A Yang Data Model for Transport Slice NBI

draft-wd-teas-transport-slice-yang-02

TEAS WG

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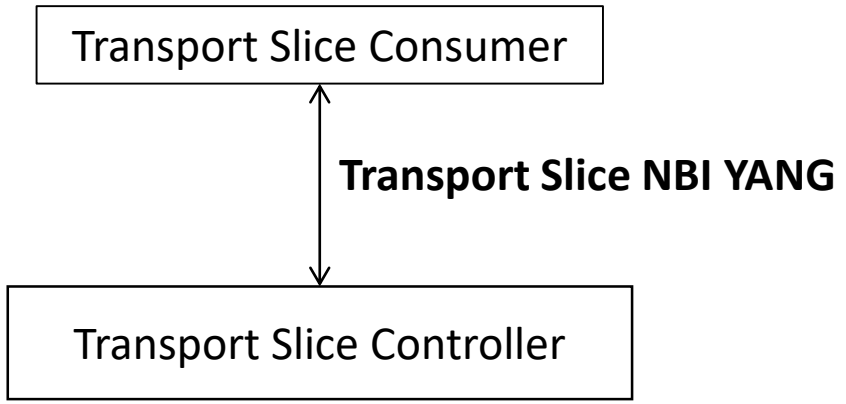
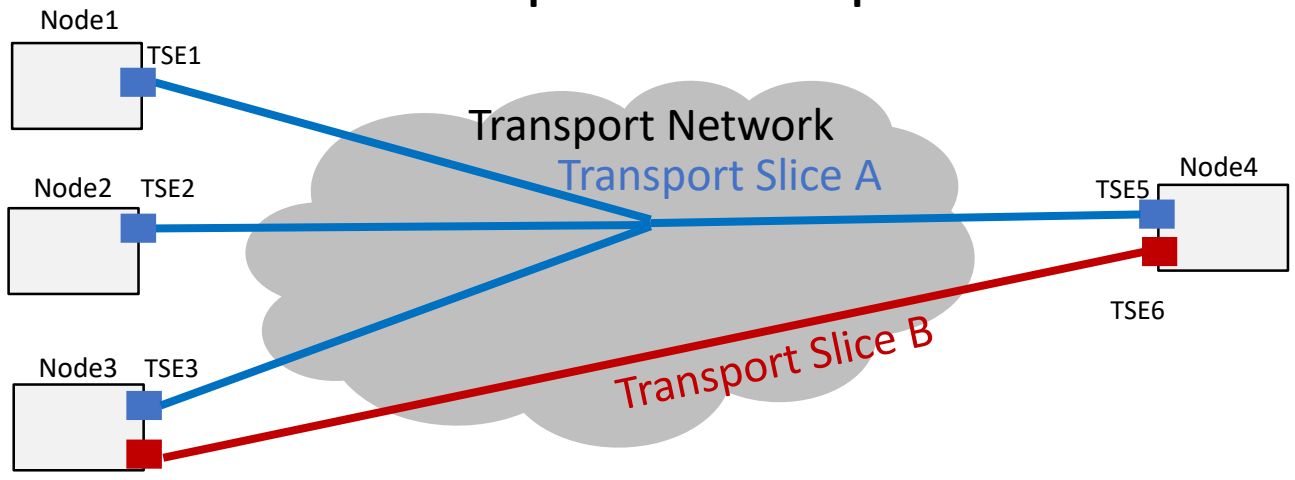
Draft Recap

- This draft defines a YANG data model for the Transport Slice NBI
  - Transport slice consumer of a Transport Slice Controller (TSC) to request, configure, and manage the components of a transport slice
- **Updates summary**
  - Updated **Appendix A Comparison with Other Possible Design choices for Transport Slice NBI** to address the comments that whether existing IETF basic network model (RFC 8345)could be augmented
  - Synchronize with the TS definition draft updates, e.g. TS, TSE and TS SLO definition



Transport Slices example: TS A and TS B



A Comparison with Other Possible Design choices for Transport Slice NBI

Possible TS NBI model	Modelling approach	Modelling Components	Gap analysis
Augmented ACTN VN Operation YANG draft-ietf-teas-actn-vn-yang	VN is an independent model, with a tight coupling with TE Topology model	**VN** (Virtual Network) **AP** (Access Point) **VN-AP** (Virtual Network Access Point) **VN-Member**	An augmented VN model would be tightly coupled to TE
Augmented network model RFC8345	Augment the network model	**Network** **Node** **Link**	"Network" view and thus suited as a Transport slice realization model
This draft	An independent Transport Slice model with a TS consumer "service" view of the slice	**Transport Slice (TS)** **Transport Slice Endpoint (TSE)** **TS-Member** **SLO-Group**	Technology agnostic model and borrows design from VN models

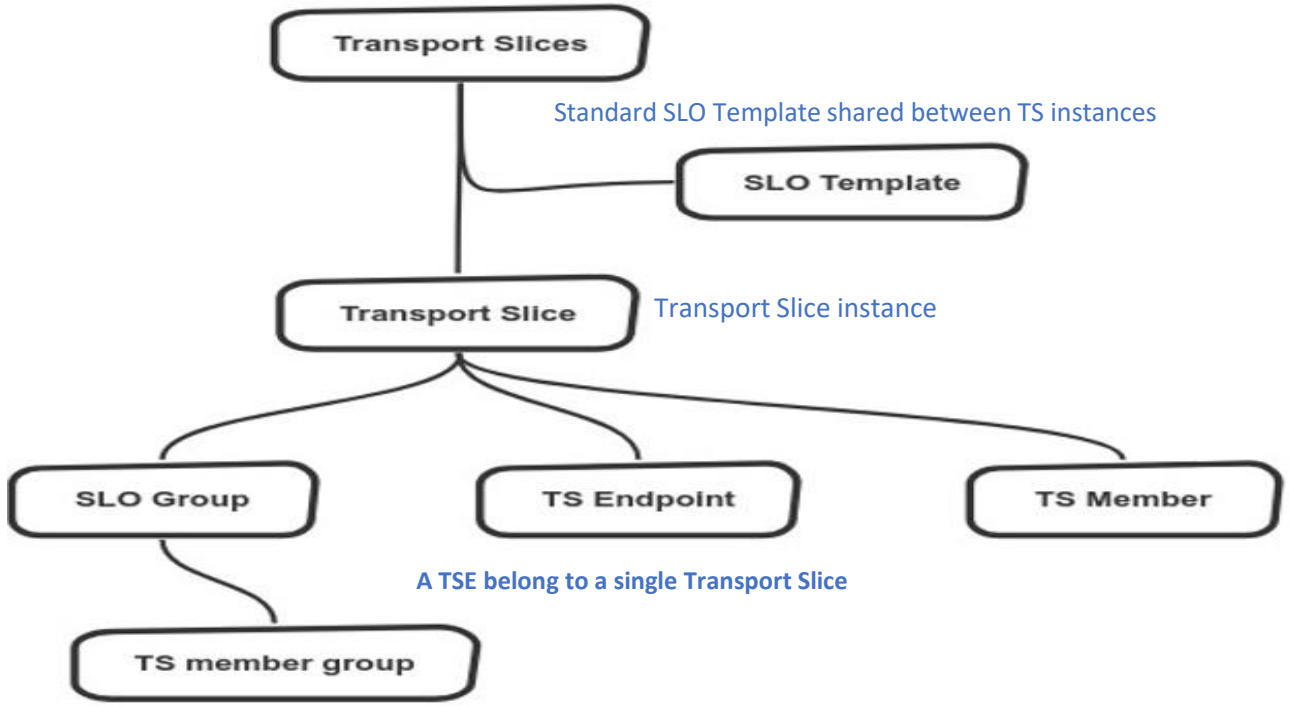
An approach taken by the Transport Network Slice YANG (draft-liu-teas-transport-network-slice-yang)

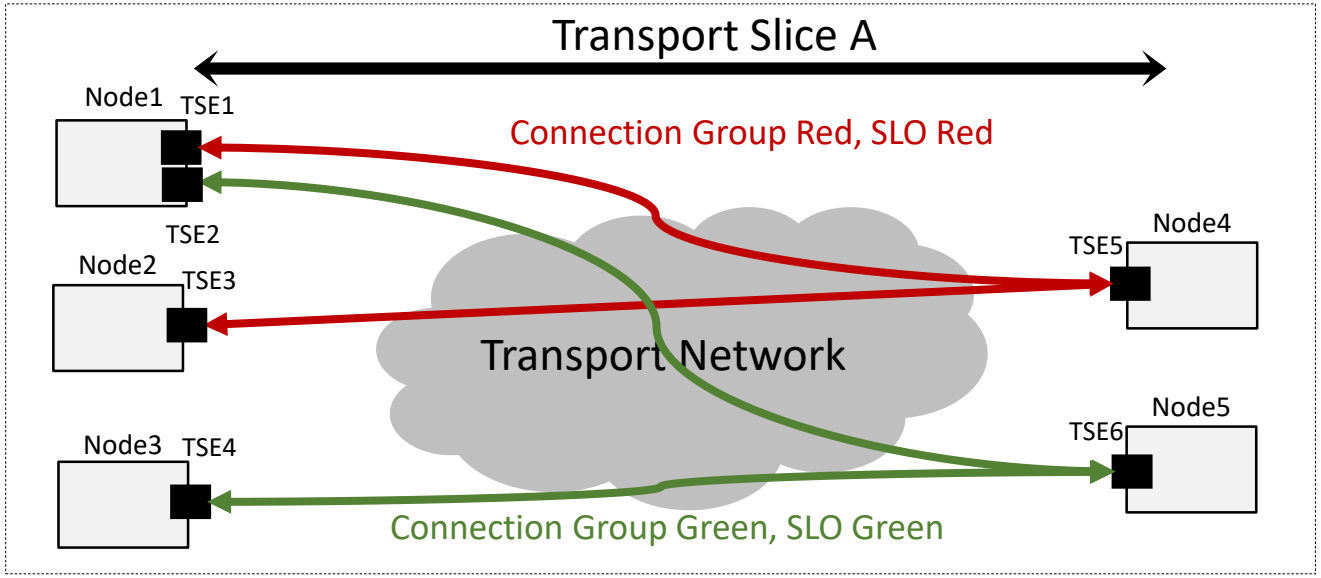
Note: Added as Appendix in the draft

TS NBI Key Concepts

- TS
- TSE
- Aligned with the TS definition draft!

- TS-Member
  - An abstract entity which represents the transport resources mapped to a particular connection between a pair of TSEs
- SLO-Group
  - Represents a group of TS-members with same SLOs in one transport slice



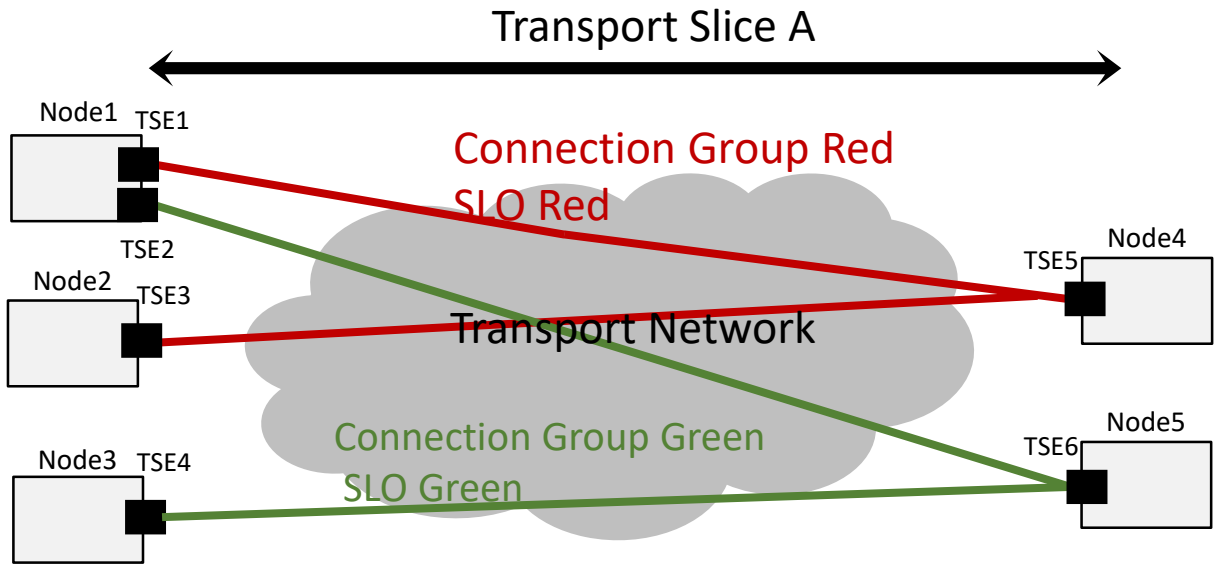


Open issues

- TS SLO-Group definition
- TSE bandwidth definition
- TS-Member and TS-Endpoint based TS Telemetry
- TS-Endpoint technology-specific Attributes definition

TS-SLO-Group Definition

- **TS definition draft:**
  - **A transport slice can have one or more SLOs associated with it**
- **Should we have different SLOs for different set of connections within a TS?**
  - **Our modelling assumption is multiple SLOs for one TS**
- **Should we have different connection type (P2P, P2MP, MP2MP) for the different connection group?**

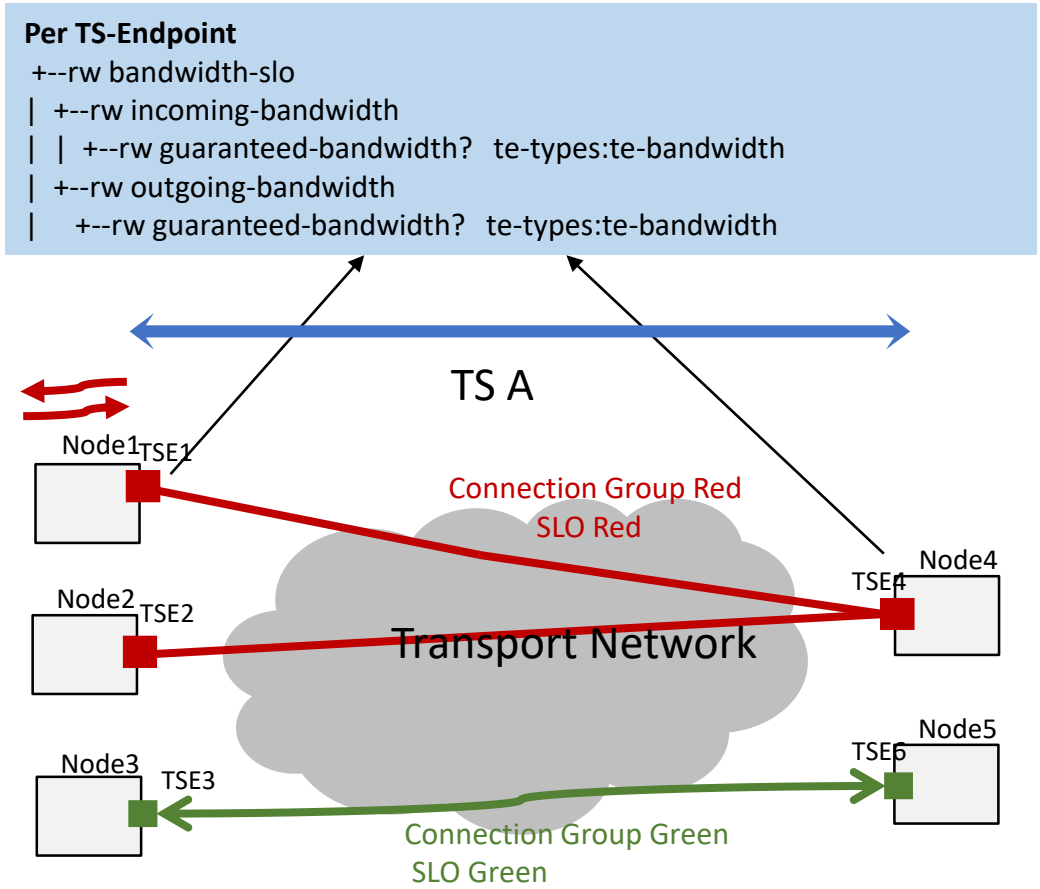


Connection Red
Topology type: Hub & Spoke
SLO: Red

Connection Green
Topology type: Hub & Spoke
SLO: Green

TSE bandwidth definition

- TS SLO bandwidth: Minimum guaranteed bandwidth between two TSEs at any time
- **Should TSE have a bandwidth control before the traffic into a TS?**
  - The TS bandwidth may not be symmetrical, e.g. one TSE is central endpoint, the other TSE are access endpoints

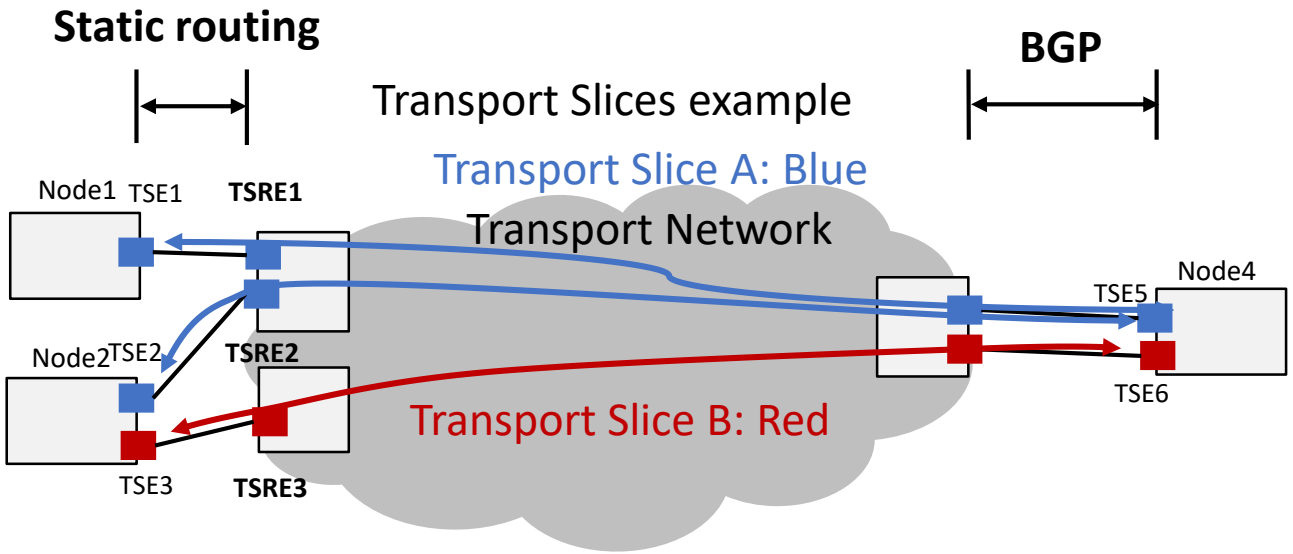


TS-Member and TSE based Telemetry

- Transport Slice monitoring in various granularity, which reports to the Transport Slice Consumer to quickly locate the affected services in particular SLO-Group or TSE
  - Per TS-Member: Per connection periodic or on-change (TCA) performance and status, e.g (OAM results)
  - Per TS Endpoint: Performance status of bandwidth utilization for incoming and outgoing e.g. (statistics)
  - Per TS SLO-Group: Aggregated performance statistics at SLO-Group
- The mechanism defined in [RFC8640] can be used for either periodic or on-demand subscription of TS operational and performance status
- **Query: We are currently maintaining SLO monitoring status at different granularity, is there any objection to this approach?**

TS Endpoint technology-specific Attributes

- The definition of TSE mainly focus on the common parameters, but a number of technology-specific attributes need be agreed with TSEs and TSREs of the Transport Network
  - Routing-protocol: Static routing or dynamic routing (e.g. BGP)
- Should we handle technology-specific attributes for TSE?



Next Step

- Solicit comments and reviews from WG

```
module: ietf-transport-slice
  +--rw transport-slices
     +--rw slice-templates
     |  +--rw slo-template* [id]
     |     +--rw id                          string
     |     +--rw template-description?       string
     +--rw transport-slice* [ts-id]
        +--rw ts-id             uint32
        +--rw ts-name?          string
        +--rw ts-topology*      identityref
        +--rw ts-slo-group* [slo-group-name]
        |  +--rw slo-group-name             string
        |  +--rw default-slo-group?         boolean
        |  +--rw slo-tag?                   string
        |  +--rw (slo-template)?
        |  |  +--:(standard)
        |  |  |  +--rw template
        |  |  +--:(custom)
        |  |     +--rw ts-slo-policy
        |  |        +--rw bandwidth?          te-types:te-bandwidth
        |  |        +--rw latency
        |  |        |  +--rw one-way-latency?    uint32
        |  |        |  +--rw two-way-latency?    uint32
        |  |        +--rw jitter
        |  |        |  +--rw one-way-jitter?    uint32
        |  |        |  +--rw two-way-jitter?    uint32
        |  |        +--rw loss
        |  |        |  +--rw one-way-loss?    decimal64
        |  |        |  +--rw two-way-loss?    decimal64
        |  |        +--rw availability-type?    identityref
        |  |        +--rw isolation-type?       identityref
        |  +--rw ts-member-group* [ts-member-id]
        |  |  +--rw ts-member-id
        |     +--ro slo-group-monitoring
        |     |  +--ro latency?    uint32
        |     |  +--ro jitter?     uint32
        |     |  +--ro loss?       decimal64
        |  +--rw status
        |  |  +--rw admin-enabled?    boolean
        |  |  +--ro oper-status?      operational-type
```

SLO policy

```
+--rw ts-endpoint* [ep-id]
       |  +--rw ep-id                    uint32
       |  +--rw ep-name?                 string
       |  +--rw ep-role*                 identityref
       |  +--rw geolocation
       |  |  +--rw altitude?    int64
       |  |  +--rw latitude?    decimal64
       |  |  +--rw longitude?   decimal64
       |  +--rw node-id?                  string
       |  +--rw port-id?                  string
       |  +--rw ts-filter-criteria
       |  |  +--rw ts-filter-criteria* [match-type]
       |  |     +--rw match-type     identityref
       |  |     +--rw value?         string
       |  +--rw bandwidth
       |  |  +--rw incoming-bandwidth
       |  |  |  +--rw guaranteed-bandwidth?    te-types:te-bandwidth
       |  |  +--rw outgoing-bandwidth
       |  |     +--rw guaranteed-bandwidth?    te-types:te-bandwidth
       |  +--rw mtu                      uint16
       |  +--rw protocol
       |  |  +--rw bgp
       |  |  |  +--rw bgp-peer-ipv4*    inet:ipv4-prefix
       |  |  |  +--rw bgp-peer-ipv6*    inet:ipv6-prefix
       |  |  +--rw static
       |  |     +--rw static-route-ipv4*    inet:ipv4-prefix
       |  |     +--rw static-route-ipv6*    inet:ipv6-prefix
       |  +--rw status
       |  |  +--rw admin-enabled?    boolean
       |  |  +--ro oper-status?      operational-type
       |  +--ro ep-monitoring
       |     +--ro incoming-utilized-bandwidth?    te-types:te-bandwidth
       |     +--ro incoming-bw-utilization         decimal64
       |     +--ro outgoing-utilized-bandwidth?    te-types:te-bandwidth
       |     +--ro outgoing-bw-utilization         decimal64
       +--rw ts-member* [ts-member-id]
          +--rw ts-member-id             uint32
          +--rw src
          |  +--rw src-ts-ep-id?
          +--rw dest
          |  +--rw dest-ts-ep-id?
          +--rw monitoring-type?         ts-monitoring-type
          +--ro ts-member-monitoring
             +--ro latency?    uint32
             +--ro jitter?     uint32
             +--ro loss?       decimal64
```

Monitoring