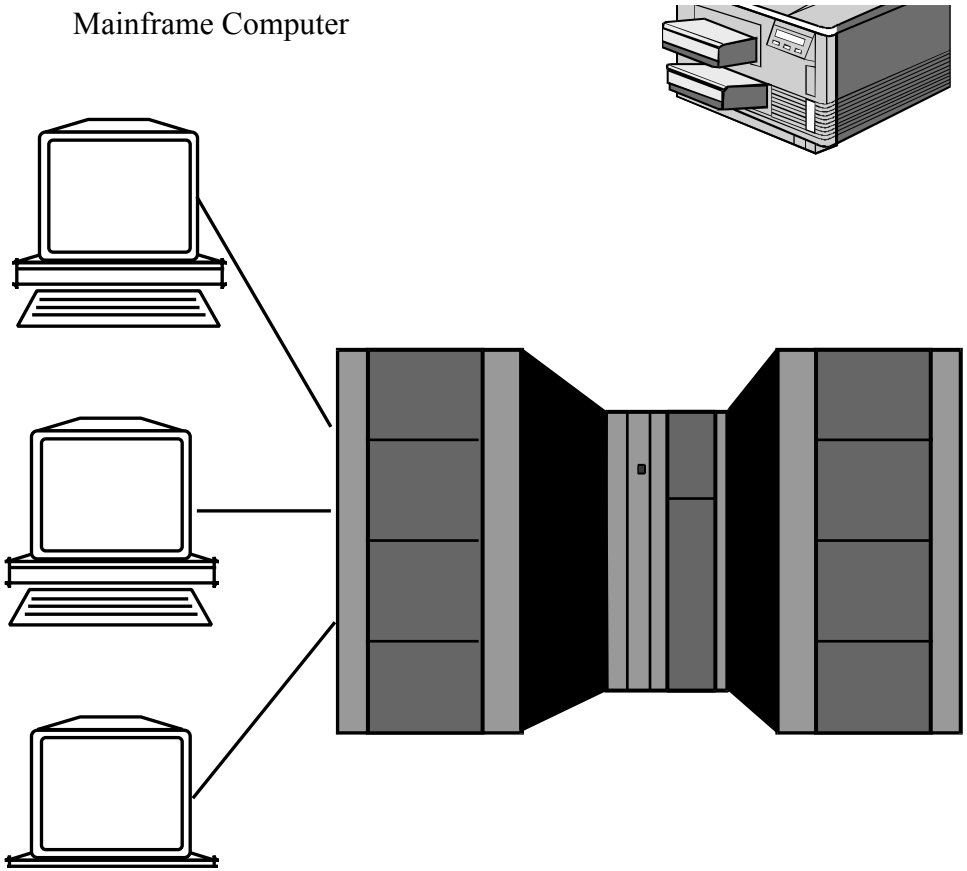
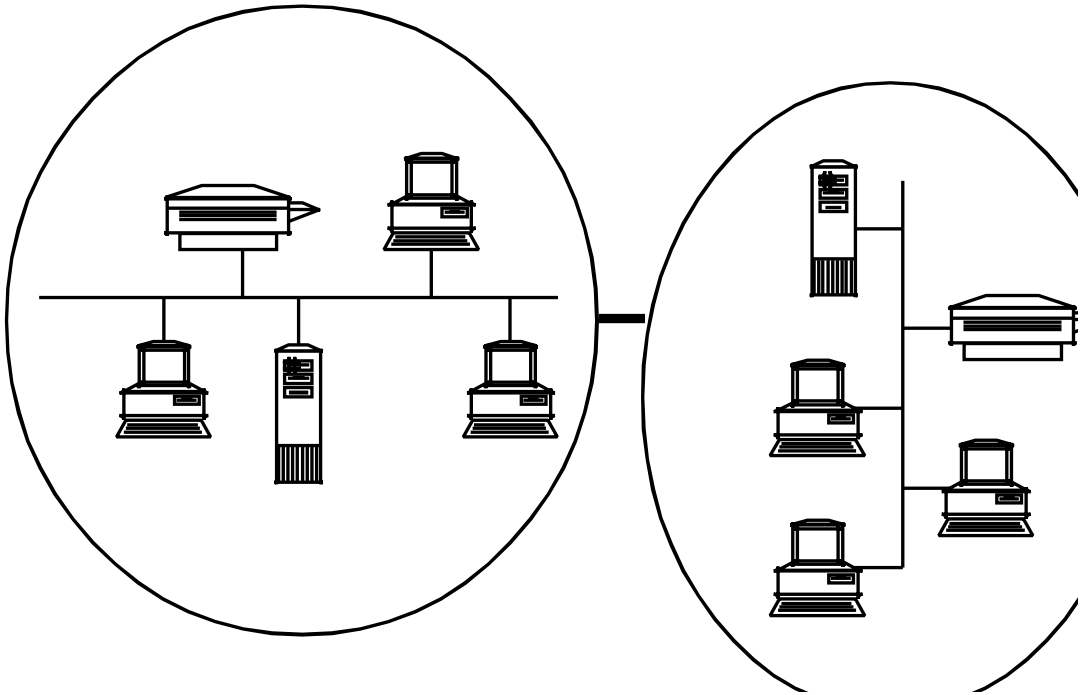
Introduction to Network Computing

Computer Science Dept
UCC

Centralized Computing



Distributed Computing



Computer Network

An electronic medium through which computers are able to share applications, peripherals and other computer resources

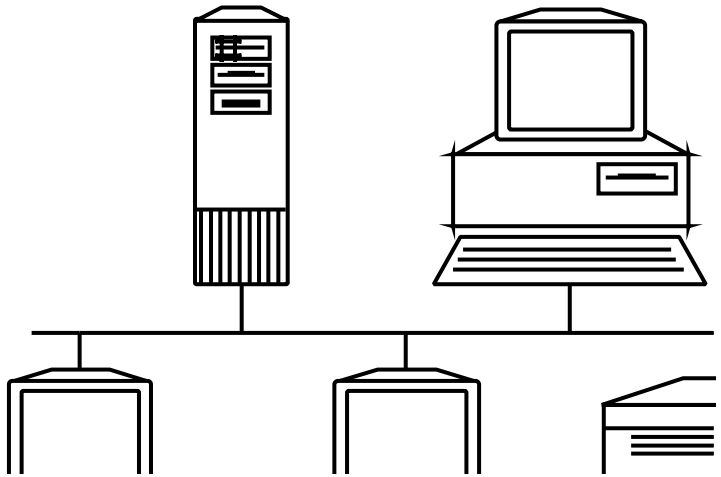
Local Area Network (LAN)

“A group of computers typically connected by no more than 1,000 feet of cable, which interoperate and allow people to share resources.”

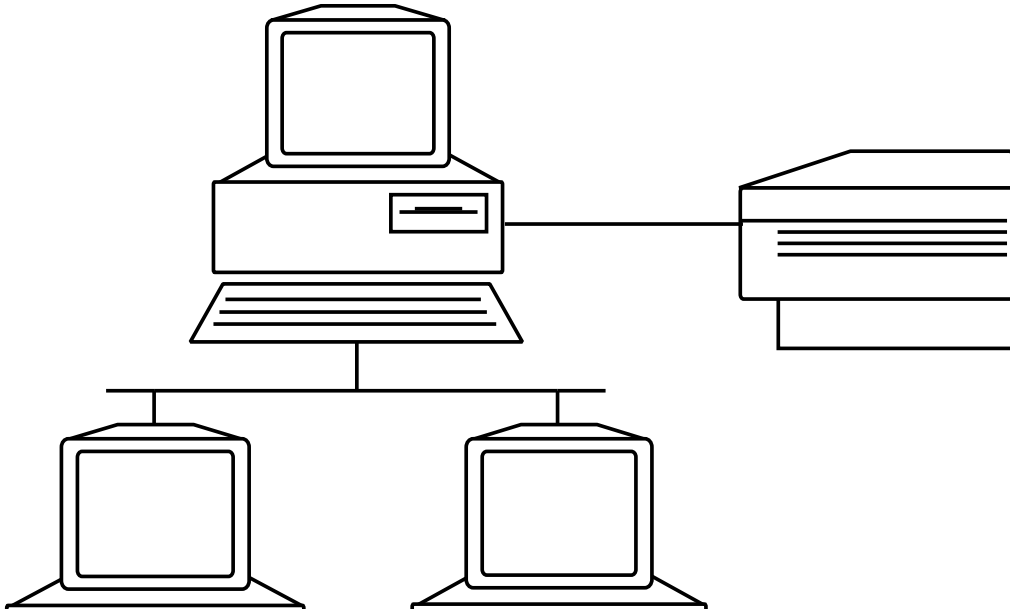
Common Network Models

- Client/server Model
- Peer to Peer Model

Client/Server Model



Peer to Peer Model



Network Operating Systems

Software that allows these models to operate to share resources across the network

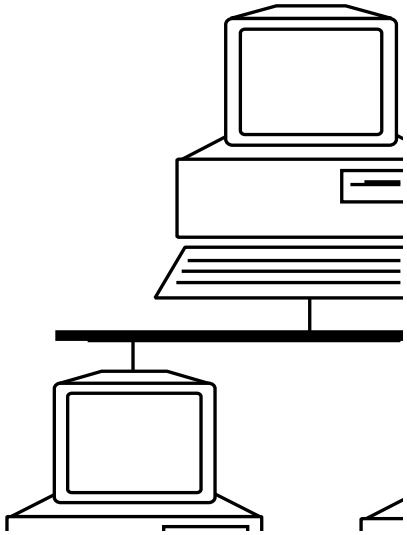
- **Client/Server--Novell Netware & Windows NT, each has two parts, client and server**
- **Peer to Peer--Windows for workgroups, Windows95, Netware Lite, LANtastic**

Network Topology

- Bus (traditional Ethernet)
- Star
- Token-ring

Traditional Ethernet (Bus)

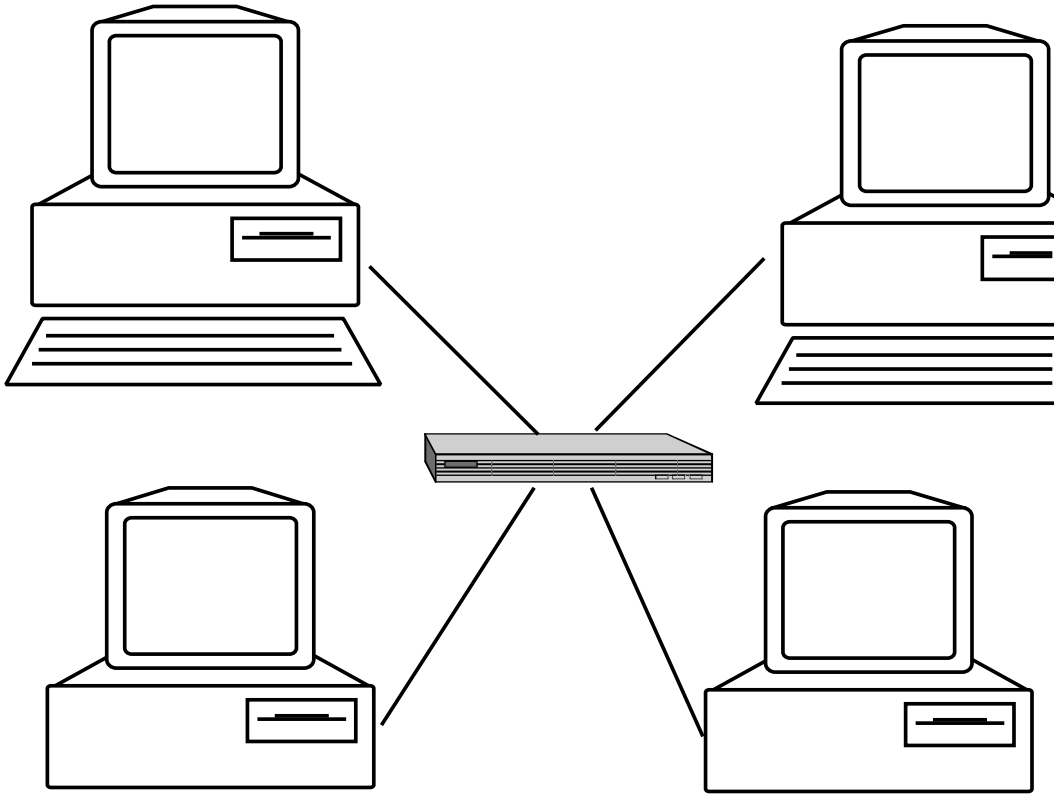
Coaxial Cable is ThinNet = 10 base 2 or
ThickNet = 10 Base 5



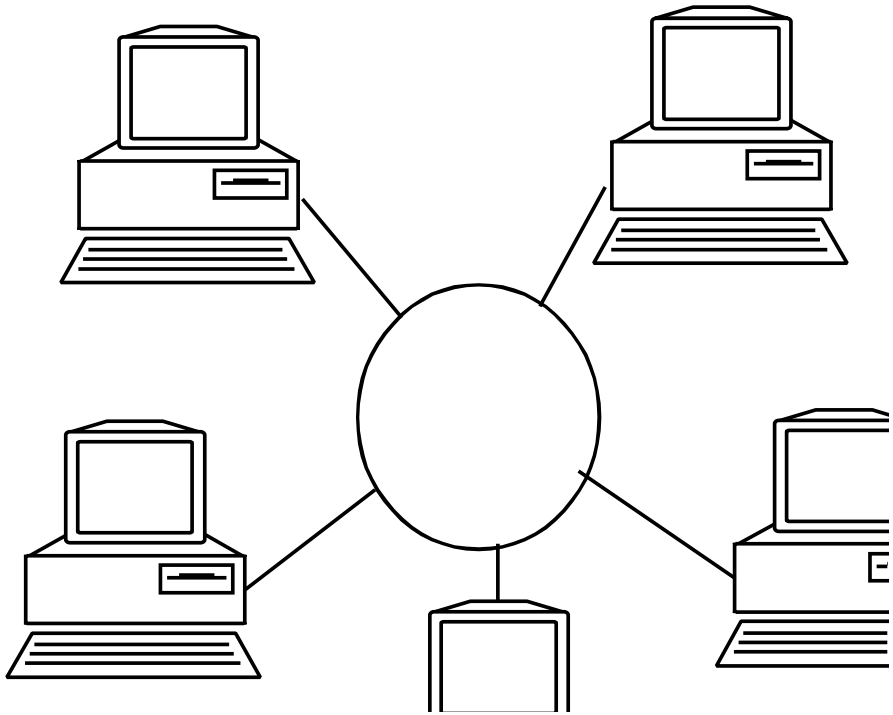
Ethernet (Star Topology)

Coaxial Cable is 10 Base T (twisted pair)

Hub



Token-ring (Ring Topology)



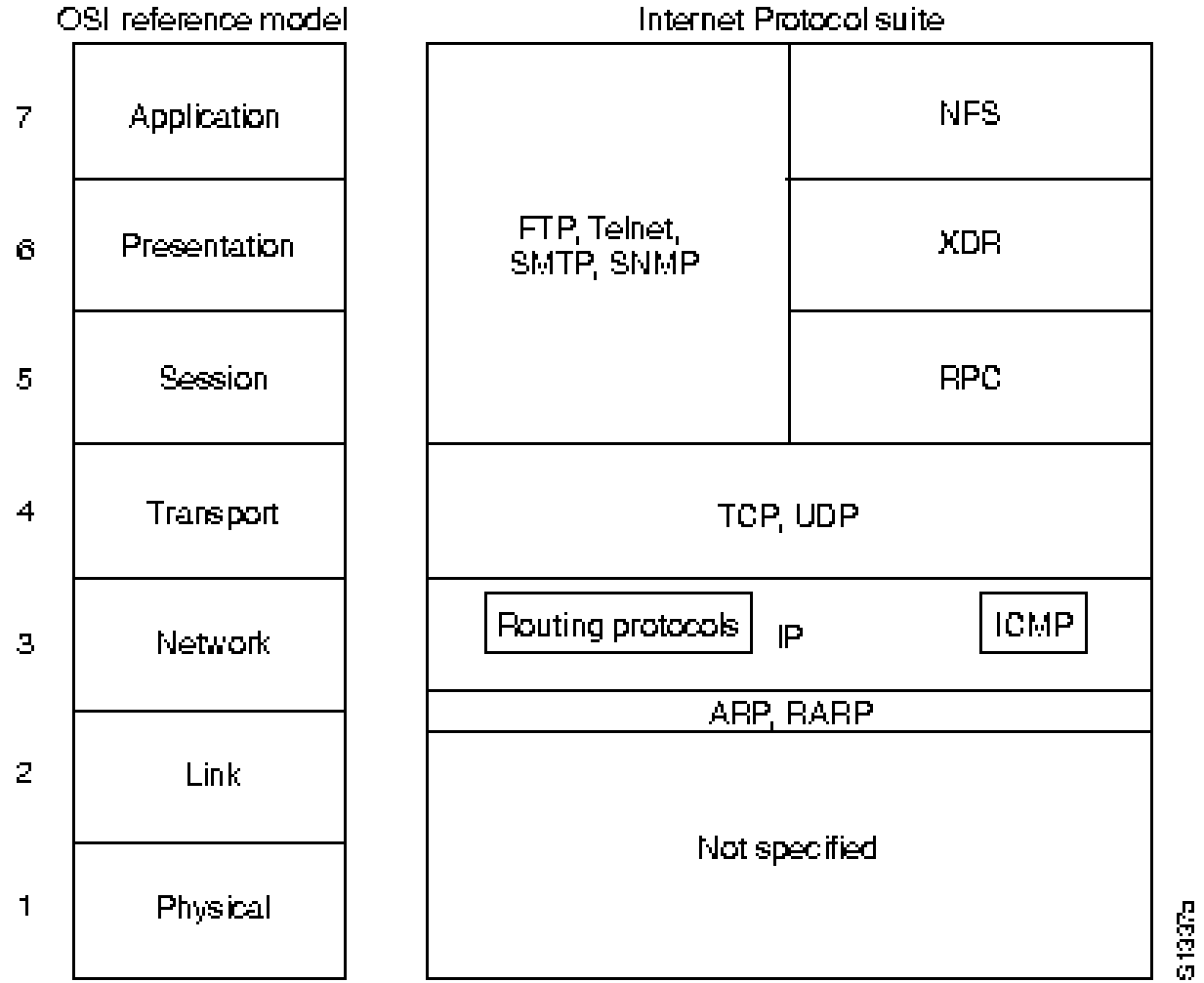
Network Standards

- ANSI--American National Standards Institute
- IEEE--Institute of Electrical and Electronics Engineers (802)
- ISO--International Organization for Standardization

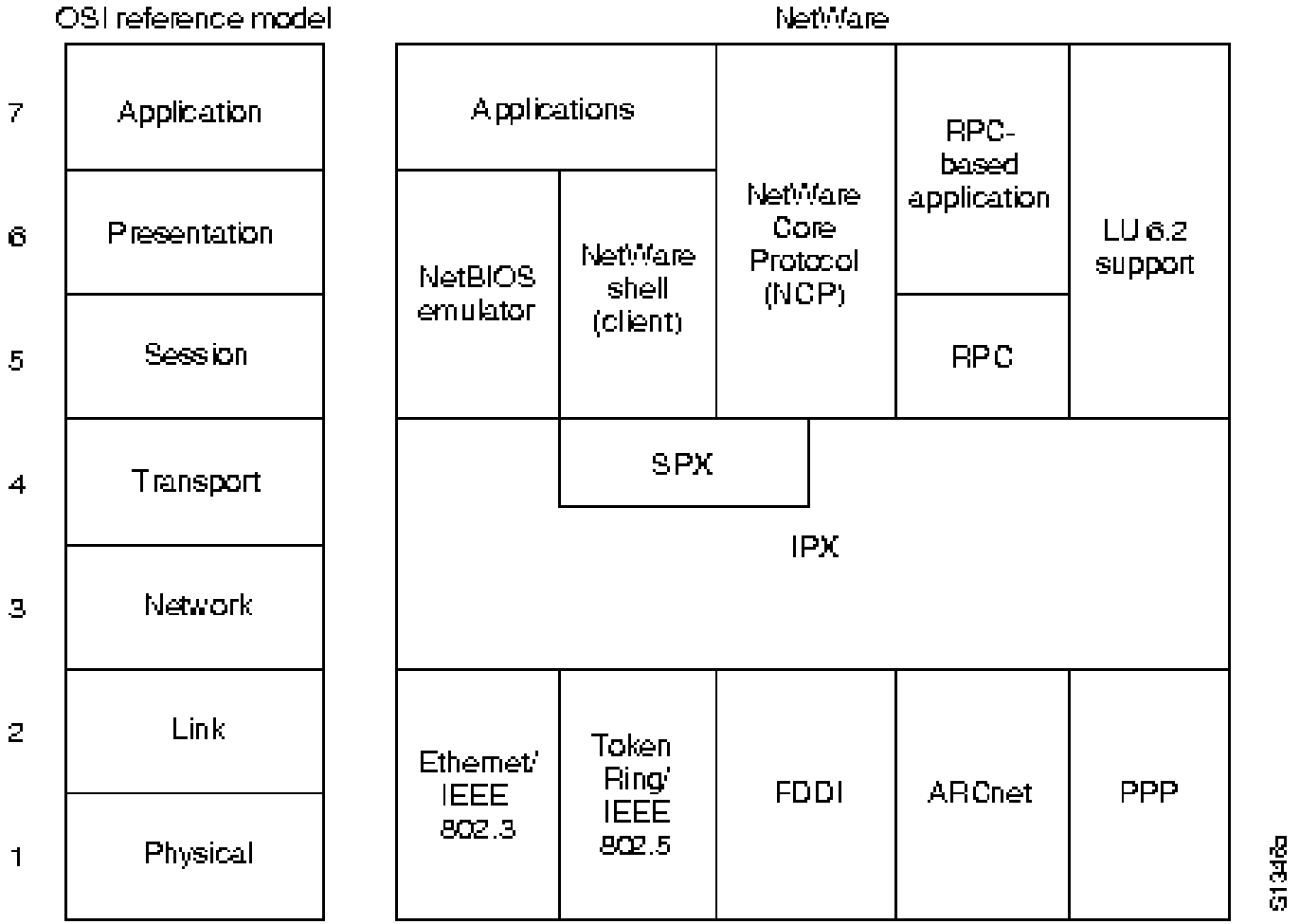
Protocols

- How network devices communicate
- OSI Model--Open Systems Interconnection
- TCP/IP--Transmission Control Protocol/Internet Protocol
- IPX--Internet Packet Exchange
- PPP--Point to Point Protocol

TCP/IP Protocol



Netware Protocol



Network Interface Card (NIC)

An electronic adapter installed in a PC that enables it to communicate over a network

Network Cabling

- Coaxial Cable
- Unshielded Twisted Pair (UTP)
  - Category 1-5 -- 5 is best
- Fiber Optic Cable

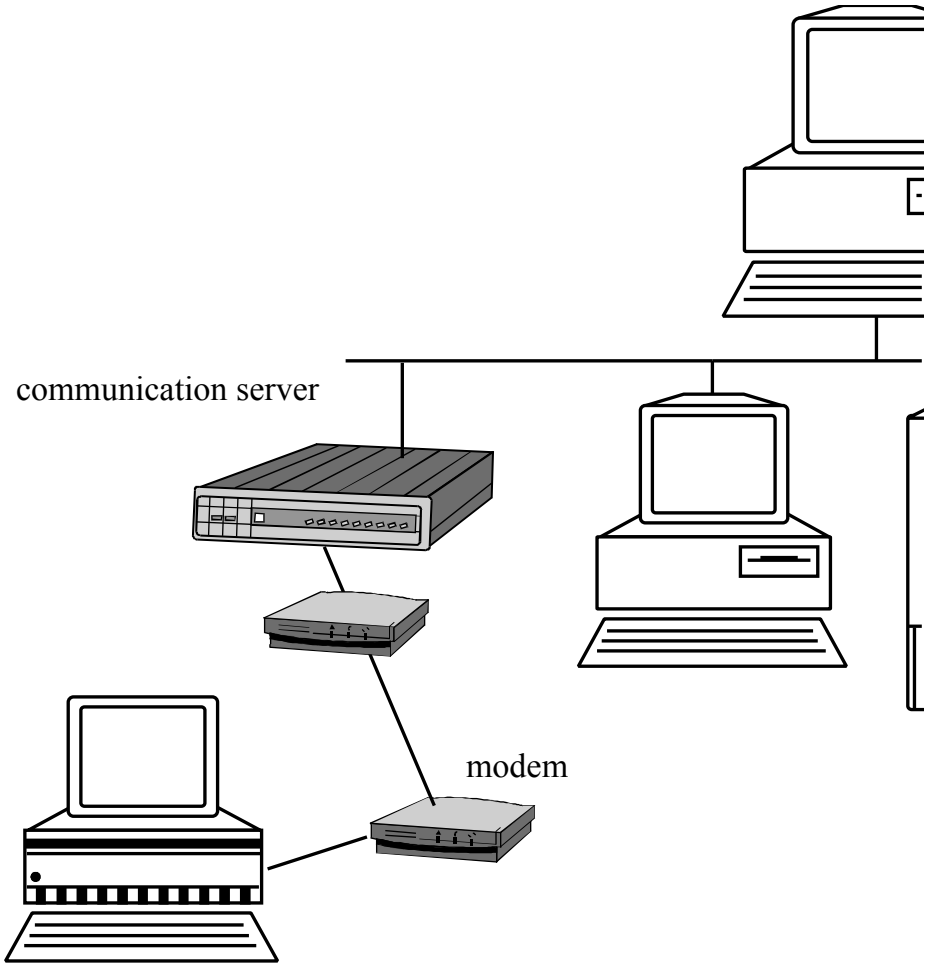
Wireless Technology

- Microwave
- Infrared
- Satellite
- Cellular or Spread Spectrum
- Radio

Remote LAN Access

- PC Anywhere
- Reachout
- LAN rover
- Chatterbox
- PPP Server

Remote LAN Access



Wide Area Network

A computer or data communication network that spans any distance and is usually provided by a public carrier

Telco Services (types of lines)

- ISDN (Integrated Sevices Digital Network)
- T1 (Digital Tranmission Rate 1)
- Frame Relay
- DSO (Digital Signal Level 0)
- SMDS (Shared Mulitmegabit Data Service)
- ATM (Asynchronous Transfer Mode)

Wide Area Network Equipment

- CSU/DSU--fastest
- FRAD (Frame Relay Access Device)
- Terminal Adapter (ISDN)
- Modem--slow

this equipment is needed to convert the signal from the telco lines

Interoperability

The ability to interconnect various network technologies in order to form an operationally seamless internetwork

Internetworking Devices

- Repeaters
- Bridges
- Routers

Repeater

Device that gives network signals a “boost” so they can travel farther

It repeats the signal near the end of its range

Bridge

Device that connects two networks so that they act as if they are one network

usually connects like networks: Ethernet to Ethernet, etc.

“smart” repeater: monitors and limits “traffic”

Router

Device that is typically used to connect networks that use multiple protocols and topologies

AKA “gateway”

“smart” bridge

controls “traffic” and limits access

Firewall

“hotest” piece of networking equipment

Sits outside the main network to limit access

A security device with definitive “rules” for access

Internet

- The world's largest network
- An infrastructure for transporting data
- A huge "network or networks"
- Uses TCP/IP protocol
- NOT a single application, but an infrastructure for E-mail, Web, etc.

internet

A network of networks (usually private)

intranet

A private network of Web servers

World Wide Web

A network of servers on the Internet, each of which has one or more homepages, which provide information and hypertest links to that server and other servers

channel service unit/data service unit (CSU/DSU)

(CSU/DSU) A device that performs both the channel service unit (CSU) and data service unit DSU functions. The Channel Service Unit (CSU) is used to terminate a DS1 or DS0 (56/64 kb/s) digital circuit. It performs line conditioning, protection, loop-back and timing functions. The Data Service Unit (DSU) terminates the data circuit to the Data Terminal Equipment (DTE) and converts the customer's data stream into a bi-polar format for transmission.