

# The Broadband Militia

*A new breed of underground Internet entrepreneurs could end the recession. If only Washington would let them.*

BY MICHAEL BEHAR

ON A RECENT CRISP SUNNY DAY IN Manhattan, I strolled up to a faded wrought-iron bench in Tompkins Square Park, flipped open my new Sony Vaio laptop, and as I sipped a cappuccino, began downloading my email. While new messages zipped into my PC at speeds many times faster than a dial-up connection, I scanned the day's headlines on CNN.com, then clicked over to E\*Trade to eye the market. In a handful of New York City's parks, coffeehouses, and other public areas, many are doing the same: getting online, surfing the Web, and checking email. And, like me, they're doing it wirelessly. What's more, they're avoiding the aggravations typically associated with getting high-speed Internet: no more waiting months for DSL providers to switch on service or for cable providers to upgrade your building. Wireless broadband is happening now, and best of all, it's free.

Sound too good to be true? It isn't. A few blocks away, someone is paying for our broadband access (the catchall term for high-speed, high-capacity Internet). A typical broadband connection pipes so much bandwidth into a customer's home—more than any one person really needs—that my benefactor is happy to share the excess with whomever cares to use it. He does this by beaming his standard DSL broadband signal through a “wireless base-station,” a device about the size of a paper-

back novel with a stubby black antenna. Base stations are designed to send a broadband signal a few hundred feet, which would allow you to receive a wireless Internet connection in most of the rooms in your home. Recently, however, a growing number of broadband customers have discovered that they can boost the range of wireless signals several miles with homemade antennas fashioned from no more than an empty Pringles potato-chip can, or scraps of metal, wire, and tinfoil. Yet what started as a clever technique to share bandwidth with friends and neighbors has grown into a national grassroots movement called Free Wireless. Today, legions of tech-savvy hobbyists have formed what amounts to a “broadband militia” and they are spreading something that many people these days want but still can't get: cheap, fast access to the Internet.

Broadband isn't merely a neat high-tech option, like a CD burner, but a potentially transformative technology with the power to jumpstart the American economy. The stock market boom of the late 1990s was fueled in large part by the promise of a dazzling array of new applications that broadband would enable—everything from seamless video-conferencing and downloading movies-on-demand to online doctors' visits and court appearances. One reason tech stocks were bid up so high is that many of these applications were ready to be deployed and needed only universal broadband to do so, something everyone figured was imminent. Only it wasn't. Today, 90 percent of American households still don't have broadband (fewer than 10 million people do). Many believe that

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the key to ending the recession is spreading broadband to all those potential customers, which would give high-tech companies a delivery mechanism for their products and allow these new industries to take off.

Unfortunately, exactly the opposite is happening. After rising steadily for the last five years, the number of new broadband users has slowed. The good news is that the necessary foundation for universal broadband has already been put in place. In the last decade, investors spent \$90 billion laying the fiber-optic cable networks that became the “backbone” which would bring broadband to the masses. The bad news is that today, 97 percent of it sits unused. That’s because the telecommunications industry hasn’t been able to bridge the gap between this fiber-optic backbone and people’s homes at a price that the public is willing to pay. In fact, while the price of most technology falls, the price local phone companies charge for broadband is going up. Those price hikes are the natural result of the phone companies’ monopoly, which has allowed them to squeeze out small competing Internet service providers, or ISPs (see “Disconnect,” October 2001).

The cost and hassle of providing broadband to the residences and businesses of people who want it has become too big an obstacle. In order to get most forms of broadband from the backbone to your home, Baby Bells and cable companies have to upgrade their networking gear, swapping out older technology for equipment that can handle data traveling in two directions. And in neighborhoods that lack decent landlines it means laying wire from this new backbone to each individual customer at an expense of about \$1,500 per home—a fee few Internet users are willing to pay. For broadband providers to foot the bill, they’d have to invest another \$100 to \$300 billion in infrastructure costs—impossible in today’s depressed tech market and a sobering realization that’s triggered an abrupt halt to broadband expansion. As ISPs go under, consumers are left with few choices for faster Internet service.

Fortunately, the recession is finally forcing Washington to pay attention. The Bush administration says that broadband expansion is a top economic priority. It assembled a high-level “tech-team” that has met dozens of times with executives and lobbyists to discuss broadband. In January, Senate Majority Leader Tom Daschle (D-S.D.) included universal broadband access in the Democrats’ economic-revival plan. Broadband got a further push a week later when the technology industry launched a major lobbying effort to establish a national goal of creating 100 million new broadband customers by 2010. As *The Washington Post* put it recently, “broadband is a new battle cry in Washington.”

But there’s a problem: There are many ways to deliver broadband to users, but Washington only hears about the ones touted by well-funded lobbyists for the phone, cable, and satellite companies, all of which are competing fiercely to become the preferred broadband technology and control and profit from the mass dissemination that everyone agrees will one day come about. None of these options, however, has a prayer of getting broadband to the masses quickly and cheaply. Worse, the big Internet providers are asking the Bush administration for vast tax breaks, subsidies, and regulatory favors to help them. The truth is that there’s only one way to spread broadband cheaply and quickly: wirelessly. But that’s the one method not being seriously discussed in Washington.

### **Broadband Through a Pringles Can**

The idea of wireless networking is not all that new. Long before Free Wireless emerged, several breeds of wireless technology had attained consumer success. Remember the HAMM radio craze in the 1970s? Or how about infrared direct access, also known as IrDA? In the early 1990s, most computers and laptops came equipped with IrDA, which allows you to transfer data between machines. (Got a Palm Pilot? Many PDAs use it to beam messages between handheld devices.) The broadband offered through Free Wireless operates similarly, on a small chunk of unlicensed spectrum the FCC set aside in 1993, which goes by the clunky name of “802.11b.” Originally, 802.11b—also called “wireless fidelity” or WiFi—was designed for home networking, allowing you to simultaneously link several computers to a single Internet connection. Place a base station in your den, connect it to your modem, and it will generate a wireless network throughout your home—sort of like a baby monitor.

When technology designed to utilize 802.11b arrived, the idea once again was to use it as a low-cost, in-home wireless network. For about \$300, you can buy Apple’s Airport Base Station, which will beam a signal to any nearby computer equipped with a \$100 Airport card. The pitch for Airport and similar devices is that mom, dad, brother, and sister can all surf the net simultaneously. On a standard, 56K dial-up connection, that’s about all it’s good for; there isn’t much extra bandwidth to siphon off for additional users. But as the number of folks with DSL, cable modems, and T-1 broadband connections grew, the extra bandwidth meant they could now share their super-fast Internet connection with dozens of other users without any noticeable loss in speed. Since 802.11b works through walls, around corners, is rarely corrupted by interference, and can, with a makeshift antenna,



have its range extended thousands of feet beyond the base station, hackers quickly realized there was no reason to limit the signal to their home or office.

By the middle of 1999, Free Wireless pioneers had discovered how to boost and retransmit their broadband signal up to several miles beyond their base stations. That meant a single user could pay an Internet service provider for a DSL, cable, or T1 connection, then broadcast access to it to everyone in their building or, in rural areas, to neighbors miles away. Today, city blocks once doomed to temperamental AOL dial-up connections are enjoying lightning-fast 802.11b-powered networks. While lawmakers bicker over how to spread broadband, engineers, computer scientists, and various geeks and hobbyists the world over are one step ahead, setting up wireless broadband networks in at least 25 cities, including New York, San Francisco, Boston, and Denver, as well as in remote regions of Alaska and Maine. It's also popping up in South America, Europe, Asia, Australia, and Canada.

### **The Do-It-Yourself Economic Stimulus Package**

One thing that everyone can agree on is that broadband spurs innovation. To understand how, look no further than your local college campus. Colleges and universities were some of the first places wired for broadband access. In the late '90s, at Northeastern University in Boston, a freshman named Shawn Fanning decided to take advantage of the bandwidth at his disposal and created a program to trade electronic music files with friends. The result was Napster, which launched a revolution in how the Internet is used. It's no coincidence that many of Napster's heaviest users were college kids with broadband access; Napster created such high demand that many schools banned students from swapping music files because their servers were overwhelmed.

It's this kind of innovation and subsequent demand that has business types so eager to spread broadband. While lobbyists and telecom conglomerates arm wrestle over ownership and policy decisions, Free Wireless is demonstrating why the excitement over broadband is justified. "I find that nearly everyone I tell about it comes up with some new idea, application, or use of the technology," says Anthony Townsend, a co-founder of NYC Wireless, one of the nation's largest and fastest-growing Free Wireless networks. "We have had artists who want

to use 802.11b for interactive sculptures, community activists who want to use it to bridge the digital divide in poor neighborhoods and public housing projects, and many other ideas we would have never thought of alone." Within days of the attack on the World Trade Center, when phone lines and cables were severed, NYC Wireless members established an ad hoc high-speed network

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at Ground Zero, linking rescue workers and survivors to the outside world.

Beyond coffeehouses and parks, the Free Wireless movement has been critical in bestowing broadband on regions where geography renders landline Internet access impossible. In Owl's Head, Maine, for instance, Jason Philbrook, founder of Midcoast Internet Solutions, employs a version of this technology to beam wireless Internet access to some of the most remote regions of his state. Midcoast charges for its service, placing it just outside the definition of Free Wireless. But it demonstrates the amazing possibilities for wireless broadband in areas where traditional ISPs would be loathe to invest.

More ambitious plans are also afoot for 802.11b. The Swedish company SAS has announced its intention to use 802.11b on Boeing 737 commercial airliners to give passengers in-flight wireless Internet access. Delphi is equipping cars with 802.11b-compatible dashboard entertainment centers. In January, at the International Consumer Electronics Show in Las Vegas, Delphi demonstrated 802.11b-ready cars that can download music wirelessly from a home network to an MP3-compatible audio deck, which will let you load up your car stereo with MP3 tunes for a long road trip or even trade songs wirelessly with other cars during a traffic jam. The possible business applications for wireless broadband are practically limitless, something the Free Wireless movement is helping to demonstrate.

### **Stealing Cable or Selling Cookies?**

There is considerable dispute within the Free Wireless movement over who, if anyone, should pay for Internet access. Many Free Wireless pioneers envision a return to the utopian ideals that marked the early days of the Internet: an organic, dynamic system that would bind communities with free, unregulated access. One such



person is Drew Ulricksen, who last year founded the Free Wireless advocacy group, Wireless Anarchy. "The beauty of WiFi," says Ulricksen, "is that with this technology we don't need to pay anyone for last mile access—we can do it ourselves." Ulricksen's views are balanced by those of a more realistic camp that champions the idea of wireless broadband, but recognizes that, if there's ever going to be a broadband revolution,

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somebody has to pick up the tab.

A few of the more entrepreneurially minded have begun collecting money for the service. Sean Berry, a Unix systems engineer in Menlo Park, Calif., pays about \$80 a month for his DSL service, which he beams to friends and neighbors who chip in to cover the monthly fee. Berry's collective points toward an innovative business model, since the cost to each user is a fraction of what they'd otherwise pay.

The debate between the "free" and "fee" camps is a friendly one. Less cordial is the growing dispute between small entrepreneurs and the telecom companies who are becoming increasingly upset that their broadband is being resold. So far, this hasn't been much of a problem, since the Free Wireless movement is so small that most ISPs haven't explicitly forbid them. "It's largely off their radar map," says Townsend, of NYC Wireless. But that won't be true for much longer. Andrew Johnson, a spokesman for AT&T, likens the actions of entrepreneurs such as Berry to cable theft and threatens to disconnect any customer caught sharing their connection. In fact, AT&T has begun to conduct regular neighborhood fly-overs in search of rogue signals being transmitted from its customers. But AT&T can't catch everyone, particularly in urban areas where an 802.11b signal gets lost in the sea of radio waves created by other wireless devices. So for now, Free Wireless is proliferating.

But the battle over broadband raises the important question of whether bandwidth is a commodity. Small entrepreneurs think it is. After all, they reason, can a flour company demand a cut of the profits from cookies you sell at a bake sale just because you baked them with their flour? Absurd as this question might seem, the Free Wireless movement is forcing ISPs and telecom

companies to define the exact legal limits of bandwidth allocation. That, in essence, is the problem with Free Wireless: It's at the mercy of the Baby Bells and cable companies, which, once the movement reaches critical mass, will crack down hard when they discover they're losing market share to a bunch of hackers.

Many of these do-it-yourself broadband networkers pride themselves on scrupulous adherence to the law,

pointing out that the contracts they sign with ISPs to get their broadband connections don't prohibit them from reselling some of their bandwidth. People like Dewayne Hen-

dricks, a wireless network developer who runs a company called the Dandin Group, pays \$925 a month for his T-1 connection, which, he says, "gives me the right to act as my own ISP and redistribute bandwidth [wirelessly] without restrictions." In turn, he is spreading broadband to neighborhoods where cable or DSL providers can't or won't service, such as the wireless network he recently began building for the Turtle Mountain Chippewa Reservation in Belcourt, N.D.

Along with his partner Matt Peterson, Tim Pozar, the co-founder of the Bay Area Wireless Users Group, was among the first to help communities set up 802.11b networks. "We want to educate people on how to create 802.11b networks that adhere to the FCC rules and regulations on how you can use this portion of unlicensed bandwidth," he explains. "We're encouraging people to build mom-and-pop [wireless networks] and a lot of people are going out there and doing it." Indeed, hundreds of Bay Area networks have already been built on this model. It would be tough to argue with Pozar's prescription for spreading broadband were it not for the sticky issue of legality: One problem with Free Wireless which Hendricks points out is that FCC regulations forbid the kind of souped-up base stations that beam wireless broadband signals to entire neighborhoods. It's true that the Free Wireless folks can spread broadband more quickly and easily than a traditional ISP, but at the same time they operate in a legal gray area—a fact that may eventually lead to their demise.

### Phone Companies Killed the Tech Boom

Killing the Free Wireless movement in its infancy would be tragic, because the alternatives for spreading broadband are fraught with problems. Not only



are the cable, phone, and satellite companies many years and billions of dollars away from creating universal broadband, but if small entrepreneurs disappear, so will customer choice: whichever of the major providers controls broadband also influences what its subscribers see and do online. In much the same way that Microsoft dominates the browser market, it's conceivable that a phone company such as Verizon could cut deals with certain news and shopping sites, then instruct its network to steer unwitting customers toward its content partners. By controlling the broadband gateway, it could even go so far as to ensure that non-partner pages download slower than preferred portals to encourage—or force—users to stay within the Verizon “family.”

At a time when Washington is flummoxed over how to spread broadband and spur the next economic boom, the Free Wireless movement is pointing the way toward a cheaper, faster way to bring broadband to the masses. The trouble is, cutting-edge entrepreneurs like Hendricks and Berry have no real presence in Washington, which is where the future of broadband will soon be decided. Right now, the debate is shaping up as a battle between the Baby Bells, cable companies, and the big wireless phone companies, all of whom have hired lobbyists and are jockeying to guide federal subsidies and regulatory advantages their way in a bid to claim for themselves this vast potential market (if you live in Washington, surely you too have been bombarded will all the television commercials for and against broadband legislation). But it will take big industry years and billions of dollars to deliver universal broadband through their preferred means.

Washington lawmakers need to create a regulatory environment in which small entrepreneurs can flourish. The first step is to clear up the law so that broadband entrepreneurs are free to resell broadband to customers quickly and affordably. AT&T may flinch over this, but NYC Wireless's Townsend makes the point that “big ISPs will come to see us as a good thing—we're building demand for broadband by demonstrating its possibilities.” The vast majority of Americans could receive some form of broadband, but due to price and hassle, so far have elected not to. Low-cost wireless community networks could change this, giving customers an easy way to get online, sparking demand for broadband applications and kicking the economy into high gear.

None of this can happen until the FCC frees up more unlicensed spectrum. While 802.11b has proven its potential for enabling cheap wireless networking, the downside is that it can only handle a limited amount of users before interference becomes a problem. Fortu-

nately, there is plenty of available spectrum that could fill this need—the catch is that it's controlled by powerful businesses which got their spectrum years ago and aren't permitted to sell it. Television broadcasters are the best case in point: Several years ago, the government allotted them, at no cost, new spectrum for high-definition television, which looked at the time to be the next stage in broadcast technology. But that idea fizzled. Digital television is instead being deployed at a rapid clip through cable. It's time to take that spectrum back.

### Try Before You Buy

Unfortunately, the Bush administration looks to be on the brink of doing exactly the wrong thing: giving Baby Bells and cable operators complete and exclusive control of their lines, effectively shutting out competition. The Baby Bells have already shown their eagerness to deny access to independent ISPs, driving many out of business. Surely, they would move just as swiftly to deny small broadband entrepreneurs the right to re-sell their signal if doing so meant sacrificing potential customers.

Throughout American history, our economy has thrived when individual entrepreneurs led the way—from homesteaders in the 19th century to the 1970s garage-geeks who founded some of today's biggest Silicon Valley tech companies. New wireless technologies could enable legions of small broadband entrepreneurs to deliver high-speed wireless Internet to tens of thousands of Americans at lower prices. Once online, these new broadband users will not only unleash long-awaited features like movies-on-demand and videoconferencing, but also set the stage for more Napster-like innovation from smaller entrepreneurs. (Ninety percent of small businesses lack broadband.)

Today, the closest thing to anytime-anywhere wireless broadband service is provided by a company called Boingo, which is garnering heaps of praise from the tech press and early adopters like me. Boingo sells “sniffer” software that hunts for 802.11b networks in the vicinity of your laptop, wherever it may happen to be. Next month, I'm travelling to San Jose and then to Seattle—both cities covered under the Boingo umbrella. While on the road, I'll be able to flip open my laptop and get fast, wireless broadband service. And I don't even need a Pringles can.

Lawmakers debating the future of broadband should take note: Before you side with big industry and sabotage free wireless, give this service a shot and discover the future of broadband yourself. Thousands of voters already have. Millions more are bound to be impressed with whomever recognizes this hidden key to fixing the economy.