

# **YANG Data Model for Composed VPN Service Delivery**

**draft-evenwu-opsawg-yang-composed-vpn-01**

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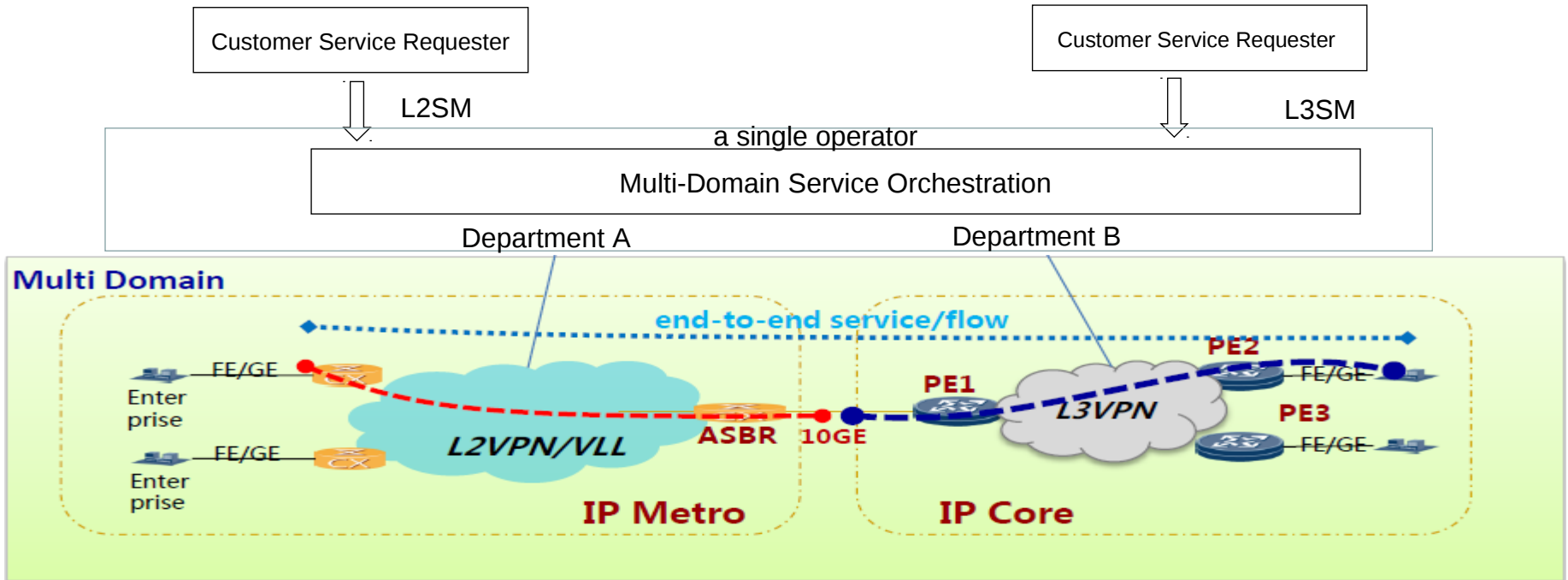
# Recap

- Service model in RFC8309 describes a service and the parameters of the service independent of the equipment and operating environment.
- The service model may be divided into the two following categories:
  - Customer Service model (e.g., L3SM,L2SM):
    - Used to describe a connectivity service as offered or delivered to a customer by a network operator
    - Abstract service from customer view
    - Not directly configure network devices, protocols, or functions
    - Have no visibility to the network topology in the operator domain.
  - Service Delivery model:
    - Used by a network operator to define and manage how a connectivity service is engineered in the network.
    - Has visibility to the network topology in each network domain
    - Technology specific model including a set of parameters common across a network technology

# Motivation

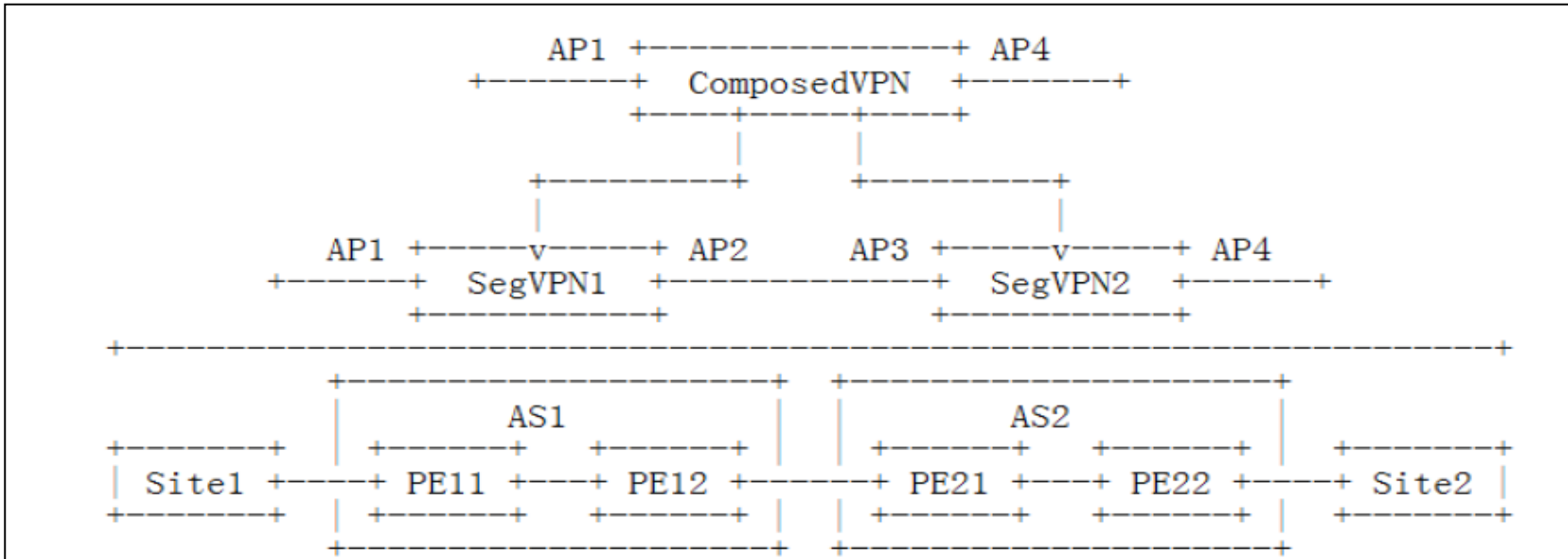
- None of the currently defined customer service models and service delivery model discusses
  - How to **decompose** end to end VPN service across multiple-domain environment into segmented tunnel or segmented VPN service in each domain;
  - Or **compose** segmented VPN service into one end to end VPN service.
- Composed VPN requirements have been briefly discussed and cooked in draft-deng-opsawg-composed-vpn-sm-requirements.  
<https://www.ietf.org/mail-archive/web/opsawg/current/msg04610.html>
  - Automate a VPN service delivery across multiple Operators is not practical since the segment VPN information may not be available using a single management system.

# Typical Use Case: Two VPNs deployed at Metro and Core domain and are managed by different department.



- **Issue:** Order L3VPN service and L2VPN service from different service portal requires coordination between two departments.
- **Limitation:** In multi domain VPN deployment case, Customer service model(e.g.,L3SM) doesn't have network visibility to network topo in operator domain and **can not provide service decomposition in different domain through a unified interface.**
- **Proposal:** Define composed VPN model between multiple domain orchestrator and domain controller for a single operator.
  - Customer can order L2VPN and L3VPN service separately, but operator with network visibility of end to end network topology have capability to manage the end to end service in a unified way. 4

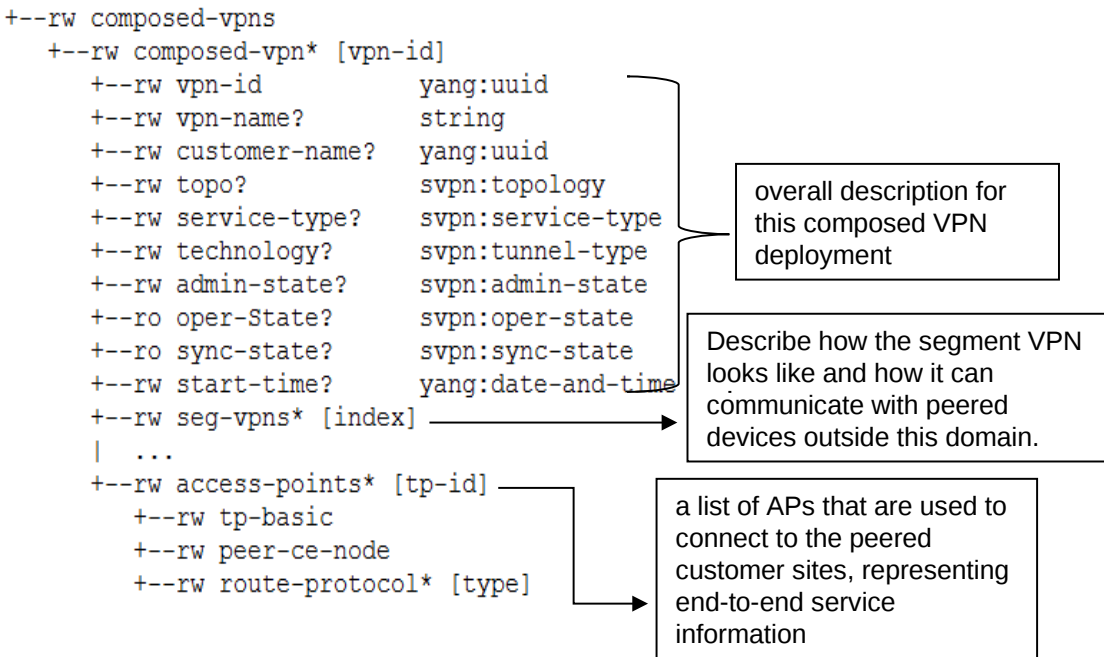
# Model Design



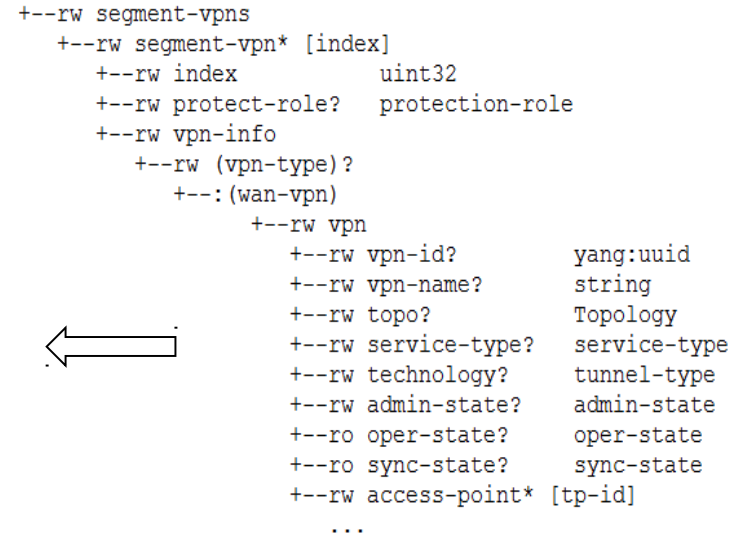
- **Access point(AP):** used as service access point for connectivity service segment between any two domains
- **Segment VPN:** The VPN deployment information in each domain
- **Composed VPN:**
  - End to end VPN deployment information across multiple domains
  - and can be mapped from L3SM/L2SM with additional operational cost.

# Model Overview

## Composed VPN Model Structure

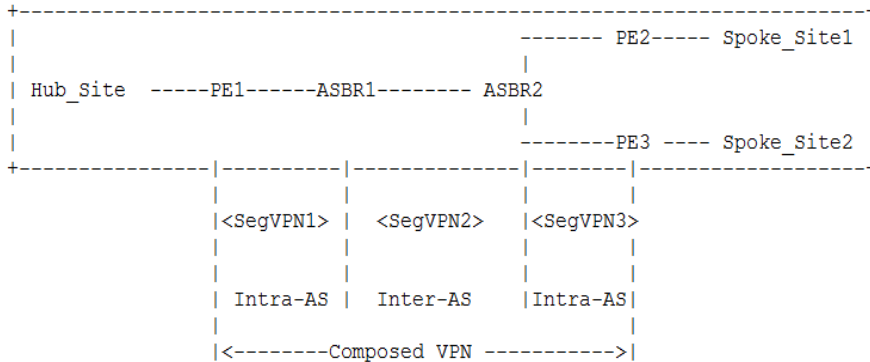


## Segment VPN Model Structure



- Composed VPN is divided into two modules
  - **"ietf-composed-vpn-svc"** : global parameters and the essential components of a composed VPN that are used to provide end to end connectivity spanning across multiple domains.
  - **"ietf-segmented-vpn"** : per domain segmented vpn parameters and associated access point list parameters that are used to connect to the peer device or domain.
- **Relation between composed VPN, segmented VPN and access point:**
  - A composed-vpn is composed of at least one access points and at least one segmented vpns.
  - A segmented vpn under "segmented-vpn" list is composed of at least one access point.

# Service Model Usage Example

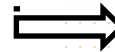


```

<?xml version="1.0"?>
<composed-vpns xmlns="urn:ietf:params:xml:ns:yang:ietf-composed-vpn-svc">
  <composed-vpn>
    <vpn-id>12456487</vpn-id>
    <topo>hub-spoke</topo>
    <service-type>hybrid-vpn</service-type>
    <seg-vpns>
      <index>1</index>
      <vpn-info>
        <vpn-id>111</vpn-id>
        <topo>hub-spoke</topo>
        <service-type>l2vpn</service-type>
        <access-point>
          <node-id>ASBR1</node-id>
          <peer-cg-node>
            <cg-node-id>PE1</cg-node-id>
          </peer-cg-node>
          <tp-basic>
            <topo-role>hub</topo-role>
            <flow-services>
              <in-template-id>TEMPLATE-A</in-template-id>
              <out-template-id>TEMPLATE-B</out-template-id>
            </flow-services>
          </tp-basic>
          <routing-protocol>
            <bgp>
              <as-no>AS1</as-no>
            </bgp>
          </routing-protocol>
        </access-point>
      </vpn-info>
    </seg-vpns>
  </composed-vpn>

```

XML Snippet  
Continue



```

    <seg-vpns>
      <index>2</index>
      <vpn-info>
        <vpn-id>222</vpn-id>
        <topo>hub-spoke</topo>
        <service-type>l3vpn</service-type>
        <access-point>
          <node-id>ASBR2</node-id>
          <peer-cg-node>
            <cg-node-id>ASBR1</cg-node-id>
          </peer-cg-node>
          <tp-basic>
            <topo-role>hub</topo-role>
            <flow-services>
              <in-template-id>TEMPLATE-B</in-template-id>
              <out-template-id>TEMPLATE-C</out-template-id>
            </flow-services>
          </tp-basic>
          <routing-protocol>
            <bgp>
              <as-no>interAS-1</as-no>
            </bgp>
          </routing-protocol>
        </access-point>
      </vpn-info>
    </seg-vpns>
    <seg-vpns>
      <index>3</index>
      <vpn-info>
        <vpn-id>333</vpn-id>
        <topo>hub-spoke</topo>
        <service-type>l2vpn</service-type>
        <access-point>
          <node-id>PE2</node-id>
          <peer-cg-node>
            <cg-node-id>ASBR2</cg-node-id>
          </peer-cg-node>
          <tp-basic>
            <topo-role>spoke</topo-role>
            <flow-services>
              <in-template-id>TEMPLATE-B</in-template-id>
              <out-template-id>TEMPLATE-D</out-template-id>
            </flow-services>
          </tp-basic>
          <routing-protocol>
            <bgp>
              <as-no>AS2</as-no>
            </bgp>
          </routing-protocol>
        </access-point>
      </vpn-info>
    </seg-vpns>
  </composed-vpns>
</composed-vpns>

```

- XML snippet describes the overall simplified service configuration of this composed VPN.

# Next Step

- Create milestone for composed VPN
- Adopt the draft as the initial document.