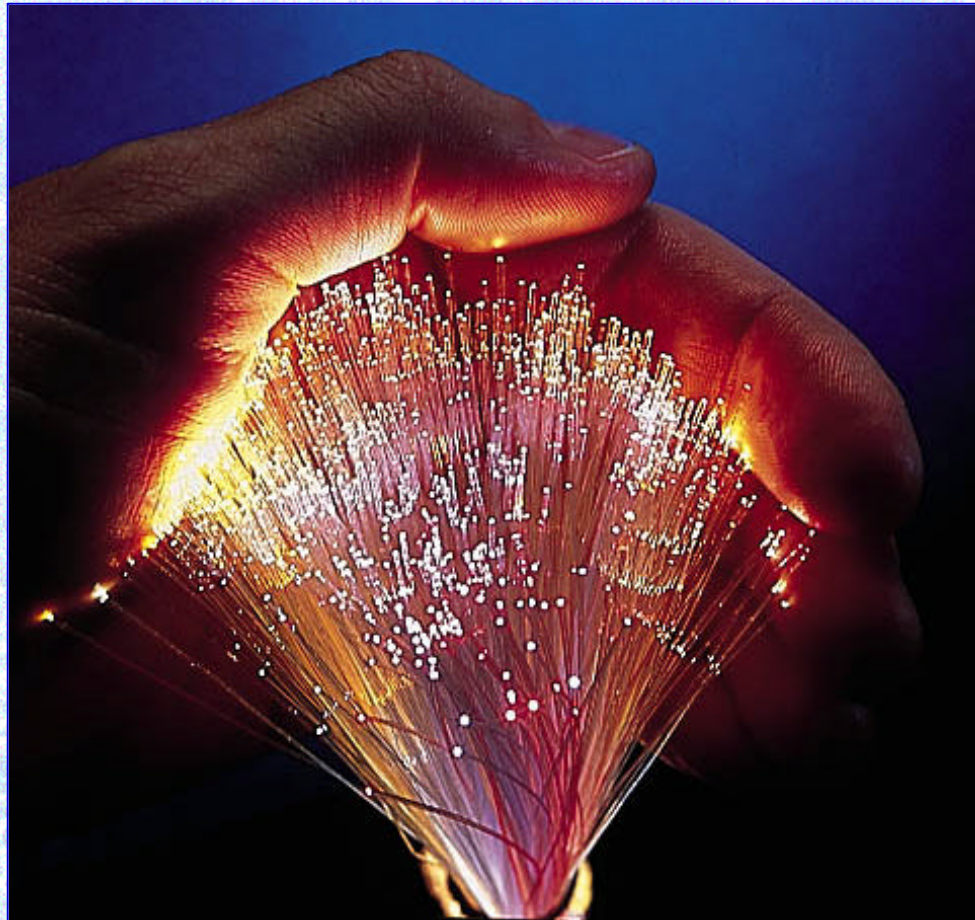




Chapter Nine



Networking and Telecommunication

After reading this chapter, you should be able to:

- Describe the nature and function of local area networks and wide area networks
- Discuss the uses and implications of electronic mail, teleconferencing, and other forms of on-line communication
- Describe several types of communication services that are available with or without an Internet connection

After reading this chapter, you should be able to:

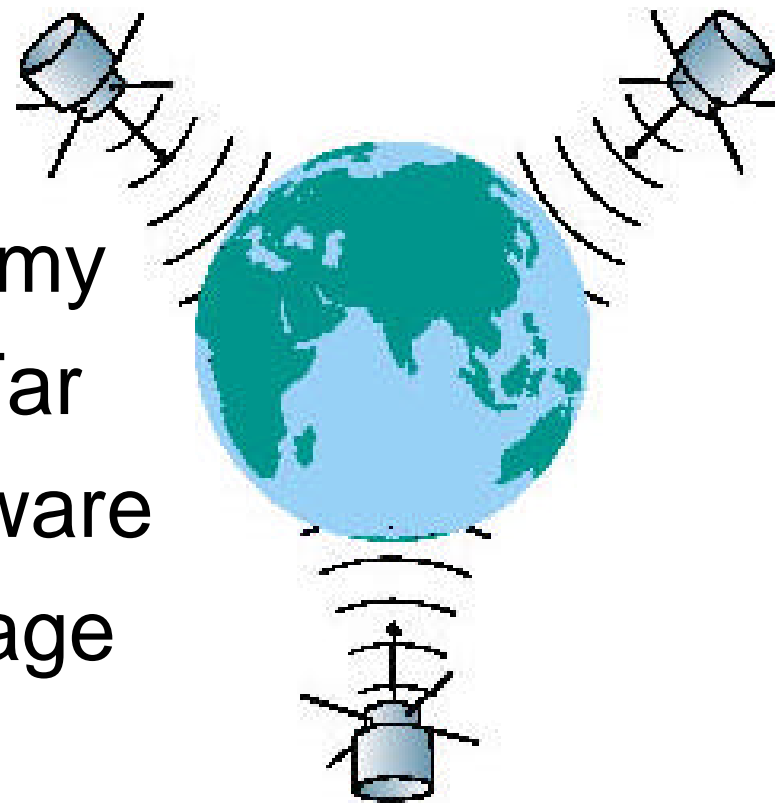
- Describe several types of electronic digital communication that don't necessarily involve personal computers
- Describe current and future trends in telecommunications and networking

Chapter Outline

- Linking Up: Network Basics
- Electronic Mail and Teleconferencing: Interpersonal Computing
- The Other Side of the Modem: An On-line Tour
- Telecommunication Trends: Merging and Emerging Technologies

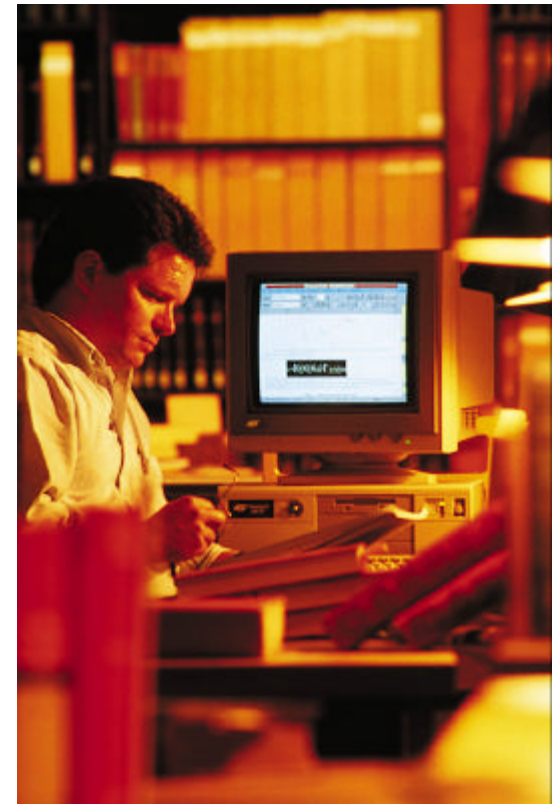
Linking Up: Network Basics

- Basic Network Anatomy
- Networks Near and Far
- Communication Software
- The Network Advantage



Basic Network Anatomy

- A computer network is any computer system that links two or more computers
- There are three essential components in a network:
 - Hardware
 - Software
 - People



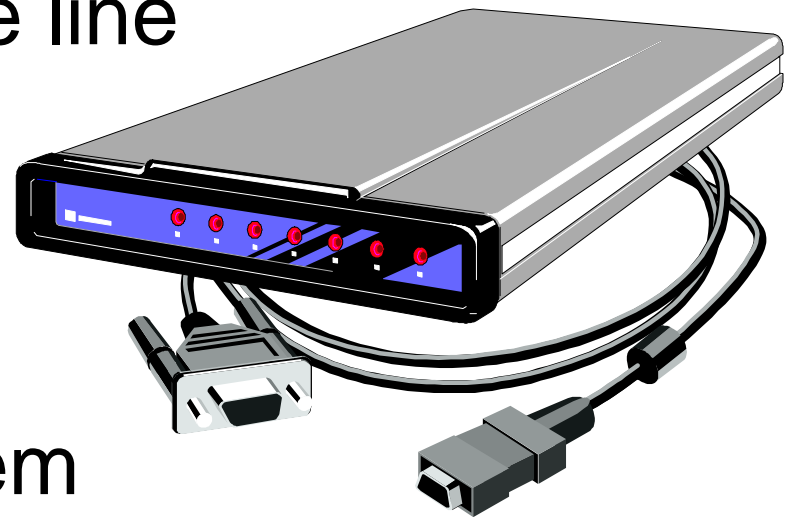
The Network Interface

- A network interface card (NIC):
 - Is needed to connect directly to a network
 - Adds an additional port to the computer
 - Controls the flow of data between the computer's RAM and the network cable
 - Converts the computer's digital signals into the type required for the particular network



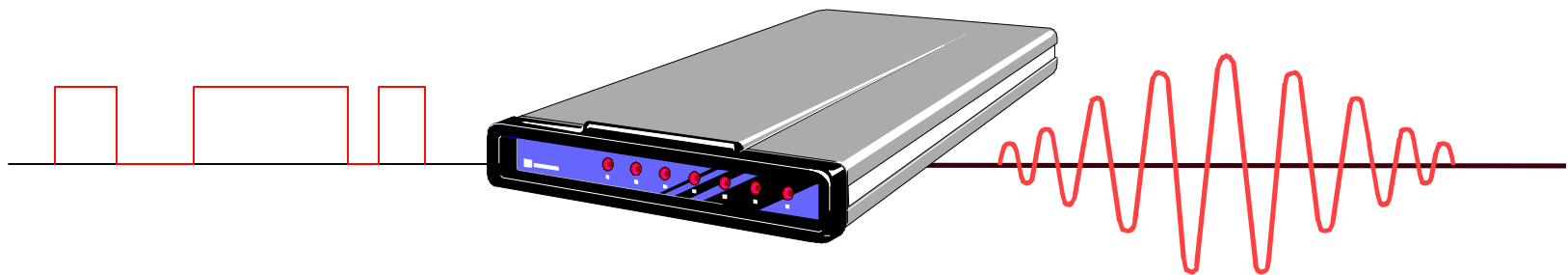
Communication á la Modem

- A modem is needed to connect a computer to a phone line
- The computer communicates with digital signals
- The telephone system was designed to transmit voice signals which are analog



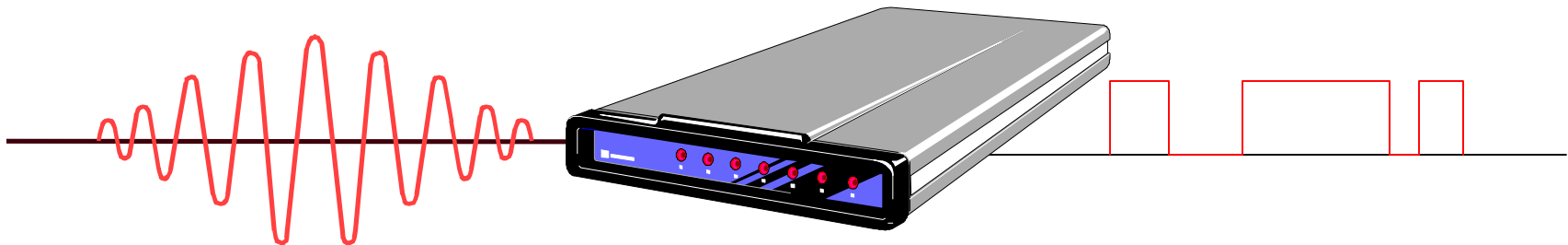
Communication á la Modem

- A modem:
 - Converts the digital stream of information from a computer to an analog stream in order to send a message on the telephone network



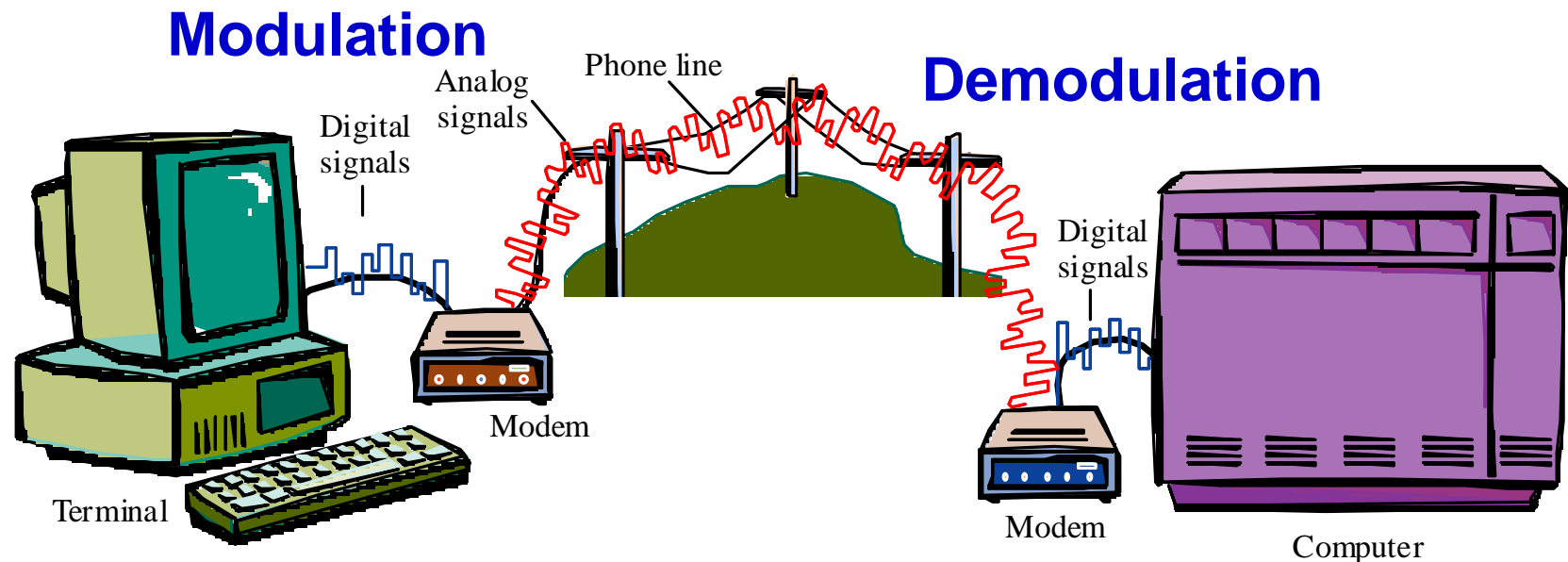
Communication á la Modem

- A modem:
 - Converts the analog stream of information received over the telephone network into the digital form that the computer understands



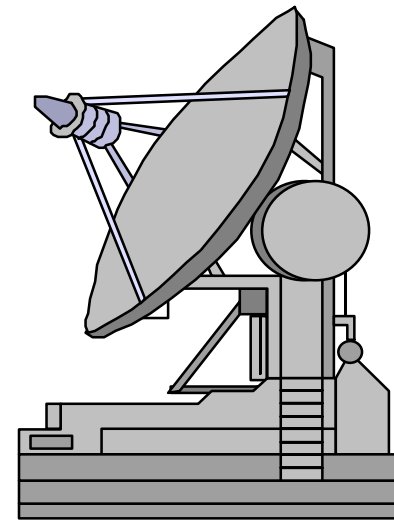
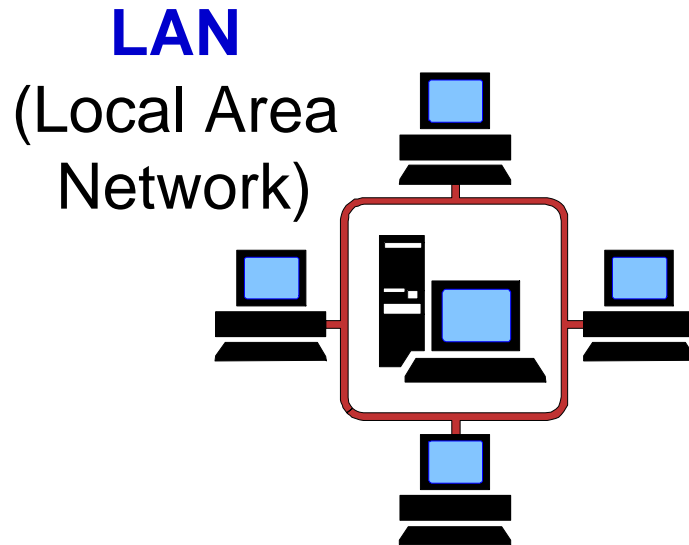
How a Modem Works

The word modem comes from the terms **mod**ulation and **dem**odulation



Networks Near and Far

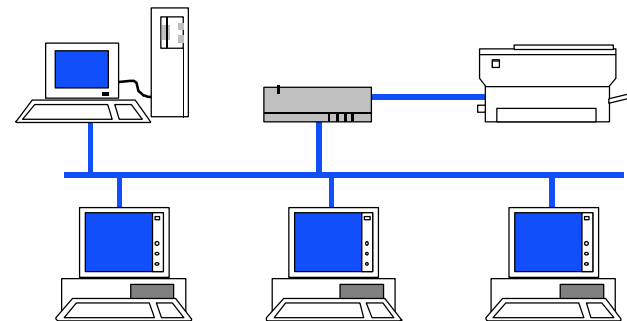
- There are two general types of computer networks:



WAN
(Wide Area Network)

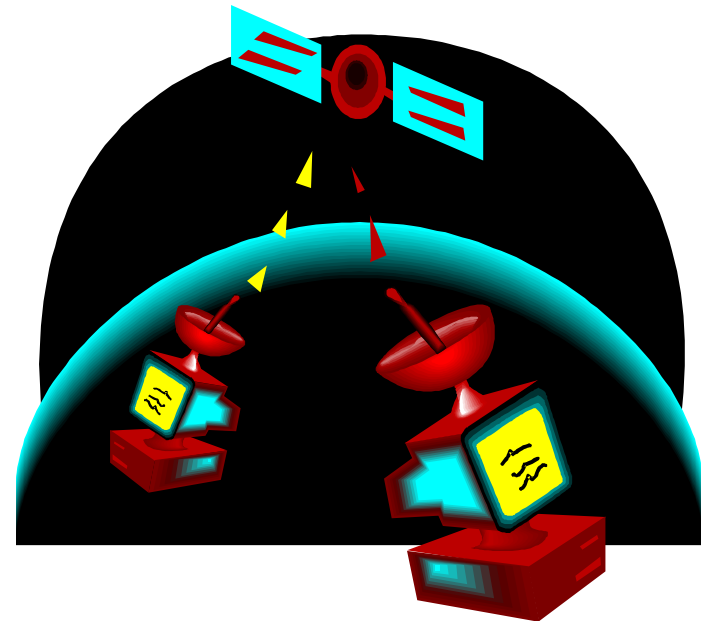
LAN (Local Area Network)

- A LAN is a network in which the computers are physically close to each other
 - LAN networks are usually set up to share peripherals, such as printers and network servers
 - Each computer and shared peripheral is a node on the LAN



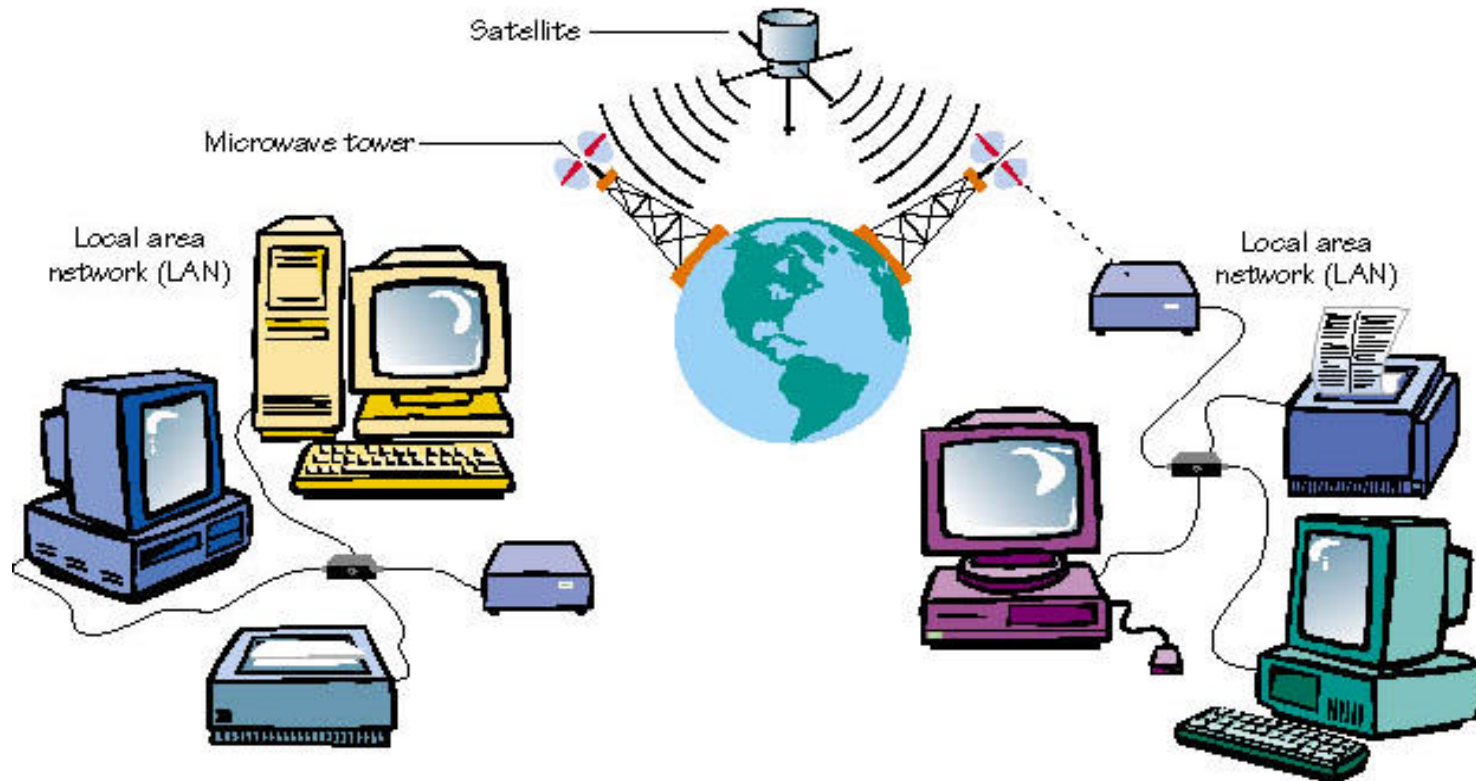
WAN (Wide Area Network)

- A WAN is a network in which the computers are a great distance from one another
 - Connections are made via telephone lines, satellites, and/or microwave relay towers
 - Each network site is a node



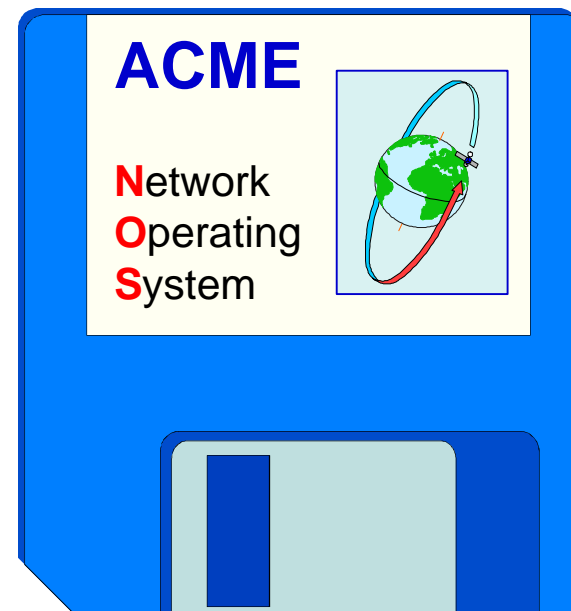
WAN (Wide Area Network)

- WANs are often made up of LANs

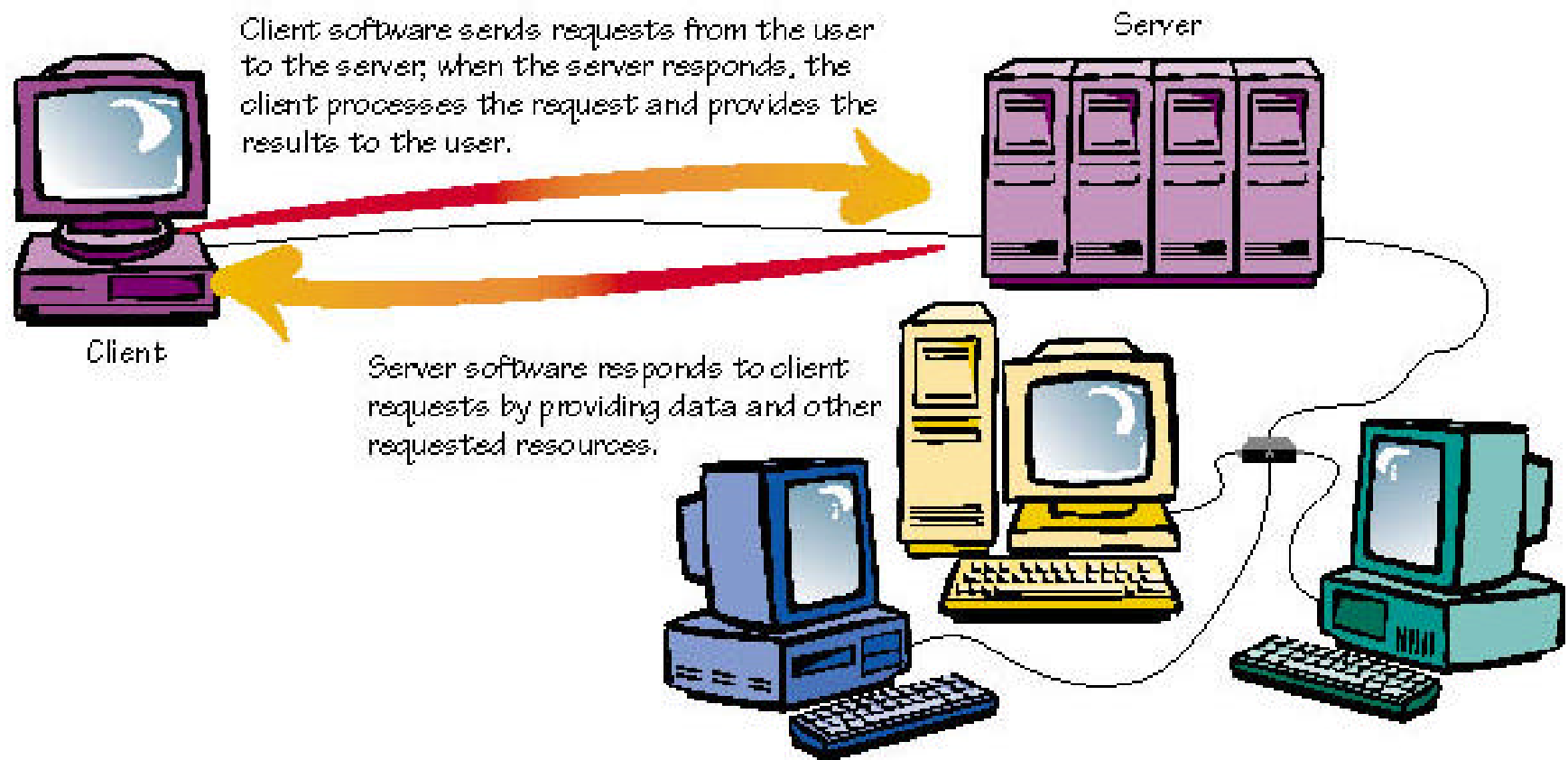


Communication Software

- Communication software includes:
 - Software that allows the hardware to interact with various networks
 - A network operating system (NOS) which controls information shared between the dedicated server and client machines

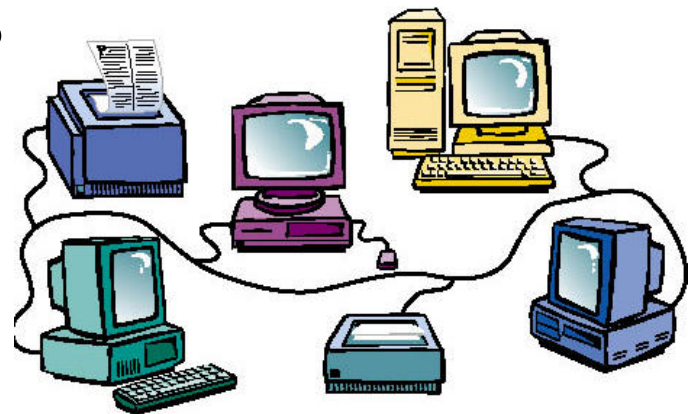


Client/Server Model



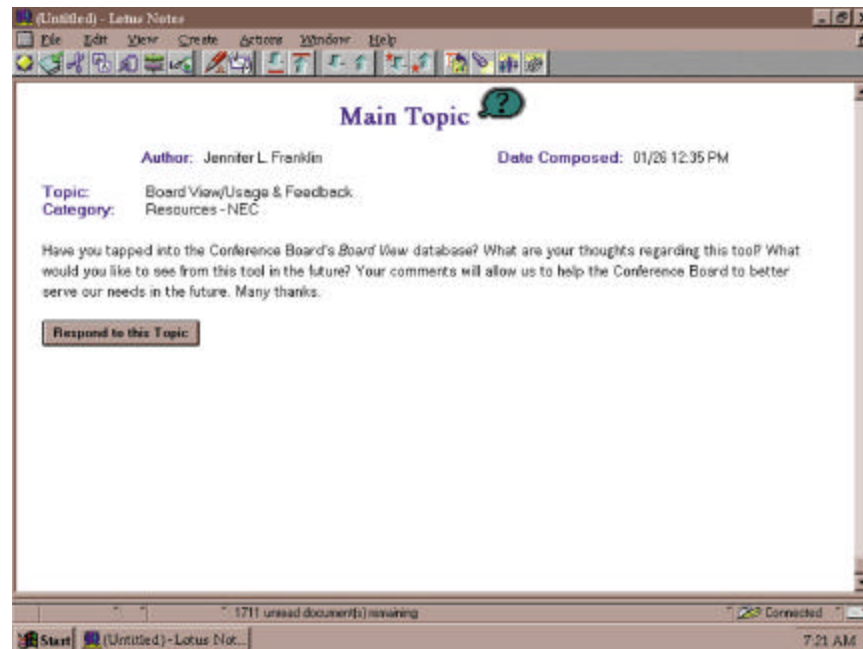
Peer-to-Peer Model

- The peer-to-peer model allow every computer on the network to be both client and server
- Peer-to-peer networking is built into some operating systems
- Many networks use a hybrid of client/server and peer-to-peer



The Network Advantage

- Networks allow people to:
 - Share computer resources (hardware and software)
 - Share data
 - Work together in new ways



Electronic Mail and Teleconferencing: Interpersonal Computing

- **Electronic mail and teleconferencing** allow communication between two or more computer users
- People can communicate in real time or delayed time, this has both advantages and disadvantages



Real-time vs. Delayed Communication

- Real-time communication (synchronous):
 - participants meet in real time
 - participants see each other's typed messages as they are typed
 - examples: Talk and Chat



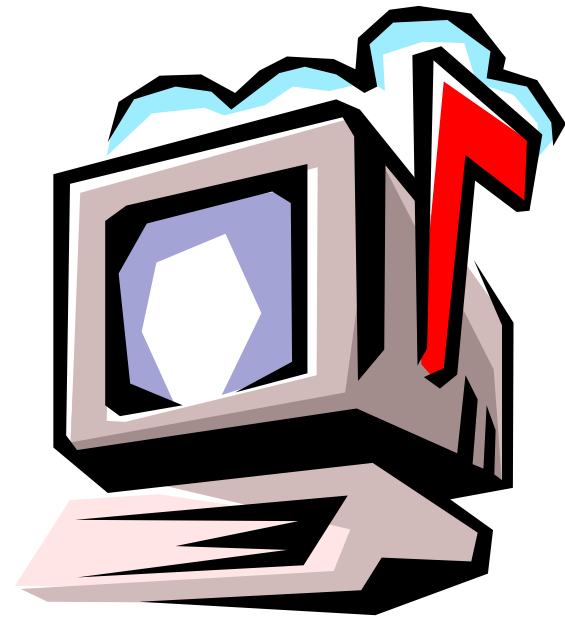
Real-time vs. Delayed Communication

- Delayed communication (asynchronous):
 - Participants type, post, and read messages at their convenience
 - Participants share an electronic mailbox among a group
 - Examples: email and Newsgroups



Advantages of Email and Teleconferencing

- Fast
- Doesn't depend on location or time
- Facilitate group communication
- Messages can be edited and combined with other computer-generated documents



Advantages of Email and Teleconferencing



- Allow decisions to evolve over time
- Make long-distance meetings possible
- Emphasize the message, not the messenger

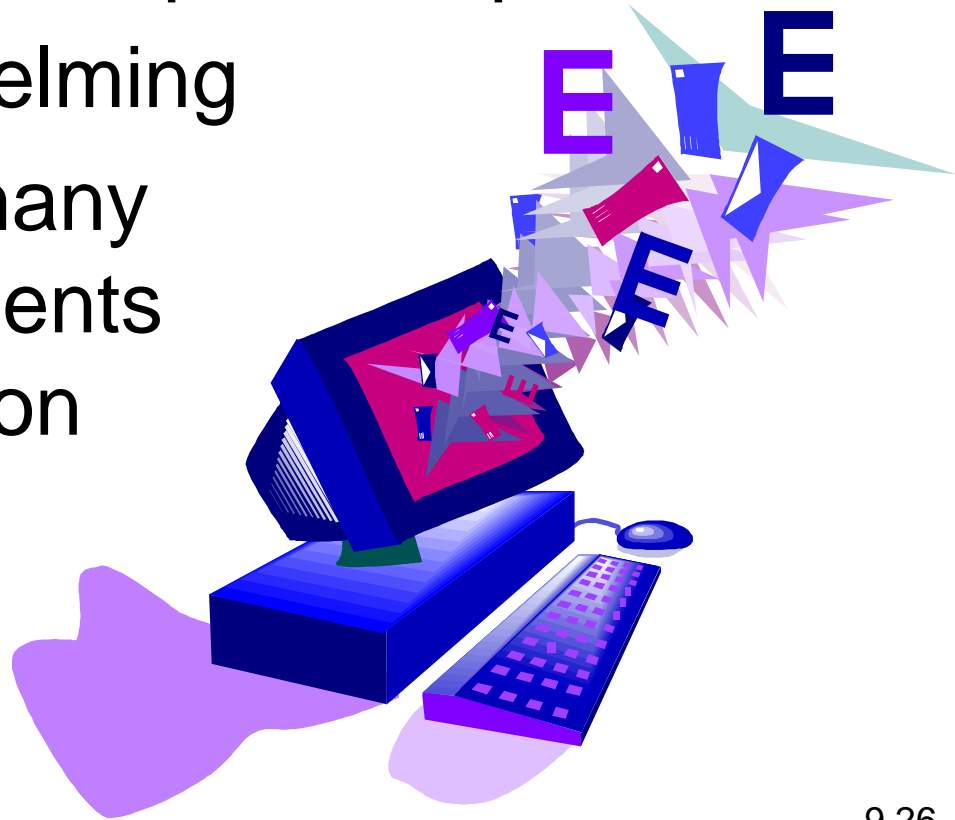
Disadvantages of Email and Teleconferencing

- Vulnerable to machine errors, human errors, and security breaches
- Can pose a threat to privacy
- Can be faked

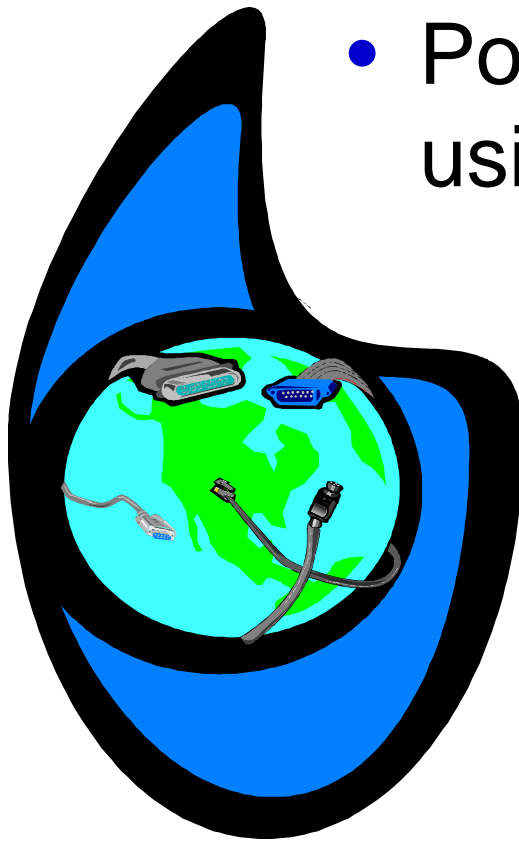


Disadvantages of Email and Teleconferencing

- Work only if the recipient responds
- Can be overwhelming
- Both filter out many human components of communication



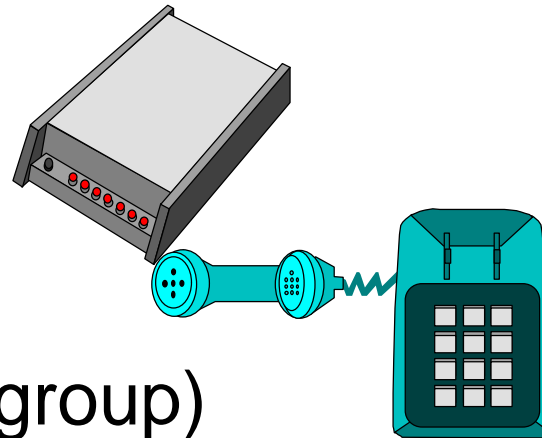
The Other Side of the Modem: An On-line Tour



- Popular services available using a modem include:
 - Bulletin Boards
 - On-line Databases
 - Commercial On-line Services

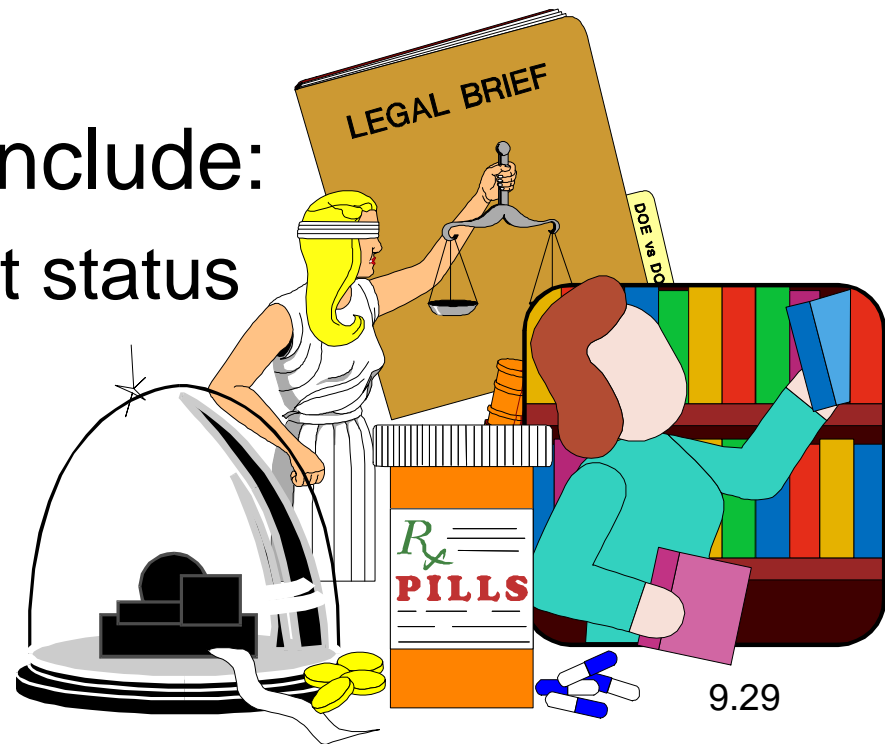
Bulletin Board Systems

- A BBS is an on-line version of a bulletin board where people post messages to others
 - BBSs are divided into groups of people with a common interest (SIG—special interest group)
 - Most BBSs allow members to post messages and download or upload software



On-line Databases

- Electronic databases allow users to connect (usually for a fee) to a variety of on-line databases
- On-line databases include:
 - current stock market status
 - legal briefs
 - library resources
 - medical references



Commercial On-line Services

- Commercial services include general-purpose on-line information services such as America Online, CompuServe, MSN, and Prodigy
- The Internet is forcing on-line services to change the way they do business



Commercial On-line Services

- Members pay a fee for these services:

- News
- Research
- Shopping
- Banking

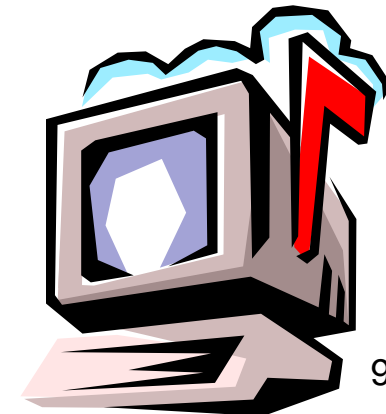
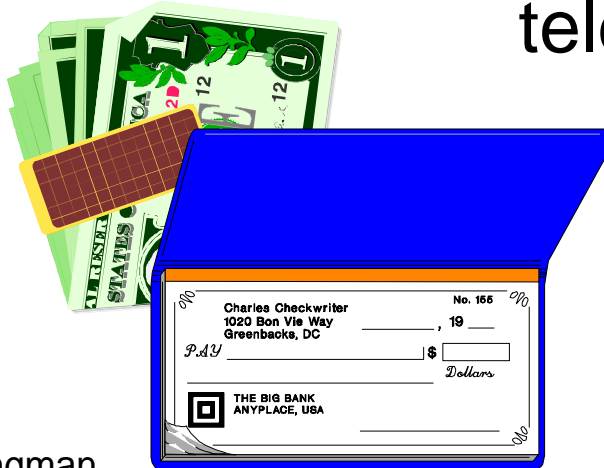
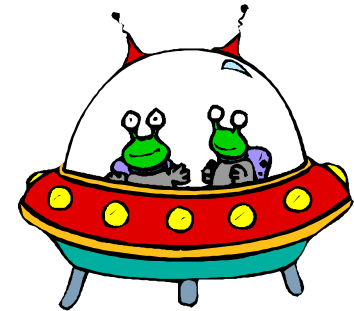


- Games

- email

- BBS

teleconferences



Rules of Thumb: On-line Survival Tips

- If you don't have to be on-line, go offline
- Avoid peak hours
- Let the system simplify and streamline your work
- Store names and addresses in an on-line address book



Rules of Thumb: On-line Survival Tips

- Protect your privacy
- Cross-check on-line information sources
- Be aware of the amount of time you spend on-line
- Avoid information overload



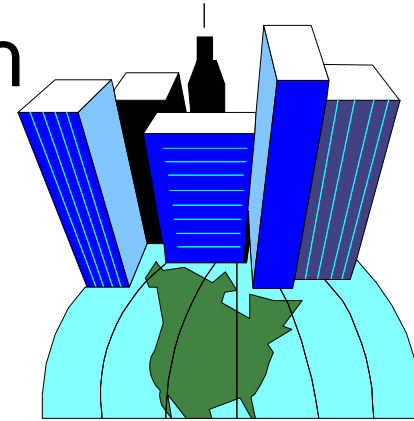
Telecommunication Trends: Merging and Emerging Technologies

- Alternative Technologies:
 - Facsimile transmission
 - Voice mail and computer telephony
 - Video teleconferencing
 - E-money
 - Personal digital assistants



Telecommunication Trends: Merging and Emerging Technologies

- Meeting the demands of tomorrow's network applications through Digital Phone Connections:
 - DDS (digital data service)
 - T1
 - ISDN (integrated services digital network)
 - ADSL (asymmetric digital subscriber)
 - Cable modems



Telecommunication Trends: Merging and Emerging Technologies

- Optical Networks:
 - Fiber optic cables are replacing copper wires
 - Light waves are used to carry information
 - Provide data rates over one billion bits per second
 - Offer extremely low error rates

