

组播路由- MSDP和PIM通过走

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简介

此条款展示独立于协议的组播(PIM)使用一简单组播拓扑，和多播源发现协议(MSDP)的操作。这是有用的了解控制面板操作和事件顺序从，当来源注册对时，当接收方启动对接收组播数据包时。

用于本文的设备是在实验室环境的?发器IOS版本15.3M。

拓扑

在左边的自治系统AS65000包含组播源。R1作为第一跳router(FHR)，并且注册来源(10.1.1.1)用PIM集合点(PIM RP) R3。R7和R3是iBGP邻居，并且R3-R4和R7-R6是EBGP邻居。R7和R6配置是两自治系统之间的首选路径。在AS64999中R5有一个本地附加的接收方。R5配置使用R4作为PIM RP。

控制面板

下面的视频展示什么信息传送，并且，当。为详细说明请查看下面视频和查看在每个步骤。

来源注册(步骤1-3)

来源开始发送组播数据对239.1.1.1。当接收此数据后，R1 (谁是分段的PIM指定路由器(DR))将使用组播信息包，并且建立PIM寄存器消息。

寄存器消息是从R1发送到R3通知PIM RP来源的单播PIM数据包。

```
R1#
*May 21 14:54:08.461: PIM(0): Check RP 10.10.10.10 into the (*, 239.1.1.1) entry
*May 21 14:54:08.461: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message
for 239.1.1.1
*May 21 14:54:08.461: PIM(0): Adding register encap tunnel (Tunnel0) as forwarding
interface of (10.1.1.1, 239.1.1.1).
```

现在PIM RP，R3收到寄存器消息并且回应寄存器终止。R3也发送MSDP SA信息对R4通过MSDP。在mroute的"A"标志位含义其MSDP广告的一候选。因为我们没有接收方或流出接口组的，指示其被修剪的"P"标志。

```
R3#
*May 21 14:54:08.459: PIM(0): Received v2 Register on Ethernet1/0 from 10.0.12.1
*May 21 14:54:08.459:      for 10.1.1.1, group 239.1.1.1
*May 21 14:54:08.459: PIM(0): Check RP 10.10.10.10 into the (*, 239.1.1.1) entry
*May 21 14:54:08.459: PIM(0): Adding register decap tunnel (Tunnel1) as accepting
interface of (*, 239.1.1.1).
*May 21 14:54:08.459: PIM(0): Adding register decap tunnel (Tunnel1) as accepting
interface of (10.1.1.1, 239.1.1.1).
*May 21 14:54:08.459: PIM(0): Send v2 Register-Stop to 10.0.12.1 for 10.1.1.1,
group 239.1.1.1
```

```
R3#show ip mroute 239.1.1.1
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,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector
Outgoing interface flags: H - Hardware switched, A - Assert winner
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
```

```
(* , 239.1.1.1), 00:00:33/stopped, RP 10.10.10.10, flags: SP
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list: Null
```

```
(10.1.1.1, 239.1.1.1), 00:00:33/00:02:26, flags: PA
Incoming interface: Ethernet1/0, RPF nbr 10.0.37.7
Outgoing interface list: Null
```

```
R3#show ip msdp sa-cache
MSDP Source-Active Cache - 0 entries
R3#
*May 21 14:54:58.511: MSDP(0): (10.1.1.1/32, 239.1.1.1)
```

此处R1接收从R3的寄存器终止

```
*May 21 14:54:08.461: PIM(0): Received v2 Register-Stop on Ethernet0/0 from 10.10.10.10
*May 21 14:54:08.461: PIM(0):      for source 10.1.1.1, group 239.1.1.1
*May 21 14:54:08.461: PIM(0): Removing register encap tunnel (Tunnel0) as forwarding
interface of (10.1.1.1, 239.1.1.1).
*May 21 14:54:08.461: PIM(0): Clear Registering flag to 10.10.10.10 for
(10.1.1.1/32, 239.1.1.1)
```

在R4我们能看到没有mroute状态，但是我们有一MSDP SA

```
R4#show ip mroute
```

```
*May 21 14:54:58.591: MSDP(0): (10.1.1.1/32, 239.1.1.1), accepted
```

```
R4#show ip mroute
```

```
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,  
Q - Received BGP S-A Route, q - Sent BGP S-A Route,  
V - RD & Vector, v - Vector
```

```
Outgoing interface flags: H - Hardware switched, A - Assert winner
```

```
Timers: Uptime/Expires
```

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

```
(* , 224.0.1.40), 00:35:32/00:02:31, RP 10.20.20.20, flags: SJCL
```

```
Incoming interface: Null, RPF nbr 0.0.0.0
```

```
Outgoing interface list:
```

```
Ethernet1/0, Forward/Sparse, 00:23:16/00:02:36
```

```
Loopback0, Forward/Sparse, 00:35:31/00:02:31
```

```
R4#show ip msdp sa-cache
```

```
MSDP Source-Active Cache - 1 entries
```

```
(10.1.1.1, 239.1.1.1), RP 10.10.10.10, BGP/AS 65000, 00:01:00/00:05:49, Peer 10.33.33.33
```

接收方参加组(步骤4 - 11)

R5接收在其接口的IGMP加入并且构件PIM加入数据包(* , G加入)。加入发送对R6。

```
R5#conf t
```

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

```
R5(config)#int e0/1
```

```
R5(config-if)#ip igmp join-group 239.1.1.1
```

```
R5(config-if)#
```

```
*May 21 14:56:43.234: PIM(0): Check RP 10.20.20.20 into the (*, 239.1.1.1) entry
```

```
*May 21 14:56:43.234: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message  
for 239.1.1.1
```

```
*May 21 14:56:43.234: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message  
for 239.1.1.1
```

```
*May 21 14:56:43.234: PIM(0): Insert (*,239.1.1.1) join in nbr 10.0.56.6's queue
```

```
*May 21 14:56:43.246: PIM(0): Building Join/Prune packet for nbr 10.0.56.6
```

```
*May 21 14:56:43.246: PIM(0): Adding v2 (10.20.20.20/32, 239.1.1.1), WC-bit, RPT-bit,  
S-bit Join
```

```
*May 21 14:56:43.246: PIM(0): Send v2 join/prune to 10.0.56.6 (Ethernet0/0)
```

R6接收(* , G)从R5的PIM加入和发送(* , G)对R4 PIM RP的加入。

```
R6#
```

```
*May 21 14:56:43.248: PIM(0): Received v2 Join/Prune on Ethernet2/0 from 10.0.56.5,  
to us
```

```
*May 21 14:56:43.248: PIM(0): Join-list: (*, 239.1.1.1), RPT-bit set, WC-bit set,  
S-bit set
```

```
*May 21 14:56:43.248: PIM(0): Check RP 10.20.20.20 into the (*, 239.1.1.1) entry
```

```
*May 21 14:56:43.248: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune  
message for 239.1.1.1
```

```
*May 21 14:56:43.248: PIM(0): Add Ethernet2/0/10.0.56.5 to (*, 239.1.1.1), Forward
```

```
state, by PIM *G Join
*May 21 14:56:43.248: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune
message for 239.1.1.1
*May 21 14:56:43.248: PIM(0): Insert (*,239.1.1.1) join in nbr 10.0.46.4's queue
*May 21 14:56:43.248: PIM(0): Building Join/Prune packet for nbr 10.0.46.4
*May 21 14:56:43.248: PIM(0): Adding v2 (10.20.20.20/32, 239.1.1.1), WC-bit,
RPT-bit, S-bit Join
*May 21 14:56:43.248: PIM(0): Send v2 join/prune to 10.0.46.4 (Ethernet1/0)
```

R4 PIM RP接收(*, G)从R6的加入。它然后发送a(S, G)往来源10.1.1.1的加入, 回到R6。

```
R4#
*May 21 14:56:43.331: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.46.6,
to us
*May 21 14:56:43.331: PIM(0): Join-list: (*, 239.1.1.1), RPT-bit set, WC-bit set,
S-bit set
*May 21 14:56:43.331: PIM(0): Check RP 10.20.20.20 into the (*, 239.1.1.1) entry
*May 21 14:56:43.331: PIM(0): Adding register decap tunnel (Tunnel1) as accepting
interface of (*, 239.1.1.1).
*May 21 14:56:43.331: PIM(0): Add Ethernet1/0/10.0.46.6 to (*, 239.1.1.1), Forward
state, by PIM *G Join
*May 21 14:56:43.331: PIM(0): Adding register decap tunnel (Tunnel1) as accepting
interface of (10.1.1.1, 239.1.1.1).
*May 21 14:56:43.331: PIM(0): Insert (10.1.1.1,239.1.1.1) join in nbr 10.0.46.6's queue
R4#
```

```
*May 21 14:56:43.331: PIM(0): Building Join/Prune packet for nbr 10.0.46.6
*May 21 14:56:43.331: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Join
*May 21 14:56:43.331: PIM(0): Send v2 join/prune to 10.0.46.6 (Ethernet1/0)
```

R6接收(S, G)从R4的加入, 然后发送(S, G)往R7的加入在AS65000。当(S, G)加入从R4接收, R6发送(SGR) prune对R4 (STEP 9)。这执行避免重复的数据包在R4。

```
*May 21 14:56:43.248: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.46.4,
to us
*May 21 14:56:43.248: PIM(0): Join-list: (10.1.1.1/32, 239.1.1.1), S-bit set
*May 21 14:56:43.248: PIM(0): Add Ethernet1/0/10.0.46.4 to (10.1.1.1, 239.1.1.1),
Forward state, by PIM SG Join
*May 21 14:56:43.248: PIM(0): Insert (10.1.1.1,239.1.1.1) join in nbr 10.0.67.7's queue
R6#
*May 21 14:56:43.248: PIM(0): Building Join/Prune packet for nbr 10.0.67.7
*May 21 14:56:43.248: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Join
*May 21 14:56:43.248: PIM(0): Send v2 join/prune to 10.0.67.7 (Ethernet0/0)
R6#
*May 21 14:56:44.476: PIM(0): Insert (10.1.1.1,239.1.1.1) sgr prune in nbr 10.0.46.4's
queue
*May 21 14:56:44.476: PIM(0): Building Join/Prune packet for nbr 10.0.46.4
*May 21 14:56:44.476: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), RPT-bit, S-bit Prune
*May 21 14:56:44.476: PIM(0): Send v2 join/prune to 10.0.46.4 (Ethernet1/0)
```

R7接收(S, G)从R6的加入, 然后发送(S, G)对跟随小路的R2的加入对来源。

```
R7#
*May 21 14:56:43.241: PIM(0): Received v2 Join/Prune on Ethernet0/0 from 10.0.67.6,
to us
*May 21 14:56:43.241: PIM(0): Join-list: (10.1.1.1/32, 239.1.1.1), S-bit set
*May 21 14:56:43.241: PIM(0): Check RP 10.10.10.10 into the (*, 239.1.1.1) entry
*May 21 14:56:43.241: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune message
for 239.1.1.1
*May 21 14:56:43.241: PIM(0): Add Ethernet0/0/10.0.67.6 to (10.1.1.1, 239.1.1.1),
Forward state, by PIM SG Join
*May 21 14:56:43.241: PIM(0): Insert (10.1.1.1,239.1.1.1) join in nbr 10.0.27.2's queue
```

```
*May 21 14:56:43.241: PIM(0): Building Join/Prune packet for nbr 10.0.27.2
R7#
*May 21 14:56:43.241: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Join
*May 21 14:56:43.241: PIM(0): Send v2 join/prune to 10.0.27.2 (Ethernet2/0)
```

```
R7#show ip mroute
```

```
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,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector
```

```
Outgoing interface flags: H - Hardware switched, A - Assert winner
```

```
Timers: Uptime/Expires
```

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

```
(* , 239.1.1.1), 00:03:33/stopped, RP 10.10.10.10, flags: SP
Incoming interface: Ethernet1/0, RPF nbr 10.0.37.3
Outgoing interface list: Null
```

```
(10.1.1.1, 239.1.1.1), 00:03:33/00:02:56, flags: T
Incoming interface: Ethernet2/0, RPF nbr 10.0.27.2
Outgoing interface list:
```

```
Ethernet0/0, Forward/Sparse, 00:03:33/00:02:53
```

R2接收(S , G)从R7的加入 , 然后发送(S , G)对跟随小路的R1的加入对来源

```
R2#
```

```
*May 21 14:56:43.253: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.27.7,
to us
*May 21 14:56:43.253: PIM(0): Join-list: (10.1.1.1/32, 239.1.1.1), S-bit set
*May 21 14:56:43.253: PIM(0): Check RP 10.10.10.10 into the (* , 239.1.1.1) entry
*May 21 14:56:43.253: PIM(0): Building Triggered (*,G) Join / (S,G,RP-bit) Prune
message for 239.1.1.1
*May 21 14:56:43.253: PIM(0): Add Ethernet1/0/10.0.27.7 to (10.1.1.1, 239.1.1.1),
Forward state, by PIM SG Join
*May 21 14:56:43.253: PIM(0): Insert (10.1.1.1,239.1.1.1) join in nbr 10.0.12.1's queue
*May 21 14:56:43.253: PIM(0): Building Join/Prune packet for nbr 10.0.12.1
```

```
R2#
```

```
*May 21 14:56:43.253: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Join
*May 21 14:56:43.253: PIM(0): Send v2 join/prune to 10.0.12.1 (Ethernet0/0)
```

```
R2#show ip mroute
```

```
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,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector
```

```
Outgoing interface flags: H - Hardware switched, A - Assert winner
```

```
Timers: Uptime/Expires
```

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

```
(* , 239.1.1.1), 00:01:27/stopped, RP 10.10.10.10, flags: SP
Incoming interface: Ethernet1/0, RPF nbr 10.0.27.7
Outgoing interface list: Null
```

```
(10.1.1.1, 239.1.1.1), 00:01:27/00:01:32, flags: T
Incoming interface: Ethernet0/0, RPF nbr 10.0.12.1
Outgoing interface list:
```

```
Ethernet1/0, Forward/Sparse, 00:01:27/00:03:01
```

R1接收(S , G)从R2的加入和添加接口到流出接口列表

```
*May 21 14:56:43.261: PIM(0): Received v2 Join/Prune on Ethernet0/0 from 10.0.12.2,
to us
```

```
*May 21 14:56:43.261: PIM(0): Join-list: (10.1.1.1/32, 239.1.1.1), S-bit set
```

```
*May 21 14:56:43.261: PIM(0): Add Ethernet0/0/10.0.12.2 to (10.1.1.1, 239.1.1.1),
Forward state, by PIM SG Join
```

```
R1#show ip mroute
```

```
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,
```

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

```
V - RD & Vector, v - Vector
```

```
Outgoing interface flags: H - Hardware switched, A - Assert winner
```

```
Timers: Uptime/Expires
```

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

```
(* , 239.1.1.1), 00:03:25/stopped, RP 10.10.10.10, flags: SPF
Incoming interface: Ethernet0/0, RPF nbr 10.0.12.2
Outgoing interface list: Null
```

```
(10.1.1.1, 239.1.1.1), 00:03:25/00:03:24, flags: FT
Incoming interface: Ethernet0/1, RPF nbr 0.0.0.0
Outgoing interface list:
```

```
Ethernet0/0, Forward/Sparse, 00:00:50/00:02:39
```

这时数据从来源一直当前流到接收方。当接收数据包后，R5从将转换(* , G)对的树(S , G)树。

```
R5#
```

```
*May 21 14:56:44.494: PIM(0): Insert (10.1.1.1,239.1.1.1) join in nbr 10.0.56.6's queue
```

```
*May 21 14:56:44.498: PIM(0): Building Join/Prune packet for nbr 10.0.56.6
```

```
*May 21 14:56:44.498: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Join
```

```
*May 21 14:56:44.498: PIM(0): Send v2 join/prune to 10.0.56.6 (Ethernet0/0)
```

```
R5#show ip mroute
```

```
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,
```

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

```
V - RD & Vector, v - Vector
```

Outgoing interface flags: H - Hardware switched, A - Assert winner
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode

(* , 239.1.1.1), 00:02:47/stopped, RP 10.20.20.20, flags: SJCL
Incoming interface: Ethernet0/0, RPF nbr 10.0.56.6
Outgoing interface list:
Ethernet0/1, Forward/Sparse, 00:02:47/00:02:14

(10.1.1.1, 239.1.1.1), 00:02:45/00:00:14, flags: LJT
Incoming interface: Ethernet0/0, RPF nbr 10.0.56.6
Outgoing interface list:
Ethernet0/1, Forward/Sparse, 00:02:45/00:02:14

R6接收(S , G)从R5的加入 , 和转发数据包在E2/0外面对R5。

R6#

*May 21 14:56:44.496: PIM(0): Received v2 Join/Prune on Ethernet2/0 from 10.0.56.5,
to us

*May 21 14:56:44.496: PIM(0): Join-list: (10.1.1.1/32, 239.1.1.1), S-bit set

*May 21 14:56:44.496: PIM(0): Update Ethernet2/0/10.0.56.5 to (10.1.1.1, 239.1.1.1),
Forward state, by PIM SG Join

*May 21 14:56:49.056: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.46.4,
to us

*May 21 14:56:49.056: PIM(0): Prune-list: (10.1.1.1/32, 239.1.1.1)

*May 21 14:56:49.056: PIM(0): Prune Ethernet1/0/239.1.1.1 from (10.1.1.1/32, 239.1.1.1)
- deleted

R6#show ip mroute

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,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector

Outgoing interface flags: H - Hardware switched, A - Assert winner
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode

(* , 239.1.1.1), 00:03:43/00:02:42, RP 10.20.20.20, flags: S
Incoming interface: Ethernet1/0, RPF nbr 10.0.46.4
Outgoing interface list:
Ethernet2/0, Forward/Sparse, 00:03:43/00:02:42

(10.1.1.1, 239.1.1.1), 00:03:43/00:02:46, flags: T
Incoming interface: Ethernet0/0, RPF nbr 10.0.67.7
Outgoing interface list:
Ethernet2/0, Forward/Sparse, 00:03:43/00:02:44

R4 PIM的RP修剪(S , G)步骤12

最终R4 PIM RP发送a (S , G)对R6的prune。 注意“M”标志是存在mroute (MSDP创建的条目)。

R4#

*May 21 14:56:44.559: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.46.6,

to us

```
*May 21 14:56:44.559: PIM(0): Prune-list: (10.1.1.1/32, 239.1.1.1) RPT-bit set
*May 21 14:56:44.579: PIM(0): Removing register decap tunnel (Tunnel1) as accepting
interface of (10.1.1.1, 239.1.1.1).
*May 21 14:56:44.579: PIM(0): Installing Ethernet1/0 as accepting interface for
(10.1.1.1, 239.1.1.1).

*May 21 14:56:46.107: MSDP(0): (10.1.1.1/32, 239.1.1.1), accepted

*May 21 14:56:49.139: PIM(0): Insert (10.1.1.1,239.1.1.1) prune in nbr 10.0.46.6's queue
*May 21 14:56:49.139: PIM(0): Building Join/Prune packet for nbr 10.0.46.6
*May 21 14:56:49.139: PIM(0): Adding v2 (10.1.1.1/32, 239.1.1.1), S-bit Prune
*May 21 14:56:49.139: PIM(0): Send v2 join/prune to 10.0.46.6 (Ethernet1/0)
```

R4#show ip mroute

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,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector

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

Timers: Uptime/Expires

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

(*, 239.1.1.1), 00:02:15/00:03:12, RP 10.20.20.20, flags: S

Incoming interface: Null, RPF nbr 0.0.0.0

Outgoing interface list:

Ethernet1/0, Forward/Sparse, 00:02:15/00:03:12

(10.1.1.1, 239.1.1.1), 00:02:15/00:02:46, flags: PMT

Incoming interface: Ethernet1/0, RPF nbr 10.0.46.6

Outgoing interface list: Null

此处对R4的流出的Interface(OIF) E1/0从R6删除。

R6#

```
*May 21 14:56:49.056: PIM(0): Received v2 Join/Prune on Ethernet1/0 from 10.0.46.4,to us
*May 21 14:56:49.056: PIM(0): Prune-list: (10.1.1.1/32, 239.1.1.1)
*May 21 14:56:49.056: PIM(0): Prune Ethernet1/0/239.1.1.1 from (10.1.1.1/32, 239.1.1.1)
- deleted
```

R6#

摘要

MSDP为互联每使用他们自己的RP的不同的PIM域提供一个方法。在本文未被覆盖的它也是常用的实现“任播RP”。MSDP和PIM允许在一个域的一个接收方收到从一来源的流量在另一个域。而PIM用于构件组播树，SA MSDP消息允许其他RP得知在另一个PIM域的来源。对于在协议的运行的更多详细信息请参考在参考提及的RFC。

参考

PIM RFC

<https://tools.ietf.org/html/rfc4601>

MSDP RFC

<https://tools.ietf.org/html/rfc3618>