TOPIC 4 – Networks Knowledge Organiser

Networks

- Collection of connected computers.
  - LAN
  - WAN

Network technicalities.

- Protocols
  - TCP/IP
  - Data packets
  - File Transfer Protocol (FTP)
  - Hypertext Transfer Protocol (HTTP)
  - HTTPS
  - SMTP
  - POP
  - IMAP
- Packet switching
- IP addressing
- MAC addressing

TCP/IP 4-layer Model

- Application
- Transport
- Internet
- Link

Network hardware

- Network interface card (NIC).
- Hub
- Switch
- Wireless access point
- Router

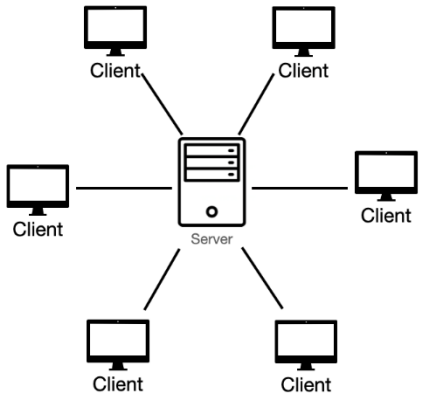
Types of network

- Client-server network
- Peer-to-peer network

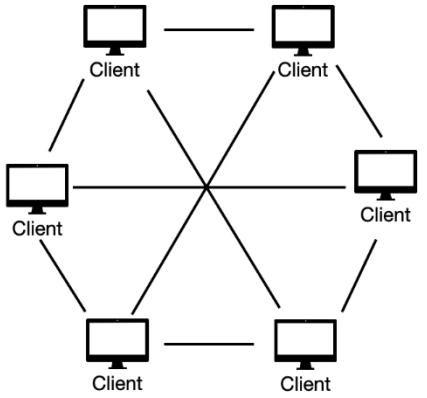
Network topologies

Diagram, advantages and disadvantages of the following:

- Bus
- Star
- Mesh



Client Server Architecture



P2P Architecture

Misconceptions

Why do we need to split data up?

The most efficient way of sending data is in small chunks. This is because if an accident happens and we lost a small packet – it is easier and more efficient to send a new packet, rather than a massive chunk of data.

Why do we need protocols?

Computers need to know how to communicate. Imagine 60 million computers all 'talking' at once! There needs to be some rules that govern what happens otherwise, there would be chaos!

Specification:

Subject content	Students should:	
4.1 Networks	4.1.1	understand why computers are connected in a network
	4.1.2	understand different types of networks (LAN, WAN)
	4.1.3	understand how the internet is structured (IP addressing, routers)
	4.1.4	understand how the characteristics of wired and wireless connectivity impact on performance (speed, range, latency, bandwidth)
	4.1.5	understand that network speeds are measured in bits per second (kilobit, megabit, gigabit) and be able to construct expressions involving file size, transmission rate and time
	4.1.6	understand the role of and need for network protocols (Ethernet, Wi-Fi, TCP/IP, HTTP, HTTPS, FTP) and email protocols (POP3, SMTP, IMAP)
	4.1.7	understand how the 4-layer (application, transport, internet, link) TCP/IP model handles data transmission over a network
	4.1.8	understand characteristics of network topologies (bus, star, mesh)
4.2 Network security	4.2.1	understand the importance of network security, ways of identifying network vulnerabilities (penetration testing, ethical hacking) and methods of protecting networks (access control, physical security, firewalls)