Course Learning Outcomes for Unit VII

Upon completion of this unit, students should be able to:

4. Explain how Microsoft Windows network communication protocols are implemented in a TCP/IP network.
   4.1 Summarize the Windows operating system.

5. Illustrate network diagrams for network topologies.

Reading Assignment

Chapter 8:
Local Area Networks: Part II

Unit Lesson

In Unit II, we discussed the local area networks (LAN) and the different typologies that existed within the LAN from an Ethernet perspective. The obvious difference between the Ethernet and wireless local area networks (WLAN) is that there is no data cabling such as Ethernet, coaxial, or fiber-optic connects. Instead, the data travels from point A to point B without any physical means of cabling. The concepts for both the physical medium and WLAN are the same except within the wireless local area networks are called cells. There are a few components that need to be identified first before setting up a WLAN. These components are shown below. As illustrated, it also represents the basic service set or single cell WLAN.

The WLAN also has network configurations similar to the wire land area network. Shown below are the illustrations for each of the wireless land area networks:
The infrastructure mode as shown above consists of an extended service set (ESS) that is connected to a wired LAN. This infrastructure mode must have at least one access point (AP). The wireless client uses the AP to access the necessary resources through the traditional wired local area network.

The independent basic service set (IBSS) does not use an AP as shown above. But instead, the clients are in a peer-to-peer mode or commonly known as the Ad hoc mode. In the Ad hoc mode, the first wireless client in the IBSS takes control and responsibilities of the wireless AP.

Just like the wired local area network has protocols for connectivity, the wireless also has set of protocol standards. This standard is known as the 802.11 protocol for accessing connectivity between wireless clients or stations and wired network devices or infrastructures. The deployment of the Institute of Electrical and Electronic Engineers (IEEE) 802.11 allows for mobile users to connect to various wireless environment or hotspots such as lobbies, cafeterias, classrooms, and conference rooms and still connect to a wired network infrastructure. The 802.11 wireless standard describes the specification for the physical layer and the media access control (MAC) layer within the open system interconnection (OSI) model. The 802.11 and OSI Model is illustrated below.

Let’s now untangle ourselves from the local area networks and examine the Network Operating System (NOS). If you’re thinking that you know about operating systems because you have Windows or Mac OS, you are partially right. Both the Windows and Mac OS are commonly known as the low level software controlled operating system for your computer. Therefore, it provides the basic functions of the computer processing unit (CPU) handling the inputs and outputs control, task execution, and memory allocation for the computer. NOS extends services to programs that run in the upper layer of the operating system that is connected by a network. The network operating systems provides a means of cooperation by facilitating file sharing, data sharing, remote execution, peripheral sharing, and even cooperative computations. Before creating a network infrastructure we would need to see what the network operating system should look like by first designing a tree of the organization, organizational units, and objects that would support a network operating system.

Some of the common networking operating systems are listed below include:

- **UNIX**: Developed by AT&T’s Bell Labs, uses high-level programming language (C), and it provides portability across multiple computer platforms.
- **LINUX**: Evolved from a kernel developed by Linus Torvalds and LINUX is part of the UNIX family of operating systems.
- **Novell NetWare**: Developed by Novell and founded in 1983, it provides powerful text-based menus on the command line for configuration on the server. Resources, such as print sharing and file sharing through graphical window system, is granted by administrator rights. Novell uses a NetWare Directory Services (NDS). The NetWare Directory Services utilizes a directory tree based design. An example of this is shown below:
Microsoft Windows NT and Windows Server: Very similar to NetWare, it provides network control for workstations which provides the resource sharing of files and peripherals and is compatible with other Microsoft applications. Microsoft has replaced the Novell’s NetWare operating system. With Windows 2000 used the Active Directory that is similar to the Novell’s Netware Directory Services (NDV) as illustrated below:

Network support software tools also reside with the NOS. These include such applications as utilities and Internet software that work in conjunction with the network operating systems. Most of you are already familiar with the network support tools, which include:

- Antivirus: This is a class of software programs that help prevent, detect, and remediate malware infections on personal computers or mobile devices.
- Anti-spam: Software program that detects e-mail messages that are unsolicited advertisements.
- Anti-spyware: Software program that detects and removes unwanted spyware programs. Spyware is that undetectable malware that is installed on your computer without your knowledge.
- Backup applications: An application that conducts backups and restores files, folders, databases, and entire networks. Such backups are referred to as disaster recovery tools.

The most important software tool should be your antivirus software. The software can be a standalone product in which it notifies the user and cleans the virus off the computer. However, most antivirus software has packages that include the anti-spam and anti-spyware as a suite. Better yet, most vendors now have a software suite that includes all the anti-applications. Internet tools or utilities provide applications to monitor bandwidth, cookie management, website control access, and computer utilities that allow the user to
defragment the computer’s hard drive, tweak certain software to better improve computer performance. Some Internet software will have backup software so the user can backup critical files on physical storage devices or even store the backups in the cloud. The cost of these Internet or utility suites are cheap compared to the labor cost and parts to fix your computer from viruses that penetrated the operating system because you failed to employ an antivirus application to protect your computer.

Hardware backup systems are used in the event of power failure. These devices are known as uninterruptible power supply (UPS) that contain a battery to keep your system running for a specific period of time depending on the size of the battery and charge. Upon power failure, the uninterruptible power supply battery takes over giving the user enough time to complete any tasking before complete shutdown. Some organizations have other power backup systems, such as generators, which automatically cut-over to provide power or are manually turned on to provide the needed power for the networked systems.

Reference


Suggested Reading

The links below will direct you to both a PowerPoint and PDF view of the Chapter 8 Presentations. This will summarize and reinforce the information from these chapters in your textbook.

Click [here](#) to access the Chapter 8 PowerPoint Presentation. (Click [here](#) to access a PDF version of the presentation.)

Learning Activities (Non-Graded)

Look in The Library

Learn more about this unit’s topics by researching in databases of the CSU Online Library. The following are examples of what you will find in the ABI/INFORM database:


The following are examples of what you will find in the Academic OneFile database:


In addition to articles, the CSU Online Library offers other types of supplemental materials that will provide more information concerning this unit’s topics. For example, try searching “pluralistic approach for the next generation of internet” in the CSU Online Library’s ebrary, in the Computers & IT section.

The Internet can provide you with a wealth of information concerning the topics in this unit. For example, the following YouTube video provides additional information about wavelength division multiplexer:

Check Your Knowledge

Answer the questions in Chapter 8 Review Questions on page 239. These questions will help you assess whether or not you have mastered the unit content. Can you answer them without looking in the textbook?

After you have answered the questions, you can find out how well you did by clicking here to check your answers.

Word Search

Some of the unit key terms and phrases (written as one word) have been hidden in a Word Search puzzle. Click here to access the Word Search puzzle and see if you can find them.

If you have any trouble finding the terms, you can click here to check the Word Search Solution to see where they can be found.

Non-graded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.