

Hierarchy of Provider Edge Devices in BGP/MPLS VPN

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Huawei Technologies

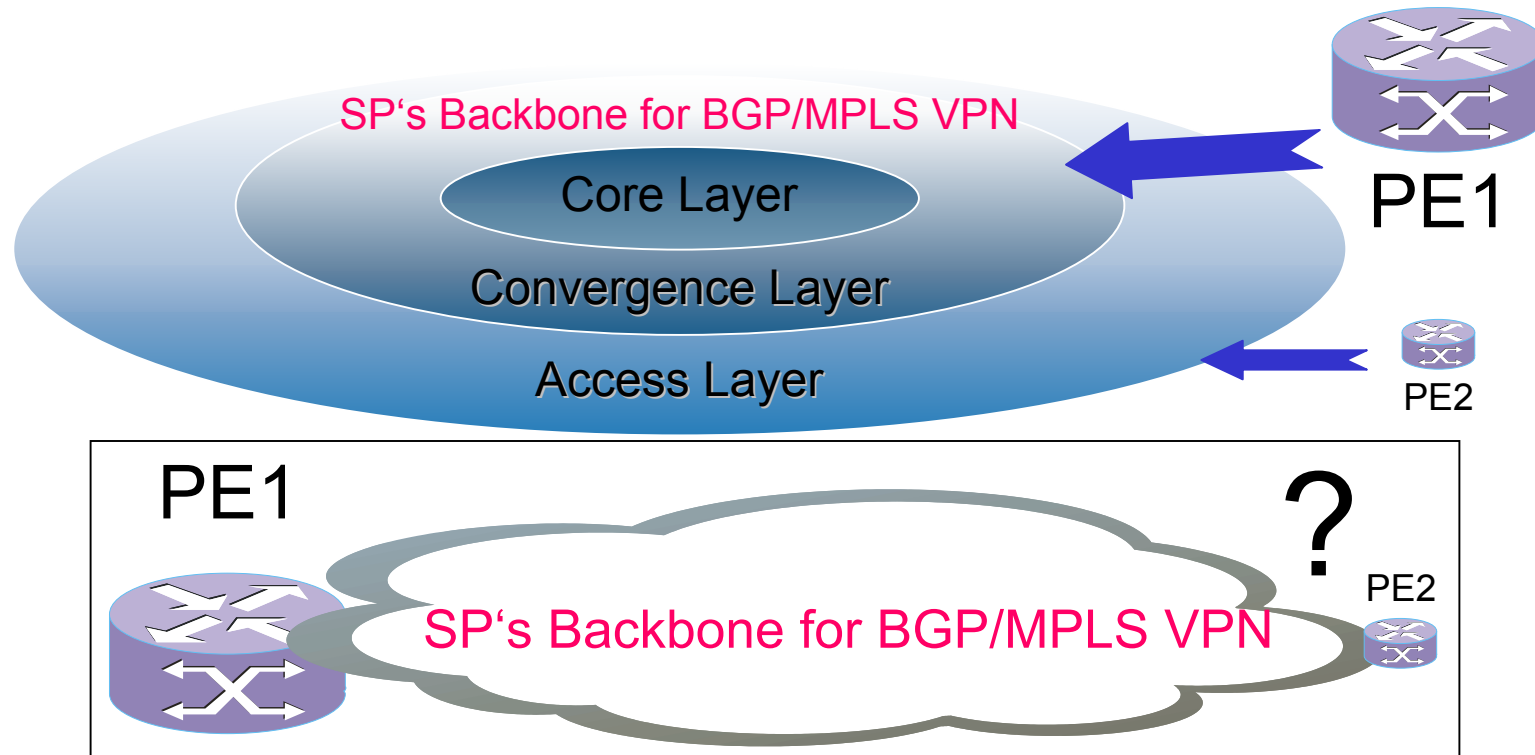
IETF 56, San Francisco, March 16-21, 2003

Agenda

- Problem Overview
- Proposed Solution
- Summary of PPVPN List Discussions
 - Differences with RFC2547bis
 - Differences with Multi-VRF CE
 - Using OSPF between CE/UPE
- Next Steps

Problem Overview

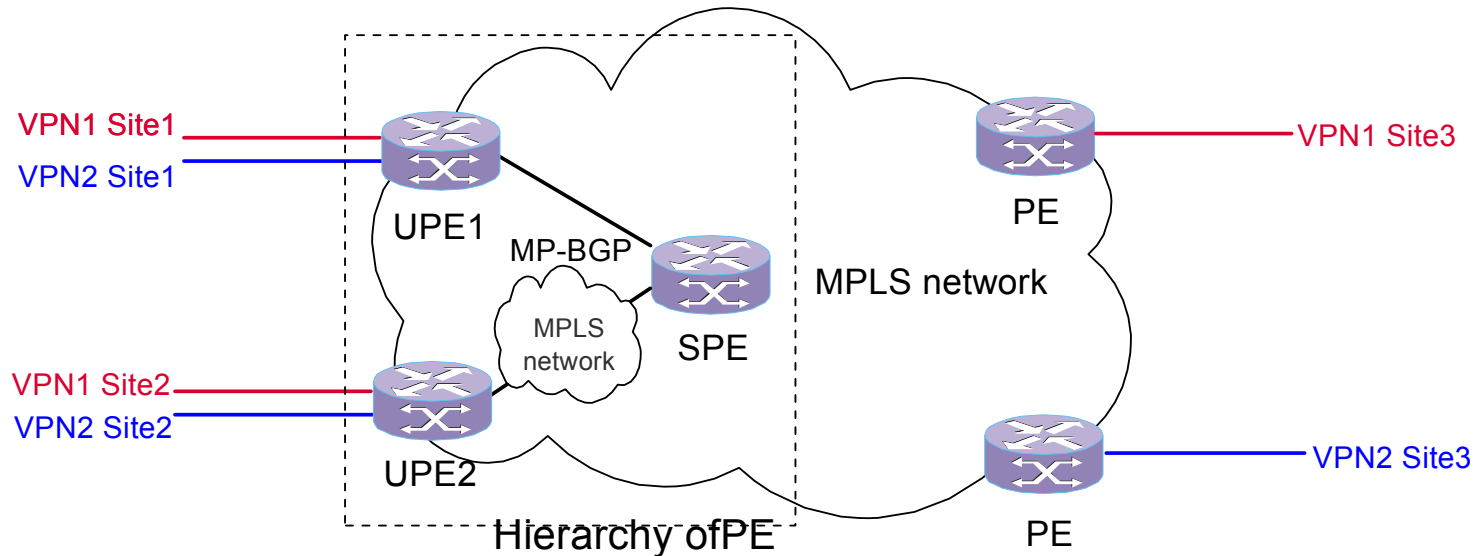
Contradiction between “Plane Model” in BGP/MPLS VPN model and typical “Layered Architecture” of SP’s network.



PE1 and PE2 should maintain the same VPN routes. However, if VPN route table is large, PE2 will have capacity and performance issues.

Proposed Solution

Hierarchy of Provider Edge (HoPE)



HoPE supplements RFC2547bis to make it more scalable.

Differences with RFC2547bis

- SPE only sends aggregate vpnv4 routes or a default vpnv4 route to UPE
- Vpnv4 routes are aggregated in SPE. SPE terminates the LSP from UPE and establishes a new LSP with the remote PE
- UPE advertises its import route target list to SPE. SPE creates the HoPE-wide import route target list to filter vpnv4 routes from other PEs

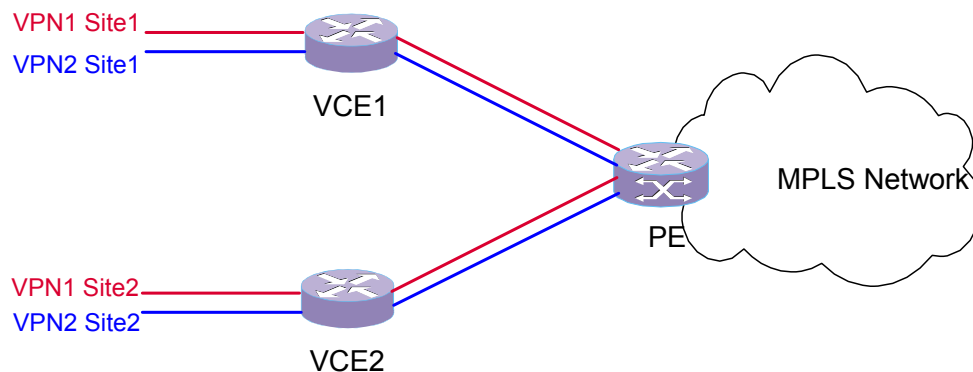
Differences with Multi-VRF CE

Multi-VRF CE

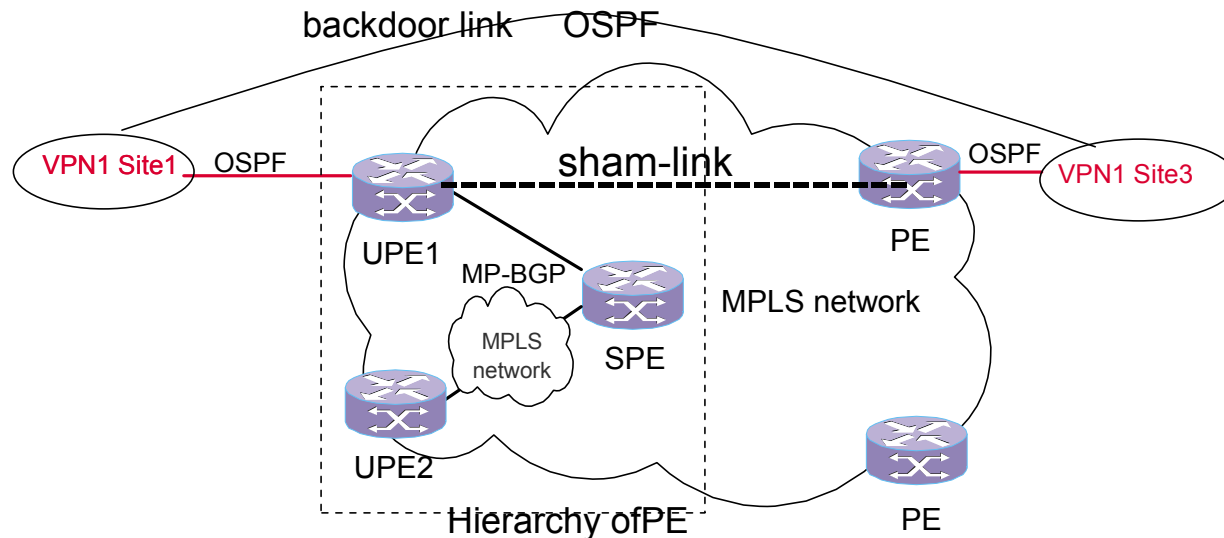
- Requires 1 tunnel, 1 sub-interface, 1 IP address, and 1 routing instance for *each* VPN site
- Plus PE and CE must both configure VRF

HoPE

- Requires 1 tunnel, 1 sub-interface, 1 IP address, and 1 routing instance for *all* VPN sites
- Via ORF mechanism, SPE does not need to configure VRFs already configured in UPE



Using OSPF between CE/UPE



- If no backdoor links b/w VPN sites, follow standard OSPF procedures
- If backdoor links, create sham-link between HoPE UPE and remote PE
- Then backdoor link may become the preferred link for UPE. To solve:
 - Aggregate routes through backdoor at the same granularity and configure metric to make the CE-UPE link the preferred link, or
 - Have remote PE distribute routes from remote sites to UPE through sham-link and configure a larger metric to backdoor link to make the CE-UPE link the preferred link

Next Steps

- Submit '01 to I-D and PPVPN mail lists
- Continue discussions on lists and get more input from interested parties to improve it
- Move forward as a PPVPN WG item
- Incorporate proposal in RFC2547bis or combine proposal with similar proposals
- Move forward as a Proposed Standard