

This era is said to be the era of computers. Computers have significantly changed the way we live. A computing device when connected to other computing devices enables us to share data and information at lightning fast speed.

What is Network?

A Network in the world of computers is said to be a collection of interconnected hosts, via some shared media which can be wired or wireless. A computer network enables its hosts to share and exchange data and information over the media. Network can be a Local Area Network spanned across an office or Metro Area Network spanned across a city or Wide Area Network which can be spanned across cities and provinces.

A computer network can be as simple as two PCs connected together via a single copper cable or it can be grown up to the complexity where every computer in this world is connected to every other, called the Internet. A network then includes more and more components to reach its ultimate goal of data exchange. Below is a brief description of the components involved in computer network:

- **Hosts** - Hosts are said to be situated at ultimate end of the network, i.e. a host is a source of information and another host will be the destination. Information flows end to end between hosts. A host can be a user's PC, an internet Server, a database server etc.
- **Media** - If wired, then it can be copper cable, fiber optic cable, and coaxial cable. If wireless, it can be free-to-air radio frequency or some special wireless band. Wireless frequencies can be used to interconnect remote sites too.
- **Hub** - A hub is a multiport repeater and it is used to connect hosts in a LAN segment. Because of low throughputs hubs are now rarely used. Hub works on Layer-1 *PhysicalLayer* of OSI Model.
- **Switch** - A Switch is a multiport bridge and is used to connect hosts in a LAN segment. Switches are much faster than Hubs and operate on wire speed. Switch works on Layer-2 *DataLinkLayer*, but Layer-3 *NetworkLayer* switches are also available.
- **Router** - A router is Layer-3 *NetworkLayer* device which makes routing decisions for the data/information sent for some remote destination. Routers make the core of any interconnected network and the Internet.
- **Gateways** - A software or combination of software and hardware put together, works for exchanging data among networks which are using different protocols for sharing data.
- **Firewall** - Software or combination of software and hardware, used to protect users data from unintended recipients on the network/internet.

| *All components in a network ultimately serve the hosts.*

Host Addressing

Communication between hosts can happen only if they can identify each other on the network. In a single collision domain *whereverypacketsentonthesegmentbyonehostisheardbyeveryotherhost* hosts can communicate directly via MAC address.

MAC address is a factory coded 48-bits hardware address which can also uniquely identify a host. But if a host wants to communicate with a remote host, i.e. not in the same segment or logically not connected, then some means of addressing is required to identify the remote host uniquely. A logical address is given to all hosts connected to Internet and this logical address is called **Internet Protocol Address**.