

Network Architecture

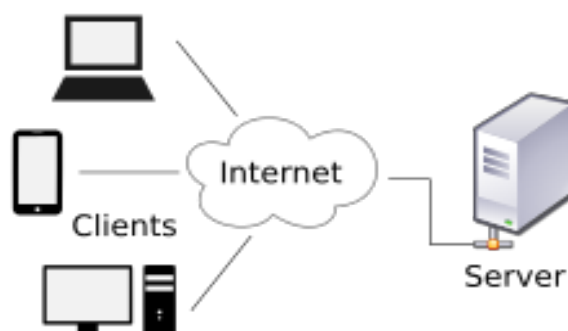
Network architecture is the design of a computer **network**. It is a framework for the specification of a **network's** physical components and their functional organization and configuration, its operational principles and procedures, as well as communication protocols used.

OSI Network Model – The Open Systems Interconnection Model (OSI model) defines and codifies the concept of layered network architecture. It is a way of subdividing a communications system further into smaller parts called layers. A layer is a collection of similar functions that provide services to the layer above it and receives services from the layer below it. On each layer, an instance provides services to the instances at the layer above and requests service from the layer below.

- OSI model**
- 7. Application layer**
 - 6. Presentation layer**
 - 5. Session layer**
 - 4. Transport layer**
 - 3. Network layer**
 - 2. Data link layer**
 - 1. Physical layer**

Client-Server Model - Client-server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called **servers**, and service requesters, called **clients**. Often clients and servers communicate over a computer network on separate hardware, but both client and server may reside in the same system. A server host runs one or more server programs which share their resources with clients. A client does not share any of its resources, but requests a server's content or service function. Clients therefore initiate communication sessions with servers which await incoming **requests**.

Example: Email, network printing, and the World Wide Web.



Peer-to-Peer Model – Peer-to-peer (P2P) computing or networking is a **distributed application architecture** that partitions tasks or workloads between peers. Peers are **equally privileged, equipotent participants** in the application. They are said to form a peer-to-peer network of nodes. Peers make a portion of their resources, such as processing power, disk storage or network bandwidth, directly available to other network participants, without the need for central coordination by servers or stable hosts. Peers are **both suppliers and consumers of resources**.



Property	Client-Server	P2P
Structure	It has a centralized definitive structure.	It has a decentralized structure or in form of DHT or Hybrid .
Stability	It is more stable than P2P.	It is less stable.
Scalability	It is easily scalable.	Not easy to scale.
Cost	It is more expensive.	It is less expensive.
Limitations	Server may get bottlenecked from incoming requests.	No chance of getting bottleneck as service is distributed.
Efficiency	More efficient then P2P on the basis of providing services.	Less efficient compared to server.
Complexity	More complex to design.	Less Complex.
Security	More secure and protected than P2P.	Less secure compare to server.
Failure	Single point of failure i.e., services will get interrupted if server goes down.	Some failures don't effect P2P networking services.
Management	Difficult to manage.	Easy to manage.