

IETF 93

July 2015

Prague

Update on
YANG Data Model for LDP and mLDP
(draft-raza-mpls-ldp-mldp-yang-01)

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Design Team Update (since IETF 92)

- Rev -00 of the I.D was presented at IETF 92 in Dallas.
 - Covered base LDP configuration, rpc, and notifications
- Weekly design meetings continued to work on the model for mLDP configuration.
 - Posted new rev -01 before IETF 93 submission deadline.
- Attended couple of meetings/discussions with Open-Config team (and TE team)
 - Ongoing
- Two new members joined the design team:
 - Loa Andersson – Huawei
 - Matthew Bocci – ALU

Rev -01 Changes

- Addressed some private comments.
- Alignment to become a VRF-centric model:
 - In accordance with the RTG discussions/decisions during last IETF 92
- LDP configuration updated:
 - New (enhanced existing) containers to cover LDP Capabilities and Forwarding configuration parameters.
- LDP notification updated:
 - New notification for FEC up/down.
- mLDP data model for:
 - Configuration
 - Notifications
 - RPCs (actions) >> None at this time.
- Updated YANG tree and spec.

LDP Configuration – Updated

module: ietf-mpls-ldp

augment /rt:routing/rt:routing-instance/rt:routing-protocols/rt:routing-protocol:

 +--rw mpls-ldp

 +--rw **capability**

 | +--rw end-of-lib {capability-end-of-lib}?

 | | +--rw enable? boolean

 | +--rw typed-wildcard-fec {capability-typed-wildcard-fec}?

 | | +--rw enable? boolean

 | +--rw upstream-label-assignment {capability-upstream-label-assignment}?

 | +--rw enable? boolean

 ...

 +--rw **forwarding-nexthop** {forwarding-nexthop-config}?

 | +--rw interfaces

 | +--rw interface* [interface]

 | +--rw interface if:interface-ref

 | +--rw address-family* [af]

 | +--rw af address-family-type

 | +--rw ldp-disable? Boolean

 ...

 +--rw neighbors

 +--rw neighbor* [lsr-id]

 +--rw **capability**

 +--rw ...

LDP Notification – Updated

- New notification defined to notify an operator about an LDP FEC operational state (going up and down)
 - An LDP FEC is to be declared operational as long as there are 1 or more NHLFE entries (LSPs) exist for the FEC

module: ietf-mpls-ldp

notifications:

+---n **mpls-ldp-fec-event**

 +--ro event-type? oper-status-event-type

 +--ro routing-instance-ref? rt:routing-instance-ref

 +--ro ldp-protocol-name? leafref

 +--ro prefix? inet:ip-prefix

mLDP model - Scope

- mLDP Base Specification [RFC6388]
- mLDP Recursive FEC [RFC6512]
- Targeted mLDP [RFC7060]
- mLDP Fast-Reroute (FRR)
 - Node Protection [I-D.ietf-mpls-mldp-node-protection]
 - Multicast-only
- Hub-and-Spoke Multipoint LSPs [RFC7140]
- Configured LSPs (manually provisioned)
- Future Revisions:
 - mLDP Inband Signaling [RFC6826] (future revision)
 - mLDP Inband Signaling with Wildcards [RFC7438] (future revision)

mLDP Configuration - Hierarchy

- Categorized into two types:
 - Parameters that leverage/extend LDP containers and parameters
 - Parameters that are mLDP specific

```
+-- mpls-ldp
  +-- <...ldp>                                     (...cont'd)
  +-- mldp
  | +-- ...
  | +-- address-family* [af]
  |   +-- af
  |       +-- ...
  +-- capability
  | +-- <...ldp>
  | +-- mldp
  |   +-- ...
  +-- discovery
  | +-- ...
  +-- neighbors
  | +-- ...
  | +-- neighbor* [lsr-id]
  |   +-- ...
  |   +-- capability
  |       +-- <...ldp>
  |       +-- mldp
  |           +-- ...
```

mLDP Configuration – mldp container

module: ietf-mpls-ldp

augment /rt:routing/rt:routing-instance/rt:routing-protocols/rt:routing-protocol:

```
+--rw mpls-ldp
  +--rw mldp {mldp}?
    | +--rw enable?      boolean
    | +--rw address-family* [af]
    |   +--rw af          address-family-type
    |   +--rw multicast-only-frr {mldp-mofrr}?
    |   +--rw recursive-fec
    |   +--rw configured-lsps
    |     +--rw p2mp
    |       | +--rw roots-ipv4
    |       | | +--rw root* [root-addr]
    |       | |   +--rw root-addr  inet:ipv4-address
    |       | |   +--rw lsp* [lsp-id source-addr group-addr]
    |       | |     +--rw lsp-id    uint16
    |       | |     +--rw source-addr  inet:ipv4-address-no-zone
    |       | |     +--rw group-addr  inet:ipv4-address-no-zone
    |       | +--rw roots-ipv6
    |       | | +rw ....
    |       +--rw mp2mp
    |         +--rw roots-ipv4
    |         | +rw ...
    |         +--rw roots-ipv6
    |         | +rw ...
```


mLDP Configuration – mldp capabilities

+-rw mpls-ldp

+-rw capability

| +-rw <...ldp>

| +--rw mldp {mldp}?

| +--rw p2mp

| | +-rw enable? boolean

| +--rw mp2mp

| | +-rw enable? boolean

| +--rw make-before-break

| | +-rw enable? boolean

| | +-rw switchover-delay? uint16

| | +-rw timeout? uint16

| +--rw hub-and-spoke {capability-mldp-hsmp}?

| | +-rw enable? boolean

| +--rw node-protection {capability-mldp-node-protection}?

| +--rw plr? boolean

| +--rw merge-point

| +-rw enable? boolean

| +-rw targeted-session-teardown-delay? uint16

- Similar mldp capability container is specified under neighbors/neighbor <id>/capability

mLDP Notification

- New notification defined to notify an operator about an mLDP FEC operational state (going up and down)

module: ietf-mpls-ldp

notifications:

```
+---n mpls-mldp-fec-event
  +--ro event-type?          oper-status-event-type
  +--ro routing-instance-ref? rt:routing-instance-ref
  +--ro ldp-protocol-name?   leafref
  +--ro tree-type?          multipoint-type
  +--ro root?                inet:ip-address
  +--ro (lsp-key-type)?
    +--:(lsp-id-based)
      | +--ro lsp-id?        uint16
      +--:(source-group-based)
        +--ro source-addr?   inet:ip-address
        +--ro group-addr?    inet:ip-address
```

Next Steps

- Add YANG data model for:
 - LDP operational state
 - mLDP operational state
- Discussions with Open-Config team and alignment
- Seeking more comments and feedback from WG and operators