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**CS 146**

Intro to the Web III: HTTP & Browsers

What is HTTP?

* HyperText Transfer Protocol
* An application protocol for distributed, collaborative hypermedia information system
* Hypermedia is an extension of hypertext
  + Nonlinear medium of information including graphics, video, audio, plain text and hyperlinks
* Multimedia: non-interactive linear presentation of graphics, etc.
* First version was HTTP:0.9, created by early developers of the Web, which had its beginnings at CERN (1989)
* HTTP/1.1 was released in June 1997
* Protocol for client-server communication
* HTTP/2 in 2015
  + According to W3Techs, as of May 2017, 13.7% of the top 10 million websites supported HTTP/2

HTTP vs HTML

* HTML: hypertext markup language
  + Definitions of tags that are added to Web documents to control their content/appearance
* HTTP: hypertext transfer protocol
  + The rules governing the conversation between a Web client and a Web server
* Both were invented at the same time by the same person

Three Important Facts About HTTP

* Connectionless protocol:
  + After making the request, the client disconnects from the server, then when the response is ready, the server re-establishes the connection and delivers the response
* HTTP can deliver any sort of data, as long as the two computers are able to read it
* Stateless protocol:
  + The client and server know about each other just during the current request
  + If it closes and the two computers want to connect again, they handle the connection as it was the first time

HTTPS (HTTP Secure)

* HTTPS is HTTP-within-SSL/TLS
* SSL (TLS) establishes a secured bidirectional tunnel for arbitrary binary data between two hosts
* HTTP is meant to run over a bidirectional tunnel for arbitrary binary data; when that tunnel is a SSL/TLS connection, then the whole is called “HTTPS”
* Uses TLS (Transport Layer Security)/SSL (Secure Sockets Layer) to encrypt the transmission of data
* Syntactically identical to HTTP
* Only needs one party to be authenticated
* Relies on certificates issued by several companies
* Usually runs on port 443

Web Browsers

Tools to View HTTP Traffic

* Chrome/Dev. Tools – Network (fav. Amongst web-devs)
* Fiddler (Windows), Charles Proxy (Mac)
  + Web debugging proxies (not only inspect, but offer expanded capabilities to interact with your site)
* Command line tools:
  + curl, tcpdump, tshark (wireshark with GUI)

Browser Rendering

* Interpreting the entire HTML markup together with the image and other assets into a grid of pixels for display within the browser window is called rendering the webpage
* Implemented different for each browser (Firefox, Chrome, Safari, Explorer, and Opera)