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YANG Data Model for Layer 3 TE Topologies
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Abstract

This document defines a YANG data model for layer 3 traffic engineering topologies.

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1. Introduction

This document defines a YANG [RFC7950] data model for describing the relationship between a layer 3 network topology [I-D.ietf-i2rs-yang-l3-topology] and a TE topology [I-D.ietf-teas-yang-te-topo].

When traffic engineering is enabled on a layer 3 network topology, there will be a corresponding TE topology. The TE topology may or may not be congruent to the layer 3 network topology. When such a congruent TE topology exists, there will be a one-to-one association between the one modeling element in the layer 3 topology to another element in the TE topology. When such a congruent TE topology does not exist, the association will not be one-to-one. This YANG data model allows both cases.

1.1. Terminology

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and

"OPTIONAL" in this document are to be interpreted as described in BCP 14, [RFC2119].

The following terms are defined in [RFC7950] and are not redefined here:

- o augment
- o data model
- o data node

2. Modeling Considerations

2.1. Relationship Between Layer 3 Topology and TE topology

In general, layer 3 network topology model and TE topology model can be used independently. When traffic engineering is enabled on a layer 3 network topology, there will be associations between objects in layer 3 network topologies and objects in TE topologies. The properties of these relations are:

- o The associations are between objects of the same class, i.e. node to node or link to link.
- o The multiplicity of such an association is: 0..1 to 0..1. An object in a layer 3 network may have zero or one associated object in the corresponding TE network.

2.2. Relationship Modeling

YANG data type leafref is used to model the association relationship between a layer 3 network topology and a TE topology. YANG must statements are used to enforce the referenced objects are in the topologies of proper type.

3. Model Structure

3.1. Layer 3 TE Topology Module

The model tree structure of the layer 3 TE topology module is as shown below:

```

module: ietf-l3-te-topology
augment /nw:networks/nw:network/nw:network-types/
l3t:l3-unicast-topology:
  +--rw l3-te!
augment /nw:networks/nw:network/l3t:l3-topology-attributes:
  +--rw l3-te-topology-attributes
    +--rw network-ref? leafref
augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes:
  +--rw l3-te-node-attributes
    +--rw node-ref? leafref
    +--rw network-ref? leafref
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? leafref
augment /nw:networks/nw:network/nt:link/l3t:l3-link-attributes:
  +--rw l3-te-link-attributes
    +--rw link-ref? leafref
    +--rw network-ref? leafref

```

3.2. Packet Switching TE Topology Module

This is an augmentation to base TE topology model.

```

module: ietf-te-topology-packet
augment /nw:networks/nw:network/nw:node/tet:te/tet:config/
tet:te-node-attributes/tet:connectivity-matrix:
  +--rw performance-metric {te-performance-metric}?
    +--rw measurement
      +--rw unidirectional-delay? uint32
      +--rw unidirectional-min-delay? uint32
      +--rw unidirectional-max-delay? uint32
      +--rw unidirectional-delay-variation? uint32
      +--rw unidirectional-packet-loss? decimal64
      +--rw unidirectional-residual-bandwidth? decimal64
      +--rw unidirectional-available-bandwidth? decimal64
      +--rw unidirectional-utilized-bandwidth? decimal64
    +--rw normality
      +--rw unidirectional-delay?
te-types:performance-metric-normality
  +--rw unidirectional-min-delay?
te-types:performance-metric-normality
  +--rw unidirectional-max-delay?

```

```

te-types:performance-metric-normality
|   +--rw unidirectional-delay-variation?
te-types:performance-metric-normality
|   +--rw unidirectional-packet-loss?
te-types:performance-metric-normality
|   +--rw unidirectional-residual-bandwidth?
te-types:performance-metric-normality
|   +--rw unidirectional-available-bandwidth?
te-types:performance-metric-normality
|   +--rw unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
+--rw performance-metric-throttle {te-performance-metric}?
|   +--rw unidirectional-delay-offset?          uint32
|   +--rw measure-interval?                      uint32
|   +--rw advertisement-interval?                uint32
|   +--rw suppression-interval?                  uint32
|   +--rw threshold-out
|   |   +--rw unidirectional-delay?              uint32
|   |   +--rw unidirectional-min-delay?          uint32
|   |   +--rw unidirectional-max-delay?          uint32
|   |   +--rw unidirectional-delay-variation?    uint32
|   |   +--rw unidirectional-packet-loss?        decimal64
|   |   +--rw unidirectional-residual-bandwidth? decimal64
|   |   +--rw unidirectional-available-bandwidth? decimal64
|   |   +--rw unidirectional-utilized-bandwidth? decimal64
|   +--rw threshold-in
|   |   +--rw unidirectional-delay?              uint32
|   |   +--rw unidirectional-min-delay?          uint32
|   |   +--rw unidirectional-max-delay?          uint32
|   |   +--rw unidirectional-delay-variation?    uint32
|   |   +--rw unidirectional-packet-loss?        decimal64
|   |   +--rw unidirectional-residual-bandwidth? decimal64
|   |   +--rw unidirectional-available-bandwidth? decimal64
|   |   +--rw unidirectional-utilized-bandwidth? decimal64
|   +--rw threshold-accelerated-advertisement
|   |   +--rw unidirectional-delay?              uint32
|   |   +--rw unidirectional-min-delay?          uint32
|   |   +--rw unidirectional-max-delay?          uint32
|   |   +--rw unidirectional-delay-variation?    uint32
|   |   +--rw unidirectional-packet-loss?        decimal64
|   |   +--rw unidirectional-residual-bandwidth? decimal64
|   |   +--rw unidirectional-available-bandwidth? decimal64
|   |   +--rw unidirectional-utilized-bandwidth? decimal64
augment /nw:networks/nw:network/nw:node/tet:te/tet:state/
tet:te-node-attributes/tet:connectivity-matrix:
+--ro performance-metric {te-performance-metric}?
|   +--ro measurement
|   |   +--ro unidirectional-delay?              uint32

```

```

|--ro unidirectional-min-delay?          uint32
|--ro unidirectional-max-delay?          uint32
|--ro unidirectional-delay-variation?    uint32
|--ro unidirectional-packet-loss?        decimal64
|--ro unidirectional-residual-bandwidth? decimal64
|--ro unidirectional-available-bandwidth? decimal64
|--ro unidirectional-utilized-bandwidth? decimal64
+--ro normality
+--ro unidirectional-delay?
te-types:performance-metric-normality
+--ro unidirectional-min-delay?
te-types:performance-metric-normality
+--ro unidirectional-max-delay?
te-types:performance-metric-normality
+--ro unidirectional-delay-variation?
te-types:performance-metric-normality
+--ro unidirectional-packet-loss?
te-types:performance-metric-normality
+--ro unidirectional-residual-bandwidth?
te-types:performance-metric-normality
+--ro unidirectional-available-bandwidth?
te-types:performance-metric-normality
+--ro unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
+--ro performance-metric-throttle {te-performance-metric}?
+--ro unidirectional-delay-offset?        uint32
+--ro measure-interval?                   uint32
+--ro advertisement-interval?             uint32
+--ro suppression-interval?              uint32
+--ro threshold-out
+--ro unidirectional-delay?               uint32
+--ro unidirectional-min-delay?           uint32
+--ro unidirectional-max-delay?           uint32
+--ro unidirectional-delay-variation?     uint32
+--ro unidirectional-packet-loss?         decimal64
+--ro unidirectional-residual-bandwidth?  decimal64
+--ro unidirectional-available-bandwidth? decimal64
+--ro unidirectional-utilized-bandwidth?  decimal64
+--ro threshold-in
+--ro unidirectional-delay?               uint32
+--ro unidirectional-min-delay?           uint32
+--ro unidirectional-max-delay?           uint32
+--ro unidirectional-delay-variation?     uint32
+--ro unidirectional-packet-loss?         decimal64
+--ro unidirectional-residual-bandwidth?  decimal64
+--ro unidirectional-available-bandwidth? decimal64
+--ro unidirectional-utilized-bandwidth?  decimal64
+--ro threshold-accelerated-advertisement

```

```

        +--ro unidirectional-delay?                uint32
        +--ro unidirectional-min-delay?             uint32
        +--ro unidirectional-max-delay?             uint32
        +--ro unidirectional-delay-variation?       uint32
        +--ro unidirectional-packet-loss?           decimal64
        +--ro unidirectional-residual-bandwidth?    decimal64
        +--ro unidirectional-available-bandwidth?   decimal64
        +--ro unidirectional-utilized-bandwidth?    decimal64
augment /nw:networks/nw:network/nw:node/tet:te/tet:state/
tet:information-source-entry/tet:connectivity-matrix:
  +--ro performance-metric {te-performance-metric}?
    |
    | +--ro measurement
    | |
    | | +--ro unidirectional-delay?                uint32
    | | +--ro unidirectional-min-delay?             uint32
    | | +--ro unidirectional-max-delay?             uint32
    | | +--ro unidirectional-delay-variation?       uint32
    | | +--ro unidirectional-packet-loss?           decimal64
    | | +--ro unidirectional-residual-bandwidth?    decimal64
    | | +--ro unidirectional-available-bandwidth?   decimal64
    | | +--ro unidirectional-utilized-bandwidth?    decimal64
    | |
    | | +--ro normality
    | | |
    | | | +--ro unidirectional-delay?                uint32
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-min-delay?             uint32
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-max-delay?             uint32
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-delay-variation?       uint32
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-packet-loss?           decimal64
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-residual-bandwidth?    decimal64
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-available-bandwidth?   decimal64
    | | |
    te-types:performance-metric-normality
    | | |
    | | | +--ro unidirectional-utilized-bandwidth?    decimal64
    | | |
    te-types:performance-metric-normality
    | |
    | | +--ro performance-metric-throttle {te-performance-metric}?
    | | |
    | | | +--ro unidirectional-delay-offset?          uint32
    | | | +--ro measure-interval?                     uint32
    | | | +--ro advertisement-interval?               uint32
    | | | +--ro suppression-interval?                 uint32
    | | |
    | | | +--ro threshold-out
    | | | |
    | | | | +--ro unidirectional-delay?                uint32
    | | | | +--ro unidirectional-min-delay?             uint32
    | | | | +--ro unidirectional-max-delay?             uint32
    | | | | +--ro unidirectional-delay-variation?       uint32
    | | | | +--ro unidirectional-packet-loss?           decimal64

```

```

    |   +--ro unidirectional-residual-bandwidth?   decimal64
    |   +--ro unidirectional-available-bandwidth?  decimal64
    |   +--ro unidirectional-utilized-bandwidth?   decimal64
+--ro threshold-in
    |   +--ro unidirectional-delay?                uint32
    |   +--ro unidirectional-min-delay?            uint32
    |   +--ro unidirectional-max-delay?            uint32
    |   +--ro unidirectional-delay-variation?      uint32
    |   +--ro unidirectional-packet-loss?          decimal64
    |   +--ro unidirectional-residual-bandwidth?   decimal64
    |   +--ro unidirectional-available-bandwidth?  decimal64
    |   +--ro unidirectional-utilized-bandwidth?   decimal64
+--ro threshold-accelerated-advertisement
    |   +--ro unidirectional-delay?                uint32
    |   +--ro unidirectional-min-delay?            uint32
    |   +--ro unidirectional-max-delay?            uint32
    |   +--ro unidirectional-delay-variation?      uint32
    |   +--ro unidirectional-packet-loss?          decimal64
    |   +--ro unidirectional-residual-bandwidth?   decimal64
    |   +--ro unidirectional-available-bandwidth?  decimal64
    |   +--ro unidirectional-utilized-bandwidth?   decimal64
augment /nw:networks/nw:network/nw:node/tet:te/
tet:tunnel-termination-point/tet:config/tet:local-link-connectivity:
    +--rw performance-metric {te-performance-metric}?
    |   +--rw measurement
    |   |   +--rw unidirectional-delay?            uint32
    |   |   +--rw unidirectional-min-delay?        uint32
    |   |   +--rw unidirectional-max-delay?        uint32
    |   |   +--rw unidirectional-delay-variation?   uint32
    |   |   +--rw unidirectional-packet-loss?       decimal64
    |   |   +--rw unidirectional-residual-bandwidth? decimal64
    |   |   +--rw unidirectional-available-bandwidth? decimal64
    |   |   +--rw unidirectional-utilized-bandwidth? decimal64
    |   +--rw normality
    |   |   +--rw unidirectional-delay?
te-types:performance-metric-normality
    |   +--rw unidirectional-min-delay?
te-types:performance-metric-normality
    |   +--rw unidirectional-max-delay?
te-types:performance-metric-normality
    |   +--rw unidirectional-delay-variation?
te-types:performance-metric-normality
    |   +--rw unidirectional-packet-loss?
te-types:performance-metric-normality
    |   +--rw unidirectional-residual-bandwidth?
te-types:performance-metric-normality
    |   +--rw unidirectional-available-bandwidth?
te-types:performance-metric-normality

```



```

|      +---rw unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
+---rw performance-metric-throttle {te-performance-metric}?
  +---rw unidirectional-delay-offset?          uint32
  +---rw measure-interval?                      uint32
  +---rw advertisement-interval?                uint32
  +---rw suppression-interval?                  uint32
  +---rw threshold-out
    | +---rw unidirectional-delay?              uint32
    | +---rw unidirectional-min-delay?          uint32
    | +---rw unidirectional-max-delay?          uint32
    | +---rw unidirectional-delay-variation?    uint32
    | +---rw unidirectional-packet-loss?        decimal64
    | +---rw unidirectional-residual-bandwidth? decimal64
    | +---rw unidirectional-available-bandwidth? decimal64
    | +---rw unidirectional-utilized-bandwidth? decimal64
  +---rw threshold-in
    | +---rw unidirectional-delay?              uint32
    | +---rw unidirectional-min-delay?          uint32
    | +---rw unidirectional-max-delay?          uint32
    | +---rw unidirectional-delay-variation?    uint32
    | +---rw unidirectional-packet-loss?        decimal64
    | +---rw unidirectional-residual-bandwidth? decimal64
    | +---rw unidirectional-available-bandwidth? decimal64
    | +---rw unidirectional-utilized-bandwidth? decimal64
  +---rw threshold-accelerated-advertisement
    | +---rw unidirectional-delay?              uint32
    | +---rw unidirectional-min-delay?          uint32
    | +---rw unidirectional-max-delay?          uint32
    | +---rw unidirectional-delay-variation?    uint32
    | +---rw unidirectional-packet-loss?        decimal64
    | +---rw unidirectional-residual-bandwidth? decimal64
    | +---rw unidirectional-available-bandwidth? decimal64
    | +---rw unidirectional-utilized-bandwidth? decimal64
augment /nw:networks/nw:network/nw:node/tet:te/
tet:tunnel-termination-point/tet:state/tet:local-link-connectivity:
  +---ro performance-metric {te-performance-metric}?
    | +---ro measurement
    | | +---ro unidirectional-delay?            uint32
    | | +---ro unidirectional-min-delay?        uint32
    | | +---ro unidirectional-max-delay?        uint32
    | | +---ro unidirectional-delay-variation?  uint32
    | | +---ro unidirectional-packet-loss?      decimal64
    | | +---ro unidirectional-residual-bandwidth? decimal64
    | | +---ro unidirectional-available-bandwidth? decimal64
    | | +---ro unidirectional-utilized-bandwidth? decimal64
    | +---ro normality
    | +---ro unidirectional-delay?

```

```

te-types:performance-metric-normality
|   +-ro unidirectional-min-delay?
te-types:performance-metric-normality
|   +-ro unidirectional-max-delay?
te-types:performance-metric-normality
|   +-ro unidirectional-delay-variation?
te-types:performance-metric-normality
|   +-ro unidirectional-packet-loss?
te-types:performance-metric-normality
|   +-ro unidirectional-residual-bandwidth?
te-types:performance-metric-normality
|   +-ro unidirectional-available-bandwidth?
te-types:performance-metric-normality
|   +-ro unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
+-ro performance-metric-throttle {te-performance-metric}?
  +-ro unidirectional-delay-offset?          uint32
  +-ro measure-interval?                    uint32
  +-ro advertisement-interval?              uint32
  +-ro suppression-interval?                uint32
  +-ro threshold-out
  |   +-ro unidirectional-delay?              uint32
  |   +-ro unidirectional-min-delay?          uint32
  |   +-ro unidirectional-max-delay?          uint32
  |   +-ro unidirectional-delay-variation?    uint32
  |   +-ro unidirectional-packet-loss?        decimal64
  |   +-ro unidirectional-residual-bandwidth? decimal64
  |   +-ro unidirectional-available-bandwidth? decimal64
  |   +-ro unidirectional-utilized-bandwidth? decimal64
  +-ro threshold-in
  |   +-ro unidirectional-delay?              uint32
  |   +-ro unidirectional-min-delay?          uint32
  |   +-ro unidirectional-max-delay?          uint32
  |   +-ro unidirectional-delay-variation?    uint32
  |   +-ro unidirectional-packet-loss?        decimal64
  |   +-ro unidirectional-residual-bandwidth? decimal64
  |   +-ro unidirectional-available-bandwidth? decimal64
  |   +-ro unidirectional-utilized-bandwidth? decimal64
  +-ro threshold-accelerated-advertisement
  |   +-ro unidirectional-delay?              uint32
  |   +-ro unidirectional-min-delay?          uint32
  |   +-ro unidirectional-max-delay?          uint32
  |   +-ro unidirectional-delay-variation?    uint32
  |   +-ro unidirectional-packet-loss?        decimal64
  |   +-ro unidirectional-residual-bandwidth? decimal64
  |   +-ro unidirectional-available-bandwidth? decimal64
  |   +-ro unidirectional-utilized-bandwidth? decimal64
augment /nw:networks/tet:te/tet:templates/tet:link-template/

```

```

tet:te-link-attributes:
  +--rw performance-metric {te-performance-metric}?
    |   +--rw measurement
    |     |   +--rw unidirectional-delay?          uint32
    |     |   +--rw unidirectional-min-delay?       uint32
    |     |   +--rw unidirectional-max-delay?       uint32
    |     |   +--rw unidirectional-delay-variation? uint32
    |     |   +--rw unidirectional-packet-loss?     decimal64
    |     |   +--rw unidirectional-residual-bandwidth? decimal64
    |     |   +--rw unidirectional-available-bandwidth? decimal64
    |     |   +--rw unidirectional-utilized-bandwidth? decimal64
    |   +--rw normality
    |     +--rw unidirectional-delay?
  te-types:performance-metric-normality
    |   +--rw unidirectional-min-delay?
  te-types:performance-metric-normality
    |   +--rw unidirectional-max-delay?
  te-types:performance-metric-normality
    |   +--rw unidirectional-delay-variation?
  te-types:performance-metric-normality
    |   +--rw unidirectional-packet-loss?
  te-types:performance-metric-normality
    |   +--rw unidirectional-residual-bandwidth?
  te-types:performance-metric-normality
    |   +--rw unidirectional-available-bandwidth?
  te-types:performance-metric-normality
    |   +--rw unidirectional-utilized-bandwidth?
  te-types:performance-metric-normality
    +--rw performance-metric-throttle {te-performance-metric}?
      |   +--rw unidirectional-delay-offset?          uint32
      |   +--rw measure-interval?                    uint32
      |   +--rw advertisement-interval?               uint32
      |   +--rw suppression-interval?                 uint32
      |   +--rw threshold-out
      |     |   +--rw unidirectional-delay?          uint32
      |     |   +--rw unidirectional-min-delay?       uint32
      |     |   +--rw unidirectional-max-delay?       uint32
      |     |   +--rw unidirectional-delay-variation? uint32
      |     |   +--rw unidirectional-packet-loss?     decimal64
      |     |   +--rw unidirectional-residual-bandwidth? decimal64
      |     |   +--rw unidirectional-available-bandwidth? decimal64
      |     |   +--rw unidirectional-utilized-bandwidth? decimal64
      |   +--rw threshold-in
      |     |   +--rw unidirectional-delay?          uint32
      |     |   +--rw unidirectional-min-delay?       uint32
      |     |   +--rw unidirectional-max-delay?       uint32
      |     |   +--rw unidirectional-delay-variation? uint32
      |     |   +--rw unidirectional-packet-loss?     decimal64

```

```

    |   +--rw unidirectional-residual-bandwidth?   decimal64
    |   +--rw unidirectional-available-bandwidth?  decimal64
    |   +--rw unidirectional-utilized-bandwidth?   decimal64
+--rw threshold-accelerated-advertisement
    |   +--rw unidirectional-delay?                uint32
    |   +--rw unidirectional-min-delay?            uint32
    |   +--rw unidirectional-max-delay?            uint32
    |   +--rw unidirectional-delay-variation?      uint32
    |   +--rw unidirectional-packet-loss?          decimal64
    |   +--rw unidirectional-residual-bandwidth?   decimal64
    |   +--rw unidirectional-available-bandwidth?  decimal64
    |   +--rw unidirectional-utilized-bandwidth?   decimal64
augment /nw:networks/nw:network/nt:link/tet:te/tet:config/
tet:te-link-attributes:
  +--rw performance-metric {te-performance-metric}?
  |   +--rw measurement
  |   |   +--rw unidirectional-delay?                uint32
  |   |   +--rw unidirectional-min-delay?            uint32
  |   |   +--rw unidirectional-max-delay?            uint32
  |   |   +--rw unidirectional-delay-variation?      uint32
  |   |   +--rw unidirectional-packet-loss?          decimal64
  |   |   +--rw unidirectional-residual-bandwidth?   decimal64
  |   |   +--rw unidirectional-available-bandwidth?  decimal64
  |   |   +--rw unidirectional-utilized-bandwidth?   decimal64
  |   +--rw normality
  |   |   +--rw unidirectional-delay?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-min-delay?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-max-delay?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-delay-variation?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-packet-loss?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-residual-bandwidth?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-available-bandwidth?
  te-types:performance-metric-normality
  |   |   +--rw unidirectional-utilized-bandwidth?
  te-types:performance-metric-normality
  +--rw performance-metric-throttle {te-performance-metric}?
  |   +--rw unidirectional-delay-offset?            uint32
  |   +--rw measure-interval?                      uint32
  |   +--rw advertisement-interval?                uint32
  |   +--rw suppression-interval?                  uint32
  |   +--rw threshold-out
  |   |   +--rw unidirectional-delay?                uint32

```

```

    |   +--rw unidirectional-min-delay?          uint32
    |   +--rw unidirectional-max-delay?          uint32
    |   +--rw unidirectional-delay-variation?     uint32
    |   +--rw unidirectional-packet-loss?         decimal64
    |   +--rw unidirectional-residual-bandwidth?  decimal64
    |   +--rw unidirectional-available-bandwidth? decimal64
    |   +--rw unidirectional-utilized-bandwidth?  decimal64
    +--rw threshold-in
    |   +--rw unidirectional-delay?              uint32
    |   +--rw unidirectional-min-delay?          uint32
    |   +--rw unidirectional-max-delay?          uint32
    |   +--rw unidirectional-delay-variation?     uint32
    |   +--rw unidirectional-packet-loss?         decimal64
    |   +--rw unidirectional-residual-bandwidth?  decimal64
    |   +--rw unidirectional-available-bandwidth? decimal64
    |   +--rw unidirectional-utilized-bandwidth?  decimal64
    +--rw threshold-accelerated-advertisement
    |   +--rw unidirectional-delay?              uint32
    |   +--rw unidirectional-min-delay?          uint32
    |   +--rw unidirectional-max-delay?          uint32
    |   +--rw unidirectional-delay-variation?     uint32
    |   +--rw unidirectional-packet-loss?         decimal64
    |   +--rw unidirectional-residual-bandwidth?  decimal64
    |   +--rw unidirectional-available-bandwidth? decimal64
    |   +--rw unidirectional-utilized-bandwidth?  decimal64
augment /nw:networks/nw:network/nt:link/tet:te/tet:state/
tet:te-link-attributes:
  +--ro performance-metric {te-performance-metric}?
  |   +--ro measurement
  |   |   +--ro unidirectional-delay?          uint32
  |   |   +--ro unidirectional-min-delay?      uint32
  |   |   +--ro unidirectional-max-delay?      uint32
  |   |   +--ro unidirectional-delay-variation? uint32
  |   |   +--ro unidirectional-packet-loss?     decimal64
  |   |   +--ro unidirectional-residual-bandwidth? decimal64
  |   |   +--ro unidirectional-available-bandwidth? decimal64
  |   |   +--ro unidirectional-utilized-bandwidth? decimal64
  |   +--ro normality
  |   |   +--ro unidirectional-delay?          uint32
  te-types:performance-metric-normality
  |   +--ro unidirectional-min-delay?          uint32
  te-types:performance-metric-normality
  |   +--ro unidirectional-max-delay?          uint32
  te-types:performance-metric-normality
  |   +--ro unidirectional-delay-variation?     uint32
  te-types:performance-metric-normality
  |   +--ro unidirectional-packet-loss?         decimal64
  te-types:performance-metric-normality

```

```

    |      +--ro unidirectional-residual-bandwidth?
te-types:performance-metric-normality
    |      +--ro unidirectional-available-bandwidth?
te-types:performance-metric-normality
    |      +--ro unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
    +--ro performance-metric-throttle {te-performance-metric}?
      +--ro unidirectional-delay-offset?          uint32
      +--ro measure-interval?                      uint32
      +--ro advertisement-interval?                uint32
      +--ro suppression-interval?                  uint32
      +--ro threshold-out
        |      +--ro unidirectional-delay?          uint32
        |      +--ro unidirectional-min-delay?      uint32
        |      +--ro unidirectional-max-delay?      uint32
        |      +--ro unidirectional-delay-variation? uint32
        |      +--ro unidirectional-packet-loss?    decimal64
        |      +--ro unidirectional-residual-bandwidth? decimal64
        |      +--ro unidirectional-available-bandwidth? decimal64
        |      +--ro unidirectional-utilized-bandwidth? decimal64
      +--ro threshold-in
        |      +--ro unidirectional-delay?          uint32
        |      +--ro unidirectional-min-delay?      uint32
        |      +--ro unidirectional-max-delay?      uint32
        |      +--ro unidirectional-delay-variation? uint32
        |      +--ro unidirectional-packet-loss?    decimal64
        |      +--ro unidirectional-residual-bandwidth? decimal64
        |      +--ro unidirectional-available-bandwidth? decimal64
        |      +--ro unidirectional-utilized-bandwidth? decimal64
      +--ro threshold-accelerated-advertisement
        |      +--ro unidirectional-delay?          uint32
        |      +--ro unidirectional-min-delay?      uint32
        |      +--ro unidirectional-max-delay?      uint32
        |      +--ro unidirectional-delay-variation? uint32
        |      +--ro unidirectional-packet-loss?    decimal64
        |      +--ro unidirectional-residual-bandwidth? decimal64
        |      +--ro unidirectional-available-bandwidth? decimal64
        |      +--ro unidirectional-utilized-bandwidth? decimal64
augment /nw:networks/nw:network/nt:link/tet:te/tet:state/
tet:information-source-entry:
  +--ro performance-metric {te-performance-metric}?
    |      +--ro measurement
    |      |      +--ro unidirectional-delay?          uint32
    |      |      +--ro unidirectional-min-delay?      uint32
    |      |      +--ro unidirectional-max-delay?      uint32
    |      |      +--ro unidirectional-delay-variation? uint32
    |      |      +--ro unidirectional-packet-loss?    decimal64
    |      |      +--ro unidirectional-residual-bandwidth? decimal64

```

```

    | |   +--ro unidirectional-available-bandwidth?   decimal64
    | |   +--ro unidirectional-utilized-bandwidth?   decimal64
    |   +--ro normality
    |       +--ro unidirectional-delay?
te-types:performance-metric-normality
    |       +--ro unidirectional-min-delay?
te-types:performance-metric-normality
    |       +--ro unidirectional-max-delay?
te-types:performance-metric-normality
    |       +--ro unidirectional-delay-variation?
te-types:performance-metric-normality
    |       +--ro unidirectional-packet-loss?
te-types:performance-metric-normality
    |       +--ro unidirectional-residual-bandwidth?
te-types:performance-metric-normality
    |       +--ro unidirectional-available-bandwidth?
te-types:performance-metric-normality
    |       +--ro unidirectional-utilized-bandwidth?
te-types:performance-metric-normality
    +--ro performance-metric-throttle {te-performance-metric}?
        +--ro unidirectional-delay-offset?           uint32
        +--ro measure-interval?                     uint32
        +--ro advertisement-interval?               uint32
        +--ro suppression-interval?                 uint32
        +--ro threshold-out
            |   +--ro unidirectional-delay?           uint32
            |   +--ro unidirectional-min-delay?       uint32
            |   +--ro unidirectional-max-delay?       uint32
            |   +--ro unidirectional-delay-variation? uint32
            |   +--ro unidirectional-packet-loss?     decimal64
            |   +--ro unidirectional-residual-bandwidth? decimal64
            |   +--ro unidirectional-available-bandwidth? decimal64
            |   +--ro unidirectional-utilized-bandwidth? decimal64
        +--ro threshold-in
            |   +--ro unidirectional-delay?           uint32
            |   +--ro unidirectional-min-delay?       uint32
            |   +--ro unidirectional-max-delay?       uint32
            |   +--ro unidirectional-delay-variation? uint32
            |   +--ro unidirectional-packet-loss?     decimal64
            |   +--ro unidirectional-residual-bandwidth? decimal64
            |   +--ro unidirectional-available-bandwidth? decimal64
            |   +--ro unidirectional-utilized-bandwidth? decimal64
        +--ro threshold-accelerated-advertisement
            +--ro unidirectional-delay?           uint32
            +--ro unidirectional-min-delay?       uint32
            +--ro unidirectional-max-delay?       uint32
            +--ro unidirectional-delay-variation? uint32
            +--ro unidirectional-packet-loss?     decimal64

```

```

        +--ro unidirectional-residual-bandwidth?    decimal64
        +--ro unidirectional-available-bandwidth?    decimal64
        +--ro unidirectional-utilized-bandwidth?     decimal64
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?    decimal64
    +--rw interface-mtu?            uint16
augment /nw:networks/nw:network/nt:link/tet:te/tet:config/
tet:te-link-attributes/tet:interface-switching-capability:
  +--rw packet-switch-capable
    +--rw minimum-lsp-bandwidth?    decimal64
    +--rw interface-mtu?            uint16
augment /nw:networks/nw:network/nt:link/tet:te/tet:state/
tet:te-link-attributes/tet:interface-switching-capability:
  +--ro packet-switch-capable
    +--ro minimum-lsp-bandwidth?    decimal64
    +--ro interface-mtu?            uint16
augment /nw:networks/nw:network/nt:link/tet:te/tet:state/
tet:information-source-entry/tet:interface-switching-capability:
  +--ro packet-switch-capable
    +--ro minimum-lsp-bandwidth?    decimal64
    +--ro interface-mtu?            uint16

```

4. YANG Modules

4.1. Layer 3 TE Topology Module

```

<CODE BEGINS> file "ietf-l3-te-topology@2016-10-28.yang"
module ietf-l3-te-topology {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-l3-te-topology";
  prefix "l3tet";

  import ietf-network {
    prefix "nw";
  }
  import ietf-network-topology {
    prefix "nt";
  }
  import ietf-l3-unicast-topology {
    prefix "l3t";
  }
  import ietf-te-topology {
    prefix "tet";
  }

```



```
}

organization "TBD";
contact "TBD";
description "L3 TE Topology model";

revision 2016-10-28 {

    description "Initial revision";
    reference "TBD";
}

grouping l3-te-topology-type {
    description
        "Identifies the L3 TE topology type.";
    container l3-te {
        presence "indicates L3 TE Topology";
        description
            "Its presence identifies the L3 TE topology type.";
    }
}

augment "/nw:networks/nw:network/nw:network-types/"
+ "l3t:l3-unicast-topology" {
    description
        "Defines the L3 TE topology type.";
    uses l3-te-topology-type;
}

augment "/nw:networks/nw:network/l3t:l3-topology-attributes" {
    when "../nw:network-types/l3t:l3-unicast-topology/l3-te" {
        description "Augment only for L3 TE topology";
    }
    description "Augment topology configuration";
    uses l3-te-topology-attributes;
}

augment "/nw:networks/nw:network/nw:node/l3t:l3-node-attributes" {
    when "../nw:network-types/l3t:l3-unicast-topology/l3-te" {
        description "Augment only for L3 TE topology";
    }
    description "Augment node configuration";
    uses l3-te-node-attributes;
}

augment "/nw:networks/nw:network/nw:node/nt:termination-point/"
+ "l3t:l3-termination-point-attributes" {
    when "../nw:network-types/l3t:l3-unicast-topology/"
```

```
    + "l3-te" {
      description "Augment only for L3 TE topology";
    }
    description "Augment termination point configuration";
    uses l3-te-tp-attributes;
  }

augment "/nw:networks/nw:network/nt:link/l3t:l3-link-attributes" {
  when "../nw:network-types/l3t:l3-unicast-topology/l3-te" {
    description "Augment only for L3 TE topology";
  }
  description "Augment link configuration";
  uses l3-te-link-attributes;
}

grouping l3-te-topology-attributes {
  description "L3 TE topology scope attributes";
  container l3-te-topology-attributes {
    must "/nw:networks/nw:network"
      + "[nw:network-id = current()/network-ref]/nw:network-types/"
      + "tet:te-topology" {
      error-message
        "The referenced network must be a TE topology.";
      description
        "The referenced network must be a TE topology.";
    }
    description "Containing TE topology references";
    uses nw:network-ref;
  } // l3-te-topology-attributes
} // l3-te-topology-attributes

grouping l3-te-node-attributes {
  description "L3 TE node scope attributes";
  container l3-te-node-attributes {
    must "/nw:networks/nw:network"
      + "[nw:network-id = current()/network-ref]/nw:network-types/"
      + "tet:te-topology" {
      error-message
        "The referenced network must be a TE topology.";
      description
        "The referenced network must be a TE topology.";
    }
    description "Containing TE node references";
    uses nw:node-ref;
  } // l3-te
} // l3-te-node-attributes

grouping l3-te-tp-attributes {
```

```

description "L3 TE termination point scope attributes";
container l3-te-tp-attributes {
  must "/nw:networks/nw:network"
    + "[nw:network-id = current()/network-ref]/nw:network-types/"
    + "tet:te-topology" {
    error-message
      "The referenced network must be a TE topology.";
    description
      "The referenced network must be a TE topology.";
  }
  description "Containing TE termination point references";
  uses nt:tp-ref;
} // l3-te
} // l3-te-tp-attributes

grouping l3-te-link-attributes {
  description "L3 TE link scope attributes";
  container l3-te-link-attributes {
    must "/nw:networks/nw:network"
      + "[nw:network-id = current()/network-ref]/nw:network-types/"
      + "tet:te-topology" {
      error-message
        "The referenced network must be a TE topology.";
      description
        "The referenced network must be a TE topology.";
    }
    description "Containing TE link references";
    uses nt:link-ref;
  }
} // l3-te-link-attributes
}
<CODE ENDS>

```

4.2. Packet Switching TE Topology Module

```

<CODE BEGINS> file "ietf-te-topology-packet@2016-10-28.yang"
module ietf-te-topology-packet {
  yang-version 1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-te-topology-packet";

  prefix "tet-pkt";

  import ietf-network {
    prefix "nw";
  }
}

```

```
import ietf-network-topology {
  prefix "nt";
}

import ietf-te-topology {
  prefix "tet";
}

import ietf-te-types {
  prefix "te-types";
}

organization
  "Traffic Engineering Architecture and Signaling (TEAS)
  Working Group";

contact
  "WG Web:    <http://tools.ietf.org/wg/teas/>
  WG List:    <mailto:teas@ietf.org>

  WG Chair:   Lou Berger
               <mailto:lberger@labn.net>

  WG Chair:   Vishnu Pavan Beeram
               <mailto:vbeeram@juniper.net>

  Editors:    Xufeng Liu
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               <mailto:vbeeram@juniper.net>

               Tarek Saad
               <mailto:tsaad@cisco.com>

               Himanshu Shah
               <mailto:hshah@ciena.com>

               Oscar Gonzalez De Dios
               <mailto:oscar.gonzalezdedios@telefonica.com>";

description "TE topology model";

revision 2016-10-28 {
  description "Initial revision";
```

```
    reference "TBD";
}

/*
 * Features
 */

feature te-performance-metric {
  description
    "This feature indicates that the system supports
    TE performance metric.";
  reference
    "RFC7471: OSPF Traffic Engineering (TE) Metric Extensions.
    RFC7810: IS-IS Traffic Engineering (TE) Metric Extensions.
    RFC7823: Performance-Based Path Selection for Explicitly
    Routed Label Switched Paths (LSPs) Using TE Metric
    Extensions";
}

/*
 * Groupings
 */
grouping packet-switch-capable-container {
  description
    "The container of packet switch capable attributes.";
  container packet-switch-capable {
    description
      "Interface has packet-switching capabilities.";
    leaf minimum-lsp-bandwidth {
      type decimal64 {
        fraction-digits 2;
      }
      description
        "Minimum LSP Bandwidth. Units in bytes per second";
    }
    leaf interface-mtu {
      type uint16;
      description
        "Interface MTU.";
    }
  }
}

grouping performance-metric-attributes {
  description
    "Link performance information in real time.";
  reference
    "RFC7471: OSPF Traffic Engineering (TE) Metric Extensions.
```

```
    RFC7810: IS-IS Traffic Engineering (TE) Metric Extensions.
    RFC7823: Performance-Based Path Selection for Explicitly
    Routed Label Switched Paths (LSPs) Using TE Metric
    Extensions";
leaf unidirectional-delay {
  type uint32 {
    range 0..16777215;
  }
  description "Delay or latency in micro seconds.";
}
leaf unidirectional-min-delay {
  type uint32 {
    range 0..16777215;
  }
  description "Minimum delay or latency in micro seconds.";
}
leaf unidirectional-max-delay {
  type uint32 {
    range 0..16777215;
  }
  description "Maximum delay or latency in micro seconds.";
}
leaf unidirectional-delay-variation {
  type uint32 {
    range 0..16777215;
  }
  description "Delay variation in micro seconds.";
}
leaf unidirectional-packet-loss {
  type decimal64 {
    fraction-digits 6;
    range "0 .. 50.331642";
  }
  description
    "Packet loss as a percentage of the total traffic sent
    over a configurable interval. The finest precision is
    0.000003%.";
}
leaf unidirectional-residual-bandwidth {
  type decimal64 {
    fraction-digits 2;
  }
  description
    "Residual bandwidth that subtracts tunnel
    reservations from Maximum Bandwidth (or link capacity)
    [RFC3630] and provides an aggregated remainder across QoS
    classes.";
}
```

```
leaf unidirectional-available-bandwidth {
  type decimal64 {
    fraction-digits 2;
  }
  description
    "Available bandwidth that is defined to be residual
    bandwidth minus the measured bandwidth used for the
    actual forwarding of non-RSVP-TE LSP packets. For a
    bundled link, available bandwidth is defined to be the
    sum of the component link available bandwidths.";
}
leaf unidirectional-utilized-bandwidth {
  type decimal64 {
    fraction-digits 2;
  }
  description
    "Bandwidth utilization that represents the actual
    utilization of the link (i.e. as measured in the router).
    For a bundled link, bandwidth utilization is defined to
    be the sum of the component link bandwidth
    utilizations.";
}
} // performance-metric-attributes

grouping performance-metric-container {
  description
    "A container containing performance metric attributes.";
  container performance-metric {
    if-feature te-performance-metric;
    description
      "Link performance information in real time.";
    reference
      "RFC7471: OSPF Traffic Engineering (TE) Metric Extensions.
      RFC7810: IS-IS Traffic Engineering (TE) Metric Extensions.
      RFC7823: Performance-Based Path Selection for Explicitly
      Routed Label Switched Paths (LSPs) Using TE Metric
      Extensions";
    container measurement {
      description
        "Measured performance metric values. Static configuration
        and manual overrides of these measurements are also
        allowed.";
      uses performance-metric-attributes;
    }
    container normality
    {
      description
        "Performance metric normality values.";
```

```
        uses performance-metric-normality-attributes;
    }
} // performance-metric-container

grouping performance-metric-normality-attributes {
  description
    "Link performance metric normality attributes.";
  reference
    "RFC7471: OSPF Traffic Engineering (TE) Metric Extensions.
     RFC7810: IS-IS Traffic Engineering (TE) Metric Extensions.
     RFC7823: Performance-Based Path Selection for Explicitly
     Routed Label Switched Paths (LSPs) Using TE Metric
     Extensions";
  leaf unidirectional-delay {
    type te-types:performance-metric-normality;
    description "Delay normality.";
  }
  leaf unidirectional-min-delay {
    type te-types:performance-metric-normality;
    description "Minimum delay or latency normality.";
  }
  leaf unidirectional-max-delay {
    type te-types:performance-metric-normality;
    description "Maximum delay or latency normality.";
  }
  leaf unidirectional-delay-variation {
    type te-types:performance-metric-normality;
    description "Delay variation normality.";
  }
  leaf unidirectional-packet-loss {
    type te-types:performance-metric-normality;
    description "Packet loss normality.";
  }
  leaf unidirectional-residual-bandwidth {
    type te-types:performance-metric-normality;
    description "Residual bandwidth normality.";
  }
  leaf unidirectional-available-bandwidth {
    type te-types:performance-metric-normality;
    description "Available bandwidth normality.";
  }
  leaf unidirectional-utilized-bandwidth {
    type te-types:performance-metric-normality;
    description "Bandwidth utilization normality.";
  }
} // performance-metric-normality-attributes
```



```
grouping performance-metric-throttle-container {
  description
    "A container controlling performance metric throttle.";
  container performance-metric-throttle {
    if-feature te-performance-metric;
    must "suppression-interval >= measure-interval" {
      error-message
        "suppression-interval cannot be less than
        measure-interval.";
      description
        "Constraint on suppression-interval and
        measure-interval.";
    }
  }
  description
    "Link performance information in real time.";
  reference
    "RFC7471: OSPF Traffic Engineering (TE) Metric Extensions.
    RFC7810: IS-IS Traffic Engineering (TE) Metric Extensions.
    RFC7823: Performance-Based Path Selection for Explicitly
    Routed Label Switched Paths (LSPs) Using TE Metric
    Extensions";
  leaf unidirectional-delay-offset {
    type uint32 {
      range 0..16777215;
    }
    description
      "Offset value to be added to the measured delay value.";
  }
  leaf measure-interval {
    type uint32;
    default 30;
    description
      "Interval in seconds to measure the extended metric
      values.";
  }
  leaf advertisement-interval {
    type uint32;
    description
      "Interval in seconds to advertise the extended metric
      values.";
  }
  leaf suppression-interval {
    type uint32 {
      range "1 .. max";
    }
    default 120;
    description
      "Interval in seconds to suppress advertising the extended
```

```

        metric values.";
    }
    container threshold-out {
        uses performance-metric-attributes;
        description
            "If the measured parameter falls outside an upper bound
            for all but the min delay metric (or lower bound for
            min-delay metric only) and the advertised value is not
            already outside that bound, anomalous announcement will be
            triggered.";
    }
    container threshold-in {
        uses performance-metric-attributes;
        description
            "If the measured parameter falls inside an upper bound
            for all but the min delay metric (or lower bound for
            min-delay metric only) and the advertised value is not
            already inside that bound, normal (anomalous-flag cleared)
            announcement will be triggered.";
    }
    container threshold-accelerated-advertisement {
        description
            "When the difference between the last advertised value and
            current measured value exceed this threshold, anomalous
            announcement will be triggered.";
        uses performance-metric-attributes;
    }
}
} // performance-metric-throttle-container

/*
 * Augmentations
 */
/* Augmentations to connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/tet:config/"
    + "tet:te-node-attributes/tet:connectivity-matrix" {
    description
        "Parameters for PSC TE topology.";
    uses performance-metric-container;
    uses performance-metric-throttle-container;
}

augment "/nw:networks/nw:network/nw:node/tet:te/tet:state/"
    + "tet:te-node-attributes/tet:connectivity-matrix" {
    description
        "Parameters for PSC TE topology.";
    uses performance-metric-container;
    uses performance-metric-throttle-container;
}

```

```
}

augment "/nw:networks/nw:network/nw:node/tet:te/tet:state/"
  + "tet:information-source-entry/tet:connectivity-matrix" {
  description
    "Parameters for PSC TE topology.";
  uses performance-metric-container;
  uses performance-metric-throttle-container;
}

/* Augmentations to tunnel-termination-point */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/tet:config/"
  + "tet:local-link-connectivity" {
  description
    "Parameters for PSC TE topology.";
  uses performance-metric-container;
  uses performance-metric-throttle-container;
}

augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/tet:state/"
  + "tet:local-link-connectivity" {
  description
    "Parameters for PSC TE topology.";
  uses performance-metric-container;
  uses performance-metric-throttle-container;
}

/* Augmentations to te-link-attributes */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes" {
  when "tet:interface-switching-capability "
    + "[tet:switching-capability = 'switching-psc1']" {
    description "Valid only for PSC";
  }
  description
    "Parameters for PSC TE topology.";
  uses performance-metric-container;
  uses performance-metric-throttle-container;
}

augment "/nw:networks/nw:network/nt:link/tet:te/tet:config/"
  + "tet:te-link-attributes" {
  when "tet:interface-switching-capability "
    + "[tet:switching-capability = 'switching-psc1']" {
    description "Valid only for PSC";
  }
}
```

```

    description
      "Parameters for PSC TE topology.";
    uses performance-metric-container;
    uses performance-metric-throttle-container;
  }

  augment "/nw:networks/nw:network/nt:link/tet:te/tet:state/"
    + "tet:te-link-attributes" {
    when "tet:interface-switching-capability "
      + "[tet:switching-capability = 'switching-psc1']" {
      description "Valid only for PSC";
    }
    description
      "Parameters for PSC TE topology.";
    uses performance-metric-container;
    uses performance-metric-throttle-container;
  }

  augment "/nw:networks/nw:network/nt:link/tet:te/tet:state/"
    + "tet:information-source-entry" {
    when "tet:interface-switching-capability "
      + "[tet:switching-capability = 'switching-psc1']" {
      description "Valid only for PSC";
    }
    description
      "Parameters for PSC TE topology.";
    uses performance-metric-container;
    uses performance-metric-throttle-container;
  }

  /* Augmentations to interface-switching-capability */
  augment "/nw:networks/tet:te/tet:templates/"
    + "tet:link-template/tet:te-link-attributes/"
    + "tet:interface-switching-capability" {
    when "tet:switching-capability = 'switching-psc1' " {
      description "Valid only for PSC";
    }
    description
      "Parameters for PSC TE topology.";
    uses packet-switch-capable-container;
  }

  augment "/nw:networks/nw:network/nt:link/tet:te/tet:config/"
    + "tet:te-link-attributes/"
    + "tet:interface-switching-capability" {
    when "tet:switching-capability = 'switching-psc1' " {
      description "Valid only for PSC";
    }
  }

```

```
    description
      "Parameters for PSC TE topology.";
    uses packet-switch-capable-container;
  }

  augment "/nw:networks/nw:network/nt:link/tet:te/tet:state/"
    + "tet:te-link-attributes/"
    + "tet:interface-switching-capability" {
    when "tet:switching-capability = 'switching-pscl' " {
      description "Valid only for PSC";
    }
    description
      "Parameters for PSC TE topology.";
    uses packet-switch-capable-container;
  }

  augment "/nw:networks/nw:network/nt:link/tet:te/tet:state/"
    + "tet:information-source-entry/"
    + "tet:interface-switching-capability" {
    when "tet:switching-capability = 'switching-pscl' " {
      description "Valid only for PSC";
    }
    description
      "Parameters for PSC TE topology.";
    uses packet-switch-capable-container;
  }
}
<CODE ENDS>
```

5. IANA Considerations

RFC Ed.: In this section, replace all occurrences of 'XXXX' with the actual RFC number (and remove this note).

This document registers the following namespace URIs in the IETF XML registry [RFC3688]:

```
-----
URI: urn:ietf:params:xml:ns:yang:ietf-l3-te-topology
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.
-----
```

```
-----  
URI: urn:ietf:params:xml:ns:yang:ietf-te-topology-packet  
Registrant Contact: The IESG.  
XML: N/A, the requested URI is an XML namespace.  
-----
```

This document registers the following YANG modules in the YANG Module Names registry [RFC6020]:

```
-----  
name:          ietf-l3-te-topology  
namespace:     urn:ietf:params:xml:ns:yang:ietf-l3-te-topology  
prefix:        l3te  
reference:     RFC XXXX  
-----  
  
-----  
name:          ietf-te-topology-packet  
namespace:     urn:ietf:params:xml:ns:yang:ietf-te-topology-packet  
prefix:        tet-pkt  
reference:     RFC XXXX  
-----
```

6. Security Considerations

The configuration, state, action and notification data defined in this document are designed to be accessed via the NETCONF protocol [RFC6241]. The data-model by itself does not create any security implications. The security considerations for the NETCONF protocol are applicable. The NETCONF protocol used for sending the data supports authentication and encryption.

7. References

7.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC6021] Schoenwaelder, J., Ed., "Common YANG Data Types", RFC 6021, DOI 10.17487/RFC6021, October 2010, <<http://www.rfc-editor.org/info/rfc6021>>.
- [RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", RFC 7950, DOI 10.17487/RFC7950, August 2016, <<http://www.rfc-editor.org/info/rfc7950>>.

7.2. Informative References

[I-D.ietf-i2rs-yang-l3-topology]

Clemm, A., Medved, J., Varga, R., Tkacik, T., Liu, X., Bryskin, I., Guo, A., Ananthakrishnan, H., Bahadur, N., and V. Beeram, "A YANG Data Model for Layer 3 Topologies", draft-ietf-i2rs-yang-l3-topology-04 (work in progress), September 2016.

[I-D.ietf-teas-yang-te-topo]

Liu, X., Bryskin, I., Beeram, V., Saad, T., Shah, H., and O. Dios, "YANG Data Model for TE Topologies", draft-ietf-teas-yang-te-topo-06 (work in progress), October 2016.

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