Networks Knowledge Organiser

Network hardware

- **Switch** – connects multiple computers together. Analyses data packet and sends to the intended computer
- **Hub** connects multiple computers together. Copies all packets and sends to all devices on the network.
- **Router –** stores addresses of computers on the network and transfers data between them.
- **Bridge** - joins two networks together that have same base protocol – e.g LAN to LAN
- **Gateway** – joins two networks together that have different base protocol e.g. LAN to WAN

LAN : **Local Area Network**

All the computer systems are all located relatively close to each other, e.g. in the same building

WAN : Wide Area Network

A network, in which the computers systems are all located distant from each other, e.g. : The Internet.

Advantages

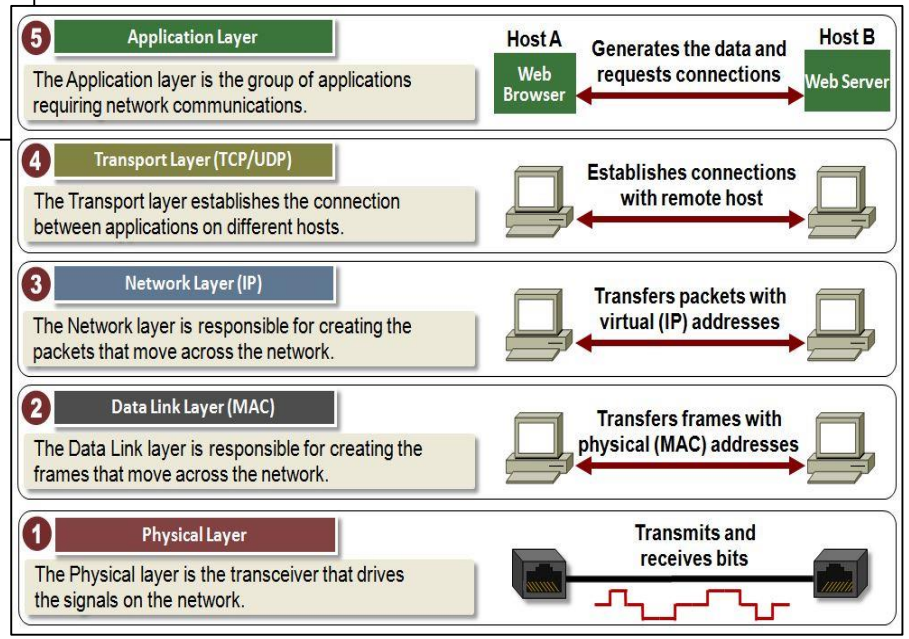
- Share hardware
- Share software
- Share data/files
- Easier for internal communication/can send email
- Central backup
- Easier to monitor network activity
- Centrally controlled security
- Can access data from any computer

Disadvantages

- A network manager may need to be employed – expensive
- Security problems – files sent between computers could spread a virus
- Hackers can gain access to data more easily
- If the server is down, all workstations on the network are affected
- Initial cost of servers, communication devices, etc. can be expensive

Contents of a data packet

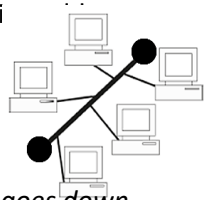
The source address	The destination address
Information which enables the data to be reassembled into its original form	
Other tracking information	
The data itself	A checksum that checks that the data has not been corrupted



BUS TOPOLOGY-

Single central cable. Terminators at both ends.

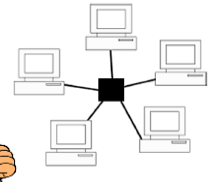
Packets sent to every node but ignored if destinati doesn't match the one in the packet.



- ✓ *Easy to implement/add more nodes*
- ✓ *Quick to set up /temporary networks*
- ✓ *Cost effective (less cabling)*
- X *Problem with main cable means entire network goes down.*
- X *Data collisions are more likely – slows network*
- X *Low security – all computers see all transmissions*

STAR TOPOLOGY -

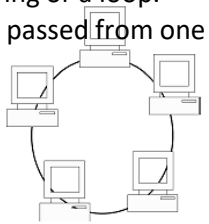
Each computer system is connected to a central node, also known as a hub/switch.



- ✓ *Good performance/fast network speed*
- ✓ *Easy to set up*
- ✓ *Minimal network collisions*
- ✓ *Better security*
- X *Expensive to install – more cabling requir*
- X *Extra hardware required, such as a hub*

RING TOPOLOGY -

Nodes are connected in a ring or a loop. Packets travel to destinatior und the ring being passed from one node to the next.



- ✓ *Quick transfer of data*
- ✓ *Simple transmission of data as packets travel in one direction only*
- ✓ *It prevents network collisions*
- X *If any nodes fail, the ring is broken and data cannot be transmitted efficiently*
- X *If there is a problem with the main cable, the entire network goes down*
- X *It is difficult to troubleshoot the ring*
- X *Difficult to add more nodes as all nodes are wired together*

Must Know

You must:

- List and draw a labelled diagram of common network topologies.
- List network hardware.
- List different network protocols.
- Give a definition of a LAN & WAN.
- Explain at least 3 advantages of networks.
- Explain at least 3 disadvantages of networks.
- Know the contents of a packet of data.

Should know

You Should:

- Describe advantages and disadvantages of different network topologies
- Know the purpose of different network hardware.
- Describe a range of different network protocols. E.g. HTTP, FTP
- Describe a range of properties for LAN & WAN
- Describe packet switching
- Describe circuit switching
- Explain the different properties of wired and wireless networks.

Top of the class

You Could:

- Select and justify a network topology
- Explain the different functions of the TCP/IP stack
- Explain how Domain Name System (DNS) servers work
- Explain Internet Protocol (IP) addresses work.