



# Troubleshooting and Maintaining Cisco IP Networks v2.0 - TSHOOT (Professional)

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## Course Details

### Course Outline

#### 1. Tools and Methodologies of Troubleshooting

##### a. Describing Troubleshooting Methodologies

- What Is Troubleshooting?
- Diagnostic Principles
- Troubleshooting Methods
- Structured Network Troubleshooting
- Common Troubleshooting Approaches
- Top-Down Method
- Bottom-Up Method
- Divide-and-Conquer Method
- Following the Traffic Path
- Spot the Differences
- Swapping Components
- Case Study: Troubleshooting Approaches

##### b. Using Troubleshooting Procedures

- Network Troubleshooting Procedures
- Defining the Problem
- Gathering Information
- Analyzing the Gathered Information
- Proposing and Eliminating Potential Problem Causes
- Proposing a Hypothesis
- Testing and Verifying a Hypothesis
- Solving and Documenting the Problem
- Case Study: Troubleshooting Procedures

##### c. Following Recommended Practices During Routine Network Maintenance



- Common Maintenance Tasks
- Troubleshooting as Part of Maintenance
- Maintenance Planning
- Change Control
- Saving Configurations
- Restoring Configurations
- Archiving Configurations
- Labeling Interfaces and Cables
- Documentation
- Implementing Time Services
- Implementing Logging Services
- Creating a Baseline
- Communication

**d. Using Basic Cisco IOS Troubleshooting Tools**

- Layer 2 Switching Process
- Layer 3 Routing Process
- Filtering show Commands
- Filtering show Command Output Using Regular Expressions
- Redirecting show Command Output to a File
- Basic Hardware Diagnostics
- Debug Commands

**e. Using Specialized Troubleshooting Tools**

- Troubleshooting Tools
- Categories of Troubleshooting Tools
- Case Study: Syslog
- Case Study: Troubleshooting with SPAN
- Case Study: Troubleshooting with SNMP
- Case Study: NetFlow
- Introducing the Cisco IOS Embedded Event Manager
- EEM Example: Logging when Configuration Mode Is Entered
- EEM Example: Bring Up a Disabled Interface



## 2. Troubleshooting at SECHNIK Networking Ltd.

- Debrief of the First Troubleshooting at SECHNIK Networking Ltd.
- Trouble Tickets Overview
- Example of Troubleshooting Flow: PC1 Unable to Access Data on the Server
- Troubleshooting Trunks
- Example of Troubleshooting Flow: PC2 Unable to Access the Internet
- Troubleshooting NAT
- Example of Troubleshooting Flow: PC3 Unable to Use SSH to Connect to the Server
- Troubleshooting Interfaces
- Example of Troubleshooting Flow: PC4 Unable to Access the Internet Through IPv6
- Troubleshooting IPv6 Address Assignment on Clients
- a. Debrief of the Second Troubleshooting at SECHNIK Networking Ltd.**
  - Trouble Tickets Overview
  - Example of Troubleshooting Flow: PC1 Unable to Access the Internet Host
  - Troubleshooting Network Layer Connectivity
  - Example of Troubleshooting Flow: PC2 Cannot Use SSH to Connect to the Internal Server
  - TCP Handshake
  - Example of Troubleshooting Flow: PC4 Does Not Acquire an IP Address via DHCP After Port Security Is Implemented
  - Troubleshooting an Error-Disabled Port
- b. Debrief of the Third Troubleshooting at SECHNIK Networking Ltd.**
  - Trouble Tickets Overview
  - Example of Troubleshooting Flow: PC1 and PC2 Cannot Ping the Internet Host
  - Troubleshooting DHCP
  - Passive Interfaces with Different Routing Protocols
  - Example of Troubleshooting Flow: PC3 Cannot Connect to the Internet
  - IPv6 Review

## 3. Troubleshooting at TINC Garbage Disposal Ltd.

- Debrief of the First Troubleshooting at TINC Garbage Disposal Ltd.
- Trouble Tickets Overview
- Example of Troubleshooting Flow: GW2 Does Not Serve as the Backup to the Internet



- Troubleshooting BGP Neighbor Relationships
- Example of Troubleshooting Flow: PC1 and PC2 Do Not Have Internet Connectivity
- Troubleshooting Port Security
- Example of Troubleshooting Flow: Classroom PC2 Does Not Have Internet Connectivity
- Troubleshooting VLANs
- Troubleshooting a Native VLAN
- a. Debrief of the Second Troubleshooting at TINC Garbage Disposal Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: GW1 Only Has OSPF Adjacency with GW2
- Troubleshooting OSPF Adjacency
- Example of Troubleshooting Flow: R2 Is Not Accessible Via SSH v2
- Troubleshooting Management Access
- Example of Troubleshooting Flow: Duplicate IP Addresses on Routers R1 and R2
- Troubleshooting HSRP
- b. Debrief of the Third Troubleshooting at TINC Garbage Disposal Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Sporadic Access to Internet
- Troubleshooting Problems with Routing Sources
- Example of Troubleshooting Flow: Multiple Masters in a VRRP Group
- Troubleshooting VRRP
- Example of Troubleshooting Flow: Nonfunctional EtherChannel
- Troubleshooting EtherChannel
- c. Debrief of the Fourth Troubleshooting at TINC Garbage Disposal Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Occasional Lack of Network Connectivity for PCs 1 and 2
- Troubleshooting GLBP
- Troubleshooting FHRPs
- Example of Troubleshooting Flow: Sporadic Loss of Connectivity on PC4
- DHCP Snooping
- Cisco TAC



- Example of Troubleshooting Flow: No SSH Connectivity to GW2 From PC4

#### **4. Troubleshooting at PILE Forensic Accounting Ltd.**

- Debrief of the First Troubleshooting at PILE Forensic Accounting Ltd.
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Branch Without Internet Connectivity
- Troubleshooting EIGRP Adjacency
- Example of Troubleshooting Flow: ISP2 Not Serving as a Backup
- a. Debrief of the Second Troubleshooting at PILE Forensic Accounting Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: PC3 Unable to Remotely Access the Branch Router
- Example of Troubleshooting Flow: No Internet Connectivity
- BGP Filtering
- BGP Transit Area
- Troubleshooting BGP
- Example of Troubleshooting Flow: HQ1 Does Not Synchronize with the Primary NTP Server
- Troubleshooting NTP
- b. Debrief of the Third Troubleshooting at PILE Forensic Accounting Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Connectivity Issue After Disaster
- Disaster Recovery
- Troubleshooting Inter-VLAN Routing
- Example of Troubleshooting Flow: Connectivity Issue When Using Domain Names
- Troubleshooting DNS
- Remote Device Management Challenges
- c. Debrief of the Fourth Troubleshooting at PILE Forensic Accounting Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: EIGRP Reconfiguration Issue
- EIGRP Named Configuration
- Troubleshooting the EIGRP Stub
- Example of Troubleshooting Flow: Lack of Management Access



- Providing the Default Route on Layer 2 and Multilayer Devices
- d. Debrief of the Fifth Troubleshooting at PILE Forensic Accounting Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: Internet Access via Router HQ0 Does Not Work
- Troubleshooting BGP Route Selection
- Example of Troubleshooting Flow: PC3 Is Able to Use Telnet to Connect to Router BR
- Securing the Management Plane

## **5. Troubleshooting at Bank of POLONA Ltd.**

- Debrief of the First Troubleshooting at Bank of POLONA Ltd.
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Lack of Connectivity
- Troubleshooting Redistribution
- Example of Troubleshooting Flow: Suboptimal Routing
- Troubleshooting FHRP Tracking
- Example of Troubleshooting Flow: IP SLA Does Not Start
- Troubleshooting IP SLA
- a. Debrief of the Second Troubleshooting at Bank of POLONA Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Incorrect EIGRP Summarization
- Troubleshooting EIGRP Summarization
- Example of Troubleshooting Flow: IPv4 and IPv6 Internet Access Issue
- Troubleshooting Basic RIPng
- Example of Troubleshooting Flow: Internet Connectivity Lost
- Troubleshooting Access Lists
- b. Debrief of the Third Troubleshooting at Bank of POLONA Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: Branch 1 Cannot Reach the Headquarters
- Troubleshooting GRE Tunnels
- Example of Troubleshooting Flow: Route Summarization from Branch 3 Does Not Work
- Troubleshooting OSPF Summarization
- Example of Troubleshooting Flow: AAA Does Not Work on Router BR1



- Troubleshooting AAA
- c. Debrief of the Fourth Troubleshooting at Bank of POLONA Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: PC0 Does Not Have Connectivity to IPv6 Internet Sites
- Troubleshooting OSPF for IPv6
- Example of Troubleshooting Flow: Totally Stubby Area on the Branch Is Not Working
- Troubleshooting OSPF Stubby Areas

## **6. Troubleshooting at RADULKO Transport Ltd.**

- Debrief of the First Troubleshooting at RADULKO Transport Ltd.
- Trouble Ticket Overview
- Example of Troubleshooting Flow: A Layer 2 Loop in the Network
- Troubleshooting STP
- Example of Troubleshooting Flow: Configuring a Route Map Causes a Local Connectivity Issue
- Troubleshooting PBR
- Example of Troubleshooting Flow: Cisco Discovery Protocol Neighboring Issue
- Troubleshooting Cisco Discovery Protocol and LLDP
- a. Debrief of the Second Troubleshooting at RADULKO Transport Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: PC1 and PC2 Do Not Have Connectivity to the Internet
- Troubleshooting VTP
- Example of Troubleshooting Flow: BR Does Not Have Connectivity to the Internet Via IPv6
- Troubleshooting EIGRP for IPv6
- Example of Troubleshooting Flow: IPv6 BGP Is Not Established to ISP2
- Troubleshooting MP-BGP
- b. Debrief of the Third Troubleshooting at RADULKO Transport Ltd.**
- Trouble Ticket Overview
- Example of Troubleshooting Flow: Lack of Connectivity
- Troubleshooting the OSPFv3 Address Families Feature



- Example of Troubleshooting Flow: Authentication Problem
- c. **Debrief of the Fourth Troubleshooting at RADULKO Transport Ltd.**
- Trouble Tickets Overview
- Example of Troubleshooting Flow: External OSPF Routes on Router DST
- Example of Troubleshooting Flow: PC1 and PC2 Cannot Access the Internet via IPv6

## 7. Lab

### . **Discovery: Maintaining and Documenting a Network**

- Discovery: Troubleshooting Connectivity
- Challenge: First Troubleshooting at SECHNIK Networking Ltd.
- Challenge: Second Troubleshooting at SECHNIK Networking Ltd.
- Challenge: Third Troubleshooting at SECHNIK Networking Ltd.
- Challenge: First Troubleshooting at TINC Garbage Disposal Ltd.
- Challenge: Second Troubleshooting at TINC Garbage Disposal Ltd.
- Challenge: Third Troubleshooting at TINC Garbage Disposal Ltd.
- Challenge: Fourth Troubleshooting at TINC Garbage Disposal Ltd.
- Challenge: First Troubleshooting at PILE Forensic Accounting Ltd.
- Challenge: Second Troubleshooting at PILE Forensic Accounting Ltd.
- Challenge: Third Troubleshooting at PILE Forensic Accounting Ltd.
- Challenge: Fourth Troubleshooting at PILE Forensic Accounting Ltd.
- Challenge: Fifth Troubleshooting at PILE Forensic Accounting Ltd.
- Challenge: First Troubleshooting at Bank of POLONA Ltd.
- Challenge: Second Troubleshooting at Bank of POLONA Ltd.
- Challenge: Third Troubleshooting at Bank of POLONA Ltd.
- Challenge: Fourth Troubleshooting at Bank of POLONA Ltd.
- Challenge: First Troubleshooting at RADULKO Transport Ltd.
- Challenge: Second Troubleshooting at RADULKO Transport Ltd.
- Challenge: Third Troubleshooting at RADULKO Transport Ltd.
- Challenge: Fourth Troubleshooting at RADULKO Transport Ltd