As the demands of data, bandwidth, and connected devices push our needs for Internet infrastructure ever higher, municipalities across the country face the realities of bringing faster connectivity to their communities. Without it, they risk being left on the far side of the digital divide and out of the innovation economy. This section features insight and examples on building your digital reach—and what your finance office needs to know.

# Dark Optical Fiber Can Help Communities Extend Their Digital Reach

BY MIKE CAFFREY

For most of the United States, optical fiber is what brings the Internet to our door. But the big providers like Charter/Spectrum, AT&T, and T-Mobile don't offer Internet to rural areas because expanding out that far is too expensive—the revenue per square mile doesn't justify it. This is a growing issue in rural America, where the "digital divide" keeps getting wider. But there are different ways to use existing or available tech to safely connect a community to the Internet, and creative people find creative answers. One of these answers can be an existing technology that is often overlooked: optical fiber, which is called "dark fiber" when it isn't being used.

Dark fiber is just optical fiber that is already in the ground or on the pole, but unused and awaiting a purpose. Utility companies, co-ops, and cities have been putting fiber on their electric pole lines for decades to help them communicate with infrastructure that provides electricity, water, sewer, and gas. Twenty years ago, one line would have contained 12 to 24 strands of fiber. Nowadays, it's 144. The utility uses a few of those fibers, but rarely if ever more than 12, leaving the remaining strands "dark."

As an example, one community has more than 1,000 miles of unused or "dark" fiber. The utility company that put it there knows this, but it isn't exactly common knowledge that this resource exists, and that the utility would allow other groups to use it.

You might wonder why a utility would invest in fiber without trying to get some kind of return on its investment. Usually, utilities make an effort not to compete with the local Internet service providers. And some utilities are hoping to become broadband providers, but they have to ask themselves: Can we provide support and customer service to existing water, electric, and gas customers if we add new Internet customers? How will we build a call center to respond to Internet problems? Many utilities find that running fiber to the home is costly and also requires support skills and infrastructure that they don't currently have.

Governments have found ways to use this unused optical fiber to provide shared services, which can save taxpayers thousands of dollars. For a relatively small investment, governments can save thousands of dollars a month while

> More than **6,500** municipalities in the U.S. (nearly one-third of all cities) lack access to fast, reliable internet.[2]

improving services for public safety, schools, hospitals, libraries, and so on. But that's not all. Many communities in rural areas are finding ways to be more attractive to larger companies that are hoping to cut costs by relocating services and people to more affordable areas of the country. The community gets jobs and tax revenue, and businesses lower their costs and provide better quality of life for their staff. Imagine a 10-gigabit private network offered to a newly relocated business: shared infrastructure with some fiber offered to business and the remainder segmented off for government, law enforcement, and schools. It's being done all over the United States.

Governments can use dark fiber to host shared services, putting the money they save to better use elsewhere. For example, a county government saved more than $9,000 a month by learning where the dark fiber was and how to put it to use. Another example: A school district had 21 campuses and 21 contracts with local providers for $1,000 a month each. By using dark fiber, the district was able to consolidate to six locations, saving $15,000 a month. Another example: An Enhanced 911 service saved money by using dark fiber to

share Internet services with the community, and it was able to spend its savings on much-needed infrastructure upgrades.

Provisioning these resources doesn't require hundreds of thousands of dollars. If a government is extending the service in partnership with businesses, it can defray the cost of maintenance by offering a reduced rate for a fast, no-frills connection to the web. One chamber of commerce was paying $500 a month for 100 megabytes per second (Mbps) service and entered into a shared agreement with its city. Its current Internet service provider offered them exactly the same service for $800 per month. By lighting up the dark fiber close by, the chamber was able to bump up service to 250 Mbps, take advantage of the government's existing network security (a service they couldn't afford before), and maintain a cost of $500 a month. By taking advantage of the dark fiber, the chamber increased service speed, added security, and kept its costs level.

Let's take it to the next level. Internet access is becoming a fundamental resource. Many of the school districts in the rural United States that closed in March chose to invest in a

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virtual school environment, sometimes giving kids laptops and sending them home for distance learning. And while this is a great idea in theory, many of the students who were getting these Chromebooks did not have Internet access at home. Studies have shown that in the rural United States, there are three reasons for lack of Internet, accounting for up to 25 percent of all households:

1. A portion of the community chooses to live "off the grid."
2. A portion of the community doesn't have reliable Internet access.
3. A portion of the community cannot afford Internet access, even when it is available.

So, in many cases, giving kids a Chromebook is as useful as giving them a brick. Progressive school districts are implementing solutions that use dark fiber to extend the schools' reach, though. For some, the answer is to give kids a hot spot to go where they can use their laptops. Others are using dark fiber to create Wi-Fi zones and Citizens Broadband Radio Service tech to connect individual devices to the Internet. All of these solutions are made more affordable by easily accessible dark fiber.

### BUSINESS PARTNERSHIPS

Business partnerships can be vital in executing a dark fiber strategy, providing experience, access to existing fiber connections, and network tools. They may even bring other, more useful partnerships to the table. Internet service providers sometimes lease dark fiber, and with the recent surge in interest in 5G, partnerships are being formed to share in the expense of getting to an existing cell tower. If you own the land with an existing tower, or for a future tower—as many communities do—an Internet service provider might pay you up to $3,000 a month.

## COVID-19: COURTROOM CONSIDERATIONS

One of the biggest IT challenges to emerge from the COVID-19 pandemic came in the courtroom. Many courtrooms today have audio/video recording systems, which can be complex and fairly sensitive. But state supreme court mandates requiring social distancing forced IT to rethink courtroom systems.

Virtual courtrooms have to overcome any number of complex issues; in fact, many counties in the rural United States simply stopped legal proceedings, hoping the pandemic would be short-lived. One of the major problems with holding court (or any legal proceeding) with streamed video is making sure the system is capable of providing an hours-long session without interruption. And live streaming from a jail has its own unique set of challenges; for example, the structure itself renders most Wi-Fi options useless. Running low-voltage wiring into a jail typically requires lots of research and drilling, but running multiple courtrooms concurrently, with a limited number of places where a defendant can communicate virtually with a judge, is a logistical nightmare. Judges now had to coordinate with people outside of their courtrooms (including other judges!)—something they'd never done.

Outside the courtroom, space was also a problem. The typical adult courtroom has a judge, a clerk, a prosecutor/district attorney, a public defender, an inmate, and perhaps witnesses. Attorneys needed spaces for meeting with their clients. An inmate's family might also attend, and perhaps the public. And then there's the jury. But complex as they can be, an adult courtroom is pretty simple compared to a juvenile court room, where many more parties are involved, such as attorneys for birthparents, step-parents, or siblings.

What should your government be doing to facilitate courtroom video conferences?

- You'll need televisions, laptops, and video conferencing licenses—but none of that equipment matters when there is no Internet access. Given the aging infrastructure in many locations, testing and fixing low-voltage wiring should be a top priority. (Wi-Fi isn't recommended for important meetings.)

- As you explore ways to go virtual, try to keep the process simple. Although some judges were using Zoom meetings before the pandemic, most judges were not. Keep the learning curve short without adding a lot of components.

- Courtrooms will need to allow for electronic filing and electronic signatures. If you haven't been looking into how you can make this transition, get started!

Your IT department should be prepared for the fact that things aren't going to go back to the way they were. Our new normal is built on virtual connection to allow for separation. And when this pandemic does end, some of these courtrooms may go back to the way they were but will always need to prepare for being virtual again at a moment's notice.

Dark fiber networks can be less expensive to "light up," but they are definitely not free. The costs are manageable, though, if you make use of programs, grants, and products. Forming alliances with neighboring communities and cooperatives built with like-minded utilities might be the best source of cost control. In a recent meeting, as two utilities shared their upcoming projects and needs, they found more than $35,000 in savings on just one project. Within the next six months, that amount surpassed $80,000.

The State of Maryland's One Maryland Broadband Network is a great example of what's possible. One Maryland started out as 10 counties attempting to band together to interconnect their dark fiber networks, joining forces with the intent of sharing government services between them. Five counties opted in and five opted out. Today, the project has grown into a statewide network that services colleges, universities, K-12 schools, and hospitals. One Maryland Broadband is now a statewide fiber network that connects more than 1,000 government agencies. This is a great example of what can be accomplished through connecting communities with existing yet overlooked resources. ▣

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[1] doit.maryland.gov/ombn/Pages/ombnHome.aspx

[2] *Broadband Models for Unserved and Underserved Communities,* US Ignite and Altman Solon (us-ignite.org).

One Maryland Broadband Network connects **1,068** community anchor institutions using **1,324** miles of fiber.