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?

77th IETF - Anahaim
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 multi-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

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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

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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

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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

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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”

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     E-Tree       |     Length=8    |                  Reserved           |P|R|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|               Root VLAN ID             |               Leaf VLAN ID                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
Next Step

- The authors would like to request more WG feedbacks