Framework and Data Model for OTN Network Slicing

draft-zheng-ccamp-yang-otn-slicing-02

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Major Updates Since IETF 110

- Admin
  - Weekly meeting (Thu 10-11am EST)
  - GitHub: https://github.com/aguoiietf/ietf-ccamp-yang-otn-slicing
  - Expanded list of authors and contributors

- Draft Updates
  - Added use case: end-to-end network slicing
  - Clarified definitions
    - OTN Slice
    - OTN Slice Controller (OTN-SC)
  - Relationship between an OTN slice and an IETF network slice
  - Abstraction methods for OTN slices
    - Connectivity-based vs. resource-based
  - OTN-SC recursion
Definition & Scope of OTN Slice

• Aligned the definition with IETF network slicing [I-D.ietf-teas-ietf-network-slices]
  • An OTN slice is an OTN virtual network topology connecting a number of OTN endpoints using a set of shared or dedicated OTN network resources to satisfy specific service level objectives (SLOs).
  • An OTN slice is a technology-specific realization of an IETF network slice in the OTN domain

• Scope of OTN slice for single-domain & multi-domain
  • Access link – Access link
  • Access link – Inter-domain link
  • OTN segment slices in hierarchical or sequential (stitched) combination

Figure 1: OTN Slice
Abstraction Method for OTN Slices

• Connectivity-based OTN slices are abstracted as a set of endpoint-to-endpoint links, with each link formed by an end-to-end tunnel across the underlying OTN networks.

• Resource-based OTN slices are abstracted as an abstract topology to allow resource sharing between endpoints, and on-demand commissioning within the slice.
  • Better optimization of resources
  • Real world example: OTN slice supporting high-quality, real-time broadcasting of sports events between multiple stadiums and TV station

• The methods are similar to the Virtual Network (VN) concept defined in RFC8453
  • VN type 1 – connectivity-based slicing
  • VN type 2 – resource-based slicing
OTN Slicing Controller & Interfaces

• OTN Slice Controller (OTN-SC)
  • A logical function responsible for the life-cycle management of OTN slices instantiated within the corresponding OTN network domains
  • Translating slice configuration into TE tunnels or TE abstract topologies with resource coloring at the MPI
  • Flexible deployment
  • Recursive

• OTN-SC NBI
  • Serves orchestrator for direct OTN slice requests
  • An IETF NSC has the option to use OTN-SC NBI or directly interface with PNC/MDSC to realize slices

• OTN-SC SBI
  • SBI clients: ACTN PNC / MDSC
OTN Slicing for Multi-domain

- OTN-SC – OTN-SC recursion
- OTN-SC – MDSC – PNC

Figure 3: OTN-SC for multi-domain
YANG Models @ MPI

• Coloring TE links

• Either type/number of ODU containers or number of time slots could be used for coloring TE link resources at the MPI

* A prior version of this YANG model was contributed to ONAP and is included in its Guilin Release.
Next Steps

• Continue updating the YANG model for OTN-SC SBI (i.e. MPI in Fig. 2)
• Develop YANG model for OTN-SC NBI. Looking into related work, e.g.
  • draft-liu-teas-transport-network-slice-yang
  • draft-wd-teas-transport-slice-yang for NBI towards the orchestrator
  • draft-contreras-teas-slice-controller-models
  • draft-ietf-teas-actn-vn-yang
• Address the slicing for external (access and inter-domain) links that support client signals other than OTN
• Address comments and reviews from the WG
• The authors believe the draft is ready for WG adoption
  • Consensus on the definition & scope among authors
  • Good interest
  • Stable YANG MPI and clear development path for NBI
Thank You!