INSTITUTO SUPERIOR TÉCNICO

Traffic Engineering

Lab Project #3

Test of IP VPNs on MPLS

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1 Goal

To simulate a MPLS network with GNS3 and Cisco IOS.

This lab project must be completed on the classes of 6-13 November.

2 Equipment

PC with GNS3, VPCS, Wireshark and Cisco IOS.

3 Setup

Prepare a network scenario of your choice to simulate the MPLS protocol. The network must have at least three LER routers in three different locations and at least four internal LSRs. The connection between LSRs must have redundant paths. Note: for points 1-5 below, only two LER routers are required.

Without being a strict/hard work plan, it is suggested as a guideline that at least points 1 and 2 (plain MPLS) should be completed in the first lab session. Try also to start also point 3 in the first lab, if you have available time. The remain of the project (full VPN setup) should be completed on the 2rd lab session.

1. Design the network architecture;
2. Implement an MPLS link between two sites of a single customer connected to two different LER routers (without a VPN, MPLS layer alone). Test the LDP protocol. Check end to end MPLS connectivity. Identity the default LSP. Check IP routing tables and LIB/LFIB entries. Introduce a failure in the default LSP and check the overall IGP behavior, and changes to IP routing tables and LIB/LFIB, and MPLS recovery. Before proceeding, call your lab supervisor to assess the implemented setup.
3. Implement a MPLS IP VPN on the top of your network, simulating a single connection between two remote sites of a single customer;
4. Implement an MPLS link between two customers connected to two different LER routers.
5. Connect two different customers to each LER sharing the same set of IPs. Show that the overall setup is functional.
6. Connect at least one of the clients to the third LER router and show that the overall connection is functional. Try to connect the second client also to the third location.

   Do not attempt to solve all setps at the same time. Start by simulating point 2, then point 3, then point 4, and only then the full network envisaged in points 5 and 6. Please demonstrate that each step is functional before proceeding to the next step. Do not forget to save intermediate functional router and network configurations before advancing to the next step.

4 Assignment duration and deadline for report delivery

The 2nd and 3rd assignment must be completed jointly in three lab sessions.

The report of this assignment must be delivered jointly with the one of the 2nd lab assignment, and it is November 16th (Friday) at 11:59PM.