

# Juniper Networks Certified Internet Specialist (JNCIS-SP) Certification

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## Course Details

### Course Outline

- 1. Course Introduction**
- 2. Protocol-Independent Routing**
  - Static Routes
  - Aggregated Routes
  - Generated Routes
  - Martian Addresses
  - Routing Instances
  - Lab 1: Protocol-Independent Routing
- 3. Load Balancing and Filter-Based Forwarding**
  - Overview of Load Balancing
  - Configuring and Monitoring Load Balancing
  - Overview of Filter-Based Forwarding
  - Configuring and Monitoring Filter-Based Forwarding
  - Lab 2: Load Balancing and Filter-Based Forwarding
- 4. Open Shortest Path First**
  - Overview of OSPF
  - Adjacency Formation and the Designated Router Election
  - OSPF Scalability
  - Configuring and Monitoring OSPF
  - Basic OSPF Troubleshooting
  - Lab 3: Open Shortest Path First
- 5. Border Gateway Protocol**
  - Overview of BGP
  - BGP Attributes
  - IBGP Versus EBGP
  - Configuring and Monitoring BGP
  - Lab 4: Border Gateway Protocol

## **6. IP Tunneling**

- Overview of IP Tunneling
- GRE and IP-IP Tunnels
- Implementing GRE and IP-IP Tunnels
- Lab 5: IP Tunneling

## **7. High Availability**

- Overview of High Availability Networks
- GR
- Graceful RE Switchover
- Nonstop Active Routing
- BFD
- VRRP
- Lab 6: High Availability

## **8. Ethernet Switching and Virtual LANs**

- Ethernet LANs
- Bridging
- Configuring and Monitoring VLANs
- Automating VLAN Administration
- Configuring and Monitoring IRB
- Layer 2 Address Learning and Forwarding
- Layer 2 Firewall Filtering
- Ethernet Switching and VLANs Lab

## **9. Virtual Switches**

- Routing Instances Overview
- Configuring and Monitoring Virtual Switches
- Interconnecting Routing Instances
- Logical Systems
- Virtual Switches Lab

## **10. Provider Bridging**

- Expanding the Bridged Network
- Provider Bridging
- Configuring and Monitoring Provider Bridging
- Provider Bridging Lab

## **11. Spanning-Tree Protocols**

- Overview of STP
- Overview of RSTP
- Overview of MSTP
- Overview of VSTP
- Configuring and Monitoring Spanning-Tree Protocols
- Understanding BPDU, Loop, and Root Protection
- MSTP Lab

## **12. Ethernet OAM**

- OAM Overview
- LFM
- CFM
- Configuring and Monitoring Ethernet OAM
- Ethernet OAM Lab

## **13. High Availability and Network Optimization**

- ERP Overview
- Configuring and Monitoring ERP
- Link Aggregation Group Overview
- Configuring and Monitoring a LAG
- MC-LAG Overview
- Configuring and Monitoring an MC-LAG
- High Availability and Network Optimization Lab

## **14. Troubleshooting and Monitoring**

- Introduction to Troubleshooting and Monitoring
- Troubleshooting and Monitoring Tools
- Troubleshooting Case Study: Network Congestion
- Troubleshooting and Monitoring Lab

## **15. MPLS Fundamentals**

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

## **16. Label Distribution Protocols**

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

## **17. Constrained Shortest Path First**

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

## **18. Traffic Protection and LSP Optimization**

- Default Traffic Protection Behavior
- Primary and Secondary LSPs
- Fast Reroute
- Bypass LSPs
- LSP Optimization
- Lab: Traffic Protection

## **19. Fate Sharing**

- Junos OS Fate Sharing
- SRLG
- Extended Admin Groups
- Lab: Fate Sharing

## **20. Miscellaneous MPLS Features**

- Routing Table Integration
- Forwarding Adjacencies
- Policy Control over LSP Selection
- LSP Metrics
- Automatic Bandwidth
- TTL Handling
- Explicit Null Configuration
- MPLS Pings
- Lab: Miscellaneous MPLS Features

## **21. VPN Review**

- Overview of VPNs
- CPE-Based VPNs
- Provider-Provisioned

## **22. Layer 3 VPNs**

- Layer 3 VPN Terminology
- VPN-IPv4 Address Structure
- Operational Characteristics
- Lab: VPN Baseline Configuration

## **23. Basic Layer 3 VPN Configuration**

- Preliminary Steps
- PE Router Configuration
- Lab: Layer 3 VPN with Static and BGP Routing

## **24. Troubleshooting Layer 3 VPNs**

- A Layered Approach
- The Routing-Instance Switch
- PE-Based and CE-Based Traceroutes
- Viewing VRF Tables and PE-PE Signaling Flow
- Monitoring PE-CE Routing Protocols

## **25. Layer 3 VPN Scaling and Internet Access**

- Scaling Layer 3 VPNs
- Public Internet Access Options
- Lab: Route Reflection and Internet Access

## **26. Layer 3 VPNs- Advanced Topics**

- Exchanging Routes Between VRF Tables
- Hub-and-Spoke Topologies
- Layer 3 VPN CoS Options
- Layer 3 VPN and GRE Tunneling Integration
- Layer 3 VPN and IPsec Integration
- Lab: GRE Tunnel Integration

## **27. BGP Layer 2 VPNs**

- Overview of Layer 2 Provider-Provisioned VPNs
- BGP Layer 2 VPN Operational Model: Control Plane
- BGP Layer 2 VPN Operational Model: Data Plane

- Preliminary BGP Layer 2 VPN Configuration
- BGP Layer 2 Configuration
- Monitoring and Troubleshooting BGP Layer 2 VPNs
- Lab: BGP Layer 2 VPNs

### **28. Layer 2 VPN Scaling and CoS**

- Review of VPN Scaling Mechanisms
- Layer 2 VPNs and CoS

### **29. LDP Layer 2 Circuits**

- LDP Layer 2 Circuit Operation
- LDP Layer 2 Circuit Configuration
- LDP Layer 2 Circuit Monitoring and Troubleshooting
- Circuit Cross-Connect
- Lab: Circuit Cross-Connect and LDP Layer 2 Circuits

### **30. Virtual Private LAN Services**

- Layer 2 MPLS VPNs Versus VPLS
- BGP VPLS Control Plane
- BGP VPLS Data Plane
- Learning and Forwarding Process
- Loops

### **31. VPLS Configuration**

- VPLS Configuration
- VPLS Troubleshooting
- Lab: VPLS

### **32. Interprovider VPNs**

- Hierarchical VPN Models
- Junos Support of Carrier-of-Carriers Model
- Junos Support of Carrier-of-Carrier VPN Applications
- Lab: Carrier-of-Carrier VPNs