

Abstract (short version):

MPLS Networks are known to provide flexibility of IP networks without compromising scalability. Guaranteed QoS in an MPLS network requires backup paths to be preset in the network. This tutorial introduces the single-layer restoration routing by placing primary as well as backup paths in MPLS networks. Our focus will be on characterizing the fault models, computing and establishing backup paths, and bandwidth sharing along such backup paths.

A quick overview of MPLS routing will be provided followed by the routing information scenarios and the type of information propagated through routing protocols and their extensions. We will also cover the information locally stored at MPLS nodes that assists in efficient restoration routing and the algorithms for computing backup paths using the local and propagated information.

Abstract (long version):

Real-time and multimedia applications have grown enormously during the last few years. Such applications require guaranteed bandwidth in a packet switched networks. Moreover, these applications require that the guaranteed bandwidth remains available when a node or a link in the network fails. Multiprotocol Label Switching (MPLS) networks cater to these requirements without compromising scalability. Guaranteed service and protection against failures in an MPLS network requires backup paths to be preset in the network. Such backup paths are computed and installed at the same time a primary is provisioned. This tutorial introduces the single-layer restoration routing by placing primary as well as backup paths in MPLS networks. Our focus will be on characterizing the fault models, computing and establishing backup paths, and bandwidth sharing along such backup paths.

We will start by providing a quick overview of MPLS routing followed by the fault models and backup provisioning. We will identify the elements and quantities that are significant to the understanding of MPLS restoration routing. To this end, we will introduce the information locally stored at MPLS nodes and information propagated through routing protocols, in order to assist in efficient restoration routing. Algorithms for computing primary and backup paths using the local and propagated information will also be covered. Insight into some existing schemes will also be provided in this tutorial. This tutorial is intended for researchers working on network and graph algorithms, for practitioners working as network engineers, and for Technical Managers who are looking to upgrade their network infrastructure.

Biography: Zartash Afzal Uzmi received his B.Sc. in Electrical Engineering from UET, Taxila and M.S. and Ph.D. in Electrical Engineering from Stanford University, CA. He is currently an Assistant Professor in the Computer Science and Engineering Department at Lahore University of Management Sciences (LUMS) where he is part of the communications and networking group. Within this group, he is heading the efforts in MPLS restoration routing, Class-based preemption, and multilayer recovery. His interests lie in routing protocols, information capacity of ad hoc networks, and signal processing for communications..