

# CompTIA Network+ 2009 Edition R3

## 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

### **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

### **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 Insecure 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  
Usernames 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: 25 hrs 53 min