

CompTIA Network+ (Release 3)

- **Course Number:** Network+
- **Length:** 7 Day(s)

Certification Exam

This course is preparation for the CompTIA Network+™ Certification exam

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

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.

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.

Course Outline

Course Introduction

9m

Module 01 - Network Basics

3h 54m

Topic A: Network Concepts

Networks

Local Area Networks

Basic Network Types

Peer-to-Peer Model

Peer-to-Peer Authentication

Client/Server Model

Client/Server Authentication

Segments and Backbones

Network Wiring

Fiber Optic

Twisted Pair

Composite Cable

Coaxial

Live Demo: Cable Types

Serial

Duplex

Wireless LAN

Benefits/Drawbacks of WLANs

Network Protocols

Wireless Network Protocols

Topic B: Network Architectures

Network Architecture

Star Architecture

Bus Architecture

Ring Architecture

Mesh Architecture

Hybrid Architecture

Point-to-Point

Point-to-Multipoint

Packet vs. Circuit Switching

Ethernet

Ethernet Mediums

Ethernet Standards

Ethernet Networks

Data Collisions

Channel Access Methods

Token Ring Networks

Wireless LANs

Wide Area Networks

WAN Connections

POTS/PSTN

ISDN

DSL

Cable

Satellite

Wireless WAN

Cellular

T and E Lines

X.25 and Frame Relay

ATM

Mesh Networks

Topic C: The OSI Model

OSI Model

OSI Layer 7

OSI Layer 6

OSI Layer 5

OSI Layer 4

OSI Layer 3

OSI Layer 2

OSI Layer 1

Module 01 - Review

Module 02 - Wired Computer-to-Computer Connections

2h 29m

Topic A: Wired Network Connections

Fiber Optic Wired Connections

SONET

Fiber Optic Connectors

Fiber Optic Connector Types

Twisted Pair Connections

UTP Categories

Stranded vs. Solid

Twisted Pair Connectors

RJ Connectors

Modern Residential Wiring

RJ-45 Connector

Pin Numbering of RJ-45 Connector

Terminating CatX to RJ-45

Live Demo: Crossover Cable

Coaxial Connections

RG Standards

Thinnet Connectors

Live Demo: Thinnet Connectors

Thicknet Vampire Tap

Plenum

Topic B: Network Interface Cards and Modems

Network Adapter

Live Demo: NIC Installation

Live Demo: NIC Removal

Internal NICs

Notebook Computers

NIC Selection

Live Demo: NIC Card

Live Demo: PCM CIA

Addressing

MAC Address

IPv4

IPv6

Character-Based Names

Domain Name System (DNS)

Demo: Examining Addresses

Top-Level Domains

NetBIOS

Resolving NetBIOS by Broadcast

Resolving NetBIOS by WINS

Port Addresses

Modems

Modulation/Demodulation

Riser Cards

Softmodems

Dial-Up Connection Creation

Vista Dial-Up Connection Wizard

Vista Connect to Workplace

Dial-Up Connection Properties

Demo: Create Dial-Up

Module 02 - Review

Module 03 - Network-to-Network Connections

58m

Topic A: Network-to-Network Connection Components

Network Access Points

Internet Service Providers (ISPs)

Small ISPs

Regional ISP

LAN Installation Components

Cross-Connects

Standards

Typical UTP Installation

Telecommunications Room

Punchdown Block

Live Demo: Punchdown Block

Wire Placement

Topic B: LAN Wiring

LAN Wiring Categories

Guidelines

Backbone Installation

Workstation Runs

Calculate Workstation Run Length

Modular Office Systems

Telecommunications Room Management

Telecommunications Room Equipment

Patch Panel

Connecting Block

Punchdown Tool

Punchdown Procedure

Live Demo: Punchdown Tool

Topic C: LAN Wiring Tests

LAN Wiring Tests

Testing Equipment

Module 03 - Review

Module 04 - Wired Internetworking Devices

3h 54m

Topic A: Basic Internetworking Devices

Common Internetworking Devices

Repeaters

Repeater Placement

Repeater Operation

Repeater Issues

Bridges

Bridge Operation

Bridge Types

Bridge Routing Management

Bridge Filtering and Intelligence

Local and Remote Bridges

Layer 2 Switch

Bridges vs. Switches

Live Demo: Switch

Trunking Example

Routers

Router Operation

About Routers

Router Features

Key Points

Types of Routers

Routing Table Contents

Routing Examples

Brouters

Bridges vs. Routers

Ethernet Hub

Hub Types

Token Ring MSAU

Token Ring Distances

MSAU Functions

Media Converters

Firewalls

Firewall Functions

Hardware Firewall

Software Firewall

Proxy Server

Port and Packet Filtering

Topic B: Specialized Internetworking Devices

Higher-Level Switches

Content Switches

IDS and IPS

IDS

Malicious Traffic Detected by IDS

IPS

Traffic Shapers

Multiprotocol Label Switching (MPLS)

Multifunction Network Devices

Module 04 - Review

Module 05 - Wired Communication Standards

4h 2m

Topic A: The TCP/IP Protocol Suite

Network Communication Protocols

TCP/IP Architecture

Network Interface Layer Protocols

Address Resolution Protocol (ARP)

MAC Address Filter

Data Packet Addresses

ARP Request Packet Structure

ARP Reply Packet Structure

Router Forwarding

IPConfig

Demo: ARP Connectivity

Internet Layer Protocols

Internet Protocol (IP)

RIP/RIPv2 and OSPF

ICMP/ICMPv6

IGMP

SSH

Transport Layer Protocols

Service Port Numbers

Demo: Port Numbers

TCP

TCP Three-Way Handshake

Microsoft Network Monitor

UDP

Demo: Packet Capture

Application Layer Protocols

HTTP

FTP

Telnet

Demo: Using Telnet

NTP

Email Messaging Protocols

Topic B: TCP/IP

IPv4

Classful IPv4 Addresses

Subnet Masks

Network IDs

Special Addresses

CIDR

CIDR Address

Demo: Binary Conversion

Demo: Subnetting Theory

Demo: Subnetting Practical

NAT

APIPA

IPv6

IPv6 Address Types

IPv6 Address Scopes

Subnet Mask Communication

IPv4 Custom Subnets

IPv6 Subnets

IPv6 Custom Subnets

Default Gateway

Address Translation

DNS

DNS Namespace

WINS

Static TCP/IP Configuration

DHCP and DHCPv6

IPv4 Lease Process

IPv6 Lease Process

IPv6 Router Flags

M and O Flags

Topic C: DHCP Servers

Installing a DHCP Server

Demo: DHCPv4

IPv6 Scopes

Demo: DHCPv6

Module 05 - Review

Module 06 - Wireless Networking

1h 41m

Topic A: Wireless Network Devices

Wireless

Wireless Connections

Infrared

Radio

Bluetooth

Wireless Communications

Indoor Point-to-Multipoint LANs

Live Demo: Wireless Router

Outdoor Point-to-Point Links

Outdoor Point-to-Multipoint Links

Wireless Connection Components

Wireless NICs

Live Demo: Wireless Network Adapters

Live Demo: USB Wireless

Wireless Access Points

Wireless Speeds

WAP Placement

Topic B: Wireless Networking Standards

Standards

802.1x Standard

802.11 Standard

Access Point

802.11 WLAN Standards

Wireless Protocols

LAN Technologies

Wi-Fi

Bluetooth

802.11a/802.11g

WiMAX

Topic C: Wireless Configuration

WLAN Security Risks

Additional Risks

WLAN Security Components

Transmission Encryption

802.1x Authentication

Wireless Access Point Configuration

Securing Your AP

Demo: WAP

Wireless Clients

Wireless Auto Configuration

Windows CE Wireless Clients

Module 06 - Review

Module 07 - Security Threats and Mitigation

1h 54m

Topic A: Security Threats

Security Threat Categories

Technology Weaknesses

Configuration Weaknesses

Human Error and Malice

Viruses, Worms, Trojan Horses

Social Engineering

Dumpster Diving

Online Attacks

Countermeasures

Phishing

Denial of Service Attacks

SYN Flood Attack

SYN Flood Defense

Smurf Attacks

Ping of Death

Distributed DoS Attacks

DDoS Countermeasures

Demo: DDoS

Man-in-the-Middle

Spoofing

IP Address Spoofing

Demo: Port Scanner

Topic B: Threat Mitigation

Security Policies

Acceptable Use

Due Care

Privacy

Separation of Duties

Need to Know

Password Management

Account Expiration

Service-Level Agreement

Disposal and Destruction

Human Resources Policy

Incident Response Policy

Preparation

Detection

Containment

Eradication

Recovery

Follow-Up

Change Management

Configuration Management Documentation

Education

Communication

User Awareness

Types of Training

Module 07 - Review

Module 08 - Security Practices

2h 9m

Topic A: Operating Systems

Antivirus Software

Demo: Antivirus

Spyware

Windows Defender

Demo: Spyware

Securing the Operating System

Windows Update

Update Categories

Patch Management

Demo: Windows Updates

Other Updates

System Information

Windows Firewall

Demo: BIOS

Demo: Firewall

Topic B: Devices

Firewalls and Proxy Servers

Security Zones

Intranet

Perimeter Network

DMZ

Screened Host

Bastion Host

Three-Homed Firewall

Back-to-Back Firewall

Dead Zone

Traffic Filtering

Network Access Control

Virtual Private Network

IPSec Encryption

Demo: IPSec

Security Issues

Built-In Management Interfaces

Secure and Unsecure Methods

Physical Attack Susceptibility

Overcoming Device Weaknesses

Intrusion Detection and Prevention

NIDS

HIDS

HIDS Advantages

Physical Access Control

Surveillance

Module 08 - Review

Module 09 - Network Access Control

2h 16m

Topic A: Authentication

AAA

Username and Passwords

Password Protection

Strong Passwords

Multiple Passwords

Authentication Factors

One-Factor Authentication

Two-Factor Authentication

Three-Factor Authentication

Live Demo: Thumb Scanner

Authentication Protocols

Preventing Impersonation

Identify Proofing

Single Sign-On

Kerberos

Kerberos System Composition

Kerberos Data Types

Kerberos Authentication Process

Kerberos Security Weaknesses

CHAP

EAP

Mutual Authentication

Topic B: Public Key Cryptography

Cryptography

ROT13 Cipher

Keys

Symmetric Encryption in Action

Public Key Cryptography

Asymmetric Encryption in Action

Public Key Cryptography Characteristics

Public Key Infrastructure

Demo: Public Key Infrastructure

Setup and Initialization Phase

Administration Phase

Cancellation and History Phase

Topic C: Remote Access

AAA

RADIUS

RADIUS Authentication

Realms

RADIUS Security

RADIUS Benefits

Diameter

Diameter Improvements

LDAP and Remote Access

LDAP Security

LDAP Authentication/Authorization

TACACS+

TACACS+ vs. RADIUS

802.1x

Virtual Private Networks

VPN Technologies

VPN Security Models

VPN Protocols

PPTP vs. L2TP

IPSec Protocols

Encryption Modes

Secure Shell (SSH)

VPN Solutions

Service Provider Tunneling

Topic D: Wireless Security

802.11 Standard

Wireless Security

Wireless Vulnerabilities

Wi-Fi Scanners

Warchalking Symbols

Module 09 - Review

Module 10 – Monitoring

59m

Topic A: Monitoring Resources

Resource Overview

Performance Monitor

Performance Objects

Demo: Performance Monitor

Bottlenecks

Configuration

Data Collector Sets

Data Collector Set Reports

Demo: Data Collector Sets

Reliability Monitor

Remote Desktop

Remote Desktop Options

Remote Desktop Connection

Demo: Remote Desktop

Topic B: Event Viewer

Event Viewer

Event Information

Event Types

Remote Logs

Event Forwarding

Demo: Event Forwarding

Source Computers

Collecting Computers

Subscriptions

Device and Application Logging

Module 10 - Review

Module 11 – Troubleshooting

1h 32m

Topic A: Troubleshooting Basics

Troubleshooting

Information Gathering

Identify the Affected Area

Determine If Anything Has Changed

Establish Probable Cause

Determine If Escalation Is Necessary

Create an Action Plan

Implement and Test a Solution

Identify Results and Effects

Document Problem and Solution

Problem and Resolution Tracking

Hardware Toolkit

Live Demo: Multimeter

Additional Tools

Software Toolkit

Topic B: Troubleshooting The Network

Troubleshooting Wired Connections

Cable Testing Devices

Physical Cable Tests

Live Demo: Troubleshooting

Network Function Tests

Network Analyzer

Troubleshooting Wireless

TCP/IP Utilities

IPConfig

Unix IFConfig

Ping

Ping Troubleshooting

NSLookup and Tracert

Windows Network Diagnostics

Demo: Troubleshooting Connections

Demo: Network Diagnostic

Topic C: Troubleshooting Scenarios

Remote Desktop Components

Module 11 - Review

Course Closure

Total Duration: 25h 53m