



Course No: (TWI-MPLS-APPS-I)

Length: 5 days

About this Course

This course focuses primarily on Traffic Engineering (MPLS-TE), however both MPLS signaling protocols (LDP and RSVP) are discussed and contrasted. Every module is accompanied with a hands-on lab to reinforce the concepts learned during the presentation. The course has been designed so that students understand not only how to configure various MPLS features, but also the application of the many aspects supported by MPLS technology. Each student that follows this class will receive their personal copy of the book MPLS-Enabled Applications by Ina Minei and Julian Lucek which is one of the most complete references on MPLS available.

Prerequisites

A student following the MPLS Applications Part I should be familiar with operational and configuration modes in the Juniper Networks JUNOS operating system, and be able to configure and troubleshoot IGP routing protocols as well as BGP.

Course Contents

Day One

Background and Fundamentals

- Evolution of the Internet Backbone
- MPLS Fundamentals
- MPLS Terminology
- MPLS-TE (Traffic Engineering)
- Information Distribution
- Path Selection
- Path Signaling
- Packet Forwarding
- Hands on Lab

RSVP

- Resource Allocation
- Reservation Styles
- Messaging Protocol
- Path/Resv Messages and State Block
- Traditional vs Extended RSVP
- RSVP TE Extensions
- RSVP Messages
- Hands on Lab

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Day Two

Constrained Routing and CSPF

- Signaled and Constrained LSP characteristics
- Concepts and components of Constraint Based Routing
- IGP Extensions
- Traffic Engineering Database (TED)
- User Constraints
- CSPF Tie Breaking
- Priorities and Pre-emption
- Admin-Groups/Link-Coloring
- Hands on Lab

Traffic Protection and Restoration

- Priorities and pre-emption
- Primary paths
- Secondary paths with/without standby
- Fast Reroute (FRR)
- Link Protection
- Node Protection
- Node-Link protection
- Scalability considerations for FRR
- Fate Sharing
- LSP Optimization
- Hands on Lab

Day Three

MPLS DiffServ-TE

- Application scenarios
- Class types
- Path computation and signalling
- Bandwidth constraint models
- Keeping traffic within its limits
- Multiclass LSPs
- Hands on Lab

Interdomain Traffic-Engineering

- Application scenarios
- Setup of interdomain TE LSPs
- Interprovider challenges
- Hands on Lab



Day Four

MPLS design and deployment

- Characteristics of LDP
- Applications for LDP
- Applications for RSVP
- RSVP deployment
- Using both signaling protocols
- Hands on Lab

Day Five

MPLS Multicast

- The business drivers for MPLS multicast
- P2MP MPLS LSP Mechanisms
- Forwarding plane mechanisms
- Control plane mechanisms
- LAN Procedures for P2MP MPLS LSPs
- Upstream Label Allocation
- Coupling traffic into a P2MP LSP
- Coupling Layer-2 traffic
- Coupling IP unicast traffic
- Coupling IP multicast traffic
- Ingress redundancy
- P2MP LSP hierarchy
- Applications for P2MP LSPs
- Hands on Lab

MPLS Management

- Detecting and Troubleshooting failures
- MPLS OAM
- Troubleshooting RSVP signaled LSPs
- Troubleshooting LDP signaled LSPs
- Troubleshooting forwarding plane problems
- LSPing
- BFD
- Hands on lab

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