

A Yang Data Model for ACTN VN Operation

draft-lee-teas-actn-vn-yang-12



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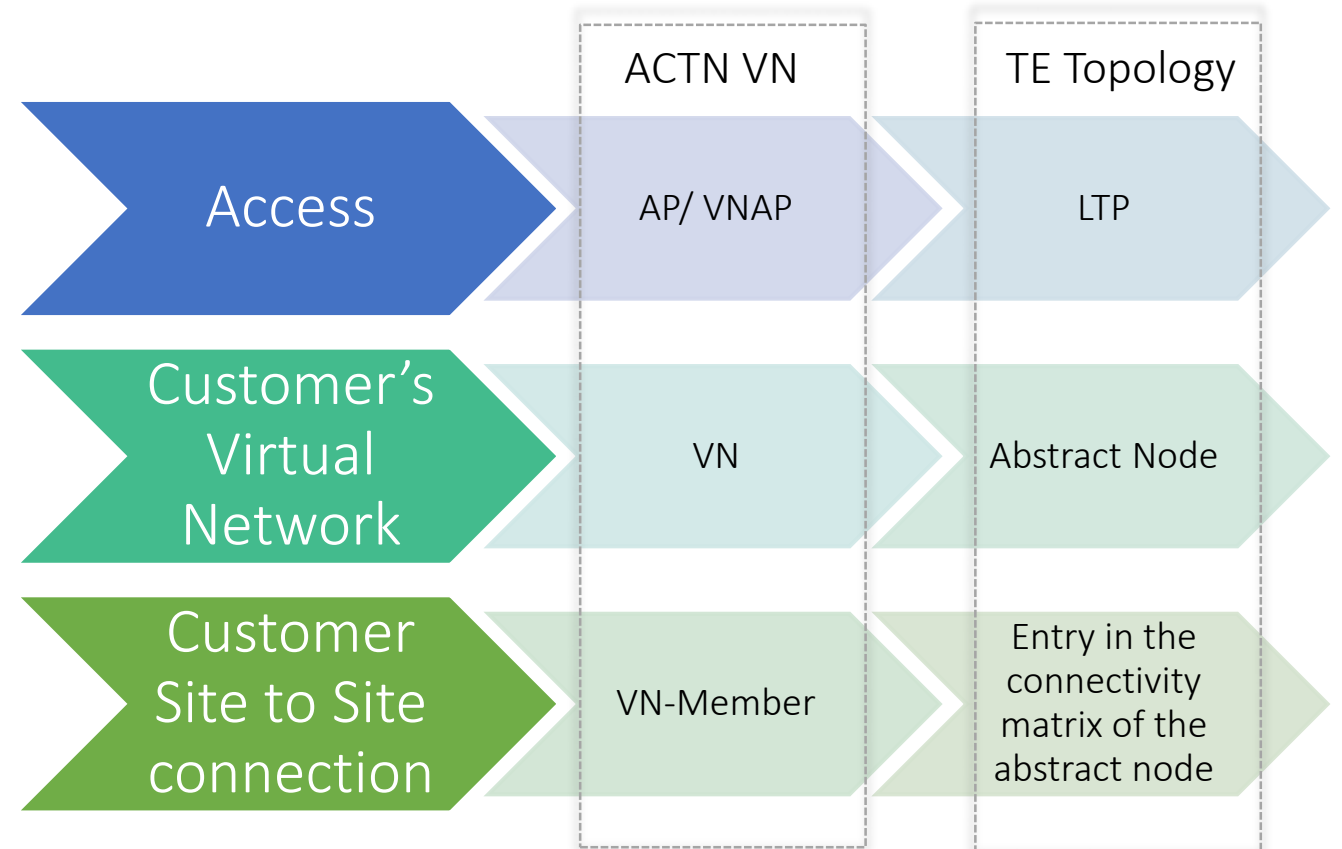
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Introduction

- A YANG data model for the ACTN Virtual Network Service (VNS) operation that is going to be implemented for CMI (between CNC and MDSC).
 - Aligned to Customer Service Model
 - VN Instantiation, VN Computation, VN Lifecycle
 - Access Points (AP) and Virtual Network Access Points (VNAP)
 - Virtual Network (VN)
 - List of VN members
 - Other VN Operations
 - Multi-src/Multi-dest
 - As per the ACTN Informational Model

Major Change

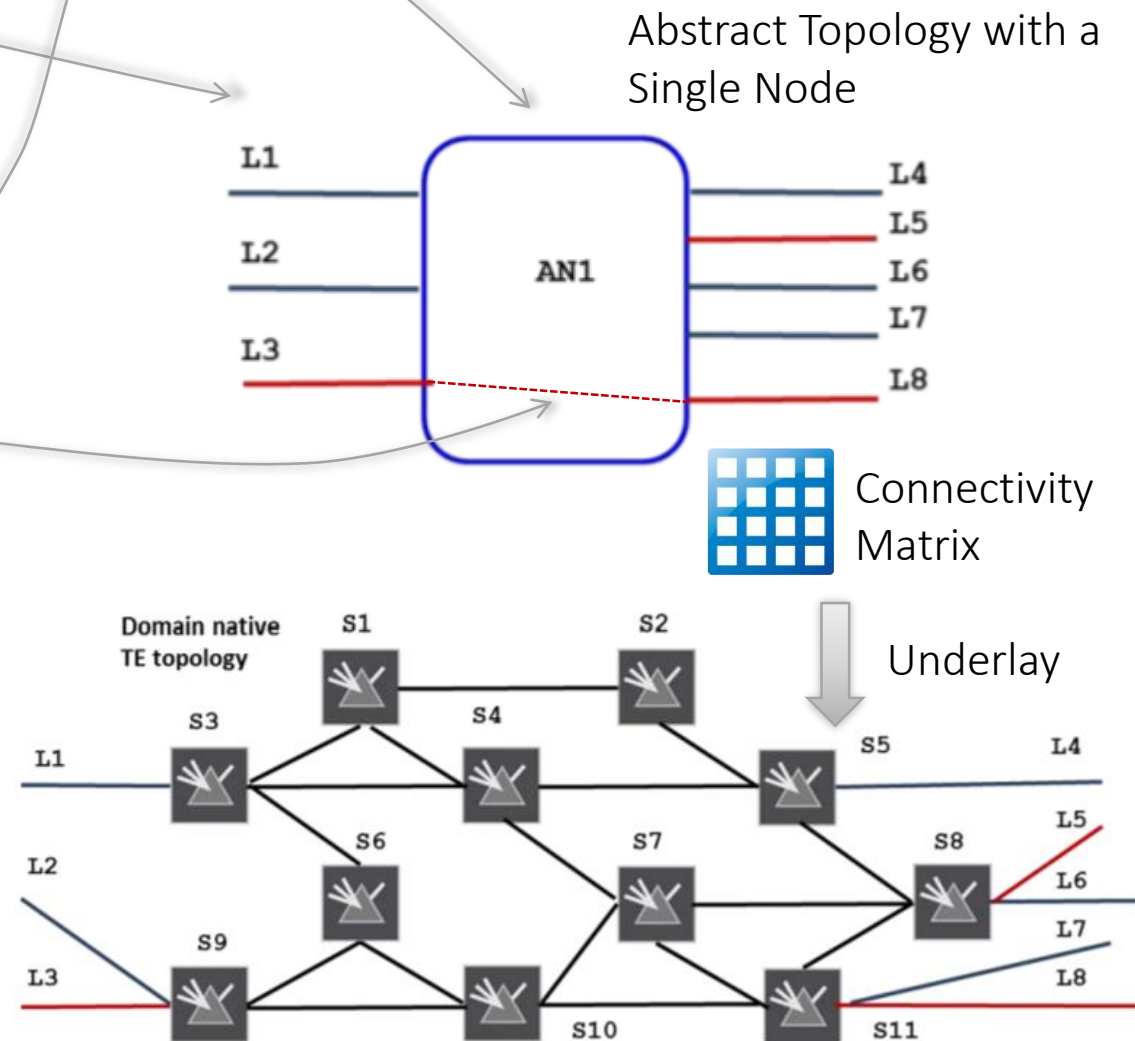
- Coupling with the TE Topology Yang Model
 - Removed any duplicated information that can be found in TE Topology
 - Constraints
 - Explicit Path
 - Underlay path
 - Etc.
- Simplification of model for both VN Type 1 & VN Type 2
- JSON examples are added



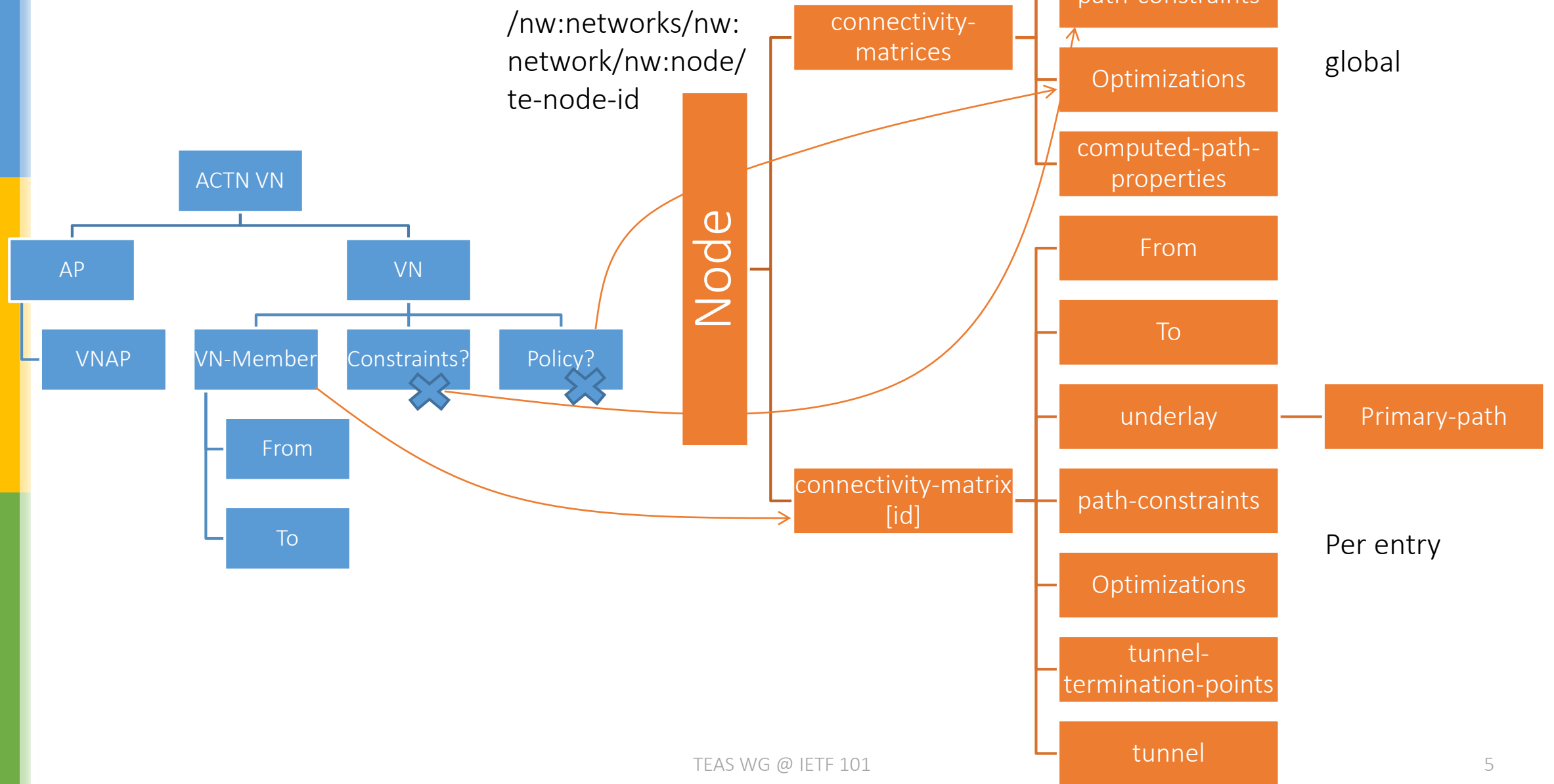
Overview



- For both VN Type 1 or Type 2 VN Yang model rely on a single node in the abstract TE Topology
- The abstract node has
 - connectivity-matrices
 - connectivity-matrix [id]
 - The attributes directly under container connectivity-matrices are the default attributes for all connectivity-matrix entries when the per entry corresponding attribute is not specified. When a per entry attribute is specified, it overrides the corresponding attribute directly under the container connectivity-matrices.



Overview



How: Reference to TE Topology Yang Model

Access	<ul style="list-style-type: none">• AP/ VNAP -> LTP• Ltp of type te-types:te-tp-id
Customer's Virtual Network	<ul style="list-style-type: none">• VN -> Abstract Node• vn-topology-id of type te-types:te-topology-id• abstract-node -> /nw:networks/network/node/tet:te-node-id (reference)
Customer Site to Site connection	<ul style="list-style-type: none">• VN-Member -> Entry in the connectivity matrix of the abstract node• connectivity-matrix-id -> /nw:networks/network/node/tet:te/te-node-attributes/connectivity-matrices/connectivity-matrix/id (reference)

All parameters which are can be set as global attributes to VN are set in the connectivity-matrices (such as bandwidth) and an attribute for a particular VN-member is set in the connectivity-matrix [id] (such as explicit path)!

Duplicate parameters in ACTN VN Yang model are removed!

- VN is seen as edge to edge links (VN-members) setup as tunnels across underlying networks!

VN Type 1

- VN 1

- VN-Member 1 L1-L4
- VN-Member 2 L1-L7
- VN-Member 3 L2-L4
- VN-Member 4 L3-L8

- This VN has following properties

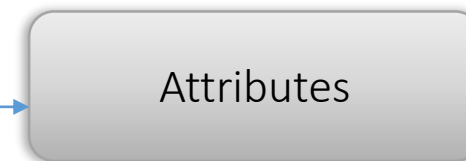
- Bandwidth 500
- Optimize by delay

These properties
are set in TE Topo

Abstract Topology with a
Single Node



connectivity-matrices

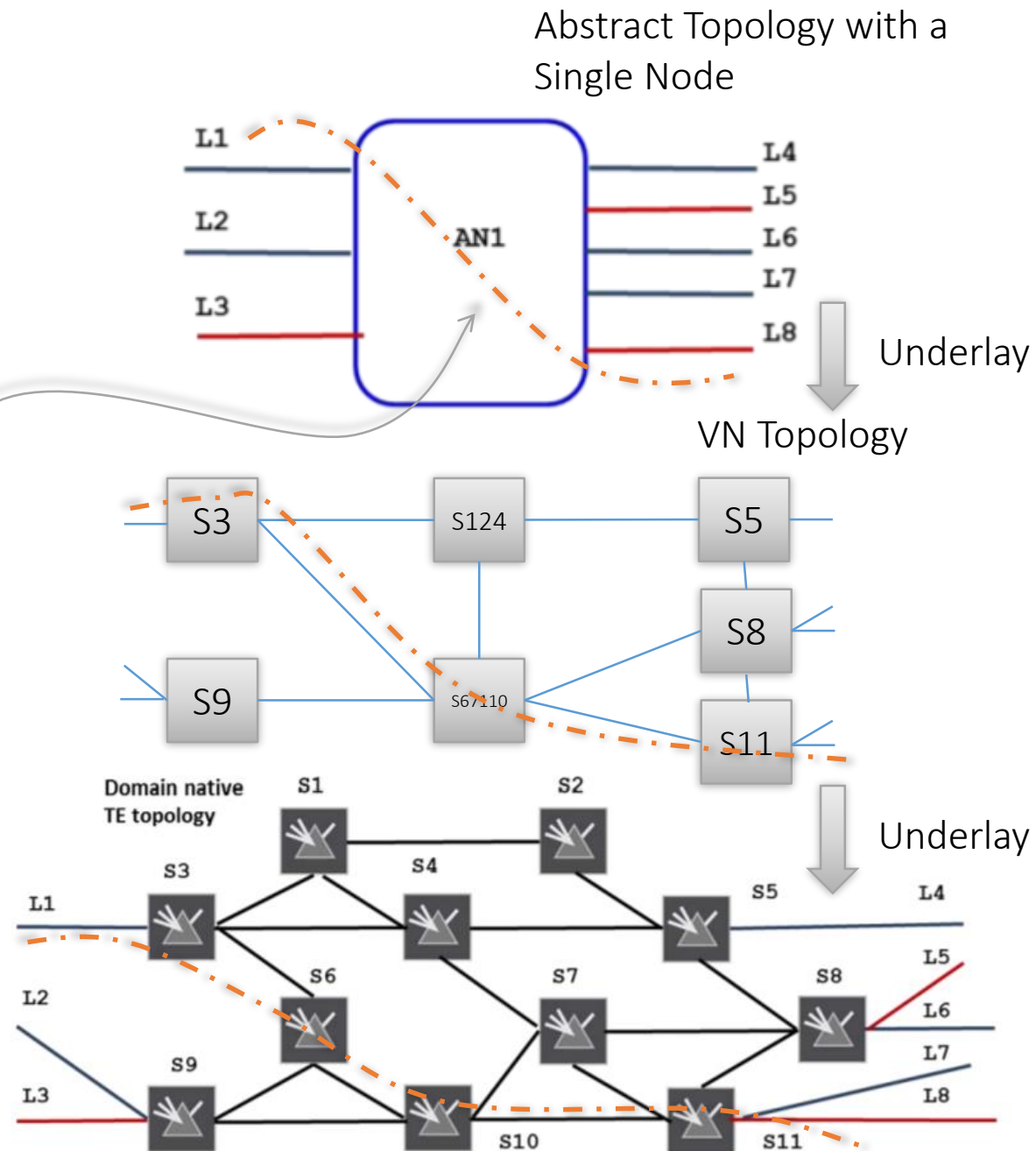


14: L1-L4	17: L1-L7
24: L2-L4	38: L3-L8

Connectivity
Matrix

VN Type 2

- VN is seems as a topology of virtual nodes and links
- To ease mapping between VN Yang Model and TE models, an abstract single node topology is created with VN topology as the underlay!
- The same mapping as VN Type 1 is reused.
- VN 2
 - VN-Member 1: L1-L8 via S3, S67110, S11
 - Set via the underlay path in connectivity-matrix[id]



Role of ACTN VN Model

Customer view of VN

- VN as a single entity (as per the ACTN info model)
- ~ Service Model

Innovative Services

- VN Compute
- Multi-Src / Multi-Dest

Service Mapping

AP / VNAP

ACTN VN Yang Tree

```
module: ietf-actn-vn
+--rw actn
  +--rw ap
    | +--rw access-point-list* [access-point-id]
    |   +--rw access-point-id    uint32
    |   +--rw access-point-name? string
    |   +--rw max-bandwidth?     te-types:te-bandwidth
    |   +--rw avl-bandwidth?     te-types:te-bandwidth
    |   +--rw vn-ap* [vn-ap-id]
    |     +--rw vn-ap-id        uint32
    |     +--rw vn?             -> /actn/vn/vn-list/vn-id
    |     +--rw abstract-node? -> /nw:networks/network/node/tet:te-node-id
    |     +--rw ltp?            te-types:te-tp-id
  +--rw vn
    +--rw vn-list* [vn-id]
      +--rw vn-id          uint32
      +--rw vn-name?       string
      +--rw vn-topology-id? te-types:te-topology-id
      +--rw abstract-node? -> /nw:networks/network/node/tet:te-node-id
      +--rw vn-member-list* [vn-member-id]
        | +--rw vn-member-id    uint32
        | +--rw src
        | | +--rw src?          -> /actn/ap/access-point-list/access-point-id
        | | +--rw src-vn-ap-id? -> /actn/ap/access-point-list/vn-ap/vn-ap-id
        | | +--rw multi-src?    boolean {multi-src-dest}?
        | +--rw dest
        | | +--rw dest?         -> /actn/ap/access-point-list/access-point-id
        | | +--rw dest-vn-ap-id? -> /actn/ap/access-point-list/vn-ap/vn-ap-id
        | | +--rw multi-dest?   boolean {multi-src-dest}?
        | +--rw connectivity-matrix-id? -> /nw:networks/network/node/tet:te/te-node-attributes/connectivity-matrices/connectivity-matrix/id
        | +--ro oper-status?      identityref
      +--ro if-selected?         boolean {multi-src-dest}?
      +--rw admin-status?       identityref
      +--ro oper-status?        identityref
      +--rw vn-level-diversity?  vn-disjointness
```

Next Step

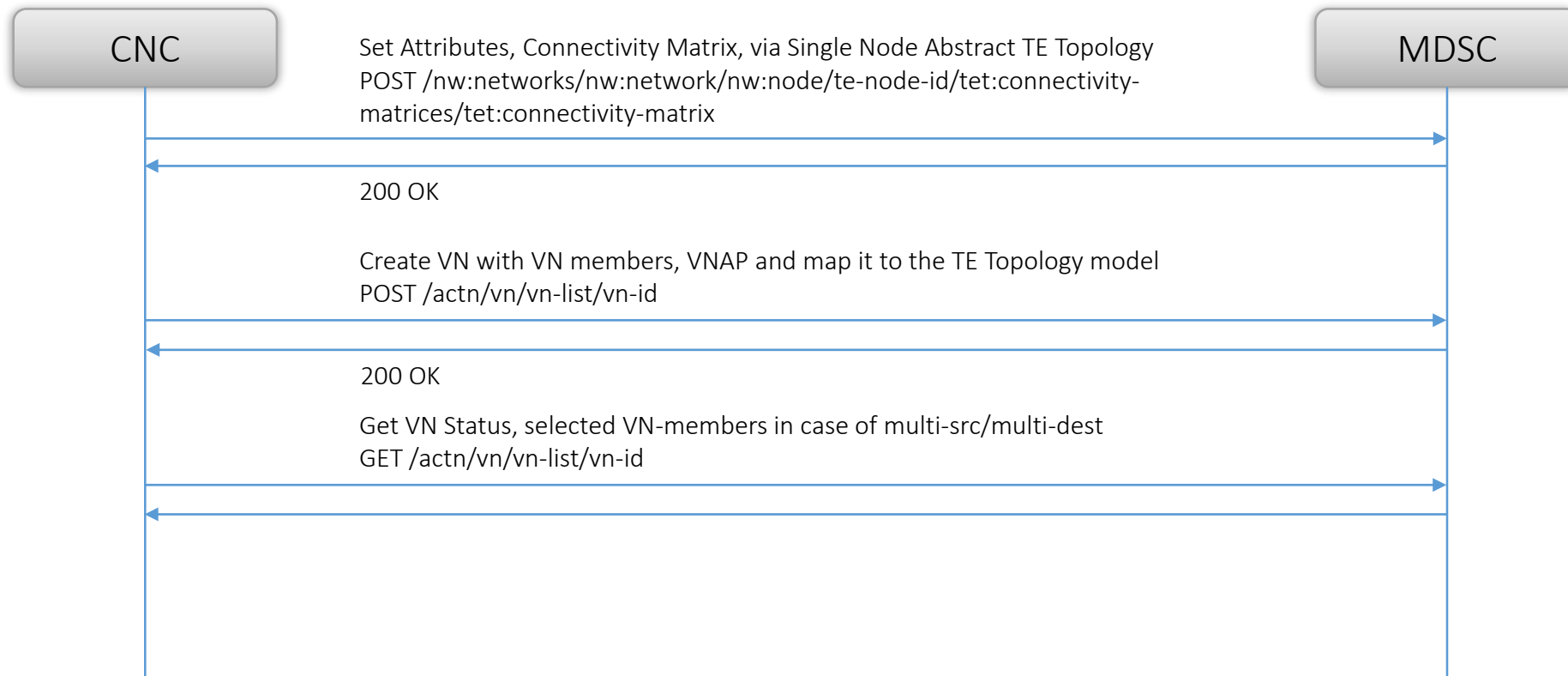
- This update of draft is based on feedback received during the last IETF to reuse existing TE yang model as much as possible.
- This update does just that and works well with abstract TE topology model
- Request for WG Adoption!



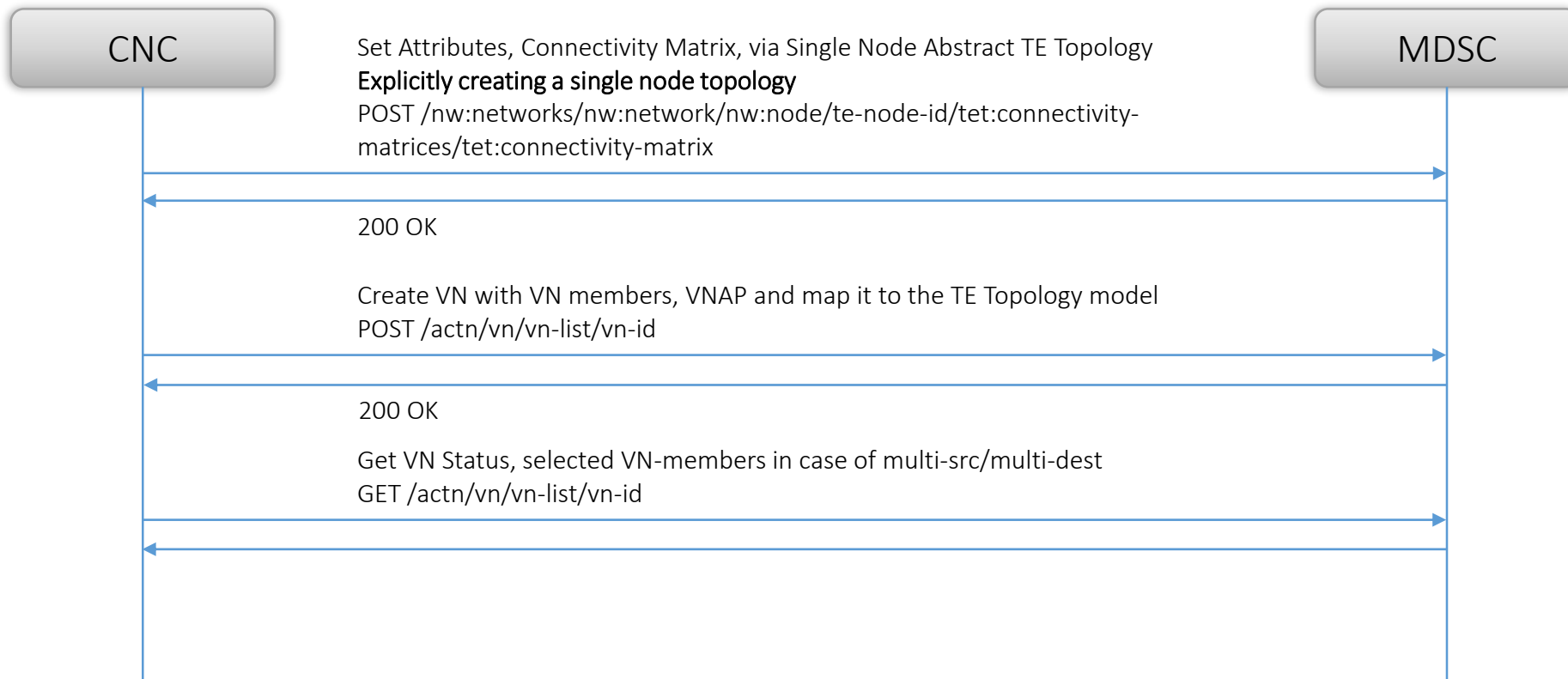
Thank You!

Backup Slides

Typical Interactions: VN Type 1

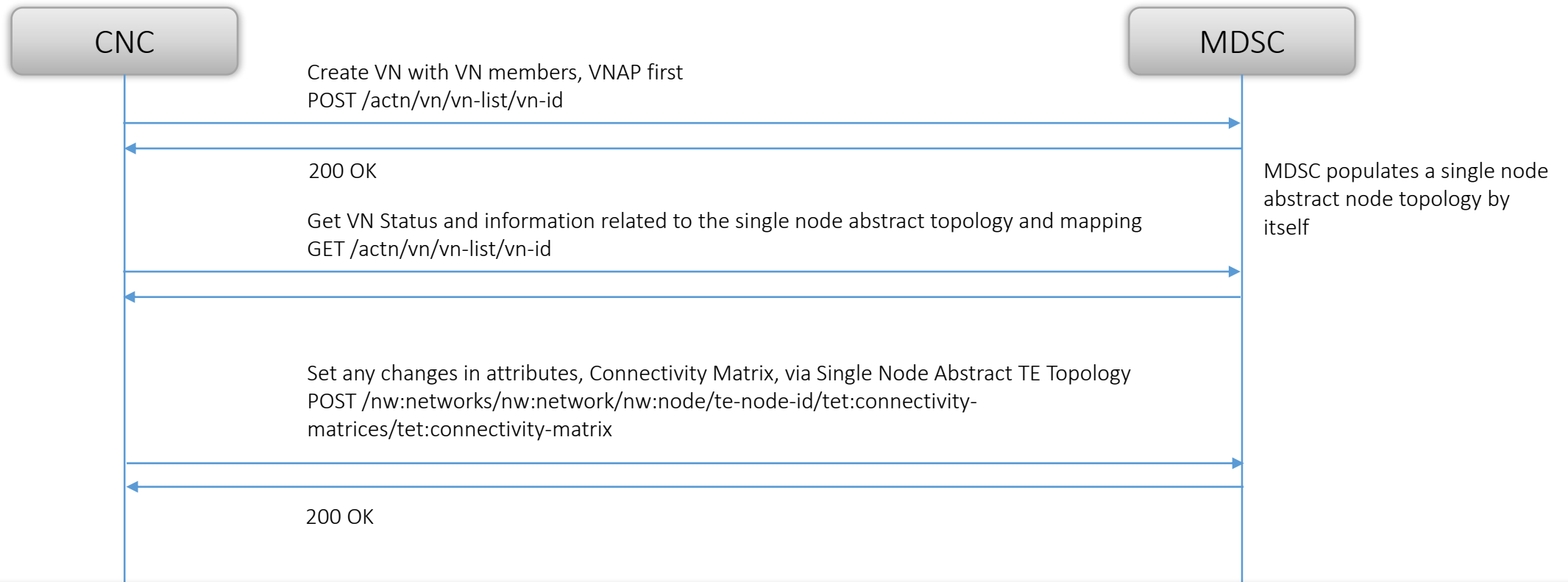


Typical Interactions: VN Type 2



The CNC creates a single node topology by itself, in this way VN Type 1 and VN Type 2 would have similar interactions

Typical Interactions: VN Type 2



The MDSC creates a single node topology by itself and maps it to the ACTN VN Yang model. Any attribute changes are done next via the te topology model

Multi-Src / Multi-Dest

- Multiple VN members are configured and marked with multi-src or multi-dest option
- The MDSC selects the VN member to actually setup and create a connectivity matrix entry in the single node abstract topology based on the selected.
- MDSC is free to change the selected VN-member in coordination with CNC

VN-Member 1	L1-L4(*)
VN-Member 2 (selected)	L1-L7(*)
VN-Member 3	L2(*)-L4
VN-Member 4 (selected)	L3(*)-L4
(*)	Multi-src or Multi-destination enabled

