

CompTIA Network+ Exam N10-006

Course Overview

CompTIA Network+ covers the configuration, management, and troubleshooting of common wired and wireless network devices. Also included are emerging technologies such as unified communications, mobile, cloud, and virtualization technologies.

Course Introduction

2m

Course Introduction

Lesson 01 - Network Theory

1h 40m

Network Theory

OSI Model Location

The IEEE 802.11 Standard

The OSI and TCP/IP Models

OSI Layer 7

OSI Layer 6

OSI Layer 5

OSI Layer 4

OSI Layer 3

OSI Layer 2

OSI Layer 1

LAN Compared with the OSI Model

TCP/IP Architecture

Demo - OSI Review

LANs

WANs

Network Coverage Areas

The Internet

Intranets

Extranets

Enterprise Networks

Specialized Network Types

Network Configurations

Centralized Networks

Client/Server Networks

Peer-to-Peer Networks

Mixed Mode Networks

Network Topologies

Frequencies and Overlap of Wireless Channels

Radio Networking

Broadcast Radio

Spread Spectrum

Infrared Transmission

Bluetooth

Microwave Transmission
Data Transmission
Analog Signals
Digital Signals
Digital Data Transmission
Unicast Transmission
Broadcast Transmission
Multicast Transmission
Anycast Transmission
Serial Data Transmission
Parallel Data Transmission
Baseband Transmission
Broadband Transmission
Transmission Speeds
Types of Media Access
Polling
CSMA/CA
CSMA/CD
Multiplexing

Lesson 02 - Bounded Network Media

1h 24m

Bounded Network Media
Twisted-pair Cable
Common UTP Categories
Additional TP Categories
Stranded vs. Solid
Straight-through, Cross-over, Rollover
Pin Numbering of RJ-45 Connector
T1 Crossover Cable
Coaxial Cable
RG Standards
Single-mode Fiber to UTP
Broadband Over Power Line
Access BPL
BPL Modem
Twisted-pair Connectors
Pin Numbering of RJ-45 Connector (Cont.)
Serial Connectors
Serial Cable
Serial Console Connections
Serial Cable Types
Serial Data Rates
Typical UTP Installation
Fiber Optic Cable
Fiber Optic Connectors
Fiber Optic Connector Types
Thinnet Connectors
Terminating Coax with BNC
RG-6 and RG-59 Connectors
Plenums

Media Converters
Telecommunications Room
Termination Choices
Punchdown Block
Wire Placement
Cross-connects
MDF to IDF Connections
Workstation Drops
Classifying Network Components

Lesson 03 - Unbounded Network Media

51m

Unbounded Network Media
The 802.11 Standard
The 802.11 Family
802.11 Networking
The 802.1x Standard
The 802.11 Standard (Cont.)
Channels
Channel Bonding
Wireless Access Points
Wireless Controllers
Wireless Bridges
Wireless Antennas
Wireless Antenna Types
Wireless Antenna Performance Factors
SSID Broadcasts
MIMO
Configuration Options
Configuring Wireless Clients
Demo - Setting Up Wi-Fi
Access Point
Device Compatibility
Troubleshooting Connections
Common Problems
Major Wireless Protocols

Lesson 04 - Network Implementations

4h 9m

Network Implementations
Repeaters
Repeater Placement
Wireless Repeater
Repeater Operation
Limitations of Repeaters
Local Area Networks
Network Topologies
Logical Network Topologies
Peer-to-peer Model
Decentralized
Peer-to-peer Authentication
Client/Server Model

A Client/Server LAN
Client/Server Authentication
Star Topology
Bus Topology
Ring Topology
Mesh Topology
Hybrid Topology
Point-to-point vs. Point-to-multipoint
MPLS
Demo - Topology
NICs
Transceivers
IEEE 802.x Standards
Ethernet (IEEE 802.3)
Ethernet Frames
MAC Addresses
The 10Base Standards
Fast Ethernet
Gigabit Ethernet
10 Gigabit Ethernet
PoE
Ethernet Hub
Ethernet
Ethernet Media
10-Gigabit Ethernet Standards
Gigabit Ethernet Standards
Fast Ethernet Standards
10BASE-T
Ethernet Bonding
Data Transmission
Data Collisions
Channel Access Methods
Demo - LAN Cable Types
Network Access Points
LAN Installation Components
MAC Address
Switches
Routers
Types of Routers
Gateways
Firewalls
Analog Modems
Network Controllers
Legacy Network Connectivity Devices
Collision and Broadcast Domains
Switches and Network Performance
Switch Types and Operating Modes
STP (IEEE 802.1d)
Internetworking Devices
Bridges

Bridge Operation
Bridge Types
Bridge Routing Management
Bridge Filtering and Intelligence
Local and Remote Bridges
Layer 2 Switch
Configurations for Switched Networks
Switched Network with Bottlenecks
Switched Network without Bottlenecks
Benefits of Switches
Higher-level Switches
Managed Layer 3 Switch
Installing Routers and Switches
Demo - Routing NAT
Label Edge Routers
Networking Appliances
Demo - The Purpose of Network Devices
Demo - Interface Monitoring
Demo - Interface Configuration
VLANs
VLAN Assignment
Port Mirroring
Trunking
IEEE 802.1q
VLAN Pooling
Virtual LAN
VLAN Filtering
VLAN Trunking
Trunking Example
Demo - Intro to Routing and Switching VLANs
Spanning Tree
Demo - Spanning Tree
Demo - Packet Tracing
Internet Service Providers (ISPs)
Small ISPs
Regional ISP
Typical UTP Installation
Telecommunications Room
Standards

Lesson 05 - TCP/IP Addressing and Data Delivery

2h

TCP/IP Addressing and Data Delivery
Network Communication Protocols
TCP
TCP Three-way Handshake
Internet Protocol (IP)
UDP
Protocols
Demo - Examining Ports and Protocols
The TCP/IP Model

Encapsulation on TCP/IP Networks
Connection-Oriented and Connectionless Protocols
The Three-Way Handshake
ICMP
IGMP
ARP
Protocol Analyzers
IPv4
Subnet Masks
Network IDs
IPv4 Subnet Masks
IPv4 Custom Subnets
Routing Example
Demo - Examining IP Settings
Classful IPv4 Addresses
Special Addresses
APIPA
Default Gateway
CIDR
CIDR Address
Demo - Convert Binary
IPv6
IPv6 Address Types
IPv6 Address Scopes
IPv6 Subnets
IPv6 Custom Subnets
IPCONFIG and IFCONFIG
Connections
Flow Control
Buffering
Data Windows
Error Detection
Parity Checking
Cyclic Redundancy Checking

Lesson 06 - Routing

1h 17m

Routing
Routes
Comparing Routing and Switching
The IP Data Packet Delivery Process
The Local and Remote Delivery Process
Static Routing
Routing Tables
Static Routing Tables
Routing Table Entries
Routing Entry Components
The Route Command
The Routing Process
Autonomous Systems
Router Roles in Autonomous Systems

Routing Methods in Autonomous Systems
Dynamic Routing
Comparing Static and Dynamic Routing
Distance-Vector Routing
Link-State Routing
Comparing Distance-Vector and Link-State Routing
Routers
Router Operation
About Routers
Router Features
Types of Routers
Routing Table Contents
Routing Metrics
Routing Examples
Brouters
Bridges vs. Routers
Virtual Routers
Hybrid Routing
Path-Vector Routing
Route Convergence
Routing Loops
Count-to-Infinity Loops
Split Horizon and Poison Reverse
Router Discovery Protocols
Link State Routing Protocols

Lesson 07 - TCP/IP Services

1h 20m

TCP/IP Services
TCP
Data Transmission on IP Networks
Static and Dynamic IP Addressing
Static IP Address Assignment
APIPA
IP Configuration Utilities
DHCP
Port Addresses
Service Port Numbers
Demo - Port Numbers
Demo - netstat
DHCP and DHCPv6
IPv4 Lease Process
IPv6 Lease Process
IPv6 Router Flags
Demo - DHCP
FQDN
Name Resolution
DNS
DNS Components
Types of DNS Servers
Types of DNS Records

The DNS Hierarchy
The DNS Name Resolution Process
Legacy Name Resolution Methods
DNS (Cont.)
Top-level Domains
DNS Namespace
DNS Records
Demo - Examining DNS
Transport-layer Protocols
M and O Flags
UDP
IP
Static IP Addressing

Lesson 08 - WAN Infrastructure

1h 4m

WAN Infrastructure
Key Points
Wide Area Networks
Packet vs. Circuit Switching
Demo - Packet Switching
WAN Connections
QoS
Mobile Devices
Cable Internet Access
MPLS
DSL
Metro-Ethernet
POTS/PSTN
ISDN
DSL (Cont.)
Cable
Satellite
Wireless
WiMAX
Cellular
T and E Lines
X.25 and Frame Relay
ATM
SONET and SDH
DWDM
PON
Voice-over-Data Systems
VoIP
VoIP Protocols
VoIP Software
Video Conferencing

Lesson 09 - Cloud and Virtualization Technologies

57m

Cloud and Virtualization Technologies

Types of Server Virtualization

Virtual NICs

Virtual Switches

Virtual Firewalls

Virtual PBX

SANs

Virtual Computers

Virtualization Concerns and Risks

Demo - Viewing VM Components

Fibre Channel

iSCSI

NAS

Jumbo Frames

Cloud Concepts

Cloud Computing Features

Cloud Computing Implementations

IaaS

SaaS

PaaS

IDaaS

NaaS

Cloud Computing

Cloud Deployment

Cloud Categories

Risks and Concerns

Lesson 10 - Network Security Basics

1h 43m

Network Security Basics

Wireless Security

Transmission Encryption

Demo - Wireless Security

Business Continuity

Disposal and Destruction

AAA

Authentication Factors

One-factor Authentication

Two-factor Authentication

Three-factor Authentication

Single Sign-on

Kerberos

Kerberos System Components

Kerberos Data Types

Kerberos Authentication Process

CHAP

EAP

PPPoE

Mutual Authentication

Cryptography

ROT13 Cipher
Wireless Security Threats
Vulnerabilities of Access Points
Wi-Fi Scanners
War Chalking Symbols
Denial-of-Service Attacks
Distributed DoS Attacks
DDoS Countermeasures
Man-in-the-Middle Attacks
Buffer Overflow
FTP Bounce Attacks
Smurf Attacks
Malware
Social Engineering
Attack Types
Social Engineering Countermeasures
TACACS+
802.1x
Tokens
Biometrics
Mutual Authentication (Cont.)
SSO
EAP (Cont.)
Kerberos (Cont.)
Wireless Authentication Methods
Password Management
Keys
Symmetric Encryption in Action
Public Key Cryptography
Asymmetric Encryption in Action
Demo - Encryption
Public Key Cryptography (Cont.)
Public Key Infrastructure
Setup and Initialization Phase
Encryption
Encryption and Security Goals
Hashing Encryption
Key-Based Encryption
Digital Certificates
Certificates and Encryption
Encryption Devices
Benefits of Encryption Devices
SSL and Encryption
TLS
Wireless Encryption Protocols

Lesson 11 - Preventing Security Breaches

2h 3m

Preventing Security Breaches

CIA Triad

Security Factors

Non-repudiation

Least Privilege

Risks

Data Breaches

Unauthorized Access

Hackers and Attackers

Security Controls

Security Policies

Common Security Policy Types

Adherence to Standards and Policies

Windows Security Policies

Group Policy

Permissions

Segmentation

Wireless Security

Disaster Recovery

Single Point of Failure

Vulnerabilities

Physical Security Threats and Vulnerabilities

Environmental Threats and Vulnerabilities

Unnecessary Running Services

Open Ports

Unpatched and Legacy Systems

Unencrypted Channels

Cleartext Credentials

Unsecure Protocols

Radio Frequency Emanation

Network Access Control

Access Control Lists

NAT

Threats

Attacks

Data Theft

Social Engineering Attacks

Types of Social Engineering Attacks

Insider Threats

Malware Attacks

Types of Malware Attacks

Types of Viruses

Effect of Malware on the Network

Compromised Systems

Buffer Overflows

Password Attacks

Types of Password Attacks

Packet and Protocol Abuse

IP Spoofing Attacks

DoS Attacks
Types of DoS Attacks
Man-in-the-Middle Attacks
Session Hijacking Attacks
Port Scanning Attacks
Replay Attacks
FTP Bounce Attacks
ARP Cache Poisoning Attacks
VLAN Hopping
Zero Day Attacks
Wireless Threats and Attacks
Firewalls and Proxies
Firewall Categories
Security Zones
Intranet Zone
Perimeter Network
DMZ Options
Screened Host
Bastion Host
Three-homed Firewall
Back-to-back Firewalls
Dead Zone
Traffic Filtering
NAT and PAT
Port Address Translation
Firewall Administration
Rule Planning
Port Security
Intrusion Detection
Events
NIDS
IDScenter for Snort
Example Snort Rule
HIDS
Advantages of HIDS over NIDS
Authentication
Authentication Factors
User Name and Password Authentication
Two-Factor Authentication
Multifactor Authentication
Strong Passwords
Patch Management
Security Policies (Cont.)
SSH
Demo - Network Security
Securing the Operating System
Windows Update
Updates
Demo - Vulnerability
Honeypots and Honeynets

Honeypot Examples
Honeypot Deployment
Account Expiration
Education
Communication
User Awareness

Lesson 12 - Responding to Security Incidents

4m

Responding to Security Incidents
Human Resources Policies
Incident Response Policy
Preparation
Detection
Containment
Eradication
Recovery
Follow-up

Lesson 13 - Remote Networking

28m

Remote Networking
RADIUS
RADIUS Authentication
TACACS+ vs. RADIUS
Remote Desktop Services
RADIUS (Cont.)
VPN Technologies
VPN Security Models
VPN Protocols
PPTP vs. L2TP
IPSec Protocols
IPSec Encryption
PPPoE
Tunneling Protocols

Lesson 14 - Network Management

1h 1m

Network Management
Acceptable Use
Due Care
Privacy
Separation of Duties
Need to Know
Service-level Agreement
Network Analyzer
TCP/IP Utilities
IPConfig
Ifconfig
Ping (Packet Internet Groper)
Ping Troubleshooting
NSLookup and Tracert
Demo - Software Tools

Performance Monitor
Performance Objects
Bottlenecks
Configuration
Event Viewer
Event Information
Event Types
Device and Application Logging
Syslog
Syslog Alert Levels
SNMP
Network Monitor
Demo - Network Monitoring
Troubleshooting

Lesson 15 - Troubleshooting Network Issues

2h 27m

Troubleshooting Network Issues
Common Problems
Troubleshooting
Troubleshooting Models
The Network+ Troubleshooting Model
Troubleshooting Documentation Template
Change Management
Configuration Documentation
Rationales
Methods
Troubleshooting with IP Configuration Utilities
The ping Utility
The traceroute and tracert Utilities
The arp Utility
The NBTSTAT Utility
The NETSTAT Utility
The nslookup Utility
WLAN Survey Software
SNIPS
Loopback Interface
Speed Test Sites
Looking Glass Sites
Demo - Troubleshooting a Switch
Demo - Troubleshooting a Router
Network Technician's Hand Tools
Hardware Toolkit
Additional Tools
Software Toolkit
Cable Testing Devices
Cable Testing Device
Physical Cable Tests
Network Function Tests
Cable Certifier
Additional Features

Testing a Basic Permanent Link
Crimpers
Coax Crimper
Twisted-pair Cable Crimper
Using a Fiber Optic Cable Crimper
Terminating Fiber Optic Cable
Butt Set
Butt Set Uses
Modapt Device
Toner Probe
Using a Toner Probe
Punchdown Tools
Using a Punchdown Tool
Network Analyzer
Loopback Plugs
TDR
OTDR
Multimeters
Measuring Resistance
Measuring Voltage
Measuring Current
Measuring Continuity
Environmental Monitor
ASHRAE 9.9 Guidelines
Safety Rules
Wire Crimpers
Cable Strippers
Punch Down Tools (Cont.)
Circuit Testers
Multimeters (Cont.)
Voltmeters
Cable Testers
Cable Certifiers
Types of Cable Testers and Certifiers
Crossover Cables
Hardware Loopback Plugs
Time-Domain Reflectometers
Tone Generators and Tone Locators
Environment Monitors
Butt Sets
LED Indicators
Network Analyzers
Demarc
Wireless Testers
Light Meters
Physical Issues
Logical Issues
Routing and Switching Issues
Wireless Issues
Simultaneous Wired/Wireless Connections

Discovery of Neighboring Devices and Nodes
Common Security Configuration Issues
Misconfigured Firewalls
Misconfigured ACLs and Applications
Open or Closed Ports
Authentication Issues
Domain or Local Group Configuration
Malware
DoS Attacks
ICMP-Related Issues
Malicious Users
Improper Access
ARP Issues
Banner Grabbing
Jamming
Troubleshooting Wired Connections
Antivirus Software

Lesson 16 - Planning and Implementing a SOHO Network

16m

Planning and Implementing a SOHO Network
Purposes of a Plan
Creating a Plan
Ongoing Planning
Implementing a Plan
Network Cable

Total Duration: 22h 45m