**Unit 11 Computer Networks**

**Computer Networks**

Whenever you post a status or download music, the device you’re using automatically connects to a computer network. A network enables information or data, in this case your status or music, to move from one place to another rather like delivery vehicles on a busy road network.

A computer network consists of hardware components and software applications connected together to enable computers and other devices to communicate and share data with each other.

Here, we will look at how networks are connected together, using network cable or wireless technology.

**Wired networks**

A simple network, like the one you may have at home, usually consists of a desktop computer or laptop, printer, router and server. These devices need to be connected so that they can communicate with each other, allowing the user to send instructions from the computer to the printer to print the documents they create, or to connect the computer to the internet.

Devices can be connected in two ways, either through a wired network or a wireless network. In a wired network, cables link the hardware devices together. The cables are plugged into switches which then make the connection.

Wired networks today mainly use Ethernet technology. The switches in Ethernet networks have sockets for RJ45 plugs to connect the cables. The speed of a wired network – how quickly the data travels – depends on the capacity of the cable. Ethernet cables have two different capacities:

* CAT5 (category 5) transmits data at 100 mega bits per second (mbps) and is now used mainly by older networks.
* CAT6 (category 6) transmits data at 1 giga bit per second (gbps) (1000 mbps). This is a faster system and is used by most current networks.

**Wireless networks**

Wired networks have one big disadvantage, computers have to be linked by cable to the network in order to connect to the internet. The wireless network, on the hand, does not use cables to connect devices, and it is this technology that allows us to use smartphones, laptops, and tablets around the home, on public transport, in coffee shops, in fact pretty well wherever we happen to be.

Wireless networks can also be used in areas where it may be physically difficult to run cables. There are three main types of wireless network:

1. **Wi-Fi networks**

Wi-Fi networks can be accessed from anywhere so long as you have a connection. You can connect to a work, school or home network via a Wi-Fi connection and you can also use Wi-Fi hotspots. Wi-Fi uses wireless radio signals to connect to mobile devices such as laptops. Modern laptops usually have a wireless radio connection built in – this allows them to search for and then to connect to a wireless access point (WAP) on the Wi-Fi network.

Wi-Fi signals can only travel short distances, up to around 20 metres, so the device needs to be fairly close to the WAP to connect to it. This distance will vary, depending on where the WAP is located. The signal will be reduced if it has to travel through several walls in a building, and businesses often have several WAPs to ensure that all parts of the building have Wi-Fi access.

Wi-Fi speeds vary. It uses the 802.11 standards developed for wireless technology: 802.11g transmits data up to 54 mbps, while 802.11n is much faster at up to 300 mbps.

1. **3G and 4G networks**

Third-generation (3G) mobile technology is a wireless network that allows mobile devices to connect anywhere using a mobile phone signal. Some devices such as tablets, netbooks and e-book readers have 3G built in so that can connect to the internet or download books, even when the user is on the move. Fourth-generation (4G) mobile services have been launched in the UK and aim to offer much faster speeds than 3G.

1. **WiMAX**

Similar to Wi-Fi, WiMAX (Worldwide Interoperability for Microwave Access) has a much wider range of around 30 miles. This technology can deliver speeds of up to 70 mbps.

WiMAX uses the IEEE 802.16 standard with a radio signal for transmitting data.