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SUBJECT -DATA COMMUNICATION & NETWORKIN

TITLE –DEVICES USED IN NETWORKING

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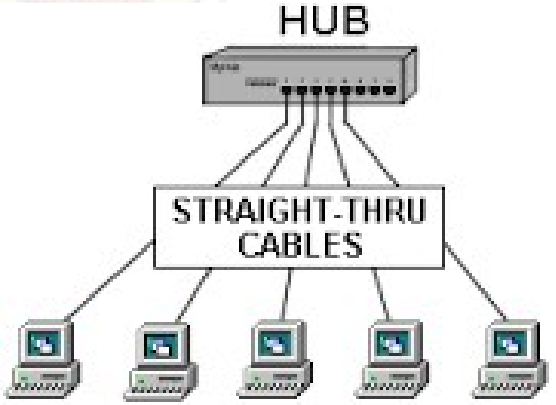
Hub

- Hub is a device used to connect nodes with each other.
- A hub includes a series of ports that each accepts a network cable
- Small hubs can network four computers together
- They contain four or sometimes five ports

Hub

- Many times the fifth port is reserved for "uplink" which is the connecting of one hub to another hub or similar device (joining two segments together).
- Larger hubs contain eight, 12, 16, and even 24 ports



Key Features of Hubs

- Hubs classify as Layer 1 devices in the OSI model
- At the physical layer, hubs can support little in the way of sophisticated networking
- Hubs do not read any of the data passing through them and are not aware of their source or destination

Key Features of Hubs

- Essentially, a hub simply receives incoming packets, possibly amplifies the electrical signal, and broadcasts these packets out to all devices on the network - including the one that originally sent the packet!
- (a **packet** is a formatted block of data carried by a computer **network**)

Different Types of Hubs

Technically speaking, three different types of hubs exist-

- Passive
- Active
- Intelligent

Passive hubs

- **Passive hubs** do not amplify the electrical signal of incoming packets before broadcasting them out to the network

Active hubs

- amplify the electrical signal of incoming packets back to their original level before broadcasting them back out on the network

Intelligent hubs

- add extra features to an active hub that are of particular importance to businesses
- An intelligent hub is typically stackable (built in such a way that multiple units can be placed one on top of the other to conserve space).

Intelligent hubs

- It also typically includes remote management capabilities via SNMP and virtual LAN (VLAN) support (You can configure or check it from a computer that is connected to it).

Switch

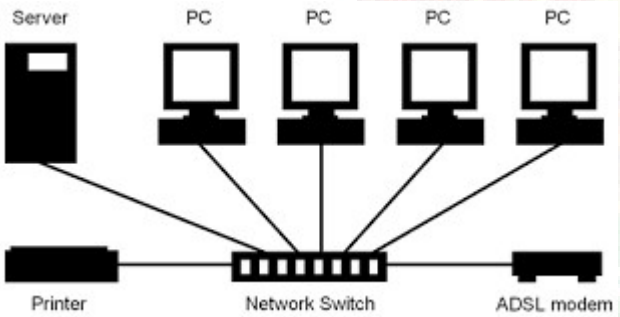
- A **network switch** is a small hardware device that joins multiple computers together within one local area network (LAN)
- Technically, network switches operate at layer two (Data Link Layer) of the OSI model

Switch

- Network switches appear nearly identical to network hubs, but a switch generally contains more "intelligence" (and a slightly higher price tag) than a hub
- Unlike hubs, network switches are capable of inspecting data packets as they are received, determining the source and destination device of that packet, and forwarding it appropriately

Switch

- By delivering each message only to the connected device it was intended for, a network switch conserves network bandwidth and offers generally better performance than a hub.



Router

- **Routers** are physical devices that join multiple wired or wireless networks together
- Technically, a wired or wireless router is a Layer 3 gateway, meaning that the wired/wireless router connects networks together
- Routers work at the Network layer of the OSI model

What is Router?

- A router is a device that acts as a medium for interconnecting several PCs. If a PC named compA wants to send data to compB, the router will choose the best path within the network and send data.
- A router is a device that forwards data packets between computer networks

Routers

- Home “networkers” often use an Internet Protocol (IP) wired or wireless router
- IP is the most common OSI network layer protocol
- Protocols are the rules governing the transfer of data information.

Routers

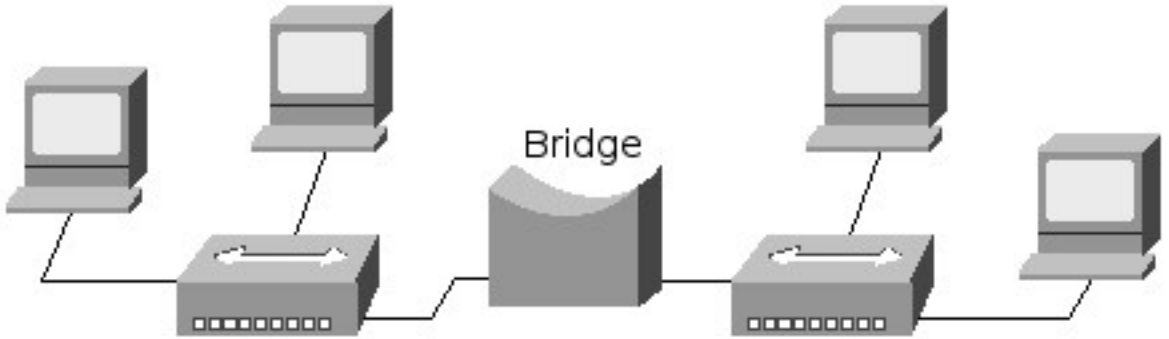
- An IP router such as a DSL or cable modem are broadband routers and joins the home's local area network (LAN) to the wide-area network (WAN) of the Internet
- A Broadband Router is a device that allows multiple PC's to access the Internet using only one address.

Bridge

In telecommunication networks, a bridge is a product that connects a local area network (LAN) to another local area network that uses the same protocol It is a device that decides whether a message from one node to other node is going to the local area network in same building or to someone on the local area network in the other building. A bridge examines each message on a LAN, "passing" those known to be within the same LAN, and forwarding those known to be on the other interconnected LAN. a bridge can join segments or workgroup LANs. a bridge can also divide a network to isolate traffic

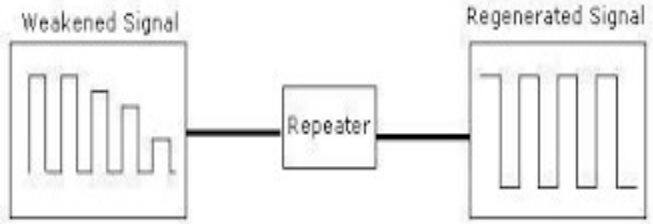
Uses of Bridge

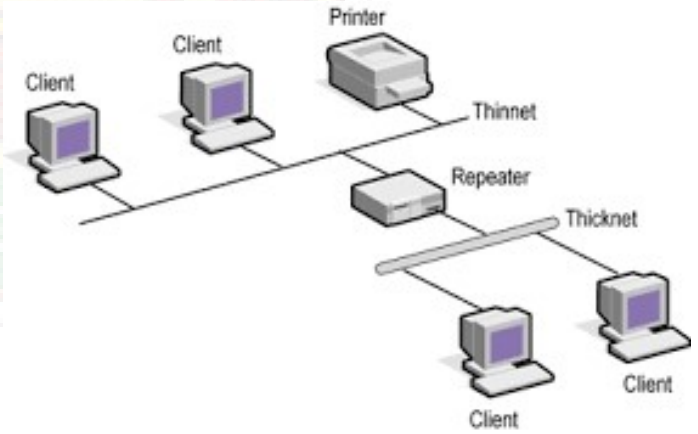
- Bridges can be used to:
- Expand the distance of a segment.
- Provide for an increased number of computers on the network.
- Reduce traffic bottlenecks resulting from an excessive number of attached computers.



Repeater

- As signals travel along a network cable (or any other medium of transmission), they degrade and become distorted in a process that is called attenuation. If a cable is long enough, the attenuation will finally make a signal unrecognizable by the receiver.
- A Repeater enables signals to travel longer distances over a network. Repeaters work at the OSI's Physical layer. A repeater regenerates the received signals and then retransmits the regenerated (or conditioned) signals on other segments.





Gateway

- A Gateway is a device that acts like a security guard and only allows data in or out if it has the right network headers.
- Gateways make communication possible between different architectures and environments. They repackage and convert data going from one environment to another so that each environment can understand the other's environment data.

Gateway

- A gateway repackages information to match the requirements of the destination system. Gateways can change the format of a message so that it will conform to the application program at the receiving end of the transfer.

- To pass data through the repeater in a usable fashion from one segment to the next, the packets and the Logical Link Control (LLC) protocols must be the same on the each segment. This means that a repeater will not enable communication. Repeaters do not translate anything.

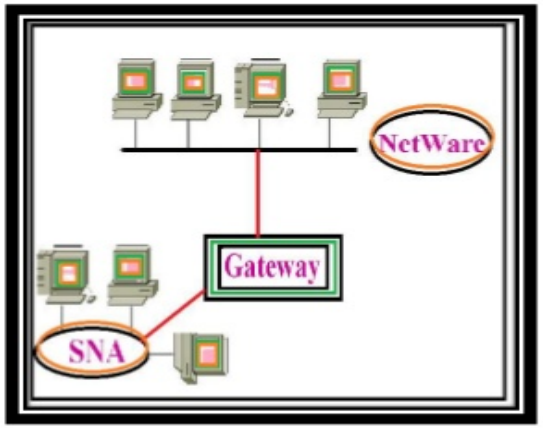
Gateway

A gateway links two systems that do not use the same:

- Communication protocols
- Data formatting structures
- Languages
- Architecture

Gateway

- It is operate in all seven layers of OSI model .
- A Gateway is also called as protocol converter. Gateway is used to connect two different network systems.
- A Gateway is generally software installed within a router.



Brouter

A bridge router or **brouter** is a **network** device that works as a bridge and as a router.
The **brouter** routes packets for known protocols and simply forwards all other packets as a bridge would.

- A brouter is a device that functions as both a bridge and a router. It can forward data between networks (serving as a bridge), but can also route data to individual systems within a network (serving as a router).

Brouter

- The main purpose of a bridge is to connect two separate networks. It simply forwards the incoming packets from one network to the next. A router, on the other hand, is more advanced since it can route packets to specific systems connected to the router. A brouter combines these two functions by routing some incoming data to the correct systems, while forwarding other data to another network. In other words, a brouter functions as a filter that lets some data into the local network, while redirecting unrecognized data to another network. the term "brouter" is used to describe bridge/router device