

## Junos MPLS Fundamentals (JMF)

### Course Level

*Junos MPLS Fundamentals* (JMF) is an intermediate-level course.

### Intended Audience

This course benefits individuals responsible for configuring and monitoring devices running the Junos OS.

### Prerequisites

Students should have intermediate-level networking knowledge and should be familiar with the Junos OS command-line interface (CLI). Students should also attend the *Introduction to the Junos Operating System* (IJOS), *Junos Intermediate Routing* (JIR), and *Junos Service Provider Switching* (JSPX) courses prior to attending this class.

### Objectives

After successfully completing this course, you should be able to:

- Describe the history and rationale for MPLS, as well as its basic terminology.
- Explain the MPLS label operations (push, pop, swap) and the concept of label-switched path (LSP).
- Describe the configuration and verification of MPLS forwarding.
- Describe the functionalities and operation of RSVP and LDP.
- Configure and verify RSVP-signaled and LDP-signaled LSPs.
- Select and configure the appropriate label distribution protocol for a given set of requirements.
- Describe the default Junos OS MPLS traffic engineering behavior.
- Explain the Interior Gateway Protocol (IGP) extensions used to build the Traffic Engineering Database (TED).
- Describe the Constrained Shortest Path First (CSPF) algorithm, its uses, and its path selection process.
- Describe administrative groups and how they can be used to influence path selection.
- Describe the default traffic protection behavior of RSVP-signaled LSPs.
- Explain the use of primary and secondary LSPs.
- Describe the operation and configuration of fast reroute.
- Describe the operation and configuration of link and node protection.
- Describe the operation and configuration of LDP loop-free alternate.
- Describe the LSP optimization options.
- Explain LSP priority and preemption.
- Describe the behavior of fate sharing.
- Describe how SRLG changes the CSPF algorithm when computing the path of a secondary LSP.
- Explain how extended admin groups can be used to influence path selection.
- Explain the purpose of several miscellaneous MPLS features.

### Course Contents

#### Day 1

##### Chapter 1: Course Introduction

##### Chapter 2: MPLS Fundamentals

- MPLS Foundation

- Terminology
- MPLS Configuration
- MPLS Packet Forwarding
- Lab: MPLS Fundamentals

### **Chapter 3: Label Distribution Protocols**

- Label Distribution Protocols
- RSVP
- LDP
- Seamless MPLS
- Lab: Label Distribution Protocols

### **Chapter 4: Routing Table Integration**

- Mapping Next Hops to LSPs
- Route Resolution Example
- Route Resolution Summary
- IGP Passive Versus Next-Hop Self for BGP Destinations
- Lab: Routing Table Integration

## **Day 2**

### **Chapter 5: Constrained Shortest Path First**

- RSVP Behavior Without CSPF
- CSPF Algorithm
- CSPF Tie Breaking
- Administrative Groups
- Interarea Traffic Engineered LSPs
- Lab: CSPF

### **Chapter 6: Traffic Protection and LSP Optimization**

- Default Traffic Protection Behavior
- Primary and Secondary LSPs
- Fast Reroute
- RSVP Link Protection
- LDP LFA and Link Protection
- LSP Optimization
- Lab: Traffic Protection

### **Chapter 7: Fate Sharing Junos OS Fate Sharing**

- SRLG
- Extended Admin Groups
- Lab: Fate Sharing

### **Chapter 8: Miscellaneous MPLS Features**

- Forwarding Adjacencies
- Policy Control over LSP Selection

- LSP Metrics
- Automatic Bandwidth
- Container LSPs
- TTL Handling
- Explicit Null Configuration
- MPLS Pings
- Lab: Miscellaneous MPLS Features

**Please note the highlighted topics will be covered theoretically only. No hands-on possible.**