

# Considerations about Hierarchical IETF Network Slices

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

Jie Dong, Zhenbin Li @Huawei

# Background

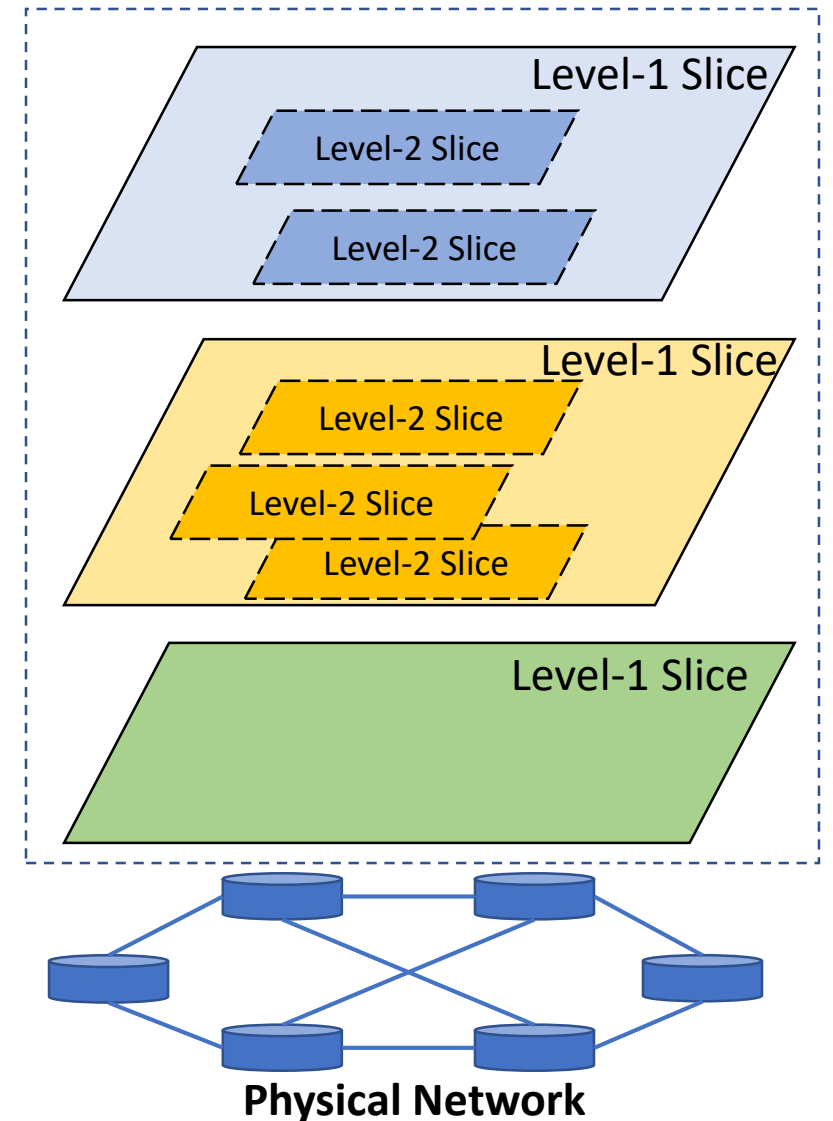
- Hierarchical network slicing is briefly mentioned in IETF network slice framework (draft-ietf-teas-ietf-network-slices)

*“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

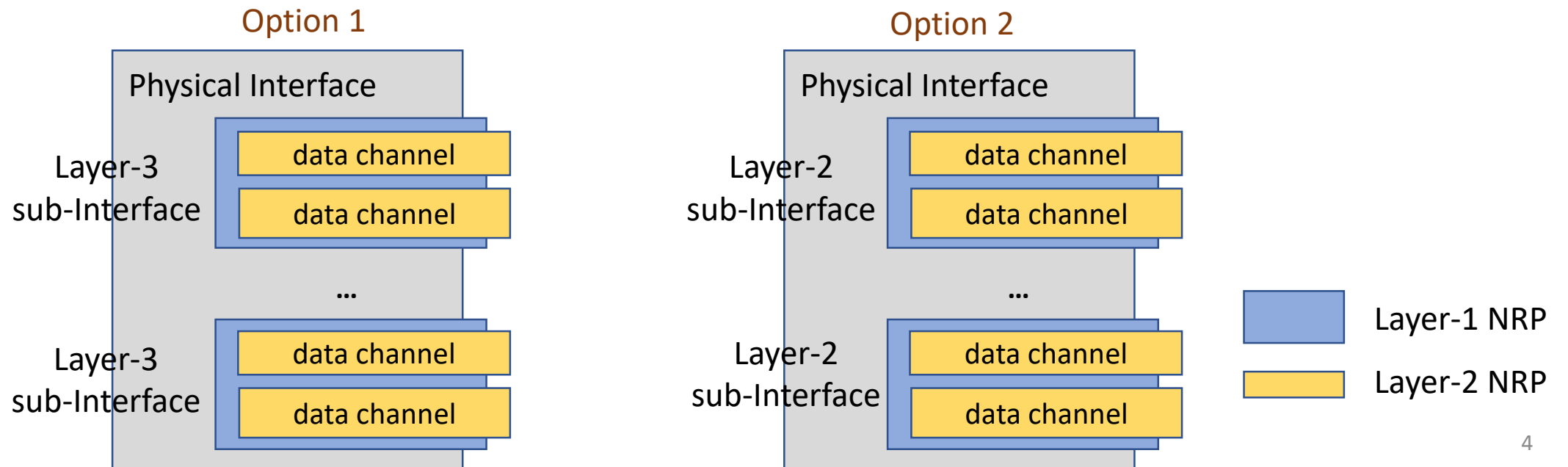
# Hierarchical IETF Network Slice Use Cases

- 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.

Unified NRP-ID for different Hierarchies

## 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

Level-1 NRP-ID

Level-2 NRP-ID

# 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