REVIEW LESSON

MTA Course: 98-366 Networking Fundamentals
Lesson name: Understanding Network Infrastructures 1.3_B
Topic: Understanding wide area networks (WANs)
(Two 50-minute class periods 1.3_A and 1.3_B)
File name: NetFund_RL_1.3_B

Lesson Objective

1.3_B: Understand wide area networks (WANs). *This objective may include but is not limited to:* leased lines, dial-up, ISDN, VPN, T1, T3, E1, E3, DSL, and cable and its characteristics (speed, availability).

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

- Collect a variety of cables for students to observe. Examples: patch cord, USB cable. Prepare to show and project the YouTube video.

Resources, software, and additional files needed for this lesson

- NetFund_PPT_1.3_A
- Networking video: *http://www.youtube.com/watch?v=o5zSxG-Atsc&feature=fvw*

Teaching Guide

Essential Vocabulary

cable TV (CATV)—cable Internet access has become a viable alternative and many cable companies are offering both a home and a business class cable connection.

DSL—digital subscriber line, a digital communication technology that can provide high-speed transmissions over standard copper telephone wiring.

E1—a 2.048 Mbps (megabits per second) point-to-point dedicated, digital circuit provided by the telephone companies in Europe. E1 is the European counterpart of the North American T1 line. E1 and T1 lines can be interconnected for international use.

E3—European counterpart to the US T3.

T1—a high-speed communications line that can handle digital communications and Internet access at the rate of 1.544 Mbps. T1 lines are commonly used by larger organizations for Internet connectivity.

T3—a T-carrier (generic designator for any of several digitally multiplexed telecommunications carrier systems) that can handle 44.736 Mbps or 672 voice channels.

Lesson Sequence

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

1. See slide 3 in the PowerPoint® presentation.
    - Pass sample cables around the class. Students are to share with another student and answer if and where they have seen these cables before.
    - Review how a LAN would be designed for the classroom. How do you imagine the design for a WAN is different?

Lesson activity (30 minutes)

1. Teacher Instruction (30 minutes)
    - Use the included PowerPoint presentation to review the components of a WAN. Designing a WAN is not as easy as designing a LAN. Understanding and choosing the appropriate telecommunications technology are vital to implementing a WAN. Some of the more common circuit-switching technologies include T1, T3, E1, E3, DSL, and cable TV (CATV).
    - Present the video *http://www.youtube.com/watch?v=o5zSxG-Atsc&feature=fvw* to give a more in-depth explanation of T1 lines. Point out that the speaker is discussing fractional T1—though his discussion implies a

network designer leases a full T1 and breaks it up as needed, when in fact you could lease just a fractional T1 due to cost and need.

Assessment/lesson reflection (20 minutes)

1. Complete the assignment on slide 10 of the presentation.
    - With a partner discuss the similarities and differences between T1, T3, E1, and E3.
    - Create a table showing the similarities and differences.
    - Indentify North American (T-carrier) and European (E-carrier).
    - Include such items as number of lines, number of channels, and max data rate.
    - Discuss why such ranges exist and describe situations that would require the various options.

Microsoft resources and Web links

- **About.com: What are T1 and T3 lines**
  http://compnetworking.about.com/od/networkcables/f/t1_t3_lines.htm
- **How Stuff Works: T1 Lines**
  http://computer.howstuffworks.com/question372.htm
- **Tech Republic: T1 and E1 lines**
  http://techrepublic.com.com/5208-6230-0.html?forumID=101&threadID=241773&start=0
- **Search Networking: E1 lines**
  http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci212027,00.html
- **Wikipedia Digital subscriber lines**
  http://en.wikipedia.org/wiki/Digital_subscriber_line
- **You Tube video on T1**
  http://www.youtube.com/watch?v=o5zSxG-Atsc&feature=fvw

Suggested best practices

An additional or alternative project can be assigned. In teams of three, students create and write a WAN design scenario and diagram the details. They should justify their choices. If time allows, as competing companies they can make an executive overview presentation in which they request funding for completing the work in their hypothetical scenario.