

Millions of Americans can't get broadband because of a faulty FCC map. There's a fix

A fundamental flaw in closing the digital divide is not knowing where the problems actually are. We're finally about to see changes.

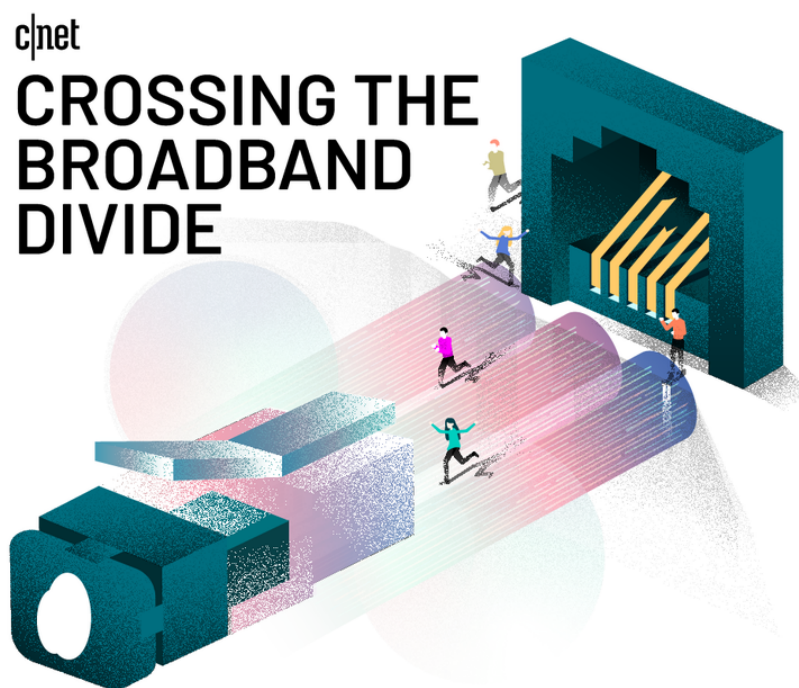
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When Kathi Shorey moved to a rural region of western Maine about 40 years ago, she knew she was giving up some comforts of life in the Boston suburbs. Her new home of [Sweden](#), located 47 miles from Portland, didn't have big box retailers or major universities, and its population of about 400 people could all fit into a single city apartment building.

Shorey never anticipated that decades later, her chosen home would make it impossible for her to work remotely and stay connected during a global pandemic -- all because her internet service is too slow to reliably get online.

"Never did I think the digital divide would be so unfair," Shorey said during a conversation on her landline phone, the only reliable way for her to communicate when she's at home.



The registered nurse, who now teaches a nurse's aide class, gets, at best, 3 Mbps download speeds through her service, far below the FCC's broadband definition of 25 Mbps -- a level itself that's viewed as [outdated and inadequate for today's needs](#). Shorey can't watch Netflix, and her internet is too slow for her to take classes to maintain her nursing license. Even more worrisome is Shorey's inability to broadcast video to her nurse's aid students while the novel coronavirus pandemic forces classes to take place remotely over Zoom.

"The issues I'm having are pretty horrific for this century," Shorey said. "I can't show students any video, and they have to turn off their video to hear me. I run around my house and shut off the two phones we have, and my iPad and my home computer ... just so I can get a connection."

For Shorey, the problem goes beyond just lack of internet. Inaccurate information about what service is available at her address limits the public funding providers can receive to improve their networks in her area. According to the [US Federal Communications Commission's national broadband map](#), which tracks internet availability, Charter Communications could provide nearly gig-speed internet access at Shorey's home, while Consolidated Communications -- her current provider -- and satellite companies ViaSat and Hughes Network Systems could supply access at about broadband speeds. That conclusion is riddled with inaccuracies.

"I can't get anything more than 3 Mbps whether I want to pay for it or not," Shorey said.

Her story isn't rare. Millions of Americans around the country lack access to fast internet at home, a need that's [become especially critical over the past year](#) as the COVID-19 pandemic forced everything from family gatherings to [classes and business meetings to go online](#). But even as President Joe Biden pushes an ambitious \$20 billion plan on top of [billions of dollars in funding already earmarked](#) for unserved communities, a fundamental flaw remains in not knowing where the problems lie. The faulty FCC national broadband map has essentially made millions of Americans without fast internet "invisible," [as Microsoft put it](#), and unless the data improve, they're likely to remain so.

"You cannot manage what you do not measure," acting FCC Chairwoman Jessica Rosenworcel said in late January. "But for too long, the FCC has lacked the data it needs about precisely where service is and is not

throughout the country."

There's reason to be hopeful. Thanks to \$65 million in funding from Congress in December, the FCC now will require internet service providers to share more detailed data, giving a better picture of what areas are unserved by broadband. It will also have to open the map to public feedback, letting people flag when something is wrong and providing more data points on gaps. On Wednesday at the agency's monthly meeting, Rosenworcel [launched a new task force to fix the data](#), saying "it's no secret that the FCC's existing broadband maps leave a lot to be desired."

But some experts say the new mapping parameters still aren't granular enough, and the new maps almost certainly will arrive too late to help people during the pandemic. The updated data likely won't be available until at least next year, the Broadband Data Task Force's chair, Jean Kiddoo, acknowledged Wednesday. Many regions of the US can't wait that long.

"Nobody wants to overbuild, and everybody only wants to serve the unserved," says Peggy Schaffer, director of the ConnectMaine Authority, the state's effort to bridge its digital divide. "But we, quite frankly, have no idea who they are."

Unwilling to wait for the federal government, Maine, Pennsylvania, Georgia and other states have set out to build their own maps, drawing on speed test data, specific information from ISPs about what homes they serve, and other resources to find out where their gaps are.

The FCC's effort is, however, a step in the right direction in addressing a problem that has grown in severity over the last quarter century.

Faulty maps

The broadband mapping problem goes back to the early days of the internet, when the Telecommunications Act of 1996 required the FCC to collect semiannual data from providers about which ZIP codes they serviced. But the agency didn't publicly disclose the internet service providers in each area.

Thirteen years later, the government tried to make the information more transparent. A provision of the American Recovery and Reinvestment Act of 2009, signed by President Barack Obama, [mandated the development of a National Broadband Plan](#) and [the creation of a US broadband map](#) by mid-February 2011.

To build the map, internet service providers twice a year give the FCC what's called [Form 477](#) data that details coverage areas and speeds. But the FCC doesn't check the data; it just relies on the ISPs to report accurate information. And the speeds that service providers list are what their advertised maximum speeds are, not necessarily the everyday reality. Pricing data is kept confidential, which means broadband speeds may be available but at very high rates.

fcc-broadband-map



Enlarge Image

The FCC's broadband map overstates the number of Americans with fast internet at home.

FCC

An even bigger issue: If even one home in a [census block](#) -- the smallest geographic area used by the US Census Bureau -- can get broadband service, the entire area is considered served. In rural areas, that home may be the only place with internet service for miles around. And the data only

shows places service providers could provide broadband within 10 business days of a request, not areas that are actually connected. As of the 2010 census, there were 11.2 million census blocks in the US. By comparison, [there are an estimated 150 million parcels](#) -- the way land is divided for taxes -- in the country.

"Census blocks in America are highly irregular in terms of size and shape," said Tyler Cooper, editor-in-chief of internet service data tracker BroadbandNow. "It could be a single city block in urban areas or dozens of square miles in a rural area. ... You have this vast issue of overreporting happening."

Accepting an ISP's data without checking it can be problematic. Barrier Communications, a New York-based ISP that does business as BarrierFree, submitted data for 2019's broadband report that said it provided speedy internet coverage for nearly 20% of the US population. That would make it the fourth largest US service provider in terms of people covered despite being in business only about six months. The FCC accepted that information without checking it. It was only after [nonprofit Free Press pointed out the "implausible" nature of the claims](#) that the FCC revised its figures on the number of Americans covered by broadband.

The flawed maps have presented a big problem as governments try to distribute broadband funding. If a census block is considered covered by the FCC map, it's not eligible for federal assistance. That's particularly worrisome as the US distributes billions through the [Rural Digital Opportunity Fund](#), which the FCC has called its "largest investment ever to close [the] digital divide."

A year ago, [the FCC approved the disbursement of \\$20.4 billion](#) to ensure that [residents in rural areas of the US have access to broadband internet](#)

[connections](#). The funding will be allocated over the next 10 years to broadband providers, cable providers, wireless companies and electric co-ops to build access to unserved Americans. At the time, two of the five agency commissioners, including Rosenworcel, dissented in part to the plan because it relies on what they and many others in the country have determined to be faulty data. Those bad maps have led to issues with RDOF.

"We shouldn't be surprised, in some ways, that parties are already raising some instances where mapping related problems are arising in RDOF in the phase one results," FCC Commissioner Geoffrey Starks said Wednesday.

There's also a massive lag between when the data is submitted and when the public sees it. [The latest FCC data](#), published the day before Biden's inauguration, compiles data provided through the end of 2019. It found that fewer than 14.5 million Americans -- or 4.4% of the population -- lack access to fixed broadband, which is defined as download speeds of 25 Mbps and upload speeds of 3 Mbps. The previous year, 18.1 million Americans didn't have access to broadband at home.

"Since 2016, the number of Americans living in rural areas lacking access to 25/3 Mbps service has fallen more than 46%," the FCC said in its report. "As a result, the rural-urban divide is rapidly closing."

The FCC also said the *entire* US population has access to broadband internet when satellite service is included -- an idea that broadband experts describe as laughable.

In reality, the FCC has been dramatically underestimating the number of people without broadband access for years, something Congress and even the FCC itself have acknowledged time and time again.

See also

[School is starting -- and the broadband gap will be a massive problem](#)
[In remote Alaska, broadband for all remains a dream. So a school district got creative](#)

[As COVID-19 ravages the world, closing the digital divide is more critical than ever](#)

[How faster internet is being blocked by politics and poverty throughout the eastern US](#)

Microsoft over the past couple of years has looked at [how quickly people across the US download its software](#) and security updates as a way to quantify how many have speedy internet access. In December, it said that [about 157.3 million people in the US](#), or 48% of the population, don't use the internet at broadband speeds. And BroadbandNow, which tracks internet service and pricing by combining Form 477 data with other sources, a year ago [estimated that at least 42 million, or 13% of the population, didn't have broadband](#) at all, double the FCC's declaration at the time.

"Right now we're in this bizarre situation where even though we know -- we know -- that there's something dreadfully awry with our broadband [data collection], as a matter of national policy dating back 15 years, we simply refuse to collect the information that would explicate that," said Sascha Meinrath, a broadband data expert who serves as director of X-Lab, a future-focused technology policy and innovation think tank, and holds the endowed Palmer Chair in Telecommunications at Penn State University.

Getting more granular

In August 2019, the FCC adopted rules for [collecting more detailed information on where ISPs provide coverage and where they do not](#) as part of its Digital Opportunity Data Collection process. But it wasn't moving fast enough for Congress -- or the constituents who have complained loudly and

frequently. Nearly a year later, President Donald Trump signed the [Broadband DATA Act](#) to order [the FCC to collect the more "granular, precise coverage data."](#) Still, the data collection process faced even more delays, largely because then-Chairman Ajit Pai said the FCC didn't have the funds to carry out the act. Congress finally allocated \$65 million for mapping as part of December's COVID-19 relief bill.

What the FCC now will do is require more precise data from broadband service providers in the form of "shapefiles." Instead of giving information at the census block level, the ISPs will give more detailed measurements through "polygons" that are overlaid on census blocks to depict the areas where broadband-capable networks exist.

"We will no longer count everyone in the census block as served if just one person is served," Pai said when [unveiling the new mapping plan](#) in August 2019.

The states are the ones who are innovating on this. We know we can't wait for the feds to fix it. We waited, we're done, so we're moving.

Peggy Schaffer, director of the ConnectMaine Authority, the state's effort to bridge its digital divide

The shapefile plan is something that ISPs championed, and it solves the problem of overstating coverage, said Steven Morris, vice president and deputy general counsel at NCTA-The Internet & Television Association. The group, formerly known as the National Cable & Telecommunications Association, represents the country's biggest cable providers like Comcast

and programmers like AMC Networks, and it's one of the most influential lobbying groups in America.

While the shapefiles will be more granular, they're still not down to the address level. The [FCC proposed that before](#), but it's something ISPs have successfully fought. In 2017, the NCTA said providing street address-level data would [cause its members to incur "significant costs,"](#) while Verizon argued it would [create "large and unjustified burdens" on providers](#). This time around, ISPs can share address-level data with the FCC, but it's not a requirement.

"It's hard to do in a way that's as accurate as doing the shapefile," Morris said. If a provider is greatly expanding its network, it could inadvertently undercount the addresses it serves, he said, while construction of new homes could also impact the accuracy.

Along with more granular data, the FCC also must create a way to gather public feedback on whether their homes and businesses are covered or not. Today, consumers have no official recourse when their homes are listed as covered but actually aren't. The new crowdsourcing method is expected to help check the data given by ISPs.

"It's not just relying on what industry tells it," said Gigi Sohn, an FCC staffer from 2013 to 2016 under Chairman Tom Wheeler and current distinguished fellow at Georgetown Law Institute for Technology Law & Policy. A common criticism about the new plan is that it still relies too much on what ISPs are willing to give, instead of requiring even more granular information and data about pricing.

Problems remain

While the maps may be better than what came before, they likely will still not

be enough to truly give an accurate picture of where broadband exists, experts say.

The FCC still hasn't "gotten rid of the 'could provide service' versus 'does provide service,'" Sohn said. That hides areas where people may be disconnected for affordability reasons or other factors that contribute to the digital divide.

Under the new rules, ISPs can only count an area as covered if it *could* set up a connection within 10 business days of a customer's request and without requiring resources or construction costs higher than an ordinary service activation fee. In the previous rules, a service provider could -- and did -- charge people thousands of dollars to extend service to their homes, even if the official broadband map showed service was available there.

gettyimages-1162780086

Steve Alexander's vacation home in Maryland lacked broadband internet -- until he and a colleague paid to wire their homes.

Getty Images

That happened to Annapolis, Maryland-based Steve Alexander in the early days of the pandemic. The chief technology officer of Ciena, a telecom equipment and software provider, wanted to spend more time at his vacation home on the Eastern Shore of Maryland, but there was just one problem -- internet was virtually nonexistent, despite the FCC data saying broadband was available. Alexander's DSL connection was too slow for him and a colleague who lived nearby to work from home, and a local ISP said it would cost \$25,000 to \$30,000 to extend service to their addresses.

Alexander ended up lucking out when a local power company dug trenches

to make repairs. He convinced it to dig to his location and that of his colleague, which allowed the cable company to install fiber. But none of that was free. It still cost them both about \$5,000 to \$7,000 apiece, Alexander said.

"I never felt the maps were accurate in terms of real availability," he said. "Would a normal homeowner be able to order a service based on that map and be guaranteed to get delivery? The answer is no."

At the same time, the FCC is only requiring information about broadband availability at homes and businesses, not anchor institutions like schools, libraries, health care facilities, public housing community centers and houses of worship. While the FCC in 2010 issued a goal for all [anchor institutions to have gigabit-speed connectivity by 2020](#), the country fell short of that goal, said John Windhausen Jr., executive director of the Schools, Health & Libraries Broadband Coalition, a public interest group.

"Even worse, we don't even know how far away from the goal we are," he said. "We're not collecting the info that would tell us how fast we have to go and how much investment we need to make to get gigabit connectivity." The new mapping plan doesn't change that.

Never did I think the digital divide would be so unfair.

Kathi Shorey, a registered nurse and nurse's aid instructor living without broadband internet in Maine

Still, the polygon shapefiles could give a better view of connectivity in agricultural areas, says Dan Leibfried, director of automation and autonomy at Deere and a member of the FCC's task force for precision agriculture connectivity. That will be key as [farming becomes even more technology- and data- driven](#) than it is today.

"If you really want the world's leading agricultural industry, you have to solve for this digital divide ... to give customers the best opportunity to make decisions in real time," he said. "I would love to see it solved yesterday."

Getting even better data

While nearly everyone agrees the FCC's current maps are bad, some researchers have tried to quantify just how inaccurate they can be. Meinrath and a team sought to show the gaps in Pennsylvania using speed tests. Along with his role at the university, Meinrath is also co-founder of Measurement Labs, an open-source network performance project. When someone Googles "speed test," the testing box that appears at the top of the results is powered by M-Lab technology.

While FCC maps in 2017 showed Pennsylvania was blanketed with broadband, [over 11 million speed tests conducted by Meinrath](#) and his team in 2018 [found no county where at least 50% of the population](#) had access to broadband. Because FCC maps rely on ISPs to self-report their coverage areas, there's often overreporting.

"I want to force the ISPs to be accountable for what they themselves are reporting to the FCC," he said. "That has to be the next step."

Pennsylvania ended up putting together its own statewide map -- taking into account ISP-provided data, FCC information and speed tests -- to help providers apply for RDOF funding last year.

pennsylvania-map



[Enlarge Image](#)

Pennsylvania built a detailed broadband map to identify where to steer funding for better coverage.

Screenshot by Shara Tibken/CNET

Another group of academic researchers [sought to quantify just how inaccurate FCC maps can sometimes be](#) by looking at 4G LTE coverage in New Mexico, many parts of which are rural or include tribal lands. And they wanted to determine what data could be useful for figuring out gaps.

Instead of running speed tests, they partnered with [Skyhook](#), a location data company, for what they called "incidental" data on where there was coverage and what the strength of the signal was. Skyhook's technology runs in the background of popular apps -- it doesn't specify which ones but says they include programs like social media and location services -- and measures where people are accessing those apps while going about their daily lives. It doesn't track a connection's speed but helps researchers know if a location has a 4G LTE signal at all.

"That's really powerful because those are actual measurements," said Elizabeth M. Belding, a computer science professor at the University of California in Santa Barbara and one of the authors of a new report on the findings.

The researchers compared the FCC's data with that from Skyhook and then actually went to parts of New Mexico in May 2019 to run their own speed tests and see for themselves what the coverage is like. What they found is FCC data diverged from Skyhook information the most in rural and tribal areas, and the on-the-ground measurement also varied in some cases. In one example, FCC T-Mobile data showed coverage in 92% of tribal rural blocks, but Skyhook showed coverage in only 63% of the blocks, the researchers said in their report.

"The takeaway is that the quality of the data is very variable," said Morgan

Vigil-Hayes, an assistant professor of computer science at Northern Arizona University and one of the report's authors. "They all have different benefits. ... What we've shown is we can take [the FCC's map] and use it as a starting point in combination with other data sets to be able to really identify where much more high-quality measurement needs to happen."

Georgia turned to a different methodology to build a map that broadband expert Sohn called "the most granular in the nation." After passing a law to keep ISP data confidential, it worked to gather information from the providers about the exact addresses they serve. But just having the ISP data of served locations and a list of all the other Enhanced 911 addresses wasn't enough.

A rectangular placeholder box with a thin gray border. Inside the box, the text "georgia-map-3" is written in a simple, lowercase font. The rest of the box is empty, indicating that the actual map image is missing or not rendered.

Enlarge Image

Georgia has built its own broadband maps using service provider data and address information from a real estate data company. The dark orange areas have broadband internet, the beige are unserved and gray areas are where there are no locations. Along with the full state view, Georgia offers a county broadband map.

Screenshot by Shara Tibken/CNET

Georgia needed some way to know what unserved addresses were actually homes or businesses, not barns or other structures that didn't need broadband. For that, the state worked with LightBox, a commercial real estate data provider that has information on all addresses in the US. ISPs provided Georgia with data on the locations they served, and the state then matched that with LightBox's data to identify homes and businesses that didn't have broadband.

"In order to get it at a granular level like we did, you do have to do this location-level approach," said Deana Perry, executive director of the Georgia Broadband Deployment Initiative.

What Georgia ultimately found was that 507,000 locations, or 10% of homes and businesses, lack access to broadband, and in rural areas, about 30% of locations are unserved. The FCC, in its most recent report in January, said only 6.2% of Georgia locations didn't have fixed broadband.

LightBox, meanwhile, has looked for ways to replicate Georgia's granular map without getting data directly from service providers, CEO Eric Frank said. One method involved collecting telemetry data from cellphones to see if that could identify coverage gaps. While the information helped approximate broad coverage, "it's not going to give you the precision" that you get by collecting address data directly from ISPs, Frank said.

"The most comprehensive way to do that is ... somebody could say to an ISP, send us everything you've got, every address that you have in the United States," he said. "It's easy for us to take that file and load it into the system, then take the files from the other ISPs. ... We can solve the United States in one shot."

Holding out hope

Maine is [counting on speed test data](#) to pinpoint its unserved areas and allow it to direct funding to providers there. The week of Thanksgiving, it launched its statewide effort, encouraging consumers to run M-Lab speed tests from their homes as often as possible. Since then, [nearly 17,000 people have taken its speed tests](#) from over 13,000 unique locations.

Speed tests aren't always useful for address-specific data but paint a picture of what an area looks like. The more tests, the better. Maine's newest grants

for unserved areas will be based on its new mapping effort. One of the four possible ways to determine if an area can get funding is if speed tests show it doesn't have broadband.

maine-map



Enlarge Image

Maine is using speed test data to figure out where gaps exist in its broadband coverage. Since the week of Thanksgiving, residents of the state -- population 1.3 million -- have taken nearly 17,000 tests.

Screenshot by Shara Tibken/CNET

While it knows speed tests aren't perfect, the data's still better than what the FCC provides, said Schaffer, the head of Maine's broadband efforts.

"The states are the ones who are innovating on this," she says. "We know we can't wait for the feds to fix it. We waited, we're done, so we're moving."

As for Shorey, she's anticipating her next call from Charter's Spectrum, urging her to install its internet service at her home before it realizes she actually can't. Her research into [SpaceX's Starlink service](#), which some believe can help connect remote parts of the US, hasn't been reassuring so far. Connectivity through the low Earth orbit satellites [costs \\$500 for equipment and \\$99 a month for the beta tests](#). Registering doesn't guarantee service.

For now, Shorey's best hope is for Consolidated to use Rural Digital Opportunity Fund money to upgrade the connectivity in her neighborhood.

Mike Schultz, senior vice president of regulatory affairs for Consolidated, said his company already has updated 760,000 rural locations to multi-gig fiber over the past few years. Consolidated now plans to upgrade another 1.6 million customer addresses in the US, or about 70% of its service area, and is counting on federal funding for assistance.

"We're hopeful that the next phase of RDOF will help areas just like Sweden, Maine," Schultz said in a statement.

For some of Consolidated's customers, getting fiber could take five years. Maybe by then, the maps will catch up.

"I've been waiting 20 years for something to happen, and nothing has really happened," Shorey said. "It's not fair. It's not OK to live in a place that doesn't have adequate communication."