New tools to get your smartphone up to speed

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"Check the map," says the voice in the commercial. "Verizon's super fast 4GLTE is the most reliable and in more places than any other 4G network."

But is it truly the most dependent, the most widespread?

In fact, there's no way of knowing: "There's absolutely no useful quantitative data for comparison purposes," according to mobile systems expert Dave Choffnes, an assistant professor in Northeastern's College of Computer and Information Science. And that means we have no control over the performance and reliability of our mobile Internet use.

Last year, the number of people using mobile devices to access the Internet surpassed the number of people using desktop computers to log online. While "most eyeball time is on devices," Choffnes said, mobile performance is nowhere near what we expect from our desktop experiences. Researchers like him would need much more data to even begin bringing mobile Internet use up to speed—literally.

"Ideally we'd have measurements from everywhere on every network all the time," he said. "And then we'd want to correlate that with where we use our phones and what applications we use on our phones. And then you can imagine with all that information we could spit out a number and say this carrier is going to give you the best overall performance."

But collecting that data is easier said than done—presumably, mobile providers would have done it by now if it weren't. One hurdle is that

users need to opt-in to donating their data, explained Choffnes, since doing so means giving up some of their expensive data-plan as well as precious battery life. As a result, he said, "we have to give an incentive."

To that end, Choffnes has created a code that could send data to the developers of a mobile app once it has been installed on a smartphone. Developers could incorporate this code into whatever apps they create, but users will only opt in to those that are the most entertaining and useful.

For instance, Choffnes envisions an app that would allow two users to pit their mobile speeds against each other. Or one that provides real-time information about a phone's performance to inform which network provider one should choose.

In another project, which he's calling Meddle, Choffnes is using the same approach to incentivize users into donating their data for research. Along with limited performance and reliability control, mobile users also lack control over how their apps share their data with the rest of the Internet.

Meddle is not itself an app, but rather a proxy network through which all of a phone's traffic must pass before accessing a website or app. Traditionally, the privacy (or lack thereof) of that journey is governed by the app through which the user is traveling. Meddle encrypts everything it sends and receives, which instantly improves a user's privacy experience.

Additionally, Meddle allows users to view their activity—and the activity of their apps—online. When we click "agree" to an app's terms, we often give it permission to share our data with other parts of the web. Meddle users can view a map of that activity and shut down any unwanted data sharing, provided it doesn't interfere with the app's functionality.

In exchange for these improvements, users agree to share all their activity data with Choffnes, but only after it's been scrubbed for anonymity. Choffnes then uses it to investigate the performance, reliability, and privacy of mobile network traffic. "If we can't see what devices are doing, we can't optimize them to work well all the time," he said.

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