

Introduction

Session 01

Network Component - Network Type - Network Topology
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■ Component of network

- o PC Having (NIC) Network Interface Card.
- o Switch.
- o HUB (old version of switch device).
- o Cable.
- o Router.

Note: Hub work with Broad-cast (Flood), Hub cause 'Loop' because of hub send packet to all, when un-target pcs drop packet and send it back to hub, hub will take return packet and re-send it again to all So on.
so any place work with hub every few no. of hours disconnect hub physically (power off) to avoid Broadcast storm (Broad-cast Loop).

Note: Switch consider as important device in LAN.

Note: every switch model has different number of ports.

Note: switch when start to work depend on Flood (Broad-cast), until build table called 'Switching-table' (Switching table: contain two columns: 1- Port, 2- Mac Address).

Note: Ports Type:

- Ethernet port 10mbit/s
- Fast-Ethernet port 100mbps
- Giga-Ethernet Port 1000mbps

Transmission Modes:

- simplex: it's a one-way communication where the sender can only transmit, and the recver can only receive (e.g radio and tv broadcasting)
- Half-Duplex: Send or receive in same time (ex: Woki Toki),(One Line for send and receive).
- Full-Duplex: Send and receive in same time (ex: Phone),(One Line send and One Line receive).

Note: Old Devices (Switch and Hub) was use one line (half-duplex) to send and receive which mean probably cause Collision when send packet during receive one.

Note: old switch that was work with Half-duplex ports calling protocol called

Note: Cables Types:

- **Coaxial** (10 Base 2 185m thin, 10 Base 5 500m thick)
 explain: speed: 10mb/s, thick:20mm, transfer Data for 185m
 Connector → BNC.

why didn't use Coaxial Cable?

- Hard (not soft), - Half-Duplex, All Switch have UTP Ports so get converter from Coaxial to UTP.

- **UTP (unshielded c) OR (STP : shield twisted pair)**

10 Base T Cat 5 100m, 100 Base T cat 5 e 100m, 1000 base T cat 6 100m
 explain: Speed: 100mb/s, Twisted pair, Category 5 Enhanced , transfer data for 100m .

Connector → RJ-45m

STP CATEGORY	PURPOSE	BANDWIDTH	DATA TRANSFER RATE
Cat1	Voice only	N/A	N/A
Cat2	Data	4 MHz	4 Mbps
Cat3	Data	16 MHz	10 Mbps
Cat4	Data	20 MHz	16 Mbps
Cat5	Data	100 MHz	100 Mbps
Cat5e	Data	100 MHz	1 Gbps
Cat6	Data	250 MHz	Up to 10 Gbps
Cat6a	Data	500 MHz	Up to 10 Gbps
Cat7	Data	600 MHz	Up to 10 Gbps
Cat7a	Data	1 GHz (1000 MHz)	Between 40 and 100 Gbps
Cat8	Data	2 GHz (2000 MHz)	Between 25 and 40 Gbps

-Fiber Optics

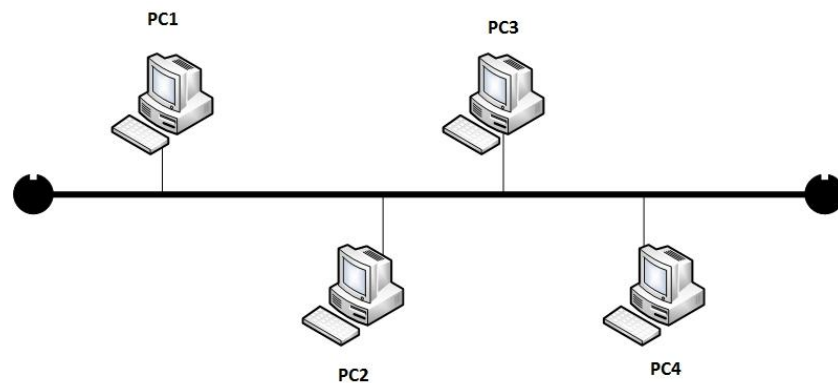
- when use fiber in LAN use 'multimode 500m'
- when use fiber for connect WAN 'Single-mode 80k'
- Connector: Termination.
- speed: Lambda (up to 10 terabit/s)

■ Type of network

- o Personal Area Network (PAN) (X)
- o Local Area Network (LAN) (1 Build)
- o Campus Area Network (CAN) (Factories – Hotel)
- o Metropolitan Area Network (MAN) (Cites)
- o Wide Area Network (WAN) (Countries)

■ Network Topology

- o Common Bus Topology



▪ Advantage

- Very easy to connect a computer to a linear bus.
- Require less cable than a star topology.
- It works well for small networks.

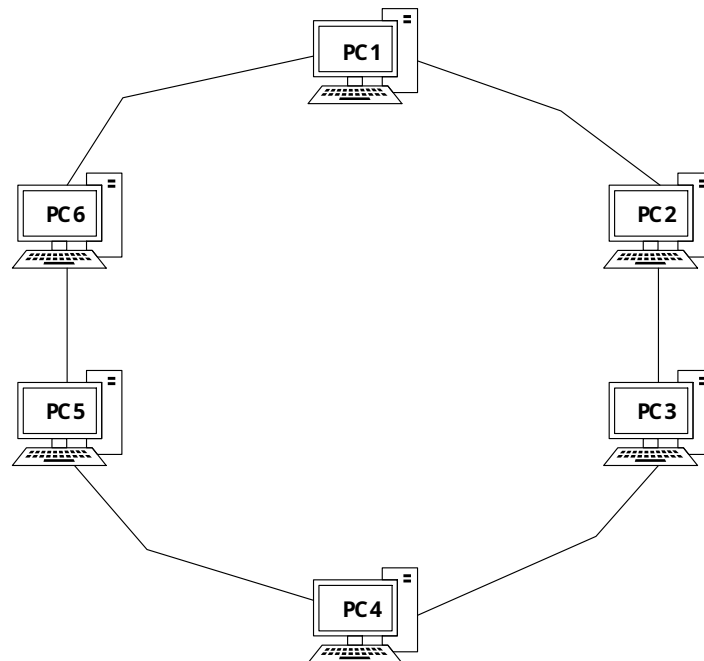
▪ Disadvantage

- Entire network shut downs if there is a break in main cable or one of the T connectors break.
- Large amount of packet loss due to collision on network.

Note: when collision is occurred?
cast, Collision
- two device send packet at same time.

Note: Broad-

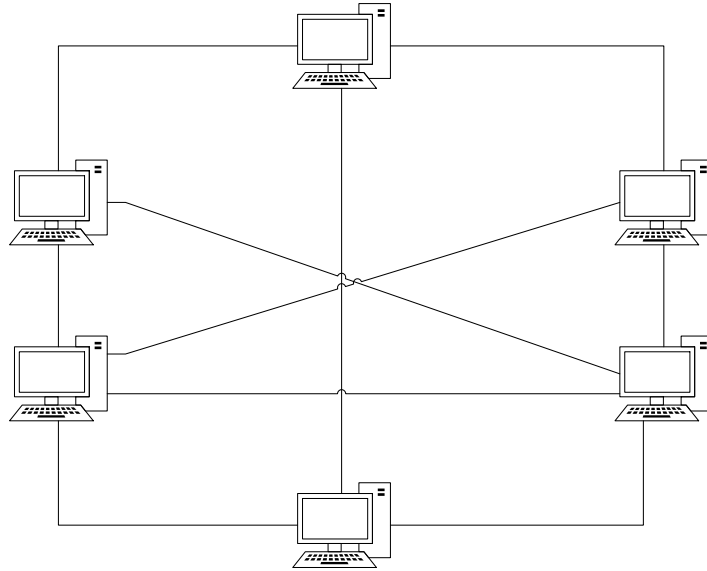
o Ring Network Topology



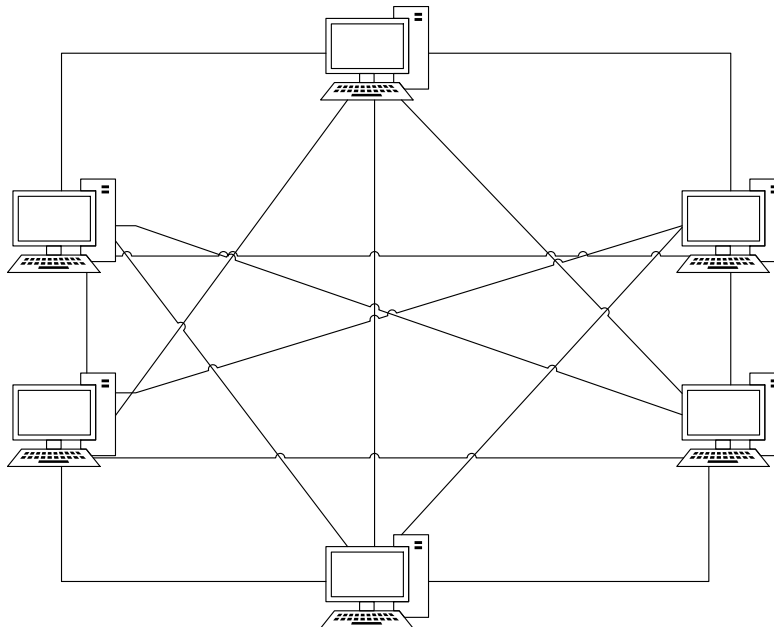
- Every PC connected with next pc and pervious pc.
- Every pc want to send packet must wait token pass.

Note: Ring Network topology need special NIC.

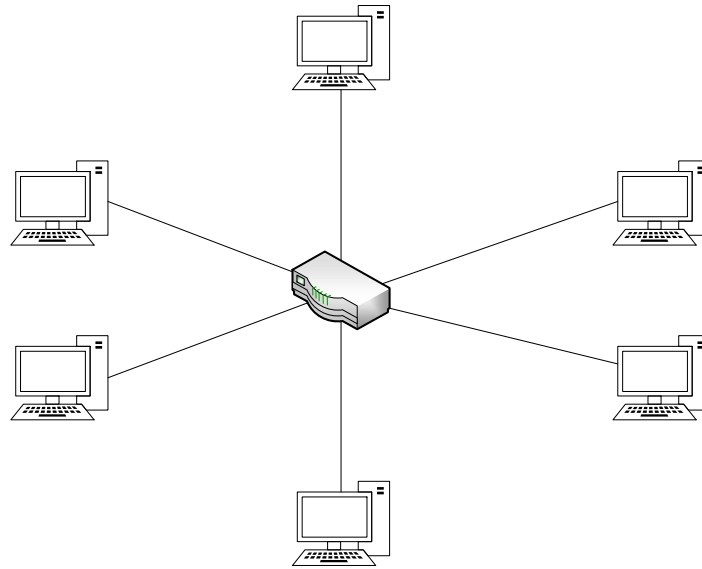
o Mesh Topology



- Every pc connecting with other with 2 cable or more.
- o Full mesh Topology



- Every pc connecting with other pc with special cable.
- o Star Network Topology



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