

# Internet And Voice Communication

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## **Network Design**

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## Network Design

- 1) Peer to Peer Model
- 2) Client Server Model
- 3) Hybrid Model

# Introduction to Peer to Peer Networks

**Peer to peer** is an approach to computer networking where all computers share equivalent responsibility for processing data. Peer-to-peer networking (also known simply as *peer networking*) differs from client-server networking, where certain devices have responsibility for providing or "serving" data and other devices consume or otherwise act as "clients" of those servers.

## Characteristics of a Peer Network

Peer to peer networking is common on small [local area networks \(LANs\)](#), particularly home networks. Both wired and wireless home networks can be configured as peer to peer environments.

Computers in a peer to peer network run the same networking protocols and software. Peer networks are also often situated physically near to each other, typically in homes, small businesses or schools. Some peer networks, however, utilize the Internet and are geographically dispersed worldwide.

Home networks that utilize [broadband routers](#) are *hybrid* peer to peer and client-server environments. The router provides centralized Internet connection sharing, but file, printer and other resource sharing is managed directly between the local computers involved.

## Peer to Peer and P2P Networks

Internet-based peer to peer networks emerged in the 1990s due to the development of [P2P](#) file sharing networks like Napster. Technically, many P2P networks (including the original Napster) are not pure peer networks but rather hybrid designs as they utilize central servers for some functions such as search.

## Peer to Peer and Ad Hoc Wi-Fi Networks

[Wi-Fi](#) wireless networks support so-called *ad hoc* connections between devices. Ad hoc Wi-Fi networks are pure peer to peer compared to those utilizing wireless routers as an intermediate

device.

## **Benefits of a Peer to Peer Network**

You can configure computers in peer to peer *workgroups* to allow sharing of files, printers and other resources across all of the devices. Peer networks allow data to be shared easily in both directions, whether for downloads to your computer or uploads from your computer.

On the Internet, peer to peer networks handle a very high volume of file sharing traffic by distributing the load across many computers. Because they do not rely exclusively on central servers, P2P networks both scale better and are more resilient than client-server networks in case of failures or traffic bottlenecks.

# **Introduction to Client Server Networks**

The term *client-server* refers to a popular model for computer networking that utilizes client and server devices each designed for specific purposes. The client-server model can be used on the Internet as well as [local area networks \(LANs\)](#). Examples of client-server systems on the Internet include Web browsers and Web servers, [FTP](#) clients and servers, and [DNS](#).

## **Client and Server Devices**

Client/server networking grew in popularity many years ago as personal computers (PCs) became the common alternative to older *mainframe* computers. Client devices are typically PCs with network software applications installed that request and receive information over the network. Mobile devices as well as desktop computers can both function as clients.

A server device typically stores files and databases including more complex applications like Web sites. Server devices often feature higher-powered central processors, more memory, and larger disk drives than clients.

## **Client-Server Applications**

The client-server model distinguishes between applications as well as devices. Network clients make requests to a server by sending messages, and servers respond to their clients by acting on each request and returning results. One server generally supports numerous clients, and multiple servers can be networked together in a pool to handle the increased processing load as the number of clients grows.

A client computer and a server computer are usually two separate devices, each customized for their

designed purpose. For example, a Web client works best with a large screen display, while a Web server does not need any display at all and can be located anywhere in the world. However, in some cases a given device can function both as a client and a server for the same application. Likewise, a device that is a server for one application can simultaneously act as a client to other servers, for different applications.

[Some of the most popular applications on the Internet follow the client-server model including email, FTP and Web services. Each of these clients features a user interface (either graphic- or text-based) and a client application that allows the user to connect to servers. In the case of email and FTP, users enter a computer name (or sometimes an [IP address](#)) into the interface to set up connections to the server.

### **Local Client-Server Networks**

Many home networks utilize client-server systems without even realizing it. [Broadband routers](#), for example, contain [DHCP](#) servers that provide IP addresses to the home computers (DHCP clients). Other types of network servers found in home include *print servers* and *backup servers*.

### **Client-Server vs Peer-to-Peer and Other Models**

The client-server model was originally developed to allow more users to share access to database applications. Compared to the mainframe approach, client-server offers improved scalability because connections can be made as needed rather than being fixed. The client-server model also supports modular applications that can make the job of creating software easier. In so-called "two-tier" and "three-tier" types of client-server systems, software applications are separated into modular pieces, and each piece is installed on clients or servers specialized for that subsystem.

Client-server is just one approach to managing network applications. The primary alternative, *peer-to-peer* networking, models all devices as having equivalent capability rather than specialized client or server roles. Compared to client-server, peer to peer networks offer some advantages such as more flexibility in growing the system to handle large number of clients. Client-server networks generally offer advantages in keeping data secure.