

# ةينب يف يلصألا ددعتملا ثبلا نم ققحتلا SD لولل لوصولا

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[IOS راسملا - MROUTE Hardware جمانب](#)

[IOS MFIB - راسملا ةزهجأ ةجمرب](#)

[MROUTE - FMAN RP ةزهجأ ةجمرب](#)

[FMAN FP - راسملا ةزهجأ ةجمرب](#)

[FMAN FP تانايب ةدعاق - راسملا ةزهجأ ةجمرب](#)

[FED - ةزهجألا ةجمرب راسم](#)

## ةمدقملا

يلصلأا (SD-Access (SDA) ثب نم ققحتلا ةيفيك دنتسمل اذه حضوي

## ةيساسأا تابلطتملا

### تابلطتملا

ةيلال عيضاوملاب ةفرعم كيدل نوكت ناب Cisco ي صوت:

- (IP) تنرتنإلا لوكوتورب هيحوت ةداعإ
- (LISP) لصلأا لوكوتورب/عقوملا ددحم فرعم
- (PIM) ددحم لوكوتورب يل ع دامتعالا نود ددعتملا ثبلل رثانتملا عضولا

### ةمدختسمل تانوكملا

- Cisco IOS® XE 17.10.1 يل ع C9000v
- Cisco Catalyst Center، رادصلأا 2.3.5.3

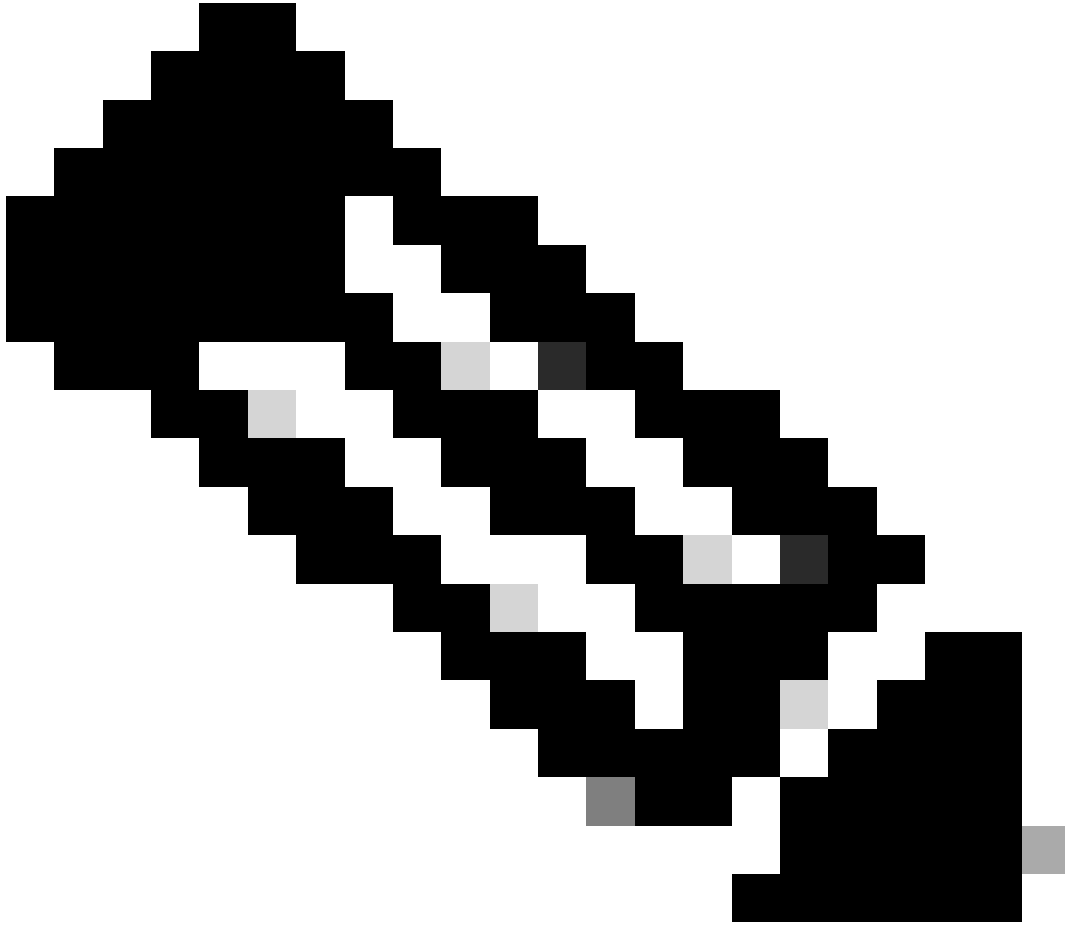
ةصاخ ةيلمعم ةئيب يف ةدوجوملا ةزهألا نم دنتسمل اذه يف ةدراولا تامولعمل عاشنإ م تناك اذا. (يضاارتفا) حوسمم نيوكتب دنتسمل اذه يف ةمدختسمل ةزهألا عيمج تادب رملأا لمحتملا ريثأتلل كمهف نم دكأتف، ليغشتلا دي قكتكبش

ةغصي صةيجمربو زاه اذه عم تلمعتسا تنك اضيأ عيظتسي ةقيثو اذه

- C9200
- C9300
- C9400
- C9500
- C9600
- Cisco IOS® XE 16.12 تارادصلأاو

## ةيساسأا تامولعمل

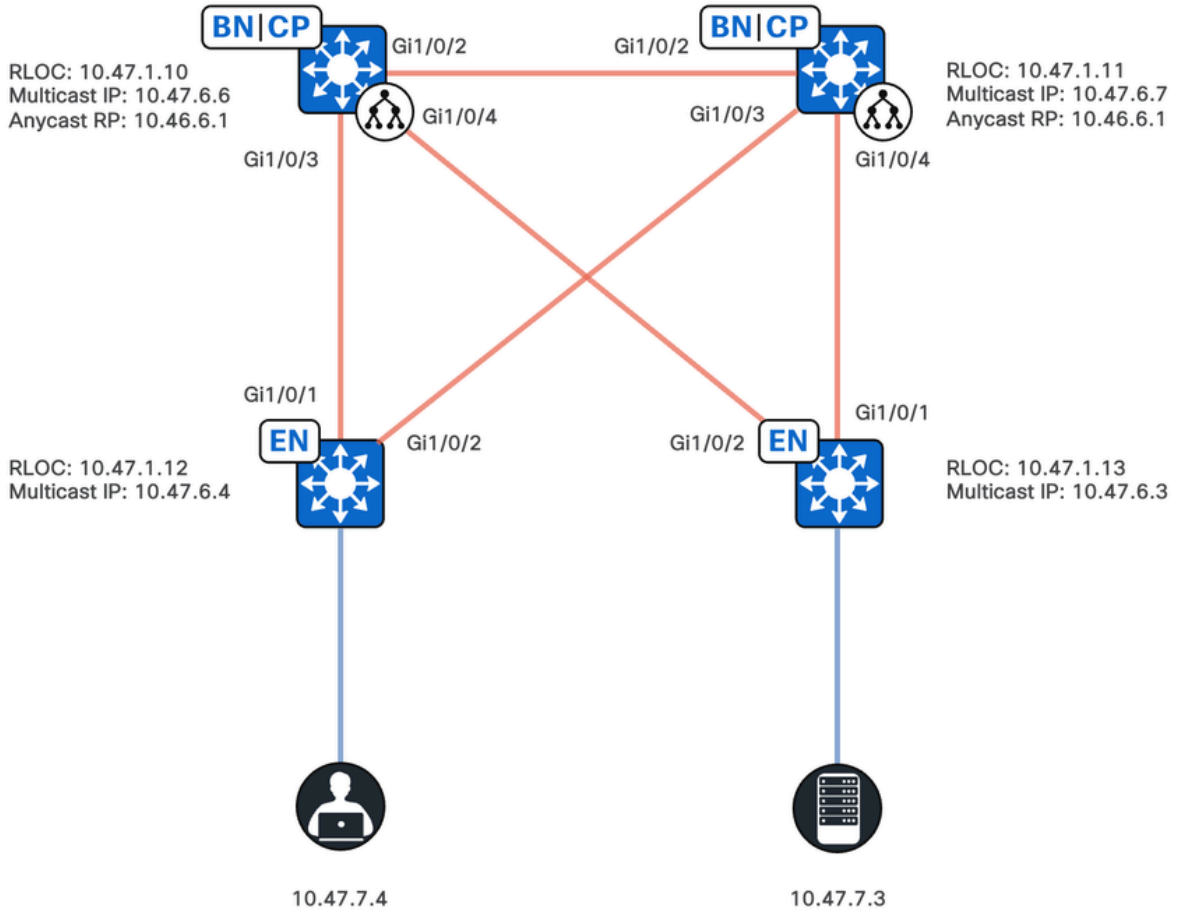
رورم ةكرح لمحل همادختسا متي، بكارت ددعتم ثب نم لكش وه SDA ل يصلأا ددعتملا ثبل ددعتم ثب ةعومجم يف ددعتملا ثبل رورم ةكرح نيضتب، ةينبال ةزهأا نيب ددعتملا ثبل ةزهأا رداصلأا نيب ددعتملا ثبل رورم ةكرح هيحوت يصلأا ددعتملا ثبلل نكمي. يرخأ هيحوت نكمي) ةفلتخم VLAN ةكبش وأ اهسفن VLAN ةكبش يف ام نوكت يتلا لابقتسال نيب ددعتملا ثبل رورم ةكرح هيحوت ةداعإ متت ال. (اهسفن VLAN ةكبش ل ددعتملا ثبل ةكبش ل ربع ددعتم ثب مادختساب اهسفن (FE) ةينبال ةفاح يل ع مالتسال او رداصلأا ددعتملا ثبلل نكمي ال. FE ةطساوب ايلحم اهه هيحوت متي نكلو، (VXLAN) ةيرهظلا ةي ل حملأا ءاقبال ةدم وأ 224.0.0.0/24 قباطت يتلا تاومجم ل ددعتملا ثبل رورم ةكرح هيحوت يصلأا ددعتملا ثبل نيوكت نكمي. (L2) 2 ةقبطلا رمل ربع تانايبال هذه ءلالعم متيو، (TTL) = 1 ةعومجم وأ (SSM) رداصلأا ددعتم ثب وأ (ASM) رداصلأا ددعتم ثب يف هيحوت ةداعإ يصلأا ي. ساسأا ددعتملا ثبل يل ع يصلأا ددعتملا ثبل دمتعت. امه ل كل نم



show رمال نوکي نأ نكمي (Fed) يساسألا مازنلا رماوأ فلتخت نأ نكمي: ةظحالم  
مل اذإ "show platform fed switch <active|standby>" لباقم "platform fed <active|standby>"  
ريغتملا ةبرجت يجرى ف، ةلثمألا يف اهيللا راشملا ةغايصللا عيزوت متي.

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طاطخملا



ةك بش لال ايج ولوب ووط

اي ج ولوب ووط لال هذ ه في

- ياً ن م دودح ياً في 10.47.1.10 و 10.47.1.10 (RLOC) دعب ن ع ق و م لال ددح م فرعم عي م ح ت م تي ث ب لال ردص م فاش ت ك ل لوك و ت و ر ب عم AnyCast (RP) عي م ح ت ة ط ق ن ك اضيأ ل م عي ام ك ، ن ا ك م ه ي ح و ت لال د ة ا ع و ه ي ح و ت لال و ا (VN) ة ي ر ه ا ط لال ة ك ب ش لال في ن ي ن ث ا لال ن ي ب (MSDP) د د ع ت م لال ي ر ه ا ط لال (VRF).
- FE د ق ع يه 10.47.1.12 و 10.47.1.3
- د د ع ت م لال ث ب لال ل ب ق ت س م وه 10.47.7.4
- د د ع ت م لال ث ب لال ردص م وه 10.47.7.3
- (GDA) د د ع ت م لال ث ب لال ة ع و م ح م ة ه و ن ا و ن ع وه 239.0.0.5

## ن ي و ك ت لال

دادع ا ة ي ل م ع ا ذ ه عم ا ن ب SDA لال د و ز ي ن ا ز ك ر م ت ل م ع ت س ا ة ز ا ف ح ة د ا م cisco ن ا ض ر ت ف ي

- ي ل ل ص ا لال د د ع ت م لال ث ب لال وه ل ل ث ا م ت م لال خ س ن لال ع ض و ذ ي ف ن ت
- (ASM) ردص م لال د د ع ت م ث ب ي ا وه د د ع ت م لال ث ب لال ع ض و
- ي ذ لال (MSDP) د د ع ت م لال ث ب لال ردص م فاش ت ك ل لوك و ت و ر ب عم AnyCast (RP) لال ب ق ت س ا ة ط ق ن Collocation Anywhere دودح ي ل ع ه ن ي و ك ت م ت

- لي غشثلا نم عزجك هنيوكت وأ ايودي ددعتملا ثبلا نيوكت مت ،كلذ يل عانب  
ثبلا يل صلألا ددعتملا ثبلا دمت عيو ،ةيلوأللا (LAN) ةيلحمللا ةكبش لئلا لئللا  
ححص لكش بلمعلل ياساسأللا ددعتملا

### نيوكت Fabric Edge (10.47.1.12)

```

ip access-list standard ASM_ACL_IPV4_blue_vn_10.47.6.1
permit 239.0.0.0 0.0.0.255
ip multicast-routing vrf blue_vn
interface LISPO.4100
ip pim lisp transport multicast
ip pim lisp core-group-range 232.0.0.1 1000
interface Vlan1025
ip pim passive
exit
interface Loopback4100
vrf forwarding blue_vn
ip address 10.47.6.4 255.255.255.255
ip pim sparse-mode
ip pim vrf blue_vn rp-address 10.47.6.1 ASM_ACL_IPV4_blue_vn_10.47.6.1
ip pim vrf blue_vn register-source Loopback4100
ip pim vrf blue_vn ssm default
router lisp
service ipv4
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
service ethernet
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
instance-id-range 8188 , 8190 , 8192 , 8193 override
remote-rloc-probe on-route-change
service ethernet
eid-table vlan 1025 , 1026 , 1028 , 2727
database-mapping mac locator-set rloc_222e1707-175d-4019-a783-060404f8bc2f
instance-id 4099
service ipv4
sgt
instance-id 4100
service ipv4
sgt
database-mapping 10.47.6.4/32 locator-set rloc_222e1707-175d-4019-a783-060404f8bc2f
instance-id 8188
service ethernet
eid-table vlan 1025
dynamic-eid detection multiple-addr bridged-vm
instance-id 8190
service ethernet
eid-table vlan 1026
dynamic-eid detection multiple-addr bridged-vm
instance-id 8192
service ethernet
eid-table vlan 1028
dynamic-eid detection multiple-addr bridged-vm
ip domain lookup source-interface Loopback0
ip domain lookup

```

```
ip multicast vrf blue_vn multipath
```

## نيوكت Fabric Edge (10.47.1.13)

```
ip access-list standard ASM_ACL_IPV4_blue_vn_10.47.6.1
permit 239.0.0.0 0.0.0.255
ip multicast-routing vrf blue_vn
interface LISP0.4100
ip pim lisp transport multicast
ip pim lisp core-group-range 232.0.0.1 1000
interface Vlan1025
ip pim passive
exit
interface Loopback4100
vrf forwarding blue_vn
ip address 10.47.6.3 255.255.255.255
ip pim sparse-mode
ip pim vrf blue_vn rp-address 10.47.6.1 ASM_ACL_IPV4_blue_vn_10.47.6.1
ip pim vrf blue_vn register-source Loopback4100
ip pim vrf blue_vn ssm default
router lisp
service ipv4
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
service ethernet
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
instance-id-range 8188 , 8190 , 8192 , 8193 override
remote-rloc-probe on-route-change
service ethernet
eid-table vlan 1025 , 1026 , 1028 , 2727
database-mapping mac locator-set rloc_691b1fe4-5264-44c2-bb1b-0903b3eb2c51
instance-id 4099
service ipv4
sgt
instance-id 4100
service ipv4
sgt
database-mapping 10.47.6.3/32 locator-set rloc_691b1fe4-5264-44c2-bb1b-0903b3eb2c51
instance-id 8188
service ethernet
eid-table vlan 1025
dynamic-eid detection multiple-addr bridged-vm
instance-id 8190
service ethernet
eid-table vlan 1026
dynamic-eid detection multiple-addr bridged-vm
instance-id 8192
service ethernet
eid-table vlan 1028
dynamic-eid detection multiple-addr bridged-vm
ip domain lookup source-interface Loopback0
```

```
ip domain lookup
ip multicast vrf blue_vn multipath
```

AnyCast RP (10.47.1.10) نيوكت/دودحلا نم ناكم يا في عيمجت

```
ip access-list standard ASM_ACL_IPV4_blue_vn_10.47.6.1
permit 239.0.0.0 0.0.0.255
ip multicast-routing vrf blue_vn
interface LISP0.4100
ip pim lisp transport multicast
ip pim lisp core-group-range 232.0.0.1 1000
interface Vlan3001
ip pim sparse-mode
exit
interface Loopback4100
vrf forwarding blue_vn
ip address 10.47.6.1 255.255.255.255
ip pim sparse-mode
interface Loopback4600
vrf forwarding blue_vn
ip address 10.47.6.6 255.255.255.255
ip pim sparse-mode
ip pim vrf blue_vn rp-address 10.47.6.1 ASM_ACL_IPV4_blue_vn_10.47.6.1
ip pim vrf blue_vn register-source Loopback4100
ip pim vrf blue_vn ssm default
ip msdp vrf blue_vn cache-sa-state
ip msdp vrf blue_vn originator-id Loopback4600
ip msdp vrf blue_vn peer 10.47.6.7 connect-source Loopback4600
ip msdp originator-id Loopback4600
router bgp 69420
address-family ipv4 vrf blue_vn
aggregate-address 10.47.6.0 255.255.255.0 summary-only
network 10.47.6.1 mask 255.255.255.255
router lisp
service ipv4
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
service ethernet
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
instance-id 4099
service ipv4
sgt
route-export site-registrations
route-import database bgp 69420 route-map DENY-red_vn locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e1
distance site-registrations 250
map-cache site-registration
instance-id 4100
service ipv4
map-cache 10.47.6.7/32 10.47.1.11 priority 1 weight 100
sgt
route-export site-registrations
```

```
route-import database bgp 69420 route-map DENY-blue_vn locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
distance site-registrations 250
map-cache site-registration
database-mapping 10.47.6.6/32 locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
database-mapping 10.47.6.1/32 locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
site site_uci
authentication-key *****
eid-record instance-id 4100 10.47.6.0/24 accept-more-specifics
```

## AnyCast RP (10.47.1.10) نيوكت/دودحلجلا نم ناكم يا في عي م ح ت

```
ip access-list standard ASM_ACL_IPV4_blue_vn_10.47.6.1
permit 239.0.0.0 0.0.0.255
ip multicast-routing vrf blue_vn
interface LISP0.4100
ip pim lisp transport multicast
ip pim lisp core-group-range 232.0.0.1 1000
interface Vlan3001
ip pim sparse-mode
exit
interface Loopback4100
vrf forwarding blue_vn
ip address 10.47.6.1 255.255.255.255
ip pim sparse-mode
interface Loopback4600
vrf forwarding blue_vn
ip address 10.47.6.6 255.255.255.255
ip pim sparse-mode
ip pim vrf blue_vn rp-address 10.47.6.1 ASM_ACL_IPV4_blue_vn_10.47.6.1
ip pim vrf blue_vn register-source Loopback4100
ip pim vrf blue_vn ssm default
ip msdp vrf blue_vn cache-sa-state
ip msdp vrf blue_vn originator-id Loopback4600
ip msdp vrf blue_vn peer 10.47.6.7 connect-source Loopback4600
ip msdp originator-id Loopback4600
router bgp 69420
address-family ipv4 vrf blue_vn
aggregate-address 10.47.6.0 255.255.255.0 summary-only
network 10.47.6.1 mask 255.255.255.255
router lisp
service ipv4
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
service ethernet
etr map-server 10.47.1.11 key *****
etr map-server 10.47.1.10 key *****
etr map-server 10.47.1.10 proxy-reply
etr map-server 10.47.1.11 proxy-reply
instance-id 4099
service ipv4
sgt
route-export site-registrations
route-import database bgp 69420 route-map DENY-red_vn locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
distance site-registrations 250
```



```

map-cache site-registration
instance-id 4100
service ipv4
map-cache 10.47.6.7/32 10.47.1.11 priority 1 weight 100
sgt
route-export site-registrations
route-import database bgp 69420 route-map DENY-blue_vn locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
distance site-registrations 250
map-cache site-registration
database-mapping 10.47.6.6/32 locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
database-mapping 10.47.6.1/32 locator-set rloc_9080ed56-a6c6-482d-9f46-28eda0e18501
site site_uci
authentication-key *****
eid-record instance-id 4100 10.47.6.0/24 accept-more-specifics

```

## مكححت ال يوتسم نم ققحت ال

نم ادب، مسقلا اذه يف (PIM) لوكوتوربلل لقتسمملا ددعتملا ثبل نم ققحت ال متي (FHR) يلوألا ةوطخل هجوم يلع (S,G) عاشن نم ققحت ال

عاشنإلا (ز، س) رأش تا فإ

بقعت نم ققحت ال 239.0.0.5 يلى ددعتملا UDP ثب مزح، 10.47.7.3، ددعتملا ثبل رصم لسري (RPF)، يسكعل راسملا هيجوت ةداعو، Cisco (CEF) نم عيرسلا هيجوت ال ةداعو، (IPDT) IP زاه AnyCast نأ نم دكأت، كلذ يلى ةفاضل ابو. ددعتملا ثبل رصم وحن حيحص لكش ب ريشي عطقملا اذهل (DR) PIM نم نيعلملا هجوملا وه Gateway SVI.

IPDT لادإ دوجو نامضل "show device-tracking database address <ip address>" رملأا مدختسا حللص

<#root>

Edge-2#

```
show device-tracking database address 10.47.7.3
```

Codes: L - Local, S - Static, ND - Neighbor Discovery, ARP - Address Resolution Protocol, DH4 - IPv4 DHCP  
Preflevel flags (prlvl):

```

0001:MAC and LLA match 0002:Orig trunk 0004:Orig access
0008:Orig trusted trunk 0010:Orig trusted access 0020:DHCP assigned
0040:Cga authenticated 0080:Cert authenticated 0100:Statically assigned
Network Layer Address Link Layer Address Interface vlan prlvl age state Time left
DH4 10.47.7.3 5254.0012.521d Gi1/0/4 1025 0024 166s

```

REACHABLE

81 s try 0(2276 s)

تطبر رصم multicast ل نأ دكأتو "show ip cef vrf <vn name> <ip address>" رملأا تلمعتسا

ةرشابم

<#root>

Edge-2#

```
show ip cef vrf blue_vn 10.47.7.3
```

10.47.7.3/32

nexthop 10.47.7.3 Vlan1025

ةكبش يه RPF ةهجاو نأ نامضل "show ip rpf vrf <vn> <ip address>" رمألا مدختسأ، كلذ دعب  
VLAN س يلو، اهيف دوجوملا ردصملا LISP.

<#root>

Edge-1#

```
show ip rpf vrf blue_vn 10.47.7.3
```

RPF information for (10.47.7.2)

RPF interface: Vlan1025

RPF neighbor: ? (

10.47.7.3

) - directly connected

RPF route/mask: 10.47.7.3/32

RPF type:

unicast (lisp)

Doing distance-preferred lookups across tables

Multicast Multipath enabled.

RPF topology: ipv4 multicast base, originated from ipv4 unicast base

"نكمم|DR ني مضت | show ip pim vrf <vn name> interface vlan <vlan> detail" رمألا مدختسأ  
FHR. اهنأ نمو عطقم ل ل PIM DR يه FE ةدقع نأ نم ققحت ل ل

<#root>

Edge-2#

```
show ip pim vrf blue_vn interface vlan 1025 detail | include DR|enabled
```

PIM: enabled

PIM DR: 10.47.7.1 (this system)

PIM State-Refresh processing: enabled

PIM Non-DR-Join: FALSE

ءاشن| نم ققحتلل "show ip mroute vrf <vn name> <multicast group address>" رمألا مدختسأ  
وأمتهم لبق تسم دوجو مدعل ارظن (OIL) ةيلاخ ةرداص ةهجاو ةمئاق هل نوكي س (S,G). (S,G)  
FHR لى مضمن PIM هجوم

<#root>

Edge-2#

show ip mroute vrf blue\_vn 239.0.0.5

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(\* , 239.0.0.5), 00:00:10/stopped, RP 10.47.6.1, flags: SPF1

Incoming interface: LISPO.4100, RPF nbr 10.47.1.10

Outgoing interface list: Null

(

10.47.7.3

,

239.0.0.5

), 00:00:10/00:02:50, flags: PFT

Incoming interface: Vlan1025, RPF nbr 0.0.0.0

Outgoing interface list:

Null

## FHR (S,G) لى جست

مت يتلا ةهجاو لا مادختساب، AnyCast RP لى لى داأل ثبلا ردصم لى جست ب FHR موقى  
PIM "registered-source" لى لى اسرك اهنى وكت

- لى جراخ لا ناو نعل RLOC لى RLOC (10.47.1.13 لى 10.47.1.10)
- لى جراخ لا سارلا (10.47.6.3 لى 10.47.6.1) لى جراخ لا سارلا

- يقيق حل ددعت مل ثبل

```
<#root>
```

```
Edge-2#
```

```
show ip pim vrf blue_vn tunnel
```

```
Tunnel1
```

```
Type : PIM Encap
```

```
RP : 10.47.6.1
```

```
Source : 10.47.6.3
```

```
State : UP
```

```
Last event : Created (00:42:43)
```

```
Edge-2#
```

```
show ip cef vrf blue_vn 10.47.6.1
```

```
10.47.6.1/32
```

```
nexthop
```

```
10.47.1.10
```

```
LISP0.4100
```

```
<-- FHR happened to register to this RP
```

```
nexthop 10.47.1.11 LISP0.4100
```

## LHR ل (IGMP) تنرتن إلتاع ومجم ةراد لوكوت ورب ةيوضع ريرقت

مامته الة الة إلة راش الة مامض الة الة IGMP ةيوضع ريرقت ددعت مل ثبل لبقت سم لسري  
تالخد إو IGMP الة لفطت الة عاشن إة الة ية دوي ية ذل او ، ددعت مل ثبل رورم ة كرح مالت ساب  
show ip igmp snooping groups vlan (LHR) ةريخ الة ةوطخ الة هجوم الة IGMP ةع ومجم  
<vlan id> <group destination address>" إة فاض الة اب <group>show ip igmp vrf <vn  
name>

```
<#root>
```

```
Edge-1#
```

```
show ip igmp snooping groups vlan 1025 239.0.0.5
```

```
Vlan Group      Type Version Port List
```

```
-----  
1025 239.0.0.5 igmp v2      Gi1/0/5
```

```
Edge-1#
```

```
show ip igmp vrf blue_vn groups 239.0.0.5
```

```
IGMP Connected Group Membership
Group Address Interface Uptime Expires Last Reporter Group Accounted
239.0.0.5 Vlan1025 00:02:01 00:02:58 10.47.7.4
```

show ip pim vrf <vn name> interface vlan <vlan> detail | include DR|enabled  
"نك م|م DR ن ي م ض ت | كل ذ دع ب  
وه LHR ن م دك أت ،

<#root>

Edge-1#

```
show ip pim vrf blue_vn interface vlan 1025 detail | include DR|enabled
```

PIM: enabled

PIM DR: 10.47.7.1 (this system)

PIM State-Refresh processing: enabled

PIM Non-DR-Join: FALSE

## ةيش غت لا عاش ن | (\*,G) LHR

دي دحت لا هجو يلعو ، PIM ةلا ح اضي أ قلخي ه نإف ، IGMP ةي و وضع ريرقت ملت سي LHR ن أ ام ب  
(\*,G) ةلا ح ةي ؤرل "show ip route vrf <vn name><overlay group> | include (\*,G) ك ن ك م ي

<#root>

Edge-1#

```
show ip mroute vrf blue_vn 239.0.0.5 verbose
```

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encaps-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(\* , 239.0.0.5), 1w3d/stopped, RP

10.47.6.1

, flags: SJCl

<-- Anycast RP IP address

Incoming interface: LISP0.4100,

RPF nbr 10.47.1.10

, LISP: [

10.47.1.10

,

232.0.2.245

]

<-- RPF neighbor to reach the Anycast RP, Overlay Group 239.0.0.5 is mapped to Underlay Group 232.0.2.245

Outgoing interface list:

Vlan1025

, Forward/Sparse-Dense, 1w3d/00:02:31, Pkts:0, flags:

<-- IGMP Membership Report/PIM Join received in VLAN 1025, multicast traffic is sent into VLAN 1025

## Under SSM ةومجم يف (\*،G) LHR نبيعت

يه ةومجم ل او RP ب صاخ ل RPF وه ردصم ل (s,g) يساس ال SSM قاق تشا متي (\*،g) نم ةيشغتل ل نبيعت.

<#root>

Edge-1#

show ip mroute 232.0.2.245 10.47.1.10

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

```
(  
10.47.1.10, 232.0.2.245  
) , 2d01h/00:02:28, flags: sT  
<-- 10.47.1.10 in this example is the RPF IP/neighbor to get to the RP, 232.0.2.245 is the Underlay Group
```

Incoming interface:

GigabitEthernet1/0/1

, RPF nbr 10.47.1.0

<-- RPF interface to reach 10.47.1.10

Outgoing interface list:

Null0

, Forward/Dense, 2d01h/stopped, flags:

<-- The Outgoing Interface List (OIL) is Null0, and in Native Multicast, this is treated as a De-Encapsu

ه تحت ي ف (S,G) و ة ي ش غ ت ي ف (\*,G) (RP) دودحل ل لوكوتورب/دودحل ل ئ ش ن ي

show ip route vrf <vn name> <overlay group> verbose" ة ي ش غ ت ل ن م ض (\*,G) ض ر ع ل ل H R P I M ل س ر ي

<#root>

Border-1#

show ip mroute vrf blue\_vn 239.0.0.5 verbose

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

```

(
*, 239.0.0.5
), 2d01h/00:03:05, RP 10.47.6.1, flags: Sp
Incoming interface:
Null
,
RPF nbr 0.0.0.0

Outgoing interface list:
LISPO.4100, (
10.47.1.10, 232.0.2.245
), Forward/Sparse, 2d01h/stopped, Pkts:0, flags: p
10.47.1.12
, 2d01h/00:03:05
<-- This is the RLOC of Edge-1, which is the LHR

```

ف ي show ip route <underlay group address> <rp rloc>"

<#root>

Border-1#

```
show ip mroute 232.0.2.245 10.47.1.10
```

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(

10.47.1.10

,



232.0.2.245

), 2d01h/00:03:13, flags: sT  
Incoming interface:

Null0

,

RPF nbr 0.0.0.0

Outgoing interface list:

GigabitEthernet1/0/3

, Forward/Sparse, 2d01h/00:03:13, flags:

<-- Interface that connects to Edge-1, which is the LHR, a PIM Join was received off this interface

## MSDP SA تقوؤم لال نپزخت لال ةركاذ نم (S,G) border-1 ءاشن

ثب لال ردصم نع border-2 نل عې. border-2 لى لى ددعتم لال ثب لال ردصم لى ج س ت ب FHR ما ق ن ا ث د ح  
ض ر ع ل "show ip msdp vrf <vn name>" ر م ا ل ا م ا د خ ت س ا ك ن ك م ي. MSDP ر ب ع border-1 لى لى ددعتم لال  
MSDP ة ل ا ح.

<#root>

Border-1#

show ip msdp vrf blue\_vn summary

```
MSDP Peer Status Summary
Peer Address AS      State Uptime/  Reset SA  Peer Name
                               Downtime Count Count
10.47.6.7      23456 Up      2d02h   1      1
```

م ت SAs ى ر ت ل "accepted-saS" <peer address> ر ي ظ ن <vn name> show ip msdp vrf ر م ا ل ا م د خ ت س ا  
ر ي ظ ن لال نم ا ه ل و ب ق

<#root>

Border-1#

show ip msdp vrf blue\_vn peer 10.47.6.7 accepted-SAs

MSDP SA accepted from peer 10.47.6.7 (?)

239.0.0.5

10.47.7.3

(?) RP:

10.47.6.7 <-- 239.0.0.5 is the Overlay Group, 10.47.7.3 is the multicast source, 10.47.6.7 is the IP address

أدخل (S.G) "show ip mroute vrf <vn name> <group destination address> verbose" في الواجهة

<#root>

Border-1#

show ip mroute vrf blue\_vn 239.0.0.5 verbose

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(\* , 239.0.0.5), 2d02h/00:03:27, RP 10.47.6.1, flags: Sp

Incoming interface: Null, RPF nbr 0.0.0.0

Outgoing interface list:

LISP0.4100, (10.47.1.10, 232.0.2.245), Forward/Sparse, 2d02h/stopped, Pkts:0, flags: p

10.47.1.12, 2d02h/00:03:27

(

10.47.7.3

,

239.0.0.5

), 00:18:26/00:02:50, flags: PTA

<-- True multicast source

Incoming interface: LISP0.4100, RPF nbr 10.47.1.13, LISP: [

10.47.1.13

,

232.0.2.245

]

<-- RLOC of Edge-2, which is FHR, and 232.0.2.245 is the Underlay multicast group

Outgoing interface list:

10.47.1.12, 00:00:05/00:03:24

<-- RLOC of Edge-1

(S,G) بكارتي ئىشنى (S,G) دودحلا بكارتي

show ip route مادلما دختسلا كنىمى (S,G) شغتلل عجتىتن (S,G) رىطستلا ئىشنى border-1  
<group destination address> ئىفلاضلا تامولعم ئىورل

ئىلمع ىلا 232.0.2.245 و 10.47.1.13 ل Null0 OIL رىشى. اهسفنلو (S,G) ل FHR ناعون كانه  
ئىلمع ىلا 10.47.1.10 ل IIF ئىلمع ىلا Null0 رىشى امنىب: ئىلبكلا

<#root>

Border-1#

show ip mroute 232.0.2.245

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encaps-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(

10.47.1.13

,

232.0.2.245

), 00:02:34/00:00:25, flags: sPT

<-- RLOC of the FHR, underlay multicast group IP

Incoming interface: GigabitEthernet1/0/4, RPF nbr 10.47.1.3 <-- RPF interface towards the FHR

Outgoing interface list: Null <-- Indicates decapsulation

```
(  
10.47.1.10  
,  
232.0.2.245  
) , 2d02h/00:02:41, flags: sT  
<-- RLOC of Border-1, underlay multicast group IP
```

Incoming interface: Null0, RPF nbr 0.0.0.0 <-- Indicates encapsulation

Outgoing interface list:

GigabitEthernet1/0/3, Forward/Sparse, 2d02h/00:02:41, flags: <-- where multicast traffic is sent

تالې صوت و ٲې شغٲ ىل ىل ءافاضا (S,G) FHR ءم ظنم ى قىل ت

ل و ص ح ل ل "show ip route" ر م ال ا م ا د خ ت س ا ك ن ك م ي ، FHR و ح ن (S,G) PIM ط ب ا و ر Border/RP ل س ر ي  
ip mroute vrf <vn name> <sublay group address" ض ر ع م د خ ت س ا ، ء ٲ ى ش غ ت ل ل ي ف . ت ا م و ل ع م ى ل ع

<#root>

Edge-2#

```
show ip mroute vrf blue_vn 239.0.0.5
```

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

```
(* , 239.0.0.5), 1w3d/stopped, RP 10.47.6.1, flags: SPF1
```

Incoming interface: LISPO.4100, RPF nbr 10.47.1.10  
Outgoing interface list: Null

```
(  
10.47.7.3  
,  
239.0.0.5  
) , 1w3d/00:01:23, flags: FT  
<-- Multicast source, true multicast group
```

Incoming interface: Vlan1025, RPF nbr 0.0.0.0  
Outgoing interface list:

```
LISPO.4100, (  
10.47.1.13  
,  
232.0.2.245  
) , Forward/Sparse, 19:12:56/stopped, flags:  
<-- FHR RLOC, underlay group IP
```

```
10.47.1.10, 00:00:09/00:03:19 <-- Border/RP RLOC
```

في عرض الـ show ip route <underlay group address>، يليه الـ لعزل الـ في

```
<#root>
```

```
Edge-2#
```

```
show ip mroute 232.0.2.245
```

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(

10.47.1.13

,

232.0.2.245

), 1w3d/00:03:01, flags: sT

<-- RLOC of the FHR, Underlay multicast group

Incoming interface: Null0, RPF nbr 0.0.0.0 <-- Indicates encapsulation

Outgoing interface list:

GigabitEthernet1/0/1

, Forward/Sparse, 00:01:42/00:03:01, flags:

<-- Where the multicast traffic is forwarded

## ةكرتشملا ةرجشلا لوط ىلع ددعتملا ثبلا رورم ةكرح LHR ىقلتت

RP، نم ةكرتشملا ةرجشلا لوط ىلع فلغملا ددعتملا ثبلا رورم ةكرح LHR لبقتسي نأ دعب مٲ Null0، وه (S,G) ةدعاقلا يف تيزلا نأ ثيح ددعتملا ثبلا رورم ةكرح ةلسبك ليزي هناف مٲ show ip route <underlay group address> و "show ip mroute vrf <vn name> <overlay group address>"

<#root>

Edge-1#

show ip mroute 232.0.2.245

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

```
(
10.47.1.10
,
232.0.2.245
), 2d03h/00:00:36, flags: sT
<-- RLOC of the RP, Underlay group

Incoming interface:
GigabitEthernet1/0/1, RPF nbr 10.47.1.0 <-- RPF interface towards the RP

Outgoing interface list:
Null0, Forward/Dense, 2d03h/stopped, flags: <-- Indicates Decapsulation
```

في show ip mroute vrf <vn name> <overlay group address>"

```
<#root>
```

```
Edge-1#
```

```
show ip mroute vrf blue_vn 239.0.0.5
```

```
IP Multicast Routing Table
```

```
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
Z - Multicast Tunnel, z - MDT-data group sender,
Y - Joined MDT-data group, y - Sending to MDT-data group,
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector, p - PIM Joins on route,
x - VxLAN group, c - PFP-SA cache created entry,
* - determined by Assert, # - iif-starg configured on rpf intf,
e - encap-helper tunnel flag, l - LISP decap ref count contributor
```

```
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
t - LISP transit group
```

```
Timers: Uptime/Expires
```

```
Interface state: Interface, Next-Hop or VCD, State/Mode
```

```
(*, 239.0.0.5), 1w3d/stopped, RP 10.47.6.1, flags: SJC1
```

```
Incoming interface: LISP0.4100, RPF nbr 10.47.1.10
```

```
Outgoing interface list:
```

```
Vlan1025, Forward/Sparse-Dense, 1w3d/00:02:03, flags:
```

```
(
```

```
10.47.7.3, 239.0.0.5
```

```
), 00:01:21/00:01:38, flags: JT1
```

<-- Multicast Source, Overlay Group

Incoming interface: LISP0.4100, RPF nbr 10.47.1.13, LISP:

[

10.47.1.13, 232.0.2.245

]

<-- RLOC of the FHR, Underlay Group

Outgoing interface list:

Vlan1025

, Forward/Sparse-Dense, 00:01:21/00:02:03, flags:

<-- Multicast traffic is forwarded into VLAN 1025

لإلخ نم ةكرتشملا ةرجشلا ب ضقتو (SPT) راسم ةرجش رصقأ لىل LHR ةدحو مضمنت :نأل او  
دعي مل ةكرتشملا ةرجشلا LHR ب ضقت نأ دع ب .ةئزجتلاو ةيشغتلا لىل ف (S,G) PIM تال صو  
show ip mroute vrf show ip mroute vrf show ip mroute vrf show ip mroute vrf show ip mroute vrf  
show ip mroute vrf show ip mroute vrf show ip mroute vrf show ip mroute vrf show ip mroute vrf  
<vn name> <overlay group address>"

<#root>

Border-1#

show ip mroute vrf blue\_vn 239.0.0.5

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(\* , 239.0.0.5), 2d04h/00:03:10, RP 10.47.6.1, flags: S

Incoming interface: Null, RPF nbr 0.0.0.0

Outgoing interface list:

LISP0.4100, (10.47.1.10, 232.0.2.245), Forward/Sparse, 2d04h/stopped, flags:

(10.47.7.3, 239.0.0.5), 00:14:17/00:02:42, flags: PT

Incoming interface: LISP0.4100, RPF nbr 10.47.1.13



Outgoing interface list: Null

إلى رورم الة كرح يقلت مت اذا يتح، طسبم طي طخت يل ع يوتحت دعت مل (S,G) ةينب نأل ارظن موق ي يذلاو LHR، أ إلى اه في لغت ةداعإب موق ي ال RP لوكوتورب نإف، UnderLay ربع 239.0.0.5 ةرجش لال او ردصم ال ةرجش لال نم لك ل (S,G) ةينب نإف، كل لذ عم و. ةكرتشم ال ةرجش لال مي لقتب show رمأل ا مادختساب ةيساسأل ةعومجم ال صحف و RP إلى لقتنا. ةدوجوم لازت ال ةكرتشم ال ip route <underlay group address>"

<#root>

Border-1#

show ip mroute 232.0.2.245

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet, X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement, U - URD, I - Received Source Specific Host Report, Z - Multicast Tunnel, z - MDT-data group sender, Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, \* - determined by Assert, # - iif-starg configured on rpf intf, e - encaps-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join t - LISP transit group

Timers: Uptime/Expires

Interface state: Interface, Next-Hop or VCD, State/Mode

(10.47.1.13, 232.0.2.245), 00:01:07/00:01:52, flags: sPT

Incoming interface: GigabitEthernet1/0/4, RPF nbr 10.47.1.3

Outgoing interface list: Null

(10.47.1.10, 232.0.2.245), 2d04h/00:03:23, flags: sT

Incoming interface: Null0, RPF nbr 0.0.0.0

Outgoing interface list:

GigabitEthernet1/0/3, Forward/Sparse, 2d04h/00:03:23, flags:

مخال طفن لال نم هسفن مي لقتب اضيأ موق ي هنإف، (هطفن) هطفن عي مج لازأ دق RP ناك اذا، show ip route vrf <vn name> ا مادختساب او FHR إلى لاقنت الال (آ) LHR طقف FHR تي ز نمضتي و <ةشغتل ةعومجم ناونع>"

<#root>

Edge-2#

show ip mroute vrf blue\_vn 239.0.0.5

## IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encap-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

```
(* , 239.0.0.5), 1w4d/stopped, RP 10.47.6.1, flags: SPF1  
Incoming interface: LISPO.4100, RPF nbr 10.47.1.10  
Outgoing interface list: Null
```

```
(  
10.47.7.3  
,  
239.0.0.5  
) , 1w3d/00:01:25, flags: FT  
<-- Multicast Source, Overlay Group
```

```
Incoming interface: Vlan1025, RPF nbr 0.0.0.0  
Outgoing interface list:  
LISPO.4100, (  
10.47.1.13, 232.0.2.245  
) , Forward/Sparse, 20:16:48/stopped, flags:  
<-- RLOC of the LHR, Underlay Group
```

## (يساسأل ماظنل نل لقتسم) تانايبلا يوتسم نل ققحتلا

ددعتم ل ثبلا لبقتسم وأ ددعتم ل ثبلا ردصم عنمي نأ فل تخم رادصإ كانه نوكي نأ نكمي  
نأ نكمي يتلا لكاشم ل نل ققحتلا لعل مسقلا اذه زكري. رورم لة كرح لابقتس/الاسرا نل  
اياضقلا لعل زيكرتل عم، ددعتم ل ثبلا يقلتمو ددعتم ل ثبلا ردصم نل لك لعل رثؤت  
ةزهأل عم ربب قلعتت ال يتلا.

## إءاشنإ FHR (S,G)

ةححص اهللك RPF و CEF و LISP و ISF نأ نل ققحتلا (S,G) ءاشنإب FHR موقت نأ لجل نل

"<ipV4 address> ناوع تانايب ةدعاق show device-tracking رمألا مدختسأ، ةحيجصو

<#root>

Edge-2#

```
show device-tracking database address 10.47.7.3
```

Codes: L - Local, S - Static, ND - Neighbor Discovery, ARP - Address Resolution Protocol, DH4 - IPv4 DHCP

Preflevel flags (prlvl):

0001:MAC and LLA match 0002:Orig trunk 0004:Orig access

0008:Orig trusted trunk 0010:Orig trusted access 0020:DHCP assigned

0040:Cga authenticated 0080:Cert authenticated 0100:Statically assigned

	Network Layer Address	Link Layer Address	Interface	vlan	prlvl	age	state	Time left
DH4	10.47.7.3	5254.0012.521d	Gi1/0/4	1025	0024	16s	REACHABLE	232 s try 0(84662 s)

show lisp instance-id <L3 LISP instance id> ipV4 database <IP/32> ISF ةطساوب نم ةدافتسالا م تي

<#root>

Edge-2#

```
show lisp instance-id 4100 ipv4 database 10.47.7.3/32
```

LISP ETR IPv4 Mapping Database for LISP 0 EID-table vrf blue\_vn (IID 4100), LSBs: 0x1  
Entries total 1, no-route 0, inactive 0, do-not-register 1

10.47.7.3/32

, dynamic-eid blue-IPV4, inherited from default locator-set rloc\_691b1fe4-5264-44c2-bb1b-0903b3eb2c51

Uptime: 5w0d, Last-change: 5w0d

Domain-ID: local

Service-Insertion: N/A

Locator Pri/Wgt Source State

10.47.1.13 10/10 cfg-intf site-self, reachable

Map-server Uptime ACK Domain-ID

10.47.1.10 2d04h Yes 0

10.47.1.11 2d15h Yes 0

Edge-2#

```
show ip lisp instance-id 4100 forwarding eid local 10.47.7.3
```

Prefix

10.47.7.3/32

ةوطخلا اهنأ نم دكأتو "show ip cef vrf <vn name> <ip address> رمألا مدختسأ، LISP CEF جمارب  
LISP لىل ريشت ال، VLAN ةكبش يف ةيالاتلا

<#root>

Edge-2#

```
show ip cef vrf blue_vn 10.47.7.3
```

10.47.7.3/32

nexthop 10.47.7.3 Vlan1025

لصتتم هنا بتكاو، حيحص لكش ب (RPF) يسكعل راسملا هي جوت ةداعإ هي جوت نم دكات، اريخأ ةرشابم.

<#root>

Edge-2#

```
show ip rpf vrf blue_vn 10.47.7.3
```

RPF information for (10.47.7.3)

RPF interface: Vlan1025

RPF neighbor: ?

(10.47.7.3) - directly connected

RPF route/mask: 10.47.7.3/32

RPF type: unicast (lisp)

Doing distance-preferred lookups across tables

Multicast Multipath enabled.

RPF topology: ipv4 multicast base, originated from ipv4 unicast base

LISP تانايب ةدعاق نيي عت مدع كلذ نع جتني، ISF/IPDT يف حلص لاخدا دوجو مدع ةلاح يف رصملا لسري نا. (دودحلا) دودحلا لىل ريشي يذلا RPF و CEF هنع جتني امم، FHR لىل ال (S,G)، قافخ RPF يف جتني يا، نراق حيحص ريغ لىل ريشي RPF، رورم ةكرح multicast لكشي.

<#root>

Edge-2#

```
show device-tracking database address 10.47.7.3
```

Codes: L - Local, S - Static, ND - Neighbor Discovery, ARP - Address Resolution Protocol, DH4 - IPv4 DHCP  
Preflevel flags (prlvl):

0001:MAC and LLA match 0002:Orig trunk 0004:Orig access

0008:Orig trusted trunk 0010:Orig trusted access 0020:DHCP assigned

0040:Cga authenticated 0080:Cert authenticated 0100:Statically assigned

Network Layer Address Link Layer Address Interface vlan prlvl age state Time left

Edge-2#

```
show lisp instance-id 4100 ipv4 database 10.47.7.3/32
```

% No database-mapping entry for 10.47.7.3/32.

Edge-2#

```
show ip cef vrf blue_vn 10.47.7.3
```

10.47.7.0/24

nexthop 10.47.1.10

LISP0.4100 <-- Result of a LISP Negative Map-Reply, so the LISP interface is now the RPF interface

nexthop 10.47.1.11

LISP0.4100 <-- Result of a LISP Negative Map-Reply, so the LISP interface is now the RPF interface

Edge-2#

```
show ip rpf vrf blue_vn 10.47.7.3
```

RPF information for (10.47.7.3)

RPF interface:

LISP0.4100

RPF neighbor: ? (

10.47.1.11

)

RPF route/mask: 10.47.7.3/32

RPF type: unicast ()

Doing distance-preferred lookups across tables

Multicast Multipath enabled.

RPF topology: ipv4 multicast base

IP، شې هېجوت مې شيح، تاماص فيضمك ددعتملا شېلا ردمم عم لماعت، اذه عنمل،  
ةلكشملا هذه ىلع ةتباتلا ISF/IPDT طباور بلغتت نأ نكمي، اتاناضي فو

## ردصملا ليجست

ىرخأ ةمزح يألثم LISP/VXLAN مدختسي يذلاو، يداحألا شېلا ةمزح قفدت وه PIM ليجست  
شېلا ردمم ليجست نكمي FHR نأ نم ققحتلل تابلطتملا نم ديدعلا كانه. يداحألا شېلا  
AnyCast RP ىلى ححص لكش ب ددعتملا

GDA. ل ححص لكش ب RP AnyCast نيوكت نم دكأت، الوأ

<#root>

Edge-2#

```
show ip pim vrf blue_vn rp 239.0.0.5
```

Group: 239.0.0.5, RP: 10.47.6.1, uptime 1w4d, expires never

PIM لجس قفن نيوكت نم دكأت

<#root>

Edge-2#

```
show ip pim vrf blue_vn tunnel
```

Tunnel1

Type : PIM Encap

RP : 10.47.6.1 <-- This is from "ip pim vrf blue\_vn rp-address 10.47.6.1 ASM\_ACL\_IPV4\_blue\_vn\_10.47.6.1"

Source : 10.47.6.3 <-- This is from ip pim vrf blue\_vn register-source Loopback4100

State : UP

Last event : Created (1w4d)

AnyCast RP لى IP لى لوصولاً ةيناكم رفوت نم دكأت ل

<#root>

Edge-2#

```
show ip cef vrf blue_vn 10.47.6.1
```

10.47.6.1/32

nexthop

10.47.1.10

LISPO.4100

<-- RLOC of Border-1

nexthop

10.47.1.11

LISPO.4100

<-- RLOC of Border-2

Edge-2#

```
ping vrf blue_vn 10.47.6.1 source lo4100
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.47.6.1, timeout is 2 seconds:

Packet sent with a source address of 10.47.6.3

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/3 ms

## لبقتسمالابناج نم ققحتال

- IGMP MR لاسراب موقوي ددعتمالا ثبالا لبقتسم نا نم دكأت
- ال نا VN نم ديحولال عونل VNس طقف L2 IGMP. لوكوتورب يلعل فطتلال نيكمت نم دكأت نكمي IGMP لفطتي يقلتي
- يف مكحتلال عمئاق، ذفنم لابة صاخلال لوصولال يف مكحتلال عمئاق دوجو مدع نم دكأت مت يتال هجومال ذفنم لابة صاخلال لوصولال يف مكحتلال عمئاق، VLAN ةكبشل لوصولال IGMP MR طقس تبحب اهنيوكت
- ثبالا لبقتسم ناك اذا IGMPv2، وه يضارتفالكشب، IGMP MR رادصل نم ققحتال "ip igmp version 3" بلطتي كلذ نإف، IGMPv3 وه ددعتمال "ip option drop" نيوكت مدع نم دكأت

## لبقتسمالابناج نم ققحتال LHR PIM (\*،G)

- لبقتسمالاب صاخلال عطقم لابة يعرفلال ةكبشلال PIM DR وه LHR نا نم دكأتال
- "ip multicast group-range" نيوكت مدع نم دكأت
- يف مكحتلال عمئاق، ذفنم لابة صاخلال لوصولال يف مكحتلال عمئاق دوجو مدع نم دكأت مت يتال هجومال ذفنم لابة صاخلال لوصولال يف مكحتلال عمئاق، VLAN ةكبشل لوصولال IGMP MR طقس تبحب اهنيوكت
- (CoPP) مكحتلال يوتسم ميظنت وأ ةيلاع (CPU) ةيزكرم ةجلاعم ةدحو دوجو مدع نم دكأت IGMP MR لوكوتورب طاقسال

## لبقتسمالابناج نم ققحتال LHR PIM ةكرتشمالا ةرجشلال نم ققحتال

ةعومجملل نوكم RP دوجو نم دكأت

<#root>

Edge-1#

```
show ip mroute vrf blue_vn 239.0.0.5
```

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,

x - VxLAN group, c - PFP-SA cache created entry,

\* - determined by Assert, # - iif-starg configured on rpf intf,

e - encap-helper tunnel flag, l - LISP decap ref count contributor

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join

t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

(\* , 239.0.0.5), 1w3d/stopped, RP

10.47.6.1

, flags: SJC1

<-- Anycast RP address

Incoming interface: LISP0.4100, RPF nbr 10.47.1.10  
Outgoing interface list:  
Vlan1025, Forward/Sparse-Dense, 1w3d/00:02:36, flags:

AnyCast RP على (RPF) يسكن على راسم ال هي جوت ة داع | ة حص نم دك أت

<#root>

Edge-1#

show ip cef vrf blue\_vn 10.47.6.1

10.47.6.1/32

nexthop 10.47.1.10 LISP0.4100

nexthop 10.47.1.11 LISP0.4100

Edge-1#

show ip rpf vrf blue\_vn 10.47.6.1

RPF information for (10.47.6.1)  
RPF interface: LISP0.4100  
RPF neighbor: ? (10.47.1.10)  
RPF route/mask: 10.47.6.1/32  
RPF type: unicast ()  
Doing distance-preferred lookups across tables  
Multicast Multipath enabled.  
RPF topology: ipv4 multicast base

ي لص أل ا د دع تم ال ث ب ل ل رد ص م ال ب ن ا ج ن م ق ق ح ت ال - MFIB هي جوت ة داع |  
(ة ش غ ت ال)

أ م ز ح ال هي جوت ة داع | ل و ح ي ف ا ض | ة م و ل ع م ل ص ح ي ن ا " show ip mfib vrf <vn name> <overlay group address> <unicast source> verbose"

<#root>

Edge-2#

show ip mfib vrf blue\_vn 239.0.0.5 10.47.7.3 verbose



Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,  
ET - Data Rate Exceeds Threshold, K - Keepalive  
DDE - Data Driven Event, HW - Hardware Installed  
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB  
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary  
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,  
e - Encap helper tunnel flag.  
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,  
NS - Negate Signalling, SP - Signal Present,  
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,  
MA - MFIB Accept, A2 - Accept backup,  
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup  
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second  
Other counts: Total/RPF failed/Other drops  
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps  
VRF blue\_vn  
(10.47.7.3,239.0.0.5) Flags: K HW DDE  
0x530 OIF-IC count: 0, OIF-A count: 1  
SW Forwarding: 0/0/0/0, Other: 0/0/0  
HW Forwarding: 352467143981268992/0/19/0, Other: 0/0/0  
Vlan1025 Flags: RA A MA  
LISPO.4100, (

10.47.1.13

,

232.0.2.245

) Flags: RF F NS

<-- RLOC of FHR, Underlay Group IP address

CEF: Adjacency with MAC:

4500000000004000001184BC0A2F010DE80002F5000012B5000000000840000000100400BA25CDF4AD38BA25CDF4AD380000

Pkts: 0/0/0 Rate: 0 pps

Underlay (UnderLay) يخلص الة ددعت الما ثبلل ردصم الة بناج نم ققحت الة - MFIB هي جوت ةداع

ةيساس الة ةومجم الة ضرعل "show ip route <underlay group address> <rloc of FHR>" مدختس أ

<#root>

Edge-2#

show ip mroute 232.0.2.245 10.47.1.13

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encap-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

```
(  
10.47.1.13  
,  
232.0.2.245  
) , 1w4d/00:03:17, flags: sT  
<-- RLOC of the FHR, Underlay Group
```

Incoming interface:

```
Null0  
, RPF nbr 0.0.0.0  
<-- Indicates Encapsulation
```

Outgoing interface list:

```
GigabitEthernet1/0/1, Forward/Sparse, 00:00:26/00:03:17, flags <-- Where the multicast traffic is forwarded
```

Edge-2#

```
show ip mfib 232.0.2.245 10.47.1.13 verbo
```

```
se  
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,  
ET - Data Rate Exceeds Threshold, K - Keepalive  
DDE - Data Driven Event, HW - Hardware Installed  
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB  
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary  
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,  
e - Encap helper tunnel flag.  
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,  
NS - Negate Signalling, SP - Signal Present,  
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,  
MA - MFIB Accept, A2 - Accept backup,  
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup  
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second  
Other counts: Total/RPF failed/Other drops  
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps  
Default  
(
```

```
10.47.1.13,232.0.2.245
```

```
) Flags: K HW
```

0x348 OIF-IC count: 0, OIF-A count: 1  
SW Forwarding: 0/0/0/0, Other: 0/0/0  
HW Forwarding:

5268151634814304256

/0/1/0, Other: 0/0/0

Null0

Flags: RA A MA  
GigabitEthernet1/0/1 Flags: RF F NS  
CEF: Adjacency with MAC: 01005E0002F552540017FE730800  
Pkts: 0/0/0 Rate: 0 pps

## إدخال مسبب ك ف دع ب ام) ي ل ص أ ل د دع ت م ل ث ب ل - MFIB هي جوت إدعا

ناونع و IP 10.47.1.13 ردصم يلع ة لم ت ش م ل LHR ي ل د دع ت م ل ث ب ل رورم ة ك رح ل ص ت ام دن ع  
ءاغل ل ي غ ش ت ي ل ء ا ر ج ا ل ا ذ ه ي د و ي . ة ر د ا ص ل ا Null0 ة ه ج ا و ل ي ل ا ه ي ج و ت م ت ي ، 232.0.2.245 ة ه ج و ل ا  
ة م ز ح ل ا ة ل س ب ك .

<#root>

Edge-1#

show ip mroute 232.0.2.245 10.47.1.13

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encaps-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode  
(

10.47.1.13

,

232.0.2.245

), 00:38:22/00:00:37, flags: sT

Incoming interface: GigabitEthernet1/0/2, RPF nbr 10.47.1.4

Outgoing interface list:

Null0

, Forward/Dense, 00:01:12/stopped, flags:

Edge-1#

show ip mfib 232.0.2.245 10.47.1.13 verbose

Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,  
ET - Data Rate Exceeds Threshold, K - Keepalive  
DDE - Data Driven Event, HW - Hardware Installed  
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB  
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary  
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,  
e - Encap helper tunnel flag.  
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,  
NS - Negate Signalling, SP - Signal Present,  
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,  
MA - MFIB Accept, A2 - Accept backup,  
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup  
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second  
Other counts: Total/RPF failed/Other drops  
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps  
Default  
(

10.47.1.13,232.0.2.245

) Flags: K HW

0x77 OIF-IC count: 0, OIF-A count: 1

SW Forwarding: 0/0/0/0, Other: 0/0/0

HW Forwarding: 0/0/0/0, Other: 0/0/0

GigabitEthernet1/0/2

Flags: RA A MA

Null0, LISPv4 Decap Flags: RF F NS

CEF: OCE (lisp decap)

Pkts: 0/0/0 Rate: 0 pps

VNI 4100، 239.0.0.5 هنا على يقي قح الحاله جولا IP ناو نع نأ LHR ددحت، ةلس ب كلالا ةلازا دعب  
10.47.7.3 ةم ي ق ب IP ردصم نم اع بان نو كي ي ذل او

<#root>

Edge-1#

show ip mroute vrf blue\_vn 239.0.0.5

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encaps-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

(\*, 239.0.0.5), 1w3d/stopped, RP 10.47.6.1, flags: SJC1  
Incoming interface: LISPO.4100, RPF nbr 10.47.1.10  
Outgoing interface list:  
Vlan1025, Forward/Sparse-Dense, 1w3d/00:02:01, flags:

(

10.47.7.3

,

239.0.0.5

), 00:01:29/00:01:30, flags: JT1

Incoming interface: LISPO.4100, RPF nbr 10.47.1.13

Outgoing interface list:

Vlan1025

, Forward/Sparse-Dense, 00:01:29/00:02:01, flags:

Edge-1#

show ip mfib vrf blue\_vn 239.0.0.5 10.47.7.3

Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,  
ET - Data Rate Exceeds Threshold, K - Keepalive  
DDE - Data Driven Event, HW - Hardware Installed  
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB  
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary  
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,  
e - Encap helper tunnel flag.  
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,  
NS - Negate Signalling, SP - Signal Present,  
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,  
MA - MFIB Accept, A2 - Accept backup,  
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup  
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second  
Other counts: Total/RPF failed/Other drops  
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps  
VRF blue\_vn

(

10.47.7.3,239.0.0.5

) Flags: HW

<-- Unicast Source and Overlay Group

SW Forwarding: 0/0/0/0, Other: 2/1/1

HW Forwarding: 0/0/0/0, Other: 0/0/0

LISP0.4100 Flags: A <-- Incoming Interface

Vlan1025 Flags: F NS <-- Outgoing Interface

Pkts: 0/0/0 Rate: 0 pps

ملتستست يتللا ذفانملا ةفرعمل "show ip igmp snooping groups vlan <vlan>" رمالا مدختسأ ددعتملا ثبلا رورم ةكرح.

<#root>

Edge-1#

show ip igmp snooping groups vlan 1025

Vlan Group	Type	Version	Port List
------------	------	---------	-----------

1025	239.0.0.5	igmp v2	Gi1/0/5
------	-----------	---------	---------

## (يساسألا ماظنلا بسح) تانايبلا يوتسم نم ققحتلا

### IOS راسملا - MROUTE Hardware جم انرب

نم ققحت FED، م FMAN FP، م FMAN RP، م IOS، ةلسلسلا هذه ةزهجالا ةجمرب مدختستو "show ip route vrf <vn name> <overlay group address> verbose" و "show ip route <underlay group address> verbose"

<#root>

Edge-1#

show ip mroute vrf blue\_vn 239.0.0.5 verbose

IP Multicast Routing Table

Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,

L - Local, P - Pruned, R - RP-bit set, F - Register flag,

T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,

U - URD, I - Received Source Specific Host Report,

Z - Multicast Tunnel, z - MDT-data group sender,

Y - Joined MDT-data group, y - Sending to MDT-data group,

G - Received BGP C-Mroute, g - Sent BGP C-Mroute,

N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,

Q - Received BGP S-A Route, q - Sent BGP S-A Route,

V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encap-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

(

\*, 239.0.0.5  
) , 1w3d/stopped, RP 10.47.6.1, flags: SJC1  
Incoming interface: LISP0.4100, RPF nbr 10.47.1.10, LISP: [10.47.1.10, 232.0.2.245]  
Outgoing interface list:  
Vlan1025, Forward/Sparse-Dense, 1w3d/00:02:58, Pkts:0, flags:

(

10.47.7.3, 239.0.0.5  
) , 00:02:19/00:00:40, flags: JT1  
Incoming interface: LISP0.4100, RPF nbr 10.47.1.13, LISP: [10.47.1.13, 232.0.2.245]  
Outgoing interface list:  
Vlan1025, Forward/Sparse-Dense, 00:02:19/00:02:58, Pkts:0, flags:

ي لفس ل ا ع ز ل ا ي ف

<#root>

Edge-1#

show ip mroute 232.0.2.245 verbose

IP Multicast Routing Table  
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,  
L - Local, P - Pruned, R - RP-bit set, F - Register flag,  
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,  
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,  
U - URD, I - Received Source Specific Host Report,  
Z - Multicast Tunnel, z - MDT-data group sender,  
Y - Joined MDT-data group, y - Sending to MDT-data group,  
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,  
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector, p - PIM Joins on route,  
x - VxLAN group, c - PFP-SA cache created entry,  
\* - determined by Assert, # - iif-starg configured on rpf intf,  
e - encap-helper tunnel flag, l - LISP decap ref count contributor  
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join  
t - LISP transit group  
Timers: Uptime/Expires  
Interface state: Interface, Next-Hop or VCD, State/Mode

(

10.47.1.13, 232.0.2.245

```
), 01:18:55/00:02:04, flags: sT
Incoming interface: GigabitEthernet1/0/2, RPF nbr 10.47.1.4
LISP EID ref count: 1, Underlay ref timer: 00:05:13
Outgoing interface list:
Null0, Forward/Dense, 00:01:46/stopped, Pkts:0, flags:
(
10.47.1.10, 232.0.2.245
```

```
), 2d06h/00:02:59, flags: sT
Incoming interface: GigabitEthernet1/0/1, RPF nbr 10.47.1.0
LISP EID ref count: 1, Underlay ref timer: 00:05:12
Outgoing interface list:
Null0, Forward/Dense, 2d06h/stopped, Pkts:0, flags:
```

## راسم الةزهجأة مجمر ب - IOS MFIB

show ip mfib vrf <vn name> <overlay group address> " MFIB دي قو فافش لة تقود  
"show ip route <underlay group address> رة لاسر"

بكارتل الي

```
<#root>
```

```
Edge-1#
```

```
show ip mfib vrf blue_vn 239.0.0.5 verbose
```

```
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
MA - MFIB Accept, A2 - Accept backup,
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF blue_vn
(
```

```
*,239.0.0.5
```

```
) Flags: C K HW
0x6D OIF-IC count: 0, OIF-A count: 1
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 16218869633044709376/0/0/0, Other: 0/0/0
LISP0.4100 Flags: RA A MA NS
Vlan1025 Flags: RF F NS
CEF: Adjacency with MAC: 01005E00000500000C9FFB870800
Pkts: 0/0/0 Rate: 0 pps
(
```



10.47.7.3,239.0.0.5

```
) Flags: K HW DDE
0x7B OIF-IC count: 0, OIF-A count: 1
SW Forwarding: 0/0/0/0, Other: 2/0/2
HW Forwarding: 0/0/0/0, Other: 0/0/0
LISP0.4100 Flags: RA A MA
Vlan1025 Flags: RF F NS
CEF: Adjacency with MAC: 01005E00000500000C9FFB870800
Pkts: 0/0/0 Rate: 0 pps
```

يوسف السليمان

<#root>

Edge-1#

show ip mfib 232.0.2.245 verbose

```
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
MA - MFIB Accept, A2 - Accept backup,
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
(
```

10.47.1.10,232.0.2.245

```
) Flags: K HW
0x18 OIF-IC count: 0, OIF-A count: 1
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 8384858081233731584/0/0/0, Other: 0/0/0
GigabitEthernet1/0/1 Flags: RA A MA
Null0, LISPv4 Decap Flags: RF F NS
CEF: OCE (lisp decap)
Pkts: 0/0/0 Rate: 0 pps
(
```

10.47.1.13,232.0.2.245

```
) Flags: K HW
0x77 OIF-IC count: 0, OIF-A count: 1
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
GigabitEthernet1/0/2 Flags: RA A MA
Null0, LISPv4 Decap Flags: RF F NS
CEF: OCE (lisp decap)
Pkts: 0/0/0 Rate: 0 pps
```

## MROUTE - FMAN RP ةزهجأ ةجمرب

VRF فرع م طاق تلاب الوأ مق ، FMAN RP ةحص نم ققحتلل

```
<#root>
```

```
Edge-1#
```

```
show vrf detail blue_vn | include Id
```

```
VRF blue_vn (
```

```
VRF Id = 2
```

```
); default RD <not set>; default VPNID <not set>
```

مدختسأ (\*,g) ةيشغتلل نم ققحتلل. ةيلال رماوألل VRF سرهف ةمي ق مدختسأ ، كلذ دع ب  
show platform software switch active r0 mfib vrf index <vrf index> ةومجم <sublay group  
address>/32"

```
<#root>
```

```
Edge-1#
```

```
show platform software ip switch active r0 mfib vrf index 2 group 239.0.0.5/32
```

```
Route flags:
```

```
S - Signal; C - Directly connected;
```

```
IA - Inherit A Flag; L - Local;
```

```
BR - Bidir route
```

```
*, 239.0.0.5/32 --> OBJ_INTF_LIST (0x6d)
```

```
Obj id: 0x6d, Flags: C
```

```
OM handle: 0x348030b738
```

show platform software switch active r0 mfib vrf مدختسأ (S,G) ةيشغتلل نم ققحتلل  
index 2 ةومجم ناو نع <sublay group address> <unicast source>"

```
<#root>
```

```
Edge-1#
```

```
show platform software ip switch active r0 mfib vrf index 2 group address 239.0.0.5 10.47.7.3
```

```
Route flags:
```

```
S - Signal; C - Directly connected;
```

```
IA - Inherit A Flag; L - Local;
```

```
BR - Bidir route
```

```
239.0.0.5, 10.47.7.3/64 --> OBJ_INTF_LIST (0x7f)
```

Obj id: 0x7f, Flags: unknown  
OM handle: 0x34803a3800

show platform software switch active r0 mfib group address <underlay group address> <rp address>"  
ةيشغتلل (S,G) ساسأل نم ققحتلل

<#root>

Edge-1#

```
show platform software ip switch active r0 mfib group address 232.0.2.245 10.47.1.10
```

Route flags:

S - Signal; C - Directly connected;

IA - Inherit A Flag; L - Local;

BR - Bidir route

232.0.2.245, 10.47.1.10/64 --> OBJ\_INTF\_LIST (0x18)

Obj id: 0x18, Flags: unknown

OM handle: 0x34803b9be8

show platform software switch active r0 mfib group address <underlay group address> <rloc of FHR>"  
ةيشغتلل (S,G) ساسأل نم ققحتلل

<#root>

Edge-1#

```
show platform software ip switch active r0 mfib group address 232.0.2.245 10.47.1.13
```

Route flags:

S - Signal; C - Directly connected;

IA - Inherit A Flag; L - Local;

BR - Bidir route

232.0.2.245, 10.47.1.13/64 --> OBJ\_INTF\_LIST (0x77)

Obj id: 0x77, Flags: unknown

OM handle: 0x348026b988

راسملا ةزهجأ ةجمررب - FMAN FP

show platform software switch active f0 mfib vrf index <vrf id> group <overlay group address>"  
ةيشغتلل (S,G) ساسأل نم ققحتلل

<#root>

Edge-1#

```
show platform software software ip switch active f0 mfib vrf index 2 group 239.0.0.5/32
```

```
Route flags:
S - Signal; C - Directly connected;
IA - Inherit A Flag; L - Local;
BR - Bidir route
*, 239.0.0.5/32 --> OBJ_INTF_LIST (0x6d)
Obj id: 0x6d, Flags: C
aom id:

100880

, HW handle: (nil) (created)
```

show platform software switch active f0 mfib vrf index <vrf id> <sublay group address> <unicast source>"

<#root>

Edge-1#

```
show platform software ip switch active f0 mfib vrf index 2 group address 239.0.0.5 10.47.7.3
```

```
Route flags:
S - Signal; C - Directly connected;
IA - Inherit A Flag; L - Local;
BR - Bidir route
239.0.0.5, 10.47.7.3/64 --> OBJ_INTF_LIST (0x8f)
Obj id: 0x8f, Flags: unknown
aom id:

161855

, HW handle: (nil) (created)
```

show platform software switch active f0 mfib group address <underlay group address> <rp address>"

<#root>

Edge-1#

```
show platform ip switch active f0 mfib group address 232.0.2.245 10.47.1.10
```

```
Route flags:
S - Signal; C - Directly connected;
IA - Inherit A Flag; L - Local;
BR - Bidir route
232.0.2.245, 10.47.1.10/64 --> OBJ_INTF_LIST (0x18)
Obj id: 0x18, Flags: unknown
aom id:

138716

, HW handle: (nil) (created)
```

show platform software switch active f0 mfib group address <underlay group address> <rloc of FHR" (S,G) ةيشغتلل (S,G) ساسأل نم ققحتلل

<#root>

Edge-1#

```
show platform software ip switch active f0 mfib group address 232.0.2.245 10.47.1.13
```

Route flags:

S - Signal; C - Directly connected;

IA - Inherit A Flag; L - Local;

BR - Bidir route

232.0.2.245, 10.47.1.13/64 --> OBJ\_INTF\_LIST (0x5)

Obj id: 0x5, Flags: unknown

aom id:

161559

, HW handle: (nil) (created)

FMAN FP تانايب ةدعاق - راسملا ةزهجأ ةجمرب

show platform software object-manager switch active f0 object <object id> parent فMAN FP نئاك ةحص نم ققحتلل

(\*,G) ةيشغتلل نم ققحتلل، لاثملا ليلبس ىلع

<#root>

Edge-1#

```
show platform software object-manager switch active f0 object 100880 parents
```

Object identifier: 100605

Description: ipv4\_mcast table 2 (

blue\_vn

), vrf id 2

Status: Done

Object identifier: 100878

Description:

m1ist 109

Status: Done

(S,G) ةيشغتلل ةحص نم ققحتلل

<#root>

Edge-1#

```
show platform software object-manager switch active f0 object 161855 parents
```

Object identifier: 100605

Description: ipv4\_mcast table 2 (blue\_vn), vrf id 2

Status: Done

Object identifier: 161854

Description:

```
mlist 143
```

Status: Done

راسم ل ن ع ة ل و ص ف م (OIL) ة ر د ا ص ل ل ة ه ج ا و ل ا ة م ئ ا ق و (IIF) ة د ر ا و ل ا ة ه ج ا و ل ا ن م ة ع و م ج م ي ه ة م ئ ا ق ل ل  
show platform software mlist switch active f0 index <index> ف ل ت خ م ن ئ ا ك ي ف ة م ئ ا ق ل ل ة ح ص ن م ق ق ح ت ل ل .

<#root>

Edge-1#

```
show platform software mlist switch active f0 index 109
```

Multicast List entries

OCE Flags:

NS - Negate Signalling; IC - Internal copy;

A - Accept; F - Forward;

OCE Type OCE Flags Interface

-----  
0xf8000171 OBJ\_ADJACENCY NS, A LISP0.4100

<-- Incoming Interface for (\*,G)

0xf80001f1 OBJ\_ADJACENCY NS, F Vlan1025

<-- Outgoing Interface for (S,G)

<#root>

Edge-1#

```
show platform software mlist switch active f0 index 143
```

Multicast List entries

OCE Flags:

NS - Negate Signalling; IC - Internal copy;

A - Accept; F - Forward;

OCE Type OCE Flags Interface

-----  
0xf8000171 OBJ\_ADJACENCY A LISP0.4100

<-- Outgoing Interface for (S,G)

0xf80001f1 OBJ\_ADJACENCY NS, F Vlan1025

<-- Incoming Interface for (S,G)

## FED - ةزهجألا ةجمرب راسم

show platform software fed switch active ip mfib vrf  
<vn name> <sublay group address> <unicast source>"

<#root>

Edge-1#

show platform software fed switch active ip mfib vrf blue\_vn 239.0.0.5 10.47.7.3

Multicast (S,G) Information

VRF : 2

Source Address : 10.47.7.3

HTM Handler : 0x7f0efe53a638

SI Handler : 0x7f0efe50ec68

DI Handler :

0x7f0efe530768

REP RI handler : 0x7f0efe5387e8

Flags :

Packet count : 0

State : 4

RPF :

LISPO.4100 A

OIF :

Vlan1025 F NS

LISPO.4100 A

(Adj: 0xf8000171 )

show platform software fed switch active ip mfib  
<underlay group address> <rloc of FHR>"

<#root>

Edge-1#

show platform software fed switch active ip mfib 232.0.2.245 10.47.1.13

Multicast (S,G) Information

VRF : 0

Source Address : 10.47.1.13

HTM Handler : 0x7f0efe512408

SI Handler : 0x7f0efe5158f8





CPU Map Index (CMI) [0]

ctiLo0 = 0  
ctiLo1 = 0  
ctiLo2 = 0  
cpuQNum0 = 0  
cpuQNum1 = 0  
cpuQNum2 = 0  
npuIndex = 0  
stripSeg = 0  
copySeg = 0

=====  
  
لفسألل (S,G)

<#root>

Edge-1#

```
show platform hardware fed switch active fwd-asic abs print-resource-handle 0x7f0efe525538 1
```

```
Handle:0x7f0efe525538 Res-Type:ASIC_RSC_DI Res-Switch-Num:255 Asic-Num:255 Feature-ID:AL_FID_L3_MULTICA  
00 00 00 00 00 00 00 00 00 00 00 00 0d 01 2f 0a f5 02 00 e8 00 00 00 00 00 00 00 00 00 00 00 00 00  
Detailed Resource Information (ASIC_INSTANCE# 0)
```

-----  
Destination index = 0x5284

pmap = 0x00000000 0x00000000 <-- Expected since this is the Underlay, and recirculation is required to s

cmi = 0x0

rcp\_pmap = 0x1 <-- Indicates recirculation is required

al\_rsc\_cmi

CPU Map Index (CMI) [0]

ctiLo0 = 0  
ctiLo1 = 0  
ctiLo2 = 0  
cpuQNum0 = 0  
cpuQNum1 = 0  
cpuQNum2 = 0  
npuIndex = 0  
stripSeg = 0  
copySeg = 0

Detailed Resource Information (ASIC\_INSTANCE# 1)

-----  
Destination index = 0x5284

pmap = 0x00000000 0x00000000

cmi = 0x0

rcp\_pmap = 0x0

al\_rsc\_cmi

CPU Map Index (CMI) [0]

ctiLo0 = 0  
ctiLo1 = 0  
ctiLo2 = 0  
cpuQNum0 = 0  
cpuQNum1 = 0  
cpuQNum2 = 0

npuIndex = 0  
stripSeg = 0  
copySeg = 0

=====

ةمچرتل هذه ل و ح

ةلأل تاي نقتل ن م ة و مچ م ادخت ساب دن تسم ل ا اذ ه Cisco ت مچرت  
م ل ا ل ا ا ن ا ع مچ ي ف ن م دخت س م ل ل م عد ي و ت ح م م ي دقت ل ة ي ر ش ب ل و  
ا م ك ة ق ي ق د ن و ك ت ن ل ة ل ا ة مچرت ل ض ف ا ن ا ة ظ ح ا ل م ي ج ر ي . ة ص ا خ ل ا م ه ت غ ل ب  
Cisco ي ل خ ت . ف ر ت ح م مچرت م ا ه م د ق ي ي ت ل ا ة ي ف ا ر ت ح ا ل ا ة مچرت ل ا ع م ل ا ح ل ا و ه  
ي ل ا م ا د ع و ج ر ل ا ب ي ص و ت و ت ا مچرت ل ا ه ذ ه ة ق د ن ع ا ه ت ي ل و ئ س م Cisco  
Systems (ر ف و ت م ط ب ا ر ل ا) ي ل ص ا ل ا ي ز ي ل ج ن ا ل ا دن ت س م ل ا