

How Cedar Falls Got Its Gigabit

Is the “gig” a goal that a community should aspire to reach someday – or does taking the plunge today make more sense? Here’s how Cedar Falls, Iowa, made the decision.

By Craig Settles / *Gigabit Nation*

In May 2013, Cedar Falls Utilities (CFU), a municipal utility that provides broadband communications, electricity, water and natural gas services in Cedar Falls, Iowa, launched Internet service at 1 Gbps. This made Cedar Falls the first and only Iowa community on the nation’s short list of gigabit cities. CFU’s gigabit service, delivered through the new citywide fiber optic network, is available now at any Cedar Falls business or home.

Cedar Falls is one of many communities inspired by early, high-profile gigabit deployments in Chattanooga, Kansas City and elsewhere as well as by policy initiatives such as the FCC’s Gigabit City Challenge. As broadband project leaders in these communities form their plans and partnerships, they face a critical question: “Should we offer gigabit service immediately, or should we deliver broadband in incremental speeds and work up to a gigabit over time?”

This question matters because costs and benefits differ depending on which option a community chooses. With the intense pressure on municipal budgets, the road to a gigabit network is more than a little bumpy.

The temptation to go slow and create lower-bandwidth broadband services as a way to make network buildouts affordable initially and offer gigabit speeds later is logical, but is it in communities’ best interests? Understanding how Cedar Falls’ high-speed network evolved from its 1995 introduction to the 2013 announcement of its gigabit network services offers perspective and provides insights for answering this question.

CFU originally delivered residential services

over a hybrid fiber-coaxial (HFC) network. This strategy was popular at the time with cable TV operators as well as with small telecom companies and public utilities that wanted to expand into Internet access and TV services.

Like other cable companies, CFU adopted Data Over Cable Service Interface Specification (DOCSIS), an international telecommunications standard created in 1997, to add high-speed data transfer to its existing cable TV network. In a DOCSIS-based HFC network, video, Internet and voice traffic travels from a network’s regional headend through optical fiber cables strung onto utility poles or buried underground. The cables fan out from distribution hubs to optical nodes that serve local neighborhoods. There data is translated from light beams to radio signals that are carried on coaxial cables with copper cores that distribute data to subscribers’ residences.

Public demand for faster broadband, heightened by the 2009 broadband stimulus and Google’s efforts to build gigabit networks, led many cable providers to upgrade to DOCSIS 3.0, which has proven to be a relatively low-cost way to increase downstream bandwidth for cable broadband. For example, Mediacom, one of Iowa’s dominant incumbent providers, recently did this to increase its network’s downstream capacity to 105 Mbps.

Rural telcos, conversely, have felt compelled in recent years to get into the TV and Internet business but believe copper plants are not capable of supporting this need as demand increases over time. Thus, many have replaced their copper with fiber to the home. Though

Cedar Falls could have followed the cable pattern, it made the decision to upgrade to fiber rather than to DOCSIS 3.0. For CFU, going directly from HFC to gigabit fiber was a better long-term financial strategy.

“It’s true that you can build a less expensive DOCSIS 3.0 network and deliver 20 or 30 Mbps to customers, which some are doing,” states Betty Zeman, marketing manager of CFU. “If you’re doing four-channel bonding, you can deliver 100 Mbps capacity to neighborhoods, plus you can control the number of customers per node to help individual customers get better speed performance. But as we analyzed the situation in 2009, customers’ needs were growing too fast for DOCSIS to be a viable option, even with version 3 evolving. We’d constantly be playing catch-up with customers’ demands and constantly changing the physical network to make those adjustments.

“Now that we’ve fully upgraded to fiber with gigabit capacity, all we have to do to increase an individual customer’s speed is to change the customer’s service tier while they’re on the phone. Furthermore, we linked our infrastructure through three cities to the three largest network providers in the world, giving us multiple options to channel traffic to the public Internet. If you have only one path to an Internet backbone, you’re just one errant backhoe away from a systemwide outage.”

A GIG FROM THE GET-GO?

Once a community makes the decision to upgrade to a fiber network, it faces the decision that Cedar Falls, Chattanooga, Wilson, N.C., and others grappled with: Do they roll out incrementally faster services over time (25 Mbps, 40 Mbps and so forth) until at some time in the future they offer a gigabit, or do they roll out gigabit service from the outset? Chattanooga and Wilson, among others, introduced higher speeds incrementally.

There are two important factors to consider: the cost of backhaul and the cost of getting fiber to, and providing services for, the premises.

Robert Houlihan, CTO and director of communications for CFU, says broadband project leaders have to

address the cost of handing off data traffic to be backhauled to the public Internet. “That handoff point can be very expensive and is a reason some providers are worried about going to a gigabit. However, if you already deliver 15 Mbps or higher as your base package, you won’t see much of an increase in your total upstream backhaul by introducing a gigabit.”

Calix, a leading provider of broadband communications access systems and software, concurs. “We have now deployed several gigabit networks, including in Cedar Falls, and we are seeing no incremental increase in backhaul bandwidth,” says David Russell, Calix solutions marketing director. “In fact, the networks function more efficiently because subscribers get their application and data faster.”

Still, backhaul remains an unknown. Buy too much of it, and the network will have difficulty breaking even because it is paying a lot for unused bandwidth. Buy too little or fail to ensure redundancy, and the network won’t be able to meet customer demand.

Oversubscription (selling more bandwidth than a network could support if all subscribers went online simultaneously) is part of sound revenue management. Network operators that are just starting out can lack the experience to know where the balance is between too much and too little backhaul speed. Offering incremental speed increases helps minimize losses during this learning process.

Managing the costs of delivering broadband to customers’ premises can also be tricky when communities offer a gig right out of the gate. “Some communities have chosen to use a network architecture called active Ethernet, in which one [dedicated] fiber cable is run between each premises served and the central office,” states Houlihan. “Though significantly costlier than the alternative because you need more fiber cables and electronics, active Ethernet ensures that the operator doesn’t oversubscribe.”

Cedar Falls took an alternative route by using a GPON architecture. GPON allows a configuration similar to HFC, with splitter cabinets replacing HFC’s optical nodes. A distribution fiber line

is run deep into a neighborhood and then split to reach up to 32 homes. Using GPON in a citywide buildout requires fewer fiber lines to carry data to the central office compared with active Ethernet, yet oversubscription rates are a fraction of what they would be with HFC.

WHAT’S RIGHT FOR YOU

CFU’s decision to launch its fiber-to-the-home network with a gigabit option among its service offerings came as the result of extensive customer research, technology evaluations and industry observation. The utility discovered, as other communities have, that using a one-size-fits-all approach is dangerous.

Technology and its costs are often the main factors that sway the decision. The experiences of the communities that pursued incremental increases indicate that the higher front-end expense of a launching a gigabit network is justified by better financial and economic development outcomes in the long term.

But logic and fiscal reality do not always sing from the same hymnal. It is difficult to see past the front-end price tag while staring down those who hold the purse strings. To overcome the resistance to gigabit sticker shock, broadband champions must move the discussion from one of speeds, feeds and gigabit envy.

Looking at the bigger picture of economic impact on a community, offering a gigabit from the start makes even more sense. “A gigabit gives us a way to show businesses looking for a new location that we are committed to staying in front of their needs,” states Zeman. “It tells companies, ‘You can be certain that whatever your needs, you don’t have to move your business to grow your business.’ We get the opportunity to compete for businesses we otherwise might lose.” Ultimately, Cedar Falls determined that, for what it wanted to achieve relative to its needs, this decision was the right one. ❖

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