

Networking

Overview

Networking is the sharing of information across, between, and within devices. From how a computer connects to the internet to how servers capture and respond to requests to best practices in security and protecting one's information, networking is a broad and sometimes complex subject. From hardware, like modems, routers, and servers, to different protocols like HTTP, DNS, and TCP/IP, there is a lot of terminology in networking that is generally familiar to people, but maybe not fully understood in its meaning.

Modems convert signals from a computer into signals that can be sent over communication lines (usually an analog signal over a cable line); routers send (route) data packets between networks, which could be computers on the same local network or connecting to a computer over the internet; and servers host specific services like databases, file systems, and email services which can be connected via a network and utilized by another machine (client).

HTTP(S) is the protocol used for communication between computers over the internet. It is a globally accepted standard for data transmission which allows for things like the internet to be possible. DNS is the naming system for things like websites (such as `www.google.com`), which are actually routed through numerical IP addresses. Through this naming system, users are able to connect to familiar points of interest (like `xkcd.com`) even though the actual location on the internet is not represented by the domain name, but rather its IP address. TCP/IP is the protocol used to actually send and receive packets of data over the internet. Without a protocol for this process, communication would be inconsistent at best as data moves around the internet. Through these protocols, not only communication is possible, but error identification and recovery, efficient data routing, and bolstered reliability.

How it fits into my teaching

In a freshman or introductory “general computing” course, a focus on how the computer operates at the machine level (how information is captured, generated, processed, stored, etc.), how computer systems communicate with each other (what is the internet, how URLs and IP addresses and DNS servers are related to each other, and best practices in habits and security), and how information is managed all expand the development of digital literacy. Digital citizenship is already a fundamental part of any introductory course that I offer, so having this additional layer of fluency allows students to begin to explore the deeper, more complex world of information around them.

How I might teach networking

I would love to (after learning enough about it to develop one) offer a semester or full-year course in full-stack web development. To be able to design, test,

and implement the front-end, UX/UI development-side then build and maintain a framework for back-end data management and a server client to link everything together would be an interesting and engaging way to get students actually involved in how the internet works. This would also lend itself to promoting students' identity in their work in their design of the site itself from the mechanics to the look and feel of the page.

Integrating a cybersecurity project of some kind would be (to the students, for sure) another interesting way to connect students with best practices and how data is protected on the internet. Students seem generally curious about cybersecurity, probably mostly as a buzzword, but that's a good enough hook to get them through the door and doing something.