

Element K Network+ Certification

- **Course Number:** EKN+
- **Length:** 5 Day(s)

Certification Exam

This course will help you prepare for the following exams:

- **CompTIA Exam N10-003**

Course Overview

The CompTIA Network+ Certification course builds on existing user-level knowledge and experience with personal computer operating systems and networks to present fundamental skills and concepts that students will use on the job in any type of networking career. If students are pursuing a CompTIA technical certification path, the CompTIA A+ certification is an excellent first step to take before preparing for the CompTIA Network+ certification.

Prerequisites

An introductory course in a Windows operating system, or equivalent skills and knowledge, is required. Also, the CompTIA A+ certification, or the equivalent skills and knowledge, is helpful but not required.

Audience

This course is intended for entry-level computer support professionals with basic knowledge of computer hardware, software, and operating systems, who wish to increase their knowledge and understanding of networking concepts and skills to prepare for a career in network support or administration, or to prepare for the CompTIA Network+ certification, 2005 objectives (exam number N10-003).

A typical student in the CompTIA Network+ Certification course should have nine months or more of professional computer support experience as a PC technician or help desk technician. Network experience is helpful but not required; A+ certification or the equivalent skills and knowledge is helpful but not required.

Course Outline

- Course Introduction
- Lesson 1
- Network Theory
- Network Theory
- A Computer Network

- Network Servers
- Client Computers
- Peer Computers
- A Host Computer
- Terminals and Clients on a Host-Based Network
- Authentication
- Demo - Login Locally vs. Login to Domain
- Encryption
- A Network Directory
- Networking Standards
- Standards Organizations
- Network Nodes
- The Network Backbone
- Network Segments
- Network Subnets
- Network Models
- A Centralized Network
- A Client/Server Network
- A Peer-to-Peer Network
- A Mixed Mode Network
- Network Topologies
- A Physical Bus Topology
- A Physical Star Topology
- A Physical Ring Topology
- A Physical Mesh Topology
- A Hybrid Topology
- A Logical Bus Topology
- A Logical Ring Topology
- A Logical Star Topology
- LANs within a Building
- A WAN
- The Internet
- An Intranet
- An Extranet
- An Enterprise Network
- Lesson 1 Review
- Lesson 2
- Network Communications Methods
- Network Communications Methods
- Unicast Transmission
- Broadcast Transmission
- Multicast Transmission
- Media Access Methods
- Multiplexing
- Polling
- Token-Based Media Access

- CSMA/CD
- CSMA/CA
- Contention Domains
- Analog Signal Characteristics
- Digital Signal
- Modulation
- Differential and Single-Ended Demodulation
- On-Off Keying
- Manchester Encoding
- Serial Devices
- Parallel Devices
- Baseband Transmission
- Broadband Transmission
- Lesson 2 Review
- Lesson 3
- Network Data Delivery
- Network Data Delivery
- A MAC Address
- A TCP/IP Network Address
- A DNS Network Name
- Demo - Network Identification
- A Packet
- An Ethernet Header
- An Error Checking Value
- Demo - Install Network Monitor
- Simplex Communication
- Half Duplex Communication
- Full Duplex Communication
- A Point-to-Point Connection
- A Multipoint Connection
- A Radiated Connection
- Connection Services
- The Error Detection Process
- Parity
- Cyclic Redundancy Check
- Buffering
- Data Windows
- Fixed and Sliding Windows
- Lesson 3 Review
- Lesson 4
- Network Media and Hardware
- Network Media and Hardware
- Media Types
- Coaxial Cable
- Live Demo - Connectors for Coaxial Cable
- Live Demo - Thinnet Coaxial Cable

- Twisted Pair Cable
- UTP vs. STP Cable
- Twisted Pair Cable Categories
- An RJ-45 Connector
- Live Demo - RJ11 and RJ45 Cables
- Live Demo - Inside Ethernet Cable
- A Fiber Optic Cable
- Fiber Optic Cable Mode Types
- Fiber Optic Connectors
- FireWire Connectors
- Plenum and PVC Cable
- Wireless Communications
- Radio Networking
- Infrared Transmission
- Microwave Transmission
- Electrical Noise
- Shielding
- Differential Signaling
- Noise Control with Twisted Pair
- Termination
- Grounding
- Media Installation Techniques
- Network Interface Card Types
- A Transceiver on a Network Interface Card
- Live Demo - Network Cards
- Premise Wiring
- A Repeater
- A Hub
- A Switch
- A Bridge
- A Dedicated Router
- A Wireless Access Point
- A Gateway
- Lesson 4 Review
- Lesson 5
- Network Implementations
- Network Implementations
- The OSI Model
- The OSI Layers
- The OSI Process
- OSI Acronyms
- Network Resources
- Network Browsing
- Network Searching
- Ethernet
- Switched Ethernet

- Ethernet Frames
- The IEEE 802.x Standard
- 802.3 Standards
- 802.2 Standards
- 10Base Standards
- Token Ring Standards
- Token States
- Multi Station Access Units (MSAUs)
- Token Ring Failure Recovery
- Beacons
- FDDI
- FDDI Connectivity
- FDDI Failure Recovery
- Wireless Technologies
- Wireless Access Point (WAP)
- The IEEE 802.11 Standard
- 802.11 Modes
- Bluetooth
- Lesson 5 Review
- Lesson 6
- Networking with TCP/IP
- Networking with TCP/IP
- Function of a Network Protocol
- Network- and Transport-Layer Protocol Families
- Application-, Presentation-, and Session- Layer Protocol Families
- Protocol Bindings
- Demo - Protocol Bindings
- TCP/IP
- An IP Address
- Binary to Decimal Equivalents
- The Subnet Mask
- Subnet Mask Structure
- Subnet Mask Values
- Default Subnet Masks
- Binary ANDing
- Applying a Subnet Mask
- Distinguishing Local and Remote Addresses
- The Default Gateway
- Valid IP Addressing
- The ICANN
- IP Address Classes
- Private Nonroutable Addresses
- TCP/IP Subnets
- Subnetting a Classful Address
- Limitations on Default IP Addresses
- Variable Length Subnet Masks

- CIDR
- Calculating the Base Network ID of a Custom Subnet
- The TCP/IP Network Model
- TCP and UDP
- The Internet Protocol (IP)
- ARP
- The Internet Control Message Protocol
- The Internet Group Management Protocol
- Port Blocks
- A Socket Address
- Lesson 6 Review
- Lesson 7
- TCP/IP Services
- TCP/IP Services
- Static and Dynamic Addressing
- DHCP
- The DHCP Lease Process
- Demo - Static Vs. Dynamic Address
- APIPA
- Ping Results
- Demo - TCPIP Troubleshooting Utilities
- IP Configuration Utilities
- A Host Name
- DNS
- The DNS Hierarchy
- The DNS Name Resolution Process
- A HOSTS File
- A NetBIOS Name
- NetBIOS Service Codes
- NetBIOS Name Resolution by Broadcast
- WINS
- The WINS Name Registration Process
- An LMHOSTS File
- The NetBIOS Name Resolution Process
- Non-WINS Clients
- WINS Proxy Agents
- The Tracert Utility
- Tracert Options
- The Netstat Command
- NetStat Options
- Socket States
- Nbtstat
- Nbtstat Options
- The Nslookup Utility
- Nslookup Syntax
- The Arp Command

- Arp Options
- FTP
- FTP Options
- Telnet
- NTP
- SMTP
- POP3
- IMAP4
- NNTP
- HTTP
- HTTPS
- LPR and LPD
- NFS
- SSH
- SSH1 and SSH2
- SCP
- SMB
- LDAP
- SNMP
- Zeroconf
- Lesson 7 Review
- Lesson 8
- Other Network Protocols
- Other Network Protocols
- NetBEUI
- Demo - Install NetBEUI
- IPX/SPX
- IPX/SPX Node Addresses
- IPX/SPX Server Addresses
- IPX Frame Types
- Demo - Install Network Clients or Protocols
- AppleTalk
- Appletalk Addressing
- The AppleTalk Protocol Suite
- AppleTalk and TCP/IP Interoperability
- Limitations of IPv4
- IPv6
- IPv6 Addresses
- Lesson 8 Review
- Lesson 9
- Local Area Network (LAN) Infrastructure
- Local Area Network (LAN) Infrastructure
- A Bridge Routing Table
- Bridge Broadcasting
- Types of Bridges
- Connections within a Switch

- The Routing Process
- Routers
- Autonomous Systems
- Router Roles
- Router Roles in Autonomous Systems
- Routing Table Information
- Routing Entry Components
- Typical Default Routing Table Entries
- Routing Table Entries
- Demo - Show Routing Table
- Dynamic Routing
- Distance-Vector Routing
- Link-State Routing
- Convergence
- Count-to-Infinity Loops
- Routing Loops
- Router Discovery Protocols
- Demo - Install RIP II
- RIP vs. OSPF
- Data Filtering with Routers
- Demo - Install NIC Filters
- A VLAN
- Physical Segmentation
- Logical Segmentation
- VLAN
- Lesson 9 Review
- Lesson 10
- Wide Area Network (WAN) Infrastructure
- Wide Area Network (WAN) Infrastructure
- Circuit Switching Networks
- Virtual Circuits
- Permanent Virtual Circuits
- Switched Virtual Circuits
- Packet Switching Networks
- Cell Switching Networks
- Dial-Up Connections
- Demo - Network Wizard
- Leased Data Lines
- Integrated Services Digital Network (ISDN)
- ISDN Channels
- ISDN Hardware
- Cable Internet Access
- Cable Connectivity Devices
- Cable Access Speeds
- DSL
- DSL Connection Lines

- DSL Channels and Technologies
- X.25
- Frame Relay
- ATM
- The T-Carrier System
- SONET
- The Optical Carrier System
- SONET Network Components
- Unbounded WAN Media
- A Mux in a WAN Link
- A CSU/DSU
- V Dot Standards
- ICS
- Voice Over Data
- Lesson 10 Review
- Lesson 11
- Network Security
- Network Security
- Unauthorized Access
- Data Theft
- Password Attacks
- Brute Force Password Attacks
- Trojan Horse Attacks
- Spoofing Attacks
- The Spoofing Process
- Session Hijacking Attacks
- Man-in-the-Middle Attacks
- DoS Attacks
- DDoS Attacks
- Viruses
- Social Engineering Attacks
- Data Protection Methods
- Virus Infection Methods
- Virus Types
- Antivirus Software
- Updating Virus Definitions
- Demo - Install AVG
- Internet Email Virus Protection
- Share-Level and User-Level Security
- Rights
- Permissions
- The NTFS File System
- Users and Groups
- Demo - Local Users and Groups
- Demo - Create Groups
- Effective Permissions

- Share and File System Permissions
- Demo - Create A Share
- Demo - Connect to a Network-Based Share
- Strong Passwords
- Kerberos
- The Kerberos Process
- EAP
- Shared-Key Encryption
- Public-Key Encryption
- DES and Triple DES
- Digital Certificates
- Demo - Confidential File
- PKI
- The Certificate Encryption Process
- The Certificate Authentication Process
- Demo - Install Root CA
- IPsec
- IPsec Levels
- IPsec Policies
- SSL
- NAT
- The NAT Process
- A Firewall
- A DMZ
- An Internet Proxy
- Website Caching
- Web Proxy Features
- Demo - Configure IE Proxy
- Lesson 11 Review
- Lesson 12
- Remote Networking
- Remote Networking
- Remote Access Networking
- RAS Servers
- Demo - RRAS
- Remote Control Networking
- Terminal Services
- Thin Clients
- Basic Thin Client Components and Actions
- Comparing Host-Based and Thin Client Computing
- Microsoft Terminal Services
- Windows Terminal Services Features
- Demo - Remote Desktop
- Demo - Install Terminal Server and Config
- Citrix MetaFrame Deployment
- Web-Based Remote Access

- Remote Access Protocols
- Remote Access Authentication
- PAP
- CHAP
- The Challenge-Response Process
- RADIUS
- Tunneling
- VPN
- VPN Protocols
- VPN Types
- Access VPN
- Intranet VPN
- Extranet VPN
- Lesson 12 Review
- Lesson 13
- Disaster Recovery
- Disaster Recovery
- Disaster Categories
- Disaster Recovery Plans
- Responsible Individuals
- Critical Hardware Inventory
- Critical Software Inventory
- Network Reconstruction Plan
- Hot, Warm, and Cold Sites
- Backup Policies
- Backup Policy Considerations
- Backup Media Types
- Magnetic Tape Formats
- The GFS Rotation Method
- The Tower of Hanoi Rotation Method
- Backup Types
- Data Backup System Maintenance
- Specialized Data Backups
- Fault Tolerance
- A UPS
- Partitions
- RAID
- Striping (RAID 0)
- Mirroring or Duplexing (RAID 1)
- Striping with Parity (RAID 5)
- Other RAID Levels
- Other Disk Fault Tolerance Features
- Link Redundancy
- Enterprise Fault Tolerance Planning
- Lesson 13 Review
- Lesson 14

- Network Data Storage
- Network Data Storage
- High Availability
- Scalability
- A Distributed Storage System
- A High-Performance Drive Array
- Clusters
- An Active/Active Cluster
- An Active/Passive Cluster
- A Fault-Tolerant Cluster
- Network-Attached Storage
- Advantages of NAS
- NAS Operating Systems and Protocols
- Connecting to a NAS
- Connecting to a NAS through a Server
- Storage Area Networks
- Fibre Channel
- Fibre Channel Topologies
- Module 14 Review
- Lesson 15
- Network Operating Systems
- Network Operating Systems
- Windows Server 2003
- Windows Server Versions
- Windows XP
- Demo - DOS Version 5
- Demo - Windows 3.1
- Demo - Windows 98
- Demo - NT 4.0 Workstation
- Demo - Windows 2000 Workstation
- Demo - Windows XP
- Active Directory
- The Active Directory Structure
- Active Directory Components
- Workgroup Membership
- Domain Membership
- Windows File Systems
- Other Windows Servers
- Older Windows Server Versions
- Novell NetWare 6.5
- NLMs
- The Novell eDirectory
- The eDirectory Tree Structure
- NetWare Client Software
- Native File Access Protocols
- NSS

- NDPS
- Early NetWare Versions
- UNIX
- UNIX Versions
- UNIX Architecture
- UNIX Interfaces
- Open Standards
- Linux
- Linux Distributions
- Popular Linux Distributions
- Linux Server Applications
- File Systems in Linux
- Remote Connectivity on UNIX and Linux
- The Macintosh Operating System
- Mac OS X Server
- Macintosh Network Security
- Remote Connectivity
- Module 15 Review
- Lesson 16
- Network Troubleshooting
- Network Troubleshooting
- Troubleshooting
- Troubleshooting Models
- The CompTIA Network+ Troubleshooting Model
- The Network+ Troubleshooting Model – Steps 1-8
- Troubleshooting IP Configuration
- Troubleshooting with Ping
- Troubleshooting with Tracert
- Troubleshooting with Arp
- Troubleshooting with Telnet
- Troubleshooting with Nbtstat
- Troubleshooting with Netstat
- Troubleshooting with FTP
- Troubleshooting with Nslookup
- Demo - IPConfig
- Demo - Troubleshooting Utilities
- Network Technician's Hand Tools
- Live Demo - Hardware Toolkit
- Electrical Safety Rules
- Wire Crimpers
- A Punch Down Tool
- A Circuit Tester
- Voltmeters
- A Cable Tester
- Types of Cable Testers
- Crossover Cables

- A Hardware Loopback Plug
- LED Indicator Lights
- Types of LED Lights
- Tone Generators and Tone Locators
- A Performance Monitor
- Counter Threshold Values
- A Protocol Analyzer
- The Protocol Analysis Process
- A Baseline
- The Baseline Process
- Lesson 16 Review
- Course Closure