



Instantiation of IETF Network Slices in service providers networks

draft-barguil-teas-network-slices-instantation-00

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Motivation

- The IETF has produced **several YANG data models** to support the Network Automation:
 - Service Models: Capture the customer requirements (i.e. LXSM, ...)
 - Network Models: Capture the Network requirements to deliver a service. (i.e. LXNM)
 - TE Models:
 - Service Mapping: Maps the TE data models and the service/network models.
 - ACLs and Routing Policies
- The IETF is working on a **Network Slice Architecture**:
 - [draft-ietf-teas-ietf-network-slice-definition-00] Definition of IETF Network Slices
 - [draft-nsdt-teas-ns-framework-05] Framework for IETF Network Slices
- **Consistency is needed** with other architectures and frameworks proposed for Network Automation and SDN:
 - [RFC 8969] A Framework for Automating Service and Network Management with YANG
 - [RFC 8453] Framework for Abstraction and Control of TE Networks (ACTN)
- **Goal**: *How to instantiate IETF Network Slices considering the variety of potential SDN implementations?*

IETF Network Slice: requirements and data models

[draft-contreras-teas-slice-nbi-03]

e.g. **Network Slice Requirements for 5G service**

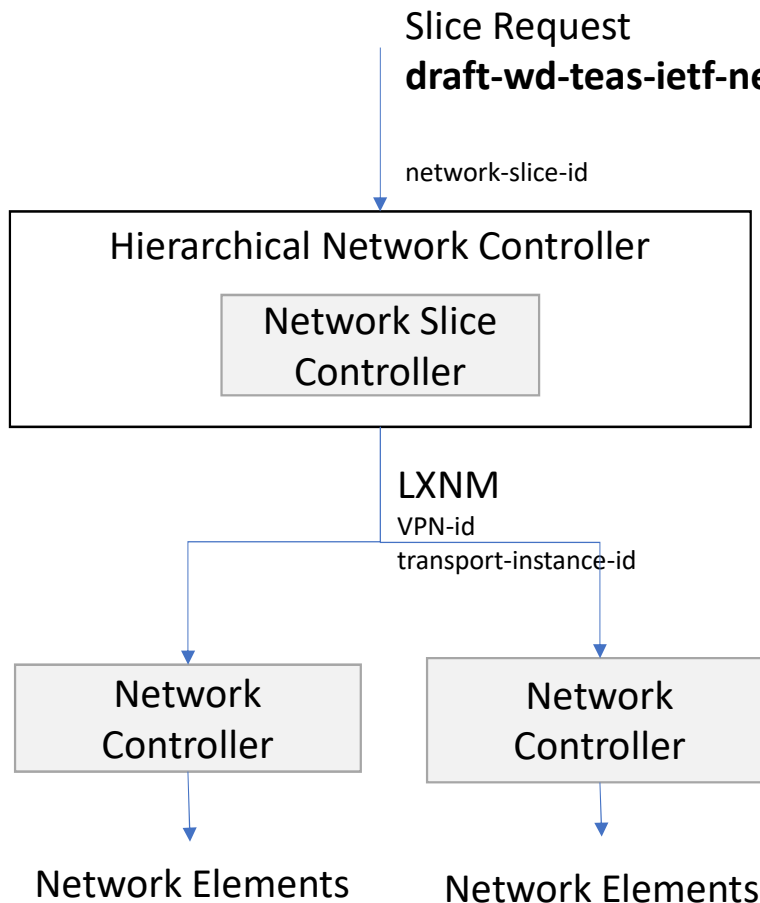
Availability
Deterministic communication
Downlink throughput per network slice
Energy efficiency
Group communication support
Isolation level
Maximum supported packet size
Mission critical support
Performance monitoring
Slice quality of service parameters
Support for non-IP traffic
Uplink throughput per network slice
User data access (i.e., tunneling mechanisms)

The set of Yang models proposed today allow to request tunnels/paths with different resiliency requirements in terms of protection and restoration.

However, none of them include the possibility of requesting a specific availability (e.g. 99.9999%).

The LxVPN Models allow to specify the bandwidth at the interface level between the slice and the customer. In addition, the TE models allow to force a given bandwidth in the connection between Provider Edges

Implementation options (1/3)

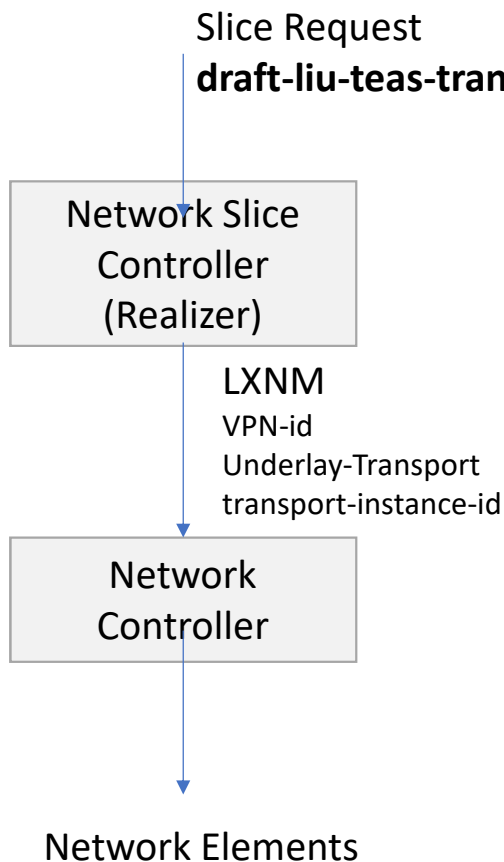


Example: instantiation of slice requests received by a hierarchical SDN controller incorporating NSC functionality and interacting with per-domain Network controllers below

- **Map:** The customer request received using the [[draft-wd-teas-ietf-network-slice-nbi-yang-01](#)] must be processed by the NCS.
- **Realize:** Create necessary network requests. The slice realization can be translated into one or several LXNM Network requests, depending on the number of underlay controllers. Thus, the NCS must have a complete view of the network to map the orders and distribute them across domains. The realization should include the expansion/selection of **Forwarding Policies, Routing Policies, VPN policies, and Underlay transport preference.**

Implementation options (2/3)

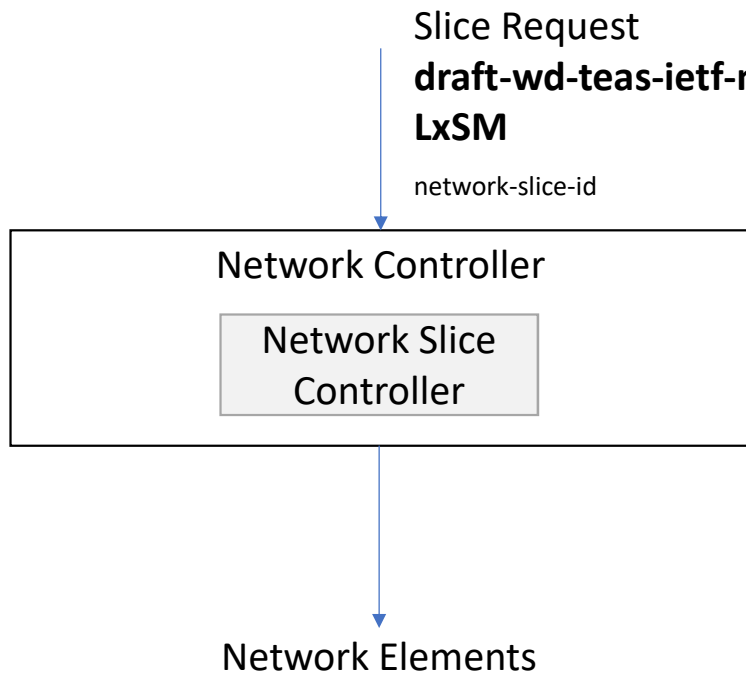
Example: instantiation of slice requests received by an independent NSC interacting with Network controllers below (case reflected in IETF definitions draft)



- **Map:** Process the customer request. The customer request can be sent using the [[draft-liu-teas-transport-network-slice-yang-01](#)]. This draft allows the topology mapping of the Slice request.
- **Realize:** Create necessary network requests. The slice's realization can be translated into one or several LXNM Network requests, depending on the number of underlay controllers. Thus, the NCS must have a complete view of the network to map the orders and distribute them across domains. The realization should include the expansion/selection of **Forwarding Policies, Routing Policies, VPN policies, and Underlay transport preference.**

Implementation options (3/3)

Example: instantiation of a conventional service realized on top of an IETF Network Slice (being the NSC part of the Network Controller)



- **Map:** Process the customer request at NCS level.
- **Realize:** Instantiate the slices using devices datamodels.

Conclusions and next steps

Conclusions

- A wide variety of yang models currently progressing in IETF can be used by Network Controllers to instantiate IETF network slices.
 - Some of the IETF slice requirements can be satisfied by multiple means, as there are multiple choices available.
 - However, other requirements are still not covered by the existing models.
- A more detailed definition of those uncovered requirements is needed.

Next steps

- Keep working on detailing the different implementation options
- Collect feedback / comments from the WG
- Prepare a new version for IETF#111