Framework and Data Model for OTN Network Slicing

draft-ietf-ccamp-yang-otn-slicing-02

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Updates Since IETF 113

• **Text Updates**
  • Added a section to describe OTN slice realization with NRP (Network Resource Partition)
  • Other cosmetic updates

• **YANG Model Updates**
  • **NBI**: Updated ietf-transport-network-slice.yang by augmenting the model defined in draft-ietf-teas-ietf-network-slice-nbi-yang-02
  • **MPI**: Renamed “ietf-otn-slice” to “ietf-otn-slice-mpi”
    • “ietf-otn-slice” is reserved for the NBI model
Use of NRP for OTN Slicing

- NRP can be used to address scalability issues mostly occurred in packet networks and to reduce complexity in the realization of slices.
- NRP is internal construct to a network slice controller, but may be configured on the underlying SDN controller through MPI to facilitate the slice realization.
- For OTN and other transport networks (MW, L0, etc.) resources are much coarse granular.
  - Use of NRP is optional but still has its benefits for e.g. resource-based slicing.
  - Evolving OTN data plane technologies may face similar scalability issues.
    - E.g. sub-1G OTN.
Realizing OTN Slices with NRP

- For connectivity-based OTN slices, a connection within an OTN slice can be realized by an OTN tunnel in the underlay topology. Resources are reserved by the tunnel, thus use of NRP is optional in this case.

- For resource-based OTN slices, the OTN-SC may choose to map an OTN slice directly onto the underlay TE topology
  - An underlay topology is an abstracted topology exposed by the underlying MDSC/PNC and may not be a “native” OTN topology
  - Resources need to be colored in the underlay topology
  - A connection created within the slice needs to be specified with colors

- Alternatively, the OTN-SC can create NRP topologies for resource reservation.
  - OTN slice topology: NRP topology = 1: 1
  - No need for coloring
  - NRP topologies are configured on subtended MDSC/PNC through the MPI
YANG Model Updates

- ietf-transport-network-slice.yang now augments ietf-network-slice-services.yang
  - Added list of network topologies to support resource-based slicing
  - Introduced common SLO grouping for slices with transport network technologies
  - Added path references to each connectivity construct of a slice
Open Issue: How to define technology-specific attributes?

• Opaque vs. explicit definition of attributes for e.g. SLO/SLE
  • Is it the best way using opaque definition of (key, value) pairs to define technology-specific attributes?
    • Implementation agreements are required in addition to the YANG model to avoid interoperability problem
    • May not capture complex attribute structures
    • Unable to be auto/explicitly validated with YANG

• For OTN Slicing our preference is to define explicit, technology-specific attributes and not use the opaque definition
Open Issue: Defining multiple MPI Interface Models?

- OTN-SC is flexible in choosing different MPI interfaces for realizing a slice. Use of NRP is optional.
- Is it necessary for a standard draft to include multiple optional MPI models? Currently,
  - ietf-otn-slice-mpi.yang uses coloring
  - New MPI model is needed if using NRP
    - Augments the TE topology model (RFC8795) with new topology type = NRP
Next Steps

• Address open issues
• Continue working with draft-ietf-teas-ietf-network-slice-nbi-yang-02 to align the two models
• Define OTN technology-specific model based on ietf-transport-network-slice (which augments ietf-network-slice-service)
  • Technology-specific SLO/SLE for OTN
  • Support both connection-based and resource-based slicing
  • Support multi technology links (non-OTN access links and OTN links)

* GitHub Repo

* CCAMP Weekly Call: Thu 10-11am EST
  https://mailarchive.ietf.org/arch/msg/ccamp/Dr3HWPImP9LyA6NmabWJvx7hW1c/
Thank You!