YANG Data Models for TE and RSVP

draft-ietf-teas-yang-te-04

https://github.com/ietf-mpls-yang/te

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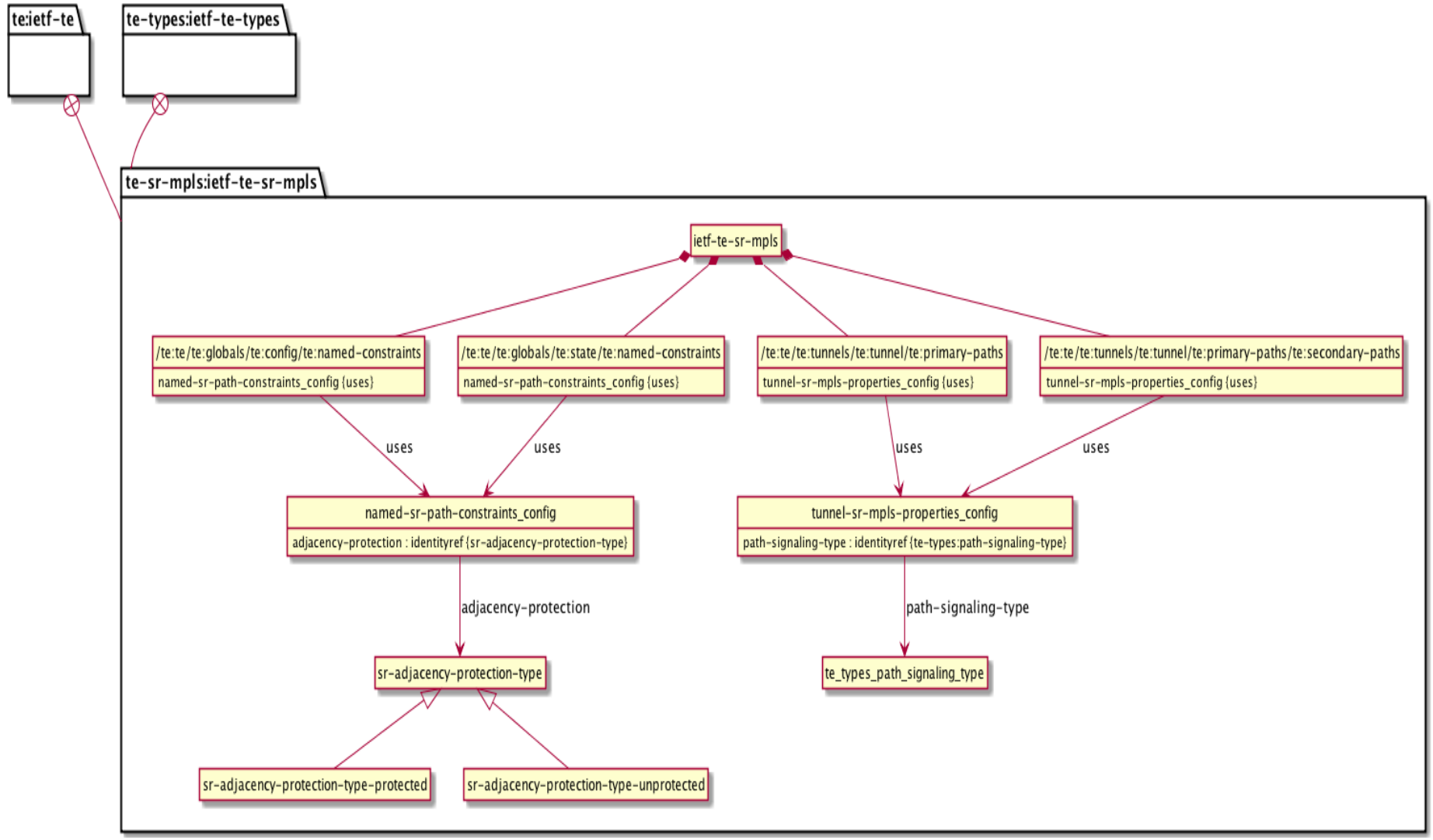
Agenda

- Updates (from previous version)
- Open issues
- Next steps

Since IETF95 Update # 1
MPLS Segment Routing Traffic Engineering

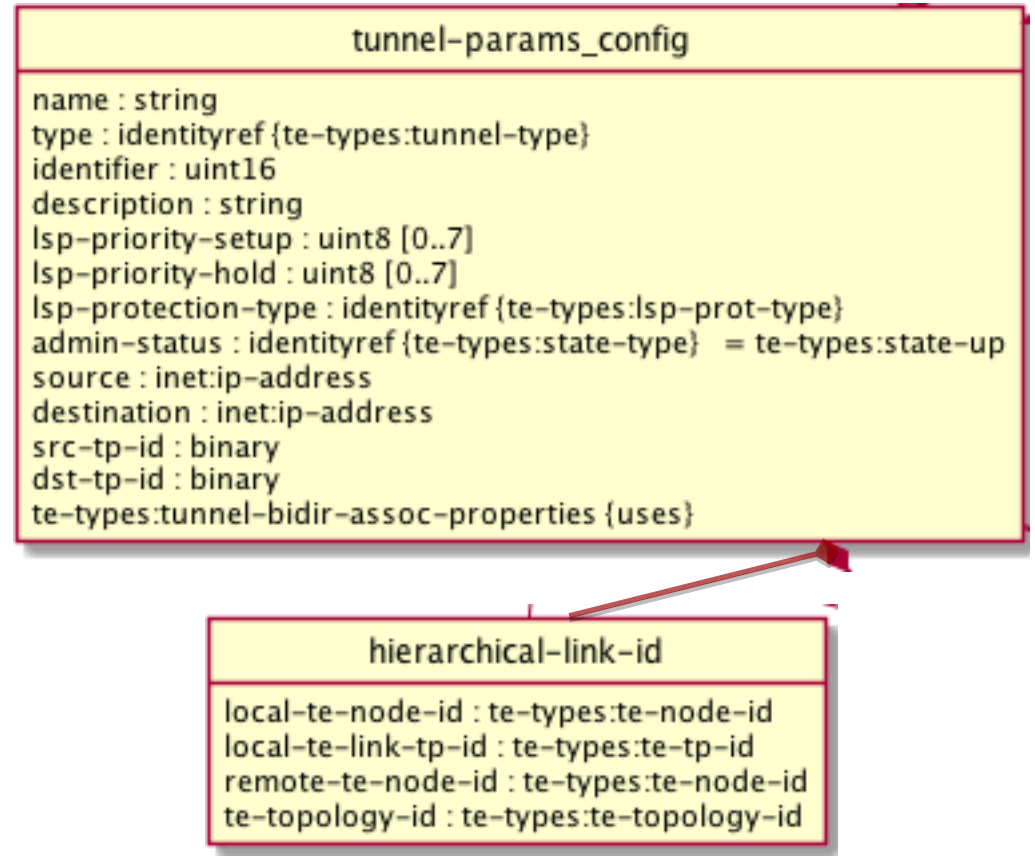
New module that

- 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



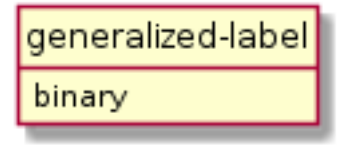
Since IETF95 Update # 2
TE link endpoint for H-LSP

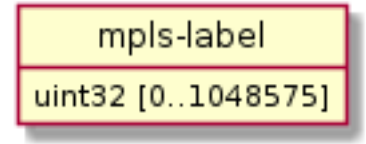
- Support for TE link endpoint for hierarchical LSP
  - Associates the underlay tunnel with the overlay TE link
  - Allows propagating properties of the hierarchical LSP to the overlay TE link

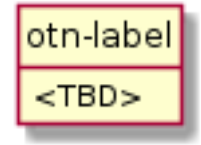


Since IETF95 Update # 3
Generic TE label type

- 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)







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Since IETF95 Update # 4
TE transport Model

- Continious 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

- **<u>OPTION # 1:</u>** 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 **<u>only</u>** 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

```
module ietf-te-mpls {
  uses te-generic-grouping {
    augment "te" {
      uses te-mpls-grouping
    }
  }
  etc.
}
```

```
module ietf-te-otn {
  uses te-generic-grouping {
    augment "te" {
      uses te-otn-grouping
    }
  }
  etc.
}
```

Issue# 1

Reuse of TE model for different technologies

- **<u>OPTION # 2:</u>** 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

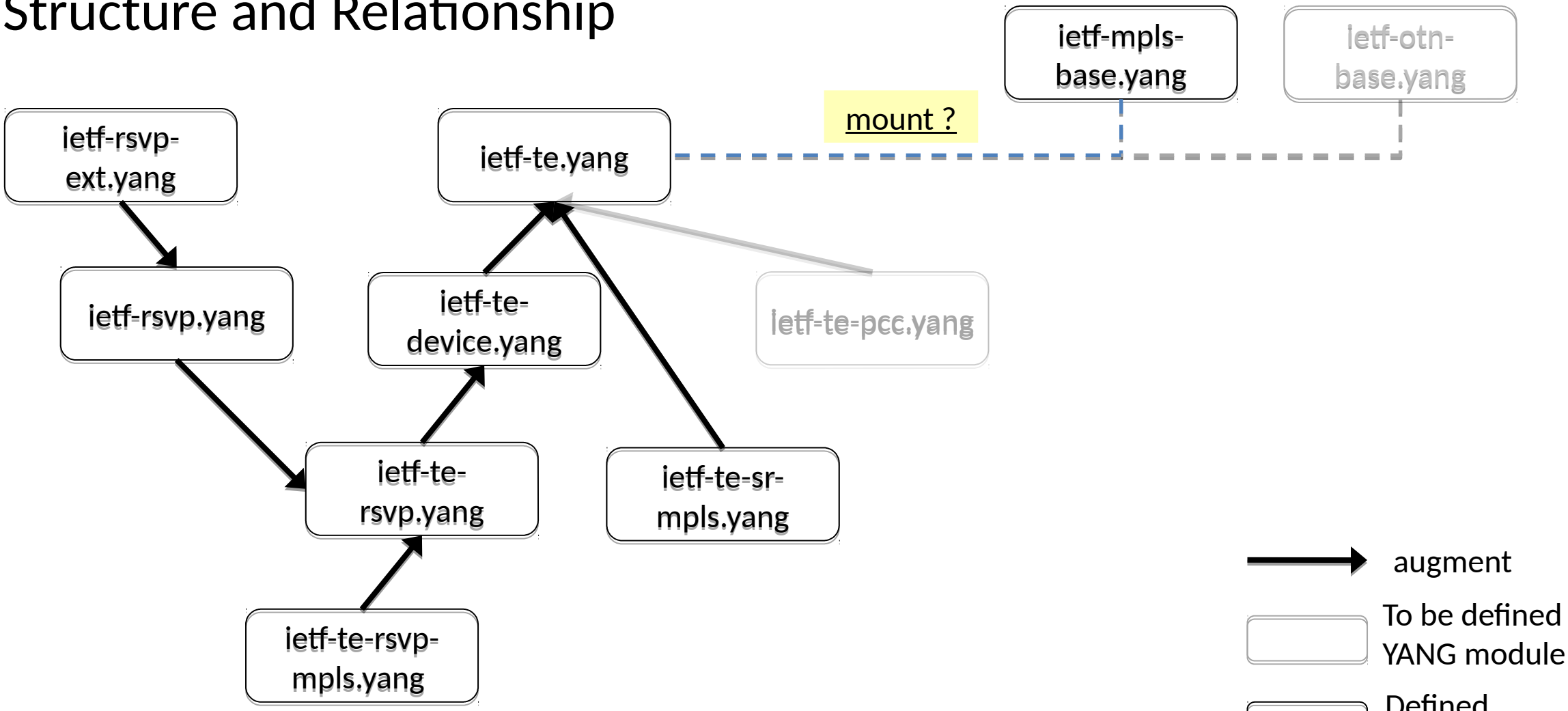
- **<u>OPTION # 3:</u>** TE generic model defined as standalone at the root/TOP of tree with per data node technology type
  - Different TE technology data nodes are represented in same model, e.g.:
    - MPLS, OTN, and other LSPs coexist in same model (in same list too)
    - A new technology type per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

Option	Reusability of Generic Data	Dependency between data nodes (leafref)	Separation of technology specific data	Augment of generic model
OPTION #1 (groupings)	✝	✝	✝	Only when grouping is used
OPTION #2 (mount)	✝	Not outside mount space	✝	✝
OPTION #3 (multi-technology generic model)	✝	✝	✝	✝

TE/RSVP and MPLS YANG Modules

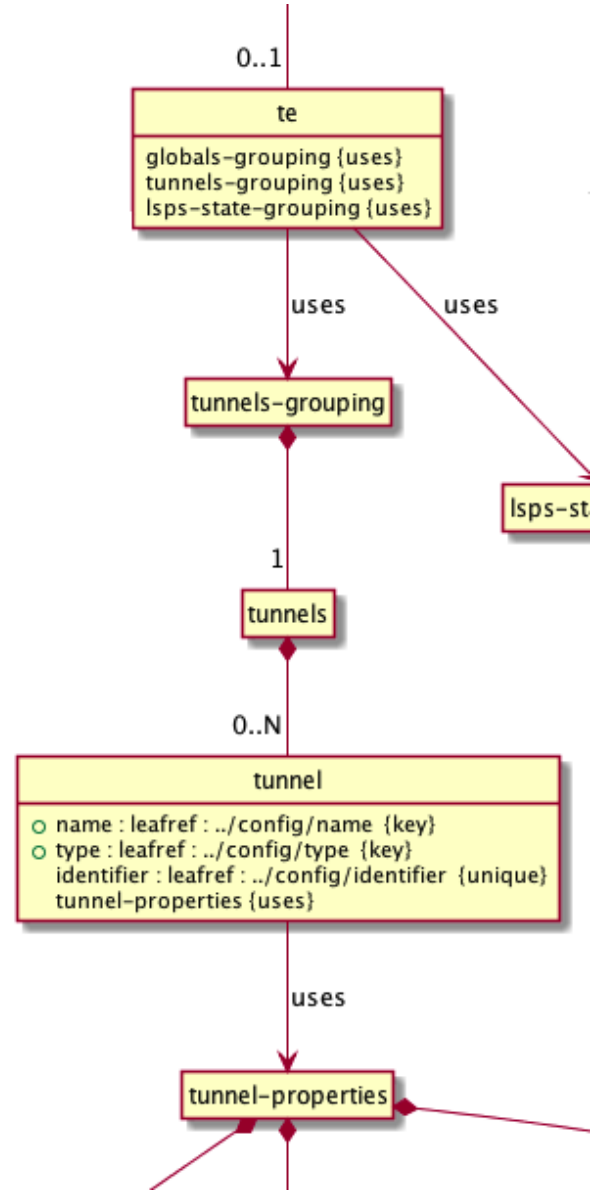
Structure and Relationship



Issue# 2

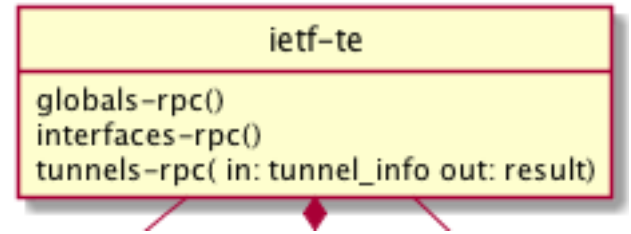
P2MP and P2P TE tunnels lists

- 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