Profiles for TE Topology Model

TEAS WG, IETF111, Virtual Meeting

draft-busi-teas-te-topology-profiles-02

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Motivation

• Multiple similar discussions in IETF working groups
  – Scenario: non-TE networks
  – Requirement: sub-set TE Topology attributes

• TE Topology Model (RFC8795) looks very complex at the first glance
  – Extensive model to support many features
    • Some applicable only to TE networks
    • Others applicable to both TE and non-TE networks
  – Most of the features/attributes are optional

• Clarify that a sub-set (profile) of TE Topology can be used in specific scenarios (including non-TE use cases)
Examples of non-TE scenarios

• UNI Topology Discovery
• Administrative and Operational State
• Geolocation
• Overlay and Underlay Topology
• Nodes with switching limitations
Technology-specific Augmentations

Option 1
(single inheritance)

Network

Network Topology

TE Topology (profile)

Technology-specific
TE Topology

Option 2
(multi-inheritance)

Network

Network Topology

TE Topology (profile)

Technology-specific
Network Topology
Changes from IETF 110

• Added new section 3.1 about multi-inheritance
  – There is not a detailed description of the multi-inheritance capability of RFC8345
  – Authors/contributors believe this document could be a common reference for other drafts using multi-inheritance

• Added new section 4 about reporting to the client the profiles implemented by a server
  – More investigation needed based on the feedbacks from Netmod WG:
    [https://mailarchive.ietf.org/arch/msg/netmod/8wsAyGazqi7KqgFHz9VK-7vuzHc/](https://mailarchive.ietf.org/arch/msg/netmod/8wsAyGazqi7KqgFHz9VK-7vuzHc/)

• Git: [https://github.com/tsaad-dev/te](https://github.com/tsaad-dev/te)
  – Written in kramdown
Next Step

• Advertising this draft to other WGs
• Update the title as suggested by Daniele
  – Profiles for TE Topology Data Model and applicability to non TE use cases
• Get more review and feedbacks
  – Address the open issues and any comments
• Authors/contributors believe it would be valuable to progress this work as an Informational RFC
  – Ready for TEAS WG adoption
Backup
module: ietf-te-topology
  augment /nw:networks/nw:network/nw:network-types:
    +-rw te-topology!
  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +-rw te-tp-id?   te-types:te-tp-id
    +-rw te!
      +-rw admin-status?
      |    te-types:te-admin-status
      +-rw inter-domain-plug-id?   binary
      +-ro oper-status?   te-types:te-oper-status
Administrative and Operational State

module: ietf-te-topology
augment /nw:networks/nw:network/nw:network-types:
  +--rw te-topology!
augment /nw:networks/nw:network:
  +--rw te-topology-identifier
    |  +--rw provider-id?  te-global-id
    |  +--rw client-id?    te-global-id
    |  +--rw topology-id?  te-topology-id
  +--rw te!
    +--rw name?                string
augment /nw:networks/nw:network/nw:node:
  +--rw te-node-id?  te-types:te-node-id
  +--rw te!
    +--rw te-node-attributes
      |  +--rw admin-status?    te-types:te-admin-status
      |  +--rw name?            string
    +--ro oper-status?        te-types:te-oper-status
augment /nw:networks/nw:network/nt:link:
  +--rw te!
    +--rw te-link-attributes
      |  +--rw name?            string
      |  +--rw admin-status?    te-types:te-admin-status
    +--ro oper-status?        te-types:te-oper-status
augment /nw:networks/nw:network/nw:node/nt:termination-point:
  +--rw te-tp-id?  te-types:te-tp-id
  +--rw te!
    +--rw admin-status?    te-types:te-admin-status
    +--rw name?            string
    +--ro oper-status?      te-types:te-oper-status
Geolocation

module: ietf-te-topology
augment /nw:networks/nw:network/nw:network-types:
  +-rw te-topology!
augment /nw:networks/nw:network:
  +-rw te-topology-identifier
    |  +-rw provider-id?   te-global-id
    |  +-rw client-id?     te-global-id
    |  +-rw topology-id?   te-topology-id
    +-rw te!
      --ro geolocation
      --ro altitude?     int64
      --ro latitude?     geographic-coordinate-degree
      --ro longitude?    geographic-coordinate-degree
augment /nw:networks/nw:network/nw:node:
  +-rw te-node-id?   te-types:te-node-id
  +-rw te!
    --ro geolocation
    --ro altitude?     int64
    --ro latitude?     geographic-coordinate-degree
    --ro longitude?    geographic-coordinate-degree
augment /nw:networks/nw:network/nw:node/nt:termination-point:
  +-rw te-tp-id?     te-types:te-tp-id
  +-rw te!
    --ro geolocation
    --ro altitude?     int64
    --ro latitude?     geographic-coordinate-degree
    --ro longitude?    geographic-coordinate-degree
Overlay and Underlay Topology

module: ietf-te-topology

augment /nw:networks/nw:network/nw:network-types:
    +-rw te-topology!

augment /nw:networks/nw:network/nw:node:
    +-rw te-node-id? te-types:te-node-id
    +-rw te!
    +-rw te-node-attributes
        +-rw underlay-topology {te-topology-hierarchy}?

augment /nw:networks/nw:network/nt:link:
    +-rw te!
    +-rw te-link-attributes
        +-rw underlay {te-topology-hierarchy}?
        +-rw enabled? boolean
        +-rw primary-path
            +-rw network-ref?
            +-rw path-element* [path-element-id]
                +-rw path-element-id uint32
        +-rw (type)?
            +-rw:(numbered-link-hop)
        +-rw:(unnumbered-link-hop)
            +-rw link-tp-id te-tp-id
            +-rw hop-type? te-hop-type
            +-rw direction? te-link-direction
Nodes with switching limitations

module: ietf-te-topology
augment /nw:networks/nw:network/nw:network-types:
  +-rw te-topology!

augment /nw:networks/nw:network/nw:node:
  +-rw te-node-id?  te-types:te-node-id
  +-rw te!
    +-rw te-node-attributes
      +-rw connectivity-matrices
        +-rw number-of-entries?  uint16
        +-rw is-allowed?         boolean
        +-rw connectivity-matrix* [id]
          +-rw id               uint32
          +-rw from
            |   +-rw tp-ref?        leafref
          +-rw to
            |   +-rw tp-ref?        leafref
          +-rw is-allowed?       boolean
Technology-specific Augmentations
Option 1

Augments Network Topology:
- Nodes
- Links
- Termination Points (TPs)

Augment also TE Topology:
- Bandwidth
- Tunnel Termination Points (TTPs)
- Connectivity Matrix
Technology-specific Augmentations
Option 2

Network

Network Topology

TE Topology (profile)

Technology-specific Network Topology

Augments only Network Topology
- Nodes
- Links
- Termination Points (TPs)
Technology-specific Augmentations
Option 3

Network

Network Topology

TE Topology (profile)

Technology-specific Network Topology

Technology-specific TE Topology

Augments only Network Topology
- Nodes
- Links
- Termination Points (TPs)

References

No advantages compared to Option 1
Useful only if the Technology-specific Network Topology already exists

Augment only TE Topology:
- Bandwidth
- Tunnel Termination Points (TTPs)
- Connectivity Matrix
Example: Technology-specific Augmentations (Link)

```bash
+--rw link* [link-id]
  +--rw link-id link-id
  <...>
  +--rw example-link-attributes // augment TE (Option 1) OR
  |  <...> // augment NT (Option 2 or 3)
  +--rw te!
    +--rw te-link-attributes
    +--rw name? string
    +--rw example-te-link-attributes // augment TE (Option 1 or 3)
    |  <...>
    +--rw max-link-bandwidth
      +--rw te-bandwidth
      +--rw (technology)?
      +--:(generic)
      |  +--rw generic? te-bandwidth
      +--:(foo) // augment TE (Option 1 or 3)
      +--rw foo? foo-bandwidth
```