[Networking Hardwares]

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What is Networking Hardware?

Networking hardware includes all computers, peripherals, interface cards and other equipment needed to perform data-processing and communications within the network.
Networking Hardware

- Network Interface Card
- Hub
- Repeater
- Bridge
- Switch
- Gateway
Network Interface Cards

• Network interface cards, commonly referred to as NICs, are used to connect a PC to a network.

• The NIC provides a physical connection between the networking cable and the computer's internal bus.

• Different computers have different bus architectures; PCI bus master slots are most commonly found on 486/Pentium PCs and ISA expansion slots are commonly found on 386 and older PCs.

• NICs come in three basic varieties: 8-bit, 16-bit, and 32-bit. The larger the number of bits that can be transferred to the NIC, the faster the NIC can transfer data to the network cable.
Network Interface Cards
Hubs

• A hub joins multiple computers (or other network devices) together to form a single network.

• On this network, all computers can communicate directly with each other.

• The networking hub is a junction box with several ports in the back for receiving the Ethernet cables that are plugged into each computer on the LAN.
Types of Hubs

- **Passive hub** serves simply as a passage for the data, enabling it to go from one device to another.

- **Intelligent hub** include additional features that enables an administrator to monitor the traffic passing through the hub and to configure each port in the hub.

- **Switching hub** actually reads the destination address of each packet and then forwards the packet to the correct port.
Hubs
Repeater

- Since a signal loses strength as it passes along a cable, it is often necessary to boost the signal with a device called a repeater.

- A repeater is an electronic device that receives a signal, cleans it of unnecessary noise, regenerates it, and retransmits it at a higher power level so that the signal can cover longer distances without degradation.

- A good example of the use of repeaters would be in a local area network using a star topology with unshielded twisted-pair cabling.
Repeaters
Switch

• A network switch is a small hardware device that joins multiple computers together within one local area network (LAN).

• Network switches appear nearly identical to network hubs, but a switch generally contains more intelligence than a hub.

• Unlike hubs, network switches are capable of inspecting data packets as they are received, determining the source and destination device of each packet, and forwarding them appropriately.

• Allow several users to send information over a network at the same time without slowing each other down.
Switch
Router

• A device to interconnect SIMILAR networks, e.g. similar protocols and workstations and servers.

• A router is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them.

• Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another.
Router
Bridge

• A bridge is a device that connects a local area network (LAN) to another local area network that uses the same protocol (for example, Ethernet or token ring).

• The function of a bridge is to connect separate networks together. Bridges connect different networks types (such as Ethernet and Fast Ethernet) or networks of the same type.

• Bridges map the Ethernet addresses of the nodes residing on each network segment and allow only necessary traffic to pass through the bridge. When a packet is received by the bridge, the bridge determines the destination and source segments.
Types of Bridges

• Bridges come in three basic types:

• **Local bridges**: Directly connect local area networks (LANs)

• **Remote bridges**: Can be used to create a wide area network (WAN) link between LANs. Remote bridges have been replaced with routers.

• **Wireless bridges**: Can be used to join LANs or connect remote stations to LANs.
Bridges

Wireless Network Bridge

Main Building
SCADA1

1.0 mile distance

Remote Building
SCADA2

www.eazynotes.com
Gateway

• Gateways are used to interconnect two different networks having different protocols.

• Networks using different protocols use different addressing formats.

• A gateway is a network point that acts as an entrance to another network.

• Gateways are also called protocol converters.
Gateway
What is the difference?

• **Bridge**: device to interconnect two LANs that use the SAME logical link control protocol but may use different medium access control protocols.

• **Router**: device to interconnect SIMILAR networks, e.g. similar protocols and workstations and servers.

• **Gateway**: device to interconnect DISSIMILAR protocols and servers, and Macintosh and IBM LANs and equipment