Classification of Networks and Network Topologies

Classification of Networks

- Criteria of classification
  - Technique
  - Scale/Size

Classification of Networks

- Classification based on Technique
  - Broadcast Networks
  - Point-to-Point Networks

Classification Based on Technique

- Broadcast Networks
  - Single communication channel shared by all the machines
  - A packet sent by one machine is received by all other machines in the network
  - Packet is accepted or rejected based on the destination address

Classification Based on Technique

- Broadcast Networks facilitate
  - Broadcasting
  - Multicasting
  - Unicasting

Classification Based on Technique

- Point-to-Point Networks
  - Separate communication channel between two individual machines
  - A packet sent by one machine is received by only the intended (destination) machines

Classification Based on Technique

- Point-to-Point Networks facilitate
  - Unicasting
  - Multicasting
  - Broadcasting

Classification of Networks

- Classification based on Scale/Size
  - Local Area Networks (LAN)
  - Metropolitan Area Network (MAN)
  - Wide Area Network (WAN)
  - Personal Area Network (PAN)
  - Control Area Network (CAN)

Classification Based on Size

- Local Area Networks
  - Privately owned
  - Within a building or a campus

  Example: IEEE 802.3, 802.5, 802.11x

Classification Based on Size

- LAN Characteristics
  - Broadcast Medium
  - High Speed
  - Restricted size: few kilometers (2-3km)
  - Very less transmission time i.e. low delay
  - Very few errors
  - Supports (primarily) data

Classification Based on Size

- Metropolitan Area Networks
  - Private or Public
  - Within the city boundary
  - IEEE 802.6 Standard
    - ❖ Distributed Queue Dual Bus (DQDB)

Classification Based on Size

- MAN Characteristics
  - Broadcast Medium
  - High Speed
  - Restricted size: 10 kilometers
  - Low transmission time
  - Supports both Data and Voice

Classification Based on Size

- Wide Area Networks
  - Primarily Public Networks
  - Spans large geographical area
  - Communication aspects are separated from Application aspects
    - ❖ Communication Subnet
    - ❖ Hosts

  Example: ERNET, NKN, Internet

Classification Based on Size

- WAN Characteristics
  - Primarily point-to-point medium
  - Lower Speeds
  - Shared resources
  - Higher delays
  - High cost of bandwidth

Classification Based on Size

- PAN
  - Meant for one person
  - Primarily use wireless technology

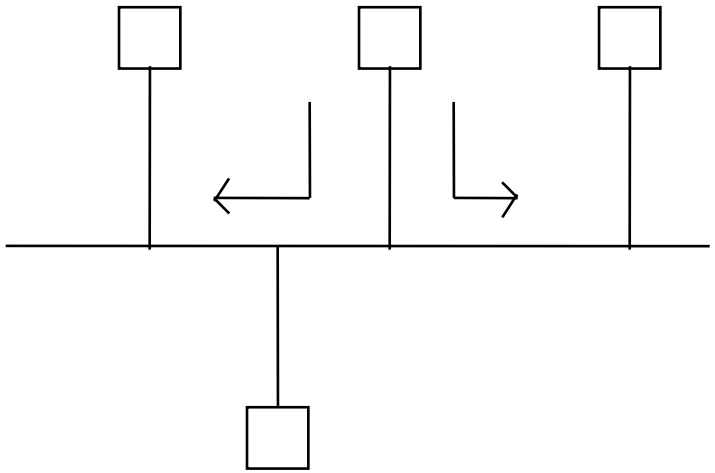
  Example: Bluetooth

Network Topology

Network Topologies

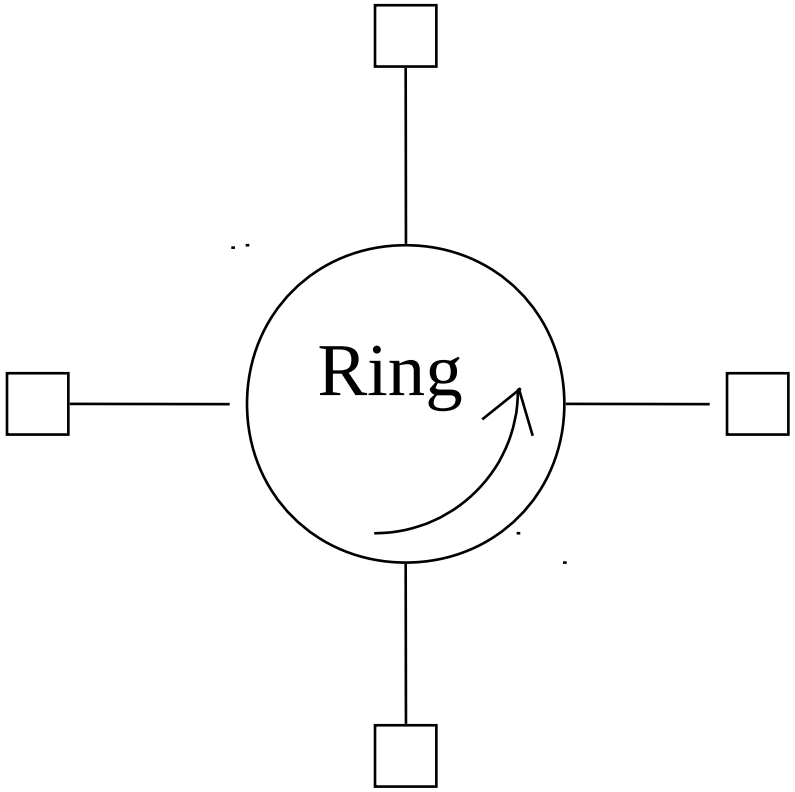
- Topology
  - Geometrical arrangement of wiring scheme
- Physical Topology
  - Describes the way actual cables are routed
- Logical Topology
  - Describes the way the network behaves

Bus Topology



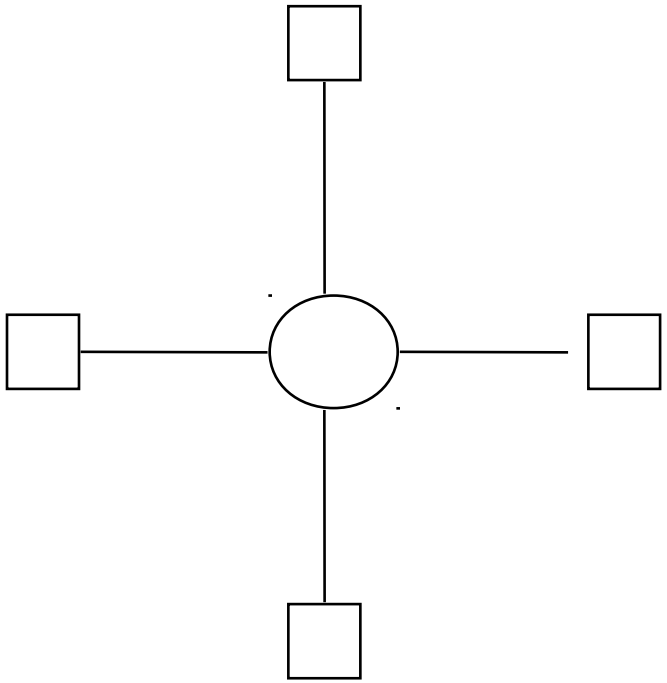
- Shared Media
- Access to shared media done by distributed control
- Bidirectional broadcast

Ring Topology



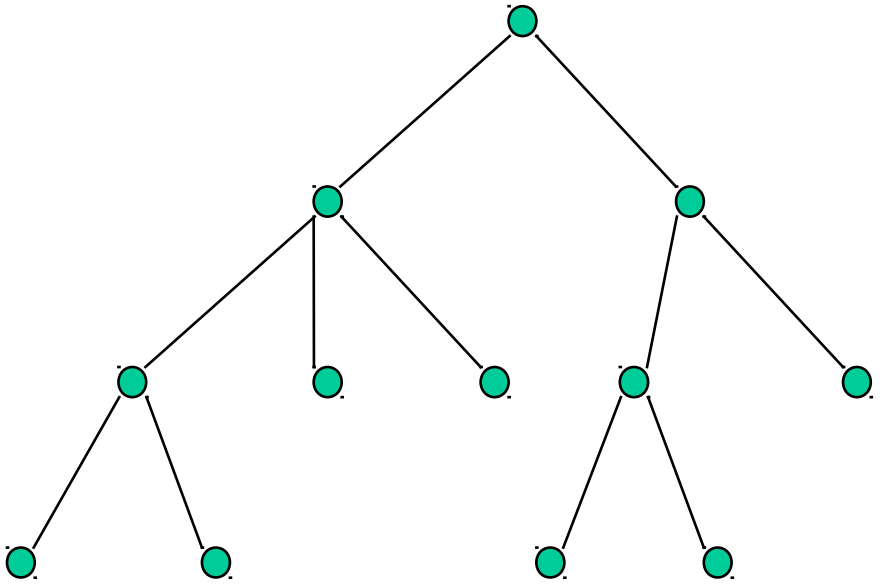
- Shared media
- Access to shared media done by distributed control
- Unidirectional broadcast

Star Topology



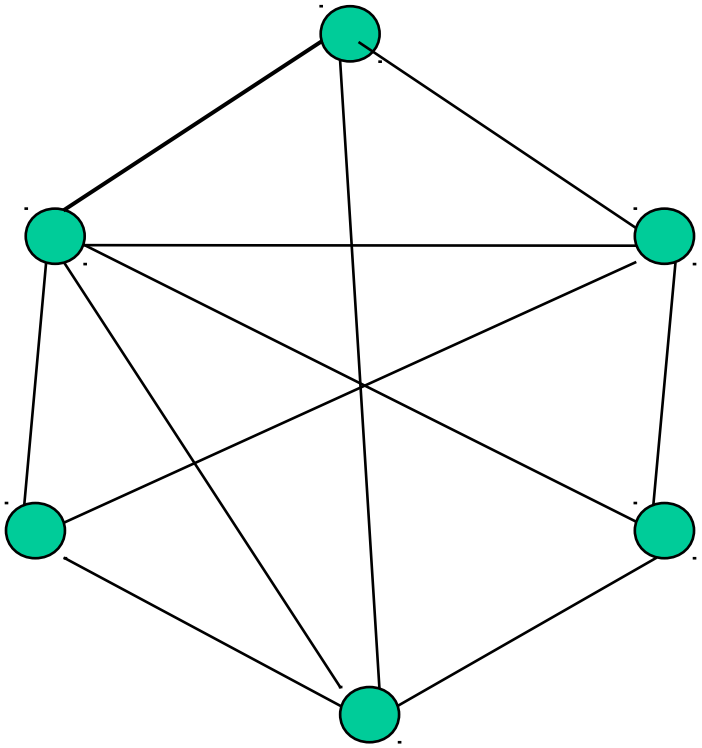
- Media not shared
- Centralized switching / connection function

Tree Topology



- Hierarchical Structure
- Media not shared
- Point-to-point links

Mesh Topology



- Peer-to-Peer
- Media not shared
- Point-to-point links
- Multiple links from one node to the other node

Wish you a happy

Makar Sankranti & Pongal!