A topology describes how the devices in a network are arranged / laid-out.
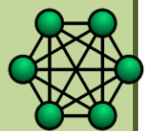
In a star topology, all devices are connected to a central switch or server.

- ✓ If one device fails the rest of networks is unaffected.
- ✓ It's easy to add more devices.
- ✓ All devices can send data at the same time (faster than RING).
- ✓ There are few collisions than the BUS).

- ✗ In wired networks, each device needs a cable which can be expensive.
- ✗ If there is a problem with the switch or the server, the whole network fails.

In a mesh topology, every device is directly or indirectly connected to every other device without a central switch or server.

- ✓ Data can be sent from different devices simultaneously.
- ✓ Decentralised (not reliant on one switch or sever in the centre).
- ✓ Each device connected to every other one – lots of routes to send data.
- ✓ Mesh networks send data along the fastest route.
- ✓ Can handle high volumes of data.

- ✗ Wired mesh = expensive.
- ✗ Difficult to manage - requires a network technician.
- ✗ Each device connected directly to every other one – **adding new devices is complicated.**
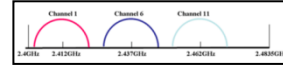
A network protocol is a set of rules for how devices communicate and transmit data.

The **Wi-Fi protocols** are responsible for sending and receiving data wirelessly using radio waves.

2.4GHz Frequency
- Passes through objects well.
- Range 100 metres.
- **Interference prone.**
- 13 channels but ONLY 3 channels do NOT overlap.
- NOT effective at supporting many networks at the same time.

5GHz Frequency
- Not as good at passing through objects.
- Range 30 metres.
- Faster due to less interference.
- 24 NON OVERLAPPING channels.
- More effective at supporting a high number of networks.

- As there is no PHYSICAL way of protecting the radio waves of data travelling in a wireless network, protection is required.
- WEP – weakest protection as it just requires a password to join the network. Data not encrypted.
- WPA – stronger - requires a password to join network and encrypts data using an encryption algorithm so only devices with decryption key can read the data.
- WPA2 – stronger algorithm used than WPA – making data harder to be read by unauthorised users.

Domain Name Service (DNS) is the Internet's equivalent of a phone book. **Name severs** maintain a directory of domain names and translate them to Internet Protocol (IP) addresses.

When you type in a URL, the ISP looks up the domain name, finds the matching IP address and sends it back.

The web browser sends a request straight to that IP address for the page or file that you are looking for and sends the information back to your computers IP address.

Ethernet is a set of protocols responsible for sending and receiving data along a network cable.

The **internet** is a world wide connection of interconnected networks.

The **www** is a collection of websites that are hosted on web servers and accessed via the internet.

- Web **hosting** companies rent space on their servers for websites.
- The hosting companies handle all of the back-ups and security issues.
- Host computers must always be on.

THE CLOUD: this is where users can store their personal files on line on a **host** computer.
There is also online software available now through 'the cloud' which is also stored on a remote computer and accessed through the internet.

Virtual Network =
A software based network.
Virtual networks use the hardware and bandwidth of the physical network it is created on.
The virtual network can only be accessed by using certain software and log-in information.
- ✓ Users can access resources from anywhere around the world as though they were physically connected to the local network.
- ✓ Virtual networking makes it possible to communicate with a computer from any other computer/device on the *internet*.

What I need to know:

Define the term topology.
Describe, with the aid of a diagram the star topology.
State the advantages and disadvantages of a star topology.
Describe the mesh topology.
State the advantages and disadvantages of a mesh topology.
Define the term 'network protocol'.
State the function of the Wi-Fi protocol.
Describe the two frequencies of Wi-Fi.
State how many channels are available on the 2.4GHz frequency and how many of these are non-overlapping.
State the advantages and disadvantages of using the 2.4GHz frequency.
State how many non-overlapping channels are available on the 5GHz frequency.
State the advantages and disadvantages of the 5GHz frequency.
Describe the 3 protection methods available to protect data being sent via radio waves.
Define the term 'Ethernet'
Define the term 'internet'.
Define the term 'World Wide Web'.
Describe the function of Domain Name Service.
Describe what is meant by 'hosting'.
State what is meant by 'the cloud'
Describe a virtual network?
State the advantages of using virtual networks?

Explain **one** advantage and **one** disadvantage of mesh topologies compared to star topologies.

Advantage ....

....

Disadvantage ....

....
[4]

The table below shows star topologies, partial mesh topologies and full mesh topologies for different numbers of nodes.

Nodes are the dots on the diagrams used to represent network devices.

a) Complete the table by correctly connecting the nodes in the white cells.

[4]

A leisure centre has a Local Area Network (LAN) consisting of five computers and a central server connected in a star topology.

a) Draw a diagram of the leisure centre's star network.

[2]

A good way to think about the advantages of a star topology is to compare it to a bus or ring topology.

b) Identify **three** advantages of the star topology.

1 ....

2 ....

3 ....
[3]