

IETF Network Slice Topology YANG Data Model

[draft-liu-teas-transport-network-slice-yang-07](#)

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Motivation of a customer for expressing topology intents

- Build the logical view of the desired slice service (and its parts)
 - Impact on realization -> hints for the NSC on how to instantiate the slice service
- Operate the slice service according to the expressed topology
 - Impact on control of the slice -> control of slice is out of scope

Similar Requirements in ACTN VN Type 2 for Using Customized Topologies

- ACTN VN was considered as an equivalent concept to network slicing
 - WG decided to define new concept for network slices similar to the terms defined in ACTN VN
 - However, similar requirements would be posted against network slicing
- Similar debates under ACTN VN development for using topologies to express VN requests, which resulted in the definition of two types of VNs
 - **Type 1 VN** is connectivity-based VN, where a VN is defined as a set of edge-to-edge abstract links (VN members) == network slice with connectivity constructs
 - **Type 2 VN** is topology-based VN, where a topology is used to express actual paths for VN members == topology defined by this draft
 - Type 1 VN is actually a special case of Type 2 VN
 - A customized topology can be created a priori (i.e. agreed mutually between CNC and MDSC)
 - A customized topology can also be created “on the fly” by the MDSC as part of VN instantiation
 - TE topology model is used for defining customized topologies
 - Diff for this draft: gaps in TE topology with missing SLO/SLE definitions

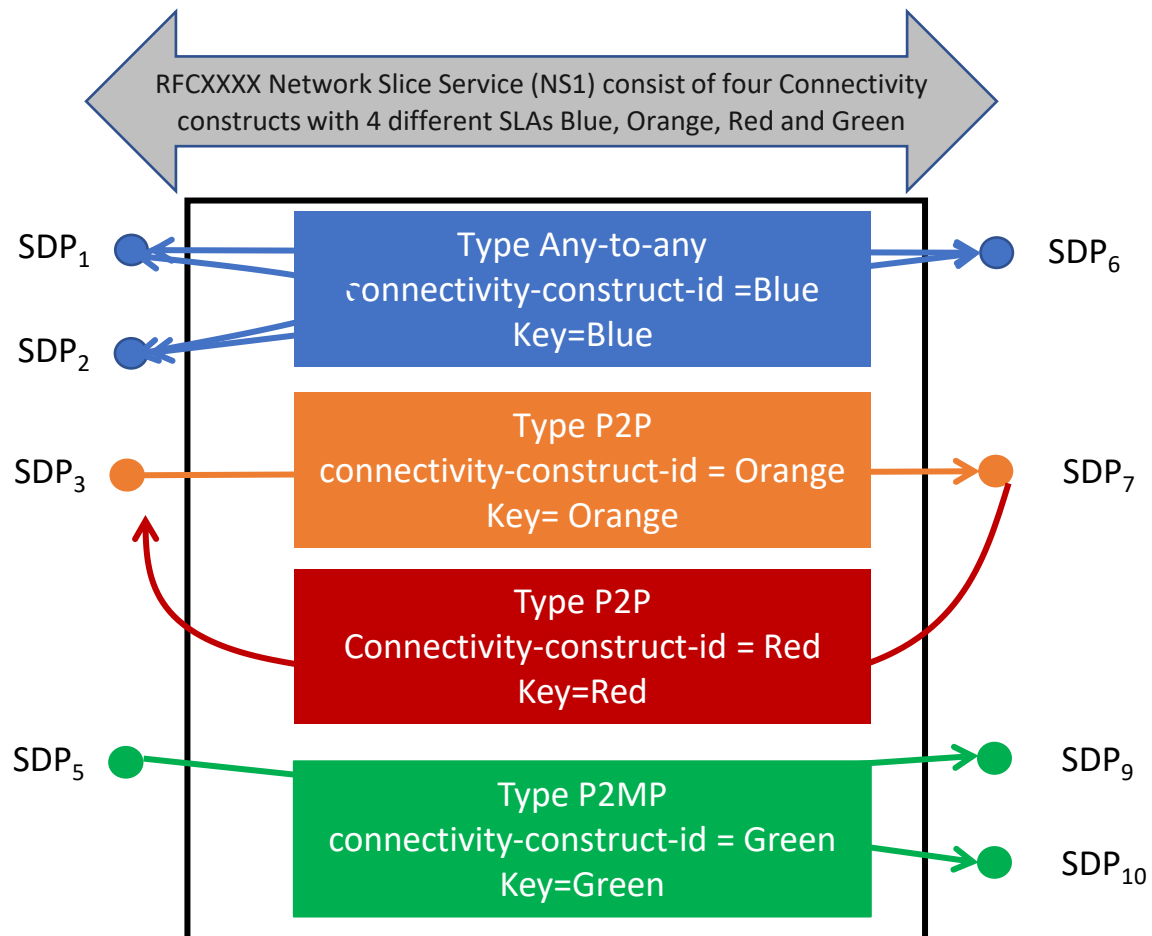
Feedbacks received on NS Topology

- Proposed use case is not convincing to explore using topologies for network slicing
 - Presenting additional use case from a provider's perspective
- There are still concerns in the concept of a customized topology
 - Whether building a customized topology require prior topology information from the provider
 - How the NSC may map a customized topology to an internal realization, e.g. an NRP
 - Whether the constraints expressed by a customized topology can be instead expressed by the connectivity constructs
 - Whether existing models are sufficient to express a customized topology

Addressing WG Concerns

- Whether building a customized topology require prior topology information from the provider
 - It's not mandatory but a customized topology may be built using e.g. offline negotiation or online with a SAP topology exposed by the provider (RFC9408)
- How the NSC may map a customized topology to an internal realization, e.g. an NRP
 - Edge node – PE node attached to a SAP
 - Edge TP – SDP
 - Transit node (P-node) – a virtual node that can be translated to resource sharing constraints
 - Link – reserved resources
- Whether the constraints expressed by a customized topology can be instead expressed by the connectivity constructs
 - We show by the use case that in some scenarios it is more efficient to use topologies to express the constraints, e.g. diversities, resource sharing
- Whether existing models are sufficient to express a customized topology
 - Base model exists (RFC8345 network topology)
 - No suitable model exist to express topology + SLO/SLE

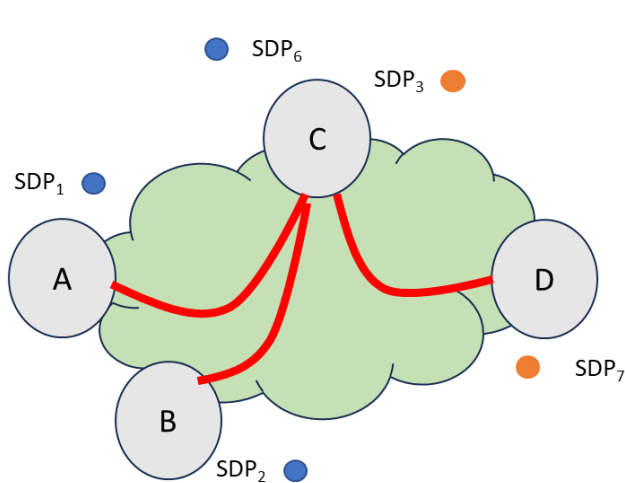
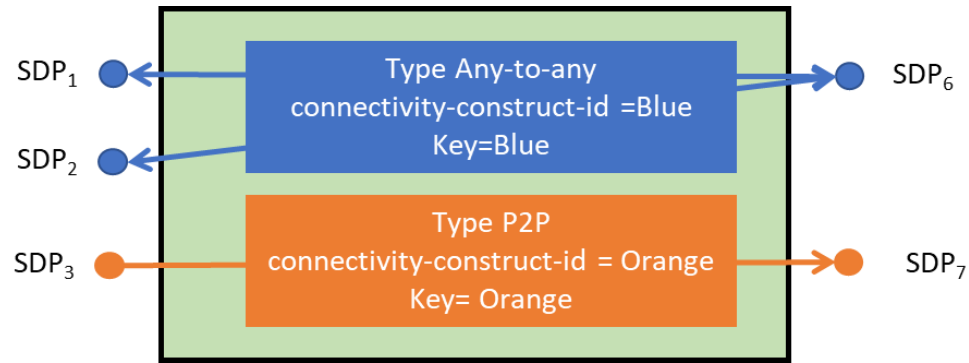
RFCXXXX Network Slice Connectivity Constructs



Modelling as NS framework definition

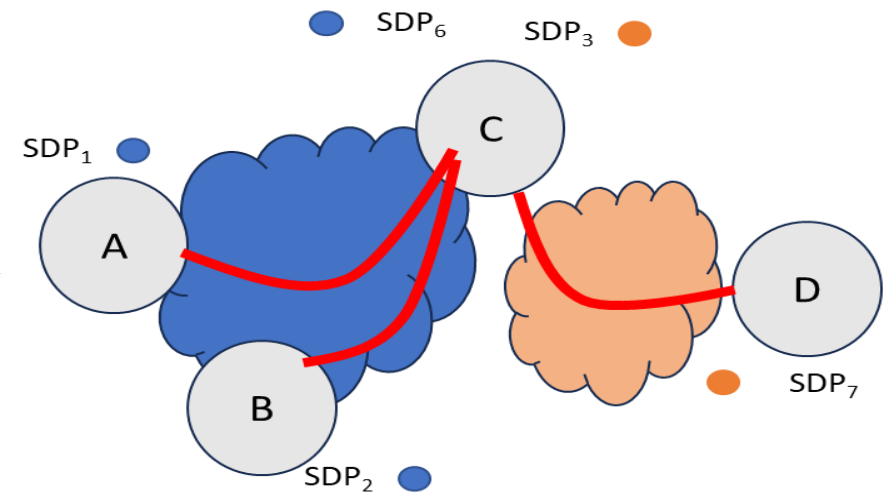
- This is what is currently in the framework draft!
- Multiple connectivity constructs
- SLO of each connection is different
- Each CC is one entry (i.e., connection)
 - CC Blue: Src{1,2,6} Dst{1,2,6} with SLO Blue
 - CC Orange: Src{3} Dst{7} with SLO Orange
 - CC Red: Src{7} Dst{6} with SLO Red
 - CC Green: Src{5} Dst {9,10} with SLO Green
- Connectivity construct Key = {new connectivity-construct-id} (i.e. Blue, Orange, Red, Green)
 - Note: connection type is not part of the key

Example



w/o
customer
topo

with
Customer
topo



- Resources may be allocated in the same NRP w/o information about desired customer topology
 - Toy example, all in the same VRF
- Adding new nodes / SDPS could affect / imply reconfiguration in all connections

- Resource isolation and resource reservation between different set of nodes / SDPs based on network planning using forecast of demand traffic matrix
 - Toy example, separated blue and orange VRFs
- On-demand addition of nodes /SDPs connections based on planning do not imply reconfiguring all set of connections

Next Steps

- Address pending and new comments / questions
- Request for WG adoption

* GitHub Repo

<https://github.com/aguoietaf/ietf-network-slice-topology>

Thank You!