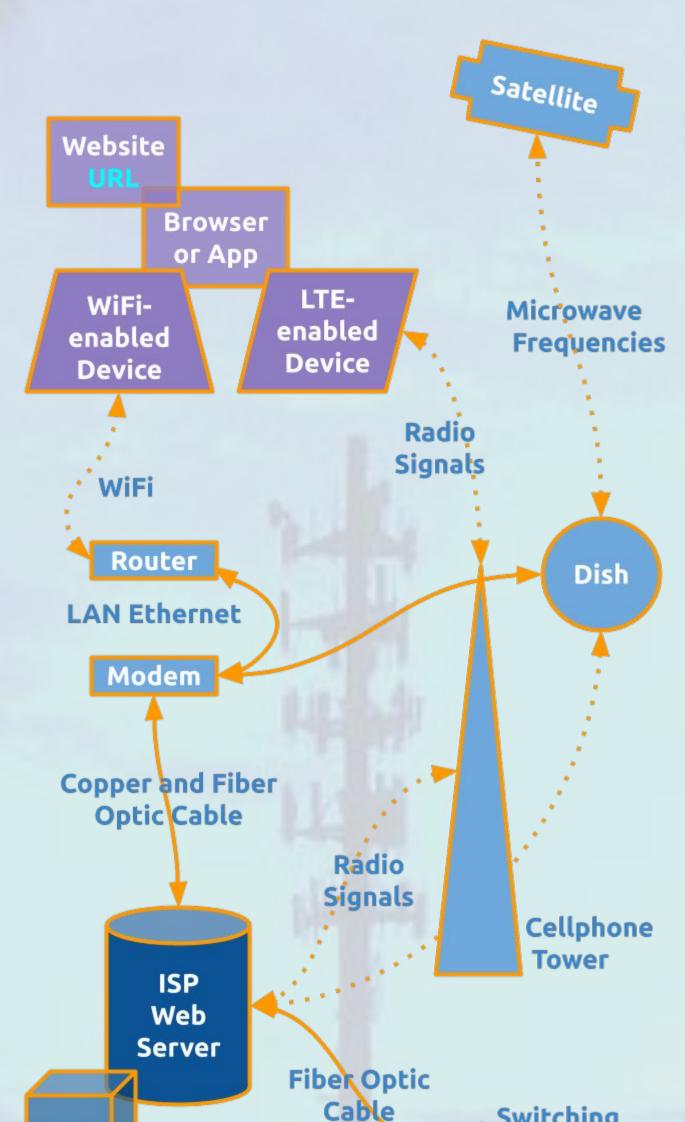# How the Internet Works

WiFi-and LTE-enabled devices use browser apps to translate and display web pages that humans request. Browsers read HyperText Markup Language (**HTML**), which is a set of tags (or marks) added to text and images to display them with style, functionality, and links. Cascading style sheets (**CSS**) are used with web pages to enhance the use of color and fonts. **JavaScripts** are used to increase the web page's interactive features. These three languages pull together what the web page users see in the **front-end** of web pages. Programmers typically build the **back-end** of websites...the parts we don't see. The languages evolve over time and are governed by organizations of programmers.

Hypertext Transfer Protocol (**HTTP**) is the language that one computer uses to talk to another computer over the Internet. A computer will use HTTP **get requests** to ask the other computer for some data. Hypertext Transfer Protocol Secure (**HTTPS**) is an encrypted version of that data transfer. Modern **encryption** uses 256 bits to secure a transfer, which would take trillions of years to decrypt. The internet makes use of **asymmetric keys** and **digital certificates** between one device and another to create an additional level of security, which is also called Secure Socket Layer (**SSL**) or Transport Layer Security (**TLS**). When you see **https://** in the browser it means that SSL or TSL is active.

When data is sent from one device to another, it doesn't stay together or follow a straight path...it is sent in **packets**, or chunks, of **binary code**, to various web servers, as if in a maze. The maze contains many other web servers that send and receive packets. Some packets have **cookies** attached, which the browser can use to speed up logging in and other preferences.

Fiber optic undersea cables connect continents and countries, so they can all share data packets at the speed of light, which is faster than electricity or copper. A **router** organizes and sends the packets and is typically connected to or part of a **modem** The modem connects router via **Ethernet** cables and to the wall of our building using coax cables of copper and glass fiber. A larger cable sends the packets from our building to an Internet Service Provider (**ISP**) where they are reassembled. ISPs also host domain name servers (**DSN**) which point devices to specific internet protocol (**IP**) addresses. Domain extensions provide businesses with .com, .edu, and many other address choices.

Satellite

Website URL

Browser or App

WiFi-enabled Device

LTE-enabled Device

Microwave Frequencies

WiFi

Radio Signals

Router

LAN Ethernet

Dish

Modem

Copper and Fiber Optic Cable

Radio Signals

Cellphone Tower

ISP Web Server

Fiber Optic Cable

URL

Switching Station

URL with Domain Name Points to IP Address

Undersea cable Connecting Countries

© Pam Van Londen 2020