VPLS PE Model with E-Tree Support

draft-jiang-l2vpn-vpls-etree-pe-00.txt

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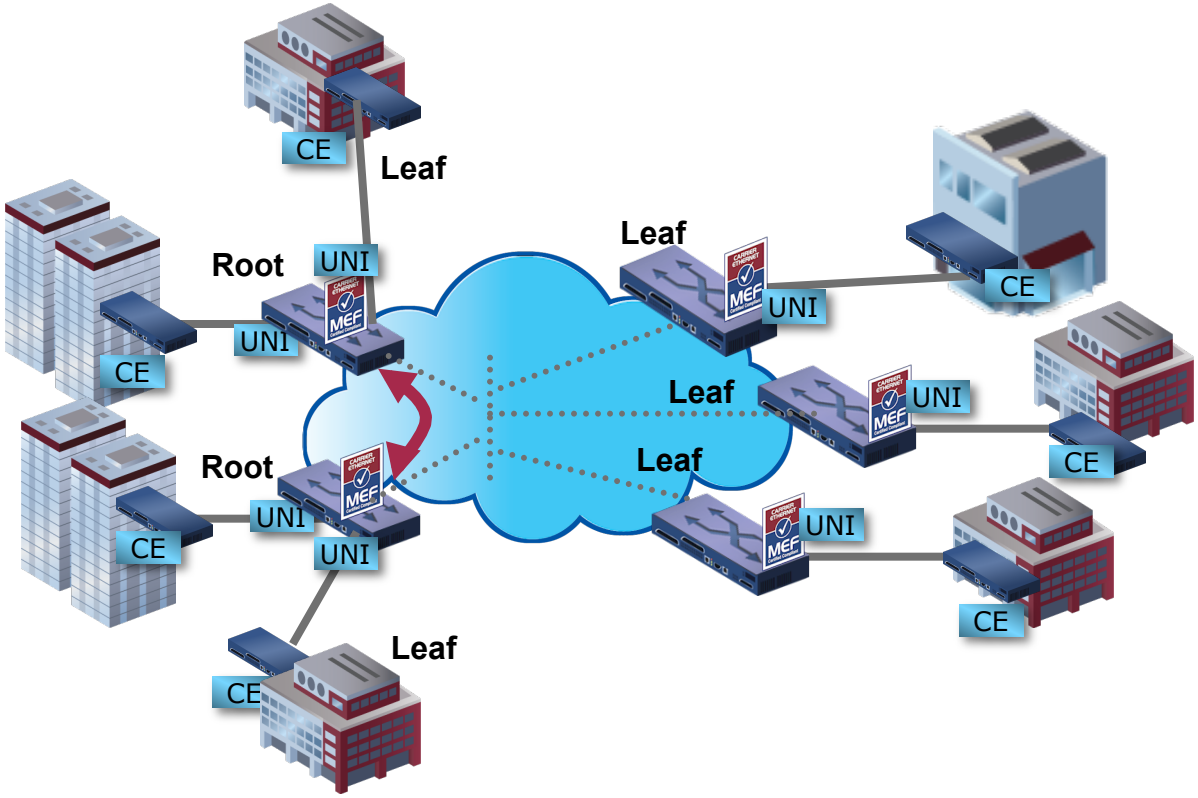
E-Tree Requirements on VPLS

- E-Tree Service
  - An EVC service defined in MEF (MEF 6.1, MEF 10.2)
    - Rooted Multipoint EVC (Multi-root possible), each UNI is either Root or Leaf
    - Connectivity: Root to Leaf, Leaf to Root, Root to Root
    - Prohibited: Leaf to Leaf
- Problems
  - VPLS is based on full mesh connectivity, how to provide E-Tree service in VPLS and guarantee the segregation between the leaves when E-Tree is a multi-rooted tree?
- History
  - 2009.09, problem of E-Tree in PBB-VPLS first raised in BBF
  - 2009.10, two I-Ds proposed to solve the general problem of E-Tree in VPLS in IETF
  - 2010.01, two presentations discussed to solve the problem of E-Tree in Ethernet in IEEE

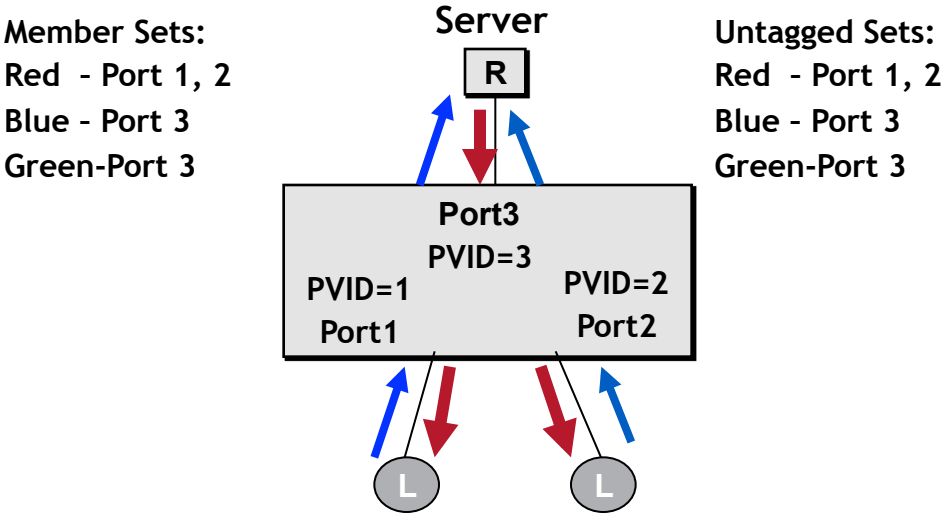
E-Tree Challenges in VPLS



How to provide E-Tree service with scalability in the MPLS/VPLS network?
How to do Leaf segregation when PE dual feed both Root & Leaf?

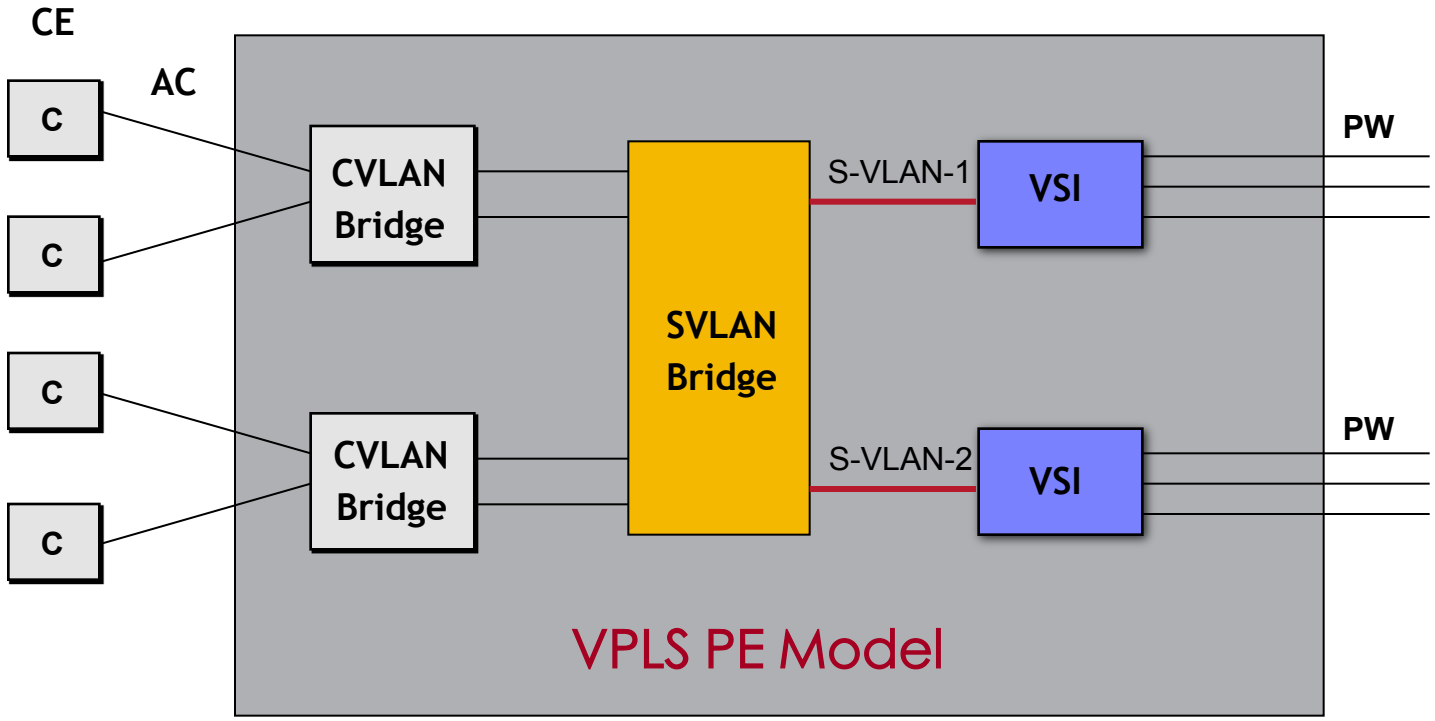
E-Tree Scheme in IEEE

- Asymmetric VLAN (IEEE 802.1Q)
  - Root/Leaf attached to bridge in untagged mode
  - Configure PVID and member set for each access port
- Stephen Haddock proposed to use only a pair of Trunk VLAN and Branch VLAN for muti-root E-Tree, this capability is anticipated to be provided in future revisions of 802.1Q



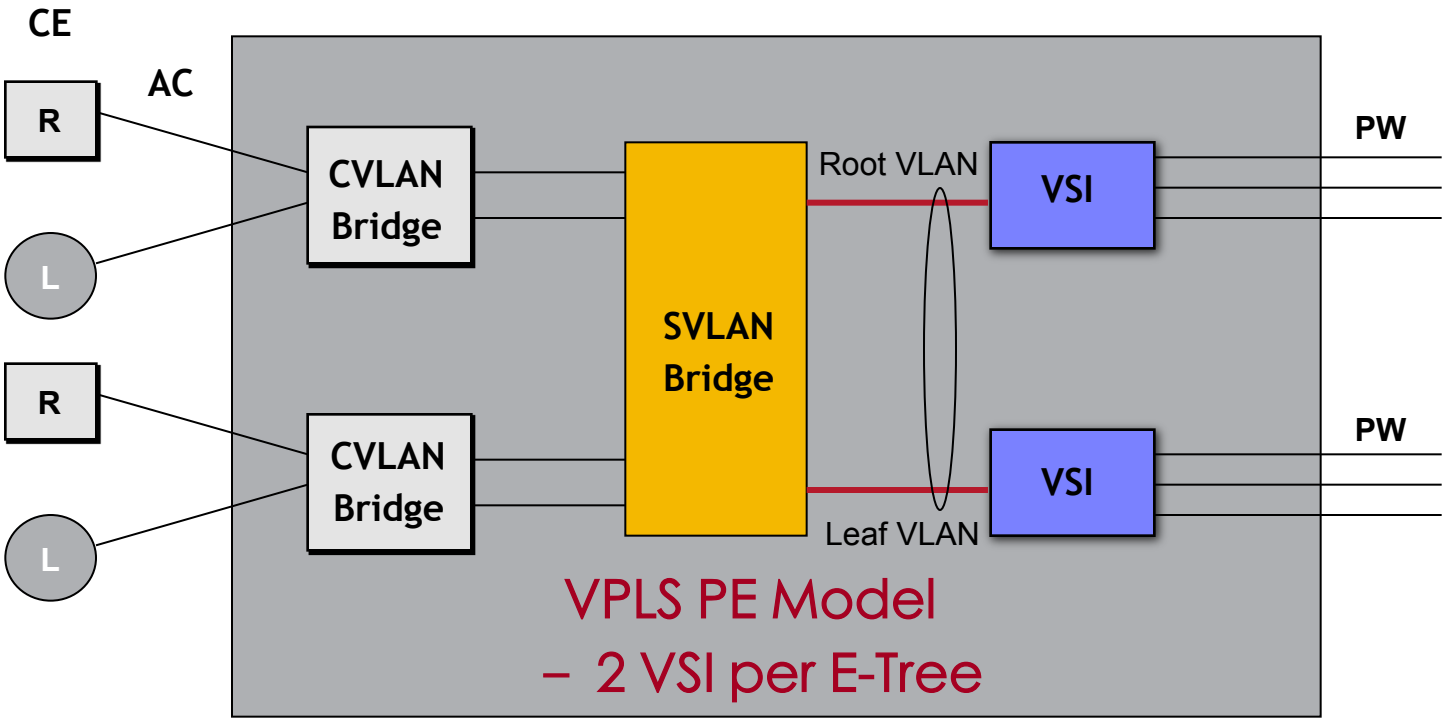
VPLS PE Model Defined in IETF (Model 2)

draft-ietf-l2vpn-vpls-bridge-interop-04



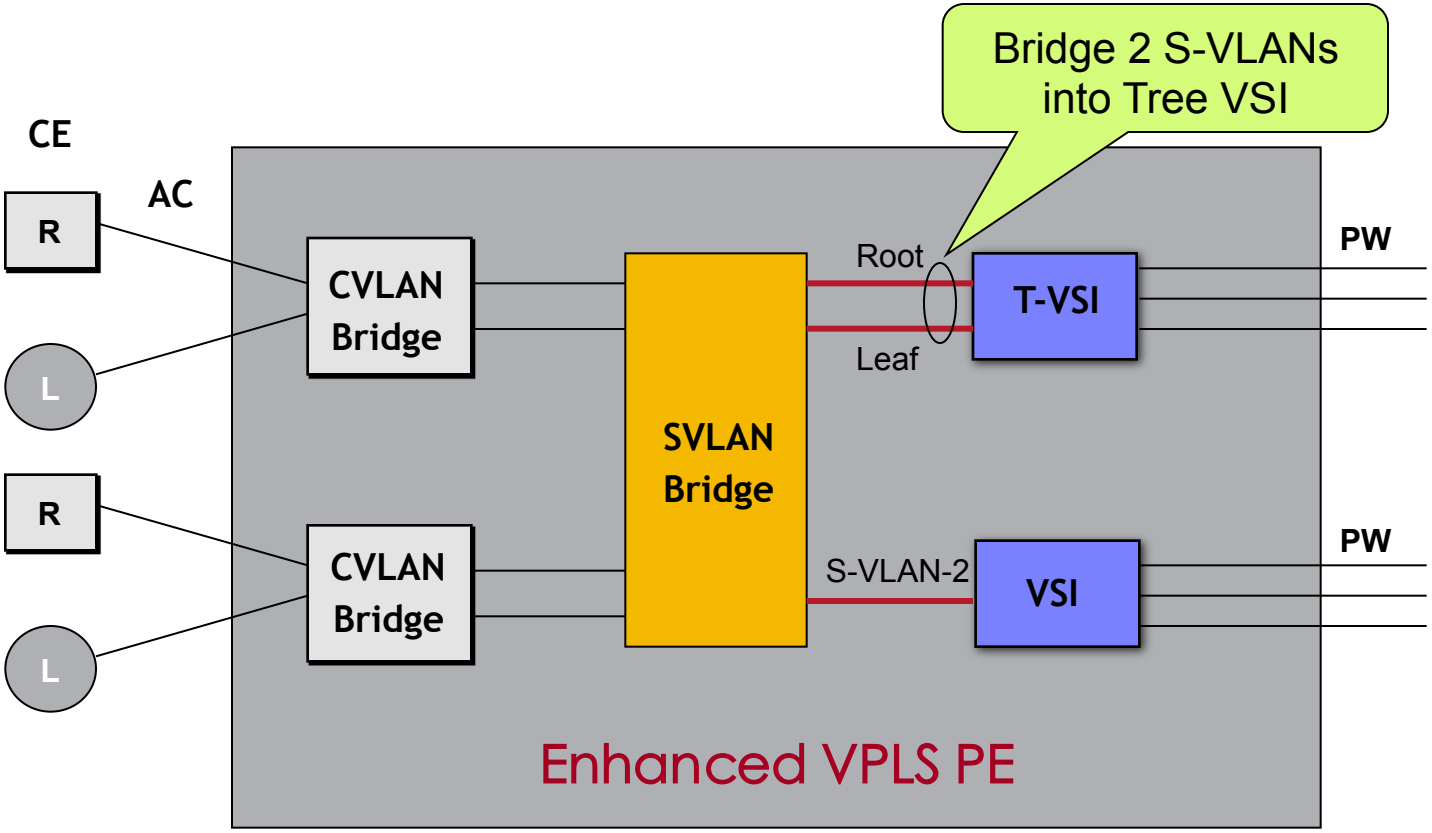
VPLS PE Model (802.1ad) with 2 stages of bridge - a typical implementation

A Model 2 Compatible E-Tree Scheme



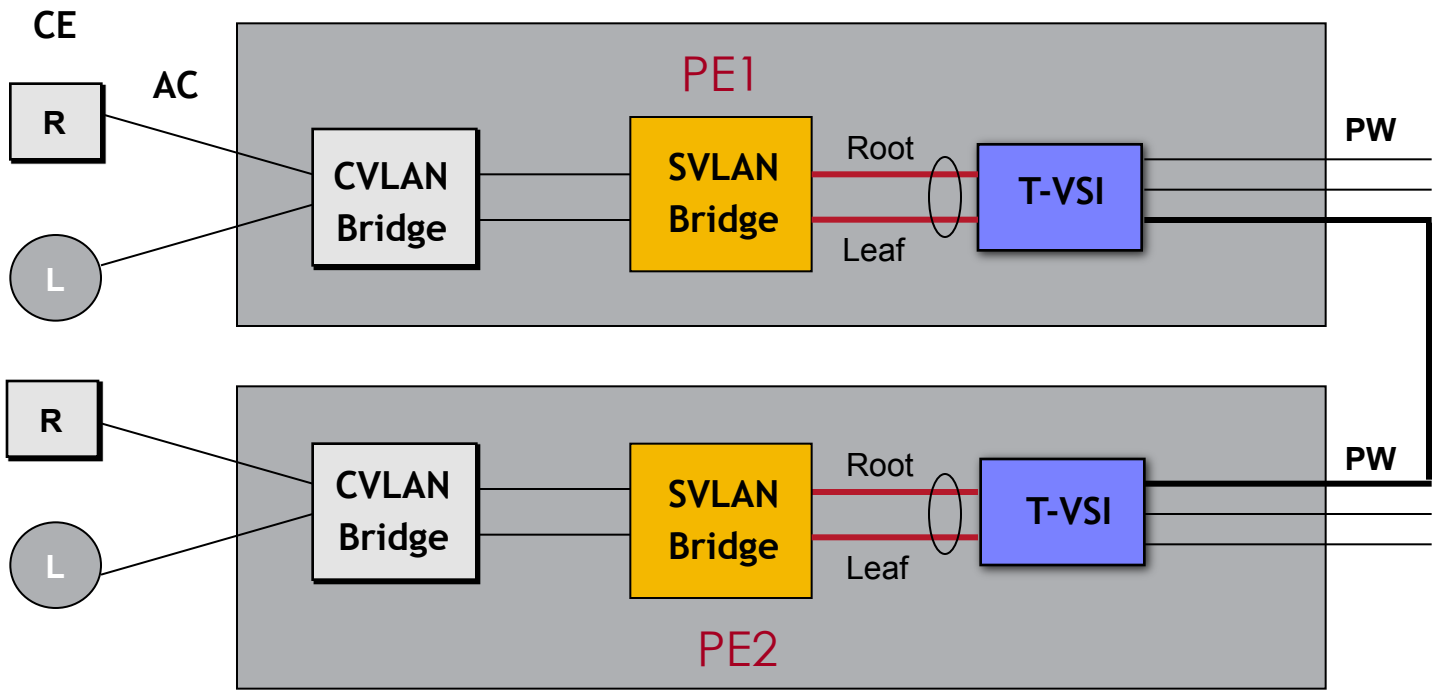
2 VSIs and 2 sets of PWs are needed per E-Tree if we incorporate the enhanced Asymmetric VLAN into the VPLS PE model 2

Enhanced Model 2 (Tree VSI)



1. Tree VSI (T-VSI) attached to S-VLAN bridge with Root VLAN and Leaf VLAN, and work in shared VLAN learning
2. Traffic from Root or Leaf UNI distributed into Root VLAN and Leaf VLAN
3. Only **one** T-VSI and **one** set of PWs needed per E-Tree

Interconnection Scenario



PE Interconnection with T-VSI

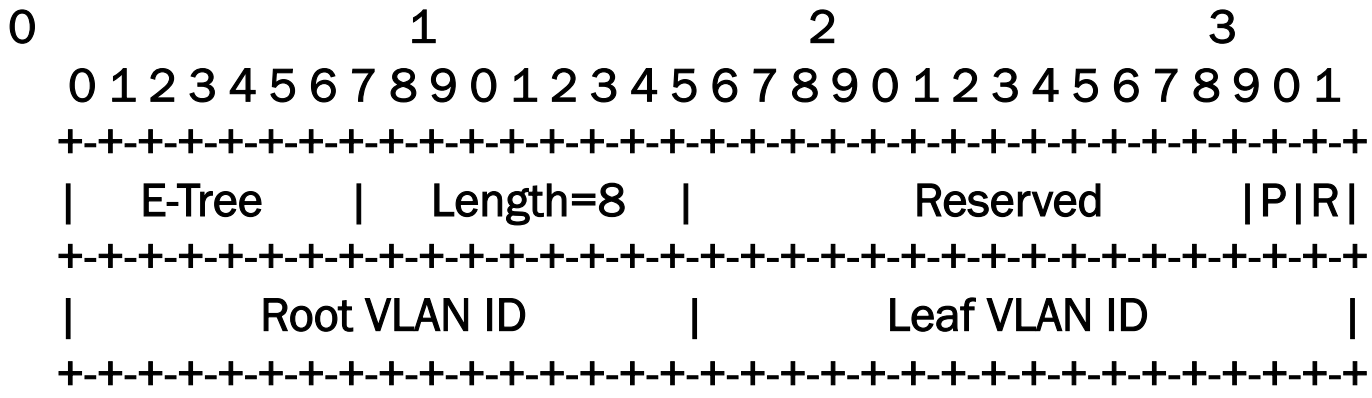
- Either PE1 or PE2 can do VLAN translation (either when enter or exit PW)
- Bridge module filters Leaf VLAN traffic on the egress Leaf port

PW Processing

- **PW works in Tagged mode**
  - At least one end of PE provided with the VLAN mapping capability
    - Remote Root VLAN <-> Local Root VLAN
    - Remote Leaf VLAN <-> Local Leaf VLAN
  - At the PW ingress, Root or Leaf VLAN encapsulated in the same PW and transparently label switched
  - At the PW egress, Ethernet frames translated into Local Root or Leaf VLAN

Extension of LDP Protocol

- E-Tree sub-TLV is defined as one of interface parameters
  - PEs negotiate their supports of E-Tree (T-VSI) when the PW is set up
  - Root VLAN ID and Leaf VLAN ID carried in the sub-TLV
  - P bit indicate that PE is attached with “Pure Leaves”
  - R bit is a request flag for “Remote VLAN Translation”



Next Step

- The authors would like to request more WG feedbacks