



IETF Network Slice use cases and attributes for Northbound Interface of controller

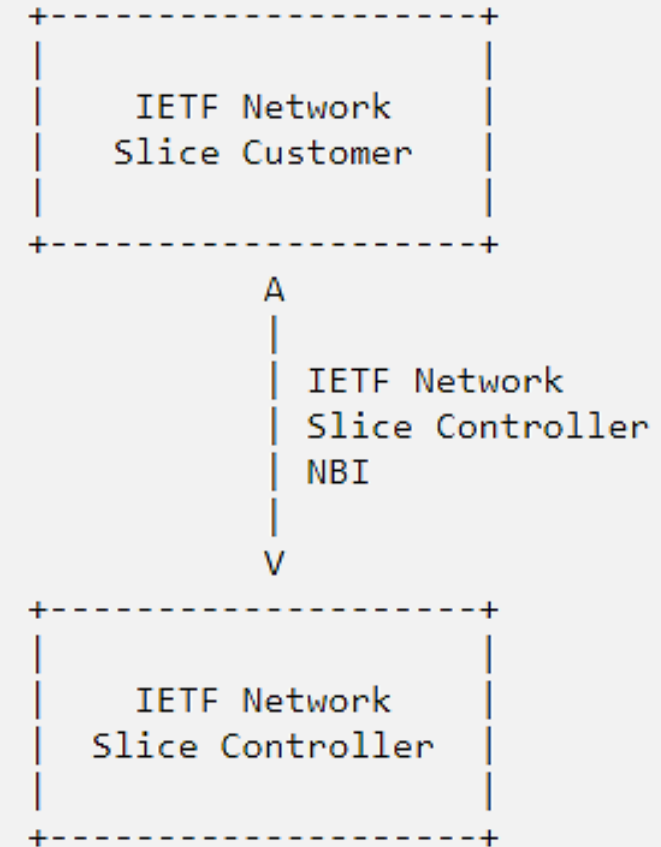
draft-contreras-teas-slice-nbi-06

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Motivation

- **Background:** The definition of IETF Network Slice (incl. high-level architecture framework, data models, etc) is being developed without a clear view yet of the overall needs for different use cases
- **Rationale:** Any mechanism for deploying IETF Network Slices can be expected to be used for different range of services
 - Unify provisioning systems rather than maintaining separated, specialized ones
 - Existing services can be expected to be delivered as slices looking for synergy and simplicity and taking profit of slice capabilities
- **Purpose:** This draft covers the gap of analysing use cases for identifying SLOs, attributes and methods needed for a IETF Network Slice controller
- The draft has been already presented at IETF 109 (Nov'20) and IETF 111 (Jul'21)



Use cases documented

The purpose is to document different use cases (i.e., customers) of the IETF Network Slicing services

- 5G services
 - Public and private networks
- NFV-based services
- Network sharing
- SD-WAN
- Radio functional splits

Updates from -05 version

- Editorial fixing (mainly figures)
- Added content related to private 5G Networks
 - Also known as non-public networks (NPN)
 - Private 5G networks are dedicatedly customized and built for companies/organizations
-> it may have more specific requirements rather than public 5G networks
(e.g., customization UL/DL rate, multi-homing for high reliability)
 - This use case can imply that a service provider uses network slices provided by other companies as a part of its own service
- Added section summarizing attributes and procedures needed for covering all the identified use cases, so far
 - The objective is to identify comprehensive SLOs, SLEs and procedures that could allow whatever use case (i.e., customer) to be supported with IETF Network Slice services
 - This section is yet work-in-progress

Next steps

- Complete the work in progress
 - DC interconnection use case
 - Summary section
- Scan for additional relevant cases, if any
- Collect feedback / comments from the WG
- Prepare a new version for IETF#114
- Authors consider the draft to be ready for adoption, so we ask for WG adoption call
 - Document valuable as input for several other documents in the WG (YANG models, NSC structure, instantiation of NS in service providers' Networks, etc)
 - Recent discussion in the mailing list makes evident the need of a document like this

Backup slides

Backup -- 5G Services

- Objective: Support the E2E Network slices as defined for 5G systems
- NBI attributes:
 - SLOs such as DL/UL throughput, slice QoS parameters, deterministic communication, etc.
 - Additional characteristics such as group communication Support, Support for non-IP traffic, area of service, etc.
- NBI procedures:
 - Defined in 3GPP specs for slice lifecycle as slice instance allocation / de-allocation, modification, status, etc
- Applicability of IETF Network Slice:
 - N3/N9/N6 interfaces for providing different networks depending on applied service types (i.e., eMBB, mMTC, and URLLC)
- Reference: GSMA GST, 3GPP TS28.541

Backup -- NFV-based Services

- Objective: Support connectivity services for VNFs established across geographically remote NFVI points of presence
- NBI attributes:
 - SLOs such Incoming and outgoing bandwidth, QoS metrics, etc.
 - Additional characteristics such as directionality, protection scheme, etc.
- NBI procedures:
 - Lifecycle, capacity, fault and performance management of Multi-Site Connectivity Service (MSCS)
- Applicability of IETF Network Slice:
 - Inter-NFVI-PoP communications for the support of services with different SLOs
- Reference: ETSI NFV IFA 032, ETSI NFV SOL 017

Backup -- RAN Sharing

- Objective: Provisioning of connectivity between cell sites and interconnection points agreed among operators
- NBI attributes:
 - SLOs such as maximum and guaranteed bit rate, bounded latency, packet loss rate, etc.
 - Additional characteristics such as secure connection, IP addressing, etc.
- NBI procedures:
 - Provisioning of connectivity services, collection of performance and fault data, etc.
- Applicability of IETF Network Slice:
 - Multi-tenancy on mobile front/mid/backhaul
- Reference: MEF white paper on fronthaul/backhaul sharing

Backup – SD-WAN

- Objective: Support SD-WAN overlays connecting sparse customers' sites
- NBI attributes:
 - SLOs such as Bandwidth, service uptime, packet loss, latency, etc.
 - Additional characteristics such as need for encryption, addressing, frame size, etc.
- NBI procedures:
 - Policies per Application Flow groups (e.g., encryption, Internet break-out, etc).
- Applicability of IETF Network Slice:
 - Mapping of SD-WAN services to IETF Network Slices in the underlay
- Reference: MEF-70

Backup – Radio Functional Split

- Objective: Accommodate fronthaul/midhaul connectivity through slices
- NBI attributes:
 - SLOs such as Bandwidth, latency, packet loss, etc (as per nature of the connection – FH, MH -).
 - Additional characteristics such as geographical location can have influence.
- NBI procedures:
 - Similar slice lifecycle as in 5G services, even though reliance on closed loop automation could motivate more dynamism.
- Applicability of IETF Network Slice:
 - Provisioning of FH and MH connectivity
- Reference: O-RAN.WG9.XTRP-REQ-v01.00, November 2020.