

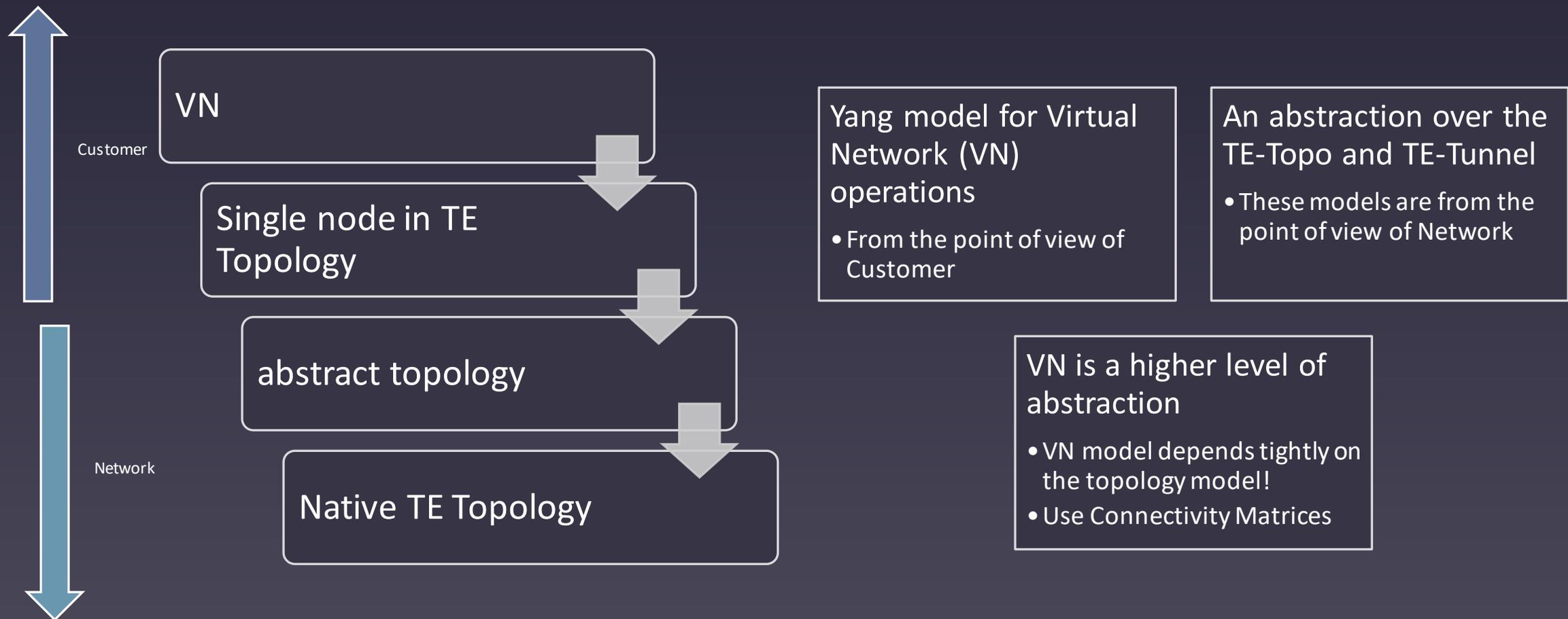
# A Yang Data Model for VN Operation

draft-ietf-teas-actn-vn-yang-06

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# VN Yang



# Recent Changes

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## Relationship to 5G

- In the context of 5G transport application, 5G Traffic Provisioning Manager (TPM) that provides slicing requirements to the transport networks (i.e., MDSC) can be considered as a type of CNC. The ACTN CMI provides the necessary interface functions between 5G and transport networks in order to facilitate dynamic VN creation and its lifecycle management with proper feedback loop for monitoring.

## Updated illustration and interactions for Type 1 and Type 2 VN

- Clarified how this model is used along side TE-topo connectivity matrix (pointer to JSON examples)

## Yang Model Changes

- ltp leaf inside vn-ap - used reference to TE-TOPO (was te-tp-id and thus was configurable)
- added references for the imported Yang Model

# Open Issues

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## VN Members

- Qin asked for clarification in the illustration for Lx in VN-Member L1-L2 etc
  - Current text says Customer End Point
  - Can be changed to AP?

## VN

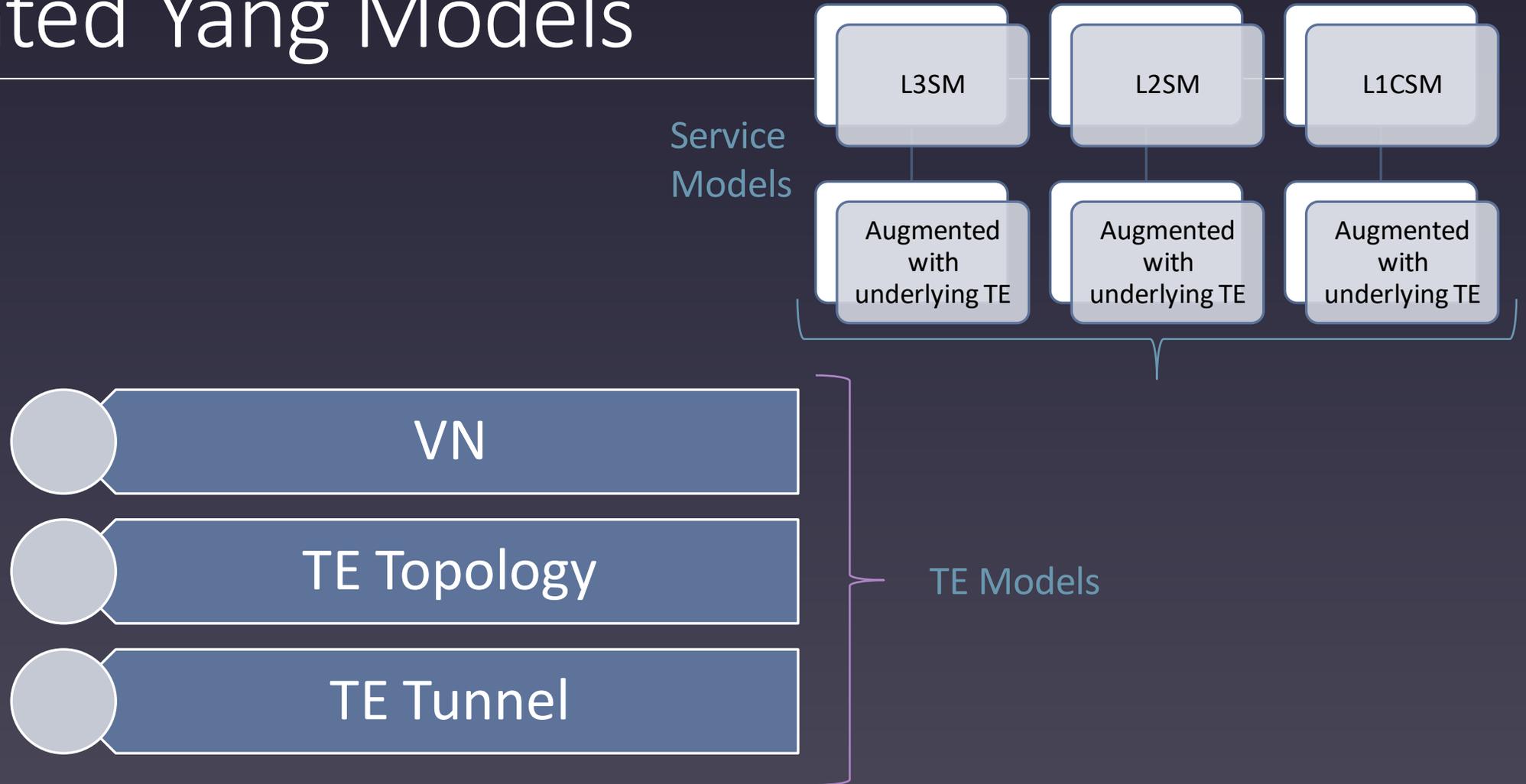
- Can VN member be set from PE to PE without attaching customer facing access also?
  - Currently VN Members is from a Source to destination AP
  - RFC 8453 describes AP as a logical identifier shared between the customer and the operator used to identify an access link. And thus this existed between CE and PE.
- Possible solutions
  - Relax the definition of AP
  - Use of loopback as an AP
  - Make AP optional
  - Recursive use of VN model in MPI that starts with PE

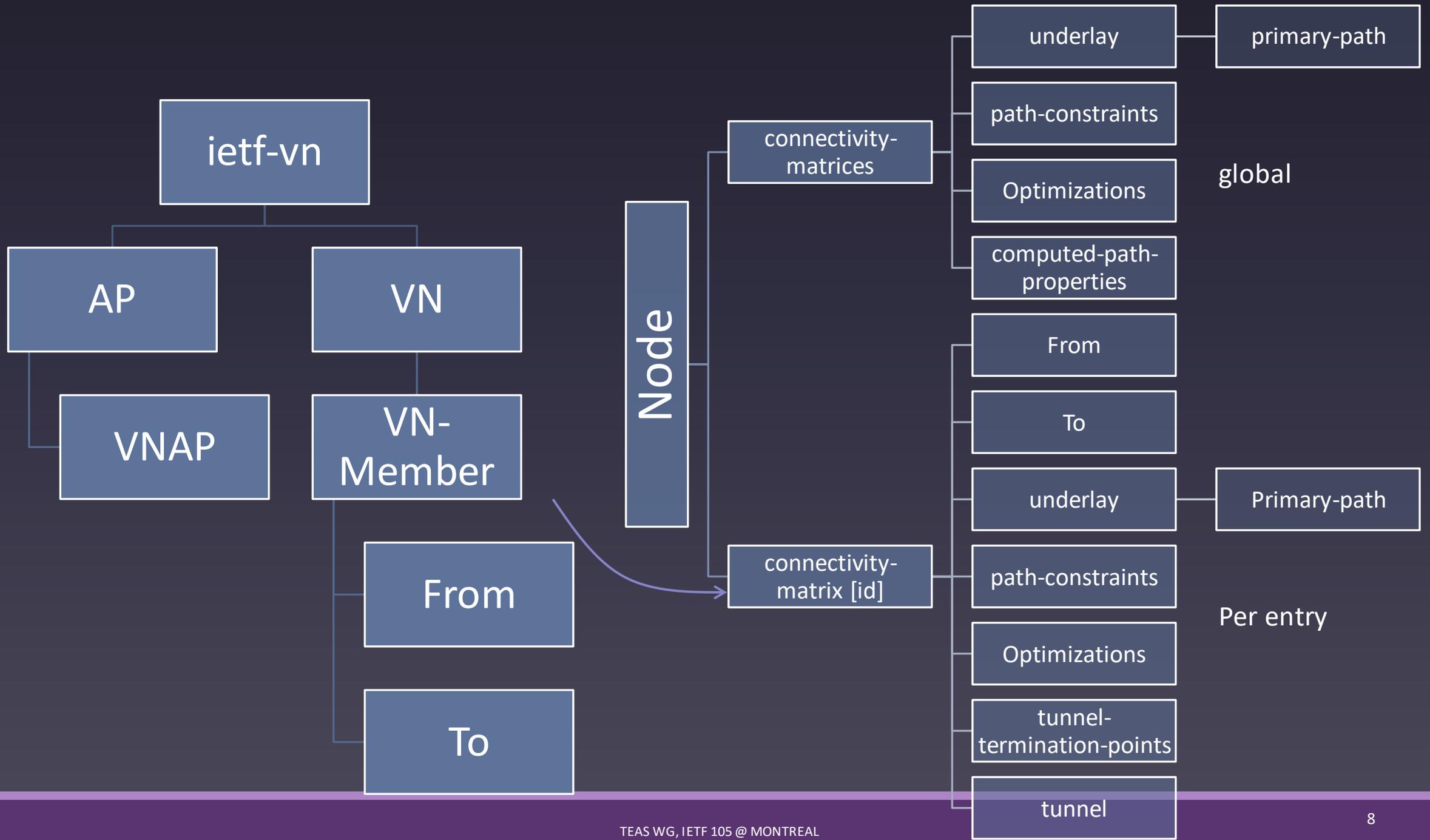
# Thanks!

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BACKUP!

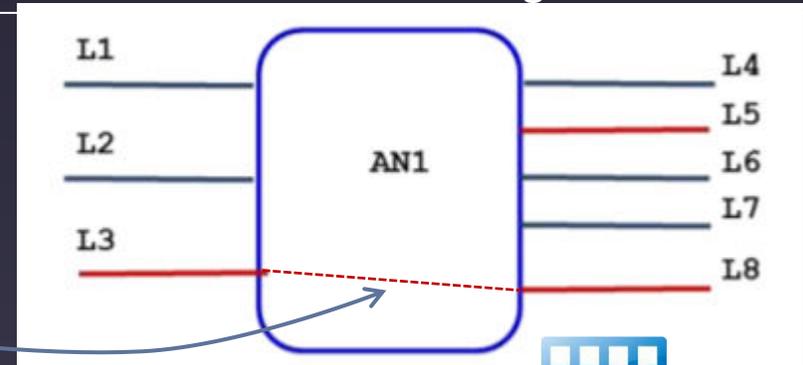
# Related Yang Models





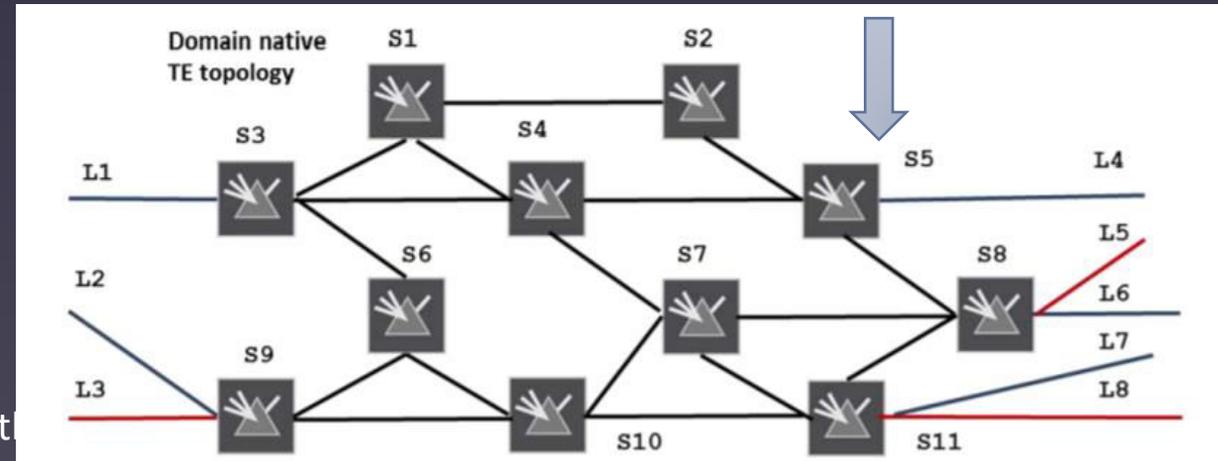


Abstract Topology with a Single Node



Connectivity Matrix

- 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.



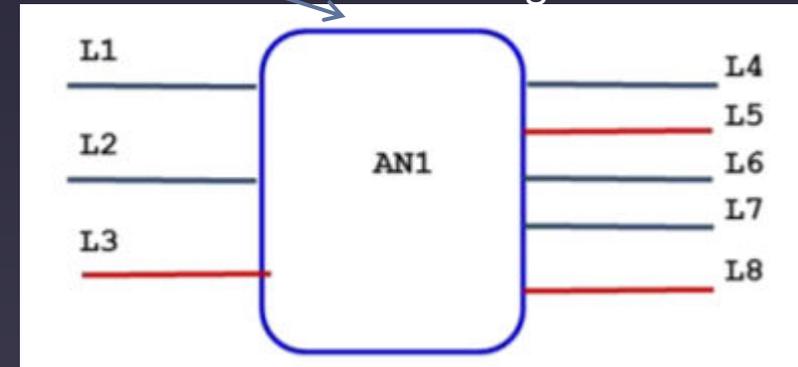
- VN is seen as edge to edge links (VN-members) setup as tunnels across underlying networks!

# VN Type 1

## •VN 1

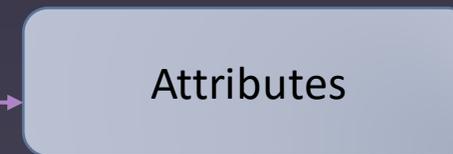
- VN-Member 1 L1-L4
- VN-Member 2 L1-L7
- VN-Member 3 L2-L4
- VN-Member 4 L3-L8
- This VN has following properties
  - Bandwidth 500
  - Optimize by delay

Abstract Topology with a Single Node



connectivity-matrices

These properties are set in TE Topo



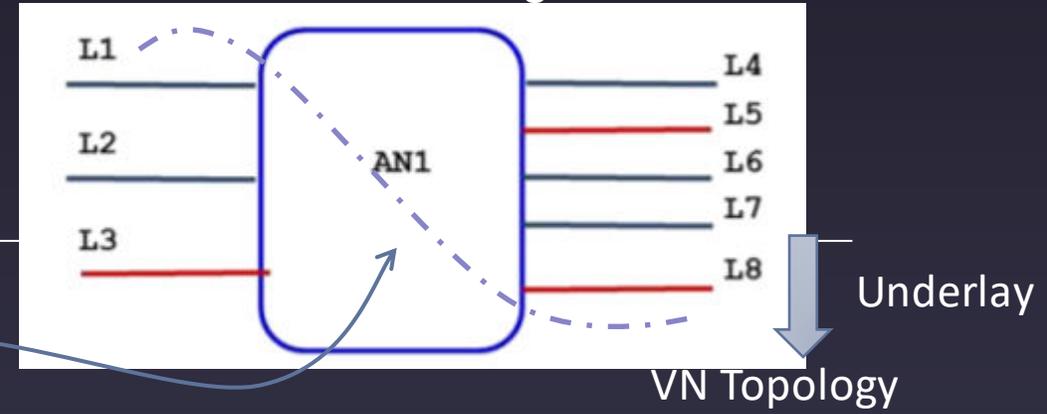
14: L1-L4	17: L1-L7
24: L2-L4	38: L3-L8

Connectivity Matrix

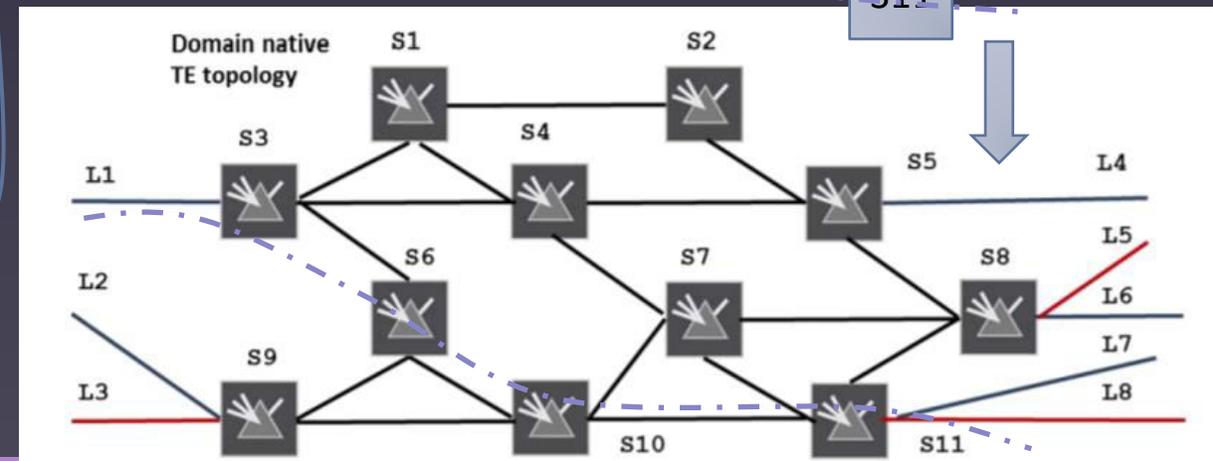
# VN Type 2

- VN is seen 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]

Abstract Topology with a Single Node



VN Topology



# How: Reference to TE Topology Yang Model

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

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 VN Yang model are removed!