

YANG Data Models for TE and RSVP Tunnels and Interfaces draft-saad-teas-yang-te-00 draft-saad-teas-yang-rsvp-00

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IETF-92, March 2015, Dallas

Agenda

- Objective and scope
- Progress update
- Model definitions
- Discussion/Next steps

Motivation

A design team spun off post IETF91 to

- Coordinate efforts and converge on a unified YANG models for TE, RSVP and RSVP-TE
 - objective to move forward faster to WG adoption and implementation
- Define a modular structure for the TE, RSVP and RSVP-TE YANG models
 - a base TE model that is data and control plane agnostic
 - data and control plane specific properties are augmentations to TE base model
- Define submodules that hold reusable type definitions, derived types, and groupings (e.g. for packet/MPLS)
 - to allow maximum reuse without unnecessary coupling

Presented
at IETF91

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-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-pcep.yang

+ **ietf-mpls-oam**

...

Generic
TE model

Proposed MPLS Yang Module Structure/Hierarchy

+ **ietf-mpls-base.yang**

+ -- **ietf-te.yang**

+ -- **ietf-te-rsvp.yang**

+-- **ietf-te-mpls-rsvp.yang**

+-- **ietf-te-otn-rsvp.yang**

+-- **ietf-mpls-te-spring.yang**

+-- **ietf-mpls-te-tp.yang**

+ -- **ietf-mpls-ldp.yang**

...

+ **ietf-pcep.yang**

+ **ietf-routing**

+ -- **ietf-rsvp.yang**

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

TE base module

Base RSVP-TE module

Packet RSVP-TE module

...

In Scope

- **Base TE YANG model**
 - covers configuration/state/RPC and notifications for:
 - TE P2P and P2MP Tunnels/LSPs
 - TE interfaces: base TE attributes and state
 - TE global attributes
 - MPLS/packet TE model is an augmentation to base TE
- **Base RSVP YANG model**
 - covers configuration/state/RPC and notifications for:
 - RSVP interfaces: base RSVP attributes and state
 - RSVP global attributes
 - covers base RSVP RFC2205
- **Base RSVP-TE YANG model**
 - augments RSVP and TE base modules
 - MPLS/packet model is augmentation to RSVP-TE
 - Covers RFC3209, etc.
- **Some “technology” TE extensions, e.g. SPRING Segment-Routing TE and MPLS-TP**
 - augmentations to base TE YANG module

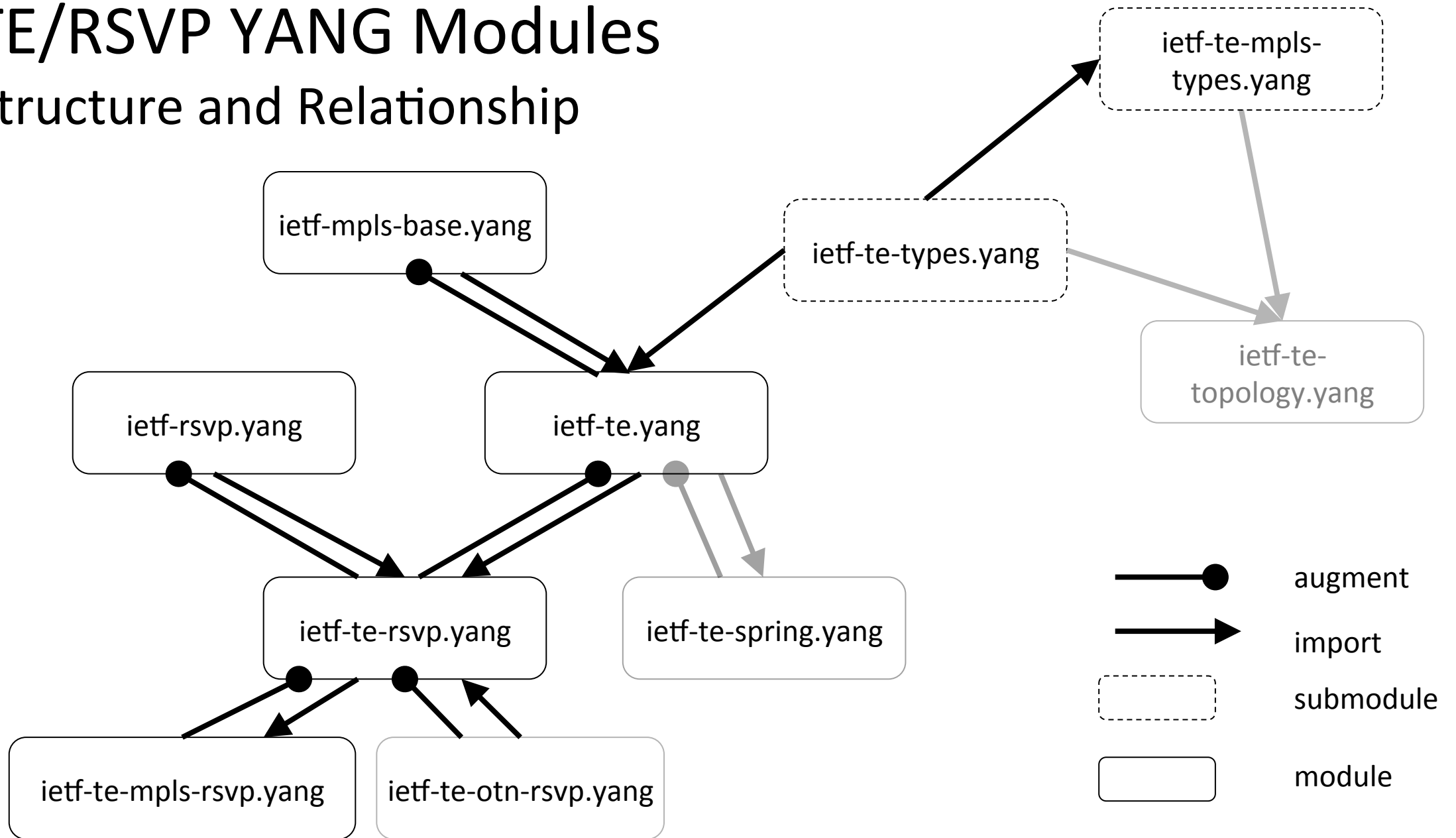
Out of Scope

- Augmentation to base TE YANG module for non-packet technologies:
 - we anticipate this will be driven by technology-specific groups:
 - GMPLS Optical/WDM, GMPLS OTN, etc.
- TE OAM YANG model for MPLS/packet or non-packet
- Other MPLS/packet technology YANG data models e.g.:
 - MPLS LDP, mLDP, MPLS-OAM
 - driven separately by other groups

Progress Update

- Weekly recurring meetings since IETF91
- Work-in-progress code:
 - Maintained in Github: <https://github.com/ietf-mpls-yang>
 - May migrate to IETF work-in-progress repository: <https://github.com/YangModels/yang/> once the group decides ready
- Wiki:
<https://github.com/ietf-mpls-yang/te/wiki/MPLS-TE-YANG>

TE/RSVP YANG Modules Structure and Relationship



TE YANG Data Model

High-level Structure

TE YANG module may augment the **routing/routing-instance/routing-protocols/routing-protocol** path defined in the ietf-routing module

```
module: ietf-te
```

```
+--te!
```

```
  +--rw tunnels
```

```
    ...
```

```
  +--rw interfaces
```

```
    ...
```

```
  +--rw globals
```

```
    ...
```

```
  +--ro tunnels-state
```

```
  +--ro lsps-state
```

```
  +--ro interface-state
```

```
  +--ro global-state
```

```
rpcs:
```

```
  +---x tunnels-rpc
```

```
  +---x lsps-rpc
```

```
  +---x global-rpc
```

```
  +---x interfaces-rpc
```

```
notifications:
```

```
  +---n tunnels-notif
```

```
  +---n lsps-notif
```

```
  +---n interfaces-notif
```

```
  +---n global-notif
```

TE Data Model

TE Globals and Interfaces (config)

```
module: ietf-te
  +--rw te!
    +--rw globals
      | +--rw interface-named-admin-groups* [name]
      | ...
      | +--rw interface-named-srlgs* [name]
      | ...
      | +--rw explicit-paths* [name]
      | ...
      | +--rw path-named-constraints* [name]
      |   +--rw path-constraints
      |   ...
      |     +--rw path-selection
      |     ...
      |       +--rw path-affinities?
      |       ...
      |         +--rw path-srlgs
      |         ...
    +--rw interfaces
      | +--rw interface* [interface]
      |   +--rw interface if:interface-ref
      |   +--rw named-admin-groups* [named-admin-group]
      |   +--rw named-srlgs* [named-srlg]?
      |   +--rw switching-capabilities*
      |   +--rw te-metric?
      |   +--rw affinities
      |     | +--:(admin-groups)
      |     | +--:(extended-admin-groups)?
      |   +--rw srlgs
      |     | +--:(srlg-name)
      |     | +--:(srlg-value)
      |   +--rw (bc-model-type)?
      |     | +--:(bc-model-rdm)
      |     | +--:(bc-model-mam)
      |   +--rw thresholds
      |     | +--:(equal-steps)
      |     | +--:(unequal-steps)
      |   ...
    ...
```

TE Data Model

TE Tunnels (config)

Ctd ...

+--rw **tunnels**

```

| +--rw tunnel* [name type]
|   +--rw name          string
|   +--rw type          identityref
|   +--rw identifier?   uint16
|   +--rw description?  string
|   +--rw admin-status? identityref
|   +--rw (routing-choice)?
|   | +--:(autoroute)
|   | +--:(forwarding-adjacency)
|   +--rw forwarding
|   | +--rw load-share?  uint32
|   | +--rw (policy-type)?
|   +--rw bidirectional
<...>

```

```

| +--:(p2p)
|   +--rw destination?
|   +--rw primary-paths* [preference]
|       +--rw preference          uint8
|       +--rw path-properties
|           | +--rw path-named-constraint?
|           | | +--:(dynamic)
|           | | +--:(explicit)
|       +--rw secondary-paths* [preference]
|           +--rw preference          uint8
|           +--rw path-properties
|               +--rw path-named-constraint?
|               +--rw path-constraints
|                   | +--:(dynamic)
|                   | +--:(explicit)
+--:(p2mp)
    +--rw p2mp-paths* [destination]
    +--rw destination          inet:ip-address
    +--rw primary-paths* [preference]
        +--rw preference          uint8
        +--rw path-properties
            | +--rw path-named-constraint?
            | | +--:(dynamic)
            | | +--:(explicit)
    +--rw secondary-paths* [preference]

```

RSVP Data Model (config)

RSVP YANG module may augment the **routing/routing-instance/routing-protocols/routing-protocol** path defined in the ietf-routing module

```
module: ietf-rsvp
  +--rw rsvp!
    +--rw globals
      | +--rw signaling
      |   +--rw graceful-restart! {graceful-restart}?
      <snip>
      |   +--rw hello {hellos}?
      |       <snip>
      |   +--rw refresh
      |       +--rw reduction {refresh-reduction}?
      <snip>
    +--rw interfaces
      | +--rw authentication {authentication}?
      <snip>
      | +--rw signaling
      <snip>
      | +--rw interface* [interface]
      |   +--rw interface          if:interface-ref
      |   +--rw authentication {authentication}?
      |   +--rw signaling
```

```
    +--rw sessions
      | +--rw session* [src_port dst_port source dest]
      |   <snip>
    +--rw neighbors
      | +--rw neighbor* [address]
      |   <snip>
    +--ro interface-state
      <snip>
    +--ro sessions-state
      | +--ro session* [src_port dst_port source dest]
      |   <snip>
    +--ro neighbors-state
      +--ro neighbor* [address]
        <snip>
```

RSVP-TE (packet/MPLS) Data Model

Augmentation of RSVP and TE Base Models

```
module: ietf-rsvp-te
augment /rsvp:rsvp/rsvp:globals:
  +--rw frr-local-revert!
    +--rw frr-local-revert-delay?  uint32
augment /ietf-te:te/ietf-te:tunnels/ietf-te:tunnel:
  <snip>
  +--rw source?                    inet:ip-address
  +--rw fast-reroute!
  | +--rw bandwidth-protection-desired?  empty
  | +--rw node-protection-desired?      empty
  +--rw se-style-desired?            empty
  +--rw soft-preemption-desired?     empty
  +--rw record-route-desired?       empty
  +--rw signaled-name?              string
  +--rw priority
  | +--rw setup?    uint8
  | +--rw hold?    uint8
  +--rw soft-preemption?            empty
```

```
augment /rsvp:rsvp/rsvp:interfaces:
  +--rw signaling
augment /rsvp:rsvp/rsvp:interfaces/rsvp:interface:
  <snip>
augment /rsvp:rsvp/rsvp:sessions:
  <snip>
augment /rsvp:rsvp/rsvp:neighbors:
  <snip>
augment /rsvp:rsvp/rsvp:sessions-state:
  <snip>
augment /rsvp:rsvp/rsvp:neighbors-state:
  <snip>
```

Next Steps

- Complete outstanding work for state/rpc/notification for TE, RSVP and RSVP-TE YANG models
- Base MPLS YANG model:
 - common attributes across MPLS control plane technologies (?)
 - more suitable for representation of MPLS data plane properties (?)
- Add MPLS Static, SPRING and TP

Thank You