Web Based client/ Server

A network architecture in which each computer or process on the network is either a client or a server. Servers are powerful computers or processes dedicated to managing disk drives *(file servers)*, printers *(print servers)*, or network traffic *(network servers)*. Clients are PCs or workstations on which users run applications. Clients rely on servers for resources, such as files, devices and even processing power.

Another type of network architecture is known as a *peer-to-peer* architecture because each node has equivalent responsibilities. Both client/server and *peer-to-peer* architectures are widely used and each has unique advantages and disadvantages.

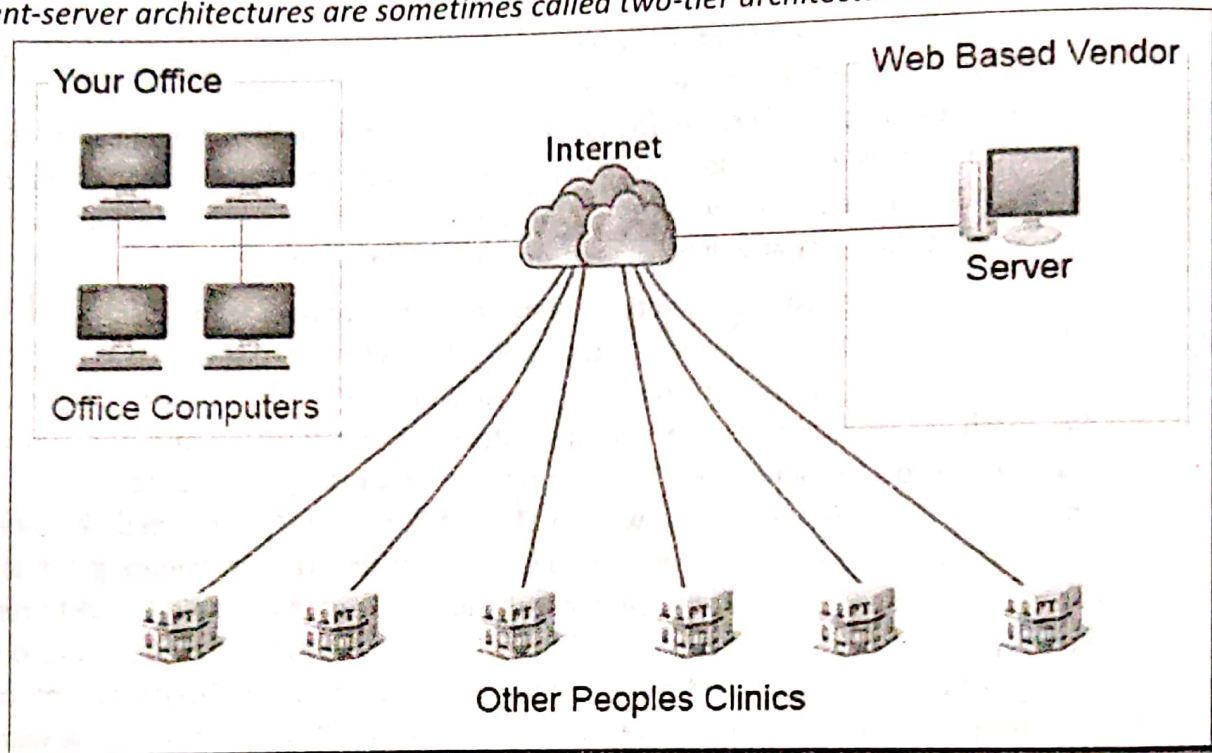*Client-server architectures are sometimes called two-tier architectures.*

Fig. 1. Web Based Client-Server Network Architecture

A Web based client/server network is a computer communication system, in which client computers send requests to the server computer for data from its database and the server returns the results to the clients via Internet/WWW. The server can be set upon a Windows 95, 98, 2000 or NT computer connected to the Internet; thus, it can be accessed via Internet by any client computers around the world. The required software is a indows 95/98/2000/NT Web server, which can be downloaded free at http://www.winfiles.com/ pps/98/servers-websrv.html or http://www.microsoft.com/windows/ie/pws/default.htm?/Windows/ie/pws/main.htm. Therefore, teaching how to create a Web based client/server network can provide students with a whole new array of hands-on training in computer networking and telecommunications.

Creating a Web based Client/Server based Client/Server Network

To create a Web based client/server network on personal computers, the instructor needs to reserve a computer lab equipped with Windows 95, 98, 2000 or NT operating systems, Microsoft Access 97 or 2000 and the internet connection. Then, the instructor can provide students with a step-by-step approach

to achieving the hands on learning objectives. This section describes in detail how to accomplish the first four steps of the hands on learning activities :

(a) designing a Web-based client/server network ;

(b) downloading and installing a Web server;

(c) developing a Microsoft Access database; and

(d) writing a client/server application.

Designing a Web based Client/Server Network

A Web based client/server network uses the Transmission Control Protocol/Internet Protocol (TCP/IP) for data communication. TCP/IP operates on Ethernet and Token Ring LANs, on various WANs and even on customary telephone lines that are connected to a modem. Therefore, a well designed Web based network often does not require extra hardware except for the extra software a Web server.

Microsoft Personal Web Server (PWS) 4.0 for Windows 95, which is downloaded free at http://www.microsoft.com/windows/ie/pws/default.htm?/Windows/ie/pws/main.htm,was elected for this hands-on training project. Once PWS 4.0 is installed on a Windows 95 computer, it turns the computer into a small-scale Web server for peer-to-peer or small group usage with a maximum of 10 concurrent connections. PWS 4.0 would enable you to teach your students, the future network developers or managers, not only how to publish Web pages on the Web servers, but also how to set up a Web-based, server-side database for client-side users to send and receive data via the Internet. In addition, PWS 4.0 is fully integrated into the Windows 95 Task Bar and Control Panel, making it easy to start and stop HTTP and FTP services whenever needed. Therefore, this desktop Web server is ideal for student hands-on learning activities such as developing, installing, testing and managing the Web based client/server network and Web applications.

How Clients and Servers Communicate

Clients and servers exchange messages in a request response messaging pattern, the client sends a request and the server returns a response. This exchange of messages is an example of inter-process communication. To communicate, the computers must have a common language and they must follow rules so that both the client and the server know what to expect. The language and rules of communication are defined in a communications protocol. All client-server protocols operate in the application layer. The application layer protocol defines the basic patterns of the dialogue. To formalize exchange data even further, the server may implement an API (such as a web service). The API is an abstraction layer for such resources as databases and custom software. By restricting communication to a specific content format, it facilitates parsing. By abstracting access, it facilitates cross-platform data exchange.

A server may receive requests from many different clients in a very short period of time. Because the computer can perform a limited number of tasks at any moment, it relies on a scheduling system to prioritize incoming requests from clients in order to accommodate them all in turn. To prevent abuse and maximize uptime, the server's software limits how a client can use the server's resources. Even so, a server is not immune from abuse. A denial of service attack exploits a server's obligation to process requests by bombarding it with requests incessantly. This inhibits the server's ability to responding to legitimate requests.