MLDP In-Band Signaling/Transit Mode

This module contains information for configuring Multicast Label Distribution Protocol (MLDP) in-band signaling to enable the MLDP core to create (S,G) or (*,G) state without using out-of-band signaling such as Border Gateway protocol (BGP) or Protocol Independent Multicast (PIM).

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. An account on Cisco.com is not required.

Restrictions for MLDP In-Band Signaling

- MLDP in-band signaling supports SOURCE-SPECIFIC MULTICAST (SSM) multicast traffic only.
- MLDP in-band signaling is not supported in the same VRF for which Rosen Model MLDP-based MVPN or GRE-based MVPN is configured.

Information About MLDP In-Band Signaling/Transit Mode

MLDP In-Band Signaling/Transit Mode

Multicast Label Distribution Protocol (MLDP)-supported multicast VPN (MVPN) allows VPN multicast streams to be aggregated over a VPN-specific tree. No customer state is created in the MLDP core;, there is only state for default and data multicast distribution trees (MDTs). In certain scenarios, the state created for VPN streams is limited and does not appear to be a risk or limiting factor. In these scenarios, MLDP can build in-band MDTs that are transit Label Switched Paths (LSPs).

Trees used in a VPN space are MDTs. Trees used in the global table are transit point-to-multipoint (P2MP) or multipoint-to-multipoint (MP2MP) LSPs. In both cases, a single multicast stream (VPN or not) is associated with a single LSP in the MPLS core. The stream information is encoded in the Forwarding Equivalence Class (FEC) of the LSP. This is in-band signaling.

MLDP in-band signaling uses access control lists (ACLs) with the range of the multicast (S, G) to be transported by the MLDP LSP. Each multicast channel (S, G) maps, one-to-one, to each tree in the in-band tree. The (S,G) join is registered in the Multicast Routing Information Base (MRIB), which is a client of MLDP. Each MLDP LSP is identified by the FEC of [(S,G) + RD], where RD is the Route Distinquisher (RD) obtained from BGP. This differs from MLDP-based MVPN, where the identity is in a FEC of [MDT #, VPN ID, Tree #]).

The ingress Provider Edge (PE) device uses the FEC to decode the stream information and associate the multicast stream with the LSP (in the FEC). This service model is only applicable for transporting Protocol Independent Multicast (PIM) source-specific multicast (SSM) traffic. There is no need to run PIM over the LSP because the stream signaling is done in-band.

The MLDP In-Band Signaling/Transit Mode feature is supported on IPv4 networks. MLDP in-band signaling and MLDP-based MVPN cannot be supported in the same VRF.

How to Configure MLDP In-Band Signaling/Transit Mode

Enabling In-Band Signaling on a PE Device

Before you begin

- VRF instances for in-band signaling must be configured.
- Access control lists (ACLs) for controlling streams must be configured.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip multicast** [**vrf** *vrf*] **mpls mldp** [**range** *acl*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip multicast** [**vrf** *vrf*] **mpls mldp** [**range** *acl*] **Example:** `Device (config)# ip multicast vrf vrf1 mpls mldp`	Brings up the MLDP MRIB process and registers MLDP with the MRIB. • To enable in-band signaling globally, use this command without the **vrf** *vrf* keyword and argument combination. • To identify streams for in-band signaling, use this command with the **range** keyword on the egress PE.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/mcl/allreleasemcl/all-book.html

Standards and RFCs

Standard/RFC	Title
No specific Standards and RFCs are supported by the features in this document.	—

MIBs

MIB	MIBs Link
—	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Configuration Examples for MLDP In-Band Signaling/Transit Mode

Example: In-Band Signaling

```
vrf definition cu1
 rd 1:1
 vpn id 1:1
 !
 address-family ipv4
  route-target export 1:1
  route-target import 1:1
 exit-address-family
!
ip multicast-routing distributed
ip multicast-routing vrf cu1 distributed
!
ip multicast mpls mldp
ip multicast mpls traffic-eng
ip multicast vrf cu1 mpls mldp
!
!
mpls label protocol ldp
mpls ldp session protection
mpls ldp igp sync holddown 10000
mpls ldp discovery targeted-hello accept
no mpls mldp forwarding recursive
!
mpls mldp path traffic-eng
mpls traffic-eng tunnels
mpls traffic-eng auto-tunnel backup nhop-only
mpls traffic-eng auto-tunnel primary onehop
!
redundancy
 mode sso
interface Loopback0
 ip address 10.10.10.3 255.255.255.255
 ip ospf 100 area 0
```

```
 load-interval 30
!
interface Loopback1
 vrf forwarding cu1
 ip address 33.33.33.1 255.255.255.0
 ip pim sparse-mode
 load-interval 30
!
interface GigabitEthernet0/2/0
 ip address 13.0.0.2 255.255.255.0
 ip ospf 100 area 0
 negotiation auto
 mpls ip
 mpls label protocol ldp
 mpls traffic-eng tunnels
 cdp enable
 ip rsvp bandwidth
!
interface GigabitEthernet0/2/1
 no ip address
 negotiation auto
 service instance 1 ethernet
  encapsulation dot1q 1
  rewrite ingress tag pop 1 symmetric
  bridge-domain 1
!
interface BDI1
 vrf forwarding cu1
 ip address 31.0.1.1 255.255.0.0
 ip pim sparse-mode
 ip igmp version 3
 load-interval 30
!
!
router ospf 100
 router-id 10.10.10.3
 timers throttle spf 50 200 5000
 timers throttle lsa 50 200 5000
 timers lsa arrival 100
 network 1.1.1.1 0.0.0.0 area 0
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng area 0
 mpls traffic-eng multicast-intact
!
router bgp 100
 bgp log-neighbor-changes
 neighbor 10.10.10.1 remote-as 100
 neighbor 10.10.10.1 update-source Loopback0
 neighbor 10.10.10.2 remote-as 100
 neighbor 10.10.10.2 update-source Loopback0
 !
 address-family ipv4
  redistribute connected
  neighbor 10.10.10.1 activate
  neighbor 10.10.10.1 send-community extended
  neighbor 10.10.10.2 activate
  neighbor 10.10.10.2 send-community extended
 exit-address-family
 !
 address-family ipv4 mvpn
  neighbor 10.10.10.1 activate
  neighbor 10.10.10.1 send-community extended
  neighbor 10.10.10.2 activate
  neighbor 10.10.10.2 send-community extended
```

```
 exit-address-family
 !
 address-family vpnv4
  neighbor 10.10.10.1 activate
  neighbor 10.10.10.1 send-community extended
  neighbor 10.10.10.2 activate
  neighbor 10.10.10.2 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf cu1
  redistribute connected
 exit-address-family
 !
 address-family ipv4 vrf cu10
  redistribute connected
!
ip pim ssm range SSM-range
ip pim mpls source Loopback0
!
ip pim vrf cu1 ssm range SSM-range
!
!
ip access-list standard SSM-range
 permit 226.0.0.0 0.255.255.255
```

Feature Information for Configuring MLDP In-Band Signaling/Transit Mode

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.

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Table 1: Feature Information for Configuring MLDP In-Band Signaling/Transit Mode

Feature Name	Releases	Feature Information
MLDP In-Band Signaling/Transit Mode	Cisco IOS XE Release 3.15.0S	This feature was introduced on the Cisco ASR 920 Series Aggregation Services Router (ASR-920-12CZ-A, ASR-920-12CZ-D, ASR-920-4SZ-A, ASR-920-4SZ-D, ASR-920-10SZ-PD, ASR-920-24SZ-IM, ASR-920-24SZ-M, ASR-920-24TZ-M) .