

Broadband Mapping Is a Mess. No One Knows What To Do About It.

As Congress and the FCC look for solutions to fix the problem of broadband mapping, they should consider a variety of factors, including speeds, prices, availability and reliability of service and competition.

By Drew Clark / *BroadbandBreakfast.com*

Broadband mapping has been in for a lot of criticism recently. On a recent episode of the Netflix show “Patriot Act,” titled “Why Your Internet Sucks,” comedian and commentator Hasan Minhaj took on the Federal Communications Commission’s mess on mapping. The heart of the show featured a medley of bipartisan congressional disgust:

Sen. Jerry Moran, R-Kansas: “The accuracy or the value of the map is nearly nil in my view.”

Rep. Peter Welch, D-Vermont: “These maps are bogus. These are phony maps.”

Sen. John Tester, D-Montana: “I got to hear a lot of conversation about the maps. The maps stink, basically. We need to kick somebody’s ass, truthfully.”

Ten years after the federal government began in earnest with a major effort to collect and publish broadband data, everyone agrees that something has gone badly wrong.

But to get at what the problem is, and how broadband mapping needs to be fixed, we need to look at different reasons and motivations for collecting and publishing broadband data. Part of the problem is that there are at least four different perspectives on collecting broadband data and maps. Each perspective calls for progressively more data to be made available:

- Some providers (such as cable companies) want to offer broadband services but

generally aren’t interested in obtaining Universal Service Fund subsidies.

- Rural telecommunications and wireless providers recognize the importance of the government mapping out areas that are served and unserved.
- New entrants want to bring high-capacity fiber deployments to areas that currently have lower-capacity cable or DSL or wireless service, as do economic development advocates seeking to bring better broadband to their communities.
- Academics, consumers and government oversight bodies could seek to hold broadband providers accountable for their promised levels of service.

Because each group approaches broadband mapping with a slightly different agenda, each pushes Congress and the FCC to recognize only its needs in broadband mapping. Understanding the history – and different perspectives on why broadband mapping is important – helps make sense of current policy and other initiatives, including new efforts of the U.S. Commerce Department and the industry group USTelecom.

WITH BROADBAND MAPPING, PAST IS PROLOGUE

In the beginning, with the passage of the Telecommunications Act of 1996, Congress

mandated that the FCC collect broadband information on a semiannual basis. The FCC, which at the time defined broadband as 200 Kbps download or upload, required providers to indicate on Form 477 the ZIP codes where they offered service. Although a limited summary of this data was publicly released, the FCC did not release information about which particular carriers operated in which particular ZIP codes. In a Freedom of Information Act lawsuit seeking release of Form 477, the FCC and the incumbents actually opposed disclosure of this data on the grounds that doing so would lead to more broadband competition and hence harm existing providers.

With the passage of the American Recovery and Reinvestment Act under President Obama in February 2009, the government took a more active role, seeking better-quality and transparent data about U.S. broadband infrastructure. This measure launched the National Broadband Plan, released in March 2010, and the National Broadband Map, released in February 2011. Partly in response to the release of the plan, in 2010 the FCC increased the speed at which it defined broadband, to 4 Mbps download and 1 Mbps upload.

A key public policy problem leading to both these initiatives was that citizen-consumers and policymakers lacked basic information about broadband. Although the United States spends more than \$8 billion per year on statistics, much of that goes to fund the Census Bureau and data collection about agricultural and labor markets, such as the monthly unemployment report. Very little of this statistical spending goes to compiling information about broadband, the infrastructure of the knowledge-based economy.

Worse, the data that the FCC has collected has been misleading, particularly when a unit of geography such as a census tract or a census block was considered “covered” when only one person in that area could obtain broadband. Although the units of geography have gotten smaller – we’ve moved from 66,438 census *tracts* to

11,155,486 census *blocks* – the problem of overcounting still exists today.

An equally important corrective to the continuing problems of carrier-provided broadband data is collecting crowdsourced data. This allows individual consumers to indicate – within some kind of platform or framework – what kind of broadband coverage they have, and to conduct speed tests of their actual internet performance. The nonprofit Measurement Lab, launched by the New America Foundation in 2008 and continuing as a freestanding entity today, is one important effort collecting consumer-generated speed tests. BroadbandCensus.com, an effort I started in 2008 to pioneer the use of crowdsourcing speed tests and other data collection, also built a 2009 prototype for the National Broadband Map that identified each carrier offering service within each census block of a U.S. city.

Publicly disclosing the census blocks in which each carrier operates became the hallmark of the National Broadband Map, created by the Commerce Department’s National Telecommunications and Information Administration in partnership with the FCC and 56 state and territorial entities through the State Broadband Initiative.

From 2010 to 2015, SBI-funded state initiatives played a crucial role in collecting broadband data. Some were housed at state public utilities commissions, others were within universities, and still others were nonprofit entities chartered with collecting data, standardizing it and providing it to NTIA for the creation of the National Broadband Map.

For all its faults, the National Broadband Map allowed everyday consumers and internet users to distinguish fiber, cable, DSL and wireless service. In disclosing broadband carriers’ footprints, the map created a framework for public verification and crowdsourcing. But because federal funding for the SBI program ended, the map was not updated after 2015. The data quickly became stale. Although the FCC has continued to collect Form 477 data, it didn’t do the verification done by the state initiatives.

THE BROADBAND SPARC

As Congress and the FCC look anew at solutions to remedy the problem of broadband mapping, they should step back and consider what I have long called the Broadband SPARC. This rubric stands for Speeds (advertised and actual), Prices, Availability (geographic availability of service), Reliability (or consumer satisfaction), and Competition (being able to identify which and how many carriers offer service within a particular area).

I view all these elements as necessary for understanding and ranking the economic vitality of regions, counties and census subunits. But some versions of broadband mapping include only a subset of these data elements, such as advertised speeds and availability. Others want to add Yelp-style customer rankings as a metric for reliability of service. Still others view the adoption of broadband (making the rubric SPAARC) as vital to assess regional connectedness. The thinking is that if broadband service is available but no one takes it, has a region experienced a broadband benefit?

Let’s return to the perspectives of the different groups mentioned above.

The cable industry wants to sell broadband, and it provides (advertised) speed and price data to a variety of aggregator websites that help generate leads for service. But this segment of the industry has been reluctant to support improvements for the most granular-level broadband mapping because it infrequently offers service to low-density rural areas.

By contrast, rural telecommunications and wireless providers have begun to tout the need to create what they call a geospatial “broadband fabric” for understanding the ways to get broadband to even the remotest rural areas. Changes in the USF over the past decade have led the FCC to a more data-centric approach for subsidizing rural broadband. These groups have been driving a pilot project led by USTelecom in Virginia and Missouri to “get the right data out, so that we know where broadband is, and more importantly, where it isn’t,”

said a spokesman for the Wireless Internet Service Providers Association. Using satellite imagery and artificial intelligence to deduce which structures are homes or businesses – and which structures are chicken coops – the project aims to get more granular than a census block, and even more granular than “address-level” mapping. Only by probing this level of availability can the

FCC, these groups believe, target rural broadband subsidies in the right way.

But these two different camps don’t exhaust the list of uses to which broadband mapping can and should be put. For example, both approaches are critical of “overbuilders” and generally oppose any efforts by federal or local governments to support competitive entrance into the broadband

marketplace. That’s why community fiber-building companies or municipalities see broadband mapping from an additional perspective. They also insist on collecting data about competition (the number and identity of providers within a given area) as well as (actual) speeds. This data collection allows a city or region to get a verified sense of their actual broadband performance.

Such neighborhood networks, whether financed and built by private companies or publicly funded, also benefit from knowing the existence and location of interconnection points and price information. This information is a necessary input into engineering-level field studies required to build new fiber networks that compete with barely broadband services. These kinds of engineering solutions were discussed in the “Mapping Matters” session at the April **BROADBAND COMMUNITIES** Summit.

In 2015, the FCC updated its broadband definition from 4 Mbps / 1 Mbps to 25 Mbps download / 3 Mbps upload, but this definition is very much due for an upgrade. I agree with those who suggest – perhaps with some cheek – that the FCC should define broadband as 1 gigabit down / 1 gigabit up. That way, a broadband map truly becomes a tool for how and where to build fiber networks.

Yet there are still more sets of information, and they involve performance-focused metrics, including actual speeds, reliability and adoption. Interestingly, both a broadband data depository and a broadband performance dashboard originally were proposed by the FCC’s National Broadband Plan. The FCC depository “would give researchers and the public better access to the FCC’s data. This will help the FCC serve its essential role as a source of independent data on broadband deployment, adoption and usage in America,” reads the National Broadband Plan. The dashboard was designed to go even further, using the transparency on a government website to track progress and accountability, and going far beyond mere availability or adoption.

GETTING GRANULAR: FROM ZIP CODES TO ‘BROADBAND FABRICS’

The FCC began collecting broadband information by ZIP code. There are 42,000 such codes in the United States. But ZIP codes are not geographic units. A ZIP code assigned to a single large building – as many are – would appear simply as a point on a map.

By contrast, the Census Bureau uses a nesting-doll framework of geographies called the FIPS Code, or the Federal Information Processing Specification. These codes include ID numbers for states, counties, census tracts (66,438 in United States), census block groups (211,267), and census blocks (11,155,486). The census block is the smallest unit of geography the U.S. government recognizes.

Census blocks are bounded by visible features such as roads, streams and railroad tracks and by nonvisible boundaries such as property lines, school districts and city, township and county limits. The average population of a census block is 30, but census blocks aren’t defined by population. They can be quite small in urban and suburban areas but hundreds of square miles in rural and remote areas.

Moreover, these geographical units don’t mesh well with broadband providers’ mapping service areas. Wireline providers use line drawings. The wireless industry employs radio frequency engineers to create propagation maps with polygons that predict coverage areas based on distance from towers. Both mapping techniques create shapefiles that can overlap with census geography and estimate which census blocks are covered.

If a census block is considered “covered” when only one person can get broadband, however, that overcounts broadband availability. One aspect of the State Broadband Initiative was the creation of address-level broadband mapping. But an address-level focus has problems, too. Many addresses are post office boxes or farms with separate structures. USTelecom and rural providers are looking to create what they call a “broadband fabric,” or a geographical map of all structures that might need broadband access. The difference between the broadband fabric and the more limited shapefile approach is that the fabric uses a range of datasets (tax assessor maps, building polygons, parcel boundaries for addresses, and so forth) to determine *where broadband needs to go*. The shapefile approach, by contrast, reflects the perspective of the carriers, showing the shapes of the areas in which a carrier offers service.

The cable industry group NCTA opposes the broadband fabric approach and instead favors a system in which shapefiles continue to be overlaid against a census block framework.

THE FUTURE OF BROADBAND MAPPING

USTelecom's pilot mapping project offers much promise, particularly if provider data about availability and competition is made available to the public and incorporated into a platform for crowdsourcing. During a June 20 webinar showcasing its progress, USTelecom demonstrated how it is using tax assessor information, building polygon datasets and parcel boundaries to create its geospatial fabric. This is more efficient than a shapefile-based approach, said Jim Stegeman, CEO at CostQuest Associates, the industry group's contractor for the pilot.

"There's nothing bad about shapefiles," Stegeman said, "but you need an underlying fabric to determine what the shapefile means." He added that a nationwide broadband mapping tool could be delivered as soon as 2020 if the government or industry decided to go forward with the USTelecom pilot.

But remember that policymakers cannot neglect the vital role of actual speed, price and adoption data. Private-sector groups such as BroadbandNow, Robert Ballance's Internet as Infrastructure tool, and Measurement Lab's open-source speed test data all will play a vital role in creating something like the "depository" and "dashboard" contemplated by the National Broadband Plan.

Regional economic development also is getting a boost from NTIA's recently revived interest in working with the State Broadband Initiative. With the absence of federal funding, about half the state offices closed. NTIA has worked with the remaining offices and earlier this year announced its own pilot program with some of the active state programs in California, Maine, Massachusetts, Minnesota, North Carolina, Tennessee, Utah and West Virginia. These state broadband offices play a vital mapping role in helping communities understand how to facilitate more competitive broadband entrants. And with states including New York, Washington, Oregon and North Carolina putting financial resources

The ideal approach to broadband mapping would be one in which every person and every home is counted and measured.

behind actual broadband deployment, state broadband offices could be an even more significant force in advocating for more and better broadband data.

On Capitol Hill and at the FCC, much of the recent legislative focus on broadband mapping has been driven by concerns from constituents in rural areas, where census blocks can be hundreds of square miles. Senate Commerce Committee Chairman Roger Wicker, R-Miss., has introduced the Broadband (Deployment Accuracy and Technological Availability) DATA Act, or S. 1822, with bipartisan support. In the same vein is Sen. Shelley Moore Capito's (R-WV) Broadband Data Improvement Act of 2019, or S. 1522, introduced in the House as H.R. 3162. (Congress previously passed a Broadband Data Improvement Act in 2008, which later was incorporated into Recovery Act legislation that created the National Broadband Map.) Also relevant to this discussion is Wicker's Broadband Interagency Coordination Act, S. 1294. That measure is designed to get the FCC and the Agriculture Department's Rural Utilities Service to work together in coordinating the distribution of funds for broadband deployment.

All these measures would direct federal funds to build out broadband infrastructure and require broadband providers to report more accurate data about availability and advertised speeds. But insofar as they appear to favor the "polygon shapefile" approach to submitting broadband information, they are less granular than the apparent aims of the USTelecom pilot project.

Given the abundance of criticism of the FCC's broadband mapping efforts, it is no surprise that FCC Chairman Ajit Pai has announced plans to circulate a broadband mapping

order for a vote at the agency's August meeting. Pai says his proposal will require reporting at the sub-census block level, and also "incorporate public feedback into our mapping efforts." He previously said that he believes in continuous public feedback as a means of improving FCC broadband maps.

For his part, Senate Commerce Chairman Wicker said he believes the commission "should not seek to move forward on broadband funding decisions until it gets the maps right." The agency's current maps "have contributed to the persistent broadband gap," and the FCC needs a "completely new approach to developing accurate and reliable maps," he said.

Broadband mapping has inherent weaknesses when conducted in a survey-like manner. Instead, the ideal would be a BroadbandCensus-like approach, in which every person and every home is counted and measured. Because the definition of broadband changes, it is necessary to have a continually updated database of the Broadband SPARC – speeds, prices, availability (and adoption), reliability and competition. As it moves toward this approach, the FCC should collect and publish Broadband SPARC data so it can be used by all different stakeholders with an interest in broadband. ❖

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