

Introduction

Initially, the design goal for MPLS was to provide a label switching technology which gave the performance of layer 2 switching yet did so based on layer 3 information. While MPLS does achieve this goal, it is no longer viewed as the main benefit to be gained from MPLS. Other key benefits of MPLS include the simplicity with which Virtual Private Networks (VPNs) may be implemented as well as the ability to perform traffic engineering, where the path through which user data traverses a network may be dictated in one of many ways.

This course looks at the subject of MPLS, what it is all about, how it works as well as looking at some of the applications to which MPLS is used.

Who should attend the course?

All individuals who wish to develop a solid understanding of all aspects of MPLS technology.

Course Agenda

The following is an outline of the sections included in the course:

1. [MPLS: The need for a new solution](#)
2. [Label Distribution and signalling](#)
3. [Frame Relay, ATM and MPLS](#)
4. [MPLS Traffic Engineering](#)
5. [Supporting Differentiated Services \(Diff-Serv\) with MPLS](#)
6. [Virtual Private Networks \(VPNs\)](#)
7. [Voice over MPLS](#)
8. [Introduction to Optical Networks and MPLS](#)

Course Length

Two days.

Course Section Descriptions

1 MPLS: The need for a new solution

- What is MPLS?
 - Challenges for new IP centric networks
 - Limitations of traditional IP networking
 - Achieving QoS
 - Understanding the fundamentals
 - Basic MPLS operation
 - MPLS Terminology
 - Forwarding Equivalence Class
 - Label encoding, distribution and binding
 - Traffic Engineering: The need for Constrained and Explicit Routes
 - Proprietary approaches to MPLS
 - IP Switching (Nokia), IP Navigator (Lucent), Tag Switching (Cisco)
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2 Label Distribution and signalling

- Routing of LSPs
 - Label distribution methods
 - RSVP as a label distribution protocol
 - Understanding RSVP
 - MPLS extensions to RSVP
 - Label distribution and binding with RSVP

 - The Label Distribution Protocol (LDP) and CR-LDP
 - LDP operation
 - Label Retention modes
 - Comparison of RSVP and LDP
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3 Frame Relay, ATM and MPLS

- Frame Relay and MPLS
- Frame Relay Essentials
 - 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

- ATM and MPLS
 - ATM Essentials
 - ATM switches as Label Switched Routers
 - Label encoding for ATM
 - ATM specifics
 - Label Ranges and processing
 - Direct Connections
 - VP and VC Tunnels
 - Time to Live
 - Multipoint and VC merging
 - Mapping to ATM QoS
 - “Ships in the night”
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4 MPLS Traffic Engineering

- LSP Path determination
 - Offline “Helicopter view”
 - Explicit routes and constraint based routing
 - Fast Re-routing: Taking account of Network Failures
 - MPLS deployment “Edge or Core”
 - ATM and Traffic Engineering
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5 Supporting Differentiated Services (Diff-Serv) with MPLS

- Understanding the Diff-Serv model
 - The aim of Diff-Serv
 - How Diff-Serv works
 - Classification
 - The DS codepoint
 - Behaviour Aggregates
 - Mapping Diffserv onto MPLS
 - Using the MPLS shim header
 - Other cases e.g. Frame Relay and ATM
 - Requirements for Label Distribution
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6 Virtual Private Networks (VPNs)

- VPNs: Definitions and Realisation
 - Customer and Service Provider Tunnels
 - Using MPLS to support VPNs: Different approaches
 - The overlay model and RFC 2547
 - How does the overlay model work?
 - Advantages and disadvantages of the overlay approach
 - The virtual router (VR) model
 - How does the VR model differ from the overlay approach?
 - Advantages and disadvantages of the VR approach
 - Summary of MPLS enabled VPNs
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7 Voice over MPLS

- Implementing a voice service over MPLS
 - Reference Model
 - Call Quality and QoS
 - MPLS network requirements
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8 Introduction to Optical Networks and MPLS

- Overlay and Integrated Networks
 - Wavelength Division Multiplexing
 - Add/Drop multiplexers
 - Optical Cross-Connects
 - MPLS and Lambda Switching
 - Requirements for Label Distribution in Optical Networks
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End of Training Outline

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To find out about our current range of training courses, please refer to our web site at:

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