

# MPLS YANG Data Models

## IETF91

### **Submitted I-Ds:**

draft-chen-mpls-ldp-yang-cfg

X. Chen, and Z. Li

draft-chen-mpls-te-yang-cfg

X. Chen, Z. Li, and X. Zeng

draft-gandhi-mpls-te-yang-model

R. Gandhi, T. Saad, and R. Sawaya

draft-zhang-mpls-tp-yang-oam

L. Zhang, L. Zheng, and S. Aldrin

***+ new members joined from Juniper and Ericsson***

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xufeng.liu@ericsson.com, and gregory.mirsky@ericsson.com

# Agenda

- Update on the meetings on MPLS YANG during IETF91
  - (Co)-authors of already submitted I-Ds, and
  - Additional member(s) that showed interest and joined
- Proposal and execution plan
- Next steps

# Current State

- 4 I-Ds targeting MPLS YANG data models definition for:
  - MPLS TE
  - MPLS LDP
  - MPLS TP/OAM
- MPLS WG chair(s) suggested
  - (Co)-authors meet and discuss possible plan for collaboration
  - Possible breakdown of the work
    - Per protocol/technology
    - Per module
    - Per feature

# MPLS YANG Model Meeting

- Team met twice (Tues 11/11 and Thur 11/13) during IETF91
- Meeting goals:
  - Define YANG modules requirements, hierarchy, and structure
  - Organize the work between the interested parties
    - Encourage more representation from different vendors
  - Define commitments to work on per module
  - Setup a common GIT repository
  - Agree on execution plan
- Team also met with YANG doctor during IETF91 “Lhotka, Ladislav”
  - We reviewed high-level module design and got recommendations from them

# MPLS YANG Team

- Wide representation
  - [rgandhi@cisco.com](mailto:rgandhi@cisco.com), [tsaad@cisco.com](mailto:tsaad@cisco.com), [skraza@cisco.com](mailto:skraza@cisco.com), [mhartley@cisco.com](mailto:mhartley@cisco.com)
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  - [xufeng.liu@ericsson.com](mailto:xufeng.liu@ericsson.com), [gregory.mirsky@ericsson.com](mailto:gregory.mirsky@ericsson.com),
  - More...
- Agreement to group into sub-teams
  - Sub-teams to handle different technology MPLS Yang module(s)
  - Sub-teams to stay synchronized of other work

# Proposed Execution Plan

- Define high level module hierarchy
  - Allow for extensibility
  - Separate YANG model for each technology area that
    - augments the top level model to include technology specific aspects
- Conduct periodic meetings:
  - Bi-weekly to discuss/review work on same module
  - Monthly to discuss/review work on base and inter-modules
- Agree on things to define like
  - Required/optional
  - Default, ranges
  - if-feature
  - Vendor augmentation
- Create common repository to check-in work-in-progress model(s)
  - Github: [https://github.com/ietf-mpls-yang/...](https://github.com/ietf-mpls-yang/)
- Submit reviews to YANG Doctor before IETF92
  - <https://www.ietf.org/iesg/directorate/yang-doctors.html>

# Proposed MPLS Yang Module Structure/ Hierarchy

```
+ ietf-mpls-base-types.yang
|
+ -- ietf-mpls-ldp-types.yang
+ -- ietf-mpls-te-types.yang
+ -- ietf-mpls-te-pce-types.yang
+ -- ietf-mpls-tp-types.yang
+ -- ietf-mpls-sr-types.yang
```

Base/reusable MPLS data type definitions: reserved MPLS labels, etc.

MPLS-LDP data type definitions

...

```
+ ietf-mpls-base.yang
+ -- ietf-mpls-te-base.yang
|   + -- ietf-mpls-te-rsvp.yang
|   + -- ietf-mpls-tp.yang
|   + -- ietf-mpls-te-sr.yang
+ -- ietf-pcep.yang
+ -- ietf-mpls-static.yang
    (may be vendor specific)
+ -- ietf-mpls-ldp.yang
```

Base MPLS data definitions

Common MPLS TE data definitions

MPLS RSVP-TE data definitions

MPLS TP data definitions

```
+ ietf-mpls-oam
```

...

# MPLS YANG Data Model

## **module: ietf-mpls-base**

To include generic MPLS data elements representation such as:

- interfaces
- counters
- in/out segments
- cross-connects

..

## **rpcs:**

+---x TBD

## **notifications:**

+---n lsr-notifications



# MPLS-TE YANG Data Model (Highlevel Structure)

## **module: ietf-mpls-te-base**

```
+--rw tunnels-cfg!  
+--rw lsps-cfg!  
+--rw links-cfg!  
+--rw global-cfg!  
    + link-templates  
    + tunnel-templates  
    + lsp-templates  
    + path-templates  
  
+--ro tunnels-state  
+--ro lsps-state  
+--ro links-state  
+--ro global-state
```

## **rpcs:**

```
+---x tunnels-rpc  
+---x lsps-rpc  
+---x global-rpc  
+---x links-rpc
```

## **notifications:**

```
+---n tunnels-notif  
+---n lsps-notif  
+---n links-notif  
+---n global-notif
```

# MPLS-TE Tunnels (Example)

```
module: ietf-mpls-te-base
```

```
  +--rw tunnels-cfg!
```

```
  | +--rw tunnel* [name type]
```

```
  |   +--rw name  string
```

```
  |   +--rw type  mtt:tunnel-type
```

```
  ..
```

```
  |   +--rw (routing-choice)?
```

```
  |     +---:(autoroute)
```

```
  ..
```

```
  |     +---:(forwarding-adjacency)
```

```
  ..
```

```
  |   +--rw (forwarding-properties)?
```

```
  |     +---:(forwarding-class)
```

```
  ..
```

```
  |     +---:(forwarding-group)
```

```
  ..
```

```
  |   +--rw (tunnel-type)?
```

```
  |     +---:(p2p)
```

```
  |       +--rw p2p-properties* [index]
```

```
  ..
```

```
  |     +---:(p2mp)
```

```
  |       +--rw p2mp-properties* [lsp-index]
```

```
  ..
```

Under discussion – to be finalized



Tunnel key



Routing properties



Forwarding properties

# MPLS-TE Links (Example)

```
module: ietf-mpls-te-base
```

```
  +--rw links-cfg!
```

```
  | +--rw link* [name]
```

```
  |   +--rw name  string
```

```
  |   +--rw (igp)?
```

```
  |   | +-- neighbor
```

```
      ....
```

```
  |   +--rw (rsvp)?
```

```
  |   | +--graceful-restart
```

```
      ...
```

```
  |   +--rw (optical)?
```

```
  |   | +-- switching-capabilities
```

```
      ....
```

Under discussion – to be finalized



Link key



IGP properties



RSVP properties



Optical properties

# MPLS-TE Global (Example)

```
module: ietf-mpls-te-base
```

```
  +--rw global-efg!
```

```
    ..
```

```
  | +--rw tunnels-templates* [name]
```

```
  | +--rw links-templates* [name]
```

```
  | +--rw paths-templates* [name]
```



Global properties, timers, or properties that affect all tunnels/lsp/links



Reusable templates

# MPLS-LDP YANG Data Model (Example)

```
module: ietf-mpls-ldp
```

```
  +--rw mpls-ldp-config (In progress)
  |  +--
  +--ro mpls-ldp-state (TBD)
  |  +--
  +--x mpls-ldp-actions (TBD)
  |  +--
  +--n mpls-ldp-notifs (TBD)
     +--
```

# MPLS-LDP YANG: Config (Example)

```
+--rw mpls-ldp-config
  +--rw global
    |   +--rw graceful-restart
    |   +--rw ...
  +--rw vrf-instances
    +--rw vrf [vrf-name]
      +--rw router-id ...
      +--rw neighbors ...
      +-- ..
    +--rw address-families
      |   +--rw address-family [af] // ipv4|ipv6
      |   +--rw enabled
      |   +--rw label-policies
      |   +--rw ...
    +--rw interfaces
      +--rw interface* [intf-name]
        +--rw hello-interval [intvl]
        +--rw ..
      +--rw address-families
        +--rw address-family [af] // ipv4|ipv6
          +--rw enabled
          +--rw transport-address ...
```

IN PROGRESS

# Open Questions

- MPLS LDP: unicast vs. multicast
  - per address family hierarchy
- Defining per technology groupings vs. augmentation
- Organization of MPLS TP OAM:
  - In MPLS TP module, or
  - In MPLS OAM module
- Where to draw the line
  - MPLS transport versus service layer (e.g. L3VPN, etc.)