

Connecting the Unconnected

A dedicated, high-speed broadband network to connect the unconnected is a game changer for Cleveland.

By Lev Gonick / *DigitalC*

Recently, DigitalC – a civic tech collaboration that partners with the Cleveland community to design technology-driven programs and services – launched Connect the Unconnected with a goal of connecting the 50 percent of Cleveland residents who have no wired broadband access.

Nationwide, families in neighborhoods with median household incomes below \$34,800 – the lowest fifth of neighborhoods – are five times more likely not to have access to broadband than households in areas with a median income above \$80,700 – the top fifth.

In Cleveland, the average household salary of the 8,802 families living in public housing is \$7,572 per year. Nearly a third of those with housing choice vouchers are working poor. Today, internet access in the Cuyahoga Metropolitan Housing Authority is measured in the hundreds of residents. Cleveland is the third least-connected city in the United States behind Detroit and Brownsville, Texas.

Twenty percent of the residents of the Lutheran's Men's Shelter, the largest homeless shelter in Ohio, are returning vets. Without an internet connection, residents can not apply for public housing, a job or a myriad of VA, city and county services.

Dr. Adam Perzynski of MetroHealth in Cleveland recently concluded that, after controlling for income and education, broadband access is the single most important social determinant of health and wellness. Students in Cleveland's Metropolitan School District all take a battery of standardized tests online. Seven of 10 teachers assign homework

online, yet one in three students has no internet access at home. More than 3,000 children are in some form of foster care or at risk of timing out of support systems provided by the county in Greater Cleveland. Internet access for youth in foster care is rare except for those who enroll in public universities so they can gain shelter instead of sleeping on the street or in a car.

This is the other America. More than 47 million in the United States are without internet access – 47 million Americans with real faces, circumstances, hopes and dreams. Nearly a third of African Americans, Hispanics, and Native Americans do not have internet. Digital equity is the 21st-century civil rights challenge for the United States. It is neither color blind nor independent of class, age, ability or location.

A DEDICATED HIGH-SPEED NETWORK

There is no silver bullet, no elixir, no one-size-fits-all solution to connect the unconnected. For the past 15 years, Cleveland has made an intentional effort to design, build, manage and operate its own digital infrastructure. I do not mean the city of Cleveland. DigitalC is a nonprofit spinoff of OneCommunity, which in turn was a rebranding and scaling of OneCleveland, launched in 2003 by a group of civic-minded technology leaders in Cleveland as a catalyst for leveraging technology for community impact. We at OneCommunity spent much of the decade from 2006 to 2016 designing, constructing, managing and operating what became a large regional fiber optic network in Northeast Ohio that

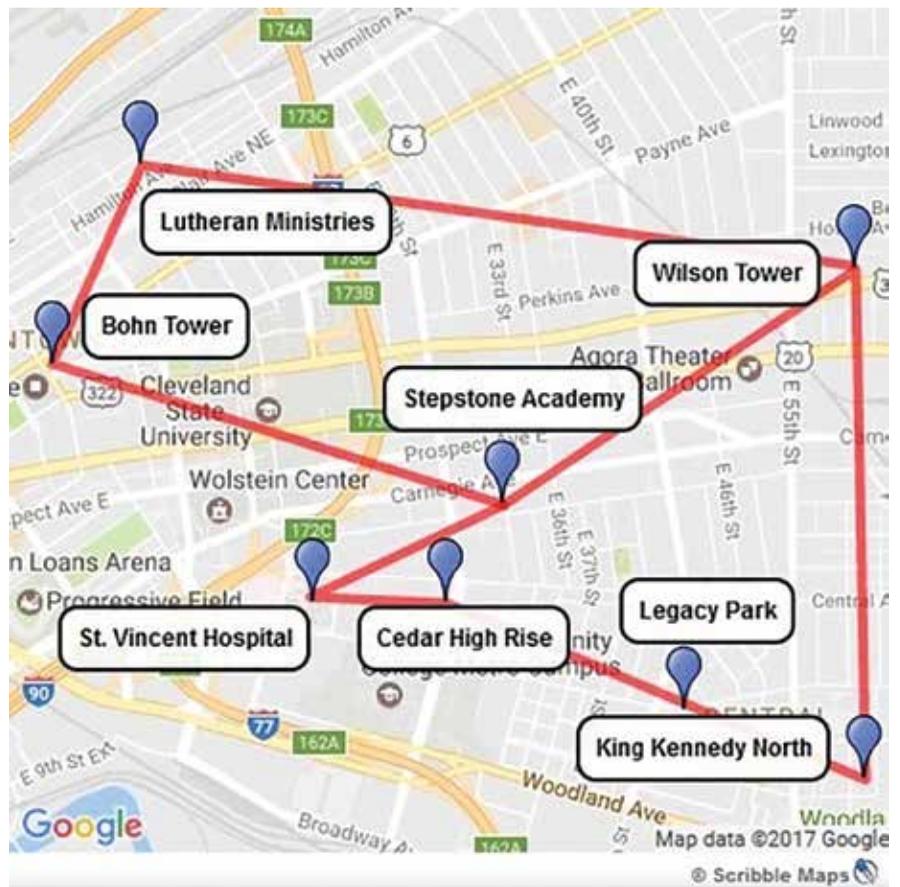
connected thousands of community anchor institutions.

In November 2015, the board of OneCommunity agreed to accept a \$50 million investment by MC Partners to accelerate and deepen the investments we sought for digital infrastructure through Everstream, OneCommunity's for-profit arm. As part of that agreement, we retained significant fiber optic capacity (through a legal arrangement known as IRUs) for our continued work in R&D, grants and mission-related activities.

DigitalC's Connect the Unconnected network leverages community anchor institutions that have a presence on OneCommunity's fiber optic backbone. The first ring is a fully redundant network designed by engineers from Siklu, a leading provider of millimeter-wave (mmWave) wireless technologies. Many Siklu antennas have been deployed for WebPass, the wireless provider recently acquired by Google Fiber.

Anchored to our fiber at St. Vincent Charity Medical Center, the antenna arrays for the Connect the Unconnected network in Cleveland have between one and three antennas per building, allowing us to extend fiber-like services. All the buildings in the ring are connected at gigabit speeds. The installation team from Agile Networks tethered and calibrated the Siklu mmWave antennas and then connected the wireless antennas from the rooftops to the demarcation points in the respective communications rooms, typically in the basement of each residential tower.

DigitalC reached out to Actelis Networks to design a solution to connect the internal copper wiring plant through its switching technology to the gigabit mmWave antennas via a fiber optic link. The team from Actelis terminated the copper wiring in every apartment to customer premises equipment and a Wi-Fi switch as well as to their own switches in the demarcation room in the basement of the residential tower. Notwithstanding the promise of technologies such as G.fast, the Actelis solution turbocharged the existing



The first ring of the Connect the Unconnected network builds off the OneCommunity backbone.

copper wiring to provide residents with a symmetrical service of, on average, 25–30 Mbps. That's a service offering I would be very happy with, could I receive it in the suburbs.

Given the well-documented challenges of leveraging the pervasive legacy copper plant in cities such as Cleveland, this pilot program provides proof positive that technology solutions can, with relatively modest investment requirements, provide all copper-connected customers with an FCC-defined, acceptable source of high-speed bandwidth.

More than 1,000 men and women live in homeless shelters in Cleveland. As noted, 20 percent are returning veterans. Another 60 percent are re-entering the community after being incarcerated in prisons. These men and women are demonstrably interested in gaining access to the internet for digital literacy training, keeping in

touch with loved ones, and seeking opportunities for workforce training, digital upskilling and looking up health care records.

The Lutheran Men's Shelter, the northernmost node on ring one, brought its connection from the rooftop to its computer lab via fiber optics. A group of 30 men immediately signed up for training. As the first computers were connected to the network, a speed test was performed at each station. The shelter now has one of the fastest internet connections in the entire city.

BUILD IT, AND THEY WILL COME (NOT)

Over the past 25 years, community technology centers have consistently demonstrated that making internet access available is a necessary but insufficient condition to onboarding those excluded from the digital economy. Digital isolation can

Once the digitally isolated get connected, they overwhelmingly see the value of investing in their own futures and paying for internet access.

be overcome only by direct and contextually relevant engagement work with unserved and underserved members of the community.

Connect the Unconnected attempts to be such a holistic, end-to-end program. DigitalC is the catalyst, but the entire program is delivered by and through our partnership network.

Every city in the United States has an e-waste stream ecosystem. In Cleveland, RET3 has long been a partner in recycling computers to support community needs. The forward-leaning leadership at RET3 provides a certified solution for recycling e-waste for corporate and enterprise Cleveland businesses and has long been engaged in supporting certified workforce development programs. RET3 offers A++ certification, Cisco network certifications, and a host of internship, re-entry and work-study opportunities. RET3's gently used PC and Apple laptops and minitowers come with TechSoup-certified software licenses.

Another key part of Connect the Unconnected is to tie the distribution of computers and software to successful completion of eight hours of certified training. The training is delivered by community partners such as the Ashbury Seniors Community Computing Center (ASC3). Digital literacy trainers who have decades of experience and credibility in the community are critical resources to raise the prospects of success. The empirical evidence bears out the value of this approach. Academic research conducted in 2012 and 2013 affirms that investments in digital literacy training bear strong positive support for employment prospects, greater responsibility for health information,

social engagement, and a sense of personal self-worth. The data also show that once the digitally isolated get connected, they overwhelmingly see the value of investing in their own futures and paying for access, and they prioritize the internet near the very top of their needs.

WHAT COMES NEXT?

The need for digital equity is as compelling as it is urgent. Failing to act in a timely manner will lead only to dystopian futures, with the threads of the social contract fraying further as the divide continues to widen.

A national framework for connecting the unconnected has always been a desired end. Even a strong set of templates for statewide efforts to connect the unconnected would prove valuable by having positive impact on individuals, families and whole communities. However, there is little to no prospect of a national policy move in this direction. Likewise, there is little prospect for statewide initiatives. American exceptionalism in broadband has meant that the action to connect the 47 million Americans with no internet is happening in cities and with rural utility co-ops and other locally defined authorities. We can wait for enlightenment, or we can continue to work on connecting the unconnected as a local issue.

The technical architecture of the Cleveland Connect the Unconnected program is scalable and replicable. Hundreds of community anchor institutions are on our network, geographically dispersed around Greater Cleveland. That said, there are several technical constraints to such efforts, including the laws of physics as they relate to line of sight,

a requirement for the mmWave fiber extension project. We are already designing hybrid approaches to solve for these constraints. Our available fiber footprint will allow us to plan and cost out the extension of fiber to advance connectivity. We are actively engaged with the R&D community and industry leaders in Cleveland to position our region for a strong, research-led engagement to bring 5G wireless test beds to Greater Cleveland.

Likewise, we anticipate adding G.fast pilots and several other emerging technologies to the mix. We have begun design work on rings 2–4, building off the work in the midtown campus district as we anticipate offerings both east and west of the downtown area. We have also been asked to model extending gigabit connectivity to geographies around the Greater Cleveland area where poverty is quickly encroaching, bringing with it the downward spiral of economic and social challenges. Connect the Unconnected is a good exemplar of the foundations for a meaningful civic internet of things to advance the quality of life in the community and serve as a reference architecture for others.

I want to end where I began. Designing and launching a reference architecture for a dedicated high-speed broadband network and all the attendant wraparound services and support is my definition of civic technology. Connect the Unconnected is about making a small contribution to a simple idea. When history is written, the ability to extend access to the digital economy and all its opportunities is the surest way to bet on a future of prosperity for all of us. Connecting the Unconnected is the promise of supporting those unserved and underserved to restart their dreams and hopes for a better tomorrow. ❖

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