

ةصاخلا MPLS ربع Nexus L2 EVPN ذي فنت عطاقملا هي جوتب

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ةمدقملا

هي جوتب ةصاخلا MPLS ربع 2 ةقبطالا نم EVPN نيوكت/رشن ةيفي ك دنتسملا اذه فصوي
Cisco Nexus 9000 Series تالوحم يل عطاقملا.

ةيساسألا تابلطتملا

تابلطتملا

هي جوتب و EVPN و RSVP و LDP و MPLS و OSPF و BGP لوح ةفرعم يل ع لوصحلل بولطم
(SR) تااعاطقلا

ةمدختسملا تانوكملا

9.3.(3) مادختساب لمعي يذلا Cisco Nexus Switch 93360YC-FX2 لوحمل

9.3.(3) عم لمعي يذلا Cisco Nexus Switch 93240YC-FX2 لوحمل

ةصاخ ةيلمعم ةئيب ي ف ةدوجوملا ةزهجالا نم دنتسملا اذه ي ف ةدراولا تامولعملا عاشنإ مت
تذاك اذا. (يضا رتفا) حوسمم نيوكتب دنتسملا اذه ي ف ةمدختسملا ةزهجالا عي مج تادب
رما يال لمتحمل ريثاتلل كمهف نم دكاتف ، ةرشابم كتكبش

ةيفلخلا

ةيرهاظلا ةصاخلا ةكبشلا ، ةفرعملا 2 يوتسملا نم (VPN) ةيرهاظ ةصاخ ةيرهاظ ةكبش
لصت 2 ةقبطالا نم طاقنلا ةددعتم (VPN) ةيرهاظ ةصاخ ةكبش ةمدخ يه (VPLS)/L2-EVPN
IP/MPLS ةكبش ربع ةدحاو ةي قطنم لوحم ةي نب ي ف ليمعلا نم عورف ةدع ني ب

2 EVPN-MPLS SR يوتسملا

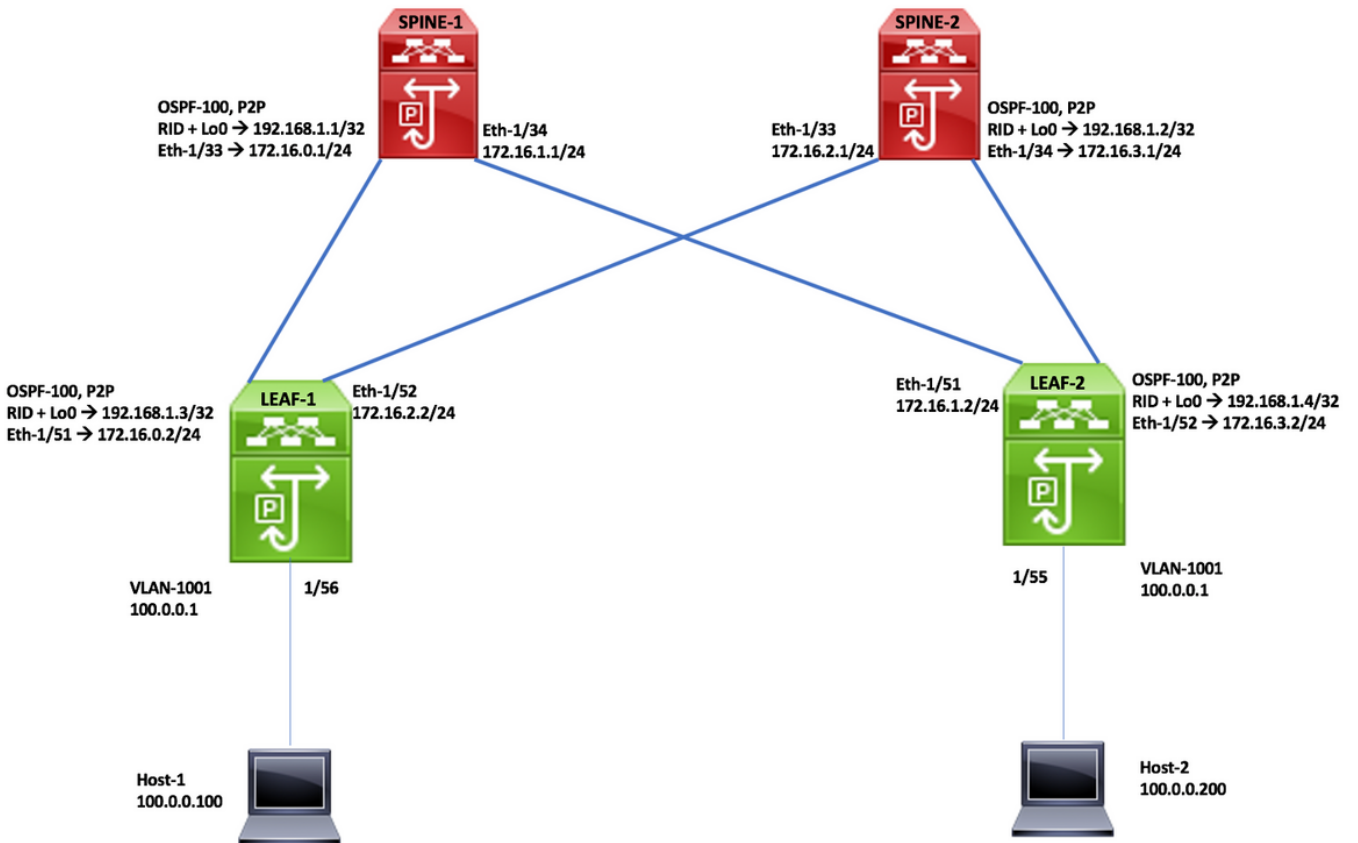
- نم تنرتي إي كيش تامدخل هم ادختسا مت BGP MPLS يلى دن تسى لى ح وه (RFC 7432) EVPN
- ةيضا رتفال انا يبال زكرم ةكيش يى يلاتلا لى لى
- تاينقت نم "VRF" و "RT" و "RD" لثم عاشن اى لى لك نم دى دى ال EVPN ةكيش مدختست
- ةدووم ال (MPLS) تالوكوتوربال ددعت لى وحتلا
- ملعت ني كمت لالى نم ةدووم ال VPLS تاكيش نم ضيقن لى لى ال EVPN ةكيش لمعت
- زكارم لى يى مكحتلا يوتسم لى دن تسم ال MAC
- لى م ع لى ال Mac تاراسم لى لى ال EVPN عضو يى اكارشلا فرعتى، EVPN ةكيش يى
- ةل اع م ب EVPN ةكيش لى لى ال دى دى مكحتلا يوتسم لى ال MAC ملعت رفوى
- قفدت لى لى ال ةنزاوم عم عى مكحتلا معد لى يى ام ب، VPLS بوى
- ماظن لى لى ال ةم ودم يى هو NXOS 9.3(1) يى ةرفوتم ةدى دى ةزى يى ال SR L2 EVPN نى
- Nexus 9300 FX2 ةل سلسل نى يى ساسا لى

SR MPLS رى بى EVPN L2 دوى قى:

- لى لى لى لى لى ال ةس نل اى لى ال EVPN 2 عطقم لى لى ةقبط رم غ دم تعت
- BUM رورم ةك رل 3 عون ال EVPN راسم مدختسى وه
- ددعتم لى لى ال MPLS بل معدى ال
- موعدم رى غ ARP عم قى
- موعدم رى غ VPC لى لى ال قس ان تلى نم ققحتلا
- اع م EVI L3 رشؤم و L2 رشؤم سفن ني وكت نى ال

نى وكتلا

ي طى طختلا مسرلا ةكيش لى لى



تاسملا ةلإة ةئيه تاطوخ:

- تازملا تيبثت
- IP -UnderLay ناونع نيوكت
- IGP -OSPF نيوكت
- MP-BGP نيوكت
- VLAN و EVPN ةيشغت نيوكت
- 2 ةقبطلال فيضملا نيوكت

SPINE -1 Configuration

Enabling Features, Label-Range, Route-map, Label-Index	OSPF Configuration	BGP/EVPN Configuration
install feature-set mpls feature-set mpls feature ospf feature bgp feature mpls segment-routing feature mpls evpn feature interface-vlan feature mpls oam	interface Ethernet1/33 ip address 172.16.0.1/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown	router bgp 65001 router-id 192.168.1.1 address-family ipv4 unicast network 192.168.1.1/32 route-map label-index-spine1 allocate-label all address-family ipv4 labeled-unicast address-family l2vpn evpn template peer EVPN
mpls label range 5000 450000	interface Ethernet1/34 ip address 172.16.1.1/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown	remote-as 65001 update-source loopback0 address-family l2vpn evpn send-community extended route-reflector-client encapsulation mpls
segment-routing mpls global-block 16000 25000 connected-prefix-sid-map address-family ipv4 192.168.1.1/32 index 211	interface loopback0 ip address 192.168.1.1/32 ip router ospf 100 area 0.0.0.0	template peer Labeled-unicast remote-as 65001 address-family ipv4 labeled-unicast send-community extended route-reflector-client next-hop-self soft-reconfiguration inbound always
route-map label-index-spine1 permit 10 set label-index 211	router ospf 100 segment-routing mpls router-id 192.168.1.1	neighbor 172.16.0.2 inherit peer Labeled-unicast neighbor 172.16.1.2 inherit peer Labeled-unicast neighbor 192.168.1.3 inherit peer EVPN neighbor 192.168.1.4 inherit peer EVPN

SPINE -2 Configuration

Enabling Features, Label-Range, Route-map, Label-Index	OSPF Configuration	BGP/EVPN Configuration
install feature-set mpls feature-set mpls feature ospf feature bgp feature mpls segment-routing feature mpls evpn feature interface-vlan feature mpls oam mpls label range 5000 450000 segment-routing mpls global-block 16000 25000 connected-prefix-sid-map address-family ipv4 192.168.1.2/32 index 221 route-map label-index-spine2 permit 10 set label-index 221	interface Ethernet1/33 ip address 172.16.2.1/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown interface Ethernet1/34 ip address 172.16.3.1/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown interface loopback0 ip address 192.168.1.2/32 ip router ospf 100 area 0.0.0.0 router ospf 100 segment-routing mpls router-id 192.168.1.2	router bgp 65001 router-id 192.168.1.2 address-family ipv4 unicast network 192.168.1.2/32 route-map label-index-spine2 allocate-label all address-family ipv4 labeled-unicast address-family l2vpn evpn template peer EVPN remote-as 65001 update-source loopback0 address-family l2vpn evpn send-community extended route-reflector-client encapsulation mpls template peer Labeled-unicast remote-as 65001 address-family ipv4 labeled-unicast send-community extended route-reflector-client next-hop-self soft-reconfiguration inbound always neighbor 172.16.2.2 inherit peer Labeled-unicast neighbor 172.16.3.2 inherit peer Labeled-unicast neighbor 192.168.1.3 inherit peer EVPN neighbor 192.168.1.4 inherit peer EVPN

Leaf-1 Configuration

Enabling Features, Label-Range, Route-map, Label-Index	OSPF Configuration	BGP/EVPN Configuration
install feature-set mpls nv overlay evpn feature ospf feature bgp feature mpls segment-routing feature mpls evpn feature interface-vlan feature mpls oam feature nv overlay fabric forwarding anycast-gateway-mac 0000.0000.1111 mpls label range 5000 450000 vlan 1,1001 segment-routing mpls global-block 16000 25000 connected-prefix-sid-map address-family ipv4 192.168.1.3/32 index 311 vlan 1001 evi auto route-map label-index-leaf-1 permit 10 set label-index 311 vrf context Tenant-A evi 30001 interface Vlan1001 no shutdown vrf member Tenant-A ip address 100.0.0.1/24 fabric forwarding mode anycast-gateway	interface Ethernet1/51 ip address 172.16.0.2/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown interface Ethernet1/52 ip address 172.16.2.2/24 ip ospf network point-to-point ip router ospf 100 area 0.0.0.0 mpls ip forwarding no shutdown interface Ethernet1/56 switchport switchport mode trunk switchport trunk allowed vlan 1001 no shutdown interface loopback0 ip address 192.168.1.3/32 ip router ospf 100 area 0.0.0.0 router ospf 100 segment-routing mpls router-id 192.168.1.3	router bgp 65001 router-id 192.168.1.3 address-family ipv4 unicast network 192.168.1.3/32 route-map label-index-leaf-1 allocate-label all address-family ipv4 labeled-unicast address-family l2vpn evpn template peer EVPN remote-as 65001 update-source loopback0 address-family l2vpn evpn send-community extended encapsulation mpls template peer Labeled-unicast remote-as 65001 address-family ipv4 labeled-unicast send-community extended soft-reconfiguration inbound always neighbor 172.16.0.1 inherit peer Labeled-unicast neighbor 172.16.2.1 inherit peer Labeled-unicast neighbor 192.168.1.1 inherit peer EVPN neighbor 192.168.1.2 inherit peer EVPN vrf Tenant-A evpn encapsulation mpls source-interface loopback0

Leaf-2 Configuration

Enabling Features, Label-Range, Route-map, Label-Index

```
install feature-set mpls
nv overlay evpn
feature ospf
feature bgp
feature mpls segment-routing
feature mpls evpn
feature interface-vlan
feature mpls oam
feature nv overlay

fabric forwarding anycast-gateway-mac 0000.0000.1111
mpls label range 5000 450000

vlan 1,1001
segment-routing
mpls
  global-block 16000 25000
  connected-prefix-sid-map
  address-family ipv4
    192.168.1.4/32 index 321
vlan 1001
  evi auto

route-map label-index-Leaf2 permit 10
  set label-index 321
vrf context Tenant-A
  evi 30001

interface Vlan1001
  no shutdown
  vrf member Tenant-A
  ip address 100.0.0.1/24
  fabric forwarding mode anycast-gateway
```

OSPF Configuration

```
interface Ethernet1/51
  ip address 172.16.1.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  mpls ip forwarding
  no shutdown

interface Ethernet1/52
  ip address 172.16.3.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  mpls ip forwarding
  no shutdown

interface Ethernet1/55
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 1001
  no shutdown

interface loopback0
  ip address 192.168.1.4/32
  ip router ospf 100 area 0.0.0.0

router ospf 100
  segment-routing mpls
  router-id 192.168.1.4
```

BGP/EVPN Configuration

```
router bgp 65001
  router-id 192.168.1.4
  address-family ipv4 unicast
    network 192.168.1.4/32 route-map label-index-Leaf2
    allocate-label all
  address-family ipv4 labeled-unicast
  address-family l2vpn evpn
  template peer EVPN
    remote-as 65001
  update-source loopback0
  address-family l2vpn evpn
    send-community extended
    encapsulation mpls
  template peer Labeled-unicast
    remote-as 65001
  address-family ipv4 labeled-unicast
    send-community extended
  soft-reconfiguration inbound always

neighbor 172.16.1.1
  inherit peer Labeled-unicast
neighbor 172.16.3.1
  inherit peer Labeled-unicast
neighbor 192.168.1.1
  inherit peer EVPN
neighbor 192.168.1.2
  inherit peer EVPN
vrf Tenant-A

evpn
  encapsulation mpls
  source-interface loopback0
```

ققحتلا

Host1# show ip int brief

```
IP Interface Status for VRF "default"(1)
Interface IP Address Interface Status
Vlan1001 100.0.0.200 protocol-up/link-up/admin-up

Mhost1# ping 100.0.0.100
PING 100.0.0.100 (100.0.0.100): 56 data bytes
64 bytes from 100.0.0.100: icmp_seq=0 ttl=253 time=0.84 ms
64 bytes from 100.0.0.100: icmp_seq=1 ttl=253 time=0.45 ms
64 bytes from 100.0.0.100: icmp_seq=2 ttl=253 time=0.443 ms
64 bytes from 100.0.0.100: icmp_seq=3 ttl=253 time=0.438 ms
64 bytes from 100.0.0.100: icmp_seq=4 ttl=253 time=0.431 ms

--- 100.0.0.100 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.431/0.52/0.84 ms
```

Host2# show ip int brief

```
IP Interface Status for VRF "default"(1)
Interface IP Address Interface Status
Vlan1001 100.0.0.100 protocol-up/link-up/admin-up

Mhost2# ping 100.0.0.200
PING 100.0.0.200 (100.0.0.200): 56 data bytes
64 bytes from 100.0.0.200: icmp_seq=0 ttl=253 time=0.854 ms
64 bytes from 100.0.0.200: icmp_seq=1 ttl=253 time=0.46 ms
64 bytes from 100.0.0.200: icmp_seq=2 ttl=253 time=0.451 ms
64 bytes from 100.0.0.200: icmp_seq=3 ttl=253 time=0.427 ms
64 bytes from 100.0.0.200: icmp_seq=4 ttl=253 time=0.418 ms

--- 100.0.0.200 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.418/0.522/0.854 ms
Mhost2#
```

Leaf1# show bgp l2vpn evpn

```
BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 57, 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, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2
```

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 192.168.1.3:37864 (L2VNI 1001)					
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[0]:[0.0.0.0]/216	192.168.1.4	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[0]:[0.0.0.0]/216	192.168.1.3	100	32768	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[32]:[100.0.0.100]/248					
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[32]:[100.0.0.200]/272	192.168.1.3	100	32768	i	
*>[3]:[0]:[32]:[192.168.1.3]/88	192.168.1.3	100	32768	i	
*>[3]:[0]:[32]:[192.168.1.4]/88	192.168.1.4	100	0	i	
Route Distinguisher: 192.168.1.4:37864					
* [2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[0]:[0.0.0.0]/216	192.168.1.4	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[32]:[100.0.0.100]/248	192.168.1.4	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[32]:[100.0.0.200]/272	192.168.1.4	100	0	i	
*>[3]:[0]:[32]:[192.168.1.4]/88	192.168.1.4	100	0	i	
*>[3]:[0]:[32]:[192.168.1.3]/88	192.168.1.3	100	0	i	

Leaf2# show bgp l2vpn evpn

```
BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 40, 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: 192.168.1.3:37864					
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[0]:[0.0.0.0]/216	192.168.1.3	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[0]:[0.0.0.0]/216	192.168.1.3	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[32]:[100.0.0.200]/272	192.168.1.3	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[32]:[100.0.0.100]/248	192.168.1.3	100	0	i	
*>[3]:[0]:[32]:[192.168.1.3]/88	192.168.1.3	100	0	i	
*>[3]:[0]:[32]:[192.168.1.4]/88	192.168.1.4	100	32768	i	
Route Distinguisher: 192.168.1.4:37864 (L2VNI 1001)					
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[0]:[0.0.0.0]/216	192.168.1.4	100	32768	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[0]:[0.0.0.0]/216	192.168.1.3	100	0	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fafd]:[32]:[100.0.0.100]/248	192.168.1.4	100	32768	i	
*>[2]:[0]:[0]:[48]:[00ee.ab39.fb4b]:[32]:[100.0.0.200]/272	192.168.1.3	100	0	i	
*>[3]:[0]:[32]:[192.168.1.3]/88	192.168.1.3	100	0	i	
*>[3]:[0]:[32]:[192.168.1.4]/88	192.168.1.4	100	32768	i	

عجارملا

[و Cisco Nexus 9500 و 9300 يساسألماظنلا لوجمل يمسرلا ريرقتلا يلغ عطاقملا هيچوت 9200 و 3200 و 3100](#)

[عطاقملا هيجوتب ةصاخلا MPLS ربع 2 ةقبطلل EVPN نيوكت](#)

ةمچرتل هذه لوج

ةللأل تاي نقتل نمة ومة مادختساب دن تسمل اذة Cisco تمةرت
ملاعلاء انء مء مء نمة دختسمل معد و تمة مء دقتل ةر شبل او
امك ةق قء نوك ت نل ةللأل ةمچرت لصف أن ةظحال مء ءرء. ةصاأل مء تءل ب
Cisco ةللخت. فرتمة مچرت مء دقء ةللأل ةل فارتحال ةمچرتل عم لاعل او
ىل إلمءءاد ءوچرلاب ةصوء و تاملرتل هذه ةقء نء اهءل وئس م Cisco
Systems (رفوتم طبارل) ةلصلأل ةزىل ءنل اءل دن تسمل