CPSC 216

What is the goal of this course?

1. Understand how the web works, under the hood.
   - (i) internet protocols
   - (ii) connectivity
   - (iii) request / response models for internet traffic

This can be important in designing effective and efficient websites!

2. Understanding modern web programming languages, at least at the level of being able to READ and understand the code of others.
   - (i) HTML
   - (ii) CSS
   - (iii) JavaScript
   - (iv) Maybe some PHP, and others, if we have time.

History

→ This really depends on who is reporting it!!

→ The internet has a very organic, fractal-like structure. (Ex. Williamsburg vs. Manhattan)

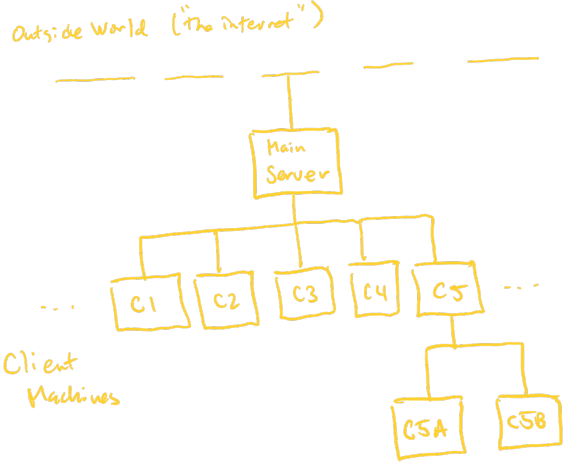
→ It is not the best, most efficient design. It was cobbled together by a diverse, loosely connected group of people, and if we had to do it over, it would probably look very different!

"It is what it is ..."

Concept 1: Internet ≠ Web !!

Bunch of Networked Computers

System for Sharing Information (one of many !!)



"the internet" is a collection of communication protocols that enables conversations between computers.

Protocols

TCP/IP → Transmission Control Protocol / Internet Protocol

→ low level protocol that allows basic communication between computers.

→ Other, higher-level protocols run "over" TCP/IP

FTP → File Transfer Protocol

→ the "OG" protocol for getting files from one computer to another.

→ insecure !!

↑ Why? Because traffic is not encrypted !! Anyone can steal it !!

SFTP → Secure File Transfer Protocol

→ Basically FTP with

→ [illegible]

encryption!

Both FTP and SFTP are based on the authentication model ... The requester must authenticate with the server before receiving the requested file (i.e. use login / password).

SCP → Secure Copy

→ A faster version of SFTP.

Both SFTP and SCP use the underlying SSH (Secure Shell) protocol

HTTP → HyperText Transfer Protocol

→ governs communication between Web servers and Web browsers

→ uses a request/response model for information transfer

→ we will discuss this in much more detail later !!

HTTPS → "Secure" version of HTTP

→ here, "secure" means encryption !!

There are, quite literally, HUNDREDS of other internet protocols !! See:

en.wikipedia.org/wiki/Lists_of_network_protocols

for a fairly complete list. ☺

Internet Protocol Suite

→ A framework for organizing large set of communication protocols. This

Four "Layers" :

Link Layer

→ communication between machines within a single network segment. Ethernet!!

Tunnels, MAC, PPP, ...

Internet Layer

→ internetworking between independent networks.

IPv4, IPv6, ICMP, ...

Transport Layer

→ communication protocols for host-to-host traffic.

TCP, UDP, ...

Application Layer

→ communication protocols for process-to-process traffic.

HTTP, FTP, SFTP, HTTPS, ...

We will mostly be focused here !!

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https://www.guru99.com/difference-tcp-ip-vs-osi-model.html

https://www.imperva.com/learn/application-security/osi-model/#:~:text=TCP%2FIP%20is%20a%20functional,all%20forms%20of%20network%20communication.