

1 ةلحرمل LISP ربع ددعتملا ثبل انيوكت

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ةمدقملا

لصف لوكتورب ربع ددعتملا ثبل اذيفنت نم 1 ةلحرمل اذيف هئا دننسملا اذو حضوي متي هئا نعي وهو. لثامتملا لخدملا خسن مادختسا متي، (LISP) عقوملا ددحم/فرعملا ةيوهلا تامولعمل ددعتملا ثبل لقنل (RLOC) اذخال ثبل اذيفنت عقوم ددحم بلق مادختسا (EID).

ةيساسال تابلطتملا

تابلطتملا

ددعتملا ثبل او LISP ب ةفرعم كيدل نوكت ناب Cisco ي صوت.

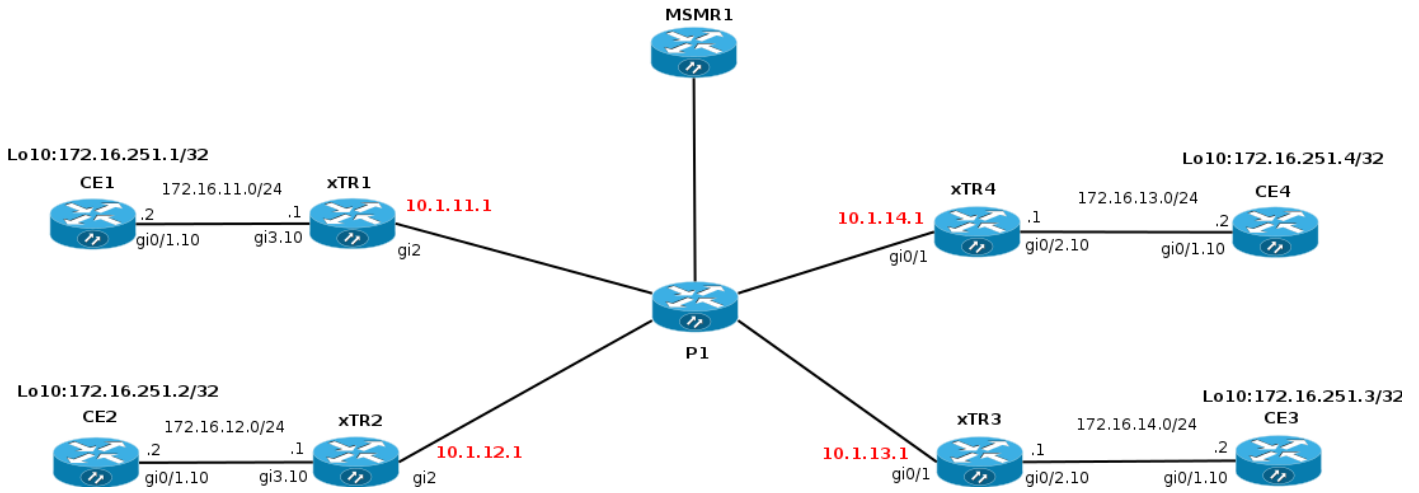
ةمدختسملا تانوكملا

ةنيعم ةيдам تانوكم وجمارب تارادصا يلع دننسملا اذو رصتقي ال.

ةصاخ ةيلمعم ةئيبي في ةدوجوملا ةزهجال نم دننسملا اذو في ةدراولا تامولعمل اءاشن اذو مت تانك اذو. (يضا رتفا) حوسمم نيوكتب دننسملا اذو في ةمدختسملا ةزهجال اذو عيمج تادب رما يال لمتحمل ريثاتلل كمهف نم دكأتف، ةرشابم كتكبش.

نيوكتلا

ةكبش ل لطيطختلا مسرلا



تانيوكتال

ددعتم ل ثب ل مزحل يداح لال ثب ل فرطال ل ثامم ل خسن ل 1 ةلحرمل معدت

- في لولوال ةلحرمل معد أدبي و Cisco IOS® 15. 4(2)T و XE 3. 13 في لولوال ةلحرمل معد أدبي.
- و XE 3. 13 في أدبت يتال (لقنل) IPv4 RLOCs تاودأ ربع IPv4 نيوانع معدت 1 ةلحرمل و Cisco IOS® 15. 4(2)T.
- في Polaris 16.6.1 في أدبت (لقنل) IPv4 RLOCs ربع IPv6 EIDs نيوانع معدت 1 ةلحرمل ةطساوب ددحمل لوصول VXLAN نيمنضت عم LISP ل طقف يضارتفالال VRF عضو (SDA) جماربال.
- عم (ةئزجتال) (VRF) ةيوهال فرعمل يرهظال هيجوتال ةداعو هيجوتال لولوال ةلحرمل معدت ةينبال ةرادا فرعمل يكلسالال ددرتال معد معد لال خ نم) (IIDs) ةيوهال تافرعم ةيساسال (PIM).
- ردمم ل ددعتم ل ثب ل او (ASM) ردمم ل ددعتم ل ثب ل جدامن ي 1 ةلحرمل معدت (SSM).
- طقف (RP) تبالال هيجوتال جلام نيوكت 1 ةلحرمل معدت.
- RP راركت 1 ةلحرمل معدت ال.
- لعل ةرداقال تالبقتسم ل او رداصم ل عقاوم نم ةعونتم تاعومجم لولوال ةلحرمل معدت عقاوم ل ددعتم لادحت ماظن مادختسا لعل ةرداقال ريغو (LISP) عقاوم ل ددعتم لادحت ماظن مادختسا (LISP).
- LISP (DCI) لقننل تانايبال زكرم لاصتال ل LISP ل ددعتم ل ثب ل معد متي ال.

أو LISP0 ةهجاو تحت "ip pim sparse-mode" ةفاضل بجي، LISP ربع ددعتم ل ثب ل نيكتم ل تامولعم نوكتت. RPF في هنيمنضت متي، LISP ةهجاو لعل PIM نيكتم لال خ نم. LISP0.xx نم LISP عقاوم ربع اهيل لوصول نكمي يتال تالال (RPF) يسكعل راسم ل هيجوت ةداع ل مداخل عقاوم صخال ل RLOC ناوعب هليثمت متي راجو LISP قفن.

PIM لئاسر ل ددعتم ل متي ال. LISP قافنأ ربع لاسرالاب صقلال/مامضنال لئاسر طقف حمسي (RP) لي محتل ل xTR ل ل ثب ل يداح PIM مي لقت/طبر لئاسر نيمنضت متي. عقاوم ل ني Hello دجوي ال. لخال xTRs/PxTRs ةطساوب مي لقتال/مامضنال لئاسر ضرع متي ال. (ردم ل أو MVPN) في يضارتفالال MDT ل ريظن.

ددعتم ل ثب ل ةجالعمل LISP قفن تاهجاو نمض PIM نيكتم بجي.

دروم ل ةئف فرعمل VRFs عم نارتق لالاب LISP ةئف فرعمل ةيضارتفالال ةاكالمدختست (VRF) EID VRF/LISP لئاسر فرعم لكل x=IID شي LISP0.x ةهجاو عاشن متي. ددعتم لال صخال (VRF).

```
xTR1#sh run
!
interface LISP0
 ip pim sparse-mode <<<< PIM under the LISP interface
!
interface LISP0.20
 ip pim sparse-mode <<<< PIM under the LISP interface
end
```

```
xTR1#sh ip pim int
```

Address	Interface	Ver/ Mode	Nbr Count	Query Intvl	DR Prior	DR
172.16.11.1	GigabitEthernet3.10	v2/S	1	30	1	172.16.11.2
10.1.255.1	LISP0	v2/S	0	30	1	10.1.255.1

PIM لدابت مدعو ةطشن تالبقتسم/رداصم دوجو مدع ببسب LISP ةهجاو ربع ناريج ىري ال
ءارظنلل نيب Hello.

```
xTR1#sh ip pim nei
```

```
PIM Neighbor Table
```

```
Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
      P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
      L - DR Load-balancing Capable
```

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.11.2	GigabitEthernet3.10	01:43:52/00:01:34	v2	1 / DR S P G

SSM

(S,G) لىغشت لىل ي دوى هن ا. ةومجم لىل امامضن الل CE2 لىل lo10 ةهجاو لىل نىوكتب مقنل
نىددجم رءصم ةومجم نال طبر.

```
CE2#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
CE2(config)#int lo10
```

```
CE2(config-if)#ip igmp join-group 232.1.1.10 source 172.16.251.1
```

```
*Nov 26 18:28:55.471: PIM(0): Insert (172.16.251.1,232.1.1.10) join in nbr 172.16.12.1's queue
*Nov 26 18:28:55.491: PIM(0): Building Join/Prune packet for nbr 172.16.12.1
*Nov 26 18:28:55.491: PIM(0): Adding v2 (172.16.251.1/32, 232.1.1.10), S-bit Join
*Nov 26 18:28:55.492: PIM(0): Send v2 join/prune to 172.16.12.1 (GigabitEthernet0/1.10)
*Nov 26 18:28:56.856: PIM(0): Send v2 join/prune to 172.16.12.1 (GigabitEthernet0/1.1)
```

CE2 لىل (S,G) راسملا عاشن ا متى.

```
CE2#sh ip mro 232.1.1.10
```

```
<...skip...>
```

```
(172.16.251.1, 232.1.1.10), 00:00:16/00:02:45, flags: sLTI
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.12.1
  Outgoing interface list:
    Loopback10, Forward/Sparse, 00:00:14/00:02:45
```

xTR2 لىل ةدحى امم ققحتن انعد

xTR2 لىل debug ip pim نىكمت متى.

CE2. نم مامضن الال (S,G) يقلت مت

```
*Nov 26 18:38:19.641: PIM(0): Received v2 Join/Prune on GigabitEthernet3.10 from 172.16.12.2, to us
```

```
*Nov 26 18:38:19.641: PIM(0): Join-list: (172.16.251.1/32, 232.1.1.10), S-bit set
```

داع| نع ثحب ل لش ف ،ببس ل اذهلو .دعب علض ل ا ف دجوي ال و xTR1 نم ديع وه 172.16.251.1 دواع| هجاو اذا| LISP ثحب لغشي هن| . 172.16.251.1 IP ردصم ل ل (RPF) يسكعل راسم ل هيجوت دواع| هجاو اذا| LISP قفن يه (RPF) يسكعل راسم ل هيجوت

```
*Nov 26 18:38:19.641: PIM(0): RPF Lookup failed for 172.16.251.1
```

```
*Nov 26 18:38:19.643: PIM(0): Add GigabitEthernet3.10/172.16.12.2 to (172.16.251.1, 232.1.1.10), Forward state, by PIM SG Join
```

```
*Nov 26 18:38:19.650: PIM(0): Insert (172.16.251.1,232.1.1.10) join in nbr 10.1.11.1's queue
```

```
xTR2#sh ip rpf 172.16.251.1
```

```
RPF information for ? (172.16.251.1)
```

```
RPF interface: LISP0
```

```
RPF neighbor: ? (10.1.11.1)
```

```
RPF route/mask: 172.16.251.1/32
```

```
RPF type: unicast ()
```

```
Doing distance-preferred lookups across tables
```

```
RPF topology: ipv4 multicast base
```

10.1.11.1. RLOC ربع ردصم ل ل ل LISP هجاو ربع هل اسراو (S,G) مامضنا عاشن| متي ،كلذ دعب

```
*Nov 26 18:38:19.650: PIM(0): Building Join/Prune packet for nbr 10.1.11.1
```

```
*Nov 26 18:38:19.650: PIM(0): Adding v2 (172.16.251.1/32, 232.1.1.10), S-bit Join
```

```
*Nov 26 18:38:19.650: PIM(0): Adding LISP Unicast transport attribute in join/prune to 10.1.11.1 (LISP0)
```

```
*Nov 26 18:38:19.650: PIM(0): Send v2 join/prune to 10.1.11.1 (LISP0)
```

نم RLOC وه ةفلغم ل ةمزح ل نم IP ردصم ل . يداح ال ا ثب ل ل LISP سار ي ف طبرل ن نمضت متي يقلت ي ا xTR ل نم ناو نع RLOC ل ip ةيغال . ةمزح ل ل اسرا هل لالخ نم متي ي ت ل هجاو ال ردصم multicast ل نم ديع ل ل ل reachability

```
xTR2#sh ip lisp map-cache 172.16.251.1
```

```
LISP IPv4 Mapping Cache for EID-table default (IID 0), 4 entries
```

```
172.16.251.1/32, uptime: 02:18:16, expires: 21:41:44, via map-reply, complete
```

```
Sources: map-reply
```

```
State: complete, last modified: 02:18:16, map-source: 10.1.11.1
```

```
Idle, Packets out: 41(4838 bytes) (~ 01:21:15 ago)
```

```
Locator Uptime State Pri/Wgt
```

```
10.1.11.1 02:18:16 up 100/100
```

```
Last up-down state change: 02:18:16, state change count: 1
```

```
Last route reachability change: 02:18:16, state change count: 1
```

```
Last priority / weight change: never/never
```

```
RLOC-probing loc-status algorithm:
```

```
Last RLOC-probe sent: never
```

تامولعم ل ل ل لوصح ل ل درجم ب . PIM راج ك ي دل نو ك ي نأ بجي ،"مامضنا" ل اسرا نم نكمت ي كل ةلباقم ل RLOC ل راج عاشن اب ح ي رص ل ك شب PIM موق ي ، (RPF) يسكعل راسم ل هيجوت دواع| هجاو اذا| LISP قفن ربع رمي ال PIM Hello ن ال ةدات عمل ة ق ي رط ل اب راج ل عاشن| متي مل

```
xTR2#sh ip pim nei
```

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.12.2	GigabitEthernet3.10	01:57:04/00:01:30	v2	1 / DR S P G
10.1.11.1	LISP0	00:00:48/00:01:10	v2	0 /

ةروضلا يف حضوم وه امك ددعتملا ثبلا ةمزلح Wireshark طاقنلا متي

No.	Time	Source	Destination	Protocol	Info
1433	2017-11-26 19:40:01.922318	10.1.11.1	10.1.255.41	TCP	[TCP Keep-Alive ACK] 38534 → 4342 [ACK] Se...
1434	2017-11-26 19:40:07.759677	10.1.11.10	224.0.0.5	OSPF	Hello Packet
1435	2017-11-26 19:40:10.230530	10.1.11.1	224.0.0.5	OSPF	Hello Packet
1436	2017-11-26 19:40:17.509349	10.1.11.10	224.0.0.5	OSPF	Hello Packet
1437	2017-11-26 19:40:18.428913	10.1.255.2	224.0.0.13	PIMv2	Join/Prune
1438	2017-11-26 19:40:20.006961	10.1.11.1	224.0.0.5	OSPF	Hello Packet
1439	2017-11-26 19:40:26.747812	10.1.11.10	224.0.0.5	OSPF	Hello Packet
1440	2017-11-26 19:40:29.176324	10.1.11.1	224.0.0.5	OSPF	Hello Packet
1441	2017-11-26 19:40:36.581463	10.1.11.10	224.0.0.5	OSPF	Hello Packet
1442	2017-11-26 19:40:38.535445	10.1.11.1	224.0.0.5	OSPF	Hello Packet
1443	2017-11-26 19:40:46.066010	10.1.11.10	224.0.0.5	OSPF	Hello Packet
1444	2017-11-26 19:40:47.743783	10.1.11.1	224.0.0.5	OSPF	Hello Packet
1445	2017-11-26 19:40:51.434533	fa:16:3e:5c:d9:c9	CDP/VTP/DTP/PAGP/UDLD	CDP	Device ID: P1 Port ID: GigabitEthernet0/1...

▶ Frame 1437: 114 bytes on wire (912 bits), 114 bytes captured (912 bits) on interface 0
▶ Ethernet II, Src: fa:16:3e:5c:d9:c9 (fa:16:3e:5c:d9:c9), Dst: fa:16:3e:86:3f:35 (fa:16:3e:86:3f:35)
▶ Internet Protocol Version 4, Src: 10.1.12.1, Dst: 10.1.11.1
▶ User Datagram Protocol, Src Port: 30222 (30222), Dst Port: 4341 (4341)
▶ Locator/ID Separation Protocol (Data)
▶ Internet Protocol Version 4, Src: 10.1.255.2, Dst: 224.0.0.13
▼ Protocol Independent Multicast
0010 = Version: 2
.... 0011 = Type: Join/Prune (3)
Reserved byte(s): 00
Checksum: 0x0e80 [correct]
PIM Options

خسننلا مادختسا متي نأ عقوتملا نم .ديعبو يلحم RLOCs امه IP ةياغللاو يجراخلا رصملا
يداخلال ثبلا لثامتملا

LISP0 ةهجاو نم يلخادلا رصملا IP ذخأ مت

```
xTR2#sh int LISP0 | i unn
```

Interface is unnumbered. Using address of Loopback0 (10.1.255.2)

PIM لئاسرل هم ادختسا متي يذلاو 224.0.0.13 ددعتملا ثبلا ناونع وه IP ةيلخادلا ةهجاو

CE2 لىل طاقنو LISP0 ةهجاو وه ILL راسملا (172.16.251.1، 232.1.1.10) ةهجاو ل xTR2 يف

```
xTR2#show ip mroute
```

<...skip...>

(172.16.251.1, 232.1.1.10), 00:00:36/00:02:55, flags: sT

Incoming interface: LISP0, RPF nbr 10.1.11.1

Outgoing interface list:

GigabitEthernet3.10, Forward/Sparse, 00:00:36/00:02:55

```
xTR2#sh ip mfib
```

<...skip...>

```
(172.16.251.1,232.1.1.10) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
LISP0 Flags: A
GigabitEthernet3.10 Flags: F NS
Pkts: 0/0
```

راسم ءاشنإ مت و xTR2 نم مامضنا يقلت مت ، xTR1 يف (S,G).

```
*Nov 26 18:38:19.464: PIM(0): Received v2 Join/Prune on LISP0 from 10.1.255.2
*Nov 26 18:38:19.464: PIM(0): J/P Transport Attribute, Transport Type: Unicast, to us
*Nov 26 18:38:19.464: PIM(0): Join-list: (172.16.251.1/32, 232.1.1.10), S-bit set
*Nov 26 18:38:19.467: PIM(0): Add LISP0/10.1.12.1 to (172.16.251.1, 232.1.1.10), Forward state,
by PIM SG Join
*Nov 26 18:38:19.467: PIM(0): Insert (172.16.251.1,232.1.1.10) join in nbr 172.16.11.2's queue
*Nov 26 18:38:19.467: PIM(0): Building Join/Prune packet for nbr 172.16.11.2
*Nov 26 18:38:19.467: PIM(0): Adding v2 (172.16.251.1/32, 232.1.1.10), S-bit Join
*Nov 26 18:38:19.467: PIM(0): Send v2 join/prune to 172.16.11.2 (GigabitEthernet3.10)
```

xTR1#sh ip mroute

<...skip...>

```
(172.16.251.1, 232.1.1.10), 00:01:00/00:03:28, flags: sT
Incoming interface: GigabitEthernet3.10, RPF nbr 172.16.11.2
Outgoing interface list:
LISP0, 10.1.12.1, Forward/Sparse, 00:01:00/00:03:28 <<<< LISP in OIL
```

ةلاسري قلت مت يذلا مداخل نم تانايا بلال قفدتل RLOC لك xTR1 UpStream بقعتي نأ بجي هلجأ نم "مامضنا".

اهي ل مزلال خس نل RLOC تالوك و تورب ةعومجم xTR ركذتي نأ بجي.

يذالال ثبلال ني ماضتل يلاتال وحنلالي ع xTR مداخل ي (EIDs،G) لاخل رظني كلذل:

(ن وديع)

A ETH0/0

F LISP0, Nexthop = RLOC1

F LISP0, Nexthop = RLOC2

xTR1#sh ip mfib

<...skip...>

```
(172.16.251.1,232.1.1.10) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
GigabitEthernet3.10 Flags: A
LISP0, 10.1.12.1 Flags: F NS <<<<
Pkts: 0/0
```

LISP0 ةهجال اول ربع PIM ةراج xTR1 نمضتي ال :ةظحال م.

xTR1# sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.11.2	GigabitEthernet3.10	04:25:32/00:01:37	v2	1 / DR S P G

راسم عاشن| متو (S,G) مامضنا يقلت مت CE1 في

CE1#sh ip mro

```
<...skip...>
(172.16.251.1, 232.1.1.10), 02:16:45/00:03:08, flags: sT
  Incoming interface: Loopback10, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet0/1.10, Forward/Sparse, 02:16:45/00:03:08
```

عقوتم وه امك ددعت مل ثبل رورم ةكرح قفدت

CE1#ping 232.1.1.10 so lo10 rep 5

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 232.1.1.10, timeout is 2 seconds:
Packet sent with a source address of 172.16.251.1
```

```
Reply to request 0 from 172.16.251.2, 11 ms
Reply to request 0 from 172.16.251.2, 15 ms
Reply to request 1 from 172.16.251.2, 14 ms
Reply to request 1 from 172.16.251.2, 15 ms
Reply to request 2 from 172.16.251.2, 12 ms
Reply to request 2 from 172.16.251.2, 16 ms
Reply to request 3 from 172.16.251.2, 9 ms
Reply to request 3 from 172.16.251.2, 13 ms
Reply to request 4 from 172.16.251.2, 9 ms
Reply to request 4 from 172.16.251.2, 9 ms
```

CE3. لىل رخآ لبقتسم فيضنل

MRIB و MFIB في دي دجل RLOC رشؤمب صاخلا طفنل في فياض| لخدم ةفاض| مت

xTR1#sh ip mro 232.1.1.10

```
<...skip...>
(172.16.251.1, 232.1.1.10), 02:28:36/00:03:25, flags: sT
  Incoming interface: GigabitEthernet3.10, RPF nbr 172.16.11.2
  Outgoing interface list:
    LISP0, 10.1.13.1, Forward/Sparse, 00:01:34/00:02:57
    LISP0, 10.1.12.1, Forward/Sparse, 02:28:36/00:03:25
```

xTR1#sh ip mfib 232.1.1.10

```
<...skip...>
(172.16.251.1,232.1.1.10) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 10/0/118/0, Other: 0/0/0
  GigabitEthernet3.10 Flags: A
  LISP0, 10.1.13.1 Flags: F NS
    Pkts: 0/0
  LISP0, 10.1.12.1 Flags: F NS
    Pkts: 0/0
```

حضورم وه امك ةيساسألا ةهجاولا ىلع 232.1.1.10 ىلإ تانايبلا رورم ةكرح لاسرا يف تأدب اذا ةروصلا يف.

The screenshot shows a network traffic capture in Wireshark. The main pane displays a list of packets. Packet 4165 is highlighted, showing an ICMP Echo (ping) request from 172.16.251.1 to 232.1.1.10. The packet details pane is expanded to show the Internet Control Message Protocol (ICMP) section, which includes the Type (8), Code (0), Checksum (0x4193), Identifier (BE) (31), and Sequence number (BE) (0). The data field is also visible.

No.	Time	Source	Destination	Protocol	Info
4162	2017-11-26 22:09:02.859375	10.1.255.41	10.1.11.1	TCP	[TCP Keep-Alive] 4342 → 38534 [ACK] Seq=70...
4163	2017-11-26 22:09:02.860981	10.1.11.1	10.1.255.41	TCP	[TCP Keep-Alive ACK] 38534 → 4342 [ACK] Se...
4164	2017-11-26 22:09:03.348785	10.1.11.1	224.0.0.5	OSPF	Hello Packet
4165	2017-11-26 22:09:03.377240	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4166	2017-11-26 22:09:03.377428	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4167	2017-11-26 22:09:03.381194	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4168	2017-11-26 22:09:03.381331	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4169	2017-11-26 22:09:03.384748	172.16.251.2	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4170	2017-11-26 22:09:03.388197	172.16.251.2	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4171	2017-11-26 22:09:03.401289	172.16.251.3	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4172	2017-11-26 22:09:03.401306	172.16.251.3	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4173	2017-11-26 22:09:10.873440	10.1.11.10	224.0.0.5	OSPF	Hello Packet
4174	2017-11-26 22:09:12.739278	10.1.11.1	224.0.0.5	OSPF	Hello Packet

ةروصلا يف حضورم وه امك xTR2 ل RLOC يه ةلغملا ةمزحلا ةهجو.

The screenshot shows a network traffic capture in Wireshark. The main pane displays a list of packets. Packet 4166 is highlighted, showing an ICMP Echo (ping) request from 172.16.251.1 to 232.1.1.10. The packet details pane is expanded to show the Internet Control Message Protocol (ICMP) section, which includes the Type (8), Code (0), Checksum (0x4193), Identifier (BE) (31), and Sequence number (BE) (0). The data field is also visible.

No.	Time	Source	Destination	Protocol	Info
4162	2017-11-26 22:09:02.859375	10.1.255.41	10.1.11.1	TCP	[TCP Keep-Alive] 4342 → 38534 [ACK] Seq=70...
4163	2017-11-26 22:09:02.860981	10.1.11.1	10.1.255.41	TCP	[TCP Keep-Alive ACK] 38534 → 4342 [ACK] Se...
4164	2017-11-26 22:09:03.348785	10.1.11.1	224.0.0.5	OSPF	Hello Packet
4165	2017-11-26 22:09:03.377240	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4166	2017-11-26 22:09:03.377428	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4167	2017-11-26 22:09:03.381194	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4168	2017-11-26 22:09:03.381331	172.16.251.1	232.1.1.10	ICMP	Echo (ping) request id=0x001f, seq=0/0, t...
4169	2017-11-26 22:09:03.384748	172.16.251.2	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4170	2017-11-26 22:09:03.388197	172.16.251.2	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4171	2017-11-26 22:09:03.401289	172.16.251.3	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4172	2017-11-26 22:09:03.401306	172.16.251.3	172.16.251.1	ICMP	Echo (ping) reply id=0x001f, seq=0/0, t...
4173	2017-11-26 22:09:10.873440	10.1.11.10	224.0.0.5	OSPF	Hello Packet
4174	2017-11-26 22:09:12.739278	10.1.11.1	224.0.0.5	OSPF	Hello Packet

زاك رمل ربه هلا سرا متي و يداحألا ثبلل نيلود يف ددعتملا ثبلل قفدت حسن متي

زاك رمل ربه هلا سرا متي و يداحألا ثبلل نيلود يف ددعتملا ثبلل قفدت حسن متي

ASM

م. موعدم ريغ RP راركت . موعدم طقف Static-RP : عظالم

الوا لجسي ردصملا

(FHR) يلوألا ةوطخلال هجوم وه CE1. 225.1.1.10 ةومجملا يلى CE1 نم ددعتملا ثبلال لسرن انعد ي كيدل سي ل هنا امب . RP (CE4) يلى يداخال ثبلال لجس ةلاس رلي غشتب موقيس كذل راسملا تالخدإ عاشنإ وليجست فاقيا CE1 يقلت دقف ، تالقبقتسم

```
CE1#ping 225.1.1.10 so lo10
```

```
Type escape sequence to abort.
```

```
Sending 1, 100-byte ICMP Echos to 225.1.1.10, timeout is 2 seconds:
```

```
Packet sent with a source address of 172.16.251.1
```

```
*Nov 27 14:29:04.083: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:29:04.084: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:29:04.089: PIM(0): Adding register encap tunnel (Tunnel0) as forwarding interface of
(172.16.251.1, 225.1.1.10).
*Nov 27 14:29:04.112: PIM(0): Received v2 Register-Stop on GigabitEthernet0/1.10 from
172.16.251.4
*Nov 27 14:29:04.112: PIM(0): for source 172.16.251.1, group 225.1.1.10
*Nov 27 14:29:04.113: PIM(0): Removing register encap tunnel (Tunnel0) as forwarding interface
of (172.16.251.1, 225.1.1.10).
*Nov 27 14:29:04.113: PIM(0): Clear Registering flag to 172.16.251.4 for (172.16.251.1/32,
225.1.1.10).
```

```
CE1#sh ip mro 225.1.1.10
```

```
<...skip...>
```

```
(*, 225.1.1.10), 00:02:16/stopped, RP 172.16.251.4, flags: SPF
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.11.1
  Outgoing interface list: Null
```

```
(172.16.251.1, 225.1.1.10), 00:02:16/00:00:43, flags: PFT
  Incoming interface: Loopback10, RPF nbr 0.0.0.0
  Outgoing interface list: Null
```

RP لسري ، CE1 نم ليجست ةلاس ر يقلت نأ دعب . ةعقوتملا ةروصلال اضيأ RP بناج يلع ةريورصلال تاراسملا ئشنينيو فلخال يلى فقوت ليجست ةلاس ر (CE4).

```
CE4#
```

```
*Nov 27 14:24:06.810: PIM(0): Received v2 Register on GigabitEthernet0/1.10 from 172.16.251.1
*Nov 27 14:24:06.810: for 172.16.251.1, group 225.1.1.10
*Nov 27 14:24:06.811: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:24:06.812: PIM(0): Adding register decap tunnel (Tunnel0) as accepting interface of
(*, 225.1.1.10).
*Nov 27 14:24:06.814: PIM(0): Adding register decap tunnel (Tunnel0) as accepting interface of
(172.16.251.1, 225.1.1.10).
*Nov 27 14:24:06.815: PIM(0): Send v2 Register-Stop to 172.16.251.1 for 172.16.251.1, group
225.1.1.10
```

```
CE4#
```

```
*Nov 27 14:24:11.207: PIM(0): Building Periodic (*,G) Join / (S,G,RP-bit) Prune message for
224.0.1.40
```

```
CE4#sh ip mro 225.1.1.10
```

```
<...skip...>
(*, 225.1.1.10), 00:00:31/stopped, RP 172.16.251.4, flags: SP
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list: Null

(172.16.251.1, 225.1.1.10), 00:00:31/00:02:28, flags: P
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.14.1
  Outgoing interface list: Null
```

ليغشت متي نل ال ID او EID قاطن في لجلس ال ردصم هه جاو نوكت نأ بجي هنأ رابت عال في عض
ة رداص ال هه جاو ال نم IP ناو نع وه نوكتي س، يضا رتفا لكش ب. LISP.

```
CE1#sh run | i source
ip pim register-source Loopback10
```

دعب اهم الت سا متي مل ددعت مل ثبل رورم ة كرح نأل عيش ريغتي مل، xTR1 و xTR4 ل

الواي تي لابق تسال زاغ

CE3 زاغ ال ل 10 Lo هه جاو ال ل ع لابق تسال زاغ ني نوكت ان عد

```
CE3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CE3(config)#int lo10
CE3(config-if)#ip igmp join-group 225.1.1.10
CE3(config-if)#end
```

ع قوتم عيش لك. راسم عاشن متي و (Join, *) ليغشت متي.

```
CE3#
*Nov 27 14:48:46.271: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:48:46.272: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:48:46.272: PIM(0): Upstream mode for (*, 225.1.1.10) changed from 0 to 1
*Nov 27 14:48:46.274: PIM(0): Insert (*,225.1.1.10) join in nbr 172.16.13.1's queue
*Nov 27 14:48:46.275: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:48:46.284: PIM(0): Building Join/Prune packet for nbr 172.16.13.1
*Nov 27 14:48:46.284: PIM(0): Adding v2 (172.16.251.4/32, 225.1.1.10), WC-bit, RPT-bit, S-bit
Join
*Nov 27 14:48:46.285: PIM(0): Send v2 join/prune to 172.16.13.1 (GigabitEthernet0/1.10)
```

```
CE3#sh ip mro
< ...skip...>
(*, 225.1.1.10), 00:26:23/00:02:42, RP 172.16.251.4, flags: SJCL
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.13.1
  Outgoing interface list:
    Loopback10, Forward/Sparse, 00:26:23/00:02:42

(*, 224.0.1.40), 21:32:32/00:02:03, RP 172.16.251.4, flags: SJPCL
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.13.1
  Outgoing interface list: Null
```

ق قحتي xTR3. RP ل لصو (g, *) ل اسرا متي. xTR3 ة طساوب مامضنا (225.1.1.10, *) ي قلت مت
PIM راج عاشن متي، LISP ربع هي ل لوصولا نكمي هنأل ارظنو. (172.16.251.4) RP ل RLOC نم

10.1.14.1. نوكي ةلجال هذه في .بس انملا RLOC لى

```
xTR3#
*Nov 27 14:30:23.229: PIM(0): Received v2 Join/Prune on GigabitEthernet0/2.10 from 172.16.13.2,
to us
*Nov 27 14:30:23.229: PIM(0): Join-list: (*, 225.1.1.10), RPT-bit set, WC-bit set, S-bit set
*Nov 27 14:30:23.231: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:30:23.233: PIM(0): Add GigabitEthernet0/2.10/172.16.13.2 to (*, 225.1.1.10), Forward
state, by PIM *G Join
*Nov 27 14:30:23.247: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:30:23.247: PIM(0): Upstream mode for (*, 225.1.1.10) changed from 0 to 1
*Nov 27 14:30:23.248: PIM(0): Insert (*,225.1.1.10) join in nbr 10.1.14.1's queue
xTR3#
*Nov 27 14:30:23.259: PIM(0): Building Join/Prune packet for nbr 10.1.14.1
*Nov 27 14:30:23.259: PIM(0): Adding v2 (172.16.251.4/32, 225.1.1.10), WC-bit, RPT-bit, S-bit
Join
*Nov 27 14:30:23.260: PIM(0): Send v2 join/prune to 10.1.14.1 (LISP0)
```

```
xTR3#sh ip pim nei
```

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.13.2	GigabitEthernet0/2.10	21:54:17/00:01:27	v2	1 / DR S P G
10.1.14.1	LISP0	00:26:16/00:01:35	v2	0 /

ةروصلال في حضوم وه امك كالسأل طاقتلال نم ققحتن انعد

No.	Time	Source	Destination	Protocol	Info
13	2017-11-27 17:21:17.082524	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
16	2017-11-27 17:21:21.919145	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
23	2017-11-27 17:21:40.187508	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
40	2017-11-27 17:22:19.699096	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
44	2017-11-27 17:22:24.993402	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
50	2017-11-27 17:22:43.325028	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
68	2017-11-27 17:23:21.901842	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
72	2017-11-27 17:23:27.859519	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
80	2017-11-27 17:23:45.593588	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
93	2017-11-27 17:24:24.326937	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
96	2017-11-27 17:24:31.517993	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
107	2017-11-27 17:24:49.498689	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
122	2017-11-27 17:25:27.840775	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
124	2017-11-27 17:25:33.769847	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
133	2017-11-27 17:25:53.115344	10.1.255.3	224.0.0.13	PIMv2	Join/Prune

▶ Frame 13: 114 bytes on wire (912 bits), 114 bytes captured (912 bits) on interface 0
▶ Ethernet II, Src: fa:16:3e:21:2e:1e (fa:16:3e:21:2e:1e), Dst: fa:16:3e:a1:b1:8e (fa:16:3e:a1:b1:8e)
▶ Internet Protocol Version 4, Src: 10.1.13.1, Dst: 10.1.14.1
▶ User Datagram Protocol, Src Port: 30223, Dst Port: 4341
▶ Locator/ID Separation Protocol (Data)
▶ Internet Protocol Version 4, Src: 10.1.255.3, Dst: 224.0.0.13
▶ Protocol Independent Multicast

وه يلدخال ردمال .دي ببال RLOC يه ةيجراخال IP ةهجوو يلدخال RLOC وه يجراخال IP ردمم
PIM ددعتال ثبلال ناوع وه ةيلدخال ةهجوولل IP ناوع .LISP0 ةهجوول هذخال م يذل IP ناوع
الال 224.0.0.13 يداعال

LISP0 ةهجوو يه RP ل RPF/ةدراوال ةهجووال .(G,*) راسم عاشنل م تيس

```
xTR3#sh ip mro 225.1.1.10
```

<...skip...>

```
(* , 225.1.1.10), 00:42:51/00:03:25, RP 172.16.251.4, flags: S
Incoming interface: LISP0, RPF nbr 10.1.14.1
Outgoing interface list:
GigabitEthernet0/2.10, Forward/Sparse, 00:42:51/00:03:25
```

xTR3#sh int LISP0 | i address

Interface is unnumbered. Using address of Loopback0 (10.1.255.3)

ب.س.انم راسم ءاشنإ متي LISP. ق فن نم (*,G) مامضنا يقلت متي xTR4 ي

xTR4#

```
*Nov 27 14:38:20.880: PIM(0): Received v2 Join/Prune on LISP0 from 10.1.255.3, to us
*Nov 27 14:38:20.881: PIM(0): Join-list: (*, 225.1.1.10), RPT-bit set, WC-bit set, S-bit set
*Nov 27 14:38:20.883: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:38:20.883: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:38:20.884: PIM(0): Add LISP0/10.1.13.1 to (*, 225.1.1.10), Forward state, by PIM *G
Join
*Nov 27 14:38:20.885: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for
225.1.1.10
*Nov 27 14:38:20.885: PIM(0): Upstream mode for (*, 225.1.1.10) changed from 0 to 1
```

xTR4#

```
*Nov 27 14:38:20.885: PIM(0): Insert (*,225.1.1.10) join in nbr 172.16.14.2's queue
*Nov 27 14:38:20.886: PIM(0): Building Join/Prune packet for nbr 172.16.14.2
*Nov 27 14:38:20.886: PIM(0): Adding v2 (172.16.251.4/32, 225.1.1.10), WC-bit, RPT-bit, S-bit
Join
*Nov 27 14:38:20.887: PIM(0): Send v2 join/prune to 172.16.14.2 (GigabitEthernet0/2.10)
```

xTR4#sh ip mro 225.1.1.10

<...skip...>

```
(* , 225.1.1.10), 00:45:05/00:02:56, RP 172.16.251.4, flags: S
Incoming interface: GigabitEthernet0/2.10, RPF nbr 172.16.14.2
Outgoing interface list:
LISP0, 10.1.13.1, Forward/Sparse, 00:45:05/00:02:56
```

طقف دوجوم CE4 ل PIM راج. ةلأال هذه ي xTR4 ل PIM راج ءاشنإ متي ال

xTR4#sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.14.2	GigabitEthernet0/2.10	22:00:37/00:01:20	v2	1 / DR S P G

(*,G). راسم ءاشنإ متي. ع قوتم ءيش لك نإف، ةعيرسلا ةباجتسالا جم انرب روظنم نمو

CE4#

```
*Nov 27 14:41:55.907: PIM(0): Building Periodic (*,G) Join / (S,G,RP-bit) Prune message for
224.0.1.40
```

CE4#

```
*Nov 27 14:42:11.841: PIM(0): Received v2 Join/Prune on GigabitEthernet0/1.10 from 172.16.14.1,
to us
*Nov 27 14:42:11.841: PIM(0): Join-list: (*, 225.1.1.10), RPT-bit set, WC-bit set, S-bit set
*Nov 27 14:42:11.844: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
*Nov 27 14:42:11.845: PIM(0): Adding register decap tunnel (Tunnel0) as accepting interface of
```

(* , 225.1.1.10).

Nov 27 14:42:11.846: PIM(0): Add GigabitEthernet0/1.10/172.16.14.1 to (, 225.1.1.10), Forward state, by PIM *G Join

CE4#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:00:11/00:03:18, RP 172.16.251.4, flags: S

Incoming interface: Null, RPF nbr 0.0.0.0

Outgoing interface list:

GigabitEthernet0/1.10, Forward/Sparse, 00:00:11/00:03:18

(* , 224.0.1.40), 21:00:55/00:02:53, RP 172.16.251.4, flags: SJCL

Incoming interface: Null, RPF nbr 0.0.0.0

Outgoing interface list:

GigabitEthernet0/1.10, Forward/Sparse, 21:00:55/00:02:53

رصقأال راسملا ةرجش لوجم (SPT)

لعللاب اهؤانب مت دق ةكرتشملا ةرجشلل نأ ضرتفملا نم

لإ اهلاسرإ م تيوي دأحأال ثبلا لآس ةلاس ر ي ف ي لولأال ددعتملا ثبلا ةمزح ني مضت متي RP. لإ اهلاسرإ م تيوي دأحأال ثبلا لآس ةلاس ر ي ف ي لولأال ددعتملا ثبلا ةمزح ني مضت متي RP.

CE1#ping 225.1.1.10 so lo10

Type escape sequence to abort.

Sending 1, 100-byte ICMP Echos to 225.1.1.10, timeout is 2 seconds:

Packet sent with a source address of 172.16.251.1

Reply to request 0 from 172.16.251.3, 77 ms

لإ اهلاسرإ م تيوي دأحأال ثبلا لآس ةلاس ر ي ف ي لولأال ددعتملا ثبلا ةمزح ني مضت متي RP.

.Nov 30 00:00:50.931: PIM(0): Check RP 172.16.251.4 into the (* , 225.1.1.10) entry

.Nov 30 00:00:50.932: MRT(0): (*,225.1.1.10), RPF change from /0.0.0.0 to

GigabitEthernet0/1.10/172.16.11.1

.Nov 30 00:00:50.932: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message for 225.1.1.10

.Nov 30 00:00:50.933: MRT(0): Create (*,225.1.1.10), RPF (GigabitEthernet0/1.10, 172.16.11.1, 90/3072)

.Nov 30 00:00:50.936: MRT(0): Reset the z-flag for (172.16.251.1, 225.1.1.10)

.Nov 30 00:00:50.937: MRT(0): (172.16.251.1,225.1.1.10), RPF install from /0.0.0.0 to

Loopback10/0.0.0.0

.Nov 30 00:00:50.937: PIM(0): Adding register encap tunnel (Tunnel0) as forwarding interface of (172.16.251.1, 225.1.1.10).

لإ ةكرتشملا ةرجشلل ربع اهلاسرإ م تيوي RP لعل لآس ةلاس ر ي ف ي لولأال ددعتملا ثبلا ةمزح ني مضت متي RP. لإ اهلاسرإ م تيوي دأحأال ثبلا لآس ةلاس ر ي ف ي لولأال ددعتملا ثبلا ةمزح ني مضت متي RP.

.Nov 30 00:00:51.540: PIM(0): Received v2 Register on GigabitEthernet0/1.10 from 172.16.251.1

.Nov 30 00:00:51.541: for 172.16.251.1, group 225.1.1.10

.Nov 30 00:00:51.542: PIM(0): Adding register decap tunnel (Tunnel0) as accepting interface of (172.16.251.1, 225.1.1.10).

تقوم عددب متي (S,G) ل ةدراول ةهجاول او (*,G) ل ةرداصل ةهجاول ني ب قباطتال ببسب اي جلوب طلباب ةصاخ ةلاح اهنإ X. ةمالعل ني يعت متي (S,G) ل ليك ومامضنا

CE4#sh ip mro

<...skip...>

```
(* , 225.1.1.10), 00:00:37/stopped, RP 172.16.251.4, flags: S
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list:
GigabitEthernet0/1.10, Forward/Sparse, 00:00:37/00:02:52
```

```
(172.16.251.1, 225.1.1.10), 00:00:26/00:02:33, flags: PX Incoming interface:
GigabitEthernet0/1.10, RPF nbr 172.16.14.1 Outgoing interface list: Null
```

قبذش (S,G) لسري الوردصملا لىا طبر (S,G) لسري CE4 ىتح

```
.Nov 30 00:00:51.544: PIM(0): Insert (172.16.251.1,225.1.1.10) join in nbr 172.16.14.1's queue
.Nov 30 00:00:51.546: PIM(0): Building Join/Prune packet for nbr 172.16.14.1
.Nov 30 00:00:51.546: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Join
.Nov 30 00:00:51.547: PIM(0): Send v2 join/prune to 172.16.14.1 (GigabitEthernet0/1.10)
```

زهجأ لىا ةكرتشم ةرجش ربع لقطعملا ددتملا ثبلا رورم ةكرح لاسرا متي ،تقولوا سفن يف روصولا يف حضورم وه امك لابقتسالا

No.	Time	Source	Destination	Protocol	Info
68	2017-11-28 13:55:29.783398	10.1.14.10	224.0.0.5	OSPF	Hello Packet
69	2017-11-28 13:55:34.738715	fa:16:3e:ab:98:7e	CDP/VTP/DTP/PAGP/UDLD	CDP	Device ID: xTR4 Port ID: GigabitEthernet0...
70	2017-11-28 13:55:35.939428	fa:16:3e:ab:98:7e	fa:16:3e:ab:98:7e	LOOP	Reply
71	2017-11-28 13:55:37.964584	10.1.14.1	224.0.0.5	OSPF	Hello Packet
72	2017-11-28 13:55:40.167524	10.1.14.10	224.0.0.5	OSPF	Hello Packet
73	2017-11-28 13:55:41.375985	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
74	2017-11-28 13:55:41.391351	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
75	2017-11-28 13:55:41.405722	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
76	2017-11-28 13:55:41.408310	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
77	2017-11-28 13:55:41.568043	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
78	2017-11-28 13:55:43.448000	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=1/256,...
79	2017-11-28 13:55:43.449757	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=1/256,...
80	2017-11-28 13:55:45.137555	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
81	2017-11-28 13:55:45.451144	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=2/512,...
82	2017-11-28 13:55:45.453196	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=2/512,...

▶ Frame 74: 150 bytes on wire (1200 bits), 150 bytes captured (1200 bits) on interface 0
 ▶ Ethernet II, Src: fa:16:3e:9b:b3:ff (fa:16:3e:9b:b3:ff), Dst: fa:16:3e:ab:98:7e (fa:16:3e:ab:98:7e)
 ▶ Internet Protocol Version 4, Src: 10.1.11.1, Dst: 10.1.14.1
 ▶ User Datagram Protocol, Src Port: 46618, Dst Port: 4341
 ▶ Locator/ID Separation Protocol (Data)
 ▶ Internet Protocol Version 4, Src: 172.16.251.1, Dst: 225.1.1.10
 ▶ Internet Control Message Protocol

No.	Time	Source	Destination	Protocol	Info
68	2017-11-28 13:55:29.783398	10.1.14.10	224.0.0.5	OSPF	Hello Packet
69	2017-11-28 13:55:34.738715	fa:16:3e:ab:98:7e	CDP/VTP/DTP/PAGP/UDLD	CDP	Device ID: xTR4 Port ID: GigabitEthernet0...
70	2017-11-28 13:55:35.939428	fa:16:3e:ab:98:7e	fa:16:3e:ab:98:7e	LOOP	Reply
71	2017-11-28 13:55:37.964584	10.1.14.1	224.0.0.5	OSPF	Hello Packet
72	2017-11-28 13:55:40.167524	10.1.14.10	224.0.0.5	OSPF	Hello Packet
73	2017-11-28 13:55:41.375985	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
74	2017-11-28 13:55:41.391351	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
75	2017-11-28 13:55:41.405722	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
76	2017-11-28 13:55:41.408310	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=0/0, t...
77	2017-11-28 13:55:41.568043	10.1.255.3	224.0.0.13	PIMv2	Join/Prune
78	2017-11-28 13:55:43.448000	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=1/256,...
79	2017-11-28 13:55:43.449757	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=1/256,...
80	2017-11-28 13:55:45.137555	172.16.23.1	224.0.0.13	PIMv2	Join/Prune
81	2017-11-28 13:55:45.451144	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=2/512,...
82	2017-11-28 13:55:45.453196	172.16.251.1	225.1.1.10	ICMP	Echo (ping) request id=0x002b, seq=2/512,...

▶ Frame 74: 150 bytes on wire (1200 bits), 150 bytes captured (1200 bits) on interface 0
 ▶ Ethernet II, Src: fa:16:3e:9b:b3:ff (fa:16:3e:9b:b3:ff), Dst: fa:16:3e:ab:98:7e (fa:16:3e:ab:98:7e)
 ▶ Internet Protocol Version 4, Src: 10.1.11.1, Dst: 10.1.14.1
 ▶ User Datagram Protocol, Src Port: 46618, Dst Port: 4341
 ▶ Locator/ID Separation Protocol (Data)
 ▶ Internet Protocol Version 4, Src: 172.16.251.1, Dst: 225.1.1.10
 ▶ Internet Control Message Protocol

مت xTR4 g0/1 ةهجاو لىع ةمزلال طاقتل مت

10.1.11.1 و 10.1.14.1 نيي جراخلال DST و IP SRC نم لك نوكي ،لىوالا ةمزلال يف

يلاوتل الال ع 10.1.13.1 و 10.1.14.1 وه DST و يجراخال ال IP SRC نم لك نوكي، ةيناثال ةمزال ال ي.

(S,G) ل راسم ءاشنن م تي. SPT ل يدبت ي ف LHR CE3 ادبت، ددعتم ل ثبلال مزح مال تس ا دع ب رصم ال ال "مامضن الال" ل اس را م ت (S,G) T. و ل تام ال ال ني عت م تي و

```
.Nov 30 00:00:51.765: MRT(0): Set 'L' flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.766: MRT(0): Reset the z-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.766: MRT(0): (172.16.251.1,225.1.1.10), RPF install from /0.0.0.0 to
GigabitEthernet0/1.10/172.16.13.1
.Nov 30 00:00:51.767: MRT(0): Set the T-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.768: PIM(0): Insert (172.16.251.1,225.1.1.10) join in nbr 172.16.13.1's queue
.Nov 30 00:00:51.768: MRT(0): Create (172.16.251.1,225.1.1.10), RPF (GigabitEthernet0/1.10,
172.16.13.1, 90/3072)
.Nov 30 00:00:51.769: MRT(0): WAVL Insert interface: Loopback10 in (172.16.251.1,225.1.1.10)
Successful
.Nov 30 00:00:51.770: MRT(0): set min mtu for (172.16.251.1, 225.1.1.10) 18010->18010
.Nov 30 00:00:51.771: MRT(0): Add Loopback10/225.1.1.10 to the olist of (172.16.251.1,
225.1.1.10), Forward state - MAC not built
.Nov 30 00:00:51.771: MRT(0): Set the J-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.780: PIM(0): Building Join/Prune packet for nbr 172.16.13.1
.Nov 30 00:00:51.780: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Join
.Nov 30 00:00:51.781: PIM(0): Send v2 join/prune to 172.16.13.1 (GigabitEthernet0/1.10)
```

CE3#sh ip mro

<...skip...>

```
(* , 225.1.1.10), 00:01:36/stopped, RP 172.16.251.4, flags: SJCL
Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.13.1
Outgoing interface list:
Loopback10, Forward/Sparse, 00:01:36/00:02:48
```

```
(172.16.251.1, 225.1.1.10), 00:00:25/00:02:34, flags: LJT Incoming interface:
GigabitEthernet0/1.10, RPF nbr 172.16.13.1 Outgoing interface list: Loopback10, Forward/Sparse,
00:00:25/00:02:48
```

رصم ل ال (RPF) يس ك ال راسم ال هي جوت ة دا ع ا ص ح ف ب موقت CE3. نم ل ص و (S,G) xTR3 ي ق ل ت ي ة فاض ال اب 10.1.11.1 RLOC ال ال PIM راج ئش ني و LISP ث ح ب ل ي غ ش ت ب موق ي وه و 172.16.251.1 مامضنا ل اس را م تي T. ة مال ع م (S,G) ل راسم ءاشنن م تي. 10.1.14.1 RLOC ال ال PIM راج ال ال (S,G) رصم ال ال 172.16.255.1 نم ل ال خ ل LISP0 RLOC 10.1.11.1

```
.Nov 30 00:00:51.104: PIM(0): Received v2 Join/Prune on GigabitEthernet0/2.10 from 172.16.13.2,
to us
.Nov 30 00:00:51.105: PIM(0): Join-list: (172.16.251.1/32, 225.1.1.10), S-bit set
.Nov 30 00:00:51.105: PIM(0): RPF Lookup failed for 172.16.251.1
.Nov 30 00:00:51.108: MRT(0): Reset the z-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.108: MRT(0): Create (172.16.251.1,225.1.1.10), RPF (unknown, 0.0.0.0, 0/0)
.Nov 30 00:00:51.109: MRT(0): WAVL Insert interface: GigabitEthernet0/2.10 in
(172.16.251.1,225.1.1.10) Successful
.Nov 30 00:00:51.110: MRT(0): set min mtu for (172.16.251.1, 225.1.1.10) 18010->1500
.Nov 30 00:00:51.110: MRT(0): Add GigabitEthernet0/2.10/225.1.1.10 to the olist of
(172.16.251.1, 225.1.1.10), Forward state - MAC built
.Nov 30 00:00:51.111: PIM(0): Add GigabitEthernet0/2.10/172.16.13.2 to (172.16.251.1,
225.1.1.10), Forward state, by PIM SG Join
.Nov 30 00:00:51.111: MRT(0): Add GigabitEthernet0/2.10/225.1.1.10 to the olist of
(172.16.251.1, 225.1.1.10), Forward state - MAC built
.Nov 30 00:00:51.112: MRT(0): Set the PIM interest flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.128: MRT(0): (172.16.251.1,225.1.1.10), RPF change from /0.0.0.0 to
LISP0/10.1.11.1
.Nov 30 00:00:51.130: MRT(0): Set the T-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:51.130: PIM(0): Insert (172.16.251.1,225.1.1.10) join in nbr 10.1.11.1's queue
.Nov 30 00:00:51.134: PIM(0): Building Join/Prune packet for nbr 10.1.11.1
```

```
.Nov 30 00:00:51.134: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Join
.Nov 30 00:00:51.135: PIM(0): Send v2 join/prune to 10.1.11.1 (LISP0)
```

```
xTR3#sh ip pim nei
```

```
PIM Neighbor Table
```

```
Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
      P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
      L - DR Load-balancing Capable
```

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.13.2	GigabitEthernet0/2.10	2d16h/00:01:20	v2	1 / DR S P G
10.1.11.1	LISP0	00:00:19/00:01:39	v2	0 /
10.1.14.1	LISP0	1d18h/00:01:39	v2	0 /

```
xTR3#sh ip mro
```

```
<...skip...>
```

```
(* , 225.1.1.10), 00:01:29/stopped, RP 172.16.251.4, flags: S
```

```
Incoming interface: LISP0, RPF nbr 10.1.14.1
```

```
Outgoing interface list:
```

```
GigabitEthernet0/2.10, Forward/Sparse, 00:01:29/00:02:57
```

```
(172.16.251.1, 225.1.1.10), 00:00:19/00:02:40, flags: T
```

```
Incoming interface: LISP0, RPF nbr 10.1.11.1
```

```
Outgoing interface list:
```

```
GigabitEthernet0/2.10, Forward/Sparse, 00:00:19/00:03:10
```

ةكرتشم ةرچش - ةفلتخم (S,G) و (*,G) ل (RPF) يسكعلا راسملا هيچوت ةداع| تاهج او حبصت و RPT-bit طبر عم (S,G) حيقنت ةلاس رلغشي هن | SPT (RLOC 10.1.11.1) و (RLOC 10.1.14.1) RP. لى xTR3 نم S-bit

```
.Nov 30 00:00:51.209: PIM(0): Insert (172.16.251.1,225.1.1.10) sgr prune in nbr 10.1.14.1's queue
```

```
.Nov 30 00:00:51.212: PIM(0): Building Join/Prune packet for nbr 10.1.14.1
```

```
.Nov 30 00:00:51.212: PIM(0): Adding v2 (172.16.251.4/32, 225.1.1.10), WC-bit, RPT-bit, S-bit Join
```

```
.Nov 30 00:00:51.213: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), RPT-bit, S-bit Prune
```

```
.Nov 30 00:00:51.214: PIM(0): Send v2 join/prune to 10.1.14.1 (LISP0)
```

```
xTR3#sh ip pim nei
```

```
PIM Neighbor Table
```

```
Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
      P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
      L - DR Load-balancing Capable
```

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.13.2	GigabitEthernet0/2.10	4d09h/00:01:19	v2	1 / DR S P G
10.1.11.1	LISP0	00:00:58/00:01:02	v2	0 /
10.1.14.1	LISP0	3d11h/00:01:34	v2	0 /

يسكعلا راسملا هيچوت ةداع | SPT. عاشن | لغشي كلذ نال xTR3 نم xTR1 (S,G) Join سى قىلتى ةداع | نم ققحتل ل PIM راج عاشن | متي. LISP. ربع هي | لوصول نكمي يذال RP وه (*,G) ل (RPF) (s,g) و (*,g) تاراسم عاشن | متي. RLOC 10.1.14.1 لى | (RPF) يسكعلا راسملا هيچوت

```
.Nov 30 00:00:55.281: PIM(0): Received v2 Join/Prune on LISP0 from 10.1.255.3
```

```
.Nov 30 00:00:55.281: PIM(0): J/P Transport Attribute, Transport Type: Unicast, to us
```

```
.Nov 30 00:00:55.282: PIM(0): Join-list: (172.16.251.1/32, 225.1.1.10), S-bit set
```

```
.Nov 30 00:00:55.283: PIM(0): Check RP 172.16.251.4 into the (*, 225.1.1.10) entry
```

```
.Nov 30 00:00:55.283: MRT(0): Create (*,225.1.1.10), RPF (unknown, 0.0.0.0, 0/0)
```



```
.Nov 30 00:00:55.284: MRT(0): Reset the z-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:55.284: MRT(0): (172.16.251.1,225.1.1.10), RPF install from /0.0.0.0 to
GigabitEthernet3.10/172.16.11.2
.Nov 30 00:00:55.284: MRT(0): Create (172.16.251.1,225.1.1.10), RPF (GigabitEthernet3.10,
172.16.11.2, 90/130816)
.Nov 30 00:00:55.285: MRT(0): WAVL Insert LISP interface: LISP0 in (172.16.251.1,225.1.1.10)
Next-hop: 10.1.13.1 Outer-source: 0.0.0.0 Successful
.Nov 30 00:00:55.285: MRT(0): set min mtu for (172.16.251.1, 225.1.1.10) 18010->17892
.Nov 30 00:00:55.285: MRT(0): Set the T-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:00:55.286: MRT(0): Add LISP0/10.1.13.1 to the olist of (172.16.251.1, 225.1.1.10),
Forward state - MAC not built
.Nov 30 00:00:55.286: PIM(0): Add LISP0/10.1.13.1 to (172.16.251.1, 225.1.1.10), Forward state,
by PIM SG Join
.Nov 30 00:00:55.286: MRT(0): Add LISP0/10.1.13.1 to the olist of (172.16.251.1, 225.1.1.10),
Forward state - MAC not built
```

يُضَيءُ xTR1 (S,G) مِلت سِي RP. لآ نَم مامضنا (S,G) مِلت سِي xTR1 اَضِيءُ
(S,G). RLOC رِبَع Oil lisp0 ةِفاضِءُ مِت ت.

```
.Nov 30 00:00:55.295: PIM(0): Received v2 Join/Prune on LISP0 from 172.16.251.14
.Nov 30 00:00:55.295: PIM(0): J/P Transport Attribute, Transport Type: Unicast, to us
.Nov 30 00:00:55.295: PIM(0): Join-list: (172.16.251.1/32, 225.1.1.10), S-bit set
.Nov 30 00:00:55.295: MRT(0): WAVL Insert LISP interface: LISP0 in (172.16.251.1,225.1.1.10)
Next-hop: 10.1.14.1 Outer-source: 0.0.0.0 Successful
.Nov 30 00:00:55.296: MRT(0): set min mtu for (172.16.251.1, 225.1.1.10) 17892->17892
.Nov 30 00:00:55.296: MRT(0): Add LISP0/10.1.14.1 to the olist of (172.16.251.1, 225.1.1.10),
Forward state - MAC not built
.Nov 30 00:00:55.296: PIM(0): Add LISP0/10.1.14.1 to (172.16.251.1, 225.1.1.10), Forward state,
by PIM SG Join
.Nov 30 00:00:55.297: MRT(0): Add LISP0/10.1.14.1 to the olist of (172.16.251.1, 225.1.1.10),
Forward state - MAC not built
```

xTR1#sh ip mro

```
(*, 225.1.1.10), 00:00:27/stopped, RP 172.16.251.4, flags: SP
Incoming interface: LISP0, RPF nbr 10.1.14.1
Outgoing interface list: Null
```

```
(172.16.251.1, 225.1.1.10), 00:00:27/00:02:31, flags: T
Incoming interface: GigabitEthernet3.10, RPF nbr 172.16.11.2
Outgoing interface list:
LISP0, 10.1.14.1, Forward/Sparse, 00:00:27/00:03:01
LISP0, 10.1.13.1, Forward/Sparse, 00:00:27/00:03:01
```

تِي زَلَا نَم 10.1.13.1 لِي لISP0 ءَانْتَسِءُ مِتِي. xTR3 نَم (S,G) ةِصَاصِقِ xTR4 يِقِلْتِي.

```
Nov 30 00:00:50.771: PIM(0): Received v2 Join/Prune on LISP0 from 10.1.255.3, to us
Nov 30 00:00:50.772: PIM(0): Join-list: (*, 225.1.1.10), RPT-bit set, WC-bit set, S-bit set
Nov 30 00:00:50.774: PIM(0): Update LISP0/10.1.13.1 to (*, 225.1.1.10), Forward state, by PIM *G
Join
Nov 30 00:00:50.774: MRT(0): Update LISP0/10.1.13.1 in the olist of (*, 225.1.1.10), Forward
state - MAC not built
Nov 30 00:00:50.775: PIM(0): Prune-list: (172.16.251.1/32, 225.1.1.10) RPT-bit set
Nov 30 00:00:50.776: PIM(0): Prune LISP0/10.1.13.1 from (172.16.251.1/32, 225.1.1.10)
Nov 30 00:00:50.776: MRT(0): Delete LISP0/10.1.13.1 from the olist of (172.16.251.1, 225.1.1.10)
- deleted
```

xTR4#sh ip mro

```
<...skip...>
```

```
(* , 225.1.1.10), 00:07:47/00:03:04, RP 172.16.251.4, flags: S
Incoming interface: GigabitEthernet0/2.10, RPF nbr 172.16.14.2
Outgoing interface list:
LISP0, 10.1.13.1, Forward/Sparse, 00:07:47/00:03:04
```

```
(172.16.251.1, 225.1.1.10), 00:00:26/00:02:33, flags:
Incoming interface: LISP0, RPF nbr 10.1.11.1
Outgoing interface list:
GigabitEthernet0/2.10, Forward/Sparse, 00:00:26/00:03:03
```

xTR4#sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.14.2	GigabitEthernet0/2.10	4d09h/00:01:16	v2	1 / DR S P G
10.1.11.1	LISP0	00:00:26/00:01:33	v2	0 /

ةرجشلا نم ردصملا RP بضقي نأ بجي. RPT تب ةومجم عم (S,G) ةبذش ملتسي (CE4) RP لا
ردصملا هاجتاب حيقنت (S,G) RP أدبي. ةكرتشملا

```
.Nov 30 00:01:34.811: PIM(0): Received v2 Join/Prune on GigabitEthernet0/1.10 from 172.16.14.1,
to us
.Nov 30 00:01:34.813: PIM(0): Prune-list: (172.16.251.1/32, 225.1.1.10) RPT-bit set
.Nov 30 00:01:34.818: MRT(0): Set the T-flag for (172.16.251.1, 225.1.1.10)
.Nov 30 00:01:34.818: PIM(0): Removing register decap tunnel (Tunnel0) as accepting interface of
(172.16.251.1, 225.1.1.10).
.Nov 30 00:01:34.819: PIM(0): Installing GigabitEthernet0/1.10 as accepting interface for
(172.16.251.1, 225.1.1.10).
.Nov 30 00:01:34.899: PIM(0): Insert (172.16.251.1,225.1.1.10) join in nbr 172.16.14.1's queue
.Nov 30 00:01:34.902: PIM(0): Building Join/Prune packet for nbr 172.16.14.1
.Nov 30 00:01:34.903: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Join
.Nov 30 00:01:34.903: PIM(0): Send v2 join/prune to 172.16.14.1 (GigabitEthernet0/1.10)
.Nov 30 00:01:39.398: PIM(0): Insert (172.16.251.1,225.1.1.10) prune in nbr 172.16.14.1's queue
.Nov 30 00:01:39.399: PIM(0): Building Join/Prune packet for nbr 172.16.14.1
.Nov 30 00:01:39.401: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Prune
.Nov 30 00:01:39.402: PIM(0): Send v2 join/prune to 172.16.14.1 (GigabitEthernet0/1.10)
```

CE4#sh ip mro

<...skip...>

```
(172.16.251.1, 225.1.1.10), 00:00:57/00:02:45, flags: PT
Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.14.1
Outgoing interface list: Null
```

داعبتسا متي. (CE1) FHR لا اهل سريري RP اهدب يتلا (S,G) ةعوطقملا xTR4 يقلت
تي زلا نم Gi0/2.10

```
Nov 30 00:01:38.620: PIM(0): Received v2 Join/Prune on GigabitEthernet0/2.10 from 172.16.14.2,
to us
Nov 30 00:01:38.621: PIM(0): Prune-list: (172.16.251.1/32, 225.1.1.10)
Nov 30 00:01:38.622: PIM(0): Prune GigabitEthernet0/2.10/225.1.1.10 from (172.16.251.1/32,
225.1.1.10)
Nov 30 00:01:38.622: MRT(0): Delete GigabitEthernet0/2.10/225.1.1.10 from the olist of
(172.16.251.1, 225.1.1.10)
Nov 30 00:01:38.624: MRT(0): Reset the PIM interest flag for (172.16.251.1, 225.1.1.10)
Nov 30 00:01:38.625: MRT(0): set min mtu for (172.16.251.1, 225.1.1.10) 1500->18010
Nov 30 00:01:38.626: PIM(0): Insert (172.16.251.1,225.1.1.10) prune in nbr 10.1.11.1's queue -
```

deleted

Nov 30 00:01:38.628: PIM(0): Building Join/Prune packet for nbr 10.1.11.1

Nov 30 00:01:38.629: PIM(0): Adding v2 (172.16.251.1/32, 225.1.1.10), S-bit Prune

Nov 30 00:01:38.630: PIM(0): Send v2 join/prune to 10.1.11.1 (LISP0)

xTR4#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:08:19/00:02:32, RP 172.16.251.4, flags: S
Incoming interface: GigabitEthernet0/2.10, RPF nbr 172.16.14.2
Outgoing interface list:
LISP0, 10.1.13.1, Forward/Sparse, 00:08:19/00:02:32

(172.16.251.1, 225.1.1.10), 00:00:57/00:02:02, flags: PT
Incoming interface: LISP0, RPF nbr 10.1.11.1
Outgoing interface list: Null

طفنل نم 10.1.14.1 RLOC ل ربق لISP0 ليزي و xTR4 نم (S,G) ةصاصق xTR1 ىقلى

.Nov 30 00:01:47.450: PIM(0): Received v2 Join/Prune on LISP0 from 172.16.251.14
.Nov 30 00:01:47.450: PIM(0): J/P Transport Attribute, Transport Type: Unicast, to us
.Nov 30 00:01:47.450: PIM(0): Prune-list: (172.16.251.1/32, 225.1.1.10)
.Nov 30 00:01:47.451: PIM(0): Prune LISP0/10.1.14.1 from (172.16.251.1/32, 225.1.1.10)
.Nov 30 00:01:47.451: MRT(0): Delete LISP0/10.1.14.1 from the olist of (172.16.251.1, 225.1.1.10) - deleted

xTR1#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:01:02/stopped, RP 172.16.251.4, flags: SP
Incoming interface: LISP0, RPF nbr 10.1.14.1
Outgoing interface list: Null

(172.16.251.1, 225.1.1.10), 00:01:02/00:01:57, flags: T
Incoming interface: GigabitEthernet3.10, RPF nbr 172.16.11.2
Outgoing interface list:
LISP0, 10.1.13.1, Forward/Sparse, 00:01:02/00:02:27

ةيئاهن ةلح كىدل نآلا

FHR (CE1)

CE1#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:01:46/stopped, RP 172.16.251.4, flags: SPF
Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.11.1
Outgoing interface list: Null

(172.16.251.1, 225.1.1.10), 00:01:46/00:03:09, flags: FT
Incoming interface: Loopback10, RPF nbr 0.0.0.0
Outgoing interface list:
GigabitEthernet0/1.10, Forward/Sparse, 00:01:46/00:02:39, A

xTR1

xTR1#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:01:02/stopped, RP 172.16.251.4, flags: SP
Incoming interface: LISP0, RPF nbr 10.1.14.1

Outgoing interface list: Null

(172.16.251.1, 225.1.1.10), 00:01:02/00:01:57, flags: T
Incoming interface: GigabitEthernet3.10, RPF nbr 172.16.11.2
Outgoing interface list:
LISP0, 10.1.13.1, Forward/Sparse, 00:01:02/00:02:27

xTR1#sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.11.2	GigabitEthernet3.10	16:23:01/00:01:29	v2	1 / DR S P G
10.1.14.1	LISP0	00:01:02/00:01:55	v2	0 /

LHR (CE3)

CE3#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:10:10/stopped, RP 172.16.251.4, flags: SJCL
Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.13.1
Outgoing interface list:
Loopback10, Forward/Sparse, 00:10:10/00:02:24

(172.16.251.1, 225.1.1.10), 00:01:46/00:01:13, flags: LJT
Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.13.1
Outgoing interface list:
Loopback10, Forward/Sparse, 00:01:46/00:02:24

xTR3

xTR3#sh ip mro

<...skip...>

(* , 225.1.1.10), 00:09:05/00:03:15, RP 172.16.251.4, flags: S
Incoming interface: LISP0, RPF nbr 10.1.14.1
Outgoing interface list:
GigabitEthernet0/2.10, Forward/Sparse, 00:09:05/00:03:15

(172.16.251.1, 225.1.1.10), 00:01:44/00:01:15, flags: T
Incoming interface: LISP0, RPF nbr 10.1.11.1
Outgoing interface list:
GigabitEthernet0/2.10, Forward/Sparse, 00:01:44/00:03:15

xTR3#sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.13.2	GigabitEthernet0/2.10	4d09h/00:01:30	v2	1 / DR S P G
10.1.11.1	LISP0	00:01:44/00:01:14	v2	0 /
10.1.14.1	LISP0	3d11h/00:01:46	v2	0 /

RP(CE4)

CE4#sh ip mro

<...skip...>

```
(*, 225.1.1.10), 00:09:10/00:03:17, RP 172.16.251.4, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet0/1.10, Forward/Sparse, 00:09:10/00:03:17
```

```
(172.16.251.1, 225.1.1.10), 00:01:45/00:02:35, flags: PT
  Incoming interface: GigabitEthernet0/1.10, RPF nbr 172.16.14.1
  Outgoing interface list: Null
```

xTR4

xTR4#sh ip mro

<...skip...>

```
(*, 225.1.1.10), 00:09:05/00:02:44, RP 172.16.251.4, flags: S
  Incoming interface: GigabitEthernet0/2.10, RPF nbr 172.16.14.2
  Outgoing interface list:
    LISP0, 10.1.13.1, Forward/Sparse, 00:09:05/00:02:44
```

```
(172.16.251.1, 225.1.1.10), 00:01:44/00:01:15, flags: PT
  Incoming interface: LISP0, RPF nbr 10.1.11.1
  Outgoing interface list: Null
```

xTR4#sh ip pim nei

PIM Neighbor Table

Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
P - Proxy Capable, S - State Refresh Capable, G - GenID Capable,
L - DR Load-balancing Capable

Neighbor Address	Interface	Uptime/Expires	Ver	DR Prio/Mode
172.16.14.2	GigabitEthernet0/2.10	4d09h/00:01:25	v2	1 / DR S P G
10.1.11.1	LISP0	00:01:44/00:01:47	v2	0 /

ةحصلا نم ققحتلا

نڤوكتلا اذه ةحص نم ققحتلل ءارج اّلاّاح دجوي ال

اهحالصإو ءاطخألا فاشكتسا

نڤوكتلا اذهل اھحالصإو ءاطخألا فاشكتسال ةددم تامولعم اّلاّاح رفوتت ال

ردصملا

- ددتمل اّلاّال تائڤل LISP لوكتورب RFC 6831 راي عملا

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 ي م د خ ت س م ل ل م ع د ي و ت ح م م ي د ق ت 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 ة 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