A Yang Data Model for L1 Connectivity Service Model (L1CSM)
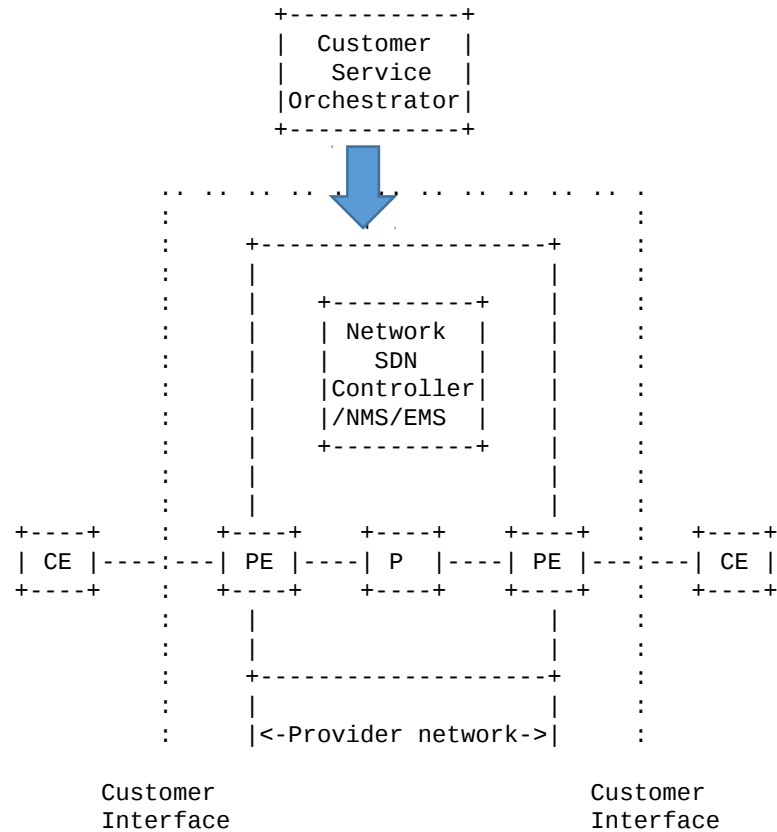
draft-fioccola-ccamp-l1csm-yang-01

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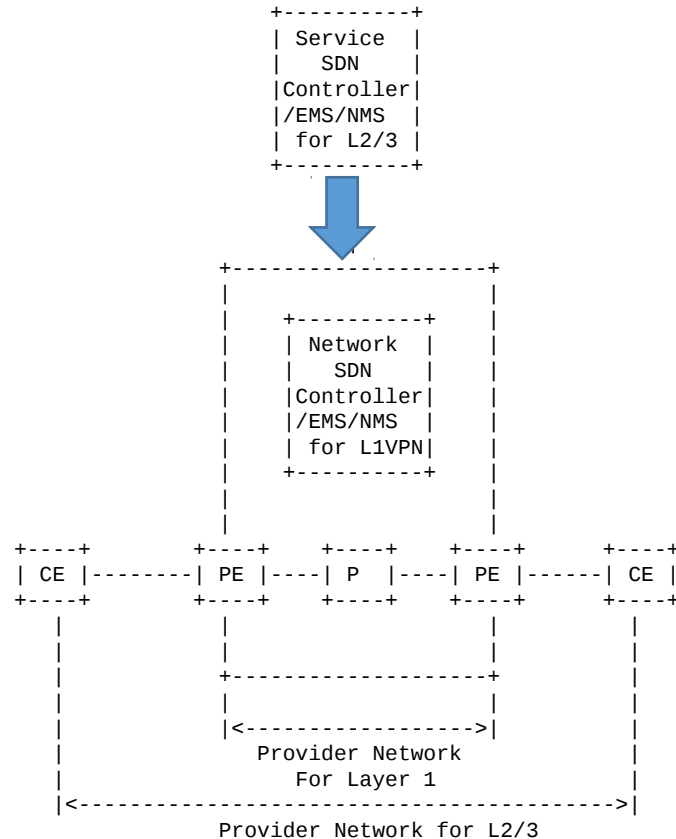
Purpose of this draft

- [RFC4847] provides a framework and service level requirements for Layer 1 Virtual Private Networks (L1VPNs).

- This draft provides a YANG data model for L1VPN Connectivity Service Model (L1CSM) in the context of L1VPN and [RFC4847] and based on the service definition by MEF Subscriber Layer 1 Connectivity Service Attributes, v0.09.

Deployment Scenario 1:
L1VPN for External Customer

```
                +------------+
                |  Customer  |
                |  Service   |
                |Orchestrator|
                +------------+
                      |
                      V
      ...........................................
      :        +--------------------+          :
      :        |                    |          :
      :        |    +----------+    |          :
      :        |    | Network  |    |          :
      :        |    |   SDN    |    |          :
      :        |    |Controller|    |          :
      :        |    |/NMS/EMS  |    |          :
      :        |    +----------+    |          :
      :        |         |          |          :
      :        |         |          |          :
 +----+  :  +----+   +----+   +----+  :  +----+
 | CE |--:--| PE |---| P  |---| PE |--:--| CE |
 +----+  :  +----+   +----+   +----+  :  +----+
      :        |               |          :
      :        |               |          :
      :        +---------------+          :
      :        |               |          :
      :        |<-Provider network->|     :
      .........................................

      Customer                Customer
      Interface               Interface
```

- Deployment scenario of the L1VPN SDN control-based service model for an external customer instantiating L1 point-to-point connectivity to the provider.

- With this scenario, the customer service orchestrator interfaces with the network SDN controller of the provider using Customer Service Model

Deployment Scenario 2:
Multi-Service Backbone for Internal Customers

```
                    +----------+
                    | Service  |
                    |   SDN    |
                    |Controller|
                    |/EMS/NMS  |
                    | for L2/3 |
                    +----------+
                          |
                          |
                          ↓
              +--------------------+
              |                    |
              |   +----------+     |
              |   | Network  |     |
              |   |   SDN    |     |
              |   |Controller|     |
              |   |/EMS/NMS  |     |
              |   | for L1VPN|     |
              |   +----------+     |
              |         |          |
              |         |          |
+----+     +----+   +----+     +----+     +----+
| CE |-----| PE |---| P  |---| PE |-----| CE |
+----+     +----+   +----+     +----+     +----+
  |          |                    |          |
  |          |                    |          |
  |          +--------------------+          |
  |          |                    |          |
  |          |<------------------>|          |
  |             Provider Network             |
  |               For Layer 1                |
  |<---------------------------------------->|
              Provider Network for L2/3
```

- Deployment scenario for internal customer (e.g., higher-layer service management department(s)) interfacing the layer 1 transport network department.

- With this scenario, a multi-service backbone is characterized such that each service department of a provider (e.g., L2/3 services) that receives the same provider's L1VPN service provides a different kind of higher-layer service.

- The customer receiving the L1VPN service (i.e., each service department) can offer its own services, whose payloads can be any layer (e.g., ATM, IP, TDM). The layer 1 transport network and each service network belong to the same organization, but may be managed separately.

L1CSM and L2SM/L3SM
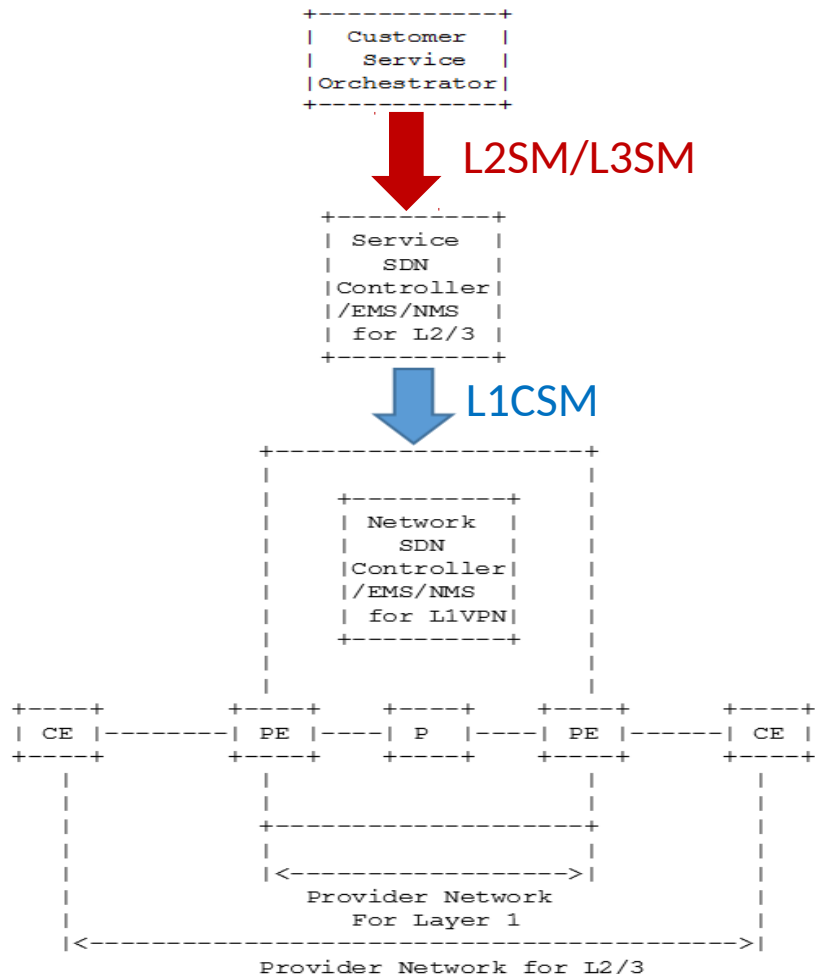
- L2SM and L3SM are Service Models
- L1CSM can be the southbound interface of the Service SDN Controller and can be used in same cases:
  - Multi-Service Backbone for Internal Customers: Only L1 connectivity is required and there is the need of an interface between two departments belonging to the same organization.
  - L1VPN for External Customer (less common for now)

Ietf-l1csm

```
module: ietf-l1csm
   +--rw l1cs
      +--rw access
      |  +--rw uni-list* [UNI-ID]
      |     +--rw UNI-ID              string
      |     +--rw protocol?          Identityref  --------------------------------
      |     +--rw coding?            identityref
      |     +--rw optical_interface?  identityref
      +--rw service
         +--rw service-list* [subscriber-l1vc-id]
            +--rw subscriber-l1vc-id    string
            +--rw service-config
               +--rw subscriber-l1vc-id?         string
               +--rw subscriber-l1vc-ep-ingress?   -> /l1cs/access/uni-list/UNI-ID
               +--rw subscriber-l1vc-ep-egress?    -> /l1cs/access/uni-list/UNI-ID
               +--rw client-protocol?            identityref
               +--rw time-start?                yang:date-and-time
               +--rw time-interval?             int64
               +--rw CoS_Name?                  string
               +--rw performance-metric?        identityref
```

UNI Data Client Protocol	Rate (Gb/s)
GigE (1000BASE-X)	1.250
10GigE WAN (10GBASE-W)	9.95328
10GigE LAN (10GBASE-R)	10.3125
40GigE (40GBASE-R)	41.250
100GigE (100GBASE-R)	103.125
FC-100	1.0625
FC-200	2.125
FC-400	4.250
FC-800	8.500
FC-1200	10.51875
FC-1600	14.025
FC-3200	28.05

UNI TDM Client Protocol	Rate (Gb/s)
OC-3/STM-1	0.15552
OC-12/STM-4	0.62208
OC-48/STM-16 (CBR2G5)	2.48832
OC-192/STM-64 (CBR10G)	9.95328

Summary & Next Steps

- Operators express the need for IETF L1CSM that can serve L1VPN service deployment scenarios for both external customers as well as internal multi-service Layer 1 backbone for L2/3VPN.

- MEF L1CS WG officially sent a letter of liaison to CCAMP WG. We can collaborate with MEF.

- This is in the scope of CCAMP WG:
  - Home of L0/L1 technology
  - Experts are here.

- The YANG model captures the basic models for access and service models and provides a good base for WG adoption. ^^