University of Al-Mustaqbal
Department of Medical Instrumentation Techniques Engineering
Class: Second
Subject: Computer Applications
Lecturer: MSc. Diyaaldeen Faaiz
Lecture:01

Computer Networks

1.0 Objectives

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1.2 Client Server Model

1.3 Types of Networks

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Introduction

A single technology has dominated each of the past three centuries. People were doing lot of paper work in organizations because, lack of advance systems which will help them in their day-to-day work. The 18th century was the time of the great mechanical systems accompanying the Industrial Revolution. Computer industry has made spectacular progress in short time. During the first two decades of their existence. Computer systems were highly centralized, usually within the single large room. A medium-sized company or university might have had one or two computers, white large institutions had at most a few dozen. The idea that within 20 years equally powerful computers smaller than postage stamps would be mass-produced

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by the millions was pure science fiction. We can see the development of Computer Generations below at fig.1.
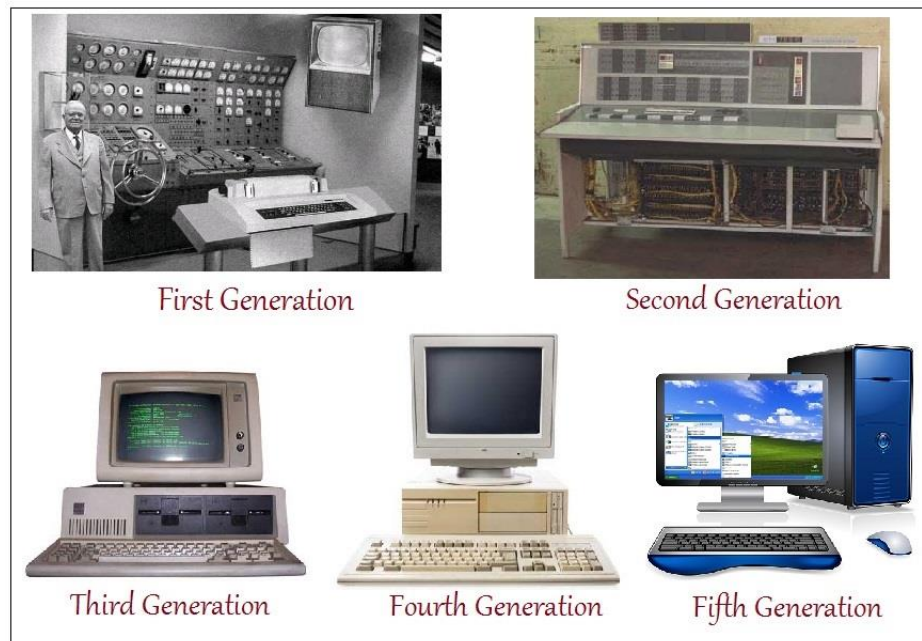

Fig.1 The computer Generations

The merging of computers and communications has had a profound influence on the way computer systems are organized. The old model of single computer serving all of the organization computational need has been replaced by one which the-large number of separate but interconnected computers with each other. These systems are called has computer networks.

A network is a group of two of more computer systems sharing services and interacting in some manner. This interaction is, accomplished through a shared communication link, with the shared components being data. Put simply a network

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is a collection of machines have been linked both physically and through software components to facilitate communication and the sharing of information. A physical pathway known as transmission medium, connects the systems and a set of rules determines how they communicate. These rules are known as protocols. A network protocol is software installed on a machine that determines the agreed –upon set of rules for two or more machine to communicate with each other. One common metaphor used to describe different protocols is to compare them to human languages.

Think of a group of people in the same room who know nothing about each other. In order for them to communicate, this group must determine what language to speak, how to handle identifying each other, whether to make general announcements or have private conversations and so on.

Machines using different protocols installed can't communicate with each other. Networks are widely used by companies or on personal level also. Network for companies should provide high reliability, cost efficiency, and recourse sharing.

1.2 CLIENT SERVER MODEL

Normally network should provide high reliability; emergency backup… etc. For satisfying this purpose big mainframe computers are required. But this will be not cost efficient. On other side small computers have a much better price/performance ratio than the large Ones. Mainframes (room-Size) computers are roughly a factor of ten faster than personal computers, but they cost thousand times more. This

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imbalance has cost many system designers to build systems consisting of personal computers, one per user with data kept on one or more shared file server machines.

In this model, the users are called clients, and the whole arrangement is called as Client-Server model, as shown below in Fig.2.
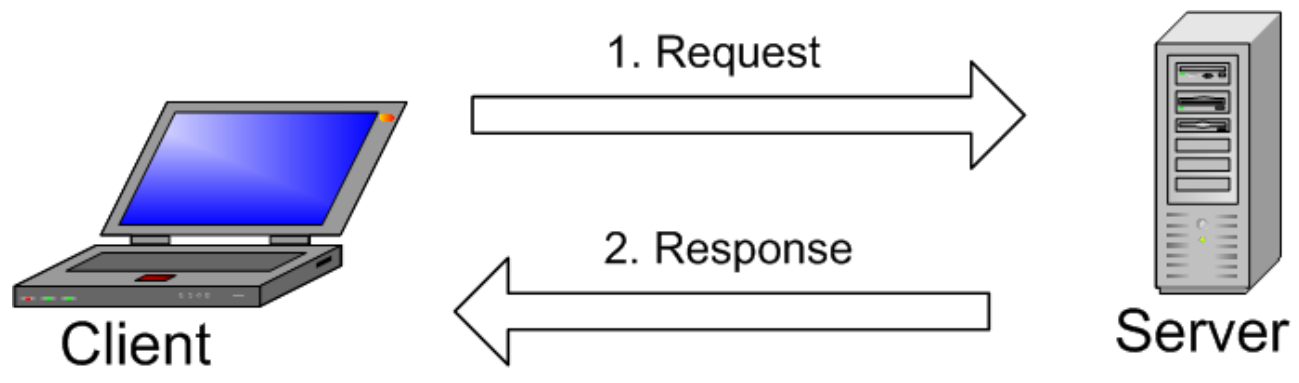

Fig.2 Client-Server model

In the client-server model communication generally takes the form of a request Message from the client to server asking for some work to be done. The server then does the work and sends back the reply. Usually, there are many clients using a small number of servers.

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1.3 TYPES OF NETWORKS

The network can be divided into geographical areas and fall into three major categories

• Local Area Network (LANs)

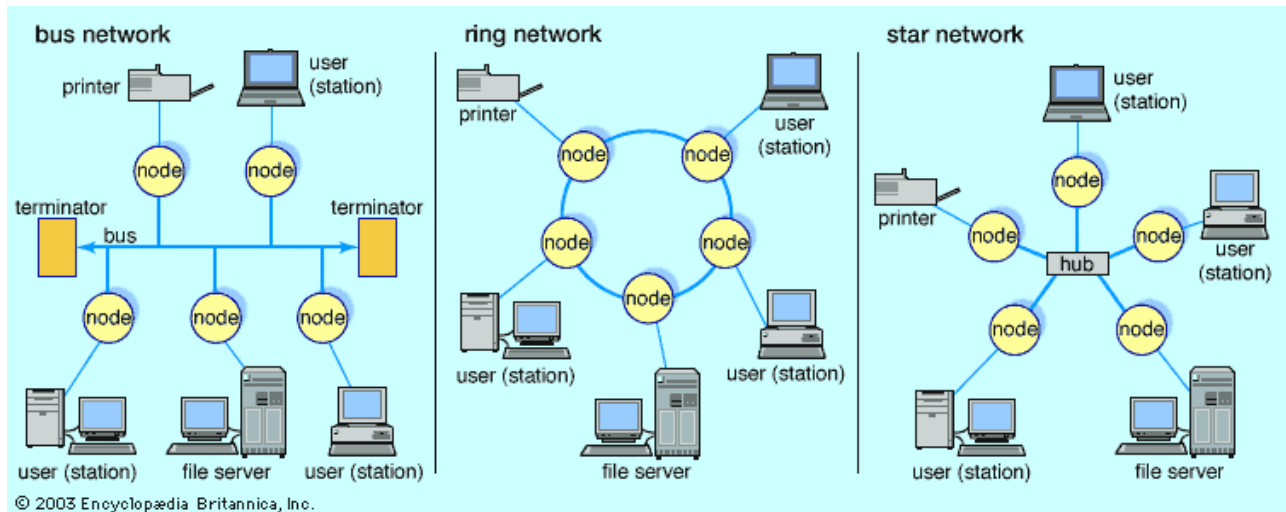• Metropolitan Area Network (MANs)

• Wide Area Network (WANs)

1.3.1 Local Area Network

A LAN is generally confined to a specific location, such as floor, building or some other small area. By being confined it is possible in most cases to use only one transmission medium (cabling). The technology is less expensive to implement than WAN because you are keeping all of your expenses to a small area, and generally you can obtain higher speed. They, are widely used to connect personal computers and workstations in company offices and factories to share recourses.

LANs often use a transmission all the machines are attached with each other. Traditional LANs runs at speed of 10 to 100 mbps have low delay and make very few errors. Never LANs may operate at higher speed up to 100 megabytes/sec.

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Local Area Networks (LAN)

1.3.2 Metropolitan Area Network (MAN)

Metropolitan Area Network is basically a bigger version of LAN and normally uses same technology. It might cover a group of nearby corporate offices or a city and might be either private or public. On other hand, MAN is a network running throughout a metropolitan area such as a backbone for a phone service carrier.

Metropolitan Area Network (MAN)

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1.3.3 Wide Area Network (WAN)

A wide area network spans a large geographical area, often a country or continent. It multiplies multiple connected LANs; that can be separated by any geographical distance. A LAN at the corporate headquarters in Indianapolis can be connected to a LAN at field office in Chicago and to another field office LAN in St. Louis to form a single Wide Area Network.

In most WANs the network contains numerous cables or telephone lines, each one connection a pair of routers. If two routers that do not share a cable nevertheless and wish to communicate, they must do it indirectly. On personal computers, we use modems to communicate indirectly with other computers.

Wide Area Network (WAN)

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1.4 SUMMARY

In this lecture we have studied the old model of single computer serving all of the organization's computational need has been replaced by one in which the large number of separate but interconnected computers do the job. These systems are called as computer network. A network is a group of two or more computer systems sharing services and interacting in some manner.

In the end Computer network are mainly divided into Local Area Network, Metropolitan area network, wide area network.