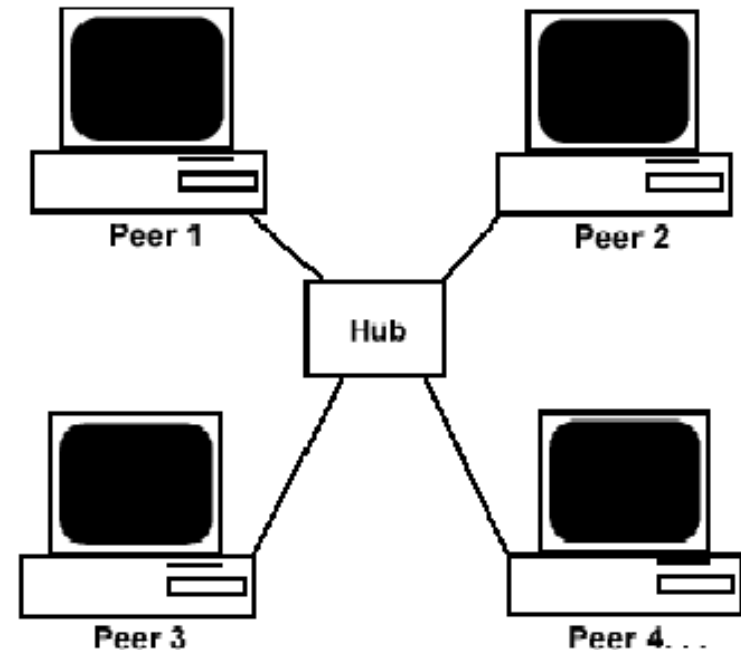


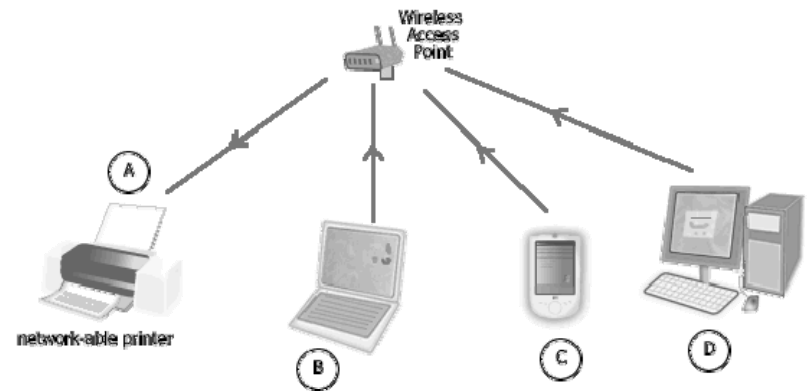
Networks: Definition

- Two or more computers connected together
- Two types of Networks
 - Peer-to-peer
 - Client Server Network



Networks: Purposes

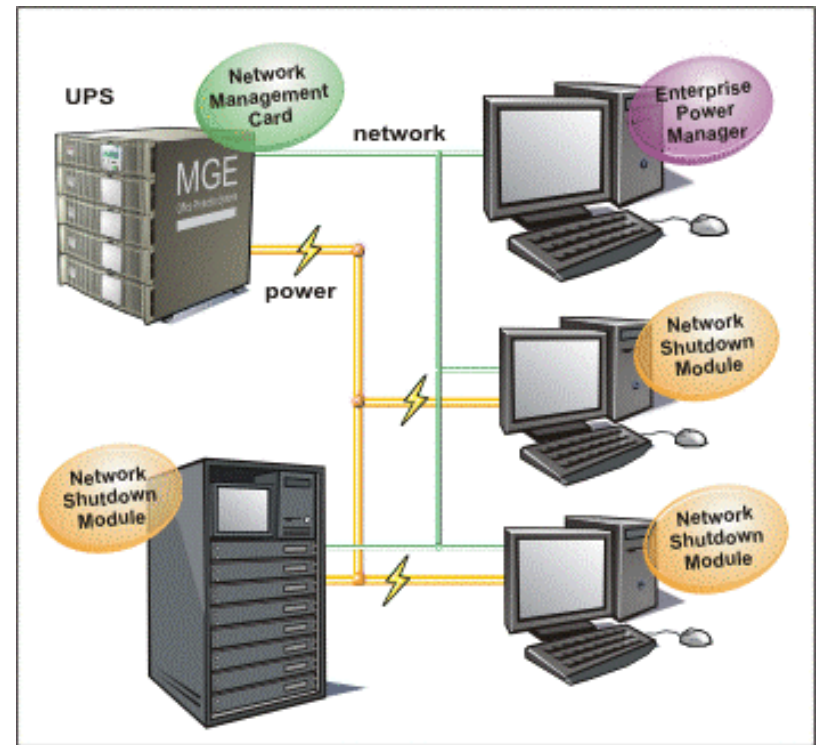
- Sharing Resources
- Sharing Printers
- Sharing Files and folders
- Internet sharing



Steps to build a Network

- Network planning
- Cost
- Human Resources
- Hardware and Software needed

© Jacques D Jean



Networks: Planning

- How many nodes(PCs)
- Server
- Cable
- Location of the desk
- Hubs and switches
- Repeater
- Router
- Bridge
- Software



Networks: Components for the PC

- Network adapter card
- Network Client
- Network Protocol
- Switch
- Router
- Repeater
- Ethernet



Network Components: NIC

- Different types of Network Interface Card
- PCI internal card
- USB network adapter
- PCMCIA NIC
- Wireless Network Interface Card



USB Ethernet NIC



PCMCIA NIC

- laptops come with integrated PCMCIA port to insert the PCMCIA card
- There are PCI Internal PCMCIA card for PC.



Network adapter: PCMCIA NIC

- PCI PCMCIA card for PC.



Wireless NIC Internal Card

- Wireless PCI Network Interface Card



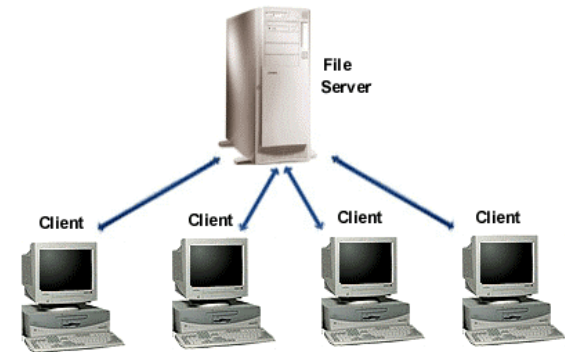
Wireless USB Network Adapter

- Wireless USB Network adapter



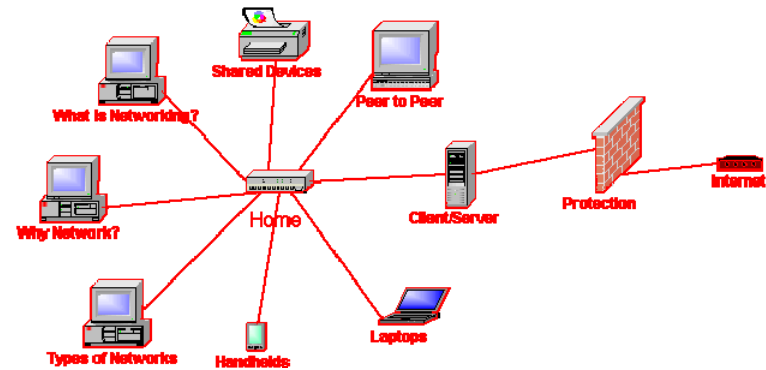
Networks: Client / Server Network.

- All resources are in one computer.
- A dedicated computer to save all files and folders



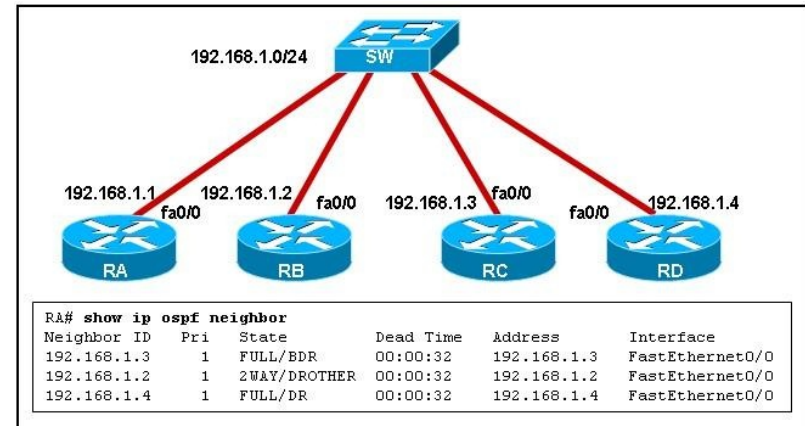
Networks:Peer-to-Peer

- ***Designed for connecting a small number of computers..***
- ***Security on a peer-to-peer network is not very powerful***
- ***Windows 95/98/ME/2000/XP all has P2P capacity***



Networks: Packets or Frame

- A data container that has :
 - The MAC address of the sending computer
 - The MAC address of the receiving computer.
 - A data check technology (CRC)



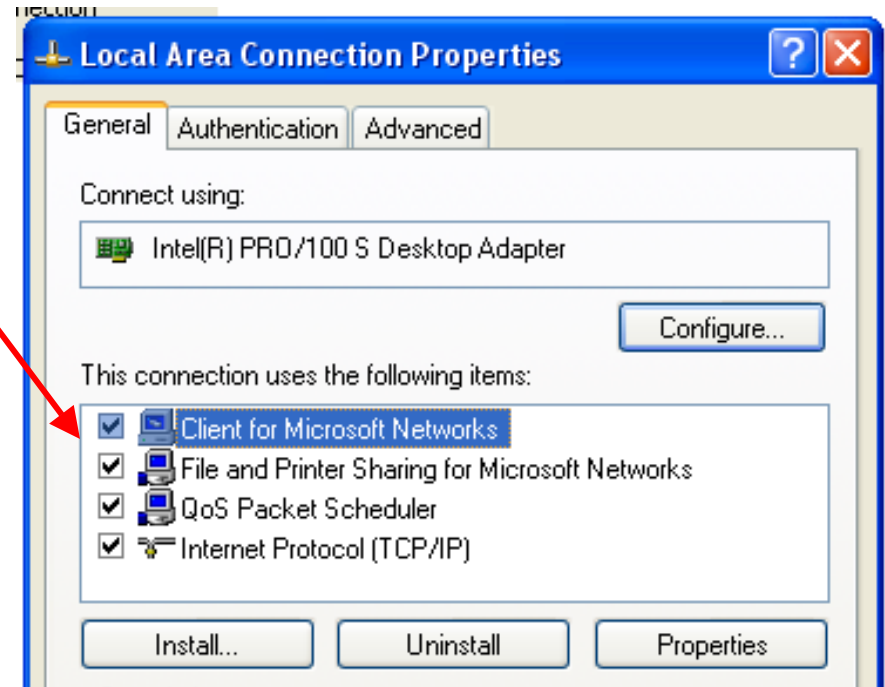
Networks: Packets

- The maximum data transfer per Unit of a packet is 1500 bytes

SYNC	PID	DATA	CRC	EOP
8 bits (low/full)/32 bits (high)	8 bits	up to ⁸ bytes (low)/1023 bytes (full)/1024 bytes (high)	16 bits	n/a

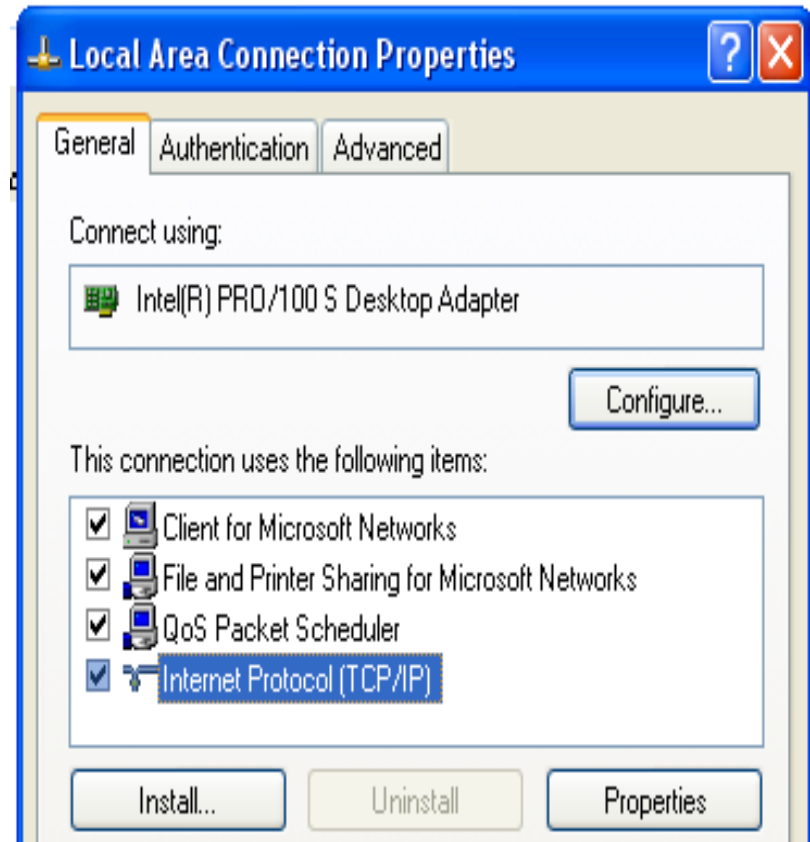
Client services

- The application that allows other computer to see your computer on a network
- Client Service for Microsoft Network
- Client Service for Netware Network



Networks: Protocols

- Applications designed to handle detail about data transfer.
- IPX/SPX (Novell)
- TCP/IP (Windows)
- TCP/IP is the de facto internet protocol



Networks: Network Standard

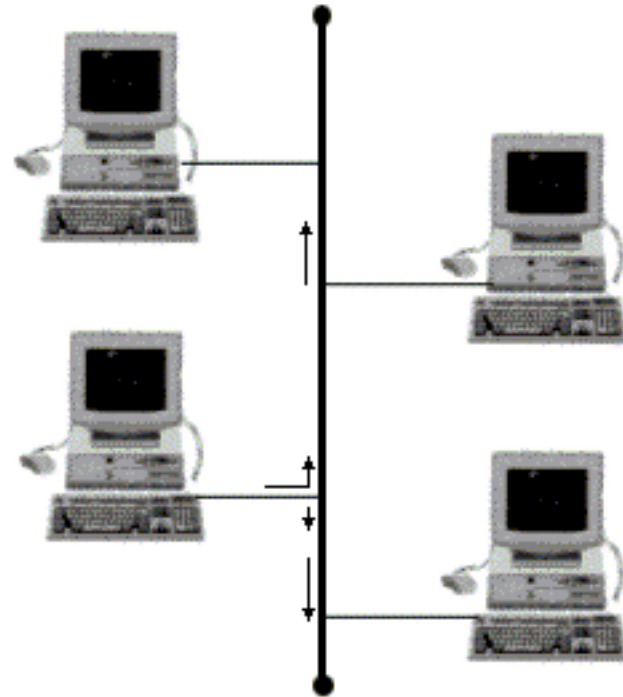
- 2 Predominant network standards.
 - Token Ring
 - Ethernet



Ethernet

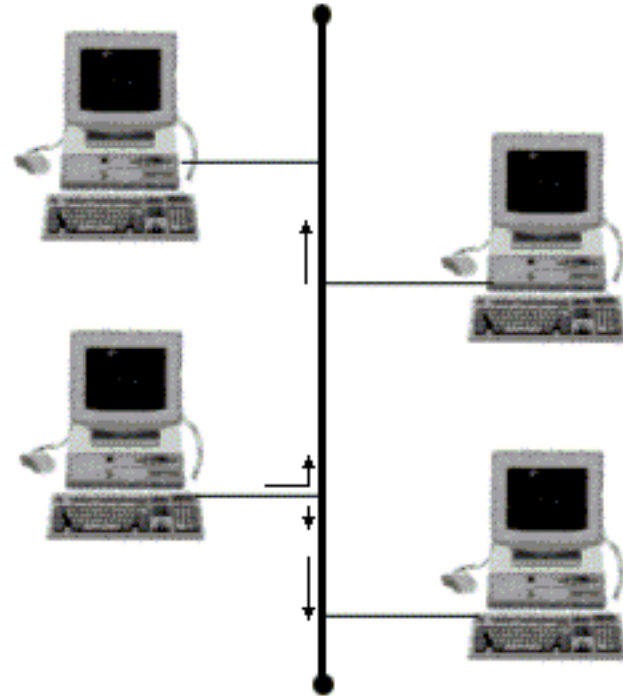
Networks: Topology

- Topology is the layout of a network.
- Two types of Topologies
 - Bus
 - Ring



Networks: Bus Topology

- PCs are connected via a single cable.
- The line must be free before any device can send a packet.
- Every network card see and read every packet
- Cable must be terminated
- CSMA/CD
 - Carrier Sense Multiple Access/CD



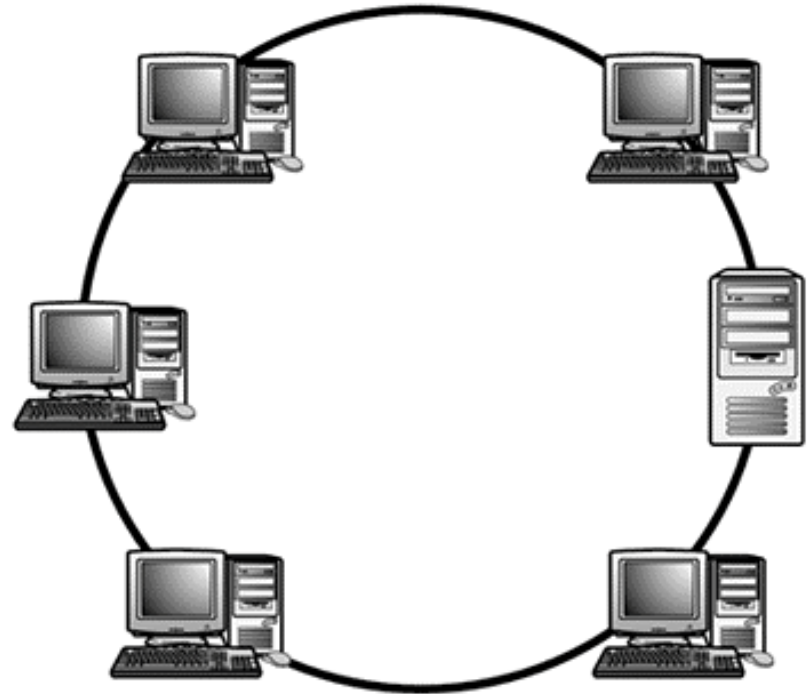
Networks: Bus Topology (Con'd)

- Reflection
- Termination
 - A terminator is a resistor that absorbs signals to prevent reflection



Networks: Ring Topology

- Ring Topology connects all PCs on a single cable like the bus topology, but its bus functions as a ring.
- Transmission method: Token Passing



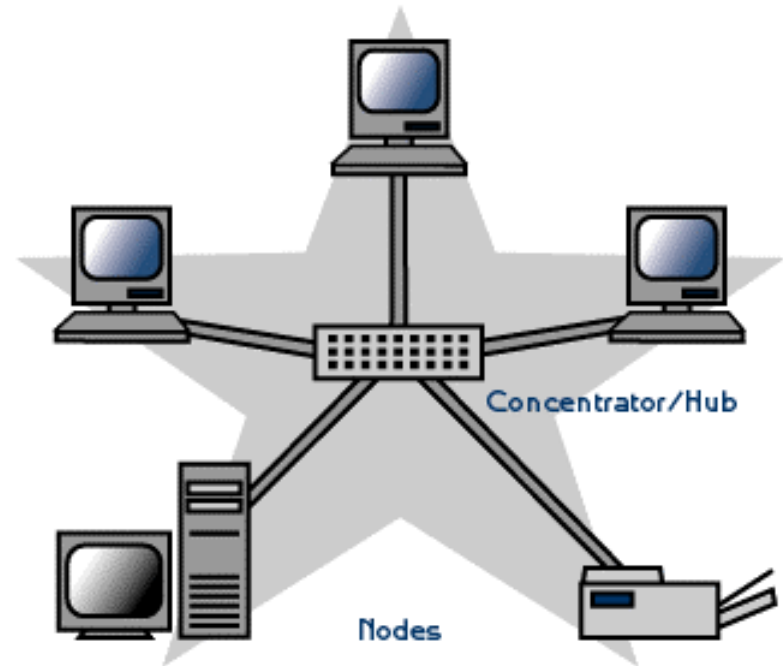
Networks: Token ring

- Token (packet) Passing via each node in one direction.
- Each node has to wait for its turn to send data
- The NIC put data in the token and place it back to the ring



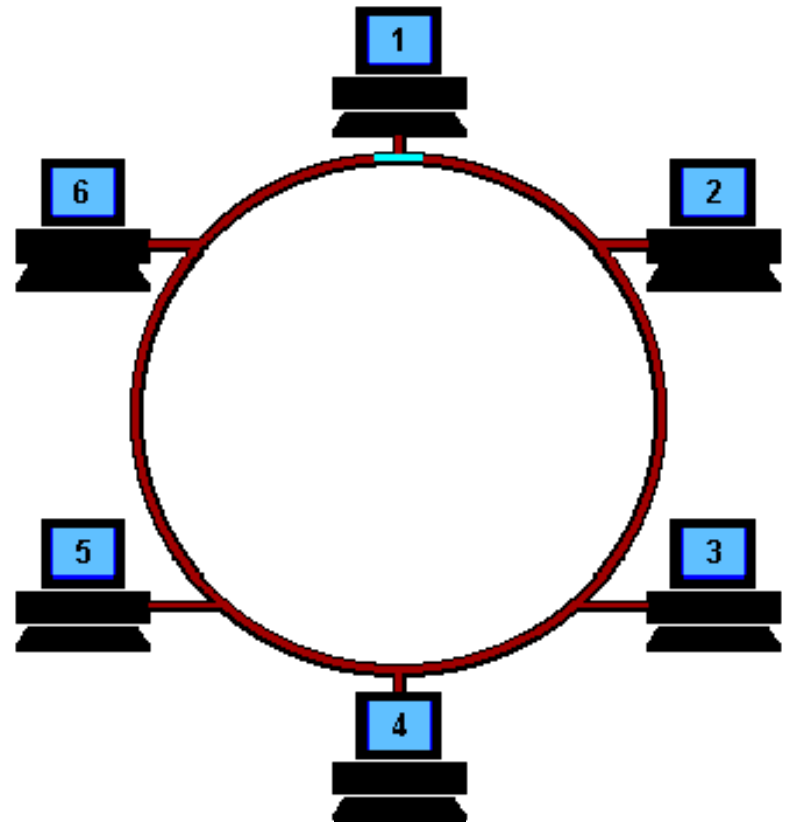
Networks: Star Ring

- Star Ring uses a special box called Multi-station Access Unit (MSAU).



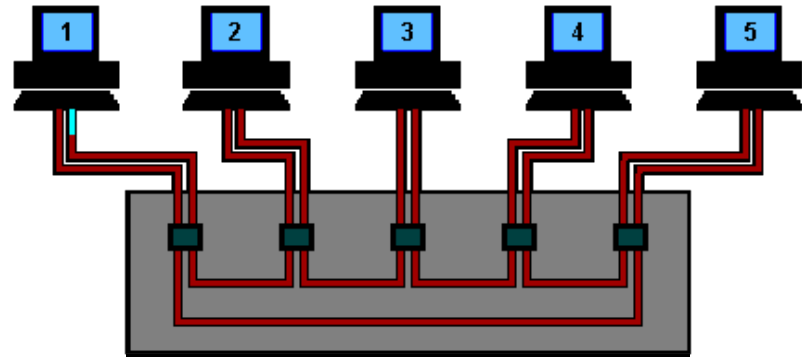
Networks: Token Ring

- Token Ring is a network topology
- Is a network standard
- The Token is passing from each computer to the other



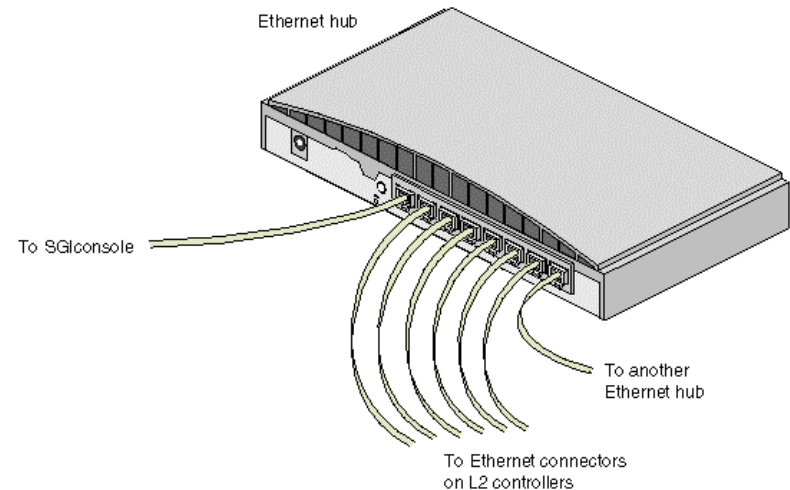
Networks: Token Ring

- Token Ring Hub
 - A Token Ring hub simply changes the topology from a physical ring to a star wired ring.
 - The Token still circulates around the network and is still controlled in the same manner.



Network: Star Bus

- Bus Topology shrink into a hub
 - The network will not be affected if one cable failed.
 - If the Hub becomes defective the network will be failed



Network: IEEE

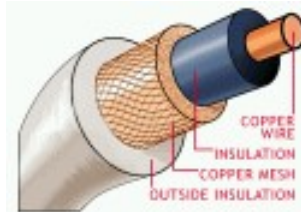
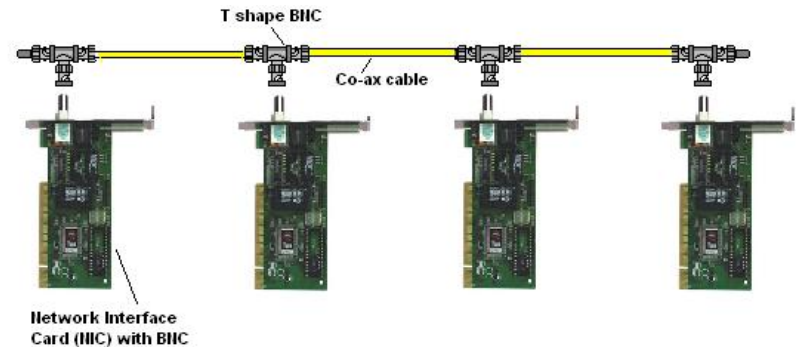
- Definition: Institute of Electronic and Electrical Engineer .
 - The world's leading professional association for the advancement of technology



Network: Ethernet Standard

- Controlled by the 802 committee of the IEEE
- Physical form:
 - 10 Base2
 - 10 Base5
 - 100BaseT
 - 100BaseFX
 - and 802.11x Wireless

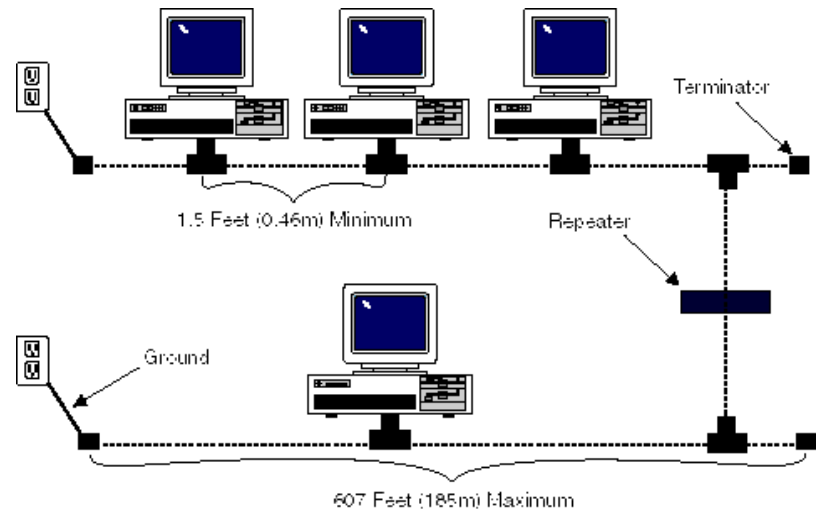
10Base5



ThickNet

Networks: 10Base2

- Use RG-58 coax cable
 - Also called ThinNet or 802.3. Use BNC and T connectors.
 - One of the terminator must be grounded.
 - Support only 30 devices per segment.
 - Maximum length of a segment is 185 meters



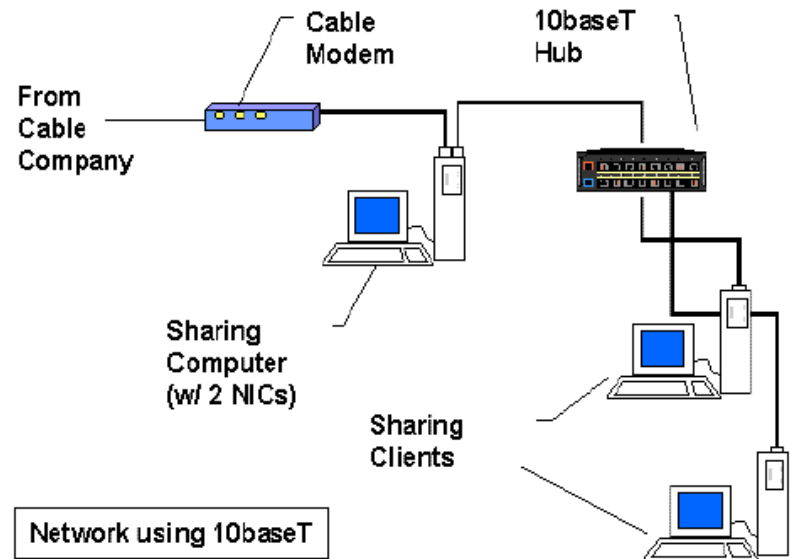
Networks: 10BaseT, 100 BaseT

- 10BaseT runs 10 Mb
- 100 BaseT runs 100 Mb
 - Maximum Length 100 meters
 - Use UTP cable (Unshielded Twisted Pair)
 - Use RJ45 Connector



Networks: Cat Levels

- Most modern Network uses 10BaseT or 100BaseT,
 - lately 1000BaseT begins to take over the networking market.
 - All 10Base Networks use UTP cable.



Networks:Cat Levels

- Cat is short for category
- UTP cables come in 7 categories that define its bandwidth.
 - Bandwidth: The maximum speed data can be transferred.



Networks:Cat Levels

- Cat 1 speeds up to 2 Mbps Standard phone line.
- Cat 2 speeds up to 4 Mbps
- Cat 3 speeds up to 16 Mbps
- Cat 4 speeds up to 20 Mbps.
- Cat 5 speeds up to 100 Mbps.
- Cat 5e speeds up to 1 Gbps.
- Cat 6 speeds up to 10 Gbps.

Networks: 10BaseT

- 10 BaseTs speed up to 10,100,1000 Mbps data transfer.
 - `100- meter segment length
 - use RJ45 connectors and UTP cabling.



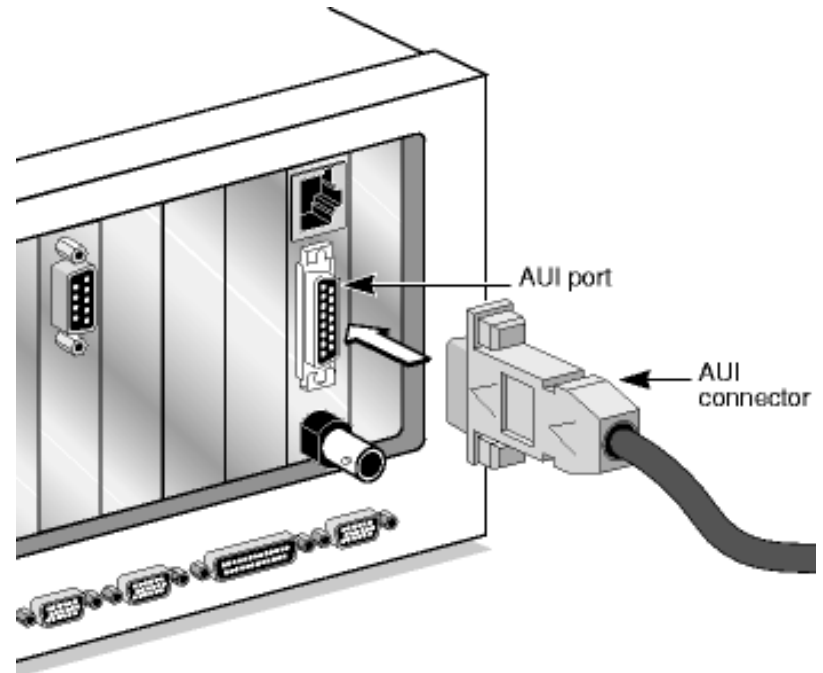
Networks: Cat 5/6

- TIA/EIA 568A and 568B are the two applicable standard for Cat 5/6.



Network: 10Base

- 10 Base2, 10Base5, 10BaseT use the same language
 - Combo NIC can support all these type of connections



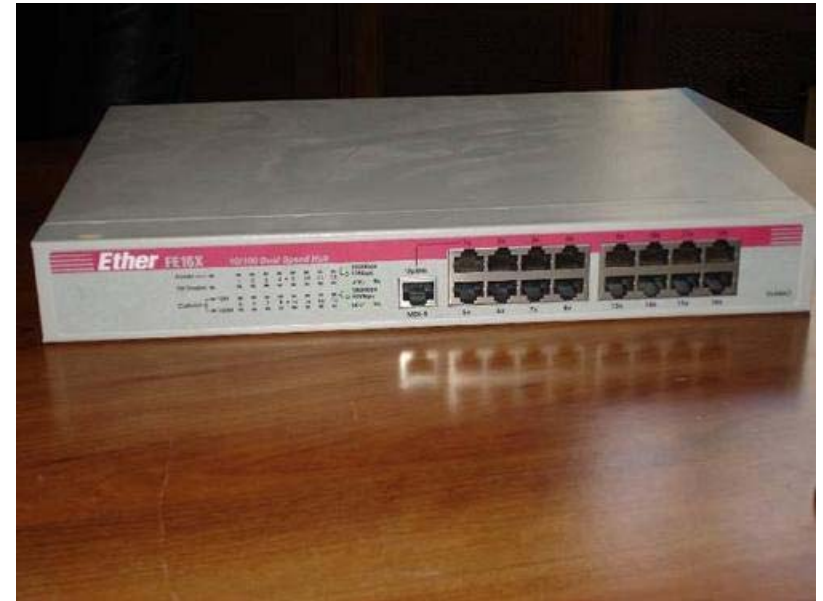
Networks: Repeater

- Electronic device that can amplify the signal on a line.
 - Allows to extend the length of a network segment.
 - Increase separation between PCs up to 200 meters in a 10BaseT network



Networks: Hub and switch

- Each PC is connected to a 10BaseT network via a switch or a hub



HUB

- When a hub receives a packet of data at one of its ports from a PC on the network, it transmits (repeats) the packet to all of the other PCs on the network. If two or more PCs on the network try to send packets at the same time a collision will occur.



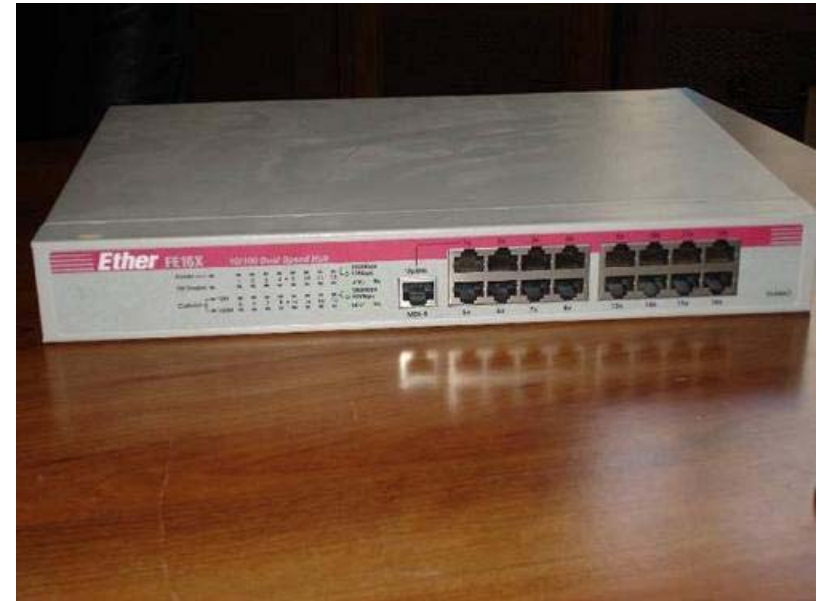
Switch

- A switch automatically divides a network into multiple segments and supports simultaneous connections of multiple pairs of computers which don't compete with other pairs of computers for network bandwidth.



Networks: Hub and Switch

- The maximum length between a hub/switch and any other device is 100 meters.
 - The maximum number of PC on a hub/switch is 1024.
 - 10baseT switch can also act as a repeater



Networks: Crossover cable

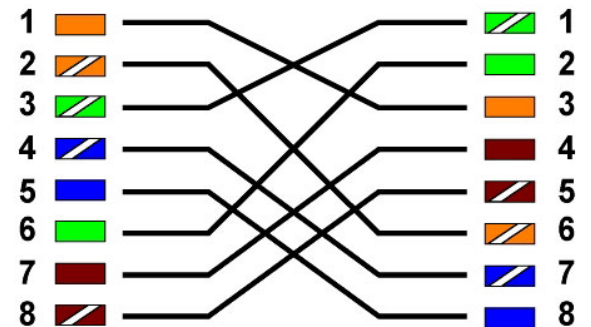
- Crossover cable is a quick way to network two PCs with out a hub.



EIA/TIA T568B Straight Through Diagram

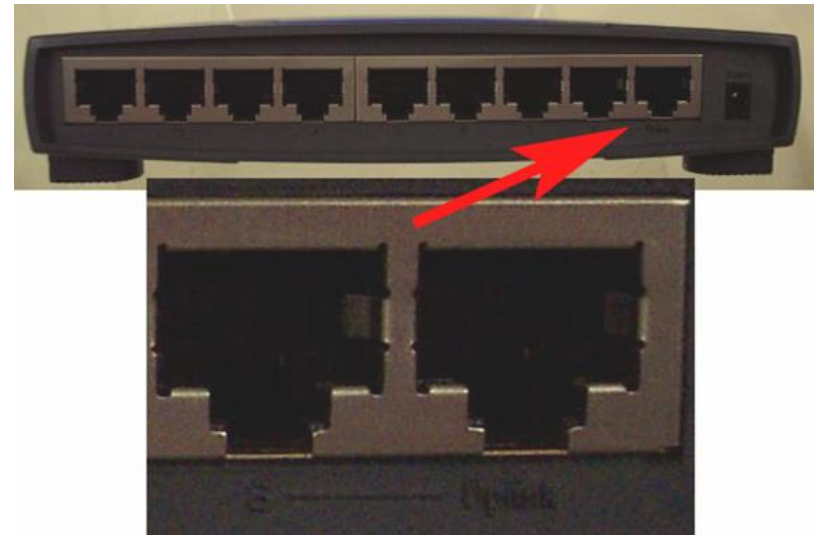


EIA/TIA T568B Crossover Diagram



Networks: Scaling

- Network can be extended by adding hub or switch via a normal patch cable.
- Hub/switch are linked via Uplink ports.
- There are switch that have up to 64 ports.



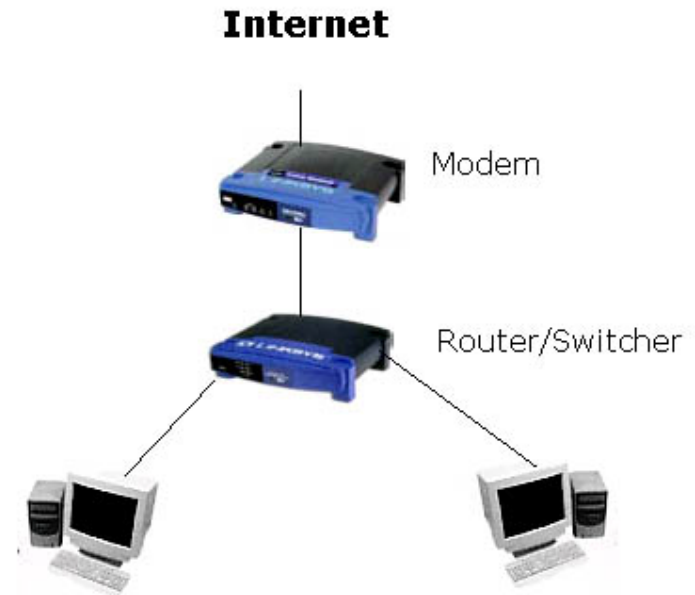
Networks: Bridge

- A device that connects two networks.



Networks: A Router

- A Device uses for internet sharing
 - Can duplicate IP addresses.
 - Act as traffic signal to direct traffic in Wide Area Network



End of the presentation

- Thank you

