

MPLS ARCHITECTURE AND DESIGN

Appplied Learning Solutions MPLS Architecture and Design is a very special knowledge transfer experience that can be presented either in a traditional lecture format for an audience comprised of representatives of multiple carrier and/or service provider personnel or as a highly interactive workshop focused on the needs of a single carrier or service provider.

MPLS Architecture and Design can be an important part of the planning and decision making process before the actual MPLS service has been designed and the network has been architected or after network build-out has begun and initial design problems have been encountered. This is truly a knowledge transfer program designed for the practitioner.

Audience:

This program is designed for engineers, network architects and planners. A minimum of two years of network architecture and design experience is recommended to get the most out of this very intensive program though it can be delivered at a more basic level.

Prerequisites:

Understanding of IPv4 protocol, QoS concept and layer 2 protocol

Objectives:

At the conclusion of the course the student will be able to:

- Design and implement MPLS and gMPLS VPN
- Balance multimedia real time and non real time for Data-Voice-Video traffic
- Contrast service level agreement
- Fine tune existing MPLS, gMPLS VPNs

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COURSE OUTLINE

Day 1

1 MPLS In Perspective

- What is MPLS?
 - MPLS
 - GMPLS
- Problems Being Solved
 - Quality of Service Issues
 - Network Scalability
 - Route Prioritization and Optimization
 - Virtual Private Network Issues

2. MPLS Overview

- Basic Operation
- Terminology
- Forwarding Equivalence Class (FEC)
- Label Marking, Distribution and Binding

3 Label Distribution and Signaling

- Routing of LSPs
- Label Distribution
 - Label Distribution Protocol (LDP) and CR-LDP
 - LDP Overview
 - Label Retention modes

4 MPLS for Optical, ATM, Frame Relay

- Optical MPLS/GMPLS Networks
 - Wavelength Division Multiplexing/Dense WDM Overview
 - Physical Architecture
 - Wavelength/Lambda Switching
 - Label Distribution
- ATM
 - ATM Overview
 - ATM switches as Label Switched Routers
 - ATM specifics
 - i. Label Ranges and Encoding
 - ii. Direct Connections

- iii. VP and VC Tunnels
- iv. Multipoint and VC merging
- v. Mapping to ATM QoS

- Frame Relay
 - Frame Relay Overview
 - Frame Relay Switches as Label Switched Routers
 - Label encoding for Frame Relay
 - Frame Relay specifics
 - Label Ranges and processing
 - Label Distribution
 - Time to Live
 - Hybrid Switches
 - Multipoint and VC merging

Day 2

5 Differentiated Services (Diff-Serv), RSVP & MPLS

- RSVP Overview
 - MPLS extensions to RSVP
 - Label distribution and binding
 - Design Considerations: RSVP vs LDP
- DiffServ Overview
 - Classification
 - DS Codepoint
 - Aggregates
 - Mapping Diffserv onto MPLS
 - MPLS shim header
 - Requirements for Label Distribution

6 Virtual Private Networks (VPNs)

- VPN Overview
 - MPLS Support for VPNs
 - i. Overlay Model/RFC 2547
 - ii. Virtual Router (VR) Model

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7 Voice over MPLS

- Quality of Service vs Quality of Experience (QoS vs QoE)
- Network Design Considerations

8 MPLS Traffic Engineering and Network Design

- LSP Path Determination
- Routing Considerations
 - Explicit routes
 - Constraint Based Routing
 - Fast Re-routing
 - Special Traffic Engineering Considerations
- Green Field vs Migration
- Security Issues

9. Conclusion