Yes	Yes	Estenda a conectividade da camada 3 ent

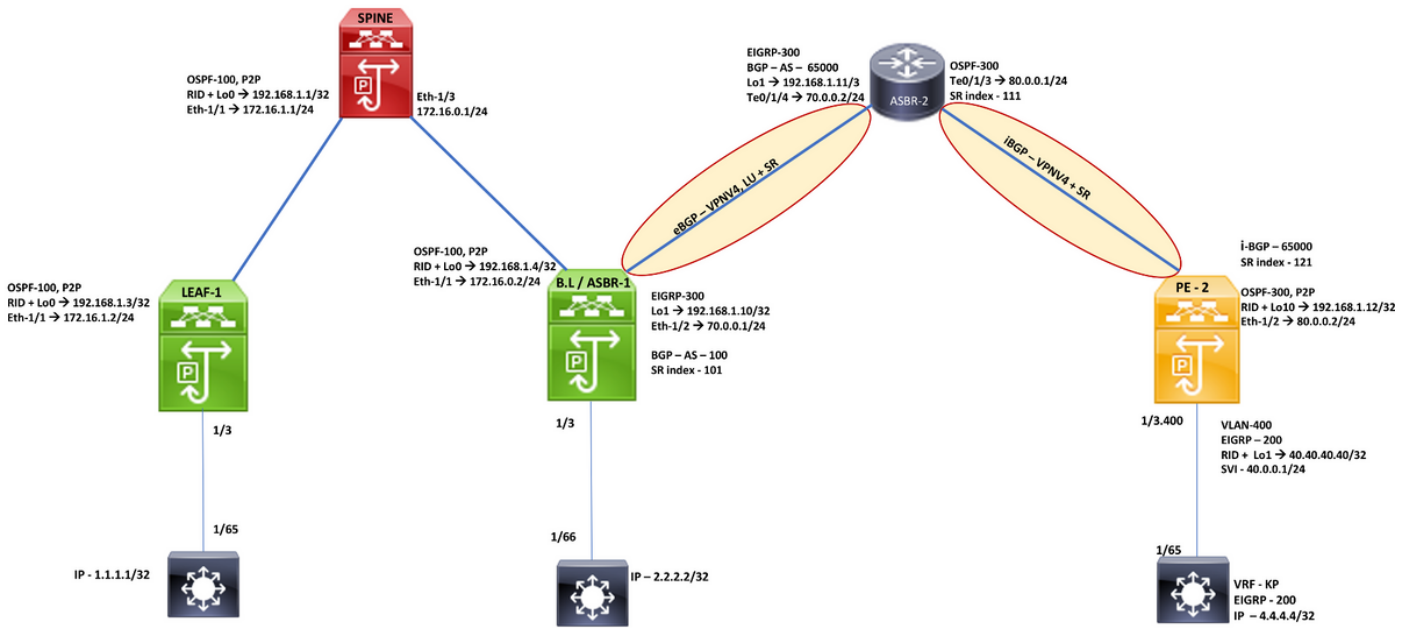
para SR-L3VPN

VXLAN EVPN para SR-L3VPN Yes Yes

VXLAN EVPN para MPLS L3VPN (LDP) No Yes

Configurar

Diagrama de Rede



Configuração

diferentes pods DC Sublay IGP/BGP com extensões SR.

Estenda a conectividade da camada 3 entre DC POD que executa VXLAN e qualquer domínio (DC ou CORE) que executa o SR

A parte inferior é o LDP.

Border Leaf - ASBR1 Configuration

```
hostname BL
install feature-set mpls
allow feature-set mpls
feature-set mpls
nv overlay evpn
feature ospf
feature bgp
feature pim
feature eigrp
feature mpls l3vpn
feature mpls segment-routing
feature interface-vlan
feature vn-segment-vlan-based
feature lldp
feature mpls oam
feature nv overlay

ip pim rp-address 192.168.1.1 group-list 224.0.0.0/4
ip pim ssm range 232.0.0.0/8
mpls label range 5000 450000

segment-routing
mpls
global-block 16000 25000
connected-prefix-sid-map
address-family ipv4
192.168.1.10/32 index 100

ip prefix-list adveig seq 5 permit 2.2.2.2/32
ip prefix-list localsub seq 5 permit 30.0.0.0/24
ip prefix-list localsub seq 10 permit 30.30.30.30/32
ip prefix-list localsub seq 15 permit 192.168.1.10/32
ip prefix-list localsub seq 20 permit 70.0.0.0/24

route-map direct permit 10
match ip address prefix-list localsub
route-map eig permit 10
match ip address prefix-list adveig
route-map lbgpout permit 10
match route-type external internal
route-map label-index-Leaf2 permit 10
set label-index 101

vlan 1,200,300
vlan 200
vn-segment 201
vlan 300
vn-segment 5000

interface Vlan200
no shutdown
vrf member KP
ip address 30.0.0.1/24
ip router eigrp 200

interface Vlan201

interface Vlan300
no shutdown
vrf member KP
ip forward

vrf context KP
vni 5000
ip pim rp-address 192.168.1.1 group-list 224.0.0.0/4
rd auto
address-family ipv4 unicast
route-target import 65000:1
route-target export 65000:1
route-target both auto
route-target both auto evpn

interface nve1
no shutdown
host-reachability protocol bgp
suppress mac-route
source-interface loopback0
member vni 201
mcast-group 239.0.0.1
member vni 5000 associate-vrf

interface loopback0
ip address 192.168.1.4/32
ip router ospf 100 area 0.0.0.0
ip pim sparse-mode

interface loopback1
ip address 192.168.1.10/32
ip router eigrp 300

interface loopback10
vrf member KP
ip address 30.30.30.30/32
ip router eigrp 200

interface Ethernet1/1
ip address 172.16.0.2/24
ip ospf network point-to-point
ip router ospf 100 area 0.0.0.0
ip pim sparse-mode
no shutdown

interface Ethernet1/2
mtu 9216
ip address 70.0.0.1/24
ip router eigrp 300
mpls ip forwarding
no shutdown

interface Ethernet1/3
switchport
switchport mode trunk
switchport trunk allowed vlan 200-201,300
no shutdown

router eigrp 200
router-id 30.30.30.30
vrf KP
address-family ipv4 unicast
redistribute bgp 100 route-map lbgpout
router eigrp 300
router-id 192.168.1.10
router ospf 100
router-id 192.168.1.4

router bgp 100
router-id 192.168.1.4
address-family ipv4 unicast
network 192.168.1.10/32 route-map label-index-Leaf2
redistribute direct route-map direct
allocate-label all
address-family ipv6 unicast
address-family vpnv4 unicast
address-family ipv4 labeled-unicast
address-family l2vpn evpn
neighbor 70.0.0.2
remote-as 65000
ebgp-multihop 10
address-family ipv4 labeled-unicast
send-community
send-community extended
neighbor 192.168.1.1
remote-as 100
update-source loopback0
address-family ipv4 unicast
send-community extended
address-family l2vpn evpn
send-community extended
import vpn unicast reoriginate

neighbor 192.168.1.11
remote-as 65000
update-source loopback1
disable-connected-check
ebgp-multihop 10
address-family vpnv4 unicast
send-community extended
import l2vpn evpn reoriginate
address-family l2vpn evpn
send-community extended
rewrite-evpn-rt-asn
vrf KP
address-family ipv4 unicast
redistribute direct route-map direct
redistribute eigrp 200 route-map eig
```

ASR1K - ASBR2 Configuration

```
hostname P-Router
interface Loopback0
ip address 192.168.1.11 255.255.255.255
!
!
segment-routing mpls
global-block 16000 25000
!
connected-prefix-sid-map
address-family ipv4
192.168.1.11/32 index 111 range 1
exit-address-family
!

interface TenGigabitEthernet0/1/3
ip address 80.0.0.1 255.255.255.0
ip ospf network point-to-point
cdp enable
mpls ip
!
router ospf 300
router-id 192.168.1.11
segment-routing area 0 mpls
segment-routing mpls
segment-routing prefix-sid-map advertise-local
redistribute connected
redistribute static
redistribute bgp 65000
network 80.0.0.0 0.0.0.255 area 0
network 192.168.1.11 0.0.0.0 area 0
!
!
router eigrp 300
network 70.0.0.0 0.0.0.255
network 192.168.1.11 0.0.0.0
eigrp router-id 192.168.1.11
!
!
interface TenGigabitEthernet0/1/4
mtu 9216
ip address 70.0.0.2 255.255.255.0
ip ospf network point-to-point
cdp enable
mpls ip
mpls bgp forwarding
!

router bgp 65000
bgp router-id 192.168.1.11
no bgp transport path-mtu-discovery
bgp log-neighbor-changes
no bgp default route-target filter
neighbor 70.0.0.1 remote-as 100
neighbor 70.0.0.1 ebgp-multihop 10
neighbor 192.168.1.10 remote-as 100
neighbor 192.168.1.10 ebgp-multihop 10
neighbor 192.168.1.10 disable-connected-check
neighbor 192.168.1.10 update-source Loopback0
neighbor 192.168.1.12 remote-as 65000
neighbor 192.168.1.12 update-source Loopback0
!
address-family ipv4
redistribute connected
redistribute ospf 300
segment-routing mpls
neighbor 70.0.0.1 activate
neighbor 70.0.0.1 send-community both
neighbor 70.0.0.1 send-label
neighbor 192.168.1.10 activate
neighbor 192.168.1.10 send-community both
neighbor 192.168.1.10 soft-reconfiguration inbound
neighbor 192.168.1.10 send-label
no neighbor 192.168.1.12 activate
exit-address-family
!
address-family vpnv4
neighbor 192.168.1.10 activate
neighbor 192.168.1.10 send-community both
neighbor 192.168.1.12 activate
neighbor 192.168.1.12 send-community both
neighbor 192.168.1.12 next-hop-self
exit-address-family
!
address-family l2vpn evpn
exit-address-family
!
```

Far-End PE2 Configuration

```

hostname PE2
install feature-set mpls
allow feature-set mpls
feature-set mpls
feature ospf
feature bgp
feature eigrp
feature mpls l3vpn
feature mpls segment-routing
feature interface-vlan
feature lldp
feature mpls oam

vlan 1,400
segment-routing
mpls
global-block 16000 25000
connected-prefix-sid-map
address-family ipv4
192.168.1.12/32 index 121

ip prefix-list adveig seq 5 permit 4.4.4.4/32
ip prefix-list localsub seq 5 permit 40.0.0.0/24
ip prefix-list localsub seq 10 permit 40.40.40.40/32
route-map direct permit 10
match ip address prefix-list localsub
route-map eig permit 10
match ip address prefix-list adveig
route-map ibgpout permit 10
match tag 100
match route-type internal

route-map label-index-Leaf2 permit 10
set label-index 121

vrf context KP
rd auto
address-family ipv4 unicast
route-target import 100:5000
route-target import 65000:1
route-target export 100:5000
route-target export 65000:1

interface Ethernet1/2
ip address 80.0.0.2/24
ip ospf network point-to-point
ip router ospf 300 area 0.0.0.0
mpls ip forwarding
no shutdown

interface loopback10
ip address 192.168.1.12/32
ip router ospf 300 area 0.0.0.0

router ospf 300
segment-routing mpls
router-id 192.168.1.12
distance 115

interface Ethernet1/3
switchport
switchport mode trunk
switchport trunk allowed vlan 400
no shutdown

interface Vlan400
no shutdown
vrf member KP
ip address 40.0.0.1/24
ip router eigrp 200

interface loopback1
vrf member KP
ip address 40.40.40.40/32
ip router eigrp 200

router eigrp 200
router-id 40.40.40.40
address-family ipv4 unicast
vrf KP
address-family ipv4 unicast
redistribute bgp 65000 route-map ibgpout

router bgp 65000
router-id 192.168.1.12
address-family ipv4 unicast
network 192.168.1.12/32 route-map label-index-Leaf2
redistribute direct route-map direct
redistribute eigrp 200 route-map eig
allocate-label all
address-family vpnv4 unicast
address-family ipv4 labeled-unicast
neighbor 192.168.1.11
remote-as 65000
update-source loopback10
address-family vpnv4 unicast
send-community extended
vrf KP
address-family ipv4 unicast
redistribute direct route-map direct
redistribute eigrp 200 route-map eig
    
```

Verificar

Host-1 & Leaf-1 Verification

host1# sh ip int br | ex down

```

IP Interface Status for VRF "default"(1)
Interface      IP Address      Interface Status
Vlan201        20.0.0.2        protocol-up/link-up/admin-up
Lo0            1.1.1.1         protocol-up/link-up/admin-up
    
```

host1# traceroute 4.4.4.4 source 1.1.1.1

```

traceroute to 4.4.4.4 (4.4.4.4) from 1.1.1.1 (1.1.1.1), 30 hops max, 40 byte packets
 1 20.0.0.1 (20.0.0.1) 0.92 ms 0.531 ms 0.513 ms
 2 30.0.0.1 (30.0.0.1) 1.043 ms 0.819 ms 0.733 ms
 3 40.0.0.1 (40.0.0.1) 0.912 ms 0.673 ms 0.624 ms
   [Label=492287 E=0 TTL=253 S=1]
 4 4.4.4.4 (4.4.4.4) 0.882 ms 0.825 ms 0.561 ms
host1#
    
```

Leaf1_N3k# show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN
 BGP table version is 42, Local Router ID is 192.168.1.3
 Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
 Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, l-injected
 Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.4:3					
*>[5]:[0]:[0]:[24]:[30.0.0.0]/224	192.168.1.4	0	100	0 ?	
*>[5]:[0]:[0]:[24]:[40.0.0.0]/224	192.168.1.4	100	0	65000 ?	
*>[5]:[0]:[0]:[32]:[2.2.2.2]/224	192.168.1.4	130816	100	0 ?	
*>[5]:[0]:[0]:[32]:[4.4.4.4]/224	192.168.1.4	100	0	65000 ?	
*>[5]:[0]:[0]:[32]:[30.30.30.30]/224	192.168.1.4	0	100	0 ?	
*>[5]:[0]:[0]:[32]:[40.40.40.40]/224	192.168.1.4	100	0	65000 ?	

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.3:3 (L3VNI 5000)					
*>[5]:[0]:[0]:[24]:[20.0.0.0]/224	192.168.1.3	0	100	32768 ?	
*>[5]:[0]:[0]:[24]:[30.0.0.0]/224	192.168.1.4	0	100	0 ?	
*>[5]:[0]:[0]:[24]:[40.0.0.0]/224	192.168.1.4	100	0	65000 ?	
*>[5]:[0]:[0]:[32]:[1.1.1.1]/224	192.168.1.3	130816	100	32768 ?	
*>[5]:[0]:[0]:[32]:[2.2.2.2]/224	192.168.1.4	130816	100	0 ?	
*>[5]:[0]:[0]:[32]:[4.4.4.4]/224	192.168.1.4	100	0	65000 ?	
*>[5]:[0]:[0]:[32]:[20.20.20.20]/224	192.168.1.3	0	100	32768 ?	
*>[5]:[0]:[0]:[32]:[30.30.30.30]/224	192.168.1.4	0	100	0 ?	
*>[5]:[0]:[0]:[32]:[40.40.40.40]/224	192.168.1.4	100	0	65000 ?	

Leaf1_N3k#

Border Leaf Verification

BLF sh bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN
 BGP table version is 30, Local Router ID is 192.168.1.4
 Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, * valid, > best
 Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, i-injected
 Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.3					
*[5]:(0):(24):(20.0.0.0)/24	192.168.1.3	0	100	0	?
*[5]:(0):(32):(1.1.1.1)/24	192.168.1.3	130816	100	0	?
*[5]:(0):(32):(20.20.20.20)/24	192.168.1.3	0	100	0	?
Route Distinguisher: 192.168.1.4 (L3VNI 5000)					
*[5]:(0):(24):(20.0.0.0)/24	192.168.1.3	0	100	0	?
*[5]:(0):(24):(30.0.0.0)/24	192.168.1.4	0	100	32768	?
*[5]:(0):(24):(40.0.0.0)/24	192.168.1.4	0	65000	?	?
*[5]:(0):(32):(1.1.1.1)/24	192.168.1.3	130816	100	0	?
*[5]:(0):(32):(2.2.2.2)/24	192.168.1.4	130816	100	32768	?
*[5]:(0):(32):(4.4.4.4)/24	192.168.1.4	0	65000	?	?
*[5]:(0):(32):(20.20.20.20)/24	192.168.1.3	0	100	0	?
*[5]:(0):(32):(30.30.30.30)/24	192.168.1.4	0	100	32768	?
*[5]:(0):(32):(40.40.40.40)/24	192.168.1.4	0	65000	?	?

BLF

BLF show bgp vpnv4 unicast

BGP routing table information for VRF default, address family VPNv4 Unicast
 BGP table version is 81, Local Router ID is 192.168.1.4
 Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, * valid, > best
 Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, i-injected
 Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.4:3 (VRF KP)					
*[1]:(1):1/32	192.168.1.3	130816	100	0	?
*[2]:(2):2/32	0.0.0.0	130816	100	32768	?
*[4]:(4):4/32	192.168.1.11	0	65000	?	?
*[10]:(10):0.0/24	192.168.1.3	0	100	0	?
*[20]:(20):20.20/32	192.168.1.3	0	100	0	?
*[30]:(30):0.0/24	0.0.0.0	0	100	32768	?
*[30]:(30):30.30/32	0.0.0.0	0	100	32768	?
*[40]:(40):0.0/24	192.168.1.11	0	65000	?	?
*[40]:(40):40.40/32	192.168.1.11	0	65000	?	?
Route Distinguisher: 192.168.1.12:3					
*[4]:(4):4.4/32	192.168.1.11	0	65000	?	?
*[40]:(40):0.0/24	192.168.1.11	0	65000	?	?
*[40]:(40):40.40/32	192.168.1.11	0	65000	?	?

BLF

BLF show segment-routing mpls clients

Segment-Routing Mpls Client Info
 Client: bgp-100
 PIB Index: 1 UIID: 0x11b PID: 4611 MTS SAP: 7255
 TIBS registered:
 VRF: default Table: base

Total Clients: 1
 BLF

BLF show segment-routing mpls ipv4 connected-prefix-sid-map
 Segment-Routing Mpls Prefix-SID Mappings
 Prefix-SID mappings for VRF default Table base

Prefix	SID	Type	Range	SRGB
192.168.1.10/32	100	Indx	1	Y

*SRGB - Indicates whether Prefix-Sid is within configured SRGB
 BLF

BLF show segment-routing mpls detail
 Segment-Routing Mpls Global Info
 Service Name: segment-routing
 State: Enabled
 Process Id: 2605
 Configured SRGB: 16000 - 25000
 SRGB Allocation status: Alloc-Successful
 Current SRGB: 16000 - 25000
 Cleanup Interval: 60
 Retry Interval: 180
 SRGB UIIB handle: 4096002
 UIIB RegStatus: Done
 UIIB PIB handle: 0x2
 BLF

BLF show mpls switching

Legend:
 (P)-Protected, (F)-FRR active, (*)-more labels in stack

IPv4:
 In-Label Out-Label FEC name Out-Interface Next-Hop
 VRF default
 5000 Pop Label 80.0.0.0/24 Eth1/2 70.0.0.2
 16111 Pop Label 192.168.1.11/32 Eth1/2 70.0.0.2
 16121 16121 192.168.1.12/32 Eth1/2 70.0.0.2

In-Label VRF
 492288 default
 492287 KP

Local Out-Label Out-Interface Next-Hop
 FEC: 4.4.4.4/32, 192.168.1.12:3
 5001 22 192.168.1.11
 5002 23 192.168.1.11
 FEC: 40.40.40.40/32, 192.168.1.12:3
 5003 24 192.168.1.11

Block Label-Range
 1 16000 - 25000
 BLF

P-Router Verification

P-Router#sh ip inter bri | ex down

Interface	IP-Address	OK?	Method	Status	Protocol
Te0/1/2	unassigned	YES	NVRAM	up	up
Te0/1/3	80.0.0.1	YES	NVRAM	up	up
Te0/1/4	70.0.0.2	YES	NVRAM	up	up
GigabitEthernet0	10.82.139.101	YES	manual	up	up
Loopback0	192.168.1.11	YES	NVRAM	up	up

P-Router#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.12	0	FULL/	00:00:35	80.0.0.2	TenGigabitEthernet0/1/3

P-Router#

P-Router#show bgp vpnv4 unicast all

BGP table version is 28, local router ID is 192.168.1.11
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
 x best-external, a additional-path, c RIB-compressed,
 t secondary path, L long-lived-stale,
 Origin codes: i - IGP, e - EGP, ? - incomplete
 RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.4:3					
*[> 1.1.1.1/32	192.168.1.10	0	100	?	
*[> 2.2.2.2/32	192.168.1.10	130816	0	100	?
*[> 20.0.0.0/24	192.168.1.10	0	100	?	
*[> 20.20.20.20/32	192.168.1.10	0	100	?	
*[> 30.0.0.0/24	192.168.1.10	0	100	?	
*[> 30.30.30.30/32	192.168.1.10	0	100	?	
Route Distinguisher: 192.168.1.12:3					
*[i 4.4.4.4/32	192.168.1.12	130816	100	0	?
*[i 40.0.0.0/24	192.168.1.12	0	100	0	?
*[i 40.40.40.40/32	192.168.1.12	0	100	0	?

P-Router#

P-Router#show segment-routing mpls state

Segment Routing MPLS State : ENABLED

P-Router#

P-Router#show mpls forwarding-table

Local Label	Outgoing Label	Prefix	Bytes	Label	Outgoing Interface	Next Hop
16	Pop Label	80.0.0.2-A	0	Te0/1/3	80.0.0.2	
17	[M] Pop Label	192.168.1.12/32	0	Te0/1/3	80.0.0.2	
18	Pop Label	192.168.1.10/32	0	Te0/1/4	70.0.0.1	
19	492287	192.168.1.4:3:2.2.2/32 \		Te0/1/4	70.0.0.1	
20	492287	192.168.1.4:3:30.0.0.0/24 \		Te0/1/4	70.0.0.1	
21	492287	192.168.1.4:3:30.30.30/32 \		Te0/1/4	70.0.0.1	
22	492287	192.168.1.12:3:4.4.4/32 \		Te0/1/3	80.0.0.2	
23	492287	192.168.1.12:3:40.0.0.0/24 \		Te0/1/3	80.0.0.2	
24	492287	192.168.1.12:3:40.40.40/32 \		Te0/1/3	80.0.0.2	
25	492287	192.168.1.4:3:1.1.1/32 \		Te0/1/4	70.0.0.1	
26	492287	192.168.1.4:3:20.0.0.0/24 \		Te0/1/4	70.0.0.1	
27	492287	192.168.1.4:3:20.20.20/32 \		Te0/1/4	70.0.0.1	

P-Router#

P-Router#show segment-routing client all

SRHandle: 1 ClientType: SR INTERNAL ClientHandle: 0

SRHandle: 2 ClientType: OSPF ClientHandle: 7FB45A5B94C8
 Registered Notifications:
 Handle: 0x0 topoid(0) sidmap_bitmask(1) algo(0)
 Handle: 0x1 topoid(0) sidmap_bitmask(1) algo(1)
 Handle: 0x2 topoid(0) sidmap_bitmask(2) algo(0)
 Handle: 0x3 topoid(0) sidmap_bitmask(2) algo(1)
 Handle: 0x4 topoid(0) sidmap_bitmask(E) algo(0) Expanded
 Handle: 0x5 topoid(0) sidmap_bitmask(E) algo(1) Expanded

SRHandle: 3 ClientType: BGP ClientHandle: 7FB45A5DF9A8
 Registered Notifications:
 Handle: 0x6 topoid(0) sidmap_bitmask(8) algo(0)
 Handle: 0x7 topoid(0) sidmap_bitmask(1) algo(0)

P-Router#

P-Router#show segment-routing mpls connected-prefix-sid-map protocol ipv4

PREFIX_SID_PROTOCOL_ADV_MAP_ALGO_0

Prefix/masklen	SID	Type	Range	Flags	SRGB	Source
192.168.1.10/32	100	Indx	1	Y	BGP	192.168.1.4
192.168.1.11/32	111	Indx	1	Y	OSPF	Area 0 192.168.1.11
192.168.1.12/32	121	Indx	1	Y	OSPF	Area 0 192.168.1.12

PREFIX_SID_PROTOCOL_ADV_MAP_ALGO_1

Prefix/masklen	SID	Type	Range	Flags	SRGB	Source
P-Router#sh mpls forwarding-table 192.168.1.12 32						
Local Label	Outgoing Label	Prefix	Bytes	Label	Outgoing Interface	Next Hop
17	[M] Pop Label	192.168.1.12/32	0	Te0/1/3	80.0.0.2	
16121	[M] Pop Label	192.168.1.12/32	0	Te0/1/3	80.0.0.2	

[M] - Merged

P-Router#sh mpls forwarding-table 192.168.1.10 32

Local Label	Outgoing Label	Prefix	Bytes	Label	Outgoing Interface	Next Hop
18	Pop Label	192.168.1.10/32	0	Te0/1/4	70.0.0.1	
16100	Pop Label	192.168.1.10/32	0	Te0/1/4	70.0.0.1	

P-Router#show mpls forwarding-table labels 16
 Local Outgoing Prefix Bytes Label Outgoing Next Hop
 Label Label or Tunnel Id Switched interface
 16 Pop Label 80.0.0.2-A 0 Te0/1/3 80.0.0.2

A - Adjacency SID

P-Router#show mpls forwarding-table labels 17

Local Label	Outgoing Label	Prefix	Bytes	Label	Outgoing Interface	Next Hop
17	[M] Pop Label	192.168.1.12/32	0	Te0/1/3	80.0.0.2	

[M] - Merged

P-Router#show mpls forwarding-table labels 18

Local Label	Outgoing Label	Prefix	Bytes	Label	Outgoing Interface	Next Hop
18	Pop Label	192.168.1.10/32	0	Te0/1/4	70.0.0.1	

P-Router#show mpls forwarding-table labels 22
 Local Outgoing Prefix Bytes Label Outgoing Next Hop
 Label Label or Tunnel Id Switched interface
 22 492287 192.168.1.12:3:4.4.4/32 \

P-Router#

Far-End PE Verification

PE2# show bgp vpn4 unicast

BGP routing table information for VRF default, address family VPNv4 Unicast
 BGP table version is 79, Local Router ID is 192.168.1.12
 Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
 Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, i-injected
 Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.4:3					
*>i1.1.1.1/32	192.168.1.11	0	100	0	100 ?
*>i2.2.2.2/32	192.168.1.11	130816	100	0	100 ?
*>i20.0.0.0/24	192.168.1.11	0	100	0	100 ?
*>i20.20.20.20/32	192.168.1.11	0	100	0	100 ?
*>i30.0.0.0/24	192.168.1.11	0	100	0	100 ?
*>i30.30.30.30/32	192.168.1.11	0	100	0	100 ?

Route Distinguisher:	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.12:3 (VRF KP)					
*>i1.1.1.1/32	192.168.1.11	0	100	0	100 ?
*>i2.2.2.2/32	192.168.1.11	130816	100	0	100 ?
*>i4.4.4.4/32	0.0.0.0	130816	100	32768	?
*>i20.0.0.0/24	192.168.1.11	0	100	0	100 ?
*>i20.20.20.20/32	192.168.1.11	0	100	0	100 ?
*>i30.0.0.0/24	192.168.1.11	0	100	0	100 ?
*>i30.30.30.30/32	192.168.1.11	0	100	0	100 ?
*>r40.0.0.0/24	0.0.0.0	0	100	32768	?
*>r40.40.40.40/32	0.0.0.0	0	100	32768	?

PE2# show ip interface brief | ex down

Interface	IP Address	Interface Status
Lo10	192.168.1.12	protocol-up/link-up/admin-up
Eth1/2	80.0.0.2	protocol-up/link-up/admin-up

PE2# sh ip interface brief vrf kp | ex down

Interface	IP Address	Interface Status
Vlan400	40.0.0.1	protocol-up/link-up/admin-up
Lo1	40.40.40.40	protocol-up/link-up/admin-up

PE2# show ip ospf neighbors

OSPF Process ID 300 VRF default
 Total number of neighbors: 1

Neighbor ID	Pri	State	Up Time	Address	Interface
192.168.1.11	1	FULL/	06:48:03	80.0.0.1	Eth1/2

 PE2#

PE2# show segment-routing mpls detail

Segment-Routing Mpls Global Info
 Service Name: segment-routing
 State: Enabled
 Process ID: 2257
 Configured SRGB: 16000 - 25000
 SRGB Allocation status: Alloc: Successful
 Current SRGB: 16000 - 25000
 Cleanup Interval: 60
 Retry Interval: 180
 SRGB ULIB handle: 4096002
 ULIB RegStatus: Done
 ULIB PIB handle: 0x2
 PE2#

PE2# show segment-routing mpls clients

Segment-Routing Mpls Client Info
 Client: ospf-300
 PIB Index: 1 UID: 0x41000119 PID: 4281 MTS SAP: 320
 TIBs registered:
 VRF: default Table: base
 Client: bgp-65000
 PIB Index: 2 UID: 0x11b PID: 4302 MTS SAP: 6825
 TIBs registered:
 VRF: default Table: base
 Total Clients: 2

PE2# show segment-routing mpls ipv4 connected-prefix-sid-map

Segment-Routing Mpls Prefix SID Mappings
 Prefix-SID mappings for VRF default Table base

Prefix	SID	Type	Range	SRGB
192.168.1.12/32	121	Indx	1	Y

*SRGB - Indicates whether Prefix-Sid is within configured SRGB

PE2# show forwarding mpls

slot	1
=====	
Local Prefix FEC Next-Hop Interface Out	
Label Table Id (Prefix/Tunnel id) Label	

16 N/A N/A 80.0.0.1 Eth1/2 Pop Label	
16111 0x1 192.168.1.11/32 80.0.0.1 Eth1/2 0	SWAP
492288	
PE2#	

PE2# show mpls switching

Legend:
 (P)=Protected, (F)=FRR active, (*)=more labels in stack
 IPv4:

In-Label	Out-Label	FEC name	Out-Interface	Next-Hop
VRF default				
16111	Pop Label	192.168.1.11/32	Eth1/2	80.0.0.1

In-Label	VRF
492288	default
492287	KP

 ADI_SID:

In-Label	Out-Label	FEC name	Out-Interface	Next-Hop
16	3	80.0.0.1	Eth1/2	80.0.0.1

 Block Label-Range
 1 16000 - 25000
 PE2#

PE2# show mpls switching detail

VRF default
 IPv4 FEC
 In-Label : 16111
 Out-Label stack : Pop Label
 FEC : 192.168.1.11/32
 Out interface : Eth1/2
 Next hop : 80.0.0.1
 Input traffic statistics : 0 packets, 0 bytes
 Output statistics per label : label Pop Label, 0 packets, 0 bytes

Deaggregation FEC type
 In-Label : 492288
 VRF : default
 Address-Family : IPv4
 Flags : RFC3107
 Input traffic statistics : 0 packets 0 bytes

Deaggregation FEC type
 In-Label : 492287
 VRF : KP
 Address-Family : IPv4
 Input traffic statistics : 132 packets 15540 bytes

ADI_SID
 In-Label : 16
 Out-Label stack : 3
 FEC : 80.0.0.1
 Out interface : Eth1/2
 Next hop : 80.0.0.1
 Input traffic statistics : 0 packets, 0 bytes
 Output statistics per label : label 3, 0 packets, 0 bytes

*Label statistics accurate as of 117 seconds ago
 Block Label-Range
 1 16000 - 25000
 PE2#

Informações Relacionadas

- [Informações sobre como configurar a integração perfeita do EVPN com L3VPN \(MPLS SR\)](#)
- [Suporte Técnico e Documentação - Cisco Systems](#)