

REVIEW LESSON

MTA Course: 98-366 Networking Fundamentals

Lesson name: Understanding Protocols and Services 3.3_B

Topic: Understand IPv6

(50-minute class period)

File name: NetFund_RL_3.3_B

Lesson Objective

3.3_B: Understand IPv6. *This objective may include but is not limited to:* subnetting; Ipconfig; why use IPv6; addressing; ipv4toipv6 tunneling protocols to ensure backwards compatibility; dual IP stack; subnetmask; gateway; ports; packets; 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_3.3_B

Resources, software, and additional files needed for this lesson

- NetFund_PPT_3.3_B
- NetFund_SA_3.3_B
- NetFund_SA_3.3_B_Key

Teaching Guide

Essential Vocabulary

Ipconfig—Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without parameters, Ipconfig displays the IP address, subnet mask, and default gateway for all adapters.

local loopback IP—a loopback network is used to test itself. **IPv6 assigns only a single address for this function, 0:0:0:0:0:0:1** (also written as ::1), having the ::1/128 prefix.

ports—an interface through which data is transferred between a computer and other devices (such as a printer, keyboard, or monitor), a network, or a direct connection to another computer. A process-specific software construct providing a communications start and endpoint used for multitasking.

packets—a formatted unit of data in groups all transmitted into suitably-sized blocks and carried by a packet mode computer network. IPv6 packet is composed of three main parts: the fixed header, optional extension headers, and the payload—the transport layer data carried by the packet.

reserved address—a set of standards for private IP address space.

subnetmask—the network address plus the bits reserved for identifying the subnetwork. It is called a **mask** because it can be used to identify the subnet to which an IP address belongs by performing a bitwise AND operation on the mask and the IP address.

subnetting—enables the network administrator to divide the host part of the address into two or more subnets by determining the number of bits to be used for the subnetting and enumerating the new subnetted address prefixes.

Lesson Sequence

Activating prior knowledge/lesson staging (Anticipatory Set: 10 minutes)

1. Student prompt (see PowerPoint® slide 3):
 - a. Compare the IPv4 with the IPv6 sections of Ipconfig on this Windows® 7® screen.
 - b. Identify aspects you do not understand.
2. Give students a few minutes to respond.
3. Call on a few students to respond.

4. Review the students' questions and give answers as time allows.
5. Students are to submit the written questions.

Lesson activity (30 minutes)

1. Teacher Instruction

Use the included PowerPoint presentation to review subnetting; why use IPv6; subnetmask; ports; packets; reserved address ranges for local use; local loopback IP.

Assessment/lesson reflection (10 minutes)

1. As indicated in the slideshow, the students are to complete the student activity from NetFund_SA_3.3_B

Microsoft resources and Web links

- **Cisco: IPv6**
<http://www.cisco.com/en/US/docs/internetworking/technology/handbook/IPv6.html>
- **Computer Hope: Ipconfig**
<http://www.computerhope.com/ipconfig.htm>
- **Exabyte: IPv6 Subnet Masking**
http://www.exabyte.net/lambert/subnet/IPv6_Subnet_Masking.htm
- **IETF: Addresses**
<http://www.ietf.org/rfc/rfc4291.txt>
- **IETF: IPv6**
<http://www.ietf.org/html.charters/ipngwg-charter.html>
- **IANA: Port Numbers**
<http://www.iana.org/assignments/port-numbers>
- **ISS.NET: Port Numbers**
http://www.iss.net/security_center/advice/Exploits/Ports/default.htm
- **Microsoft: Dual Stack Architecture**
<http://msdn.microsoft.com/en-us/library/aa922872.aspx>
- **Microsoft: Gateway**
<http://technet.microsoft.com/en-us/network/bb530961.aspx>
- **Microsoft: Ipconfig**
<http://technet.microsoft.com/en-us/library/bb490921.aspx>

- **Microsoft: IPv6 support for Home Computers**
http://www.microsoft.com/whdc/device/network/IPv6_IGD.msp#E6
- **Microsoft: IPv6 Subnetting**
<http://technet.microsoft.com/en-us/bb726997.aspx>
- **Network World: Dual IP Stack**
<http://www.networkworld.com/news/tech/2007/090507-tech-uodate.html>
- **Playground Sun: IPv6**
<http://playground.Sun.COM:80/pub/ipng/html>
- **USE IPv6**
<http://useipv6.com/>
- **Webopedia.com: Subnetmask**
http://www.webopedia.com/TERM/S/subnet_mask.html
- **Wikipedia: Addressing**
http://en.wikipedia.org/wiki/Addressing_mode
- **Wikipedia: IPv6**
<http://en.wikipedia.org/wiki/IPv6>
- **Wikipedia: IPconfig**
<http://en.wikipedia.org/wiki/Ipconfig>
- **Wikipedia: Loopback**
<http://en.wikipedia.org/wiki/Loopback>
- **Wikiedia: Packet Mode**
http://en.wikipedia.org/wiki/Packet_mode
- **Wikipedia: Private Network**
http://en.wikipedia.org/wiki/Private_network
- **Wikipedia: TCP and UDP ports**
http://en.wikipedia.org/wiki/TCP_and_UDP_port