

1.3 COMPUTER NETWORKS

CONNECTIONS AND PROTOCOLS



1.3.1 NETWORKS AND TOPOLOGIES

Types of network:

- LAN (Local Area Network)
- WAN (Wide Area Network)

Factors that affect the performance of networks
The different computers in a client-server and peer-to-peer network

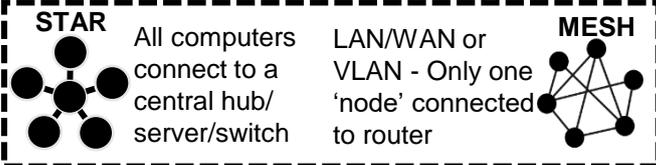
The hardware needed to connect stand-alone computers into a Local Area Network:

- Wireless access points
 - Routers
- Switches
- NIC (Network Interface Card)
- Transmission media

The internet as a worldwide collection of computer networks:

- DNS (Domain Name Server)
- Hosting
- The Cloud
- Web servers and clients

Star and Mesh network topologies



LAN – computers and devices connected over a single site or small geographical area

WAN – computers and devices connected over a wider area



Peer-to-Peer: Devices connected directly (with no server)

Client-Server: Computers (clients) connected to a central server which could provide services like:



- Shared files
- Internet access
- Share programs
- Shared peripherals (i.e. printers)

-All devices need a **NETWORK INTERFACE CARD** in order to connect to a network.

-This contains a **MAC ADDRESS** – a code which uniquely identifies a device on a network.

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-**ROUTERS** connect devices across a WAN (including the internet)



-A **SWITCH** allows devices to connect within a LAN

-Physical networks are possible with **TRANSMISSION MEDIA** such as **ETHERNET CABLES** (i.e. twisted-pair copper, coaxial, fibre-optic)



1.3.2 WIRED AND WIRELESS NETWORKS, PROTOCOLS AND LAYERS

Modes of connection:

- Wired
 - Ethernet
- Wireless
 - Wi-Fi
 - Bluetooth

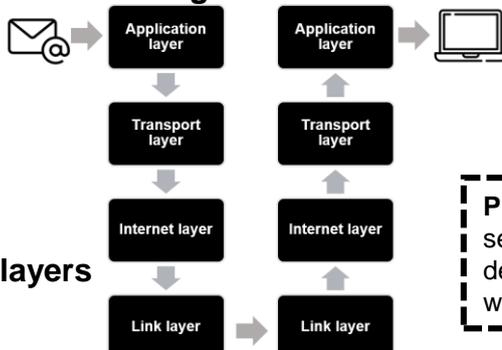
Encryption

SYMMETRIC	ASYMMETRIC
Risky - Single key used to both encrypt & decrypt the message	Safer as it uses a PRIVATE & PUBLIC key

IP addressing and MAC addressing standards

Common protocols including:

- TC/IP
- HTTP
- HTTPS
- FTP
- POP
- IMAP
- SMTP



The concept of layers

THE CLOUD

refers to services that allow users to use software or store files

on servers owned and run by a third party. **iCloud** and **Google Drive** are examples of cloud based services and users need an internet connection in order to access these services.

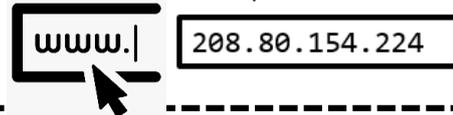


THE INTERNET is basically a giant **WAN** – it is a *network of networks*. Any computer or device connected to the internet has an IP address which acts as its “address” on the internet

REVISION NOTE

Learn the advantages and disadvantages of the different network types and connectivity methods

When a user types in a **URL**, this is sent to a **Domain Name Server** on the internet. DNS servers look up the URL and translate this into an IP address



	Wireless	Up to 100m range	Ideal for connecting personal devices	Does not need a router
	Wireless	150-350 ft range	Slower than wired ETHERNET connections	Needs a wireless router and uses 2.4 & 5ghz frequencies

PROTOCOLS are rules which allow different devices to send/receive data to/from each other. Different protocols exist depending on (i.e. uploading or downloading data, displaying a webpage, sending/receiving an email)