REVIEW LESSON

MTA Course: 98-366 Networking Fundamentals
Lesson name: Understanding Protocols and Services
Topic: Understand IPv4
(One 50-minute class period)
File name: NetFund_RL_3.2

Lesson Objective

3.2: Understand IPv4. *This objective may include but is not limited to:* addressing; subnetting; NAT, static IP, gateway; APIPA; network classes, classful/classless IP addressing; reserved address ranges for local use (including local loopback IP).

Preparation Details

Prerequisite student experiences and knowledge

This MTA Certification Exam Review lesson is written for students who have learned about networking fundamentals. Students who do not have the prerequisite knowledge and experiences cited in the objective will find additional learning opportunities using resources such as those listed in the Microsoft® resources and Web links at the end of this review lesson.

Instructor preparation activities

- Make copies of Student Activity NetFund_SA_3.2

Resources, software, and additional files needed for this lesson

- NetFund_PPT_3.2
- NetFund_SA_3.2
- NetFund_SA_3.2_Key
- Teaching Guide

Teaching Guide

Essential Vocabulary

Automatic Private IP Addressing (APIPA)—assigns an Internet Protocol address to a computer on which it is installed. Created by Microsoft.

addressing—methods of locating and gaining access to information in a computer's storage.

classful IP addressing—a classful network divides the address space for Internet Protocol Version 4 (IPv4) into five address classes - one or more 8-bit groups, resulting in the blocks of Class A, B, or C addresses.

classless IP addressing (CIDR)—a tactic of assigning IP addresses and routing Internet Protocol packets and allocates address space to Internet service providers and end users on any address bit boundary.

gateway—a computer or a network that allows or controls access to another computer or network.

IPv4—IPv4 is a connectionless protocol for use on packet-switched link layer networks like the Ethernet.

local loopback ip—addresses that are returned as incoming packets on the same virtual network device.

Network Address Translation (NAT)—devices that cover up a complete, private network "behind" a single public IP address, permitting the use of private addresses within the private network.

network classes—provide a method for interacting with the network to which the computer is connected; they are divided into classes by size.

subnetting—allows route aggregation and is done for preservation of address space and security.

static IP—a computer configured to use the same IP address each time it powers up. The opposite is when the computer's IP address is assigned automatically and referred to as dynamic IP address.

Lesson Sequence

Activating prior knowledge/lesson staging (Anticipatory Set: 5 minutes)

1. Student prompt (PowerPoint® slide 3):
    - Write the address range and broadcast address for the following subnet: Subnet: 192.168.1.128 / 255.255.255.224

Address Range?
Subnet Broadcast Address?

- Check your answer with those provided by the instructor. If it is different, review the method of how you derived the answer with your group and correct your understanding.

Answer:
Subnet:192.168.1.128 / 255.255.255.224
Address Range: 192.168.1.129 through 192.168.1.158
Subnet Broadcast Address: 192.168.1.159

- Have students form groups of three to discuss their answers.

Lesson activity (35 minutes)

1. Teacher Instruction
   Use the included PowerPoint presentation to review IP4, addressing, subnetting; NAT, static IP, gateway; APIPA; network classes, classful/classless IP addressing; reserved address ranges for local use (including local loopback IP).

Assessment/lesson reflection (10 minutes)

1. As indicated in the slideshow, divide students into small groups (3-4 students) to complete the network design activity from NetFund_SA_3.2.
   - It may be necessary for students to finish outside of class, or to allow additional time during the following class session.
   - If time permits, have groups informally present their designs to the class. Encourage students to discuss the different designs they created.

Microsoft resources and Web links

- **Comp Tech Doc: Network Classes**
  http://www.comptechdoc.org/os/linux/manual4/networkclasses.html
- **DAP Technology: IP4**
  http://www.daptechnology.com/fileadmin/manuals/fs400manual/Protocol%20IP4.html
- **Duxcw: Auto IP**
  http://duxcw.com/faq/network/autoip.htm
- **Duxcw: Private IP**
  http://duxcw.com/faq/network/privip.htm
- **Microsoft: IP Version 4**
  http://technet.microsoft.com/en-us/library/dd379485(WS.10).aspx

- **NTHelp: IP**
  http://www.nthelp.com/40/ip.htm
- **RalphB: subnet**
  http://www.ralphb.net/IPSubnet/subnet.html
- **Wikipedia: Addressing Mode**
  http://en.wikipedia.org/wiki/Addressing_mode
- **Wikipedia: IPv4**
  http://en.wikipedia.org/wiki/IPv4