

CLIENT/SERVER TECHNOLOGY AND WEB SERVICES

INTRODUCTION

The Internet and expanded network connectivity established Client/Server models as the Preferred form of distributed computing. When Client/Server models of network communication using web services the broadest components of this paradigm become the web browser (functioning as the client) and web server. By introducing web services into the equation, Client/Server models become browser/server models. These models are Server-Centric, which make applications easy to load and install, but reduces rich user interaction.

Web Server Technology

The process for web communication works as follows: a computer runs a web browser that allows it to request, communicate and display HTML documents (web pages). Web browsers are the software applications that allow users to access and view these web pages and they run on individual computers. The web server is the program that delivers the files that make up web pages. Every web site or computer that creates a web site requires a web server. The most popular web server program is Apache The server machine then returns the requested web page.

As provide in lectures lesson

Figure : Web Technology

Communication over the Internet can be broken down into two interested parties: clients and servers. The machines providing services are servers. Clients are the machines used to connect to those services.

Web servers translate URL path components in local file systems. The URL path is dependent on the server's root directory. The root directory is the top directory of a file system that usually exists hierarchically as an inverted tree.

The typical client request reads, for example, "http://www.example.com/path/file.html". This client web browser translates this request through an HTTP request and by connecting to "www.example.com", in this case. The web server will then add the requested path to its root directory path. The result is located in the server's local file system or hierarchy of directories. The server reads the file and responds to the browser's request. The response contains the requested documents, in this case, web sites and the constituent pages.

Web Browser (Web Client)

A browser is a software (the most popular web browsers are Internet Explorer, Mozilla Firefox, Safari, Opera, and Netscape) that acts as an interface between the user and the inner workings of the internet, specifically the World Wide Web Browsers are also referred to as web clients,

The browser functions includes

1. Contacts a web server and sends a request for information.
2. Receives the information and then displays it on the user's computer.

The browser automatically invokes these helper applications when a user selects a link to a resource

that requires them.

Accessing Database on the Web Page

The browsers are a program running on the web server that is an intermediary to the database. This program can be a common Gateway Interface (CGI) script, a Java servlet, or some code that lives inside an Active Server Page (ASP) or Java Server Page (JSP) document. The program retrieves the

Information from the page is an ordinary HTML document or the output of some scripts that Web-based database system. These activities happen in number of steps

1. Step1: The user types in a URL or fills out a form or submits a search on a Web page and clicks the Submit button.
2. Step 2: The browser sends the user's query from the browser to the Web server, which passes it on to a CGI script.
3. Step 3: The CGI script loads a library that lets it talk to an SQL database server, and it uses that library to send SQL commands to the database server.
4. Step 4: The database server executes the SQL commands and sends the request information to the CGI script.
5. Step 5: The CGI script generates an HTML document and writes the HTML document to the Web server.
6. Step 6: The Web server sends the HTML page back to the remote user.

Web Server

A computer that runs a computer program that is responsible for accepting HTTP requests from clients, which are known as web browsers, and serving them HTTP responses along with optional data contents, which usually are web pages such as HTML documents and linked objects.

Basic common features

1. **HTTP:** Every web server program operates by accepting HTTP requests from the client, and providing an HTTP response to the client. The HTTP response usually consists of an HTML document.
2. **Logging:** Usually web servers have also the capability of logging some detailed information, about client requests and server responses, to log files; this allows the webmaster to collect statistics by running log analyzers on log files.

Web servers implement the following features

1. Authentication, optional authorization request (request of user name and password) before allowing access to some or all kind of resources.
2. Handling of not only static content (file content recorded in server's filesystem(s)) but of dynamic content too by supporting one or more related • HTTPS support (by SSL or

TLS) to allow secure (encrypted) connections to the server on the standard port 443 instead of usual port 80.

3. Content compression (i.e., by gzip encoding) to reduce the size of the responses(to lower bandwidth usage, etc.).
4. Virtual hosting to serve many web sites using one IP address.
5. Large file support to be able to serve files whose size is greater than 2 GB on 32bit OS.
6. Bandwidth throttling to limit the speed of responses in order to not saturate the network and to be able to serve more clients.

Protocol provides the standardized rules for representing data, authenticating requests, and detecting errors.

The purpose of protocols is to make data transfer and services user-friendly. In computing, the protocols determine the nature of the connection between two communicating endpoints (wired or wireless) and verify the existence of the other endpoints being communicated with. It also negotiates the various characteristics of the connection.

It determines how to begin, end, and format a request. It also signals any errors or corruptions in files and alerts the user as to the appropriate steps to take. HTTP is the request/response protocol used specifically for communicating.

HTML documents which are the language hypertext or web pages are written in. However, responses can also return in the form of raw text, images or other types of documents. The other basic web server

characteristic is logging. This is a feature that allows the program to automatically record events. This record can then be used as an audit trail to diagnose problems. Web servers log detailed information recording client requests and server responses. This information is stored in log files and can be analyzed to better understand user behavior, such as key word preferences, generate statistics, and run a more efficient web site.

Web Server Communication

Web servers are one of the end points in communication through the World Wide Web. The World Wide Web is the global structure of electronically connected information. It refers to the global connections between computers that allow users to search for documents or web pages by requesting results from a web server. These documents are hyper-text based (written in HTML Hypertext Markup Language), allowing users to travel to other pages and extend their research through links. They are delivered in a standardized protocol, HTTP (Hypertext Transfer Protocol, usually written in lower case letters), making HTML documents intelligible across hardware and software variations.

The communication initiates from a user request through a web browser. The request is delivered to a web

server in 'HTTP' format. The server then processes the request, which can be anything from a general search to a specific task, and returns the results in the same format. The results are written in HTML, which is the language web pages are written in that supports high-speed travel between web pages. HTML is also essential for displaying many of the interactive features on web pages, such as linking web pages to other objects, like images. An important distinction when defining web servers is between hardware and software. A web server is also a computer program (software) that performs the functions HTTP and logging.

Reading exercise

Read and write short notes on the following as applied in client/ server environment.

- i) Single system image
- ii) Downsizing of Client/Server computing.