Considerations about Hierarchical IETF Network Slices

draft-dong-teas-hierarchical-ietf-network-slice-01

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Background

• Hierarchical network slicing is briefly mentioned in IETF network slice framework (draft-ietf-teas-ietf-network-slices)

> “An IETF Network Slice can be further sliced into other network slices. Recursive composition allows an IETF Network Slice at one layer to be used by the other layers.”

• This document describes some typical use cases of hierarchical network slices

• It also provides the considerations and requirements on the technologies in different network planes to realize hierarchical IETF network slices
Hierarchical IETF Network Slice Use Cases

- Multiple customer network slices in an industrial network slice
  - Level-1: education network slice
  - Level-2: university network slices

- Multiple application network slices in a customer network slice
  - Level-1: hospital network slice
  - Level-2: medical service network slices

- Network slices in a wholesale network slice
  - Level-1: wholesale network slice
  - Level-2: customer network slices
Hierarchical NS Realization Considerations

- Resource partitioning in forwarding plane
  - NRPs are used to support one or multiple network slices services
  - For hierarchical network slicing, forwarding plane network resources need to be partitioned in a hierarchical manner
  - Two options of hierarchical NRPs modeling at link resources level:
    - Can have different impacts to the control plane and management plane
Hierarchical NS Realization Considerations

• Data plane identification of hierarchical NRPs
  • The identifier needs to be able to identify different levels of NRPs
  • Two options of data plane NRP identifiers

Option 1:
• Use a unified data plane identifier for both the first-level NRP and the second-level NRP
• First-level NRPs and the second-level NRPs are identified using different identifier values.

Option 2:
• Use a hierarchical identifier for the first-level and the second-level NRPs
• The first-level and second-level NRP IDs may be carried in continuous fields in the packet, or in separate fields.
Control Plane and Data Plane Considerations

• Control plane may be used for the distribution of the attributes and states of the hierarchical NRPs among network nodes and also to the network controller
  • With different NRP modeling, the information could be advertised as either layer-3 or layer-2 information, which can have different functionality and scalability implications to the control plane
  • As the number of hierarchical network slices increases, some further control plane optimization may be needed

• Management plane may need to provide life-cycle management to both the first-level network slices and the second-level network slices.
  • It should allow to manage the first-level and second-level network slices separately, while the relationship between them are maintained
Next Steps

• Solicit input and comments on hierarchical network slices
  • The possible use cases and requirements
  • Further considerations about the realization

• Revise the draft accordingly
Thank You