



Overview

The origins of Multiprotocol Label Switching (MPLS) are in the provision of an efficient mechanism to interwork IP with an ATM infrastructure, so that the benefit of each technology could be maximized. This has evolved to support efficient transport of other protocols, traffic engineering, Virtual Private Networks (VPNs) and optimized routing. This hands-on course provides a detailed explanation of its operation and services that it supports. You will configure an MPLS environment, analyse MPLS sessions and troubleshoot the network.

You will be able to

- Explain the rationale for MPLS
- Compare MPLS standards
- Outline architecture of an MPLS solution
- Explain the operation of MPLS
- Implement traffic engineering using MPLS
- Use MPLS to transport multiple protocols
- Configure MPLS for virtual private networking

Who can benefit

Engineers wishing to build on their existing knowledge of IP in a practical environment and implement an MPLS solution

Pre requisite knowledge

It is essential that the participants have a good knowledge of the fundamentals of IP. The participant should have successfully completed the Certified IP Engineer (CIPE) practical and theory assessment.

Outline

Introduction to MPLS

- Early Proprietary Solutions
- Label Switching Concept
- Standardization Bodies and current developments
- Benefits of MPLS
- Generalized MPLS

MPLS concepts and terminology

- Labels, Stacks and Label Switched Paths
- Forward Equivalence Class
- Tunneling
- MPLS Domains
- Exercise: creating MPLS label switched paths
- Exercise: using stacked labels

MPLS Architecture and Operation

- Label Switched Routers and their operation
- Label Edge Routers
- Label distribution protocols & methods
- MPLS interaction with OSPF, IS-IS & BGP
- Label aggregation
- Label swapping and mapping operations
- MPLS Transport Profile (MPLS-TP)

- Example MPLS Topologies
- Exercise: dynamic routing & path creation

QoS and Traffic Engineering

- Definition of QoS and CoS
- Why use MPLS Traffic Engineering?
- Mapping Traffic into Tunnels
- Constrained Routing with the Label Distribution Protocol (CR-LDP)
- Resource Reservation Protocol for Traffic Engineering (RSVP-TE)
- LSP-based Traffic Management
- End-to-end OA&M
- Protection switching
- Exercise: traffic engineering
- Exercise: planning an MPLS implementation for triple play

Virtual Private Networking

- Overview of VPNs
- Pros and cons of MPLS VPNs
- Implementing VPNs at Layer 2 & 3
- Implementing VPLS
- Structure of an MPLS VPN
- Virtual routing & forwarding (VRF)
- Exercise: creating an MPLS VPN
- Exercise: configuration of VPLS
- Exercise: Overlapping address space

MPLS Multiprotocol Support

- Applications to IP
- Ethernet/MetroE over MPLS
- MPLS and Frame Relay
- HDLC & point to point protocols
- Exercise: MPLS transport of Ethernet

Hands-on exercises, review questions & section summaries throughout

DURATION 4 days

MAXIMUM CLASS SIZE 12