How the Web Functions

When we click the https://www.techtonicgroup.com/ link, the user's web browser opens up with the above URL (Uniform Resource Locator) and checks the Domain Name System (DNS) that maintains the URL. Each URL that can be accessed on the internet has an IP (Internet Protocol) address associated with it, and that IP address is tied to a computer that hosts the server of the website that our browser is attempting to access. The DNS is not necessary to access the website, but it makes the internet more user-friendly by allowing us to remember names of URLs instead of the long numbers that comprise the address of each server's host computer.

When the browser tries finding the DNS records, it will initially make a call to four different caches. The first one is the browser itself, which contains records of past URLs visited, and which may contain the one currently being searched. The second is the Operating System, which also contains DNS records in its cache. If it's not found anywhere on your computer, then your browser will access the router's cache, and then finally your Internet Service Provider's (ISP) cache if the previous three fail. If your browser fails to find the address, then your ISP's server can conduct a query to multiple DNS servers across the internet until it either finds the address we're looking for, or returns an error. This particular type of query is called a "recursive search."

Once the browser connects with an IP address, then information can be transferred between the server and the client (the user) via internet protocols. These protocols will then allow any type of HTTP request from the client to the server, and once the server responds, then the browser essentially loads the HTML code that makes up the page and renders it on their screen. HTML items that can be viewed in the browser window can include basic text, videos, links to other websites (such as the one above), as well as CSS and JavaScript functions.

The server-side code's main function is to process an HTTP request when one arrives, and then reply to the client. Most of the code to run a dynamic website must be kept on the server. The client-side code, or the code running in your browser, has only to do with the appearance of the site and user interface. This is different than server-side code, which largely concerns itself with the content being delivered after validating submitted requests. The server can also provide support for database access, storing user information, as well as user authentication. The languages used are different as well, with the exception of JavaScript (JS). Browser-side languages consist of HTML, CSS, and JS, but there are many server-side languages, including PHP, Node.js, Python, and Ruby.

Runtime refers to the instructions being executed while your program is running. The instructions don't necessarily need to be coded by the developers themselves, but can be built in to the framework being used. Only one instance of the server-side code can be rendered before requiring a full page reload, whereas many instances of client-side code can be run without having to refresh the page.