**A Computer Network** is a system of connected computers that can exchange data. If the network is limited to a single building or group of buildings then it is described as a Local Area Network (LAN). Computers in a LAN can be linked together through a hub or switch.

Some software and files can be shared by different users. Users can work together as networked computers can communicate with each other easily and quickly through email or internal messaging systems. Improved security as there is central control over user access, which programs, data and hardware users have access to.

A **network adapter** such as a **network interface card (NIC**) is needed to connect computers to a network by cable. Each connected device has an unique IP address to identify it on a network. Cabling is needed to connect the computers and peripherals together.

**A hub** is used to link computers and peripherals together in a cabled network that uses a **star network topology**. A hub is a junction box and any data packet entering any port is sent out to all the connected ports.

**A switch** is used in the same way as a hub but the switch uses the IP address of the data packet to sent the data to the correct device. resulting in a faster network than using a hub.

A **wireless access point** is a device that allows computers and printers etc. to connect to a wired network using radio waves rather than cabling. This allows a network to build with few or no cables and makes it simple to add wireless devices.

**Client-server network**. On a client-server network there are two types of computers with two roles. One or more server computers which have the role of: controlling access to shared files; installing software on the client computers; allowing the client computers to delivering and sending email

**Peer-to-peer networks**. In a peer-to-peer network computers are simply linked together, either using cables and a hub . All the computers in the network have the same status so there is no server controlling the network. A peer-to-peer network provided there are only a small number of computers, will be easier to manage than server-based networks. networks are used mainly by home users and small companies.

**A network topology** is the name given to the way in which devices are physically connected in a network. There are three common network topologies: ring; line (bus) and star.

**Ring topology**. This is typically a peer-to-peer network. The devices are connected in a ring and data travels in one direction using a control signal called a ‘token’. When the token comes to the end, the receiving device delete the data from the token and returns it to the network so the process can start again.

**Advantages:** cheap to install and expand.

**Disadvantages**: Slower than a star topology under normal load. If the cable fails anywhere in the ring or any device fails then the whole network will fail because the token cannot be passed around the ring.

**Bus (line) topology**. This is typically a peer-to-peer network. Devices are connected to a main (bus) cable using **special T-connectors**

**Advantages**: The simplest and cheapest to install and extend. Failure of one device does not affect the rest of the bus network.

**Disadvantages**: The bus cable has a limited length and if it fails then the whole network will fail. Slower than a ring network.

**Star topology**. This is typically a **client-server network.** A central computer (server) is connected to the other devices either through a switch or hub.

**Advantages:** The most reliable because the failure of one device does not affect other devices. Adding devices does not greatly affect performance because the data does not pass through unnecessary devices.

**Disadvantag**es: Uses the most cable which makes it more expensive to install than the other two topologies. If the hub/switch fails then the whole network will fail. When used as a client-server network then the whole network will fail if the cable link between the server and the hub/switch fails.