

Chapter Five

Network

5-1 What is Network

Microcomputers are often linked together to form a network. This linkage allows many users to access the same data. A network is a system that allows two or more computers to communicate and share resources with each other.

Networks can sometimes be called centralized systems as all data flows to and from these computers. The storage system on a network is generally quite large and designed to store software programs and data files. Not all networks or centralized systems have PCs connected to them; some have a combination of PCs, Macintosh machines, dumb terminals (monitor that displays information only), smart terminals (monitor that displays information with formatting capabilities and has limited processing capabilities), Unix systems, or Linux systems. You can also have portable devices such as a tablet, PDA or cellular phone connected to a network for easy access to information or e-mail when you are away from the office. Mainframe computers generally store customized software applications and large amounts of data needed by people using the computers connected to them. In order for people spread across different locations to have access to this data, networks need to be set up. In the past, people who needed the information would generally have a computer with access to and from the network connecting to the mainframe computer; no actual information would be stored on the computer at their site. A trend away from this is called client/server technology. A client/server network has PCs connected that can function on their own as well as connect to the server to access information. In this arena, the server stores the data and the PC houses the application software.

5-2 Types of Network

A network can be small or large, depending on the company or user requirements.

LAN A network connecting a small to medium number of computers together in a confined area is called a Local Area Network.

WAN A network connecting computers over long distances (i.e., between branches or offices in different provinces or states) is called a Wide Area Network.

MAN A network connecting computers in a metropolitan area is called a Metropolitan Area Network.

CAN A network connecting computers in a limited area such as a campus or military base is called a Campus Area Network.

HAN A network connecting computers in a home environment is called a Home Area Network.

Each computer requires a network interface card (NIC) and the appropriate cables to connect it to a dedicated computer called the network server. The cost of setting up a network varies, depending on the number of users and their requirements.

5-3 Connecting to a Network

There are standard network devices that facilitate putting a network together. Even the cabling comes in standard lengths complete with appropriate connectors. So putting a network together is almost like connecting a number of “boxes” together. Which options, devices, or software you use depends on the needs and requirements for the network.

When your computer has been set up to recognize the network (server), you can then log into the network. This generally requires a valid user ID (set up by the network administrator) and a password (originally provided by the network administrator and then administered by the user). This process is the same, regardless of whether the computer system is PC, Macintosh or Unix. Depending on your requirements, the computer will then run a script (mini-program) that tells the network what access rights you have on the computer.

These could include which drives/volumes, printers, modems, folders, etc., you can access. The number of files, programs, or drives available to you will depend on your login ID and what rights or privileges have been assigned to you by the network administrator, as directed by your manager and/or company policies.

When connected, every time you need to use a program or access a file that is stored on the network, you are sending a request to the network for that item. The speed at which you can access items will depend on the speed of your network connection, the server microprocessor speed, the microprocessor speed on your system, and the number of other requests being made on the network.

5-4 The Network Interface card (NIC)

To connect to a network, the PC must have a network interface card (NIC). Each NIC has a unique number or address and will have a connector (visible at the rear of the computer) that is appropriate for the type of cabling chosen. Network cards come in a variety of styles and models that are appropriate for the computer type being connected to the network



In order to be connected to a network, you need to have a network interface card (NIC) installed on your system and have it set up correctly to recognize the network. Regardless of whether you connect to a network with a cable or a wireless connection, you

still need to have a network card installed on the computer. If you plan to connect to a network using wireless technology, you will need a router that will be set up to connect to the network in addition to the NIC. Once the network card is installed, the computer must then be set up to recognize the network. In most cases this can be accomplished by adding a new connection within Windows; however, if you are using specialized network software such as Novell or Banyan Vines, you will need to have the client version of that network software installed on your system before the network will recognize the computer and allow you access to the files or programs on that network server.

5-5 Cabling Options

There is a variety of connection or cabling options available to access information to or from a network. Newer connection types allow the data to be transferred between a computer and the network to flow much faster; with the costs of these connection types dropping significantly, more people are choosing to either set up or switch to a faster connection method. Some of the more popular connection options include:

Coaxial

This is a wire with a center wire surrounded with insulation and then a grounded cover of braided wire to minimize electrical and radio frequency interference. This cable type used to be the main type of cable used for company networks or television transmission, with most company networks using Ethernet specifications in their network configuration.

Fiber Optics

A fiber optic cable is made up of bundled glass or plastic fibers (threads) to transmit data. This option is generally faster than coaxial cable as it has a much larger bandwidth for transmitting data and is much less susceptible to interference that occurs with metal cables.

Broadband

This type of data transmission is a single wire that can handle multiple paths or channels. These paths or channels are essentially from one connection to another. For example, the connection at the back of your computer is one end of a path and the network is the other end of that path; each computer in the company has its own channel to the network. Having a broadband connection allows a faster transmission of data as the network can then handle multiple channels at one time.

Wireless

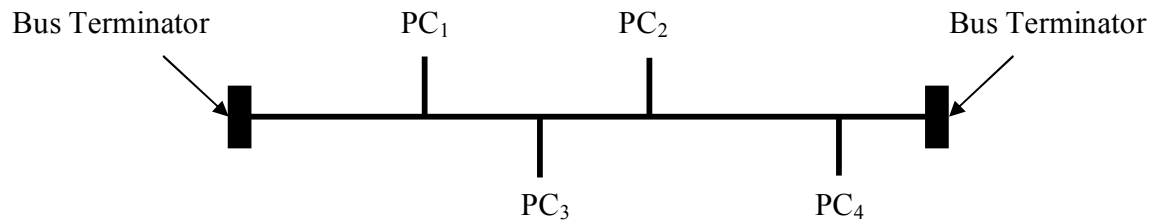
This is quickly becoming the connection option of choice as it does not require any cables to be set in your home or office. There currently are three types of connections available for a specific use: cell phone, home, and office. In order to be connected in a wireless environment, each computer must have a network card with a wireless interface and an access point. Wireless devices work with radio frequencies for data transmission.

Infrared

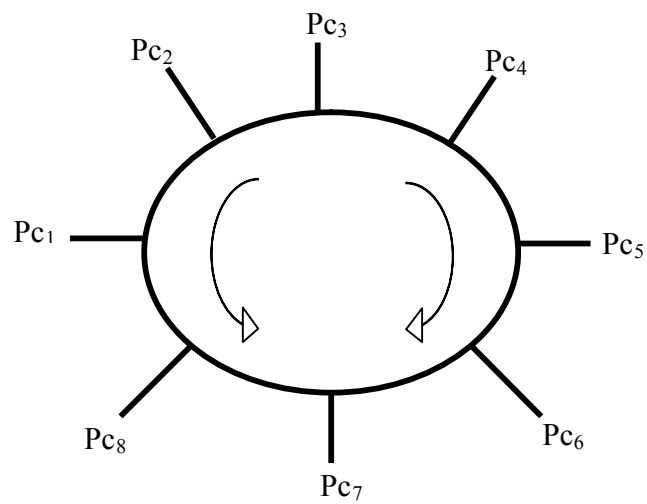
This wireless option works with infrared light waves in order to transmit data. Some newer devices such as printers have an infrared device installed which then allows you to print a document to that printer provided you have an infrared wireless network card installed on your notebook. The one downside to using infrared is that the amount of distance between the two devices is less than using a wireless device that works with radio frequencies.

5-6 Types of Computers Connecting

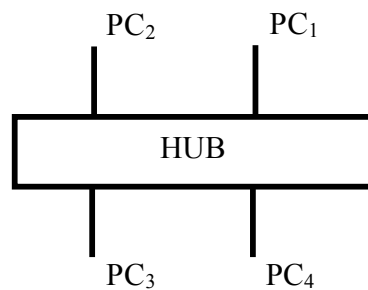
1- Linear Connecting



2- Circular Connecting



3- Star Connecting



5-7 Benefits of Networking connecting

There are many benefits to being on a network, with the main one being the ability to share information, for example, the company's policies are maintained in the Personnel department. If these policy documents were available for viewing on a computer, you could access them from a network without having to leave your workstation. Another example could be the ability to print documents on the printer two floors away. Some features and benefits of having a network include:

- 1- Larger storage capacity for company data that can be increased significantly more so than on a standard desktop
- 2- Lower costs to upgrade the network only for larger storage, more memory, faster connections, etc. versus buying new faster computers for every employee
- 3- Share resources such as data files, software programs, printers, internet connection
- 4- Organize data in a more effective manner for access by any user on the network versus copying files from individual workstations
- 5- Maintain updates on programs from one location rather than each computer workstation
- 6- Administer and manage secure access to data and programs on the network through the network software
- 7- Set up new users with the same computer configuration as existing workstations
- 8- Ability to back up (or restore) the company data on the network (central area) for security and disaster purposes
- 9- Set up different and roaming profiles for users who share workstations (e.g., log into the network from any workstation)
- 10- Secure remote access by users away on sales trips, or working at home, etc.