

Communities Rise To the Gigabit Challenge

There are many ways to improve broadband access and use – and communities are looking at all of them.

A BBC Staff Report

For a decade, communities throughout the United States waited for ultra-high-speed broadband. They waited to see whether they would be on the list for Verizon's FiOS or other telephone company fiber builds. They waited to see whether they would be on the broadband stimulus list, and they waited to see whether they would be on the Google Fiber list. Some were lucky – fiber to the home now passes about one in five U.S. households. More were not so lucky. A few took the plunge and decided to build their own networks.

In 2010, Chattanooga, Tenn., became the "Gig City" when its municipal broadband utility offered gigabit speeds citywide. Over the last year, one fiber community after another followed suit, raising the stakes by dialing network speeds up to a gigabit. At the

same time, Google began lighting its gigabit network throughout the Kansas City region and announced new builds in Austin, Texas, and Provo, Utah. In addition, AT&T announced plans for a gigabit-capable network in Austin (lucky Austin!), and CenturyLink will build one in Omaha, Neb.

Now the waiting game may finally be over. At the 2013 **BROADBAND COMMUNITIES** Summit in Dallas, many attendees said they thought the United States had reached a tipping point for ultra broadband. Encouraged by Chattanooga, by Google Fiber, by Gig.U, by US Ignite and by the FCC's Gigabit City Challenge, communities – even those that do not wish to build and operate their own FTTH networks – are taking steps to improve and leverage their broadband infrastructure. Following are highlights of Summit presentations on these topics.

Finding and Leveraging Community Assets

Diane Kruse, NEO Fiber: With Internet usage doubling each year and cellular data growing explosively, public agencies are now talking about fiber as critical infrastructure – and as an asset that can be leveraged. Google's initiative in Kansas City raised their awareness, as did the FCC's Gigabit City Challenge. Many cities are now rising to the challenge. Service providers and communities are beginning to come together, hold meetings and learn what

assets exist so everyone can benefit. I'm working with a municipality whose excess conduit is now being used for the cellular network. From the city's standpoint, this means less disruption in traffic, and for the service provider, it accounted for 80 percent of the capital cost. That's significant! It incents further broadband deployment. By using installed assets, a deployer can reduce capex, which attracts investors – so cities should always put in extra fibers when



Diane Kruse of NEO Fiber led the Summit panel on “How Innovative Fiber-Enabled Broadband Projects Are Changing Lives.”

they are laying fiber for their own use. Cities should also aggregate demand with community anchor institutions. If a deployer can presell the use of the network, it can get to that magic number of 30 percent take rate. That makes the model look a lot better.

Rick Usher, Kansas City, Kan.:

Kansas City’s contributions to the Google Fiber effort included rights-of-way, permitting, expedited review and coordination of efforts. The real investment was in waiving permitting fees. But human capital and entrepreneurial assets are as important as infrastructure. Small technology companies have been sharing ideas. There’s been a groundswell of community action to help facilitate connections. KC Startup Village is a house that was purchased for use by hackers in the first fiberhood to be connected, and it’s become as big as the Convention and Visitors Association for selling people on living in Kansas City. It’s hosting visitors from all over the world and connecting them to the entire community. They see the future. They understand the need for gigabit speed. The city helps connect them to the chamber of commerce and the economic development groups.

Mark Scifres, Pavlov Media: Dark fiber is the one municipal asset that can support every business model. It’s the lowest common denominator; it’s the easiest to sell and has the slowest depreciation rate. Operators may specialize in serving homes, multiple-dwelling-unit properties, cell sites,

hotels, hospitals – and that’s just the start. Pavlov might be the best for bringing broadband to apartments, and someone else might be best at providing security cameras. Cities should use their own fiber to support municipal activities, which reduces their opex, and then lease their excess dark fiber to as many companies as possible that will focus on their various demographics. Selling retail services is difficult to do successfully; if you can find entrepreneurs to do the retailing, do it. A number of operating companies are actively looking for fiber to lease, but they don’t want to do everything.

Joe Freddoso, MCNC: The dynamics are changing. We’re seeing more counties, instead of taking a passive approach with service providers, taking control of their destiny and leveraging their assets. The universities in the North Carolina Research Triangle, led by Duke and North Carolina State, got together a year ago and involved their municipalities in improving broadband. The cities combined their existing fiber assets and asked for strategic laterals to be built. There were eight responses, so we’re excited about the potential.

Will Towns, University of Chicago: Our campus is thriving, but the adjacent communities are suffering. The area has 18 percent unemployment. We looked at the opportunity for a Gig.U project that would let us provide broadband to these communities and their schools and use fiber to provide economic opportunity. Now we’re working with Gigabit Squared on the

Gigabit Chicago project. We have a belief in the untapped brilliance in these communities, and we want to stimulate entrepreneurship there. We’ll build out space, run fiber to it, help set up small businesses that rely on the backbone Internet and have the university be their first client. That will create income and ownership in the community. Our hospital will partner with outside clinics throughout the city for teleconferencing reviews and assistance. The clinics need broadband to participate. To develop human capital, we’re looking to build a new charter school that will maximize students’ access to information. The university has the second-largest police force in the state, so we’ll leverage broadband for safety. We’ll work with the city police department to tie in our information with theirs.

Mark Ansboury, Gigabit Squared: Think about developing strategies that attract and retain capital: providing access to facilities such as fiber, conduit and rights-of-way; allowing overloading of fiber on poles; accelerating the building and permitting processes (in Seattle, we’re helping fund the permitting department); aggregating demand by investing in local enterprise. Change the math! Leverage public and private investment to bring in other grant money. Seattle passed an ordinance that allowed it to share excess fiber capacity. It discounted access to 560 route miles of fiber and let us choose the routes. It provided access to 38 public housing sites – we get the roof rights so we can distribute

In Warren County, Ky., the municipal utility and the water district collaborated to run fiber to the water towers and use the towers for wireless broadband.

a wireless service cloud. That represents a savings of millions of dollars per year. We are partnering with Zayo for access to conduit in Chicago. If a city is willing to take a collaborative approach, it can do amazing things.

Joe Starks, ECC Technologies:

Cities should make maps of their fiber assets. Fiber isn't easy to find, but it's not as hard as you'd think. Every city finds more fiber than it thought possible. Cable TV providers, telephone companies and others all have fiber in the ground or on poles. Figure out where the gaps are, and then focus on getting grants to address the gaps. We hire engineers to drive the streets and put information into an interactive GIS database. We have nondisclosure agreements with the carriers and fiber owners – the last thing they want to see is this information made public. In addition there are homeland security issues. Cities can then use this information for modeling and planning. Once the historical information is entered, they can use permits to keep the database up to date. We can generally tell how much fiber is there, but we can't always tell how much is being used and what is available – but just having the information about what's there opens up a lot of discussions. All the fiber we've found is operable, and sometimes there are old franchise agreements giving communities access to unused fiber.

Economic development officials can use the map to find suitable locations for site selectors. A community must show what it has available – its whole telecommunications profile – and differentiate itself from other communities. It must show that broadband is located where businesses

need it and that it has the right capacity, diversity and redundancy. Technology companies in particular are looking for fiber availability, separate routes and competitive services. With an asset inventory, economic development officials can usually identify seven or eight sites where a business might want to locate.

Duke Horan, G4S: What Joe Starks does to find fiber assets is scientific, but there's also a lot of art involved. We look for municipal networks that were built to manage traffic systems and that might be underutilized. In addition, many communities received buffer tubes of fiber from cable companies in return for permits but never told anyone who might have been able to use it. Cable and telephone companies abandon fiber networks – this is huge. Adelphia built 500 miles of fiber and then went out of business, and no one realizes the fiber is there – it may be completely operational. The first step is always to think about what's going to be out there. Talk to engineers, talk to contractors who might have built the fiber, talk to consultants, city inspectors, permitting agencies, locators (people who locate infrastructure in advance of digging for something else), public works departments and even some businesses. Look for manholes and handholes. Inspect routes, read route markers and interview businesses about what they know.

Brian Mefford, Connected Nation Exchange: In Warren County, Ky., we brought all the public and private sectors together, including the utilities, and said, "Let's put all the assets on the table. Who owns what? Who has fiber? Who has poles? How can we work

together?" The municipal utility said it could run fiber to the water towers. The water district offered access to its towers and said it would share the cost of the run. The electric utility said it had dark fiber, and the school district said it would share the cost of extending that. The first responder agencies, which had seen very high costs quoted for fiber and towers in response to their RFPs, can now collaborate with the owners of existing fiber and towers. Communities have levers such as vertical assets, rights-of-way, dark fiber, pole attachments, regulations, demand aggregation and partnerships. When all the data is put together on a map, it informs the conversation and provides real, powerful, meaningful data that fuels partnership discussions. The existence of the national broadband map leads to work within communities on more detailed maps.

Scot Rourke, One Community:

Much of One Community's middle-mile network was built on found and donated fiber. The first transaction was Sprint's donation of a pair of unused fibers from a large bundle. Sprint got tax advantages and a maintenance agreement from the deal. Then the electric utility FirstEnergy gave us fiber for economic development purposes – a multimillion-dollar donation. We never build maps; we just find leads. We hired seven contractors for our BTOP project, which led to wholesale deals, swapping and so forth. Contractors know where the fiber is – get into discussions with them, build relationships, ask about bankrupt telcos. We've done deals with the regional transit authority, the department of transportation, the airports. Real estate developers that have multiple skyscrapers sometimes build fiber or conduit but have no capacity to use it, and they're willing to do economical deals to leverage it; the same goes for big employers with multiple sites. Sometimes only two or six strands of a 144-fiber bundle are being used. After a merger or an acquisition, fiber sometimes isn't used at all. Some BTOP award winners grossly overbuilt fiber because they didn't look to see what was already there.

Wholesale Agreements With Service Providers

Mike Smeltzer, UC2B: Our stimulus-funded project has both middle-mile and FTTH components. We have some IRU [indefeasible right of use, or long-term lease] agreements with the school district, the university, the mass transit district and one private provider. Another provider is considering getting an IRU.

Champaign Telephone, the private partner in our grant application, paid us to build laterals to places it needed to get to, including a shopping center. If another provider wants to use a lateral, Champaign will deed it back to UC2B, pay us for maintenance and collect revenue from the second provider. It could get two-thirds of its initial investment back. In fact, this nonexclusive arrangement turns out to be a marketing tool for Champaign Telephone. Frasca Aviation chose Champaign for its fiber connection even though Champaign's price was higher than the incumbent's because Frasca wanted to have a choice of providers at the end of its three-year contract.

We also put out a request for information to seek private providers to build out the rest of the network. Four organizations responded, and we are talking with them now.

Casey Lide, Baller Herbst Law

Group: When a fiber owner provides dark fiber, life is simple. Offering lit fiber or Internet access is potentially tricky. It may require paying 15 percent to 18 percent of revenue to the Universal Service Fund – who's on the hook for that?

A service provider may want to make sure the fiber owner isn't going to sell to its competitors or become a competitor itself. We're working with a large midwestern city that has excess fiber throughout its area and wants to use it to generate revenue and stimulate economic development. It's negotiating with a service provider that will extend the network and provide maintenance in return for the city's not doing a similar deal with another entity. There are legal and political problems with that, so it may not be permissible – but

it could be a good thing because the service provider agreed to make the network open-access.

Tim Scott, Axia NetMedia: Axia is the wholesale provider on MassBroadband 123, a BTOP-funded network in Massachusetts. It provides connectivity back to Boston, which everyone wants, and will provide wholesale lit products and dark fiber to retail service providers. Axia did not bring a capital match to the project, but it did take on operational costs, which are substantial in any new network. We were interested in the opportunity because BTOP doesn't pay for connections to cell towers, business parks or residential communities, so Axia can create those extensions. Our objective is to create viable extensions to the network, particularly to business communities that have been missed. If we fund an extension, we own it.

Clarity about who does what is really important. Massachusetts Broadband Institute [MBI, owner of MassBroadband 123] has no interaction with service providers. Axia executes the connecting agreements, provides technical support and sets prices. MBI

has federal compliance responsibilities and helps with community outreach. Thirty-one service providers have signed letters of intent, and 12 of them have executed agreements. They range from national to regional to small local competitive and wireless providers. We're pleased with the response, but that's after two years of engagement. It takes time and reassurance for them to really understand that Axia is wholesale-only.

Only about 20 percent of the service providers are truly proactive. Axia will engage with that proactive 20 percent and work with them to become successful. It takes time for competition to drive down costs, so we may consider imposing retail price caps for some community anchor institutions. Our goal is a 90 percent take rate for community anchor institutions and the network extensions.

Dave Shaw, Kirton McConkie

(counsel for UTOPIA): You can pick good providers, but you can't pick when they'll go bad. The first provider on UTOPIA was AT&T, but it then discontinued all new projects. UTOPIA then found a local provider, which paid



Gary Evans of Hiawatha Broadband speaks about broadband helping small businesses grow and thrive.

its executives too well and ran up a \$2.5 million bill with UTOPIA. The contract said UTOPIA could take its customers away and give them to someone else, but there was no one else to give them to. After two and a half years, it found another provider, vetted it and transferred the customers – and then the new provider stopped paying its bill. We went through the bankruptcy process and got a workout agreement, and then the court dismissed the bankruptcy. UTOPIA had to sue, and the provider countersued. It brought in another provider and went through the same story. Right now, UTOPIA is embroiled in multiple litigations with providers who didn't pay their bills. Even when

there's a legal remedy, the provider's quality cannot be predicted. Today, there are 15 providers on UTOPIA, so customers can switch if necessary. That makes it possible to salvage customer relationships even if a provider goes bad. But perhaps there shouldn't be wholesale agreements with service providers. Maybe it would be better for customers to pay for their own network connections.

Joe Freddoso, MCNC: MCNC serves community anchor institutions directly with a portion of its network and is marketing dark fiber. We have been in negotiations with service providers for the last two years. Every time we make

a fiber deal, we create a competitor for ourselves. But my job is getting the lowest-price broadband for community anchor institutions, and if that means enabling competitors, that's OK. In fact, we enable them with creative IRU agreements. Getting fiber on the market right away was important, so instead of a standard IRU with half the amount paid up front, we let them have the fiber up front. We got a lot more competitors that way, and we're working to help them grow. We'll be the partnership creator. In the past, the telephone and electric co-ops never sat down together to share infrastructure costs to roll out fiber to the home. We got them to do that.

Kansas City Gets Ready for Google Fiber

Mike Burke, Mayors' Bistate Innovations Team (MBIT): After the euphoria of being selected by Google, we faced the question of how to take advantage of this opportunity. We were blessed with two insightful mayors with great leadership and foresight. We realized that it was not about Google – it was about Kansas City. We began having the conversations that all communities should be having. Startups, economic development groups, health care organizations and others all started talking to each other. It's 90 percent sociology and 10 percent technology. Breaking down the silos is so important. After engaging a wide audience and collecting information, we developed a playbook with a roadmap and choices.

Aaron Deacon, KC Digital Drive: KC Digital Drive implements the playbook that MBIT developed. There's a messiness to the process – it's not top

down and also not just bubbling up from below. We're a hub – we have to connect the institutional players.

We have four priorities: encouraging digital inclusion and literacy, promoting economic opportunity and workforce skills, developing high-bandwidth applications (in conjunction with US Ignite) and helping other cities. The more gigabit communities there are, the better for all of us. It enhances our national competitiveness. We identify organizations working on these goals and fill in the gaps with resources. We make sure we look at how to use fiber, even if it means changing political boundaries. Education in the cloud requires a new organization and new teaching methods. The University of Missouri-Kansas City Medical Center hired Steve Fennel to deal with the new network on behalf of the medical center. [See "Google Fiber Powers

Caregiver App" on p. 12 for details on what the medical center is doing.]

In addition to the health care work group, about 10 others have been formed. There's one on K-12 education; another on online gaming, which will develop an online gaming conference; a convention group; KC Startup Village (an organically grown group that supports the Kansas City entrepreneur and startup community); Launch KC, which attracts IT entrepreneurs and professionals to the downtown area; one for libraries; one on digital inclusion; and nascent groups relating to public safety, energy and other subjects.

Burke: We realized that, in this new century, economic development isn't all about real estate anymore. The cities that will succeed are those that can nurture creative talent. We brought in young, bright people to advise us about what they needed to work in Kansas City, and they said they wanted us to help them find office space, financing and technical assistance. Many of the startups saw government as a hindrance, not a help, so we created a fund to help them get financing in the Midwest. In the past, startups have gone to the coasts for money and often ended up getting moved to the coasts.

With the aid of the Kauffman Foundation, we established a proof-of-

The cities that will succeed are those that can nurture creative talent. Startups need help finding financing and technical assistance as well as office space.

concept center for young entrepreneurs and tech startups, the Digital Sandbox, in downtown Kansas City, Mo. We had more than 100 applicants for the first group of 10 – and we were able to give them all some type of help, even though they couldn't all fit in the Digital Sandbox. The energy in the

startup community is huge.

Damon Porter, MOBroadbandNow: Preliminary results of a survey of Kansas City residents show 80 percent are aware of the efforts to bring high-speed services to Kansas City, and a majority are familiar with low-cost

options for service. Of those who plan to adopt the new service, 54 percent said they are looking for higher speed; others are interested in lower cost or greater reliability or are just excited about FTTH. Nearly two-thirds expect the new network to be important for schools and other public services.

Gigabit Cities, Gigabit Visions

Blair Levin, Gig.U: A change in fundamental inputs always leads to enormous progress. Human creativity will take the inputs and make something new. In one university with a Gig.U project, a student said, "The most exciting thing is what we don't know yet."

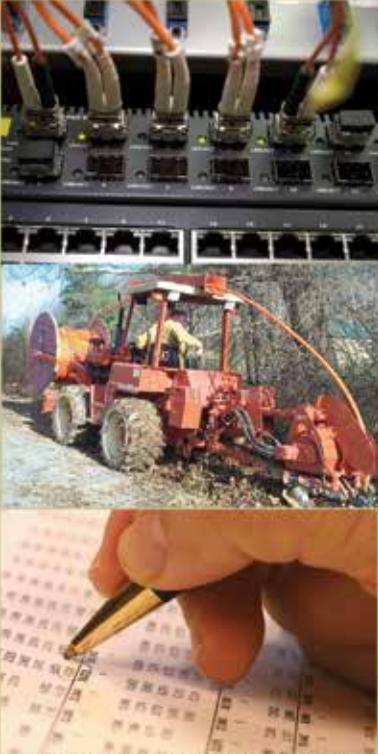
David Sandel, Sandel & Associates: Singapore decided to become the central port for the Pacific Rim. In 2005, it developed a master plan

and created a next-generation port authority with an Internet exchange hub. It aligned the resources to make it happen. The entire country of 5 million will have FTTH by 2015. In Barcelona, Spain, the city started 10 years ago to make itself more competitive and replace the shipping industry. It held a Smart City Expo with 1,000 cities in attendance. Barcelona has become a center of development for mobility and high-bandwidth application

development. Here's the lesson: It's not about the infrastructure; it's about getting organized to exploit it. What's needed is to align the organizations and resources to use the infrastructure. Even smaller cities can succeed at this. Focus on making choices that have an economic impact.

Jon Gant, UC2B: How should we align and use broadband? The answer varies from one community to the next. Organizations are set up for the prior

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Kansas City residents are aware of gigabit broadband and think it will improve public services, said Damon Porter, executive director of MOBroadbandNow.

BURLINGTON ACTIVISTS TAKE A LEAF FROM THE KANSAS CITY PLAYBOOK

Today's broadband activists are organizing not just to improve their communities' access to broadband but also to leverage the broadband they have.

In December 2012, Burlington Telecom, the municipal fiber provider in Burlington, Vt., began offering 1 Gbps Internet speeds for \$150 per month. On its website, BT suggests Netflix and Xbox Live as applications for gigabit users, but local Web developer Bradley Holt, former chair of the city's now-defunct Telecom Advisory Committee, thought there must be more ways to take advantage of the new high speeds. He says, "Gigabit represented an opportunity to talk about the potential of our community's network in tangible terms."

Holt and his partner, Jason Pelletier, organized a Gigabit Salon and invited people to discuss how the community could benefit from gigabit broadband. When more than 30 people registered, they realized there was a high level of interest in the topic. They named their initiative BTV Gig and launched a website (<http://btvgig.org>) and a social media presence to help spread the word. After holding a local Gigabit Tweetup and consulting with national experts from Gig.U, US Ignite, the Institute for Local Self-Reliance and other groups, they published a report in March 2013, "Burlington's Gigabit Opportunity," available on btvgig.org. The report, inspired by the playbook of the Kansas City Mayors' Bistate Innovations Team, outlines a plan to form communities of interest – as Kansas City has done – to discuss applications of gigabit technology that range from telemedicine to startup incubators to live streaming of concerts. The team also submitted a proposal to Mozilla Ignite to develop an application for distributed supercomputing using gigabit broadband.

Currently, the BTV Gig team is working to advance the BTV Gig initiative, to develop a culture of innovation based on gigabit service and to ensure that the entire community benefits from the gigabit network.

era, so you're always putting new wine in old bottles. Even in Chattanooga, the public library is focused on books and has rigid work rules. In the new model, the library should be about inspiration and performance. You could set aside a whole floor for collaboration.

Gary Evans, Hiawatha Broadband Communications: We've just completed deploying a network in Red Wing, Minn., that will offer 1 Gbps to the home. The city is developing a business incubator where people can work on bright ideas for applications, and it has generated an angel fund to help businesses move into independent status. We believe in generating the next-generation economy.

The home-based business is frequently the lifeblood of small-town America. Working with those businesses is important. Typically, Hiawatha charges more for business connectivity, but we need to change that for home-based businesses. Two university professors in a town of 100 are teaching online classes at distant universities. In a suburban Twin Cities community, the two largest businesses provided money to build FTTH in two housing developments because they wanted to allow employees to work from home. Telecom has begun to redefine productivity.

When Hiawatha Broadband is recruited to a community and asked to build a network, we start with one question to city leaders: Why do you want a broadband provider in your community? If the answer is lower prices, and they have no vision for how to improve the community from a business and quality-of-life standpoint, there isn't going to be much to build success on. If the community has a vision for what it wants to become, that's more promising. The first community we served outside Winona [Hiawatha's home base] said to us, "We want to become the No. 1 bedroom community for Rochester [where the Mayo Clinic is located], and we need a broadband network to do that." The community has almost doubled in size since then. The vision was proven accurate. ❖