

# G Suppl. 74 Network Slicing in a Passive Optical Network

ITU-T G Suppl. 74 is a supplemental document to ITU PON standards describing architecture and use cases of network slicing.

Slicing on OLT CTs collect individual flows into groups called slices and adds a control function for sharing

common resources at the slice level.

This control function enables a degree of isolation of services or virtual network operators (VNO) associated with different slices when the PON resources are shared between the slices.

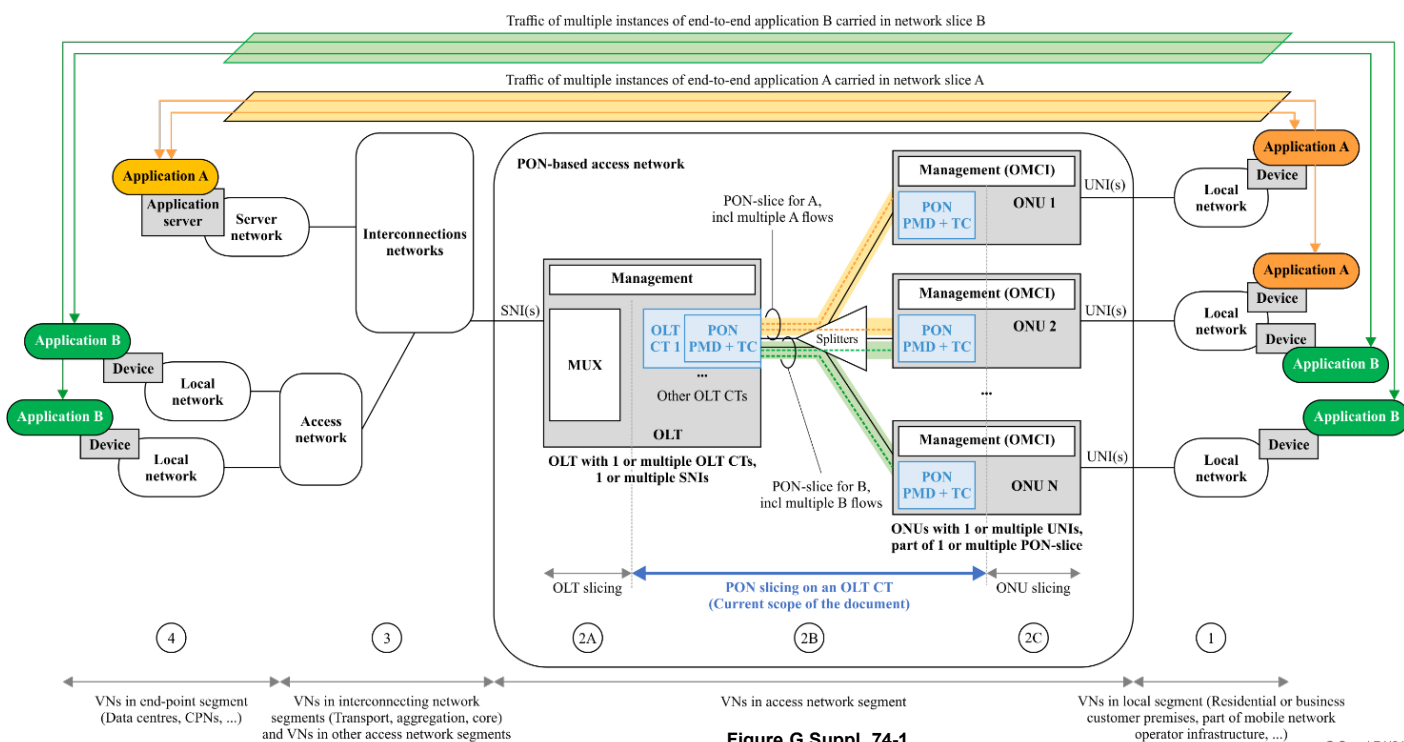


Figure G Suppl. 74-1

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## FIGURE: G Suppl. 74-1

[1] Local Segment (Residential / Business) Networks

[2A] OLT slicing represents slicing in the OLT part that is common to the multiple OLT CTs;

[2B] PON slicing represents an OLT CT carrying multiple PON slices to/from the PMD+TC functions of the associated ONUs;

[2C] ONU slicing represents slicing in the part of the ONU behind its PMD+TC function.

[3] Transport / Aggregation Network

[4] Service Termination (Data Center, CPN)

### SCOPE OF SUPPLEMENT

The current scope of the supplement is slicing in the access network

### SCOPE OF SLICE AWARENESS

#### PON Slicing Scope

Partition of the shared resources and functions of the OLT CT, namely the upstream and downstream PON capacity and the control of their sharing by utilising dynamic bandwidth allocation (DBA) in upstream and hierarchical scheduling downstream.

#### ONU Slicing Scope

Partition of the traffic management and buffering functions of the ONU. A conventional ONU has corresponding

capabilities (e.g., traffic management) that are controlled via OMCI. A sliced ONU could have multiple similar functional instances, each controlled independently.

#### OLT Slicing Scope

Partitions the relevant traffic management functions of the OLT. Similar to the ONU, the only resources that are shared in a conventional OLT (which does not support slicing), are the management and control system. Thus, a sliced OLT would appear to north-bound network management systems as several logically independent OLTs. There are many ways that the resources of the OLT associated with a particular OLT CT could be divided. OLT slicing is for future study.

### USE CASES OUTLINED IN SUPPLEMENT

1. Network Slicing for PON supporting several applications of different latency constraints
2. Dynamic optimization of resource allocation in a PON supporting mobile applications
3. Slicing a PON system for multi-operator scenarios
4. Slicing in a PON system for a multi-service shared network (example: Golden / Silver / Bronze service prioritization)
5. PON slicing for industrial PON scenario

### FUNCTIONS NEEDED FOR PON-SLICING

#### Slice Awareness in Upstream (DBA)

Supplement describes an additional layer of the DBA function over and above the flow level described within the PON TC-Layer standards.

#### Slice Awareness in the Downstream

Supplement described an additional layer in the downstream hierarchal scheduling above the flow level.

#### Control of common per-PON CT resources

Description of control mechanisms required to insure backward compatibility with existing service parameters.

#### Functions related to control of a PON slice

Description of the scope that a network operator has when configuring an assigned slice, or a network wide set of slices.

#### SLICE AWARE DBA

Description of slice-aware DBA and the partitioning of bandwidth maps to ensure service parameters such as latency are met.

#### CONTROL OF PON SLICES

Control of PON slices based upon ITU Y.3150 / Y.3151 Software Defined Network (SDN) architectures. Supplement outlines both an architectural model for PON slice abstraction as well as a SDN-based control interface.

