M1 RISE TP n°3 - VPN

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VPN BGP-MPLS

Objectif : Understand & configure VPN BGP-MPLS tunnels

Notions : VPN RFC 2547 & MPLS-TE

The deadline for the report is April 30 : maximum two persons per group.

Architecture : your network setup should include one VPN provider having at least four PEs that are interconnected by non PE routers. The provider should use OSPF as its IGP. Define at least 2 VPNs (one connected via 3 CEs and the other via only 2) using the IGP you want (even static routing and note that some VPN sites may resume to one loopback interface on a PE). Each VPN should use a different topology model (hub vs. mesh). The following figure provides an example (for the VPN having three sites connected through 3 CE) :

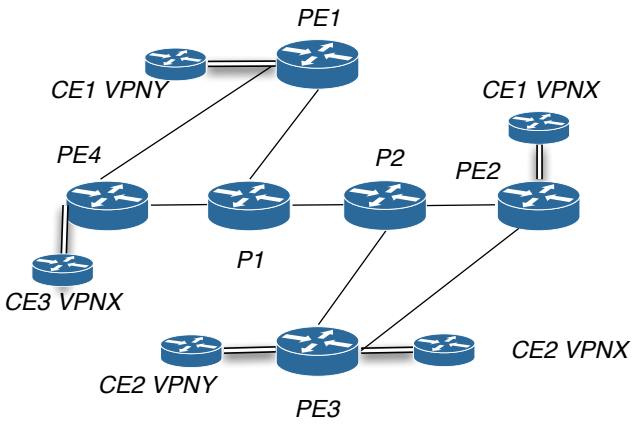

Figure 1 – A small VPN architecture

VPN without TE

1. Check the connectivity for each VPN (with `ping, traceroute`) and show the most interesting routing tables (on several distinct types of routers). Comment and justify your findings.
2. List all labels of a given connection between two sites from the same VPN and illustrate/-comment their usage.
3. What happens at all protocol levels when you add a VPN ? Show all signalling message that are related.
4. What happens when you add a new prefix in an existing VPN ? Show all signalling message that are related.
5. Show on concrete examples the differences in terms of routing paths when you use a mesh vs hub topology for a given VPN. What do you observe in terms of path optimality ?