

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. 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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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 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**}**unicast** | **multicast vrf***vrf-name*
5. **mvpn single-forwarder-selection highest-ip-address single-forwarder-selection highest-ip-address**
6. **end**
7. **configure terminal**
8. **ip multicast-routing vrf** *vrf-name*
9. **ip vrf***vrf-name*
10. **mdt overlay use-bgp**
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

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
	`Device> enable`	
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *autonomous-system-number* **Example:** `Device(config)# router bgp 65538`	Enters BGP router configuration mode and creates a BGP routing process.
Step 4	**address-family** {**ipv4** | **ipv6**}**unicast** | **multicast** **vrf***vrf-name* **Example:** `Device(config-router)# address-family ipv4 unicast vrf vrf1`	Enters address family configuration mode and enables C-route signaling.
Step 5	**mvpn single-forwarder-selection highest-ip-address single-forwarder-selection highest-ip-address** **Example:** `Device(config-router-af)# mvpn single-forwarder-selection highest-ip-address`	Configures the BGP MVPN Upstream Multicast Hop (UMH) via the highest IP address.
Step 6	**end** **Example:** `Device(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.
Step 7	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 8	**ip multicast-routing vrf** *vrf-name* **Example:** `Device(config)# ip multicast-routing vrf vrf1`	Enables IP multicast routing for the specified VRF.
Step 9	**ip vrf***vrf-name* **Example:** `Device(config)# ip vrf vpn1`	Defines a VRF instance and enters VRF configuration mode.
Step 10	**mdt overlay use-bgp** **Example:**	Specifies BGP as the overlay protocol.

	Command or Action	Purpose
	`Device(config-router-af)# mdt overlay use-bgp`	
Step 11	**mdt auto-discovery** [**pim** | **mldp** [**inter-as**]] [**pim-tlv-announce**] **Example:** `Device(config-vrf)# mdt auto-discovery mldp inter-as`	Enables inter-AS operation with BGP A-D.
Step 12	**mdt overlay bgp shared-tree-prune-delay** *seconds* **Example:** `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.
Step 13	**mdt overlay bgp source-tree-prune-delay** *seconds* **Example:** `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.
Step 14	**end** **Example:** `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

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**show bgp** [**ipv4** | **ipv6**] **mvpn** [**route-type** *route-type originator ID*] [**vrf** *vrf name*] [**all** | *prefix*] **Example:** `Device# show bgp ipv4 mvpn route-type 1 1.1.1.1 all`	Displays the route type, VRF name, and MVPN options for BGP MVPN C-route signaling.
Step 4	**show** {**ipv4** | **ipv6**} **pim** [**vrf** *vrf-name*] **mdt** [**c-mroutes** | **source-active**] [**group** | **source**] **Example:** `Device# show ipv4 pim vrf vrf1 mdt c-mroutes`	Displays all routes—learnt 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 unicast vrf vrf1
mvpn single-forwarder-selection highest-ip-address
!
ip multicast-routing vrf vrf1
ip vrf cicsvpn
mdt overlay use-bgp
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

Related Topic	Document Title
IP multicast commands	Cisco IOS IP Multicast Command Reference

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.	http://www.cisco.com/cisco/web/support/index.html

Feature Infomation 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 https://cfnng.cisco.com/. 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 MPVN 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.