The October 4th Facebook Outage

On October 4, 2021, Facebook, along with its sister applications, WhatsApp, Messenger, and Instagram, were nowhere to be found on the internet for some five hours. But first, some internet basics…

URLs and Servers and Clients — Oh my: When you want to find something on the PSRC website, you start your browser (Safari, Edge, Firefox, etc.) and enter **www.princetonsenior.org** in the address space at the top of your browser window. The "www.princetonsenior.org" is our *Universal Resource Locator—URL* for short—and when you enter it, our website shows up a couple of seconds later.

The information that comprises our website is on a *server* on the internet. Servers are computers that provide information to users like yourself, which are called *clients*. (Actually, your computer is the client.)

The server on which our website resides could be anywhere in the world (it's not in our office). It may be in a huge server warehouse owned by Amazon[1] or Google or Microsoft, or in someone's basement (probably not). My point is that servers can be physically anywhere there's a connection to the internet.

And so can clients. Folks in Bayonne or Boise or Bangalore can access our website.

184.175.101.76 Maple Street: Every server and client has a unique *internet address*. The address that Verizon assigned me is 173.72.1.218. If you want to look up your internet address, just go to whatismyip. com. www.princetonsenior.org's address is 184.175.101.76. But we don't use these addresses because they're not easy to remember, nor are they descriptive.

How to Find the Server — Calling 411: So, how does your browser know where to find the server that holds our website? There must be some kind of directory service—you know, like the old "411" that we'd dial to get a phone number. And, in fact, there is! It's called *Domain Name Services—DNS* for short—and it comprises thousands of computers on the internet that look up the address of websites for us. Your internet service provider, like Xfinity or Verizon, provide DNS.

Domain Services — Where the Magic Happens: Our *domain* is "princetonsenior.org,"[2] and when you type it in the address box, your browser contacts the closest DNS computer, which looks up the address and responds with "184.175.101.76." This all happens behind the scenes. Then your browser sends a request directly to the server at 184.175.101.76, which responds with our webpage.

Now you know how your browser finds the right server. (TA-DA!)

So, what happened to Facebook?: Facebook has thousands of servers and its own DNS computers to help sort out what's where. At noon on October 4, someone on the Facebook tech team gave an incorrect command to Facebook's DNS computers, which promptly disconnected themselves from the internet. From that moment until they fixed the problem, there was no way to find the Facebook servers on the internet.

It's like calling "411" and finding that Facebook was an unlisted number.

To complicate matters, the Facebook staff couldn't reach their own servers for several hours because their Domain Name Services was broken!

I hope you enjoyed this somewhat "deep dive" into how the internet works.

If you need technology help, go to the PSRC website, click the Tech Resources webpage and fill out the Tech Request Form at **princetonsenior.org/psrc-tech-resources/**.

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[1] Amazon made $13.5 Billion from its web services in 2020. It's a side business.

[2] The "www" part is optional. It means "world-wide web," but you don't have to use it for our site.