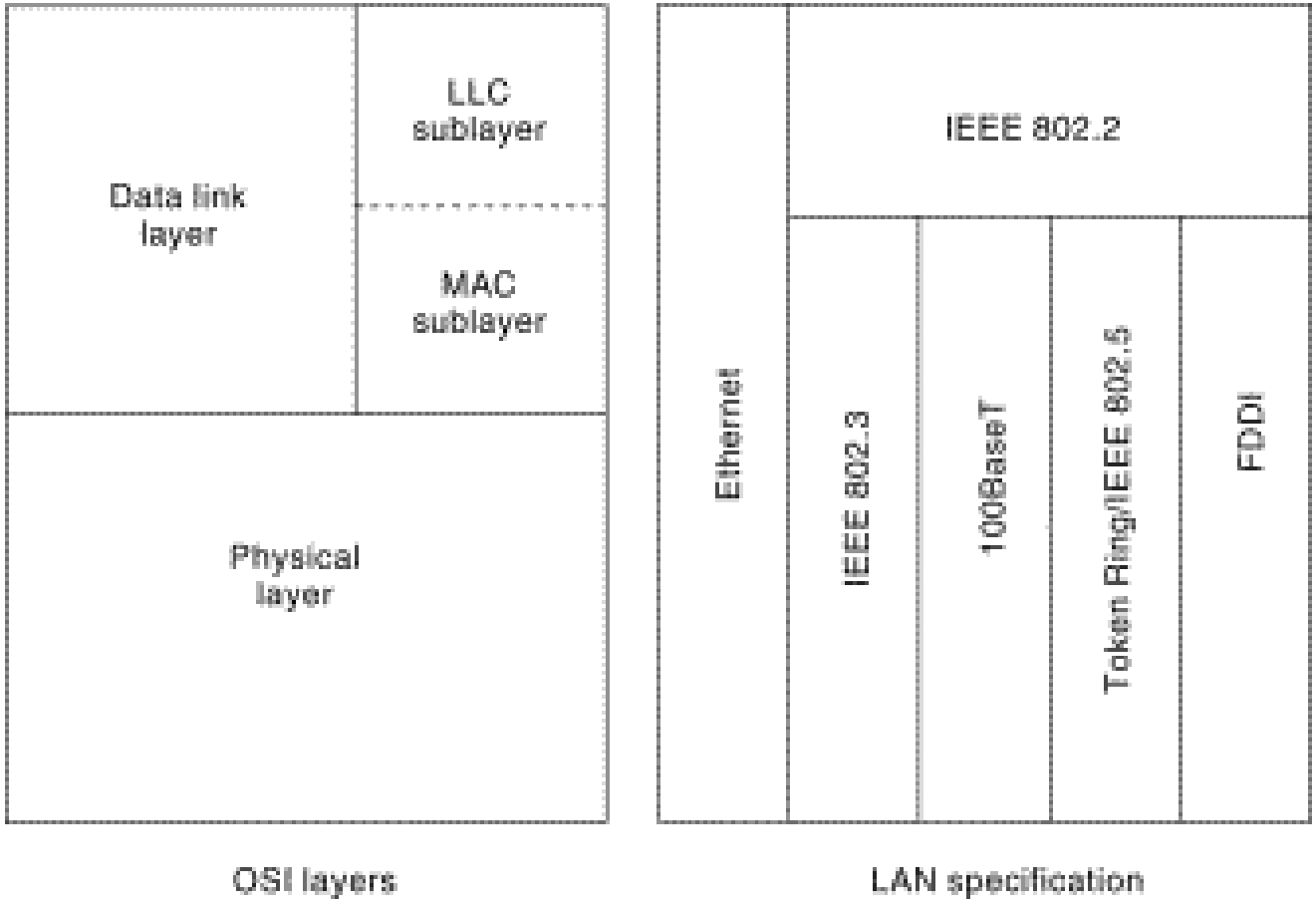
# LAN

Yudhie Kurnia M

# LAN-Local Area Network

- A *LAN* is a high-speed data network that covers a relatively small geographic area. It typically connects workstations, personal computers, printers, servers, and other devices.
- LANs offer computer users many advantages, including shared access to devices and applications, file exchange between connected users, and communication between users via electronic mail and other applications.

# LAN Protocols dalam OSI Reference Model



# LAN Media-Access Methods

- two main ways:
  - carrier sense multiple access collision detect (CSMA/CD)
  - token passing
- *CSMA/CD* (Ethernet), when a device has data to send, it first listens to see if any other device is currently using the network. If not, it starts sending its data. After finishing its transmission, it listens again to see if a collision occurred. A collision occurs when two devices send data simultaneously. When a collision happens, each device waits a random length of time before resending its data.

# LAN Media-Access Methods

- *token-passing* ( Token Ring and FDDI), a special network packet called a token is passed around the network from device to device. When a device has data to send, it must wait until it has the token and then sends its data. When the data transmission is complete, the token is released so that other devices may use the network media

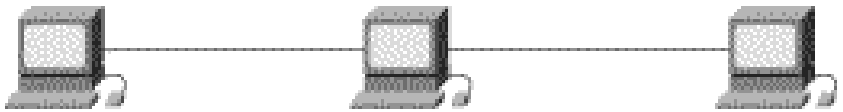
# LAN Transmission Methods

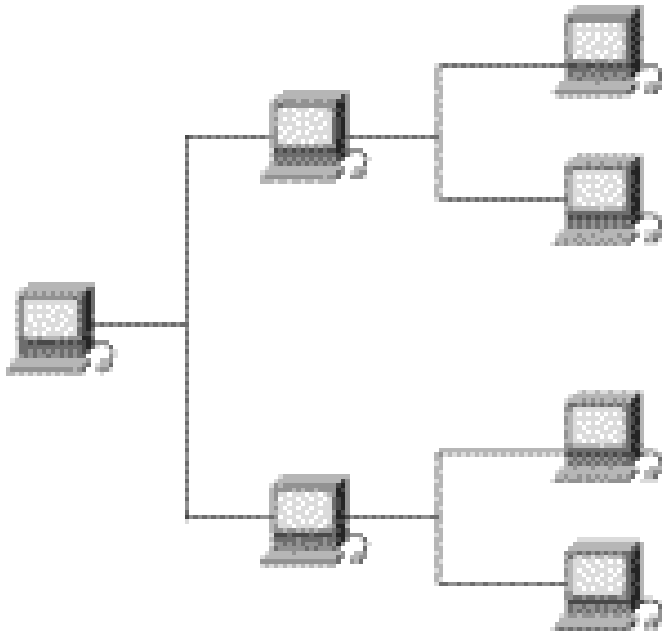
- LAN data transmissions fall into three classifications: unicast, multicast, and broadcast.
- In a *unicast transmission*, a single packet is sent from the source to a destination on a network.
- A *multicast transmission* consists of a single data packet that is copied and sent to a specific subset of nodes on the network.
- *A broadcast transmission* consists of a single data packet that is copied and sent to all nodes on the network.

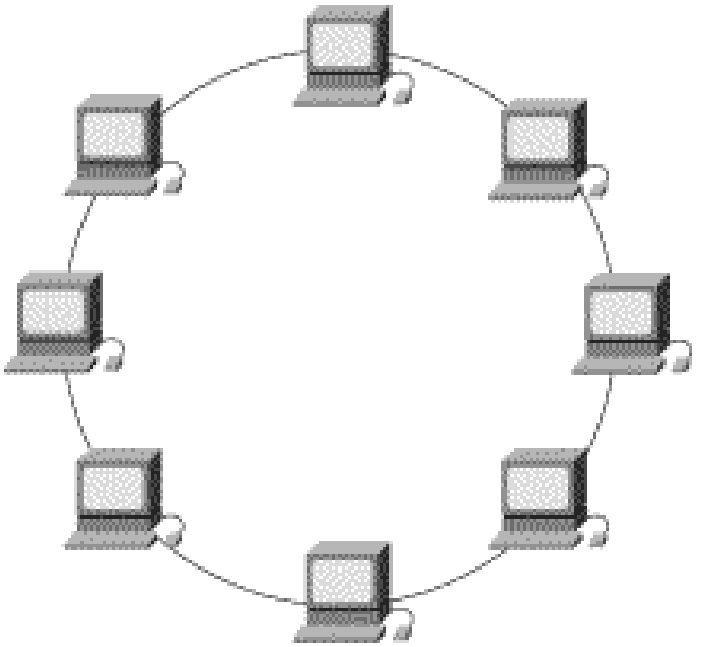
# LAN Topologies

- LAN topologies define the manner in which network devices are organized.
- Four common LAN topologies exist:
  - bus,
  - ring,
  - star,
  - tree.
- These topologies are logical architectures, but the actual devices need not be physically organized in these configurations.

# LAN Topologies







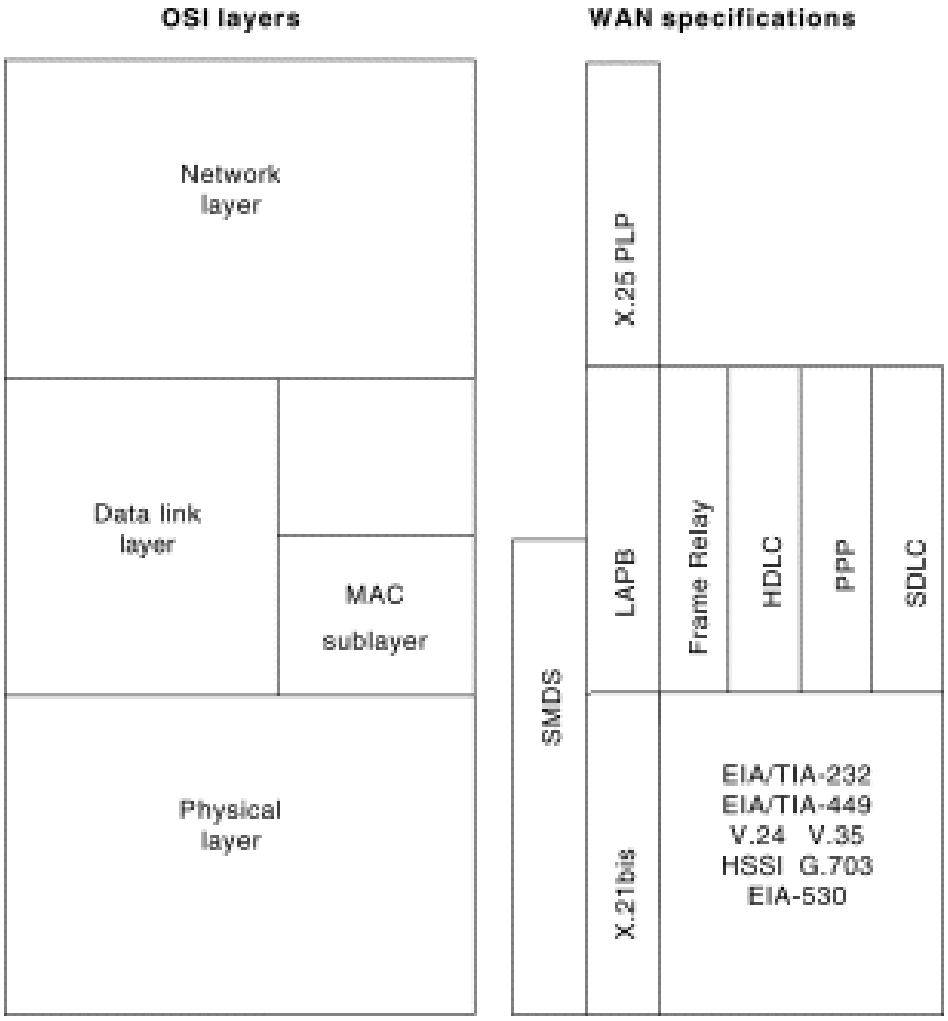
# LAN Devices

- Devices commonly used in LANs include
  - repeaters,
  - hubs,
  - LAN extenders,
  - bridges,
  - LAN switches, and
  - routers

# WAN-wide-area network

- A *WAN* is a data communications network that covers a relatively broad geographic area and that often uses transmission facilities provided by common carriers, such as telephone companies.
- WAN technologies generally function at the lower three layers of the OSI reference model: the physical layer, the data link layer, and the network layer.

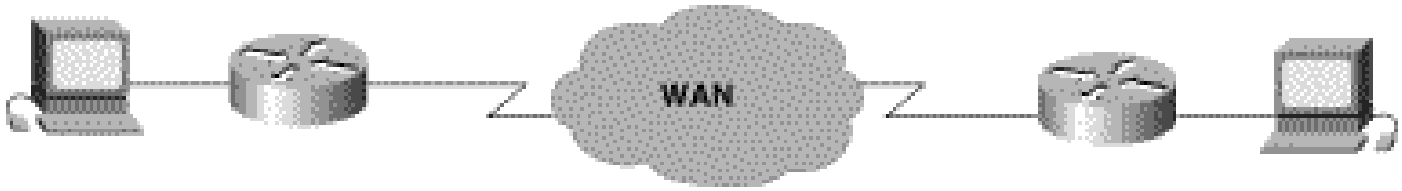
# WAN-wide-area network




**WAN Technologies Operate at the Lowest Levels of the OSI Model**

# Point-to-Point Links

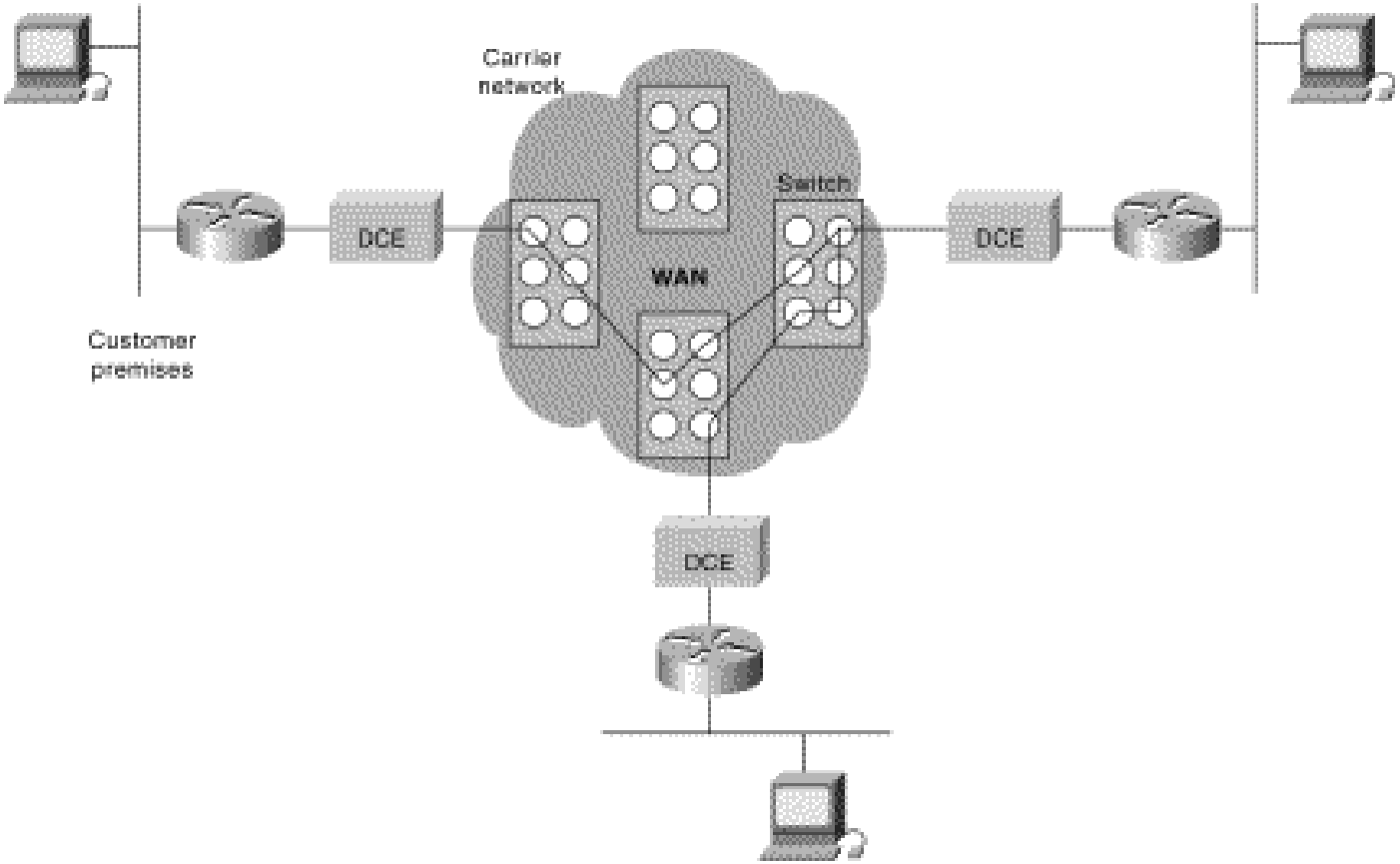
- A *point-to-point link* provides a single, pre-established WAN communications path from the customer premises through a carrier network, such as a telephone company, to a remote network



# Circuit Switching

- *Switched circuits allow data connections that can be initiated when needed and terminated when communication is complete. This works much like a normal telephone line works for voice communication. Integrated Services Digital Network (ISDN) is a good example of circuit switching.*

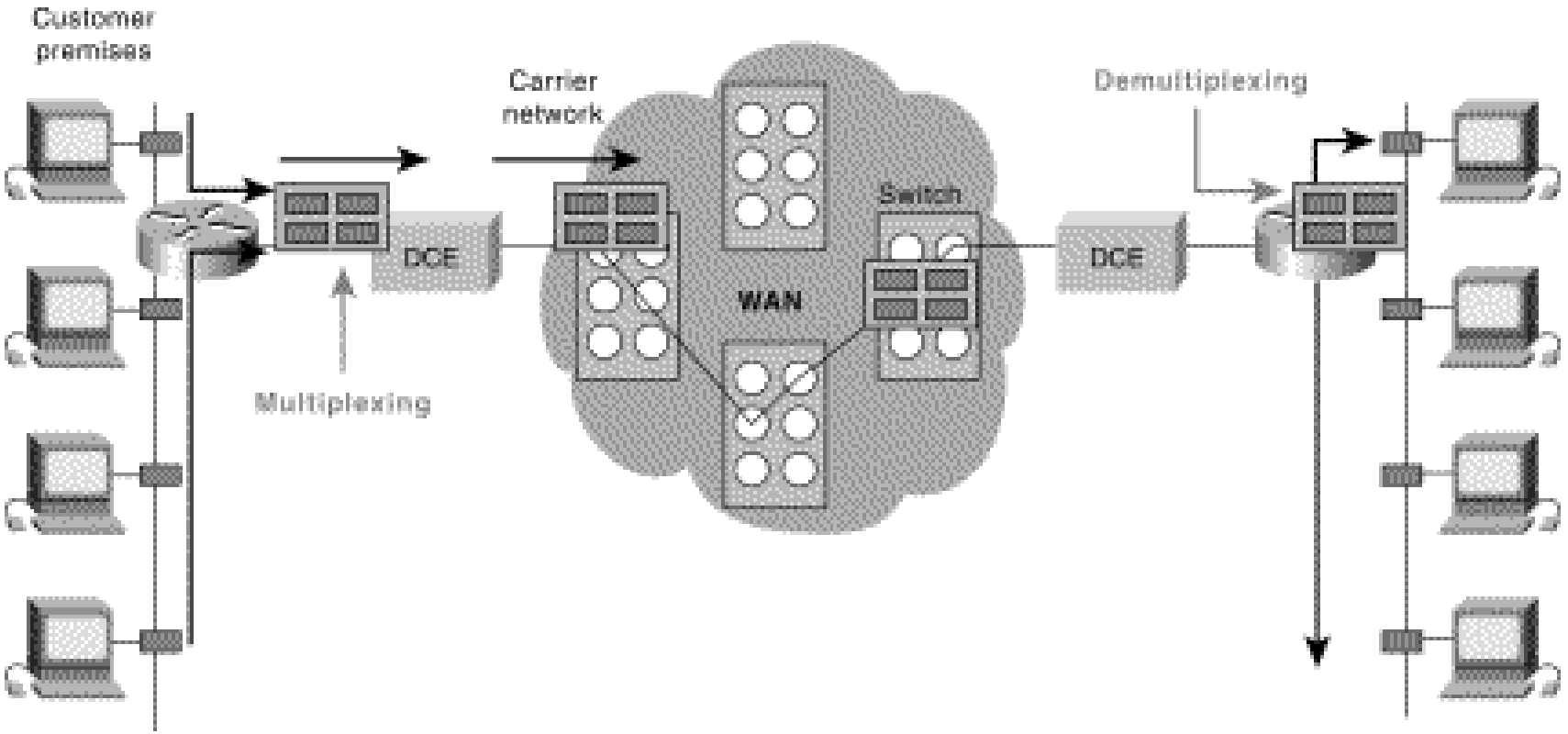
# Circuit Switching



# Packet Switching

- *Packet switching is a WAN technology in which users share common carrier resources.*
- *In a packet switching setup, networks have connections into the carrier's network, and many customers share the carrier's network. The carrier can then create virtual circuits between customers' sites by which packets of data are delivered from one to the other through the network.*
- *Some examples of packet-switching networks include Asynchronous Transfer Mode (ATM), Frame Relay, Switched Multimegabit Data Services (SMDS), and X.25. Figure 3-4 shows an example packet-switched circuit.*

# Packet Switching



# WAN Virtual Circuits

- A *virtual circuit* is a logical circuit created within a shared network between two network devices. Two types of virtual circuits exist:
  - switched virtual circuits (SVCs) and
  - permanent virtual circuits (PVCs).

# *SVC*

- *SVCs are virtual circuits that are dynamically established on demand and terminated when transmission is complete.*
- *Communication over an SVC consists of three phases:*
  - *circuit establishment,*
  - *data transfer, and*
  - *circuit termination*

# *SVC*

- The establishment phase involves creating the virtual circuit between the source and destination devices.
- Data transfer involves transmitting data between the devices over the virtual circuit
- The circuit termination phase involves tearing down the virtual circuit between the source and destination devices.

# *PVC*

- *PVC is a permanently established virtual circuit that consists of one mode: data transfer. PVCs are used in situations in which data transfer between devices is constant.*