

A Framework for E-Tree Service over MPLS Network

draft-key-l2vpn-etree-frwk-02

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This Internet Draft

This Internet draft proposes a solution framework for supporting MEF E-Tree service over MPLS network.

The objective is to provide a simple & effective way to emulate E-Tree in addition to E-LAN on an existing MPLS network.

This draft does not intend to provide a full specification of the solution, but rather to identify the functional components of the overall solution

The draft specifies each component:

- whether it is REQUIRED or OPTIONAL
- whether existing mechanism is sufficient
- whether relevant mechanism is under development

MEF Multipoint Service

MEF Multipoint Services

- MAC-based Forwarding
- E-LAN (MP-to-MP) or E-Tree (Rooted-MP)

Within the context of a MEF multipoint service

- Each UNI is designated as either Root or Leaf
- A Root can communicate with any other UNIs
- A Leaf can communicate with Roots but not Leafs

The only difference between E-LAN and E-Tree

- E-LAN has Roots only
- E-Tree has both Roots and Leafs
 - Need Leaf-to-Leaf communication restriction
 - May have single or multiple Roots

IETF Multipoint L2VPN

Virtual Private LAN Service (VPLS)

- MP-to-MP Ethernet service
 - MAC-based forwarding, emulate Ethernet switching
- Current standard RFC4761 & RFC4762
- Use for E-LAN service
 - Service Frame Delivery attribute is MAC-based forwarding

Virtual Private Multicast Service (VPMS)

- P-to-MP service, for a variety of link layers
- Ethernet VPMS
 - Single coverage of receiver membership
 - Not MAC-based forwarding
- Under development
 - draft-ietf-l2vpn-vpms-frmwk-requirements

-> No IETF L2VPN that can support E-Tree service

E-Tree Use Cases

Some major E-Tree use cases are:

- Broadcast/Multicast Video
- Wholesale Access
- Internet Access
- Hub & Spoke VPN
- IEEE 1588 Clock Synchronisation

Direct Leaf-to-Leaf communication is not required.

- If security is a concern, E-Tree should be used
- Otherwise E-LAN is also a feasible option.

E-Tree Service

A generic E-Tree service supports

- Unicast bidirectional Root to/from Root
- Unicast bidirectional Root to/from Leaf
- Broadcast/Multicast unidirectional Root to all Roots and Leafs
- Broadcast/Multicast unidirectional Leaf to all Roots

A particular E-Tree service may need to support all the above or only a subset depending on the target application.

-> Need a solution in MPLS to support E-Tree

Challenges in MPLS

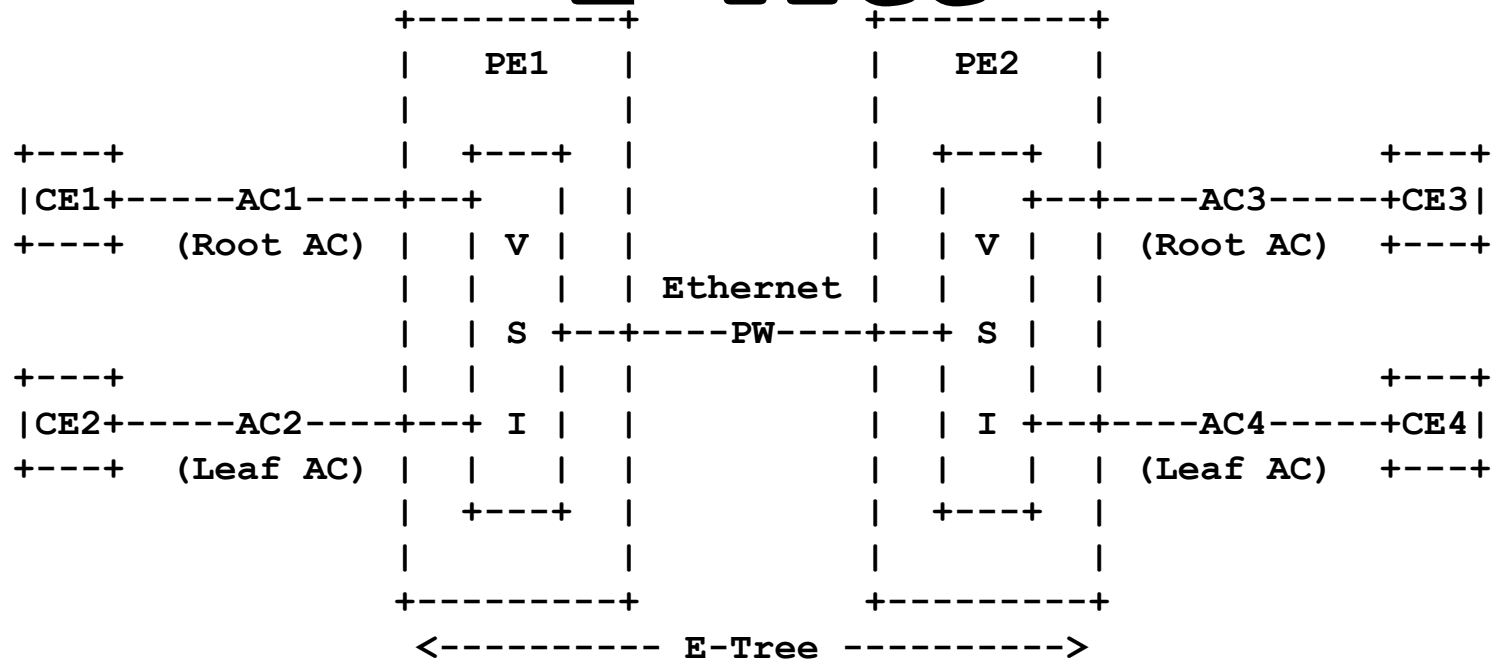
Generic E-Tree Service Definition

- Mandatory Leaf-to-Leaf Communication Restriction
- Current standard VPLS treats all ACs equal
 - hence insufficient to support E-Tree service

Additional Desirable in the context of MPLS

- Ethernet Broadcast/Multicast Optimisation
- IP Multicast Optimisation
- These are not related to the generic E-Tree service definition but the desirable requirements

A Solution Framework For E-Tree



Based on existing VPLS

- MAC-Based Forwarding

One VSI at PE for an E-Tree Services

Both Root ACs and Leaf ACs attach to the VSI

Ethernet PW is used between any pair of VSIs

Leaf-to-Leaf communication restriction

A Solution Framework for E-Tree

Functional Components:

MAC-based Forwarding Any-to-Any Ethernet VPN

- Current standard VPLS
- REQUIRED base component

Leaf-to-Leaf Communication Restriction

- REQUIRED component, under development
- Per-payload indication on PW
 - Differ traffic from Leaf or Root
 - I-D: draft-delord-pwe3-cw-bit-etree proposes extension to RFC4448
- Additional forwarding rules
 - I-D: draft-key-l2vpn-vpls-etree proposes VPLS extension to RFC4761 and RFC4762

A Solution Framework for E-Tree

Functional Components:

Enhancement - Point-to-Multipoint PW

- OPTIONAL component, under development
- Ethernet broadcast/multicast optimisation
- Agnostic to customer's Layer 3 traffic encapsulated within Layer 2 frames (RFC4665 recommendation)
- I-D: draft-ietf-pwe3-p2mp-pw-requirements
- I-D: draft-martini-pwe3-p2mp-pw

Enhancement - IP Multicast in VPLS

- OPTIONAL component, under development
- IP multicast optimisation
- Make use of Layer 3 IP multicast information in payload frames to improve transport efficiency
- I-D: draft-ietf-l2vpn-vpls-mcast

Other Solutions?

There are other possible ways to do this

- Review them in Appendix
- Differences are in complexity

Next Steps

Please review the draft and post
comments and feedbacks to WG
mailing list

Thank You Very Much