Name : **PRAJJWAL KUMAR**

ROLL NO. : **2K18/IT/085**

CASE STUDY ON HARDWARE COMPONENTS

Computer network components are the *major parts* which are needed to *install the software*. Some important network components are **switch**, **cable**, **hub**, **router**, and **modem**. Depending on the type of network that we need to install, some network components can also be removed. For example, the wireless network does not require a cable.

Following are the hardware components:

REPEATER

A **repeater** is an electronic device that receives a signal and retransmits it. Repeaters are used to extend transmissions so that the signal can cover longer distances or be received on the other side of an obstruction. Some types of repeaters broadcast an identical signal, but alter its method of transmission. When an information-bearing signal passes through a communication channel, it is progressively degraded due to loss of power. For example, when a telephone call passes through a wire telephone line, some of the power in the electric current which represents the audio signal is dissipated as heat in the resistance of the copper wire. The longer the wire is, the more power is lost, and the smaller the amplitude of the signal at the far end. So, with a long enough wire the call will not be audible at the other end. Similarly, the farther from a radio station a receiver is, the weaker the radio signal, and the poorer the reception. A repeater is an electronic device in a communication channel that increases the power of a signal and retransmits it, allowing it to travel further. Since it amplifies the signal, it requires a source of electric power.

MODEM

Another significant network component is modern. The term Modem is the shortened version of the name modulator-demodulator. Modern provides two-way communication facility between a computer network and telephone network. As Wide Area Network uses the existing telephone network to connect to a distant network, it always uses a modern to dial-up the telephone network.
The modem converts the digital data from the computer into useful analog signals that can transmit through a telephone network. Similarly, signals from the telephone channels are converted back into digital data s1suitable for a computer.

HUB

The network hub is a centralised distribution point for all data transmission in a network. Hub may also refer to as a concentrator Data packet from a NIC arrives at the hub. The hub receives and rebroadcasts them to other computers connected to it. In general, the hub network is a passive device. It does not know the destination of a received data packet. Hence, it is required to send copies to all the hub connections. Stackable hubs are hubs that can be stacked or interconnected to make a single hub appearance.

They are useful for vendors to make hubs of a size suitable to customer requirement. Non-stackable hubs cannot be interconnected. They always provided only a fixed number of connections.
The hubs that connect to the network backbone are known as active hubs. The hubs, which connect only to active hubs, are known as passive hubs.
Intelligent hubs contain a special firmware that can be accessed by remote workstations. The firmware is known as the Simple Network Management Protocol (SNMP). Network performance and Network status data read from SNMP.

ROUTER

Routers guide and direct network data, using packets that contain various kinds of data—such as files, communications, and simple transmissions like web interactions.
The data packets have several layers, or sections, one of which carries identifying information such as sender, data type, size, and most importantly, the destination IP (Internet protocol) address. The router reads this layer, prioritizes the data, and chooses the best route to use for each transmission. A router also can act as a bridge. Such a router is known as a router. The router receives the packet and examines whether it supports the protocol used by the packet. If not, it only drops the packet. The packet is bridged using the physical address information.

SWITCH

A switch is a device in a computer network that connects other devices together. Multiple data cables are plugged into a switch to enable communication between different networked devices. Switches manage the flow of data across a network by transmitting a received network packet only to the one or more devices for which the packet is intended. Each networked device connected to a switch can be identified by its network address, allowing the switch to direct the flow of traffic maximizing the security and efficiency of the network.

Role in network:

Switches are most commonly used as the network connection point for hosts at the edge of a network. In the hierarchical internetworking model and similar network architectures, switches are also used deeper in the network to provide connections between the switches at the edge.

In switches intended for commercial use, built-in or modular interfaces make it possible to connect different types of networks, including Ethernet, Fibre Channel, RapidIO, ATM, ITU-T G.hn and 802.11. This connectivity can be at any of the layers mentioned. While the layer-2 functionality is adequate for bandwidth-shifting within one technology, interconnecting technologies such as Ethernet and token ring is performed more easily at layer 3 or via routing. Devices that interconnect at the layer 3 are traditionally called routers.

GATE WAY

Two different networks can be connected using a gateway. For example, a mainframe can be connected and accessible to a PC network using a gateway. Unlike routers, a gateway converts the format of the data sent between two networks. A router adds only addressing information to the data packet. Routers never change the content of the message. However, a gateway has to identify the protocols used in the networks, and recognise the data format and convert the message format into a suitable format to be accepted by the other network. Wide area networks often use gateways because there is a large number of different networks present in a WAN. Gateways provide excellent connectivity to different kinds of networks on the Internet.

BRIDGE

A bridge in a computer network is one kind of network device, used to separate a network into sections. Every section in the network represents a collision domain that has separate bandwidth. So that network performance can be improved using a bridge. In the OSI model, a bridge works at layer-2 namely the data link layer. The main function of this is to examine the incoming traffic and examine whether to filter it or forward it.

The working principle of a bridge is, it blocks or forwards the data depending on the destination MAC address and this address is written into every data frame. In a computer network, a bridge separates a LAN into different segments like segment1 & segment2, etc and the MAC address of all the PCs can be stored into the table. For instance, PC1 transmits the data to PC2, where the data will transmit to the bridge first. So the bridge reads the MAC address & decides whether to transmit the data to segment1 or segment2. Therefore, the PC2 is accessible in segment1, which means the bridge transmits the data in segment1 only & eliminates all the connected PCs in segment2. In this way, the bridge reduces traffic in a computer network.