# A Description of the Internet Process
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Introduction

Since its creation in 1983, the Internet has served trillions of webpages and other resources. Most users simply type in the web address they'd like to view, hit enter, and expect the site to magically appear, without knowledge of what's happening behind the scenes. This document will cover the process that your browser (i.e. Chrome, Safari, etc.) follows to find, receive, and render web pages almost instantly. It will also provide you with some useful definitions and explain how a server breaks down a webpage into binary to send back to the browser. Hopefully, this information can give you a deeper understanding of how the Internet works and the ability to recognize and solve basic problems.

The Internet is just a collection of networks, known as subnets. These subnets can be created by companies to offer customers internet access, a business that wants privacy for their employees, or a personal home wifi network. Subnets can also reside in other subnets, creating deep networks of routers and servers. Each device connected to the internet is given an IP address that other computers can use to find it. For example, your wifi's router is on your ISP's (Internet Service Provider) subnet, and your phone is on that wifi router's subnet. This is the basis of the Internet. Throughout this document, servers will be discussed a good amount. A server is just a computer that has information on it (webpages, images, files, etc.) that others wish to access through a network, local or the Internet. The image below gives an example of a network that you could see in real life.
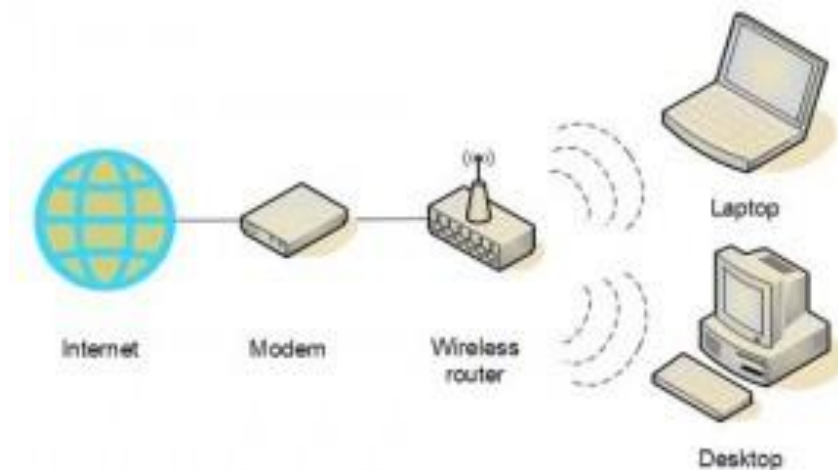
A Basic Network Connected to the Internet
Image from iamatechie.com

Finding the Server

When you type an address into a browser and hit enter or click a link, the first thing your browser has to do is translate the web address (such as "google.com") into an IP address (8.8.8.8). To do this, your browser first searches through a cache of your most recently visited websites. If you haven't been to that website recently, the browser will contact your ISP's Domain Name System (DNS). If no mapping from the web to IP address exists in this giant table, your ISP is responsible for working with the rest of the internet to find that IP address. Assuming a mapping exists, this process occurs in rougly 500 milliseconds, or half a second.

Sending a Request and Getting the Response

Your browser has the IP of the needed server and now needs to prepare an HTTP request to send over to the server that tells it exactly which resources it needs. This request contains information on the version of protocol your browser is using, the IP address, and the exact webpage you wish to receive (ex. Amazon.com/prime needs the prime page, not the normal homepage, Amazon.com). To send this request, your browser opens a TCP (Transmission Control Protocol) connection with the server and sends the request on it. Although diving into protocols goes beyond the scope of this document, one can imagine the TCP connection as a bridge between the browser and server, and the HTTP request as a delivery truck going over it. Once the server receives this response, the website's "backend" works to read this request and return the proper resources. A server has a constantly-running process on it that detects connections and prepares responses. This is all done through code. The image below shows you how a server breaks down a webpage into sendable data. To render this binary, your browser simply reverses the process to generate the needed HTML.

From Webpage to 1s and 0s
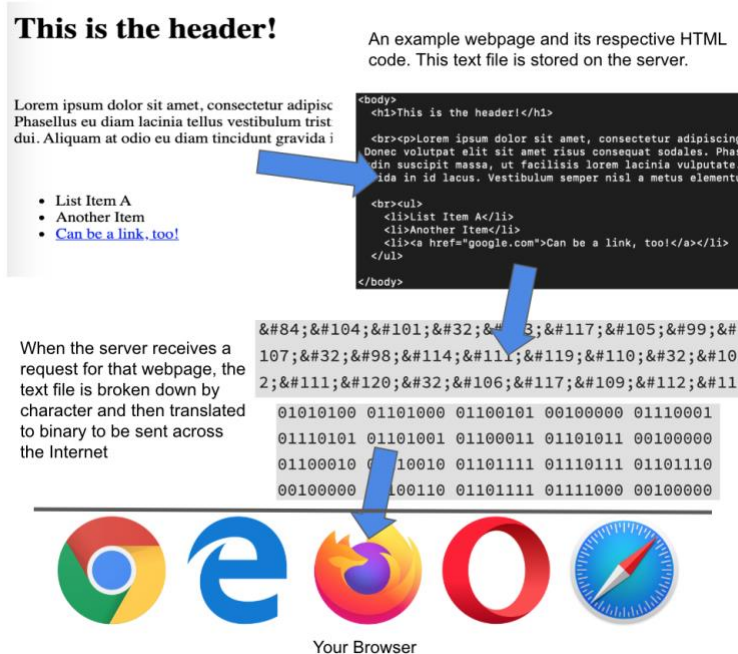
After Rendering the Response

Your browser has now rendered the HTML document you've received, and sent subsequent resource requests for all of the images, videos, or live data on the site. Your browser keeps the connection alive with the server for the entire duration you have the window open on your computer. The server will continue to send any live data (i.e. chat room messages) through this connection. Once completely ready, your browser will cache this webpage for use in the near future, allowing you to quickly load the page without waiting on the networking process. Usually, when accessing a cached webpage, the browser will immediately render the saved page while also sending the request to review the response for any changes. The server can also send back cookies, or site-specific data your browser saves to remember a certain state or user. For example, you enter your username and password to log into a site. The site will send back the appropriate response page as well as some data for your browser to keep. Now, when you access another link on the site that requires an account, your browser knows to send that bit of data that tells the server you've already logged in.

Conclusion

The exact same process has been followed by the Internet for nearly 40 years now, with updates only to the protocols and devices used. This is because using subnets and IP addresses and servers is a reliable, efficient method of computer communication. While other methods have been developed (telephone, Bluetooth), none even compete with the mass of content that can be accessed on the internet. With the information above, you should be able to understand very basic networking concepts that apply to everyday life.