Web Servers

Summary

The term web server can refer to hardware or software, or both working together.

1) On the hardware side, a web server is a computer that stores web server software and a website's component files (for example, HTML documents, images, CSS stylesheets, and JavaScript files). A web server connects to the Internet and supports physical data interchange with other devices connected to the web.
2) On the software side, a web server includes several parts that control how web users access hosted files. At a minimum, this is an HTTP server. An HTTP server is software that understands URLs (web addresses) and HTTP (the protocol your browser uses to view webpages). An HTTP server can be accessed through the domain names of the websites it stores, and it delivers the content of these hosted websites to the end user's device.

At the most basic level, whenever a browser needs a file that is hosted on a web server, the browser requests the file via HTTP. When the request reaches the correct (hardware) web server, the (software) HTTP server accepts the request, finds the requested document, and sends it back to the browser, also through HTTP.

To publish a website, you need either a static or a dynamic web server.

A static web server, or stack, consists of a computer (hardware) with an HTTP server (software). We call it "static" because the server sends its hosted files as-is to your browser

A dynamic web server consists of a static web server plus extra software, most commonly an application server and a database. We call it "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server

Deeper dive
1) Hosting files

First, a web server has to store the website's files (all HTML documents, CSS, JS files, images etc)
Technically, you could host all those files on your own computer, but it's far more convenient to store files all on a dedicated web server because:

- A dedicated web server is typically more available. (up and running)
- A dedicated web server is always connected to the Internet.
- A dedicated web server can have the same IP address all the time
- A dedicated web server is typically maintained by a third-party.

2) Communicating through HTTP

Second, a web server provides support for HTTP (Hypertext Transfer Protocol). As its name implies, HTTP specifies how to transfer hypertext (linked web documents) between two computers.
HTTP provides clear rules for how a client and server communicate (as we have covered).

- Usually only clients make HTTP requests, and only to servers. Servers respond to a client's HTTP request
- When requesting a file via HTTP, clients must provide the file's URL.
- The web server must answer every HTTP request, at least with an error message
- Upon receiving a request, an HTTP server checks if the requested URL matches an existing file.
- If so, the web server sends the file content back to the browser. If not, the server will check if it should generate a file dynamically for the request
- If neither of these options are possible, the web server returns an error message to the browser, most commonly 404 Not Found

URL

URL stands for Uniform Resource Locator. A URL is nothing more than the address of a given unique resource on the Web. In theory, each valid URL points to a unique resource.

Anatomy of a URL