
Computer Science Colloquium

An Overview of MPLS Traffic Engineering

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Olsen 311

Refreshments at 2:30, Talk from 3:00-4:00

The art of traffic engineering consists of making an efficient use of the network resources; traffic engineering has been used for decades in data communication networks (public telephony, private data network, Internet, ...) and comprises a vast number of tools and optimization techniques. The wide adoption of MPLS (MultiProtocol Label Switching) during the last past years in many public and private multi-service networks was driven by the emergence of new technologies providing sophisticated Traffic Engineering techniques, Virtual Private networks (layer-2 and layer-3), efficient QoS (Quality of Service) to mention a few of them. MPLS Traffic Engineering has been widely deployed during the last few years and was motivated by the need for bandwidth optimization, fast recovery (MPLS TE Fast Reroute) and strict QoS guarantees to carry sensitive traffic over multi-service packet networks.

The aim of this presentation is to provide an overview of the major building blocks of MPLS Traffic Engineering: use of routing extensions to flood network resources information across the network, computation of Traffic Engineering Label Switched (TE LSP) path satisfying various constraints, use of RSVP Traffic Engineering extensions to signal TE LSPs, Call admission Control and so on. MPLS TE has been also extensively used for its capability to provide fast network recovery by using local protection techniques so as to reroute traffic flows within a few tens of milliseconds in addition with the ability to provide bandwidth guarantees and bounded increased delay during failures. The fundamentals of MPLS Traffic Engineering Fast Reroute (FRR) will be briefly explained. Finally, the presentation will conclude with an introduction of more advanced MPLS Traffic Engineering techniques such as the automatic meshing of TE LSPs, automatic resizing of TE LSP based on traffic demand, new emerging techniques to compute optimal path across multiple routing areas and Autonomous Systems and some recent work on the use of MPLS Traffic Engineering Point to Multipoint LSPs to efficiently carry multicast traffic by means of constrained based Steiner trees.

Biography: Jean-Philippe Vasseur is System Architect at Cisco Systems where he works on IP/MPLS architecture specifications, focusing on IP, Traffic Engineering, and Network Recovery. Before joining Cisco, he worked for several service providers in large multiprotocol environments. He is an active member of the IETF, co-chair of the IETF PCE (Path Computation Element) Working Group and coauthored several IETF specifications. He is a regular speaker at various international conferences and he is involved in various research projects in the area of IP and MPLS. He has also filed numerous patents in the area of IP and MPLS and is the coauthor of "Network Recovery" (Morgan Kaufmann, July 2004) and "Definitive MPLS Network Designs" (Cisco Press, March 2005).