# Framework and Data Model for OTN Network Slicing

[draft-zheng-ccamp-yang-otn-slicing-01](draft-zheng-ccamp-yang-otn-slicing-01)

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# OTN Slicing Interfaces

```
                    +----------------------+
                    | Provider's User      |
                    +--------|-------------+
                             |CMI
+--------------------+-------+----------------------------------+
|          Orchestrator / E2E Slice Controller                 |
+--------------------+------------------------+----------------+
                     |OTN-SC NBI              |
                     |                        |
+-------------+------+----------+  OTN-SC NBI |OTN-SC NBI
|   OTN-SC    |            +-----------------+   |
+-------------+------+-----+                     |   |
                     |MPI                        |   |
+----------+---------+-----------------|---------|-------+
| SDN      |                  +-------+----+------+----+|
| Controller |                |        OTN-SC          ||
|          |                  +-----------------------++|
|          |                           |Internal API |  |
|+---------+------------------+---------+-------------+--+|
||              PNC/MDSC                             ||
|+----------------------------+----------------------+|
+--------------------|-------------------------------+
                     |SBI
        +------------+----------+
        |OTN Physical Network   |
        +-----------------------+
```
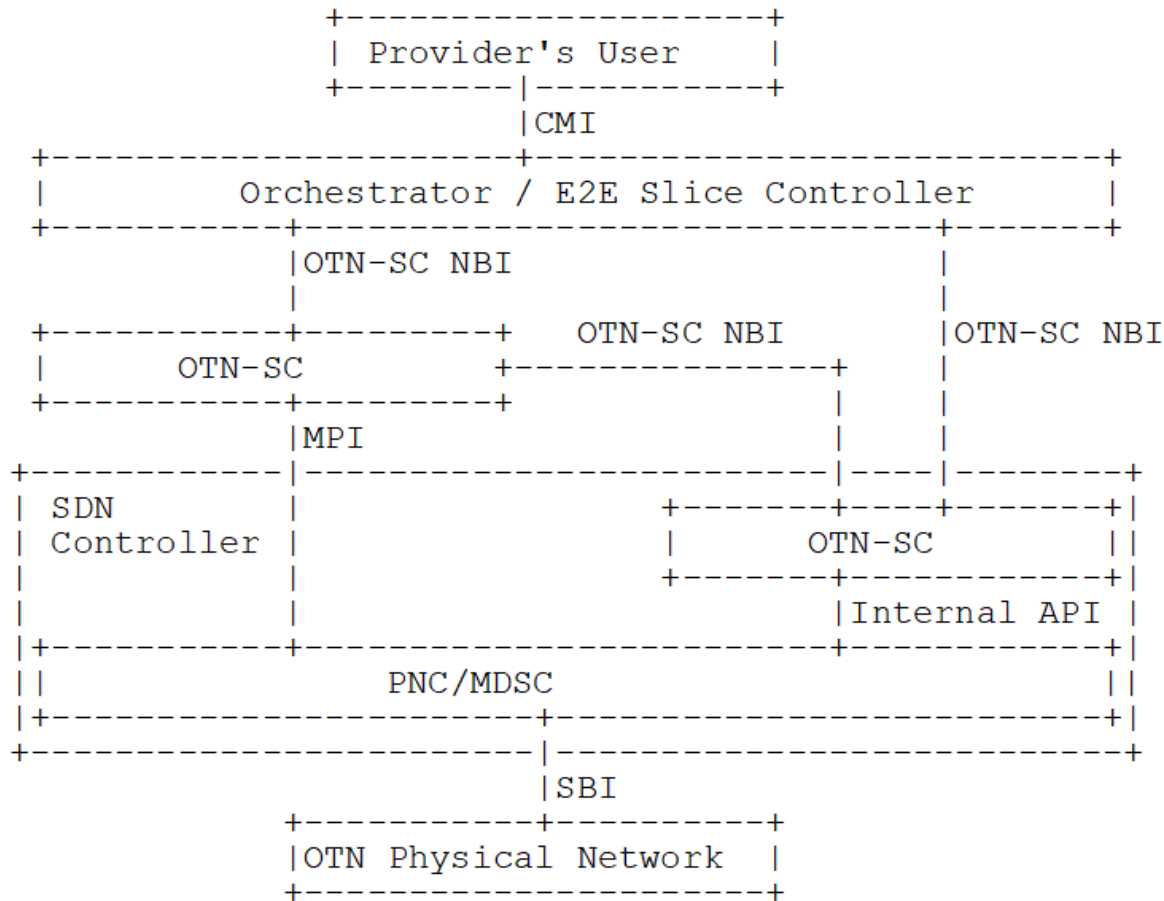
- OTN slice controller (OTN-SC) may be deployed either outside or within an SDN controller
  - Translating slice configuration into OTN TE topology or TE tunnel requests at the MPI, or
  - Interact with higher- or lower-level slice controller in a recursive manner
- Interaction between OTN-SC and IETF network slice controller is for further study
  - An IETF network slice controller may use an OTN-SC to provision OTN slices to support end-to-end slicing

# OTN Slicing Realization @ MPI

- Connectivity-based
  - An OTN slice is realized by creating client services over ODU switched TE tunnels.
  - This case is already covered by existing YANG model clusters:
    - Network topology/generic TE topology/OTN TE topology
    - Generic TE tunnel/OTN TE tunnel
    - Client signal
- Resource-based
  - Realizing an OTN slice by reserving ODU topological resources
  - This is the focus of the YANG model proposed in this draft

# Major Updates since IETF 109

- Added co-authors
- Updated use case description
    - Leased Line Services with OTN
    - Co-construction and Sharing
    - Wholesale of optical resources
    - Vertical dedicated network with OTN
- Added YANG data model for OTN-SC MPI
    - OTN slice realization with ODU resource coloring over TE topology
        - Link- or time slot-based
    - ODU resource reservation is performed by the underlying PNC/MDSC
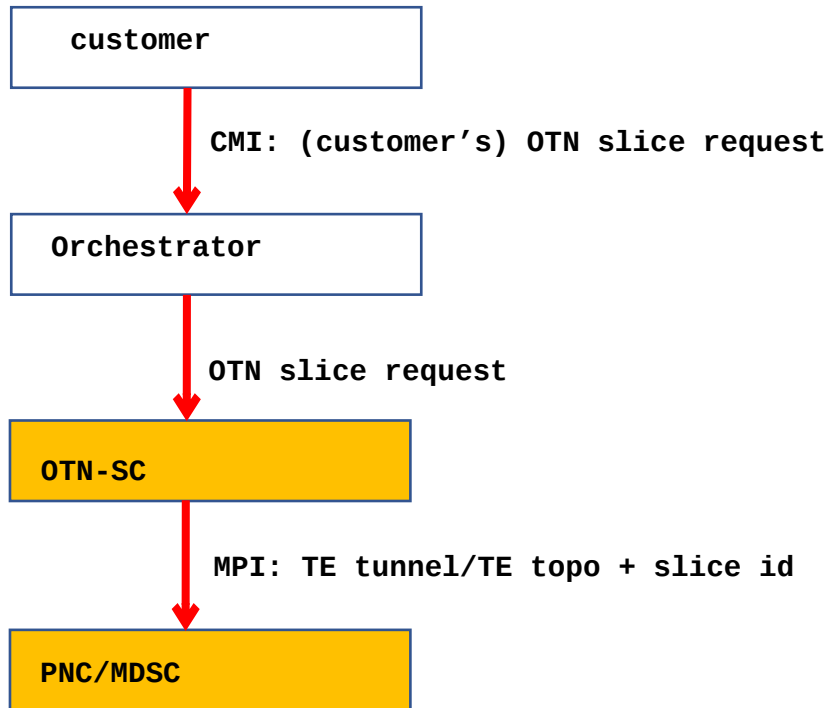
# YANG Model @ MPI

```
module: ietf-otn-slice

    augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes:

      +--rw (otn-slice-granularity)?

        +--:(link)

        |  +--rw slice-id?    uint32

        +--:(link-resource)

          +--rw slices* [slice-id]

            +--rw slice-id          uint32

            +--rw (technology)?

            |  +--:(otn)

            |     +--rw otn-ts-num?   uint32

            +--ro sliced-link-ref?    -> ../../../../../nt:link/link-id
```

\* A prior version of this YANG model was contributed to ONAP and is included in its Guilin Release.

# Next Steps

- Add YANG data model for OTN-SC NBI
  - Possible to augment the model defined by draft-liu-teas- transport-network-slice-yang-01
- Address the slicing for external (access and inter-domain) links
- Align with draft-ietf-teas-ietf-network-slice-definition on the terms and definitions
  - New use case: OTN slicing is a realization of IETF network slice
- Address comments and reviews from the WG
- Socialize and invite more co-authors and contributors before a possible call for WG adoption

# New Use Cases for OTN Slicing

```
┌─────────────────────────┐
│        customer         │
└─────────────────────────┘
             │
             ▼  CMI: (customer's) OTN slice request
┌─────────────────────────┐
│      Orchestrator       │
└─────────────────────────┘
             │
             ▼  OTN slice request
┌─────────────────────────┐
│         OTN-SC          │
└─────────────────────────┘
             │
             ▼  MPI: TE tunnel/TE topo + slice id
┌─────────────────────────┐
│        PNC/MDSC         │
└─────────────────────────┘
```

Current use cases:
- Leased Line Services with OTN
- Co-construction and Sharing
- Wholesale of optical resources
- Vertical dedicated network with OTN

```
┌─────────────────────────┐
│        customer         │
└─────────────────────────┘
             │
             ▼  Other services
┌─────────────────────────┐
│      Orchestrator       │
└─────────────────────────┘
             │
             ▼  E2e slice request
┌─────────────────────────┐
│   E2E slice controller  │
└─────────────────────────┘
             │
             ▼  Network slice request
┌─────────────────────────┐
│           NSC           │
└─────────────────────────┘
             │
             ▼  OTN slice request
┌─────────────────────────┐
│         OTN-SC          │
└─────────────────────────┘
             │
             ▼  MPI: TE tunnel/TE topo + slice id
┌─────────────────────────┐
│        PNC/MDSC         │
└─────────────────────────┘
```
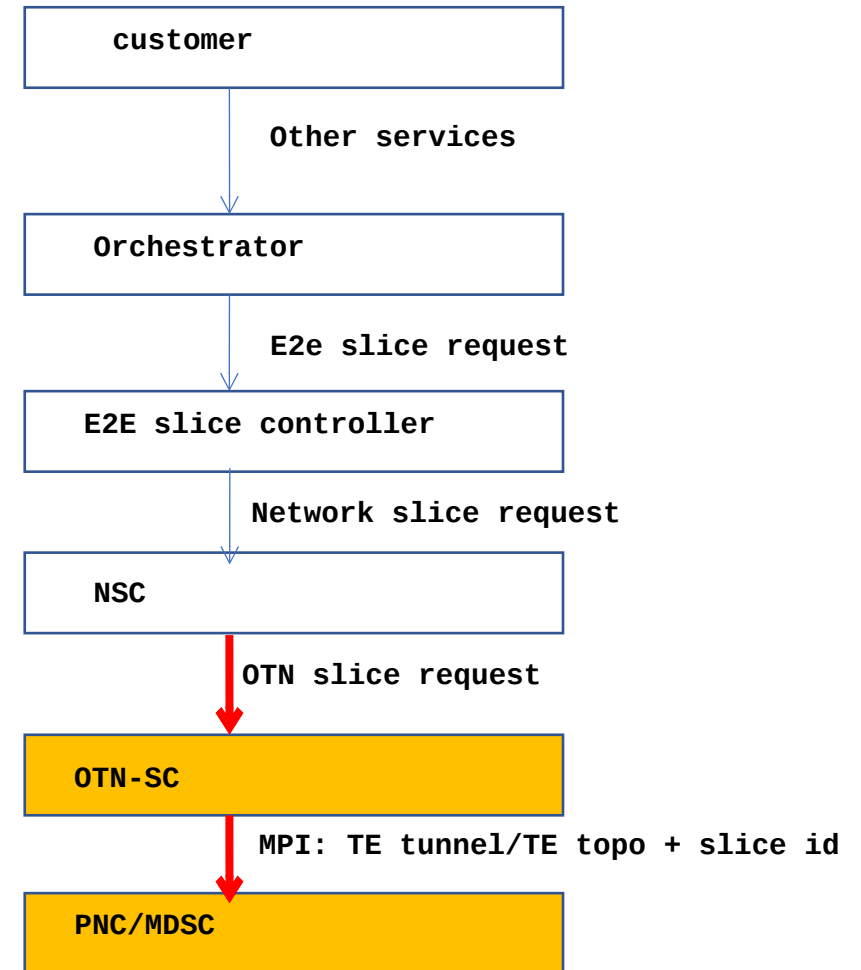
New use case
- OTN slice is (part of) a realization of IETF network slice

# Thank You!