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

draft-contreras-teas-slice-nbi-05

Luis M. Contreras *(Telefonica)*
Shunsuke Homma *(NTT)*
Jose Ordonez-Lucena *(Telefonica)*
Jeff Tantsura *(Microsoft)*
Krzysztof Szarkowicz *(Juniper)*

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

```
+-----------------------+
|                       |
|    IETF Network       |
|   Slice Customer      |
|                       |
|                       |
+-----------------------+
            A
            |
            |   IETF Network
            |   Slice Controller
            |   NBI
            |
            V
+-----------------------+
|                       |
|    IETF Network       |
|   Slice Controller    |
|                       |
+-----------------------+
```
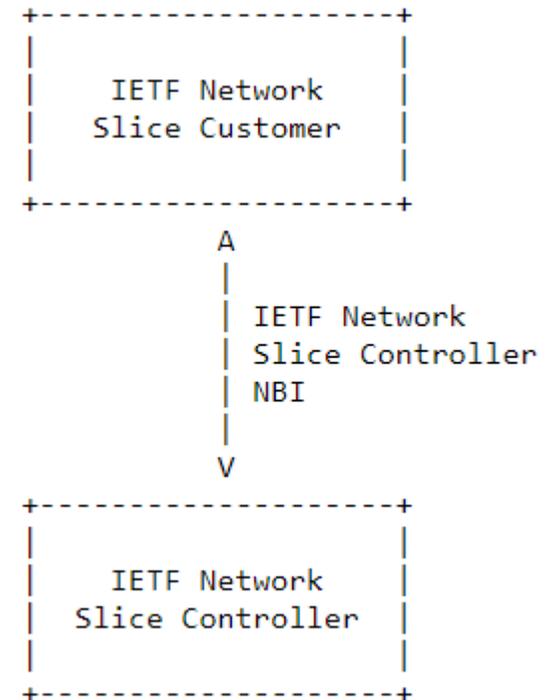
Updates from -03 version

- Two versions generated from -03
- New use cases documented (details in next slides)
  - SD-WAN
  - Radio functional splits
- Existing use case complemented
  - 5G services (adding details in the situation when IETF Network Slice Customer is the 3GPP mgmt system)
- Two new co-authors (Jeff and Krzysztof)
- Content in progress for -06
  - Slices extending to DC
  - Summary table of attributes / functionalities providing an aggregated view of all the scenarios

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

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.

Next steps

- **Complete the work in progress** (and correct some typos)
  - DC, summary table
- Scan for additional relevant cases, if any

- Collect feedback / comments from the WG
- Prepare a new version for IETF#112

- Call for adoption as WG document
  - Document valuable as input for several others in the WG (YANG models, NSC structure, instantiation of NS in service providers' Networks, etc)

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