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CompTIA Network+ Certification

Course Outline

Objective 1.1 - The OSI and TCP/IP Models
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
Objective 1.1 Review
Objective 1.2 - Applications, Devices, Protocols
Applications, Devices, Protocols
Classifying Network Components
Objective 1.2 Review
Objective 1.3 - IP Addressing
IP Addressing
MAC Address
IPv4
Classful IPv4 Addresses
Subnet Masks
Network IDs
Special Addresses
CIDR
CIDR Address
APIPA
IPv6
IPv6 Address Types
IPv6 Address Scopes
Demo - Convert Binary
IPv4 Subnet Masks
IPv4 Custom Subnets
IPv6 Subnets
IPv6 Custom Subnets
Default Gateway
Routing Example
IPCONFIG and IFCONFIG
Demo - Examining IP Settings
Objective 1.3 Review
Objective 1.4 - Routing and Switching
Routing and Switching
Internetworking Devices
Ethernet Hub
Repeaters
Repeater Placement
Wireless Repeater

Repeater Operation
Limitations of Repeaters
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
Virtual LAN
VLAN Filtering
VLAN Trunking
Trunking Example
Demo - Intro to Routing and Switching VLANs
Routers
Router Operation
About Routers
Router Features
Key Points
Types of Routers
Routing Table Contents
Routing Metrics
Routing Examples
Brouters
Bridges vs. Routers
Objective 1.4 Review
Objective 1.5 - TCP and UDP Ports
TCP and UDP Ports
Transport-layer Protocols
Port Addresses
Service Port Numbers
Demo - Port Numbers
Demo - netstat
Objective 1.5 Review
Objective 1.6 - Protocols
Protocols
Network Communication Protocols
TCP
TCP Three-way Handshake
Internet Protocol (IP)
UDP
Protocols

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Demo - Examining Ports and Protocols
Objective 1.6 Review

Objective 1.7 - The Domain Name System
The Domain Name System
DNS
Top-level Domains
DNS Namespace
DNS Records
Demo - Examining DNS
Objective 1.7 Review

Objective 1.8 - Troubleshooting Methodology
Troubleshooting Methodology
Troubleshooting
Hardware Toolkit
Additional Tools
Software Toolkit
Objective 1.8 Review

Objective 1.9 - Virtual Networks
Virtual Networks
Virtual Computers
Virtualization Concerns and Risks
Demo - Viewing VM Components
Cloud Computing
Cloud Deployment
Cloud Categories
Risks and Concerns
Objective 1.9 Review

Objective 2.1 - Installing and Configuring Routers and Switches
Installing and Configuring Routers and Switches
Installing Routers and Switches
Demo - Routing NAT
Objective 2.1 Review

Objective 2.2 - Installing and Configuring Wireless Networks
Installing and Configuring Wireless Networks
The 802.11 Standard
The 802.11 Family
802.11 Networking
Configuration Options
Configuring Wireless Clients
RADIUS
Demo - Setting Up Wi-Fi
Objective 2.2 Review

Objective 2.3 - DHCP
DHCP
Static IP Addressing
DHCP and DHCPv6
IPv4 Lease Process
IPv6 Lease Process
IPv6 Router Flags
M and O Flags
Demo - DHCP
Objective 2.3 Review

Objective 2.4 - Troubleshooting Wireless Networks
Troubleshooting Wireless Networks
Troubleshooting Connections
Common Problems
Objective 2.4 Review

Objective 2.5 - Troubleshooting Router and Switch Problems
Troubleshooting Router and Switch Problems
Common Problems
Demo - Troubleshooting a Switch

Demo - Troubleshooting a Router
Objective 2.5 Review

Objective 2.6 - Planning and Implementing a SOHO Network
Planning and Implementing a SOHO Network
Purposes of a Plan
Creating a Plan
Ongoing Planning
Implementing a Plan
Network Cable
Objective 2.6 Review

Objective 3.1 - Standard Media Types
Standard Media Types
Fiber Optic Cable
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
Plenums
Media Converters
Single-mode Fiber to UTP
Broadband Over Power Line
Access BPL
BPL Modem
Objective 3.1 Review

Objective 3.2 - Standard Connector Types
Standard Connector Types
Fiber Optic Connectors
Fiber Optic Connector Types
Twisted-pair Connectors
Pin Numbering of RJ-45 Connector
Thinnet Connectors
Terminating Coax with BNC
RG-6 and RG-59 Connectors
Serial Connectors
Serial Cable
Serial Console Connections
Serial Cable Types
Serial Data Rates
Typical UTP Installation
Telecommunications Room
Termination Choices
Punchdown Block
Wire Placement
Objective 3.2 Review

Objective 3.3 - Wireless Standards
Objective 3.3 - Wireless Standards
Wireless Standards
The 802.1x Standard
The 802.11 Standard
Access Point
Major Wireless Protocols
Device Compatibility
Channels
Channel Bonding
MIMO
Objective 3.3 Review

Objective 3.4 - WAN Technologies

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WAN Technologies

Wide Area Networks
Packet vs. Circuit Switching
Demo - Packet Switching
WAN Connections
POTS/PSTN
ISDN
DSL
Cable
Satellite
Wireless
WiMAX
Cellular
T and E Lines
X.25 and Frame Relay
ATM
SONET and SDH
DWDM
PON
Objective 3.4 Review

Objective 3.5 - Network Topologies
Network Topologies
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
Label Edge Routers
Demo - Topology
Objective 3.5 Review

Objective 3.6 - Troubleshooting Physical Connectivity
Troubleshooting Physical Connectivity
Troubleshooting Wired Connections
Cable Testing Devices
Physical Cable Tests
Objective 3.6 Review

Objective 3.7 - LAN Technologies
LAN Technologies
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
Objective 3.7 Review

Objective 3.8 - Wiring Distribution Components

Wiring Distribution Components

Network Access Points
Demo - Packet Tracing
Internet Service Providers (ISPs)
Small ISPs
Regional ISP
LAN Installation Components
Cross-connects
MDF to IDF Connections
Standards
Workstation Drops
Typical UTP Installation
Telecommunications Room
Objective 3.8 Review

Objective 4.1 - Network Appliances
Network Appliances
Networking Appliances
Demo - The Purpose of Network Devices
Objective 4.1 Review

Objective 4.2 - Network Hardware Tools
Network Hardware Tools
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
Objective 4.2 Review

Objective 4.3 - Network Software Tools
Network Software Tools
Network Analyzer
TCP/IP Utilities
IPConfig
Ifconfig
Ping (Packet Internet Groper)
Ping Troubleshooting
NSLookup and Tracert
Demo - Software Tools
Objective 4.3 Review

Objective 4.4 - Monitoring Network Traffic

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Monitoring Network Traffic
Performance Monitor
Performance Objects
Bottlenecks
Demo - Performance and Monitoring
Configuration
Event Viewer
Event Information
Event Types
Device and Application Logging
Syslog
Syslog Alert Levels
SNMP
Network Monitor
Demo - Network Monitoring
Objective 4.4 Review
Objective 4.5 - Management Documentation
Management Documentation
Change Management
Configuration Documentation
Objective 4.5 Review
Objective 4.6 - Optimizing Network Performance
Optimizing Network Performance
Rationales
Methods
Objective 4.6 Review
Objective 5.1 - Implementing Wireless Security
Implementing Wireless Security
Wireless Security
Transmission Encryption
Demo - Wireless Security
Objective 5.1 Review
Objective 5.2 - Network Access Security Methods
Network Access Security Methods
Network Access Control
Access Control Lists
VPN Technologies
VPN Security Models
VPN Protocols
PPTP vs. L2TP
IPSec Protocols
IPSec Encryption
PPPoE
Remote Desktop Services
SSH
Demo - Network Security
Objective 5.2 Review
Objective 5.3 - User Authentication
User Authentication
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
Keys
Symmetric Encryption in Action
Public Key Cryptography
Asymmetric Encryption in Action
Demo - Encryption
Public Key Cryptography
Public Key Infrastructure
Setup and Initialization Phase
RADIUS
RADIUS Authentication
TACACS+
TACACS+ vs. RADIUS
802.1x
Objective 5.3 Review
Objective 5.4 - Network Security Threats
Topic A: Attacks and Threats
#NAME? 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
Topic B: Mitigation
Antivirus Software
Securing the Operating System
Windows Update
Updates
Patch Management
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 Policies
Incident Response Policy
Preparation
Detection
Containment
Eradication
Recovery
Follow-up
Education
Communication
User Awareness
Demo - Vulnerability
Objective 5.4 Review
Objective 5.5 - Installing and Configuring a Firewall
Installing and Configuring a Firewall
Firewalls and Proxies

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