About this Course:

The Networking Essentials course is designed to familiarize you with the elements of local and wide area networking with an emphasis on Microsoft technology. The course will prepare you to analyze various business situations and environments and be able to design the most efficient network possible, while taking into account the capabilities and features of various networking components as well as the cost of the project.

The material in this course can help you prepare for the Microsoft Certified Professional exam #70-058: Networking Essentials.

Textbook Synopsis:

The Networking Essentials Self-Study guide used in this course was written by ETI, Inc and published by Ziff-Davis Education. The book consists of seven self-guided chapters, a glossary, and a comprehensive index. Each chapter is accompanied by pre- and post-test questions designed to help you prepare for and test your knowledge of the material in each chapter. You'll also find the answers to all the questions in the appendix.

The book comes with an Interactive Learning CD-ROM from Wave Technologies International, which is designed to supplement the material in the book and enhance the learning experience. The Interactive Learning CD-ROM includes introductory videos, interactive simulations that pose day-to-day problem scenarios for you to solve, and sample test questions from the Microsoft Certified Professional exam #70-058: Networking Essentials.

Networking Essentials

Duration

This course will be open for 8 weeks.

Course Overview

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The material in this course can help you prepare for the Microsoft Certified Professional exam #70-058: Networking Essentials.

CEUs: [???]

Objectives

In this course, students will learn how to:

- Define the roles of clients, servers, and peers on a network.
- Describe the OSI model and list each of its seven layers.
- Describe the physical characteristics of a LAN.
- Describe the procedure for installing and configuring network adapters.
- Identify internetwork connectivity hardware by sight.
- Identify potential network bottlenecks.
- Identify the basic characteristics of both local area networks (LANs) and wide area networks (WANs).
- Identify the best network protocol for a given network situation.
- List and identify the use of common network devices.
- List common network protocols.
- List fault-tolerance procedures.
- List the most common network operating systems.

You'll need approximately 1-4 hours per lesson to complete the class assignments.

Requirements

This course is geared toward students who have a basic understanding of networking and are familiar with both Windows 9x and Windows NT.

Software, System, & Setup

The Networking Essentials course is primarily about networking concepts and theory and applying them, rather than about performing a specific task. As such, the minimal system configuration will be a Windows system with a CD-ROM drive so that you can use the Interactive Learning CD-ROM that accompanies the textbook.

However, you can experiment with some of the concepts presented in this course on a small LAN consisting of a Windows NT Server and one client system running with Windows NT Workstation or Windows 9x. However, keep in mind that such a LAN must be designated for training purposes *only*. Experimenting on a LAN or Workstation that is used for other purposes may cause configuration problems, which could require the reinstallation and/or restoration from a tape backup of the original configuration.

Required Textbook

Book: Networking Essentials

Author: ETI, Inc

Publisher: Ziff-Davis Education

You can purchase this book through the ZDU campus store.

Course Syllabus

Lesson 1: Examining the OSI Model

- LAN Basics
- The seven layers

Lesson 2: Network Communications

- Bounded Communications
  a) Cable Media
  b) Network Adapter Cards
- Unbounded Communications

- Public Carriers

Lesson 3: Topology and Channel Access Methods

- Bus Topology
- Ring Topologies
- Star Topology
- Mesh and Cellular Topologies
- Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
- Token Passing

Lesson 4: Protocol suites

- NetBEUI
- IPX/SPX
- TCP/IP
- DLC
- AppleTalk

Lesson 5: Directing Network Traffic

- Repeaters
- Bridges
- Routers
- Brouters
- Gateways

Lesson 6: Managing A Network

- Security
- User Management
- Disaster Recovery
- Networking Services

Lesson 7: Networking Considerations

- Networking environments
- LAN vs. WAN
- Windows NT and TCP/IP

Lesson 8: Ongoing Management

- Performance factors
- Troubleshooting
- Common problems and solutions

About The Instructor

Greg Shultz has been using PC-based computers since 1986 when he acquired a Kaypro 16 *luggable* (www.silicium.org/ibm/kaypro16.htm) running MS-DOS 2.11 and began programming in Microsoft BASICA and Turbo Pascal. From 1989 to 1992 he was the technical editor for PCM, a small niche publication that focused on Tandy computers. He then joined The Cobb Group and worked as the editor-in-chief of a number of technical and networking journals, including Inside PC Tools, Inside LANtastic, and Exploring Windows NT. He's now a Senior Editor with ZD Journals and writes the monthly tips and techniques journals, Inside Microsoft Windows 98, Inside Microsoft Windows 95, and Windows Professional. He also runs a one-man consulting operation specializing in small business networking.

Lesson 1

Networking Essentials – Examining the OSI Model

Lesson Overview

In this lesson, you'll focus on learning about the OSI model, which forms the basis of communication between systems on a network.

Time Estimate

It should take approximately 2 - 3 hours to complete this week's lesson.

Objectives

In this lesson, you'll learn to

- Understand the OSI model is and describe why it's important.
- Recognize and name each of the seven layers that make up the OSI model.
- Understand what the function is of each layer in the OSI model.

Lesson Guide

The first part of this week's reading assignment covers the basic characteristics of the Local Area Network or LAN. While this is information that you should already be familiar with, it's included her to give you a quick refresher.

The primary focus of this week's lesson is on the OSI model and the second part of this week's reading assignment dives very quickly and very generally into the OSI model. You'll find this reading a good primer for the video presentation, which you'll watch in this week's exercise. The video is very good and goes into more detail about how the OSI model works and how it relates to real-world devices and situations.

As the lesson breaks the OSI model down into its seven layers, you'll want to pay close attention to the location of each layer in the model and take note of the function that each layer plays in preparing the data for transmission across the network. The basic information that you learn in this lesson will be expanded on in more detail in the other lessons in this course

Lesson 1 Assignments

Networking Essentials – Examining the OSI Model

Reading Field Trip Exercise

Reading Assignment

Read

In Chapter 1 of the Networking Essentials textbook, read pages 6-13 for a refresher course on LAN basics. Then, read pages 14-19 for a brief introduction to the OSI model.

Time Estimate

½-1 hour

Class Discussion Questions

1. How many layers make up the OSI model?
2. What is the significance of the OSI model?
3. Name each layer in the OSI model in the order that it appears in the diagram

Field Trip

Visit the following Web site:

GoCertify.com (http://www.gocertify.com)

Objectives

Test your knowledge of the OSI model by taking the OSI Model Quiz.

Learn more about becoming a certified professional. The ultimate goal of taking the Networking Essentials class on ZDU is to help you prepare to take and pass Microsoft's Certified Professional exam #70-058: Networking Essentials. If you want to find out more information about becoming a certified computer professional, then you'll find that the GoCertify.com Web site to be a great resource. You'll find everything from up-to-date news on certification topics to message boards for communicating with colleagues to a job search database.

Time Estimate

½-1 hour

Activity

When you arrive at the GoCertify.com Web site, locate and follow the link to the FREE OSI Model Quiz. This interactive multiple-choice quiz includes 25 questions about the OSI model and provides you with immediate answers.

Once you finish with the quiz, spend some time looking over the various resources and information on the GoCertify.com Web site that pertain to becoming a certified professional. You may wish to bookmark this site and return at a later time to learn more about certification.

Exercise

Summary

For this exercise, you'll view the OSI Model video presentation on the Interactive Learning CD found in the back of your textbook. This video will describe the OSI model in much more detail and show you how it relates to real-world devices and situations.

Time Estimate

1 hour

Activity

To install the Interactive Learning CD program, insert the CD into your CD-ROM drive and open your file management program—either Windows Explorer or Windows NT Explorer. Now, open the CD-ROM drive, locate and double-click the Setup.exe file, and follow the online instructions to install the Interactive Learning program.

To run the video, you'll have to disable your screen saver so that it won't interfere with the presentation. To do so, right-click on the desktop and select Properties from the shortcut menu. Then, in the Display Properties dialog box, choose the Screen Saver tab and select None from the Screen Saver dropdown list. To continue, click OK.

Now, click the Start button, open the Programs | Wave Interactive Learning menu and click the Interactive Learning CD link. After the opening screen appears, you'll see the main menu and will click on the Digital Videos link. When you see the Networking Essentials menu, click on the OSI Model link and watch the presentation.

When the OSI Model presentation finishes, the Interactive Learning program will immediately jump to the next presentation on Ethernet and Token Ring. When it does, click the Exit button on the bottom left corner of the window to end the presentation. (You'll view this presentation in another exercise.) Now, click the Exit button again to close the presentation player. Finally, click the Exit button one more time to close the Interactive Learning program.

Optional Exercise

Summary

As we mentioned, knowing OSI model inside and out is crucial to your understanding of material in this course. With this in mind, you may want to create your own OSI model diagram in Microsoft Paint. Actually creating the diagram yourself will help you to memorize the layers in the OSI model and will later serve as a resource that you can refer to as you learn more about the different layers. You can print out copies of your OSI diagram and then use it to take notes on the various topics throughout the course. Alternatively, you can make copies of the original BMP file and keep your notes electronically.

Time Estimate

10 Minutes

Activity

To begin, click the Start button and select Programs | Accessories | Paint. Once you have Paint up and running, select the Rectangle tool from the Tool Box, and draw rectangle that is approximately 5-inches long by 1-inch high near the top of the screen. Next, use the Select tool and drag the pointer diagonally across your rectangle. Now, copy your rectangle to the clipboard and paste it into the drawing six times, placing each copy right below the previous one.

Once you have seven rectangles in your drawing, select the Text tool from the Tool Box, and create a text frame right next to your rectangles by dragging the pointer diagonally to the size you want. Then, on the Fonts toolbar, click the font, size, and style you want for the text. Now, click inside the text frame and type the name of each of the seven layers in the OSI model. Try to do so from memory.

To continue, use the Select tool to drag each layer name to its appropriate rectangle.

To help you memorize the OSI model, use the Fill With Color tool to paint the first letter of each layer name. When you do, you'll see the letters

APSTNDP

which you can then associate with the mnemonic device

A Protocol Signal That Never Drops Packets

Lesson 1 Self-Study Quiz

Networking Essentials – Examining the OSI Model

The following quiz is strictly for self-edification. Please DON'T post your answers in the message board; they won't be graded. The answers are in the quiz answers posting.

1. **How many layers are in the OSI model?**

   A. 4
   B. 5
   C. 7
   D. 8

2. **At what layer are the mechanical and electrical characteristics of the network described?**

   E. Network layer
   F. Transport layer
   G. Physical layer
   H. Control layer

3. **Which layer is divided into two sublayers?**

   A. Transport layer
   B. Data Link layer
   C. Session layer
   D. Presentation layer

4. **One of the Network layer's responsibilities is translating logical addresses and physical addresses.**

   True or False?

5. **At which layer of the OSI model are hardware addresses defined?**

   E. Transport layer
   F. Data Link layer
   G. Session layer
   H. Presentation layer

Lesson 1 Self-Study Quiz Answers

Networking Essentials – Examining the OSI Model

Following are the answers to this lesson's self-study quiz questions. Please DON'T post your answers in the message board; they won't be graded.

1. **How many layers are in the OSI model?**

   A. 4
   B. 5
   C. 7
   D. 8

2. **At what layer are the mechanical and electrical characteristics of the network described?**

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   H. Control layer

3. **Which layer is divided into two sublayers?**

   A. Transport layer
   B. Data Link layer
   C. Session layer
   D. Presentation layer

4. **One of the Network layer's responsibilities is translating logical addresses and physical addresses.**
   True.

   Since the Network layer is responsible for routing the data on a network it must be able to translate logical addresses, such as machine names, passed down to it from the upper layers into a physical address that the Data Link layer can work with. On the other end of the communication, the Network layer must take the physical address passed up to it from the Data Link layer and translate it into logical addresses that the upper layers can work with.

5. **At which layer of the OSI model are hardware addresses defined?**

E. Transport layer
F. Data Link layer
G. Session layer
H. Presentation layer