

# ASM Educational Center (ASM) Est. 1992

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# **Cisco Certified Entry Level Technician (CCENT) Certification Online Training**



### **Course Outline**

#### Module 01 - Building a Simple Network

Exploring the Functions of Networking What is a Network? Physical Components of a Network Interpreting a Network Diagram Impact of User Applications on the Network Characteristics of a Network **Physical Topologies** Logical Topologies Summary Understanding the Host-to-Host Communications Model Introducing Host-to-Host Communications **OSI Reference Model** TCP/IP Protocol Suite Data Encapsulation Data De-Encapsulation Peer-to-Peer Communications Summary Introducing LANs Local Area Networks LAN Components Need for Switches Switches Summary Operating Cisco IOS Software **Cisco IOS Software Features and Functions Cisco IOS CLI Functions** User EXEC Mode Privileged EXEC Mode Help Functions in the CLI **CLI Error Messages** Managing Cisco IOS Configurations Improving the User Experience in the CLI Summary Starting a Switch Switch Installation Switch LED Indicators Connecting to a Console Port **Basic Switch Configuration** 

Verifying the Switch Initial Startup Status Summary Understanding Ethernet and Switch Operation Ethernet LAN Connection Media Fiber Connector Types Ethernet Frame Structure MAC Addresses Switching Operation **Duplex Communication** Configuring Duplex and Speed Options Summary Troubleshooting Common Switch Media Issues Common Troubleshooting Tools Media Issues - Copper Media Issues - Fiber Troubleshooting Switch Media Issues Interface Status Verification Port Issues **Troubleshooting Port Issues** Summary Demo - Perform Switch Startup Demo - Troubleshooting Switch Media Issues Module 01 Review Module 02 - Establishing Internet Connectivity Understanding the TCP/IP Internet Layer Internet Protocol IPv4 Address Representation IPv4 Header Address Fields **Decimal and Binary Systems** Base X Number System (eNotes) Decimal-to-Binary Conversion **IP Address Classes Reserved IPv4 Address** Domain Name System Verifying the IPv4 Address of a Host Summarv Understanding IP Addressing and Subnets Subnets Subnet Masks

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Octet Values of a Subnet Mask **Default Gateways** Possible Subnets and Hosts for a Class B Network Applying Subnet Masks Determining the Network Addressing Scheme Example: Addressing Scheme Variable-Length Subnet Masking VLSM Example Summary Understanding the TCP/IP Transport Layer TCP/IP Transport Layer Functions Reliable vs. Best-Effort Transport TCP vs. UDP Analogy UDP Characteristics **TCP** Characteristics **TCP/IP** Applications TCP 3-Way Handshake (eNotes) Summary Exploring the Functions of Routing Role of a Router **Router Characteristics Router Functions** Path Determination Routing Table Types of Routes Dynamic Routing Protocols Distance Vector vs. Link State Summary Configuring a Cisco Router Initial Router Startup Initial Router Setup **Configuring Router Interfaces** Configuring the Cisco Router IP Address Router show ip interface brief Command Router show interfaces Command Exploring Connected Devices **Cisco Discovery Protocol** Discovering Neighbors Using Cisco Discovery Protocol Using the show cdp neighbors detail Command Summarv Exploring the Packet Delivery Process Layer 2 Addressing Layer 3 Addressing Address Resolution Protocol Host-to-Host Packet Delivery (Step 1 of 16) Host-to-Host Packet Delivery (Step 2 of 16) Host-to-Host Packet Delivery (Step 3 of 16) Host-to-Host Packet Delivery (Step 4 of 16) Host-to-Host Packet Delivery (Step 5 of 16) Host-to-Host Packet Delivery (Step 6 of 16) Host-to-Host Packet Delivery (Step 7 of 16) Host-to-Host Packet Delivery (Step 8 of 16) Host-to-Host Packet Delivery (Step 9 of 16) Host-to-Host Packet Delivery (Step 10 of 16) Host-to-Host Packet Delivery (Step 11 of 16) Host-to-Host Packet Delivery (Step 12 of 16) Host-to-Host Packet Delivery (Step 13 of 16) Host-to-Host Packet Delivery (Step 14 of 16) Host-to-Host Packet Delivery (Step 15 of 16) Host-to-Host Packet Delivery (Step 16 of 16) Role of a Switch in Packet Delivery (Step 1 of 4) Role of a Switch in Packet Delivery (Step 2 of 4) Role of a Switch in Packet Delivery (Step 3 of 4)

Role of a Switch in Packet Delivery (Step 4 of 4) Summary Enabling Static Routing Routing Operations Static and Dynamic Routing Comparison When to Use Static Routing Static Route Configuration **Default Routes** Static Route Configuration Verification Verifying the Default Route Configuration Summary Managing Traffic Using ACLs Understanding ACLs ACL Operation ACL Wildcard Masking Wildcard Bit Mask Abbreviations Types of ACLs Testing An IP Packet Against a Numbered Standard Access List Basic Configuration of Numbered Standard IPv4 ACLs Summary Enabling Internet Connectivity The Demarcation Point **Dynamic Host Configuration Protocol** Options for Configuring a Provider-Assigned IP Address Configuring a Static Provider-Assigned IP Address Configuring a DHCP Client Public vs. Private IPv4 Addresses Introducing NAT Types of Addresses in NAT Types of NAT Understanding Static NAT Configuring Static NAT Verifying Static NAT Configuration Understanding Dynamic NAT Configuring Dynamic NAT Verifying Dynamic NAT Configuration Understanding PAT Configuring PAT Verifying PAT Configuration Troubleshooting NAT Troubleshooting NAT Case Study Summary Demo - Performing Initial Router Setup Media Issues Demo - Connecting to the Internet Module 02 Review Module 03 - Managing Network Device Security Securing Administrative Access Network Device Security Overview Securing Access to Privileged EXEC Mode Securing Console Access Securing Remote Access Enabling Remote Access Connectivity Limiting Remote Access ACLs **External Authentication Options** Configuring the Login Banner Summary Implementing Device Hardening Securing Unused Ports Disabling an Interface (Port) Port Security Configuring Port Security Port Security Verification **Disabling Unused Services** 

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Network Time Protocol Configuring NTP Verifying NTP Summarv Implementing Traffic Filtering with ACLs Using ACLs to Filter Network Traffic ACL Operation Applying ACLs to Interfaces The Need for Extended ACLs Configuring Numbered Extended IPv4 ACLs Configuring Named ACLs ACL Configuration Guidelines Monitoring ACLs Troubleshooting Common ACL Errors: Scenario 1 Troubleshooting Common ACL Errors: Scenario 2 Troubleshooting Common ACL Errors: Scenario 3 Troubleshooting Common ACL Errors: Scenario 4 Troubleshooting Common ACL Errors: Scenario 5 Troubleshooting Common ACL Errors: Scenario 6 Troubleshooting Common ACL Errors: Scenario 7 Summary Demo - Enhancing the Security of the Initial Configuration Demo - Device Hardening Demo - Filtering Traffic with ACLs Module 03 Review Module 04 - Building a Medium-Sized Network Implementing VLANs and Trunks Issues in a Poorly Designed Network **VLAN** Introduction Trunking with 802.1Q Creating a VLAN Assigning a Port to a VLAN Configuring an 802.1Q Trunk VLAN Design Considerations Physical Redundancy in a LAN Summary Routing Between VLANs Purpose of Inter-VLAN Routing Options for Inter-VLAN Routing Configuring a Router with a Trunk Link Summarv Using a Cisco Network Device as a DHCP Server Need for a DHCP Server Understanding DHCP Configuring a DHCP Server Monitoring DHCP Server Functions DHCP Relay Agent Summary Introducing WAN Technologies Introducing WANs WANs vs. LANs Role of Routers in WANs

WAN Communication Link Options Point-to-Point Connectivity Configuring a Point-to-Point Link Summarv Introducing Dynamic Routing Protocols Purpose of Dynamic Routing Protocols Interior and Exterior Routing Protocols Distance Vector and Link-State Routing Protocols Understanding Link-State Routing Protocols Summary Implementing OSPF Introducing **OSPF OSPF** Adjacencies SPF Algorithm Router ID Configuring Single-Area OSPF Verifying OSPF Configuration Summary Demo - Configuring Expanded Switch Networks Demo - Configuring DHCP Server Demo - Implementing OSPF Demo - Troubleshooting OSPF Module 04 Review Module 05 - Introducing IPv6 Introducing Basic IPv6 IPv4 Addressing Exhaustion Workarounds Problems with IPv4 Addressing Workarounds **IPv6** Features IPv6 Addresses IPv6 Address Types IPv6 Unicast Addresses EUI-64 Interface ID Assignment IPv6 Addresses Allocation Basic IPv6 Connectivity **Cisco IOS IPv6 Configuration Example** Basic IPv6 Connectivity (Cont.) Summarv Understanding IPv6 IPv6 Header Changes and Benefits ICMPv6 Neighbor Discovery Stateless Autoconfiguration Summary Configuring IPv6 Routing Routing for IPv6 Static Routing OSPFv3 Summary Demo - IPv6 Addresses Demo - Configure and Verify IPv6 Routing Module 05 Review Course Closure