Introduction to Networks

Networking Concepts
IST-200
VWCC

What is Networking?

Connecting computers
to form a
Local Area Network
(LAN)

Device Sharing

Sharing of:

- Hardware
- Software
- Information

A Simple Network

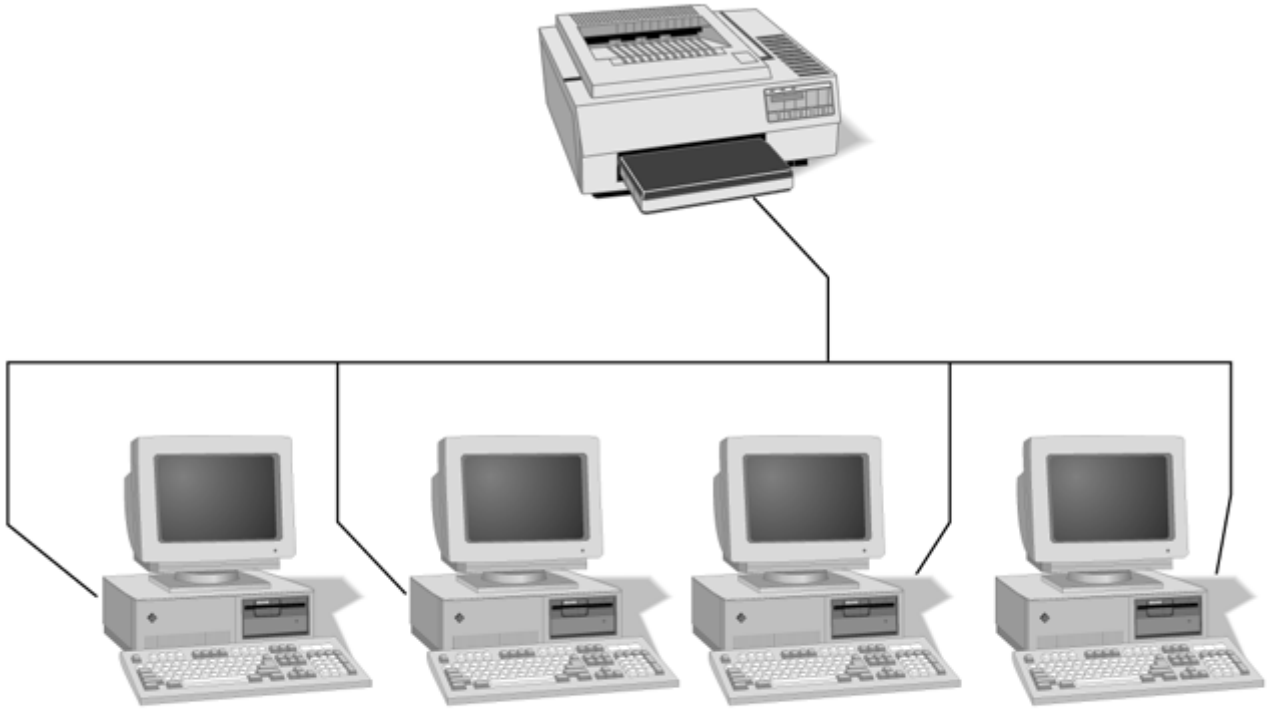


Figure 1-2 A simple network

Local & Wide Area Networks

- Early networks were custom built
- Connecting a dozen computers
- Only 1 or 2 peripherals
- Early Ethernet
  - 30 users
  - total span of 601 feet

Local Area Network (LAN)

- A single collection of machines & peripherals
- Generally less than 1000 computers
- “Spanned” generally less than 250 meters feet
- Basic building block for larger networks-Internetworks

InterNetworks IntraNetworks

- A network of networks
- A networked collection of LANs
- More than one floor in a business (intranetwork)
- Multiple buildings
- Campus environment

Wide Area Networks (WAN)

- Spans miles of distance
- Two or more separate locations
- Down the road or across the world
- Microsoft, Federal Express

The Internet

- A WAN internetwork
- Millions of machines worldwide
- The World Wide Web (WWW)

Networking Terminology

- Client/Server relationship
- Client requests shared resources
- Server responds & shares resources

Networking Terminology

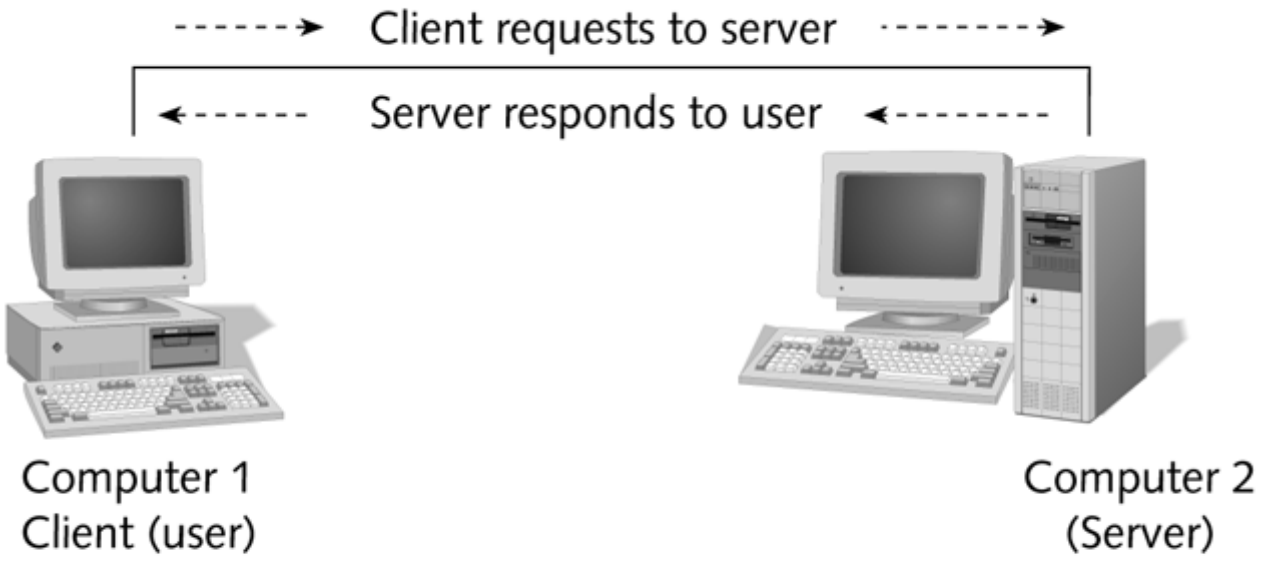


Figure 1-3 A client/server relationship

Client Server Networks

- Concentrate CPU power & storage capacity
- Windows NT Server / Server 2000
- Peer to Peer
  - Client/Server role interchanges
  - Windows 95/98/2000/XP

Simple Network Needs

- Medium to carry data
- Adapter (NIC)
- Protocol
- Client / Server Software

Local Network Medium (media)

- Carries network messages
- Connects machines together on network
- 3 types:
  - Wired
  - Fiber optic cable
  - Wireless

Network Interface Card

- (NIC)
- Physical link between machine & network
- Connection between machine & medium
- Also known as network adapter

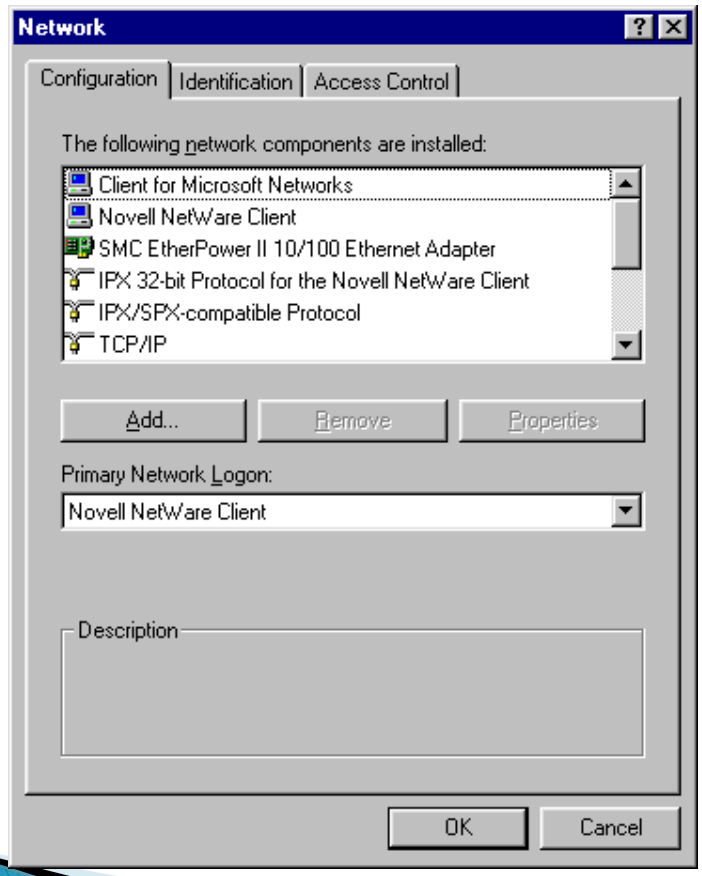
Network Protocols

- Common set of communication rules
- Identify ‘oneself” & others on network
- Interpret signals
- Begin & end network communication
- Manage network information exchange

Protocol Examples

- TCP/IP
  - for the Internet
- IPX/SPX & NWLINK
  - for Novell
- NetBEUI
  - for Microsoft

Windows Client Setup



- Control Panel
- Networking
- Protocols
- Clients
- Adapters

Network Software

- Programs that access the network
- Network Operating System (NOS)
  - Windows NT
  - Novell NetWare (IntranetWare)
- Consist of client & server components

Network Layers

- Network Applications (NOS & client)
- Instruct network medium
- Using machines interface (NIC)
- Address & exchange information
- To other machines on LAN or WAN

Network Types

- Peer to Peer
  - Windows 98/2000
  - Windows for Workgroups
- Client Server (server-based)
  - Windows NT
  - Novell
  - Unix / Linux

Peer to Peer

- No centralized control
- Act as both client & server
- User controls access to machine
- Institutionalized chaos & security concerns
- Adding machines slows network down

Peer to Peer Advantages

- Easy to install & configure
- Users control individual shared resources
- Inexpensive to purchase & operate
- No Network Administrator
- Best for 10 or fewer users

Peer to Peer Disadvantages

- Security for only a single resource at a time
- Users may need to know many passwords
- Individual machine backups
- Speed decreases while sharing
- No central location/access of data

Server Based Networks

- Server is the key to this type
- Centralized control of resources
- Utilize faster processors
- More memory
- Extra peripherals

Server Security

- Physical access to the server
- Specialized sentry servers
- Domain model
- Account names
- Passwords
- Firewalls

Server Based Advantages

- Central security/ accounts/ access
- Simplify network administration
- Powerful/ efficient access to resources
- Single password for each user
- Best for high use, user, networks

Server Based Disadvantages

- Server failure results in unusable network
- Server failure results in loss of resources
- Expert staff to manage increases cost
- Dedicated hardware increases cost
- Dedicated software increases cost
- All disadvantages may be overcome with $$$

Specialized Servers

- Individual services supplied
  - Application Servers
  - Communication Servers
  - Domain Controllers/Directory Servers
  - Fax Servers

Specialized Servers (cont.)

- Mail Servers
- Web Servers
- File & Print Servers

Selecting the Right Network

- Budget considerations, number of users?
- Physical span of the network?
- Specialized servers, services desired?
- Internetwork or WAN access?
- Future growth?

Summary

- Basic elements to build a network
  - Medium, physical interface, protocol
  - Networking software–client & server
- Basic network types
  - Peer to Peer
  - Server based