

# COMPUTER NETWORKS

- Networking
- Open Systems and Protocols
- The World Wide Web

# COMPUTER NETWORKS

- oA collection of computing devices that are connected in various ways in order to communicate and share resources.
- •Connection between computers in a network:
  - Cable
  - Wireless

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# CLASSIFICATION OF COMPUTER NETWORKS

- OBy network layer
- $\circ$ By scale
- By connection method
- •By functional relationship
- Oby network topology
- Objective of the second of

#### CLASSIFICATION BY SCALE

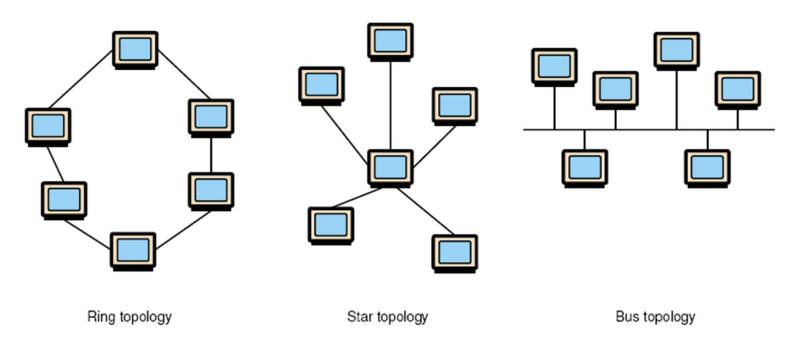
- A Local Area Network (LAN) connects na relatively small number of machines in a relatively close geographical area
- A Wide Area Network (WAN) connects two or more local area networks over a potentially large geographic distance
- MAN (Metropolitan Area Network) A network infrastructures developed for a large city

# CLASSIFICATION BY FUNCTIONAL RELATIONSHIP

- Server based (client/server)
  - Computers set up to be primary providers of services such as file service or mail service.
  - such as file service or man service.

    The computers providing the service are called g
  - The computers that request and use the service are called client computers.
- Peer-to-peer
  - Various computers on the network can act both as clients and servers.
  - Example: Many Microsoft Windows based computers allow file and print sharing.
- Many networks are combination peer-to-peer and server based networks.

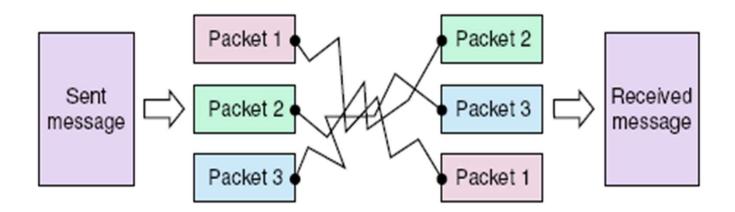
# TOPOLOGIES OF LANS



Ethernet: The industry standard for LANs based on a bus topology

#### PACKET SWITCHING

- Messages are divided into fixed-sized, numbered packets
- Packets are sent individually, then combined into original message



#### ROUTERS

- A packet may make several intermediate hops between computers before it reaches the final destination
- Routers are used to direct packets between networks
- If a path directed to a down machine or a path have many network traffic, a router might choose an alternative route

## REPEATER

- The device that are installed periodically along the line to strengthen and propagate the signal
- Restrict information loss of digital signal

## THE INTERNET

• The wide-area network that spans the planet

#### Internet Connections

- Internet backbone: A set of high-speed networks carrying Internet traffic
- Internet Service Provider (ISP) A company providing access to the Internet
- o Phone Modem: Converts computer data into an analogation audio signal and back again
- DSL (Digital Subscriber Line): an internet connection made using a digital signal on regular phone lines
- Cable Modem: A device that allow computer network communication using the cable TV hook up in a home

## UPLOAD AND DOWNLOAD

• Upload: Sending data from your home computer to a destination on the internet

• Download: receiving data on your home computer from the internet

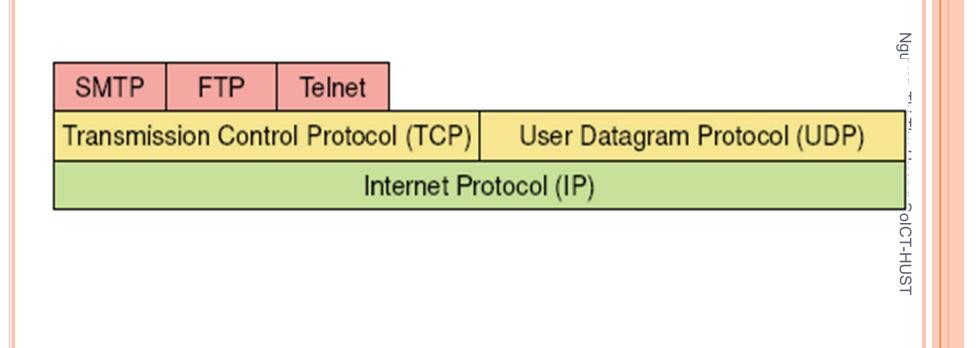
## **OPEN SYSTEMS**

- Interoperability: The ability of software and hardware on multiple machines and from multiple commercial vendors to communicate
- Open System: A system that is based on a common model of network architecture and an accompanying suite of protocols

## Layers of the OSI Model

7	Application layer
6	Presentation layer
5	Session layer
4	Transport layer
3	Network layer
2	Data Link layer
1	Physical layer

# LAYERING OF KEY NETWORK PROTOCOLS



#### TCP/IP

- Transmission Control Protocol (TCP): The network protocol that breaks messages into packets, reassembles them at the destination, and takes care of errors
- Internet Protocol (IP): The network protocol that deals with the routing of packets through interconnected networks to the final destination
- TCP/IP: A suite of protocols and programs that support low-level network communication

#### HIGH LEVEL PROTOCOLS

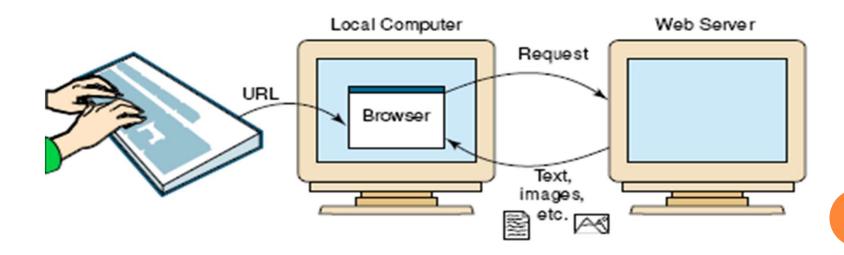
- Simple Mail Transfer Protocol (SMTP): A protocol used to specify the transfer of electronic mail
- File Transfer Protocol (FTP): A protocol that allows a user on one computer to transfer files to and from another computer
- Telnet: A protocol used to log into a computer system from a remote computer
- Hyper Text Transfer Protocol (HTTP): A protocol defining the exchange of World Wide Web documents that are written using HTML

# THE WORLD WIDE WEB (WEB)

- An infrastructure of information and the network software used to access it
- Web page: a document that contains or references various kinds of data
- Link: a connection between one Web page and another
- Web site: a collection of related Web pages, usually designed and controlled by the same person or company

# THE WORLD WIDE WEB (CONT'D)

- Web browser :A software tool that retrieves and displays
   Web pages
- Web server: A computer set up to respond to requests for Web pages
- Uniform Resource Locator (or URL) A standard way of specifying the location of a Web page



## HOW TO CONNECT TO THE INTERNET?

- The Hardware: Modem (dial up, ADSL) or Ethernet Card
- The Software: Operating System, Connection Software
- The Browser
- Connection Options: Dial up, Cable, ADSL, Wireless. . .
- Locating Internet Access Providers