Yang Data Model for Layer 3 TE Topologies

draft-ietf-teas-yang-l3-te-topo-02

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Augmentation Hierarchy

- Layer 3 TE Topology augments L3 Topology and references TE Topology.
- Packet extension module augments ietf-te-topology.
Changes Since Last Revision

- Aligned with latest dependencies
- Added more detailed descriptions on the model structures
- Updated the section of Security Considerations
Aligned with latest dependencies

- RFC8340: YANG Tree Diagrams
- RFC8342: NMDA
- RFC8345: Model for Network Topologies
- RFC8346: Model for Layer 3 Topologies
- draft-ietf-teas-yang-te:
  Model for TE Tunnels and Interfaces (including ietf-te-types)
- draft-ietf-teas-yang-te-topo:
  Model for TE Topologies
Added more detailed descriptions on the model structures

- **Topology Referencing**

```xml
augment /nw:networks/nw:network/l3t:l3-topology-attributes:
    +--rw l3-te-topology-attributes
```
Added more detailed descriptions on the model structures

- **Node Referencing**

```
augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes:
  +--rw 13-te-node-attributes
    +--rw node-ref? leafref
```
Added more detailed descriptions on the model structures

- **Link Termination Point Referencing**

```xml
augment /nw:networks/nw:network/nw:node/nt:termination-point
     /l3t:l3-termination-point-attributes:
     +--rw l3-te-tp-attributes
        +--rw tp-ref?      leafref
        +--rw node-ref?    leafref
```

![L3 TE Topology 1](image1.png)

![L3 Topology 2](image2.png)
Added more detailed descriptions on the model structures

- **Link Referencing**

  ```
  augment /nw:networks/nw:network/nt:link/l3t:l3-link-attributes:
    +--rw l3-te-link-attributes
    +--rw link-ref?       leafref
  ```

![Diagram of L3 TE Topology 1 and L3 Topology 2 with nodes R1, R2, R3, R6, R7, R1', R2', R3', R6', R7']
Added more detailed descriptions on the model structures

- Packet Switching Technology Extensions to TE Link

```xml
   /tet:te-link-attributes  
   /tet:interface-switching-capability:
   +--rw packet-switch-capable
     +--rw minimum-lsp-bandwidth?   rt-types:bandwidth-ieee-float32
     +--rw interface-mtu?           uint16

augment /nw:networks/nw:network/nt:link/tet:te  
   /tet:te-link-attributes  
   /tet:interface-switching-capability:
   +--rw packet-switch-capable
     +--rw minimum-lsp-bandwidth?   rt-types:bandwidth-ieee-float32
     +--rw interface-mtu?           uint16

augment /nw:networks/nw:network/nt:link/tet:te  
   /tet:information-source-entry  
   /tet:interface-switching-capability:
   +--ro packet-switch-capable
     +--ro minimum-lsp-bandwidth?   rt-types:bandwidth-ieee-float32
     +--ro interface-mtu?           uint16
```
Added more detailed descriptions on the model structures

- Packet Switching Technology Extensions for Performance Metric

```
augment /nw:networks/nw:network/nw:node/tet:te
    /tet:te-node-attributes/tet:connectivity-matrices:
    +--rw performance-metric
        +--rw measurement
            |      ......
        +--rw normality
            |      ......
        +--rw throttle
            ......
```
Updated the section of Security Considerations

- Followed the latest YANG security guidelines
Next Steps

▪ Add a configuration example and a state example.
▪ Complete and confirm performance metrics (The topic is currently being finalized by TE Tunnel Modeling Team).
▪ Ask for YANG doctor's review.
▪ Welcome further reviews and suggestions.
▪ Working Group Last Call after completing above.
Yang Data Model for SR and SR TE Topologies

draft-ietf-teas-yang-sr-te-topo-02

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SR (Segment Routing) Topology

- Augment layer 3 network topology model

Diagram:

- Layer 3 Network Topology
  - ietf-l3-unicast-topology

- Segment Rougint Topology
  - ietf-sr-topology
SR (Segment Routing) TE Topology

- Multiple inheritance:
  - Is both SR topology and layer 3 TE topology model.
  - Uses multiple network types: “l3-te” and “sr”.

Diagram:

- SR Topology (ietf-sr-topology)
- Layer 3 TE Topology (ietf-l3-te-topology)
- SR TE Topology
Changes Since Last Revision

- Aligned with latest dependencies.
- Add more detailed descriptions on the model structures.
- Covered features:
  - Link protection.
  - Link bundle.
Aligned with latest dependencies

- RFC8340: YANG Tree Diagrams
- RFC8342: NMDA
- RFC8345: Model for Network Topologies
- RFC8346: Model for Layer 3 Topologies
- draft-ietf-teas-yang-te: Model for TE Tunnels and Interfaces (including ietf-te-types)
- draft-ietf-teas-yang-te-topo: Model for TE Topologies
Added more detailed descriptions on the model structures

- Topology Attributes

```ini
augment /nw:networks/nw:network/l3t:l3-topology-attributes:
  +-rw sr
    +-rw srgb* [lower-bound upper-bound]
      +-rw lower-bound      uint32
      +-rw upper-bound      uint32
```
Added more detailed descriptions on the model structures

- **Node Attributes**

```xml
augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes:
  +--rw sr
    +--rw srgb* [lower-bound upper-bound]
    |   +--rw lower-bound uint32
    |   +--rw upper-bound uint32
    +--rw srlb* [lower-bound upper-bound]
    |   +--rw lower-bound uint32
    |   +--rw upper-bound uint32
  +--rw node-capabilities
    +--rw transport-planes* [transport-plane]
    |   +--rw transport-plane identityref
    |   +--rw readable-label-stack-depth? uint8
  +--ro information-source? enumeration
  +--ro information-source-state
    +--ro credibility-preference? uint16
```
Added more detailed descriptions on the model structures

- **Node Prefix Attributes**

```plaintext
augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes
    /l3t:prefix:
    +--rw sr!
        +--rw value-type?            enumeration
        +--rw start-sid              uint32
        +--rw range?                 uint32
        +--rw algorithm?             identityref
        +--rw last-hop-behavior?      enumeration
            {sid-last-hop-behavior}?
        +--rw is-local?              boolean
```
Added more detailed descriptions on the model structures

- Link Termination Point Attributes

```text
augment /nw:networks/nw:network/nw:node/nt:termination-point
    /l3t:l3-termination-point-attributes:
    +--rw sr!
       +--rw value-type?               enumeration
       +--rw sid                      uint32
       +--rw advertise-protection?    enumeration
       +--rw is-local?                boolean
       +--ro is-backup?               boolean
       +--ro is-part-of-set?          boolean
       +--ro is-on-lan?               boolean
       +--ro information-source?      enumeration
       +--ro information-source-state
          +--ro credibility-preference? Uint16
```
Link protection

- Added attribute advertise-protection

```plaintext
augment /nw:networks/nw:network/nw:node/nt:termination-point
    /l3t:l3-termination-point-attributes:
    +--rw sr!
        +--rw value-type? enumeration
        +--rw sid uint32
        +--rw advertise-protection? enumeration
        +--rw is-local? boolean
        +--ro is-backup? boolean
        +--ro is-part-of-set? boolean
        +--ro is-on-lan? boolean
        +--ro information-source? enumeration
        +--ro information-source-state
            +--ro credibility-preference? Uint16
```
Link bundle

- Re-used the existing modeling construct in ietf-te-topology.yang

```
augment /nw:networks/nw:network/nt:link:
  +-rw te!
    +-rw (bundle-stack-level)?
      |   +--:(bundle)
      |     +-- rw bundled-links
      |     |     +-- rw bundled-link* [sequence]
      |     |       |     +-rw sequence         uint32
      |     |       |     +-rw src-tp-ref?  leafref
      |     |       |     +-rw des-tp-ref?  leafref
      |   +--:(component)
      |     +-- rw component-links
      |     |     +-- rw component-link* [sequence]
      |     |       |     +-rw sequence         uint32
      |     |       |     +-rw src-interface-ref?  string
      |     |       |     +-rw des-interface-ref?  string
```
Next Steps

▪ Add a configuration example and a state example.
▪ Complete the missing features:
  • MSD in node capabilities.
▪ Ask for YANG doctor's review.
▪ Update the section of Security Considerations according to latest guidelines.
▪ Welcome further reviews and suggestions.
▪ Working Group Last Call after completing above.