6.0 TMA

7.0 Reference & Further Reading

1.0 Introduction

Specialized software, called Network Operating Systems (NOS), is needed to control LANs. However there are Personal Computers (PC) without Network operating systems this is discussed in section 3.2 while those with NOS is discussed in section 3.1.

A Network Operating System (NOS) transfers files between computers, and between computers and print servers. Often when a user is using a program, such as a word processor, and requests a file, the user is not aware that the file was not residing on his or her machine's hard drive.

A Network Operating System (NOS) transfers files between computers, and between computers and print servers.

The NOS monitors who logs in and that the user employs the correct password. The latest NOS versions have elaborate methods of hacker/intruder detection, monitoring, and disabling the hacker.

2.0 Objectives

At the end of this unit, you should be able to:

Define a Network Operating System (NOS)
Compare a Computer with a NOS to a Computer without a NOS and a Network Interface Card (NIC) Discuss
Peer-to-peer and Client/Server LAN
Explain what a NOS does and
Discuss Network monitoring

3.0 Main Content

3.1 PC with Network Operating systems

When a NOS is added to a computer, a major addition is the Redirector as shown in fig 6.1.When the Redirector receives a command from the application program, the Redirector determines if the command is intended for the computer Operating System (OS) and BIOS, or for the network. If the command is a network command, it will be directed to the LAN software and hardware.

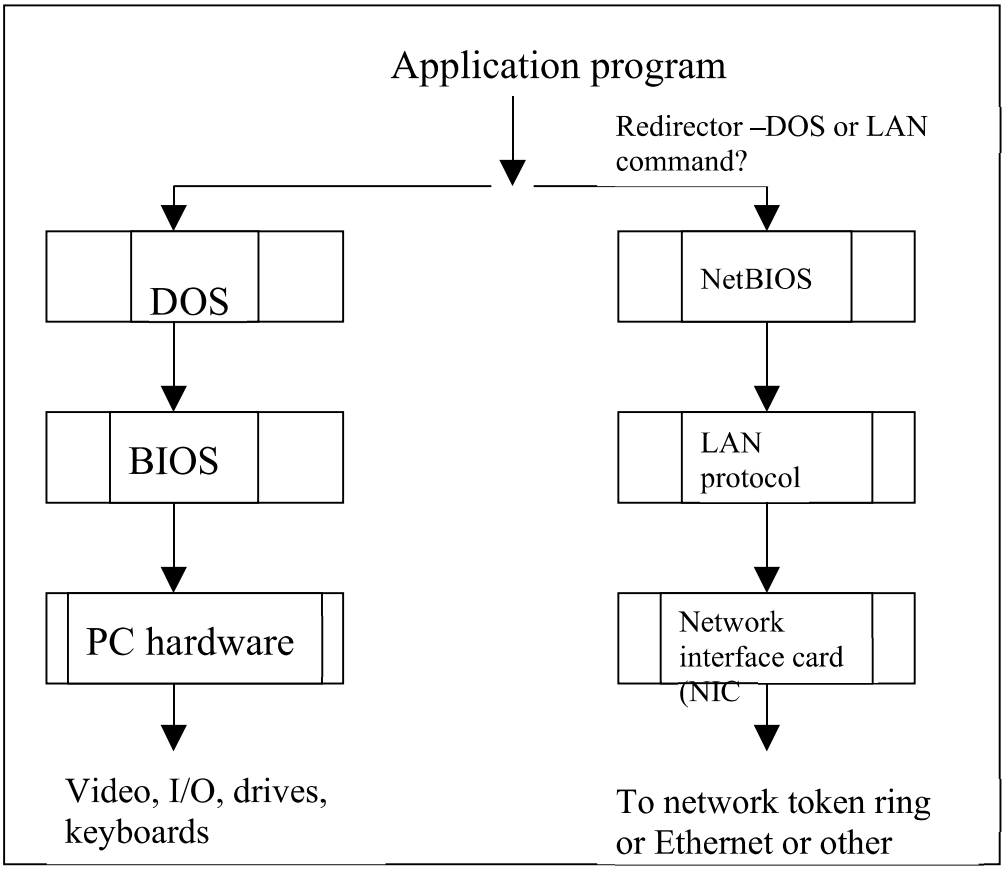
A network command will go first to the NetBIOS (Network Basic Input Output System) software, then to the LAN protocol software. The LAN protocol software is unique to the type of LAN. Token Ring software will be different from 10Base5 software, and so forth. The LAN protocol software converts the NetBIOS command to a command that the network Interface card (NIC) can understand. The NIC is a card that plugs into the computer and is the hardware that connects the computer to the LAN. Generally each type of LAN (10Base5 or Token Ring) requires a different type of NIC, but some NICs can support both 10Base2 and 10 BaseT. Newer NICs translate between 10BaseT and 100BaseT.

Fig 6.1 PC software and LAN software

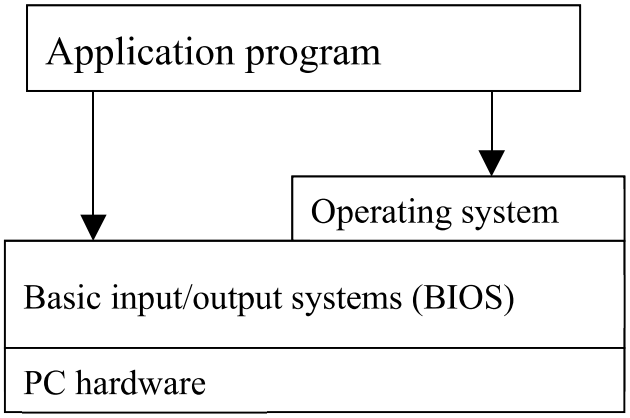
3.2 PC without Network Operating systems

Figure 6.2 shows the organization of an operating System (OS) based IBM PC without a NOS. The OS can be DOS or Windows. A command in an application program will call either an OS command, an input device (keyboard) or an output device (printer), or an input/output device (disk drive). If an input, or output, or input/output device is called, the command will be routed to the Basic Input Output System (BIOS) and then to the PC hardware.

The BIOS is software written or 'burned' into a read only Memory (ROM) that converts program commands to commands the PC



hardware can understand. A ROM stores data even if the power is turned off.



NT Windows 95, etc
Software control of video, I/O, keyboard, drives

Fig 6.2 PC software without LAN software

3.3 Peer-to-Peer versus Client/Server

Peer-to peer means there is no dedicated server, yet all workstations within the work group can communicate with each other via the network. No workstation is a server, and all workstations are considered equals or peers. All workstations share resources. A server is a computer dedicated to sending files (serving) to workstations requesting those files; the server allows other computers on the network to use its resources. A client is the computer requesting files from the server.

3.4 NOS Functions

A Network Operating System (NOS) transfers files between computers, and between computers and print servers. Often when a user is using a program, such as a word processor, and requests a file, the user is not aware that the file was not residing on his or her machine's hard drive. When a user commands his or her word processor to print a file, the user also is unaware of the file transfer to a print server. The file transfers are 'transparent' to the user.

3.4.1 Network Monitoring

The NOS monitors who logs in and that the user employs the correct password. The latest NOS versions have elaborate methods of

hacker/intruder detection, monitoring, and disabling (shutting out) the hacker.

NOSs will monitor and log the users for their time on the net. It is possible to monitor a user's e-mail, and the U.S courts have ruled that an employee provides the equipment and connection to the Internet, the company has the right to monitor what is being sent over the net.

NOSs monitor traffic and are useful to find traffic bottleneck and equipment failures.

4.0 Conclusion

We can now easily differentiate between PC with NOS and PC without NOS. We also saw the difference between Peer-to-Peer and Client/Server networks. Finally we looked at NOS Functions of which the key is monitoring network users and the network traffic.

5.0 Summary

The redirector is the key piece of software in a computer with a NOS. The redirector examines a command to see if it is part of the normal Operating System or a network command. If the command is an Operating System command, the computer operates as usual. If the command is a network command, the command will go to the NOS. The NOS will perform the proper network function.

A NOS does file serving, print serving and network monitoring. Network monitoring, keeps track of traffic levels, types of traffic, sources and destinations, what users are logged in, what users will be allowed to log in, and hackers and intruders.

6.0 Tutor-Marked Assignment

1. What is a Network Operating System (NOS)?
2. Compare a computer without a NOS to One with a NOS

7.0 Reference & Further Reading

Milan Milenkovic, Operating Systems and Design, Second Edition. Tata McGraw - Hill