

CSTA Academy: 2006 - 2007

Understanding and Building Basic Networks

November 14, 2006

Part 2: Computer Networking

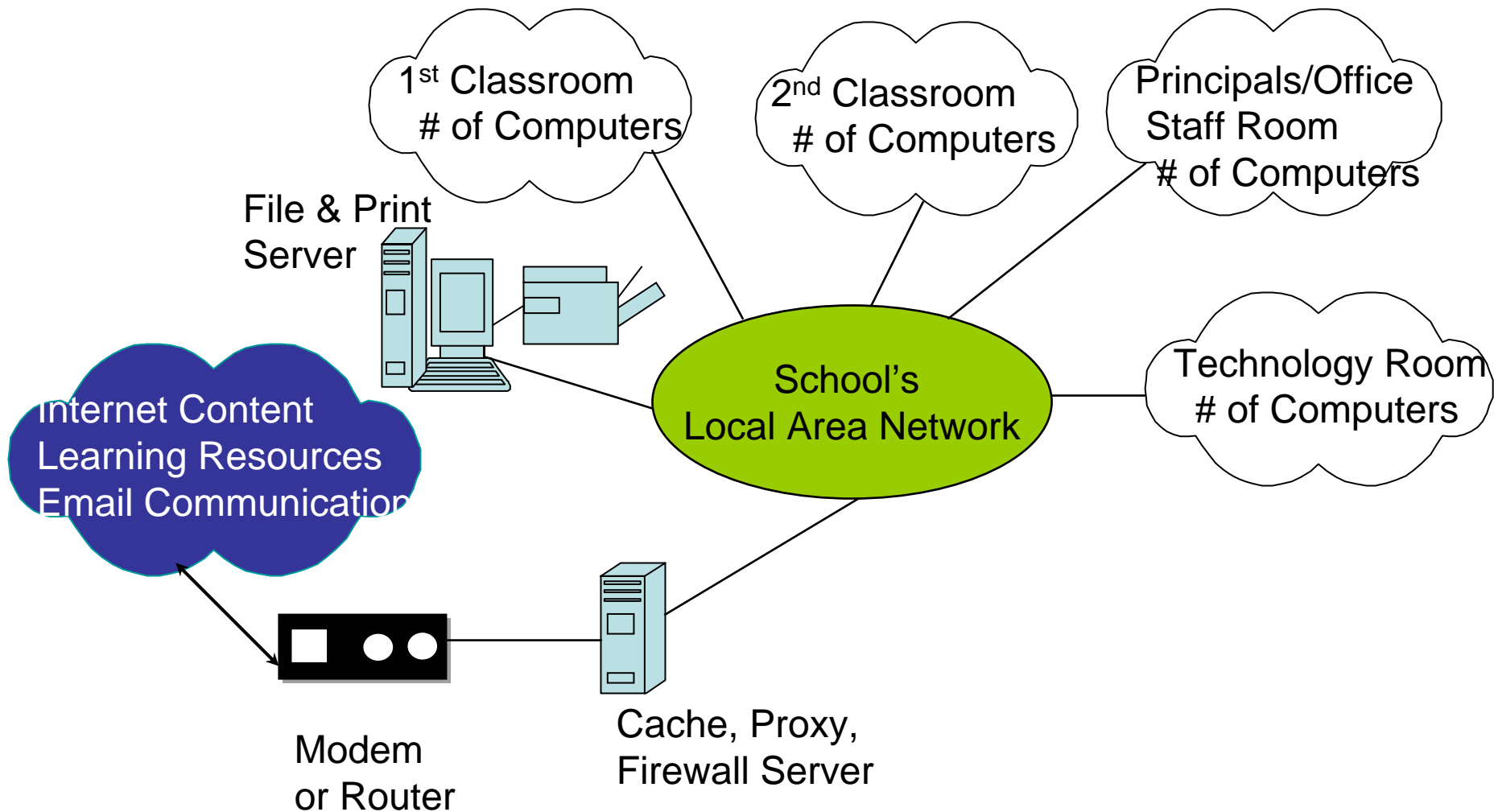
Objectives

- ❑ Distinguish between client/server and peer-to-peer networks
- ❑ Identify elements of a network
- ❑ Describe several specific uses of a network
- ❑ Hands-on Activities:
 - ✓ Compare the performance of 10BaseT Hub, 10BaseT switch and 100BaseT Hub LAN connection devices.
 - ✓ Create a shared 100BaseT Ethernet LAN and 100Mbps FDDI; Compare throughput and delay for each of these two LAN technologies.

Basic of Networking

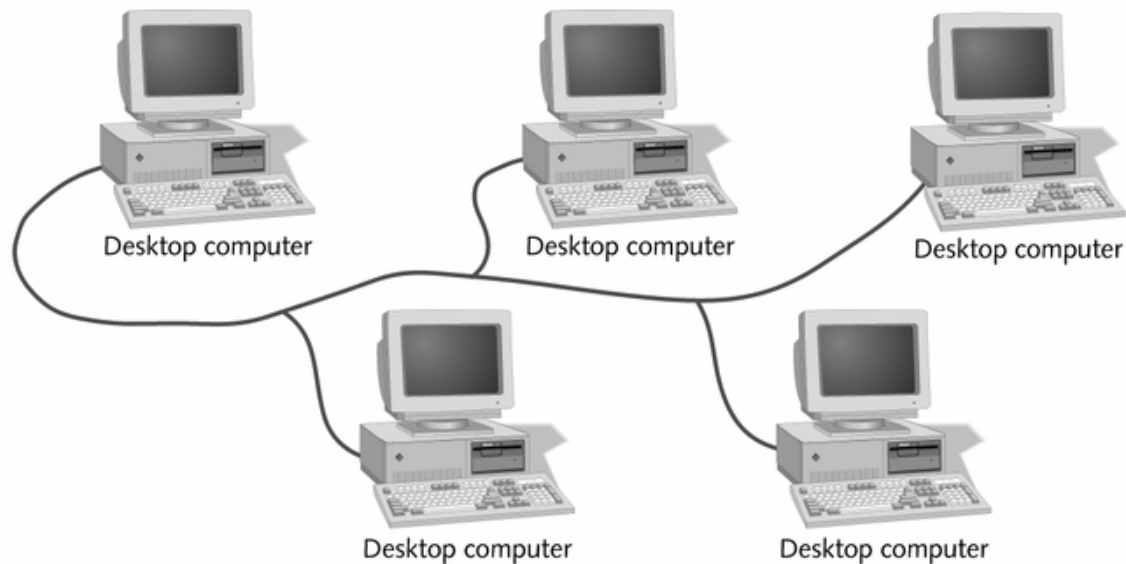
- Network
 - Group of computers and other devices connected by some type of transmission media
 - Networks enable users to share devices and data

Example of A Network in A School



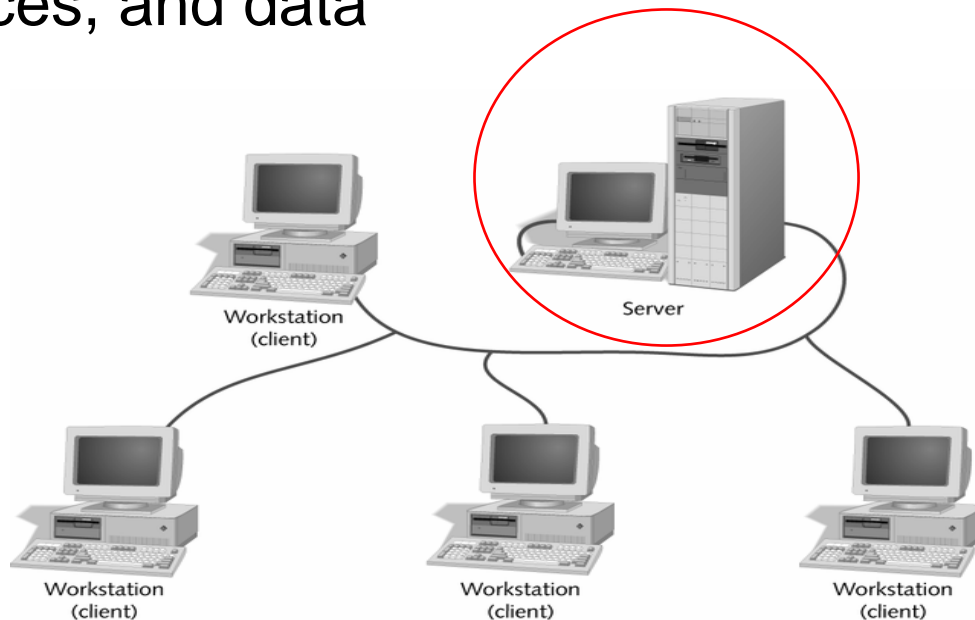
Peer-to-Peer Network

- Two or more PCs are connected and share resources *without* going through a separate 'server' computer.



Client/Server Network

- A type of network setup that utilizes both servers and clients
 - Clients use central server to share applications, devices, and data



Components of a Network

- A minimum of at least 2 computers
- Cables that connect the computers to each other, although wireless communication is becoming more common
- A network interface device on each computer
- A 'Switch' used to switch the data from one point to another.
- Network operating system software

Cabling

- Twisted-pair

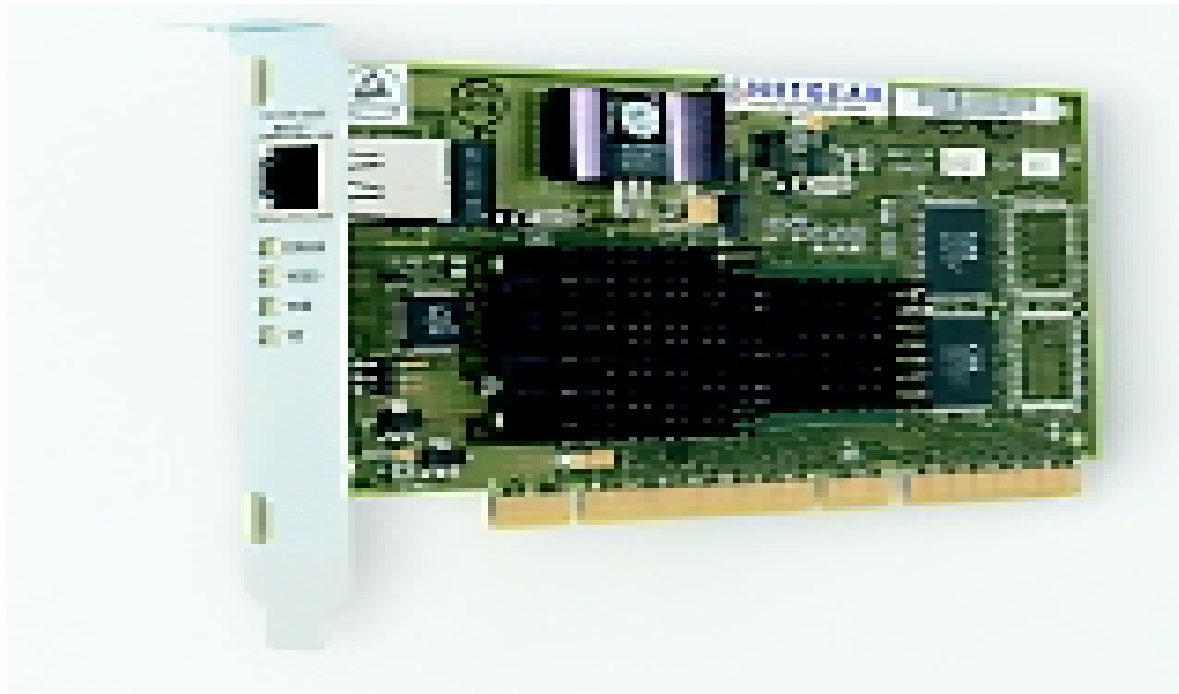


- Thin coax



Network Interface Card (NIC)

- Ethernet card



Hub and Switch

- A hub is a device used to connect a PC to the network; While a Switch is a 'smart hub' (i.e., provide a better performance such as higher throughput)
- Examples:
 - An 8 port Hub
 - 24 port Switches



Network Operating System

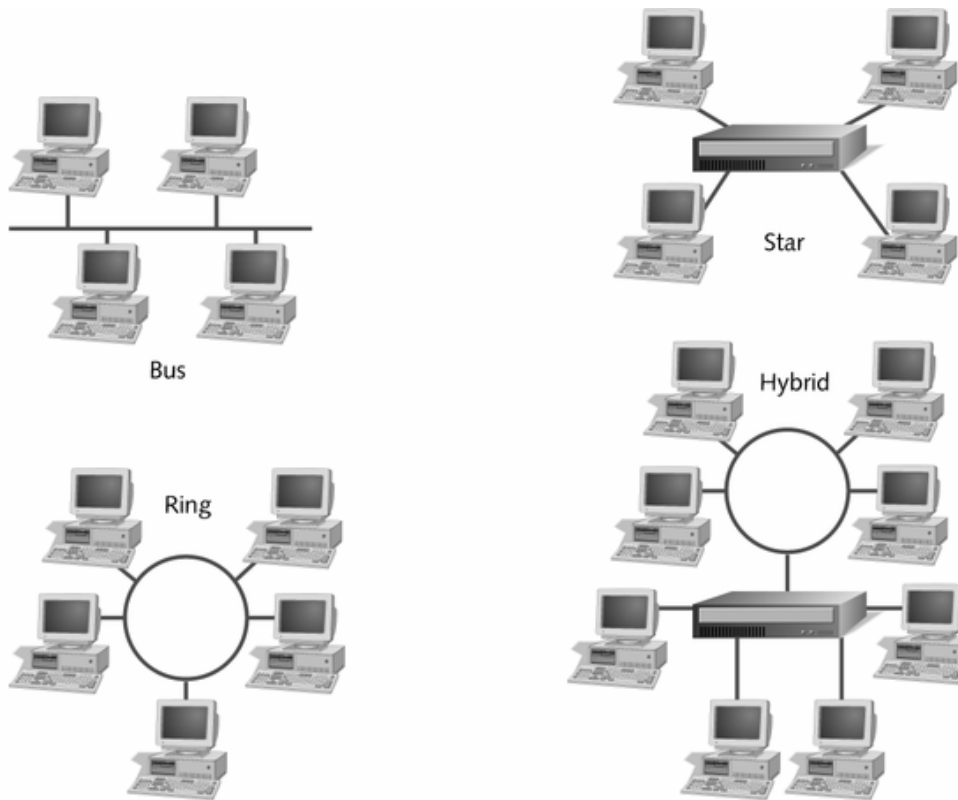
- Special software designed to manage data and other resources on a server for a number of clients

Local Area Network (LAN)

- Network of computers and other devices confined to relatively small space
- LANs involving many computers are usually server-based
 - On a **server-based network**, special computers (known as **servers**) process data for and facilitate communication between other computers on the network (known as **clients**)

LAN Topologies

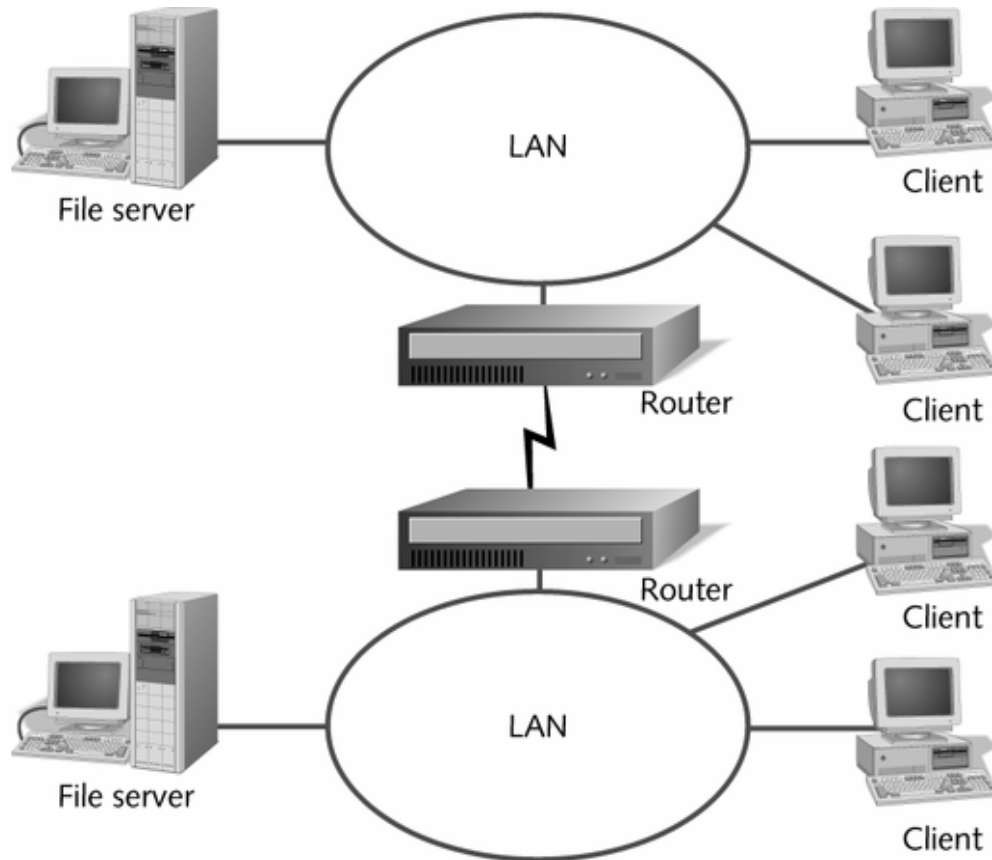
- Topology: It is the physical layout of computer network



WANs

- Wide area network (WAN)
 - Network that spans large distance and connects two or more LANs
 - The **Internet** is an example of a very intricate and extensive WAN that spans the globe

A Simple WAN Example



How Networks Are Used

- Services
 - Features provided by a network
 - File and print services
 - Communications services
 - Mail services
 - Internet services
 - Management services

Other Elements for Server-Based Networks

- Protocol
 - Rules network uses to transfer data
- Data Packets
 - The distinct units of data transmitted from one computer to another on a network
- Addressing
 - Scheme for assigning unique identifying number to every workstation on network
 - The number that uniquely identifies each workstation and device on a network is its address

Hands-on Activities

- Compare the performance of 10BaseT Hub, 10BaseT switch and 100BaseT hub LAN connection devices.
- Create a shared 100BaseT Ethernet LAN and 100Mbps FDDI; Compare throughput and delay for each of these two LAN technologies.