Training: CompTIA
CompTIA Network+ Prep Course

TRAINING GOALS:

This course can prepare you for the CompTIA Network+ (Exam N10-009) certification examination and a job role in network administration. It utilizes a learning progression model to help you learn and build skills related to the course objectives and job task requirements. This learning methodology uses a series of steps to contextualize what you're learning, elaborate on areas where additional instruction is needed, and provide relevance through practice and personalized feedback. You'll then apply what you learned and demonstrate the skills you've gained through a series of lab activities and quizzes.

On course completion, you will be able to:

- Deploy and troubleshoot Ethernet networks.
- Support IPv4 and IPv6 networks.
- Configure and troubleshoot routers.
- Support network services and applications.
- Ensure network security and availability.
- Deploy and troubleshooting wireless networks.
- Support WAN links and remote access methods.
- Support organizational procedures and site security controls.
- Summarize cloud and data center architecture.

Skills you'll learn

- Deploy wired and wireless devices, covering IP addressing, ports, protocols, and network architecture for network deployment.
- Understand documentation, life-cycle, change, and configuration management processes and procedures.
- Grasp virtualization, cloud service models, elasticity, and scalability to apply cloud concepts.
- Monitor networks for high availability and resolve connectivity issues to maintain network performance.
- Establish secure networks and mitigate vulnerabilities to strengthen security.

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- Diagnose and resolve network issues using appropriate tools for effective troubleshooting.

Job roles that benefit from Network+ skills

- Network Administrator
- Network Engineer
- System Administrator
- Information Technology (IT) Support Specialist
- Field Service Technician
- Network Analyst
- NOC (Network Operations Center) Technician
- Junior Cybersecurity Analyst

Each participant in an authorized training CompTIA Network+ Prep Course held in Exclusive Networks will receive a free N10-009 CompTIA Network+ Certification Exam vouchers.

CONSPECT:

- Explaining Network Topologies
  - Networking Overview
    - Networking Concepts
    - Network Types
    - Network Topology
    - Star Topology
    - Mesh Topology
    - Legacy Topologies
  - OSI Model Concepts
    - Open Systems Interconnection Model
    - Data Encapsulation and Decapsulation
    - Layer 1 - Physical
    - Layer 2 - Data Link
    - Layer 3 - Network
    - Layer 4 - Transport
    - Upper Layers
    - OSI Model Summary

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- SOHO Networks
  - SOHO Routers
  - Physical Layer Functions
  - Data Link Layer Functions
  - Network Layer Functions
  - Transport and Application Layer and Security Functions
  - The Internet
  - Binary and Hexadecimal
- Troubleshooting Methodology
  - Network Troubleshooting Methodology
  - Identify the Problem
  - Identify Problem Symptoms
  - Establish a Theory of Probable Cause
  - Test the Theory to Determine the Cause
  - Establish a Plan of Action
  - Implement the Solution
  - Verify the Solution
  - Document Findings, Actions, and Outcomes
- Additional Resources
  - Network Terminology and Types
  - The OSI Model
  - Troubleshooting Methodology

- Supporting Cabling and Physical Installations
  - Ethernet
    - Network Data Transmission
    - Ethernet Standards
    - Media Access Control and Collision Domains
    - 100BASE-TX Fast Ethernet Standards
    - Gigabit Ethernet Standards
    - Fiber Ethernet Standards
  - Copper Cables and Connectors
    - Unshielded Twisted Pair Cable
    - Shielded and Screened Twisted Pair Cable
    - Cat Cable Standards
    - Twisted Pair Connector Types
    - Plenum and Riser-Rated Cable

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        - Coaxial and Twinaxial Cable and Connectors
    - Wiring Implementation
        - Structured Cabling System
        - T568A and T568B Termination Standards
        - Patch Panels
        - Structured Cable Installation
        - Termination Tools and Techniques
    - Fiber Optic Cables and Connectors
        - Fiber Optic Cable Considerations
        - Single Mode Fiber and Multimode Fiber
        - Fiber Optic Connector Types
        - Fiber Optic Cable Installation
        - Fiber Distribution Panels
        - Multi-Fiber Push On Connectors
        - Wavelength Division Multiplexing
    - Physical Installation Factors
        - Rack Systems
        - Humidity and Temperature
        - Power Management
        - Fire Suppression
    - Cable Troubleshooting
        - Specification and Limitations
        - Cable Issues
        - Cable Category Issues
        - Cable Testers
        - Wire Map Testers and Tone Generators
        - Attenuation and Interference Issues
        - Crosstalk Issues
        - Fiber Optic Cable Testing Tools
        - Cable Troubleshooting Strategies
    - Additional Resources
        - Ethernet Standards
        - Cables and Connectors
        - Structured Cable Installation
        - Structured Cable Installation and Troubleshooting
- Configuring Interfaces and Switches

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- Network Interfaces
  - Network Interface Cards
  - Modular Transceivers
  - Transceiver Mismatch Issues
  - Transceiver Signal Strength Issues
  - Ethernet Frame Format
  - Media Access Control Address Format
- Ethernet Switches
  - Hubs
  - Bridges
  - Switches
  - Ethernet Switch Types
  - Switch Interface Configuration
  - Cisco IoS Basics
- Switch Port Configuration
  - Link Aggregation and NIC Teaming
  - Maximum Transmission Unit
  - Spanning Tree Protocol
  - Spanning Tree Protocol Configuration
  - Power Over Ethernet
- Switch Troubleshooting
  - Hardware Failure Issues
  - Port Status Indicators
  - Switch Show Commands
  - Interface Error Counters
  - MAC Address Table
  - Network Loop and Broadcast Storm Issues
  - Power Over Ethernet Issues
- Additional Resources
  - NIC Cards and MAC Addresses
  - Ethernet Switches

- Configuring Network Addressing
  - Internet Protocol Basics
    - IPv4 Datagram Header
    - Layer 2 vs Layer 3 Addressing and Forwarding
    - Address Resolution Protocol

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- Unicast and Broadcast Addressing
- Multicast and Anycast Addressing

- IP Version 4 Addressing
  - IPv4 Address Format
  - Network Masks
  - Subnet Masks
  - Host Address Ranges
  - Default Gateway
  - Broadcast Addresses
  - IP Interface Configuration in Windows
  - IP Interface Configuration in Linux
- IP Version 4 Subnetting
  - Classful Addressing
  - Public vs Private Addressing
  - Other Reserved Address Ranges
  - IPv4 Address Scheme Design
  - Classless Inter-Domain Routing
  - Variable Length Subnet Masks
- IP Troubleshooting Tools
  - ipconfig
  - ifconfig and ip
  - arp
  - ping
- IP Version 6
  - IPv4 vs IPv6
  - IPv6 Address Format
  - IPv6 Network Prefixes
  - IPv6 Unicast Addressing
  - IPv6 Link Local Addressing
  - IPv6 Multicast and Anycast Addressing
  - IPv4 and IPv6 Transition Mechanisms
  - Common IPv6 Address Prefixes
- IP Troubleshooting
  - IP Configuration Issues
  - Duplicate IP and MAC Address Issues
  - IP Forwarding Issues

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- Additional Resources
  - Network Addresses and Message Types
  - IPv4 Addressing and Troubleshooting
  - Subnetting Terminology
  - Subnetting Demonstration
  - IPv6 Addressing and Troubleshooting
  - Networking Command-Line Tools
- Configuring Routing and Advanced Switching
  - Routing Technologies
    - Routing Tables and Path Selection
    - Static and Default Routes
    - Routing Table Example
    - Packet Forwarding
    - Fragmentation
    - Router Configuration
    - Routing Table Tools
    - tracert and traceroute
  - Dynamic Routing Technologies
    - Dynamic Routing Protocols
    - Routing Information Protocol
    - Enhanced Interior Gateway Routing Protocol
    - Open Shortest Path First
    - Border Gateway Protocol
    - Route Selection
  - Network Address Translation
    - Edge Routers
    - Network Address Translation Types
    - Port Address Translation
  - Firewalls
    - Firewall Uses and Types
    - Firewall Selection and Placement
  - Enterprise Network Topologies
    - Hybrid Topology
    - Three-Tiered Network Hierarchy
  - Virtual LANs
    - Virtual LANs and Subnets

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        - Virtual LAN IDs and Membership
        - Trunking and IEEE 802.1Q
        - Tagged and Untagged Ports
        - Voice VLANs
        - Default VLAN and Native VLAN
        - VLAN Routing
    - Routing and VLAN Troubleshooting
        - Routing Table Issues
        - Default Route and Routing Loop Issues
        - VLAN Assignment Issues
    - Additional Resources
        - Routing Basics
        - Network Address Translation
        - Hardware Firewalls
        - Enterprise Network Design
- Implementing Network Services
    - Transport and Application Layer Protocols
        - Transport Layer Ports and Connections
        - Transmission Control Protocol
        - TCP Handshake and Teardown
        - User Datagram Protocol
        - netstat
        - Common TCP and UDP Ports
    - Dynamic Host Configuration Protocol
        - DHCP Process
        - DHCP Server Configuration
        - DHCP Options
        - DHCP Reservations and Exclusions
        - Configure Client Addressing
    - APIPA and SLAAC
        - Automatic Private IP Addressing
        - IPv6 Interface Autoconfiguration and Testing
        - DHCPv6 Server Configuration
        - Set Up Alternate Addressing
    - DHCP Relay and Troubleshooting
        - DHCP Relay and IP Helper

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        - DHCP Issues
        - Troubleshooting DHCP Exhaustion
    - Domain Name System
        - Host Names and Domain Names
        - DNS Hierarchy
        - Name Resolution Using DNS
        - Resource Record Types
        - Host Address and Canonical Name Records
        - Mail Exchange, Service, and Text Records
        - Pointer Records
        - DNS Server Configuration
        - Internal vs External DNS
        - DNS Security
        - Configuring DNS Caching on Linux
    - DNS Troubleshooting
        - Client DNS Issues
        - Name Resolution Issues
        - nslookup
        - dig
    - Additional Resources
        - Transport and Application Protocols
        - Dynamic Host Configuration Protocol
        - DNS and DNS Troubleshooting
- Explaining Application Services
    - Application Security and Time Synchronization
        - Transport Layer Security
        - Network Time Protocol
        - Precision Time Protocol
    - Web, File, Print, and Database Services
        - Hyper Text Transfer Protocol
        - HTTP Secure
        - File Transfer Protocol
        - Secure File Transfer Protocol
        - Server Message Block
        - Network Attached Storage
        - Database Services

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- Email and Voice Services
  - Simple Mail Transfer Protocol
  - Internet Message Access Protocol
  - Voice and Video Services
  - VoIP Protocols
  - VoIP Phones
- Disaster Recovery and High Availability
  - Disaster Recovery Concepts
  - Disaster Recovery Metrics
  - Disaster Recovery Sites
  - Fault Tolerance and Redundancy
  - Load Balancers
  - High Availability Clusters
  - First Hop Redundancy
- Additional Resources
  - Network Time Protocol
  - File and Web Services
  - Email and Video and Voice Services
  - Disaster Recovery and High Availability

- Supporting Network Management
  - Organizational Policies and Documentation
    - Configuration Management
    - Network Device Backup Management
    - Change Management
    - Asset Inventory Documentation
    - Lifecycle Management
    - Decommissioning
    - Physical Network Diagrams
    - Logical Network Diagrams
    - IP Address Management
    - Common Agreements
  - Host Discovery and Monitoring
    - Network Discovery
    - Nmap
    - Nmap Port Scanning
    - Discovery Protocols

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        - Performance Monitoring
        - Availability Monitoring
        - Configuration Monitoring
    - Simple Network Management Protocol
        - SNMP Agents and Monitors
        - SNMP Security
        - Configuring an SNMP System on a Router
        - Monitoring a Switch with SNMP
        - Configuring SNMP Trap
    - Event Management
        - Network Device Logs
        - Log Collectors and Syslog
        - Event Prioritization and Alerting
        - Security Information and Event Management
        - Log Reviews
    - Packet Capture and Analysis
        - Packet Capture
        - tcpdump
        - Protocol Analyzers
        - Using Wireshark to Troubleshoot Network Issues
    - Traffic Monitoring
        - Common Performance Issues
        - Interface Statistics
        - Flow Data
        - Traffic Testing Tools
        - Bandwidth Management
        - Traffic Shaping
        - Monitoring Interface Statistics
    - Additional Resources
        - Network Diagrams
        - Host Discovery and Monitoring
        - Network Analysis
- Explaining Network Security Concepts
    - Security Concepts
        - Common Security Terminology
        - Security Audits and Assessments

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        - Regulatory Compliance
        - Encryption
        - Vulnerability and Exploit Types
        - Deception Technologies
    - Network Threats and Attacks
        - Threat Types and Assessment
        - Attack Types
        - Distributed DoS Attacks and Botnets
        - Malware Attacks
    - Spoofing Attacks
        - On-Path Attacks
        - Performing an On-Path DHCP Attack
        - Poison ARP
        - MAC Flooding Attack
        - Using SMAC to Spoof MAC Addresses
        - VLAN Hopping Attacks
    - Rogue System Attacks
        - Rogue Devices and Services
        - Rogue DHCP
        - Setting Up DHCP Snooping
        - DNS Attacks
        - Poisoning DNS
    - Social Engineering
        - Social Engineering Attacks
        - Password Attacks
    - Additional Resources
        - Security Concepts
        - Threats and Attacks
        - Social Engineering
- Applying Network Security Features
    - Authentication
        - Access Control
        - Authentication Methods
        - Local Authentication
        - Single Sign-On and Kerberos
        - Digital Certificates and PKI

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        - Key Management
        - Federated Identity and SAML
        - Remote Authentication
    - Authorization and Account Management
        - Authorization and Role-Based Access Control
        - Privileged Access Management
        - Lightweight Directory Access Protocol
        - LDAP Secure
    - Network Hardening
        - Defense in Depth
        - Device and Service Hardening
        - Scanning for Unsecure Protocols
    - Switch Security
        - Network Access Control and Port Security
        - Extensible Authentication Protocol and IEEE 802.1X
        - Port Guards
        - Port Mirroring
    - Network Security Rules
        - Security Rules and ACL Configuration
        - Proxy Servers
        - Content Filtering
        - Misconfigured Firewall and ACL Issues
        - Creating Firewall ACLs
    - Additional Resources
        - Authentication
        - Public Key Infrastructure
        - Authorization and Account Management
        - Switch Port Security
- Supporting Network Security Design
    - Zone-based Security
        - Network Security Zones
        - Configuring a Screened Subnet
        - Perimeter Networks
        - Screened Subnets
        - Intrusion Detection and Prevention Systems
        - Implementing Intrusion Detection and Prevention

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- Internet of Things
  - IoT Devices
  - Industrial Embedded Systems
  - IoT Networks
  - IoT Network Security
- Physical Security
  - Locks
  - Cameras
  - Geofencing
- Additional Resources
  - Zones and Perimeter Networks
  - Embedded Systems and Zero Trust

- Configuring Wireless Networks
  - Wireless Concepts and Standards
    - IEEE 802.11 Wireless Standards
    - IEEE 802.11a and 5GHz Channel Bandwidth
    - IEEE 802.11b/g and 2.4GHz Channel Bandwidth
    - IEEE 802.11n, MIMO, and Channel Bonding
    - Wi-Fi 5 and Wi-Fi 6
    - Multiuser MIMO and Band Steering
    - Cellular Technologies
    - Satellite Technologies
  - Enterprise Wireless Network Design
    - Infrastructure Network Type
    - Range and Signal Strength
    - Wireless Surveys and Heat Maps
    - Wireless Roaming
    - Wireless Controllers
    - Antenna Types
    - Other Wireless Network Types
  - Wireless Security
    - Wi-Fi Encryption Standards
    - Personal Authentication
    - Enterprise Authentication
    - Guest Networks and Captive Portals
    - Bring Your Own Device Issues

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        - Wireless Network Attacks
    - Wireless Troubleshooting
        - Wireless Performance Assessment
        - Insufficient Wireless Coverage Issues
        - Channel Overlap Issues
        - Interference Issues
        - Roaming and Client Disassociation Issues
        - Overcapacity Issues
    - Additional Resources
        - Enterprise Wireless Network Design
        - Wireless Standards and Security
        - Wireless Troubleshooting
- Comparing Remote Access Methods
    - WAN and Internet Connectivity
        - Wide Area Networks and the OSI Model
        - Internet Access Types
        - Fiber to the Curb and Fiber to the Premises
    - Virtual Private Networks
        - Remote Access Considerations
        - Tunneling Protocols
        - Internet Protocol Security
        - Internet Key Exchange
        - Client-to-Site VPNs
        - Clientless VPNs
        - Site-to-Site VPNs
    - Remote Management
        - Remote Host Access
        - Secure Shell
        - Telnet
        - Remote Desktop Protocol
        - Console Connections and Out-of-Bound Management
        - Jump Boxes
        - API Connection Methods
    - Additional Resources
        - Network Types: LANs, WLANs, and WANs
        - Internet Connection Types

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        - VPNs
        - Remote Access
    - Summarizing Cloud Concepts
        - Datacenter and Storage Networks
            - Data Center Network Design
            - Spine and Leaf Topology
            - Storage Area Networks
            - Fibre Channel
        - Cloud Concepts
            - Cloud Scalability and Elasticity
            - Cloud Deployment Models
            - Cloud Service Models
            - Content Delivery Networks
        - Cloud Networking
            - Cloud Instances
            - Virtual Private Clouds
            - Cloud Gateways
            - Cloud Connectivity Options
            - Cloud Firewall Security
            - Security Groups and Security Lists
        - Modern Network Environments
            - Infrastructure as Code
            - Uses for Infrastructure as Code
            - Source Control
            - Software-Defined Networking
            - Software-Defined WAN
            - Overlay Networks
            - Zero Trust Architecture
            - Secure Access Service Edge
        - Additional Resources
            - Datacenter and Storage Networks
            - Cloud Concepts and Networks
            - Modern Network Environments

REQUIREMENTS:

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Recommended experience: CompTIA A+ certification, with 9 to 12 months of hands-on experience in a junior network administrator or network support technician role.

Difficulty level



CERTIFICATE:

The participants will obtain certificates signed by CompTIA (course completion). This course will help prepare you for the CompTIA Network+ certification exam, which is available through the Pearson VUE test centers.

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TRAINER:

Authorized CompTIA Trainer.

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