Yang Data Model for Layer 3 TE Topologies
draft-ietf-teas-yang-l3-te-topo-02

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Igor Bryskin (Huawei Technologies)

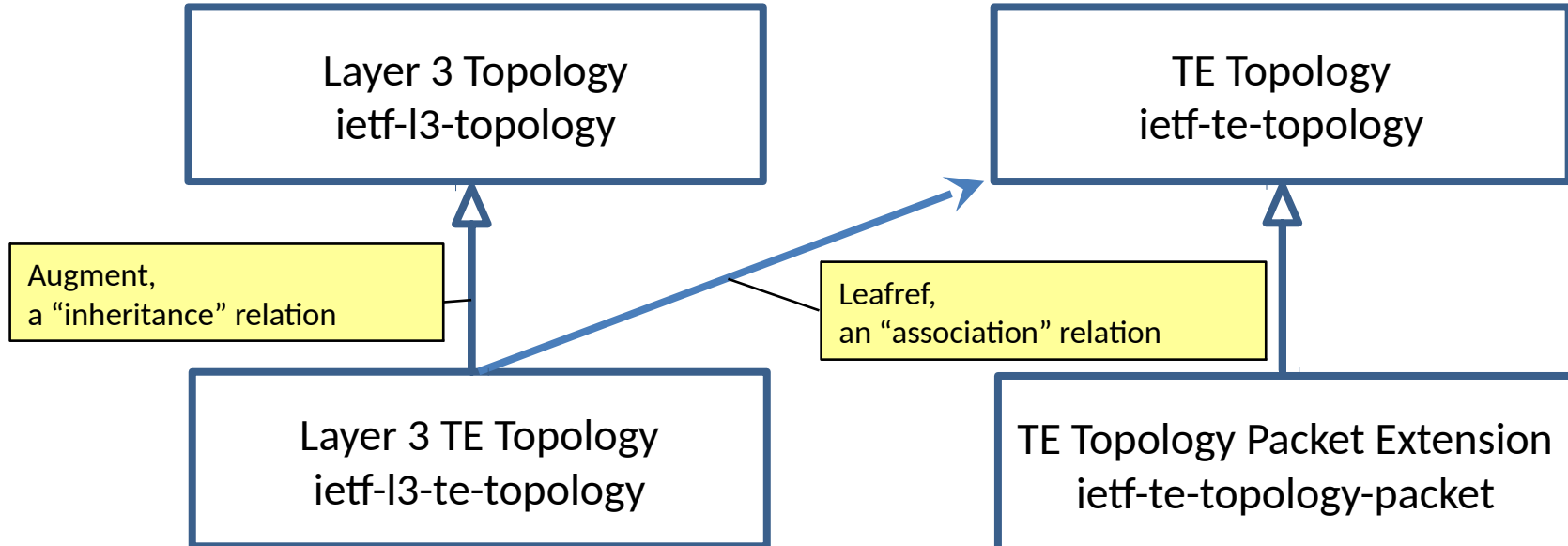Vishnu Pavan Beeram (Juniper Networks)

Tarek Saad (Cisco)

Himanshu Shah (Ciena)

Oscar Gonzalez De Dios (Telefonica)

Augmentation Hierarchy

- L3 TE Topology augments L3 Topology and references TE Topology.
- Packet extension module augments ietf-te-topology.

Layer 3 Topology ietf-l3-topology		TE Topology ietf-te-topology

Augment,
a "inheritance" relation

Leafref,
an "association" relation

Layer 3 TE Topology ietf-l3-te-topology	TE Topology Packet Extension ietf-te-topology-packet

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
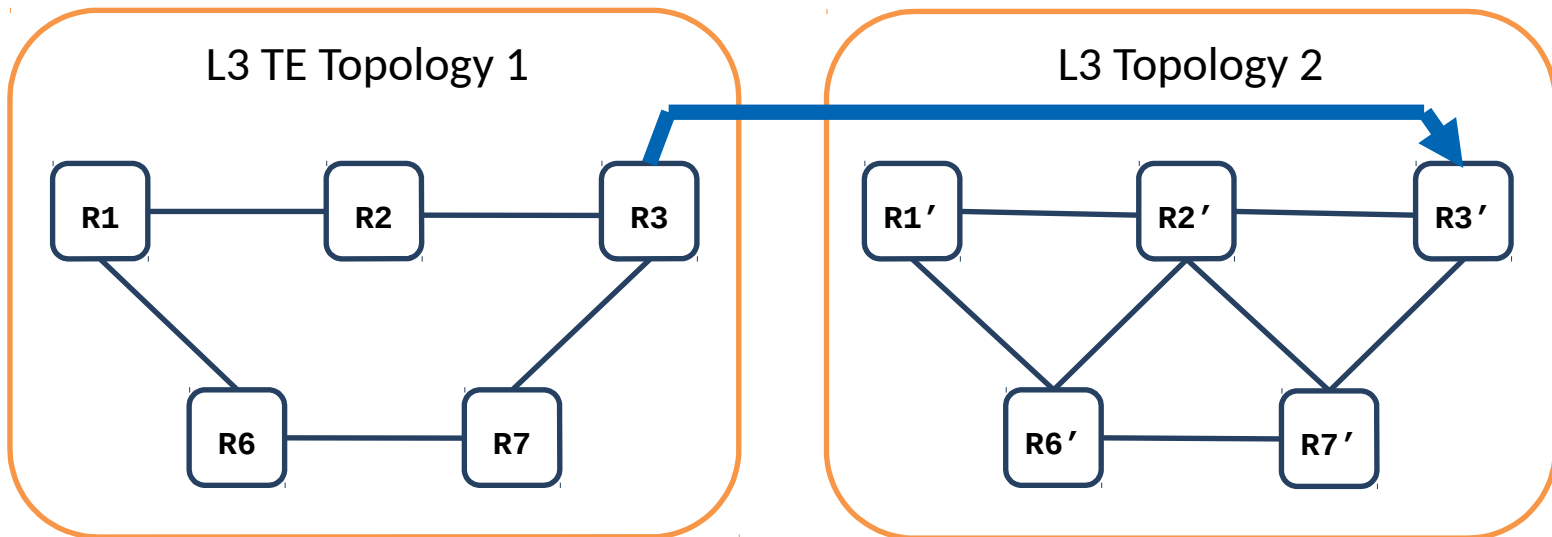
- Topology Referencing

```
augment /nw:networks/nw:network/l3t:l3-topology-attributes:
  +--rw l3-te-topology-attributes
    +--rw network-ref?   -> /nw:networks/network/network-id
```
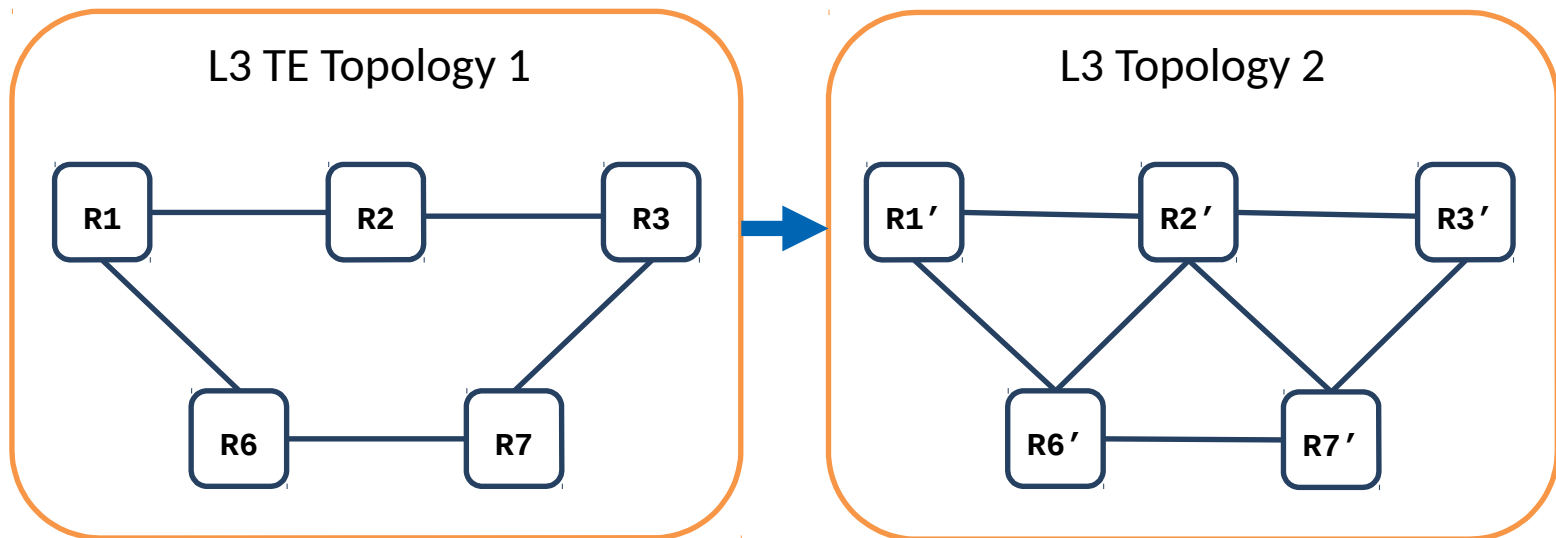
Added more detailed descriptions on the model structures
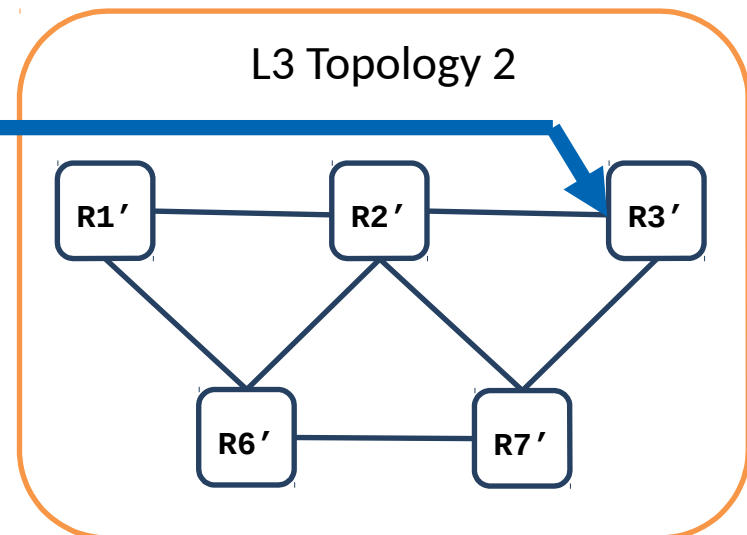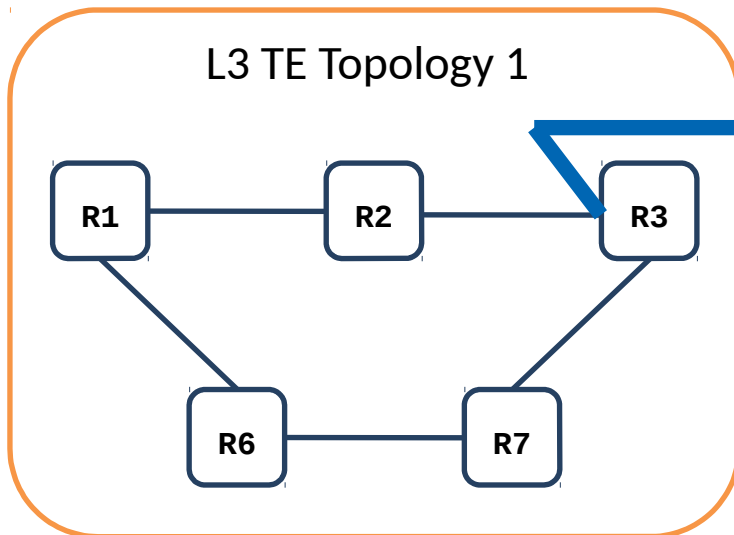
- Node Referencing

```
augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes:
  +--rw l3-te-node-attributes
    +--rw node-ref?      leafref
    +--rw network-ref?   -> /nw:networks/network/network-id
```

Added more detailed descriptions on the model structures

- Link Termination Point Referencing

```
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
     +--rw network-ref?   -> /nw:networks/network/network-id
```

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
    +--rw network-ref?   -> /nw:networks/network/network-id
```
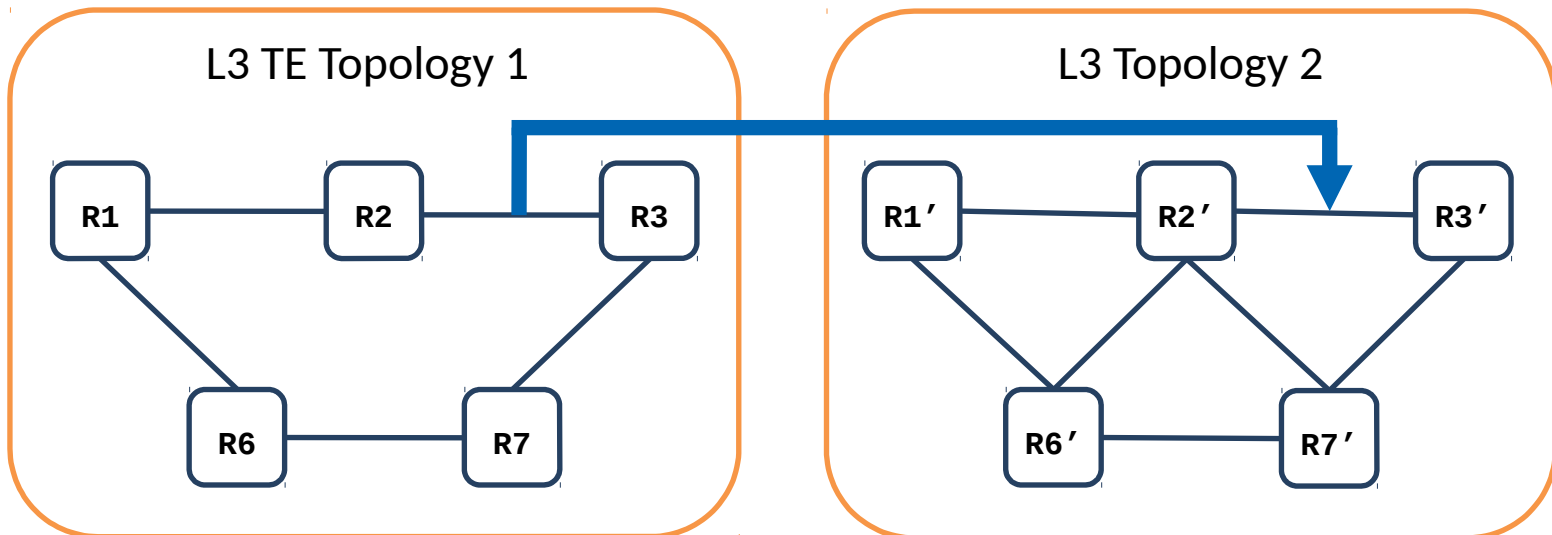
Added more detailed descriptions on the model structures

- Packet Switching Technology Extensions to TE Link

```
augment /nw:networks/tet:te/tet:templates/tet:link-template
        /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 metrices (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

Xufeng Liu (Volta Networks)

Igor Bryskin (Huawei Technologies)
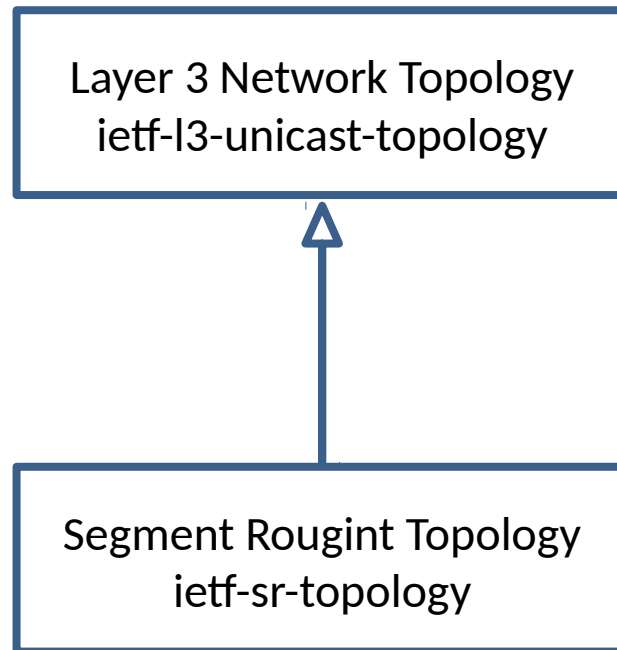
Vishnu Pavan Beeram (Juniper Networks)

Tarek Saad (Cisco)

Himanshu Shah (Ciena)

Stephane Litkowski (Orange)

SR (Segment Routing) Topology

- Augment layer 3 network topology model

```
┌─────────────────────────────────┐
│     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".
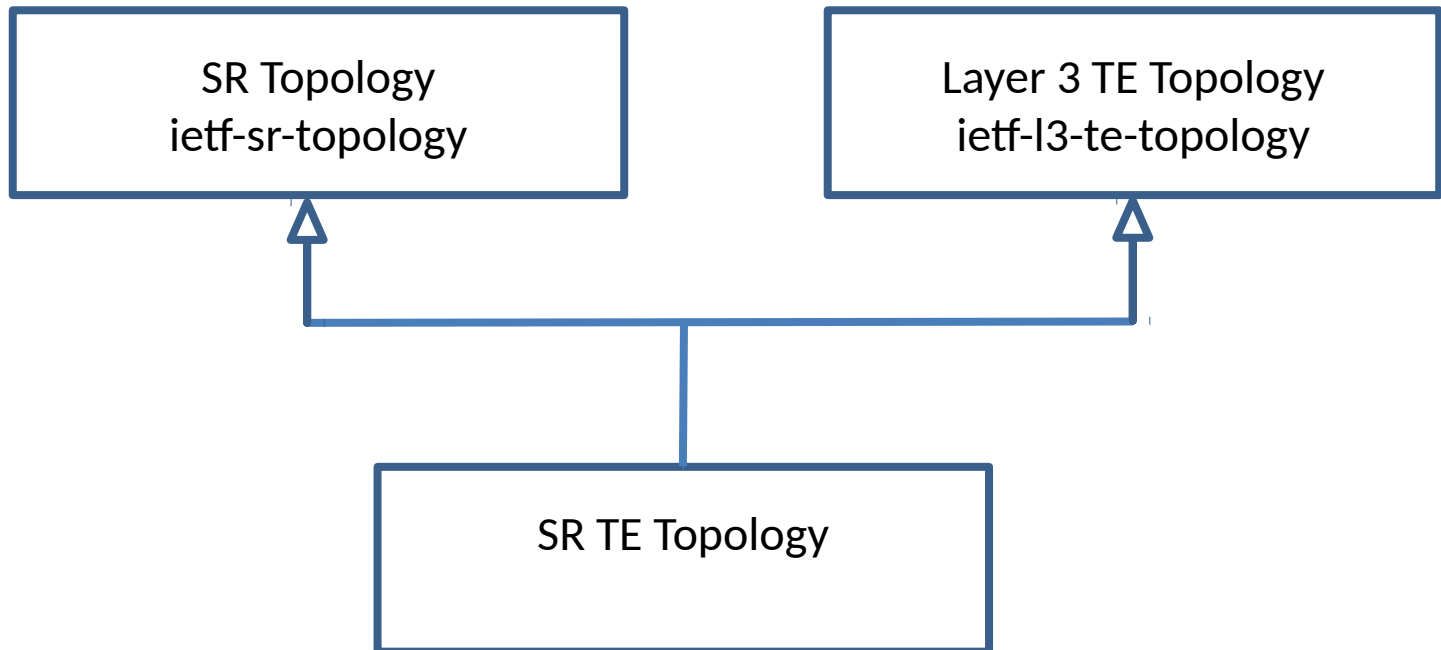
Changes Since Last Revision

- 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

```
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

```
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

```
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

```
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

```
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.