2006 Network +

Domain 2 - Study Guide

(2nd of a 4 part series)

CompTIA Network+ - Domain 2

Introduction

The second domain of the CompTIA Network+ exam represents 20% of the examination and covers the most commonly encountered network protocols and standards. Complete each section of the study guide before you attempt to take the practice test. The domain contains the acronyms and meaning of each. As always, be sure to memorize each of the acronyms in the list below. This section also introduces many basic security protocols.

In addition to the textbook, lab manual and study guide manual, you will want to visit the following web sites for very useful information.

www.protocols.com - extensive information about hundreds of protocols. This is a must visit site.

www.3com.com/network/whitepapers.html - check out the free available white papers section.

http://www.ethermanage.com/ethernet/ethernet.html - Charles Spurgeon's Ethernet web site contains a lot of good basic network information. Another must see site.

http://www.techfest.com/networking/prot/osi.htm - Information about the OSI model and related protocols. Good chart.

http://www.neon.com/atalk_routing.shtml - Extensive information about Apple protocols and routing. More than you'll need for the certification test.

http://www.sangoma.com/main/support/tutorials/tcpip - Excellent information on TCP/IP and IPX/SPX addressing.

Don't forget you can also conduct your own Internet searches using key terms indicated in the domain objectives listed below.

Domain 2.0 – Protocols and Standards – 20%

2.1 Identify a MAC (Media Access Control) address and its parts.

2.2 Identify the seven layers of the OSI (Open Systems Interconnect) model and their functions. Look at the example for layer 1, physical.

OSI Model Layer Function

7.

6.

5.

4.

3.

2.

1. Physical - Provide physical connection of network devices. Network media such as cables, radio waves, connectors, and all basic network connection devices and materials.

2.3 Identify the OSI (Open Systems Interconnect) layers at which the following network components operate:

OSI Layer

Hubs

Switches

Bridges

Routers

NICs (Network Interface Card)

WAPs (Wireless Access Point)

2.4 Differentiate between the following network protocols in terms of routing, addressing schemes, interoperability and naming conventions:

IPX / SPX (Internetwork Packet Exchange / Sequence Packet Exchange)

NetBEUI (Network Basic Input / Output System Extended User Interface)

AppleTalk / AppleTalk over IP (Internet Protocol)

TCP / IP (Transmission Control Protocol / Internet Protocol)

2.5 Identify the components and structure of IP (Internet Protocol) addresses (IPv4, IPv6) and the required setting for connections across the Internet.

2.6 Identify classful IP (Internet Protocol) ranges and their subnet masks

Range Subnet Mask

Class A

Class B

Class C

Class D

2.7 Identify the purpose of subnetting.

2.8 Identify the differences between private and public network addressing schemes.

2.9 Identify and differentiate between the following IP (Internet Protocol) addressing methods:

Static

Dynamic

Self-assigned [APIPA (Automatic Private Internet Protocol Addressing)]

What IP range of addresses and subnet mask is associated with APIPA?

When does APIPA automatically configure?

2.10 Define the purpose, function and use of the following protocols used in the TCP / IP (Transmission Control Protocol / Internet Protocol) suite:

Explain what each of the protocols is used for.

TCP (Transmission Control Protocol)

UDP (User Datagram Protocol)

FTP (File Transfer Protocol)

SFTP (Secure File Transfer Protocol)

TFTP (Trivial File Transfer Protocol)

HTTP (Hypertext Transfer Protocol)

SMTP (Simple Mail Transfer Protocol)

HTTPS (Hypertext Transfer Protocol Secure)

POP3 (Post Office Protocol version 3)

IMAP4 (Internet Message Access Protocol version 4)

Telnet

SSH (Secure Shell)

ICMP (Internet Control Message Protocol)

ARP / RARP (Address Resolution Protocol / Reverse Address Resolution Protocol)

NTP (Network Time Protocol)

NNTP (Network News Transport Protocol)

SCP (Secure Copy Protocol)

LDAP (Lightweight Directory Access Protocol)

IGMP (Internet Group Multicast Protocol)

LPR (Line Printer Remote)

Draw an example of the Ethernet encapsulation process. Use Ethernet, IP and TCP/UDP protocols as well as one of the upper level protocols.

2.11 Define the function of TCP / UDP (Transmission Control Protocol / User Datagram Protocol) ports.

2.12 Identify the well-known ports associated with the following commonly used services and protocols:

You need to memorize this list of port numbers and associated protocols. Also know the purpose or function of each.

20 FTP (File Transfer Protocol)

21 FTP (File Transfer Protocol)

22 SSH (Secure Shell)

23 Telnet

25 SMTP (Simple Mail Transfer Protocol)

53 DNS (Domain Name Service)

69 TFTP (Trivial File Transfer Protocol)

80 HTTP (Hypertext Transfer Protocol)

110 POP3 (Post Office Protocol version 3)

119 NNTP (Network News Transport Protocol)

123 NTP (Network Time Protocol)

143 IMAP4 (Internet Message Access Protocol version 4)

443 HTTPS (Hypertext Transfer Protocol Secure)

2.13 Identify the purpose of network services and protocols

Briefly describe the purpose and function of each protocol. I guarantee two or more will be on the certification exam.

DNS (Domain Name Service)

NAT (Network Address Translation)

ICS (Internet Connection Sharing)

WINS (Windows Internet Name Service)

SNMP (Simple Network Management Protocol)

NFS (Network File System)

Zeroconf (Zero configuration)

SMB (Server Message Block)

AFP (Apple File Protocol)

LPD (Line Printer Daemon)

Samba

2.14 Identify the basic characteristics (For example: speed, capacity and media) of the following WAN (Wide Area Networks) technologies:

Define packet switching and circuit switching. Provide the speed and media for ISDN, FDDI, T1, T3, OCX, and X.25. Be aware that some may have more than one media associated with it as well as more than one speed or capacity.

Simply define the two terms, packet switching and circuit switching.

Identify several protocols associated with each, packet switching and circuit switching.

Packet switching

Circuit switching

List the maximum speed and data rates for each protocol or service listed below.

ISDN (Integrated Services Digital Network)

FDDI (Fiber Distributed Data Interface)

T1 (T Carrier level 1) / E1 / J1

T3 (T Carrier level 3) / E3 / J3

OCx (Optical Carrier)

X.25

2.15 Identify the basic characteristics of the following internet access technologies:

Write a brief description of each of the technologies listed below to include speed/capacity.

xDSL (Digital Subscriber Line)

Broadband Cable (Cable modem)

POTS / PSTN (Plain Old Telephone Service / Public Switched Telephone Network)

Satellite

Wireless

2.16 Define the function of the following remote access protocols and services:

When would you use a particular remote access protocol? What other protocols are associated with each?

RAS (Remote Access Service)

PPP (Point-to-Point Protocol)

SLIP (Serial Line Internet Protocol)

PPPoE (Point-to-Point Protocol over Ethernet)

PPTP (Point-to-Point Tunneling Protocol)

VPN (Virtual Private Network)

RDP (Remote Desktop Protocol)

2.17 Identify the following security protocols and describe their purpose and function:

IPSec (Internet Protocol Security)

L2TP (Layer 2 Tunneling Protocol)

SSL (Secure Sockets Layer)

WEP (Wired Equivalent Privacy)

WPA (Wi-Fi Protected Access)

802.1x

2.18 Identify authentication protocols.

Briefly list characteristics and sequence of actions for each.

CHAP (Challenge Handshake Authentication Protocol)

MS-CHAP (Microsoft Challenge Handshake Authentication Protocol)

PAP (Password Authentication Protocol)

RADIUS (Remote Authentication Dial-In User Service)

Kerberos

EAP (Extensible Authentication Protocol)

1. First, you must know each of the following acronyms that are represented in Domain 1 of the examination. Many test items use acronyms rather than the equivalent words. Express the following list of acronyms using the words each letter represents.

CPU

HDD

FDD

VGA

CRT

CD

CD-RW

DVD

DVD-RW

AC

DC

NIC

IEEE

SCSI

USB

LCD

CAD/CAM

ISA

PCI

PCMCIA

IRQ

DMA

IO

BIOS

IDE

EIDE

ATA

PIO

RAID

LVD

HVD

PDA

UPS

NiMH

1. The following questions are directed toward various areas covered by Domain1.

2. Define the purpose of the CPU.

3. List the characteristics of a motherboard that are used for comparisons.

4. Define the term form factor

5. Define the term firmware.

6. How are power supplies rated?

7. What is the difference between ATX and AT power supply?

8. What are the standard voltages associated with an ATX power supply?

9. Much of this domain will expect you to readily identify common connectors given in digital photographs, drawings, descriptions, or applications. Draw a representation of each of the connectors listed below. Pay particular attention to the number of pins in each appropriate device. Also list the type of hardware commonly associated with each.

Serial Port

Parallel Port

Game Port

Centronics

PS/2

USB

FireWire or IEEE1394

SCSI (all types)

VGA Monitor Connection

DVI

IDE/EIDE(PATA)

Serial IDE(SATA)

FDD

RJ-11

RJ-45

The next section of the exam will test your skills as related to common installation and replacement of standard computer parts such as hard disk drives, CD, and DVD drivers. If you have not installed the devices listed such as SCSI devices, you should go to a manufacturer web site, and download a copy of the installation manual for the device.

9. Describe the key steps to install a hard disk drive. (Web sources Maxtor, Seagate)

10. Describe the key steps to installing a second disk drive.

11. Describe the key steps to installing a CD-RW drive.(Web sources Sony, Adaptec)

12. Describe the key steps to installing a DVD drive.

13. Describe the key steps for installing a SCSI hard drive.

15. Define the term Field Replacement Unit and give five examples.

16. List typical IRQ and I/O device assignments.

1.

2.

3.

4.

5.

6.

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15.

17. List typical DMA assignments.

18. Define port replicator.

19. What is another name for a port replicator?

20. Describe SCSI characteristics. (Data transfer rates, number of connector pins, maximum number of devices.)

Narrow

Fast

Wide

Ultra-wide

SCSI Cable Lengths

Define SCSI termination types, active, passive and automatic.

Define SCSI LVD

Define SCSI HVD

21. List the binary bit patterns for the numbers 0-7 associated with SCSI card settings using DIP switches. Use only three binary number positions and a dip switch settings for three DIP switches equal to the binary positions.

(Express as a binary bit patter)

0 =

1 =

2=

3=

4=

5=

6=

7=

22. Define the following RAID types:

RAID 0

RAID 1

RAID 5

23. Describe the key steps to installing a dial-up modem and configuring an Internet access through an ISP.

24. Describe the key steps to installing a cable modem and configuring an Internet access through an ISP.

25 Describe the key steps to installing a DSL modem and configuring Internet access through an ISP.

26. Describe the key steps to installing an ISDN modem and configuring Internet access.

27. Determine the issues that must be considered when upgrading a PC. In a given scenario, determine when and how to upgrade system components.

28. Describe how the following devices effect computer performance:

Additional Memory

Video Cards

Additional CPU

Additional cooling devices for the CPU

29. Describe the factors to consider before upgrading a computer system.

30. Identify common Motherboard form factors.

Much of the Domain 1 Core Hardware requires basic component identification and installation.

1. Identify all major components of the motherboard. You should visit the Intel web site and look at several motherboards and download the technical manual for the motherboard. Study the motherboard diagrams to see how the components are identified. The technical manual for two or three of the motherboards can be used to research information relating to other domains as well.

2. Remove and install a hard disk drive, CD-ROM, DVD, Video card, modem and network card as well. Don't forget to install a SCSI drive, CD-ROM, tape drive as well. If you do not have the SCSI devices available, download an installation manual from a SCSI device manufacture such as Adaptec and go over the step by step procedures. While most students are quite familiar with standard computer ports and cables, they generally are not sufficiently prepared to identify SCSI device cables, connectors, and procedures which can account for part of the certification questions. Many SCSI equipment manufacturers provided detailed drawings of SCSI connection types. You should download and print a copy of all SCSI connector types for test identification purposes.

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