Client Server Arch:

A client can be a machine or a program.

Client program is web browser to make request to web server

A server is a computer program which run on a high performance computer. Server provide functionality and serve other program called clients. Client Server is Centralized structure.

Characteristics of a Client-Server Architecture[4]

- Client and server machines need different amount of hardware and software resources.
- Client and server machines may belong to different vendors.
- Horizzontal scalability (increase of the client machines) and vertical scalability (migration to a more powerful server or to a multiserver solution)
- A client or server application interacts directly with a transport layer protocol to establish communication and to send or receive information.
- The transport protocol then uses lower layer protocols to send or receive individual messages. Thus, a computer needs a complete stack of protocols to run either a client or a server.
- A single server-class computer can offer multiple services at the same time; a separate server program is needed for each service.

Advantages:

1) **Centralization**

   The main advantage of client server network is the centralized control that it is integrated with. All the necessary informations are placed in a single location.

2) **Security:**

   In client server network, the data is well protected due to its centralized architecture.

3) **Scalability:**

Client server networks are highly scalable. Whenever the user needs they can increase the number of resources such as clients and servers.

4) **Accessibility:**
   Irrespective of the location or the platform, every client is provided with the opportunity to log into the system.

Disadvantages:

1) **Traffic congestion**
   The primary disadvantage of client server network is the traffic congestion it undergoes. If too many clients make request from the same server, it will result in crashes or slowing down of the connection. An overloaded server creates many problems in accessing informations.

3. Cost

The cost involved in setting up and maintaining the server is usually high in client server network as it does on the network operations. Since the networks are powerful they can be expensive to purchase. Hence, not all the users will be able to afford them.

4. Maintenance

When the servers are implemented, it is going to work non-stop. Which means it must be given proper attention. If there are any problems, it must be resolved immediately without any delay. Hence, there should be a specialized network manager appointed to maintain the server.

Peer-to-peer architecture (P2P architecture) is a commonly used computer networking architecture in which each workstation, or node, has the same capabilities and responsibilities. It is often

compared and contrasted to the classic client/server architecture, in which some computers are dedicated to serving others.

P2P may also be used to refer to a single software program designed so that each instance of the program may act as both client and server, with the same responsibilities and status.

P2P networks have many applications, but the most common is for content distribution. This includes software publication and distribution, content delivery networks, streaming media and peercasting for multicasting streams, which facilitates on-demand content delivery. Other applications involve science, networking, search and communication networks. Even the U.S. Department of Defense has started researching applications for P2P networks for modern network warfare strategies.

Peer-to-Peer Network: advantages and 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	Files and resources are not centrally organised into a specific 'shared area'. They are stored on individual computers and might be difficult to

permissions as to which files they are willing to share.	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.	There is little or no security besides the permissions. Users often don't need to log onto their workstations.

Distributed Architecture:

In distributed architecture, components are presented on different platforms and several components can cooperate with one another over a communication network in order to achieve a specific objective or goal.

- In this architecture, information processing is not confined to a single machine rather it is distributed over several independent computers.
- A distributed system can be demonstrated by the client-server architecture which forms the base for multi-tier architectures; alternatives are the broker architecture such as CORBA, and the Service-Oriented Architecture (SOA).
- There are several technology frameworks to support distributed architectures, including .NET, J2EE, CORBA, .NET Web services, AXIS Java Web services, and Globus Grid services.
- Middleware is an infrastructure that appropriately supports the development and execution of distributed applications. It provides a buffer between the applications and the network.
- It sits in the middle of system and manages or supports the different components of a distributed system. Examples are transaction processing monitors, data convertors and communication controllers etc.

Advantages

- **Resource sharing** − Sharing of hardware and software resources.
- **Openness** − Flexibility of using hardware and software of different vendors.
- **Concurrency** − Concurrent processing to enhance performance.
- **Scalability** − Increased throughput by adding new resources.
- **Fault tolerance** − The ability to continue in operation after a fault has occurred.

Disadvantages

- **Complexity** − They are more complex than centralized systems.
- **Security** − More susceptible to external attack.
- **Manageability** − More effort required for system management.
- **Unpredictability** − Unpredictable responses depending on the system organization and network load.