

Yang Data Model for TE Topologies

draft-ietf-teas-yang-te-topo-04

Github: <https://github.com/ietf-mpls-yang/te/blob/master/ietf-te-topology.yang>

Xufeng Liu (Ericsson)

Vishnu Pavan Beeram (Juniper Networks)

Igor Bryskin (Huawei Technologies)

Tarek Saad (Cisco)

Himanshu Shah (Ciena)

Oscar Gonzalez De Dios (Telefonica)

Contributors:

Sergio Belotti (Alcatel-Lucent)

Diete Beller (Alcatel-Lucent)

Summary of Changes

- Alignment with new I2RS network topology model (version 2015-12-09).
- Submitted separate draft for schedule.
- Split the packet attributes to an augmentation module.
- In node, added alt-information-sources.
- Support for request containing multiple topologies from client to provider. Added an attribute "preference" in topology.
- Alignment with L3 network topology model.
- Worked with TE Yang model DT to align TE Tunnel modeling.
- Added support for tunnel termination point.

Alignment with New I2RS Network Topology Model

```

module: ietf-network
  +--rw networks
  |   +--rw network* [network-id]
  |   |   +--rw network-types
  |   |   +--rw network-id          network-id
  |   |   +--rw supporting-network* [network-ref]
  |   |   |   +--rw network-ref    leafref
  |   |   +--rw node* [node-id]
  |   |   |   +--rw node-id        node-id
  |   |   |   +--rw supporting-node* [network-ref node-ref]
  |   |   |   |   +--rw network-ref    leafref
  |   |   |   |   +--rw node-ref      leafref
  |   |
  |   +--rw node-id          node-id
  |   +--rw supporting-node* [network-ref node-ref]
  |   |   +--rw network-ref    leafref
  |   |   +--rw node-ref      leafref
  |
  +--rw node-id          node-id
  +--rw supporting-node* [network-ref node-ref]
  |   +--rw network-ref    leafref
  |   +--rw node-ref      leafref

```

```

augment /nw:networks:
  +--rw te!
  +--rw templates
augment /nw:networks/nw:network:
  +--rw te!
  +--rw provider-id      te-global-id
  +--rw client-id        te-global-id
  +--rw te-topology-id   te-topology-id
  +--rw config
  +--ro state
augment /nw:networks/nw:network/nw:node:
  +--rw te!
  +--rw te-node-id       te-node-id
  +--rw config
  +--ro state
augment /nw:networks/nw:network/nt:link:
  +--rw te!
  +--rw config
  +--ro state

```

Submitted Separate Draft for Schedule

- Submitted draft-liu-netmod-yang-schedule-00
 - Has wider applicability.
 - Will present it to Netmod working group.

Split the Packet Attributes to an Augmentation Module

- Base TE Topology Model Is Technology Agnostic
 - Packet switching model augments base model.
 - Packet switching model covers packet switch attributes.

```

module: ietf-te-topology-psc
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:alt-information-
sources/tet:interface-switching-capability:
  +--ro packet-switch-capable
    +--ro minimum-lsp-bandwidth?   decimal64
    +--ro interface-mtu?           uint16
augment /tet:te-link-event/tet:te-link-attributes/tet:interface-switching-capability:
  +---- packet-switch-capable
    +---- minimum-lsp-bandwidth?   decimal64
    +---- interface-mtu?           uint16

```

In Node, Added alt-information-sources

```
augment /nw:networks/nw:network/nw:node:
  +--rw te!
    +--ro state
      | +--ro information-source?          enumeration
      | +--ro information-source-state
      | | +--ro credibility-preference?    uint16
      | | +--ro topology
      | | | +--ro provider-id-ref?         leafref
      | | | +--ro client-id-ref?          leafref
      | | | +--ro te-topology-id-ref?     leafref
      | | | +--ro network-id-ref?         leafref
      | | +--ro routing-instance?         string
      | +--ro alt-information-sources* [information-source]
```

Support for Request Containing Multiple Topologies from Client to Provider

- Added an attribute "preference" in topology.

```
module: ietf-te-topology
augment /nw:networks/nw:network:
  +--rw te!
    +--rw config
      | +--rw preference?   uint8
```

Alignment with L3 Network Topology Model

- Submitted separate draft
draft-liu-teas-yang-l3-te-topo-00.

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

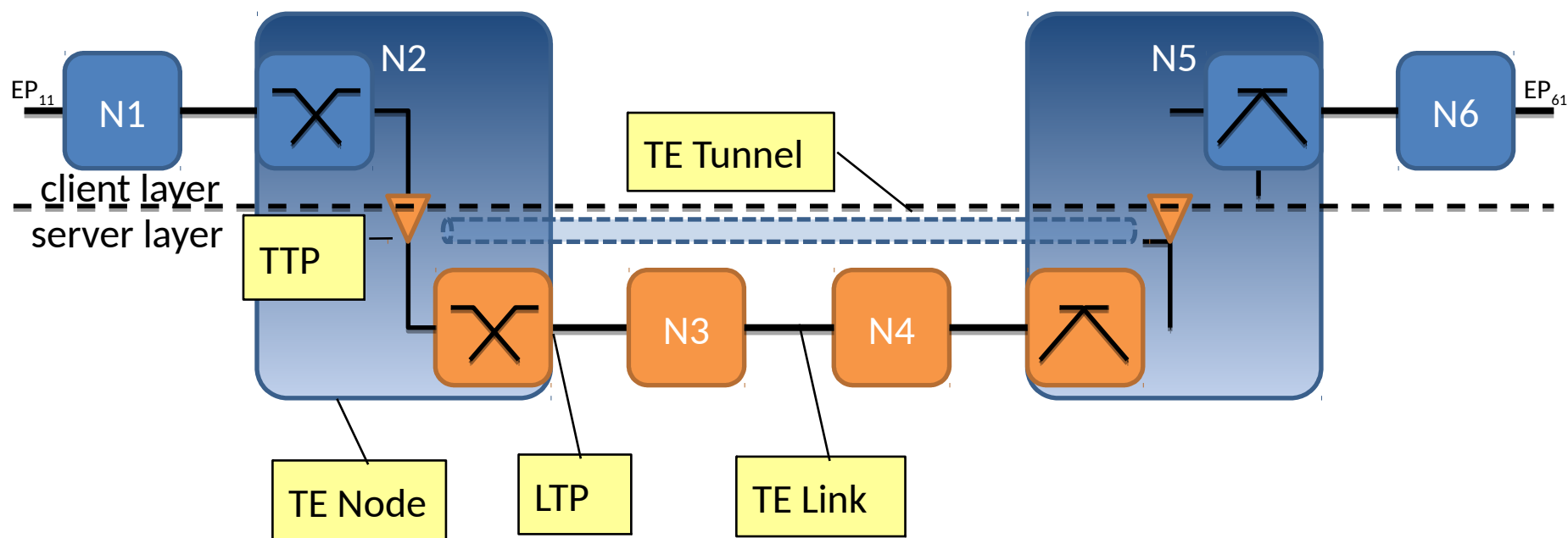

Worked with TE Yang Model DT to Align TE Tunnel Modeling

- Both models can be on either device or controller.
- Both models share the same terminologies and types.
- Both models cross reference each other whenever needed.

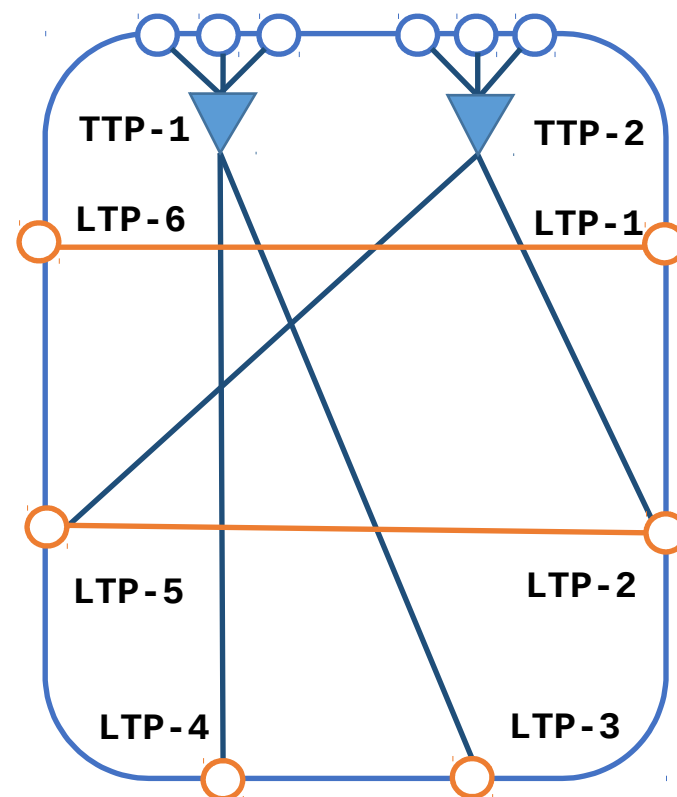
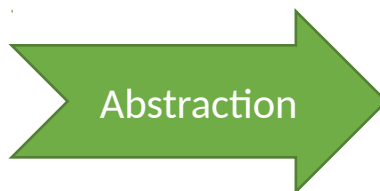
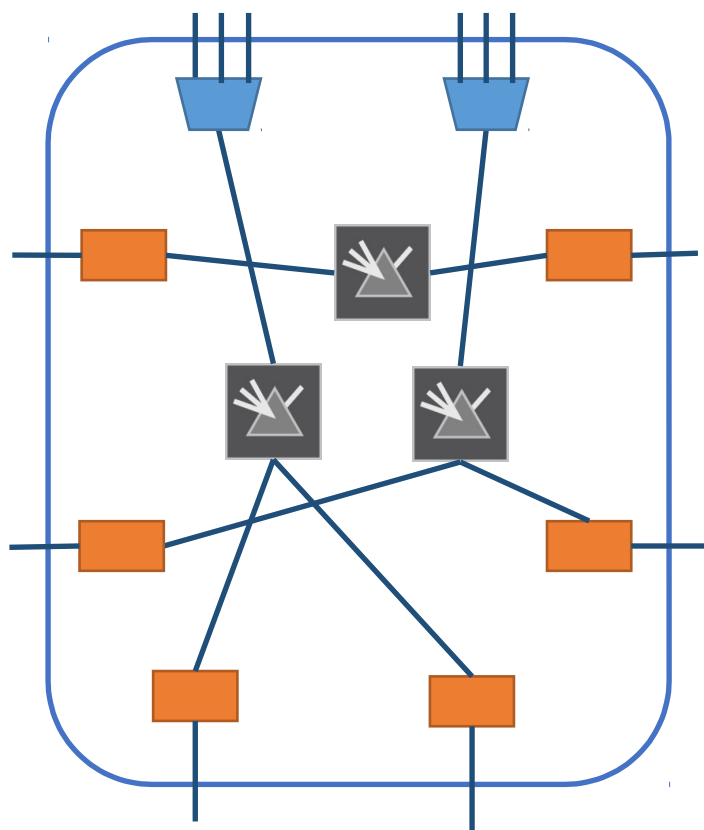
Support for Tunnel Termination Point

```
module: ietf-te-topology
augment /nw:networks/nw:network/nw:node:
  +--rw te!
    +--rw te-node-id          te-node-id
    +--rw tunnel-termination-point* [tunnel-tp-id]
      +--rw tunnel-tp-id      binary
      +--ro state
        +--ro switching-capability?      identityref
        +--ro encoding?                  identityref
        +--ro termination-capability* [link-tp]
          +--ro link-tp      leafref
```

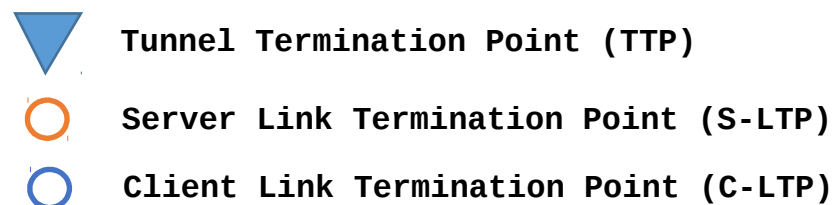
Modeling Abstractions



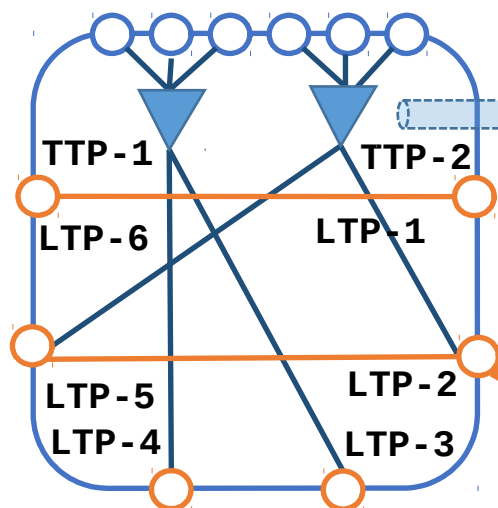
Modeling Abstractions



Modeling Abstractions

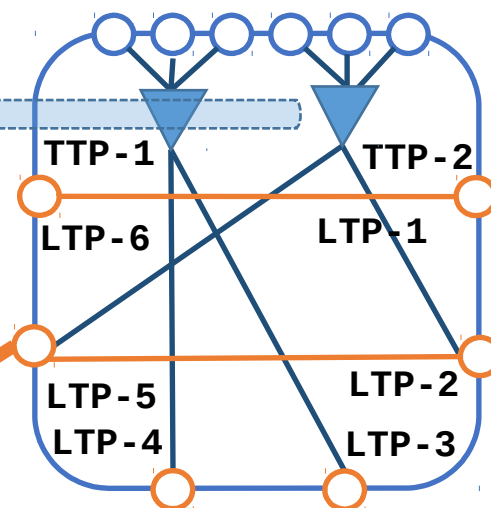


Node - 1

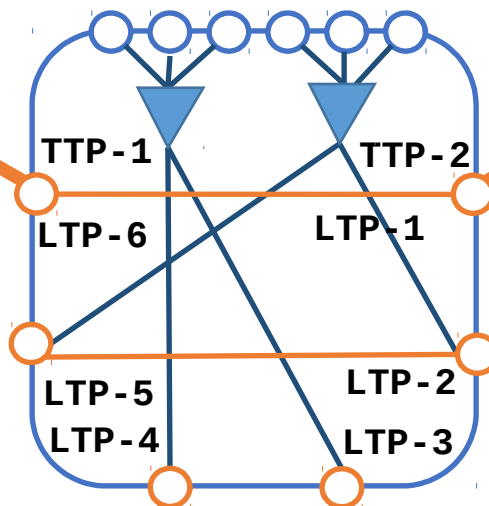


TE-Tunnel-1

Node - 3



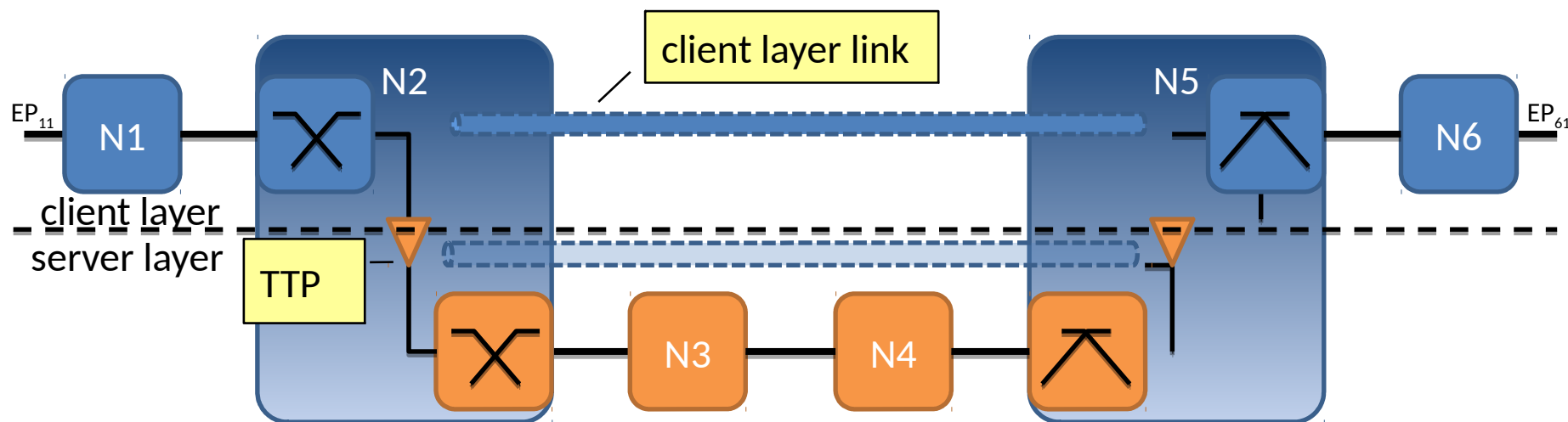
Node - 2



Link - 12

Link - 23

Multi-layer Transformations



- Working in progress.
- There are two approaches:
 - Transition-link
 - Inter-layer lock
- The model can support both.

Next Steps

- Address review comments.
 - To Do List:
 - <https://github.com/ietf-mpls-yang/te/blob/master/ietf-te-topology-todo-list.txt>
- Request further review.