Configuring PIM Allow RP

This chapter describes how to configure the PIM Allow RP feature in IPv4 networks for inter-connecting Protocol Independent Multicast (PIM) Sparse Mode (SM) domains with different rendezvous points (RPs). PIM Allow RP enables the receiving device to use its own RP to create state and build shared trees when an incoming (*, G) Join is processed and a different RP is identified. This allows the receiving device to accept the (*, G) Join from the different RP.

Restrictions for PIM Allow RP

- PIM Allow RP only supports connecting PIM SM domains.
- PIM Allow RP is applicable for downstream traffic only, that is, it is only applicable for building the shared tree.
- PIM Allow RP does not work with Auto-RP or Boot Strap Router (BSR). Only static configuration is supported. However, it does allow the RP used in the consumer network to be different than the one configured statically in the service provider network.
- PIM Allow RP is restricted to use only the route-map.
- PIM Allow RP does not support the IPv6 Multicast.
- PIM Allow RP does not support the RPM with “Source”. PIM Allow RP Information AboutPIM AllowRP.
- When the Allow-RP configuration is added with a non-existent RPM, all Joins/Prunes get rejected.
- When the Allow-RP configuration is added with an RPM having PERMIT-ALL or DENY-ALL, all Joins/Prunes are either accepted or discarded accordingly.

Information about PIM Allow RP

Rendezvous Points

A rendezvous point (RP) is a role that a device performs when operating in Protocol Independent Multicast (PIM) Sparse Mode (SM). An RP is required only in networks running PIM SM. In the PIM-SM model, only
network segments with active receivers that have explicitly requested multicast data will be forwarded the traffic. This method of delivering multicast data is in contrast to PIM Dense Mode (PIM DM). In PIM DM, multicast traffic is initially flooded to all segments of the network. Routers that have no downstream neighbors or directly connected receivers prune back the unwanted traffic. An RP acts as the meeting place for sources and receivers of multicast data. In a PIM-SM network, sources must send their traffic to the RP. This traffic is then forwarded to receivers down a shared distribution tree.

By default, when the first hop device of the receiver learns about the source, it will send a Join message directly to the source, creating a source-based distribution tree from the source to the receiver. This source tree does not include the RP unless the RP is located within the shortest path between the source and receiver. In most cases, the placement of the RP in the network is not a complex decision.

By default, the RP is needed only to start new sessions with sources and receivers. Consequently, the RP experiences little overhead from traffic flow or processing. In PIM version 2, the RP performs less processing than in PIM version 1 because sources must only periodically register with the RP to create state.

**PIM Allow RP**

There are three types of networks: publisher, consumer, and transport. Many publisher networks can originate content and many consumer networks can be interested in the content. The transport network, owned and operated by a service provider, connects the publisher and the consumer networks.

The consumer and the transport networks are connected as follows: For a specific group range, or all-groups range (similar to a default route), the service provider defines a particular rendezvous point (RP), such as RP-A. Reverse path forwarding of RP-A from a consumer device will cause a (*,G) Join to be sent towards the transport network. For the same group, the service provider may define a different RP, such as RP-B, that is used to build the shared tree within the transport network for G. RP-A and RP-B are typically different RPs and each RP is defined for different group ranges. RFC 4601 dictates that if a device receives a (*, G) Join and the RP that is specified in the (*, G) Join is different than what the receiving device expects (unknown RPs), the incoming (*, G) Join must be ignored.

The PIM Allow RP feature is introduced in Cisco NX-OS Release 8.4(1). This feature enables the receiving device to use its own RP to create state and build shared trees when an incoming (*, G) Join is processed and a different RP is identified. This allows the receiving device to accept the (*, G) Join from the different RP. A route-map is used to control which RP address and/or group addresses the (*,G) join is for. The RP address and the group address in the (*,G) join message is matched against any RP and group addresses specified in the route-map.

PIM Allow RP is only applicable for downstream traffic, for building the shared tree. It does not work with Auto-RP or BSR. Only static configuration is supported. However, PIM Allow RP does compensate for the embedded RP in the consumer network to be different than the one configured statically in the transport network.

### Configuring RPs for PIM-SM

All access lists should be configured prior to beginning the configuration task. For information about how to configure an access list, see the “Configuring IP ACLs” chapter in the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide*.

#### Procedure

1. Enter the global configuration mode.

```
config terminal
```
Enabling PIM Allow RP

In the following configuration steps, you can configure one of the combinations of RPM at a time — group only, RP only, group RP, group-range only.

Procedure

Step 1  Enter the global configuration mode.
config terminal

**Step 2**
Enter route-map configuration mode. Note that this configuration method uses the permit keyword.

```
route-map map-name [permit | deny] [sequence-number]
```

Example: Device(config)# route-map mcast-grp permit 10

**Step 3**
Match the IP multicast group. Note that you can configure only one combination of RPM at a time — group only, RP only, group RP, group-range only. For example; after you configure this step (group only), you should go to step 9. This is applicable to the below mentioned steps as well (from step-4 to step-8).

```
mult ip multicast group group-address
```

Example: Device(config-route-map)# match ip multicast group 224.0.0.0/4

**Step 4**
Match the IP multicast group range from/to the specified group address.

```
mult ip multicast group-range { group address_start to group address_end}
```

Example: Device(config-route-map)# match ip multicast group-range 230.1.1.1 to 230.1.1.255

**Step 5**
Match the IP multicast and the RP specified.

```
mult ip multicast rp rp-address
```

Example: Device(config-route-map)# match ip multicast 222.0.0.0/4

**Step 6**
Match the IP multicast RP address and the RP type specified. ASM is the only supported RP type.

```
mult ip multicast rp address rp-type type
```

Example: Device(config-route-map)# match ip multicast rp 1.1.1.1/32 rp-type ASM

**Step 7**
Match the IP multicast group address and the RP address.

```
mult ip multicast group address rp address
```

Example: Device(config-route-map)# match ip multicast group 230.1.1.1/4 rp 1.1.1.1/32

**Step 8**
Matches the IP multicast group range from/to the specified address and the RP address.

```
mult ip multicast group-range {group address_start to group address_end} rp address
```

Example: Device(config-route-map)# match ip multicast group-range 230.1.1.1 to 230.1.1.255 rp 1.1.1.1/32

**Step 9**
Enable PIM Allow RP; and allow sparse-mode RP addresses. This command is configured at the VRF level also. A route-map is used to control which RP address and/or group addresses the (*,G) join is for. The RP address and the group address in the (*,G) join message is matched against any RP and group addresses specified in the route-map.

```
ip pim allow-rp route-map-name
```

Example: Device(config-route-map)# ip pim allow-rp test-route-map

**Step 10**
Exit the route map configuration mode.

```
end
```

Example: Device(config-route-map)# end
Displaying Information About Allow RP Policy

Note: The following commands can be used under VRF mode also.

Procedure

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<td><code>clear ip pim policy statistics allow-rp-policy</code></td>
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Feature Information for PIM Allow RP

This table lists the release history for this feature.

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