INSTITUTO SUPERIOR TÉCNICO

Traffic Engineering

Lab Project #2

Part C

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1 Goal

The third part of the MPLS project will be dedicated to the implementation and test of VPN IP over MPLS.

2 Equipment

PC with GNS3, VPCS, Wireshark and Cisco IOS.

3 Setup

Modify the MPLS network architecture used in the previous lab sessions in order to test IP VPN over MPLS.

The new operator network must have at least three LER routers in three different locations and at least five internal LSRs (a total of 8 routers in the operator network). The connection between any two LSRs must have redundant paths. Design the network such that there is a high redundancy level and the failure of any internal link is fail safe.

Consider that there are two operator clients, each one with at least two physical sites, each one connected to a PoP (Point of Presence) of the operator. Each PoP is served by one of the LER defined before. The two clients must share at least one PoP at one location.

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 a single 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 steps 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 show each concluded step to the class supervisor 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 report

The final report must cover the three parts of project #2 on MPLS, which will cover 4 lab sessions. The final report must be delivered May 19th, as announced in the initial planning.