

REVIEW LESSON

MTA Course: 98-366 Networking Fundamentals
Lesson name: Understand Network Infrastructures 1.4
Topic: Understand wireless networking
(One 50-minute class period)
File name: NetFund_RL_1.4

Lesson Objective

1.4: Understand wireless networking.

This objective may include but is not limited to: types of wireless networking standards and their characteristics (802.11a, b, g, n including different GHz ranges), types of network security (for example, WPA/WEPA/802.1X), point-to-point (P2P) wireless, wireless bridging.

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.

Resources, software, and additional files needed for this lesson

- NetFund_PPT_1.4

Teaching Guide

Essential Vocabulary

802.11a, b, g, n—wireless local area networking (WLAN) standards created by the Institute of Electrical and Electronics Engineers (IEEE) and extensions were created for faster connections.

electromagnetic waves—the basis for wireless networks.

IEEE—the **Institute of Electrical and Electronics Engineers** or **IEEE** (read *I-Triple-E*) is a professional, international non-profit organization for the advancement of technology related to electricity and has developed IEEE 802LAN/MAN group of standards.

gigahertz—gigahertz is a measure of frequency.

point-to-point (P2P) wireless—a data link protocol commonly used to establish a direct connection between two networking nodes is Point-to-point Protocol (PPP)

types of network security (WPA, WEP, 802.1X)—encryption algorithm systems that provide network security to prevent damage and unauthorized access to computers using wireless networks.

wireless bridging—A bridge is used to connect two network segments.

wireless networking—telecommunications networks created without wires and implemented between nodes in a computer network.

wireless networking standards—specifications for 802.11 standards, which are defined according to the characteristics of the wireless LAN Ethernet networks.

Lesson Sequence

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

Students prompt (available in the Microsoft PowerPoint® file)

1. Make a list of all the wireless devices they have seen, used, or are familiar with. Answer the following questions relating to the devices in the list.
 - a. How do they transmit and communicate with other devices?
 - b. It is likely that there are many wireless devices in the same room or area? How are they able to not interfere with each other? Or do they interfere with each other?
2. Give students a few minutes to respond, allowing them to work until the 10 minutes have passed.
3. As time permits, call on a few students to report to the group with their results.

Lesson activity (30 minutes)

1. **Teacher Instruction**
Use the included PowerPoint slideshow to review wireless networking, wireless networking standards and their characteristics, 802.11a, b, g, and n, including different GHz ranges, types of network security, point-to-point (P2P) wireless, and wireless bridging.
2. **Guided practice:** Guide students to expand the previous LAN diagram assignment (NetFund_SA_1.2_A). Add a wireless LAN component to multiple areas with different needs (security, speed, access). Students can use the document from lesson 1.2_A or create a new diagram. They should justify their choices and possibly create a network parts list.

Assessment/lesson reflection (10 minutes)

As indicated in the slideshow, arrange students in small groups (3–4 students):

1. Instruct students to compare WEP and WPA by creating a list of the advantages and disadvantages of each.
2. Discuss the various wireless transmission methods.
3. If time permits, have the students share their outcomes with the class. The instructor may collect this so he or she can assess and troubleshoot as necessary.

Microsoft resources and Web links

- **About.com: Networking**
<http://compnetworking.about.com/>
- **About.com: Wireless**
<http://compnetworking.about.com/cs/wireless80211/a/aa80211standard.htm>
- **Brainbell: 802.11 Standards**
http://www.brainbell.com/tutorials/Networking/802.11_IEEE_Standards.html
- **Colorado.edu: Waves particles**
(*http://www.colorado.edu/physics/2000/waves_particles/index.html*)
- **Dell: Bridging**
<http://support.dell.com/support/edocs/network/p57205/en/images/bridging.gif>
- **Derrick Park: Wireless encryption**
www.derrickpark.com/articles/mac/article-7-wep-vs-wpa-wireless-encryption/
- **Informit.com: IEEE and 802**
<http://www.informit.com/articles/article.aspx?p=1358404>
- **Private Line: Modulation**
<http://www.privateline.com/PCS/modulation.htm>
- **Search Mobile Computing: Wireless**
(*<http://searchmobilecomputing.techtarget.com/definition/wireless>*)

- **Topbits.com: Wepkey**
<http://www.topbits.com/wep-key-passphrase.html>
- **Wikipedia – IEEE and 802**
http://en.wikipedia.org/wiki/IEEE_802.11
- **Wikipedia – Frequency**
<http://en.wikipedia.org/wiki/Frequency>
- **Wikipedia – IEEE**
<http://en.wikipedia.org/wiki/IEEE>
- **Wikipedia – Wi-Fi_Protected Access (WPA)**
http://en.wikipedia.org/wiki/Wi-Fi_Protected_Access
- **Wikipedia – Wireless network**
http://en.wikipedia.org/wiki/Wireless_network
- **Wikipedia – Wireless security**
http://en.wikipedia.org/wiki/Wireless_security