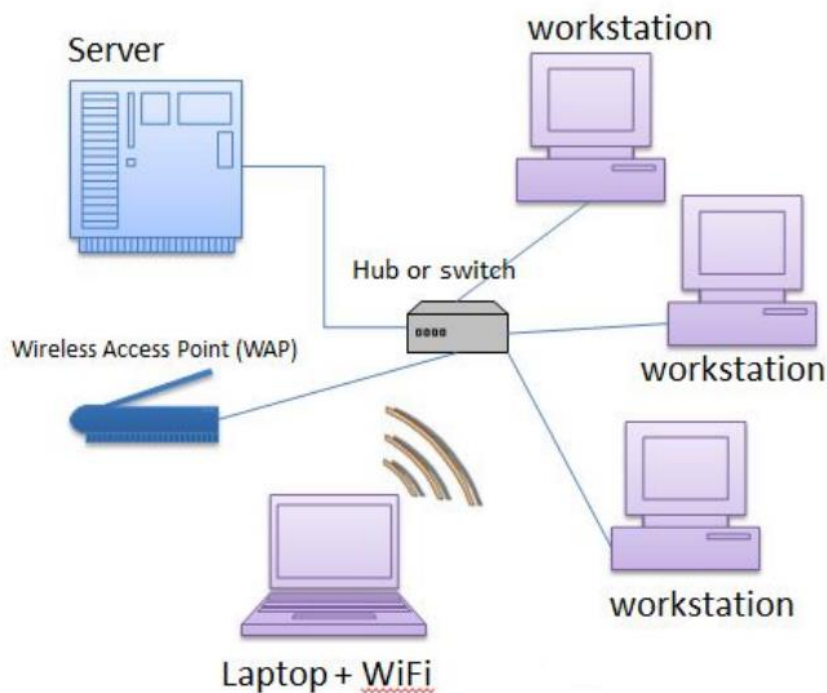


2. OVERVIEW OF CLIENT-SERVER COMMUNICATION AND PEER TO PEER MODEL

CLIENT-SERVER NETWORK

- With a client server network the files will not be stored on the hard drive of each workstation. Instead they will be stored on a computer which is known as a server
- If you are using a client server network then you will have a user account and you will have to log on with a user name and password.



- The first is to identify you to the server so that it knows which files belong to you and it can fetch them for you.
- The second is so that the security systems can check that you are actually who you say you are and that the account belongs to you.
- On a large network there may be more than just the file server.
- There might also be an email server which deals with the internal email system.

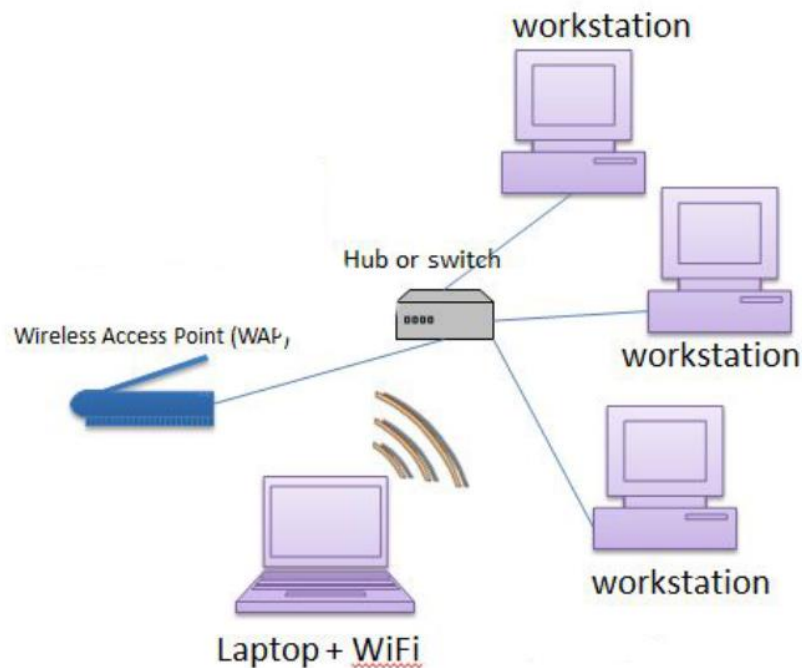
- A web server controls access to the Internet and blocks access to any unsuitable sites and a print server which deals with all of the printing requests.
- So that is the 'server' part of the client server network.
- The 'client' part is the workstations that are connected to the network.
- The 'clients' rely on servers to ☐ store and fetch networked files ☐ provide services that the users require
- manage network peripherals that the user wants to access.

Client- Server Networks

Advantages	Disadvantages
Files can be stored in a central location (although each workstation can have its own files as well)	A specialist network operating system is needed
Network peripherals are controlled centrally	The server is expensive to purchase
Backups and network security is controlled centrally	Specialist staff such as a network manager is often needed
Users can access shared data which is centrally controlled	If key parts of the network fail such as the server or the switch, a lot of disruption can occur
Software licenses and installation for each workstation can be controlled centrally	

PEER TO PEER NETWORK (P2P)

- This type of network is where two or more computers are connected together without needing a file server to be part of the network.
- A peer to peer network can be as simple as two people in the same room temporarily connecting their computers via a Universal Serial Bus to enable them to transfer or share files directly with one another.
- It can also include a more permanent network where say half-a-dozen computers in a small office are connected together via a hub or switch.



- This type of network means that every PC, once connected to the network is acting both as a server and a client. There is no need for a special network operating system. Access rights to files, folders and data is controlled by setting the sharing permissions on individual machines. So for example, if User A wants to access some files from User B's computer, User B must set their permissions to allow this. Otherwise, User A won't be able to see or access any of User B's work.
- Permissions can be set to allow complete access to every file, folder and document stored on your system or just for particular things - perhaps a music library if at home. This also works with a Wi-Fi connected laptop as long as the Wireless Access Point is also connected to the hub. In home networking systems, the hub / switch / WAP / ADSL modem are
- all built into one unit that an ISP (Internet Service Provider) supplies. For example; BT supplies a 'Home Hub' unit for its customers that acts as a switch, WAP and a modem.

Peer- to- Peer Networks

Advantages	Disadvantages
No need for a network operating system	Because each computer might be being accessed by others it can slow down the performance for the user
Does not need an expensive server because individual workstations are used to access the files	Files and folders cannot be centrally backed up
No need for specialist staff such as network technicians because each user sets their own permissions as to which files they are willing to share.	Files and resources are not centrally organized into a specific 'shared area'. They are stored on individual computers and might be difficult to locate if the computer's owner doesn't have a logical filing system.
Much easier to set up than a client-server network - does not need specialist knowledge	Ensuring that viruses are not introduced to the network is the responsibility of each individual user
If one computer fails it will not disrupt any other part of the network. It just means that those files aren't available to other users at that time.	Although it is often the case that a password protected user account is set up on a machine, this does not have to be the case and so security is not as robust as a client server model.



DNS OPERATION AND THE ROLE OF WEB SERVERS

DNS (Domain Name System) operations translate human-friendly domain names (like google.com) into computer-readable IP addresses, acting as the internet's phonebook, while web servers host the actual website content; DNS resolution finds the correct IP address, allowing a user's browser to connect to the specific web server hosting the site, making browsing intuitive and functional. Web servers store website files, and when a browser gets the IP via DNS, it sends an HTTP request to that server to fetch the page.

DNS OPERATIONS (THE LOOKUP PROCESS)

1. **User Request**: You type a domain name (e.g., www.example.com) into your browser.
2. **Recursive Resolver**: Your computer asks a recursive DNS resolver (often your ISP's server) to find the IP address.
3. **Caching**: The resolver checks its cache; if the IP is found, it's returned instantly.
4. **Root Servers**: If not cached, the resolver asks a root server, which directs it to the Top-Level Domain (TLD) server (e.g., for .com).
5. **TLD Servers**: The TLD server points to the **Authoritative Nameserver** for that domain.
6. **Authoritative Nameserver**: This server holds the official DNS records (like A records, which map names to IPs) and provides the final IP address.
7. **Connection**: Your browser receives the IP address and connects to the web server hosting the site.

ROLE OF WEB SERVERS

- **Hosting Content**: Web servers store all website files (HTML, CSS, images, videos).
- **Responding to Requests**: They listen for HTTP/HTTPS requests from browsers (once the IP is found via DNS) and send back the requested page data.
- **Serving Data**: They are the destination for DNS lookups, making the actual website accessible.