

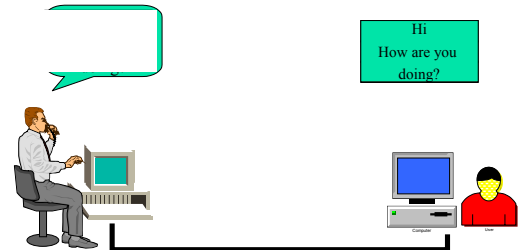
Introduction to Computer Networks

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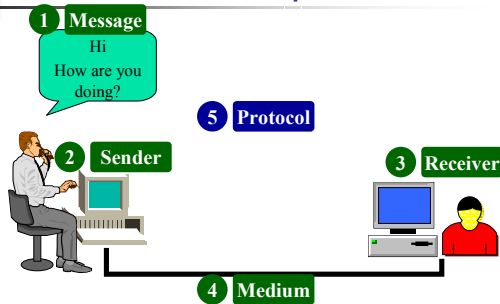
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Data Communication



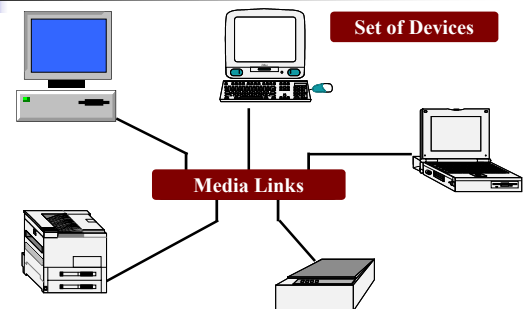
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Data Comm. Components



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Networks



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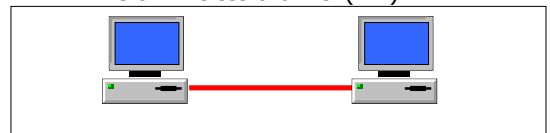
The relationship of communication devices

- Line Configuration
 - Point-to-point
 - Multipoint
- Topology
- Transmission Mode
- Categories of Networks
- Internetworks

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Point-to-point

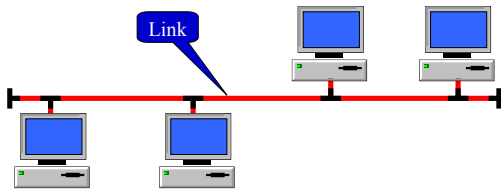
- Link between two devices
- Use entire channel capacity for communication
- Wire or wireless channel (link)



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Multipoint

- More than 2 devices share a single link
- Channel capacity is shared



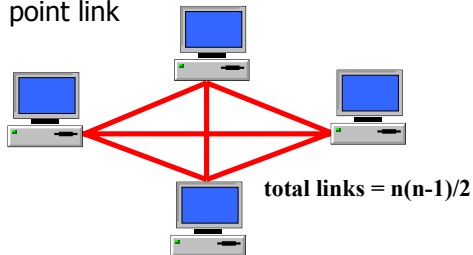
Topology

- The way a network is physically or logically layout
- 2 or more devices connected to a link
- 2 or more links form a topology
- Basic topologies
 - Mesh
 - Star
 - Tree
 - Bus
 - Ring
 - Hybrid

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Mesh Topology

- Each device has a dedicated point-to-point link



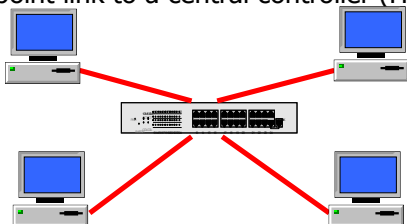
Mesh Topology

- Advantages
 - High throughput
 - Robust
 - High Security
 - Easy to cope with fault
- Disadvantages
 - Number of cables – space & cost (material, install.)
 - Number of I/O ports
 - Difficult to reconfigure
- Usage
 - Backbone connecting

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Star Topology

- Each device has a dedicated point-to-point link to a central controller (Hub)



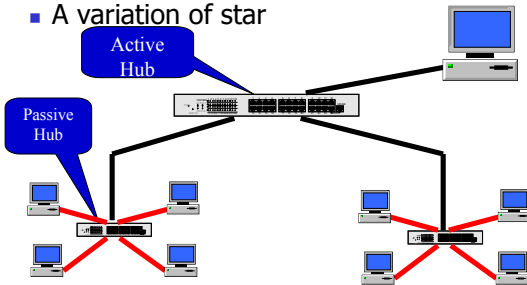
Star Topology

- Advantages
 - Less expensive (cable) than Mesh
 - One I/O port
 - Easy to install and reconfigure
 - Robust
 - Easy to cope with fault
- Disadvantages
 - High Number of cables (cost)
- Usage
 - Ethernet

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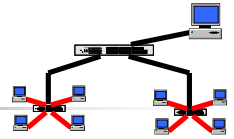
Tree Topology

- A variation of star



Tree Topology

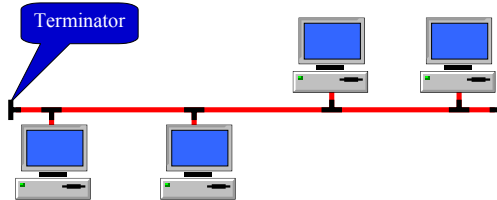
- Advantages
 - Same as star
 - Increase the distance
 - Allow network to isolate / prioritize
- Disadvantages
 - Same as star
- Example
 - Cable TV



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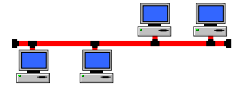
Bus Topology

- Each node connects to the Bus (a long cable running as a backbone)



Bus Topology

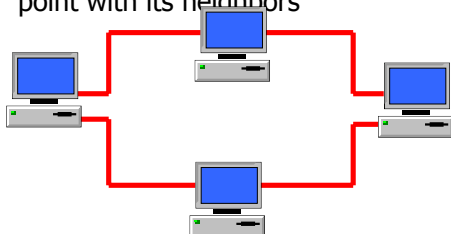
- Advantages
 - Easy to install
 - Less cable compare to other topologies
- Disadvantages
 - Difficult to cope with fault
 - Difficult to modify
 - Not robust



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Ring Topology

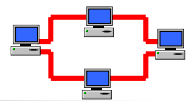
- Each device has a dedicated point-to-point with its neighbors



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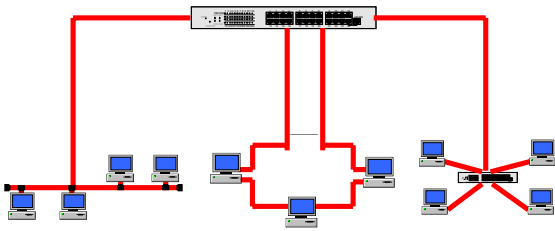
Ring Topology

- Advantages
 - Easy to install
 - Easy to cope with fault
- Disadvantages
 - Not robust



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Hybrid Topologies



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The relationship of communication devices

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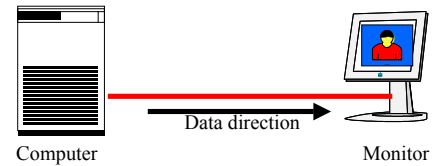
Transmission mode

- The direction of signal flow between two linked devices
- Three types of transmission modes
 - Simplex
 - Half-duplex
 - Full-duplex

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Simplex

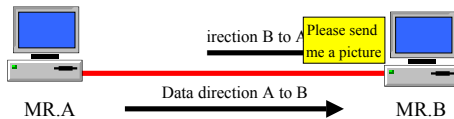
- Unidirection
- While one node transmits, the other receives



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Half-Duplex

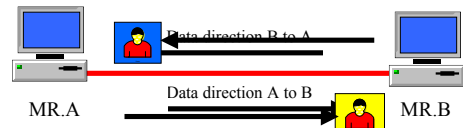
- Each node can both transmit and receive
- One at a time



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Full-Duplex

- Each node can both transmit and receive at the same time



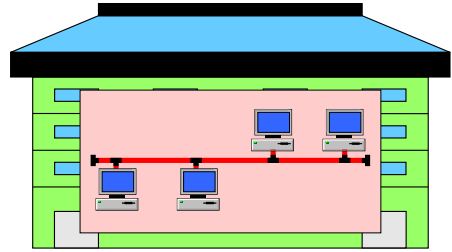
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Categories of Networks

- Local Area Network (LAN)
- Metropolitan Area Network (MAN)
- Wide Area Network (WAN)

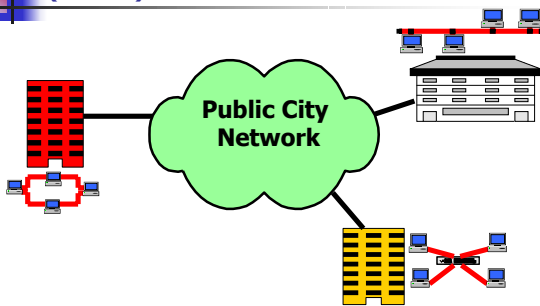
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Local Area Network (LAN)



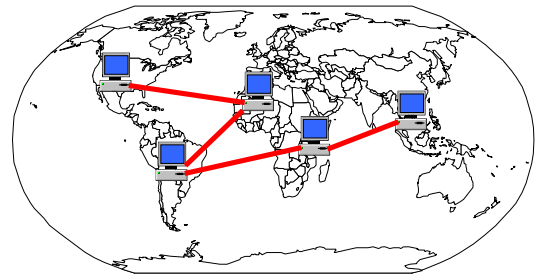
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Metropolitan Area Network (MAN)



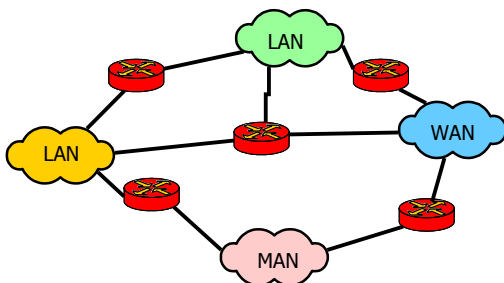
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Wide Area Network (WAN)



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Internetworks



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Client - Server

