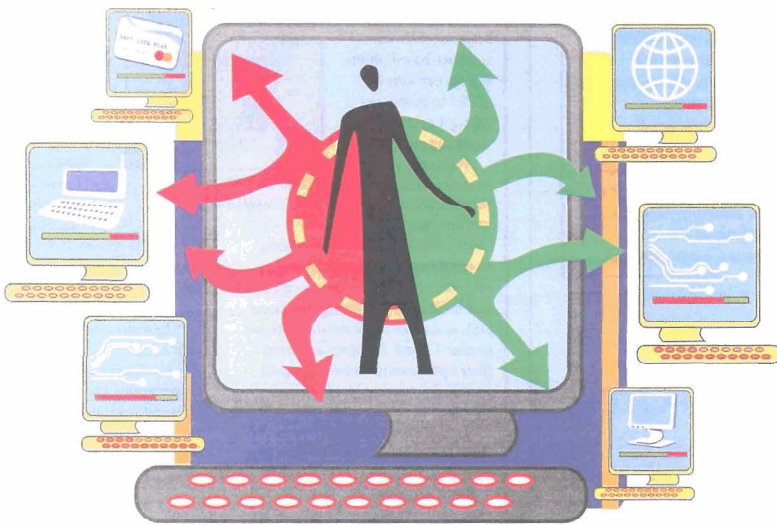


The Future of Bandwidth

With demand surging for fast Internet connections, businesses will need bigger, better bandwidth.



by Suzy Frisch

Consumers and businesses are devouring bandwidth at a torrid pace. They're using the Web to talk on the phone, access software over the Internet, and download increasingly large files such as high-definition videos.

Marc Agar, CEO of CA Communications, Inc., a Wayzata-based telecommunications consulting firm, tells his business clients that they're going to need more and more bandwidth using different types of technology.

"If you don't have a fast connection, you might be losing revenue and customers because you can't provide the right applications," he says.

The escalating need for bandwidth is readily apparent at Qwest Communications. The provider has seen "explosive growth" as client traffic on its networks doubles every 15 months, says Qwest Minnesota's President John Stanoch. This prompted Qwest to invest \$300 million in its fiber optic system, which will boost speeds for two million business and residential digital subscriber line (DSL) customers in 23 of its top markets.

So far, technology providers have kept up with demand for bandwidth. But what about the future? It's an issue now under discussion among members of the new Ultra High-Speed Broadband Task Force, a group comprised of providers, business customers, government representatives, consumers, and others. The Minnesota Legislature passed a bill this spring to create the task force, which will evaluate Minnesota's broadband infrastructure, identify a level of service and connection speed that will be needed by 2015, and estimate costs for meeting these goals.

Concerned that broadband speeds in Minnesota and the United States overall are falling behind the rest of the world, State Representative Sandra Masin (DFL-Eagan) sponsored the bill. She cites a recent report by the Organization for Economic Cooperation and Development that ranks the U.S. 15th worldwide for broadband usage for the second year in a row.

"We are competing with the rest of the world, and there are countries that are way ahead of what the United States has right now," Masin says. "It's important to the economy of our state that we have affordable, accessible technology. We might not need the ultra-high speeds right now, but sooner or later, we'll be way outpaced."

For now, though, telecommunications experts note that **there are ways for businesses to get more out of their existing bandwidth.** Many companies have

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started using multi-protocol label switching (MPLS) to prioritize their voice, video, and data service over one network, says Nita Singh, president and CEO of American Business Communication, Inc., an independent telecommunications management firm in Maple Grove.

For instance, if a company's most important applications are customer relationship management (CRM) tools, anyone using CRM would have priority access to the fastest connections. Or a business with an Internet-based phone system can employ MPLS to make sure calls get priority over watching videos.

When a company requires additional bandwidth, there are multiple ways to install more robust Internet connections to satisfy present and future needs. Providers already are dropping prices and increasing availability for faster DSL and cable modem connections, beefier T1 and T3 pipes, and even fiber optic connections—the gold standard—to meet burgeoning demand.

This means most consumers and small businesses should be able to get by with DSL and cable modem technology in the near future. Comcast now offers 50 megabit cable modem connections for \$150 a month, allowing users to download 50 megabits of data per second. That is 50 times faster than a T1 connection of 1.5 megabits, which used to be too expensive for many small companies at \$300 a month. Agar says two years ago, T1 connections were \$700 a month, one year ago they were \$450, and now they're \$325 to \$400.

Companies can now get six megabits of bandwidth using four T1 lines that terminate into one router, or 10 megabits by running seven T1 lines into a media converter, says Todd Meester, general manager of XO Communications, a full-service

telecommunications provider for businesses in Minneapolis. "Separate T1s create a bottleneck in a customer's network," Meester says.

Supersized Bandwidth

Businesses are gravitating toward another new technology that offers more bandwidth for less money. Ethernet over copper has started serving as a viable alternative to T1 lines, offering 20 to 40 megabit speeds for 25 percent less. The savings comes from eliminating the T1 loop charges—costs associated with running wire from the provider's office to the customer's location that can run \$200 to \$250 a month per line.

XO Communications and Qwest are offering considerable bandwidth by using ethernet over copper. "If you don't need fiber yet, or you're in a location where there is no fiber, this is the next best option for handling bandwidth," Agar says.

There are a few cons to ethernet over copper. It's available in only a few locations outside of downtown Minneapolis and St. Paul. And if a business is located too far from a provider's central office, it might not be able to get the service. But these problems will be solved in the next few years as providers expand their services, Meester says.

When businesses' bandwidth needs grow beyond a T1 or bonded T1s, they can move onto T3 connections, which equal 28 T1 lines, and offer 45 megabit speeds. Eventually, though, a company that needs multiple T3s should look into switching to fiber optic service because it can be more efficient and less expensive, Agar says. **Fiber provides super-fast speeds** that allow businesses to download 155 megabits to 2.5 gigabits of data in seconds, depending on the size of the fiber optic pipe. Businesses such as graphic design firms, advertising agencies, and doctors' offices (transmitting X-ray files)



TODD MEESTER,
XO COMMUNICATIONS

use fiber optic service to move large files back and forth quickly.

The downside of fiber is the expense of connecting to an existing network if a company's office building does not offer it. Going even a half mile out to connect to a fiber network can cost \$25 to \$30 a foot and will run a company \$250,000 to \$300,000 in total, Meester says.

Broadband on the Go

For many businesses, employees need hearty bandwidth for their wireless devices to work efficiently and productively off-site. Currently most wireless providers are switching from analog networks to digital third-generation (3G) networks. These 3G networks can handle bigger chunks of data at faster speeds and offer more reliable voice service. Sprint and Verizon operate solely on 3G networks, while AT&T is currently expanding its 3G offerings across the United States.

Simultaneously, some businesses and cities have adopted wireless-fidelity (wi-fi) technology to offer mobile Internet access. By installing equipment in a fixed location, they create wireless "hot spots" such as those within the city of Minneapolis. But many users are displeased with wi-fi's range, speed, tendency toward interference, and lack of security.

These days, providers are working on the next next-generation technology to meet future needs for wireless bandwidth. Picking up where wi-fi leaves off is WiMax, a broadband wireless technology also known as 4G. Eventually WiMax will offer a broader geographical range of service at faster speeds than 3G and wi-fi.

Users will install WiMax chipsets in their cell phones, laptops, PDAs, or other electronics equipment, providing access to wireless multimedia applications, from live videoconferencing to high-definition movies.

Downloading speeds are two to four megabits per second for 4G, compared to 450 to 700 kilobits for 3G.

"WiMax speeds will be as fast as a screaming monkey," says Robin Carlton, director of client services and business development at American Business Communication.

WiMax service isn't available locally, yet. And Carlton cautions that it's not quite ready for business use—there are still too many unanswered questions about security and integrating WiMax with companies' enterprise systems. But it will come in the next few years.

So far, there are two major camps of companies teaming to deploy WiMax.

Sprint recently merged its WiMax business with Clearwire Corporation. The new entity, named Clearwire, is launching a nationwide WiMax network, attracting substantial investments from Intel, Google, Comcast, Time Warner Cable, and Bright House Networks.

David Diers, region vice president of advanced services at Comcast, says, "This will be broadband on the go. We'll be able to offer much faster speeds for people to watch live video on their cell phone or laptop."

Qwest announced this spring that it is aligning with Verizon to sell its wireless services to Qwest customers. Stanoch says that may include WiMax in the future; Qwest is currently monitoring and testing WiMax to prepare for when it is more reliable and scalable.

In general, companies shouldn't worry if there will be enough fast and affordable bandwidth to meet their needs. Diers adds: "We'll continually upgrade our network and provide faster speed."

Suzy Frisch is a freelance writer living in Apple Valley.



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