IETF Network Slice Topology YANG Data Model

draft-liu-teas-transport-network-slice-yang-06

Co-authors:

Xufeng Liu (IBM)  
Jeff Tantsura (Microsoft)  
Igor Bryskin (Individual)  
Luis M. Contreras (Telefonica)  
Qin Wu (Huawei)  

Sergio Belotti (Nokia)  
Reza Rokui (Ciena)  
Aihua Guo (Futurewei)  
Italo Busi (Huawei)
Motivation

- A network slice may require an additional level of control to customize its connections, as described in Section 2 of draft-ietf-teas-ietf-network-slices.
  - “Additionally, the IETF Network Slice service customer might ask for some level of control of, e.g., to customize the service paths in a network slice.”

- A network slice can benefit from using a customized topology to allow better resource reservation and resource sharing among connections
  - We call it a “network slice topology”
Network Slice Topology

• A network slice topology is a customized topology used to express a customer’s intent for reserving topology resources and expressing connectivity constraints
  • A network slice topology is defined by the customer (“customized”), not one exposed by the provider (“abstract” or “native” topology)
  • Existing topology models, e.g. network topology or TE topology is not designed for expressing the slice intent, e.g. no customer SLO/SLEs defined

• Service paths for connections in a network slice can be specified on top of a network slice topology

• The topology model defined in early revisions of draft-liu-teas-transport-network-slice-yang is a good candidate for defining the network slice topology
Updates in Rev-06

• Imported common SLO/SLE attributes from ns-nbi & applied them to the topology constructs
• Removed the augments from the TE topology model for model connectivity constructs as they are already covered by the ns-nbi YANG model
• Text & diagram updates
Updated Model Relationships

Figure 1: Model Relationships
Model Tree

Network augments

Node augments
Model Tree (Cont.)

Link augments

```
augment /nw:networks/nw:network/nt:link:
  +--rw (slo-sle-policy)?
  |    +--:(standard)
  |       |    +--rw slo-sle-template? leafref
  |    +--:(custom)
  |       +--rw service-slo-sle-policy
  |          +--rw description?
  |          +--rw metric-bounds
  |             |    +--rw metric-bound* [metric-type]
  |             |         |    +--rw metric-type identityref
  |             |         |    +--rw metric-unit string
  |             |         |    +--rw value-description? string
  |             |         |    +--rw percentile-value? percentile
  |             |         |    +--rw bound? uint64
  |             |    +--rw security* identityref
  |             |    +--rw isolation? identityref
  |             |    +--rw max-occupancy-level? uint8
  |             |    +--rw mtu? uint16
  |       +--rw steering-constraints
  |          +--rw path-constraints
  |          +--rw service-function
  |          +--rw disjointness?
  |             |    +--:te-types:te-path-disjointness
  |          +--rw optimization-criterion? identityref
  |          +--rw resize-requirement? identityref
  |          +--rw service-info? string
```

TP augments

```
augment /nw:networks/nw:network/nw:node/nt:termination-point:
  +--rw (slo-sle-policy)?
  |    +--:(standard)
  |       |    +--rw slo-sle-template? leafref
  |    +--:(custom)
  |       +--rw service-slo-sle-policy
  |          +--rw description?
  |          +--rw metric-bounds
  |             |    +--rw metric-bound* [metric-type]
  |             |         |    +--rw metric-type identityref
  |             |         |    +--rw metric-unit string
  |             |         |    +--rw value-description? string
  |             |         |    +--rw percentile-value? percentile
  |             |         |    +--rw bound? uint64
  |             |    +--rw security* identityref
  |             |    +--rw isolation? identityref
  |             |    +--rw max-occupancy-level? uint8
  |             |    +--rw mtu? uint16
  |       +--rw steering-constraints
  |          +--rw path-constraints
  |          +--rw service-function
  |          +--rw disjointness?
  |             |    +--:te-types:te-path-disjointness
  |          +--rw optimization-criterion? identityref
  |          +--rw resize-requirement? identityref
  |          +--rw service-info? string
```
Open Issue

• Since the NS Topology model is a NS technology agnostic topology model, why not reference directly this model in NS-NBI for customized topology
  • Add constraint into NS-NBI that the reference topology must be of type “network-slice”
Open Issue – Relationship between SDP and LTP

• Current NS NBI model defines an SDP to reference an LTP object
  
  ```
  +--rw sdps
  +--rw sdp* [id]
      +--rw id                        string
      +--rw description?              string
      +--rw location
      | ...                            
      +--rw node-id?                  string
      +--rw sdp-ip-address*           inet:ip-address
  ```

• Should the reference be the other way around, i.e. an LTP object to reference an SDP?
  
  ```
  augment /nw:networks/nw:network/nw:node/nt:termination-point:
  +--rw customer-facing-sdp-id?     Leafref
  ```

• Can multiple LTPs in different topologies point to the same SDP?

• Should an SDP exist before or at the time the LTP is created?
Next Steps

• Request for WG adoption
• Resolve open issues

* GitHub Repo
  https://github.com/aguoiietf/ietf-network-slice-topology
Thank You!