

Hiawatha Broadband Communications

It's a Matter of Connecting the Dots — Effectively

HBC was conceived before the Web; it added FTTH this year

By Gary Evans ■ *Hiawatha Broadband Communications*

That section of mid-America that rolls on unencumbered for hundreds of miles, a pastoral landscape in emerald that seemingly was dabbed on canvas by Grandma Moses, is dotted by small towns. But those dots are largely unconnected and America's competitiveness is affected in a major way by the gaps.

Once struggling to survive — and just as importantly to keep their young people at home following high school — small rural towns blessed by visionary residents have discovered that winning the battle of survival can be as simple as running a series of fiber optic cables the size of your thumb. Connecting the dots.

For those communities that were technology early adopters, the results are arriving and they are positive. For those more reticent about change, the decline continues. And that is hurting the U.S.,

which has slipped from first to fifth to 13th and as low as 16th in broadband penetration, depending upon which study you read.

Southeastern Minnesota is blessed. In the days of Internet infancy at least two people in Winona (on the banks of the Mississippi about where Minnesota, Wisconsin and Iowa connect), pondered the usefulness of the new tool and how best to harness its power to benefit education (See Box).

Hiawatha Broadband Communications has extended its network to the southeastern Minnesota communities of St. Charles and Wabasha (the latter its first fiber-to-the-home build). It serves a growing family of telecommunications firms through its wholesale division, soon will be international in reach, and is the dominant provider in each of its retail communities.

The young Winona business (three employees in the spring of 1998) today employs 60, including nine who produce television programming for a local channel seen on the HBC network.

Following completion of the Winona network, in the spring of 2002, HBC began constructing a hybrid fiber-coax network in St. Charles, 20 miles east of Winona. City officials there had courted HBC, saying incumbent communications providers in the community had made several promises to deliver broadband services over the years but had not made satisfactory progress. St. Charles city officials knew these services would be necessary to draw residents to their community.

The HFC network was built with each of the fiber nodes handling fewer than 100 homes. This allowed for greater bandwidth, reduced maintenance costs and higher customer satisfaction. Like Winona, HBC customers in St. Charles receive 80 analog channels, 30 digital channels, 32 digital premium channels, 45 music channels and 14 high definition channels. HBC uses Motorola and Pace digital boxes to provide digital, high-definition, and DVR service.

Cable modems are used to provide data services with a variety of packages available up to 10 Mbps. Telephone services are provided using the Arris Cornerstone TDM platform. Each home with telephone service has an Arris voice port. The coaxial drop is connected to the voice port and voice, data and video is delivered inside the home over the existing coax, cat 5 and copper telephone cable.

Kierlin and his partners in the Hiawatha Education Foundation funded one of the first such networks in the world. Luminet became a model for other education projects across the country and, as it moved from concept to reality, emerged also as one of the nation's first small-town Internet service providers, giving Winona a head start in the connectivity race.

Wabasha Goes Fiber

While the Winona and St. Charles HFC networks were state-of-the-art at the time, fiber to the home (FTTH) was becoming more reliable and cost-effective. In the fall

of 2004, HBC began plans to build its third network, this one in Wabasha, 30 miles north of Winona. With the Mississippi River on one side and river bluffs on the other, the network build would prove

challenging. Another issue to deal with before construction could take place was construction of a 30-mile fiber link between the HBC headend in Winona and a central office location in Wabasha.

Before There Was a World Wide Web...

While the early family of Internet users was accessing for the most part via toll calls to AOL, Bob Kierlin, founder of the Fastenal empire, and Bud Baechler, a public relations/corporate education guru, spoke frequently about how best to use technology to extend the reach of teachers and learners.

Those quiet early-morning talks, held a year before the Web existed, sparked a burgeoning broadband business and small-town success that just keeps growing and growing.

It was 1992

The founders of Winona's Fastenal Company, the first fruits of their corporate creation invested in a foundation devoted to advancing and enhancing education, had purchased a local college campus and were creating an education park on the property. Cotter High School, from which four of the five founders had graduated, was its technologically rich centerpiece. Growing in stature were preparatory schools in math and science, language studies, and the performing arts, the secondary schools served by twin 200-bed residence halls. Winona's two universities (Winona State and Saint Mary's of Minnesota) occupied space there, too. Winona State was developing a residential college in a 400-bed residence hall. Saint Mary's moved its college of education to the campus.

But Fastenal Chairman and CEO Kierlin was thinking about the Internet and the role advanced telecommunications connectivity could play in extending the reach of teaching and learning ... leveraging precious resources.

He asked two friends – Baechler and me, then a vice president at Winona State – to examine the feasibility of a network that would connect Winona's education facilities. Four months later, Kierlin and his partners in the Hiawatha Education Foundation funded one of the first such networks in the world. Luminet became a model for other education projects across the country and, as it moved from concept to reality, emerged also as one of the nation's first small-town Internet service providers, giving Winona a head start in the connectivity race.

Not surprisingly, Internet use in Winona grew rapidly, quickly outstripping the national average. Ultimately more than 80 percent of Winona's residents obtained e-mail addresses and began traversing the World Wide Web. Kierlin helped to fuel the effort, creating The Vir-

tual School, which equipped the homes of private school students in the community with computers. That allowed parents to participate more fully in their children's education by keeping track of lesson progress, communicating with faculty members, and exchanging ideas with administrators. And the students served as mentors for their parents in proper use of technology.

Although there was much going on, Kierlin didn't forget the last line of the study delivered to him in February 1993: "If we are serious about extending the reach of teaching and learning, Luminet must ultimately become a network that all Winona residents can access." Prescient. The Internet had been commercialized a few months earlier, in October 1992. The first graphical Web browser, Mosaic, was in beta at the University of Illinois.

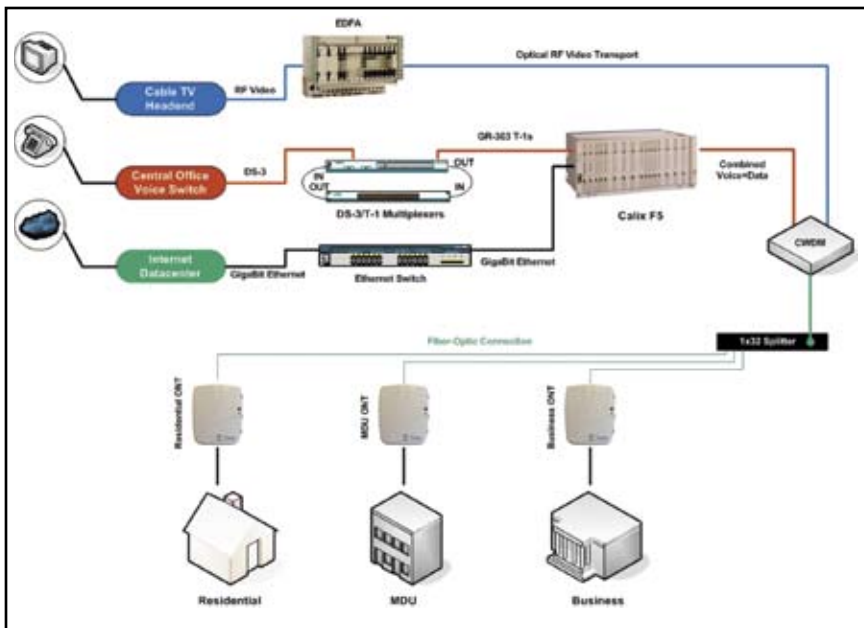
In 1997, the five-member Luminet board of directors voted to build a "network of the future" to serve residents of the greater Winona area, converting the not-for-profit initiative to for-profit status and installing the community's education institutions as major shareholders.

I moved from my administrative position at Winona State to head the newly created Hiawatha Broadband Communications. HBC was building its hybrid fiber-coax platform, and would use Scientific Atlanta's interdiction system (later acquired by Blonder Tongue) to control content changes. Technology Planners, Fond du Lac, Wis, designed the network and headend.

HBC connected Winona State and Saint Mary's universities in July 1998, and much of the network was activated in January 1999. Cable television was its first product. HBC added high-speed Internet service in October of that year.

The 65th node was lit in the summer of 2000. By October of that year the network was delivering the "triple play" to a growing number of Winona residents, one of the first networks in the country to merge all three services onto a single platform and the first system to bill for all three on one monthly invoice. Chorus Communications, Madison, Wis., delivered the voice component through a partnership with HBC.

The telephone product line was acquired by HBC in October of 2003 from TDS Telecom, Madison, Wis., which had merged with Chorus in 2001. With switching services initially handled by Chorus' switch in Madison, TDS in 2002 installed a Class 5 Siemens EWSD switch in HBC's Winona headquarters.



Wabasha FTTH network; it lit earlier this year. The take rate is at 80 percent, with almost all users buying the triple play. Calix is the technology provider.

Winona was chosen in 2001 by Cerner Corp. of Kansas City as the alpha site for development of an on-line health initiative that now connects Winona-area consumers and providers.

HBC made the decision to use FTTH technology from Optical Solutions (now Calix) for a number of technical reasons. But the firm's customer service and ability to deliver on promises made it the ideal partner. On the infrastructure side, HBC chose the Corning solution.

The Optifit connectors on the distribution ports and in the ONTs made for an easily maintainable network and an estimated construction time cost savings of 10 percent over the typical splice-on-site network. Following six months of engineering, mapping, and permit work, network construction began in July 2005. The construction of 48-count transport fiber was completed by the middle of August. Calix and Corning had quickly shipped the necessary equipment and materials and had the Wabasha headend room set up by

the end of August.

The construction of 45 miles of fiber plant started from the headend location and spread throughout the community. As construction of each PON splitter node was completed, test customers were installed and provided with TV and Internet service. The first test customer was added on the last day of August. The entire network was completed in November and a full rollout of services began in December.

HBC chose TDM service for telephone rather than voice over Internet protocol (VoIP). VoIP still causes reliability concerns and TDM allows use of HBC's Class 5 switch. Using RF at the home to deliver the video content provided savings in that the existing in-home coaxial cable could be used to connect to each TV.

A variety of Internet speeds is also

offered. HBC installs a first cat 5 cable to a computer location at no charge. Additional in-home network wiring and wireless service is also offered.

HBC workers were kept busy and installed more than 100 customers in each of the first six months of 2006. By June, HBC had more than 50 percent of Wabasha's residents connected to its cable, Internet, and telephone service. By contrast, it took the firm five years to reach 50 percent penetration in Winona and three years in St. Charles. HBC's reputation has been enhanced by each community it serves, but FTTH technology was a key factor among more discerning users.

Another surprise in Wabasha is the high take-rate of digital services. HBC had projected 30 percent. It is currently steady at 80 percent. In addition, customers signed up for more services than expected. Counting TV, Internet and Telephone each as a service, HBC is now averaging 2.4 services per customer home in Wabasha. This is up from a 2.1 service average in the firm's communities served by HFC networks.

Success, however, can be measured in a variety of additional ways:

- 1) Economic development progress because of broadband applications;
- 2) Growth in the number of telecommuters who work jobs across the world from homes attached to the network;
- 3) The emergence of advanced applications that can travel only on high bandwidth infrastructures;
- 4) Educational enhancements and resource sharing;
- 5) Experimental efforts developed exclusively because of the network; and,
- 6) The realization of community dreams through advanced connectivity.

In all cases, HBC's Minnesota communities are achieving success, to say nothing of the advantages that accrue to residents because of competition.

Community Benefits

When the company was founded, its creators envisioned a three-legged foundation upon which the company would op-

erate: economic development, education, and competition. The beneficiaries have been the residents of the communities HBC serves: Winona (area population 35,000), St. Charles (population 3,500), and Wabasha (population 2,500).

In the economic development area, Winona can boast of four new industries and a transplanted firm that located there strictly because of broadband connectivity. In each case, enhanced data services, video-conferencing capabilities, and high-speed worldwide connectivity were the determining factors.

St. Charles economic development officials invited HBC to develop a network there to advance the community vision of becoming the bedroom community of choice for people who work in Rochester, 20 miles to the west and home of the Mayo Clinic and a major IBM plant. When network construction started, two housing projects were being developed. Today there are eight, with dwellings occupied in each. In Wabasha, an expansive riverfront condominium project and the National Eagle Center (the Wabasha area is home to a large population of bald eagles) will be major users of the fiber to the home technology.

Each of the communities boasts an increase in telecommuting residents. Some simply work at home rather than in their offices, in the community where they reside or in a nearby community. Others work for employers on the East and West coasts or even for employers in Europe and Asia. Telecommuting in Winona, St. Charles, and Wabasha is no longer an idea, it has become a way of life.

Video conferencing is another way-of-life application, employed by business, industry, telecommuters and proud grandparents interested in staying in touch with their children and their children's children. Winona also hosts one of the first successful on-line health systems in the nation. Business and industry, from accountants to youth centers, have developed individualized programs that make life better and easier for their constituents.

Winona State University, an original Luminet partner, drove many of

the early applications and, upon the emergence of broadband connectivity, moved its technology platform forward a quantum leap by becoming one of the nation's first laptop universities.

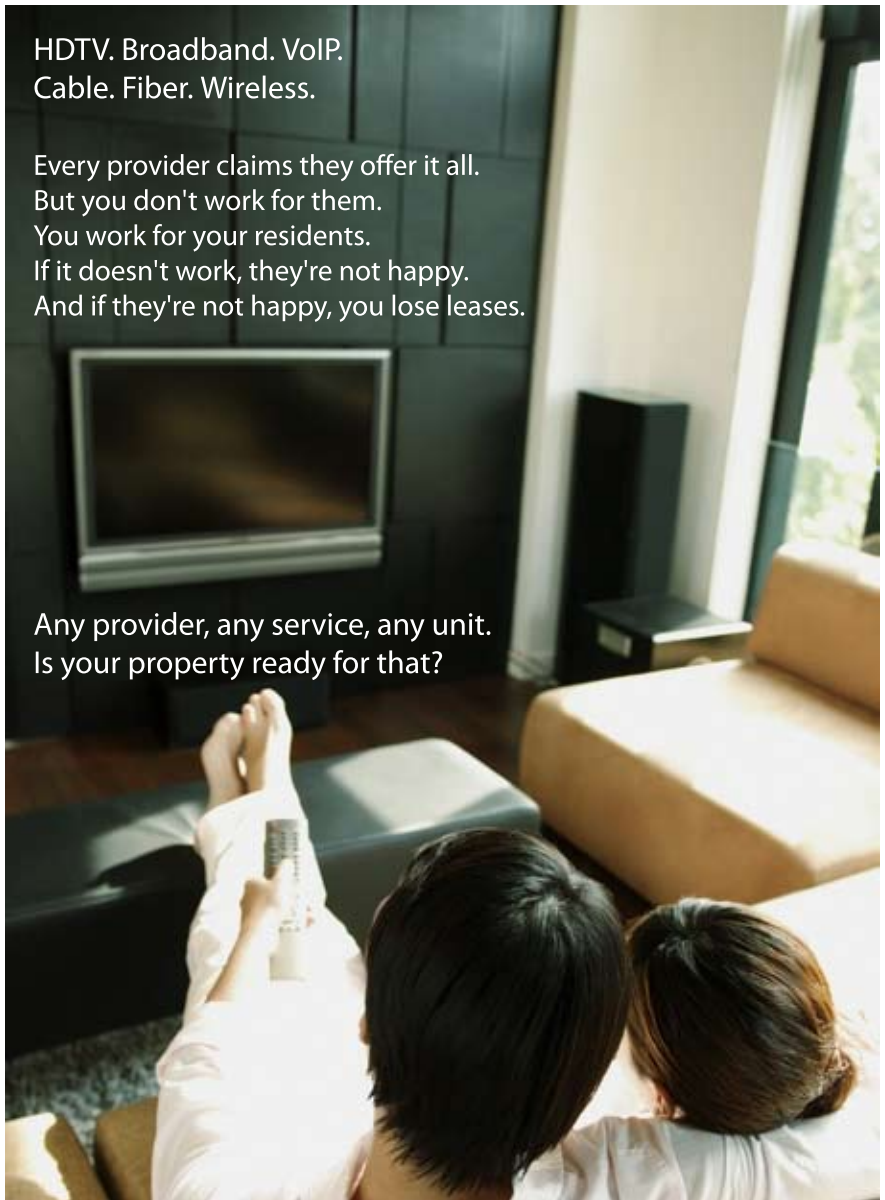
Minnesota State College-Southeast Technical has connected its campuses in Winona and Red Wing via the network, eliminating commuting time for students and expanding the reach of its

offerings. Winona's Cotter High School pioneered The Virtual School, equipping the homes of its students with Apple computers and implementing technology-aided discourse between students, parents, faculty, and administration. Teachers from around the globe are daily visitors to Winona classrooms, their virtual presence providing students with expertise available in few other places.

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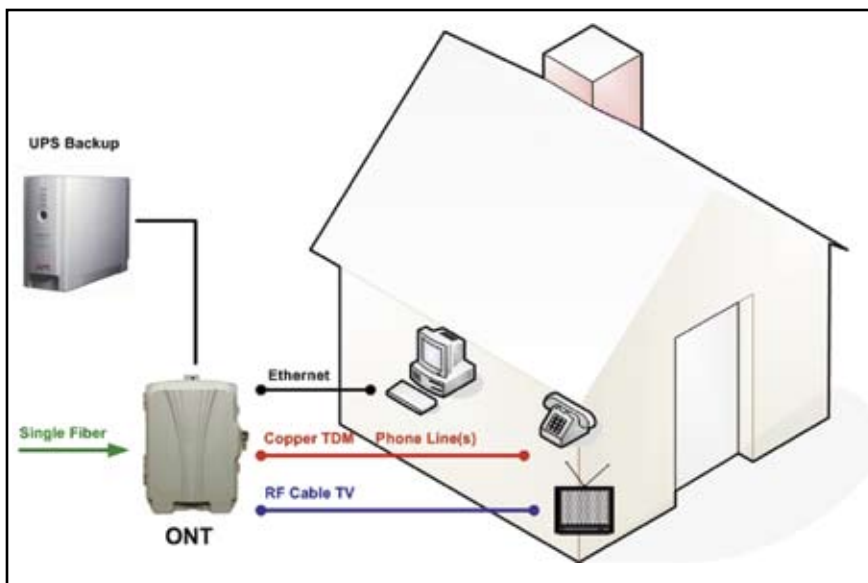


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Phone service from HBC is switched, not VoIP, although users can dedicate some Internet bandwidth for a third-party VoIP provider. Almost all choose the HBC bundle.

Winona was chosen in 2001 by Cerner Corp. of Kansas City as the alpha site for development of an on-line health initiative that now connects Winona-area consumers and providers for meaningful exchanges of information, in addition to more routine processes such as making appointments and ordering medications on-line.

The project was implemented as a partnership between Cerner, HBC, and Winona Health, the community's health care system.

Cerner, the world's leading clinical healthcare information technology company, chose Winona because it was the community that Cerner chairman of the board, chief executive officer and co-founder Neal L. Patterson believed didn't exist. As he searched for a test community, he found lots of them with suitable demographics...but none with the broadband network he knew would be necessary to traffic the high volume of data that would be essential to a useful and meaningful on-line program,

He made contact with the health system CEO the day he heard about Winona from a consultant who worked with Winona Health, visited the city one week later with an entourage of executives, and approved the partnership before leaving four hours after his arrival.

Better Health

Today, Winona Health is one of the first systems in the nation to implement a full electronic patient medical record. It is now pioneering automated physician order entry and has been named to the "America's Most Wired" health sys-

tems list for five consecutive years.

As residents of Winona, St. Charles, and Wabasha work more and more from home, stay in touch with families around the world, videoconference using their home computers, bank and shop on line, they rarely think about the significant advantage competition has brought.

But residents of nearby Rochester, Minn., and La Crosse, Wis., certainly know. They pay more than double the rates of their neighbors for broadband connectivity. Each of the HBC communities can also boast of a new broadband business and additional employment.

That is because Hiawatha's commitment is to operate offices and employ local staff members in each of the communities it serves. All of the decisions mean that the early vision to connect the dots has brought significant competitive advantages to the southeastern Minnesota communities served by HBC. **BBP**

About the Author

By Gary Evans is now president of Hiawatha Broadband Communications, www.HBCI.com.

Vendors

1990's Builds, Hybrid Fiber-Coax

Motorola, and Pace, set-top boxes www.motorola.com, www.pacemso.com

Scientific Atlanta's interdiction system (later acquired by Blonder Tongue) to control video content changes www.blondertongue.com

Technology Planners, Fond du Lac, Wisconsin, network and headend www.techplanners.com

Phone Services, 2002

Siemens Class 5 EWSD switch www.siemens.com

Arris Cornerstone TDM platform www.arris.com

FTTH Network, Wabasha, 2006

Calix for electronics and system design www.calix.com

Corning for fiber infrastructure www.corning.com