How the Web Functions

Techtonic Group Technical Writing Assignment

When somebody types https://www.techtonicgroup.com/, or any other web address into the address bar of a web browser, there is a process of steps that takes place. Because the address is readable, not a dotted quad IP address, the browser first connects to a Domain Name Server (DNS), and resolves the IP address for the web server where the Techtonic Group website is located.

The protocol stack is a protocol suite that is used to communicate via the Internet. The protocols we are concerned with here are HTTP, TCP and IP. HTTP, or HyperText Transfer Protocol, is part of the Application Layer and functions as a request-response protocol in the client-server computing model. TCP, the Transfer Control Protocol, is part of the Transport Layer, and provides end-to-end communication services for applications. IP, or Internet Protocol, is part of the Internet Layer, and is used to carry data from source host to destination host.

Using the IP address, the browser then sends an HTTP GET request for the desired web page. Upon receiving the request from the browser, a TCP connection is established. The server checks for the desired page, and depending on if the server finds the file, it sends an appropriate response. For instance, if it can't find the desired page, it will send a '404 Page Not Found' message, or if it does find it, it would send a '200 OK' message and then proceed to send the file in a series of small chunks called data packets. This message, and all other data sent between the client and the server, is sent across your internet connection using TCP/IP.

After receiving the packets, the connection between the browser and server is closed. The browser reassembles the packets into the original file, then looks over the file for additional elements that it may need to complete the page, such as images or JavaScript & CSS files. Once those elements are determined, the browser sends additional, individual HTTP requests for those files as well.

When all additional files have been sent to and received by the browser, the page is complete, and has been rendered in the browser. This means it has taken whatever language or languages the files are written in, and compiles them into HTML, which is displayable in a web browser.

Websites are generally made up of server-side code and client-side code. Server-side code exists and operates on the server, and handles tasks such as validating requests, retrieving data from databases, and sending data to the client.

Client-side code, on the other hand, exists and operates on the browser. It is mainly concerned with the appearance and behavior of the web page, which includes styling UI elements and form validation.

For each request, there is only one client-side asset created. Similarly, there is only one instance of the server-side code available at any given time. However, there can be multiple instances to databases connected to the server application.

Runtime is the period of time that a program is running. It begins when a program is opened, and ends when the program is closed.