

# CCNP Cisco Troubleshooting and Maintaining Cisco IP Networks

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**Meet the expert:** Robert has more than 20 years of expertise in the fields of >sophisticated networking, information, and telecommunication technologies. He has

worked as an Information Technology Consultant and Instructor, consulting and

training in the networking realm of the IT Industry throughout Europe and USA since

2005. Clients include the United States Military, Mercedes Benz, Deutsche Telekom,

and Diversion German Government Entities.

**Prerequisites:** none

**Runtime:** 10:49:59

**Course description:** Troubleshooting and Maintaining Cisco IP Switched Networks is a qualifying exam for the Cisco Certified Network Professional CCNP®, certification. The TSHOOT exam will certify that the successful candidate has important knowledge and skills necessary to (1) plan and perform regular maintenance on complex enterprise routed and switched networks and (2) use technology-based practices and a systematic ITIL-compliant approach to perform network troubleshooting.

## Course outline:

### Planning Maintenance for Complex Networks

- Introduction
- A Network Engineer's Job
- Benefits of Structured Maintenance
- Maintenance Models and Methodologies
- Configuration Management
- Network Maintenance Plan
- Network Maintenance Planning
- Tools, Applications, and Resources
- NTP Example
- Cisco Configuration and Documentation Tools
- Logging Services
- Logging to a Server
- Monitoring and Performance Measurement Tools
- Implementing Backup and Restore
- Disaster Recovery Tools
- Summary

### Planning Maintenance for Complex Networks Demo

- Introduction
- Demo: Create Network Topology
- Demo: Interconnect Network Devices
- Demo: Interconnect Network Devices Continued
- Summary

### Troubleshooting Processes for Complex Networks

- Introduction

- Troubleshooting Methodologies
- Troubleshooting Methodologies Continued
- Troubleshooting Approaches
- Troubleshooting Examples
- Implementing Troubleshooting Procedures
- Verify and Define the Problem
- Gather Information, Analyze, and Eliminate
- Propose and Test Hypothesis and Solve Problem
- Troubleshooting and Network Maintenance
- Network Baseline
- Communication and Change Control
- Disaster Recovery Tools
- Demo: Configure Router 1
- Demo: Router 1 Passwords
- Demo: IP Host Tables
- Demo: Set up Interfaces
- Demo: Interfaces Continued
- Demo: SNMP Servers
- Summary

### Troubleshooting Processes for Complex Network Demo

- Introduction
- Demo: Baseline Switch Configuration
- Demo: Switch Setup
- Demo: Spanning Tree

- Demo: Set up Port Channels and Interfaces
- Demo: Interfaces Continued
- Demo: One More Interface
- Demo: Set up IP Address and Default Gateway
- Summary

### Using Tools and Applications

- Introduction
- IOS show Commands
- IOS show Commands Continued
- Testing Network Connectivity
- Ping Results Characters
- Testing Network Connectivity Continued
- Collecting Real-time Information
- Diagnosing Hardware Issues
- Additional Hardware Commands and Tools
- Using Traffic Capturing Tools
- Using Traffic Capturing Tools Continued
- Gathering Information with SNMP
- Gathering Information with NetFlow
- SNMP and NetFlow Comparison
- Enabling Network Event Notification
- EEM
- Demo: show ip route
- Summary

### Campus Switched Solutions

- Introduction

- LAN Switch Operation
- LAN Switch Operation Continued
- Verifying Layer 2 Forwarding
- Spanning Tree Operation
- Spanning Tree Operation Continued
- Spanning Tree Failures
- EtherChannel Operation
- EtherChannel Problems
- Inter-VLAN Routing and Multilayer Switching
- Troubleshooting Routers and Multi-Layer Switches
- Troubleshooting Multi-Layer Switches
- SVIs and Routed Ports
- Multilayer Switches, VLANs, and Routing
- Routed Interfaces vs. SVIs
- Checking SVI Status
- FHRPs
- Verifying HSRP Operation
- Alternatives to HSRP
- HSRP, VRRP, and GLBP Diagnostic Commands
- Summary

### Campus Switched Solutions Demo

- Introduction
- Demo: Check Connectivity
- Demo: Spanning Tree

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- Demo: Spanning Tree Interfaces
- Demo: HSRP
- Demo: HSRP Continued
- Demo: Verification and Troubleshooting
- Summary

## EIGRP and OSPF

- Introduction
- Routing and Routing Data Structures
- Using IOS Commands to Verify Routing Functions
- Display the CEF FIB Table
- Verify Layer 3 to Layer 2 Mappings
- Clear FIB and Adjacency Entries
- IGP Routing Protocol Review
- EIGRP Review
- EIGRP Incremental Update Process
- Monitoring EIGRP with show Commands
- EIGRP Troubleshooting Example
- EIGRP Troubleshooting Example Continued
- OSPF Review: Process and Operation
- OSPF Review: Data Structures
- OSPF Review: Network Areas and LSAs
- OSPF Review: Information Flow Within an Area
- Summary

## OSPF Troubleshooting and BGP

- Introduction
- OSPF Review: Information Flow Between Areas
- Monitoring OSPF with show Commands
- Monitoring OSPF with debug Commands
- OSPF Troubleshooting Example
- OSPF Troubleshooting Example Continued
- Route Redistribution Review
- Route Redistribution Review Continued
- Verifying and Troubleshooting Route Propagation
- OSPF to EIGRP Troubleshooting Process
- BGP Overview
- BGP Route Processing and Data Structures
- BGP Neighbor and BGP Tables
- Peering
- Monitoring BGP with show Commands
- Monitoring BGP with debug Commands
- Summary

- NAT/PAT Operation Review
- NAT/PAT Operation Review Continued
- Troubleshooting NAT/PAT Issues
- Troubleshooting NAT/PAT Issues
- NAT/PAT Troubleshooting Example 1
- Using NBAR for Protocol Discovery
- NAT/PAT Troubleshooting Example 2
- NAT/PAT Troubleshooting Example 2 Continued
- DHCP Overview
- Client-Server Communication
- DHCP Packet Message Types
- Three DHCP Roles a Router May Take
- DHCP Troubleshooting Issues Continued
- DHCP Relay Agent
- DHCP Parameters and Options
- DHCP Troubleshooting Issues
- DHCP Troubleshooting Commands
- Summary

## DHCP Troubleshooting and IPv6

- Introduction
- DHCP Troubleshooting Example 1
- DHCP Troubleshooting Example 2
- DHCP Troubleshooting Example 3
- IPv6 vs. IPv4
- Troubleshooting IPv6 Issues
- IPv6 Troubleshooting with show Commands
- IPv6 Troubleshooting with debug Commands
- IPv6 Troubleshooting Example 1
- IPv6 Troubleshooting Example 2
- IPv6 Troubleshooting Example 2 Continued
- Summary

## IPv6 Troubleshooting

- Introduction
- IPv6 Troubleshooting Example 3
- IPv6 Troubleshooting Example 3 Continued
- IPv6 Troubleshooting Example 4
- IPv6 Troubleshooting Example 4 Summary

- Demo: Set up DHCP
- Demo: IP Configuration
- Summary

## NetFlow, IP SLA, and AutoQoS

- Cisco IP SLA Configuration
- Cisco IP SLA Responder
- NBAR and IP SLA Responders
- SLB Overview
- QoS and AutoQoS
- Common NetFlow Issues
- Common IP SLA Issues
- Common NBAR Issues
- Common AutoQoS Issues
- NAS Troubleshooting Commands
- NetFlow Troubleshooting Example
- IP SLA Troubleshooting Example
- AutoQoS Troubleshooting Example
- Identifying Switch Performance Issues
- AutoQoS Troubleshooting Example Continued
- Identifying Switch Performance Issues Continued
- Summary

## Switch Performance Issues

- Introduction
- Troubleshooting Example: Duplex
- Automatic Medium-Dependent Interface Crossover
- Switch Forwarding Hardware
- Troubleshooting TCAM Problems
- Troubleshooting TCAM Problems Continued
- Troubleshooting High CPU Load on Switches
- DHCP Issues
- Spanning-Tree Issues
- HSRP Issues
- Switch Performance Issue 1
- Switch Performance Issue 2
- Switch Performance Issue 3
- Summary

## Troubleshooting and Wireshark

- Introduction
- Troubleshooting High Router CPU Load
- ARP Input
- Net Background, IP Background, and TCP Timer
- Troubleshooting Switch Paths
- Troubleshooting CEF
- Analyzing Packet Forwarding
- Troubleshooting Router Memory Issues
- Wireshark
- Demo: Installing Wireshark
- Summary

## Wireless Connectivity

- Introduction
- Section Overview
- Common Wireless Integration

- Split MAC or Lightweight Solution
- Wireless Integration Issues Continued
- Wireless Integration Issue Tools
- WLAN Connectivity Troubleshooting Example 1
- WLAN Connectivity Troubleshooting Example 2
- WLAN Connectivity Troubleshooting Example 3
- WLAN Connectivity Troubleshooting Example 4
- Summary

## Unified Communications

- Introduction
- Unified Communications Integration Issues
- IP Phones
- QoS
- Unified Communications Commands
- Voice Troubleshooting Example 1
- Voice Troubleshooting Example 2
- Voice Troubleshooting Example 3
- Summary

## Video Integration

- Introduction
- Video Application Types and Common Issues
- Multicast Operation
- Troubleshooting Video Integration Issues
- Video Integration Troubleshooting Example 1
- Video Integration Troubleshooting Example 2
- Demo: Install SolarWinds
- Demo: Network Sonar Wizard
- Demo: Configure Alerts
- Summary

## Network Security

- Introduction
- Network Security
- Management Plane Security
- Management Plane Accounting
- IOS packet Inspection
- Troubleshoot ZPF
- TSHOOT example
- TSHOOT example Continued
- Summary

## Topics Review

- Introduction
- Topics Review
- Chapter 8
- Summary

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- Introduction
- Troubleshooting