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CompTIA®

**CertMaster Learn Network+**

*N10-009*

# **COURSE OUTLINE**

# List of Modules

- 1.0 Explaining Network Topologies ..... 1
- 2.0 Supporting Cabling and Physical Installations ..... 3
- 3.0 Configuring Interfaces and Switches..... 6
- 4.0 Configuring Network Addressing..... 8
- 5.0 Configuring Routing and Advanced Switching ..... 10
- 6.0 Implementing Network Services ..... 12
- 7.0 Explaining Application Services ..... 15
- 8.0 Supporting Network Management ..... 17
- 9.0 Explaining Network Security Concepts..... 19
- 10.0 Applying Network Security Features..... 21
- 11.0 Supporting Network Security Design ..... 23
- 12.0 Configuring Wireless Networks..... 24
- 13.0 Comparing Remote Access Methods..... 26
- 14.0 Summarizing Cloud Concepts ..... 27
- A.0 Network Sandbox ..... 29
- B.0 CompTIA Network+ N10-009 Practice Exams..... 29

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# 1.0 Explaining Network Topologies

## 1.1 Networking Overview

- 1.1.1 Networking Concepts
- 1.1.2 Network Types
- 1.1.3 Network Topology
- 1.1.4 Star Topology
- 1.1.5 Mesh Topology
- 1.1.6 Network Topologies
- 1.1.7 Lab: Create Network Topologies
- 1.1.8 Lesson Review

## 1.2 OSI Model Concepts

- 1.2.1 Open Systems Interconnection Model
- 1.2.2 Data Encapsulation and Decapsulation
- 1.2.3 Layer 1 - Physical
- 1.2.4 Layer 2 - Data Link
- 1.2.5 Layer 3 - Network
- 1.2.6 Layer 4 - Transport
- 1.2.7 Upper Layers
- 1.2.8 OSI Model Summary
- 1.2.9 Lesson Review

## 1.3 SOHO Networks

- 1.3.1 SOHO Routers
- 1.3.2 Physical Layer Functions
- 1.3.3 Data Link Layer Functions
- 1.3.4 Network Layer Functions
- 1.3.5 Transport and Application Layer and Security Functions
- 1.3.6 The Internet
- 1.3.7 Binary and Hexadecimal
- 1.3.8 Lab: Explore a Single Location in a Lab
- 1.3.9 Lab: Create a Home Wireless Network
- 1.3.10 Lab: Create a SOHO Network
- 1.3.11 Lesson Review

## **1.4 Troubleshooting Methodology**

- 1.4.1 Network Troubleshooting Methodology
- 1.4.2 Identify the Problem
- 1.4.3 Identify Problem Symptoms
- 1.4.4 Establish a Theory of Probable Cause
- 1.4.5 Test the Theory to Determine the Cause
- 1.4.6 Establish a Plan of Action
- 1.4.7 Implement the Solution
- 1.4.8 Verify the Solution
- 1.4.9 Document Findings, Actions, and Outcomes
- 1.4.10 Lab: Troubleshooting Methodology
- 1.4.11 Lesson Review

## **1.5 Module Quiz**

# 2.0 Supporting Cabling and Physical Installations

## 2.1 Ethernet

- 2.1.1 Network Data Transmission
- 2.1.2 Ethernet Standards
- 2.1.3 Media Access Control and Collision Domains
- 2.1.4 100BASE-TX Fast Ethernet Standards
- 2.1.5 Gigabit Ethernet Standards
- 2.1.6 Fiber Ethernet Standards
- 2.1.7 Ethernet Specifications
- 2.1.8 Lab: Reconnect to an Ethernet Network
- 2.1.9 Lesson Review

## 2.2 Copper Cables and Connectors

- 2.2.1 Unshielded Twisted Pair Cable
- 2.2.2 Shielded and Screened Twisted Pair Cable
- 2.2.3 Cat Cable Standards
- 2.2.4 Twisted Pair Connector Types
- 2.2.5 Plenum and Riser-rated Cable
- 2.2.6 Coaxial and Twinaxial Cable and Connectors
- 2.2.7 Lab: Connect to an Ethernet Network
- 2.2.8 Lab: Connect a Cable Modem
- 2.2.9 Identify Cabling
- 2.2.10 Identify Connectors
- 2.2.11 Lesson Review

## **2.3 Wiring Implementation**

- 2.3.1 Structured Cabling System
- 2.3.2 T568A and T568B Termination Standards
- 2.3.3 Patch Panels
- 2.3.4 Structured Cable Installation
- 2.3.5 Termination Tools and Techniques
- 2.3.6 Lab: Explore Multiple Locations in a Lab
- 2.3.7 Lab: Connect Network Devices
- 2.3.8 Lab: Connect Patch Panel Cables 1
- 2.3.9 Lab: Connect Patch Panel Cables 2
- 2.3.10 Lesson Review

## **2.4 Fiber Optic Cables and Connectors**

- 2.4.1 Fiber Optic Cable Considerations
- 2.4.2 Single Mode Fiber and Multimode Fiber
- 2.4.3 Fiber Optic Connector Types
- 2.4.4 Fiber Optic Cable Installation
- 2.4.5 Fiber Distribution Panels
- 2.4.6 Multi-Fiber Push On Connectors
- 2.4.7 Wavelength Division Multiplexing
- 2.4.8 Lab: Connect Fiber Optic Cables
- 2.4.9 Identify Fiber Optic Connectors
- 2.4.10 Lesson Review

## **2.5 Physical Installation Factors**

- 2.5.1 Rack Systems
- 2.5.2 Humidity and Temperature
- 2.5.3 Power Management
- 2.5.4 Fire Suppression
- 2.5.5 Lesson Review

## **2.6 Cable Troubleshooting**

- 2.6.1 Specification and Limitations
- 2.6.2 Cable Issues
- 2.6.3 Cable Category Issues
- 2.6.4 Cable Testers
- 2.6.5 Wire Map Testers and Tone Generators
- 2.6.6 Attenuation and Interference Issues
- 2.6.7 Crosstalk Issues
- 2.6.8 Fiber Optic Cable Testing Tools
- 2.6.9 Cable Troubleshooting Strategies
- 2.6.10 Lab: Explore Physical Connectivity 1
- 2.6.11 Lab: Explore Physical Connectivity 2
- 2.6.12 Lab: Troubleshoot Physical Connectivity 1
- 2.6.13 Lab: Troubleshoot Physical Connectivity 2
- 2.6.14 Lab: Troubleshoot Physical Connectivity 3
- 2.6.15 Lab: Troubleshoot Physical Connectivity 4
- 2.6.16 Lesson Review

## **2.7 Module Quiz**

# 3.0 Configuring Interfaces and Switches

## 3.1 Network Interfaces

- 3.1.1 Network Interface Cards
- 3.1.2 Modular Transceivers
- 3.1.3 Transceiver Mismatch Issues
- 3.1.4 Transceiver Signal Strength Issues
- 3.1.5 Ethernet Frame Format
- 3.1.6 Media Access Control Address Format
- 3.1.7 Compare Network Adapters
- 3.1.8 Lab: Select and Install a Network Adapter
- 3.1.9 Lab: Connect a Media Converter
- 3.1.10 Lesson Review

## 3.2 Ethernet Switches

- 3.2.1 Hubs
- 3.2.2 Bridges
- 3.2.3 Switches
- 3.2.4 Ethernet Switch Types
- 3.2.5 Switch Interface Configuration
- 3.2.6 Cisco IOS Basics (8:37)
- 3.2.7 Lab: Install a Switch in the Rack
- 3.2.8 Lab: Secure a Switch
- 3.2.9 Lab: Cisco IOS Basics
- 3.2.10 Lesson Review

## 3.3 Switch Port Configuration

- 3.3.1 Link Aggregation and NIC Teaming
- 3.3.2 Maximum Transmission Unit
- 3.3.3 Spanning Tree Protocol
- 3.3.4 Spanning Tree Protocol Configuration
- 3.3.5 Power Over Ethernet
- 3.3.6 Lab: Configure Port Aggregation
- 3.3.7 Lab: Enable Jumbo Frame Support
- 3.3.8 Lab: Configure PoE
- 3.3.9 Lesson Review



## **3.4 Switch Troubleshooting**

- 3.4.1 Hardware Failure Issues
- 3.4.2 Port Status Indicators
- 3.4.3 Switch Show Commands
- 3.4.4 Interface Error Counters
- 3.4.5 MAC Address Table
- 3.4.6 Network Loop and Broadcast Storm Issues
- 3.4.7 Power Over Ethernet Issues
- 3.4.8 Lab: Troubleshoot Disabled Ports
- 3.4.9 Lab: Switching Loop
- 3.4.10 Lesson Review

## **3.5 Module Quiz**

## **3.6 Checkpoint Review**

# 4.0 Configuring Network Addressing

## 4.1 Internet Protocol Basics

- 4.1.1 IPv4 Datagram Header
- 4.1.2 Layer 2 vs. Layer 3 Addressing and Forwarding
- 4.1.3 Address Resolution Protocol
- 4.1.4 Unicast and Broadcast Addressing
- 4.1.5 Multicast and Anycast Addressing
- 4.1.6 Lab: Explore Packets and Frames
- 4.1.7 Lab: Explore ARP in Wireshark
- 4.1.8 Lesson Review

## 4.2 IP Version 4 Addressing

- 4.2.1 IPv4 Address Format
- 4.2.2 Network Masks
- 4.2.3 Subnet Masks
- 4.2.4 Host Address Ranges
- 4.2.5 Default Gateway
- 4.2.6 Broadcast Addresses
- 4.2.7 IP Interface Configuration in Windows
- 4.2.8 IP Interface Configuration in Linux
- 4.2.9 Lab: Configure IP Addresses
- 4.2.10 Lab: Configure IP Addresses on Mobile Devices
- 4.2.11 Lab: Configure IP Addresses on Linux
- 4.2.12 Lesson Review

## 4.3 IP Version 4 Subnetting

- 4.3.1 Classful Addressing
- 4.3.2 Public vs Private Addressing
- 4.3.3 Other Reserved Address Ranges
- 4.3.4 IPv4 Address Scheme Design
- 4.3.5 Classless Inter-Domain Routing
- 4.3.6 Variable Length Subnet Masks
- 4.3.7 Lab: Configure IP Networks and Subnets
- 4.3.8 Lesson Review

## **4.4 IP Troubleshooting Tools**

- 4.4.1 ipconfig
- 4.4.2 ifconfig and ip
- 4.4.3 arp
- 4.4.4 ping
- 4.4.5 Lab: IPv4 Troubleshooting Tools
- 4.4.6 Lab: IPv4 Troubleshooting tools for Linux
- 4.4.7 Lab: Use IPv4 Test Tools
- 4.4.8 Lesson Review

## **4.5 IP Version 6**

- 4.5.1 IPv4 vs IPv6
- 4.5.2 IPv6 Address Format
- 4.5.3 IPv6 Network Prefixes
- 4.5.4 IPv6 Unicast Addressing
- 4.5.5 IPv6 Link Local Addressing
- 4.5.6 IPv6 Multicast and Anycast Addressing
- 4.5.7 IPv4 and IPv6 Transition Mechanisms
- 4.5.8 Common IPv6 Address Prefixes
- 4.5.9 Lab: Configure an IPv6 Address
- 4.5.10 Lesson Review

## **4.6 IP Troubleshooting**

- 4.6.1 IP Configuration Issues
- 4.6.2 Duplicate IP and MAC Address Issues
- 4.6.3 IP Forwarding Issues
- 4.6.4 Lab: Use ping and tracert on Windows
- 4.6.5 Lab: Use ping and traceroute on Linux
- 4.6.6 Lab: Assisted Troubleshooting 1
- 4.6.7 Lab: Assisted Troubleshooting 2
- 4.6.8 Lab: Assisted Troubleshooting 3
- 4.6.9 Lesson Review

## **4.7 Module Quiz**

# 5.0 Configuring Routing and Advanced Switching

## 5.1 Routing Technologies

- 5.1.1 Routing Tables and Path Selection
- 5.1.2 Static and Default Routes
- 5.1.3 Routing Table Example
- 5.1.4 Packet Forwarding
- 5.1.5 Fragmentation
- 5.1.6 Router Configuration
- 5.1.7 Routing Table Tools
- 5.1.8 tracert and traceroute
- 5.1.9 Lab: Install an Enterprise Router
- 5.1.10 Lab: Cisco Troubleshooting Tools
- 5.1.11 Lesson Review

## 5.2 Dynamic Routing Technologies

- 5.2.1 Dynamic Routing Protocols
- 5.2.2 Routing Information Protocol
- 5.2.3 Enhanced Interior Gateway Routing Protocol
- 5.2.4 Open Shortest Path First
- 5.2.5 Border Gateway Protocol
- 5.2.6 Route Selection
- 5.2.7 Lesson Review

## 5.3 Network Address Translation

- 5.3.1 Edge Routers
- 5.3.2 Network Address Translation Types
- 5.3.3 Port Address Translation
- 5.3.4 Lab: Configure NAT
- 5.3.5 Lesson Review

## **5.4 Firewalls**

- 5.4.1 Firewall Uses and Types
- 5.4.2 Firewall Selection and Placement
- 5.4.3 Lesson Review

## **5.5 Enterprise Network Topologies**

- 5.5.1 Hybrid Topology
- 5.5.2 Three-Tiered Network Hierarchy
- 5.5.3 Compare Three-Tier Hierarchical Model
- 5.5.4 Lab: Create a Three-Tier Network
- 5.5.5 Lesson Review

## **5.6 Virtual LANs**

- 5.6.1 Virtual LANs and Subnets
- 5.6.2 Virtual LAN IDs and Membership
- 5.6.3 Trunking and IEEE 802.1Q
- 5.6.4 Tagged and Untagged Ports
- 5.6.5 Voice VLANs
- 5.6.6 Default VLAN and Native VLAN
- 5.6.7 VLAN Routing
- 5.6.8 Lab: Configure Switch IP and VLAN - GUI
- 5.6.9 Lab: Create VLANs - GUI
- 5.6.10 Lab: Configure Trunking
- 5.6.11 Lab: Configure Switch IP Settings - CLI
- 5.6.12 Lab: Configure Management VLAN Settings - CLI
- 5.6.13 Lesson Review

## **5.7 Routing and VLAN Troubleshooting**

- 5.7.1 Routing Table Issues
- 5.7.2 Default Route and Routing Loop Issues
- 5.7.3 VLAN Assignment Issues
- 5.7.4 Lesson Review

## **5.8 Module Quiz**

# 6.0 Implementing Network Services

## 6.1 Transport and Application Layer Protocols

- 6.1.1 Transport Layer Ports and Connections
- 6.1.2 Transmission Control Protocol
- 6.1.3 TCP Handshake and Teardown
- 6.1.4 User Datagram Protocol
- 6.1.5 netstat
- 6.1.6 Common TCP and UDP Ports
- 6.1.7 Lab: Explore Three-Way Handshake in Wireshark
- 6.1.8 Lab: View Open Ports with netstat
- 6.1.9 Lesson Review

## 6.2 Dynamic Host Configuration Protocol

- 6.2.1 DHCP Process
- 6.2.2 DHCP Server Configuration
- 6.2.3 DHCP Options
- 6.2.4 DHCP Reservations and Exclusions
- 6.2.5 Lab: Configure a DHCP Server
- 6.2.6 Lab: Configure DHCP Server Options
- 6.2.7 Lab: Create DHCP Exclusions
- 6.2.8 Lab: Create DHCP Client Reservations
- 6.2.9 Configure Client Addressing (2:22)
- 6.2.10 Lab: Configure Client Addressing for DHCP
- 6.2.11 Lesson Review

## 6.3 APIPA and SLAAC

- 6.3.1 Automatic Private IP Addressing
- 6.3.2 IPv6 Interface Autoconfiguration and Testing
- 6.3.3 DHCPv6 Server Configuration
- 6.3.4 Lab: Explore APIPA Addressing
- 6.3.5 Lab: Explore APIPA Addressing in Network Modeler
- 6.3.6 Set Up Alternate Addressing (3:33)
- 6.3.7 Lesson Review

## **6.4 DHCP Relay and Troubleshooting**

- 6.4.1 DHCP Relay and IP Helper
- 6.4.2 DHCP Issues
- 6.4.3 Troubleshooting DHCP Exhaustion (4:09)
- 6.4.4 Lab: Configure a DHCP Relay Agent
- 6.4.5 Lab: Add a DHCP Server on Another Subnet
- 6.4.6 Lab: Troubleshoot Address Pool Exhaustion
- 6.4.7 Lab: Explore DHCP Troubleshooting
- 6.4.8 Lab: Troubleshoot IP Configuration 1
- 6.4.9 Lab: Troubleshoot IP Configuration 2
- 6.4.10 Lab: Troubleshoot IP Configuration 3
- 6.4.11 Lesson Review

## **6.5 Domain Name System**

- 6.5.1 Host Names and Domain Names
- 6.5.2 DNS Hierarchy
- 6.5.3 Name Resolution Using DNS
- 6.5.4 Resource Record Types
- 6.5.5 Host Address and Canonical Name Records
- 6.5.6 Mail Exchange, Service, and Text Records
- 6.5.7 Pointer Records
- 6.5.8 DNS Server Configuration
- 6.5.9 Internal vs External DNS
- 6.5.10 DNS Security
- 6.5.11 Lab: Configure DNS Addresses
- 6.5.12 Lab: Create Standard DNS Zones
- 6.5.13 Lab: Create Host Records
- 6.5.14 Lab: Create CNAME Records
- 6.5.15 Lab: Troubleshoot DNS Records
- 6.5.16 Configuring DNS Caching on Linux (4:24)
- 6.5.17 Lesson Review

## **6.6 DNS Troubleshooting**

- 6.6.1 Client DNS Issues
- 6.6.2 Name Resolution Issues
- 6.6.3 nslookup
- 6.6.4 dig
- 6.6.5 Lab: Explore nslookup
- 6.6.6 Lab: Use nslookup
- 6.6.7 Lesson Review

## **6.7 Module Quiz**

## **6.8 Checkpoint Review**



# 7.0 Explaining Application Services

## 7.1 Application Security and Time Synchronization

- 7.1.1 Transport Layer Security
- 7.1.2 Network Time Protocol
- 7.1.3 Precision Time Protocol
- 7.1.4 Lab: Configure NTP on Linux
- 7.1.5 Lesson Review

## 7.2 Web, File, Print, and Database Services

- 7.2.1 Hyper Text Transfer Protocol
- 7.2.2 HTTP Secure
- 7.2.3 File Transfer Protocol
- 7.2.4 Secure File Transfer Protocol
- 7.2.5 Server Message Block
- 7.2.6 Network Attached Storage
- 7.2.7 Database Services
- 7.2.8 Lab: Scan for Web Services with Nmap
- 7.2.9 Lesson Review

## 7.3 Email and Voice Services

- 7.3.1 Simple Mail Transfer Protocol
- 7.3.2 Internet Message Access Protocol
- 7.3.3 Voice and Video Services
- 7.3.4 VoIP Protocols
- 7.3.5 VoIP Phones
- 7.3.6 Lab: Connect VoIP 1
- 7.3.7 Lab: Connect VoIP 2
- 7.3.8 Lesson Review

## **7.4 Disaster Recovery and High Availability**

- 7.4.1 Disaster Recovery Concepts
- 7.4.2 Disaster Recovery Metrics
- 7.4.3 Disaster Recovery Sites
- 7.4.4 Fault Tolerance and Redundancy
- 7.4.5 Load Balancers
- 7.4.6 High Availability Clusters
- 7.4.7 First Hop Redundancy
- 7.4.8 Lab: Configure NIC Teaming
- 7.4.9 Lesson Review

## **7.5 Module Quiz**

# 8.0 Supporting Network Management

## 8.1 Organizational Policies and Documentation

- 8.1.1 Configuration Management
- 8.1.2 Network Device Backup Management
- 8.1.3 Change Management
- 8.1.4 Asset Inventory Documentation
- 8.1.5 Lifecycle Management
- 8.1.6 Decommissioning
- 8.1.7 Physical Network Diagrams
- 8.1.8 Logical Network Diagrams
- 8.1.9 IP Address Management
- 8.1.10 Common Agreements
- 8.1.11 Lab: Update Firmware
- 8.1.12 Lesson Review

## 8.2 Host Discovery and Monitoring

- 8.2.1 Network Discovery
- 8.2.2 Nmap
- 8.2.3 Nmap Port Scanning
- 8.2.4 Discovery Protocols
- 8.2.5 Performance Monitoring
- 8.2.6 Availability Monitoring
- 8.2.7 Configuration Monitoring
- 8.2.8 Lab: Scan Using Zenmap
- 8.2.9 Lesson Review

## 8.3 Simple Network Management Protocol

- 8.3.1 SNMP Agents and Monitors
- 8.3.2 SNMP Security
- 8.3.3 Configuring an SNMP System on a Router (2:39)
- 8.3.4 Monitoring a Switch with SNMP (1:56)
- 8.3.5 Configuring SNMP Trap (5:42)
- 8.3.6 Lesson Review

## **8.4 Event Management**

- 8.4.1 Network Device Logs
- 8.4.2 Log Collectors and Syslog
- 8.4.3 Event Prioritization and Alerting
- 8.4.4 Security Information and Event Management
- 8.4.5 Log Reviews
- 8.4.6 Lab: Configure Logging in pfSense
- 8.4.7 Lab: Evaluate Event Logs in pfSense
- 8.4.8 Lab: Auditing Device Logs on a Cisco Switch
- 8.4.9 Lab: Configure Logging on Linux
- 8.4.10 Lab: View Event Logs
- 8.4.11 Lesson Review

## **8.5 Packet Capture and Analysis**

- 8.5.1 Packet Capture
- 8.5.2 tcpdump
- 8.5.3 Protocol Analyzers
- 8.5.4 Using Wireshark to Troubleshoot Network Issues (4:23)
- 8.5.5 Lab: Troubleshoot with Wireshark
- 8.5.6 Lab: Configure Port Mirroring
- 8.5.7 Lesson Review

## **8.6 Traffic Monitoring**

- 8.6.1 Common Performance Issues
- 8.6.2 Interface Statistics
- 8.6.3 Flow Data
- 8.6.4 Traffic Testing Tools
- 8.6.5 Bandwidth Management
- 8.6.6 Traffic Shaping
- 8.6.7 Lab: Configure QoS
- 8.6.8 Monitoring Interface Statistics (5:09)
- 8.6.9 Lesson Review

## **8.7 Module Quiz**

# 9.0 Explaining Network Security Concepts

## 9.1 Security Concepts

- 9.1.1 Common Security Terminology
- 9.1.2 Security Audits and Assessments
- 9.1.3 Regulatory Compliance
- 9.1.4 Encryption
- 9.1.5 Vulnerability and Exploit Types
- 9.1.6 Deception Technologies
- 9.1.7 Lab: Create a Honeypot
- 9.1.8 Lesson Review

## 9.2 Network Threats and Attacks

- 9.2.1 Threat Types and Assessment
- 9.2.2 Attack Types
- 9.2.3 Distributed DoS Attacks and Botnets
- 9.2.4 Malware Attacks
- 9.2.5 Lab: Analyze a DoS Attack
- 9.2.6 Lab: Analyze a DDoS Attack
- 9.2.7 Lesson Review

## 9.3 Spoofing Attacks

- 9.3.1 On-Path Attacks
- 9.3.2 Performing an On-Path DHCP Attack (6:59)
- 9.3.3 Poison ARP (5:45)
- 9.3.4 MAC Flooding Attack
- 9.3.5 Using SMAC to Spoof MAC Addresses (3:46)
- 9.3.6 VLAN Hopping Attacks
- 9.3.7 Lab: Poison ARP and Analyze with Wireshark
- 9.3.8 Lab: Spoof MAC Addresses with SMAC
- 9.3.9 Lab: Perform a DHCP Spoofing On-Path Attack
- 9.3.10 Lesson Review

## **9.4 Rogue System Attacks**

- 9.4.1 Rogue Devices and Services
- 9.4.2 Rogue DHCP
- 9.4.3 Setting Up DHCP Snooping (1:45)
- 9.4.4 DNS Attacks
- 9.4.5 Poisoning DNS (6:19)
- 9.4.6 Lab: Discover a Rogue DHCP Server
- 9.4.7 Lab: Configure DHCP Snooping
- 9.4.8 Lab: Poison DNS
- 9.4.9 Lab: Analyze DNS Spoofing
- 9.4.10 Lesson Review

## **9.5 Social Engineering**

- 9.5.1 Social Engineering Attacks
- 9.5.2 Password Attacks
- 9.5.3 Lab: Respond to Social Engineering Exploits
- 9.5.4 Lab: Crack a Password with John the Ripper
- 9.5.5 Lesson Review

## **9.6 Module Quiz**

## **9.7 Checkpoint Review**

# 10.0 Applying Network Security Features

## 10.1 Authentication

- 10.1.1 Access Control
- 10.1.2 Authentication Methods
- 10.1.3 Local Authentication
- 10.1.4 Single Sign-On and Kerberos
- 10.1.5 Digital Certificates and PKI
- 10.1.6 Key Management
- 10.1.7 Federated Identity and SAML
- 10.1.8 Remote Authentication
- 10.1.9 Lesson Review

## 10.2 Authorization and Account Management

- 10.2.1 Authorization and Role-Based Access Control
- 10.2.2 Privileged Access Management
- 10.2.3 Lightweight Directory Access Protocol
- 10.2.4 LDAP Secure
- 10.2.5 Lab: Manage Account Policies
- 10.2.6 Lesson Review

## 10.3 Network Hardening

- 10.3.1 Defense in Depth
- 10.3.2 Device and Service Hardening
- 10.3.3 View Linux Services
- 10.3.4 Scanning for Unsecure Protocols (4:51)
- 10.3.5 Lab: Scan for Unsecure Protocols
- 10.3.6 Lab: Enable and Disable Linux Services
- 10.3.7 Lab: Disable Network Service
- 10.3.8 Lesson Review

## **10.4 Switch Security**

- 10.4.1 Network Access Control and Port Security
- 10.4.2 Lab: Secure Access to a Switch
- 10.4.3 Lab: Secure Access to a Switch 2
- 10.4.4 Lab: Disable Switch Ports - GUI
- 10.4.5 Extensible Authentication Protocol and IEEE 802.1X
- 10.4.6 Port Guards
- 10.4.7 Lab: Harden a Switch
- 10.4.8 Port Mirroring
- 10.4.9 Lesson Review

## **10.5 Network Security Rules**

- 10.5.1 Security Rules and ACL Configuration
- 10.5.2 Proxy Servers
- 10.5.3 Content Filtering
- 10.5.4 Misconfigured Firewall and ACL Issues
- 10.5.5 Creating Firewall ACLs (5:51)
- 10.5.6 Lab: Configure Network Security Appliance Access
- 10.5.7 Lab: Configure a Security Appliance
- 10.5.8 Lab: Configure a Perimeter Firewall
- 10.5.9 Lab: Restrict Telnet and SSH Access
- 10.5.10 Lab: Permit Traffic
- 10.5.11 Lab: Block Source Hosts
- 10.5.12 Lesson Review

## **10.6 Module Quiz**



# 11.0 Supporting Network Security Design

## 11.1 Zone-based Security

- 11.1.1 Network Security Zones
- 11.1.2 Configuring a Screened Subnet (3:40)
- 11.1.3 Perimeter Networks
- 11.1.4 Screened Subnets
- 11.1.5 Lab: Configure a Screened Subnet (DMZ)
- 11.1.6 Lab: Configure Screened Subnets
- 11.1.7 Intrusion Detection and Prevention Systems
- 11.1.8 Implementing Intrusion Detection and Prevention (6:18)
- 11.1.9 Lab: Implement Intrusion Prevention
- 11.1.10 Lesson Review

## 11.2 Internet of Things

- 11.2.1 IoT Devices
- 11.2.2 Industrial Embedded Systems
- 11.2.3 IoT Networks
- 11.2.4 IoT Network Security
- 11.2.5 Lab: Scan for IoT Devices
- 11.2.6 Lesson Review

## 11.3 Physical Security

- 11.3.1 Locks
- 11.3.2 Cameras
- 11.3.3 Geofencing
- 11.3.4 Lab: Implement Physical Security
- 11.3.5 Lesson Review

## 11.4 Module Quiz

# 12.0 Configuring Wireless Networks

## 12.1 Wireless Concepts and Standards

- 12.1.1 IEEE 802.11 Wireless Standards
- 12.1.2 IEEE 802.11a and 5GHz Channel Bandwidth
- 12.1.3 IEEE 802.11b/g and 2.4GHz Channel Bandwidth
- 12.1.4 IEEE 802.11n, MIMO, and Channel Bonding
- 12.1.5 Wi-Fi 5 and Wi-Fi 6
- 12.1.6 Multiuser MIMO and Band Steering
- 12.1.7 Cellular Technologies
- 12.1.8 Satellite Technologies
- 12.1.9 Lab: Configure Wireless Profiles
- 12.1.10 Lesson Review

## 12.2 Enterprise Wireless Network Design

- 12.2.1 Infrastructure Network Type
- 12.2.2 Range and Signal Strength
- 12.2.3 Wireless Surveys and Heat Maps
- 12.2.4 Wireless Roaming
- 12.2.5 Wireless Controllers
- 12.2.6 Antenna Types
- 12.2.7 Other Wireless Network Types
- 12.2.8 Lab: Design an Indoor Wireless Network
- 12.2.9 Lab: Design an Outdoor Wireless Network
- 12.2.10 Lab: Implement an Enterprise Wireless Network
- 12.2.11 Lesson Review

## **12.3 Wireless Security**

- 12.3.1 Wi-Fi Encryption Standards
- 12.3.2 Personal Authentication
- 12.3.3 Enterprise Authentication
- 12.3.4 Guest Networks and Captive Portals
- 12.3.5 Bring Your Own Device Issues
- 12.3.6 Wireless Network Attacks
- 12.3.7 Lab: Configure a Captive Portal
- 12.3.8 Lab: Create a Guest Network for BYOD
- 12.3.9 Lab: Secure an Enterprise Wireless Network
- 12.3.10 Lab: Secure a Home Wireless Network
- 12.3.11 Lab: Enable Wireless Intrusion Prevention
- 12.3.12 Lesson Review

## **12.4 Wireless Troubleshooting**

- 12.4.1 Wireless Performance Assessment
- 12.4.2 Insufficient Wireless Coverage Issues
- 12.4.3 Channel Overlap Issues
- 12.4.4 Interference Issues
- 12.4.5 Roaming and Client Disassociation Issues
- 12.4.6 Overcapacity Issues
- 12.4.7 Lab: Explore Wireless Network Problems
- 12.4.8 Lab: Troubleshoot Wireless Network Problems
- 12.4.9 Lab: Optimize a Wireless Network
- 12.4.10 Lesson Review

## **12.5 Module Quiz**

## **12.6 Checkpoint Review**

# 13.0 Comparing Remote Access Methods

## 13.1 WAN and Internet Connectivity

- 13.1.1 Wide Area Networks and the OSI Model
- 13.1.2 Internet Access Types
- 13.1.3 Fiber to the Curb and Fiber to the Premises
- 13.1.4 Lesson Review

## 13.2 Virtual Private Networks

- 13.2.1 Remote Access Considerations
- 13.2.2 Tunneling Protocols
- 13.2.3 Internet Protocol Security
- 13.2.4 Internet Key Exchange
- 13.2.5 Client-to-Site VPNs
- 13.2.6 Clientless VPNs
- 13.2.7 Site-to-Site VPNs
- 13.2.8 Lab: Configure a Remote Access VPN
- 13.2.9 Lab: Configure an iPad VPN Connection
- 13.2.10 Lab: Configure a RADIUS Solution
- 13.2.11 Lesson Review

## 13.3 Remote Management

- 13.3.1 Remote Host Access
- 13.3.2 Secure Shell
- 13.3.3 Telnet
- 13.3.4 Remote Desktop Protocol
- 13.3.5 Console Connections and Out-of-Bound Management
- 13.3.6 Jump Boxes
- 13.3.7 API Connection Methods
- 13.3.8 Lab: Allow Remote Desktop Connections
- 13.3.9 Lab: Use PowerShell Remote
- 13.3.10 Lesson Review

## 13.4 Module Quiz

# 14.0 Summarizing Cloud Concepts

## 14.1 Datacenter and Storage Networks

- 14.1.1 Data Center Network Design
- 14.1.2 Spine and Leaf Topology
- 14.1.3 Storage Area Networks
- 14.1.4 Fibre Channel
- 14.1.5 Lab: Configure an iSCSI Target
- 14.1.6 Lab: Configure an iSCSI Initiator
- 14.1.7 Lesson Review

## 14.2 Cloud Concepts

- 14.2.1 Cloud Scalability and Elasticity
- 14.2.2 Cloud Deployment Models
- 14.2.3 Cloud Service Models
- 14.2.4 Content Delivery Networks
- 14.2.5 Lesson Review

## 14.3 Cloud Networking

- 14.3.1 Cloud Instances
- 14.3.2 Virtual Private Clouds
- 14.3.3 Cloud Gateways
- 14.3.4 Cloud Connectivity Options
- 14.3.5 Cloud Firewall Security
- 14.3.6 Security Groups and Security Lists
- 14.3.7 Lesson Review

## **14.4 Modern Network Environments**

- 14.4.1 Infrastructure as Code
- 14.4.2 Uses for Infrastructure as Code
- 14.4.3 Source Control
- 14.4.4 Software-Defined Networking
- 14.4.5 Software-Defined WAN
- 14.4.6 Overlay Networks
- 14.4.7 Zero Trust Architecture
- 14.4.8 Secure Access Service Edge
- 14.4.9 Lesson Review

## **14.5 Module Quiz**

# A.0 Network Sandbox

## A.1 Network Sandbox Lab

# B.0 CompTIA Network+ N10-009 Practice Exams

## B.1 Prepare for CompTIA Network+ Certification

B.1.1 Why Should I Take a Certification Exam?

B.1.2 Exam Details for CompTIA Network+ N10-009

B.1.3 Exam Objectives for CompTIA Network+ N10-009

B.1.4 Course Mapping with CompTIA Network+ N10-009 Exam Objectives

B.1.5 How to Take the Certification Exam

B.1.6 Tips for Taking the Certification Exam

## B.2 CompTIA Network+ N10-009 Practice Materials

B.2.1 Exam Practice 1: Networking Concepts

B.2.2 Exam Practice 2: Network Implementations

B.2.3 Exam Practice 3: Network Operations

B.2.4 Exam Practice 4: Network Security

B.2.5 Exam Practice 5: Network Troubleshooting

B.2.6 Skills Practice: Competency in Networking

B.2.7 Practice Test: CompTIA Network+ N10-009