Wednesday 14th July 2021

The Internet – Wired and Wireless

The Internet

The Internet is a collection of worldwide interconnected networks. It is the largest example of a WAN (Wide Area Network).

What is an IP Address?

An IP Address is a unique address which identifies a device on a network. They allow a device to be recognised by other devices on the network. There are two main formats used today – IPv4 and IPv6.

Routers

Routers are an essential component of the internet. They connect multiple parts of a network, and forward data packets to devices or other routers.

Packets

Data sent over the internet is split into multiple packets. Each packet has a header and data. The header is normally 20 – 24 bytes, and contains a source (From) destination (To) and a packet ID. This ID is used to reassemble the packet at the destination.

Hardware in Local Area Networks

* Fibre Optic Cables – Used for longer distances, high bandwidth, and less interference however, more expensive.
* Unshielded Twisted Pair (UPT) – Copper cable, cheap and flexible, but with lower bandwidth.
* Wireless Access Points – Used for wireless devices to connect to the network.

Wireless Technology – Pros

* Reduces the number of cables required
* Portable
* Cheap
* Easy to install

Wireless Technology – Cons

* Lower bandwidth compared to wired connections
* Data transfer speeds are slow
* Less secure
* Signal can be easily affected by walls or ceilings

Wireless Connection Methods – Wi-Fi

Wi-Fi has an approximate range of 100m, a high bandwidth (52 Mb/s) but a higher power consumption.

Wireless Connection Methods – Bluetooth

Bluetooth has an approximate range of 1-100m, a medium bandwidth (24 Mb/s) and a medium power consumption.

Wireless Connection Methods – NFC/RFID

NFC has an approximate range of <10 cm, a low bandwidth (106 – 424 Kb/s) and a low power consumption.

Wireless Connection Methods – ZigBee

ZigBee is used for communication between sensors and control systems (for example hive heating). Short range communication like Wi-Fi or Bluetooth. Low power consumption, and only supports simple data transfer.

Example Question (Grade 4/6)

**A company stores customer’s financial details on a network connected computer. Give one reason why using a wired network may be more secure than a wireless network.**

Wireless networks are often less secure, as you do not need a physical connection to access the network. This is unsecure because anyone who is in range of the network could potentially access the data.