



## Nextgen MVPN BGP C-Route Signaling

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The Next-generation MVPN BGP C-Route Signaling feature provides a simpler solution to configure multicast over Layer 3 VPNs using BGP for C-multicast signaling. The MVPN BGP C-Route Full SM Support option uses BGP to signal the customer multicast routes. Sending the multicast routes over BGP avoids the need for the periodic refresh of the routes since BGP uses a reliable transport. This module provides information for configuring the Next-generation MVPN BGP C-Route Signaling feature with the MVPN BGP C-Route Full SM Support option.

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The Next-generation MVPN BGP C-Route Signaling feature provides a simpler solution to configure multicast over Layer 3 VPNs using BGP for C-multicast signaling. The MVPN BGP C-Route Full SM Support option uses BGP to signal the customer multicast routes. Sending the multicast routes over BGP avoids the need for the periodic refresh of the routes since BGP uses a reliable transport. This module provides information for configuring the Next-generation MVPN BGP C-Route Signaling feature with the MVPN BGP C-Route Full SM Support option.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To

find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Restrictions for Nextgen MVPN BGP C-Route Signaling

The following multicast features are not supported by MVPN BGP C-route signaling :

- BGP signaling with mLDP Transport
- Inter-AS scenarios with BGP signaling
- Dense mode in the VRF
- Extranets with BGP Signaling
- Full ASM Mode (SM and Bidir) in the VRF
- IPv6 in the VRF with mLDP Transport
- BGP Non Stop Routing (NSR)
- Inter-AD for GRE and IP-IP MVPN transport
- Migration/Hybrid solution between PIM Signaling and BGP Signaling
- Static mroutes used in conjunction with BGP signaling

## Information About Nextgen MPVN BGP C-Route Signaling

### Overview of MVPN BGP C-Route Full SM Support

A service provider determines whether a particular VPN is multicast-enabled. If it is, it corresponds to a "multicast domain". A PE that attaches to a particular multicast-enabled VPN is said to belong to the corresponding multicast domain. For each multicast domain, there is a default "Multicast Distribution Tree (MDT)" through the backbone, connecting all of the PEs that belong to that multicast domain. A given PE may be in as many multicast domains as there are VPNs attached to that PE. However, each multicast domain has its own MDT. The MDTs are created by running PIM in the backbone, and in general an MDT also includes P routers on the paths between the PE routers.

The default MDT for a multicast domain is constructed automatically as the PEs in the domain come up. Construction of the default MDT does not depend on the existence of multicast traffic in the domain; it will exist before any such multicast traffic is seen. Default MDTs correspond to the "MI-PMSIs" of MVPN.

In MVPNs, each CE router is a unicast routing adjacency of a PE router, but CE routers at different sites do not become unicast routing adjacencies of each other. This important characteristic is retained for multicast routing—a CE router becomes a PIM adjacency of a PE router, but CE routers at different sites do not become PIM adjacencies of each other. Multicast packets from within a VPN are received from a CE router by an ingress PE router. The ingress PE encapsulates the multicast packets and forwards them along the default MDT tree to all the PE routers connected to sites of the given VPN. Every PE router attached to a site of the

given VPN thus receives all multicast packets from within that VPN. If a particular PE routers is not on the path to any receiver of that multicast group, the PE simply discards that packet.

If a large amount of traffic is being sent to a particular multicast group, but that group does not have receivers at all the VPN sites, it may not be needed to forward that group's traffic along the default MDT. Therefore, a method is specified for establishing individual MDTs for specific multicast groups called as "Data MDTs". A data MDT delivers VPN data traffic for a particular multicast group only to those PE routers that are on the path to receivers of that multicast group. Using a data MDT has the benefit of reducing the amount of multicast traffic on the backbone, as well reducing the load on some of the PEs; it has the disadvantage of increasing the amount of state that must be maintained by the P routers. The service provider has complete control over this tradeoff. Data MDTs correspond to the S-PMSIs of MVPN.

An enterprise that uses PIM-based multicasting in its network can migrate from a private network to a BGP/MPLS IP VPN service, while continuing to use whatever multicast router configurations it was previously using; no changes need be made to CE routers or to other routers at customer sites. For instance, any dynamic RP-discovery procedures that are already in use may be left in place.

The BGP MVPN signaling mechanism does not use the MDT tunnel for signaling. The BGP signaling separates the control-plane and the data-plane for MVPN multicast c-route exchange. The MVPN BGP C-Route Full SM Support feature helps the service providers to leverage the existing BGP operation experience for deploying MVPN services.

For more details see [Cisco Systems' Solution for Multicast in MPLS/BGP IP VPNs](#).

# How to Configure Nextgen MVPN BGP C-Route Signaling

## Configuring the MVPN BGP C-Route Signaling

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **address-family** {*ipv4* | *ipv6*} **mvpn**
5. **mvpn single-forwarder-selection highest-ip-address single-forwarder-selection highest-ip-address**
6. **mdt overlay use-bgp**
7. **end**
8. **configure terminal**
9. **ip multicast-routing vrf** *vrf-name*
10. **ip vrf***vrf-name*
11. **mdt auto-discovery** [*pim* | *mldp* [*inter-as*]] [ *pim-tlv-announce*]
12. **mdt overlay bgp shared-tree-prune-delay** *seconds*
13. **mdt overlay bgp source-tree-prune-delay** *seconds*
14. **end**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>router bgp <i>autonomous-system-number</i></b>  <b>Example:</b> Device(config)# router bgp 65538	Enters BGP router configuration mode and creates a BGP routing process.
<b>Step 4</b>	<b>address-family {ipv4   ipv6} mvpn</b>  <b>Example:</b> Device(config-router)# address-family ipv4 mvpn	Enters address family configuration mode and enables C-route signaling.
<b>Step 5</b>	<b>mvpn single-forwarder-selection highest-ip-address single-forwarder-selection highest-ip-address</b>  <b>Example:</b> Device(config-router-af)# mvpn single-forwarder-selection highest-ip-address	Configures the BGP MVPN Upstream Multicast Hop (UMH) via the highest IP address.
<b>Step 6</b>	<b>mdt overlay use-bgp</b>  <b>Example:</b> Device(config-router-af)# mdt overlay use-bgp	Specifies BGP as the overlay protocol.
<b>Step 7</b>	<b>end</b>  <b>Example:</b> Device(config-router-af)# end	Exits address family configuration mode and returns to privileged EXEC mode.
<b>Step 8</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 9</b>	<b>ip multicast-routing vrf <i>vrf-name</i></b>  <b>Example:</b> Device(config)# ip multicast-routing vrf vrf1	Enables IP multicast routing for the specified VRF.
<b>Step 10</b>	<b>ip vrf <i>vrf-name</i></b>  <b>Example:</b> Device(config)# ip vrf vpn1	Defines a VRF instance and enters VRF configuration mode.
<b>Step 11</b>	<b>mdt auto-discovery [pim   mldp [inter-as]] [pim-tlv-announce]</b>  <b>Example:</b> Device(config-vrf)# mdt auto-discovery mldp inter-as	Enables inter-AS operation with BGP A-D.
<b>Step 12</b>	<b>mdt overlay bgp shared-tree-prune-delay <i>seconds</i></b>  <b>Example:</b> Device(config-vrf)# mdt overlay bgp shared-tree-prune-delay 100	Sets the delay after which (C-S, C-G) prune state is installed on an ingress PE connected to a RP. This generally happens when a Type-5 source active route is received.
<b>Step 13</b>	<b>mdt overlay bgp source-tree-prune-delay <i>seconds</i></b>  <b>Example:</b> Device(config-vrf)# mdt overlay bgp source-tree-prune-delay 70	Sets the delay after which (C-S, C-G) prune state is installed on an ingress PE connected to a source C-S. This generally happens when the last Type-7 source tree join route is withdrawn.
<b>Step 14</b>	<b>end</b>  <b>Example:</b> Device(config-vrf)# end	Exits VRF configuration mode and returns to privileged EXEC mode.

## Displaying Information About MVPN BGP C-Route Signaling

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `show bgp [ipv4 | ipv6] mvpn [route-type route-type originator ID] [vrf vrf name] [all | prefix]`
4. `show {ipv4 | ipv6} pim [vrf vrf-name] mdt [c-mroutes | source-active] [group | source]`

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Device> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<code>configure terminal</code>  <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.
Step 3	<code>show bgp [ipv4   ipv6] mvpn [route-type route-type originator ID] [vrf vrf name] [all   prefix]</code>  <b>Example:</b> Device# <code>show bgp ipv4 mvpn route-type 1 1.1.1.1 all</code>	Displays the route type, VRF name, and MVPN options for BGP MVPN C-route signaling.
Step 4	<code>show {ipv4   ipv6} pim [vrf vrf-name] mdt [c-mroutes   source-active] [group   source]</code>  <b>Example:</b> Device# <code>show ipv4 pim vrf vrf1 mdt c-mroutes</code>	Displays all routes—learned and originated from the PE.

## Configuration Examples for Nextgen MVPN BGP C-Route Signaling

### Example: MVPN BGP C-Route Full SM Support

```
router bgp 65538
```

```

address-family ipv4 mvpn
  mvpn single-forwarder-selection highest-ip-address
  mdt overlay use-bgp
!
ip multicast-routing vrf vrf1
ip vrf cicsvpn
  mdt auto-discovery mldp inter-as
  mdt overlay bgp shared-tree-prune-delay 100
  mdt overlay bgp source-tree-prune-delay 70
!
!

```

## Additional References for Nextgen MVPN BGP C-Route Signaling

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
IP multicast commands	<a href="#">Cisco IOS IP Multicast Command Reference</a>

### Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Nextgen MVPN BGP C-Route Signaling

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for Nextgen MVPN BGP C-Route Signaling**

Feature Name	Releases	Feature Information
Nextgen MVPN BGP C-Route Signaling		The Next-generation MVPN BGP C-Route Signaling feature provides a simpler solution to configure multicast over Layer 3 VPNs using BGP for C-multicast signaling.