MPLS and Segment Routing Automation Using NorthStar (MSRN)

JUNIPER NETWORKS
EDUCATION SERVICES

Engineering Simplicity

COURSE OVERVIEW

This four-day course is designed to introduce various Juniper NorthStar Controller and NorthStar Planner features including, but not limited to, WAN topology discovery, Multiprotocol Label Switching (MPLS) label switched path (LSP) management, Segment Routed (SR-TE) LSPs, RSVP signaled LSPs, Path Computation Element Protocol (PCEP), LSP optimization, egress peer engineering (EPE), LSP calendaring, maintenance scheduling, NorthStar troubleshooting, REST API, P2MP LSPs, failure simulation, reporting, network modeling, path demand placement, hardware inventory, and an introduction to the HealthBot component. Students will learn to configure and monitor these features that exist on Juniper's NorthStar Controller and NorthStar Planner platforms with the help of a network built using vMX Series devices.

Through demonstrations and hands-on labs, students will gain experience configuring, monitoring, and analyzing the above features of the NorthStar Controller and NorthStar Planner. This course is based on NorthStar Release 6.1.

COURSE LEVEL

Advanced

AUDIENCE

- Individuals responsible for managing MPLS networks that want to add automation using the NorthStar Controller and NorthStar Planner
- Individuals in professional services, sales and support organizations, and end users

PREREQUISITES

- Understanding of the OSI model
- Junos OS configuration experience—the *Introduction to the Junos Operating System* (IJOS) course or equivalent
- Advanced MPLS knowledge—the *Junos MPLS Fundamentals* (JMF) course or equivalent

RELEVANT JUNIPER PRODUCT

- Automation
- NorthStar Controller
- NorthStar Planner
- vMX Series

CONTACT INFORMATION

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OBJECTIVES

- Describe the various WAN domains.
- Describe the use cases for NorthStar.
- Describe the use cases for NorthStar Planner.
- Describe the usage of PCEP.
- Describe RSVP signaling using the CSPF algorithm.
- Describe the NorthStar VMs and their processes.
- Describe the post installation setup process.
- Describe the behavior of topology discovery.
- Describe the configuration of IGP topology discovery.
- Describe the configuration of BGP-LS topology discovery.
- Describe how to access the NorthStar Controller Operator and Planner user interfaces.
- Describe the basic features of the NorthStar Controller Operator user interface.
- Describe the various LSP types.
- Configure PCC controlled LSPs.
- Configure PCE delegated LSPs.
- Configure PCE initiated LSPs.
- Monitor LSPs from the NorthStar Operator user interface.
- Describe primary, secondary, and standby LSPs.
- Describe symmetric pairs of LSPs.
- Describe diversity groups.
- Describe using Junos MPLS LSP templates.
- Describe LSP calendaring.
- Describe Inter-AS LSPs.
- Describe Egress Peer Engineering.
- Describe how to provision multiple LSPs.
- Describe LSP optimization.
- Configure segment routing.
- Provision segment routed LSPs.
- Manage NorthStar using the REST API.
- Troubleshoot NorthStar Controller.
- Create P2MP LSPs.
- Explain the features, capabilities, and benefits of NorthStar Planner and how they work to optimize WAN design.
- Access NorthStar Planner Desktop and navigate and customize the NorthStar Planner Desktop Administrative interface.
- Access NorthStar Planner Web UI.

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OBJECTIVES (contd.)

- Explain different methods of creating a network model.
- Manage different files that make up a network model and understand how these files are organized.
- Modify a network model by performing tasks such as adding links, nodes, and sites and save these changes to a modeled network.
- Optimize network demand paths, design diverse paths, and perform what-if scenarios to see how demands are routed.
- Simulate link and node failures and view the effects of these failures on demand routing across the WAN.
- Analyze and manage network information using the Report Manager interface.
- Describe the fundamental operations of HealthBot.

COURSE CONTENT

DAY 1

1 Course Introduction

2 WAN Automation

- The WAN Network
- Juniper Network WAN Automation Overview
- NorthStar Controller Components
- NorthStar Controller Use Cases
- NorthStar Planner
- NorthStar Planner Use Cases

3 NorthStar Controller Architecture

- Path Computation Element Protocol (PCEP)
- LSP Signaling and the CSPF Algorithm
- IGP Traffic Engineering
- NorthStar Virtual Machines
- Initial Setup
- Post Installation Setup and Configuration
- NorthStar Controller High Availability Overview

Lab 1: Initial Setup

4 Topology Discovery

- Topology Discovery Overview
- IGP Topology Discovery
- BGP-LS Topology Discovery
- Transport Topology Discovery
- BGP Monitoring Protocol (BGP-MP)

Lab 2: Topology Discovery

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DAY 2

5 Using the NorthStar Controller

- Operator User Interface Overview
- Accessing the Operator User Interface
- User Options
- More Options
- View
- NorthStar Planner User Interface Overview
- NorthStar Planner Web UI Overview

Lab 3: Using the NorthStar Controller

6 Basic LSP Management

- LSP Control Review
- Configuring PCC Controlled LSPs
- Configuring PCE Delegated LSPs
- Configuring PCE Initiated LSPs
- Verifying LSP Status

Lab 4: Basic LSP Management

7 Advanced LSP Management

- Secondary and Standby LSPs
- Symmetric Pairs of LSPs
- Diversity Groups
- Junos MPLS LSP Templates
- LSP Calendaring
- Inter-AS LSPs
- Provisioning Multiple LSPs
- LSP Optimization

Lab 5: Advanced LSP Management

8 Segment Routing

- Segment Routing Overview
- Configuring a PE to Support SR
- Provisioning and Managing SR LSPs

Lab 6: Segment Routing

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COURSE CONTENT (contd.)

DAY 3

9 P2MP LSPs

- P2MP LSP Overview
- P2MP LSP Use Cases
- NorthStar P2MP Configuration and Management
- P2MP LSP Design

10 Maintenance Scheduling and NETCONF Provisioning

- Maintenance Scheduling
- NETCONF Provisioning

Lab 7: Scheduling Maintenance and NETCONF Provisioning

11 Data Collection and Analytics

- Telemetry Architecture
- JTI Router Configuration
- SNMP Data Collection
- Netflow Collection
- LSP Routing Behavior

Lab 8: Data Collection and Analytics

12 NorthStar Controller Troubleshooting

- Process Troubleshooting
- Log File Analysis
- Network Topology Troubleshooting

Lab 9: Troubleshooting

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DAY 4

13 NorthStar REST API

- NorthStar Controller REST API Concepts
- REST API Examples

14 NorthStar Planner

- Launching NorthStar Planner
- NorthStar Planner Interface

Lab 10: NorthStar Planner Interface

15 Network Modeling

- Creating Network Models
- Analyzing Network Model Data Files
- Adding Network Demands, Links, Nodes

Lab 11: Network Modeling

16 Network Demands and Failure Simulation

- Network Demand Placement
- Failure Simulation

Lab 12: Demand Placement and Failure Simulation

A Introducing HealthBot

- Fundamentals of Network Monitoring
- Native and gRPC Sensors
- Closed-Loop Automation
- Function and Structure of Playbooks and Rules
- Triggers and Functions
- NorthStar Integration with HealthBot
- HealthBot Use Case and Demonstration

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