Multicast Service Reflection

Multicast service reflection feature enables the users to translate externally received multicast destination addresses to addresses that conform to the organization's internal addressing policy. With this feature, users need not redistribute routes at the translation boundary into their network infrastructure for the Reverse Path Forwarding (RPF) to work properly. Also, users can receive identical feeds from two ingress points in the network and route them independently.

The multicast service reflection feature is configured on the virtual interface. When a packet is forwarded to a virtual interface (original IP), this feature maps the original IP address to an internal IP address and the traffic is directed to the internal IP address. Therefore, it enables an organization to logically separate the private and public multicast networks.

Multicast Service Reflection Working Architecture

For multicast service reflection, the virtual interface is configured to statically join the group that needs to be translated to build a multicast tree. The virtual interface maintains information about:

- Input interface
- Private-to-public multicast group mappings
- Mask length to define the pool range
- Source of translated packet

When a packet is forwarded to a virtual interface, it is reflected for translation. The source IP address is changed to the IP address of the virtual interface subnet, which prevents RPF failures. Finally, the destination IP address is translated to a new multicast group IP address.
Figure 73-1 shows the multicast service reflection working architecture.

**Restrictions for Multicast Service Reflection**

Following restrictions apply for multicast service reflection feature:

- The virtual interface should be installed on the border router.
- Multicast service reflection does not support bidirectional multicast.
- Protocol Independent Multicast (PIM)/IGMP control packets are not translated.
- Multicast service reflection does not support P2P GRE tunnelling.
- Multicast service reflection does not support IPv6 multicasting.
• Only 1000 service reflection translations are supported.
• Multicast service reflection is not supported in the PIM-Dense mode.

Configuring Multicast Service Reflection

Complete these steps to configure multicast service reflection feature.

SUMMARY STEPS

1. enable
2. configure terminal
3. ip multicast-routing [distributed]
4. interface loopback loopback_id
5. description description
6. ip address ip_address subnet_mask
7. ip pim sparse-mode
8. exit
9. interface gigabitEthernet slot/port
10. ip address ip_address subnet_mask
11. ip pim sparse-mode
12. exit
13. interface gigabitEthernet slot/port
14. ip address ip_address subnet_mask
15. ip pim sparse-mode
16. exit
17. interface vif_id
18. ip address ip_address subnet_mask
19. ip pim sparse-mode
20. ip service reflect interface_id destination destination_ip1 to destination_ip2 mask-len subnet_mask_length source source_ip
21. ip igmp static-group {* | group-address [source {source-address | ssm-map}]}
22. exit
23. ip pim rp-address rp_address
24. end
### DETAILED STEPS

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable</td>
<td>Enables the privileged EXEC mode. Enter your password if prompted.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1> enable
```

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>configure terminal</td>
<td>Enters the global configuration mode.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1# configure terminal
```

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip multicast-routing [distributed]</td>
<td>Enables the IP multicast routing.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config)# ip multicast-routing
```

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface loopback loopback_if_number</td>
<td>Enters the interface configuration mode.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config)# interface Loopback0
```

<table>
<thead>
<tr>
<th>Step 5</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>description description</td>
<td>Describes the interface.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config-if)# description Rendezvous Point for Public Net
```

<table>
<thead>
<tr>
<th>Step 6</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip address ip_address subnet_mask</td>
<td>Assigns the IP address and subnet mask to the interface.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config-if)# ip address 22.22.22.22 255.255.255.255
```

<table>
<thead>
<tr>
<th>Step 7</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip pim sparse-mode</td>
<td>Enables the PIM sparse mode on the interface.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config-if)# ip pim sparse-mode
```

<table>
<thead>
<tr>
<th>Step 8</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>exit</td>
<td>Exits the interface configuration mode.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config-if)# exit
```

<table>
<thead>
<tr>
<th>Step 9</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface gigabitethernet GigabitEthernet_interface_number</td>
<td>Enters the interface configuration mode.</td>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```
R1(config)# interface GigabitEthernet2/0/0
```
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<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 10</strong> ip address ip_address subnet_mask</td>
<td>Assigns the IP address and subnet mask to the interface.</td>
</tr>
<tr>
<td>Example: R1(config-if)# ip address 2.1.1.1 255.255.0.0</td>
<td></td>
</tr>
<tr>
<td><strong>Step 11</strong> ip pim sparse-mode</td>
<td>Enables the PIM sparse mode on the interface.</td>
</tr>
<tr>
<td>Example: R1(config-if)# ip pim sparse-mode</td>
<td></td>
</tr>
<tr>
<td><strong>Step 12</strong> exit</td>
<td>Exits the interface configuration mode.</td>
</tr>
<tr>
<td>Example: R1(config-if)# exit</td>
<td></td>
</tr>
<tr>
<td><strong>Step 13</strong> interface gigabitethernet GigabitEthernet_interface_number</td>
<td>Enters the interface configuration mode.</td>
</tr>
<tr>
<td>Example: R1(config)# interface GigabitEthernet4/13</td>
<td></td>
</tr>
<tr>
<td><strong>Step 14</strong> ip address ip_address subnet_mask</td>
<td>Assigns the IP address and subnet mask to the interface.</td>
</tr>
<tr>
<td>Example: R1(config-if)# ip address 23.1.1.2 255.255.0.0</td>
<td></td>
</tr>
<tr>
<td><strong>Step 15</strong> ip pim sparse-mode</td>
<td>Enables the PIM sparse mode on the interface.</td>
</tr>
<tr>
<td>Example: R1(config-if)# ip pim sparse-mode</td>
<td></td>
</tr>
<tr>
<td><strong>Step 16</strong> exit</td>
<td>Exits the interface configuration mode.</td>
</tr>
<tr>
<td>Example: R1(config-if)# end</td>
<td></td>
</tr>
<tr>
<td><strong>Step 17</strong> interface interface_name</td>
<td>Enters the interface configuration mode.</td>
</tr>
<tr>
<td>Example: R1(config)# interface Vif1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 18</strong> ip address ip_address subnet_mask</td>
<td>Assigns the IP address and subnet mask to the interface.</td>
</tr>
<tr>
<td>Example: R1(config-if)# ip address 1.1.1.1 255.255.0.0</td>
<td></td>
</tr>
</tbody>
</table>
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Configuration Example

This example describes how to configure multicast service reflection.

R1>enable
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip multicast-routing
R1(config)#interface Loopback0
R1(config-if)#description Rendezvous Point for Public Net

Command | Purpose
---|---
Step 19  ip pim sparse-mode | Enables the PIM sparse mode on the interface.

**Example:**
R1(config-if)# ip pim sparse-mode

Step 20  ip service reflect input-interface destination destination-address to new-destination-address mask-len number source new-source-address | Matches and rewrites the multicast packets routed onto the virtual interface.

- The matched and rewritten packets are sent back into multicast packet routing (or unicast routing if the destination is unicast), where they are handled like any other packets arriving from an interface.

**Example:**
R1(config-if)# ip service reflect GigabitEthernet2/0/0 destination 239.1.1.100 to 225.1.1.100 mask-len 32 source 1.1.1.2

**Step 21  ip igmp static-group {:* | group-address [source {source-address | ssm-map}]}** | Configures the router to be a statically connected member of the specified group on the interface, and forwards traffic destined for the multicast group onto the interface.

**Note**  This step is only applicable for multicast-to-multicast and multicast-to-unicast scenarios.

**Example:**
R1(config-if)# ip igmp static-group 239.1.1.100

Step 22  exit | Exits the interface configuration mode.

**Example:**
R1(config-if)# end

Step 23  ip pim rp-address rp-address | Configures the address of a PIM RP for a particular group.

**Example:**
R1(config)# ip pim rp-address 22.22.22.22

Step 24  end | Ends the configuration session.

**Example:**
R1(config-controller)# end
R1(config-if)#ip address 22.22.22.22 255.255.255.255
R1(config-if)#ip pim sparse-mode
R1(config-if)#exit
R1(config)#interface GigabitEthernet2/0/0
R1(config-if)#ip address 2.1.1.1 255.255.0.0
R1(config-if)#ip pim sparse-mode
R1(config-if)#exit
R1(config)#interface GigabitEthernet4/13
R1(config-if)#ip address 23.1.1.2 255.255.0.0
R1(config-if)#ip pim sparse-mode
R1(config-if)#exit
R1(config)#interface Vif1
R1(config-if)#ip address 1.1.1.1 255.255.0.0
R1(config-if)#ip pim sparse-mode
R1(config-if)#ip service reflect GigabitEthernet2/0/0 destination 239.1.1.100 to
225.1.1.100 mask-len 32 source 1.1.1.2
R1(config-if)#ip igmp static-group 239.1.1.100
R1(config-if)#exit
R1(config)#ip pim rp-address 22.22.22.22
R1(config)#exit

For more information on configuring multicast service reflection, see Configuring Multicast Service Reflection.