

配置VRF間組播而不單播VRF間路由洩漏

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簡介

本檔案介紹如何轉送來自虛擬路由和轉送(VRF)來源中來源且面向VRF接收器中使用者的多點傳播流，而無需執行單點傳播VRF間路由洩漏。

必要條件

需求

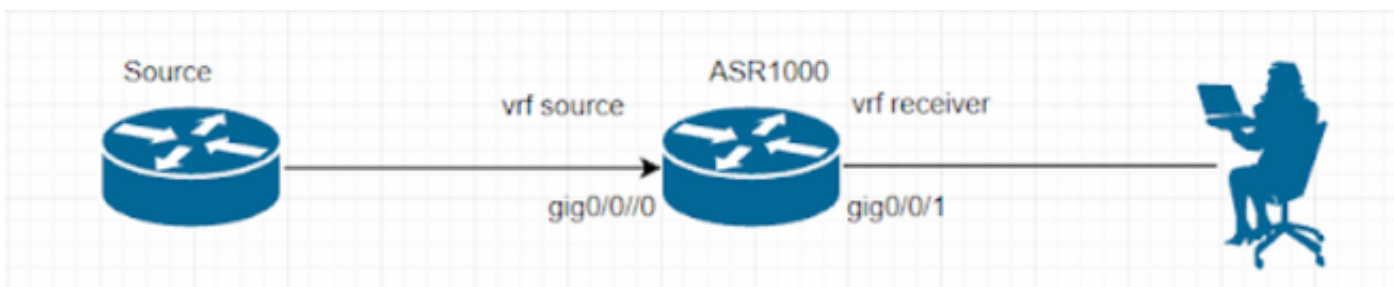
思科建議您瞭解PIM功能和ASM。

採用元件

本文檔中的資訊基於ASR1000。

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

網路圖表



組態

在源上生成UDP組播流。

Source#

```
ip sla 1
```

```
udp-echo 239.1.1.1 2000 source-ip 10.1.1.1
```

```
ip sla schedule 1 life forever start-time now
```

接收方配置了IGMP並傳送IGMP成員報告。

ASR1000路由器正在執行vrf間組播流量轉發。VRF「source」中的回送1是兩個VRF的RP。

ASR1000#

```
ip vrf source
```

```
rd 1:1
```

```
!
```

```
ip vrf receiver
```

```
rd 2:2
```

```
!
```

```
ip multicast-routing vrf source distributed
```

```
ip multicast-routing vrf receiver distributed
```

```
ip pim vrf source rp-address 1.1.1.1
```

```
ip pim vrf receiver rp-address 1.1.1.1
```

```
interface Loopback1
```

```
ip vrf forwarding source
```

```
ip address 1.1.1.1 255.255.255.255
```

```
ip pim sparse-mode
```

```
interface GigabitEthernet0/0/0
```

```
ip vrf forwarding source
```

```
ip address 10.1.1.2 255.255.255.0
```

```
ip pim sparse-mode
```

```
interface GigabitEthernet0/0/1
```

```
ip vrf forwarding receiver
```

```
ip address 20.1.1.2 255.255.255.0
```

```
ip pim sparse-mode
```

(S, G)條目暫時未在vrf「接收」中形成。

```
ASR1002-1#show ip mroute vrf source
```

```
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
```

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

```
Timers: Uptime/Expires
```

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

```
(*, 239.1.1.1), 00:05:01/stopped, RP 1.1.1.1, flags: SPF
```

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

```
Outgoing interface list: Null
```

```
(10.1.1.1, 239.1.1.1), 00:05:01/00:02:26, flags: PFT
```

```
Incoming interface: GigabitEthernet0/0/0, RPF nbr 0.0.0.0
```

```
Outgoing interface list: Null
```

```
(*, 224.0.1.40), 00:07:03/00:02:59, RP 1.1.1.1, flags: SJCL
```

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

```
Outgoing interface list:
```

```
Loopback1, Forward/Sparse, 00:07:01/00:02:59
```

```
ASR1002-X-1#sh ip mroute vrf receiver
```

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

```
(* , 239.1.1.1), 00:03:23/00:02:44, RP 1.1.1.1, flags: SJC  
Incoming interface: Null, RPF nbr 0.0.0.0  
Outgoing interface list:  
GigabitEthernet0/0/1, Forward/Sparse, 00:03:23/00:02:44
```

為了解決此問題，您需要執行VRF選擇以便通過RPF檢查。

```
ip access-list standard 1  
  
permit 239.1.1.1 log  
  
exit  
  
ip multicast vrf receiver rpf select vrf source group-list 1
```

驗證

使用本節內容，確認您的組態是否正常運作。

執行完上述步驟後，接收方即可看到多點傳送饋送。

```
Receiver#show flow monitor test cache format table  
  
Cache type: Normal (Platform cache)  
  
Cache size: 200000  
  
Current entries: 1  
  
High Watermark: 3  
  
Flows added: 50  
  
Flows aged: 49  
  
- Inactive timeout ( 15 secs) 49
```

```
IPV4 SRC ADDR IPV4 DST ADDR TRNS SRC PORT TRNS DST PORT INTF INPUT FLOW SAMPLER ID IP TOS IP  
PROT ip src as ip dst as ipv4 next hop addr ipv4 src mask ipv4 dst mask tcp flags intf output
```

bytes pkts time first time last

```
=====
=====
=====
```

```
10.1.1.1 239.1.1.1 57314 1967 Gi0/0/3 0 0x00 17 0 0 0.0.0.0 /0 /0 0x00 Null 80 1 11:09:08.082
11:09:08.082
```

接收器上的封包擷取。

```
> Frame 1: 94 bytes on wire (752 bits), 94 bytes captured (752 bits)
> Ethernet II, Src: Cisco_93:70:01 (00:a6:ca:93:70:01), Dst: IPv4mcast_01:01:01 (01:00:5e:01:01:01)
v Internet Protocol Version 4, Src: 10.1.1.1, Dst: 239.1.1.1
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 80
    Identification: 0x0000 (0)
  > Flags: 0x00
    Fragment Offset: 0
    Time to Live: 254
    Protocol: UDP (17)
    Header Checksum: 0xc198 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 10.1.1.1
    Destination Address: 239.1.1.1
  > User Datagram Protocol, Src Port: 54527, Dst Port: 1967
  > Data (52 bytes)
```

(S, G)條目形成在VRF接收器中。

```
ASR1002-1#show ip mroute vrf receiver 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,
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 Outgoing interface flags: H - Hardware switched,
A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state:
Interface, Next-Hop or VCD, State/Mode

(*, 239.1.1.1), 00:21:36/stopped, RP 1.1.1.1, flags: SJC
Incoming interface: Loopback1, RPF nbr 1.1.1.1, using vrf source
Outgoing interface list:
GigabitEthernet0/0/1, Forward/Sparse, 00:21:36/00:02:43

(10.1.1.1, 239.1.1.1), 00:03:55/stopped, flags: T
Incoming interface: GigabitEthernet0/0/0, RPF nbr 0.0.0.0, using vrf source
Outgoing interface list:
GigabitEthernet0/0/1, Forward/Sparse, 00:03:55/00:02:43
```

```
ASR1002-1#show ip mroute vrf source 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,
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
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode

(* , 239.1.1.1), 00:22:36/stopped, RP 1.1.1.1, flags: SJCFE
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list: Null

Extranet receivers in vrf receiver:
(* , 239.1.1.1), 00:21:54/stopped, RP 1.1.1.1, OIF count: 1, flags: SJC

(10.1.1.1, 239.1.1.1), 00:04:14/00:02:55, flags: FTE
Incoming interface: GigabitEthernet0/0/0, RPF nbr 0.0.0.0
Outgoing interface list: Null

Extranet receivers in vrf receiver:
(10.1.1.1, 239.1.1.1), 00:04:14/stopped, OIF count: 1, flags: T

ASR1002-1#show ip mfib vrf receiver 239.1.1.1
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.
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 receiver

(* ,239.1.1.1) Flags: C HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 1/1/0
GigabitEthernet0/0/1 Flags: NS
(10.1.1.1,239.1.1.1) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 15/0/94/0, Other: 0/0/0
GigabitEthernet0/0/1 Flags: NS

此外，VRF接收器RIB中沒有用於RP和源IP的單播條目。

ASR1002-1#show ip route vrf receiver 1.1.1.1
Routing Table: receiver % Network not in table

```
ASR1002-1#show ip route vrf receiver 10.1.1.1
Routing Table: receiver % Network not in table
```

因此，RPF顯示為失敗，這是預期的，但是組播流量將被轉發。

```
ASR1002-1#show ip rpf vrf receiver 1.1.1.1
failed, no route exists
ASR1002-1#show ip rpf vrf receiver 10.1.1.1
failed, no route exists
```

實現此目標的另一種方式如下：

```
ip mroute vrf receiver 10.1.1.0 255.255.255.0 fallback-lookup vrf source
```

```
ip mroute vrf receiver 1.1.1.1 255.255.255.255 fallback-lookup vrf source
```

這樣，RPF檢查將成功。

```
ASR1002-1#show ip rpf vrf receiver 1.1.1.1
RPF information for ? (1.1.1.1)
RPF interface: Loopback1
RPF neighbor: ? (1.1.1.1) - directly connected
RPF route/mask: 1.1.1.1/32
RPF type: multicast (connected)
Doing distance-preferred lookups across tables
Using Extranet RPF Rule: Static Fallback Lookup, RPF VRF: source
RPF topology: ipv4 multicast base
```

```
ASR1002-1#show ip rpf vrf receiver 10.1.1.1
RPF information for ? (10.1.1.1)
RPF interface: GigabitEthernet0/0/0
RPF neighbor: ? (10.1.1.1) - directly connected
RPF route/mask: 10.1.1.0/24
RPF type: multicast (connected)
Doing distance-preferred lookups across tables
Using Extranet RPF Rule: Static Fallback Lookup, RPF VRF: source
RPF topology: ipv4 multicast base
```

但是，您可以使用RPF **select**或**fallback lookup**命令，這兩種命令最終都能實現我們的目的。

疑難排解

目前尚無適用於此組態的具體疑難排解資訊。