

CLOSING THE DIGITAL DIVIDE

MANY POOR US COMMUNITIES HAVE BEEN LEFT BEHIND BY INTERNET PROVIDERS. **PATRICIA CUMMENS** EXPLAINS HOW MAPS ARE BEING USED TO FIND THEM AND BRING THEM UP TO SPEED

For many Americans, spotty internet access doesn't just make it hard to stream a favourite TV show. Poor internet access is now an existential issue – grindingly slow access hampers school and work, makes it difficult to apply for jobs, and blocks access to basic services such as banking and health care.

The COVID-19 pandemic illustrated just how critical and inequitable that access is – a system of private investment in broadband has left out many communities, creating stark divides, often along racial and economic lines. Draw a broadband map of the US, and you'd see that the places with the worst and sometimes costliest connections often overlap with the poorest communities, where people already struggle with everyday needs.

A key first step in upgrading the country's internet is knowing where the upgrades are needed most. That means governments, non-profit organisations and advocacy groups have been busy making those broadband maps. To begin with, they help stakeholders – and the public – grasp where problems are worst.

"I go to the committee and the first thing I put up are the maps," says Selwyn Hollins, director of Los Angeles County's Internal Services Department. "It's one thing to say we know that people don't have the internet, but when you look at where it's happening, that just speaks volumes."

In Los Angeles County, the country's most densely populated and the home of

the nation's second-largest school district, the problem is urgent. It's estimated that one out of five students in the county still lacks high-quality internet connection at home – a problem that's only exacerbated by existing economic, educational and racial disparities.

The pandemic brought that divide into stark relief, as schools closed, people worked from home and many others lost their jobs, all while trying to find social services and health care online.

Last year, as local officials puzzled over lower vaccination rates in some poorer communities, Selwyn pointed to the map. "To register for a vaccine, you had to go online," he says. "But they don't have internet or they'll have internet on their phones, but they may have limited minutes, so they can't spend a lot of time online."

A surge in unemployment led to more problems as people tried to find jobs. How do you do that? "You have to go on the internet."

As COVID-19 further deepened the digital gaps and galvanised public awareness, Hollins' department developed a county-wide campaign called 'Delete the Divide', aimed at expanding access to computers and reliable, high-speed internet service. In presentations to lawmakers, he used maps to show why and where action was needed most.

"We took the areas where 20% or more of the households don't have internet access and then we layered that on maps

with income level," Hollins says. The overlap underscored that affordability is a basic barrier to broadband access. "In LA County, you have over 1.1 million households that earn less than \$50,000 a year."

The maps included geographic layers for households with at least some access, showing service quality and costs as well as demographics including income level and race: in Boyle Heights and Watts, more than one in four households is likely to experience similar struggles because they lack in-home internet connections, according to county census data; by contrast, all but about 3% of households in the heavily white and wealthy enclaves of Brentwood and Pacific Palisades are well-connected to the internet. In some cases, residents in lower-income communities tend to pay more on average than their wealthier neighbours.

"When I showed the maps to policymakers, everyone in the room was speechless," Hollins says. "It's like: 'Here's where it is, and it's in your political district – how can we ensure that the efforts and the attention go to those gaps that you have in your district? And why is it like that?' Spatial awareness enabled that conversation."

Mapping scenarios to build or partner

Last year, the Los Angeles Board of Supervisors approved an unprecedented internet expansion plan aimed at delivering wireless



broadband to the hundreds of thousands of low-income households in Los Angeles County that don't subscribe to high-speed service. As part of the multi-year plan, the county is also laying the groundwork for administering a fibre network in partnership with existing providers and with the help of state and federal grants – a daring approach that will ensure reliable and affordable broadband for the county's most vulnerable residents over the long term.

Across the country, the hope is that public-oriented municipal networks could boost competition among internet providers, improve service and drive down prices, without costly regulatory action. But that's assuming they can get off the ground.

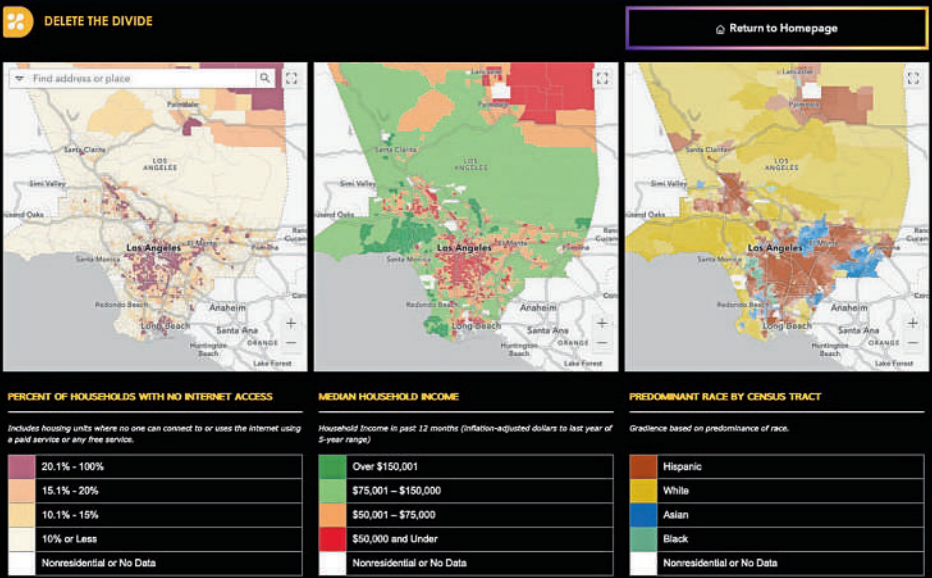
The ambition and scale of the project is larger than any existing municipal broadband effort. LA County contains 88 different municipalities with 9.8 million residents; 3.5 million live in the city of Los Angeles. One goal is to be able to provide a 100Mbps monthly service at no cost or low cost for low-income residents. By next winter, the county hopes to switch on a part-fibre, part-wireless network across several neighbourhoods, bringing low-cost or free internet to as many as 40,000 households. Eventually, a larger network will reach some 400,000 households who currently lack reliable, affordable internet.

Hollins's department is in charge of coordinating the effort, leading a growing

coalition of partners from government, education, business and each of the local communities the network will encompass. Throughout the process, his team is using digital maps and GIS technology to orchestrate, prioritise and accelerate an unprecedented broadband build-out.

Along with rates of internet adoption and indicators representing the county's racial equity and inclusion objectives, the

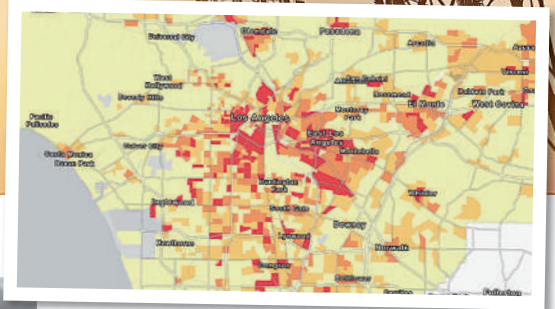
maps show areas of opportunities for public-private partnerships and shovel-ready construction. By highlighting the locations of public assets across the county, managed service providers can place antennas and other broadband equipment on existing light poles and other municipal infrastructure and buildings, eliminating mobile phone tower leasing costs and reducing construction costs and disruptions.



LA County's Delete the Divide site hosts interactive maps to explore the percentage of households without internet compared to household income and predominant race



Internet and wireless infrastructure such as these mobile phone towers are a prominent feature along streets and in the hills of Los Angeles, the country's entertainment capital, but not everyone has access



This map from Delete the Divide shows the percentage of households where no one can connect to or use the internet using a paid service or any free service. Higher numbers are in red



When the pandemic hit, online classes became a norm for many, but the one in five students without internet in the Los Angeles Unified School District struggled to make the shift to learning at home

"All the consultants said: 'We need \$8bn to do this,'" says Hollins. "And I said, 'No, you can do it for a fraction of that. Here's what the map shows, these are the reasons why, and here's how we're going to do it.' How can you lose?"

The scale of the divide

Broadband is in the homes of more than 70% of people in the US. But around 24 million people still can't access it at high speeds or at all; even more can't afford it. Gaps in broadband service may be much wider.

A multi-million, multi-year federal mapping effort based on a patchwork of data from around the country will help inform the distribution of some \$65bn earmarked for broadband expansion. But, in many places, officials like Hollins aren't waiting.

Detailed broadband maps help the county spend \$56m in new funding recently allotted for the networking project and will help officials request funds from California's new \$7bn broadband expansion plan. Hollins expects the maps will eventually make the county more competitive for millions more in federal dollars, by showing how carefully

it plans to spend on upgrades. "We will know what the real costs are," Hollins says.

To begin engaging private partners and better understand those costs, Hollins has been working with his office's GIS specialists to enhance the map to show where a public-private effort could build broadband fastest and with the greatest impact. By keeping track of a constellation of variables – like the physical extent of fibre-optic lines, service areas, the incumbency of various providers, the level of service provided, and the county's physical assets – GIS helps show the optimal places and ways to build the basic network infrastructure.

Poised to begin building

Hollins says that eventually, the maps will be crucial for construction and upgrades, helping coordinate the complex orchestra needed for a once-in-a-generation build-out. GIS show the physical terrain, to help situate infrastructure most efficiently, with the least amount of material and digging. GIS will also help the department negotiate with the county's corporate partners and track

grant applications, bids and other funding requirements while chronicling work progress, materials and operation of the networks.

The spatial planning component of the public-private project, with its holistic view, will also better position the county to apply for federal grants, Hollins says. "Timing-wise, it couldn't be better because of the infrastructure bill."

Even before government funds roll in, Hollins's department is using maps to engage the public and bring more help to those who struggle to afford high-speed internet. More than 534,000 households in LA are currently enrolled in the federal subsidy programme, but it's estimated 1.6 million households are eligible. The department built a 'Delete the Divide' website that offers residents guidance about how to apply for subsidies and resources like a map of open hotspots and an ArcGIS StoryMaps story that illustrates the county's digital gaps. On a map dashboard, anyone can input an address and see the digital divide in real time, equipping residents with the information they can use to impact their path to a better internet.

"It gives citizens a tool where they can go to local politicians or schools and say, 'Hey, this is what's going on in my neighbourhood,'" Hollins says.

No infrastructure projects can proceed without geospatial awareness. But Hollins says that in making the case for and charting LA's unprecedented effort, digital maps have been transformative. "I would say this was a game changer."

Patricia Cummins is director of government strategy and policy solutions at Esri (www.esri.com)



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