

4 Computer Networks

Networks Systems

A **network** consists of a number of computers and peripherals connected together.

Advantages of networks...

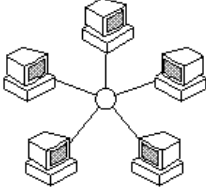
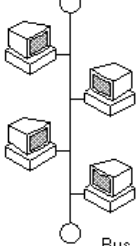
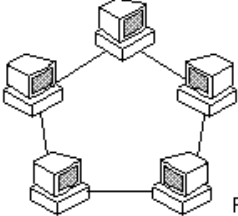
- **hardware can be shared** (eg. a number of computers can use the same printer)
- **software can be shared** (eg a number of workstations can all load up a program from a **file server**)
- **data can be shared** (eg a number of computers can access the same database stored on a file server)
- computers may **communicate** between each other (messages / email)

A **Local Area Network (LAN)** is connected by cable, usually on the same site.

A **Wide Area Network (WAN)** is connected by telephone or satellite links, possibly in different towns, countries...

Network topologies

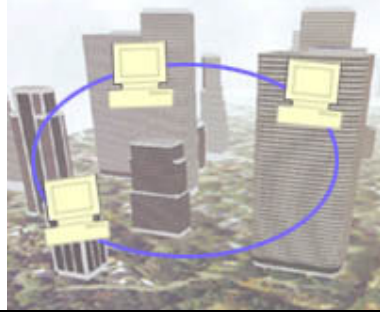
A **topology** is the arrangement of computers in a network (LAN).

<p>Star network</p> <p>All computers are connected to a central hub. Bottlenecks may occur because all data must pass through the central hub.</p>	 <p>Star</p>
<p>Bus network</p> <p>All devices connected to a central cable (bus). Cheap and easy to install.</p> <p>Ethernet networks use a bus topology.</p>	 <p>Bus</p>
<p>Ring network</p> <p>All devices are connected to one another in the shape of a closed loop, so that each device is connected directly to two other devices, one on either side of it.</p> <p>Fast data flow but problems may arise if one computer breaks down.</p>	 <p>Ring</p>

Types of Networks

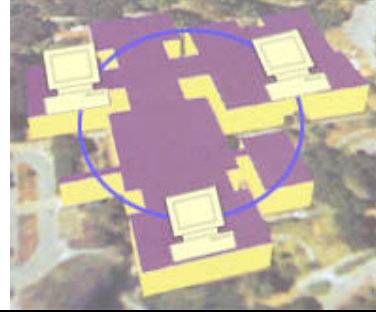
Wide Area Network

A Wide Area Network (WAN) is a network that connects computers across a large geographic area, such as a city or country. A WAN can transmit information by telephone line, microwave or satellite.



Local Area Network

A Local Area Network (LAN) is a network that connects computers within a small geographic area, such as a building.



Network Advantages

Share Information

Networks let you easily share data and programs. You can exchange documents, electronic mail, video, sound and images.

Work Away From Office

When traveling or at home, you can connect to the network at work to exchange messages and files.

Eliminate Sneakernet

Sneakernet refers to physically carrying information from one computer to another to exchange information. A computer network eliminates the need for sneakernet.

Share Equipment

Computers connected to a network can share equipment, such as a printer or modem.

Network Applications



Electronic Mail

You can exchange electronic mail (e-mail) with other people on a network. Electronic mail saves paper and provides a fast and convenient way to exchange ideas and request information.

Groupware

Groupware is software that helps people on a network is coordinate and manage projects. Groupware package usually let you exchange electronic mail, schedule meetings, participate in online discussions and share corporate information. Popular groupware packages include Lotus Notes and Novell GroupWise.

Videoconferencing

Videoconferencing lets you have face-to-face conversations with other people on a network, whether they are around the corner or on the other side of the country. Using videoconferencing software and equipment, you can see and hear the people you are communicating with.



Parts of a Network

Computers

A network links computers together, allowing the people using the computers to work more efficiently. A network can connect different types of computers.



Hub

A hub provides a central location where all the cables on a network come together.



Network Interface Card

A network interface card physically connects each computer to a network. This card controls the flow of information between the network and the computer.



Cables

Cables connect computers and equipment to a network. There are four main types of cables- coaxial, Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP) and fiber optic. Fiber optic cable is the most expensive type of cable, but it can carry information faster and over longer distances.



How Information is Stored

Client/Server Network

A client/server network provides a highly efficient way to connect ten or more computers or computers exchanging large amounts of information. And the client/server network store their files on a central computer. Everyone connected to the network can access the files stored on the central computer.



How Information is Exchanged

Ethernet

Ethernet can send information through a network at a speed of 10 megabits per second (Mbps). Fast Ethernet can send information through a network at a speed of megabits per second (Mbps).



Network Security

Firewall

A firewall is special software or hardware designed to protect a private computer network from unauthorized access. Firewalls are used by corporations, banks and research facilities to keep information private and secure.

User Name and Password

You usually have to enter a user name and password when you want to access information on a network. This ensures that only authorized people can use the information stored on the network.

Choose a Password

When choosing a password, do not use words that people can easily associate with you, such as your name or favorite sport. The most effective password connects two words or number sequences with a special character (example:easy@123). To increase security, memorize your password and do not write it down.

Intranet

An intranet is a small version of the Internet inside an office.

Programs

The program you use to browse through information on an intranet is the same program you would use to browse through information on the World Wide Web.

Connected Documents

Documents on an intranet are connected. Employees can select highlighted text in one document to display another, related document.

Information

An intranet is a very efficient and inexpensive way to make internal company documents available to employees. Companies use intranets to distribute information such as phone directories, product listings and job openings.

Introduction to the Internet

The internet is the largest computer network in the world. It consists of thousands of connected networks world-wide. A network is a collection of computers that are connected to share information. Each organization on the Internet is responsible for maintaining its own network.

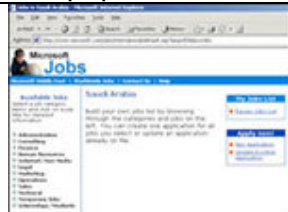
And some of the information on the Internet is free. Governments, universities, colleges, companies and individuals provide free information to educate and entertain the public.



What the Internet Offers

Electronic Mail

Exchanging electronic mail (e-mail) is the most popular feature on the Internet. You can exchange electronic mail with people around the world, including friends, colleagues, family members, customers and even people you meet on the Internet. Electronic mail is fast, easy, it saves money and paper.



Information

The Internet gives you access to information on any subject imaginable. You can review newspapers, magazines, academic papers, government documents, television show transcript, famous speeches, recipes, job listings, works by Shakespeare, airline schedules and much more

Entertainment

The Internet also lets you review current movies, hear television theme songs, read movie scripts and have interactive conversations with people around the world even with celebrities.



Programs

Thousands of programs are available on the Internet. These programs include word processors, spreadsheets, games and much more.

Online Shopping

You can buy items such as books, computer programs, flowers, music CDs, pizza, stocks, second-hand cars and much more.





Chat

The chat features allows you to exchange typed messages with another person on the internet. A message you send will instantly appear on the other person's computer. You can chat with one person at a time or with a group of people.

How Information Transfers

All computers on the Internet work together to transfer information around the world.

Packets

When you send information over the Internet, the information is broken down into smaller pieces, called packets. Each packet travels independently over the Internet and may take a different path to arrive at the intended destination, the packets are reassembled.

Download Information

When you receive information from another computer on the Internet, you are downloading the information. When you send information to another computer on the Internet, you are uploading the information.

TCP/IP

Transmission Control Protocol/Internet Protocol (TCP/IP) is a language computers on the Internet use to communicate with each other. TCP/IP divides information you send into packets and sends the packets over the Internet. When information arrives at the intended destination, TCP/IP ensures that all the packets arrived safely.

Router

A router is a specialized computer that regulates traffic on the Internet and picks the most efficient route for each packet. A packet may pass through many routers before reaching its intended destination

Backbone

The backbone of the Internet consists of high-speed data lines that connect major networks all over the world.