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).

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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 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 Distinguisher (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 and IPv6 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example: Device&gt; enable</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>
**Configuration Examples for MLDP In-Band Signaling/Transit Mode**

**Example: In-Band Signaling**

```bash
vrf definition cu1	n
    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
```
Example: In-Band Signaling

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
Example: In-Band Signaling