



Multicast VPN Commands

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ip multicast-routing

To enable IP multicast routing, use the **ip multicast-routing** command in global configuration mode. To disable IP multicast routing, use the **no** form of this command.

ip multicast-routing [**vrf** *vrf-name*]
no ip multicast-routing [**vrf** *vrf-name*]

Syntax Description

vrf <i>vrf-name</i>	(Optional) Enables IP multicast routing for the Multicast VPN routing and forwarding (MVRP) instance specified for the <i>vrf-name</i> argument.
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Command Default

IP multicast routing is disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines

When IP multicast routing is disabled, the Cisco IOS software does not forward any multicast packets.



Note For IP multicast, after enabling IP multicast routing, PIM must be configured on all interfaces. Disabling IP multicast routing does not remove PIM; PIM still must be explicitly removed from the interface configurations.

Examples

The following example shows how to enable IP multicast routing:

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

The following example shows how to enable IP multicast routing on a specific VRF:

```
Switch(config)#  
ip multicast-routing vrf vrf1
```

The following example shows how to disable IP multicast routing:

```
Switch(config)#  
no ip multicast-routing
```

The following example shows how to enable MDS in Cisco IOS XE Release 3.3S a specific VRF:

```
Switch(config)#  
ip multicast-routing vrf vrf1
```

Related Commands

Command	Description
ip pim	Enables PIM on an interface.

ip multicast mrimfo-filter

To filter multicast router information (mrimfo) request packets, use the **ip multicast mrimfo-filter** command in global configuration mode. To remove the filter on mrimfo requests, use the **no** form of this command.

```
ip multicast [vrf vrf-name] mrimfo-filter access-list
no ip multicast [vrf vrf-name] mrimfo-filter
```

Syntax Description	Parameter	Description
	vrf	(Optional) Supports the multicast VPN routing and forwarding (VRF) instance.
	<i>vrf-name</i>	(Optional) Name assigned to the VRF.
	<i>access-list</i>	IP standard numbered or named access list that determines which networks or hosts can query the local multicast device with the mrimfo command.

Command Default No default behavior or values

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines The **ip multicast mrimfo-filter** command filters the mrimfo request packets from all of the sources denied by the specified access list. That is, if the access list denies a source, that source's mrimfo requests are filtered. mrimfo requests from any sources permitted by the ACL are allowed to proceed.

Examples The following example shows how to filter mrimfo request packets from all hosts on network 192.168.1.1 while allowing requests from any other hosts:

```
ip multicast mrimfo-filter 51
access-list 51 deny 192.168.1.1
access list 51 permit any
```

Related Commands	Command	Description
	mrimfo	Queries a multicast device about which neighboring multicast devices are peering with it.

ip ospf network

To configure the Open Shortest Path First (OSPF) network type to a type other than the default for a given medium, use the **ip ospf network** command in interface configuration mode. To return to the default value, use the **no** form of this command.

```
ip ospf network {broadcast | non-broadcast | {point-to-multipoint [non-broadcast] | point-to-point}}
no ip ospf network
```

Syntax Description

broadcast	Sets the network type to broadcast.
non-broadcast	Sets the network type to nonbroadcast multiaccess (NBMA).
point-to-multipoint non-broadcast	Sets the network type to point-to-multipoint. The optional non-broadcast keyword sets the point-to-multipoint network to be nonbroadcast. If you use the non-broadcast keyword, the neighbor command is required.
point-to-point	Sets the network type to point-to-point.

Command Default

Depends on the network type.

Command Modes

Interface configuration (config-if)

Virtual network interface (config-if-vnet)

Command History

Release	Modification
Cisco IOS XE Fuji 16.8.1a	This command was introduced.

Usage Guidelines

Using this feature, you can configure broadcast networks as NBMA networks when, for example, routers in your network do not support multicast addressing. You can also configure nonbroadcast multiaccess networks (such as X.25, Frame Relay, and Switched Multimegabit Data Service (SMDS)) as broadcast networks. This feature saves you from needing to configure neighbors.

Configuring NBMA networks as either broadcast or nonbroadcast assumes that there are virtual circuits from every router to every router or fully meshed networks. However, there are other configurations where this assumption is not true. For example, a partially meshed network. In these cases, you can configure the OSPF network type as a point-to-multipoint network. Routing between two routers that are not directly connected will go through the router that has virtual circuits to both routers. You need not configure neighbors when using this feature.

If this command is issued on an interface that does not allow it, this command will be ignored.

OSPF has two features related to point-to-multipoint networks. One feature applies to broadcast networks; the other feature applies to nonbroadcast networks:

- On point-to-multipoint, broadcast networks, you can use the **neighbor** command, and you must specify a cost to that neighbor.
- On point-to-multipoint, nonbroadcast networks, you must use the **neighbor** command to identify neighbors. Assigning a cost to a neighbor is optional.

Examples

The following example sets your OSPF network as a broadcast network:

```
Device(config)# interface serial 0
Device(config-if)# ip address 192.168.77.17 255.255.255.0
Device(config-if)# ip ospf network broadcast
Device(config-if)# encapsulation frame-relay
```

The following example illustrates a point-to-multipoint network with broadcast:

```
Device(config)# interface serial 0
Device(config-if)# ip address 10.0.1.1 255.255.255.0
Device(config-if)# encapsulation frame-relay
Device(config-if)# ip ospf cost 100
Device(config-if)# ip ospf network point-to-multipoint
Device(config-if)# frame-relay map ip 10.0.1.3 202 broadcast
Device(config-if)# frame-relay map ip 10.0.1.4 203 broadcast
Device(config-if)# frame-relay map ip 10.0.1.5 204 broadcast
Device(config-if)# frame-relay local-dlci 200
!
Device(config-if)# router ospf 1
Device(config-if)# network 10.0.1.0 0.0.0.255 area 0
Device(config-if)# neighbor 10.0.1.5 cost 5
Device(config-if)# neighbor 10.0.1.4 cost 10
```

Related Commands

Command	Description
frame-relay map	Defines mapping between a destination protocol address and the DLCI used to connect to the destination address.
neighbor (OSPF)	Configures OSPF routers interconnecting to nonbroadcast networks.
x25 map	Sets up the LAN protocols-to-remote host mapping.

mdt data

To specify a range of addresses to be used in the data multicast distribution tree (MDT) pool, use the **mdt data** command in VRF configuration or VRF address family configuration mode. To disable this function, use the **no** form of this command.

mdt data threshold *kb/s*

no mdt data threshold *kb/s*

Syntax Description

threshold <i>kb/s</i>	(Optional) Defines the bandwidth threshold value in kilobits per second (kb/s). The range is from 1 to 4294967.
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Command Default

A data MDT pool is not configured.

Command Modes

VRF address family configuration (config-vrf-af)

VRF configuration (config-vrf)

Command History

Release	Modification
Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines

A data MDT can include a maximum of 256 multicast groups per MVPN. Multicast groups used to create the data MDT are dynamically chosen from a pool of configured IP addresses.

Use the **mdt data** command to specify a range of addresses to be used in the data MDT pool. The threshold is specified in kb/s. Using the optional **list** keyword and *access-list* argument, you can define the (S, G) MVPN entries to be used in a data MDT pool, which would further limit the creation of a data MDT pool to the particular (S, G) MVPN entries defined in the access list specified for the *access-list* argument.

You can access the **mdt data** command by using the **ip vrf** global configuration command. You can also access the **mdt data** command by using the **vrf definition** global configuration command followed by the **address-family ipv4** VRF configuration command.

Examples

The following example shows how to configure the range of group addresses for the MDT data pool. A threshold of 500 kb/s has been set, which means that if a multicast stream exceeds 1 kb/s, then a data MDT is created.

```
ip vrf vrf1
 rd 1000:1
  route-target export 10:27
  route-target import 10:27
  mdt default 236.1.1.1
  mdt data 228.0.0.0 0.0.0.127 threshold 500 list 101
!
.
.
.
!
ip pim ssm default
```

```
ip pim vrf vrf1 accept-rp auto-rp
!
```

Related Commands

Command	Description
mdt default	Configures a default MDT group for a VPN VRF.

mdt default

To configure a default multicast distribution tree (MDT) group for a Virtual Private Network (VPN) routing and forwarding (VRF) instance, use the **mdt default** command in VRF configuration or VRF address family configuration mode. To disable this function, use the **no** form of this command.

mdt default *group-address*
no mdt default *group-address*

Syntax Description

<i>group-address</i>	IP address of the default MDT group. This address serves as an identifier for the community in that provider edge (PE) devices configured with the same group address become members of the group, allowing them to receive packets sent by each other.
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Command Default

The command is disabled.

Command Modes

VRF address family configuration (config-vrf-af) VRF configuration (config-vrf)

Command History

Release	Modification
Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines

The default MDT group must be the same group configured on all PE devices that belong to the same VPN.

If Source Specific Multicast (SSM) is used as the protocol for the default MDT, the source IP address will be the address used to source the Border Gateway Protocol (BGP) sessions.

A tunnel interface is created as a result of this command. By default, the destination address of the tunnel header is the *group-address* argument.

You can access the **mdt default** command by using the **ip vrf** global configuration command. You can also access the **mdt default** command by using the **vrf definition** global configuration command followed by the **address-family ipv4** VRF configuration command.

Examples

In the following example, Protocol Independent Multicast (PIM) SSM is configured in the backbone. Therefore, the default and data MDT groups are configured within the SSM range of IP addresses. Inside the VPN, PIM sparse mode (PIM-SM) is configured and only Auto-RP announcements are accepted.

```
ip vrf vrf1
  rd 1000:1
  mdt default 236.1.1.1
  mdt data 228.0.0.0 0.0.0.127 threshold 50
  mdt data threshold 50
  route-target export 1000:1
  route-target import 1000:1
!
```


Related Commands

Command	Description
mdt data	Configures the multicast group address range for data MDT groups.

mdt log-reuse

To enable the recording of data multicast distribution tree (MDT) reuse, use the **mdt log-reuse** command in VRF configuration or in VRF address family configuration mode. To disable this function, use the **no** form of this command.

mdt log-reuse
no mdt log-reuse

Syntax Description	This command has no arguments or keywords.
Command Default	The command is disabled.
Command Modes	VRF address family configuration (config-vrf-af) VRF configuration (config-vrf)

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines The **mdt log-reuse** command generates a syslog message whenever a data MDT is reused. You can access the **mdt log-reuse** command by using the **ip vrf** global configuration command. You can also access the **mdt log-reuse** command by using the **vrf definition** global configuration command followed by the **address-family ipv4** VRF configuration command.

Examples The following example shows how to enable MDT log reuse:

```
mdt log-reuse
```

Related Commands	Command	Description
	mdt data	Configures the multicast group address range for data MDT groups.
	mdt default	Configures a default MDT group for a VPN VRF.

ip pim nbma-mode

To configure a multiaccess WAN interface to be in nonbroadcast multiaccess (NBMA) mode, use the **ip pim nbma-mode** command in interface configuration mode. To disable this function, use the **no** form of this command.

ip pim nbma-mode
no ip pim nbma-mode

Syntax Description This command has no arguments or keywords.

Command Default The command is disabled.

Command Modes Interface configuration (config-if)
 Virtual network interface (config-if-vnet)

Command History	Release	Modification
	Cisco IOS XE Fuji 16.8.1a	This command was introduced.

Usage Guidelines Use this command on Frame Relay, Switched Multimegabit Data Service (SMDS), or ATM only, especially when these media do not have native multicast available. Do not use this command on multicast-capable LANs such as Ethernet or FDDI.

When this command is configured, each Protocol Independent Multicast (PIM) join message is tracked in the outgoing interface list of a multicast routing table entry. Therefore, only PIM WAN neighbors that have joined for the group will get packets sent as data-link unicasts. This command should only be used when the **ip pim sparse-mode** command is configured on the interface. This command is not recommended for LANs that have natural multicast capabilities.

Examples

The following example configures an interface to be in NBMA mode:

```
Device(config-if)# ip pim nbma-mode
```

Related Commands	Command	Description
	ip pim	Enables PIM on an interface.

ip pim sparse-mode

To configure a multiaccess WAN interface to be in sparse mode, use the **ip pim sparse-mode** command in interface configuration mode. To disable this function, use the **no** form of this command.

ip pim sparse-mode
no ip pim sparse-mode

Syntax Description This command has no arguments or keywords.

Command Default The command is disabled.

Command Modes Interface configuration (config-if)
 Virtual network interface (config-if-vnet)

Command History	Release	Modification
	Cisco IOS XE Fuji 16.8.1a	This command was introduced.

Usage Guidelines When this command is configured on all interfaces, any existing groups running in sparse mode will continue to operate in sparse mode but will use an RP address set to 0.0.0.0. Multicast entries with an RP address set to 0.0.0.0 will exhibit the following behavior:

- Existing (S, G) states will be maintained.
- No PIM Join or Prune messages for (*, G) or (S, G, RPbit) are sent.
- Received (*, G) or (S, G, RPbit) Joins or Prune messages are ignored.
- No registers are sent and traffic at the first hop is dropped.
- Received registers are answered with register stop.
- Asserts are unchanged.
- The (*, G) outgoing interface list (olist) is maintained only for the Internet Group Management Protocol (IGMP) state.
- Multicast Source Discovery Protocol (MSDP) source active (SA) messages for RP 0.0.0.0 groups are still accepted and forwarded.

Examples

The following example configures an interface to be in sparse mode:

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

Related Commands	Command	Description
	ip pim	Enables PIM on an interface.

show ip pim mdt bgp

To show details about the Border Gateway Protocol (BGP) advertisement of the route distinguisher (RD) for the multicast distribution tree (MDT) default group, use the `show ip pim mdt bgp` command in user EXEC or privileged EXEC mode.

show ip pim [*vrf vrf-name*] **mdt bgp**

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays information about the BGP advertisement of the RD for the MDT default group associated with Multicast Virtual Private Network (MVPN) routing and forwarding (MVRF) instance specified for the <i>vrf-name</i> argument.
----------------------------	---

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines

Use this command to show detailed BGP advertisement of the RD for the MDT default group.

Examples

The following is sample output from the `show ip pim mdt bgp` command:

```
Device# show ip pim mdt bgp
MDT-default group 232.2.1.4
  rid:10.1.1.1 next_hop:10.1.1.1
```

The table below describes the significant fields shown in the display.

Table 1: show ip pim mdt bgp Field Descriptions

Field	Description
MDT-default group	The MDT default groups that have been advertised to this router.
rid:10.1.1.1	The BGP router ID of the advertising router.
next_hop:10.1.1.1	The BGP next hop address that was contained in the advertisement.

show ip pim mdt history

To display information about the history of data multicast distribution tree (MDT) groups that have been reused, use the **show ip pim mdt history** command in privileged EXEC mode.

show ip pim vrf *vrf-name* **mdt history interval** *minutes*

Syntax Description	Parameter	Description
	vrf <i>vrf-name</i>	Displays the history of data MDT groups that have been reused for the Multicast VPN (MVPN) routing and forwarding (MVRF) instance specified for the <i>vrf-name</i> argument.
	interval <i>minutes</i>	Specifies the interval (in minutes) for which to display information about the history of data MDT groups that have been reused. The range is from 1 to 71512 minutes (7 weeks).

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines The output of the **show ip pim mdt history** command displays the history of reused MDT data groups for the interval specified with the **interval** keyword and *minutes* argument. The interval is from the past to the present, that is, from the time specified for the *minutes* argument to the time at which the command is issued.

Examples

The following is sample output from the **show ip pim mdt history** command:

```
Device# show ip pim vrf vrf1 mdt history interval 20
MDT-data send history for VRF - vrf1 for the past 20 minutes
MDT-data group      Number of reuse
  10.9.9.8           3
  10.9.9.9           2
```

The table below describes the significant fields shown in the display.

Table 2: show ip pim mdt history Field Descriptions

Field	Description
MDT-data group	The MDT data group for which information is being shown.
Number of reuse	The number of data MDTs that have been reused in this group.

show ip pim mdt receive

To display the data multicast distribution tree (MDT) group mappings received from other provider edge (PE) routers, use the **show ip pim mdt receive** command in privileged EXEC mode.

show ip pim vrf *vrf-name* mdt receive [detail]

Syntax Description	Field	Description
	vrf <i>vrf-name</i>	Displays the data MDT group mappings for the Multicast VPN (MVPN) routing and forwarding (MVRF) instance specified for the <i>vrf-name</i> argument.
	detail	(Optional) Provides a detailed description of the data MDT advertisements received.

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines When a router wants to switch over from the default MDT to a data MDT, it advertises the VRF source, the group pair, and the global multicast address over which the traffic will be sent. If the remote router wants to receive this data, then it will join this global address multicast group.

Examples

The following is sample output from the **show ip pim mdt receive** command using the **detail** keyword for further information:

```
Device# show ip pim vrf vpn8 mdt receive detail
Joined MDT-data groups for VRF:vpn8
group:172.16.8.0 source:10.0.0.100 ref_count:13
(10.101.8.10, 225.1.8.1), 1d13h/00:03:28/00:02:26, OIF count:1, flags:TY
(10.102.8.10, 225.1.8.1), 1d13h/00:03:28/00:02:27, OIF count:1, flags:TY
```

The table below describes the significant fields shown in the display.

Table 3: show ip pim mdt receive Field Descriptions

Field	Description
group:172.16.8.0	Group that caused the data MDT to be built.
source:10.0.0.100	VRF source that caused the data MDT to be built.
ref_count:13	Number of (S, G) pairs that are reusing this data MDT.
OIF count:1	Number of interfaces out of which this multicast data is being forwarded.

Field	Description
flags:	<p>Information about the entry.</p> <ul style="list-style-type: none"> • A--candidate Multicast Source Discovery Protocol (MSDP) advertisement • B--bidirectional group • D--dense • C--connected • F--register flag • I--received source-specific host report • J--join shortest path source tree (SPT) • L--local • M--MSDP created entry • P--pruned • R--RP bit set • S--sparse • s--Source Specific Multicast (SSM) group • T--SPT bit set • X--proxy join timer running • U--URL Rendezvous Directory (URD) • Y--joined MDT data group • y--sending to MDT data group • Z--multicast tunnel

show ip pim mdt send

To display the data multicast distribution tree (MDT) groups in use, use the **show ip pim mdt send** command in privileged EXEC mode.

show ip pim vrf *vrf-name* mdt send

Syntax Description	vrf <i>vrf-name</i>	Displays the data MDT groups in use by the Multicast VPN (MVPN) routing and forwarding (MVRP) instance specified for the <i>vrf-name</i> argument.
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Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.2	This command was introduced.

Usage Guidelines Use this command to show the data MDT groups in use by a specified MVRP.

Examples

The following is sample output from the **show ip pim mdt send** command:

```
Device# show ip pim vrf vpn8 mdt send
MDT-data send list for VRF:vpn8
  (source, group)                MDT-data group      ref_count
(10.100.8.10, 225.1.8.1)        232.2.8.0           1
(10.100.8.10, 225.1.8.2)        232.2.8.1           1
(10.100.8.10, 225.1.8.3)        232.2.8.2           1
(10.100.8.10, 225.1.8.4)        232.2.8.3           1
(10.100.8.10, 225.1.8.5)        232.2.8.4           1
(10.100.8.10, 225.1.8.6)        232.2.8.5           1
(10.100.8.10, 225.1.8.7)        232.2.8.6           1
(10.100.8.10, 225.1.8.8)        232.2.8.7           1
(10.100.8.10, 225.1.8.9)        232.2.8.8           1
(10.100.8.10, 225.1.8.10)       232.2.8.9           1
```

The table below describes the significant fields shown in the display.

Table 4: show ip pim mdt send Field Descriptions

Field	Description
source, group	Source and group addresses that this router has switched over to data MDTs.
MDT-data group	Multicast address over which these data MDTs are being sent.
ref_count	Number of (S, G) pairs that are reusing this data MDT.

tunnel mode gre multipoint

To set the global encapsulation mode on all roaming interfaces of a mobile device to multipoint generic routing encapsulation (GRE), use the **tunnel mode gre multipoint** command in mobile device configuration mode. To restore the global default encapsulation mode, use the **no** form of this command.

tunnel mode gre multipoint
no tunnel mode gre multipoint

Syntax Description This command has no arguments or keywords.

Command Default The default encapsulation mode for Mobile IP is IP-in-IP encapsulation.

Command Modes Interface configuration (config-if)

Release	Modification
Cisco IOS XE Fuji 16.8.1a	This command was introduced.

Usage Guidelines Use this command to configure multipoint GRE as the tunnel mode.

The **no tunnel mode gre multipoint** command instructs the mobile device to revert to the default and register with IP-in-IP encapsulation.

Examples The following example configures multipoint GRE as the tunnel mode:

```
Device(config-if)# tunnel mode gre multipoint
```