A Yang Data Model for ACTN VN Operation
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ACTN Yang Model Map

Service Models

L3SM
Augmented with underlying TE

L2SM
Augmented with underlying TE

L1CSM
Augmented with underlying TE

TE Models

VN

TE Topology

TE Tunnel
ACTN VN Yang

Yang model for Virtual Network Service (VNS) operations
- From the point of view of Customer

An abstraction over the TE-Topo and TE-Tunnel
- These models are from the point of view of Network

Some similarity, but still different!
- VN is a higher level of abstraction than topology!
- VN depends on topology!
In case of VN Type 2 operations, customer could access!
The diagram illustrates a network architecture with nodes and connections. Each node represents a specific component or concept, such as "ACTN VN", "AP", "VN", "VNAP", "VN-Member", "From", and "To". The connectivity matrix is indicated with "connectivity-matrix [id]". Various paths and constraints are highlighted, including "underlay", "path-constraints", "computed-path-properties", "Optimizations", "From", "To", "underlay", "Primary-path", "tunnel-termination-points", and "tunnel". The diagram also shows how these components are interconnected, representing the network's global structure and per-entry details.
Overview

ACTN VN Yang Model

AP/VNAP

VN

VN-Member

• 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 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

This VN is seen as edge to edge links (VN-members) setup as tunnels across underlying networks!
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]
ACTN Info Model [RFC 8454]

- VN Action primitives on CMI -
  - VN Instantiate
  - VN Modify
  - VN Delete
  - VN Update
  - VN Path Compute
  - VN Query

- Maps to actions on ACTN VN Yang model easily
  - But, with dependency on the TE topology model when it comes to details such as constraints, actual path etc
ACTN VN Operations

• VN could be explicitly created via this yang model

• VN could also be auto-created based on the service model
  • With a service mapping to the VN
  • Via ACTN VN abstraction, customer could learn how the network fulfills the service!

• Further allow some new interesting services!
  • Multi-Source / Multi-Destination
  • VN Compute
Status

• Adopted as WG draft after IETF 101.

• Relationship between other models clarified
  • Suggest further improvements

• Security & IANA considerations updated
BACKUP!
## How: Reference to TE Topology Yang Model

<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>• AP/VNAP -&gt; LTP</td>
</tr>
<tr>
<td></td>
<td>• Ltp of type te-types:te-tp-id</td>
</tr>
<tr>
<td><strong>Customer’s Virtual Network</strong></td>
<td>• VN -&gt; Abstract Node</td>
</tr>
<tr>
<td></td>
<td>• vn-topology-id of type te-types:te-topology-id</td>
</tr>
<tr>
<td></td>
<td>• abstract-node -&gt; /nw:networks/network/node/tet:te-node-id (reference)</td>
</tr>
<tr>
<td><strong>Customer Site to Site connection</strong></td>
<td>• VN-Member -&gt; Entry in the connectivity matrix of the abstract node</td>
</tr>
<tr>
<td></td>
<td>• connectivity-matrix-id -&gt; /nw:networks/network/node/tet:te- node-</td>
</tr>
<tr>
<td></td>
<td>attributes/connectivity-matrices/connectivity-matrix/id (reference)</td>
</tr>
</tbody>
</table>

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!