

**B. S . Patel Polytechnic, Kherva**  
**Chapter - 6**

## **Repeater**

- A repeater is the simplest facility used for network interconnection.
- The major function is to receive a network signal from one LAN terminal cable segment and to regenerate and retransmit the signal as it is in its original strength over a one or more other cable segment.
- Basically repeater regenerates the strength of the signal before transmitting it.
- Repeaters operate in the **OSI model Physical layer** and are transparent to all the protocols operating in the layers above the Physical layer.
- Repeaters allow a network to be constructed to exceed the size limit of a single, physical, cable segment.
- The number of repeaters that can be used intended is generally limited by a particular LAN implementation. Using a repeater between two or more LAN cables segment requires that the same physical layer protocol be used to send signal over all the cable segments.

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**Example of how this work**      **(Extra Information not for exam)**

Two LAN cable segment in an Ethernet LAN that both use baseband transmission could be connected with a repeater. Different types of physical transmission medium can be connected using a properly designed repeater as long as they handle similar type of signal, as explained below: Ethernet repeaters are available that allows all the various types of baseband Ethernet

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transmission medium, including 10baseT, Coaxial cable, 10base2 and twisted pair cable segment to be interconnected in the same LAN

### **Advantages of a repeater**

- Simple to connect
- Cost effective
- Ability to strengthen signal

### **Disadvantages of a repeater**

- Repeaters provide no method for isolating traffic generated on one cable segment from traffic generated by the other cable segment.
- When network uses a repeater to connect cable segment A to segment B whether or not there is a station in segment B that is the destination of the signal.

## Hub

- Basically the main function of the hub is to connect the multi computers with the single device and then perform like a single network.
- Hubs operate at the Physical layer (OSI Model's layer 1).
- Different computers are connected with the hub with the help of individual ports and then perform different type o networking tasks as a single network.
- The main responsibility of the hub is to amplify the data in the form of electrical signals and then broadcast the data over the network.
- A big advantage of the hub is to share the different applications without the individual access and can share the resources with the help of hub.
- So hub provides a convenient and easy networking for all the users connected to the device.



## Types of Hub:

- On the basis of working and the performance networking hub is differentiated into the three different types. The brief descriptions of these three types are as follows.

### Passive Hub:

- The first type of the networking hub is the passive hub. Passive hub does not perform any particular function but it just behaves like a bridge between the cables of connection and just receives the information and forwards it without any change in topology.

### Active Hub:

- Second type of the networking hub is the active hub. This type of hub is quite similar to that of the passive hub but can perform the additional tasks.
- Active hubs are those hubs that can work as connector between two regions but also has ability to regenerate the information with the help of strong electrical signals.
- it is also called as the multi port repeater. It helps in the communication and can upgrade the properties of the signals before delivery.

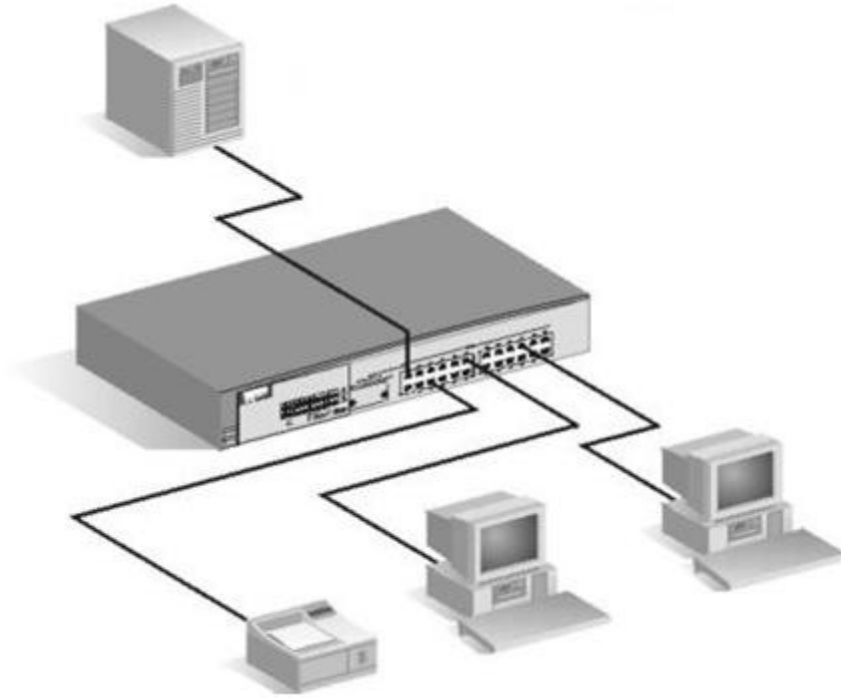
### Intelligent Hub:

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- The third and the last type of the hub that can perform the both functions of the active and the passive hub is generally referred to as the intelligent hub.
- Basically this hub provides the opportunity to increase the speed of networking and also make the performance of the network efficient as compared to other devices.
- Addition to their specific work intelligent hubs can also perform the different functions that of routing, bridging etc.

## **Switch**

- This networking switch can perform different functions such as connecting the network segments or monitoring the networking traffic or also can pass the IP traffic.
- The basic function of the switch is to connect the networking parts so, it is able deal with all the parts of network such as hubs, printers or another networking device that is required to do the communication between two places.
- Switch operate at the Datalink layer (OSI Model's layer 2).
- Networking switches are use to transfer the data in the form of data packets between the two different networking devices present in the LAN network.
- The main advantage of switch on hub, a switch forwards a message to a specific host. When any host on the network sends a message to another host on the same network, the switch receives and decodes the frames to read the physical (MAC) address and send the message to particular host.



### **Types of Network Switch:**

On the basis of configuration they are differentiated into managed, unmanaged, smart or enterprise managed switches.

➤ **Managed Switches:**

A type of network switch in which different types of methods are used to manage the different parts of the network and can able to upgrade the working and the performance of the switch with the help of common methods of management is called as the managed network switch.

➤ **Unmanaged Network Switch:**

A type of network switch in which interface is not involved is called as unmanaged network switches. They are designed for the direct use.

➤ **Smart Switch:**

Basically the smart network switches are the important types of managed switches in which the specific management features are discussed. Typically these switches are used for the networking devices

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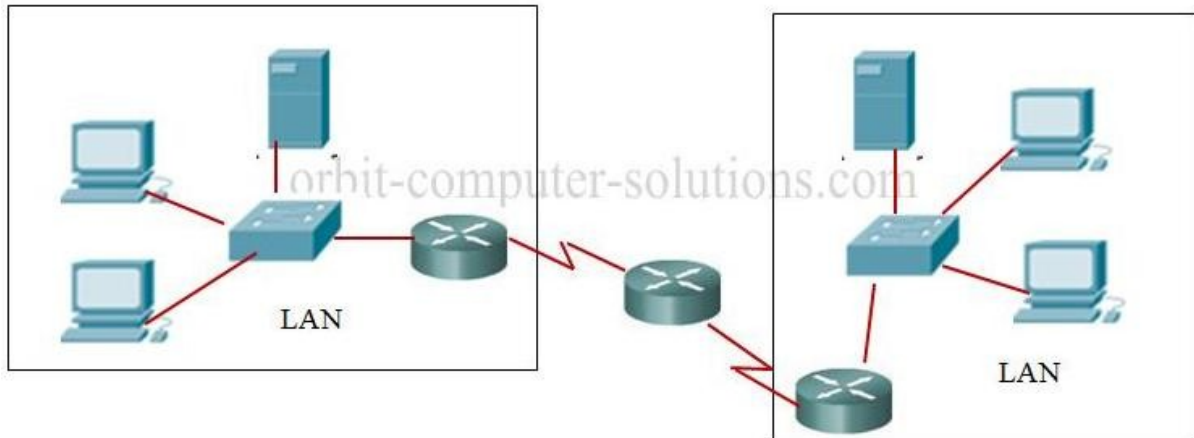
such as VLANs. They also increase the working ability of the parts connected by the switches

**Advantages of Network Switch:**

1. Network switches are very beneficial for the expenditure of the network and can also help in decreasing the load from the systems individually
2. They are also helpful for the in maintaining and enhancing the performance of the network using switches
3. In the networking data is transmitted in the form of the data packets and in these cases there are more chances of collision between the packets but network switches are also able to avoid the collision between the data grams.

**Router**

- A router is specialized computer connected to more than one network.
- A router runs software that allows the device to move data from one network to another.
- Routers operate at the network layer (OSI Model's layer 3).
- The router is responsible for the delivery of packets across different networks.
- The primary function of a router is to connect networks together and keep certain kinds of broadcast traffic under control.
- Routers use network layer protocol headers, such as IP header where the source and destination addresses are include, and routing tables to determine the best path to forward the packets.
- A routing table contains a collection of information, including:
  - Information on which connections lead to particular groups of addresses
  - Priorities for connections to be used
  - Rules for handling both routine and special cases of traffic

**DCN****Advantage of Router**

- Router limits the collision domain.
- Router can function on LAN & WAN.
- Router can connect different media & architectures.
- Router can determine best path/route for data to reach the destination.
- Router can filter the broadcasts.

**Disadvantage of Router**

- Router is more expensive than Hub, Bridge & Switch.
- Router only works with routable protocols.
- Routing updates consume bandwidth.
- Increase latency due to greater degree of packet filtering.

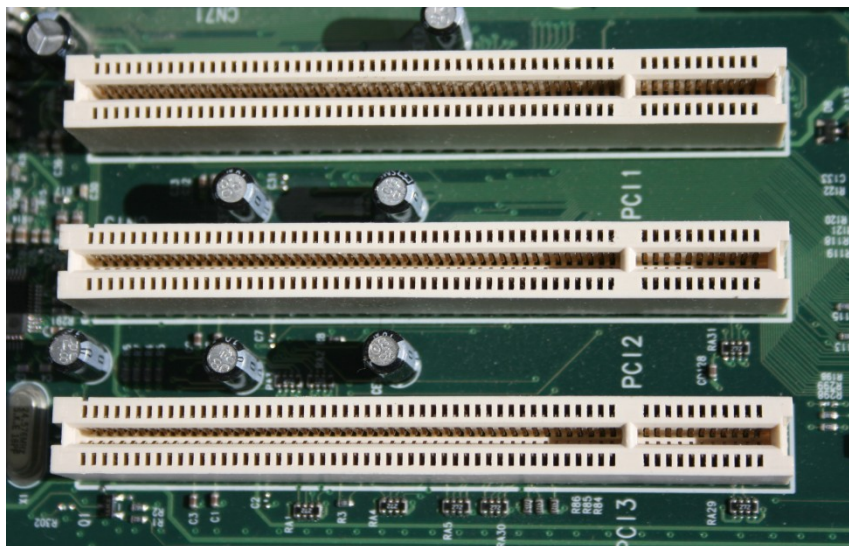
**Network Interface Card(NIC)**

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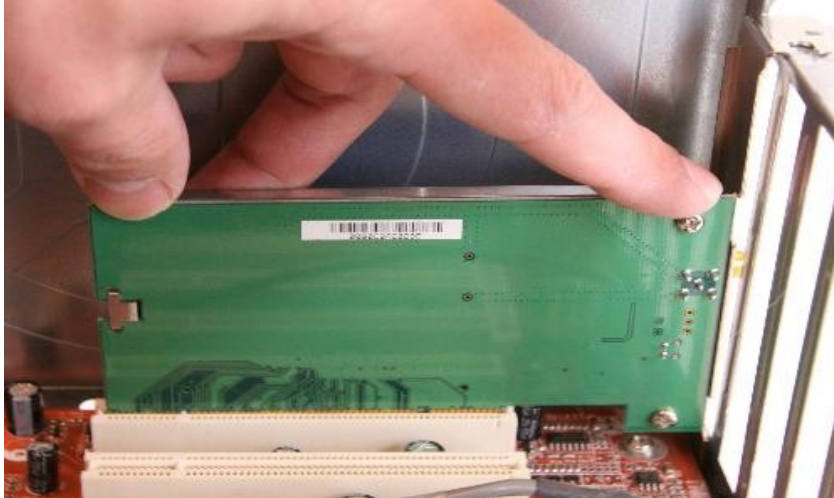


View of a typical Network Interface Card (NIC)

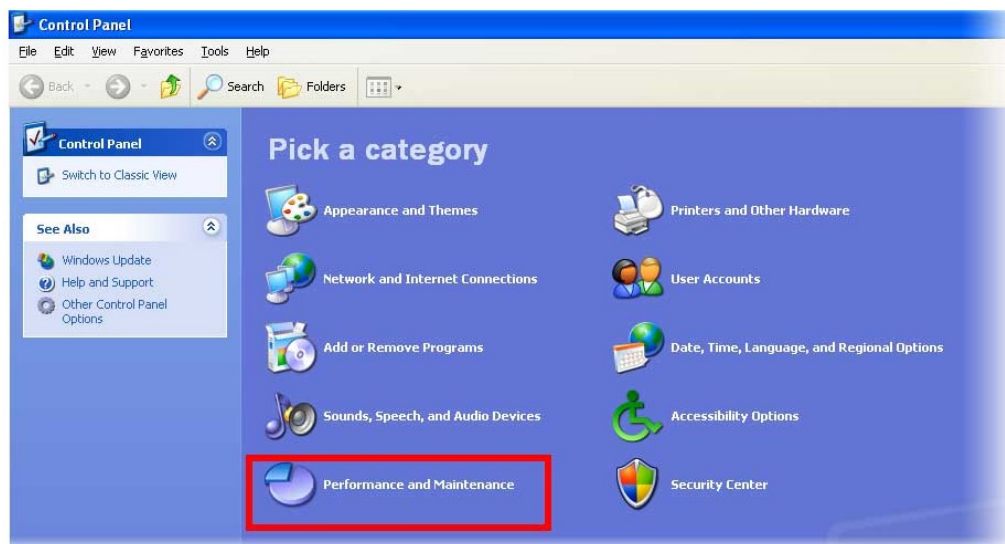
- First step is to read the user's guide and familiarize yourself with the new card.
- Power down PC and remove the AC power cord.
- Open the computer case.
- Find an available Peripheral Component Interconnect (PCI) slot on the motherboard and remove slot insert if one exists.



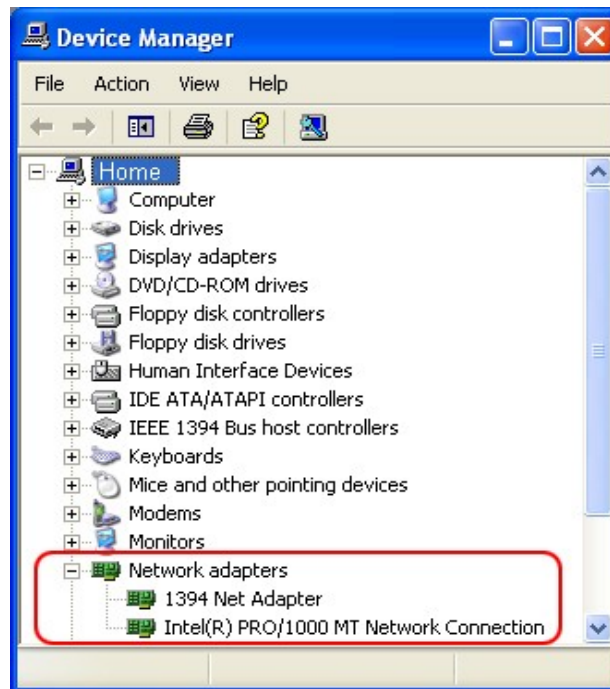
- Carefully remove the network card from its static-proof plastic envelope, and slide it into the slot.
- Seat the card in the slot firmly with gentle pressure along the length of the card, especially right about the slot itself.



- Snugly, screw the card to the computer frame, but do not over tighten. Close the computer case.
- Plug your computer in and power it up.
- Click Start, then click Control Panel.
- In Category View (vs. Classic View) click Performance and Maintenance.



- Click "System" icon at bottom of window.
- Click the Hardware tab.
- Click the Device Manager button.
- Double-click Network Adapters.



- Beneath it should appear the name of your Ethernet card.
- Next, double click the name of your Ethernet adapter.
- If the text in the "Device Status" box says "This device is working properly.", then you successfully installed the card and are finished.



- If the text in the "Device status" box doesn't say "This device is working properly.", then write down on a piece of paper what it says and continue with next step.
- Click the Troubleshoot. Button and follow instructions. Double check you followed the directions above. Install the most up to date device drivers.