IEEE 802.1 Ethernet E-TREE Requirements and Solution space

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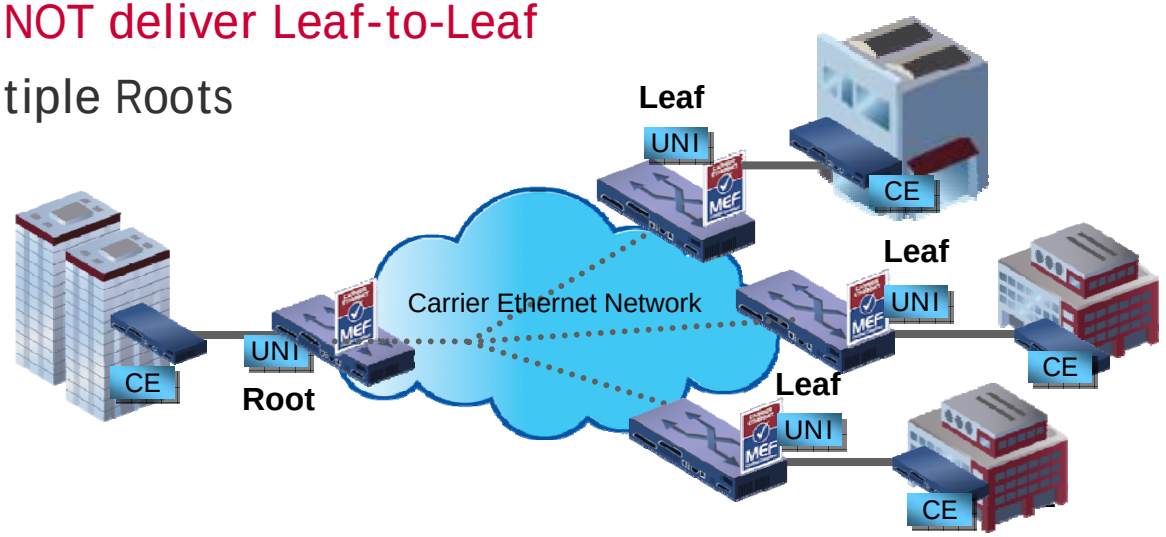
22/01/2010

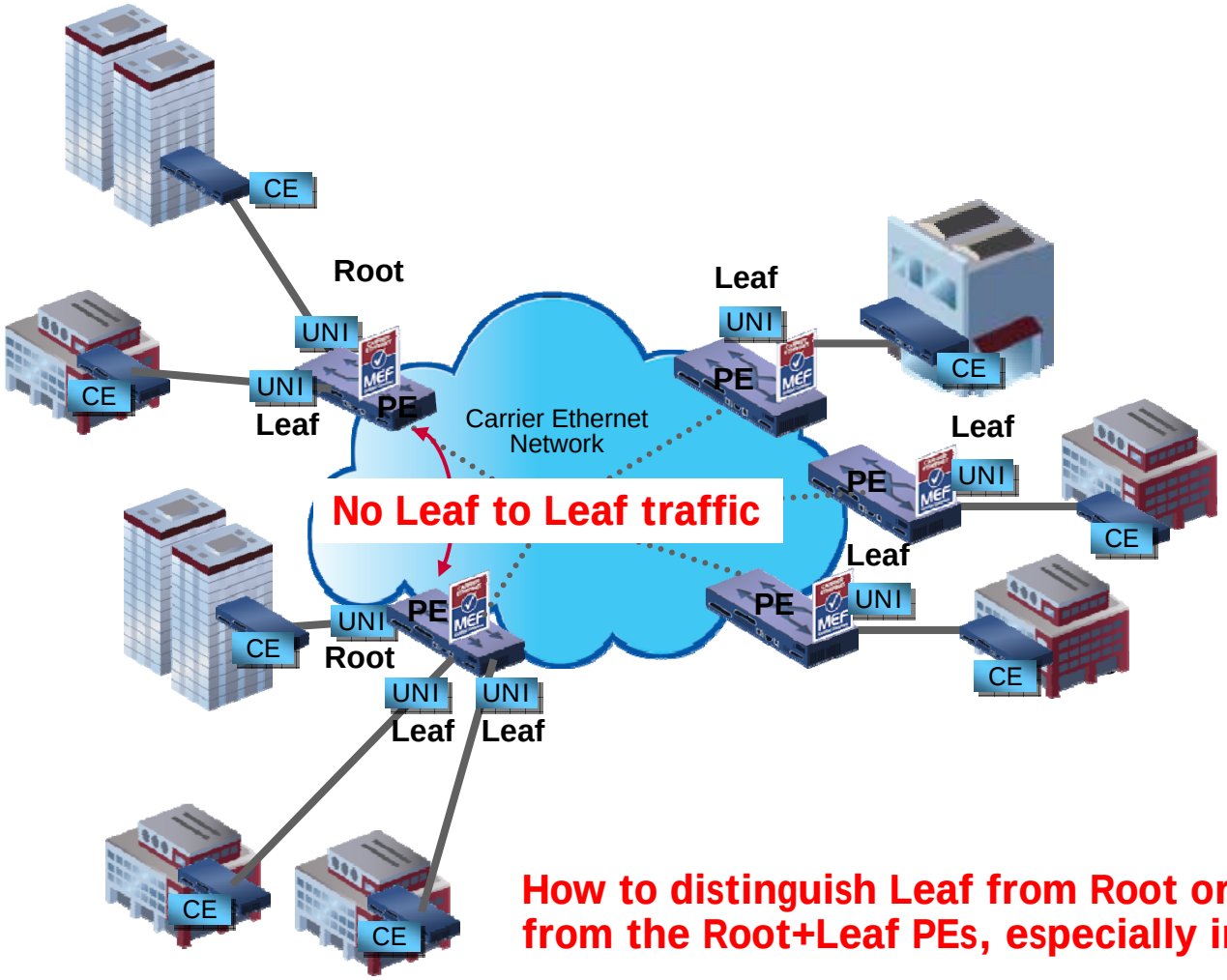
E-TREE
Service Provider View

E-TREE definition is in MEF6.1 and subject to MEF10.1 Requirements:

- Rooted-Multipoint EVC
  - Delivers Unicast/Broadcast/Multicast Service Frame according to Service Frame Delivery Attribute (provider to specify)
  - Not equivalent to IETF Internet Draft Virtual Private Multicast Service (VPMS)
- Each UNI is designated as either Root or Leaf
- Deliver Root-to-Leaf, Leaf-to-Root, Root-to-Root
- Similar to VPLS plus MUST NOT deliver Leaf-to-Leaf
- Support Single Root or Multiple Roots



E-TREE challenges
Service Provider View

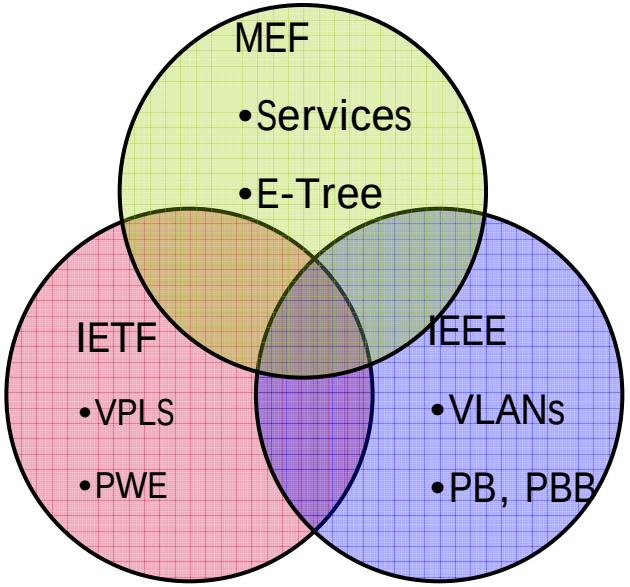


How to distinguish Leaf from Root originated traffic coming from the Root+Leaf PEs, especially in the redundant case?

E-TREE Applicability

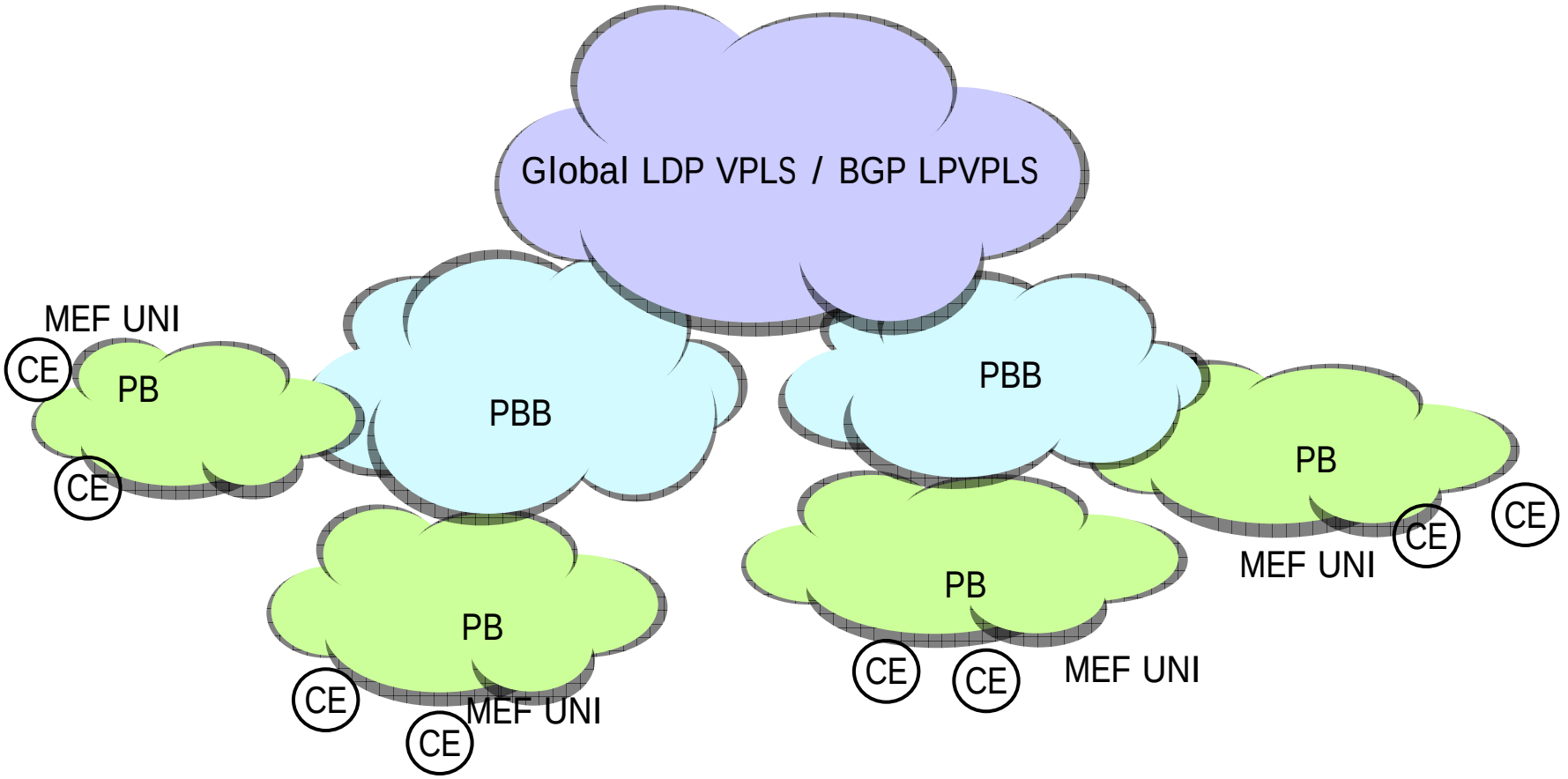
MEF E-Tree Example Services
- Internet Access
- Mobile Backhaul
- Clock Synchronization
- Video over IP

Service Provider use cases:
- Business VPNs
- Internet Aggregation
- Wholesale
- Network Management



Should maintain IEEE forwarding principles or higher layer applications might not work

E-Tree multiple technologies: Many providers, many scenarios, demand now



Requirements for E-Tree Solution

Ethernet solution that provides:

- Root to Leaf, Root to Root and Leaf to Root
- Prevents Leaf to Leaf Traffic
- Allow Leaf and Root site to be homed on the same switch
  - Able to differentiate Leaf and Root Traffic via the Frame
  - Redundant
- Interwork with various types of VPLS solutions
- Support over QinQ and PBB environments
- Interwork with various types of VPLS and PBB VPLS

Problems to Solve (IEEE)

- **How to tag/mark the data plane for Leaf and Root originated traffic?**
- **How to prevent a Leaf from listening to other Leaf traffic?**
  - **Pruning of Leaf to Leaf traffic**
- Do not send Leaf originated traffic to other Leaves.
  - Auto Discovery of Leaf only destinations
- Efficient replication and transport of Root to Leaf traffic
- **Common mechanisms and common capabilities**

Bold items important to solve now

Ethernet State of solutions/proposals (MEF/IEEE)

VLANs Environments

- Marking/Configuration
  - Asymmetric VLANs provide a way to "tag" traffic as " Leaf or Branch" or Root or Trunk" (Stephen Haddock's MEF presentation). Uses two VLANs
    - Leaves and Roots to share the same nodes.
    - Could be extended for QinQ where outer Qtag VLAN is Root/Leaf
    - Could be extended for PBB where B-VLAN is Root/Leaf
  - SPBM Configuration of Receive/Transmit /I-SID
- Options for Pruning? Options for Auto discovery?
  - MVRP?
  - SPBM has a proposal for E-Tree supported with IS-IS and Leaf to Leaf pruning and efficient replication.

IETF State of proposals

Mainly considers VPLS or PWE environments

- Marking/Configuration
  - Bit in the PWE CW to specify Root or Leaf (draft reference)
  - Compatible with VLAN tag context root or leaf sources
- Pruning/ Auto discovery
  - Uses Signaling in LDP-VPLS or BGP-VPLS to prune Leaf to Leaf (or enable Leaf to Root).
  - P2MP distributions Efficient replication in the data plane.

Questions

What is the best approach to solve this?

- Ethernet is the common denominator.
- Do we complete the Private VLAN standardization for E-Tree?
- Does Private VLAN include PB and PBB environments?
  - Or do we need technology specific mechanisms? E.g. Reserved bit in the I-tag.
- What we do in Ethernet will automatically apply to VPLS
- Need to keep the number solutions to common and minimal set
  - Avoid duplication and/or multiple solutions where possible.

Proposal

Produce a IEEE Standard ETREE solution for all IEEE 802.1 VLAN Bridges

Work with other bodies to ensure common requirements are covered but we define the Ethernet solution.