

6.0 COMPUTER NETWORK (PART I)

**School of Education
Faculty of Social Sciences and Humanities**

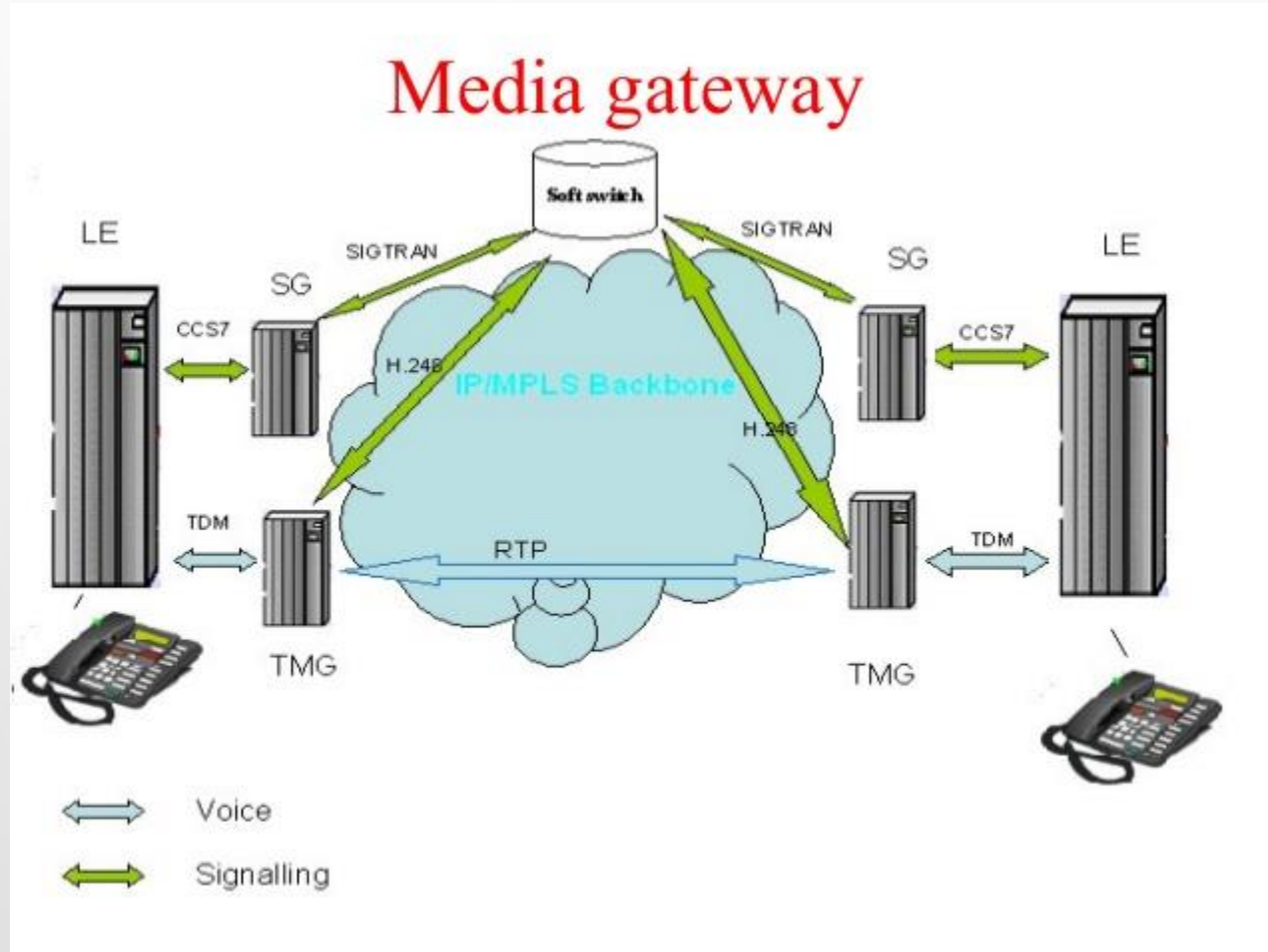
6.1

NETWORKING HARDWARE

Gateway



Gateway



Gateway

Kehijauan hutan pengubat mata,
Senyum terukir penambah seri;
Assalamualaikum pembuka kata,
Gerbang Jaringan tajuk diberi.

Termenung jauh sambil berangan,
Berangan hidup berdua serasi;
Fungsi berhubung disetiap jaringan,
Email diberi contoh “aplikasi”.

Gateway

Ahmad cakap dia suka,
Berjalan kaki dengan gadis bertudung;
Lebihnya pada privasi terjaga,
Tambahan pula jaringan terlindung.

Jauh berjalan hingga ke kempas,
Tanpa mengira penat dan lelah;
Kurangnya kerana akses terbatas,
Tidak dapat berhubung dengan mudah.

Router



*P
E
N
G
H
A
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A*

Router

- Alat penghubung antara 2 atau lebih jaringan komputer untuk meneruskan data dari satu jaringan ke jaringan lain.
- Menyampaikan paket data melewati jaringan internet hingga sampai ke tujuannya.

Jenis Router

- **ROUTER PC**
 - Menggunakan komputer yang telah diubah suai untuk dijadikan sebagai router.
 - Bahagi dan berkongsi IP adress
- **ROUTER APLIKASI**
 - Aplikasi yang di install pada sistem operasi sehingga sistem operasi miliki kemampuan router.
- **ROUTER HARDWARE**
 - Bahagi sambungan internet pada suatu ruang dan wilayah

Switch

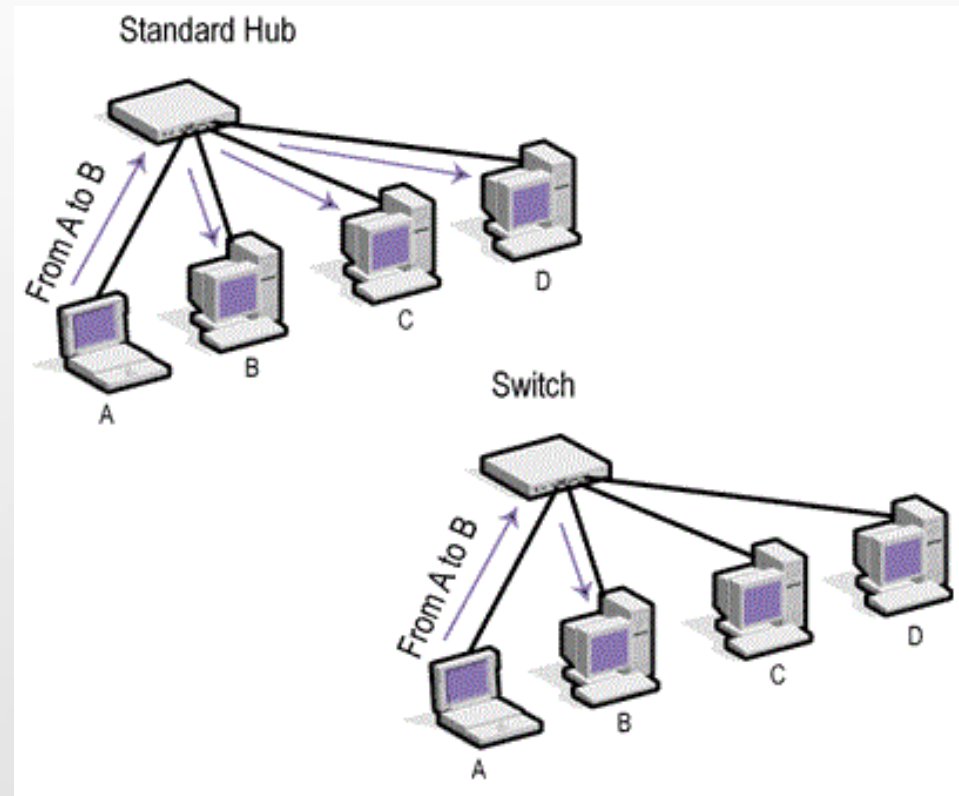


Switch

Putih-putih si burung merpati,
Terbang-terbang berak merata,
Switches ini ada fungsi,
Fungsinya mengawal aliran data.

Cantik-cantik si rama rama,
Terbang-terbang bertempiaran,
Fungsinya menentukan alamat penerima,
Tangani kesilapan ketika penghantaran.

Switch VS Hub



Bridge



Bridge

Pisang emas, diatas perahu

Enak dimakan, bersama mayonis

Kalau tuan, ingin tahu

Bridge ada, empat jenis

Pemain liverpool, Daniel Sturridge

Ada anak, namanya Zuckerperth

Antaranya transparent, dan simple bridge

Selebihnya multiport, dan shortest path

Bridge

Merah menyala si bunga raya,
Biarkan ia mekar di sana,
Izinkan saya mula bicara,
Agar manfaat diperoleh bersama.

Ayam berkokok di atas bumbung,
Berkokok pula dirumah NurAin,
Bridge merupakan perangkat penghubung,
yang menghubungkan jaringan LAN dan yang lain.

Kelebihan Bridge

Bernyanyi Cik Siti di atas buaian,
Seakan berangan di panggung teater,
Bridge boleh memanjangkan rangkaian,
Bertindak sebagai repeater,

Pergi ke sungai mencuci mencuci pakaian,
mencuci pakaian diiringi nyanyian,
Bridge boleh mengurangkan trafik rangkaian,
Kerana pembahagian komunikasi rangkaian.

Repeater



Repeater

Repeaters (continued)

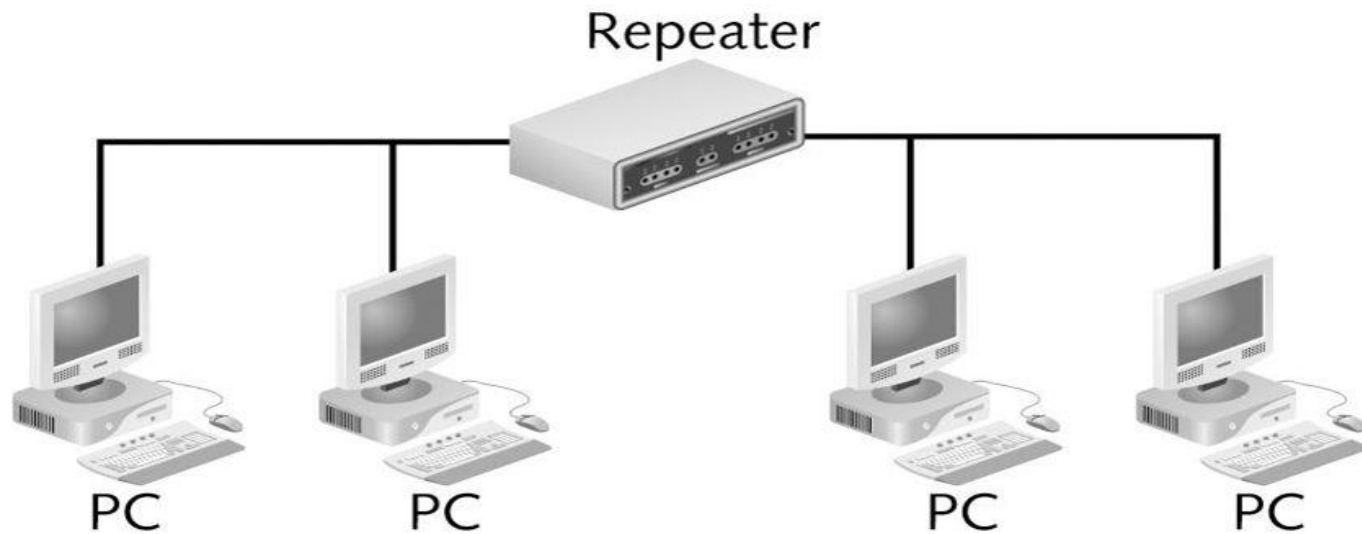


Figure 2-2 Repeater in the network

Repeater

1) Fungsi:

- Sebuah alat elektronik yang menerima dan menghantar signal.
- Memanjangkan/meluaskan signal.
- Menguatkan signal.

2) Jenis-jenis:

i) Telefon repeater

Contoh : Amplifier

ii) Optical repeater

Contoh : Optoelectronic

iii) Radio repeater

Contoh : Radio

iv) Network repeater

Contoh: Extender/Repeater

Networking Hardware

Gateway: an interface providing a compatibility between networks by converting transmission speeds, protocols, codes, or security measures.

Router: a networking device that forwards data packets between computer networks. A data packet is typically forwarded from one router to another through the networks until it reaches its destination node (OSI layer 3).

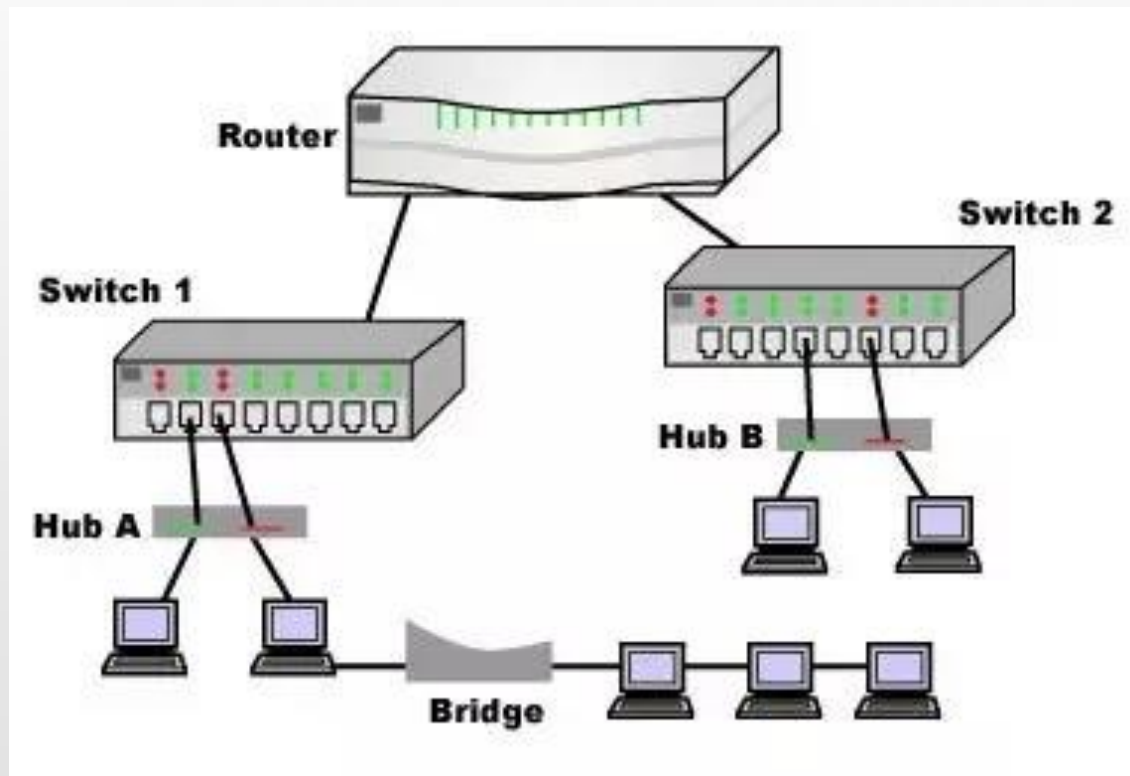
Switch: a device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device. (OSI layer 2)

Hub: a device that broadcasting the same data out of each of its ports (OSI layer 1).

Bridge: a device that connects multiple network segments (OSI layers 1 and 2).

Repeater: an electronic device that receives a signal and retransmits it at a higher level or higher power, so that the signal can cover longer distances

Networking Hardware



6.2

NETWORK TOPOLOGY

Network Topology

- Computer network topology is the way various components of a network (like nodes, links, peripherals, etc) are arranged.
- Network topologies define the layout, virtual shape or structure of network, not only physically but also logically.
- The way in which different systems and nodes are connected and communicate with each other is determined by topology of the network.

Network Topology

- **Physical Topology** is the physical layout of nodes, workstations and cables in the network.
- **Logical topology** is the way information flows between different components.

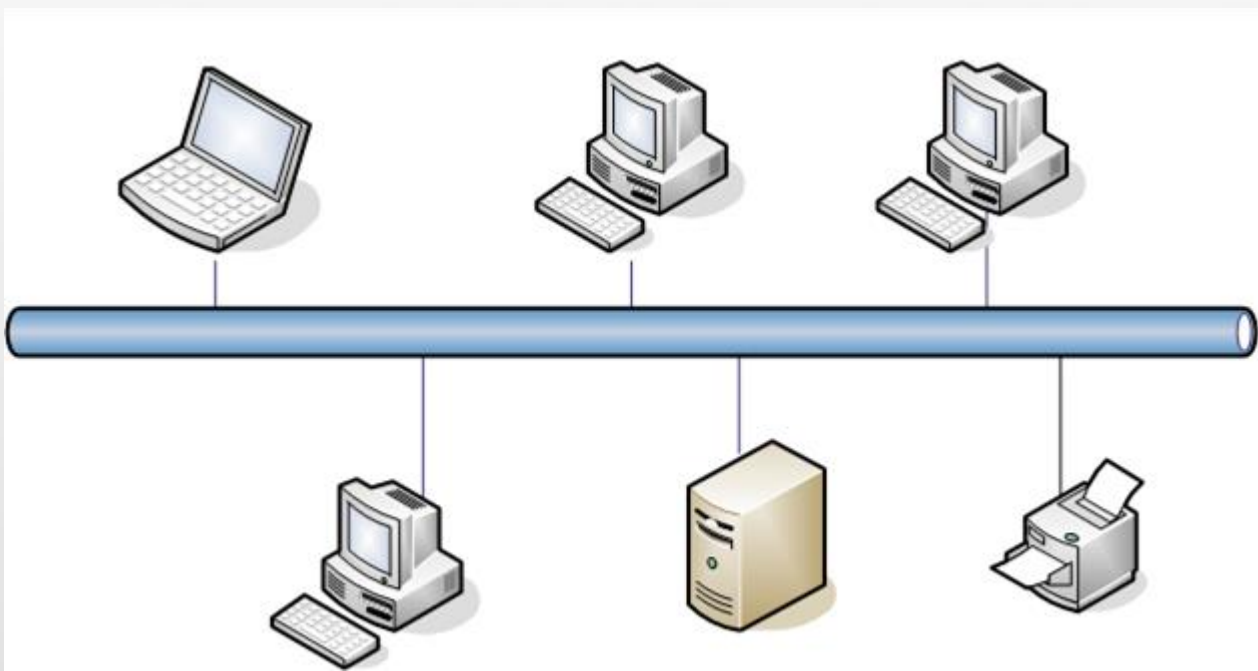
Types of Network Topology

- Bus Topology
- Star Topology
- Ring Topology
- Mesh Topology
- Tree Topology
- Hybrid Topology

Bus/ Linear Topology

- Computers are connected through a common communication media.
- A special type of central wire called Bus is used as communication media.
- The computer are attached through the bus the ends of the bus are closed with the terminator.
- The terminators are used to absorb signals.

Bus Topology



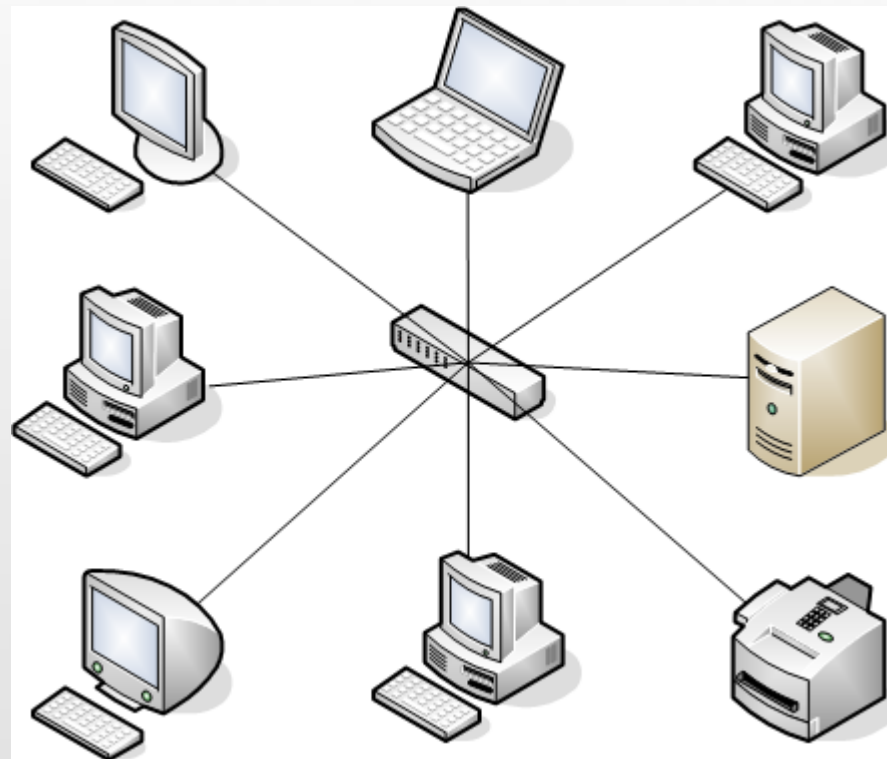
Bus Topology

Advantages	Disadvantages
<ul style="list-style-type: none">● Easy to install and configure● Inexpensive● Easily extended	<ul style="list-style-type: none">● Performance decreases● Weak signals● Difficult troubleshooting● Bad connection to the cable can bring down the entire network

Star Topology

- Uses a separate cable for each work station.
- The cable connects the work station to a central device typically a HUB.
- The configuration provides a more reliable network that is easily expended.
- If there is a problem with the cable only the station connected to that cable is affected.
- To add more work stations simply connect another HUB.

Star Topology



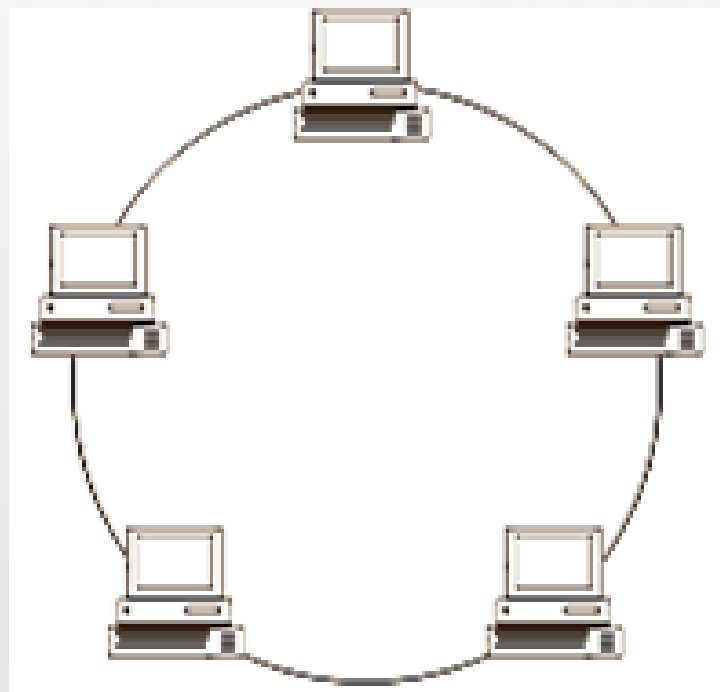
Star Topology

Advantages	Disadvantages
<ul style="list-style-type: none">● Easily expanded and modified● Easy to troubleshoot● Multiple cable types supported by hub	<ul style="list-style-type: none">● If hub fails then entire network will fail● Require more cables● May require a device to rebroadcast signals across the network

Ring Topology

- The messages flow around the ring in one direction.
- A short message called token (memory area) is passed around a ring until a computer wishes to send information to other computers.
- That computer modifies token, adds an electronic address and data and send it around the ring.
- Each computer in sequence receives the token until the data is received or return to its origin.
- The receiving computer returns a message to the sender indicating that message has been received.

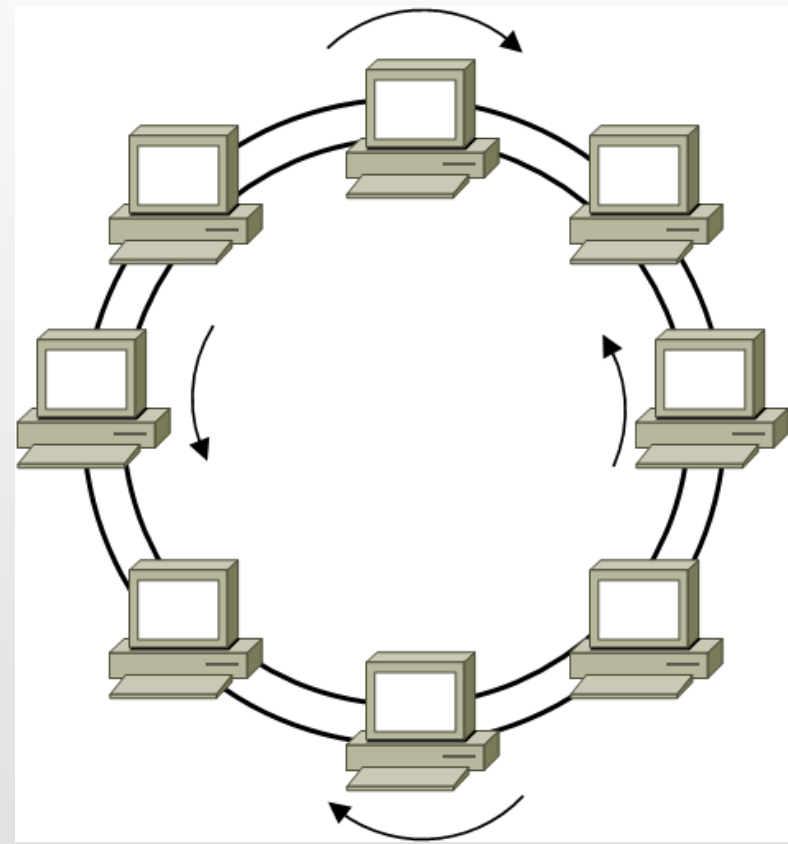
Ring Topology



Ring Topology

Advantages	Disadvantages
<ul style="list-style-type: none">● It provides an orderly network in which every device has access to the token and can transmit.● It performs well under a heavy load.	<ul style="list-style-type: none">● Failure of one computer can affect the whole network.● Difficult to troubleshoot.● Change mode with adding or removing a device affect the entire network.

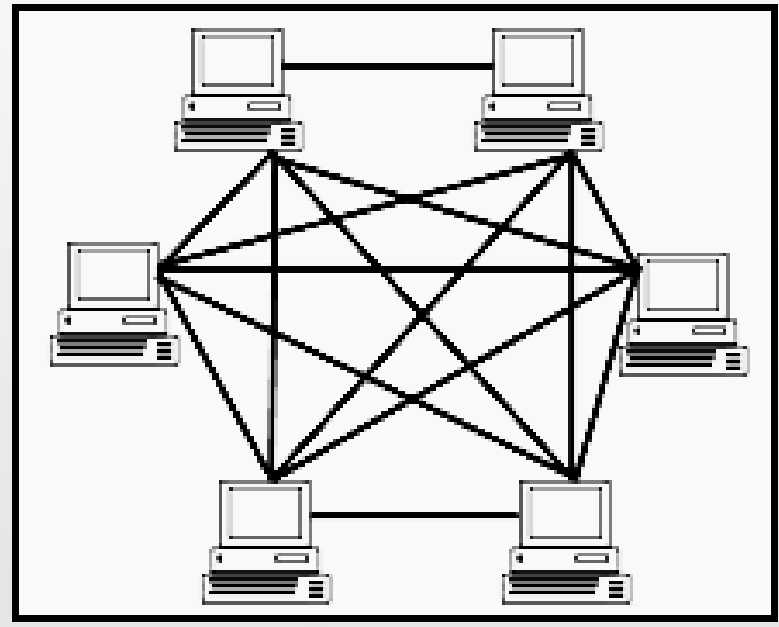
Dual Ring Topology



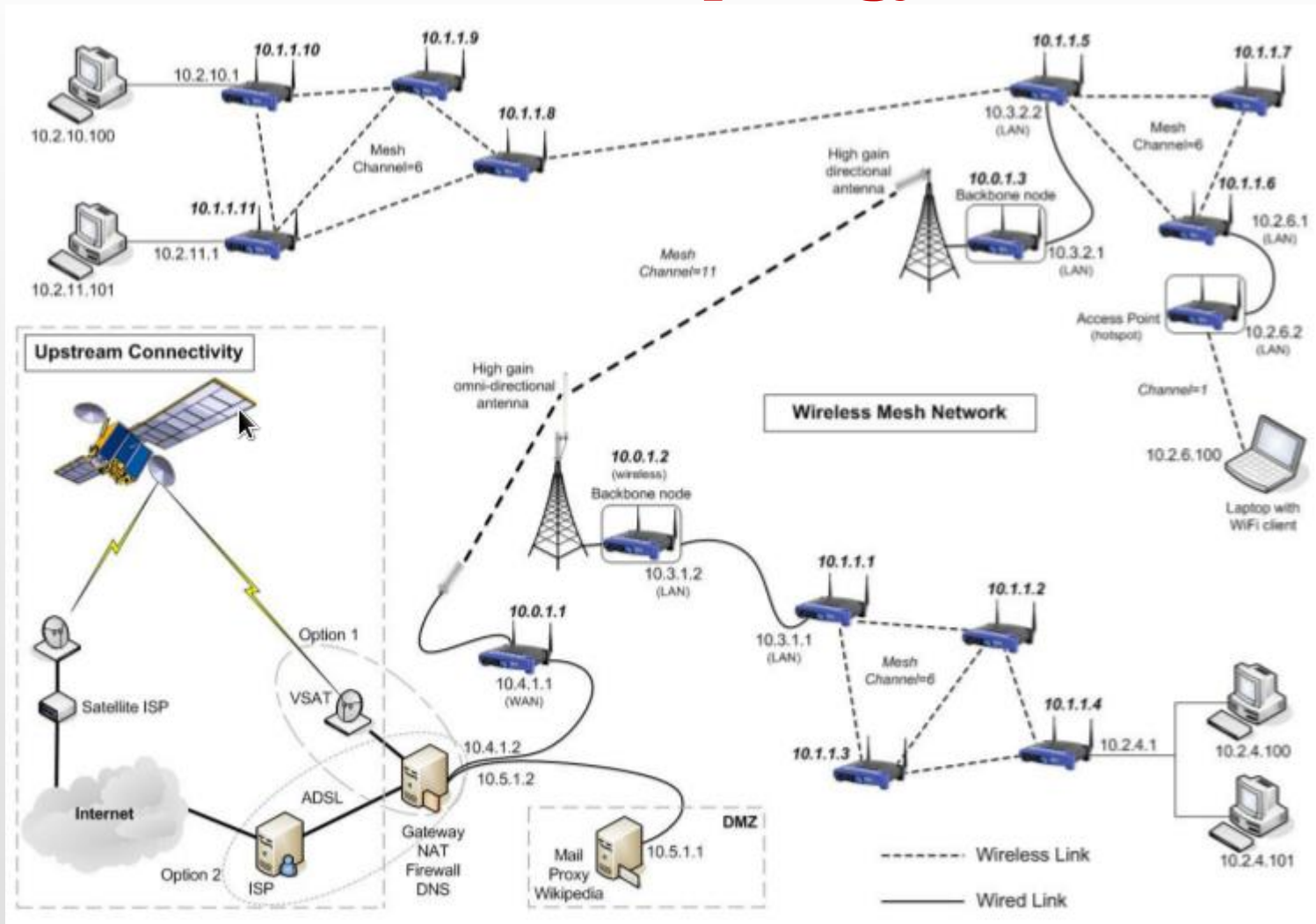
Mesh Topology

- Uses separate cable to connect each device to every other device on the network, providing a straight communication path.
- For sending messages, if the cable connected into two devices, a message is send directly from sender to receiver because each one has individual and separate connection.

Mesh Topology



Mesh Topology



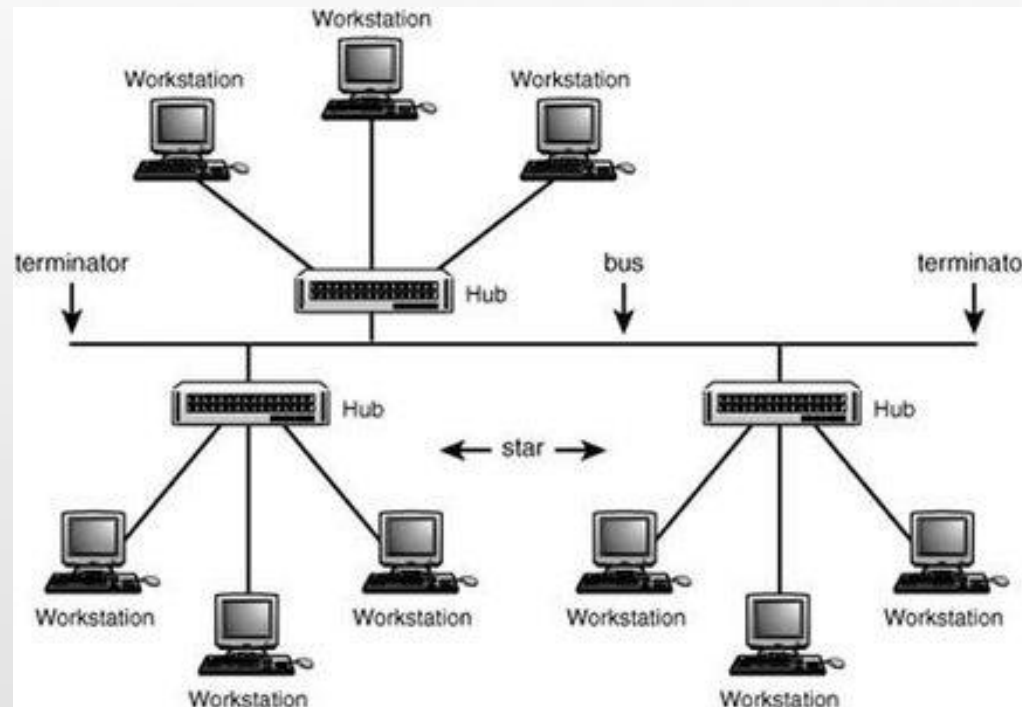
Mesh Topology

Advantages	Disadvantages
<ul style="list-style-type: none">● Enhance for error tolerance provided by redundant links.● Easy to troubleshoot.	<ul style="list-style-type: none">● Difficult to install and maintain.● Expensive.

Tree Topology

- A special type of structure in which many connected elements are arranged like the branches of a tree.
- It incorporates elements of both a bus topology and a star topology.
- The Tree Topology follows a hierarchical pattern where each level is connected to the next higher level in a symmetrical pattern.

Tree Topology



Tree Topology

Advantages

- Secondary nodes allow more devices to be connected to a central node.
- Point to point connection of devices.
- Having different levels of the network makes it more manageable hence easier fault identification and isolation.

Disadvantages

- Maintenance of the network may be an issue when the network spans a great area.
- Since it is a variation of bus topology, if the backbone fails, the entire network is crippled.

Hybrid Topology

