YANG Data Models for TE and RSVP
draft-ietf-teas-yang-te-04
https://github.com/ietf-mpls-yang/te

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Agenda

• Updates (from previous version)

• Open issues

• Next steps
Since IETF95 Update # 1
MPLS Segment Routing Traffic Engineering

New module that
• Augments the TE module
• Allows per path signaling type as “SR”
• Allows specifying the TE path as set of MPLS label(s)
• Additional path constraints, including protected/unprotected segments
Since IETF95 Update # 2
TE link endpoint for H-LSP

• Support for TE link endpoint for hierarchical LSP
  – Associates the underlay tunnel with the overlay TE link
  – Allows propagating properties of the hierarchical LSP to the overlay TE link
Since IETF95 Update # 3
Generic TE label type

• Need for technology agnostic label
  • Series of bytes with no strict type check

• Technology specific module(s) use technology specific label type
  • Packet MPLS LSP use labels of type mpls-label, OTN LSPs of type otn-label

• The abstract TE model(s) (e.g. abstract TE topology) that may contain data nodes belonging to multiple technologies use TE generic label type
  • Run time check using “must” (e.g. on expected value)
Since IETF95 Update # 4
TE transport Model

• Continuous sync-ups with the team driving TE transport service model on possible alignments
• Received some comments from team driving Transport service model on possible changes/alignments
• Topics under discussion
  • Use of strings (or uints) versus URIs for IDs or keys in the model
  • RPCs for creation/deletion of tunnels
Issue# 1
Reuse of TE model for different technologies

• **OPTION # 1:** Reusable data as groupings (tunnels, LSPs, etc.) in generic module(s)
  – Technology models (e.g. MPLS, OTN, etc.) import the generic module and use the generic groupings

• PROs:
  – Allows reuse across technologies

• CONs:
  – Augment of generic groupings **only** possible after grouping is used (in each tech model)
  – Referencing nodes in one generic grouping from another is error prone
    • Relative path in leafrefs can easily break if groupings are arbitrarily used in the tree
Issue# 1
Reuse of TE model for different technologies

• **OPTION # 2**: TE generic model defined as standalone at the root/TOP of tree
  – Technology models reuse the generic model by “mounting” it under respective path (../mpls/te/..., ../otn/te/..., etc)

• PROs:
  – Augmentation of generic model possible
  – Separation of technology specific TE data

• CONs:
  – Limitation on referencing data nodes outside mount:
    • e.g. needed to reference interfaces for TE device model
Issue# 1
Reuse of TE model for different technologies

• **OPTION # 3:** TE generic model defined as standalone at the root/TOP of tree with per data node technology type
  – Different TE technology data nodes are represented in same model, e.g.:
    • MPLS, OTN, and other LSPs coexist in same model (in same list too)
    • A new technology type per data node (e.g. LSP) to identify specific tech.

• PROs:
  – Augmentation of generic model possible

• CONs:
  – No separation of technology specific TE data
## Summary Issue #1

<table>
<thead>
<tr>
<th>Option</th>
<th>Reusability of Generic Data</th>
<th>Dependency between data nodes (leafref)</th>
<th>Separation of technology specific data</th>
<th>Augment of generic model</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTION #1 (groupings)</td>
<td>_thumb</td>
<td></td>
<td>_thumb</td>
<td>_thumb</td>
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<tr>
<td>OPTION #2 (mount)</td>
<td>_thumb</td>
<td>Not outside mount space</td>
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<td>_thumb</td>
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<tr>
<td>OPTION #3 (multi-technology generic model)</td>
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</tbody>
</table>
TE/RSPV and MPLS YANG Modules
Structure and Relationship

- ietf-rsvp-ext.yang
- ietf-rsvp.yang
- ietf-te-device.yang
- ietf-te-rsvp.yang
- ietf-te-rsvp-mpls.yang
- ietf-te.yang
- ietf-te-sr-mpls.yang
- ietf-te-pcc.yang
- ietf-mpls-base.yang
- ietf-otn-base.yang
Issue# 2
P2MP and P2P TE tunnels lists

• Currently have single list of tunnels and LSPs:
  – Keyed by name and type: P2P or P2MP
  – List contains both P2P and P2MP types

• P2MP tunnels/LSPs have multiplicity of destinations
  – May be simpler to model P2MP separate from P2P LSPs
  – Existing P2P/P2MP MIBs have this separation
Open Issue# 3  
RPCs for TE tunnels

• Model (so far) allows TE tunnels creation via:
  – Configuration
  – PCE/controller as ephemeral

• Another option is to allow creation/deletion of TE tunnels via RPC:
  – Also creates ephemeral state
  – User specified tunnel attributes or associated with attribute set
  – Generic question and may apply to apply to many other model that support ephemeral state
Next Steps

• Conclude on open issues

• Request further review and address comments

• Complete the augmentation for module:
  1. PCC-TE data
Thank You