



IP Multicast Routing Configuration Guide

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1. IGMP Overview

Internet Group Management (IGMP) protocol allows a host to advertise its multicast group membership to neighbouring switches and routers. IGMP is a standard protocol used by the TCP/IP protocol suite to achieve dynamic multicasting.

There are two components in the IGMP solution:

- IGMPv2/v3 Client: It sends Join or Leave messages to a multicast group. Typical example of a client is a SET-TOP box. The IGMP client can respond to any IGMP general queries or group-specific queries that are received.
- Multicast Router: The recipient of IGMP Join/Leave message. After receiving the message, it determines whether the corresponding message needs to be processed or not. After processing the IGMP messages, it sends this information to its multicast upstream router. Along with this, it can program certain entries in its routers which results in forwarding specific multicast packets on that interface.

1.1. IGMPv3 Lite

IGMP version 3 adds support for "source filtering", that is, the ability for a system to report interest in receiving packets **only** from specific source addresses, or from **all but** specific source addresses, sent to a particular multicast address. That information may be used by multicast routing protocols to avoid delivering multicast packets from specific sources to networks where there are no interested receivers.

The RtBrick IGMP v3lite solution adds support for source filtering. Source filtering enables a multicast receiver host to signal from which groups it wants to receive multicast traffic, and from which sources this traffic is expected. That information may be used by multicast routing protocols to avoid delivering multicast packets from specific sources to networks where there are no interested receivers.

IGMP Version 3 will help conserve bandwidth by allowing a host to select the specific sources from which it wants to receive traffic. Also, multicast routing protocols will be able to make use of this information to conserve bandwidth when constructing the branches of their multicast delivery trees.

2. Configuring IGMP

2.1. Configuring Global Instance

To configure the global instance, enter the following command:

Syntax

```
set instance <instance> address-family ipv4 unicast
set instance <instance> address-family ipv4 multicast
```

Command Parameters

<instance>	Name of the IGMP instance
------------	---------------------------

Example

```
admin@rtbrick: cfg> set instance default address-family ipv4 unicast
admin@rtbrick: cfg> set instance default address-family ipv4 multicast
```

2.2. Configuring IGMP Protocol on an Instance

To configure an IGMP on an instance, the same instance should be enabled globally with AFI IPv4 and SAFI as both unicast and multicast.

Syntax

```
set instance <instance> protocol igmp
set instance <instance> protocol igmp source-address <source-address>
set instance <instance> protocol igmp robustness-variable <count>
set instance <instance> protocol igmp tos <tos-value>
```



If no instance is specified, IGMP will be enabled on the default instance.

Command Parameters

<instance>	Name of the IGMP instance.
<source-address>	Source address of the IGMP query at the instance-level. NOTE: IF subscriber IFL is configured with the source address, then takes priority; otherwise, the the instance-level source address will be used. If source address is not configured, 0.0.0.0 will be the default address.
<count>	The number of times that the device sends each IGMP message. Default value: 3. Range: 0-255.
<tos_value>	Specifies the type-of-service. Default value: 0. Range: 0-255.

Example

```
admin@rtbrick: cfg> set instance vpn1 protocol igmp
admin@rtbrick: cfg> set instance vpn1 protocol igmp source-address
192.168.9.1
admin@rtbrick: cfg> set instance vpn1 protocol igmp robustness-variable 5
admin@rtbrick: cfg> set instance vpn1 protocol igmp tos 10
```

2.2.1. Deleting IGMP Protocol on an Instance



When you delete an IGMP instance, it will delete the IGMP instance-specific configuration tables.

Syntax

```
delete instance <instance> protocol igmp
```

Example

```
admin@rtbrick: cfg> delete instance default protocol igmp
```

2.3. Configuring IGMP Robustness Value

To configure the IGMP robustness value, enter the following command:

Syntax

```
set instance <instance> protocol igmp robustness-variable <count>
```

Command Parameters

<instance>	Name of the instance
<count>	The robustness value is used by IGMP to determine the number of times to send messages. Default value: 3. Range: 0-255.

Example

```
admin@rtbrick: cfg> set instance vpn1 protocol igmp robustness-variable 5
```

2.3.1. Deleting IGMP Robustness Value

To delete the IGMP robustness value, enter the following command:

Syntax

```
delete instance <instance> protocol igmp robustness-variable <count>
```

Example

```
admin@leaf: cfg> delete instance default protocol igmp robustness-variable 5
```

2.4. Configuring IGMP TOS Value

To configure the IGMP type-of-service (TOS) value, enter the following command:

Syntax

```
set instance <instance> protocol igmp tos <tos_value>
```

Command Parameters

<instance>	Name of the instance
<tos_value>	Specifies the type-of-service. Default value: 0. Range: 0-255.

Example

```
admin@leaf: cfg> set instance vpn1 protocol igmp tos 10
```

2.4.1. Deleting IGMP TOS Value

To delete the IGMP type-of-service (TOS) value, enter the following command:

Syntax

```
delete instance <instance> protocol igmp tos <tos_value>
```

Example

```
admin@rtbrick: cfg> delete instance vpn1 protocol igmp tos 10
```

2.5. Enabling IGMP Service on an Interface



When you start IGMP on an interface, it operates with the default settings.

To enable IGMP service on an interface, enter the following command:

Syntax

```
set instance <instance> protocol igmp interfaces interface <interface> max-groups <count>
```

```
set instance <instance> protocol igmp interfaces interface <interface> version <version>
```

```
set instance <instance> protocol igmp interfaces interface <interface> interface-profile <profile>
```

Command Parameters

<instance>	Name of the instance
<interface>	Name of the IP multicast interface
<count>	Specifies the maximum count of multicast group memberships

<version>	Specifies the IGMP version, that is, IGMPv2 or IGMPv3
<profile>	Name of the interface configuration profile

Example

```
admin@rtbrick: cfg> set instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 max-groups 30

admin@rtbrick: cfg> set instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 version IGMPv3

admin@rtbrick: cfg> set instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 interface-profile profile
```

2.5.1. Deleting IGMP Service on an Interface

To delete IGMP service on an interface, enter the following command:

Syntax

```
delete instance <instance> protocol igmp interfaces interface <interface>
```

To delete the interface options, enter the following commands:

```
delete instance <instance> protocol igmp interfaces interface <interface>
max-groups <count>

delete instance <instance> protocol igmp interfaces interface <interface>
version <version>

delete instance <instance> protocol igmp interfaces interface <interface>
interface-profile <profile>
```

Command Parameters

<instance>	Name of the instance
<interface>	Name of the logical interface

Example

```
admin@rtbrick: cfg> delete instance default protocol igmp interfaces
interface if1-0/0/1/1
admin@rtbrick: cfg> delete instance default protocol igmp interfaces
interface if1-0/0/1/1 max-groups 10
admin@rtbrick: cfg> delete instance default protocol igmp interfaces
interface if1-0/0/1/1 version IGMPv3
admin@rtbrick: cfg> delete instance default protocol igmp interfaces
interface if1-0/0/1/1 interface-profile iprofile
```

2.6. Configuring IGMP Version

The version command sets the IGMP version on the interface.



The default IGMP version is IGMPv3.

Syntax

```
set instance <instance> protocol igmp interfaces interface <interface>
version <IGMPv2 | IGMPv3>
```

Command Parameters

<instance>	Name of the instance
<interface>	Name of the logical interface
<IGMPv2 IGMPv3>	Specifies the IGMP version

Example

```
admin@rtbrick: cfg> set instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 version IGMPv3
```

2.6.1. Deleting IGMP Version

To delete the IGMP version, enter the following command:

Syntax

```
delete instance <instance> protocol igmp interfaces interface <interface>
version <version>
```

Example

```
admin@rtbrick: cfg> delete instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 version IGMPv3
```

2.7. Configuring IGMP Maximum Members

To configure the IGMP maximum members count, enter the following command:

Syntax

```
set instance <instance> protocol igmp interfaces interface <interface> max-
groups <count>
```

Command Parameters

<instance>	Name of the instance
<interface>	Name of the logical interface
<count>	Specifies max-members count. The range is 1-100000. The default is 8192.

Example

```
admin@rtbrick: cfg> set instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 max-groups 9000
```

2.7.1. Deleting IGMP Maximum Members

To delete the IGMP maximum members count, enter the following command:

Syntax

```
delete instance <instance> protocol igmp interfaces interface <interface>
max-groups <count>
```

Example

```
admin@rtbrick: cfg> delete instance vpn1 protocol igmp interfaces interface
hostif-0/0/0/1 max-groups 9000
```

2.8. Configuring IGMP Interface Profile

To configure IGMP interface profile, enter the following commands:

Syntax

```
set multicast-options igmp interface-profile <profile>
```

Command Parameters

<profile>	Name of the interface configuration profile
-----------	---

Example

```
admin@rtbrick: cfg> set multicast-options igmp interface-profile profile
```

2.8.1. Configuring IGMP Interface Profile Attributes

You can configure the following interface profile attributes:

- filter-policy
- immediate-leave
- query-max-response-time
- query-interval
- querier-timeout-interval
- ssm-map-policy
- start-query-count
- start-query-interval

2.8.2. Deleting IGMP Interface Profile Attributes

To delete IGMP interface profile and interface profile options, enter the following commands:

Syntax

```
delete multicast-options igmp interface-profile <profile> filter-policy <filter-policy>
```

```
delete multicast-options igmp interface-profile <profile> immediate-leave <enable|disable>
```

```
delete multicast-options igmp interface-profile <profile> querier-timeout-interval <interval>
```

```
delete multicast-options igmp interface-profile <profile> query-interval <interval>
```

```
delete multicast-options igmp interface-profile <profile> ssm-map-policy <ssm-map-policy>
```

```
delete multicast-options igmp interface-profile <profile> start-query-count <count>
```

```
delete multicast-options igmp interface-profile <profile> start-query-interval <interval>
```

```
delete multicast-options igmp interface-profile <profile> query-max-response-time <interval>
```

Command Parameters

<profile>	Name of the interface configuration profile
-----------	---

Example

```
admin@rtbrick: cfg> delete multicast-options igmp interface-profile iprofile
start-query-interval 1
```

2.8.3. Configuring Maximum Query Response Interval

The Maximum Query Response Interval specifies the time that a host can take to reply to a query (maximum response time).

To configure Maximum Query Response Interval, enter the following command:

Syntax


```
set multicast-options igmp interface-profile <profile> query-max-response-time <interval>
```

Command Parameters

<profile>	Name of the interface configuration profile
<interval>	Maximum query response interval in seconds. The maximum query response interval ranges from 1 to 1024 seconds. The default value is 100 seconds.

Example

```
admin@leaf: cfg> multicast-options igmp interface-profile iprofile query-max-response-time 10
```

2.8.4. Deleting Maximum Query Response Interval

To delete Maximum Query Response Interval, enter the following command:

Syntax

```
delete multicast-options igmp interface-profile <profile> maximum-query-response-interval <interval>
```

Example

```
admin@leaf: cfg> delete multicast-options igmp interface-profile profile maximum-query-response-interval 10
```

2.8.5. Configuring Query Interval

The Query Interval specifies the time interval at which IGMP query is sent.

To configure query interval, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> query-interval <interval>
```

Command Parameters

<interval>	IGMP query interval in seconds. The query interval ranges from 1 to 1024 seconds. The default value is 125 seconds.
------------	---

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile query-
interval 30
```

2.8.6. Configuring Start Query Count

The Start Query Count specifies the number of queries sent out on startup, separated by the Start Query Interval.

To configure the start query count, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> start-query-count
<count>
```

Command Parameters

<count>	Specifies the number of queries sent out on startup, separated by the Start Query Interval. The start query count ranges from 1 to 1024. The default value is 3.
---------	--

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile start-
query-count 10
```

2.8.7. Configuring Start Query Interval

To configure the start query interval, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> start-query-interval
<interval>
```

Command Parameters

<interval>	Specifies the start query interval. The start-query-interval ranges from 1 to 1024 seconds. The default value is 31 seconds (query-interval/4).
------------	---

Example

```
supervisor@leaf: cfg> set multicast-options igmp interface-profile profile
start-query-interval 10
```

2.8.8. Configuring Querier Timeout Interval

This command specifies the length of time that must pass before a multicast router decides that there is no longer another multicast router which should be the querier.

To configure the querier timeout interval, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> querier-timeout-
interval <interval>
```

Command Parameters

<interval>	Specifies the querier timeout interval in seconds. The querier-timeout-interval ranges from 1 to 1024 seconds. The default value is 425 seconds $\text{robustness} * \text{query-interval} + (\text{maximum-query-response-interval} / 2)$
------------	--

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile
querier-timeout-interval 10
```

2.8.9. Enabling or Disabling Immediate Leave

The **immediate-leave** attribute removes group membership immediately upon receiving a group leave membership report.

Syntax

```
set multicast-options igmp interface-profile <profile> immediate-leave
<enable|disable>
```

Command Parameters

<enable disable>	Enable or disable the immediate leave option
--------------------	--

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile
immediate-leave enable
```

2.8.10. Configuring SSM Mapping


SSM mapping takes IGMPv2 reports and converts them to IGMPv3. In case of legacy devices, there could be a possibility that BNG might receive IGMPv2 membership reports. If BNG receives an IGMPv2 membership for a specific group G1, BNG uses the SSM mapping configuration to determine one or more Source (S) addresses for a given group. This SSM mappings are translated to the IGMPv3 joins like IGMPV3 JOIN INCLUDE (G, [S1, G1], [S2, G1] and so on) and BNG continues to process as if it has received from the subscriber.

To configure an SSM mapping policy, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> ssm-map-policy
<policy>
```

Command Parameters

<profile>	Specifies the interface profile
<policy>	Specifies SSM mapping policy
	 Policy should be defined under policy statement.

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile ssm-  
map-policy ssm_policy
```

2.8.11. Configuring Filter Policy

To configure a filter list, enter the following command:

Syntax

```
set multicast-options igmp interface-profile <profile> filter-policy <policy>
```

Command Parameters

<profile>	Specifies the name of the configuration profile list
<policy>	Specifies the filter policy. The policy should be defined under policy statement.

Example

```
admin@leaf: cfg> set multicast-options igmp interface-profile profile filter-  
policy filter_policy
```

2.9. Configuring SSM Mapping Policy

SSM mapping takes IGMPv2 reports and converts them to IGMPv3. In case of legacy devices, there could be a possibility that BNG might receive IGMPv2 membership reports. If BNG receives an IGMPv2 membership for a specific group G1, BNG uses the SSM mapping configuration to determine one or more Source (S) addresses for a given group. This SSM mappings are translated to the IGMPv3 joins like IGMPV3 JOIN INCLUDE (G, [S1, G1], [S2, G1] and so on) and BNG continues to process as if it has received from the subscriber.

The example below shows a sample configuration of the ssm-policy.

```
admin@rtbrck: cfg> set policy statement ssm ordinal 1 match rule 1 type
mcast-route-ipv4-group
admin@rtbrck: cfg> set policy statement ssm ordinal 1 match rule 1 value-type
complete
admin@rtbrck: cfg> set policy statement ssm ordinal 1 match rule 1 match-type
or-longer
admin@rtbrck: cfg> set policy statement ssm ordinal 1 match rule 1 value
233.1.1.0/24
admin@rtbrck: cfg> set policy statement ssm ordinal 1 action rule 1 type
mcast-route-ipv4-source
admin@rtbrck: cfg> set policy statement ssm ordinal 1 action rule 1 operation
overwrite
admin@rtbrck: cfg> set policy statement ssm ordinal 1 action rule 1 value
100.1.1.1/32
```

2.10. Configuring Filter Policy

The example below shows how to configure the filter policy.

```
admin@rtbrck: cfg> set policy statement filter ordinal 1 match rule 1 type
mcast-route-ipv4-group
admin@rtbrck: cfg> set policy statement filter ordinal 1 match rule 1 value-
type complete
admin@rtbrck: cfg> set policy statement filter ordinal 1 match rule 1 match-
type or-longer
admin@rtbrck: cfg> set policy statement filter ordinal 1 match rule 1 value
232.1.1.0/24
admin@rtbrck: cfg> set policy statement filter ordinal 1 action rule 1
operation return-deny
```

2.11. Configuring the IGMP Static Joins on an Instance

After an interface on a multicast device is configured to statically join an IGMP group, the multicast device considers that the interface has static multicast group members and sends multicast packets to this interface, regardless of whether hosts connected to this interface request the multicast packets.

To configure an IGMP static join on the default instance, enter the following command:

Syntax

```
set instance <instance> protocol igmp static-group <group> <source>
<interface>
```

Command Parameters

<instance>	Specifies the instance name
<group>	Specifies the multicast address
<source>	Specifies the source from which the multicast traffic is received
<interface>	Name of the outbound interface

Example

```
admin@rtbrick: cfg> set instance default protocol igmp static-group 232.2.2.2
1.1.1.1 null0
```



- The **null0** is a discard or sink interface for IGMP static join configuration.

2.11.1. Deleting IGMP Static Joins

To delete an IGMP static join, enter the following command:

Syntax

```
delete instance <instance> protocol igmp static-group <group> <source>
<interface>
```

Command Parameters

<instance>	Specifies the instance name
<group>	Specifies the multicast multicast group address
<source>	Specifies the source from which the multicast traffic is received
<interface>	Name of the IP multicast interface

Example

```
admin@leaf: cfg> delete instance default protocol igmp static-group 232.2.2.2
1.1.1.1 null0
```

3. IGMP Show and Clear Commands

3.1. IGMP interface show commands

3.1.1. IGMP interface summary commands

3.1.1.1. show igmp interface

This command displays the IGMP interface details for all instances.

```
supervisor@rtbrick: op> show igmp interface
Interface          Primary Address  State      Querier
Address  Instance      Uptime
null0
vpn1          n/a
ppp-0/0/3/72339069014638597  100.100.100.1  Querier    192.1.4.3
vpn1          03h:37m:31s
```

3.1.1.2. show igmp interface instance <instance_name>

This command displays the interface summary on specific instance.

```
supervisor@rtbrick: op> show igmp interface instance vpn1
Interface          Primary Address  State      Querier
Address  Instance      Uptime
null0
vpn1          n/a
ppp-0/0/3/72339069014638597  100.100.100.1  Querier    192.1.4.3
vpn1          03h:37m:39s
```

3.1.2. IGMP interface detail commands

3.1.2.1. show igmp interface <interface_name>

This command displays detailed of the IGMP interface on the default instance.


```
supervisor@rtbrick: op> show igmp interface ppp-0/0/3/72339069014638597
Interface: ppp-0/0/3/72339069014638597
  Instance                               : vpn1
  State                                   : Querier
  Uptime                                  : 03h:38m:06s
  Primary address                         : 100.100.100.1
  Querier address                         : 192.1.4.3
  IGMP version                            : IGMPv3
  Timer values
    Last member query interval           : 1s
    Query interval                       : 10s
    Other querier present interval       : 425s
    Query response interval              : 100s
    Startup query interval                : 2s
  Count values
    Active members count                  : 10
    Last member query count               : 3
    Startup query count                   : 3
  Statistics
    General query sent                    : 282
    General query received                 : 0
    Group specific query sent             : 9
    Group specific query received         : 0
    IGMPv2 reports received               : 0
    IGMPv3 reports received               : 2736
    Filter match permit count             : 0
    Filter match deny count               : 0
    Membership limit deny count           : 0
    SSM map success count                  : 394
    SSM map failure count                 : 0
    ASM reports count                     : 168
```

3.2. IGMP group show commands

3.2.1. IGMP group summary commands

3.2.1.1. show igmp group

This command displays IGMP group summary on all instances.

```

supervisor@rtbrick: op> show igmp group
Source Address      Group Address      Interface
Instance           Uptime            Expires           Version
50.0.0.234/32      233.233.233.223/32 null0             vpn1
03h:42m:33s      n/a              IGMP
192.168.200.64/32  233.233.233.233/32 null0             vpn1
03h:42m:33s      n/a              IGMP
50.0.0.1/32        232.27.72.2/32    ppp-0/0/3/72339069014638597 vpn1
00h:32m:58s      1m 43s          IGMPv3
50.0.0.1/32        232.27.72.5/32    ppp-0/0/3/72339069014638597 vpn1
00h:33m:03s      1m 48s          IGMPv3
50.0.0.3/32        232.27.72.3/32    ppp-0/0/3/72339069014638597 vpn1
00h:35m:26s      3m 36s          IGMPv3
50.0.0.4/32        232.27.72.4/32    ppp-0/0/3/72339069014638597 vpn1
00h:35m:26s      3m 35s          IGMPv3
50.0.0.6/32        225.0.0.6/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:16s      3m 33s          IGMPv3
50.0.0.7/32        225.0.0.7/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:16s      3m 29s          IGMPv3
50.0.0.8/32        225.0.0.8/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:16s      3m 42s          IGMPv3
50.0.0.9/32        225.0.0.9/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:16s      3m 35s          IGMPv3
50.0.0.10/32       225.0.0.10/32     ppp-0/0/3/72339069014638597 vpn1
03h:38m:16s      3m 40s          IGMPv3
50.0.0.125/32      232.2.2.2/32      ppp-0/0/3/72339069014638597 vpn1
00h:35m:26s      3m 40s          IGMPv3

```

3.2.1.2. show igmp group instance <instance_name>

This command displays the group summary on specific instance.

```

supervisor@rtbrick: op> show igmp group instance vpn1
Source Address      Group Address      Interface
Instance           Uptime             Expires            Version
50.0.0.234/32      233.233.233.223/32 null0              vpn1
03h:42m:37s      n/a                IGMP
192.168.200.64/32  233.233.233.233/32 null0              vpn1
03h:42m:37s      n/a                IGMP
50.0.0.1/32        232.27.72.2/32    ppp-0/0/3/72339069014638597 vpn1
00h:33m:02s      1m 40s            IGMPv3
50.0.0.1/32        232.27.72.5/32    ppp-0/0/3/72339069014638597 vpn1
00h:33m:07s      1m 45s            IGMPv3
50.0.0.3/32        232.27.72.3/32    ppp-0/0/3/72339069014638597 vpn1
00h:35m:30s      3m 41s            IGMPv3
50.0.0.4/32        232.27.72.4/32    ppp-0/0/3/72339069014638597 vpn1
00h:35m:30s      3m 43s            IGMPv3
50.0.0.6/32        225.0.0.6/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:20s      3m 43s            IGMPv3
50.0.0.7/32        225.0.0.7/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:20s      3m 42s            IGMPv3
50.0.0.8/32        225.0.0.8/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:20s      3m 39s            IGMPv3
50.0.0.9/32        225.0.0.9/32      ppp-0/0/3/72339069014638597 vpn1
03h:38m:20s      3m 42s            IGMPv3
50.0.0.10/32       225.0.0.10/32     ppp-0/0/3/72339069014638597 vpn1
03h:38m:20s      3m 37s            IGMPv3
50.0.0.125/32      232.2.2.2/32      ppp-0/0/3/72339069014638597 vpn1
00h:35m:30s      3m 36s            IGMPv3

```

3.2.2. IGMP group detail commands

3.2.2.1. show igmp group <group>

This command displays detailed group information for specific group on all instances.

```

supervisor@rtbrick: op> show igmp group 233.233.233.223/32
(50.0.0.234/32, 233.233.233.223/32)
  Outgoing interface      : null0
  Instance                : vpn1
  Source                  : Static
  State                   : No Members Present
  Version                 : IGMP
  Uptime                  : 03h:42m:46s
  Expires                 : n/a
  Membership interval     : n/a
  Last reporter           : n/a
  Last member query count : n/a
  Last member interval    : n/a
  Retransmit time        : n/a
  Max response time       : n/a

```

3.2.2.2. show igmp group <group_address> <source_address>

This command displays detailed group information for specific group and source on all instances

```

supervisor@rtbrick: op> show igmp group 233.233.233.223/32 50.0.0.234/32
(50.0.0.234/32, 233.233.233.223/32)
  Outgoing interface      : null0
  Instance                : vpn1
  Source                  : Static
  State                   : No Members Present
  Version                 : IGMP
  Uptime                  : 03h:42m:54s
  Expires                 : n/a
  Membership interval     : n/a
  Last reporter           : n/a
  Last member query count : n/a
  Last member interval    : n/a
  Retransmit time         : n/a
  Max response time       : n/a

```

3.2.2.3. show igmp group outgoing-interface <interface_name>

This command displays detailed group information over specific IGMP logical interface.

```

supervisor@rtbrick: op> show igmp group outgoing-interface ppp-
0/0/3/72339069014638597
(50.0.0.1/32, 232.27.72.2/32)
  Outgoing interface      : ppp-0/0/3/72339069014638597
  Instance                : vpn1
  Source                  : Dynamic
  State                   : Members Present
  Version                 : IGMPv3
  Uptime                  : 00h:33m:44s
  Expires                 : 1m 43s
  Membership interval     : 110s
  Last reporter           : 100.100.100.1
  Last member query count : 3
  Last member interval    : 1s
  Retransmit time         : 1s
  Max response time       : 0s
(50.0.0.1/32, 232.27.72.5/32)
  Outgoing interface      : ppp-0/0/3/72339069014638597
  Instance                : vpn1
  Source                  : Dynamic
  State                   : Members Present
  Version                 : IGMPv3
  Uptime                  : 00h:33m:49s
  Expires                 : 1m 48s
  Membership interval     : 110s
  Last reporter           : 100.100.100.1
  Last member query count : 3

```

```
Last member interval      : 1s
Retransmit time          : 1s
Max response time        : 0s
(50.0.0.3/32, 232.27.72.3/32)
Outgoing interface       : ppp-0/0/3/72339069014638597
Instance                 : vpn1
Source                   : Dynamic
State                    : Members Present
Version                  : IGMPv3
Uptime                   : 00h:36m:12s
Expires                  : 3m 37s
Membership interval      : 225s
Last reporter            : 100.100.100.1
Last member query count  : 3
Last member interval     : 1s
Retransmit time          : 1s
Max response time        : 0s
(50.0.0.4/32, 232.27.72.4/32)
Outgoing interface       : ppp-0/0/3/72339069014638597
Instance                 : vpn1
Source                   : Dynamic
State                    : Members Present
Version                  : IGMPv3
Uptime                   : 00h:36m:12s
Expires                  : 3m 41s
Membership interval      : 225s
Last reporter            : 100.100.100.1
Last member query count  : 3
Last member interval     : 1s
Retransmit time          : 1s
Max response time        : 0s
(50.0.0.6/32, 225.0.0.6/32)
Outgoing interface       : ppp-0/0/3/72339069014638597
Instance                 : vpn1
Source                   : Dynamic
State                    : Members Present
Version                  : IGMPv3
Uptime                   : 03h:39m:02s
Expires                  : 3m 38s
Membership interval      : 225s
Last reporter            : 100.100.100.1
Last member query count  : 3
Last member interval     : 1s
Retransmit time          : 1s
Max response time        : 0s
```

3.2.2.4. show igmp group instance <instance_name> <group_address> <source_address>

This command displays detailed group information for specific group and source on selected instance.

```
supervisor@rtbrick: op> show igmp group instance vpn1 225.0.0.7/32
50.0.0.7/32
(50.0.0.7/32, 225.0.0.7/32)
  Outgoing interface      : ppp-0/0/3/72339069014638597
  Instance                : vpn1
  Source                  : Dynamic
  State                   : Members Present
  Version                 : IGMPv3
  Uptime                  : 03h:39m:31s
  Expires                 : 3m 34s
  Membership interval     : 225s
  Last reporter           : 100.100.100.1
  Last member query count : 3
  Last member interval    : 1s
  Retransmit time         : 1s
  Max response time       : 0s
supervisor@rtbrick: op> show igmp group instance vpn1 source 50.0.0.7/32
(50.0.0.7/32, 225.0.0.7/32)
  Outgoing interface      : ppp-0/0/3/72339069014638597
  Instance                : vpn1
  Source                  : Dynamic
  State                   : Members Present
  Version                 : IGMPv3
  Uptime                  : 03h:39m:44s
  Expires                 : 3m 40s
  Membership interval     : 225s
  Last reporter           : 100.100.100.1
  Last member query count : 3
  Last member interval    : 1s
  Retransmit time         : 1s
  Max response time       : 0s
supervisor@rtbrick: op>
```

3.3. IGMP Clear Commands

3.3.1. clear igmp groups all

This command clears IGMP groups on all instance.

Syntax

```
clear igmp groups all
```

Example

```
supervisor@rtbrick: op> clear igmp group all
IGMP groups were successfully cleared
supervisor@rtbrick: op>
```

3.3.2. clear igmp group instance <instance-name>

This command clears igmp group on a specific instance.

Syntax

```
clear igmp group instance <instance-name>
```

Example

```
supervisor@rtbrick: op> clear igmp group instance vpn1
IGMP groups were successfully cleared
supervisor@rtbrick: op>
```

3.3.3. clear igmp group interface <logical-interface-name>

This command clears igmp group on a specific interface.

Syntax

```
clear igmp group interface <logical-interface-name>
```

Example

```
supervisor@rtbrick: op> clear igmp group interface hostif-0/0/0/1
IGMP groups were successfully cleared
supervisor@rtbrick: op>
```

3.3.4. clear igmp interface <logical-interface-name> statistics

This command clears the IGMP interface statistics.

Syntax

```
clear igmp interface <logical-interface-name> statistics
```

Example

```
supervisor@rtbrick: op> clear igmp interface hostif-0/0/0/1 statistics
Interface IGMP statistics were successfully cleared
supervisor@rtbrick: op>
```

3.3.5. clear igmp interface instance <instance-name> statistics

This command clears the IGMP interface statistics for the specified instance.

Syntax

```
clear igmp interface instance <instance-name> statistics
```

Example

```
supervisor@rtbrick: op> clear igmp interface instance vpn1 statistics
Interface IGMP statistics were successfully cleared
supervisor@rtbrick: op>
```


4. IGMP for Subscribers

IGMP can be configured as a service for subscribers in two ways:

- Local Configuration
- Using RADIUS Attributes

For more information about these, see the *Subscriber Management Configuration Guide*.

5. Multicast VPN

5.1. Introduction

The Multicast VPN (MVPN) feature provides the ability to support multicast over a Layer 3 VPN. Multicast allows the efficient distribution of information between a single multicast source and multiple receivers. IP multicast is used to stream video, voice, and data to an MPLS VPN network core.

RBFS operates on the LEAF and SPINE devices. The Leaf layer delivers access services to subscribers or assets, and the spine provides connectivity to the network. The leaf is fully meshed into the Spine and this arrangement is usually referred to as an IP CLOS architecture. The framework provides the network operators with methods to configure and manage a network brick by brick, and provides full control of the network so the focus can be on the deployment of the new services and without any dependencies on hardware. The two tier CLOS architecture allows future extensibility through the leaves that can be added without disturbing the existing topology, so long as they are fully meshed with the spines. Leafs and spines are connected via 100G ports.

LEAF and SPINES are Edge Core devices with Broadcom BCM 88375 (Qumran) with KBP running RBFS stack. Each of these devices are configured with BGP to bring up the fabric. BGP neighbors are in the default instance and the following address families are enabled by default in the peer-group template:

- IPv6 Unicast (to resolve the next hops)
- IPv6 Labeled Unicast (to resolve the next hops)
- VPNv4 (to transport subscriber IPv4 routes, LI End point, LAC endpoint, RADIUS endpoint)
- VPNv6 (to transport subscriber IPv6 routes, RADIUS endpoint)
- MVPN (to carry subscriber multicast routes)

5.2. Enabling Multicast Address Family in Fabric

To advertise the subscriber multicast routes, you need to enable MVPN address family in the fabric. RBFS MVPN implementation is based on RFC 6513, "Multicast in MPLS/BGP IP VPNs" and RFC 6514, "BGP Encodings and Procedures for Multicast in MPLS/BGP IP VPNs".

Before you can enable IPTV service to subscribers, Multicast/MVPN can be enabled in the fabric to achieve this.

- Enable Multicast address family under global instance
- Enable the Multicast address family under BGP for the instance

5.2.1. Enabling Multicast Address Family Under Global Instance

The address-family command places the switch in address family mode to configure the address family activity level of individual BGP neighbor addresses. The switch supports these address families:

- ipv4
- ipv6
- mpls

To configure multicast IPV4 address family under the global instance, enter the following command:

```
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast
```

5.2.2. Enabling Route-Target Address Family in the Fabric

Similar to the unicast address family, MVPN address family defined under VRF instance needs an import and export route target. The below example shows defining the MVPN address family and corresponding attributes under vpn1.

```
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast route-target
export target:192.1.4.0:14
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast route-target
export target:192.1.4.0:14
```

5.2.3. Enabling Multicast address family under BGP for an instance

To define the multicast address family under BGP for the instance, enter the following commands:

```
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4 vpn-
multicast
```



When the address family **IPv4 multicast** is enabled, all the VPNv4 routes which are exported from this instance will have a new extended community (rt-import) added.

5.3. Enabling MVPN Address Family and Peer Group

5.3.1. Enabling the MVPN address family under default BGP

To define the MVPN address family under default BGP, enter the following command:

```
admin@leaf: cfg> set instance default protocol bgp address-family ipv4 vpn-multicast
```

5.3.2. Enabling the MVPN address family under default peer group

To define the MVPN address family under default peer group, enter the following commands:

```
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4 multicast
```

5.3.3. Enabling Extended Nexthop

You can enable extended nexthop capability so that peers in the group do not have to be directly connected.

```
admin@leaf: cfg> set instance vpn1 protocol bgp peer-group spine address-family ipv4 vpn-multicast extended-nexthop
```

5.3.4. Enabling Update Nexthop

You can update the nexthop for routes advertised to this peer group.

```
admin@leaf: cfg> set instance vpn1 protocol bgp peer-group spine address-family ipv4 vpn-multicast update-nexthop ipv6-address 192:1::3
```

5.4. Enabling Multicast Redistribution

5.4.1. Enabling Multicast Redistribution from the PIM Source

To enable Multicast Redistribution from the PIM source, enter the following command:

```
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4
multicast redistribute pim
```

Example: Redistributing PIM into BGP

```
supervisor@rtbrick: op> show config instance vpn1 protocol bgp address-family
ipv4 multicast
{
  "rtbrick-config:address-family": {
    "afi": "ipv4",
    "safi": "multicast",
    "redistribute": [
      {
        "source": "pim"
      }
    ]
  }
}
```

5.5. The list of CLI commands for the configuration of MVPN

```
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4 vpn-
multicast
admin@leaf: cfg> set instance vpn1 protocol bgp peer-group spine address-
family ipv4 vpn-multicast extended-nexthop
admin@leaf: cfg> set instance vpn1 protocol bgp peer-group spine address-
family ipv4 vpn-multicast update-nexthop ipv6-address 192:1::3
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast rt import
target:192.1.4.0:13
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast rt export
target:192.1.4.0:13
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4 multicast
admin@leaf: cfg> set instance vpn1 protocol bgp address-family ipv4 multicast
redistribute igmp
```

6. Configuring PIM

Routing devices can translate Protocol Independent Multicast (PIM) join and prune messages into corresponding Internet Group Management Protocol (IGMP) or Multicast Listener Discovery (MLD) reports or leave messages.

6.1. PIM operational modes

PIM can operate in the following mode:

- Sparse mode (PIM-SM): PIM-SM uses a shared distribution tree built rooted at an RP to determine paths from source to receiver groups. The RP must be administratively configured on the network.

6.2. Enable Multicast Globally

To enable multicast globally, enter the following command:

Syntax

```
set instance <instance> address-family <ipv4 | ipv6> multicast
```



Currently multicast is supported on IPv4 address family only.

Command Parameters

<instance>	Name of the instance
<ipv4 ipv6>	Specifies the multicast address family

Example

```
admin@leaf: cfg> set instance vpn1 address-family ipv4 multicast
```

6.2.1. Deleting Multicast Configuration

The example below shows how to delete the mutlicast configuration.

Syntax

```
delete instance <instance> address-family ipv4 multicast
```

Example

```
delete instance vpn1 address-family ipv4 multicast
```

6.3. Enabling PIM on a Specific Instance

To enable PIM on a specific instance, enter the following command.

Syntax

```
set instance <instance> protocol pim afi <ipv4>
```



If no instance is specified, PIM will be enabled on the default instance. RBFS supports only IPV4 address family.

Command Parameters

<instance>	Name of the instance <ipv4>
------------	-----------------------------

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim afi ipv4
```

6.3.1. Deleting the PIM Configuration on an Instance

The example below shows how to delete the PIM configuration on an instance.

Syntax

```
delete instance <instance> protocol pim afi <ipv4>
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim afi ipv4
```

6.3.2. Configuring PIM ToS Value

To configure PIM type-of-service (TOS) value, enter the following command:

```
set instance <instance> protocol pim tos <value>
```

Command Parameters

<tos value>	Specifies the type-of-service. Default value: 0. Range: 0-255.
-------------	--

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim tos 10
```

6.3.3. Configuring the PIM Join-Prune Interval

To configure the the Join-Prune interval, enter the following command:

Syntax

```
set instance <instance> protocol pim join-prune-interval <timer-value>
```

Command Parameters

<timer-value>	The join/prune interval value, in seconds. The timer ranges from 1 to 65535. The default timer is 210.
---------------	--

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim join-prune-interval 100
```

6.3.4. Deleting PIM ToS Value or Join-Prune Interval

To delete PIM ToS Value or Join-Prune Interval, enter the following commands:

Syntax


```
delete instance <instance> protocol pim tos
delete instance <instance> protocol pim join-prune-interval
```

Example

```
delete instance vpn1 protocol pim tos
delete instance vpn1 protocol pim join-prune-interval
```

6.4. Configuring PIM Static Join

To configure PIM static join, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode <interface> <group>
source <multicast-source>
```

Command Parameters

<instance>	Name of the instance
<group>	Specifies the multicast group address
<interface>	Specifies the name of the logical interface

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode static-join
hostif-0/0/0/1 232.1.1.2 192.0.1.2 hostif-0/0/0/1

admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode static-join null0
232.1.1.3 192.0.1.3
```



The **null0** is a discard or sink interface for PIM static join configuration.

6.4.1. Deleting PIM Static Join

To delete PIM static join, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode static-join <logical-
interface> <multicast-group> <multicast-source>
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode static-join
hostif-0/0/0/1 232.1.1.2 192.0.1.2
```

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode static-join
null0 232.1.1.3 192.0.1.3
```

6.5. Enabling PIM on an Interface

To enable PIM on an interface, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode interface <logical-
interface>
```

Command Parameters

<instance>	Specifies the name of the instance.
<logical-interface>	Specifies the name of the logical interface.

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode interface hostif-
0/0/1/2
```

6.5.1. Deleting PIM on an Interface

To delete PIM on an interface, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode interface <logical-
interface>
```

Command Parameters

<instance>	Specifies the name of the instance.
<logical-interface>	Specifies the name of the logical interface.

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode interface
hostif-0/0/1/2
```

6.5.2. Configuring PIM Redistribution

To configure PIM redistribution, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode redistribute <ipv4 | ipv6>
<multicast> <source>
```

Command Parameters

<instance>	Specifies the name of the instance.
<ipv4 ipv6>	Specifies the address family identifier such as IPv4 or IPv6. Currently only IPv4 is supported.
<multicast>	Specifies the subsequent address family identifier such as multicast.
<source>	Source protocol from which routes are being redistributed such as BGP or static.

Example

```
admin@leaf: cfg> set instance red protocol pim sparse-mode redistribute ipv4
multicast bgp
```

6.5.3. Deleting PIM Redistribution

To delete PIM redistribution, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode redistribute <ipv4
| ipv6> <multicast> <source>
```

Command Parameters

<instance>	Specifies the name of the instance.
<ipv4 ipv6>	Specifies the address family identifier such as IPv4 or IPv6.
<multicast>	Specifies the subsequent address family identifier such as multicast.
<source>	Source protocol from which routes are being redistributed such as BGP or static.

Example

```
admin@leaf: cfg> delete instance red protocol pim sparse-mode redistribute
ipv4 multicast bgp
```

6.5.4. Configuring hello-timer

To configure the hello interval, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode interface <interface>
hello-interval <value>
```

Command Parameters

<instance>	Specifies the name of the instance.
<interface>	Specifies the name of the logical interface.
<value>	Specifies the hello timer in seconds.

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode interface hostif-0/0/0/1 hello-interval 100
```

6.5.5. Deleting hello-timer

To delete the hello interval, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode interface <interface> hello-timer
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode interface hostif-0/0/0/1 hello-interval 100
```

6.5.6. Configuring dr-priority

To configure the designated router (DR) priority, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode interface <interface> dr-priority <value>
```

Command Parameters

<instance>	Specifies the name of the instance.
<interface>	Specifies the name of the logical interface.
<value>	Specifies the designated router (DR) priority value.

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode interface hostif-0/0/0/1 dr-priority 101
```

6.5.7. Deleting dr-priority

To delete the designated router (DR) priority, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode interface <interface>
dr-priority
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode interface
hostif-0/0/0/1 dr-priority
```

6.5.8. Configuring Override Interval

To configure the override interval, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode interface <interface>
override-interval <interval>
```

Command Parameters

<instance>	Specifies the name of the instance.
<interface>	Specifies the name of the logical interface.
<interval>	Specifies the override interval in milliseconds.

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode interface
hostif-0/0/3/3 override-interval 1000
```

6.5.9. Deleting Override Interval

To delete the override interval, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode interface hostif-0/0/3/3 override-interval <value>
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode interface hostif-0/0/3/3 override-interval 1000
```

6.5.10. Configuring PIM Propagation Delay

To configure the propagation delay for PIM on an interface, enter the following command:

Syntax

```
set instance <instance> protocol pim sparse-mode interface <interface> override-interval propagation-delay <value>
```

Command Parameters

<instance>	Specifies the name of the instance.
<interface>	Specifies the name of the logical interface.
<value>	Specifies the propagation delay in milliseconds.

Example

```
admin@leaf: cfg> set instance vpn1 protocol pim sparse-mode interface hostif-0/0/3/3 propagation-delay 103
```

6.5.11. Deleting PIM Propagation Delay

To delete the propagation delay for PIM on an interface, enter the following command:

Syntax

```
delete instance <instance> protocol pim sparse-mode interface <interface>  
override-interval propagation-delay <value>
```

Example

```
admin@leaf: cfg> delete instance vpn1 protocol pim sparse-mode interface  
hostif-0/0/3/3 propagation-delay 103
```


7. PIM Show commands

7.1. PIM interface show commands

7.1.1. PIM interface summary commands

7.1.1.1. show pim interface

This command displays the PIM logical interface summary for all instances.

```

supervisor@rtbrick: op> show pim interface
Interface           Instance           IP Address         State             DR
Generator ID
memif-1/7/1/1      default           30.1.1.1          Non-DR           30.1.1.2
1896236448
null0              default           n/a               n/a              n/a
n/a
hostif-0/0/3/3    vpn1              50.0.0.25        Non-DR           50.0.0.3
2123016228
null0              vpn1              n/a               n/a              n/a
n/a

```

7.1.1.2. show pim interface instance <instance_name>

This command displays interface summary on specific instance.

```

supervisor@rtbrick: op> show pim interface instance vpn1
Interface           Instance           IP Address         State             DR
Generator ID
hostif-0/0/3/3    vpn1              50.0.0.25        Non-DR           50.0.0.3
2123016228
null0              vpn1              n/a               n/a              n/a
n/a

```

7.1.2. PIM interface detail commands

7.1.2.1. show pim interface <interface_name>

This command displays the PIM interface detail default instance.

```

supervisor@rtbrick: op> show pim interface hostif-0/0/3/3
Interface: hostif-0/0/3/3
  Instance           : vpn1
  State              : Non-DR
  Primary address    : 50.0.0.25
  Generation ID      : 2123016228
  Timer values
    Hello interval   : 35s
    Join/Prune interval : 35s
    Hold interval    : 105s
    Override interval : 2000ms
    Prune delay interval : 500ms
  DR election
    DR address       : 50.0.0.3
    DR priority      : 1
    DR election count : 251
  Negotiated
    DR priority used : True
    Lan delay used   : False
    Lan prune interval : 0
    Lan override used : False
    Lan override interval : 0
  Statistics
    Hello
      Received       : 17214
      Sent           : 95
    Membership
      Received       : 0
      Sent           : 759
    Assert
      Received       : 0
      Sent           : 0

```

7.2. PIM membership show commands

7.2.1. PIM membership summary command

7.2.1.1. show pim membership

This command displays PIM membership summary on all instances.

```

supervisor@rtbrick: op> show pim membership
Source           Group           Interface
Instance        Uptime
30.1.1.2/32     232.198.198.198/32  null0
default         00h:38m:05s
30.1.1.2/32     234.234.234.234/32  null0
default         00h:38m:05s
30.1.1.2/32     235.235.235.235/32  null0
default         00h:38m:05s

```

7.2.1.2. show pim membership instance <instance_name>

This command displays the PIM membership summary information on specific instance.

```
supervisor@rtbrick: op> show pim membership instance default
Source          Group          Interface
Instance        Uptime
30.1.1.2/32     232.198.198.198/32  null0
default         00h:38m:18s
30.1.1.2/32     234.234.234.234/32  null0
default         00h:38m:18s
30.1.1.2/32     235.235.235.235/32  null0
default         00h:38m:18s
```

7.2.2. PIM membership detail commands

7.2.2.1. show pim membership detail

This command displays the PIM membership detail command on all instances.

```
supervisor@rtbrick: op> show pim membership detail
30.1.1.2/32, 232.198.198.198/32
  Instance          : default
  Outgoing interface : null0
  Source            : pim
  Subtype           : Join
  Subsource        : Static
  Uptime            : 00h:39m:29s
30.1.1.2/32, 234.234.234.234/32
  Instance          : default
  Outgoing interface : null0
  Source            : pim
  Subtype           : Join
  Subsource        : Static
  Uptime            : 00h:39m:29s
30.1.1.2/32, 235.235.235.235/32
  Instance          : default
  Outgoing interface : null0
  Source            : pim
  Subtype           : Join
  Subsource        : Static
  Uptime            : 00h:39m:29s
```

7.2.2.2. show pim membership instance <instance_name> detail

This command displays the PIM membership detailed information on specific instance.

```

supervisor@rtbrick: op> show pim membership instance default detail
30.1.1.2/32, 232.198.198.198/32
  Instance           : default
  Outgoing interface : null0
  Source             : pim
  Subtype            : Join
  Subsource          : Static
  Uptime             : 00h:39m:39s
30.1.1.2/32, 234.234.234.234/32
  Instance           : default
  Outgoing interface : null0
  Source             : pim
  Subtype            : Join
  Subsource          : Static
  Uptime             : 00h:39m:39s
30.1.1.2/32, 235.235.235.235/32
  Instance           : default
  Outgoing interface : null0
  Source             : pim
  Subtype            : Join
  Subsource          : Static
  Uptime             : 00h:39m:39s

```

7.2.2.3. show pim membership instance <instance> <group_address> <source_address>

This command displays the PIM membership detailed information for specific group-address and source-address in selected instance.

```

supervisor@rtbrick: op> show pim membership instance default
232.198.198.198/32 30.1.1.2/32
30.1.1.2/32, 232.198.198.198/32
  Instance           : default
  Outgoing interface : null0
  Source             : pim
  Subtype            : Join
  Subsource          : Static
  Uptime             : 00h:39m:50s
supervisor@rtbrick: op>

```

7.3. PIM join-prune show commands

7.3.1. PIM join-prune summary commands

7.3.1.1. show pim join-prune

This command displays PIM join-prune summary command on all instances.

```

supervisor@rtbrick: op> show pim join-prune
Source                Group                Upstream Interface   Instance
30.1.1.2/32          232.198.198.198/32  memif-1/7/1/1       default
30.1.1.2/32          234.234.234.234/32  memif-1/7/1/1       default
30.1.1.2/32          235.235.235.235/32  memif-1/7/1/1       default
50.0.0.1/32          232.27.72.2/32      hostif-0/0/3/3      vpn1
50.0.0.1/32          232.27.72.5/32      hostif-0/0/3/3      vpn1
50.0.0.3/32          232.27.72.3/32      hostif-0/0/3/3      vpn1
50.0.0.4/32          232.27.72.4/32      hostif-0/0/3/3      vpn1
50.0.0.6/32          225.0.0.6/32        hostif-0/0/3/3      vpn1
50.0.0.7/32          225.0.0.7/32        hostif-0/0/3/3      vpn1
50.0.0.8/32          225.0.0.8/32        hostif-0/0/3/3      vpn1
50.0.0.9/32          225.0.0.9/32        hostif-0/0/3/3      vpn1
50.0.0.10/32         225.0.0.10/32       hostif-0/0/3/3      vpn1
50.0.0.125/32        232.2.2.2/32        hostif-0/0/3/3      vpn1
50.0.0.234/32        233.233.233.223/32  hostif-0/0/3/3      vpn1

```

7.3.1.2. show pim join-prune instance <instance_name>

This command displays join-prune summary on a specific instance.

```

supervisor@rtbrick: op> show pim join-prune instance vpn1
Source                Group                Upstream Interface   Instance
50.0.0.1/32          232.27.72.2/32      hostif-0/0/3/3      vpn1
50.0.0.1/32          232.27.72.5/32      hostif-0/0/3/3      vpn1
50.0.0.3/32          232.27.72.3/32      hostif-0/0/3/3      vpn1
50.0.0.4/32          232.27.72.4/32      hostif-0/0/3/3      vpn1
50.0.0.6/32          225.0.0.6/32        hostif-0/0/3/3      vpn1
50.0.0.7/32          225.0.0.7/32        hostif-0/0/3/3      vpn1
50.0.0.8/32          225.0.0.8/32        hostif-0/0/3/3      vpn1
50.0.0.9/32          225.0.0.9/32        hostif-0/0/3/3      vpn1
50.0.0.10/32         225.0.0.10/32       hostif-0/0/3/3      vpn1
50.0.0.125/32        232.2.2.2/32        hostif-0/0/3/3      vpn1
50.0.0.234/32        233.233.233.223/32  hostif-0/0/3/3      vpn1

```

7.3.2. PIM join-prune detail command

7.3.2.1. show pim join-prune instance <instance_name> detail

This command displays detailed join-prune information in selected instance.

```
supervisor@rtbrick: op> show pim join-prune instance vpn1 detail
50.0.0.1/32, 232.27.72.2/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.1
  Type               : Join
  Uptime             : 00h:01m:11s
50.0.0.1/32, 232.27.72.5/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.1
  Type               : Join
  Uptime             : 00h:01m:11s
50.0.0.3/32, 232.27.72.3/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.3
  Type               : Join
  Uptime             : 00h:03m:41s
50.0.0.4/32, 232.27.72.4/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.4
  Type               : Join
  Uptime             : 00h:03m:41s
50.0.0.6/32, 225.0.0.6/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.6
  Type               : Join
  Uptime             : 00h:55m:31s
50.0.0.7/32, 225.0.0.7/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.7
  Type               : Join
  Uptime             : 00h:55m:30s
50.0.0.8/32, 225.0.0.8/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.8
  Type               : Join
  Uptime             : 00h:55m:30s
50.0.0.9/32, 225.0.0.9/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.9
  Type               : Join
  Uptime             : 00h:55m:31s
50.0.0.10/32, 225.0.0.10/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.10
  Type               : Join
  Uptime             : 00h:55m:31s
```

7.3.2.2. show pim join-prune instance <instance_name> <group_address> <source_address>

This command displays the join-prune detailed information for specific instance, source and group.

```
supervisor@rtbrick: op> show pim join-prune instance vpn1 225.0.0.10/32
50.0.0.10/32
50.0.0.10/32, 225.0.0.10/32
  Instance           : vpn1
  Upstream interface : hostif-0/0/3/3
  Upstream neighbor  : 50.0.0.10
  Type               : Join
  Uptime             : 00h:55m:50s
```

7.4. PIM neighbor show commands

7.4.1. PIM neighbor summary commands

7.4.1.1. show pim neighbor

This command displays the PIM neighbor summary on all instances.

```
supervisor@rtbrick: op> show pim neighbor
Neighbor           Interface           Instance           Generation ID  Uptime
Expires
30.1.1.2           memif-1/7/1/1      default            1413290566
00h:55m:34s      1m 35s
50.0.0.1           hostif-0/0/3/3     vpn1                666648646    00h:55m:59s
21s
50.0.0.2           hostif-0/0/3/3     vpn1                1893441310   00h:55m:59s
28s
50.0.0.3           hostif-0/0/3/3     vpn1                1582670973   00h:55m:56s
24s
50.0.0.4           hostif-0/0/3/3     vpn1                2114142516   00h:55m:59s
21s
50.0.0.5           hostif-0/0/3/3     vpn1                620803409    00h:55m:56s
29s
50.0.0.6           hostif-0/0/3/3     vpn1                21872824     00h:56m:00s
28s
50.0.0.7           hostif-0/0/3/3     vpn1                1938032162   00h:55m:58s
22s
50.0.0.8           hostif-0/0/3/3     vpn1                1317312430   00h:55m:58s
22s
50.0.0.9           hostif-0/0/3/3     vpn1                135050151    00h:55m:59s
27s
50.0.0.10          hostif-0/0/3/3     vpn1                1992665194   00h:55m:59s
21s
50.0.0.11          hostif-0/0/3/3     vpn1                223322718    00h:55m:57s
28s
50.0.0.12          hostif-0/0/3/3     vpn1                1604225905   00h:55m:59s
```

```

21s
50.0.0.13      hostif-0/0/3/3      vpn1      2016644219  00h:55m:56s
29s
50.0.0.14      hostif-0/0/3/3      vpn1      1702825153  00h:55m:59s
21s
50.0.0.15      hostif-0/0/3/3      vpn1      946957262   00h:55m:58s
22s
50.0.0.16      hostif-0/0/3/3      vpn1      629661990   00h:55m:58s
22s
50.0.0.17      hostif-0/0/3/3      vpn1      28854718    00h:55m:59s
27s
50.0.0.18      hostif-0/0/3/3      vpn1      569003403   00h:55m:59s
28s
50.0.0.19      hostif-0/0/3/3      vpn1      1005143597  00h:55m:58s
22s
50.0.0.20      hostif-0/0/3/3      vpn1      1947663757  00h:55m:57s
28s
50.0.0.21      hostif-0/0/3/3      vpn1      935980530   00h:55m:59s
29s
50.0.0.22      hostif-0/0/3/3      vpn1      1077227716  00h:55m:57s
28s
50.0.0.23      hostif-0/0/3/3      vpn1      1883998663  00h:55m:56s
28s
50.0.0.24      hostif-0/0/3/3      vpn1      1080685537  00h:55m:59s
28s
50.0.0.26      hostif-0/0/3/3      vpn1      552779013   00h:55m:58s
25s
50.0.0.27      hostif-0/0/3/3      vpn1      1263214263  00h:55m:58s
28s
50.0.0.28      hostif-0/0/3/3      vpn1      2048997893  00h:56m:00s
28s
50.0.0.29      hostif-0/0/3/3      vpn1      946709615   00h:55m:56s
29s
50.0.0.30      hostif-0/0/3/3      vpn1      118339568   00h:56m:00s
28s
50.0.0.31      hostif-0/0/3/3      vpn1      1455498510  00h:56m:00s
28s
50.0.0.32      hostif-0/0/3/3      vpn1      624592867   00h:55m:58s
22s
50.0.0.33      hostif-0/0/3/3      vpn1      852784085   00h:55m:56s
29s
50.0.0.34      hostif-0/0/3/3      vpn1      1723470230  00h:55m:59s
21s

```

7.4.1.2. show pim neighbor instance <instance_name>

This command displays the PIM neighbor summary information on specific instance.

```

supervisor@rtbrick: op> show pim neighbor instance default
Neighbor      Interface      Instance      Generation ID  Uptime
Expires
30.1.1.2      memif-1/7/1/1  default      1413290566
00h:55m:41s   1m 28s

```


7.4.2. PIM neighbor detail command

7.4.2.1. show pim neighbor instance <instance_name> <neighbor_address>

This command displays detailed information for specific PIM neighbor in selected instance.

```
supervisor@rtbrick: op> show pim neighbor instance default 30.1.1.2
Neighbor: 30.1.1.2
  Interface      : memif-1/7/1/1
  Instance       : default
  Hold down interval : 105s
  Expires        : 105s
  Generation ID  : 1413290566
  DR priority    : 1
  Uptime         : 00h:55m:47s
  Last transition time : Tue Nov 24 06:47:08 GMT +0000 2020
  Holddown received : 1
```

7.5. PIM rpf show commands

7.5.1. PIM rpf summary command

7.5.1.1. show pim rpf

This command displays the PIM rpf summary information on all instance.

```
supervisor@rtbrick: op> show pim rpf
Multicast Source Instance      RPF Interface      Neighbor
30.1.1.2         default      memif-1/7/1/1     30.1.1.2
50.0.0.1         vpn1        hostif-0/0/3/3    50.0.0.1
50.0.0.3         vpn1        hostif-0/0/3/3    50.0.0.3
50.0.0.4         vpn1        hostif-0/0/3/3    50.0.0.4
50.0.0.6         vpn1        hostif-0/0/3/3    50.0.0.6
50.0.0.7         vpn1        hostif-0/0/3/3    50.0.0.7
50.0.0.8         vpn1        hostif-0/0/3/3    50.0.0.8
50.0.0.9         vpn1        hostif-0/0/3/3    50.0.0.9
50.0.0.10        vpn1        hostif-0/0/3/3    50.0.0.10
50.0.0.125       vpn1        hostif-0/0/3/3    50.0.0.125
50.0.0.234       vpn1        hostif-0/0/3/3    50.0.0.234
192.168.200.64   vpn1        n/a                n/a
```

7.5.1.2. show pim rpf instance <instance_name>

This command displays the PIM rpf summary information on specific instance.

```

supervisor@rtbrick: op> show pim rpf instance vpn1
Multicast Source Instance RPF Interface Neighbor
50.0.0.1 vpn1 hostif-0/0/3/3 50.0.0.1
50.0.0.3 vpn1 hostif-0/0/3/3 50.0.0.3
50.0.0.4 vpn1 hostif-0/0/3/3 50.0.0.4
50.0.0.6 vpn1 hostif-0/0/3/3 50.0.0.6
50.0.0.7 vpn1 hostif-0/0/3/3 50.0.0.7
50.0.0.8 vpn1 hostif-0/0/3/3 50.0.0.8
50.0.0.9 vpn1 hostif-0/0/3/3 50.0.0.9
50.0.0.10 vpn1 hostif-0/0/3/3 50.0.0.10
50.0.0.125 vpn1 hostif-0/0/3/3 50.0.0.125
50.0.0.234 vpn1 hostif-0/0/3/3 50.0.0.234
192.168.200.64 vpn1 n/a n/a

```

7.5.2. PIM rpf detail commands

7.5.2.1. show pim rpf instance <instance> <source_address>

This command displays the PIM rpf detailed information for specific source-address in selected instance.

```

supervisor@rtbrick: op> show pim rpf instance vpn1 50.0.0.1
Multicast source : 50.0.0.1
Instance : vpn1
AFI : ipv4
SAFI : unicast
RPF interface : hostif-0/0/3/3
Peer : 50.0.0.1
Covering prefix : n/a
MAC address : 00:12:01:00:00:01

```

7.6. PIM mroute show commands

7.6.1. PIM mroute summary commands

7.6.1.1. show pim mroute

This command displays PIM mroute summary for all instances.

```

supervisor@rtbrick: op> show pim mroute
Instance: default, AFI: ipv4, SAFI: multicast
  Source          Group          Route Source  Preference  Nexthop
OIF
  30.1.1.2/32     232.198.198.198/32 pim          240         n/a
null0
  30.1.1.2/32     234.234.234.234/32 pim          240         n/a
null0
  30.1.1.2/32     235.235.235.235/32 pim          240         n/a
null0

```

7.6.2. PIM mroute detail commands

7.6.2.1. show pim mroute detail

This command displays the PIM mroute detail for all instances.

```

supervisor@rtbrick: op> show pim mroute detail
30.1.1.2/32, 232.198.198.198/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype        : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action  : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast
30.1.1.2/32, 234.234.234.234/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype        : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action  : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast
30.1.1.2/32, 235.235.235.235/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype        : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action  : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast

```

7.6.2.2. show pim mroute instance <instance_name>

This command displays the PIM mroute summary on specific instances.

```

supervisor@rtbrick: op> show pim mroute instance default
Instance: default, AFI: ipv4, SAFI: multicast
  Source          Group          Route Source  Preference  Nexthop
OIF
  30.1.1.2/32     232.198.198.198/32 pim          240         n/a
null0
  30.1.1.2/32     234.234.234.234/32 pim          240         n/a
null0
  30.1.1.2/32     235.235.235.235/32 pim          240         n/a
null0

```

7.6.2.3. show pim mroute instance <instance_name> detail

This command displays the PIM mroute detailed information on specific instances.

```

supervisor@rtbrick: op> show pim mroute instance default detail
30.1.1.2/32, 232.198.198.198/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype         : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action   : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast
30.1.1.2/32, 234.234.234.234/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype         : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action   : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast
30.1.1.2/32, 235.235.235.235/32
  Source          : pim          Preference      : 240
  Sub source      : Static       Subtype         : Join
  RPF neighbor    : 30.1.1.2     RPF interface   : memif-1/7/1/1
  Nexthop         : n/a         Egress interface : null0
  Nexthop type    : Multicast Fanout NextHop action   : None
  Destination     : default-ipv4-multicast
  Resolved in     : default-ipv4-multicast
supervisor@rtbrick: op>

```

8. Multicast Show Commands

8.1. show mroute

This command displays all multicast routes in summary format.

```

supervisor@rtbrick: op> show mroute
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source  Pref    Outgoing
Intf
10.1.1.1/32     232.1.1.1/32   static      2       memif-
8/8/8/8
20.1.1.1/32     232.1.1.2/32   static      2       memif-
4/4/4/1
30.1.1.1/32     232.1.1.1/32   static      2       memif-
8/8/8/8

```

8.2. show mroute detail

This command displays all multicast routes in detailed format.

```

supervisor@rtbrick: op> show mroute detail
Instance: default, AFI: ipv4, SAFI: multicast
10.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 20010,bos:1

```

8.3. show mroute instance <instance-name>

This command displays all multicast routes with given <instance-name> in summary format

```

supervisor@rtbrick: op> show mroute instance default
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source  Pref    Outgoing
Source          Intf
10.1.1.1/32     232.1.1.1/32   static      2       memif-
8/8/8/8
20.1.1.1/32     232.1.1.2/32   static      2       memif-
4/4/4/1
30.1.1.1/32     232.1.1.1/32   static      2       memif-
8/8/8/8

```

8.4. show mroute instance <instance-name> detail

This command displays all multicast routes with given <instance-name> in detailed format

```

supervisor@rtbrick: op> show mroute instance default detail
Instance: default, AFI: ipv4, SAFI: multicast
10.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 20010,bos:1

```

8.5. Displaying route using filters

You can display routes with filters like instance, source(multicast source address), group (multicast group address), route-source (source of this route like static, bgp) and address family.

This information can be displayed in summary format or detailed format.

```
show mroute <AFI>
```

```
show mroute <instance-name>
```

```
show mroute source <source-address>
```

```
show mroute group <group-address>
```

```
show mroute route-source <route-source>
```

```

supervisor@rtbrick: op> show mroute ipv4
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source Pref    Outgoing
Intf
10.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
20.1.1.1/32     232.1.1.2/32   static      2      memif-
4/4/4/1
30.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8

supervisor@rtbrick: op> show mroute instance default
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source Pref    Outgoing
Intf
10.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
20.1.1.1/32     232.1.1.2/32   static      2      memif-
4/4/4/1
30.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
                                                    memif-
8/8/8/8

supervisor@rtbrick: op> show mroute source 30.1.1.1/32
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source Pref    Outgoing
Intf
30.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
                                                    memif-
8/8/8/8

supervisor@rtbrick: op> show mroute group 232.1.1.2/32
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source Pref    Outgoing
Intf
20.1.1.1/32     232.1.1.2/32   static      2      memif-
4/4/4/1

supervisor@rtbrick: op> show mroute route-source static
Instance: default, AFI: ipv4, SAFI: multicast
Source          Group          Route Source Pref    Outgoing
Intf
10.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
20.1.1.1/32     232.1.1.2/32   static      2      memif-
4/4/4/1
30.1.1.1/32     232.1.1.1/32   static      2      memif-
8/8/8/8
                                                    memif-
8/8/8/8
supervisor@rtbrick: op>

```

This information can be displayed in detailed format.


```
show mroute <AFI> detail
```

```
show mroute <instance-name> detail
```

```
show mroute source <source-address> detail
```

```
show mroute group <group-address> detail
```

```
show mroute route-source <route-source> detail
```

```
supervisor@cli1: op> show mroute ipv4 detail
Instance: default, AFI: ipv4, SAFI: multicast
10.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 20010,bos:1

supervisor@cli1: op> show mroute instance default detail
Instance: default, AFI: ipv4, SAFI: multicast
10.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
```

```
Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
MPLS-Label: 20010,bos:1

supervisor@cli1: op> show mroute source 30.1.1.1/32 detail
Instance: default, AFI: ipv4, SAFI: multicast
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 20010,bos:1

supervisor@cli1: op> show mroute group 232.1.1.2/32 detail
Instance: default, AFI: ipv4, SAFI: multicast
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1

supervisor@cli1: op> show mroute route-source static detail
Instance: default, AFI: ipv4, SAFI: multicast
10.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
20.1.1.1/32, 232.1.1.2/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: IP Replicate
    Egress interface: memif-4/4/4/1
30.1.1.1/32, 232.1.1.1/32
  Source: static, Preference: 2
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 10010,bos:1
    Next Hop type: Multicast Fanout, Next Hop action: MPLS Replicate
    Resolved in: default-ipv4-unicast
    Egress interface: memif-8/8/8/8, NextHop MAC: 7a:41:7e:60:00:08
    MPLS-Label: 20010,bos:1
```