在Nexus 3000上配置組播服務反射

目錄

簡介

本檔案介紹如何在Cisco Nexus 3000（常規模式）系列交換器上設定和驗證服務反射功能。

必要條件

需求

您瞭解以下主題的一般建議：

- 通訊協定無關多點傳送(PIM)
- 開放最短路徑優先(OSPF)
- 網路位址轉譯(NAT)
- 網際網路群組管理協定(IGMP)

採用元件

本文中的資訊係根據以下軟體和硬體版本：

Sw1#	N9K-C93180YC-FX	NXOS：版本9.3(5)
Sw2#	N3K-C3548P-XL	NXOS：版本7.0(3)I7(9)
Sw3#	N3K-C3172TQ-10GT	NXOS：版本7.0(3)I7(9)

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。

背景資訊

支援的Cisco Nexus 3k平台

組播服務反射功能僅在7.0(3)I7(2)版的Cisco Nexus 3548-X平台上受支援。

支援的服務反射方法

常規模式多點傳送NAT

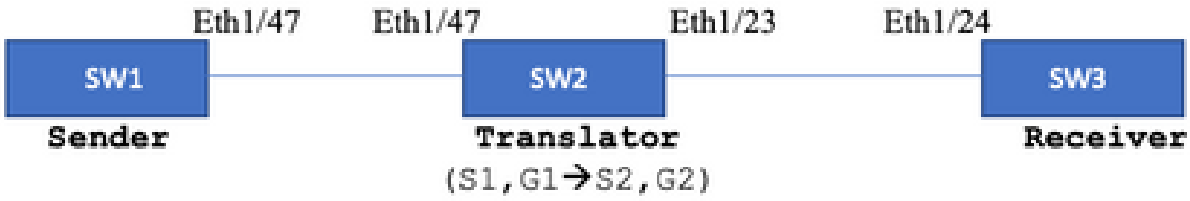
在常規模式下，作為S1、G1介面傳入的包被轉換為S2、G2介面，並且傳出包的目的地媒體訪問控制(MAC)地址被轉換為G2介面（例如，轉換後的組）的組播MAC地址。

使用無重寫組播NAT的快速通道和快速通道

在快速傳遞模式中，S1、G1介面被轉換為S2、G2介面，並且傳出資料包的目的MAC地址具有與G1介面對應的組播MAC地址（例如，預轉換組的MAC地址）。

設定

拓撲



本地組：239.194.169.1(G1)

轉換後的組：233.193.40.196(G2)

原始來源：10.11.11.1(S1)

轉換後來源：172.16.0.1。(S2)

組態

Switch 1配置（傳送方）

```
SW1# show run int eth1/47

interface Ethernet1/47
no switchport
ip address 10.11.11.1/24
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0
ip pim sparse-mode


SW1# show run ospf
feature ospf
router ospf 1
router-id 192.168.1.1
interface Ethernet1/47
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0

SW1# show run pim
feature pim
ip pim rp-address 10.10.10.10 group-list 239.194.169.1/32
ip pim ssm range 232.0.0.0/8
interface Ethernet1/47
ip pim sparse-mode
```

交換機2配置（轉換器）

```
SW2# show run int eth 1/23,eth1/47
interface Ethernet1/23
no switchport
ip address 10.0.0.1/24
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0
ip pim sparse-mode
no shutdown

interface Ethernet1/47
  no switchport
  ip address 10.11.11.2/24
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown


SW2# show run int lo0,lo411
interface loopback0
ip address 10.10.10.10/32
ip router ospf 1 area 0.0.0.0
ip pim sparse-mode

interface loopback411
ip address 172.16.0.1/32
ip router ospf 1 area 0.0.0.0
ip pim sparse-mode
ip igmp join-group 239.194.169.1


SW2# show run ospf
feature ospf
router ospf 1
router-id 192.168.1.2

interface loopback0
ip router ospf 1 area 0.0.0.0

interface loopback411
ip router ospf 1 area 0.0.0.0

interface Ethernet1/23
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0

interface Ethernet1/47
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0

SW2# show run pim
feature pim

ip pim rp-address 10.10.10.10 group-list 239.194.169.1/32
ip pim rp-address 172.16.0.1 group-list 233.193.40.196/32
ip pim ssm range 232.0.0.0/8

interface loopback0
ip pim sparse-mode

interface loopback411
ip pim sparse-mode
```

```
interface Ethernet1/23
ip pim sparse-mode

interface Ethernet1/47
ip pim sparse-mode

ip service-reflect mode regular
ip service-reflect destination 239.194.169.1 to 233.193.40.196 mask-len 32 source 172.16.0.1
hardware profile multicast service-reflect port 7
```

Switch 3配置（接收器）

```
SW3# show run int eth 1/24
interface Ethernet1/24
ip address 10.0.0.2/24
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0
ip pim sparse-mode
ip igmp join-group 233.193.40.196
no shutdown


SW3# show run ospf
feature ospf
router ospf 1
router-id 192.168.1.3

interface Ethernet1/24
ip ospf network point-to-point
ip router ospf 1 area 0.0.0.0


SW3# show run pim

feature pim
ip pim rp-address 172.16.0.1 group-list 233.193.40.196/32
ip pim ssm range 232.0.0.0/8

interface Ethernet1/24
ip pim sparse-mode
```

驗證

使用本節內容，確認您的組態是否正常運作。

驗證服務反射功能

交換機1驗證

```
SW1# show ip mroute
IP Multicast Routing Table for VRF "default"

(*, 232.0.0.0/8), uptime: 3w6d, pim ip
  Incoming interface: Null, RPF nbr: 0.0.0.0
  Outgoing interface list: (count: 0)

(10.11.11.1/32, 239.194.169.1/32), uptime: 00:06:57, pim ip
  Incoming interface: Ethernet1/47, RPF nbr: 10.11.11.1
  Outgoing interface list: (count: 1)
  Ethernet1/47, uptime: 00:06:57, pim, (RPF)
```

交換機2驗證

<#root>

```
SW2# show ip mroute
IP Multicast Routing Table for VRF "default"

(*, 232.0.0.0/8), uptime: 00:04:39, pim ip
  Incoming interface: Null, RPF nbr: 0.0.0.0
  Outgoing interface list: (count: 0)

(*, 233.193.40.196/32), uptime: 00:04:11, pim ip
```

Incoming interface: loopback411

```
, RPF nbr: 172.16.0.1  <--
```

Translation (ingress) Loopback interface

```
  Outgoing interface list: (count: 1)
  Ethernet1/23, uptime: 00:03:59, pim    <--
```

Egress interface for S2,G2

```
(172.16.0.1/32, 233.193.40.196/32), uptime: 00:00:15, ip mrib pim
  Incoming interface: loopback411, RPF nbr: 172.16.0.1
  Outgoing interface list: (count: 1)
  Ethernet1/23, uptime: 00:00:15, pim

(*, 239.194.169.1/32), uptime: 00:04:34, static pim ip  <-- (The NAT router would pull the traffic by u
  Incoming interface: loopback0, RPF nbr: 10.10.10.10
  Outgoing interface list: (count: 1)
```

loopback411,

```
 uptime: 00:04:34, static    <--
```

Translation (egress) Loopback interface

```
(10.11.11.1/32, 239.194.169.1/32), uptime: 00:00:17, ip mrib pim
  Incoming interface: Ethernet1/47, RPF nbr: 10.11.11.1, internal     <--
```

Ingress interface for S1,G1

```
  Outgoing interface list: (count: 1)
  loopback411, uptime: 00:00:17, mrib



SW2# show ip mroute sr   <--
```

(Only SR nat routes)

```
IP Multicast Routing Table for VRF "default"

(
```

***, 239.194.169.1/32**

```
), uptime: 00:09:29, static pim ip
    NAT Mode: Ingress
    NAT Route Type: Pre
    Incoming interface:
```

loopback0

```
, RPF nbr: 10.10.10.10
    Translation list: (count: 1)
    SR: (
```

172.16.0.1, 233.193.40.196

```
)

(
```

10.11.11.1/32, 239.194.169.1/32

```
), uptime: 00:05:12, ip mrib pim
    NAT Mode: Ingress
    NAT Route Type: Pre
    Incoming interface:
```

Ethernet1/47

```
, RPF nbr: 10.11.11.1, internal
    Translation list: (count: 1)
    SR: (
```

172.16.0.1, 233.193.40.196

```
)
```

交換機3驗證

```
SW3# show ip mroute
IP Multicast Routing Table for VRF "default"
(*, 232.0.0.0/8), uptime: 02:45:09, pim ip
```

```
Incoming interface: Null, RPF nbr: 0.0.0.0
Outgoing interface list: (count: 0)

(*, 233.193.40.196/32), uptime: 01:47:02, ip pim igmp
Incoming interface: Ethernet1/24, RPF nbr: 10.0.0.1
Outgoing interface list: (count: 1)
Ethernet1/24, uptime: 01:43:27, igmp, (RPF)

(172.16.0.1/32, 233.193.40.196/32), uptime: 00:02:59, ip mrib pim
Incoming interface: Ethernet1/24, RPF nbr: 10.0.0.1
Outgoing interface list: (count: 1)
Ethernet1/24, uptime: 00:02:59, mrib, (RPF)
```

疑難排解

本節提供的資訊可用於對組態進行疑難排解。

如果S2和G2未建立，或者使用者遇到隨機轉換問題，您可以檢查以下幾點：

1.一旦收到流量（預轉換），就會根據mcastfwd中的pkt建立轉換後的條目。

2.如果您沒有看到在mcastfwd中傳送pkt，可以檢查是否透過ACL在輸入介面上取得所請求的流量。

3如果您在ACL中看到計數器增加，請通過ethanalyzer檢查相同流量命中CPU。

4還可以檢查MRIB event-history中的轉換：

<#root>

```
SW2# show system  internal  mfwd ip mroute  -->

Packets Punted in Mcast Forwarding.


MCASTFWD Multicast Routing Table for VRF "default"
(0.0.0.0/0, 232.0.0.0/8)
  Software switched packets: 0, bytes: 0
  RPF fail packets: 0, bytes: 0
(0.0.0.0/0, 233.193.40.196/32)
  Software switched

packets: 1

, bytes: 84
  RPF fail packets: 0, bytes: 0
(172.16.0.1/32, 233.193.40.196/32), data-alive
  Software switched

packets: 1

, bytes: 84
  RPF fail packets: 8, bytes: 672
(0.0.0.0/0, 239.194.169.1/32)
  Software switched
```

packets: 1

, bytes: 84
RPF fail packets: 0, bytes: 0
(10.11.11.1/32, 239.194.169.1/32), data-alive
Software switched

packets: 10

, bytes: 840
RPF fail packets: 0, bytes: 0

<#root>

SW2# show ip access-lists test
IP access list test
        statistics per-entry
        10 permit ip any 239.194.169.1/32 [match=105] <--

Intrested traffic hitting ingress interface

        20 permit ip any any [match=11]

interface Ethernet1/47
  no switchport
  ip access-group test in <--

ACL applied on ingress interface

  ip address 10.11.11.2/24
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

<#root>

SW2# ethanalyzer loca int inband display-filter "ip.addr == 239.194.169.1" limit-captured-frames 0

 --> Confirm (S1,G1) seen on CPU

Capturing on inband
wireshark-cisco-mtc-dissector: ethertype=0xde09, devicetype=0x0
2022-09-18 04:21:37.840227 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request
2022-09-18 04:21:37.841275 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request
2022-09-18 04:21:37.860153 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request
2022-09-18 04:21:37.861199 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request
2022-09-18 04:21:37.880072 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request
2022-09-18 04:21:37.881113 10.11.11.1 -> 239.194.169.1 ICMP Echo (ping) request

SW2# ethanalyzer local interface inband capture-filter "host 172.16.0.1" limit-captured-frames 0

--> Confirm (S2,G2) seen on CPU

```
Capturing on inband
wireshark-cisco-mtc-dissector: ethertype=0xde09, devicetype=0x0
2022-09-18 03:12:51.423484 172.16.0.1 -> 233.193.40.196 ICMP Echo (ping) request
2022-09-18 03:12:51.423978 10.0.0.2 -> 172.16.0.1 ICMP Echo (ping) reply
2022-09-18 03:12:53.425754 172.16.0.1 -> 233.193.40.196 ICMP Echo (ping) request
2022-09-18 03:12:53.425761 10.0.0.2 -> 172.16.0.1 ICMP Echo (ping) reply
2022-09-18 03:12:55.426719 172.16.0.1 -> 233.193.40.196 ICMP Echo (ping) request
2022-09-18 03:12:55.426726 10.0.0.2 -> 172.16.0.1 ICMP Echo (ping) reply
2022-09-18 03:12:57.428669 172.16.0.1 -> 233.193.40.196 ICMP Echo (ping) request
2022-09-18 03:12:57.429175 10.0.0.2 -> 172.16.0.1 ICMP Echo (ping) reply
2022-09-18 03:12:59.429890 172.16.0.1 -> 233.193.40.196 ICMP Echo (ping) request
2022-09-18 03:12:59.430386 10.0.0.2 -> 172.16.0.1 ICMP Echo (ping) reply
10 packets captured
```

<#root>

```
SW2# show ip pim event-history  mrib
```

--> Event history to confirm that the translation is being done

```
2022 Sep 18 04:28:39.970688: E_DEBUG    pim [19433]:  Sending ack: xid: 0xeeee00d2

2022 Sep 18 04:28:39.970255: E_DEBUG    pim [19433]:  MRIB Join notify for (10.11.11.1/32, 239.194.169.1


2022 Sep 18 04:28:39.968875: E_DEBUG    pim [19433]:  MRIB sr route type notif for (10.11.11.1/32, 239.1
2022 Sep 18 04:28:39.968859: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: MRIB RPF notify for
: 0.0.0.0, route-type 1
2022 Sep 18 04:28:39.968307: E_DEBUG    pim [19433]:  Copied the flags from MRIB for route (10.11.11.1/
2022 Sep 18 04:28:39.968301: E_DEBUG    pim [19433]:  MRIB Join notify for (10.11.11.1/32, 239.194.169.1
2022 Sep 18 04:28:39.968294: E_DEBUG    pim [19433]: Received a notify message from MRIB xid: 0xeeee00cf
2022 Sep 18 04:28:35.904652: E_DEBUG    pim [19433]:  Sending ack: xid: 0xeeee00cc
2022 Sep 18 04:28:35.904625: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: MRIB RPF notify for
e RLOC address: 0.0.0.0, route-type 0
2022 Sep 18 04:28:35.904484: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: After copying the val
ype 0
2022 Sep 18 04:28:35.904476: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: MRIB RPF notify for
.0.0.0, route-type 0

2022 Sep 18 04:28:35.904400: E_DEBUG    pim [19433]:  MRIB Join notify for (172.16.0.1/32, 233.193.40.19


2022 Sep 18 04:28:35.904343: E_DEBUG    pim [19433]:  MRIB Join notify for (0.0.0.0/32, 233.193.40.196/3


2022 Sep 18 04:27:49.862827: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: After copying the val
2022 Sep 18 04:27:49.862812: E_DEBUG    pim [19433]:  pim_process_mrib_rpf_notify: MRIB RPF notify for
type 0
2022 Sep 18 04:27:49.862798: E_DEBUG    pim [19433]:  MRIB Join notify for (*, 239.194.169.1/32)

2022 Sep 18 04:27:49.862795: E_DEBUG    pim [19433]:  MRIB Join notify for (172.16.0.1/32, 233.193.40.19


2022 Sep 18 04:27:49.862789: E_DEBUG    pim [19433]:  MRIB Join notify for (0.0.0.0/32, 233.193.40.196/3
```

```
2022 Sep 18 04:27:49.861870: E_DEBUG    pim [19433]:  Creating PIM route for (*, 239.194.169.1/32)

2022 Sep 18 04:27:49.861868: E_DEBUG    pim [19433]:  MRIB Join notify for (*, 239.194.169.1/32)
```

摘要

- 在常規模式下，流量在第一次通過時到達原始S、G條目，由於傳出介面清單(OIFL)只有環回埠而重新循環。在第二個通道中，它獲取重寫的目標MAC。
- 在第三步中，組播路由查詢在轉換後的S、G上進行，並將資料包轉發到相應的轉換組OIFL埠。
- 新增了環回上的靜態連線，強制在NAT盒上接收流量。
- 當(s1,g1)接收到第一個資料包時，交換機將使用新的SR標誌(s1,g—> s2,g2)對(s1,g1)進行程式設計。
- 交換機將使用此後設資料對資料包進行重新循環，並為g2丟棄該資料包。將(S2、G2)資料包轉發到sup後，在s2、g2的NAT裝置上會觸發FHR（第一跳路由器）功能。
- 收到流量後，即會根據在mcastfwd中列印的pkt建立翻譯前和翻譯後條目。
- 如果您沒有看到各組在mccastfwd中傳送的封包，可以使用上述疑難排解程式來確認是否有興趣的流量到達交換器

相關資訊

- 思科技術支援與下載

.

關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。