Cisco Certified Network Associate (CCNA) Study guide Exam 200-301 v1



CONTENTS

Introduction
Cisco's Network Certifications
What Does This Book Cover?
Chapter 1 Internetworking
<u>Internetworking Basics</u>
<u>Internetworking Models</u>
The OSI Reference Model
Summary
Chapter 2 Ethernet Networking and Data Encapsulation
Ethernet Networks in Review
Ethernet Cabling
Data Encapsulation
The Cisco Three-Layer Hierarchical Model
Summary
Chapter 3 Introduction to TCP/IP
Introducing TCP/IP
TCP/IP and the DoD Model
IP Addressing
<u>IPv4 Address Types</u>
Summary
Chapter 4 Easy Subnetting
Subnetting Basics
Summary
Chapter 5 Troubleshooting IP Addressing

Cisco's Way of Troubleshooting IP
Summary
Chapter 6 Cisco's Internetworking Operating System (IOS)
The IOS User Interface
Command-Line Interface (CLI)
Administrative Configurations
Router and Switch Interfaces
Viewing, Saving, and Erasing Configurations
Summary
<u>Chapter 7 Managing a Cisco Internetwork</u>
The Internal Components of a Cisco Router and Switch
Backing Up and Restoring the Cisco Configuration
Configuring DHCP
<u>Using Telnet</u>
Resolving Hostnames
Checking Network Connectivity and Troubleshooting
Summary
Chapter 8 Managing Cisco Devices
Managing the Configuration Register
Backing Up and Restoring the Cisco IOS
Summary
Chapter 9 IP Routing
Routing Basics
The IP Routing Process
Configuring IP Routing
Configuring IP Routing in Our Network
Dynamic Routing
Routing Information Protocol (RIP)
Summary



Chapter 10 Wide Area Networks

Introduction to Wide Area Networks

Cabling the Serial Wide Area Network

High-Level Data-Link Control (HDLC) Protocol

Point-to-Point Protocol (PPP)

Summary

Glossary

Index

End User License Agreement

List of Tables

Chapter 2
Table 2.1
Table 2.2
<u>Table 2.3</u>
Chapter 3
Table 3.1
<u> Table 3.2</u>
<u> Table 3.3</u>
<u> Table 3.4</u>
Table 3.5
Chapter 4
Table 4.1
<u>Table 4.2</u>
Table 4.3
Chapter 6
Table 6.1
Table 6.2
<u>Table 6.3</u>
Chapter 7
* '
Table 7.1
Chapter 8
Table 8.1
Table 8.2
Table V o



Chapter 9 **Table 9.1**



List of Illustrations

_		1	. •	
In	tro	du	ıctı	on

Figure I.1 The Cisco certification path

Chapter 1

Figure 1.1 A very basic network

Figure 1.2 A switch can break up collision domains.

Figure 1.3 Routers create an internetwork.

Figure 1.4 Internetworking devices

Figure 1.5 Switched networks creating an internetwork

Figure 1.6 Other devices typically found in our internetworks today

Figure 1.7 The upper layers

Figure 1.8 The lower layers

Figure 1.9 OSI layer functions

Figure 1.10 Establishing a connection-oriented session

Figure 1.11 Transmitting segments with flow control

Figure 1.12 Windowing

Figure 1.13 Transport layer reliable delivery

Figure 1.14 Routing table used in a router

Figure 1.15 A router in an internetwork. Each router LAN interface is a broadcast domain. R...

Figure 1.16 Data Link layer

Figure 1.17 A switch in an internetwork

Figure 1.18 A hub in a network

Figure 1.19 Physical vs. Logical Topolgies

Chapter 2

Figure 2.1 Legacy collision domain design

Figure 2.2 A typical network you'd see today

Figure 2.3 A router creates broadcast domain boundaries.

Figure 2.4 CSMA/CD

Figure 2.5 Half-duplex example

Figure 2.6 Full-duplex example

Figure 2.7 Ethernet addressing using MAC addresses

Figure 2.8 Typical Ethernet frame format

Figure 2.9 Category 5 Enhanced UTP cable

Figure 2.10 Straight-through Ethernet cable

Figure 2.11 Crossover Ethernet cable

<u>Figure 2.12 Typical uses for straight-through and cross-over</u> Ethernet cables

Figure 2.13 UTP Gigabit crossover Ethernet cable

Figure 2.14 Rolled Ethernet cable

Figure 2.15 Configuring your console emulation program

Figure 2.16 A Cisco 2960 console connection

Figure 2.17 RJ45 UTP cable question #1

Figure 2.18 RJ45 UTP cable question #2

Figure 2.19 Typical fiber cable dimensions are in um (10⁻⁶ meters). Not to scale.

Figure 2.20 Multimode and single-mode fibers

Figure 2.21 Data encapsulation

Figure 2.22 PDU and layer addressing

Figure 2.23 Port numbers at the Transport layer

Figure 2.24 The Cisco hierarchical model

Chapter 3

Figure 3.1 The DoD and OSI models

Figure 3.2 The TCP/IP protocol suite

Figure 3.3 Telnet

Figure 3.4 Secure Shell

Figure 3.5 FTP

Figure 3.6 TFTP

Figure 3.7 SNMP

Figure 3.8 HTTP

Figure 3.9 NTP

Figure 3.10 DNS

Figure 3.11 DHCP client four-step process

Figure 3.12 TCP segment format

Figure 3.13 UDP segment

Figure 3.14 Port numbers for TCP and UDP

Figure 3.15 IP header

Figure 3.16 The Protocol field in an IP header

Figure 3.17 ICMP error message is sent to the sending host from the remote router.

Figure 3.18 ICMP in action

Figure 3.19 Local ARP broadcast

Figure 3.20 Summary of the three classes of networks

Figure 3.21 Local layer 2 broadcasts

Figure 3.22 Layer 3 broadcasts

Figure 3.23 Unicast address

Figure 3.24 EIGRP multicast example

Chapter 4
Figure 4.1 One network
Figure 4.2 Multiple networks connected together
Figure 4.3 Implementing a Class C /25 logical network
Figure 4.4 Implementing a class C /26 (with three networks)
Figure 4.5 Implementing a Class C /27 logical network
Chapter 5
Figure 5.1 Basic IP troubleshooting
Figure 5.2 IP address problem 1
Figure 5.3 IP address problem 2
Figure 5.4 Find the valid host #1
Figure 5.5 Find the valid host #2
Figure 5.6 Find the valid host address #3
Figure 5.7 Find the valid subnet mask
Chapter 6
Figure 6.1 A Cisco 2960 switch
Figure 6.2 A Cisco 1900 router
Figure 6.3 A typical WAN connection. Clocking is typically provided by a DCE network to ro
Figure 6.4 Providing clocking on a nonproduction network
Figure 6.5 Where do you configure clocking?
Figure 6.6 By looking at R1 using the show controllers command, you can see that R1 and R2
Chapter 7
Figure 7.1 Router bootup process
Figure 7.2 DHCP configuration example on a switch
Figure 7.3 Configuring a DHCP relay

Chapter 8

Figure 8.1 Copying an IOS from a router to a TFTP host

Chapter 9

Figure 9.1 A simple routing example

Figure 9.2 IP routing example using two hosts and one router

Figure 9.3 Frame used from Host A to the Lab_A router when Host B is pinged

Figure 9.4 IP routing example 1

Figure 9.5 IP routing example 2

Figure 9.6 Basic IP routing using MAC and IP addresses

Figure 9.7 Testing basic routing knowledge

Figure 9.8 Configuring IP routing

Figure 9.9 Our internetwork

Chapter 10

Figure 10.1 Hub-and-spoke

Figure 10.2 Fully Meshed Topology

Figure 10.3 Partially Meshed

Figure 10.4 WAN terms

Figure 10.5 WAN connection types

Figure 10.6 DTE-DCE-DTE WAN connection: Clocking is typically provided by the DCE network t...

Figure 10.7 Cisco's HDLC frame format: Each vendor's HDLC has a proprietary data field to s...

Figure 10.8 Configuring Cisco's HDLC proprietary WAN encapsulation

Figure 10.9 Point-to-Point Protocol stack

Figure 10.10 PPP session establishment

Figure 10.11 PPP authentication example
Figure 10.12 Failed PPP authentication
Figure 10.13 Mismatched WAN encapsulations
Figure 10.14 Mismatched IP addresses
Figure 10.15 MLP between Corp and SF Routers
Figure 10.16 PPPoE with ADSL